



# **SITRAK G7S Series Vehicles (Exported)**

## **Driver's Manual**

### **(4th Version)**

**SINOTRUK Jinan Commercial Vehicle Co., Ltd.**





This Manual introduces information about the operation, maintenance, and other aspects of the SITRAK G7S series (exported).

Please read this Manual carefully before driving the vehicle for the first time. During the operation and maintenance of the vehicle, please strictly abide by the provisions of this Manual.

Due to the numerous models, the vehicle images in this Manual are for illustration purposes only and may not completely match the vehicle model you have purchased. The Company reserves the right to make product changes at any time without prior notice. If there is a conflict between the technical data mentioned in this Manual and the announced parameters, the latter shall prevail.

This Manual and the Warranty Manual are integral parts of the vehicle. Please carry them with the vehicle.

The warning symbols used in this Manual are specified as follows:



**Danger:** Involving risks to personal and vehicle safety. Non-compliance may result in death or serious injury to individuals, or the vehicle being scrapped or severely damaged.



**Warning:** Involving risks to personal and vehicle safety. Non-compliance may result in injury to individuals and damage to the vehicle.



**Caution:** Suggestive additional descriptive information.

**China National Heavy Duty Truck Group Co., Ltd.**

**2025.12**

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### **WARNING!**

- The vehicle should use the oil specified in this Manual, and go to a Sinotruk service station for the replacement of oil, and filter elements, as well as first maintenance and scheduled maintenance. Otherwise, if the vehicle is damaged, SINOTRUK will only provide paid services!
- The setting of the driver assistance system depends on the system configuration of the original vehicle, including but not limited to major assemblies such as engines, transmissions, retarders, brake systems, and electrical systems. Users are not allowed to modify the original vehicle, including but not limited to changing the original vehicle assembly and superstructure modification. Otherwise, the performance of the vehicle will be seriously affected, resulting in serious consequences, for which SINOTRUK only provides paid service!
- Genuine SINOTRUK air filters, diesel filters, oil filters, and other filtration components should be used to ensure the cleanliness of engine intake, fuel, and oil. Otherwise, early engine wear may occur, leading to blockage and damage of the particulate filter in the aftertreatment system. Sinotruk will only provide paid services!
- Qualified diesel fuel that meets the GB 19147 standard should be used. Otherwise, the parts and components of the high-pressure common rail system, such as high-pressure oil pump and fuel injector will be damaged. The fuel injection unit may also be damaged, resulting in poisoning and failure of the aftertreatment oxidation catalyst, blockage and failure of the particulate filter, and excessive exhaust emissions!
- The exhaust gas temperature is high during active regeneration, so it is forbidden to carry out regeneration in flammable or explosive areas. During the regeneration process, the exhaust temperature is extremely high. It is strictly forbidden to approach the muffler, and it is strictly forbidden to stand or place items immediately downstream of the exhaust pipe outlet!
- AdBlue solution that meets the GB 29518 standard should be used, and the cleanliness inside the AdBlue tank should be ensured. Otherwise, the AdBlue pump and AdBlue nozzle will be blocked or even damaged, resulting in crystallization or even blockage of the selective catalytic reducer and excessive emissions!



### **WARNING!**



–For the damage of ECU, harness assembly, fuel injector harness, generator, starter, various sensors and other parts and components caused by the fault to cut off the power supply before electric appliance operation, incorrect cleaning of the engine or unauthorized adjustment and refitting of the engine electrical system, CNHTC only provides paid service!

–It is not allowed to install electrical equipment such as air conditioners, heaters, high-power appliances, and etc., For any damage to the electrical system caused by connection of electrical load at the electrical interface where the electrical load is not allowed as specified in the "Driver's Manual", or load exceeding the manufacturer's regulations even though the electrical load is connected at the correct interface, CNHTC only provides paid services!

# Vehicle identification

## Vehicle nameplate

The vehicle nameplate (① for tractor models, ② for dump and cargo trucks) is located on the co-driver's side door frame and is visible when the door is opened. The nameplate displays the vehicle model, key specifications, and engine model.

①	②
	
SINOTRUK Jinan Commercial Vehicle Co., Ltd. Manufactured by	SINOTRUK Jinan Commercial Vehicle Co., Ltd. Manufactured by
Brand <input type="text"/> Country of manufacture <input type="text"/> China	Brand <input type="text"/> Country of manufacture <input type="text"/> China
Vehicle model <input type="text"/>	Vehicle model <input type="text"/>
Vehicle identification number <input type="text"/>	Vehicle identification number <input type="text"/>
Engine model <input type="text"/>	Engine model <input type="text"/>
Rated power of engine <input type="text"/> kW	Rated power of engine <input type="text"/> kW
Maximum net power/speed of engine <input type="text"/> kW/ <input type="text"/> r/min	Maximum net power/speed of engine <input type="text"/> kW/ <input type="text"/> r/min
Vehicle curb weight <input type="text"/> kg	Vehicle curb weight <input type="text"/> kg
Maximum design static load of fifth wheel <input type="text"/> kg	Maximum authorized total mass <input type="text"/> kg
Maximum allowable towable mass <input type="text"/> kg	Maximum authorized towed mass <input type="text"/> kg
Manufacturing date <input type="text"/>	Manufacturing date <input type="text"/>

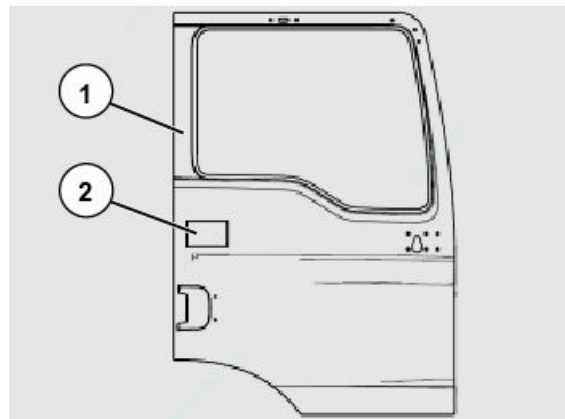
## Vehicle identification number (VIN)

VIN is engraved on the outer side of the right longitudinal beam web of the frame at the centerline of the front axle and on the vehicle nameplate.



### Vehicle Load Distribution Diagram

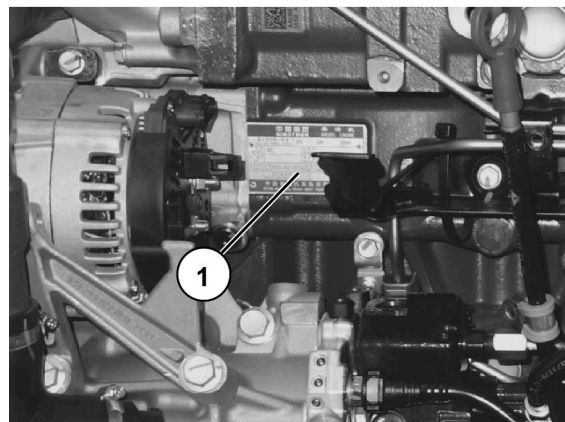
The vehicle load arrangement diagram ② is pasted on the right door ① of the cab.



### Engine nameplate

The nameplate ① of the MC11/MC13/MT13 engine is installed on the cylinder block, located on the engine intake side and at the rear end of the generator.

The information marked on the engine nameplate includes: engine model, rated power/speed, factory number, order number, emission standard, net mass, etc.

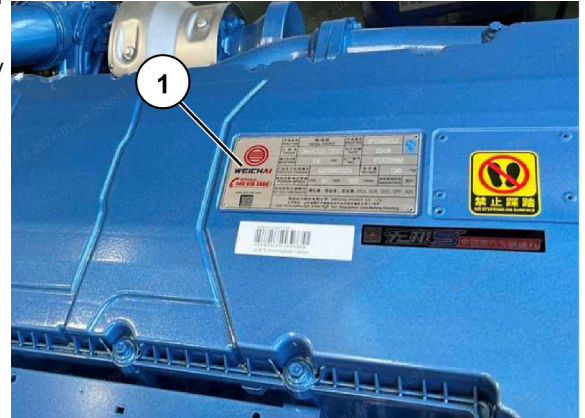


## Vehicle identification

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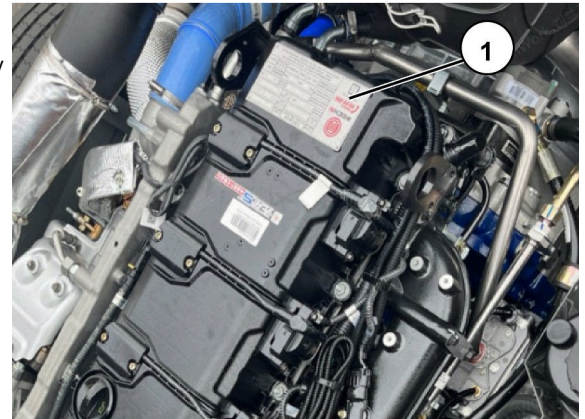
The Weichai WP15H engine nameplate (①) is located on the engine cylinder head cover.

Information marked on the engine nameplate: engine model, power, speed, factory number, net mass, etc.



The WP15NG engine nameplate (①) is mounted on the engine cylinder head cover.

Information marked on the engine nameplate: engine model, power, speed, factory number, net mass, etc.



The service life of vehicles of this series shall be in accordance with the international standard for compulsory scrapping of motor vehicles.

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# Chapter I Driver's Operations

## Door lock operation

### Door lock operation

#### Central control door lock (outside the vehicle)

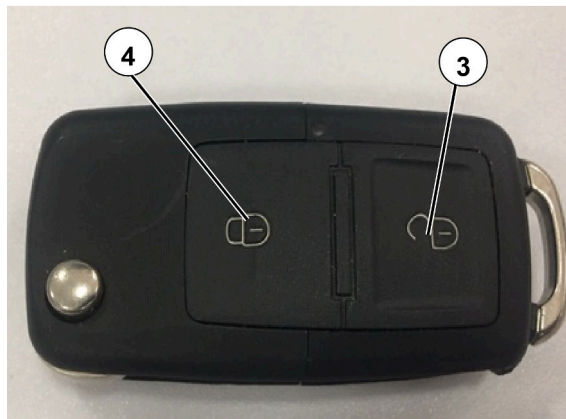
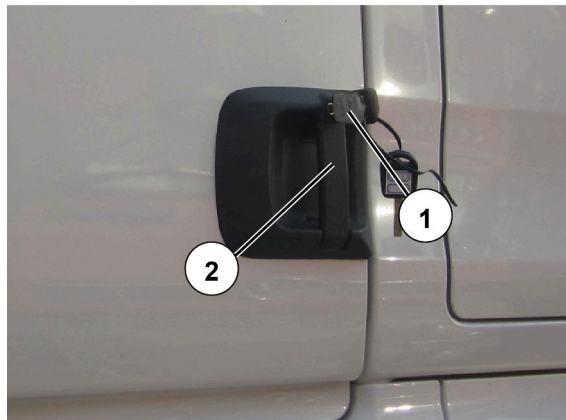


#### **WARNING!**

**Do not drive the vehicle before the door is closed properly.**

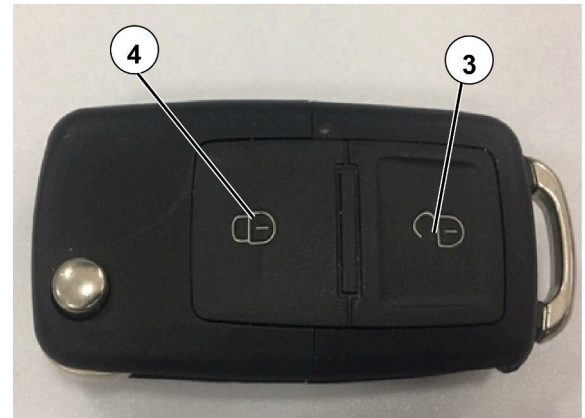
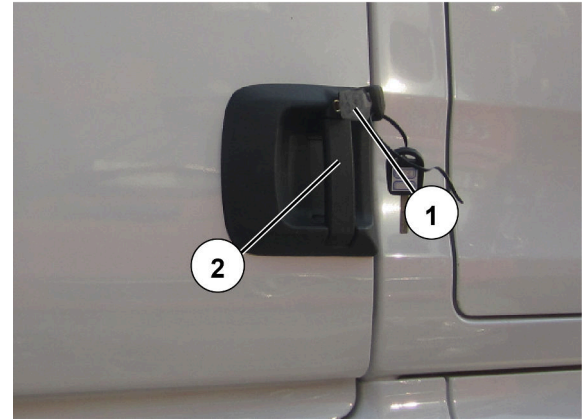
#### Open the door

- Method 1: Insert key ① into the lock cylinder and turn counterclockwise (clockwise for the co-driver side) to unlock the door. Pull handle ② to open the door.
- Method 2: Use the remote key and press the unlock button ③ to unlock the driver's door first. Then press the unlock button again to unlock the remaining door locks. Pull handle ② and open the door.
- Method 3 (one-button start models): With the remote key within 1.5 meters of the door, press the switch on the exterior handle and pull handle ② to open the door.



### Lock the door

- Method 1: Close the door firmly. Insert key ① into the lock cylinder and turn clockwise (counterclockwise for the co-driver side) to lock the door.
- Method 2: Close the door firmly. Press the lock button ④ on the remote key to lock all doors.
- Method 3 (one-button start models): When leaving the vehicle with the remote key, press the switch on the exterior handle to lock the door.



## Door lock operation

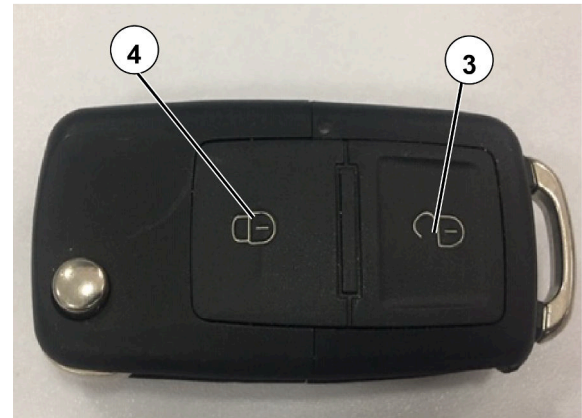
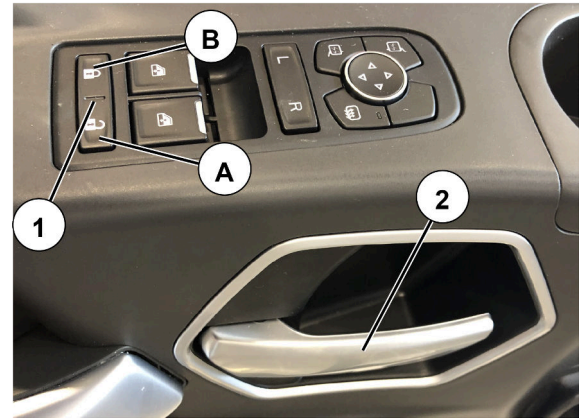
### Central control door lock (inside the vehicle)

#### Open the door

- Method 1: When locked, press the right side "A" of the rocker switch ①. Pull handle ② and push the door open. When unlocked, simply pull handle ② and push the door open.
- Method 2: Use the remote key and press the unlock button ③ to unlock the driver's door first. Then press the unlock button again to unlock the remaining doors. Pull handle ② and push the door open.

#### Lock the door

- Method 1: Close the door firmly. Press the left side "B" of the rocker switch ① to lock all doors.
- Method 2: Close the door firmly. Press the lock button ④ on the remote key to lock all doors.



### Key barcode

Depending on configuration, keys are either remote keys or standard keys. The plastic key tag contains the barcode required for cutting new keys (please keep this safe). This code can be used at a dealer to have new keys made.



## Power window operation

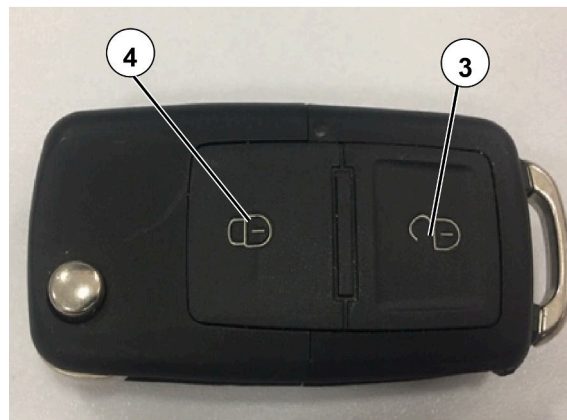
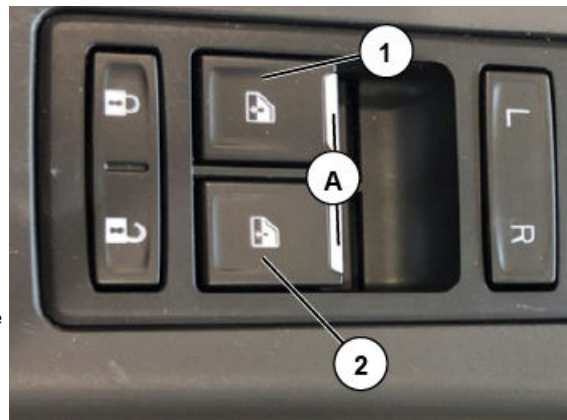
### Power window operation

#### Partially or completely open the window

- Power on the vehicle (for details on one-button start models, refer to the "PEPS system").
- Press the end "A" of the rocker switch ① (driver side) or ② (co-driver side).
  - If the pressing time is less than 1s, the window glass will automatically open continuously until the switch is released.
  - Press for more than 1 s for automatic full descent. During movement, press or lift the end "A" of rocker switch ① or ② again to stop the window.

When the vehicle is powered off (for details on one-button start models, refer to the "PEPS system"):

- Press and hold the remote key unlock button ③ for 2 s. After the doors unlock, the left and right windows will automatically open fully in sequence.
- During window operation, turning on the vehicle can interrupt window movement on both sides. Activating the driver's side rocker switch (① or ②) can stop window movement on that side, while activating the co-driver's side rocker switch will interrupt window movement for the corresponding door.





### Partially or completely close the window



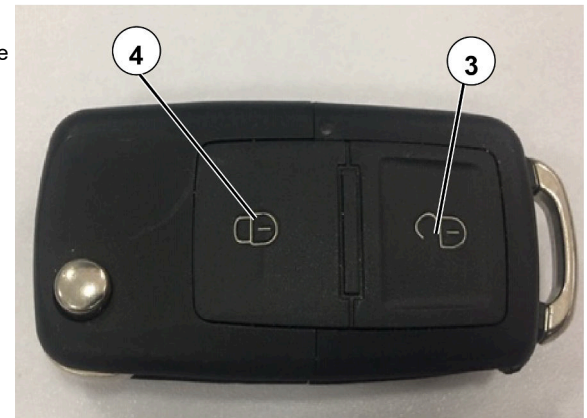
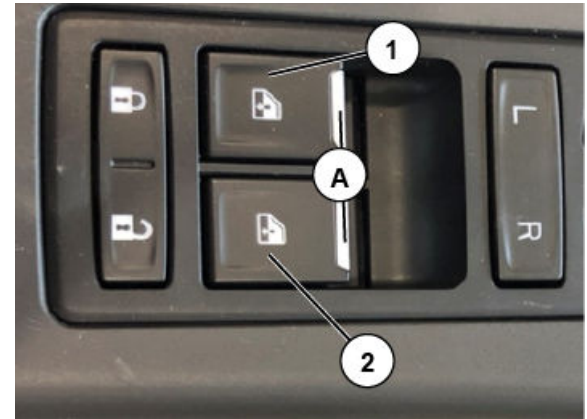
#### **WARNING!**

- Be careful not to get injured.
- Make sure no one is crushed when closing the window.
- In order to avoid overheat of the door lock motors resulting from frequent closing, opening of the door and window, the control system will provide protection for the door, window and door lock motors against overheating.

- Lift the end "A" of the rocker switch ① (driver side) or ② (co-driver side):
  - If the lifting time is less than 1 s, the window glass will automatically continue to rise until the switch is released.
  - Lift for more than 1 s for automatic full ascent. During movement, lift or press the end "A" of rocker switch ① or ② again to stop the window.

When the vehicle is powered off (for details on one-button start models, refer to the "PEPS system"):

- Press and hold the remote key lock button④ for 2 s. After the doors lock, the left and right windows will automatically close fully in sequence.



## Power window operation

---

### Power window (sleeper control switch)

Operate the rocker switch ⑤ (controls the right window) or ⑥ (controls the left window):

- Press or pull for less than 1 s to move the window glass up or down in short increments.
- Press or pull for more than 1 s for automatic operation. During movement, pressing or lifting again will interrupt the window movement.

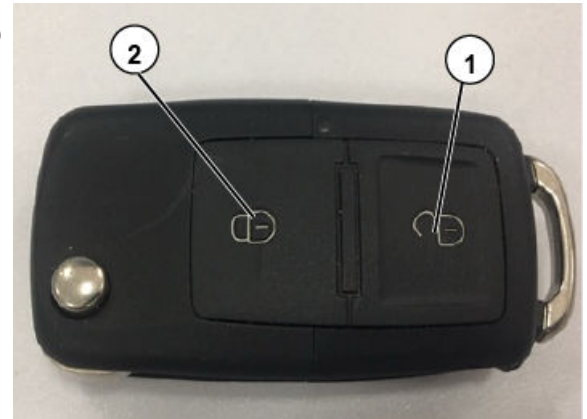


### Key remote control function

#### Self-inspection function of remote control light (non-one-button start model)

When turning on the power main switch:

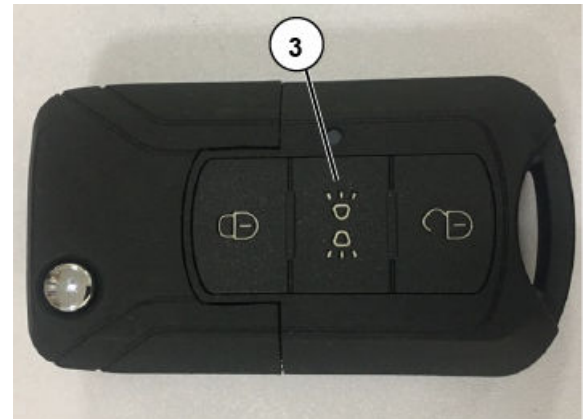
- Press the unlock ① and lock ② buttons of the remote control at the same time to start the light self-inspection function.
- When the light self-inspection time lasts for 60s, the unlock ① and lock ② buttons of the remote control are pressed at the same time again, or the vehicle is powered on, the light self-inspection function stops.



#### Self-inspection function of remote control light (one-button start model)

When the vehicle is powered off:

- Press the remote control key ③ button for  $\geq 2$ s to start the light self-inspection function.
- When the light self-inspection time lasts for 60s, the above light self-inspection command is received again or the vehicle is powered on, the light self-inspection function stops.



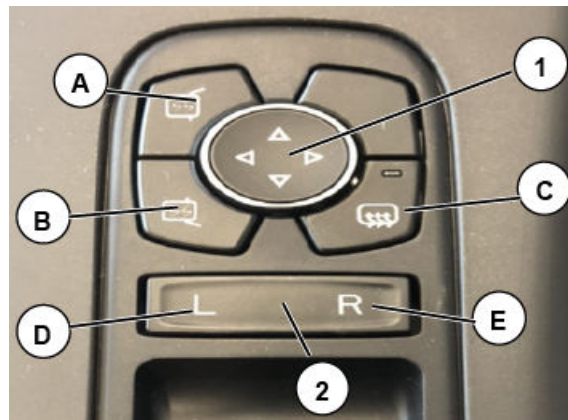
## Electric rear-view mirror adjustment

### Electric rear-view mirror adjustment



#### CAUTION!

- For the sake of safety, the rear-view mirror shall only be adjusted after the vehicle is parked.
- Ensure that the driver's seat is in a comfortable driving position.
- In order to prevent the motor from overheating due to frequent operation of the switch, the control system functions to protect the motor from overheating. The rear-view mirror will not respond to any operation command within 3 minutes after 10 starting and stopping operations of the rear-view mirror motor in 5s.



### Electric rear-view mirror adjustment

- The vehicle is powered on.
- Select the type (main rear-view mirror or wide angle mirror) of the mirror that needs to be adjusted with the button A/B.
- Select the mirror on the left and right sides with the rocker switch ②.
- Press the control button ① to adjust the mirror in different directions: front, back, left and right.



Switch on rear-view mirror heating device.



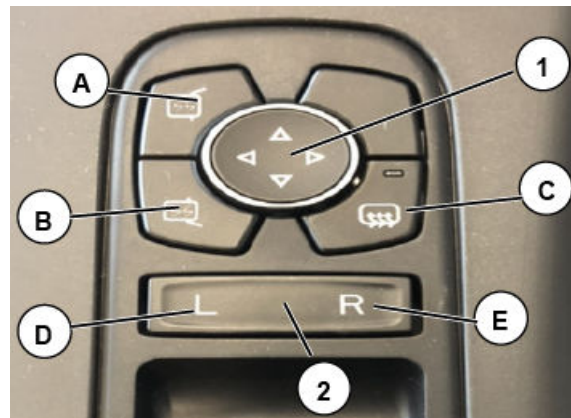
**CAUTION!**

- The rearview mirror heating device can only work when the vehicle is powered on.
- Turn on the rear-view mirror heating device when there is ice or frost on the rear-view mirror.
- If the voltage drops below 23V, the rearview mirror heater will fail. When the voltage returns to normal, the rearview mirror heater will not be automatically reactivated. To restore this function, the vehicle must be re-energized.

- The vehicle is powered on.
- Press the button C to turn on the rear-view mirror heating device, and the heating indicator lamp of the rocker switch will be on.

**Switch off the rear-view mirror heating device (in case of any of the following three circumstances, it shall switch off the rear-view mirror heating)**

- Press the button C when the rear-view mirror defroster is working.
- The rear-view mirror defroster is automatically turned off after working for 15 minutes.
- Power off of the vehicle.



## Front windshield

### Front windshield

#### Front windshield heating

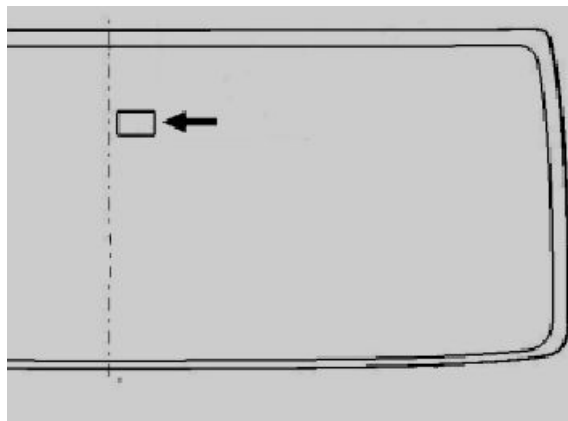
For the front windshield heating, refer to "Air Conditioning System".

Press the "MODE" button to select the defrosting mode, and press the defrost button to enter the front windshield heating mode. Press the defrost button again to exit the defrosting mode. ① is the air outlet.



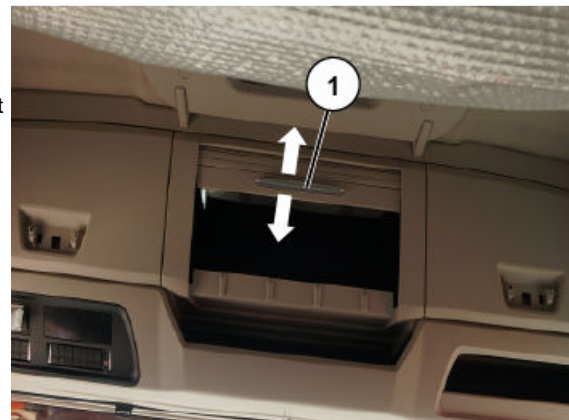
#### Microwave window

The microwave window (electronic identification of motor vehicles) shall be provided at the middle upper part of the front windshield, slightly on the right, and the position of the microwave window shall be such that the driver's field of vision is not blocked.



### Storage box

- The upper storage box can be used to store clothes and other on-board living items, but heavy items should be avoided.
- Hold the handle ① and push and pull it up and down to the uppermost and lowest positions.
- Turn the left and right handles to open the left and right box doors.



- Drawer ② can be used to place personal belongings.



## Storage box

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- When the on-board refrigerator is not optional, the drawer under the lower bunker can be used as a storage space for personal belongings.





## Toolbox

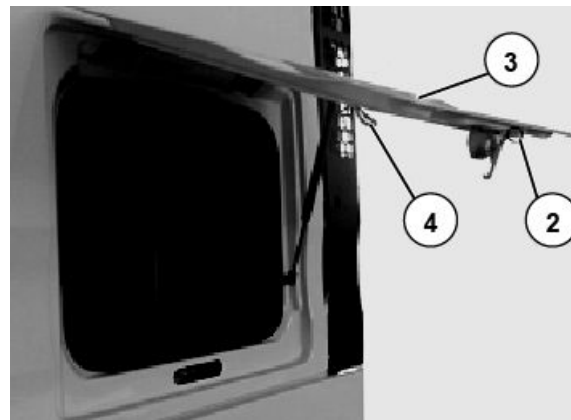
There is one toolbox on both sides of the cab.

### Opening of toolbox

- The opening handle ① for the toolbox is behind the seat. Pull the opening handle to open the toolbox.
- Push the buckle switch ② upward with a finger to open the toolbox cover ③. The cover can remain in the desired open position when it is turned for over approximately 20°.

### Closing of toolbox cover

- Pull down the pull strap ④, close the toolbox cover ③ and press it carefully to lock the toolbox.



## Instrument panel

---

### Instrument panel

- Driver side: Vehicle control and information display.



- Middle and co-driver side: item placement and storage area:  
Storage compartments and lockers meet the storage of various daily necessities; the cup holder is easy to use, and the ashtray is convenient for the driver and co-driver to use.



- Convenient and practical pull-out table on the co-driver side.



**CAUTION!**

- Do not use the table when the vehicle is running.
- The load on the small table shall not exceed 3kg.

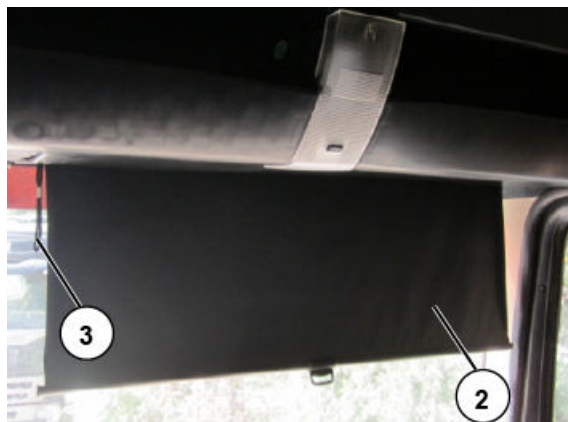
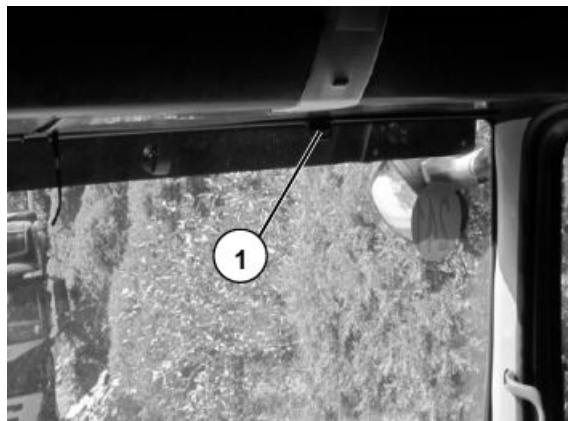


## Front sunshade

### Front sunshade

At the top of the front windshield in the cab, there is a sunshade on both sides (retracted and released in the same way).

- The status of the front sunshade when it is retracted is shown in the figure above.
- The driver may pull the pull ring ① to place the front sunshade ② in the desired position.
- The status of the front sunshade when it is pulled down is shown in the figure below.
- The driver may pull the pull strap ③ to retract the front sunshade ②.



### Side sunshade

There is a side sunshade on each of the left and right windows in the cab (retracted and released in the same way).

- The figure above shows the state when the side sunshade is retracted.
- The driver may pull the pull ring ① to place the sunshade ② in the desired position.
- The figure below shows the state when the side sunshade is lowered.
- The driver may push the sunshade ② upward to retract it as needed.



## Power sunshade

---

### Power sunshade

At the top of the front windshield in the cab, there is a power sunshade on both sides (operated in the same way).

- The status of the sunshade when it is retracted.



- The status of the sunshade when it is working.



### Adjustment of power sunshade

- Adjust the lifting of the power sunshade on the driver side with the rocker switch ①, which allows the sunshade to stay in any position.
- Adjust the lifting of the power sunshade on the co-driver side with the rocker switch ②, which allows the sunshade to stay in any position.



#### CAUTION!

Never pull the power sunshade with hand, because its retraction and expansion are electrically controlled.



## Full wrap-around curtains

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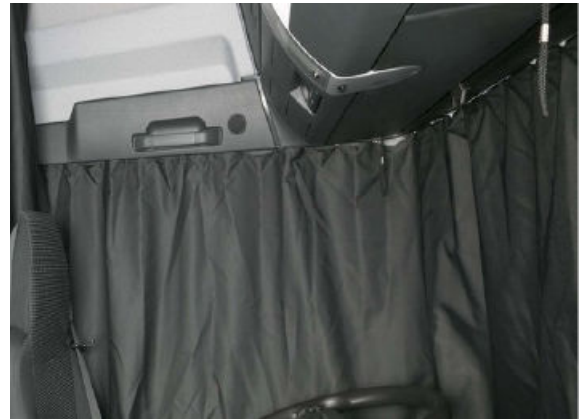
### Full wrap-around curtains

The driver may use the full wrap-around curtains when resting.

- The curtains can be tied up and fixed on both sides when they are retracted.
- The status of the wrap-around curtains when they are retracted is shown in the figure.



- Unfold the curtains slowly along the curtain rail.
- The status of the wrap-around curtains when they are unfolded is shown in the figure.



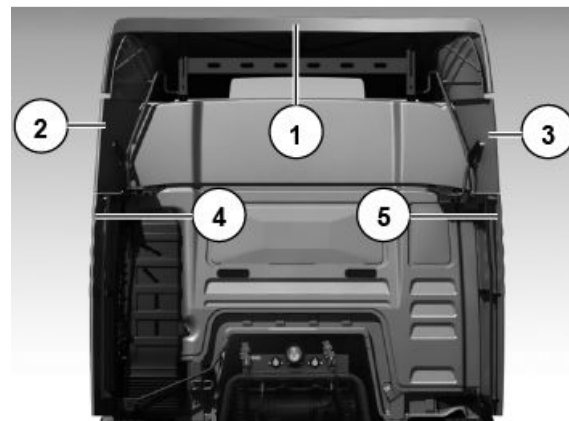


### Deflecting device

The deflecting device (optional) is composed of cab-roof fairing and flank air deflector.

Correct installation of the cab-roof fairing and flank air deflector can reduce fuel consumption.

- ① Height-adjustable roof deflector
- ② Left wing deflector
- ③ Right wing deflector
- ④ Left deflector
- ⑤ Right deflector



### Adjustment of deflecting devices



#### WARNING!

–Be careful!

–When adjusting the cab-roof fairing, make sure you stand on a proper platform with adequate adhesion.

–The height of the cab-roof fairing after adjustment shall not exceed the vehicle height allowed by laws and regulations.

–If low-chassis platform cars or railway transport vehicles are used, the vehicle transport height allowed by the regulations shall not be exceeded.

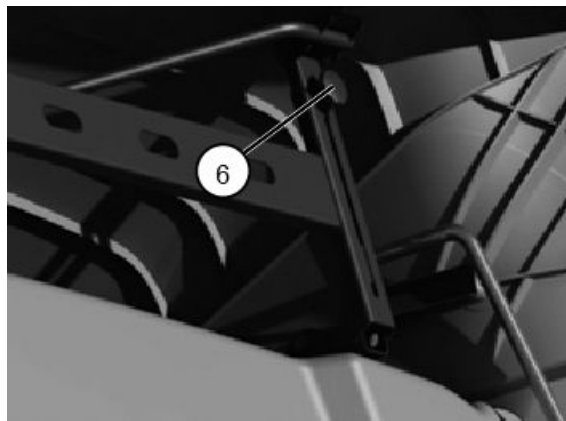
–When the vehicle is used on international routes, the applicable laws and regulations of the related countries shall be followed. If necessary, the deflecting device shall be readjusted.

–Ensure that the height of the left and right sides of the deflecting device is the same.

## Deflecting device

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- According to the height of the whole vehicle, the adjustable bracket on the back can be used to adjust the cab-roof fairing ①.
- Unscrew the adjustment handle ⑥ on any adjustment bracket until the clamp slider is disengaged from the adjustment handle.
- Hold the car-roof fairing reliably and unscrew the adjustment handle on the other bracket.
- Place the car-roof fairing in the desired position, clamp the two clamp sliders on the back in order, and fix them with the adjustment handle.



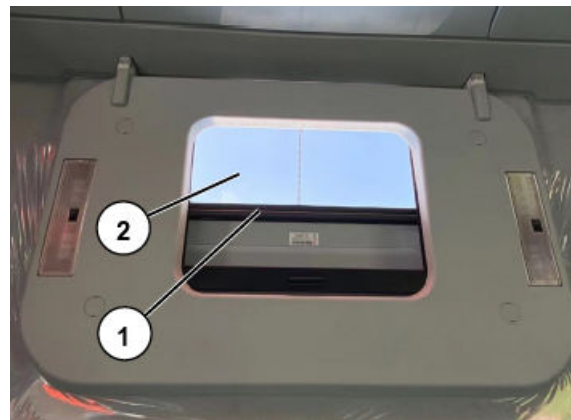
### Power sunroof



#### **WARNING!**

The sunroof shall be closed when no personnel is in the cab to ensure anti-theft and prevent rain and dust from entering the.

- ① Sunroof
- ② Insect screen



## Power sunroof

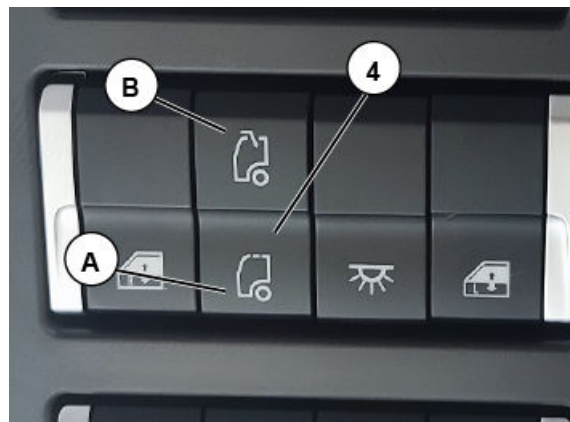
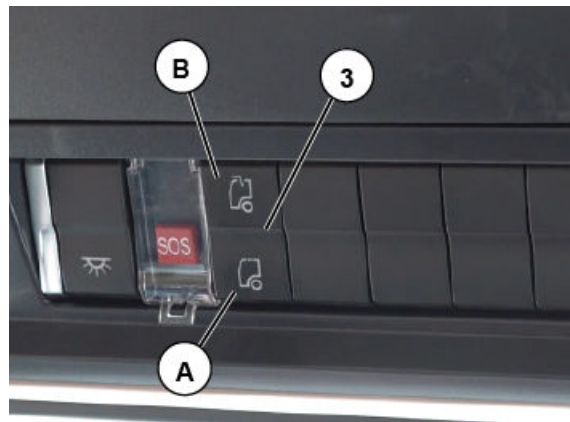
The electric sunroof has three statuses: closed, tilted and fully opened.

### Opening the sunroof

- Turn on the vehicle power supply.
- When the sunroof is closed, press the end B of the rocker switch ③ above the front windshield or the rocker switch ④ on the side of the sleeping berth control module, and the sunroof will start to tilt until the tilting is completed.
- At the tilting point, press the end B of the rocker switch ③ above the front windshield or the rocker switch ④ on the side of the sleeping berth control module, and the sunroof will slide outward until the sunroof is fully open.

### Closing the sunroof

- Turn on the vehicle power supply.
- When the sunroof is fully open, press the end A of the rocker switch ③ above the front windshield or the rocker switch ④ on the side of the sleeping berth control module, and the sunroof will directly run to the closed status.

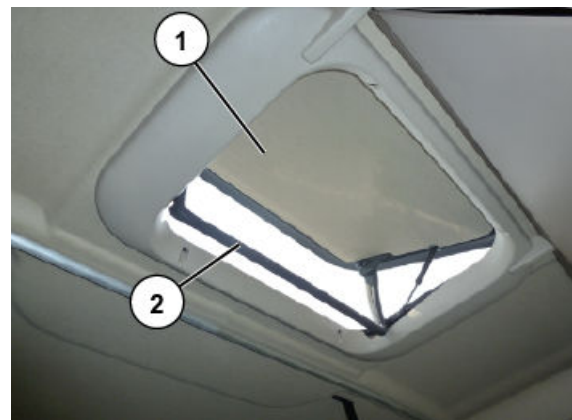
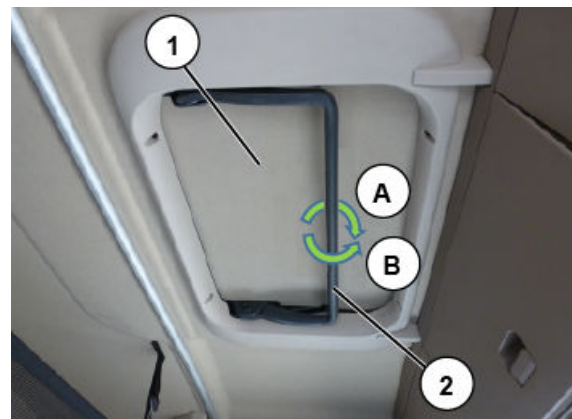


## Manual sunroof

**WARNING!**

The sunroof shall be closed when no personnel is in the cab to ensure anti-theft and prevent rain and dust from entering the.

- The position of the sunroof ① when it is closed.
- The position of the sunroof ① when it is opened to the maximum opening angle.



## Manual sunroof

### Setting of opening gears (three) of the sunroof

- Opening to the full open position③ (maximum angle gear)

Rotate the handle ② in direction A to the end, then push the handle ② upwards to the limit position.

- Closing from the full open position ③(maximum angle gear)

Pull the handle ② downwards to the lowest point, then rotate the handle ② in direction B to the locking position.

- Opening to the second gear position④ (middle gear)

Rotate the handle ② in direction A to the end, then push the handle ② upwards to the Position II, and finally rotate the handle ② in direction B to the locking position.

- Closing from the second gear position ④(middle gear)

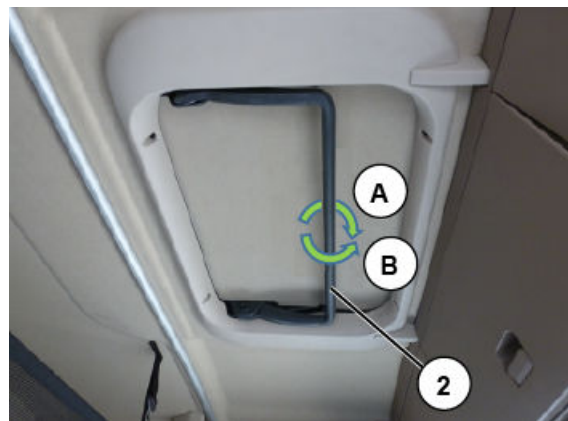
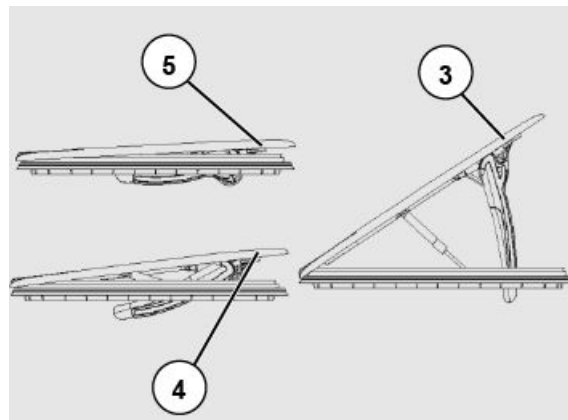
Rotate the handle ② in direction A to the end, then pull the handle ② downwards to the lowest point, and finally rotate the handle ② in direction B to the locking position.

- Opening to the tilted position⑤ (minimum gear)

Rotate the handle ② in direction A to the end, then push the handle ② upwards to the warping position, and finally rotate the handle ② in direction B to the locking position.

- Closing from the tilted position⑤ (minimum gear)

Rotate the handle ② in direction A to the end, then pull the handle ② downwards to the lowest point, and finally rotate the handle ② in direction B to the locking position.



### Seat Assembly (Driver/Ventilation/Heating/Airbag)



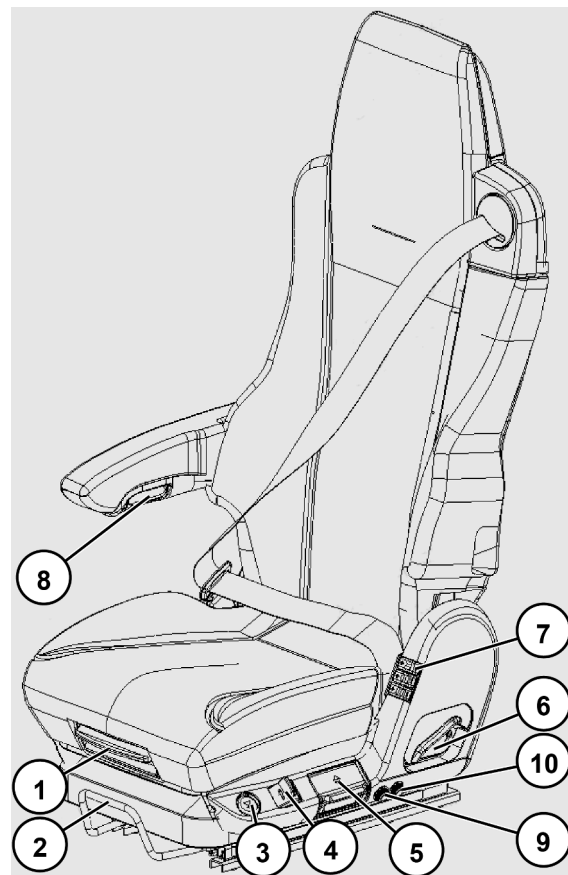
**WARNING!**

- Adjust the seat only when the vehicle is stationary. Do not adjust it during the driving.
- Make sure you can hear the sound of engagement of the seat locking device.
- It is not inadvisable to fix the child seat on the driver's and co-driver's seats.
- Fasten the seat belt before driving every time, see "Seat Belt".

## Seat Assembly (Driver/Ventilation/Heating/Airbag)

---

- ① Cushion Angle Adjustment Handle
- ② Seat Fore/Aft Adjustment Handle
- ③ Quick-Drop Handle (for easy entry/exit)
- ④ Seat Stiffness Adjustment Handle
- ⑤ Seat Height Adjustment Handle
- ⑥ Seat Backrest Angle Adjustment Handle
- ⑦ Lumbar and Side Support Adjustment Button
- ⑧ Armrest Angle Adjustment Knob
- ⑨ Ventilation Adjustment Switch
- ⑩ Heating Adjustment Switch





### Cushion Angle Adjustment

Pull handle ① up. Adjust the cushion angle as needed. Release the handle to lock the cushion in place.

### Seat Fore/Aft Adjustment

Pull handle ② up. Slide the seat forward/backward to the desired position. Release the handle; push the seat slightly until it locks in place with a click.

### Quick-Drop Adjustment (for easy entry/exit)

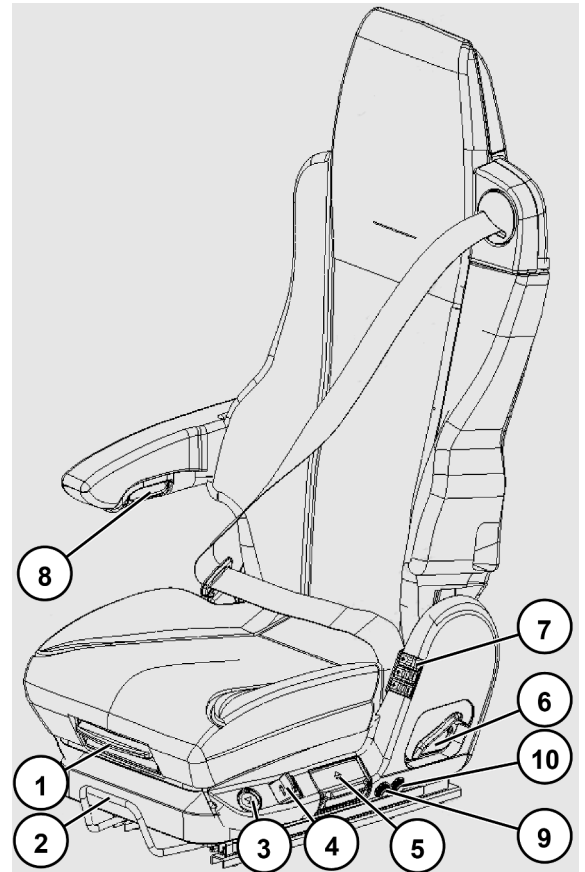
- After entering the cab, press button ③ (button pops out); the seat rises to the driving position.
- Before exiting the cab, press button ③ (button is pressed in); the seat lowers to the exit position.

### Seat Stiffness Adjustment

Move handle ④ forward/backward to set the desired seat stiffness (soft/hard).

### Seat Height Adjustment

- While seated, pull handle ⑤ up to raise the seat. Release the handle at the desired height.
- While seated, push handle ⑤ down to lower the seat. Release the handle at the desired height.



## Seat Assembly (Driver/Ventilation/Heating/Airbag)

### Seat Backrest Angle Adjustment

Lean lightly against the backrest. Pull handle ⑥ up, adjust the backrest to the desired position, and release the handle to lock.

### Lumbar and Side Support Adjustment

Press button ⑦ to inflate or deflate the air bladders.

"+" button: Inflates bladders.

"-" button: Deflates bladders.

### Armrest Angle Adjustment

1 Turn knob ⑧ to adjust the armrest to the desired angle.

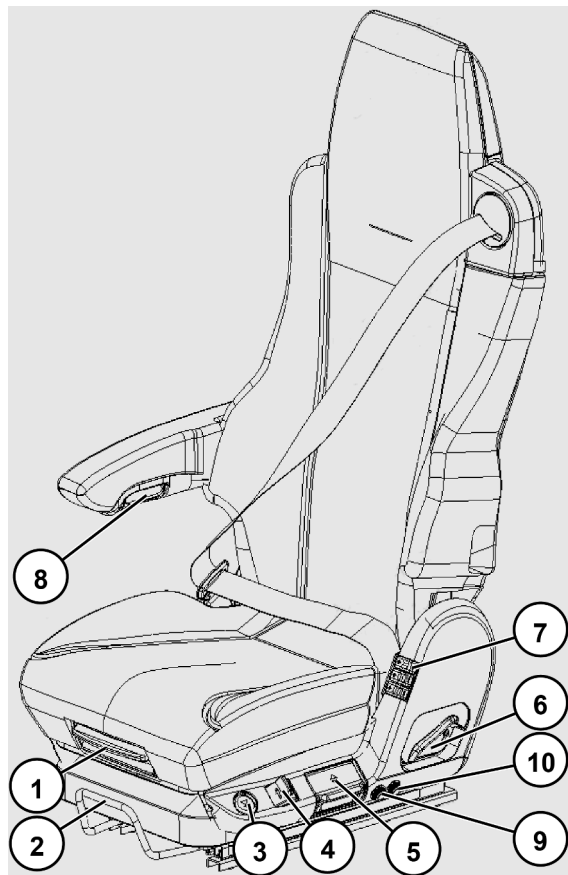
2 Release the knob.

### Ventilation Adjustment

Rotate ventilation switch ⑨ to the desired level.

### Heating Adjustment

Rotate heating switch ⑩ to the desired level.

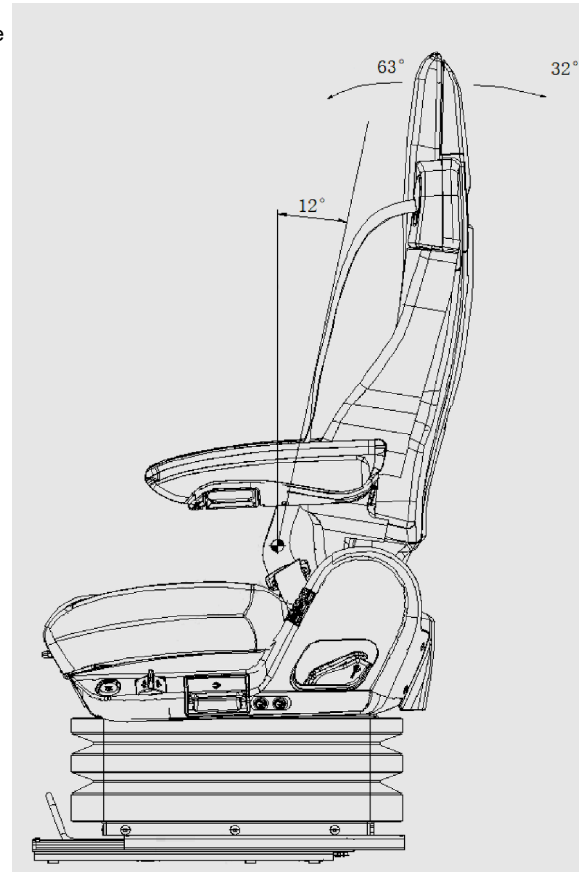


### Seat Fore/Aft Position Adjustment and Backrest Angle State

- The seat fore/aft position can be adjusted as needed (the cushion itself cannot be adjusted fore/aft).
- The standard backrest angle state is  $12^{\circ}$  from vertical.

### Seat Backrest Angle Adjustment Range

Seat backrest angle adjustment range:  $63^{\circ}$  forward,  $32^{\circ}$  backward.



## Co-driver seat (mechanical shock absorption)

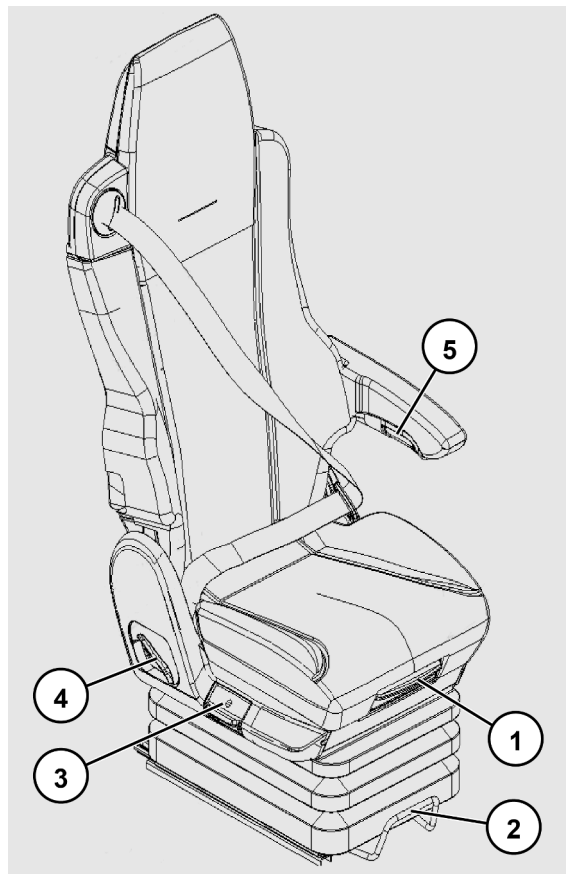
### Co-driver seat (mechanical shock absorption)



#### **WARNING!**

- Adjust the seat only when the vehicle is stationary. Do not adjust it during the driving.
- Make sure you can hear the sound of engagement of the seat locking device.
- It is not inadvisable to fix the child seat on the driver's and co-driver's seats.
- Fasten the seat belt before driving every time, see "Seat Belt".

- ① Seat cushion angle adjustment handle
- ② Seat forward/backward adjustment handle
- ③ Seat height adjustment handle
- ④ Backrest angle adjustment handle
- ⑤ Armrest angle adjustment handle (optional)



### Adjustment of seat cushion angle

- Pull up the handle ① and adjust the angle of the seat cushion as needed.
- Release the handle.

### Forward/backward adjustment of seats

- Pull up the handle ② and slide the seat forward/backward.
- Release the handle.
- Gently push the seat forward or backward until the "click" of seat locking is heard.

### Adjustment of seat height

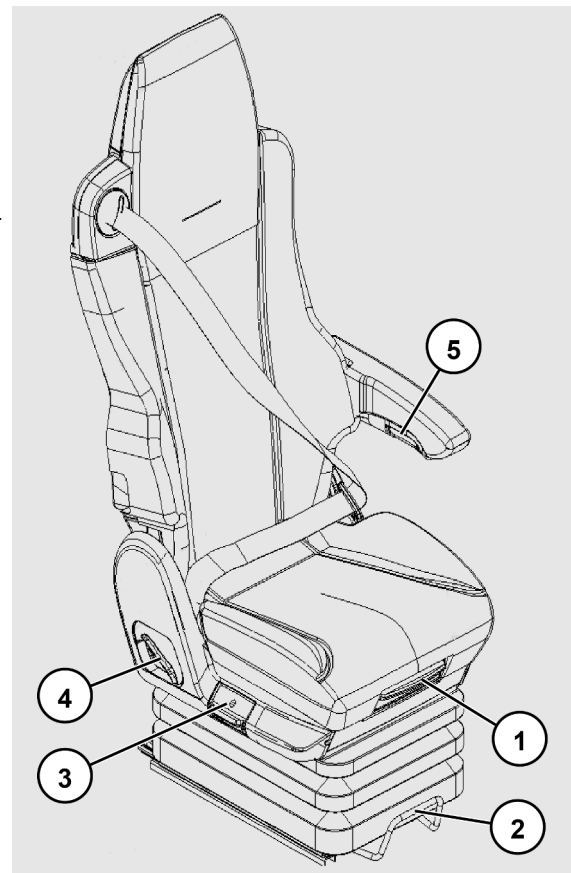
- Pull up the handle ③, and adjust the seat to a suitable height by sitting on the seat or leaving the seat
- Release the handle.

### Backrest angle adjustment

- Lean back and gently push the seat backrest to unlock it.
- Pull up the handle ④ and adjust the backrest to the desired position.
- Release the handle.

### Armrest angle adjustment

Turn the handle ⑤ to adjust the armrest to the required angle.



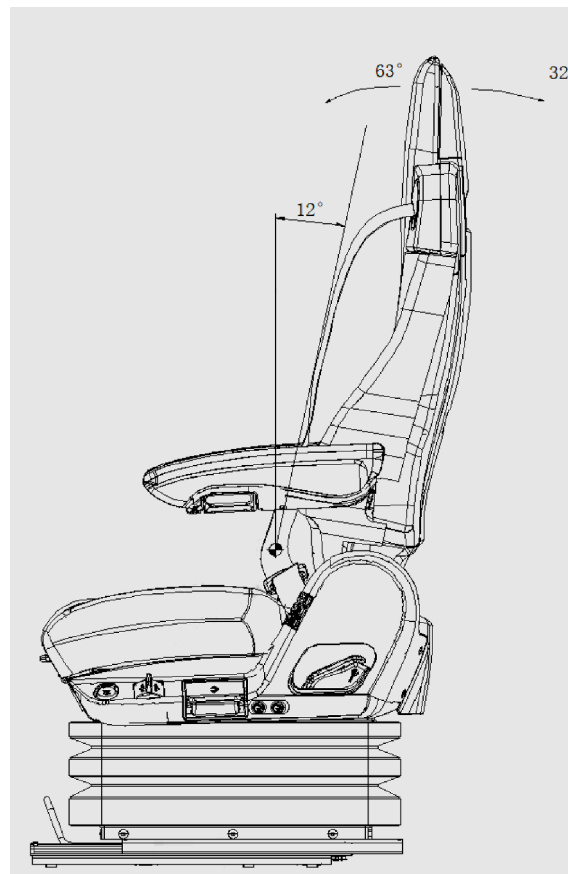
## Co-driver seat (mechanical shock absorption)

### Seat forward and backward adjustment and seat backrest angle

- The front and rear position of the seat can be adjusted as required (the seat cushion can not be adjusted forward/backward).
- When the backrest is at 12° with the vertical direction, it is in the designed position.

### Adjustment range of seat backrest angle

Adjustment range of the backrest angle: 63° forward and 32° backward.



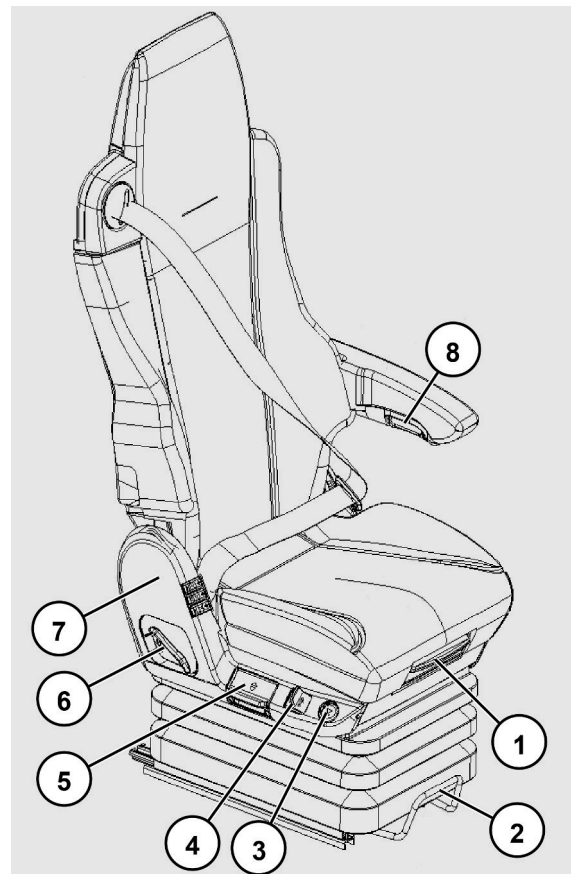
### Co-driver seat (airbag shock absorption)



#### **WARNING!**

- Adjust the seat only when the vehicle is stationary. Do not adjust it during the driving.
- Make sure you can hear the sound of engagement of the seat locking device.
- It is not inadvisable to fix the child seat on the driver's and co-driver's seats.
- Fasten the seat belt before driving every time, see "Seat Belt".

- ① Seat cushion angle adjustment
- ② Forward/backward adjustment of seats
- ③ Quick lowering device adjusting (to get on and off easily)
- ④ Seat elasticity adjustment
- ⑤ Seat height adjustment
- ⑥ Backrest angle adjustment
- ⑦ Lumbar support device and side support device adjustment
- ⑧ Armrest angle adjustment.



## Co-driver seat (airbag shock absorption)

### Adjustment of seat cushion angle

Pull the handle ① upwards, and adjust the angle of the seat cushion according to the need. When the desired angle is reached, release the handle and lock the seat cushion.

### Forward/backward adjustment of seats

Pull the handle ② upwards, and slide the seat forward/backward. When the desired position is reached, release the handle. Gently push the seat forward or backward until the "click" of seat locking is heard.

### Quick lowering device adjusting (to get on and off easily)

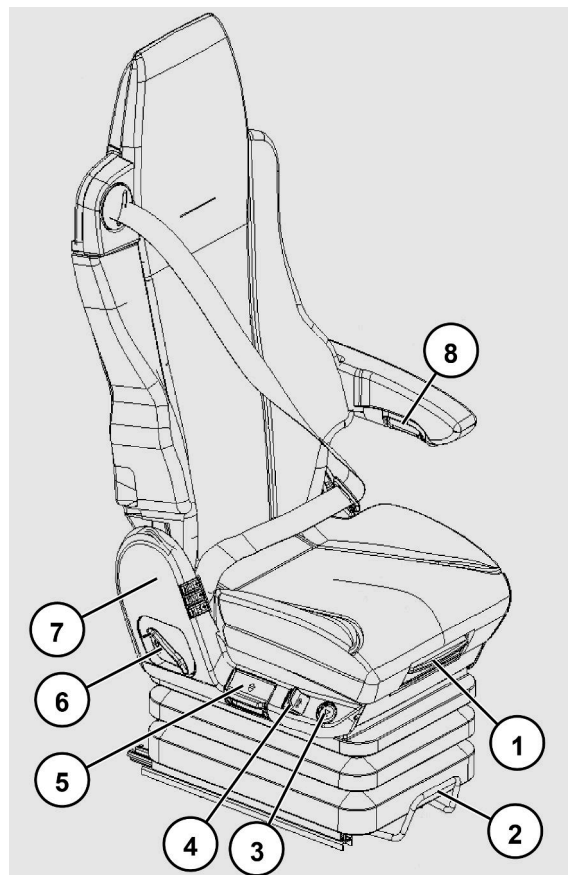
- After getting on the vehicle, press button ③ (button pops out) to raise the seat to the driving position.
- Before getting off the vehicle, press button ③ (button pressed in) to lower the seat to the exit position.

### Seat elasticity adjustment

Move handle ④ forward or backward to set the seat elasticity to the desired level (soft or firm).

### Adjustment of seat height

- While sitting on the seat, pull handle ⑤ upward to raise the seat. Release the handle when the desired height is reached.
- While sitting on the seat, push handle ⑤ downwards to lower the seat. Release the handle when the desired height is reached.





### Seat backrest angle adjustment

Lean gently against the backrest, lift handle ⑥ upward, adjust the backrest to the desired position, then release the handle to lock it.

### Lumbar support device and side support device adjustment

Press button ⑦ to inflate or deflate the airbag.

“+”: airbag inflation;

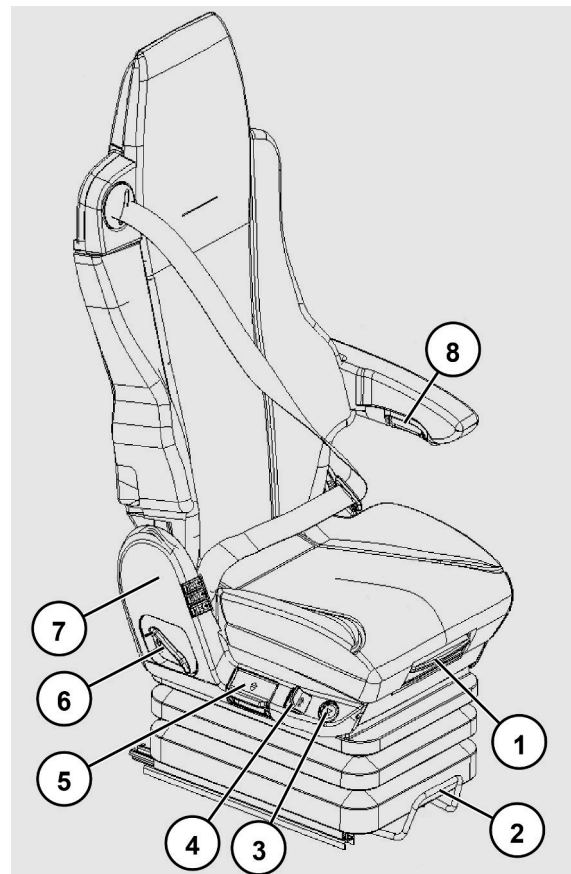
“-”: airbag deflation.

### Armrest angle adjustment

Use the knurled button ③ to set the desired armrest angle.

Rotate inward toward the seat: The armrest rises.

Rotate outward away from the seat: The armrest lowers.



## Co-driver seat (airbag shock absorption)

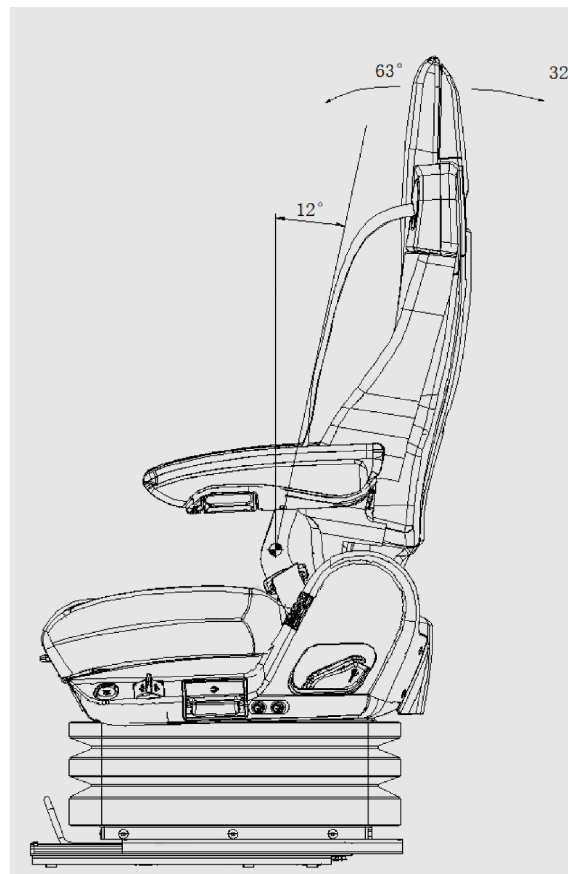
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### Seat forward and backward adjustment and seat backrest angle

- The front and rear position of the seat can be adjusted as required (the seat cushion can not be adjusted forward/backward).
- When the backrest is at  $12^{\circ}$  with the vertical direction, it is in the designed position.

### Adjustment range of seat backrest angle

Adjustment range of the backrest angle:  $63^{\circ}$  forward and  $32^{\circ}$  backward.



## Middle seat

**WARNING!**

- Adjust the seat only when the vehicle is stationary. Do not adjust it during the driving.
- Make sure you can hear the sound of engagement of the seat locking device.
- It is not inadvisable to fix the child seat on the driver's and co-driver's seats.
- Fasten the seat belt before driving every time, see "Seat Belt".

① Backrest angle adjustment handle

**Backrest angle adjustment**

- Lean back and gently push the seat backrest to unlock it.
- Pull up the handle ①
- Lay the seat backrest flat.
- Release the handle.



## Steering wheel adjustment

### Steering wheel adjustment

When adjusting the steering wheel, there should be enough air pressure in the compressed air system.

- 1 Adjust the driver's seat first with reference to "Seat adjustment", and then adjust the steering wheel.
- 2 Press the button ① on the lower boss of the driver's seat with your heel.
- 3 Adjust the steering wheel height and angle to a proper position.
- 4 Move the heel from the button ①, and the steering wheel is locked.

Moving the steering wheel forward is convenient for entering or leaving the vehicle and helps to move toward the co-driver side.



#### **DANGER!**

**It is not allowed to adjust the position of the steering wheel when the vehicle is running. Only when the vehicle is stationary and the parking brake is applied, can the steering wheel be adjusted!**



## Seat belt

**WARNING!**

- Fasten your seat belt before each trip.
- Each person shall wear a seat belt.
- Do not intertwine the seat belt, and ensure that the seat belt fits your body.
- The seat belt can provide you with the best protection only when the seat back is almost in the vertical position. See "Seat Adjustment".
- Ensure the back is close to the seat back, and the safety belt is close to the neck and shoulder.
- The safety belt shall be at the middle of the shoulder, rather than at the throat.
- The seat belt shall be moderately tight at the thigh, and shall pass through the lower abdomen, rather than through the stomach whenever it is possible.
- Do not adjust the seat to a position where the seat belt cannot fit your body.
- During driving, the tightness of the seat belt shall be adjusted by pulling the shoulder belt from time to time.
- Do not let the seat belt pass through the pocket with hard or fragile items in it (such as pens, glasses, and etc.).
- Installation of new safety belts, replacement of damaged or seriously deformed safety belts in the accident and inspection of safety belt fixing points shall be carried out at a CNHTC service station.
- Do not refit the seat belt.

## Seat belt

### Fasten the seat belt.

Before fastening the seat belt, adjust the driver's seat and co-driver's seat according to their body size.

- The safety belt shall pass through the middle of the shoulder, and shall not pass through your throat.
- Hold the seat belt buckle and pull the seat belt through the shoulder and thigh.
- Insert the seat belt buckle into the seat belt buckle clip until the sound of buckle engagement is heard.
- The tightness of the safety belt on the upper body and thigh shall be appropriate.



#### **WARNING!**

**After fastening the safety belt, check the condition and performance of the safety belt from time to time during driving, and re-tighten the safety belt if necessary.**

### Check the safety belt catch (everyday)

Pull the safety belt with force, and the safety belt reel shall be locked.

#### **Release**

- Press the red button on the safety belt buckle in the direction of the arrow.
- Hold the safety belt buckle until the safety belt retracts automatically.

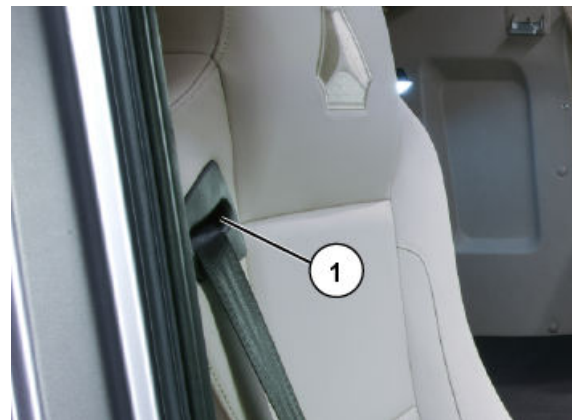


### Inertia retractor

The retractor ① shall lock the safety belt to prevent the safety belt from being pulled out under the following conditions:

- The vehicle decelerates suddenly in any direction.
- The safety belt is pulled out quickly.

The locking function of the inertia retractor can be detected by quickly pulling out the safety belt.



## Upper berth

### Upper berth



#### **WARNING!**

- Safety protection device shall be switched on and locked when the berth is used.
- Ensure that the seat belt devices at both ends are locked when the upper berth is retracted.

### Flipping down the upper berth

- If necessary, push forward the driver's/co-driver's seat or adjust the backrest. Refer to "Seat Adjustment".
- Unlock the seat belt locking device ②, and hold the outer edge of the upper berth ① and rotate it downward until the rubber pad ③ at both ends clings to the support ④.
- Pull the safety clip ⑤ properly, adjust the protective net ⑥ in place, and lock the safety clip ⑤ to ensure safety.

### Flipping up the upper berth

- Loosen the safety clip ⑤ and lower the protective net ⑥.
- Hold the outer edge of the upper berth ① tightly and rotate it upward with moderate force to an appropriate position.
- Correctly lock the seat belt locking device ② at both ends of the upper berth.





### Lower bunker

#### Lower bunker safety protection device



#### **WARNING!**

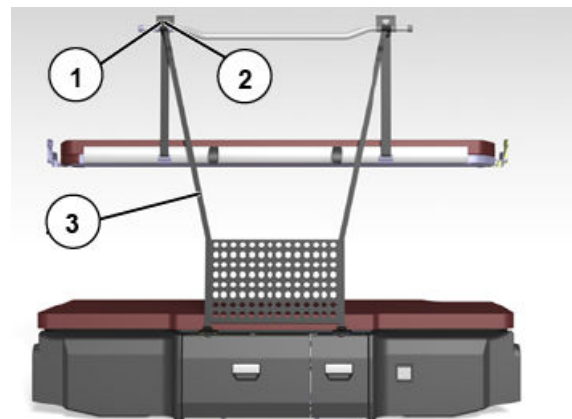
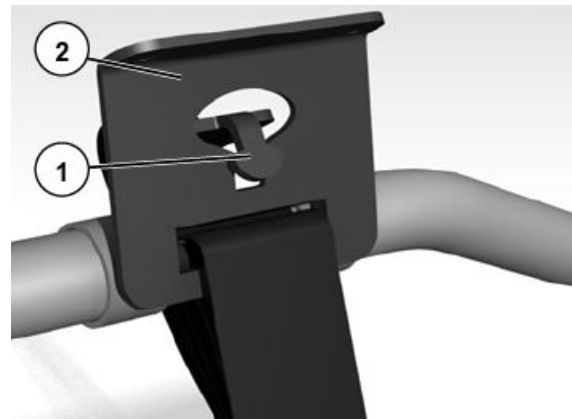
- The lower berth shall be put down when the vehicle is running.
- It is not allowed to place any article on the berth when the vehicle is running.
- Safety protection device shall be switched on and locked when the berth is used.

#### **Protection ON**

- When the lower bunker protection is closed, adjust the tether ③.
- Drop the left and right clips ① from the upper bunker slot ② to open and fix the lower bunker safety protection device.

#### **Protection OFF**

- With the lower bunker protection open, take out the left and right clips ① from the slot ② of the upper bunker.
- Adjust the drawstring ③ and place it on the lower bunker together with the protective net.



## Lower bunker

### Lower bunker turnover and use of drawers



#### **WARNING!**

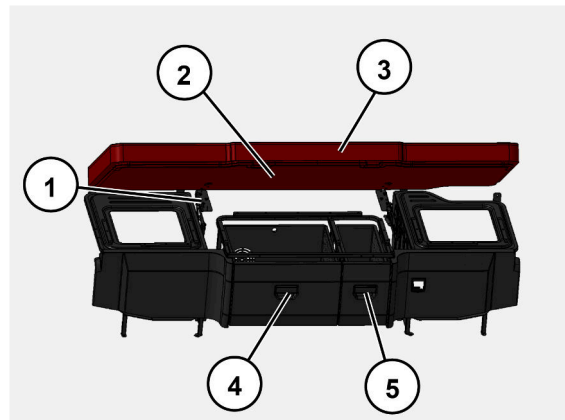
- When the bunker is turned upward, the turning angle shall be  $\leq 80^\circ$ .
- Drawers and lower bunkers shall be closed while the vehicle is in motion.

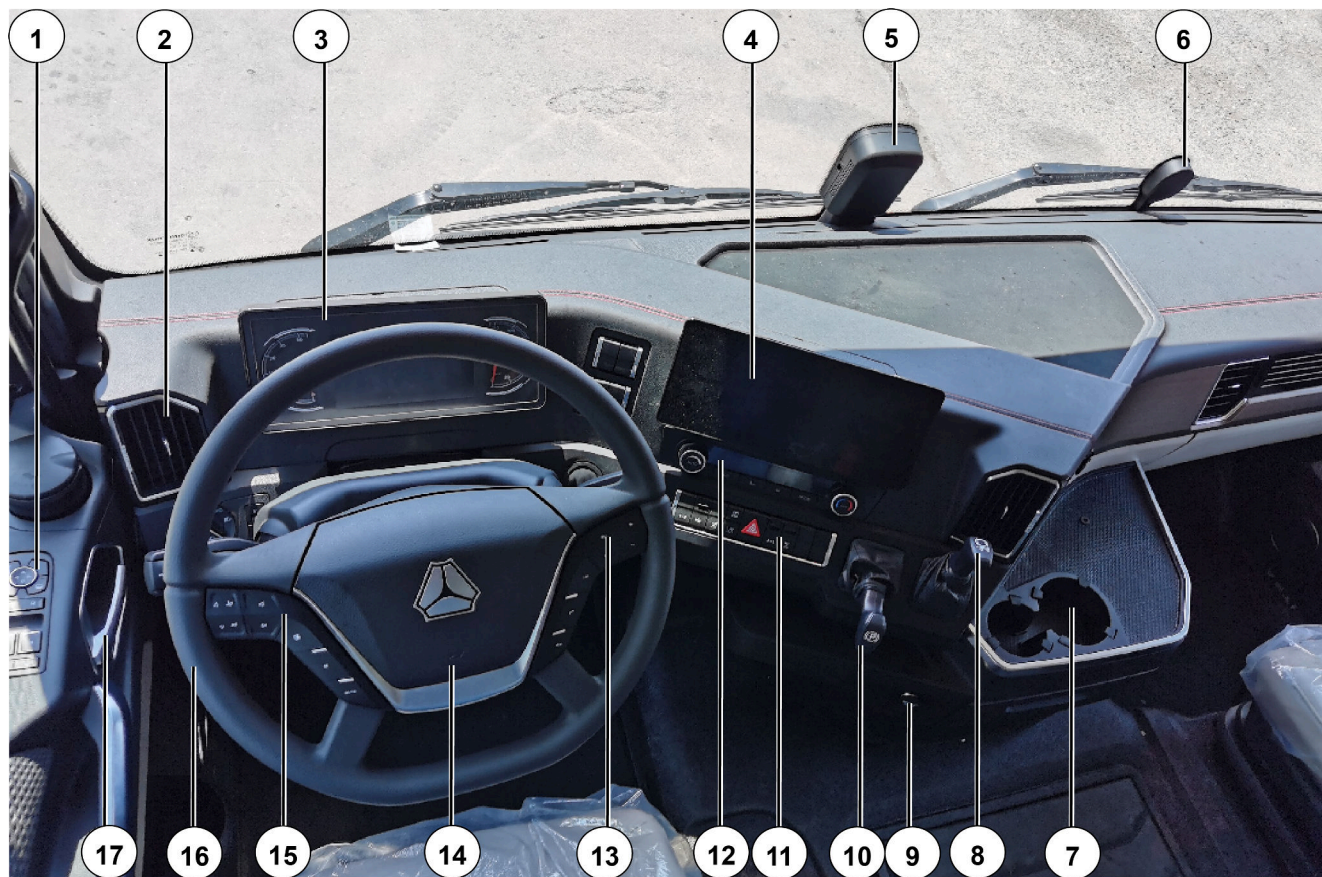
#### **Turn over the lower bunker**

- Lower bunker turnover mechanism ①.
- Lift up the upper cover plate ② of the tool box to turn over the lower bunker for easy storage and retrieval of articles.
- Press down the bunker cushion ③ to flatten the lower bunker.

#### **Use of drawers**

- Pull the handle ④ obliquely upward to release the locking mechanism, and the drawer can be pulled out forward or closed backward.
- Pull the handle ⑤ obliquely upward to release the locking mechanism and pull the drawer forward or close it backward.



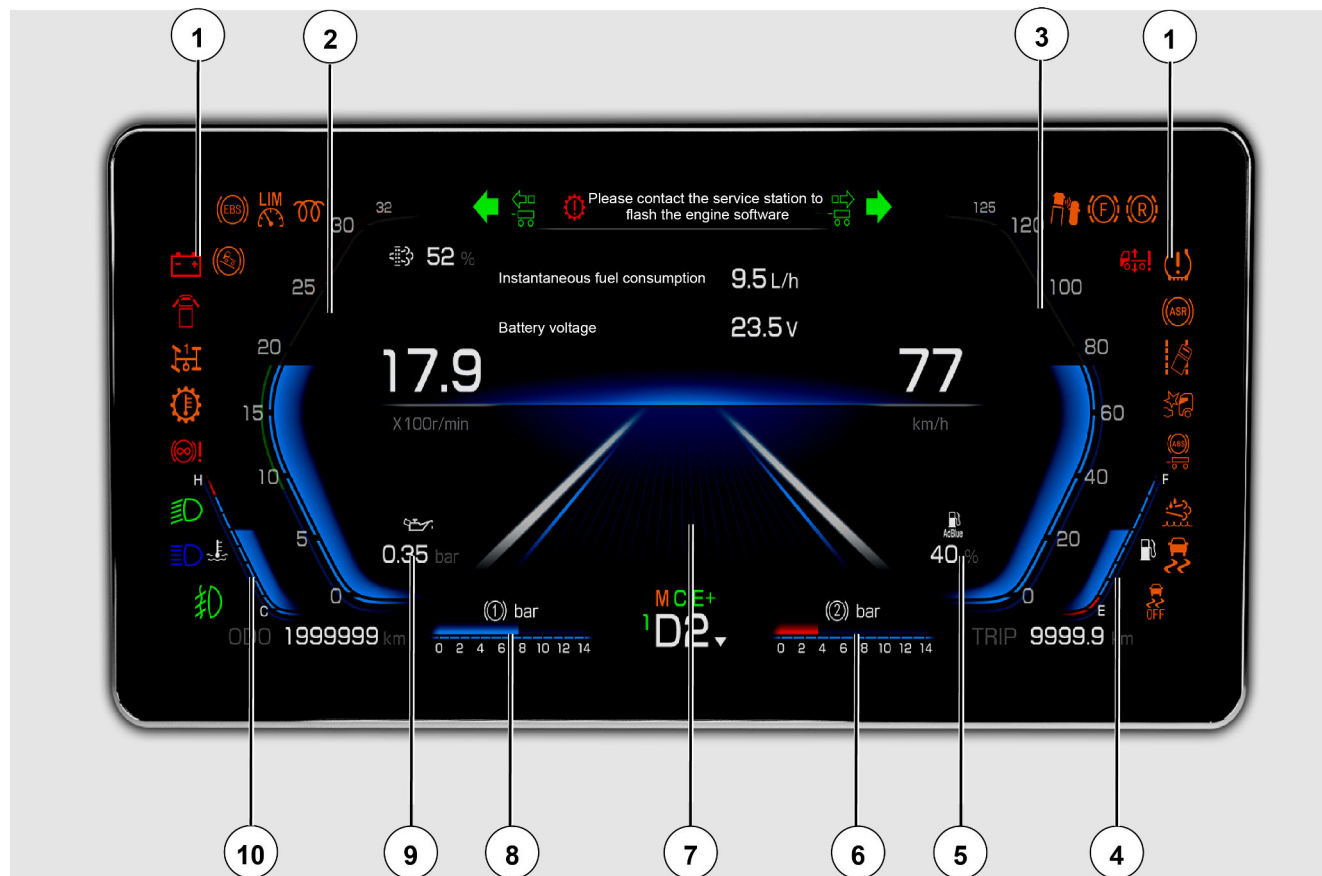


## Overview of cab interior

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### Overview of cab interior

- 1 Door control panel
- 2 Air vent
- 3 Instrument panel
- 4 TELEMATICS
- 5 Forward collision warning (FCW)
- 6 Sunlight and rain sensor
- 7 Cup holder
- 8 Trailer brake handle
- 9 24V power socket
- 10 Parking brake handle
- 11 Rocker switch
- 12 A/C control panel
- 13 Steering wheel button (right)
- 14 Horn switch
- 15 Steering wheel button (left)
- 16 Steering wheel
- 17 Door handle



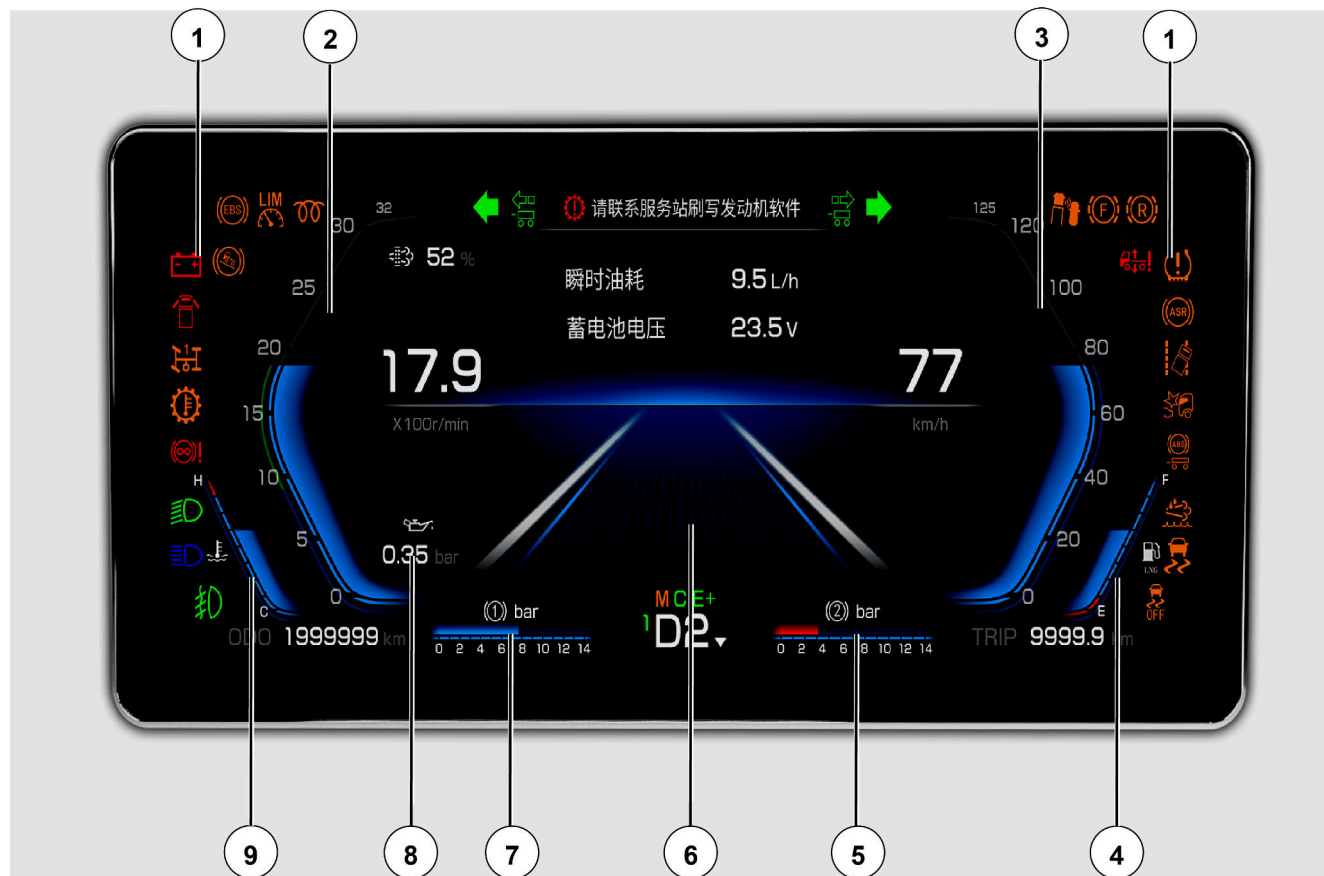
## **Instrument panel**

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### **Instrument panel**

#### **Full LCD instrument (fuel-powered model)**

- 1 Detection lamp and warning lamp
- 2 Tachometer
- 3 Speedometer
- 4 Fuel level gauge
- 5 AdBlue level gauge
- 6 Air pressure gauge 2
- 7 Driver display screen
- 8 Air pressure gauge 1
- 9 Oil pressure gauge
- 10 Coolant temperature gauge



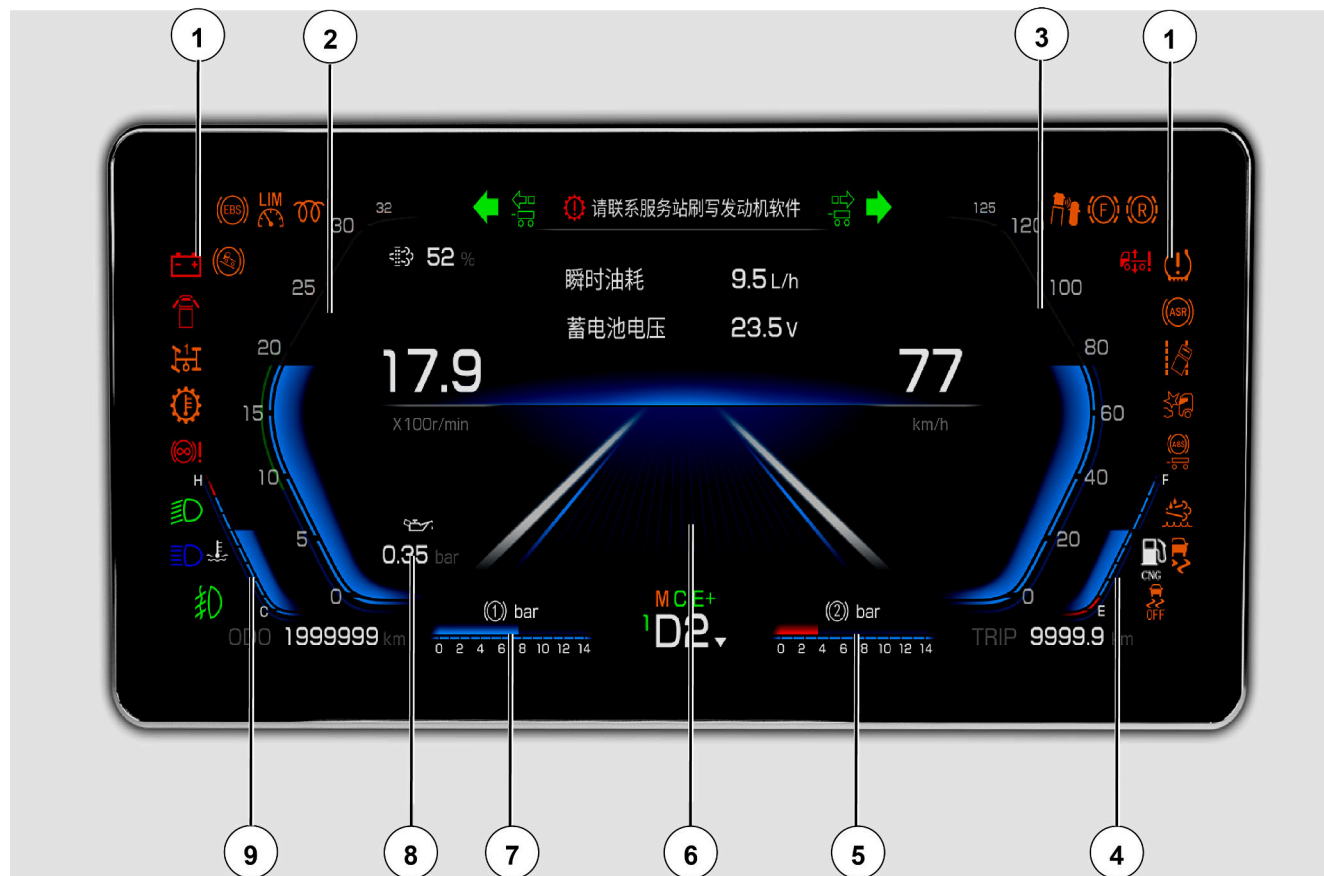
## **Instrument panel**

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### **Full LCD instrument (LNG-powered model)**

- 1 Detection lamp and warning lamp
- 2 Tachometer
- 3 Speedometer
- 4 LNG meter
- 5 Air pressure gauge 2
- 6 Driver display screen
- 7 Air pressure gauge 1
- 8 Oil pressure gauge
- 9 Coolant temperature gauge





## Instrument panel

### Full LCD instrument (CNG-powered model)

- 1 Detection lamp and warning lamp
- 2 Tachometer
- 3 Speedometer
- 4 CNG meter
- 5 Air pressure gauge 2
- 6 Driver display screen
- 7 Air pressure gauge 1
- 8 Oil pressure gauge
- 9 Coolant temperature gauge

#### Tachometer ①

It displays the engine rpm, with an indication range of 0-3,200 r/min.

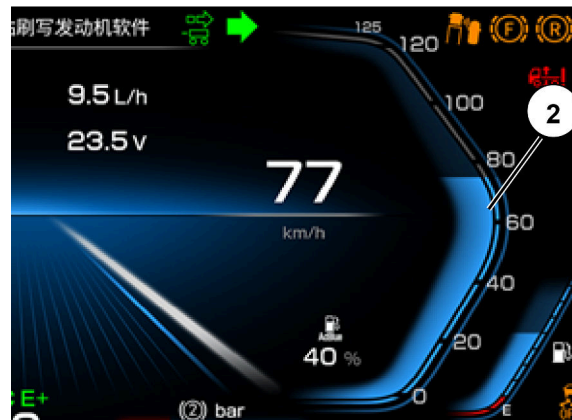
The green area is the engine economic speed area. When the engine speed is too high, the engine overspeed warning lamp on the instrument panel will light up.



**Speedometer ②**

It displays the traveling speed of the vehicle, with an indication range of 0-125 km/h.

When the vehicle speed is too high, the vehicle overspeed warning lamp on the instrument panel will light up.

**Coolant temperature gauge ③**

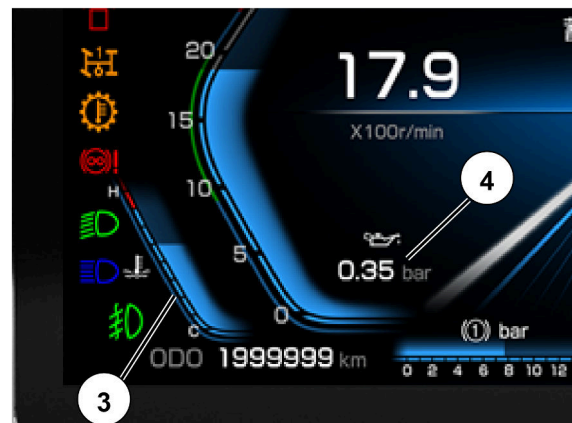
It displays the temperature of the engine coolant.

When the coolant temperature is too high, the high coolant temperature warning lamp will go on and the progress bar turns red.

**Engine oil pressure gauge ④**

Display the engine oil pressure.

When the oil pressure is too high or too low, the oil pressure warning lamp will come on.



## Instrument panel

### Urea level gauge ⑤

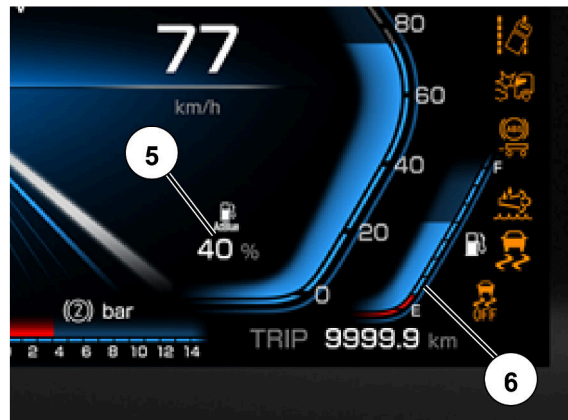
It displays the urea level in the urea tank.

When the urea level is too low, the low urea level warning lamp will go on.

### Fuel gauge ⑥

It displays the level of fuel remaining in the vehicle's fuel tank.

When the level of remaining fuel is too low, the low fuel level indicator lamp will go on and the progress bar will turn red.



### Barometer 1 ⑦

It displays the air pressure of brake circuit 1, with the display range of 0~14bar.

When the air pressure is lower than 5.5 bar, the brake system fault warning lamp will go on.

### Barometer 2 ⑧

It displays the air pressure of brake circuit 2, with the display range of 0~14bar.

When the air pressure is lower than 5.5 bar, the brake system fault warning lamp will go on.

### Gear position display ⑨

It displays the current gear position of the transmission.



**LNG meter ⑩**

Display the remaining LNG of the vehicle.

When the remaining LNG volume is low, the LNG low level indicator lamp goes on, and the progress bar turns red.

**CNG meter ⑪**

Display the remaining CNG of the vehicle.

When the remaining CNG volume is low, the CNG low level indicator lamp goes on, and the progress bar turns red.

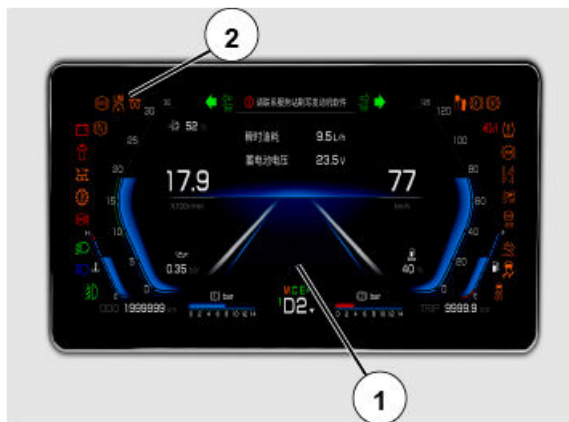


## Description of driver display screen

### Description of driver display screen

The driver display screen ① and the detection lamp panel ② are used to indicate the conditions of the vehicle. They are supplement to the information provided by the respective instruments on the instrument panel.

When the warning conditions are met, the warning symbol will be displayed on the screen.



### Boot screen

The startup animation lasts for 3 s.



### Main interface 1



## Description of driver display screen

### Main interface 2



The driver can select the menu through the button on the left side of the steering wheel.

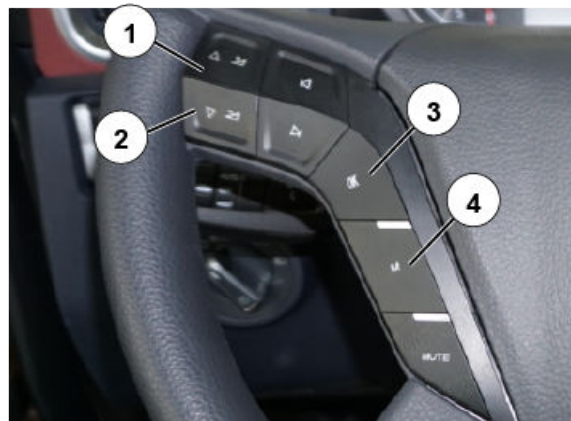
Button ①: instrument page up

Button ②: instrument page down

Button ③: OK button, to enter the main menu in the main interface 1

Button ④: Menu button, to enter/exit the main menu

In the main interface 1, press and release to enter the menu. There will be no response after pressing and releasing on the main interface 2





### First-level menu

Including the vehicle information, fault query, pin status, system settings, navigation and entertainment system.



### Vehicle information

Vehicle information 1



## Description of driver display screen

### Vehicle information 2

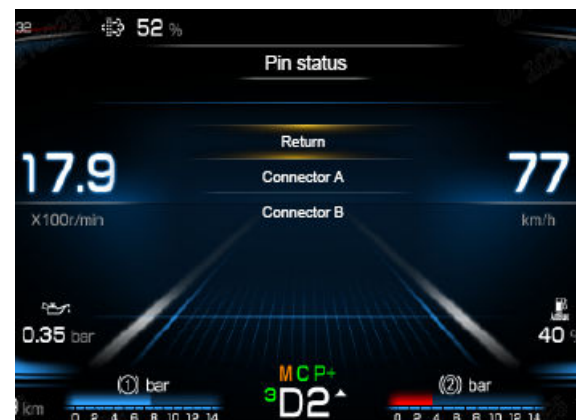


### Vehicle information 3



### Pin status

The two options, connector A and connector B, can be selected.



## Description of driver display screen

The pin status of connector A



The pin status of connector B



## Description of driver display screen

### Fault query

The fault query includes the following options:

Engine, TCU, ABS, retarder, BCU, VCU, ECAS, AEB, LDWS, TCO, BBM, ACC, and PEB.

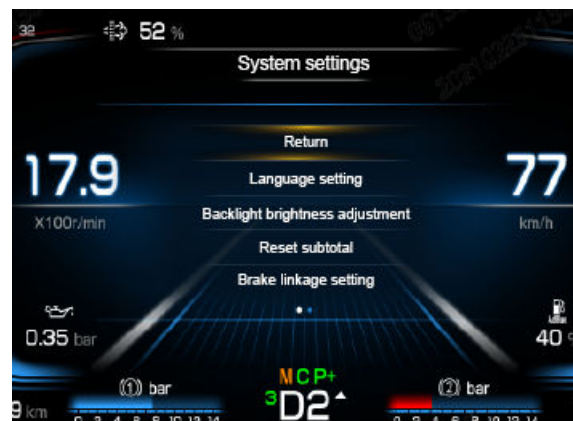




## Description of driver display screen

### System Settings

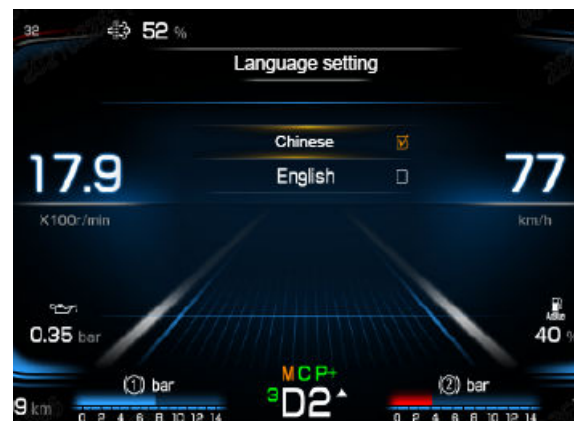
Including: language setting, backlight brightness adjustment, trip meter reset, brake linkage setting, and system upgrade.





### Language setting

Chinese or English



### Backlight adjustment

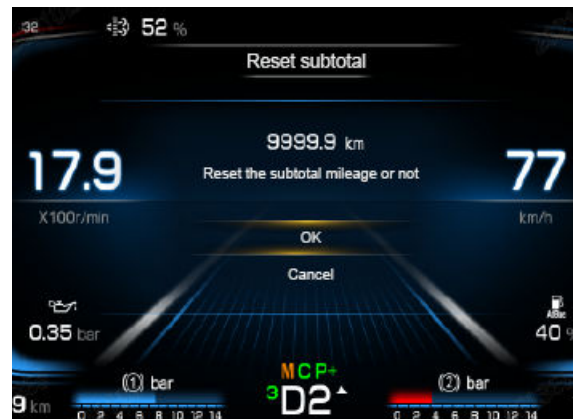
Gear 1-5 brilliance adjustment



## Description of driver display screen

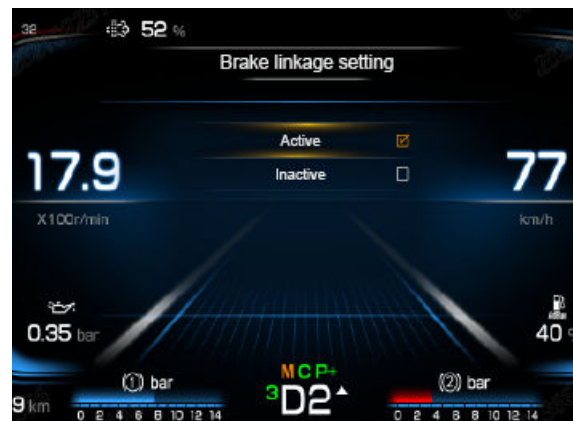
### Trip resetting

Select OK to reset the trip



### Brake linkage setting

Select Active to trigger the brake linkage function.



### System upgrade

There are two upgrade methods: on-board upgrade and OTA upgrade.



### On-board upgrade



## Description of driver display screen

Prompt for successful upgrade



Prompt of upgrade failure



## OTA Upgrade



## Description of driver display screen

Prompt for successful upgrade

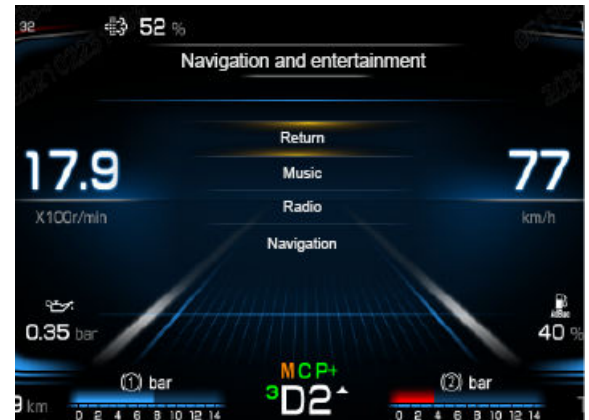


Prompt of upgrade failure



### Navigation and entertainment

Including music, radio, and navigation.



### Music



## Description of driver display screen

Radio



Navigation





### Tire information

4X2 model

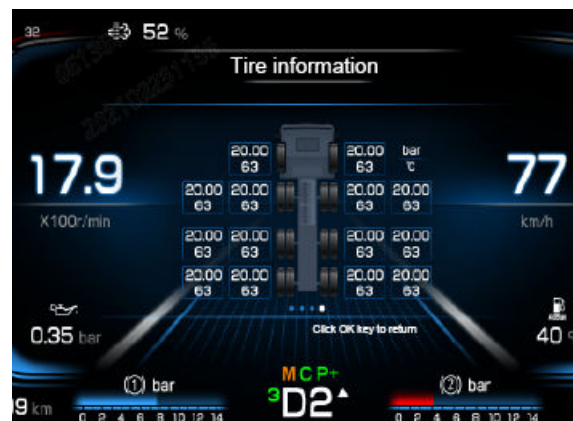


6X4 model



## Description of driver display screen

8X4 model



10X4 model



Smart truck

Adaptive cruise control



## Description of driver display screen



### Lane departure warning

Left departure



Right departure



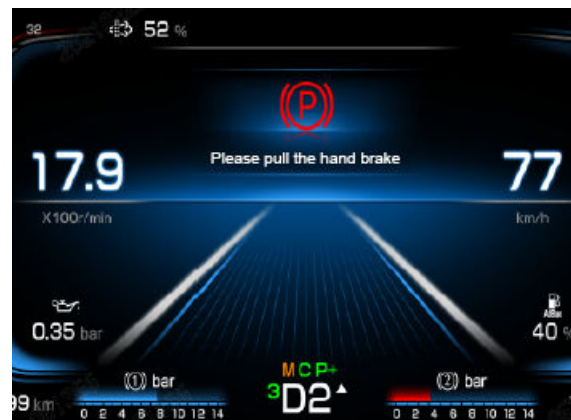
## Description of driver display screen

### Alarm information

Door not closed



Please pull the parking brake

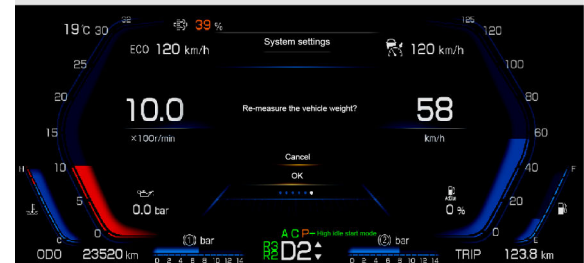


### Axle load information

Display the weight values of the main axle, trailer and cargo.



### Re-measure the vehicle's weight



## Description of driver display screen





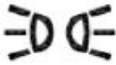


### Re-measuring



















## Description of signal light and alarm light

## Signal Light and Alarm Light







Information description	Detection light panel		Significance	Comments/further measures
Tractor left turn		Green	<b>Information</b> - Tractor left-turn indicator	
Trailer left turn		Green	<b>Information</b> - Trailer left-turn indicator	
Trailer right turn		Green	<b>Information</b> - Trailer right-turn indicator	
Tractor right turn signal		Green	<b>Information</b> - Tractor right-turn indicator	
Clearance light		Green	<b>Information</b> - Position light ON	
Parking brake		Red/Yellow	<b>Information</b> - Parking brake not released when the vehicle is running	Stop the vehicle immediately and release the parking brake.
ABS alarm of tractor		Red/Yellow	<b>Information</b> - ABS system fault	<b>Please drive the vehicle slowly and carefully!</b> <ul style="list-style-type: none"> <li>The tendency of wheel locking is increasing, please brake carefully.</li> <li>Immediately ask for help from a SINOTRUK service station.</li> </ul>







## Description of signal light and alarm light

Information description	Detection light panel		Significance	Comments/further measures
Engine fault warning light		Red	<b>Information</b> - Serious fault of engine system	<ul style="list-style-type: none"> <li>• Stop the vehicle immediately and please pay attention to the traffic conditions!</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
Engine fault warning light		Yellow	<b>Information</b> - General fault of engine system	<ul style="list-style-type: none"> <li>• Please drive carefully and slowly.</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
Fault warning symbol		Red	<b>Safety</b> - Accompanied by the illumination of other MILs or abnormal performance of instrument sensors	<ul style="list-style-type: none"> <li>• Stop the vehicle immediately and please pay attention to the traffic conditions!</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
Fault warning symbol		Yellow	<b>Information</b> - Together with other MIL illuminating	<ul style="list-style-type: none"> <li>• Please drive carefully and slowly.</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
Excessive emission alarm (China V)		Yellow	<b>Information</b> - excessive emission	<ul style="list-style-type: none"> <li>• Stop the vehicle immediately and please pay attention to the traffic conditions!</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
Excessive emission alarm (China VI)		Yellow	<b>Information</b> - excessive emission	<ul style="list-style-type: none"> <li>• Stop the vehicle immediately and please pay attention to the traffic conditions!</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
Brake system malfunction		Red	<b>Safety</b> - Too low air pressure circuit in the system	<p><b>The vehicle is not ready for driving!</b></p> <ul style="list-style-type: none"> <li>• Stop the vehicle immediately and please pay attention to the traffic conditions!</li> <li>• Idle the engine at a relatively higher rotating speed until the air pressure reaches the rated value (the displayed information disappears).</li> <li>• If the air pressure of the brake circuit cannot reach the rated value: do not move the vehicle,</li> </ul>









Information description	Detection light panel		Significance	Comments/further measures
				and ask for help from a SINOTRUK service station.
Low fuel level		Yellow	<b>Information</b> - Low fuel level	Refuel.
Low LNG level		Yellow	<b>Information</b> - LNG level low	Fill LNG.
Low CNG level		Yellow	<b>Information</b> - CNG level low	Refill the CNG.
High coolant temperature		Red	<b>Service station</b> - engine coolant temperature too high	<ul style="list-style-type: none"> <li>• Shift into a low gear to improve engine cooling.</li> <li>• Check the level of coolant and add coolant if necessary.</li> </ul>
Oil pressure alarm		Red/Yellow	<b>Safety</b> - Engine oil pressure Engine oil pressure is too low or too high	Check the engine oil level, fill or drain some engine oil as required, or immediately ask for help from a Sinotruk service station.
Low AdBlue level		Yellow	<b>Information</b> - Too low AdBlue tank level	Add AdBlue.
Tire pressure alarm		Yellow	<b>Information</b> - Tire pressure too high or too low	Check the tires.








## Description of signal light and alarm light

Information description	Detection light panel		Significance	Comments/further measures
ASR working indicator		Yellow	<b>Information</b> - ASR working	<ul style="list-style-type: none"> <li>• Please start the vehicle carefully.</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
ABS alarm of trailer		Red/Yellow	<b>Information</b> - ABS having only partial functions	<p><b>Please drive the vehicle slowly and carefully!</b></p> <ul style="list-style-type: none"> <li>• The tendency of wheel locking is increasing, please brake carefully.</li> <li>• Check the plug connection between the tractor and the trailer; if necessary, clean the plug to ensure reliable connection.</li> <li>• Check the connecting cables between the tractor and the trailer, and replace them with new ones if necessary.</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
LDW alarm		Yellow	<b>Information</b> - lane departure system	Pay attention to the driving environment and drive carefully.
AEBS alarm		Red/Yellow	<b>Safety</b> - automatic emergency braking system	Collision risk present. Maintain awareness of surroundings and drive with caution.
Driver warning indicator		Yellow	<b>Information</b> - low AdBlue level (less than or equal to 10%), poor AdBlue quality, abnormal AdBlue consumption, AdBlue freezing, etc.	Check the AdBlue level. If it is normal, ask for help from a SINOTRUK service station.
ESC effective working indicator		Yellow	<b>Information</b> - ESC open	









Information description	Detection light panel		Significance	Comments/further measures
ESC OFF indicator		Yellow	<b>Information</b> - ESC closed	
Wear of front axle brake pad		Yellow	<b>Information</b> - Wear of front axle brake pad	Replace the front axle brake pad in time.
Wear of rear axle brake pad		Yellow	<b>Information</b> - Wear of rear axle brake pad	Replace the rear axle brake pad in time.
Hill-start assist		Yellow	<b>Information</b> - Hill-start indicator	
ECAS fault		Red/Yellow	<b>Service station - electronically controlled air suspension (ECAS)</b> Electronically Controlled Air Suspension (ECAS) If the frame is lowered: reduce the braking effect. If the frame is lifted above the driving position: there is a risk of damaging the shock absorber.	<ul style="list-style-type: none"> <li>• Please drive carefully and slowly.</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
LCA (Blind Spot Detection)		Yellow	<b>Information</b> - blind spot detection system	Pay attention to the surrounding driving environment.

## Description of signal light and alarm light








Information description	Detection light panel		Significance	Comments/further measures
Retarder operation		White	<b>Information</b> - Retarder working	
Low beam		Green	<b>Information</b> - Low beam ON	
High beam		Blue	<b>Information</b> - High beam ON	
Daytime running light		Green	<b>Information</b> - Daytime running light ON	
Front fog light		Green	<b>Information</b> - Front fog light ON	
Rear fog light		Yellow	<b>Information</b> - Rear fog light ON	
Cruise control		Green	<b>Information</b> - Cruise working	
High tire pressure		Yellow	<b>Information</b> - high tire pressure	Ask for help from a SINOTRUK service station.

Information description	Detection light panel		Significance	Comments/further measures
Low tire pressure		Yellow	<b>Information-</b> low tire pressure	Ask for help from a SINOTRUK service station.
Tire overtemperature alarm		Yellow	<b>Information-</b> high tire temperature alarm	Please drive carefully and slowly.
Cab not locked		Red	<b>Safety</b> - Cab not fully locked	Please stop the vehicle immediately and lock the cab correctly.
Seat belt alarm		Red	<b>Information</b> - Driver not having the seat belt fastened	Fasten the seat belt before driving.
DPF carbon load indicator		Yellow/Red		The condition of carbon deposits is displayed; see "Engine Maintenance" for details.
DPF regeneration indicator		Yellow		It flashes when regeneration is activated, indicating that the exhaust pipe temperature is very high. Pay attention to driving safety.
Low coolant level		Red	<b>Information</b> - Engine coolant level too low	Please add coolant in time.








## Description of signal light and alarm light








Information description	Detection light panel		Significance	Comments/further measures
Transmission fault		Red	<b>Information-</b> serious fault of transmission	Immediately ask for help from a SINOTRUK service station.
Transmission fault		Red/Yellow	<b>Information-</b> transmission fault	Please drive carefully and slowly. You can check the DTC through the instrument and ask for help from a SINOTRUK service station.
Battery voltage low (high)		Red	<b>Service station</b> - Charging control	Immediately ask for help from a SINOTRUK service station.
PCW (Pedestrian Collision Warning)		Red/Yellow	<b>Information-</b> pedestrian collision warning	Pay attention to the driving environment and drive carefully.
STOP		Red	<b>Safety</b> - Other MILs will illuminate	<ul style="list-style-type: none"> <li>• Stop the vehicle immediately and please pay attention to the traffic conditions!</li> <li>• Immediately ask for help from a SINOTRUK service station!</li> </ul>
Adaptive cruise control fault		Red	<b>Information-</b> adaptive cruise control system fault	Immediately ask for help from a SINOTRUK service station.
Steering gear fault		Red/Yellow	<b>Information-</b> steering machine fault	<ul style="list-style-type: none"> <li>• Stop the vehicle immediately and please pay attention to the traffic conditions!</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
ADAS controller fault		Red/Yellow	<b>Information-</b> fault of controller of intelligent driver assistance system	Immediately ask for help from a SINOTRUK service station.











Information description	Detection light panel		Significance	Comments/further measures
Air pressure circuit 3		Red	<b>Safety</b> - low air pressure of circuit 3	<b>The vehicle is not ready for driving!</b> <ul style="list-style-type: none"> <li>• Stop the vehicle immediately and please pay attention to the traffic conditions!</li> <li>• Idle the engine at a relatively higher rotating speed until the air pressure reaches the specified value (the displayed information disappears).</li> <li>• If the air pressure of the brake circuit cannot reach the specified value: do not move the vehicle, and ask for help from a SINOTRUK service station.</li> </ul>
Air pressure circuit 4		Red	<b>Safety</b> - low air pressure of circuit 4	
Door not closed		Red	<b>Information</b> - door not closed	Close the door.
DPF regeneration prohibition indicator		Yellow	<b>Information</b> - DPF regeneration disabled	
Retarder alarm		Red	<b>Information</b> - Serious fault of retarder	Immediately ask for help from a SINOTRUK service station.
Retarder alarm		Yellow	<b>Information</b> - Retarder fault	<ul style="list-style-type: none"> <li>• Please drive carefully and slowly.</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
LKA (Lane Keeping Assist)		Green	<b>Information</b> - lane keeping assist system activated	

## Description of signal light and alarm light








Information description	Detection light panel		Significance	Comments/further measures
LKA (Lane Keeping Assist)		Yellow	<b>Information</b> - fault of lane keeping assist system	Immediately ask for help from a SINOTRUK service station.
TSR (Traffic Sign Recognition)		Green	<b>Information</b> - traffic sign identification system turned on	
TSR (Traffic Sign Recognition)		Red	<b>Information</b> - fault of traffic sign identification system	Immediately ask for help from a SINOTRUK service station.
Brake linkage disable		White	<b>Information</b> - brake linkage disable function activated	
PTO 1		Red/Yellow	<b>Information</b> - The yellow signal light is on when the PTO 1 works. At this time, if the vehicle speed is greater than 30 km/h and the engine speed is greater than 1900 r/min, the red signal light flashes with an audible alarm	Reduce the vehicle speed and engine rpm.
PTO 2		Red/Yellow	<b>Information</b> - the yellow signal light is on when the power take-off 2 works. At this time, if the vehicle speed is greater than 30 km/h and the engine speed is greater than 1900 r/min, the red signal light flashes with an audible alarm	Reduce the vehicle speed and engine rpm.
Engine overspeed		Red	<b>Information</b> - Engine speed exceeding the set value.	Shift into a higher gear or reduce the vehicle speed!

Information description	Detection light panel		Significance	Comments/further measures
Vehicle overspeed		Red/Yellow	<b>Information</b> - Vehicle speed exceeding the set value.	Reduce speed !
Fuel filter blocked		Red	<b>Information</b> - Fuel filter blocked	Replace the filter element.
ADCU fault		Red	<b>Information</b> - serious fault of ADCU	<ul style="list-style-type: none"> <li>• Stop the vehicle immediately and please pay attention to the traffic conditions!</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
ADCU fault		Yellow	<b>Information</b> - ADCU fault	<ul style="list-style-type: none"> <li>• Please drive carefully and slowly.</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
BCU fault		Red	<b>Information</b> - serious fault of BCU	<ul style="list-style-type: none"> <li>• Stop the vehicle immediately and please pay attention to the traffic conditions!</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
BCU fault		Yellow	<b>Information</b> - BCU fault	<ul style="list-style-type: none"> <li>• Please drive carefully and slowly.</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
High transmission oil temperature		Yellow	<b>Information</b> - High transmission oil temperature	Reduce the vehicle speed and engine rpm. If the oil temperature continues to be high, consider whether the working conditions/loads are reasonable, or consult a SINOTRUK service station.








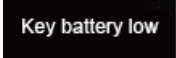
## Description of signal light and alarm light








Information description	Detection light panel		Significance	Comments/further measures
Water in fuel		White	<b>Information</b> - Water in fuel	Drain water from the primary fuel filter.
Air filter blockage		White	<b>Information</b> - Air filter blockage	Maintain the air filter. See "Air filter" for details.
Maintenance prompt		Yellow		Timely maintain it.
PPC working indicator		White/Green	<b>Information</b> - predictive driving system activated	
PPC system fault		Yellow	<b>Information</b> - fault of predictive cruise control system	Immediately ask for help from a SINOTRUK service station.
Exhaust brake		White	<b>Information</b> - Exhaust brake working	
Intake preheating		White	<b>Information</b> - Intake preheating system activated	
Low gear		Green	<b>Information</b> - Transmission in low gear range	

## Description of signal light and alarm light








Information description	Detection light panel		Significance	Comments/further measures
ECAS drive help mode		White	<b>Information</b> - drive help mode activated	
ECAS optimal drive traction mode		White	<b>Information</b> - optimal traction mode activated	
Lift axle		Green	<b>Information</b> - Lift axle in lifting status	
Status of intelligent headlight control (IHC) system		White	<b>Information</b> - IHC turned off	
Status of intelligent headlight control (IHC) system		Green	<b>Information</b> - IHC turned on	
Intelligent auxiliary brake status indicator		White/red/ yellow/green	<b>Information</b> - intelligent auxiliary brake status	
Steering oil level alarm		Red	<b>Information</b> - low fuel level	Add steering fluid in time.

## Description of signal light and alarm light

Information description	Detection light panel		Significance	Comments/further measures
Manual mode		Amber	<b>Information</b> - transmission gear manual mode	
Auto mode		Green	<b>Information</b> - transmission gear Auto mode	
Power mode		Amber	<b>Information</b> - transmission gear power mode	
Economic mode		Green	<b>Information</b> - transmission gear economic mode	
C mode		Green	<b>Information</b> - transmission gear C mode	
Adaptive cruise control		White	<b>Information</b> - adaptive cruise control	
ECO mode		White	<b>Information</b> - energy-saving mode	
Low key battery		Text displayed	<b>Information</b> - low battery of remote control key	Replace the battery in time.



Information description	Detection light panel		Significance	Comments/further measures
Airbag system warning light		Amber	<b>Information</b> - airbag system status indicator	When the vehicle is powered on, the airbag system is automatically turned on. At this time, the airbag system warning light on the instrument panel lights up after about 3 seconds, and then goes out after about 3 seconds, indicating that the airbag system is working normally.
Airbag system warning light		Indicator off/ always on/ always on after flashing	<b>Information</b> - airbag system status indicator	If there is a fault in the airbag system, immediately ask for help from a SINOTRUK service station.
Blind spot information information system (BSIS)		Yellow		<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• For more details, please refer to the "Driver Assistance System" section.</li> </ul>
ISA off indicator		Green	<b>Information</b> - ISA off	<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• For more details, please refer to the "Driver Assistance System" section.</li> </ul>
ISA indicator		Yellow		<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• For more details, please refer to the "Driver Assistance System" section.</li> </ul>
ISA not detected		Red	<b>Information</b> - ISA system unable to detect speed limit information	<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• For more details, please refer to the "Driver Assistance System" section.</li> </ul>
ISA speed limit display		Digital display	<b>Information</b> - ISA detects speed limit information	<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• For more details, please refer to the "Driver Assistance System" section.</li> </ul>

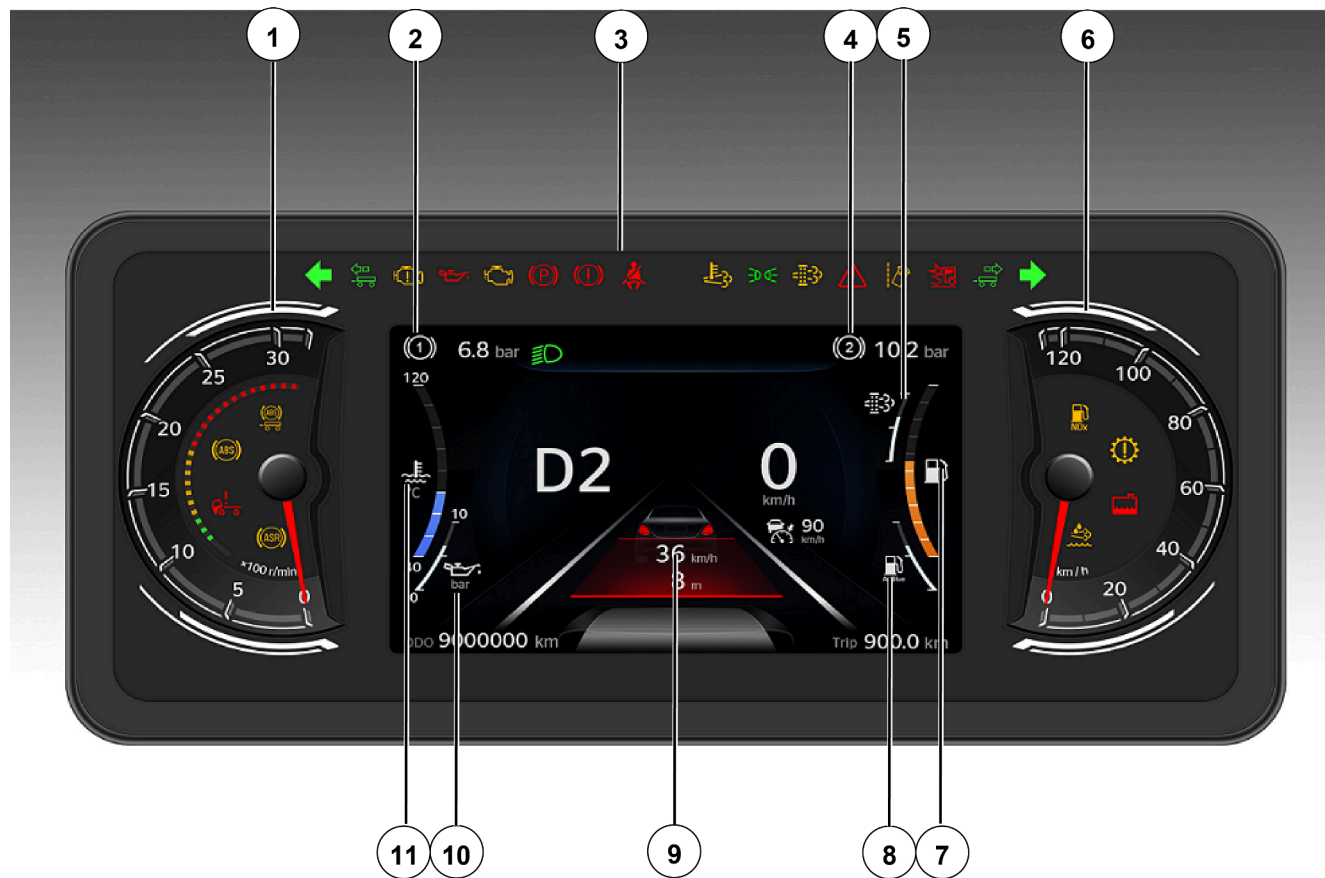
## Description of signal light and alarm light

Information description	Detection light panel		Significance	Comments/further measures
MOIS indicator		Amber		<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• For more details, please refer to the "Driver Assistance System" section.</li> </ul>
MOIS warning light		Yellow	<b>Information</b> - MOIS warning	<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• For more details, please refer to the "Driver Assistance System" section.</li> </ul>
MOIS off indicator		Green	<b>Information</b> - MOIS off	<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• For more details, please refer to the "Driver Assistance System" section.</li> </ul>
DDAW fatigue Level I		White	<b>Information</b> - driver fatigue level	<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• For more details, please refer to the "Driver Assistance System" section.</li> </ul>
DDAW fatigue Level II		Yellow	<b>Information</b> - driver fatigue level	<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• For more details, please refer to the "Driver Assistance System" section.</li> </ul>
DDAW fatigue Level III		Red	<b>Information</b> - driver fatigue level	<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• For more details, please refer to the "Driver Assistance System" section.</li> </ul>
DDAW system fault		Yellow	<b>Information</b> - DDAW system fault	<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>



## Description of signal light and alarm light

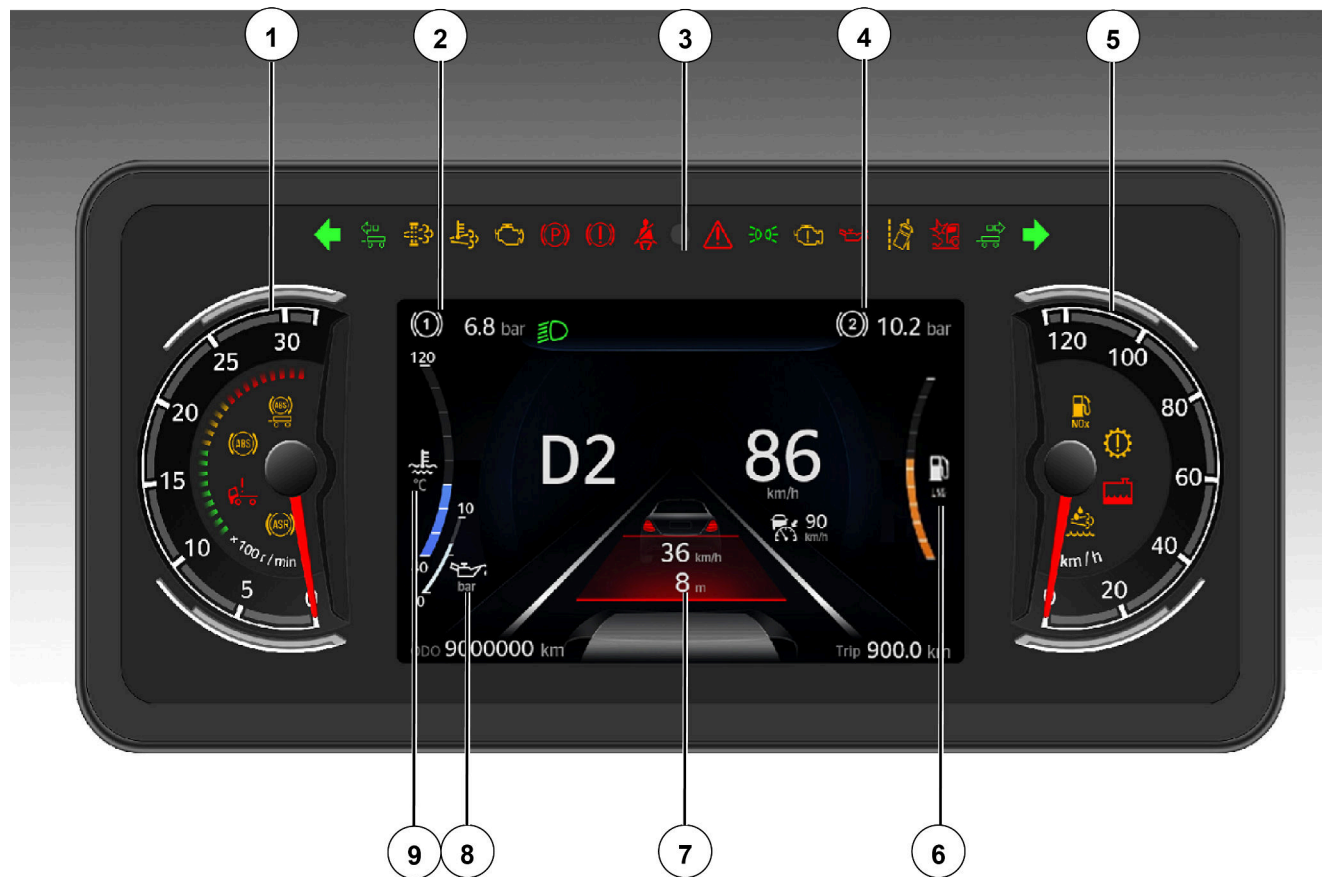
Information description	Detection light panel		Significance	Comments/further measures
ADDW warning		Red	<b>Information</b> - When driver fatigue is detected, the system issues a warning to alert the driver	<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• For more details, please refer to the "Driver Assistance System" section.</li> </ul>
ADDW fault		Yellow	<b>Information</b> - ADDW system fault	<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>



### Instrument panel

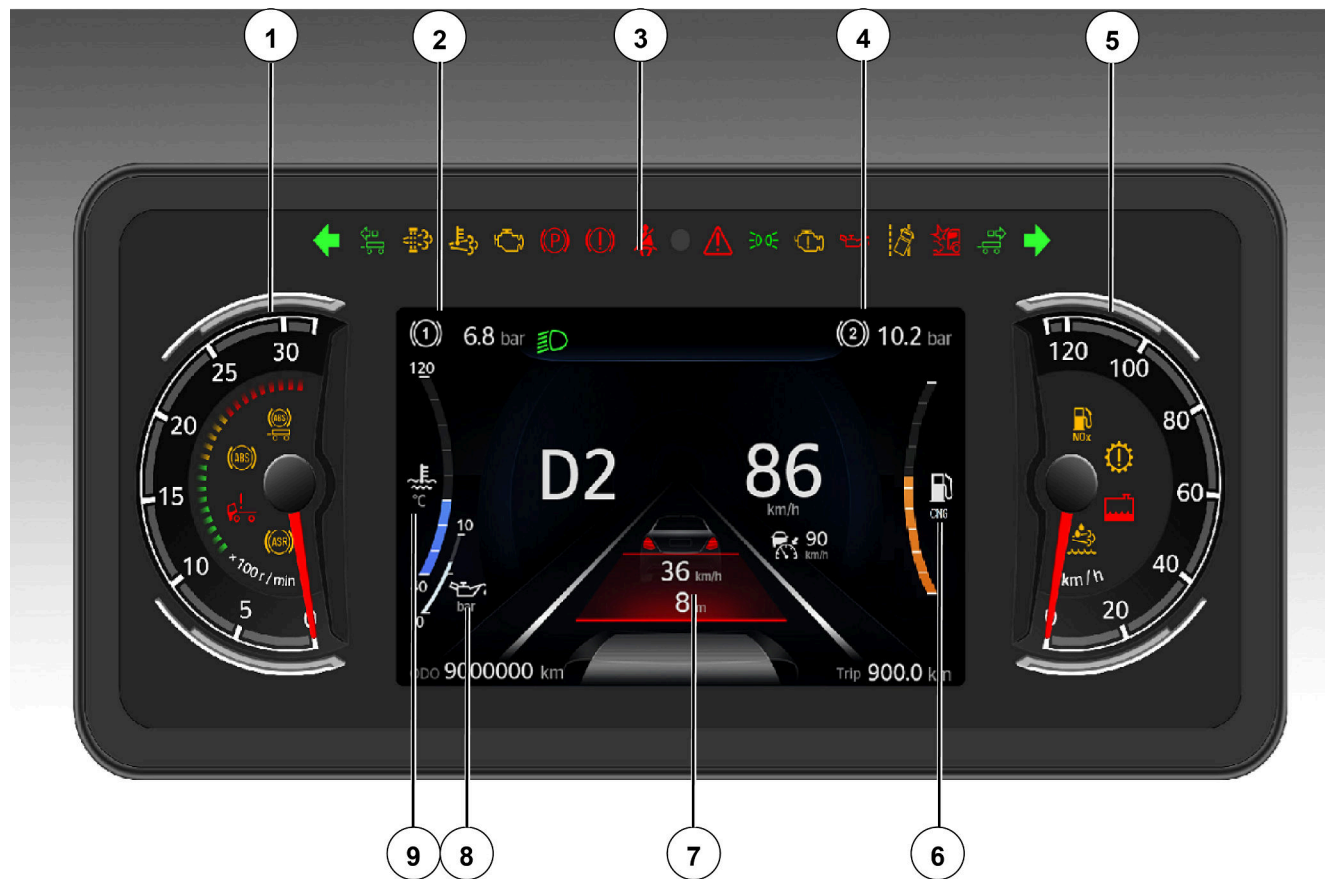
#### Suspended color screen instrument (fuel-powered model)

- 1 Tachometer
- 2 Air pressure gauge 1
- 3 Detection lamp and indicator lamp
- 4 Air pressure gauge 2
- 5 Carbon loading
- 6 Speedometer
- 7 Fuel level gauge
- 8 AdBlue level gauge
- 9 Driver display screen
- 10 Oil pressure gauge
- 11 Coolant temperature gauge



### **Suspended color screen instrument (LNG-powered model)**

- 1 Tachometer
- 2 Air pressure gauge 1
- 3 Detection lamp and indicator lamp
- 4 Air pressure gauge 2
- 5 Speedometer
- 6 LNG meter
- 7 Driver display screen
- 8 Oil pressure gauge
- 9 Coolant temperature gauge



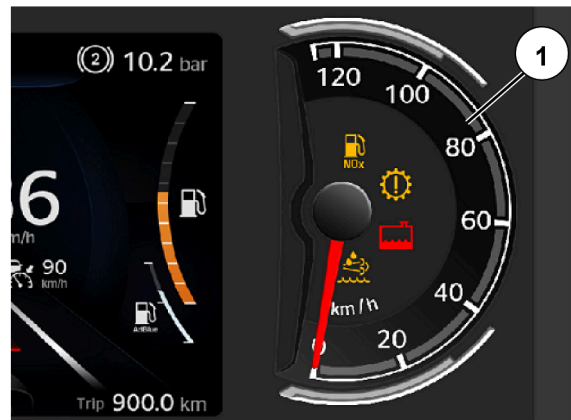
**Suspended color screen instrument (CNG-powered model)**

- 1 Tachometer
- 2 Air pressure gauge 1
- 3 Detection lamp and indicator lamp
- 4 Air pressure gauge 2
- 5 Speedometer
- 6 CNG meter
- 7 Driver display screen
- 8 Oil pressure gauge
- 9 Coolant temperature gauge

**Speedometer ①**

It displays the traveling speed of the vehicle, with an indication range of 0-120 km/h.

When the vehicle speed is too high, the vehicle overspeed warning lamp on the driver display screen will go on.



## Instrument panel

### Engine tachometer ②

It displays the engine rpm, with an indication range of 0-3,000 r/min.

The green area represents the economical rpm range of the engine. When the engine rpm is too high, the engine overspeed warning lamp on the driver display screen will go on.



### Coolant temperature gauge ③

It displays the temperature of the engine coolant, with an indication range of 40-120°C, and each minor division represents 10°C.

When the coolant temperature is too high, the high coolant temperature warning lamp will go on and the progress bar turns red.

### Engine oil pressure gauge ④

It displays the engine oil pressure, with an indication range of 0-10bar.

When the engine oil pressure is too high or too low, the engine oil pressure warning lamp will go on and the progress bar will turn red.





**Fuel gauge ⑤**

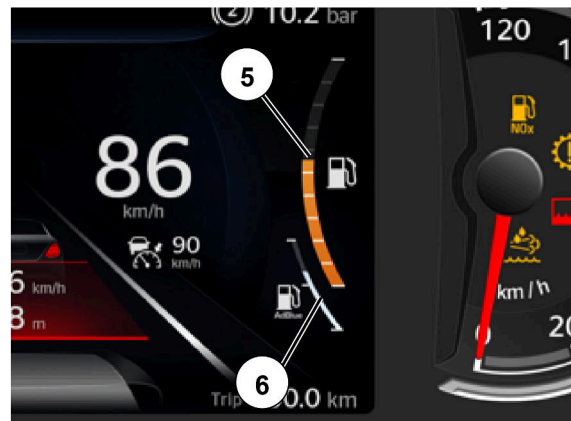
It displays the level of fuel remaining in the vehicle's fuel tank.

When the level of remaining fuel is too low, the low fuel level indicator lamp will go on and the progress bar will turn red.

**Urea level gauge ⑥**

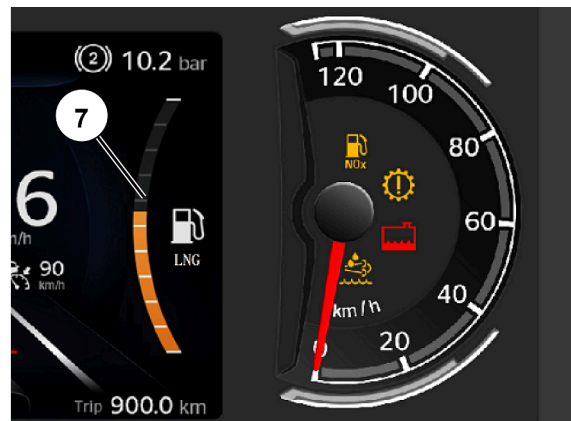
It displays the urea level in the urea tank.

When the urea level is too low, the low urea level warning lamp will go on, and the progress bar turns red.

**LNG meter ⑦**

Display the remaining LNG of the vehicle.

When the remaining LNG volume is low, the LNG low level indicator lamp goes on, and the progress bar turns red.

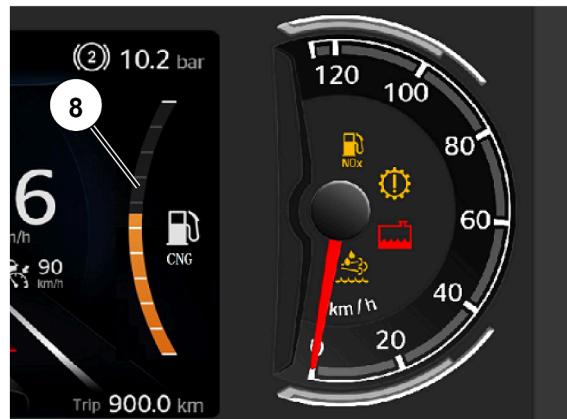


## Instrument panel

### CNG meter ⑧

Display the remaining CNG of the vehicle.

When the remaining CNG volume is low, the CNG low level indicator lamp goes on, and the progress bar turns red.



### Barometer 1 ⑨

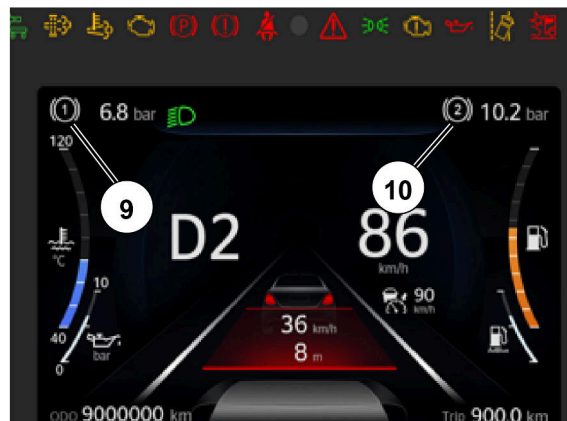
It displays the air pressure of brake circuit 1, with the display range of 0~12bar.

When the air pressure is lower than 5.5 bar, the brake system fault warning lamp will go on.

### Barometer 2 ⑩

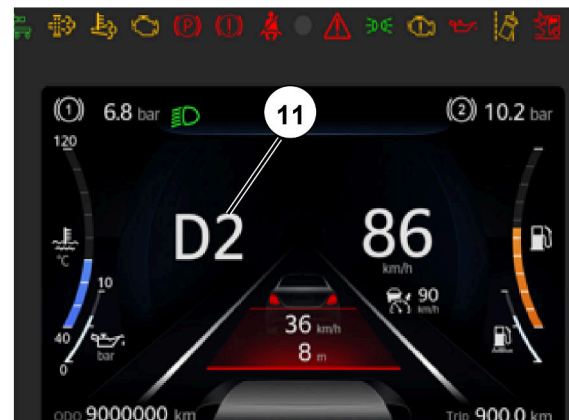
It displays the air pressure of brake circuit 2, with the display range of 0~12bar.

When the air pressure is lower than 5.5 bar, the brake system fault warning lamp will go on.



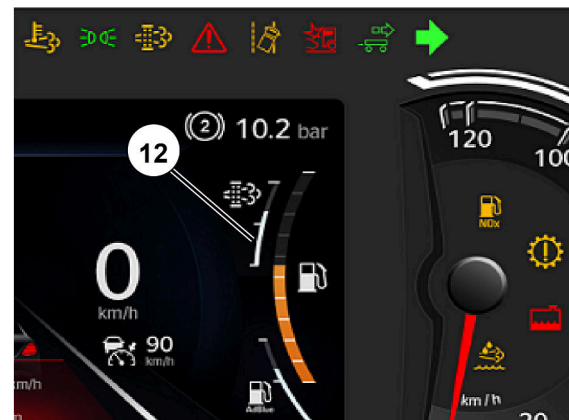
**Gear display ⑪**

It displays the current gear position of the transmission.

**Carbon load ⑫**

Display the carbon deposit of the vehicle.

When the carbon load is too high, the DPF carbon load indicator lamp on the instrument will light up and the progress bar will turn red.



## Description of driver display screen

### Description of driver display screen

The driver display screen ① and the detection lamp panel ② are used to indicate the conditions of the vehicle. They are supplement to the information provided by the respective instruments on the instrument panel.

When the warning conditions are met, the warning symbol will be displayed on the screen.



Select the menu with the left button of the steering wheel.



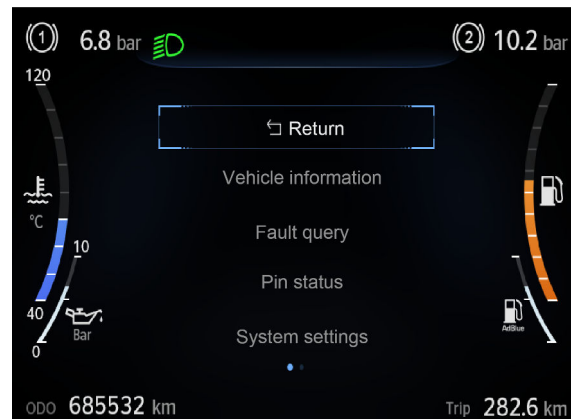
### Home screen



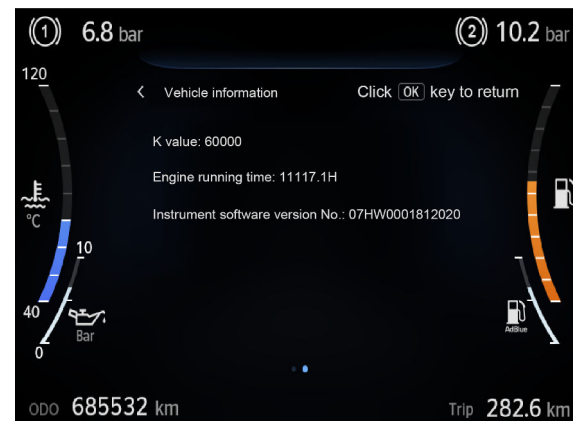
## Description of driver display screen

### First-level menu

Including the vehicle information, fault query, pin status, system setting, and tire pressure monitoring.



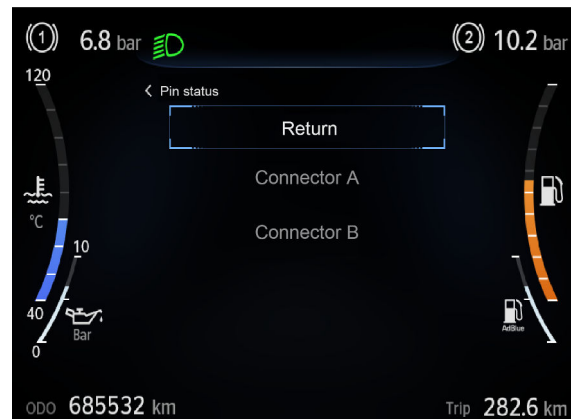
## Vehicle information



## Description of driver display screen

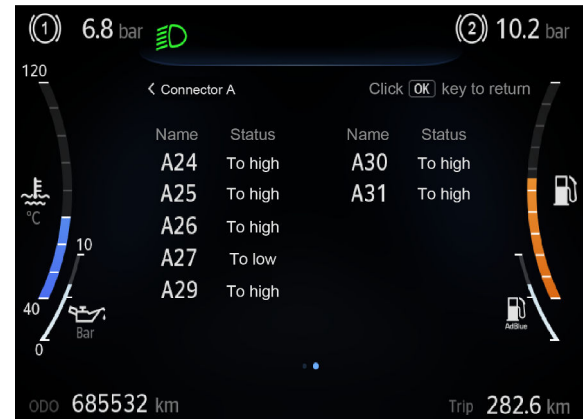
### Pin status

The two options, connector A and connector B, can be selected.





### The pin status of connector A



## Description of driver display screen

### The pin status of connector B



### Fault query

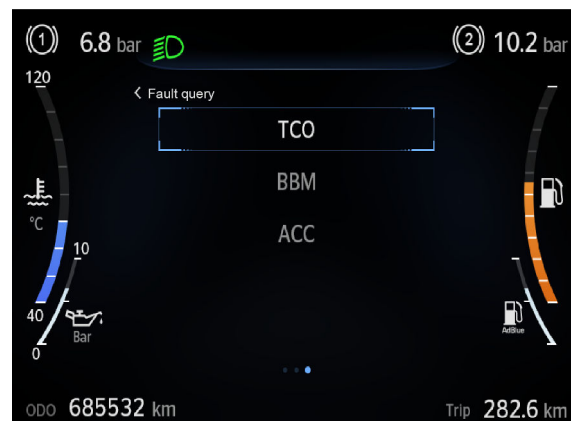
The fault query includes the following options:

Engine, TCU, ABS, Retarder, BCU, VCU, ECAS, AEB, LDWS, TCO, BBM, ACC



## Description of driver display screen

### Fault query



### Engine fault query screen



## TCU fault query screen



## ABS fault query



## Description of driver display screen

### Retarder fault query



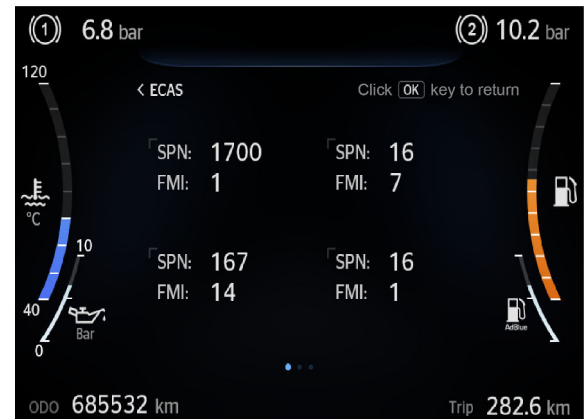
### BCU fault query



### VCU fault query



### ECAS fault query



## Description of driver display screen

### AEB fault query



### LDWS fault query





## TCO fault query



## BBM fault query



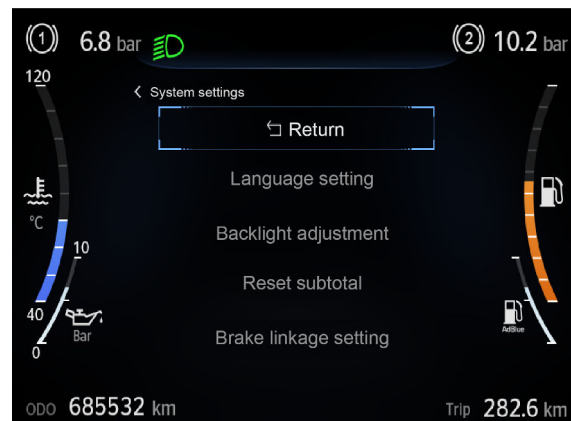
## Description of driver display screen

### ACC fault query



### System Settings

Including: Language setting, backlight adjustment, trip resetting, and brake linkage feature setting



### Language setting

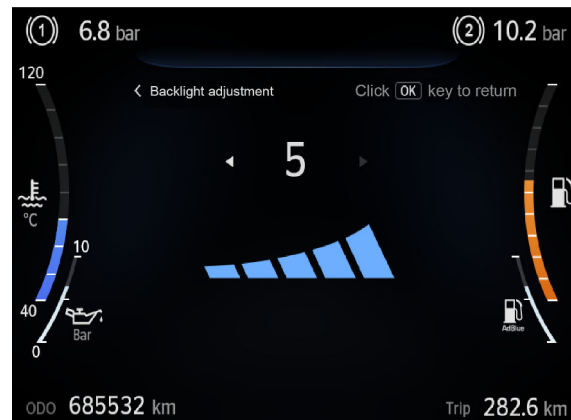
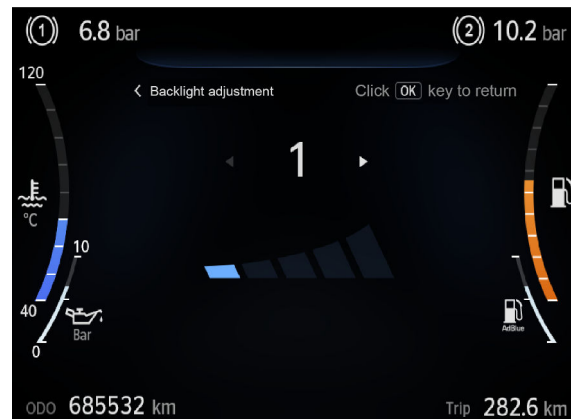
Chinese or English



## Description of driver display screen

### Back lighting adjustment

Gear 1-5 brilliance adjustment



### Trip resetting

Select OK to reset the trip



### Brake linkage setting

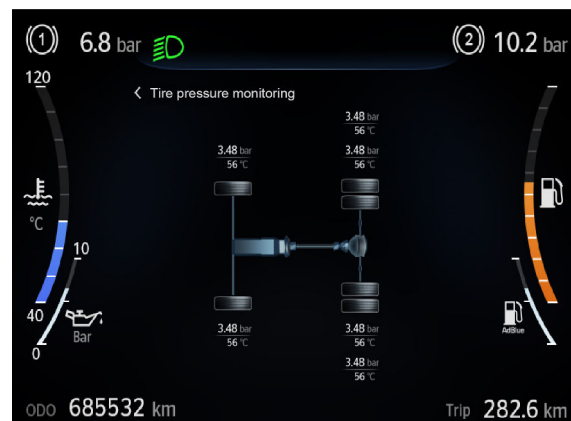
Select Activate to enable brake linkage.



## Description of driver display screen

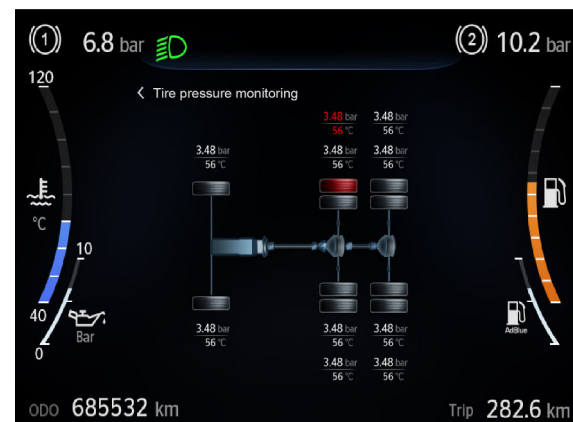
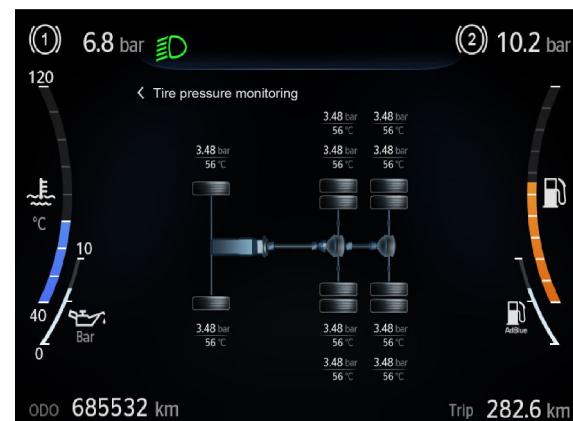
### Tire pressure monitoring

4X2 model



## Tire pressure monitoring

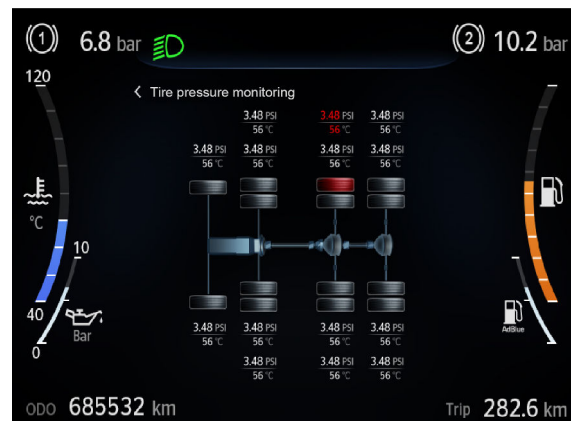
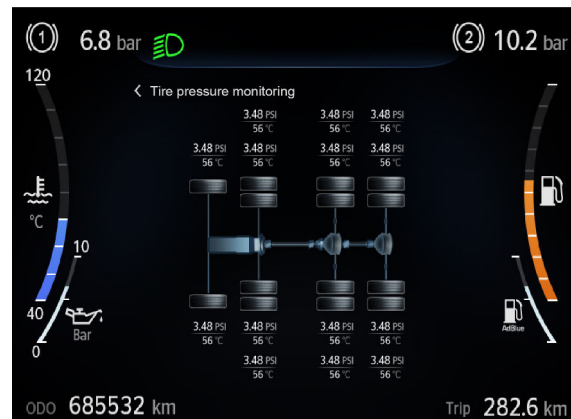
6X4 model



## Description of driver display screen

### Tire pressure monitoring

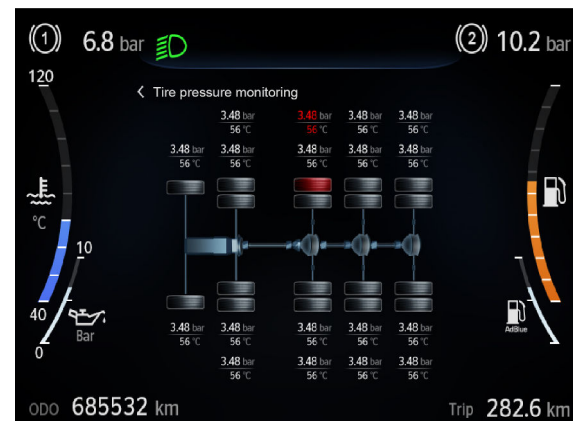
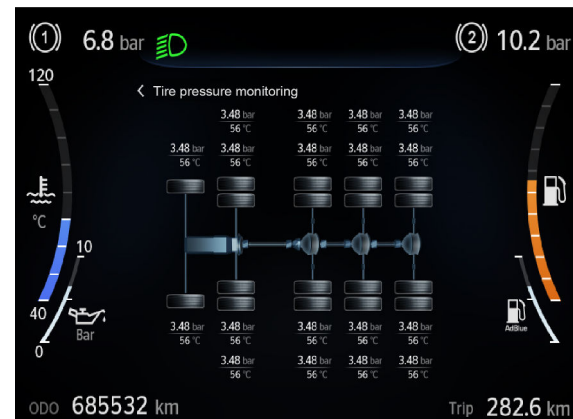
8X4 model





## Tire pressure monitoring

10X4 model



## Description of driver display screen

Smart truck

Adaptive cruise control



## Cruise control



## Eco mode



## Description of driver display screen

### Lane departure warning

#### Left departure



#### Right departure



### Axle load information - gross vehicle weight

Enter "Axle load information". "Gross vehicle weight" is selected by default.

In this interface, you can press the OK button to return to the main menu.

Enter this interface:

- Press the Up or Down button on the left side of the steering wheel to switch directly to this interface from other options.
- After the vehicle net weight operation, the system will automatically jump to this interface.



### Axle load information - cargo weight

In this interface, you can press the OK button to return to the main menu.

Enter this interface:

Press the Up or Down button on the left side of the steering wheel to switch directly to this interface from other options.

**Note:** When the instrument does not receive the relevant message, the "Gross Vehicle Weight" and "Cargo Weight" are displayed as "-".]



## Description of driver display screen

### Axle load information - cargo weight

In this interface, you cannot press the OK button to return to the main menu.

Enter this interface:

Press the Up or Down button on the left side of the steering wheel to select this interface, and then press the OK button to enter.





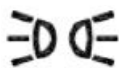


Select OK button or [Cancel] to jump to the "Gross vehicle weight" interface.

Select the OK button to record the current "gross vehicle weight" as the "net vehicle weight" information in the background (the driver cannot view the net weight of the vehicle).










## Description of signal light and alarm light








## Signal Light and Alarm Light

Information description	Detection light panel		Significance	Comments/further measures
Tractor left turn		Green	<b>Information</b> - Tractor left-turn indicator	
Trailer left turn		Green	<b>Information</b> - Trailer left-turn indicator	
Trailer right turn		Green	<b>Information</b> - Trailer right-turn indicator	
Tractor right turn signal		Green	<b>Information</b> - Tractor right-turn indicator	
Clearance light		Green	<b>Information</b> - Position light ON	
Parking brake		Red/Yellow	<b>Information</b> - Parking brake not released when the vehicle is running	Stop the vehicle immediately and release the parking brake.
ABS alarm of tractor		Red/Yellow	<b>Information</b> - ABS system fault	<b>Please drive the vehicle slowly and carefully!</b> <ul style="list-style-type: none"> <li>The tendency of wheel locking is increasing, please brake carefully.</li> <li>Immediately ask for help from a SINOTRUK service station.</li> </ul>







## Description of signal light and alarm light







Information description	Detection light panel		Significance	Comments/further measures
Engine fault warning light		Red	<b>Information</b> - Serious fault of engine system	<ul style="list-style-type: none"> <li>• Stop the vehicle immediately and please pay attention to the traffic conditions!</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
Engine fault warning light		Yellow	<b>Information</b> - General fault of engine system	<ul style="list-style-type: none"> <li>• Please drive carefully and slowly.</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
Fault warning symbol		Red	<b>Safety</b> - Accompanied by the illumination of other MILs or abnormal performance of instrument sensors	<ul style="list-style-type: none"> <li>• Stop the vehicle immediately and please pay attention to the traffic conditions!</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
Fault warning symbol		Yellow	<b>Information</b> - Together with other MIL illuminating	<ul style="list-style-type: none"> <li>• Please drive carefully and slowly.</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
Excessive emission alarm (China V)		Yellow	<b>Information</b> - excessive emission	<ul style="list-style-type: none"> <li>• Stop the vehicle immediately and please pay attention to the traffic conditions!</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
Excessive emission alarm (China VI)		Yellow	<b>Information</b> - excessive emission	<ul style="list-style-type: none"> <li>• Stop the vehicle immediately and please pay attention to the traffic conditions!</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
Brake system malfunction		Red	<b>Safety</b> - Too low air pressure circuit in the system	<p><b>The vehicle is not ready for driving!</b></p> <ul style="list-style-type: none"> <li>• Stop the vehicle immediately and please pay attention to the traffic conditions!</li> <li>• Idle the engine at a relatively higher rotating speed until the air pressure reaches the rated value (the displayed information disappears).</li> <li>• If the air pressure of the brake circuit cannot reach the rated value: do not move the vehicle,</li> </ul>











Information description	Detection light panel		Significance	Comments/further measures
				and ask for help from a SINOTRUK service station.
Low fuel level		Yellow	<b>Information</b> - Low fuel level	Refuel.
Low LNG level		Yellow	<b>Information</b> - LNG level low	Fill LNG.
Low CNG level		Yellow	<b>Information</b> - CNG level low	Refill the CNG.
High coolant temperature		Red	<b>Service station</b> - engine coolant temperature too high	<ul style="list-style-type: none"> <li>• Shift into a low gear to improve engine cooling.</li> <li>• Check the level of coolant and add coolant if necessary.</li> </ul>
Oil pressure alarm		Red/Yellow	<b>Safety</b> - Engine oil pressure Engine oil pressure is too low or too high	Check the engine oil level, fill or drain some engine oil as required, or immediately ask for help from a Sinotruk service station.
Low AdBlue level		Yellow	<b>Information</b> - Too low AdBlue tank level	Add AdBlue.
Tire pressure alarm		Yellow	<b>Information</b> - Tire pressure too high or too low	Check the tires.








## Description of signal light and alarm light

Information description	Detection light panel		Significance	Comments/further measures
ASR working indicator		Yellow	<b>Information</b> - ASR working	<ul style="list-style-type: none"> <li>• Please start the vehicle carefully.</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
ABS alarm of trailer		Red/Yellow	<b>Information</b> - ABS having only partial functions	<p><b>Please drive the vehicle slowly and carefully!</b></p> <ul style="list-style-type: none"> <li>• The tendency of wheel locking is increasing, please brake carefully.</li> <li>• Check the plug connection between the tractor and the trailer; if necessary, clean the plug to ensure reliable connection.</li> <li>• Check the connecting cables between the tractor and the trailer, and replace them with new ones if necessary.</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
LDW alarm		Yellow	<b>Information</b> - lane departure system	Pay attention to the driving environment and drive carefully.
AEBS alarm		Red/Yellow	<b>Safety</b> - automatic emergency braking system	Collision risk present. Maintain awareness of surroundings and drive with caution.
Driver warning indicator		Yellow	<b>Information</b> - low AdBlue level (less than or equal to 10%), poor AdBlue quality, abnormal AdBlue consumption, AdBlue freezing, etc.	Check the AdBlue level. If it is normal, ask for help from a SINOTRUK service station.
ESC effective working indicator		Yellow	<b>Information</b> - ESC open	









Information description	Detection light panel		Significance	Comments/further measures
ESC OFF indicator		Yellow	<b>Information</b> - ESC closed	
Wear of front axle brake pad		Yellow	<b>Information</b> - Wear of front axle brake pad	Replace the front axle brake pad in time.
Wear of rear axle brake pad		Yellow	<b>Information</b> - Wear of rear axle brake pad	Replace the rear axle brake pad in time.
Hill-start assist		Yellow	<b>Information</b> - Hill-start indicator	
ECAS fault		Red/Yellow	<b>Service station - electronically controlled air suspension (ECAS)</b> Electronically Controlled Air Suspension (ECAS) If the frame is lowered: reduce the braking effect. If the frame is lifted above the driving position: there is a risk of damaging the shock absorber.	<ul style="list-style-type: none"> <li>• Please drive carefully and slowly.</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
LCA (Blind Spot Detection)		Yellow	<b>Information-</b> blind spot detection system	Pay attention to the surrounding driving environment.






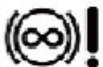

## Description of signal light and alarm light

Information description	Detection light panel		Significance	Comments/further measures
Retarder operation		White	<b>Information</b> - Retarder working	
Low beam		Green	<b>Information</b> - Low beam ON	
High beam		Blue	<b>Information</b> - High beam ON	
Daytime running light		Green	<b>Information</b> - Daytime running light ON	
Front fog light		Green	<b>Information</b> - Front fog light ON	
Rear fog light		Yellow	<b>Information</b> - Rear fog light ON	
Cruise control		Green	<b>Information</b> - Cruise working	
High tire pressure		Yellow	<b>Information</b> - high tire pressure	Ask for help from a SINOTRUK service station.








Information description	Detection light panel		Significance	Comments/further measures
Low tire pressure		Yellow	<b>Information-</b> low tire pressure	Ask for help from a SINOTRUK service station.
Tire overtemperature alarm		Yellow	<b>Information-</b> high tire temperature alarm	Please drive carefully and slowly.
Cab not locked		Red	<b>Safety</b> - Cab not fully locked	Please stop the vehicle immediately and lock the cab correctly.
Seat belt alarm		Red	<b>Information</b> - Driver not having the seat belt fastened	Fasten the seat belt before driving.
DPF carbon load indicator		Yellow/Red		The condition of carbon deposits is displayed; see "Engine Maintenance" for details.
DPF regeneration indicator		Yellow		It flashes when regeneration is activated, indicating that the exhaust pipe temperature is very high. Pay attention to driving safety.
Low coolant level		Red	<b>Information</b> - Engine coolant level too low	Please add coolant in time.

## Description of signal light and alarm light








Information description	Detection light panel		Significance	Comments/further measures
Transmission fault		Red	<b>Information-</b> serious fault of transmission	Immediately ask for help from a SINOTRUK service station.
Transmission fault		Red/Yellow	<b>Information-</b> transmission fault	Please drive carefully and slowly. You can check the DTC through the instrument and ask for help from a SINOTRUK service station.
Battery voltage low (high)		Red	<b>Service station</b> - Charging control	Immediately ask for help from a SINOTRUK service station.
PCW (Pedestrian Collision Warning)		Red/Yellow	<b>Information-</b> pedestrian collision warning	Pay attention to the driving environment and drive carefully.
STOP		Red	<b>Safety</b> - Other MILs will illuminate	<ul style="list-style-type: none"> <li>• Stop the vehicle immediately and please pay attention to the traffic conditions!</li> <li>• Immediately ask for help from a SINOTRUK service station!</li> </ul>
Adaptive cruise control fault		Red	<b>Information-</b> adaptive cruise control system fault	Immediately ask for help from a SINOTRUK service station.
Steering gear fault		Red/Yellow	<b>Information-</b> steering machine fault	<ul style="list-style-type: none"> <li>• Stop the vehicle immediately and please pay attention to the traffic conditions!</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
ADAS controller fault		Red/Yellow	<b>Information-</b> fault of controller of intelligent driver assistance system	Immediately ask for help from a SINOTRUK service station.

Information description	Detection light panel		Significance	Comments/further measures
Air pressure circuit 3		Red	<b>Safety</b> - low air pressure of circuit 3	<b>The vehicle is not ready for driving!</b> <ul style="list-style-type: none"> <li>• Stop the vehicle immediately and please pay attention to the traffic conditions!</li> <li>• Idle the engine at a relatively higher rotating speed until the air pressure reaches the specified value (the displayed information disappears).</li> <li>• If the air pressure of the brake circuit cannot reach the specified value: do not move the vehicle, and ask for help from a SINOTRUK service station.</li> </ul>
Air pressure circuit 4		Red	<b>Safety</b> - low air pressure of circuit 4	
Door not closed		Red	<b>Information</b> - door not closed	Close the door.
DPF regeneration prohibition indicator		Yellow	<b>Information</b> - DPF regeneration disabled	
Retarder alarm		Red	<b>Information</b> - Serious fault of retarder	Immediately ask for help from a SINOTRUK service station.
Retarder alarm		Yellow	<b>Information</b> - Retarder fault	<ul style="list-style-type: none"> <li>• Please drive carefully and slowly.</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
LKA (Lane Keeping Assist)		Green	<b>Information</b> - lane keeping assist system activated	









## Description of signal light and alarm light








Information description	Detection light panel		Significance	Comments/further measures
LKA (Lane Keeping Assist)		Yellow	<b>Information</b> - fault of lane keeping assist system	Immediately ask for help from a SINOTRUK service station.
TSR (Traffic Sign Recognition)		Green	<b>Information</b> - traffic sign identification system turned on	
TSR (Traffic Sign Recognition)		Red	<b>Information</b> - fault of traffic sign identification system	Immediately ask for help from a SINOTRUK service station.
Brake linkage disable		White	<b>Information</b> - brake linkage disable function activated	
PTO 1		Red/Yellow	<b>Information</b> - The yellow signal light is on when the PTO 1 works. At this time, if the vehicle speed is greater than 30 km/h and the engine speed is greater than 1900 r/min, the red signal light flashes with an audible alarm	Reduce the vehicle speed and engine rpm.
PTO 2		Red/Yellow	<b>Information</b> - The yellow signal light is on when the PTO 2 works. At this time, if the vehicle speed is greater than 30 km/h and the engine speed is greater than 1900 r/min, the red signal light flashes with an audible alarm	Reduce the vehicle speed and engine rpm.
Engine overspeed		Red	<b>Information</b> - Engine speed exceeding the set value.	Shift into a higher gear or reduce the vehicle speed!










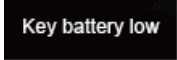
Information description	Detection light panel		Significance	Comments/further measures
Vehicle overspeed		Red/Yellow	<b>Information</b> - Vehicle speed exceeding the set value.	Reduce speed !
Fuel filter blocked		Red	<b>Information</b> - Fuel filter blocked	Replace the filter element.
ADCU fault		Red	<b>Information</b> - serious fault of ADCU	<ul style="list-style-type: none"> <li>• Stop the vehicle immediately and please pay attention to the traffic conditions!</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
ADCU fault		Yellow	<b>Information</b> - ADCU fault	<ul style="list-style-type: none"> <li>• Please drive carefully and slowly.</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
BCU fault		Red	<b>Information</b> - serious fault of BCU	<ul style="list-style-type: none"> <li>• Stop the vehicle immediately and please pay attention to the traffic conditions!</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
BCU fault		Yellow	<b>Information</b> - BCU fault	<ul style="list-style-type: none"> <li>• Please drive carefully and slowly.</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>
High transmission oil temperature		Yellow	<b>Information</b> - High transmission oil temperature	Reduce the vehicle speed and engine rpm. If the oil temperature continues to be high, consider whether the working conditions/loads are reasonable, or consult a SINOTRUK service station.








## Description of signal light and alarm light

Information description	Detection light panel		Significance	Comments/further measures
Water in fuel		White	<b>Information</b> - Water in fuel	Drain water from the primary fuel filter.
Air filter blockage		White	<b>Information</b> - Air filter blockage	Maintain the air filter. See "Air filter" for details.
Maintenance prompt		Yellow		Timely maintain it.
PPC working indicator		White/Green	<b>Information</b> - predictive driving system activated	
PPC system fault		Yellow	<b>Information</b> - fault of predictive cruise control system	Immediately ask for help from a SINOTRUK service station.
Exhaust brake		White	<b>Information</b> - Exhaust brake working	
Intake preheating		White	<b>Information</b> - Intake preheating system activated	
Low gear		Green	<b>Information</b> - Transmission in low gear range	








Information description	Detection light panel		Significance	Comments/further measures
ECAS drive help mode		White	<b>Information</b> - drive help mode activated	
ECAS optimal drive traction mode		White	<b>Information</b> - optimal traction mode activated	
Lift axle		Green	<b>Information</b> - Lift axle in lifting status	
Status of intelligent headlight control (IHC) system		White	<b>Information</b> - IHC turned off	
Status of intelligent headlight control (IHC) system		Green	<b>Information</b> - IHC turned on	
Intelligent auxiliary brake status indicator		White/red/ yellow/green	<b>Information</b> - intelligent auxiliary brake status	
Steering oil level alarm		Red	<b>Information</b> - low fuel level	Add steering fluid in time.



## Description of signal light and alarm light

Information description	Detection light panel		Significance	Comments/further measures
Manual mode		Amber	<b>Information</b> - transmission gear manual mode	
Auto mode		Green	<b>Information</b> - transmission gear Auto mode	
Power mode		Amber	<b>Information</b> - transmission gear power mode	
Economic mode		Green	<b>Information</b> - transmission gear economic mode	
C mode		Green	<b>Information</b> - transmission gear C mode	
Adaptive cruise control		White	<b>Information</b> - adaptive cruise control	
ECO mode		White	<b>Information</b> - energy-saving mode	
Low key battery		Text displayed	<b>Information</b> - low battery of remote control key	Replace the battery in time.

Information description	Detection light panel		Significance	Comments/further measures
Airbag system warning light		Amber	<b>Information</b> - airbag system status indicator	When the vehicle is powered on, the airbag system is automatically turned on. At this time, the airbag system warning light on the instrument panel lights up after about 3 seconds, and then goes out after about 3 seconds, indicating that the airbag system is working normally.
Airbag system warning light		Indicator off/ always on/ always on after flashing	<b>Information</b> - airbag system status indicator	If there is a fault in the airbag system, immediately ask for help from a SINOTRUK service station.
Blind spot information information system (BSIS)		Yellow		<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• For more details, please refer to the "Driver Assistance System" section.</li> </ul>
ISA off indicator		Green	<b>Information</b> - ISA off	<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• For more details, please refer to the "Driver Assistance System" section.</li> </ul>
ISA indicator		Yellow		<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• For more details, please refer to the "Driver Assistance System" section.</li> </ul>
ISA not detected		Red	<b>Information</b> - ISA system unable to detect speed limit information	<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• For more details, please refer to the "Driver Assistance System" section.</li> </ul>
ISA speed limit display		Digital display	<b>Information</b> - ISA detects speed limit information	<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• For more details, please refer to the "Driver Assistance System" section.</li> </ul>

## Description of signal light and alarm light

Information description	Detection light panel		Significance	Comments/further measures
MOIS indicator		Amber		<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• For more details, please refer to the "Driver Assistance System" section.</li> </ul>
MOIS warning light		Yellow	<b>Information</b> - MOIS warning	<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• For more details, please refer to the "Driver Assistance System" section.</li> </ul>
MOIS off indicator		Green	<b>Information</b> - MOIS off	<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• For more details, please refer to the "Driver Assistance System" section.</li> </ul>
DDAW fatigue Level I		White	<b>Information</b> - driver fatigue level	<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• For more details, please refer to the "Driver Assistance System" section.</li> </ul>
DDAW fatigue Level II		Yellow	<b>Information</b> - driver fatigue level	<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• For more details, please refer to the "Driver Assistance System" section.</li> </ul>
DDAW fatigue Level III		Red	<b>Information</b> - driver fatigue level	<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• For more details, please refer to the "Driver Assistance System" section.</li> </ul>
DDAW system fault		Yellow	<b>Information</b> - DDAW system fault	<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>

Information description	Detection light panel		Significance	Comments/further measures
ADDW warning		Red	<b>Information</b> - When driver fatigue is detected, the system issues a warning to alert the driver	<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• For more details, please refer to the "Driver Assistance System" section.</li> </ul>
ADDW fault		Yellow	<b>Information</b> - ADDW system fault	<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>

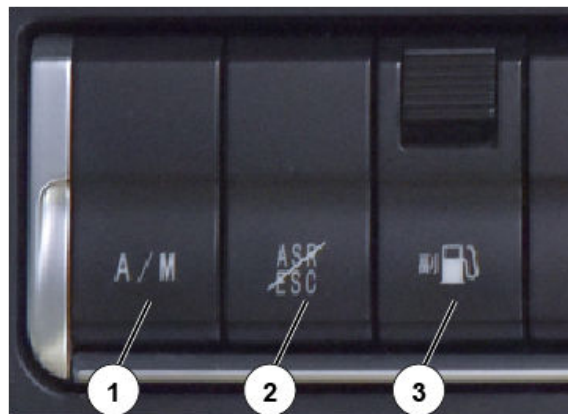
## Rocker switch and button

### Rocker switch and button

1 A/M switch: transmission mode selector switch. Press it to switch the transmission to the manual or Auto mode.

2 ASR/ESC switch: See the "Driver Assistance System" section.

3 Main and auxiliary fuel tank change-over switch: press the switch to switch to auxiliary fuel tank fuel, and the fuel gauge displays the amount of fuel in the auxiliary fuel tank.



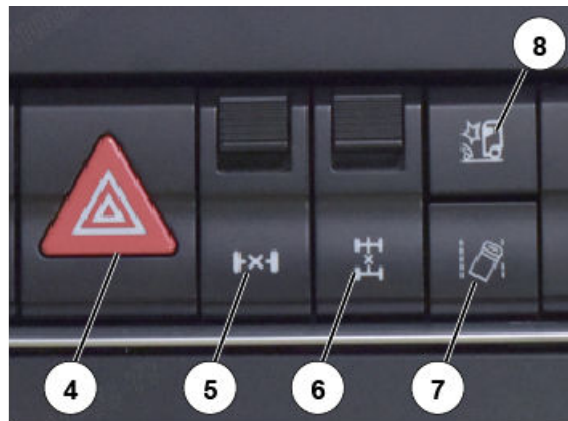
4 Emergency alarm switch: Press this switch, and all turn signal lights will flash and the turn indicators on the instrument will flash at the same time.

5 Inter-wheel differential switch: Press this switch to engage the inter-wheel differential lock.

6 Inter-axle differential switch: Press this switch to engage the inter-axle differential lock.

7 Lane departure warning switch: See the "Driver Assistance System" section.

8 Forward collision warning switch: See the "Driver Assistance System" section.

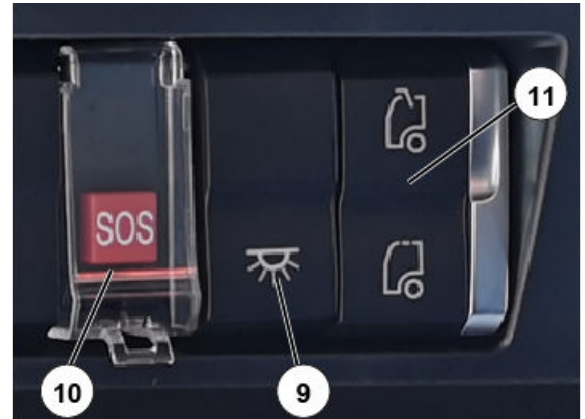




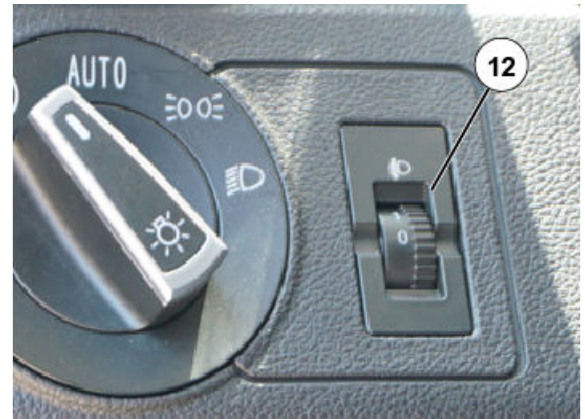
9 Interior lighting switch: Press the switch to turn on or off the interior lighting.

10 SOS switch: (internationally accepted) radio call signal.

11 Electric sunroof switch: press the switch to open or close the electric sunroof.



12 Headlight beam adjusting knob: The illumination position of the headlight beam adjustment switch can be adjusted manually based on the loading condition of the vehicle. There are a total of four gears, with the beam height gradually decreasing from gear 0 to gear 3.



## Rocker switch and button

13 Three-height optional switch: see "Air Suspension Operation".

14 Working light switch: Press this switch to turn on the rear working lights of the cab.



15 Fuel heating switch: press the switch to activate the primary fuel filter heating function.

16 Horn change-over switch: After pressing the switch, press the horn button on the steering wheel to sound the pneumatic horn.

17 DPF regeneration disable switch: press the switch to suppress DPF active regeneration and parking regeneration.

18 DPF active regeneration switch: press the switch to activate parking regeneration.



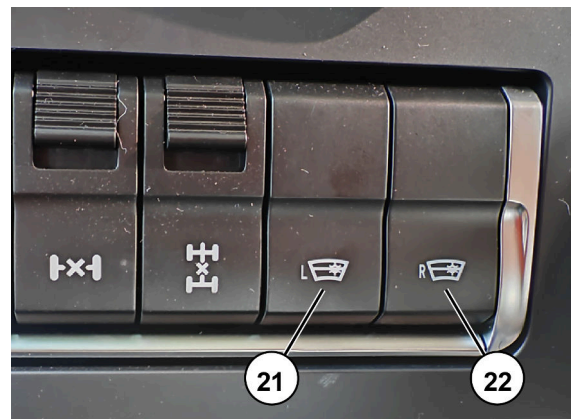
19 Right glass lift switch: press the switch to raise or lower the right glass.

20 Left glass lift switch: press the switch to raise or lower the left glass.



21 Left electric sunshade switch: Press the switch to open or retract the left sunshade.

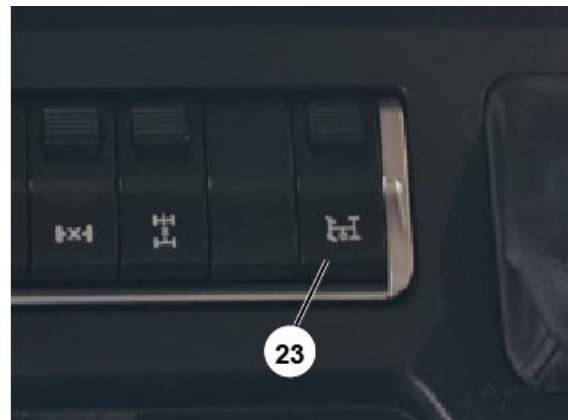
22 Right electric sunshade switch: Press the switch to open or retract the right sunshade.



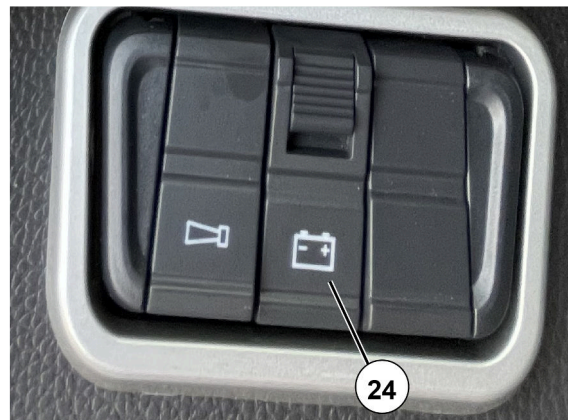
## Rocker switch and button

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23 Power take-off switch: press the switch to engage the power take-off.



24 Electromagnetic power master switch: The electromagnetic power master switch is optional, and the vehicle can be powered on/off by operating the switch.



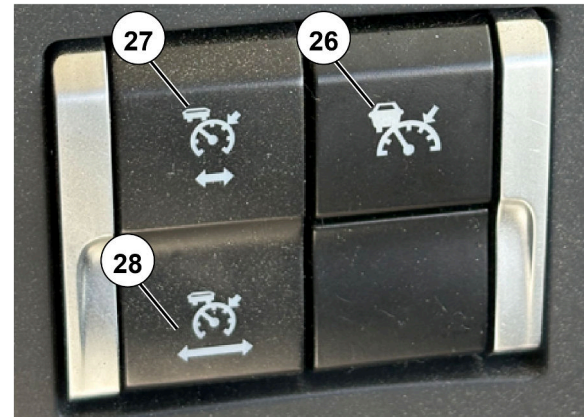
25 Hill-start assist switch: See the "Driver Assistance System" section.



26 Adaptive cruise control switch: See the "Driver Assistance System" section.

27 Adaptive cruise distance decrease button: Press the switch to reduce the following distance. See the "Driver Assistance System" section.

28 Adaptive cruise distance increase button: Press the switch to increase the following distance. See the "Driver Assistance System" section.



## Rocker switch and button

29 Intelligent speed assistance switch: Press the switch to enable or disable the ISA. A corresponding indicator will appear on the instrument panel. See the "Driver Assistance System" section.

30 Moving-off information system switch: Press the switch to enable or disable MOIS. A corresponding indicator will appear on the instrument panel. See the "Driver Assistance System" section.

31 Blind spot information system switch: Press the switch to enable or disable BSIS. A corresponding indicator will appear on the instrument panel. See the "Driver Assistance System" section.



### OBD diagnostic interface

The OBD DLC ① is located at the driver's pedal on the left side of the instrument panel. Connect the SINOTRUK special diagnostic scan tool at this interface to access the engine diagnostic interface.





## Left combination switch

### Left combination switch



The left combination switch is located on the left side of the steering column, which integrates the functions of steering switch, light switch, dimmer switch, wiper switch, and windshield washer switch.

See "Lighting" for details of lighting/dimming operation.

### Right steering switch

Push the left combination switch forward to position ①, then the right turn indicator lamp on the instrument panel will  flash. If there is a trailer, the right steering indicator lamp of the trailer will flash  at the same time.

### Left steering switch

Turn the left combination switch backward to position ②, then the left turn indicator lamp on the instrument panel will  flash. If there is a trailer, the left turn signal indicator lamp of the trailer will flash  at the same time.





**Wiper switch ③**

When the handle ③ is in the OFF position, the wiper is off.

When the handle ③ is turned to the LO position, the wiper works at low speed.

When the handle ③ is turned to the HI position, the wiper works at high speed.

When the handle ③ is turned to the AUTO position, the wiper enters the auto wiper gear. When it rains, the wiper will be switched on automatically, and the speed of the wiper will be adjusted according to the rainfall.

When the handle ③ is turned to the MIST position, the wiper works for one working cycle at low speed.

**Windshield washer switch ④**

Press the button ④ continuously for at least 1s, and the windshield washer system sprays the washer fluid onto the front windshield, and the wiper works at the same time. After the button is released, the wiper continues to work for one or two working cycles before stopping.



## Right multi-function switch

### Right multi-function switch

The right multi-function switch integrates transmission control, retarder switch, and exhaust brake switch.

For detailed operating instructions, please refer to "Transmission Operation" and "Retarder Operation."

**Right multi-function switch: matched with the HW automatic transmission.**

#### Retarder switch ①

The retarder switch features five positions: constant speed, 1st gear, 2nd gear, 3rd gear, and 4th gear.

#### Exhaust brake switch ②

The exhaust brake switch features 2 gears, namely gear I and gear II.

When the knob ② is in the "OFF" position, the exhaust brake function is deactivated.

**Right multi-function switch: matched with the ZF AMT transmission.**

#### Retarder switch ①

The retarder switch features five positions: constant speed, 1st gear, 2nd gear, 3rd gear, and 4th gear.

#### Exhaust brake switch ②

The exhaust brake switch features 2 gears, namely gear I and gear II.

When the knob ② is in the "OFF" position, the exhaust brake function is deactivated.

Switch ③: Economic/power mode selector switch.

Switch ④: Manual/Auto mode selector switch.

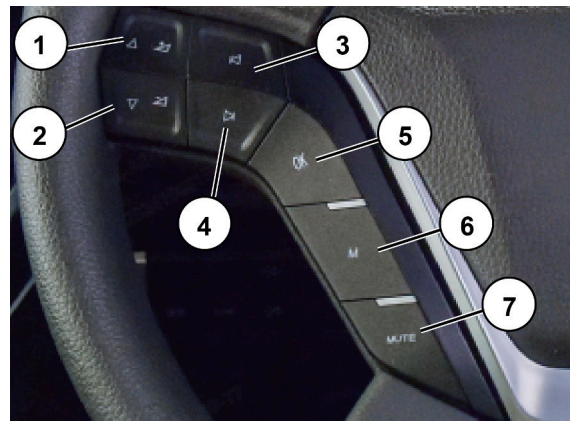
Switch ⑤: Upshift/downshift switch.



### Steering wheel button

#### Steering wheel left button 1

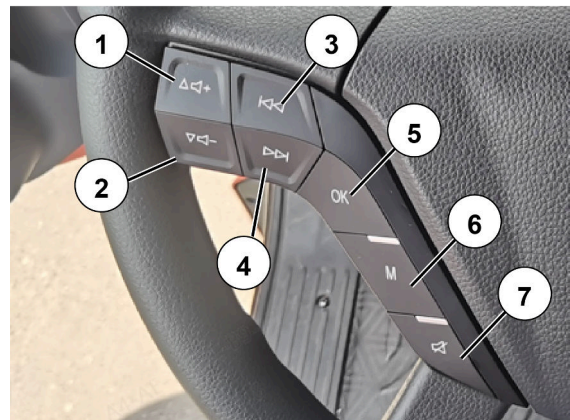
- Button ①: Volume + before mode switching. After mode switching: when the instrument menu is not activated, the instrument will turn up the screen, and when the instrument menu is activated, the menu cursor will be selected upward
- Button ②: Volume - before mode switching. After mode switching: when the instrument menu is not activated, the instrument turns down the screen, and when the instrument menu is activated, the menu cursor selects down
- Button ③: Previous track
- Button ④: Next track
- Button ⑤: Confirm button and instrument menu activation button
- Button ⑥: Mode switching key of ①② button
- Button ⑦: Mute



#### Steering wheel left button 2

##### Steering wheel left button

- ① Instrument - upward selection/volume +
- ② Instrument- down select/volume-
- ③ Instrument - flip up/previous song
- ④ Instrument - flip down/next song
- ⑤ Confirm button
- ⑥ Menu activation button (function switching between instrument and center control display)
- ⑦ Mute button

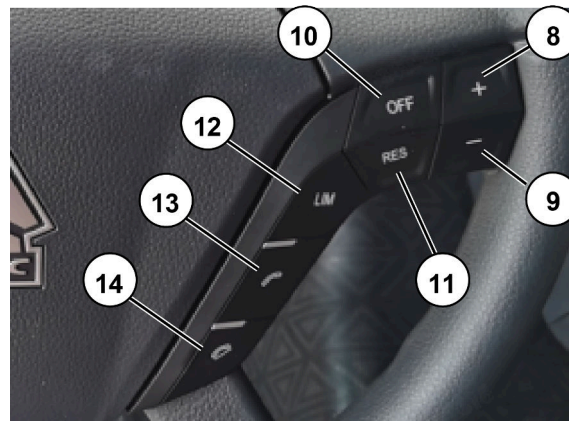


## Steering wheel button

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### Right side of steering wheel button

- Button ⑧: Cruise speed "+"
- Button ⑨: Cruise speed "-"
- Button ⑩: cruise control OFF
- Button ⑪: Cruise control recovery button
- Button ⑫: Speed limit function key
- Button ⑬: Bluetooth call answering button
- Button ⑭: Bluetooth phone hang-up button



### Cruise control

The cruise control function allows the vehicle to run at a constant speed without the need to press the accelerator.

When the following conditions are met, the vehicle can enter the cruise control function:

- The vehicle speed is greater than 30km/h;
- The engine is not in external torque control mode;
- Non-neutral gear;
- The clutch pedal is not pressed;
- The brake pedal is not pressed.

During driving, the driver can set the cruise speed by pressing the +/- button to make the vehicle enter the cruise mode. The driver can release the accelerator pedal, and the vehicle will run at the set cruising speed.

Throttle operation is allowed in the cruise control mode. In cruise control mode, when the torque corresponding to the driver stepping on the accelerator pedal is less than the torque required for current cruise control, the vehicle will still drive at the set cruising speed; otherwise, the vehicle will accelerate in response to the accelerator opening. If the driver releases the accelerator pedal, the vehicle will return to the previous target cruise speed.

During cruise driving, the driver can change the cruise target speed value by +/-.

When the cruising speed is set, the corresponding display is displayed on the instrument.

- When the driver jogs the +/- key, the cruise target speed increases or decreases in steps of 1 km/h;
- When the +/- key is pressed and held, the cruise target speed increases/decreases at a speed of 2 km/h/s.

### Cruise exit



## Cruise control

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- When any of the conditions is not met, the cruise control mode will exit automatically. When the conditions are met again, the driver can press the RES button to re-enter the cruise control, and the cruise control target speed is the last cruise control target speed.
- When the driver presses the OFF button or pulls up the parking brake, the cruise control will exit directly and cannot be restored. Press the +/- button again to enter the cruise control.

**Key switch**

The key switch ① is located on the right side of the steering column.

- Switch the key to the "LOCK (0)" position, the entire vehicle is powered off and the key can be pulled out.
- Switch the key to the "ACC (I)" position to connect the electric equipment when the vehicle is stopped.
- Turn the key to the "ON (II)" position, that is, the driving position.
- Turn the key to the "START(III)" position to start the engine.

**DANGER!**

- During driving, do not turn the key switch to the "LOCK (0)" position, otherwise the key switch will lock the steering wheel, and the vehicle will not be able to turn!
- When you leave the vehicle, you shall take the key from the key switch even if you leave for only a short time. Otherwise, children or unauthorized persons may start the engine and drive the vehicle away.

**CAUTION!**

- Before starting the vehicle, turn the key to the "START (III)" position. After releasing the key, it will automatically return to the "ON (II)" position.
- If you want to turn the key to the "START (III)" position to start the engine again, first turn the key to the "LOCK (0)" position before turning it to "START (III)" position to start the engine.

## Electric/pneumatic horn

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### Electric/pneumatic horn

#### Electric horn

Press the horn button ① on the steering wheel to turn on the electric horn.



#### Pneumatic horn

Press the horn change-over switch ② and press the horn button ① to turn on the pneumatic horn.





### 24V power socket

The power socket ① can be used to supply power to 24V equipment with a rated load of 300W.



## USB interface

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### USB interface

The USB interface ① can be used to charge batteries of smart phones, tablets and other smart mobile devices but cannot be used for data transmission.

Output voltage: 5V, output current: 2.1A.



### 220V power socket

The 220V power socket has a rated voltage of 220V and a rated power of 1000W; It supports the Chinese 2-pin and 3-pin plugs, and can be used to supply power for household appliances with a power of up to 1000W.



## Rotary light switch operation

### Rotary light switch operation

#### Rotary light switch (lamp switch)

- ① Turn off the lamp
- ② Intelligent lighting position
- ③ Position lamp (outline marker lamp) switched on position
- ④ Low-beam lamps switched on position
- ⑤ Rear fog lamp indicator lamp (yellow)
- ⑥ Front fog lamp indicator lamp (green)



#### Intelligent lighting position/low beam automatic position

- Power on the vehicle.
- Turn the rotary light switch from position ① to gear ②, and the rain and light sensor will judge the brightness of the surroundings. The lamp will not be on when the surroundings is bright, and the position lamp will be turned on when the surroundings is dark, or the position lamp and low-beam lamps will be turned on at the same time.

#### Turn on the position lamp (outline marker lamp)

- Power on the vehicle.
- Turn the rotary light switch from position ① to the outline marker lamp switched on gear ②, and the outline marker lamps and side marker lamps will be switched on.



### Switching on the low-beam headlamps

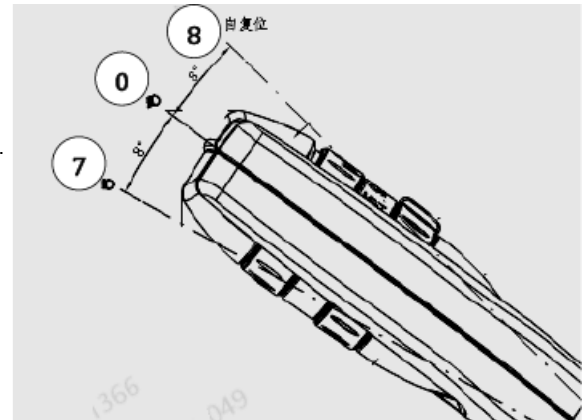
- Power on the vehicle.
- Turn the rotary light switch from position ① to the low beam ON position ④ and set the left combination switch in the low beam position ⑥, then the low beam headlamp is turned on, and the low beam symbol on the instrument panel comes on..

### Switching on the high-beam headlamps

- Power on the vehicle.
- Turn the rotary light switch from position ① to the low-beam lamp switched on position ④, toggle downward the left combination switch to position ⑦, and the high-beam headlamps are switched on, and the high-beam lamp symbol on the instrument panel lights up at the same time.

### High beam passing lamp

- Power on the vehicle.
- There is no need to operate the rotary light switch. Move the left combination switch upward to position ⑧, then the high beam will flash, which can be used as a momentary light when overtaking or meeting other vehicles at night.
- Release the left combination switch, then it will automatically return to position ⑥.



## Rotary light switch operation

### Turn on/off the front fog lamp

- Power on the vehicle.
- Method I: Turn the rotary light switch from position ① to the position lamp (outline marker lamp) switched on gear ③, press the rotary light switch once, and the front fog lamps will be switched on, the front fog lamp indicator lamp ⑥ will be on, and the front fog lamp symbol on the instrument panel will light up at the same time; then press the rotary light switch again, the front fog lamps will be switched off, and the front fog lamp indicator lamp ⑥ will go out.
- Method II: Turn the rotary light switch from position ① to the low-beam lamp switched on gear ④, press the rotary light switch once, and the front fog lamps will be switched on, the front fog lamp indicator lamp ⑥ will be on, and the front fog lamp symbol on the instrument panel will light up at the same time; then press the rotary light switch again, the front fog lamps will be switched off, and the front fog lamp indicator lamp ⑥ will go out.



### Turn on/off the rear fog lamp

- Power on the vehicle.
- Method 1: Turn on the front fog lamps (for specific operations, see "Connecting Front fog lamps" above), pull up the rotary light switch once, the rear fog lamp will be connected, the rear fog lamp indicator lamp ⑤ will light up, and the rear fog lamp symbol on the instrument panel will light up; pull up the rotary light switch again, the rear fog lamp will turn off, and the rear fog lamp indicator lamp ⑤ will go out.
- Method 2: Turn the rotary light switch from position ① to the low beam on position ④. Pull the rotary light switch up once, then the rear fog light will be turned on, the rear fog light indicator lamp ⑤ will light up, and at the same time, the rear fog lamp symbol on the instrument panel will also light up. Pull up the rotary light switch again, then the rear fog lamp will be turned off, and the rear fog lamp indicator lamp ⑤ will go out.

When the rotary light switch is in the smart light position ②, if the light is dim, the position lamps and low-beam lamp will turn on automatically, and you can press down on the knob switch to turn on the front fog lamps or pull up the knob switch to turn on the rear fog lamps; if the light is bright, the position lights and low-beam lamp are not turned on, and you cannot turn on the fog lamps by pulling up or pressing down on the knob switch.

When the front or rear fog lamps are on, in addition to being able to turn off with the switch, turning off the position lamps will automatically turn them off.



## Rotary light switch operation

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### Instrument back lighting and switch position indicator lamp

- Power on the vehicle.
- Turn the rotary light switch from position ① to the low-beam lamp auto sense gear ②, and the instrument back lighting will be on if the surrounding brightness is dark enough to automatically light up the position lamps.
- Turn the rotary light switch from position ① to the outline marker lamp switched on gear ③ or low-beam lamp switched on gear ④, and the instrument back lighting and switch position indicator lamp will be on.



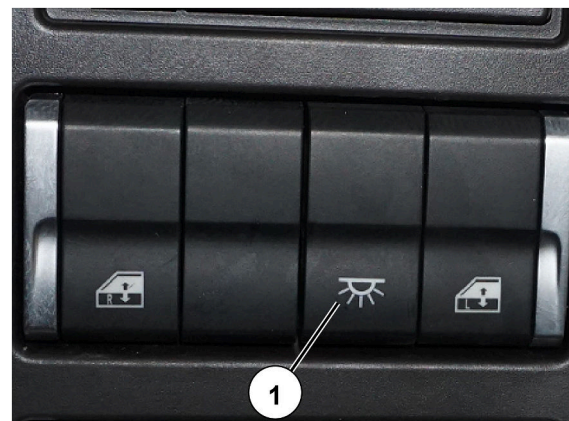
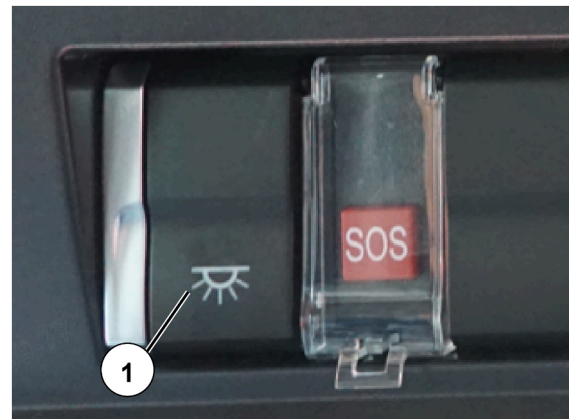


### Interior light switch operation

#### Indoor lighting

There are two operation switches ① for the interior floodlight, which are located at the glove box and in the sleeping berth area, respectively.

Press the switch to turn on/off the interior lights.

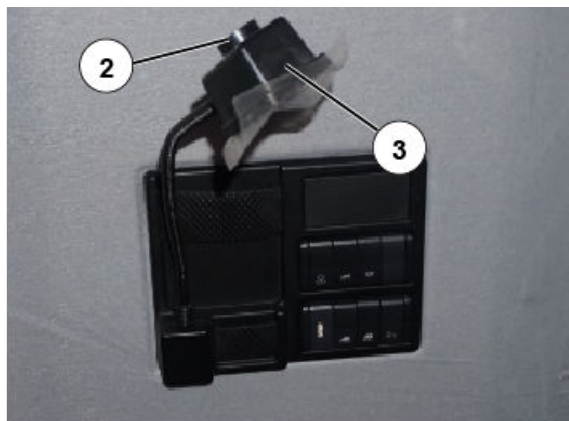


## Interior light switch operation

### Berth lamp (lower berth)

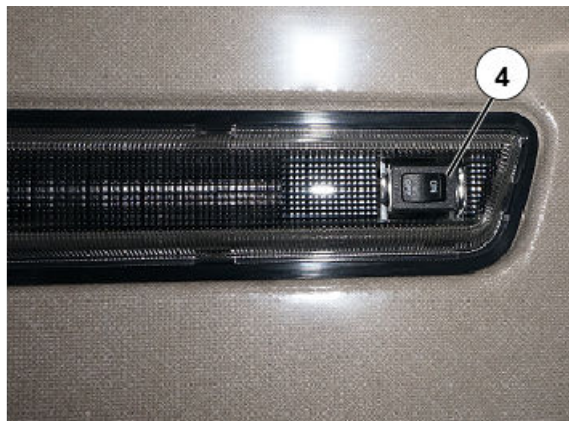
Press the switch ② to turn on the berth lamp, and press the switch ② again to turn off the berth lamp.

Turn the lamp holder ③ to the required position as needed.



### Berth lamp (upper berth)

Press the switch ④ to the ON position to turn on the berth lamp, and press the switch ④ to OFF position to turn off the berth lamp.



### Emergency warning switch

Press the emergency warning switch ⑤, and all steering lamps and steering indicator lamps will flash.



## Replace bulbs

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### Replace bulbs

- Turn off the defective electric equipment before replacing the bulb.
- Do not touch the bulb glass with unprotected fingers.
- When installing a new bulb, make sure that the identification label at the bottom of the new lamp is consistent with that of the old lamp.

### Check the headlamp

After replacing the high beam lamp and low beam lamp, check the headlamp setting.



#### **WARNING!**

**Do not touch the bulb glass with unprotected fingers!**

### Reasons for fogging of lamps

When the headlamp is on, it will generate a large amount of heat, which shall be dissipated through the vent hole. At the same time, the external moist air may also enter the interior of the lamp through the vent hole. This process of cold and hot air exchange produces fog. This phenomenon usually occurs in winter, rainy season or regions with high humidity.

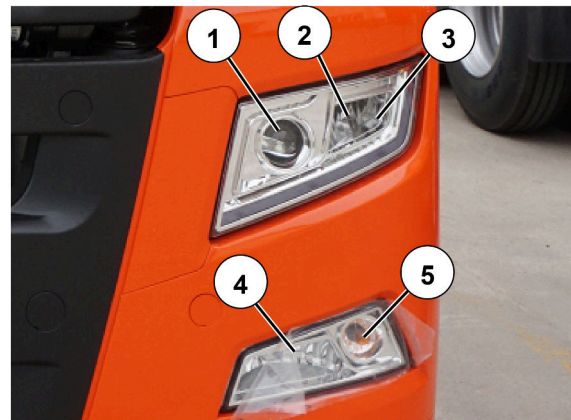
In this case, if the fog disappears automatically within 45 minutes after the headlamp is on, it is a normal phenomenon.

### Headlight and taillight

#### Headlight (left)

The right headlight is symmetrical with the left one.

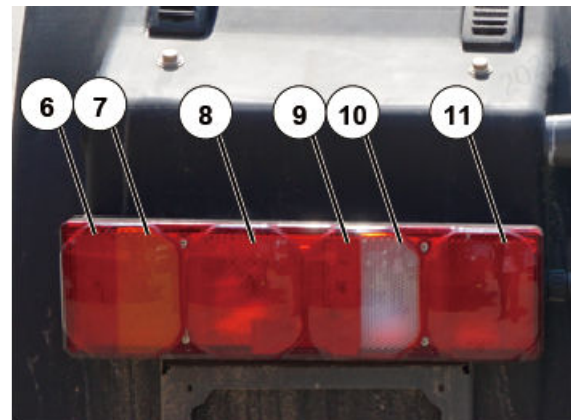
- ① Low beam
- ② Position light/daytime running light
- ③ High beam
- ④ Front fog light/auxiliary high beam
- ⑤ Turn signal



#### Taillight cluster (left)

The right taillight is symmetrical with the left one

- ⑥ Rear clearance light
- ⑦ Rear turn signal (amber transparent)
- ⑧ Rear fog light
- ⑨ Rear position light
- ⑩ Reversing light (colorless and transparent)
- ⑪ Brake light



## Telematics

### Telematics

The Telematics of CNHTC integrates functions such as driving data recorder, radio and tape player, fleet management, vehicle monitoring, driving behavior analysis and fuel consumption management (specific functions may vary with different configurations).

Please refer to the supplier's Instruction Manual for the operation method.



### Camera position

The four-directional image is a standard configuration and offers high-definition reversing image and all-round driving recorder functions, capable of video recording.

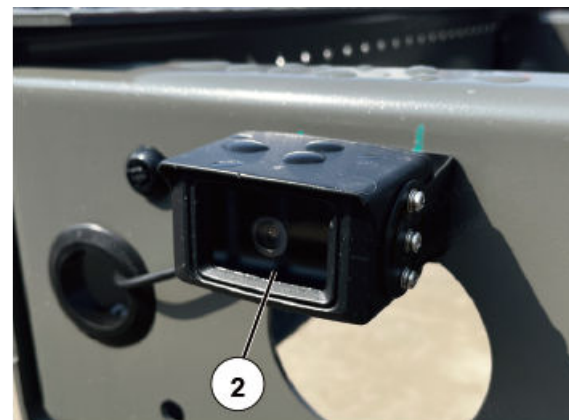
#### ① Front camera

The front camera is located under the company logo of the front cover.



#### ② Rear camera

The rear camera is located on the rear tail beam.

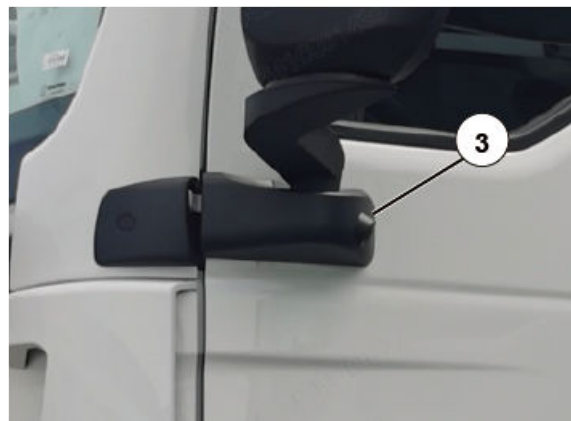


## Camera position

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### ③ Left camera

The left camera is located on the left rearview mirror housing.



### ④ Right camera

The left camera is located on the right rearview mirror housing.





## Introduction and operation of system function

## System function description

Function	Function description
<b>Picture display</b>	Support single-screen display and quad image display
<b>Camera compatibility</b>	1. AHD720P camera; 2. 4-way CVBS camera;
<b>Storage media (SD card)</b>	1. Support the insertion of a new SD card, the device automatically recognizes and formats without manual formatting required; 2. Support up to 256GB; 3. During recording and playback, the video function is normal, with no skipping seconds or other abnormalities.
<b>Hard disk lock</b>	1. Hard disk lock is turned on and SD card is powered off; 2. Close the hard disk lock and power on the SD card;
<b>Date and time</b>	1. Support manual setting of four-way host time 2. Support interaction with the central control screen, and automatically synchronize the time of the central control screen
<b>Video recording</b>	1. Support pause recording, backup recording with recording on by default; 2. When recording is paused, the device can restart or manually resume recording to record normally again; 3. Recording channel supports two systems (NES and PAL) 4. Support delayed shutdown, with a default of 15min; 5. Support cyclic coverage recording, which is enabled by default;
<b>Video playback</b>	1. Support device-side video playback; 2. Support removing the storage device and using a hard drive player on the computer for playback and backup; 3. Support interaction with the central control screen, and the central control screen controls the playback of the device.

## Introduction and operation of system function

### Description of indicator lamp

- PWR indicator lamp is always on: the power supply of host is normal
- RUN indicator lamp flashes: the host runs normally
- SD indicator lamp flashes: the SD card works normally and the video is recorded normally
- ALM indicator lamp is on: left view, right view and rear view are normal



### SD card installation

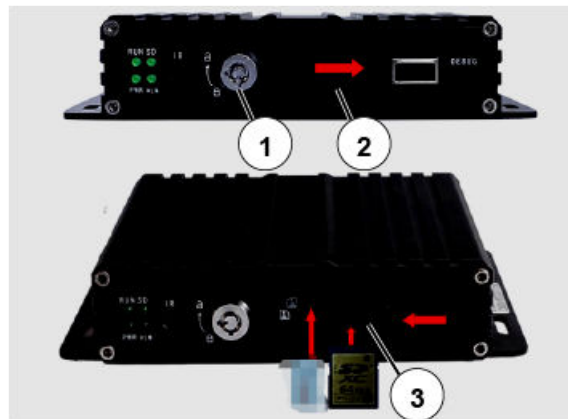
- 1 Insert the key from the accessories into the SD card lock hole ① in the front shell of the four-way image host, turn 90 degrees clockwise, push the SD card cover ② to the right, and you can see the SD card slot ③.
- 2 Insert the SD card into the host according to the icon direction, close the SD card cover ② to the left, and lock the SD card lock.



#### CAUTION!

–Be sure to lock the SD card lock, otherwise, the SD card function cannot be used!

–The installation and removal of the SD card should be carried out in a power-off state (i.e., when the "PWR" indicator lamp of the host is completely off) to avoid damaging the SD card and affecting its normal use.





## Introduction and operation of system function

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### Video image display:

#### AV1 - left view image

#### AV2 - right view image

#### AV3 - front view image

#### AV4 - rear view image

- ① Red dot indicates that the video is normal.
- ② SD status bar
- ③ Video playback button (different buttons or identifications for different models)

### Picture display

The four-way image system supports single image display and quad image display.

The central control screen detects the left turn, right turn, and reverse signals of the whole vehicle, and controls the four-way host through the RS232 serial port:

- Left turn: When the central control screen detects a left turn signal, it sends a single image preview command, and the four-way host switches to the AV1 image for display; when the left turn signal ends, the central control screen sends a full-screen preview command, and the four-way host switches to a quad image display.
- Right turn: When the central control screen detects a right turn signal, it sends a single image preview command, and the four-way host switches to the AV2 image for display; when the right turn signal ends, the central control screen sends a full-screen preview command, and the four-way host switches to a quad image display.
- Reverse: When the central control screen detects a reverse signal, it sends a single image preview command, and the four-way host

switches to the reverse image for display; when the reverse signal ends, the central control screen sends a full-screen preview command, and the four-way host switches to a quad image display.

### Image zoom

Enter the monitoring APP of display screen, click on the areas where AV1, AV2, AV3 and AV4 images are located to switch to the corresponding single image display; click it again to switch to a quad image display.

NOTE: When AV4 image is zoomed in, it does not include an electronic ruler.

### Time synchronization

After the central control screen is powered on, when the first received positioning information is valid, the central control screen sends a time correction command, and the time will automatically synchronize after a few seconds.

### Playback function

#### Method 1: View through the central control screen monitoring interface

Step 1: Click the video playback button or mark on the four-way monitoring interface to enter the calendar information interface.

This interface displays video calendar information, the presence of video files, calendar information selection, and channel number selection.

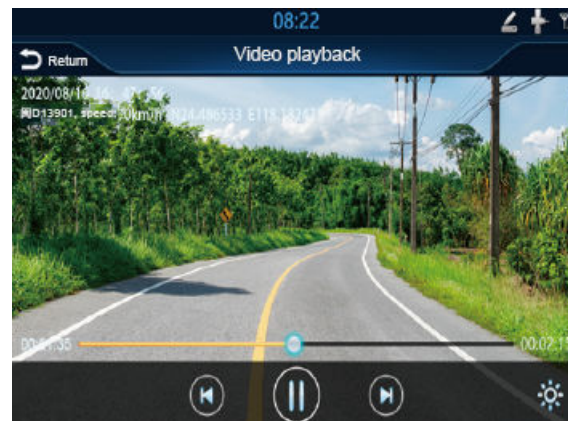
When searching for recordings, the search channels must correspond: Channel 1 (left), Channel 2 (right), Channel 3 (front), Channel 4 (rear).



## Introduction and operation of system function

Step 2: Click on a date with a video file, the central control screen displays historical video files, and you can select a time period video for playback control (playback, pause playback, drag, stop playback).

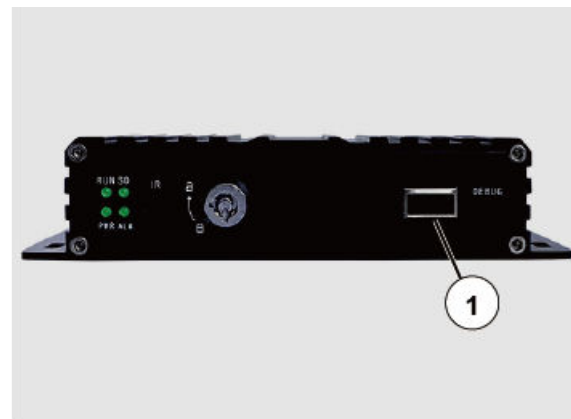
When operating in the calendar, search, and playback interfaces, if the vehicle turns left, right, or reverses, the central control screen switches to the relevant preview display interface; after the end of related operations, the central control screen switches to the quad screen preview display interface (does not return to the playback interface).



### Method 2: Use a mouse on the vehicle to view through MP5

Step 1: Find the four-way host and insert the computer mouse into the USB interface ① on the main panel of host.

**Note: It is not the USB port of MP5.**

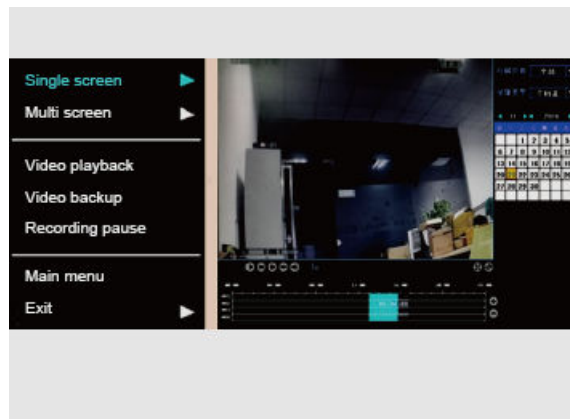


Step 2: Click "Monitoring" on the MP5 interface to enter the monitoring interface, and click the right mouse button to pop up the user login interface, and click "OK" with the mouse.



## Introduction and operation of system function

Step 3: Click the right mouse button again to pop up the menu, click "Playback" to enter the playback operation interface, and select the playback time to play the corresponding video file.

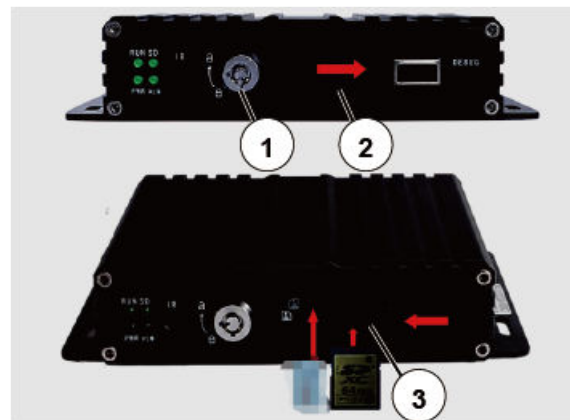


### Method 3: View through a computer

Step 1: Find the four-way host, insert the key from the accessories into the SD card lock hole ① in the front shell of the four-way image host, turn 90 degrees clockwise, push the SD card cover ② to the right, and remove the SD card from the SD card slot ③.

Step 2: Install the dedicated software on the computer (contact the manufacturer to request it).

Step 3: Open and view the video files in the SD card through the dedicated software (encrypted).





### Common faults

No.	Fault	Cause	Troubleshooting
1	Starting failure of host	Power fuse blown	Replace the fuse
		Incorrect power wiring	Wire as required and ensure that the input voltage is within 9-36V
		Power harness damage	Replace the harness
2	Zoom in or playback failure	Harness issue: check whether the harness serial port connection is normal	Replace the harness
		The software version of the host or central control screen is not the latest version	Update the software version of the host or central control screen
3	Some cameras have no screen display or abnormal screen display	Poor contact of wiring harness	Plug and unplug the harness again
		Harness damage	Replace the harness
		Camera damage	Replace the camera
4	No recording	SD card unlocked	Lock the SD card, and there is a prompt on the disk status in the upper right corner
		SD card ejected	Open the hard disk lock, plug and unplug the SD card and lock it
		SD card format unsuccessful	Manually format the SD card with the mouse
		SD card damage	Replace the SD card
5	Unable to locate (or incorrect system time)	Time not updated	If the antenna is abnormal, check (replace) the GPS antenna of the display
		The vehicle is in an underground parking lot or tunnel	Area positioning signal is weak, drive away from the area

### Precautions during use



#### **CAUTION!**

- The four-way imaging system is only an auxiliary driving tool, and drivers should still pay attention to safe driving.
- The four-way imaging system supports reverse view images, but should not rely entirely on the reverse view system to reverse, and use the rearview mirror reasonably.
- The four-way imaging system is a system composed of different parts after debugging, and it should avoid mixing use. When repairing or replacing parts, choose the same brand of parts.
- Please clean the rearview camera lens regularly to keep it clean at all times to avoid unclear or no image. For cement trucks, check the lens daily to avoid cement sticking to the lens, resulting in no image.
- Pay attention to the extension cable of the rearview camera and keep it tight to avoid exposure and being pulled off, resulting in no rearview image. If the extension cable is replaced, it should also be tightened again.
- Please clean the left and right camera lenses regularly to avoid dirt affecting the imaging effect of the left and right cameras.



#### **CAUTION!**

Please pay attention to the recording status on the four-way monitoring interface at ordinary times. If it is recording or covering, it means it is normal; if it is red, it indicates that the current recording status is abnormal, please go to the nearby SINOTRUK service station for repair as soon as possible.

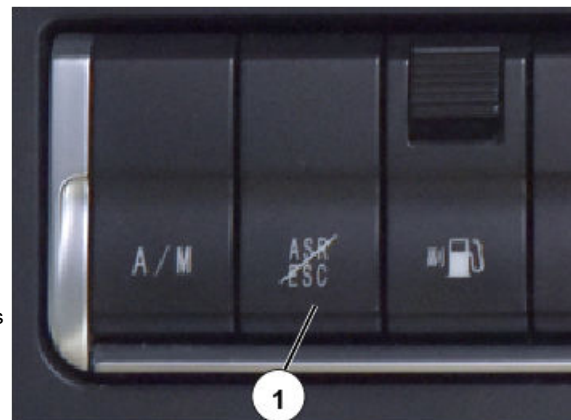
## ASR/ESC system

### Electronic braking system/electronic stability control

The Electronic Braking System is an active brake control system that can significantly improve the braking performance of the vehicle; and the Electronic Stability Control, including the anti-rollover control and directional control, can enhance the stability of directional control of the vehicle.

When the vehicle is powered on, the Acceleration Slip Regulation (ASR) and the Electronic Stability Control (ESC) are enabled in default. When the vehicle is trapped in mud or sand and cannot get out, the ASR/ESC function can be deactivated by turning of the ASR/ESC rocker switch ①; In case that the driver has special driving needs and recognizes that there may be dangers, if he/she deactivates the ASR/ESC function according to his/her own driving habits, the driver shall be fully responsible for the safety accident arise from such deactivation.

When the Electronic Braking System is faulty, the corresponding fault lamp will be displayed on the instrument. In this case, contact a CNHTC service station for help.



#### **WARNING!**

- It is strictly forbidden to flush the radar system with a water cannon when washing the vehicle.
- To ensure driving safety, the ASR/ESC function shall not be deactivated at will!

## Lane departure warning system

### Lane departure warning system

#### Functions and enabling conditions

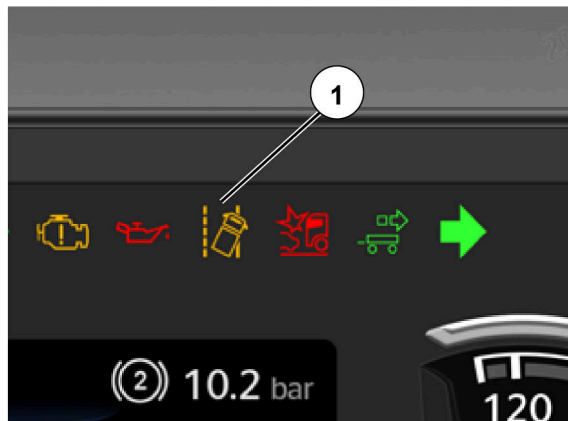
When the driver unintentionally make the vehicle depart from the current traveling lane, the lane departure warning system can automatically alarm to remind the driver to focus and keep driving in the current lane, so as to ensure driving safety. When the vehicle speed is between 60 km/h and 120 km/h, and the driver does not turn on the turn signal lamp switch corresponding to the vehicle's deviation direction, if the vehicle is about to deviate from the lane, the lane departure warning system will automatically give an audible and visual alarm to remind the driver to pay attention to driving safety. During the warning, the indicator lamp ① will flash, and the horn in the corresponding direction will sound the alarm according to the departure direction of the vehicle.

The lane departure warning system will be enabled by default when the vehicle is powered on. In this driving cycle, the driver can operate the rocker switch ② to turn off the function, and the instrument indicator lamp ① will be always on; if the driver wants to restore the warning function, he/she only needs to operate the rocker switch ② again.

When the driver operates the brake pedal, the emergency steering wheel or the automatic emergency braking system gives an alarm, the system will not give an alarm even if the vehicle deviates from the driving lane. When the turn signal switch is turned on, the system will not alarm when the vehicle deviates from the lane on the corresponding side.

If the warning lamp ① of lane departure warning system is always on (the driver has not actively turned off the system), it indicates that there is a system fault. Contact a CNHTC service station for help in such as case.

#### IMPORTANT



The lane departure warning system may give an inaccurate warning or may not respond when any of the following driving scenarios occur, including but not limited to:

- Hardware system failure, such as camera and radar failure;
- Poor vision, such as poor road lighting conditions, rain, snow, fog and other bad weather;
- Strong illumination, such as the opposite headlight, direct sunlight or reflection on a wet surface;
- When the installation position of the windshield camera or the radar surface is muddy, misty, damaged or blocked;
- Missing or blurred lane markings, such as construction areas, lane markings covered by snow, mud, shadows, etc.;
- The lane marking is a non-standard type, such as winding lane markings, split lane markings, crossing or merging lane markings, etc.;
- Special road conditions, such as laneless roads, roads with too wide or too narrow lane markings, sharp curves, etc.



**WARNING!**

**This function shall be used on express ways or roads with clear lane lines. The lane departure warning system is just a driving assist system, and this system itself does not control the vehicle in any way. The driver shall be fully responsible for the driving safety of the vehicle.**

## Forward collision warning system

### Forward collision warning system

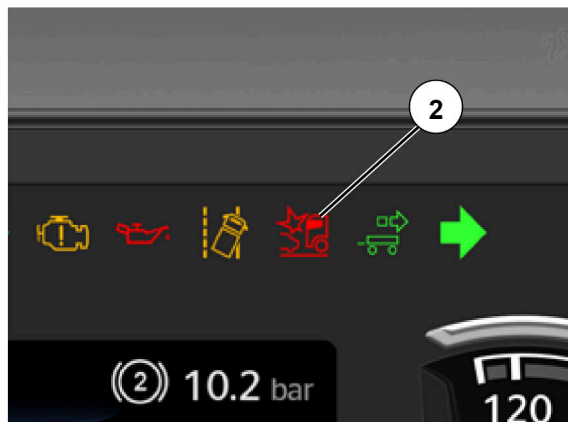
#### Functions and enabling conditions

The forward collision warning system can be used to detect the distance with the car in front. When there is a risk of rear-end collision, the system will remind the driver of the collision risk with automatic warning to improve the safety of driving, thus reducing the occurrence and casualty of traffic accidents.

The forward collision warning system will be enabled by default when the vehicle is powered on. The forward collision warning system can only be activated when the vehicle speed is no less than 15 km/h. In this driving cycle, the driver may operate the rocker switch ① to turned off the forward collision warning function, and the icon ② on the instrument will be yellow and always on; operate the rocker switch ① again to turn on the function again.

When the forward collision warning system detects a risk of collision with the vehicle ahead, it will make an audible and visual alarm to the drive to prompt him/her.

If the icon ② on the instrument is yellow and always on (the driver has not actively turn off the system), it indicates there is system fault. Immediately contact a CNHTC service station for help in such a case.



### IMPORTANT

The following actions by the driver in a short time may restrain the function of the forward collision warning system:

- Turning on the signal lamp switch;
- Pressing the accelerator pedal fast and deep;
- Turning off the system enable rocker switch;
- Emergency operation of steering wheel;
- Pressing the brake pedal;
- R gear is engaged;
- The system has a short cooling time (the function is triggered continuously in a short time).

The forward collision warning system may give inaccurate warnings or not respond in the following driving scenarios (including but not limited to). Please always drive carefully to ensure driving safety:

- System hardware failure, such as radar and camera failure;
- The target ahead in this lane changes, for example, the vehicle ahead changing lanes at a short distance, overtaking at a short distance, etc.;
- Obstacles that suddenly appear in the lane, such as falling cargo boxes, falling objects in the air, etc.;
- Static objects on either side of the lane, such as street lamps, signs, etc.;
- Special road conditions, such as interchange ramps, sharp curves, steep slopes, winding roads, laneless roads, roads with too wide or too narrow lane markings, etc.;
- Poor braking conditions of roads, such as slippery road surface caused by construction, rain, snow and other weather;

- Poor vision, such as poor road lighting conditions, rain, snow, fog and other bad weather.



### **CAUTION!**

- The forward collision warning system only responds to vehicles ahead moving in the same direction, and responds poorly or does not respond to humans, animals, motorcycles, bicycles and other targets as well as vehicles running in opposite directions.
- The forward collision warning system verification is a professional test, which requires professional technicians to conduct professional tests in a professional test field. Users are not allowed to conduct such tests. The resulting risks shall be borne by the user.



### **WARNING!**

It is prohibited to remove the radar controller without authorization. Do not paint or mount any attachment (such as an anti-collision crossbeam) in front of the radar, otherwise this may affect the performance of the radar, leading to system function failures.



### **WARNING!**

- The forward collision warning system is an important driver assist system, please do not turn off or restrain it at will!
- As the forward collision warning system cannot learn the current conditions of traffic and weather, therefore, the driver shall be fully responsible for the driving safety of the vehicle. Relying solely on the Forward Collision Warning system to ensure driving safety is completely inadvisable!



### Automatic emergency braking system (AEBS)

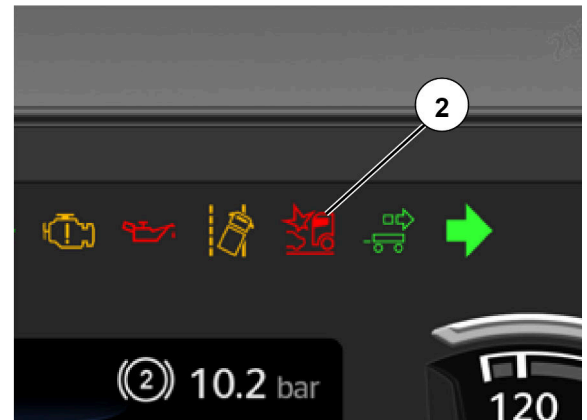
#### Functions and enabling conditions

The automatic emergency braking system can detect the distance to the vehicle in front and the crossing pedestrians. When there is a risk of rear-end collision and other collisions, the system can mitigate or avoid the collision by automatic warning, partial braking and even full braking to improve the safety of driving and reduce the incidence and casualty rate of traffic accidents.

When the vehicle is powered on, the automatic emergency braking system is turned on by default. The automatic emergency braking system can only be activated when the vehicle speed is within 15-120 km/h. In this drive cycle, the driver can deactivate the automatic emergency braking function by operating the rocker switch ①, then the instrument will display the icon ② in steady yellow; operating the rocker switch ① again can activate the function again.

When the automatic emergency braking system detects a risk of collision with the vehicle in front, it will first give audible and visual alarms to the driver to remind he/her to take relevant measures to avoid collision. If the driver does not take any braking action, the system will automatically apply partial braking to remind the driver again. However, the risk of collision still exists, the driver's response is needed urgently. If the driver still does not take measures, the system will automatically apply full braking to avoid collision.

If the icon ② on the instrument is yellow and always on (the driver has not actively turn off the system), it indicates there is system fault. Immediately contact a CNHTC service station for help in such a case.



## Automatic emergency braking system (AEBS)

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### IMPORTANT

When the following driving situations occur (including but not limited to), the automatic emergency braking system may brake or be unresponsive unexpectedly. The driver shall always pay attention to driving carefully to ensure driving safety:

- Hardware system failure, such as radar camera failure or EBS failure;
- There are problems with the vehicle configuration, such as the trailer not equipped with ABS system;
- The target ahead in this lane changes, for example, the vehicle ahead changing lanes at a short distance, overtaking at a short distance, etc.;
- The target vehicle ahead is a special vehicle, such as an extra-wide vehicle, an irregular vehicle, etc.;
- Obstacles that suddenly appear in front of the lane, such as falling cargo boxes, falling objects in the air, etc.;
- Static objects on either side of the lane, such as street lamps, signs, etc.;
- Special road conditions, such as interchange ramps, sharp curves, steep slopes, winding roads, laneless road, roads with too wide or too narrow lane markings, tunnels, bridges, roundabouts, etc.;
- Poor braking conditions of roads, such as slippery road surface caused by construction, rain, snow and other weather;
- Poor vision, such as poor road lighting conditions, rain, snow, fog and other bad weather;
- The first driving after system calibration and load change after vehicle start-up.

The following actions of the driver in a short period of time can inhibit the function of the automatic emergency braking system:

- Turning on the signal lamp switch;
- Emergency operation on the accelerator pedal;
- Turning off the system enable rocker switch;
- Sharp turning of the steering wheel;
- Pressing the brake pedal;
- R gear is engaged;
- The system has a short cooling time (the function is triggered continuously in a short time).



### CAUTION!

- The automatic emergency braking system only responds to the front vehicle moving in the same direction and the crossing pedestrians. It may fail in providing correct response to non-motor vehicle targets such as motorcycles and bicycles, and has no response to other targets such as vehicles or animals moving in the opposite direction;
- Vehicles with manual transmission are equipped with an automatic emergency braking system, and may stall when the automatic emergency braking system is triggered;
- When the road is not marked or during driving at night, the reaction distance to the target will be shortened.



### CAUTION!

- The reaction of the automatic emergency braking system to pedestrians:
  - Once the vehicle speed is higher than 60 km/h, the system will suppress the brake and only serve as a warning system until the vehicle speed reaches 120 km/h. The AEBS applies brake for pedestrians to reduce the vehicle speed by 20km/h, which may not be enough to completely avoid collision;
- After each activation, the automatic emergency braking system will be temporarily unavailable for 10 seconds regardless of the vehicle speed.



### CAUTION!

The AEBS verification is a professional test, which is required to be conducted by specialized technicians in a special test site. Users are not allowed to test. The resulting risks shall be borne by the user.



### WARNING!

It is prohibited to remove the radar controller without authorization. Do not paint or mount any attachment (such as an anti-collision crossbeam) in front of the radar, otherwise this may affect the performance of the radar, leading to system function failures.

## Automatic emergency braking system (AEBS)

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### **WARNING!**

- Automatic emergency braking system is an important driver assistance system. Do not turn it off or suppress it without reasons!
- The automatic emergency braking system cannot understand the current traffic and weather conditions, so the driver shall be fully responsible for the driving safety of the vehicle. It is completely wrong to rely only on the automatic emergency braking system to ensure driving safety!
- The automatic emergency braking system is designed to ensure the driving safety, but it cannot completely avoid collisions!
- Automatic emergency braking system cannot be used as a substitute for maintaining a safe driving distance from the vehicle ahead!

### Predictive cruise control (PPC) system

#### Functions and enabling conditions

The predictive cruise control is optional and needs to be bound to the AMT.

The predictive cruise control system can predict the road slope and curvature information of the road several kilometers ahead through the pre-stored ADAS map, and scientifically plan the cruising speed or activate the N gear for coasting to achieve the purpose of energy saving and emission reduction.

The driver can activate the predictive cruise control by following these steps:

- The cruise control function switch is enabled and the function is activated;
- When the set speed of cruise control is over 60 km/h;

When the predictive cruise control system is activated, the indicator lamp ① on the instrument cluster lights up.

The predictive cruise control automatically exits when:

- When the set speed of cruise control is below 60 km/h;
- The cruise control function is disabled;
- There is no map information for the road;
- There is a fault in the system;



## Predictive cruise control (PPC) system

If the icon ② on the instrument is on (the driver has not actively turn off the system), it indicates there is system fault. Please contact a CNHTC service station for help in such a case.

### IMPORTANT

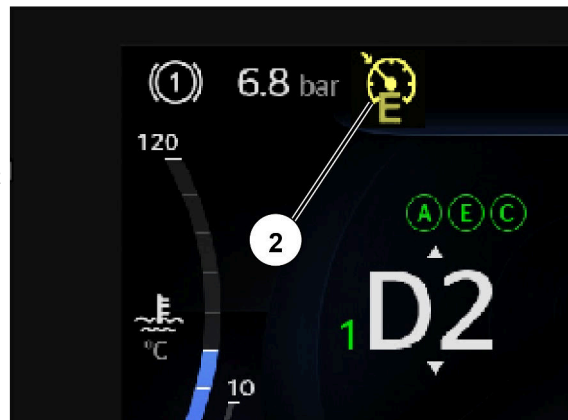
The predictive cruise control will adjust the cruising speed according to the road slope, so that the actual speed fluctuates within the range of the cruising speed set by the driver (set cruising speed - 10 km/h to set cruising speed + 5 km/h).

Therefore, slight acceleration or fuel cut-off may occur during driving.

When the vehicle goes downhill, if the vehicle speed, road gradient, downhill length, etc. meet the conditions, the predictive cruise control function will make the vehicle enter the N gear coasting state.

When the vehicle speed is too high or too low, the accelerator is depressed, the brake is depressed, and other conditions are met, the predictive cruise control will make the vehicle automatically engage the gear.

When the actual vehicle speed exceeds a certain threshold of the set vehicle speed range (related to the set vehicle speed for cruise control and the road slope), the predictive cruise control will automatically call the hydraulic retarder brake or exhaust brake.



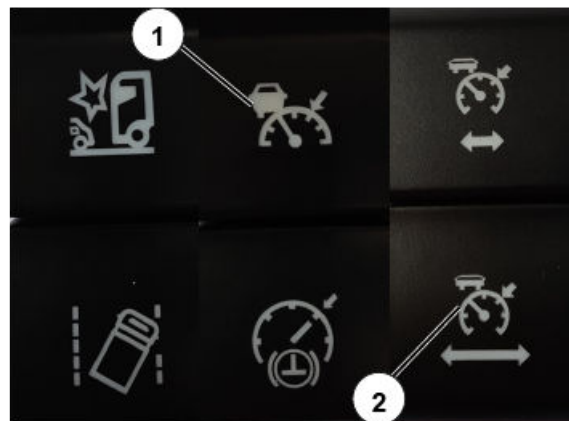
### Adaptive cruise control (ACC)

#### Functions and enabling conditions

The adaptive cruise control (ACC) can automatically adjust the vehicle speed, maintain a safe following distance from the front vehicle, and realize automatic braking and acceleration control without the driver's intervention, thus improving driving comfort, fuel economy and driving safety.

When the vehicle is powered on, the adaptive cruise control (ACC) is turned on by default; during this driving cycle, the driver can turn off the adaptive cruise control (ACC) by enabling the rocker switch ①; if the driver wants to turn on the system again, he/she only needs to operate the rocker switch ① again.

The driver can operate the distance mode switch ② to select different following distance modes. The system defaults to "Medium Distance Mode". Press the Down key to switch to "Short Distance Mode" and "Shortest Distance Mode" in turn; press the Up key to switch to "Long Distance Mode" and "Longest Distance Mode" in turn. There is a corresponding message displayed on the instrument panel.



## Adaptive cruise control (ACC)

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The driver can activate the adaptive cruise control (ACC) by following these steps:

- Confirm that the vehicle speed is greater than 30 km/h and less than 120 km/h;
- Confirm that the adaptive cruise control (ACC) is on;
- Select different following distance modes according to the actual situation;
- Press the +/- button ③/④ on the right side of the steering wheel, or press the ⑤ RES button to set the cruising speed, then the adaptive cruise control (ACC) will be activated.

When there is no vehicle ahead, the adaptive cruise control (ACC) will make the vehicle cruise according to the set cruising speed; when the set cruising speed exceeds 60 km/h, the adaptive cruise control (ACC) will scientifically control the cruising speed according to the current road slope information and control the vehicle to enter the N gear for coasting to improve the fuel economy; when the vehicle ahead decelerates, the adaptive cruise control (ACC) will automatically control the vehicle to decelerate to maintain a safe distance; when the vehicle ahead accelerates, the adaptive cruise control (ACC) will automatically control the vehicle to accelerate and follow the vehicle until the set cruising speed is reached, and in order to ensure the fuel economy of the vehicle, the following distance will be automatically extended during the acceleration process; when the vehicle ahead runs far away, the system will restore the vehicle speed to the set target cruising speed.





The adaptive cruise control (ACC) automatically exits when any of the following conditions occur:

- The vehicle speed is lower than 30 km/h;
- The driver operates the brake pedal;
- The driver operates the exhaust brake switch or the retarder handle;
- The driver operates the OFF key on the right side of the steering wheel;
- There is a fault in the system;
- The driver operates the gear switch back to N gear;
- The driver operates the parking brake;
- A vehicle stability or safety system (ABS\ASR\ESC\AEB) is activated.

After the operating system enables the rocker switch to turn off the adaptive cruise control (ACC), the driver can press the +/- buttons on the steering wheel to enter the normal cruise control system. The driver can inhibit the adaptive cruise control by quickly and deeply depressing the accelerator pedal.

### **IMPORTANT**

When the following driving situations occur (including but not limited to), the adaptive cruise control (ACC) may brake, accelerate or be unresponsive unexpectedly. The driver shall always pay attention to driving carefully to ensure driving safety:

- Hardware system failure, such as radar camera failure, EBS system failure, etc;
- There are problems with the vehicle configuration, such as the trailer not equipped with ABS system;

- The target ahead in this lane changes, for example, the vehicle ahead changing lanes at a short distance, overtaking at a short distance, etc.;
- The target vehicle ahead is a special vehicle, such as an extra-wide vehicle, an irregular vehicle, etc.;
- Special road conditions, such as interchange ramps, sharp curves, steep slopes, winding roads, laneless road, roads with too wide or too narrow lane markings, tunnels, bridges, roundabouts, etc;
- Poor braking conditions of roads, such as slippery road surface caused by construction, rain, snow and other weather;
- Poor vision, such as poor road lighting conditions, rain, snow, fog and other bad weather.

## Adaptive cruise control (ACC)

If the icon ⓘ on the instrument is on (the driver has not actively turn off the system), it indicates there is system fault. Please contact a CNHTC service station for help in such a case.



### CAUTION!

–When the adaptive cruise control (ACC) is working, if the vehicle in front drives away, the system will automatically increase the vehicle speed to the previously set cruising speed. When passing through intersections or wet and slippery roads, the driver shall pay special attention to the risks caused by this situation and drive the vehicle carefully.

–When the distance from the vehicle in front is too close, the adaptive cruise control (ACC) will automatically request the brake system to work. If the braking-based deceleration is not enough to maintain a safe distance, the system will send an alarm message. The driver shall actively press the brake pedal to avoid collision.



### CAUTION!

–The adaptive cruise control (ACC) may request the driver to take over the control of the vehicle at any time. Typical operating conditions include but are not limited to:

- Long-time downhill driving following another vehicle (risk of overheating brakes), significant deceleration of the vehicle in front, low engine speed, etc.

–The adaptive cruise control (ACC) is a driver assistance system and cannot replace the driver's control of the vehicle under any circumstances. The driver still needs to control the vehicle during driving and determine any necessary operations for safe driving.





### CAUTION!

The adaptive cruise control (ACC) will respond to motor vehicles in the same direction, and will not respond to vehicles, pedestrians and animals moving across or towards each other. The driver shall keep alert to special targets and be ready to press the brake pedal at any time.



### WARNING!

- Do not use the adaptive cruise control (ACC) when ABS is faulty;
- The adaptive control system is a driver assistance system. In order to improve the driving comfort, it is necessary to limit the maximum braking deceleration of the vehicle. When encountering a operating condition where the front vehicle is in emergency braking and the braking force provided by the adaptive cruise control system of your vehicle is insufficient to maintain a safe distance from the front vehicle, the system will send an alarm message and then exit the adaptive cruise control.



### WARNING!

- Do not disassemble the radar without permission. The radar cover shall be kept clean. No other items shall be installed on the front and the radar cover shall be painted. Otherwise, the system function may be affected.
- Do not use the ACC function on mountain roads, traffic jams or slippery roads.
- The adaptive cruise control (ACC) is a driver assistance system. Limited by weather, road surface and other conditions, the system may not provide a safe distance from the vehicle in front under all operating conditions. Do not use the adaptive cruise control in foggy days, heavy rain, icy and snowy days and other bad weather. The driver is fully responsible for keeping a safe distance between the vehicle and the front vehicle and shall take full responsibilities for potential traffic conditions that may occur at any time.

## Hill-start hold control (HHC) system

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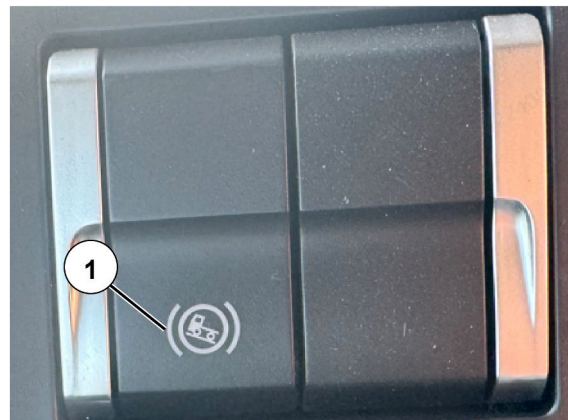
### Hill-start hold control (HHC) system

The HHC system can generate the braking force before the vehicle starts, and brake the wheels to prevent the vehicle from slipping in case of hill-start.

After the vehicle is powered on, the HHC system is turned off by default, and the driver can activate the HHC system through the following steps:

- Confirm whether the following conditions are met:
  - The engine has started/there is no air pressure alarm on the instrument/the vehicle is stationary/the parking brake status is recognized.
- Depress the brake pedal;
- Press the hill-start enable switch ① to activate the hill-start assist function;
- The forward gear is engaged;
- Release the parking brake (this step is not available when the vehicle is equipped with electronic parking);
- Release the brake pedal and depress the accelerator, the hill-start assist function will be activated, and the hill-start indicator on the instrument panel will be lit. At this time, the HHC system will maintain the brake air pressure when stepping on the foot, and the vehicle will remain stationary;
- Depress the accelerator pedal to start the vehicle smoothly.

When the hill-start indicator on the instrument is always on (the driver does not activate the function actively), it is a system fault, and SINOTRUK's service station shall be contacted for handling.



Before the brake air pressure is gradually released, the hill-start assist symbol on the instrument will flash, accompanied by a "beep-beep" alarm sound.



### CAUTION!

When the HHC system is activated, after the driver releases the brake pedal, the maximum brake pressure will be kept for 2.2s, and then the brake pressure will be gradually released. Please step on the accelerator to start in time after releasing the brake pedal, otherwise there is a risk of slipping!



### WARNING!

–On icy and snowy roads, even if the driver activates the hill-start hold control (HHC) system, the vehicle may slip. Therefore, it is strictly forbidden to use the HHC system on icy and snowy roads.

–The HHC system is only the driver's assistance system. Before the vehicle starts, the driver shall fully understand the surrounding conditions of the vehicle and take full responsibility for the vehicle safety.

In any of the following circumstances, the hill-start assist function will exit:

- Engine shutdown;
- Vehicle power-off;
- Air pressure alarm appears on the instrument;
- The vehicle is not at a stationary status;
- Applied with parking brake;
- The hill-start enable switch is turned off;
- After the driver releases the brake pedal, the waiting time for starting is too long.

## Hill-start hold control (HHC) system

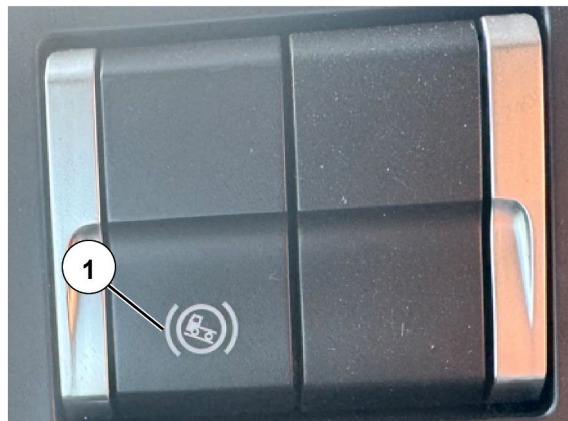
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### Operation of self-resetting rocker switch

- If the vehicle is equipped with a self-reset switch, when the hill-start assist function is needed, press the switch ① to activate the function when the conditions are met, and the switch will automatically reset after releasing it.
- After the current instruction is completed, the hill-start assist function will be automatically deactivated. When using this function next time, press the switch ① again to activate it.

### Operation of gear rocker switch

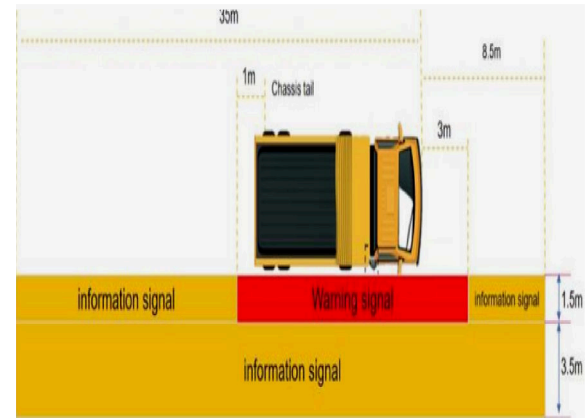
- If the vehicle is equipped with a gear switch, the hill-start assist function will not be activated by default in the default status of the switch.
- When the hill-start assist function is needed, press the switch ① to activate the function when the conditions are met, and the switch will remain pressed after releasing.
- After the current instruction is completed, the hill-start function will be automatically deactivated, and there is no need to repeatedly operate the switch ①.
- The driver turns on or off the switch ① as required.



### Blind spot information assistance system (BSIS)

#### Functions and activation conditions

When a pedestrian or cyclist enters the right-side blind spot of a left-hand drive vehicle, or the left-side blind spot of a right-hand drive vehicle (illustrated by the yellow and red zones in the diagram), the system issues a warning to the driver. This enhances driving safety and helps the driver avoid potential roadway hazards, significantly reducing the risk of accidents caused by blind spots.



When the vehicle is powered on, the blind spot information assistance system automatically activates. During the self-inspection, indicator ① remains illuminated, and it turns off once the self-test is complete.

If the blind spot information assistance system warning light ① remains continuously on (without the driver manually turning off the system), it indicates a system malfunction. Stop the vehicle to investigate the cause, or contact a SINOTRUK service station for assistance.



## Blind spot information assistance system (BSIS)

### Alarm notification

#### • Level I alarm

When a pedestrian or cyclist (moving at 5–20 km/h) enters the yellow warning zone within the vehicle's blind spot, and the vehicle speed is between 0 and 30 km/h without the right turn signal activated, the blind spot information assistance system triggers a Level I alarm. The system responds with a steady yellow illumination of the warning indicator ② to caution the driver.

#### • Level II alarm

When a pedestrian or cyclist (moving at 5–20 km/h) enters the red warning zone within the vehicle's blind spot, and the vehicle speed is between 0 and 30 km/h with the right turn signal activated or the steering wheel angle exceeding 50°, the blind spot information assistance system triggers a Level II alarm. The system responds with a steady red illumination of the warning indicator ③ and an audible alarm to caution the driver.





## Blind spot information assistance system (BSIS)

During the current driving cycle, the driver may use rocker switch ④ to disable the Level II alarm. After pressing the switch, a prompt pop-up window ⑤ appears, and the alarm does not issue a Level II warning. To re-enable the Level II alarm, the driver simply operates rocker switch ④ again.



## Blind spot information assistance system (BSIS)

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### Cautions

In the following driving scenarios, including but not limited to those listed below, the blind spot information assistance system may issue inaccurate warnings or fail to respond, and the instrument panel will display a fault indicator ①:

- Hardware system faults, such as camera or controller malfunction;
- Heavy rain, snow, or fog leading to numerous minor lens contamination scenarios in the camera image;
- Strong light exposure, such as from oncoming headlights, direct sunlight, or reflections from wet road surfaces;
- Dirt, moisture, damage, or obstruction on the surface where the windshield camera is mounted;
- Automatic deactivation and a fault warning signal are displayed when the ambient light falls below 15 lux;
- Communication failure between the controller and vehicle CAN network.



### WARNING!

–The blind spot information assistance system (BSIS) is strictly a driver assistance system; it does not control the vehicle. The driver remains fully responsible for vehicle safety.

–Do not remove the camera without authorization. If the camera is impacted or scratched, promptly visit a service station for camera angle adjustment or calibration. Failure to do so may affect camera performance and cause system malfunction.

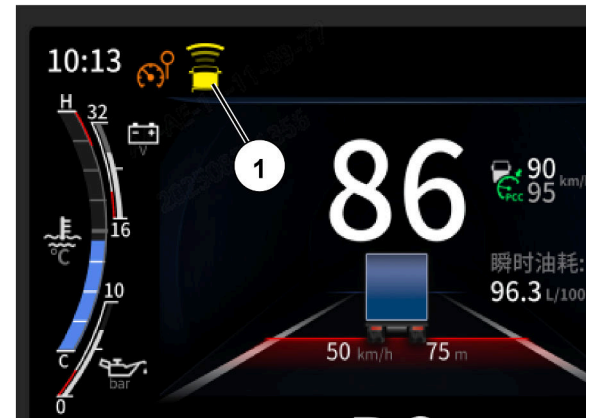
### Moving-off information system (MOIS)

#### Functions and activation conditions

The MOIS is used to alert the driver to potential pedestrians or cyclists ahead when the vehicle starts or moves at low speed. Its purpose is to enhance driving safety and reduce low-speed collisions caused by driver negligence or blind spot obstacles, especially for vulnerable road users such as pedestrians and cyclists.

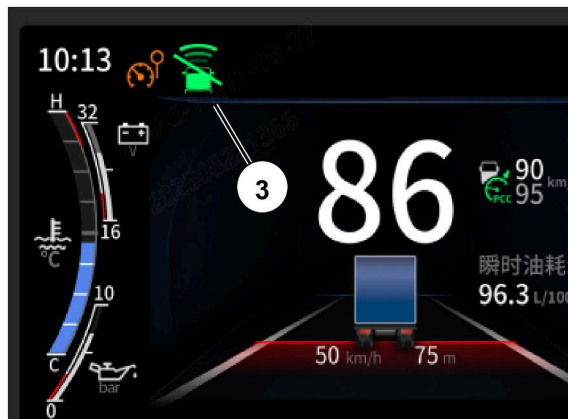
When the vehicle is powered on, the start information system is enabled by default. During self-inspection, indicator ① remains illuminated. Once self-inspection is complete, the indicator turns off.

If the start information system warning light ① remains on (without the driver manually turning off the system), it indicates a system malfunction. Stop the vehicle to investigate the cause, or contact a SINOTRUK service station for assistance.



## Moving-off information system (MOIS)

The driver may manually deactivate the alarm function while driving. To disable the alarm, press the rocker switch ② twice consecutively; the indicator light ③ will be displayed on the instrument panel. To reactivate the system, press the switch ② once more or turn the vehicle off for 30 seconds and then power it back on.



### Alarm prompt information

#### • Blind spot yellow zone

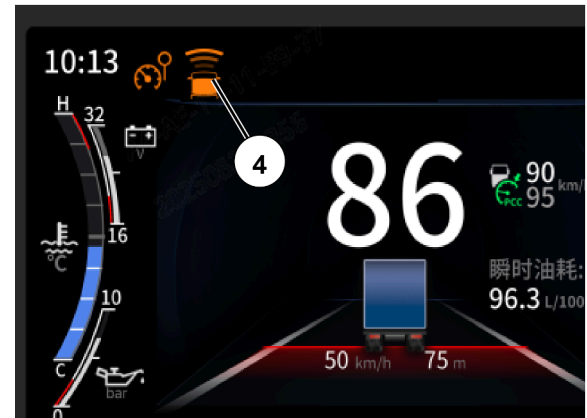
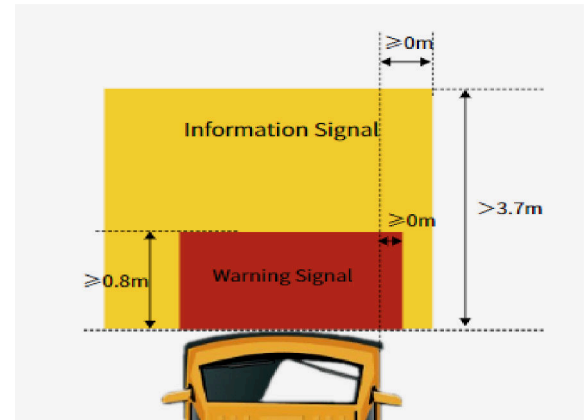
When the vehicle speed is between 0 km/h and 10 km/h, if pedestrians or cyclists are moving at 0-10 km/h within the yellow zone of the front blind spot, indicator ④ on the instrument panel will flash at 2 Hz.

#### • Blind spot red zone

When the vehicle speed is between 0 km/h and 10 km/h, if pedestrians or cyclists are moving at 0-10 km/h within the red zone of the front blind spot, indicator ④ on the instrument panel will flash at 2 Hz and an audible alarm will sound.

### System output

When the vehicle speed exceeds 10 km/h, the MOIS will automatically deactivate.



## Moving-off information system (MOIS)

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### Cautions

In the following driving scenarios, including but not limited to those listed below, the blind spot information assistance system may issue inaccurate warnings or fail to respond, and the instrument panel will display a fault indicator ①:

- Hardware system faults, such as camera or controller malfunction;
- Heavy rain, snow, or fog leading to numerous minor lens contamination scenarios in the camera image;
- Strong light exposure, such as from oncoming headlights, direct sunlight, or reflections from wet road surfaces;
- If there is dirt, moisture, damage, or any obstruction on the windshield where the camera is mounted,
- Automatic deactivation and a fault warning signal are displayed when the ambient light falls below 15 lux;
- Communication failure between the controller and vehicle CAN network.



### WARNING!

–The moving-off information system (MOIS) is solely a driver assistance feature; it does not control the vehicle. The driver is fully responsible for vehicle safety at all times.

–Do not remove the camera without authorization. If the camera is impacted or scratched, promptly visit a service station for camera angle adjustment or calibration. Failure to do so may affect camera performance and cause system malfunction.

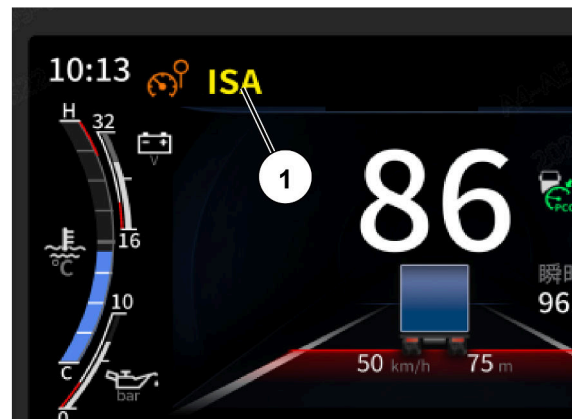
### Intelligent speed assistance (ISA)

#### Functions and activation conditions

ISA helps drivers reduce traffic accidents caused by speeding by providing information prompts and alerts. Its primary function is to detect current road speed limits while the vehicle is in motion. If the vehicle exceeds the speed limit, the system quickly issues a warning. By clearly notifying the driver, it prompts them to correct improper driving behavior as soon as possible, thereby minimizing traffic incidents resulting from speeding.

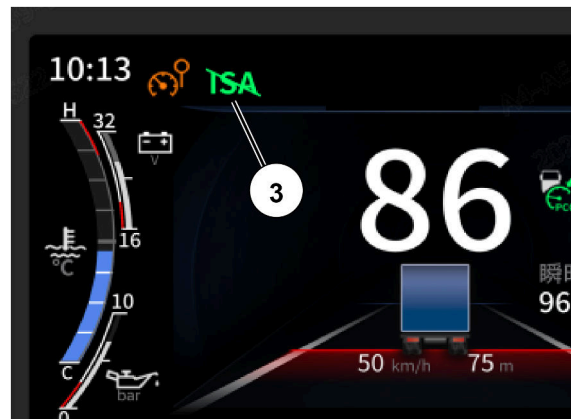
When the vehicle is powered on, the ISA system activates by default. During the self-inspection process, indicator ① remains illuminated and turns off upon completion of the self-inspection.

If the ISA system warning light ① remains continuously on (without the driver manually turning off the system), it indicates a system malfunction. Stop the vehicle to investigate the cause, or contact a SINOTRUK service station for assistance.



## Intelligent speed assistance (ISA)

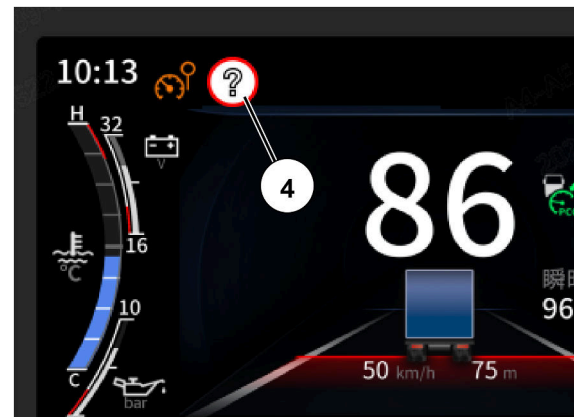
The driver may manually disable the alarm function while driving by pressing rocker switch ②, which turns off the alarm and illuminates indicator ③ on the instrument panel. Pressing rocker switch ② again reactivates the alarm, causing indicator ③ to turn off.





When the vehicle speed is between 0 km/h and 150 km/h, the ISA function is active. Once the vehicle is powered on, if it is on a road with no posted speed limit or unclear signage, and map data does not include this road, the instrument panel will display a prompt message ④. If the map data includes the road, the current speed limit will be shown on the instrument panel. When the camera detects a speed limit sign, the speed limit information is displayed with priority. For example, if an 80 km/h speed limit sign is recognized, the "?" at position ④ will change to "80". If there are no speed limit signs on subsequent roads, the instrument cluster will continue displaying the current speed limit reminder until the next speed limit sign is detected or updated map information is received. At that point, the instrument's speed limit information will be refreshed accordingly.

When a speed limit sign appears ahead, if the vehicle's reference point (front axle) passes the sign within 2 seconds (or within 10 meters if the vehicle speed is below 20 km/h), the instrument will immediately update and display the new speed limit information.



## Intelligent speed assistance (ISA)

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### Vehicle speed limit alarm

The vehicle speed displayed on the instrument panel is continuously compared with the posted speed limit. When the displayed speed exceeds 100% of the speed limit, start timer T (timing is paused while Level-2 alarm suppression conditions are active). Each Level-2 alarm terminates automatically after 4 s.

When the vehicle speed exceeds the speed limit, the corresponding icon on the instrument panel flashes as a visual warning. Under the following conditions, a secondary-level audible alarm is triggered:

- The instrument cluster displays a vehicle speed  $\geq 130\%$  of the speed limit value; T=2s.
- The instrument cluster displays a vehicle speed  $\geq 120\%$  of the speed limit value; T=3s.
- The instrument cluster displays a vehicle speed  $\geq 110\%$  of the speed limit value; T=4s.
- The instrument cluster displays a vehicle speed is 100% of the speed limit value; T=5s.

The secondary audible alarm of the intelligent speed assist system will be suppressed under the following conditions:

- Manually deactivate vehicle systems that control driving speed, such as turning off cruise control.
- Fully release the accelerator pedal (for electric vehicles with regenerative braking, this condition may be applicable).
- The audible alarm stops immediately when the brake pedal is pressed.

### Cautions

In driving scenarios including but not limited to the following, the intelligent speed assist system may provide inaccurate warnings or fail to respond, and the dashboard will display warning light ①:

- Hardware system failures, such as camera or controller malfunction, GPS antenna fault, etc.
- Heavy rain, snow, or fog leading to numerous minor lens contamination scenarios in the camera image;
- Strong light exposure, such as from oncoming headlights, direct sunlight, or reflections from wet road surfaces;
- If there is dirt, moisture, damage, or any obstruction on the windshield where the camera is mounted,
- Communication fault between the controller and the vehicle CAN network.
- Check whether a suitable map package is available for the current national system.

**WARNING!**

- The intelligent speed assistance (ISA) function only displays the speed limit and issues overspeed alerts; it does not actively adjust or intervene in the vehicle's speed.
- This feature is a driving assistance system and does not apply to all scenarios. Drivers should maintain a safe speed and exercise caution, strictly adhering to local traffic regulations and current road conditions. The driver is fully responsible for the safety of the vehicle during operation.
- Do not remove the camera without authorization. If the camera is impacted or scratched, promptly visit a service station for camera angle adjustment or calibration. Failure to do so may affect camera performance and cause system malfunction.

## **Driver drowsiness and attention warning (DDAW)/Attention and Drowsiness driver warning (ADDW)**

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### **Driver drowsiness and attention warning (DDAW)/Attention and Drowsiness driver warning (ADDW)**

#### **Camera position**

The driver fatigue warning camera ① is mounted on the A-pillar inside the cab.

#### **Driver fatigue warning system (DDAW)**

##### **System activated**

When the tractor speed exceeds 65 km/h, the DDAW system actively monitors the driver's fatigue status.

##### **Automatic calibration learning**

When the vehicle speed exceeds 20 km/h, the system initiates a 5-minute automatic calibration learning process. The system calculates and analyzes specific driver data, including eye closure duration, blinking frequency, and facial expressions, to learn the driver's typical driving patterns. Increased blinking frequency, prolonged blink duration, reduced eyelid movement, and yawning are recognized as signs of drowsiness, enabling real-time assessment of the driver's fatigue level.



## Driver drowsiness and attention warning (DDAW)/Attention and Drowsiness driver warning (ADDW)

### Drowsiness threshold

When KSS > 7, the DDAW system issues a drowsiness warning.

#### KSS levels and corresponding descriptions

KSS level	Description
KSS=7	<ul style="list-style-type: none"><li>• Detects yawning and eyelid closure of at least 50%. If the cumulative eyelid closure time within one minute exceeds 300 ms, and the total duration exceeds 5 seconds.</li><li>• Cumulative eye closure time exceeds 8 seconds within 1 minute.</li></ul>
KSS=8	<ul style="list-style-type: none"><li>• Eyelid closure rate is at least 70%, and the total eyelid closure time within 1 minute is more than 500 ms but does not exceed 7 seconds.</li><li>• Total eye closure time within 1 minute exceeds 10 seconds.</li></ul>
KSS=9	<ul style="list-style-type: none"><li>• Eyelid closure rate is at least 90%, and the total eyelid closure time within 1 minute is more than 700 ms but does not exceed 7 seconds.</li><li>• Total eye closure time within 1 minute exceeds 12 seconds.</li></ul>

### System activation, reactivation, and deactivation.

#### • Fatigue warning description (KSS=7)

When the DDAW system detects that the driver is in a drowsy state equivalent to KSS level 7, a drowsiness warning is issued to the driver.

#### Fatigue warning description



Fatigue level	Instrument display	Audio warning
Fatigue Level I (Drowsy)		Frequency spectrum: 1500 Hz Amplitude range: 70–80 dB Sound frequency: 3Hz

#### • Fatigue warning description (KSS≥8)

When the DDAW system detects that the driver is in a drowsy state equivalent to KSS level 8 or higher, a fatigue warning is issued to the driver.



## Driver drowsiness and attention warning (DDAW)/Attention and Drowsiness driver warning (ADDW)

### Fatigue warning description

Fatigue level	Instrument display	Audio warning
Fatigue Level II (Microsleep)		Frequency spectrum: 1500 Hz Amplitude range: 70–80 dB Sound frequency: 4Hz
Fatigue Level III (Sleep)		Frequency spectrum: 1500 Hz Amplitude range: 70–80 dB Sound frequency: 3Hz

### Fault Description

#### Fault Description

Fault information	Fault Description	Comments
 A pop-up window warning appears, displaying "Face Information Incomplete. Cannot Recognize Face Status."	Eye obstruction; The face is outside the recognition area. Camera blocked;	Adjust the angle of the face and clean the camera lens to allow the system to capture images.
	Electrical System Fault	<ul style="list-style-type: none"> <li>• Drive with care, slow down, and stay aware of traffic conditions.</li> <li>• Immediately ask for help from a SINOTRUK service station.</li> </ul>

### **Advanced Driver Distraction Warning (ADDW)**

The system performs an initial self-inspection each time the vehicle is started.

#### **System alarm**

The ADDW system alerts the driver through both visual and audible signals. When the camera detects driver distraction, an audible alarm will sound on the instrument panel to alert the driver.

When the system issues an alarm, three consecutive beeps will sound at 0.3-second intervals, and the ADDW warning light on the dashboard will illuminate for 3 seconds.

In the following situations, the ADDW system will output a fault warning, sounding a buzzer and illuminating the ADDW fault indicator, which will remain on until the issue is resolved. Once the fault is eliminated, the ADDW system will resume normal operation within 60 seconds.

- The camera is blocked or other factors result in the loss of human image.
- The video signal is lost due to an interrupted connection to the CL54A camera.
- CAN communication between the vehicle and the ESS-A device is interrupted.

## Introduction to brake system

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### Introduction to brake system

#### Function of brake system

- Service braking
- Parking brake and emergency brake
- Auxiliary brake (exhaust gas brake)
- Trailer brake (applicable for trailers)

The service brake is a dual-circuit air brake and is independent of the control device of the parking brake. The parking brake allows the vehicle to be parked reliably on a certain slope even without the driver. The control device is shared by the emergency brake and parking brake. If any part of the control device of the service brake fails, the parking brake can be operated to realize the emergency brake of the vehicle.



#### **WARNING!**

**The brake system cannot exceed its physical limits. In particular, when driving on a smooth, wet road or a road with extremely poor condition, you shall constantly adjust your driving behavior to adapt to different road conditions and traffic conditions.**



**Brake system function inspection**

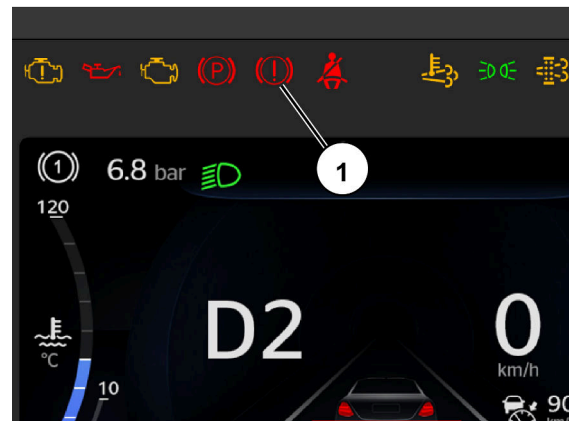
After the vehicle is powered on, all functions of the brake system are automatically activated.

**Brake system fault display**

In case of a low pressure alarm, the symbol ① for "Brake system fault" will be displayed on the instrument.

**WARNING!**

- When you find that the braking system is faulty, stop the vehicle by applying the service brake or emergency brake, seek help from a CNHTC service station, and resume driving only after troubleshooting.
- If the ABS is faulty, the wheels may be locked up during braking. Visit the nearest CNHTC service station for repairing.



## Service braking

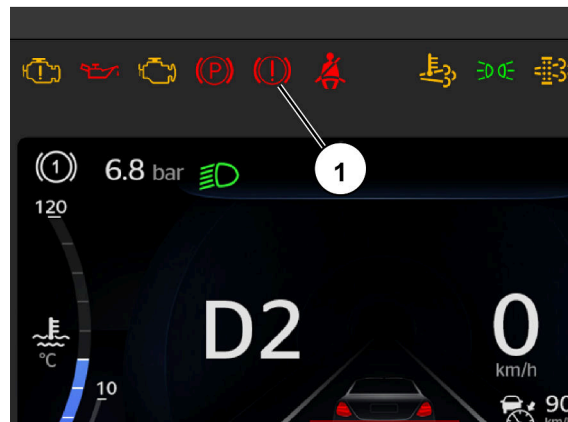
### Service braking

The brake pedal acts on all wheels of the vehicle via two independent circuits. The rated working pressure is 1.0MPa. Circuit I acts on the rear axle wheel, and circuit II acts on the front axle wheel. Once the pressure of either circuit drops below 0.55 MPa, the brake system fault indicator lamp ① lights up in red. At this time, stop the vehicle immediately for inspection to ensure driving safety. If full-stroke braking is performed for several times in a short period of time, the pressure may also drop below 0.55MPa.



#### WARNING!

—If the linkage cut-off function of the exhaust gas brake is not disabled, and when the brake pedal is pressed, the exhaust gas brake will automatically function.  
—In rainy or snowy weather and when the road is wet and slippery, in order to ensure driving safety, operate the brake linkage setting on the driver display screen, and select deactivation to disable the exhaust gas brake linkage function.

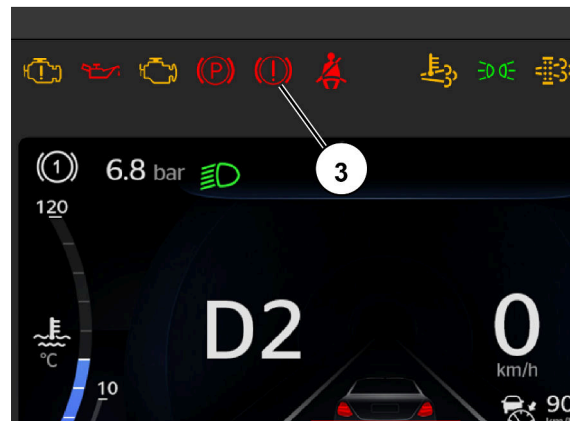
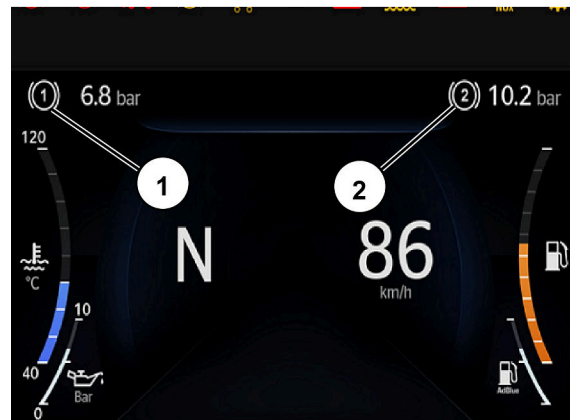


**Air pressure display**

On the instrument, ① indicates the pressure of the rear axle and brake circuit I; ② indicates the pressure of the front axle and brake circuit II.

**WARNING!**

- If the air pressure is too low (below 0.55MPa), the warning lamp lights up. The vehicle can only be started after the warning lamp goes out and the displayed warning information is gone.
- After starting, test the braking function (service brake and parking brake) as soon as possible on a dry road with good conditions!
- Ensure that there are no foreign objects in the operating area of the pedal.



## Service braking

### Anti-lock braking system (ABS)

The ABS can prevent the wheels from being locked up in the braking process. In addition, the Anti-Slip Regulation (ASR) can prevent the driving wheels of the vehicle from skidding.

The ABS still allows the vehicle to maintain its steering ability and directional stability even during an emergency brake. Press the braking pedal to the end regardless of the road conditions to ensure the shortest braking distance.



#### **WARNING!**

- The ABS will not work when driving at a slow speed.
- As the ABS cannot compensate driving mistakes (such as a short safety distance with the vehicle ahead, an excessive speed or failure to decelerate when turning), the driver shall still drive cautiously.
- When ABS fails, the wheels may lock up during braking, and the braking force may decrease.

### ABS function inspection

After the vehicle is powered on, the ABS starts automatically.

① is the ABS indicator lamp of the tractor, and ② is the ABS indicator lamp of the trailer. When the ABS indicator lamp is always on, it indicates that the ABS is faulty.

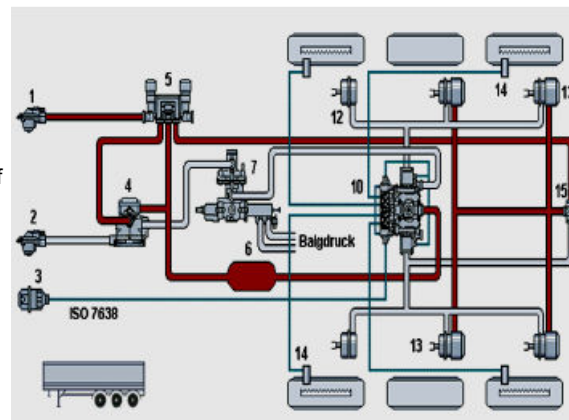


**When towing a trailer with ABS**

After the vehicle is powered on, the trailer's ABS starts automatically.

The ECU of the trailer ABS is independent, whose power is supplied by the tractor, and the status of the trailer ABS is displayed on the instrument screen of the tractor.

When the ABS indicator lamp of the trailer is always on, it indicates that the ABS of the trailer is faulty. When the ABS is faulty, contact the SINOTRUK service station for handling.



## Service braking

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### Electronic braking system (EBS) (optional)

The EBS (optional unit) has the functions of the following systems:

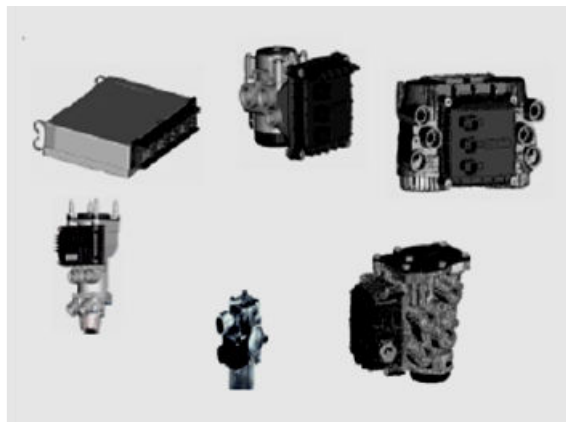
- Anti-lock braking system (ABS)
- Anti-slip regulation (ASR) unit
- Electronic stability control (ESC), optional unit

After the vehicle is powered on, this function will start automatically.



#### **WARNING!**


**When the EBS is faulty, the ABS indicator lamp will be on. Yellow light represents a general fault, and it is recommended to repair as soon as possible. Red light represents a severe fault, and you need to drive the vehicle to the nearest CNHTC service station for repairing. When a power failure of the EBS occurs, the emergency function of the EBS system will work. In this case, the braking performance will decline, and the vehicle needs to be repaired at the service station as soon as possible.**



### ESC system

The ESC (Electronic Stability Controller) is a system that reduces the truck's danger of rollover or side skidding. If the system senses a danger of side skidding or rollover, it will first reduce the throttle, and also use the wheel brakes to brake the wheels while the truck continues traveling in the correct path, so as to slow down the truck. The system works better if the trailer is also equipped with the ABS or EBS.

When the vehicle is running and ESC is working, the ESC indicator

lamp on the driver's display flashes.  When the system fails, the ESC indicator lamp will stay on constantly. In this case, please contact the SINOTRUK service station for handling. The driver shall drive cautiously to ensure driving safety before troubleshooting.



#### **WARNING!**

- Sideskidding may still occur on a wet and slippery road surface even with the ESC.
- On trucks equipped with the ESC, please drive at a slow speed on curves with a large camber. Driving too fast on curves with a large camber may lead to ESC intervention, affecting the driving experience.

## Parking brake

### Parking brake

The parking brake can also be used as the emergency brake. The driver operates the handle ① of hand brake valve to activate the spring energy storage brake chamber, thus achieving parking braking. When the service brake system has a leakage or other faults, parking brake can be used to achieve vehicle emergency braking.

The hand brake valve is mounted on the dashboard. -Only when the brake system pressure is higher than 0.55 MPa and after the parking brake signal lamp is off, can the parking brake be completely released by operating the hand brake valve, and the vehicle can be started.



#### **WARNING!**

- When stopping the vehicle, be sure to apply the parking brake, and use wheel pads to prevent vehicle skidding if necessary!
- Do not start the vehicle until the parking brake signal lamp goes off!
- Before starting the engine, place the handle of the hand brake valve in the parking position. Otherwise, after the brake pressure increases, the original parking brake effect will be released!





### Apply the parking brake.

Pull the handle ① backward until it is locked, and the parking brake indicator lamp ② goes on. The parking brake is now fully locked.

### Partial braking

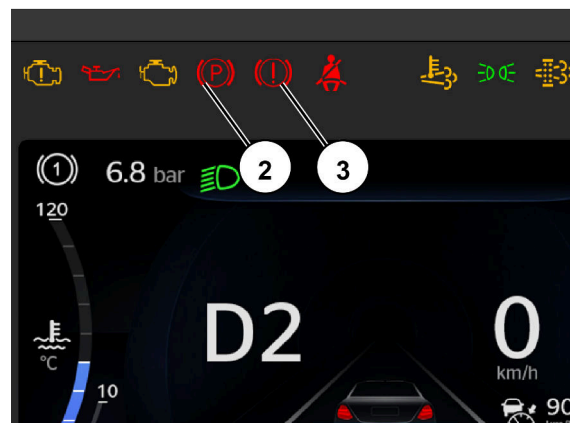
Pull the handle backward gradually and keep it at the desired position; otherwise, it will flip back to the released position. When the stroke of the handle is approximately over 10°, the parking brake indicator lamp ② on the instrument panel will be on.

If the operating handle is not fully placed at the braking position, it may automatically return to the released position. At this time, if the vehicle is not applied with the parking brake, it may skid.

### Releasing the parking brake

Release the handle latch, the handle will automatically return to the released position, and the parking brake indicator lamp ② will go out.

The pressure of the air reservoir shall be at least 0.55 MPa to ensure that the parking brake can be released completely. If the pressure is lower than this value, the "brake system fault" indicator lamp ③ and "STOP" text on the instrument panel will light up.



## Parking brake

### Testing position of parking brake

The test position is used to check whether the braking force of the tractor's spring energy storage brake chamber alone is sufficient to stop the tractor train on the slope.

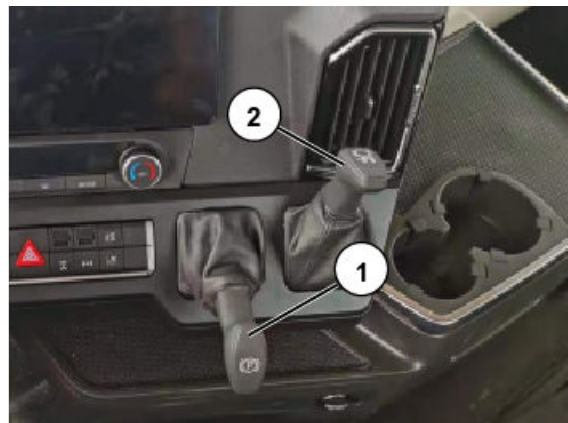
#### Detection method

- Place the parking brake handle ① in the brake position.
- Continue to pull backward the handle ① to the testing position, and place the trailer brake handle ② to the released position. The combination vehicles will apply the parking brake with only the brake force from the energy storage spring brake chamber of the towing vehicle.



#### **WARNING!**

Detecting the brake performance of the energy storage spring brake chamber of the towing vehicle before reliably blocking the wheels of the towing combination vehicles with wedges may lead to the skidding of the towing combination vehicles, thus causing an accident!




### Auxiliary brake

#### Auxiliary brake (exhaust gas brake)

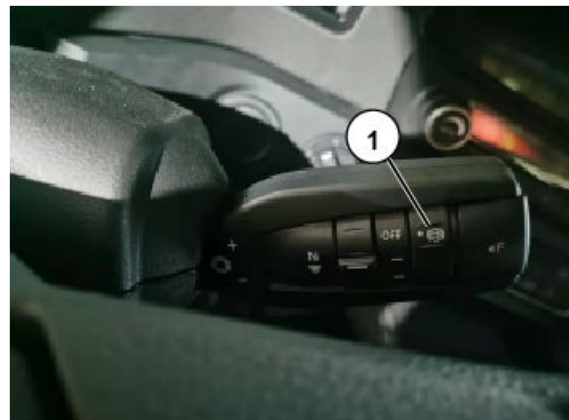
The exhaust gas brake of the engine can make the vehicle decelerate continuously or stabilize the speed. Exhaust gas brake can be used for deceleration when going down a long slope, before meeting or passing a road section with poor conditions.

Rotate the knob at the right combination switch ①, where there are two gears, and

the exhaust gas brake lamp  goes on. The vehicle will realize the exhaust gas brake when the following conditions are met:

- The clutch pedal is not applied;
- The accelerator pedal is released
- The vehicle is in non-neutral gear
- The engine rpm is over 1000 rpm.

Exhaust gas brake can be used for deceleration before meeting or passing a road section with poor condition. Using the exhaust gas brake can reduce the times of service brake, decrease the wear and heating of tires and wheel brakes, lower fuel consumption, and improve driving safety.





**WARNING!**

- Use exhaust gas brake carefully on wet, dirty or icy roads, as the vehicle may slip and slide in such a case.
- When going down a long slope, use the exhaust gas brake in the transmission gear, because the neutral gear cannot play the braking role.
- The engine rpm shall not exceed 2400 rpm when the exhaust gas brake is used.
- The exhaust gas brake is an auxiliary brake, not an automobile parking device. Therefore, it cannot substitute the service brake of the car. The service brake shall still be used to stop the car completely.

### Trailer brake

#### Trailer brake (applicable for trailers)

The trailer brake is used to brake the trailer separately.

The driver can apply the trailer brake by pulling backward the trailer brake handle

①. When releasing the handle, the handle will automatically return to the initial position, and the trailer brake will be released.



## Electronic parking brake (EPB)

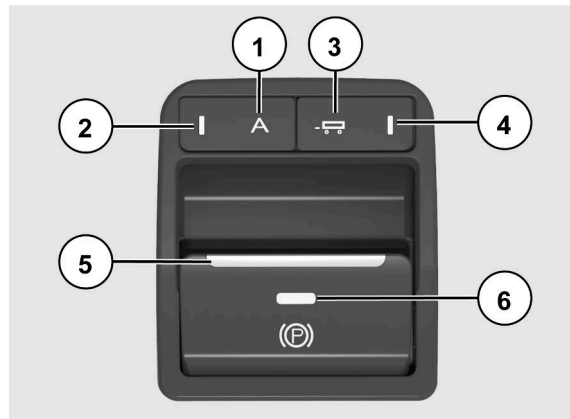
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### Electronic parking brake (EPB)

The electrical park brake (EPB) is an electronic control system that realizes parking braking through electronic control. When the vehicle is shut down, even if you forget to pull up the hand brake, the system will automatically complete parking; when the vehicle starts, if the driver forgets to release the hand brake, the parking brake will also be released automatically. When the vehicle starts on a ramp, it will not slip backwards, making the vehicle more intelligent, simpler and safer, and reducing accidents.

### EPB switch

- ① Autohold button
- ② Autohold indicator
- ③ Trailer independent brake button
- ④ Trailer independent brake indicator
- ⑤ EPB system switch
- ⑥ Parking indicator



### Instructions for use of EPB switch light

- When the power supply is on, all switch backlights are illuminated; when the power supply is off, all switch backlights turn off.
- When the parking brake is engaged, the parking indicator on the switch lights up; when the parking brake is released, the indicator turns off.
- When the temporary parking function is activated, the temporary parking indicator on the switch illuminates; when the function is deactivated, the indicator turns off.
- Activate the trailer independent brake function, and the trailer independent brake indicator of the switch will light up; turn off the trailer independent brake function, and the trailer independent brake indicator of the switch will go out.


### EPB instrument display

When the EPB function is activated, the red parking brake alarm light



lights up (normally on).

When EPB fails, the red parking brake warning light flashes or the

yellow parking brake warning light.  Steady ON



### WARNING!

When the EPB has a fault, the yellow parking brake warning lamp is on or the red parking brake warning lamp flashes. When the yellow lamp is on, it indicates a general fault, and it is recommended to repair as soon as possible. When the red lamp flashes, it indicates a serious fault, and it is necessary to drive to the nearest SINOTRUK service station for repair.

## Electronic parking brake (EPB)

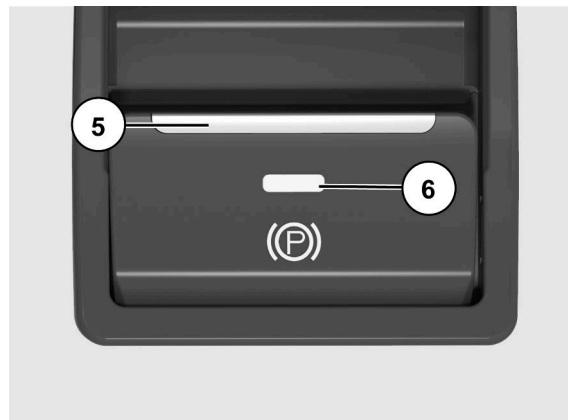
### EPB function operation

**Manual parking:** When the vehicle needs to be parked, fully pull handle ⑤ on the EPB switch. The parking brake is engaged and the parking indicator ⑥ on the switch lights up.

**Automatic parking:** When the vehicle is powered off without parking, EPB automatically activates parking, the parking indicator ⑥ on the switch lights up, and all lights on the EPB switch go out after 5 seconds.

**Manual release of parking brake:** Step on the brake, push the EPB switch handle ⑤ by hand, EPB releases the parking brake, and the parking indicator ⑥ on the switch goes out.

**Automatic release of parking brake:** The EPB system can detect the driver's intention to start the vehicle: when you start the vehicle, engage a gear, and step on the accelerator, even if you forget to release the parking brake, the EPB will automatically release it and the parking indicator on the switch will go out.



#### **WARNING!**

–When the EPB switch handle is pressed without pressing the brake pedal, the electronic parking system cannot release the parking brake. The dashboard displays the prompt "Press the brake pedal to release parking brake" with an audible alarm.

–When the system pressure of the whole vehicle is lower than 5.5bar, and the brake pedal is pressed and the EPB switch handle is pressed, the electronic parking system cannot release the parking brake. The dashboard displays the "Low Air Pressure" prompt with an audible alarm.



### Manual mechanical parking

If the vehicle malfunctions and the EPB cannot engage the parking brake, manual mechanical parking can be used. The EPB module is typically installed on the frame's rear axle module. Open the test port on the EPB module, press the valve inside the port by hand to release the air, and the vehicle will be parked.

### Manual parking brake release

If the EPB fails and the parking brake cannot be released, you can manually release it using the manual mechanical parking brake release method. Open the test port on the EPB module, and use an air hose to inflate through the test port to release the parking brake.



#### **WARNING!**

–When manually releasing the parking brake using the mechanical method, the inflation hose cannot supply air to the vehicle through the test joint. The vehicle must maintain sufficient air pressure to release the parking brake.

–When the electronic parking brake system is functioning properly, do not use manual mechanical methods to engage or release the parking brake.

### Forced parking brake release

If the vehicle malfunctions and requires repair, and the air pressure drops below 5.5 bar and cannot be restored, making it impossible to release the parking brake via normal operation, a forced release can

be performed. Depress the brake pedal and hold down the EPB switch handle until the parking indicator on the EPB switch turns off, then the vehicle's parking brake will be forcibly released.



#### **WARNING!**

When the parking brake is forcibly released, the pressure in the parking air chamber is low and cannot fully release the brake, resulting in brake drag. This feature should only be used for short-distance vehicle movement when air pressure is available but below 5.5 bar. Do not use this function unless necessary.

## Electronic parking brake (EPB)

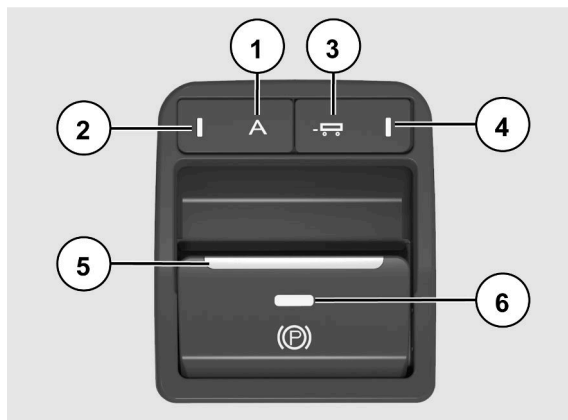
### Autohold

Press the Autohold button ① on the switch, the Autohold indicator ② on the button lights up, and the Autohold function is activated. Press the button ① again, the Autohold indicator ② goes out, and the Autohold function is turned off. When the Autohold function is activated (the Autohold indicator ② illuminates), step on the brake pedal from the running state until the vehicle stops. After 3 seconds of braking, the vehicle will automatically park, the parking brake warning light on the instrument will light up, and the parking indicator ⑥ on the switch will light up. When the Autohold indicator is off, the vehicle cannot park automatically.



### Trailer independent braking function (available only on tractors)

Press the trailer independent brake button ③ on the switch; the trailer independent brake indicator ④ on the button will light up, and the trailer independent brake function will be activated. Press button ③ again, the trailer independent brake indicator ④ will go out, and the trailer independent brake function will be turned off. When the trailer independent brake function is activated (the indicator ④ is on), when the vehicle is connected to a trailer and the speed is greater than 5 km/h, pull the EPB switch handle ⑤ by hand, the parking indicator ⑥ flashes, and EPB applies braking force to the trailer alone. The larger the angle of pulling the EPB switch handle, the greater the braking force.



### Door open parking function

When the vehicle is stationary and the door switch signal is normal, if the parking brake is not engaged, opening the driver's side door will automatically apply the

parking brake. The driver should confirm that the red parking brake warning light is illuminated before safely exiting the vehicle.

### Emergency braking

When the trailer independent brake function is turned off and the vehicle speed is greater than 5 km/h, pull the EPB switch handle ⑤ by hand, and EPB will apply braking force to the tractor and trailer. The larger the angle of pulling the EPB switch handle, the greater the braking force.



#### **WARNING!**

- When performing emergency braking, the wheels may lock, and there is a certain risk. Please use this function only in emergency situations.**
- Pull the EPB switch handle for the full stroke and hold for 3s to stop the vehicle, and the electronic parking system will activate the emergency parking. This parking cannot be released automatically.**

### Trailer mode

When the vehicle is normal in the self-inspection, the air pressure is normal, and the vehicle is not parked, press the EPB switch to turn off the key until the vehicle is turned off for more than 5 seconds (all lights on the EPB switch are off), and then release the EPB switch. At this time, the vehicle remains unparked before flameout. When the vehicle fails and needs to be towed, this function can be used to keep the parking release state of the vehicle when it is turned off and powered off.

## Electronic parking brake (EPB)

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### **WARNING!**

After entering the towing mode, the vehicle will remain in the release state when powered on again. Please pull the EPB switch handle to park first before performing other operations.

### **Parking force detection (test spot) (available only on tractors)**

When the vehicle is coupled to a trailer and is parked, pull up the EPB switch to the bottom twice within 1 second (after pulling it up to the bottom for the first time and releasing it, pull it up to the bottom for more than 5 seconds for the second time and keep pulling up the EPB switch). The vehicle releases the parking force of the trailer and only retains the parking force of the tractor.



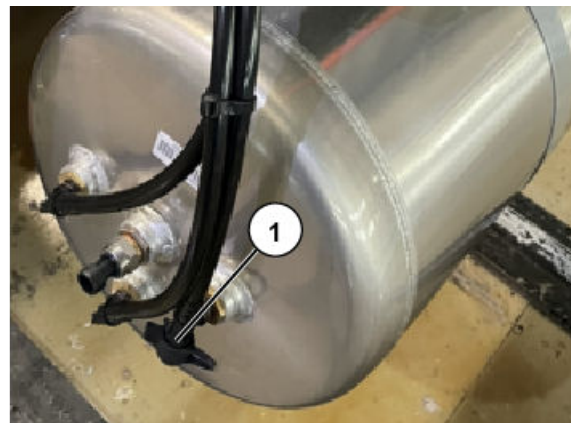
### **WARNING!**

The purpose of this function is to detect the park braking force of the driving vehicle. Please do not use it unless necessary.

### Daily precautions for brake system

#### Inflation coupling

The inflation coupling ① is located at the air reservoir to connect an external test instrument to detect the air pressure in the brake pipeline. The inflation coupling connected to the inflation hose can inflate the tire, or an external air source can be used to inflate the vehicle brake system.



#### Auxiliary air consumption module

#### Inflation coupling

The auxiliary air consumption module is located on the inside of the frame. Unscrew any plug and equip it with a VOSS 230 series quick-connect connector body to take air.



#### **WARNING!**

**It is not allowed to connect with a ferrule pipe connector here.**



## Daily precautions for brake system

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### Protection measures for brake pipeline



#### **WARNING!**

When performing welding, cutting or drilling holes near the nylon pipe used for braking, the following instructions shall be followed:

- Release the air pressure in the pipeline first.
- Cover the pipeline to protect it from being damaged by sparks, flames and hot chips.
- The maximum allowable heating temperature of non-pressure pipe is 130 °C, and the maximum duration is not exceeding 1 hour.



#### **CAUTION!**

- The sealing of the brake pipeline system shall be checked regularly.
- The compressed air pipeline shall be checked frequently, and if the pipeline is found to be bent, with friction marks, pits or other damaged parts as well as corrosion, it shall be replaced with a new one in time.

### Check and remove the moisture in the air reservoir

The vehicle stops and the parking brake is applied. Pull the manual drain valve pull ring ① at the lower part of the air reservoir laterally to remove moisture condensed in the air reservoir.

It is recommended to check the air reservoir farthest from the air dryer every day. If any oil-water mixture is discharged from the drain valve, it indicates that the air dryer has failed, and the drying tank in the upper part of the air dryer should be replaced immediately. The drying tank of the air dryer should be replaced at least once every two years.



#### **WARNING!**

- After parking in winter in cold areas, all air reservoirs shall be emptied to prevent the brake valve from jamming and affecting the braking effect.
- During winter, increase the frequency of draining water from the air reservoir as needed.
- Do not add any additives to the brake air circuit. Some additives may be flammable, explosive, and corrosive to organic materials such as rubber seal rings.



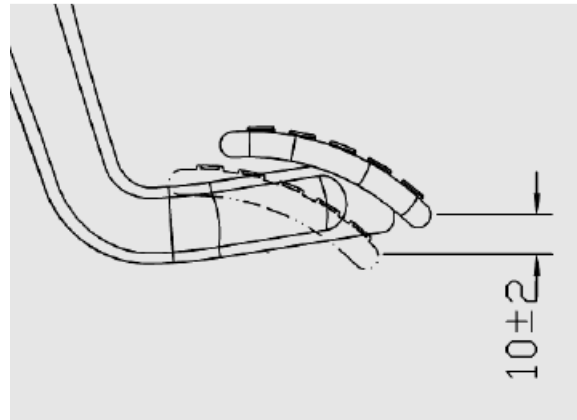
## Daily precautions for brake system

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### Inspection of brake pedal travel

Gently depress the brake pedal to check its free travel. The standard value is  $10 \pm 2$  mm.

There should be no jamming when fully depressing the brake pedal.



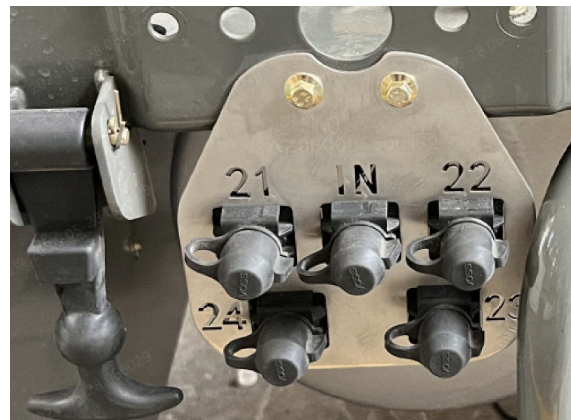
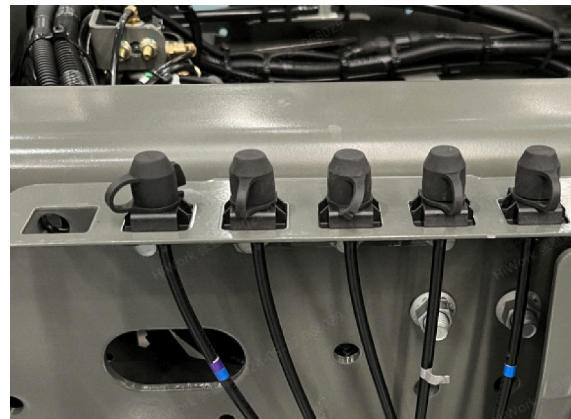


### External integrated test coupling

Location of integrated test coupling (if any): For models with single-layer battery box, it is located outside the battery box; for models with double-layer battery box, it is located outside the frame longitudinal beam and inside the fuel tank. The couplings are 5-port or 12-port couplings, depending on the actual vehicle.

#### 5-port couplings:

- 21: Air source for rear axle service
- 22: Air source for front axle service
- 23: Air source for parking circuit
- 24: Air source for auxiliary circuit
- IN: 21-port air dryer



## Daily precautions for brake system

### 12-port couplings:

The following ports are added to the 12-port couplings based on the 5-port couplings:

F1: Front primary axle chamber

F2: Front secondary axle chamber (empty for single front axle models)

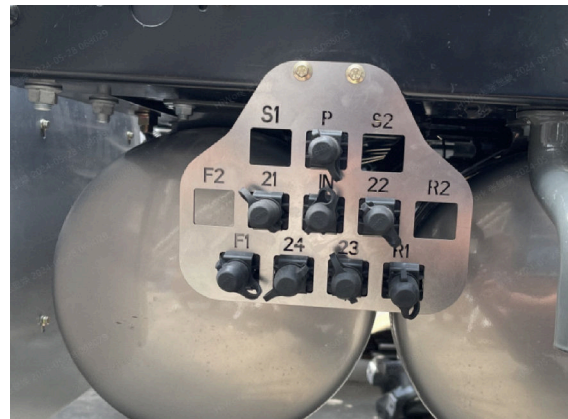
R1: Rear primary axle chamber

R2: Rear secondary axle chamber (empty for single rear and front models)

P: Parking chamber of rear primary axle chamber

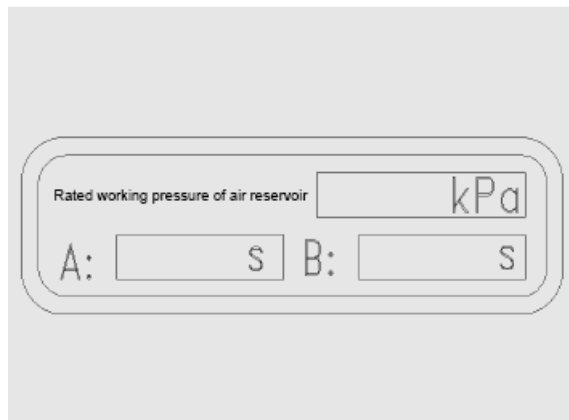
### Clean air gun interface

The clean air gun interface ① is located behind the main seat in the cab to provide air source for the clean air gun. Open the dust cap connection. The interface specification is M16X1.5.



**Brake nameplate**

The brake nameplate is located at the door frame on the co-driver side, under the vehicle nameplate. The nameplate shows the rated working pressure and brake response time of the air reservoir.



## Refrigerator assembly (16L single temperature control)

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### Refrigerator assembly (16L single temperature control)

#### Power on

- Open the refrigerator lid.
- Turn the temperature switch knob clockwise, and the refrigerator will start cooling.

#### Set temperature

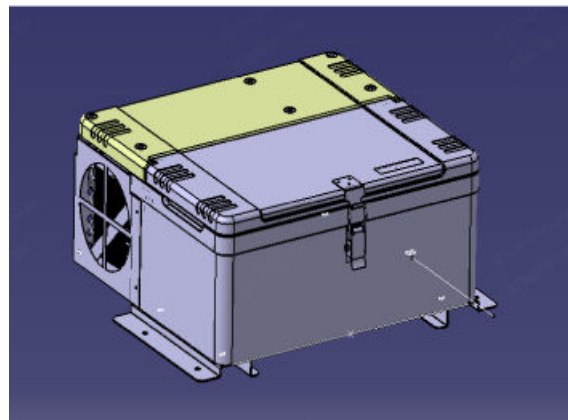
MAX internal temperature about  $-10^{\circ}\text{C}$

MIN internal temperature about  $10^{\circ}\text{C}$

Turn the temperature switch knob to set the desired refrigeration temperature.

#### Power off

- Open the refrigerator lid.
- Turn the temperature switch knob to the "0" position.



### Refrigerator assembly (30L dual temperature control)

- The figure shows the closed state of the box.
- Pull the handle ⑤ to open the refrigerator drawer.

#### Startup

- Press and hold the button ① for at least 3 seconds to turn on the refrigerator.
- Display ④ shows the current temperature inside the refrigerator.

#### Setting temperature

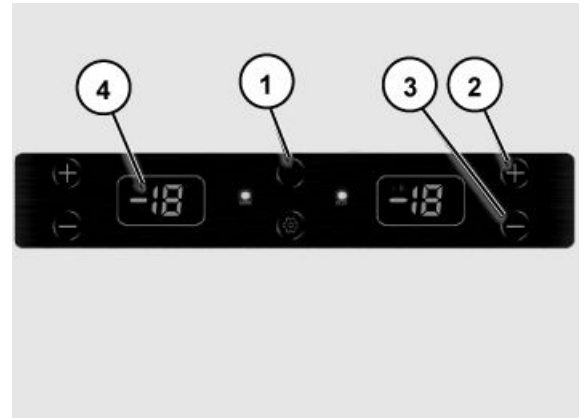
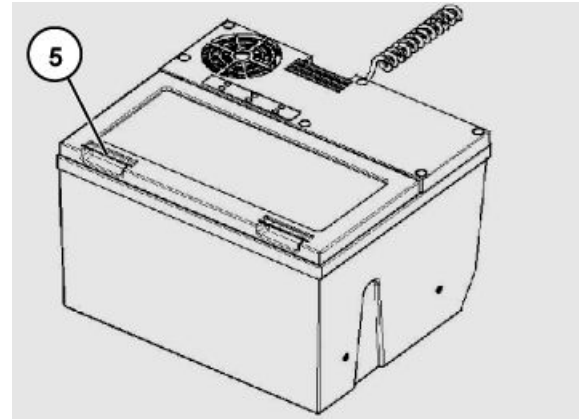
MIN: Approximately  $-10^{\circ}\text{C}$  inside.

MAX: Approximately  $10^{\circ}\text{C}$  inside.

- Press the button ② to raise the cooling temperature, then the display ④ shows the set temperature.
- Press the button ③ to reduce the cooling temperature, then the display ④ shows the set temperature.

#### Shutdown

Press and hold the button ① for at least 3 seconds, then the refrigerator turns off.



## Refrigerator assembly (30L dual temperature control)

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When a fault occurs, the DTC will be displayed on the display.

Fault code	DTC description	Solutions
E1	Battery voltage protection	The on-board voltage has been reduced below the minimum value, the refrigerator will automatically power off to protect the battery. After the voltage is sufficient, the refrigerator automatically starts and the DTC disappears., Start the engine if necessary.
E2	Fan overcurrent protection	Please drive to a service store to repair the fan.
E3	Compressor motor start error	Wait for 15 minutes to see if the refrigerator can start automatically. If not, please drive to a service store for repair.
E4	Compressor motor speed low	If the power supply voltage is unstable, wait for 15 minutes to see if the refrigerator can start automatically. If not, please drive to a service store for repair.
E5	Module overheating protection	When the compressor overheats, the refrigerator automatically shuts down. After the temperature drops, the refrigerator will automatically start and the DTC disappears.
E6	Temperature sensing bulb short/open circuit	Please drive to a service store for repair.
E7	The inclination angle of the refrigerator is greater than 45°	Please restore the cab to the horizontal position.

### Air conditioning system (US standard)



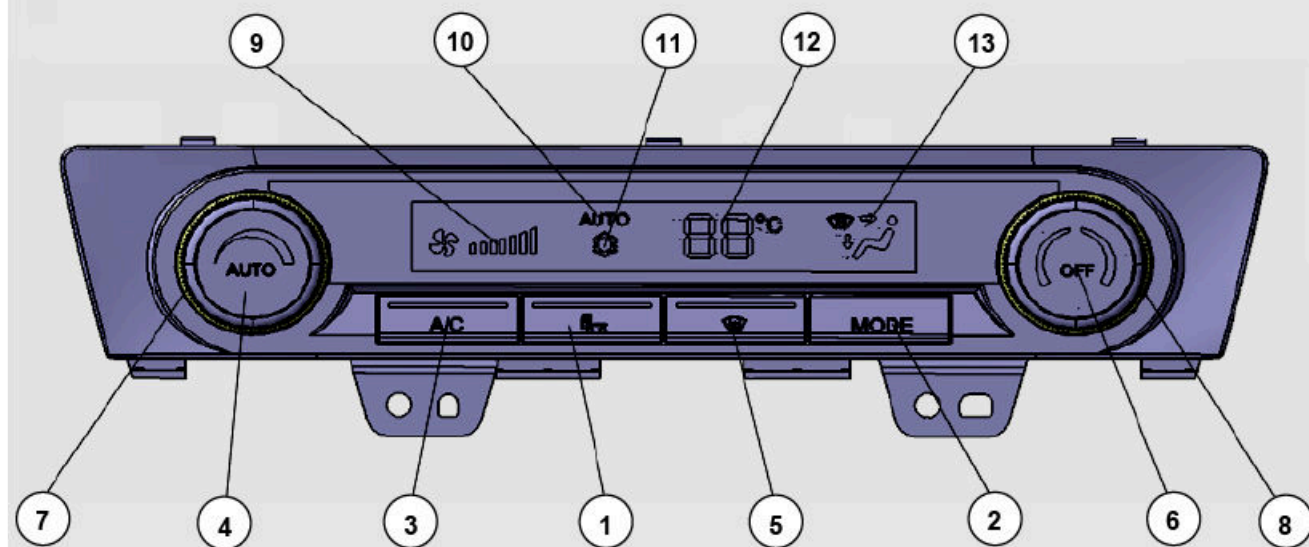
#### **WARNING!**

- The refrigerant is R134a, and the filling amount is 675 g $\pm$ 25 g (except in heat regions, the filling amount is 775 g $\pm$ 25 g, subject to the A/C label).
- When there is a loss of lubricating oil in the system, supplement with an appropriate amount of the lubricating oil designated by the manufacturer of the compressor.
- The maintenance of the air conditioning system and the filling of refrigerant shall be conducted by specialized maintenance personnel.
- It is prohibited to flush the front wall of the cab when the air conditioning system is in the external circulation state.
- Operate the air conditioning 1-2 times to ensure that the compressor is sealed reliably and lubricated.



#### **CAUTION!**

- After the vehicle has been parked for a long time (more than 1 month), if you need to use the A/C cooling function, please follow these steps:
  - Start the vehicle normally;
  - Keep the idle state, start the A/C control panel, and inch the A/C switch (the A/C on the A/C control panel lights up for 2-3s and then disconnects, with more than 10s interval before pressing A/C switch next time) 3-4 times.
  - Normal use.










## Composition of the Control Panel




- ① Internal/external circulation button
- ② Mode button
- ③ Air conditioning button
- ④ AUTO button
- ⑤ Defrost button
- ⑥ OFF button
- ⑦ AUTO button outer knob
- ⑧ OFF button outer knob
- ⑨ Air volume sign
- ⑩ AUTO on sign
- ⑪ A/C working sign
- ⑫ Temperature value
- ⑬ Air outlet mode sign

## Instructions for panel operation

No.	Button	Function	Description
1	 Internal/external circulation button	Switch between internal and external circulation	<ul style="list-style-type: none"> <li>In manual mode, press the circulation button once to switch the internal/external circulation operating state once. The indicator lamp is on during the internal circulation.</li> <li>In AUTO mode, press this button to switch the internal/external circulation without changing the AUTO mode.</li> </ul>
2	 Mode button	Change the air blowing mode	<ul style="list-style-type: none"> <li>5 air blowing modes are set for the system, i.e. face flowing, face and foot blowing, foot blowing and defrosting, and defrosting (direction of the blowing air, which does not indicate the switching on of the defrost function).</li> <li>The system switches between the five air blowing modes in sequence each time the button is pressed.</li> </ul>

## Air conditioning system (US standard)

No.	Button	Function	Description
3	 <p>Air conditioning button</p>	Turn on/off the air conditioning compressor	<ul style="list-style-type: none"> <li>In manual mode, the operating mode (suction/disconnection) of the compressor is switched each time the button is pressed.</li> <li>In AUTO mode, press the AC button to exit the AUTO operating mode. Except for the AC, other actuators will remain in the current operating mode.</li> <li>To protect the compressor, the starting interval of the compressor shall be greater than 10s.</li> </ul>
4	 <p>AUTO button</p>	Switch to the AUTO operating mode	<ul style="list-style-type: none"> <li>Press the "AUTO" button to enter the auto mode, and the "AUTO" state will be displayed on the screen. The AC, air quantity, mode and temperature is controlled by the auto mode, and the current state and set temperature will be displayed on the screen in real time.</li> <li>Press the "air conditioning" button, defrost button, air quantity knob, "MODE" button, or "OFF" button to exit the auto mode, and the function of each button will be switched from the current value once.</li> <li>In auto mode, press the "AUTO" button to exit the auto mode and enter the manual mode. Others will remain in their current state.</li> <li>In defrost mode, press the "AUTO" button to exit the defrost mode and enter the manual mode.</li> <li>In standby mode, press the "AUTO" button to turn on the panel and enter the auto mode.</li> </ul>
5	 <p>Defrost button</p>	Switch to forced defrost	<ul style="list-style-type: none"> <li>Press the defrost button, and the defrost indicator lamp light up, the system enters the defrost mode, with the default air quantity of 7 gear, external circulation and the air outlet mode of defrost. If the outdoor temperature is judged to be over 18°C, the compressor will be turned on, and the water valve will be fully closed; If the outdoor temperature is greater than 5°C and equal to or less than 18°C, the compressor will run according to the air conditioning auto control logic, and the water valve will run according to the auto control logic; If the outdoor temperature is equal to or less than 5°C, the compressor will be turned off, and the water valve will be fully open.</li> <li>In auto mode, press the defrost button to exit the auto mode and enter the defrost mode.</li> <li>In defrost mode, press the defrost button to exit the defrost mode. In defrost mode, if the air quantity, set temperature, internal/external circulation and AC state are changed manually, (the operated functions) will remain in their current state when the defrost mode is exited, and the other functions will return to the state before defrosting. In defrost mode, if no state is changed manually, the functions will remain in the state before defrosting.</li> <li>In standby mode, press the defrost button to turn on the panel and enter the defrost mode.</li> </ul>

No.	Button	Function	Description
6	 <p>OFF button</p>	Shut down the system	<ul style="list-style-type: none"> <li>• In power on state, press the "OFF" button, the panel will enter standby mode and memorize the state before shutting down, the display screen will go off, and all loads will be shut down (the water valve will run to the fully closed position, all actuators will be turned off after running in place or after 10S (actuators at locked-rotor), the internal circulation, compressor and air blower will be turned off).</li> <li>• In standby mode, the OFF is ineffective.</li> </ul>
7	 <p>AUTO button outer knob</p>	Regulate the air quantity	<ul style="list-style-type: none"> <li>• The air quantity is upshifted 1 gear each time the air quantity knob is rotated clockwise, with the maximum gear of 7 gear. After that, the air quantity will remain in 7 gear when the air quantity knob is rotated clockwise continuously; The air quantity is downshifted 1 gear each time the air quantity knob is rotated counterclockwise, with the minimum gear of 0 gear. After that, the air quantity will remain in 0 gear when the air quantity knob is rotated counterclockwise continuously.</li> <li>• When the air quantity is downshifted to 0 gear, the AC will be turned off, the compressor will not work, and both the air quantity symbol and air conditioning symbol will not be displayed.</li> </ul>
8	 <p>OFF button outer knob</p>	Regulate the temperature	<ul style="list-style-type: none"> <li>• Rotate the temperature knob to regulate the set temperature of the air conditioning. The temperature increases or decreases by 1°C for each rotation; The temperature range allowed to be set is: LO, 18°C-29°C, HI.</li> <li>• In standby mode, the temperature knob is ineffective.</li> <li>• In other modes, the set temperature will change according to the rotation direction when the temperature knob is rotated, and the other states will not change.</li> </ul>

## Air conditioning system (US standard)

### Self checking and trouble code of air conditioning control system

#### Conditions for self checking

Within 3s after setting the temperature to 28°C, press the MODE button and AUTO button simultaneously for 3 times, and the control panel will enter the self checking procedure after 3s.

#### Display Mode of Trouble Codes

- In case of inside and outside temperature sensor failure, operate at 25°C as the reference;
- In case of evaporator temperature sensor failure, operate at over 7°C as the reference and follow the working mode below:
- The compressor is switched on for 20s and switched off for 10s;
- When the air conditioning is switched on, the display screen works normally for 1.5 min, the trouble code "07" is displayed with flashing for 30s (displayed for 0.5s and not displayed for 0.5s); At this time, the driver shall turn off the air conditioning, and visit a CNHTC service station for repairing to prevent the evaporator from freezing.

#### Auto exit method for forced self checking

- If the buttons on the panel are ineffective, exit automatically after the display is over;
- During the self checking, if the IGN is powered off, the self checking mode will be exited by force, and the standby process will be executed immediately. Power on again, and the panel will enter the state before the self checking.

### Definition of trouble codes

Fault display	Fault content
00	Normal
01	Inside temperature sensor error (short or broken circuit)
02	Preserved
03	CAN communication error
04	CAN back light message exception
05	Defrost 1 actuator fault (broken circuit)
06	Preserved
07	Evaporator temperature sensor error (short or broken circuit)
08	Water valve motor error (broken circuit)
09	Mode actuator fault (broken circuit)
10	Pressure fault (open circuit of pressure switch )
11	Internal and external circulation actuator (broken circuit)
12	Defrost 2 actuator fault (broken circuit)
13	Air blower fault
14	Speed regulation module fault

Air conditioning system and refrigeration elements



**WARNING!**

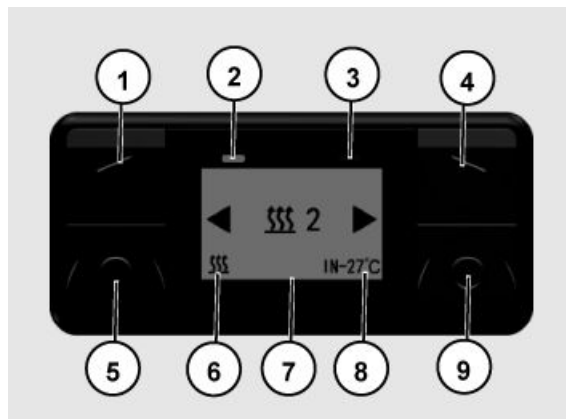
- The refrigerant and its volatile vapor are harmful to human health, and contacting with them shall be avoided.
- Gloves and goggles shall be worn during the overhaul and maintenance of the system! If the refrigerant gets into contact with the skin or eyes, seek medical help immediately.
- It is not allowed to discharge gaseous refrigerant in a closed room, which may cause suffocation! A special treatment system shall be used to pump out the refrigerant.
- Do not perform welding and other operations at the parts of the refrigeration system or near the refrigeration system. Such operations are not allowed even when the refrigerant is drained. This may result in explosion and poisoning.
- Do not use the steam cleaner to clean the parts of the refrigeration system.
- Overhaul of the refrigeration system shall be carry out at a CNHTC service station.
- Fluorine-free refrigerant R134a is used for the air conditioning system, which shall not be changed to or mixed with other refrigerants such as R12.

## Independent heating system (Jingwei)

### Independent heating system (Jingwei)

#### Function Introduction

- ① Left button
- ② Standby indicator (green)
- ③ Operation (fault) indicator (red)
- ④ Right button
- ⑤ Back button
- ⑥ Heating mark
- ⑦ LCD screen
- ⑧ Ambient temperature
- ⑨ OK button



#### Operation Guidelines

##### Power on

Press and hold the "OK" button for 2 seconds, the control panel will light up, the interface will display "System Ignition or Standby", the red indicator will light up for 1s, and the module will start the system.



### Mode switching

- When the heater enters the normal working status, the red indicator is always on, the LCD screen switches to the default interface, and the heater operates in Manual Mode at Level 3 (default setting).
- Heater mode: It is divided into heater mode 1, heater mode 2 and heater mode 3, which can be switched by Left and Right buttons (the leftmost mode is mode 1, and the rightmost mode is mode 3).
- In the manual mode, short press the "Back" button to switch to the automatic mode. In the automatic mode, short press the "Back" button to switch to the manual mode.
- The default automatic constant temperature value of the heater is 22°C.
- You can set the automatic temperature value by pressing the "Left" and "Right" buttons.



## Independent heating system (Jingwei)

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### Power off

- In the power-on status, press and hold the "OK" key for 2 seconds to shut down the system.
- At this time, the LCD screen shows "Shutdown, do not turn off the power supply". It takes 3 minutes for the heater to turn off and dissipate heat, and the controller cannot be operated during this process. After 3 minutes, the display screen goes out.



### Fault status and interface

In any interface, when the heater fails, the red indicator flashes, the system switches to the fault status and interface, and the LCD screen displays the fault information corresponding to the fault.





Fault Description

DTC	Flashing code of the indicator	Cause	Solution
E00	00000	Combustion sensor open-circuited	Replace the combustion sensor or controller
E01	00001	Short circuit of load (motor, electromagnetic oil pump)	Measure the corresponding current, and replace the load with larger current or replace the controller with larger current.
E02	00010	Power supply overvoltage	The input voltage of heater is higher than 30 V or replace the controller.
E03	00011	Power supply undervoltage	The input voltage of heater is lower than 30 V or replace the controller.
E04	00100	Combustion sensor short-circuited	Replace the combustion sensor.
E05	00101	Overheat sensor open-circuited	Check the circuit, and replace the overheating sensor or controller.
E06	00110	Overheat sensor short-circuited	Check the circuit, and replace the overheating sensor or controller.
E08	01000	Excessive self-checking current of electromagnetic pump startup	Check whether the circuit connector is plugged in properly and whether the oil pump harness is short-circuited, and replace the electromagnetic pump
E13	01101	Fail to ignite	<p>1 If there is exhaust at the exhaust port of heater and there is no oil dripping, first check whether the oil pump has pulse action and whether the oil outlet of the oil pump can inject oil. If there is pulse action, check whether the fuel label is appropriate and whether the oil pipe pump is waxed. If there is no pulse action, check whether the oil pump connector is powered on and whether it is plugged in properly.</p> <p>2 If there is oil dripping and no smoke from the heater exhaust port, first check whether the ignition plug is energized and whether the ignition plug is open-circuited.</p>
E14	01110	Fire extinguishes	<p>1 Check whether the fuel grade is appropriate and whether the volatile net has blocked the oil injection port.</p> <p>2 Check whether the heater exhaust port is blocked.</p> <p>3 Check whether the altitude is too high.</p> <p>4 If the diesel fuel is of poor quality and contains water, replace the diesel fuel.</p>

## Independent heating system (Jingwei)

DTC	Flashing code of the indicator	Cause	Solution
E18	10010	Ignition plug open-circuited	<ol style="list-style-type: none"> <li>1 Check whether the ignition plug has an open circuit.</li> <li>2 Check whether the ignition plug wire is well connected.</li> <li>3 Check whether all connectors are plugged in properly, and focus on checking whether the gray wire of the middle eight-hole connector is burnt.</li> <li>4 Check whether the ceramic ignition plug is burnt out.</li> </ol>
E19	10011	Short circuit of ignition plug	<ol style="list-style-type: none"> <li>1 Check the ignition plug for inter-turn short circuit, and replace the ignition plug if necessary.</li> <li>2 Check whether the ignition plug is short-circuited to the volatile net.</li> </ol>
E21	10101	Excessive self-checking current of motor startup	Check whether the motor fan is stalled and stuck, clean up foreign matters, and replace the main motor assembly.
E25	11001	Too low output voltage of atmospheric pressure sensor	This DTC is generally a false alarm. Unplug the six-hole connector on the left side of the controller, power off for 2 minutes, and if it is still reported after the connector is restored, replace the controller.
E26	11010	Too high output voltage of atmospheric pressure sensor	This DTC is generally a false alarm. Unplug the six-hole connector on the left side of the controller, power off for 2 minutes, and if it is still reported after the connector is restored, replace the controller.
E27	11011	Heater overheating protection	Check whether the air inlet and outlet are unobstructed, whether there are return air holes, and whether the installation ambient temperature is too high.
E29	11101	Hall sensor cannot detect motor rotation	<ol style="list-style-type: none"> <li>1 The motor does not rotate, the fan is blocked by foreign matter, or the controller is not installed.</li> <li>2 Replace the main motor, remove foreign matters, and reinstall the controller.</li> </ol>
E30	11110	Heater dry burning or poor water circulation	<ol style="list-style-type: none"> <li>1 Check whether the water pump runs normally, whether the water circuit circulates, and whether the water pipe is bent or jammed.</li> <li>2 Check whether the valve is open and the water circuit circulates.</li> </ol>
E32	11111	No feedback information detected	Check the control harness and replace the LCD switch.

### Independent heating system (Webasto)

#### Menu introduction

① Left button    ② Gear display    ③ Right button    ④ Back button    ⑤ OK button

#### Startup confirmation menu

After clicking the OK button, the LCD panel screen will light up and the startup confirmation menu will be displayed;

Under this menu, press the OK button to display the automatic control menu and start the heater;

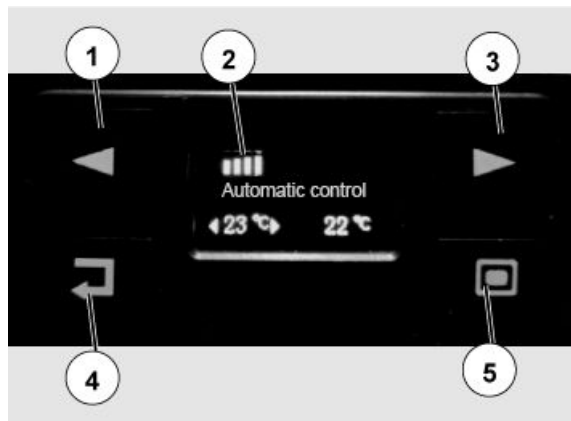
Under this menu, press the back button to enter the manual control menu and start the heater;

Under this menu, press the left button to display the version information menu;

Under this menu, press the right button to display the language selection menu;

Under this menu, press the left button and the back button at the same time to start the one-button oil pumping function and display the one-button oil pumping menu;

Under this menu, no operation is performed, and the LCD panel turns off after 30s.



## Independent heating system (Webasto)

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### Version information menu

Display the current software version information.

Under this menu, press the back button and the OK button to return to the startup confirmation menu.



### Language selection menu

Display selectable language information. The current version supports switching menu information between Chinese, English and Russian.

Under this menu, press the left button or the right button to select the language to be used;

Under this menu, press the back button to exit the language selection function, and the startup confirmation menu will be displayed, using the language set last time;

Under this menu, press the OK button to exit the language selection function, and the startup confirmation menu will be displayed, using the language set this time.








### Automatic control menu

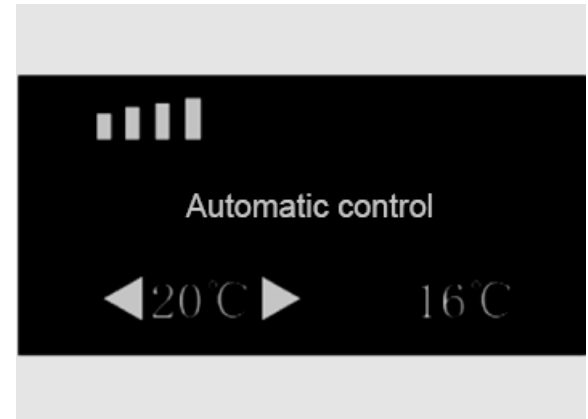
Display the target temperature and ambient temperature, and display the current heater operation status and heater operation gear.

Under this menu, press the left button or the right button to adjust the target temperature.

Under this menu, press the back button, and the shutdown confirmation menu pops up.

Under this menu, the current operation gear of the heater is displayed:

Gear display information	Description
	Indicate that the heater is not running;
	Indicate that the heater is running in the gear 1;
	Indicate that the heater is running in the gear 2;
	Indicate that the heater is running in the gear 3;
	Indicate that the heater is running in the gear 4.




## Independent heating system (Webasto)

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### One-button oil pumping menu

During the operation of the one-button oil pumping function, press and hold the back button to turn off the heater and display the shutdown countdown menu.

A screenshot of a vehicle's infotainment screen showing the 'One-key oil pump' menu. The screen has a black background with white text. At the top, it says 'One-key oil pump'. Below that, there is a large 'Start' button. The screen is framed by light gray bars at the top and bottom.

One-key oil pump

Start

### Shutdown confirmation menu

Under this menu, press the back button to exit the current menu and display the heater operation menu;

Under this menu, press the OK button to turn off the heater and display the shutdown countdown menu.

A screenshot of a vehicle's infotainment screen showing the 'Turn off heater' confirmation menu. The screen has a black background with white text. At the top, it says 'Turn off heater'. Below that, there are two options: 'No' on the left and 'Yes' on the right. The screen is framed by light gray bars at the top and bottom.

Turn off heater

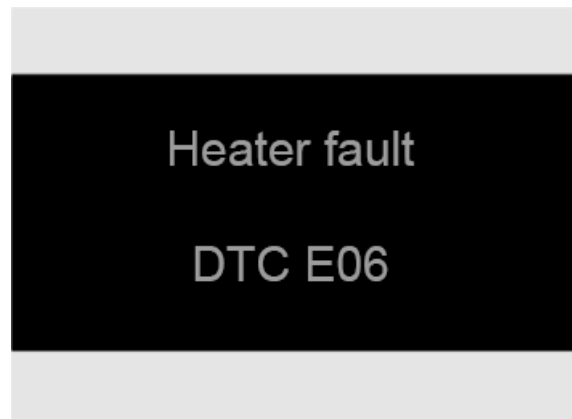
No

Yes

### Fault information menu

Display the heater fault information.

Under this menu, press and hold the back button to turn off the heater and display the shutdown countdown menu.



### Shutdown countdown menu

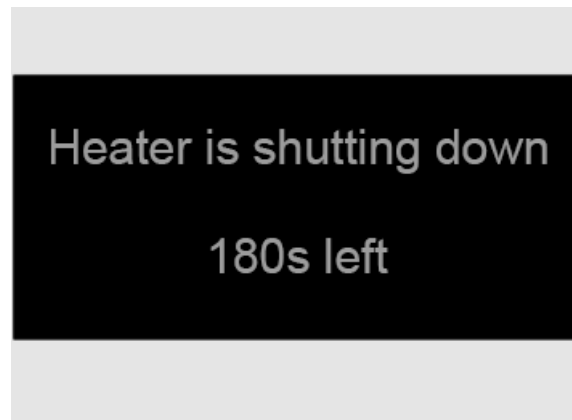
Display the shutdown countdown information.

Under this menu, pressing any button is invalid. After the countdown ends, the system returns to the startup confirmation menu and the screen goes out.

#### Start-up

Before use, please confirm that the wiring harness is connected and the vehicle power supply is turned on.

After the LCD controller is powered on, it automatically starts to enter the startup confirmation menu. At this time, the screen does not light up. Press the OK button and the screen lights up.

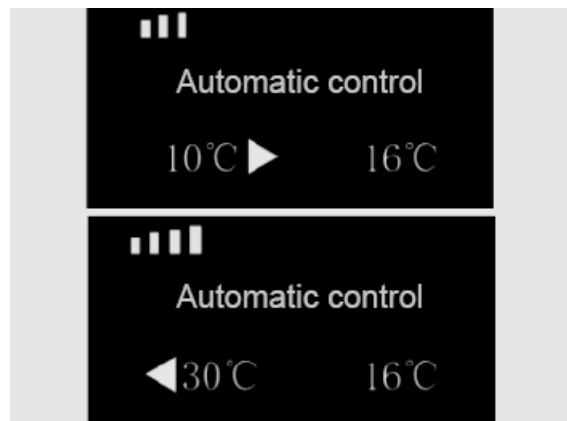
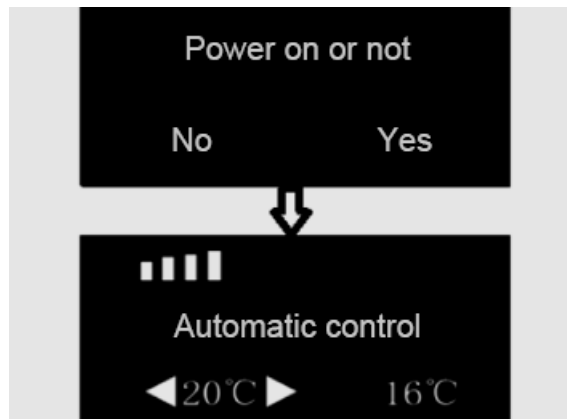


## Independent heating system (Webasto)

### AUTO mode

Press the OK button in the startup confirmation menu to enter the automatic control status, and the automatic control page will be displayed. In this mode, the LCD controller automatically adjusts the operation gear of the heater.

In the automatic control mode, adjust the target temperature by pressing the left and right buttons. The setting range is 10°C ~ 30°C, and the target temperature value is decreased/increased by 1°C every time the button is pressed. Press and hold the left button and the right button, and the target temperature value will decrease/increase continuously.





In the automatic control mode, press the back button, and the shutdown confirmation menu pops up;

Press the OK button to turn off the heater;

It takes 3 minutes to turn off the heater (40s for the heater with the ADR function), and the controller cannot be operated during this process.

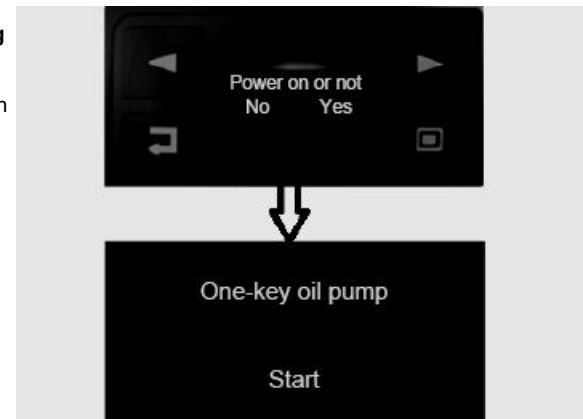
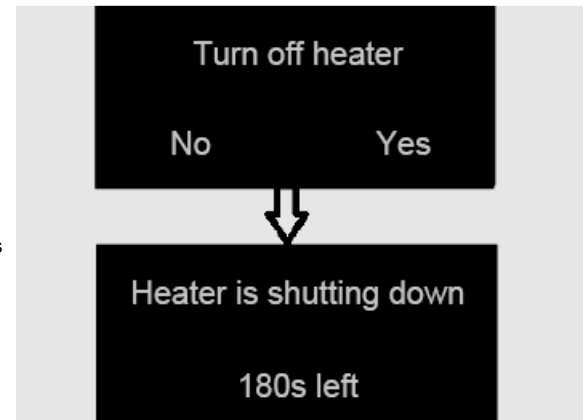
After the 3-minute countdown, the display turns off and the screen can be awakened by pressing the OK button.

Press the back button, and the shutdown confirmation menu pops up. The heaters continue to run. If there is no operation within 5 seconds, the current menu will be closed and the heater will continue to run.

### One-button oil pumping mode

**Note: This mode is only used by professional maintenance personnel during maintenance, and shall not be used during daily use.**

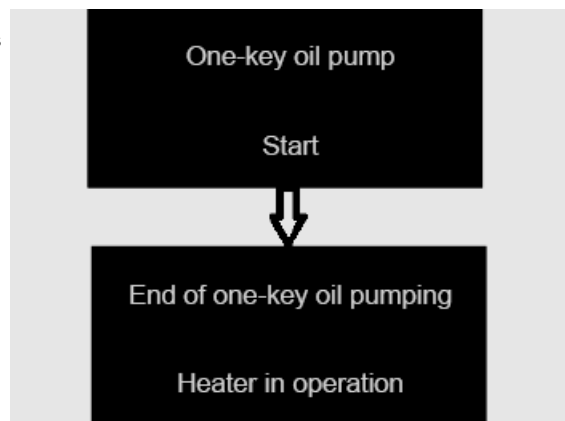
When the LCD screen displays the startup confirmation menu, press the left button and the back button at the same time to enter the one-button oil pumping mode.



## Independent heating system (Webasto)

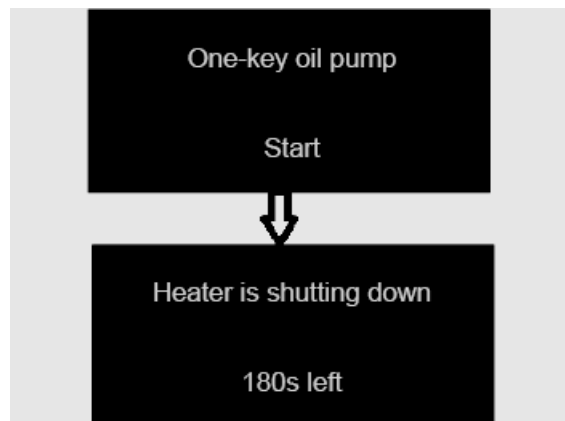
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The one-button oil pumping function will last for 240 seconds. After 240 seconds, the LCD screen will automatically display the one-button oil pumping end menu, as shown in the figure. At this time, the one-button oil pumping function ends.

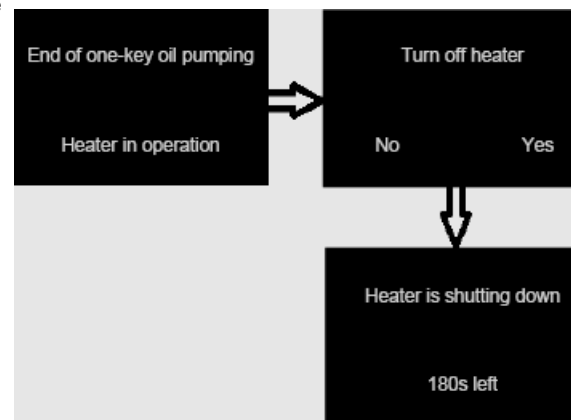


During the one-button oil pumping operation, you can press and hold the back button for 2 seconds to exit the one-button oil pumping mode. The heater is turned off and no other operations are supported during the operation.

It takes 3 minutes to turn off the heater, and the controller cannot be operated during this process. After the 3-minute countdown, the startup confirmation menu will be displayed, and the screen will not light up. You can light up the screen by pressing the OK button.



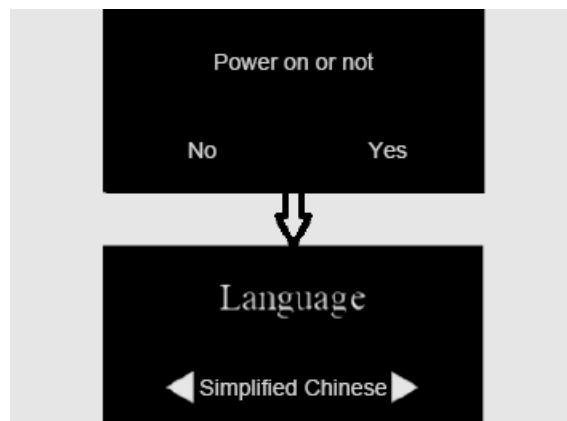
After the one-button oil pumping is completed, press the back button to display the shutdown confirmation menu, and press the OK button to turn off the heater and display the shutdown countdown menu.



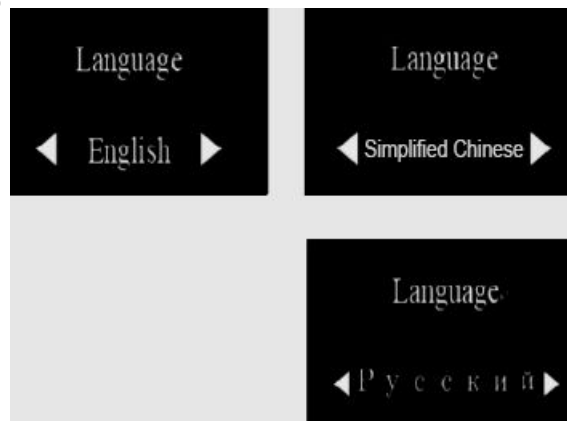
## Independent heating system (Webasto)

### Language setting

Press the left button under the startup confirmation menu to display the "Language Settings" menu.



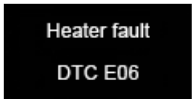




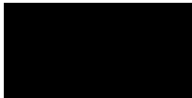
Press the left button or the right button to switch languages, press the OK button to confirm the selection, and the startup confirmation menu will be displayed, and the menu language will become the selected language.



**DTC**

<b>DTC</b>	<b>Fault information</b>
E01	Fail to start
E02	Flameout due to lack of oil
E03	Abnormal voltage
E04	Fault of air outlet/heat exchanger temperature sensor
E05	Intake temperature sensor fault
E06	Abnormal fuel pump
E07	Abnormal fan
E08	Abnormal ignition plug
E09	High temperature anomaly

### Fault symptoms and troubleshooting

Display information	Description	Solutions
 <p>Heater fault DTC E06</p>	The oil pump is open-circuited or short-circuited.	Contact the after-sales service or local dealers.
 <p>Over-temperature torque gear ◀30℃ 16℃▶</p>	The air outlet temperature of the heater is too high, and it enters the downshift mode.	After the heater exits the downshift mode, the prompt information disappears automatically, and no handling is needed.
 <p>Over-temperature ventilation ◀30℃ 16℃▶</p>	The air outlet temperature of the heater is too high, and it enters the ventilation mode.	After the heater exits the ventilation mode, the prompt information disappears automatically, and no handling is needed.
 <p>Standby ◀18℃▶ 20℃</p>	The currently set target temperature is lower than the ambient temperature, and the heater is not running.	Increase the target temperature. When the target temperature is greater than the ambient temperature, the heater starts to run and the prompt icon disappears.
 <p>Standby ◀18℃▶ 20℃</p>	The target temperature value has been reached, and the heater stops running.	Under normal conditions, no handling is needed. When the ambient temperature is lower than the target temperature, the heater will run automatically.
	<b>1</b> Heater not start. <b>2</b> The heater screen is off.	<b>1</b> Power on <b>2</b> Press the OK button to light up the screen. If the above methods do not solve the problem, please contact the manufacturer.

### Other Functions (Optional)

- 1 Intermittent air exchange by air conditioner linkage: After the engine is turned off, the air conditioner is in the internal circulation mode. After the independent warm air heater is turned on, the air conditioner is switched to the external circulation mode every 20 minutes, works with the second grade air for 130s, and then is switched to the internal circulation mode without blowing any more air, so as to cycle.
- 2 Remote start function: When the heater is not working, you can turn on the heater by double-clicking the remote key lock button within 2s or through the air-conditioning control interface in the mobile TELEMATICS APP. When the heater is working, you can turn off the heater by clicking the remote key lock button or through the air-conditioning control interface in the mobile APP.
- 3 ADR function: The independent warm air of the hazardous chemicals transport vehicle must meet the regulatory requirements. When the engine is turned off, the heater will be turned off and stopped within 40s, and it can be turned on manually again; when the transfer pump is running, the heater is not allowed to start and not allowed to start remotely.

### Maintenance

Do not press the display screen during daily use.

Please pay attention to waterproofing during daily maintenance.

**WARNING!**

- Do not turn on or operate the heater in environments containing flammable vapors, dust, or hazardous materials (such as gas stations, oil depots, fuel depots, coal warehouses, wood warehouses, or grain warehouses), as there is a risk of explosion.
- Do not operate the heater in enclosed spaces without exhaust extraction equipment, as there is a risk of explosion and suffocation.
- Do not operate the heater in enclosed spaces such as garages or workshops without exhaust extraction equipment, including preheating start-up operations; exhaust gases shall be directed outside the vehicle's cab, and ensure that the exhaust or exhaust pipeline is not laid out inside the cab, otherwise, there is a risk of poisoning or suffocation.
- There is a risk of fire from flammable materials in the hot air flow, avoid directing the exhaust pipe towards flammable objects or heat-sensitive parts, and avoid blocking the cold air intake and warm air outlet with dirt or objects, otherwise, there is a risk of fire.
- Ensure smooth hot air flow, hot air should not accumulate at the installation location; the heater should not be operated without a controller cover, otherwise, overheating can cause a fire hazard.





### **WARNING!**

–If the heater has the following faults, do not use the heater, and cut off the fuse to interrupt the heater operation, otherwise there is a risk of injury caused by the faulty heater:

- The heater emits heavy smoke for a long time;
- Abnormal noise when the heater is burning;
- Obvious smell of heater fuel leakage;
- Heater is permanently locked due to fault codes;
- Damaged heater.

–In case of the above situation, please contact the franchise store in time.

–Conductive parts:

- Please disconnect the power supply of the vehicle before installation;
- Note that the electrical system shall be well grounded;
- Comply with legal requirements;
- Pay attention to the value on the decal.

–Sharp edges:

- Sharp edges shall be protected by protective strips.

## Independent heating system (Eberspächer)

### Independent heating system (Eberspächer)


Button functions:


Buttons ① and ②: Select menu items and configure settings.

Button ③: Turns off the heater, exits the menu, and ends operations.

Button ④: Starts the heater and confirms operation.




Press and hold button ④ for more than 2 seconds to start the heater in heating mode immediately; press and hold button ③ for more than 2 seconds to shut down all heater functions.

Use buttons ① and ② to make selections in the menu.  The icon enables the heater's heating function. Set the desired temperature and heating duration using buttons ① and ②, and confirm with button ④. Use buttons ① and ② to make


selections in the menu.  The icon activates the heater's ventilation function. Adjust the ventilation time with buttons ① and ②, and confirm with button ④.





### • P program


- In the menu bar, use buttons ① and ② to select icon P, then confirm with button ④. Select program memory P1, P2, or P3 using buttons ① and ②, and confirm with button ④.
- To enable the selected program memory: use buttons ① and ② to select "ON", then confirm with button ④.
- To disable the selected program memory: use buttons ① and ② to select "OFF", then confirm with button ④.
- To edit the selected program memory: Use buttons ① and ② to select the icon in the menu,  then press button ④ to confirm.
- Select week group/week day: Use buttons ① and ② to choose the week group (Monday to Friday, Saturday to Sunday, or Monday to Sunday) or specific weekday (Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday), then press button ④ to confirm.
- Set stop/start time: Use buttons ① and ② to adjust the hour, then press button ④ to confirm. Use buttons ① and ② to set the minute, then press button ④ to confirm.
- Select the operation mode: Press buttons ① and ② to select  or  then press button ④ to confirm.
- Set the rated temperature: Use buttons ① and ② to adjust the rated temperature, then press button ④ to confirm.
- Set the operating time: Use buttons ① and ② to adjust the time, then press button ④ to confirm.

### • Settings

Use buttons ① and ② to make selections in the menu.  then press button ④ to confirm.

–Set the clock time: Press button ④ to select the icon,  then use buttons ① and ② to set the hour, and press button ④ to confirm. Use buttons ① and ② to set the minute, then press button ④ to confirm.

–Week setting: Press buttons ① and ② to select  then press button ④ to confirm. Use buttons ① and ② to set the current week number, then press button ④ to confirm.

–Time format setting: Use buttons ① and ② to select  then press button ④ to confirm.



### CAUTION!

- When the heater is put into use for the first time in heating operation mode, there may be a situation where the heater outlet blows natural wind instead of hot air. At this time, it is not a system fault, but because the oil pump needs to exhaust the air in the oil pipe before supplying oil to the heater. Just wait for the heater to automatically shut down before starting it again in heating operation mode. According to different models and configurations, start the heater several times in the above manner until the heater operates normally.
- The heater may emit an odor for a short time when it is used for the first time, which is normal within a few minutes of starting operation.
- After the heater is turned off, the control light goes out and the fuel delivery function stops, but the fan needs to cool down for about 4 minutes before stopping working.
- Since the heater operation requires air circulation, no other items can be stored around the heater to avoid affecting the normal use of the heater.
- When you are away for a long time, please turn off the heater to avoid wasting electricity.
- If the main power supply of the vehicle needs to be turned off during the use of the heater, please turn off the heater first and wait for the heater cooling fan to stop working before turning off the main power supply to avoid damaging the heater.



### DANGER!

- There is a risk of fire, explosion, poisoning and injury!
- Heaters shall not be used in enclosed rooms such as garages or parking buildings.
- During the heating operation, the hot air duct experiences high temperatures. Therefore, operation in the area where the hot air duct is located should be avoided during the heating operation. If the operation is really necessary, turn off the heater and wait until all components have completely cooled. Wear protective gloves if necessary.
- All parts of the exhaust device are hot throughout the operation from the start of the heating operation. During heating operation, no operation shall be carried out in the area where the exhaust guide device is located. If it is necessary to carry out operations, first turn off the heater until all components are completely cooled, and wear protective gloves if necessary.
- Turn off the heater before any operation on the heater to allow all heat-generating components to cool.
- Do not inhale exhaust gas.
- Use fuel with caution.
- Turn off the engine and heater before and during refueling.
- Avoid open flames when using fuel.
- Do not inhale fuel vapors.
- For vehicles transporting dangerous goods (such as oil tankers), turn off the heater before the vehicle enters hazardous areas (refineries, gas stations, etc.).

## Independent heating system (Eberspächer)

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### Common faults and troubleshooting

- After powering on, if the heater does not start (not the first startup):  
Turn off the unit, then restart.
- If the heater still fails to start, check the following:
  - Whether there is fuel in the tank.
  - Whether the fuse is functioning.
  - Check whether the circuit, connection and connector are in good condition.
  - Whether the heating air guide device, combustion air guide device or exhaust gas discharge device is blocked.

### Precautions

- Turn on the heater for approximately 10 minutes per month outside of the heating period.
- Put the heater into trial operation before the heating period. If there is thick smoke for a long time, or abnormal burning sound or obvious fuel smell or overheating of electrical/electronic components, turn off the heater, take out the fuse, and contact the repair personnel of a SINOTRUK service station for inspection.
- After long-term inactivity, check the openings of the heating air duct, combustion air supply pipe and exhaust gas discharge pipe to ensure their cleanliness.

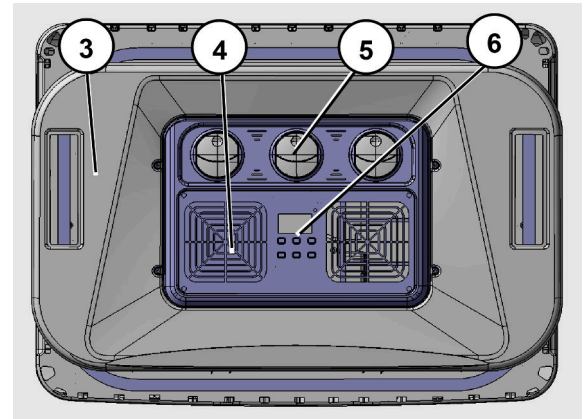
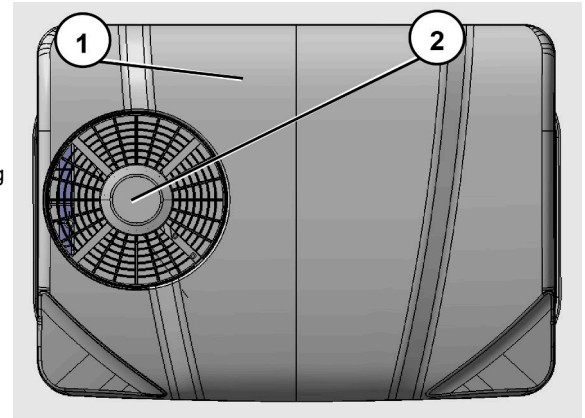
### Parking air conditioning system (Webasto)

The parking air conditioning system is optional.

The parking air conditioning system is mainly used for refrigeration and dehumidification inside the cab. This system is a fixed refrigeration system, concentrating all components of the A/C in a single unit, which is installed on the roof of the vehicle, independent of the original vehicle A/C, and can be used during vehicle shutdown, parking, or while driving. The operating temperature of the equipment is 5°C - 52°C.

#### Element

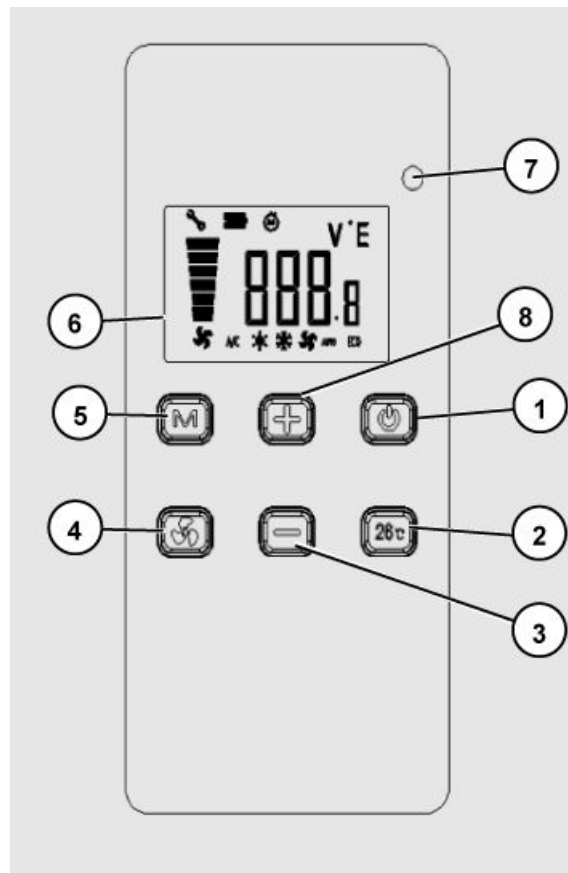
- ① Upper shell: It is made of ABS, a special material for automobiles, which is strong, not easy to deform, and anti-aging.
- ② Electronic fan: Dual brushless electronic fans, with low current, low noise and long service life.
- ③ Trim panel: It is made of ABS, a special material for automobiles, which is strong, not easy to deform, and anti-aging.
- ④ Air inlet: large air volume inlet, with gentle air flow and low wind noise.
- ⑤ Outlet: Three-unit outlet, with independently rotatable vane angles of 360° to adjust the air direction, meeting the needs of drivers and passengers.
- ⑥ Control panel



## Parking air conditioning system (Webasto)

### Control panel

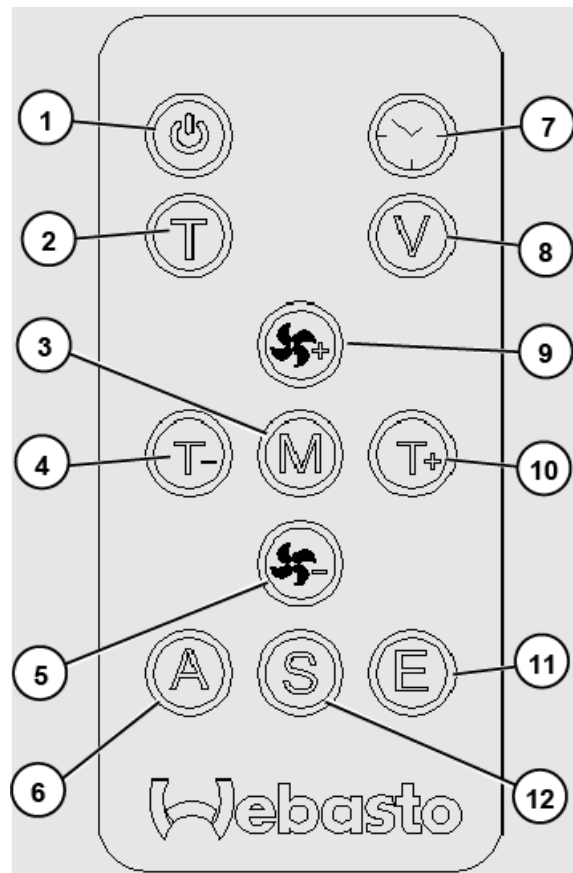
- ① Power button: control the A/C to turn on and off;
- ② One-touch 26°C: set the A/C to operate at 26°C;
- ③ Temperature "-": Decrease the A/C set temperature, with the lowest set temperature at 16°C (the indoor temperature must not be lower than the set temperature, otherwise the A/C cannot work properly); ;
- ④ Air speed button: cyclic switching among 1~5 position;
- ⑤ Mode button: ventilation/cooling (Auto, Eco, Boost);
- ⑥ Display window: Displays temperature, voltage, battery level, fault codes, and normally shows the ambient temperature collected;
- ⑦ Infrared receiver: receives infrared signals from the remote control;
- ⑧ Temperature "+": Increase the A/C set temperature, with the highest set temperature at 30°C (hold for 5ss to reset and clear current faults).





## Remote control

- ① Power on/off
- ② Temperature query
- ③ Mode button
- ④ temperature "-"
- ⑤ Air volume "-"
- ⑥ Auto mode
- ⑦ Timing
- ⑧ Voltage query
- ⑨ Air volume "+"
- ⑩ Temperature "+"
- ⑪ Eco mode
- ⑫ Boost mode



## Parking air conditioning system (Webasto)

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- When you need rapid cooling, you can use the powerful mode.
- When you are resting or reading and need quiet, you can use Eco mode.
- In the powerful state, the fan speed defaults to strong, but you can also adjust the air volume.
- In Eco state, the compressor runs at a low frequency, but you can also adjust the air volume.
- When the ambient temperature is  $\geq 35^{\circ}\text{C}$  and the cabin temperature is relatively high, please use the original car A/C to cool down quickly, then turn on the powerful mode to get the maximum air volume and cooling effect.
- It is recommended not to use the powerful mode for more than 20 min, as running it for a long time will significantly shorten the A/C operation time.
- When the cabin temperature is  $< 30^{\circ}\text{C}$ , you can choose the auto mode for cooling.
- When operating the A/C at night, you can choose the Eco mode to get a longer usage time.
- Users can adjust the air volume according to their needs in different modes.
- Please set according to your needs, and this warm reminder is for reference only.
- Timer: After pressing the timer, set the time with the temperature "+" and "-", in increments of 0.5 hours, up to 10 hours, press the timer button again to cancel the timer.
- Temperature query: Switch between ambient temperature and evaporator surface temperature.
- Mode key: strong, heating, ventilation, automatic, Eco cycle switching. (Common product status in heating and ventilation modes, only the indoor blower works). Common fault analysis and troubleshooting methods

### Common fault analysis and handling methods

- Fault analysis of no cooling or poor effect:
  - 1 The rear power supply wire is too long or too thin, or there is poor contact at the joint or connector.
  - 2 No refrigerant or insufficient refrigerant.
  - 3 Eco mode is used when the air temperature is too high.
  - 4 The compressor or condenser fan does not work.
  - 5 The evaporator or condenser is too dirty or blocked.
- Troubleshooting methods for common fault codes:

Type 1: low battery power and undervoltage E2;

  - 1 Check whether the battery is aged and replace it.
  - 2 The battery is not fully charged and needs to be charged.
  - 3 The negative power wire is grounded or directly connected to the alternator, rewire it.

Type 2: Pressure (system leakage) E4; refrigerant leakage or poor heat dissipation.

Type 3: sensor fault E0 or E1;

  - 1 Check whether the connector is loose and re-insert it.
  - 2 If the sensor is defective, replace the sensor.

Type 4: Overcurrent protection F6, electronic fan fault F7/F8;

  - 1 Check if the condenser heat dissipation is dirty or blocked.
  - 2 Check if the power wire terminal or power wire plug is loose.
  - 3 Check whether the fan connector is loose and re-insert it.
  - 4 The condenser fan is faulty. Replace the fan.

## Parking air conditioning system (Webasto)

Trouble Code	Fault Description	Treatment method
E0	Intake air temperature sensor fault	Check whether the sensor is loose
E1	Outlet air temperature sensor fault	Check whether the sensor is loose
E2	Undervoltage	Check the battery and wiring
E3	Overvoltage	Check the battery or alternator
E4	Pressure (system leakage)	Check the A/C system for leakage
F0	Compressor short circuit/locked rotor	Check whether the external unit fan works or the system has too much refrigerant
F1	Driver module over-temperature/temperature fault	Check whether the external fan is working or the current temperature is higher than 55 degrees
F2	Driver bus undervoltage	Check whether the power cable is falsely connected or grounded
F3	Driver bus overvoltage	Check whether the power cable is falsely connected or grounded
F4	Driver output phase loss	Check whether the power cable is falsely connected or grounded
F5	Driver output overload	Check whether the power cable is falsely connected or grounded
F6	Driver bus overcurrent	Check whether the external fan is working or the current temperature is higher than 55 degrees
F7	Fault of electronic fan 1	Check whether the fan 1 of the outdoor unit works
F8	Fault of electronic fan 2	Check whether the fan 2 of the outdoor unit works

**The above code handling method: Turn off the power, disconnect the power supply, and turn on the power after 5min. If the fault is not resolved, refer to the maintenance manual or contact the local dealer.**

### **Routine maintenance**

To ensure the normal operation of the parking A/C, please pay attention to daily maintenance:

1 When not in use for a long time, remove the positive and negative power wires of the battery and pay attention to sealing to avoid grounding, so as not to damage the battery due to long-term power (the power wire must be connected to the battery and must not be grounded or connected to the alternator).

2 A/C shall be maintained every 3 months (cleaning the evaporator and condenser, and checking the internal and external circuits); the maintenance interval shall be appropriately shortened in special operating environments, such as dusty and high temperature environments.

3 It is not recommended to add additional charging devices such as alternators and solar panels.

**If external charging devices are added without permission, it may cause voltage fluctuations and affect the safe operation of A/C.**



### CAUTION!

- To ensure a better user experience, please use the original car A/C to quickly cool down before using the parking A/C when parking. A/C is only for parking use, and the company is not responsible for any damage to A/C or vehicle caused by improper use.
- To ensure better comfort, try to park the vehicle in the shade to avoid direct sunlight.
- To protect your battery, use the original A/C while driving.
- Improper installation or repair of the overhead parking A/C may lead to adverse consequences, which may cause damage to vehicle components. Installation and repair of roof-mounted parking A/C requires completion of the relevant training courses of our company, and the necessary technical documentation, professional tools, and specialized equipment. Only original parts are allowed to be used.
- If you have not completed the relevant training of our company, have not mastered the necessary skills, and do not have the correct technical documentation, tools, and equipment for installation and repair, then never attempt to install or repair a roof-mounted parking A/C system. Be sure to follow all installation instructions and pay attention to all warnings.
- Refrigerant R134a shall comply with GB/T 18826-2016. Refrigeration oil RL68H shall comply with ASTM test standards.
- If external charging devices are added without permission, it may cause voltage fluctuations and affect the safe operation of A/C.

## Parking air conditioning system (Taybo)

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### Parking air conditioning system (Taybo)

The parking air conditioning system is optional.

The parking air conditioning system is mainly used for refrigeration and dehumidification inside the cab. This system is a fixed refrigeration system, which integrates all components of the A/C in one unit. The unit is installed on the roof and is independent of the original A/C of the vehicle. It is mainly used in the following situations:

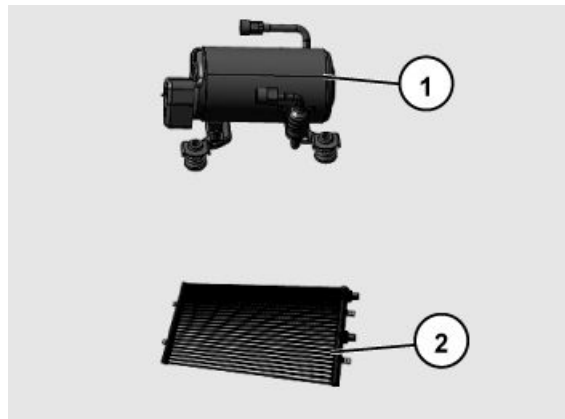
It can be used with the engine turned off when you are sleeping at night in summer or resting in the shade during the daytime in summer.

In the case of exposure to sunlight or high interior temperature, use the original A/C to lower the cab temperature and then turn on the parking A/C.

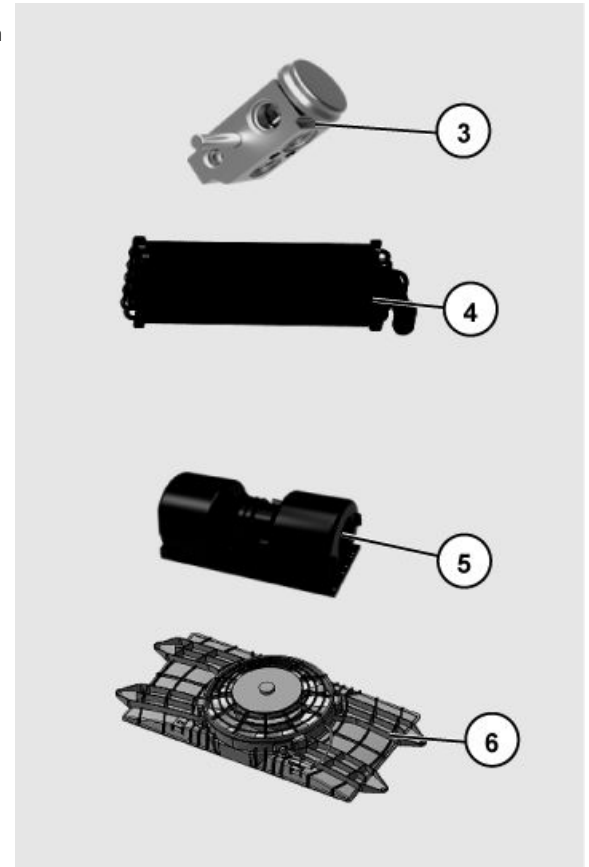


### Element

- ① Compressor: Be electrically driven, compress low-temperature and low-pressure gaseous refrigerant into high-temperature and high-pressure gas and transfers it to the condenser.
- ② Condenser: A device that condenses the gas-phase refrigerant to produce high-temperature and high-pressure liquid-phase refrigerant.



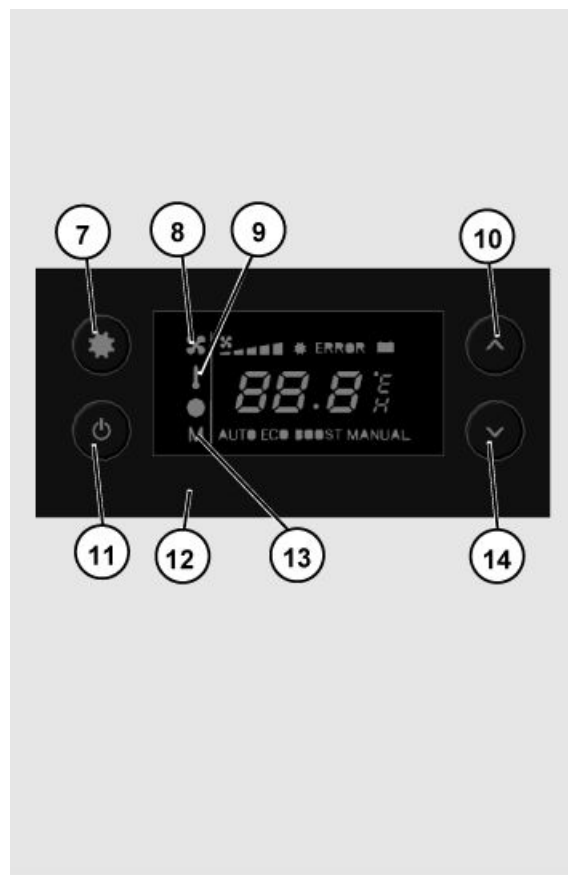
- ③ Expansion valve: A control element that automatically adjusts the amount of refrigerant flowing into the evaporator according to the variation of the evaporation pressure and the superheat of the gas-phase refrigerant at the evaporator outlet.
- ④ Evaporator: A device for the mixture of low-temperature and low-pressure saturated refrigerant liquid and gas to exchange heat with the outside air, in which the mixture absorbs heat and is then vaporized, thereby achieving the purpose of refrigeration.
- ⑤ Blower assembly: A device that pushes air through the evaporator for heat exchange and delivers the cooled air into the vehicle.
- ⑥ Condenser fan: A device that works to cool the high-temperature refrigerant by circulating outside air.



## Parking air conditioning system (Taybo)

### Buttons on the panel

- ⑦ Mode button
- ⑧ Air volume selection
- ⑨ Temperature selection
- ⑩ Up button
- ⑪ Power switch button
- ⑫ Infrared receiver
- ⑬ Mode selection
- ⑭ Down button





### BOOST/ECO mode adjustment

It is recommended to operate this air conditioner only when the engine is stopped.

- 1 After turning on the air conditioner by pressing the Power button ⑪, press the Mode button ⑦ until the "Mode Selection ⑬" icon is displayed, and then select BOOST or ECO through the Up/Down button ⑩/⑭, and then press ⑦ again to end the setting, or the setting will be ended and take effect automatically if do not perform any operation for several seconds.
- 2 After entering the selected mode, switch to the desired mode as above again.
- 3 In order to maintain an effective and comfortable interior temperature, it is generally recommended to set the temperature at about 25°C.

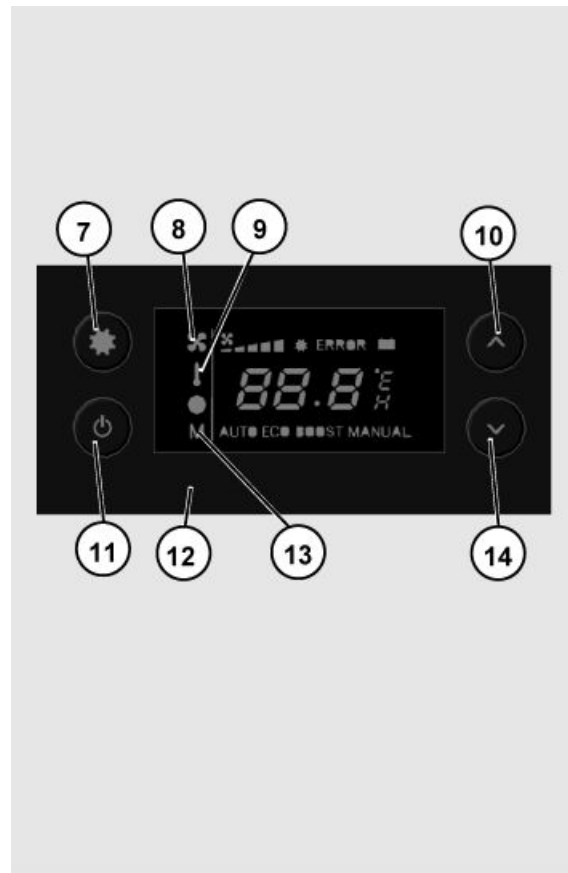
### Temperature adjustment

Please press the Mode button ⑦ until the panel displays the "Temperature Selection ⑮" icon, then increase the temperature by 1 °C (the maximum temperature that can be adjusted is 28 °C).

Each time the Down button ⑭ is pressed, the set temperature decreases by 1°C (the minimum temperature that can be adjusted is 17°C); each time the button ⑩ is pressed, the set temperature increases.

### Air volume adjustment

Press the Mode button ⑦ until the panel displays the "Fan Speed Selection ⑯" icon. Each time the Down button ⑭ is pressed, the fan speed will be decreased by 1 level (the minimum fan speed that can be adjusted is Level 1); and each time the Up button ⑩ is pressed, the fan speed will be increased by 1 level (the maximum fan speed that can be adjusted is Level 5);.



## Parking air conditioning system (Taybo)

### Remote control button

#### Eco mode

Press the ECO button ⑮ to enter the ECO mode in the non-ECO mode, and press the ECO button ⑮ to exit the ECO mode in the ECO mode.

#### Temperature adjustment

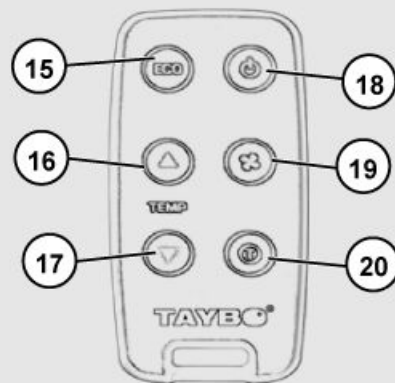
Each time the Down button ⑭ is pressed, the set temperature decreases by 1°C (the minimum temperature that can be adjusted is 17°C); each time the Up button ⑯ is pressed, the set temperature increases by 1°C (maximum temperature that can be adjusted is 28°C).

#### Air volume adjustment

Each time the air volume adjustment button ⑰ is pressed, the air volume changes once in the cycle sequence of: 1st position - 2nd position - 3rd position - 4th position - 5th position - 1st position.

#### Setting time

Each time the timer button ⑳ is pressed, the set time will be changed in the cycle sequence of 30 minutes - 60 minutes - 90 minutes - 120 minutes - Cancel.



### Fault Diagnosis

Turn on the Power button, press the Up and Down buttons simultaneously for 3 s, and then press the Mode button to activate the self-test mode; after the self-test is completed, press the Power button again to exit the self-test mode.

1 For the fault self-diagnosis function, DTCs appear on the temperature display (00 under normal working condition)

2 Other functions cannot be used in self-test mode

3 The fault display is as follows (flashing for 0.5 seconds)

- (1) When it is a normal or there is a single fault, the display will show the light every 0.5 seconds;
- (2) When multiple faults occur, the display will show the fault information every 0.5 seconds, and show the information of one fault at a time.

The following phenomena are not fault symptoms:

- 1 When the battery voltage is lower than 22.8V with power on, the battery protection function will be activated, and after an alarm, the air conditioner will be turned off and cannot be used until the battery is properly charged;
- 2 When the set temperature in Auto mode is higher than the cab temperature, the compressor does not start;
- 3 The A/C compressor starts 1 to 2 minutes later;
- 4 In case of high heat load, the compressor activates the self-protection and stops running;
- 5 A/C condensate will be discharged from the roof.

Trouble Code	Fault Description
01	Undervoltage
02	Overvoltage
03/04	Evaporator sensor fault (open/short circuit)
07/08	Air inlet sensor fault (open/short circuit)
09	Compressor fault
10	Compressor control box
11	Air blower fault
12/13	Condenser fan fault (left/right)

## Parking air conditioning system (Taybo)

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### Routine maintenance

To ensure the normal operation of the parking A/C, please pay attention to daily maintenance:

- 1 When not in use for a long time, remove the positive and negative power wires of the battery and pay attention to sealing to avoid grounding, so as not to damage the battery due to long-term power (the power wire must be connected to the battery and must not be grounded or connected to the alternator).
- 2 A/C shall be maintained every 3 months (cleaning the evaporator and condenser, and checking the internal and external circuits); the maintenance interval shall be appropriately shortened in special operating environments, such as dusty and high temperature environments.
- 3 It is not recommended to add additional charging devices such as alternators and solar panels.

**If external charging devices are added without permission, it may cause voltage fluctuations and affect the safe operation of A/C.**



#### CAUTION!

- In order to protect your battery, it is recommended to use the original A/C to reduce the cab temperature before turning on the parking A/C.
- To ensure better comfort, try to park the vehicle in the shade to avoid direct sunlight.
- To protect your battery, use the original A/C while driving.
- If external charging devices are added without permission, it may cause voltage fluctuations and affect the safe operation of A/C.

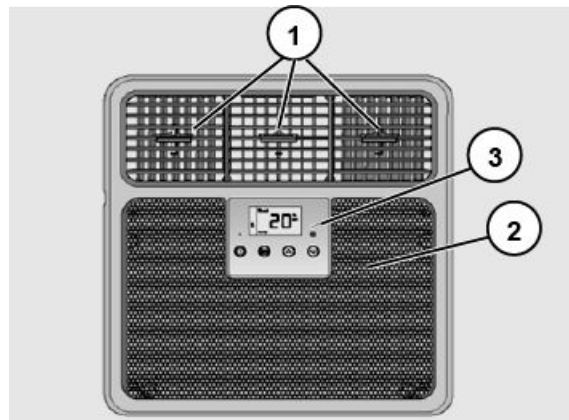
### Parking A/C system (Dometic)

The parking A/C system is optional.

The parking A/C system is primarily used for cooling and dehumidification inside the cab. This system is a fixed refrigeration unit that can operate while the vehicle is off, parked, or in motion. The equipment operates within a temperature range of 5°C to 52°C.

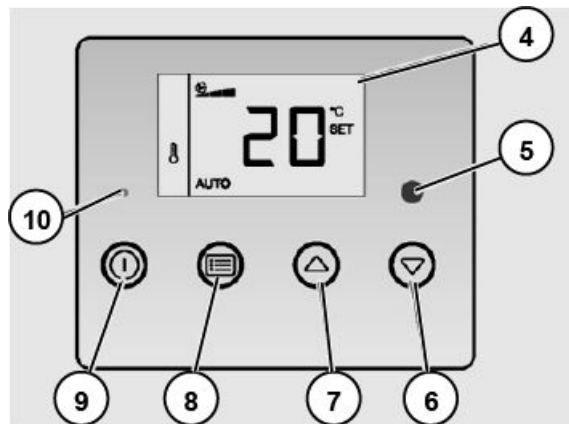
#### Component

- ① Air outlet      ② Inlet grille      ③ Control panel



#### Control panel

- ④ Display screen
- ⑤ Infrared receiver (remote control)
- ⑥ Open the submenu to set additional functions or decrease the set parameter values.
- ⑦ Collapse the submenu to set new features or increase existing parameter values.
- ⑧ Scroll to select menu items.
- ⑨ Power button (On: short press; Off: press and hold for over three seconds; Standby: short press to enter standby mode)
- ⑩ LED indicator (blue): Illuminates when the unit is operating or in standby.



## Parking A/C system (Dometic)

### Remote controller

#### ⑪ Power On/Off

Press the power button to switch the device to standby mode. When the device is in standby mode, the A/C switches to start-up mode. Press and hold the power button for over three seconds to turn off the A/C power. The A/C can only be restarted using the power button on the control panel.

#### ⑫ Extend the timer by 10 minutes.

#### ⑬ Decrease the set temperature by 1°C.

#### ⑭ Increase the set temperature by 1°C.

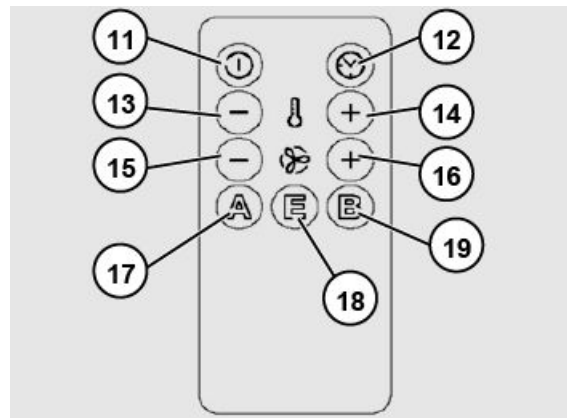
#### ⑮ Decrease the fan speed.

#### ⑯ Increase the fan speed.

#### ⑰ Enter the Auto (automatic control) mode.

#### ⑱ Enter the Eco (energy-saving) mode.

#### ⑲ Enter the Boost mode



### Display screen

#### ① Displays the currently selected function menu

#### ② On the current settings menu page, the following is shown:

- Set temperature
- Current fan speed
- Remaining cooling time

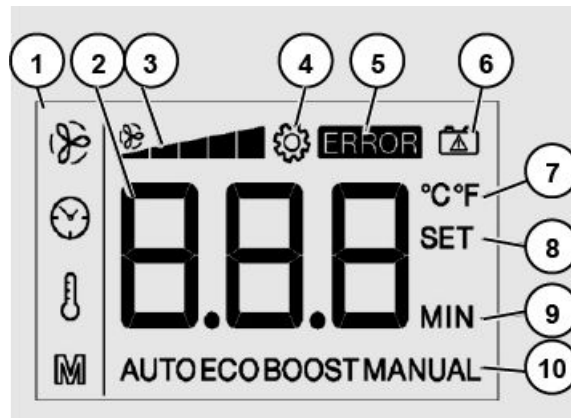
#### ③ Current fan speed

#### ④ Settings: When the settings menu is active, the indicator turns on

#### ⑤ ERROR: When the operating voltage is below the preset voltage or the display flickers, the warning indicator turns on.

#### ⑥ Battery indicator: Illuminates when the power supply voltage is interrupted or there is a failure

#### ⑦ °C: It indicates Celsius temperature. °F: It indicates Fahrenheit temperature.



- ⑧ SET: It indicates that the set temperature is now shown on the display
- ⑨ MIN: When the timer is set, the light illuminates
- ⑩ Displays the current operating mode

## Parking A/C system (Dometic)

---

### Instructions



#### **CAUTION!**

- Do not close all A/C outlets simultaneously, as this may cause icing within the system.
- A slight odor may occur during first-time use. This odor is a result of the A/C manufacturing process and will dissipate quickly after initial operation.

### Technical Description

This device is designed for in-vehicle cooling. Cabin air enters the A/C through the return air grille, then undergoes cooling and dehumidifying before being recirculated into the interior via the air outlet. When Boost mode is activated, the system operates at maximum power for up to 20 minutes before switching to Auto mode. After reaching the set temperature, the system will automatically switch to Auto mode within 20 minutes of activation. In Auto mode, the speeds of the fan and compressor are managed automatically by the system. In Eco mode, the system automatically controls fan and compressor speeds. In Eco mode, the air compressor's power output is restricted by the available electrical supply. This unit can be operated using either the control panel or the remote control.



#### **CAUTION!**

- This device can help lower the cabin temperature to a certain degree. The actual cooling temperature is jointly influenced by the vehicle model, ambient temperature, and the cooling capacity of your device.
- The system is equipped with a battery monitor. If the system remains operational after the engine is switched off, it will automatically shut down when the power supply voltage drops below the preset level.



## Startup

- Press the power button ⑩ briefly to start the A/C.
- The fan begins operation.
- The power indicator ⑨ illuminates.
- The digital display screen ④ shows the unit's current operating status.



### CAUTION!

Based on the current system status, the compressor startup may be delayed by up to 180 seconds.

## Standby mode

- Quickly press the power button ⑩ to enter standby mode.
- The system will save the current parameter settings.
- The power LED light ⑨ will turn on.

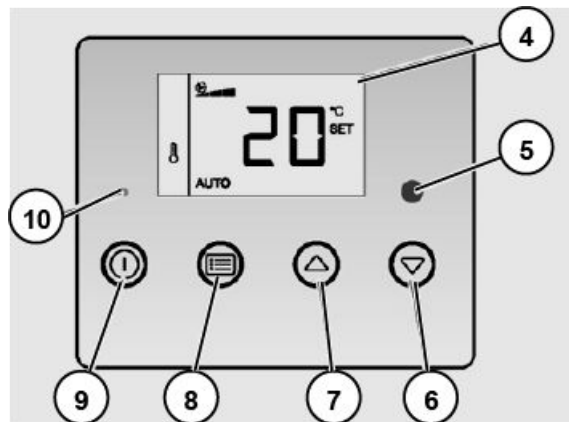


### CAUTION!

–When the A/C is set to Boost mode and then switched to Standby mode, it will operate in Auto mode the next time it is powered on.

–After switching to Standby mode, the scheduled shutdown function will be disabled.

–To conserve power, the system will automatically shut down the power supply after 12 hours in Standby mode.



## Parking A/C system (Dometic)

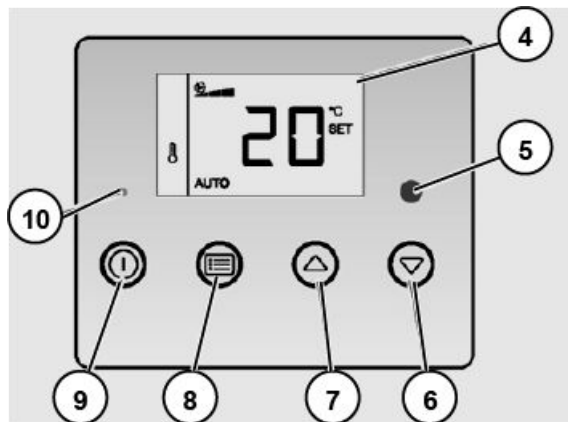
### Power off

- Press and hold the power button ⑨ for 3 seconds to shut down the system.
- The system will save the settings prior to shutdown.
- The power LED light ⑩ will turn off.



#### CAUTION!

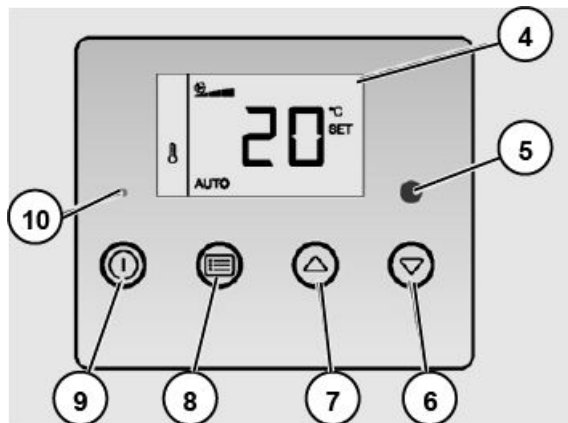
- When the A/C is in Boost mode and then turned off, it will operate in Auto mode the next time it is switched on.
- After the shutdown, any scheduled shutdown settings will be disabled.
- If the compressor continues running after shutdown, its fan will operate for an additional 20 seconds to help dry any moisture inside the A/C unit.



### Mode settings

#### Control panel

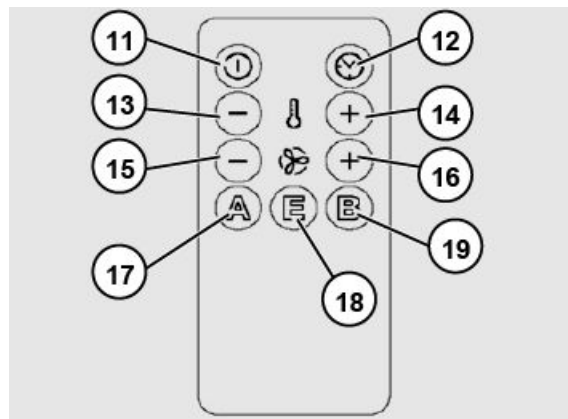
- Press the scroll selection button ⑧ until the adjustment mode icon appears.
- Press the up or down arrow ⑥/⑦ to select Auto, Eco, or Boost mode.
- Press the scroll selection button ⑧ to select the start mode.
- Manually adjust the fan speed as needed:
  - Press the scroll selection button ⑧ until the fan speed icon is displayed.
  - Press the up or down arrow ⑥/⑦ to adjust the desired fan speed.
  - Press the scroll selection button ⑧ to save the current operation.
- Exit the adjustment mode as needed:
  - Press the scroll selection button ⑧ until the adjustment mode icon appears.
  - Press the up arrow ⑦ to exit adjustment mode.
- Enter start mode:



–Press arrow ⑦. Press repeatedly to enter Eco mode; press twice consecutively to enter Auto mode.

### Remote control operation

- Press the Auto mode button ⑰ to switch to automatic operation mode.
- Press the Eco mode button ⑱ to activate energy-saving operation mode.
- Press the Boost mode button ⑲ to engage high-power operation mode.
- Press the fan speed button ⑮ to enter adjustment mode and increase the fan speed.
- Press the fan speed button ⑮. Enter adjustment mode to decrease the fan speed.
- If no operation occurs for 5 seconds, the system will automatically save the current settings.

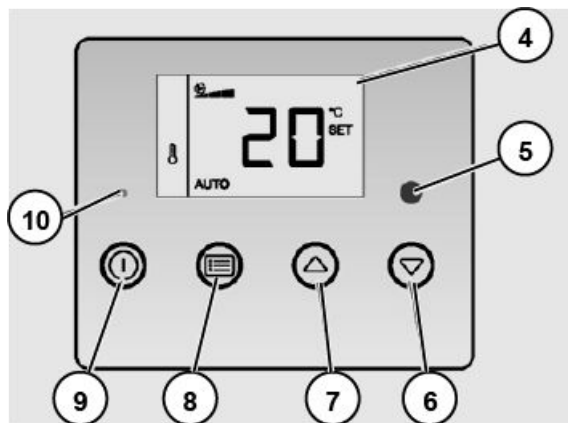


## Parking A/C system (Dometic)

### Timed shutdown settings

The A/C features a timed shutdown function. Once the preset time is reached, the unit will shut down automatically. When the timed shutdown is enabled, the display will alternate between the set temperature and the remaining time.

- Control panel timed shutdown settings.
  - Press the scroll selection button ⑩ to locate the timed shutdown function.
  - Use the up/down arrow buttons ⑥/⑦ to adjust the shutdown timer; each step changes the setting by 10 minutes.
  - Press the scroll selection button ⑩ to save the set time.
- Remote control timed shutdown settings.
  - Press the timed shutdown button ⑨ to extend the automatic shutdown duration. Each press extends the time by 10 minutes. The maximum setting is 120 minutes.
  - If no operation occurs for 5 seconds, the system will automatically save the current settings.



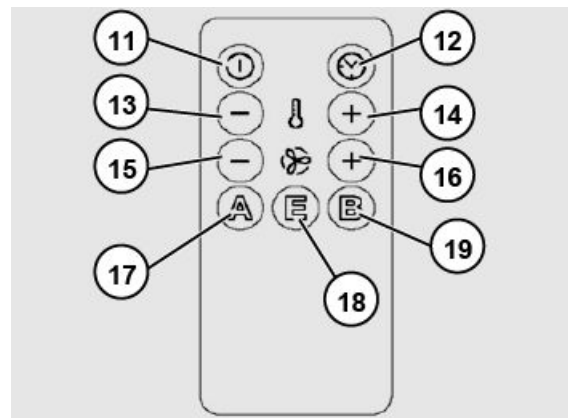
### Cancel timer

- Press and hold the timed shutdown button ⑫ until the screen shows a timer setting of 120 minutes.
- Press the timer button ⑫ again.
- If no operation is performed for 5 seconds, the system will automatically save the current settings.








### CAUTION!

When starting the vehicle or powering on multiple high-draw devices simultaneously, the screen may display the message "LO."



## Parking A/C system (Dometic)

**Control panel precautions:** The system is equipped with multiple protection features for safeguarding the equipment and battery. If any of these functions are triggered, a warning will be displayed on the control panel.

Display warning	Description	Cause	Troubleshooting method
LO	 <p>The battery tester has detected low voltage.</p>	The operating voltage is below the required threshold. The battery capacity is insufficient to support system operation.	<ul style="list-style-type: none"> <li>Recharge the vehicle's onboard battery.</li> <li>If the warning appears again, please contact a SINOTRUK service station.</li> </ul>
LO	<p>°C The system has detected that the external temperature is too low for safe equipment operation.</p>	The ambient temperature is below 5° C.	Resume use only after the ambient temperature rises above 5°C.
HI	 <p>The system detects either transient or persistent overvoltage.</p>	A brief overvoltage may occur when switching off high-power electrical devices. Incorrect voltage connections can cause sustained overvoltage.	<ul style="list-style-type: none"> <li>Transient overvoltage: no special action required.</li> <li>If the "HI" indicator remains on the screen for an extended period, recheck the circuit wiring to ensure the connection voltage is below 30V.</li> </ul>
	The system detects a significant current surge. Turn off the compressor. The entire system will shut down after 10 minutes.	The vehicle is significantly tilted.	Do not tilt the vehicle.
	 <p>On initial use, if the warning indicator flashes every 5 seconds, there may be a battery sensor error.</p>	The system is unable to detect battery voltage.	Contact a SINOTRUK service station and have a professional check the battery wiring for possible errors.
	 <p>The warning indicator flashes continuously while the system is operating. The system indicates that the battery voltage will soon be insufficient to support operation.</p>	The battery voltage is only slightly higher than the shutdown voltage.	Recharge the vehicle's onboard battery.

### Control panel fault prompt

If the A/C malfunctions, the fault icon on the control panel will illuminate, and ask for help from a SINOTRUK service station.



#### **CAUTION!**

- Beware of damage.
- Do not use a high-pressure washer to clean the A/C.
- Do not use sharp objects or cleaning agents, as these may damage the A/C.
- For cleaning, use water and a mild detergent. Do not use gasoline, diesel or solvents.
- Regularly clean the bottom-mounted A/C housing and air distribution box with a damp cloth.
- Regularly remove leaves and debris from the A/C ventilation grille. Take care during this process to avoid damaging the A/C grille.
- Regularly clean the remote control with a slightly damp cloth. It is recommended to use a glass cleaning cloth to wipe the display.

## Parking A/C system (Dometic)

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### Recommendations to enhance equipment performance

This parking A/C system is specifically designed and developed for in-cab cooling. You may use this unit while driving, but it does not replace the engine-driven in-cab A/C system.

For optimal use of this equipment, please adhere to the following operating instructions.

Suggestions for use:

- Whenever possible, park the vehicle in a shaded area.
- To protect your battery, it is recommended to first use the original A/C system to lower the cab temperature before switching on the parking A/C when parked.
- To preserve your battery, please operate the original A/C system while driving.
- Cover the vehicle with a vehicle cover when not in use.
- If your vehicle is not equipped with an A/C system, ensure the cabin is well ventilated before operating the equipment. Lower the cabin temperature before using this equipment.
- Ensure all doors and windows are closed when operating the equipment.
- Remove all heat sources from the cabin.
- Minimize the use of other electrical devices inside the vehicle to maximize the equipment's operating time.
- Select the appropriate temperature and operation mode.
- Ensure that the air outlet and the return air grille are not blocked by foreign objects such as cloth or paper.
- Operate strictly in accordance with the instructions below:

–If you wish the equipment color to match your vehicle body, only spray paint the top of the equipment housing. Remove the equipment top before painting. Use only light-colored paint.

–Wash the vehicle body regularly. Excessive dust on the cab can cause it to heat up more quickly.

–Ensure the equipment's performance is not affected by external heat sources. For example: (heat produced by refrigeration equipment).



### CAUTION!

**–The installation and servicing of the top-mounted parking A/C must be performed exclusively by qualified personnel familiar with the risks associated with refrigerants, A/C systems, and relevant regulations.**

**–Improper maintenance can lead to serious safety hazards. For maintenance services, please contact our after-sales team.**

- Keep electrical equipment out of reach of children and the infirm. Do not allow electrical equipment to be used without supervision.
- Individuals unable to safely use the equipment due to physical, sensory, or mental limitations, or lack of experience and knowledge, must not use the equipment without supervision or guidance.
- In the event of a fire, do not open the top cover of the top-mounted parking A/C. Use only approved fire extinguishing agents. Never use water to extinguish a fire.





**CAUTION!**

- Only automatic vehicle washers may be used to clean the A/C.
- Turn off the A/C power supply before tilting the cab for vehicle maintenance.
- Before using automatic vehicle washers or similar equipment to clean the vehicle body, turn off the A/C power supply.
- Do not use high-pressure water jets to clean the equipment, to avoid damaging the unit.

## Operation of front cover

### Operation of front cover

#### Open the front cover



#### CAUTION!

Before opening the front cover, wiper shall be in the original position.

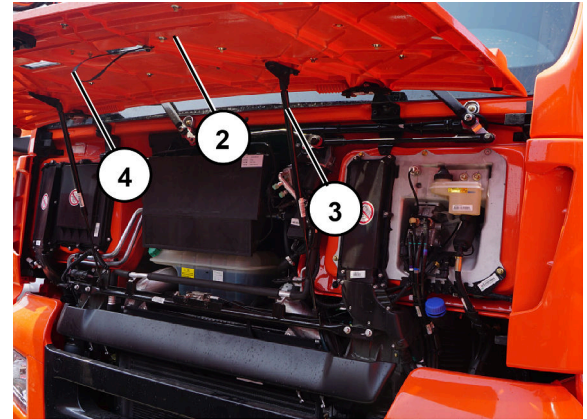
- Pull the handle ① on the left side of the instrument panel in the cab to release the front cover locking device.
- Push up the hook under the front cover with your hand (as shown by the arrow in the figure).



- The front shield ② is lifted, and the pneumatic spring ③ helps to open it and fix it in its final position.

### Close the front cover

Pull down the front cover ② with the pulling ring ④ and close it. Be gentle closing the front cover ②, so as to hear the locking sound of the hook and confirm the correct locking.



## Maintenance of front cover lock

### Maintenance of front cover lock

- Regularly apply grease to the cover lock.

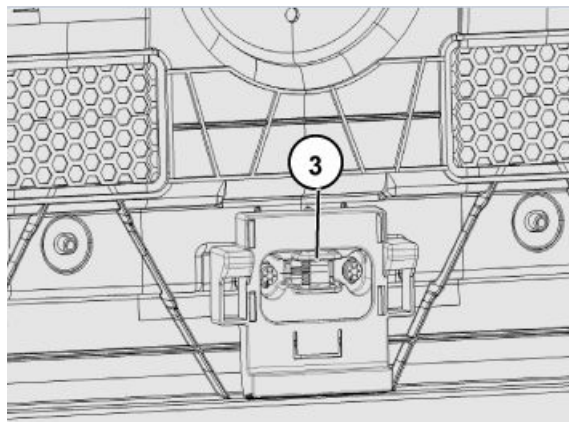
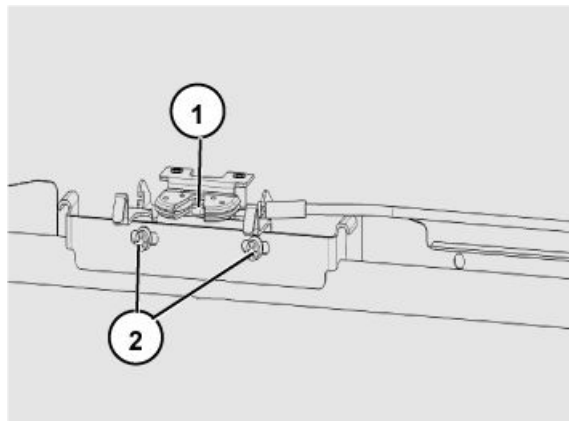
The grade of grease is 2 # lithium-based grease.

Clean up the dust and impurities on the lock before applying grease.

Grease application method: Apply grease evenly at ① the cover lock ratchet pawl and ③ the lock pin.

It is recommended to clean every 30,000 km for highway vehicles, and every 5,000 km for off-road vehicles and cement mixers. For mining trucks and engineering trucks operating in poor road conditions, the cleaning interval or mileage should be shortened.

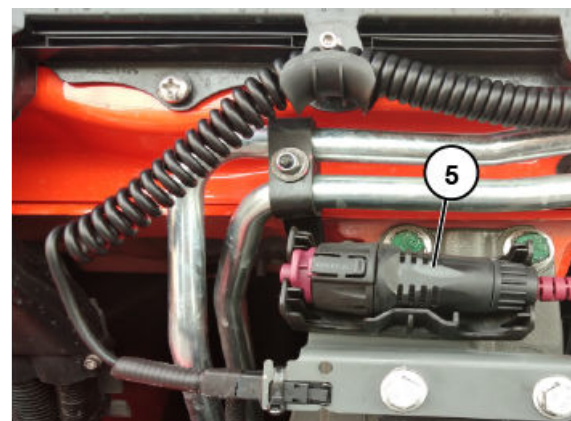
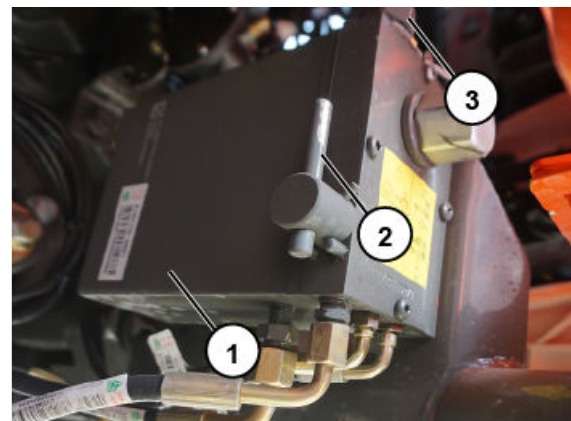
- If the front cover opening process is not smooth, remove the ② fixing bolt to adjust the lock position, ensuring the lock and lock pin engage centrally. When assembling the lock, use new locking bolts and calibrate the tightening torque with a torque wrench. The tightening torque is  $(9 \pm 0.9) \text{ N} \cdot \text{m}$  (this operation is recommended to be performed by professionals).



### Cab tilting operation

#### Cab tilting mechanism

- ① Manual hydraulic fuel pump
- ② Reversing handle
- ③ Oil plug
- ⑤ Handheld switch



## Cab tilting operation

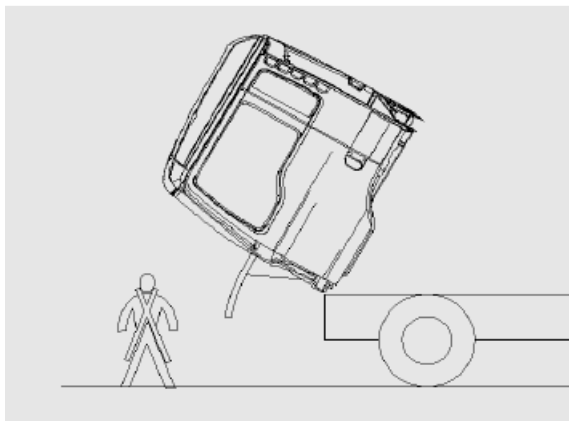
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### Cab tilting



#### **WARNING!**

- The reversing handle can be turned only during the cab tilting operation; The handle shall remain pointing at the vertical position in case of driving, fuel filling, etc.
- To ensure safety, no personnel or obstacles shall be in the tilting area in front of the cab.
- During cab tilting, one is allowed to enter between the space between the cab and the chassis.
- The cab shall be tilted properly before any operation is performed in the tilted cab.

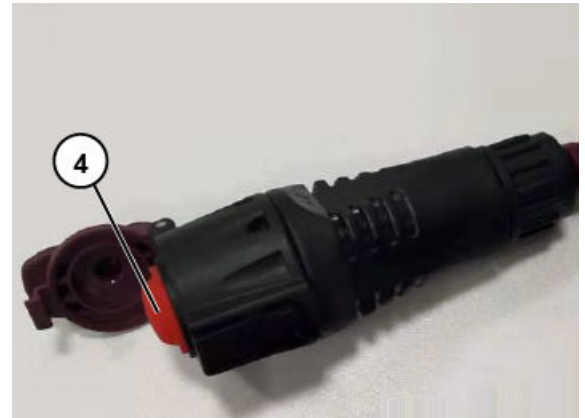
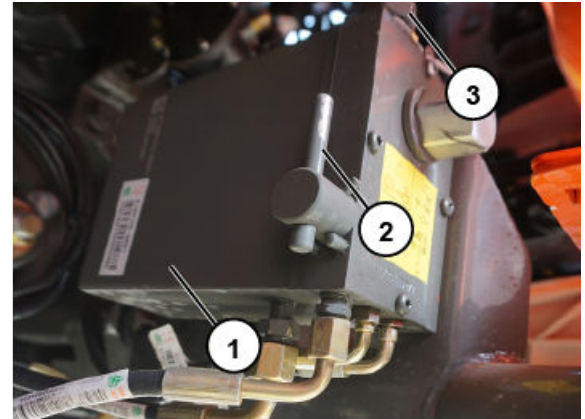


#### **Preparations before tilting**

- The vehicle shall be parked on a level and solid ground, and shall not affect the passing of other vehicles.
- Apply the parking brake.
- The transmission is in the neutral position.
- Shut down the engine.
- Fix the loose objects in the cab.
- Ensure that the storage box is emptied.
- Close the door.
- Open the cab front cover.

### Cab tilting operation

- Turn the reversing handle② of the manual hydraulic fuel pump ① to the transverse position.
- Crank the fuel pump ① with a crowbar (or press the button ④, only for electric hoisting) for the tilting operation.



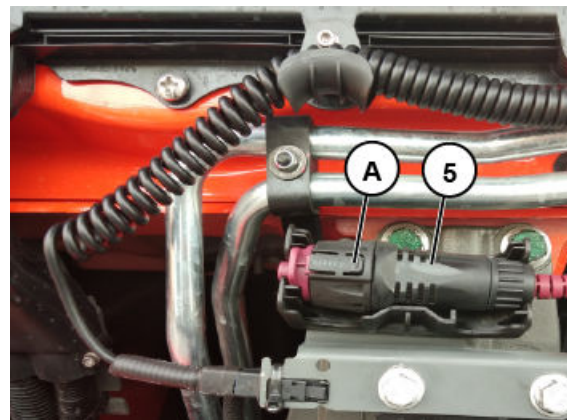
## Cab tilting operation

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### Cab tilting operation

#### Use the hand-held cab tilting switch

- Open the front cover.
- Take out the handheld switch ⑤
- Press at A, and the handheld switch will pop up.
- Press the cab electric tilting switch button ④ for the tilting operation.





### Cab return operation

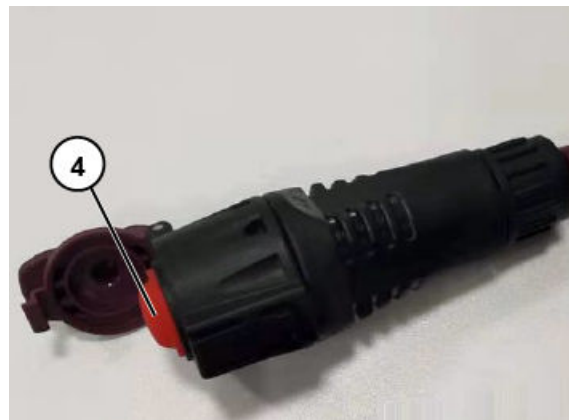
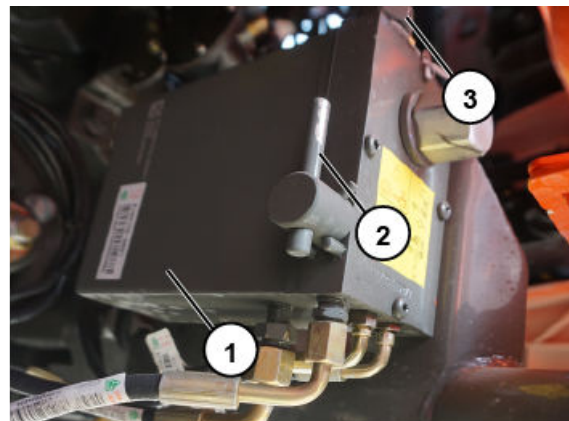
- Turn the reversing handle ② to the vertical position, crank the manual oil pump ① (or press the electric tilting switch button ④, only for electric hoisting) to lower the cab.



#### WARNING!

The motor pump shall not be operated consecutively for more than three times (excessive heat will shorten the life of the motor).

- During the cab lowering, the rubber bellows connected to the upper intake duct shall fit in place with the lower intake duct to prevent the dust from entering.
- Close the cab front cover.
- Finally, check the locked signal lamp on the instrument panel, which will be on if the cab is not locked.



## Tilting mechanism hydraulic oil

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### Tilting mechanism hydraulic oil

The type and usage regulation of the hydraulic oil for the cab tilting mechanism are shown in the table below:

Assembly	Oil name	Quality grade and viscosity grade	Oil quantity	Replacement interval mileage or time
Cab tilting mechanism	Hydraulic oil for lift pumps	#10 aviation hydraulic oil	0.85L	Check normally, maintain and supplement, with no need to change.

### Passive entry passive start (PEPS)

The passive entry passive start (PEPS) system can realize the functions of entering the vehicle and starting the engine without operating the remote control key.

- When the driver approaches the door with the remote control key, the system automatically recognizes the legal key, and you can press the door handle switch button to unlock the door automatically;
- When the driver leaves the vehicle with the remote control key, press the door handle switch button to lock the door automatically;
- When the vehicle is powered off, the electronic steering column lock is automatically locked and the anti-theft function is activated; when the vehicle is powered on, the electronic steering column lock is automatically unlocked;
- By operating the one-button start switch ①, the vehicle can be powered on/off, and the engine can be started/shut down.



## Passive entry passive start (PEPS)

### Engine start/stop switch

The one-button start switch has three statuses:

#### ① Power-off status

In the initial status of getting on the vehicle, when the vehicle is powered off, the indicator ④ does not light up.

#### ② Working status of central control panel

When the power supply is off, press the switch once, and the vehicle will enter the working status of the central control panel, the indicator ④ will be normally on in orange, and the central control panel will display normally at this time.

#### ③ Driving status

##### • Engine not start

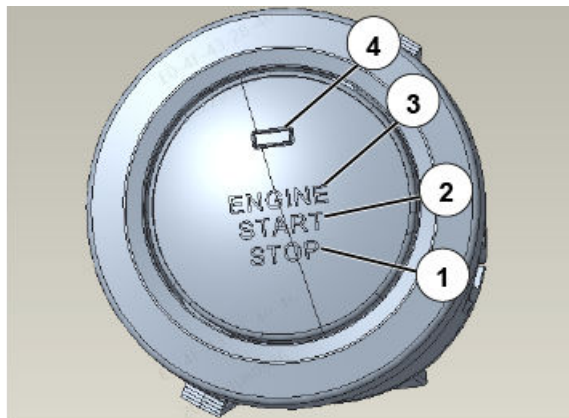
–On the basis of the orange light of the one-button start switch, press the switch once, and the vehicle will enter the power-on status, the instrument will display normally, and the indicator ④ will be always green.

##### • Start of engine

–When the brake pedal is depressed as the engine is not started and the indicator ④ is green, press the switch to start the engine.

### Power off the vehicle

When the brake pedal is not depressed as the engine is not started and the indicator ④ is green, press the switch to power off the vehicle.



### Stop the engine

When the engine is running and the vehicle speed is 0, press the one-button start switch, turn off the engine and power off the vehicle.

### Cut off the battery power supply

The battery power supply is cut off after the vehicle is powered off for 3min.

### Key reminder

If you do not carry the remote control key with you, press the one-button start switch once when the power is off, and the orange light flashes for 3 ~ 5s, indicating that the remote control key is not in the cab.

### Low key battery

When the battery of the remote control key is low, the words "Key Battery Low" will be written on the instrument to remind the driver to replace the remote control key battery in time.



#### CAUTION!

- The driver must carry the remote key with him/her and ensure that the remote key battery is not low.
- The driver must ensure that the remote key is in the cab before powering on the vehicle and starting the engine.
- The system fault information must be read through the OBD DLC.

## Passive entry passive start (PEPS)

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### Key mark ⑤ (only for one-button start models)

The remote control key is placed at the lower instrument panel on the right side of the driver.

#### • Emergency start

When the battery of the remote control key is too low to start the vehicle, place the remote control key at ⑤, power on and start the vehicle normally, and complete the vehicle startup process.

#### • Key pairing

After the remote control key is lost, put the new remote control key at ⑤, which can be paired with the vehicle again.



## Chapter II Inspection and Maintenance

## Inspection and maintenance overview

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### Inspection and maintenance overview

**Before starting the engine, the following inspections shall be carried out:**

#### Daily inspection:

- Engine: engine oil level
- Cooling system: coolant level
- Lighting and signal system: function
- Seat belt: condition and function
- Cab tilting system: condition
- Fuel/ gas: fuel quantity/gas quantity
- AdBlue: amount of AdBlue
- Traction device and saddle: connect the pipelines and cables
- Basic hand tools

#### Weekly inspection:

- Tires: pressure and condition
- Wheel nuts: whether they are properly tightened and fit<sup>1)</sup><sup>2)</sup>
- Windscreen washer: washer fluid level, winter adaptability, and function
- Fuel primary filter: drain water <sup>1)</sup>
- Check the appearance for leakage: engine, gearbox, transfer case, driving axle, steering mechanism, heater unit and hydraulic tilting system

Check the engine, gearbox, transfer case, driving axle, steering mechanism, heating device and hydraulic tilting system for leakage once every week. If necessary, please go to a CNHTC service station for repairing.

#### Monthly inspection:

- Steering system: steering fluid level
- Clutch system: brake fluid level
- V-ribbed belt: condition
- EGR system: check the water and gas lines of the EGR system

#### Biannual inspection:

- Cab tilting mechanism: oil level
- Oil tank: drain water.

If the vehicle is provided with special equipment, the above inspection items are not all-inclusive.



NOTE:1) The inspection frequency shall be appropriately increased according to the local climate, use and driving conditions.

2) New vehicles shall be inspected every day.

### **Inspection after starting the engine**

#### **Daily inspection:**

- Engine: engine oil pressure
- brake system: functioning well and effective
- Steering system: functioning well
- Air suspension system: whether the vehicle is tilting

#### **Weekly inspection:**

- Air suspension system: check the compressor air bags

#### **Monthly inspection:**

- Air dryer: function 1)

If the vehicle is provided with special equipment, the above inspection items are not all-inclusive.

NOTE:1) The inspection frequency shall be appropriately increased according to the local climate, use and driving conditions.

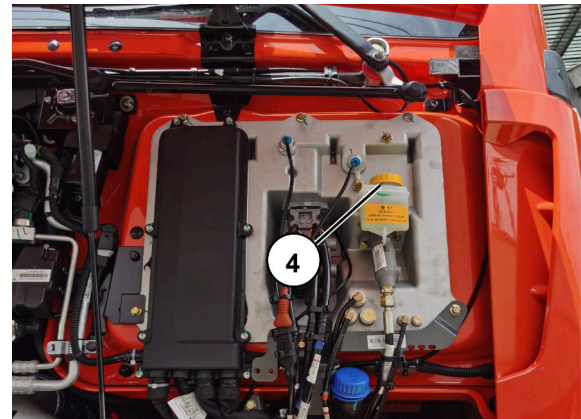
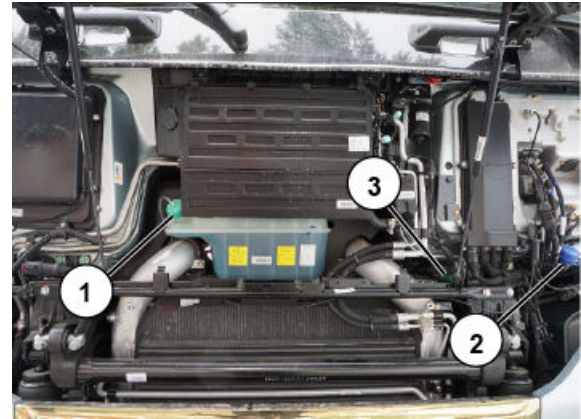
## Inspection and maintenance points

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### Inspection and maintenance points

After opening the front cover, the following parts for inspection and maintenance can be seen:

- ① Coolant filler
- ② Windshield washer fluid filler
- ③ Engine oil dipstick
- ④ Clutch hydraulic oil filler



### Inspection of engine oil MC11/MC13/MT13 engine



#### **WARNING!**

**Before inspection and maintenance, the site shall be checked and cleaned completely!**

**Check the following items on a daily basis before engine startup:**

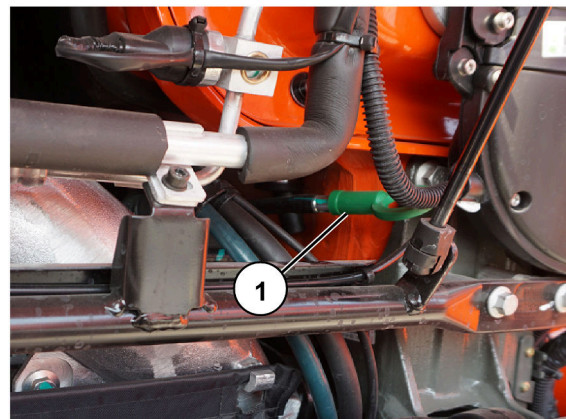
#### **Engine oil**

- Park the vehicle on a level road, shut down the engine and wait for 20 minutes before checking the oil level.
- Open the front cover and pull out the oil dipstick ①. Wipe it with a clean lint-free cloth. Insert the oil dipstick back into its tube and pull it out again. Check that the oil level should be between the MAX and MIN marks of the oil dipstick, not below the MIN mark. Check several times to determine the oil level, and add oil if the level is too low.



#### **WARNING!**

**Do not allow the oil level to exceed the maximum mark.  
Adding too much oil will damage the engine!**



## Inspection of engine oil

### WP15NG China V Weichai engine



#### **WARNING!**

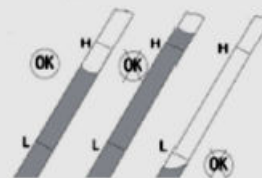
Check the oil level after the engine stops, at least wait for 5 min, so that the engine oil has enough time to flow back to the oil sump.

### WP15H China V Weichai engine



#### **WARNING!**

Check the oil level after the engine is stopped, and wait at least 30 min to allow sufficient time for the oil to flow back to the oil pan.



Before starting the engine, check the oil level. The oil level should be between the upper and lower scale lines of the oil dipstick. If necessary, add oil at the oil filler port.

If the oil level is below the MIN mark, add oil through the engine oil filler. If the oil level is above the MAX mark, remove the excess oil either via the oil dipstick tube or by draining it from the oil drain plug. During routine maintenance or oil replenishment, please control the liquid level at the scale line position on the oil dipstick (not higher than the upper scale line).

### Fill engine oil

- 1 Turn off the ignition switch/power off the vehicle.
- 2 Tilt the cab. See "Cab Tilting Mechanism".
- 3 Unscrew the oil filler cap ①.
- 4 Filling oil.
- 5 Tighten the filler cap.



#### **WARNING!**

- Be careful not to damage the engine!
- Only certificated engine oil of CNHTC can be used.
- Do not add too much oil!

See "Engine Maintenance" for the filling amount of engine oil.



## Inspection of cooling system

### Inspection of cooling system

#### Cooling system (check every day)

- 1 Park the vehicle on a horizontal road and open the front cover.
- 2 Observe the coolant level in the expansion tank. The coolant level should be between the MAX and MIN marks on the side of the expansion tank. If the coolant level is below the MIN mark (when the vehicle is powered on, the low coolant level warning light on the instrument panel illuminates), replenish the coolant.

#### Add coolant (if necessary)

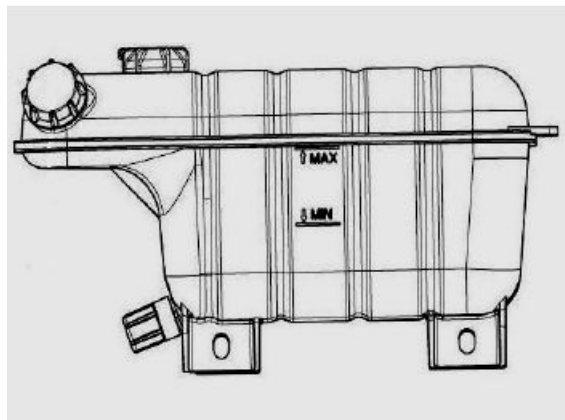
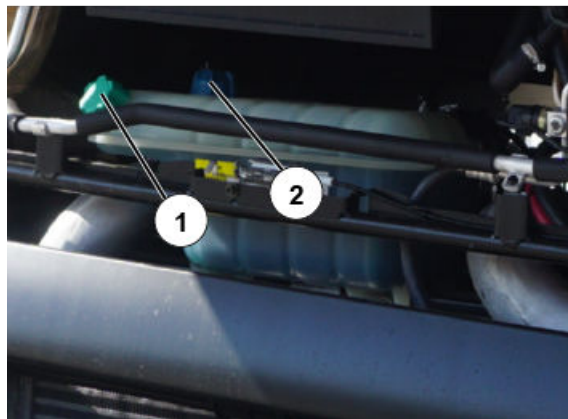
- ① Filler cap    ② Pressure cap

- 1 Slowly unscrew the filling cap counterclockwise to release the pressure of the cooling system, and remove the filling cap.
- 2 Turn the warm air temperature regulation button to the maximum position.
- 3 Fill the coolant (see "Engine maintenance" for the coolant type) until it reaches MAX.
- 4 Tighten the liquid filling cap.
- 5 Start the engine and keep it idling for 4 minutes.
- 6 Check the coolant level and replenish it if necessary.



#### CAUTION!

If the pressure cap or fill cap is found to be damaged, they should be replaced as soon as possible; the vehicle should have a new pressure cap and a new filler cap replaced every 500,000 km or every 3 years (whichever comes first).



The closed forced water cooling system is adopted for the cooling system, and all-season long-life anti-freeze liquid is used as coolant.

It is not allowed to use water instead of coolant.

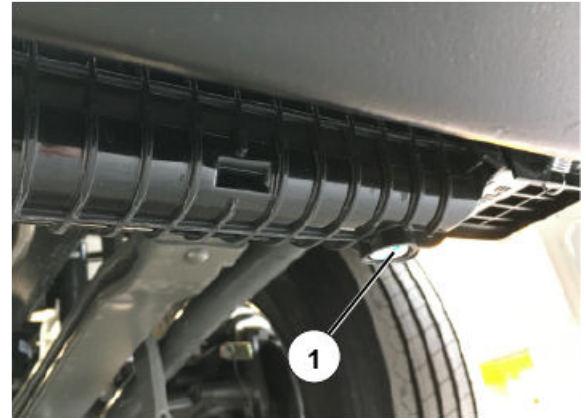


### **WARNING!**

- The coolant is toxic and shall not be inhaled into human body during use, storage and preparation.
- Mixed use of coolants of different models is not allowed.
- It is not allowed to open the water tank cover immediately after the engine is stopped, so as to avoid being burnt by the high-temperature pressure gas inside.
- If the coolant is greatly reduced during the use of the vehicle, causing the entire system to overheat, do not add the coolant immediately at this time, because the sudden drop of the coolant temperature will damage the engine.

### **Drain the coolant**

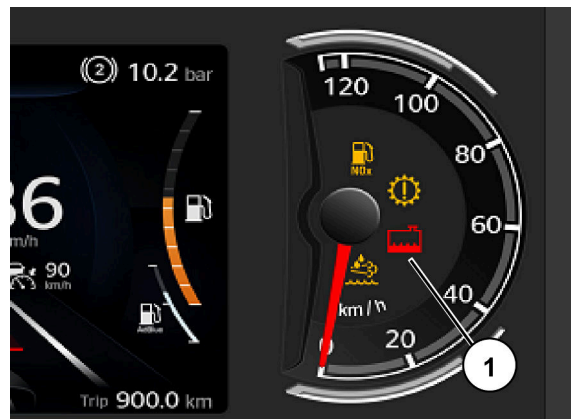
Unscrew the drain plug ① from the radiator lower water chamber to empty the coolant of the vehicle. Tighten the drain plug to a torque of 2 N·m. For engine coolant emptying, please refer to the section: Engine Maintenance.



## Inspection of cooling system

### Level sensor alarm

When the vehicle is powered on and the coolant level is low, the low coolant level warning light ① will illuminate.





### Fuel system inspection

Fuel (check every day)



#### **WARNING!**

- Diesel is very flammable, beware of fire and explosion.
- After shutting down the engine and auxiliary heating device, refill with diesel.

### Check the oil quantity (check the gas quantity in case of a gas engine)

- Power on the vehicle.
- Check the fuel quantity indicated by the fuel gauge ①; if necessary, refill with fuel that meet national standards.



#### **CAUTION!**

- The refueling quantity shall not exceed 95% of the fuel tank capacity to prevent the fuel from overflowing after expansion due to heating.
- Do not use up the fuel in the fuel tank. Otherwise, the fuel system needs to be exhausted (see "Fuel system").



## Fuel system inspection

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Check the following items every six months before starting the engine:

### Oil tank drainage

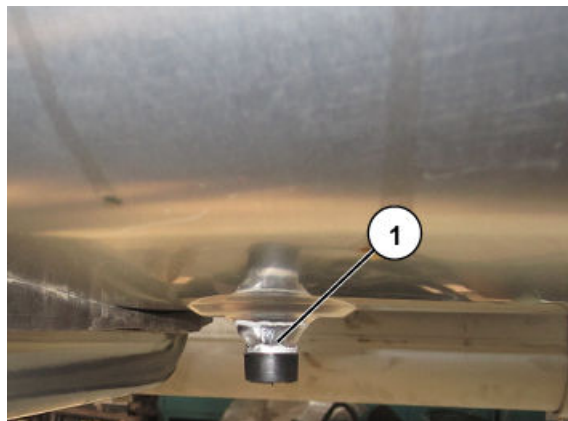


#### **WARNING!**

**During operation, take measures to avoid environmental pollution caused by fuel leakage!**

The sediment and water in the fuel tank shall be removed every six months to avoid damage to the fuel system and engine.

- Place a suitable container under the fuel tank;
- Unscrew the plug screw ① at the oil drain outlet at the bottom of the oil tank to empty the sediment and water at the bottom of the oil tank;
- Properly dispose of drained substances;
- Tighten the plug (torque 34 N·m).



### **Inspection of fire extinguishers and driver's tools**

#### **Fire extinguisher**

Check the fire extinguisher to ensure that it can work properly when necessary. Refill the extinguisher with fire extinguishing agent or replace the fire extinguisher after each use.

#### **Basic hand tools**

Check whether the basic hand tools are complete. Basic hand tools include jack, wheel wrench, wheel pad, tire inflation hose, reflective vest, parking wedge, and warning triangle.

## Wheel and tire inspection

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### Wheel and tire inspection

The following inspection items shall be carried out before starting the engine every week:

#### Tire pressure and condition (cold state of tire)

- Check the air pressure of all tires (including the spare tire) to ensure they are normal.
- Check the appearance, wear and tread pattern depth of all tires (check in accordance with the legal conditions).
- Find and remove the foreign matters embedded in the tire tread or between the double tires.
- Check whether the outer surface of the tire is damaged.

#### Wheel nuts

- Check the connection of nuts.
- Tighten all wheel nuts again to the specified tightening torque.



#### WARNING!

–The tire pressure shall comply with the regulations; otherwise it will affect the driving speed, safety, operability and service life of the vehicle.

–If the air pressure of the tire keeps decreasing, check the tire for embedded foreign matters and check whether there is air leakage at the hub and valve.

–The tire may become hot when the vehicle is running, and the tire pressure will rise, and it is not allowed to deflate the tire at this time. The pressure of the tire will change with the air temperature, at a rate of about 0.2 bar per 10 °C. In winter, be particularly careful when inspecting the tire indoors.

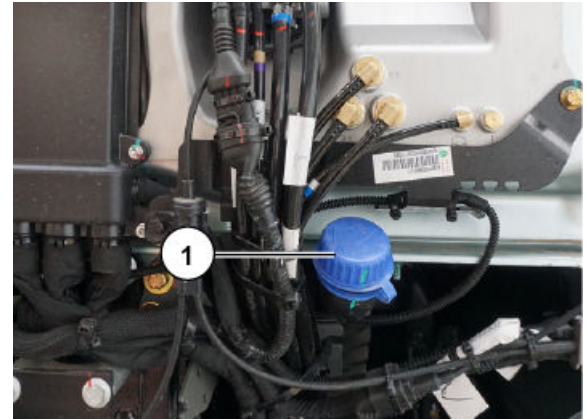
### Windshield washing wiper system inspection

The inspection shall be carried out every week or more frequently according to the climate, use and driving conditions.

- Open the front cover.
- Remove the cap ①.
- Check the liquid level in the reservoir.
- Please add washer fluid if needed.

Before the winter comes, add anti-freezing windshield washer fluid , i.e. methanol (or isopropanol, glycol) water solution with a volume ratio of 50%.

- Tighten the cap ① again.
- Check whether the function of the windshield washing system/wiper system is normal.



## Steering system inspection

### Steering system inspection

#### Steering system (monthly inspection)



#### **WARNING!**

If the hydraulic oil is reduced due to leakage, the hydraulic power steering system may fail, and the vehicle steering will be hindered. Please drive the vehicle to the nearest a CNHTC service station at a slow speed for repairing.

#### **Check the liquid level**

1 The vehicle shall be parked on a level road and the cab shall be turned over.

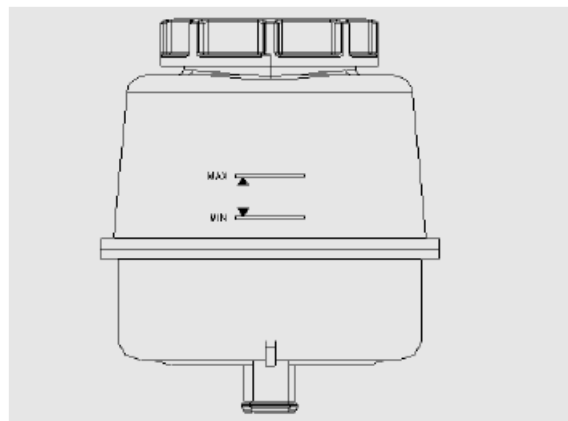
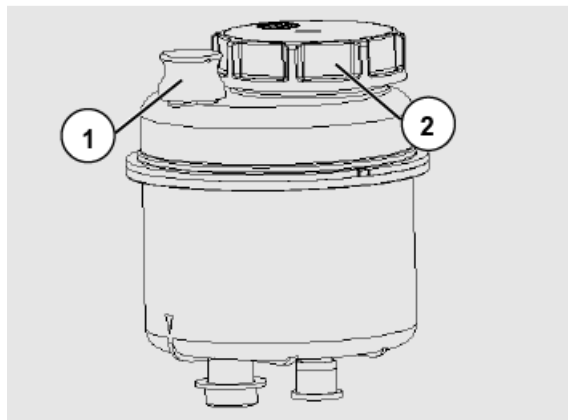
2 Check the liquid level according to the MIN and MAX scales on the transparent reservoir.

3 When the engine is shut down, the liquid level shall be between the MIN and MAX marks on the reservoir.

If the fluid level is too low, add the automatic steering hydraulic oil through the filler ②.

4 Keep the vent hole ① clean and clear.

When adding hydraulic oil, start the engine and keep it running stably at low speed. When adding oil into the oil reservoir, turn the steering wheel to the left and right limits. Repeat this until there is no air in the return oil. Shut down the engine, add oil into the oil reservoir to the above specified level, and put back the cap.



### Inspection of clutch system

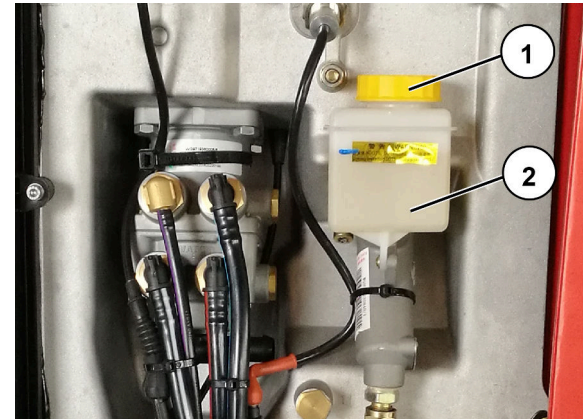
#### Inspection of brake fluid level (monthly)

The vehicle shall be parked on a level road. Open the front cover of the cab and check the brake fluid level in the clutch reservoir ②, which shall be between MAX and MIN marks.

If necessary, unscrew the oil tank cover ① and fill the brake fluid (see "Clutch Maintenance").

#### Check the clutch system pipeline

Check the clutch system pipeline for air and liquid leakage.



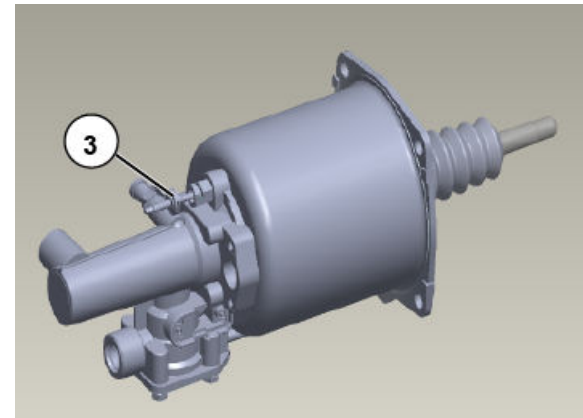
#### Check the wear indicator

Check the wear indicator ③ to determine if clutch driven plate needs to be replaced (see "Clutch Maintenance").



#### **WARNING!**

**If the oil level in the tank drops below the MIN mark, the clutch control device will not function properly.**



## Engine oil pressure inspection

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### Engine oil pressure inspection

#### Engine oil pressure (daily)



#### **WARNING!**

- Be careful not to damage the engine!**
- If the oil pressure alarm lamp lights up, stop the vehicle immediately and shut down the engine. Find out the cause, check the amount of oil, and add or drain an appropriate amount of oil if necessary to make the oil level at a proper height.**

When the engine is started, there shall be no information as follows displayed on the instrument: "STOP", and "Oil Pressure Alarm Lamp".

- Check the oil level, and add an appropriate amount of oil if necessary.

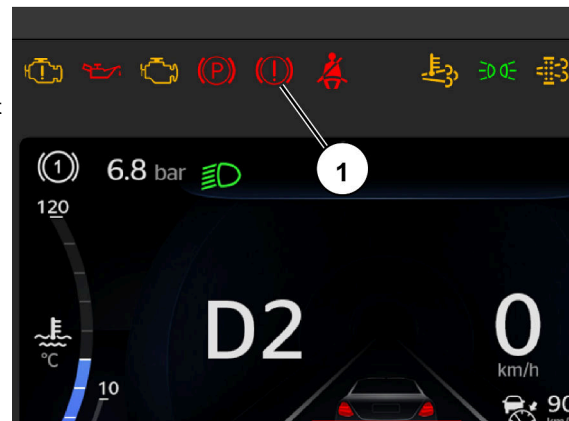


### Brake system inspection

- Before starting the vehicle, check whether the service brake and parking brake system function well.
- After the engine is started, the parking brake can be released to get ready to start only after the air pressure of the system exceeds 0.55 MPa, the fault warning lamp ① of the brake system goes off, and the alarm buzzer stops sounding.

### Check the brake air pressure.

- Check the barometer.
- If necessary, start the engine and inflate the brake system until the air dryer is unloaded and air discharged.



## Brake system inspection

The following inspection items shall be carried out after starting the engine every month:

### Air dryer

Check whether the air dryer functions well and effectively every month (or check this more frequently according to local climate conditions, use and driving conditions). Open the drain valve of the air reservoir to check the air dryer.

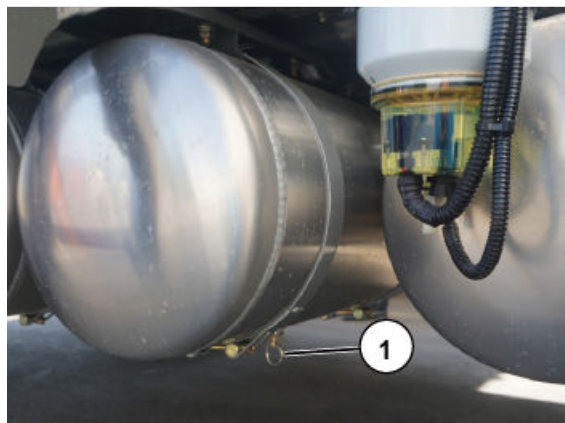


#### **WARNING!**

- In winter, a failed air dryer can cause the brake system to freeze, rendering the brakes ineffective!
- When operating the water drain valve, protect the eyes and hands properly.

During the checking, the brake system shall have adequate air pressure.

Pull the pull ring ① sideways to check whether there is any discharge of water and oil mixture. See details in Chapter I "Brake System".



### Inspection of steering system

#### Inspection of steering clearance (every day)

- Start the engine and run it at idle speed.
- When the steering wheel is in neutral position, turn it left or right for about 30 mm (about 7.5°), and the wheels shall rotate obviously.
- If the steering clearance is too large, check the steering system and steering linkage immediately, and go to a SINOTRUK service station for maintenance if necessary.



## Air suspension system inspection

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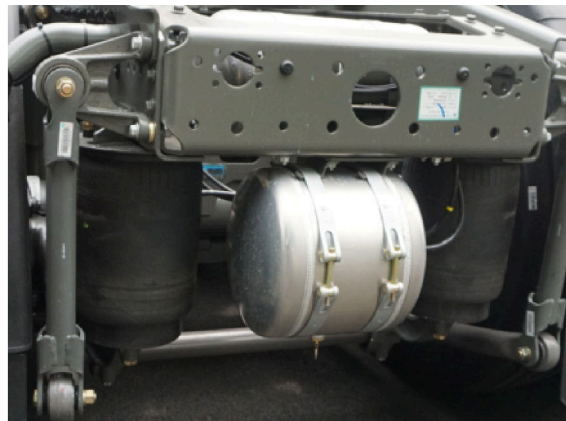
### Air suspension system inspection

#### Check whether the vehicle body is tilted

- After inflating the airbags, park the vehicle on a level road, and the vehicle body shall not be tilted.
- If one of the airbags is not sufficiently inflated, appropriately deflate the other airbags of this axle to the current level of this axle, and drive the vehicle slowly to the nearest CNHTC service station for repairing.

#### Weekly inspection items after engine start: air suspension system (weekly)

- Check all airbags of the front and rear axles for signs of wear, contamination and aging.



## Chapter III Vehicle Operation

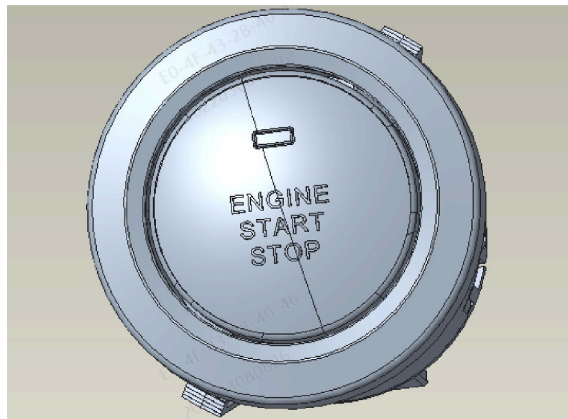
## Start the engine

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### Start the engine

#### One-button start model

Start the engine. For detailed operations, refer to Chapter I "Passive Entry Passive Start (PEPS)."



### Start the engine

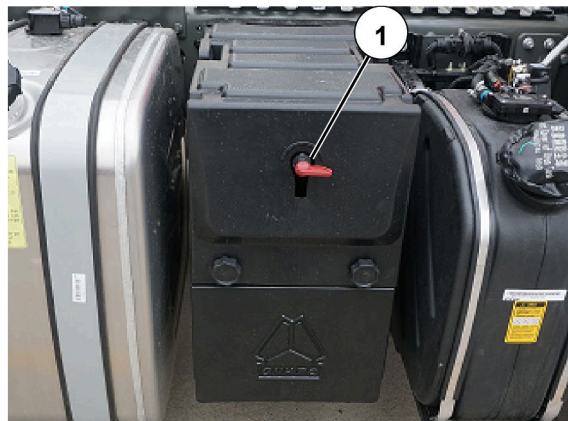
#### Connect the power supply

Rotate the main switch ① to ON to connect the power supply.

#### Disconnect the power supply

Rotate the main switch ① to OFF to disconnect the power supply.

Before starting the engine, check whether the switch of the battery is turned on.





### WARNING!

- Avoid starting the engine unnecessarily to protect the battery.
- The remote key should be taken with you when leaving the vehicle (even if for a short period of time).



### WARNING!

- If the vehicle is to be parked for a long time or during maintenance of the electrical system, the main switch of the battery shall be switched off.
- Do not disconnect the main switch when the engine is running.
- Do not loosen or remove the battery terminal when the engine is running.



### DANGER!

- Do not turn off the ignition switch when driving, and always put it in the service position "ON (II)".
- Remove the key when leaving the vehicle (even if for a short time).

### Release the steering lock mechanism

- Turn the key to the "ACC (I)" position, and simultaneously turn the steering wheel left and right to release the steering lock mechanism.
- Turn the key to the "ON (II)" position.**

- All indicator and warning lights on the instrument panel illuminate simultaneously. After self-inspection, the instrument panel begins displaying information.
- If the system detects a fault, the information display will show the corresponding fault information.

### Start the engine.

- Apply the parking brake.
- Shift the transmission to neutral or depress the clutch pedal.

**If the transmission is in gear, the engine cannot be started without depressing the clutch pedal.**

- Turn the key to the "START (III)" position to start the engine.
- The start-up time shall not exceed 15s.
- Release the key after the engine starts.



### WARNING!

- Check the driver's display immediately when the engine is started. See "Driver's Display".
- If the vehicle has started, the oil pressure warning lamp on the instrument panel lights up, and the "STOP" warning lamp starts to flash at the same time, turn off the engine immediately, and continue driving only after the fault is eliminated.

All other lights go out after completing their check/warning functions. Do not start the vehicle before the fault display sign "STOP" on the driver display screen disappears.

## Start the engine

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### If the engine fails to start

- Turn the key counterclockwise to the "LOCK (0)" position.
- Wait for about 30s to allow the battery to recover.
- Repeat the starting procedure above.



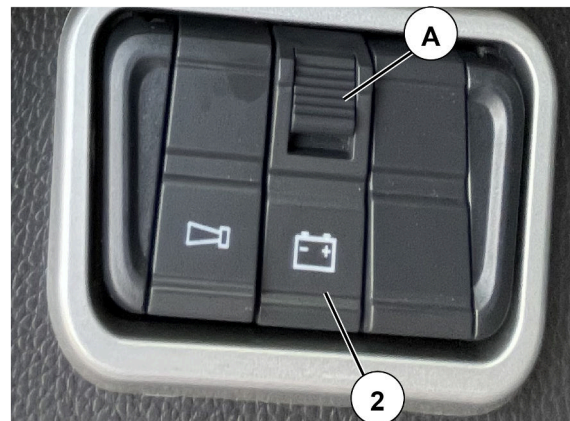
### Electromagnetic power switch

#### Connect the power supply

Press the lower part of the rocker switch ② to power on.

#### Disconnect the power supply

First press at point A to release the lock switch, then press the upper part of the rocker switch ② to power off.



## Shut down the engine.

### Shut down the engine.



#### **WARNING!**

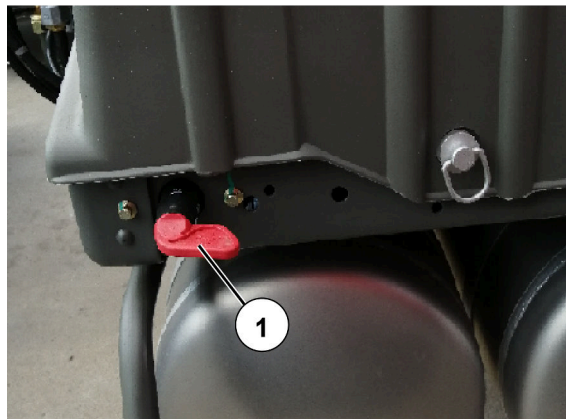
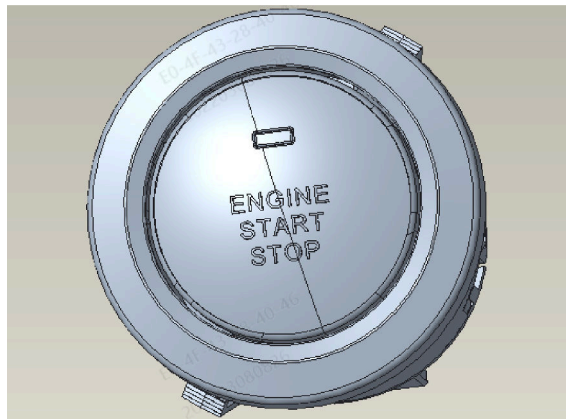
If the engine is running under heavy load for a long time, the coolant temperature will be very high. The engine shall not be shut down immediately. It shall be allowed to idle for 3 to 5 minutes, and the engine shall not be shut down until the engine coolant temperature drops; otherwise the engine may be damaged.

#### **Models with PEPS**

- Place the transmission in the neutral position..
- Apply the parking brake.
- Turn off the engine. For details, see Chapter I "Passive Entry Passive Start (PEPS)".

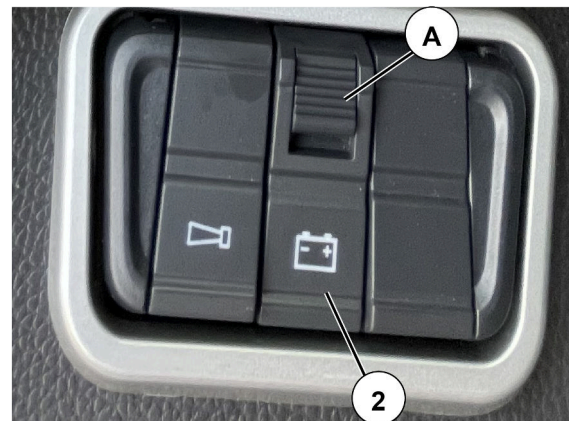
#### **Mechanical power switch**

- Place the transmission in the neutral position..
- Apply the parking brake.
- Turn the key counterclockwise to the "LOCK (0)" position, and the engine will be shut down.
- Switch the master switch ① to the OFF position to disconnect the power supply.



### **Electromagnetic power switch**

- Place the transmission in the neutral position.
- Apply the parking brake.
- Press A to turn on the locking switch, and then press the upper part of the rocker switch ② to disconnect the power supply.



### **Lock the steering wheel**

- Power off the vehicle (see "Passive Entry Passive Start (PEPS)" for models with PEPS).
- Rotate the steering wheel until you hear the lock sound of the steering wheel. At this time, the steering wheel can no longer be rotated.



#### **WARNING!**

**Never lock the steering wheel during driving.**

## Clutch operation

---

### Clutch operation

- When operating the clutch, press the clutch pedal to the bottom.
- During start, the engine speed shall be controlled at the minimum level enough to keep the vehicle running. After releasing the clutch pedal, gradually increase the engine speed by stepping on the accelerator pedal, and then shift to a higher gear.
- When loosening the clutch pedal during start, try to engage the clutch as quickly as possible (while ensuring a smooth start), and do not allow the vehicle to run under the half-clutch mode for a long time.
- If the vehicle has a large load and is starting on a steep slope or on a road with poor adhesion, sometimes multiple starts are needed. If the clutch slips (clutch pedal in a semi-released state) for a cumulative time of 10s within 1min, stop operating the clutch for 5min, and do not turn off the engine during this period.
- If there is smell burning from the friction plate when the vehicle is started, and the vehicle fails to start, or the clutch slips after starting, then release the clutch and wait for 15 minutes. The engine shall not flame out during this period.
- When there is a gear clash sound when shifting gears with a hot engine, step on the clutch pedal and wait for a while before shifting gears and starting.



### **WARNING!**

If the vehicle is fully loaded or is moving on a ramp or on a road with poor condition, it shall start in first gear to protect the clutch. If abnormal wear of the clutch is caused by starting with a high gear, SINO-TRUK only provides paid services!

### Shifting operation (with synchronizer)

#### Gear Shifting

The vehicle should be started with Gear "1" or Gear "2", depending on road conditions.

#### Shift in low/high gear range

- 1 The clutch pedal shall be fully depressed for each gear shift.
- 2 Shift gears according to the gear label plate, and engage the shift lever in place.
- 3 Slowly engage the clutch.



#### **WARNING!**

- When shifting gears, be familiar with the driving range of each speed to avoid shifting into a gear that is not suitable for the vehicle speed.
- When the vehicle is driving downhill, it can be shifted into a lower gear that matches the vehicle speed, and make full use of engine braking, but attention shall be paid to avoiding engine overspeed.
- The reverse gear can be engaged only when the vehicle is stationary and the engine is at idle speed.
- The parking brake can be released only when the air pressure rises to the specified value.
- When the vehicle speed is greater than 25 km/h, it is strictly prohibited to shift from the high gear area to the low gear area.

## Shifting operation (with synchronizer)

---

### Synchronizer shifting steps

- 1 When shifting gear, depress the clutch pedal ① completely.
- 2 Move the gear lever ② to the required gear smoothly and accurately. When encountering resistance, gradually apply force for a moment, and then engage the required gear.
- 3 Release the clutch pedal stably and accelerate to a proper speed.



### Shifting operation (without synchronizer)



#### CAUTION!

- Vehicles should operate in the highest possible gear during travel to ensure the engine runs within the fuel-efficient RPM range.
- When parking or leaving the cab, place the transmission in Neutral and apply the parking brake.
- Unnecessary emergency brake or sharp acceleration should be avoided.
- Do not coast downhill with the transmission in Neutral.



#### WARNING!

- When shifting gears, be familiar with the driving range of each speed to avoid shifting into a gear that is not suitable for the vehicle speed.
- When the vehicle is driving downhill, it can be shifted into a lower gear that matches the vehicle speed, and make full use of engine braking, but attention shall be paid to avoiding engine overspeed.
- The reverse gear can be engaged only when the vehicle is stationary and the engine is at idle speed.
- The parking brake can be released only when the air pressure rises to the specified value.
- When the vehicle speed is greater than 25 km/h, it is strictly prohibited to shift from the high gear area to the low gear area.

### Gear shifting

According to the road conditions, start with 1st gear or 2nd gear.

#### Shifting in the low/high range

- Depress the clutch pedal to the bottom every time you shift gears.
- The clutch should be engaged slowly.
- Shift according to the gear position plate; the operating lever should be moved fully into gear.

## Shifting operation (without synchronizer)

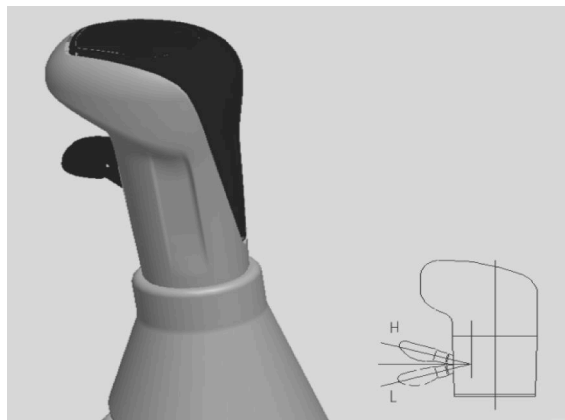
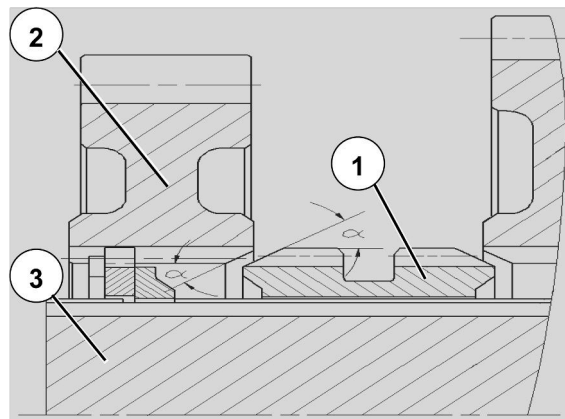
### Transmission without synchronizer

The main box of this series of transmissions does not have synchronizers. Shifting is done by moving the sliding sleeve ①. The main shaft sliding sleeve is mounted on the main shaft ③ via involute splines. Moving the sliding sleeve engages its external splines with the internal splines of the main shaft gear ② to transmit power.

The main shaft gear floats relative to the main shaft, so significant shifting force is required to overcome resistance during gear engagement. Shifting force must be applied smoothly.

### Shifting precautions

- Engaging the clutch sleeve requires overcoming significant resistance. Shifting force must be applied smoothly.
- When downshifting while the vehicle is moving, the "double-clutching method" should be used.
- Shifting into reverse should be done after the vehicle has stopped; otherwise, the clutch sleeve may be easily damaged.





### High/low gear switching

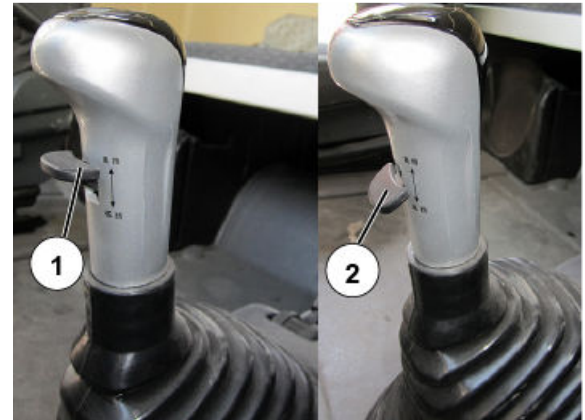
#### Shift between high and low gears

The shift lever switch valve has two positions: high gear ① and low gear ②.

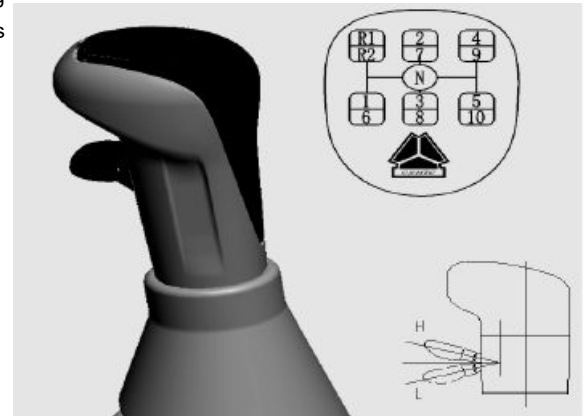


#### **WARNING!**

- When shifting gears, be familiar with the driving range of each speed to avoid shifting into a gear that is not suitable for the vehicle speed.
- Depress the clutch pedal to the bottom every time you shift gears.
- Do not skip gears when the transmission is shifting from a low range to a high range (or vice versa).
- When the vehicle is going downhill, do not change high/low gear.



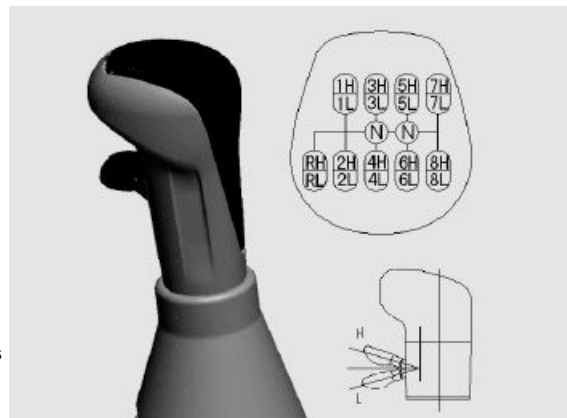
HW10 transmission joystick is equipped with high-low gear switch valve for shifting between high and low gears of the transmission. Taking HW15710 transmission as an example, when shifting from the low gear area to the high gear area (or vice versa), first put the handle valve in the H (L) position, then depress the clutch pedal to the floor and shift to neutral. Wait for a moment intentionally before engaging the Gear "6" (Gear "5"). Do not skip gears. Otherwise, the service life of the auxiliary transmission synchronizer will be affected. When the handle is in a gear, change between the H-L positions of the handle valve. The high and low gears are not changed, but can only be changed when it is in the neutral position.



## High/low gear switching

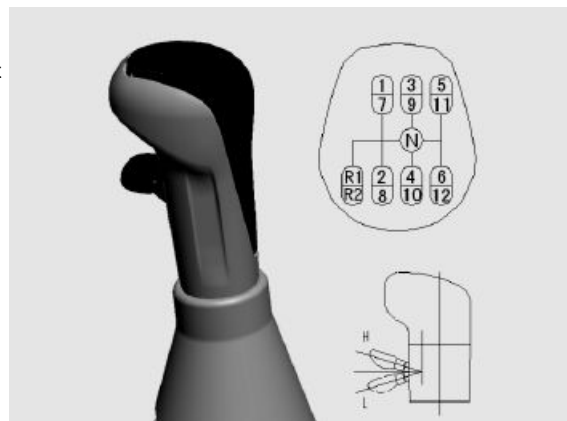
### Shift between high and low gears

When shifting gears (half gears) of HW16 series transmissions, first switch the switch on the shift lever (as shown in the figure), such as the operation steps of switching from 1L to 1H: first switch the switch valve from the L position to the H position, depress the clutch pedal (the clutch pedal shall be depressed to the bottom, the same below), release the clutch, and complete the shifting (this process does not require the action of the lever); operation steps of switching from 1H to 2L: first switch the switch valve from the H position to the L position, depress the clutch pedal, return the lever to the neutral position, shift to the 2nd position, release the clutch pedal, and complete the shifting. And so on, until the gear is shifted to 8H, and the same operation is performed for downshifting. If you depress the clutch pedal first, release it, and then switch the switch on the lever, the gear will not switch.



### Shift between high and low gears

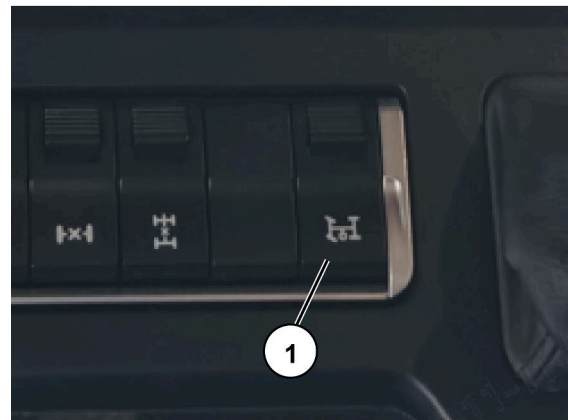
When shifting gears of the HW19712C(HW14712XSTCL/HW25712XST(C)L/HW13709XSTC(L) transmission from low gear to high gear (or vice versa), first put the handle valve in the H (L) position, shift it to the neutral gear, consciously wait for a while, and then engage the 7th gear (6th gear) [5th gear (4th gear) for the 9-gear transmission]. Do not skipping gears. Otherwise, the service life of auxiliary transmission synchronizer will be affected. When the handle is in a gear, change between the H-L positions of the handle valve. The high and low gears are not changed, but can only be changed when it is in the neutral position.



### PTO (power take-off) operation

#### Operation method

- 1 First, place the transmission lever in the neutral gear;
- 2 Depress the clutch pedal and press the PTO switch ① (while simultaneously pressing the upper lock switch).
- 3 Engage the PTO, and the PTO indicator on the instrument panel will illuminate.
- 4 After engaging the PTO, gently release the clutch pedal. The PTO will then enter its operating mode.



## Precautions for operation

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### Precautions for operation

- When shifting, the clutch shall be completely disengaged, and the shift lever shall be engaged in place.
- The shift lever switch valve has two positions: high gear and low gear. When parking, the on-off valve shall be placed in the neutral position of the low gear area.
- When the vehicle is in Gear R, stop the vehicle first and then engage the gear to avoid damaging the internal parts of the transmission. When Gear R is engaged, a larger selective force is required to overcome the resistance of Gear R lock, and the shift force is also larger than that of the forward gear.
- When the vehicle is going downhill, it is forbidden to change between high and low gears.
- Start with Gear 1 or 2 according to the road conditions.
- Before the vehicle starts, wait until the air pressure rises to the pressure required to release the parking brake before releasing the parking brake.
- If the transmission is found to have abnormal sound, obvious heavy operation and other abnormal phenomena during use, stop the vehicle immediately for inspection, and continue driving after troubleshooting.
- When the transmission is equipped with the main and auxiliary gearbox interlocking mechanism, if the auxiliary gearbox is not shifted in place, the main gearbox shift will be locked. If the gear can be engaged during gear shifting, it may be that the main gearbox and auxiliary gearbox interlock are working. Check the range gear cylinder and its air circuit first to ensure that the auxiliary gearbox is in gear.
- The transmission within the "Three Guarantees" period is not allowed to be disassembled and assembled without permission.

### Operating temperature

- The maximum temperature of the transmission during continuous operation shall not exceed 120°C, and the minimum temperature shall not be lower than -40°C. Excessive oil temperature will decompose the lubricating oil and shorten the service life of the transmission.
- Any of the following conditions can cause the working temperature of the transmission to exceed 120°C:
  - Operating continuously at a driving speed of <32 km/h;
  - High engine speed;
  - High ambient temperature;
  - The exhaust system is too close to the transmission;
  - High-power overspeed operation;
  - The eddy current surrounds the transmission.

### Working inclination angle

When the working inclination angle of the transmission exceeds 15°, the lubrication may be insufficient (the working inclination angle is equal to the installation angle of the transmission on the chassis plus the slope angle).

### Towing or coasting

- Do not depress the clutch pedal to make the vehicle coast in neutral.
- When the vehicle needs to be towed, the axle shaft can be pulled out or the drive shaft can be disengaged, or the driving wheels can be lifted off the ground.

## Gear shifting operation

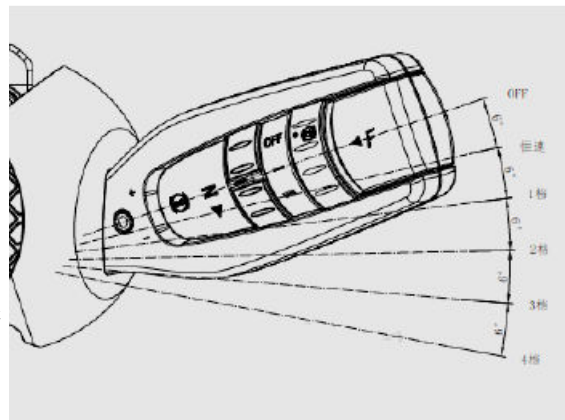
### Gear shifting operation

#### A/M function selection

The driver can switch between the Manual Function (M) and Auto Function (A) with the A/M rocker switch on the panel.

#### Handle unit

- **E/P – knob switch for the shifting of Eco-Coasting Mode (E+), Power Mode (P), and Eco Mode (E):** Under the Auto Function (A), rotate the E/P button to the left to cycle from E+→P→E mode, and the respective mode will be displayed on the instrument.
- **C – Knob switch for crawling mode:** When the vehicle is stationary, rotate the C button to the right to activate the three modes: crawl start, medium idle start and high idle start.
- **F key - Function key:** The F button is a function button. Press the F button in the direction of the arrow, and toggle up or down perpendicular to the steering wheel. The right combination switch can be used to realize the engagement of start gear and the upshifting and downshifting of driving.
- **N – Self-returning neutral knob:** Rotate the self-returning knob downward, and the gearbox will return to neutral gear.
- **EVB – Exhaust gas brake knob:** Rotate the exhaust gas brake knob (EVB) switch to turn on the exhaust gas brake.
- **Retarder:** Pull the handle clockwise in the same steering direction with the steering wheel to select the gear of retarder (0-5th gear)



### Vehicle start

When the vehicle is parked and the gearbox is in neutral gear, press the "F" function button and toggle upward the right combination switch perpendicular to the steering wheel at the same time to engage into the default forward start, and toggle downward to engage into the default reverse gear. The effective start gear range allowed by the AMT is the low gear range.

Users may also directly select and engage into other start gears according to different loads and use conditions. If the driver wishes to start in the 4th gear, just press the F button for 4 consecutive times, and press the F button for the 5th time and toggle upward the right combination switch at the same time, and the system will engage into the 4th gear directly.

There are three different modes of AMT vehicle start:

- **Normal start mode**

The accelerator is pressed normally, the clutch is engaged when the engine remains idle, and the vehicle starts.

- **Full-throttle start mode**

The accelerator is pressed to the end to realize the start mode of accelerating while engaging the clutch. This start mode is suitable for hill start with a full load and other cases in which a start cannot be realized by using the engine idle start alone.

- **Special start mode**

–Crawling start: When the vehicle is stationary and the gearbox is put in N gear, rotate the C knob to the right for two consecutive times to enter the Crawl Control mode. The crawl indicator lamp on the instrument will be on, and the system will be switched to

the M mode. To exit the crawl control mode, manually switch to the A mode.

–Medium idle start: When the vehicle is stationary and the gearbox is put in N gear, rotate the C knob to the right once to enter the medium idle mode, and the crawl indicator lamp on the instrument will flash. When you no longer need the C mode, please rotate the C button again to exit, or exit automatically after completing the start.

–High idle start: When the vehicle is stationary and the gearbox is put in N gear, rotate the C knob to the right and hold it in place for 5s to enter the high idle mode. In this mode, the buzzer will be activated continuously, and the crawl indicator lamp on the instrument will flash. The vehicle will exit the high idle start mode automatically after a normal start.



### CAUTION!

–To prevent vehicle skidding at hill start, press the accelerator pedal first, and release the hand brake when the clutch is at the half-linkage point.

–Keep pressing the accelerator during the starting of the vehicle; avoid keeping a small throttle for a long time, as this will make the clutch in a half-linkage state, affecting the life of the clutch.

–Warm up the engine sufficiently before driving, and drive only after the engine water temperature is above 50°C.

## Gear shifting operation

### Operation in Auto Mode (A)

#### 1 Auto Function (A) Start

Under the Auto Function (A), the system automatically engages into the recommended gear; when the vehicle is parked with the power on, it will automatically engages into the recommended start gear.

#### 2 Acceleration

The driver can control the upshifting timing with the accelerator. As the throttle opening increases, the upshift rpm point of the system will rise accordingly. The system cannot forecast the road condition ahead, and is required to be input by the driver with the accelerator pedal.

During the downhill driving, after the driver releases the accelerator pedal, the system does not upshift before the engine rpm reaches the highest allowable rpm, so as to make the most of the braking efficiency of the engine, ensuring the safety of downhill driving.



#### CAUTION!

After the engine rpm reaches the highest allowable rpm of the engine, the system will still shift gears automatically to protect the engine.

#### 3 Rapid acceleration/overtaking mode

If you need a larger acceleration for the vehicle to achieve fast overtaking during driving, please press the accelerator pedal to the end fast (full throttle Kick-Down). The system will keep the gear or downshift based on the current driving condition of the vehicle to allow the vehicle to gain the highest acceleration capacity.

After reaching the target speed, the driver may release the accelerator pedal to the normal position, and the system will exit the full-throttle mode, reselect a proper gear and complete the shift.



#### CAUTION!

The driver should keep the position of the accelerator stable when the vehicle is accelerating or running at a constant speed, and there is no need to release the accelerator during the shifting of gears. Please note that this is different from the driving operation of vehicles with a manual gearbox!

### 4 Eco+ Mode (E+), Power Mode (P), and Eco Mode (E)

#### (1) Eco+ Mode (E+)/Eco Mode (E)

The control system selects an appropriate gear to make the engine operate in the economical rpm range, with good economy and low fuel consumption. During the driving of the vehicle, if the driver does not press the accelerator and brake, and the current road condition is a level road or gentle slope, the system will automatically engage into neutral; when the driver presses the accelerator (or turn on the exhaust gas brake and retarder, switches to E/P and exits E+, toggles the shift handle) or the slope becomes steeper, the system will automatically engage into an appropriate gear and exit the neutral coasting.

#### (2) Power Mode (P)

The control system selects an appropriate gear to make the engine produce the maximum power, with good dynamics. It is



recommended to use the P mode in cases of mountain roads with full a full load, soft surface, and plateau working condition.

immediately shift to an appropriate gear based on the current speed and road condition.

### 5 Braking deceleration

To slow down the vehicle, the accelerator pedal should be released, or the brake pedal should be pressed at the same time, and the system will automatically reduce the gear according to the vehicle operation situation:

- (1) If the drive presses the brake pedal, the vehicle will decelerate rapidly  
When the vehicle starts to decelerate rapidly in the low gear zone of the range gear, the system will not shift gears until the driver release the brake pedal. If the vehicle is braked until it stops, the system will shift to the start gear. When the vehicle starts to decelerate rapidly in the high gear zone of the range gear, the system will not shift gears until the engine rpm is close to idling. The clutch will be disengaged automatically, and the system will engage into an appropriate gear.
- (2) If the driver press the brake gently to decelerate slowly, the system will downshift normally until the vehicle stops or the brake is released.
- (3) If the driver only releases the accelerator and the vehicle is coasting, the system will delay the downshifting to reduce the number of unnecessary shifting. But when the driver presses the accelerator pedal again to start accelerating, the system will

## Gear shifting operation

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### 6 Manual shifting in Auto Mode (A)

When the vehicle is running in Auto Mode, the driver can intervene by operating the handle. The handle action in Auto Mode can realize shifting only when the running environment of the vehicle meets the shifting requirement. The handle action in Auto Mode can affect the operation of Auto Mode, but will not release the Auto Mode, nor will it switch the operation mode of the transmission to Manual Mode.

### Operation in Manual Mode (M)

In Manual Mode, the shift action comes from the driver, but it is still controlled automatically by the AMT system to complete the relevant actions.

If the engine rpm cannot reach the rpm required by the target gear, the control system will shift to an appropriate gear (not necessarily the target gear) according to the current rpm; if the control system in the current operating environment does not allow gear shifting, it will make an audible alarm, indicating that the shifting request by the driver is rejected.

### 1 Upshifting and downshifting operation

The driver can realize the upshifting and downshifting operations with the right combination switch handle. The specific operations are as follows:

- Press and hold the Function Button (F), and toggle the handle upward or downward perpendicular to the steering wheel to send the shifting request for 1 gear, that is, upshift or downshift 1 gear each time;
- Without pressing the Function Button (F), toggle the handle upward or downward perpendicular to the steering wheel, and the AMT will

automatically shift to an appropriate gear according to the current operation of the vehicle;

- After press the Function Button (F) for n times, toggle the handle upward or downward perpendicular to the steering wheel upshift or downshift n gears each time.

### 2 Braking deceleration

During the deceleration, if the brake pedal is pressed or the exhaust gas brake is applied, the transmission will remain in the gear after the vehicle is stopped.

If the vehicle starts to brake in the low gear zone of the range gear and the driver does not request for downshift operation, the AMT will maintain the current gear until the vehicle slows down and the clutch is disengaged; If the vehicle starts to brake in the high gear zone of the range gear and the driver does not request for downshift operation, the AMT will shift to an appropriate lower gear when the engine is close to idling



#### CAUTION!

To protect the auxiliary gearbox synchronizer, the automatic shifting of the AMT during braking may occur even under manual function.

### Neutral Operation

In both auto function or manual function, so long as the driver rotates the neutral button ("N"), i.e. requests for the AMT to shift back to neutral. When the neutral symbol "N" is displayed on the instrument, it indicates that the AMT has returned to neutral. When the vehicle is coasting or the transmission is put in neutral position, the gear can be directly engaged into an appropriate gear by the operation of the handle. Under the neutral coasting function of A Gear, when the accelerator is pressed, the system automatically upshifts, and controls the engine torque to recover gradually, with no impact on the transmission system.

### Stopping the vehicle and stalling

- 1 The accelerator pedal is released by the driver;
- 2 The brake pedal is applied;
- 3 Stop the vehicle;
- 4 Pull down the hand brake;
- 5 Engage the transmission back into neutral. The transmission will return to the neutral position completely after N is displayed on the instrument;
- 6 Shut down the engine.



### CAUTION!

–If the engine is shut down directly in the gear, the system will automatically engage the gearbox into neutral. However, if the air pressure of the vehicle is not sufficient at this moment, the system will not be able to automatically engage the gearbox into neutral, which will make it hard to start the engine next time. To ensure the normal start of the engine, be sure to engage back into neutral before shutting down the engine! If the hand brake is not pulled down, the vehicle may move and cause dangers. Therefore, please make sure to pull down the hand brake before shutting down the engine.

–Medium and high idle start modes improve the starting performance by increasing the engine rpm to medium and high speed in advance before engaging the clutch. They shall be used cautiously to avoid affecting the life of the clutch.

–The crawl control mode is suitable for the working condition in which the vehicle is moving at a low speed in site.

## Gear shifting operation

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### Resetting Learning Function

If the AMT system is updated, the gearbox type is changed, the clutch is replaced, the spare parts (splitter gear cylinder, transmission brake, clutch booster cylinder, range gear cylinder) of the gearbox are replaced, the system must be set to reset the learning in the following steps:

- 1 When the air pressure is sufficient and the parking brake is pulled up, the transmission is in N gear, and the vehicle is powered off for more than 30s.
- 2 Power on the vehicle (the engine cannot be started now), and in 2s after power on (or before power-on), press and hold the function key "F" and the N gear knob switch "N" at the same time. This state must be maintained throughout the system reset learning process without release.
- 3 When "AMT in configuration" is displayed on the instrument, it indicates that the system has entered the resetting process. If "AMT in configuration" is not displayed, it indicates that the learning has not begun. Check whether the above conditions are met, and restart the operation.
- 4 When "AMT in configuration, please start the engine" is displayed on the instrument, start the engine immediately.
- 5 When "AMT configuration success" is displayed on the instrument, release the function buttons F and N (if "AMT configuration invalid this time" is displayed on the instrument, then repeat the above steps to restart the learning).
- 6 Wait for more than 10 seconds until the vehicle is powered off, and then wait for more than 1 minute.

7 Step on the brake, start the engine, engage any gear in the low gear area, return to the N gear, and repeat the action 3 to 4 times, with an interval of about five seconds each time.

8 Engage the starting gear, release the parking brake, slowly depress the accelerator pedal, slowly engage the clutch until the vehicle moves, then release the accelerator pedal, stop the vehicle, apply the parking brake until the vehicle is powered off, and wait for more than 30 s.

### Grade zeroing function

After the learning is completed, the grade sensor of the TCU needs to be zeroed.

- 1 Drive the vehicle to a level road, release the hand brake on the premise of ensuring safety, and the vehicle shall remain stationary.
- 2 Power on the vehicle (do not start the engine), press the A/M button and rotate the E/P button at the same time until the buzzer of the instrument sounds an alarm, and release the button. If the grade sensor is not zeroed successfully, the trouble code 520293 will be displayed on the instrument. Restart the operation.
- 3 Power off the vehicle, wait for 30s, and the zeroing of the grade sensor will be completed.

### **Emergency start in case of engine ignition failure**

If the gearbox is kept in forward gear or reverse gear (the specific forward gear or reverse gear will be displayed on the instrument) after stalling due to the air pipeline fault of the vehicle, and the vehicle has no air pressure, the gearbox cannot return to neutral, causing the engine to fail to start. In this case, the following emergency method can be used to start the engine:

- 1 Using the inflation rope that comes with the vehicle, connect to the tire pressure and inflate the clutch booster cylinder (there is a standard valve core port on the clutch booster cylinder). After the clutch is disengaged, the engine can be started normally and the vehicle can be inflated; or use a bicycle pump to inflate the booster cylinder to disengage the clutch.
- 2 If an external air source is used, for example, if another vehicle connects to the external air source inflation inlet beside the air dryer with an inflation rope to inflate the air pipeline of the host vehicle, when the air pressure of the gearbox reaches the desired value, the gear will be automatically shifted to N as the neutral request by the handle. The engine can be started normally after the gearbox returns to neutral.

## Operation of ZF manual 16-speed transmission

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### Operation of ZF manual 16-speed transmission

#### ZF transmission - manual transmission

The ZF-Ecosplit 16-speed transmission consists of a four-speed main gearbox, high and low gears and a half gear group.

#### Gear 4 main gearbox

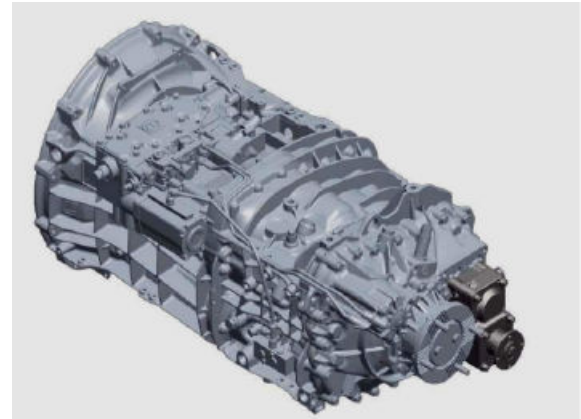
- Synchronizer type, Gear R combination sleeve type.
- Manual gear shift (rotary shaft control type).
- Double-H shift pattern or (overlapping) single-H shift pattern.
- Servo gearshift.

#### High and low gears, at the rear end of the transmission

- Synchronizer gearshift.
- Double-H shift pattern; automatic switching (pneumatic) when the shift lever moves between the Gear 3/4 and Gear 5/6.
- (Overlap) single-H shift pattern; switch by operating the preselection switch on the shift lever.

#### Split gear group, at the front end of the transmission

- Synchronizer gearshift.
- Shift the gear pneumatically by operating the preselector valve on the shift lever, and then operate the clutch.



### Gear description (Double-H shift pattern)

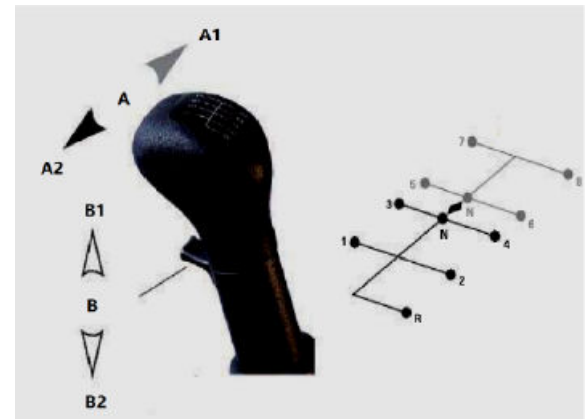
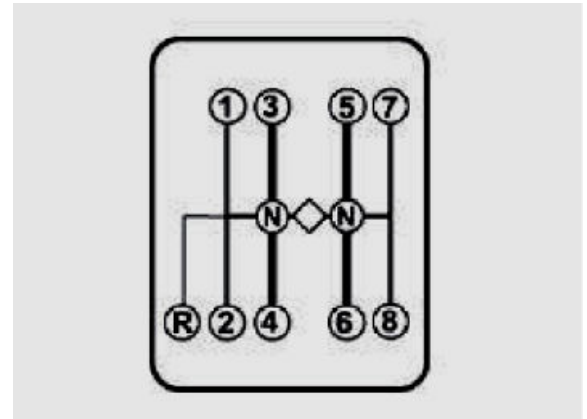
◇ Automatic switching room

Gear R

1~4 low gear area

5~8 High gear area

Gear N



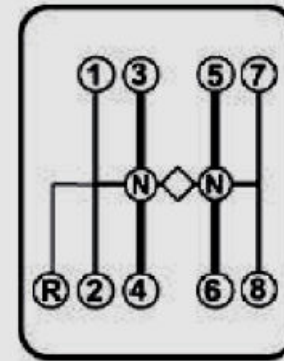
## Operation of ZF manual 16-speed transmission

### Gearshift system

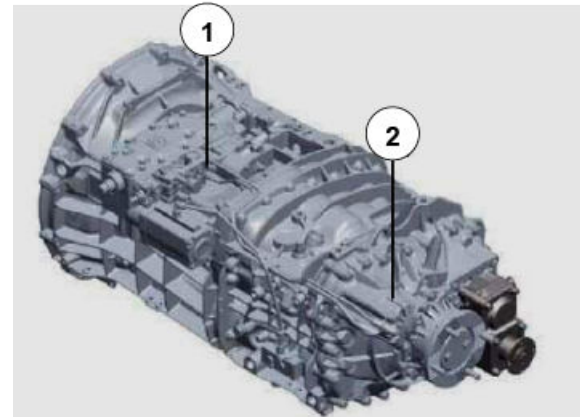
#### Double-H shift pattern system for high and low gear

The gearshift system is divided into 5 adjacent gear selection positions. In the gear selection position, the Gear 3/4 or Gear 5/6 has a spring return neutral position respectively.

When shifting from the Gear 3/4 to the Gear 5/6 in the gear selection position, the pneumatic shifting of high and low gears is automatically completed, and vice versa.



The high and low gear shift control system consists of a shift module ① and a bidirectional cylinder ② located in the transmission.





### Half gear group

The gearshift operation of the half gear group is controlled by the pre-selection switch on the shift lever. After the driver pre-selects the high half gear or low half gear, depress the clutch pedal to switch between high and low half gears.

A: High/low gear

A1: High gear area

A2: Low gear area

B: High/low half gear

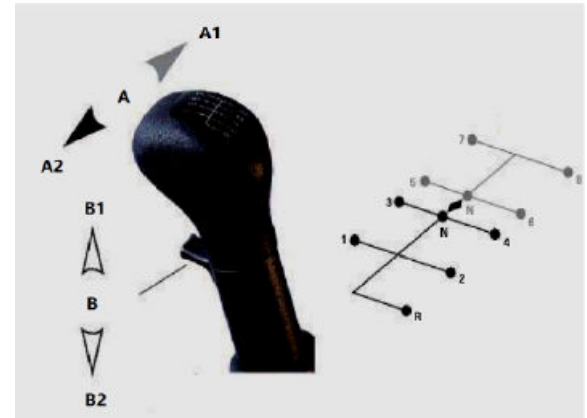
B1: High half gear

B2: Low half gear



#### CAUTION!

- The half gear starts to change only after the clutch pedal is fully pressed.
- The high and low half gears shall be selected according to the driving conditions of the vehicle.



### Start the engine and start the vehicle

- Apply the parking brake (to prevent the vehicle from rolling).
- The transmission is in the neutral position.
- Start the engine.
- Engage the gear (in order to protect the clutch, it is recommended to start with Gear 1).
- Release the parking brake, gradually release the clutch pedal, and the vehicle starts to move.

### Clutch operation

- Each time the clutch is disengaged, the clutch pedal should be pressed to the bottom.



**WARNING!**

When the clutch is not fully disengaged, gear shifting will cause wear of the transmission synchronizer.

## Gearshift operation

ZF Ecosplit series transmission is a synchronizer transmission

- No two-leg clutch is required during upshift.
- There is no need to press the accelerator pedal and two-foot clutch when downshifting.

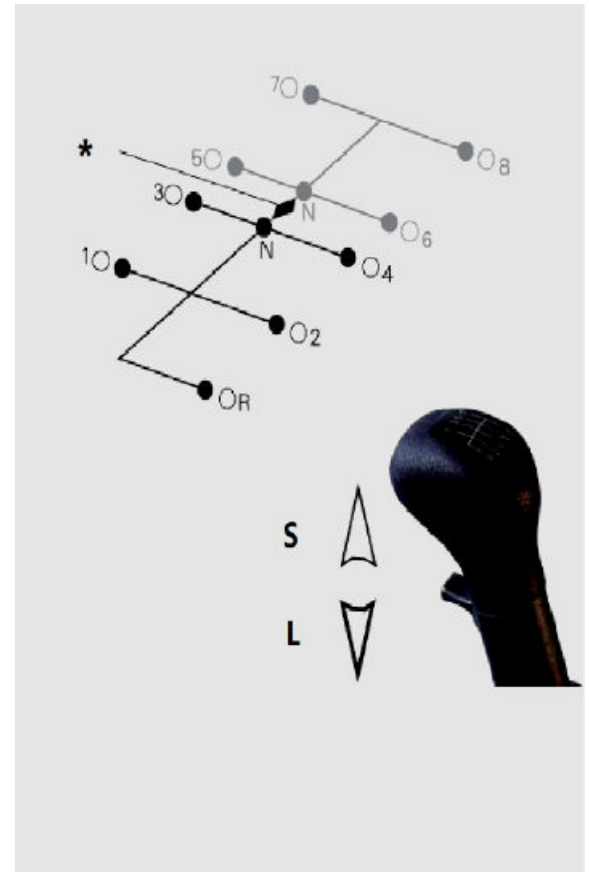
## Transmission gear diagram

Double-H shift pattern has a spring return neutral position (idle position) in the Gear 3/4 (low gear area) and Gear 5/6 (high gear area) of the gear selection position. When the shift lever selects the 1st/2nd or 7th/8th gear of the gear selection position, it is necessary to push into the corresponding gear selection position against the spring force before engaging the gear. If the gear is removed, the shift lever will automatically return to the corresponding neutral gear.

The low gear zone is separated from the high gear zone by a stronger spring locking mechanism.

Gear R channel is protected by the stop limiter, and a greater force needs to be applied when Gear R is engaged.

The limit spring force of each gear is different, which is convenient for confirming the gear selection position.



## Operation of ZF manual 16-speed transmission

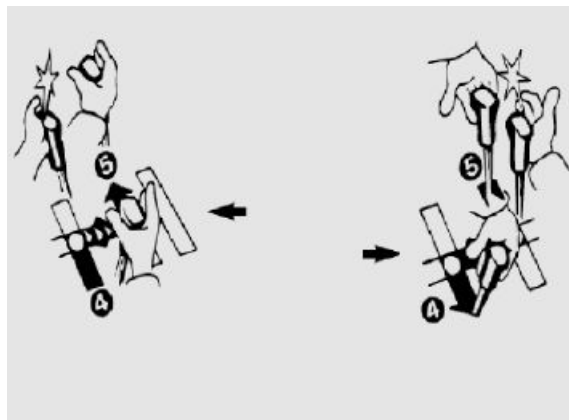
←: Upshift operation

→: Downshift operation



### **WARNING!**

- In order to protect the transmission synchronizer, make sure that the clutch is completely disengaged during gear shifting.
- When upshifting or downshifting, do not exceed two gear levels at most (for example, from Gear 4 to 6th gear), otherwise the synchronizer will be worn.
- In order to avoid damage to the transmission and engine, downshift can only be performed after deceleration and reaching the maximum speed allowed by the target gear.
- During the use of the PTO, do not shift gears (including half-gear switching), otherwise the synchronizer will be worn. If you need to adjust the vehicle speed by shifting gears, be sure to disconnect the PTO first.
- Operate the shift lever quickly and gently (do not apply too much force), especially in the cold state. It is recommended to control the shift lever with an open palm.
- When engaging a gear, hold the shift lever to overcome the gearshift resistance until synchronization is completed and the gearshift is realized.



## Double-H shift pattern

←: Upshift operation

→: Downshift operation

When it is necessary to switch between the Gear 3/4 neutral gear and the 5th/6th neutral gear, tap the shift lever with the palm of your hand and then engage the required gear.



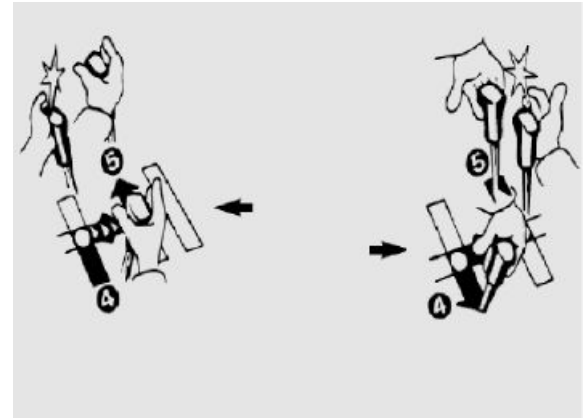
### CAUTION!

Gear shifting requires greater effort when the vehicle is cold. If transitioning from the neutral position of Gears 5/6 to that of Gears 3/4, the high/low range auxiliary gearbox may not engage the low range. To resolve this, reduce the vehicle speed before selecting the appropriate gear.



### WARNING!

- When the vehicle speed is greater than 28 km/h, switching between high and low auxiliary gearbox positions is not allowed. Otherwise, the synchronizer of the high/low range auxiliary gearbox will be worn.
- In the driving mode, other high and low gears can be preselected only before the gearshift is about to occur. If other high and low gears are selected too early, the actual gear engaged may not be what you need in traffic conditions where rapid gear shifting is required, and the synchronizer may also be worn.



Shift between high and low gears

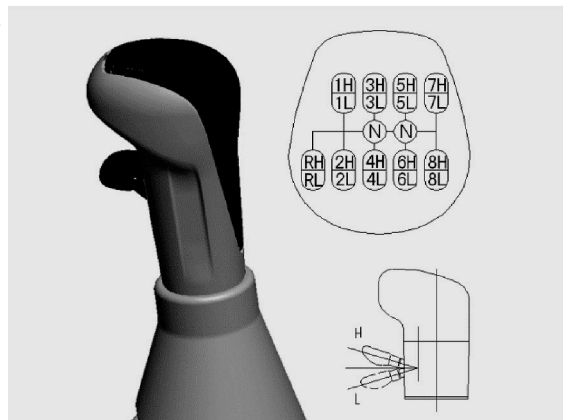


### WARNING!

- Do not shift down to any gear in advance unless the current vehicle speed is within the range allowed by the gear you want to engage.
- The clutch should be pressed to the bottom during the next gear shift.
- When the transmission is shifted from the low gear zone to the high gear zone (or vice versa), do not jump gear.
- When the vehicle is going downhill, it is forbidden to change between high and low gears.

### Shift between high and low gears

When the ZF series 16-speed manual transmission is shifted between two and half gears, first switch the upper switch of the shift lever (as shown in the figure). For example, the operation steps from 1L to 1H: first switch the switch valve from L to H position, then press the clutch pedal (the clutch pedal should be pressed to the bottom, the same below), release the clutch, and the gearshift is completed (no action of the handle is required in this process); operation steps from 1H to 2L: First switch the switch valve from H to L position, then press the clutch pedal, return the handle to Gear N, and then engage the gear to the 2nd position. After engaging, release the clutch pedal, and the gearshifting process is completed. And so on until the gearshift reaches 8H, and the downshift operation is the same. If the clutch pedal is pressed first, then released, and then the switch on the handle is switched, the gear will not be switched.



## Gear R



### **WARNING!**

Gear R can only be engaged when the vehicle is stopped.

- When engaging Gear R and exiting gear, make sure that the clutch is completely disengaged.
- Disengaging the clutch shall be completed when the engine is idling.
- Gear R can only be engaged when the transmission countershaft is stationary, otherwise the teeth will be hit when the gear is engaged.
- If necessary, please extend the waiting time before engaging a gear.
- Engage the clutch slowly.

### **Power take-off operation**

#### **Bonding/Unbonding**

- The PTO can be engaged or disengaged only when the clutch is disengaged.
- Disengaging the clutch shall be completed when the engine is idling.
- The power take-off can only be engaged when the transmission countershaft is stationary, otherwise the power take-off will have teeth striking.



### **CAUTION!**

- The time required for the countershaft to stop rotating may vary with the operating mode, and the time can be shortened by briefly activating the synchronizer, preferably in Gear 1.
- When the power take-off is engaged, there shall be no tooth knocking sound. If necessary, the waiting time before engaging the power take-off shall be extended, or the clutch shall be checked for complete disengagement.
- Slowly engage the clutch to the normal operating speed.



### **WARNING!**

- It is not allowed to shift gears when the PTO is working.
- When parking for a long time, the power take-off shall be disconnected.

### **Shift interlock (optional)**

Gearshift interlock is required in the following cases:

- When the vehicle is not allowed to start when the PTO is engaged.
- When the PTO is not allowed to engage during driving.

## Operation of ZF manual 16-speed transmission

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### Shutdown

- The transmission is engaged in the low gear zone (Gears 1-4). If the vehicle is parked uphill, engage the forward gear; if the vehicle is parked downhill, engage Gear R!
- Apply the parking brake.
- Load the vehicle, and in order to ensure safety, block and fix the wheels with chocks.

### Traction start

When starting the engine by towing the vehicle, shift the gear to the high gear (5th-8th gear) of the high and low gear auxiliary gearbox.



#### **WARNING!**

- In order to avoid damage to the transmission, the starting engine can only be pulled in the high gear (5th-8th gear).
- Never pull the engine in Gear R.



#### **CAUTION!**

- If any of the above towing conditions is not met, disconnect the drive shaft rear axle connecting flange or take out the axle shaft to prevent transmission damage.
- The maximum towing speed specified in the relevant regulations shall be observed.

### Trailer

When towing the vehicle, the following conditions shall be met:

- Equipped with emergency steering pump.
- Select the high gear area and place the shift lever in the neutral position.
- The maximum trailer distance is 100 km.
- Determining the maximum allowable trailer speed depends on the axle speed ratio and tire size.



### Emergency operation

If the high/low gear switching is faulty, there may be the following reasons:

- The compressed air system pipeline is damaged.
- Failure of high/low gear valve ① or high/low gear cylinder ② (condensed water or dirt).



#### **WARNING!**

**–If the above situation occurs, you can only continue driving in low gear (Gears 1-4).**

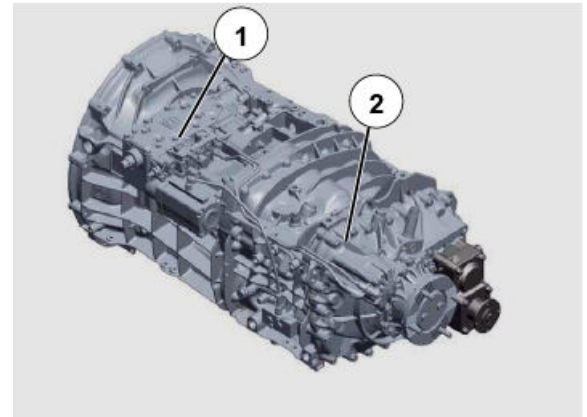
**–If the gear is in the high gear area when the fault occurs, tow the vehicle.**

### Gearshift assist

- If the shift assist fails, a large force can still be applied to manually shift gears.

### Lubricating oil

The transmission shall use the lubricating oil specified by SINOTRUK or the oil certified in ZF lubricating oil table TE-ML 02. When the engine is used in an environment with a temperature lower than  $-15^{\circ}\text{C}$ , confirm whether the oil used is suitable according to the oil table, and change the oil in time if necessary; it can also be preheated before the engine is started, for example, with hot air, but the temperature on the transmission shall not exceed  $130^{\circ}\text{C}$ .



## Operation of ZF manual 16-speed transmission

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### Low temperature parking

When the outdoor temperature is lower than 0°C, make sure that the transmission is in the low gear zone (shift to Gear 1 or Gear N in the low gear zone).

### Starting the vehicle at low temperature

Vehicles equipped with ZF-Ecosplit transmission

<b>Transmission temperature</b>	Above -20°C	-20°C to -40°C
<b>Model and grade of lubricating oil</b>	See "ZF transmission maintenance"	
<b>Precautions for starting the engine</b>	All functions of the transmission can be used normally.	<ul style="list-style-type: none"><li>• Warm up for at least 15 minutes at an engine speed of about 1500 rpm.</li><li>• The transmission is in the neutral position.</li><li>• External preheating can be selected, and hot air can be used, but the transmission temperature shall not exceed 110°C.</li><li>• Do not apply heat to mechanical parts, EST54 ECU and heat exchanger.</li></ul>
<b>Restrictions</b>	Gearshift time may become longer	Warm-up required

Note: The transmission temperature may be different from the external temperature.

### ZF automatic 12-gear transmission operation

#### Combination switch ①

- + Upshift by one gear
- Downshift by one gear

A/M Manual/ Auto mode switching

E/P Eco and power mode switching

#### Knob switch ②

RM

R

N

D

DM



## ZF automatic 12-gear transmission operation

---

### Driver display

A/M: Auto mode / Manual mode

N: N gear

D/R: D gear/R gear

DM/RM: D gear creep/R gear creep

Δ: Upshift

E/P: Eco/power mode



### **WARNING!**

- Do not leave the vehicle when the engine is running and the gear has been engaged.
- When the engine is inoperative (e.g., no fuel), neither the power steering system nor the engine brake can work, and the gear cannot be engaged.
- Do not release the parking brake during engine start to prevent the wheels from turning.

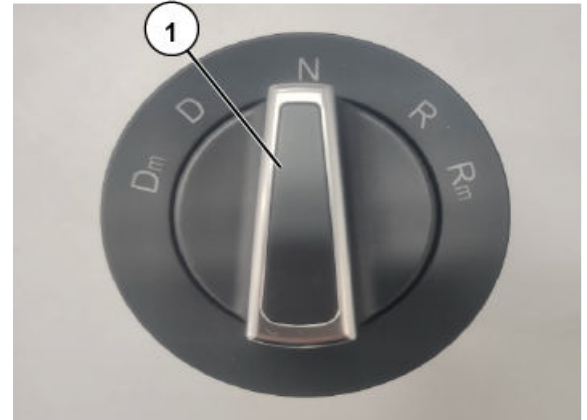
### Start the engine

- Apply the parking brake.
- Rotary switch ① is in "N" position (N gear of transmission).
- Press the PEPS switch twice, then the vehicle enters the power-on state.
  - Transmission system self-test.
  - When "N" is displayed on the driver information system, the self-test is completed. The transmission is in N gear.
- Start the engine



#### CAUTION!

The gear cannot be shifted when the engine stops. You can shift into N gear.



## ZF automatic 12-gear transmission operation

---

### Start and drive forward

- Start the engine.
- Step on the main brake and turn the rotary switch from "N" to "D" position.
  - The driver information system displays the starting gear that has been engaged.  
(The system automatically selects the starting gear, and the clutch remains disengaged.)
- Step on the accelerator pedal and release the parking brake at the same time.
  - The vehicle starts (the clutch is automatically engaged).  
During driving, the gear is displayed in digital form in the driver information system.



#### **WARNING!**

The wheel may also start to roll when the accelerator pedal is not depressed, so the driving/parking brake can only be released after the gear is engaged.

### Adjust the starting gear

The driver can adjust the starting gear recommended by the system.

Make adjustments:

- Move the combination switch up once to shift up by one gear, and move it down once to shift down by one gear.
  - The driver information system displays the starting gear that has been engaged.

### Starting on a hill



#### **WARNING!**

- When starting on a slope, the wheels may roll backwards.
- The parking brake can only be released after the gear is engaged and only after the accelerator pedal is pressed.

### Creep mode (clutch in semi-linkage state)

The creep mode can be used when the vehicle is running slowly.



The accelerator pedal in the creep mode is more sensitive, and the control of the clutch changes compared with the normal state.

### Creep by DM or RM position of rotary switch

The system identifies the driver's creep requirement from the position of the rotary switch.

D gear and R gear can be used for creep mode. The entire travel of the accelerator pedal is available in this shift mode.

To exit this mode, turn the rotary switch to "D", "N" or "R".

Position of rotary switch	Description
	<p>Try to avoid using the creep mode for a long time.</p> <p>When the clutch is overloaded, "Clutch Overload" will be displayed on the driver information system.</p> <p>If the driver does not respond to the "Clutch Overload" reminder, the clutch may be damaged due to overload.</p>
	

## ZF automatic 12-gear transmission operation

---

### Downhill coasting

Prerequisite: engine running.

When the parking brake is released and the vehicle starts to slide with the gear engaged, the clutch will be engaged automatically. As long as the gear engaged is consistent with the sliding direction of the vehicle, it is unnecessary to operate the accelerator pedal.

If the gear is engaged but does not match the sliding direction of the vehicle, you can disengage the clutch, or slightly engage and disengage it repeatedly. The driver will receive a warning from the driver information system.



#### **WARNING!**

- If the vehicle is coasting with no gear engaged - rotary switch in "N" - the engine brake does not work!
- Do not make the vehicle coast in the direction opposite to the gear engaged.

When the brake is released, the transmission is in N gear, the vehicle slides forward, and the driver shifts from "N" to "D" gear, the system will select a gear suitable for the vehicle speed.

### **Sport mode switching: Auto mode / Manual mode**

It can be switched at any time even during driving.

### **Switching the operating mode from Manual to Auto**

Press the combination switch A/M once to switch to the self-reset button.

### **Switching the operating mode from Auto to Manual**

Press the combination switch A/M once to switch to the self-reset button.

### **Gear shifting**

#### **Gear shifting in auto operation mode**

All upshift and downshift operations are carried out automatically.

This function depends on:

- Driving resistance
- Load
- Accelerator pedal position
- Speed
- Engine speed



### Gear shifting in manual operation mode

Move the combination switch up once for upshift by one gear, move it down once for downshift by one gear, move it up twice for upshift by two gears, and move it down twice for downshift by two gears.

The driver can use the rotary switch to shift from any gear to the N gear at any time. This shift request has priority.

There is no need to change the position of the accelerator pedal during shifting.

If the gear shifting will result in the maximum allowable engine speed being exceeded, the shifting command will not be executed, or the vehicle will be shifted into an/another appropriate gear.



#### CAUTION!

You can also shift into "N gear" during driving. If the vehicle is shifted into N gear, the drivetrain will be disconnected. The engine brake will no longer work.

Engage one gear (select "D") to reconnect the drive train.

### Reversing



#### CAUTION!

The vehicle cannot be shifted to R gear to stop the vehicle when it is coasting.

### Engage the R gear

- The vehicle must be stationary.
- Turn the rotary switch to "R" or "RM".

–R or RM is displayed on the driver information system (the clutch remains disengaged).

- Step on the accelerator pedal and release the brake at the same time (the clutch is automatically engaged).
  - The vehicle reverses

### Switching the driving direction

Switching from reversing "R/RM" to forward driving "D/DM" and the reverse process.

Turn the rotary switch from "R/RM" to "D/DM".



#### CAUTION!

The driving direction can only be changed by setting the rotary switch position from R/RM to D/DM or vice versa when the vehicle is stationary, otherwise the transmission will shift to N gear according to the vehicle speed.

### Engine brake



#### **CAUTION!**

- If the engine brake is interrupted during shifting, the vehicle will accelerate when going downhill.
- The service brake can be used to control the vehicle speed.



#### **CAUTION!**

- If the transmission is not placed in the N gear before the engine is turned off, it will shift automatically after the "ignition switch is turned off".
- The restart of the engine depends on the engine start permission (the engine start permission signal sent through the CAN bus).
- When the vehicle is stationary, please continuously press the brake pedal or apply the parking brake.
- If the engine is still running and the gear is engaged when the vehicle is stationary, depress the accelerator pedal to make the vehicle move!
- If you leave the vehicle at engine idle speed, please put the transmission in N gear and apply the parking brake.
- When driving on a smooth road, operating the parking brake will cause the engine to stall, and the steering booster will no longer work.

### Manual driving mode

During shifting, engine braking is disabled by the system; after shifting is completed, engine braking is automatically enabled.

### Auto driving mode

The system uses engine braking to execute downshift, thus achieving the maximum braking torque.

### Stop the vehicle

- The vehicle is slowed down to a stop by the service brake with the accelerator pedal released.
  - The clutch automatically disengages before the vehicle stops to prevent the engine from "stalling".
- After a long period of parking, it is recommended that the N gear of the transmission be selected.

### Turn off the engine / stop the vehicle

- The vehicle stops.
- Apply the parking brake.
- Place the rotary switch in the N gear.
- Shut down the engine.
- Block the wheel with wedges (e.g., when parking on a slope).



#### **WARNING!**

The vehicle cannot be parked with the gear engaged. If no braking measures are taken, the vehicle may slide in the N gear.

### Trailer

The flange-connected universal shaft or axle shaft may be used for towing. The following conditions must be met:

- Confirm that you have switched to the fast high/low gear group. The following conditions shall be met for this purpose:
  - Ensure the power and gas supplies
  - Ignition switch ON (waiting for inspection)
  - There is no fault information. It can be confirmed that the vehicle has been switched to the "fast high/low gear group".
- The main transmission is not in gear.
- The towing distance is up to 100 km.
- The maximum allowable towing speed is determined according to the rear axle speed ratio and tire size, and shall be considered according to the different regulations of each country.

### Restrictions

A flange-connected universal shaft or built-in axle shall not be used for towing under the following conditions:

- If any of the above conditions are not met.
- A fault message (250) occurs or it is not possible to confirm that the fast high-low gear group has been engaged and the main transmission has been engaged in the N gear (e.g., unexplained stagnation, and power supply and/or air supply interruption).
- It is suspected that the transmission is damaged.



#### **WARNING!**

When the vehicle is being towed, if the gear is in the low gear range or set to the main transmission, the transmission or engine will be damaged in a very short time.

The operator is responsible for towing with a flange-connected universal shaft or axle (confirming the necessary boundary conditions). Be sure to follow the provisions of "Towing and Towing Start" in this manual when towing the vehicle!

When axle shafts with flanges are used for towing, be sure to avoid potential environment pollution due to oil leakage.

### **Towing start**

Do not start the engine by towing.

### **Clutch protection**

If the vehicle is started continuously for several times in a short period of time or the vehicle is in high gear for a long time of creeping, the clutch may be overloaded, and the driver information system will

## ZF automatic 12-gear transmission operation

display "Clutch Overload". Please select an operating state in which there is no clutch overload, such as:

- Vehicle acceleration (for clutch engagement).
- Stop the vehicle.
- Start or creep in a low gear.



### **WARNING!**

If the driver ignores the system warning, the engine may "shut down", which may cause the vehicle to slide on an uphill slope!

In order to protect the mechanical parts of the clutch release device, the transmission shall be placed in N gear when the vehicle stalls for a long period of time (more than about 1 to 2 minutes, such as traffic jams, traffic lights, etc.). Thus, the clutch is engaged and the load of the clutch release device turns small.

Although the clutch has been automatically controlled, the driver's operation still has a great impact on the service life of the clutch.

In order to reduce clutch wear, it is recommended that the vehicle be started in a gear as low as possible.

### **Engine overspeed protection**

In order to prevent the entire drivetrain from rotating too fast, the transmission is only allowed to shift gears within the specified speed range.

### **Operation mode: manual**

The engine shall not exceed the allowable speed range, otherwise it may be damaged.

If the vehicle accelerates on a downhill slope, it will not automatically upshift.

### **Operation mode: auto**



### **WARNING!**

The vehicle will accelerate when going downhill. In order to prevent the engine from being damaged in the overspeed range (red range), the system will perform upshift.


### **PTO operation**

Static/dynamic configuration type PTO

During static/dynamic operation of the PTO, only the specified gear can be used according to the transmission model.

Shift gears only when the vehicle is stationary. Gear shifting is not possible when the vehicle is running.

- Turn on the PTO and engage the starting gear.

–The driver information system displays the message "  ".

Static configuration type PTO

Do not shift gears during static operation of the PTO. The transmission is kept in N gear.



### **WARNING!**

Please apply the parking brake before and during the operation of the PTO when the vehicle is stationary.

### Nameplate

#### ZF-TraXon nameplate

The nameplate ⑫ is located on the left side of the transmission (viewed from the output shaft).

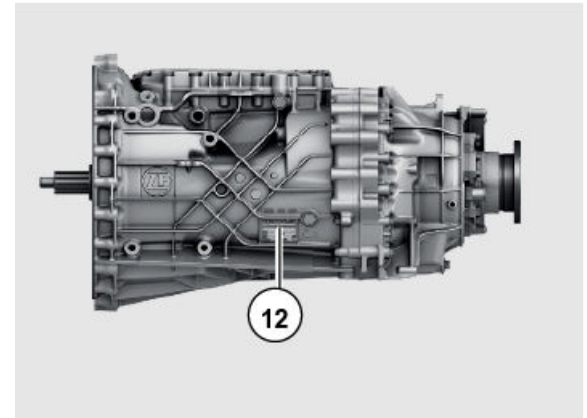
The nameplate contains the most important data for identifying the transmission.

The following data can be found on the nameplate:

- |  |                      |
|--|----------------------|
| ① Transmission series/ transmission type | ② Parts List Number  |
| ③ Serial number                          | ④ DMC code           |
| ⑤ Customer's order number                | ⑥ Transmission ratio |
| ⑦ Tachometer speed ratio (pulses/rev)    | ⑧ PTO model          |
| ⑨ PTO ratio                              | ⑩ Oil volume         |
| ⑪ Lubricant list                         |                      |

The following data shall be given at the time of consultation or repair:

- Transmission model
- Parts list Number



## ZF automatic 12-gear transmission operation

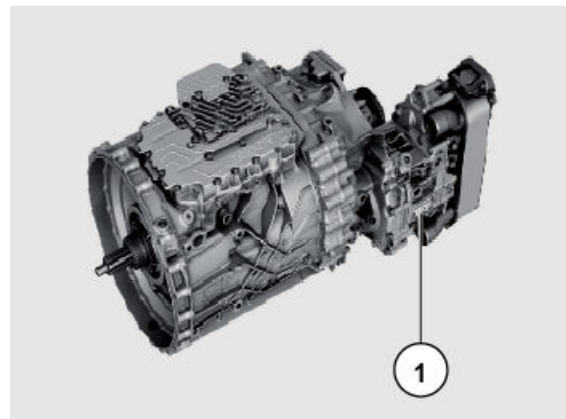
### ZF-Intarder nameplate

The nameplate ① is located on the side of the ZF-Intarder housing.

The nameplate also includes important ZF-Intarder data.

The following data shall be given at the time of consultation, ordering or repair:

- ZF-Intarder Parts List Number
- ZF-Intarder serial number

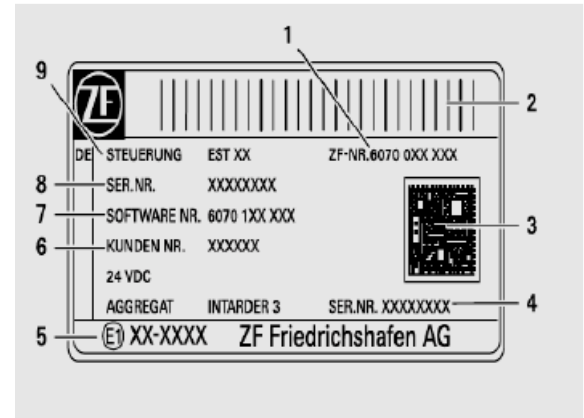


ZF FRIEDRICHSHAFEN AG MADE IN GERMANY			
PARTS LIST NO.		MODEL	DMC
6093 060 XXX		SERIAL NO. XXXXXXX	
CUSTOMER			
SPEC. NO.			
TOTAL RATIO	SPEEDO RATIO		
P.T.O. IN	n =		xn ENGINE
OIL CAPACIT IN LITERS	OIL GRADE SEE LUBRIC. LIST IE-ML		

### ECU (EST) nameplate

- ① EST Parts List Number
- ② Barcode consisting of ZF number and serial number
- ③ Data matrix code (DMC)
- ④ ZF-Intarder serial number
- ⑤ Type approval number of the Federal Office of Motor Transport
- ⑥ Customer number, if any
- ⑦ Software number
- ⑧ EST serial number
- ⑨ EST name

**Note:** The ZF-Intarder serial number on the ZF-Intarder and EST nameplate must be consistent.



## Operation of Fast automatic transmission

### Operation of Fast automatic transmission

#### Fast integrated AMT transmission - column shift operation

##### Right multi-function switch ①

+ Increase by a gear

- Decrease by a gear

A/M Manual/automatic mode switching

E/P Economy and power mode switching



##### Knob switch ②

Rm Reverse gear creeping

R Reverse gear

N Neutral gear

D Drive

Dm Forward gear creeping





### Display of driver display

A/M: Automatic/manual mode

N: Neutral gear

D/R: Drive/Reverse gear

DM/RM: Forward gear creeping/reverse gear creeping

Δ: Upshift

E/P: Economy/power mode



#### **WARNING!**

–Do not leave the vehicle when the engine is running and in gear.

–When the engine is non-functional (e.g., without fuel), both the power steering system and the engine brake cannot work and gears cannot be engaged.

–The parking brake must not be released during engine starting to prevent the wheels from turning.

## Operation of Fast automatic transmission

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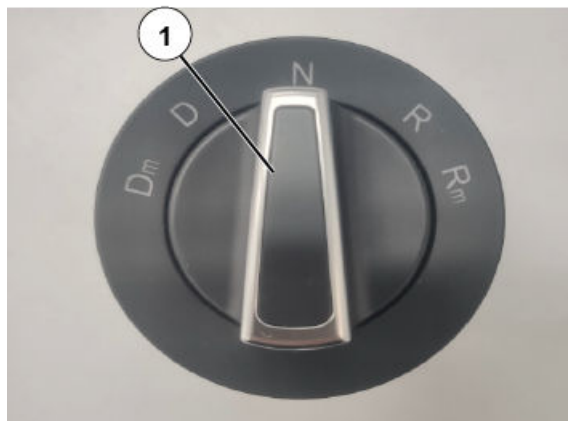
### Start the engine

- Apply the parking brake.
- Turn the rotary switch ① to "N" (transmission neutral position).
- Power on the vehicle.
  - Self-inspection of transmission system.
  - When "N" is displayed on the driver information system, the self-inspection is completed. The transmission is in the neutral position.
- Start the engine.



#### CAUTION!

When the engine is stopped, shifting gears is not possible, but it can be shifted to neutral gear.



### Starting and moving forward

- Start the engine.
- Step on the main brake and turn the rotary switch from "N" to "D".
  - The driver information system displays the starting gear engaged.  
(The system selects the starting gear by itself, and the clutch remains disengaged)
- Depress the accelerator pedal and release the parking brake at the same time.
  - During driving, the gear is displayed digitally in the driver information system.



#### **WARNING!**

The wheels may also start to roll when the accelerator pedal is not depressed, so the service/parking brake can only be released after a gear is engaged.

### Hill-start



#### **WARNING!**

- When starting on a slope, the wheels may roll backwards.
- Engage a gear first, and release the parking brake only after the accelerator pedal is depressed.

### Adjustment of starting gear

The driver can adjust the starting gear recommended by the system.

Adjust:

- Pull the multi-function switch up once to increase one gear and down once to decrease one gear.
  - The driver information system displays the starting gear engaged.

### Creeping mode (clutch semi-linkage)

The creeping mode can be used when driving slowly.

The accelerator pedal of the vehicle is more sensitive in creeping mode, and the clutch control has changed compared to normal conditions.



## Operation of Fast automatic transmission

### Creeping through the DM or RM position of the rotary switch

The system identifies the driver's creeping request from the position of the rotary switch.

Forward and reverse gears can be used in creeping mode. The entire accelerator pedal stroke can be used in this shift mode.

To exit this mode, turn the rotary switch to "D", "N" or "R" position.

Rotary switch position	Description
	<p>Try to avoid using creeping for a long time. When the clutch is overloaded, "clutch overload" will be displayed on the driver information system. If the driver does not respond to the "clutch overload" display, the clutch may be damaged due to overload.</p>
	

### Downhill coasting

Prerequisite: The engine is running.

When a gear is engaged, if the parking brake is released and the vehicle starts to coast, the clutch will automatically engage. As long as the gear is engaged in the direction of the vehicle's coasting, there is no need to operate the accelerator pedal.

If the gear engaged does not match the vehicle's coasting direction, there is an option to disengage the clutch or repeatedly engage and disengage it slightly. The driver will receive a warning from the driver information system.



#### **WARNING!**

- If the vehicle is coasting with the rotary switch in "N" and without a gear engaged, the engine brake will not work!
- The vehicle shall not be allowed to coast in the opposite direction of travel to the gear engaged.

If after the brake is released - the transmission is in neutral - the vehicle coasts forward, and the driver switches the gear from "N" to "D", the system will select a gear suitable for the driving speed.

### **Motion mode switching: automatic mode/manual mode**

It can be switched at any time even during driving.

#### **Switching of operation mode from manual to automatic**

- Press the A/M switching self-resetting button of the multi-function switch once.

#### **Switching of operation mode from automatic to manual**

- Press the A/M switching self-resetting button of the multi-function switch once.

### **Gear shifting**

#### **Shifting in automatic operation mode**

All upshift and downshift operations are carried out automatically.

This function depends on:

- Driving resistance
- Load
- Accelerator pedal position
- Speed
- Engine speed

## Operation of Fast automatic transmission

---

### Shifting in manual operation mode

Pull the multi-function switch up once to increase one gear, and pull it down once to decrease one gear; pull it up twice in a row to increase two gears, and pull it down twice in a row to decrease two gears.

The driver can use the rotary switch to shift from any gear to neutral at any time. This shifting requirement has priority.

There is no need to change the position of the accelerator pedal during shifting.

If shifting will result in exceeding the maximum allowable speed of the engine, do not execute the shifting command, or switch to (another) appropriate gear.



#### CAUTION!

It can also be shifted to "neutral" during driving. If shifted to "neutral", the drive train is interrupted. The engine brake no longer works.

Only a certain gear can be engaged (select "D") to reconnect the powertrain.

### Reversing



#### CAUTION!

When the vehicle is coasting, it cannot be shifted to reverse gear to stop the vehicle.

### Engage the reverse gear

- The vehicle must be stationary.
- Turn the rotary switch to "R" or "RM".

–R or RM is displayed on the driver information system (the clutch remains disengaged).

- Press the accelerator pedal and release the brake at the same time (the clutch automatically engages).
  - The vehicle is reversing.

### Change of driving direction

Shifting from reverse "R/RM" to forward "D/DM" and vice versa

- Turn the rotary switch from "R/RM" to "D/DM".



#### CAUTION!

The change of driving direction can only be completed by changing the rotary switch position from R/RM to D/DM or vice versa when the vehicle is stationary; otherwise, the transmission will shift to neutral gear according to the vehicle speed.

### Engine brake



#### CAUTION!

- The engine braking effect is interrupted during shifting, and the vehicle will accelerate when going downhill.
- The vehicle speed can be controlled by using the service brake.



#### CAUTION!

- If the transmission is not in neutral before engine shutdown, it will automatically shift after "Ignition Off".
- The restart of the engine depends on the engine start permission (engine start permission signal sent via CAN).
- When the vehicle is stationary, the brake pedal should be depressed continuously or the parking brake should be applied.
- If the engine is still running and in gear when the vehicle is stationary, press the accelerator pedal to move the vehicle!
- When leaving the vehicle with the engine idling, place the transmission in neutral and apply the parking brake.
- When driving on a smooth road, operating the parking brake will cause the engine to stall and the power steering to become inoperative.

### Manual driving mode

The system disables the engine brake during gear shifting, and the engine brake automatically restarts after the gear shift is completed.

### Autonomous driving mode

The system uses engine braking to downshift, thereby achieving maximum braking torque.

### Parking

- Use the service brake to decelerate the vehicle until it stops when the accelerator pedal is released.
  - The clutch is automatically disengaged before the vehicle stops to prevent the engine from "stalling".
- After parking for a long time, it is recommended to select the neutral position of the transmission.

## Operation of Fast automatic transmission

---

### Shut down the engine/park

- The vehicle stops.
- Apply the parking brake.
- Turn the rotary switch to "N".
- Turn off the engine.
- Block the wheels with wheel chocks (such as parking on a slope).



#### **WARNING!**

The vehicle cannot be parked with a gear engaged. If no braking measures are taken, the vehicle may slip in neutral.

### Towing vehicle

Flange-connected universal shafts or axle shaft towing vehicles can be used. The following conditions must be met:

- Confirm that it has been switched to the fast high/low gear groups.  
The following conditions must be met for this:
  - Ensure power and air supply
  - Ignition on (pending inspection phase)
  - No fault information. This confirms that the "fast high/low gear group" has been switched.
- No main transmission gear is engaged.
- The towing distance is up to 100 km.
- The maximum allowable towing speed is determined based on the rear axle speed ratio and tire size, taking into account the maximum allowable towing speed according to different regulations in each country.

### Restrictions

Flange-connected universal shafts or built-in axle shaft towing vehicles shall not be used in the following cases:

- If any of the above conditions are not met.
- Fault message (250) appears or it cannot be confirmed that the fast high and low gear group has been engaged and the main transmission is in neutral (such as unexplained stagnation, power supply and/or air supply interruption)
- The transmission is suspected to be damaged.



#### **WARNING!**

**–When towing a vehicle, if the gear is in the low-gear area or main transmission, it will cause damage to the transmission or engine in a very short time.**

**–If any of the above conditions is not met, the connecting flange of the rear axle of the drive shaft shall be disengaged or the axle shaft shall be taken out to prevent the transmission from being damaged.**

For flange-connected universal shafts or axle shaft towing vehicles, the operator is responsible for this (confirmation of necessary boundary conditions). When towing a vehicle, be sure to comply with the provisions of "Towing and Towing Starting" in this manual!



When using an axle shaft towing vehicle equipped with flanges, it is necessary to avoid environmental pollution that may be caused by oil leakage.

### **Towing start**

Do not tow-start the engine.

### **Clutch protection**

If continuous starting in a short period of time or creeping in high gear for too long will cause the clutch to be overloaded, the driver information system will display clutch overload. Please select an operating state without clutch overload, for example:

- Vehicle acceleration (used to engage the clutch).
- Stop the vehicle.
- Start or creep in a lower gear.



### **WARNING!**

If the driver ignores the system warning prompt, it may cause the engine to "stall" and thus cause the vehicle to roll back on an uphill section!

In order to protect the mechanical components of the clutch release device, the transmission should be in neutral when it is stagnant for a long time (more than about 1 to 2 minutes, such as encountering traffic jams, traffic lights, etc.). The clutch is thereby engaged and the clutch release device is less loaded.

Although the clutch has achieved automatic control, the driver's operation still has a great impact on the service life of the clutch.

In order to reduce clutch wear, it is recommended that the vehicle be started in a lower gear as much as possible.

### **Engine overspeed protection**

In order to prevent the speed of the entire drive train from being too high, the transmission only allows shifting within the specified speed range.

### **Operation mode: manual**

The engine must not exceed the allowable speed range; otherwise, it may cause damage to the engine.

If the vehicle accelerates downhill and exceeds the engine's allowable speed range, the transmission will automatically shift up.

## Operation of Fast automatic transmission

---

### Operation mode: automatic



#### **WARNING!**

The vehicle will accelerate when going downhill. In order to protect the engine from damage in the over-speed area (red area), the system shifts up.

### PTO (power take-off) operation

#### Static/Dynamic-configured PTO

When performing static/dynamic operation of the PTO, only specified gears can be used, depending on the transmission model.

Shift gears only when the vehicle is stationary. The gear cannot be shifted when the vehicle is running.

- Turn on the PTO and engage the starting gear.

—Instrument panel displays information "  ".

#### Static-configured PTO

Do not shift gears during static operation of the PTO. Keep the transmission in the neutral position.



#### **WARNING!**

The parking brake shall be applied before the vehicle's stationary PTO is connected and during its operation.

The maximum temperature of the transmission during continuous operation shall not exceed 110°C, and the minimum temperature shall not be lower than -30°C. When the operating temperature exceeds 110°C, the lubricating oil will decompose and shorten the service life of the transmission. At this time, the transmission requires a radiator. The temperature may exceed 110°C if any of the following conditions occur:

- The transmission installation position is too confined, or the air flow around the transmission is poor;
- The transmission is too close to other devices that generate heat, such as oil pumps, engine exhaust systems, and turbochargers;
- Driving at very high or very low speeds;
- Too much lubricating oil is added to the transmission;
- The engine speed is too high, or it is used under high-power overspeed working conditions for a long time;
- The vehicle works in an environment where the ambient temperature is higher than 40°C for a long time.

### Use requirements

#### Operating temperature

### Use in a low-temperature environment

When the transmission works in a low-temperature environment, its functions may be limited. To minimize the limitation of transmission functions, please operate according to the following table during use, depending on different ambient temperatures:

Ambient temperature	Above -20°C	-20°C to -30°C	Below -30°C
Start the engine.	Allowed	Allowed	Do not start before transmission warm-up
Precautions for starting	\	The transmission warm-up is required after starting and before departure: the transmission is in neutral, the vehicle idles for more than 10 minutes, and gear operations are prohibited during the preheating process.	When the temperature is lower than -30°C, it is necessary to heat the transmission with hot air not exceeding 110°C before starting the engine. It is forbidden to heat the transmission controller and harness
Transmission limit	When the temperature is below -10°C, the gear shifting time may be longer.	Shifting time becomes longer, and shifting failure may occur.	The shifting time becomes significantly longer, and shifting failure may occur.

### Working inclination angle

When the transmission is installed at a 5° angle on the vehicle, the vehicle operating inclination shall not exceed 21%.

When the transmission is installed at 0° angle on the vehicle, the vehicle operating inclination shall not exceed 30%.

### Towing or coasting

During operation of the transmission, the transmission's shafts and gears keep rotating to provide sufficient lubrication for the transmission. However, when the vehicle is dragged under the conditions that the rear wheels touch the ground and the power train is connected, the countershaft gear and the main shaft gear of the main transmission do not rotate, while the main shaft, driven by the rear wheels, rotates at a high speed, resulting in serious damage of transmission due to poor lubrication.



### **WARNING!**

To prevent the above phenomena from happening, the following two points shall be noted:

- Do not let the vehicle coast in neutral when the engine is shut down;**
- When the vehicle needs to be towed, the axle shaft may be pulled out, or the drive shaft may be disengaged, or the drive wheels may be towed off the ground.**

### **Special notes**

- Since the integrated AMT uses a sliding sleeve (non-synchronizer) to shift gears, it is necessary to control and increase the engine speed to drive the primary shaft speed during the downshift process. Therefore, there will be a phenomenon of a sudden increase in engine speed during the downshift process. This is a normal control performance and not an abnormal fault;
- The integrated AMT is controlled by a highly intelligent controller, so only the accelerator needs to be stabilized during gear engagement without deliberately releasing the accelerator for gear engagement. Releasing the accelerator during gear engagement may cause misjudgment by the controller and affect the comfort of gear engagement;
- In order to improve the smoothness of gear shifting without a power shock, the engine is controlled by the transmission controller during the gear shifting process. At this time, the engine does not respond when the accelerator is pressed. After the gear is engaged, the engine is immediately controlled by the accelerator;
- The integrated AMT adopts electro-pneumatic control, so the exhaust sound of gear engagement during gear shifting is normal;
- If the battery is fed due to special circumstances (extreme cold, failure to disconnect power in time, etc.), please carefully select an external power supply that meets the requirements for starting to avoid the risk of irreversible damage to the AMT controller caused by an external power supply that does not meet the requirements.
- It is forbidden to drive the vehicle into a strong magnetic environment. Otherwise, it will cause the failure of the vehicle's electrical components, and the vehicle cannot drive normally!

### VOITH retarder operation

The retarder is an auxiliary braking device of the vehicle, which can be used to decelerate the vehicle at high speed or control the vehicle speed during continuous downhill driving. The retarder is controlled by the right combination switch on the steering wheel column. After the retarder is activated, the retarder operator is displayed on the driver display. When the retarder fails, the retarder alarm indicator on the instrument panel will come on (yellow or red).

- If the vehicle is equipped with ABS or EBS braking system, the retarder braking will be affected or interrupted when the ABS/EBS system works. Once the ABS or EBS stops working, the retarder will return to the working mode before the interruption.
- The operation of the transmission is not affected when the retarder is used. When the clutch is disengaged (for gear shifting), the braking torque of the retarder remains constant.
- The engine exhaust brake can work together with the retarder.
- If necessary, the transmission can be downshifted by one gear to increase the engine speed, thus improving the water pump flow and heat dissipation effect.



#### **WARNING!**

Before and during downhill driving, ensure the engine speed stays above 1600 rpm. Avoid idling the engine or pressing the clutch pedal, as this can hinder the full cooling of the coolant.

- If the coolant temperature reaches the maximum allowable temperature, the retarder ECU will automatically adjust the retarder braking torque to the maximum allowable value (the retarder will automatically reduce the braking torque). The driver shall take into account this reduction in retarding performance and change the driving style accordingly (change driving gear, apply engine exhaust brake or service brake).

**WARNING!**

- Exercise caution when using the retarder on slippery roads. Danger: Vehicle may slip! If the retarder is used, it should be operated step by step, and it must be turned off in poor road conditions.
- When the vehicle is running without a load, use the retarder carefully!
- The retarder is an auxiliary braking device. In emergencies, please use the service brake (foot brake) to decelerate. To stop the vehicle, apply the service brake.
- When the vehicle starts under low temperature conditions, using the retarder for the first time will result in a delayed braking effect. The service brake can be applied if required.
- At low speed, the retarder function has only a weak effect, and if necessary, the service brake shall be applied.

**WARNING!**

- Never use the retarder when the transmission is in neutral.
- When the ABS works, the retarder function is automatically turned off.
- When the retarder fails, the exhaust brake and service brake shall be used to control the vehicle speed.
- The retarder is an auxiliary braking device and must not replace the parking brake. Always apply the parking brake before exiting the vehicle.
- If the coolant is insufficient, do not start, otherwise the retarder and gearbox may be damaged.

## Voith retarder – right combination switch

The right combination switch ① is the retarder operating handle.

OFF: turn off the retarder

Constant speed gear: downhill constant speed function

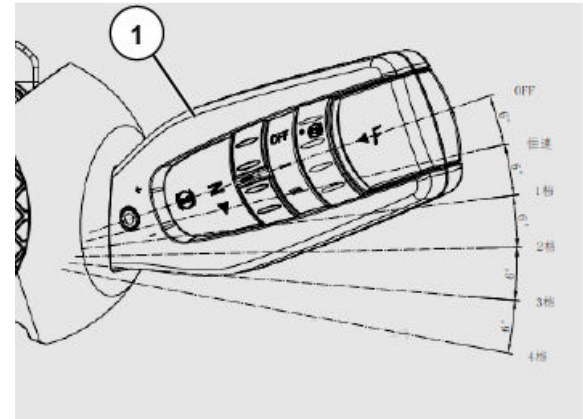
Gears 1-4: manually set the brake gear, and increase the braking force from Gear 1 to Gear 4 in turn.

### Constant speed gear (downhill constant speed function)

(The downhill constant speed function depends on the vehicle configuration)

This function can be used to keep the vehicle running at a constant speed when the vehicle is going downhill (the vehicle speed can be set as required). The retarder ECU automatically sets the braking torque required for constant speed driving.

When the accelerator pedal is pressed, the downhill constant speed function is automatically interrupted; when the accelerator pedal is released again, the current vehicle speed is set to the driving speed after the constant speed function is started again.



## VOITH retarder operation

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- **Engage Gear 1**

Place the operating handle in Gear 1

- **Disengage Gear 1**

Depress the accelerator pedal in Gear 1 (when the accelerator pedal is released, the downhill constant speed function is activated again and set at the current vehicle speed) or turn the operating handle to OFF or Gears 2-4 (brake gear mode).

If the braking force required during downhill driving is greater than the maximum braking force of the retarder, please apply the engine exhaust brake and the service brake at the same time.

If the current vehicle speed is less than the set value, the retarder will not work; when the vehicle speed reaches the set value, the Retarder will start to work.

- **Gears 2-4**

Set different braking torques for Gears 2-4.

Gear 1: 25%, Gear 2: 50%, Gear 3: 75%, Gear 4: 100%.

- **Enable Gears 2-4**

Turn the operating handle to the desired gear, ranging from 1 to 4.

- **Disengage Gears 2-4**

Turn the operating handle to OFF position.

If the braking force required by the vehicle is greater than the maximum braking force of the retarder, please apply the engine exhaust brake and the service brake at the same time.




### CAUTION!


The retarder can be used together with the engine exhaust brake. If only a small braking force is required, it is recommended to give priority to the engine exhaust brake.



### ZF retarder operation

The retarder is the auxiliary brake unit of the vehicle, which is used to decelerate the vehicle when driving at a high speed or to control the speed during continuous downhill driving. The retarder uses the right combination switch on the column of the steering wheel to control.

After the retarder is turned on, the retarder working symbol  will be displayed on the driver display screen. When the retarder is faulty,

the retarder warning symbol  on the instrument will be on (yellow or red).

- If the vehicle is equipped with the ABS or EBS brake system, when the ABS/EBS system is working, the retarder brake will be affected or disrupted. Once the ABS or EBS stops working, the retarder will recover to its working mode before the interruption.
- Using the retarder does not affect the operation of the gearbox. When the clutch is disengaged (to shift the gear), the braking torque of the retarder remains the same.
- The exhaust gas brake can work with the retarder at the same time.
- If necessary, the retarder may downshift a gear to raise the engine rpm, thus improving the water pump flow and heat radiating effect.



#### **WARNING!**

Before and during downhill driving, ensure that the engine rpm is no less than 1600 r/min. Do not run the engine at idle speed or press the clutch pedal, otherwise, the sufficient cooling of the engine coolant cannot be guaranteed.

- If the coolant temperature reaches the maximum allowable temperature, the Electronic Control Unit of the retarder will automatically adjust the braking torque of the retarder to the maximum allowable value (the retarder automatically lowers the braking torque). The driver shall consider this decrease of retarding performance, and change the driving mode accordingly (change the driving gear, apply engine exhaust gas brake or service brake).

**WARNING!**

- The retarder shall be used cautiously on wet and slippery roads. The vehicle is in danger of slipping! If the retarder is used, it shall be operated level by level, and it shall be turned off in harsh road conditions.
- The retarder shall be used cautiously when the vehicle is running without load!
- The retarder is just an auxiliary brake unit, therefore, please use the service brake (foot brake) to decelerate in emergency. The service brake shall be used to stop the vehicle.
- When the retarder is used for the first time after the vehicle starts at low temperature, the braking effect will be delayed. If needed, the service brake may be used.
- The effect of the retarder function is poor at a low speed. If needed, the service brake shall be used.

**WARNING!**

- It is prohibited to use the retarder when the transmission is put in neutral.
- The retarder function is automatically turned off when the ABS is working.
- In the event of a retarder fault, the exhaust gas brake or service brake shall be used to control the driving speed of the vehicle.
- The braking function of the retarder cannot replace the parking brake. Apply parking brake before getting of the vehicle.
- Do not start if the coolant is insufficient, otherwise, this may damage the retarder and gearbox.

### ZF retarder - Right combination switch

The right combination switch is the operating handle for the retarder.

OFF gear: turning off the retarder

Constant speed gear: downhill constant speed feature

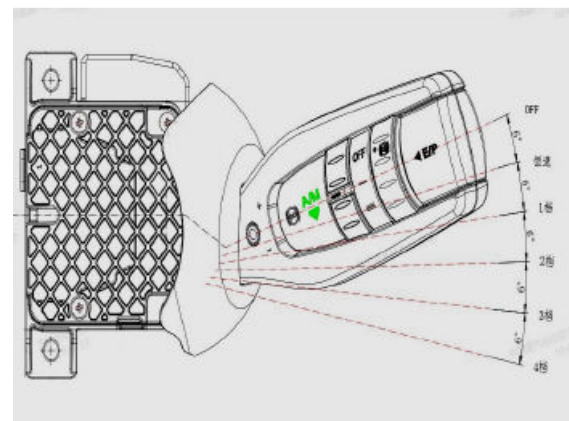
1-4 gears: Manually set the retarder braking gears

### Constant speed gear (downhill constant speed feature)

(The specific downhill constant speed feature is depending on the configuration of the vehicle)

Use this feature to keep the vehicle at a constant speed when driving downhill (the speed can be set as required). The Electronic Control Unit of the retarder automatically sets the braking torque required for driving at a constant speed.

When the accelerator pedal is pressed, the downhill constant speed feature will be disrupted automatically; when the accelerator pedal is released, the current speed will be set as the driving speed after the constant speed feature is enabled again.



## ZF retarder operation

### Activate constant speed gear

Place the operating handle in the constant speed gear position (position as shown in the figure, same below)

### Cancel constant speed gear

- In the working status of constant speed gear, press the accelerator pedal (after the accelerator pedal is released, the downhill constant speed feature will be enabled again and set at the current speed) or
- toggle the operating handle to 0 or 1-4 gears (brake gear mode).

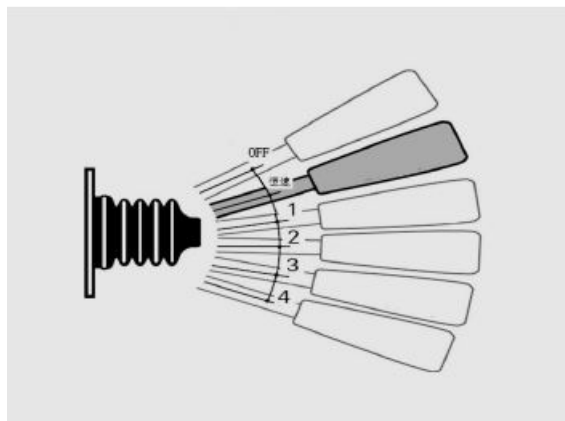
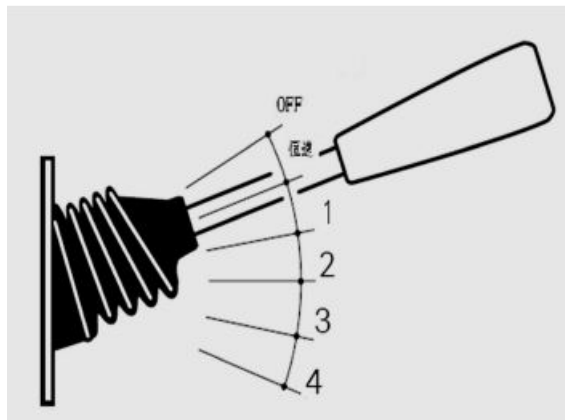
If the required braking force during the downhill driving of the vehicle is higher than the maximum braking force of the retarder, please apply the engine exhaust gas brake and service brake at the same time.

If the current speed is less than the set value, the retarder will not work; when the speed reaches the set value, the retarder will start to work.



### CAUTION!

The retarder can be used simultaneously with the engine exhaust brake. If only a small braking force is required, it is recommended to use the hydraulic retarder first.



**1-4 gears**

1st-4th gears set different braking torques, with the braking force increasing from 1st gear to 4th gear.

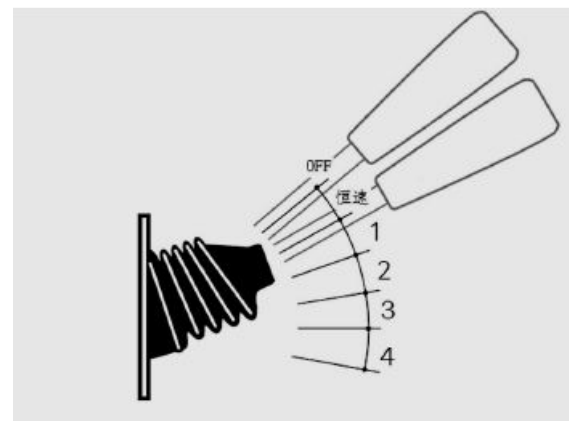
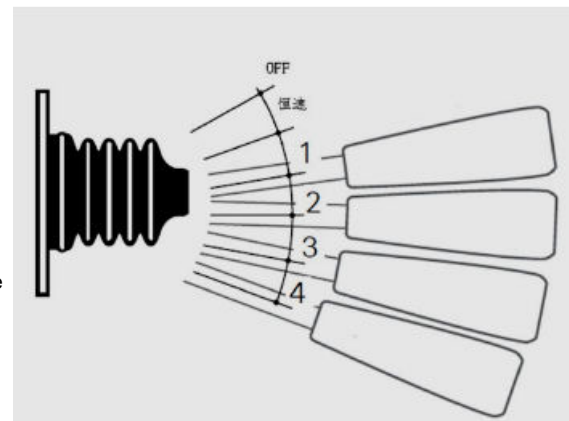
**Enabling 1-4 gears**

Toggle the operating handle to the 1-4 gears as required.

**Canceling 1-4 gears**

Move the operating handle to neutral or constant speed gear.

If the required braking force of the vehicle is higher than the maximum braking force of the retarder, please apply the engine exhaust gas brake and service brake at the same time.



## Operation of Fast retarder

### Operation of Fast retarder

#### Manual operation

In manual operation, there are generally 5 gear positions: one constant-speed gear (gear 1) and four braking gears (gears 2 to 5).

A Retarder controller indicator (vehicle-specific installation position).

B. Retarder gear switch (vehicle-specific installation position).

0 Retarder off

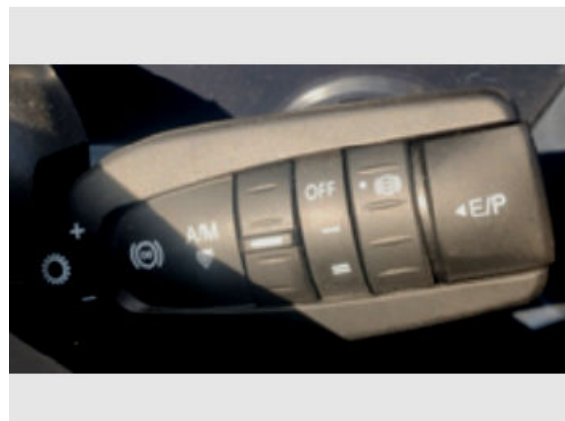
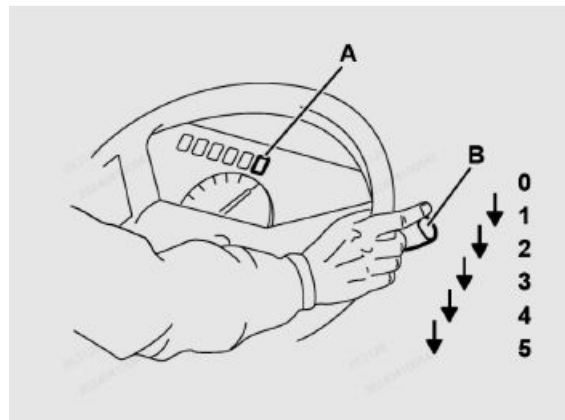
1 Constant speed braking gear

2 Brake gear "1"

3 Brake gear "2"

4 Brake gear "3"

5 Brake gear "4"



## Use of constant speed gear

### ① Adjust the vehicle speed

Adjust the vehicle speed to the required speed, actively reduce the transmission gear so that the engine speed is above 1500rpm, and pull the retarder gear 1 to enable the "constant speed" function.

② Enable the "constant speed" gear at the required vehicle speed. The retarder ensures that the vehicle runs at a constant speed within the range of maximum braking torque and heat dissipation capacity of the vehicle.

If already in "constant speed" gear but needing to reset the constant speed for downhill driving, first shift back to "0" gear, then shift to constant speed gear "1".

If the "constant speed" function is enabled and the vehicle speed increases, it is necessary to step on the brake (use the main brake) to adjust the vehicle speed.

If the retarder indicator on the vehicle instrument flashes during operation (retarder overheat protection), the retarder automatically reduces torque until it disengages.

Once the engine coolant temperature drops, the retarder torque automatically increases.

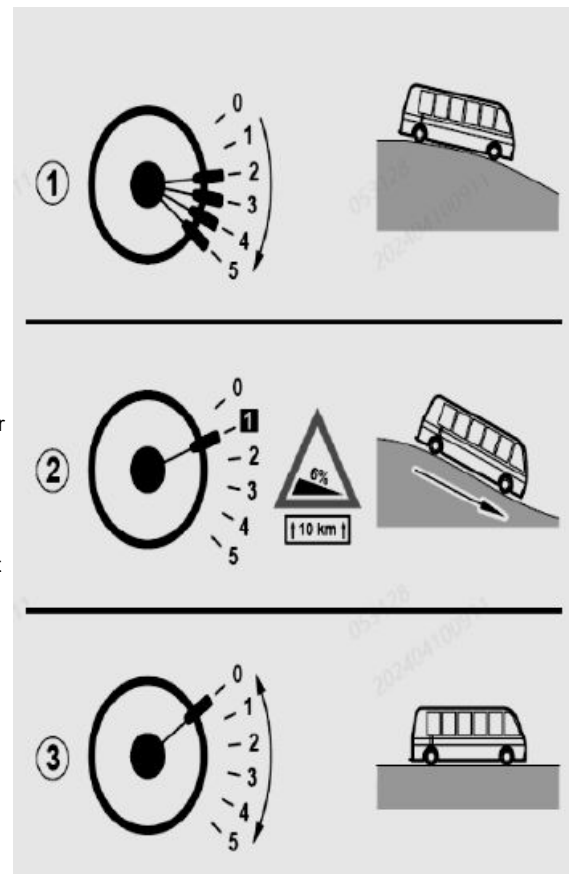
If the handle is not in the "constant speed gear" position, the automatic adjustment function will be turned off immediately.

③ Exit the "constant speed" gear when driving on a flat road.



### **WARNING!**

**After using the constant speed mode, remember to turn off the retarder when the vehicle is driving on level ground or uphill.**



## Operation of Fast retarder

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### Use of braking gear

Gears 2 to 5 are braking gears, and the braking torque increases in turn. The appropriate braking gear can be selected according to the vehicle weight, braking distance, etc. Shift the retarder gear switch step by step (skipping gears is strictly prohibited) to obtain appropriate braking torque. To reduce actual braking torque, shift the retarder handle switch directly from high gear to low gear, skipping intermediate levels.



#### **WARNING!**

After using the braking mode, remember to turn off the retarder when the vehicle is driving on level ground or uphill.



#### **CAUTION!**

If the outdoor temperature is low, the retarder braking effect will lag the first time it is used after starting the vehicle. On vehicles equipped with cruise control, the cruise control function will be automatically canceled when the retarder's "constant speed" function is activated.

### Warm tips

Hydraulic retarder braking converts the kinetic energy of the vehicle into heat energy and dissipates the heat through the engine circulating coolant. When the engine coolant temperature and the retarder oil temperature exceed the set value, the retarder will remind the driver in the form of an alarm and reduce the torque before exiting the brake.

To better play the role of hydraulic retarder, in actual use, the downhill speed and engine speed can be reasonably selected according to factors such as vehicle weight, slope, and slope length, so that the retarder does not alarm or quit working; specifically, if the vehicle is heavy and the slope is long and steep, it is necessary to increase the engine speed and maintain a relatively low downhill constant speed.





### WARNING!

- Regardless of which working gear the retarder handle is in, the transmission must be in a suitable forward gear (it is not permitted to use the retarder while coasting in neutral). This allows the engine cooling system to dissipate the heat generated by braking (in constant speed mode, the engine speed should not be lower than 1500 rpm; also, take care to prevent engine overspeeding).
- The retarder should be used when appropriate and road conditions are safe. Do not use the retarder when the road surface is covered with snow, ice, or large amounts of water. Using the retarder in these conditions poses a risk of the vehicle pulling to one side during braking. If you notice the vehicle pulling during use, turn off the retarder.
- WARNING: Strictly prohibited to "jump" or skip braking gears on the retarder handle! This is to prevent excessive retarder braking torque, which can cause sudden braking and vehicle pulling.
- Do not use the retarder when the tractor is navigating sharp turns.
- The retarder cannot be used as a parking brake.
- To maximize the retarder's effectiveness and extend its service life, use antifreeze as the engine cooling medium.
- The water wading depth for the retarder must not exceed its bottom part.
- CAUTION: During use and maintenance, it is strictly prohibited to step on or apply impact pressure to the control valve and the heat exchanger assembly.

## Differential lock operation

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### Differential lock operation

#### Differential lock—inter-wheel differential lock, inter-axle differential lock

The tandem axle is fitted with both inter-wheel and inter-axle differential locks.

Engaging the differential locks helps prevent wheel slippage.

Engage the differential lock before driving into challenging conditions (such as sand, ice, or mud). When engaging the differential lock, the vehicle shall be stationary.



#### **WARNING!**

—When the differential lock is in use, the adjustment function of the Anti-Lock Braking System will be delayed for a period of time, and the wheels may be locked for a short time, restraining the steering ability and directional stability of the vehicle.

—When the differential lock is working, there is no differential function between the left and right wheels. In this case, do not drive on curves on a solid ground. When driving to a solid ground, disengage the differential lock immediately.

### Inter-wheel differential lock operation (4×2, 6×2 models)

#### Inter-wheel differential lock engagement

- Release the accelerator pedal (to decelerate). Ensure the wheels are stationary before engaging the differential lock.
- Press the lower part of the inter-wheel differential lock switch ① (it is necessary to press and hold the locking switch on the upper part at the same time), the inter-wheel differential lock on the rear axle engages, and the indicator of the inter-wheel differential lock on the instrument lights up. If the differential lock indicator does not illuminate, drive the vehicle forward or backward slightly to ensure the differential lock engages.
- Depress the accelerator pedal carefully to accelerate slowly.

#### Disengaging the inter-wheel differential lock

- Release the accelerator pedal and depress the clutch pedal.
- Press the upper part of the inter-wheel differential lock switch ① to disengage the differential lock; the inter-wheel differential lock indicator on the instrument goes out.



#### WARNING!

- The differential lock can only be engaged when the vehicle is at a complete stop.
- Never engage the differential lock when the wheels are slipping.
- When the differential lock indicator is illuminated, the vehicle must not turn, and the speed must not exceed 50 km/h.
- Disengage the differential lock immediately upon vehicle entering a paved surface.

## Differential lock operation

### Inter-axle and inter-wheel differential lock operation (6×4, 8×4 models)

The operating principle of differential lock engagement: Engage the inter-axle differential lock first, and then engage the inter-wheel differential lock.

#### Inter-axle differential lock operation

The inter-axle differential lock is used to lock the inter-axle differential between the first and second drive axles.

##### • Inter-axle differential lock engagement

- Release the accelerator pedal (to decelerate). Ensure the wheels are stationary before engaging the differential lock.
- Press the inter-axle differential lock switch ② (it is necessary to press and hold the locking switch on the upper part at the same time). After the inter-axle differential lock engages, the indicator of inter-axle differential lock on the instrument lights up. If the differential lock indicator does not illuminate, drive the vehicle forward or backward slightly to ensure the differential lock engages.

##### • Disengagement of inter-axle differential lock

- Release the accelerator pedal and depress the clutch pedal.
- Press the inter-axle differential lock switch ②. When the inter-axle differential lock is disengaged, the inter-axle differential lock indicator on the instrument goes out.



**WARNING!**

- The differential lock can only be engaged when the vehicle is at a complete stop.
- Never engage the differential lock when the wheels are slipping.
- When the differential lock indicator is illuminated, the vehicle must not turn, and the speed must not exceed 50 km/h.
- Disengage the differential lock immediately upon vehicle entering a paved surface.

**Inter-wheel differential lock operation****• Inter-wheel differential lock engagement**

- Engage the inter-axle differential lock (see "Inter-axle Differential Lock Engagement").
- Release the accelerator pedal (to decelerate). Ensure the wheels are stationary before engaging the differential lock.
- Press the inter-wheel differential lock switch ① (while simultaneously holding the upper locking switch). After the rear axle inter-wheel differential lock is engaged, the corresponding indicator on the instrument panel will light up. If the differential lock indicator does not illuminate, drive the vehicle forward or backward slightly to ensure the differential lock engages.
- Depress the accelerator pedal carefully to accelerate slowly.

**• Disengaging the inter-wheel differential lock**

- Release the accelerator pedal and depress the clutch pedal.

## Differential lock operation

---

–Press the inter-wheel differential lock switch ①. Once the inter-wheel differential lock is disengaged, the corresponding indicator on the instrument panel turns off.



### **WARNING!**

- The differential lock can only be engaged when the vehicle is at a complete stop.
- Never engage the differential lock when the wheels are slipping.
- When the differential lock indicator is illuminated, the vehicle must not turn, and the speed must not exceed 50 km/h.
- Disengage the differential lock immediately upon vehicle entering a paved surface.

### **Air suspension operation**

#### **Electronically controlled air suspension (ECAS)**

Air suspension primarily uses airbags filled with compressed air as the main load-bearing components. It adjusts the inflation and deflation of the airbags through an electronically controlled air suspension system to achieve vehicle height adjustment and axle lifting.

#### **Functions and characteristics**

- Chassis damping function: The vehicle is equipped with air suspension to reduce ground impact and protect the cargo effectively.
- Height memory function: Maintains a level balance height during driving, loading, and unloading.
- Remote control function: The height is adjustable, and the height can be adjusted using a remote controller or buttons, which is convenient for towing and loading/unloading cargo.
- Lifting function: Vehicles equipped with lifting axles can lift the lifting axle under empty or partially loaded conditions to improve fuel economy.
- Memory function: store commonly used heights for convenient rework.
- Drive assistance function: Within the allowable range of axle load, axle load transfer is performed to increase driving force (for vehicles with lifting axles).

## Air suspension operation

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### Electronically Controlled Air Suspension (ECAS)



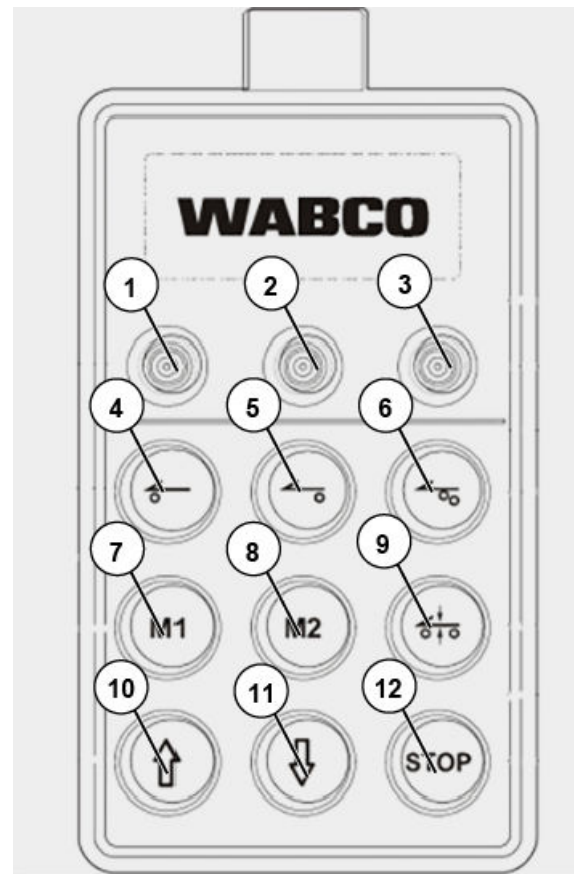
#### **WARNING!**

- A frame that has been lowered or raised can pose driving hazards and vehicle wear. Please adjust to a balanced height before starting. If the ECAS fault light on the instrument panel comes on, please contact a professional service station for inspection.
- When the vehicle is raised, ensure there are no obstacles above the vehicle. When the vehicle is lifted, make sure that there are no obstacles above the vehicle.
- Frame bouncing may damage shock absorbers and other components. When performing related risk operations, please first lower the vehicle height; when performing sudden load loading operations, it may impact the airbags and frame. Please first raise the vehicle height; when entering or exiting strong magnetic field areas, be aware that ECAS may be disturbed and not adjust. Please check whether it is at a balanced height before driving.
- Before performing long-term loading/unloading operations, the vehicle shall have good air tightness, and the system pressure shall reach full pressure. Depending on the situation, you can first raise or lower the vehicle height before the operation.
- When the vehicle speed exceeds the set value (30km/h), it is prohibited to use the remote controller and buttons for height adjustment actions. It is recommended to use it when the vehicle is stationary.
- After completing special use scenarios, if the vehicle does not automatically reset, please re-power on and off in the case of sufficient vehicle air pressure, press the reset button; or manually loosen the connector to release the air and lower the vehicle height.
- ECAS system performs best when the vehicle air pressure is sufficient and the air tightness is good. If the fault light comes on due to low air pressure or poor air tightness, you can re-power on and off in the case of sufficient vehicle air pressure, press the reset button, and repair the air tightness.
- When the vehicle is empty and full or lightly loaded, the airbag pressure is small, and the left and right airbags are inconsistent (such as deflated on one side), you can use the remote controller to lower-reset, raise-reset 2~3 times to restore.



**Remote controller height adjustment (I)****Description on the buttons of remote control**

- ① Front axle airbag status indicator lamp
- ② Rear axle airbag status indicator lamp
- ③ Lifting axle airbag status indicator lamp
- ④ Front axle airbag activation button
- ⑤ Rear axle airbag activation button
- ⑥ Lifting axle activation button
- ⑦ Memory button
- ⑧ Memory button
- ⑨ Normal height button
- ⑩ Up button
- ⑪ Down button
- ⑫ Stop button



## Air suspension operation

### Remote controller height adjustment (I)

The electronically controlled air suspension system achieves different axle suspension height increase/decrease, lifting axle raise/lower, load transfer, and other functions through the manipulation of the remote controller toggle switch. The remote control can only be operated in the height range allowed to be set.

#### Axle selection

If the front axle is equipped with an airbag suspension, press the front axle airbag activation button ④, and the front axle airbag status indicator lamp ① lights up, then the front axle related control can be performed. Press ④ again to cancel the function.

If the rear axle is equipped with an airbag suspension, press the rear axle airbag activation button ⑤, and the rear axle airbag status indicator lamp ② lights up, then the rear axle related control can be performed. Press ⑤ again to cancel the function.

If the lifting axle is equipped with an airbag suspension, press the lifting axle airbag activation button ⑥, and the lifting axle airbag status indicator lamp ③ lights up, then the lifting axle related control can be performed. Press ⑥ again to cancel the function.

#### Up and down

After the axle indicator lamp lights up, pressing the Up button ⑦ can raise the corresponding axle, and pressing the Down button ⑧ can lower the corresponding axle. When the lifting axle airbag status indicator lamp is on, pressing the Up button ⑦ can lift the lifting axle, and pressing the Down button ⑧ can lower the lifting axle.



**Remote controller height adjustment (I)****Reset balance height**

When the vehicle height is not in a balanced position, press the normal height button ⑨ to restore the vehicle to the set balanced height.

**Stop action**

During the height adjustment of the vehicle, press the "stop" button ④ to immediately stop the height adjustment action (including raising, lowering, reset, etc.).

**Storage and recall memory height**

Adjust the vehicle to the desired height, press the "STOP" button ④ + memory button ① to store and remember the current vehicle height.

When you need to use the memory height again, press the memory button ①, and the vehicle automatically adjusts to the stored height.

Operate the memory button ② by reference to ①.

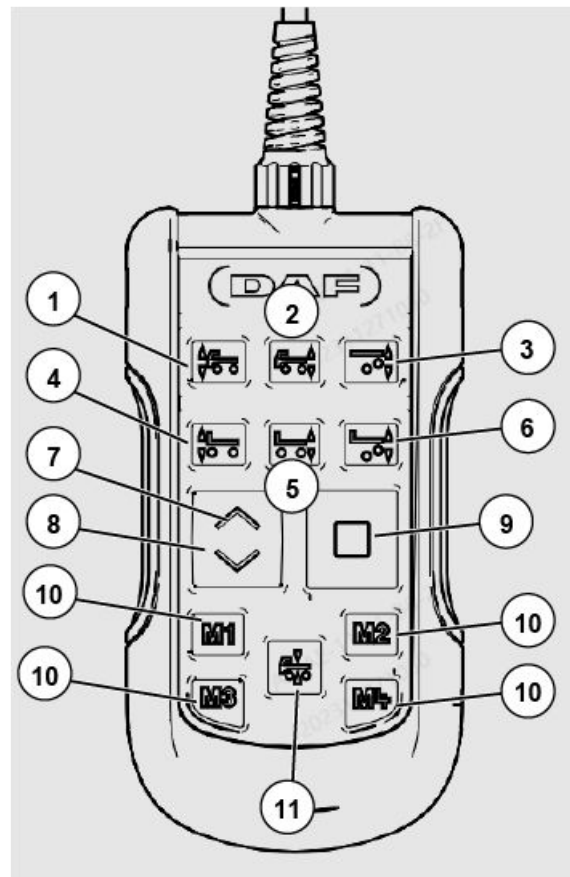


## Air suspension operation

### Remote controller height adjustment (II)

#### Description on the buttons of remote control

- ① Front axle airbag status indicator lamp
- ② Rear axle airbag status indicator lamp
- ③ Lifting axle airbag status indicator lamp
- ④ Front axle airbag activation button
- ⑤ Rear axle airbag activation button
- ⑥ Lifting axle airbag activation button
- ⑦ Up button
- ⑧ Down button
- ⑨ Stop button
- ⑩ Memory button
- ⑪ Normal height button



### Remote controller height adjustment (II)

The electronically controlled air suspension system achieves different axle suspension height increase/decrease, lifting axle raise/lower, load transfer, and other functions through the manipulation of the remote controller toggle switch. The remote control can only be operated in the height range allowed to be set.

#### Axle selection

If the front axle is equipped with an airbag suspension, press the front axle airbag activation button ④, and the front axle airbag status indicator lamp ① lights up, then the front axle related control can be performed. Press ④ again to cancel the function.

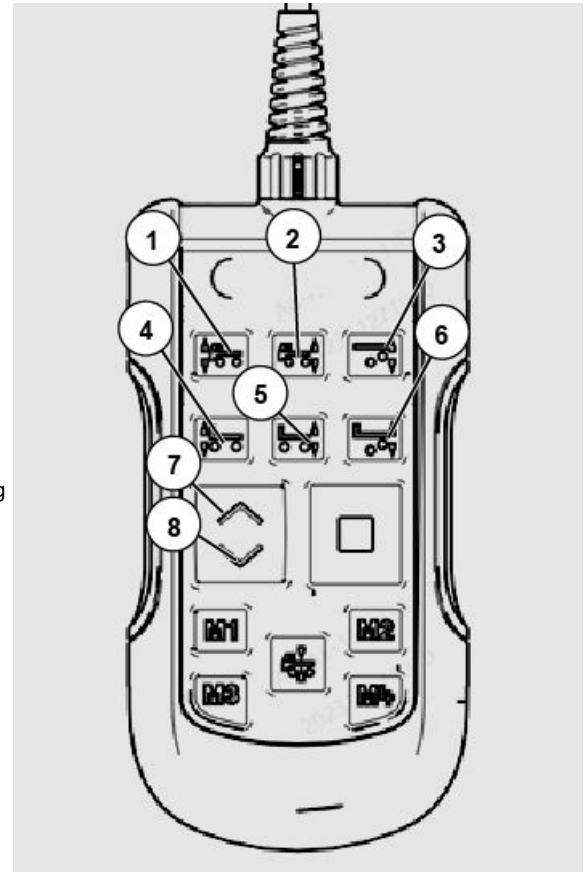
If the rear axle is equipped with an airbag suspension, press the rear axle airbag activation button ⑤, and the rear axle airbag status indicator lamp ② lights up, then the rear axle related control can be performed. Press ⑤ again to cancel the function.

If the lifting axle is equipped with an airbag suspension, press the lifting axle airbag activation button ⑥, and the lifting axle airbag status indicator lamp ③ lights up, then the lifting axle related control can be performed. Press ⑥ again to cancel the function.

#### Up and down

After the corresponding axle indicator lamp is on, press the Up button ⑦ to raise the corresponding axle, and press the Down button ⑧ to lower the corresponding axle. If the lifting axle airbag status indicator lamp is on ③, press the Up button ⑦ to lift the lifting axle, and press the Down button ⑧ to lower the lifting axle.

If a full airbag suspension is configured, ascending, descending, and resetting all require pressing buttons ① and ② simultaneously to operate.



## Air suspension operation

### Remote controller height adjustment (II)

#### Reset balance height

If the vehicle height is not in a balanced position, press the normal height button ② to restore the vehicle to the set balanced height.

#### Stop action

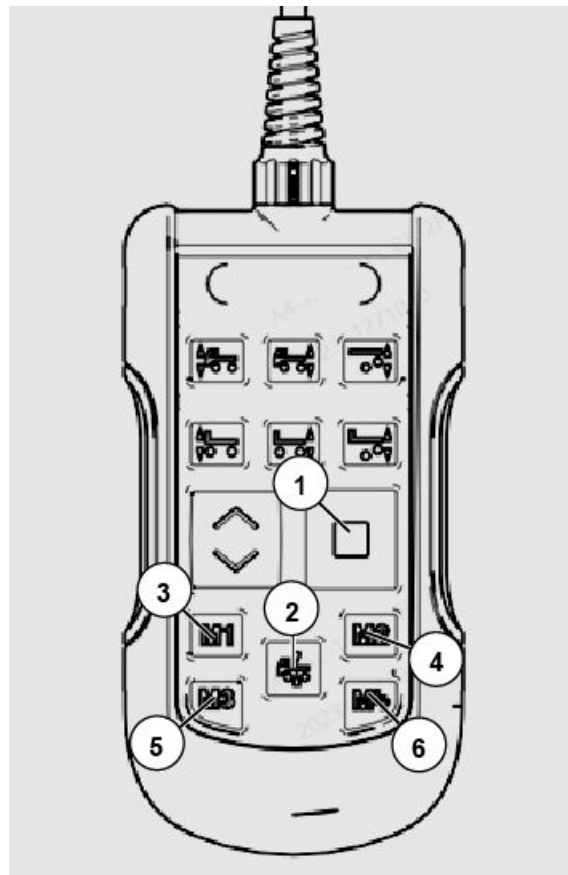
During the height adjustment of the vehicle, press the "stop" button ① to immediately stop the height adjustment action (including raising, lowering, reset, etc.).

#### Storage and recall memory height

Adjust the vehicle to the desired height, press the "stop" button ① + memory button ③ to store and remember the current vehicle height.

When you need to use the memory height again, press the button ③, and the vehicle automatically adjusts to the stored height.

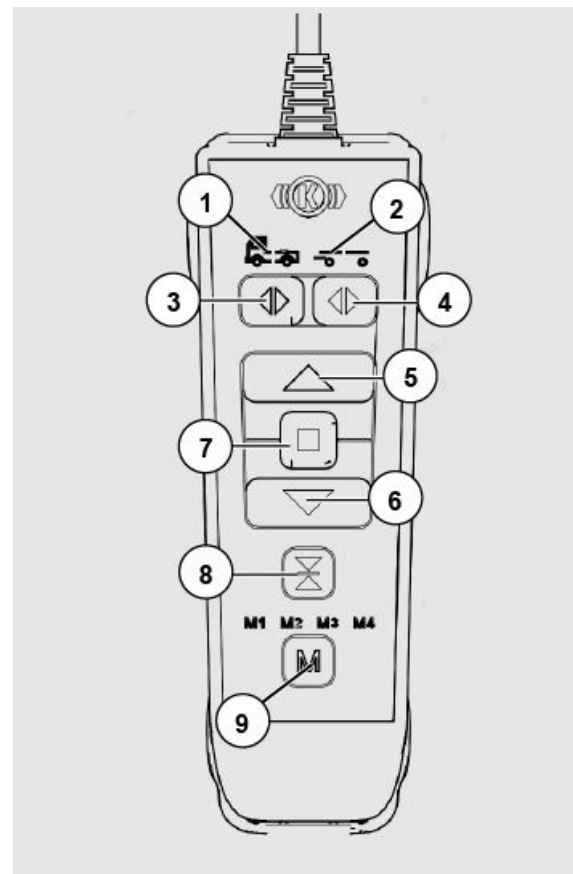
Refer to ③ for the operation of memory buttons ④, ⑤, and ⑥.



## Remote controller height adjustment (III)

### Description on the buttons of remote control

- ① Driving vehicle airbag status indicator lamp
- ② Trailer airbag status indicator lamp
- ③ Driving vehicle airbag activation button
- ④ Trailer airbag activation button
- ⑤ Up button
- ⑥ Down button
- ⑦ Stop button
- ⑧ Normal height button
- ⑨ Memory button



## Air suspension operation

### Remote controller height adjustment (III)

The electronically controlled air suspension system achieves different axle suspension height increase/decrease, lifting axle raise/lower, load transfer, and other functions through the manipulation of the remote controller toggle switch. The remote control can only be operated in the height range allowed to be set.

#### Axle selection

If the front axle is equipped with an airbag suspension, press the driving vehicle airbag activation button ③ for continuous operation, and the front axle airbag status indicator lamp ① lights up, then the front axle related control can be performed. Press ③ again to cancel the function.

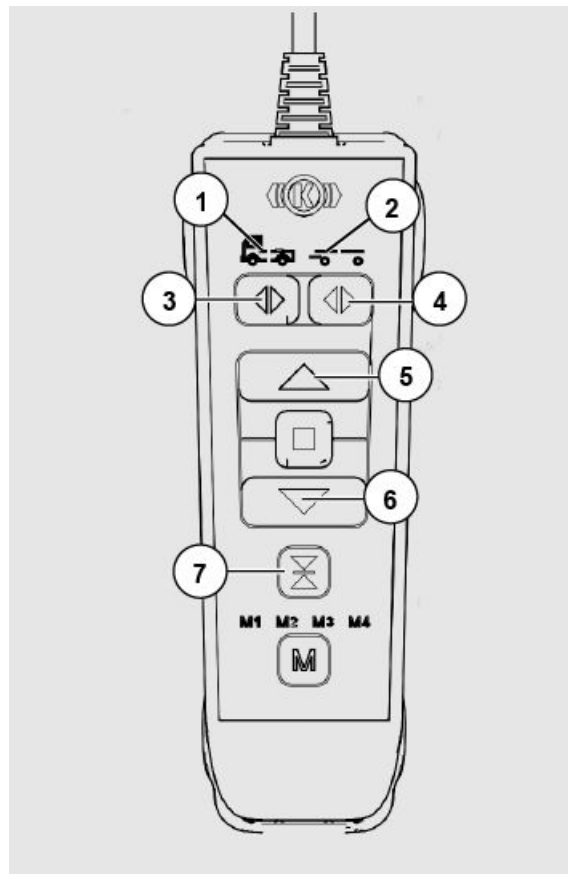
If the rear axle is equipped with an airbag suspension, press the driving vehicle airbag activation button ③ for continuous operation, and the rear axle airbag status indicator lamp ② lights up, then the rear axle related control can be performed. Press ③ again to cancel the function.

If the lifting axle is equipped with an airbag suspension, this type of remote controller is not applicable, and the lifting axle switch can be used for operation.

#### Up and down

After the corresponding axle indicator lamp lights up:

- Press the Up button ⑤ to raise the corresponding axle, and press the Down button ⑥ to lower the corresponding axle.
- Press the normal height button ⑦ + Up button ⑤ at the same time, and the vehicle automatically rises to a high position.
- Press the normal height button ⑦ + Down button ⑥ at the same time, and the vehicle automatically drops to a low position.





### Remote controller height adjustment (III)

#### Reset balance height

If the vehicle height is not in a balanced position, press the normal height button ② to restore the vehicle to the set balanced height.

#### Stop action

During the height adjustment of the vehicle, press the "stop" button ① to immediately stop the height adjustment action (including raising, lowering, reset, etc.).

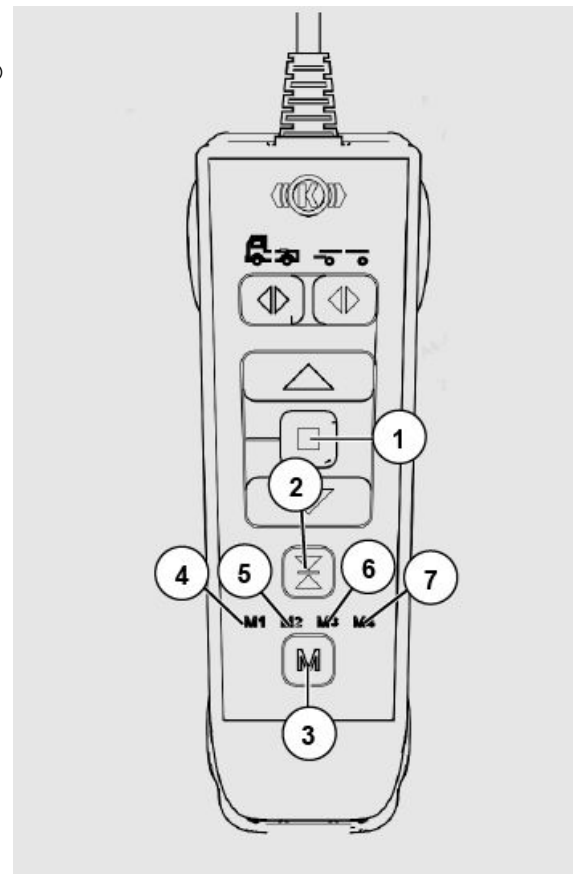
#### Storage and recall memory height

Adjust the vehicle to the desired height, press the ③ button once, ④ lights up, continue to press the ③ button for about 3s and release (or observe ④ flashing 3 times), then store and remember the current vehicle height.

When using the memory height again, press button ③ once, and ④ lights up.

Continue to press button ③ for about 1s and then release (or observe ④ flashing), the vehicle will automatically adjust to the stored height.

Button ⑥ for memory operation is the same as for ④. In this version, ⑤ and ⑦ do not have memory functions.

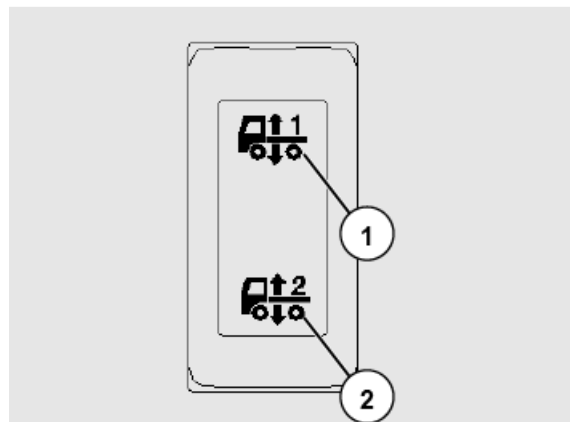


## Air suspension operation

### Cab switch height adjustment

#### Three-height Selection Switch

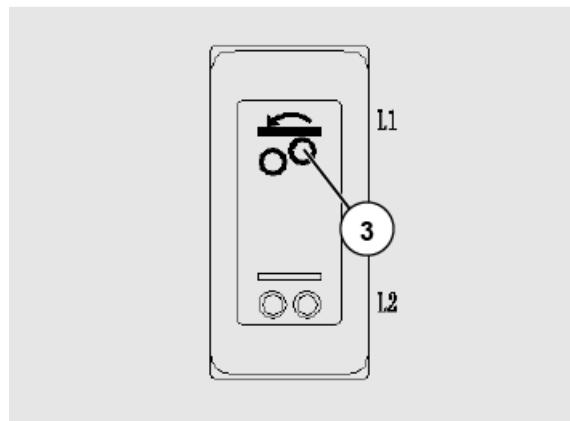
Three-position height selection switch, press the switch ① upwards to adjust the vehicle height to the set high position (not the highest calibrated position); press the switch ② downwards to adjust the vehicle height to the set low position (not the lowest calibrated position).



#### Drive Help Switch

Press the switch ③ upwards to activate the drive assistance function on the lifting axle model, transferring the load on the driven axle to the driving axle.

Drive assistance function deactivation: Long press it 5s to exit the drive assistance function or when the vehicle speed exceeds 55 km/h, such function will exit.



## Cab switch height adjustment

### Lifting axle switch

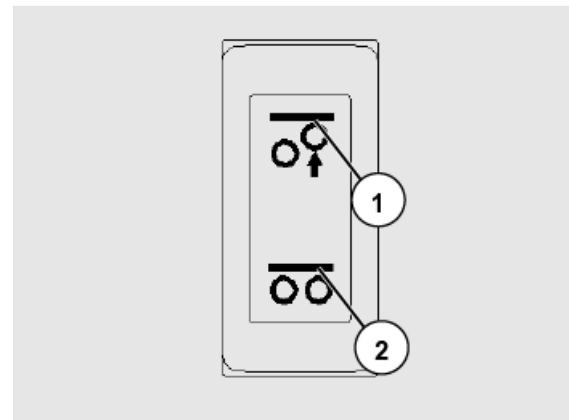
The lifting axle switch has the same function as the remote controller for the lifting axle. Press the switch ① upwards to raise the lifting axle. Press the switch ② downwards to lower the lifting axle.

The lifting axle position only has two states: lifted and lowered, and cannot be stopped in the middle position.

When the lift axle is in lifting status, it can be activated to fall automatically under the following conditions:

- The driving axle is fully loaded. To protect the driving axle and the vehicle's safety, the lift axle will fall automatically to bear the load.
- If the ECAS system is faulty, the lift axle will fall automatically to avoid unknown risks.

In the above two situations, the lifting axle cannot be raised.




## Air suspension operation

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### Instrument indicator lamp


#### ECAS fault lamp

When there is a fault with the ECAS, the fault warning lamp  lights up, and you should immediately stop the vehicle for inspection. Refer to "Description of inspection lamp and warning lamp".


If the vehicle is able to run, then drive at walking speed to a place where the vehicle does not block the traffic. Meanwhile, ask a CNHTC service station for help immediately.


#### Lifting axle indicator lamp

When the lifting axle is raised, the lifting axle indicator lamp  lights up, indicating that the lifting axle is in the raising state.

When the lifting axle falls, the lifting axle indicator lamp  goes out, indicating that the lifting axle is in the falling state.

#### Drive assistance indicator lamp

When drive assistance is activated, the driver assistance indicator lamp  lights up, indicating that the drive assistance function is activated.

When drive assistance exits, the drive assistance indicator lamp  goes out, indicating that the drive assistance function exits.

### Precautions for use of electronically controlled air suspension system models

The total weight of the vehicle/train shall be based on the standard load.

Vehicles with lifting axles are single-axle driven, so the wear on the driving axle tires will be greater than on the non-driving axle tires. Driving tires should be chosen with driving patterns; without affecting the front and rear turning radius, the traction base should be as close to the driving axle as possible.

When the vehicle is empty or the load is not large, if the lifting axle can be raised, raise the lifting axle. This can effectively avoid problems such as driving wheel slippage and insufficient vehicle climbing ability, and effectively reduce the wear of the lifting axle tires.

When the vehicle has a large load, if the lifting axle cannot be raised, the best traction mode can be activated (place the three-mode selection switch in the lower position) to keep the driving axle at the standard load, to avoid problems such as driving wheel slippage and insufficient vehicle climbing ability. It is recommended that users use the best traction function when driving with a full load.

When the vehicle is about to enter the toll station, the proportional control mode should be turned on in advance (place the three-mode selection switch in the middle position). This keeps the vehicle's axle load distribution at the factory setting to avoid unnecessary trouble when the vehicle is weighed due to a large difference in the load of the middle and rear axles.'

When the vehicle is starting or about to climb a slope and other working conditions, the drive assistance mode should be activated in advance (press the upper part of the three-mode selection switch). This allows the driving axle to obtain the maximum load, maximize the

vehicle's driving and climbing ability, effectively avoid driving wheel slippage, and extend the service life of the tires.

When driving on slippery, rainy, or snowy roads, to improve vehicle handling stability and prevent skidding, it is not suitable to lift the lifting axle and activate the drive assistance function.

To protect the driving axle tires, start the operation gently, and avoid stepping on the accelerator abruptly.

When the frame height is low, the gap between the tire and the fender is small. If the tire pattern is embedded with mud, sand, and stones, it may damage the fender. Therefore, before starting the vehicle, check whether there is enough gap between the tire and the fender. If the gap is not enough, appropriately raise the frame to about 40mm below the maximum height and drive at a speed of no more than 50km/h for a period of time, then restore the frame to the normal height.

If the vehicle tires are equipped with anti-skid chains, the frame height should be appropriately raised to ensure that the anti-skid chains do not damage the fender.

When the frame deviates from the normal height set by the factory, the suspension travel will be affected. If the vehicle is driven for a long time at the highest or lowest position, it may damage the frame, suspension, and transmission system, and may also damage the fender. Therefore, unless it is very necessary, it should be driven at the normal frame height.

When there is a fault in the airbag air circuit, resulting in insufficient air pressure for the airbag to work, the vehicle should be stopped immediately and SINOTRUK Service Station should be requested for assistance in time.

After the support axle (and steering support axle) is lifted or the drive assistance function is activated, due to the large transfer of vehicle axle load, it may cause changes in the vehicle's braking and steering performance. Be sure to drive carefully.

During the loading or unloading process of the vehicle, the vehicle load changes greatly. At this time, do not activate the drive assistance and best traction functions to prevent the frame from suddenly rising or falling.

For vehicles operating in mountainous areas such as Yunnan, Guizhou, and Sichuan, in order to have the best traction performance, the drive assistance is automatically exited at a speed of 55 km/h.

Therefore, vehicles operating in these areas will have the driving axle running overloaded for a longer time than other areas, which will have a certain impact on the service life of the driving axle and driving wheels.

## Semi-trailer operation

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### Semi-trailer operation

#### General regulations for semi-trailer operation

The semi-trailer towing vehicle is equipped with a two-line trailer braking control system.



#### **WARNING!**

- Check the notice plate on the side of the saddle carefully when connecting the semi-trailer or operating the saddle.
- No one is allowed to stand between the towing vehicle and the semi-trailer when the towing vehicle is reversing toward the semi-trailer.
- After connecting to the semi-trailer, check the handle position and confirm that the saddle is engaged properly.
- Check the clearance between the pivot pin and saddle if you are using multiple types of semi-trailers.
- When coupling, always check the connection and sealing condition of the air connector between the tractor and the semi-trailer to ensure normal function, and replace the air connector in time if any damage is found.
- Moisture, dust or sand that enter the trailer sockets, especially the ABS socket (always loaded with 24V voltage), are easy to lead to corrosion and heating of the connector, and may damage the connector and cables. Purge the sockets and plugs with compressed air regularly, and clean with anti-abrasion fabrics when necessary.
- Check the conditions of the towing vehicle and semi-trailer connection brake spiral tube as well as the electrical connection spiral cable frequently, and visit a CNHTC service station for replacement in case of damage.

#### Cleaning the sockets of towing vehicle and semi-trailer

- Clean the sockets of towing vehicle and semi-trailer with 6-8bar compressed air. Do not clean with water and mechanical objects.
- During cleaning, the key switch and lighting system shall be turned off.

**Connecting the semi-trailer**

- Fix the semi-trailer to prevent it from skidding.
- Open the saddle.

Rotate upward the pull bolt positioning block ① to the horizontal position, push the handle ② forward at the same time, then pull it out and clamp its quadrilateral slot on the front side of the rectangular slot of the saddle plate. At this time, the saddle is in an opening state and ready for coupling.

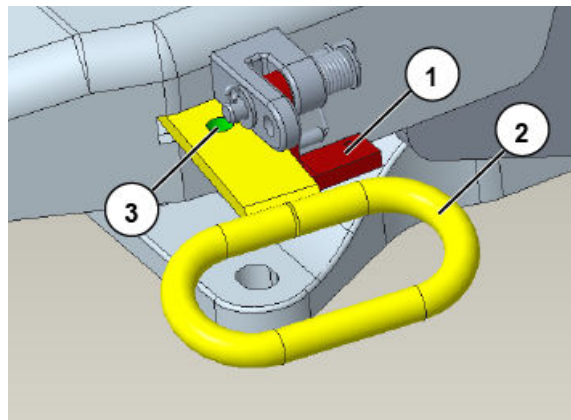
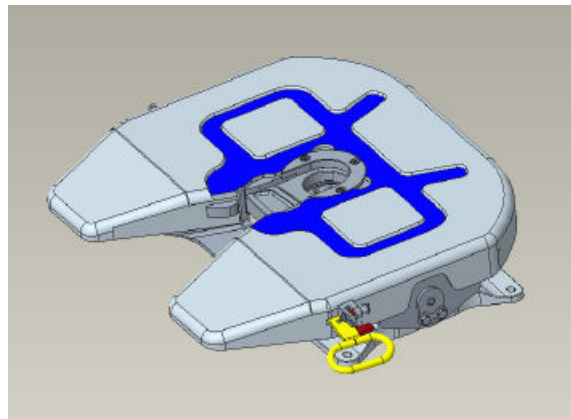
- Reverse to dock, and when the towing pin enters the saddle interface, the coupler lock and pin block automatically lock the towing pin to complete the docking. At this time, the pull bolt positioning block ① shall return to the shown state, the warning hole ③ on the handle ② shall be close to the outer side of the saddle, and the saddle shall be locked reliably.
- If the pull bolt positioning block ① does not drop to the locked position, or the warning hole ③ is too far from the outer side of the saddle, check whether the saddle is locked in place.

**WARNING!**

–Operate according to the operating specifications.

Incorrect connection of the saddle will lead to operation accidents of vehicles.

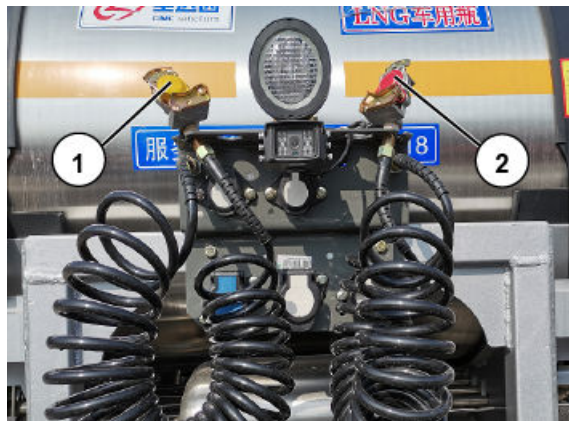
–When the towing vehicle is connected with the semi-trailer, be sure to check whether the saddle lock handle is locked correctly, so as to ensure driving safety!



## Semi-trailer operation

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- Connect the brake pipeline and electric joints between the semi-trailer and towing vehicle. Note that the pipeline and wires shall not be strained, rubbed and winded up during driving.
  - Connect the control pipeline joint ① (yellow) first, and then connect the gas pipeline joint ②(red).
  - Check whether their functions are normal.



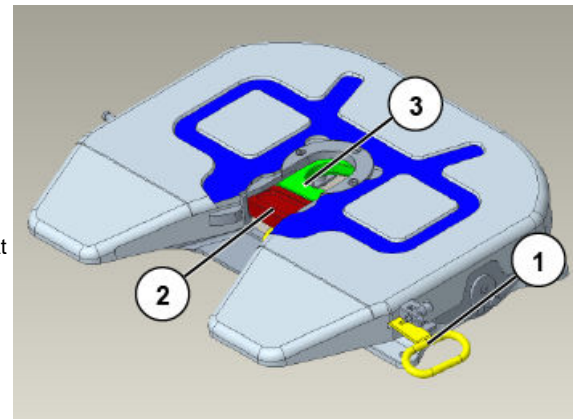


**Disengagement of semi-trailer**

- Check the road condition, and prevent the semi-trailer from skidding.
- Fix the semi-trailer to prevent the wheels from moving.
- Disconnect the brake pipeline and electric connection joints between the semi-trailer and towing vehicle. Follow the disconnection order strictly: disconnect the inflation pipeline joint (red) first, and then disconnect the control pipeline joint (yellow). Otherwise, the trailer brake will be released.
- Pull out the saddle handle ① until its positioning slot clamps the saddle casing. At this time, the pin block ② disengages from the coupler lock ③. Start the towing vehicle forward, and the coupler lock ③ turns to release the towing pin, completing the disengagement action. If the trailer will not be connected for a long time, the saddle handle ① shall be reset.
- Cover the joint with a joint cap after disconnecting the pipeline gas joint to prevent contamination.

**WARNING!**

**Be sure to disconnect the pipeline gas joint in the correct order. Otherwise, the semi-trailer brake will be released, which may lead to vehicle skidding.**



## Semi-trailer operation

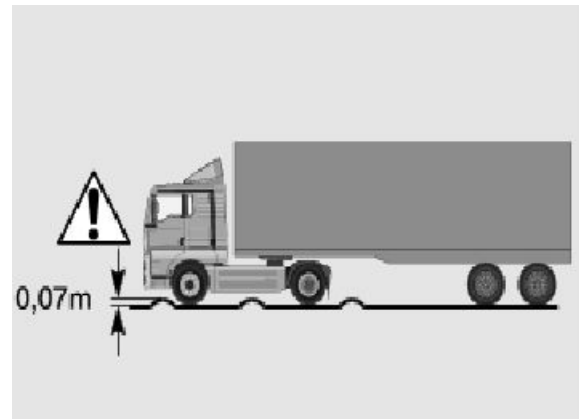
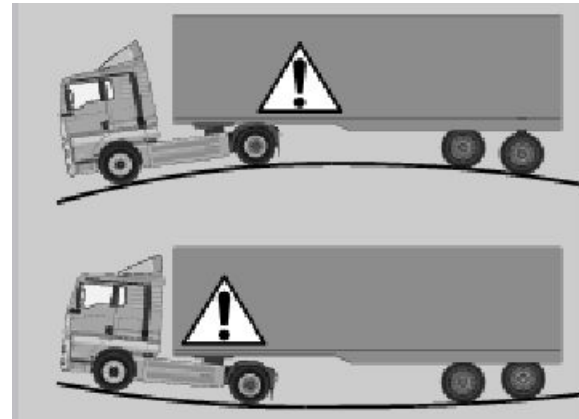
### Tire spacing

Ensure that the tire clearance is sufficient!



#### WARNING!

- Danger of damaging the vehicle!
- The distance between the semi-trailer and towing vehicle is strictly limited!
- The mobility of the towing vehicle and trailer is limited!
- Driving on puddles, slopes and muddy roads may cause serious damages to the towing vehicle and semi-trailer.
- The vehicle shall only travel at walking speed for a short distance when the height of the vehicle is lowered. Otherwise, the fender and tires will be damaged.



## Chapter IV Precautions and Practical Suggestions

## Driving/running-in

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### Driving/running-in

At the initial driving stage, attention shall be paid to the running-in of engine and other assemblies, which is very important for the economy and reliability of the vehicle.



#### **WARNING!**

- For new vehicles and vehicles with newly replaced tires, the wheel nuts shall be tightened to the specified torque after driving for about 50 km.**
- In the beginning stage, the wheel nuts shall be tightened to the specified torque until they are confirmed to be fastened every day.**

### **Before 2,000 km**

- The vehicle is in the running-in period and shall be driven carefully.
- The vehicle shall be driven on a flat road in good condition.
- Do not drive a new vehicle at high speed with full load. Pay attention to various indicator lamps and warning lamps!
- Always pay attention to check the transmission, front and rear axles, wheel hub and brake disc (drum). If there is serious heat, find out the cause and immediately adjust or repair it.

### **After the first 2,000 km**

The vehicle speed can be gradually increased until it reaches the maximum vehicle speed or the maximum engine speed allowed. Drive the vehicle carefully after replacing the axle and other assemblies or after an overhaul.

### Economical use of vehicles

#### Optimize the operating conditions of the vehicle

- Go through maintenance and service at a CNHTC service station on a regular basis. The best fuel consumption can only be achieved when the vehicle is in good condition.
- Avoid unnecessary running resistance. Properly bind the canopy and lower the adjustable canopy frame to the minimum height. This can prolong the service life of the canopy, reduce air resistance, and lower fuel consumption.
- Correct tire pressure. If the tire pressure is 1 bar lower than the normal value, the fuel consumption will increase by 5%, and the service life of the tire will also be reduced.

#### Operation of economical driving

- Engine startup. When the engine is started, the electronic fuel injection control will automatically adjust the fuel injection amount according to the engine temperature, and etc. Therefore, do not step on the accelerator pedal, so as to avoid unnecessary fuel injection and reduce smoke exhaust volume.
- Engine warm-up. Under low load, the temperature of the engine rises very slowly at idle speed. Therefore, do not run the engine when the vehicle is parked to warm the engine up. The engine warm-up shall be carried out under medium load.
- Cab heating. The vehicle engine is used to drive the vehicle. The engine is not the best heat source at idle speed! The cab auxiliary heater is recommended for heating.
- If the vehicle does not move for a long time, the engine shall be shut down.

- Do not accelerate before the engine is shut down; otherwise it will increase fuel consumption.

#### Economical driving methods

- Low speed, high load. The economic working range of turbocharged engine is 50% to 70% of its rated speed and about 80% of its maximum load. So, during normal driving, try to keep the pointer of the engine tachometer within the green scale range and run the engine under heavy load.
- High power and low rotation speed are recommended as necessary. When high power is required, such as when going uphill, overtaking, and driving at the uphill entrance of expressway, the maximum power can be provided by at the rated rotation speed.
- Use of tachometer. Keep an eye on the engine tachometer during driving and try to keep the engine speed within the economic speed range.
- Shift gears as appropriate. If it is needed to shift down before entering the uphill section, it is advisable to shift to low gear before starting climbing. In this way, you can drive into the ramp at a high enough engine speed so that you don't need to shift gears again.
- Do not shift gears unless its necessary, and use engine torque reasonably. Each gear shift will interrupt the traction, so unnecessary gear shift will increase fuel consumption, and will also accelerate the wear of clutch and synchronizer.
- For the transmission with a synchronizer, there is no need to disengage the clutch twice or cut off the fuel when shifting gears. This means that it can shift gears more rapidly, thus reducing the disruption time of traction and lowering fuel consumption.

## Economical use of vehicles

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- Drive steadily without obvious acceleration or deceleration, with high average speed and low fuel consumption. Listen carefully the radio for the traffic announcements to avoid traffic jam.
- Maintain safe distance. Keep enough distance from the vehicle in front, so that the vehicle can drive safely, and the driver will have enough time to respond to changing traffic conditions.
- Use the inertia of the vehicle as much as possible. The truck has great inertia, which can be used to climb a slope or coast on a flat road. When permitted by traffic conditions and the expressway is flat, the accelerator pedal can be released 800 m away from the expressway exit; Before reaching the bottom of the ramp, the brakes pedal can be released at an appropriate time to allow the vehicle to gain momentum (when permitted by traffic conditions and traffic management regulations).
- Avoid unnecessary stop and braking. Drive slowly but steadily instead of stopping the vehicle (e.g: at the traffic lights) will reduce fuel consumption and reduce the wear of the transmission system mechanism.
- Cruise control cannot predict traffic conditions. Reasonable use of cruise control can make driving more comfortable and reduce unnecessary fuel consumption.

### Vehicle load

#### When loading the vehicle, pay attention to the following matters:

- Current national laws and regulations on labor protection for workers and accident prevention (e.g. health and safety provisions in labor law).
- National regulations on load safety and load distribution for road vehicles.
- Relevant operating instructions from the manufacturer stored on the vehicle.

#### Common loading errors

Loading error	Consequences
Loading on one side only	Suspension/tire unilateral overload
The center of gravity is too high when loading only on one side	Possible rollover during cornering
Cargo improperly secured/not adequately lashed on the cargo bed	When braking or turning <ul style="list-style-type: none"> <li>• Cargo rocking</li> <li>• Risk to vehicle body and cargo</li> </ul>
There are clearances between the loaded goods and the front partition, side panel and rear partition of the wagon, or there are clearances between the goods.	When braking or turning <ul style="list-style-type: none"> <li>• Cargo rocking</li> <li>• Risk to vehicle body and cargo</li> </ul>

#### Basic requirements for loading and unloading

- Do not exceed the maximum axle load or permissible gross vehicle weight.
- Secure the load to prevent it from scattering when driving.

- The center of gravity of the goods should be located in the middle of the vehicle. Do not move the center of gravity forward, otherwise it will overload the front axle.
- If the cargo is shifted toward the rear axle, the load on the front steering axle should be maintained above the minimum specified value (for example, the minimum front axle load for a two-axle truck is 25% of the vehicle's weight, and for other vehicle types, it is 20% of the vehicle's weight).
- When the vehicle brakes, the load will be transferred to the front axle, and the rear axle load will decrease accordingly. The front axle will bear the risk of overloading.
- Pay attention to the tire size, rated load capacity and required pressure.
- For overload or harsh operating conditions, remove the upper cover from the rear mudguard to prevent the tire from jumping up and scraping against the mudguard, or to prevent the trailer from scraping the mudguard.

## Use of vehicle in winter

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### Use of vehicle in winter

We recommend that you apply wax-based protective agent to the cab, body and chassis of the vehicle before winter comes. Reapply the sealing protective agent to the parts vulnerable to freezing damage in particular. Thoroughly clean the entire vehicle frequently to remove corrosive substances that may contain salt.

### When the engine is idling at a temperature below 0 °C

When the engine is idling for a long time at a temperature below 0 °C, it will accelerate the wear of the engine. Therefore, the engine shall not be allowed to idle for a long time.

### Cleaning of filter screen of heating water cutoff solenoid valve of urea tank

Clean the filter screen once a year before winter to ensure smooth water flow.

### Fuel tank

Drain the water in the fuel tank before winter comes.

Choose the diesel grade that suits the local operating environment in winter. Start the engine with the main and auxiliary fuel tanks properly.

See Chapter IV Fuel system.

### Fuel coarse filter

Drain the water in the fuel coarse filter every day.

### Cooling system

Check the antifreeze liquid and add it when necessary.

### Windshield washing system

Add antifreeze cleaning solution.

### Battery

Fully charge the battery before winter comes. The capacity of the battery shall be kept at more than 90% of the total capacity throughout the winter to ensure that the battery is ready to work at any time.

### Headlamp

Check the installation condition and adjust it if necessary.



### Snow chains

When driving on roads covered with snow, install snow chains on the driving wheels. The snow chains shall not be too tight. It is better to ensure that the snow chains can move slightly (so that it can clean itself).



#### **WARNING!**

**–When using snow chains, it shall be ensured that there is sufficient clearance between the fender and the tire, and if necessary, between the fender and the body!**

**–In case that snow chains are installed on a vehicle with an air suspension, do not drive when the air suspension is in a low position!**

## Use and replace of tires

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### Use and replace of tires

#### Use and maintenance of tires

##### Air Pressure

- After tire inflation, check all parts for air leakage and repair the tire in time when necessary.
- The tire pressure shall remain normal during use.
- Check the tire pressure regularly during long-time operation or working. When the vehicle is stopped at full load for a long time, the front and rear shafts shall be supported.
- If the air pressure is too high, the middle pattern of the tire will wear quickly and the tire may burst. If the air pressure is low, the tire may deform quickly and be damaged.
- When two tires are installed in parallel, the pressure of the two tires shall be the same.

##### Speed

- Different tires have different speed limits. Overspeed can cause early tire damage. Do not drive too fast on a road with poor conditions and try to avoid the abrupt braking and sharp turning.
- When driving at high speed, the tire gets hot quickly. Once the tire is overheated, measures shall be taken in time to prevent the tire body from bursting.

##### Vehicle condition

- The toe-in of the front wheel shall be checked and adjusted from time to time; otherwise it will cause the eccentric wear and early damage of the tire.
- Do not use the rim with rust deformation or wrong size; otherwise it will cause the wear of the edge.

- Driving over the roadside steps will cause invisible internal damage (tire body damage) to the tires, which may cause serious accidents. If this cannot be avoided, drive vertically to the steps (lower than walking speed) at the minimum speed possible.

##### Tread pattern

- When the tread pattern is worn to the wear mark, the tire shall no longer be used.

##### Load

- The vehicle load shall comply with the current national standards, and overloading is strictly not allowed.
- The goods loaded on vehicles shall be evenly distributed to avoid unbalanced loading.

### Assembling

- Tires shall be assembled on the specified vehicle models and rims. Special tools and instruments shall be used for the installation and removal of tires. A standard operation process shall be followed.
- The guide wheels shall be equipped with tires of the same specification, brand, structure, tread pattern and ply rating. The driving wheels shall also be equipped with tires of the same specification, brand, structure, tread pattern and class. It is recommended that tires of the same brand be used for the vehicle.
- Mixed use of bias tires and radial tires is not allowed.
- When installing tires with directed pattern, the rotation direction sign shall be consistent with the driving direction of the vehicle.
- The tire chain shall be installed symmetrically and removed immediately when not in use.

### Tire rotation

- Tire rotation is recommended every 12,000 km.
- If conditions permit, dynamic balance test shall be carried out on the wheel and tire assembly after rotation.
- Tires with similar wear of patterns shall be installed on the same axle as far as possible during the rotation.
- After the rotation, the running direction of the tire shall be opposite to that before the rotation (this does not apply to tire with directed pattern).
- For vehicle models using different types of tires, the drive pattern tires shall be rotated with each other, and the non-drive pattern tires shall be rotated with each other. Interchange between drive pattern tires and non-drive pattern tires is not allowed.

- When installing double-tire, the inner tire and outer tire valves shall be staggered 180 ° to facilitate inflation.

### Spare tires

- For tubeless tires, the steering wheel and driving wheel are distinguished. The steering wheel has good steering performance, and the driving wheel has good adhesion force. Therefore, driving wheel tires cannot be used for the steering wheel!
- Spare tires shall be steering wheel tires.
- When the specification of the spare tire of the vehicle is not consistent with that of the standard tire, such spare tire is only allowed to be used for a short time, and the vehicle speed shall not exceed 80 km/h.

### Tires for all-wheel drive vehicles

- For all-wheel drive vehicles, tires of the same specification, size and structure are used.
- The difference between the rolling circumference of tires of the front and rear axles shall not exceed 2%, otherwise, when the front axle is engaged or the inter-axle differential lock is locked, the drivetrain will form a stress force, which will bring serious hazards to the safety and driving performance, and accelerate the wear of tires.

## Use and replace of tires

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### Change tire size

- Only the wheel and tire with specifications and dimensions specified for this model can be used.
- After changing the tire size, please go to a CNHTC service station to refresh the program of the complete vehicle control unit CBCU, engine ECU and driving recorder; otherwise the accuracy of the driving data recorder will be affected.

### Basic norms

Due to the influence of sunlight and environmental factors, tires will age. The rubber in the tire will gradually harden, become brittle, lose elasticity, and begin to crack. The tires shall be replaced in time according to their use and wear, otherwise, they will affect the safety of driving.

### Replacing the spare tire



#### **WARNING!**

When the spare tire is released, as its center of gravity is very easily to change due to the heavy weight of the tire, it may drop off or roll over, injuring yourself or others.

### Installing the spare tire

Install spare tire in the reverse order that it is removed.

Regularly check the tightening condition of the nuts fixing the spare tire.

### Remove the spare tire

- Unscrew the wheel nuts.
- Remove the spare tire pressing plate assembly.
- Remove the spare tire.

### Replace the tire



#### CAUTION!

Turn off the key switch before changing the spare tire.

- If you change the tire on the road, for your safety, be sure to follow the local traffic regulations (such as placing the warning triangle correctly) and ensure that the vehicle cannot move.
- Remove the fixing nuts of the wheel until only 3 evenly distributed nuts are left.
- Place the jack at the designed support point on one side of the vehicle to ensure that it does not slide.

**According to related regulations, the jack shall be inspected by professional personnel (a professional maintenance center) at least once a year.**

- Jack up the vehicle and ensure the ground is solid.
- After confirming that the replaced wheel can move freely on the wheel bolt, loosen the remaining 3 wheel nuts.
- Remove the wheel. Be careful not to damage the thread.
- Before installing the spare tire, remove the rust and dirt on the contact surface of the brake drum, rim, nut and bolt. Wipe the wheel alignment holes and the related outer circles on the wheel edge, and apply a proper amount of grease.
- Install the spare tire (the inflation pressure of the tire shall meet the regulations), and be careful not to damage the thread.

- Screw on the nuts by hand and tighten them in a zig-zag manner until they cannot be moved by hand.
- Lower the jack, put down the wheel, and tighten the nuts in a cross pattern with the specified torque (M18 wheel nut tightening torque (350 ~ 410) N·m; M20 wheel nut tightening torque (390 ~ 470) N·m; M22 wheel nut tightening torque (550 ~ 600) N·m).
- After driving for about 50 km, tighten the nuts again with the specified torque. Perform daily inspection, and retighten until the nuts are fastened.

## Use and replace of tires

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### Tire inflation

The tire can be inflated via the inflation connector installed on the air dryer. The specific steps are as follows:

- Remove the dust cap ① of the connector.
- Connect one end of the tire inflation hose to the valve of the tire.
- Tighten the other end of the tire inflation hose to the inflation connector of the air dryer.
- Accelerate the engine.
- Check the tire pressure and adjust it as necessary.



### Traction and traction start

#### Overview

The vehicle is equipped with a towing hook for towing vehicles and self-rescue.

The towing hook is stored in the storage box on the driver side and should be fully screwed into the mounting threaded hole when in use. When towing the vehicle, make sure that the traction force is centered on the vehicle to avoid frame deformation caused by unilateral traction.

When towing a vehicle from muddy and soft ground, unload it first.

When towing a vehicle, turn on the hazard warning lamps of the towing vehicle and faulty vehicle.

#### General requirement

- Follow the instructions in "Electrical system".
- Keep the engine running so that the brake and steering systems can be used.
- Place the transmission in neutral position.
- Use a rigid drawbar, not ropes or cables. If the air suspension is faulty, tow the vehicle slowly.
- If the vehicle is stuck, do not swing left and right or pull it obliquely when towing the vehicle, especially do not tow from the side.
- If the steering system is damaged, raise the front axle.

## Traction and traction start

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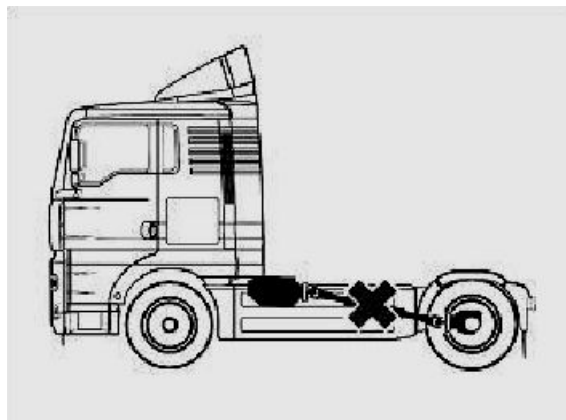
### Preparation for towing

Before towing, disconnect the drive shaft of the towed vehicle and cut off power transmission.



#### **WARNING!**

- Attempting to steer a stationary vehicle without hydraulic power assistance will cause damage to the steering system!
- Steering without hydraulic power assistance is only possible when the vehicle is moving.
- If the engine is stalling, due to the failure of hydraulic power assistance, it is necessary to apply more force on the steering wheel, and the vehicle shall be towed slowly.
- If the air pressure in the brake system is insufficient and the spring brake is activated, the external compressed air (at least 5.5bar) or mechanical means can be used to release the brake. Refer to "Energy storage spring brake chamber-emergency release" part. Remember that the brake is released after that!



### Towing start

Towing start of the vehicle is not recommended. It is recommended to start the vehicle by jump starting. See "Jump starting/auxiliary starting". The battery and starter of the started vehicle shall be in good condition.



### Traction with damaged axle



#### **CAUTION!**

**Shut down the engine if the vehicle is lifted.**

#### **Front axle**

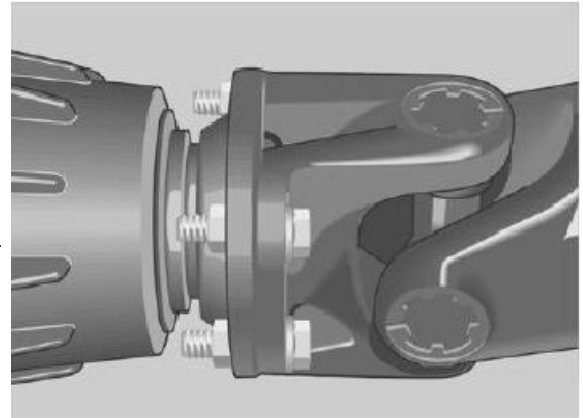
- Use special transportation equipment or lift the front axle for towing.
- If the front of the vehicle is elevated, disconnect the drive shaft from the rear axle.
- For four-axle vehicles, only the front of the vehicle can be elevated.

#### **Rear axle**

- Use special transportation equipment or elevate the rear axle for towing.
- If the vehicle is all-wheel drive, disconnect the drive shaft of the front axle.

#### **Support axle**

- Use special transportation equipment or lift the axle for towing.



## Traction and traction start

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### Emergency method of transporting the vehicle to the nearest maintenance station

- Lower the support axle wheel and screw the wheel nut back to the fixing bolt.
- Tow the vehicle slowly because the support axle is hanging on the shock absorber.
- After the repair is completed, ensure that the airbag is in place accurately.



#### **WARNING!**

If no condition is met, or the transmission is suspected to be damaged, disconnect the transmission shaft or remove the half shaft at the rear axle flange.

### After traction

- Shut down the engine.
- Apply the parking brake, and block the wheels with wedges if necessary to prevent sliding.

### Towing the vehicle with a drawbar

The towed vehicle shall have a driver for steering and braking.

- Start the engine.
- Charge the brake system until it reaches the unloading pressure of the air dryer.
- Place the transmission in neutral position of high gear range.
- Disconnect the transfer case.
- Release the parking brake.
- Tow the vehicle slowly at a speed not exceeding 50 km/h (the maximum towing speed shall not exceed 40 km/h if a hydraulic retarder is equipped, and the provisions of relevant local applicable laws and regulations shall also be observed).
- The maximum towing distance shall not exceed 100km.

### Jumper startup/auxiliary startup

Due to the low battery level, the engine cannot be started. Another battery can be used to start the engine. The auxiliary equipment shall be operated as specified. A jumper wire with adequate section area shall be used.



#### WARNING!

- Only compliant jumper wire shall be used.
- The jumper wire shall be used in accordance with the Instructions for Use.
- Only battery with the same rated voltage (24V) can be used.
- It is not allowed to use the charger or the jumper startup device that is used for auxiliary startup.

- ① Provide the battery for jumper startup      ② The battery for jumper startup is needed.

**Connect the positive and negative terminals (when the engine is shut down).**

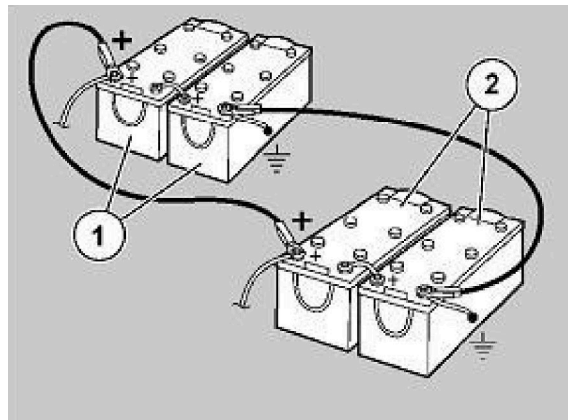
- Connect the positive terminal.
- Connect the negative terminal of the charged battery to the grounding point of the transmission or engine.



#### WARNING!

**Do not connect the grounding point to the frame!**

- Jumper wire with power main switch can also be used for jumper startup. Disconnect the power main switch; connect the negative pole of the two batteries. It shall not be switched on until connection is completed.
- It shall be confirmed that the jumper wire does not hinder the movement of the vehicle fan/belt and other parts.



## **Jumper startup/auxiliary startup**

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- Start the engine for jumper startup.
- Start and operate the engine to be started. The maximum duration is 15 s.

### **Remove the positive and negative terminals.**

- The sequence shall be reverse to the connection sequence.

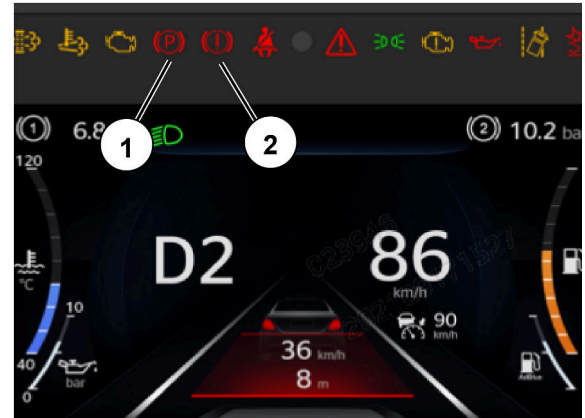
### Spring energy storage brake chamber - emergency release

When the air pressure in the parking brake circuit is lower than about 0.55 MPa, the air pressure acting on the diaphragm of the spring energy storage brake chamber is less than the spring force, and the parking brake begins to work. Meanwhile, the "STOP" indicator, brake system fault light ②, and parking brake light ① will illuminate. In case of emergency or maintenance at the service station, the spring energy storage chamber can be released by pneumatic or mechanical means.



#### **WARNING!**

- Before releasing the energy storage spring brake chamber, take the relevant measures to make sure that the vehicle cannot move itself!
- The energy storage spring brake chamber can only be released by pneumatic or mechanical means in case of an emergency or during repairing at the service station.
- After the emergency release of the energy storage spring brake chamber, accidents may occur during driving, because the air pressure of the service brake circuit I and circuit II may not enough to ensure effective braking!
- Do not start the vehicle until the parking brake signal lamp goes off!



## **Spring energy storage brake chamber - emergency release**

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### **Spring energy storage brake chamber - mechanical emergency release**

#### **Diaphragm spring brake chamber**

When the air pipeline connecting the spring brake chamber leaks and causes automatic braking, the brake can be released when the bolt ① at the rear end of the spring brake chamber is screwed out to the release position.



### Inspection of fuel tank

#### Check the condition and tightness of the fuel system.

- Inspect the pipelines and pipe joints of the fuel system (especially near the heat source) for damage and corrosion.
- If leakage, damage and other abnormalities are found, contact a CNHTC service station for repairing immediately.
- There is no need to replace the fuel hose if it is not worn.

#### Re-tighten the fuel tank strap.

When the travel distance of the vehicle reaches 2,000 km, all fuel tank straps ① shall be re-tightened to  $50 \pm 3$  N·m for the first time. After this, it shall be re-tightened every 5000 km. In case of bad road conditions, the mileage for re-tightening shall be appropriately shortened.

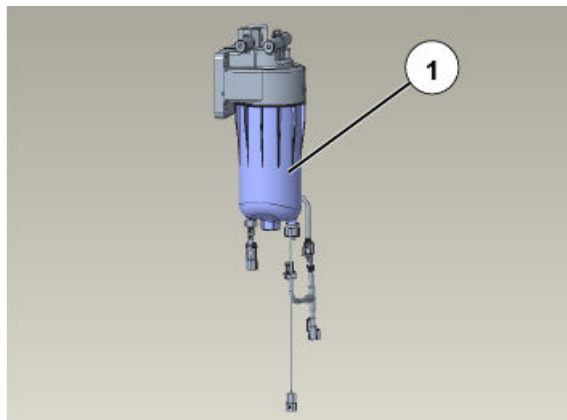


## Primary fuel filter

### Primary fuel filter

- The primary filter ① features integrated electric fuel pumping and fuel heating functions.
- It is recommended to use the electric oil pump function in winter and when replacing the filter element. Frequent use of the electric oil pumping function creates a risk of wear on engine components.
- When the vehicle is powered on, the electric pump of the primary fuel filter starts pumping fuel and stops after three minutes. If the ambient temperature is below 4°C, the fuel can be added to the primary filter.

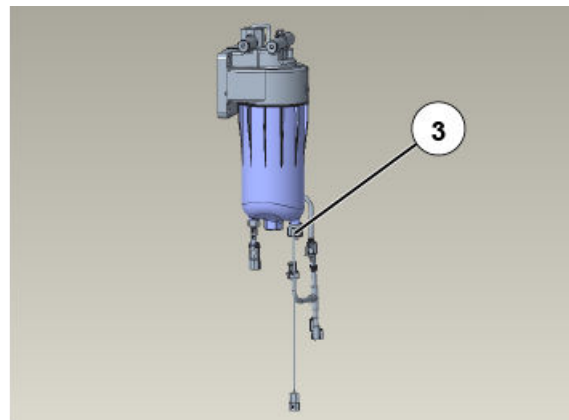
When the water level (filtered from fuel) at the bottom of the primary filter reaches the specified height, the warning prompt of water-in-fuel signal light ② will appear to remind the user to drain water in time, so as to protect the fuel system and ensure the normal operation of the engine.





Drain the impurities and water in the primary fuel filter.

- Stop the vehicle, shut down the engine and apply the parking brake.
- Unscrew the drain valve ③ at the bottom of the primary fuel filter.
- Remove impurities and water, and dispose of them properly.
- Tighten the bottom drain valve.



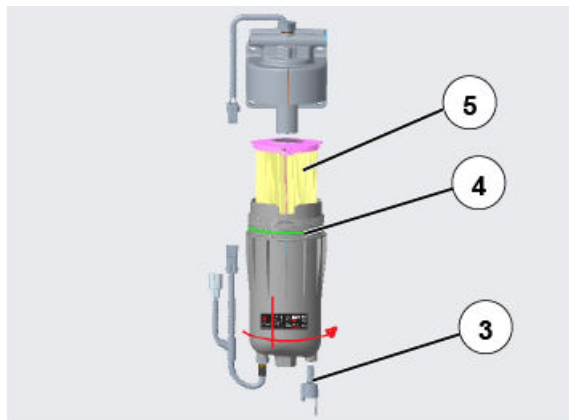
## Primary fuel filter

### Maintenance of primary fuel filter element

When using regular oils, it is recommended that the filter element be replaced every 100,000 km for tractors (please shorten the maintenance cycle appropriately for other working conditions).

#### Replacement steps

- Stop the vehicle, shut down the engine and apply the parking brake.
- Disconnect the connecting harness of the filter, and unscrew the drain valve ③ at the bottom of the primary fuel filter to drain the diesel oil in the filter.
- Remove the filter housing from the bottom of the housing with a 36mm socket wrench or from the top of the housing with a clamp wrench.
- Take out the old filter element and remove the old O-ring on the housing.
- Apply a small amount of diesel oil to the bottom seal ring of the new filter element ⑤, lubricate it and put it into the housing.
- Install a new O-ring ④ on the housing and apply clean diesel oil for lubrication.
- Pre-install the housing with the filter element on the aluminum seat, and then tighten it counterclockwise for 3.5 to 4 turns with a socket wrench or clamp wrench starting from the housing label.
- Reconnect the filter harness, energize the electric pump to exhaust the pump oil, and exhaust the fuel system when there is continuous bubble-free fuel flowing in the oil return pipe.
- Start the engine and check whether there is leakage in the fuel pipe and filter. If not, the replacement of the filter element is completed.
- Please replace the filter element at SINOTRUK service station.





**CAUTION!**

- The seal ring of the housing is a disposal part, which must be replaced with a new one every time the housing is removed for re-installation!
- Every time the housing is removed and re-installed, the gas in the fuel system must be exhausted. The engine start may be affected if the gas in the fuel system is not exhausted completely.

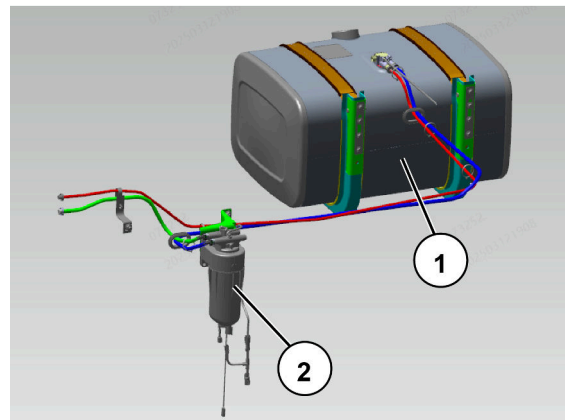
## Cold region package

### Cold region package

#### Configuration of single fuel tank:

- ① Oil tank
- ② Electric heating primary fuel filter of electric pump

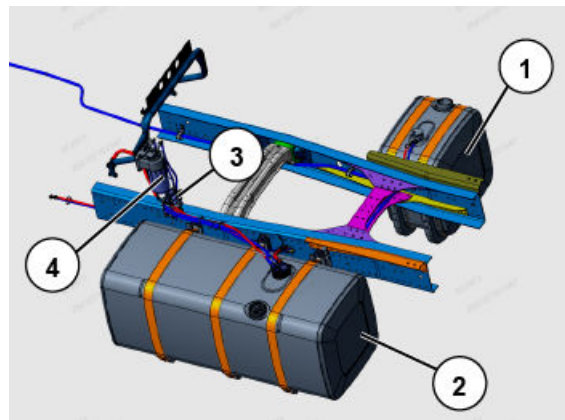
Applicable to areas with a minimum temperature of  $-25^{\circ}\text{C}$  or above in winter.



#### Configuration of dual fuel tank:

- ① Right auxiliary fuel tank;
- ② Left main fuel tank;
- ③ Electric reversing valve;
- ④ Electric heating primary filter of electric pump

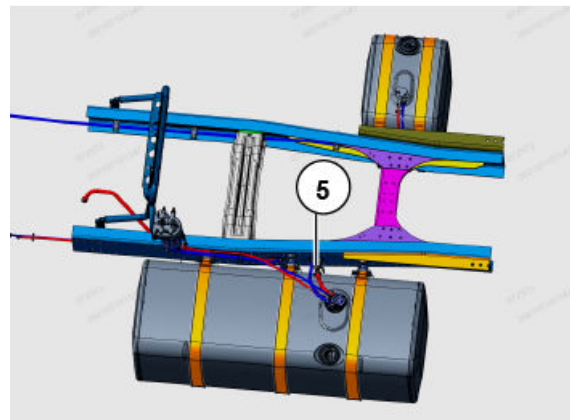
Applicable to areas with a minimum temperature of  $-25^{\circ}\text{C}$  or above in winter.



### Instructions for use of fuel heating system in cold region package

When the ambient temperature is  $\geq 4^{\circ}\text{C}$ :

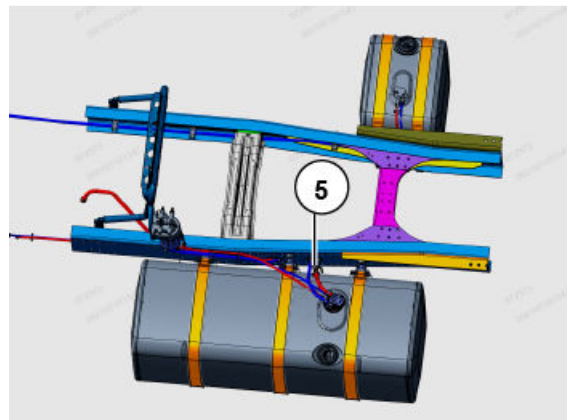
- When running the vehicle, turn off the main fuel tank outlet ball valve switch ⑤ to keep the diesel in the large fuel tank in a non-heating state.



## Cold region package

When the ambient temperature is less than 4°C:

- Before starting the vehicle, press the primary filter heating switch, open the main tank outlet ball valve switch ⑤, and check that the main and auxiliary tank conversion switch ⑥ is in the auxiliary tank oil extraction status. When starting the vehicle, the auxiliary tank diesel runs the vehicle, and the main tank diesel is heated by the engine coolant circulation.
- Observe the instrument panel coolant temperature gauge. When the engine coolant temperature is  $\geq 60^{\circ}\text{C}$ , press the upper part of the main and auxiliary fuel tank conversion switch ⑥ to switch to the main fuel tank for oil extraction.
- Before parking, press the lower part of the main and auxiliary fuel tank conversion switch ⑥ (press and hold the lock switch at the upper end at the same time) to switch the fuel supply system to the auxiliary fuel tank diesel, and let the engine run for  $\geq 2$  minutes before stopping the engine and turning off the primary filter heating switch.



- The main fuel tank should be filled with 0# diesel, and the auxiliary fuel tank should be filled with diesel according to the ambient temperature (according to GB 19147). The diesel grade can be referred to as follows:

When the ambient temperature is  $\geq 4^{\circ}\text{C}$ , add 0# diesel

When  $4^{\circ}\text{C} > \text{ambient temperature} \geq -5^{\circ}\text{C}$ , add -10# diesel

When  $-5^{\circ}\text{C} > \text{ambient temperature} \geq -14^{\circ}\text{C}$ , add -20# diesel

When  $-14^{\circ}\text{C} > \text{ambient temperature} \geq -29^{\circ}\text{C}$ , add -35# diesel



### **CAUTION!**

**Do not operate the main/auxiliary tank changeover switch at will. Reduce the number of unnecessary changeover, otherwise, it will mix the fuel and affect the engine start.**

## Fuel fine filter

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### Fuel fine filter

When the engine fuel fine filter is clogged, the engine fault warning indicator lamp



on the instrument panel will light up.

If the fuel fine filter is blocked, replace it with a new filter element in time.




## Dry air filter

**WARNING!**

- Be sure to shut down the engine when replacing the filter element, and it is prohibited to clean with oil or water.
- It is not allowed to clean the safety element.
- To reduce the risk of contaminants entering the clean air side, do not open the air filter if not necessary.
- Use original accessories when replacing the filter element.
- Ensure that the filter element is not damaged and there is no contaminants in the clean air side when replacing the filter element.

**Maintenance interval**

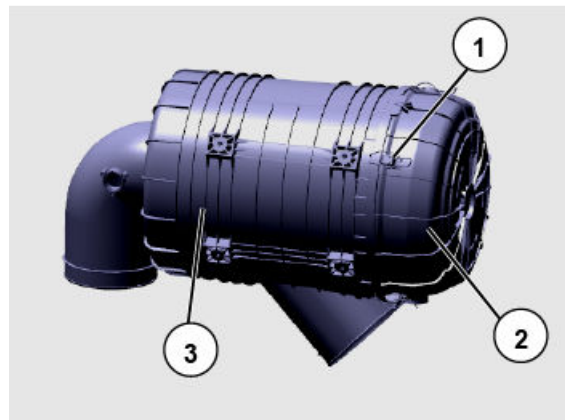
When the air filter blockage warning lamp on the instrument panel  goes on, it indicates maintenance of the air filter is required.

- For models not equipped with oil bath air filter, replace with a new main filter element of dry air filter.
- For models equipped with oil bath air filter, clean the steel wire filter element in the fuel filter first. Replace with a new main filter element of dry air filter every three times of maintenance of the oil bath air filter.
- Replace the safety filter element with a new one every 5 times the main filter element of the dry air filter is removed.

## Dry air filter

### Maintenance method

- Shut down the engine, and apply the parking brake.
- tilt the cab, see "Cab Turnover Mechanism".
- First, loosen the spring clip ① on the sealing end cover of the air filter, remove the end cover②, pour out the dust inside the end cover and wipe it clean.
- Take out the main filter element, remove the dust inside the air filter housing③ with a brush or vacuum cleaner and wipe it clean.
- Make a "✓" on the mark of maintenance times of the safety element tail every time you take out the main filter element, and replace 1 safety element every 5 times you take out the main filter element. If there is dust accumulation on the safety element, a new safety element shall be replaced immediately (rotate clockwise to remove the safety element).
- Before installing the main filter element, check whether the filter paper is broken and whether the sealant at the end face is cracking, and replace with a new filter element if there are abnormalities.
- After checking that there are no abnormalities, install the filter elements back into the housing in turn, put back the sealing end cover and tighten the spring clip.
- Finally, check whether the air intake pipeline is air-tight. In particular, check whether the hose clamp has come loose and the pipe wall is worn, so as to prevent air short circuit and stop air from getting into the engine.

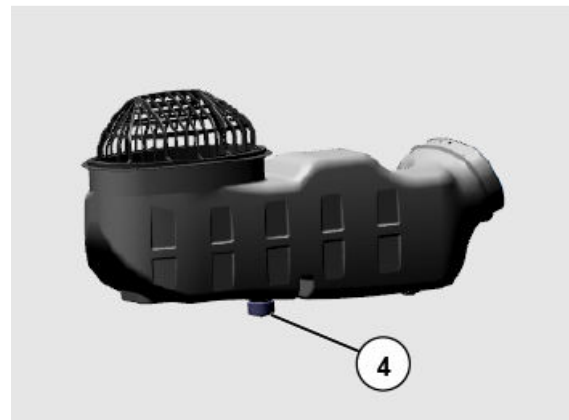


### Checking the drain valve

**WARNING!**

- Clean the drain valve regularly and check its function.
- If there are water drops in the air entering the engine cylinder, the engine will be damaged.

- The drain valve④ is located at the bottom of the air inlet tube at the intake end of the air filter, which shall be cleaned regularly.



### Clean the dust collection bag.

- In winter and dusty conditions, dust collection bags shall be cleaned every day. If the dust collection bag falls off or is damaged, it shall be replaced in time. Otherwise, it will cause early wear of the engine and turbocharger.

## Oil bath air filter

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### Oil bath air filter



#### **WARNING!**

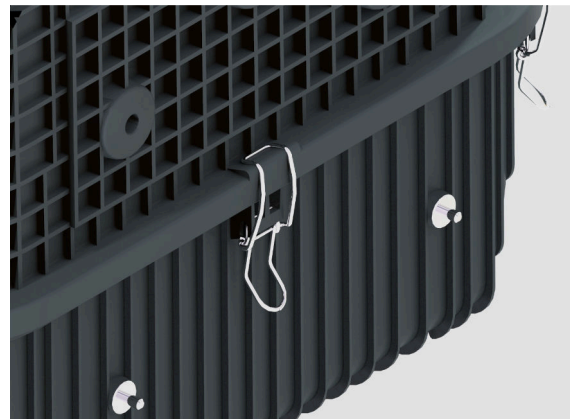
- New vehicles are not injected with engine oil before leaving the factory.
- The vehicle needs to be injected with engine oil before it is put into operation. Waste oil may be used.
- When injecting engine oil, add to an oil quantity of 4 L or an oil depth of 30 mm, and do not add too much oil.
- If the engine oil dose not flow easily when you shake the oil pan, the steel wire filter element shall be cleaned and the engine oil shall be replaced.
- Under particularly harsh service conditions, the flowing of the engine oil shall be checked every day. It can be used for 80-150 hours continuously under general working conditions. The steel wire filter element can be used for a long time and is not required to be replaced.
- Check whether the connecting bolt or drag hook between the oil pan and the filter body is loose when getting off work every day, and fasten as needed.
- For models equipped with oil bath air filter, check whether there is water accumulation in the oil pan after driving in rainy weather. If there is water accumulation, clean it in time.



### Oil bath air filter

Inspection and cleaning procedure

- Open the locking spring clips of the upper and lower housings.
- Remove the oil pan, add 4 L of oil or until the oil depth reaches 30mm.



## Oil bath air filter

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- Clean the lower filter element assembly.

Clean the fan blades and filter element with diesel fuel until no sludge is visible by visual inspection, then allow them to dry.



- Clean the upper filter assembly (using the same method as for the lower filter element).



- Reassemble the filter element assemblies.

First install the upper filter, then install the lower filter, and finally secure them with rubber gaskets, flat washers, and butterfly nuts.



- Reassemble the lower housing. Secure the refilled lower housing firmly with the spring clips.



## Desert air filter

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### Desert air filter

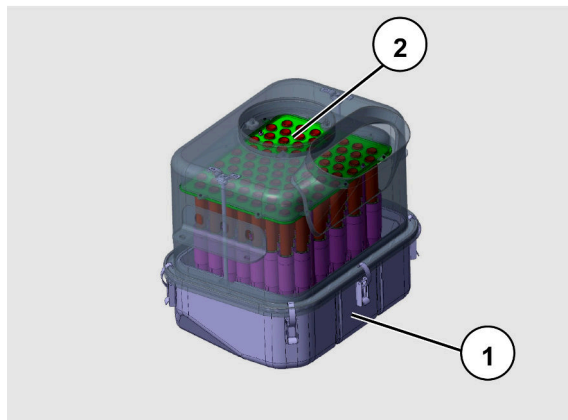
#### Maintenance interval

Under typical domestic highway conditions, the recommended maintenance interval for the filter element is 200 hours or approximately one month of operation, at which point dust removal should be performed.

In areas with poor road conditions (such as frequent dirt roads) or deserts, it is recommended to perform dust removal maintenance every 100 hours or approximately every one to two weeks in high-dust environments.

#### Maintenance Method

- 1 Remove the bottom housing ①.
- 2 Clean out the dust accumulated in the bottom housing.
- 3 Use compressed air to blow off dust from the surface of filter element ②.
- 4 Reinstall the bottom housing ①.





### Precautions

- In addition to the above maintenance, it is recommended to wash and dry the filter element in the desert air filter once a year under standard highway conditions. In poor road environments (such as frequent dirt roads) or desert regions, the filter element should be washed and dried every six months to prevent internal soil caking that could reduce filtration efficiency.
- All of the above are theoretical estimates. Due to the complex and variable operating conditions in practice, users should make adjustments accordingly. It is recommended to conduct a one-year trial based on the actual usage of your vehicle to determine the optimal maintenance plan for your vehicle.

## LNG natural gas supply system for vehicles

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### LNG natural gas supply system for vehicles



#### **WARNING!**

- Dangerous.
- LNG natural gas has an extremely low temperature at ambient atmospheric pressure:  $-162^{\circ}\text{C}$ .
- Natural gas is a suffocating gas.
- Natural gas is a flammable gas.
- Non-professionals are not allowed to operate and maintain the LNG gas supply system.
- Before maintenance, the gas in the vaporizer, buffer tank and pipeline shall be depressurized and replaced by the professionals.



#### **Re-tighten the gas cylinder strap**

After the vehicle has traveled 2,000 km, the cylinder fixing devices should be inspected and the straps retightened, and this should be done every 5,000 km thereafter.

Rear-mounted cylinder retightening torque:  $(100 \pm 10) \text{ N} \cdot \text{m}$ ; Side-mounted cylinder retightening torque:  $(50 \pm 5) \text{ N} \cdot \text{m}$ .

### Valve operation

The operation of an LNG cylinder is relatively simple; normally, only three valves require user operation daily:

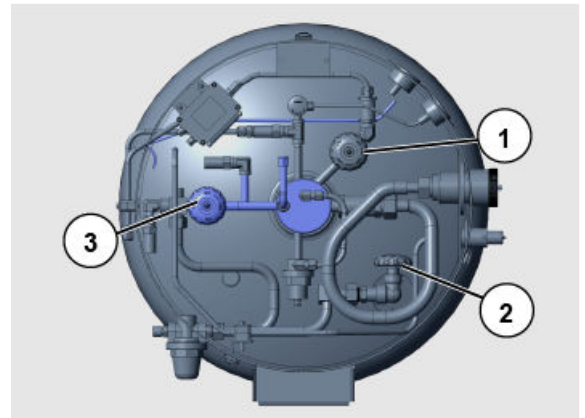
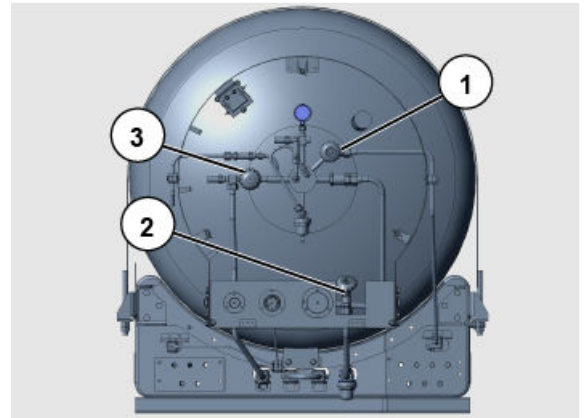
- Outlet valve ①: Keep it normally open and close it in case of fault; when reopening it, do so slowly to prevent the overflow valve from automatically shutting off.
- Pressure valve ②: Normally closed, and open it for self-pressurization when the cylinder pressure is too low, and also open valve ③ at the same time.
- Vent valve ③: It is opened for pressure relief of the gas cylinder.



#### CAUTION!

–While driving, if the vehicle experiences insufficient power due to frosting in the vaporizer or buffer tank, after pulling over and turning off the engine, wait until the pipelines have thawed before closing the cylinder liquid cutoff valve (do not close it immediately).

–After the vehicle returns to the yard or needs to be parked for an extended period, ensure that there is no low-temperature liquid gas in the pipelines (no freezing or frosting of low-temperature phenomena) before closing the cylinder liquid cutoff valve.



## LNG natural gas supply system for vehicles

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### LNG filling

#### Conventional filling

The conventional filling of LNG is completed through a separate filling hose. The filling steps are as follows:

- 1 First, release the pressure inside the cylinder to between 0.6 to 0.9 MPa, and connect the filling gun to the filling seat.
- 2 Then activate the filling machine's liquid filling switch, and the liquid will be injected through the inlet pipe inside the cylinder.
- 3 When the liquid level reaches the rated position, the filling will automatically stop.

#### Air return filling

When the pressure inside the cylinder is too high and filling is difficult, vapor return filling should be carried out. The filling steps are as follows:

- 1 Connect the filling gun to the cylinder's filling seat and the return gas gun to the cylinder's return gas seat.
- 2 Open the vent valve to reduce the cylinder pressure below the required pressure of the filling machine, then close the valve.
- 3 Start the filling pump for filling until the filling machine stops automatically, then remove the filling and return gas guns.

#### Hot cylinder filling

Cylinders that are being filled with LNG for the first time or have been out of service for more than two weeks are generally referred to as hot cylinders. The filling steps are as follows:

- 1 First, charge about 30L of LNG natural gas into the cylinder, let it stand, and cool the inner liner of the cylinder during the vaporization and pressure rise of the LNG natural gas.

2 After the pressure inside the cylinder reaches the normal working pressure, perform a gas tightness test on the system.

3 After depressurizing and reducing the pressure, you can follow the regular filling or venting filling procedures.



#### CAUTION!

**–A completely filled cylinder will experience rapid pressure increase, which may cause the safety valve to open frequently; therefore, a completely filled cylinder should be put into use as soon as possible and not stored for a long time.**

**–When the remaining liquid in the cylinder exceeds two-thirds, avoid filling if possible.**

**–It is strictly prohibited to park the vehicle in an enclosed space after the gas cylinder is filled with liquid.**

## System maintenance

- To ensure the normal operation of the vehicle, regularly check the system for sealing integrity. If any fuel leak is found, contact the China National Heavy Duty Truck service station for processing immediately.
- A vacuum failure cylinder will see its pressure rise rapidly at a rate of about 0.1 ~ 0.4MPa/h, this pressure change is very obvious, and you should contact the China National Heavy Duty Truck service station for processing immediately.
- Please have the SINOTRUK service station perform dismantling or replacement of parts and other after-sales processing.

## Precaution

Under poor road conditions, maintain low-speed driving; otherwise, it may cause fatigue damage to the cylinder support structure, leading to cylinder leakage and other safety accidents.

## Regular maintenance requirements

Maintenance content	Maintenance interval	Maintenance method
Upper connecting nut of cylinder pipe	Before each trip	Visually inspect for leakage
Vaporizer	12 months	Clean the scale on the coil
Valve	Every 7500km or 2 months	Check the closing condition and leakage
Safety valve	12 months	Send to the local technical supervision department for verification

Maintenance content	Maintenance interval	Maintenance method
Pressure gauge	6 months	Send to the local technical supervision department for verification
Vacuum degree of cylinder	12 months	Pressure test
Leak detection at each connection point of the system	Every 7500km or 2 months	Air tightness test or leak detection

## Replacement cycle of gas hose

It is recommended to replace it every two years.

## **LNG natural gas supply system for vehicles**

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### **Gas indicator**

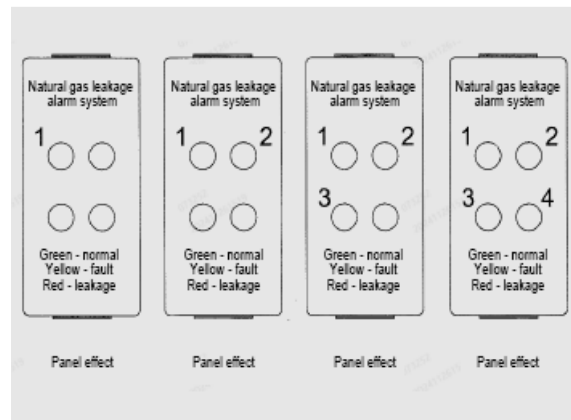
Displays the fuel remaining in the cylinder.

When the gas in the gas cylinder is low, the low gas alarm lamp on the instrument panel will light up to remind the driver to recharge in time.

### Natural gas leakage alarm

When the natural gas leak reaches the set alarm concentration, the alarm will issue an audible and visual alarm.

According to the usage environment of this product, for safety reasons, regular inspections should be carried out. The inspection cycle is 1 to 3 months and involves whether the alarm host and detector are operating normally. The detector should avoid the impact of artificially high concentrations of natural gas, which could temporarily reduce the sensitivity of the gas-sensitive elements. Avoid contamination from materials containing silicon during use to prevent damage to the detector! If a natural gas leak occurs, the host will issue an audible and visual alarm. You should stop the vehicle as soon as possible, turn off the power supply, immediately locate the leak, and take measures such as closing valves and ventilating. Do not plug or unplug the connectors between the alarm host and the detector with power on, as it may damage the internal chips of the system. If the sensor in the detector is damaged or fails, do not replace it yourself; contact SINOTRUK service station for handling.



## CNG natural gas supply system for vehicles

### CNG natural gas supply system for vehicles

#### Re-tighten the gas cylinder strap

After the vehicle has traveled 2,000 km, the cylinder fixing devices should be inspected and the straps retightened, and this should be done every 5,000 km thereafter.

Re-tightening torque:  $(90 \pm 5) \text{ N} \cdot \text{m}$

#### Composition of CNG gas system

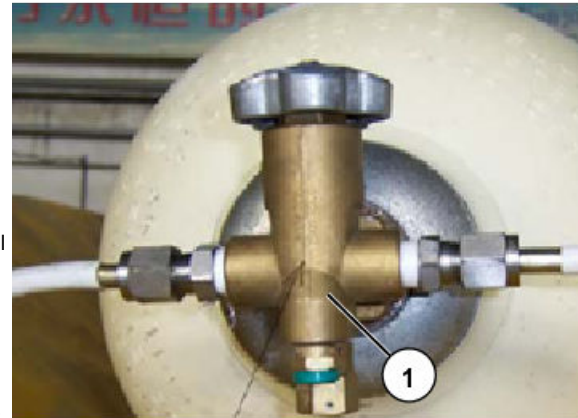
CNG gas system consists of gas cylinder and gas cylinder valve, integrated control assembly, high and low pressure filter, low pressure solenoid valve, gas cylinder pipeline, etc.

#### Gas cylinders and cylinder valves

Before starting the engine, make sure that the cylinder valve ① is open. The cylinder valve integrates a fusible plug and a rupture disc, which can ensure timely pressure release in case of high temperature or overpressure; the overflow protection device inside the cylinder valve can cut off the pipeline in time when a leak occurs in the gas supply system.

#### High and low pressure filter assembly

The high-pressure filter assembly ② and the low-pressure filter assembly ③ can effectively filter water and impurities from natural gas, thereby better protecting the engine.

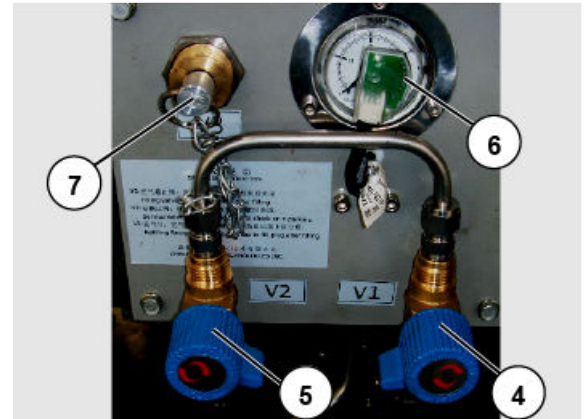




### Integrated control assembly

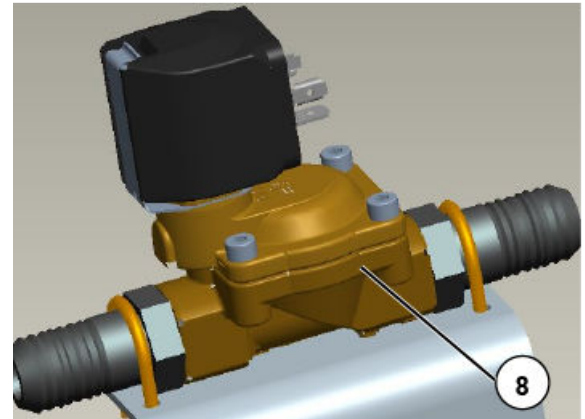
Integrated control assembly consists of the cutoff valve V1④, cutoff valve V2⑤, barometer ⑥ and filling port ⑦.

- Cutoff valve V1 represents the filling cutoff valve, which should be opened during filling and closed after filling is completed.
- Cutoff valve V2 represents the supply cutoff valve, which should be opened before the vehicle operates and closed during vehicle maintenance and long-term parking.
- The barometer displays the system gas pressure.



### Low pressure solenoid valve

The low-pressure solenoid valve ⑧ is used to cut off the flow of natural gas; this valve is normally closed and opens when electrified.



## CNG natural gas supply system for vehicles

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### High pressure reducer

Refer to the engine maintenance section.

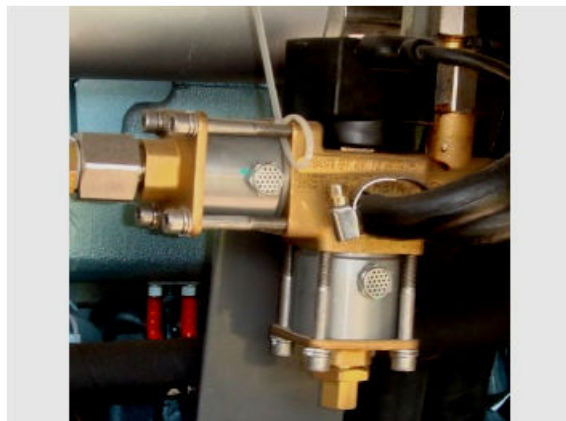
### Filling of CNG gas system

- When using gas, strictly follow the operating procedures to ensure the pressure in the cylinder is above 5 MPa. If the cylinder pressure is below 5MPa, consider recharging; if the pressure in the cylinder is below 2.5MPa, recharge immediately.
- The CNG used by the vehicle should meet the Compressed Natural Gas as Vehicle Fuel (GB 18047).



#### **CAUTION!**

- When filling, the engine should be turned off, and the power supply should be disconnected.
- Because a large amount of heat will be released during the filling process, and the gas temperature is high, the pressure will drop after the gas is sufficiently cooled, which is normal.



### Operating specifications

CNG vehicle drivers shall receive professional technical training, be familiar with the use, maintenance, and safety requirements of natural gas engines, especially have an in-depth understanding of the natural gas system, to ensure normal use and safe operation.

### Inspection before driving

Generally, after parking at night, record the pressure value indicated by the integrated panel barometer, and observe it again before driving the next day. Compare the two values to see if there is a significant drop to verify whether there is a gas leak in the natural gas system. If the pressure drops significantly, locate and eliminate the leak.



#### CAUTION!

The instrument in the cab displays the remaining ratio of compressed gas in the cylinder, not the actual pressure. The actual pressure should be based on the pressure indicated by the integrated panel barometer.

### Handling of problems during driving

When the engine's circulating water temperature is normal, the pressure reducer will not exhibit frosting or ice blockage. In the cold winter, the exterior of the pressure regulator may have a thin frost, but it will not affect normal operation.

While the vehicle is in operation, if a gas leak is detected or significant noise occurs, the vehicle should be stopped immediately for inspection, and after troubleshooting, continue driving.

### Emergency treatment of faults during driving

If a large amount of natural gas leaks due to natural gas pipeline rupture or ferrule loosening while the vehicle is in motion, pull over immediately, cut off the power supply, and close all gas valves, then troubleshoot.

In case of severe gas leak and the failure of the overflow valve, and if the cylinder cutoff valve cannot be closed, evacuate personnel, isolate the scene, and separate from fire sources. At the same time, report to local fire, traffic, and other relevant departments, and wait until the natural gas has dissipated before handling.

If a vehicle catches fire, immediately close the main power switch and close all gas valves if possible, and call for help immediately.

When filling, the engine should be turned off, and the power supply should be disconnected.

## CNG natural gas supply system for vehicles

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### **Requirements when stopping driving**

When the driver leaves the car or stops temporarily for more than 10 min, the power should be turned off, and the engine should be turned off.

Leak detection is only allowed with a gas leak detector, soap water, or other non-corrosive foaming water. Open flames are strictly prohibited for leak detection.

When maintaining the vehicle, do not hit or collide with the natural gas system devices and keep them away from fire sources more than 10m. Operation of the vehicle is strictly prohibited when there are faults in the devices or leaks in the system.

Before starting the engine, slowly open each gas supply valve to prevent the overflow valve from activating.

### **Maintenance and service**

#### **Routine maintenance**

In addition to following the vehicle's maintenance requirements for routine maintenance, the following standards should also be followed for routine maintenance of the natural gas system. Higher-level items include all items of the previous level.

#### **5000km maintenance**

Check for gas leaks or damage in all high and low-pressure pipe connections, gas valves, pressure regulators, and other system components. Ensure that all components are securely installed, that pipeline clamps are tightened, that pipelines do not interfere with other components, and troubleshoot any existing issues.

#### **10000km maintenance**

Check for leaks in the pressure regulator; check whether the outlet pressure of the pressure regulator is normal and whether the pressure relief valve of the pressure regulator is working properly.

#### **50000km maintenance**

Test the performance of the pressure regulator. If the performance cannot be restored to a level close to that when it was new, it should be replaced. Check for damage and aging of the circulating water hose.

Maintenance of high and low-pressure filters is described in the vehicle maintenance section for natural gas engines.

#### **Replacement cycle of gas hose**

It is recommended to replace it every two years.

#### **Precaution**

Disassembly and replacement of natural gas supply system components are strictly prohibited without permission.

Fill out and keep records related to the natural gas system for reference during repairs.

## Electrical system

To ensure safety, it is required to disconnect the battery or battery main switch before repairing the electrical system.



### WARNING!

Hydrogen and oxygen mixture will be generated in the closed battery box. When the battery terminal is disconnected, the electrical equipment or monitoring device in operation will generate sparks, which will ignite the gas. Therefore, before disconnecting the battery terminals, it is required to dry or clean the battery box with compressed air.

- Do not start the engine before ensuring that the battery is firmly connected.
- Do not disconnect the battery while the engine is running.
- Connect the battery and at least partially charge it before traction starting. See "traction and traction starting".
- Do not jump start the vehicle with the charger.
- Disconnect the positive and negative poles before charging.
  - Disconnection sequence: the negative pole first and then the positive pole.
  - Connection sequence: the positive pole first and then the negative pole.
- If the vehicle is out of use for a long time, charge the battery every four weeks.
- Make sure that only the correct measuring equipment is used to measure the voltage.
- Avoid short circuit. The input resistance of the measuring equipment shall be at least 10M  $\Omega$ .
- Turn off the ignition switch before disconnecting and connecting the plug of the electronic control unit.
- If obvious corrosion or visible cracks are seen on the plug or socket, it shall be replaced.
- When washing the car:
  - Protect the socket, starter and generator from moisture (water splash). Tractor and trailer sockets shall be cleaned with 6-8 bar compressed air. Water or mechanical objects shall not be used.
  - During cleaning, the key switch and lighting circuit shall be turned off.
- If the vehicle is equipped with AC generator and 400 V three-phase AC socket (such as refrigerated truck), the compressed air can be used for cleaning only after the engine and external power supply are turned off.
- During carrying out electric welding, the following regulations shall be followed:
  - Disconnect the battery and connect the removed positive and negative cables.
  - Do not use any power supply other than DC power supply, and ensure that the polarity of the electrode is correct.
  - Close the mechanical master switch of the battery.

## Electrical system

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- The electromagnetic switch connector shall not be connected with the battery. It is not allowed to disconnect or remove these cables and connect them together.
- The grounding wire of welding equipment shall be as close as possible to the welding and are grounded at a place with satisfactory conductivity.
- The cable of welding equipment shall not be placed parallel to the vehicle cable.
- The parts to be welded shall be in good contact to ensure satisfactory conductivity. For example, the negative clip of the welding equipment shall be used to press the parts to be welded together.
- The battery box of the truck, dump truck and cement mixer is provided with a power adapter of the upper position lamp. The power on one side shall be less than 100W.



### **WARNING!**

The user shall not add electrical equipment or change the electrical circuit of the vehicle without authorization; otherwise the vehicle electrical system may fail, resulting in serious consequences!

### Cleaning and maintenance of the vehicle

Regular, professional maintenance helps maintain the value of your vehicle.

#### Car wash



##### **WARNING!**

Shut down the engine before washing the vehicle if the vehicle is equipped with a high-voltage electrical system (with an operating voltage of more than 24V).

- The vehicle can only be washed in a fully equipped cleaning place, and measures shall be taken to avoid environmental pollution.
- In the first few weeks, new vehicles and newly painted vehicles shall only be washed with clean water, and the steam cleaner shall not be used in the first six weeks.
- Flush the sponge for vehicle washing frequently.
- When washing the vehicle, do not expose the vehicle to the sun.
- Clean the wheel and wheel housing with brush and water.
- Use a cleaning solvent or special cleaning agent according to the degree of dirtiness when flushing alloy wheels.
- Do not spray water on the device at operating temperature.
- Do not wet the alternator and starter.
- If steam cleaner is used, the manufacturer's operating requirements shall be strictly followed, and the distance between nozzle and paint working surface shall be at least 30 cm.



##### **WARNING!**

When using a steam cleaner, do not spray water directly into the steering knuckle.

- Wash the vehicle more frequently in winter.
- Do not apply paint or oil onto the brake pipeline, or use gasoline, benzene, mineral oil, and etc. to treat the pipeline. In particular, do not allow the brake hose to contact with the spray or lubricating grease.

#### **Paint maintenance**

- Minor paint damage should be repaired immediately.
- Anti-corrosion protection shall be provided on the painted surface in time.

#### **Rear-view mirror**

- Clean the dirty mirror surface with a glass cleaner.

#### **Clean the interior of the cab**

- Clean the steering wheel, gear lever, dirty interior trim and carpet with warm water and cleaning agent solution. Do not use detergents.
- Greasy dirt can be removed with alcohol (use of gasoline is not allowed).
- Wash the curtain with flexible cleaning agent at a temperature below 30 °C.
- Wash the seat belt with warm water and soap, and do not use chemical cleaning agent.
- In frosty weather, seal the doors and windows with talcum powder to prevent doors and windows from bonding with sealing strips.

## **Cleaning and maintenance of the vehicle**

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### **Carry out cleaning and maintenance of the seats and sleeping berths.**

- Clean plastic parts (such as belt, support frame and control rod) with damp cloth. If it is very dirty, use solvent cleaner (such as cleaning agent).
- Clean the interior trim and cushion with wet cleaning cloth, or dry foam and soft brush.



### List of Dirts

The substances listed in the table below can be purchased from chemical or special stores. Do not spill these substances on the material surface. The following treatment methods are based on experience. It is advisable to try each substance at a hidden location. We are not responsible for any damage.

#### Water-soluble dirt

Dirt type	Cleaning agent	Treatment method
Blood stains, eggs, excreta, urine stains	Cold water, shampoo, carpet, foam solvent	Apply the reagent onto a soft cotton cloth until the dirt begins to dissolve. Do not rub the cloth with force; otherwise the surface will be damaged. If necessary, wipe from the margin to the center, and then rinse it with water.
Fatty substances, vomitus, coffee with cream, hot chocolate, lipstick, mayonnaise milk, ice cream	Warm water, shampoo, liquid carpet foam, benzene, stain remover	The same as above
Ordinary alcohol, beer, foam drink, fruit juice, lemonade, fruit, liquor, sugar-containing solution	Warm water, shampoo, solvents such as benzene, methylated solvent and stain remover can only be used after the dirt becomes dry	The same as above
Butter, polishing wax, pigment (bright), grease, varnish, resin, carbon, nail polish, oil, paint, soot, tar	Cleaning agent, stain remover, shampoo	A) Apply the reagent on soft cotton cloth. Until the dirt begins to dissolve. Do not rub the cloth with force; otherwise the surface will be damaged. If necessary, wipe from the margin to the center, and then rinse it with water.
Paraffin wax, stearin candle	Benzene, try to scrape it off	The same as above
Chewing gum	Icing spray	Spray, use a hard object (hammer) to break it into pieces
Rust	Dissolve 15% sodium fluoride in water, use one scoop of sodium fluoride for every 100 ml of water	Use as described in A).

## Chapter V Vehicle Maintenance

### Maintenance of aftertreatment system of MC China VI engine

In order to meet the requirements of China VI emission regulations, the high-efficiency SCR technical route of DOC oxidation catalytic converter + DPF diesel particulate filter + SCR selective catalytic reduction converter + ASC ammonia escape catalyst is adopted for the aftertreatment system of SINOTRUK's China VI diesel engine. The China VI post-processor of SINOTRUK is equipped with 2 NOx sensors, 3 exhaust temperature sensors, 1 differential pressure sensor, and 1 AdBlue nozzle.

#### DPF system

The DPF system mainly consists of post injection system, DOC assembly and DPF assembly.

Diesel engine exhaust contains inhalable particles, which seriously harms human health. The China VI emission standard not only imposes stricter restrictions on the particle mass (PM), but also puts forward requirements for particle number (PN). SINOTRUK's China VI diesel engine uses a catalytic particulate filter (DPF) that meets the China VI emission regulations.

DPF is a bag-type particulate filter with wall-flow structure. Its working principle is as follows: The exhaust gas flows through the honeycomb bag-type particulate filter and the airflow passes through the wall surface, leaving the particles in the bag. Most of the particles are captured in this way. Particle trapping occurs continuously, leading to more particle accumulation in the DPF and eventually the blockage of DPF. Carbon particles must be removed through regeneration.







#### DPF regeneration

DPF regeneration modes include passive regeneration and active regeneration. The DPF regeneration strategy of SINOTRUK's China VI post-processing system is mainly based on passive regeneration, supplemented by active regeneration.

DPF active regeneration does not occur continuously. It only happens when the vehicle mileage or particle trapping weight meets the limit requirements and ECU controls the post injection device to inject a certain amount of fuel into the exhaust pipe; Under the action of DOC (oxidation catalyst), high temperature is generated by oxidation and carbon particles accumulated on DPF are burned off, thus realizing DPF regeneration. DPF active regeneration mode can be divided into two types: driving regeneration and parking regeneration. Driving regeneration means that the vehicle driver does not need to carry out any operation on the vehicle. When the regeneration activation conditions are met, ECU automatically controls regeneration activation. Parking regeneration is to realize DPF parking regeneration of the vehicle by operating the DPF active regeneration button.

## Maintenance of aftertreatment system of MC China VI engine






The DPF regeneration operation interface consists of 4 indicator lights and 1 button switch. See the table on the next page for details.

	DPF regeneration state indicator light is used to remind the driver that during regeneration activation, the exhaust temperature is high and attention should be paid to driving and operation safety.
	The DPF carbon loading state indicator light reminds the driver that the engine has conditions (medium and high loads) to activate regeneration.
	The MI light, when lit at the same time as DPF carbon loading status indicator, reminds the driver of the need for regeneration as soon as possible.
	The engine fault indicator, when lit at the same time as the DPF carbon loading status indicator, indicates that the carbon loading is too large to be regenerated and needs to be handled at the service station.
	DPF parking regeneration button is applied to activate parking regeneration.
	DPF regeneration prohibition button is applied to prohibit DPF active regeneration.

## Maintenance of aftertreatment system of MC China VI engine

When a standard high-speed towing vehicle is in operation, the DPF carbon deposition and the regeneration strategy indicated by the warning light can be categorized into 4 modes.

NOTE: The DPF indicator light and regeneration strategy for special vehicles shall be subject to the dedicated vehicle instructions.

	Mode 1	Mode 2	Mode 3	Mode 4
<b>Carbon deposit</b>	Less carbon deposits, no need to activate active regeneration	More carbon deposits, vehicle automatically activates active regeneration	Heavy carbon deposits, active regeneration needs to be activated immediately	Excessive carbon deposits, unable to activate active regeneration
	Off	On	On	Flashing
	Off	Off	On	Off
	Off	Off	Off	On
<b>Driver's operating requirements</b>	N/A	Conditionally choose continuous operation under high-speed and heavy-load conditions for more than 40 minutes	Must be completed on the same day: continuous operation for more than 40 minutes under high-speed and heavy-load conditions or parking regeneration	Please go to the service station for handling
	Used during parking regeneration. When the DPF requires regeneration, the vehicle should idle in neutral gear. Once the water temperature meets the requirements, press this switch for 8 seconds and then release it to enter parking regeneration mode			Invalid operation
	It flashes when regeneration is activated, indicating that the exhaust temperature is very high. Pay attention to driving safety			

## Maintenance of aftertreatment system of MC China VI engine

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**Mode 1:** It indicates that there are less carbon deposits and regeneration does not need to be activated. At this time, the driving regeneration will not be activated automatically, but the parking regeneration can be activated through the parking regeneration button.

**Mode 2:** The carbon deposit has reached a state where regeneration can be activated, indicating that the carbon deposit indicator light is activated. During normal driving, if the vehicle operating conditions meet the regeneration activation conditions, active regeneration will be activated automatically, and the DPF regeneration indicator light will illuminate to remind the driver that the exhaust pipe temperature is high and that attention should be paid to driving safety. Parking regeneration can also be activated through the parking regeneration button.

**Mode 3:** When the DPF carbon loading status indicator and MIL are on at the same time, it indicates that there are heavy carbon deposits in DPF. If active regeneration is not carried out again, excessive carbon deposit in DPF will eventually lead to failure of active regeneration. Remind the driver to carry out parking regeneration immediately after stopping operation. When the parking regeneration button activates regeneration, the DPF regeneration indicator light will illuminate to remind the driver of high-temperature operation safety.

**Mode 4:** If the regeneration operation is still not carried out in time after mode 3, or the regeneration operation is incomplete, mode 4 will be activated, and the DPF carbon loading status indicator and engine fault indicator will illuminate to remind the driver that active regeneration is prohibited and needs to be handled at a service

station. At this time, active regeneration is prohibited and the regeneration button is in an invalid state.

### Parking regeneration trigger

The following conditions shall be met to trigger parking regeneration:

- The amount of carbon deposited in the DPF meets the regeneration state and does not exceed the upper limit, and the severe carbon loading state results in the engine malfunction light in the off state;
- The engine is idling; the vehicle is in neutral gear; parking brake is engaged;
- Long press the parking regeneration switch for 8s and then release it.

After the parking regeneration is triggered, ECU automatically controls to increase the diesel engine speed and the exhaust temperature.

When the exhaust temperature rises to a reasonable temperature, ECU controls post injection system to inject atomized diesel oil into the exhaust gas. The diesel oil is oxidized in DOC to generate a large amount of heat, while the exhaust temperature rises above 550°C. At this time, the regeneration status indicator light keeps flashing to remind the driver to pay attention to operational safety.

Parking regeneration needs to be carried out continuously. The duration is about 45 minutes to 60 minutes. Please be sure to reserve enough workable time before triggering parking regeneration.

### Parking regeneration stop

After the parking regeneration is completed, the regeneration mode will be automatically exited, and the carbon deposits will be cleared.

The light for carbon deposits and the regeneration status light will go

out automatically, and the engine speed will automatically return to low idle speed after the regeneration is completed. Try to avoid controlling the engine shutdown and other operations during regeneration, unless failure to shut down or perform other operations will result in danger. The exhaust temperature is very high during regeneration, and a sudden shutdown prevents the heat from dissipating. If it is necessary to stop the operation in the regeneration process, press and hold the parking regeneration switch for 10 seconds or step on the brake/clutch/accelerator pedal to directly exit the parking regeneration.



### CAUTION!

- After the severe DPF carbon load indicator is displayed on the instrument panel, in order to prevent the DPF from being burnt out, the active regeneration will be stopped. At this time, the engine has a regeneration-related fault and enters the cleaning mode. The engine should be returned to the service station for ash cleaning.
- In order to ensure the normal operation of DPF, it is necessary to carry out periodic back blowing and ash cleaning for DPF.
- After entering the regeneration state, the engine idle speed will increase to 800 r/min.
- At low speed operation, the active regeneration may be interrupted but will restart when the speed and load increase again.



### WARNING!

- The exhaust temperature is high during active regeneration, so it is forbidden to carry out regeneration in gas stations, places with high dust or other areas containing flammable and explosive hazardous chemicals.
- The "No regeneration" button is used in special occasions. When the vehicle enters a gas station or an area with high dust or other flammable and explosive hazardous chemicals, the driver needs to press this switch in advance to prohibit all active regeneration.
- During the regeneration process, the exhaust temperature is extremely high. It is strictly prohibited to approach the muffler and exhaust pipe. Standing or piling up articles downstream of the exhaust pipe outlet is strictly forbidden.
- Inferior oil products will not only greatly shorten the mileage and time of ash cleaning, but also poison DOC and DPF, resulting in failure to complete regeneration smoothly. Be sure to use fuel and engine oil that comply with China VI regulations.

### Maintenance of DPF system

The maintenance of the DPF system is mainly the cleaning process of DPF carrier.

The specific removal and installation steps of post-processing during ash cleaning are as follows:

- 1 Loosen the fixing bolts of the upper trim cover of the post-processor and remove the upper trim cover;
- 2 Loosen the fixing bolts of the trim cover bracket and remove the trim cover bracket;
- 3 Remove the differential pressure sensor pipe connector, loosen the upper and lower clamps of the air deflector, remove the air deflector and take out the DPF assembly;
- 4 After cleaning, install the DPF. Install the DPF into the post-processor. Tighten the V-type clamps at both ends of the air deflector. Install the differential pressure sensor pipe and trim cover bracket and trim cover. Tighten the V-band clamps to a torque of  $22 \pm 2 \text{ N}\cdot\text{m}$ .

NOTE:As the front and rear sealing gaskets of the DPF are easy to be damaged during removal, the corresponding clamps and sealing gaskets must be replaced with new ones after each DPF maintenance.



### Ash removal interval of DPF assembly

DPF ash removal shall be carried out once every 300,000 km for highway vehicles (tractors and cargo trucks) under standard load.

Engineering vehicles (regular dump trucks and mixer trucks) and sanitation vehicles shall be subject to ash removal once every 200,000 km.

For special vehicles used for long-time parking operations such as engines and pump trucks for lifting purposes, the ash shall be removed once every 4000h of engine running. (4000h is calculated based on the fuel consumption of about 20kg per hour)

### Precautions for DPF system

- It is strictly prohibited to remove the ash from DPF by knocking or flapping. Improper cleaning methods may damage DPF.
- Ensure that the DPF is removed and installed correctly. The clamps and sealing gasket cannot be reused.
- Ash removal mileage and time are affected by many factors, including engine operation conditions, quality of oil and fuel applied, etc. When the engine operates for a long time without achieving the conditions of active regeneration, the ash removal mode can be activated in advance.
- During regeneration, the exhaust temperature is very high. Under certain driving conditions, for example, at low speeds, the temperature may become extremely high. Avoid driving or parking in inappropriate locations and stay away from areas containing flammable materials or gases.

- Regularly check the DPF system to ensure that there is no leakage in fuel and air pipelines, and that harness connectors and other electrical components are functioning normally.
- During driving, constantly monitor the relevant indicator lights on the instrument panel and keep an eye on whether the DPF system needs regeneration and its regeneration status.

### Maintenance of SCR system

#### Regularly check and add the aqueous AdBlue solution

Aqueous AdBlue solution (the quality and performance shall meet the requirements specified in GB 29518 standard) needs to be purchased from authorized retailers or professional manufacturers. When filling, it is recommended to use professional filling equipment to prevent splashing of aqueous AdBlue solution.

It is forbidden to use self-made or substandard AdBlue solution and other alternative liquids, otherwise it will affect the normal operation of the system and shorten its service life. The loss caused thereby is not within the range of warranty. The aqueous AdBlue solution will freeze at about -11°C. As the SCR system has a heating function, it can ensure normal starting and driving of the vehicle.



#### WARNING!

Aqueous AdBlue solution is corrosive to the skin. If it accidentally touches the skin or eyes during filling, rinse it with water as soon as possible; if the pain persists, please contact medical assistance. If swallowed accidentally, seek medical attention immediately!

## Maintenance of aftertreatment system of MC China VI engine

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When the liquid level of AdBlue tank is lower than 10%, the low AdBlue liquid level indicator light on the instrument panel flashes, and the aqueous AdBlue solution shall be filled in time. When the AdBlue tank level is lower than 2.5%, the engine will limit torque and speed.

### **Avoid long-term operation at low load**

The vehicle is running at low load for a long time, the exhaust temperature is low, the local temperature of the aftertreatment device is too low, and the outside temperature is low, so the sprayed AdBlue is not easy to decompose, and crystallization occurs in the exhaust aftertreatment device. A small amount of AdBlue crystallization will not affect the normal work of the whole aftertreatment system. When the large-scale crystallization occurs, it will lead to an increase in fuel consumption. When the OBD system monitors that the emission does not meet the regulatory requirements, it will limit the speed and torque of the vehicle, which will affect the operation of the vehicle. Please go to the service station in time for handling.

### Maintenance contents of SCR system

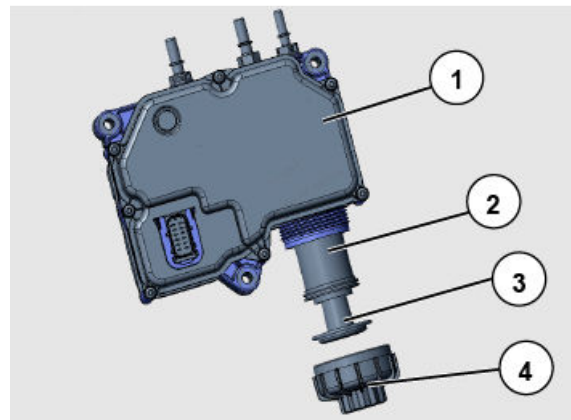
The SCR system shall be maintained in the designated service station of SINOTRUK. The maintenance contents include: replacing the 3D filter screen of AdBlue level quality sensor and filter element of AdBlue pump, cleaning the AdBlue pump, cleaning the AdBlue nozzle, cleaning the AdBlue tank and SCR system pipeline.

#### Replace the filter element of AdBlue pump

- 1 Remove the AdBlue filter cover ④.
- 2 Pull out the pressure balance element ③ and the used filter element ② from the AdBlue pump housing ①;
- 3 Put the pressure balance element ③ and the new filter element ② into the AdBlue pump housing ①;
- 4 Screw in the AdBlue filter element cover ④ to a tightening torque of 20N·m.

#### Check the AdBlue level, temperature and quality sensor

Check and clean the breather pipe during the first maintenance, and then clean it every 5,000 km.

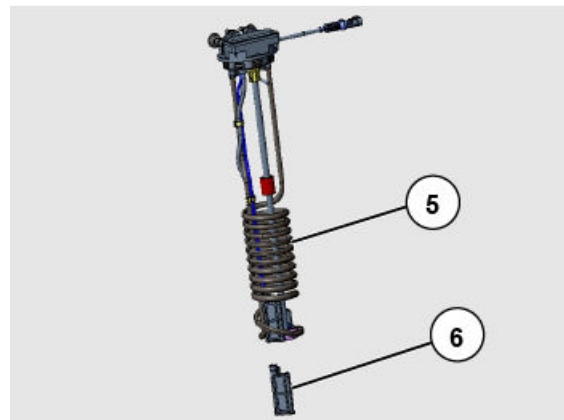


## Maintenance of aftertreatment system of MC China VI engine

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### Replace the 3D filter screen of AdBlue level quality sensor of AdBlue pump

- 1 Pull out the 3D filter screen ⑥ from the AdBlue level quality sensor ⑤;
- 2 Insert the new 3D filter screen ⑥ into the AdBlue level quality sensor ⑤.



### Precautions for using SCR system

- 1 After the diesel engine is started, when the diesel engine speed and exhaust temperature reach the set values, the SCR system starts to work. After the diesel engine stops, SCR system enters the reverse pumping stage to empty the aqueous AdBlue solution in the system. This stage will last for two to three minutes, and the main power switch shall not be disconnected when the system is still working.
- 2 After the SCR system is normally shut down (the entire reverse pumping process is completed), it can remain shut down for 4 months in an environment of  $-40\sim 25^{\circ}\text{C}$  without the need for disassembly, provided the pipelines and electrical wiring harnesses are not disconnected during this period. To prevent the evaporation of water vapor from the aqueous AdBlue solution in the AdBlue pump and AdBlue nozzle, it is recommended to fill the AdBlue tank before shutdown to minimize evaporation in the pipelines. At higher temperatures, the upper limit of downtime without disassembly will be reduced accordingly. After the time limit expires, carry out trial running before starting the system by the following steps to ensure its normal startup:
  - (1) Refill the AdBlue tank with aqueous AdBlue solution;
  - (2) Replace the AdBlue pump filter element;
  - (3) Start the SCR system;

- (4) If the system starts abnormally, turn off the system and restart the system after the ECU main relay stops working (the stopping time varies depending on different applications). If it still fails to start, contact a SINOTRUK service station for help.
- 3 SCR system components should be protected from direct exposure to mechanical and thermal shocks, their protective covers should not collect stones, dirt or other debris, and should be kept away from heat sources such as exhaust pipes, turbochargers and engines.
- 4 The AdBlue pump and AdBlue nozzle are waterproof and dustproof to some extent, but they shall be prevented from flooding or impact of high-pressure water gun. Lubrication is not recommended for pipeline joints, and it is forbidden to lubricate electrical interfaces.
- 5 The AdBlue pipeline and wiring harness shall be securely fixed, without looseness or bending; ensure that the cooling water pipeline of the AdBlue nozzle is free from leakage and blockage, and has sufficient water flow; ensure that the AdBlue tank heating pipeline is firmly fixed and functions normally.
- 6 In order to prevent AdBlue from freezing and cracking the AdBlue tank in a severe cold climate environment, it is strictly forbidden to fill the AdBlue tank too full when filling AdBlue. About 10% of expansion space shall be reserved.

## Maintenance of SCR System

### Maintenance of SCR System

**Regularly check the level of aqueous urea solution and add aqueous urea solution.**

Aqueous urea solution (conforming to GB 29518 Diesel engines NO<sub>x</sub> reduction agent-Aqueous urea solution (AUS 32)) shall be purchased from authorized retailers or professional manufacturers. During filling, professional filling equipment shall be used to prevent splashing of aqueous urea solution .

#### Maintenance interval of urea filter element

Maintenance interval of urea filter element	First maintenance mileage or hours (whichever comes first) )	Maintenance interval mileage or hours (whichever comes first)	Condition description (load characteristics, environment, climate, domestic or overseas)
	Every 120,000 km or 12 months	Every 120,000 km or 12 months	Courier and express delivery (when the average fuel consumption is less than 30L/100km)
	Every 100,000 km or 12 months	Every 100,000 km or 12 months	Light load condition (when the average fuel consumption is 30-40L/100km)
	Every 80,000 km or 12 months	Every 80,000 km or 12 months	Medium load condition (when the average fuel consumption is 40-50L/100km)
	Every 40,000 km or 12 months	Every 40,000 km or 12 months	Heavy load condition (when the average fuel consumption is greater than 50L/100km)
	After 40,000 km (30,000 km under harsh conditions) or 12 months	After 40,000 km (30,000 km under harsh conditions) or 12 months	Municipal vehicles, urban construction engineering vehicles and dump trucks (Harsh conditions means the vehicle is seriously overloaded when running, with poor road condition and dusty environment.)
	After 1,000 hours (working hours) or 12 months	Every 800 hours (working hours) or 12 months	Cement mixer, mining truck

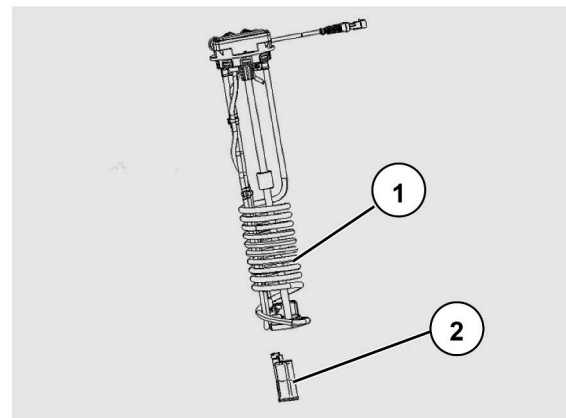
### Maintenance content of the electronic control SCR system

Please visit a special service station for the maintenance of the electronic control SCR system. The maintenance content includes: replacement of the 3D filter screen of the urea level quality sensor and the filter element of the urea pump, and cleaning of the urea pump, urea nozzle, urea

tank and the pipeline of the SCR system. When adding urea, add genuine urea, pay attention to the sanitation around the filler port, and reduce the dirt entering the urea tank to avoid affecting the service life.

### Replacement of filter element of urea level sensor

- 1 Pull out the 3D filter screen ② from the urea level sensor ①;
- 2 Insert a new 3D filter screen ② into the urea level sensor ①;

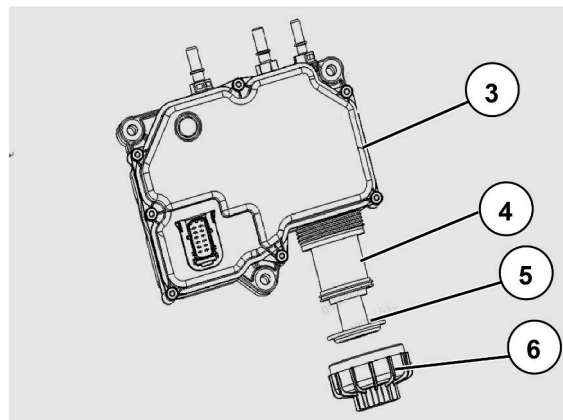


## Maintenance of SCR System

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### Replacement of filter element of urea pump.

- 1 Remove the urea filter element cap ⑥;
- 2 Pull out the pressure balance element ⑤ and the old filter element ④ from the urea pump casing ③;
- 3 Put the pressure balance element ⑤ and the new filter element ④ into the urea pump casing ③;
- 4 Screw in the AdBlue filter element cover ⑥ to 20 N·m.



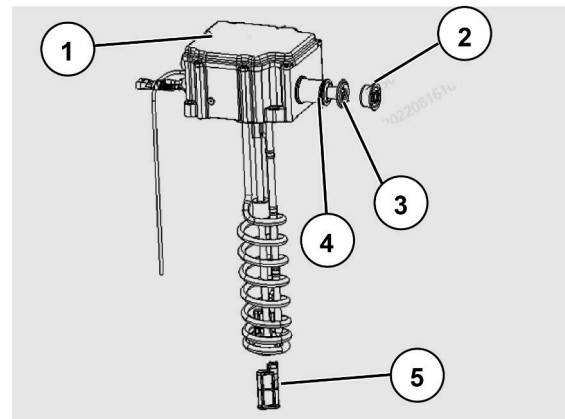
### Maintenance content of the air-assisted SCR system

Please visit a special service station for the maintenance of the air-assisted SCR system. The maintenance content includes: replacement of the filter element of the integrated urea pump tank system, and cleaning of the urea nozzle, urea tank and the pipeline of the SCR system. When adding urea, add genuine urea, pay attention to the sanitation around the filler port, and reduce the dirt entering the urea tank to avoid affecting the service life.



### Replacement of the filter element of the integrated urea pump tank system

- 1 Remove the urea filter element cap ②;
- 2 Pull out the pressure balance element ③ and the old filter element ④ from the integrated urea pump tank system casing ①;
- 3 Put the pressure balance element ③ and the new filter element ④ into the integrated urea pump tank system casing ①;
- 4 Screw in the AdBlue filter element cover ② to 18 N·m;
- 5 Pull out the filter screen ⑤ from the integrated urea pump tank system ①;
- 6 Insert the new filter screen ⑤ into the integrated urea pump tank system casing ①;



## Maintenance of SCR System

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### Precautions for use of SCR system

1 After the diesel engine is started, the SCR system starts to work when the diesel engine speed and exhaust temperature reach the set values. After the diesel engine is stopped, the SCR system enters the reverse pumping stage to remove the AdBlue solution in the system. This stage will last for two to three minutes. Do not disconnect the main power switch when the system is still in working condition.

2 After the SCR system is normally turned off (the whole reverse pumping process is over), it can be shut down and stored for 4 months in an environment of -40~25°C without disassembly. However, the air/fluid pipelines and electrical pipelines and harnesses shall not be disconnected during this period. The evaporation of water vapor in the AdBlue solution in the AdBlue pump and AdBlue nozzle shall be avoided. It is recommended that the AdBlue tank be filled fully before shutdown to reduce the evaporation in the pipeline. The maximum shutdown time without disassembly will be shortened accordingly if the ambient temperature is high. After this time limit is exceeded, the system shall be started after warm-up to ensure normal startup. The steps are as follows:

- (1) Refill the urea tank with aqueous urea solution;
- (2) Replace the urea pump filter element;
- (3) Start the SCR system;
- (4) If the system fails to start, shut down the system and restart the system after the ECU main relay stops working (the stop time

varies according to different applications). If the system fails to start again, contact CNHTC service station for help.

3 SCR system components shall not be directly exposed to mechanical and thermal shock. The protective cover shall be free of stones, dirt and other foreign matters. In addition, it shall be kept away from heat sources such as exhaust pipe, turbocharger and engine.

4 The urea pump and the urea nozzle shall be waterproof and dust-proof. However water flooding and the impact of high-pressure water gun shall be avoided. Lubrication of the pipeline connector is not recommended. It is not allowed to lubricate the electrical interface.

5 The AdBlue pipeline and harness shall be fixed in good condition without looseness or bending; ensure that the AdBlue nozzle coolant pipeline is not leaking or blocked and there is sufficient coolant flow; ensure that the Adblue tank heating pipeline is fixed firmly and works normally.

6 To prevent the urea from expending and cracking the urea tank due to freezing in severe cold climate, it is prohibited make the urea tank too full when adding urea. Preserve an expansion space of about 10%.

Pay attention to check the following content when maintaining the whole vehicle:

- The cleanness on the surface of the system, especially the waterproof and dustproof conditions of the harness connector. If the outer surface or shield is covered with gravel, mud and other debris, remove tin time;

- Whether the pipeline and harness are intact and fixed, and there shall be no loosening or bending;
- Whether the urea pump tank filter element shall be replaced;
- Whether there is urea crystallization attached in the urea nozzle and exhaust pipe (remove the nozzle or use the endoscope equipped at the service station).



### **WARNING!**

**–Aqueous urea solution is corrosive to the skin.**

**If it splashes on the skin or eyes during filling, rinse the skin or eyes with water as soon as possible. If the pain persists, please seek medical help. If the urea is swallowed by accident, please seek medical help immediately.**

**–If the engine continues to run after the aqueous urea solution is used up, the emission will exceed the standard, and the malfunction indicator lamp (MIL) will be on. The output torque will be limited when the engine is started again.**

**–It is strictly not allowed to disassemble and repair the system without authorization. The maintenance shall be carried out at a service station of CNHTC!**

## Replacement cycle of MC11/MC13 China III engine oil

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### Replacement cycle of MC11/MC13 China III engine oil

**CAUTION!**

GB17691 clearly provides for that during the warranty period, users shall keep the vouchers of using oil products and reagents that meet the requirements of national standards (such as the voucher of regular gas stations within one year, and the sales certificates of reagents from regular sales stores). In order to guarantee your legal rights and interests, please follow the above instructions and keep related vouchers.

## Recommended engine oil and replacement cycle for vehicles equipped with MC13/MC11 Euro V and below engines

Assembly	Product name	Oil quantity	Model	Engine oil change mileage or time <sup>1)</sup>				Prompt
1. Second/third generation high thermal efficiency models (TD Euro V and below): MC11, MC13 2. Diverter models (Euro V and below): MC13, MC11	MC-III 5W-30 <sup>3)</sup> MC-I 10W-40	1. Green handle oil dipstick 42L (first filling) 40L (filling amount without changing the filter element) 2. Red handle oil dipstick 36L (first filling) 34L (filling amount without changing the filter element)	Long-distance transport vehicles (long-distance tractors, and long-distance trucks)	Average fuel consumption (L/100km)				1. The first engine oil maintenance interval is the same as the regular maintenance interval. 2. Please use the engine oil specified by SINOTRUK. Otherwise, SINOTRUK will only provide paid services for engine damage caused by improper use of oil. 3. Mixing engine oils of different specifications or viscosities is strictly prohibited. 4. Please use China VI fuel that meets the requirements of the latest GB19147 standard. Otherwise, SINOTRUK will only provide paid services for engine damage caused by the use of non-standard fuel. 5. The oil filter element must be replaced when the oil is replaced.
				< 30	30 ~ 40	40 ~ 50	> 50	
				Light load condition	Standard load working condition	Standard weight condition	Loading condition	
				120,000 km	100,000 km	80,000 km	40,000 km	
				Or 12 months, whichever comes first.				
			Municipal vehicles, urban construction engineering vehicles, sanitation vehicles, dump trucks	40,000 km (20,000 km under severe working conditions <sup>2)</sup> ) or 12 months, whichever comes first				
			Vehicles for transport operation	100,000 km or 12 months, whichever comes first.				
			Cement mixer trucks, fire trucks, mining site vehicles, truck-mounted lifting vehicles, pumping vehicles, oil field/road operation vehicles	1000 hours (working time) or 12 months, whichever comes first.				

NOTE:1) The influence coefficient of fuel sulfur content on the oil replacement cycle: If fuel sulfur content < 50ppm, coefficient is 1; if 50ppm ≤ fuel sulfur content < 1000ppm, coefficient is 0.5; if fuel sulfur content ≥ 1000ppm, coefficient is 0.3. The actual engine oil change interval for the vehicle is calculated by multiplying the recommended change interval by the coefficient corresponding to the sulfur content range of the fuel used in the vehicle. (For example: For a long-distance transport vehicle under light-duty conditions using MC-I 10W-40 engine oil, with a fuel sulfur content of 60ppm, the actual oil change interval = 12 × 0.5 = 60,000 km).

2) Severe operating conditions refer to severe overload, poor road conditions, and high dust levels during vehicle operation; mine mouth dump trucks, ultra-severe condition trucks, etc., are classified under this condition.

3) MC-III 5W-30 engine oil is the initial fill oil for second/third generation high thermal efficiency models (TD Euro V and below).

## Replacement cycle of MC11/MC13 China III engine coolant

### Replacement cycle of MC11/MC13 China III engine coolant

#### Maintenance of cooling system

#### Specification and replacement interval of coolant

Initial installation: non-cold region: -35°C-Type I engine cooling working fluid Q/ZZ 21007.1

Cold region: -45°C-Type I engine cooling working fluid Q/ZZ 21007.1

After-sales: non-cold region: -35°C-type I engine cooling working fluid Q/ZZ 21007.1

Cold region: -45°C-Type I engine cooling working fluid Q/ZZ 21007.1

Export to extremely cold areas:

Initial installation: -45°C-Type I engine cooling working fluid Q/ZZ 21007.1

After-sales: NF/SNF Type -45°C engine cooling working fluid that meets M324 specifications

#### Oil and filling amounts for medium and heavy truck drivetrains.

Assembly		Coolant filling amount/L <sup>1)</sup> (reference value <sup>2)</sup> )	Product name	Note
Coolant	MC11/MC13	42-48	For non-cold regions: -35°C-Type I engine coolant Q/ZZ 21007.1 For cold regions: -45°C-Type I engine cooling working fluid Q/ZZ 21007.1	1) The after-sales coolant specified by SINOTRUK must be used, otherwise the engine cooling system will be corroded and damaged in a short time, and SINOTRUK only provides paid service for the damage. 2) The filling amount provided in the table is for the basic model and for reference only.

**Recommended Consumption and Change Cycles of Drive Trains of Medium-heavy Trucks**

Applicable models	Application conditions		Coolant	Remarks
			Cooling system	
Long-distance tractor and cargo truck	Light load working condition	11/13 L MC engine: average fuel consumption is <30 L/100km	480,000 km or 48 months, whichever comes first	1. The coolant used for any other engines (including WD615, D12, T10 and T12) shall not be used in the cooling system of MC/MT engine; otherwise, it will cause corrosion damage to the engine cooling system in a short time, and SINOTRUK only provides paid service for the damage. 2. The coolant filling amount in the table is only for reference. The filling amount is subject to the actual vehicle configuration, such as the vehicle with retarder. 3. It is forbidden to mix coolants of different brands and models. 4. The recommended liquid change cycles in this table are consistent with the initial and regular maintenance intervals.
		7 L MC engine: average fuel consumption is <20L/100km	300,000 km or 48 months, whichever comes first	
	Standard load working condition	11/13 L MC engine: average fuel consumption is 30-40 L/100km	300,000 km or 48 months, whichever comes first	
		11/13 L MT engine: average gas consumption <35L/100km	320,000 km or 48 months, whichever comes first	
		7 L MC engine: average fuel consumption is 20–25L/100km	300,000 km or 48 months, whichever comes first	
	Standard weight working condition	11/13 L MC engine: average fuel consumption is 40-50 L/100km	240,000 km or 48 months, whichever comes first	
		7 L MC engine: average fuel consumption is 25–35L/100km		
	Loading condition	11/13 L MC engine: average fuel consumption is >50 L/100km	240,000 km or 48 months, whichever comes first	
		11/13 L MT engine: average gas consumption>35L/100km		
		7 L MC engine: average fuel consumption is >35 L/100km		

## Replacement cycle of MC11/MC13 China III engine coolant

**Recommended Consumption and Change Cycles of Drive Trains of Medium-heavy Trucks**

Applicable models	Coolant	Remarks
	Cooling system	
<b>Vehicles for transport operation</b>	200,000 km or 48 months, whichever comes first	<p>1. The coolant used for any other engines (including WD615, D12, T10 and T12) shall not be used in the cooling system of MC/MT engine, otherwise it will cause corrosion damage to the engine cooling system in a short time, and SINOTRUK only provides paid service for the damage.</p> <p>2. The coolant filling amount in the table is only for reference. The filling amount is subject to the actual vehicle configuration, such as the vehicle with retarder.</p> <p>3. It is forbidden to mix coolants of different brands and models.</p> <p>4. The recommended liquid change cycles in this table are consistent with the initial and regular maintenance intervals.</p>
<b>Municipal and sanitation vehicles</b>	240,000 km or 48 months, whichever comes first	
<b>Vehicles for lifting, fire fighting and pumping</b>	240,000 km or 48 months, whichever comes first	
<b>Oilfield/pavement truck and cement mixer truck</b>	240,000 km or 48 months, whichever comes first	
<b>Urban construction slag dump truck</b>	240,000 km or 48 months, whichever comes first	
<b>Road transport dump truck</b>	240,000 km or 48 months, whichever comes first	
<b>Pithead dump truck and truck under super load working condition</b>	6 months	
<b>Mine site vehicle</b>	To be replaced with the engine oil	



## Replacement cycle of MC11/MC13 China III engine coolant

### Recommended Consumption and Change Cycles of Coolants of Vehicles Exported to Extremely Cold Areas

Assembly		Nam-e	Coolant level	Model	Mileage or time of replacement				Note
En-gin-e	M-C13 M-C11	Cool-ant	Initial installation: -45°C- type I engine cooling working fluid Q/ZZ 21007.1 After-sales: NF/SNF type -45°C engine cooling working fluid that meets M324 specifications	Long-distance transport trucks (long-distance tractors, and long-distance cargo trucks)	Average fuel consumption (L/100km)				1. The filling amount of coolant shall be subject to the actual vehicle configuration and on-site filling. 2. It is forbidden to mix coolants of different brands and models.
					< 30	30 ~ 40	40 ~ 50	> 50	
					Light load working condition	Standard load working condition	Standard weight working condition	Loading condition	
					300,000 km	240,000 km	200,000 km	200,000 km	
					Or 48 months, whichever comes first				
			Vehicles for transport operations, municipal and sanitation vehicles, truck-mounted lifting vehicles, firefighting trucks, pump trucks, oilfield trucks, pavement operation vehicles, cement mixer trucks, urban construction slag dump trucks, and road transport dump trucks	200,000 km or 48 months, whichever comes first					
			Pithead dump truck and truck under super load working condition	6 months, whichever comes first					

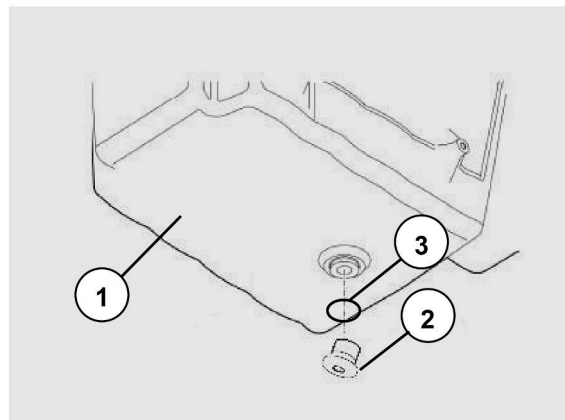
## Maintenance content of MC11/MC13 China III engine

### Maintenance content of MC11/MC13 China III engine

#### Replace engine oil

The engine oil can be replaced only when the diesel engine is in a horizontal position and the engine is shut down for at least 10 minutes.

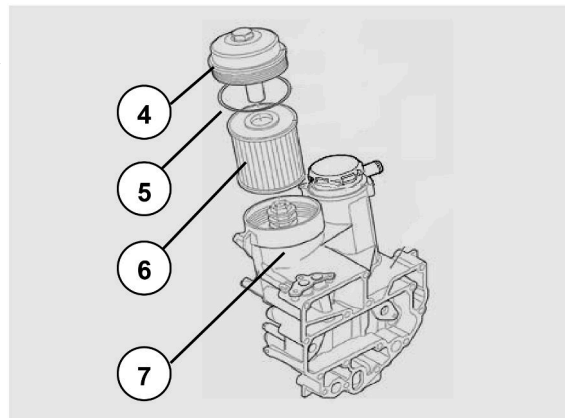
- 1 Place a suitable oil container under the diesel engine.
- 2 Loosen and remove the drain plug ② on the oil pan ① to drain the used oil.
- 3 After installing a new composite seal ring ③, screw in the oil drain plug ② with a tightening torque of 80N·m.



#### Install a new oil filter element

- 1 Loosen the oil filter cover ④ and let it stand for two minutes.
- 2 Pull out the oil filter cover ④, seal ring ⑤ and oil filter element ⑥ from the oil filter housing ⑦.
- 3 Remove the old seal ring ⑤.
- 4 Apply a little oil to the new seal ring ⑤ and then put it into the seal groove of the oil filter cover ④.
- 5 Insert the new filter element ⑥ into the oil filter cover ④ as pre-assembly.
- 6 Insert the oil filter housing ⑦, and tighten the oil filter cover to  $40 \pm 10 \text{ N} \cdot \text{m}$  (excessive torque may cause the filter cover to break).

**Replace the oil filter element every time the oil is changed.**





**WARNING!**

MC engine special oil and oil filter element shall be used;  
otherwise it will cause early engine wear, CNHTC only  
provides paid service in such a case.

**Inject oil**

Please refer to "Inspection and maintenance before starting the engine".

**Check the oil level.**

Please refer to "Inspection and maintenance before starting the engine".



**CAUTION!**

- Mixed use of different grades of oil is not allowed.
- Oils of the same grade produced by different manufacturers are compatible with each other, which are allowed for mixed use.

## Maintenance content of MC11/MC13 China III engine

### Maintenance of Fuel System

#### Diesel specification

Diesel oil shall comply with GB 19147. Appropriate diesel grade shall be selected according to the operating ambient temperature (generally, the selected diesel grade shall be 5~10°C lower than the operating temperature).

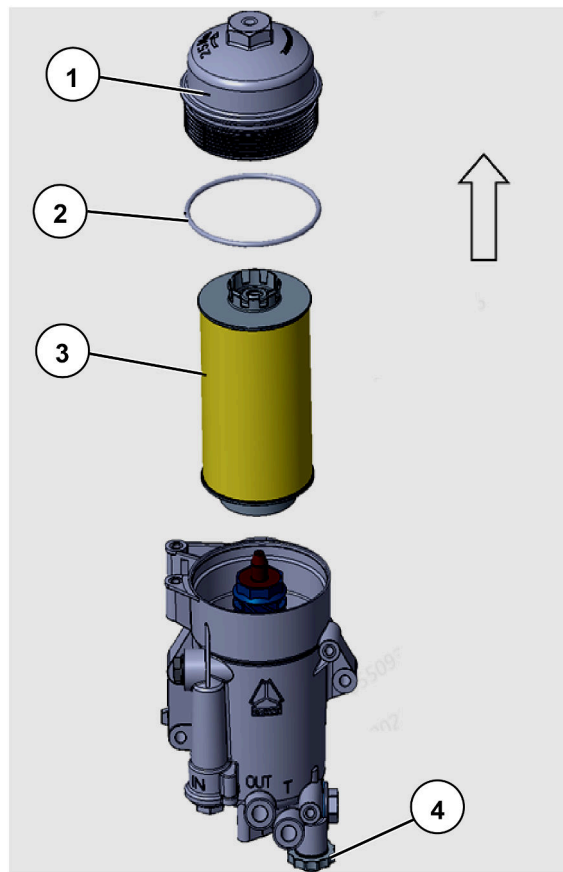
#### Replace the fuel filter and clean the filter screen

- 1 Unscrew the fuel filter cover ①, wait or two minutes, unscrew the water drain valve ④, and drain the fuel filter.
- 2 Re-tighten the drain valve ④ to 3 N·m.
- 3 Remove the filter cover ① and fuel filter element ③.
- 4 Take the fuel filter element ③ out of the fuel filter cover ①.
- 5 Remove the sealing ring ②.
- 6 Apply a small amount of diesel oil onto the new sealing ring ② and then assemble it onto the fuel filter cover ①. After that, insert the new filter element ③ into the upper cover ① as pre-assembly. Finally, screw them into the filter housing together. The tightening torque shall be 25±5N·m.



#### WARNING!

MC engine special fuel filter element shall be used; otherwise it will cause early engine wear, CNHTC only provides paid service in such a case.



### Drain the coolant.

- 1 Place a suitable collecting container under the oil module ①.
- 2 Unscrew the drain plug ② and composite sealing washer ③ to drain the coolant.
- 3 Install a new composite sealing washer ③ and tighten the screw plug ② to  $80 \pm 10 \text{ N}\cdot\text{m}$ .
- 4 Dispose of the drained coolant in the correct way.

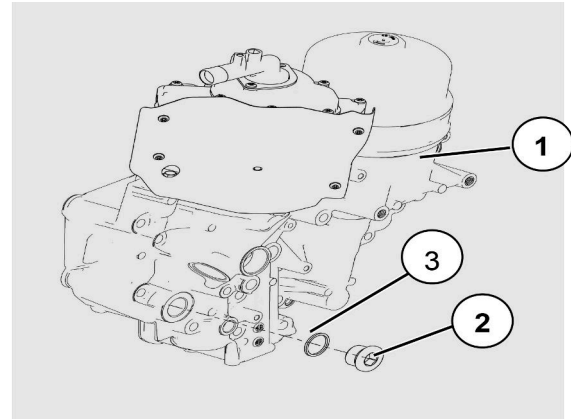
### Add coolant

Please refer to "Inspection and maintenance before starting the engine".



#### WARNING!

- The special coolant for MC engine of CNHTC shall be used, otherwise the engine may be damaged. CNHTC only provides paid service in such a case.
- Do not use water instead of coolant.
- The gas in the coolant shall be drained completely, otherwise the water pump will be damaged.



If the coolant becomes cloudy or brown, replace it immediately.

### **Check and replace the V-ribbed belt and automatic tension pulley**

- Check the alignment of the complete gear train: Adjust any deviation in time and find out the cause.
- Check the V-ribbed belt for cracks, oil stains, sintering overheating, wear, abnormal noise and other conditions. If the poly V-belt is damaged or abnormally worn, please replace it in time.
- Check the performance of the tensioner.
- Check the rotation flexibility of the tensioning wheel rocker arm, and ensure it can recover automatically.
- Check the rotation flexibility of the belt pulley bearing of the tensioning wheel.
- Check the condition of other structural parts of the tension pulley.
- In case of any abnormality, replace the tensioning wheel.

### **Check the belt tension.**

The V-ribbed belt tensioning wheel is under the action of spring tension and is maintenance-free. If the belt cannot be tensioned, it is required to check whether this is caused by the failure of the tensioning wheel or the excessive extension of the belt, and replace it in time.

### Replace with a new V-ribbed belt

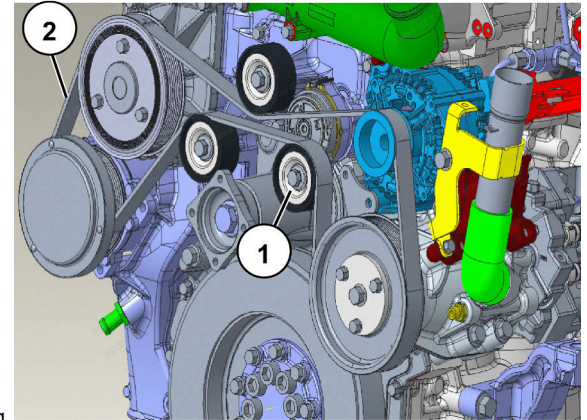
- 1 Use a wrench to rotate the tensioner ① bolt clockwise to the stopper position and stabilize it.
- 2 Remove the old V-ribbed belt, replace it with a new V-ribbed belt ②, and confirm the installation position of the V-ribbed belt.
- 3 The automatic tensioner ① returns slowly until it contacts the new V-ribbed belt. Check the contact surface of the V-ribbed belt again.
- 4 Check the contact surface of the belt again.

### Replacement interval of poly V-belt and tensioning wheel.

Light-load express vehicles: 2 years or 360,000km, whichever comes first;

Long-distance road transport vehicles: the vehicle has been running for 2 years or 240,000 km, whichever comes first;

Heavy-haul transportation and engineering vehicles: The vehicle has been running for 2 years or 120,000 km, whichever comes first.



## Maintenance content of MC11/MC13 China III engine

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### Daily maintenance

#### • First maintenance

The first maintenance is carried out between 2,000 km and 5,000 km.

#### • Regular maintenance

Maintenance is carried out every year (after 12 months), and regular maintenance is independent of the replacement of diesel engine oil.

#### • Winter maintenance

In order to maintain diesel engine operation and safe running, winter maintenance shall be carried out when the temperature starts to drop.

Select the appropriate grade of fuel according to the ambient temperature.

Drain the water from the fuel coarse filter.

Check and add coolant to the cooling system.

Check the electrical equipment.



Maintenance list

Working	Interval	Remark
<b>Cooling system</b>		
Check the fluid level	Routine inspection specification	
Check the function and tightness	Initial maintenance, regular maintenance	
Re-tighten the hose clamp of cooling and air intake supercharging system.	First maintenance	
Check the intercooler and radiator fins for contamination.	Regular maintenance	
Replace the coolant, check the expansion tank safety valve (replace it with a new one if necessary)	4 years or 200,000 km	
Check the coolant specification.	Winter maintenance, regular maintenance.	
V-ribbed belt, check the state and tension	20,000km, regular maintenance	
<b>Injection system</b>		
Check fuel level	Routine inspection specification	
Check the status and tightness of the fuel system	Initial maintenance, regular maintenance	
Fuel module: replace the fuel fine filter element	Synchronized with oil maintenance	
Replacement of primary fuel filter element	Synchronized with oil maintenance	
<b>Air intake and exhaust system</b>		
Check the air filter element for contamination.	When changing the oil	
Replace filter element.	According to vehicle regulations	It shall be replaced in time according to the contamination condition.
Check the status, function and tightness of the exhaust system.	First maintenance, when the diesel engine oil is changed	

## Maintenance content of MC11/MC13 China III engine

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Working	Interval	Remark
<b>Cylinder head</b>		
Check the valve clearance and adjust it if necessary	Regular maintenance	
<b>Lubrication system</b>		
Check the oil level.	Routine inspection specification	
Replace oil and filter element	According to the oil change interval	
<b>Electrical system</b>		
Check the status of starter and generator	Initial maintenance, regular maintenance	

### Replacement cycle of MC11/MC13 China III TD engine oil

**CAUTION!**

GB17691 clearly provides for that during the warranty period, users shall keep the vouchers of using oil products and reagents that meet the requirements of national standards (such as the voucher of regular gas stations within one year, and the sales certificates of reagents from regular sales stores). In order to guarantee your legal rights and interests, please follow the above instructions and keep related vouchers.

## Replacement cycle of MC11/MC13 China III TD engine oil

### Recommended engine oil and replacement cycle for vehicles equipped with MC13/MC11 Euro V and below engines

Assembly	Product name	Oil quantity	Model	Engine oil change mileage or time <sup>1)</sup>				Note
1. Second/third generation high thermal efficiency models (TD Euro V and below): MC11, MC13 2. Diverter models (Euro V and below): MC13, MC11	MC-III 5W-30 <sup>1)</sup> MC-I 10W-40	1. Green handle oil dipstick 42L (first filling) 40L (filling amount without changing the filter element) 2. Red handle oil dipstick 36L (first filling) 34L (filling amount without changing the filter element)	Long-distance transport trucks (long-distance tractors, and long-distance cargo trucks)	Average fuel consumption (L/100km)				1. The first engine oil maintenance interval is the same as the regular maintenance interval. 2. Please use the engine oil specified by SINOTRUK. Otherwise, SINOTRUK will only provide paid services for engine damage caused by improper use of oil. 3. Mixing engine oils of different specifications or viscosities is strictly prohibited. 4. Please use China VI fuel that meets the requirements of the latest GB19147 standard. Otherwise, SINOTRUK will only provide paid services for engine damage caused by the use of non-standard fuel. 5. The oil filter element must be replaced when the oil is replaced.
				< 30	30 ~ 40	40 ~ 50	> 50	
				Light load working condition	Standard load working condition	Standard weight working condition	Loading condition	
				120,000 km	100,000 km	80,000 km	40,000 km	
				Or 12 months, whichever comes first				
			Municipal vehicles, urban construction engineering vehicles, sanitation vehicles, dump trucks	40,000 km (under severe working conditions) <sup>1)</sup> 20,000 km) or 12 months, whichever comes first				
			Vehicles for transport operation	100,000 km or 12 months, whichever comes first.				
			Cement mixer trucks, fire trucks, mine site vehicles, truck-mounted lifting vehicles, pumping vehicles, oil field/road operation vehicles	1000 hours (working time) or 12 months, whichever comes first.				

NOTE:1) The influence coefficient of fuel sulfur content on the oil change cycle: If fuel sulfur content < 50ppm, coefficient is 1; if 50ppm ≤ fuel sulfur content < 1000ppm, coefficient is 0.5; if fuel sulfur content ≥ 1000ppm, coefficient is 0.3. The actual engine oil change interval for the vehicle is calculated by multiplying the recommended change interval by the coefficient corresponding to the sulfur content range of the fuel used in the vehicle. (For example: For a long-distance transport truck under light load working conditions using MC-I 10W-40 engine oil, with a fuel sulfur content of 60ppm, the actual oil change interval = 12 × 0.5 = 60,000 km).

2) Severe operating conditions refer to severe overload, poor road conditions, and high dust levels during vehicle operation; mine mouth dump trucks, ultra-severe condition cargo trucks, etc., are classified under this condition.

3) MC-III 5W-30 engine oil is the initial fill oil for second/third generation high thermal efficiency models (TD Euro V and below).

## Replacement cycle of MC11/MC13 China III TD engine coolant

### Replacement cycle of MC11/MC13 China III TD engine coolant

#### Maintenance of cooling system

#### Specification and replacement interval of coolant

Initial installation: non-cold region: -35°C-Type I engine cooling working fluid Q/ZZ 21007.1

Cold region: -45°C-Type I engine cooling working fluid Q/ZZ 21007.1

After-sales: non-cold region: -35°C-type I engine cooling working fluid Q/ZZ 21007.1

Cold region: -45°C-Type I engine cooling working fluid Q/ZZ 21007.1

Export to extremely cold areas:

Initial installation: -45°C-Type I engine cooling working fluid Q/ZZ 21007.1

After-sales: NF/SNF Type -45°C engine cooling working fluid that meets M324 specifications

#### Oil and filling amounts for medium and heavy truck drivetrains.

Assembly		Coolant filling amount/L <sup>1)</sup> (reference value <sup>2)</sup> )	Product name	Note
Coolant	MC11/MC13	42-48	For non-cold regions: -35°C-Type I engine coolant Q/ZZ 21007.1 For cold regions: -45°C-Type I engine cooling working fluid Q/ZZ 21007.1	1) The after-sales coolant specified by SINOTRUK must be used, otherwise the engine cooling system will be corroded and damaged in a short time, and SINOTRUK only provides paid service for the damage. 2) The filling amount provided in the table is for the basic model and for reference only.

## Replacement cycle of MC11/MC13 China III TD engine coolant

**Recommended Consumption and Change Cycles of Drive Trains of Medium-heavy Trucks**

Applicable models	Application conditions		Coolant	Remarks
			Cooling system	
Long-distance tractor and cargo truck	Light load working condition	11/13 L MC engine: average fuel consumption is <30 L/100km	480,000 km or 48 months, whichever comes first	1. The coolant used for any other engines (including WD615, D12, T10 and T12) shall not be used in the cooling system of MC/MT engine; otherwise, it will cause corrosion damage to the engine cooling system in a short time, and SINOTRUK only provides paid service for the damage. 2. The coolant filling amount in the table is only for reference. The filling amount is subject to the actual vehicle configuration, such as the vehicle with retarder. 3. It is forbidden to mix coolants of different brands and models. 4. The recommended liquid change cycles in this table are consistent with the initial and regular maintenance intervals.
		7 L MC engine: average fuel consumption is <20L/100km	300,000 km or 48 months, whichever comes first	
	Standard load working condition	11/13 L MC engine: average fuel consumption is 30-40 L/100km	300,000 km or 48 months, whichever comes first	
		11/13 L MT engine: average gas consumption <35L/100km	320,000 km or 48 months, whichever comes first	
		7 L MC engine: average fuel consumption is 20–25L/100km	300,000 km or 48 months, whichever comes first	
	Standard weight working condition	11/13 L MC engine: average fuel consumption is 40-50 L/100km	240,000 km or 48 months, whichever comes first	
		7 L MC engine: average fuel consumption is 25–35L/100km		
	Loading condition	11/13 L MC engine: average fuel consumption is >50 L/100km	240,000 km or 48 months, whichever comes first	
		11/13 L MT engine: average gas consumption>35L/100km		
		7 L MC engine: average fuel consumption is >35 L/100km		

## Replacement cycle of MC11/MC13 China III TD engine coolant

**Recommended Consumption and Change Cycles of Drive Trains of Medium-heavy Trucks**

Applicable models	Coolant	Remarks
	Cooling system	
<b>Vehicles for transport operation</b>	200,000 km or 48 months, whichever comes first	<p>1. The coolant used for any other engines (including WD615, D12, T10 and T12) shall not be used in the cooling system of MC/MT engine, otherwise it will cause corrosion damage to the engine cooling system in a short time, and SINOTRUK only provides paid service for the damage.</p> <p>2. The coolant filling amount in the table is only for reference. The filling amount is subject to the actual vehicle configuration, such as the vehicle with retarder.</p> <p>3. It is forbidden to mix coolants of different brands and models.</p> <p>4. The recommended liquid change cycles in this table are consistent with the initial and regular maintenance intervals.</p>
<b>Municipal and sanitation vehicles</b>	240,000 km or 48 months, whichever comes first	
<b>Vehicles for lifting, fire fighting and pumping</b>	240,000 km or 48 months, whichever comes first	
<b>Oilfield/pavement truck and cement mixer truck</b>	240,000 km or 48 months, whichever comes first	
<b>Urban construction slag dump truck</b>	240,000 km or 48 months, whichever comes first	
<b>Road transport dump truck</b>	240,000 km or 48 months, whichever comes first	
<b>Pithead dump truck and truck under super load working condition</b>	6 months	
<b>Mine site vehicle</b>	To be replaced with the engine oil	

## Replacement cycle of MC11/MC13 China III TD engine coolant

### Recommended Consumption and Change Cycles of Coolants of Vehicles Exported to Extremely Cold Areas

Assembly		Nam-e	Coolant level	Model	Mileage or time of replacement				Note
En-gin-e	M-C13 M-C11	Cool-ant	Initial installation: -45°C- type I engine cooling working fluid Q/ZZ 21007.1 After-sales: NF/SNF type -45°C engine cooling working fluid that meets M324 specifications	Long-distance transport trucks (long-distance tractors, and long-distance cargo trucks)	Average fuel consumption (L/100km)				1. The filling amount of coolant shall be subject to the actual vehicle configuration and on-site filling. 2. It is forbidden to mix coolants of different brands and models.
					< 30	30 ~ 40	40 ~ 50	> 50	
					Light load working condition	Standard load working condition	Standard weight working condition	Loading condition	
					300,000 km	240,000 km	200,000 km	200,000 km	
					Or 48 months, whichever comes first				
			Vehicles for transport operations, municipal and sanitation vehicles, truck-mounted lifting vehicles, firefighting trucks, pump trucks, oilfield trucks, pavement operation vehicles, cement mixer trucks, urban construction slag dump trucks, and road transport dump trucks	200,000 km or 48 months, whichever comes first					
			Pithead dump truck and truck under super load working condition	6 months, whichever comes first					

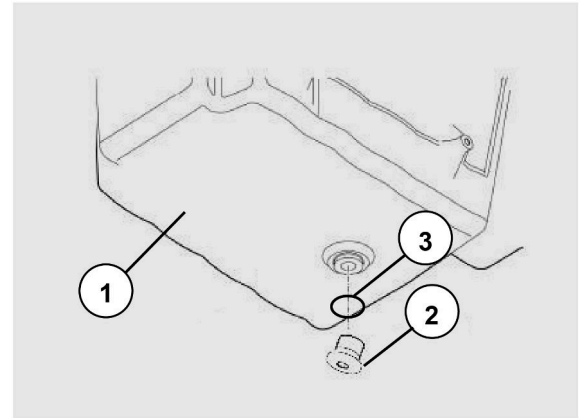


### MC11/MC13 China III TD engine maintenance content

#### Replace engine oil

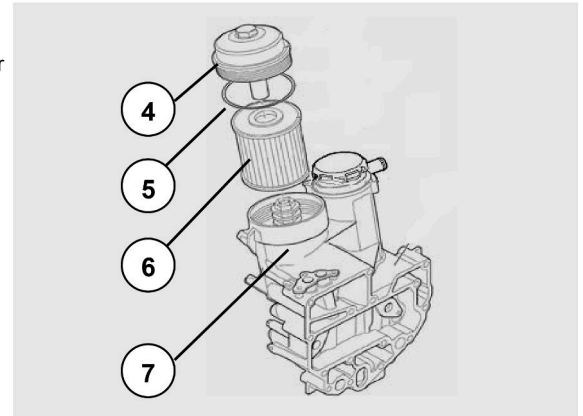
The engine oil can be replaced only when the diesel engine is in a horizontal position and the engine is shut down for at least 10 minutes.

- 1 Place a suitable oil container under the diesel engine.
- 2 Loosen and remove the drain plug ② on the oil pan ① to drain the used oil.
- 3 After installing a new composite seal ring ③, screw in the oil drain plug ② with a tightening torque of 80N·m.



#### Install a new oil filter element

- 1 Loosen the oil filter cover ④ and let it stand for two minutes.
- 2 Pull out the oil filter cover ④, seal ring ⑤ and oil filter element ⑥ from the oil filter housing ⑦.
- 3 Remove the old seal ring ⑤.
- 4 Apply a little oil to the new seal ring ⑤ and then put it into the seal groove of the oil filter cover ④.
- 5 Insert the new filter element ⑥ into the oil filter cover ④ as pre-assembly.
- 6 Insert the oil filter housing ⑦, and tighten the oil filter cover to  $40 \pm 10$  N·m (excessive torque may cause the filter cover to break).



**Replace the oil filter element every time the oil is changed.**

**WARNING!**

MC engine special oil and oil filter element shall be used; otherwise it will cause early engine wear, CNHTC only provides paid service in such a case.

**Inject oil**

Please refer to "Inspection and maintenance before starting the engine".

**Check the oil level.**

Please refer to "Inspection and maintenance before starting the engine".

**CAUTION!**

- Mixed use of different grades of oil is not allowed.
- Oils of the same grade produced by different manufacturers are compatible with each other, which are allowed for mixed use.

## Maintenance of Fuel System

### Diesel specification

Diesel oil shall comply with GB 19147. Appropriate diesel grade shall be selected according to the operating ambient temperature (generally, the selected diesel grade shall be 5~10°C lower than the operating temperature).

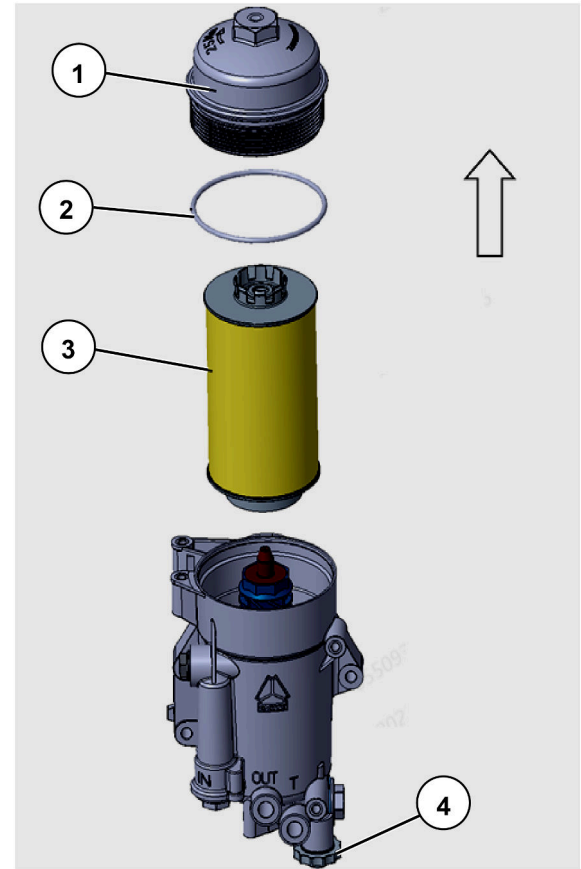
### Replace the fuel filter and clean the filter screen

- 1 Unscrew the fuel filter cover ①, wait or two minutes, unscrew the water drain valve ④, and drain the fuel filter.
- 2 Re-tighten the drain valve ④ to 3 N·m.
- 3 Remove the filter cover ① and fuel filter element ③.
- 4 Take the fuel filter element ③ out of the fuel filter cover ①.
- 5 Remove the sealing ring ②.
- 6 Apply a small amount of diesel oil onto the new sealing ring ② and then assemble it onto the fuel filter cover ①. After that, insert the new filter element ③ into the upper cover ① as pre-assembly. Finally, screw them into the filter housing together. The tightening torque shall be  $25 \pm 5 \text{ N} \cdot \text{m}$ .



#### WARNING!

MC engine special fuel filter element shall be used; otherwise it will cause early engine wear, CNHTC only provides paid service in such a case.



### Drain the coolant.

- 1 Place a suitable collecting container under the oil module ①.
- 2 Unscrew the drain plug ② and composite sealing washer ③ to drain the coolant.
- 3 Install a new composite sealing washer ③ and tighten the screw plug ② to  $80 \pm 10 \text{ N}\cdot\text{m}$ .
- 4 Dispose of the drained coolant in the correct way.

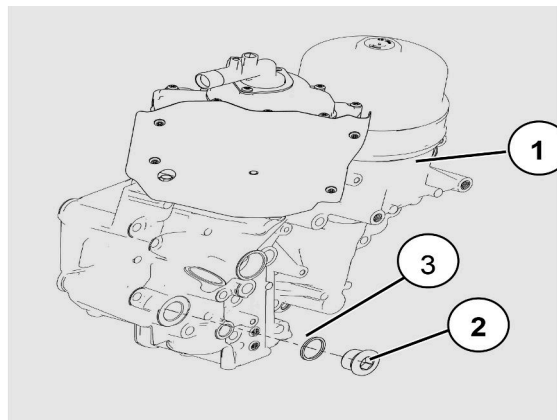
### Add coolant

Please refer to "Inspection and maintenance before starting the engine".



#### **WARNING!**

- The special coolant for MC engine of CNHTC shall be used, otherwise the engine may be damaged. CNHTC only provides paid service in such a case.
- Do not use water instead of coolant.
- The gas in the coolant shall be drained completely, otherwise the water pump will be damaged.



If the coolant becomes cloudy or brown, replace it immediately.

**Check and replace the V-ribbed belt and automatic tension pulley**

- Check the alignment of the complete gear train: Adjust any deviation in time and find out the cause.
- Check the V-ribbed belt for cracks, oil stains, sintering overheating, wear, abnormal noise and other conditions. If the poly V-belt is damaged or abnormally worn, please replace it in time.
- Check the performance of the tensioner.
- Check the rotation flexibility of the tensioning wheel rocker arm, and ensure it can recover automatically.
- Check the rotation flexibility of the belt pulley bearing of the tensioning wheel.
- Check the condition of other structural parts of the tension pulley.
- In case of any abnormality, replace the tensioning wheel.

**Check the belt tension.**

The V-ribbed belt tensioning wheel is under the action of spring tension and is maintenance-free. If the belt cannot be tensioned, it is required to check whether this is caused by the failure of the tensioning wheel or the excessive extension of the belt, and replace it in time.

### Replace with a new V-ribbed belt

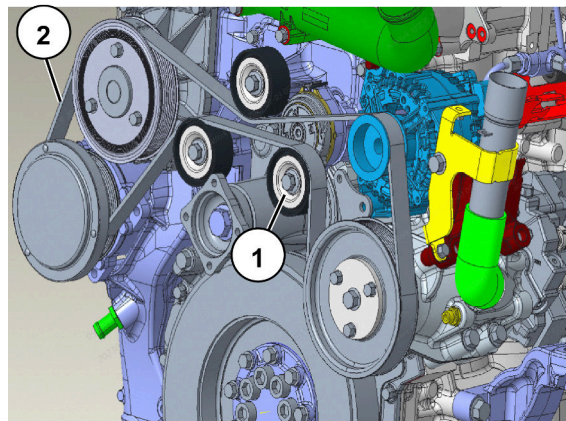
- 1 Use a wrench to rotate the tensioner ① bolt clockwise to the stopper position and stabilize it.
- 2 Remove the old V-ribbed belt, replace it with a new V-ribbed belt ②, and confirm the installation position of the V-ribbed belt.
- 3 The automatic tensioner ① returns slowly until it contacts the new V-ribbed belt. Check the contact surface of the V-ribbed belt again.
- 4 Check the contact surface of the belt again.

### Replacement cycle of V-ribbed belt and tensioner (2-3 oil change cycles)

Light-load express vehicles: 2 years or 360,000km, whichever comes first;

Long-distance road transport vehicles: the vehicle has been running for 2 years or 240,000 km, whichever comes first;

Heavy-haul transportation and engineering vehicles: The vehicle has been running for 2 years or 120,000 km, whichever comes first.



### **Daily maintenance**

#### **• First maintenance**

The first maintenance is carried out between 2,000 km and 5,000 km.

#### **• Regular maintenance**

Maintenance is carried out every year (after 12 months), and regular maintenance is independent of the replacement of diesel engine oil.

#### **• Winter maintenance**

In order to maintain diesel engine operation and safe running, winter maintenance shall be carried out when the temperature starts to drop.

Select the appropriate grade of fuel according to the ambient temperature.

Drain the water from the fuel coarse filter.

Check and add coolant to the cooling system.

Check the electrical equipment.

## Maintenance list

Working	Interval	Remark
<b>Cooling system</b>		
Check the fluid level	Routine inspection specification	
Check the function and tightness	Initial maintenance, regular maintenance	
Re-tighten the hose clamp of cooling and air intake supercharging system.	First maintenance	
Check the intercooler and radiator fins for contamination.	Regular maintenance	
Replace the coolant, check the expansion tank safety valve (replace it with a new one if necessary)	4 years or 200,000 km	
Check the coolant specification.	Winter maintenance, regular maintenance.	
V-ribbed belt, check the state and tension	20,000km, regular maintenance	
<b>Injection system</b>		
Check fuel level	Routine inspection specification	
Check the status and tightness of the fuel system	Initial maintenance, regular maintenance	
Fuel module: replace the fuel fine filter element	Synchronized with oil maintenance	
Replacement of primary fuel filter element	Synchronized with oil maintenance	
<b>Air intake and exhaust system</b>		
Check the air filter element for contamination.	When changing the oil	
Replace filter element.	According to vehicle regulations	It shall be replaced in time according to the contamination condition.
Check the status, function and tightness of the exhaust system.	First maintenance, when the diesel engine oil is changed	



Working	Interval	Remark
<b>Cylinder head</b>		
Check the valve clearance and adjust it if necessary	Regular maintenance	
<b>Lubrication system</b>		
Check the oil level.	Routine inspection specification	
Replace oil and filter element	According to the oil change interval	
<b>Electrical system</b>		
Check the status of starter and generator	Initial maintenance, regular maintenance	

## Replacement cycle of MC11(H)/MC13 China V engine oil

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### Replacement cycle of MC11(H)/MC13 China V engine oil



#### **CAUTION!**

GB17691 clearly provides for that during the warranty period, users shall keep the vouchers of using oil products and reagents that meet the requirements of national standards (such as the voucher of regular gas stations within one year, and the sales certificates of reagents from regular sales stores). In order to guarantee your legal rights and interests, please follow the above instructions and keep related vouchers.

## Replacement cycle of MC11(H)/MC13 China V engine oil

### Recommended engine oil and replacement cycle for vehicles equipped with MC13/MC11(H) Euro V and below engines

Assembly	Product name	Oil quantity	Model	Engine oil change mileage or time <sup>1)</sup>				Prompt
1. Second/third generation high thermal efficiency models (TD Euro V and below): MC13, MC11H 2. Diverter models (Euro V and below): MC13, MC11H, MC11	MC-III 5W-30 <sup>3)</sup> MC-I 10W-40	1. Green handle oil dipstick 42L (first filling) 40L (filling amount without changing the filter element) 2. Red handle oil dipstick 36L (first filling) 34L (filling amount without changing the filter element)	Long-distance transport vehicles (long-distance tractors, and long-distance trucks)	Average fuel consumption (L/100km)				1. The first engine oil maintenance interval is the same as the regular maintenance interval. 2. Please use the engine oil specified by SINOTRUK. Otherwise, SINOTRUK will only provide paid services for engine damage caused by improper use of oil. 3. Mixing engine oils of different specifications or viscosities is strictly prohibited. 4. Please use China VI fuel that meets the requirements of the latest GB19147 standard. Otherwise, SINOTRUK will only provide paid services for engine damage caused by the use of non-standard fuel. 5. The oil filter element must be replaced when the oil is replaced.
				< 30	30 ~ 40	40 ~ 50	> 50	
				Light load condition	Standard load working condition	Standard weight condition	Loading condition	
				120,000 km	100,000 km	80,000 km	40,000 km	
				Or 12 months, whichever comes first.				
			Municipal vehicles, urban construction engineering vehicles, sanitation vehicles, dump trucks	40,000 km (20,000 km under severe working conditions <sup>2)</sup> ) or 12 months, whichever comes first				
			Vehicles for transport operation	100,000 km or 12 months, whichever comes first.				
Cement mixer trucks, fire trucks, mining site vehicles, truck-mounted lifting vehicles, pumping vehicles, oil field/road operation vehicles	1000 hours (working time) or 12 months, whichever comes first.							

NOTE:1) The influence coefficient of fuel sulfur content on the oil replacement cycle: If fuel sulfur content < 50ppm, coefficient is 1; if 50ppm ≤ fuel sulfur content < 1000ppm, coefficient is 0.5; if fuel sulfur content ≥ 1000ppm, coefficient is 0.3. The actual engine oil change interval for the vehicle is calculated by multiplying the recommended change interval by the coefficient corresponding to the sulfur content range of the fuel used in the vehicle. (For example: For a long-distance transport vehicle under light-duty conditions using MC-I 10W-40 engine oil, with a fuel sulfur content of 60ppm, the actual oil change interval = 12 × 0.5 = 60,000 km).

2) Severe operating conditions refer to severe overload, poor road conditions, and high dust levels during vehicle operation; mine mouth dump trucks, ultra-severe condition trucks, etc., are classified under this condition.

3) MC-III 5W-30 engine oil is the initial fill oil for second/third generation high thermal efficiency models (TD Euro V and below).

## Replacement cycle of MC11(H)/MC13 China V engine oil

### Recommended engine oil and replacement cycle for vehicles equipped with MC engines exported to extremely cold areas

Assembly <sup>2)</sup>			Qual- ity grad- e and vis- cosi- ty grad- e.	Oil quan- tity	Model	Mileage or time of replacement				Hint
Die- sel en- gine <sub>1)</sub>	M- C13 M- C11	Euro V	Initial instal- lation: MC- III 5W- 30 Q/ ZZ 2103- 7 After- sale: ACE- A E6/ CK-4 5W- 30	42 L (first filling) 40L (filling vol- ume with- out filter ele- ment re- place- ment).	Long-distance transport vehicles (tractors, trucks)	Average fuel consumption (L/100km)				1. The first engine oil maintenance interval is the same as the regular maintenance interval. 2. Please use fuel from regular gas stations and CNG/LNG from regular gas stations that meet the latest local standards. 3. The oil quantity of the standard weight is for reference only, and the specific oil dipstick scale shall prevail. 4. The oil filter element must be replaced when the oil is replaced.
						< 30	30 ~ 40	40 ~ 50	> 50	
						Light load condition	Standard load working condition	Standard weight condition	Loading condition	
						120,000 km	120,000 km	80,000 km	40,000 km	
						Or 12 months, whichever comes first.				
					Municipal vehicles, urban construction engineering vehicles, and dump trucks	40,000 km (20,000 km under severe working conditions <sup>3)</sup> or 12 months, whichever comes first.				
					Vehicles for transport operation	100,000 km or 12 months, whichever comes first.				

Assembly <sup>2)</sup>			Quality grade and viscosity grade.	Oil quantity	Model	Mileage or time of replacement	Hint
					Cement mixer trucks, mining site vehicles, truck-mounted lifting vehicles, pumping vehicles, oil field/road operation vehicles	1000 hours (working time) or 12 months, whichever comes first.	

NOTE:1) For diesel engines, the impact coefficient of fuel sulfur content on the oil change interval: if fuel sulfur content < 50ppm, coefficient is 1; if  $50\text{ppm} \leq \text{fuel sulfur content} < 1000\text{ppm}$ , coefficient is 0.5; if fuel sulfur content  $\geq 1000\text{ppm}$ , coefficient is 0.3. The actual oil change interval for the vehicle is calculated by multiplying the recommended oil change interval by the coefficient corresponding to the sulfur content range of the fuel used in the vehicle.

2) If the ambient temperature is below  $-20^{\circ}\text{C}$  for more than three consecutive months within a year, the oil change interval for all engines must be multiplied by a coefficient of 0.7.

3) Severe operating conditions refer to severe overload, poor road conditions, and high dust levels during vehicle operation; mine mouth dump trucks, ultra-severe condition trucks, etc., are classified under this condition.

## Replacement cycle of MC11(H)/MC13 China V engine coolant

### Replacement cycle of MC11(H)/MC13 China V engine coolant

#### Maintenance of cooling system

#### Specification and replacement interval of coolant

Initial installation: non-cold region: -35°C-Type I engine cooling working fluid Q/ZZ 21007.1

Cold region: -45°C-Type I engine cooling working fluid Q/ZZ 21007.1

After-sales: non-cold region: -35°C-type I engine cooling working fluid Q/ZZ 21007.1

Cold region: -45°C-Type I engine cooling working fluid Q/ZZ 21007.1

Export to extremely cold areas:

Initial installation: -45°C-Type I engine cooling working fluid Q/ZZ 21007.1

After-sales: NF/SNF Type -45°C engine cooling working fluid that meets M324 specifications

#### Oil and filling amounts for medium and heavy truck drivetrains.

Assembly		Coolant filling amount/L <sup>1)</sup> (reference value <sup>2)</sup> )	Product name	Note
Coolant	MC11/MC13	42-48	For non-cold regions: -35°C-Type I engine coolant Q/ZZ 21007.1 For cold regions: -45°C-Type I engine cooling working fluid Q/ZZ 21007.1	1) The after-sales coolant specified by SINOTRUK must be used, otherwise the engine cooling system will be corroded and damaged in a short time, and SINOTRUK only provides paid service for the damage. 2) The filling amount provided in the table is for the basic model and for reference only.

**Recommended Consumption and Change Cycles of Drive Trains of Medium-heavy Trucks**

Applicable models	Application conditions		Coolant	Remarks
			Cooling system	
Long-distance tractor and cargo truck	Light load working condition	11/13 L MC engine: average fuel consumption is <30 L/100km	480,000 km or 48 months, whichever comes first	1. The coolant used for any other engines (including WD615, D12, T10 and T12) shall not be used in the cooling system of MC/MT engine; otherwise, it will cause corrosion damage to the engine cooling system in a short time, and SINOTRUK only provides paid service for the damage. 2. The coolant filling amount in the table is only for reference. The filling amount is subject to the actual vehicle configuration, such as the vehicle with retarder. 3. It is forbidden to mix coolants of different brands and models. 4. The recommended liquid change cycles in this table are consistent with the initial and regular maintenance intervals.
		7 L MC engine: average fuel consumption is <20L/100km	300,000 km or 48 months, whichever comes first	
	Standard load working condition	11/13 L MC engine: average fuel consumption is 30-40 L/100km	300,000 km or 48 months, whichever comes first	
		11/13 L MT engine: average gas consumption <35L/100km	320,000 km or 48 months, whichever comes first	
		7 L MC engine: average fuel consumption is 20-25L/100km	300,000 km or 48 months, whichever comes first	
	Standard weight working condition	11/13 L MC engine: average fuel consumption is 40-50 L/100km	240,000 km or 48 months, whichever comes first	
		7 L MC engine: average fuel consumption is 25-35L/100km		
	Loading condition	11/13 L MC engine: average fuel consumption is >50 L/100km	240,000 km or 48 months, whichever comes first	
		11/13 L MT engine: average gas consumption>35L/100km		
		7 L MC engine: average fuel consumption is >35 L/100km		

## Replacement cycle of MC11(H)/MC13 China V engine coolant

**Recommended Consumption and Change Cycles of Drive Trains of Medium-heavy Trucks**

Applicable models	Coolant	Remarks
	Cooling system	
<b>Vehicles for transport operation</b>	200,000 km or 48 months, whichever comes first	<p>1. The coolant used for any other engines (including WD615, D12, T10 and T12) shall not be used in the cooling system of MC/MT engine, otherwise it will cause corrosion damage to the engine cooling system in a short time, and SINOTRUK only provides paid service for the damage.</p> <p>2. The coolant filling amount in the table is only for reference. The filling amount is subject to the actual vehicle configuration, such as the vehicle with retarder.</p> <p>3. It is forbidden to mix coolants of different brands and models.</p> <p>4. The recommended liquid change cycles in this table are consistent with the initial and regular maintenance intervals.</p>
<b>Municipal and sanitation vehicles</b>	240,000 km or 48 months, whichever comes first	
<b>Vehicles for lifting, fire fighting and pumping</b>	240,000 km or 48 months, whichever comes first	
<b>Oilfield/pavement truck and cement mixer truck</b>	240,000 km or 48 months, whichever comes first	
<b>Urban construction slag dump truck</b>	240,000 km or 48 months, whichever comes first	
<b>Road transport dump truck</b>	240,000 km or 48 months, whichever comes first	
<b>Pithead dump truck and truck under super load working condition</b>	6 months	
<b>Mine site vehicle</b>	To be replaced with the engine oil	



## Replacement cycle of MC11(H)/MC13 China V engine coolant

### Recommended Consumption and Change Cycles of Coolants of Vehicles Exported to Extremely Cold Areas

Assembly		Nam-e	Coolant level	Model	Mileage or time of replacement				Note
En- gin- e	M- C13 M- C11	Cool- ant	Initial installation: -45°C- type I engine cooling working fluid Q/ZZ 21007.1 After-sales: NF/SNF type -45°C engine cooling working fluid that meets M324 specifications	Long-distance transport trucks (long-distance tractors, and long-distance cargo trucks)	Average fuel consumption (L/100km)				1. The filling amount of coolant shall be subject to the actual vehicle configuration and on-site filling. 2. It is forbidden to mix coolants of different brands and models.
					< 30	30 ~ 40	40 ~ 50	> 50	
					Light load working condition	Standard load working condition	Standard weight working condition	Loading condition	
					300,000 km	240,000 km	200,000 km	200,000 km	
					Or 48 months, whichever comes first				
			Vehicles for transport operations, municipal and sanitation vehicles, truck- mounted lifting vehicles, firefighting trucks, pump trucks, oilfield trucks, pavement operation vehicles, cement mixer trucks, urban construction slag dump trucks, and road transport dump trucks	200,000 km or 48 months, whichever comes first					
			Pithead dump truck and truck under super load working condition	6 months, whichever comes first					

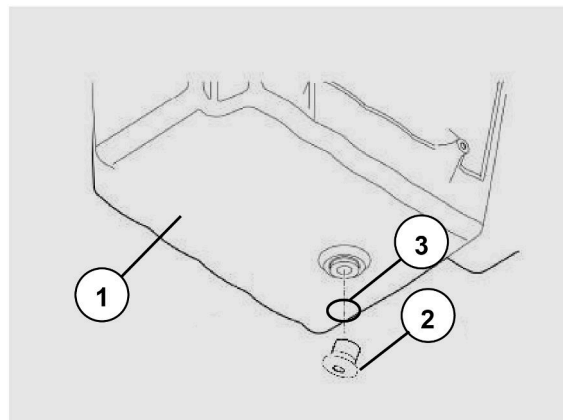
## Maintenance contents of MC11/MC13 China V engine

### Maintenance contents of MC11/MC13 China V engine

#### Replace the oil

The oil can be replaced only after the diesel engine is in a horizontal position and has been shut down for at least 10 minutes.

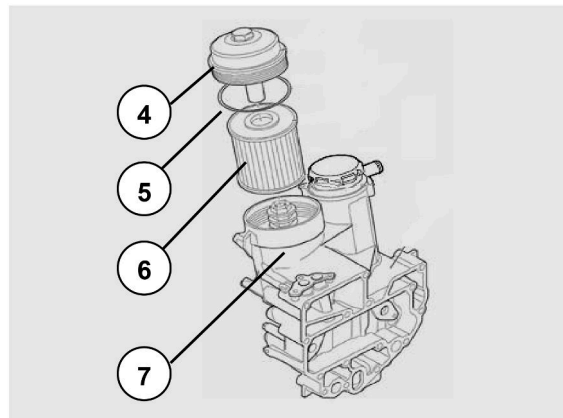
- 1 Place a suitable oil collecting container under the diesel engine.
- 2 Loosen and remove the drain plug ② from the oil pan ① to drain out the used oil.
- 3 After installing a new composite seal ring ③, screw in the oil drain plug ② with a tightening torque of 80 N·m.



#### Install a new oil filter element

- 1 Loosen the oil filter cap ④ and let it stand for two minutes.
- 2 Pull out the oil filter cap ④, seal ring ⑤, and oil filter element ⑥ from the oil filter housing ⑦.
- 3 Remove the old seal ring ⑤.
- 4 Apply a small amount of engine oil to the new seal ring ⑤ and insert it into the sealing groove inside the oil filter cover ④.
- 5 Insert the new filter element ⑥ into the oil filter cap ④ as a pre-assembly.
- 6 Insert the assembly into the oil filter housing ⑦ and tighten the filter cap. Tightening torque:  $40^{+10}$  N·m (Excessive torque may cause the filter cap to break).

**The oil filter element should be replaced every time the engine oil is changed.**





**WARNING!**

MC engine special oil and oil filter element shall be used;  
otherwise it will cause early engine wear, CNHTC only  
provides paid service in such a case.

**Filling oil**

Refer to "Inspection and Maintenance Before Starting the Vehicle."

**Check the oil level**

Refer to "Inspection and Maintenance Before Starting the Vehicle."



**CAUTION!**

- Mixed use of different grades of oil is not allowed.
- Oils of the same grade produced by different manufacturers are compatible with each other, which are allowed for mixed use.

## Maintenance contents of MC11/MC13 China V engine

### Maintenance of fuel system

#### Diesel oil specification

Diesel must comply with the requirements of GB 19147. Select the appropriate diesel grade according to the ambient temperature (in general, the selected diesel grade should be 5–10°C below the operating temperature).

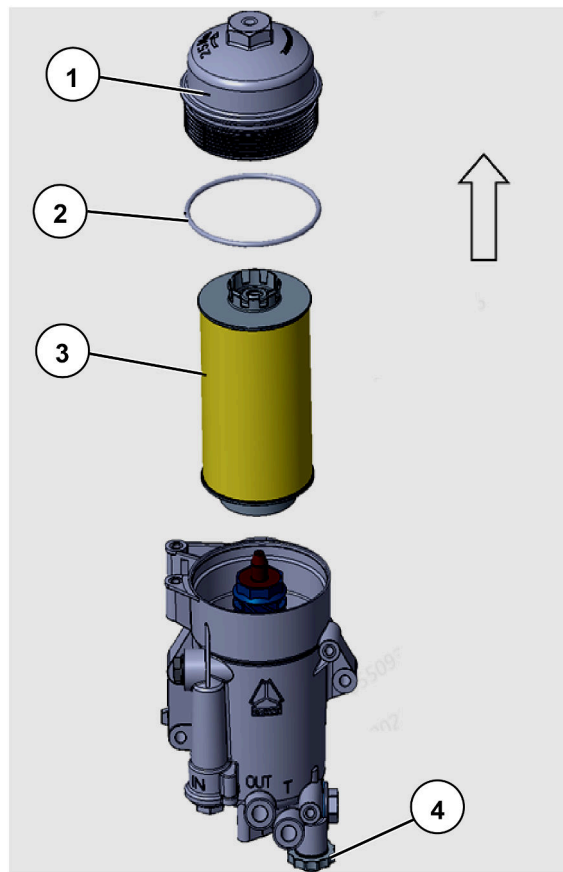
#### Replace the fuel filter and clean the filter screen.

- 1 Loosen the fuel filter cover ①, let it stand for two minutes, unscrew the drain valve ④ and drain the fuel filter.
- 2 Retighten the drain valve ④ to 3 N·m.
- 3 Remove the filter cover ① and fuel filter element ③.
- 4 Pull the fuel filter element ③ out of the fuel filter cover ①.
- 5 Remove the seal ring ②.
- 6 Apply a small amount of diesel oil to the newly replaced seal ring ② and assemble it on the fuel filter cover ①. Then, insert the new filter element ③ into the upper cover ① as a pre-assembly, and finally screw them together into the filter housing with a tightening torque of 25<sup>+5</sup> N·m.



#### WARNING!

MC engine special fuel filter element shall be used; otherwise it will cause early engine wear, CNHTC only provides paid service in such a case.



### Drain the coolant

- 1 Place a suitable collecting container under the oil module ①.
- 2 Unscrew the drain plug ② and composite sealing washer ③ to drain the coolant.
- 3 Install a new composite sealing washer ③ and tighten the screw plug ② with a tightening torque of  $80^{+10}$  N·m.
- 4 Deal with the discharged coolant correctly.

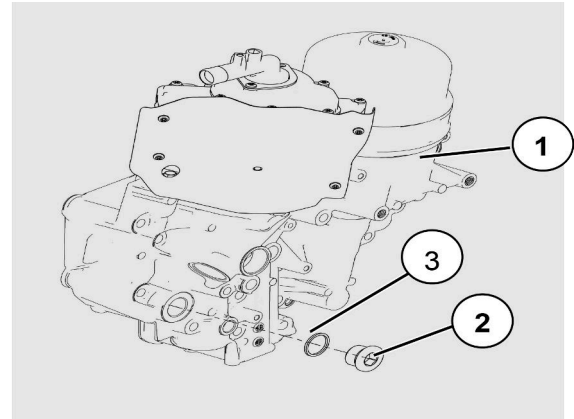
### Coolant filling

Refer to "Inspection and Maintenance Before Starting the Vehicle."



#### WARNING!

- The special coolant for MC engine of CNHTC shall be used, otherwise the engine may be damaged. CNHTC only provides paid service in such a case.
- Do not use water instead of coolant.
- The gas in the coolant shall be drained completely, otherwise the water pump will be damaged.



If the coolant becomes turbid or turns brown, it should be replaced immediately.

### Check and replace the multi-V belt and automatic tension pulley

- Check the alignment of the entire gear train: If there is any deviation, make adjustments promptly and identify the cause.
- Check the multi-V belt for cracks, oil stains, overheating caused by sintering, wear, abnormal noise, etc. If any, replace it in time.
- Check the performance of tension pulley.
- Check whether the rocker arm of tension pulley rotates flexibly and can recover automatically.
- Check the rotation flexibility of tension pulley bearing.
- Check the condition of other structural parts of tension pulley.
- In case of any abnormality, replace the tension pulley.

### Check the belt tension

The multi-V belt tension pulley is under the force of the spring tension and then it is maintenance-free. If the belt cannot be tensioned, further inspection is needed to determine if it is due to tension pulley failure or excessive belt elongation, and replace it promptly.

### Replace with a new multi-V belt

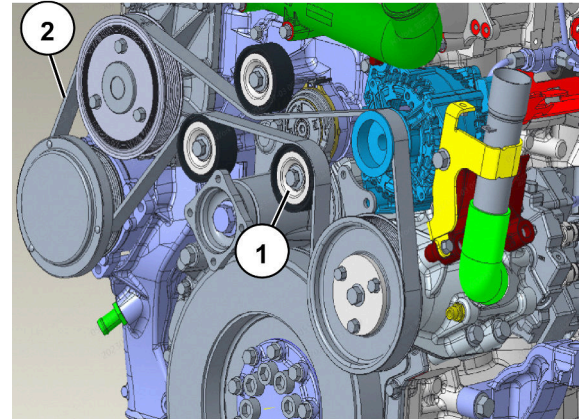
- 1 Use a wrench to rotate the bolt of the tension pulley ② clockwise to the stop position and fix it.
- 2 Remove the old multi-V belt, replace it with a new one ②, and confirm its installation position.
- 3 The automatic tension pulley ① slowly returns to its position until it contacts the new multi-V belt. Check the contact surface of the multi-V belt again.
- 4 Check the contact surface of the belt again.

### Replacement interval of multi-V belt and tension pulley

Light-load express delivery vehicle: The vehicle has been driving for 2 years or 360,000km, whichever comes first;

Long-distance road transport trucks: The vehicle has been driving for 2 years or 240,000km, whichever comes first;

Heavy-duty transportation and engineering vehicle: The vehicle has been driving for 2 years or 120,000km, whichever comes first.



### **Routine maintenance**

#### **• First maintenance**

The first maintenance is carried out between 2,000km and 5,000km.

#### **• Regular maintenance**

Annual maintenance (after 12 months) shall be implemented; and the regular maintenance is independent of the oil replacement of diesel engine.

#### **• Winter maintenance**

To maintain the operation of the diesel engine and ensure safe driving, carry out winter maintenance in a timely manner when temperatures begin to drop.

Select fuel of appropriate grade according to the ambient temperature.

Drain the water in the primary fuel filter.

Coolant of cooling system shall be checked and filled up.

Electrical appliances shall be checked.



## Maintenance List

Work	Cycle	Remarks
<b>Cooling system</b>		
Check the fluid level	Daily inspection specification	
Check the functions and tightness	Initial maintenance and regular maintenance	
Re-tighten the hose clamps of cooling and intake supercharge systems	First maintenance	
Check the contamination of intercooler and radiator fins	Regular maintenance	
Replace the coolant and check the safety valve of expansion tank (replace with new parts if necessary)	200,000 km or 4 years	
Check the coolant specification	Winter maintenance, regular maintenance	
Multi-V belt, check the condition and tension.	Routine inspections and scheduled maintenance.	
<b>Fuel system</b>		
Check the fuel level	Routine inspection	
Check the condition and tightness of fuel system	Initial maintenance and regular maintenance	
Replace the secondary fuel filter element.	Synchronize the engine oil maintenance interval with the fuel pressure sensor reminder; whichever comes first.	
Replace the primary fuel filter element.	Synchronize with the replacement the fine filter element	
<b>Intake and exhaust system</b>		
Check the air filter element for contamination	When replacing the oil	
Replace the filter element	See "Air filter"	It is suggested to replace in time according to contamination condition

## Maintenance contents of MC11/MC13 China V engine

Work	Cycle	Remarks
Check the condition, function and tightness of exhaust system	During the first spot check and oil replacement	
<b>Cylinder head</b>		
Check the valve clearance and adjust it if necessary	MC11/MC13:120000km	In order to reduce the frequency of entering a service station, the valve clearance inspection can be carried out simultaneously during oil replacement/regular maintenance.
<b>Lubrication system</b>		
Check the oil level	Routine inspection	
Replace the oil and filter element	Refer to engine oil and filter replacement requirements for details.	
<b>Electrical system</b>		
Check the conditions of starter and generator	Initial maintenance and regular maintenance	

### Replacement cycle of MC11(H)/MC13 China V TD engine oil

**CAUTION!**

GB17691 clearly provides for that during the warranty period, users shall keep the vouchers of using oil products and reagents that meet the requirements of national standards (such as the voucher of regular gas stations within one year, and the sales certificates of reagents from regular sales stores). In order to guarantee your legal rights and interests, please follow the above instructions and keep related vouchers.

## Replacement cycle of MC11(H)/MC13 China V TD engine oil

### Recommended engine oil and replacement cycle for vehicles equipped with MC13/MC11(H) Euro V and below engines

Assembly	Oil product name	Oil product quantity	Model	Engine oil change mileage or time <sup>1)</sup>				Note
1. Second/third generation high thermal efficiency models (TD Euro V and below): MC13, MC11H 2. Diverter models (Euro V and below): MC13, MC11H, MC11	MC-III 5W-30 <sup>3)</sup> MC-I 10W-40	1. Green handle oil dipstick 42L (first filling) 2. Red handle oil dipstick 36L (first filling) 34L (filling amount without changing the filter element	Long-distance transport trucks (long-distance tractors, and long-distance cargo trucks)	Average fuel consumption (L/100km)				1. The first engine oil maintenance interval is the same as the regular maintenance interval. 2. Please use the engine oil specified by SINOTRUK. Otherwise, SINOTRUK will only provide paid services for engine damage caused by improper use of oil. 3. Mixing engine oils of different specifications or viscosities is strictly prohibited. 4. Please use China VI fuel that meets the requirements of the latest GB19147 standard. Otherwise, SINOTRUK will only provide paid services for engine damage caused by the use of non-standard fuel. 5. The oil filter element must be replaced when the oil is replaced.
				< 30	30 ~ 40	40 ~ 50	> 50	
				Light load working condition	Standard load working condition	Standard weight condition	Loading condition	
				120,000 km	100,000 km	80,000 km	40,000 km	
				Or 12 months, whichever comes first.				
			Municipal vehicles, urban construction engineering vehicles, sanitation vehicles, dump trucks	40,000 km (under severe working conditions) <sup>2)</sup> 20,000 km) or 12 months, whichever comes first				
			Vehicles for transport operation	100,000 km or 12 months, whichever comes first.				
			Cement mixer trucks, fire trucks, mining site vehicles, truck-mounted lifting vehicles, pumping vehicles, oil field/road operation vehicles	1000 hours (working time) or 12 months, whichever comes first.				

NOTE:1) The influence coefficient of fuel sulfur content on the oil change cycle: If fuel sulfur content < 50ppm, coefficient is 1; if 50ppm ≤ fuel sulfur content < 1000ppm, coefficient is 0.5; if fuel sulfur content ≥ 1000ppm, coefficient is 0.3. The actual engine oil change interval for the vehicle is calculated by multiplying the recommended change interval by the coefficient corresponding to the sulfur content range of the fuel used in the vehicle.

2) Severe operating conditions refer to severe overload, poor road conditions, and high dust levels during vehicle operation; mine mouth dump trucks, ultra-severe condition cargo trucks, etc., are classified under this condition.

3) MC-III 5W-30 engine oil is the initial fill oil for second/third generation high thermal efficiency models (TD Euro V and below).

## Replacement cycle of MC11(H)/MC13 China V TD engine oil

### Recommended engine oil and replacement cycle for vehicles equipped with MC engines exported to extremely cold areas

Assembly <sup>2)</sup>			Quality grade and viscosity grade.	Oil product quantity	Model	Mileage or time of replacement				Tip
Diesel engine <sup>1)</sup>	M-C13 M-C11	Euro V	Initial installation: MC-III 5W-30 Q/ZZ 2103-7 After-sales: ACEA E6/CK-4 5W-30	42 L (first filling) 40L (filling volume without filter element replacement).	Long-distance transport trucks (tractors, cargo trucks)	Average fuel consumption (L/100km)				1. The first engine oil maintenance interval is the same as the regular maintenance interval. 2. Please use fuel from regular gas stations and CNG/LNG from regular gas stations that meet the latest local standards. 3. The oil quantity of the standard weight is for reference only, and the specific oil dipstick scale shall prevail. 4. The oil filter element must be replaced when the oil is replaced.
						< 30	30 ~ 40	40 ~ 50	> 50	
						Light load working condition	Standard load working condition	Standard weight condition	Loading condition	
						120,000 km	120,000 km	80,000 km	40,000 km	
						Or 12 months, whichever comes first.				
					Municipal vehicles, urban construction engineering vehicles, and dump trucks	40,000 km (under severe working conditions) <sup>3)</sup> 20,000 km or 12 months, whichever comes first				
					Vehicles for transport operation	100,000 km or 12 months, whichever comes first.				

## Replacement cycle of MC11(H)/MC13 China V TD engine oil

Assembly <sup>2)</sup>				Quality grade and viscosity grade.	Oil product quantity	Model	Mileage or time of replacement	Tip
						Cement mixer trucks, mining site vehicles, truck-mounted lifting vehicles, pumping vehicles, oil field/road operation vehicles	1000 hours (working time) or 12 months, whichever comes first.	

NOTE:1) For diesel engines, the impact coefficient of fuel sulfur content on the oil change interval: if fuel sulfur content < 50ppm, coefficient is 1; if  $50\text{ppm} \leq \text{fuel sulfur content} < 1000\text{ppm}$ , coefficient is 0.5; if fuel sulfur content  $\geq 1000\text{ppm}$ , coefficient is 0.3. The actual oil change interval for the vehicle is calculated by multiplying the recommended oil change interval by the coefficient corresponding to the sulfur content range of the fuel used in the vehicle.

2) If the ambient temperature is below  $-20^{\circ}\text{C}$  for more than three consecutive months within a year, the oil change interval for all engines must be multiplied by a coefficient of 0.7.

3) Severe operating conditions refer to severe overload, poor road conditions, and high dust levels during vehicle operation; mine mouth dump trucks, ultra-severe condition cargo trucks, etc., are classified under this condition.

## Maintenance of MC11(H)/MC13 China V TD engine coolant

### Maintenance of cooling system

#### Specification and replacement interval of coolant

Initial installation: non-cold region: -35°C-Type I engine cooling working fluid Q/ZZ 21007.1

Cold region: -45°C-Type I engine cooling working fluid Q/ZZ 21007.1

After-sales: non-cold region: -35°C-type I engine cooling working fluid Q/ZZ 21007.1

Cold region: -45°C-Type I engine cooling working fluid Q/ZZ 21007.1

Export to extremely cold areas:

Initial installation: -45°C-Type I engine cooling working fluid Q/ZZ 21007.1

After-sales: NF/SNF Type -45°C engine cooling working fluid that meets M324 specifications

#### Oil and filling amounts for medium and heavy truck drivetrains.

Assembly		Coolant filling amount/L <sup>1)</sup> (reference value <sup>2)</sup> )	Product name	Note
Coolant	MC11/MC13	42-48	For non-cold regions: -35°C-Type I engine coolant Q/ZZ 21007.1 For cold regions: -45°C-Type I engine cooling working fluid Q/ZZ 21007.1	1) The after-sales coolant specified by SINOTRUK must be used, otherwise the engine cooling system will be corroded and damaged in a short time, and SINOTRUK only provides paid service for the damage. 2) The filling amount provided in the table is for the basic model and for reference only.

## Maintenance of MC11(H)/MC13 China V TD engine coolant

**Recommended Consumption and Change Cycles of Drive Trains of Medium-heavy Trucks**

Applicable models	Application conditions		Coolant	Remarks
			Cooling system	
Long-distance tractor and cargo truck	Light load working condition	11/13 L MC engine: average fuel consumption is <30 L/100km	480,000 km or 48 months, whichever comes first	1. The coolant used for any other engines (including WD615, D12, T10 and T12) shall not be used in the cooling system of MC/MT engine; otherwise, it will cause corrosion damage to the engine cooling system in a short time, and SINOTRUK only provides paid service for the damage. 2. The coolant filling amount in the table is only for reference. The filling amount is subject to the actual vehicle configuration, such as the vehicle with retarder. 3. It is forbidden to mix coolants of different brands and models. 4. The recommended liquid change cycles in this table are consistent with the initial and regular maintenance intervals.
		7 L MC engine: average fuel consumption is <20L/100km	300,000 km or 48 months, whichever comes first	
	Standard load working condition	11/13 L MC engine: average fuel consumption is 30–40 L/100km	300,000 km or 48 months, whichever comes first	
		11/13 L MT engine: average gas consumption <35L/100km	320,000 km or 48 months, whichever comes first	
		7 L MC engine: average fuel consumption is 20–25L/100km	300,000 km or 48 months, whichever comes first	
	Standard weight working condition	11/13 L MC engine: average fuel consumption is 40-50 L/100km	240,000 km or 48 months, whichever comes first	
		7 L MC engine: average fuel consumption is 25–35L/100km		
	Loading condition	11/13 L MC engine: average fuel consumption is >50 L/100km	240,000 km or 48 months, whichever comes first	
		11/13 L MT engine: average gas consumption>35L/100km		
		7 L MC engine: average fuel consumption is >35 L/100km		



**Recommended Consumption and Change Cycles of Drive Trains of Medium-heavy Trucks**

Applicable models	Coolant	Remarks
	Cooling system	
<b>Vehicles for transport operation</b>	200,000 km or 48 months, whichever comes first	<p>1. The coolant used for any other engines (including WD615, D12, T10 and T12) shall not be used in the cooling system of MC/MT engine, otherwise it will cause corrosion damage to the engine cooling system in a short time, and SINOTRUK only provides paid service for the damage.</p> <p>2. The coolant filling amount in the table is only for reference. The filling amount is subject to the actual vehicle configuration, such as the vehicle with retarder.</p> <p>3. It is forbidden to mix coolants of different brands and models.</p> <p>4. The recommended liquid change cycles in this table are consistent with the initial and regular maintenance intervals.</p>
<b>Municipal and sanitation vehicles</b>	240,000 km or 48 months, whichever comes first	
<b>Vehicles for lifting, fire fighting and pumping</b>	240,000 km or 48 months, whichever comes first	
<b>Oilfield/pavement truck and cement mixer truck</b>	240,000 km or 48 months, whichever comes first	
<b>Urban construction slag dump truck</b>	240,000 km or 48 months, whichever comes first	
<b>Road transport dump truck</b>	240,000 km or 48 months, whichever comes first	
<b>Pithead dump truck and truck under super load working condition</b>	6 months	
<b>Mine site vehicle</b>	To be replaced with the engine oil	

## Recommended Consumption and Change Cycles of Coolants of Vehicles Exported to Extremely Cold Areas

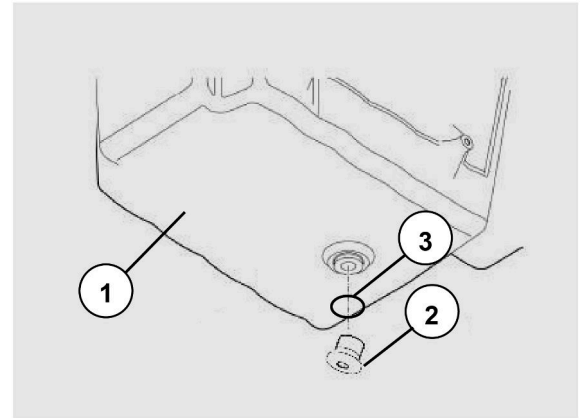
Assembly		Nam-e	Coolant level	Model	Mileage or time of replacement				Note
En-gin-e	M-C13 M-C11	Cool-ant	Initial installation: -45°C- type I engine cooling working fluid Q/ZZ 21007.1 After-sales: NF/SNF type -45°C engine cooling working fluid that meets M324 specifications	Long-distance transport trucks (long-distance tractors, and long-distance cargo trucks)	Average fuel consumption (L/100km)				1. The filling amount of coolant shall be subject to the actual vehicle configuration and on-site filling. 2. It is forbidden to mix coolants of different brands and models.
					< 30	30 ~ 40	40 ~ 50	> 50	
					Light load working condition	Standard load working condition	Standard weight working condition	Loading condition	
					300,000 km	240,000 km	200,000 km	200,000 km	
					Or 48 months, whichever comes first				
			Vehicles for transport operations, municipal and sanitation vehicles, truck-mounted lifting vehicles, firefighting trucks, pump trucks, oilfield trucks, pavement operation vehicles, cement mixer trucks, urban construction slag dump trucks, and road transport dump trucks	200,000 km or 48 months, whichever comes first					
			Pithead dump truck and truck under super load working condition	6 months, whichever comes first					

### Maintenance content of MC11/MC13 China V TD engine

#### Replace engine oil

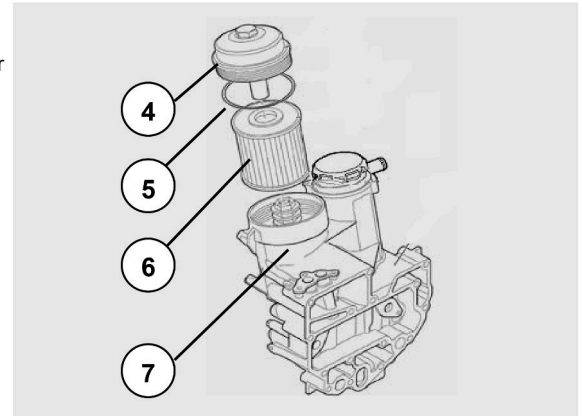
The engine oil can be replaced only when the diesel engine is in a horizontal position and the engine is shut down for at least 10 minutes.

- 1 Place a suitable oil container under the diesel engine.
- 2 Loosen and remove the drain plug ② on the oil pan ① to drain the used oil.
- 3 After installing a new composite seal ring ③, screw in the oil drain plug ② with a tightening torque of 80N·m.



#### Install a new oil filter element

- 1 Loosen the oil filter cover ④ and let it stand for two minutes.
- 2 Pull out the oil filter cover ④, seal ring ⑤ and oil filter element ⑥ from the oil filter housing ⑦.
- 3 Remove the old seal ring ⑤.
- 4 Apply a little oil to the new seal ring ⑤ and then put it into the seal groove of the oil filter cover ④.
- 5 Insert the new filter element ⑥ into the oil filter cover ④ as pre-assembly.
- 6 Insert the oil filter housing ⑦, and tighten the oil filter cover to  $40 \pm 10$  N·m (excessive torque may cause the filter cover to break).



**Replace the oil filter element every time the oil is changed.**

**WARNING!**

MC engine special oil and oil filter element shall be used; otherwise it will cause early engine wear, CNHTC only provides paid service in such a case.

**Inject oil**

Please refer to "Inspection and maintenance before starting the engine".

**Check the oil level.**

Please refer to "Inspection and maintenance before starting the engine".

**CAUTION!**

- Mixed use of different grades of oil is not allowed.
- Oils of the same grade produced by different manufacturers are compatible with each other, which are allowed for mixed use.

## Maintenance of Fuel System

### Diesel specification

Diesel oil shall comply with GB 19147. Appropriate diesel grade shall be selected according to the operating ambient temperature (generally, the selected diesel grade shall be 5~10°C lower than the operating temperature).

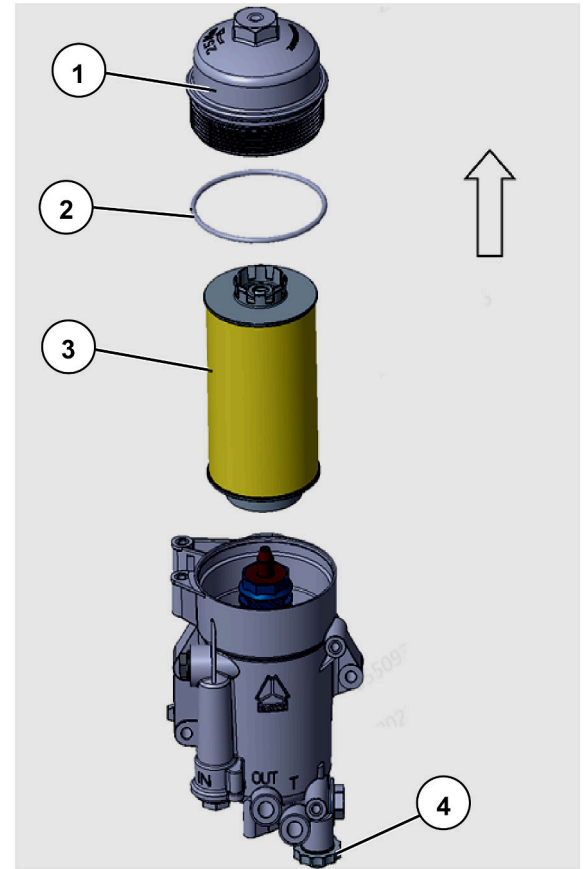
### Replace the fuel filter and clean the filter screen

- 1 Unscrew the fuel filter cover ①, wait or two minutes, unscrew the water drain valve ④, and drain the fuel filter.
- 2 Re-tighten the drain valve ④ to 3 N·m.
- 3 Remove the filter cover ① and fuel filter element ③.
- 4 Take the fuel filter element ③ out of the fuel filter cover ①.
- 5 Remove the sealing ring ②.
- 6 Apply a small amount of diesel oil onto the new sealing ring ② and then assemble it onto the fuel filter cover ①. After that, insert the new filter element ③ into the upper cover ① as pre-assembly. Finally, screw them into the filter housing together. The tightening torque shall be  $25 \pm 5 \text{ N} \cdot \text{m}$ .



### WARNING!

**MC engine special fuel filter element shall be used; otherwise it will cause early engine wear, CNHTC only provides paid service in such a case.**



## Maintenance content of MC11/MC13 China V TD engine

### Drain the coolant.

- 1 Place a suitable collecting container under the oil module ①.
- 2 Unscrew the drain plug ② and composite sealing washer ③ to drain the coolant.
- 3 Install a new composite sealing washer ③ and tighten the screw plug ② to  $80 \pm 10 \text{ N}\cdot\text{m}$ .
- 4 Dispose of the drained coolant in the correct way.

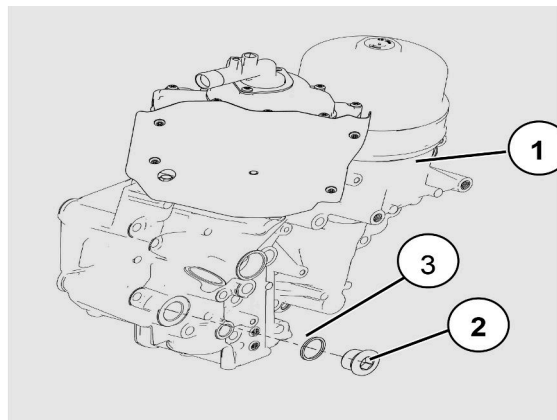
### Add coolant

Please refer to "Inspection and maintenance before starting the engine".



#### WARNING!

- The special coolant for MC engine of CNHTC shall be used, otherwise the engine may be damaged. CNHTC only provides paid service in such a case.
- Do not use water instead of coolant.
- The gas in the coolant shall be drained completely, otherwise the water pump will be damaged.



If the coolant becomes cloudy or brown, replace it immediately.

### **Check and replace the V-ribbed belt and automatic tension pulley**

- Check the alignment of the complete gear train: Adjust any deviation in time and find out the cause.
- Check the V-ribbed belt for cracks, oil stains, sintering overheating, wear, abnormal noise and other conditions. If the poly V-belt is damaged or abnormally worn, please replace it in time.
- Check the performance of the tensioner.
- Check the rotation flexibility of the tensioning wheel rocker arm, and ensure it can recover automatically.
- Check the rotation flexibility of the belt pulley bearing of the tensioning wheel.
- Check the condition of other structural parts of the tension pulley.
- In case of any abnormality, replace the tensioning wheel.

### **Check the belt tension.**

The V-ribbed belt tensioning wheel is under the action of spring tension and is maintenance-free. If the belt cannot be tensioned, it is required to check whether this is caused by the failure of the tensioning wheel or the excessive extension of the belt, and replace it in time.

## Maintenance content of MC11/MC13 China V TD engine

### Replace with a new V-ribbed belt

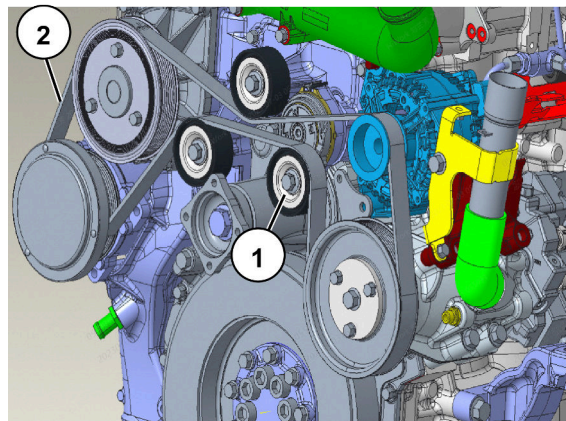
- 1 Use a wrench to rotate the tensioner ① bolt clockwise to the stopper position and stabilize it.
- 2 Remove the old V-ribbed belt, replace it with a new V-ribbed belt ②, and confirm the installation position of the V-ribbed belt.
- 3 The automatic tensioner ① returns slowly until it contacts the new V-ribbed belt. Check the contact surface of the V-ribbed belt again.
- 4 Check the contact surface of the belt again.

### Replacement cycle of V-ribbed belt and tensioner (2-3 oil change cycles)

Light-load express vehicles: 2 years or 360,000km, whichever comes first;

Long-distance road transport vehicles: the vehicle has been running for 2 years or 240,000 km, whichever comes first;

Heavy-haul transportation and engineering vehicles: The vehicle has been running for 2 years or 120,000 km, whichever comes first.





### **Daily maintenance**

#### **• First maintenance**

The first maintenance is carried out between 2,000 km and 5,000 km.

#### **• Regular maintenance**

Maintenance is carried out every year (after 12 months), and regular maintenance is independent of the replacement of diesel engine oil.

#### **• Winter maintenance**

In order to maintain diesel engine operation and safe running, winter maintenance shall be carried out when the temperature starts to drop.

Select the appropriate grade of fuel according to the ambient temperature.

Drain the water from the fuel coarse filter.

Check and add coolant to the cooling system.

Check the electrical equipment.

## Maintenance content of MC11/MC13 China V TD engine

Maintenance list

Working	Interval	Remark
<b>Cooling system</b>		
Check the fluid level	Routine inspection specification	
Check the function and tightness	Initial maintenance, regular maintenance	
Re-tighten the hose clamp of cooling and air intake supercharging system.	First maintenance	
Check the intercooler and radiator fins for contamination.	Regular maintenance	
Replace the coolant, check the expansion tank safety valve (replace it with a new one if necessary)	4 years or 200,000 km	
Check the coolant specification.	Winter maintenance, regular maintenance.	
V-ribbed belt, check the state and tension	20,000km, regular maintenance	
<b>Injection system</b>		
Check fuel level	Routine inspection specification	
Check the status and tightness of the fuel system	Initial maintenance, regular maintenance	
Fuel module: replace the fuel fine filter element	Synchronized with oil maintenance	
Replacement of primary fuel filter element	Synchronized with oil maintenance	
<b>Air intake and exhaust system</b>		
Check the air filter element for contamination.	When changing the oil	
Replace filter element.	According to vehicle regulations	It shall be replaced in time according to the contamination condition.
Check the status, function and tightness of the exhaust system.	First maintenance, when the diesel engine oil is changed	

## Maintenance content of MC11/MC13 China V TD engine

Working	Interval	Remark
<b>Cylinder head</b>		
Check the valve clearance and adjust it if necessary	Regular maintenance	
<b>Lubrication system</b>		
Check the oil level.	Routine inspection specification	
Replace oil and filter element	According to the oil change interval	
<b>Electrical system</b>		
Check the status of starter and generator	Initial maintenance, regular maintenance	

## Replacement cycle of MC11(H)/MC13(H) China VI engine oil

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### Replacement cycle of MC11(H)/MC13(H) China VI engine oil



#### **CAUTION!**

GB17691 clearly provides for that during the warranty period, users shall keep the vouchers of using oil products and reagents that meet the requirements of national standards (such as the voucher of regular gas stations within one year, and the sales certificates of reagents from regular sales stores). In order to guarantee your legal rights and interests, please follow the above instructions and keep related vouchers.

## Replacement cycle of MC11(H)/MC13(H) China VI engine oil

### Recommended engine oil types and replacement intervals for MC13(H)/MC11H second/third-generation high thermal efficiency engine models (TD China VI) in long-distance transport trucks

Assembly	Model	Oil product name	Oil product quantity	Engine oil change mileage or time <sup>1)</sup>				Note
				Average fuel consumption (L/100km)	Test Cycle	Mileage or time of replacement		
Second/third-generation high thermal efficiency models (TD China VI); MC13H, MC13,	Long-distance transport trucks (long-distance tractors, and long-distance cargo trucks)	FA-4 5W-30 <sup>2)</sup>	1. Green handle oil dipstick 42L (first filling) 40L (filling amount without changing the filter element) 2. Red handle oil dipstick 36L (first filling) 34L (filling amount without changing the filter element)	< 30	Light load working condition	120,000 km		Or 12 months, whichever comes first.
				30 ~ 40	Standard load working condition	100,000 km		
				40 ~ 50	Standard weight condition	80,000 km		
				> 50	Loading condition	40,000 km		
		MC-III 5W-30		< 30	Light load working condition	Strategic key customers with stable operating conditions	150,000 km	Or 12 months, whichever comes first.
						Other users	120,000 km	
				30 ~ 40	Standard load working condition	100,000 km		
				40 ~ 50	Standard weight condition	80,000 km		
				> 50	Loading condition	40,000 km		
		MC-II 10W-40		< 30	Light load working condition	120,000 km		Or 12 months, whichever comes first.
				30 ~ 40	Standard load working condition	100,000 km		
				40 ~ 50	Standard weight condition	80,000 km		
				> 50	Loading condition	40,000 km		

NOTE:1) The influence coefficient of fuel sulfur content on the oil change cycle: If fuel sulfur content < 50ppm, coefficient is 1; if 50ppm ≤ fuel sulfur content < 1000ppm, coefficient is 0.5; if fuel sulfur content ≥ 1000ppm, coefficient is 0.3. The actual engine oil change interval for the

## **Replacement cycle of MC11(H)/MC13(H) China VI engine oil**

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vehicle is calculated by multiplying the recommended change interval by the coefficient corresponding to the sulfur content range of the fuel used in the vehicle.

2) To achieve better fuel efficiency, it is recommended to

## Replacement cycle of MC11(H)/MC13(H) China VI engine oil

### Recommended engine oil types and replacement intervals for MC13(H)/MC11H diverter engine models (China VI) in long-distance transport trucks

Assembly	Model	Oil product name	Oil product quantity	Engine oil change mileage or time <sup>1)</sup>					Note
				Average fuel consumption (L/100km)	Test Cycle	Mileage or time of replacement			
Diverter models (China VI): MC13H, MC13,	Long-distance transport trucks (long-distance tractors, and long-distance cargo trucks)	MC-III 5W-30	1. Green handle oil dipstick 42L (first filling) 2. Red handle oil dipstick 36L (first filling) 34L (filling amount without changing the filter element)	< 30	Light load working condition	Strategic key customers with stable operating conditions	150,000 km	Or 12 months, whichever comes first.	1. The first engine oil maintenance interval is the same as the regular maintenance interval. 2. Please use the engine oil specified by SINOTRUK. 3. Mixing engine oils of different specifications or viscosities is strictly prohibited. 4. Please use China VI fuel that meets the requirements of the latest GB19147 standard. 5. The oil filter element must be replaced when the oil is replaced.
						Other users	120,000 km		
				30 ~ 40	Standard load working condition	100,000 km			
				40 ~ 50	Standard weight condition	80,000 km			
				> 50	Loading condition	40,000 km			
		MC-II 10W-40		< 30	Light load working condition	120,000 km		Or 12 months, whichever comes first.	
				30 ~ 40	Standard load working condition	100,000 km			
				40 ~ 50	Standard weight condition	80,000 km			
				> 50	Loading condition	40,000 km			

NOTE:1) The influence coefficient of fuel sulfur content on the oil change cycle: If fuel sulfur content < 50ppm, coefficient is 1; if 50ppm ≤ fuel sulfur content < 1000ppm, coefficient is 0.5; if fuel sulfur content ≥ 1000ppm, coefficient is 0.3. The actual engine oil change interval for the vehicle is calculated by multiplying the recommended change interval by the coefficient corresponding to the sulfur content range of the fuel used in the vehicle.

## Replacement cycle of MC11(H)/MC13(H) China VI engine oil

Recommended engine oil types and replacement intervals for MC13(H)/MC11H China VI engine models in engineering vehicles

Assembly	Oil product name	Oil product quantity	Model	Engine oil change mileage or time	Note
1. Second and third generation high thermal efficiency models (TD China VI): 2. Diverter models (China VI): MC13H, MC13, MC11H, and MC11	MC-III 5W-30 MC-II 10W-40	1. Green handle oil dipstick 42L (first filling) 2. Red handle oil dipstick 36L (first filling) 34L (filling amount without changing the filter element)	Municipal vehicles, urban construction engineering vehicles, sanitation vehicles, dump trucks	40,000 km (under severe working conditions) <sup>1)</sup> 20,000 km) or 12 months, whichever comes first	1. The first engine oil maintenance interval is the same as the regular maintenance interval. 2. Please use the engine oil specified by SINOTRUK. Otherwise, SINOTRUK will only provide paid services for engine damage caused by improper use of oil. 3. Mixing engine oils of different specifications or viscosities is strictly prohibited. 4. Please use China VI fuel that meets the requirements of the latest GB19147 standard. Otherwise, SINOTRUK will only provide paid services for engine damage caused by the use of non-standard fuel. 5. The oil filter element must be replaced when the oil is replaced.
			Vehicles for transport operation	100,000 km or 12 months, whichever comes first.	
			Cement mixer trucks, fire trucks, mining site vehicles, truck-mounted lifting vehicles, pumping vehicles, oil field/road operation vehicles	1000 hours (working time) or 12 months, whichever comes first.	

NOTE:1) Severe operating conditions refer to severe overload, poor road conditions, and high dust levels during vehicle operation; mine mouth dump trucks, ultra-severe condition cargo trucks, etc., are classified under this condition.



## Replacement cycle of MC11(H)/MC13(H) China VI engine coolant

### Replacement cycle of MC11(H)/MC13(H) China VI engine coolant

#### Maintenance of cooling system

#### Specification and replacement interval of coolant

Initial installation: non-cold region: -35°C-Type I engine cooling working fluid Q/ZZ 21007.1

Cold region: -45°C-Type I engine cooling working fluid Q/ZZ 21007.1

After-sales: non-cold region: -35°C-type I engine cooling working fluid Q/ZZ 21007.1

Cold region: -45°C-Type I engine cooling working fluid Q/ZZ 21007.1

Export to extremely cold areas:

Initial installation: -45°C-Type I engine cooling working fluid Q/ZZ 21007.1

After-sales: NF/SNF Type -45°C engine cooling working fluid that meets M324 specifications

#### Oil and filling amounts for medium and heavy truck drivetrains.

Assembly		Coolant filling amount/L <sup>1)</sup> (reference value <sup>2)</sup> )	Product name	Note
Coolant	MC11(H)/MC13(H)	42-48	For non-cold regions: -35°C-Type I engine coolant Q/ZZ 21007.1 For cold regions: -45°C-Type I engine cooling working fluid Q/ZZ 21007.1	1) The after-sales coolant specified by SINOTRUK must be used, otherwise the engine cooling system will be corroded and damaged in a short time, and SINOTRUK only provides paid service for the damage. 2) The filling amount provided in the table is for the basic model and for reference only.

## Replacement cycle of MC11(H)/MC13(H) China VI engine coolant

Recommended Consumption and Change Cycles of Drive Trains of Medium-heavy Trucks

Applicable models	Application conditions		Coolant	Remarks
			Cooling system	
Long-distance tractor and cargo truck	Light load working condition	11/13 L MC engine: average fuel consumption is <30 L/100km	480,000 km or 48 months, whichever comes first	1. The coolant used for any other engines (including WD615, D12, T10 and T12) shall not be used in the cooling system of MC/MT engine; otherwise, it will cause corrosion damage to the engine cooling system in a short time, and SINOTRUK only provides paid service for the damage. 2. The coolant filling amount in the table is only for reference. The filling amount is subject to the actual vehicle configuration, such as the vehicle with retarder. 3. It is forbidden to mix coolants of different brands and models. 4. The recommended liquid change cycles in this table are consistent with the initial and regular maintenance intervals.
		7 L MC engine: average fuel consumption is <20L/100km	300,000 km or 48 months, whichever comes first	
	Standard load working condition	11/13 L MC engine: average fuel consumption is 30-40 L/100km	300,000 km or 48 months, whichever comes first	
		11/13 L MT engine: average gas consumption <35L/100km	320,000 km or 48 months, whichever comes first	
		7 L MC engine: average fuel consumption is 20-25L/100km	300,000 km or 48 months, whichever comes first	
	Standard weight working condition	11/13 L MC engine: average fuel consumption is 40-50 L/100km	240,000 km or 48 months, whichever comes first	
		7 L MC engine: average fuel consumption is 25-35L/100km		
	Loading condition	11/13 L MC engine: average fuel consumption is >50 L/100km	240,000 km or 48 months, whichever comes first	
		11/13 L MT engine: average gas consumption>35L/100km		
		7 L MC engine: average fuel consumption is >35 L/100km		

## Replacement cycle of MC11(H)/MC13(H) China VI engine coolant

**Recommended Consumption and Change Cycles of Drive Trains of Medium-heavy Trucks**

Applicable models	Coolant	Remarks
	Cooling system	
<b>Vehicles for transport operation</b>	200,000 km or 48 months, whichever comes first	<p>1. The coolant used for any other engines (including WD615, D12, T10 and T12) shall not be used in the cooling system of MC/MT engine, otherwise it will cause corrosion damage to the engine cooling system in a short time, and SINOTRUK only provides paid service for the damage.</p> <p>2. The coolant filling amount in the table is only for reference. The filling amount is subject to the actual vehicle configuration, such as the vehicle with retarder.</p> <p>3. It is forbidden to mix coolants of different brands and models.</p> <p>4. The recommended liquid change cycles in this table are consistent with the initial and regular maintenance intervals.</p>
<b>Municipal and sanitation vehicles</b>	240,000 km or 48 months, whichever comes first	
<b>Vehicles for lifting, fire fighting and pumping</b>	240,000 km or 48 months, whichever comes first	
<b>Oilfield/pavement truck and cement mixer truck</b>	240,000 km or 48 months, whichever comes first	
<b>Urban construction slag dump truck</b>	240,000 km or 48 months, whichever comes first	
<b>Road transport dump truck</b>	240,000 km or 48 months, whichever comes first	
<b>Pithead dump truck and truck under super load working condition</b>	6 months	
<b>Mine site vehicle</b>	To be replaced with the engine oil	

## Replacement cycle of MC11(H)/MC13(H) China VI engine coolant

### Recommended Consumption and Change Cycles of Coolants of Vehicles Exported to Extremely Cold Areas

Assembly		Nam-e	Coolant level	Model	Mileage or time of replacement				Note
En-gin-e	M-C13 M-C11	Cool-ant	Initial installation: -45°C- type I engine cooling working fluid Q/ZZ 21007.1 After-sales: NF/SNF type -45°C engine cooling working fluid that meets M324 specifications	Long-distance transport trucks (long-distance tractors, and long-distance cargo trucks)	Average fuel consumption (L/100km)				1. The filling amount of coolant shall be subject to the actual vehicle configuration and on-site filling. 2. It is forbidden to mix coolants of different brands and models.
					< 30	30 ~ 40	40 ~ 50	> 50	
					Light load working condition	Standard load working condition	Standard weight working condition	Loading condition	
					300,000 km	240,000 km	200,000 km	200,000 km	
				Or 48 months, whichever comes first					
			Vehicles for transport operations, municipal and sanitation vehicles, truck-mounted lifting vehicles, firefighting trucks, pump trucks, oilfield trucks, pavement operation vehicles, cement mixer trucks, urban construction slag dump trucks, and road transport dump trucks	200,000 km or 48 months, whichever comes first					
			Pithead dump truck and truck under super load working condition	6 months, whichever comes first					

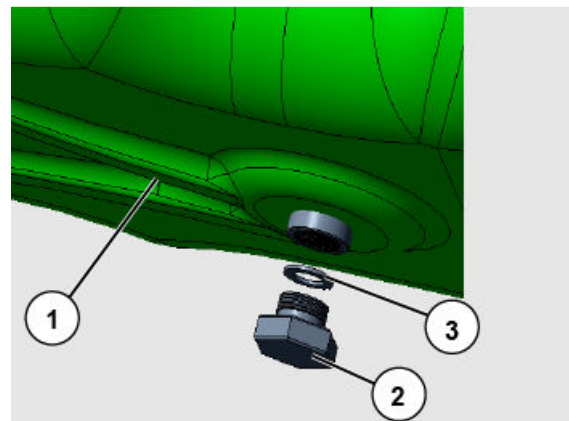
### Maintenance contents of MC11(H)/MC13(H) China VI engine

#### Replace engine oil

The engine oil can be replaced only when the diesel engine is in a horizontal position and the engine is shut down for at least 10 minutes.

- Place a suitable oil container under the diesel engine.
- Loosen and remove the drain plug ② on the oil pan ① to drain the used oil.
- After installing a new composite seal ring ③, screw in the drain plug ② and tighten it to 80 N·m

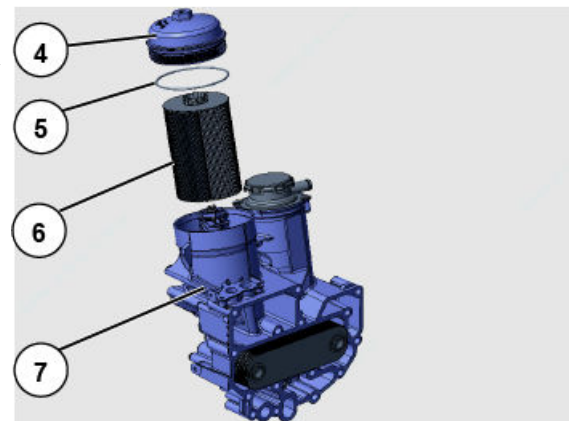
The tightening torque of plastic oil pan and oil drain plug ② is 28 N·m.



#### Install a new oil filter element

- Loosen the oil filter cover ④ and let it stand for two minutes.
- Pull out the oil filter cover ④, seal ring ⑤ and oil filter element ⑥ from the oil filter housing ⑦.
- Remove the old seal ring ⑤.
- Apply a little oil to the new seal ring ⑤ and then put it into the seal groove of the oil filter cover ④.
- Insert the new filter element ⑥ into the oil filter cover ④ as pre-assembly.
- Insert the oil filter housing ⑦, and tighten the oil filter cover to  $40 \pm 10$  N·m (excessive torque may cause the filter cover to break).

**Replace the oil filter element every time the oil is changed.**



**WARNING!**

MC engine special oil and oil filter element shall be used; otherwise it will cause early engine wear, CNHTC only provides paid service in such a case.

**Inject oil**

Please refer to "Inspection and maintenance before starting the engine".

**Check the oil level.**

Please refer to "Inspection and maintenance before starting the engine".

**CAUTION!**

- Mixed use of different grades of oil is not allowed.
- Oils of the same grade produced by different manufacturers are compatible with each other, which are allowed for mixed use.

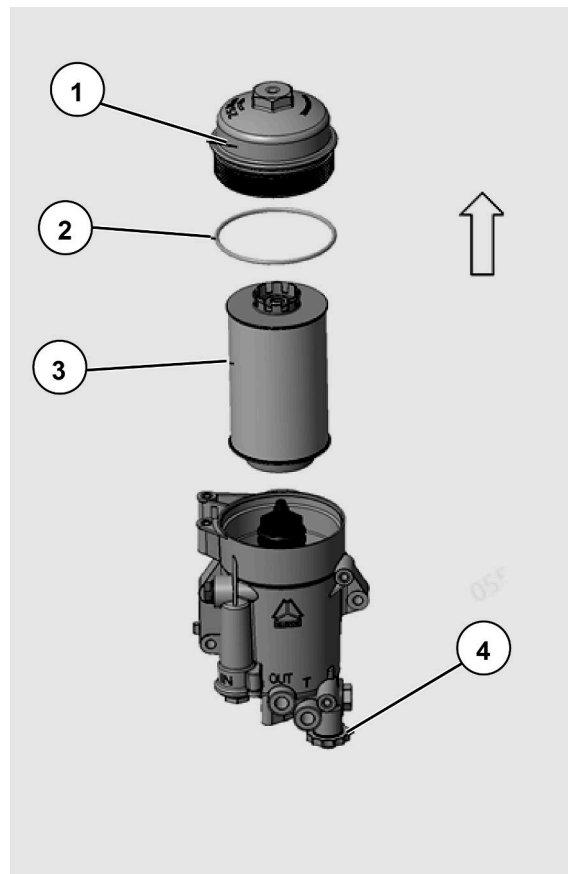
## Maintenance of Fuel System

### Diesel specification

Diesel oil shall comply with GB 19147. Diesel grades are divided into #5, #0, #-10, #-20, #-35 and #-50, and the appropriate diesel grade shall be selected according to the operating ambient temperature (generally, the selected diesel grade shall be 5°C~10°C lower than the operating temperature).

### Replace the fuel filter element.

- 1 Loosen the fuel filter cover ①, unscrew the drain valve ④, stand for two minutes, and drain the fuel filter.
- 2 Re-tighten the drain valve ④ to 3 N·m.
- 3 Remove the filter cover ① and fuel filter element ③.
- 4 Take the fuel filter element ③ out of the fuel filter cover ①.
- 5 Remove the sealing ring ②.
- 6 Apply a small amount of diesel oil onto the new sealing ring ② and then assemble it onto the fuel filter cover ①. After that, insert the new filter element ③ into the upper cover ① as pre-assembly. Finally, screw them into the filter housing together. The tightening torque shall be 25±5N·m.



## Maintenance contents of MC11(H)/MC13(H) China VI engine

### Drain the coolant.

- 1 Place a suitable collecting container under the oil module ①.
- 2 Unscrew the drain plug ② and composite sealing washer ③ to drain the coolant.
- 3 Install a new composite sealing washer ③ and tighten the screw plug ② to  $80 \pm 10 \text{ N} \cdot \text{m}$ .
- 4 Dispose of the drained coolant in the correct way.

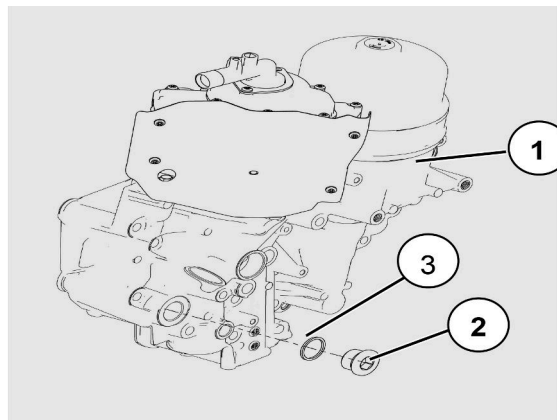
### Add coolant

Please refer to "Inspection and maintenance before starting the engine".



#### **WARNING!**

- The special coolant for MC engine of CNHTC shall be used, otherwise the engine may be damaged. CNHTC only provides paid service in such a case.
- Do not use water instead of coolant.
- The gas in the coolant shall be drained completely, otherwise the water pump will be damaged.



If the coolant becomes cloudy or brown, replace it immediately.

### Check and replace the V-ribbed belt

#### Check the condition of the poly V-belt and the automatic tensioning wheel.

- Check the alignment of the complete gear train: Adjust any deviation in time and find out the cause.
- Check the poly V-belt for cracks, oil stains, sintering overheating, wear, abnormal noise and other conditions. If the poly V-belt is damaged or abnormally worn, please replace it in time.
- Check the performance of the tensioning wheel.



- Check the rotation flexibility of the tensioning wheel rocker arm, and ensure it can recover automatically.
- Check the rotation flexibility of the belt pulley bearing of the tensioning wheel.
- Check whether other structural parts of the tensioning wheel are in good condition.
- In case of any abnormality, replace the tensioning wheel.

### Check the belt tension.

The poly V-belt tensioning wheel is under the action of spring tension and is maintenance-free. If the belt cannot be tensioned, it is required to check whether this is caused by the failure of the tensioning wheel or the excessive extension of the belt, and replace it in time.

### Replace with a new V-ribbed belt

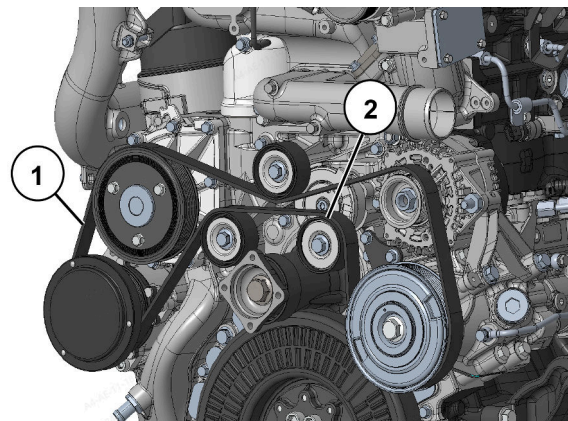
- 1 Use a wrench to turn the bolt ① of the tensioning wheel clockwise to the stopper position and fix it.
- 2 Remove the used belt, install the new belt ②, and confirm the installation position of the belt.
- 3 The automatic tensioning wheel returns to its original position slowly until it contacts the new belt.
- 4 Check the contact surface of the belt again.

### Replacement cycle of V-ribbed belt and tensioner (2-3 oil change cycles)

Light-load express vehicles: 2 years or 360,000km, whichever comes first;

Long-distance road transport vehicles: the vehicle has been running for 2 years or 240,000 km, whichever comes first;

Heavy-haul transportation and engineering vehicles: The vehicle has been running for 2 years or 120,000 km, whichever comes first.



## Maintenance contents of MC11(H)/MC13(H) China VI engine

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### Daily maintenance

- Observe the coolant level in the expansion tank and add coolant as needed.
- Check the oil level and add oil as needed.
- Check the fuel level and add fuel in time.
- Check the urea solution level. The urea level shall be kept between 30% and 80% of the total capacity of the urea tank.

- Check and top up the coolant of the cooling system;
- Check the electrical appliances;
- Empty the low grade diesel in the HCl module.

### Periodic maintenance interval and maintenance specification of engine

- Spot inspection

It is carried out between 2000 km and 5000 km.

- Regular maintenance

Maintenance is carried out every year (after 12 months), and regular maintenance is independent of the replacement of diesel engine oil.

The tightening torque of hexagon socket head cap fastening screw of China VI post-processor fixing tether is  $100 \pm 5 \text{ N} \cdot \text{m}$ . It shall be re-tightened for the first time and spot-checked for the first time, and then re-tightened every 5000km.

- Winter maintenance

In order to maintain diesel engine operation and safe running, winter maintenance shall be carried out when the temperature starts to drop.

- Replace the oil with low viscosity oil in time;
- Select fuel of appropriate grade according to ambient temperature;
- Drain the water in the fuel module;

## Maintenance list

Working	Interval	Remark
<b>Cooling system</b>		
Check the fluid level	Routine inspection	
Check the function and tightness	First spot check and regular maintenance	
Re-tighten the hose clamp of cooling and air intake supercharging system.	First spot check	
Check the intercooler and radiator fins for contamination.	Regular maintenance	
Replace the coolant, check the expansion tank safety valve (replace it with a new one if necessary)	200,000km or 4 years	
Check the coolant specification.	Winter maintenance, regular maintenance.	
Condition of belt and automatic tensioner	Daily inspection and regular maintenance	
Check the water circuit and air circuit conditions of the EGR system	Regular maintenance	
<b>Fuel system</b>		
Check fuel level	Routine inspection	
Check the status and tightness of the fuel system	First spot check and regular maintenance	
Replacement of fuel fine filter element for fuel module	Synchronized with oil maintenance	Use the electric pump on the coarse filter to exhaust air after replacement
Replacement of primary fuel filter element	Replace according to vehicle requirements	
<b>Air intake and exhaust system</b>		

## Maintenance contents of MC11(H)/MC13(H) China VI engine

Working	Interval	Remark
Check the air filter element for contamination.	When changing the oil	
Replace filter element.	According to vehicle regulations	It shall be replaced in time according to the contamination condition.
Check the status, function and tightness of the exhaust system.	First spot check, when the diesel engine oil is changed	
<b>Cylinder head</b>		
Check the valve clearance and adjust it if necessary	120000km	In order to reduce the frequency of going the service station, the valve clearance inspection shall be carried out as part of the oil replacement/regular maintenance.
<b>Lubrication system</b>		
Check the oil level.	Routine inspection	
Replace oil and filter element	According to the oil change interval	
<b>Electrical system</b>		
Check the status of starter and generator	First spot check and regular maintenance	
<b>After-treatment system</b>		
Check the level of urea aqueous solution	Routine inspection	
HCI fuel draining	Inspection in winter	
Check and replace the urea supply unit main filter element and urea level sensor 3D filter screen	50000km	It shall be replaced in time according to the contamination condition.
Clean the urea pump, urea nozzle, urea tank and other pipelines of the system	50000km	It shall be replaced in time according to the contamination condition.

## Maintenance contents of MC11(H)/MC13(H) China VI engine

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Working	Interval	Remark
Check the urea level, temperature and quality sensor breather pipe	First spot inspection, inspection every 5000km	
Re-tighten screws of post-processor assembly	First spot check, re-tighten every 5000km	

## Oil change interval of MT13 China V engine

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### Oil change interval of MT13 China V engine

#### Fuel

The CNG used in the engine shall comply with the provisions of the national standard GB 18047 Compressed Natural Gas for Vehicles.



#### **WARNING!**

The use of substandard natural gas will affect the engine performance, may cause power reduction or damage to the engine, and SINOTRUK only provides paid services.

Factory-fill oil for MT gas engine:

Engine oil MC-III 5W-30 Q/ZZ 21037.2

MT gas engine aftermarket oil is:

SINOTRUK China VI engine long-life special oil 10W-40 (meeting ACEA E6);

SINOTRUK China VI engine high-end special oil 5W-30 (meeting ACEA E6/CK-4).

There is no need to change the oil for the first maintenance of the vehicle equipped with MT gas engine.

## Lubricant recommendations and replacement schedule for MT-series China V natural gas engines – 2024 edition

Assembly			Quality grade and viscosity grade	Oil quantity	Model	Replacement mileage or time		Tip
Gas engine	M-T13	National Standard Stage-V	Engine oil MC-III 5W-30 Q/ZZ 21037.2 (ACEA E6/CK-4 5W-30) Engine oil MC-II 10W-40 Q/ZZ 21037.2 (ACEA E6 10W- 40)	42L (first filling) 40 L (filling without replacing the filter element)	Long-distance transport vehicle	Average gas consumption (kg/100km)		1. The first maintenance mileage of engine oil is consistent with the regular maintenance mileage. 2. Please use CNG and LNG from regular filling stations that meet the requirements of the latest local standards. 3. The oil type and quantity in the table are for reference only; the specific oil dipstick scale line shall prevail. 4. The oil filter element must be replaced at the same time as the oil is replaced.
						≤35	> 35	
						Standard load condition	Heavy load condition	
						50,000 km	30,000 km	
						Or 12 months, whichever comes first		
					Municipal vehicles, dump trucks	20,000 km or 1,000 hours (working time) or 12 months, whichever comes first		
					Cement mixer truck, mine car (non-road 3rd and 4th stage), engine for lifting purpose	Every 1000 hours (working hours) or 12 months, whichever comes first		

## Oil change interval of MT13 China V engine

Engine oil recommendations and replacement schedule for MT13-equipped vehicles exported to extreme-cold regions

Assembly 2)		Quality grade and viscosity grade	Oil quantity	Model	Replacement mileage or time		Tip
Gas engine	M-T13	Factory-fill: MC-III 5W-30 Q/ZZ 21037 After-sales: ACEA E6/CK-4 5W-30	42L (first filling) 40 L (filling without replacing the filter element)	Long-distance transport vehicle	Average gas consumption (kg/100km)		1. The first maintenance mileage of engine oil is consistent with the regular maintenance mileage. 2. Please use fuel from regular gas stations and CNG/LNG from regular gas stations that meet the requirements of the latest local standards. 3. The oil type and quantity in the table are for reference only; the specific oil dipstick scale line shall prevail. 4. The oil filter element must be replaced at the same time as the oil is replaced.
					≤35	> 35	
					50,000 km	30,000 km	
					Or 12 months, whichever comes first		
				Municipal vehicles, dump trucks	30,000 km or 1,000 hours (working time) or 12 months, whichever comes first		
				Cement mixer truck, mine car (non-road 3rd and 4th stage), engine for lifting purpose	Every 1000 hours (working hours) or 12 months, whichever comes first		

NOTE:1)For diesel engines, the influence coefficient of fuel sulfur content on oil change interval is as follows: if the fuel sulfur content is <50ppm, the coefficient is 1; if 50ppm≤fuel sulfur content <1000ppm, the factor is 0.5; if the fuel sulfur content ≥1000ppm, the coefficient is 0.3. The actual oil change interval of the vehicle is the recommended oil change interval multiplied by the coefficient corresponding to the sulfur content range of the specific fuel used by the vehicle.

2)If the ambient temperature is below minus 20°C for more than three consecutive months in a year, the oil change interval of all engines shall be multiplied by a factor of 0.7.

3)Severe working conditions refer to serious overload, poor road conditions and heavy dust when the vehicle is running, and pithead dump trucks and super-strong working condition trucks are included in this working condition.





**WARNING!**

- Do not check the lubricating oil level when the engine is running.
- It is not allowed to mix different grades of engine oil.
- Do not use any other engine oil for MT13 engine, otherwise it will cause serious damage to the engine in a very short time, and SINOTRUK only provides paid services.

## Replacement cycle of MT13 China V engine coolant

### Replacement cycle of MT13 China V engine coolant

#### Maintenance of cooling system

#### Specification and replacement interval of coolant

Initial installation: non-cold region: -35°C-Type I engine cooling working fluid Q/ZZ 21007.1

Cold region: -45°C-Type I engine cooling working fluid Q/ZZ 21007.1

After-sales: non-cold region: -35°C-type I engine cooling working fluid Q/ZZ 21007.1

Cold region: -45°C-Type I engine cooling working fluid Q/ZZ 21007.1

Export to extremely cold areas:

Initial installation: -45°C-Type I engine cooling working fluid Q/ZZ 21007.1

After-sales: NF/SNF Type -45°C engine cooling working fluid that meets M324 specifications

#### Oil and filling amounts for medium and heavy truck drivetrains.

Assembly		Coolant filling amount/L <sup>1)</sup> (reference value <sup>2)</sup> )	Product name	Note
Coolant	MT13	42-48	For non-cold regions: -35°C-Type I engine coolant Q/ZZ 21007.1 For cold regions: -45°C-Type I engine cooling working fluid Q/ZZ 21007.1	1) The after-sales coolant specified by SINOTRUK must be used, otherwise the engine cooling system will be corroded and damaged in a short time, and SINOTRUK only provides paid service for the damage. 2) The filling amount provided in the table is for the basic model and for reference only.

**Recommended Consumption and Change Cycles of Drive Trains of Medium-heavy Trucks**

Applicable models	Application conditions		Coolant	Remarks
			Cooling system	
Long-distance tractor and cargo truck	Light load working condition	11/13 L MC engine: average fuel consumption is <30 L/100km	480,000 km or 48 months, whichever comes first	1. The coolant used for any other engines (including WD615, D12, T10 and T12) shall not be used in the cooling system of MC/MT engine; otherwise, it will cause corrosion damage to the engine cooling system in a short time, and SINOTRUK only provides paid service for the damage. 2. The coolant filling amount in the table is only for reference. The filling amount is subject to the actual vehicle configuration, such as the vehicle with retarder. 3. It is forbidden to mix coolants of different brands and models. 4. The recommended liquid change cycles in this table are consistent with the initial and regular maintenance intervals.
		7 L MC engine: average fuel consumption is <20L/100km	300,000 km or 48 months, whichever comes first	
	Standard load working condition	11/13 L MC engine: average fuel consumption is 30-40 L/100km	300,000 km or 48 months, whichever comes first	
		11/13 L MT engine: average gas consumption <35L/100km	320,000 km or 48 months, whichever comes first	
		7 L MC engine: average fuel consumption is 20–25L/100km	300,000 km or 48 months, whichever comes first	
	Standard weight working condition	11/13 L MC engine: average fuel consumption is 40-50 L/100km	240,000 km or 48 months, whichever comes first	
		7 L MC engine: average fuel consumption is 25–35L/100km		
	Loading condition	11/13 L MC engine: average fuel consumption is >50 L/100km	240,000 km or 48 months, whichever comes first	
		11/13 L MT engine: average gas consumption>35L/100km		
		7 L MC engine: average fuel consumption is >35 L/100km		

## Replacement cycle of MT13 China V engine coolant

**Recommended Consumption and Change Cycles of Drive Trains of Medium-heavy Trucks**

Applicable models	Coolant	Remarks
	Cooling system	
<b>Vehicles for transport operation</b>	200,000 km or 48 months, whichever comes first	<p>1. The coolant used for any other engines (including WD615, D12, T10 and T12) shall not be used in the cooling system of MC/MT engine, otherwise it will cause corrosion damage to the engine cooling system in a short time, and SINOTRUK only provides paid service for the damage.</p> <p>2. The coolant filling amount in the table is only for reference. The filling amount is subject to the actual vehicle configuration, such as the vehicle with retarder.</p> <p>3. It is forbidden to mix coolants of different brands and models.</p> <p>4. The recommended liquid change cycles in this table are consistent with the initial and regular maintenance intervals.</p>
<b>Municipal and sanitation vehicles</b>	240,000 km or 48 months, whichever comes first	
<b>Vehicles for lifting, fire fighting and pumping</b>	240,000 km or 48 months, whichever comes first	
<b>Oilfield/pavement truck and cement mixer truck</b>	240,000 km or 48 months, whichever comes first	
<b>Urban construction slag dump truck</b>	240,000 km or 48 months, whichever comes first	
<b>Road transport dump truck</b>	240,000 km or 48 months, whichever comes first	
<b>Pithead dump truck and truck under super load working condition</b>	6 months	
<b>Mine site vehicle</b>	To be replaced with the engine oil	

## Recommended Consumption and Change Cycles of Coolants of Vehicles Exported to Extremely Cold Areas

Assembly		Name	Coolant level	Model	Mileage or time of replacement				Note
Engine	M-T13	Coolant	Initial installation: -45°C- type I engine cooling working fluid Q/ZZ 21007.1 After-sales: NF/SNF type -45°C engine cooling working fluid that meets M324 specifications	Long-distance transport trucks (long-distance tractors, and long-distance cargo trucks)	Average fuel consumption (L/100km)				1. The filling amount of coolant shall be subject to the actual vehicle configuration and on-site filling. 2. It is forbidden to mix coolants of different brands and models.
					< 30	30 ~ 40	40 ~ 50	> 50	
					Light load working condition	Standard load working condition	Standard weight working condition	Loading condition	
					300,000 km	240,000 km	200,000 km	200,000 km	
					Or 48 months, whichever comes first				
			Vehicles for transport operations, municipal and sanitation vehicles, truck-mounted lifting vehicles, firefighting trucks, pump trucks, oilfield trucks, pavement operation vehicles, cement mixer trucks, urban construction slag dump trucks, and road transport dump trucks	200,000 km or 48 months, whichever comes first					
			Pithead dump truck and truck under super load working condition	6 months, whichever comes first					

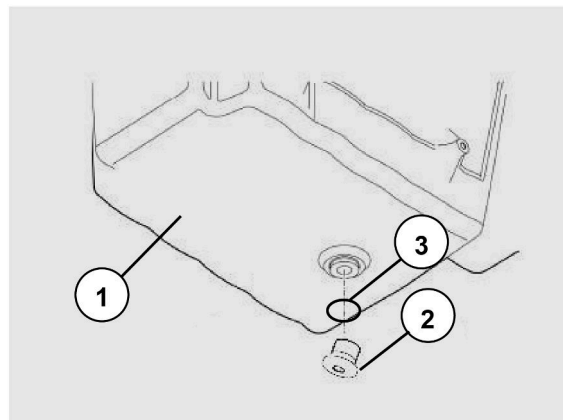
## Maintenance contents of MT13 China V engine

### Maintenance contents of MT13 China V engine

#### Replace the oil

The oil can be replaced only after the diesel engine is in a horizontal position and has been shut down for at least 10 minutes.

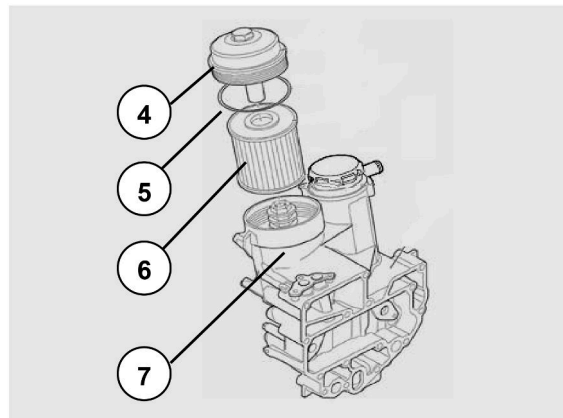
- 1 Place a suitable oil collecting container under the diesel engine.
- 2 Loosen and remove the drain plug ② from the oil pan ① to drain out the used oil.
- 3 After installing a new composite seal ring ③, screw in the oil drain plug ② with a tightening torque of 80 N·m. (Tightening torque of plastic oil pan plug: 28 N·m).



#### Install a new oil filter element

- 1 Loosen the oil filter cap ④ and let it stand for two minutes.
- 2 Pull out the oil filter cap ④, seal ring ⑤, and oil filter element ⑥ from the oil filter housing ⑦.
- 3 Remove the old seal ring ⑤.
- 4 Apply a small amount of engine oil to the new seal ring ⑤ and insert it into the sealing groove inside the oil filter cover ④.
- 5 Insert the new filter element ⑥ into the oil filter cap ④ as a pre-assembly.
- 6 Insert the assembly into the oil filter housing ⑦ and tighten the filter cap. Tightening torque:  $40^{+10}$  N·m (Excessive torque may cause the filter cap to break).

**The oil filter element should be replaced every time the engine oil is changed.**



**WARNING!**

MC engine special oil and oil filter element shall be used;  
otherwise it will cause early engine wear, CNHTC only  
provides paid service in such a case.

**Fill the engine oil**

See "Inspection and maintenance before engine startup".

**Check the oil level**

See "Inspection and maintenance before engine startup".

**CAUTION!**

- Mixed use of different grades of oil is not allowed.
- Oils of the same grade produced by different manufacturers are compatible with each other, which are allowed for mixed use.

## Maintenance contents of MT13 China V engine

### Drain the coolant

- 1 Place a suitable collecting container under the oil module ①.
- 2 Unscrew the drain plug ② and composite sealing washer ③ to drain the coolant.
- 3 Install a new composite sealing washer ③ and tighten the screw plug ② with a tightening torque of  $80^{+10}$  N·m.
- 4 Deal with the discharged coolant correctly.

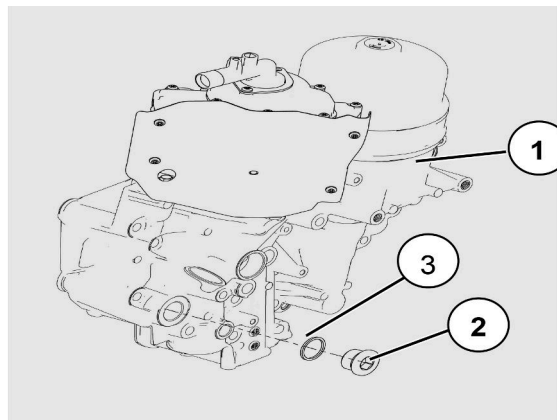
### Fill the coolant

See "Inspection and maintenance before engine startup".



#### WARNING!

- The special coolant for MC engine of CNHTC shall be used, otherwise the engine may be damaged. CNHTC only provides paid service in such a case.
- Do not use water instead of coolant.
- The gas in the coolant shall be drained completely, otherwise the water pump will be damaged.



If the coolant becomes turbid or turns brown, it should be replaced immediately.



### **Check and replace the multi-V belt and automatic tension pulley**

- Check the alignment of the entire gear train: If there is any deviation, make adjustments promptly and identify the cause.
- Check the multi-V belt for cracks, oil stains, overheating caused by sintering, wear, abnormal noise, etc. If any, replace it in time.
- Check the performance of tension pulley.
- Check whether the rocker arm of tension pulley rotates flexibly and can recover automatically.
- Check the rotation flexibility of tension pulley bearing.
- Check the condition of other structural parts of tension pulley.
- In case of any abnormality, replace the tension pulley.

### **Check the belt tension**

The multi-V belt tension pulley is under the force of the spring tension and then it is maintenance-free. If the belt cannot be tensioned, further inspection is needed to determine if it is due to tension pulley failure or excessive belt elongation, and replace it promptly.

## Maintenance contents of MT13 China V engine

### Replace with a new multi-V belt

- 1 Use a wrench to rotate the bolt of the tension pulley ① clockwise to the stop position and fix it.
- 2 Remove the old multi-V belt, replace it with a new one ②, and confirm its installation position.
- 3 The automatic tension pulley ① slowly returns to its position until it contacts the new multi-V belt. Check the contact surface of the multi-V belt again.
- 4 Check the contact surface of the belt again.

### Replacement interval of multi-V belt and tension pulley

Light-load express delivery vehicle: The vehicle has been driving for 2 years or 360,000km, whichever comes first;

Long-distance road transport vehicles: The vehicle has been driving for 2 years or 240,000km, whichever comes first;

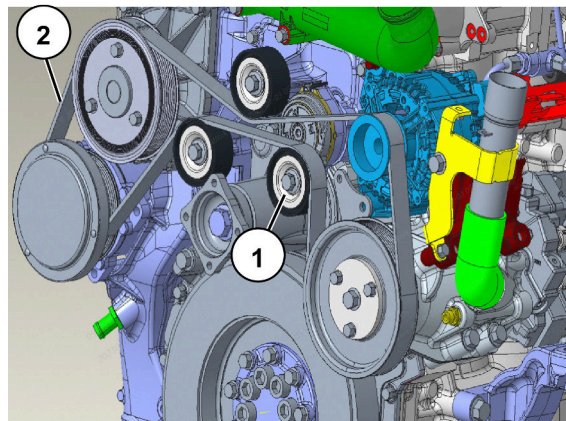
Heavy-duty transportation and engineering vehicle: The vehicle has been driving for 2 years or 120,000km, whichever comes first.

### Valve clearance

Check regularly and adjust if necessary.

The maximum inspection mileage interval shall not exceed 100,000 km.

To reduce service station visits, valve clearance checks can be performed synchronously during vehicle maintenance according to the actual interval mileage.



### Routine maintenance

#### • First maintenance

The first maintenance is carried out between 2,000km and 5,000km.

#### • Scheduled maintenance

Annual maintenance (after 12 months) shall be implemented; and the regular maintenance is independent of the oil replacement of diesel engine.

#### • Winter maintenance

To maintain the diesel engine operation and safe driving, winter maintenance shall be carried out in time when the temperature starts to drop.

Select fuel of appropriate grade according to the ambient temperature.

Drain the water in the primary fuel filter.

Coolant of cooling system shall be checked and filled up.

Electrical appliances shall be checked.

### Cautions for operation

To ensure driving safety, perform daily checks on relevant engine components before use. If any abnormalities are found, immediately proceed to a SINOTRUK service station for inspection and repair.

- Before starting the engine, check that the engine oil level, coolant level, and air reservoir pressure meet requirements to ensure normal operation and safety.
- When starting the engine, if it does not start within 5 s, wait 15 s before attempting to start again.
- After the engine starts, let it idle for 3-5 min; oil pressure should be above 100 kPa. Do not operate the engine at high speed or under

heavy load when the coolant temperature is below 60°C, as this can affect the reliability of the gas engine.

- Before stopping a loaded engine, reduce the load and speed, and let it idle for no less than 3-5 min.
- During the engine break-in period, operate only under moderate loads or less.
- The maximum continuous idle time for the vehicle is 15-20 min; exceeding 20 min is strictly prohibited. Prolonged idling may cause carbon buildup in the engine.

### Precautions for maintenance

#### Spark plug

During routine engine maintenance, check if the spark plug gap meets requirements. Replace spark plugs based on usage conditions; recommended replacement interval is 100,000 km. Spark plugs should only be removed after the engine has cooled down to prevent burns and damage to the spark plug threads. After the spark plug threads are fully unscrewed, use the ignition coil boot to remove the spark plug.

When installing the spark plug, first use the ignition coil boot to screw the spark plug into the cylinder head's spark plug threads until it contacts the sealing washer. Then use a spark plug socket to tighten it. Tightening torque for M14 spark plugs is 25-30 N·m.

If a torque wrench is unavailable or not functioning properly, the spark plug can first be hand-tightened until it cannot be turned further, ensuring the spark plug washer contacts the cylinder head surface. For new products, use a 1/2 to 2/3 turn (180° to 240°). For reused products, use a 1/12 turn (30°). The MT13 uses M14 spark plugs.

## **Maintenance contents of MT13 China V engine**

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Replacement is recommended when the spark plug electrode gap exceeds 0.6mm.

### **High-pressure filter (CNG vehicle/national and international ISO certification requirements))**

Drain contaminants every 2,000 - 5,000 km of vehicle operation. Replace the filter element every 50,000 km or 6 months of vehicle operation. When replacing the filter element, also replace the housing rubber seal ring. After reassembly, perform a leakage check on the filter and its connections.

### **High-pressure filter (CNG vehicle/international ECE certification requirements)**

For every 30,000 km of vehicle operation, soak and clean the filter element in gasoline and dry it with compressed air. Replace the filter element every 100,000 km or one year. When replacing the filter element, also replace the spring seat seal ring. After reassembly, perform a leakage check on the filter and its connections.



## Maintenance contents of MT13 China V engine

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### Low-pressure filter

Drain contaminants every 2,000 - 3,000 km.

For CNG vehicles, replace the filter element every 40,000 km.

For LNG vehicles, replace the filter element every 80000 km.

Depending on the vehicle configuration, the specific replacement mileage shall be based on the product label.

According to the actual situation, the maintenance mileage of sewage discharge and filter replacement can be appropriately shortened. When replacing the filter element, the housing O-ring must be replaced.



#### **WARNING!**

**Do not maintain or blow down under pressure, otherwise serious injury may occur.**

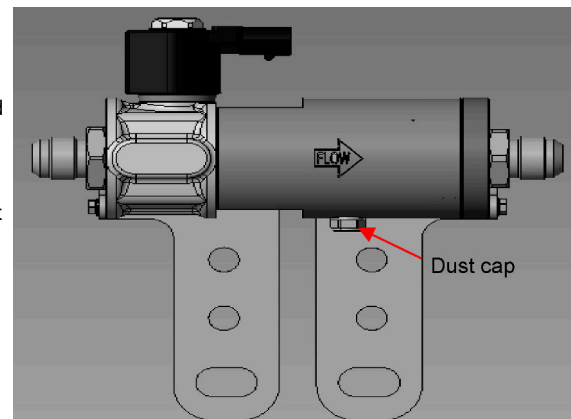


### Pressure regulator

The MT13-LNG model is equipped with a pressure regulator.

Ensure that the dust cap on the pressurizer is clean and not blocked with dust, which may cause deviations in the pressurizer stabilization. If the dust cap is found to be blocked, it can be removed and blown clean with compressed air before installation.

It is recommended to blow it every 2000 km (if there is a lot of muddy water or dust in the use environment, the mileage can be appropriately shortened).



## Maintenance contents of MT13 China V engine

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### HP reducer

The MT13-CNG model is equipped with a HP reducer.

During operation, check whether the engine coolant can be supplied to the engine normally every day.

If the engine power is insufficient and frost is found on the HP reducer during inspection, it means that there is a problem with the coolant heating HP reducer pipeline. The coolant pipeline should be checked for bends that affect the flow of coolant. Insufficient heating for a long time will cause the gas temperature to be too low, damaging the HP reducer and downstream components.

The HP reducer of the T10-EPR system/T12-DEPR system engine cannot be used for the MT13-CNG engine, otherwise, the CFV may be damaged due to excessive adjustment pressure.

### Precautions

#### CNG cylinder

The temperature of the gas cylinder will rise during inflation, which is obvious to the touch but not hot. This is due to the heat released by the compression of gas during inflation, which is a normal phenomenon. For a vehicle that has completed refueling (charged up to 20 MPa), a reduction in pressure after being parked for some time is a normal phenomenon (caused by the drop in gas temperature inside the cylinder). During refueling, the operating procedures of the CNG filling station should be strictly followed, and the inflation pressure of CNG shall not exceed 20MPa.

#### Vehicle stop

When the CNG vehicle is parked for more than 3 hours, the driver needs to close the main shut-off valve and main battery switch located on the integrated control panel when leaving.

When the CNG vehicle is parked for more than 24 hours, in addition to closing the master shut-off valve and the main battery switch on the integrated control panel, the driver shall also close all cylinder valves to ensure vehicle safety.

#### LNG cylinder

During operation, attention should be paid to whether frost appears on the vaporizer. If frosting occurs, it indicates insufficient coolant flow through the vaporizer. The heating pipeline should be inspected to check whether there is any bending. Otherwise, inadequate engine power will occur due to insufficient vaporization capacity of the carburetor.

In low ambient temperatures during winter or when the vehicle is operating under heavy load for extended periods, the self-pressurization valve may be opened to increase the internal pressure of the cylinders, thereby increasing LNG vaporization. Ensure the supply of gas engine and engine power. When the temperature is high or the vehicle load is small in summer, the self-pressurization valve should be closed.



## Maintenance of Weichai WP15H China V engine

### Fuel

Fuel used must comply with the EN 590 standard and should be chosen according to the local ambient temperature, as detailed below:

- 5# vehicle diesel: used in areas where the risk rate is 10% and minimum temperature is above 8°C.
- 0# vehicle diesel: used in areas where the risk rate is 10% and minimum temperature is above 4°C.
- -10# vehicle diesel: used in areas where the risk rate is 10% and minimum temperature is above -5°C.
- -20# vehicle diesel: used in areas where the risk rate is 10% and minimum temperature is above -14°C.
- -35# vehicle diesel: used in areas where the risk rate is 10% and minimum temperature is above -29°C.
- -50# diesel for automobile: used in area with the risk rate of 10% and the lowest temperature of -44°C and above.

### Engine lubricating oil

Model	Oil filling amount	Product category
WP15H	42-50L	CI-4 level
1) Engine oil filling volume data is for reference only. The actual filling volume should be based on the oil dipstick. 2) If the vehicle is equipped with a Weichai fuel system protector or fuel filter with water separator, replace the filter element of the fuel system protector or fuel filter with water separator simultaneously when replacing the diesel filter. 3) The number of filter(s) given herein is for reference only. For the actual number, the actual model shall prevail.		

Engine lubricating oil temperature-viscosity reference table

Viscosity grade	Operating temperature range, °C	Viscosity grade	Operating temperature range, °C
0W	-35 ~ -15	10W-50	-25 ~ 50
0W-20	-35 ~ 20	15W-30	-20 ~ 30
0W-30	-35 ~ 30	15W-40	-20 ~ 40
0W-40	-35 ~ 40	15W-50	-20 ~ 50
5W	-30 ~ -10	20W-30	-15 ~ 30
5W-20	-30 ~ 20	20W-40	-15 ~ 40
5W-30	-30 ~ 30	20W-50	-15 ~ 50
5W-40	-30 ~ 40	20	-10 ~ 20
5W-50	-30 ~ 50	30	-5 ~ 30
10W-30	-25 ~ 30	40	5 ~ 40
10W-40	-25 ~ 40	50	15 ~ 50

For the viscosity grade of oil in the table, the smaller the number before W, the better the low-temperature performance of oil; the larger the number after W, the greater the viscosity of oil; the viscosity and temperature performance requirements of engine lubricating oil are detailed in GB11122.



**CAUTION!**

- Before starting the engine, check the oil level in the oil pan.
- Do not check the oil level when the engine is running.
- Never mix Weichai special engine oil with engine oil from other manufacturers at the same time.

### Engine coolant

The freezing points of Weichai Power coolant are -25°C, -35°C and -40°C. Please select Weichai special coolant with different freezing points according to the local ambient temperature. Generally, the freezing point shall be about 10°C lower than the local ambient temperature.

#### Engine coolant

Category	Product category	Packaging specification
Coolant for heavy-duty engines	HEC-II-25 HEC-II-35 HEC-II-40	4 kg, 10 kg

If Weichai's special coolant is not used, it is recommended to provide the coolant certificate and related parameters for confirmation by Weichai.



#### CAUTION!

- The coolant must be ethylene glycol type, not propylene glycol type (propylene glycol has a freezing point 5.4°C higher and a boiling point 4°C lower).
- Use coolant that meets GB29743.1 national standard or ASTM D6210 international standard, but not phosphate-type coolant (which easily reacts with hard water). Organic-type coolant is recommended.
- Do not mix different types of coolant.
- Prevent the use of counterfeit methanol-based coolant and ethylene glycol derived from coal purification as antifreeze.
- The coolant must be inspected regularly. To prevent corrosion damage, replace the coolant in time as appropriate.
- Never use water or coolant of poor quality as engine coolant.

### AdBlue Solution

The quality and performance of AdBlue solution shall meet the requirements specified in GB 29518. Unqualified AdBlue solution has the risk of blocking AdBlue pump and AdBlue nozzle, and metal impurities in unqualified AdBlue solution are easy to cause permanent poisoning of SCR catalyst, resulting in a decrease in efficiency of SCR catalytic converter. AdBlue solution must be added through formal channels or designated units. It is strictly prohibited to use any other liquid instead of AdBlue solution during normal operation.

**CAUTION!**

- The urea solution should be stored in a closed container in a cool, dry space away from strong oxidants. If the urea is directly poured into the urea tank during filling, it may splash and cause environmental pollution. Specialized filling equipment is recommended.
- The urea solution is corrosive to the skin. If you accidentally touch the skin or eyes during adding, rinse with water as soon as possible; if the pain persists, seek medical help. If accidentally swallowed, rinse mouth first, do not induce vomiting, and seek medical attention immediately.

### Routine maintenance

#### • Coolant level inspection

Check the coolant level in a cold state. If the coolant is not enough, open the coolant filler cap to add coolant.

#### • Inspection of engine oil level

When the oil level is lower than the MIN mark or higher than the MAX mark of the oil dipstick, starting the engine is prohibited. When the oil level is lower than the MIN mark, it is necessary to add oil from the engine oil filler; when the oil level is higher than the MAX mark, it is necessary to pump oil at the dipstick tube or drain oil through the drain plug until the oil level is between the MAX and MIN marks of the oil dipstick. It is recommended that oil be filled near the MAX mark of the dipstick.

#### • Inspection of fuel level

If the engine has been installed on the vehicle, turn on the power switch, check the fuel level from the fuel gauge, and add fuel in time.

#### • Inspection of water level in fuel filter

Check the water-in-fuel indicator or the water level in the fuel filter. If there is an alarm or obvious water accumulation, loosen the drain valve to drain the water in the fuel filter, and then tighten the drain valve again.

#### • Inspection of AdBlue solution level

The AdBlue tank level shall be kept between 30% and 80% of the total volume of the AdBlue tank.



#### CAUTION!

–When the urea level is lower than 10%, the alarm system will be activated, and the driver alarm light on the instrument will flash. At this time, urea solution needs to be added in time.  
–If it is not added in time, the engine may have power limiting protection measures.



#### CAUTION!

–The urea tank cover and the top of the urea tank shall be kept clean and protected if necessary. Anti-fouling and dust-proof structures such as urea tank cover are strictly prohibited from being lost or damaged.  
–The auxiliary filling funnel, filling pipeline and other tools and equipment shall be cleaned as necessary after use, and sealed and stored in plastic bags.  
–The tin foil at the seal of the urea drum and the sealing sticker on the urea cap must be torn off before filling. The urea solution shall be kept clean, protected from light and sealed.

#### • Inspection for three leakages (oil, coolant and gas leakages)

Three leakages are not allowed during engine operation. During routine maintenance, the following parts should be checked particularly (but not limited to):

## Maintenance of Weichai WP15H China V engine

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No leakage is allowed at the fuel pipeline connection and fuel filter;

No leakage is allowed at the cooling pipeline connection;

No leakage is allowed at the oil filter;

No leakage is allowed at the oil pan sealing gasket, and no cracks or damage are allowed on the sealing gasket;

No leakage is allowed at the oil inlet and return pipes of turbocharger;

The clamps on the intake and exhaust pipelines must not be loose.

No leakage is allowed at the cylinder head cover and gasket;

No leakage is allowed at the air compressor and its pipeline connections;

No leakage is allowed at the connection between the flywheel housing and the transmission.

### • Line inspection

The connection of various engine accessories shall be reliable, and the line is not allowed to be loose.

### • Pipeline inspection

The gas, oil and water lines of the vehicle and engine shall run smoothly, and the pipelines are not allowed to be bent, twisted or compressed.

### • Fan inspection

The fan is not allowed to have abnormal wear, cracks or damage.

### • Check the tension pulley

Abnormal wear is not allowed on the outer circle of the tension pulley;

At the contact position between the belt and the automatic tension pulley, the belt must not extend beyond the edge of the tension

pulley. If the belt protrudes more than 1 mm from the tension pulley, please replace the automatic tension pulley promptly.

### • Belt inspection

Check the belt for cracks, delamination and wear.

### • Fault inspection

If the instrument can directly display information such as engine DTCs, you may check for engine faults after powering on the vehicle. If necessary, please contact professionals for troubleshooting.

## Engine regular maintenance interval and maintenance specifications

Purpose	Tractor and cargo truck	
Maintenance type	First maintenance	Regular maintenance
Maintenance interval	3000km-6000km/3 months	120000 km/12 months
Replace the oil	•	•
Replace the oil filter/oil filter element	•	•
Check and adjust the valve clearance		•
Check the coolant pump (lubricated by lubricating grease cup)		•
Replace the fuel filter element		•
Replace the filter element of fuel system protector		•
Check the coolant level and add coolant when necessary		•
Replace the coolant	Replace annually	
Tighten the connectors of intake pipelines, hoses and flanges		•
Check the air filter maintenance indicator light or indicator		•
Clean the dust cup of the air filter (excluding automatic dust removal models)		•
Clean the main element of air filter	When the indicator is on	
Replace the main element of air filter	After cleaning the main filter element for 5 times	
Replace the safety element of air filter	After cleaning the main filter element for 5 times	
Check and re-tighten the belt	Manually tension after 3,500 km (for new vehicles or after belt replacement)	Check and retighten after every 10000 km-15000 km

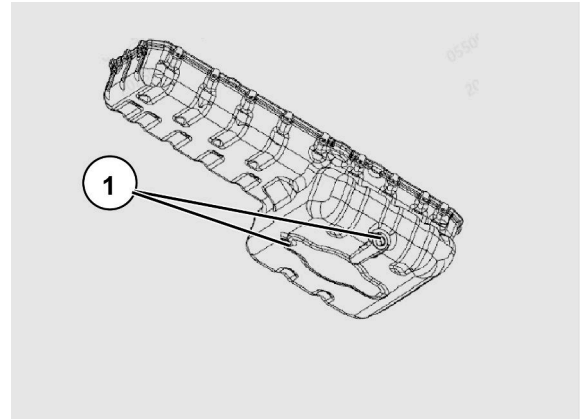
## Maintenance of Weichai WP15H China V engine

Purpose	Tractor and cargo truck	
Maintenance type	First maintenance	Regular maintenance
Maintenance interval	3000km-6000km/3 months	120000 km/12 months
Replace the belt		Replace it according to the wear condition after 70000 km
Check the bearing clearance of turbocharger	Every 240000 km	
Clean the AdBlue pump and the AdBlue nozzle		•
Replace the filter element of the AdBlue pump		•
Replace the AdBlue nozzle gasket	Every time the AdBlue nozzle is removed	
Clean the AdBlue tank and its filter element:		•
Clean and replace the filter at the suction inlet of the AdBlue tank sensor.		•
Clean the filter screen at the AdBlue pump inlet pipe joint		•
Clean or replace the filter screen for the aftertreatment coolant switch solenoid valve	Every year before winter	
NOTE 1 : • Indicating maintenance is required. NOTE 2 :Diesel engines that have not been used for over half a year shall be provided with corresponding maintenance like oil seal. NOTE 3 :Weichai will provide maintenance suggestions based on customers' requests. NOTE 4 :Irregularly check the oil level to ensure that it is kept between the L and H scale marks of the dipstick. NOTE 5 :For other special vehicles not specifically mentioned, the maintenance interval should follow that of tractor, cargo trucks, or dump trucks according to the actual application.		

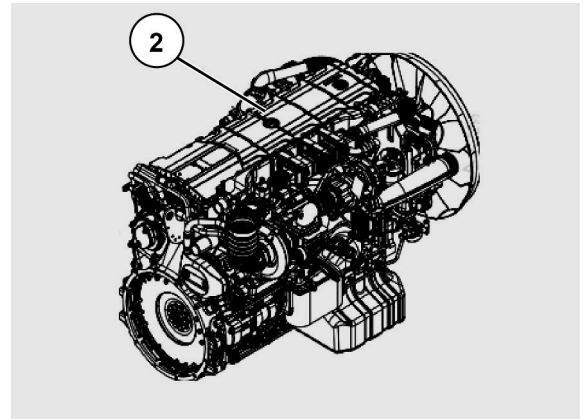


### Replace the oil

Unscrew the drain plug ① at the bottom of the oil pan to drain the engine oil, and then screw on the drain plug ①.



Open the oil filler cap ②, add oil from the oil filler, observe the dipstick scale until it meets the requirements, and then install the oil filler cap ②.



### Replace the oil filter element

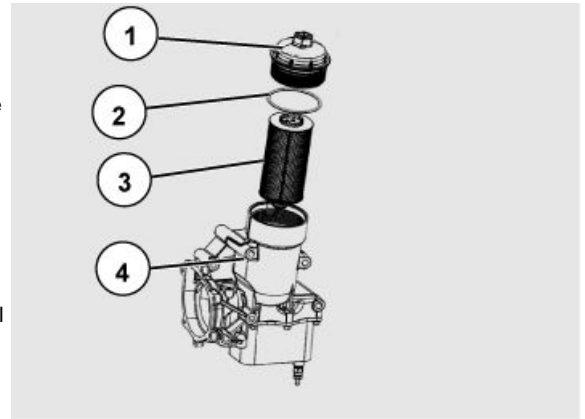
**When replacing the oil filter element (spin-on type), follow the steps below:**

- 1 Remove the oil filter element with special tooling, pay attention to preventing the remaining oil inside the filter element from contaminating environment, and do not discard the waste oil filter element arbitrarily;
- 2 Clean the sealing surface of the joint surface between the oil filter element and filter seat to ensure that there is no impurity affecting the sealing performance;
- 3 Apply an oil film to the new sealing surface. Gently screw the oil filter element by hand until the rubber ring (filter element seal) fits closely against the joint surface. Then, use a special tool wrench to further tighten it by 3/4 to 1 full turn.
- 4 After replacement of oil filter, add oil according to the dipstick level indication;
- 5 Start the engine and then keep it idling for 15~30s. After ensuring that there is no abnormality, let the engine run at a high speed. Keep the engine running at a high speed for over 5 min (the accelerator pedal can be pressed down). Check the oil filter for oil leakage, and tighten the filter again if necessary.



## When replacing the oil filter element (eco-friendly), follow the steps below:

- 1 Follow the oil filter cover rotation mark, use a wrench to loosen and remove the oil filter cover ①, and take out the oil filter element ③; Note that there is oil in the oil filter. Try to avoid polluting the environment during the removal process. At the same time, do not discard the replaced oil filter element ③ arbitrarily;
- 2 Clean the joint surface between the oil filter cover ① and the oil filter seat ④ to avoid residual impurities on the sealing surface affecting the seal;
- 3 Install the new oil filter element ③ into the oil filter base ④, then screw the oil filter cover onto the oil filter base by hand, and tighten the oil filter cover with a wrench. The tightening torque is shown in the oil filter cover; Note that the new oil filter cover seal ring ② needs to be replaced before installation, and the surface of the seal ring should be coated with engine oil before installation for installation lubrication;
- 4 After replacement of oil filter, add oil according to the dipstick level indication;
- 5 Start the engine and keep it idling for 15-30s. After ensuring that there is no abnormality, keep the engine running at a high speed for more than 5 min (the accelerator pedal can be pressed down). Check for sealing performance of the oil filter cover. If necessary, tighten the oil filter cover again according to the tightening torque.



### CAUTION!

- Avoid installing the filter element and filter cover separately. The filter element and filter cover must be combined together before being installed on the filter seat.
- Unqualified oil or oil filter element will cause early wear of bushings at crankshaft and other parts, aggravate the risk of excessive emission, etc.

## Maintenance of Weichai WP15H China V engine

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### Replace the fuel filter element

**When replacing the fuel filter element (spin-on type), follow the steps below:**

- 1 Remove the used fuel filter element;
- 2 Lubricate the sealing lip before installation, clean the mounting surface and apply oil on the seal ring. Tighten the filter by hands until the seal ring contacts the base;
- 3 After the seal ring contacts the base, tighten it for 3/4~1 turn to seal it;
- 4 Exhaust air until there is no bubble;
- 5 Start the engine and then keep it idling for 15~30s. After ensuring that there is no abnormality, let the engine run at a high speed. Keep the engine running at a high speed for over 5 min (the accelerator pedal can be pressed down). Check the filter for oil leakage, and tighten the filter again if necessary.

**When replacing the fuel filter element (eco-friendly), follow the steps below:**

- Loosen and remove the fuel filter cover with a wrench according to the rotation mark of the fuel filter cover, and take out the fuel filter element; Note that there is fuel in the fuel filter, do not make fuel pollute the environment during removal, and do not discard the replaced fuel filter element arbitrarily; Before installation, clean the joint surface between the fuel filter cover and the fuel filter body to prevent residual impurities on the joint surface from affecting the sealing. In addition, lubricate the seal end, replace with a new seal ring and apply a little engine oil on the seal ring.

- Install the filter element into the fuel filter body, then screw the fuel filter cover onto the fuel filter body by hand, and then tighten the fuel filter cover with a wrench according to the torque specified by the rotation mark of the fuel filter cover; bleed the air until no bubbles appear.
- Start the engine and then keep it idling for 15~30s. After ensuring that there is no abnormality, let the engine run at a high speed. Keep the engine running at a high speed for over 5 min (the accelerator pedal can be pressed down). Check the fuel filter for leakage, and tighten the filter again if necessary.

### Inspection of air tightness

Check if the intake hose is cracked due to aging, and if the clamp gets loosened. When necessary, tighten or replace related parts to ensure the airtightness of the intake system.

### Check the air filter element

Using a high-quality air filter and performing regular maintenance are crucial for engine durability. A clogged air filter will increase air intake system resistance, resulting in elevated intake and combustion temperatures, black smoke emissions, and premature engine wear. A clogged air filter may cause a malfunction or filter rupture, allowing dust to enter the air intake system and power cylinder, leading to power cylinder wear and increased crankcase blowby. Be sure to use a quality air filter and replace it regularly according to the operation instructions.

The maximum allowable intake resistance of the engine is 6 kPa. The maximum intake resistance must be checked when the engine runs at rated speed and with full load. When the intake resistance reaches the maximum allowable value, the filter element shall be cleaned or replaced according to the provisions of the manufacturer.



#### **CAUTION!**

Unqualified air filter element will cause abnormal blockage of DPF after-treatment, resulting in excessive emission, DPF damage and other serious faults!

### Maintenance of aftertreatment component

After the engine is shut down (T15 power-off only), the SCR system will automatically enter the reverse suction state to suck the AdBlue solution in the AdBlue pump and AdBlue pipeline back to the AdBlue tank. This stage will last for 2 min, during which it is forbidden to turn off the master switch of the vehicle power supply.

### Inspection of AdBlue pump filter element

For the maintenance interval of the AdBlue pump filter element, please refer to the engine regular maintenance interval and maintenance specifications in this manual. During each maintenance, remove the AdBlue pump filter element, and then wash it with clear water before installation. Do not tap or knock the filter element hard. When maintaining the AdBlue tank and its filter element, it is necessary to check their cleanliness. Clean the AdBlue tank and filter element if needed.



#### **CAUTION!**

- Check the state of the urea nozzle every time it is replaced or disassembled. If it is damaged or deformed, replace the urea nozzle!
- The maintenance of after-treatment parts shall be carried out at Weichai service station with special maintenance tools; the urea pump and urea nozzle shall be cleaned with Weichai special urea injection system inspection and cleaning tools!

### Maintenance of AdBlue tank

In order to prevent blockage and wear of the AdBlue pump caused by particulate impurities in the AdBlue tank, please clean the AdBlue tank according to the "Regular maintenance interval and specification". For details on the AdBlue tank cleaning interval, please refer to the Engine regular maintenance interval and maintenance specifications.

The AdBlue tank sensor is intelligent and is used to measure the solution level and AdBlue concentration, corresponding to data in the engine ECU. Using an incompatible AdBlue tank for replacement may cause fault and trigger engine torque limit. To replace the AdBlue tank, please always use a product of the original manufacturer and the same model as the replacement.

#### **Clean or replace the inlet filter screen of AdBlue tank coolant switch solenoid valve**

When the vehicle enters the station for repair or maintenance in winter, it is necessary to actively check whether the inlet filter screen of the coolant switch solenoid valve of the AdBlue tank is dirty and blocked, and clean or replace the filter screen according to the above operation steps to avoid vehicle fault caused by serious filter screen blockage in the later period.

Ensure that the engine is in a shutdown state; find the coolant switch solenoid valve of the AdBlue tank, unplug the inlet pipe of the solenoid valve, bend the water pipe immediately after unplugging and tie it firmly with a cable tie to prevent the engine coolant from flowing out.

Use a screwdriver or other tools to gently pry the plastic part at the arrow position in the filter screen diagram, pull out the filter screen after loosening, and take out the inlet filter screen of coolant switch solenoid valve.

After taking it out, clean the inside of the filter screen and remove all impurities as much as possible. Be careful not to damage the filter screen. If the filter screen is damaged, replace it with a new one.

Install the clean filter screen in its original position, i.e. the water inlet of coolant switch solenoid valve, and connect the water pipe to ensure that the interface is well sealed.

## Maintenance of Weichai WP15NG China V engine

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### Maintenance of Weichai WP15NG China V engine

#### Fuel

CNG and LNG can be selected as engine fuel for Weichai natural gas engine. Only compressed natural gas above 12T specified in GB/T18047 and liquefied natural gas meeting the requirements of GB/T19204 are allowed to be used. If the fuel is not used as required, the emission may not meet China VI regulations.

#### Engine oil

Model	Oil filling quantity (L)	Packaging specification
WP15NG	43	4L , 18L , 170kg
1)The oil filling quantity data is for reference only, and the actual filling quantity is subject to the oil dipstick. 2)The number of filters is for reference, and the actual model shall prevail. 3)Oil filling quantity = capacity marked on the oil pan + capacity of the oil filter.		



**Engine Lubricating Oil Temperature-Viscosity Reference Table**

Viscosity grade	Operating temperature range, °C	Viscosity grade	Operating temperature range, °C
0W	-35 ~ -15	10W-50	-25 ~ 50
0W-20	-35 ~ 20	15W-30	-20 ~ 30
0W-30	-35 ~ 30	15W-40	-20 ~ 40
0W-40	-35 ~ 40	15W-50	-20 ~ 50
5W	-30 ~ -10	20W-30	-15 ~ 30
5W-20	-30 ~ 20	20W-40	-15 ~ 40
5W-30	-30 ~ 30	20W-50	-15 ~ 50
5W-40	-30 ~ 40	20	-10 ~ 20
5W-50	-30 ~ 50	30	-5 ~ 30
10W-30	-25 ~ 30	40	5 ~ 40
10W-40	-25 ~ 40	50	15 ~ 50

For the viscosity grade of the oil in the table, the smaller the number before W, the better the low temperature performance of the oil; the larger the number after W, the higher the viscosity of the oil; see GB 11122 for the viscosity-temperature performance requirements of engine lubricating oil.



**CAUTION!**

- Before starting the engine, check the oil level in the oil pan
- Do not check the oil level when the engine is running.
- It is prohibited to mix Weichai Power special oil with the oil of another manufacturer.

## Maintenance of Weichai WP15NG China V engine

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### Coolant

The freezing point of Weichai special coolant has specifications such as -25°C, -35°C and -40°C. Please select Weichai genuine coolant with different freezing points according to the local ambient temperature. The principle of selection is that the freezing point is about 10 degrees lower than the local temperature.

#### Coolant

Species	Product type	Packaging specification
Heavy-duty engine coolant	HEC-II-25 HEC-II-35 HEC-II-40	4kg, 10kg



#### CAUTION!

- The coolant should be checked at a regular interval. In order to prevent corrosion damage, the coolant shall be replaced in time according to the situation.
- It is not allowed to use water and inferior coolant as engine coolant.

### Engine oil and coolant exported to extremely cold areas:

Factory-fill: engine oil MC-III 5W-30 Q/ZZ 21037.2

After-sales: Engine oil products conforming to ACEA E6/CK-4 specifications

Factory-fill: -45°C Type I engine coolant Q/ZZ 21007.1

After-sales service: M324 NF/SNF -45°C engine coolant

### **Routine inspection**

- Check the coolant level, engine oil level, gas gauge pressure, and whether the grease at the place where grease needs to be added is sufficient.
- Check the oil, water and gas for leakage.
- Check whether the external connectors and accessories are well connected and fastened.
- Check the fan, visually check whether the fan blades are damaged and whether the connecting bolts are tightened.
- Check whether the belt is too tight or too loose.
- Check whether the line connection and connector are damaged.
- Check whether the exhaust temperature, color, sound and vibration of the engine are normal, and whether the speed is stable.
- Check whether the turbocharger oil inlet and return pipes are unobstructed and whether there is oil leakage.
- Check the exhaust pipeline to ensure that there is no leakage and the intake pipeline is unblocked.

## Maintenance of Weichai WP15NG China V engine

Periodic maintenance interval and maintenance specification of engine

Purpose	Standard-load road vehicle	
Maintenance type	First maintenance	Regular maintenance
Maintenance interval	3000km–6000km/3 months	60,000km/6 months
Replace engine oil	•	•
Replace the oil filter or filter element	•	•
Check and adjust the valve clearance	Every 120,000km	
Check the water pump (lubricated by grease cup)		•
Check and re-tighten the belt	Manual tensioning at 3500km (new vehicle or after belt replacement)	Test and re-tighten every 10,000km-15,000km
Replace the belt		If it exceeds 70,000km, replace it according to wear
Check the coolant capacity and add sufficient coolant	•	•
Replace the coolant	Replace once a year (exported to extremely cold areas: 100,000 km or 12 months, whichever comes first)	
Tighten the cooling pipe clamp	•	
Tighten the intake pipeline and hose	•	•
Replace the gas filter element	Every 60,000km for LNG vehicles and every 30,000 km for CNG vehicles	
Check the gas pipe seal	•	•
Replace the gas pipe	Every 240000km	
Replace pressure reducer repair kit (CNG model)	Every 240000km	
Replacement of exhaust control valve filter element	Every 60000km	
Cleaning mixer		•

## Maintenance of Weichai WP15NG China V engine

Purpose	Standard-load road vehicle	
Maintenance type	First maintenance	Regular maintenance
Maintenance interval	3000km–6000km/3 months	60,000km/6 months
Clean the throttle		•
Clean the EGR control valve		•
Check the turbocharger bearing clearance	Every 240000km	
Replace the high-voltage wire/rubber sleeve	Every 120,000km	
Replace the spark plug	Recommended every 120,000 km	
Check the air filter maintenance indicator or indicator		•
Clean the air filter dust cup (excluding the automatic dust exhaust type)		•
Clean the main filter element of air filter	When the indicator is on	
Replacement of air filter safety filter element	After cleaning the main filter element for 5 times	
Check and adjust the clutch stroke	•	•

NOTE 1 : •Maintenance mark is required.

NOTE 2 :The diesel engine that has been parked for more than half a year must be maintained accordingly, such as re-sealing.

NOTE 3 :Weichai will provide maintenance suggestions according to user request.

NOTE 4 :Check the engine oil every 15,000 km of the road vehicle. If the engine oil is insufficient, add engine oil to the upper mark position.

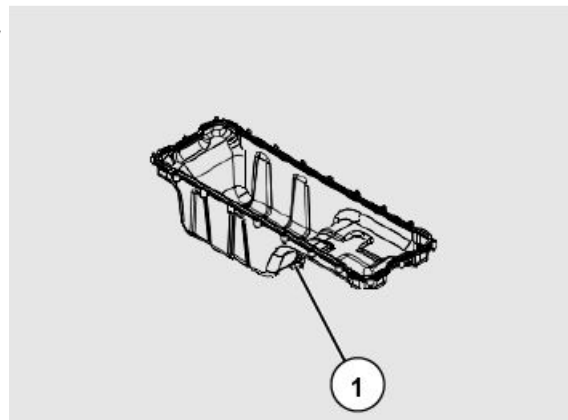
NOTE 5 : Extended oil change intervals require the following: 1. The use of special long-mileage 10W-40 oil for Weichai gas engines; 2. The nominal oil quantity marked on the oil pan must not be less than 41L (WP15NG). Under heavy load and severe working conditions such as traction, self-dumping, etc., the oil change interval shall be halved.

NOTE 6 :Weichai will provide maintenance suggestions according to user request.

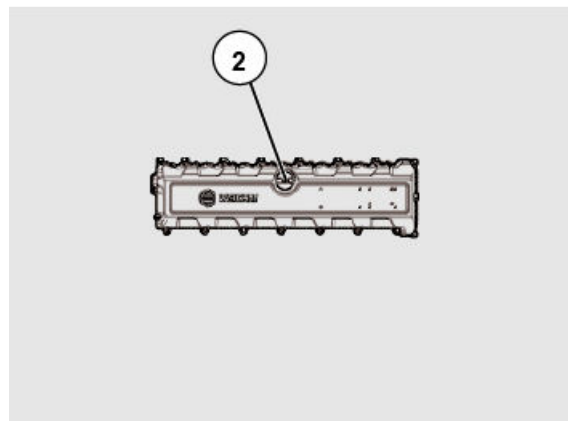
## Maintenance of Weichai WP15NG China V engine

### Replace engine oil

Unscrew the drain plug ① at the bottom of the oil pan, drain the oil, and then screw on the drain plug ①.



Open the filler cap ②, add oil from the oil filler, observe the oil dipstick scale until the requirements are met, and then install the filler cap ①.



### **Replace the oil filter or filter element**

#### **Replace the paper filter element**

- 1 Remove the head end cover of the oil cooling filter module. Loosen the head end cover of the oil cooling filter module with a socket wrench and take it off. At this time, the paper filter element can be clearly seen, and slowly take out the paper filter element.
- 2 Install a new paper filter element into the module so that it falls naturally to the bottom of the module. The lower end of the paper filter element and the inside of the module are provided with a special guiding and positioning structure. After the paper filter element is placed inside the module, the paper filter element will be naturally positioned inside the module along the center tube. In addition, do not press down the paper filter element forcibly after the paper filter element is installed.

#### **Description:**

The O-ring is disposable. When replacing the filter element, replace the O-ring of the filter cover at the same time, and ensure that the rubber ring is not damaged, the groove is free of impurities, and the assembly is not distorted. Apply oil before assembly.

It is recommended to use a socket to remove the filter cover. When installing the filter cover, refer to the torque value on the filter cover surface to tighten it. It is recommended to remove the filter cover according to the recommended time on the filter cover surface. Never use an open-end wrench to remove the filter cover in an ultra-low temperature environment. Plastic parts are hard and brittle at low temperature and are prone to brittle cracks.

Before replacing the filter element, please check whether the filter paper is damaged and whether the filter paper is well bonded. It is recommended to use a regular filter element.

#### **Replace the gas filter and filter element**

Replace the filter element according to the engine maintenance interval. Observe the locking indicator label of the filter housing, unscrew the housing, replace it with a new filter element, and then tighten the housing (tightening torque:  $40\pm 5\text{N}\cdot\text{m}$ ).

## Clutch working parameters

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### Clutch working parameters

Working medium: compressed air, DOT3 brake fluid;

Maximum working pressure: 4MPa for brake fluid, 0.85MPa for air;

Working temperature:-40 °C~100 °C;

Pedal travel: total travel up to 130 mm;

Pedal effort: No more than 190N when assisted.



## Clutch brake fluid replacement

## Recommended Consumption and Change Cycles of Drive Trains of Medium-heavy Trucks

Applicable models	Application conditions		Brake fluid	Remarks
			Clutch control system	
Long-distance tractor and cargo truck	Light load working condition	11/13L MC engine: Average fuel consumption < 30L/100km	120,000 km or 12 months, whichever comes first	The recommended liquid change cycles in this table are consistent with the first and regular maintenance.
		7L MC engine: Average fuel consumption < 20L/100km	100,000 km or 12 months, whichever comes first.	
	Standard load working condition	11/13L MC engine: The average fuel consumption is 30-40L/100km.	100,000 km or 12 months, whichever comes first.	
		11/13L MT engine: Average gas consumption < 35L/100km	80,000 km or 12 months, whichever comes first	
		7L MC engine: Average fuel consumption 20-25L/100km	100,000 km or 12 months, whichever comes first.	
	Standard weight working condition	11/13L MC engine: The average fuel consumption is 40-50L/100km.	80,000 km or 12 months, whichever comes first	
		7L MC engine: The average fuel consumption is 25-35L/100km.		
	Loading condition	11/13L MC engine: Average fuel consumption > 50L/100km	80,000 km or 12 months, whichever comes first	
		11/13L MT engine: Average gas consumption > 35L/100km		

## Clutch brake fluid replacement

Applicable models	Application conditions		Brake fluid	Remarks
			Clutch control system	
		7L MC engine: Average fuel consumption > 35L/ 100km		

### Recommended Consumption and Change Cycles of Drive Trains of Medium-heavy Trucks

Applicable models	Brake fluid	Remarks
	Clutch control system	
Vehicles for transport operation	100,000 km or 12 months, whichever comes first.	The recommended liquid change cycles in this table are consistent with the first and regular maintenance.
Municipal and sanitation vehicles	80,000 km or 12 months, whichever comes first	
Vehicles for lifting, fire fighting and pumping	12 months	
Oilfield/pavement truck and cement mixer truck	12 months	
Urban construction slag dump truck	40,000 km or 12 months, whichever comes first	
Road transport dump truck	40,000 km or 12 months, whichever comes first	
Pithead dump truck and truck under super load working condition	20,000 km or 6 months, whichever comes first	
Mine site vehicle	To be replaced with the engine oil	

### Brake fluid and filling amounts for medium and heavy truck drivetrains.

Assembly	Brake fluid filling amount (reference value)	Product name	Note
Clutch	0.5L	DOT3 brake fluid (exported to extremely cold areas: products that meet ISO 4925-Class 3 specifications)	You must use the brake fluid designated by SINOTRUK for after-sales use; otherwise, damage may occur to the clutch control system, and SINOTRUK will only provide paid service for repairs.

### Precautions

- Before adding or replacing brake fluid, ensure the oil reservoir and surrounding environment are clean. Tighten the oil reservoir cover after adding brake fluid.
- When replacing the brake fluid, ensure all residual fluid in the hydraulic system is completely removed before refilling with brake fluid of the specified grade and same batch.
- The brake fluid is corrosive. Try to prevent the brake fluid from splashing on human body and the painted surface of vehicle.



### **WARNING!**

Do not let oil and grease enter the hydraulic pipeline; otherwise the clutch master cylinder and subsidiary power cylinder will be damaged.

## Maintenance contents of clutch

### Maintenance contents of clutch

#### Exhaust the hydraulic pipeline

If air exists in the clutch hydraulic pipeline, the effective stroke of the booster cylinder push rod will be reduced, the separation of the clutch will be incomplete, and the shift lever will be difficult to push to the corresponding gears. Exhaust air after replacement or replenishment of brake fluid or removal and installation of pipelines (air exhaust shall be carried out by two persons in cooperation). Remove the dust cap ② on the bleed screw ①, wipe up the bleed screw ①, connect one end of the ethylene hose to the bleed screw ①, and put the other end into a transparent container. Keep sufficient brake fluid in the oil tank during exhaust. Tighten the bleed screw ①, repeatedly depress the clutch pedal several times and then keep it fully depressed. Loosen the bleed screw ① to discharge the brake fluid with bubbles into the container, and then tighten the bleed screw ①. Repeat the above operations several times until there is no bubble in the brake fluid coming out of the bleed screw ①. Finally, install the dust cap ② back to the bleed screw ①.

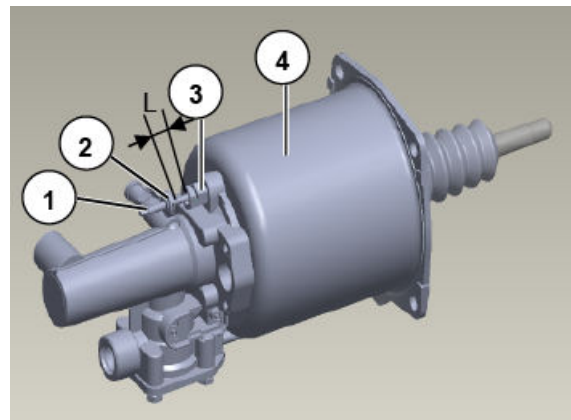
#### Precautions

- In the process of system exhaust, attention shall be paid to tightening the bleed screw before loosening the pedal to avoid suction of air.
- The pedal shall be lifted to the maximum height so that the brake fluid in the oil tank can be replenished into the master cylinder.



### Application of clutch wear indicator

- The clutch wear indicator (composed of ①②③) is located above the valve body of the clutch booster cylinder ④. By observing the position of the indicator ②, you can find out whether the clutch driven plate is worn to the limit. The clutch wear indicator is used for models matching the pull-type clutch.
- With the wear of clutch driven plate, the clearance L between the indicator sheet ② and the measuring rod seat ③ will gradually increase, which is as follows, so the driven plate needs to be replaced:
  - 430-25 pull type:  $L=28\text{mm}$ ;
  - 430-21/430-19 pull type:  $L=23\text{mm}$ ;
  - 430 side-push type:  $L=19\text{mm}$ ; 430 bottom-push type:  $L=22\text{mm}$ ;
  - (WP6T/MC07) 395 side-push type:  $L=20\text{mm}$ ; 395 bottom-push type:  $L=25\text{mm}$ ;
  - (WP5N/WP4.6/WP4.1) 395 side-push type:  $L=18\text{mm}$ ; 395 bottom-push type:  $L=22\text{mm}$ .
- After the clutch booster cylinder ④ is installed for the first time, the state of the indicator ② and the measuring rod ① is similar to that shown in the figure, with a clearance  $L>0$ . At this time, it is necessary to push the indicator ② along the measuring rod ① until it contacts with the measuring rod holder ③, i.e. initialization. Do not move the indicator ② when the vehicle is in use.
- After replacing the clutch driven plate, push the measuring rod ① towards the measuring rod holder ③ until it cannot be pushed (the thrust is about 50N, and the thrust after the indicator ② contacts with the measuring rod holder ③ is about 80N); and if  $L > 0$ , push the indicator ② along the measuring rod ① to contact with the measuring rod holder ③, i.e. initialization.



## Maintenance contents of clutch

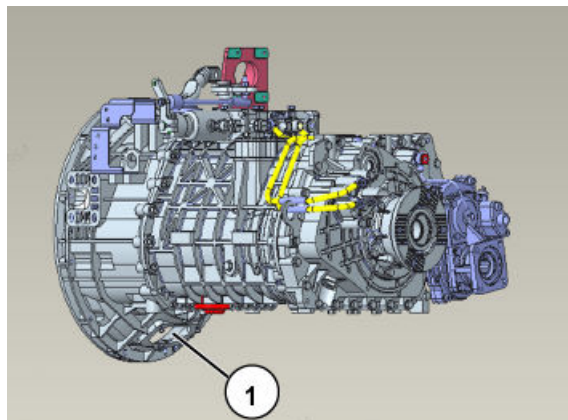
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### Cleaning of dust on clutch brake pad

According to the replacement interval of engine oil, open the observation hole under the transmission and clean up the dust accumulated on the brake pad under the clutch.

#### Cleaning method

- 1 Power off the vehicle and open the observation hole ① under the transmission.
- 2 Clean up the dust accumulated under the clutch.



**Common Faults and Troubleshooting**

<b>Fault Symptom</b>	<b>Possible cause</b>	<b>Fault cause</b>
Clutch slipping	Oil stain on friction plate	Clean the oil stain on the clutch pressure plate, driven plate and flywheel
	The friction plate of driven disc has been worn to the limit position	Replace the driven disc
	Damage of clutch pressure plate assembly	Replace the pressure plate assembly
Incomplete clutch disengagement	There is air in the clutch hydraulic system, and the effective release stroke becomes smaller	Exhaust air from the hydraulic system
Clutch start shaking	Release bearing and release ring not completely assembled in place	Reassemble the release bearing
Failure of clutch to release	The release bearing is not completely assembled in place or the release ring is damaged, causing the release bearing to fall off.	Reassemble the release bearing or replace the release ring assembly
Clutch pedal sinking and poor return	Clutch master cylinder seal ring expansion	Replace the clutch master cylinder and brake fluid

## HW transmission lubricating oil and its change cycle

### HW transmission lubricating oil and its change cycle

#### Recommended Consumption and Change Cycles of Drive Trains of Medium-heavy Trucks

Application models <sup>5)</sup>	Application conditions <sup>1) 5)</sup>		Long-life gear oil (J2360 75W-90)	Long-life gear oil (J2360 80W-90)	Note
			HOWO transmission <sup>2) 3) 4)</sup>	HOWO transmission <sup>2) 3) 4)</sup>	
Long-distance tractor and cargo truck	Light load working condition	11/13L MC engine: Average fuel consumption < 30L/100km	600,000 km or 36 months, whichever comes first	240,000 km or 24 months, whichever comes first	1) For specific assembly models and oil specifications, refer to the table "Consumption and Filling Amount of HW Transmission Oil." 2) When changing the gear oil of the transmission with a removable oil filter, the oil filter must be replaced at the same time. 3) Box type with removable oil filter: The filter element is only replaced at the first 20,000km, and the oil is not changed. The first maintenance of the gear oil is consistent with the scheduled maintenance. 4) Box type without removable oil filter: first change of gear oil 2,000-5,000km. 5) The recommended oil change cycles in this table are consistent with the first and regular maintenance.
		7L MC engine: Average fuel consumption < 20L/100km	480,000 km or 24 months, whichever comes first.	200,000 km or 24 months, whichever comes first	
	Standard load working condition	11/13L MC engine: The average fuel consumption is 30-40L/100km.	500,000 km or 24 months, whichever comes first	200,000 km or 24 months, whichever comes first	
		11/13L MT engine: Average gas consumption < 35L/100km	480,000 km or 24 months, whichever comes first.	240,000 km or 24 months, whichever comes first	
		7L MC engine: Average fuel consumption 20–25L/100km	480,000 km or 24 months, whichever comes first.	200,000 km or 24 months, whichever comes first	
	Standard weight working condition	11/13L MC engine: The average fuel consumption is 40-50L/100km.	240,000 km or 24 months, whichever comes first	160,000 km or 24 months, whichever comes first	
		7L MC engine: The average fuel consumption is 25 ~ 35L/100km.			
	Loading condition	11/13L MC engine: Average fuel consumption > 50L/100km	120,000 km or 24 months, whichever comes first	80,000 km or 12 months, whichever comes first	
		11/13L MT engine: Average gas consumption > 35L/100km			
		7L MC engine: Average fuel consumption > 35L/100km			



**Recommended Consumption and Change Cycles of Drive Trains of Medium-heavy Trucks**

Applicable models <sup>1) 7)</sup>	Long-life gear oil (J2360 80W-90)	Note
	HOWO transmission <sup>2) 3) 4) 5)</sup>	
Vehicles for transport operation	200,000 km or 12 months, whichever comes first	<p>1) For specific assembly models and oil specifications, refer to the table "Consumption and Filling Amount of HW Transmission Oil."</p> <p>2) When changing the gear oil of the transmission with a removable oil filter or filter element, the oil filter must be replaced at the same time.</p> <p>3) Box type with removable oil filter: The filter element is only replaced at the first 20,000km, and the oil is not changed. The first maintenance of the gear oil is consistent with the scheduled maintenance.</p> <p>4) Box type without removable oil filter: first change of gear oil 2,000-5000km.</p> <p>5) For transmissions with filter screens, the filter screen needs to be cleaned when replacing gear oil.</p> <p>6) Severe working conditions refer to severe overload, poor road conditions, and heavy dust during vehicle operation.</p> <p>7) The recommended oil replacement cycles in this table are consistent with the first and regular maintenance.</p>
Municipal and sanitation vehicles	40,000 km or 24 months, whichever comes first	
Vehicles for lifting, fire fighting and pumping	12 months	
Oilfield/pavement truck and cement mixer truck	12 months	
Urban construction slag dump truck	40,000 km or 12 months, whichever comes first	
Road transport dump truck	40,000 kilometers (20,000 kilometers under severe working conditions <sup>6)</sup> or 12 months, whichever comes first.	
Pithead dump truck and truck under super load working condition	20,000 km or 6 months, whichever comes first	
Mine site vehicle	To be replaced with the engine oil	

## HW transmission lubricating oil and its change cycle

Recommended Oil and Change Cycle for Large Gear HW Transmission of Medium and Heavy Trucks

Assembly and model		Product name <sup>1) 2)</sup>	Initial replacement interval mileage or time	Replacement interval mileage or time	Note
HW large gear transmission	HW19710T(C)	SAE 80W-90 long-life gear oil (conforming to J2360) Q/ZZ 21040.2 Cold region: SAE 75W-90 long-life gear oil (conforming to J2360) Q/ZZ 21040.2	2000~5000 km	① Express delivery working condition: 160,000 kilometers or 12 months, whichever comes first. ② Green passage working condition: 120,000 kilometers or 12 months, whichever comes first. ③ Bulk transport conditions (variable routes and cargo): 100,000 kilometers or 12 months, whichever comes first.	1) The special after-sales gear oil specified by SINOTRUK must be used; otherwise, the transmission will be damaged and fees will be charged for any services from SINOTRUK. 2) Special transmission oil with different viscosity grades shall not be mixed.
	HW19712T(C)(L)				
	HW19716T				
	HW90510(C)(2)(L), HW95510C(L)				
	HW95508STC(2)(L), HW95508SC(2)(L)				
	HW11708STC(2)(L)				
	HW95508(H)ACL, HW08WYC				
	HW95510(H)ACL, HW10WYC(95)				
	HW11710ACL, HW10WYC(11)				
	HW12710ACL, HW10WYC(12)				
	HW11712STC, HW12712STC, HW12712AC(L)				
	HW13712STC, HW13712AC(L)				
	HW13709XST(C)(2)(L)				
	HW14710XACL, HW14710XAC2L, HW10WYC(14)				

**Recommended Consumption and Change Cycles of Gear Oil for Vehicle Transmissions Exported to Extremely Cold Areas**

Product name			Gear oil	Remarks
			SAE 75W-90 long-life gear oil (conforming to J2360)	
Application models and application conditions			Replacement mileage or time of HOWO transmission	
Long-distance tractor and cargo truck	Light load working condition	Average fuel consumption < 30L/100km	600,000 km or 24 months, whichever comes first	<b>1</b> The first maintenance and scheduled maintenance mileage of gear oil for HOWO transmission are consistent. <b>2</b> When replacing the gear oil of the transmission, the filter element must be replaced at the same time. <b>3</b> <b>(1)</b> Box type with oil filter: replace the filter element at the first 20,000km, do not change the oil, and the first maintenance of gear oil is consistent with the scheduled maintenance; <b>(2)</b> Box type without oil filter: first change of gear oil 2,000-5,000km. <b>4</b> For transmissions with filter screens, the filter screen needs to be cleaned when replacing gear oil.
	Standard load working condition	Average fuel consumption 30 ~ 40L/100km	480,000 km or 12 months, whichever comes first	
		Average gas consumption ≤ 35kg/100km		
	Standard weight working condition	Average fuel consumption 40 ~ 50L/100km	240,000 km or 12 months, whichever comes first	
	Loading condition	Average fuel consumption > 50L/100km	120,000 km or 12 months, whichever comes first	
		Average gas consumption > 35kg/100km		
Vehicles for transport operation			200,000 km or 12 months, whichever comes first	
Municipal and sanitation vehicles, tank trucks, refrigerator trucks, urban construction slag dump trucks, and road transport dump trucks			40,000 km or 12 months, whichever comes first	
Pavement trucks, cement mixer trucks, vehicles for pumping, pithead dump trucks and vehicles for lifting			12 months	

## Consumption and filling amount of HW transmission oil

### Consumption and filling amount of HW transmission oil

#### Oil and filling amount of HW transmission for medium and heavy trucks

HW transmission	Filling amount <sup>1) 2) Note</sup> <sup>1)/L (reference value</sup> <sup>3))</sup>	Product name	Note
HW12706T (C)	12	SAE 80W-90 long-life gear oil (conforming to J2360) or SAE 75W-90 long-life gear oil (conforming to J2360)	<p>1) The special after-sales gear oil specified by SINOTRUK must be used; otherwise, the transmission will be damaged and fees will be charged for any services from SINOTRUK.</p> <p>2) Special transmission oil with different viscosity grades shall not be mixed.</p> <p>3) The filling amount in the table is the refueling amount of the basic model and is for reference only.</p> <p>(*It is recommended to judge the filling amount of lubricating oil through the oil level observation hole when the vehicle is in a horizontal state during filling. In principle, the lubricating oil level should be flush with the bottom end of the oil level observation hole.)</p>
HW12710	9		
HW13709XST (C) (L)	9.5		
HW13710 <sup>Note 2)</sup> (C)	13		
HW15710(A)(C)	11		
HW15710(A)(C)L	10		
HW16709XST(C)(L)	11		
HW19709XST(L), HW19709XA	12		
HW19710(A)(C)	11		
HW19710(A)(C)L, HW10WY(C) <sup>Note 3)</sup>	10		
HW19712(A)(C)	12.5		
HW19712(A)(C)L	11.5		
HW20716(A)(C)	14		
HW21712	13		
HW21716XSTL	12.5		
HW23710(A), HW23710(C)	12		
HW23712XST (C)L	12		

**Oil and filling amount of HW transmission for medium and heavy trucks**

HW transmission	Filling amount <sup>1) 2)</sup> Note 1)/L (reference value <sup>3)</sup> )	Product name	Note
HW23713C, HW25713C	13.5	SAE 80W-90 long-life gear oil (conforming to J2360) or SAE 75W-90 long-life gear oil (conforming to J2360)	<p>1) The special after-sales gear oil specified by SINOTRUK must be used; otherwise, the transmission will be damaged and fees will be charged for any services from SINOTRUK.</p> <p>2) Special transmission oil with different viscosity grades shall not be mixed.</p> <p>3) The filling amount in the table is the refueling amount of the basic model and is for reference only.  <b>(*It is recommended to judge the filling amount of lubricating oil through the oil level observation hole when the vehicle is in a horizontal state during filling. In principle, the lubricating oil level should be flush with the bottom end of the oil level observation hole.)</b></p>
HW25712XS(C)J, HW25712XA(C), HW25712XST(C), HW25712XA(C)J	13.5		
HW25712XS(C)L, HW25712XST(C)L, HW25712XA(C)L, HW25712XS(T)(C)Q	12		
HW27712XST(C)L, HW27712XA(C)L, HW12WY(C) <sup>Note 4)</sup>	12		
HW25712XU(C)L, HW27712XU(C)L, HW30712XU(C)L	12		
HW25714XUCL, HW27714XUCL, HW30714XUCL	12		
HW14WYCQ, HW25714XACL, HW27714XACL	12		
HW25716XST(C)L, HW25716XA(C)L, HW25716XS(C)L	12		
HW25716XU(C)L, HW27716XU(C)L, HW30716XU(C)L	12		
HW28712XSJ, HW30712XSCJ	13.5		
HW30712XST(C)L	12		
HW30716XST(C)L, HW30716XA(C)L	12		

## Consumption and filling amount of HW transmission oil

Oil and filling amount of HW transmission for medium and heavy trucks

HW transmission	Filling amount <sup>1) 2) Note 1)/</sup> L (reference value <sup>3)</sup> )	Product name	Note
HW19710T(C)	18	SAE 80W-90 long-life gear oil (conforming to J2360)	<p>1) The special after-sales gear oil specified by SINOTRUK must be used; otherwise, the transmission will be damaged and fees will be charged for any services from SINOTRUK.</p> <p>2) Special transmission oil with different viscosity grades shall not be mixed.</p> <p>3) The filling amount in the table is the refueling amount of the basic model and is for reference only.</p> <p><b>(*It is recommended to judge the filling amount of lubricating oil through the oil level observation hole when the vehicle is in a horizontal state during filling. In principle, the lubricating oil level should be flush with the bottom end of the oil level observation hole.)</b></p>
HW19712T(C)(L)	17		
HW19716T	18		
HW90510(C)(L), HW95510(C)(L)	6		
HW95508STC(L)(C)(L)	6		
HW11708STC(L), HW11708ACL	6		
HW95508(H)ACL	6		
HW95510(H)ACL	6		
HW11710ACL	6		
HW11710(C)(L)	6		
HW11712STC(L), HW12712STC(L), HW12712AC(L)	9		
HW13712STC(L), HW13712AC(L)	9		
HW13709XST(C)(2)(L)	9.5		
HW14712XSTCL	10.5		
HW14710XACL, HW14710XAC2L	9.5		

## Consumption and filling amount of HW transmission oil

NOTE:1) When fitted with a PTO, retarder, and rear mount, add up their respective transmission oil volumes:

- a. With rear PTO: The oil quantity of HW13709XST and HW14712XSTCL transmissions increases by 0.1L; HW11712STC, HW12712STC, and HW12712AC(L) transmissions remain unchanged; all other models increase by 0.5L.
- b. With side PTO: Increase transmission oil quantity by 0.5L.
- c. With retarder installed: HW13709XST transmission oil quantity increases by 1L; HW25716XU(C)L, HW27716XU(C)L, and HW30716XU(C)L transmissions increase by 0.5L; all other gearbox types increase by 1.5L. The oil quantity does not increase for tandem retarders.
- d. Installation of primary shaft PTO: When adding the primary shaft PTO, it is necessary to separately add gear oil of the same model as that in the transmission.

Model of primary shaft PTO	Primary shaft PTO oil quantity / L	Applicable transmission
HW140Q	11.5 (with oil cooler)	HW12706T/HW12706TC
	6 (without oil cooler)	
HW80Q-F300	6	DC6J95T
HW80Q/HW100Q	8	HW15710/HW19710T/HW19710/HW19712/HW23710/HW21712
HW80QZ/HW100QZ	11.3 (without oil cooler)	HW15710/HW19710/HW23710/ HW19709XST/HW19712/HW21712
	9.7 (without oil cooler)	HW25712X
	10.5 (without oil cooler)	HW16709XST
	10 (without oil cooler)	HW13709XST
HW80QZ/HW100QZ/HW140QZ	11.8 (with oil cooler)	HW15710/HW19710/HW23710/HW19709XST/HW19712/HW21712
	10.2 (with oil cooler)	HW25 series
	11 (with oil cooler)	HW16709XST
	10.5 (with oil cooler)	HW13709XST
HW160QZ	12 (with oil cooler)	HW25 series

For example, the recommended oil quantity for an HW19712 transmission with retarder and right rear PTO is: 13 + 1.5 + 0.5 = 15L.

## Consumption and filling amount of HW transmission oil

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- 2) For HW13710 transmissions: add 8.5L of oil separately to the HW60Q primary shaft PTO; add 0.5L of oil separately to the HW50 PTO at the upper left position; add 0.8L of oil separately to the HW70 PTO at the upper left position.
- 3) The input torque range for the HW10WY(C) transmission here is (1500–2100) N·m.
- 4) The input torque for the HW12WY(C) transmission here is  $\geq 2500$  N·m.

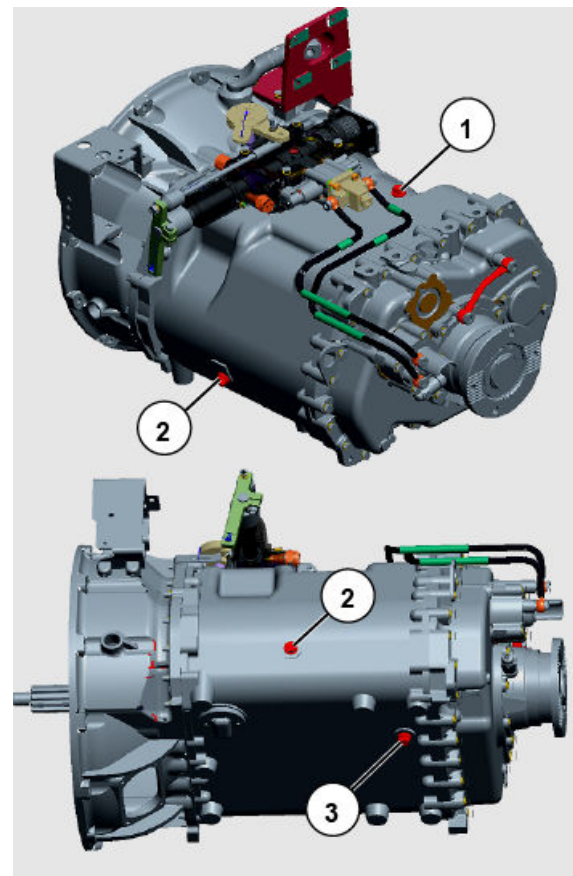


### HW transmission fluid change and precautions

- ① Oil filler
- ② Viewing port
- ③ Drain plug

#### Oil replacement method

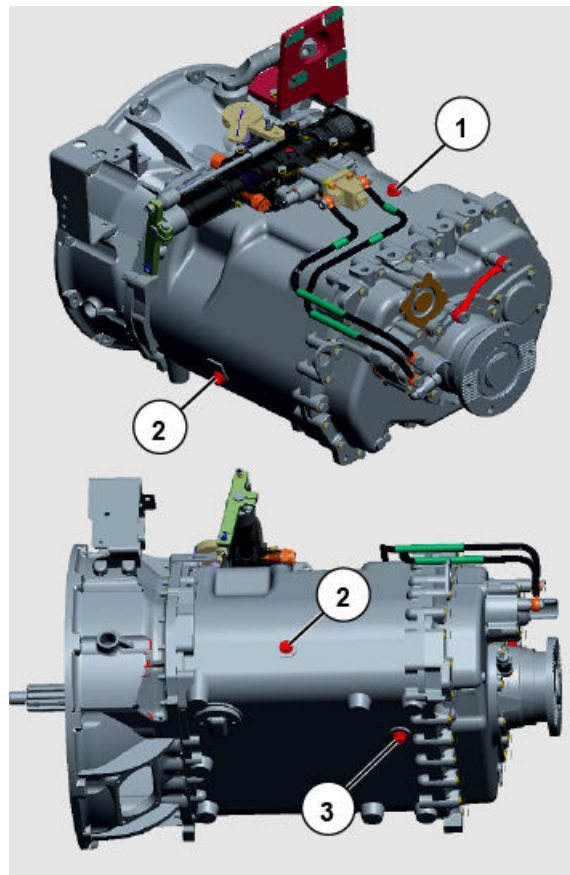
- 1 When replacing the lubricating oil of the transmission, unscrew the drain plug③ first, drain out the original lubricating oil in the transmission (dispose of the discharged waste oil properly), and clean the filter mesh assembly.
- 2 Then, add lubricating oil of the specified grade from the oil filler ①, and tighten the drain plug ③.



## HW transmission fluid change and precautions

### Oil level inspection

- 1 Park the car on a level road.
- 2 When the oil level is stable and the oil temperature is close to the ambient temperature, unscrew the plug at the oil level observation port ②.
- 3 If the oil level is below the observation port, add oil according to the content of schedule.
- 4 Unscrew the plug at the oil filler ① and add gear oil until the oil overflows from the observation port ②.
- 5 Tighten the plugs ① and ②.
- 6 The tightening torque of plugs at the oil filler, oil level observation port and oil drain port are all 40-50 Nm.



### Precaution

- Check the oil level every 10,000 km. Due to the volume expansion of hot oil, in order to ensure measurement accuracy, do not check the oil level immediately after the vehicle is stopped. Check the oil level after the oil level becomes stable and the oil temperature is close to the ambient temperature.

The oil level shall be level with the lower edge of the oil level observation port.

Add gear oil until it overflows from the orifice.

In order to prevent chemical reaction between different types of lubricating oil, only the lubricating oil of the same type as the original lubricating oil shall be added.

- When replacing lubricating oil, drain the original lubricating oil in the transmission completely first, and clean the filter mesh assembly.



### **WARNING!**

The special transmission gear oil of CNHTC shall be used, otherwise the transmission may be damaged. CNHTC only provides paid service in such a case.

## ZF transmission oil and its change cycle

### ZF transmission oil and its change cycle

#### Oil and replacement cycle of purchased transmission for medium and heavy trucks

Assembly and model		Oil quality and quantity (L)	Product name <sup>1)</sup> <sub>2)</sub>	Mileage or time for first replacement	Replacement interval mileage or time	Note
ZF transmission	16S1930	15.5	ZF 02B 85W-90 transmission special gear oil Q/ZZ 21040.3 Cold region: ZF 02L 75W-80 transmission special gear oil (Q/ZZ 21040.3)	① Long-distance transport trucks: Light/standard load working condition: 100,000 km or 12 months; Standard weight working condition: 80,000 km or 12 months; Loading working condition: 40,000 km or 6 months; Whichever comes first. ② Municipal and sanitation vehicles, urban construction slag dump trucks, road transport dump trucks, mixer trucks: 40,000 km or 10 months, whichever comes first. ③ Mine site vehicles and special vehicles for in-situ operation: the main engine working time is 1,000 hours.	① Long-distance transport trucks: Light load/standard load/standard weight working condition: 160,000 km or 12 months; Loading working condition: 80,000 km or 12 months; Whichever comes first. ② Municipal and sanitation vehicles, urban construction slag dump trucks, road transport dump trucks, mixer trucks: 120,000 km or 12 months, whichever comes first. ③ Mine site vehicles and special vehicles for in-situ operation: the main engine working time is 1,000 hours.	1) The special after-sales gear oil specified by SINOTRUK must be used; otherwise, the transmission will be damaged and fees will be charged for any services from SINOTRUK. 2) Special transmission oil with different viscosity grades shall not be mixed.
	16S2230	15.5				
	16S2530	15.5				
	16S2222	15				
	16S2522	15				
	9S1310	9L (transmission model changes to 9S1315 when PTO is installed)				

Oil and replacement cycle of purchased transmission for medium and heavy trucks

Assembly and model		Oil quality and quantity (L)	Product name <sup>1) 2)</sup>	Mileage or time for first replacement	Replacement interval mileage or time	Note
ZF transmission	16S1931	25.5L (initial filling) 18.5L (maintenance filling)	ZF 02E 75W-80 Q/ZZ 21040.3 special lubricant for non-self-made transmissions ② 75W-80 ZF 02L transmission special lubricant Q/ZZ 21040.3	① Long-distance transport trucks: Light/standard load working condition: 300,000 km or 24 months; Standard weight working condition: 240,000 km or 24 months; Loading working condition: 160,000 km or 12 months; Whichever comes first. (2) Municipal and sanitation vehicles, urban construction slag dump trucks, road transport dump trucks, mixer trucks: 240,000 km or 20 months, whichever comes first. ③ Mine site vehicles and special vehicles for in-situ operation: the working time of the main engine is 5,000 hours or 12 months, whichever comes first.	① Long-distance transport trucks: Light/standard load working condition: 300,000 km or 24 months; Standard weight working condition: 240,000 km or 24 months; Loading working condition: 160,000 km or 12 months; Whichever comes first. (2) Municipal and sanitation vehicles, urban construction slag dump trucks, road transport dump trucks, mixer trucks: 240,000 km or 20 months, whichever comes first. ③ Mine site vehicles and special vehicles for in-situ operation: the working time of the main engine is 5,000 hours or 12 months, whichever comes first.	1) The special after-sales gear oil specified by SINOTRUK must be used; otherwise, the transmission will be damaged and fees will be charged for any services from SINOTRUK. 2) Special transmission oil with different viscosity grades shall not be mixed.
	16S2231					
	16S2531					
	9S1311	24L (initial filling) 13.5L (maintenance filling)				
	12TX2621	23.5L (initial filling) 19L (maintenance filling)				
	12TX2821					
	12TX3221					
	12TX3421					
	12TX2620	13.5L (initial filling) 12L (maintenance filling)				
	12TX2820					
	12TX3220					
	12TX3420					

## ZF transmission oil and its change cycle

Oil and replacement cycle of purchased transmission for medium and heavy trucks

Assembly and model		Oil quality and quantity (L)	Product name <sup>1) 2)</sup>	Mileage or time for first replacement	Replacement interval mileage or time	Note
ZF transmission	12TX2660	13.5L (initial filling) 12L (maintenance filling)	ZF 02E 75W-80 Q/ZZ 21040.3 special lubricant for non-self-made transmissions ② 75W-80 ZF 02L transmission special lubricant Q/ZZ 21040.3	① Long-distance transport trucks: Light load/standard load working condition: 600,000 km or 36 months (02E); 300,000 km or 24 months (02L); Standard weight working condition: 240,000 km or 24 months; Loading working condition: 160,000 km or 12 months; Whichever comes first. ② Municipal and sanitation vehicles, urban construction slag dump trucks, road transport dump trucks, mixer trucks: 240,000 km or 20 months, whichever comes first. ③ Mine site vehicles and special vehicles for in-situ operation: the working time of the main engine is 5000 hours or 12 months, whichever comes first.	① Long-distance transport trucks: Light load/standard load working condition: 600,000 km or 36 months (02E); 300,000 km or 24 months (02L); Standard weight working condition: 240,000 km or 24 months Loading working condition: 160,000 kilometers or 12 months; Whichever comes first. ② Municipal and sanitation vehicles, urban construction slag dump trucks, road transport dump trucks, mixer trucks: 240,000 km or 20 months, whichever comes first. ③ Mine site vehicles and special vehicles for in-situ operation: the working time of the main engine is 5000 hours or 12 months, whichever comes first.	1) The special after-sales gear oil specified by SINOTRUK must be used; otherwise, the transmission will be damaged and fees will be charged for any services from SINOTRUK. 2) Special transmission oil with different viscosity grades shall not be mixed.
	12TX2860					
	12TX3060					
	12TX3260					
	12TX3460					
	12TX2661	23.5L (initial filling) 19L (maintenance filling)				
	12TX2861					
	12TX3061					
	12TX3261					
	12TX3461					
12TT3021S0	23.5L WSK (torque converter): 26L (excluding cooling system)	ZF 02E 75W-80 Q/ZZ 21040.3 special lubricant for non-self-made transmissions	/	① Hot areas or average vehicle speed below 60 km/h: 12 months; ② Average speed above 60 km/h: 24 months		

### ZF transmission oil change and precautions

#### Maintenance of ZF-Ecosplit 16-speed transmission

##### Oil type and oil change interval

**WARNING!**

Only the oil specified by SINOTRUK or ZF-Ecofluid M, the ZF transmission oil certified in the latest ZF lubricant list TE-ML 02, can be used.

Refer to ZF transmission oil and replacement interval.

##### Refueling quantity

Operate in strict accordance with the oil filling regulations of "ZF transmission oil and oil change interval" to ensure the correct oil filling amount.

**WARNING!**

- The oil change interval shall be strictly implemented, otherwise the transmission performance and reliability will be affected.
- The vehicle shall be stored in a shaded place.
- When the vehicle speed is higher than 25km/h, never switch between high and low gears.

##### Transmission maintenance after parking the vehicle for a long time

For vehicles parked for more than six months, regular inspection and maintenance are required:

- Apply anti-rust oil to the uncoated components of the transmission (such as the output flange).
- After parking for more than six months, start the vehicle at least once a month (appropriately increased in wet seasons), increase the engine speed, run the transmission until the oil temperature reaches 80°C (or run it for not less than 30 minutes), and engage the transmission in each gear during operation.
- After parking for more than two years, in addition to the regular test and maintenance according to Article 2, it is also necessary to check whether the seal is leaking, whether the breather plug/breather hose is blocked, and whether the peripheral parts are damaged; after the inspection is completed, drain the oil in the transmission and add new oil that meets the requirements to the standard scale.
- When the vehicle is modified to match the ZF transmission, a water baffle shall be added above the transmission; during the use of the vehicle, the phenomenon of water flow directly facing the transmission such as superstructure drain port and high pressure water gun spray shall be avoided.

## ZF transmission oil change and precautions

### Transmission oil change

#### Oil drain



#### CAUTION!

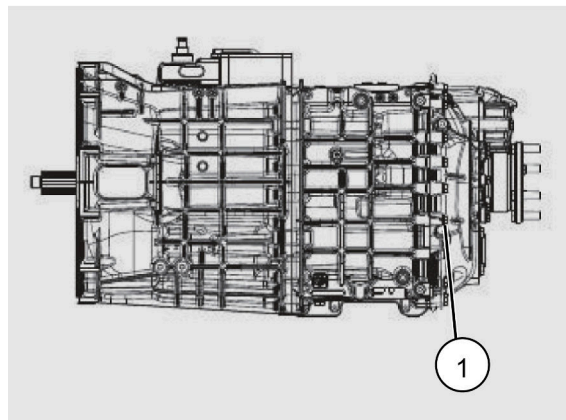
- Lubricating oil and cleaning fluid are strictly prohibited from flowing into soil, groundwater and drainage system. The lubricating oil shall be collected in a suitable container and disposed of in accordance with the relevant regulations of the environmental protection department.
- Generally, the oil should be drained after the vehicle has been running for a period of time, when the transmission oil temperature is high and the viscosity is low.

- Unscrew the transmission oil drain plug ① and collect the drained oil in a suitable container.
- Clean the magnetic drain plug ①, replace it with a new seal ring and tighten it to the specified torque.



#### DANGER!

- Contact with hot transmission and lubricating oil may cause scalding, so please take protection.





### Refueling

- Add oil from the oil filler holes ① and ②.
- Add oil until the oil level reaches the lower edge of the oil filler hole ① and ② or the oil overflows from the oil filler hole.

### Oil level check



#### **WARNING!**

**Too little oil in the transmission will cause damage to the transmission and cause accidents!**

Regularly check the transmission oil level:

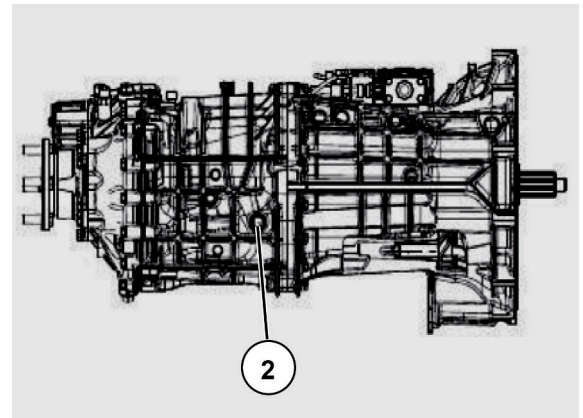
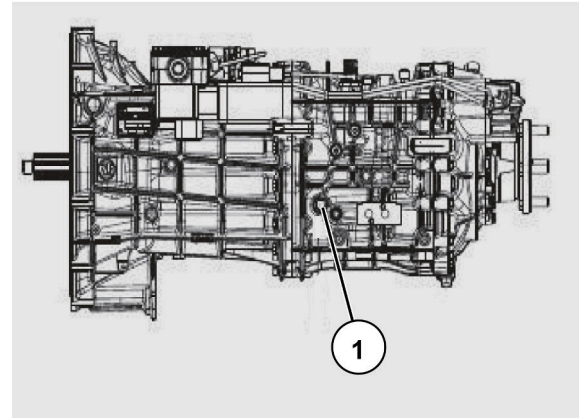
When checking the oil level, park the vehicle on a level ground, shut down the engine, and apply the parking brake. Do not check the oil level immediately after driving (the measurement result is wrong), but wait for the oil to cool down.

- Unscrew the oil filler plugs ① and ② to check the oil level.
- If the oil level is found to be lower than the lower edge of the oil filler hole, add oil until the oil filler hole overflows.



#### **CAUTION!**

**Every time you check the oil level, check the transmission for oil leakage.**



## ZF transmission oil change and precautions

### Oil filling and oil level inspection of transmission with clutch control PTO

The refueling and oil level checking methods are the same as the above methods, but the refueling amount will be increased by about 0.5L according to different PTO models.

### Maintenance of transmission with heat exchanger

#### Oil drain

Loosen the drain plug on the heat exchanger (if possible).

#### Refueling

- Add oil until it overflows from the oil filler hole, and tighten the oil filler plug to 60 N·m.
- The transmission is in the neutral position.
- Run the engine at about 1200 rpm for 2-3 minutes to ensure that the heat exchanger and connecting pipes are filled with oil.
- The engine is turned off.
- Add oil to the transmission again until it overflows.

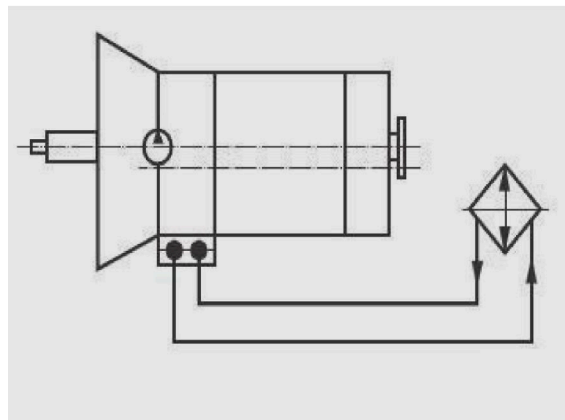
#### Oil level check

- The engine runs at idle speed for about 3 minutes.
- The transmission is in the neutral position.
- The engine is turned off.
- Check the oil level according to the above common transmission oil level inspection method.

#### Inspection of clutch

In order to ensure the service life and normal operation of the synchronizer, it is necessary to ensure that the clutch can be completely disengaged. The above is also applicable to the operation of the clutch PTO.

Check whether the clutch is completely disengaged Steps:



- When the engine is at normal operating temperature and running at idle speed, depress the clutch pedal to the bottom.
- Wait for about 20 seconds (depending on flywheel mass and temperature) and slowly engage Gear R.
- If there is a knocking sound during gear engagement, it indicates that the clutch needs to be adjusted or checked.

### Release valve adjustment at clutch pedal

① Hydraulic clutch operating system brake master cylinder ② to clutch slave cylinder

③ To half gear group relay valve ④ From compressed air tank

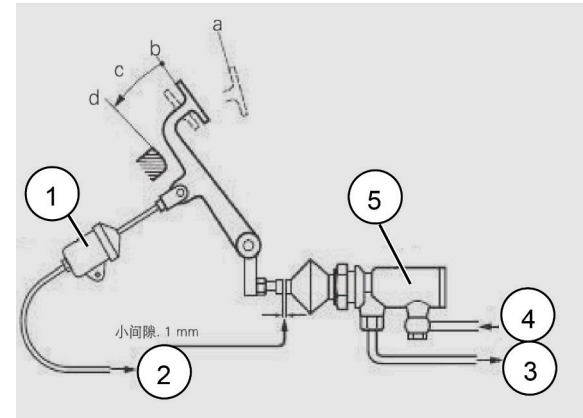
⑤ Half gear group release valve

Before the release valve ⑤ controls the half gear shift, the clutch shall be fully disengaged.



#### WARNING!

**If the release valve is improperly adjusted, the synchronizer will be damaged when the half gear is shifted.**



### Inspection and adjustment

Adjust the adjusting bolt on the clutch pedal to make the release valve ⑤ work only at the limit position (c) of the clutch.

When the clutch pedal is at position (b), the clutch is completely disengaged. At this pedal position, there should be at least 1 mm clearance between the release valve ⑤ and the pedal limit bolt.

A "Clutch fully engaged" position

B "Clutch fully disengaged" position

## **ZF transmission oil change and precautions**

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C Limit position of clutch pedal

D Clutch pedal limit end

### Transmission Bleeding

When the vehicle is running, the transmission oil temperature rises, which will cause the air pressure in the transmission to rise.

The transmission breather plug can ensure that the air pressure inside and outside the transmission is balanced.



#### **CAUTION!**

**Check the breather plug every time the vehicle is checked.**

### Breather plug

The breather plug ① shall be clean and free of coverings. Never directly flush the breather plug with high pressure water (otherwise water entering the transmission will cause rust).

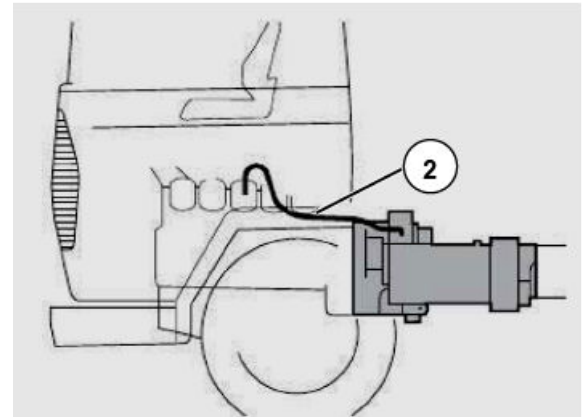
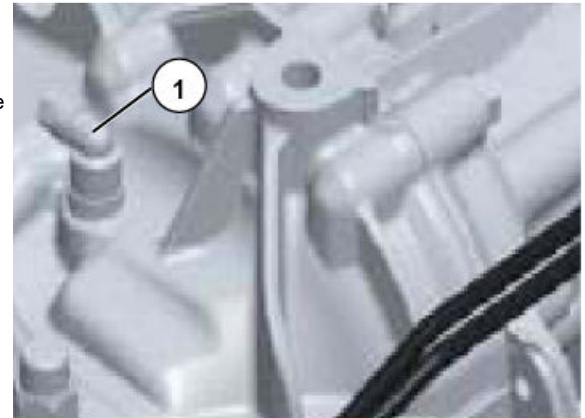
### Breather hose

Vehicles that need to be cleaned frequently, such as milk trucks and concrete mixers, shall be equipped with breather hoses ②.

The permeability hose ② shall not be kinked and twisted, and its end shall be placed in a dry area.

### Maintenance of compressed air system

In order to prevent condensate, rust and other impurities in the compressed air reservoir from entering the control valve or gearshift cylinder, the compressed air system should be maintained regularly. The compressed air reservoir shall be emptied once a week (once a day in winter).

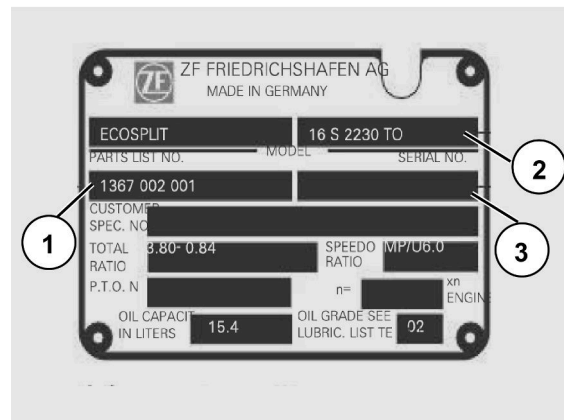


## ZF transmission oil change and precautions

### Transmission nameplate

The transmission nameplate is installed on the left side of the transmission (viewed from the driving direction of the vehicle), mainly including the following information of the transmission:

- ① Transmission assembly No.
- ② Transmission model
- ③ Transmission production serial number



### **Oil change and precautions for ZF-TraXon transmission**

- Regular maintenance will improve the operation safety of the transmission.
- Visually inspect the vehicle for oil leakage during inspection.
- All maintenance of the transmission can only be carried out when the vehicle is parked horizontally and the engine is turned off.
- Note that the sealing ring shall be replaced before each installation of all screw plugs.

### **Visual inspection of cable laying**

- Check whether the laid cables are damaged within the scope of vehicle inspection.
- Pay attention to whether the plug position is correct, and the plug shall not be pulled by force.

### **Maintenance of compressed air equipment**

- The compressed air reservoir shall be emptied and cleaned every week (every day in winter).
- For vehicles equipped with air dryers, the drying tank replacement cycle must be observed.
- When the air reservoir is emptied, the air filter and oil-water separator must also be emptied, unless they can be emptied automatically.
- Water in the compressed air indicates that the dehydrator is damaged.

### **Transmission ventilation**

In the standard case, the transmission is equipped with a vent cap. The vent cap can only be seen when the TCU has been removed. Bleed air at the bottom of the transmission.

## ZF transmission oil change and precautions

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### Oil change (without hydraulic retarder)

- Oil change is only allowed when the vehicle is parked horizontally and the engine is shut down.
- Each oil change should be carried out after the vehicle has been running for a period of time, so that the transmission oil is still in a warm fluid state.
- Prepare a suitable container for collecting the oil.



#### **WARNING!**

–If the transmission fluid of the transmission to be repaired contains water, all molybdenum-coated components, including synchronizer rings, shift forks, and transmission brakes, must be replaced. Failure to do so may result in unforeseeable consequences during vehicle operation and even lead to severe accidents.

–Contact with hot transmission or hot transmission fluid may cause scalding. Appropriate protective clothing, protective gloves and protective glasses/face shields are recommended.

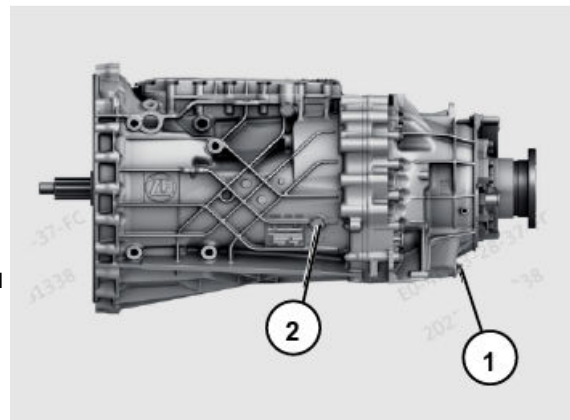


### Oil drain

- 1 Remove the screw plug ① on the transmission oil drain hole and the screw plug ② on the oil filler hole, collect the transmission oil with a suitable container and dispose of it in an environmentally friendly manner.
- 2 Clean the magnet on the screw plug and replace the sealing ring.
- 3 Tighten the drain hole plug to 60 N·m.

### Oil filling

- 1 Fill oil through the oil filling hole ②.
- 2 The oil level is correct when the oil level surface reaches the lower edge of the oil filler hole, or oil has overflowed from the oil filler hole.
- 3 Tighten the screw plug on the oil filler hole ② to 60 N·m.



### Oil level check (without hydraulic retarder)



#### **WARNING!**

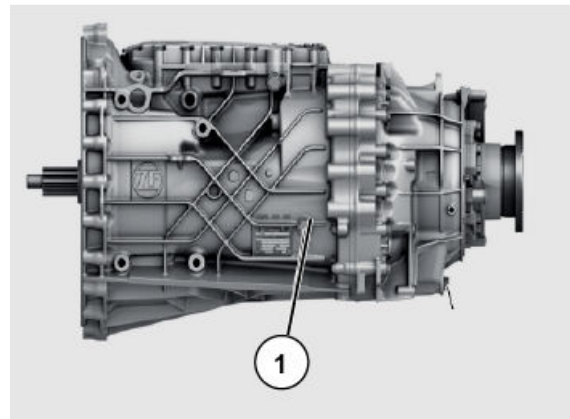
#### **Accident hazard!**

Too little lubricating oil in the transmission will damage the transmission.

Observe specified service checks.

#### **Check the transmission oil level:**

- Check the oil level only when the vehicle is in a horizontal position.
- Never check the oil level immediately after driving (wrong measurement result).  
Check the transmission oil tank only after it is cooled down (<40°C).
- Remove the screw plug ① of the oil filler hole.
- If the oil level is lower than the oil filler hole, it is necessary to add oil.
- Replace the sealing ring of screw plug ①.



## ZF transmission oil change and precautions

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- Tighten the screw plug ① to 60 N·m.

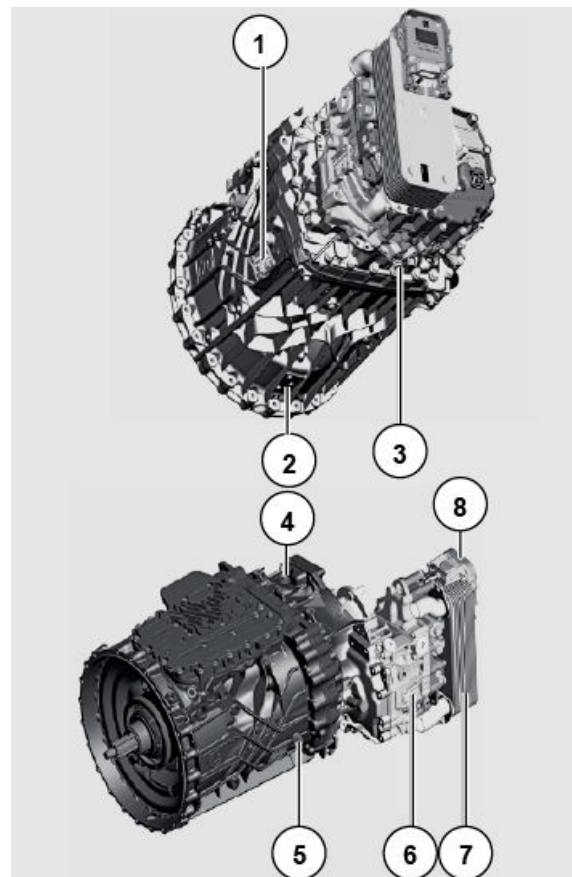
During each inspection, check the parts where the transmission may not be tightly sealed.

### **Oil change (with hydraulic retarder)**

For oil change, it is not allowed to operate the hydraulic retarder before the vehicle is about to stop! So as to ensure that the correct oil change amount is set in the transmission.

- Oil change is only allowed when the vehicle is parked horizontally and the engine is shut down.
- Each oil change shall be carried out after the vehicle has been running for a period of time, so that the transmission oil is still warm and fluid.
- Prepare a suitable container for collecting the oil.

- ① Transmission nameplate
- ② Transmission ventilation
- ③ Oil drain hole
- ④ Oil filler hole after repair
- ⑤ Oil filler or overflow hole
- ⑥ Hydraulic retarder nameplate
- ⑦ Heat exchanger
- ⑧ Control unit



## ZF transmission oil change and precautions

### Oil drain

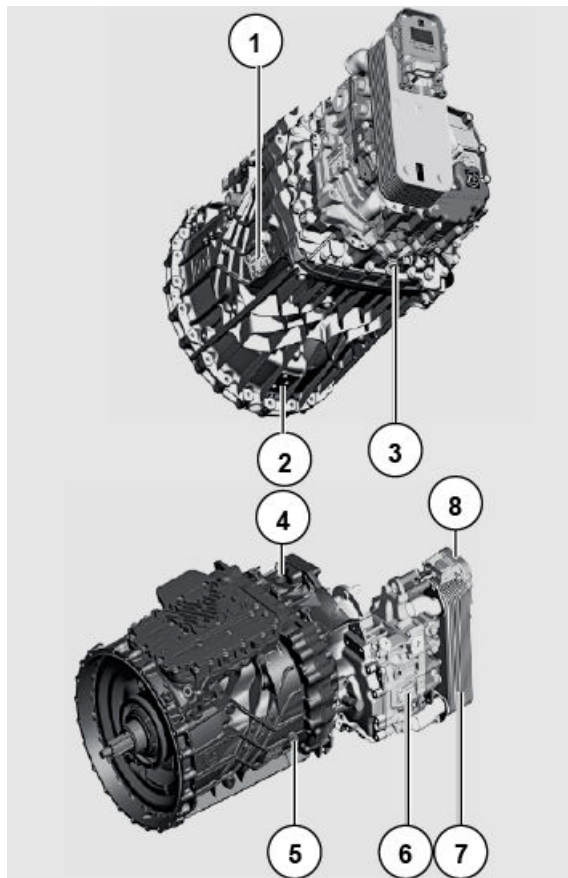


#### **WARNING!**

–If the transmission fluid of the transmission to be repaired contains water, all molybdenum-coated components, including synchronizer rings, shift forks, and transmission brakes, must be replaced. Failure to do so may result in unforeseeable consequences during vehicle operation and even lead to severe accidents.

–Contact with hot transmission or hot transmission fluid may cause scalding. Appropriate protective clothing, protective gloves and protective glasses/face shields are recommended.

- Remove the screw plugs ③ and ⑤, collect the transmission oil with a suitable container, and dispose of it correctly.
- Replace the oil filter.



### Replacement of oil filter

Drain oil before replacing the oil filter.

Use a new filter element every time the oil is changed.

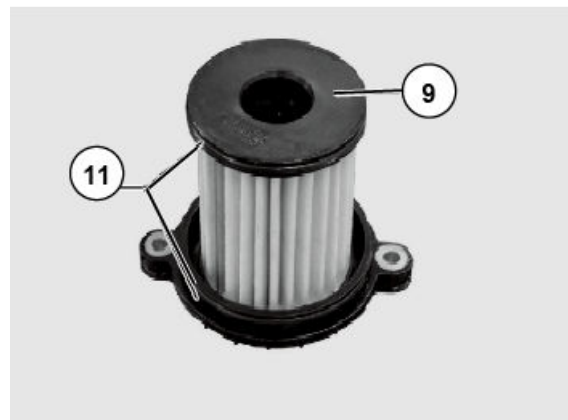
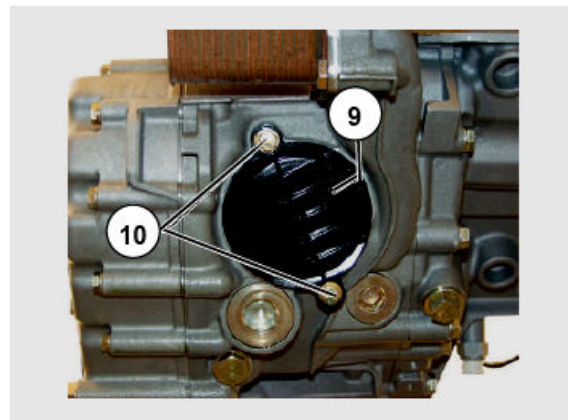


#### **WARNING!**

#### **Danger of burns!**

Contact with hot transmission or hot transmission fluid may cause scalding. Please wear appropriate protective clothing, protective gloves and protective glasses/face shields.

- Remove the two bolts ⑩ on the filter ⑨.  
The remaining oil is located in the hydraulic retarder housing!
- Pull out the filter ⑨ from the hydraulic retarder housing.
- Apply grease to the O-ring ⑪ on the new filter ⑨.
- Put the new filter ⑨ into the hydraulic retarder housing.
- Use two bolts ⑩ to fix the filter ⑨. Tightening torque: 23 N·m.



## ZF transmission oil change and precautions

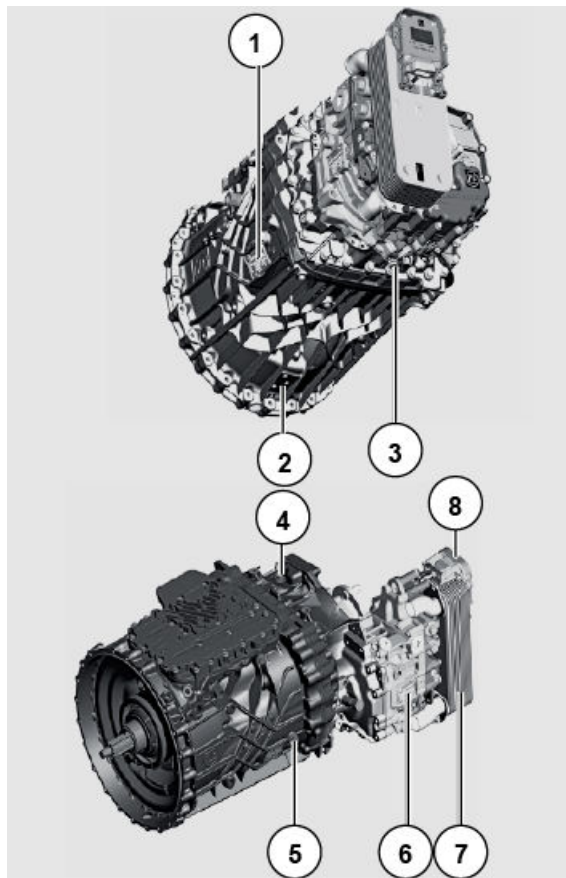
### Refueling

For the transmission with hydraulic retarder, there is a difference between closing the oil filler hole ④/overflow hole ⑤ when changing or filling oil after transmission maintenance.

### Oil filling during oil change

Refueling is only allowed when the vehicle is parked horizontally and the engine is turned off.

- 1 Remove the screw plug ⑤.
- 2 Fill oil through the oil filling hole ④.
- 3 When the oil level reaches the lower edge of the oil filler hole or the oil has overflowed from the oil filler hole, it indicates that the oil level is correct.
- 4 Screw in screw plug ⑤ with a new sealing ring and tighten it. Tightening torque: 60N·m.



### Carry out test drive: 2-5 km

Test driving: one short operation at the beginning of the hydraulic retarder (level 6).

End of test drive: The vehicle is stationary.

Do not operate the hydraulic retarder!

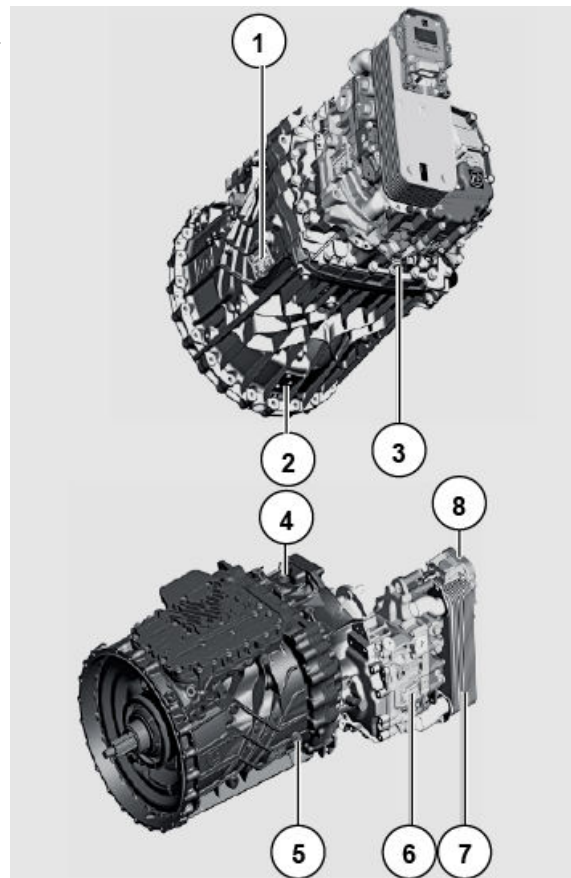
1 Remove the screw plug ⑤.

2 Check the oil level again and add oil if necessary until it overflows.

3 Replace the sealing ring on the screw plug.

4 Tighten the screw plug ⑤.

5 Tightening torque: 60N·m.



## ZF transmission oil change and precautions

### Refueling after transmission repair

Refueling is only allowed when the vehicle is parked horizontally and the engine is turned off.

- 1 Remove the upper screw plugs of oil filler hole ④ and oil overflow hole ⑤.
- 2 Add oil through the oil filler ④.
- 3 When the oil level reaches the lower edge of the overflow hole ⑤, or the oil has overflowed from the overflow hole ⑤, it indicates that the oil level is correct.
- 4 Screw in and tighten the screw plug ④⑤ together with a new sealing ring.

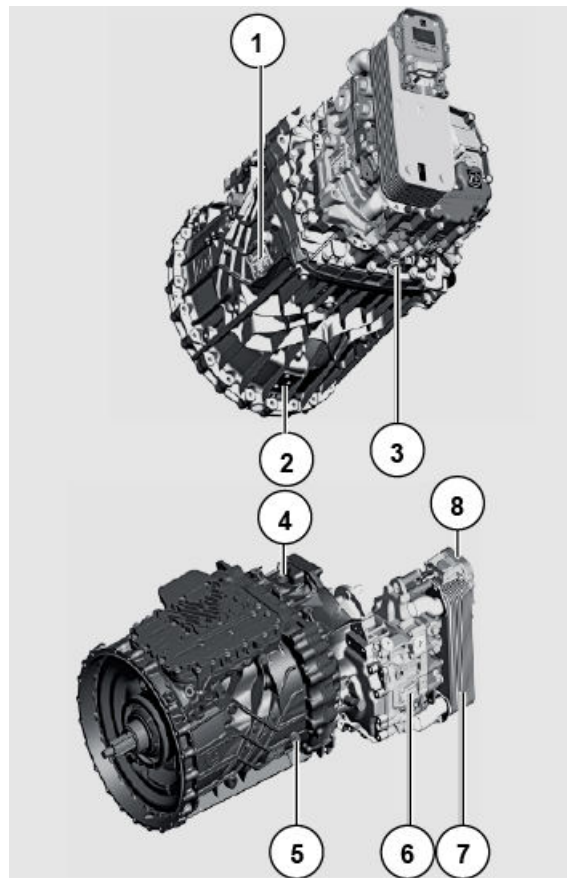
Tightening torque: 60N·m.

### Carry out test drive: 2-5 km

Test driving: one short operation at the beginning of the hydraulic retarder (level 6).

End of test drive: The vehicle is stationary. Do not operate the hydraulic retarder!

- 1 Remove the screw plug ⑤.
  - 2 Check the oil level again and add oil if necessary until it overflows.
  - 3 Replace the upper sealing ring of the screw plug ⑤ and tighten the screw plug.
- Tightening torque: 60N·m.





### Oil level inspection (with hydraulic retarder)



#### **WARNING!**

Accident hazard!

Too little lubricating oil in the transmission will damage the transmission.

- Tighten the screw plug. Tightening torque: 60N·m.

#### **Visual inspection**

If it is determined that there is a serious oil leakage on the filling valve of the oil reservoir, the entire oil reservoir shall be replaced.

Observe specified service checks.

If the oil level check is carried out, the hydraulic retarder shall not be operated until the vehicle is about to stop. This will ensure that the correct amount of oil is set in the transmission.

- The oil level check shall meet the following conditions:
  - The vehicle is in a horizontal position
  - Engine flameout
  - Cooling transmission oil (<40°C)
- Check the oil level within the vehicle inspection range.
- Note that there may be leaks, located at:
  - Transmission;
  - Hydraulic retarder;
  - Oil/water heat exchanger;
  - Configured cooling water pipes.

#### **Check**

- Stop the vehicle without operating the hydraulic retarder.
- Remove the screw plug on the oil filler hole.
- If the oil level is below the filling port, oil must be replenished (See "Oil filling during oil change").
- Replace the sealing ring on the screw plug.

## Fast transmission oil and oil change cycle

### Fast transmission oil and oil change cycle

#### Oil and replacement cycle of purchased transmission for medium and heavy trucks

Assembly and model		Filling amount	Product name <sup>1) 2)</sup>	Mileage or time for first replacement	Replacement interval mileage or time	Note
FAST transmission	RT-11509	12.5L	SAE 80W-90 long-life gear oil (conforming to J2360) Q/ZZ 21040.2 Cold region: SAE 75W-90 long-life gear oil (conforming to J2360) Q/ZZ 21040.2	<sup>①</sup> Highway conditions <sup>3)</sup> (such as long-distance transport trucks): 3,000–5,000 km or 200 hours, whichever comes first; <sup>②</sup> Mixed operating conditions <sup>3)</sup> (such as cargo trucks and intercity buses): 3,000–5,000 km or 200 hours, whichever comes first; <sup>③</sup> Off-road conditions <sup>3)</sup> (such as mixer trucks and tractors): 2,000–3,000 km or 200 hours, whichever comes first.	<sup>①</sup> Highway conditions <sup>3)</sup> (such as long-distance transport trucks): 60,000 km or 12 months, whichever comes first; <sup>②</sup> Mixed-duty conditions <sup>3)</sup> (such as cargo trucks and intercity buses): 30,000 km or 12 months, whichever comes first; <sup>③</sup> Off-road conditions <sup>3)</sup> (such as mixer trucks and tractors): 10,000 km, or 500 hours, or 12 months, whichever comes first.	1) The special after-sales gear oil specified by SINOTRUK must be used; otherwise, the transmission will be damaged and fees will be charged for any services from SINOTRUK. 2) Special transmission oil with different viscosity grades shall not be mixed. 3) Off-road conditions refer to environments featuring one or more of the following: mountainous areas, unpaved roads, overloading (actual gross weight exceeding 50 tons), low speed (average speed below 50 km/h) or very low speed (average speed below 20 km/h), frequent stops (each interval less than 50 km), extended stationary operations (each stop longer than 2 hours), or short-distance transport (haul distance less than 100 km), etc. Such as tractors, mixer trucks, and specialty vehicles operating in regions such as Yunnan, Guizhou, and Sichuan.
	8JS85(T)E-C	6L				
	8JS95(T)E-C	6L				
	9JS119	13L				
	9JSD135TA	13.5L				
	9JSD(X)150T-B	13.5L				
	10JSD180	13.5L				
	12JSD200T	15L				
	10JSD140	13L				
	10JSD160	13.5L				
	12JS160T	14L				
	12JS180T	15L				
	12JSD(X)220T-B	16L				
	12JSDX220T-B	16L				
	12JSDX240T (A)	16.5L				
	16JS200T(A)	16L				

Oil and replacement cycle of purchased transmission for medium and heavy trucks

Assembly and model		Filling amount	Product name <sup>2)</sup>	Mileage or time for first replacement	Replacement interval mileage or time	Note
Fast AMT <sup>1)</sup>	F12JZ series (without retarder, input torque ≤2400 N·m)	15L	Fast Shell FL-01E 75W-80	<sup>①</sup> Highway conditions <sup>4)</sup> : (e. g., long-distance tractor transport trucks) No initial service is required. <sup>②</sup> Mixed conditions <sup>4)</sup> : (e. g., cargo trucks) No initial service is required. <sup>③</sup> Off-road conditions <sup>4)</sup> : (e. g., heavy-duty tractors, cargo trucks, mixer trucks) 2,000–3,000 kilometers or 200 hours. <sup>④</sup> Severe conditions <sup>4)</sup> : (e. g., mining trucks, muck trucks) 1,000–2,000 kilometers or 200 hours.	<sup>①</sup> Highway conditions <sup>4)</sup> : (e. g., long-distance tractor transport trucks) 500,000 kilometers or 36 months, whichever comes first. <sup>②</sup> Mixed conditions <sup>4)</sup> : (e. g., cargo trucks) 300,000 kilometers or 24 months, whichever comes first. <sup>③</sup> Off-road conditions <sup>4)</sup> : (e. g., heavy-duty tractors, cargo trucks, mixer trucks) 150,000 kilometers, 2,000 hours, or 24 months, whichever comes first. <sup>④</sup> Severe conditions <sup>4)</sup> : (e. g., mining trucks, muck trucks) 60,000 kilometers, 1,000 hours, or 1 year, whichever comes first.	1) For the F12JZ series, the transmission nameplate shows models HW12/HW12C; for the F13JZ series, it is HW13C; and for the F16JZ series, HW16/HW16C. The input torque should match the value specified on the nameplate. 2) Only the dedicated lubricating oil approved for Fast transmissions must be used. 3) Special transmission oil with different viscosity grades shall not be mixed. 4) <sup>①</sup> Highway operating conditions refer to environments that meet all of the following criteria: the vehicle is not overloaded and travels on well-paved roads, average speed exceeds 50 km/h, long-distance transportation (haul distance 500–1000 km, annual mileage over 100,000 km), typical cruising speed of 80 km/h, infrequent stops (each stop more than 50 km apart), etc. Examples include high-speed logistics tractors (commonly 6×4, 6×2, 4×2 configurations) and van cargo trucks. <sup>②</sup> Comprehensive operating conditions refer to environments where the vehicle is not overloaded, positioned between highway and off-road conditions, and exhibiting one or more of the following: regional transportation (haul distance 100–500 km), typical cruising speed around 50 km/h, and general or rough road surfaces. Examples include cargo trucks, city buses, and coaches. <sup>③</sup> Off-road conditions refer to environments with one or more of the following conditions: Mountainous areas, bad road surface, overload (total vehicle and cargo weight of 50 t), low speed (average vehicle speed of 50 km/h), frequent parking (each parking distance is less than 50 km), long-term parking for work (each parking time is more than 2 hours), short-distance transportation (haul distance is less than 100 km), etc. Such as tractors, cargo trucks or special operation vehicles such as mixer trucks and cranes that operate for a
	F13JZ series (without retarder, input torque ≤2400 N·m) F16JZ series (without retarder, input torque ≤2400 N·m)	16L				
	F12JZ series (with retarder, input torque ≤2400 N·m)	17L				
	F13JZ series (with retarder, input torque ≤2400 N·m) F16JZ series (with retarder, input torque ≤2400 N·m)	18L				

## Fast transmission oil and oil change cycle

Assembly and model		Filling amount	Product name <sup>2)</sup>	Mileage or time for first replacement	Replacement interval mileage or time	Note
						<p>long time in Yunnan, Guizhou, Sichuan and Chongqing.</p> <p>④ Severe working conditions refer to environments with one or more of the following conditions:            Continuous operation under full load or near full load, a humid or dusty environment, continuous operation on a slope greater than 8%, and extremely low speed (average speed 20 km/h), such as mining trucks, muck trucks, etc.</p>

Oil and replacement cycle of purchased transmission for medium and heavy trucks

Assembly		Filling amount	Product name <sup>2)</sup>	Mileage or time for first replacement	Replacement interval mileage or time	Note
Fast AMT <sub>1)</sub>	F12JZ series (without retarder, input torque >2400 N·m)	15L	Fast Shell FL-01F 75W-90	① Highway conditions <sup>4)</sup> : (e. g., long-distance tractor transport trucks) No initial service is required. ② Mixed conditions <sup>4)</sup> : (e. g., cargo trucks) No initial service is required. ③ Off-road conditions <sup>4)</sup> (e. g., heavy-duty tractors, cargo trucks, mixer trucks): 2,000–3,000 kilometers or 200 hours; ④ Severe conditions <sup>4)</sup> : (e. g., mining trucks, muck trucks) 1000–2,000 kilometers or 200 hours.	① Highway conditions <sup>4)</sup> : (e. g., long-distance tractor transport trucks) 500,000 kilometers or 36 months, whichever comes first. ② Mixed conditions <sup>4)</sup> : (e. g., cargo trucks) 300,000 kilometers or 24 months, whichever comes first. ③ Off-road conditions <sup>4)</sup> : (e. g., heavy-duty tractors, cargo trucks, mixer trucks) 150,000 kilometers, 2,000 hours, or 24 months, whichever comes first. ④ Severe conditions <sup>4)</sup> : (e. g., mining trucks, muck trucks) 60,000 kilometers, 1000 hours, or 1 year, whichever comes first.	1) For the F12JZ series, the transmission nameplate shows models HW12/HW12C; for the F13JZ series, it is HW13C; and for the F16JZ series, HW16/HW16C. The input torque should match the value specified on the nameplate. 2) Only the dedicated lubricating oil approved for Fast transmissions must be used. 3) Special transmission oil with different viscosity grades shall not be mixed. 4) ① Highway operating conditions refer to environments that meet all of the following criteria: the vehicle is not overloaded and travels on well-paved roads, average speed exceeds 50 km/h, long-distance transportation (haul distance 500–1000 km, annual mileage over 100,000 km), typical cruising speed of 80 km/h, infrequent stops (each stop more than 50 km apart), etc. Examples include high-speed logistics tractors (commonly 6×4, 6×2, 4×2 configurations) and van cargo trucks. ② Comprehensive operating conditions refer to environments where the vehicle is not overloaded, positioned between highway and off-road conditions, and exhibiting one or more of the following: regional transportation (haul distance 100–500 km), typical cruising speed around 50 km/h, and general or rough road surfaces. Examples include cargo trucks, city buses, and coaches. ③ Off-road conditions refer to environments with one or more of the following conditions: Mountainous areas, bad road surface, overload (total vehicle and cargo weight of 50 t), low speed (average vehicle speed of 50 km/h), frequent parking (each parking distance is less than 50 km), long-term parking for work (each parking time is more than 2 hours), short-distance transportation (haul distance is less than 100 km), etc. Such as tractors, cargo trucks or special operation vehicles such as mixer trucks and cranes that operate for a
	F13JZ series (without retarder, input torque >2400 N·m) F16JZ series (without retarder, input torque >2400 N·m)	16L				
	F12JZ series (with retarder, input torque >2400 N·m)	17L				
	F13JZ series (with retarder, input torque >2400 N·m) F16JZ series (with retarder, input torque >2400 N·m)	18L				

## Fast transmission oil and oil change cycle

Assembly		Filling amount	Product name <sup>2)</sup>	Mileage or time for first replacement	Replacement interval mileage or time	Note
						<p>long time in Yunnan, Guizhou, Sichuan and Chongqing.</p> <p>④ Severe working conditions refer to environments with one or more of the following conditions: Continuous operation under full load or near full load, a humid or dusty environment, continuous operation on a slope greater than 8%, and extremely low speed (average speed 20 km/h), such as mining trucks, muck trucks, etc.</p>

### Change and change precautions of Fast transmission oil

#### Fast F16JZ Series Transmission Maintenance

##### • Lubricating oil quality and maintenance cycle

Selecting the lubricating oil grade specified by Fast and replacing the lubricating oil as required helps optimize transmission performance and service life.

##### • Filling amount

When adding lubricating oil to the transmission, insufficient oil will result in poor lubrication, while excessive oil will cause the transmission temperature to rise.

The specific amount of oil should be filled until the oil level is flush with the lower edge of the PTO oil level observation hole.



#### CAUTION!

- The specific amount of oil should be filled until the oil level is flush with the lower edge of the oil level observation hole;
- During maintenance and oil change, the filling amount may be lower than the value in the table due to residual lubricating oil in the transmission.

Before replacement of the lubricating oil for the transmission, the waste oil inside the transmission must be discharged first. Before oil draining, the vehicle can be run for a period of time to increase the temperature of the transmission lubricating oil. As the temperature

rises, the viscosity of the lubricating oil decreases and the fluidity increases, which is conducive to the discharge of waste oil.

The oil filler hole is at the top of the transmission, and the oil level observation hole is located on the right side of the clutch housing. There is an oil drain hole at the bottom and rear end of the basic integrated AMT, and there are two oil drain holes at the bottom of the integrated AMT equipped with the hydraulic retarder.



#### WARNING!

Contact with hot transmission or lubricating oil may cause burns. Please wear appropriate protective clothing, gloves and masks.

## Change and change precautions of Fast transmission oil

### • Oil drainage

- ① Oil filler hole      ② Oil level inspection port      ③ Oil drain port

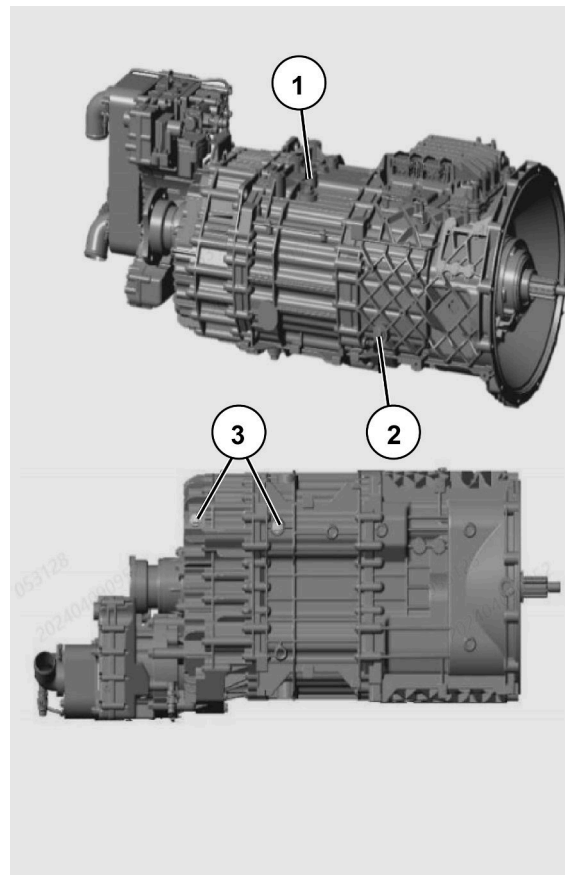
When draining oil, please follow the steps below:

- Park the vehicle on a level road;
- Unscrew the screw plug on the oil level observation hole ②;
- Unscrew the screw plug on the oil drain hole ③, collect the transmission waste oil in a large enough container, and let it stand for a long enough time to ensure that the waste oil is drained as cleanly as possible;
- Clean the iron filings on the screw plug magnet of the oil drain hole ③, and replace the sealing ring if necessary;
- Tighten the screw plug at the oil drain hole ③ (tightening torque: 47~68 N·m).



#### **CAUTION!**

- The transmission has two drain plugs, both of which need to be unscrewed when draining the oil.
- Waste lubricating oil must not be dumped indiscriminately; it must undergo non-hazardous treatment.





### • Oil filling

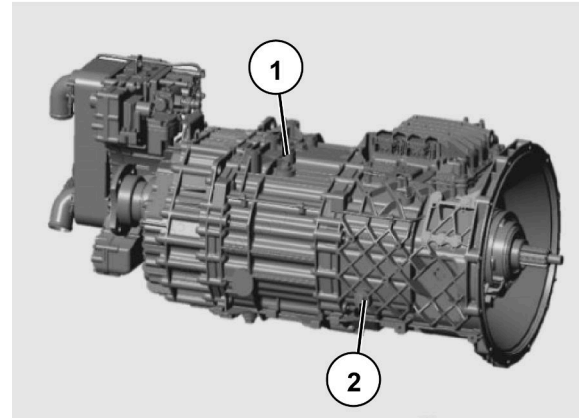
When filling, please follow the steps below:

- Add lubricating oil through the oil filler hole ① or the oil level observation hole ②;
- When filling, pay attention to observing the amount of oil through the oil level observation hole ②. When the oil level is flush with the lower edge of the oil level observation hole or just overflows, it means that the amount of oil is appropriate;
- Tighten the screw plugs of the oil filler hole and the oil level observation hole (tightening torque: 47~68N·m), and replace the screw plug seal ring if necessary.



#### **CAUTION!**

**Before filling lubricating oil, make sure that the vehicle or transmission is level and has no roll.**



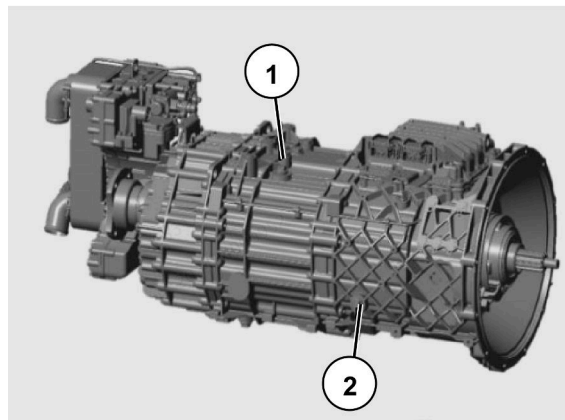
## Change and change precautions of Fast transmission oil

### • Oil level inspection

Too little oil will lead to problems such as insufficient lubrication of the transmission, difficulty in shifting gears, and abnormal noise in the transmission. In some cases, it may cause irreparable damage to the transmission. In extreme cases, it may cause the vehicle to suddenly stop and fail to shift gears. Excessive oil will cause the transmission oil temperature to rise, and in severe cases, it will cause the lubricating oil to deteriorate, the transmission seals to be damaged, and the transmission to leak.

To ensure the reliability of the transmission, the amount of transmission lubricating oil needs to be checked every 50,000km during use. When checking, please follow the steps below:

- 1 Ensure that the vehicle is horizontal without tilting;
- 2 Let the vehicle stand for a period of time to ensure that the transmission is in a cold state;
- 3 Unscrew the screw plug of the oil level observation hole ② and observe the oil level;
- 4 If the oil level is more than 5mm below the lower edge of the oil level observation hole ②, it is necessary to add lubricating oil according to the filling method; if the oil level is higher than the oil level observation hole, the excess lubricating oil needs to be drained;
- 5 After removing the iron filings from the oil level observation hole screw plug, tighten the screw plug (tightening torque: 47~68N·m), and replace the screw plug seal ring if necessary.



**CAUTION!**

Do not check the oil level immediately after the vehicle has been in operation. Wait until the oil level stabilizes; the oil level should only be checked once the lubricating oil has cooled (temperature not exceeding 40°C).

## Maintenance of Voith retarder

### Maintenance of Voith retarder

#### Oil type and replacement cycle for purchased retarders for medium and heavy trucks

Assembly and model	Oil quality and quantity (L)	Product name <sup>1)</sup>	Mileage or time for first replacement	Replacement interval mileage or time	Note
Voith retarder <sup>2) 3)</sup> VR115CT	6.8L (initial filling) 6.4L (maintenance filling)	Initial installation: Voith retarder special oil VR Fluid S 10W-40 (TYPE B) After-sales: ① Voith retarder special oil VR Fluid S 10W-40 (TYPE B) ② SINOTRUK China VI engine ultra-long-life special oil 10W-40.	① Tractor and cargo truck: 100,000 km or 24 months, whichever comes first. ② Dump truck: 45,000 km or 12 months, whichever comes first. ③ Mine transport truck: 500 hours (according to vehicle operating time).	① Tractor and cargo truck: 100,000 km or 24 months, whichever comes first. ② Dump truck: 45,000 km or 12 months, whichever comes first. ③ Mine transport truck: 500 hours (according to vehicle operating time).	1) Special retarder oil with different viscosity grades shall not be mixed. 2) Voith retarders are supplied pre-filled with oil for initial installation. 3) Replace the filter element when changing the oil in the Voith retarder.

#### Maintenance tasks are performed during each oil change.

- Visually inspect the retarder for oil leaks before and after replacing the oil.
- Tighten the screw plug in the retarder base part and the heat exchanger to the specified torque.
- Additional maintenance every second oil change: Replace the oil separator mounted on the oil separator assembly.

### Oil drainage

- Place an appropriate container under retarder ①.



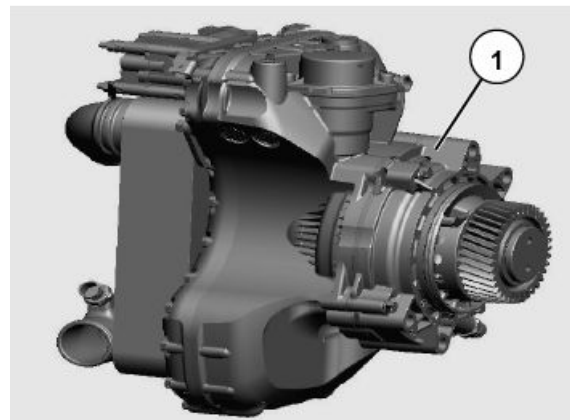
#### CAUTION!

- When changing the oil, the vehicle shall be parked in a horizontal position and the parking brake shall be applied.
- The oil temperature reaches the working temperature (greater than 60°C).
- Turn off the retarder.
- Switch off the key switch.



#### WARNING!

The oil flowing out and the screw plug are hot! They can cause burns. Please operate carefully and wear protective equipment such as gloves if necessary.



## Maintenance of Voith retarder

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1 Remove plug ① and sealing gasket ②.

2 Remove screw plug ③, seal ring ④, and O-ring ⑤.

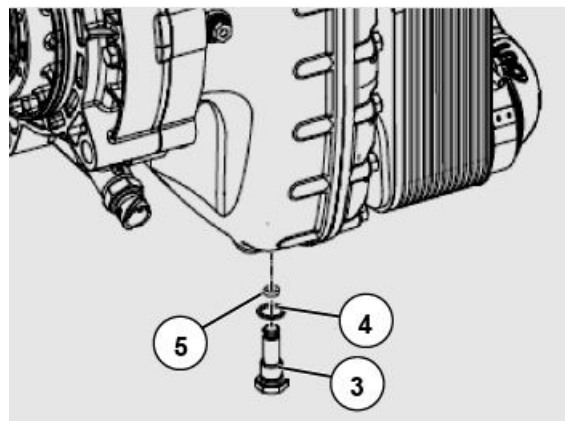
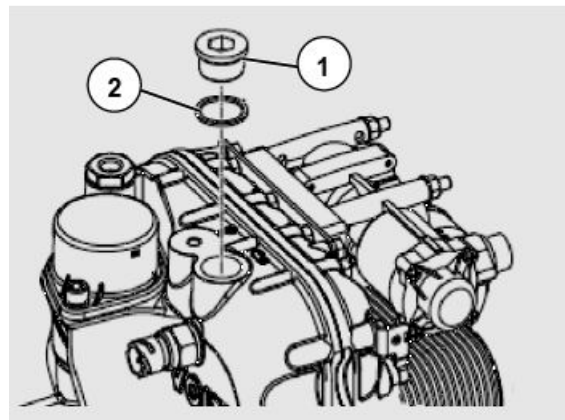
3 Drain the oil into a container and analyze it.

If water is detected in the oil, inspect the heat exchanger. If particles (debris) are present in the oil, please contact Voith.

4 Apply a silicone-free, non-corrosive grease to the new O-ring ⑤ and fit it onto screw plug ③.

5 Apply silicone-free and non-corrosive grease to the new sealing gasket ④.

6 Install the drain plug ③ and sealing gasket ④ (tightening torque: 30 N·m).



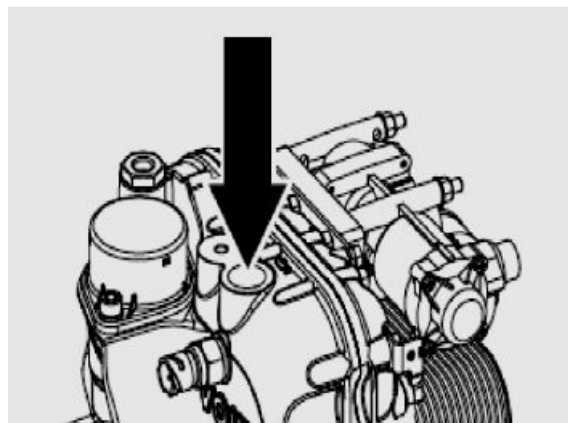
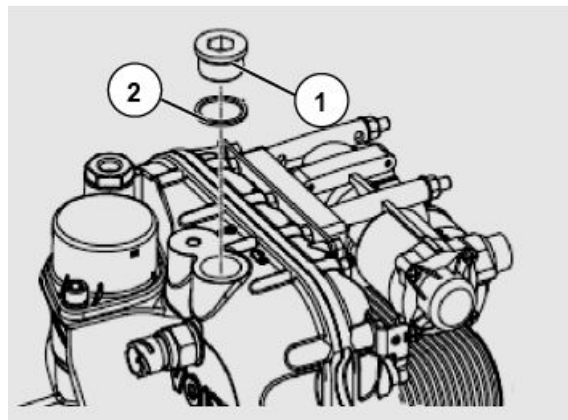
**Oil filling**

- 1 Slowly add 4L oil through the screw plug opening ① (>2 minutes), ensuring the retarder vents air through the fill port.
  - 2 Wait for about 2 minutes.
  - 3 Slowly add 2.4L of oil through the screw plug opening (2 minutes), ensuring the retarder vents air through the fill port.
  - 4 Apply silicone-free and non-corrosive grease to the new seal ring ②.
  - 5 Install the drain plug ① and seal ring ② (tightening torque: 130 N·m).
- The oil filler port is indicated by the arrow in the figure.

**WARNING!**

–Only oils, lubricants and accessories approved by SINOTRUK can be used to ensure vehicle safety and retarder function.

–For damage caused by changing the retarder or its oil and lubricant, and using accessories, accessories, additional devices and special equipment not approved by SINOTRUK, SINOTRUK only provides paid services.



## Maintenance of ZF retarder

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### Maintenance of ZF retarder

#### ZF-Intarder hydraulic retarder.

#### Oil level inspection



#### **WARNING!**

**–Insufficient transmission oil volume will lead to retarder fault, braking torque reduction or failure.**

**–Please switch on other auxiliary braking devices and contact a CNHTC service station for help.**

- When inspecting the oil level, make sure to turn off the retarder before parking the vehicle to ensure the transmission oil quantity is accurate.
- Before checking the oil level in a transmission equipped with a retarder, perform the following steps:
  - Park the vehicle horizontally.
  - The engine stalls.
  - The transmission oil temperature drops below 40°C.
- Regularly check the transmission oil level. When checking the oil level, also inspect the following areas for oil leaks:
  - Transmission
  - Retarder
  - Oil/Water heat exchanger
  - Related cooling pipelines

#### **Check the Oil Level**

1 Park the vehicle horizontally and engage the parking brake. Be careful not to use the retarder.

2 Loosen the overflow plug.

3 If the oil level is below the overflow port, continue adding oil until it spills out.

4 Replace the sealing gasket and tighten the overflow plug to the specified torque.

For specific maintenance instructions, refer to the section on transmissions equipped with hydraulic retarders.



## Nameplate

### • Retarder nameplate

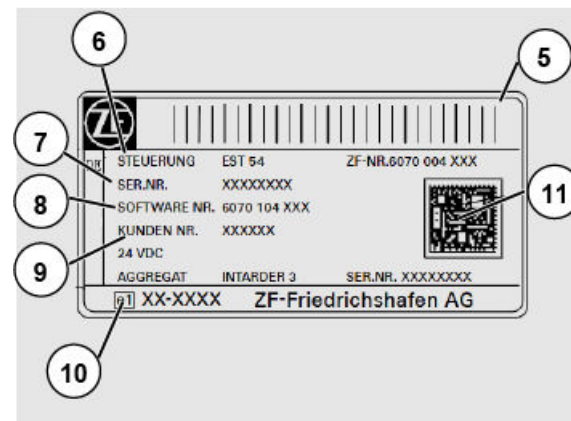
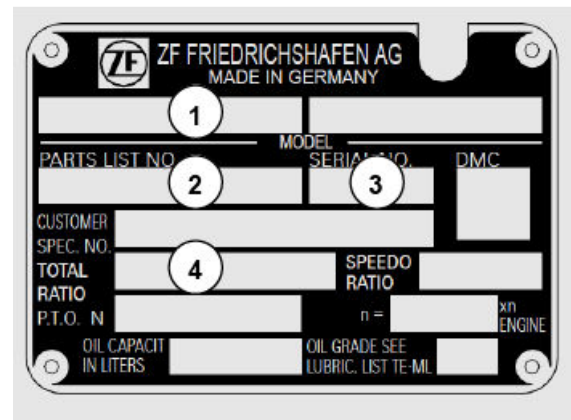
The nameplate is mounted on the side of the retarder housing and contains the following details:

- ① Retarder model      ② Retarder assembly number
- ③ Retarder serial number      ④ Speed ratio

### • Nameplate of the EST54 electronic control unit

- ⑤ Barcode, containing the ZF part number and serial number
- ⑥ EST54
- ⑦ EST54 serial number
- ⑧ EST54 program number
- ⑨ Retarder serial number
- ⑩ Certification number
- ⑪ QR code

The retarder serial numbers on both the retarder and EST54 nameplates must correspond.



### Oil drainage

**WARNING!**

Touching hot transmission or transmission fluid may cause scalding. Please take protective measures!

**CAUTION!**

When checking the oil level, turn off the retarder before stopping the vehicle to ensure that the oil volume in transmission is correct.

### Preparation

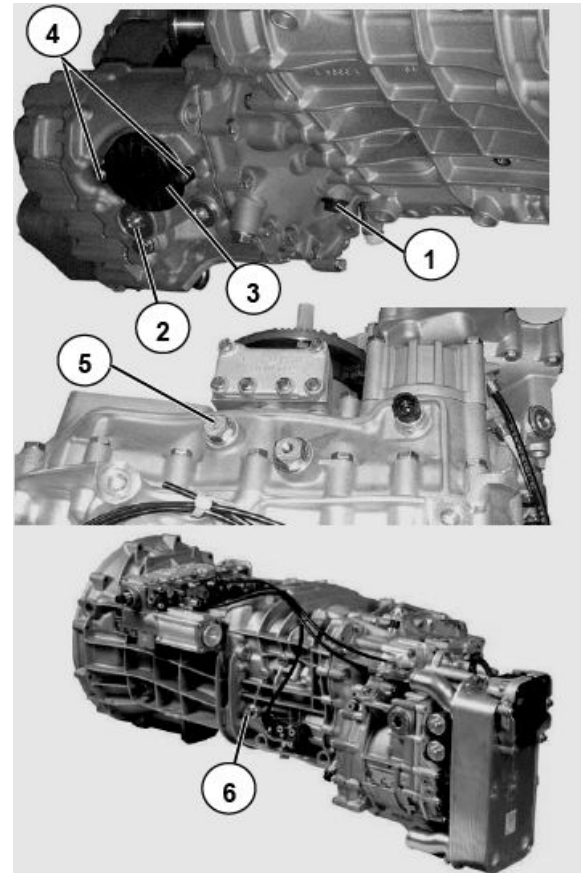
- Prepare suitable containers for collecting lubricating oil (the discharged oil should be disposed of in accordance with environmental regulations).
- Change the oil after long-distance driving while the oil temperature is still high and oil viscosity is low.

### Oil drainage

- 1 Park the vehicle horizontally, turn off the engine and engage the parking brake.
- 2 When draining the oil, loosen both the transmission and retarder drain plugs (see diagram on the next page).
- 3 After draining the oil, thoroughly clean the magnetic drain plug and replace the sealing gasket with a new one.
- 4 Install the new filter element.
- 5 Finally, tighten the drain plug (see Chapter VII Technical Parameters for tightening torque).

### Drain, fill, and overflow port plugs

- ① Transmission drain plug
- ② Retarder drain plug
- ③ Oil suction filter element
- ④ Install the filter element bolts
- ⑤ Overflow port and oil change/filling port/post-maintenance filling port
- ⑥ Post-maintenance filling port/overflow port and oil change/filling port



## Maintenance of ZF retarder

### Replacement of filter element

Drain the oil before replacing the filter element.

Always use a new filter element for each oil change.



#### **DANGER!**

**Touching hot transmission or transmission fluid may cause scalding. Please take protective measures!**

1 Loosen the fixing bolt ④ securing the oil suction filter element ③.



#### **CAUTION!**

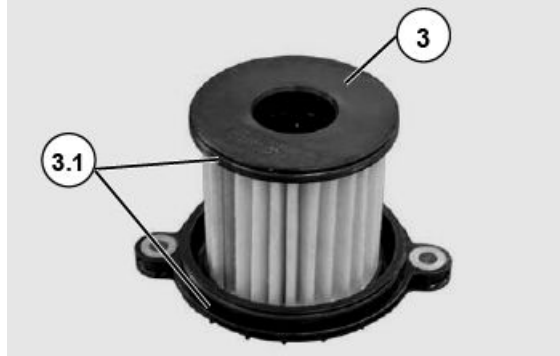
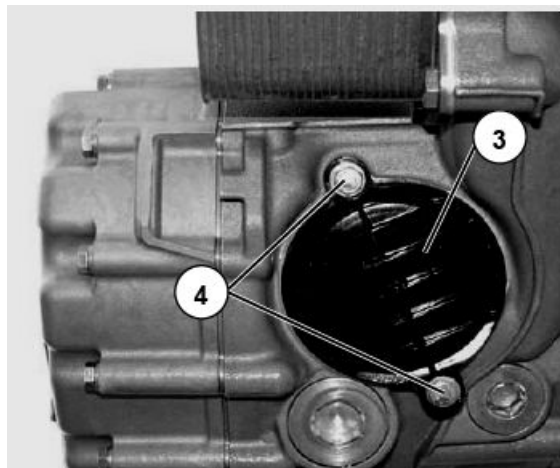
There will be some residual oil in the retarder!

2 Remove the oil suction filter element ③.

3 Lubricate the new O-ring (3.1) on the new filter element ③.

4 Install the new filter element into the retarder housing.

5 Secure the filter element ③ and tighten the bolt ④ (tightening torque:  $23 \pm 2$  N·m).



## Oil filling

## Oil type and replacement cycle for purchased retarders for medium and heavy trucks

Assembly model		Oil quality and quantity (L)	Product name <sup>1)</sup>	Mileage or time for first replacement	Replacement interval mileage or time	Note
ZF trans- mission <sup>2)3)</sup>	16S1931	25.5L (First filling)	Initial installation: ZF 02E 75W-80 special lubricant for non-self-made transmissions. After-sales: ① ZF 02E 75W-80 Q/ZZ 21040.3 special lubricant for non-self-made transmissions ②75W-80 ZF 02L transmission special lubricant Q/ZZ 21040.3	① Long-distance transport trucks: Light/standard load working condition: 300,000 km or 24 months; Standard weight working condition: 240,000 km or 24 months; Loading working condition: 160,000 km or 12 months; Whichever comes first. ② Municipal and sanitation vehicles, urban construction slag dump trucks, road transport dump trucks, mixer trucks: 240,000 km or 20 months, whichever comes first. ③ Mine site vehicles and special vehicles for in-situ operation; Main engine operating time: 5,000 hours or 12 months, whichever comes first.	① Long-distance transport trucks: Light/standard load working condition: 300,000 km or 24 months; Standard weight working condition: 240,000 km or 24 months; Loading working condition: 160,000 km or 12 months; Whichever comes first. ② Municipal and sanitation vehicles, urban construction slag dump trucks, road transport dump trucks, mixer trucks: 240,000 km or 20 months, whichever comes first. ③ Mine site vehicles and special vehicles for in-situ operation; Main engine operating time: 5,000 hours or 12 months, whichever comes first.	1) Special retarder oil with different viscosity grades shall not be mixed. 2) The ZF retarder is supplied with oil for initial installation. 3) The ZF transmission and retarder share the same oil circuit; the ZF retarder uses the same oil as the ZF transmission.
	16S2231	18.5L (Maintenance filling)				
	16S2531					
	9S1311	24L (First filling) 13.5L (Maintenance filling)				
	12T-X2621	23.5L (First filling) 19L (Maintenance filling)				
	12T-X2821					
	12T-X3221					

## Maintenance of ZF retarder

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### Add oil after the routine oil change.

- Refuel and check the oil level only after the vehicle is parked horizontally and the engine is turned off.
- For vehicles with transversely mounted transmissions, ensure the transmission is positioned horizontally before adding oil; otherwise, the oil quantity may be inaccurate.
- Always use a new filter element for each oil change.
- If the vehicle is equipped with a PTO, the oil capacity should include the amount required by the power take-off unit.
- If the heat exchanger and retarder are installed separately, make sure to include the oil volume in the connecting pipelines.

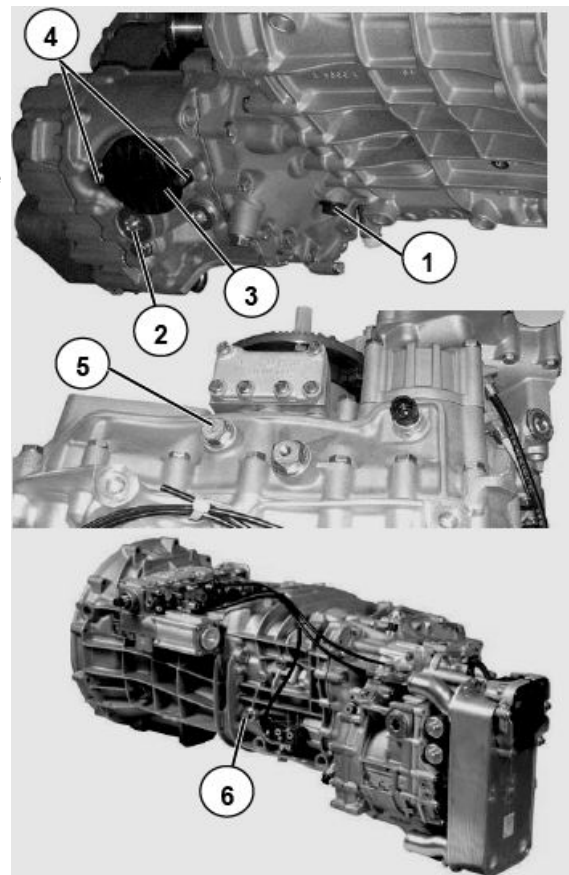
## Add oil after the routine oil change.

- 1 Loosen the overflow port plug ④.
- 2 Add oil through the overflow port until it spills out.
- 3 Install the sealing gasket and securely tighten the overflow port plug.
- 4 Test-drive the vehicle at approximately 10 km/h for at least one minute. At start-up, briefly operate the retarder at the highest gear, then turn it off by returning the lever to the "0" position.
- 5 The engine stalls.
- 6 Loosen the oil overflow port plug ⑤.
- 7 Check the oil level and add oil if necessary until it overflows.
- 8 After replacing with a new sealing gasket, tighten the oil overflow port plug. (Refer to "Chapter VII Technical Parameters" for the tightening torque).



### CAUTION!

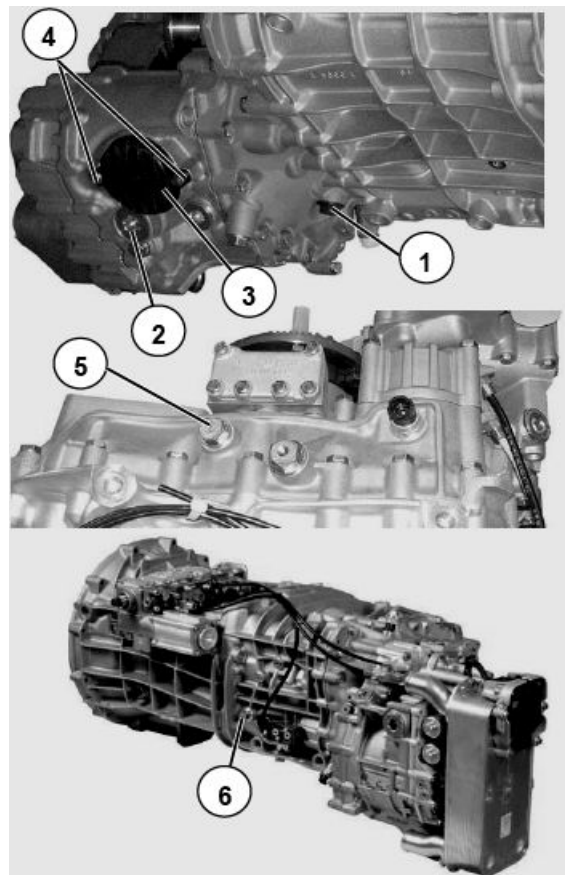
**Check the oil level after driving to ensure accurate filling volume. If the vehicle is equipped with a split heat exchanger, check it after 5 minutes of test run to prevent the heat exchanger from idling.**



## Maintenance of ZF retarder

### Refueling after maintenance

- 1 Refueling the transmission and checking the oil level should only be performed when the vehicle is parked horizontally and the engine is turned off.
- 2 For vehicles with transversely mounted transmissions, ensure the transmission is level before refueling.
- 3 The oil grade and change interval are the same as those specified for regular refueling and oil changes above.
- 4 The oil quantity and tightening torque are the same as those for regular oil filling and oil changing, as previously described.
- 5 Additionally, if the vehicle is equipped with a PTO, the oil capacity should include the amount required by the power take-off unit.
- 6 If the heat exchanger and retarder are installed separately, make sure to include the oil volume in the connecting pipelines.
- 7 Loosen the oil filler plug ⑤.
- 8 Add oil through the oil filler ⑤ until it begins to overflow.
- 9 Install the sealing gasket and tighten the overflow plug ⑤.
- 10 Vehicle test run (run at a speed of about 10 km/h for at least 1 minute).
- 11 Briefly activate the retarder (at its maximum setting) when starting off.
- 12 Deactivate the retarder function (switch back to "0" position).
- 13 The engine stalls.
- 14 Loosen the overflow port plug ⑥.
- 15 Check the oil level and add oil if necessary until it overflows.
- 16 Check oil level only when the temperature is below 40°C.
- 17 The correct oil level is at the lowest edge of the overflow port—oil should just reach the overflow point.
- 18 After replacing with a new sealing gasket, tighten the overflow plug.







**WARNING!**

Insufficient oil in the transmission can cause transmission damage and accident hazard!



**WARNING!**

Insufficient oil volume in retarder will lead to retarder fault, braking torque reduction or failure. Please switch on other auxiliary braking devices and contact a CNHTC service station for help.

## Maintenance of ZF retarder

### Engine coolant

Low or no pressure in the cooling system can lead to cavitation damage and internal leakage in the heat exchanger. Regularly check the engine coolant and replace it according to specifications.

**Drain any remaining coolant.**



#### **WARNING!**

**Contact with hot transmissions or engine coolant may cause burns, please take precautions measures.**

Residual coolant can only be fully drained after removing the temperature sensor.

1 Loosen the bolt ①

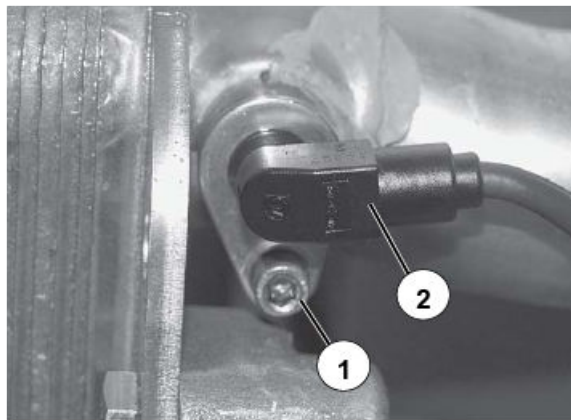
2 Remove the temperature sensor ②

3 After draining, replace the O-ring with a new one, reinstall the temperature sensor, and tighten the bolt (torque:  $9.5 \pm 1 \text{ N}\cdot\text{m}$ ).

### Retarder breather plug

The transmission breather plug is designed to balance the internal and external air pressure when the retarder is operating.

The location of the breather plug varies depending on the transmission model.



## Maintenance of Fast retarder

## Oil type and replacement cycle for purchased retarders for medium and heavy trucks

Assembly and model		Oil volume	Product name <sup>1)</sup>	Mileage or time for first replacement	Replacement interval mileage or time	Note
Fast retarder <sup>2)</sup> <sub>3)</sub>	FH-B400A	6.5L	Fast Shell FL-03A 5W-30	<p>① Long-distance transport trucks, municipal and sanitation vehicles, urban construction slag dump trucks, road transport dump trucks: 100,000 kilometers or 12 months, whichever comes first.</p> <p>② Mixer trucks, mine site vehicles, and special vehicles for in-situ operation: 50,000 kilometers or 6 months, whichever comes first.</p>	<p>① Long-distance transport trucks, municipal and sanitation vehicles, urban construction slag dump trucks, road transport dump trucks: 100,000 kilometers or 12 months, whichever comes first.</p> <p>② Mixer trucks, mine site vehicles, and special vehicles for in-situ operation: 50,000 km or 6 months, whichever comes first.</p>	<p>1) Special retarder oil with different viscosity grades shall not be mixed.</p> <p>2) Fast retarder is pre-filled with oil upon initial installation.</p> <p>3) The filter element should be replaced when changing the oil in Fast retarder.</p>

## Maintenance of Fast retarder

### Fast hydraulic retarder

Correct and reasonable operation of the retarder, as well as its regular maintenance, are essential to ensure the safe and reliable driving of the vehicle and to extend the service life of the retarder. Therefore, the following use requirements should be observed:

#### Operating oil

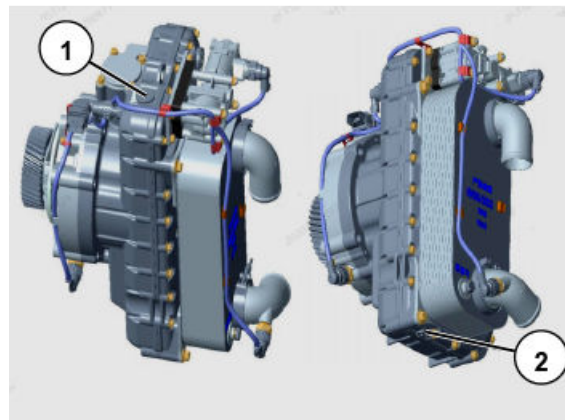
Fast hydraulic retarder special oil is recommended.

#### Precautions for oil draining and filling

- 1 Park the vehicle in a horizontal position;
- 2 Turn off both the retarder and ignition switch;
- 3 Oil temperature: 60°C;
- 4 Beware of burns from hot oil.

#### Specifications for oil draining and filling

- 1 Place a container beneath the retarder;
- 2 Remove the oil filler plug ① and drain plug ②;
- 3 Drain the old oil into the container and check the oil level;
- 4 Tighten the drain plug to 22 N·m;
- 5 Slowly fill 6.5L of special oil through the filler plug opening;
- 6 Tighten the oil filler plug to 22 N·m;



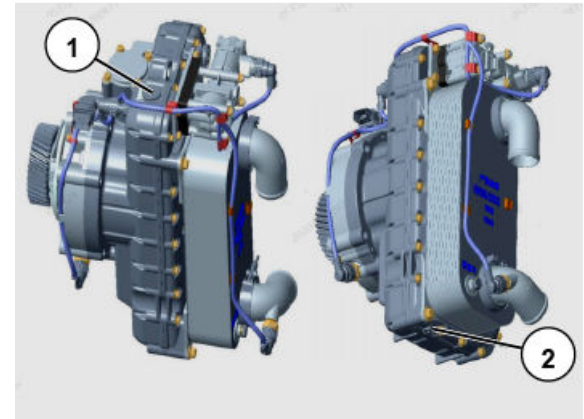
### Oil replacement interval

The oil change interval for Fast hydraulic retarder special oil is listed in the table "Oil type and replacement cycle for purchased retarders for medium and heavy trucks."

### Oil change method

- 1 Unscrew the retarder drain plug ②. Drain the oil for at least 10 minutes, until it drips steadily;
- 2 After tightening the drain plug ②, open the oil filler plug ① and fill with 6.5L of new oil.

Perform this procedure for each maintenance service.



## Maintenance of steering system

### Maintenance of steering system

#### Recommended Consumption and Change Cycles of Drive Trains of Medium-heavy Trucks

Applicable models	Application conditions		Steering fluid	Remarks
			Steering gear	
Long-distance tractor and cargo truck	Light load working condition	11/13L MC engine: Average fuel consumption < 30L/100km	120,000 km or 12 months, whichever comes first	The recommended liquid change cycles in this table are consistent with the first and regular maintenance.
		7L MC engine: Average fuel consumption < 20L/100km	100,000 km or 12 months, whichever comes first.	
	Standard load working condition	11/13L MC engine: The average fuel consumption is 30-40L/100km.	100,000 km or 12 months, whichever comes first.	
		11/13L MT engine: Average gas consumption < 35L/100km	80,000 km or 12 months, whichever comes first	
		7L MC engine: Average fuel consumption 20-25L/100km	100,000 km or 12 months, whichever comes first.	
	Standard weight working condition	11/13L MC engine: The average fuel consumption is 40-50L/100km.	80,000 km or 12 months, whichever comes first	
		7L MC engine: The average fuel consumption is 25-35L/100km.		
	Loading condition	11/13L MC engine: Average fuel consumption > 50L/100km	80,000 km or 12 months, whichever comes first	
		11/13L MT engine: Average gas consumption > 35L/100km		

Applicable models	Application conditions		Steering fluid	Remarks
			Steering gear	
		7L MC engine: Average fuel consumption > 35L/ 100km		

## Recommended Consumption and Change Cycles of Drive Trains of Medium-heavy Trucks

Applicable models	Steering fluid	Remarks
	Steering gear	
Vehicles for transport operation	100,000 km or 12 months, whichever comes first.	The recommended liquid change cycles in this table are consistent with the first and regular maintenance.
Municipal and sanitation vehicles	80,000 km or 12 months, whichever comes first	
Vehicles for lifting, fire fighting and pumping	80,000 km or 12 months, whichever comes first	
Oilfield/pavement truck and cement mixer truck	80,000 km or 12 months, whichever comes first	
Urban construction slag dump truck	80,000 km or 12 months, whichever comes first	
Road transport dump truck	80,000 km or 12 months, whichever comes first	
Pithead dump truck and truck under super load working condition	20,000 km or 6 months, whichever comes first	
Mine site vehicle	To be replaced with the engine oil	

## Maintenance of steering system

### Steering fluid and filling amounts for medium and heavy truck drivetrains.

Assembly	Model	Oil quantity 1)2)3)/L	Product name	Remarks	Note	Note
Steering gear	C9H/G7S/ G7H/C7/G7 left-mounted single front axle	4.2	Automotive automatic transmission fluid ATF IIIH Q/ZZ 21097 (Exported to extremely cold areas: automotive automatic transmission fluid that complies with GM DEXRON IIIH/VI (-40°C apparent viscosity not higher than 8500 mPa·s), select the appropriate product according to the ambient temperature.)	/	The specific steering fluid designated by SINOTRUK must be used; otherwise, the steering mechanism may be damaged, and SINOTRUK will only provide paid service.	1) For G5/G5S vehicles equipped with ECO108 steering machine, the filling quantity of steering oil is reduced by 700ml. 2) The allowable error for steering oil filling is ±50ml. 3) The recommended filling quantity is given in the table, and the actual filling quantity shall be between MIN line and MAX line.
	C9H/G7S/ G7H/C7/G7 right-hand drive single front axle	4.55		/		
	C9H/G7S/ G7H/C7/G7 double front axle	5.8		/		
	G5/G5S single front axle	4.0		Steering oil reservoir and steering machine are not on the same side		
		3.8		Steering oil reservoir and steering machine are on the same side		
	G5/G5S double front axle	6.1		Plastic power steering fluid reservoir assembly (2L)		
		5.45		Square plastic oil reservoir assembly (1.6L)		



### Oil change method:

- 1 Jack up the front axle.
- 2 Open the oil reservoir cover and unscrew the return pipe on the steering gear (pay attention to prevent dirt and foreign matter from entering the oil system).
- 3 Start the engine, run it at idle speed for about 10s, and turn the steering wheel to the left and right limit ends several times to drain all the oil in the oil reservoir , power pump and steering gear (collect and dispose of the discharged oil correctly).
- 4 Re-tighten the oil return pipe and clean the oil reservoir , refueling filter and filter element. It is recommended to replace the filter element with a new one for each oil change.
- 5 After the oil reservoir is filled with hydraulic oil, run the engine at idle speed, turn the steering wheel left and right repeatedly, and continue to replenish hydraulic oil until the oil level in the oil reservoir no longer drops and no bubbles are generated. The oil level should be between the MIN and MAX marks.



### CAUTION!

- The clearance of all rotating parts shall be checked during the first and regular maintenance, such as the steering tie rod and drag link ball head. The rotating parts with excessive clearance shall be replaced.
- Grease shall be added to related parts during each regular maintenance.

## Driven axle hub bearing grease and its change cycle

### Driven axle hub bearing grease and its change cycle

#### Recommended Consumption and Change Cycles of Drive Trains of Medium-heavy Trucks

Application models <sup>1) 2)</sup>	Application conditions		Wheel hub bearing grease	Remarks
			Driven axle hub bearing	
Long-distance tractor and cargo truck	Light load working condition	11/13L MC engine: Average fuel consumption < 30L/100km	120,000 km or 12 months, whichever comes first	1) For the model number, oil specification, and oil quantity of each assembly listed in the table, please refer to the corresponding oil filling chart for details. The oil type and quantity in this table are for reference only; actual usage shall prevail. 2) The recommended oil change cycles in this table are consistent with the first and regular maintenance.
		7L MC engine: Average fuel consumption < 20L/100km	100,000 km or 12 months, whichever comes first.	
	Standard load working condition	11/13L MC engine: The average fuel consumption is 30-40L/100km.	100,000 km or 12 months, whichever comes first.	
		11/13L MT engine: Average gas consumption < 35L/100km	80,000 km or 12 months, whichever comes first	
		7L MC engine: Average fuel consumption 20-25L/100km	100,000 km or 12 months, whichever comes first.	
	Standard weight working condition	11/13L MC engine: The average fuel consumption is 40-50L/100km.	80,000 km or 12 months, whichever comes first	
		7L MC engine: The average fuel consumption is 25 ~ 35L/100km.		
	Loading condition	11/13L MC engine: Average fuel consumption > 50L/100km	40,000 km or 12 months, whichever comes first	
		11/13L MT engine: Average gas consumption > 35L/100km		

		7L MC engine: Average fuel consumption > 35L/100km		
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**Recommended Consumption and Change Cycles of Drive Trains of Medium-heavy Trucks**

Applicable models <sup>1) 2)</sup>	Wheel hub bearing grease	Remarks
	Driven axle hub bearing	
<b>Vehicles for transport operation</b>	100,000 km or 12 months, whichever comes first.	1) For the model number, oil specification, and oil quantity of each assembly listed in the table, please refer to the corresponding oil filling chart for details. The oil type and quantity in this table are for reference only; actual usage shall prevail. 2) The recommended oil change cycles in this table are consistent with the first and regular maintenance. 3) Severe working conditions refer to severe overload, poor road conditions, and heavy dust during vehicle operation.
<b>Municipal and sanitation vehicles</b>	40,000 km or 12 months, whichever comes first	
<b>Vehicles for lifting, fire fighting and pumping</b>	12 months	
<b>Oilfield/pavement truck and cement mixer truck</b>	12 months	
<b>Urban construction slag dump truck</b>	40,000 km or 12 months, whichever comes first	
<b>Road transport dump truck</b>	40,000 kilometers (20,000 kilometers under severe working conditions <sup>3)</sup> or 12 months, whichever comes first;	
<b>Pithead dump truck and truck under super load working condition</b>	20,000 km or 6 months, whichever comes first	
<b>Mine site vehicle</b>	To be replaced with the engine oil	

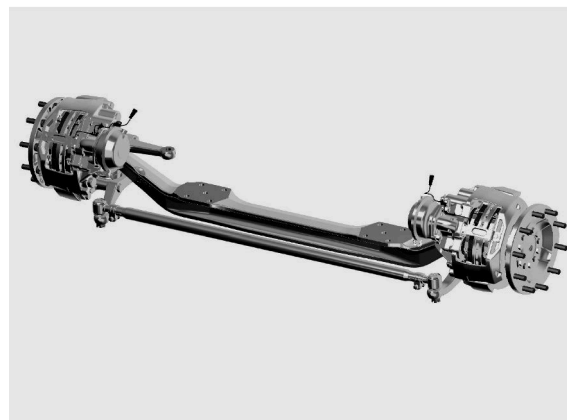
## Operation and maintenance of VGD/VPD series driven axle

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### Operation and maintenance of VGD/VPD series driven axle

#### Structure overview

The front axle is a forged I-beam structure with an integral steering knuckle. It is equipped with a wear limit alarm and an Anti-Lock Braking System (ABS). Drum brakes or disc brakes are also optional.



### Operation and maintenance

#### Driven axle with drum brake

- Before driving a new vehicle, fill each grease fitting with a sufficient amount of 2 # lithium-based grease.
- Highway vehicle (long-distance mainline) every 15000km/1 month, highway vehicle (urban area) every 10000km/1 month, engineering vehicle (highway dump truck) 5000km/1 month, engineering vehicle (wading, construction site, mining area) every 2000km/15 days, the above cycle comes first, inject No. 2 lithium-based grease from the upper and lower ends of the kingpin, camshaft, and brake support slipper grease mouth assembly.
- The self-adjusting arm shall be filled with 2 # lithium-based grease every 30,000 km or 6 months (whichever comes first) for road vehicles/every 15,000 km or 6 months (whichever comes first) for off-road vehicles.
- The adjustment range of the brake clearance for assembling the self-adjusting arm is 0.6~0.9mm (the allowable clearance range of the new friction plate during running-in period is 0.6~1.1mm). The gap between the left and right sides of the whole axle shall not be greater than 0.3mm.
- Check the fastening of wheel nuts and tie rod ball joint fastening nuts before driving each time.
- The tightening torque of the wheel nut is (550~600) N·m.
- After the wheel bolts and wheel nuts have been repeatedly removed and used for 5 times, it is necessary to replace them with new ones at the same time.
- For the front axle assembly equipped with electronic wear warning device, if the electronic wear warning device lamp in the cab is on during the driving of the vehicle, check and replace the friction plate and electronic wear warning device.
- Every 8,000~10,000 km:
  - For the front axle assembly without an electronic wear warning device, check the wear of the brake friction plate. If the wear exceeds the limit pit, the friction plate shall be replaced immediately;
  - Check the fastening of the brake backing plate;
  - Check the looseness of hub bearing;
  - Check whether the brake clearance meets the requirements;
  - Check the fit between the adapter sleeve and the fixing pin on the self-adjusting arm. If it has come loose, replace the adapter sleeve.
  - Check the fit between the connecting ring on the self-adjusting arm and the control arm. If there is relative rotation between the two, replace the self-adjusting arm.
- If the braking seems to be weak, the counterclockwise torque of the self-adjusting arm worm hexagon shall be measured after ruling out other causes. Rotate it by one round. If the measured minimum torque is less than 18Nm, it indicates the self-adjusting arm is damaged, and the self-adjusting arm assembly shall be replaced in time in such a case.
- During maintenance and replacement, the left and right self-adjusting arms of each shaft shall be from the same manufacturer. If only one self-adjusting arm fails and there is no substitute from the

## Operation and maintenance of VGD/VPD series driven axle

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same manufacturer, the left and right self-adjusting arms of the axle shall both be replaced.

### Driven axle with disc brake

- Before driving a new vehicle, fill each grease fitting with a sufficient amount of 2 # lithium-based grease.
- Highway vehicle (long-distance mainline) every 15000km/1 month, highway vehicle (urban area) every 10000km/1 month, engineering vehicle (highway dump truck) 5000km/1 month, engineering vehicle (wading, construction site, mining area) every 2000km/15 days, the above cycle comes first, inject No. 2 lithium-based grease from the upper and lower ends of the kingpin.
- Check the fastening of wheel nuts and tie rod ball joint fastening nuts before driving each time.
- The tightening torque of the wheel nut is (550~600) N·m.
- After the wheel bolts and wheel nuts have been repeatedly removed and used for 5 times, it is necessary to replace them with new ones at the same time.
- For the front axle assembly equipped with electronic wear warning device, if the electronic wear warning device lamp in the cab is on during the driving of the vehicle, check and replace the friction plate and electronic wear warning device.
- For the front axle assembly without an electronic wear warning device, visually inspected the wear of brake pad and brake disc very 5,000 km without removing the tires. If a lot of wear is found, remove the tires to measure the thickness of the brake pads and brake disc, and replace the brake disc immediately when its thickness reaches 37 mm. The maximum wear allowed on each side of the brake disc

is 4 mm. When replacing brake pads, replace the ones on both side of the whole axle at the same time.

- Remove the tires and check the sliding pin cap, sliding pin sleeve, piston sleeve and other rubber parts for abnormalities every 6 months; check whether the caliper body slides on the sliding pin normally (the sliding resistance shall not be over 100 N); and test whether the brake clearance is normal.
- Every 8,000~10,000 km:
  - Check the looseness of hub bearing;
  - Check whether the brake clearance meets the requirements;

## VGD/VPD series driven axle hub bearing grease and filling amount

### VGD/VPD series driven axle hub bearing grease and filling amount

#### At the hub bearing

#### Grease and filling amount for axle hub bearing of medium and heavy truck

Assembly		Grease/g1)2) Reference value	Grease name	Tip
Driven axle hub bearing	VGD70	Minimum filling quantity on one side 620	HP-R extreme pressure lithium complex grease Q/ZZ21038.2 (Export to extremely cold areas: Select the appropriate product according to DIN 51825 and ambient temperature (e.g. Mobilgrease XHP 222 according to DIN 51825-KP2N))	1)The special after-sales grease specified by SINOTRUK must be used, otherwise the hub bearing will be damaged, and SINOTRUK will only provide paid services. 2)This special grease shall not be mixed with other greases. 3)The driven axles of VPD75ES, VPD71DS, VGD71S and other models are maintenance-free bearings without replacing grease.
	VGD75			
	VPD75D			
	VPD95D			
	VPD95E			
	VGD95	Minimum filling quantity on one side 300		
	VGD71			
	VPD71D			
	VGD75 (2021 model)			
	VPD75D (2021 model)			
	VPD50C			
	VGD50			

## **VGD/VPD series driven axle hub bearing grease and filling amount**

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### **At the hub bearing unit (applicable driven axle models: VGD70S, VGD71S, VGD 75S, VPD71DS, VPD75ES, VPD85ES, VPD95ES)**

The bearing unit does not need to be replaced or greased in the whole life cycle, and shall be inspected according to the following cycle:

Except for special recommendations, when the vehicle is operated under normal load, the routine inspection shall be carried out once every 12 months or 240,000 km, whichever comes first. It is recommended to check the bearing unit at the same time during the vehicle maintenance period.

During inspection, rotate the hub to feel whether there is seizure or looseness, and pay attention to the sound of bearing rotation. If the bearing is worn, there will be a low friction sound, and the rim will amplify this noise. At this time, it is necessary to check the axial clearance to further determine the use of the bearing unit.

Precautions for use of bearing unit:

- The above inspection must be carried out before removing the hub bearing unit.
- The hub bearing unit integrates grease, oil seal and other parts, and is not allowed to be opened under any circumstances!
- The bearing unit is a maintenance-free solution product that requires no later grease injection.



Self-made drive axle oil and replacement cycle

Recommended Consumption and Change Cycles of Drive Trains of Medium-heavy Trucks

Application models <sup>1) 2)</sup>	Application conditions		Long-life gear oil (J2360 75W-90)	Long-life gear oil (J2360 80W-90)	Remarks
			Self-made drive axle	Self-made drive axle	
Long-distance tractor and cargo truck	Light load working condition	11/13L MC engine: Average fuel consumption < 30L/100km	600,000 km or 36 months, whichever comes first	240,000 km or 24 months, whichever comes first	1) The recommended oil replacement cycles in this table are consistent with the first and regular maintenance. 2) When changing the gear oil of an axle with a removable oil filter, the oil filter must be replaced at the same time.
		7L MC engine: Average fuel consumption < 20L/100km	480,000 km or 24 months, whichever comes first	200,000 km or 24 months, whichever comes first	
	Standard load working condition	11/13L MC engine: The average fuel consumption is 30-40L/100km.	500,000 km or 24 months, whichever comes first	200,000 km or 24 months, whichever comes first	
		11/13L MT engine: Average gas consumption < 35L/100km	480,000 km or 24 months, whichever comes first	240,000 km or 24 months, whichever comes first	
		7L MC engine: Average fuel consumption 20-25L/100km	480,000 km or 24 months, whichever comes first	200,000 km or 24 months, whichever comes first	
	Standard weight working condition	11/13L MC engine: The average fuel consumption is 40-50L/100km.	240,000 km or 24 months, whichever comes first	160,000 km or 24 months, whichever comes first	
		7L MC engine: The average fuel consumption is 25 ~ 35L/100km.			
	Loading condition	11/13L MC engine: Average fuel consumption > 50L/100km	120,000 km or 24 months, whichever comes first	80,000 km or 12 months, whichever comes first	
		11/13L MT engine: Average gas consumption > 35L/100km			
		7L MC engine: Average fuel consumption > 35L/100km			

## Self-made drive axle oil and replacement cycle

**Recommended Consumption and Change Cycles of Drive Trains of Medium-heavy Trucks**

Applicable models <sup>1)2)</sup>	Long-life gear oil (J2360 80W-90)	Remarks
	Self-made drive axle	
Vehicles for transport operation	200,000 km or 12 months, whichever comes first	1) The recommended oil replacement cycles in this table are consistent with the first and regular maintenance. 2) When changing the gear oil of an axle with a removable oil filter, the oil filter must be replaced at the same time. 3) Severe working conditions refer to severe overload, poor road conditions, and heavy dust during vehicle operation.
Municipal and sanitation vehicles	40,000 km or 24 months, whichever comes first	
Vehicles for lifting, fire fighting and pumping	12 months	
Oilfield/pavement truck and cement mixer truck	12 months	
Urban construction slag dump truck	40,000 km or 12 months, whichever comes first	
Road transport dump truck	40,000 kilometers (20,000 kilometers under severe working conditions <sup>3)</sup> or 12 months, whichever comes first;	
Pithead dump truck and truck under super load working condition	20,000 km or 6 months, whichever comes first	
Mine site vehicle	To be replaced with the engine oil	

**Recommended Consumption and Change Cycles of Gear Oil of Vehicle Drive Axles Exported to Extremely Cold Areas**

Product name			Gear oil	Remarks
			SAE 75W-90 long-life gear oil (conforming to J2360)	
Application models and application conditions			Mileage or time of drive axle replacement	
Long-distance tractor and cargo truck	Light load working condition	Average fuel consumption < 30L/100km	600,000 km or 24 months, whichever comes first	1. The mileage of the first maintenance is consistent with that of the regular maintenance. 2. When changing the gear oil of an axle with a removable oil filter, the oil filter must be replaced at the same time.
	Standard load working condition	Average fuel consumption 30 ~ 40L/100km	480,000 km or 12 months, whichever comes first	
		Average gas consumption ≤ 35kg/100km		
	Standard weight working condition	Average fuel consumption 40 ~ 50L/100km	240,000 km or 12 months, whichever comes first	
	Loading condition	Average fuel consumption > 50L/100km	120,000 km or 12 months, whichever comes first	
		Average gas consumption > 35kg/100km		
Vehicles for transport operation			200,000 km or 12 months, whichever comes first	
Municipal and sanitation vehicles, tank trucks, refrigerator trucks, urban construction slag dump trucks, and road transport dump trucks			40,000 km or 12 months, whichever comes first	
Pavement trucks, cement mixer trucks, vehicles for pumping, pithead dump trucks and vehicles for lifting			12 months	

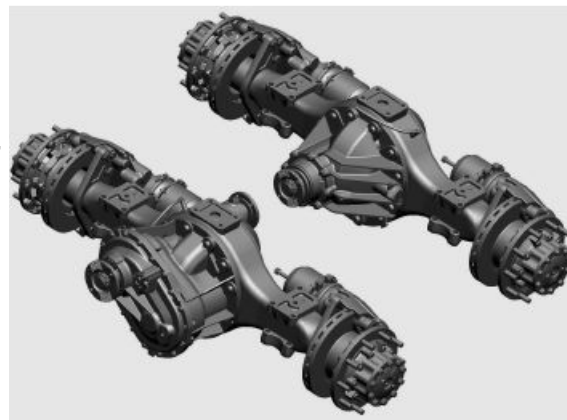
## Operation and maintenance of MCY/MCJ series driving axle

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### Operation and maintenance of MCY/MCJ series driving axle

#### Structure overview

The structure type of the MCY series driving axle consists of a central single-reduction final drive, press-welding axle housing and precision-forged differential gear, added with an oil filter and matched with an adjustment-free hub bearing unit, and can be equipped with a drum brake or disc brake.



### Operation and maintenance

- After the use of the new axle and the running-in of the vehicle, the vehicle shall be put into operation formally only after the fasteners are checked (except for the glued bolts).
- Check the oil level every 5,000 km or every month.
- Replace the grease at the camshaft bushing every 80,000 km or every year.
- Check the dirt and dust on the breather plug of the rear axle housing from time to time. Check the oil filler plug and drain plug, and if oil seepage or leakage is found, tighten in time or replace the plug.
- Because the torque transmitted by the axle shaft flange is very large and acts as an impact load, the fastening of axle shaft bolts shall be checked frequently to prevent the axle shaft bolts from breaking due to the loosening of bolts.

### Drum brake

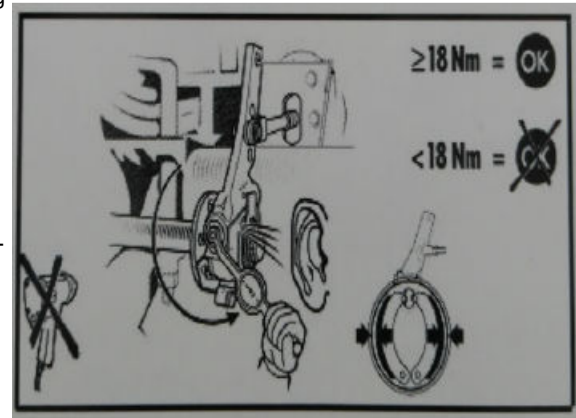
- Press the brake of the new vehicle 30-50 times in situ to adjust the brake clearance to the normal working clearance. Avoid sudden brake as much as possible before driving for 50 km.
- After running-in 1500km of the new vehicle, check whether the brake clearance meets the requirements, and check the fastening of each part before it can be put into regular use.
- The self-adjusting arm shall be filled with 2 # lithium-based grease every 30,000 km or 6 months (whichever comes first) for road vehicles/every 15,000 km or 6 months (whichever comes first) for off-road vehicles.
- The adjustment range of the brake clearance for assembling the self-adjusting arm shall be 0.6-0.9 mm (the set clearance for assembling

the self-adjusting arm of different suppliers may differ slightly). The gap between the left and right sides of the whole axle shall not be greater than 0.3 mm.

- For the drum brake equipped with electronic wear warning device, if the electronic wear warning device lamp in the cab is on during the driving of the vehicle, check and replace the friction plate and electronic wear warning device.
- Every 8,000~10,000 km:
  - For the driving axle assembly without an electronic wear warning device, check the wear of the brake friction plate. If the wear exceeds the limit pit, the friction plate shall be replaced immediately;
  - Check the fastening of the brake backing plate;
  - Check whether the brake clearance meets the requirements;
  - Check the fit between the adapter sleeve and the fixing pin on the self-adjusting arm. If it has come loose, replace the adapter sleeve.
  - Check the fit between the connecting ring on the self-adjusting arm and the control arm. If there is relative rotation between the two, replace the self-adjusting arm.

## Operation and maintenance of MCY/MCJ series driving axle

- If the braking seems to be weak, the counterclockwise torque of the self-adjusting arm worm hexagon shall be measured after ruling out other causes. Rotate it by one round. If the measured minimum torque is less than 18Nm, it indicates the self-adjusting arm is damaged, and the self-adjusting arm assembly shall be replaced in time in such a case.
- During maintenance and replacement, the left and right self-adjusting arms of each axle shall be from the same manufacturer. If only one self-adjusting arm fails and there is no substitute from the same manufacturer, the left and right self-adjusting arms of the axle shall both be replaced.



### Disc brake

- After running-in 1500km of the new vehicle, check whether the brake clearance meets the requirements, and check the fastening of each part before it can be put into regular use.
- Press the brake of the new vehicle 30-50 times in situ to adjust the brake clearance to the normal working clearance. Avoid sudden brake as much as possible before driving for 50 km.
- For the driving axle assembly equipped with electronic wear warning device, if the electronic wear warning device lamp in the cab is on during the driving of the vehicle, check and replace the friction plate and electronic wear warning device.
- For the driving axle assembly without an electronic wear warning device, visually inspect the wear of brake pads and brake disc very 5,000 km without removing the tires. If a lot of wear is found, remove the tires to measure the thickness of the brake pads and brake disc, and replace the brake disc immediately when its thickness reaches 37 mm. The maximum wear allowed on each side of the brake disc is 4 mm. When replacing brake pads, replace the ones on both side of the whole axle at the same time.
- Remove the tires and check the sliding pin cap, sliding pin sleeve, piston sleeve and other rubber parts for abnormalities every 6 months; check whether the caliper body slides on the sliding pin normally (the sliding resistance shall not be over 100 N); and test whether the brake clearance is normal.



### WARNING!

The special driving axle gear oil designated by CNHTC shall be used for the driving axle, otherwise, the driving axle might be damaged, and CNHTC will only provide paid service in such a case!

## Operation and maintenance of MCY/MCJ series driving axle

### Inspection and maintenance

Inspection and maintenance items	Inspection and maintenance interval (mileage and time, whichever comes first)			
	First inspection		Regular inspection and maintenance	
Regular inspection items	After 1500 km After the first month	Every 15000 km Every three months	Every 60000 km Every six months	Every 120000 km Every year
Inspection on the wear, sealing, and damage of moving parts, inspection on the wear of brake friction plates, inspection on the fast and light return of the camshaft, inspection on the function of the adjusting arm, and inspection on the function and sealing of the brake chamber	○	○	○	○
Safety inspection (daily)				
Inspection on the correct adjustment of the brake	○	○	○	○
Inspection on the braking operation of the brake	○	○	○	○
Re-tighten the bolts to the specified torque	○			○
Clean the brake				○
Apply anti-stuck agent at the brake shoe pins and rollers				○
Inspect the rotation of the hub bearing, and adjust of replace the hub bearing is necessary	○			○

- The maintenance interval shall be shorten accordingly when the car is running under harsh working conditions.
- After installing or replacing the wheel, retighten the wheel nuts to the specified torque after driving 50 km; retighten the wheel nuts to the specified torque after 150 km until the nuts are securely tightened.
- The tightening torque of the wheel nut is (550~600) N·m.



- After the wheel bolts and wheel nuts have been repeatedly removed and used for 5 times, it is necessary to replace them with new ones at the same time.
- When installing or replacing the wheel, pay attention to the brake drum to prevent it from falling off.

## Consumption and filling amount of MCY/MCJ series drive axle oil

### Consumption and filling amount of MCY/MCJ series drive axle oil

#### Oil and filling amount of drive axles for medium and heavy trucks

Assembly		Filling amount <sup>1) 2)/L</sup>		Product name	Note
Drive axle	MCY16ZG MCJ16ZGY	Intermediate axle	21+2*1 (wheel rim)	SAE 80W-90 long-life gear oil (conforming to J2360) or SAE 75W-90 long-life gear oil (conforming to J2360)	1) The special after-sales gear oil designated by SINOTRUK must be used, otherwise the drive axle will be damaged, and SINOTRUK only provides paid service. 2) Special gear oil with different viscosity grades shall not be mixed.
		Rear axle	17.5+2*1 (wheel rim)		
	MCJ13BGY MCJ13JGY	Intermediate axle	17.5+2*1 (wheel rim)		
		Rear axle	14.5+2*1 (wheel rim)		
	MCY13BGS MCY13JGS MCY13BES MCY13JES MCY13BEU	Intermediate axle	17.5		
		Rear axle	14.5		
	MCY13JEU	Single rear axle	14.5		
	MCJ12JGY MCJ12BGY	Intermediate axle	17.5+2*1 (wheel rim)		
		Rear axle	12+2*1 (wheel rim)		
	MCY12BGS MCY12JGS MCY12BES MCY12JES MCY12ZGQ MCJ12BG	Intermediate axle	17.5		
		Rear axle	12		
	MCY12BGH MCY12BEH	Intermediate axle	16		
		Rear axle	10.5		
	MCY12JEU	Single rear axle	14.5		

## Consumption and filling amount of MCY/MCJ series drive axle oil

**Oil and filling amount of drive axles for medium and heavy trucks**

Assembly		Filling amount <sup>1) 2)/L</sup>		Product name	Note	
Drive axle	MCY11BGS MCY11BES MCJ11BG	Intermediate axle	17.5	SAE 80W-90 long-life gear oil (conforming to J2360) or SAE 75W-90 long-life gear oil (conforming to J2360)	1) The special after-sales gear oil designated by SINOTRUK must be used, otherwise the drive axle will be damaged, and SINOTRUK only provides paid service. 2) Special gear oil with different viscosity grades shall not be mixed.	
		Rear axle	12			
	MCJ11BGQ MCJ11ZGQ MCJ11BEQ	Intermediate axle	16+2*1 (wheel rim)			
		Rear axle	11+2*1 (wheel rim)			
	MCJ11BGY	Intermediate axle	17.5+2*1 (wheel rim)			
		Rear axle	12+2*1 (wheel rim)			
	MCY09BGS	Single rear axle	10			
	MCJ09BG					
	MCJ09BGY	Single rear axle	10+2*1 (wheel rim)			
	MCJ09BGQ	Single rear axle	10+2*1 (wheel rim)			

## MCY/MCJ series drive axle hub bearing grease and filling amount

### MCY/MCJ series drive axle hub bearing grease and filling amount

- Remove the wheel and hub brake drum assembly, clean the hub bearing, clean the dirty and deteriorated grease in the hub inner cavity, fill the gap between the bearing inner race and the retainer roller with new grease, and apply a thin layer on the inner and outer surfaces of the bearing for assembly.

#### Grease and filling amount for axle hub bearing of medium and heavy truck

Assembly		Grease/g <sup>1)</sup> 2)	Grease name	Mileage or time of the first replacement	Replacement interval mileage or time	Tip
Drive axle hub bearing	MCJ09BG	Minimum filling quantity on one side 1000	HP-R extreme pressure lithium complex grease Q/ZZ21038.2 (Export to extremely cold areas: Select the appropriate product according to DIN 51825 and ambient temperature (e.g. Mobilgrease XHP 222 according to DIN 51825-KP2N))	Every 40,000 km or 6 months, whichever comes first.		1)The special after-sales grease specified by SINOTRUK must be used, otherwise the hub bearing will be damaged, and SINOTRUK will only provide paid services. 2)This special grease shall not be mixed with other greases.
	MCJ11BG MCJ12BG	Minimum filling quantity on one side 1500				

### Use and maintenance of MCP series drive axles

#### Structure Overview

MCP series drive axles, including MCP16ZG, MCP16ZGQ and MCP23ZG types, are two-stage drive axles with central one-stage reduction and wheel planetary reduction. For cast axle housing, with inter-axle and inter-wheel differentials and differential locks, drum brake, double-diaphragm brake chamber, automatic adjusting arm and ABS.



## Use and maintenance of MCP series drive axles

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### Usage and maintenance

- For a new vehicle, press the brake pedal 30~50 times with vehicle stationary to adjust the brake clearance to the normal operating clearance, and avoid emergency braking as much as possible within the first 50 km.
- After 1500 km break-in of a new vehicle, check whether the brake clearance meets the requirement and check the tightening of fasteners in each part before officially putting the vehicle into service.
- After the new axle is used, the vehicle should undergo a 1500-kilometer break-in period. After this, all fasteners (including but not limited to the drive shaft and flange connection bolts, wheel bolts, bolts at the interface of the main reducer and axle housing, and u-bolts, except sealant bolts) should be re-checked before the vehicle can be officially put into operation.
- When the vehicle is running, regularly check the temperature of the drive axle wheel reducer (not more than 70°C of ambient temperature) and the connection of each component (the drive shaft and flange connection bolts, wheel bolts, bolts at the interface of the main reducer and axle housing). Check every 2000 km and re-tighten if necessary.
- Check the oil level every 5,000 kilometers or once a month. When changing oil, drain the original gear oil of the middle and rear axles first, and then change it with new gear oil. When filling the oil, fill the gear oil quantitatively according to the axle type. First, fill the gear oil to each wheel edge, and then fill the gear oil to the middle section of the axle housing.
- After changing oil or checking the oil level, when tightening the oil filler/drain plug, apply removable fastening adhesive such as "Loctite 200" or "WD 200" to the threads in advance.
- Check the filler/drain plugs of the wheel rim, main reducer and axle housing regularly, and re-tighten them if necessary. The tightening torque of the filler/drain cone plugs of the main reducer and axle housing is  $70 \pm 10 \text{ N} \cdot \text{m}$ , and the tightening torque of the filler/drain plugs of the wheel rim is  $95 \text{ N} \cdot \text{m}$ . Do not disassemble and assemble repeatedly to prevent damage to the plug thread. Replace the plug in time.
- Fill the 2# lithium base grease to the adjusting arm, camshaft bracket and brake base plate oil nozzle every 80,000 kilometers or every year (20,000 kilometers or 4 months under bad working conditions). Fill the self-adjusting arm with the 2# lithium base grease every 20,000 kilometers.
- Regularly check and clean the breather plug to ensure good ventilation of the vent hole.
- Regularly check the working condition of the differential lock. If it does not work well, find out the cause and repair it in time.
- Adjustment range of brake clearance for assembling self-adjusting arm: 0.6 ~ 0.9mm (the set clearance of self-adjusting arm from different suppliers is slightly different), and the gap difference between the left and right sides of the whole axle shall not be greater than 0.3mm.
- For the drum brake with an electronic wear indicator, if the lamp of the electronic wear indicator in the cab lights up during driving, check and replace the friction plate and the electronic wear indicator.

- Every 8000~10000 km:

- For the drive axle assembly without electronic wear alarm device, check the wear of brake pad. If the wear exceeds the limit pit, replace the brake pad immediately;
- Inspect the firmness of brake baseplate;
- Check whether the brake clearance meets the requirements;
- Check the fitting between connecting sleeve and fixing pin on automatic adjusting arm, and replace the connecting sleeve in case of looseness;
- Check the fitting between connecting ring and control arm of automatic adjusting arm. If there is relative rotation between them, replace the automatic adjusting arm.

- When the brake feels weak, it is recommended to check the counterclockwise torque of the automatic adjusting arm worm hexagon head after other reasons are excluded. If the measured minimum torque is less than 18 Nm after one revolution, it indicates that the automatic adjusting arm has been damaged, and the automatic adjusting arm assembly should be replaced in time.
- During maintenance and replacement, the automatic adjusting arms on the left and right sides of each axle shall be equipped with products from the same supplier. If only the automatic adjusting arm on one side fails and there is no product from the same supplier for replacement, the left and right automatic adjusting arms of the axle shall be replaced at the same time.



### **WARNING!**

The special driving axle gear oil designated by CNHTC shall be used for the driving axle, otherwise, the driving axle might be damaged, and CNHTC will only provide paid service in such a case!

## Use and maintenance of MCP series drive axles

### Inspection and maintenance

Inspection and maintenance item	Inspection and maintenance interval (Mileage and time, whichever comes first)			
	First Inspection		Regular Inspection and Maintenance	
Regular Inspection Item	After 1500 km After the first month	Every 15000 km Every Three Months	Every 60,000 km Every six months	Every 120000 km Every year
Check the wear, sealing and damage of moving parts, check the wear of brake pads, check the return condition of camshaft, check the function of adjusting arm, and check the function and sealing performance of brake chamber.	○	○	○	○
Safety inspection (daily)				
Check for correct adjustment of brakes	○	○	○	○
Braking work inspection of brake	○	○	○	○
Tighten the bolts again as per specified torque.	○			○
Cleaning of brake drum				○
Application of anti-seize agent to the brake shoe support pin and roller				○
Check the rotation of hub bearing, and adjust or replace it if necessary	○			○

- After the vehicle runs under severe working conditions, the maintenance period shall be shortened accordingly.
- After installing or replacing a new wheel, and driving for 50 km, tighten the wheel nuts to the specified torque; after driving for 150 km, tighten the wheel nuts firmly again.
- The tightening torque of the wheel nut is (550 ~ 600)N•m.
- After the wheel bolt and wheel nut are repeatedly removed and installed for 5 times, new wheel bolt and wheel nut need to be replaced at the same time.
- When installing or replacing wheels, pay attention to the brake drum to prevent it from falling off.



## Oil consumption and filling amount of MCP series drive axle

### Oil consumption and filling amount of MCP series drive axle

#### Oil consumption and filling amount of medium and heavy truck drive axle

Assembly		Filling amount <sup>1) 2)</sup> /L		Oil name	Tip
Driving axle	MCP16ZG MCP16ZGQ MCP23ZG	Medium bridge	19.4+2*1.8 (wheel edge)	SAE 80W-90 long-life gear oil (in accordance with J2360) Or SAE 75W-90 long-acting gear oil ( in accordance with J2360 )	1)The special after-sales gear oil specified by SINOTRUK must be used, otherwise the drive axle will be damaged, and SINOTRUK only provides paid services. 2)Special gear oils of different viscosity grades shall not be mixed.
		Rear axle	17.5+2*1.8 (wheel edge)		

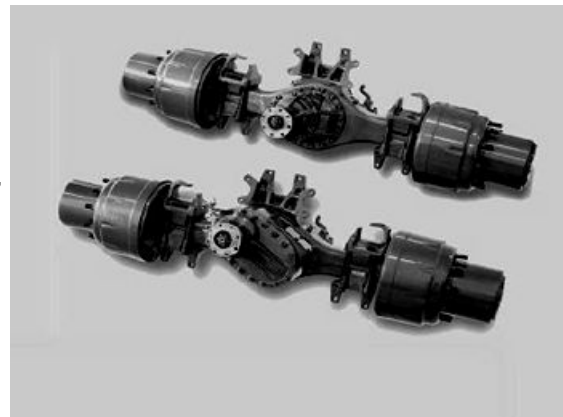
## Operation and maintenance of MCX series drive axle

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### Operation and maintenance of MCX series drive axle

#### Structural overview

MCX series drive axles include MCX13ZG and MCX16ZG drive axles, which are two-stage drive axles with central one-stage reduction and wheel-side planetary reduction. Cast axle housing, with inter-axle and inter-wheel differential and differential lock, drum brake, double-diaphragm brake chamber, self-adjusting arm, with ABS.



### Operation and maintenance

- For a new vehicle, press the brake pedal for 30~50 times to adjust the brake clearance to the normal working clearance. Avoid sudden braking before driving for 50 km.
- After running-in 1500km of the new vehicle, check whether the brake clearance meets the requirements, and check the fastening of each part before it can be put into regular use.
- After the new axle is used, the vehicle shall go through 1500 km running-in, and the fasteners (including but not limited to the connecting bolts between the drive shaft and the flange, wheel bolts, bolts on the joint surface between the main reducer and the axle housing, U-bolts, etc., except the glued bolts) shall be rechecked before it can be officially put into use.
- Regularly check the temperature of the drive axle and the wheel-hub reducer (not exceeding the ambient temperature of 70°C) and the connection of each component (the connecting bolt between the drive shaft and the flange, the wheel bolt, the main reducer and the axle housing joint surface bolt) during the driving of the vehicle. Check it every 2000km and re-tighten it if necessary.
- Check the oil level every 5,000 km or every month. When changing the oil, first drain the original gear oil of the middle and rear axles, and then replace it with new gear oil. When adding oil, fill sufficient gear oil. First, fill 2.8 L gear oil to each wheel edge respectively, and then fill gear oil to the middle section of the axle housing. After refueling, the vehicle runs for 5km and stops to check the oil level again. The oil level shall be subject to the oil dripping from the oil level limit port of the axle housing. If the oil level is low, it shall be added again.
- After changing the oil or checking the oil level, when tightening the oil filler/drain plug, the thread should be pre-coated with removable fastening adhesive, such as "Loctite 200" or "WD 200".
- Regularly check the oil filler/drain plugs of the wheel hub, final drive and axle housing, and re-tighten them if necessary. The tightening torque of the oil filler/drain cone plugs of the final drive and axle housing is  $70 \pm 10 \text{ N} \cdot \text{m}$ , and the tightening torque of the wheel hub filler/drain screw plugs is  $95 \text{ N} \cdot \text{m}$ . Do not disassemble and assemble repeatedly to prevent damage to the screw plug thread, and replace the screw plug in time.
- Fill the adjusting arm, camshaft bracket and brake backing plate grease nipple with 2# lithium base grease every 80,000 km or every year (20,000km or 4 months under severe working conditions). Apply 2# lithium base grease to the self-adjusting arm every 20,000 km.
- Check and clean the vent plug regularly to ensure that the vent hole is well ventilated.
- Regularly check the working condition of the differential lock. If it works poorly, check the cause and repair it in time.
- The clearance adjustment range of the brake equipped with the self-adjusting arm: 0.6-0.9 mm (the clearance set by the self-adjustment arm of different suppliers is slightly different), and the clearance difference between the left and right sides of the whole axle shall not be greater than 0.3 mm.

## Operation and maintenance of MCX series drive axle

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- For the drum brake equipped with electronic wear warning device, if the electronic wear warning device light in the cab is on during the driving of the vehicle, check and replace the friction plate and electronic wear warning device.
- Every 8,000~10,000 km:
  - For the drive axle assembly without electronic wear alarm device, check the wear of the brake lining. If the wear exceeds the limit pit, replace the brake lining immediately;
  - Check the fastening of the brake backing plate;
  - Check whether the brake clearance meets the requirements;
  - Check the fit between the adapter sleeve and the fixing pin on the self-adjusting arm. If it has come loose, replace the adapter sleeve;
  - Check the fit between the connecting ring on the self-adjusting arm and the control arm. If there is relative rotation between the two, replace the self-adjusting arm.
- If the braking seems to be weak, the counterclockwise torque of the self-adjusting arm worm hexagon shall be measured after ruling out other causes. Rotate it by one round. If the measured minimum torque is less than  $18\text{N}\cdot\text{m}$ , it indicates the self-adjusting arm is damaged, and the self-adjusting arm assembly shall be replaced in time in such a case.
- During maintenance and replacement, the left and right self-adjusting arms of each axle shall be from the same manufacturer. If only one self-adjusting arm fails and there is no substitute from the same manufacturer, the left and right self-adjusting arms of the axle shall both be replaced.



### **WARNING!**

The special driving axle gear oil designated by CNHTC shall be used for the driving axle, otherwise, the driving axle might be damaged, and CNHTC will only provide paid service in such a case!

## Inspection and maintenance

Inspection and maintenance items	Inspection and maintenance interval (Mileage and time, whichever comes first)			
	First inspection		Regular inspection and maintenance	
Regular inspection items	After 1500 km After the first month	Every 15,000 km Every three months	Every 60,000 km Every six months	Every 120,000 km Every year
Check the wear, sealing and damage of moving parts, check the wear of brake lining, check the return condition of camshaft, check the function of adjusting arm, and check the function and sealing of brake chamber	○	○	○	○
Safety inspection (daily)				
Inspection of correct adjustment of brake	○	○	○	○
Inspection of brake operation	○	○	○	○
Tighten the bolt again according to the specified torque	○			○
Clean the brake drum				○
Apply anti-seize agent to the brake shoe pivot pin and roller				○
Check the rotation of the hub bearing, and adjust or replace the hub bearing if necessary	○			○

- When the vehicle is running under harsh working conditions, the maintenance interval shall be shortened accordingly.
- After the wheel is newly installed or replaced, tighten the wheel nut according to the specified torque after driving for 50 km; after 150 km, tighten the wheel nut again according to the specified torque until the nut is tightened.
- The tightening torque of wheel nut is (550~600) N·m.
- After the wheel bolts and wheel nuts have been removed and refitted for 5 times, they need to be replaced with new ones at the same time.
- When installing or replacing the wheel, pay attention to the brake drum to prevent it from falling off.

## Consumption and filling amount of MCX series drive axle oil

### Consumption and filling amount of MCX series drive axle oil

#### Oil and filling amount of drive axles for medium and heavy trucks

Assembly		Filling amount <sup>1) 2)/L(Reference value<sup>3)</sup>)</sup>		Product name	Note
Drive axle	MCX13ZG	Intermediate axle	15+2*2.5 (wheel rim)	SAE 80W-90 long-life gear oil (conforming to J2360) or SAE 75W-90 long-life gear oil (conforming to J2360)	1) The special after-sales gear oil designated by SINOTRUK must be used, otherwise the drive axle will be damaged, and SINOTRUK only provides paid service. 2. Special gear oil with different viscosity grades shall not be mixed. 3) The filling amount in the table is the refueling amount of the basic model and is for reference only. 4) For the first and regular maintenance, refer to "Self-made Drive Axle Oil and Replacement Cycle".
		Rear axle	14+2*2.5 (wheel rim)		
	MCX16ZG	Intermediate axle	16+2*1.8 (wheel rim)		
		Rear axle	15.6+2*1.8 (wheel rim)		

### Drive shaft maintenance

The drive shaft assembly includes universal joint bearing, intermediate support bearing and telescopic spline. In order to ensure the normal operation of the drive shaft assembly, maintenance should be carried out regularly.

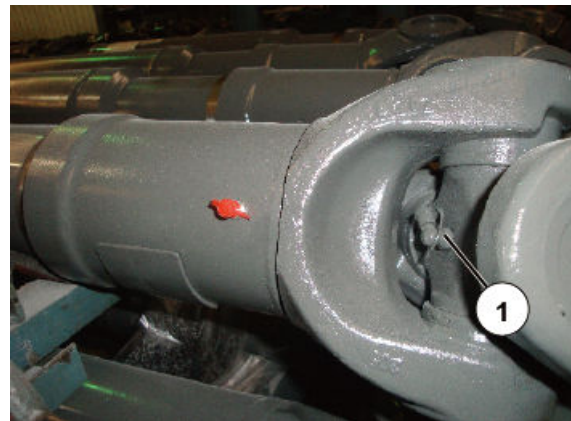


#### CAUTION!

**The maintenance interval of the transmission shaft shall be shortened if it is used in a harsh environment such as mud, dust, ozone, high and low temperature.**

### Universal joint bearing (maintenance type)

- Add grease regularly. It is recommended to refuel every 30,000 km for road vehicles and every 5,000 km for dump trucks and cement mixer trucks.
- Grease grade: Derunbao WGC-2 universal joint special grease, 2# lithium-based grease and multi-performance composite lithium base grease can also be used. The high and low temperature resistance of the grease is required to be  $-30^{\circ}\text{C} \sim 120^{\circ}\text{C}$ .
- Grease filling method: Fill grease from the universal joint oil nipple ① until fresh grease overflows from the bowl opening of four universal joint shafts. For mining trucks and engineering vehicles with poor road conditions, the time or mileage for grease filling shall be shortened.



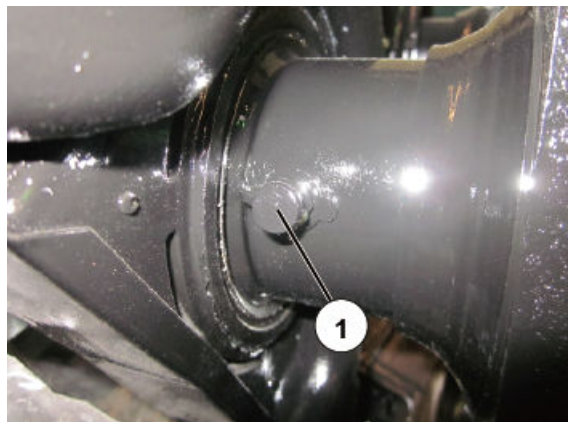
## Drive shaft maintenance

### Intermediate support bearing

- The end face tooth flange is connected with the drive shaft, and its intermediate support bearing is a maintenance-free bearing without regular grease filling.
- The flat plate flange is connected with the drive shaft, and the intermediate support bearing needs to be greased regularly. Generally, grease shall be added once every 30000 km (or regular maintenance shall be carried out according to the vehicle warranty policy).

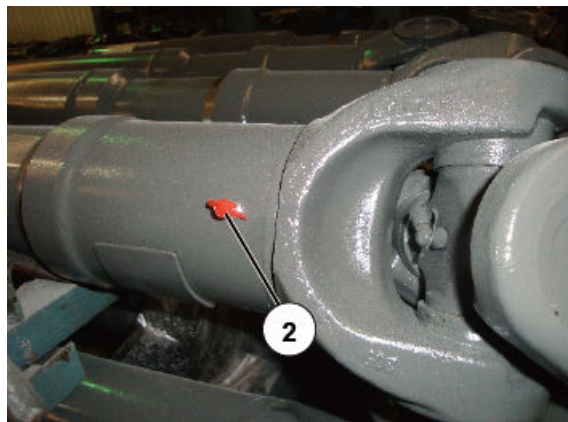
Grease grade: lithium base grease #2.

Grease filling method: Fill grease from the oil nipple ① of spline connecting plate until grease overflows from the intermediate supporting port.



### Telescopic spline

- Add grease to the telescopic spline regularly. Refuel every 30,000 km for road vehicles and every 5,000 km for dump trucks and cement mixer trucks.
- Grease grade: lithium base grease #2.
- Grease filling method: Fill grease from the oil nipple ② of the spline shaft sheath until grease overflows from the oil seal port of the sheath.
- For mining trucks and engineering vehicles with poor road conditions, the time or mileage for grease filling shall be shortened.

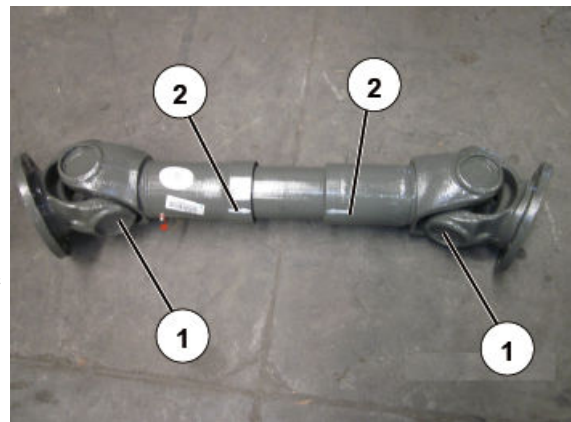
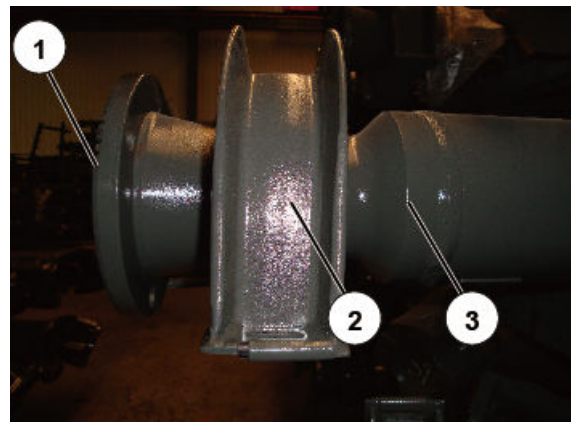




### The drive shaft assembly shall be assembled according to the following steps during disassembly, inspection and maintenance

When assembling the intermediate drive shaft assembly after disassembly and inspection, for a face gear flange connecting drive shaft, ensure that the four holes of the spline connecting plate align with the four holes of the connecting plate. For a flat plate flange connecting drive shaft, ensure that the grease fitting on the spline connecting plate aligns with the oil groove on the spline joint, and clean off any glue dust and grease from the connecting bolts, nuts, and the threaded surface of the intermediate spline joint. Apply LT271 thread locker to the threaded part ①, then tighten with a torque of 650 Nm. Allow the assembly to sit for 24 hours before use. When the intermediate drive shaft is connected with the frame beam hanger plate, ensure that the intermediate support ② of the intermediate drive shaft is perpendicular to the drive shaft axis ③. Adjust the angle of the hanger plate if necessary.

- For the drive shaft assembly with telescopic spline, after removal and installation, make sure that the paint mark arrow ② (or steel arrow) on the drive shaft spline joint corresponds to the paint mark arrow ② (or steel arrow) on the clutch hub, and ensure that the axes of universal joint spider ① of connecting plate at both ends are coplanar.
- When the drive shaft assembly is installed, it shall be ensured that the universal joint spider axis of the intermediate drive shaft connecting plate and the universal joint spider axis of the expansion joint drive shaft connecting plate are coplanar.
- When disassembling the intermediate support, ensure that the rubber buffer disc is located in the center of the U-shaped hanger and locked after it is perpendicular to the axis of the intermediate drive shaft assembly.
- When disassembling and assembling the universal joint bearing, it shall be ensured that the universal joint bearing is pulled by hand without jamming or



## Drive shaft maintenance

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obvious axial clearance. For the drive shaft using the bearing elastic retainer ring, it shall be ensured that the retainer ring falls into the snap spring groove during installation.

- When the drive shaft assembly is installed, all lock bolts and nuts shall be new, and a torque wrench shall be used to calibrate the tightening torque when tightening. The reference values of torque are as follows:

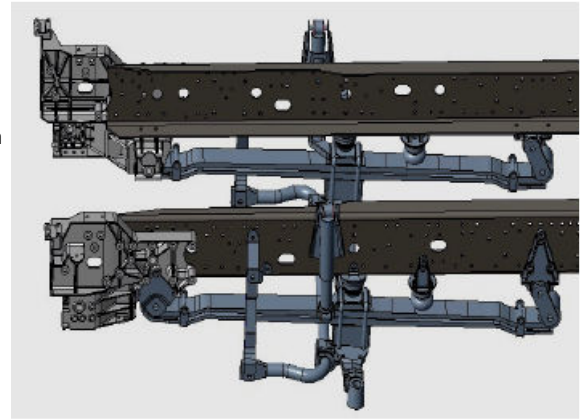
The tightening torque of M12×1.25 is 120N·m;

The tightening torque of M14×1.5 is 185N·m;

The tightening torque of M16×1.5 is 280N·m.

### Leaf spring suspension maintenance

- Overload and bad road conditions may damage the leaf spring and clip. Damaged leaf spring and clip shall be replaced in time; otherwise this will accelerate the damage.
- The connection pin of the leaf spring should be regularly checked to ensure it can be greased normally. Grease should be added once a year from the start of the vehicle's operation to ensure the normal operation of the suspension system.
- U-bolt should be regularly checked and retightened to the specified torque: the first retightening of U-bolt should be carried out at 2000km, and a new tightening mark should be drawn after retightening. The second retightening should be carried out at 10000km, and a new tightening mark should be drawn after retightening. Tighten the M20 nut to  $450\text{N}\cdot\text{m}\pm 10\%$ , the M24 nut to  $800\text{N}\cdot\text{m}\pm 10\%$ , and the M27 nut to  $1050\text{N}\cdot\text{m}\pm 10\%$ , and then check and retighten the above torque according to the specified mileage in maintenance manual. If the above maintenance is not carried out as specified and the vehicle has a broken center hole of the leaf spring, the vehicle manufacturer has the right to refuse to make a claim.
- If there is oil leakage or oil mud at the metal bearing balance shaft shell, the internal bearing and seal should be inspected and replaced in time.
- If the stop block is damaged or lost, it shall be replaced in time. Otherwise, there may be excessive runout of the axle when driving in bad road conditions, which will lead to early fracture of the leaf spring.
- The skateboard seat is a wearing part. It shall be checked every 30,000 km, and shall be replaced when the wear exceeds 6 mm.



## Leaf spring suspension maintenance

### Leaf spring suspension

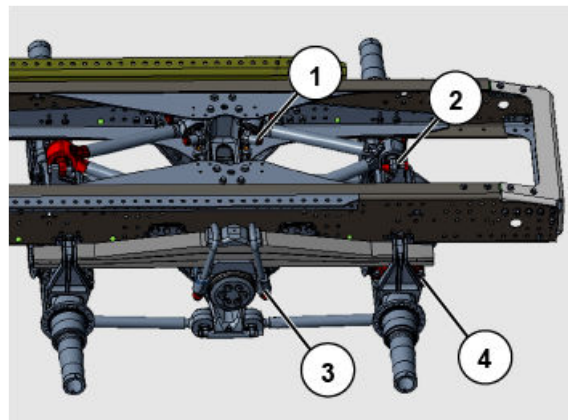
The tightening torques during maintenance and replacement are shown in the figure.

- ① 795N·m
- ② 960N·m
- ③ The torque of M20: 450 N·m; M24: 800N·m; M27: 1050N·m
- ④ 290N·m



#### **WARNING!**

- It is not allowed to change the number of leaf springs, use leaf springs of different thickness and change the suspension structure without authorization.
- It is not allowed to use parts other than those manufactured by our Company, modified parts or substitute parts; otherwise it may cause damage to parts and vehicle out of control, resulting in personal injury or property loss!



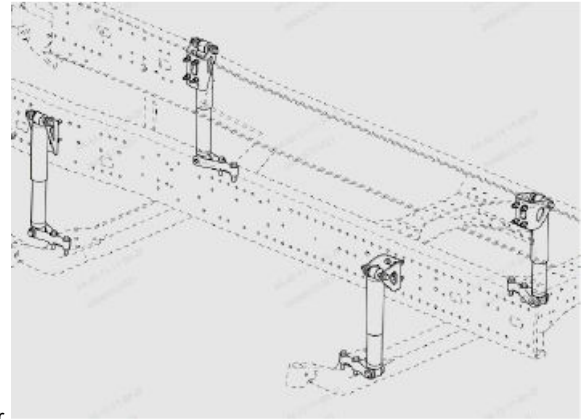
### Shock absorber

In case of oil leakage of shock absorber, damage of rubber bushing, crack of lifting ring weld seam, and etc., it shall be replaced in time; otherwise it will accelerate the damage of related parts.

Shock absorber oil leakage is divided into false leakage and actual leakage. False leakage does not affect the performance of the shock absorber and should not be claimed. For false leakage, there is no need to replace the shock absorber. The determination method is: there is some oil on the outer tube, and after wiping it off, wipe it again after two weeks. If the oil does not reappear after the second wipe, it is considered false leakage.

For leakage, it is need to replace the shock absorber. The determination method is:

- 1 Oil stains are damp with no signs of drying and the oil stains on the outer cylinder are obvious with a developing trend;
- 2 Damping force fails, and after disassembling the oil leak damper, the damping force is significantly reduced and fails in the indicator test.



## Leaf spring suspension maintenance

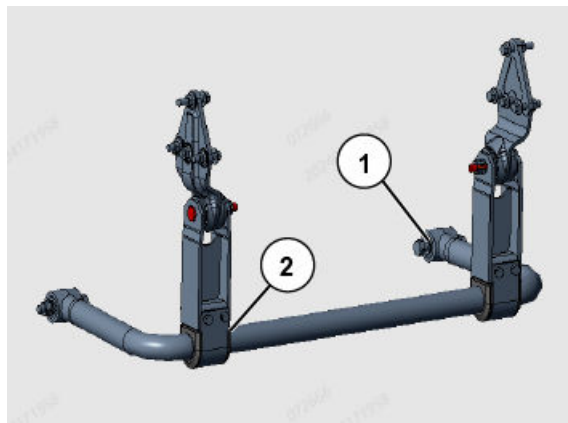
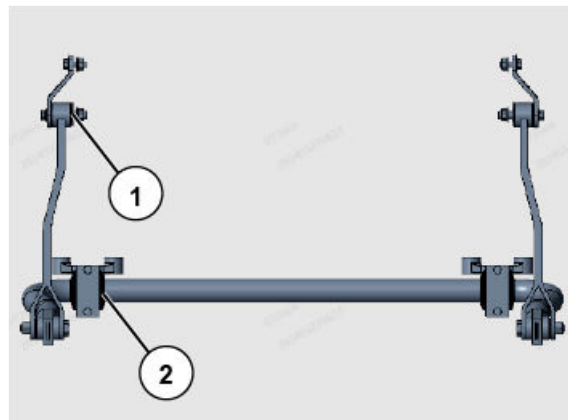
### Stabilizer bar

The stabilizer bar is key to the driving attitude of the vehicle. If it is damaged, it may result in tilting or even rollover of the vehicle. It is necessary to check whether its connecting parts are loose and worn, and whether the bar itself is bent or broken.

The stabilizer bar bushing shall be inspected as follows:

Wear of end bushing ①: When the end bushing makes abnormal noise due to wear or the colloid is damaged, replace it immediately.

Clamping bushing ② axial slip: When the axial relative displacement of the clamping bushing exceeds 5mm, it is considered that the bushing has failed and should be replaced.



### Maintenance of air suspension

#### Electronically controlled air suspension

The air suspension takes the air bag filled with compressed air as the main elastic element. The control system controls the inflation and deflation of the air bag to realize the height adjustment of the suspension system and axle lifting.

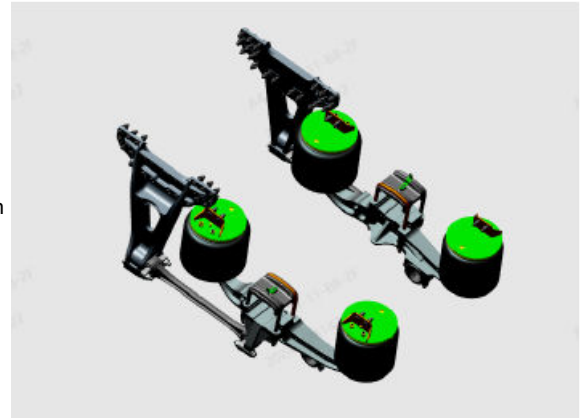
#### Features

Each axle is equipped with a shock absorber to reduce the impact of the ground on the vehicle.

Each axle is equipped with a lateral stabilizer bar to improve vehicle stability.

The height is adjustable, which is convenient for towing and cargo loading and unloading. For models equipped with lifting axles, the lifting axle can be lifted under no-load or half-load conditions;

The load of each axle can be monitored in real time.



## Maintenance of air suspension

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### Maintenance of air suspension

#### Requirements for use

- Vehicles are not allowed to be over-loaded.
- Do not apply lubricating oil or grease to any part of the air suspension system, especially to its rubber parts.
- Carry out maintenance as required.

#### Routine inspection and maintenance

- Be sure to carry out a routine inspection every day or before each drive.
- Routine inspection contents:
  - Visually check if airbag is adequately and evenly inflated.
  - Check whether the suspension system is at normal height and leaked.
- Simple inspection method: when receiving a new vehicle, park it on a flat ground, measure the distance from the center of the wheel to an easily determined fixing point on the vehicle body above the wheel center, and record the data; during each subsequent inspection, park the vehicle on a flat ground, check the values for no significant changes, which indicate normal suspension height and no system leakage. If any, the causes shall be identified and troubleshooting shall be carried out.

#### Regular safety inspection

- Safety inspection shall be carried out regularly.
- When performing the periodic safety check, be sure to park the vehicle on a clean flat ground, preferably on a repair pit, with the parking brake applied and the vehicle fixed (this requirement is

applicable to the inspection and maintenance procedures described below).

#### • Safety inspection items:

- Check whether all fasteners are fastened without looseness, whether the tightening torque meets the stipulated requirement, and whether there are dirt, scale, metal wear articles around the bolt head and nut due to looseness.
  - With the air supply pressure greater than 6.0 bar, check the airbag for normal inflation, check the airbags on both sides of the same axle for uniform solidness, and check the airbag for no wear, damage, abnormal bulge and a gap over 25 mm around them.
  - Check whether the shock absorber has oil leakage and damage, and whether it works normally (the shock absorber is hot after driving means it works normally. Precautions: The shock absorber may be hot!).
  - All parts (components) and welds are free of cracks.
- For other maintenance contents, see "Vehicle Maintenance".



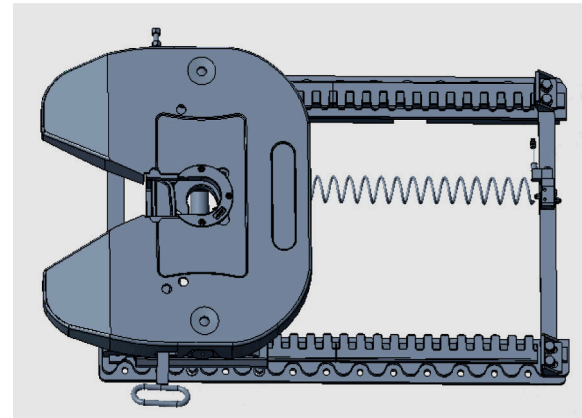
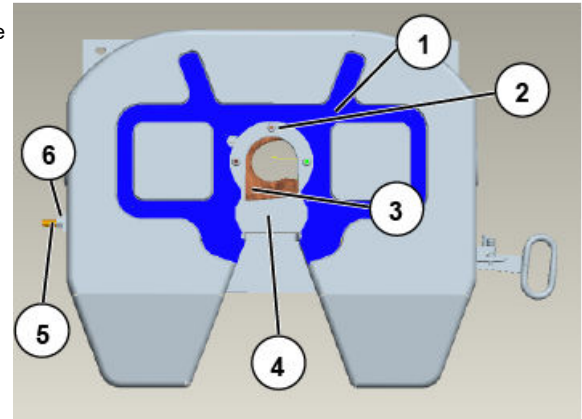
### Maintenance of fifth wheel

- Before coupling the tractor and semi-trailer, always clean the upper surface of the fifth wheel and the lubricating oil reservoir ①. Ensure the lubricating oil reservoir ① is filled with heavy-duty grease (e.g., #2 lithium-based grease containing molybdenum disulfide) and evenly apply it to the upper surface of the fifth wheel, the lock jaw ③, and the kingpin ②.
- For every 5,000 km driven, remove the grease from the surface of the fifth wheel, jaw ③, and kingpin ②. After thorough cleaning, apply new heavy-duty grease evenly on the surface of the fifth wheel, lock jaw ③, kingpin ②, and the mating surface of the towing pin. For sliding fifth wheels, clean the grease from the rails and apply new grease.
- Adjust and check the following items every 10000 km.

In order to compensate the wear of traction pin and lock jaw ③ and prevent pin block ④ from being too tight during engagement, so that the handle cannot be pulled out.

When the tractor is combined with a semi-trailer, the adjusting bolt ⑤ can be screwed out and then screwed in again until it bears the force. After that, continue to screw in for 1 turn, and tighten the nut ⑥ after adjustment.

- Every 5,000 km: Tighten the bolts connecting the fifth wheel to the frame. The tightening torque for M16 bolts is 300 N·m.
- Every 10,000 km: Check if the fifth wheel locking mechanism is functioning correctly. For sliding fifth wheels, also check if the sliding lock mechanism is operating properly.



## MC11(H)/MC13(H) engine maintenance items

### MC11 (H) /MC13 (H) engine maintenance items

The first maintenance performed at the service station designated in the Warranty Manual according to the maintenance regulations of CNHTC is called the first maintenance, or "the first maintenance". The regular maintenance performed at the service station designated in the Warranty Manual according to the maintenance regulations of CNHTC is called the regular maintenance, or "the regular maintenance".

Road vehicles refer to tractors, platform lorry, stake trucks, oil reservoir truck and other vehicles that are often used on classified highways. Off-road vehicles refer to vehicles that are often used on roads outside the classified highways, such as construction site vehicles, mine vehicles, dump trucks, side dumpers, and etc.

### MC11(H)/MC13(H) engine maintenance items

Assembly	Maintenance items	First maintenance	Regular maintenance	
		First maintenance mileage (km)	Regular maintenance mileage (km)	
			Road vehicles	Off-road vehicles and cement mixers
Engine	Check whether the engine harness connection is loose, rubbed or worn.	2000 ~ 5000	Every 30000	Every 5000
	Check whether the pipeline is loose, rubbed or worn.	2000 ~ 5000	Every 30000	Every 5000
	Check for oil leakage.	2000 ~ 5000	Every 30000	Every 5000
	Check oil level of the fuel coarse filter (if equipped).	2000 ~ 5000	Every 30000	Every 5000
	Check and clean the fuel float filter screen in the fuel tank.	2000 ~ 5000	Every 30000	Every 5000
	Check whether the oil and coolant levels are within the normal range.	2000 ~ 5000	Every 30000	Every 5000
	Change the engine oil	See "Engine Maintenance".		
	Replace the oil filter element	Replace the engine oil filter element when changing the engine oil, and use the engine oil filter element that comes with the vehicle for the first change.		
	Replace the fuel fine filter element.	Replace the fuel filter element when changing the engine oil		
	Check and clean the air filter element and check whether the air filter element sensor is effective.	2000 ~ 5000	Every 30000	Every 5000

## MC11(H)/MC13(H) engine maintenance items

Assem- bly	Maintenance items	First maintenance	Regular maintenance	
		First maintenance mileage (km)	Regular maintenance mileage (km)	
			Road vehicles	Off-road vehicles and cement mixers
	Replace the coolant	See "Engine Maintenance".		
	Check the fan connecting bolts; whether the fan and the fan cowl are interfering with each other or may interfere with each other.	2000 ~ 5000	Every 30000	Every 5000
	Check the tension pulley to ensure proper belt tension.	2000 ~ 5000	Every 30000	Every 5000
	Check whether the connecting bolts of engine suspension connections are loose.	2000 ~ 5000	Every 30000	Every 5000
	Check the engine support rubber pad for damage	2000 ~ 5000	Every 30000	Every 5000
	Check whether the engine oil pressure and water temperature are normal.	2000 ~ 5000	Every 30000	Every 5000
	Check the valve clearance and adjust it if necessary	See "Engine Maintenance".		
<b>Inspection of engine EOL tool</b>	Read the engine fault code and check whether there is a fault	2000 ~ 5000	Every 30000	Every 5000

## MT13 engine maintenance items

### MT13 engine maintenance items

The first maintenance performed at the service station designated in the Warranty Manual according to the maintenance regulations of SINO-TRUK is called the first maintenance, or "the first maintenance". The regular maintenance performed at the service station designated in the Warranty Manual according to the maintenance regulations of SINOTRUK is called the regular maintenance, or "the regular maintenance". Road vehicles refer to tractors, platform lorry, stake trucks, oil reservoir truck and other vehicles that are often used on classified highways. Off-road vehicles refer to vehicles that are often used on roads outside the classified highways, such as construction site vehicles, mine vehicles, dump trucks, side dumpers, and etc.

### MT13 engine maintenance items

Assembly	Maintenance items	First maintenance	Regular maintenance	
		First maintenance mileage (km)	Regular maintenance mileage (km)	
			Road vehicles	Off-road vehicles and cement mixers
Engine	Check whether the engine harness connection is loose, rubbed or worn	2000 ~ 5000	Every 30000	Every 5000
	Check the pipeline and clamp for looseness, interference and rubbing	2000 ~ 5000	Every 30000	Every 5000
	Check for oil leakage	2000 ~ 5000	Every 30000	Every 5000
	Check for gas leakage	2000 ~ 5000	Every 30000	Every 5000
	Check whether the gas cylinder pressure gauge and buffer tank pressure gauge are normal	2000 ~ 5000	Every 30000	Every 5000
	Check whether the oil and coolant levels are within the normal scale range	2000 ~ 5000	Every 30000	Every 5000
	Change the engine oil	See "Engine Maintenance".		
	Replace the oil filter element	When replacing the engine oil, replace the oil filter element at the same time, and use the attached oil filter element for the first replacement.		
	Check and clean the air filter element and check whether the air filter element sensor is effective	2000 ~ 5000	Every 30000	Every 5000

Assem- bly	Maintenance items	First maintenance	Regular maintenance	
		First maintenance mileage (km)	Regular maintenance mileage (km)	
			Road vehicles	Off-road vehicles and cement mixers
	Replace the coolant	See "Engine Maintenance".		
	Check the fan connecting bolts; whether the fan and the fan cowl are interfering with each other or may interfere with each other	2000 ~ 5000	Every 30000	Every 5000
	Check the tension pulley to ensure the belt tension	2000 ~ 5000	Every 30000	Every 5000
	Check whether the connecting bolts of engine suspension connections are loose	2000 ~ 5000	Every 30000	Every 5000
	Check whether the engine support rubber pad is damaged	2000 ~ 5000	Every 30000	Every 5000
	Check whether the engine oil pressure and water temperature are normal	2000 ~ 5000	Every 30000	Every 5000
	High pressure filter blowdown (CNG)	2000 ~ 5000	Every 2000~5000km	
	Low pressure filter blowdown	2000 ~ 5000	Every 2000~5000km	
	Replace the high pressure filter element	See "Engine Maintenance".		
	Replace the low pressure filter element	See "Engine Maintenance".		
	Check the valve clearance and adjust it if necessary	See "Engine Maintenance".		
	Replace the ignition coil	Paid replacement every 100,000 km		
	Replace the spark plug	See "Engine Maintenance".		
	Replacement of oil-gas separator filter element	Paid replacement every 50,000 km of vehicle operation		
	Engine EOL tool inspec- tion	Read the engine fault code and check whether there is a fault	2000 ~ 5000	Every 30000
Check whether the pressure of the exhaust bleeder valve is normal		2000 ~ 5000	Every 30000	Every 5000

## Chassis maintenance items (7 platforms/China V)

### Chassis maintenance items (7 platforms/China V)

The first maintenance performed at the service station designated in the Warranty Manual according to the maintenance regulations of CNHTC is called the first maintenance, or "the first maintenance". The regular maintenance performed at the service station designated in the Warranty Manual according to the maintenance regulations of CNHTC is called the regular maintenance, or "the regular maintenance".

Road vehicles refer to tractors, platform lorry, stake trucks, oil reservoir truck and other vehicles that are often used on classified highways. Off-road vehicles refer to vehicles that are often used on roads outside the classified highways, such as construction site vehicles, mine vehicles, dump trucks, side dumpers, and etc.

### Chassis maintenance items (7 platforms/China V)

Assembly	Maintenance items	First maintenance	Regular maintenance	
		First maintenance mileage (km)	Regular maintenance mileage (km)	
			Road vehicles	Off-road vehicles and cement mixers
Clutch	Check whether the clutch disengages completely, and whether the engagement is smooth without slipping.	2000 ~ 5000	Every 30000	Every 5000
	Check the clutch hydraulic oil (brake fluid) level and add oil when necessary.	2000 ~ 5000	Every 30000	Every 5000
	Check whether the clutch booster exhaust port is blocked.	2000 ~ 5000	Every 30000	Every 5000
	Lubricate the clutch pedal shaft.	2000 ~ 5000	Every 30000	Every 5000
	Check the free travel of clutch pedal and ensure the clearance of release bearing.	2000 ~ 5000	Every 30000	Every 5000
	Lubricate the release bearing sliding sleeve.	2000 ~ 5000	Every 30000	Every 5000
	Replace the clutch oil.	See "Clutch Maintenance".		
Gearbox-Transmission	Check the lubricating oil level of the transmission and add lubricating oil if necessary. Clean the filter screen.	2000 ~ 5000	Every 30000	Every 5000

## Chassis maintenance items (7 platforms/China V)

Assembly	Maintenance items	First maintenance	Regular maintenance	
		First maintenance mileage (km)	Regular maintenance mileage (km)	
			Road vehicles	Off-road vehicles and cement mixers
	Replace the transmission lubricating oil.	See "Transmission Maintenance"		
	Lubricate the clutch selector rod.	2000 ~ 5000	Every 30000	Every 5000
	Check and clean the air filter pressure relief valve.	2000 ~ 5000	Every 30000	Every 5000
	Lubricate the transmission shifting mechanism and check the transmission connecting bolts	2000 ~ 5000	Every 30000	Every 5000
	Check and clean the transmission vent hole.	2000 ~ 5000	Every 30000	Every 5000
	Check whether the transmission control mechanism functions well.	2000 ~ 5000	Every 30000	Every 5000
	Check whether the power take-off functions well.	2000 ~ 5000	Every 30000	Every 5000
	Check for oil and gas leakage.	2000 ~ 5000	Every 30000	Every 5000
	Check for abnormal noise.	2000 ~ 5000	Every 30000	Every 5000
	Check whether the connecting bolts of the engine have come loose.	2000 ~ 5000	Every 30000	Every 5000
Retarder	Check whether the retarder is normal	2000 ~ 5000	Every 30000	Every 5000
	Replace the retarder oil and filter element (if any)	See "Retarder Maintenance"		
Driving axle	Replace the gear oil of the driving axle main reducer and wheel-side reducer.	See "Driving Axle Maintenance"		

## Chassis maintenance items (7 platforms/China V)

Assembly	Maintenance items	First maintenance	Regular maintenance	
		First maintenance mileage (km)	Regular maintenance mileage (km)	
			Road vehicles	Off-road vehicles and cement mixers
	Check whether the brake retracts normally.	2000 ~ 5000	Every 30000	Every 5000
	Check whether the differential lock functions well.	2000 ~ 5000	Every 30000	Every 5000
	Check the vent hole.	2000 ~ 5000	Every 30000	Every 5000
	Check the clearance between brake shoe and brake drum/wear of disc brake pad.	2000 ~ 5000	Every 30000	Every 5000
	Check the hub bearing for oil leakage.	2000 ~ 5000	Every 30000	Every 5000
	Lubricate the brake clearance adjusting arm and camshaft.	2000 ~ 5000	Every 30000	Every 5000
Front steering axle and steering gear	Check and lubricate the front hub.	See "Driven Axle Maintenance".		
	Lubricate the front steering kingpin, brake adjusting arm and camshaft.	2000 ~ 5000	Every 30000	Every 5000
	Check and adjust the front wheel toe-in and wheel tightness.	2000 ~ 5000	Every 30000	Every 5000
	Check whether the steering tie rod clamp, bolt and ball joint have come loose.	2000 ~ 5000	Every 30000	Every 5000
	Check whether the steering drag link clamp, bolt and ball joint have come loose.	2000 ~ 5000	Every 30000	Every 5000
	Check whether the pitman arm of the steering gear has come loose	2000 ~ 5000	Every 30000	Every 5000
	Check whether the double-steering intermediate pitman arm has come loose.	2000 ~ 5000	Every 30000	Every 5000



## Chassis maintenance items (7 platforms/China V)

Assembly	Maintenance items	First maintenance	Regular maintenance	
		First maintenance mileage (km)	Regular maintenance mileage (km)	
			Road vehicles	Off-road vehicles and cement mixers
	Check the steering linkage for abnormal wear.	2000 ~ 5000	Every 30000	Every 5000
	Check and adjust the synchronous working condition of the double front axles.	2000 ~ 5000	Every 30000	Every 5000
	Check whether the oil level of the steering oil reservoir is normal, and clean or replace the filter element of the steering oil reservoir if necessary	2000 ~ 5000	Every 30000	Every 5000
	Check the power steering pipeline for aging or leakage.	2000 ~ 5000	Every 30000	Every 5000
	Check the oil and gas pipelines for interference and wear.	2000 ~ 5000	Every 30000	Every 5000
	Check the clearance between brake shoe and brake drum/wear of disc brake pad.	2000 ~ 5000	Every 30000	Every 5000
	Check whether the brake retracts normally.	2000 ~ 5000	Every 30000	Every 5000
	Replace the steering hydraulic oil.	See "Maintenance of the Steering System".		
Transmission shaft	Lubricate the transmission shaft cross shaft, telescopic sleeve and intermediate support bearing of the transmission shaft.	2000 ~ 5000	Every 30000	Every 5000
	Tighten the fixing bolts of the intermediate support of the transmission shaft.	2000 ~ 5000	Every 30000	Every 5000
	Tighten the connecting bolts of the transmission shaft.	2000 ~ 5000	Every 30000	Every 5000
Chassis	Lubricate the leaf spring pin and bushing of the entire vehicle.	2000 ~ 5000	Every 30000	Every 5000

## Chassis maintenance items (7 platforms/China V)

Assembly	Maintenance items	First maintenance	Regular maintenance	
		First maintenance mileage (km)	Regular maintenance mileage (km)	
			Road vehicles	Off-road vehicles and cement mixers
	Tighten the front and rear u-bolts.	2000 ~ 5000	Every 30000	Every 5000
	Tighten the connecting bolts of the lifting lug of the leaf spring support.	2000 ~ 5000	Every 30000	Every 5000
	Check the effectiveness of the leaf spring stop block.	2000 ~ 5000	Every 30000	Every 5000
	Check the mounting bolts of frame tubular beam.	2000 ~ 5000	Every 30000	Every 5000
	Tighten the V propelling rod and lower propelling rod bolts.	2000 ~ 5000	Every 30000	Every 5000
	Check the clearance between the balance suspension leaf spring and the sliding plate and lubricate the sliding plate.	2000 ~ 5000	Every 30000	Every 5000
	Check the balance shaft gear oil	See suspension parameters		
	Tighten the bolts connecting the balance shaft and the frame.	2000 ~ 5000	Every 30000	Every 5000
	Tighten the wheel nuts.	2000 ~ 5000	Every 30000	Every 5000
	Check each part for oil, gas and liquid leakage.	2000 ~ 5000	Every 30000	Every 5000
	Check the lines for wear and possible wear	2000 ~ 5000	Every 30000	Every 5000
	Check the water pipelines for interference and possible damage.	2000 ~ 5000	Every 30000	Every 5000

## Chassis maintenance items (7 platforms/China V)

Assembly	Maintenance items	First maintenance	Regular maintenance	
		First maintenance mileage (km)	Regular maintenance mileage (km)	
			Road vehicles	Off-road vehicles and cement mixers
<b>Brake system</b>	Check the air circuit tightness under the service and parking brake status.	2000 ~ 5000	Every 30000	Every 5000
	Check whether the brake air pressure of the entire vehicle reaches the specified value.	2000 ~ 5000	Every 30000	Every 5000
	Drain water in the air reservoir	2000 ~ 5000	Every 30000	Every 5000
	Check whether the brake is normal.	2000 ~ 5000	Every 30000	Every 5000
	Check the brake pipeline for aging, wear and possible damage.	2000 ~ 5000	Every 30000	Every 5000
	Replace the air drying chamber.	See the "brake system".		
<b>Electric appliances and electronic control system</b>	Check whether all lamps function well.	2000 ~ 5000	Every 30000	Every 5000
	Check whether the instrument functions well.	2000 ~ 5000	Every 30000	Every 5000
	Check whether the charging condition of the generator is normal.	2000 ~ 5000	Every 30000	Every 5000
	Check the fastening of battery power line and grounding wire	2000 ~ 5000	Every 30000	Every 5000
	Check whether each harness for interference and make sure that the harness is away from heat sources and sharp objects	2000 ~ 5000	Every 30000	Every 5000
	Check the connection of each harness and plug connectors of the electric appliances.	2000 ~ 5000	Every 30000	Every 5000

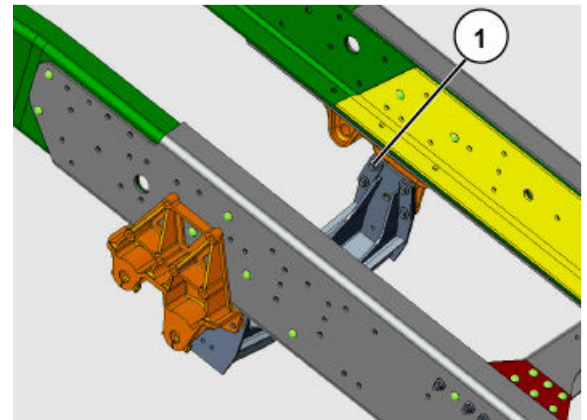
## Chassis maintenance items (7 platforms/China V)

Assembly	Maintenance items	First maintenance	Regular maintenance	
		First maintenance mileage (km)	Regular maintenance mileage (km)	
			Road vehicles	Off-road vehicles and cement mixers
	Check whether the wiper system functions well and whether it is needed to add cleaning agent.	2000 ~ 5000	Every 30000	Every 5000
	Check the fuses and their specifications.	2000 ~ 5000	Every 30000	Every 5000
	Check or replace the air conditioning filter element, and add refrigerant as necessary	2000 ~ 5000	Every 30000	Every 5000
	Check whether heating (including independent heat source) and air conditioning systems function well.	2000 ~ 5000	Every 30000	Every 5000
	Check whether MP5 functions well.	2000 ~ 5000	Every 30000	Every 5000
Cab	Check and tighten the bolts of the turnover mechanism	2000 ~ 5000	Every 30000	Every 5000
	Check whether the door control mechanism functions well.	2000 ~ 5000	Every 30000	Every 5000
	Check and lubricate the cab locking mechanism.	2000 ~ 5000	Every 30000	Every 5000
	Check whether the seat adjustment and safety belt function well, and add lithium-base lubricating oil into the sliding chute of the seat adjustment mechanism	2000 ~ 5000	Every 30000	Every 5000
	Check whether the steering wheel and steering operating mechanism function well	2000 ~ 5000	Every 30000	Every 5000
	Check whether the body suspension airbag, height adjusting unit and shock absorber function well.	2000 ~ 5000	Every 30000	Every 5000
	Apply grease to the roller of the door upper hinge	2000 ~ 5000	Every 30000	Every 5000

## Chassis maintenance items (7 platforms/China V)

Assembly	Maintenance items	First maintenance	Regular maintenance	
		First maintenance mileage (km)	Regular maintenance mileage (km)	
			Road vehicles	Off-road vehicles and cement mixers
	Check the hydraulic oil volume of the lifting pump, and add the hydraulic oil of the lifting pump as necessary.	2000 ~ 5000	Every 30000	Every 5000
SCR system	Clean the urea tank vent valve	See "Engine Maintenance".		
	Replace the urea pump filter element	See "Engine Maintenance".		

The connecting bolts ① at the lower auxiliary frame of off-road vehicles and cement mixers shall be re-tightened every 5,000Km.



## Chassis maintenance items (platform 7/China VI)

### Chassis maintenance items (platform 7/China VI)

The first maintenance carried out by the user at the service station designated in the Warranty Manual according to the maintenance regulations of SINOTRUK is considered the first maintenance, hereinafter referred to as "first maintenance". The regular maintenance carried out by the user at the service station designated in the Warranty Manual according to the maintenance regulations of SINOTRUK is considered the regular maintenance, hereinafter referred to as "regular maintenance".

Road vehicles see towing vehicles, flatbed trucks, stake trucks, oil tankers, and other vehicles that are frequently used on classified roads. Off-road vehicles see construction site vehicles, mining vehicles, dump trucks, rollover trucks, and other vehicles that are frequently used on unclassified roads.

### Chassis maintenance items (platform 7/China VI)

Assembly	Maintenance items	First maintenance	Regular maintenance	
		First maintenance mileage (km)	Regular maintenance mileage (km)	
			Road vehicle	Off-road vehicles, cement mixer trucks
Transmission	Check the transmission lubricating oil level and replenish if necessary; clean the filter screen	2000 ~ 5000	Every 30,000	Every 5000
	Replace the transmission lubricating oil	See "Transmission maintenance"		
	Lubricate the clutch pedal shaft	2000 ~ 5000	Every 30,000	Every 5000
	Check and clean the air filter pressure reducing valve	2000 ~ 5000	Every 30,000	Every 5000
	Lubricate the transmission shift mechanism and check the transmission connecting bolts	2000 ~ 5000	Every 30,000	Every 5000
	Check and wash the transmission vent hole	2000 ~ 5000	Every 30,000	Every 5000
	Check whether the transmission control mechanism works properly	2000 ~ 5000	Every 30,000	Every 5000
	Check whether the power take-off works normally	2000 ~ 5000	Every 30,000	Every 5000

## Chassis maintenance items (platform 7/China VI)

Assembly	Maintenance items	First maintenance	Regular maintenance	
		First maintenance mileage (km)	Regular maintenance mileage (km)	
			Road vehicle	Off-road vehicles, cement mixer trucks
	Check whether there is oil leakage or air leakage	2000 ~ 5000	Every 30,000	Every 5000
	Check whether there is abnormal sound	2000 ~ 5000	Every 30,000	Every 5000
	Check whether the connecting bolts with engine are loose	2000 ~ 5000	Every 30,000	Every 5000
Retarder	Check whether the retarder is normal	2000 ~ 5000	Every 30,000	Every 5000
	Replace the retarder oil and filter element (if any)	See "Retarder maintenance"		
Drive axle	Replace the drive axle main reducer and gear oil of in-wheel reducer	See "Drive axle maintenance"		
	Check whether the brake return is normal	2000 ~ 5000	Every 30,000	Every 5000
	Check whether the differential lock works properly	2000 ~ 5000	Every 30,000	Every 5000
	Check the vent	2000 ~ 5000	Every 30,000	Every 5000
	Check the clearance between brake shoe and brake drum/wear of disc brake pad	2000 ~ 5000	Every 30,000	Every 5000
	Check the hub bearing for oil leakage	2000 ~ 5000	Every 30,000	Every 5000
	Lubricate the brake clearance adjusting arm and camshaft	2000 ~ 5000	Every 30,000	Every 5000

## Chassis maintenance items (platform 7/China VI)

Assembly	Maintenance items	First maintenance	Regular maintenance	
		First maintenance mileage (km)	Regular maintenance mileage (km)	
			Road vehicle	Off-road vehicles, cement mixer trucks
Front steering axle and steering gear	Check and lubricate the front wheel hub	See "Driven axle maintenance"		
	Lubricate the front steering king pin, brake adjusting arm and camshaft	2000 ~ 5000	Every 30,000	Every 5000
	Check and adjust the front wheel toe-in and the tightness of the wheels	2000 ~ 5000	Every 30,000	Every 5000
	Check the steering tie rod clamp, bolt and ball joint for looseness	2000 ~ 5000	Every 30,000	Every 5000
	Check whether the steering drag link clamp, bolt and ball joint are loose	2000 ~ 5000	Every 30,000	Every 5000
	Check the steering gear drop arm for looseness.	2000 ~ 5000	Every 30,000	Every 5000
	Check whether the double-steering middle drop arm is loose	2000 ~ 5000	Every 30,000	Every 5000
	Whether the steering linkage is subject to abnormal wear	2000 ~ 5000	Every 30,000	Every 5000
	Check and adjust the synchronous working condition of double front axles	2000 ~ 5000	Every 30,000	Every 5000
	Check whether the fluid level of steering oil tank is normal, and clean or replace the filter element if necessary.	2000 ~ 5000	Every 30,000	Every 5000
	Check the steering pipeline for aging and oil leakage	2000 ~ 5000	Every 30,000	Every 5000
	Check the oil and air pipelines for interference or wear	2000 ~ 5000	Every 30,000	Every 5000



## Chassis maintenance items (platform 7/China VI)

Assembly	Maintenance items	First maintenance	Regular maintenance	
		First maintenance mileage (km)	Regular maintenance mileage (km)	
			Road vehicle	Off-road vehicles, cement mixer trucks
	Check the clearance between brake shoe and brake drum/wear of disc brake pad	2000 ~ 5000	Every 30,000	Every 5000
	Check whether the brake return is normal	2000 ~ 5000	Every 30,000	Every 5000
	Replace the steering hydraulic oil	See "Maintenance of steering system"		
Drive shaft	Lubricate the cross shaft, telescopic sleeve, and intermediate support bearing of drive shaft	2000 ~ 5000	Every 30,000	Every 5000
	Tighten the fixing bolt of intermediate support of drive shaft	2000 ~ 5000	Every 30,000	Every 5000
	Tighten the connecting bolt of drive shaft	2000 ~ 5000	Every 30,000	Every 5000
Chassis	Lubricate the leaf spring pin and bushing of the whole vehicle	2000 ~ 5000	Every 30,000	Every 5000
	Tighten the front and rear U-bolts	2000 ~ 5000	Every 30,000	Every 5000
	Tighten the connecting bolt of leaf spring bracket lug	2000 ~ 5000	Every 30,000	Every 5000
	Check the effectiveness of leaf spring stopper block	2000 ~ 5000	Every 30,000	Every 5000
	Check the mounting bolts of frame tubular crossmember	2000 ~ 5000	Every 30,000	Every 5000
	Tighten the bolts of V-shaped thrust rod and lower thrust rod	2000 ~ 5000	Every 30,000	Every 5000

## Chassis maintenance items (platform 7/China VI)

Assembly	Maintenance items	First maintenance	Regular maintenance	
		First maintenance mileage (km)	Regular maintenance mileage (km)	
			Road vehicle	Off-road vehicles, cement mixer trucks
	Check the clearance between the balanced suspension leaf spring and the sliding plate, and lubricate the sliding plate	2000 ~ 5000	Every 30,000	Every 5000
	Check the balance shaft gear oil	See "Suspension parameters"		
	Tighten the bolts connecting the balance shaft and the frame	2000 ~ 5000	Every 30,000	Every 5000
	Tighten the wheel nuts	2000 ~ 5000	Every 30,000	Every 5000
	Check all parts for oil leakage, air leakage and liquid leakage	2000 ~ 5000	Every 30,000	Every 5000
	Check whether the line is worn and whether it may be worn	2000 ~ 5000	Every 30,000	Every 5000
	Check the water pipeline for interference and possible damage	2000 ~ 5000	Every 30,000	Every 5000
<b>Brake system</b>	Check the air circuit tightness of service and parking brake states	2000 ~ 5000	Every 30,000	Every 5000
	Check whether the brake air pressure of the vehicle reaches the specified value	2000 ~ 5000	Every 30,000	Every 5000
	Drainage of air reservoir	2000 ~ 5000	Every 30,000	Every 5000
	Check whether the brake is normal	2000 ~ 5000	Every 30,000	Every 5000
	Check whether the brake pipeline is aged, worn, or may be damaged	2000 ~ 5000	Every 30,000	Every 5000

## Chassis maintenance items (platform 7/China VI)

Assembly	Maintenance items	First maintenance	Regular maintenance	
		First maintenance mileage (km)	Regular maintenance mileage (km)	
			Road vehicle	Off-road vehicles, cement mixer trucks
	Replace the air drying tank	See "Brake system"		
Electrical appliance and electronic control system	Check whether the lights work normally	2000 ~ 5000	Every 30,000	Every 5000
	Check whether the instrument works properly	2000 ~ 5000	Every 30,000	Every 5000
	Check whether the alternator charging is normal	2000 ~ 5000	Every 30,000	Every 5000
	Check the tightening of battery power line and GND wire	2000 ~ 5000	Every 30,000	Every 5000
	Check whether there is interference in the harnesses of each part, and make sure that the harnesses are away from heat sources and sharp objects.	2000 ~ 5000	Every 30,000	Every 5000
	Check the connection of each harness and electrical connector	2000 ~ 5000	Every 30,000	Every 5000
	Check whether the wiper system works properly and whether washing fluid needs to be replenished	2000 ~ 5000	Every 30,000	Every 5000
	Check the fuse and its specifications	2000 ~ 5000	Every 30,000	Every 5000
	Check or replace the A/C filter element, and replenish refrigerant if insufficient.	2000 ~ 5000	Every 30,000	Every 5000
	Check whether the heater (including independent heat source) and A/C work properly	2000 ~ 5000	Every 30,000	Every 5000
	Check whether MP5 is working normally	2000 ~ 5000	Every 30,000	Every 5000

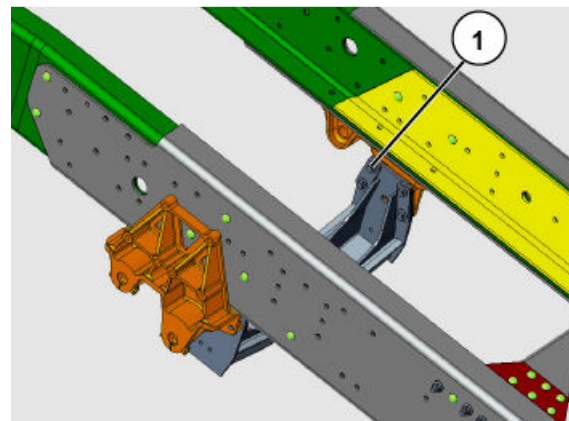
## Chassis maintenance items (platform 7/China VI)

Assembly	Maintenance items	First maintenance	Regular maintenance	
		First maintenance mileage (km)	Regular maintenance mileage (km)	
			Road vehicle	Off-road vehicles, cement mixer trucks
Cab	Check and tighten the bolts of the tilting mechanism	2000 ~ 5000	Every 30,000	Every 5000
	Check whether the door control mechanism works properly	2000 ~ 5000	Every 30,000	Every 5000
	Check and lubricate the cab locking mechanism	2000 ~ 5000	Every 30,000	Every 5000
	Check whether the seat adjustment mechanism and seat belt function properly, and add lithium base lubricating oil in the chute of the seat adjustment mechanism	2000 ~ 5000	Every 30,000	Every 5000
	Check whether the steering wheel and steering control mechanism work normally	2000 ~ 5000	Every 30,000	Every 5000
	Check whether the body suspension airbag, height adjustment and shock absorber work normally	2000 ~ 5000	Every 30,000	Every 5000
	Apply grease to the roller of the hinge on the door.	2000 ~ 5000	Every 30,000	Every 5000
	Check the hydraulic oil quantity of the lifting pump, and replenish it in case of a lack	2000 ~ 5000	Every 30,000	Every 5000
Aftertreatment system	Check and clean the breather pipe during the first maintenance, and then clean it every 5,000 km	2000 ~ 5000	Every 5000	
	Replace the main filter element of AdBlue pump and the filter screen of AdBlue level sensor	See "Engine maintenance"		
	Clean the AdBlue pump, AdBlue nozzle, AdBlue tank, filler filter screen of AdBlue tank, inlet pipe joint of AdBlue pump and other pipelines of the system.	See "Engine maintenance"		

## Chassis maintenance items (platform 7/China VI)

Assembly	Maintenance items	First maintenance	Regular maintenance	
		First maintenance mileage (km)	Regular maintenance mileage (km)	
			Road vehicle	Off-road vehicles, cement mixer trucks
	Check whether there is AdBlue crystal attached to the mounting flange of AdBlue injection unit.	Daily inspection and cleaning		
	Re-tighten the fastening bolts of the aftertreatment unit	2000 ~ 5000	Every 5000	
	DPF dust removal	See "Engine maintenance"		

The connecting bolt ① at the round girder under off-road vehicles and cement mixer trucks shall be retightened every 5000Km.



## Chapter VI Safety and Environmental Protection

### Safety instructions

#### General safety precautions

##### Plastic hose, rubber hose and electric wire harness



#### **WARNING!**

Do not carry out welding or drill holes near plastic hoses, rubber hoses and wire harnesses.

#### **Re-tighten the wheel nuts.**

For a new vehicle or a vehicle with newly replaced wheels, re-tighten the wheel nuts after driving for 50 km. See "Use and Replacement of Tires".

#### **Automobile accessories**

For your benefit, we recommend that you only use the "family" accessories of CNHTC. The reliability, safety and suitability of these accessories and parts have passed special certification. Although we have been closely observing the market, we still cannot judge the performance of other products in the market. Even if they are approved by a certain official organization, we will not be responsible for them.

#### **See "Traction and Traction Starting".**

See "Traction and Traction Starting".

#### **Safety device and basic hand tools**

Check whether the following equipment is complete

- Jack, jack rocker, basic hand tools, reflective vest, parking wedge and warning triangle.

#### **Modified parts and additional devices**

It shall be installed in accordance with the provisions of the related model refitting manual of CNHTC.

The user must obtain written approval from the equipment manufacturer.

Any change inconsistent with the vehicle structure of CNHTC shall be approved in writing by the designated department of CNHTC.

This also includes the additional devices of the vehicle, such as the air conditioning system, the tailgate, and retarder, ect.

#### **Overload protection of brake system/energy storage spring brake chamber**

If the parking brake is working, the service brake (foot brake) shall not be used. Otherwise, the braking force of the parking brake and the service brake will be superimposed, causing brake damage.

### Use of the battery



#### **CAUTION!**

–Avoid using automotive electric appliances for a long time when the engine of the vehicle is not working, such as interior floodlight, radio and tape player, as this may cause deep discharge of the battery, and vehicle start fault, and shorten the battery life.

–The natural leakage caused by the vehicle load cannot be avoided. Therefore, if the vehicle is to be parked for more than 10 days, the negative connection of the battery shall be disconnected to avoid the load leakage and protect the battery from deep discharge.

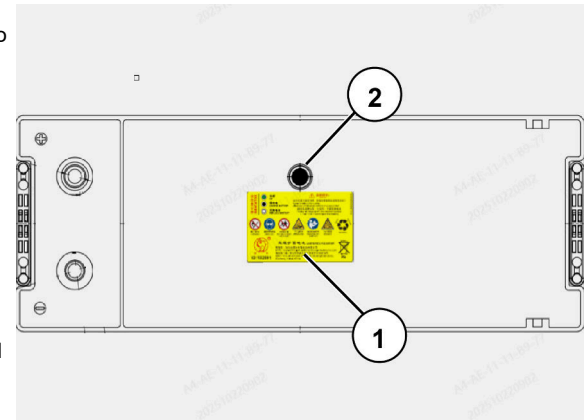
–If the battery has been used for more than 2 years, it is recommended to replace the battery whether it is still usable to prevent fault of the vehicle to be started due to natural fault of the battery.



- Some batteries are provided with electric eyes. It is needed to observe the color of electric eyes ② on the status display according to the label ① on the battery to determine whether the battery shall be charged or replaced.

### Safety protection of battery

- Wear protective glasses when operating and installing the battery.
- Do not allow the metal tools and wires to contact the positive and negative poles at the same time to prevent short circuit.
- During charging, handling or vibration, the battery will produce explosive gas, which will be discharged from the vent hole. If the concentration of hydrogen in the environment exceeds 4%, it will explode in case of open fire. Adequate ventilation shall be provided. No smoking or open fire is allowed. It is not allowed to move or move the battery without disconnecting the power supply during charging; The battery that has just been fully charged shall be used 10 minutes later. Do not put the battery close to open fire, impact and drop the battery.



## Safety instructions

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### Safety protection of battery

- The liquid in the battery is dilute sulfuric acid. Therefore, it shall be handled carefully and placed vertically to prevent the overflow of sulfuric acid. In case of skin contact with sulfuric acid, immediately take off the contaminated clothes, and rinse the affected part with plenty of water. In case of eye contact, immediately wash with clean water for at least 2 minutes and then seek medical help immediately. In case of accidental swallowing of sulfuric acid, immediately drink a large amount of water and milk, and seek medical help.

### Transportation of storage battery

- Avoid excessive bumping and collision during transportation.
- The transportation environment shall be free of high temperature (no more than 45 °C).
- The battery cannot be inverted or tilted.
- Avoid tilting the battery by more than 40 ° during handling to prevent acid from flowing out of the vent hole.

### Storage of battery

- Prevent the battery from fault due to long-time storage, which may result in unnecessary loss.
- Check the battery on a regular basis. If the voltage is less than 12.3V, the battery shall be charged.
- The battery shall be stored in a cool and well-ventilated place.

### Battery replacement process

- Shut down the engine and all electric appliances on the vehicle, and disconnect the main switch of the battery.
- Disconnect the negative terminal of the battery first, and disconnect then the positive terminal.

- Remove the battery.
- Confirm that the performance of the new battery is consistent with that of the old battery. Use a multimeter to confirm that the polarity of the battery is correct and the battery state of charge (voltage is greater than 12.5V) is appropriate.
- Clean the battery terminals and ends of the vehicle connecting wire.
- Install and secure the battery.
- Connect the terminal of the battery and the vehicle (positive first and then negative).



#### **WARNING!**

**–During the installation of storage battery, measures shall be taken to prevent accidental short circuit of positive and negative poles.**  
**–It is strictly not allowed to connect the positive and negative poles in reverse, as this may damage the electrical equipment in the vehicle!**

### Battery charging

- Select appropriate charging equipment, read the instructions for use carefully before charging, and use the charging equipment as instructed.
- With the charging equipment switched off, connect the battery terminals.
- The positive terminal (generally red) of the charger output is connected to the positive terminal of the battery, and the negative terminal (blue or black wires) of the output terminal is connected to

the negative terminal of the battery. Ensure that the connection is firm.

- Switch on the charging switch of the charger, and slowly adjust the charging voltage or current from low to high using the charger regulator until the required setting range is reached. After 2~3 hours of charging, observe and adjust the charging current in time to prevent accidents.
- Determine the charging duration and ending conditions according to the type of charger.
- At the end of charging, switch off the power switch of the charger first, and then disconnect the charging cable of the battery (do not remove the charging cable without disconnecting the power supply during charging).



### CAUTION!

**–Do not charge the battery that has a broken case, solidified electrolyte has or that shall be replaced.**

**–Battery charging shall be carried out in a well-ventilated environment.**

**–During the charging process, if the battery temperature exceeds 45 °C, the charging voltage shall be reduced appropriately or the charging shall be stopped. If acid overflows from the battery vent hole, stop charging immediately.**

### Compressed air reservoir

- The product model and supplier ID are marked on the air reservoir housings of the brake system and auxiliary equipment.
- When installing the fastening belt, be careful not to contact the welding point of the gas reservoir to prevent the gas reservoir from yielding under tension, which may compromise safety of the air reservoir.
- In order to prevent water accumulation in the gas reservoir, it shall be fully drained from time to time. The drain valve is at the bottom of the gas reservoir.
- Do not carry out welding, heat treatment or other treatment that will damage the safety of the gas reservoir (gas reservoir housing, base, thread and accessories).

### Air conditioning system and refrigeration elements



### WARNING!

Refrigerant and its volatile vapor are harmful to human health!

- Avoid contact with refrigerant and its volatile vapor.
- Wear gloves and goggles! If the refrigerant gets into contact with the skin or eyes, seek medical help immediately.
- It is not allowed to discharge gaseous refrigerant in a closed room, which may cause suffocation!
- A special treatment system shall be used to pump out the refrigerant.
- Do not carry out welding on or near the parts of the refrigeration system. This operation is not allowed even after the refrigerant is discharge, as there is a danger or explosion and poisoning !

## Safety instructions

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- Do not use the steam cleaner to clean the parts of the refrigeration system.
- In case of a fault of the air conditioning system, visit a CNHTC service station for repairing.
- The air conditioning system is filled with the fluorine-free R134a refrigerant. Using or mixing of refrigerants of other types or models are prohibited.

### Used waste oil

- Long-time or frequent contact with oil will remove sebum from the skin and cause skin dryness, allergy or redness.
- The result of animal skin test shows that the waste oil contains carcinogens. The waste oil will be hazardous unless the basic operation regulations for safety and health are followed when disposing of the waste oil.

### Health protection warning

- Prevent long-time, excessive or frequent contact with waste oil.

### Please pay attention to safety when handling cleaning agent, coolant, engine oil, fuel, and etc.

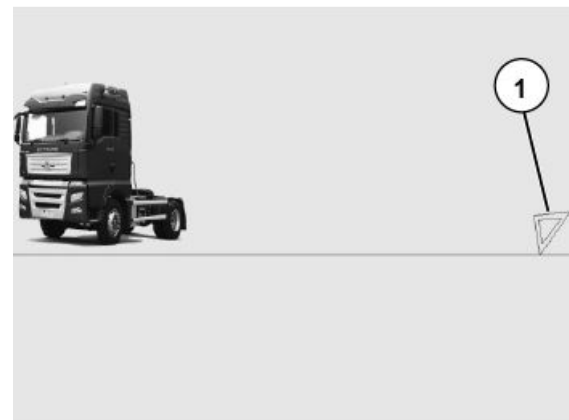
- Keep out of reach of children.
- Keep away from ignition sources-No smoking.
- Immediately remove clothing contaminated or soaked with such chemicals.
- Don't let these chemicals flow into the sewer.
- Frequent contact with cleaning agents, coolant, engine oil, and etc. poses a risk of damage to health.
- Clean the skin that has come into contact with oil.
  - Clean with soap and water thoroughly

- Use a small brush to ensure thorough cleaning.
- It is recommended to use special cleaning agents
- Do not use gasoline, diesel, kerosene, diluent or solvent for cleaning

- Protect the skin with suitable protective agent or protective gloves.
- Apply some skin care grease after cleaning.
- Change the oil-stained clothes and shoes, and never put oil-stained rags in the pockets of your clothes.

## Warning triangle

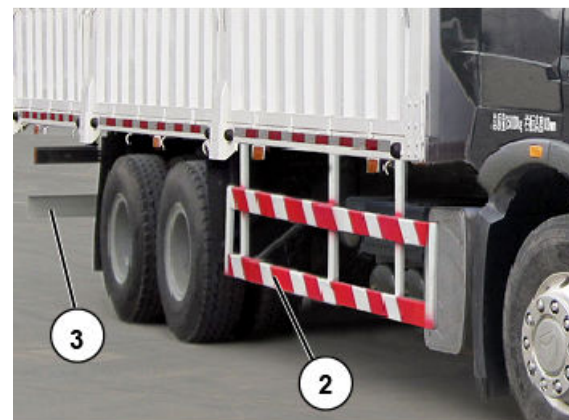
Warning triangle ①: In the event of a fault, traffic accident, etc. during driving, the driver shall place a warning triangle according to provisions of traffic regulations, and ensure that the warning triangle can be easily spotted by the drivers in the vehicles behind.



## Lateral and rear protection of cargo trucks

Side guard ② of cargo trucks: It prevents personnel from being drawn under the vehicle.

Rear guard ③: It acts as a block to the motor vehicle in a rear end collision, and prevents the rear vehicle from penetrating into the front vehicle.



## Side guard

## Safety instructions

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- The side guard rail is comprised of vertical bracings and cross bars. The vertical bracing can be made by bending and welding the steel pipe or angle steel, and is fixed to the sub-frame side with bolts.
- The cross bar is made of M-shaped or C-shaped steel, and welded on the vertical support.

### Section dimensions and material of cross bar

- Dimensions of section: 120×25×3(mm)
- Material: Q235A

### Structure of rear underrun guard

The rear guard rail is usually a fixed structure, and a fixed rear guard rail is comprised of guard rail brackets, diagonal bracings and cross bars. The guard rail bracket is made of bent channel steel or angle steel, and the inside of the bracket is enhanced with diagonal bracings made of bent channel steel and angle steel.

The cross bar is welded on the guard rail bracket, and the guard rail bracket is connected to the tail of the frame.

### Common dimensions and material of rear underrun guard

100×50×4.0(mm) or 120×60×4.0(mm) rectangular steel pipe, and the material is Q235A.

### Environmental protection

#### Used waste oil (engine oil, transmission gear oil, and etc.)



#### **WARNING!**

The used waste oil will damage the quality of underground water and shall be disposed of in a proper way.

- The waste oil shall not be poured on the ground, to water or in sewers and drainage pipes; otherwise, the user may face charges.
- The used waste oil shall be collected and disposed of according to the provisions of related local regulations.

#### **Filter cartridge, filter element, filter and drying chamber**

- Used filter elements, cartridges, and filters (oil and fuel filters, and drying chamber of air dryers) are classified as hazardous waste and shall be properly disposed of according to the local regulations.

#### **Coolant**

- The undiluted coolant is a hazardous article.
- Observe the provisions of relevant local regulations when disposing of the used coolant.

## Chapter VII Technical Parameters



## Parameters of MC11/MC13 China III engine

### Parameters of MC11/MC13 China III engine

#### Parameters of MC11/MC13 China III engine

Model	MC11.35-30	MC11.43-30 (with rear PTO)	MC13.48-30	MC13.54-30
Type	In-line six-cylinder, water-cooled, four-stroke, turbocharged and intercooled			
Emission level	China III			
Cylinder bore × stroke (mm × mm)	120×155		126×166	
Displacement (L)	10.518		12.419	
Rated power/speed (Kw/r/min)	260	319/1900	400/1900	356/1900
Maximum net power/speed (kW/r/min)	257	316/1900	397/1900	353/1900
Maximum net torque/speed (N·m/r/min)	1750/1000-1400	2100/1000-1400	2300/1050-1350	2500/1050-1400
Idle speed (r/min)	550±50		600±50	
Ignition sequence	1 - 5 - 3 - 6 - 2 - 4			
Rotation direction of crankshaft	Clockwise (viewed from the free end)			

## Parameters of MC13 China III TD engine

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### Parameters of MC13 China III TD engine

#### Parameters of MC13 China III TD engine

Model	MC13.54-30A
Type	In-line six-cylinder, water-cooled, four-stroke, turbocharged and intercooled
Emission level	China III
Cylinder bore × stroke (mm × mm)	126×166
Displacement (L)	12.419
Rated power/speed (Kw/r/min)	400/1800
Maximum net power/speed (kW/r/min)	397/1800
Maximum net torque/speed (Nm/r/min)	2600/900-1400
Idle speed (r/min)	550±100
Ignition sequence	1 - 5 - 3 - 6 - 2 - 4
Rotation direction of crankshaft	Clockwise (viewed from the free end)

## Parameters of MC11 China V engine

### Parameters of MC11 China V engine

Model	MC11.40-50	MC11.44-50	MC11.46-50
Emission standard	China V (SCR)		
Number of cylinders	6		
Number of valves/cylinder	4		
Cylinder bore (mm)	120		
Stroke (mm)	155		
Displacement (L)	10.518		
Compression ratio	19:1		
Maximum net power (kW/PS)	294/400	324/440	338/460
Rated power (kW/PS)	297/404	327/445	341/464
Rated speed (rpm)	1900		
Maximum torque (N·m)	1900	2100	2200
Maximum Torque RPM	1000 ~ 1400		
Idling speed (rpm)	550±50		
Ignition sequence	1 - 5 - 3 - 6 - 2 - 4		
Rotation direction of crankshaft	Clockwise (viewed from the free end)		

## Parameters of MC13 China V engine

### Parameters of MC13 China V engine

#### Parameters of MC13 China V engine

Model	MC13.48-50	MC13.54-50
Type	In-line six-cylinder, water-cooled, four-stroke, turbocharged and intercooled, high-pressure common rail	
Emission level	China V	
Number of cylinders	6	
Number of valves/cylinder	4	
Cylinder bore (mm)	126	126
Stroke (mm)	166	166
Displacement (L)	12.419	12.419
Compression ratio	19:1	
Maximum net power (kW/PS)	353/480	397/540
Rated power (kW/PS)	356/484	400/544
Rated speed (rpm)	1900	
Maximum torque (N·m)	2300	2500
Maximum torque speed (rpm)	1050 ~ 1400	1050 ~ 1350
Idle speed (rpm)	600±50	
Ignition sequence	1 - 5 - 3 - 6 - 2 - 4	
Rotation direction of crankshaft	Clockwise (viewed from the free end)	

## Parameters of MC13 China V TD engine

### Parameters of MC13 China V TD engine

Model	MC13.48-50A	MC13.54-50A
Emission standard	Euro V	
Number of cylinders	6	
Number of valves/cylinder	4	
Cylinder bore (mm)	126	126
Stroke (mm)	166	166
Displacement (L)	12.419	12.419
Compression ratio	19:1	
Maximum net power (kW/PS)	353/480	397/540
Rated power (kW/PS)	356/484	400/544
Rated speed (rpm)	1900	
Maximum torque (N·m)	2300	2500
Maximum Torque RPM	1050 ~ 1400	1050 ~ 1350
Idling speed (rpm)	600±50	
Ignition sequence	1 - 5 - 3 - 6 - 2 - 4	
Rotation direction of crankshaft	Clockwise (viewed from the free end)	

## Parameters of MC11/MC13 China VI engine

### Parameters of MC11/MC13 China VI engine

#### Parameters of MC11/MC13 China VI engine

Model	MC11.40-61	MC11.43-61	MC11.46-61	MC13.50-61	MC13.54-61
Type	In-line six-cylinder, water-cooled, four-stroke, turbocharged and intercooled, high-pressure common rail				
Emission level	China VI				
Cylinder bore × stroke (mm × mm)	120×155			126×166	
Displacement (L)	10.518			12.42	
Rated power/speed (Kw/r/min)	297/1900	319/1900	341/1900	371/1800	400/1800
Maximum net power/ speed (kW/r/min)	294/1900	316/1900	338/1900	368/1800	397/1800
Maximum net torque/ speed (N·m/r/min)	1900/1000-1400	2100/1000-1400	2200/1000-1400	2400/1000-1400	2500/1000-1400 2600/900-1400
Idle speed (r/min)	550±50				
Ignition sequence	1 - 5 - 3 - 6 - 2 - 4				
Rotation direction of crankshaft	Clockwise (viewed from the free end)				
Aftertreatment device	DOC+DPF+SCR+ASC				

## Parameters of MT13 China V engine

### Parameters of MT13 China V engine

Model	MT13.44-51	MT13.46-51
Type	In-line six-cylinder, water-cooled, four-stroke, turbocharged and intercooled	
Emission level	China V	
Cylinder bore × stroke (mm × mm)	126×166	
Displacement (L)	12.419	
Rated power/speed (Kw/r/min)	327/1800	341/1800
Maximum net power/speed (kW/r/min)	324/1800	338/1800
Maximum net torque/speed (N·m/r/min)	2150/1100-1400	2250/1100 ~ 1400
Idle speed (r/min)	550±50	
Ignition sequence	1 - 5 - 3 - 6 - 2 - 4	
Rotation direction of crankshaft	Clockwise (viewed from the free end)	

## Parameters of Weichai WP15H China V engine

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### Parameters of Weichai WP15H China V engine

#### Parameters of Weichai WP15H China V engine

Item	Unit	WP15H
Engine type	-	Four-stroke water-cooled, electronically controlled high-pressure common rail, direct injection, dual-turbocharged and intercooler.
Number of cylinders	-	6
Cylinder bore	mm	140
Stroke	mm	166
Displacement	L	15.3
Power range	kW	485
Rotation direction of crankshaft	-	Clockwise
Starting mode	-	Electric starting



## Parameters of Weichai WP15NG China V engine

### Parameters of Weichai WP15NG China V engine

#### Parameters of Weichai WP15NG China V engine

Item	Unit	WP15NG530E52
Engine type	-	In-line, four-stroke, water-cooled, four-valve
Number of cylinders	-	6
Cylinder bore	mm	136
Stroke	mm	167
Displacement	L	14.6
Power	kW	390
Rotation direction of crankshaft	-	Clockwise

# HW transmission parameters

## HW transmission parameters

### HW transmission parameters

Model		HW25712XSJ	HW25712XSCJ	HW27712XSTCL	HW28712XSJ	HW25713C
Input torque N·m		2500	2500	2750	2800	2600
Gear		12	12	12	12	13
Speed ratio	1	14.941	11.697	11.697	15.315	16.274
	2	11.611	9.091	9.091	11.902	12.120
	3	8.986	7.038	7.038	9.212	9.364
	4	6.987	5.467	5.467	7.160	7.262
	5	5.514	4.318	4.318	5.588	5.691
	6	4.318	3.381	3.381	4.318	4.375
	7	3.460	2.709	2.709	3.547	3.443
	8	2.689	2.105	2.105	2.756	2.770
	9	2.081	1.630	1.630	2.133	2.140
	10	1.618	1.266	1.266	1.658	1.660
	11	1.277	1.000	1.000	1.294	1.301
	12	1.000	0.783	0.783	1.000	1.000
	13					0.787
	14					
	15					
	16					
	R1	13.148	10.294	10.294	13.477	14.972
	R2	3.045	2.384	2.384	3.121	/
Weight (kg)		428	428	331	428	415

HW transmission parameters

Model		HW25712XSTC	HW25712XAC	HW25712XACL	HW25712XAL	HW25716XSTL	HW25716XUL
Input torque N·m		2500	2500	2500	2500	2500	2500
Gear		12	12	12	12	16	16
Speed ratio	1	11.697(11.796)	11.795	11.697(11.796)	15.315	15.628	19.193
	2	9.091(9.167)	9.167	9.091(9.167)	11.902	12.960	13.314
	3	7.038(7.095)	7.095	7.038(7.095)	9.212	10.853	11.245
	4	5.467(5.615)	5.615	5.467(5.615)	7.160	9.000	9.246
	5	4.318(4.375)	4.375	4.318(4.375)	5.588	7.489	7.759
	6	3.381(3.438)	3.438	3.381(3.438)	4.318	6.210	6.380
	7	2.709(2.696)	2.696	2.709(2.696)	3.547	5.209	5.252
	8	2.105(2.095)	2.095	2.105(2.095)	2.756	4.318	4.318
	9	1.630(1.622)	1.622	1.630(1.622)	2.133	3.618	3.750
	10	1.266(1.283)	1.283	1.266(1.283)	1.658	3.000	3.083
	11	1.000(1.000)	1.000	1.000(1.000)	1.294	2.512	2.604
	12	0.783(0.786)	0.786	0.783(0.786)	1.000	2.083	2.141
	13					1.733	1.797
	14					1.438	1.477
	15					1.206	1.216
	16					1.000	1.000
	R1	10.294(10.852)	10.852	10.294(10.852)	13.477	13.886	14.393
	R2	2.384(2.480)	2.480	2.384(2.480)	3.121	11.515	11.835
Weight (kg)		431	395	315	330	320	310

## HW transmission parameters

HW transmission parameters

Model		HW25716XAL	HW25716XACL	HW25716XSTCL	HW27716XAL	HW27716XACL
Input torque N·m		2500	2500	2700	2750	2750
Gear		16	16	16	16	16
Speed ratio	1	15.628(15.586)	12.960	12.960(13.125)	15.628	12.960
	2	12.960(13.125)	10.800	10.800(11.053)	12.960	10.800
	3	10.853(10.885)	9.000	9.000(9.167)	10.853	9.000
	4	9.000(9.167)	7.500	7.500(7.719)	9.000	7.500
	5	7.489(7.481)	6.210	6.210(6.300)	7.489	6.210
	6	6.210(6.300)	5.175	5.175(5.305)	6.210	5.175
	7	5.209(5.195)	4.318	4.318(4.375)	5.209	4.318
	8	4.318(4.375)	3.600	3.600(3.684)	4.318	3.600
	9	3.618(3.563)	3.000	3.000(3.000)	3.618	3.000
	10	3.000(3.000)	2.500	2.500(2.526)	3.000	2.500
	11	2.512(2.488)	2.083	2.083(2.095)	2.512	2.083
	12	2.083(2.095)	1.736	1.736(1.764)	2.083	1.736
	13	1.733(1.710)	1.438	1.438(1.440)	1.733	1.438
	14	1.438(1.440)	1.198	1.198(1.213)	1.438	1.198
	15	1.206(1.188)	1.000	1.000(1.000)	1.206	1.000
	16	1.000(1.000)	0.833	0.833(0.842)	1.000	0.833
	R1	13.886(14.287)	11.515	11.515(12.031)	13.886	11.515
	R2	11.515(12.031)	9.596	9.596(10.132)	11.515	9.596
Weight (kg)		312	316	318	316	316

**HW transmission parameters**

Model		HW27716XSTCL	HW30716XAL	HW30716XSTCL
Input torque N·m		3000	3000	3200
Gear		16	16	16
Speed ratio	1	12.960(13.125)	15.628(15.586)	12.960(13.125)
	2	10.800(11.053)	12.960(13.125)	10.800(11.053)
	3	9.000(9.167)	10.853(10.885)	9.000(9.167)
	4	7.500(7.719)	9.000(9.167)	7.500(7.719)
	5	6.210(6.300)	7.489(7.481)	6.210(6.300)
	6	5.175(5.305)	6.210(6.300)	5.175(5.305)
	7	4.318(4.375)	5.209(5.195)	4.320(4.375)
	8	3.600(3.684)	4.32(4.375)	3.600(3.684)
	9	3.000(3.000)	3.618(3.563)	3.000(3.000)
	10	2.500(2.526)	3.000(3.000)	2.500(2.526)
	11	2.083(2.095)	2.512(2.488)	2.083(2.095)
	12	1.736(1.764)	2.083(2.095)	1.736(1.764)
	13	1.438(1.440)	1.733(1.710)	1.438(1.440)
	14	1.198(1.213)	1.438(1.440)	1.198(1.213)
	15	1.000(1.000)	1.206(1.188)	1.000(1.000)
	16	0.833(0.842)	1.000(1.000)	0.833(0.842)
	R1	11.515(12.031)	13.886(14.287)	11.515(12.031)
	R2	9.596(10.132)	11.515(12.031)	9.596(10.132)
Weight (kg)		318	316	310

## ZF Transmission parameters

### ZF Transmission parameters

#### ZF Transmission parameters

Model		ZF12TX2620T-D	ZF12TX2621TD	ZF12TX3221TO	ZF16S2230TO	ZF16S2530TO	ZF16S2231TO	ZF16S2531TO
Input torque N·m		2600	2600	3200	2200	2500	2200	2500
Gear		12	12	12	16	16	16	16
Speed ratio	1	16.688	16.688	12.924	13.805	13.805	13.805	13.805
	2	12.924	12.924	9.982	11.540	11.540	11.540	11.540
	3	9.926	9.926	7.688	9.487	9.487	9.487	9.487
	4	7.668	7.668	5.938	7.930	7.930	7.930	7.930
	5	5.895	5.895	4.565	6.530	6.530	6.530	6.530
	6	4.565	4.565	3.526	5.458	5.458	5.458	5.458
	7	3.655	3.655	2.831	4.565	4.565	4.565	4.565
	8	2.831	2.831	2.187	3.816	3.816	3.816	3.816
	9	2.174	2.174	1.684	3.024	3.024	3.024	3.024
	10	1.684	1.684	1.301	2.528	2.528	2.528	2.528
	11	1.291	1.291	1.000	2.078	2.078	2.078	2.078
	12	1	1	0.772	1.737	1.737	1.737	1.737
	13				1.430	1.430	1.430	1.430
	14				1.196	1.196	1.196	1.196
	15				1.000	1.000	1.000	1.000
	16				0.836	0.836	0.836	0.836
	R1	15.537	15.537	12.033	12.923	12.923	12.923	12.923
	R2	12.033	12.033	9.293	10.802	10.802	10.802	10.802
Weight (kg)		265/347 (equipped with retarder)		265	314	314	379	379

Parameters of Fast transmission

Parameters of Fast transmission					
Model		F16JZ24	F16JZ26A	F16JZ26	F16JZ28
Input torque N·m		2400	2600	2600	2800
Gear		16	16	16	16
Speed ratio	1	17.095	14.129	17.095	17.095
	2	14.129	11.703	14.129	14.129
	3	11.816	9.766	11.816	11.816
	4	9.766	8.089	9.766	9.766
	5	8.088	6.685	8.088	8.088
	6	6.685	5.537	6.685	6.685
	7	5.47	4.521	5.47	5.470
	8	4.521	3.745	4.521	4.521
	9	3.781	3.125	3.781	3.781
	10	3.125	2.588	3.125	3.125
	11	2.613	2.16	2.613	2.613
	12	2.16	1.789	2.16	2.160
	13	1.789	1.479	1.789	1.789
	14	1.479	1.225	1.479	1.479
	15	1.21	1	1.21	1.210
	16	1	0.828	1	1.000
	R1	15.727	12.999	15.727	15.727
	R2	12.999	10.767	12.999	12.999
Weight (kg)		390	390	390	390

## VOITH retarder parameters

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### VOITH retarder parameters

#### VOITH retarder parameters

Model	Refueling quantity (L)		Tightening torque (N·m)			Lubricating oil grade/oil change interval
	Initial	Repair	Oil change plug M30	Oil change plug M30	Coolant drain plug	
VOITH VR115CT	6.8	6.4	130	30	25	See "Retarder maintenance"



## ZF retarder parameters

## Parameters of ZF-Intard retarder

Matching transmission model	Tightening torque (N·m)					
	Transmission Oil drain plug	Retarder Oil drain plug	Retarder Filter element bolt	Transmission Oil overflow plug	Rear oil filler plug after repair	Install the temperature sensor bolt
9S1311TO	60	60	60	60	60	35 (heat exchanger drain plug)
16S1931	60 ±6	60 ±6	23±2	60 ±6	60 ±6	9.5±1
16 S 2231TD/TO						
16 S2531TO						
12TX2621TD	60	60	23	60	60	9.5
12TX2821TD						
12TX3221TO						
12TX3421TO						

## FAST Retarder Parameters

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### FAST Retarder Parameters

FAST Retarder Parameters									
Retarder Model	Max. Braking Torque (N·m)	Tightening Torque (N·m)						Weight (kg)	Lube Grade / Change Interval
		Transmission Drain Plug	Retarder Drain Plug	Oil Cooler Drain Plug	Oil Level Check Plug	Retarder Filler Plug	Transmission Filler Plug		
FHB400A	4000	47 ~ 68	18 ~ 25	40 ~ 55	47 ~ 68	18 ~ 25	47 ~ 68	53	See "Retarder Maintenance"

## Driven axle parameters

Table of driven axle parameters

Model		VPD95D	VPD95E	VPD95ES	VGD95	VPD85ES
Maximum turning angle of inner wheel (°)		43	43	43	43	43
Maximum turning angle of outer wheel (°)		31	31	31	31	29
King pin caster angle (°)		Road vehicle 3° Engineering vehicle 2°	Road vehicle 3° Engineering vehicle 2°	Road vehicle 3°	Road vehicle 3° Engineering vehicle 2°	3.2°
King pin inclination angle (°)		6	6	6	6	6
Wheel camber angle (°)		1	1	1	1	1
Toe-in (Vehicle unloaded)	Radial tire	-0.5 ~ 1mm/m	0±0.5mm/m	2.5±0.5mm/m	-0.5 ~ 1mm/m	2.5±0.5mm/m
Brake type		QP20L disc type	QP22 disc type	QP22 disc type	Φ410×160 drum type	QP22 disc type
Applicable minimum rim (inches)		20	20	20	20	20

## Driven axle parameters

Table of driven axle parameters

Model		VPD75D	VG75	VGD71		VGD71S		VPD71D		VPD71DS	
Maximum turning angle of inner wheel (°)		43		43	47	43	47	43	47	43	47
Maximum turning angle of outer wheel (°)		32.1		31.5	33.1	31.5	33.1	31.5	33.1	31.5	33.1
King pin caster angle (°)		Road vehicle 3°	Road vehicle 3° Engineering vehicle 2°	Road vehicle 3°		Road vehicle 3°		Road vehicle 3°		Road vehicle 3°	
King pin inclination angle (°)		6		6.5		6.5		6.5		6.5	
Wheel camber angle (°)		1		0.5		0.5		0.5		0.5	
Toe-in (Vehicle unloaded)	Radial tire	-0.5 ~ 1mm/m		-0.5 ~ 1mm/m		-0.5 ~ 1mm/m		-0.5 ~ 1mm/m		-0.5 ~ 1mm/m	
Brake type		QP20L disc type	Φ410×160 drum type	Φ 400×150 drum type		Φ 400×150 drum type		QP20L disc type		QP20L disc type	
Applicable minimum rim (inches)		20		20		20		20		20	

Table of driven axle parameters

Model		VGD50	VGD50S
Maximum turning angle of inner wheel (°)		45	
Maximum turning angle of outer wheel (°)		29.8	
King pin caster angle (°)		2-3	
King pin inclination angle (°)		6.5	
Wheel camber angle (°)		0.5	
Toe-in (Vehicle unloaded)	Radial tire	-0.5 ~ 1mm/m	
Brake type		Φ 400×150 drum type	
Applicable minimum rim (inches)		20	

## Suspension parameters

### Suspension parameters

Table of front suspension parameters

Front suspension				
Vehicle type	Drive type	Model of front axle	Few-leaf spring	Multi-leaf spring
			Specification of leaf spring	Specification of leaf spring
Towing	4×2	VPD71DS, VGD71, VGD71S, VPD95ES	3, 4	/
	6×2 (center support axle)	VPD71DS	3	/
	6×2 (rear-lifting)	VPD71DS, VGD71S	3	/
	6×4	VPD71DS, VGD95, VPD95D, VGD71, VPD95ES	3, 4	9
	6×4 (single front steering axle, twin drive axles + rear lift axle)	VPD71DS	3	/
Cargo truck	6×2 (rear-lifting)	VPD95ES, VPD71D, VPD71DS	3, 4	/
	6×4	VPD95D, VGD95, VPD71D, VPD71DS, VPD85ES	3, 4, -	9
	8×2 (rear-lifting)	VPD71D	3/3	/
	8×4	VPD71DS, VPD71D, VGD95, VPD95D	4/4, 5/5	11/11
	10×4 (rear lift axle, with steering)	VPD75D, VGD95	3/3, 4/4	11/11
Special truck	8×4	VPD71D	4/4	/
	10×4 (centrally positioned with follow-steering)	VPD95D	/	11/11
Dump truck	6×4	VGD75, VPD71DS, VGD95, VPD95D	3	10
	8×4	VPD71DS, VPD95D, VGD95, VPD71D	3/3, 4/4	11/11
	10×4 (rear lift axle, with steering)	VPD75D	4/4	/

**Table of rear suspension parameters**

Rear suspension				
Vehicle type	Drive type	Rear axle model	Few-leaf spring	Multi-leaf spring
			Specification of leaf spring	Specification of leaf spring
Towing	4×2	MCY13JES, MCY13JGS, MCP16ZG	5, -	9+6
	6×2 (center support axle)	MCY13JES	-/-	/
	6×2 (rear-lifting)	MCY13JES, MCY13JGS	5, -/-	/
	6×4	MCY13BGS, MCP16ZG, MCY13BES, MCX16ZG, MCY12BES, MCP23ZG	5, -/-	12
	6×4 (single front steering axle, twin drive axles + rear lift axle)	MCY12BES	-/-	/
Cargo truck	6×2 (rear-lifting)	MCY13JGS, MCY13JES	-/-	/
	6×4	MCY13BGS, MCP16ZG, MCY11BGS, MCY13BES	5, -/-	12
	8×2 (rear-lifting)	MCY13JES	-/-	/
	8×4	MCX16ZG, MCY13BGS, MCP16ZG, MCY13BES	5, -/-	12
	10×4 (rear lift axle, with steering)	MCY13BGS, MCY13JGS	2+/-2+/-	12/2+/-
Special truck	8×4	MCY13BGS	5	/
	10×4 (centrally positioned with follow-steering)	MCP16ZG	/	-/12
Dump truck	6×4	MCX16ZG, MCY13BES, MCP16ZG	-/-	12
	8×4	MCY13BES, MCP16ZG, MCY13JES, MCY13BGS, MCP23ZG	5, -/-	12, 14
	10×4 (rear lift axle, with steering)	MCY13JGS, MCY13JES	2+/-2+/-/-, 5/5/-	/

## Suspension parameters

**Balance Shaft Maintenance Parameter Table**

Assembly	Product name	Quality grade and viscosity grade	Quantity	Maintenance mileage and items
Leaf spring pin	Grease	Lithium-based grease #2	350 g	Check every 2,500-3,500 km. Fill in case of a lack, and no replacement is required.
Metal balance shaft	Gear oil	GL-5 85W/-90 gear oil	Single-sided 0.35-0.4L (MAN chassis tractor)	No replacement
			Single-sided 0.9-1L (Version 5 tractor)	
Rubber bearing balance shaft	N/A	N/A	N/A	Maintenance-free, no replacement



## Tire parameters

Table of wheel parameters

Model	8.00V-20	8.5-20	8.5-24	8.75-20	8.75-24	22.5×8.25	22.5×9.00	22.5×11.75
Rim type	Two-piece	Two-piece	Two-piece	Two-piece	Two-piece	One-piece	One-piece	One-piece
Tire specification	11.00R20	12.00R20	12.00R24	12.00R20	325/95R24	275/70R22.5 285/70R22.5 11R22.5	12R22.5 315/80R22.5 295/80R22.5 315/70R22.5 315/60R22.5 13R22.5	385/65R22.5

## Tire parameters

Table of tire pressure parameters

Model	Single tire (kPa)	Double tires (kPa)
11.00R20 (ply rating 18)	930	
11R22.5 (ply rating 18)	930	
11R22.5 (ply rating 16)	830	
12.00R24, ply rating 20	900	
12.00R20 (ply rating 16)	760	
12.00R20 (ply rating 18)	830	
12.00R20 (ply rating 20)	900	
12R22.5 (ply rating 18)	930	
275/70R22.5 (ply rating 16)	830	
315/70R22.5 (ply rating 16)	760	
315/70R22.5 (ply rating 18)	830	
315/70R22.5 (ply rating 20)	930	
295/80R22.5 (ply rating 18)	900	
315/80R22.5 (ply rating 18)	830	
315/80R22.5 (ply rating 20)	900	
385/65R22.5 (ply rating 20)	900	
315/60R22.5 (ply rating 18)	830	
325/95R24 (ply rating 20)	900	
13R22.5 (ply rating 18)	830	

## Requirements for dynamic balance of wheel and tire assembly

Tire specification	Wheel and tire assembly unbalance amount (g.cm)
11.00R20 (ply rating 18)	≤8000
11R22.5 (ply rating 18)	≤5000
11R22.5 (ply rating 16)	≤5000
12.00R24, ply rating 20	≤8000
12.00R20 (ply rating 16)	≤8000
12.00R20 (ply rating 18)	≤8000
12.00R20 (ply rating 20)	≤8000
12R22.5 (ply rating 18)	≤5000
275/70R22.5 (ply rating 16)	≤5000
315/70R22.5 (ply rating 16)	≤5000
315/70R22.5 (ply rating 18)	≤5000
315/70R22.5 (ply rating 20)	≤5000
295/80R22.5 (ply rating 18)	≤5000
315/80R22.5 (ply rating 18)	≤5000
315/80R22.5 (ply rating 20)	≤5000
385/65R22.5 (ply rating 20)	≤5000
315/60R22.5 (ply rating 18)	≤5000
325/95R24 (ply rating 20)	≤8000
13R22.5 (ply rating 18)	≤5000

## Light parameters

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### Light parameters

#### Light parameters - headlight

Light name	Light source type/model	Power (W)	Quantity per vehicle (piece)
Low beam	PHILPS	LED	2
Position light	PHILPS	LED	2
Daytime running light	PHILPS	LED	2
High beam	PHILPS	LED	2
Front fog light	PHILPS	75	2
Auxiliary high beam	PHILPS	70	2
Turn signal	PHILPS	21	2

Light parameters - taillight

Light name		Light source type/model	Power (W)	Quantity per vehicle (piece)
With side marker light 7-function rear tail light	Clearance light	PHILPS	LED	2
	Turn signal	PHILPS	21	2
	Rear fog light	PHILPS	21	2
	Rear position light	PHILPS	LED	2
	Reversing light	PHILPS	21	2
	Brake light	PHILPS	21	2
	Side marker lights	PHILPS	LED	2
	License plate light	PHILPS	5	1
Rear tail light	Clearance light	R5W	5	2
	Turn signal	PY21W	21	2
	Brake light	P21W	21	2
	Reversing light	P21W	21	2
	Rear position light	R5W	2*5	2
	Rear fog light	P21W	21	2
	Side marker lights	R5W	5	2
	License plate light	/	5	1

## Light parameters

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### Light parameters - other lighting

Light name	Light source type/model	Power (W)	Quantity per vehicle (piece)
Height light	PHILPS	5	2
Front clearance light	PHILPS	5	2
Rear clearance light	PHILPS	5	2
Rear side marker light	PHILPS	5	2
Rear side marker light	PHILPS	LED	2
Turn signal marker light	PHILPS	21	2
Interior light	PHILPS	LED	2
Reading Light	PHILPS	LED	2
Sleeper light	PHILPS	LED	1
Door light	PHILPS	5	2

**Vehicle parameters**
**Vehicle Parameter Table**

Model No.			ZZ4186V391HE1B (tractors)	ZZ4256V334HC1B (tractors)
Drive type			4×2	6×4
Mass parameters	Curb weight (kg)		7600	8800,9300
	Axial load distribution (kg)	Front Axle	5270	4889,5200
		Rear axle	2330	3911,4100
	Full-load mass (kg)		18000	25000
	Axial load distribution (kg)	Front Axle	7000	7000
		Rear axle	11000	18000
	Total weight of trailer allowed (kg)		33000	40000,39500
	Maximum permissible load mass on the (traction) base (kg)		10470	16070,16005,15570,15505
Dimensions	Total length (mm)		6417	7170
	Overall width (mm)		2550	2496,2550
	Total height (mm)		3260	3290,3620,3845,3960,3980
	Wheelbase (mm)		3900	3300+1400
	Wheel track (mm)	Front wheel	2045	2022,2041
		Rear wheel	1816	1830/1830
	Front overhang (mm)		1492	1492
	Rear overhang (mm)		1025	978
Performance parameters	Maximum speed (km/h)		110	89
	Maximum gradeability (%)		35	35
	Minimum turning diameter (m)		15	17,18
	Fuel consumption (L/100 km)		35	42

## Vehicle parameters

**Vehicle Parameter Table**

Model No.			ZZ3316V306ME1 (Dump truck)	ZZ4256V323HC1R (tractors)
Drive type			8×4	6×2
Mass parameters	Curb weight (kg)		10700	8608
	Axial load distribution (kg)	Front Axle	6700	4874
		Rear axle	4000	3734
	Full-load mass (kg)		31000	25000
	Axial load distribution (kg)	Front Axle	15000	7000
		Rear axle	16000	18000
	Total weight of trailer allowed (kg)		/	40000
	Maximum permissible load mass on the (traction) base (kg)		/	16005
Dimensions	Total length (mm)		8617	6916
	Overall width (mm)		2550	2490
	Total height (mm)		3620	4015
	Wheelbase (mm)		1950+3025+1350	3200+1400
	Wheel track (mm)	Front wheel	2029	2022
		Rear wheel	1852	1816
	Front overhang (mm)		1492	1475
Performance parameters	Rear overhang (mm)		800	841
	Maximum speed (km/h)		110	80
	Maximum gradeability (%)		35	30
	Minimum turning diameter (m)		22	15
	Fuel consumption (L/100 km)		55	45



Vehicle Parameter Table

Model No.			ZZ4256V324HE1B (tractors)	ZZ4256V324HE1B (tractors)
Drive type			6×4	6×4
Mass parameters	Curb weight (kg)		8800,9300	8800,9300
	Axial load distribution (kg)	Front Axle	4889,5200	4889,5200
		Rear axle	3911 (two-axle group), 4100 (two-axle group)	3911 (two-axle group), 4100 (two-axle group)
	Full-load mass (kg)		25000	25000
	Axial load distribution (kg)	Front Axle	7000	7000
		Rear axle	18000 (parallel-mounted axle)	18000 (parallel-mounted axle)
	Total weight of trailer allowed (kg)		40000,39500	40000,39500
	Maximum permissible load mass on the (traction) base (kg)		16070,16005,15570,15505	16070,16005,15570,15505
Dimensions	Total length (mm)		7170	7170
	Overall width (mm)		2496,2550	2496,2550
	Total height (mm)		3290,3620,3845,3960,3980	3290,3620,3845,3960,3980
	Wheelbase (mm)		3300+1400,3325+1350	3325+1350, 3300+1400
	Wheel track (mm)	Front wheel	2022,2041	2022,2041
		Rear wheel	1830/1830	1830/1830
	Front overhang (mm)		1492	1492
	Rear overhang (mm)		978	978
Performance parameters	Maximum speed (km/h)		89110	89110
	Maximum gradeability (%)		35	35
	Minimum turning diameter (m)		17	17,18
	Fuel consumption (L/100 km)		39.7,39.1,39.9,39.5	39.7,39.1,39.9,39.5

Vehicle parameters

Vehicle Parameter Table				
Model No.			ZZ4186V361HE1B (tractors)	ZZ4256V324HE1W (tractors)
Drive type			4×2	6×4
Mass parameters	Curb weight (kg)		6800,7400	8800
	Axial load distribution (kg)	Front Axle	4420,4810	4930
		Rear axle	2380,2590	3870 (two-axle group)
	Full-load mass (kg)		18000	25000
	Axial load distribution (kg)	Front Axle	6500	7000
		Rear axle	11500	18000 (two-axle group)
	Total weight of trailer allowed (kg)		35000,34400	40000
	Maximum permissible load mass on the (traction) base (kg)		11070,11005,10470,10405	16070,16005
Dimensions	Total length (mm)		6070,6417	7170
	Overall width (mm)		2496,2550	2496,2550
	Total height (mm)		3290,3620,3845,3960,3980	3290,3620,3845,3960,3980,3500
	Wheelbase (mm)		3600,3900	3300+1400
	Wheel track (mm)	Front wheel	2022,2041	2022,2041
		Rear wheel	1830	1830/1830
	Front overhang (mm)		1492	1492
	Rear overhang (mm)		978,1025	978
Performance parameters	Maximum speed (km/h)		89110	89110
	Maximum gradeability (%)		35	35
	Minimum turning diameter (m)		13.2,14.1	15
	Fuel consumption (L/100 km)		35	39.2

Vehicle Parameter Table

Model No.			ZZ4256V364HC1H (tractors)	ZZ4256V334HC1B (tractors)
Drive type			6×4	6×4
Mass parameters	Curb weight (kg)		10924	8800,9300
	Axial load distribution (kg)	Front Axle	5461	4889,5200
		Rear axle	5463 (two-axle group)	3911 (two-axle group), 4100 (two-axle group)
	Full-load mass (kg)		25000	25000
	Axial load distribution (kg)	Front Axle	7000	7000
		Rear axle	18000 (two-axle group)	18000 (two-axle group)
	Total weight of trailer allowed (kg)		40000	40000,39500
	Maximum permissible load mass on the (traction) base (kg)		13946,13881	16070,16005,15570,15505
Dimensions	Total length (mm)		7192	7170
	Overall width (mm)		2550	2550
	Total height (mm)		3290,3620,3845,3960,3980	3290,3620,3845,3960,3980
	Wheelbase (mm)		3625	3300
	Wheel track (mm)	Front wheel	2034	2022,2041
		Rear wheel	1862	1830/1830
	Front overhang (mm)		1492	1492
	Rear overhang (mm)		725	978
Performance parameters	Maximum speed (km/h)		89110	89
	Maximum gradeability (%)		35	35
	Minimum turning diameter (m)		17.2	16.2
	Fuel consumption (L/100 km)		45	42

## Vehicle parameters

Vehicle Parameter Table

Model No.			ZZ4186V361HE1B (tractors)	ZZ4186V391HE1B (tractors)
Drive type			4×2	4×2
Mass parameters	Curb weight (kg)		6800	7600
	Axial load distribution (kg)	Front Axle	4420	5270
		Rear axle	2380	2230
	Full-load mass (kg)		18000	18000
	Axial load distribution (kg)	Front Axle	6500	7000
		Rear axle	11500	11000
	Total weight of trailer allowed (kg)		35000	33000
	Maximum permissible load mass on the (traction) base (kg)		11070,11005,10470,10405	10470
Dimensions	Total length (mm)		6070,6417	6417
	Overall width (mm)		2496,2550	2550
	Total height (mm)		3290,3620,3845,3960,3980	3290,3620,3845,3960,3980
	Wheelbase (mm)		3600	3900
	Wheel track (mm)	Front wheel	2022	2045
		Rear wheel	1830	1816
	Front overhang (mm)		1492	1492
	Rear overhang (mm)		978	1025
Performance parameters	Maximum speed (km/h)		89110	89110
	Maximum gradeability (%)		35	35
	Minimum turning diameter (m)		14.1	15.3
	Fuel consumption (L/100 km)		35	35

Vehicle Parameter Table

Model No.			ZZ4256V323HC1R (tractors)	ZZ1256V523HF1 (cargo)
Drive type			6×2	6×2 (rear-lifting)
Mass parameters	Curb weight (kg)		8610	9680
	Axial load distribution (kg)	Front Axle	4875	5080
		Rear axle	3735	2300/2300
	Full-load mass (kg)		25000	26000
	Axial load distribution (kg)	Front Axle	7000	7000
		Rear axle	18000	9500/9500
	Total weight of trailer allowed (kg)		40000	/
	Maximum permissible load mass on the (traction) base (kg)		16005	/
Dimensions	Total length (mm)		6916	10375
	Overall width (mm)		2490	2525
	Total height (mm)		3595	3100
	Wheelbase (mm)		3200+1400	5200+1400
	Wheel track (mm)	Front wheel	2022	2045
		Rear wheel	1816	1850/1850
	Front overhang (mm)		1475	1475
	Rear overhang (mm)		841	2300
Performance parameters	Maximum speed (km/h)		80	90
	Maximum gradeability (%)		30	35
	Minimum turning diameter (m)		15.8	24
	Fuel consumption (L/100 km)		45	30

## Vehicle parameters

Vehicle Parameter Table

Model No.			ZZ1256V523ME1K (cargo)	ZZ1326V62AHF1 (cargo)
Drive type			6×2 rear-lifting	8×2
Mass parameters	Curb weight (kg)		9680	10050
	Axial load distribution (kg)	Front Axle	5080	3200/2850
		Rear axle	2300/2300	40000
	Full-load mass (kg)		26000	32000
	Axial load distribution (kg)	Front Axle	7000	6500/7000
		Rear axle	9500/9500	18500
	Total weight of trailer allowed (kg)		/	/
	Maximum permissible load mass on the (traction) base (kg)		/	/
Dimensions	Total length (mm)		10375	11992
	Overall width (mm)		2525	2492
	Total height (mm)		3100	3312
	Wheelbase (mm)		5200+1400	1950+6200+1400
	Wheel track (mm)	Front wheel	2045	2041
		Rear wheel	1850/1850	1830
	Front overhang (mm)		1475	1492
	Rear overhang (mm)		2300	950
Performance parameters	Maximum speed (km/h)		90	115
	Maximum gradeability (%)		35	30
	Minimum turning diameter (m)		24	24
	Fuel consumption (L/100 km)		30	28

**Vehicle Parameter Table**

Model No.			ZZ1316V436ME1 (cargo)	ZZ1266V484HE1K/W7PDM48-BZ (cargo)
Drive type			8×4	6×4
Mass parameters	Curb weight (kg)		9500	10620
	Axial load distribution (kg)	Front Axle	3170/2835	5530
		Rear axle	1754/1712	2650/2445
	Full-load mass (kg)		31000	24620
	Axial load distribution (kg)	Front Axle	5820/5480	10220
		Rear axle	9875/9830	7475/7250
	Total weight of trailer allowed (kg)		/	/
	Maximum permissible load mass on the (traction) base (kg)		/	/
Dimensions	Total length (mm)		11425	10375
	Overall width (mm)		2496,2550	2550
	Total height (mm)		3600	3261
	Wheelbase (mm)		4300+1400	4800+1400
	Wheel track (mm)	Front wheel	2054	2048
		Rear wheel	1850	1838
	Front overhang (mm)		1475	1475
	Rear overhang (mm)		2300	2600
Performance parameters	Maximum speed (km/h)		89	90
	Maximum gradeability (%)		30	35
	Minimum turning diameter (m)		14	19.54
	Fuel consumption (L/100 km)		28	32

## Vehicle parameters

Vehicle Parameter Table

Model No.			ZZ3316V306ME1 (Dump truck)	ZZ1386V26KF1R (Stirring)
Drive type			8×4	10×4
Mass parameters	Curb weight (kg)		10700	10729
	Axial load distribution (kg)	Front Axle	3350/3350	3360/3359
		Rear axle	2000/2000	1337/1337/1336
	Full-load mass (kg)		31000	38000
	Axial load distribution (kg)	Front Axle	4650/4650	7000/7000
		Rear axle	10850/10850	8000/8000/8000
	Total weight of trailer allowed (kg)		/	/
	Maximum permissible load mass on the (traction) base (kg)		/	/
Dimensions	Total length (mm)		8617	9955
	Overall width (mm)		2550	2500
	Total height (mm)		3620	3260
	Wheelbase (mm)		1950+3025+1350	1950+2550+1400+1400
	Wheel track (mm)	Front wheel	2033	2036
		Rear wheel	1852	1847
	Front overhang (mm)		1492	1475
	Rear overhang (mm)		800	1180
Performance parameters	Maximum speed (km/h)		110	100
	Maximum gradeability (%)		35	30
	Minimum turning diameter (m)		22	19.72
	Fuel consumption (L/100 km)		55	45



**Vehicle Parameter Table**

Model No.			ZZ1386V26KF1R (mixer)	ZZ4256V364HC1H (tractor)
Drive type			10×4	6×4
Mass parameters	Curb weight (kg)		10729	10924
	Axial load distribution (kg)	Front Axle	6719	5461
		Rear axle	4010	5463
	Full-load mass (kg)		38000	25000
	Axial load distribution (kg)	Front Axle	14200	7000
		Rear axle	30900	18000
	Total weight of trailer allowed (kg)		/	40000
	Maximum permissible load mass on the (traction) base (kg)		/	13946,13881
Dimensions	Total length (mm)		9955	7192
	Overall width (mm)		2496	2550
	Total height (mm)		3260	3290
	Wheelbase (mm)		1950+2550+1400+1400	3625
	Wheel track (mm)	Front wheel	2036	2034
		Rear wheel	1848	1862
	Front overhang (mm)		1180	1492
	Rear overhang (mm)		1475	725
Performance parameters	Maximum speed (km/h)		100	110
	Maximum gradeability (%)		30	35
	Minimum turning diameter (m)		19.72	15.8
	Fuel consumption (L/100 km)		45	45

## Vehicle parameters

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(The above relevant assembly models and technical parameters are for reference only, and the actual configuration of the ordered model shall prevail. For details, please consult SINOTRUK International and its local Sales Divisions)



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