

Operation

Overview



Operation

Overview

The general overview helps you to know instrument panels and control equipments.

Item	Description	Item	Description
1	Warm air outlet	8	Transmission shift handle
2	Horn button	9	Button switch control panel
3	Steering wheel	10	Ashtray
4	Combination instrument	11	Air conditioner control panel and LCD
5	Cruise control switch	12	Cigar lighter
6	Handle of hand brake valve	13	Cup seat
7	Handle of trailer hand brake valve		

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Combination Instrument CMIC



Item	Description	Page No.	Item	Description	Page No.
1	Speedometer	4	6	Air pressure gauge of brake circuit 1	5
2	Engine tachometer	4	7	Air pressure gauge of brake circuit 2	34
3	Engine water temperature gauge	4	8	LCD	34
4	Fuel gauge	5	9	Alarm indicator	35
5	Subsection mileage/Subsection mileage fuel consumption reset button	5			

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Combination Instrument CMIC

Combination Instrument Function Instruction

1. Speedometer

The speedometer displays vehicle's running speed.

The speed will be zero if error occurs in the communication between tachograph and CPU, meanwhile the error indicating message will be displayed on the combination instrument screen.

The vehicle odometer and phase mileage information will be displayed on the lower right corner of screen.

2. Engine Tachometer

The engine tachometer displays engine rotating speed.

The needle will stay at the position which is $+5^\circ$ exceeding maximum when engine rotating speed is over scale range.

3. Engine Water Temperature Gauge

It displays the temperature of engine cooling water.

The alarm indicator of engine cooling water temperature will light up when temperature is over 95°C , meanwhile the serious alarm indicator flashes and buzzer gives an alarm.



Notice:

In this case, stop and check the vehicle at once, otherwise it will cause loss of life and property!

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4. Fuel Gauge

The fuel gauge displays fuel quantity in the fuel tank.

The fuel alarm indicator will light up when the fuel quantity is less than 1/8 of total fuel capacity in the fuel tank.

5. Subsection Mileage Fuel Consumption Reset Button

When vehicle is parking, press the button continuously more than 2 seconds, which is used to reset subsection mileage/subsection mileage fuel consumption.

6. LCD

It displays many kinds of information, such as accumulative total mileage, subsection mileage, time and so on. All the information is dispatched from CPU to combination instrument through data bus and displayed on LCD.

According to display sequence and detail functions on LCD, the displaying contents of each page is introduced as follows:

6.1. Logo

The logo "CNHTC" will be displayed within 1.5 second after key switch turns on. Please refer to picture 6.1.



Picture 6.1

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6.2. Normal Driving Information

Display vehicle information under normal driving, refer to picture 6.2

The contents are displayed as follows:

◆ Electric Source Voltage (Item 1, Item 2 in Picture 6.2)

Display electric source voltage in the form of figure on LCD, range: 0–32 V.

◆ Oil Pressure of Engine (Item 3, item 4 in Picture 6.2)

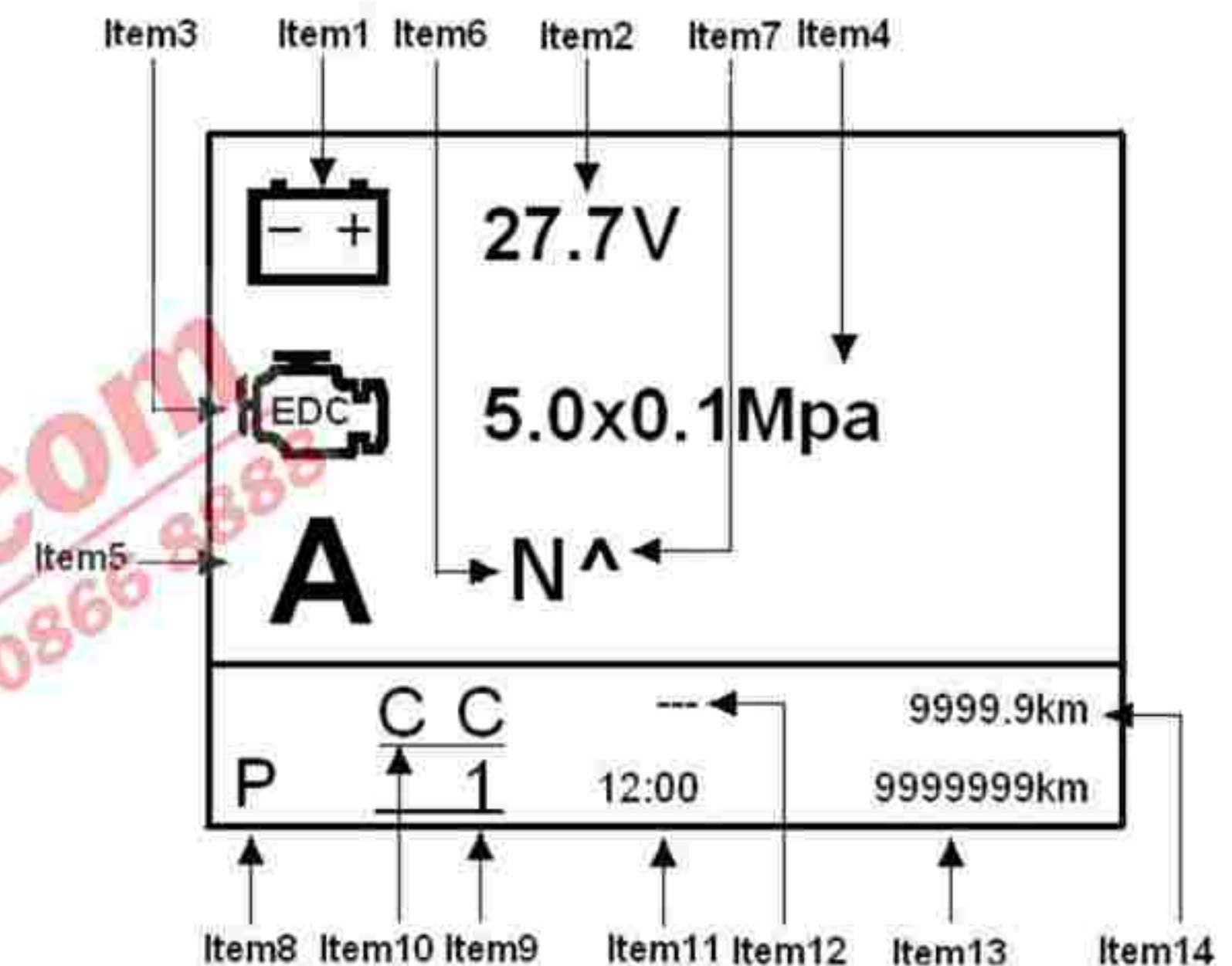
Display oil pressure in the form of figure on LCD as well.

◆ Transmission Gears Information (Item 5 and item 6 in Picture 6.2)

When installed manual transmission, it shows N, R and blank on the Item 6 position which means neutral, reverse gear and forward gear.

◆ Cruise Working Indicator (Item 10 in Picture 6.2)

When vehicle comes into cruise driving, it displays “CC”.



Picture 6.2

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◆ Time (Item 11 in Picture 6.2)

Time displaying: The time will show tachograph's time if system connects with tachograph of VDO which connects chassis CPU through CAN bus.

If tachograph of VDO is not equipped, the displayed time will be set by the customer after system electrifying.

◆ Accumulative Total Mileage of Vehicle (Item 13 in Pic. 6.2)

Display range: 0~99999999km.

◆ Subsection mileage (Item 14 in Picture 6.2)

Display range: 0~9999.9km.

If accumulative mileage exceeds displaying range or press subsection mileage/subsection mileage fuel consumption reset button for 2 seconds, subsection mileage and subsection mileage fuel consumption will be reset.



Notice:

It is prohibited to disconnect battery with chassis CPU directly without turning off the key, otherwise the data of single mileage will be lost.

Operation

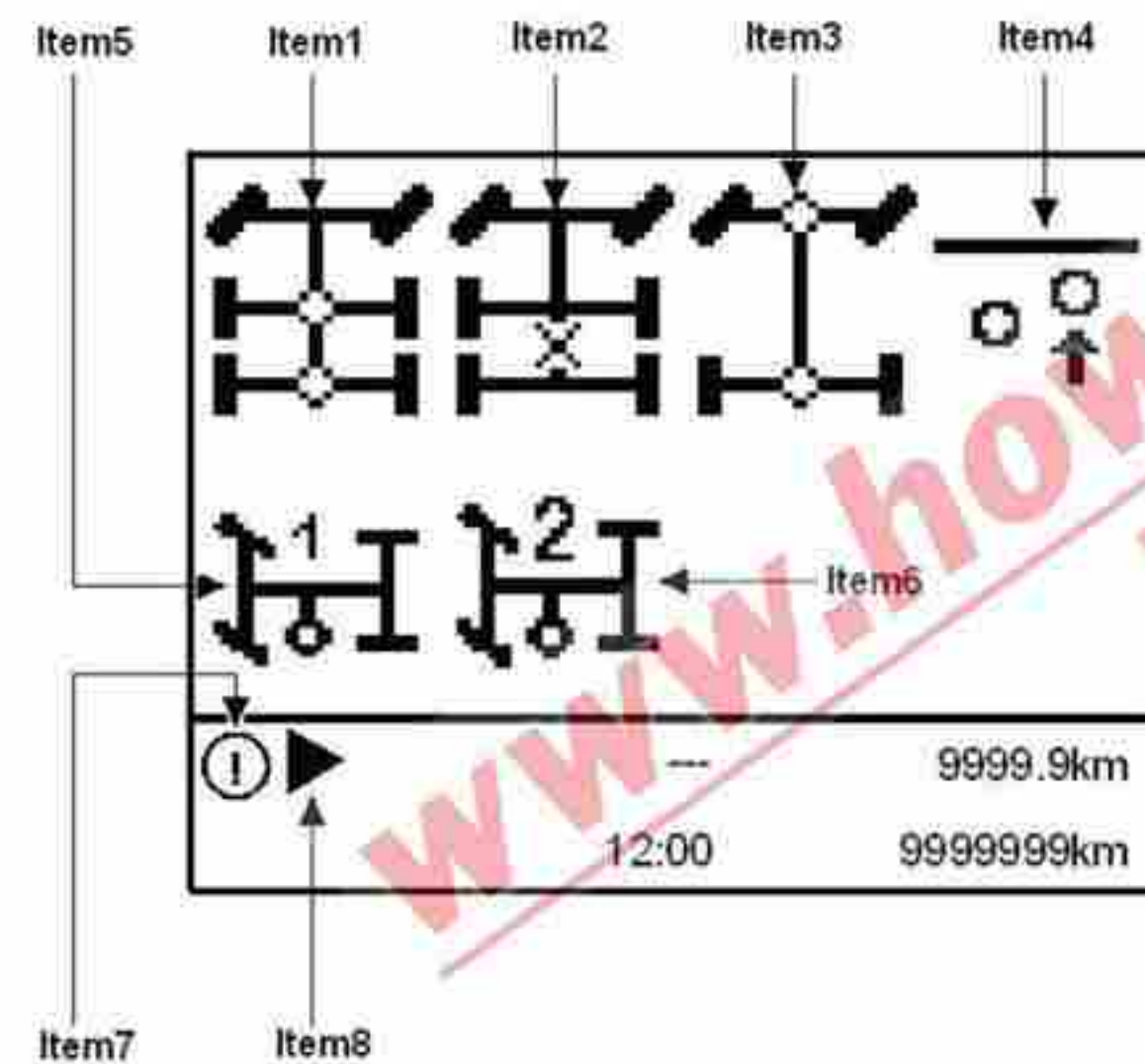
Combination Instrument CMIC

6.3. Displaying Page of Working Information

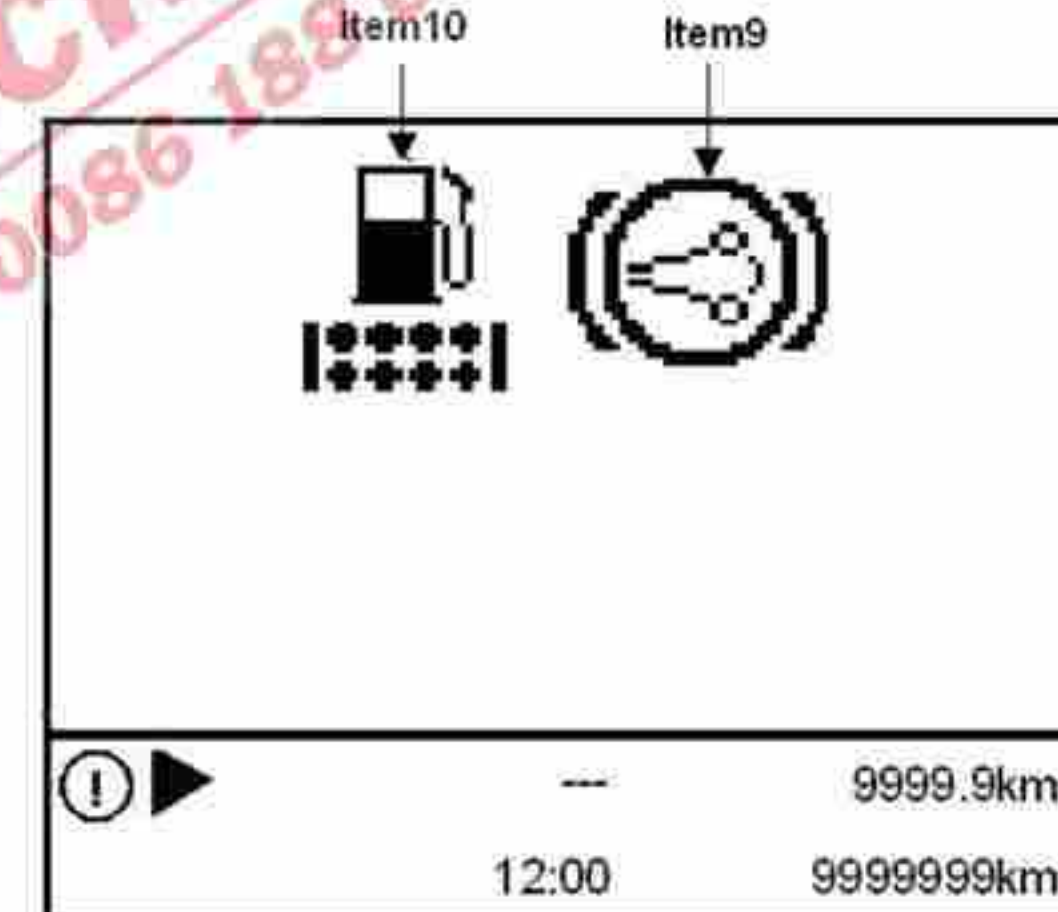
It is used for displaying some system working information of vehicle, such as working indication of differential lock, lifting axle, PTO and EVB, ect.

There are seven indication symbols displaying on the LCD, which is divided to display on two screens.

Displaying pages refer to picture 6.3 and picture 6.4:



Pic. 6.3



Pic. 6.4

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Indicators Description in Illustration:

Item 1: Working indicator of interwheel differential lock

When interwheel differential lock is at the right place, the indicator symbol hushes on the LCD; otherwise, the indicator symbol will flash.

Item 2: Working indicator of interaxle differential lock

When interaxle differential lock is at the right place, the indicator symbol hushes on the LCD. Otherwise, the indicator symbol will flash.

Item 3: Working indicator of all-wheel driving

When all-wheel driving differential lock is at the right place, the indicator symbol hushes on the LCD. Otherwise, the indicator symbol will flash.



Note:

When any indicator of Item 1-3 displaying on LCD, that shows, when switches of interwheel, interaxle differential locks or all-wheel driving are off, the LCD will stay on this page.

Item 4: Working indicator symbol of lifting axle

When lifting axle works, the indicator will display on LCD.

Item 5: Working indicator of PTO magnetic valve

After PTO starts to work, the indicator symbol hushes on the LCD. Otherwise, the indicator symbol will flash.

Item 6: Working indicator of PTO on neutral

When PTO works on neutral gear, the indicator symbol hushes on the LCD.

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Item 7: Working information indicator

It will display , when differential lock, all-wheel driving, PTO, PTO neutral work and exhaust valve brake work.

Item 8: When the information could not display on one screen, the indicator of page down/page up will be displayed on the LCD, it can be browsed by turning menu button.

When the current page is shown as picture 3.3 and some information is needed to display on picture 3.4, the indicator will flash. Press down menu button and come to next screen.

When the current page is shown as picture 3.4 and some information is needed to be displayed on picture 3.3, the indicator will appear and keep hushing. Press menu button and return to the first screen.

Item 9: Alarm indicator of oil-water separator.

When oil-water separator alarms, the indicator symbol begins to indicate.

Item 10: Working indicator of exhaust valve brake (EVB)

When exhaust valve brake works, the indicator symbol will display on LCD.

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6.4. Vehicle Status Adjustment/ Checking the Page

It is used for entering into vehicle status adjustment/ checking page layout, as picture 6.5:



Picture 6.5 Vehicle status adjustment/ checking the page

Procedure:

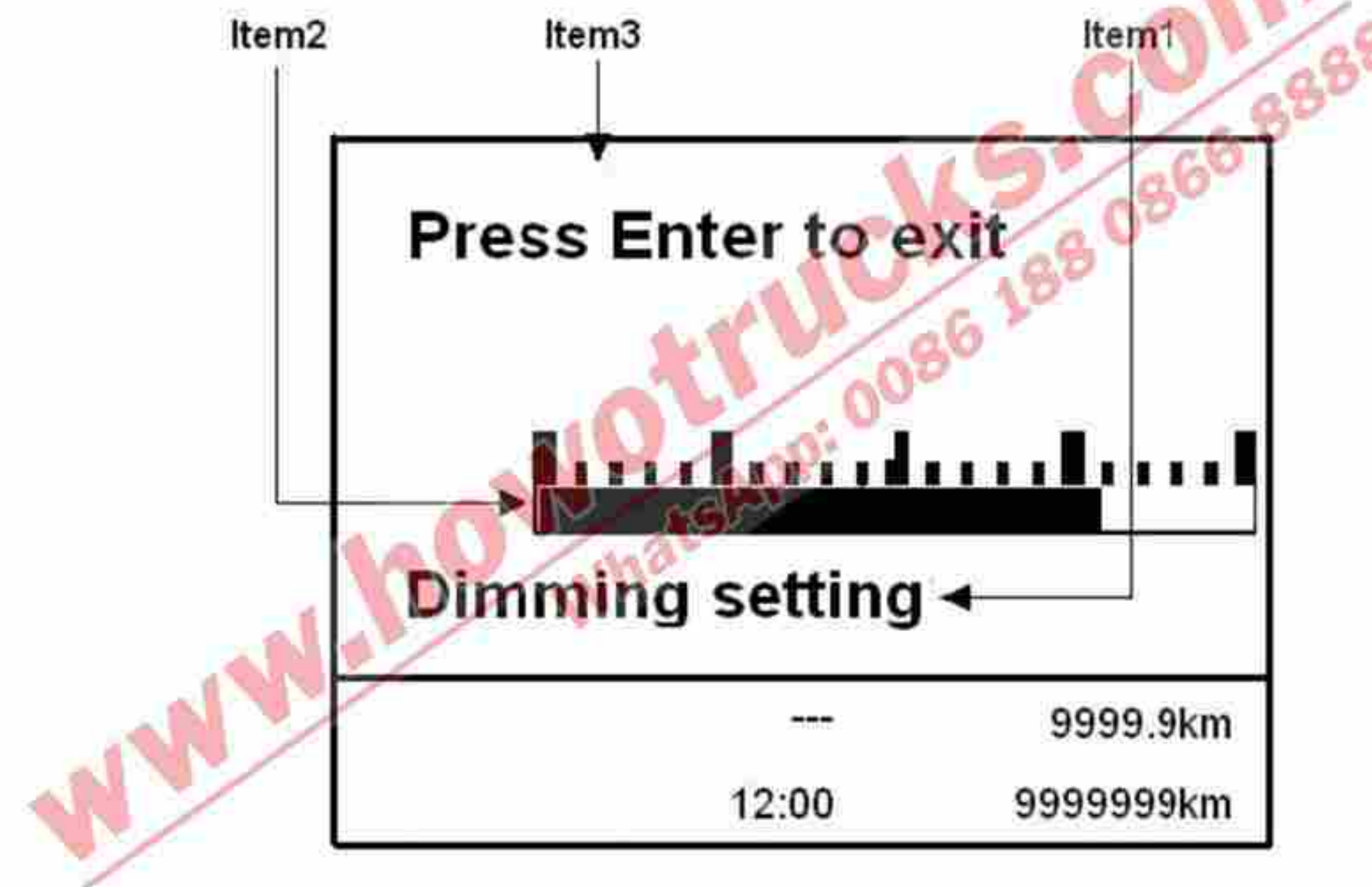
1. Press the menu button and enter (as item 1 of picture 6.5):
2. Brightness adjustment of LCD (as item 2 of picture 6.5)
3. Fuel consumption situation (Refer to item 3 of picture 6.5) (It is only restricted to the vehicle with common rail engine).
4. Time adjustment (Refer to item 4 of picture 6.5)

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- **Brightness Adjustment of LCD**

Turn menu knob until the background of **Brightness adjustment of LCD** turns to yellow, and then press menu button to enter page shown as picture 6.6: Brightness adjustment of LCD (Item 1).



Pic. 6.6 Brightness Adjustment of LCD

The Brightness and columniation bar (Item 2) will increase or decrease as long as turning menu button to left or right, the brightness reach maximum when the columniation bar is full.

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When adjust to the brightness meets requirement, press menu button for one time (Item 3) to quit brightness adjustment. In this case, the interface comes back to the page shown in picture 6.5, and the chosen brightness will be saved in the CBCU.

Before adjusting the brightness of LCD next time, the brightness saved before will be shown on the background.

When the small lamp is lights up, adjust the brightness of LCD, the background brightness of combination instrument and brightness of tilting switch head lamp are adjusted in the same time.

Brightness adjustment mode would be cancelled if any switch of interaxle differential, interwheel differential or all-wheel driving turns off, and the current brightness will be saved in CBCU.

● Fuel Consumption Situation (Picture 6.7)

It is used for displaying fuel consumption situation of vehicle with common rail engine only. It will not display this interface if the vehicle is not equipped with common rail engine.

Item 1: Subsection mileage fuel consumption (Qtrip) display:

Press down reset button of subsection mileage /subsection mileage fuel consumption on the combination instrument and keep two seconds, the subsection mileage fuel consumption (Qtrip) will be reset.

Item 2: Engine total fuel consumption (Qtotal) display:

Item1	Qtrip	2.5	L
Item2	Qtotal	600	L
Item3	Qinst	20.1	L/h
Item4	Q100km	0.0	L/100km
		---	9999.9km
		12:00	9999999km

Pic. 6.7

Operation

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Item 3: Hour fuel consumption display (Qinst)

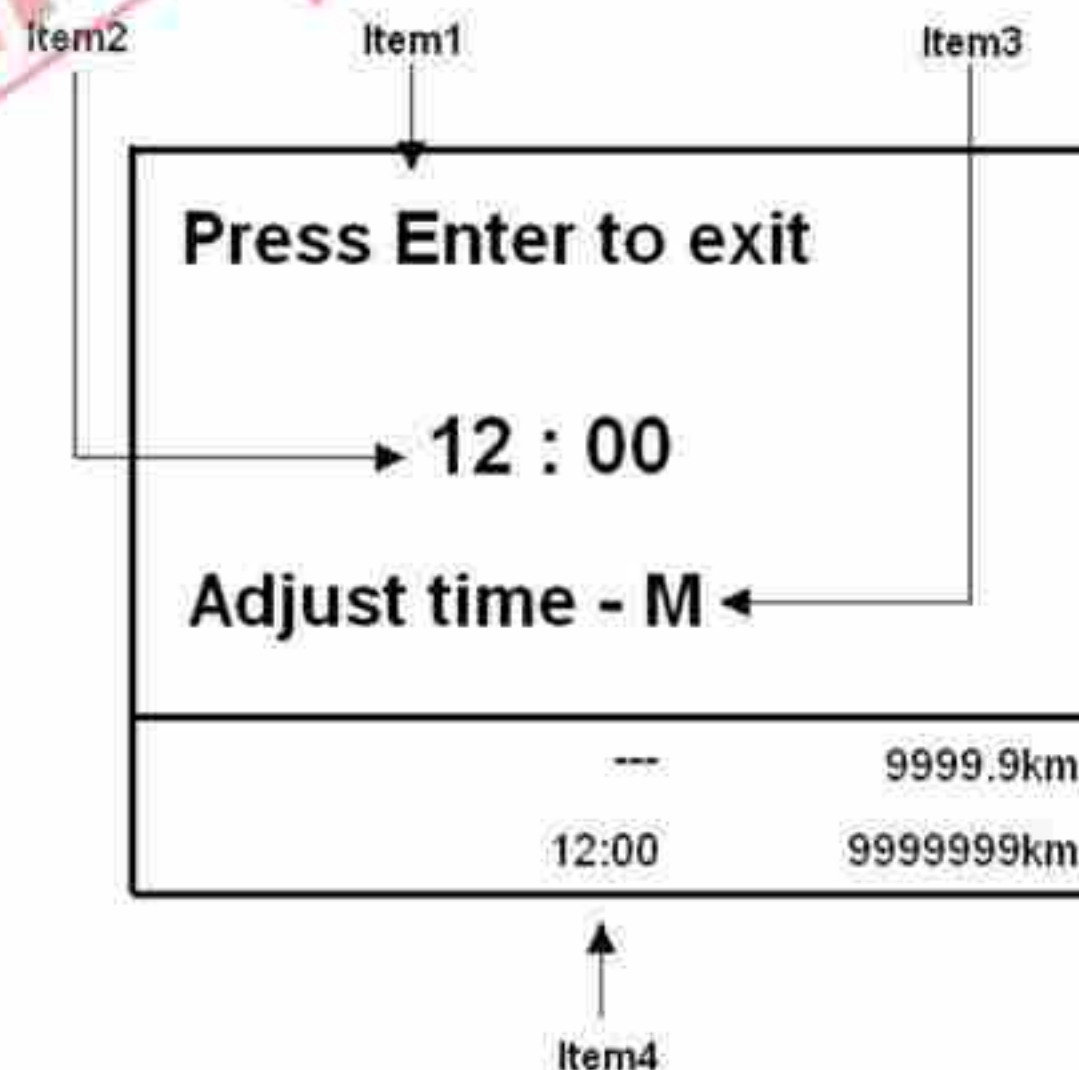
Item 4: Fuel consumption (per 100km) display (Q100km):

When the value of Q100km is beyond 150 L/100 km, cancel display of fuel consumption (1/100km), hour fuel consumption will display only.

● Time Adjustment

When system disconnects with VDO tachograph, enter time setting through operating menu knob.

Turn the menu knob to right until the background of *time adjustment* turns yellow, press down menu knob/switch and enter time adjustment interface (Refer to picture 6.8).



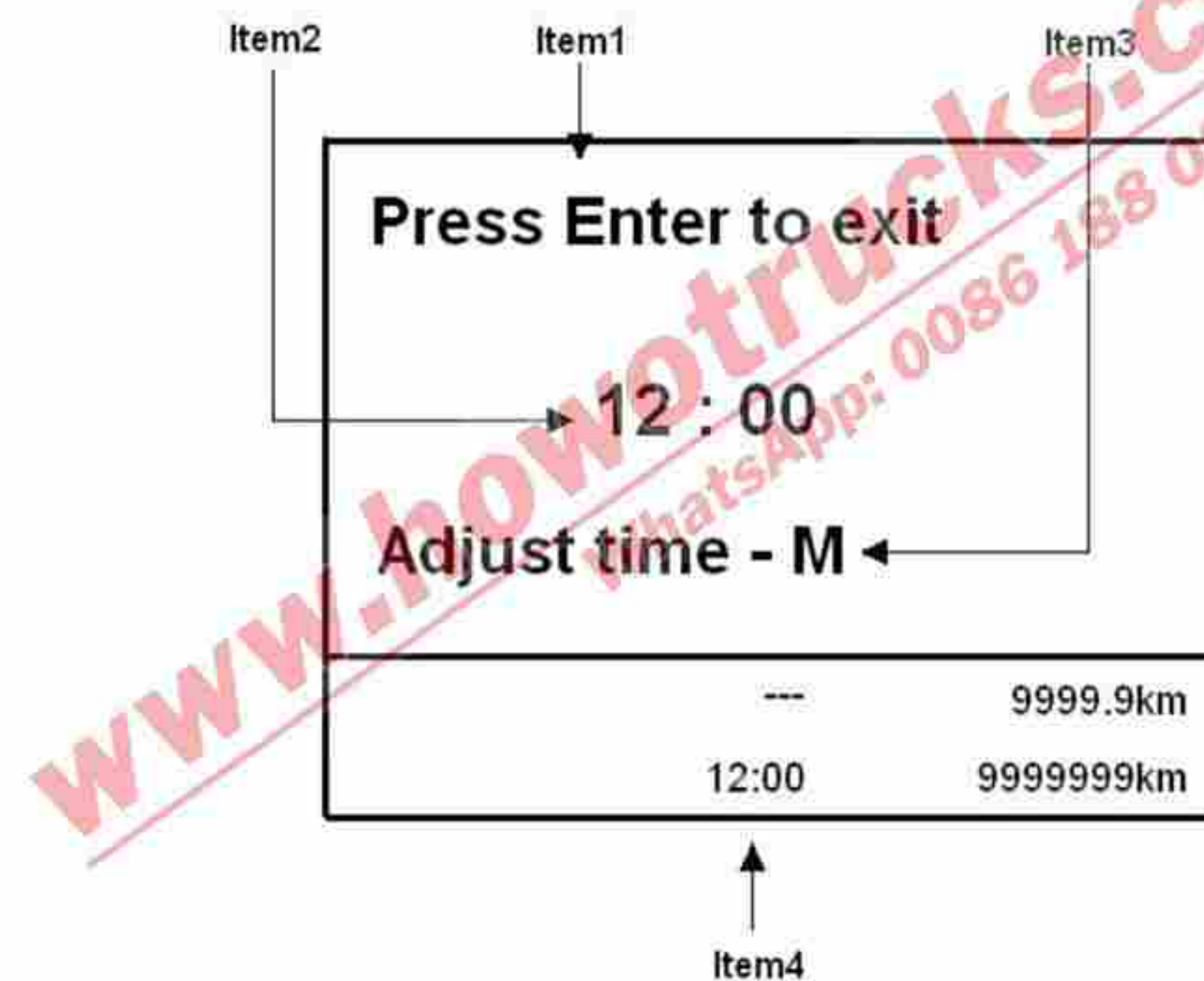
Pic. 6.8

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Press down the menu knob one time, enter into hour adjustment, and the hour position is flashing. Turn left to decrease, turn right to increase; the adjustment range is displayed circularly within 0-23.

Press down menu knob one time as soon as the hour meets requirement, it will enter minute adjustment mode which is as same as hour's. It is circled within 0-59. After adjusting in the right place, save it through pressing down menu knob referring to showing, and exit. (Picture 6.9)



Pic. 6.9

Exit method: The adjustment mode will exit if any switch of interaxle differential, interwheel differential or all-wheel driving turns off in this process, and the current time will be saved in the system.

The time setting interface will not be displayed if the VDO tachograph is installed and connected with CAN bus.

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6.5. System Errors Information

The errors information will be displayed on the LCD when the system errors occur, such as sensor connecting error, lower brake air pressure and overtime of CAN communication of engine, ABS (Refer to picture 6.10).

When new error occurs, it will displayed on LCD automatically.



Pic. 6.10 System error information

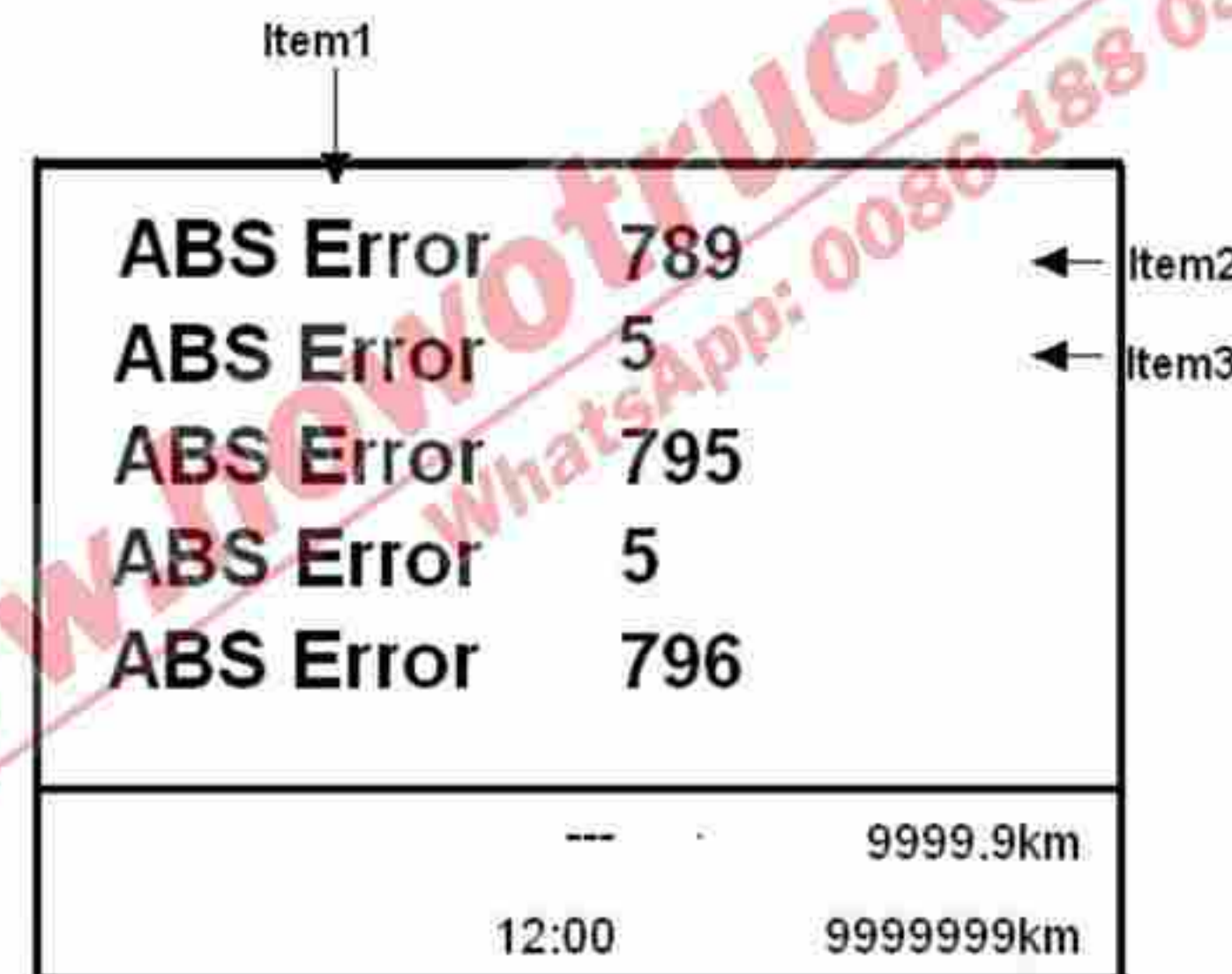
Operation

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- **Code Display Mode**

For the system in support of CAN-DMI diagnosis function, the SPN code and FMI code of error information of AMT and ABS systems will be displayed on the interface.

For the error information shown on the LCD, find out error source according to annex A *ABS (WABCO) errors code table*.



Pic. 6.11 ABS Error Code Display

Above picture 6.11 is the interface displaying ABS errors, when ABS errors occur.

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Take the case of ABS, above displayed information shows that:

Item 1 ----ABS error: error source is ABS system;

Item 2 ----789: SPN code, error position will be sensor of left front wheel as per Agreement J1939;

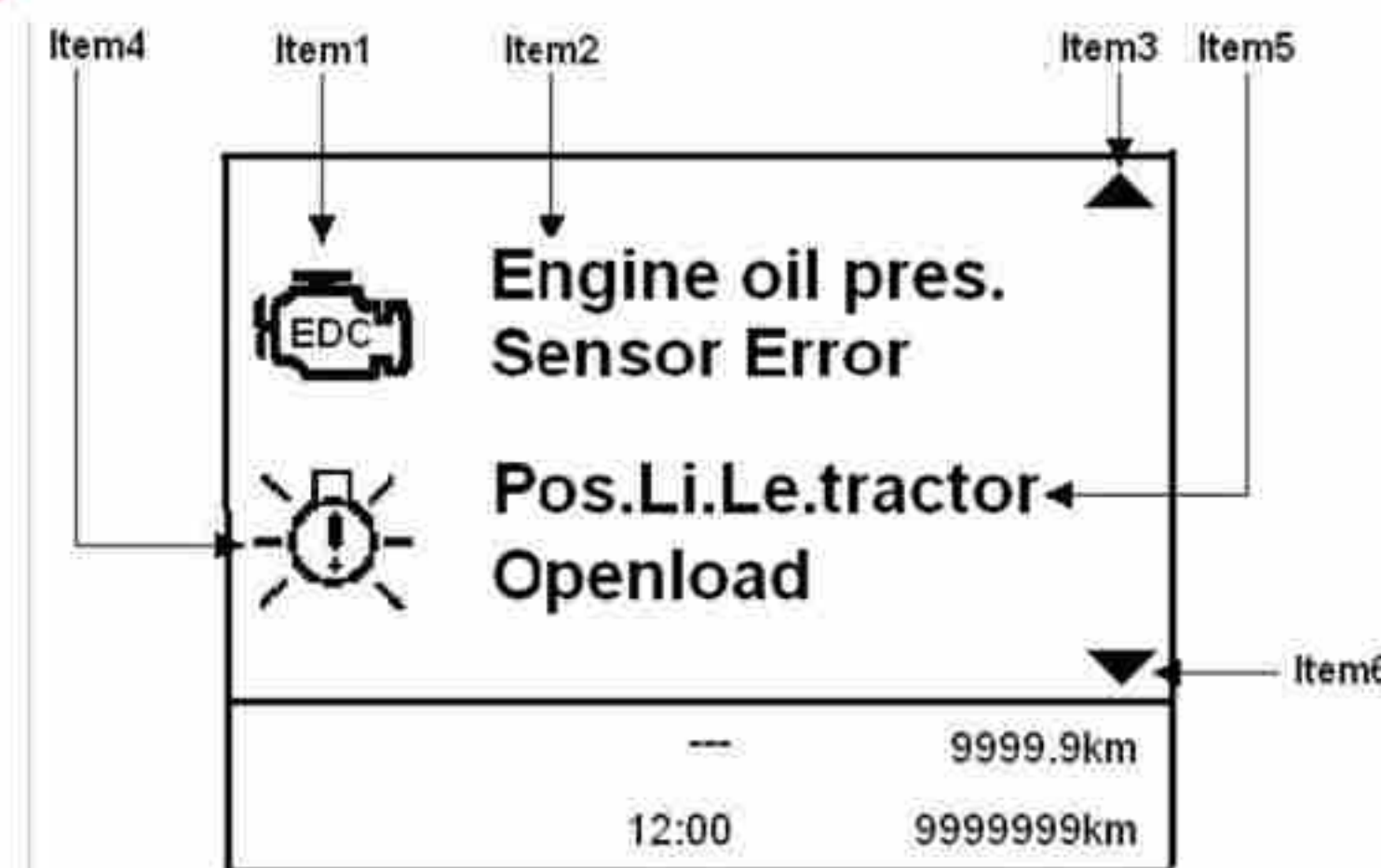
Item 3 ---- 5: FMI code, error position will be lower electricity than requirement or open circuit as per Agreement.

● Words Displaying Mode (Picture 6.12)

The error information excepting getting by DMI diagnosis of CAN system will be displayed on the interface in the form of words.

All displaying error information will be ranked as per priority level, if many errors happen, the errors with high priority will be displayed firstly such as the errors of brake, body safety and engine safety.

As per the error information shown on the LCD, find out error source and removing methods according to annex B *System error information and exit methods*.



Pic. 6.12 Words displaying Mode

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Item 1: The first error symbol;

Item 2: The text description of the first error. And it will be displaying on two rows if the information more than one row.

Item 3: The arrowhead of page up;

Item 4: The second error symbol;

Item 5: The text description of the second error. And it will be displaying on two rows if the information more than one row.

Item 6: The arrowhead of page down;

Item 3 will be displayed on the interface if the error information can not displayed on one page fully and not displayed on the first page as well;

Item 6 will be displayed on the interface if the error information can not displayed on one page fully and not displayed on the last page as well;

Item 3 and *Item 6* will be displayed on the interface at one time if the error information displays on many pages and not displayed on the first page or last page;

If error occurred is very serious, the serious error alarm indicator *STOP* will light up, and the buzzer alarms continuously when engine is working.



Notice:

For this case, please stop and check the vehicle at once! Restart to drive after errors are sloved, or it will cause loss of life and property!

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Press down menu knob, the buzzer alarm sound will close for a while, but it will restart to alarm one minute later or new serious error happened within one minute later on.

When common error happens, the alarm indicator lights up. Meanwhile, if the following error happens with engine operating, the buzzer alarm ten times in the form of one time per second.

After removing all errors, the buzzer will be silent, and symbols of all error information will disappear.

The alarm interface will return back to normal driving interface.

6.6. System Operation

Sleep mode means that the CBCU is under power saving status, and system does not work.

Operating mode means that CBCU is under working status, the program and all connectors are working.

There are three waken methods, different signal with different waken object, details as following:

Signals	Waking objects			
	CBCU	CMIC	VDR/MTCO	MCU
Key switch	✓	✓	✓	✓
Emergency alarm switch	✓	✓	X	X
Lighting switch	✓	✓	X	X

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- **Key Switch Wake-up**

In this case, all the system will be activated, electrify to self-check and LCD lights up.

All the system starts to work, the communication connections between them will be established and the vehicle enters driving status if connected with ABS or common rail engine.

- **Emergency Alarm Switch Wake-up**

Under the condition that the key switch close and the emergency alarm switch turn on only, body central computer will be waken up partly and the LCD of instrument does not work, in this case, the emergency alarm, that is, steering lamps light up.

- **Lighting Switch Wake-up**

When the key switch is off and lighting switch is on, function of CBCU will be wakened partly, and the lamps controlled by lighting switch are working such as position lamp, height lamp, side indicator, instrument backlighting and switch indicator.

Turn-on and turn-off voltages of emergency alarm switch wake-up and lighting switch wake-up can be defined by program.

Key switch delays 1 second after closed, the system will return to sleeping status which makes sure all systems exit working status safely.

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6.7. System Electrify and Self-checking

When the key switch is at the *ON* position, that is, bus system will self-check after KL15 turning on. After that, all parts will operate as following:

All instruments: Every instrument finger starts from mechanism terminal, and rotate to scale span within 2 seconds. Later on, the odometer and engine tachometer return to zero position, and air pressure gauge, fuel gauge and water temperature gauge show the real value of current system.

All indicators: All indicators will light up for one second, and then return to real condition.

LCD: Interval of two seconds, it displays CNHTC logo firstly and then displays normal driving interface (displays voltage and oil pressure).

After self-checking, if any switch of interaxle differential, interwheel differential lock switch and all-wheel driving switch is on, the differential lock indicator interface will be displayed;

If above mentioned differential locks are not engaged and error happens, the interface will enter into error information page;

If the two situations above mentioned do not exist, but the working indicator symbols of other indicator interface is working, the system will switch to indicator interface.

If above mentioned three situations do not appear, the system will stay on normal driving interface.

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6.8. System Turn-off

If the system is activated by emergency alarm switch or lighting switch, it will return to sleeping status after switch is off.

Disconnect switch, the system will delay for one second to return to sleeping status.

In this case, all working loads are off, and the instrument fingers go back to zero position, the instrument backlighting will be off.



Notice:

It is strictly prohibited to cut off electric circuit connection between battery and body center computer under unclosing key switch or other input power with wake-up function!

Otherwise, all components including the system control units, wire harness and electronic components of whole vehicle may be damaged, and system data may be lost and down to cause vehicle unavailable!

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6.9. LCD Menu and Interface Operation

Only one menu is displayed on the LCD every time. But the needed content is more than one item, so it is needed to switch between them.

Turn the menu knob to right to browse downwards;

Turn the menu knob to left to browse upwards;

When the displayed differential lock information is more than one screen, press down menu knob to display next information, all information can be displayed in turns.

If the screen is not enough to display needed error information, turn menu knob to right or left to display more information.



Notice:

When entering error information interface and other information interfaces, it will display from the very beginning every time.

After system electrifying and self-checking, interface displays in priority order.

1. Display differential lock information as long as differential lock starts to work, and other interface will exit immediately including error information, backlighting adjustment, time adjustment mode and so on;
2. If it is not under the first status, and new error happened, the error information will be displayed on the interface immediately after ending of lighting adjustment or time adjustment (if it is under this status);

Operation

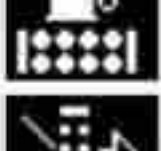
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3. If it is not under the first and second statuses, and new working information happened, the working information will display on the interface immediately after ending of lighting adjustment or time adjustment (if it is under this status);
4. If the second and third happens simultaneously, it will display 3 one minute after 2 is displayed.
5. If above mentioned does not exist, it will display normal driving information;
6. Excepting description mentioned in item 1 and 4 and under no any operation, all interfaces will return to normal driving interface after delaying one minute.

Operation

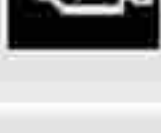
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Annex B Displayed Error Information and Failure Recovery Methods

Error Source	Display Content on LCD		Error Cause and Failure Recovery Methods
	Symbol	Wording Information	
Brake Circuit 1		Air pressure in brake circuit 1 is low	The air pressure of air reservoir is lower than 5.5x 0.1Mpa (5.5bar).
Brake Circuit 2		Air pressure in brake circuit 2 is low	
Assistant Air		Air pressure in auxliary air is low	
Engine Water Temperature		Engine water temperature is high	When engine is working, the temperature of cooling water is higher than 95°C. Please check engine cooling system.
Engine Oil Pressure		Engine oil pressure of is low	When engine is working, the engine oil circuit pressure is less than 0.6 x 0.1Mpa (0.6bar).
Engine Overspeed		Engine overspeed	The engine speed is over 2600 rpm for five seconds.
Fuel Height		Low fuel level in fuel tank	The rest of fuel of fuel tank is less than 1/8 of total capacity.
Oil Filter		Oil filter is jammed	Oil filter is jammed, please check and maintain oil fuel filter.
Fuel Filter Jam		Fuel filter is jammed	Fuel filter is jammed, please check and maintain fuel filter.
Air Filter		Air filter is jammed	Air filter is jammed, please check and maintain air filter.

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Battery And Generator		Generator can not charge.	The voltage at end of "D+" is lower than 24V after generator operation. Failure reasons: generator error or connection error.
Cab		Cab is unlocked	Cab is unlocked. The cause is that cab is unlocked or wire harness error.
Cab Unlocking		Cab door is unlocked	Cab door is not locked well on running.
Air Pressure Sensor (Brake Circuit 1)		Air pressure sensor error in brake circuit 1	The numerical value of resistance of sensor installed on brake circuit 1 is over normal range (open circuit of sensor) or connection error. Please measure sensor and check connection.
Air Pressure Sensor (Brake Circuit 2)		Air pressure sensor error in brake circuit 2	The numerical value of resistance of sensor installed on brake circuit 2 is over normal range (open circuit of sensor) or connection error. Please measure sensor and check connection.
Water Temperature Sensor		Engine water temperature sensor error	The numerical value of resistance of water temperature sensor installed on engine is over normal range (open circuit of sensor) or connection error. Please measure sensor and check connection.
Oil Pressure Sensor		Engine oil pressure sensor error	The numerical value of resistance of oil pressure sensor installed on engine is over normal range (open circuit of sensor) or connection error. Please measure sensor and check connection.
Oil Level Sensor		Fuel level sensor error	The numerical value of resistance of water temperature sensor installed on fuel tank over normal range (open circuit of sensor) or connection error. Please measure sensor and check connection.
Engine Communication Error		Engine communication error	If disconnect communication between engine and center computer, this error will display the information. Check CAN line and ECU of engine.
ABS Communication Error		ABS communication error	If disconnect communication between ABS and center computer, this error will display. Check CAN line and ECU of ABS.
Tachograph		Tachograph error	If disconnect communication between tachograph and center computer, this error will be displayed. Check CAN line and tachograph.

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System Voltage of Whole Vehicle		voltage is high	The voltage is higher than 31.5 V which is over normal permitted working voltage of electric system. It maybe damage electricity components. Please check generator, charging circuit and battery.
		Voltage is low	The voltage is lower than 20 V which maybe cause some system can not work normally. And maybe damage electricity components. Please check generator, charging circuit and battery.
Voltage Error of the Sixth Group		G6 power error (CBCU power)	The voltage of the sixth group is lower than system voltage. The circuit and fuse connected the second hole of plug-in 1 (total nine holes) of body center computer and power. Note: when error occurs, the load connected with this group power will be affected and unavailable.
Voltage Error Of The Fifth Group		G5 power error (CBCU power)	The voltage of the fifth group is lower than system voltage. The circuit and fuse connected the eighth hole of plug-in 1 (total nine holes) of body center computer and power. Note: when error occurs, the load connected with this group power will be affected and unavailable.
Voltage Error of The Forth Group		G4 power error and menu knob disabled	The voltage of the fourth group is lower than system voltage. The circuit and fuse connected the eighth hole of plug-in 5 (total nine holes) of body center computer and power. In this case, menu knob disabled, please press menu knob instead of ratating. Note: when error occurs, the load connected with this group power will be affected and unavailable.
Voltage Error of The Third Group		G3 power error (CBCU power)	The voltage of the third group is lower than system voltage. The circuit and fuse connected the second hole of plug-in 5 (total nine holes) of body center computer and power. Note: when error occurs, the load connected with this group power will be affected and unavailable.
Voltage Error of The Second Group		G2 power error (CBCU power)	The voltage of the second group is lower than system voltage. The circuit and fuse connected the sixth hole of plug-in 6 (total fifteen holes) of body center computer and power. Note: when error occurs, the load connected with this group power will be affected and unavailable.
Voltage Error of The First Group		G1 power error (CBCU power)	The voltage of the first group is lower than system voltage. The circuit and fuse connected the tenth hole of plug-in 6 (total fifteen holes) of body center computer and power. Note: when error occurs, the load connected with this group power will be affected and unavailable.

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Washing Motor		Washing motor error	Conducting wire from center computer to washing motor is short circuit to the ground, please check the circuit.
Tractor Truck Braking Lamp		Braking lamp is short circuit to the ground	Press down brake pedal, if the lamp does not light and displays the error information, it means short circuit. Check the circuit connected this lamp.
		Braking lamp overload	Press down brake pedal, if the braking lamp light up and display the error, it means the power of the lamp over permitted power range(30-54w). Check the lamp and examine whether the power meets the requirement or not.
		Braking lamp is open circuit.	Press down brake pedal, if displays the error, it means that the power of lamp is not in permitted range. Check lamp and circuit, examine whether the power meets the requirement and connection good or not.
Trailer Braking Lamp		Braking lamp is short circuit to the ground	After connecting trailer, press down brake pedal, if the lamp does not light and display the error information, it means short circuit. Check the circuit connected this lamp.
		Braking lamp overload	After connecting trailer, press down brake pedal, if the braking lamp light up and display the error, it means the power of the lamp over permitted power range (30-54w). Check the lamp and examine whether the power meets the requirement or not.
		Braking lamp is open circuit.	After connecting trailer, press down brake pedal, if display the error, it means that the power of lamp is not in permitted range. Check the lamp and circuit, examine whether the power meets the requirement and connection good or not.
Tractor Truck Left-front And Left-rear Steering Lamps		Left-front and left-rear steering lamps are short circuit to the ground.	If turn on left steering switch or emergency alarm switch and display error information on the LCD, it means short circuit. Please check circuit and lamp.
		Left-front and left-rear steering lamps overload	Turn on left steering switch or emergency alarm switch, if steering lamp light up, but display error information on LCD, it means the power of the lamp over permitted power range (30-54w). Examine whether the power meets the requirement or not.

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Left-front And Left-rear Steering Lamps		Left-front and left-rear steering lamps are open circuit.	Turn on the left steering switch or emergency alarm switch, if steering lamp lights up, but displays error information on LCD, it means that the power of lamp connected is lower than permitted power range (30-54w). Check the lamp power and connections whether they meet requirement or not.
Left-middle Steering Lamp Of Main Vehicle		Left-middle steering lamp is short circuit to the ground.	If turn on left steering switch or emergency alarm switch and displays error information on LCD, it means short circuit. Please check the circuit and lamp.
		Left-middle steering lamp overloads	Turn on the left steering or emergency alarm switch, if steering lamp lights up, but displays error information on LCD, it means that the power of lamp connected exceeds the permitted power range (15-27w). Check the lamp power whether it meets regulated power or not.
		Left-middle steering lamp is open circuit	Turn on the left steering switch or emergency alarm switch, if steering lamp lights up, but displays error information on LCD, it means that the power of lamp connected is lower than the permitted power range (15-27w). Check the lamp and circuit, examine the power and connections whether the power meets regulated power and connections are good or not.
Left-side Steering Lamp Of Trailer		Trailer left-side steering lamp is short circuit to the ground.	If turn on left steering switch or emergency alarm switch and displays error information on LCD, it means short circuit. Please check the circuit and lamp.
		Trailer left-side steering lamp overloads	Turn on the left steering switch or emergency alarm switch, if steering lamp lights up, but displays error information on LCD, it means the power of lamp connected exceeds the permitted power range (15-180w). Check the lamp power whether it meets regulated power or not.
		Trailer left-side steering lamp is open circuit.	Turn on the left steering switch or emergency alarm switch, if steering lamp lights up, but displays error information on LCD, it means that the power of lamp connected is lower than the permitted power range (15-180w). Check the lamp and circuit, examine the power and connections whether the power meets regulated power and connections are good or not.
Right-front And Right-rear Steering Lamp		Right-front and right-rear steering lamps are short circuit to the ground.	If turn on left steering switch or emergency alarm switch and displays error information on LCD, it means short circuit. Please check the circuit and lamp.
		Right-front and right-rear steering lamps overload.	Turn on the left steering switch or emergency alarm switch, if steering lamp lights up, but displays error information on LCD, it means the power of lamp connected exceeds the permitted power range (30-54w). Check the lamp power whether it meets regulated power or not.

Operation

Combination Instrument CMIC

Tractor Truck Right-front And Right-rear Steering Lamps		Right-front and right-rear steering lamps are open circuit.	Turn on the right steering switch or emergency alarm switch, if steering lamp lights up, but displays error information on LCD, it means the power of lamp connected is lower than permitted power range (30-54w). Check the lamp power and connections whether they meet requirement or not.
Tractor Truck Right-middle Steering Lamp		Right-middle steering lamp is short circuit to the ground.	If turn on right steering switch or emergency alarm switch and displays error information on LCD, it means short circuit. Please check the circuit and lamp.
		Right-middle steering lamp overloads	Turn on the right steering switch or emergency alarm switch, if steering lamp lights up, but displays error information on LCD, it means the power of lamp connected exceeds the permitted power range (15-27w). Check the lamp power whether it meets regulated power or not.
		Right-middle steering lamp is open circuit	Turn on the right steering switch or emergency alarm switch, if steering lamp lights up, but displays error information on LCD, it means that the power of lamp connected is lower than the permitted power range (15-27w). Check the lamp and circuit, examine the power and connections whether the power meets regulated power and connections are good or not.
Trailer Right-side Steering Lamp		Trailer right-side steering lamp is short circuit to the ground.	If turn on right steering switch or emergency alarm switch and displays error information on LCD, it means short circuit. Please check the circuit and lamp.
		Trailer right-side steering lamp overloads	Turn on the right steering switch or emergency alarm switch, if steering lamp lights up, but displays error information on LCD, it means the power of lamp connected exceeds the permitted power range (15-180w). Check the lamp power whether it meets regulated power or not.
		Trailer right-side steering lamp is open circuit.	Turn on the right steering switch or emergency alarm switch, if steering lamp lights up, but displays error information on LCD, it means that the power of lamp connected is less than the permitted power range (15-180w). Check the lamp and circuit, examine the power and connections whether the power meets regulated power and connections are good or not.
Tractor Truck Rear Fog Lamp		Rear fog lamp is short circuit to the ground	Turn on the switch of small lamp, front and rear fog lamp, if the lamps can not light up and displays the error information on LCD, it means short circuit. Check the circuit connected to the lamp.
		Rear fog lamp overload	Turn on the switch of small lamp, front and rear fog lamp, if the lamps light up and displays the error information on LCD, it means that the power of lamp connected goes beyond the permitted power range (30-54 w). Check the lamp and examine the power whether it meets requirement or not.

Operation

Combination Instrument CMIC

Tractor Truck Rear Fog Lamp		Rear fog lamp is open circuit.	Turn on the switch of small lamp, front and rear fog lamps, if displays the error information, it means that the power of lamp is not in the permitted power range. Check the lamps and connections, examine whether the power meets requirement and connections are good or not.
Tractor Truck Front Fog Lamp		Front fog lamp is short circuit to the ground.	Turn on the switch of small lamp and front fog lamp, if the lamp can not light up and displays the error information, it means short circuit. Check the circuit connected to the lamp.
		Front fog lamp overloads.	Turn on the switch of small lamp and front fog lamps; if the lamp lights up and displays error information, it means that the power of the connected lamp is beyond the permitted power range (98-182w). Check the lamp and examine whether the power meets requirement or not.
		Front fog lamp is open circuit.	Turn on the switch of small lamp and front fog lamp, if displays the error information, it means that the power of lamp is not in the permitted power range. Check the lamp and connections, examine whether the power meets the requirement and connections are good or not.
Trailer Rear Fog Lamp		Rear fog lamp of trailer is short circuit to the ground.	Turn on the switch of small lamp, front and rear fog lamps, if the lamp can not light up and displays the error information, it means short circuit. Check the circuit connected to the lamp.
		Trailer rear fog lamp overloads.	Turn on the switch of small lamp, front and rear fog lamps, if the lamp lights up and displays error information, it means the power of the connected lamp is beyond the permitted power range (30-54w). Check the lamp and examine whether the power meets requirement or not.
		Trailer rear fog lamp is open circuit.	Turn on the switch of small lamp, front and rear fog lamps, if displays the error information, it means that the power of lamp is not in the permitted power range. Check the lamp and connections, examine whether the power meets the requirement and connections are good or not.
Distance Headlamp		Relay of distance headlamp is short lamp to the ground.	Turn on the switch of distance headlamp, if displays the error information, it means short circuit between center computer and relay. Check the circuit and relay.
Dipped Headlamp		Dipped headlamp is short circuit to the ground.	Turn on the light switch with II gear and the light locates dipped light position, the lamp can not light up and display the error information, it means short circuit. Check circuit connected to lamp and lamp.
		Dipped headlamp overloads.	Turn on the light switch with II gear and the light locate dipped light position, the lamp lights up and displays the error information, it means the power of lamp is beyond the permitted power range (126-234w). Check the lamp, examine whether the power meets the requirement or not.

Operation

Combination Instrument CMIC

Dipped Headlamp		Dipped headlamp is open circuit.	Turn on the light switch with II gear and the switch locates dipped light position, and displays the error information, it means the power of lamp is not in the permitted power range. Check the lamp and circuit, examine whether the power meets the requirement and connections are good or not.
Tractor Truck Reversing Lamp		Reversing lamp is short lamp to the ground.	Turn on with the key located on reversing gear position, the reversing lamp can not light up and display the error information, it means short circuit. Check the lamp and circuit connected the lamp.
		Reversing lamp overloads.	Turn on with the key located on reversing gear position, the reversing lamp light up and displays the error information, it means that the power of lamp is beyond the permitted power range (30-54w). Check the lamp, examine whether the power meets requirement or not.
		The lamp is open circuit.	Turn on with the key located on reversing gear position, and displays the error information, it means that the power of lamp is not in the permitted power range. Check the lamp and circuit, examine whether the power meets the requirement and connections are good or not.
Trailer Reversing Lamp		Trailer reversing lamp is short circuit to the ground.	Turn on with the key located on reversing gear position, when the trailer connected, the trailer reversing lamp can not light up and displays the error information, it means short circuit. Check the lamp and circuit connected the lamp.
		Trailer reversing lamp overloads.	Turn on with the key located on reversing gear position, when the trailer connected, the reversing lamp light up and display the error information, it means that the power of lamp is beyond the permitted power range (30-54w). Check the lamp, examine whether the power meets requirement or not.
		Trailer lamp is open circuit	Turn on with the key located on reversing gear position, when the trailer connected, if displays the error information, it means that the power of lamp is not in the permitted power range. Check the lamp and circuit, examine whether the power meets the requirement and connections are good or not.
Lamp Switch		Switch lamp is short lamp to the ground.	Turn on the key and when turn on the switch of small lamp, switch lamp can not light up and displays the error information, it means short circuit. Check the lamp and circuit connected the lamp.

Operation

Combination Instrument CMIC

Tractor Truck Left Position Lamp		Left-side position is short circuit to the ground.	Turn on the key and when turn on the switch of small lamp, left-side position lamp (including flank lamp, height lamp, position lamp and license plate lamp) can not light up and display the error information, it means short circuit. Check the lamp and circuit connected the lamp.
		Left-side position overloads.	Turn on the key and when turn on the switch of small lamp, left-side position lamp (including flank lamp, height lamp, position lamp and license plate lamp) light up and displays the error information, it means that the power of lamp is beyond the permitted power range. Check the lamp, examine whether the power meets requirement or not.
		Left-side position lamp is open circuit.	Turn on the key and when turn on the switch of small lamp, if displays the error information, it means that the power of lamp is not in the permitted power range. Check the lamp and circuit, examine whether the power meets the requirement and connections are good or not.
Tractor Truck Right Position Lamp		Right-side position lamp is short circuit to the ground	Turn on the key and when turn on the switch of small lamp, right-side position lamp (including flank lamp, height lamp, position lamp and license plate lamp) can not light up and displays the error information, it means short circuit. Check the lamp and circuit connected the lamp.
		Right-side position overloads.	Turn on the key and when turn on the switch of small lamp, left-side position lamp (including flank lamp, height lamp, position lamp and license plate lamp) light up and displays the error information, it means that the power of lamp is beyond the permitted power range (35-60w). Check the lamp, examine whether the power meets requirement or not.
		Right-side position lamp is open circuit.	Turn on the key and when turn on the switch of small lamp, if displays the error information, it means that the power of lamp is not in the permitted power range. Check the lamp and circuit, examine whether the power meets the requirement and connections are in good condition.
Trailer Position Lamp Reply		Trailer position lamp relay is short circuit to the ground.	When displaying the error, please check the circuit and relay.

Operation

Combination Instrument CMIC

Other Error Analysis of Bus System Between Instrument or CBCU:

- a) When connection is disconnected, and error already exists, the contents will display three seconds on the LCD of instrument, *STOP* will flash three minutes and backlight is up.
- b) If error already exists before starting the key switch, instrument can not light up, while lamps work, it means that the CBCU is normal, please check instrument or circuit connections.
- c) Under normal connections, if all in-out does not work, please check CBCU.

7. Air pressure gauge of brake circle 1

8. Air pressure gauge of brake circle 2

It is used for display air pressure value of brake circle 1 and brake circle 2.

When any alarm switch of air pressure circles connects (the air pressure of brake circle less than 5.5x0.1 MPa), the lower air pressure alarm indicator will light up, in the meanwhile, the serious alarm indicator lights up as well, and the buzzer will alarm during running.



Notice:

In this case, stop and check the vehicle at once, otherwise it will cause loss of life and property!

Operation

Combination Instrument CMIC

9. Indicators



Signal lamp symbol and function:

Code	Description	Color	Code	Description	Color
1	Left steering indicator	Green	13	Serous alarm indicator	Red
2	Right steering indicator	Green	14	Preheat working indicator	Yellow
3	Oil pressure alarm indicator	Red	15	Fuel lower level alarm indicator	Yellow
4	Low air pressure alarm indicator	Red	16	Air filter plug alarm indicator	Yellow
5	Parking brake indicator	Red	17	Cab unlocking alarm indicator	Red
6	Trailer steering indicator	Green	18	Engine error indicator	Yellow
7	Safety belt alarm indicator	Red	19	Transmission lower gear range indicator	Green
8	High water temperature alarm indicator	Red	20	Common alarm indicator	Yellow
9	Charging indicator	Red	21	Tractor truck ABS indicator	Yellow
10	High beam indicator	blue	22	Trailer ABS indicator	Yellow
11	Front fog lamp indicator	Green	23	ASR indicator	Yellow
12	Rear fog lamp indicator	Yellow			

Operation

Combination Instrument CMIC

1. Left steering indicator

2. Right steering indicator

Left-side or right-side steering indicator will flash according to steering signal, the flash frequency of indicator will be around two times than normal situation if one of steering lamp meets errors. All the steering lamps and left/right side indicators will flash when press down alarm indicator switch.

3. Lower oil pressure alarm indicator

This lamp will light up when the engine oil pressure is low. In this case, stop the vehicle and engine, check immediately or contact with local service station to maintain if it is necessary.

4. Lower air pressure alarm indicator

This lamp will light up when the brake air pressure is lower. Contact with local service station to maintain if it is necessary.

5. Parking brake indicator

This lamp will light up when the vehicle stops and turn on the hand brake switch.

6. Trailer steering indicator

The green lamp will light up when turn on trailer steering indicator; this lamp will display with continuously flash as long as the lamp meets errors.

7. Safety belt alarm indicator

This lamp will light up with alarm, if driver does not fasten safety belt after starting.

Operation

Combination Instrument CMIC

8. Higher water temperature alarm indicator

This lamp will light up when the water temperature is high, for the time being, stop the vehicle and check water level of engine. Contact with local service station to maintain if it is necessary.

9. Charging indicator

When the generator works with normal situation, the lamp is off; when the generator meets errors, the lamp will light up.

10. High beam indicator

This lamp will light up when turn on the headlamp switch and distance lamp switch.

11. Front fog lamp indicator

The green lamp will flash when turn on the front fog lamp indicator; this lamp will display with continuously flash as long as the lamps meet errors.

12. Rear fog lamp indicator

The yellow lamp will flash when turn on the front fog lamp indicator; this lamp will display with continuously flash as long as the lamps meet errors.

13. Serious alarm indicator

This lamp will light up when the vehicle meets serious errors. For the time being, stop vehicle and check, contact with local service station to maintain if it is necessary.

Operation

Combination Instrument CMIC

14. Preheating indicator

When turn on starting switch to start the engine, the lamp will light up to preheat the engine; and the lamp will be off after engine starting.

15. Low fuel level alarm indicator

This lamp will light up when the fuel level of fuel tank is low. In this case, supply the fuel to fuel tank.

16. Air filter plug alarm indicator

The lamp will light up when much dust on filter lead to air intake blocked. Clean the filter or change it.

17. Cab unlocking alarm indicator

This lamp will light up when the door unlock. In this case, lock the door again.

18. Engine error indicator

This lamp will light up when engine meets errors. In this case, stop the vehicle and check, contact with the local service station to maintain if it is necessary.

19. Transmission lower speed range indicator

This lamp will light up when the transmission is on lower speed range (1~4 gear).

20. Common alarm indicator

This lamp will light up when the vehicle meets common errors. In this case, stop the vehicle and check, contact with the local service station to maintain if it is necessary.

Operation

Combination Instrument CMIC

21. Tractor truck ABS indicator

The ABS system will operate when the tractor truck brakes. This lamp will light up when the ABS system meets errors.

22. Trailer ABS indicator

The ABS system will operate when the trailer brake. This lamp will light up when the ABS system meets errors.

23. ASR indicator

The ASR system will operate when the vehicle slide during starting or accelerating. This lamp will light up when the ABS system meets errors.

Operation

Combination Instrument CMIC



Operation

Tilting Switch Symbol

Roller switches and function illumination

(Including indicators. It is invalid when the key switch is on 1 gear, unless specified description)

Item	Description	Status	Function	Remarks
1	Distance Lamp Switch	0	Off	
		1	On	
2	Interwheel Differential	0	Off	
		1	On	Interwheel differential magnetic valve will be driven, and the indicator will be flash until interwheel differential switch put in right place, the indicator light up completely.
3	Front Fog Lamp Switch	0	Off	
		1	On	Precondition: Shift 1 of lighting switch have been turned on.
4	Interaxle Differential	0	Off	
		1	On	Interaxle differential magnetic valve will be driven, and the indicator will be flash until interwheel differential switch put in right place when the indicator light up fully.
5	Rear Fog Lamp Switch	0	Off	
		1	On	Precondition: 1) Shift 1 of lighting switch have been turned on, front fog lamp have been turned on also; or 2) Shift 2 of lighting switch have been turned on.
6	Working Lamp Switch	0	Off	
		1	On	Working lamp driven
7	Serious Alarm Switch	0	Off	
		1	On	1,2,3,4 shifts of key switch are available.

Operation

Tilting Switch Symbols

8	ECU diagnostic switch	0	Off	
		1	On	
9	Horn transferring switch	0	Electric horn	Press horn button on the steering wheel
		1	Air horn	Press horn button on the steering wheel
10	ABS Checking switch	0		
		1		
11	Screen adjustment button			



Notice:

After pushing the interaxle diff-lock switch, the lamp will flash, if there is feedback signal from interaxle diff-lock switch within 5 seconds, the lamp for interaxle diff-lock will be on; if there is no feedback signal, check driving output of interaxle diff-lock magnetic valve, and if the output is normal, the lamp will be on.

Operation

Main Switch

The main switch is at outside of battery box on right side member.



Notice:

Switch off if out of using for long time to avoid accident.



1- Main switch

Key

The key is on the steering pillar.

Position	Purpose	Remarks
1 (ACC)	Launch the facilities of parking	
2 (LOCK)	Power cut	Key may be removed
3 (ON)	Driving	
4 (START)	Start engine	Return to position 3 automatically



Operation

Unlock/Lock the Vehicle with Key

Operation on Door



Warning:

Driving without door locked is forbidden!

Use the Door Lock from Outside

Open the door: When the door is not locked, pull down the handle to open the door; if the door is locked, insert the key and turn 180° anticlockwise, then pull the handle to open.

Lock the door: Insert the key and turn 180° clockwise.

Use the Door Lock from Inside

Open the door: Turn the handle and push the door to open.

Lock the door: Close the door. If push the lock switch, door can not be opened from outside.



① Lock ② Unlock



① Locking handle
② Locking switch

Operation

Manual Glass Lifter

Manual Glass Lift:

Turn the handle to lift or decline the glass.



Radio with USB Connection



Radio with USB Connection



Notice:

1. Adjust volume not to disturb your hearing others' horn.
2. To avoid short circuit, please connect cathode of battery after connecting the equipment.

Operation

Radio with USB Connection

Panel Instruction

- ① Power supply switch
- ②, ③ Channel search, USB playing chooser
- ④ SEL button, sound mode
- ⑤, ⑥, ⑦, ⑨, ⑩, ⑪ Settings
- ⑧ USB socket
- ⑫ DSP sound resource setting
- ⑬ AUX button
- ⑭ Reset
- ⑮ AST auto searching and saving
- ⑯ SRC USB/AUX shifting
- ⑰ BND change to FM/AM
- ⑱ LCD screen

Sound Adjustment

On/Off	Button 1
Volume	Button 1
Sound and EQ mode	Button 4



Notice:

Operate within 2 seconds after chosen the mode, or it will turn back to volume control.

Radio

BND, button 14, shift between FM and AM

Auto searching: Press button 2 or 3 till channel received. Press again for next searching.

Operation

Radio with USB Connection

Auto searching—pressing button 2 or 3 more than 2 seconds (at least two seconds) will shift to manual searching. Change one frequency point with one press, and it will change to short pressing mode with no operation during 3 seconds.

Auto channel saving (AST)—Button 15. Channels will be saved by setting button 1-6.

Settings buttons (1-6)—Turn to the wanted channel and press relevant setting button at least two seconds to save the channel.

USB Playing

Connection—Insert flash memory and press SRC 16 button to shift to USB mode.

File Type —Sound file is *.mp3; Storage type is FAT16 and FAT32 in segments; bit speed is 8—320kbps.

Quick choosing—Press one combination of 1-6 or any one of them quickly, it will play automatically after 3 seconds; shortly press any one of 1-6, for instance 2, it will play the second song; press channel button 2 or 3, you can choose previous or next song.



Notice:

Please remove the flash memory after turning off.

Operation

Tachograph

Operation Method

The tachograph will be on automatically when the voltage between power line and ground is above 9V and applicable voltage scope is 9~36V.



Operation and Displaying

Generally, the tachograph shows time and speed.

There 4 buttons: menu, upward, downward and print. Menu button is for page down of the screen. 'Upward' and 'downward' buttons are to show the information which is out of one screen. 'Print' button is for printing the information.

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

Operation

Tachograph

Printing

When under parking, press 'print' button to print data according to operation shown on screen.



Notice:

1. No printing when driving.
2. It always prints data of current driver and no recognition of drivers.

Specification Settings

IC card is for recognizing drivers and position of tachograph.

Notes: when inserting the IC card, make the CMOS chip upward and quickly insert or remove.

Vehicle character coefficient settings: insert the IC card and the screen will show 'vehicle coefficient settings: 624', then press 'upward' and 'downward' to adjust the value. Remove the IC card when comes to the needed value and the settings will be saved. Excessive speed and time can be set as well in the time way.

Operation

Air Conditioner

1. Controller

1.1 Panel:

- ① Screen
- ② Wind power adjuster
- ③ Defrost wind directions:
head, foot, foot defrost and defrost.
- ④ Air inlet mode select: circulatory selecting
- ⑤ Power off
- ⑥ Auto
- ⑦ Wind mode select:
head, foot, foot defrost and defrost.
- ⑧ Cooling
- ⑨ Temperature settings

1.2 Screen Showing

- ① Wind power
- ② Air inlet
- ③ Wind mode
- ④ Set temperature and real temperature
- ⑤ Aeration
- ⑥ Cooling



Operation

Air Conditioner

2. Instruction

2.1 Set Needed Inside Temperature

Adjust the button to your needed temperature with scope 'LO', '18°C--29°C' and 'HI'. 'LO' to make cooler and 'HI' to make warmer.

Notes: Normally 22°C~26°C is better.

2.2 Wind Power Setting

Wind power can be set manually or automatically.



Notice:

Totally nine (9) grades of wind power and changes slowly after you pressing the button.

2.3 Night Vision Function

Turn on small lamp, the buttons' symbol can be shown as other symbols.

2.4 Wind Mode Selecting

Four (4) modes can be selected by wind mode button and defrost button.

Operation

Air Conditioner

2.5 Air inlet mode selecting

Inside circulation can be adopted within short time in following cases:

- In hot weather, quickly reduces temperature inside.
- In cold weather, quickly rises temperature inside.
- Bad air outside, for instance dusty or smelly.

3. Notice

3.1 Termly maintain A/C.

3.2 Clean the panel with soft and dry cloth. Wet and hard cloth may cause damages to panel, buttons and screen.

3.3 Do not touch the screen with finger, hard or grease things to cause the screen displays unclearly.

3.4 Refrigerant filling port is on compressor and pipe. Please contact technician if the refrigerant is insufficient. When refrigerant is insufficient, white foam can be seen from window; when refrigerant is sufficient, colorless liquid can be seen.

3.5 If defect occurs to the system, please contact with technician.

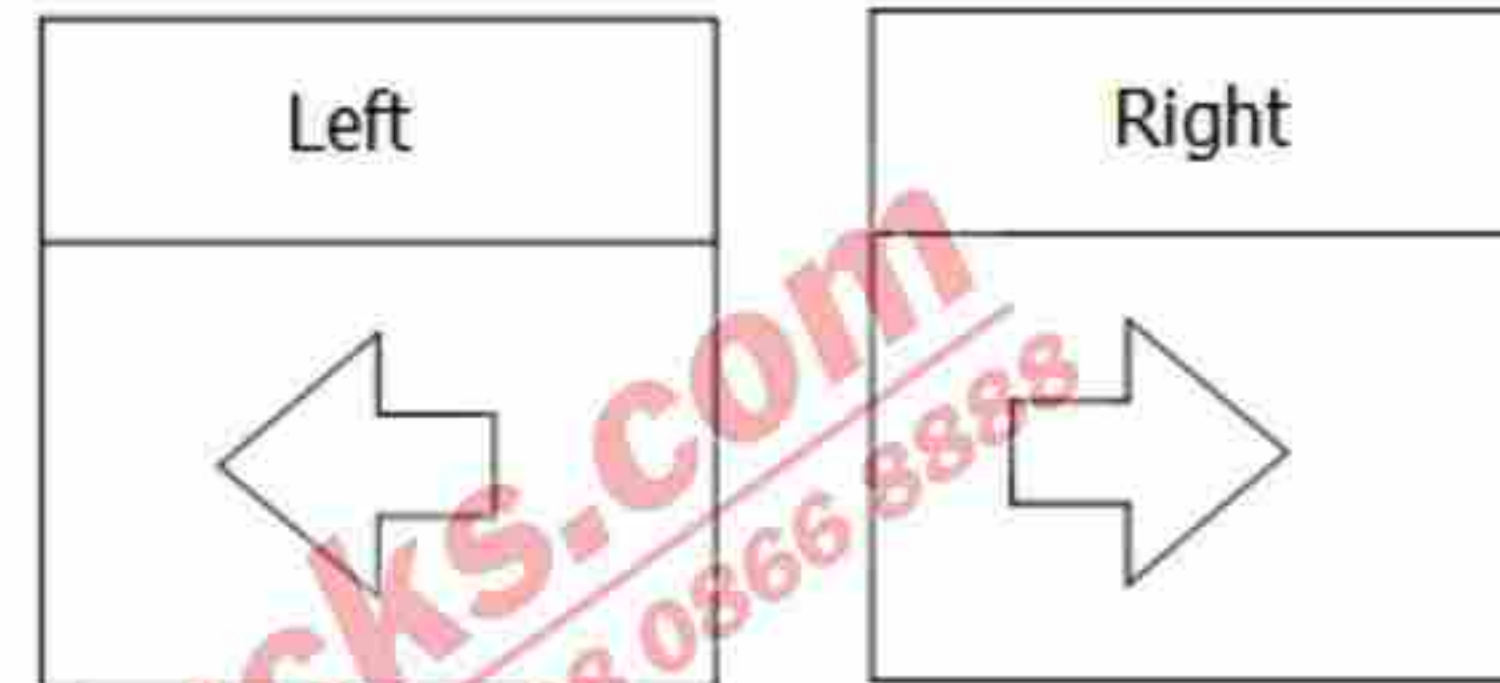
Operation

Steering Indicator and Alarm

1. Steering Indicator:



- ① Turn right
- ② Turn left

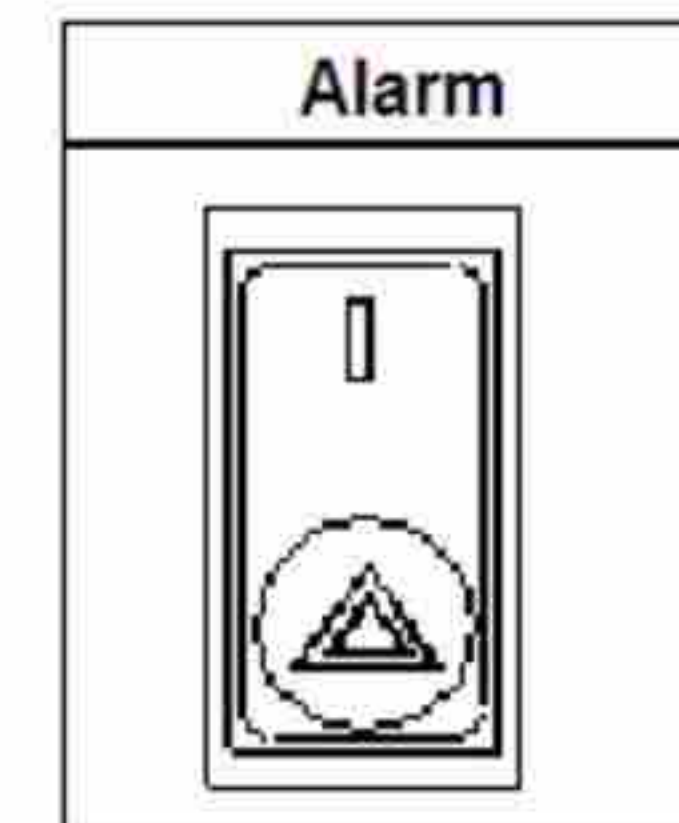


Notice:

When the steering lights on, the indicating lamp on the instrument panel also flashes (indicators on trailers also will flash). If some bulb of indicating lamp is damaged, the flash and indicating lamp will be more frequent (frequent doubling); defect notice will be shown on information screen at the same time.

2. Alarm

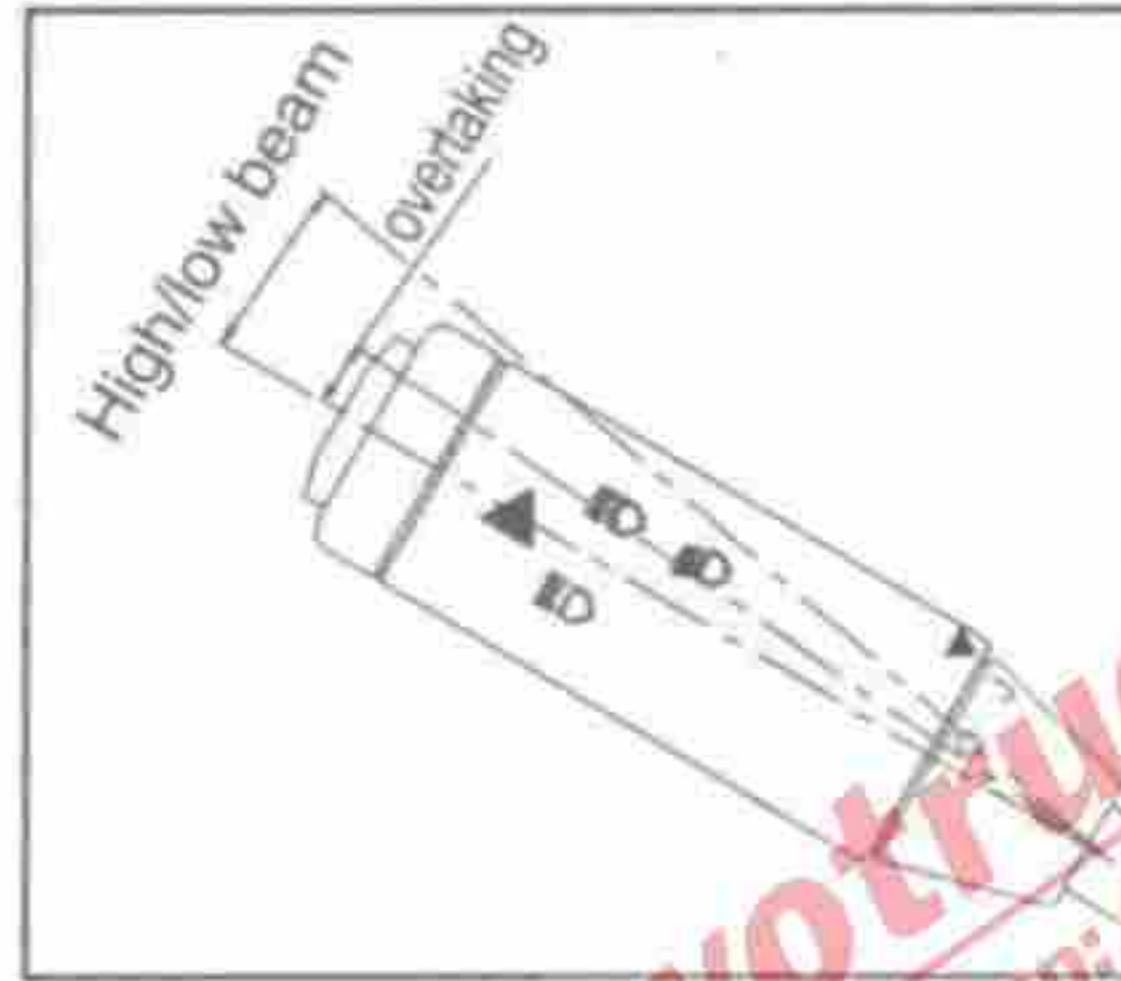
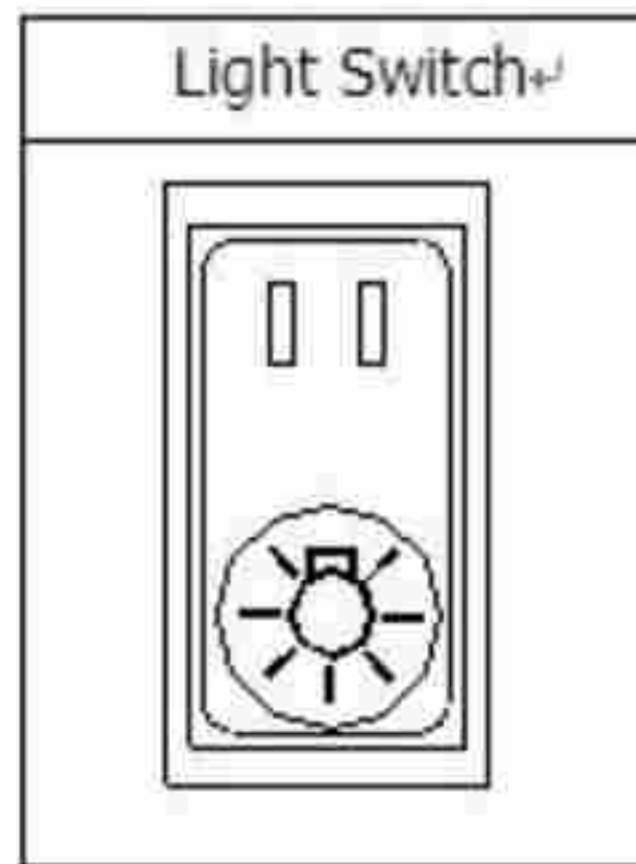
Power on and press alarm switch, then all the steering indicators and indicating lamps will be on.



Operation

High Beam

Operation of Front Lamp:



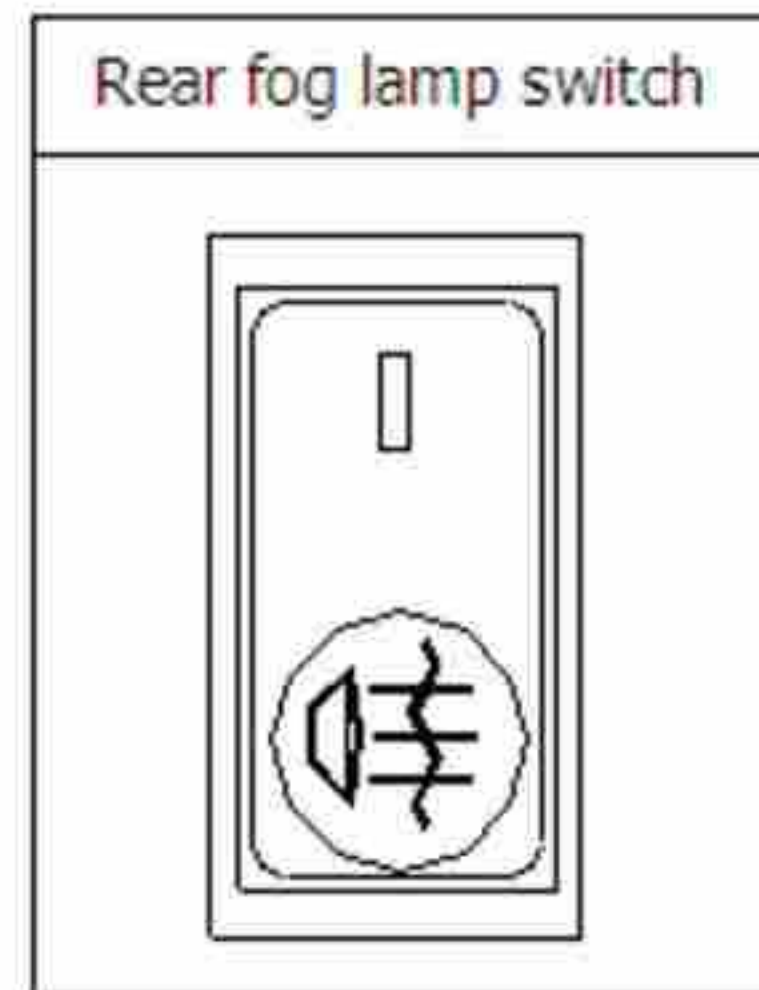
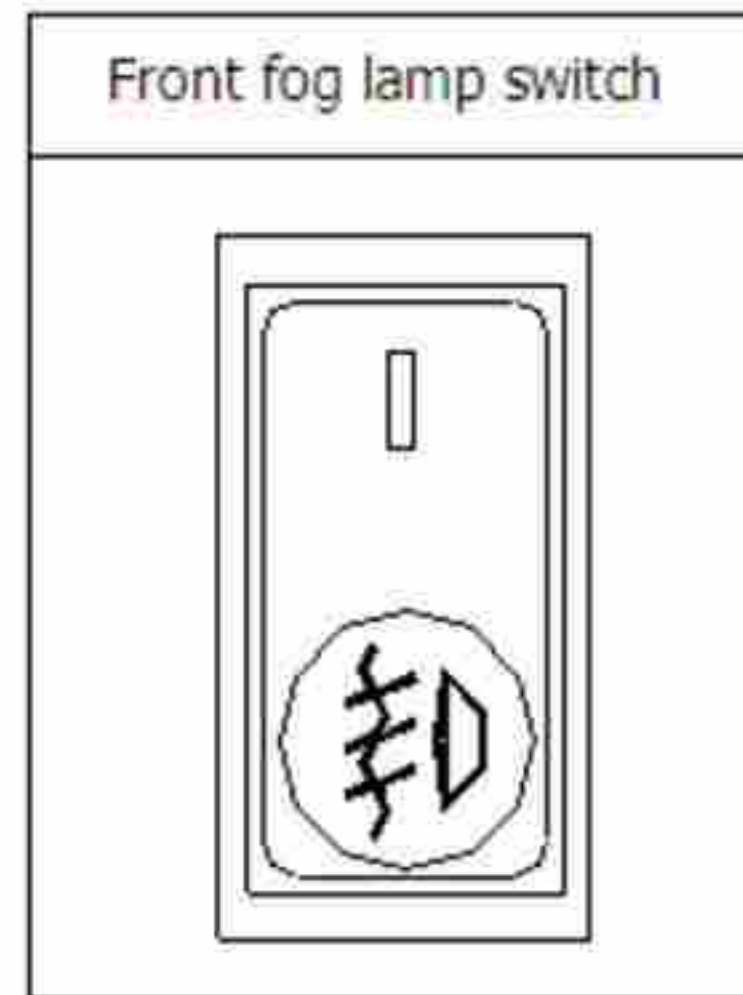
① Front lamp ② Assist high beam

Combination switch handle is at middle. When the key is at position 3 and lamp switch is at shift 2, the low or high beam will be on. Then shift the handle to 4, the low and high beam will be both on. Lift the handle to 10 degree, the low or high beam will change to the other. The handle can reposition itself.

When overtaking/passing or meeting vehicles at day time, lift the handle by 4 degrees to turn on high beam, then the handle will reposition after your action.

Operation

Fog Lamp and Inside Lamp



① Front fog lamp



Notice:

Fog lamps can only be operated when the lamp switch is on.

1. Front fog lamp

Lamp switch is at position 1;

Press front fog lamp switch, the front fog lamp will be on and also indicator on the instrument panel.

2. Rear fog lamp

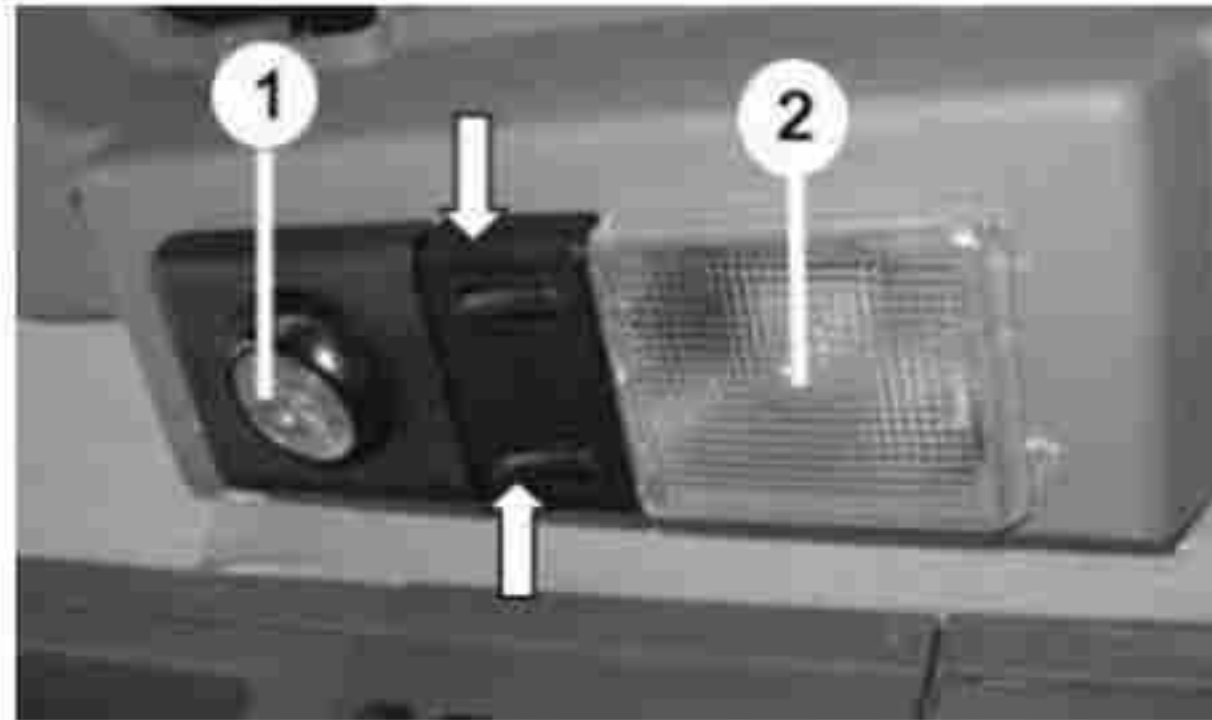
Lamp switch is at position 2, or the front fog lamp is on;

Press rear fog lamp switch, the rear fog lamp will be on and also indicator on the instrument panel.

Operation

Fog Lamp and Inside Lamp

Inside Lamp



① Reading lamp ② Illuminating



Sleeper lamp

3.1 Turn on or off inside lamp

Press left of inside lamp switch, then when the door opens, inside lamp system will automatically be on.

3.2 Continuous illuminating

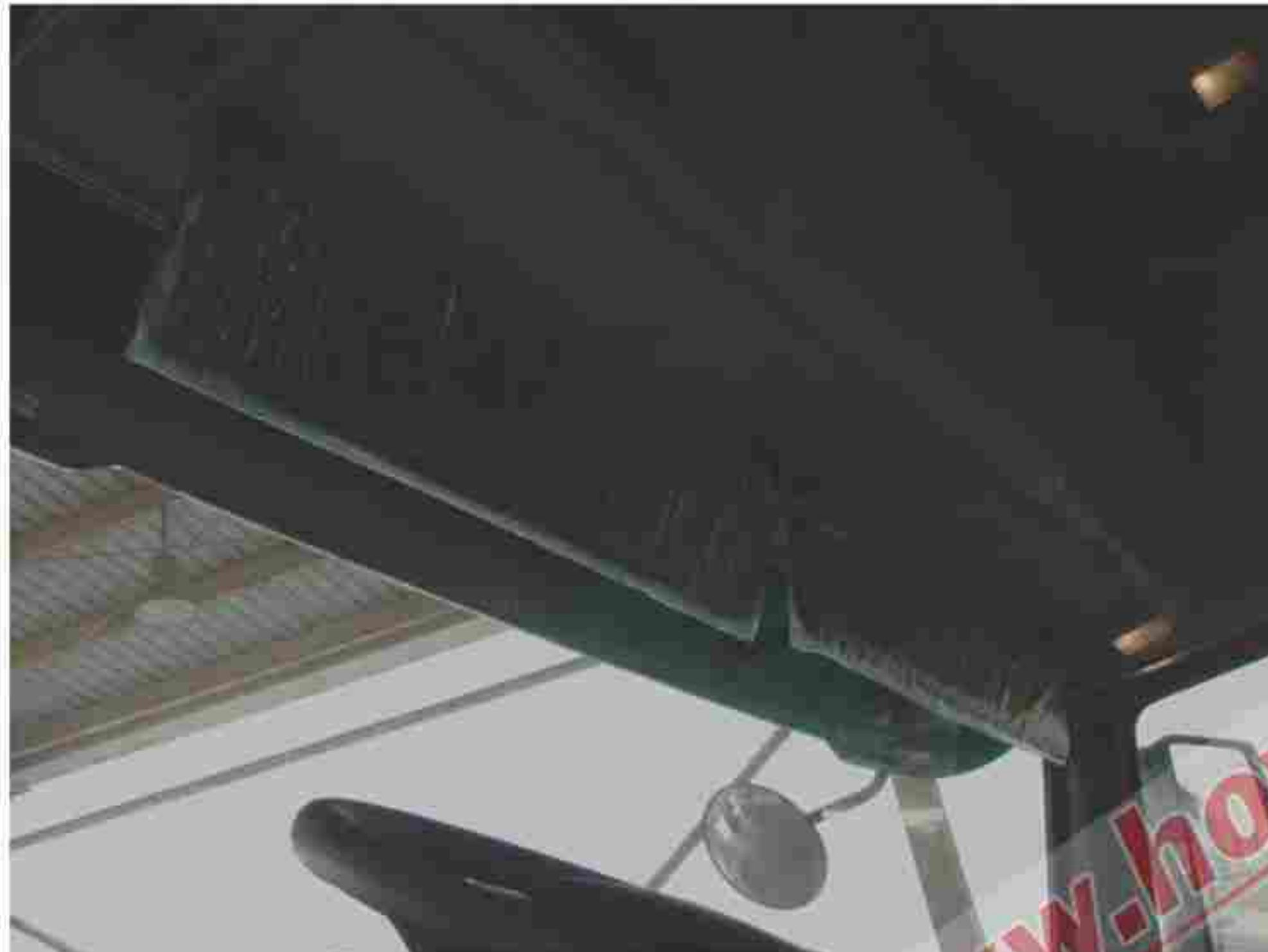
Press right side of inside lamp switch.

3.3 Turn off the switch

Turn the switch to the middle.

Operation

Sun Visor



Windscreen Wiper and Cleaner



Operation of Wiper	
0	Off
J	Intermission
I	Low
II	High
Press	Windscreen cleaner

Operation of windscreen cleaner: press left arrowhead to start the windscreen cleaner.

Operation

Rearview Mirror



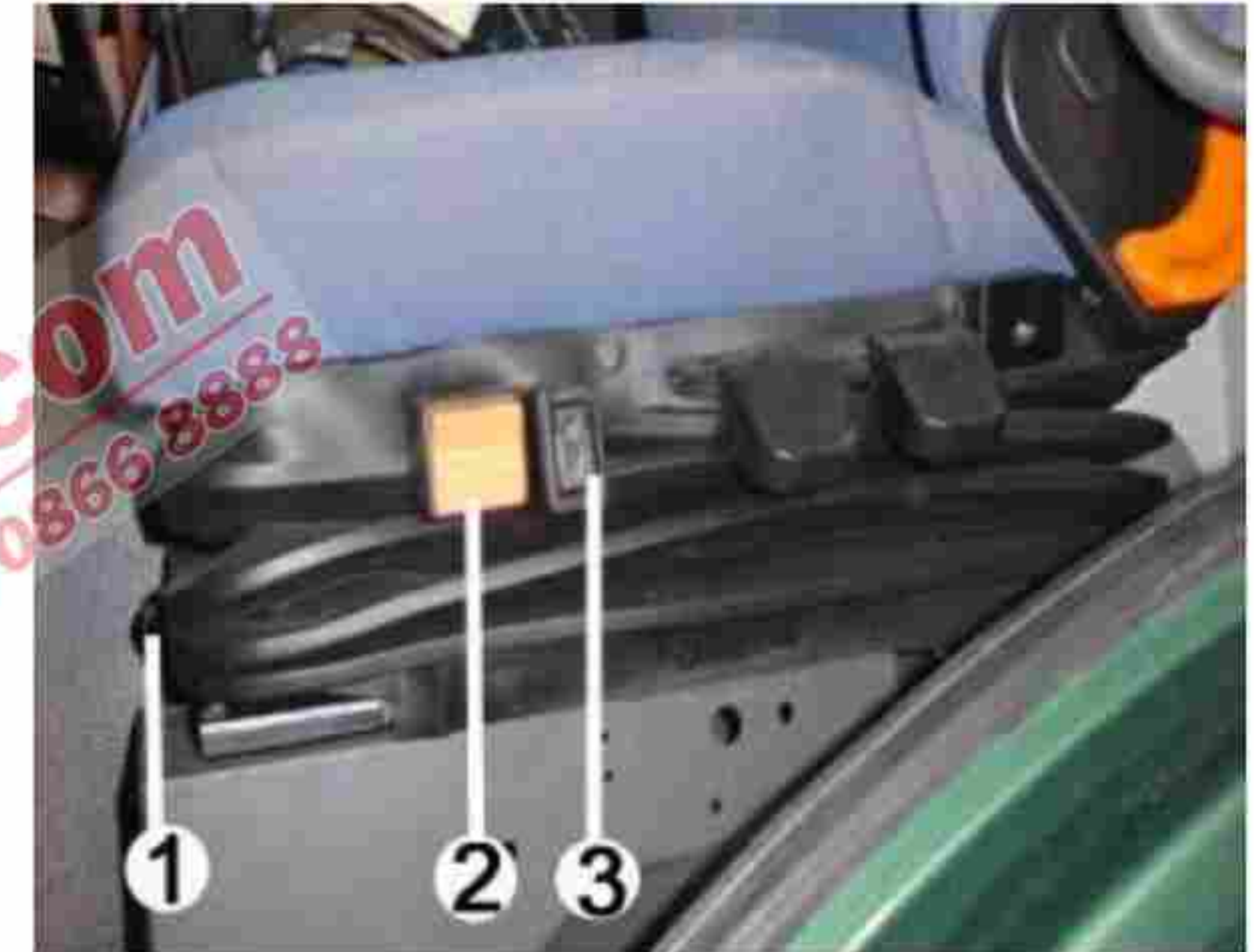
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Operation

Seat

1. Instruction

- ① Forward and backward adjustment
Lift the handle and adjust the seat position.
- ② Waist support
Press lower end of controlling valve, the air charging begins; press higher end of the valve, the deflation begins.
- ③ Heating
Press higher end of switch, the temperature will rise up to the set on; press lower end of switch, the temperature will be kept; press the middle to cut.



Operation

Seat

- ④ Front height adjustment
Lightly lift the handle and force the front of the seat upward or downward to adjust the front of the seat. Free the handle when the position is all right.
- ⑤ Rear height adjustment
Lightly lift the handle and force the rear of the seat upward or downward to adjust the rear of the seat. Free the handle when the position is all right.
- ⑥ Backrest adjustable handle
Turn the handle to adjust the backrest to right position.
- ⑦ Backrest elevation adjustment
List the handle to adjust the elevation of backrest.

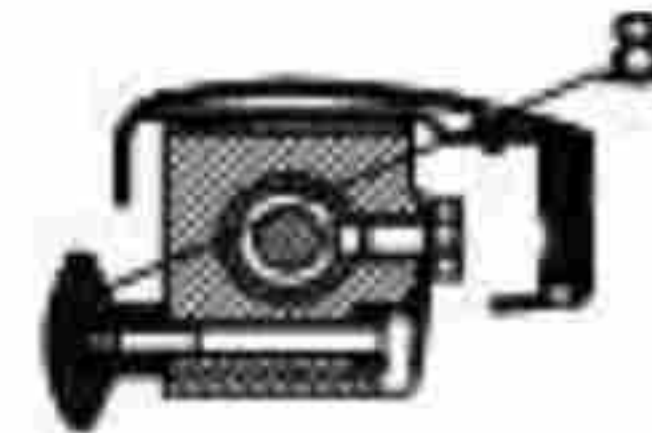
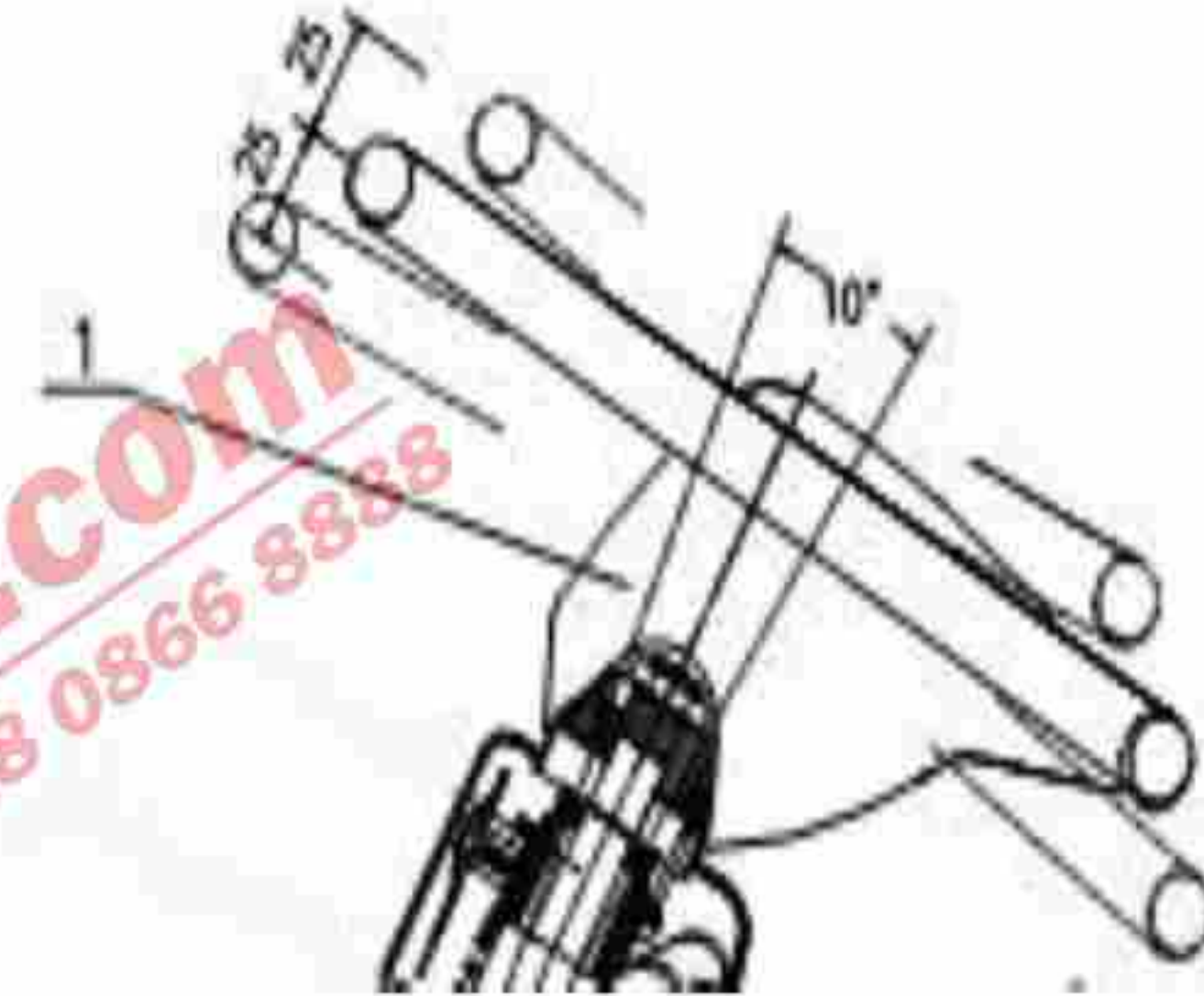


Operation

Adjusting Steering Wheel

The steering wheel is adjustable in the scope of ± 25 mm in height and $\pm 5^\circ$ in degree.

Instruction: Free the adjustment handle 8 and make the steering wheel to the needed position, then fasten the handle.



Operation

Sleeper

Long cab and high roof cab have sleepers. For high roof cab, there are 2 sleepers and the upper one can be folded to any position.



Pedal



Operation

Cup Bracket



Ashtray



Operation

Cigar Lighter



Glovebox

For high-roof cab, one portable cooling and heating box can be placed. (for customer's option)



Operation

New Vehicle Running-in

The distance of running-in is 2000~4000Km. Check the vehicle before running-in, and make sure the vehicle be in the normal working conditions.

Running-in notice:

1. After the engine starting, do not accelerate immediately; increase the engine speed when reaching the normal using temperature.
2. Drive the vehicle on the flat road in breaking-in period.
3. Change the gear timely, make the clutch smooth engagement, and avoid to sudden accelerate or brake.
4. Change into the low-grade before uphill; do not let the engine work at a very low speed.
5. The new vehicle is not driven at high speed when full-loading. Pay attention to every indicating signal and warning light!
6. Exam and control the normal temperature of cooling fluid and grease pressure. Pay attention to the temperature of gearbox, front and rear axle, wheel-hub and brake drum. If serious heating, find the reason, adjust and repair it immediately.
7. In the first 50 km road and after changing the wheels tighten the wheel nuts according to the set torque.

After running-in, check and maintain the vehicle according to the content of maintenance requirements 'First Examination'.

Operation

Preparation before Driving



Warning:

Make sure no defect before driving!

Preparation includes: duty check before driving, ignition and flameout.

Duty Check before Driving

1. Turn on the main electric source switch.
2. Check electric system (system check automatically)
Please refer to content 6.7 of 'electric instruments and controlling system'
3. Check coolant level. Fill coolant if it is insufficient.

Open the mask and check coolant level in extension tank. Fill the specified coolant to scale if it is insufficient.



Operation

Preparation before Driving



Notice:

1. Tilt the cab to fill coolant.
2. Open the mask of radiator before tilting the cab.

Relief valve can raise boiling point of coolant by keeping higher pressure than outside. It is especially important on tableland. When the temperature of engine is still high, fill the coolant by two steps: first, relief high pressure from the filling port; second, open the filling port cover, and then fill the coolant during idle speed.



Warning:

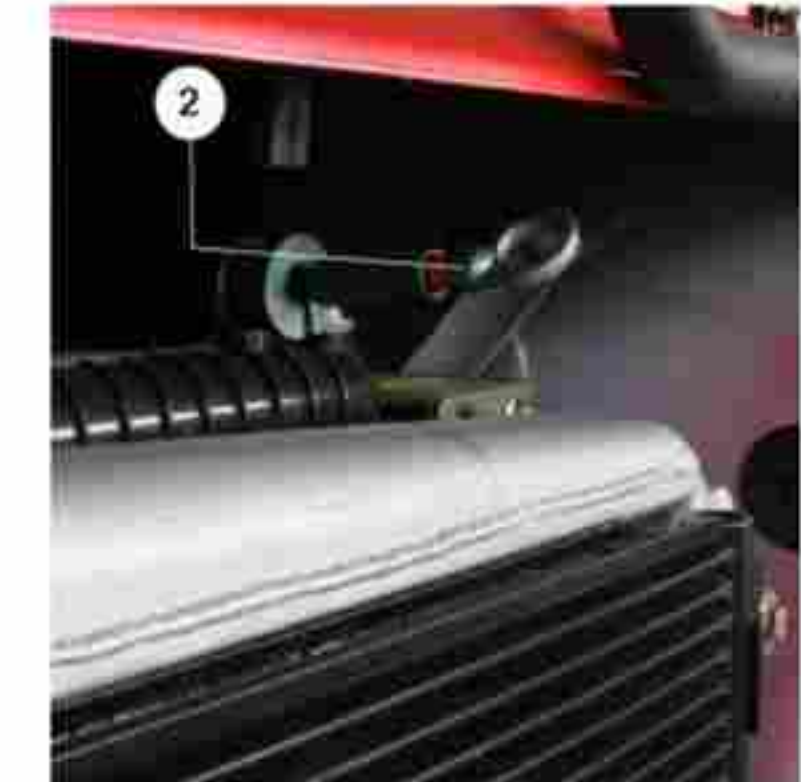
Filling coolant in high engine temperature is forbidden!

3.1 Check fuel quantity

Turn on the key switch to check fuel. If it shows incorrectly, please check fuel gauge and sensor.



① Engine oil filling port



② Oil Gauge

3.2 Check the engine oil

Park the truck on horizontal road. After the engine cools down, pull out the oil gauge, the level should be between upper and lower scales (around 3L). Fill specified engine oil if it is insufficient with the stipulated oil.

Operation

Preparation before Driving

3.3 Fill cleaning liquid

The fill port of cleaning liquid is at second left foot pedal of cab. After removing the tap, pull out the port and fill.



4. Check and remove the water in brake air reservoir

When the vehicle is stopped, pull or push the drain valve 1 to remove water from air reservoir. If liquid mixed by water and oil, the drier is invalid and it is necessary to change a new one.



Preparation before Driving

5. Check air pressure of tires.

6. Check leakage of lubricant, coolant and air.

7. Check the air cleaner.

In winter or dusty condition, the 3 dust bags should be cleared everyday. Damaged dust bag might cause early damage to engine and turbo-charger.



① Dust bag

Signal lamp is on if the air cleaner is blocked. Air cleaner should be changed if blocking signal lamp is on.

Operation

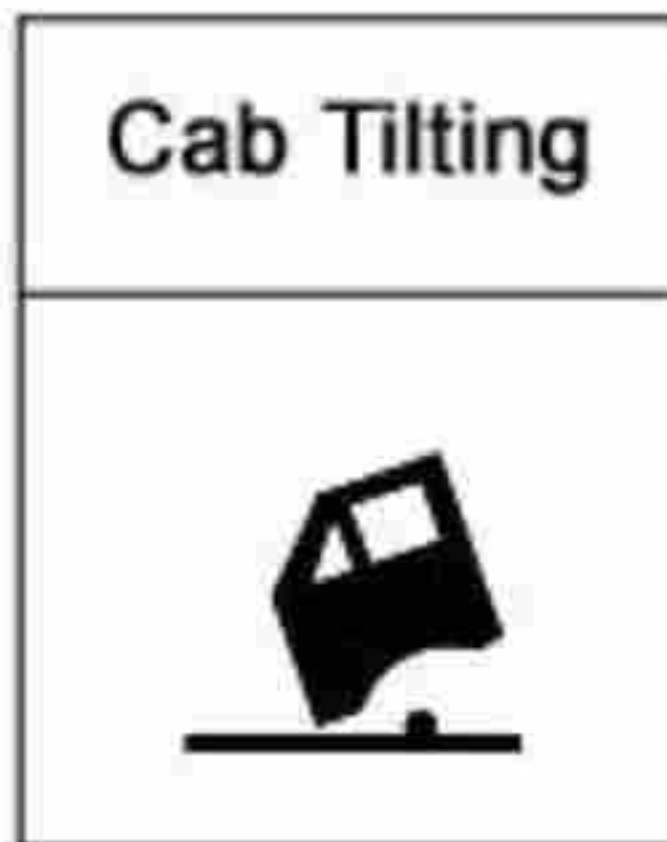
Preparation before Diving

8. Check if the cab is locked



Warning: Cab must be locked during driving.

Indicating lamp will be on if the cab is not locked.



After the cab is locked, check if the cab lifting cylinder is in initial position by watching the piston rod in initial position or not, or the cab may be damaged.

Make sure that no person or other obstacles near the vehicle before starting the vehicle.

Operation

Start the Engine

Start the engine

1. Switch on and turn the key to position 4 (STRAT).



Notice: When driving, do not turn off the key switch. The key is at position 3 (ON) when driving.

2. Starting

Launch hand brake. Shift to neutral and turn the key to start. After started, the charging indicator lamp will be off.



**Notice: 1. If failed to start for first time, turn the key to position 2 and start again.
2. Every start should be least than 15 seconds and at least 30 seconds between two times of starting.**

3. Engine oil pressure

After engine started, watch the engine oil pressure value. The signal lamp for oil pressure should be off if the value is normal.



Notice: The engine should never work with high speed in cold condition! Check and repair immediately if no pressure value shown after starting the engine.

4. Turbo-charger

Turbo-charger is at top-back of the engine, composed with turbo parts and pump wheel parts. The exhaust gas goes into the turbo and makes the pump wheel rotate with high speed, then press the compressed air into the air inlet pipe of the

Operation

Start the Engine

engine to enlarge air pressure and enhance the engine power. .

The rotor of turbo-charger has very high speed (7000~10000 rpm). The rotor bearing is lubricated by enforcement and the lubricant is supplied by engine main oil pipeline. Lubricant is cut with flameout.



Notice:

- 1. The engine should work in idle speed for 3~5 mins after started without hard accelerating before the oil pressure and temperature is normal (especially in cold weather),** or the bearing and sealing ring of turbo-charger will be damaged in advance.
- 2. The engine should work in idle speed for 3~5 mins before flameout.** Flameout after the speed of turbo-charger goes down. No hard accelerating before flameout because it will cause high speed and lubricant pump will stop immediately after flameout, the rotor axis, bearing and sealing ring will be damaged in advance.
- 3. Pre-lubricate the turbo-charger before starting the engine which has not been started for a long time.** You may remove the oil inlet pipe of the turbo-charger and fill some clean lubricant to avoid the turbo-charger from being damaged.

Operation

Turn Off the Engine

Flameout

Turn the key to 'LOCK' position and the engine will stop, then turn off the main electric switch and remove the key for the switch.



Warning: After working with heavy loading, the engine should stop after 3~5 mins working in idle speed.

Operation

Parking Brake Release

Hand Brake Valve (Parking brake of power-storing with spring)

The hand brake valve is at right side of instrument panel. (The picture is at 'without brake')
Only when the hand brake signal lamp is off and the air pressure is over 0.65 Mpa (6.5 bar), the hand brake can release completely, then the vehicle can start.



Specification: Trailer hand brake valve is added on tractors. The trailer hand brake valve will reposition automatically and can not be used for parking brake.



Warning: Do not drive the vehicle before the signal lamp is off!

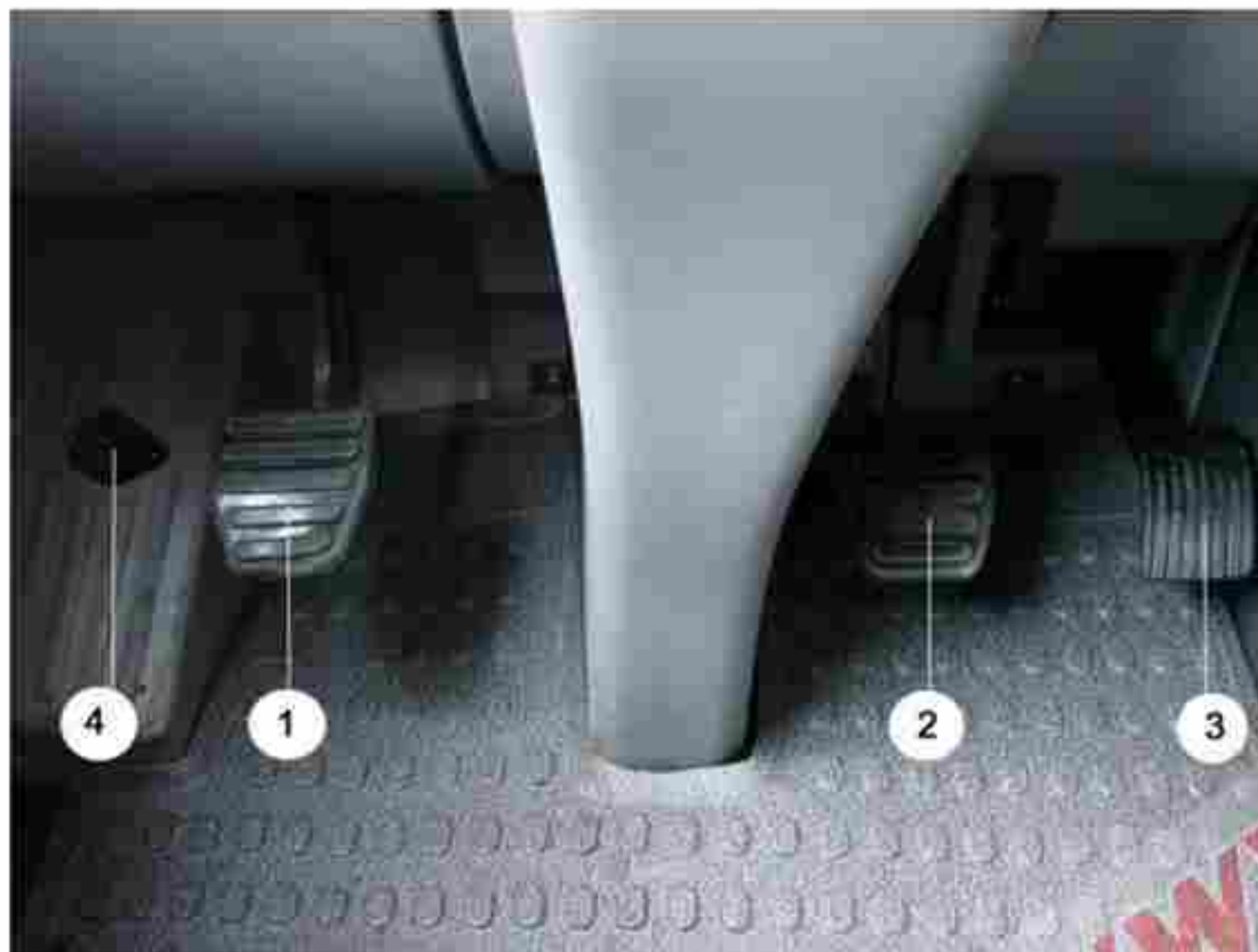
After the signal lamp is off, operate power-assist systems (clutch, shifting and so on). After the air pressure in air reservoir is more than 0.7 Mpa (7 bar), the brake system will reach the standard performance and the vehicle is suitable for driving. Only when the pressure of air reservoir reaches 0.7 Mpa (7 bar), the brake system can reach its standard performance.

Operation

Starting and Shift

Starting

After starting the engine, the vehicle can not be started if low air pressure warning lamp and alarm is on. After the air pressure reaches 0.55 Mpa (5.5 bar) and lamp or alarm is off, release the hand brake to start the vehicle.



- ① Clutch pedal
- ② Brake pedal
- ③ Accelerating pedal
- ④ Exhaust brake button



- ⑤ Hand brake valve
- ⑥ Trailer hand brake valve

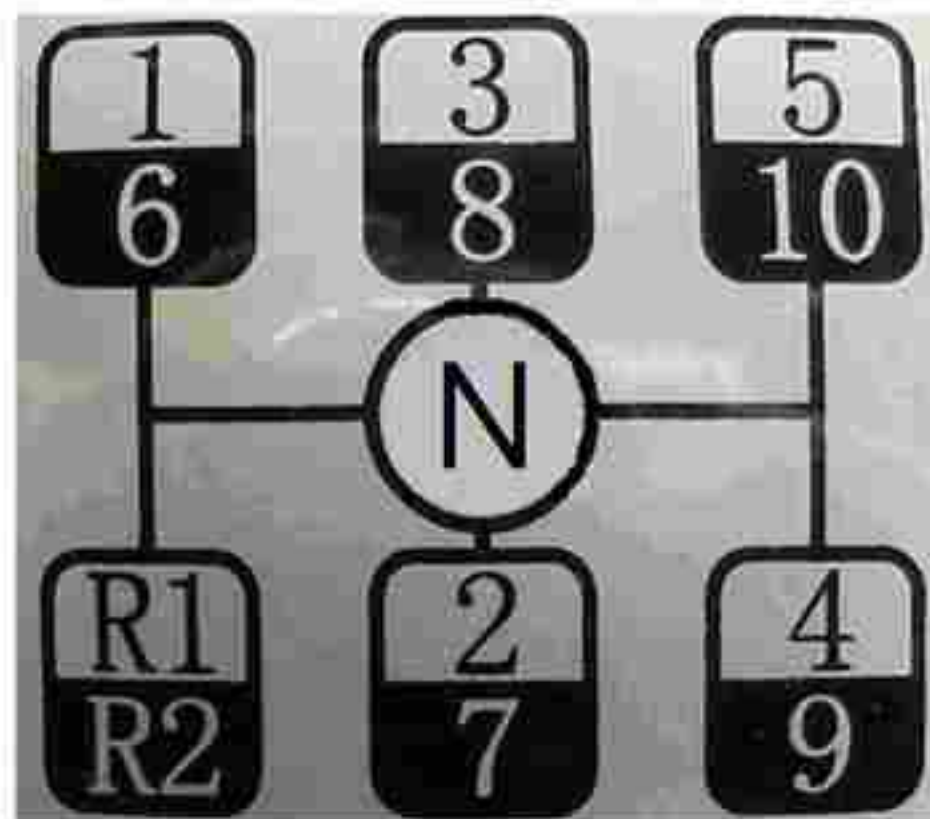
Operation

Start and Shift

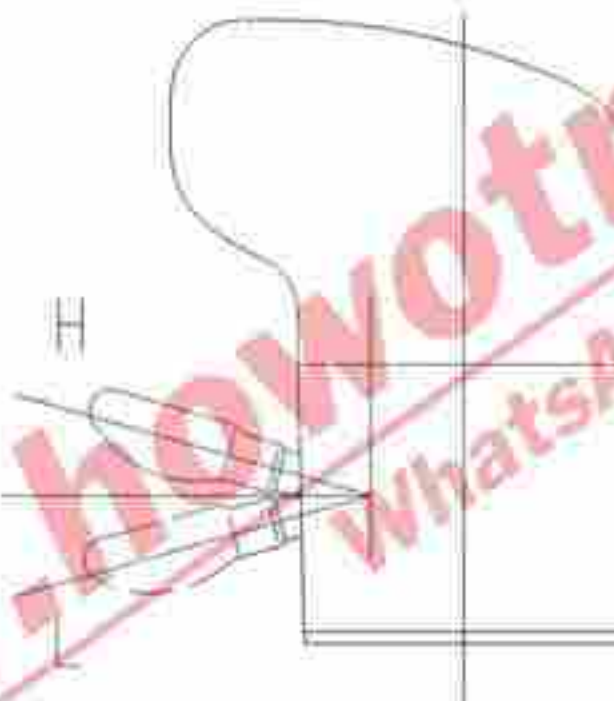
Gears and Operation of Gearbox

Operation System

Picture 1 and 2 are shifting handle and shifts. When the switch is at L, 1-2-3-4-5-6 and R1 gears are available; when the pre-selecting valve switch is at H, 5-6-7-8-9-10 and R2 gears are available.



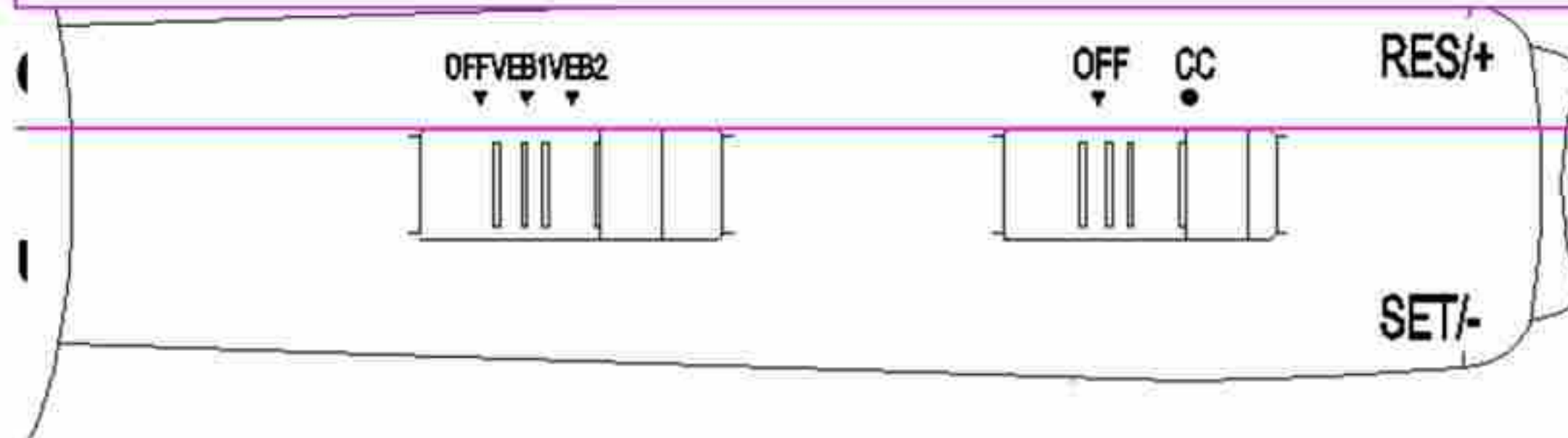
Gears



Shifting rod

To move vehicle smoothly, turn the pre-switch to L and shift to 1 or 2 to drive forward or R1 to reverse.

Operation



ed with exhaust brake).



1. Cruise

There are 3 cruise switches: CC, RES/+ and SET/-:

'CC' is main cruise switch and can reposition. Switch on and enter cruise function. Now the symbol of CC on instrument will flash by frequency of 90HZ. Change the accelerating to reach needed speed, stop accelerating and press SET/- to enter cruise mode. The symbol of CC is always on.

Operation

Cruise Driving and EVB Control

During cruise, step brake or clutch pedal will cancel cruise mode and symbol of CC again flashes by frequency of 90HZ. Press RES/+ for exit temporarily and re-enter cruise mode.

Raise needed speed: accelerate to the new target speed and press SET/- or repetitive operation on pressing RES/+ (1 km faster by one press).

Reduce needed speed: brake to the new speed and press SET/- or repetitive operation on pressing SET/- (1 km slower by one press).



Cautions:

- 1) The cruise mode is available between 35km to 105km, otherwise it will be cancelled automatically.
- 2) Duration of pressing RES/+ and SET/- button should not exceed 559 ms, or engine error 26 and 43 will occur. Error 43 only can be released by stopping the engine; Error 26 can be released by releasing the button.

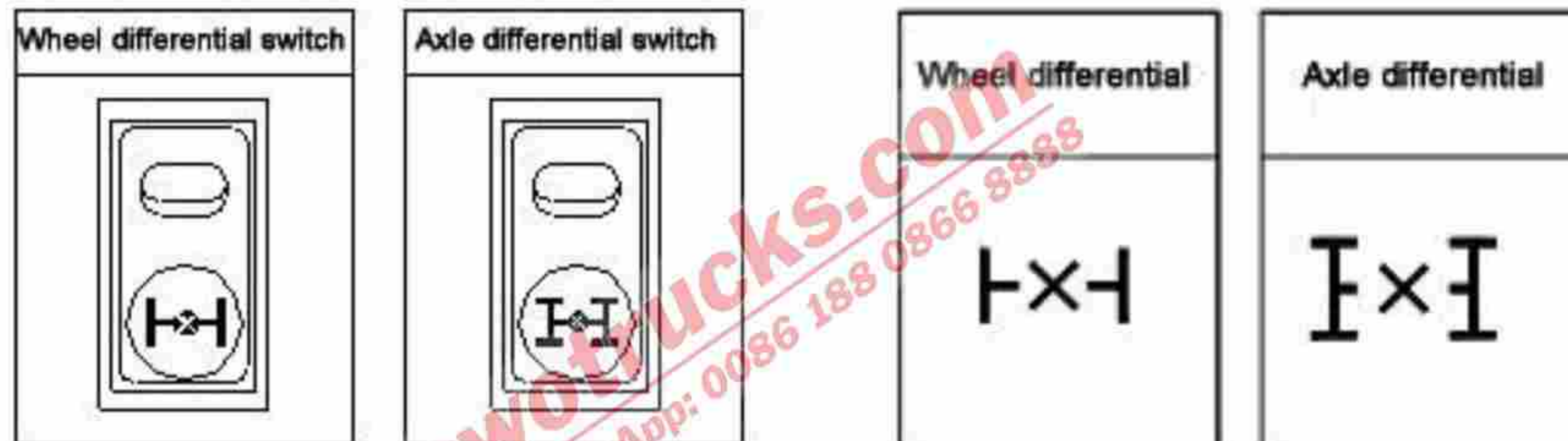
2. Engine Exhaust Valve Brake

Engine exhaust valve brake (EVB) can be use to gain better braking performance. Switch the cruise switch to VEB1 or VEB2, and then step the exhaust valve brake switch to brake.

Operation

Differential Lock Control

Operation of Diff-lock



The driving axles are equipped with diff-locks. When the wheels are sliding or trapped in mud, use the diff-lock to gain more trafficability. Diff-lock includes inter-wheels and inter-axles and only inter-wheels for single axle.



Notice:

No inter-wheels diff-lock for single reduction driving axle.

Operation

Differential Lock Control

1. Operation of Single Driving Inter-wheel Diff-lock



Warning: Inter-wheel diff-lock can only be used when vehicle is going straightly.

1.1 Engage: only when the vehicle is in halted state or going straightly under low speed.

Press the switch for inter-wheels diff-lock and the indicating lamp will be on after engaged.



Warning: When driving, release the clutch before engaging!

1.2 Release: stop accelerating and release the clutch, then press top of the switch. The indicating lamp will be off after the lock is released.

2. Operation for Multiple Driving Axles Vehicle

Operation Principle: First engage inter-axles diff-lock, then for inter wheels.

2.1 Inter-axles diff-lock: Inter-axle diff-lock is for locking the differential between the first and second driving axles.

2.1.1 Engage: When the vehicle is halted state or going straightly under low speed (equivalent to walking speed). Press the switch for inter-wheels diff-lock and the indicating lamp will be on after engaged.



Warning: When driving, release the clutch before engaging!

2.1.2 Release: Stop accelerating and release the clutch, then press top of the switch. The indicating lamp will be off after the lock is released.

Operation

Differential Lock Control

2.2 Inter-wheels diff-lock

Inter-wheels diff-lock is for locking the first and second driving axle.



Warning: Inter-wheel diff-lock can only be used when vehicle is going straightly.

The operation is same as operation for single driving axle vehicle (4x2 model).



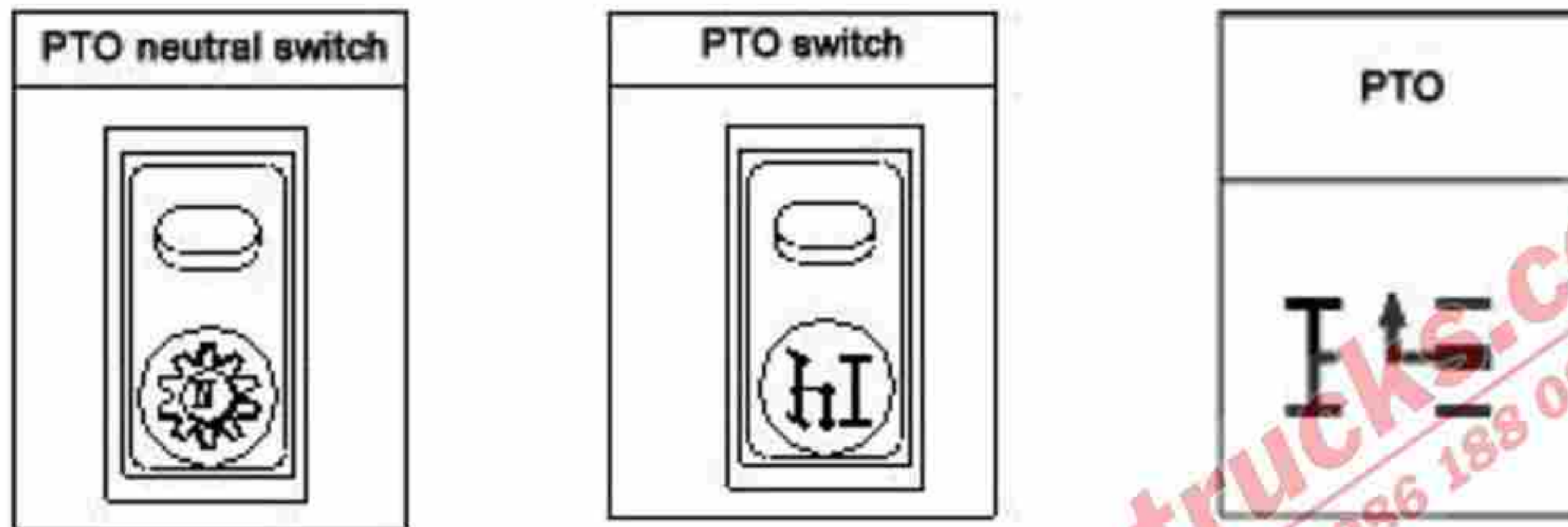
Caution: 1. When the indicating lamp of inter-wheel diff-lock is on, the vehicle should not turn or drive in high speed.

2. After getting through rough road, the diff-lock should be released immediately. Stop accelerating, release the clutch and reposition the tilting switch of diff-lock. The diff-lock will be released after the indicating lamp is off.

Operation

PTO Control

Operation of PTO (Take PTO after gearbox for instance)



Caution: PTO can only be used on low gears.

1. Engage:

Release the clutch and press the switch of PTO, the indicating lamp will be on, then shift the gear. The PTO only effects when the gear is engaged.

2. Release:

Release the clutch and press the switch of PTO, after 3 seconds, engage the gear and the indicating lamp is off.

3. Operation of neutral switch for PTO

The PTO neutral switch is for shifting-locking, to prevent the vehicle from driving after engaging the PTO. The vehicle can not drive when the PTO is working.

Operation

PTO Control

3.1 Use of neutral switch of PTO

When use the PTO during the vehicle is parking, use the neutral switch of PTO.



Warning: Shift to low gear before using PTO!

- Shift to low gear and press PTO switch.
- Press neutral switch, compressed air will force the gear to neutral (there is no output from sub box of gearbox at this moment, but the main box is able to shift), the vehicle is in halted stated. In the meanwhile, the indicating lamp will be on. Engage the PTO and power will be transferred.

3.2 Release the neutral switch of PTO

- Shift to neutral gear
- Press top of the switch and the indicating lamp will be off.



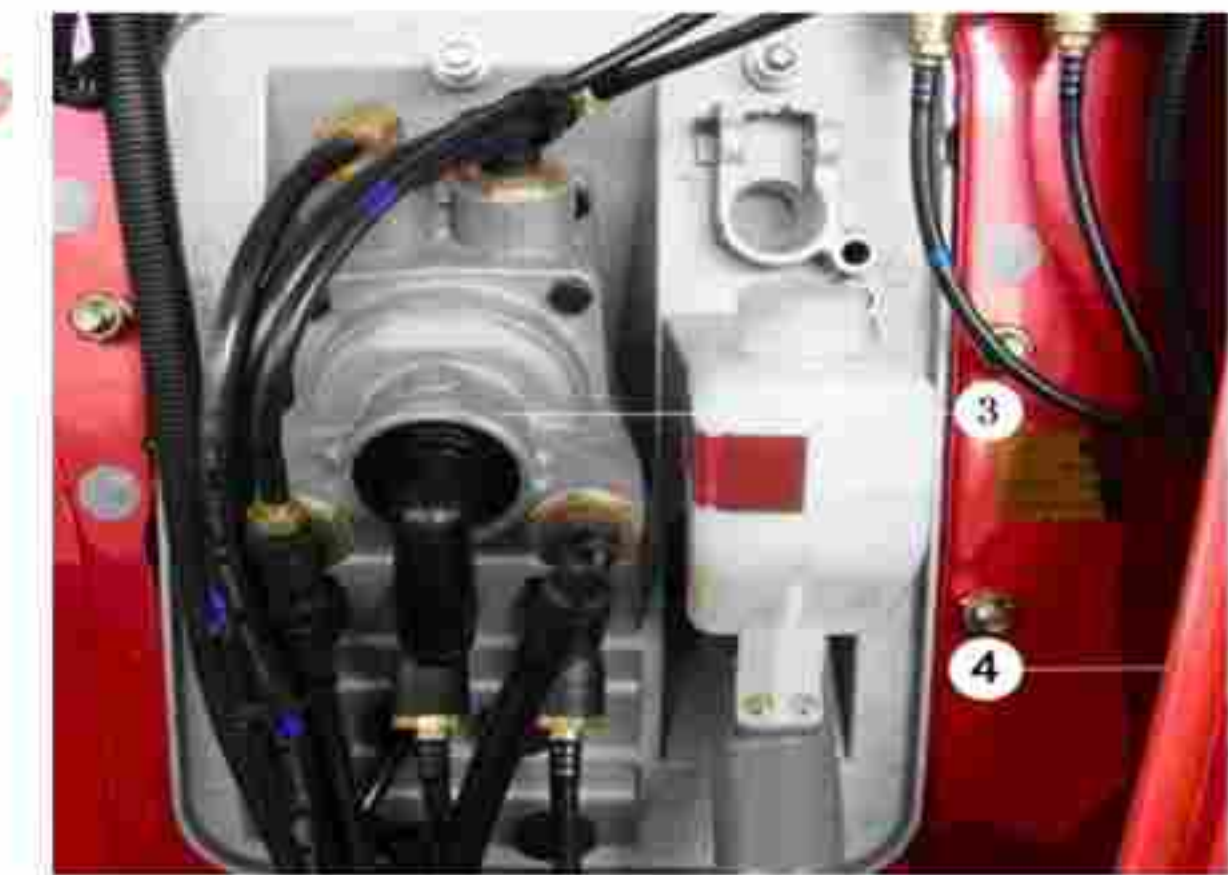
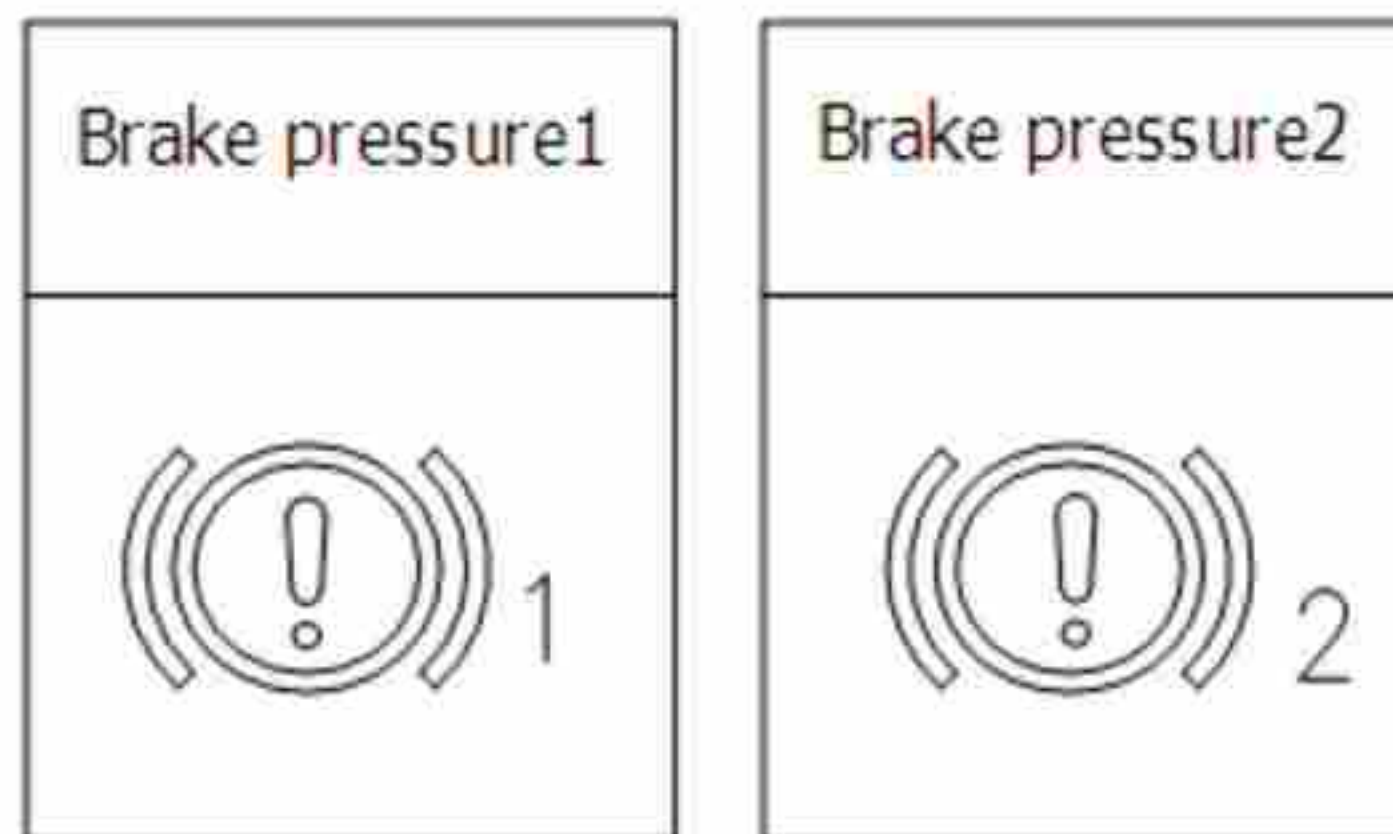
Warning: Shift to neutral before releasing!

Security

Service Brake

Braking system have four brake devices: Service brake (Foot brake), Auxiliary brake (Engine exhaust brake, exhaust valve brake or both installed), emergency brake and parking brake (Hand brake) and trailer brake (for tractor truck).

1. Service Brake



1. Brake pedal 2. Exhaust brake button 3. Brake main valve 4. Cab front wall

Pedal controlling, dual circuit compressed air brake, the working pressure and the cutting pressure of pressure regulating valve is 0.85 MPa (8.5Bar). The first loop effects on the wheels of rear driving axle or tandem rear driving axle; and the second loop works on the wheels of front axle. Once the air pressure of one air cylinder in the two loops is lower than 0.55MPa, the pressure indicator light will turn on, and please stop the vehicle immediately and find the reason of pressure leakage.

Do the full application of brake repeatedly and continuously in short time, it may cause pressure lower than 0.55 MPa (5.5 Bar).

Examination of pressure leakage: Stop the engine and pull up the control lever of hand brake, the pressure will reduce 0.05Mpa at most in 2 hours, or reduce 0.01Mpa in thirty minutes.

Security

Auxiliary Brake

2. Auxiliary Brake

2.1 Exhaust brake:

When using auxiliary brake, step the exhaust brake button 2 and stop the engine, then the vehicle can use the energy of engine to do the auxiliary brake.

The exhaust brake must be used when driving on the long downhill way; and it can be used on the snowy and muddy road to reduce the possibilities of sideslip; when meeting and on the rough road the exhaust brake also can be used to slow down in advance.

Using the exhaust brake, it can reduce the times of using the main brake, and decrease the abrasion and heat between the wheel and wheel brake, extend the service life of wheels, reduce the fuel consumption and improve the drive security.



1-Brake Cylinder



Notice: When the gearbox is in neutral gear, the auxiliary brake doesn't work.

When the gearbox is in the lower gear, the efficiency of exhaust brake is higher.

2.2 EVB Brake:

EVB is exhaust valve brake. Common rail diesel equips the exhaust valve brake device, which can help to reduce the speed and control the vehicle. It can observably raise the braking performance when it works with exhaust brake at the same time, and improve the drive security.

Security

Auxiliary Brake

Exhaust brake increase the intake and exhaust power consumption through keeping exhaust valve open, leaking the compressed mixed gas in the air cylinder during compressing stroke and with the backpressure brought by exhaust brake, so as to promote brake power. So that there is hardly energy returns to piston in the process of expansion stroke. Through engine repeatedly functioning, the forward momentum of vehicle is consumed. Meanwhile the speed is also cut down.

The engine adopts an exhaust brake valve (DC24V, 0.78A) for each cylinder, and installed under the valve cover.

2.3 Operation of EVB:

When the exhaust brake is open, release the clutch and accelerator pedal, step down the switch of exhaust brake, then the exhaust brake and exhaust valve brake will function at the same time. The Jacobs exhaust brake will stop automatically when you step down the clutch pedal or accelerator pedal. The exhaust brake will also stop by itself when the engine running speed is under 1000 r/min. Moreover, under the premise of less than governed engine speed, make gear-box in the lowest gear to get the maximum decelerator power.



Notice: 1. EVB is a kind of vehicle retarder device instead of parking device. Service brake is only way to stop the vehicle completely, which is braking.

2. Make sure the engine reaches its sufficient operating temperature before starting the exhaust brake.

3. As long as the exhaust brake is adopted, it is forbidden to shift without releasing the clutch.

When the vehicle driving in the wet and slipped way without trailer or the trailer empty, it is not allowed to use EVB device, specially for the vehicle with single drive axle.

Security

Emergency and Parking Brake

3. Emergency and Parking Brake

Hand brake can be used as emergency and parking brake, it works through energy-stored spring brake cylinder of rear driving axle. And parking brake operates through controlling the handle of hand brake valve.

When brake system has any errors, emergency brake starts automatically pushing the energy-stored spring.

When the pressure of brake system is higher than 0.55 Mpa (5.5 Bar) and the signal light of hand brake is off, the spring brake can be removed completely.

The usage of hand brake: Pull the handle. At the same time, the signal light on the instrument is on.

Releasing: Lift the handle, the handle will return to the discharge position automatically after releasing it. (Refer to the picture)
At the same time the signal light on the instrument is off.



Release Position

① Handle of hand brake valve



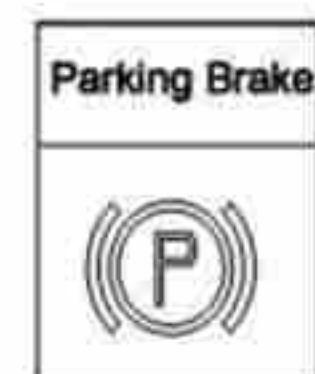
Brake Position

② Handle of trailer hand brake valve



Notice:

1. Hand brake must be pulled when the vehicle stops.
2. Before starting the engine, put handle of hand brake valve at the brake position; if not, the pressure of brake system will be raised and all the parking brake will be removed.

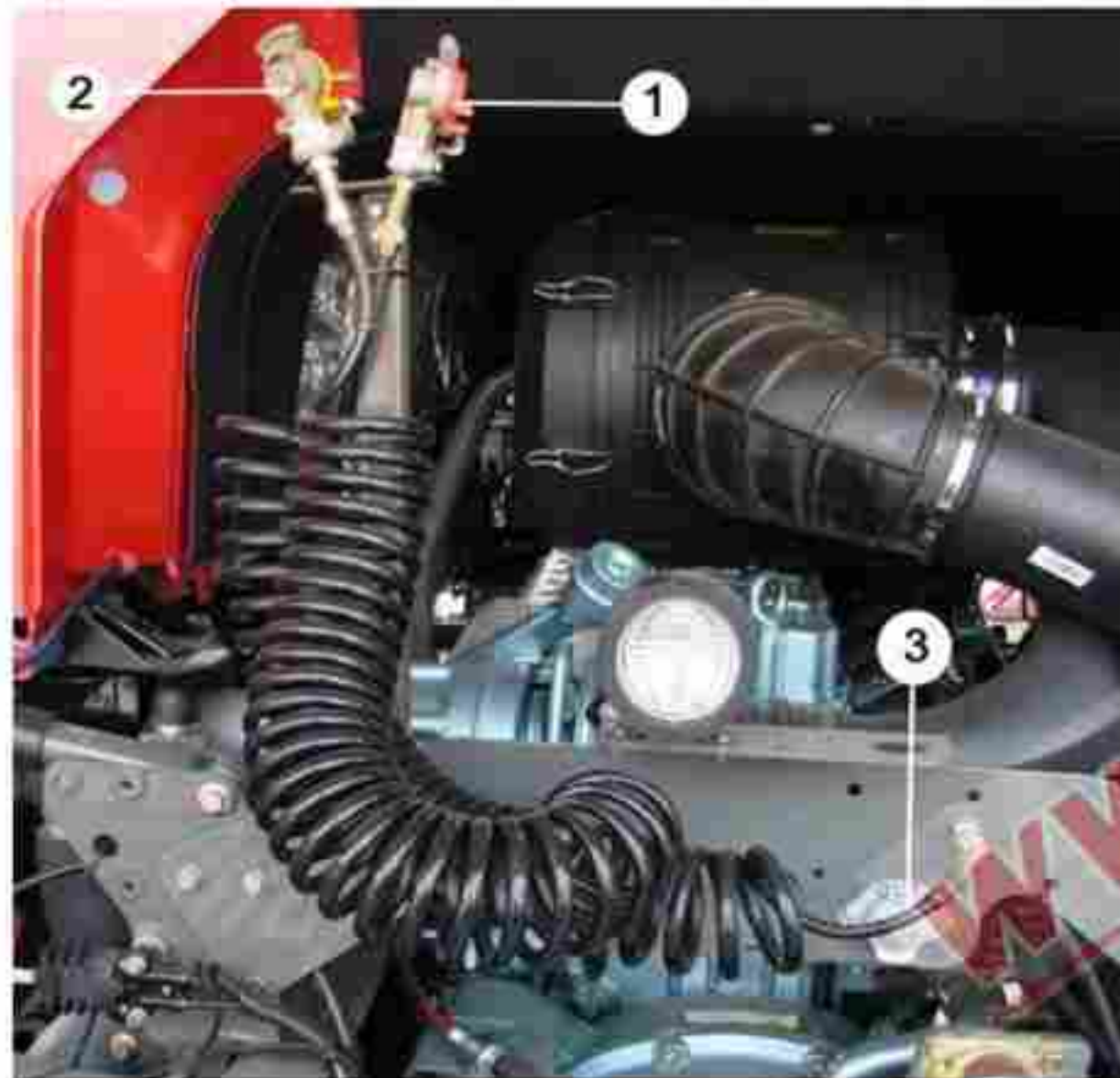


Security

Trailer Brake

Trailer hand brake, works on the trailer or semi-trailer, is separated from the brake system of tractor truck.

When loosing the hand brake valve handle of trailer, the handle rebounds back to the initial position (The initial position is as the above picture).



1. Dual circuit joint of air cylinder (red)
2. Dual circuit joint of brake (yellow)
3. Seven-holes trailer socket

ABS Operation

When the indicating light of ABS testing is on, it expresses ABS failure. Please go to service station immediately to repair and maintain.

Security

Brake Cautions

1. Urgently Loosing of Spring Brake Cylinder

When the connecting pipe of spring brake cylinder is braking self-powered because of leakage, loosen the bolt of cylinder to the released position and the brake is released.



- Notice:**
1. Before losing the spring brake cylinder, shift into first gear and examine whether the service brake (foot braking) is normal.
 2. When losing the spring brake cylinder on the uphill/downhill road, please block the wheel to prevent vehicle slippage.

2. Usage of Charging Connector

Because use the combined air dryer, combine the adjusting valve and the air dryer together, install charging connector on the dryer. Screw on charging tube over the charging connector, and charge the wheel itself and also charge the wheel from the air source outside.

3. Maintenance of Braking Line

When welding, cutting and drilling near the plastic pipe for braking, it should be subject to the following provisions:

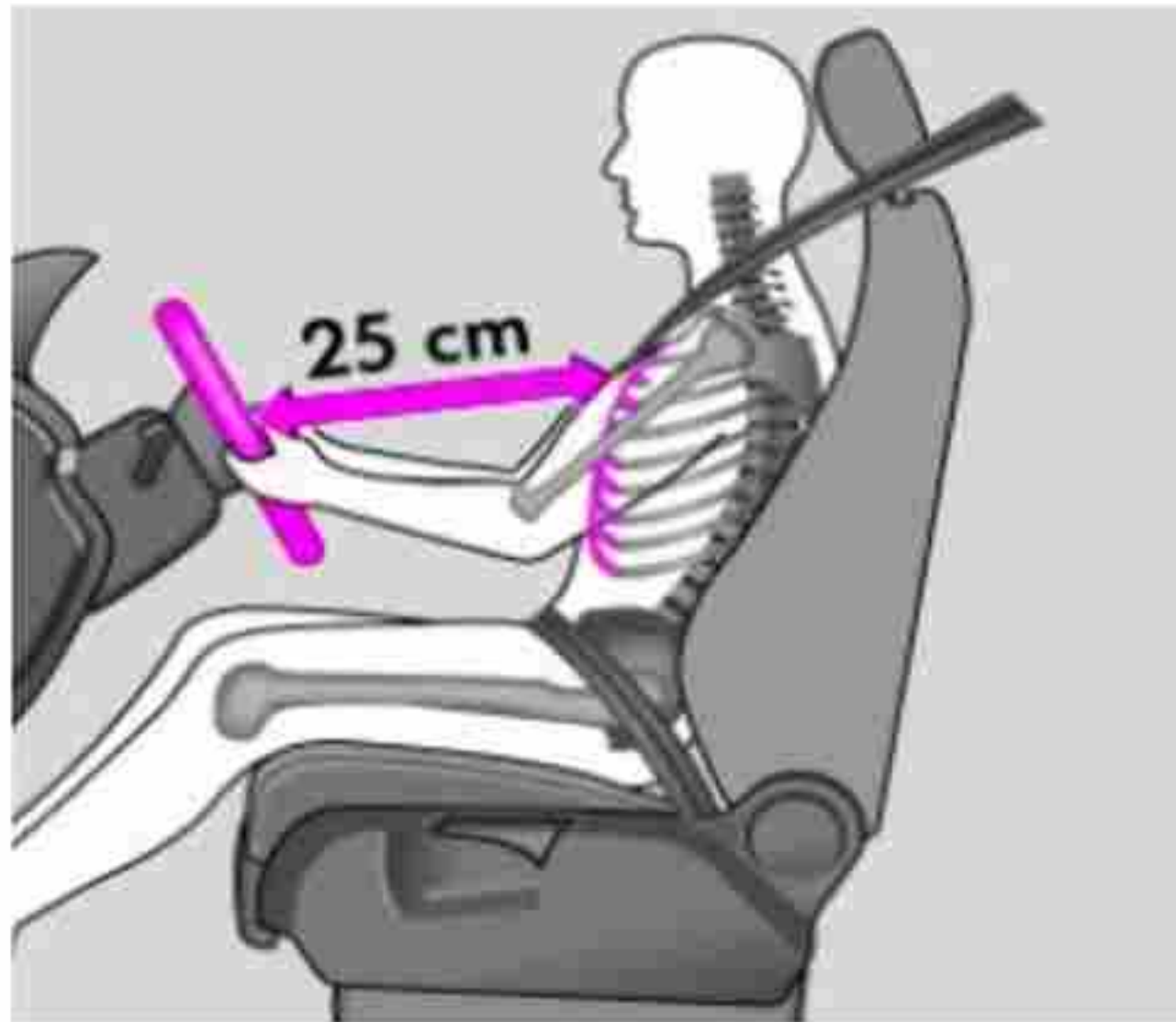
- a) Let out the gas in the pipe;
- b) Cover the pipe in order to avoid to be damaged by the spark, fire and glowed chip;
- c) The permitted temperature without any pressure pipe is 130°C, the duration is one hour.



Warning: Battery and other electrical parts connected with the electronic device (main-control, driven, instrument and ECU etc.) should be cut off or pull out!

Security

Driver's Sitting Position



Correct driver sitting position is of much importance to the safety and comfort driving.

For driver's safety and reducing the damage of the accident, the following following adjusting program is strongly suggested:

- 1) Adjusting the steering wheel: The distance between the steering wheel and breast is less than 25 cm (Referring to the above picture);
- 2) Adjusting the driver's seat forward and backward to make the driver to step on the accelerator, brake and clutch to the end under the case of slight bowlegs.
- 3) Adjusting headrest: Upper edge of headrest is flush to the overhead (Referring to the picture).
- 4) Seat back is at the upright position, and the back should be fully fit in the seat back.
- 5) Wearing the safety belt correctly (Referring to safety belt instructions).
- 6) Putting the foot at the foot space, and make the vehicle to be the driver's control.
- 7) Adjusting the driver's seat manually.

Security

Driver's Sitting Position

Front Passengers' Sitting Position:

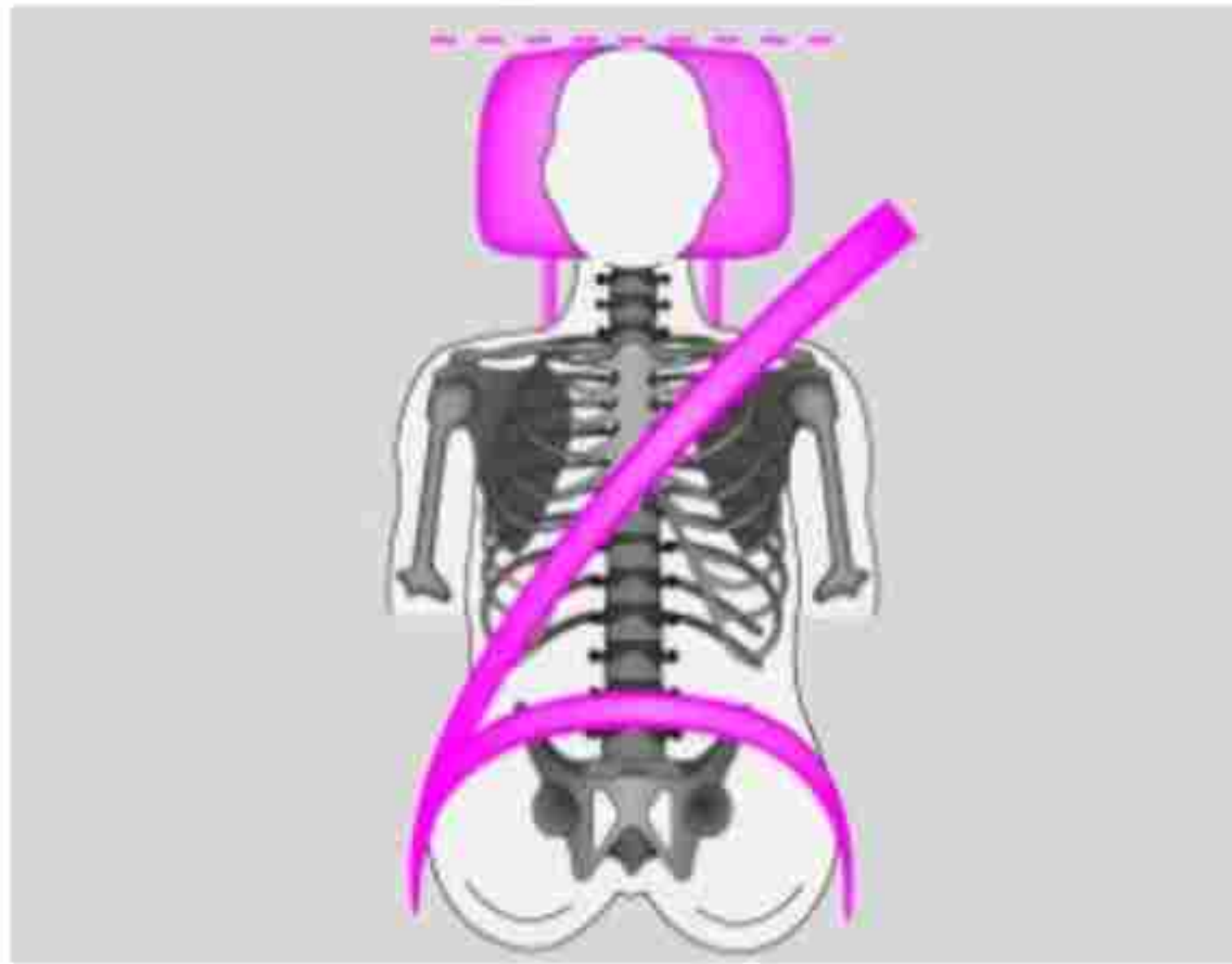
The distance between instrument plate and front passengers is not less than 25 cm.

For your safety and reducing the damage of the accident, the following following adjusting program is strongly suggested to the front passengers:

- 1) The front passenger seat should be moved backward as much as possible.
- 2) Seat back is at the upright position, and the back should be fully fit in the seat back.
- 3) Adjusting headrest: Upper edge of headrest is flush to the overhead.
- 4) The front passengers' feet should be put in the foot space in front of the seat.
- 5) Wearing the safety belt correctly.
- 6) Adjusting the passenger's seat manually.

Security

Headrest



The Headrests Adjusting:

The headrest adjusting is very important to protect the passengers, and it can reduce the damage risk when accident occurs.

The headrest must be adjusted correctly to gain the best protection.

Adjusting headrest: Upper edge of headrest is abreast to the overhead as much as possible.



Warning !

1. Removing or wrong position of the headrest may increase the damage risk.
2. Wrong position of the headrest may cause serious damage even death in the accident.
3. Wrong position of the headrest may increase the damage risk in the sudden driving conditions or brakes.
4. Headrest should be properly adjusted according to driver or passenger's height.

Security

Safety Belt

Every seat has one safety belt.

1. Wearing Safety Belt

Pull the seat belt lock, make belt around the shoulder and insert the latch into the socket until you hear the voice of meshing.

2. Releasing Safety Belt

Press the red button on the safety belt lock according to the direction of the arrow, pull out the latch, the safety belts will come back to the original position.



Security

Safety belt

3. Safety Belt Alarm Instruction

- 3.1 Switch the key to the driving position, if the safety belts are engaged, the safety belt lock signal lamp on instrument does not flash; if not, signal lamp will keep on without alarm buzzer.
- 3.2 After starting the engine, if the belt is not engaged, safety belt locking signal lamp lights up, and buzzer alarm in low frequency and stop after 6 seconds; after inserting the safety belt well, the lamp is off and buzzer stop to alarm at the same time.
- 3.3, if pull out the safety belt when the engine is working, the signal lamp is on and the buzzer alarm in low frequency for 6 seconds.



Notice:

Please wear the safety belt well before driving every time! Check the performance and functions of the safety belt everyday.

Security

Pedal Area

Pedal:



- All staff and pedal pad should not affect the operation and movement of pedals.
- To ensure the pedals of accelerator, brake and clutch are able to be stepped down to the end without a hitch at any time.
- To ensure the pedal to be back to the position without a hitch.
- The pedal pad does not affect the pedal area, and fixed in the foot space.
- When the brake loop encounters error, the brake pedal needs the longer pedal travel to stop the vehicle.
- Wearing proper shoes.
- The shoes should make foot to hold up well in order to have the good pedal feeling.



Warning:

- 1. If the pedal could not make trouble-free operation, it may lead to dangerous driving conditions.**
- 2. Do not put anything in the driver's foot space. The staff may slide to the pedal area to prevent pedal operations and result to no brake, operating the clutch or accelerator in the sudden driving or braking.**

Security

Pedal Area



Driver's side pedal pad:

- The pedal pad must be fixed in the foot space without affecting the pedal's movement.
- Ensure the pedal pad is immovable and does not affect the movement of the pedal when driving. And pay attention to the warning.
- The pedal pad should not come in the pedal area or slide. Fixing parts of the pedal pad must be fixed in the foot area.



Warning:

- 1. If the pedal could not make trouble-free operation, it may lead to dangerous driving conditions.**
- 2. To ensure the pedal pad is immovable.**
- 3. Do not put any other pedal pads on the fixed pedal pad, because it can reduce the pedal area and affect the pedal movement.-Danger!**

Security

Sundries & Articles Storage



Warning:

1. Only soft articles or staff can be put in the glovebox.
2. Incompact articles loaded may lead to the serious damage.
3. All the articles must be put in the glovebox and fixed well.
4. When the sudden driving or accident occurred, hard and heavy object splashing may lead to the serious damage if the incompact articles loaded.

Maintenance

Vehicle Service Conditions

Table 1 Service Conditions of Vehicle

WG I	WGII	WG III
Poor conditions (Severe cold or hot climate, high dust content, used in construction site or bus, municipal engineering vehicle, snow sweeper, fire-fighting engine) or vehicles with annual mileage less than 20,000km or with running hours less than 600h.	Vehicle with annual mileage less than 60,000km, medium-short distance transportation (For cargo delivery)	Vehicles with annual mileage over 60,000km, long distance transportation

Maintenance

Cycle of Maintenance

Table 2 Cycle of Maintenance

Service Conditions Items	WG I	WGII	WGIII
First-time Check	After running 1000~1500km After running 30~50h	After running 1500~2000km	After running 1500~2000km
Routine Check (P)	Every 5000km Every 150h	Every 1×10^4 km	Every 1.5×10^4 km
1st-Grade Service (WD1)	Every 1×10^4 km Every 300h	Every 2×10^4 km	Every 3×10^4 km
2nd-Grade Service (WD2)	Every 2×10^4 km Every 600h	Every 4×10^4 km	Every 6×10^4 km
3rd-Grade Service (WD3)	Every 4×10^4 km Every 1200h	Every 8×10^4 km	Every 12×10^4 km
4th-Grade Service (WD4)	Every 8×10^4 km Every 2400h	Every 16×10^4 km	Every 24×10^4 km

Maintenance

Maintenance Items

1. Regular Maintenance Items

- 1.1 Check hand brake and service brake;
- 1.2 Check illuminating lamps, signal lamps and indication lamps (oil pressure, pressure in air reservoir, air filter maintenance indicator and battery charge indicator, etc.);
- 1.3 Check the working mode of starter, alternator and battery;
- 1.4 Check tire pressure and condition;
- 1.5 Check the level of engine oil, coolant and steering hydraulic oil;
- 1.6 Drain water from air reservoir.

2. Graded Maintenance Tasks

Please refer to the second part for the checking and maintenance of the engine, transmission, front and rear axles, steering gear.

Table 3-1

• Maintenance items include changing oil, checking and adjustment

Cab	First-time Check	Routine Check	1 st -grade Service	2 nd -grade Service	3 rd -grade Service	4 th -grade Service
Check the wiper	•	•	•	•	•	•
Re-tighten locking handle on driver's cab	•			•	•	•
Re-tighten engine radiator's cover	•					
Check oil level of cab tipping hand pump				•	•	•
Check lifting cylinder	•		•	•	•	•

Maintenance

Maintenance Items

Table 3-2

• Maintenance items include changing oil, examing and adjusting.

Chassis	First-time Check	Routine Check	1 st -grade Service	2 nd -grade Service	3 rd -grade Service	4 th -grade Service
Check fixation and action of towing hook	•		•	•	•	•
Re-tighten the bolts on cross member of the frame	•					
Tighten front and rear leaf spring bolts and brackets	•			•	•	•
Check spare tire fixing device				•	•	•
Check and adjust slide rail clearance of leaf spring				•	•	•
Check the fixation of wheel nuts			•	•	•	•
Check the fixation of battery				•	•	•
Check the fixation of fuel tank				•	•	•
Electrical System	First-time Check	Routine Check	1 st -grade Service	2 nd -grade Service	3 rd -grade Service	4 th -grade Service
Check the working condition of electrical system (Instrument, lamps, wiper, and air conditioner).	•	•	•	•	•	•
Check electrolyte level and cell voltage	•		•	•	•	•
Check the fixation of battery terminal, coat electrode with grease	•		•	•	•	•
Check electric tachometer and speed accuracy	•	•	•	•	•	•

Maintenance

Maintenance Items

Table 3-3

• Maintenance items include changing oil, examining and adjusting.

Brake System	First-time Check	Routine Check	1st-grade Service	2nd-grade Service	3rd-grade Service	4th-grade Service
Drain water from air reservoir	•	•	•	•	•	•
Check leakproofness of air pressure system (With barometer)	•			•	•	•
Check brake lining thickness and adjust brake clearance				•	•	•
Clean wheel brake					•	•
Check vulnerability of brake pipeline and hoses	•			•	•	•
Check brake chamber			•	•	•	•
Check footbrake, handbrake and exhaust brake action (When do the trial running)	•		•	•	•	•
Check ABS	•		•	•	•	•
Vehicle	First-time Check	Routine Check	1st-grade Service	2nd-grade Service	3rd-grade Service	4th-grade Service
Short distance trial running (Including braking test)	•		•	•	•	•
Visual check for leakage	•	•	•	•	•	•
Check and tighten cargo body	•	•	•	•	•	•

Maintenance

Maintenance Items

Table 3-4

• Maintenance items include changing oil, examining and adjusting.

Lubrication	First-time Check	Routine Check	1st-grade Service	2nd-grade Service	3rd-grade Service	4th-grade Service
Water pump	•	•	•	•	•	•
Clutch release shaft	•	•	•	•	•	•
Clutch pedal shaft	•	•	•	•	•	•
Clutch release bearing	•	•	•	•	•	•
Universal joint and intermediate support of transmission shaft	•	•	•	•	•	•
Steering knuckle and front axle	•	•	•	•	•	•
Leaf spring pin	•	At least once every four weeks				
Check leaf spring slide rail clearance of suspension	•	•	•	•	•	•
Shock absorber mounting	•	•	•	•	•	•
Gearshift lever bracket	•	•	•	•	•	•
Brake camshaft and brake arm	•	•	•	•	•	•
Towing hook	•	•	•	•	•	•
Fifth wheel	•	•	•	•	•	•
Cab door hinge	•	•	•	•	•	•
Perform rust-proofing treatment of driver's cab again according to schedule		Once every 12 months				

Note: After cleaning the vehicle, re-lubricate all the parts which need lubricant at once, once a week for the vehicle operated on construction site.

Maintenance

Mandatory Maintenance

1. Purpose

Remove and clean the particles, burrs and other harmful impurities caused during the initial operation of vehicle, solve the connections loosening problems resulting from the initial operation, carrying out a mandatory running-in maintenance, to improve the reliability, so that make the vehicle in the best working condition to extend the service life of vehicle.

2. Implementation

Special service stations authorized by CNHTC can implement the mandatory service.

3. Mileage Requirement

The vehicle can enjoy a mandatory maintenance with the *Warranty and Maintenance Manual* of CNHTC, if the mileage is between 2000 to 4000 kilometers and within six months.

4. Content

Please refer to the First-time Check of Table 2 for the details of checking.

Maintenance

Engine

1. Operation Attentions and Maintenance

For driving safety, the engine must be carried out routine inspections of each component. If somewhere is abnormal, the vehicle should be sent to the repairing service station for maintenance.

Before running the diesel engine, the height of cooling level, fuel and oil level, and diesel level will be checked.

When the diesel engine is started, if it doesn't work within 15 seconds, restart it after 2 minutes.

After diesel engine is started, idle speed running will last for 2-3 minutes. Fuel pressure will exceed 100,000Pa. When cooling water temperature is lower than 60°C, do not run the engine at high-speed and heavy load at once, otherwise its wear resistance and reliability will be affected.

In the case that the engine working with load, load and speed must be reduced before shutdown. Idle speed running must last for no less than 5 minutes.

During running-in period (within 3000km), it is suitable for diesel engine to run only under medium load.

2. Routine Inspection and Maintenance

2.1 Oil Level Check

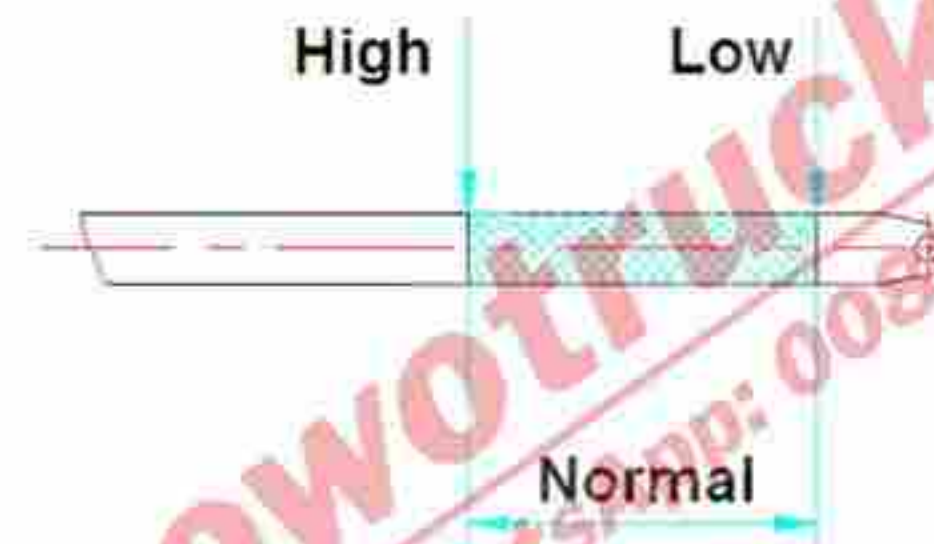
Check must be carried out after engine shuts down for 5 minutes with the vehicle parked on level ground. When the engine is running or the vehicle is tilting, the oil level could not be measured accurately.

Maintenance

Engine

Checking Methods:

1. Pull out the oil rule, clean the oil.
2. Re-insert the oil gauge completely, and then pull it out again, check the oil level. If the oil level in the grid within the region (As shown in Figure 3-1), it indicates that it is normal.



Pic. 3-1 Oil level check

3. If it lacks of the oil, please fill oil. When refueling, do not exceed the "maximum" of oil gauge.
4. After using, re-insert the oil gauge correctly. Do not let the oil spill all around during refueling. Prevent the oil spills on other components of the engine to avoid danger.

2.2 Coolant Level

Check whether the coolant water level is adequate or not.

Check the coolant level and add the coolant after the engine is cool.

The reason of sudden dropping in coolant level may be the leak of cooling system, please go to service station for maintenance.

Maintenance

Engine

Table 4 Oil Change Interval of Diesel Engine in Maintenance Rules

Service Conditions Items	WG I	WGII	WGIII
	Annual mileage less than 20,000km	Annual mileage less than 60,000km	Annual mileage less than 60,000km
First-time Check	After running 1000~1500km	After running 1500~2000km	After running 1500~2000km
Routine Check (P)	Every 5000km	Every 1×10^4 km	Every 1.5×10^4 km
1st-Grade Service (WD1)	Every 1×10^4 km	Every 2×10^4 km	Every 3×10^4 km
2nd-Grade Service (WD2)	Every 2×10^4 km	Every 4×10^4 km	Every 6×10^4 km
3rd-Grade Service (WD3)	Every 4×10^4 km	Every 8×10^4 km	Every 12×10^4 km
4th-Grade Service (WD4)	Every 8×10^4 km	Every 16×10^4 km	Every 24×10^4 km

Maintenance

Engine

Table 5 Maintenance Range of Diesel Engine

Diesel Engine Maintenance Items	First-time Check	P	W1	W2	W3	W4
Replace diesel oil (At least once a year)	•	•	•	•	•	•
Replace fuel filter or filter element	•	When changing diesel oil				
Check and adjust valve clearance	•		•	•	•	•
Replace fuel filter element			•	•	•	•
Clean fuel prefilter or replace filter element			•	•	•	•
Check coolant volume and add it to full	•	•	•	•	•	•
Replace coolant		According to table 4				
Fasten cooling pipe clamp	•					
Fasten inlet air pipe, soft tube, and flange connection parts	•		•	•	•	•
Check air filter maintenance indicating light or indicator			•	•	•	•
Clean dust cup of air filter (Excluding automatic exhausting type)		•	•	•	•	•
Clean main filter element of air filter		When indicator light or it indicates red				
Replace safety filter core of air filter		After cleaning main filter core for five times				
Check bearing clearance of turbocharger						•
Check, adjust clutch stroke and wire rope conditions	•	•	•	•	•	•
Electric components and electronically controlled system wiring harness		Check it every 250 hours				

Note: • The mark means that the maintenance is needed.

Maintenance

Engine

Fuel Oil, Lubricating Oil, Coolant and Auxiliary Materials Used in Engine:

1. Fuel Oil

Summer: diesel which apply to the local market in summer.

Winter: diesel which apply to the local market in winter.

2. Lubricating Oil

2.1 Grade CF—4 15W/40 engine oil is recommended.

2.2 High-grade oil is allowed to replace lower-grade oil.

Before starting the engine, check the height of the oil within the oil pan.



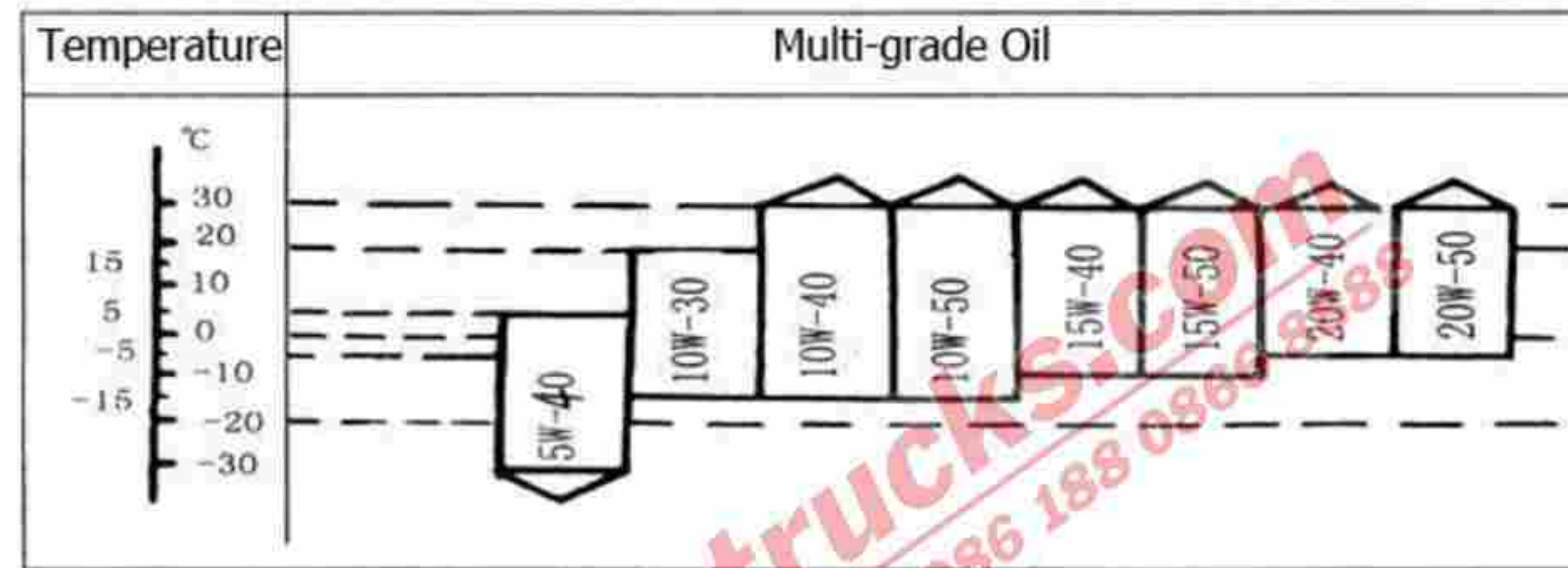
Warning:

- 1. Do not check the height of lubricating oil level when the engine is running.**
- 2. It is not allowed to mix-use the different grade oils.**

Maintenance

Engine

Table 6 Selection of Oil Brand



As the multi-grade oil with a flat viscosity curve, between the range of lubricating low temperature and high temperature, it has good lubricating characteristic, so we recommend use multi-level lubricant.

Changing Engine Oil:

Check whether the oil color is normal and extraneous matter is mixed in oil or not when discharging the oil, so as to detect hidden errors. After the oil is to be drained completely, clean the drain plug and then tighten it; replace with new oil filter element, the new oil should be added into the engine to the upper limit of oil ruler. In order to prevent the case that starting the engine without lubrication, turn the key switch to the starting position (Position 4) when the high-pressure oil pump is in the off position, empty running for a while, and then start the engine and operate in low speed. Check oil filter if there is any leaks, shut down five minutes later, check and add oil to the upper limit.



Notice: Do not replace the engine oil when it is hot.

Maintenance

Engine

3. Grease

Inject the general lithium grease into the oil cup of water pump in line with the requirements of the local market.

4. Coolant

Cooling system should be added with the long-acting cooling fluid, this fluid has capability of antifreeze rust. Please refer to the ratio of long-acting coolant antifreeze instructions.



Warning:

1. When temperature is below 0°C, you should check the antifreeze concentration regularly.
2. Vehicles perennial running at areas above 0°C, water which has been treated with anti-rust and anti-scaling could be used as the coolant; it is prohibited using untreated water as the engine coolant.

Maintenance

Transmission

1. Usage Requirements

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:

1.1 Lubricant Brand

Please fill and inject 85W/91GL-5 vehicle gear oil in the transmission.

1.2 Proper Oil Level

Please make sure that the oil level is abreast with the observation slit of oil level. Check the oil level through the observation slit on box flank until the oil level reached the slit and spillage happens. The oil injection volume is about 12L for HW18710 transmission (12.5L with power take-off added).

1.3 Inspection of Oil Level

Regular inspection should be made to the oil level. The car should be parked on flat road when 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 can we check the oil level, to prevent the inaccurate measurement.

1.4 Re-supply of Lubricant

To prevent the chemical reaction of different kinds of lubricants, the re-supplied lubricant should be identical with the former lubricant brand and specifications.

Maintenance

Transmission

1.5 Cycle for Lubricant Replacement

Discharge the used lubricant in the transmission and then rinse the strainer assembly when replacing the lubricant for transmission.

The lubricant in the new transmission must be replaced between 2,000~5,000km.

For each 10,000km, the lubricant must be checked for its oil level and leakage. It should be supplemented and the strainer can also be rinsed at any time if necessary.

For each 50,000km, the lubricant must be replaced.

1.6 Working Temperature

The maximum temperature for transmission during the continuous working period must not exceed 120°C and its minimum temperature must be below -40°C.

The lubricant will decompose and reduce the lifetime of transmission if the working temperature exceeds 120°C.

Any of the following conditions can cause the transmission's working temperature to exceed 120°C.

- ① Continuous driving at the speed no more than 32Km/h.
- ② Engine speed is too high.
- ③ Ambient temperature is too high.
- ④ Transmission is surrounded by eddy current.
- ⑤ Exhaust system is too close to the transmission.
- ⑥ Running at high-power and over-speed rotating.

Maintenance

Transmission

1.7 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).

1.8 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 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 dragged liftoff the ground.

2. Precautions

2.1 The clutch must be completely released and the gear shaft lever should be moved into relevant positions when shifting.

2.2 When parking, the gear shaft lever should be moved into neutral position in low gears area.

Maintenance

Transmission

- 2.3 When shift 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.
- 2.4 When the transmission shifts from low gears to high gears (vice versa), do not skip gears, or it will influence the lifetime of auxiliary gearbox's synchronizer.
- 2.5 When driving downhill, shifting between high and low gears is prohibited.
- 2.6 Shift to first gear or second gear to move in accordance with the road conditions.
- 2.7 Release the brake before the vehicle starts. For the vehicles that 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.
- 2.8 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. Do not continue driving until the failure is eliminated.
- 2.9 The transmission is featured with interlocked mechanism for main and auxiliary transmission. The gear shifting for main transmission is locked up before the auxiliary transmission shifts into relevant gear. In the event any failed shifting, it may be affected by the interlock of main and auxiliary transmission. Check the sequential gear shifting cylinder and its gas pipeline to ensure that auxiliary transmission has shifted into relevant gear.
- 2.10 Privately disassembly/knock down or assemble the transmission is strictly prohibited within warranty period.

Maintenance

Front Axle

1. Regular maintenance and care of front axle every 15,000km or every six months.
2. Check rotation of wheel bearings, replace grease, and check whether the wheel bearings can continue to use, adjust or replace it if necessary; the grease used in wheel hub bearings, brake camshaft and the main pin, tie rod ball pins, brake gap adjustment arm, etc. is for motor vehicles through the lithium-based grease.
3. Grease Volume:
 - 3.1 Volume of grease for each wheel: at a total of about 0.6kg for wheel hub cavity and two bearings;
 - 3.2 Each brake camshaft and the kingpin of the grease volume: approximately 0.2kg, adding to the bracket with the oil gun until overflow from the holes;
 - 3.3 Tie rod ball pins, brake lash adjuster arm should be filled with grease.

Maintenance

Rear Axle

Pay Attention to the Following Points in the Use and Maintenance of the Rear Axle:

1. Maintain Lubricant Volume, and Frequently Check Oil Volume of Wheel Reductor and Main Retarder.

Oil lacking may lead to early wear of running components and even cause burning damage. While, more lubricant does not mean that it will provide better performance, because excessive lubricant may result in high temperature and even oil leakage.

For new vehicle's initial maintenance, when replacing lubricant of the wheel reductor, rotate the wheel till drain plug is in the lowest position while filling plug is in the position near half height of the axle housing. Open the drain plug to drain out used oil, screw it back and open the filling plug to fill lubricant to its height, and then screw back the filling plug. Rotate the wheel for several times, locate it in the position where drain plug is in the highest position while filling plug is in the position near half height of the axle housing. Open the filling plug to drain out excessive lubricant till oil level is kept in the height of filling plug, and then screw it back.

There are two screw plugs on the rear axle housing: one is an oil drain plug in the bottom of axle housing, the other is an oil filling plug in the position near half height of the axle housing. The normal oil level should be maintained in the height of filling plug.

The main reducing gear and wheel reductor in rear axle use API GL-5, SAE 85W/90 gear oil. Generally, oil volume is 16.5L for rear driving axle main retarder, 19.7L for middle axle main retarder and about 3L for each wheel reductor.

The oil change interval for rear axle gear oil is 50000km or one year. Gear oil should be replaced for the first 2000-3000 km compulsory maintenance.

Maintenance

Rear Axle

2. Operation of Differential Lock

The interwheel differential in rear axle is used to automatically realize speed difference between left and right wheel when the vehicle turns corner so as to avoid tire wear and mechanical damage. Engage the differential lock when the vehicle wheels on one side skids on smooth or muddy road, at this time the left and right axle shaft become one rigidly coupled shaft, thus the vehicle will drive away from the trouble road.



Notice:

After the vehicle driving out of rough road, disengage the differential lock immediately, or it will result in tire worn and differential damaged.

3. Avoiding Serious Overloading

Serious overloading and loading concentration will result in axle housing deforming and break. Therefore, the loading capacity shall be complied with the specified loading in accordance with certain driving conditions.

4. Other Precautions

If the connection fittings such as differential gear and driven gear, etc. need to be reassembled during repairing, smear the coupling threads with LOCTITE 262 thread setting glue, and tighten the coupling bolt according to the specified torque.

If abnormal sound is heard during operation, do not drive the vehicle, check and repair immediately.

Maintenance

Steering System

1. Check hydraulic oil level inside the tank. First, clean oil reservoir and its surroundings to keep dirt out. Pay attention to the oil stick mark when checking, the oil level should be the same as the oil stick when the engine operates; the oil level should be a bit higher when the engine does not work.
2. The hydraulic oil of new vehicle needs to be replaced, and cleaned cartridge in the reservoir after the first 2,500Km, and then each subsequent 20,000Km (or half a year) the vehicle needs to replace the hydraulic oil.
3. Check the oil surface height once a month, and check the cleanliness of hydraulic oil.
4. The procedure for changing oil as following:
 - 4.1 Put up the front axle.
 - 4.2 Open the cover of fuel tank; screw off the return pipe on the steering gear.
 - 4.3 Start the engine, idle running about 10 seconds, and turn the steering wheel to its right and left limit position several times, so as to drain oil from inside the oil reservoir, booster pumps, steering gear.
 - 4.4 Re-tighten the return pipe (keep it clean and keep dirt out of the oil circuit), clean oil reservoir, oil filters and filter elements. It is best to renew filter element every time when changing oil.
 - 4.5 After filling up hydraulic oil, run the engine at idle speed, turn left and right the steering wheel repeatedly, at the same time, fill oil continuously till oil level no longer reduces and no bubble occurs. The oil level should be added on all the components in the first-grade service.

Maintenance

Steering System



Notice: Please replace with the specified hydraulic oil (HVN32 Low Temperature Hydraulic Oil).

5. In the first-grade service, check the clearance of every rotary component such as steering tie rod and drag rod joint. If the clearance is huge, the component should be replaced, and grease should be added on all the components in the first-grade service.

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Maintenance

Clutch

Running Parameter:

1. Working medium: air and brake fluid;
2. The largest working pressure: 4 MPa for brake fluid, 0.85 Mpa for air;
3. Working temperature: - 40°C~+ 80°C;
4. Brake fluid: complying with DOT3, DOT4 or JG3, JG4 standard;
5. Pedal travel: Max stroke 200mm; free stroke, 25mm for pull, 40mm for push;
6. Pedal force: not more than 190N with assistance.

Adjustment of Clutch Operation System

1. Check and Adjust the Clearance between Master Cylinder Pushrod and Piston:

When adjusting, push the pedal with hand smoothly till the main cylinder pushrod contacts against the piston, then adjust the limit bracket until the clearance between limit bracket and pedal is about 1mm. Tighten the limit bracket nut. Ensure there is 0.5mm~1mm clearance between the pushrod and piston, this clearance should not exceed 1mm, or it will reduce the effective travel and influent the effect of clutch.

Maintenance

Clutch

2. Adjust Clutch Brake Control Valve:

Step on the clutch pedal fully, at this time the working travel of main cylinder pushrod should not be less than 32mm, and the clutch pedal should have control valve to move 3~5mm. Fix the brake control valve, tighten the bolt, and then adjust the limit screw of the pedal bracket, making the screw cap contact against the clutch against the clutch pedal (when the clutch pedal is stepped down fully). This can prevent the brake control valve from coming off the pedal bracket.

3. Release the Air in Hydraulic System Thoroughly:

Air in hydraulic system can reduce the effective travel of booster cylinder pushrod, and the clutch can't be released thoroughly, thus shifting becomes difficult.

When assembling and disassembling oil tube, be sure to release the exhaust valve of booster cylinder first. Fill the specified oil to the reservoir. At the same time step on the clutch pedal and release air from the exhaust valve, then tighten it. After stepping on the clutch pedal rapidly for several times, hold the pedal tightly, release the exhaust valve till no air comes out, then tighten the exhaust valve.

Repeat the afore-mentioned steps for 2~3 times, air in hydraulic system will be released completely.

Maintenance

Clutch

Attentions:

1. During the exhaust process, relax the pedal after the exhaust valve or an associated tube nut is tightened, so as to avoid inhalation of air, lifting the pedal to the maximum height in order to add the brake fluid inside the tank to the master cylinder fluid anvil cell.
2. Re-adjust the clearance when you maintain the new vehicle for the first time. Check the vehicle for second grade maintenance every 12,000km and for first grade maintenance every 4,000km. Push the clutch rocker arm with hand, there should be gap in the head of limit bolt.
3. You must adopt DOT3 or DOT4 brake fluid as actuating medium in hydraulic system. When mounting and dismounting the pipeline, you can use the Loctite572 to seal the union nut and connector.
4. When changing brake fluid, drain the remaining fluid out of the system thoroughly, and change to the specified brand fluid manufactured in the same batch.
5. Brake fluid is corrosive. Avoid brake fluid splashed on the human body and the paint surface of the vehicle during the exhaust process.

Maintenance

Air Conditioner

Maintenance

	Item	Content	Check Period				
			Every week	Every month	Every two month	Every quater	Every year
Air-conditioning Unit	Coolant Volume	Check coolant level	+				
	Coolant Leakage	Check leakage with halogen checker			+		
	Hose and Pipe	Check cracks and damage			+		
		Check leakage of connectors and tightening of clamps					—
		Replace desiccant and filter					—
Compressor	Coolant	Refill with specified coolant	+				
	Oil Seal	Check leakage trace with white paper	+		—		
	Belt	Check tightness of belt pulley and check wear			+		
	Bolt	Check tightness, check and check change all of them, if necessary	+				
Evaporator Condenser	Evaporator Cartridge	Check dirt, clean if necessary	+				
	Wind Motor	Check running condition	+				
	Expansion Valve	Check running condition, remove filter gauze and clean					+
	Condenser Cartridge	Check dirt, clean if necessary	+				
	Wind Motor	Check running condition	+				
Electrical Apparatus Element	Connector and Plug	Check looseness of wire clamp plug	+	+			
	Heat Sensitive Resistance Switch	Check action				+	
	Magnetic Clutch	Check if specified requirements has been met				+	
	Magnetic clutch bearing	If it can't turn steadily, please replace it					+



Specification: "+" indicated adjustment or repair if necessary; "—" indicates replacement.

Maintenance

Battery

Check the surface and proportion of liquid electrolyte every three months. The surface is 10~15mm higher than the electrode plate; the proportion is more than 1.24 g per cm³.

Take off the battery into the warmer room when the vehicle does not run for a long period and the temperature is low.

Check whether the battery electrode pile and wire connection clip is loose and the battery conditions are normal or not when the vehicle runs for each 500 km.

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Maintenance

Changing and Replacing Parts

Your vehicle is designed based on the latest technical knowledge of security, so it provides excellent active and passive safety. In order to maintain this state, it is forbidden to change parts arbitrarily. So if the vehicle must be added other accessories, carry out technical improvement or replace parts, pay attention to the following instructions:

1. Before purchasing the accessories and parts for replacement or technical improvement, ask for the CNHTC sales agencies's advice first.
2. CNHTC sales agency provides original accessories, parts and components, and professional installation services.
3. We suggest using original accessories and parts only, and installing them at CNHTC service agency. Due to the damage caused by violation of operation, CNHTC service agency does not provide quality assurance.
4. If the additional installation of the accessories which will directly affect the driver's control of the vehicle, such as speed control devices, these devices must get CE (European Community recognized mark) or "CCC" mark which approve equipment can be installed in your models.
5. If the connected electrical equipment does not directly control the vehicle, such as refrigerators, horns, or fan, CE (European Community recognized mark), or "CCC" mark should be attached to them.
6. If your vehicle needs technical midification, please note our principles, that is, do not modify the vehicle without our permission; do not perform to damage the vehicle; the transportation safety and operating reliability should be ensured. CNHTC service agency will provide professional service or introduce professional state under particular cases.

Maintenance

Changing and Replacing Parts



Notice:

- 1. Reliability, security and acceptability of the original accessories and parts have the approval and is suitable for the vehicle.**
- 2. For other brand parts and components, we could not provide quality warranty, even if they have official approval from the technical inspection supervision authorities' acceptance.**
- 3. For unauthorized vehicles modification and the adverse consequences caused by the modification, no warranty will be provided.**

Do It By Yourself

Driver's Tools and Spare Tire



Notice:

1. Ensure that the driver's tools and spare wheel firmly fixed, in order to avoid loosen in accidents and sudden braking situations.
2. The vehicle must not be started when it is lifted.
3. Ensure the vehicle is lifted by appropriate support block if you work under the truck.
4. The jack must be screwed completely before putting back to workbox, and make the crank handle firmly resisted the side of the jack.

Do It By Yourself

Changing Wheels

1. When changing a wheel, take care not to damage the stud threads.
2. The matching surface between the brake drum and rim must be absolutely free from paint, grease or dirt.
3. It is essential that the contact face of the wheel nut is clean and free from dirt or grease.
4. Before installation of wheel, clean the rim matching with wheel locating hole and wheel reductor housing, and coat it with a little grease.
5. Coat threads of the wheel studs and nuts with a little grease, oil or antifreeze.
6. All the threads of the wheel nuts are right-hand threads. Put on the wheel and tighten the wheel nuts in cross sequence while the wheel is still raised, then low the wheel and tighten the nuts with a torque of 550~600Nm.
7. Every time when the wheel is changed, the nuts must be retightened after driving 50Km. And later on, retighten the wheel nuts every 1000Km.

Do It By Yourself

Trailer



1. Coupling the Trailer

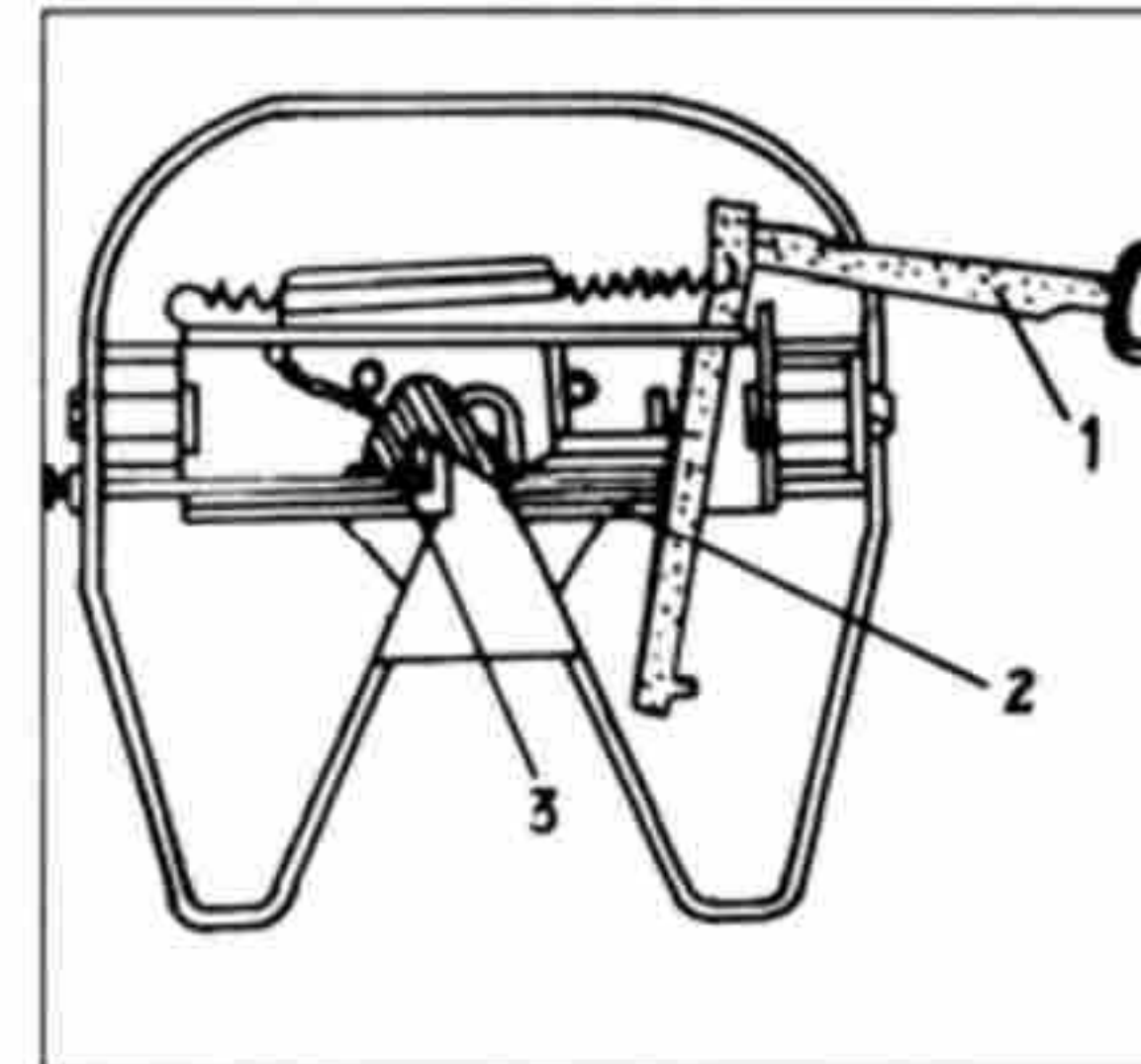
Semi-trailer:

The coupling of tractor truck and trailer is conducted by fifth wheel. Coupling procedure:

1.1 Secure the semi-trailer stands still.

1.2 Lift the hand lever 1 on the fifth wheel, put the lever to the upper long eye pull it out until the position slot locks housing. At that time, the fifth wheel is ready to couple.

1.3 Coupling during backing the tractor truck, after putting drawbar pin to the connecting jaw in the fifth wheel, coupling hook 3 and wedge block 2 lock the coupling jaw automatically and complete the coupling. At the same time the lever returns to its original position. It means the operation is correct.



Do It By Yourself

Trailer

2. Uncoupling the Trailer

2.1 Secure semi-trailer or trailer stand still.

2.2 Uncoupling the semi-trailer with dual circuit brake system, first uncoupling the reservoir line (red) and then the brake line (yellow). It is essential to adhere to this order, otherwise the trailer brake will be released.

2.3 Uncoupling the trailer: Put forward the hand lever mechanism (in the travel direction of the truck forward the tractor to complete the uncoupling operation. Return the hand lever 1 of the fifth wheel to its original position if the trailer will not be coupled again.

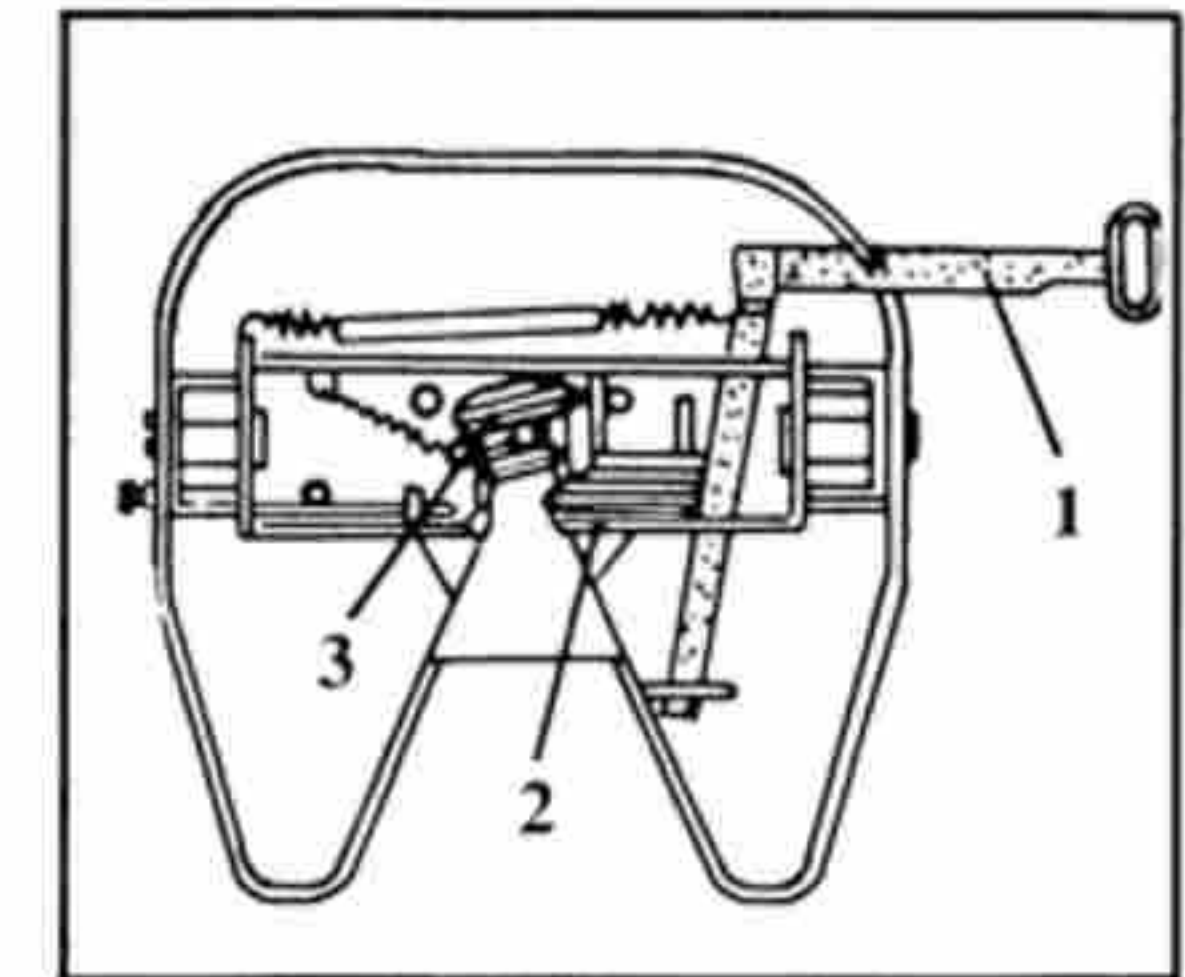
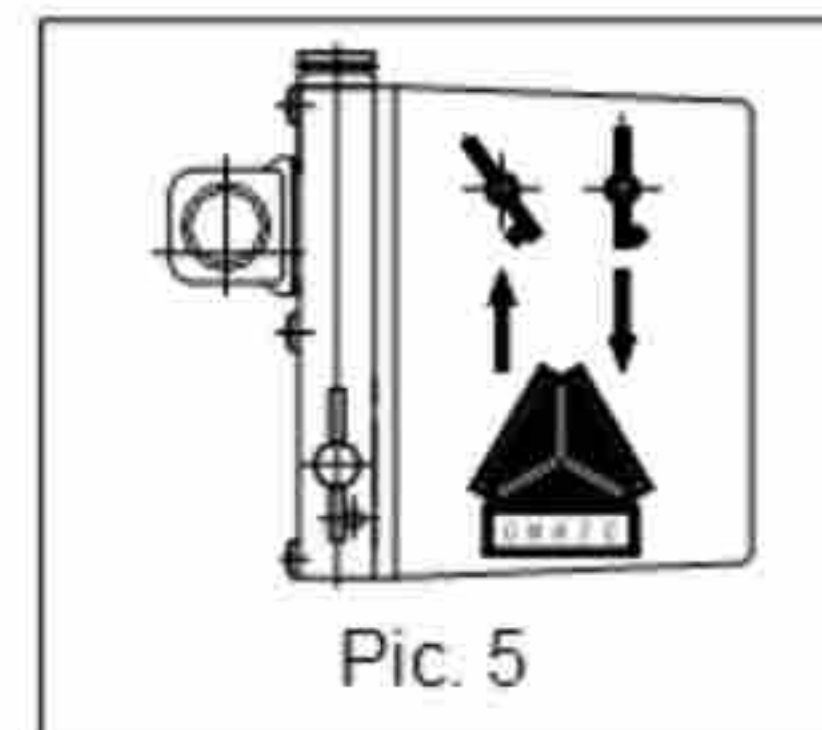
2.4 Uncoupling the semi-trailer: Put out the hand lever will uncouple hook 3. Drive forward the tractor to complete the uncoupling operation. Return the hand lever 1 of the fifth wheel to its original position if the semi-trailer will not be coupled with for a long period.

3. Cautions

3.1 Connecting compressed air lines and electric cables. The vehicle turns or rebounds.

3.2 After connecting the compressed air lines, adjust the pressure according to the requirements of the trailer manufacturer.

3.3 With the dual circuit brake system, the connectors are red to red (on the right) and yellow to yellow (on the left).



automatic locking mechanism. Drive lever to its original position.

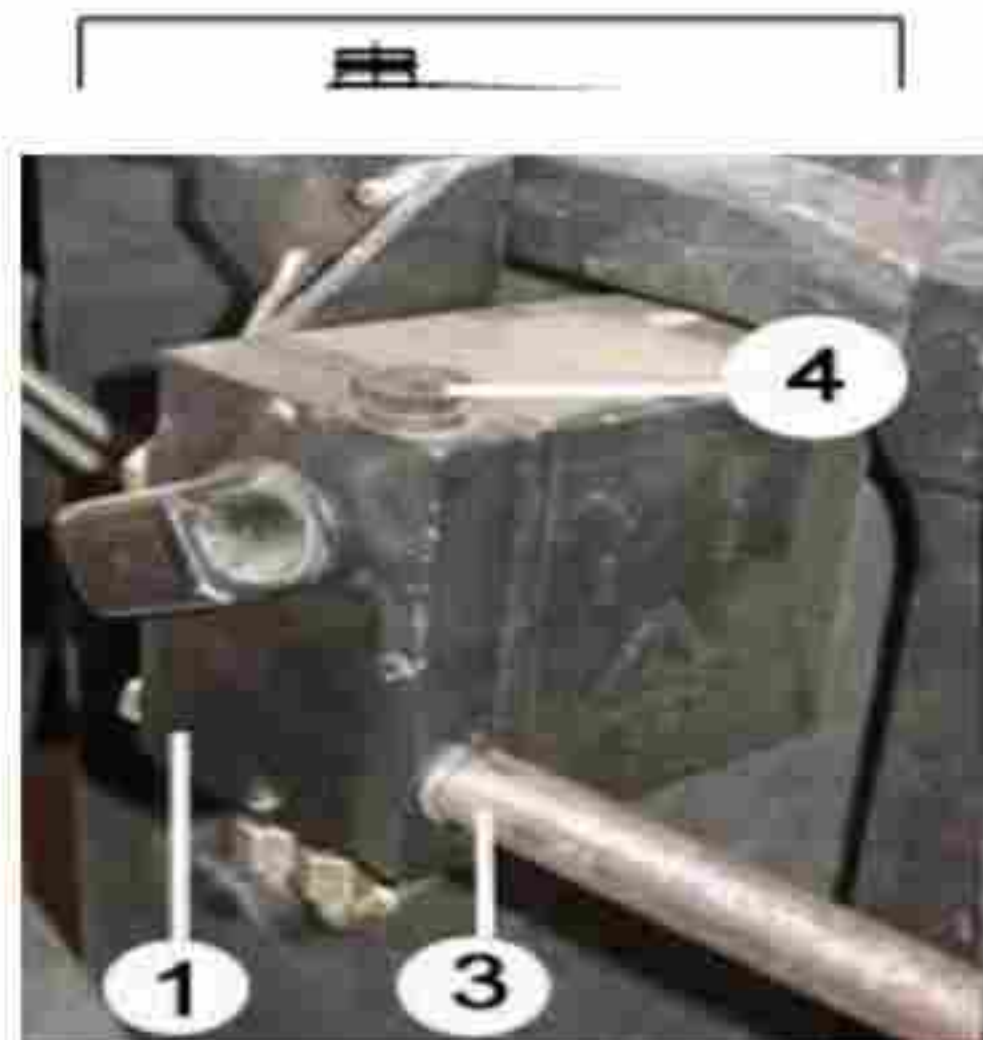
the position slot locks housing, the edge block 2 will be released. Drive forward the tractor to complete the uncoupling operation. Return the hand lever 1 of the fifth wheel to its original position if the semi-trailer will not be coupled with for a long period.

no stress, kinking or abrasion will occur when the vehicle turns or rebounds.

regulator (if fitted) on the trailer in accordance with requirements of the trailer manufacturer.

Do It By Yourself

Pic. 4



Pic.1



Pic. 2

- ① Manual hydraulic oil pump
- ② Transfer handle
- ③ Lever
- ④ Fuel plug



1. Cab tilting operation

- 1.1 Before tilting, remove all the loose articles from the cab.
- 1.2 Before tilting, open the radiator cover first (Pic. 3).
- 1.3 When tilting, nobody should stand near the front of the cab (Pic. 4).
- 1.4 Turn the tilting hand lever of the tilting oil pump to "↑" position, tip up the cab with hand pump (Pic. 5).
- 1.5 Turn the tilting hand to "↓" position, tip down the cab to its original position with hand pump.



Warning:

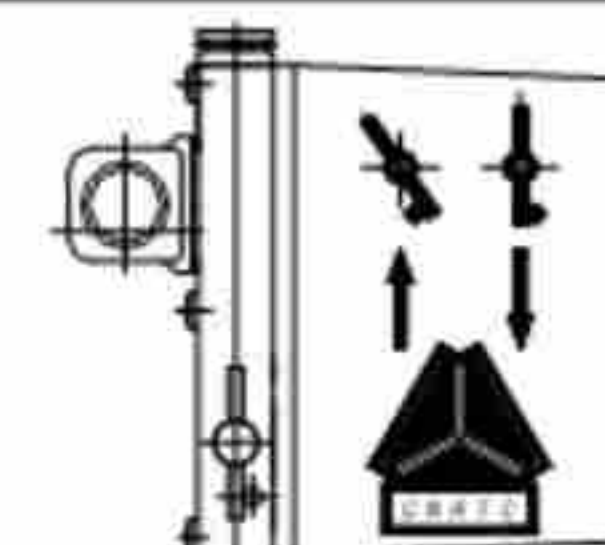
Because the oil cylinder can fall back automatically at the top die point, when the distance between the lock pin and the lock catch is 40~100 mm, the cab will fall back automatically.



Pic.3



Pic. 4



Pic. 5

Do It By Yourself

Cab Tilting System

- 1.6 After the cab has been tilted down, the rubber bellows connecting with the top intake duct must cling to the bottom intake duct so as to keep the dust outside.
- 1.7 During the period when the cab is being tilted down, check if the guide pad of the front air bag is aligned. After the cab has completely fallen back, check if the front air bag is upright, if not aligned, tip up and down the cab again.
- 1.8 Finally check cab lock indicator on the instrument. If the cab is unlocked, the cab lock indicator will light up.



Notice:

When titling, the cab must be tipped forward beyond the top die point, otherwise the next operation procedure could not be continued.

2. Filling Oil and Releasing Air of the Titling System

Filling oil and releasing air of only after the cab returning to its original position.

About 0.41 HVN32 low temperatures hydraulic oil should be used, to ensure that the hydraulic oil is clean and in accordance with the specification before filling.

Filling procedures:

- ① Open the oil plug and fill up the specified hydraulic oil.
- ② While titling up the cab slowly with hand pump, fill the oil continuously.
- ③ Tilt down the cab and drain the superfluous oil at the same time.
- ④ Tilt up and down the cab again with hand pump, after titling down the cab to its original position, check and fill up the oil again.
- ⑤ Finally, screw the oil plug.

Air filter clogged



Do It By Yourself

Cab Tilting System

3. Check Function of the Tilting System

3.1 Tilt the cab forward to top die point, check the working condition during tilting down. If the system is working in good condition, the cab will tip down slowly with resistance rather than strike down.

3.2 When tilting the cab to 30°, the cab can be kept in this position for 20 minutes without sinking.

(1). Front suspension: (Pic. 6)



Warning:

When adjusting, pressure of air bag should not be over 2kg.



Pic. 6 Coil spring of front suspension (or air spring)

Do It By Yourself

Cab Tilting System

(2). Rear suspension: (Pic. 8)

With air springs:

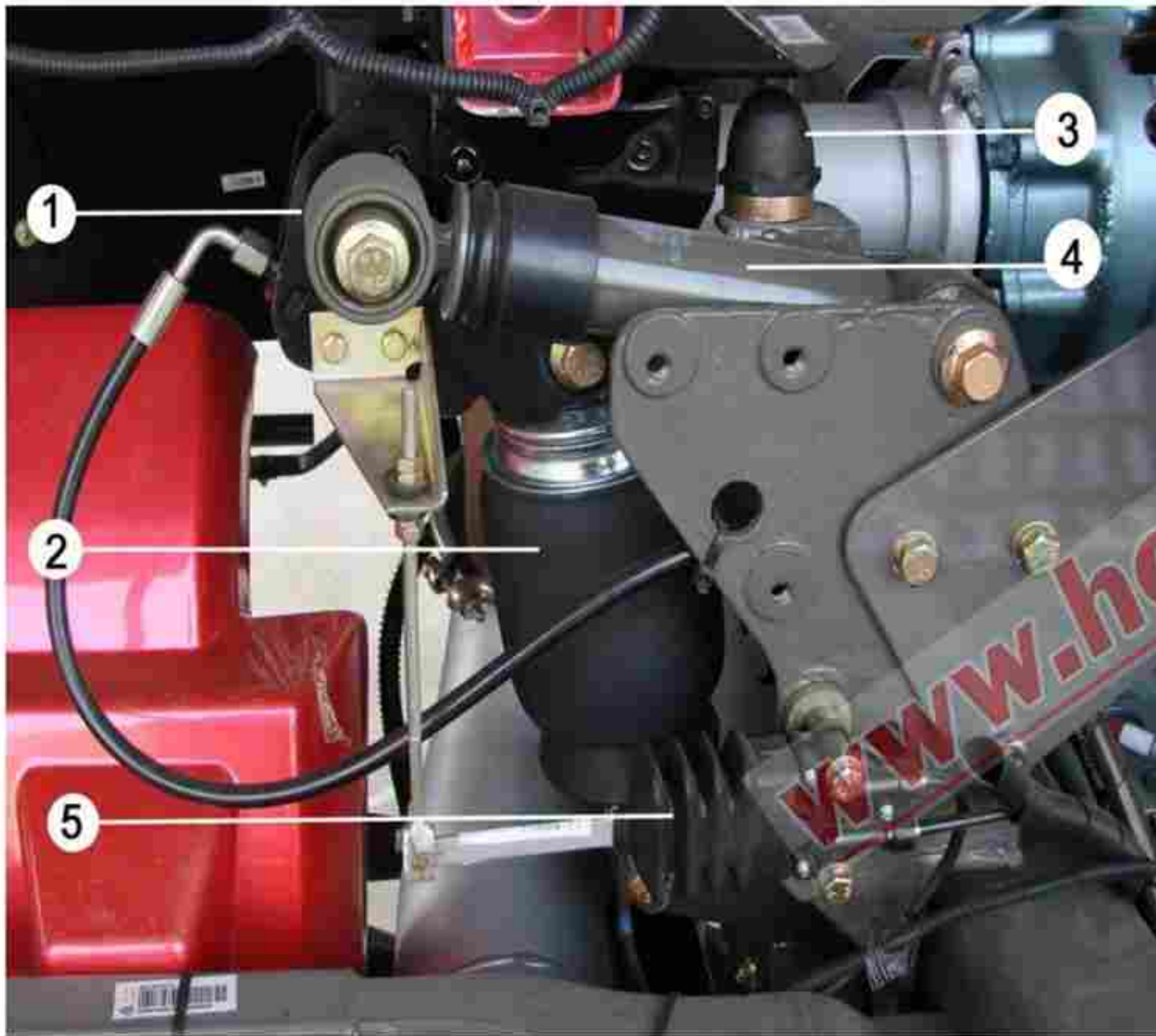


Fig 8



Notice:

If front and rear suspension is both air suspensions, clean the air bag in time to prevent it from aging, when the air bag is stained with grease during its application and repair.

- 1. Hydraulic lock
- 2. Shock absorber (air bag) of rear suspension
- 3. Limiting block
- 4. Stabilizer bar
- 5. Height control valve
- 6. Shock absorber (coil spring may be adopted according to working conditions) of rear suspension

The hydraulic lock and the lock shaft should be coated with lithium-based grease.

The height of left and right shock absorber of rear suspension should be the same. Adjust track bar nut to change their height to 270 ± 2 mm.

Do It By Yourself

Cab Tilting System

4. Check the Suspension System

After the cab has been mounted on the frame, tilt up and down the cab.

5. Other Cautions

- 5.1 Check if the air bags of front and rear suspension inflates and deflates normally and if the front rocker arm turns flexibly.
- 5.2 Check if the hydraulic lock engages and disengages normally, and at the same time, check the working condition of hydraulic lock indicator (in normal condition, the indicator will go out when the hydraulic lock locks up, and it will light up when the lock releases).

Do It By Yourself

Common Errors and Solutions

Front Axle

Errors	Error Source	Solutions
Heavy Steering	Steering knuckle is not flexible	Lubricate the kingpin of steering knuckle, check the clearance between steering knuckle and front axle.
	Inadequate lubrication	Lubricate the kingpin of steering knuckle and track-rod ball pin.
	Improper toe-in adjustment	Re-adjust toe-in
Flexible Steering	Improper pre-tightening of hub bearings	Re-adjust the pre-tightening force of hub bearings.
	Ball pin of tie-bar flexible and worn-down	Tight or replace the ball pin
	Steering knuckle bush worn-out	Replace steering knuckle bush
Wheel Flutter	Improper pre-tightening of hub bearings	Re-adjust the pre-tightening force of hub bearings
	Ball pin of tie-bar flexible and worn-down	Tight or replace the ball pin
	Steering knuckle bush worn-down	Replace steering knuckle bush
	Clearance between steering knuckle and front axle is too large	Re-adjust the clearance
Brake Side-slipping	Whether one side of friction block is polished or not	Replace the friction block
	Clearance between friction block and retarding disc	Initial adjustment and function check
	Whether friction block can move freely within the fixed base plate or not.	Remove the brake pads, clean the brake pads, fixed base plate and brake calipers
	Whether the air pressure on both sides of brake chamber of axles are the same or not (with barometer measuring the pressure)	Refer to the vehicle manual.
	Remove the air relief plug or not	Remove the air relief plug of brake chamber

Do It By Yourself

Common Errors and Solutions

Front Axle

Errors	Error Source	Solutions
Braking Drag	When the brakes are released, whether there are compressed air in brake chamber or not.	Refer to the vehicle manual
	When parking braking is released, whether all the spring braking are released in the brake chamber or not.	Refer to the vehicle manual
	Check the clearance between the brake pads and retarding disc is right or not	Initial adjustment and function check
	Whether brake pads can move freely within the fixed base plate or not.	Remove the brake pads, clean the brake pads, fixed base plate and brake calipers
	Sliding function of brake caliper is normal or not	Change sliding pin and bush
	Remove the air relief plug of brake chamber or not	Remove the air relief plug of brake chamber
No or inferior Braking Effect	Whether the brake pads are polished or not	Replace the brake pads
	Check the clearance between the brake pads and retarding disc is right or not	Initial adjustment and function check
	Retarding disc is in good working condition or not	Replace the retarding disc
	Whether the air pressure on both sides of brake chamber of axles are normal or not (with barometer measuring the pressure)	According to the vehicle use requirements, implement the remedial measures

Do It By Yourself

Common Errors and Solutions

Rear Driving Axle FAQ Troubleshooting

1. Oil Leak

There are several leaking places of rear driving axle. Oil leaking place of final gear is always at the input shaft. It is usually because of damage of worn-out oil seal of the input shaft (driving gear shaft) , or loosen of oil seal spring. When maintaining it should be noticed that if oil leaks from outside of oil seal, it shows the outside of oil seal and housing are matched loosely. When reassemble the outside of oil seal and oil seal seat hole on the housing should be cleaned, and apply LOCTITE603 solid glue to the outside of oil seal and punch the seal into the oil seal seat hole. If the oil seal is intact, but oil still leaks heavily, check the axle housing ventilation devices(which should be checked frequently). If the ventilate port is jammed, the heat brought from movement of axle may push the lubricant outside by accumulated pressure. This may usually be ignored.

There are three parts should be checked when the hub leaks, the O type ring between the hub and wheel reducer's shell, the O type ring between the hub oil seal seat and axis tube of axle housing, the seal of hub. Normally the seal of hub leaks more often. When reassemble the hub seal should notice that the hub has two seals of the same dimension but materials, normally put the one with yellow mark or engraved mark to the inside, while the other one to outside. If the outer ring of oil seal and the shell connection loosing, use LOCTITE603 solid glue to the outer ring of oil seal.

If the axle head leaks that shows the end cover and planet carrier contact surface is not airproof, which is connected without mat, we can disassembly them and clean the end cover and wheel reductor housing flange, then use LOCTITE587 to reassemble them. Glue trail should be continuous.

If find out the blowhole of axle shell leaks and the wheel reductor leak oil very often that commonly means the oil seal of half shaft has installed in a wrong way or has broken down.

If the axle head leaks, there would be oil stain on brake lining and brake drum, which can cause failure of brake.

Do It By Yourself

Common Errors and Solutions

2. Overheat of Hub

Overheat of hub commonly arises from excessive pre-tightening force of hub bearing, which commonly occurs after maintenance. If haven't tighten the axle head nuts according to regulation during maintenance, the pre-tightening force is excessive, which will cause over heat of hub. The hub should be reassembled according to regulation. Certainly, distortion and broke down of hub bearing also can arise over heat of hub.

3. Overheat of Brake Drum

There are many factors for overheat of brake drum, some are resulted from mechanical brake parts and some are resulted from brake control air path system.

Firstly, check out whether the brake chamber back to place quickly after braking. If the brake chamber can not back to place quickly or back to place slowly, driver may remove the handspike of brake chamber and the brake adjusting arm to check whether the brake chamber back to place quickly, if not, it means failure of brake chamber and brake control air path. And if the brake chamber back to place quickly after removing the handspike of brake chamber and the brake adjusting arm, then should check whether the brake camshaft running neatly.

Deformation of the brake camshaft, lacking oil of axis bush or deformation/dislocation of camshaft bearing, can all make the failure of brake chamber back to place to cause the over heat of brake drum.

Broken or loosing of brake shoe return spring may cause overheat of brake drum or make frictional noise.

During the normal driving, there should have a certain gap between the braking friction plate and the brake drum (normally 0.2 mm), if the gap is too large, it may affect the braking effect; and if too small, it will arise overheating.

Do It By Yourself

Common Errors and Solutions

The heat dissipation of brake drum is not good condition, frequently braking action will make the brake drum overheating very soon, which will seriously even burn tire valve and cause air leakage of tire. So if vehicles traveling downhill in a long-distance, using engine exhaust braking is highly recommended instead of using service brake frequently, in order to prevent overheating of brake drum.

4. Abnormal Noise from Central Powertrain

If there is sudden abnormal noise coming from the rear axle housing while driving, stop the vehicle immediately for inspection. Generally, this abnormal noise indicates parts have been damaged.

The falling apart of the supporting bearing for the differential, the serious pit corrosion or abrasion of the bearing, the loosening or falling off of the set bolt of the driven gear, the loosening of the engaging sleeve for the differential lock as well as the tooth breaking of the differential gear may cause serious abnormal noise.

If the noise due to gear abrasion is continuous and the level of such noise increases with the increase of vehicle speed, it is generally caused by the pit corrosion of the bearing, abrasion of driving gear or the scratch pit corrosion of the tooth surface. If the noise is not obvious when driving, but high noise when slowing the vehicle down by withdrawing fuel, it is generally caused by the drag mark or pit corrosion of the tooth back of the driving gear.

If there is no obvious noise when the vehicle is normally traveling in a straight line, but abnormal noise when the vehicle is turning at the corner, it is apparently caused by the damage or burning of the differential gear, or by the moving of differential lock's loosened engaging sleeve.

If there is continuous noise after replacing the driving and driven gears and the level of such noise increases with increase of the vehicle speed, check whether the backlash of the driving and driven gears and the contact trace of tooth surfaces are qualified, and pay special attention to whether the driving and driven gears are assembled as a matched set.

Do It By Yourself

Common Errors and Solutions

Rear Driving Axle FAQ Troubleshooting

The deformation of axle housing can also cause the abnormal noise from the rear axle, which should be attended to during inspection. In case of abnormal noise from the rear axle, do not drive the vehicle forcibly. Remove and check the rear axle immediately. The falling apart of the bearing, the loosening of the set bolt and damage of the gear may, if not repaired in time, result in more serious consequences.

5. The Failure of Differential Lock

When the differential lock is needed to put up, push the switch but the signal light does not on. The first thing you should do is to check out whether the push rod of differential cylinder moves. When finding the push rod could shoot out, however, not in right position, that means the head of mating gear tooth mated with the head of gear peak but not in the right position. When move the truck front and back the differential lock will work naturally. If the differential cylinder doesn't work, it indicates some problems is the electricity, air control system of electromagnetic valve. Then, just loosen the outlet connection of magnetic valve to observe whether some compressed air output, if not that shows the problem from circuit control system of magnetic valve or magnetic valve itself; if yes, that indicates the problem comes from the working cylinder.

If pushing rod puts the differential lock in right position after pressing the differential lock switch, however, the signal light is not on, obviously the problem is from the switch of signal light or signal light itself, which is easy to check out by using the test lamp.

6. Rear Wheel Abrading Tire

There may be several possibilities for rear wheel abrading tire: the distortion of tyre steel ring, loosing of hub bearing and malposition of rear axle. The reason for malposition of rear axle is commonly the cracking of screw of center armor plate.

Do It By Yourself

Common Errors and Solutions

Clutch

Errors	Reasons	Solutions
Clutch Slipping	There is no release bearing clearance, and clutch is half-releasing.	Adjust the release bearing clearance as specified.
	Clutch plate lining has been worn down to a dangerous level.	Replace friction plates
Clutch Incomplete Releasing	Release bearing clearance is too wide, and effective separate distance are not enough.	Adjust the release bearing clearance as specified.
	The air went into the clutch hydraulic system, and effective separate distance become smaller.	Remove all the air in the clutch hydraulic system.

Do It By Yourself

Common Errors and Solutions

Air-Conditioner Error Diagnosis and Resolution Table

Errors	Possible Reasons	Solutions
1. High pressure is low	Leak	Leak checking and repair
	Expansion valve error	Replacement
	Return-air valve closed	Turn on
	Lack of freezing medium	Liquid charging
	Drier blocked	Replacement
	Compressor return-air valve leak	Replacing the valve
	Compressor reed valve damaged	Replacement
2. High pressure is high	Air in the system	Re-inject freezing medium
	Condenser blocked	Clear the condenser
	Exhaust valve was closed	Open the exhaust valve
	Freezing medium overcapacity	Discharge redundant freezing medium
3. Back pressure is low	Lack of freezing medium	Add the freezing medium
	Compressor piston worn-out	Repair
	Compressor head gasket leak	Replace head gasket
	Tube jammed or squeezed	Replace tubes
	Compressor return-air valve leak	Replace the valve plate
	Moisture in the system	Replace drier
	Expansion valve trap valve blocked	Clean and replace the drier
4. Back pressure is high	Expansion valve sensing bulb flexible	Tightening the sensing bulb retaining clip
	Freezing medium overcapacity	Exhaust redundant freezing medium
	Expansion valve can not be closed	Replace expansion valve
	Compressor reed valve damaged	Replace reed valve
	Compressor head gasket leak	Replace air cylinder gasket

Do It By Yourself

Common Errors and Solutions

Air-Conditioner Error Diagnosis and Resolution Table

5. Compressor doesn't work	Driving belt damaged	Replace belt
	Clutch wire damaged	Replace wire
	Compressor piston damaged	Replace compressor
	Thermostat switch failure	Replace thermostat switch
	Clutch coil damaged	Replace coil
6. Poor cooling effect	Coil freezing, the temperature adjusted overvaluation	Tighten down the thermostat switch, and defrosting
	Hot air infiltrates into cab	Turn off heat source valve
	Drier clogged	Replace the drier
	Lack of freezing medium	Add the freezing medium
	High pressure is a little high	Refer to 2
	Return pressure is a little low	Refer to 3
	Return pressure is a little high	Refer to 4
	Drier blocked	Clear and replace the drier
	Expansion valve error	Replace expansion valve
7. Evaporator coil freeze	Thermostat switch failure	Replace thermostat switch
	Thermostat switch improper adjustment	Adjust to the working condition
	Insufficient air capacity going through evaporator	Examine evaporator fan

Do It By Yourself

Common Errors and Solutions

Air-Conditioner Error Diagnosis and Resolution Table

8. Trouble in Belts	Misalignment belt pulley	Adjust the belt pulley axial location
	Too tight or too loose	Right adjustment
	Improper specification	Replacement
	Damaged idler bearings	Replace the bearing
9. The fan doesn't work	Fuse is burned down	Replacement
	Pilot switch failure	Replacement
	Injured motor of fans	Replacement
	Motor voltage is low	Check the wires
	Contact unreliable	Examination
10. The fan runs too slow	Wires become flexible or short circuit	Troubleshooting
	Crooked rotor spindle	Replacement
	Controller resistance is burned down	Replace the resistance
	Low voltage	Examine the engine
	Screws used to fix the blades	Tightening the screws
11. Leak of hose or connectors	Connectors leaking	Repair or Replacement
	Hose leaking	Replace the hose

Technical Data

Frequently-Used Vehicle Data

Volume Data

Assembly	Petroleum Product		Brand	Volume
Fuel tank capacity (L)	Diesel	Solidifying point in summer<0°C	GB252 Excellent grade 0# light diesel oil	400 or 300
		Solidifying point in winter<-20°C	GB252 Excellent grade -20# light diesel oil	
Engine Cooling system (L)	Long-lasting antifreeze	anti-corrosion coolant	Heavy duty long-lasting antifreeze anti-corrosion coolant used in four seasons	40
Engine Lubrication system (L)	Engine oil		15W-40 CD Grade	27
Transmission (L)	Gear oil of heavy duty vehicles		85W/90 GL-5	13
Clutch (L)	Brake fluid		SAE 116/ DOT3	About 1L
Steering (L)	Hydraulic liquid		HVN32 Low temperature hydraulic liquid	3.5
Rear-axle final drive and bush bearing (HW1697 Rear axle)(L)	Gear oil of heavy duty vehicles		GL-5EP 80W/90 or GL-5EP 85W/140	23
Rear-axle final drive and bush bearing (STR Rear axle)(L)	Gear oil of heavy duty vehicles		GL-5EP 80W/90 or GL-5EP 85W/140	23
Tilt-cab assembly(L)	Hydraulic liquid		HVN32 Low temperature hydraulic liquid	0.4



Notice: Actual volume is subject to the actual configuration.

Technical Data

Frequently-Used Vehicle Data

Data for Adjusting

Travel of clutch pedal (Free travel)(mm)		Pedal	40		
Brake Shoe Clearance (mm)			0.6~1		
Travel of brake chamber push-rod (Travel of piston rod)(mm)			57 (min)		
Air pressure of tyres (kpa)	Type	9.00-20	10.00-20	11.00-20	12.00-20
	Single tyre	700	740	740	740
	Dual tyre	770	810	810	810

Technical Data

Logo

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