Welcome to choose the SINOTRUK series product, HOWO － A7

Preface

This Driver's Manual introduces the operating method, daily maintenance and vehicle maintenance of HOWO-A7 series vehicles, and relevant safety regulations to be observed during vehicle use.

Please read this Manual carefully before driving the vehicle for the first time.

Refer to relevant manufacturer's documents for detailed description of assembly, modification parts or accessories produced by other companies other than SINOTRUK.

As vehicle models are numerous, it is possible that the vehicle photos in this Manual are inconsistent with the vehicle model you have purchased. These illustrations are only representative examples. This Company reserves the right to modify vehicle shape, configuration and technical performance at any time. So, we will not accept any claim about data, legend or text description in This Manual.

Vehicle configuration is subject to purchase order, and Driver's Manual will be updated from time to time.

The Driver's Manual is a part of vehicle, so please carry it about for use from time to time.

Wish you have a safe and enjoyable drive!

China National Heavy Duty Truck Group Co., Ltd. (SINOTRUK)
March, 2016

Warning

- **Engine must use special oil for Sinotruk engine, engine oil filter element and fuel filter element; otherwise, it may cause premature wear of engine, and SINOTRUK will only provide paid service!**
- **Transmission must use special transmission gear oil of SINOTRUK; otherwise, it may cause transmission damage, and SINOTRUK will only provide paid service!**
- **Drive axle must use special drive axle gear oil of SINOTRUK; otherwise, it may cause drive axle damage, and SINOTRUK will only provide paid service!**
- **When replacing air filters, only use SINOTRUK original parts, otherwise dust may enter engine inlet. SINOTRUK only provides paid service.**
- **Please use special coolant for SINOTRUK; otherwise it may cause engine damage, and SINOTRUK will only provide paid service!**
- **Please go to the Sinotruk-appointed service station for the replacement of fuel and oil filter elements, and first or regular maintenance.**

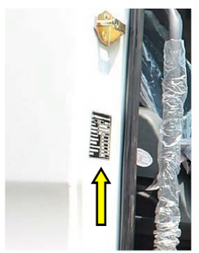
Vehicle nameplate

The vehicle nameplate is located on the lower part of the door frame pillar at the codrivers' side. (Visible when the door is open). Vehicle model, main quality parameters and engine model are indicated on the nameplate.

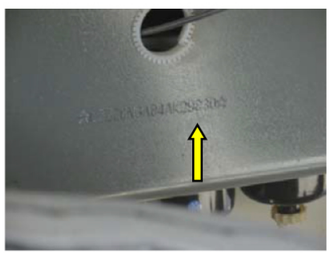
Please verify whether VIN is consistent with certificate of conformity.

Engine nameplate of WD615, D12, D10, T10 and T12 is on the oil cooler's cap.

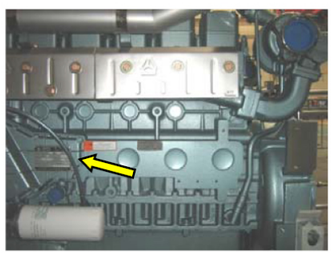
Engine nameplate information includes engine model, rated power/speed, and factory number and purchase order.



Vehicle Nameplate



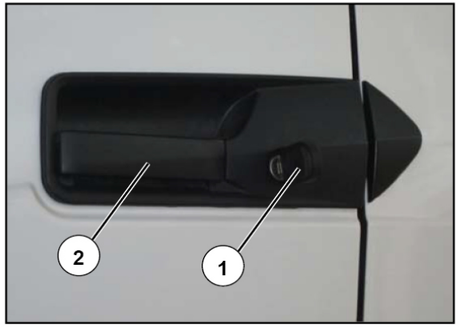
VIN Code

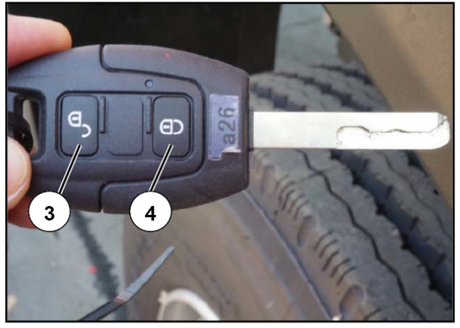


Engine Nameplate

HOWO-A7

Chapter I Vehicle Operation





Door operation/central control door lock

Warning!

Do not drive vehicle before vehicle door is closed normally!

Door operation (outside vehicle)

Open vehicle door

- Method I: Insert the key into lock hole, turn the key counterclockwise (clockwise at co-driver's side) to open the door lock; pull the handle ② and open the door.
- Method II: Use a remote key, press the unlock button to open all door locks by controlling the central control door lock; pull the handle ② and open the door.

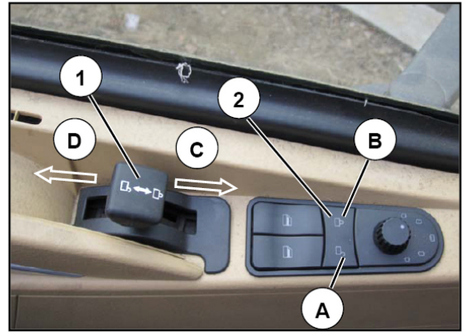
Lock vehicle door

- Method I: Close the door with proper force; insert the key ① into lock hole, turn it clockwise (counterclockwise at co-driver's side) to lock the door lock.
- Method II: Close the door with proper force; use a remote key and press the lock button to lock all door locks by controlling the central control door lock.

Door operation (inside door)

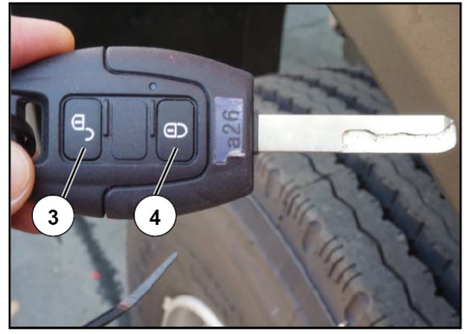
Open the door (on driver's side, and the door lock is not latched)

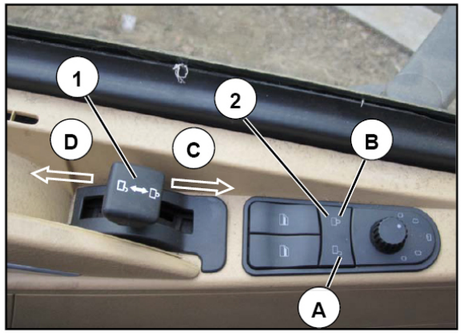
Pull the handle ① in D direction to the limit and push open the door.



Open the door (At driver's side, and the door lock is locked)

- Method I: Pull the handle ① in D direction and push the door open
- Method II: Press the "A" button at right side of rocker switch ②; at this moment, the door lock is unlocked and the handle is at middle position; pull the handle ① in D direction to the limit to push the door open.
- Method III: when key switch is at off position, use a remote key and press the unlock button③,to open all door locks by controlling the central control door lock.Pull the handle① towards D position to the limit and open the door.

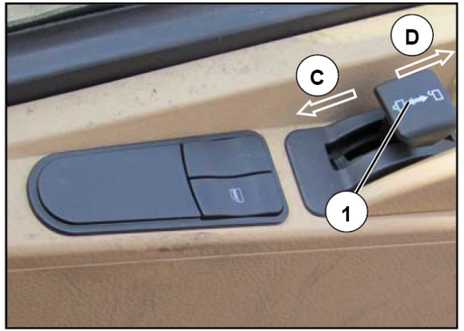




Lock vehicle door (At driver's side)

- Method I: Close the door with proper force, and push the handle ① in C direction to the limit.
- Method II: Close the door with proper force, and press "B" key on the left side of rocker switch ②.
- Method III: Close the door with proper force; use a remote key and press the lock key to lock all door locks by controlling the central control door lock.

Note: The rocker switch ② controls doors on both sides, while the handle ① only controls the single-side door.



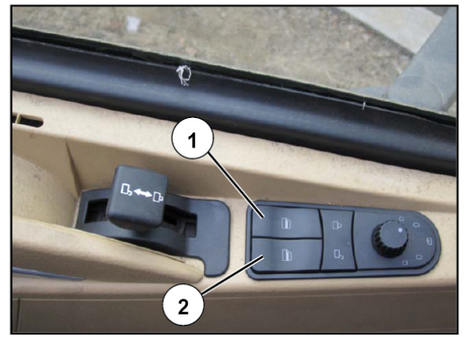
Open vehicle door (At co-driver's side)

The operating method is the same as that at driver's side.

Lock vehicle door (At co-driver's side)

The operating method is the same as that at driver's side.

Power window (At driver's side)



Warning!

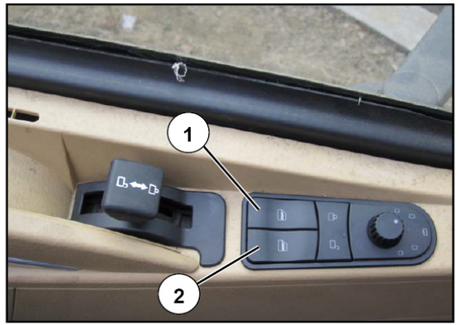
– Be careful of injury risk!

– Ensure that nobody is clamped when closing windows!

– To prevent door window and lock motors are overheated due to frequent switching operation, control system will implement overheating protection for door window and lock motors! After the door and window motors start and stop continuously for 10 times within 5s, such motors will not respond to the operating commands within 3min any longer. After the door lock motor unlocks and locks continuously for 8 times within 5s, this motor will not respond to any operating command within 10s any longer.

Partially or completely open the window

- Press the key switch.
- Press the front part of the rocker switch ① (controlling the window at driver's side) or ② (controlling the window at co-driver's side).
- If pressing time is less than 2s, the door glass will fall automatically and keeps moving till the switch is released.
- If pressing time is over 2s, the window will automatically moves down to the bottom; when the window glass is moving, the window stops moving if the rocker switch ① or ② is pressed again



Partially or completely close the window

- Press the rear part of the rocker switch ① (controlling the window at driver's side) or ② (controlling the window at co-driver's side).
- If pressing time is less than 2s, the window will close automatically and keeps moving till the switch is released.
- If pressing time is over 2s, the window will automatically moves up to top; when the window glass is moving, the window stops moving if the rocker switch ① or ② is pressed again.

Power window (At co-driver's side)

The operating method is the same as that at driver's side.

Note: The rocker switch at driver's side can control rise and fall of door window glasses at both sides but the rocker switch at co-driver's side only can control rise and fall of door window glasses at single one side.

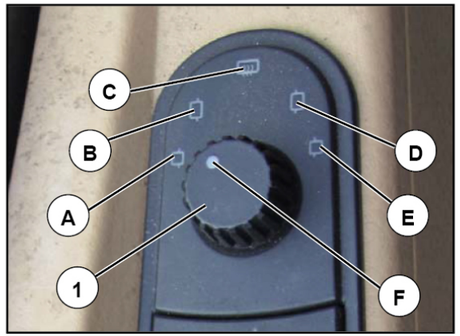
Adjustment of rear-view mirror

Warning!

– The rear view mirror cannot be adjusted unless the key switch is at position II!

– Ensure that the driver's seat is at correct position!

– The control system can offer overheat protection to motors in order to prevent overheating due to frequent action of switches! After the rear-view mirror starts and stops continuously for 10 times within 5s, the mirror will not respond to the operating commands within 3min any longer.



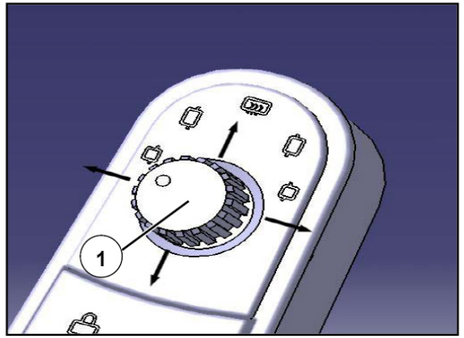
- Check rearview mirror setting, and make adjustment as required.
- If necessary, clean the rear-view mirror.
- The control knob of rear-view mirror ① is at the door switch panel at driver's side and has 5 positions:

  A Left wide-angle mirror B Left rear-view mirror

  C Rear-view mirror defrost D Right rear-view mirror

  E Right wide-angle mirror

- Select the rear-view mirror (wide-angle mirror) or rear-view mirror defroster to be controlled via the above 5 positions.
- During adjusting, the mark F on knob ① must stay at the extact positions



Adjustment of rear-view mirror

- The control knob ① of rear-view mirror can be turned on the switch panel as follows:

Turn upwards (forwards)

Turn downwards (backwards)

Turn leftwards

Turn rightwards

- The knob lever automatically recovers to the middle position after the operation is canceled.
- Rear-view mirror stops moving where：

The control knob of rear-view mirror is reset;

The control knob of rear-view mirror is turned to other positons;

The ignition switch is not at position II.

Warning!

– Rearview mirror heating device will work only after key switch is connected!

– Please open rearview mirror heating device when rearview mirror is frozen or frosty!

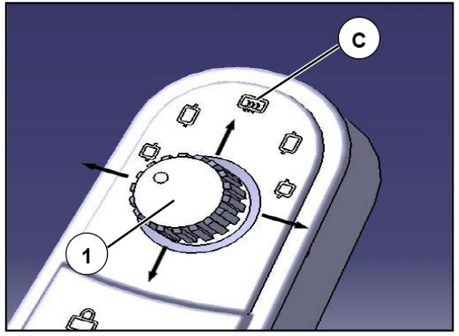
– The heating unit of rear-view mirror will fail when voltage is lower than 23V; the heating unit of rear-view mirror cannot open automatically when the voltage returns to normal; after the key switch is turned to position II again and the voltage returns to normal, the heating unit of rear-view mirror also returns to normal!

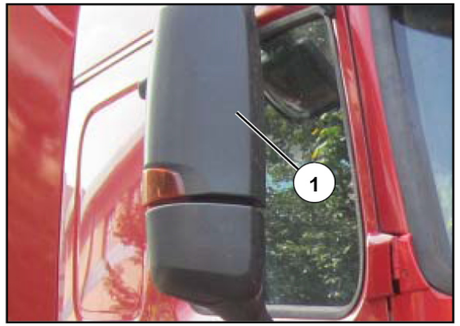
Open rearview mirror heating device

- Connect key switch.
- When the knob switch ① is turned to C, turn upwards (forwards) the knob lever of rear-view mirror to turn on the heating unit of all rear-view mirrors.

Close rearview mirror heating device

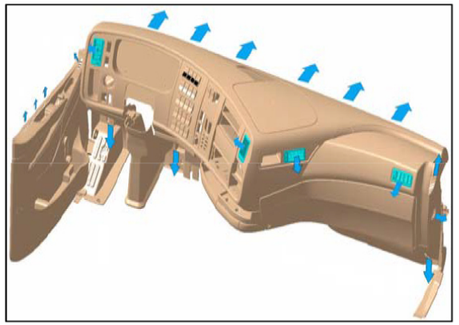
- When the rear-view defroster is working, turn the control knob ① of rear-view mirror to upwards (forwards) again.
- After the rear-view mirror defrost function is started 15min.
- The key switch signal is not at ON any longer, i.e. the switch is not at position II.





Adjustment of manual rear-view mirror (optional)

- The rear-view mirror ① shall be adjusted when the vehicle stops.
- Confirm vehicle door is in lock state before rearview mirror adjustment.
- Lower window glass, and obtain appropriate glass lens angle by pressing the perimeter of left and right rearview mirrors.
- Appropriate glass lens angle may come when repeated readjuustements happen.



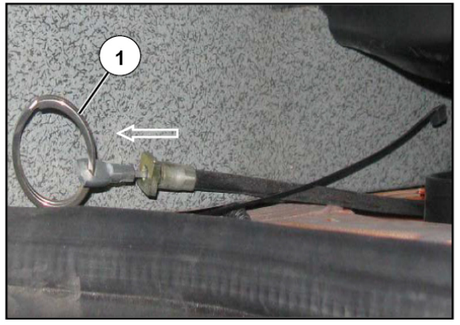
Front windshield heating

Please see “air conditioning system” for front windshield heating control

Storage box

Storage box can be used to store clothes and other live items, but heavy objects shall not be placed in it.

The right figure shows the state when the storage box is open.

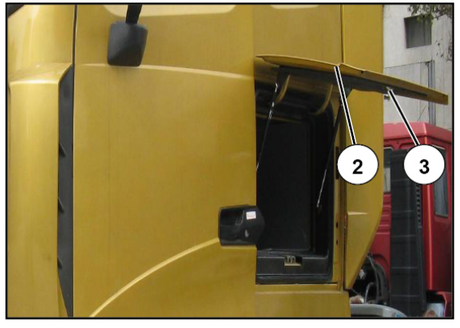


Toolkit

There are a tool box ② respectively at left and right sides.

Open the door of tool boxes

- Find the cable ① of tool box outside the seat, and pull along the direction where the arrow shows



- Open the cover of tool box ② and it will uplift automatically under support of air spring after passing the dead point.

Close the toolkit

- Use the belt③ to pull down toolkit downward, and close the cover of the toolkit with proper force to lock it.

Sun visor

Operating of side sun visor

State of contracted side sun visor ①

Unfolding of side sun visor

- Drag the side visor ① inwards and downwards to turn downward the hinge plate ② and drag the side visor ① forward or backward to get a proper position.

Folding the side visor

- The folding steps of side visor are reverse to its unfolding steps.

Front sun visor operation

This figure shows the state when the visor is unfolded.

Fold the front sun visor

- Turn the visor to stay close to the panel at the top, and then it will stop at designed position when it is folded.

This figure shows the front sun visor is folded.

Unfold the front sun visor

- Implement the steps reverse to those to fold the sun visor

Curtain

The curtains shall be contracted behind left and right seats!

Unfolding and fixation of curtains

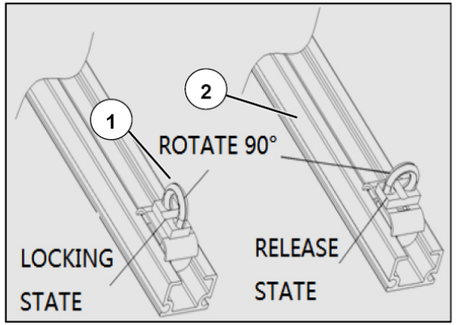
● Unfold the left and right curtains along curtain rails respectively forwards to the middle position of air window, and then bond left and right curtains together (the curtain is provided with thread gluing).

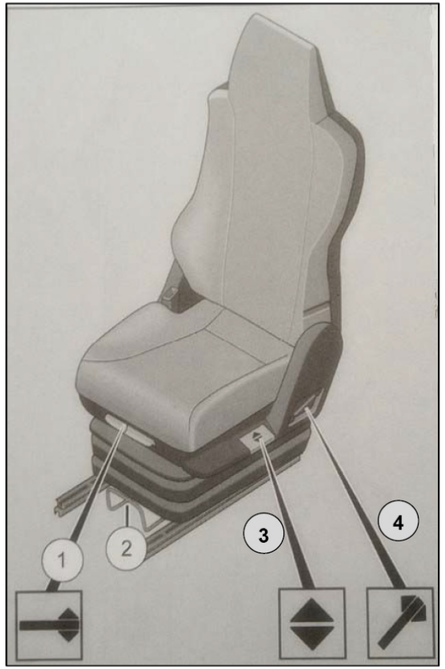
Unfolding of curtain

● Take reverse steps of folding the curtains, and hang down curtains respectively behind two sides of the seat.

Removal and installation of curtain

● There is a limit stopper ① respectively at both ends of each curtain rail to prevent curtain slipping from rail ②; the curtain cannot be removed unless the limit stopper ① is taken down. Rotate 90° the plastic parts on limit stopper ① to fasten and release the limit stopper, thereby finishing removal, installation and fixation of curtains.





Seat adjustment

Driver and co-driver's seats (comfort type)

Warning!

– Do not adjust seats during driving. Seat can only be adjusted when vehicle is in stationary state, and luxurious seat can only be adjusted under load and air pressure is not lower than 8bar.

– Make sure that you can hear the engagement sound of seat locking device!

– Be sure not to fix child seat on driver and assistant driver seats.

– Be sure to fasten the safety belt before driving; refer to "seat belt".

1 Seat angle adjustment

2 Seat front and back adjustment

3 Seat height adjustment

4 Seat backrest adjustment angle

Seat angle adjustment

- Pull handle ① up to adjust seat angle as required.
- Release handle.

Seat front and back adjustment

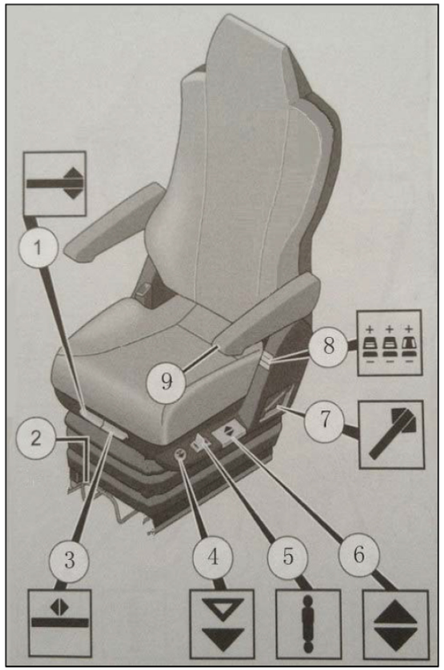
- Pull handle ② up to slide seat forward/backward.
- Release handle.
- Slightly push seat forward or backward, until locking sound of seat is heard.

Seat height adjustment

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

Seat backrest adjustment angle

- Lean forward to leave seat backrest.
- Pull handle ④ up.
- Adjust backrest to the required position.
- Release the handle.



Driver and co-driver's seats (luxurious type)

Warning!

– Do not adjust seats during driving. Seat can only be adjusted when vehicle is in stationary state, and luxurious seat can only be adjusted under load and air pressure is not lower than 8bar.

– Make sure that you can hear the engagement sound of seat locking device!

– Be sure not to fix child seat on driver and assistant driver seats.

– Be sure to fasten the safety belt before driving, refer to "seat belt".

1 Seat angle adjustment
2 Seat front and back adjustment
3 Front and rear adjustment of seat cushion
4 Quick lowering device
5 Absorber adjustment
6 Seat height adjustment (pneumatic)
7 Seat backrest adjustment angle
8 Waist support device and lateral support device adjustment (pneumatic)
9 Armrest adjustment

Seat angle adjustment

- Pull handle ① up to adjust seat angle as required
- Release handle.

Seat front and back adjustment

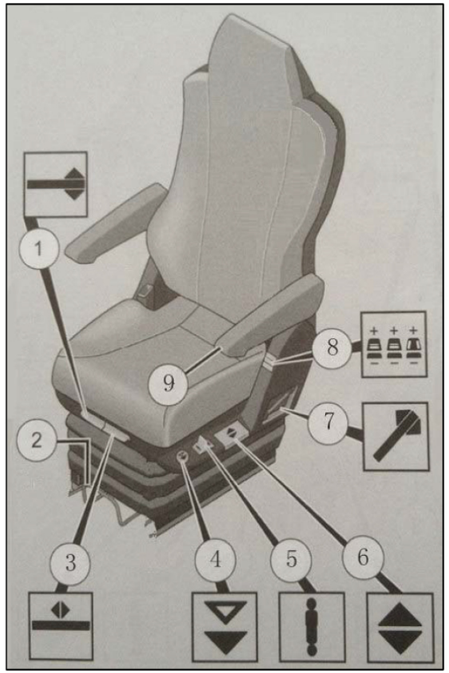
- Pull handle ② up to slide seat forward/backward
- Release handle.
- Slightly push seat forward or backward, until locking sound of seat is heard

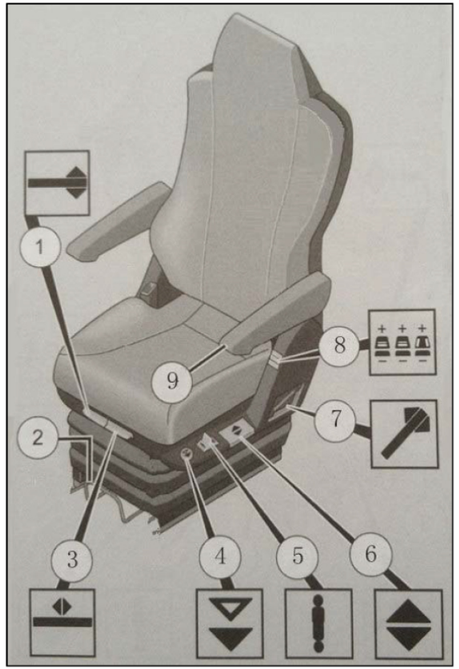
Seat front and back adjustment

- Pull handle ③up to slide seat forward/backward
- Release handle.
- Slightly push seat forward or backward, until locking sound of seat is heard.

Quick lowering device

- After getting in the car, press button ④ (button popup), seat will lift to the driving position.
- Before getting off the car, press button ④ (button press-in), seat will lower to the alighting position.





Absorber adjustment

- Use handle ⑤ to set seat elasticity to the required degree (hardness)

Seat height adjustment (pneumatic)

- Pull handle ⑥ up to lift seat.
- Pull handle ⑥ up to lower seat.
- Release handle when seat reaches appropriate height.

Seat backrest adjustment angle

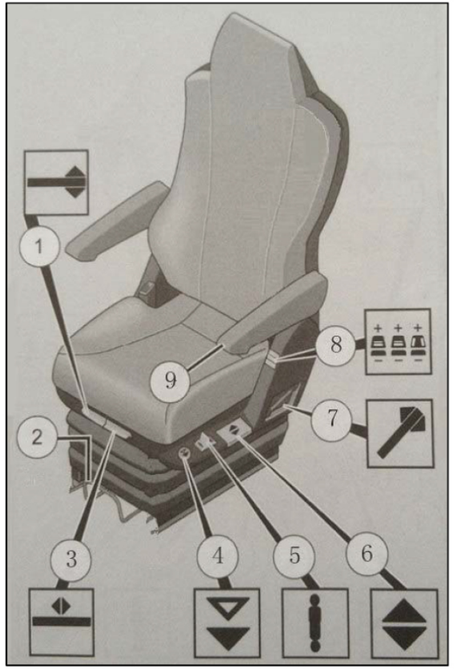
- Lean forward to leave seat backrest.
- Pull handle ⑦ up.
- Adjust backrest to the required position.
- Release handle.

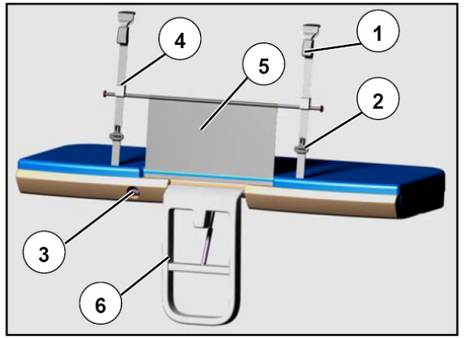
Waist support device and lateral support device adjustment (pneumatic)

- Press button ⑧ to inflate and deflate air bag.
- "+" symbol: Air bag inflation.
- "-" symbol: Air bag deflation.

Adjustment of armrest angle

- Use the knurled knob ⑨ to set the required angle.
- Rotate inward to the seat and the armrest is raised.
- Rotate outward to the seat and the armrest is lowered down.





Sleeping berth device

Upper berth

Warning!

– During driving, do not put any articles on the berth!

– Adjust the seat so that there is sufficient space for setting upper berth (refer to “Seat Adjustment”).

–-Make sure fence adjustment handle ④ is in lock state during use of upper berth.

– Make sure fence is extented during use of upper berth.

– For the berth ladder, its adjusting knob ③ must be at “OFF”.

Folding of upper berth

Turn upward the upper berth and insert the spring bolt ②on the berth suspender into belt buckle ①; when hearing engaging sound of the spring bolt ② and belt buckle ①, release lower berth

Laying flat of upper berth

Press the red button on belt buckle ① to make spring bolt ② out from belt buckle ①, so as to support front end of the berth and lay it flat.

Use of berth protective screening

Turn upward the locking handle on 2 cross-bar locating buckles ④ to unlock the cross-bar locating buckle ④; push upward or pull down the cross-bar locating buckle ④ to the highest or lowest position, and turn downward the locking handle on cross-bar locating buckle ④ to lock the cross-bar locating buckle ④, i.e. realize expansion or contraction of berth protective screening.

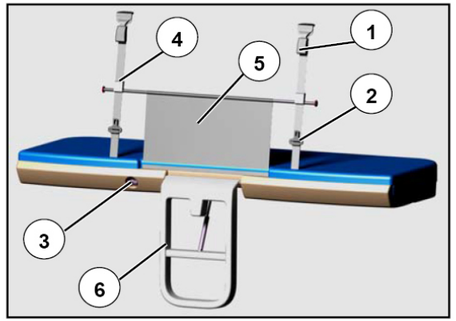
Ladder

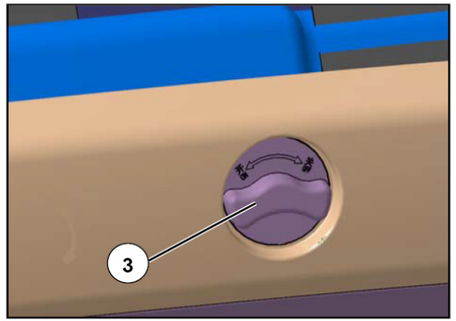
Folding of ladder

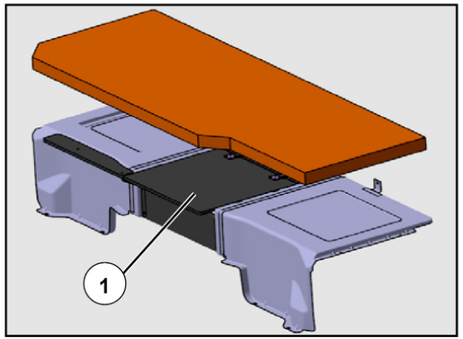
Rotate the adjusting knob ③ along “ON” direction to unlock the ladder ⑥; pull the lower edge of ladder ⑥ to fold it to berth bottom, and then rotate the adjusting knob ③ along “OFF” direction to lock the ladder.

Unfolding of ladder

Rotate the adjusting knob ③ along “ON” direction to unlock the ladder ⑥; pull the lower edge of ladder ⑥ to unfold it, and then rotate the adjusting knob ③ along “OFF” direction to lock the ladder.





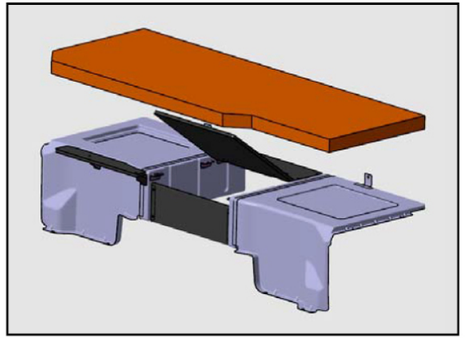


Lower berth

Warning!

Do not step on the middle anchor plate ① of berths.

Gently turn the upper part of the middle anchor plate ① to turn up the berth anchor plate 1; the empty cavity below berth anchor plate ① can be used for storage.

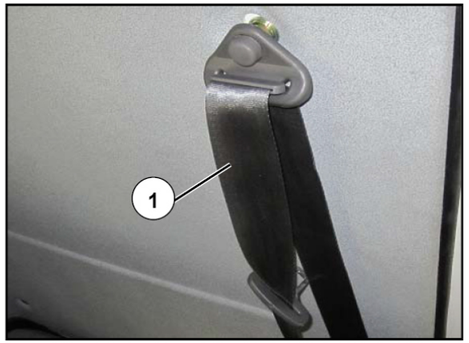


Seat belt

Warning!

- **Before each driving, fasten the safety belt to ensure personal safety.**
- **One safety belt for each person.**
- **To ensure seat safety belt fits your body, it is prohibited to wind safety belt.**
- **Only when seat backrest is almost in vertical position, safety belt can provide you with best protection. Refer to "seat adjustment".**
- **Keep your back close to seat backrest, safety belt close to between neck and shoulder.**
- **Safety belt shall be located in the middle of shoulder, not throat.**
- **Safety belt at thigh position must have an appropriate tightness, and pass through lower abdomen not stomach.**
- **Do not adjust seat to the position where seat safety belt does not fit your body.**

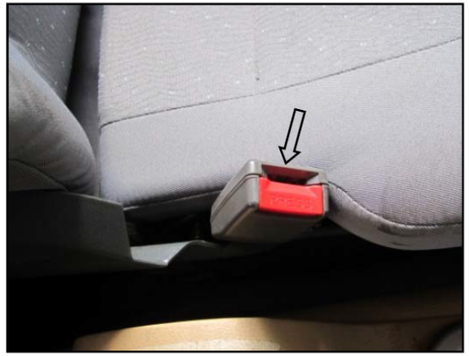
- **During driving, pull shoulder safety belt frequently to adjust the tightness of seat safety belt.**
- **Do not make safety belt pass through pockets in which hard or fragile.**
- **Make sure safety belt is clean and dry.**
- **Install new safety belts to replace the damaged or seriously-deformed safety belts in accidents and check safety belt anchorages at the service station of Sinotruk.**
- **Seat safety belt modification is not allowed.**



Fasten the safety belt

Before the safety belt ① is fastened, adjust driver and assistant driver seats according to their body size. Refer to “Driver and co-driver’s seats”.

- Safety belt shoulder passes through the central part of shoulder, not your throat.
- Grasp the safety belt buckles, and pull safety belt to make it pass through shoulder and thigh.
- Insert safety belt buckles into safety belt clip, until bucket engagement sound is heard.
- Tightness of safety belt on upper body and thigh must be appropriate.



Warning!

Please fasten your safety belt!

Check safety belt lock (everyday)

- Pull safety belt to lock the belt reel

Release

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

Inertia retractor

In the following conditions, retractor ② must lock safety belt to prevent safety belt from pulling out:

- Vehicle slows down suddenly in any direction.
- When safety belt is pulled out quickly
- Locking function of inertia retractor can be detected by pulling safety belt out quickly.

Adjustment of steering wheel

The steering wheel can be adjusted forward and backward about 125mm in height and about 34° in angel, i.e. about 210mm forward or backward.

Specific adjustment methods：

– Step on the pedal by foot①, and then adjust the steering wheel to a proper driving position.

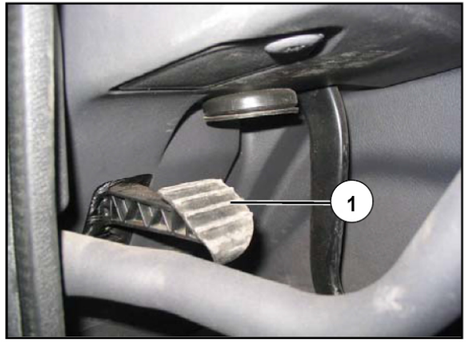
– Release the pedal①, and the position of steering wheel will be locked.

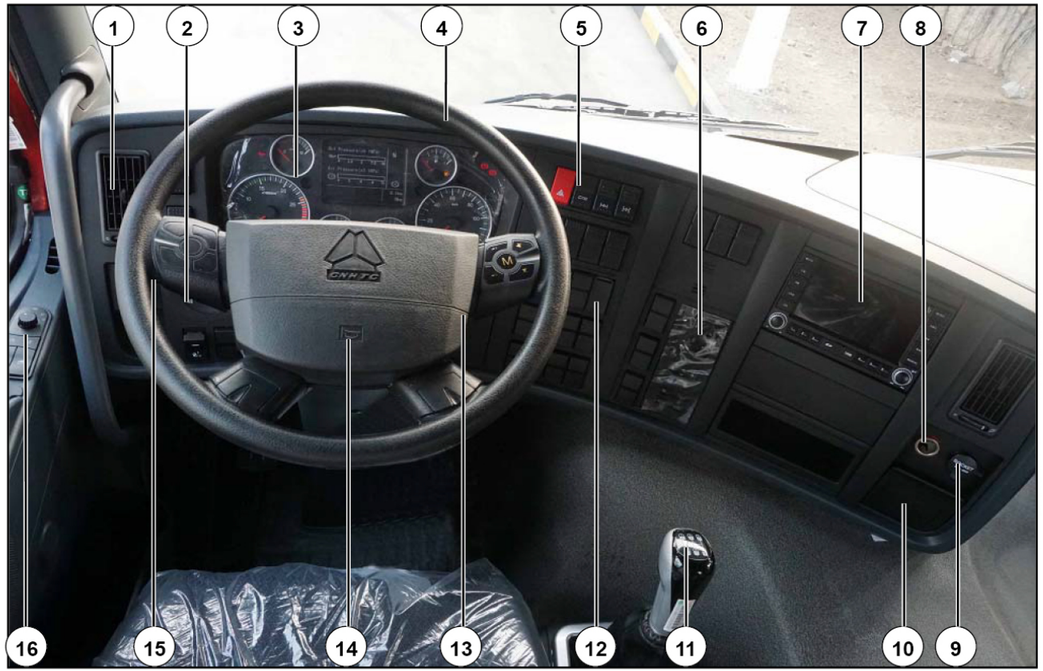
Description:

Moving steering wheel forward not only facilitates entering or leaving vehicle, but also helps to move toward the assistant driver's side.

Warning!

During driving, it is prohibited to adjust steering wheel position. Steering wheel can only be adjusted when vehicle is in stationary state and parking brake is used.





HOWO-A7

Cab internal overview

1 Air vent

2 Rotary light switch

3 Instrument panel

4 Steering wheel

5 Rocker switch

6 Air conditioner control panel

7 MP5 player

8 24V cigar lighter

9 24V power socket

10 Ash tray

11 Transmission shift lever

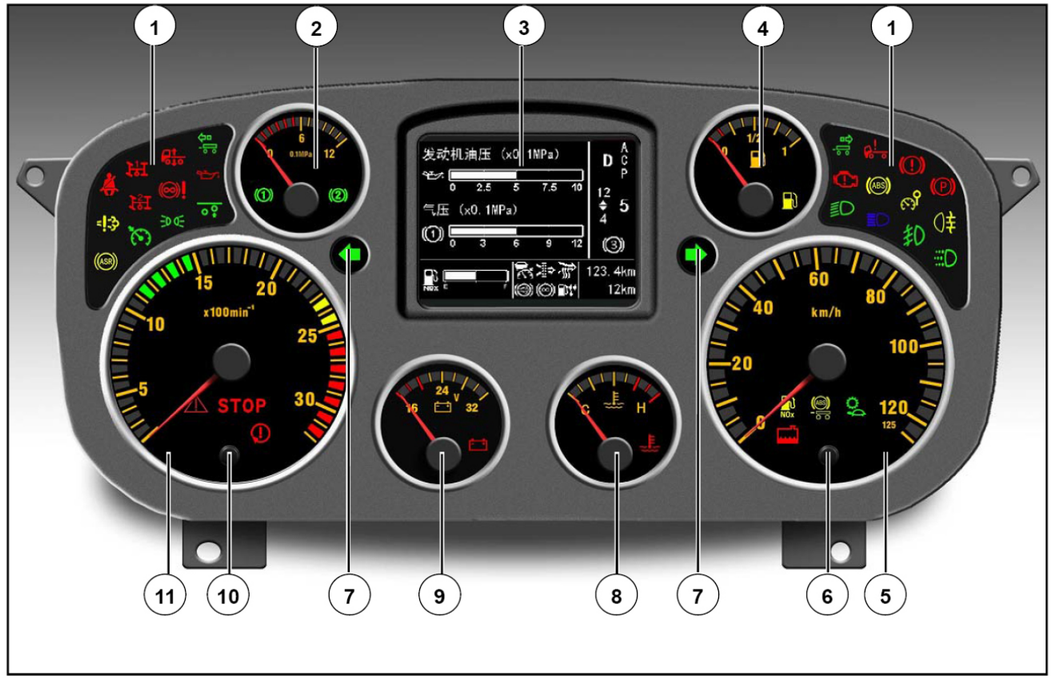
12 Diagnosis interface

13 Key switch

14 Horn switch

15 Combination switch

16 Door control panel



Instrument panel (fuel gauge)

1 Detection and alarm lamp panel

2 Air pressure gauge

3 Driver's display screen

4 Fuel gauge

5 Speedometer

6 Button 1 (see "Driver's display Screen and Detection Lamp Panel)

7 Turning indicator lamp

8 Engine coolant temperature gauge

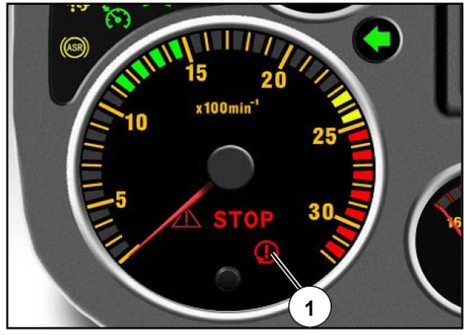
9 Voltmeter

10 Button 2 (see "Driver's display Screen and Detection Lamp Panel)

11 Engine tachometer

Speedometer

It is used to indicate vehicle running speed, indication range is 0-125km/h, each small scale means 5km/h and each big scale means 20km/h.



Engine tachometer

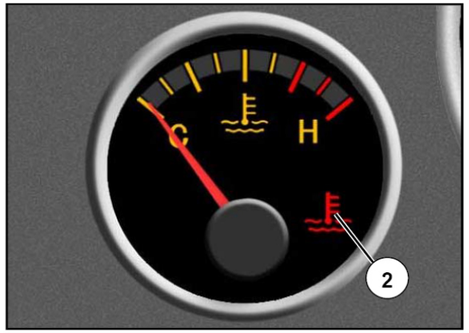
It is used to indicate engine speed, indication range is 0-3200r/min, each small scale means 100r/min and each big scale means 500r/min.

The green area refers to economic speed area of the engine; when the engine speed is too high, the high engine speed indicator lamp at ① is lit.

Coolant temperature gauge

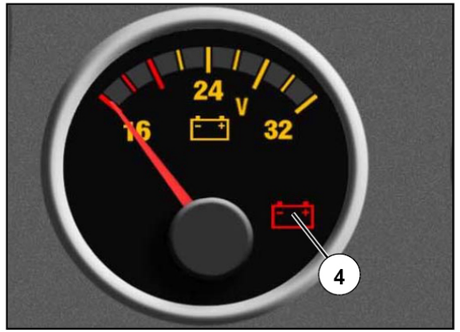
It is used to indicate engine coolant temperature.

When the hand is in the red area, it means that the engine coolant temperature is too high and red high temperature indicator lamp of coolant at ② will be lit.



Fuel gauge

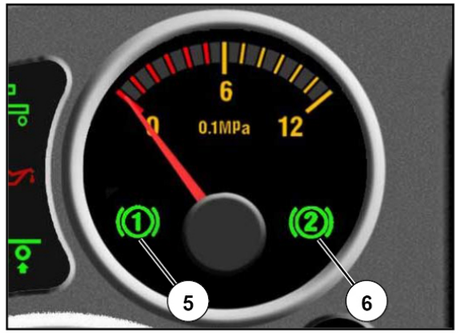
To show remaining fuel inside the fuel tank, 0 means there is no fuel and 1 means it is full of fuel; When the remaining fuel inside the fuel tank is too low, the low fuel level indicator lamp at ③ will also be lit to remind the driver to charge fuel.



Voltmeter

It is used to indicate battery voltage, indication range is 16~32V and each small scale means 2V.

When the battery voltage is too low or too high, the indicator light at④ will be lit.



Air pressure gauge

It is used to indicate air pressure of brake circuit 1 or 2, indication range is 0-12×0.1MPa and each small scale is 0.1MPa. When pointer is located in red alarm area, air pressure is lower than 5.5×0.1MPa, and Driver's display screen will display relevant fault information.

The gauge indicates the air pressure of brake circuit with low air pressure, and indicator lamp at ⑤ or ⑥ will be lit. But pressure value for brake circuit with high air pressure is displayed on the screen

Rocker switch and button

1 Emergency alarm switch

2 Horn change-over switch

3 Rear axle lifting airbag control switch

4 Three height selection switch

5 Working light switch

6 Inter-wheel differential lock switch

7 Inter-axle differential lock switch

8 All-wheel drive switch

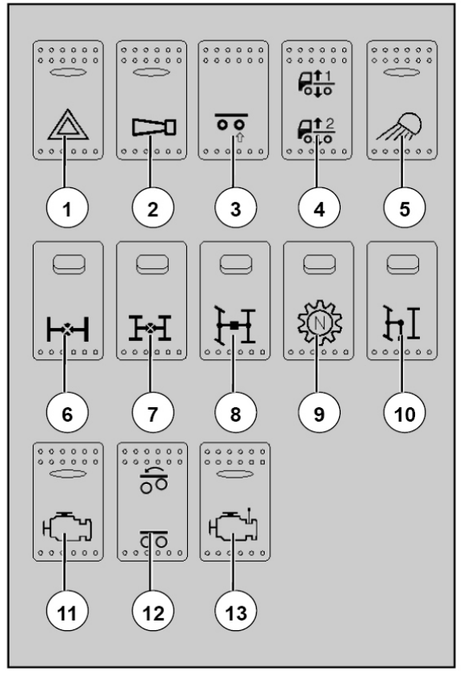
9 Power take-off neutral switch

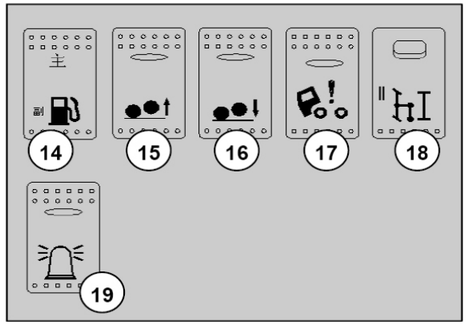
10 Power take-off switch

11 Engine diagnosis switch

12Drive help/best traction mode switch

13 Engine PTO switch





14 Main/auxiliary oil tank change-over switch

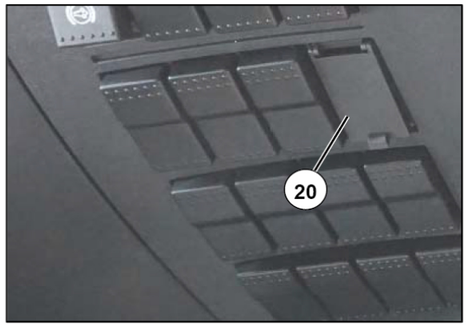
15 Supporting axle lifting switch

16 Supporting axle lowering switch

17 Cab lifting switch

18 The second power take-off switch

19 Alarm lamp switch



Diagnosis interface

Diagnosis interface ⑳ can be used to connect computer to diagnose the vehicle for troubleshooting.

1 Emergency alarm switch: Press the switch, all turn lights will flash and turning indicator lamp on instrument panel will also flash.

2 Horn change-over switch: If the switch does not work, press the horn button on steering wheel and the electric horn will honk; after pressing this switch, press the horn button on steering wheel and the air horn will honk

3 Rear axle lifting airbag control switch: when rear axle is at normal position, press the switch upward, airbag lifting will reach the highest position, and press the switch downward, airbag lifting will reach the lowerset position. But airbag lifting can not stay in the middle.

4 Three height selection switch: when the switch is in position 1, the frame will be lifted by 25mm, and in position 2, the frame will bey lower by 25mm.

5 Working light switch: press switch to open working light behind cab.

6 Inter-wheel differential lock switch: Press this switch and the inter-wheel differential lock will be engaged.

7 Inter-axle differential lock switch: Press this switch and the inter-axle differential lock will be engaged.

8 All-wheel drive switch Press this switch and the front drive axle will be engaged.

9 Power takeoff neutral switchPress the power takeoff neutral switch and power takeoff switch at the same time in order that HW13710 transmission takes off power.

10 Power take-off switch: Press the switch, power take-off will engage.

11 Engine diagnosis switch: Press this switch and read the flash code of engine fault indicator lamp on instrument; find the fault code table, and you will know what fault exist in the current engine system.

12 Auxiliary Drive/best traction mode switch: This switch has three positions. Whne this switch is not operated, the mode is ratio control. When the upper part of the switch is pressed (automatic restoration), auxiliary drive mode is activated. When the lower part of the switch is pressed, the best traction mode is activated. Auxiliary drive, as a special function enabled by electronic controlled air suspension (ECAS), can transfer the load on the lifting axle or auxiliary axle to the driving axle until it reaches the maxium load. In this way, the positive pressure of the driving axle against the road surface reaches the maximum level, which in turn will also maximize the driving force of the vehicle. Normally, when vehicle speed is lower than 30kph including 0kph, it is allowed to activate the auxiliary drive and when the vehicle speed is

more than 30kph, auxiliary drive for the rear drive will automatically stop.

13 Engine PTO switch: Press this switch and you can adjust engine speed by adjusting PTO knob. At this moment, the accelerator pedal will not function any more.

14 Main/auxiliary oil tank change -over switch: For a vehicle provided with two fuel tanks, the fuel meter shows fuel mount of main tank; press the main/auxiliary fuel tank change-over switch, the fuel meter will show fuel amount of auxiliary tank.

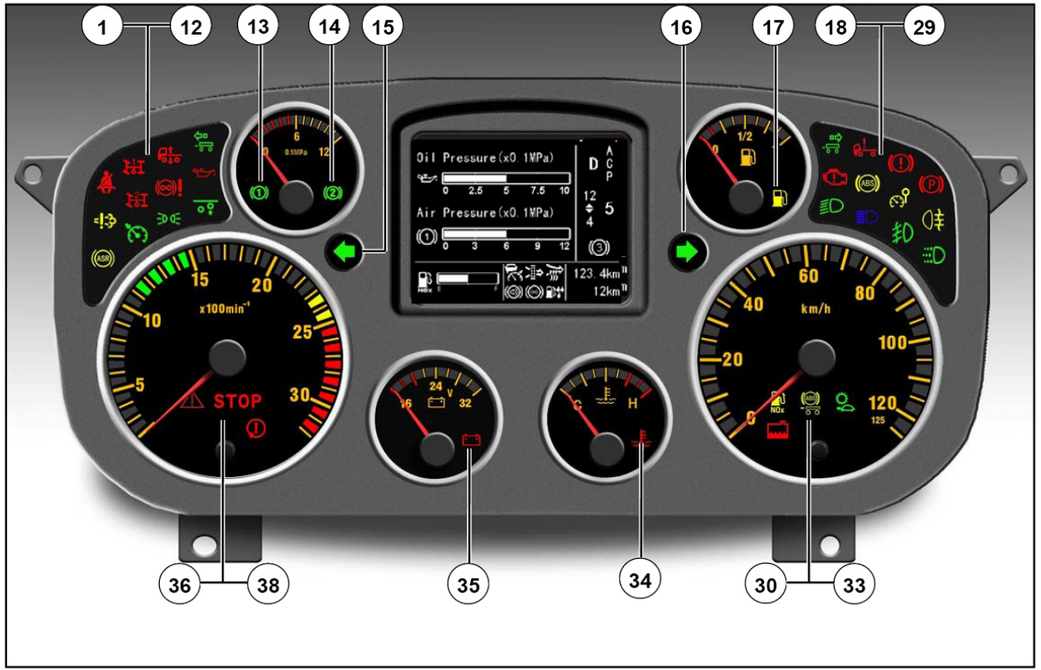
15 Supporting axle lifting switch: Press this switch, the supporting shaft rises.

16 Supporting axle lowering switch: Press this switch, the supporting shaft falls.

17 Cab lifting switch: press the switch, keep lifting oil pump in lift or decline state, and then press lift button outside cab to achieve electric lift or decline of cab.

18 The second power take-off switch: if transmission is installed with the second power take-off, press the second power take-off switch, the second power take-off will work.

19 Press this switch, the alarm lamp on the top of driving cab begins working.



Detection lamp and alarm lamp

1  Safety belt

2  Power take-off 1

3  Air suspension alarm indicator lamp

4  Trailer left-turn working indicator lamp

5  Excessive emission alarm

6  Power take-off 2

7  Retarder alarm

8  Engine oil pressure indicator lamp

9  ASR working indicator lamp

10  Cruise

11  Lamplet

12  Lift axle

13  Status indication of brake air pressure circuit 1

14  Status indication of brake air pressure circuit 2

15  Left-turn working indicator lamp of main vehicle

16  Right-turn working indicator lamp of main vehicle

17  Low fuel quantity

18  Right-turn working indicator lamp of trailer

19  Cab locking

20  Brake system failure

21  Parking brake

22  General failure of engine

23  ABS trouble lamp

24  Vehicle overspeed

25  Rear fog lamp

26  Low-beam lamp

27  High-beam lamp

28  Front fog lamp

29  Daytime running lamp

30  Low gear

31  ABS indicator lamp of trailer

32  Low coolant level

33  Low urea level

34  High coolant temperature

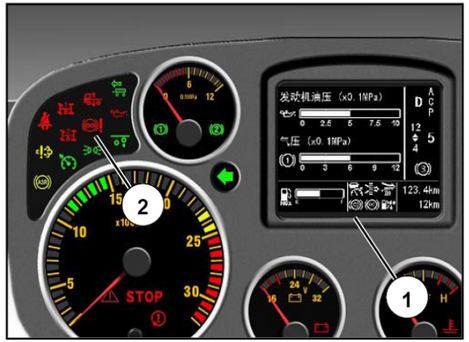
35  Battery charging, low (high) voltage alarm

36  Engine speed is too high

37  Emergency stop

38  Fault Warning symbol

Note: Duo to varied configurations for different vehicles, certain detection or alarm lights will not be lit if the vehicle you have bought is not equipped with the related functions.



Driver's display screen and detection lamp panel

Driver's display screen① and detection lamp panel② provides information on vehicle condition to the driver.

When alarm condition is met, alarm symbol will appear on display screen.

Driver's display screen

Short press：Press the button for ＜3s

Long press：Press and hold the button for ≥3s

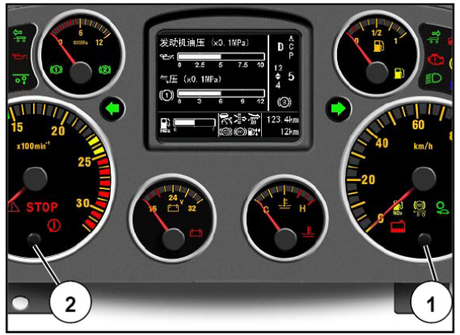
Button 1：Short press to slip the screen, long press to reset the mileage

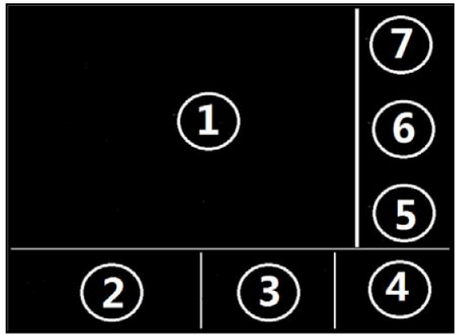
Button 2：Long press to adjust the instrument backlight brightness

When it is connected with electricity, simultaneous press on both button 1 and button 2 for over 10s will activate diagnostic mode.Then long press on button 1 to exit. When engine speed is≥300rpm or vehicle speed is

≥5km/h, diagnostic mode can also be closed

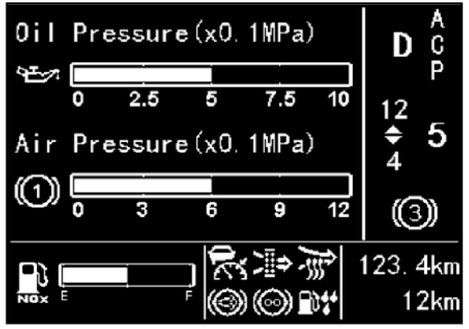
Driver's display screen is divided into 7 areas with diffrent information.





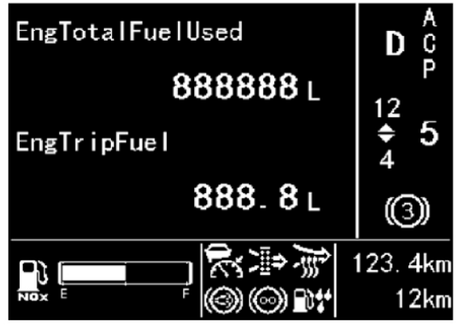
Driver's display screen area 1

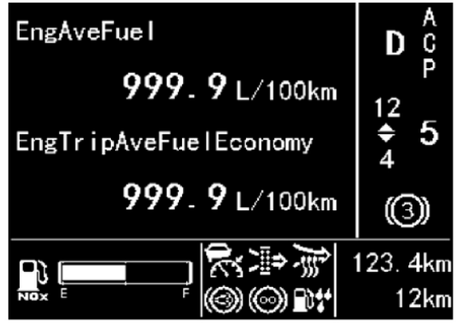
When key is at ON position, Sinotruk will be displayed on the screen.

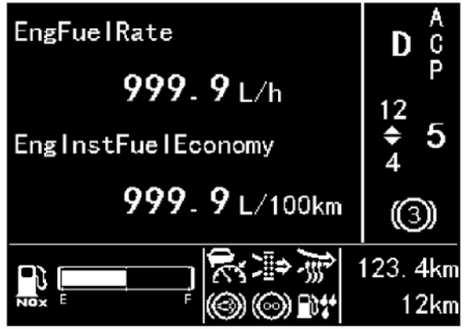


After 3 seconds of self check, driving information will be displayed on the screen.

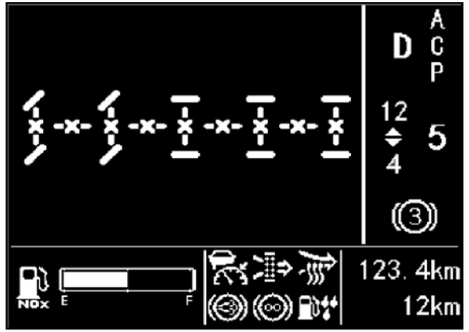
Turn MCS knob or give a short press on button to the right of this instrument to enter this interface:



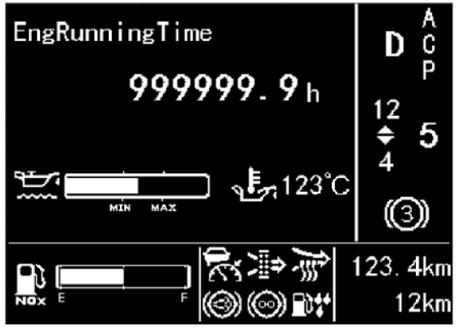


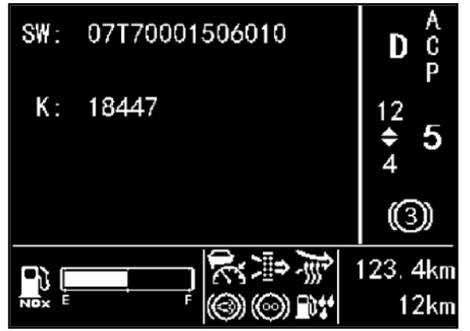


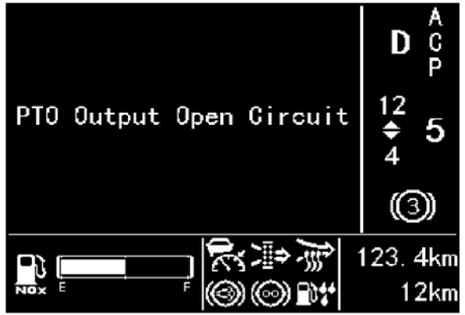
Turn MCS knob or give a short press on button to the right of this instrument to enter this interface:



Turn MCS knob or give a short press on button to the right of this instrument to enter this interface:

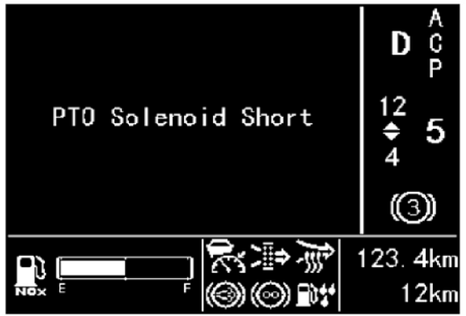




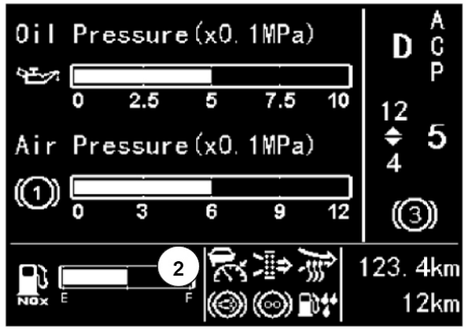


Area 1 of the driver's display screen also include alarm indicator

For vehicles equipped with mechanical transmission, this interface shows related faults on the screen if the PTO solenoid valve has open or short circuit.

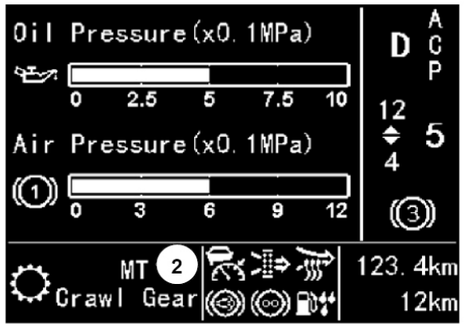


When the key is at on position, vehicle speed is 0 and handbrake is not applied, this interface will show up:



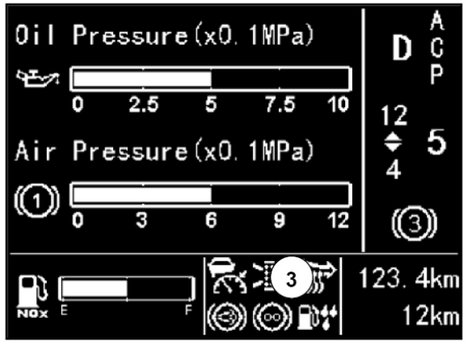
Area 2 of the driver's display screen

When emission satisfies the standard of Euro Ⅳ or above, the urea level will be shown on area 2, while when emission is of the standard of Euro Ⅲ or below, no information will be shown on the area 2.



For vehicles equipped with AMT, interface of area 2 will show up if the transmission is in creeper gear.

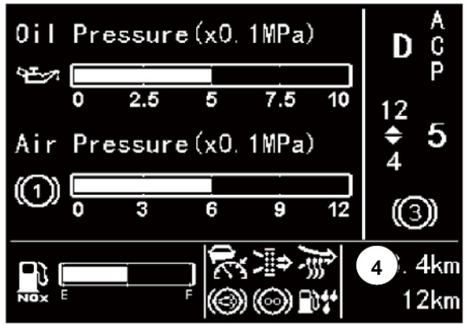
Area 3 of the driver's display screen



Signal lamp on the display screen

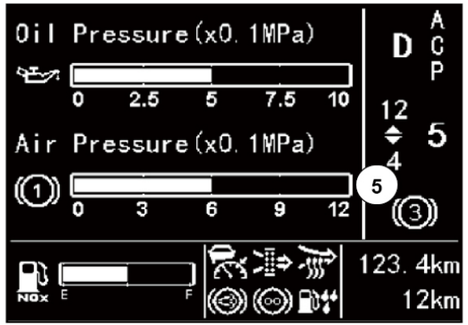
NO.	Description	Symbol	Color
1	Air filter blockage		White
2	Exhaust brake		White
3	Intake air preheating		White
4	Fuel blends with water		White
5	Retarder on		White
6	ACC (self-adaptive cruise control)		White
7	Maintenance tips		Yellow
8	ESC normal		Yellow

No.	description	symbol	color
9	Hill-start		Yellow
10	tyre pressure alarm		Yellow
11	ESC off		Yellow
12	Self-adaptive headlamp		Yellow
13	ACC fault		Red
14	Collision emergency warning activated		Red
15	Fuel filter blocked		Red
16	DPF carbon fouling indicator lamp		Yellow
17	DPF active regeneration indicator lamp		Yellow



Area 4 of the driver's display screen

It shows information on total mileage and current driving distance.

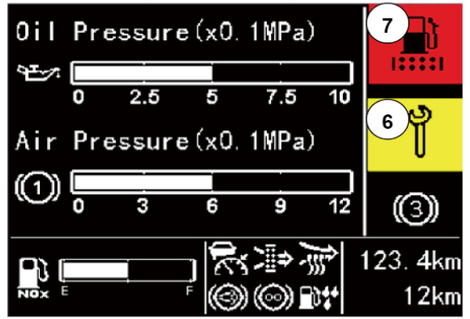


Area 5 of the driver's display screen

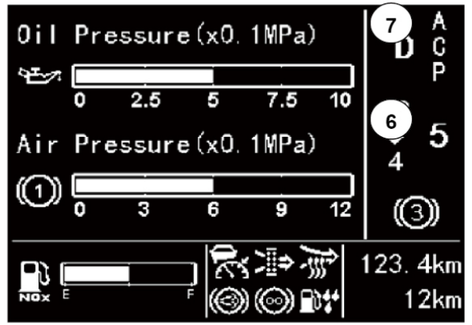
It shows alarm of the brake circuit 3 and 4. For example this picture shows brake circuit 3 has fault. If both brake circuit 3 and 4 have fault, alarm lights will flash in turn for 3 seconds.

Area 6 and 7 of the driver's dispalay screen

Yellow and red alarm lights can be displayed on this interface. For details please refer to "signal lamp on the display screen". If there is more than one alarm light to flash, they will flash in turn for 3 senconds.



When there are no alarm lights to flash, transimission gear information will be displayed. For mechanical transmission, gear information will displayed on area 7 only, and for AMT or AT, information will be displayed on both area 6 and 7.



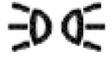
Display information on Driver's display screen and detection lamp panel

Information Description	Detection lamp panel		Sound Signal	Significance	Suggestions/Further Measures
Safety belt trouble		Red	Yes	**Function**-safety belt control: Driver does not fasten the safety belt.	Driver must fasten the safety belt.
Charging system trouble		Red	Yes	**Service station**-charge control	Immediately seek help from SINOTRUK service station
Parking brake trouble		Red	Yes	**Information:** handbrake is apllied; alarm will sound if handbrake is not release when vehicle speed is more than 10kph.	
PTO 1		Yellow/Red	Yes	**Information**-Yellow lamp flashes when PTO is working. At this time if vehicle speed is over 30 kph with engine speed more than 1900 rpm, red lamp flashes with alarm sound.	lower vehicle speed or engine speed
PTO 2		Yellow/Red	Yes		

Information Description	Detection lamp panel		Sound Signal	Significance	Suggestions/Further Measures
Cab locking		Red	Yes	**Safety-cab lock:** Cab is not locked completely. At least one touch sensor of cab locking system is in open state.	Lock cab correctly.
Front fog lamp		Green	NO	**Information**-Front fog lamp is on	
Emissions exceed standards		Yellow	NO	**Information-**emissions have exceeded the standard.	Immediately seek help form SINOTRUK service station
Rear fog lamp		Yellow	NO	**Information-**rear fog lamp is on.	
High beam		Blue	NO	**Information-**high beam is on	
Low beam		green	NO	**Information**-low beam is on	

Information Description	Detection lamp panel		Sound Signal	Significance	Suggestions/Further Measures
General fault of retarder		Yellow	NO	**Information**-retarder fault	• Drive carefully and slowly • Seek help immediately from Sinotruk Service Station
Serious fault of retarder		Red	NO	**Information**-serious retarder fault	Seek help immediately from Sinotruk Service Station
Cruise		Green	NO	**Information-**vehicle is cruising	
Left-turn indicator lamp		Green	Yes	**Information-** Trailer steering indicator lamp This lamp flashes when left-turn indicator lamp of tractor fails	● Replace bulb immediately! ● Detect turn light. • If necessary, immediately ask SINOTRUK service station for assistance.
High coolant temperature		Red	NO	**Repair station – Engine:** Coolant temperature is too high.	● Shift to low gear to improve engine cooling. ● Check liquid level of coolant, and add coolant if necessary.

Information Description	Detection lamp panel		Sound signal	Significance	Suggestions/Further Measures
Left-turn indicator lamp of the vehicle		Green	Yes	**Information – Main left-turn signal lamp**: This lamp flashes when there is a fault with left-turn lamp of the vehicle.	● Replace bulb immediately! ● Detect turn light. • If necessary, immediately ask SINOTRUK service station for assistance.
Right-turn indicator lamp of the vehicle		Green	Yes	**Information – Main right-turn signal lamp** : This lamp flashes when there is a fault with right-turn lamp of the vehicle.	● Replace bulb immediately! ● Detect turn light. • If necessary, immediately ask SINOTRUK service station for assistance.
Low fuel level		Yellow	No	**Information** –Fuel level is below 12.5%	Charge fuel
Serious failure shutdown alarm symbol		Red	No	**Safety –** it flashes together with other trouble lights or with abnormal beheavior of the instrument sensor.	● Stop the vehicle immediately, and notice traffic condition! • Ask SINOTRUK service station for help immediately.

Information Description	Detection lamp panel		sound signal	Significance	Suggestions/Further Measures
General failure alarm symbol		Yellow	No	**Information**-it flashes with other trouble light.	●Please drive carefully and slowly. • Seek help from SINOTRUK service station immediately.
Brake system failure		Red	Yes	**Safety-** low pressure is detected in the brake system circuits.	Brake system failure
Engine serious failure alarm		Red	Yes	**Information –**engine system failure	Engine serious failure alarm
General failure alarm of engine		Yellow	Yes	**Information –**engine system failure	General failure alarm of engine
lamplet		Green	No	**Information-** Sidelights are truned on	lamplet

Information Description	Detection lamp panel		Sound Signal	Significance	Suggestions/Further Measures
ABS failure		Yellow	No	**Information**-ABS failure	**Please drive slowly and carefully!** ●Wheel lock risk increases. Please brake carefully. • Seek help from SINOTRUK service station immediately.
Low urea level alarm		Blue	No	**Information -** Urea tank liquid level is below 10%	• Charge urea.
ECAS alarm		Yellow	No	**Repair station-** ECAS If frame is lowered, braking effct is reduced. If frame is lifted higer than the normal driving position, there are risks of absorber damage.	●Please drive carefully and slowly. ●Seek help form SINOTRUK service station immediately
Right-turn indicator lamp trouble of trailer		Green	Yes	**Information – Trailer steering indicator lamp** It flashes when there is a fault with the steering lamp	●Replace bulb immediately! ●Detect turn light. • If necessary, immediately ask SINOTRUK service station for assistance.

Information Description	Detection lamp panel		sound signal	Significance	Suggestions/Further Measures
ASR working indication trouble		Yellow	No	**Information**-ASR	ASR working indication trouble
ABS alarm of trailer		Yellow	No	**Information**- ABS fault of the trailer	ABS alarm of trailer
Veicle speed limitation		Red	No	**Function**-Vehicle speed is over set value.	Veicle speed limitation
Air pressure indicator lamp of brake circuit 2		Green	No	**Information:** air pressure indication for brake circuit 2.	
Air pressure indicator lamp of brake circuit 1		Green	No	**Information**:air pressure indication for brake circuit 1.	
Engine oil pressure alarm		Red	Yes	**Safety - Engine oil pressure:** Engine oil pressure is too low or too high.	Check engine oil level, and fill or drain a part of engine oil or ask SINOTRUK service station for assistance as required.

Information Description	Detection lamp panel		Sound Signal	Significance	Suggestions/Further Measures
Engine overspeed		Red	Yes	**Function – Engine:** Engine speed is over set value.	Shift to high speed gear, or reduce driving speed!
Lifting axle		Green	No	**Information**-lifting axle is lifted	
Driving lamp for daylight		Green	No	**Information**-driving lamp fordaylight is on.	
Low Gear		Green	No	**Information-**transmission is working with low gear.	
Low coolant level		Red	Yes	**Information**-Engine coolant level is too low.	Add coolant in time
STOP (Emergent Braking)	STOP	Red	Yes	**Safety-**it will be lit together with other trouble lamps	Stop the vehicle immediately, and notice traffic condition! Ask SINOTRUK service station for help immediately.

Left combination switch

Left combination switch is located behind steering wheel on left side of steering column.

① Indicate right turn

② Indicate left turn

③ Indicate right lane change

④ Indicate left lane change

Indicate right turn

Turn the left combination switch to position ① and the right-turn signal indicator lamp on instrument panel will flash. If trailer is connected, right turn indicator lamp of full trailer/semi-trailer will also be on. When steering wheel returns to straight line driving section, left combination switch will rebound to position 0 automatically.

Indicate left turn

Turn the left combination switch to position ② and the left-turn signal indicator lamp on instrument panel will flash. If trailer is connected, left turn indicator lamp of full trailer/semi-trailer will also be on. When steering wheel returns to straight line driving section, left combination switch will rebound to position 0 automatically.

Indicate right lane change

Turn the left combination switch to position ① and the right-turn signal indicator lamp on instrument panel will flash. If trailer is connected, right turn indicator lamp of full trailer/semi-trailer will also be on. Release left combination switch, combination switch will return to 0 position automatically.

Indicate left lane change

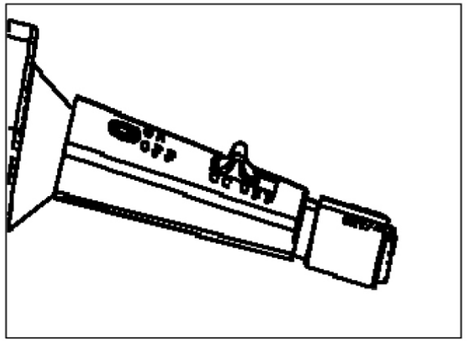
Turn the left combination switch to position ④ and the left-turn signal indicator lamp on instrument panel will flash. If trailer is connected, left turn indicator lamp of full trailer/semi-trailer will also be on. Release left combination switch, combination switch will return to 0 position automatically.

Windshield wiper

When handle arrow ⑤ is at position 0 shown in figure, it indicates “close windshield wiper”, and the other positions respectively indicate “intermittent wiping”, “normal wiping” and “quick wiping” from left to right in order.

Windshield washer system

- Press button ⑥ once in the arrow direction (at most 1 second), windshield washer system will spray washing liquid to windshield and conduct cycle wiping for one time.
- Press button ⑥ once in the arrow direction (over 1 second), windshield washer system will spray washing liquid to windshield and conduct cycle wiping for three times.
- Press button ⑥ in the arrow direction and hold on for a while, windshield washer system will spray washing liquid to windshield and conduct cycle wiping continuously.



this time, the indication light  will begin to flash.

Simple cruise control（CC）

Cruise control switch is located at the right conbination switch on the steering column.(see the left figure)

There are three positions, namely CC, RES/+ and SET/-. Specific operations are as follows：

“CC”：CC master control

“RES/+”：reset and increase speed

“SET/-”：set and decrease speed

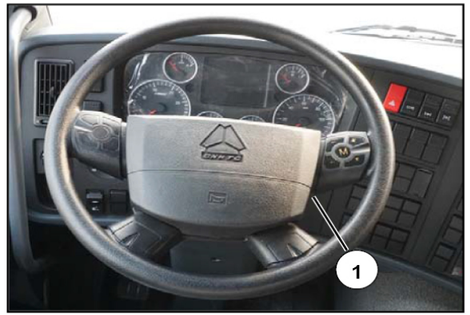
“CC” is the master cruise control switch that is self-return. When this switch is operated to choose cruise control, the cruise control function will be enabled. At

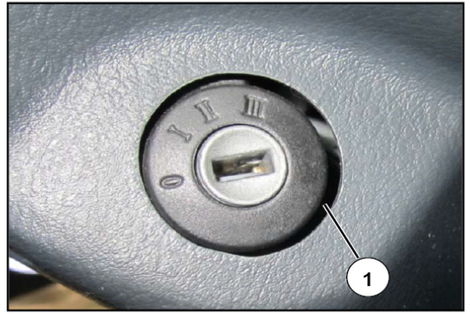
Throttle can be used to change the vehicle speed. When target speed is reached say, 80 kph, to release the throttle and press SET/- can make the vehicle enter into cruise control mode. Under cruise control mode, to depress the brake pdel or clutch pedal can deactivate the CC mode temporarily. At this time, CC indication light  begines to flash. When CC mode exits temporarily, RES/+ should be pressed if you want to reenter into CC mode.

Target speed setting：there are two ways to increase the target speed: push the throttle pedal to reach the target speed and then press SET/- , or press RES/+（press it for one time to increase 1 kph）. There are also two ways to reduce the targe speed：depress the brake pedal to reach the new target speed and the press SET/- or SET/- repeatedly（press it one time to decrease 1 kph）.

Special attention：

- **Cuirse control has a setting range of 35 to 105 kph. When vehicle speed is over 105 kph or lower than 35 kph, cruise control will exit automatically.**
- **No more than 0.5 second for a single press on RES/+ and SET/-.**
- **Cruise control will exit if throttle pedal or brake pedal is depressed during running.**





Key switch

Key switch ① is located on right side of steering column.

Key at "0"position; Cut power supply and pull out the key.

Key at" Ⅰ"position: Ensure power supply for electricity consummers when the vehicle is parked with engine shut off.

Key at "Ⅱ"position: For driving.

Key at "Ⅲ"position: Forengine startup.

Warning!

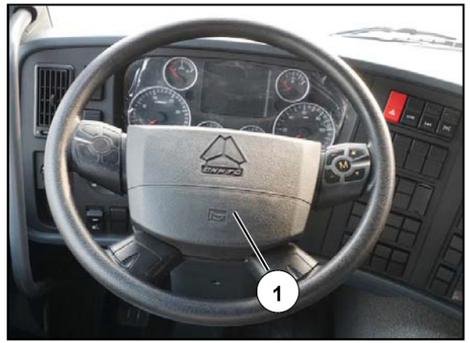
– When starting engine, key shall be rotated to “III” position, and after being released, key will return to “II” position automatically.

– If you try to turn the key to “III” position again to start engine, key must be turned to “0” position first and then to “III” position to start engine.

Danger!

– Key switch shall not be turned to “0” position while driving; otherwise, key switch will lock the steering wheel, which wil make the vehicle unable to turn.

– When you leaves vehicle, even though for a short time, key must be taken off from key switch. Otherwise, child or some unknown person may start engine even drive the vehicle.



Electric horn/air horn

Electric horn

Press horn button ① on the steering wheel, to connect electric horn.

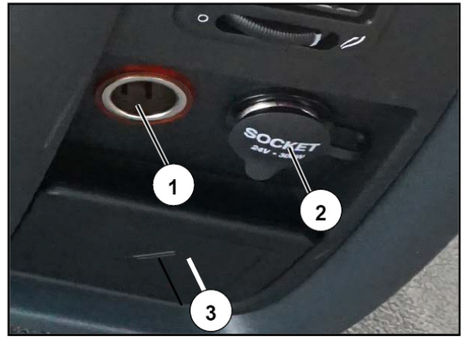
Air horn

Press horn change-over rocker switch ② on instrument panel, and then horn button ① of steering wheel, to connect air horn.

24V cigar lighter/Ash tray/24V power socket

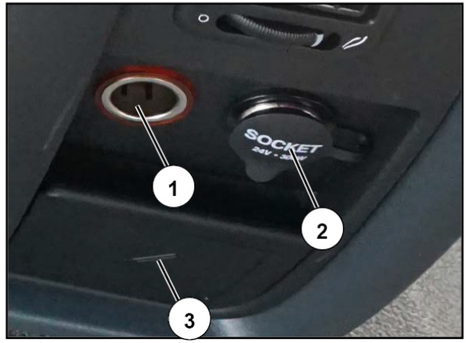
24V cigar lighter

- Ignition key is at "I" or "II" position.
- Push cigar lighter ① inward until locking sound is heard. When resistance wire at cigar lighter head becomes red and hot, cigar lighter will pop up automatically.



Warning!

- **Cigar lighter socket can only supply power to direct current equipment with maximum power 240W (24V/10A). Otherwise, cigar lighter may be damaged. For other socket, refer to 24V power socket.**
- **Heated cigar lighter may cause scald, use it carefully.**
- **If there is a child, cigar lighter shall be removed to avoid scald or fire.**
- **Your primary task is to pay attention to road vehicles and traffic condition, and ensure cigar lighter is only used when the traffic condition permits.**



Ash tray

Pull out the ash tray ③ for use.

24V power socket

24V power socket ②, for power supply to 24V devices, with rated load of 300W.

Lighting

Rotating light switch (lighting lamp switch)

	Turn off lighting lamp
	Outline marker lamp connection position
	Low beam lamp connection position
	Front fog lamp indicator lamp (green)
	Rear fog lamp indicator lamp (yellow)

Connect outline marker lamp

Turn the rotating light switch from position ① to outline marker lamp connection position ②, outline marker lamp and side marker lamp will be connected.

Connect front fog lamp

Turn the rotating light switch from position ① to outline marker lamp connection position ② or low beam lamp connection position ③, and press rotating light switch once, front fog lamp will be connected and front fog lamp indicator lamp will be on press rotating light switch once again, front fog lamp will close and front fog lamp indicator lamp will be out.

Connect rear fog lamp

Turn the rotating light switch from position ① to outline marker lamp connection position ② or low beam lamp connection position ③, and pull rotating light switch once, rear fog lamp will connect and rear fog lamp indicator lamp will be on; pull rotating light switch once again, rear fog lamp will close and rear fog lamp indicator lamp will be out.

Headlamp control

Combination switch

Connect low-beam headlamp

- Turn ignition key to “II” gear position.
- Turn rotating light switch from position ① to low beam lamp connection position ②, place combination switch at gear 0 and connect low-beam headlamp.

Connect high-beam headlamp

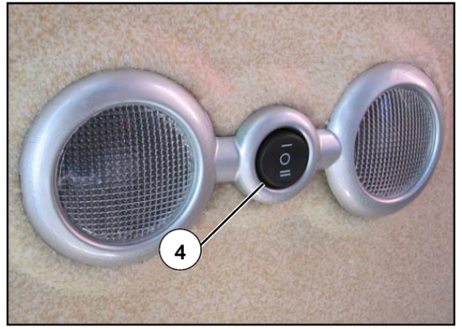
- Turn ignition key to “II” gear position.
- Turn rotating light switch from position ① to low beam lamp connection position ②, push handle down and connect high-beam headlamp.
- High-beam headlamp indicator lamp on instrument panel will be on.

Headlamp flash

- Push the combination switch to Headlamp flash position (towards the driver), the headlamp will flash.
- Release combination switch, combination switch will return to 0 position automatically.

Backlight and switch position indicator lamp

Turn the rotating light switch from position ① to outline marker lamp connection position ② or low beam lamp connection position ③, backlight and switch position indicator lamps will be on.



Indoor light

When the switch ④ is at position I, indoor light and step lamp will be connected and out simultaneously.

When switch④ is at position 0, indoor light will be out.

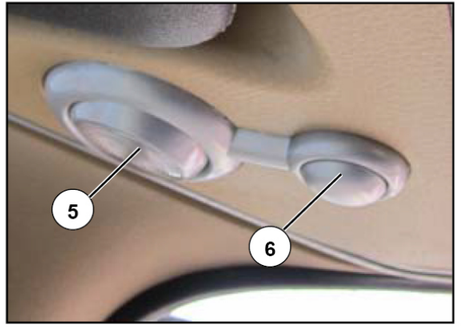
When switch ④ is at position II, indoor light will be connected.

Reading lamp (Rotatable)

Press the reading light switch ⑥, reading lights turned on.

Push switch ⑥ again, reading lights extinguished.

Turn the lamp ⑤ to the needed position as required.



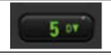
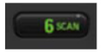
Emergency alarm switch

When emergency alarm switch ⑦ is pressed, all turn lights and turning indicator lamps will flash.

MP3 player

MP3 player can be used to play music etc.

Function descriptions

Icon	Name	Function	Icon	Name	Function
	PWR/MUTE	ON/OFF(Long press) ; Mute (Short press)		5/ D▼	Radio P5 ; Next track(USB mode)
	SRC /SOUND	Sound source choosing: Aux In/USB(Short press); enter or choose sound mode (Long press)		6/ SCAN	Radio P6 ; Scan mode(USB mode)
	VOLUME+	Increase the volume		◄	To low frequency radio search (radio); Select last tracks (USB device)
	VOLUME-	Decrease the volume		►	To high-end frequency radio search (radio), select the next track (USB device)
	1/RND	Radio save P1 ; Random play mode (USB mode)		BAND	Select the radio band;
	2	Radio save P2		AST/ SET	Auto-save the radio tuner (Short press) ; Enter/Exit setting surface (Long press)
	3/ RPT	Radio P3 ; Repeat play mode (USB mode)		USB PLUG	USB
	4/ D▲	Radio P4 ; Prev. track(USB mode)		AUX IN	Standard audio input plug

Audio adjustment

On & off

Press PWR key for short time to open or close such audio, press for short time to power on, and press for long time to power off in the state of power-on.

Volume

(1) Press VOLUME+/- to adjust volume, and ensure you can hear traffic signal (siren, police whistle).

(2) In the state of power-on, press PWR/MUTE key for short time to achieve mute function.

Sound/audio effect mode adjustment

• Press SRC/SOUND key for long time to enter audio effect setting mode to select options to be adjusted.

• Press VOLUME+/- key for short time to adjust the selected sound mode setting.

- BASS (-7,+7)
- TREBLE (-7,+7)
- BAL left and right volume balance (7--,-0-,--7)
- FADER front and rear horn control (_7_--,-0-,--¯7¯)
- LOUD off, low, middle, high (OFF,LOW,MID,HI)
- Enter audio effect mode (BASS-TRE) to select preset audio effect type（BASS-TRE, FLAT, JAZZ, VOCAL, POP, CLASSIC, ROCK）

• Upon selection, display screen will display the selected audio effect.

• After 5s, display screen will return to previous operation mode automatically.

Note: Under non-“BASS-TRE” audio effect, only “BAL”, “FADER” and “LOUD” sound modes can be set.

Tuning

Band

• Press BAND key to select radio state, and then press BAND again to select the required band.

Band can be switched between FM1, FM2, AST, AM1 and AST, and system will display the selected band.

Automatic search of radio station

• Press ◄ key to tune to radio station of low end frequency..

• Press ► key to tune to radio station of high end frequency.

Searching sensitivity (only in FM band)

• Switch between local/remote modes. Refer to “LO/DX” item in “setting”.

Manual tuning

Press ◄ or ► key for long time to switch manual tuning mode, and then tune to the required frequency manually. Upon completion of tuning, it will return to “automatic search” mode automatically after several seconds. Hold

Automatic storage of radio station (AST)

You can store 6 strongest FM radio stations in FM AST band, or 6 strongest AM radio stations in AM AST band. When you use automatic search function, radio stations originally stored in FM AST or AM AST band will be covered.

•Press AST key to enter automatic storage,

- Machine will make a “beep” sound and then keep silent, display will start flashing.
- Upon completion of storage, you will hear a “beep” sound, and display will stop flashing.
- Radio stations are stored in preset key 1-6.
- Sometimes, it is possible that we can not search 6 radio stations.

Preset radio station (1 - 6)

Store radio station into preset key manually.

Use preset key (1-6) to store 6 radio stations in each band.

• Turn to the required radio station.

• Hold the required preset key for 2s at least, you can hear a “beep” sound. At this time, your can store currents radio station into such preset key.

Recall preset radio station

• Press the required preset key (1-6) to obtain preset radio station.

USB play mode

Such radio and tape player has an external USB interface, which can be used to connect your U flash disk or portable media player.

File decoding description

• It supports audio file with suffix *.mp3 or *.MP3.

• It supports 32Mbyte~4G USB storage device which uses flash memory as storage medium.

• It supports the following sampling rate range: 8k, 16k, 32k, 11.025k, 22.05k, 44.1k, 12k, 24k and 48Kh.

• It supports the following bite rate: 8k~320kbps, VBR (MP3 PRO)

Equipment connection

Please insert your USB storage device into standard USB interface of radio and tape player, and then press SRC key to select USB mode, LCD will display “USB” word.

Note: As USB storage device is connected just now, radio and tape player will begin to search MP3 file, which will cause different waiting time from a few seconds to ten seconds depending on different USB storage device capacity and storage file size. Please do not pull U flash disk during this period.

Play

During normal play, screen will display audio effect mode (if it has been selected), current USB track No. and play time.

When all tracks in previous folder are played, it will skip to the first MP3 file of the next folder in sequence automatically.

Previous and next track play

Press ◄ or ► key to select previous/next track

Random play

Press RUD key for short time to enter or exit random play mode.

Repeat play

Press RPT key for short time to enter or exit repeat play mode.

Scan play

During play, press SCAN key for short time, the beginning part of each track will play for 10 seconds. Press SCAN key again, it will return to normal play status.

Previous and next folder selection

Press D▲ for short time to select the previous folder, and press D▼ for short time to select the next folder.

Note:

1. Please do not pull U flash disk when playing file in U disk, it may damage file. U disk shall be plugged and pulled during player shutdown. If player is closed under USB play mode. When you start the player again, “USB ERR” prompt will appear. Take it easy, this is a normal phenomenon.

2. Please do not connect extension line to USB interface provided by manufacturer, because USB protocol has very high requirements on cable length, impedance, and signal delay etc. Otherwise, it is possible that machine can not read U disk.

Warning:

USB of this player can not used to charge any external equipment (such as: mobile phone charging)

USB of this player does not support other storage devices other than U disk (such as: mobile hard disk)

MP5 player.

1. Functions

- 6.2 inch digital TFT display, full electronic audio controls,
- Multimedia player
- ESC digital FM / AM Full-Band Radio, anti-interference capacity
- E-book picture playback
- USB, SD card, mobile hard disk playback

2. Features of product function keys

1. Mute;
2. FM shortcuts;
3. AM shortcuts;
4. USB shortcuts;
5. SD shortcuts;
6. PWR power button and VOL keys; PWR power button function, standby mode, short press the button for turning on; long press for turning off, press to enter the setting of play sound effect; VOL key feature to increase the volume button clockwise, counterclockwise rotation down the volume.

7. Digital display
8. Switching function / back / menu
9. Full-band auto search and store radio stations, according to the radio signal strength sorted automatically
10. Manual Search Shortcuts - forward / forward selection
11. Manual Search Shortcuts - backward / backward selection
12. MANUAL shortcuts (read built-in TF card, currently no function is invalid for TF card)
13. Enter key and manual transferring station keys
14. Selection under TEXT document selection shortcuts and radio
15. Selection 5 under Picture Shortcuts and Radio
16. Selection 4 under Movie Shortcuts and Radio
17. SD card, USB interface shell
18. Selection 3 under Music Shortcuts and Radio
19. Selection 2 under Music Shortcuts and Radio
20. Selection 1 under Music & Video Play Pause Shortcuts and Radio

3. Operation Interface Description

1) Powered on

Press the PWR key to start the system; after system startup, show heavy truck LOGO; long press the PWR button to turn off the system.

2) Main interface(see top right)

From left to right display information is as followes:

Top: Main interface, date display, including year, month, day and week day, digital watch and volume

Icon bars on the screen: There are radio, U disck, SD car, AUX (reserved), manual, and settings.

3) Setting interface(see right)

Including picture settings, sound settings, e-book sittings, miscellaneous, system settings, use  and  buttons to select your desired function, short press the enter button to proceed with sittings.

4） Movie player

Method I: Select shortcut key USB or SD /and press 4 MOVIE Video Play (numerical key 4);

Method II: Use selection key to enter the main interface--choose from USB or SD card--then choose the play category of the movie in store-use the enter button to enter and select the programs to be played.

5） Music player

Method I: Select shortcut key USB or/ SD and press 3 MUSIC Music Play (numerical key 3);

Method II: Use selection key to enter the main interface--choose from USB or SD card--then choose the play category of the music in store-use the enter button to enter and select the programs to be played.

6） Picture browsing

Choose USB or/ SD -->and press 5 PHOTO (numerical key 5)

7） E-books

Choose USB or/ SD -->and press 6 TEXT (numerical key 6)

8） Radio player

A. Pre-stored sets of radio stations on the screen. Each set contains 6 stations.There are 18 stations in a set for FM3 and 12 stations for AM2.

B. Radio function settings

1. Settings of radio sound effects:

Press MENU to enter the main interface, select the red section in the "Sittings" of the main interface, and short press the enter button to enter into set interface, use ' ▶▶| ' to enter into sound settings interface. Items to be selected include: balance, bass and treble, loudness, EQ settings.

2. Switching operations of radio band

Switch to FM Function: Use selection FM key and short press the button,

Switch to AM Function: Use selection AM key and short press the button.

3. Automatic full band search (AMS key), long press for 2s and it may start the full band search from the current position, the station found will be stored automatically in the pre-stored stations and station lists.

4. Manual search operations for radio stations under the radio mode

Method I: Short press |◀◀ , ▶▶| button

Method II: Turn the key 13 till a clear broadcasting station is found.

5. Find stations by hand and short press 1-6 to call out the broadcasting stations saved at corresponding positions.

4. Simple troubleshooting

Trouble Phenomenon	Possible Cause	Solution
General Problems		
Impossible to start	The power supply voltage exceeds the rated working range and the system activates automatic protection.	Do not start until the automobile battery voltage gets stabilized
	Troubles caused by illegal operation or other factors	 Rest the system by pressing the reset key above the MIN interf figure above: yellow circle.
No sound or small sound is output	The audio output line is wired wrongly	Re-connect wires correctly
	The main machine or connected equipment is at mute state or its sound volume is low	Close mute or turn up the sound volume of main machine or connected equipment
	The speaker fails	Repair or replace the speaker
	The speaker wire gets contact with the body or grounded	Connect the speaker with insulated conductors and wrap the exposed part with insulating glue
Bad sound quality or sound distortion	The speaker power does not match with this machine	Replace with a proper speaker
	The conductors between speakers are shared	The speaker outlet terminals are respectively connected at each speaker terminal.
	The online speaker gets contact with body screws	Check connection of the speaker
Radio		
Bad sound effect	The vehicle's automatic antenna does not stretch out completely	Correctly connect the automatic antenna line as per the General Drawing of System Connection
	The radio antenna is not well connected	Correctly connect the radio antenna as per the General Drawing of System Connection
Read card/Read USB		
Impossible to insert SD card	There has been a SD card in the bin	Insert a SD card after the SD card inside bin is ejected.
The SD card cannot be played	The SD card is scratched and cannot be read	Replace with a good SD card
	The SD card is too dirty or wetted	Clean the SD card

Brake system

Brake system function:

– Service brake

– Parking and emergency brake

– Auxiliary brake (engine exhaust brake etc.)

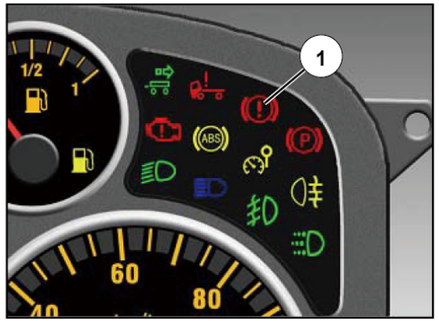
– Trailer brake (apply to tractor)

Service brake is double-circuit air pressure brake, and independent from parking brake control device. Parking brake can make vehicle lock the brake by mechanical device even without driver, and park on certain ramp reliably. Emergency brake and parking brake control devices are interoperable.

Warning!

– Brake system can not surpass its own physical limit. Bear this in mind especially when vehicle runs on slippery, wet or poor roads. Adapt your driving to different road conditions and traffic conditions.

– Do not make safety protection function of brake system induce you to have false sense of security.



Function check of brake system

When key switch is on, functions of brake system will start automatically.

Failure display of brake system

When the brake system has a trouble, the Driver's display screen will show symbol ① of "brake system".

Warning!

– In case of brake system malfunctions, vehicle driving and brake performance of vehicle may have some changes unnoticed. In some cases, brake lamp will not be lit. Therefore, please drive very carefully.

– In case ABS malfunctions, wheel may be locked when braking, and braking force may get smaller.

– In case of brake system malfunctions, ask SINOTRUK service station for assistance.

Service brake

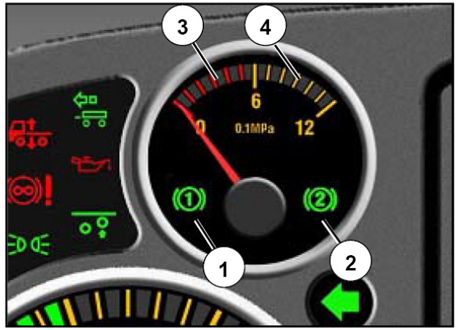
Pedal operation acts on all wheels by two independent circuits.

Working pressure is 0.75MPa, and cut-out pressure of built-in pressure regulating valve in the dryer is 0.81MPa. The first circuit acts on rear axle (or double rear axle) wheel, the second circuit acts on front axle wheel. Once any air reservoir pressure of the two circuits drops to below 0.55MPa, pressure indicator lamp of air reservoir will be lit. In this case, vehicle shall be stopped immediately and pressure drop cause shall be found out to ensure driving safety.

If full travel brake is conducted for many times in a short time, the pressure may drop to below 0.55MPa.

Pressure leak check

Shut down the engine and activate the hand brake. Within 2 hours, pressure at best can only be allowed to drop by 0.05Mpa, or 0.01Mpa within 30 minites.



Air pressure display

The pressure gauge generally shows the value of circuit with lower pressure, and pressure indicator light① or ② will be lit. The value of circuit with higher pressure is indicated on the drivers' display screen⑤.

Air pressure gauge ① indicates pressure of rear axle brake circuit

Air pressure gauge② indicates pressure of front axle brake circuit

when air gauge pointer is in red area ③: Low air pressure

when pointer is back to yellow area④: Air pressure gets normal

Warning!

– If air pressure is too low (lower than 0.55MPa), don't drive the vehicle until the alarm lamp is out and warning information disappears.

– After startup, test brake performance (service brake and parking brake) of vehicle on dry road surface with good adhesion!

– Ensure there is no foreign matter in control pedal area.

Parking brake (manual brake)

Parking brake (manual brake) can also be used as emergency brake. Operating manual brake valve handle ① can make spring energy storage brake chamber work, thus activating parking brake. When service braking system has malfunctions such as leakage, operate manual brake valve to activate emergency brake.

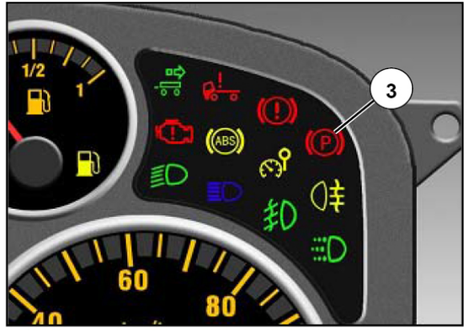
Manual brake valve is installed at the rear of shift handle. Only when manual brake valve is operated with brake system pressure higher than 0.55MPa and manual brake signal lamp out, parking brake can be relieved completely and vehicle can be driven away.

Warning!

– Make sure to use parking brake during parking! When necessary, use wheel block to prevent slide.

– Do not drive vehicle before manual brake signal lamp is out!

– Make sure to place manual brake valve at brake position before engine is started. Otherwise, when brake pressure rises, original parking brake will relieve!



- **Parking brake (manual brake):**

Pull backward the handle②until it is locked and the parking brake indicator lamp ③ will be lit. At this time, parking brake is locked completely.

- Partial brake

Pull handle back gradually and maintain it in required position, otherwise, it will bounce back to release position automatically. At this time, parking brake indicator lamp ③ on instrument panel will be on.

If operation handle of parking brake is not pulled to complete brake position, operation handle may return to release position automatically. At this time, as vehicle is not braked fully, vehicle slide may occur.

–Parking brake handle release

Release handle latch and handle will return to release position automatically. At this time, the parking brake indicator lamp ③ is off.

Air cylinder pressure shall keep over 0.55MPa at least, ensuring parking brake can be relieved completely. If pressure is lower than the above value, fault display lamp “STOP” on instrument panel will be on.

Parking brake test position

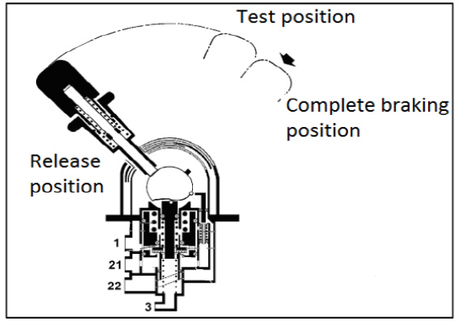
It is used to test whether braking force of tractor spring energy storage brake chamber is enough to park tractor train on slope.

Test method is as follows:

Pull manual brake handle.

Pull backward the handle(→)or press it downward(↓). When it gets over the lock point, keep it in this position and release the trailer brake. The trailer parks and brakes only by braking force from the tractor spring energy storage brake chamber.

If test results indicate that spring energy storage brake chamber can not brake tractor train, wedge shall be used to block the wheel.

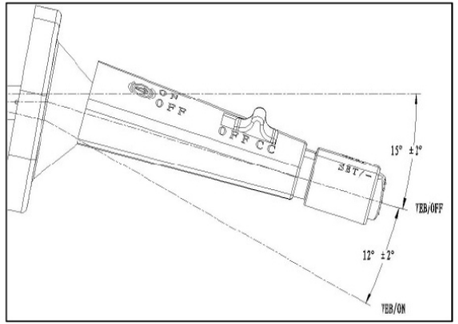


Warning!

– During test, tractor train may roll back.

– In case no above provision is considered, according to relevant regulations, wedge shall be used to block wheel.

– If brake performance of spring energy storage brake chamber is tested before tractor train wheel is reliably blocked by triangle block, accident may occur!



Warning!

– Be careful, do not use engine exhaust brake on wet, dirty or frozen road, otherwise vehicle may slip and skid!

- When vehicle drives on a long slope, as transmission neutral position can not play an auxiliary brake role, exhaust brake shall be used only when it is not in nuetral.

- The engine speed cannot be more than 2000rpm when applying exhaust brake.

-Higher braking efficiency can be acquired when lower gears are applied.

Auxiliary brake（Engine exhaust brake）

When all the following conditions are met, vehicle will achieve exhaust brake:

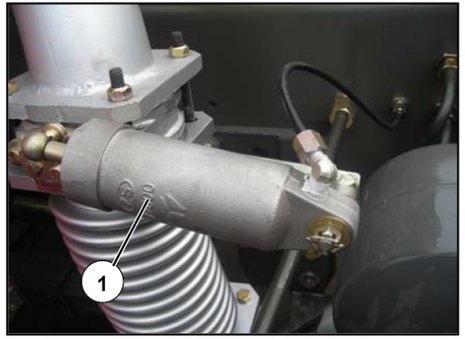
- Clutch is not pushed;
- The vehicle is not at neutral gear;
- Engine speed is over 800rpm;

The driver switches downward the multi-function handle to activate (exhaust brake switch).

When vehicles meet or pass through worse road section, exhaust brake can be used to decelerate ahead of time. Use of exhaust brake can reduce number of parking brake, wear and heating of tire and wheel brake, prolong their lift, reduce oil consumption and improve driving safety.

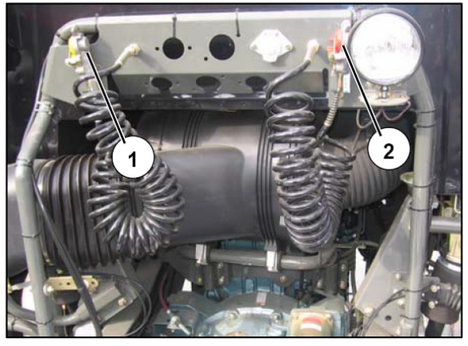
Exhaust brake

Exhaust brake is based on traditional exhaust brake butterfly valve ① which can increase engine brake efficiency. Reasonable use of exhaust brake can increase braking torque generated by diesel engine, keep vehicle decelerating continuously or stabilize vehicle speed, reduce use frequency of service brake, decrease wear of both brake and tire, prolong replacement cycle of brake shoe, and reduce running costs of the whole vehicle.



Warning!

Exhaust brake is a kind of auxiliary brake device not parking device, and can not substitute for service braking system of vehicle. Thus, if you want to stop vehicle completely, service braking system must be used, that is, footbrake. To meet deceleration demands, auxiliary brake device can be used to make service brake keep cold, thus providing maximum braking force quickly when required.



Trailer brake（applicable to tractor）

Brake systems on the tractor, used to control the semi-trailer or full-trailer. Respectively connect coupling head (yellow) ① and air charging connection (red) ② with corresponding joints of trailer.

Compressed air line connection

Connect brake control line joint (yellow)

Connect trailer air charging line joint (red).

Disconnect the compressed air pipeline

Make sure to separate trailer connectors as per the following sequence; otherwise, the trailer brake will be relieved, causing movement of trailer.

- Pull parking brake handle to stop trailer.
- Connect parking brake of full-trailer/semi-trailer (please follow the manufacturer's operating instructions).
- Disconnect air charging line hose (red), brake of trailer and semi-trailer will work automatically.
- Disconnect brake control line joint (yellow).

Antilock braking system (ABS)

ABS, short for "Antilock Braking System", can prevent wheel from locking during braking.

Even during emergency brake, vehicle still can keep steering and directional stability. No matter how the road condition is, brake pedal shall be pushed to the limit to ensure the shortest braking distance.

Warning!

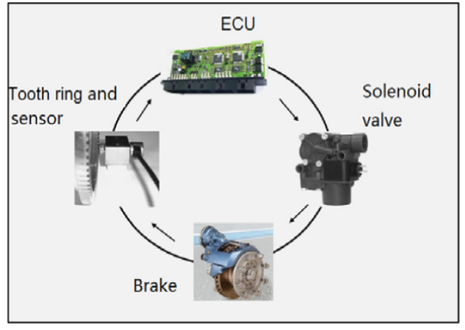
– When driving at low speed, ABS does not work.

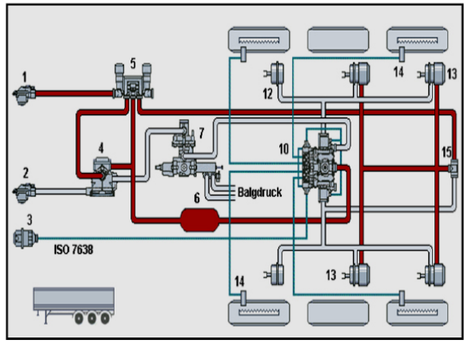
– ABS can not compensate for driving error (for example, safe distance from the front vehicle is too small, vehicle speed is too high or vehicle does not slow down when steering).

ABS function check

When key switch is opened, ABS will start automatically.

When the ABS detection lamp ① is lit, it indicates that ABS fails. For ABS check, repair and maintenance, please refer to ABS supplier technical documents issued with the vehicle





In case semi-trailer with ABS is pulled

When key switch is opened, ABS will start automatically.

ECU of trailer ABS is independent, main vehicle shall supply power and display fault state of trailer ABS through its instrument display screen.

When trailer ABS fails, the driver's display screen will display trailer ABS alarm symbol  . For more details, refer to "display information on Driver's display screen and detection lamp panel" for details.

Acceleration Slip Regulation (ASR）

The effect of ASR is intended to prevent the drive wheels from spinning when driving on the muddy and snowy/icy roads, especially at the time of startup or acceleration, to increase the orientation stability of startup and acceleration.If the drive wheels of one or both sides are spinning, the ASR will automatically activate.If just The drive wheels at one side spinning, then the ASR will automatically brake the spinning wheels. If the drive wheels at both sides spinning, the ASR will automatically reduce the engine output

Electronic braking force distribution/limiting system (EBD/EBL, optional)

Electronic brake force distribution (short for EBD) is the brake force regulation function extended on the basis of vehicle antilock brake system; such function is similar to traditional load sensing valve device and optimizes brake performance of vehicle.

EBL function is based on ABS wheel speed sensor. It is used to monitor slip rate difference between rear axle and front axle during braking, and keep slip rate within the given range.

Tire pressure monitoring system (TPM, optional)

TPM mainly detects tire pressure change of the vehicle during driving; considering influences of steering, temperature, and load change, some compensation is provided by TPM for calculation results; if the difference exceeds the preset limit, ABS Warning light will be lit to indicate tire pressure drop. Under unstable driving conditions such as sharp corners, slipping, calculation will be halted. Further, tire performance and load will also influence TPM functions. As other ABS faults also can cause alarm lamp to be on, you must operate ABS diagnosis to read flash code, and then identify it on the fault code table to confirm whether tire pressure decreases or not.

In addition, TPM only monitors wheels directly controlled by ABS system, and can not detect pressure change of the remaining tires.

TPM function activation:

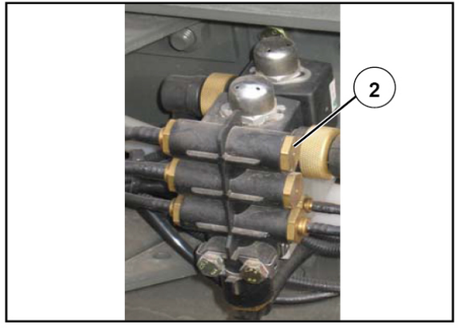
1) When vehicle is motionless, turn key switch to gear 0 or 1;
2) Press ASR rocker switch and hold on;
3) Turn key switch to gear 2;
4) Wait for 3s until ABS indicator lamp is out;
5) Release ASR rocker switch;
6) Wait for initialization confirmation information of TPM function, until ABR indicator lamp flashes for three times;
7) TPM function is activated successfully.

Daily notices of brake system

Air charging connection

- The charging connector①is located at the air dryer , which is used to connect the exteranl test instrument and detect the air pressure in the brake pipeline

- After screwing on the charging hose on the charging connector, the tyre can be charged and the vehicle braking system can also be charged through the external air source.



Auxiliary air module

The auxiliary air module is on the frame; the air can be supplied through the quick plug connector after unscrewing any plug at position②.

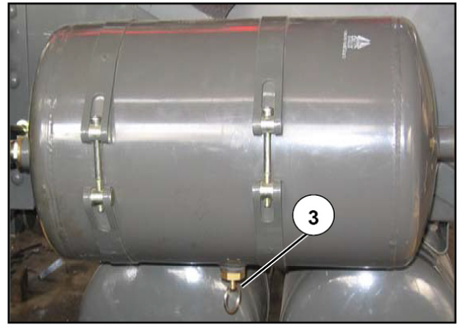
Warning!

The ferrule-type pipe joint can't be connected here.

Brake line maintenance

Welding, cutting or drilling operation nearby plastic pipe for braking shall comply with the following stipulations:

- Firstly drain air pressure in pipeline.
- Cover pipeline to avoid spark, flame and hot smear metal.
- Allowable maximum temperature of zero-pressure pipe is 130℃, and the longest duration is 1h.

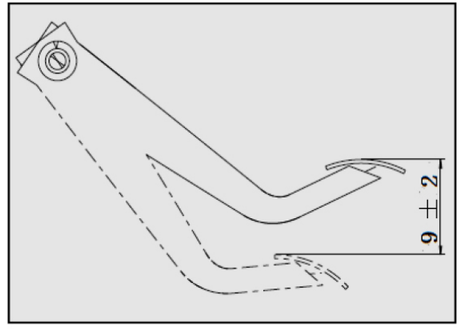


Pay attention to check and remove moisture in air cylinder of brake system

When vehicle stops, pull manual drain valve③in the lower of air cylinder to remove moisture in air cylinder. If oil-water mixture is drained from air cylinder which is farthest from dryer, indicating air dryer fails. Drying cylinder on the top of air dryer shall be replaced immediately. (Drying cylinder on the top of air dryer shall be replaced every two years)

Inspection of brake pedal travel

Gently step on the brake pedal and check its free travel; the normal value shall be 9±2mm. There shall be no unsmooth feeling if the brake pedal is floored.



Air conditioning system

Warning!

– Refrigerant is R134a, and filling quantity is 775±25 g.

– In case of system lubricant loss, lubricant designated by compressor manufacturer shall be filled properly.

– Air conditioning system maintenance and refrigerant filling shall be conducted by professional maintenance personnel.

– It is prohibited to flush the front wall when air conditioning system is in external circulating state.

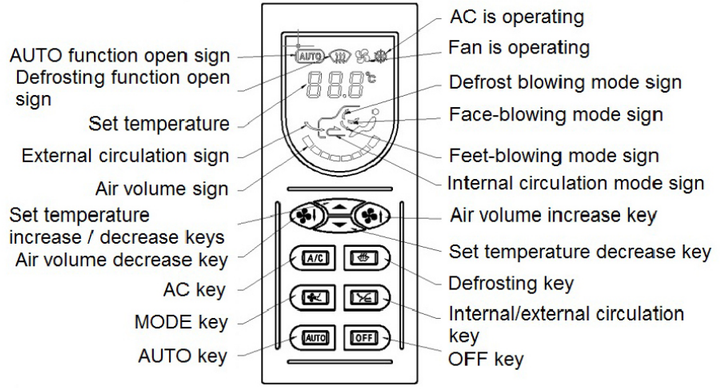
– Air conditioner shall be operated 1~ 2 times each month to ensure reliable seal and lubrication of compressor.

Composition of electric control system

No.	Component
1	Control panel
2	Internal temperature sensor
3	External temperature sensor
4	Evaporator temperature sensor
5	Speed-regulating module
6	Internal and external circulating motors
7	Mode Motor
8	Water valve motor
9	Linked damper motor

Composition of control panel

The composition of A/C control panel and meaning of each component are as follows:



Panel operation instructions

No.	Key	Function	Description
1	 Internal/external circulation Key	Switch internal and external circulation	● Every time you press this key, system will switch between internal and external circulation states once. ● Press this key under AUTO mode, system will switch between internal and external air working conditions, but will not exit AUTO mode. ● When system is set as internal circulation state, system will turn to external circulation state for a certain time automatically at regular intervals, and then return to internal circulation state.
2	 Temperature increase	Press the key once, the set temperature will increase by 0.5℃	Press this group of key under AUTO mode, set temperature will change but system will not exit AUTO mode.
3	 Temperature decrease	Press the key once, the set temperature will decrease by 0.5℃	
4	 MODE key	Change blowing mode	● System includes 5 blowing modes totally, that is, face-blowing, face and feet-blowing, feet-blowing, feet-blowing and defrost, and defrost (defrost herein only refers to draft direction, and does not mean the open or close of defrost function). ● Press this key under AUTO mode, system will exit AUTO mode and enter face-blowing mode.
5	 AC key	Open/close air condition compressor	● Under manual mode, press this key once, working condition (absorb/disconnect) of compressor will switch for one time. ● If blower does not work when AC is started, system will set air volume as gear 2 automatically.

No.	Key	Function	Description
6	 AUTO button	Switch to AUTO working mode	● When air conditioning system is powered down, press this key, air conditioning system will enter AUTO mode. ● When air conditioning system is powered on, if it is in manual mode currently, press this key, air conditioning system will enter AUTO mode. ● Under AUTO mode, press temperature increase and decrease keys, the set temperature can be changed but system will not exit AUTO mode. ● When system is in AUTO mode and set temperature is changed manually, press this key, system will not exit AUTO mode while recalculate set temperature according to the procedure. ● Under AUTO mode, press MODE, air volume increase and decrease keys, system will exit AUTO mode.
7	 Defrost key	Switch to forced defrosting	● Under non-defrost mode, press this key, air conditioner will enter defrost mode; press defrost key again, air conditioner will exit defrost mode and return to working condition before defrosting. ● Defrost state will memory working method and interface set by user automatically and execute it. Temperature, AC, internal/external circulation, air volume adjustment will not exit defrost mode.

No.	Key	Function	Description
8	OFF OFF button	Shutdown system	● When air conditioner is powered on, press OFF key, air conditioner will enter OFF state, display screen will close, and all actuators will close and stop working. ● When air conditioner is in OFF state, press defrost key, system will start working and enter defrost mode. ● When air conditioner is in OFF state, press air volume increase key, system will start working and enter manual mode. In addition, air volume will be at gear 1, but set temperature, mode, internal and external circulation and other working conditions will enable state previously set by user. ● When air conditioner is in OFF state, press AUTO key, system will start working and enter AUTO mode. ● If air conditioner is not closed with OFF key last time, when air conditioner is started again, it will enter working method and interface previously set by user. If in manual mode, AC and air volume will not resume; if in AUTO mode, air conditioner will operate according to AUTO mode.

9	Air volume down Key	Air volume down	● Every time you press this key, air volume will decrease step-by-step until gear 0. When air volume is in gear 0, compressor will not work and air conditioner pattern will not appear.
10	Air volume up Key	Air volume up	● Every time you press this key, air volume will increase step-by-step until gear 4 and maintain unchanged. ● If you change air volume manually under AUTO mode, it will exit AUTO mode. ● Fan can only be started in case engine is working.
9	Air volume down Key	Air volume down	● Every time you press this key, air volume will decrease step-by-step until gear 0. When air volume is in gear 0, compressor will not work and air conditioner pattern will not appear. ● If you change air volume manually under AUTO mode, it will exit AUTO mode.

Self-check and error recovery functions of air conditioner control system

Self-check conditions:

Press MODE and AUTO keys simultaneously for three times within 3s after temperature is set as 28℃, after 3s, control panel will enter self-check program.

Fault code display method:

- Temperature display position will display fault code. If there are multiple fault codes, these codes will be displayed circularly at the speed of 2s, interval time of single fault code is 2s, and interval time of two fault codes is 4s, and so on. When the display is over, system will exit automatically.
- When temperature sensor of evaporator malfunctions, if AC is working, fault code will flash for 30s every 1.5min to prompt driver. In this case, driver shall turn off air conditioner and send it to maintenance station for repair, to prevent evaporator freezing.

Automatic exit method of forced self-check:

- When the display is over, system will exit automatically.
- Restart vehicle or press OFF switch.
- Work interface after exit: set temperature is 25℃ and system operates under AUTO mode.

Fault code definition:

00	Normal
01	Internal air temperature sensor errors (short circuit or open
02	External air temperature sensor errors (short circuit or open
03	CAN communication error (rotating speed)
04	CAN communication error (other information except
05	Reserved
06	Linked damper (open circuit)
07	Evaporator temperature sensor errors (short circuit and
08	Water valve (open circuit)
09	Mode motor error (open circuit)

Cab tilting mechanism

Manual/electric turning and lifting system of driving cab

1 Hydraulic manual oil pump

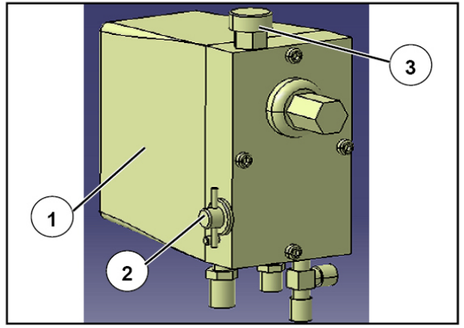
2 Reversing valve

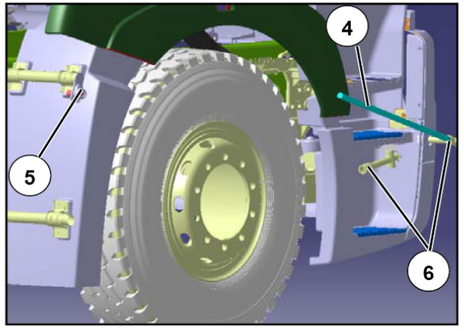
3 Oil plug

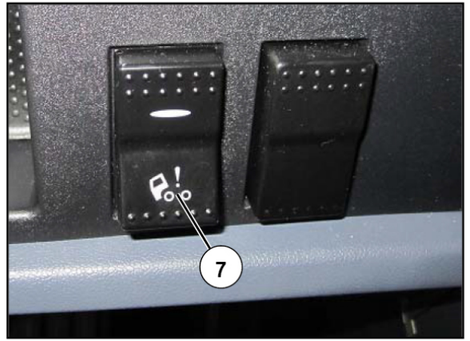
4 Pry bar

5 Switch

6 Reversing tool







7 Rocker switch

Cab turnover

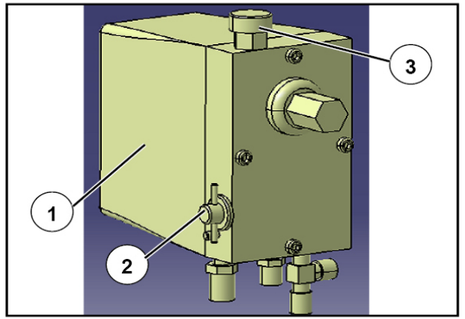
Danger!

– The reversing valve② can only be operated when turning over the cab; It must be maintained directing " ↓ " on all other conditions including driving or adding oil.

– To ensure safety, no barrier is allowed in turnover area in front of cab!

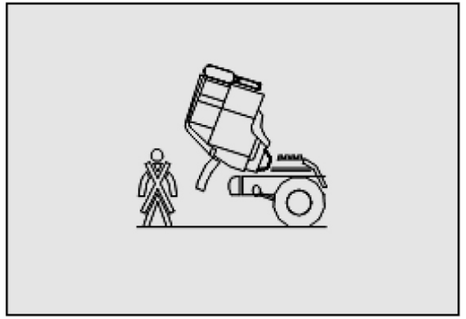
– During cab turnover, no personnel can enter between cab and chassis.

– Operation after cab turnover can only be conducted when cab is turned over to limit position!



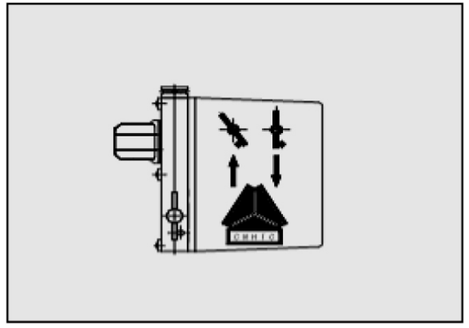
Preparations before turnover

- Park vehicle on flat ground, and ensure it has no impact on other vehicle traffic.
- Use parking brake.
- Place gearshift lever at neutral position.
- Shut down engine.
- Fix loose objects in cab.
- Ensure storage box has been cleared.
- Close cab door.



Cab tilting operation

- Before turning the driving cab, firstly open the radiator grille ⑧.
- Press rocker switch ⑦ (only for electric lift) and close vehicle door.



- Turn the reversing valve of oil pump to " ↑ " and shake the oil pump with the crowbar (or press switch ⑤ only for electric lifting) to turn.

Cab return

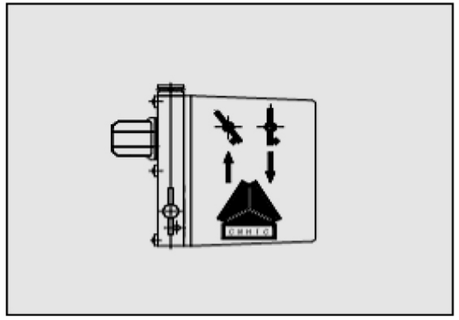
- Turn the reversing tool of oil pump to "↓"and shake the hand pump (or press switch ⑤) to turn back the driving cab.

Warning!

– Continuous operation of electric pump shall not exceed three times (though motor protection circuit is set inside, excessive heat will shorten motor life).

– As oil cylinder has the characteristic of automatic dropping at fallback end, when lock pin is 40~150mm away from lock hook, cab will drop automatically.

- When cab is dropped down, rubber bellows ⑨ connected with upper air inlet must fit closely with lower air inlet, to keep dust out.
- Finally, check lock signal lamp on instrument panel, and cab is not locked, lock signal lamp will be on.。
- Close rocker switch ⑦ in the cab (only for electric lift).
- Close the front cover



Hydraulic oil for lift oil pump of cab turnover is originally 10# aviation hydraulic oil produced by PetroChina. It is also recommnended to use oil that satisfies DIN 51524_HVLP 15 requirements from other international brands such as Mobil, Castrol, and Shell.

Detailed information is as follows:

Assembly	Oil Name	Quality grade and viscosity grade	Recommended proucers and specifications	Oil Quantity	Interval Mileage or Time of Replacement	Remarks
Cab tilting mechanism	Hydraulic oil of lifting pump	DIN 51524_HVLP 15	Mobil DTE 10 Excel 15 Castrol Hyspin AWH-M 15# Shell Tellus S2 V 15	1.8L	With normal inspection, maintenance and repair, no replacement is required.	

Chapter II Driving Preparation

Inspection and maintenance overview

Develop the habit of inspecting diesel engine before startup and after shutdown, which will help you timely find any or possible abnormal situations, for example, whether there is air in diesel engine, and fuel and coolant leakage etc.

The following aspects shall be inspected before engine startup:

Every day:

- Engine: Engine oil level
- Cooling system: Coolant level
- Light and signal systems: Function (refer to relevant contents in Chapter I)
- Seat safety belt: Condition and function (refer to relevant contents in Chapter I)
- Cab turnover system: Condition (refer to relevant contents in Chapter I)
- Fuel: fuel level.
- Urea: amount of remaining urea (Euro IV and V model, see related content in Chapter I)
- Traction device, Saddle: Function, connecting line and cable (refer to relevant contents in Chapter III)

Every week:

- Tire: air pressure and condition
- Wheel nuts: Whether it fits tightly[1) 2)]
- Windshield washer: Cleaning liquid level, winter adaptability, function
- Observe appearance to ensure there is no leakage: Engine, transmission, transfer case, drive axle, steering mechanism, heater, hydraulic tilting system
- Fuel oil primary filter: Drainage[1)]
- Transmission: Lubricating oil level

Note:

[1)]: Insepection frequency should be increased if necessary according to local climate, vehicle use and conditions

[2)]: Inspect the new vehicle on daily basis.

Every month:

- Power steering system: Liquid level
- Cluth storage tank: liquid level
- Clutch wear indicator：check clutch driven plate wear condition
- V-belt and multi wedge belt: Condition

Every six months

- Cab tilting mechanism: Oil level
- Battery: Electrolyte liquid level（Non-maintenace-free battery）
- Hydraulic system of dumper (or other hydraulic devices): liquid level

If vehicle is installed with special equipment; it is possible that required inspection item is not listed in the table.

Inspections after engine startup

Every day:

- Engine: Engine oil pressure
- Brake system: Function is normal and effective
- Air suspension system: Whether the vehicle is inclined
- Steering: Whether operation is normal

Every week:

- Air suspension system: Check compressed air bag

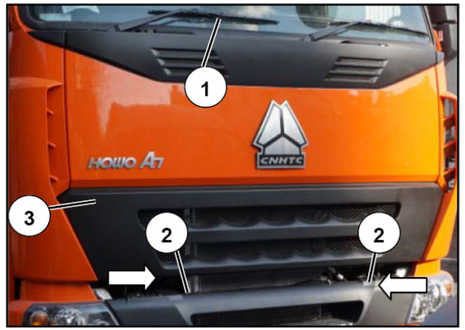
Every month:

- Air dryer: Function [1)]

Note: If vehicle is installed with special equipment, it is possible that required inspection item is not listed in the table.

Note:

[1)]: Inspection frequency can be increased properly if necessary according to local climate, use and driving conditions.



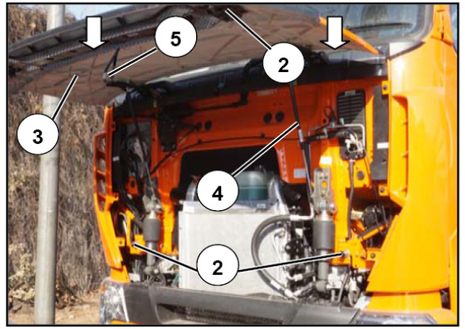
Inspection and maintenance before engine startup

Open front face shield

Note:

Before opening the radiator grille, keep the windshield wiper ① at returning state.

- Open the locking devices ② at both sides of radiator grille along the indicated direction, and then open the radiator grille lock.
- Lift front face shield ③, two pneumatic springs ④ will help to open front face shield and fix it at the final position.



Close front face shield

- Pull front face shield ③ down along both sides of front face shield to close it.
- Properly close the front face shield ③ so as to hear the locking sound of locking devices ②.

Inspection and maintenance points:

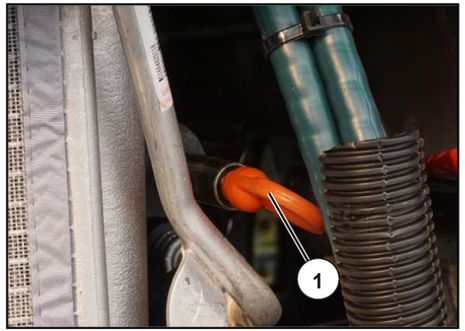
After front face shield is opened, the following inspection and maintenance positions can be seen:

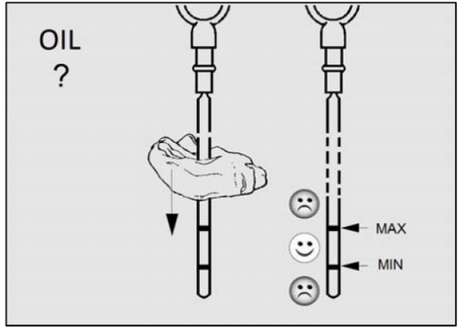
①Coolant filler

② Clutch hydraulic oil tank

③Clutch fluid reservoir

④Oil dip stick





Warning!

Please inspect and clean the site thoroughly before inspection and maintenance!

Before engine startup, check it every day:

Engine oil

- Park vehicle on a level road, close diesel engine, and then check engine oil level after 10min.
- Pull oil level gauge ① out, wipe oil level gauge with clean lint-free cloth, insert oil level gauge into pipe and then pull it out again, engine oil level shall be between maximum and minimum markers of oil level gauge, and not lower than minimum scale. Perform many inspections to confirm whether engine oil level is too low, if so, fill engine oil.

Warning!

Do not fill engine oil to exceed the maximum scale. Excessive engine oil may damage diesel engine!

Fill engine oil

- Turn off key switch

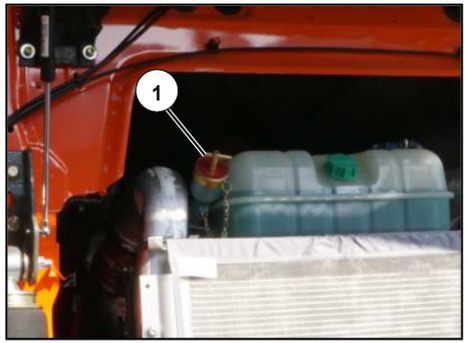
Warning!

– Be careful not to damage engine!

– Only engine oil certified by SINOTRUK can be used.

– Do not fill excessive engine oil!

- For cab turnover, refer to “cab turnover mechanism”.
- For cab turnover, refer to “cab turnover mechanism”.
- Fill engine oil（For oil type and filing amount please see engine maintenance）
- Tighten filler cap ①



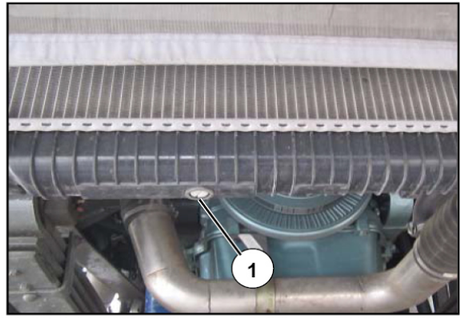
Cooling system adopts closed forced water cooling system and long life coolant.

Warning!

– As coolant is poisonous, be careful not to absorb it into the body during use, storage and preparation.

– It is not allowed to open expansion tank cover immediately after engine stops running in case personnel are burnt by internal hot pressure gas.

– While using the vehicle, in case the coolant reduces significantly, causing the entire system to overheat, at this point do not fill up coolant directly as the sudden changes in the coolant temperature may damage the engine.



Even though there is no antifreezing requirement in places where the vehicle is used (air temperature is above ice point perennially), coolant can not be replaced by water.

Drain coolant

Unscrew drain plug at radiator ① to empty coolant of the complete vehicle; refer to "engine" maintenance for engine coolant emptying.

Cooling system (daily inspection)

- Park vehicle on a level road, and then open front face shield.
- Observe the level of expansion water tank and the coolant level shall be between high and low level marks at the side of the tank.

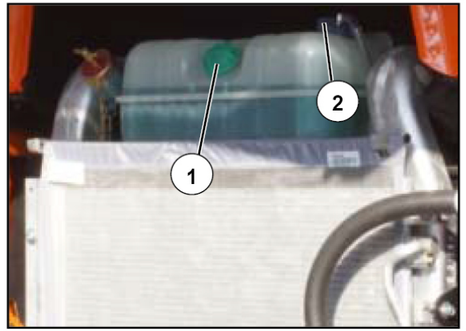
Fill coolant

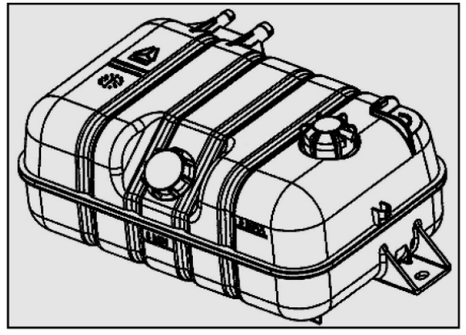
① Liquid-adding cover ② Pressure-limiting valve deck

- Open expansion tank cover ①, and release cooling system pressure. Turn counterclockwise expansion tank cover for half round, and then take expansion tank cover.
- Turn the warm air temperature-regulating button to maximum air volume
- Fill coolant to MAX
- Close expansion tank cover and tighten it.
- Keep engine operate for a certain time.
- Check coolant level, and fill coolant when necessary.

Note !

The relief valve can keep certain pressure inside the cooling system relative to atmosphere to increase boiling point of coolant; otherwise, damage will be caused to the water pump. The function of relief valve is especially necessary at plateau, so it is not allowed to replace it without authorization





Fuel (daily inspection)

Warning!

– As fuel is flammable, caution fire and explosion!

– Close engine and auxiliary heating device before filling fuel.

– When filling, 5% expansion space shall be reserved to prevent fuel overflow due to expansion.

– Check fuel quantity through fuel gauge, if indication is incorrect, check fuel gauge and sensor.

- Turn on key switch.
- Check fuel quantity on fuel gauge ①; if required, fill fuel.

Note !

– Fuel in the fuel tank shall not be used up. Otherwise, it is needed to exhaust the air inside fuel system (see "Fuel System").

– Before the winter starts, check freezing resistance of fuel.

Inspect performance and condition of vehicle lamp and signal system (daily inspection)

- Check surface of each vehicle lamp.
- Check bulb, switch and control lamp.

Fire extinguisher

Check fire extinguisher, and ensure it can work normally when necessary. After every use, fill fire extinguishing agent or replace new fire extinguisher.

Basic hand tool

Check whether basic hand tools are ready. Such as jack, wheel wrench, wheel block and tire inflation hose.

Before engine startup, inspect the following items every week:

Tire pressure and condition

Check (tire cold state)

- Check all tires (including spare tire), their air pressure shall be normal.
- Check the appearance, tire wear and tread depth of all tires (inspect according to the specified conditions).
- Find foreign matter inserted in tread or between tire and tire.
- Check whether external surface of tire is damaged.

Wheel nuts

Check whether nuts are connected firmly.

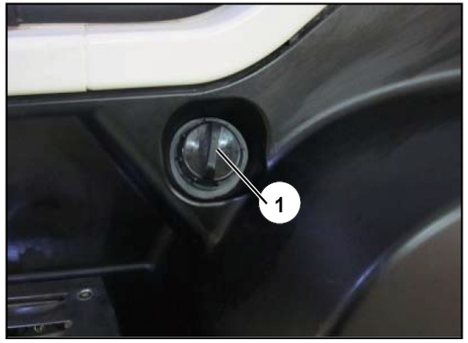
- Retighten all wheel nuts according to the specified tightening torque.

Warning!

– Vehicle speed, safety and maneuverability, and tire service life depend on whether tire pressure conforms to relevant regulations.

– Insufficient tire inflation pressure will reduce driving safety and tire life. If tire pressure decreases continuously, check whether there is foreign matter in tire. In addition, check whether wheel hub and valve are tight.

– If tire gets hot after vehicle drives at certain speed, tire pressure will rise by 1bar. In this case, tire deflation is prohibited. Tire inflation pressure will change with air temperature, about 0.2bar every 10 ℃. Special attention shall be paid when checking tire indoor in winter.



Windshield washer system/wiper system

Windshield shall be cleaned weekly or more frequently according to climate, use and driving conditions.

- Open the door on the driver's side.
- Unscrew the cover ①.
- Check the liquid level in reservoir.
- Fill cleaning liquid if necessary.

Note: Before winter is coming, fill anti-freeze windshield washer liquid, that is, methanol (or isopropyl alcohol, ethylene glycol) aqueous solution with a volume ratio of 50%.

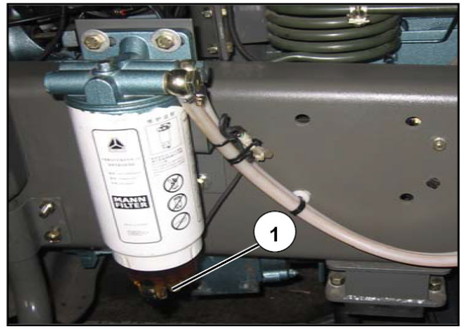
- Screw the cover ①.
- Check whether windshield washer system/wiper system works normally.

Mann-Hummelfuel preliminary filter（oil-water seperator）

Check impurities and water and remove it on requirement.

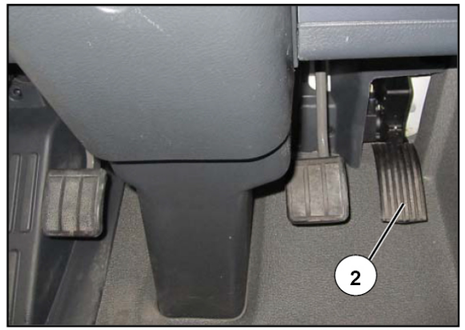
(Weekly or more freqrently, depending on climate, use and operation conditions)

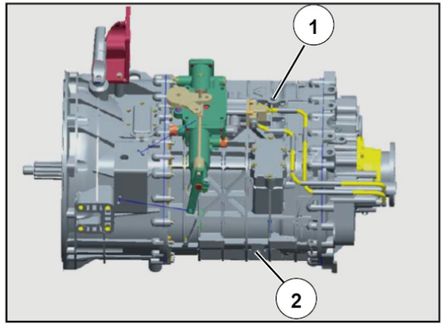
- Park the vehicle.
- Unscrew the nut①.
- Drain water and impurities and deal with it properly.
- Screw up the nut.

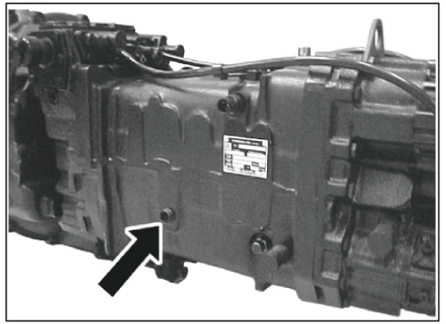


Accelerator operation

Depress the pedal② as required during starting and driving.







Check transmission weekly

Check oil level.

- Park the vehicle on a level road
- When oil level stabilizes and oil temperature is close to normal temperature, unscrew plug ② at oil level observation port.
- If oil level is lower than observation port position, add GL-5 85W/90 heavy-duty vehicle gear oil.
- Unscrew plug ① at filler, and fill gearoil until it overflows from the observation port ②.
- Tighten plug ① and ②

Check whether engine, transmission, transfer case, drive axle, steering mechanism, heater and hydraulic turnover system are free from leakage.

When necessary, conduct inspection and repair at SINOTRUK service station.

The following items shall be inspected monthly before engine startup:

Power steering system (monthly inspection)

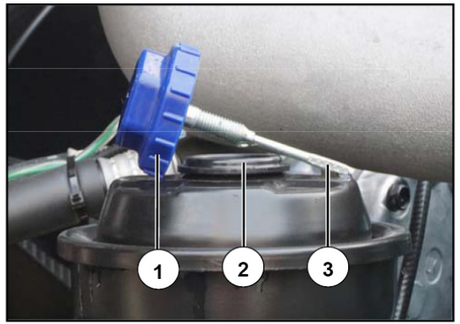
Warning!

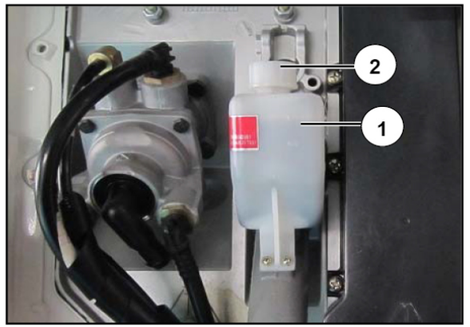
If hydraulic oil decreases due to leakage, hydraulic power steering system may not work. In this case, vehicle steering is very heavy. At this moment, slowly drive the vehicle to the nearest SINOTRUK service station for check and repair.

Liquid level inspection

- Park the vehicle on a level road, and turn cab over.
- Turn over the cab
- Pull oil gauge ① out and check liquid level.
- When the engine stops running, the oil level shall be above the mark at dipstick scale ③. If liquid level is too low, fill ATF III automatic steering oil through filler ②.

When filling oil, start the engine and keep it running stably at a low speed; as adding new oil to the oil tank, repeatedly turn the steering wheel lock-to-lock from untill no air appears inside return oil. Shut the engine out, fill oil storage tank with oil to the required level and then screw up the cover.





Hydraulic power clutch (monthly inspection)

Check brake fluid level of clutch oil storage tank

- Park the vehicle on level road.
- Open the radiator grille.
- Check liquid level in clutch oil storage tank ①.

Note: Clutch brake fluid level in oil tank shall be between MIN and MAX scale.

- If necessary, unscrew cover ② and fill DOT3 brake fluid.
- Screw on the cover ②

Chck the wear indicator (monthly)

Check the wear indicator for clutch boost cylinder and judge whether or not there is a need of replacing the clutch driven plate.

(See clutch wear indicator application)

Warning!

If oil in the tank reduces to below MIN scale, transmission will stop working, thus causing serious accident.

The following items shall be checked once every six months before engine startup

Battery

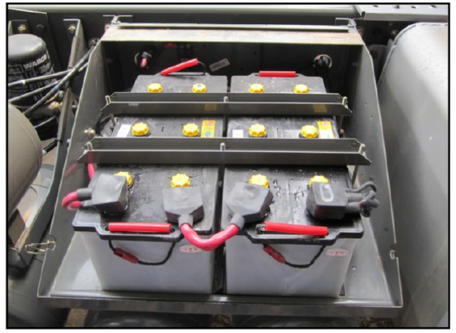
(In tropical areas, check them once every month).

Warning!

– Caution hurt, explosion and short circuit danger!

– Comply with safety notices for battery treatment, refer to "Safety instruction" in chapter Ⅵ.

– No smoking, open fire and spark are allowed nearby battery, and metal object cannot be placed on battery.



Check electrolyte level. (The maintenance-free battery is not required)

- Take battery box cover down.
- Check whether connecting clamp between battery electrode pile and conductor is loose.
- Check electrolyte liquid level.

The electrolyte liquid level of each battery shall be 10~15mm higher than separator upper edge, or flush with Max marker on side plate. If electrolyte liquid level is lower than Min marker, distilled water must be filled.

Inspections after engine startup

Pressure of engine oil (Daily inspection)

Warning!

– Be careful not to damage engine!

– If Driver's display screen indicates "engine oil pressure alarm", immediately stop the vehicle and turn off engine. Find out the reason, check engine oil quantity, and fill or drain appropriate amount of engine oil to keep engine oil level at a suitable level when necessary.

During engine startup, none of the following indications is allowed to appear on Driver's display screen: "STOP" symbol, "engine oil pressure alarm" information.

Troubleshooting

Check engine oil level, and fill appropriate amount of engine oil when necessary.

Brake system (daily inspection)

Before vehicle starts, check whether service brake system and parking brake system work normally.

Warning!

– Vehicle can only start when alarm information ("STOP") on Driver's display screen disappears.

– Pay attention to hear whether air dryer (pressure regulating valve) makes exhaust sound!

After engine startup, manual brake handle can only be released for preparing start when system air pressure is over 0.55MPa (5.5bar), alarm lamp is out and alarm buzzer stops pealing. Before air pressure indicated on air pressure gauge reaches 0.7MPa (7bar), vehicle does not meet requirements for driving completely, and only after air pressure indicated on air pressure gauge reaches 0.7MPa (7bar), brake can achieve the stipulated brake performance.

Check brake function and efficiency

- Open key switch, air pressure gauge pointer is not in red area.
- If necessary, start engine, inflate brake system until unloading pressure of air dryer is reached.

Air suspension system (daily inspection)

Check whether vehicle body is tilted.

- After air bag is inflated and vehicle is parked on a level road, vehicle shall not be tilted.
- If one air bag is not fully inflated, release the air of another air bag on the same drive axle.
- Then, drive the vehicle to the nearest SINOTRUK service station for repair.

Steering system (daily inspection)

Check steering clearance

- Start engine and keep it idle.
- Turn front wheel to straight travel position, and then turn steering wheel to the left and right in turns. The steering wheel angle required for making front wheel rotate in left and right direction shall not exceed 9°respectively. If steering clearance is too big, immediately check steering system and steering rod, and repair at SINOTRUK service station when necessary.

The following items shall be checked every week after engine startup:

Air suspension system

Check air bag.

- Check all air bags on front and rear axles, and ensure they are free from wear, pollution and aging.
- If the air bag is damaged, please replace it with a new one at SINOTRUK service station.

The following items shall be checked every month after engine startup:

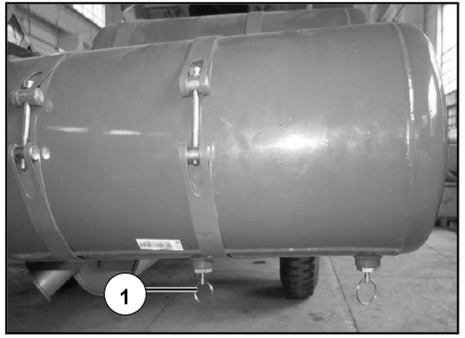
Air dryer

Check whether air dryer works normally and effectively every month (or more frequently according to local climate condition, use and driving conditions). Air dryer can be checked by opening water drain valve of air reservoir.

Warning!

– In winter, invalid air dryer will cause brake system to freeze, thus failing.

– Pay attention to protect eyes and hands when operating water drain valve



Test:

During test, brake system must have sufficient air pressure.

- Pull string ring laterally①.
- Check if there is water.

Chapter III Vehicle Driving

Driving/running-in

In the intial stage of driving, pay attention to the running-in of engine and other assemblis, it is very important to vehicle durability, reliability and economy.

Warning!

– After new vehicle and vehicle whose wheels are replaced drive for about 50km, wheel nuts shall be tightened according to torque requirements.

– In initial stage, wheel nut shall be tightened with the same torque until it is fastened.

So, we suggest you comply with the following specifications:

Before the first 2000km

- As vehicle is in run-in period, be careful to drive.
- Vehicle during run-in period shall drive on the flat road.
- Do not drive new vehicle under full load at high speed. Pay attention to observing indicator lamps and alarm lamps!
- Keep always an eye to temperature of the transmission, front and rear axles, hubs and brake discs; find out causes, adjust or repair immediately in case of overheating.
- Do not draw trailer.

During over 2000km of driving

- Vehicle speed can increase gradually until maximum speed or maximum allowable engine speed is reached. If certain mechanical assembly is updated or the vehicle has been overhauled, be careful to drive.

Automatic transmission

Before the first 2000km

- Please do not run with full load and the engine speed shall not be too high.
- Do not achieve the low-speed travelling range by using the engine brake function completely.

Economical use of vehicle

Optimize working conditions of vehicle

– Maintain vehicle at SINOTRUK service station regularly

Only vehicle with good condition (for example, air filter is clean, and fuel injection system is adjusted correctly) can obtain the best fuel consumption indicator.

– Avoid unnecessary driving resistance

Bind the canopy correctly, lower the adjustable canopy frame to bottom to extend the service life of canopy and reduce air resistance, so as to obviously reduce fuel consumption.

– Correct tire air pressure

If tire air pressure is 1bar lower than normal value; oil consumption will increase by 5%. Such additional consumption is caused by increase of tire deformability, which makes driving energy convert into thermal energy, and will reduce tire life.

Economical driving

– Start engine

Do not step on the accelerator pedal when starting the engine, because at such moment, the electronic diesel engine control device (EDC) can adjust amount of fuel injected according to various factors such as engine temperature. This can avoid unnecessary large fuel injection quantity, thus reducing smoke exhaust rate.

–Warm engine up

Under low load, engine temperature rise is very slow at idle speed, thus do not operate engine (to make engine temperature increase) when vehicle is in stationary state but warm engine up under medium load. This is the most effective way to make engine, transmission and drive axle reach respective operating temperature. As it is unnecessary to wait engine to be warmed up before vehicle driving, thus saving time.

– Cab heating

Vehicle engine is used to drive engine, so the heat source when engine is at idle is not the best! Auxiliary heater only consumes 1/4 to 1/3 of fuel oil quantity when vehicle engine is at idle. In addition, this will reduce vibration, noise and exhaust emission.

– Shutdown condition

If vehicle is in stationary state for quite some time, engine shall be shut down.

– Engine shutdown (Do not turn off the engine immediately after stopping)

Do not accelerate before the engine stops. The acceleration of engine will increase fuel consumption.

Economic running method

– Low rotate speed and big load

The economical working range of turbocharged diesel engine is 50-70% of its rated engine speed and 80% of its maxium load. Therefore, try your best to keep the engine speed within the green area of the tachometer so that engine can run under big load.

– Aplly high engine speed for big power if necessary

When big power is need in road conditions such as upslop, overtaking, express way entry on upslop, please use the biggest power possible generated by rated engine speed.

– Use tachometer

For economically driving the vehicle, engine tachometer is a very important parapeter for accurate judgement of the engine speed.

– Shifting

- **Appropriate shifting timing**

Shift to low speed gear before driving uphill, so that you can obtain big enough engine speed to drive on the upslope to avoid repeated shifting

- **Do not random shift and reasonably use engine torque**

Because tracting force will be cut off during each shifting, there will be loss of time and speed, and increase of fuel consumption and accelerate clutch and synchronizer wear.

- **Gear skipping allowed if possible**

During shifting to high speed gear or low speed gear, it is allowed to skip gears.

- **Choose low speed gear for starting**

On flat road, vehich uder full load can be driven away with low speed gear. For example one can use the third or fourth gear to drive away the vehicle without the need of further shifting afterwards until the the clutch is fully engaged, for the reduction of clutch wear.

- **Sychronized transmission: no need to disengage the clutch twice or cut off the accelerator**

For transmissions with synchronizer, there is no need to disengage the clutch twice or cut off the accelerator. This means quiker shifting and less time for tracting force cut-off and lower fuel consumption.

– Ideal running method

- **Drive smoothly**

Keep driving smoothly and has no obvious acceleration or deceleration, high average speed and low oil consumption. For example, listen to traffic announcement issued by radio broadcast, to avoid road with traffic congestion.

- **Keep safe distance**

Keep enough distance from the front vehicle to ensure safe driving, and driver will have the chance to adapt to the changing traffic condition.

- **Make the best use of vehicle inertia**

Truck has great inertia. Once vehicle has great inertia, even if there is no driving force, vehicle will decelerate slowly and can climb or slide on flat road by inertia. In case traffic condition permits and highway is flat, accelerator pedal can be released at 800m distance from highway exit, and the lost time is very short. Before vehicle gets to the ramp bottom, release brake pedal when appropriate and make vehicle obtain momentum (if traffic condition and traffic management ordinance permits). In this way, vehicle will not require accelerate to obtain required momentum, and avoid additional fuel consumption.

- **Avoid unnecessary parking and brake**

Slow and smooth driving, not parking (such as at traffic signal lam) will reduce fuel consumption. Because this can avoid vehicle starting from stationary state, and reduce drive system mechanisms wear.

For example, it consumes about 0.5L fuel to accelerate from 0km/h to 60km/h for a 40ton tractor trailer.

–Use cruise control reasonably

If cruise control is used reasonably, driving will become more comfortable. However, cruise control can not predict traffic condition during vehicle speed management. Thus, misuse of cruise control will increase unnecessary fuel consumption. This is similar to the case that driver does not predict road condition ahead of time.

- **Close cruise control before vehicle gets to ramp top**

As cruise control can not detect ramp length, so vehicle will continue driving under full load condition until vehicle speed reaches its set value. After that, as vehicle speed increases during downhill, vehicle must be braking immediately. Therefore, closing cruise control before vehicle gets to ramp top can make vehicle drive through ramp top in sliding state, and the required fuel injection quantity is very little. After vehicle drives through ramp top, vehicle brake will be decreased or not required.

- **Switch off cruise control when appropriate**

When driver realizes that vehicle will be decelerated, for example, before highway exit or there are many blocked vehicles in front, he shall close cruise control. As cruise control can not distinguish that vehicle will decelerate, vehicle will drive at set speed until clutch or braking device is used. If driver closes cruise control device before he realizes that vehicle will decelerate, vehicle will slide over obstacles or curve without fuel consumption. After that, vehicle brake will be decreased or not required.

Travelling data recorder

Travelling data recorder is used to record relevant vehicle information.

Main technical parameters:

Maximum speed range: 125km/h;

Effective impulse range: 4000-25000imp/km..

Main functions:

The MTCO1324 travelling data recorder can record travelling/rest time and different driving environment for preparation, working, etc.

Fault code can be stored in travelling data recorder. After processed by CMOS chips, the vehicle speed is stored as system parameters in internal memory.

Operation and display

•The panel content includes:

Connection interface: it is located on the upper left of panel, and used to connect devices with standard interface.

Liquid crystal display: it is used to display data, time, mileage, driver information, initial configuration and fault code.

• Key 1, 2: It is used to select driver;

• Key M: It is used to select display and setting information;

• Key +, -: used to adjust time, date, page up and page down.

• key ^ : to open paper tray.

• Paper tray is under panel and includes two layers: the upper layer is used to place recorder paper for first driver, the lower layer is for the second driver

• The nameplate is pasted in paper tray.

User mode or servicing mode can be performed by operating the buttons on panel: press the button M shortly to enter user mode; press M after engine is started to enter service mode.

Press 'menu' button, the screen will show the average speed within 15 mins before parking, press upward and downward, you can check successively:

1. Real Time and Speed 2. Average Speed Within 15 Mins Before Parking

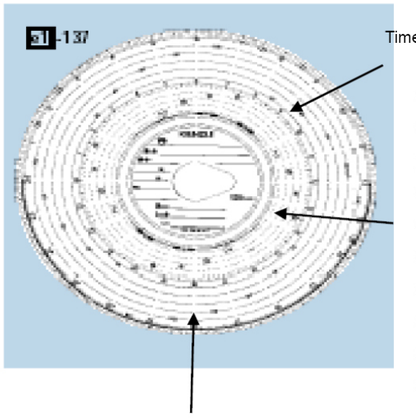
3. Fatigue Driving Record 4. Driver'S Code

5. Driving License Number 6. Excessive Alarm Speed

7. Vehicle Character Coefficient 8.Total Mileage And Trip Mileage

9. Record Index and Parking Index 10.Serial No. Of Tachograph and Software Version.

Paper Recorder: record and print the information as vehicle speed, mileage, etc



Maintenance

In addition to daily cleaning, other maintenance is not required. In case of failure, it is suggested to replace the whole component or relevant parts. When cleaning travelling data recorder with clean and soft cloth, ensure no corrosive chemical is used and there is no water in machine.

Fault code and fault cause:

Fault Code	Fault Cause
A00C	Internal error
A400	No power supply
A822	Sensor error
A423	Sensor communication error
A411	System communication error
A051	Paper tray has no record during driving
900B	CAN communication interruption
900A	Other CAN error
9430	Speed output error
9010	Liquid crystal display screen error
9060	Paper tray error
9061	Vehicle speed system error
9063	Paper tray bracket error
9064	Paper tray mechanism trigger error
900F	Key error
9051	The first driver has no information record
9052	The second driver has no information record
9053	Update setting of paper disc mechanism

Print

Park vehicle, and then press “print” key to print data according to the contents of display screen.

Note:

1. **Do not print during driving.**

2. **It always prints data of current driver and unidentified drivers.**

Setting description

IC card is only used for identifiable driver and travelling data recorder position.

Description: When IC card is inserted, lift CMOS chip and insert or pull out quickly.

Vehicle performance coefficient setting: insert IC card, screen will display “vehicle performance coefficient setting: 624”, and then press up or down key to adjust value. After setting is completed, pull IC card out and the set value will be saved. Vehicle speed setting and time setting methods are the same.

Vehicle load

Warning!

When loading, attention shall be paid to the following matters:

– Current national laws and regulations concerning worker labor protection and accident prevention (such as, health and safety regulations in Labor Law).

- National laws concerning road vehicle load safety and load distribution scheme.

- Manufacturer’s relevant operating instructions provided together with vehicle.

Common loading error

Error	Results
Load on one side	One-sided overload of suspension/tire
Load on one side and center of gravity is too high	Vehicle may turn over when turning
Goods are not fixed properly/fastened on cargo truck	When vehicle brakes or turns – Goods shake – Vehicle and goods are at risk
There is gap between goods and truck front clapboard, side plate and rear clapboard, or between goods and goods.	When vehicle brakes or turns – Goods shake – Vehicle and goods are at risk

Basic requirements of loading and unloading

– Loading and unloading shall not exceed maximum axle load or allowable vehicle total weight.

– Fix goods well and do not fall goods on the road.

– Check whether front sideboard of cargo compartment is firm. Fix and lean vehicle goods tightly on front sideboard as soon as possible, utilize all compartments to ensure goods are placed evenly.

– Center of gravity of goods shall be in the middle of vehicle, do not shift weight forward, otheriwise, front axle may overload.

– Avoid placing goods on a few supporting points if the forklift is driven onto the truck platform floor during loading.

– If goods are moved to rear axle, front axle load of steering axle must be greater than minimum specified value (for example, minimum front axle load of two-axle truck is 25% of vehicle weight, and 20% of other vehicle weight. For rigid draw bar/center axle draw-bar trailer, minimum load shall be 25% of vehicle weight at any time).

– When vehicle brakes, load will transfer to front axle and rear axle load will decrease correspondingly, thus front axle may suffer from overload.

– Pay attention to tire size, rated loading capacity and required air pressure.

Basic requirements of dumper loading

- Place goods to make its center of gravity close to dumper center as soon as possible.

- Be careful when loading stone or chunk rubber in case they fall from height to dumper platform floor.

- Take fastening measures as soon as possible, to prevent sideplate bulge or deformation.

- When unloading, make sure wheels are placed on flat, level and hard ground.

- For vehicle with crane is installed in the rear, rear axle shall not exceed maximum allowable load.

Vehicle use in winter

We suggest you to paint wax-based protective agent on cab, vehicle body and chassis before the winter is coming. For freezable positions, recoat seal protective agent. Clean the vehicle frequently and thoroughly, and remove corrosives containing salt.

When engine idling at below 0℃

More wear will be caused if the engine runs at idle speed below 0° for a long time; therefore, the running time under idling state cannot exceed 20min.

Fuel tank

Drain water in fuel tank before winter is coming.

Fuel

Please use the winter diesel oil in winter.

Fuel primary filter

When temperature is lower than -30℃, drain water in fuel oil primary filter every day.

Auxiliary heater

When the weather is very cold (temperature is lower than -20℃), vehicle shall be installed with auxiliary heater (optional). Check its function and condition, and ensure it works normally.

Cooling system

Check antifreezing solution. Fill antifreezing solution when necessary. Use antifreezing solution which is applicable to ambient temperature.

Windshield wiper

Fill antifreezing solution.

Battery

Check the acidity of electrolyte.

Charge battery completely before the winter starts. During the winter, electric quantity of battery must keep over 90% of total electric quantity. Ensure battery can be used at any time.

Headlamp

Check installation condition, and make adjustment if necessary.

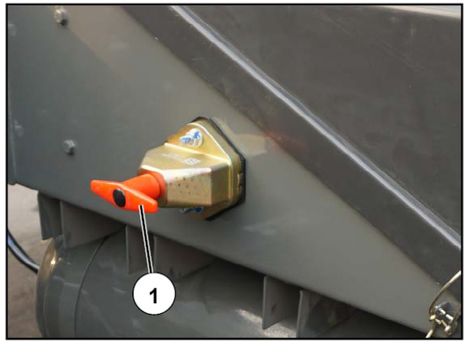
Snow chain

When vehicle drives on snow-covered road or road on which hard ice and snow layer is formed, drive wheel shall be installed with snow chains. Do not install snow chain too tightly. Ensure snow chain can move slightly (self-cleaning).

Warning!

– When using snow chain, ensure there is sufficient gap between fender and tire. When necessary, sufficient gap shall be reserved between fender and vehicle!

– For vehicle installed with air suspension, if snow chain is installed, vehicle shall not drive when air suspension is low!



Start engine

Before engine startup, check whether battery switch is connected.

Avoid unnecessary engine startup to protect battery.

Warning!

– During extended parking of vehicle or electrical system maintenance, disconnect battery main switch. Do not disconnect main switch during engine running.

– Do not loosen or take down battery terminal end during engine running.

Power master switch

Connect switch

- Rotate outer handle ① of battery box clockwise to horizontal position, power will be connected.

Disconnect switch

- Rotate outer handle ① of battery box counterclockwise to vertical position, power will be disconnected.

Warning!

– Do not turn off key switch during driving, and keep key switch at driving position "II" all the time.

– Take the key off when leaving the vehicle, even though in a very short time.

Turn key to "II" gear position

Relevant lamps will be driven in turns: position lamp - brake lamp/reverse lamp is on - rear fog lamp/work lamp is on - front fog lamp/low beam lamp is on and so on. At the same time, all instrument indicator lamps will be on successively, instrument swings from 0 to maximum repeatedly, and information display screen switches between "travelling screen", "input information screen" and "output information screen".

In case fault is detected by system, corresponding fault content will appear on information display screen (if there are many faults, they will appear in turns).

Air-intake heating

Air-intake heater which is resistance type is installed on the air-intake pipe. When the coolant temperature of the disel engine is below -15℃, prewarming device can heat the air in the intake pipe before or during engine startup. Heating will be stoped when engine startup is finished and air heating indication lamp is out.

Operation process: Turn key to "Ⅱ" position, ECU will activate automatically activate prewarming according to coolant temperature. When prewarming relay is connected, heater begins to work. At this time heating indication lamp ① on the Driver's display screen will be lit. when prewarming lamp is out, it means prewarming process is finished and engine can be started.

Engine startup

- Use parking brake
- Put nsmission to neutral position
- Turn key to " II " position and turn the steering wheel and unlock it.
- Turn key to "III" at engine startup position.（cranking time no more than 15 seconds）.
- Release the key when engine get started

Warning!

– When engine starts, immediately check Driver's display screen. Refer to "Driver's display screen and detection lamp instrument panel".

– If vehicle has been started, "engine oil pressure alarm" oil pressure control lamp on Driver's display screen will be on, and central alarm lamp will begin to flash. In this case, turn off engine immediately and find out the reason.

Other lamps will be out after inspection/alarm function is completed. Do not drive vehicle before fault display symbol "STOP" on Driver's display screen disappears.

If engine can not be started

- Turn key counterclockwise to gear "0" position.
- Wait for about 30s to make battery resume.
- Repeat the above starting steps.

Turn off engine

Turn off engine (Only when the vehicle is stationary)

Warning!

If engine keeps operating under high load, coolant temperature will be very high. In this case, do not close the engine immediately, and leave it to idle for 3-5min. Stall engine only after cooling temperature drops.

- Turn transmission to neutral gear.
- Use parking brake.
- Rotate counterclockwise key to "0" gear position.

In this way, engine will be turned off.

- Turn off battery switch.

Lock steering wheel

- Turn key to "0" gear position and take it down.
- Rotate steering wheel until locking sound is heard.

Now, steering wheel can not be rotated any more.

Warning!

Do not lock steering mechanism during vehicle driving process.

Start and stop buttons under the cab

when the cab is turned over, and engine is running, do not approach or touch the moving parts and part of high temperature, such as exhaust pipe, belt, and fan.

Operation method:

- When the cab is turn over, the following two buttons are visible:

  ① start button（green）

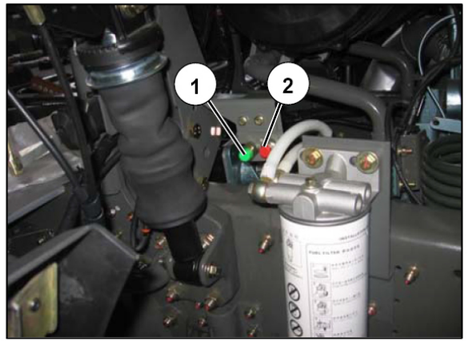
  ② stop button (red)

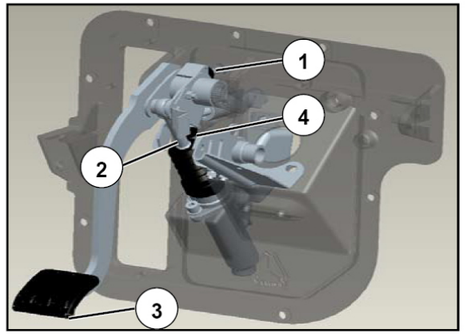
- Start the engine：Press button ① until engine gets started.
- Stop the engine：Press button ② until engine shuts off.
- Press button① and ②, engine will be driven by the starter but will not work.

Note：

Be carefull of operation and cautious of injury！

When transmission is not in nuetral, it does not work to press button ①.





Clutch operation system

Check and adjust the clteh pedal travel：

Generally this adjustment is not needed. Push gently the clutch pedal③, and adjust the upper limit bolt ① until there is a travel of 3mm～10mm from the original position of the clutch to the point where master cylinder push rod touches the cylinder piston. Then, tighen the limit bolt and nut. Dead travel should not be too big, or it will infuluce negatively the operation confort for clutch original positon would be too high.

Adjustment of the lower limit bolt：

Generally this adjustment is not needed. Push clutch pdeal③ and ensure the working travel of the push rod of clutch master cylinder② is 21～22.5mm（excluding push rod clearance 0.5～1mm）, then adjust the lower limit bolt ④ until the bolt head touches clutch pedal, thus limiting the downward movement of the clutch. Then, tighten the lower limit bolt.

Working parameters:

Working medium: compressed air and DOT3/DOT4 brake fluid；

Maximum working pressure: brake fluid is 4MPa, air is 0.85MPa;

Working temperature: -40℃- +80℃;

Pedal travle：total travel 150mm～180mm；dead travel 3mm～10mm；

Pedal force: no more than 190N with booster

Exhaust of the hydraulic pipeline

Air in the hydraulic pipeline of the clutch will cause shortend effective travel of booster push rod, and incomplete release of clutch, thus making it difficult to engage gears. So, please exhaust the air after the pipeline is reinstalled or you replace and add brake fluid. It requires coordinated efforts of two persons to exhaust the air.

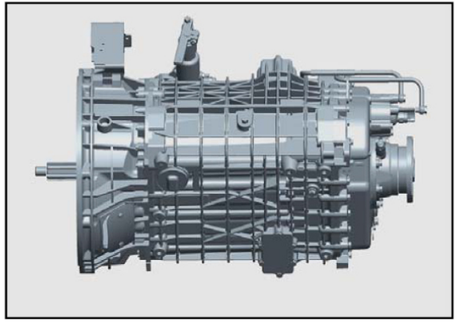
Take down the dust cap② on the air bleed screw①; Wipe clean the air bleed screw①; Connect one end of the ethane tube with the air bleed screw① and put the other end into transparent container. Ensure there is sufficient brake fluid in the reservoir. Air bleed screw① must be tighten during air exhausting. Depress and releas the pedal repeatedly and then keep the pedal depresse; tighten the screw ①, and drain bubbled brake fluid to the contrainter; then tighter the air bleed screw①. Repeat the above operations for a few times until brake fuild discharged from the air bleed screw ① has no bubbles. Then put the dust cap② back on the air bleed screw①.

Warning:

- **Retain suufficient brake fluid in the reservoir during exhausting.**
- **Do not release the clutch pedal unitl air bleed screw is tightened when exhausting the air, in order not to draw air in.**
- **When clutch is released, please ensure it is relased to the limit so that the brake fluid can flow into the master cylinder**

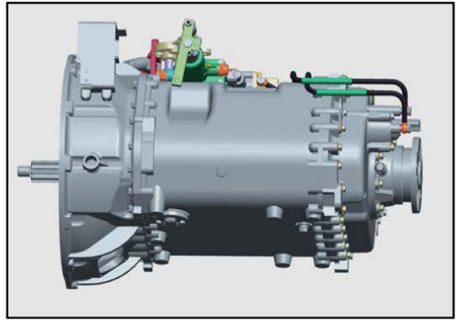
HW transmission

Sinotruk transmission is compact in structure, light in weight, easy in operation and repair, strong in reliability and well compatible with complete vehicle. Its components also have good commonality. With shifting booster, driver can feel much more confortable during driving for substantibally easier shifting operation.



Note:

- **During driving, try best to drive at high gear to ensure engine is in economic speed area**
- **When parking vehicle or leaving cab, place gearshift lever at neutral gear and use hand brake.**
- **Before vehicle starts, relieve parking brake firstly.**
- **Parking brake shall be relieved when air pressure rises to parking brake relief pressure, at this time, vehicle can be engaged a gear and started.**
- **If it is unnecessary, do not brake suddenly or accelerate sharply.**
- **Do not slide down a hill when transmission is at neutral position.**



Shift

According to road condition, start vehicle at gear 1 or 2.

Shift gear in the low gear/high gear range

- Push the clutch to the metal each time when you shift gear.
- Shift gear according to gear label, and ensure gear is fully engaged
- Slowly engage the the clutch after gear is engaged.

Warning!

– When shifting gear, driver shall know travel range of different vehicle speeds very well to avoid switching to gear which is not matched with vehicle speed.

– When driving down a hill, vehicle shall be switched into low gear to make the best of engine braking.

– Only when vehicle is stopped, engine can be put into reverse gear during idling.

– Parking brake shall be relieved only when air pressure rises to parking brake relief pressure.

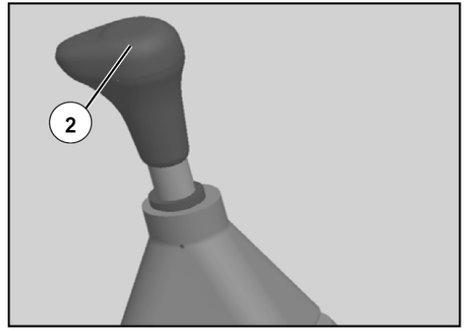
Transmission-with synchronizer

(HW19710T/HW19709XST(C)/HW16709XST/HW21716STL(C))

The gear shifting lever adopts a pneumatic booster structure, saving labor and easy to operate.

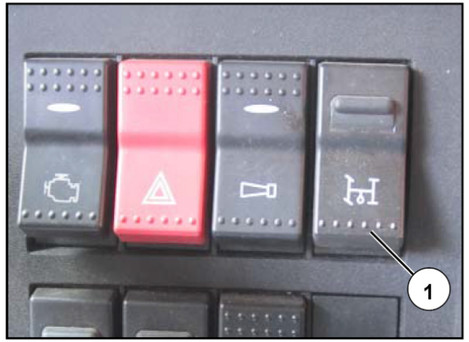
Gear shifting steps of synchronizer are as follows:

- When shifting gears, the clutch pedal ① shall be floored.
- Move the shift lever ② stably and correctly to the required gear and increase the force for a while in case of resistance, and you will put it into the required gear.
- Smoothly release clutch pedal and accelerate to the appropriate vehicle speed.



Warning!

When shifting gears, the driver shall be familiar with the vehicle speed range at each gear to avoid changing to the gear not suitable for vehicle speed, damaging the engine and transmission parts.



Engage PTO

Transmission - with synchronizer

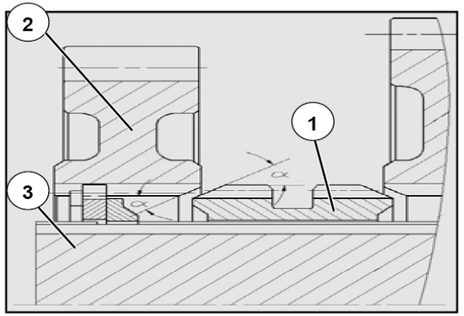
Engagement: step on the clutch pedal, press the rocker switch ① to engage the power takeoff, and the power takeoff signal lamp  on the instrument will be lit. If the transmission gear shifting and locking mechanism is provided, please place the shift lever to neutral position before the power takeoff is engaged.

The transmission gear shifting and locking mechanism can prevent the vehicle from travelling continuously after the power takeoff is engaged.

Transmision- without synchronizer

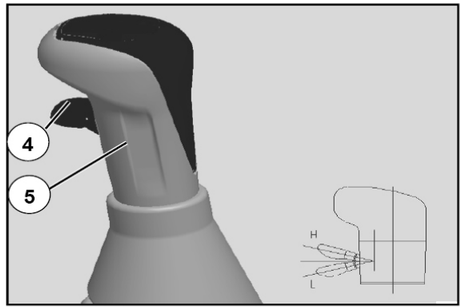
（HW13710CL/HW19710/ HW19710CL/HW19712/HW19712CL）

Transmissions of this series haven't synchronizer, whose shifting relies on the sliding sleeve①. The spindle sleeve is bind together with the spindle③ through envolute spline. Power is tramitted by the movement of the sliding sleeve, which makes the soldered tooth (external splines) engage with the gear of the spindle②. There is a same taper angleα=35°for each gear enagement of the spindle with the sliding sleeve. Because the gears of the spindle are not fixed relative to the spindle itself, the driver needs to apply big shifting force to counter the great resistance during shifting before the shift is moothly engaged.



Engagement sleeve engageing steps:

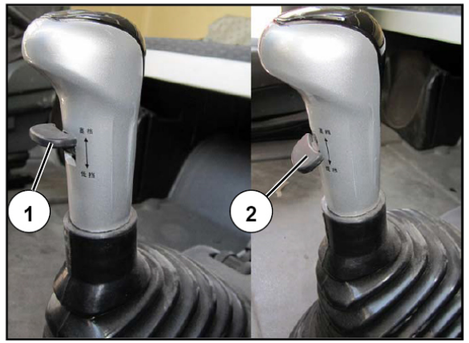
- The drive needs to apply stably big shifting force to counter the resistance for shift engagement.
- During driving, the drive needs to depress the clutch twice when he or she is trying to shif from 1 to 2 gear.
- Vehicle shall be stopped if the driver wants to engage reverse gear, or the engagement sleeve will be damaged.



Note:

– During shifting, clutch shall be fully separated and shift lever shall be fully engaged.

–The switch valve ④on the shift handle ⑤ has two positions, namely high and low gears. Switch valve must be in the low gear position when the vehicle is stopped.



Switch between high gear and low gear

Warning!

– Unless the current vehicle speed is in the range allowed by shift, otherwise, it is not allowed to switch to any gear ahead of time.

– Each time you shifts, push the clutch to the metal.

– When transmission shifts from low gear area to high gear area (vice versa), do not skip any gear.

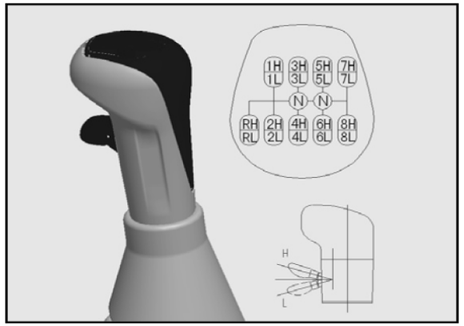
– When vehicle drives down a hill, it is not allowed to change high and low gear areas.

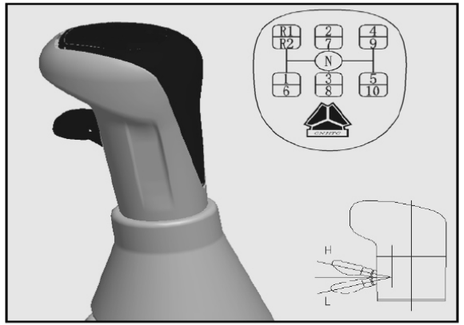
Switch valve of shift handle includes high gear ① and low gear ②. Shift mechanism position and shift handle are shown in the figure.

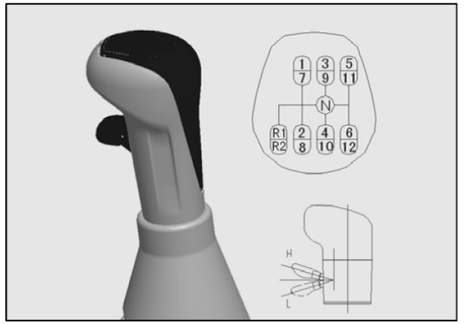
Switch between high gear and low gear

16 gears transmission: When shifting among gear interpolation points, firstly switch the switch valve on shift lever and the operational steps from 1L to 1H are: firstly switch the switch valve from L to H, step on the clutch (ensure that the clutch is floored) and release it to finish gear shifting (no movement of the handle is required during this process); the operating steps from 1H to 2L are: firstly switch the switch valve from H to L and step on the clutch to return the handle back to neutral gear; then put the shift lever into gear 2, and release the clutch to finish gear shifting. The rest may be deduced by analogy till the shift gear is switched to 8H; the down-shift operation is the same. Step on and release the clutch pedal and then turn the switch on the handle, the gear will not be switched.

10 gears transmission: when shifting from low gear area to high gear area (vice versa), firstly place the handle valve at H (L) and then switch it to neutral gear; after a moment, put it into gear 6 (gear 5), but do not jumper gears; otherwise, the service life of deputy-box synchronizer will be impacted. When handle is at gear position, switch H-L of handle valve. High gear and low gear can only be switched at neutral gear position.

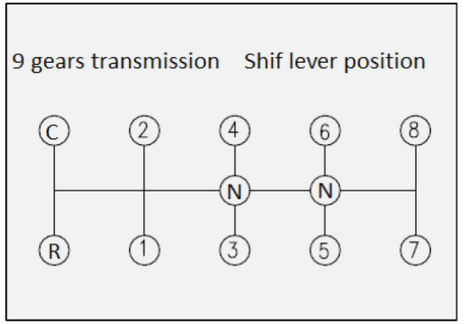






Switch between high gear and low gear

12 gears transmission:when shifting from low gear area to high gear area (vice versa), place handle valve at H(L) position firstly, and then turn to neutral position, wait for a moment, put into gear 7 (6) but do not skip any gear, otherwise, the service life of auxiliary box synchronizer will be affected. When handle is at gear position, switch H-L of handle valve. High gear and low gear can only be switched at neutral gear position.



9 gears transmission: gear pisition sketch

Engage power take-off

Warning!

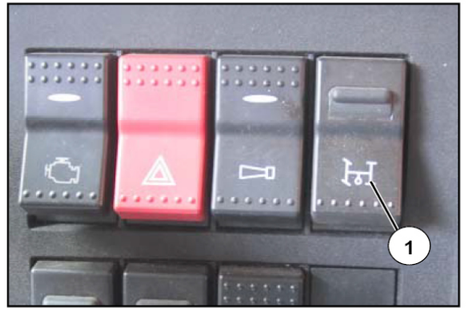
Power take-off can only be used in low gear section.

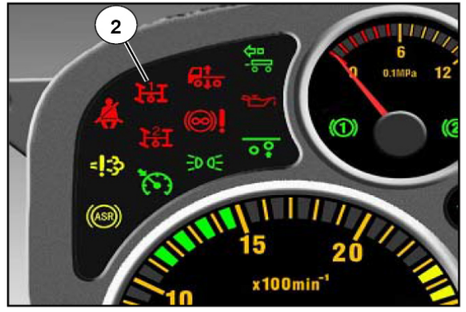
Power take-off engagement

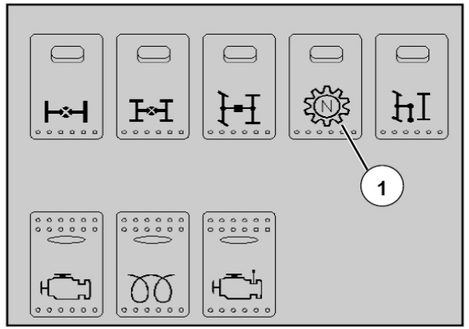
Step on the clutch pedal, press the power takeoff ① and engage the power takeoff, at this moment, the indicator lamp ② on the instrument will be lit; put the shift lever into a low gear, and release the clutch.

Power take-off disconnection

Step on the clutch pedal and reset the power takeoff ①; about 3s later, release the clutch pedal to disconnect the power takeoff. At the same time, indicator lamp ② on instrument panel will be out.







Switch between high gear and low gear

Power take-off in neutral (for vehicles equipped with HW13710 transmission

PTO shall be used when vehicle is stopped. Operational steps are as follows:

- Engage low gear for the transmission and press switch ① for neutral;
- At this time transmission auxiliary box is forced into neutral by compressed air (no power output from the auxiliary box, shifting still allowed for main transmission box). Stop the vehicle and press switch ②, and the corresponding light will be lit on the instrument panel, indicating that power take-off is working.

Power take-off cancealation in nuetral

- Engage neutral gear.
- Press the upper part of switch ① for neutral and upper part of switch ② for power take-off, the lights will be out on the dashboard indicating PTO is stopped.

Warning!

- Engage low gear before using PTO switch for neutral!

- Engage neutral for transmission before releasing PTO switch for neutral!

ZF Transmission

Product Introduction (ZF 16S1850, ZF 16S1950, ZF 16S1930, ZF 16S2231TO, ZF 16S2230, ZF 9S1820, ZF 16S1830)

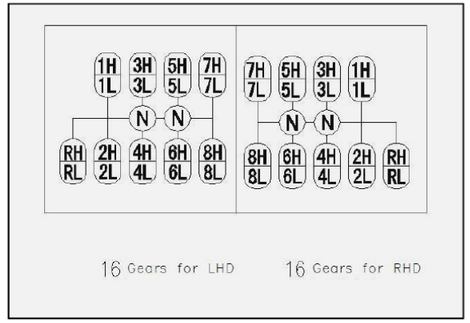
ZF transmission consists of four-gear main gearbox, one high/low gear and a half gear.

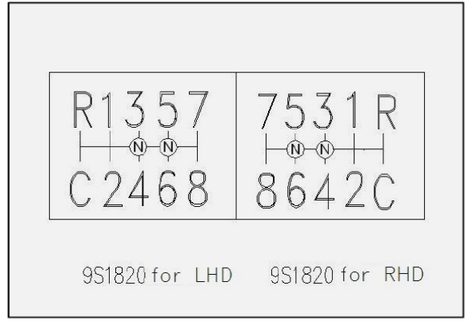
Structure of four-gear main gearbox:

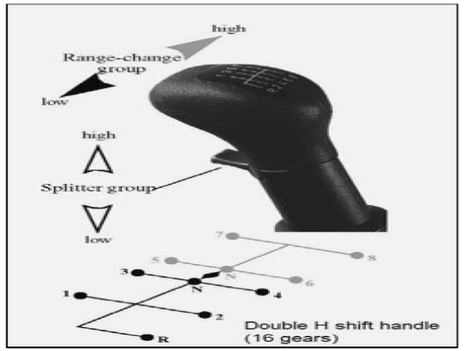
—Synchronizer shift, reverse gear applies sliding sleeve

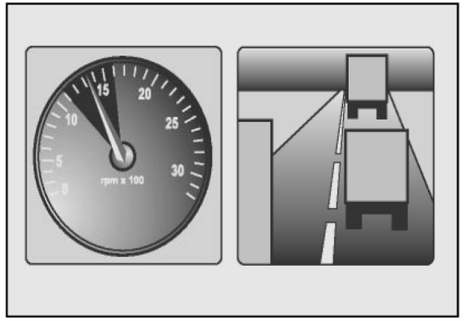
—Manual shift（Rotating shaft control）

—Double-H gear shifting









Shifting control

Double-H gear shifting mode for high-low gears

Shifting system is divided by 5 adjacent selecting positions. There is a spring-setting neutral gear respectively in 3/4 neutral gear and 5/6neutral gear. Due to different forces of spring-locking device, it is easy to find the corresponding gear. When put the the shift handle from the position of 3/4 to the position of 5/6 or from 5/6 to 3/4, the shifting process would be completed automatically by pneumatic control.

Operation instructions:

Following the methods below can ensure the economical use of the vehicle:

- Ensure that the engine pointer is always in the middle range (Green range).
- High gear should be used as much as possible.
- Watch the road condition, making the engine work in the economic zone.
- If not necessary, avoid using frequent emergency braking or sharp acceleration.

Starting engine and vehicle starting

- Pull the hand brake (to prevent accidentally sliding of the vehicle)
- Idle the vehicle.
- Start the engine.
- Engage the gear（recommend 1 gear to protect the clutch）
- Release the hand brake and gently engage the clutch.

Operation of the clutch

- Step on the cluch to the end all the time.

Gear selection

ZF-ECOSPLIT transmission is a type of fully synchronized transmission.

For synchronizer transmission, ZF transmission can make the gears mesh only when their rotating speed is same So the shifting can be fast and reliable.

- No need to step on the clutch padel twice when upshifting.
- No need to step on the clutch padel twice when downshifting, even running downslope or under complicated traffic conditions.

Warning!

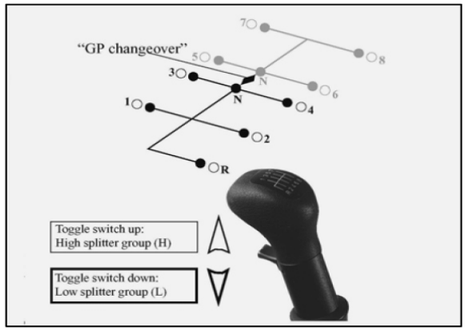
-Pull the hand brake before leaving the vehicle

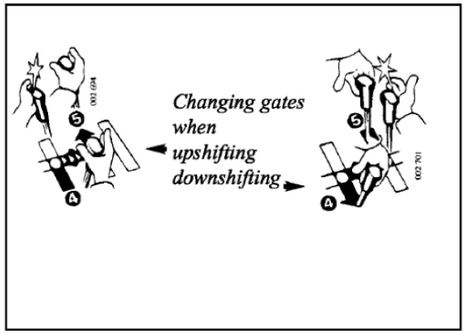
(to prevent accidentally sliding).

Be careful!

-Incomplete seperation of clutch when shiftign

gears may accelerate the wear of synchronizer.





Warning!

– When the vehicle speed is more than 28km/h, do not change from 5/6 gears-neutral gear to 3/4 gears-neutral gear.

- Gear When the vehicle speed is more than 28km/h, switching from high gears to low gears .will cause early wear to the synchronizer.

Engaging gears

- To protect the transmission, you shall make sure that the clutch is completely disengaged at any time.
- To avoid serious damage to the transmission and engine, you cannot decrease gears unless the vehicle speed is reduced to the maximum speed for the corresponding gear through braking.
- Please operate the gear shifting handle quickly and gently. In particular, the vehicle is at cold state. You shall preferably control the operating lever with your palm, as shown in the figure.
- When putting into gears, hold tightly the shift lever to overcome gear shifting resistance till the synchronizer realizes gear shifting.

Double-H gear shifting mode

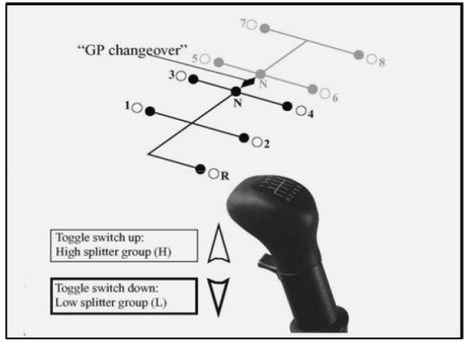
When moving between 3/4 gears -neutral gear and 5/6 gears-neutral gear, clap the gear shifting lever with your palms, and then hold it with your hand and increase gears quickly.

Warning!

- The gear shifting force is bigger than usually when the vehicle is under cold state. If GP cannot be changed to low gears when the gear shifting lever is moved from 5/6 gears-neutral gear to 3/4 gears-neutral gear, please decrease the vehicle speed and then change gears.

Gear shifting with preselected valve

High/low shifting is controlled by the preselected valve switch on the shift lever. When the preselected valve switch is at the position of “H”， the lever can engage 1H-2H-3H-4H-5H-6H-7H-8H and RH gear. When the preselected valve switch is at the position of “L”, the lever can engage 1L-2 L -3 L -4 L –5 L –6 L –7L-8L and RL gear. When switch from H to L or from L to H, first toggle the switch of the preselected valve, then step on the clutch padel, turn the gear between H and L by compressed air after the clutch is fully disconnected.



Warning!

Only toggle the switch of H/L gear of preselected valve when gear shifting is needed immediately.

Reverse gear

Take care

Do not switch to reverse gear unless the vehicle stops.

• The reverse gear must be put into or out when the clutch is fully disengaged.

• The clutch shall be disengaged when the engine is idling.

• Do not change to reverse gear unless the intermediate shaft is stationary; Otherwise, knocking noise will occur.

Pay attention, the time for the countershaft becoming still may differ in different operation modes. To shorten the waiting time, synchronizer can be used for a short period. First gear is recommended.

• No knocking noise is allowed during engagement and disengagement of the reverse gear.

Extend waiting time before engaging the gear if necessary or check if the clutch can be fully separated.

• Engage the clutch gradually.

Warning!

- **The service life is different depending on operating methods, and will also be shortened in case of too short synchronization time; thus, it is better to start at gear 1.**
- **Knocking noise is not allowed when reverse gear operation. If necessary, extend the disengaging time before engaging the reverse gear, you can also refer to the relevant clutch sections.**
- **Slowly engage the clutch.**
- **If gears are always shifted by violence, the synchronizerpart may have excessive wear.**
- **Only shift gears when the clutch is fully released.**

Engage and disconnect power take-off (PTO)

Control the power takeoff with the clutch

Operate when the vehicle is still or moving.

Engagement / disconnection

• The power takeoff cannot be engaged or separated unless the clutch is at disengaged state.

• The clutch shall be disengaged when the engine is idling.

• The power takeoff cannot be engaged unless the intermediate shaft is still;

otherwise, knocking noise will appear during engagement.

Warning!

- **The service life is different depending on operating methods, and will also be shortened in case of too short synchronization time; thus, it is better to start at gear 1**
- **No knocking noise is allowed during engagement and disengagement of the power takeoff. If necessary, refer to relevant chapters of the clutch for extension of disengagement time prior to changing to reverse gear.**

Slowly engage the clutch.

• Do not change gears when the power takeoff is working.

• The power takeoff must be disengaged when the vehicle parks for a long time

(such as overnight).

Parking

• Engage low gears (1-4 gears）.

• Pull the hand brake.

For the consideration of safety:

• When parking on the uphill road, engage the first gear.

• When parking on the downhill road, engage the reverse gear

• If the vehicle has heavy load, stop blocks should be applied to the wheels for safety consideration.

Towing start

When starting the vehicle by being towed, high gears of the auxiliary transmission (5-8 gears) should be engaged.

Be careful!

To prevent damaging the transmission, high gears (5-8 gears) should be engaged for towing start. In addition, it is forbidden to engage the reverse gear for towing start.

Towing

Only by satisfy the following conditions can the vehicle be towed:

• The vehicle is equipped with emergency steering pump.

• Engage neutual gear in the high gear area.

• The maximum towing distance is 100km.

• The maximum towing speed depends on axle speed ratio and tire size.

Note:

Abide by the relevant regulations of vehicle manufacturing company.

Abide by the maximum towing speed in the relevant laws and regulations.

Warning!

-If the conditions mentioned above can not be satisfied, disconnect drive shaft at the position of rear axle flange.

-For possible breakdown of transmission, disconnect drive shaft at the position of rear axle flange.

Emergency operation

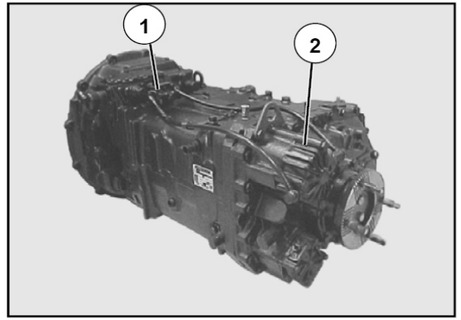
If the H/L gear shifting fails (for instance, shifting between 3⁄4 gear and 5⁄6 gear), the possible causes are as follows:

• Damaged pipeline of compressed air system.

• Damaged H/L gear shifting valve or shifting cylinder (condensation of water vapor or the impurities).

① H/L gear shifting valve

② H/L gear shifting piston



Warning!

– If these situations occur，low gears (1-4 gear) should be engaged to continue driving.

– If the high gear is engaged when the failures occur, the vehicle has must be towed.

Starting below 0℃

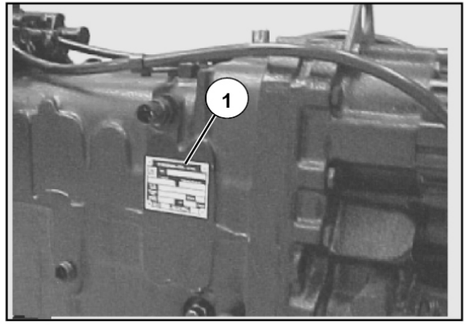
When the ambient temperature is below -15℃, transmission oil can be selected according to temperature. Replace oil in time if necessary. Or preheat transmission oil before starting engine, by warm-wind heating, for example. However, the temperature of transmission should be below 130℃.

Warning!

Pull the hand brake when leaving the vehicle without shut down the engine.

Parking below 0℃

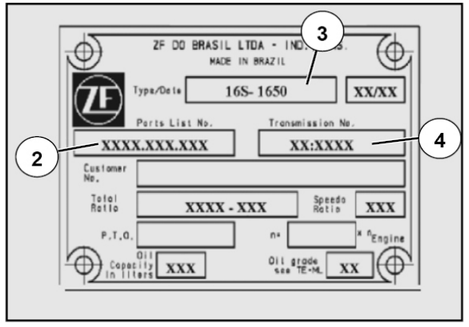
Ensure that the low gear is engaged when outdoor temperature is lower than 0℃.(Engage the first or the 3⁄4 neutral gear)



Nameplate

Nameplate ① is located on the left side of gearbox; it has indicated most important information of the transmission.

When connecting with ZF aftersales at any time, provide the following information:



② Transmission assembly model number

③ Transmission model number

④ Transmission serial number

Differential lock

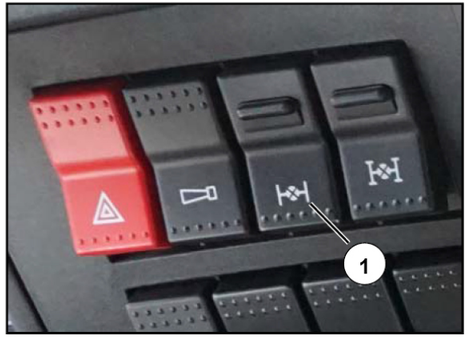
Differential lock – rear-axle inter-wheel differential lock

When driving into bad road or flabby pavement, to prevent single tire of rear wheel from slipping, differential lock can be used for a short time. When engaging differential lock, vehicle shall be stopped or go straight slowly.

Warning!

-In case differential lock is used, regulation function of wheel anti-lock brake system will be delayed for a period of time. Before wheel anti-lock brake system is adjusted, wheel may be locked for a short time. Steering capacity and directional stability can be limited.

-When the differential lock is working, the vehicle steering capacity will be limited. In case interwheel differential lock is used, as there is no differential function between left and right wheels on the same wheel axle, vehicle shall not drive at the corner of solid road surface. When the vehicle drives on solid road surface, differential lock shall be disengaged immediately.



Warning!

- Differential lock can only be engaged when vehicle is stopped or drives in a straight line at low speed (equivalent to walking speed).

- When indicator lamp of interwheel differential lock is on, the vehicle can not make a turn or drive at high speed.

Engagement of inter-wheel differential lock - 4×2, 6×2 vehicle

- Release accelerator pedal (deceleration)
- Press the inter-wheel differential lock switch ①.

Differential lock between rear axle wheels engages.

Indicator lamp of interwheel differential lock is on or the lamp flashes.

- Carefully step on the accelerator pedal and accelerate slowly.

Disengagement of differential lock

- Release the accelerator, and push clutch.
- Press the differential lock switch back to the original position.

When interwheel differential lock disengages, indicator lamp of interwheel differential lock on instrument panel will be out.

Interwheel differential lock-6×4 and 8×4 vehicles

Operating principles of differential lock engagement: firstly engage interaxle differential lock and then interwheel differential lock.

- Engage interaxle differential lock (refer to engagement of interaxle differential lock for specific operation).
- Release accelerator pedal (deceleration).
- Press the axle differential lock switch ①.

The rear axle inter-wheel differential lock engages.

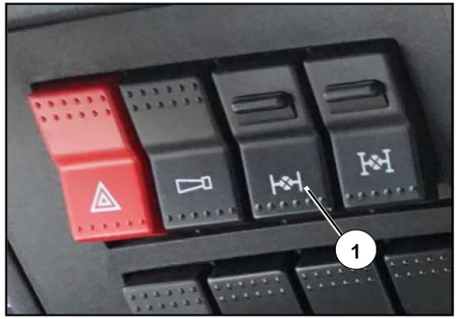
Indicator lamp of interwheel differential lock is on or the lamp flashes

- Carefully step on the accelerator pedal and accelerate slowly.

Disengagement of differential lock

- Release accelerator, and push clutch.
- Press the differential lock switch back to the original position.

When interwheel differential lock disengages, indicator lamp of interwheel differential lock on instrument panel will be out.



Warning!

- Differential lock can only be engaged when vehicle is stopped or drives in a straight line at low speed (equivalent to walking speed).

- When indicator lamp of interwheel differential lock is on, wheel can not make a turn or drive at high speed.

Warning!

- Differential lock can only be engaged when vehicle is stopped or drives in a straight line at low speed (equivalent to walking speed).

- When indicator lamp of interwheel differential lock is on, wheel can not make a turn and drive at high speed.

Interaxle differential lock

Interaxle differential lock: it is used to lock interaxle differential between the first and the second drive axles.

Engagement of interaxle differential lock

- Release accelerator pedal (deceleration)
- Press the upper part of inter-axle differential lock switch ②.
- After interaxle differential engages, the indicator lamp of inter-axle differential lock is on or the lamp flashes.

Disengagement of differential lock

- Release the accelerator, and push clutch.
- Press the interaxle differential lock switch ② back to the original position.

When the inter-axle differential lock disengages, the inter-axle differential lock indicator lamp on the instrument panel goes out.

Saddle

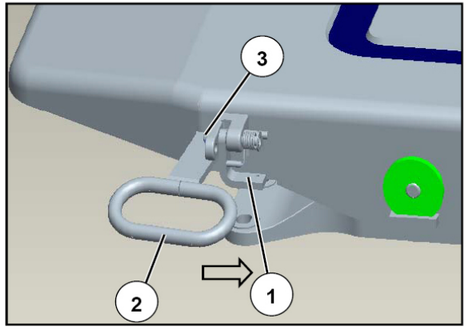
Operation steps:

Rotate the locating stop ① of pulling plug upward to horizontal position, and rotate handle ② forward to fix quadrangular slot on the front side edge of rectangular slot of the saddle plate.

After trailer is connected, please check:

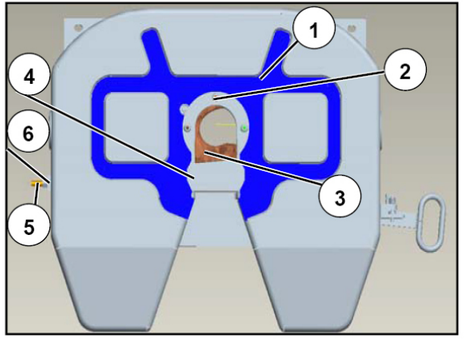
Ensure the locating stop ① of pulling plug has been returned to the state shown in figure, and the warning hole ③ is near the outside of the saddle plate. And the saddle is locked firmly and reliably.

If the locating stop ① of pulling plug is not dropped to the locking position (as shown) ,or the warning hole ③ is far away from the outside of the saddle plate, check whether the saddle is locked properly.



Warning!

Make sure to perform operation according to operation requirements.



Saddle maintenance and service

- Before connecting tractor and semitrailer, clean upper surface of traction seat and lubrication groove ①, and fill lubrication groove ① with heavy duty grease (such as 2# lithium base grease) and evenly paint upper surface of traction seat.
- Every time vehicle drives for 5000km, clean grease on upper surface of traction seat, latch hook ③ and horse-shoe gate ②, and evenly paint heavy duty grease on upper surface of traction seat, latch hook ③ and horse-shoe gate ② and traction pin mating surface.
- Adjust and check the following items each time driving 5000km.

To compensate wear of traction pin and latch hook ③ and prevent handle from pulling out as pin block is too tight during engagement, in case tractor and semitrailer are connected, unscrew adjustment bolt⑤ and then screw in clockwise until adjustment bolt ⑤ contacts with pin block④, and then unscrew adjustment bolt ⑤ for half round counterclockwise, lock nut⑥ on adjustment bolt.

Semitrailer operation

General procedures for semitriler operation

Sinotruck tractor is equipped with dual circuit brake system.

Warning!

–When connecting semitrailer or operating the saddle for the first time, look through the notice board on the side of saddle.

–No one is allowed to stand between the tractor and semitrailer while the tractor is moving backward to semitrailer.

– After semitrailer is coupled, check handle to confirm saddle is engaged correctly.

– If different types of semitrailers are used, pay attention to check the gap between pivot pin and saddle.

– Damaged or old air joint may cause trailer brake system failure. When connecting, check the air joint between tractor and semitrailer frequently, and replace if necessary.

– Pay attention to wire damage caused by heating!

– Joint may be corroded when moisture, dust or sand enters into trailer socket, especially ABS socket (24V voltage is loaded all the time). Under load, socket will produce considerable heat which may damage joint and cable. Thus, compressed air shall be used to dry socket and plug regularly, and clean them with wear-resistant cloth if necessary.

– Check socket frequently, in case damage is found, immediately replace at SINOTRUK service station.

Clean tractor and semitrailer sockets

Tractor and semitrailer sockets can not be cleaned with water and mechanical object. 6-8bar compressed air shall be used.

During cleaning, key switch and lighting system shall be closed.

Connect semitrailer

- Fix semitrailer to prevent slide.
- Uplift the Saddle handle to make it into the upper slot hole, and draw it out until the locating slot on the handle lever gets stuck by saddle shell; at this moment, the saddle gets into an open state and is ready to couple.
- Reverse vehicle to achieve connection. When traction pin enters into saddle interface, latch hook and wedge block will lock traction pin automatically to complete connection. At this time, handle will also send back automatically, indicating correct connection.

Warning!

–Please check whether locking handle is locked correctly after tractor is connected with trailer.

- Connect brake line and electrical connector between semitrailer and tractor.

—Connect compressed air line, and ensure line is free from tension, friction.

—Firstly connect brake control line joint (yellow).

—And then connect the air charging pipe joint (red)

—Check its functions.

Semitrailer disengagement

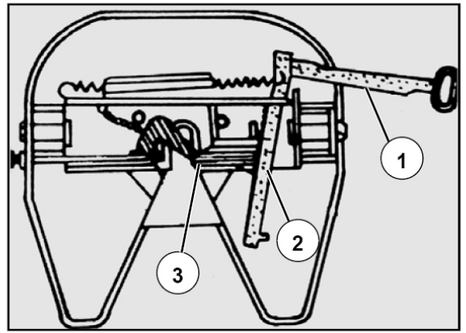
- Check road condition to prevent semitrailer slide.
- Fix semitrailer to ensure wheels can not move.
- Before semitrailer or full trailer with dual-circuit brake system disengage from tractor; firstly disengage air charging pipe joint (red) and then brake control line joint (yellow) in order, otherwise, trailer brake will loosen.
- Pull saddle handle ① out until its locating slot locks Saddle shell. At this time, wedge block ② disengages from latch hook ③. Move tractor forward, latch hook ③ will rotate, and the the traction pin is loosened. In this way, the semitrailer disengages.

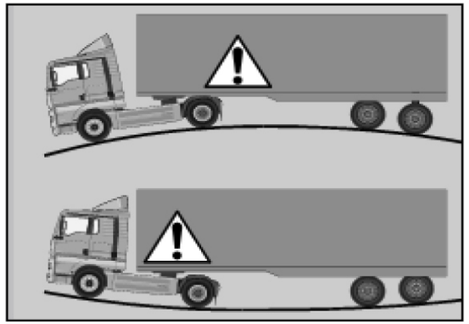
Warning!

- If no trailer will be connected for a long time, please reset Saddle handle ①.

– Make sure to disconnect air joint in the correct order. Otherwise, semitrailer will relieve brake, thus causing vehicle slide

– After disconnection, use joint cover to protect joint from pollution.

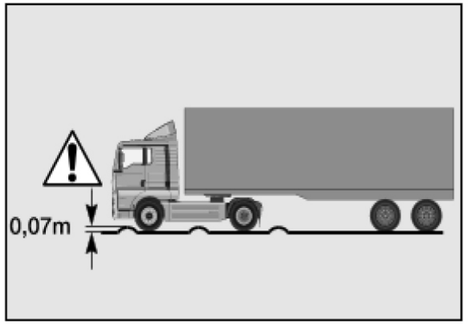




Tire spacing

Warning!

- **There is risk for vehicle damage!**
- **There is strict limit on distance between semitrailer and tractor!**
- **There is limit on maneuverability of tractor trailer!**
- **When driving on ponding, slope and muddy road, it may bring serious damage to tractor and semitrailer.**



Ensure sufficient tire spacing!

Warning!

- **There is risk for vehicle damage!**
- **To obtain the best bearing, gap between tire and fender is limited. When vehicle height lowers, vehicle can only drive for a short distance at walking speed. Refer to "winter maintenance" and "semitrailer operation". Otherwise, fender and tire may be damaged.**

Air suspension

Air suspension system overview

The air bags of the air suspension are filled with compressed air. The control system inflate or exhaust air in the air bags to adjust the height and loading capacity.

Characteristics of air suspension system:

—For 4×2,6×4 air suspension, one axle is equipped with 4 air bags, two axles with 8.

—For 6×2 air suspension of rear lifting vehicles, one axle is equipped with 4 air bags, two axles with 8. The rear axle is the supporting axle. Lifting air bag is placed in front of the rear axle to lift rear axle.

—For 6×2 air suspension of middle lifting vehicles, the rear axle is equipped with 4 air bags, middle axle with two air bags. The middle axle is the supporting axle. And the two air bags of the middle axle is lifting air bags to lift middle axle.

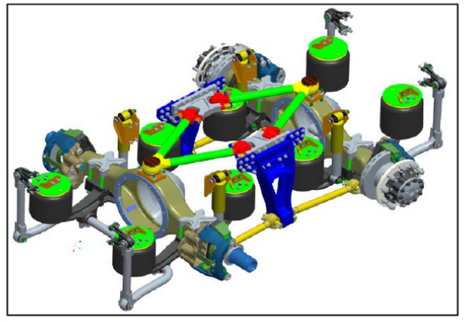
—Crosswise rear stabilizer is equipped on front and rear axles to increase vehicle stability.

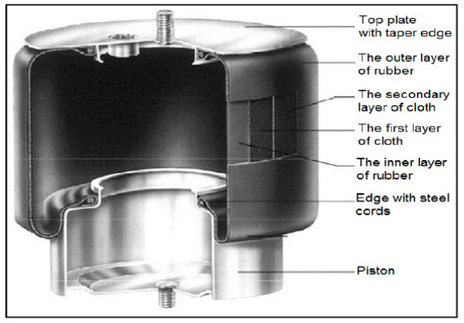
Chararcteristics of air suspenstion function

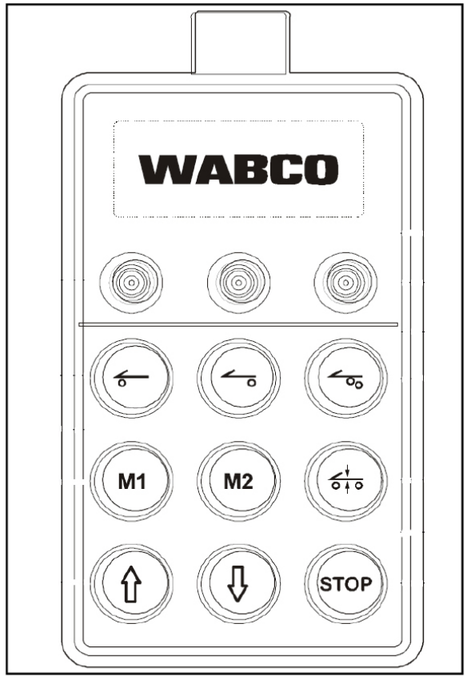
—The height is adjustable to enable pulling and freight handling.

—The lifting axle is permitted in no-load or semi-load condition.

—The loading of each axle can be monitored in real time.







Electronically controlled air suspension (ECAS)

Electronically controlled air suspension controls the suspension height, lifting and lowering of lifting axle and transfering load by remote control or rocker switch on the instrument desk.

Remote control button illustration

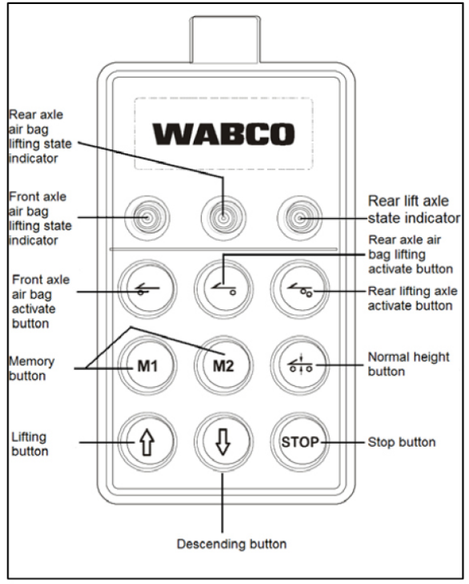
Note:

—The lift button won't work if the front axle is not of air bag suspension structure.

—The lift button won't work if the medium (rear) axle is not lifting axle.

If the lifting axle control is activated, the front and rear axle control will be automatically turned off, and vice versa.

—The controller can only adjust the lifting axle to go up and down when speed is less than 30 km/h, but it can make the axle recover to the normal height all the time.



Adjust the vehicle height:

- Press the “up” key of rear axle air bag, the lifting signal lamp lights on, and the lifting mode is activated.
- Press the “up” key of rear axle air bag again, the lifting signal lamp lights off, and the lifting mode is shut down.

Adjust the vehicle height:

- Long press the "up" key or "down" key the vehicle height can rise or fall, between the processes of up or down, loosen the hand, vehicle stopped height change.

The highest height: setting allows the highest level

Normal height: the default normal ride height

The minimum height: set the minimum allowed height.

Note!

- The operation of the remote control can only be set within the height range of operation.

Store memories height

- Press "up" or "down" button, adjust the vehicle to the need height then loosen the hand, at the same time, press the "STOP" + "M1 / M2" button, the storage vehicle height at this time.

Using store memories height

- Press the "M1"/" M2 "key, the vehicle automatic deflate to store memories height.

Recover the vehicle normal height

- Press the "normal height" key, and the vehicle can be automatically recover to the normal height setting.

"STOP" button

- Stop all the operations (including the frame height adjustment, rising and falling, lifting axle lifting and falling, etc.) immediately, and the frame remains at the height before the “stop” button is pressed.

Operation of lifting axle

- Press the activation key of lifting axle and the indicator lamp of rear axle lifting state is lighted. The lifting status is on.
- Press the activation key of lifting axle again and the indicator lamp of rear axle lifting state goes out. And the lifting status is off.

- If the lifting status is on, press “up”or “down”button to control the rise and fall of the lifting axle.

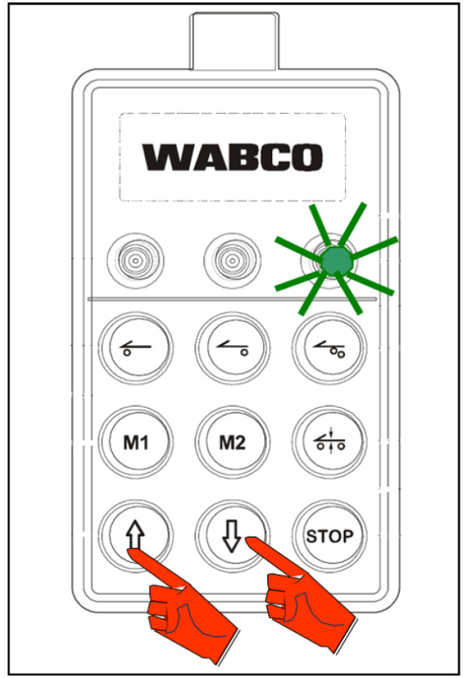
Notice:

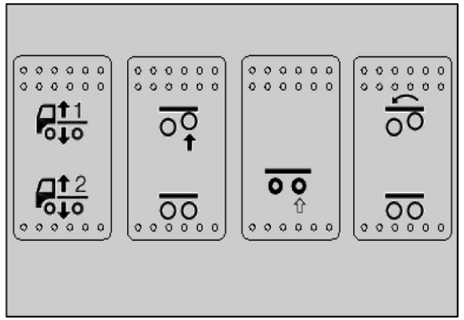
When the lifting status is activated, the buttons for storing memories and recovering normal height are invalid.

If the lifting status is activated, the lifting axle will automatically fall when satisfying the following conditions:

—The drive axle is full-loaded. When the drive axle is full-loaded, the lifting axle will automatically fall in order to protect the drive axle and the vehicle safety.

—ECAS system has failure. When the system has failure, the lifting axle will fall automatically to prevent unknown risks。



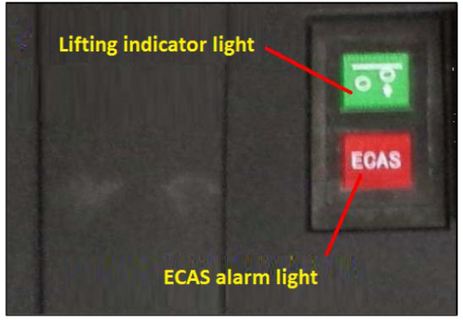


Cab rocker switch

For 4×2、6×4 trucks（1 axle 4 air bags, 2 axles 8 air bags）, they will be equipped with 3 height option switch and ECAS alarm light.

For 6×2 trucks with lifting rear axle, they will be equipped with 3 height option switch, rear lifting axle control switch, three height option switch, ECAS alarm light and lifting signal light.

The instructions for the switches mentioned above are as follows:



ECAS alarm light

When it alerts and flashes, ECAS has malfunction. Stop the vehicle and check. If the vehicle can move, drive the vehicle at walking speed. to a postion where it does not hinder traffic and contact SINOTRUK after-sale department

Rear lifting axle control indiactor

When the rear lifting axle control indicator on th instrument panel is on, the lifting axle is in the state of lifting.

Rear lifting axle control switch (three height option switch)

The rear lifting axle control switch can be used to control the rise and fall of the lifting axle. The function of this switch is as same as the button for lifting axle on the controller (some controllers support this function). The positon of lifting axle only has two states: rise and fall. Press the switch and the lifting axle will rise to the suitable position by continuous inflation and deflation. The switch is not capable of controlling the axle to stay on intermediate position.

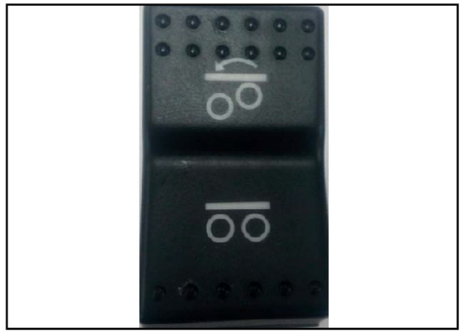
- Press the switch upward for rear axle lifting, and the indicator light will be lit. Press the switch downward, and the rear axle begains to fall and the indicator light will be lit.

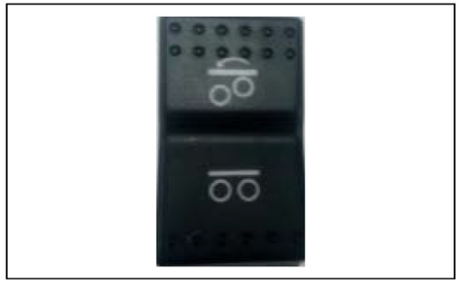
Three height option switch

The lifting axle is at normal height without any operation.

Press the position 1, the frame rises by 25mm from the normal height.

Press the position 2, the frame falls by 25mm from the normal height.





Three height option switch (three height positions and 1 restoration position)

When the switch is at 0 position, ECAS system controls in the mode of proportion.:

Presss the lower part of the switch to activate the most optimal traction mode. At this time, the loading of lifting axle transfers to the drive axle, and the loading of drive axle reaches standard loading (13 tons), thus the driving force strengthens.

Press the upper part of the switch (restoration position) to activate the drive assisting function. The loading of lifting axle transfers to the drive axle until the loading of drive axle reaches the maximum level (16 tons), thus the vehicle gains the maximum driving force.。

When the speed is over 30km/h, the drive assisting will automatically turn off and recovers to the control mode of proportion.

When the speed is lower than 30km/h, with drive assisting mode activated, press the upper part of the switch for more than 5 seconds or turn off the master switch for power supply, you can deactivate the drive assisting mode.

Under the optimal traction mode, the ECAS system is not restricted by the vehicle speed.

Notes for the vehicles with air suspension of lifting functions:

1. The gross mass of the vehicle should be less than 46 tons.

2. As this type of vehicle is single-axle driven, the tyres wearing of drive-axle is more serious than those of non-driven axles. Thus the tires for drive axle should have tread patterns. The saddle should be placed as close as possible to the drive axle under the condition of not affecting the front and rear turning radius.

3. If the vehicle is with no load or light load, the lifting axle must be lifted because it will effectively prevent driving wheel slip and insufficient vehicle climbing ability. Meanwhile it can also help reduce tyre wear.

4. If the vehicle is with heavy load, and the lifting axle can not be lifted (the lifting axle cannot be lifted when the load for drive axle is more than 13 tons), the optimal traction mode is recommended to be activated in order to remain standard load for drive axle and prevent driving wheel slip and insufficient vehicle climbing ability. Optimal traction mode is recommended in full load condition.

5. When the vehicle is close to toll gate, control in proportion mode should be activated (put the three height option switch at 0 position) to recover the factory setting for the axle load distrivution, thus avoiding unwanted problems when scaling for big loa difference between the intermediate and rear axles.

6. When the vehicle is under conditions of starting up or about to climb, the driving assisting switch should be turned on in advance to activate the mode of driving assistance(press the upper part of the three height option stwith). It will help the drive axle to reach the maximum load and the best driving and climbing force while effectively prevent driving wheel slip and insufficient vehicle climbing ability. This can also lenthen tire life span.

7. When the vehicle is running on slippery road or the road with snow or rain on the surface, in order to increase the operation stability and prevent sideslipping, do not lift the axle or activate the drive assitings mode..

8. To protect the tyres of drive axl, we recommend starting the vehicle softly, not to apply pressure on the accelerator in a hard way.

9. When the frame height is lower, there is less clearance between tyres and fender. If there is sediment and stones are embedded in the tire pattern, the fenders might be damaged. Therefore, before the vehicle start, we recommend a check of space between the tyres and fender. If the clearance is not enough, increase the frame to the height of about 40 mm under the maximum height. Then run at the speed of no more than 50 km/h for a period of time before recovering the frame back to normal level.

10. If the tyres are equipped with tyre chain, the frame is recommended to be lifted to a proper height to prevent the fender being damaged.

11. When the frame is diverted from the normal height of factory setting, the displacement of the frame will be affected. If the vehicle runs at the hightest or the lowest height for a long time, the frame, suspension, transmission system and the fender might be damaged. Therefore, the vehicle should be run at normal height under most circumstances.

12. When the gas path of airbag fails, which leads to insufficient air pressure for the normal functions of the airbag, we recommend you to drive the vehicle at walking speed to the safe place or the nearest service station for repairing.

13. After the supporting axle (including steering supporting axle) is lifted or the drive assisting function is activated, the vehicle braking and the function of steering may be changed due to the transferring of loading of axles of the vehicle. Please drive carefully.

14. During the process of loading and unloading, the loading of the vehicle may change greatly. Do not turn on drive assisting and the most optimal traction functionin order to prevent sudden rise and fall of the frame.

15. To provide the best traction performance for the vehicles running in provinces of Yunnan, Guizhou and Sichuan where there are many mountain roads, the drive assisting mode will be automatically closed when the speed reaches 55km/h. Therefore, in those areas, the relatively longer period of the drive axle in overloading state will affect the life of drive axle and drive wheel.

Chapter IV Practical Suggestions

Replacement of wheels

Operation and maintenance of tires

-Air pressure

Inspect whether any inflated tire suffers from air leakage and repair leaking tires.

Keep tires at the normal pressure throughout their operation.

Regularly inspect tire pressure during long time running or operation. It is a must to support front and rear axles for long-time parking with full load.

In case of high tire pressure, crown is vulnerable to wear and explosion; in case of low tire pressure, tire is vulnerable to deformation and damage.

Two tires installed together shall have the same pressure.

-Speed

Different tires have different speed limitations. Overspeed running may lead to early damage of tires. Do not drive fast in case of poor road conditions and minimize sudden braking and sudden turn.

Temperature of tires will increase during high-speed running. Take measures in case of high temperature rise to prevent explosion of tires.

-Vehicle conditions

Constantly inspect and adjust toe-in of front wheels to prevent eccentric wear and early damage of tires.

Do not use deformed rim due to deformation or rim with unqualified dimension as it may lead to wear of valve.

Running over roadside step will cause internal damage (tire damage) hardly seen at the outside, which will lead to tire explosion or even severe accident. Therefore, avoid running over roadside steps and if inevitable, run slowly in the angle of 900 (lower than walking speed).

-Pattern

Circumferential patterns featuring little resistance and fast speed are applicable to hard roads such as cement and asphalt roads.

Transverse patterns boast good adhesion and sound climbing performance.

Mixed patterns integrating characteristics of circumferential patterns are applicable to asphalt and cement concrete roads.

Off-road patterns are applicable to roads without pavement or poor roads.

Stop use the tire when tread patterns are worn to the wear mark.

-Load

Vehicle load shall meet load specified by prevailing national standard and overload is strictly forbidden.

Cargo loaded on the vehicle must be evenly distributed to avoid unbalanced loading.

Severe overload will result in abnormal wear of tread, separation at shoulder, delaminating and burst of valve.

Tires with high ply rating and large load are not suitable for high-speed running.

For use of reinforced tires, load may be properly increased according to the design standard.

-Assembly

Tires must be assembled on specified vehicle model and rim. Tires shall be installed and removed with special tools and instrument. Forcible prying and smashing are strictly forbidden.

The same axle shall be installed with tires with the same specification, structure, pattern and ply rating.

Diagonal tires and radial tires shall not be mixed.

For use of tires with directional patterns, keep the mark of tire rotating direction consistent with running direction of the vehicle.

Tire chains shall be installed symmetrically and removed upon finish of use.

-Exchange

Tires shall be exchanged regularly. Tires of a truck shall be exchanged every 5,000km operation.

-Tubeless tire

Tubeless tire are divided into steering wheel tire and diving wheel tire. Steering wheel features good steering characteristics and driving wheel good adhesion. Therefore, use of driving wheel tire as steering wheel tire is not allowed!

The spare tire must be tire of steering wheel.

-Tires of all-wheel drive vehicle

A vehicle applying all-wheel drive shall use tires with the same specification, dimension and structure.

Difference in rolling circumstance of tires of front and rear axles shall not exceed 2%, otherwise power drive system will form stress during engagement of front axle or locking of axial differential that will cause severe damage to safety and rideability and aggregate wear of tires.

-Change of tire size

Only wheels and tires with specified sizes can be used for the vehicle.

If it is required to change tire size, please come to the Sinotruk repair service station and refresh CBCU of complete vehicle, ECU and vehicle travelling data recorder program; otherwise, the accuracy of the recorder will be impacted.

-Basic specification

Due to solar radiation and environmental factors, tires will age gradually and rubber inside tire will gradually lose its elasticity Tires will become hard and brittle with crack little by little. Tires shall be changed in time according to their use and wear situation.

Replace with spare wheel

Warning!

– **As the spare wheel is so heavy that its center of gravity is likely to change when loosed and may fall off or turn over, leading to injury of the operator or others.**

Removal of spare wheel

- Remove wheel nuts.
- Take down the spare tire pressing plate.
- Remove the spare tire.

Installation of spare wheel

The steps for mounting spare tire are converse to those for removal. Regularly check and fix nuts of the spare tire.

Replacement of wheels

Warning!

– **Turn off the key switch before change with the spare wheel.**

- When it is necessary to change with spare wheel, be sure to observe local traffic laws (such as place a triangle Warning board) and make sure the vehiclewill not slide for the sake of your safety
- Remove fixing nuts of the wheel until only 3 evenly distributed nuts are left..
- Place a jack on the support point designed at one side of the vehicle to make sure it will not slide

Note: Jack shall be inspected by professionals (professional service center) at least once per year according to relevant stipulations.

- Jack up the vehicle and ensure the foundation is solid
- Confirm the replacing wheel may move freely with the wheel nuts and then loose the last 3 wheel nuts.
- Pay attention not to damage thread when removing the wheel.
- Remove rust and impurities on contact surface among brake drum, rim, nut and bolt before installation of the spare wheel, clean wheel locating hole and mating excircle at the wheel edge and apply a proper amount of grease.
- Pay attention not to damage threads during installation of the spare wheel (tire inflation pressure must conform to specification).
- Tighten nuts in diagonal cross sequences until nuts are hardly moved by hand.
- Put down jack to lower wheels and cross tighten nuts with 550-600Nm torque.
- Retighten nuts of a new vehicle after running for 50km approximately, inspect everyday to meet the specified tightening torque and if necessary tighten until nuts are tight.

Inflation of tires

Inflate tires with inflation connector installed on the air dryer in following steps::

- Remove dust cap ① of the connector.
- Connect one end of the tire air-charging hose to the inflating valve of tire.
- Connect the other end of tire inflation hose with inflation connector of the air dryer.
- Speed up the engine.
- Inspect tire pressure and correct the pressure if necessary.

Towing and Towing Start

Overview

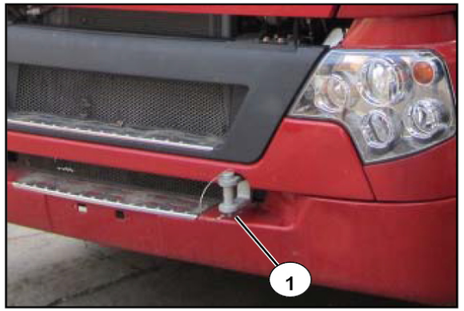
The vehicle is equipped with a tow hook ① used for towing and towing start for the sake of self-rescue. The frame chassis is provided with 2 assembling screw holes for mounting the towing fork. Generally, the hook is put inside the storage box at the driver side when not used and installed completely into the installation threaded hole when used. Another tow fork (optional) can be purchased.

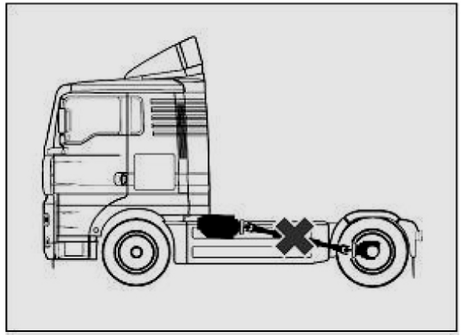
Do not tow a vehicle on the soft ground before it is unloaded. If the vehicle can not be unloaded due to technological or actual reasons, select as many as possible bearing points on the vehicle (points on axles are the best) for towing or dragging of the vehicle.

It is necessary to turn on hazard Warning lamps of both the towing truck and the towed vehicle during towing.

General requirements

- Please observe description of “Electrical System.
- Open key switch.
- Keep engine operating if possible so that both brake system and power assistant steering system are operable.
- For a vehicle equipped with a steering/starting key, turn the key to gear “II”and do not take out the key.
- Switch transmission to neutral gear.
- Use rigid tow bar instead of rope or cable.
- In case of trouble of air suspension, tow the vehicle slowly.
- If the vehicle is stuck, do not swing it left and right, or tow eccentrically, especially do not tow from one side.
- Lift front axle if steering system fails.





Towing preparation (towing)

Before towing, disconnect drive shaft and cut off power.

Warning!

–Do not try to steer a static vehicle as this action may damage its steering system due to absence of hydraulic power assistance!

-Steering without hydraulic power assistance is allowed only when the vehicle is moving.

-Steering wheel requires larger force when engine is shut down as then hydraulic power assistance will fail. In this case, the vehicle shall be towed slowly.

-In case of underpressure of brake system air, the applied spring brake can be released with external compressed air (0.55MPa as a minimum) or mechanical manner. Please refer to "Spring Energy Storage Brake Chamber-Emergency Release", after which the entire vehicle will lose braking!

Towing of vehicle with broken axle

Warning!

-Close ignition switch when the vehicle is lifted.

-Turn the key to gear "0".

Front axle

- Tow with special transport equipment or after the front axle is lifted.
- Drive shaft of rear axle shall be disconnected when vehicle front is lifted.
- Only front of a four-axle vehicle can be lifted.

Rear axle

- Tow with special transport equipment or after the rear axle is lifted.
- In case of all-wheel drive vehicle, disconnect drive shaft of front axle.

Support axle

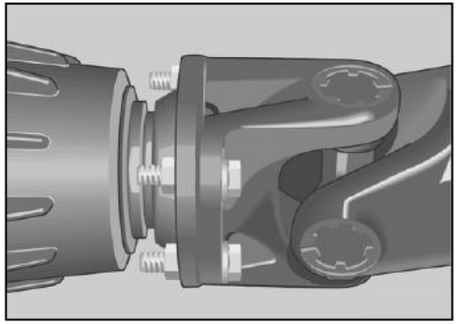
- Tow with special transport equipment or after the axle is lifted.

Emergency methods for sending a vehicle to the nearest service station

- Remove wheels of support axle and tighten nuts onto the brake drum.
- Slowly tow the vehicle as its support axle is hanged onto the shock absorber.
- Make sure air bag locates at the exact position after repair.

Warning!

– Disconnect drive shaft or remove semi-axle at the position of rear axle flange when the drive axle is of the vehicle is on the ground.



Towing of vehicle with tow bar

The towed vehicle must be steered and braked by a driver.

- Start its engine.
- Inflate its brake system to the extent of unloading pressure.
- Switch transmission to neutral gear.
- Disconnect transfer gear.
- Release hand brake.
- Tow the vehicle slowly.
- Towing speed shall not exceed 60km/h as a maximum.

After towing

- Turn off the engine.
- Apply parking brake and block wheels with wedges to prevent sliding of the vehicle.

Towing start

Sinotruk does not recommend starting the engine by towing.We recommend jump start, see "Jump start".Please ensure the starting engine of the breakdown vehicle and the battery is in good condition.

Jump Start

Engine hardly started due to battery underpower can be started by another battery. Before using auxiliary equipment, please read operating instructions; only the jumper wire with sufficient area can be used.

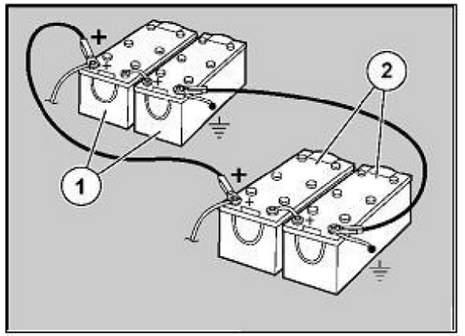
Warning!

-Only jumper wires up to the standard can be used.

-Please use jumper wires in accordance with instruction.

-Only battery with rated voltage (24V) can be used.

-Do not use charger or jump start device for assistant start use.



①Battery for jump start ②Battery requiring jump start

Connect positive and negative wiring terminals (engine shut down)

- Connect positive wiring terminal.
- Connect negative wiring terminal of charged battery to transmission or engine ground point.

Warning!

Do not connect ground point with frame!

- Use of jumper wire with master power station for jump start is allowed. Disconnect master power switch, connect negative of two batteries and close the switch after connection.
- Start the engine used for jump start.
- Start and operate the engine requiring jump start, which requires 15 seconds as a maximum.

Remove positive and negative wiring terminals.

- Dismantlement sequences are reverse to installation sequences.

Spring Energy Storage Brake Chamber-Emergency Release

When pressure of parking brake circuit is lower than 0.55MPa, spring brake functions if pressure acted on cylinder diaphragm is less than spring force.

The "STOP" lamp①, brake system trouble lamp ② and parking brake lamp ③ are lighted at the same time. Spring energy storage chamber can be released pneumatically or mechanically under emergency or at the repair station.

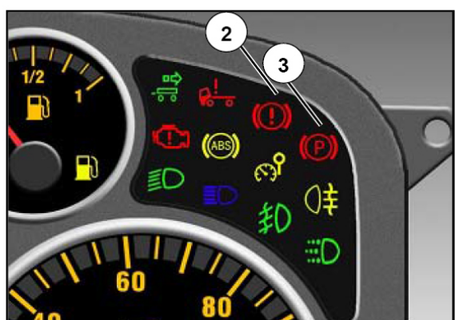
Warning!

– Make sure the vehicle cannot move before release of spring energy storage brake chamber.

– Emergency release device of spring energy storage brake chamber can be used only for operation of the vehicle at the repair station or under emergency.

– After releasing the spring energy storage chamber under emergency, an accident may be caused during vehicle driving because the pressure of driving brake circuits is not sufficient to ensure effective brake!

– Do not drive the vehicle before all display information on the driver's display screen disappears.



The driving spring energy storage brake chamber – parking brake release

Push forward hand brake valve handle ① to release position. In addition, instrument panel indicator lamp goes out.

Warning!

– Parking brake can be completely released only when brake system pressure is higher than 0.55MPa and parking brake signal lamp goes out.

-Do not start the vehicle before its signal lamp goes out!!

Spring energy storage brake chamber- emergency mechanical release

Diaphragm spring brake chamber

Automatic braking due to leakage of air circuit of spring brake chamber can be released by loosing bolt ① at the end of spring brake chamber.

Dual diaphragm spring brake chamber

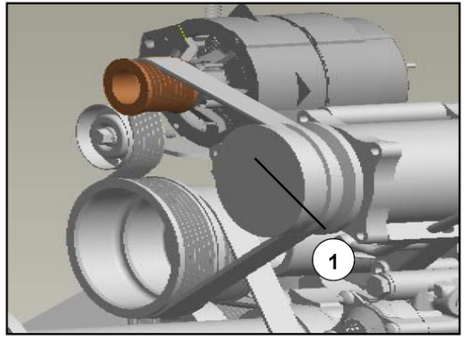
Parking brake can be released by opening rear end cover ② of dual diaphragm spring brake chamber, inserting bolt ③ from rear end cover and manually loosing it.

Warning!

– Before release of spring brake cylinder, engage gear I and inspect whether service brake (foot brake) functions properly.

– To release spring brake cylinder on a slope, block wheels for fear of slip of the vehicle.

– Do not start the vehicle before its signal lamp goes out!



Belt

Status inspection (every month)

For cab turnover, refer to “cab turnover mechanism”.

Inspect crack, oil stain, ageing and wear of belt ①.

The belt shall be replaced at SINOTRUK service station in case of damage, oil stain, ageing or wear.

Visually inspect whether damping element suffers from oil leakage.

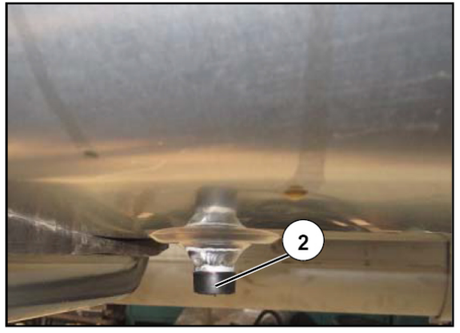
The belt pulley shall be inspected at SINOTRUK service station.

Belt replacement cycle: 2 years or 200,000 km running of the entire vehicle, whichever comes first.

Fuel System

- Inspect status and airtightness of fuel system.
- Visually inspect whether pipeline and pipe joint of fuel system (especially the part close to heat source) are damaged and corroded.
- Please go to SINOTRUK service station for immediate repair in case of any leakage.
- The fuel filling quantities is no further than 95% of the capacity of the fuel tank.

Open plug ② at oil drain port of fuel tank to completely drain diesel oil in fuel tank.



Fuel filter

- When the water level sensor of fuel coarse filter alarms, drain the water in the fuel coarse filter in time.
- Replace two filters at the same time.
- Clean the fuel coarse filter at the oil pump.

Drain water in the fuel coarse filter:

1. Place a container under the drain plug.
2. Loose the drain plug.
3. Tighten the rain plug.
4. Check if there is any leakage in the fuel system.

Note: Dispose the fuel-water mixture environmentally.

Vehicle LNG supply system

Warning!

−LNG with extremely low temperature in the ambient atmospheric pressure: -162℃.

− Natural gas can be suffocating.

− Natural gas is a flammable gas.

− Do not allow the non-professionals to operate the vehicles with LNG supply system.

- Do not allow the non-professionals (without relavant qualifications) to repair the LNG supply system.

Valves operation

LNG cylinder operation is simple, during daily normal usage, and it need no frequent valve operation. Only three valves may require user operation:

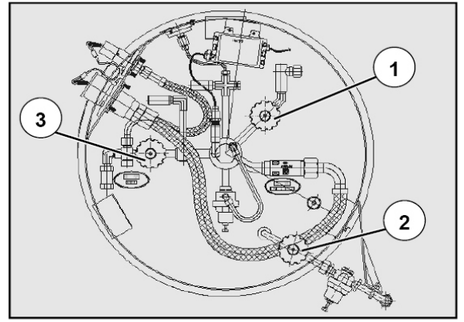
Delivery valve ①:

It is normally open, and shall be closed when failure; the opening should be slow after once closed, to prevent over-current valve automaticly cut-off.

Booster delivery valve ②:

It is normally closed, when cylinder pressure is too low, you need to open the valve for self-boosting.

Vent valve ③: Open when the cylinder pressure relief.



LNG filling

Conventional filling

LNG filling according to this method is through a separate filling hose achieved. When filling, first release the inner cylinder pressure to 0.6 ~ 0.9Mpa. Second, connect fueling nozzle to aerated block. Then open filling machine filling switch, and the liquid will inject into gas cylinder through the inlet tube inside. Filling wil stop automatically, when the level reaches the rated position

Vent filling

- If the cylinder inner pressure is too high, resulting in extra time was difficult, it need for vent filling;
- Connect the fueling nozzle to aerated block of the cylinder, and gas-return gun to gas-return block of the cylinder.
- Open the vent valve to release the cylinder pressure to filling machine needed pressure or less, and then close the vent valve;
- Open filling machine filling switch to fill until it automatically stops, remove the nozzle and gas-return gun

Warning!

- **A completely filled cylinder pressure rises very rapidly and may lead to frequent safety valve open; therefore completely filled cylinder should be put into use as soon as possible to prohibit prolonged storage.**
- **When remaining liquid inside cylinder more than two-thirds, filling should be avoided!**

Thermal cylinder filling

Usually the vehicle LNG welded insulation cylinders before first filling and more than two weeks off work are called thermal cylinders. Thermal cylinders filling should be in accordance with the following procedures:

- First, fill about 30L LNG into the cylinder, standing.In the process of LNG vaporization boosting process, gas cylinder liner has also been cooled down.
- When the cylinder pressure reaches normal operating pressure, conduct system tightness test.
- You can follow the conventional filling or vent filling procedure after reducing the pressure through the vent valve.

System maintenance

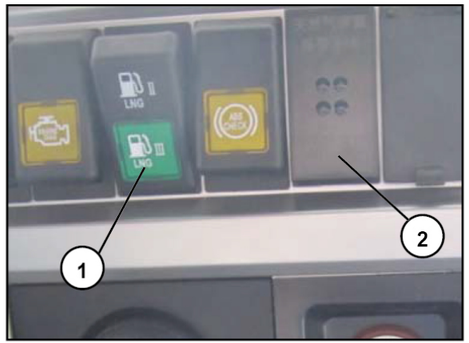
- To ensure the normal operation of the vehicle, periodically performed leakage checks on the system are needed. If there is any leakage, contact Sinotruk service staation immediately to repair.
- A vacuum failure cylinder, the pressure will be about 0.1 ~ 0.4MPa/h rates rise rapidly, the pressure change is very obvious, shall contact SINOTRUK service station for processing.
- When removing or replacing parts, contact SINOTRUK service station for processing.

Applicable conditions

In bad road conditions, shall be kept at low speed, otherwise it could lead to fatigue failure of the supporting structure, and cause leaks and other accidents.

Regular maintenance requirements as follows:

Maintenance items	Maintenance intervals	maintenance method
Coupling nut on the cylinder pipe	Before each trip	Visual observation for leakage
Vaporizer	12 months	Clean up the scale on the coil
Valves	7500km or 2 months	Closed lax, leaks
Relief valve	12 months	Send to local technical supervision department
pressure gauges	12 months	Send to local technical supervision department
Cylinder vacuum	12 months	Pressure test
Leak detection of each connection point	7500km or 2 months	Tightness test or probe leak detection



Natural gas gauge

Natural gas gauge: Displays the amount of gas in cylinders.

If the pointer return to scale 0 or less,which represents the gas sensor signal failure,and gas alarm lamp will flash on the fuel gauge. When gas amount is less than 12.5% (the pointer is at red zone), the gauge will light on the low gas level alarm lamp to prompt the driver to fill gas timely. When the gas gets higher than 14.5% again, the gauge will shut down the lower gas level alarm lamp.

The number of LNG cylinder selection switch

The switch ① has three gears (the upper, the middle and the lower) which indicate the gas cylinders respectively. When installing cylinders fewer than gears and selects the corresponding gear, gas meter display is empty

Gas leakage alarm

When a gas leak reaches the set alarm levels, alarm ② performed audible and visual alarm.

Note: According to the use environment of the vehicle, to ensure safety, please implement periodic inspection.Inspection period of 1-3 months, check the alarm host and the detector is operating properly or not.To avoid the impact of artificially high concentration of natural gas to the detector, otherwise it will reduce gas sensor sensitivity for a short period. Please avoid contamination of silicon component material to prevent damage to the detector during use! If the gas leak, the vehicle will alarm with sound and light. Park the vehicle and turn off the power as soon as possible. Immediately look for leaks, close the valves, turn on ventilation, etc. Do not plug or unplug the connector between alarm vehicle and detectors, as this may damage the system's internal chip. If detector sensor is damaged or has failure, no replacement is allowed without permission. It should be sent to Sinotruk service station for repair.

Vehicle CNG supply system

CNG system components

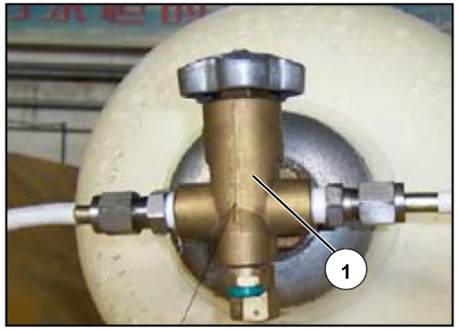
CNG system consists of gas cylinder, gas cylinder valve, high and low pressure filter, integrated control assembly, low pressure solenoid valve, pressure reducing regulator and pipelines, etc..

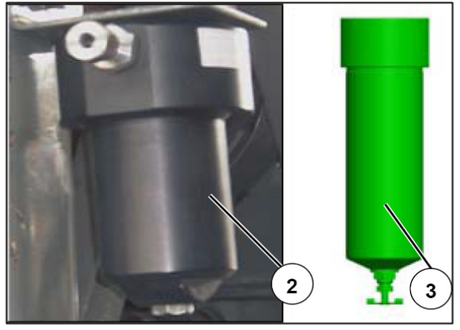
Gas cylinder and gas cylinder valve

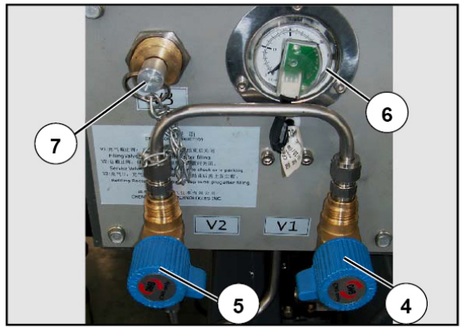
Before the engine starts, ensure the gas cylinder ① is open. The gas valve integrates fusible plugs and rupture disks, which ensure the gas cylinder’ s timely releasing pressure under high temperature and high pressure. The overcurrent protection device in the gas cylinder valve ensures timely cutting the pipes when the gas supply system has leakage.

High and low pressure filter assembly

High pressure filter ② and low pressure filter ③ can effectively filter the water and impurities in the natural gas in order to better protect the engine.



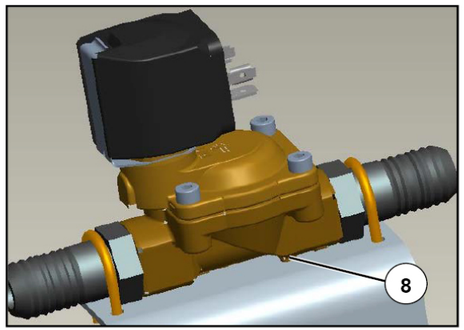




Integrated control assembly

Integrated control assembly includes stop valve V1 ④, stop valve V2 ⑤, barometer ⑥ and air charging port ⑦.

- Stop valve V1 is filling stop valve. Turn on the valve when inflating and turn it off when inflation is completed.
- Stop valve V2 is gas supply valve. Turn on the valve before starting the vehicle. Turn off the valve when the vehicle needs maintenance or parks for a long period.
- The barometer indicates gas pressure of the system.



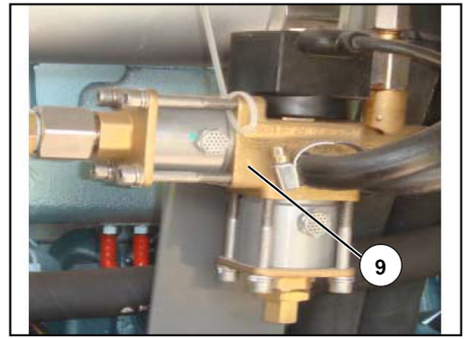
Low voltage solenoid valve

Low voltage solenoid valve ⑧ which is normally closed is used stop the flowing of natural gas. Turn the valve on when the vehicle is powered on.

High pressure regulator

High pressure regulator ⑨ is used to reduce the pressure of gas from 20Mpa to 1Mpa.

High pressure regulator is fixed on the bracket with its own retaining nuts. The connected outer threads should apply raw material belts or thread sealant: Loctite 565, Loctite 567, Loctite 592, Permatex 562xx or Permatex 8063x. Tightening torque of retaining nuts is 30Nm.



Filling of CNG gas system

Ensure the pressure of the gas cylinder is above 5Mpa. Consider to fill the fuel gas cylinder when the pressure of gas cylinder is below 5Mpa. Fill the fuel gas immediately when pressure of gas cylinder is below 2.5Mpa.

CNG vehicle should apply the fuel gas according to ISO/FDIS 15403, otherwise the resulting reduction of power may damage the engine. Sinotruk only provides paid service.

Notice:

Because of the high temperature of fuel gas filled, the process of filling will release great amount of heat. The phenomenon of reduction of fuel gas pressure is normal due to sufficient cooling of the gas.

CNG vehicle operation

Drivers of CNG vehicles should have specialized technical training and be familiar with the operation & maintenance and safety requirements of natural gas engine, especially the natural gas system to ensure the normal use and safe operation of natural gas system.

Check before starting the vehicle

After parking at night, observe the indicated pressure of the barometer in the integrated control assembly, and observe it again before starting the vehicle the next day. If the there are no obvious decrease, the natural gas system has no leakage. Otherwise it has leakage in the natural gas system. Contact Sinotruk service station for maintenance.

Do not start the vehicle under the condition of leakage!

Notice: The instrument display panel in the cab indicates the remaining proportion of compressed gas in the gas cylinder rather than the actual pressure. The actual pressure is subject to the indicated pressure of the barometer in the integrated control assembly.

Treatments to the problems during driving

When the temperature of circulation water of the engine is normal while the vehicle is running, the pressure regulator will not be frozen and ice-blocked. In cold winter, a thin layer of thin frost may be attached on the surface of pressure regulator, which does not influence its normal functions.

In case there is leakage or big noise when the vehicle is running smoothly, park the vehicle and troubleshoot before continue driving.

Emergency treatments to the problems during driving

In case the vehicle has natural gas leakage due to cracked pipelines and loosened sleeves, pull over the vehicle to the side of the road immediately. Turm off the power and close all the valves of gas circuit. Contact Sinotruk service station for maintenance.

In case of severe leakage, failed throttle valve and failure of closing the throttle valves of gas cylinder, evacuate and keep people away from the scene. Keep away from fire source. Make the case to related departments of vehicle service, fire fighting and transportation. Dispose of the vehicle after the natural gas has fully exhasted.

In case of a fire, turn off the main switch of the battery and close all the valves of gas circuit as many as possible. Call the police immediately. And isolate the scene while putting out the fire with fire extinguisher. Spray fire fighting foamer to prevent the explosion resulting from excessive temperature of gas cylinder.

Requirements when the vehicle is parking:

Turn off the power and engine when the driver leaves the vehicle or temporarily parks for more more than 10 minutes.

Only the gas leakage detector, soapy water or other non-corrosive foam can be applied for inspection of leakage. Open fire is prohibited to inspect the leakage.

Do not strike or crush the devices of natural gas system. Keep away the fire source for over 10m.

Do not operate the vehicle with leakage or failures in the system!

Before starting the vehicle, slowly open all the valves of gas supply circuit and prevent the functions of throttle valves.

The engine should be stopped and the power should be turned off when filling the gas.

Do not privately dismantle and repair the CNG system assembly and parts when the vehicle mulfunctions. Contact Sinotruk service station for maintenance.

Repair and maintenance

Routine maintenance

Besides the maintenance requirements of the complete vehicle, users should conduct routine maintenance to the natural gas system. Notice: the higher level includes all the items of the former level of the requirements.

Maintenance after 5000km:

Inspect the leakage and damage of all the high and low pressure pipe connection, valves of gas circuit, pressure reducing regulator and other system parts. Inspect whether the mounting of all the components is secure and fixed, whether the pipe clamps is fastened, and the pipelines' interference with other components. Troubleshoot the problems occured.

Maintenance after 10000km:

Replace the low pressure filter element; inspect the leakage of pressure reducing regulator; inspect whether the pressure of the outlet of pressure reducing regulator is normal and whether the pressure release valves of the pressure reducing regulator function well.

Maintenance after 50000km:

Test the functions of pressure reducing regulator. If its performance cannot recover to the state near the ex-factory level, replace it. Inspect the damage and aging of the rubber hoses of circulating water.

Maintenance of high pressure filter:

Drain water every 5000km.

Replace the filter element every 30000km.

Maintenance of low pressure filter:

Discharge pollution for the assembly every 15-30 days.

Replace the filter element every 10000km or every 3 months.

Notices:

Information of the maintenance of CNG supply system can be get from Sinotruk service station. Do not privately dismantle and repair the CNG system assembly and parts when the vehicle mulfunctions. Contact Sinotruk service station for maintenance.

Carefully write and save the driving records regarding natural gas system for the reference of maintenance.

Air cleaner

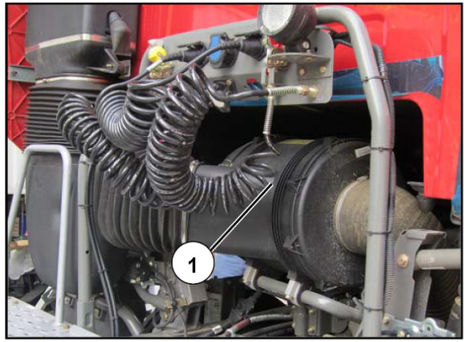
Dry-type air cleaner

Warning!

- Never clean it with oil or water!

- The safety filter element cannot be cleaned and shall be replaced together with the outer filter element.

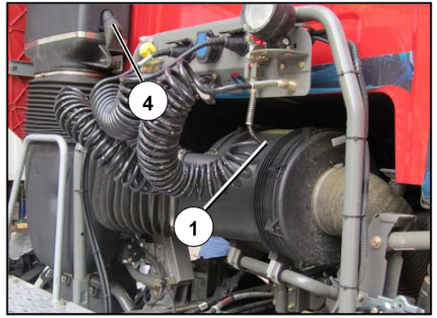
-Please use original Sinotruk filter element for replacement. For non-Sinotruk filter element that leads to fouling in the engine airtake inlet, SINOTRUK only provides paid service.



- The filter element of dry-type air cleaner ① must be maintained properly to prevent blocking of filter element, decrease of engine power and increase of oil consumption.

Maintemance period: in ordinary areas 8000～12000km, in dusty areas or areas with bad conditions, the period shall be shortened as appropriate.

- When the filter element maintenance exceeds 4 times or it service has exceeded one year, replace it with a new one.



Cleaning method

- Firstly, loosen those fixing latches on end cover ① of air cleaner and detach the end cover, remove dust in it and clean it.
- Pull out the main filter element, purge with compressed air from inside to outside and clean rubber gaskets at both ends. Take care to make sure the compressed air pressure will not exceed 0.5MPa or otherwise, the paper filter element may be broken.
- After cleaning, you should carefully inspect the filter paper to avoid damage and the end sealant for cracking, if any, the filter element must be replaced with a new one.
- After inspection, press the filter element into the housing in place, install the end cover and fasten the elastic buckles.
- Finally, inspect the seal of air intake pipeline for intactness, and particularly, check if the hose clamps are loose. Inspect the pipe wall for wear to prevent air accidentally entering the engine.

Cleaning dust bag

Used in winter and dusty conditions, the dust bag ② should be emptied and cleaned on a daily basis. Drop and poor tightness (caused by damage) of the dust bag will degrade the filtration effect, resulting in premature wear of engine and supercharger.

Oil bath air cleaner

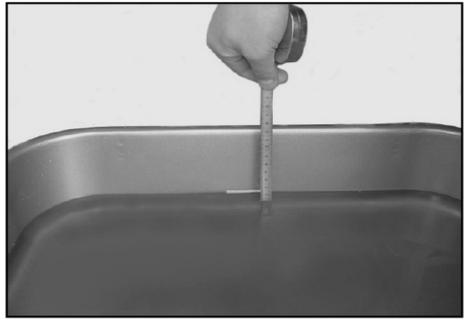
Warning!

- **The cleaner is not filled with engine oil before delivery of new vehicle.**
- **Before use, the cleaner must be filled with engine oil. The type of the engine oil filled should be the same as that applied by the engine!**
- **Fill the cleaner with engine oil up to 30 mm or 5 L.**
- **If the engine oil cannot flow easily when you are swinging the bottom case, the filter element shall be cleaned and the oil shall be replaced.In especially severe conditions, the cleaner shall be inspected daily. In normal conditions, the cleaner can work 80 to 150 hs. The filter element can be used for a long time without the need of replacement.**
- **Housing and connectiong bolt must ben checked on daily basis to ensure that they are tightly fastened.**

Oil bath air cleaner

Steps of disassembling, check and cleaning:

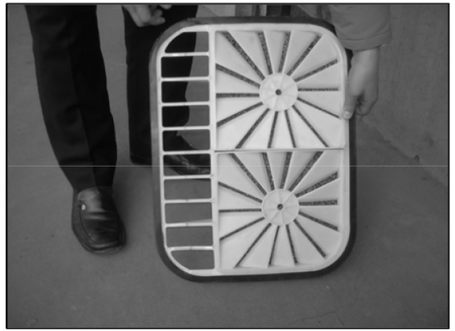
- Unlock the locking devices of upper and lower housings.



- Take down oil pan and pour 5L oil into it, or until oil level reaches 30mm.

- Clean the lower filter element assembly

Clean the fan blade and filtter element until no visible oil sludge on the fan blade and filter element..



- Clean the upper filter element assembly according to the same method as that for lower filter element.

- Fit the filter element assembly. Install the upper filter element first, then the lower filter element and finally fix them with rubber gasket, flat gaskets and wing nuts.

- Fit the bottom case. Securely fix the bottom case filled with oil by using draw hooks.

Electrical system

Caution:

For safety purpose, please cut off the battery or disconnect the master switch of battery before modifying the electrical system.

Warning!

Hydrogen-oxygen mixed gas will be generated in the enclosed battery box. When disconnecting battery terminals, the electric equipment or monitoring device in operation will generate sparks and ignite the gas. Therefore, you shall fully purge or clean the enclosed battery box with compressed air before disconnecting the terminals.

- Do not start the engine unless the battery is securely connected.
- Do not disconnect the battery when the engine is running.
- The tow-starting can only be conducted when the battery is connected and has been partially charged. See “Towing and Towing Start”.
- Jump starting of vehicle shall not be achieved by charger.
- Before charging, disconnect the positive and negative terminals.

Order of disconnection: negative first, then positive.

Order of connection: positive first, then negative.

- If left unused for long time, the battery shall be charged every four weeks.
- Only use proper measuring equipment to measure voltage.
- To avoid short circuit, the input resistance of measuring equipment shall be 10 MΩ at least.
- The ignition switch shall be shut down before disconnecting and connecting plugs of all electronic control units.
- Plugs or sockets with visible rust or cracks shall be replaced.

When cleaning the vehicle:

Sockets, engine and generator shall be protected against moisture (splash); sockets of tractor and trailer shall be cleaned with about 0.6 - 0.8 MPa compressed air rather than water or mechanical objects.

- If the vehicle is equipped with AC generator and 400 V 3-phase AC sockets (such as refrigerator truck), the cleaning can only be conducted after the engine and external power supply are shut down.

- When conducting electric welding:

-disconnect the battery and connect the positive and negative cables unpacked

-You must use DC power supply. Check if the polarity of electrode is correct.

-Turn on the mechanical master switch of battery.

-The electromagnetic type switch connector shall not be connected to the battery. In disconnection, you may also remove and connect those cables.

- Place the earth wire of welding equipment as close to the welding area as possible and earth the equipment at the place with good electric conductivity.

-Cables of welding equipment shall not be placed in parallel with cables of vehicle.

-Make sure the welded parts are in good contact to ensure a good electric conductivity; e.g. use negative clip of welding equipment to press welded parts together.

- The battery box of truck, dump truck and cement mixer has an electrical connector for installing position lamp (one-side power shall be less than 100 W).

Warning!

Users shall not add new electric equipment or modify the electrical circuits on vehicle without permission, or else, the electrical system of vehicle may break down and result in serious consequence!

Lighting

Replacing bulbs

Shut down the defective electric equipment before replacing bulbs

Do not use bare hand to have direct contact with the bulb glass.

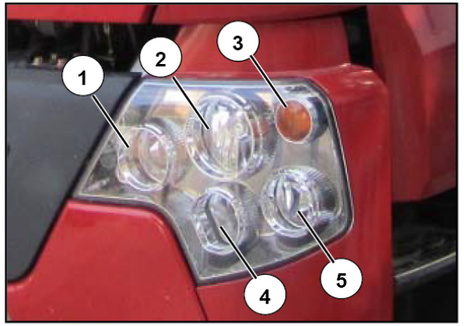
When installing new bulbs, please ensure that the identification label on the bottom of new bulb is the same as that of the old bulb.

Headlamp

Check the setting of headlamp after replacing high beam and low beam.

Warning!

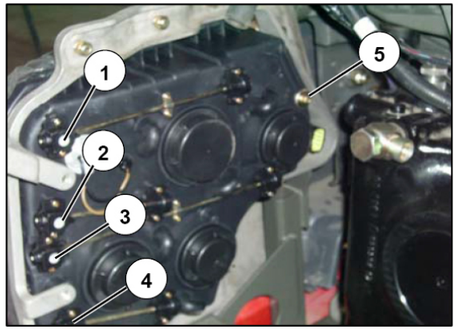
- Do not use bare hand to have direct contact with the bulb glass!



①. High beam and position lamp ②. Low beam

③. Steering lamp ④. Auxiliary high beam

⑤. Front fog lamp



Setting of headlamp (adjustment)

- Left and right adjusting point ① of low-beam lamp: Rotate this adjusting point with a screwdriver to proper position.
- Up and down adjusting point ② of low-beam lamp: Rotate this adjusting point with a screwdriver to proper position.
- Up and down adjusting point ③ of high-beam lamp: Rotate this adjusting point with a screwdriver to proper position.
- Up and down adjusting point ④ of fog lamp and auxiliary high-beam lamp: Rotate this adjusting point with a screwdriver to proper position.
- Left and right adjusting point ⑤ of high-beam lamp: Rotate this adjusting point with a screwdriver to proper position.

Replace the bulb of high-beam lamp

See number, voltage and power of bulbs in the last chapter.

Reasons for fogging inside lamps

The heat generated by headlamps when they are lit dissipates through the ventilation hole thourgh which outside cold air may come inside, thereby causing fog. This phenomenon usually appears in the winter, rainy seasons or in regions and climate with high humidity.

In this case, if the fog lamps light up 45 minutes, fog will disappear automatically.

This phenomenon is normal.

Cleaning and maintenance of vehicle

Regular professional maintenance may keep your vehicle value.

Vehicle washing

Warning!

If the vehicle is installed with high-voltage electrical system (system working voltage is higher than 24V), shut down the engine before vehicle washing.

- The vehicle can be washed only at the washing site with complete equipment
- A new vehicle and newly painted vehicle shall be washed frequently in the preliminary several weeks with clean water. Washing with steam cleaner in preliminary six weeks is not allowed
- Constantly wash the sponge for vehicle washing use clean.
- Do not let the vehicle expose in the sun during vehicle washing.
- Wash wheels and wheel casings with brush and water.
- When alloy wheels become too dirty, wash them with cleaning solvent or special detergent.
- Do not spray water to any device at working temperature.
- Do not wet socket (semi-trailing towing truck/trailer), AC generator and actuator.
- Please observe operation requirements of the manufacturer for use with steam cleaner and keep nozzle 30cm away from the paint operation surface as a minimum.

Warning!

Do not spray water directly into steering knuckle when steam cleaner is used.

- Apply lubricating oil to the vehicle cleaned with steam cleaner or oil dissolving detergent.
- Wash the vehicle more frequently in winter.
- Do not spray oil to the brake pipeline, or use gasoline, benzene and petroleum and mineral oil. Pay attention not to let brake hose contact spray substances or lubricating grease during spraying and lubrication.

Cleaning of sockets of towing truck and trailer

Do not clean sockets of towing truck and trailer with water or mechanical substances. Clean with 6-8bar compressed air.

Close key switch and switch off lighting in the process of cleaning.

- Repair paint in case of small paint damage.
- Carry out corrosion prevention protection to the paint surface at due time.

Rearview mirror

- Clean dirty mirror surface with a glass cleaner.

Cleaning of cab inside

- Clean steering wheel, gearshift lever and dirty trim and carpet with warm water and detergent solution. Do not use detergent.
- Remove oil stain with alcohol (use of gasoline is not allowed).
- Wash curtain with soft cleaning agent under 30℃.
- Wash seat belt with warm water and soap instead of chemical detergent.
- Handle seals of doors and windows with talcum powder under frosty weather for fear that doors and windows freeze with seal.

Cleaning and maintenance of seat and cushion

- Clean plastic parts (for instance: belt, support and control rod) with wet cloth and use solvent cleaning agent (such as cleaning solution) if they are extremely dirty.
- Clean trim and cushion with special wet cleaning cloth or clean with dry foam and soft brush.

Table of dirts

Substances listed in following tables can be purchased from a chemical or special store. Do not spray following substances to the material surface. All following handling manners are based on experiences. Try every substance at an unimpressive place. SINOTRUK is not responsible for any damage.

Water soluble pollutants

Type of Pollutant	Detergent	Handling Method
Bloodstain, egg, excrement and urine stain	Cold water, shampoo and carpet foam solvent	Apply reagent to a soft cotton cloth until pollutants start to dissolve. Do not scrub forcibly, otherwise you may damage the surface. If necessary, scrub from the outside to the center and then wash with clean water.
Fatty substance, vomit, coffee with cream, hot chocolate, lipstick, mayonnaise milk, ice cream and flavor	Warm water, shampoo, liquid carpet foam, benzene and stain remover	The same as above
Common alcohol, beer, carbonated beverage, fruit juice, lemonade, liqueur, fruit or white spirit and solution with sugar	Warm water, shampoo, solvent such as benzene, methyl-based solvent and stain remover (applicable only when pollutants are dry)	The same as above

Water insoluble pollutants

Type of Pollutant	Detergent	Handling Method
Grease, polishing wax, pigment (bright) grease, varnish, resin, carbon, nail polish, oil, paint, soot and tar	Cleaning agent, stain remover and shampoo	A) Apply reagent on soft cotton until pollutants start to dissolve. Do not scrub forcibly, otherwise you may damage the surface. If necessary, scrub from the outside to the center and then wash with clean water.
Paraffin and hard wax such as candle	Scrap with benzene as far as possible	The same as above
Chewing gum	Freezing spray	Spray and knock it into fragments with a hard object (hammer)
Rust	Dissolve 15% sodium fluoride in water, one spoon for every 100ml water	Use as per instruction A)

Chapter V Maintenance of Vehicle

Steering system

The hydraulic oil of steering system: ATFIII automobile automatic transmission fluid. No replacement is needed during the first warrany period. For detailed replacement intervals under different conditions, please see the table below:

Assembly		Oil Product	Quality and Viscosity	Recommended suppliers and product specifications	Volume	Mileage or time of First Change	Change Interval Mileage or Time	Remark
Steering gear	Single steering axle	Steering hydraulic oil	ATF III automatic steering oil	Mobil Multipurpose ATF Castrol ATF Dex III Shell Spirax S3 ATF MD3	5L	Hydraulic oil should be replaced after the first 2500 km for a new vehicle, clean the filter element of the oil tank at the same time.	80,000 km or 10 months, whichever comes first	
	Double steering axle				6.5L			

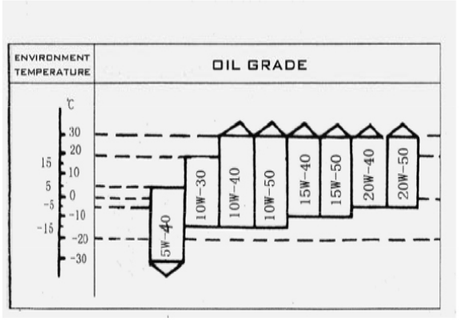
Inspect oil level every month and inspect also cleanliness of hydraulic oil. First clean the oil tank and around in case of the pollution of dirt. Notice the mark of oil scale. When the engine is working, the level of oil should be as same as the corresponding mark of oil scale. When the engine is not working, the level of oil should be higher.

Oil replacement method is as following

- Put up the front axle.
- Uncover oil tank cover and remove oil return pipe on the steering gear.
- Start the engine, idle for 10 seconds approximately and turn the steering wheel left and right to extremity for several times to complete drain oil inside oil tank, booster pump and steering gear.
- Retighten oil return pipe (keep it clean and prevent entry of dirty and foreign matters into oil circuit system) and wash oil tank, filler filter and filter element. Replace filter element every time after replacement of oil.
- Fill oil tank up with hydraulic oil, idle engine, turn steering wheel left and right repeatedly and keep filling hydraulic oil until oil inside the oil tank no longer drops and no bubble comes out, when oil level shall be within the mark scope.

Note !

– During first and regular maintenance, check the gap among all rotating parts, such as steering tie rod and drag link connectors. Replace if the gap is too big. Fill lubricating grease to all relevant parts during every regular maintenance.



Diesel Engine

Maintenance of lubricating system

- **Oil Specification**

Select diesel engine oil as per working environment temperature. Vehicles of Euro II emission standard should apply CF-4 grade of diesel oil and vehicles of Euro III or the higher emission standard should apply CH-4 grade of diesel. It is allowed to apply a higher grade of engine oil, such as the oil of CI-4 grade.

Select the type and brand of engine oil according to the table. Oil number of 15W-40 is recommended in the environment of the minimum temperature of no lower than -10℃. We recommend the brands of Mobil, Castrol and Shell.

Warning!

– Do not check the level of lubricant oil when the diesel engine is working.

-Different oil products cannot be used in a mixed way.

– Select diesel engine oil of different viscosity as per the specific working environment temperature.

- **Use of engine oil and replacement cycle (No replacement is required during first maintenance)**

The service conditions of vehicle:

Service condition 1:

Normal conditions	**Bad conditions**			
A	B	C	D	E
Good condition, long-distance transportation, the contain of the sulphur in fuel is less than 0.05%	Short-distance transportation, engineering truck, bus, municipal vehicle, etc.	Non-highway, mountain road, rough roads	Hot or cold area (The ambient temperature is often over +30℃or below -10℃.	The contain of the sulphur in fuel is more than 0.05%

Service condition 2:

WG Ⅰ	**WG Ⅱ**	**WGⅢ**
Operating condition is very bad (very hot or cold weather, high dust, close transportation construction sit, and bus, municipal vehicle, snowplough and fireengine), annual service distance is less than 2×10^4km or annual working time is less than 600h.	Annual service distance is less than 6×10^4km, short-medium distance transportation (for delivery)	Annual service distance is more than 6×10^4km, long distance transportation.

First-time check, routine check and maintenance cycle:

Items \ Service Conditions	WG Ⅰ	WG Ⅱ	WG Ⅲ
	Less than 20000km in a year	**Less than 60000km in a year**	**More than 60000km in a year**
First-time Check	After running 1000~1500km or running for 30-50h	After running 1000~2000km	After running 1000~2000km
Routine Check (P)	Every 5000km or every 150h (whichever comes first)	Every 10000km	Every 15000km
1st-Grade Service (WD1)	Every 10000km or every 300h (whichever comes first)	Every 20000km	Every 30000km
2nd-Grade Service (WD2)	Every 20000km or every 600h (whichever comes first)	Every 40000km	Every 60000km
3rd -Grade Service (WD3)	Every 40000km or every 1200h (whichever comes first)	Every 80000km	Every 120000km
4th -Grade Service (WD4)	Every 80000km or every 2400h (whichever comes first)	Every 160000km	Every 240000km

Oil change cycle:

Oil change interval \ Service Conditions	WG Ⅰ	WG Ⅱ	WG Ⅲ
A	————————	15000km	20000km
B	5000km or 4 months or 200h of operating time	10000km or 6 months or 500h of operating time	————————
C	5000km or 4 months or 200h of operating time	10000km	15000km
D	5000km or 4 months or 200h of operating time	10000km	15000km
E	5000km or 4 months or 200h of operating time	10000km	15000km
1. For vehicles serves in various bad condition or always over-loads, interval of oil changing shall be shortened. 2. Ensure changing engine oil twice per year under whatever conditions.			

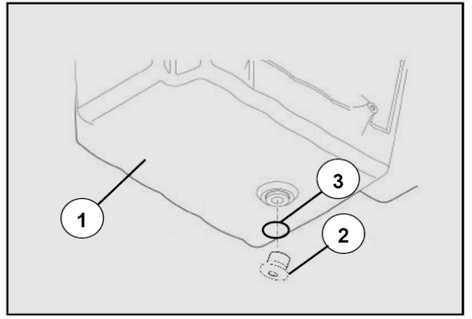
• Engine oil change

Engine oil shall be replaced after diesel engine is kept level and diesel engine is shut down for 10 minutes as a minimum.

Put an oil container under the diesel engine.

Loosen and remove the oil drain plug ② on oil pan ①, and empty waste oil.

After mounting a new compound seal ring ③, screw in a drain plug ② on the oil pan.

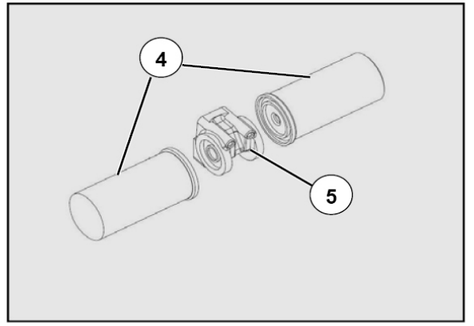


• Replacement of oil filter element

Draw out the two oil filter elements ④ of WD615/D10 series engine from oil filter housing ⑤ from both sides.

Screw the new filter element ④ into the filter housing ⑤.

Note: Replace engine oil filter together with diesel engine oil.



Warning!

– The engine must use the engine oil and oil filter element specified by Sinotruk otherwise early abrasion may occur. Sinotruk only provides paid service.

- **Filling engine oil**

When replacing engine oil and engine oil filter, the filling volume for WD615 series engine is approximately 25L..

When replacing engine oil and engine oil filter, the filling volume for D10 series engine is approximately 25L..

For D12 series engine, the filling volume is approximately 37L..

The level of engine oil should be between the maximum and the minimumscale range. For other information please refer to “Inspection and Maintenance before Engine Start”.

Maintenance of fuel system

- **Fuel specification**

Fuel selection should be in accordance with European BS EN590:2004 or a higher standard. Applying the oil which does not meet the standard will lead to excessive emission of the diesel engine.Fuel with proper brand no. shall be selected according to ambient tempeature. Generally speaking, the brand no. should be 5-10℃ lower than the ambient tempeature.

- **Replacement of oil filter**

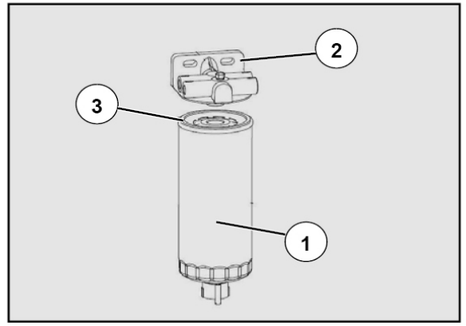
Apply lubricating oil to the seal ring when replacing the oil filter and tighten with hands. If there is any leakage, tighenten it again.

- **Replacement of oil filter element for Sinotruk WD615/D12 engine**

Fuel coarse filter: Screw out the oil filter element ① of oil coarse filter downwards from the filter housing ②.

Apply lubricating oil to the seal ring ③ of the new filter element ①.

Screw the new filter element ① until it reach the filter housing ②, then continue screwing by hand for another 3/4 round.



Fuel fine filter:

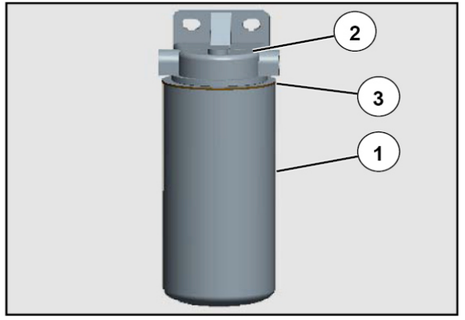
Screw out the oil filter element ① of oil coarse filter downwards from the filter housing ②.

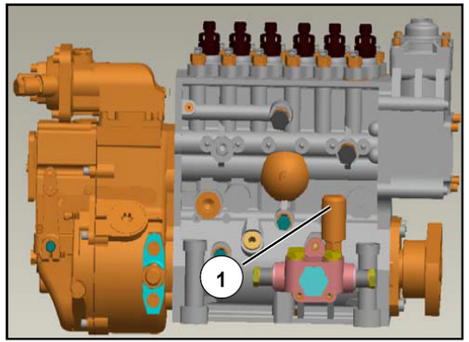
Apply lubricating oil to the seal ring ③ of the new filter element ①.

Screw the new filter element ① until it reach the filter housing ②, then continue screwing by hand for another 3/4 round.

Warning!

– The engine must use the engine oil and oil filter element specified by Sinotruk otherwise early abrasion may occur. Sinotruk only provides paid service.





- **Exhaust of manual oil pump of Sinotruk WD615/D12 engine**

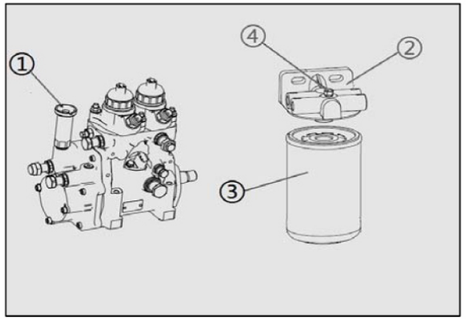
Rotate handle ① of manual fuel pump counterclockwise and pull it up. Press and pull handle ① repeatedly to exhaust air inside the fuel pipeline. Fill up the filter with diesel fuel and then press handle ① to the bottom clockwise to lock it when manual fuel pump receives certain resistance.

Warning!

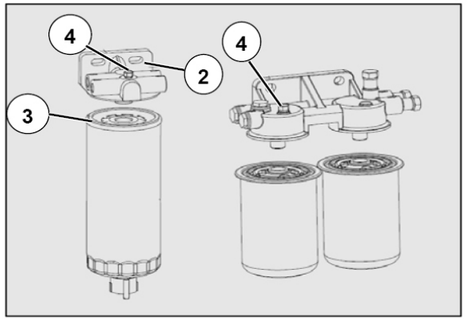
– Engine must be applied with fuel filter element special for WD615/D12, otherwise early abrasion may occur. Sinotruk only provides paid service.

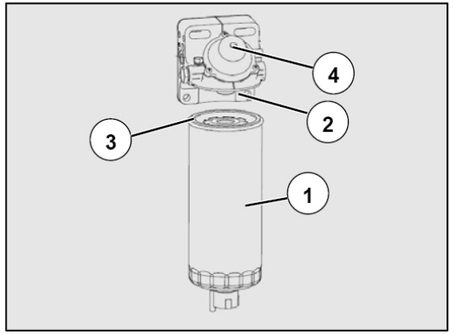
- **Exhaust of manual oil pump of D12 Denso common rail system engine**

The exhaust device of manual oil pump of D12 Denso common rail system engine is integrated in the high presure oil pump. Rotate handle ① of manual fuel pump counterclockwise and pull it up. Then loose the bleed screw ④counterclockwise. Press and pull handle ① repeatedly to exhaust air inside the fuel pipeline and stop pressing and pulling when the manual fuel pump receives certain resistance. Tighten up the bleed screw ④ clockwise with the tightening torque of 6±1.3Nm.



Then loose the bleed screw ④counterclockwise. Press and pull handle ① to further exhaust air inside the fuel pipeline and let diesel oil fill up the filter. Stop pressing and pulling when the manual fuel pump receives certain resistance. Tighten up the bleed screw ④ clockwise with the tightening torque of 6.5±1.3Nm. Then press handle ①to the bottom clockwise to lock it.





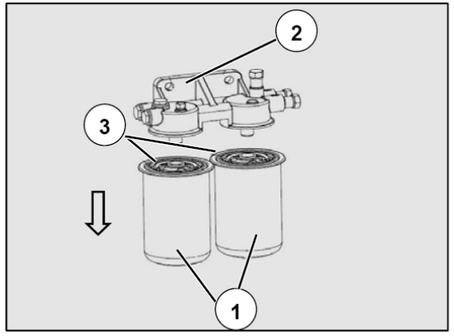
• **Replacement of oil filter element for D10 engine with Bosch common rail system**

Fuel coarse filter:

Screw out the oil filter element ① of fuel coarse filter downwards from the filter housing ②.

Apply lubricating oil to the seal ring ③ of the new filter element ①.

Screw the new filter element ① until it reach the filter housing ②, then continue screwing by hand for another 3⁄4 round.



Fuel fine filter:

Screw out two oil filter elements ① respectively of fuel fine filter downwards from the filter housing ②.

Apply lubricating oil to the seal ring ③ of the new filter element ①.

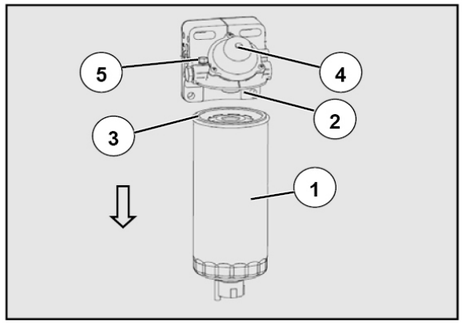
Screw the new filter element ① until it reach the filter housing ②, then continue screwing by hand for another 3⁄4 round.

Warning!

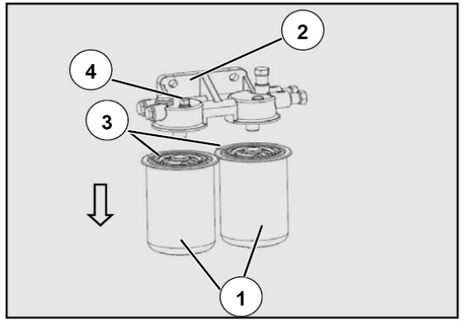
The engine must use the oil filter element specified by Sinotruk otherwise early abrasion may occur. Sinotruk only provides paid service.

• **Exhaust of manual oil pump of D10 engine with Bosch common rail system**

The exhaust device of manual oil pump of D10 Bosh common rail system engine is integrated in the fuel coarse filter. Loose the bleed screw ⑤ counterclockwise. Press the button ④ repeatedly to exhaust air inside the fuel pipeline and let diesel oil fill up the filter. Stop pressing when the manual fuel pump receives certain resistance. Tighten up the bleed screw ⑤ clockwise with the tightening torque of 6.5±1.3Nm.



Then loose the bleed screw ④ of the fuel fine filter counterclockwise. Press the button ④ repeatedly to further exhaust air inside the fuel pipeline and let diesel oil fill up the filter. Stop pressing when the manual fuel pump receives certain resistance. Tighten up the bleed screw ④ clockwise with the tightening torque of 6.5±1.3Nm.

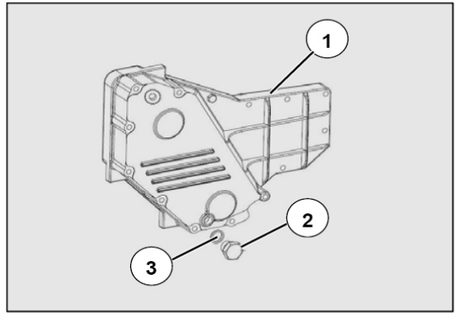


Maintenance of cooling system

- **Specification and replacement cycle of coolant**

WD615、D10、D12 series diesel engine should apply long-acting drain coolant (with rust-proof and antifreezing function). Refer the table below for the the ratio of coolant.

The lowest temperature for use℃ / Specification	-10	-26	-35
The content of glycol %	33	50	56
Proportion(15.6℃)	1.05	1.074	1.082
Boiling point ℃	104.5 ±1	108.5 ±1	110.0 ±1
Freezing point ℃	-18 ±1	-36±1	-45 ±1



Coolant is not necessarily replaced during initial maintenance of the entire vehicle. The recommended replacement cycle is 200,000km or 4 years operation of the entire vehicle, whichever comes first.

Note: Coolant must be replaced immediately once it turns turbid or brown, regardless how long the interval shall be.

- **Drain coolant**

Put a large container under engine oil module ①.

Unscrew the water drain plug ② and compound seal ring ③ to drain all coolant.

Install a new compound seal ring ③ and tighten screw plug ② with a torque of 35Nm.

Handle drained coolant in a correct manner.

- **Fill coolant**

Refer to “Inspection and Maintenance before Engine Start”.

Warning!

-Do not use water as a substitute of coolant.

-Air inside coolant must be completely exhausted, otherwise water pump may fail.。

Air-assisted SCR after-treatment system

The system mainly consists of catalytic muffler, urea pump box, urea injecting nozzle, after-treatment control unit of diesel engine exhaust (DCU), NOX, sensor of exhaust temperature, correponding pipelines and wiring harness.

Regular inspection and filling urea aqueous solution

Urea solution (vehicle's urea solution in accordance with DIN 70700 or ISO 22241-1 standard) needs to be purchased from authorized retailers or professional manufacturers. When filling, it is recommended to use professional filling equipment charging urea aqueous solution, to prevent urea aqueous solution spill. In according with Euro Ⅳ OBD, when the urea tank liquid level is lower than 10%, the dashboard urea low liquid level indicator lights flashes for warning, at this time it should be timely charged with urea aqueous solution.

Warning!
Urea aqueous solution is corrosive to the skin. if it accidentally run into the skin or eyes when filling, rinse with water as soon as possible. If pain continues, please seek for medical help. If it is accidentally swallowed, immediately seek for medical help please.

Warning!
It is prohibited to use urea aqueous solution without authorization or the substandard urea aqueous solution as well as other alternative liquid, otherwise the normal function of the system will be affected and the system life will be shortened. Sinotruk only provides paid service.

Maintenance of air-assisted SCR after-treatment system:

After using 2 years or running 40000 kilometers the urea filter element is needed to be replaced in specified service station. If driving condition is bad and urea aqueous solution is polluted seriously, the filter element is needed to be changed according to the actual situation.

Cleaning of vent pipe of urea tank and urea tank

Inspect and clean the vent pipe of the urea tank in the first maintenance. Clean the vent pipe every 5000km after the first maintenance.

Urea tank is required to be regularly inspected and filled urea aqueous solution. Keep the urea aqueous solution in the urea tank clean, and avoid dust, dirt and other turbid matter coming into the urea aqueous solution, otherwise the urea pump will be damaged, the resulting loss will not be included in the scope of quality warranty.

Other notices

- Urea solution (vehicle's urea solution in accordance with DIN 70700 or ISO 22241-1 standard) needs to be purchased from authorized retailers or professional manufacturers. When filling, it is recommended to use professional filling equipment charging urea aqueous solution, to prevent urea aqueous solution spill. It is prohibited to use personal configuration or substandard urea solution, as well as other alternative liquid, impurities and metal ion can affect system, shorten the system life.The resulting loss is beyond the scope of the warranty of quality.
- After diesel engine is shut down, system goes into back pumping stage, emptying urea aqueous solution in system, this phase will last two to three minutes, please don't turn off switch when system is still in the working state.
- At higher temperatures, disassembly time limit will be reduced. If time limit is exceeded, pre-operation must goes before starting the system to ensure the normal start. steps are as follows: ①. Refill the urea box with urea aqueous solution; ②. Replace filter of urea pump box; ③. Start the system; ④. If abnormal system startup occurs, shut down the system. After DCU/ECU main relay stop working (stop time varies according to different application), restart the system, if it still fails to start, seek help from Sinotruk service station.
- System components should avoid direct exposure under mechanical and thermal shock. Stones, dust and other sundries should not be laid on the protection cover. Keep away from the exhaust pipe, turbocharger and diesel engine heat source.
- Urea supply unit and urea injection unit have certain waterproof and dustproof function, but they should avoid flooding as well as the impact of water. Hydraulic pipe joint's lubrication is not recommended and lubrication of electrical interface is absolutely forbidden.
- During the vehicle maintenance, pay attention to the following items:

  Cleanliness of system surface, especially the waterproof and dustproof wiring harness connector. Any crushed stone soil or other sundries on the outer surface or the protection cover is needed to be removed in time;

  The completeness and fastening of the pipelines and wiring harness. No looseness or bending is allowed.;

  The need of replacement of the urea pump box filter;

  Inspection of whether there is any urea crystallization attached to the injection nozzle and exhaust pipe (when removing DM or the service station is equipped with endoscope).

Natural gas engine

T10 and T12 series natrual gas engine adopt special engine oil for Sinotruk natural gas engine. Replacement cycle of the engine oil is the same as D10 common rail diesel engine. When replacing engine oil and filter element, the filling volume for T10 series engine is approximately 25L; for T12 series engine, the filling volume is approximately 36L. The engine oil level should be within the maximun and the minimum scale range of the oil level gauge. For other information please refer to "Inspection and Maintenance before Engine Start".

Engine coolant for T10 and T12 series natural gas engine is the same as that for D10 diesel engine.

T10 and T12 series natural gas engine should apply fuel gas in accordance with ISO 15403, otherwise the power decrease will occur and the engine will be damaged. Sinotruk only provides paid service.

Maintenance of electronic control system and gas supply system

Daily maintenance

- Daily maintenance of gas supply system see "Vehicle LNG supply system" and "Vehicle LNG supply system".
- Inspect whether the ignition system and the generator have electric leakage or flaming out. If so, repair them in time.
- Inspect and clean engine air filter regularly.
- Clean the natural gas filter in gas supply system regularly.
- Clean the heating water circulation system of the decompressor regularly.

WARNING

–Turn off the ignition switch and battery main switch before pulling the wirings from the connection part of the sensor/actuator or plugging into it. Then the daily maintenance of electrical components can be conducted.

–Wipe the accumulated greasy dirt and dust regularly and keep wirings and the connection part of the sensor/actuator dry and clean.

–If water enters the electric components accidentally, for instance, the controller or wirings get wet or soaked, turn off the battery main switch first, then immediately seek help from the maintenance personnel. Do not turn on the engine on your own.

–Apply compressed air (≤ 3bar) to blow off the accumulated dust on the engine (especially on the controller) regularly.

–The electronic control components should be kept dry and without any water, grease, and dust on them.

First level maintenance (every 5000-6000km or every 150hs of running time)

• Check whether there is any deformation or damage of the fixing device of the natural gas storage tank. Fasten the fixing device.

• Check the valve of natural gas storage tank.

- Check whether there is leakage in the multifunction valve or inflation valve with air leakage detector or detection liquid. In case there is leakage, take measures in time.
- Check the manual outlet valve. Ensure the pipe connection has no leakage and the switch should work smoothly.
- Check the charging valve, pipeline connection and pipeline clamp, ensure there is no loosening and leakage.

• Check the pipelines and connections:

- No damage and cracks of the pipelines. Check whether there is leakage with a leakage detector or detection liquid.
- No loosening and leakage of the connections of the piplelines and the valve.
- Check circulating pipe and connections:

  Check whether the pipelines are clogged by dirt, if so, remove the dirt.

  Check whether the pipeline is aging or damaged, and whether it has cracks or leakage.

—Solenoid valve operation and installing inspection:

Check whether all the solenoid valves work normally with power sockets well contacted and whether it has leakage.

Check and fasten solenoid holder.

• Check the electrical system

Low voltage circuit connection should be firm and well contacted without insulation damage, short circuit and open circuit. The fuses in fuse box are complete and reliable with no other connecting with wires. Check and clean the sparking plug.

Second level maintenance (every 15000km or every 400hs of running time)

High -tension ignition system: No insulation damage, electric leakage and flaming out of the rubber sleeves of ignition coil of each cylinder. And the bearings are firmly fastened.

Requirements for ignition coil installing: Clean the dirts in the rubber sleeves when installing and fasten the mounting bolts of ignition coil to ensure the close contact of the inner spring of rubber sleeve in the ignition coil and the head of sparking plug.

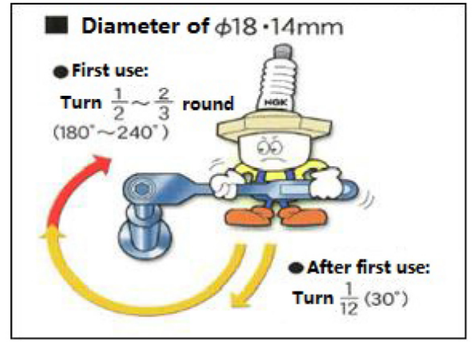
Sparking plug: Check whether the sparking plug gap meets the requirements.

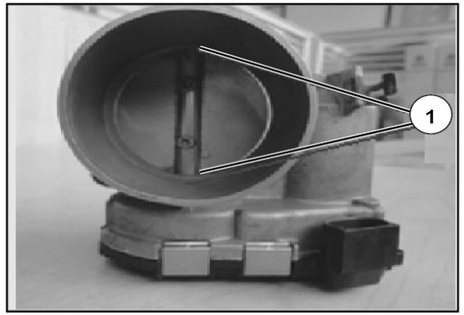
Replace the sparking plug as per the using condition; the suggested mileage of replacement: 60000km.

Dismantle the sparking plug after the engine's cooling down. Prevent burns and damages to the fastening thread of sparking plug.

Notice: Specified sparking plug sleeves must be used when fastening the sparking plug.

The fastening torque of M14 sparking plug is 25-30Nm, when mounting without torque wrench or the torque wrench does not function well, please refer to the right drawing.



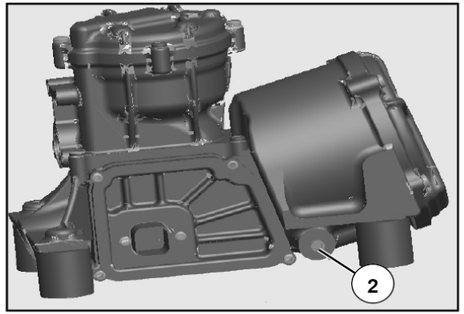


- **Third level maintenance**

Throttle: Clean the throttle① with non-corrosive detergent every 30000km of running mileage..

Shorten the throttle cleaning cycle under bad running conditions.

If the insepection shows that throttle is stuck, clean the throttle irrespect of the cleaning cycle reached or not.



T12 CFV persistent current control valve: Release the pollution discharge bolt ② at the bottom of CFV to drain pollution every 3000±100km of running mileage.

Mixer: Clean the mixer with non-corrosive detergent every 50000km of running mileage.

Clean the valve carrier and guide slot: carefully examine the wear condition of the valve carrier. If serious groove wear exists, the assembly should be replaced.

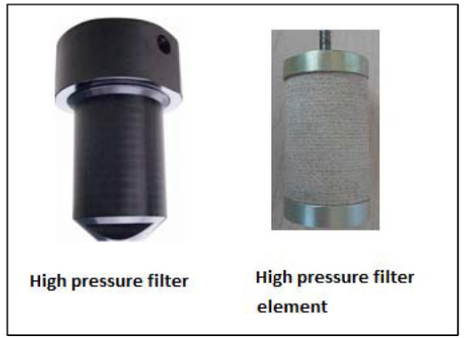
When cleaning the guide slot, focus on the inner guide slot of fuel air valve. Clean up the excessive detergent with clean cotton after cleaning the valve carrier and guide slot.

Clean the diaphragm: Remove the dust and greasy dirt on the diagragm with clean cotton. In case the greasy dirt is serious, use cotton with small amount of non-corrosive detergent to wipe the diaphragm. If the diaphragm has cracking or wear on it, replace the diaphragm.

High pressure filter: It is used to filter impurities of water and oil in the gas to ensure a clear gas circuit. It is a special part for CNG vehicles.

Requirements for installation: install according to the direction of gas flowon the filter base with the water outlet down. Do not install to the reverse direction.

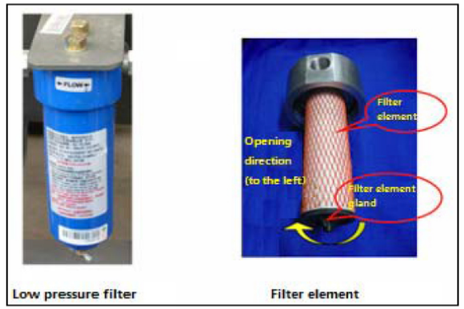
Replace with a new filter element every 40000km of running mileage or every 6 months. Discharge pollutions every 10-15 days or every 2000km of running mileage.



Low pressure filter: It is used to filter impurities of water, oil and solid particles in the fuel gas to protect the electronic pressure regulator, mixer and electronic throttle valve from damaged.

Requirements for installation: install according to the direction of gas flowon the filter base with the water outlet down. Do not install to the reverse direction. The fastening torque of the housing is 40±5Nm.

Replace with a new filter element every 20000km of running mileage or every 3 months. Discharge pollutions every 10-15 days or every 2000km of running mileage.



Warning!

The special filter element for Sinotruk engines should be applied, otherwise early abrasion will occur. Sinotruk only provides paid service!

Warning!

- Do not dismantle filter element or discharge pollutions without unloading the inner pressure of the filter, otherwise serious damage will occur.

-Turn off the main valve of gas cylinder before replacing the filter element. Idling the vehicle until the engine's automatical flameout. Turn the starting key to the "OFF" position to drain the natural gas in gas supply system.

- Turn on the gas cylinder valve after replacement and start the engine. Inspect whether there is air leakage in the connection part of filter base and the housing as well as the threads of discharging pollution valve with soapy water. Ensure the good seal before further operate in a normal way. If there is gas leakage, retighten the body or dischage pollution valve. Then apply soapy water to check the leakage.

Engine maintenance

- **Initial maintenance**

The first maintenance is carried out between 2000km and 5000km.

- **Regular maintenance**

Regular maintenance performed every year (12 months) is independent from replacement of diesel engine oil.

- **Maintenance in winter**

Winter maintenance shall be given timely in case of decrease of air temperature in order to maintain operation of diesel engine and safe driving.

Select the proper-grade fuel based on environment temperature.

Drain water inside the fuel module.

Check and fill the cooling system with coolant.

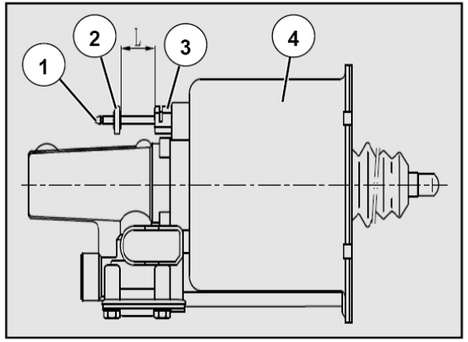
Check the electric appliances.

- **Maintenance list**

Work	Cycle	Remarks
Cooling system		
Inspect liquid level	Daily inspections regulation	
Inspect function and airtightness	Initial maintenance and regular maintenance	
Retighten hose clamps of cooling and intake supercharging system	Initial maintenance	
Inspect for pollution of fin inside intercooler and radiator	Regular maintenance	
Replace coolant and inspect safety valve of expansion water tank (replace with new parts if necessary)	4 years or 200,000km	
Inspect coolant specification	Maintenance in winter and regular maintenance	
Inspect status and tightness of belt	Inspection after 20,000km and regular maintenance	
Injection system		
Inspect fuel level	Daily inspections regulation	
Inspect status and airtightness of fuel system	Initial maintenance and regular maintenance	
Fuel module; clean filter net of manual fuel pump and replace fuel fine filter element	Do not exceed 20,000km as a maximum according to hint of fuel pressure sensor	
Replace coarse filter element	To be replaced together with replacement of fine filter element.	
Air intake and exhaust system		
Inspect for pollution of air filter element	During replacement of engine oil	
Replace filter element	Follow vehicle regulations	Replacement based on pollution conditions is recommended
Inspect status, function and airtightness of exhaust system	During initial maintenance and replacement of engine oil of diesel engine	
Lubrication system		
Inspection of engine oil level	Daily inspections regulation	
Replace engine oil and filter element	Observe engine oil replacement cycle	
Electric equipment system		
Inspect status of actuator and generator	Initial maintenance and regular maintenance	

Clutch operating system

Application of indicator of clutch wear



Indicator of clutch wear can be applied for vehicles with pull - type clutch. Through observing the position of indicator piece ② the informtion of whether the clutch driven plate is worn to the limit position can be get, which facilitates to replace the driven plate timely. Indicator of clutch wear is located above the valve body of clutch booster cylinder ④.

Along with the wear of clutch driven plate, the clearance L between measuring rod housing ③ and indicator piece ② will become larger gradually. When L=20mm, driven plate should be replaced for HW12706T、HW12710C transmissions. When L=23mm, driven plate should be replaced for other transmissions.

After installing the clutch booster cylinder ④ for the first time or replacing the driven plate, push indicating piece ② along with the measuring rod ① until it touches the measuringg rod housing ③. This is called initialization. Do not move the indicating piece ② while the vehicle is running.

Clutch operating system

- **Check and adjust the gap between master pump push bar and piston:**

When adjusting, push by hand the pedal so that you can feel the master pump push bar tops the master pump piston; adjust the position of upper-limit bolts to ensure there is a 0.5mm-1mm gap between push bar and piston; this gap shall not exceed 1mm, otherwise, the effective stroke of master pump will be reduced, influencing clutch separation effect.

- **Exhaust air in hydraulic system:**

With air inside clutch hydraulic system, effective stroke of booster cylinder pushrod will reduce, which will give rise to incomplete release of bearing and difficult gear engagement. To install or removal oil pipe, first loose vent valve of booster cylinder, fill brake fluid with designated brand no. to oil reservoir, fill brake fluid while tread on the clutch pedal until the fluid comes out of vent valve and tighten vent valve. Tread on clutch pedal for several times, loose r vent valve of booster cylinder until no air comes out and then tighten vent valve. Repeat the above step for 2-3 times to completely exhaust air inside hydraulic system.

Notices:

•Pay attention to release pedal after vent valve or coupling nut are tightened in the process of exhaust for fear of suction of air. Pedal shall be lifted to the maximum height to supply brake fluid inside oil reservoir to hydraulic chamber of main pump.

•Clearance shall be readjusted during initial maintenance of the vehicle. The clearance shall be inspected and adjusted during every secondary maintenance, i.e. every 12,000km running of the vehicle and during every initial maintenance, i.e. every 4,000km running of the vehicle. By pushing clutch release rocker manually, limit bolt head shall have some clearance.

Precautions:

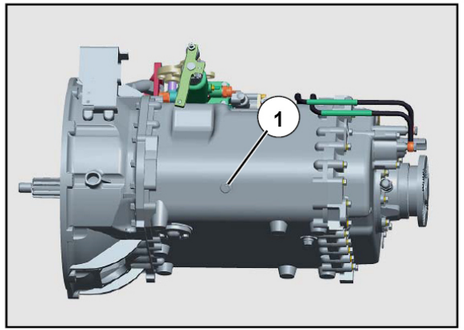
- **Clutch brake fluid: DOT3 /DOT4 brake fluid, no replacement is needed during the first warranty period.**

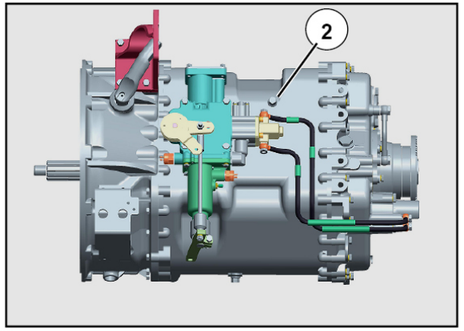
Assembly	Name	Quality grage	volume	Replacement interval by time or mileage	Remarks
Clutch	Brake fluid	DOT3/DOT4	0.5L	160,000 km or 2 years, whichever comes first	

- **Please ensure that oil tank and its periphery are clean before adding and replacing brake fluid and tighten up the oil tank cap after it is replenished.**
- **Never let oil, grease enter into the hydraulic pipeline, or it may damage the master cylinder and booster cylinder.**
- **When dismantling oil pipe, you can seal the place between pipe nut and joint with Loctit572 thread sealant.**
- **To replace brake fluid, completely drain residual fluids inside hydraulic system and use brake fluid with the designated brand no. and the same batch.**
- **Brake fluid is corrosive and it is necessary to prevent the brake fluid from spilling over person and vehicle paint surface.**

Common malfunctions and troubleshootings

Malfunction	Cause	Troubleshooting Method
Clutch slip	oil dirt on the friction plate	Clean the dirt on the clutch pressure plate, driven plate and flywheel
	The friction plate of driven disk is worn to the limit position	change driven plate
Clutch disengagement incomplete	Air in the clutch hydraulic system, causing shorter effective travel for disengagement.	Exhaust the air in the hydraulic system
Clutch tremble during start	uneven pressure plate surface or diaphragm	Replace the pressure plate assembly
Unable to disengage the clutch	unfitting assembly of the release bearing or release bearing breaks away due to damaged hub and torsion rubber	Reassemble the release bearing and replace the hub and torsion rubber.





Transmission

Operate the transmission properly, and implement regular servicing and maintenance, which is crucial for vehicle's reliable driving and the transmission's long life expectancy. Please comply with the following requirements for use:

Oil level check

- Vehicle must parked on level ground
- Oil level should be stale and be close to normal temperature, unscrew the oil check bolt ①.
- If oil level is below the required level, add 85W-90 (GL-5 grade) gear oil for middle load.
- Unscrew the bolt ②, add gear oil until it spills over from the check port①
- Tighten bolts ① and ②.

- **Add Lubricating oil**

To avoid chemical reaction between different types of lubricating oil, please ensure consistence of oil type when filling. Oil filling amount also varies from transmission to transmission.

For the information of lubricating oil replacement interval and oil quantity, please refer to Appendix I.

- **Operating temperature**

The maximum temperature must not exceed 120℃, and lowest temperatre -40℃ for continuous working, or it may cause lubricating oil degradation and shorten the transmission life span. Any one of the following conditions may contribute to over 120℃ of transmission operating temperature.

-Driving continuously <32km/h
-High engine speed
-High ambient temperature
-Exhaust system too close to the transmission
-Overrunning with great power.

- **Working Inclination Angle**

The working inclination angle for transmission must not exceed 15°, otherwise, it may not be fully lubricated (the working inclination angle is equal to transmission's installation angle on the chassis plus slope angle).

- **Dragging and Sliding**

When the transmission works, its countershaft rotates and drives the oil pump to run, plus splash lubrication, which can fully lubricate the transmission. When the vehicle is dragged with rear wheels touching the ground and transmission system connected, the main shaft rotates comparing to main shaft gear and the planetary mechanism also rotates, although the countershaft gear and main shaft gear for main transmission do not rotate. This will cause great damage to the transmission's planetary mechanism and localization elements of main shaft due to insufficient lubrication.

Pay attention to the following points to prevent this kind of phenomena:

- Do not nutrual slide the vehicle when the power is shut off.
- Do not step on the clutch pedal to let the vehicle slid on neutral position.
- When the vehicle needs to be dragged, draw the half axle out or disconnect the drive shaft, or have the driving wheel lifted up from the ground.

Lubricating oil No. and replacement interval

In order to prevent the chemical reactions between different types of lubricating oil, add the same type of lubricant as the original lubricating oil. The amount of oil added differs between different types of transmission.

Appendix I:

<table>
<tr><th>Assembly</th><th>Oil Name</th><th>Quality grade and viscosity grade</th><th>Recommended suppliers and product specification</th><th colspan="2">Oil Quantity</th><th>First replacement mileage or time</th><th>Interval Mileage or Time of Replacement</th><th>Remarks</th></tr>
<tr><td rowspan="8">HW gearbox</td><td rowspan="8">Gear oil</td><td>GL-4/
GL-5
85W-90</td><td rowspan="8">Mobil Delvac Synthetic Gear Oil
Castrol Syntrax Universal Plus
Shell Spirax S6 AXME</td><td>HW19709XST</td><td>12L/12.5L
(with PTO)
Note: separately adding 8L for input shaft PTO</td><td>2000-5000km</td><td>1 year or 100000km in highway environment; every 1000 hours for off-road environment; every 500 hours in bad environment.</td><td rowspan="8">Special after-sales gear oil designated by SINOTRUK must be used, otherwise transmission may break down, to which SINOTRUK only provides paid service.</td></tr>
<tr><td rowspan="7">GL-5
75W-90
/80W-90
/85W-90</td><td>With filter
HW19710T/
HW19712T</td><td>18L/18.5 L (with PTO)</td><td>2000-5000km
Only replace filter</td><td rowspan="7">The first maintenance cycle is required during 100,000km or 10 months for long-distance truck, whichever comes first. 80,000km or 10 months for municipal vehicle, civil engineering truck, transport dump truck and mixer truck, whichever comes first. 25,000km or 5 months for mine engineering truck, whichever comes first.</td></tr>
<tr><td>With filter
HW19710/
HW23710</td><td>12L/12.5L (with PTO)
Note: separately adding 8L for input shaft PTO</td><td rowspan="5">2000-5000km</td></tr>
<tr><td>With filter
HW19712</td><td>13L/13.5L(with PTO)
Note: separately adding 8L for input shaft PTO</td></tr>
<tr><td>HW13710L</td><td>13L/13.5L (with PTO)</td></tr>
<tr><td>HW21716STL</td><td>14L/14.5L (with PTO)</td></tr>
</table>

·Note:

- Regular inspection should be made to the oil level.The truck should be parked on flat road when you are checking the oil level.Considering the inflation of hot oil, do not immediately check the vehicle that is just parked, and only when the oil level is stabilized and the oil temperature comes close to the ambient temperature canwe check the oil level, to prevent the inaccurate measurement.
- Whenreplacing gearoil, firstly drain the oil in transmission completely, and clean the oil screen.
- Every 10000km should check the oil level in transmission, add oil if the oil is insufficient.

Warning!

— For HW transmissions, when shifting into low gear (Creeping gear) or reverse gear, it must be stopped first and then shift into relevant gear to prevent the parts inside the transmission from being damaged. When shifting into reverse gear (Creeping gear), choose relatively greater gear force to overcome the resistance of reverse gear (Creeping gear).

— Release the brake before the vehicle starts. For the vehicle is equipped with air cut-off brake, do not shift to relevant gear and start until their brake valves are connected and the air pressure reaches the level required to release the brake.

— On the event of any unusual phenomenon, such as abnormal sound or heavy operation during the use of transmission, the vehicle must be parked immediately to check for any failure.

— Privately disassembly/knock down or assemble the transmission is strictly prohibited within warranty period.

ZF transmission

ZF transmission should be maintained regularly.

Transmission oil change

Oil specification and replacement cycle see Appendix II

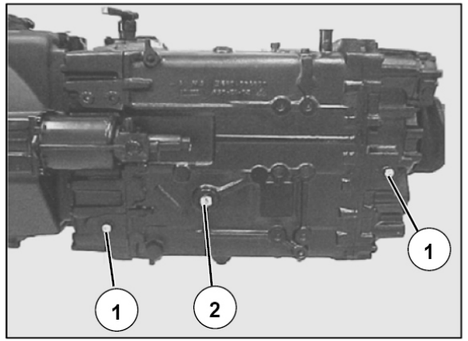
Oil amount

Accurate filling amount can be ensured as long as you fill it in line with the specification. Oil amount is indicated on the nameplate of the transmission (at one side of the transmission) and on the technical document.

Appendix II

Assembly	Oil	Quality and Viscosity Level	Recommended suppliers and product specification	Oil Quantity		First replacement mileage or time	Interval Mileage or Time of Replacement	Remarks
ZF transmission	MTF manual transmission fluid for heavy load vehicle	①The lowest environment temperature is -40℃: 75W-80/75W-85/75W-90; ②The lowest environment temperature is -20℃: 80W-85/80W-90; ③The lowest environment temperature is 0℃: 85W-90.	Castrol: ①Castrol syntrax universal 80W- 90; ②Castrol syntrax universal plus 75W-90; ③Castrol manual EP 80W; ④Castrol manual EP 80W-90; Shell: ①Shell spirax GX 80W; ②Shell spirax GX 80W-90; ③Shell spirax MX 80W-90; ④Shell spirax S3 AM 80W-90; ⑤Shell spirax S3 G 80W; ⑥Shell spirax S3 G 80W-90; ⑦Shell spirax MA 80W; ZF special oil: ZF-Ecofluid X SAE 80W-90	16S1950 16S1930 16S1850 16S1830 16S1670	14.5L	Carrying capacity less than 44 tons, long distance transportation vehicle:120,000 km or 12 months, whichever comes first. Carrying capacity more than 44 tons, long distance transportation vehicle: 80,000 km or 12 months, whichever comes first. Municipal vehicle, urban construction engineering truck, transport dumper, mobile mixer and temp. exceeds 40℃: 80,000 km or 12 months, whichever comes first. Mine special truck and other special vehicles: 1,000 hours, 20,0000 km or 12 months, whichever comes first.		Lubricants which satisfy TE-ML 02 (table) of ZF company are recommended to be ZF transmission after-service lubricant.
				9S1820	17L			

Note: Using PTO does not affect oil filling and oil level inspection. But there will be an increase of approximately 0.5L lubricant using according to the type of PTO mounted.



Oil drainage

• Unscrew oil drain plugs ① and ② from transmission and collect used oil in suitable container.

• Tighten the oil drain plugs ① to the indicated torque.

• Clean oil drainage plug and magnetic plug. Change seal ring and srcew up the plug with specified torque ① oil drainage plug（50 Nm） ②magnectic oil drainage plug（140Nm）

Caution:

Do not pour the lubricating oil and cleaning fluid over the soil, pool and sewage system. Treat the left oil in line with regulations provided by the environtment protection agency.

Warning!

Drive the vehicle for long distance before you dain the oil because oil temperature can rise to a proper level for drainage.

Danger!

Do not touch hot transmission and its fluid to avoid scald.

Oil filling

•Pour in the oil through the oil filler hole (see the arrow) until it spills over.

• Oil level check

Danger!

Insufficent oil may damage transmission and cause accident.

Check the transmission oil level at regular intervals:

•Check oil level with vehicle standing on level ground

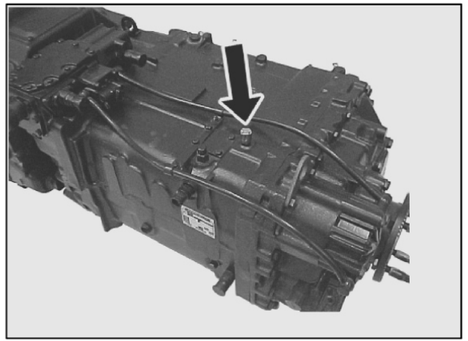
•Don't check oil level immediately after long distance runing (or incorrect results will be obtained).Only check the oil level after the oil in transmission has cooled down (＜40℃);

•Unscrew oil filler plug

•If the oil level has fallen below the edge of the oil filler hole, fill oil immediately.

Note!

Check the transmission for leakage as you check the oil level.



Transmission breather

The transmission oil heats up during travel, leading to an increase of air pressure inside. Therefore transmission breather can balance it by ventilation. Do not cover with a cap. Check it to ensure normal operation and keep it clean.

Installation and adjustment of flexible shaft operation system

(1) Flexible shaft set up on the entire vehicle shall have a bending radius of no less than 300mm and its application temperature range is -40℃-+100℃.

(2) Connection between flexible shaft and shift and selector rocker shall meet following requirements:

a. Flexible shaft shall form a 90° angle with rockers to the extent possible;

b. Guide sleeve of flexible shaft, protective tube joint and push-pull rod must be on the same line.

(3) Shift and selector flexible shafts shall be installed on the controller respectively.

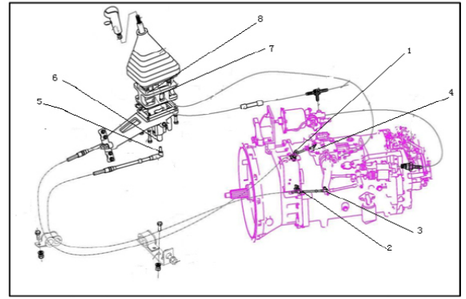
Note: Ball joint threads of two flexible shafts shall be tightened fully.

(4) After installation, set control lever to neutral gear and measure whether dimension of flexible shaft at transmission side complies with requirements. If failed, adjust connection length between flexible shaft ball joint and pull rod thread to adjust its dimension of flexible shaft.

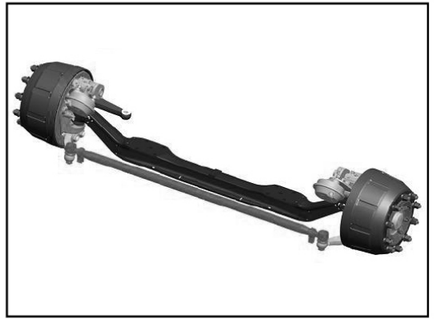
(5) Shift and select gear after installation to confirm all gears can be engaged. In case of difficult shifting and selecting at a side, inspect and adjust installation dimension of selector flexible shaft at the transmission side.

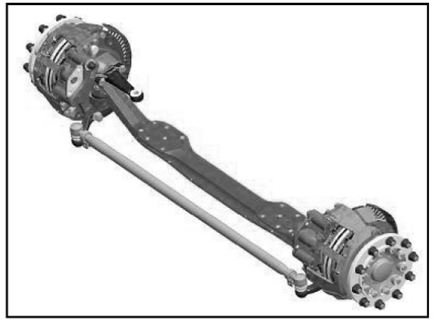
(6) Refer to the figure for specific adjustment of flexible shaft:

a. In case front gear cannot be fully engaged during running-in after assembly, loose ① nut (or ⑤ nut) and turn ④ spherical hinge (or ⑥ spherical hinge) properly in counterclockwise direction (lengthening). On the contrary, if rear gear cannot be fully engaged, loose ① nut (or ⑤ nut) and turn ④ spherical hinge (or ⑥ spherical hinge) properly in clockwise direction (shortening). Repeat above steps to adjust until all gears can be fully engaged.



b. If case gear in low gear zone cannot be fully engaged during running-in after assembly, loose ② nut (or ⑦ nut) and turn ③ spherical hinge (or ⑧ spherical hinge) properly in counterclockwise direction (lengthening). On the contrary, if gear in high gear zone cannot be fully engaged, loose ② nut (or ⑦ nut) and turn ③ spherical hinge (or ⑧ spherical hinge) properly in clockwise direction (shortening). Repeat above steps to adjust until all gears can be fully engaged.





Front axle

- **Structural Overview**

The **HF7/9 drum-type front axle** comprise of the forged I-beam and V-shape knuckle plus the drum brake and diaphragm brake air chamber with the optional automatic clearance adjustment arm and anti-lock braking system (ABS).

The front wheel toe-in: the bias-ply tire 12′ ±4′ , radial tire 0′ ±4′

Kingpin inclination angle: 3°

Braking clearance is 0.5-0.9mm

The **HF7/9 disc-type front axle** comprise of the forged I-beam and V-shape knuckle plus the disc brake and diaphragm brake air chamber with the optional anti-lock braking system (ABS).

The front wheel toe-in: the bias ply tire 12′ ±4′ , radial tire 0′ ±4′

Kingpin inclination angle: 6°

Braking clearance is 1.0-1.4mm

The **VGD060QB drum-type front axle** comprise of the forged I-beam , V-shape knuckle , maintenance-free wheel hub bearing units, the drum brake and diaphragm brake air chamber with the optional automatic clearance adjustment arm and anti-lock braking system (ABS).

The front wheel toe-in: the bias ply tire 2-4mm, radial tire-1-1mm

Kingpin inclination angle: 6°

Braking clearance is 0.5-0.9mm

The **VPD060QB disc-type front axle** comprise of the forged I-beam, V-shape knuckle , maintenance-free wheel hub bearing units, the disc brake and diaphragm brake air chamber with the optional anti-lock braking system (ABS).

The front wheel toe-in: the bias ply tire 2-4mm, radial tire-1-1mm

Kingpin inclination angle: 6°

Braking clearance is 1.0-1.4mm (for QP20 disc brake)

0.7-1.2mm for (for QP19 disc brake)

Grease amount

HF7/9 front axle

Amount of grease must be proper. Too much or little grease can damage relevant parts (brake pad surface, brake drum surface, rubbers).

Grease amount for each hub: 0.62kg (in total) for inner chamber and two hub bearings.

Grease amount for each brake camshaft and kingpin: 0.38kg

Brake clearance adjusting arm must be filled with grease.

HF7/9 front axle

Amount of grease must be proper. Too much or little grease can damage relevant parts (brake pad surface, brake disc surface, rubbers). Grease the tie rod ball socket before you install the brake chamber.

Grease amount for each hub: 0.62kg (in total) for inner chamber and two hubbearings.

Grease amount for each kingpin: 0.06kg.

VGD060QB front axle

Amount of grease must be proper. Too much or little grease can damage relevant parts (brake pad surface, brake drum surface, rubbers).

Grease amount for each kingpin: fill 0.05kg respectively to the upper and lower grease nipple.

Brake clearance adjusting arm must be filled with grease.

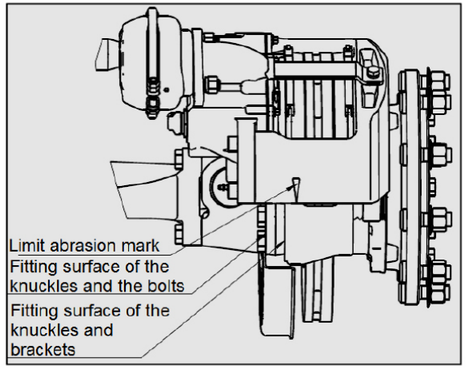
VGD060QB front axle

Amount of grease must be proper. Too much or little grease can damage relevant parts (brake pad surface, brake disc surface, rubbers). Grease the tie rod ball socket before you install the brake chamber.

Grease amount for each kingpin: fill 0.05kg respectively to the upper and lower grease nipple.

- **Maintenance**

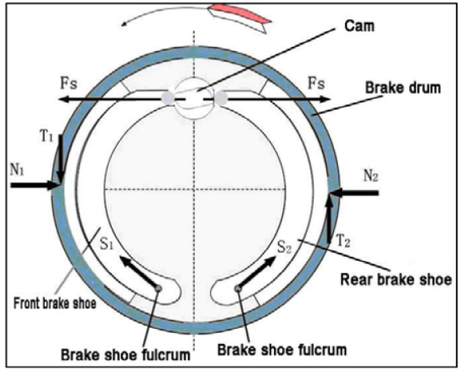
- Before starting drivng the vehicle, fill plenty of 2# lithium base grease to each grease nipple.
- Press brake pedal of a new vehicle 20-30 times to adjust the braking clearance to normal working clearance. Avoid placing a hard brake of pressing the brake pedal for a long time during the first 50km.
- After a 1500 km of running-in period for a new vehicle, we recommend adjustment of braking clearance for axle. Check fasteners (except gummed bolts) in each part before putting the vehicle into use.
- Fill 2# lithium base grease to each grease nipple every 2000 km.
- Check wheel nut and tightening nut of tie rod ball every time before driving.
- Inspect the fastening of the brake bottom plate every 8000 km to 10000 km. Check the looseness of wheel hub bearing. Check the wear condition of braking friction plate. If the wear is over the limit, you must immediately replace the friction plate.
- Take down the tyres every 6 months to check the sliding pin cap, sliding pin protective jacket, piston protective jacket and other rubbers for damage.caliper body must move mormally on the sliding pin(resistance is no more than 100N, Sliding distance less than 26mm); check correct clearance of the brake (the braking clearance of QP20, QP22 disc brake is 1.0-1.4mm, the braking clearance of QP19 is 0.7-1.2mm).
- The type grease for hub bearing of front axle (except for bearing unit) is HP-R lithium grease. Replacement cycle: carrier vehicle for long distance: 10,000km or 12 months, whichever comes first; tipper: 80,000km or 10 months, whichever comes first; mine vehicle: 40,000km or 6 months, whichever comes first;



- Check the limit abrasion of brake block assembly without dismantling tyres every 3 months or 20,000km, whichever comes first. There is a limit abrasion mark (trangle mark) of the brake block on the disc brake, which is shown in the figure. When this mark and the fitting surface of the steering knuckle and bracket are lined up (for QP19 disc brake, this mark and the fitting surface of the steering knuckle and the bolts are lined up), wheels must be dismantled for further check of the abrasion of brake assembly. When the thickness of brake block assembly is smaller than 12mm, be sure to replace brake disc. If thickness of the brake disc is smaller than 37mm, be sure to replace brake disc.
- The alarm device of brake block assembly mechanical abrasion will send sound alarm signal when the brake block assembly reaches abrasion limit. In this case, the driver should immediately check the abrasion of brake block assembly. If it reaches the abrasion limit, it should be replaced immediately.
- When replacing disc-type brake, brake block assembly, or brake disc, our suggestion is to use products of the same manufacture for both left and right side of the axle. Then press brake pedal of a new vehicle 20-30 times to adjust the braking clearance to normal working clearance. Avoid placing a hard brake of pressing the brake pedal for a long time during the first 50km.

Analysis of common troubles of disc-type front axle

Troubles	Causes	Measures
Off-track of braking	Whether friction plates are worn on one side	Replace friction lining
	Clearance between friction plate and brake disc is abnormal	Adjust initial clearance and check automatic adjusting function
	Friction plates cannot slide freely on bracket	Clean friction plates, sliding pin and bracket.
	Air pressure of air chambers of both side of axle is not consistent (measure air pressure of two sides with air	Examine and repair brake chamber and valve
Braking force insufficient	Whether friction plates are worn on one side	Replace friction lining
	Clearance between friction plate and brake disc is abnormal	Adjust initial clearance and check automatic adjusting function
	Brake disc cannot work properly	Replace brake disc
	Air pressure of brake chamber is abnormal (measure air pressure of air chamber with air pressure gauge)	Check whether air way and valves leak air or cannot work properly etc.
Brake cannot be released completely	Clearance between friction plate and brake disc is abnormal	Adjust initial clearance and check automatic
	Friction plates cannot slide freely on bracket	Clean friction plates, sliding pin and bracket.
	There is compressed air stored in brake chamber when brake is released	Repair brake chamber and valve
	Whether sliding function of brake caliper is normal	Replace with new sliding pin and new shaft sleeve



Drum-type brake front axle

Drum-type brakes used by Sinotruk are cam leading trailing shoe brakes. Brake drum on drum-type brake as rotating component shown in the figure is mounted on flange of wheel hub. As fixing component, brake shoe can rotate around fixed support (brake shoe rest pin fixed on backing plate).

Key points of use and maintenance of drum-type front axle system

1. Start moving and park vehicle stably, avoid emergency stop and turn steering wheel to limit position and try to keep vehicle slide to stop and keep wheels straight. Use emergency brake as few as possible when traveling and travel at low speed on uneven road so as to prevent front axle suffering impact load and avoid earlier damage of front suspension components.

2. Keep normal tire pressure; front wheel: (235±19.6) kPa; rear wheel (314±19.6) kPa. Bouncing frequency of wheels will increase if tire pressure is too high; rolling resistance and yawing force of wheels will increase if tire pressure is too low.

3. Implement daily maintenance and periodical maintenance properly; check connecting ball joints like steering tie rod arm and tie rod etc. frequently. Replace immediately if finding wear or looseness. Check quality of new spare parts before replacing. Service life will become shorter and it will result in earlier damage of other components if spare parts of poor quality are assembled.

4. Tires must be dismantled with tire changer; do not dismantle tires manually so as to prevent hub getting deformed. Implement dynamic balance test periodically for tires so as to prevent asymmetry of rotating mass causing radial run-out and horizontal swinging.

5. Be sure to replace swing arm ball joint dust cover when installing lower swing arm and fill up dust cover with lubricating grease. Do not apply any lubricating oil or lubricating grease on taper positions of ball joint.

6. Check whether shock absorber works normally or is installed firmly, whether spiral springs are damaged and whether elastic force of left and right springs is consistent before adjusting toe-in.

7. Replace lubricating grease in hub.

8. Lubricate steering knuckle king pin and brake arm brake camshaft

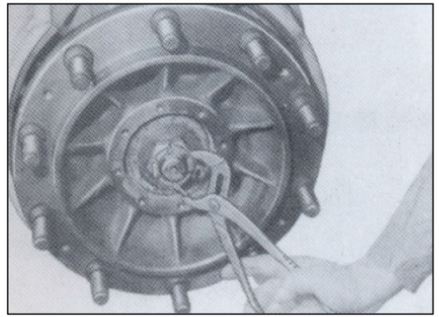
Repair of common troubles of drum-type front axle

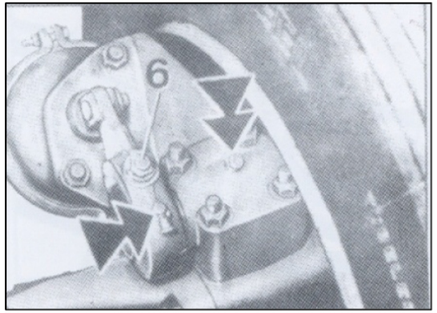
1 Hard steering

(1) King pin and thrust roller bearing are not lubricated properly and get rusting;

(2) Adjusting shims of steering knuckle are too tight;

(3) Tire pressure is insufficient.





2 Abnormal wear of front wheel tires

(1) Toe-in is not adjusted properly;

(2) Front beam, steering knuckle and steel rim are deformed.

3 Swinging of front wheels

(1) Front wheel hub bearing becomes loose or brake drum is out-of-roundness;

(2) Wheel assembly is unbalanced; brake drum, hub and steel rim are not assembled concentrically;

(3) Clearance between front axle king pin and bushing is too large, tie rod ball joint pin becomes loose or thrust roller bearing is damaged;

(4) Front axle and frame are deformed;

(5) Plate spring fixing becomes loose or is on improper position; deflection or quantity of front plate springs are not consistent.

4 Abnormal noise or over-temperature of front wheel assembly

(1) Front axle bearing, thrust bearing and steering knuckle bushing etc. are damaged or pre-tightening force of hub bearing is too large;

(2) Hub bearing is not lubricated with sufficient oil;

5 Off tracking

(1) Steering tie/ straight pull rod is bent or deformed;

(2) Difference between pressure values of left front/right front tires is large so that front wheel is off-tracking;

(3) Front axle or frame is deformed so that wheel base of two sides is not equal;

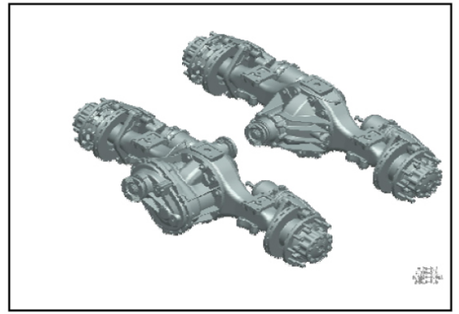
(4) Difference between elastic force values of left/right front plate springs is large.

Driving axle

MCY13(Q) driving axle

- **Structural overview**

Structure of MCY13(Q) consists of central single-stage main reducer, press-welding axle housing and finish forged differential mechanism gear. Oil filter is installed to clean lubricating oil; adjustment-free hub bearing unit is configured; brake can be drum-type or disc-type brake; dual diaphragm brake chamber; ABS as option. It features such merits as simple yet reliable structure, long service life, low noise, light weight, high efficiency, easy operation and repair, etc.



- **Maintenance of axles**

Refer to the following table for recommended gear oil replacement cycle under different working conditions:

Assembly	Oil Name	Quality grade and viscosity grade	Recommended suppliers and product specifications	Oil Quantity		First replacement mileage or time	Interval Mileage or Time of Replacement	Remarks
MCY axle	Gear oil	GL-5 80W-90	Mobil Mobilube HD 80W-90 Castrol Castrol Syntrax Universal 80W-90 Shell Spirax S2 A 80W-90	MCY13	18L (Intermediate axle) 14.5L (rear axle)	The first maintenance cycle is required during 100,000km or 10 months for long-distance truck, whichever comes first. 80,000km or 10 months for municipal vehicle, civil engineering truck, transport dump truck and mixer truck, whichever comes first. 25,000km or 5 months for mine engineering truck, whichever comes first.		Special after-sales gear oil designated by SINOTRUK must be used, otherwise drive axle may break down, to which SINOTRUK only provides paid service.
		GL-5 85W-90	Mobil Mobilube HD-A 85W-90 Castrol/ Shell					

A new axle requires 1,500km running-in followed by reinspection of fasteners (except bolts applied with sealant) before official operation.

Oil level shall be inspected every 5,000km running or every month.

Lubricating grease of brake regulating arm and camshaft shall be replaced every 150,000km running or every year.

Regularly inspect quality of gear oil inside axle housing and replace with new oil in case it deteriorates or thins.

Always remove dirt and dust on vent plug of rear axle housing.

Always inspect oil filler hole plug and oil drain hole plug and tighten or replace the plug in case of oil penetration and leakage.

As semi-axle flange outputs huge torque with shock impact, tightness of semi-axle bolts shall be constantly inspected for fear of looseness and consequent rupture.

For every 2,000km running, fill every grease nozzle with 2# lithium-based lubricating grease; clean vent plug; and inspect gear oil level inside axle housing (inspect by removing oil filler plug on the main decelerator housing).

Brake clearance shall be inspected every 5,000km running.

For every 8,000km-10,000km running, inspect tightness of brake bottom plate; looseness of hub bearing; and wear of brake friction lining, and replace friction lining if its wear exceeds the limit pit.

Brake clearance adjustment

Item	Parameter
Clearance between brake shoes and brake drum（mm）	0.4-0.7

Warning!

Drive axle must use special drive axle gear oil of Sinotruk; otherwise, it may cause drive axle damage, and Sinotruk only provides paid service!

- **Inspection and maintenance**

Inspection and maintenance items	Inspection and maintenance cycle (Based on mileage or time, whichever comes first)			
	Initial inspection		Regular inspection and maintenance	
Regular inspection items	After 1,500km After 1st month	Every 15000km Every 3 months	Every 60000km Every 6 months	Every 120000km Every 1 year
Inspect for wear, sealing and damage of moving parts, inspect for wear of brake friction lining, inspect for quick return of camshaft, function inspect of regulating arm, and inspect for function and airtightness of brake chamber	○	○	○	○
Safety inspection (everyday)				
Inspect and adjust brake correctness	○	○	○	○
Inspect brake functioning	○	○	○	○
Retighten bolts with specified torque	○			○
Clean brake				○
Apply antilock agent to brake shoe backing pin and roller				○
Inspect operation of hub bearing and adjust or replace it if necessary	○			○

Note: Maintenance cycle of a vehicle running under harsh conditions shall be properly shortened; tighten wheel nuts with specified tightening torque after 50km running following installation or replacement of any wheel and tighten wheel nuts again with specified tightening torque after 150km running.

AC16 drive axle

- **Structure overview**

AC16 rear drive axles are duel-stage drive axles with both central one-stage reducer and wheel-side planetary reducer. Currently there are two types, e.g. dual drive axles and single rear drive axle. Housing is either forged or stamped, with inter-axle and inter-wheel differential and differential lock.

- **Axle maintenance**

Recommended gear oil replace interval in different working conditions:

Assembly	Oil	Quality and Viscosity Level	Recommended suppliers and product specification	Oil Quantity	First replacement mileage or time	Interval Mileage or time of Replacement	Remarks
AC16	Gear oil	GL-5 80W-90	Mobil Mobilube HD 80W-90 Castrol Castrol Syntrax Universal 80W-90 Shell Spirax S2 A 80W-90	21L (intermediate axle) 17.5L (rear axle)	2000-5000km	Long-distance vehicle: 100,000 km or 10 months, whichever comes first. Municipal vehicle, urban construction engineering truck, transport dumper, mobile mixer: 80,000 km or 10 months, whichever comes first. Mine special truck: 25,000 km or 5 months, whichever comes first	Only the special gear oil specified by Sinotruk can be used, otherwise it will result in damage of drive axle, for which Sinotruk only provides the paid service.
		GL-5 85W-90	Mobil Mobilube HD-A 85W-90 Castrol/ Shell				

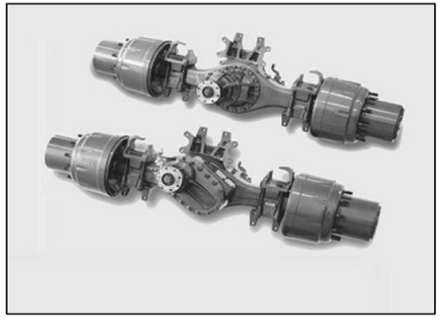
- Keep lubricating oil volume and always inspect oil volume of hub decelerator and main decelerator during operation. Fill it if insufficient. Replacement period for rear driving axle gear oil is 10000km. It is necessary to replace gear oil during mandatory service of first 2000-4000km.
- Inspect operation of differential lock regularly. If it functions in a wrong way, check the cause and recover its functions in time.
- Use inter-axle differential and Inter-wheel differential lock correctly.
- Fill enough oil for intermediate axle and rear axle when replacing oil. Inspect the oil level (especially for the pass axle box of intermediate axle and inter-axle differential) when the vehicle runs for 5km after oil-filling. If the oil level is low, fill it again.
- Check the temperature of the drive axle and hub reduction gear (no more than the environment temperature 70 ℃) when the vehicle is on the road, on the way to and connection between the components (wheel drive shaft and the flange bolts, bolts, final driver and axle case connecting bolt). Tighten them again every 2000 km.
- Regular clean the air vent hole to ensure the vent ventilation is in a good state. Check the wheel hub, final drive, adding/draining oil plug of the axle case regularly, Tighten when it is necessary. To prevent damage to the oil plug threads, pay attention not to repeatedly disassembling and assembling
- Injecting grease to the clearance adjusting arm every 2000 km.

Brake clearance adjustment

Item	Parameter
Clearance between brake shoes and brake drum（mm）	0.4-0.7

Lubricating oil (grease) and the filling quantity

Lubrication part	Lubricating oil (grease)	Quantity
Brake clearance adjusting arm	Automobile general lithium base grease	Fill oil until it overflows out of the vent hole



STR driving axle

- **Structural overview**

STR rear drive axles are duel-stage drive axles with both central one-stage reducer and wheel-side planetary reducer. There are two types of driving axles, dual drive axles and single rear driving axle, for different drive modes. Housing is either forged or stamped, with inter-axle and inter-wheel differential and differential lock..According to different housings, there are two types of rated axle load, 13T or 16T.

- **Maintenance of axle**

Refer to the following table for recommended gear oil replacement cycle under different working conditions:

Assembly	Oil Name	Quality grade and viscosity grade	Recommended suppliers and product specifications	Oil Quantity		First replacement mileage or time	Interval Mileage or Time of Replacement	Remarks
STR axle	Gear oil	GL-5 80W-90	Mobil Mobilube HD 80W-90 Castrol Syntrax Universal 80W-90 Shell Spirax S2 A 80W-90	STR13	21L(Intermediate axle) 18.5L (Rear axle)	2000-5000km	The first maintenance cycle is required during 100,000km or 10 months for long-distance truck, whichever comes first. 80,000km or 10 months for municipal vehicle, civil engineering truck, transport dump truck and mixer truck, whichever comes first. 25,000km or 5 months for mine engineering truck, whichever comes first.	Special after-sales gear oil designated by SINOTRUK must be used, otherwise drive axle may break down, to which SINOTRUK only provides paid service.
		GL-5 85W-90	Mobil Mobilube HD-A 85W-90 Castrol/ Shell	ST16 / HC16	23L(Intermediate axle) 20.5L (Rear axle)			

Keep proper lubricating oil volume, and check oil volume of hub reducer and final drive frequently during use.

Lack of oil will lead to early wear of moving parts or even sintering. Then it is not good if there is too much lubricating oil because it will cause too high temperature of lubricating oil and even oil leak.

To replace lubricating oil of hub decelerator during initial maintenance of a new vehicle, turn the wheel to the most bottom of oil drain plug, while keep oil filler plug on the top of the other half, open oil drain plug, drain used oil, reinstall oil drain plug, open oil filler plug, fill lubricating oil to its level and then reinstall oil filler plug. Rotate wheels for several turns, place oil drain plug on highest position, and oil fill plug on position with less edge, open oil fill plug to let surplus lubricating oil flow until oil level is kept on oil fill plug position, and then install oil fill plug properly.

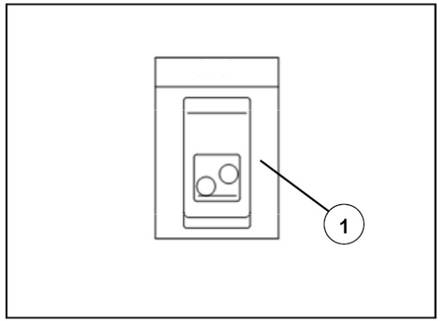
There are two plugs on rear axle housing: an oil drain plug at the bottom of reducer and an oil filler plug at the half height of reducer. Normally, oil shall be kept at the height of oil filler plug.

Hydraulic lifting axle

Overview

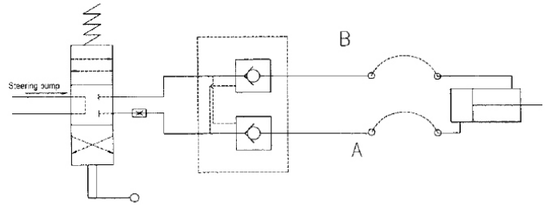
Rear-mounted 6×2 floating axle provides pressure oil with steering oil pump and controls work of brake oil cylinder with hydraulic control valve so as to realize ascending and descending of rear axle.

Warning:
- Lifting device of driven axle can be operated only when vehicle is still and no-load.
- Driven axle must ascend to position of limit block when ascending.
-Rolling circle must rise up to highest position when driven axle reduces.
- Lock operating handle of lifting axle after finishing operation.



Lifting axle working principle and operation

Operating medium of lifting axle is high pressure oil provided by steering pump. Work of hydraulic cylinder is controlled by hydraulic valve. Working principle of hydraulic system is as shown in the figure below.



Lifting operation:

When vehicle stops and engine is idling, open protection unit of hydraulic control valve and lift up handle to lifting position so that hydraulic oil will enter lower chamber of working cylinder through high-pressure oil pipe, piston rod will be pushed out and push arm 4 on working cylinder will be driven to rotate on rotation shaft 2. Rolling circle 5 on push arm will press top end of balance arm 11 after reaching stroke. If working cylinder still stretches out, load of driven axle will reduce, leaf spring of rear suspension will get deformed; after load reduces to 0, deformation of plate spring will stop, hydraulic cylinder 8 will continue stretching out, balance arm 11 will turn over balance shaft so that driven axle will rise up. After deformation of plate spring stops, vehicle frame will start rising up; when lifting axle reaches limit position, handle will return to neutral position automatically after being released. Hydraulic working cylinder will be locked up by hydraulic pressure, lifting axle will rise up and operating handle will be locked.

Dropping operations:

When vehicle stops and engine is idling, open protection unit of hydraulic control valve and press handle to dropping position so that high pressure oil will enter upper chamber of working cylinder through high-pressure oil pipe, piston rod will withdraw and drive push arm 4 to rotate around rotation shaft 2, and axle will drop due to gravity. After axle drops to the ground, piston cylinder will continue withdrawing to limit position and drive push arm 4 and rolling circle 5 to highest position about 60mm to balance arm 11. Handle will return to neutral position automatically after it is released. Hydraulic cylinder will be self-locked. Rear axle will drop to the ground. Lock handle.

1. Rotation shaft bracket assembly
2. Rotation shaft
3. Push arm of hydraulic cylinder
4. Push arm
5. Rolling circle
6. High pressure oil pipe
7. Supporting arm
8. Hydraulic cylinder
9. Reinforcer of frame
10. Hydraulic cylinder bracket assembly
11. Balance rocker arm

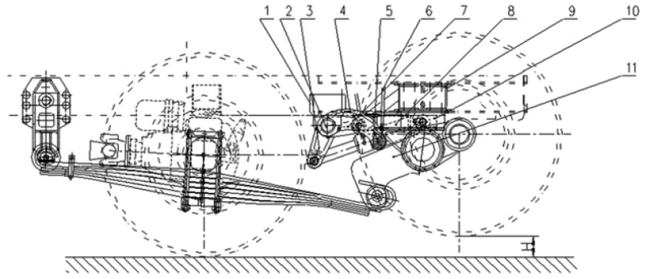


Figure a: After rear axle rises up

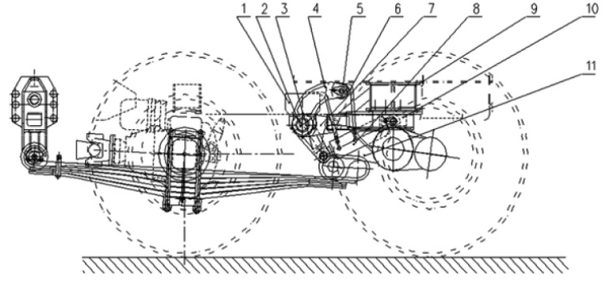


Figure b: After rear axle drops

Operating requirements:

It is necessary to ensure cleanliness of hydraulic oil first for hydraulic system. Generally, circulated and washed oil of hydraulic system cannot be used further and it is necessary to replace with new hydraulic oil; new oil can be injected into system after being filtered. Filter oil one time every 2 months, and clean oil tank during initial normal working period; replace hydraulic oil one time every half a year to a year (model: ATF III).

This hydraulic system is configured with oil suction filter which shall be washed or replaced every 6 months.

Normal working oil temperature of hydraulic system is -30℃-50℃; when temperature exceeds 55℃, it is necessary to stop the machine immediately and check causes for oil temperature rise.

Check oil tank oil level periodically, ensure oil level between marks on oil filler cap, and check viscosity of oil when temperature is -20℃.

Do not spray water directly toward pipe ports of shield and cable outlet otherwise wire may be burnt out due to short circuit.

Please turn off power supply immediately if there is abnormal noise or smoke is emitted, and operate after finding out causes and handling.

Do not open air cleaner or oil window without permission when hydraulic system work. It is necessary to wash hydraulic components cleanly before re-installing when replacing hydraulic components.

Notices of overhaul

It is necessary to stop system; do not examine and repair system before pressure is released or control power supply is cut off so as to prevent accident.

Keep overhaul site clean; clean dirt on the surface before dismantling components or loosening pipes; seal up exposed port with clean covers in the process of overhauling so as to prevent pollutant entering system.

Do not polish, construct or weld on overhaul site.

Do not use sharp tool to replace seals; do not collide seals or working surfaces.

Parts must be washed cleanly when components are assembled.

Common troubles and troubleshootings

High noise

Troubles	Causes	Troubleshooting
Oil pump sucks air	Oil suction filter is blocked or is too small	Clean or replace oil filter
	Inner diameter of suction pipe is too small or suction pipe is bending too much	Replace with new pipe or install pipe with larger inner diameter
	(Section of) suction pipe shrink on local position. For example: Valve is closed or blocked partially, check valve spring is too strong, oil pipe is damaged or hose is damaged.	Open, repair or replace oil valve; repair or replace oil pipe and hose
	Oil is too cold	Heat oil to proper temperature
	Viscosity of oil is too high	Use hydraulic oil of recommended viscosity
	Oil produces steam	Reduce working temperature to proper temperature (specified temperature); supplement oil or replace proper oil
	Oil level in oil tank is too low	Fill oil to proper position
Oil produces foam	Oil level is higher than specified level after oil returns to (oil tank)	Drain return oil until oil level is lower than specified level
	Wrong oil	Replace with proper oil
	Seal of oil pump shaft leaks air	Replace seal ring
	Suction hose or connector leaks air	Replace with new hose, fasten connector or replace with new connector
	Air in system is not exhausted completely	Exhaust air in entire equipment
Mechanical vibration	Transmission center line is not aligned or coupling becomes loose	Align center lie or tighten screws
	Pipes vibrate	Fasten or add pipe clamp
Oil pump	Worn or damaged	Repair or replace with new oil pump
	Model is improper	Replace with proper model

Troubles	Causes	Troubleshooting
Motor	Worn or damaged	Repair or replace with new motor
	Model is improper	Replace with proper model
Overflow valve or relief valve	Instable	Replace with proper valve

Oil cylinder cannot move (pressure is insufficient or there is no pressure at all)

Troubles	Causes	Troubleshooting
Oil pump is over-temperature	Oil pump is worn or damaged	Repair or replace
	Oil viscosity is too low	Use hydraulic oil of recommended viscosity
	Cooling is insufficient or interrupted	Improve or adjust cooling system so as to make cooling water unobstructed
Problems of overflow valve	Pressure adjusting screw becomes loose	Adjust properly
	Overflow valve cannot be closed, there is dirt or parts are damaged	Wash and determine damaged parts; repair or replace
Problems of change valve	Electrical magnet cannot work	Check circuit
	Change valve gets stuck due to pollution	Wash or replace
Problems of oil cylinder	Inner wall, piston rod or piston seal of oil cylinder is damaged	Repair or replace the damaged components
Stop immediately after moving one time	Problems of pressure switch setting or program	Increase set value of pressure switch or replace it

Suspension

Rubber suspension

Warning!

If there are cracks, fractures and serious corrosion on the hanging bracket of the vehicle frame, do not drive the vehicle, because it may lead to separation of components loss of vehicle control and personal injuries and property losses.

Check the rubber spring edges for fractures or signs of rives at least once a year.

Do not remove any fastners and rubber parts.

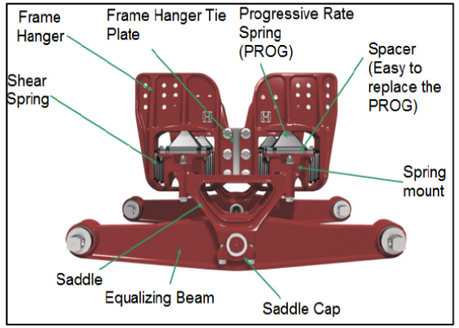
Do not grease any part of the rubber suspension system with grease or oil in particular the grease on rubbers.

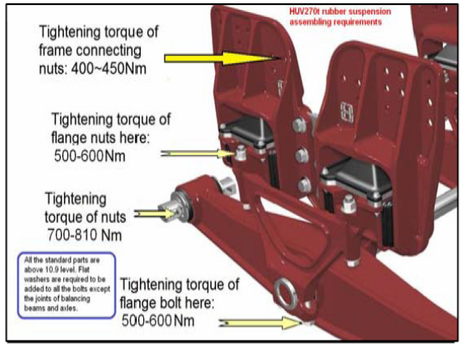
NOTE：SINOTRUK recommends the use of Class 10.9 bolts, hardened washers, and Class 10 locknuts. Hardened washers are not necessary when flange head fasteners are used.

NOTE: Do not screw the nut to install the cotter, or it may affect the tightening torque.

Warning!

Insuffient tightening torque will lead to damage and premature wear to legs, holes of the axle bracket and to connecting parts of the equalizing beam.





Advantages of rubber suspension:

a. Simple structure:

The simple structure facilitates installation, reduces assembly time, improves working efficiency, cuts cost, and increases benefit.

b. Light dead weight:

c. Lubrication free:

With such features as maintenance and lubrication free, the rubber suspension will also bring customers better economic benefits while saving their costs and time.

d. Good trafficability:

The rubber suspension has good trafficability so that tire wear is reduced while tire service life is extended and maintenance cost is cut while maintenance expense is saved effectively to bring customers good economic benefits.

e. Excellent comfort:

With the variable rigidity feature, the rubber suspension can provide your vehicle with excellent comfort, reduce the vibration caused by rugged road surfaces to the maximum extent, mitigate driver's fatigue, protect integrity of vehicle components and goods, and extend lives of on-vehicle components, whether the vehicle is in noload or full load condition.

f. Damage of elastic components will not affect travel of the vehicle:

When a conventional leaf spring structure is used, once the leaf spring is damaged, the vehicle will be unable to run and you can not but replace the leaf spring with a new one. For a vehicle equipped with rubber suspension, if any of its elastic components is damaged when the vehicle is running, its travel will not be affected, so you can replace the component after you have sent the goods to your destination thus avoiding the customer's direct or indirect loss.

g. Tire wear can be reduced greatly:

When the vehicle is running, tire bounce will cause wear. Because the rubber suspension improves running smoothness greatly, tire wear can be reduced significantly.

Maintenance of rubber suspension

Correct inspection flow is extremely important to ensure correct maintenance and operation of suspensions system or suspension parts. Strict inspection of HUV 270t rear suspension system during 2,000km service maintenance and vehicle regular maintenance before vehicle start is recommended by Hendrickson. Non-road vehicles shall be overhauled more frequently compared with road vehicles. Overhaul items must incorporate following items and reference items of other parts indicated in the chapter.

Inspection interval

2,000km overhaul

(1) Visually inspect suspension parts

a. Whether suspension functions properly

b. Whether there is abnormal application and lost or missing part

c. Whether there is severe scratch with other parts or wear

Whether any part is damaged or ruptured

(2) Inspect whether all fasteners are tight and pay special attention to following connections:

a. Fastener of hanger assembly connecting piece

b. Connecting part at balanced beam end, with reference to standards of the truck manufacturer

c. Connecting part of suspension triangle supporting seat and spring bearing

d. Connecting part of suspension bottom cap

e. Hanger assembly and frame connection fastener

Preventive maintenance:

Every three months inspect progressive rate springs and shear springs.

Every six months inspect V-Torque rods, equalizing beam end connections.

Every twelve months:

1. Visually inspect suspension for proper assembly.

2. Visually inspect suspension components.

a. Proper suspension function

b. Signs of unusual movement, loose or missing components

c. Signs of abrasive or adverse contact with other components

d. Damaged bent or cracked parts

Troubleshooting instruction

Conditions	Possible Reason	Solution
Jolt of suspension	Damage of variable-rigidity spring	Replace variable-rigidity springs in pair
	Damage of shear spring	Replace hanger assembly
	Replace hanger assembly	Redistribute cargo or reduce vehicle load
Inclination of vehicle	Damage of variable-rigidity spring	Replace variable-rigidity springs in pair
	Damage of shear spring	Replace hanger assembly
	Cargo	Redistribute vehicle cargo
Abnormal wear of tires	Out-of-parallelism of double rear axles	Guarantee parallelism of double rear axles and contact truck manufacturer
	Bending of horizontal pipe	Replace horizontal pipe
	Damage of suspension parts	Replaced damaged part
Loose suspension fasteners	Suspension overload	Redistribute cargo or reduce vehicle load
		Replace and tighten all fasteners according to torque specification
	Constant high-speed start and braking of vehicle	Shorten inspection interval of vehicle fasteners
		Change driving habit and reduce high-speed start and braking of the vehicle
		Replace and tighten all fasteners according to torque specification
Cracking of hanger assembly	Suspension overload	Replace hanger assembly
		Redistribute cargo or reduce vehicle load
	Loose fasteners	Replace hanger assembly
		Replace hanger assembly
		Replace and tighten all fasteners according to torque specification
	Damage of hanger assembly	Replace hanger assembly
Friction between suspension triangle supporting leg and balanced beam	Wear, bending, crack or damage of suspension parts	Replaced damaged part
	Bending or loss of horizontal pipe	Replace horizontal pipe
	Looseness or wear of bottom cap	Replace bottom cap and/or triangle supporting seat
	Triangle supporting seat is not right above the balanced beam	Adjust triangle supporting seat to be right above the balanced beam

Single swing arm air suspension

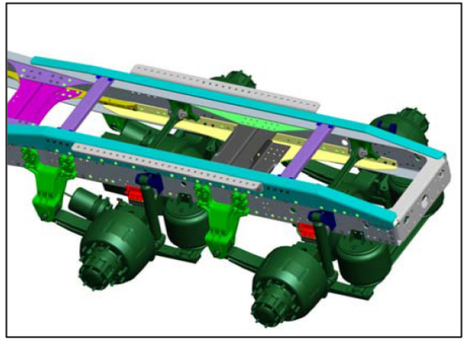
Overload is prohibited!

The vehicle should be running on the express way and first-class high way with the maximum load of one axle of 13 tons.

No lubricating and greasing on any part of the air suspention, in particular on its rubber parts.

Ensure normal air supply pressure which is about 8.5bar.

For vehicles which have air suspension with lifting function, any lifting operation should be conducted when the vehicle remains height of complete vehicle



Operating requirements of air suspension system:

– Overload is prohibited!

- No lubricating and greasing on any part of the air suspention, in particular on its rubber parts.

-Maintain the system according to the requirements.

Daily routine check and maintenance

- Daily routine check and maintenance
- Daily routine check and maintenance include:

-Check visually whether air spring is inflated sufficiently and is balanced.

- Check whether suspension height is normal and system does not leak.

Simple check method: When receiving vehicle from manufacturer, park vehicle in good condition on horizontal ground, measure distance between wheel center and fixed point on vehicle body, and take records properly; it is only necessary to park the vehicle on horizontal ground and measure whether such value varies significantly when checking each time; it indicates suspension height is normal and system does not leak air if such value does not change significantly.

Find out causes, eliminate the troubles and repair when necessary if it is not qualified during check.

Periodic safety check

- Periodic safety check can be implemented during level-one maintenance with interval of 1500- 2000km, or implemented as per specified safety check time for complete vehicle.
- When checking, park vehicle on clean horizontal ground; it would be the best if parking it on overhaul trough, apply parking brake and fix the vehicle (comply with this provision during all kinds of check and maintenance below).
- Safety check items:

- Whether all fasteners become loose, whether tightening torque meets requirements, whether there are dirt, rusting skin or metal wearer around bolt head and nut due to looseness.

When air supply pressure exceeds 6.0bar, air spring can be inflated normally; solidness degree of air bags on two sides of same axle is consistent; check whether air spring is worn or damaged, or has improper heave, and check clearance 25mm around.

- Check whether shock absorber leaks oil or is damaged, and whether it can work normally.

Simple method for judging whether shock abnormal works normally: It indicates shock absorber works normally if it emits heat after traveling.

- There is no flaw on all parts (components) and welding lines.

See section “Maintenance of complete vehicle” for other maintenance contents.

Maintenance of complete vehicle

According to maintenance regulations of SINOTRUK, the first maintenance carried out in the service station designated in warranty manual is called initial maintenance, hereinafter referred to as "initial maintenance". According to maintenance regulations of SINOTRUK, regular maintenance carried out in the service station designated in warranty manual is called regular maintenance, hereinafter referred to as "regular maintenance".

Road vehicles refer to vehicles constantly running on classified highways such as towing truck, platform truck, stake truck and oil tanker. Non-road vehicles refer to vehicles constantly running on roads out of classified highways such as construction site vehicle, mine vehicle, dump truck and side dumper.

Assembly	Maintenance Items	First Maintenance	Regular Maintenance	
		First Maintenance Mileage (km)	Regular Maintenance Mileage (km)	
			Road Vehicles	Non-road Vehicles and Cement Mixer Truck
Diesel engine	1. Check the engine harness for looseness, interference and rub	2000-5000	Per 10000	Per 5000
	2. Check the pipeline for looseness, interference and rub	2000-5000	Per 10000	Per 5000
	3. Check for the oil leakage	2000-5000	Per 10000	Per 5000
	4. Check the fuel coarse filter level (if this function is provided)	2000-5000	Per 10000	Per 5000
	5. Check and clean the float filter screen in the oil tank	2000-5000	Per 10000	Per 5000
	6. Check if the oil and coolant levels are within the normal scale range	2000-5000	Per 10000	Per 5000
	7. Change the engine oil	See Engine Maintenance		
	8. Replace the oil filter element	Replace the oil filter element meanwhile change the engine oil,and use the accompanying oil filter element for the first replacement		
	9. Check and clean air filter element; check whether air filter alarm sensor works properly	2000-5000	Per 10000	Per 5000
	10. Change the coolant	See Engine Maintenance		
	11. Check the connection bolt of fan; check the fan and fan cover for the interference and possibility	2000-5000	Per 10000	Per 5000

Assembly	Maintenance Items	First Maintenance	Regular Maintenance	
		First Maintenance Mileage (km)	Regular Maintenance Mileage (km)	
			Road Vehicles	Non-road Vehicles and Cement Mixer Truck
Diesel engine	12. Check the tension pulley and ensure the tension of belt	2000-5000	Per 10000	Per 5000
	13. Check the idling of engine	2000-5000	Per 10000	Per 5000
	14. Check the abnormal noise	2000-5000	Per 10000	Per 5000
	15. Check the connection bolts of engine for looseness	2000-5000	Per 10000	Per 5000
	16. Check the support rubber gasket of engine for damage	2000-5000	Per 10000	Per 5000
	17. Check the pressure of engine oil and water temperature	2000-5000	Per 10000	Per 5000
	18.Check valve Squeaks and rattles and check and adjust valve clearance.	2000-5000	Per 10000	Per 5000
	19.Check the fuel supply advance angle	2000-5000	Per 10000	Per 5000
Check with the EOL tools for diesel engine	20. Read the fault code of engine, and check for the fault	2000-5000	Per 10000	Per 5000
	21. Read the fault code of SCR and check for the fault	2000-5000	Per 10000	Per 5000
	22. Select the type of common rail system on EOL, and check if the throttle pedal is able to change from the OFF to OPEN (only for DENSO)	2000-5000	Per 10000	Per 5000
	23. Check if K value is correct	2000-5000		
	24. Check if fuel water warning sensor is normal	2000-5000	Per 10000	Per 5000
	25. Check if common rail pressure is normal	2000-5000	Per 10000	Per 5000
	26. Check if the intake manifold pressure is normal	2000-5000	Per 10000	Per 5000
	27. Other parameters	2000-5000	Per 10000	Per 5000

Assembly	Maintenance Items	First Maintenance	Regular Maintenance	
		First Maintenance Mileage (km)	Regular Maintenance Mileage (km)	
			Road Vehicles	Non-road Vehicles and Cement Mixer Truck
Natural gas engine	28. Check the engine harness for looseness, interference and rub	2000-5000	Per 10000	Per 5000
	29. Check the pipeline for looseness, interference and rub	2000-5000	Per 10000	Per 5000
	30. Check for the oil leakage	2000-5000	Per 10000	Per 5000
	31. Check low pressure gas filter element,ensure the cleanness of the element	2000-5000	Per 10000	Per 5000
	32. Check high pressure gas filter element,ensure the cleanness of the element	2000-5000	Per 10000	Per 5000
	33. Check leakage, damage, looseness of connection of gas pipelines	2000-5000	Per 10000	Per 5000
	34. Check if the oil and coolant levels are within the normal scale range	2000-5000	Per 10000	Per 5000
	35. Change the engine oil	See Engine Maintenance		
	36.Replace the oil filter element	Replace the oil filter element meanwhile change the engine oil,and use the accompanying oil filter element for the first replacement		
	37.Check and clean the air cleaner element and check if the air cleaner warning sensor is effective	2000-5000	Per 10000	Per 5000
	38 .Change the coolant	See Engine Maintenance		
	39. Check the connection bolt of fan; check the fan and fan cover for the interference and possibility	2000-5000	Per 10000	Per 5000
	40. Check the tension pulley and ensure the tension of belt	2000-5000	Per 10000	Per 5000
	41. Check the idling of engine	2000-5000	Per 10000	Per 5000
	42. Check abnormal sounds	2000-5000	Per 10000	Per 5000
	43. Check the connection bolts of engine for looseness	2000-5000	Per 10000	Per 5000

Assembly	Maintenance Items	First Maintenance	Regular Maintenance	
		First Maintenance Mileage (km)	Regular Maintenance Mileage (km)	
			Road Vehicles	Non-road Vehicles and Cement Mixer Truck
Natural gas engine	44. Check the support rubber gasket of engine for damage	2000-5000	Per 10000	Per 5000
	45.Check the pressure of engine oil and water temperature	2000-5000	Per 10000	Per 5000
	46. Check rubber sleeve ignition coil	2000-5000	Per 10000	Per 5000
	47. Check spark plug gap	2000-5000	Per 10000	Per 5000
Check with the EOL tools for natural gas engine	48. Read the fault code of engine, and check for the fault	2000-5000	Per 10000	Per 5000
	49. Wash throttle	2000-5000	Per 10000	Per 5000
	50. Check condition of gas mixer, clean gas mixer	2000-5000	Per 10000	Per 5000
	51. Check whether the pressure value of exhaust vent valve is normal	2000-5000	Per 10000	Per 5000
	52. Check the synchronization of the opening of throttle and accelerator padel	2000-5000	Per 10000	Per 5000
	53. Check ignition of each cylinder	2000-5000	Per 10000	Per 5000
	54. Other parameters	2000-5000	Per 10000	Per 5000
Clutch	55. Check if the clutch separates completely and engages stably	2000-5000	Per 10000	Per 5000
	56. Check the clutch hydraulic oil level	2000-5000	Per 10000	Per 5000
	57. Check the vent of clutch booster for blockage or clog	2000-5000	Per 10000	Per 5000
	58. Lubricate the clutch pedal shaft	2000-5000	Per 10000	Per 5000
	59. Check the clutch for assistance stroke	2000-5000	Per 10000	Per 5000
	60. Lubricate the sliding sleeve of release bearing	2000-5000	Per 10000	Per 5000
	61. Replace the clutch oil	See “Clutch operating system maintenance”		

Assembly	Maintenance Items	First Maintenance	Regular Maintenance	
		First Maintenance Mileage (km)	Regular Maintenance Mileage (km)	
			Road Vehicles	Non-road Vehicles and Cement Mixer Truck
Transmission	62.Check the level of lubricant ; refill oil if necessary ; clean the filter screen	2000-5000	Per 10000	Per 5000
	63.Replace the transmission lubricant	See “Transmission maintenance”		
	64.Lubricate the supporting position of clutch fork shaft / lubricate the clutch fork shaft	2000-5000	Per 10000	Per 5000
	65.Check and clean pressure reduction valve of air cleaner (only for HW13710 series)	2000-5000	Per 10000	Per 5000
	66.Lubricate the clutch fork shaft	2000-5000	Per 10000	Per 5000
	67.Lubricate the shift mechanism /Check the joint bolt of transmission	2000-5000	Per 10000	Per 5000
	68.Check the blow vent of transmission	2000-5000	Per 10000	Per 5000
	69.Check the shift mechanism normal or not	2000-5000	Per 10000	Per 5000
	70.Check PTO normal or not	2000-5000	Per 10000	Per 5000
	71.Check is there oil leak or air leakage	2000-5000	Per 10000	Per 5000
	72.Check is there the noise	2000-5000	Per 10000	Per 5000
	73.Check the joint bolt between engine and transmission loose or not	2000-5000	Per 10000	Per 5000
MCYdrive axle	74. Change the lubricating oil of drive axle	See “Drive axle maintenance”		
	75. Lubricate the adjustment arm of brake clearance	2000-5000	Per 10000	Per 5000
	76. Check if the brake return is normal	2000-5000	Per 10000	Per 5000
	77. Check if the differential lock works normal	2000-5000	Per 10000	Per 5000
	78. Check the venting hole	2000-5000	Per 10000	Per 5000
	79. Check the clearance between the brake shoe and brake drum and the abrasion of disc brake block	2000-5000	Per 10000	Per 5000

Assembly	Maintenance Items	First Maintenance	Regular Maintenance	
		First Maintenance Mileage (km)	Regular Maintenance Mileage (km)	
			Road Vehicles	Non-road Vehicles and Cement Mixer Truck
Other drive axles	80. Change the gear oil of main reducer of drive axle	See “Drive axle maintenance”		
	81. Lubricate the adjustment arm of brake clearance	2000-5000	Per 10000	Per 5000
	82. Check if the brake return is normal	2000-5000	Per 10000	Per 5000
	83. Check if the differential lock is normal	2000-5000	Per 10000	Per 5000
	84. Check the venting hole	2000-5000	Per 10000	Per 5000
	85. Check the clearance between the brake shoe and brake drum and the abrasion of disc brake block	2000-5000	Per 10000	Per 5000
Front steering axle and steering gear	86. Lubricate the front steering main pin	2000-5000	Per 10000	Per 5000
	87. Lubricate the brake adjustment arm	2000-5000	Per 10000	Per 5000
	88. Depending on the tyre, check and adjust the front wheel toe-in and tightness of wheel	2000-5000	Per 10000	Per 5000
	89. Check the steering horizontal rod clamp bolts and ball head for looseness	2000-5000	Per 10000	Per 5000
	90. Check the steering vertical rod clamp bolts and ball head for looseness	2000-5000	Per 10000	Per 5000
	91. Check the plumbing arm of traversing mechanism for looseness	2000-5000	Per 10000	Per 5000
	92. Check the double steering middle plumbing arm for looseness	2000-5000	Per 10000	Per 5000
	93. Check the steering lever system for abnormal wear	2000-5000	Per 10000	Per 5000
	94. Check if the oil level of traversing mechanism is normal, and clean the filter element if necessary	2000-5000	Per 10000	Per 5000
	95. Check the power-assisted steering pipeline for aging and oil leakage	2000-5000	Per 10000	Per 5000

Assembly	Maintenance Items	First Maintenance	Regular Maintenance	
		First Maintenance Mileage (km)	Regular Maintenance Mileage (km)	
			Road Vehicles	Non-road Vehicles and Cement Mixer Truck
Front steering axle and steering gear	96. Check the oil and gas pipelines for interference and wear	2000-5000	Per 10000	Per 5000
	97. Check the clearance between the brake shoe and brake drum and the abrasion of disc brake block	2000-5000	Per 10000	Per 5000
	98. Check if the brake return is normal	2000-5000	Per 10000	Per 5000
	99. Change the steering gear oil	See “Steering system maintenance”		
Transmission shaft	100. Lubricate the telescopic sleeve and the universal joint bearing of transmission shaft	2000-5000	Per 10000	Per 5000
	101. Check the hanger bolt of transmission shaft	2000-5000	Per 10000	Per 5000
	102. Check the attachment bolt of transmission shaft	2000-5000	Per 10000	Per 5000
Chassis	103. Lubricate the all leaf spring pins and bushings	2000-5000	Per 10000	Per 5000
	104. Tighten up the front and rear U-bolts	2000-5000	Per 10000	Per 5000
	105. Connection bolts of leaf spring support lug	2000-5000	Per 10000	Per 5000
	106. Check the effectiveness of leaf spring limit block	2000-5000	Per 10000	Per 5000
	107. Check the mounting bolts of tube beam of frame	2000-5000	Per 10000	Per 5000
	108. Check the bolts of V-shape push rod and lower push rod	2000-5000	Per 10000	Per 5000
	109. Check the clearance between the balance suspension leaf spring and sliding plate and lubricate the sliding plate	2000-5000	Per 10000	Per 5000
	110. Check the balance shaft for oil leakage	2000-5000	Per 10000	Per 5000
	111. Complement the balance shaft gear oil	1 L GL-5 85 W/90 gear oil for single side, oil change is unnecessary		

Assembly	Maintenance Items	First Maintenance	Regular Maintenance	
		First Maintenance Mileage (km)	Regular Maintenance Mileage (km)	
			Road Vehicles	Non-road Vehicles and Cement Mixer Truck
Chassis	112. Check the bolts connecting the balance shaft and frame	2000～5000	Per 10000	Per 5000
	113. Check the wheel nuts	2000～5000	Per 10000	Per 5000
	114. Check the positions for oil, gas and water leakage	2000～5000	Per 10000	Per 5000
	115. Check the line for wear and the potential wear	2000～5000	Per 10000	Per 5000
	116. Check the water pipes for interference and the potential damage	2000～5000	Per 10000	Per 5000
Brake system	117. Check the air tightness of service and parking brake status	2000～5000	Per 10000	Per 5000
	118. Check if the brake air pressure achieves the specified value	2000～5000	Per 10000	Per 5000
	119. Drainage of air tank	2000～5000	Per 10000	Per 5000
	120. Check if the brake works normally	2000～5000	Per 10000	Per 5000
	121. Check the brake pipeline for wear and the possible damage	2000～5000	Per 10000	Per 5000
	122. Check the system for air leakage	2000～5000	Per 10000	Per 5000
Electrical Appliances	123. Check if the lighting and instrument work normally	2000～5000	Per 10000	Per 5000
	124. Check if the engine is charged normally	2000～5000	Per 10000	Per 5000
	125. Check the tightening of power line and ground line of storage battery;	2000～5000	Per 10000	Per 5000
	126. Check the harness for interference, and determine that the harness is away from the heat source and sharp objects	2000～5000	Per 10000	Per 5000
	127. Check the connectors of harnesses and electrical equipments.	2000～5000	Per 10000	Per 5000

Assembly	Maintenance Items	First Maintenance	Regular Maintenance	
		First Maintenance Mileage (km)	Regular Maintenance Mileage (km)	
			Road Vehicles	Non-road Vehicles and Cement Mixer Truck
Electrical Appliances	128. Check if the wiper system is working normally and if the detergent shall be added	2000～5000	Per 10000	Per 5000
	129. Check the fuss and specification	2000～5000	Per 10000	Per 5000
	130. Check if MP3 works normally	2000～5000	Per 10000	Per 5000
Cab	131. Check and tighten the bolts of dumping gear	2000～5000	Per 10000	Per 5000
	132. Check if the control mechanism of door works normally	2000～5000	Per 10000	Per 5000
	133. Check if the locking mechanism is reliable and lubricated	2000～5000	Per 10000	Per 5000
	134. Check if the control mechanism of seat works normally, and add the lithium-based lubricating oil in the sliding groove of control mechanism	2000～5000	Per 10000	Per 5000
	135. Check if the steering wheel and steering rotation mechanism work normally	2000～5000	Per 10000	Per 5000
	136. Check the suspension air bag, height adjustment and shock absorber work normally	2000～5000	Per 10000	Per 5000
	137. Check if the safety belt works normally	2000～5000	Per 10000	Per 5000
	138. Check the lift pump for the volume of hydraulic oil	2000～5000	Per 10000	Per 5000
	139. Complement the hydraulic oil of lift pump	See “ Cab Tilting Mechanism”		
SCR system	140. Clean the urea tank ventilation valve	2000～5000	Per 5,000	Per 5,000
	141. Replacement of urea pump filter	2000～5000	40000km or 2 years	

Chapter VI Safety and Environmental Protection

Safety instruction

Common notices regarding safety

Plastic hose, rubber hose and electric harness

Warning!

Do not weld or drill at a place close to plastic hose, rubber hose and electric harness

Retightening of wheel nuts

Retighten wheel nuts of a new vehicle or a vehicle with replacing wheel after 50km running, with reference to “Change of Wheels”.

Towing suggestions

Please refer to “Towing and Towing Start”.

Prevent damage to electrical system

Please refer to “Electrical System”

Accessories and parts

SINOTRUK recommends you to use SINOTRUK “partner” accessories only for the sake of your benefits. Such accessories and parts are specially certified in terms of reliability, safety and adaptability. These performances of other products available in market can hardly judged despite our constant investigation, to which SINOTRUK is not responsible even if there is certification of an official institute.

Safety devices and attached tools

Inspect whether following equipment is complete:

- Jack, jack rocker and attached tools

Refit parts and additional devices

Installation must be carried out in accordance with refitting manual of relevant SINOTRUK vehicle model.

The user must obtain written approval of relevant manufacturer.

Any change incompliant with SINOTRUK vehicle structure requires written approval of designated SINOTRUK department.

The requirement is applicable to additional vehicle devices such as A/C system, rear baffle, retarder, etc.

Overload protection of brake system/energy storage air chamber

If parking brake is acted due to pressure reduction of spring, use of service brake device (foot brake) is not allowed. as it may lead to overlap of braking force of parking brake and service brake that damages mechanical parts of transmission system.

Battery service life

For a vehicle to be stored for more than 12 weeks, please operate as following to prolong service life of its battery:

— Disconnect battery negative if the battery is not removed.

— Inspect acid liquid level of battery (not necessary for maintenance-free battery). In case of low liquid level, fill liquid to the maximum liquid level mark (be sure to use distilled water).

— Daily discharge rate of a battery at 20℃ is 0.2% its rated capacity.

It is required to regularly measure standby voltage (at least once every month) to prevent low-voltage discharge. or regularly inspect concentration of acid liquid. Description on allowed voltage:

12.6volt = Voltage when storage battery is fully charged

12.3 volt = Voltage when storage battery discharges by 50%

12.25 volt or less = Storage battery should be re-charged immediately but shall not be charged rapidly.

Open-circuit voltage of battery shall be measured 10 hours after last charging or 1 hour after last discharging.

Description on density of acid liquid

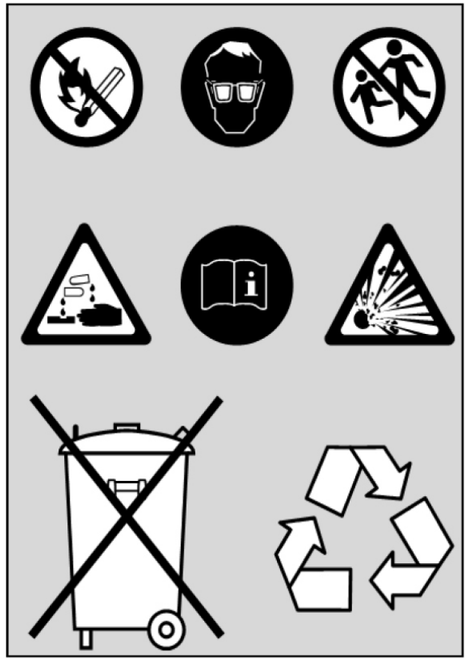
It is required to charge the battery when density of acid liquid reduces to be less than 1.21kg/L. Charging current recommended by SINOTRUK is 1/10 capacity.

Battery in acute discharging will be filled with lead sulfate. In this case, battery cannot be recovered by charging.

Start the vehicle at least 1 hour after charging of its battery.

Do not start the vehicle before dry-charged battery is placed for half an hour after filling with liquid.

For the batteries with sulfate, silvery white coating and turbid acid liquid may be on the plate. This condition is beyond the warranty range, thus those batteries can not be replaced.



Precautions for Safe Operation of Storage Battery

- Beware of the risk of explosion! Storage battery must be away from fire, spark and open flame. No smoking!

When connecting or disconnecting any electrical consumer, or using the instruments to make contact directly with the storage battery for measurement, be careful not to produce any sparks! Before connecting or disconnecting any electrical consumer to storage battery (tachograph, interior lighting, etc.), be sure to first turn it off. Disconnect all grounding wires and electrical consumers by removing the corresponding fuss in the central control box.

Avoid connecting the wrong polarities or using a spanner without insulation head to cause a short circuit. Unless necessary, do not twist off the insulating cap of terminal.

After all appliances are installed, connect the grounding wire.

- Wear the goggles or other protective masks!
- Keep the children away from acid and storage battery!

- Acid is corrosive! Storage battery contains the corrosive acid which will harm you!

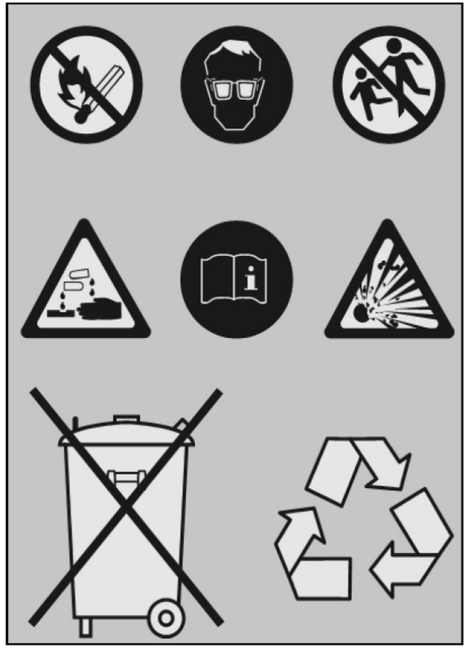
Wear the suitable protective clothing, acid resistant protective gloves and goggles.

Do not tilt the storage battery; Acid may pop out of the venting hole.

- Follow the operation manual and other relevant instructions of storage battery manufacturer.
- Beware of the risk of explosion! - Pay particular attention to the explosive oxy-hydrogen mixture after the long-distance running and charging. Ensure the adequate ventilation!
- Storage battery contains the contaminants which shall be handled properly. See Environmental Protection!

Storage and Transport of Storage Battery

- Storage battery shall be stored in a cool and dry place. The storage battery without acid may be stored for a long time.
- If the acid concentration of storage battery is less than 1.21 kg/l, charge the storage battery.
- In order to prevent any acid leakage of storage battery, it shall be stored and transported with front upwards to prevent the tipping-over.
- Only when connecting the storage battery terminal, you can unscrew the safety cap from the positive pole. For the removed storage battery (old battery), the safety cap shall be kept at the positive terminal.
- When transporting the waste storage battery, at least one unobstructed venting hole shall be retained.



Storage battery enters operating state.

- Fill up storage battery with acid liquor.
- Inject dilute sulphuric acid with concentration of 1.28kg/L into empty battery (concentration of dilute sulphuric acid is 1.23kg/L in tropical zone) until highest value of liquid level is 15mm higher than edge of plate. Temperature of storage battery and acid liquor should be above 10℃ when implementing this operation. Tilt fully charged battery for several times after about 15min. supplement according to needs and add acid liquor to scale line. Then, loosen spiral plug and wipe off splashing acid liquor.

If electricity for starting engine is insufficient, please re-charge storage battery.

Charging battery

Warning!

–There is risk of damaging refrigerator.

–Cut off power supply for refrigerator first before connecting battery charger.

- Dismantle storage battery from vehicle.
- Use proper DC battery charger and comply with operation manual of electrical appliance manufacturer.
- Please connect positive terminal post of storage battery on positive output terminal of battery charger, and then connect negative electrode of storage battery on negative output terminal of battery charger.

Note: It is necessary to ensure room for charging storage battery well ventilated.

- Be sure to connect charger on storage battery before turning on power supply for battery charger. After completing charging of storage battery, it is necessary to disconnect switch of battery charger first and then disconnect connection between storage battery and battery charger.

It is recommended that charging current should be 1/10 of storage battery capacity.

Warning!

Be aware of risk of explosion!

Stop charging battery immediately if acid liquor temperature in storage battery rises up to be above 55℃.

- It indicates storage battery is fully charged if density of acid liquor and charging voltage do not rise up within two hours.
- Check acid liquor level and add distilled water to upper scale when necessary

Note: Do not add acid liquor!

Disconnect connection of storage battery and turn on master switch of storage battery

Be sure to disconnect connection of storage battery and turn on master switch of storage batter in the following sequence:

- Switch off engine and all electrical devices (such as electronic monitoring device, hazard alarm lamp etc.).
- Turn off key switch
- Close door
- Wait for about 20s before disconnecting connection of storage battery (disconnect negative terminal first)
- Wait for another 15s before turning off master switch of storage battery.
- Disconnect connection of storage battery with reference to the column on the left
- Disconnect negative terminal of storage battery when dismantling storage battery
- Eliminate any foreign matters on mounting position for battery, put storage battery on designated position and fix it with clamp.
- Clean positive terminal and wiring terminal of storage battery.
- Connect positive terminal and then connect negative terminal when installing storage battery. Ensure wiring terminals of both electrodes to be fixed on their positions reliably.
- Apply little grease on battery electrode and wiring terminal.
- Dismantle accessories on used battery and install them on new battery such as wiring terminal cap, exhaust container, bracket, hose connector and wiring clamp etc.
- At least keep one unobstructed vent hole.

Maintenance of storage battery

- Keep storage battery clean and dry.
- Maintenance-free battery also should be maintained. Maintenance-free only means it is unnecessary to check acid liquor level of storage battery.

Warning!

Wipe storage battery only with wet cloth; static electricity generated by dry cloth may cause explosion hazard!

- Check acid liquor level height and supplement distilled water in storage battery periodically. Please go to service station of SINOTRUK to check alternator regulator if water consumption is high.
- Do not use so-called ameliorant

It is necessary to re-charge if acid strength in storage battery is lower than 1.21kg/L.

Storage of storage battery

- Dismantled storage battery shall be stored in cool place. Or storage battery can be stored on vehicle is negative terminal is not connected.
- Check charging situation of storage battery periodically; re-charge timely if necessary.

Compressed air reservoir

- Air reservoir is special air storage device for brake system and auxiliary equipment of vehicle and trailer.
- Housing of air reservoir is marked with product model and manufacturer name.
- Fix bracket of air reservoir on vehicle with fastening strip. Do not contact welding point at the bottom of air reservoir when installing fastening strip so as to prevent tension yield of air reservoir damaging safety.
- Clean only with non- alkaline detergent.
- Check inside of air reservoir through opening on connecting position. Drain water sufficiently to prevent water storing in air reservoir. Water drain valve is at the lowest position of air reservoir.
- Avoid welding, thermal treatment and other treatment which may damage safety of air reservoir on pressure-carrying surface of air reservoir (housing of air reservoir, foundation, threads and accessories etc.).

Air conditioning system and refrigerating components

Warning!

Refrigerant and its volatilized steam will be harmful to human health!

- Avoid contacting with refrigerant and its volatilized steam.
- Wear gloves and protective goggles! Please go to a doctor immediately if refrigerant is splashed on skin or eyes.
- Do not exhaust refrigerant in gas state in closed room as there is risk for suffocation!
- Pump out refrigerant with special handling system.
- Do not weld on parts of refrigeration system or on position near parts of refrigeration system. Such operation is not allowed even if refrigerant is discharged. There are risks for explosion and poisoning!
- Do not clean parts of refrigerant system with steam detergent.
- Please examine and repair refrigerant system at service state of Sinotruk.
- Do not use dimethylmethane or butane refrigerant on vehicles produced by Sinotruk.
- Air conditioning system is charged with fluoride-free R134a refrigerant.
- Be sure not to mix fluoride-free refrigerant R134a and refrigerant R12 (with fluoride) in refrigeration system.
- Be sure not to use R12 refrigerant in system using refrigerant R134a.

Used engine oil

Notices when handling used engine oil:
Grease on skin will be removed, and it will result in dry skin, irritability or red and swollen phenomenon if contacting with engine oil for long time or frequently.
Experiment to skin of animal indicates that used engine oil contains cancerogenic substances; used engine oil will not become a kind of dangerous substance if handling it in accordance with basic safety and sanitation standard operating procedures.

Health protection Warning

- Prevent contacting used engine oil for long time, excessively or frequently
- Protect skin with proper protective agent or protective goggles
- Clean skin contacting engine oil

— Clean position contacting engine oil with soap and water sufficiently

— Enhance cleaning effect with small brush

— It is easy if using special detergent

— Do not use gasoline, diesel, kerosene, diluent or solvent

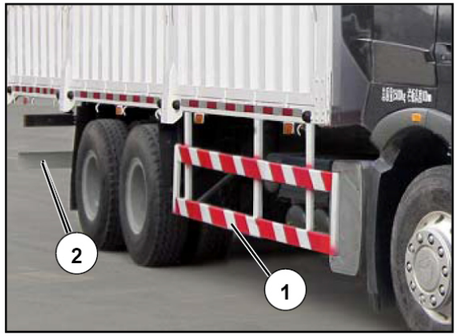
- Apply some skin care grease after washing
- Take off clothes and shoes contaminated by engine oil
- Be sure not to put clothes contaminated by engine oil in pocket.

Cold-cleaner agent, halogen-free/ fuel oil and pollution (clean grade)
Please be careful when handling cold-cleaner agent/ fuel oil!

- Please them in place out of children's reach
- Keep away from fire- do not smoke
- Take off immediately clothes contaminated by or immersed by such chemicals
- Do not let such chemicals flow into sewer

Please be alert when handling cold-cleaner agent/ fuel oil!

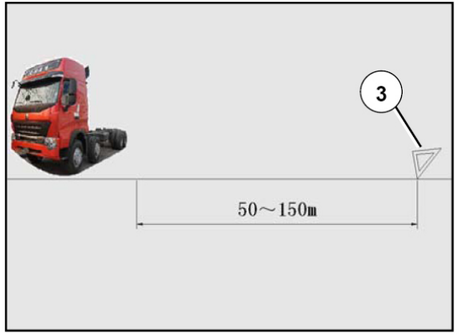
- They are inflammable/ highly inflammable
- They are toxic if they are breathed in, eaten or contact skin
- There are risks of harming health and resulting in other complication if handling cold-cleaner agent/ fuel oil for long time.
- Carcinogenicity (fuel oil only).



Rear side protection of cargo truck

Side proction ①: Prevent people from being drawn into under the vehicle.

Rear protection bumper②: prevent the car hiting from behing from running into under the vehicle.



Triangle Warning sign

Triangle Warning sign③: put it 50～150m (in accordance with local regulations) away from behind the vehicle,and make it visible to othter cars running from the rear.

Environmental protection

Waste oil (engine oil, transmission gear oil, etc.)

Warning !

- Pay attention to proper disposal of the used oil.

- Used oil will damage the quality of underground water.

The used oil shall not fall to the ground, water or sewer and drain, or you may be alleged.

Carefully collect and dispose of the used oil.

Filter element, Filter element, Filter and Dry Can

Waste filter elements, filter element and filter (oil and fuel filters, dry can of air dryer) are included in the emergencyous waste which must be handled properly.

Please observe the provisions of the relevant local authorities.

Coolant

Undiluted antifreeze is emergencyous. In disposing of used coolant (mixture of antifreeze and water), please observe the regulations issued by local authorities.

Chapter VII Technical Parameters

Euro II Engine Parameters

Model	WD615.62	WD615.87	WD615.69	WD615.47	D12.38	D12.42
Emission standard	Euro II					
Number of cylinders	6					
Bore (mm)	126				126	
Stroke (mm)	130				155	
Displacement (L)	9.726				11.596	
Compression ratio	17:1				17:1	
Rated power (kW/Ps)	196/266	213/290	247/336	273/371	279/380	309/420
Rated speed (rpm)	2200				2000	
Max. torque (Nm)	1100	1160	1350	1500	1650	1820
Speed at max. torque	1100-1600				1100-1500	
Idle speed (rpm)	600±50				650±50	
Ignition sequence	1-5-3-6-2-4					
Rotation direction of crankshaft	Clockwise (seen from the free end)					

Euro III Engine parameters

Model	D10.38-30	D10.34-30	D10.31-30	D10.28-30	D12.38-30	D12.42-30
Emission standard	Euro III					
Number of cylinders	6					
Bore (mm)	126				126	
Stroke (mm)	130				155	
Displacement (L)	9.726				11.596	
Compression ratio	17.5:1				17:1	
Rated power (kW/Ps)	276	249	228	206	279	309
Rated speed (rpm)	2000	1900			2000	
Max. torque (Nm)	1560	1490	1390	1190	1650	1820
Speed at max. torque (rpm)	1200-1500				1100～1400	
Idle speed (rpm)	650±50				650±50	
Ignition sequence	1-5-3-6-2-4					
Rotation direction of crankshaft	Clockwise (seen from the free end)					

Euro IV Engine Parameters

Model	D10.38-40	D10.34-40	D10.31-40	D10.28-40	D12.38-40	D12.42-40
Emission standard	Euro IV					
Number of cylinders	6					
Bore (mm)	126				126	
Stroke (mm)	130				155	
Displacement (L)	9.726				11.596	
Compression ratio	17.5:1				17:1	
Rated power (kW/Ps)	276	249	228	206	279	309
Rated speed (rpm)	2000	1900			2000	
Max. torque (Nm)	1560	1490	1390	1190	1650	1820
Speed at max. torque (rpm)	1200-1500				1100-1400	
Idle speed (rpm)	650±50				650±50	
Ignition sequence	1-5-3-6-2-4					
Rotation direction of crankshaft	Clockwise (seen from the free end)					

Euro V Engine Parameters

Model	D10.38-50	D10.34-50	D10.31-50	D10.28-50	D12.38-50	D12.42-50
Emission standard	Euro V					
Number of cylinders	6					
Bore (mm)	126				126	
Stroke (mm)	130				155	
Displacement (L)	9.726				11.596	
Compression ratio	17:1				17:1	
Rated power (kW/Ps)	276	249	228	206	279	309
Rated speed (rpm)	2000	1900			2000	
Max. torque (Nm)	1560	1490	1390	1190	1650	1820
Speed at max. torque (rpm)	1200～1500				1100～1400	
Idle speed (rpm)	650±50				650±50	
Ignition sequence	1-5-3-6-2-4					
Rotation direction of crankshaft	Clockwise (seen from the free end)					

Natural-gas Engine Parameters

Model	T10.27-50	T10.29-50	T10.32-50	T10.34-50	T12.38-50	T12.42-50
Emission standard	Euro V				Euro V	
Number of cylinders	6				6	
Bore (mm)	126				126	
Stroke (mm)	130				155	
Displacement (L)	9.726				11.596	
Compression ratio	11：1				11:1	
Rated power (kW/Ps)	196	213	235	250	279	309
Rated speed (rpm)	2200				2000	
Max. torque (Nm)	1160	1230	1300	1350	1650	1820
Speed at max. torque	1200-1500				1200-1500	
Idle speed (rpm)	600±50				600±50	
Ignition sequence	2420				2250	
Rotation direction of	1—5—3—6—2—4				1—5—3—6—2—4	
	Clockwise (seen from the free end)				Clockwise (seen from the free end)	

Transmission Parameters

Model		HW19709XST		HW19710	HW19710C	HW19710T	HW23710	HW23710C
Input torque		1900		1900	2100	1900	2300	2500
Gear		9		10	10	10	10	10
Gear ratio of each gear	1	C	15.28	14.28	10.73	14.36	14.28	10.73
	2	1	12.47	10.62	7.98	10.66	10.62	7.98
	3	2	8.79	7.87	5.91	7.88	7.87	5.91
	4	3	6.17	5.88	4.38	5.82	5.88	4.38
	5	4	4.375	4.38	3.29	4.38	4.38	3.29
	6	5	2.85	3.27	2.45	3.28	3.27	2.45
	7	6	2.01	2.43	1.82	2.44	2.43	1.82
	8	7	1.41	1.8	1.35	1.80	1.8	1.35
	9	8	1	1.34	1	1.33	1.34	1
	10			1	0.75	1	1.00(1.00)	0.75
	11							
	12							
	R1	14.06		13.91	10.45	14.01	13.91	10.45
	R2			3.18	2.39	3.20	3.18	2.39
Weight(kg)		395		355	355	430	359	359
Oil amount(L)		12		12	12	18	12	12

Transmission Parameters

Model		HW19712	HW19712L	HW19712C	HW19712CL	HW21716STL	HW21716STLC	ZF16S1950	ZF16S1670	ZF9S1820
Input torque (Nm)		1900	1900	2100	2100	2100	2300	1900	1760	1800
Gear		12	12	12	12	16	16	16	16	9
Gear ratio of each gear	1	15.01	15.01	11.8	11.8	15.59	13.12	11.64	15.39	15.16
	2	11.67	11.67	9.17	9.17	13.12	11.05	9.70	13.09	11.26
	3	9.03	9.03	7.10	7.10	10.89	9.17	8.00	10.57	7.90
	4	7.14	7.14	5.61	5.61	9.17	7.72	6.67	9.00	5.67
	5	5.57	5.57	4.38	4.38	7.48	6.30	5.73	6.96	4.07
	6	4.38	4.38	3.44	3.44	6.3	5.30	4.77	5.92	2.76
	7	3.43	3.43	2.70	2.70	5.2	4.38	4.07	4.58	1.94
	8	2.67	2.67	2.10	2.10	4.38	3.68	3.40	3.90	1.39
	9	2.06	2.06	1.62	1.62	3.56	3.00	2.86	3.36	1.00
	10	1.63	1.63	1.28	1.28	3	2.52	2.38	2.86	
	11	1.27	1.27	1.00	1.00	2.49	2.10	1.96	2.31	
	12	1	1	0.79	0.79	2.1	1.76	1.64	1.96	
	13					1.71	1.44	1.41	1.52	
	14					1.44	1.21	1.17	1.29	
	15					1.19	1.00	1.00	1.00	
	16					1	0.84	0.83	0.85	
	R1	13.81	13.81	10.85	10.85	14.29	12.03	9.41	12.44	12.26
	R2	3.16	3.16	2.48	2.48	12.03	10.13	7.84	10.59	
Weight(kg)		393	300	379	300	335	335	360	390	360
Oil amount(L)		13	13	13	13	14	14	14.5	14.5	17

Steering gear parameters

Parameter \ Model	ZF8198	ZF8118
Front axle loading(kg)	5000～7000	6500～9000
maximum pressure（MPa）	15.5+1.5	18.5+1.5
Oil Pump Volume (L/min)	16～25	16～25
transmission ratio	22.2～26.2	22.2～26.2
Limit rotation circle of steering wheel	6.2	6.2

Table of wheel parameters

Model	7.00T-20	7.50V-20	8.00V-20	8.5-20	22.5×8.25	22.5×9.00
Rim model	Two-piece	Two-piece	Two-piece	One-piece	One-piece	One-piece
Tyre specification	9.00R20/ 9.00-20	10.00R20/ 10.00-20	11.00-20/ 11.00R20	12.00-20/ 12.00R20	11R22.5	12R22.5 315/80R22.5 295/80R22.5

Table of tire pressure parameters

Model	Single Tire (kPa)	Double Tires (kPa)
11.00-20 (18-ply rating)	910	840
12.00-20 (18-ply rating)	810	740
11.00R20 (18-ply rating)	930	
12.00R20 (18-ply rating)	830	
12R22.5 (18-ply rating)	830	
295/80R22.5 (18-ply rating)	900	
315/80R22.5 (18-ply rating)	830	

Requirements of dynamic balance of wheel

Wheel specification	Amount of unbalance of wheel assembly (g.cm)
7.00T-20	2000
7.50V-20	2000
8.00V-20	2000
8.5-20	2000
22.5×8.25	1500
22.5×9.00	1500

Note: the data in the tables above is of reference value, please refer to the number labeled on the side of tyre in actual use.

Bulb Parameters Table

Lamp Name		Bulb Model	Bulb Power (W)	Quantity on Single Vehicle (Piece)
Position lamp		PHILPS	5	2
High-beam lamp		PHILPS	70	2
Auxiliary high-beam lamp		PHILPS	70	2
Low-beam lamp		PHILPS	70	2
Fog lamp		PHILPS	70	2
Turn signal lamp		PHILPS	21	2
T/ 7-function combination tail lamp with side marker lamp	Turn signal lamp	PHILPS	21	2
	Backup lamp	PHILPS	21	2
	Brake lamp	PHILPS	21	2
	Rear fog lamp	PHILPS	21	2
	Clearance lamp	PHILPS	LED	2
	Side marker lamp	PHILPS	LED	2
	Rear position lamp	PHILPS	LED	2
	License plate lamp	PHILPS	5	1
Height indicator lamp		PHILPS	5	2
Front clearance lamp		PHILPS	5	2
Rear clearance lamp		PHILPS	5	2

Lamp Name	Bulb Model	Bulb Power (W)	Quantity on Single Vehicle (Piece)
Side marker lamp	PHILPS	5	4
Turn indicator lamp	PHILPS	21	2
Inside illumination lamp	PHILPS	20	2
Reading lamp	PHILPS	10	2
Sleeper lamp	PHILPS	10	2
Door lamp	PHILPS	5	2