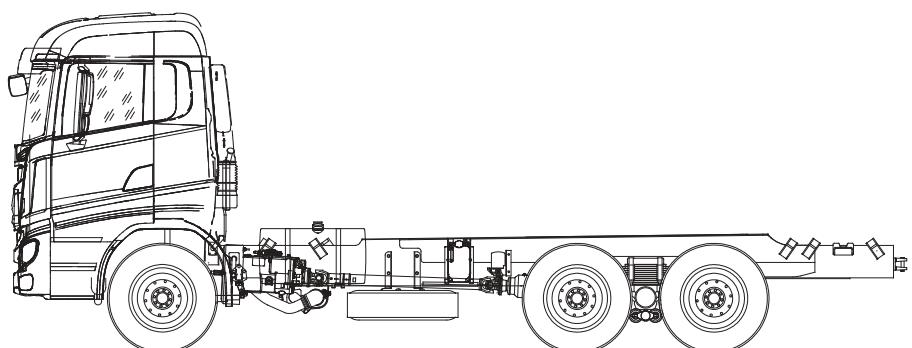


Quality Changes the World



Concrete Mixer Truck Chassis

CB318



Operation and Maintenance Manual

SANY

Concrete Mixer Truck Chassis

Operation and Maintenance Manual

⚠ WARNING

Read and follow the safety precautions and instructions in this manual and on the machine decals. Failure to do so can cause serious injury, death or property damage. Keep the manual with the machine for reading and future reference.

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⚠ WARNING

Read and understand all safety precautions and instructions in this manual before reading any other manuals provided with this machine and before operation or maintaining it. Failure to do this could result in death or serious injury.

1. Introduction

1.1 Overview

- SANY-built machines offer the high-quality performance, star-grade after-sales service.
- SANY-built machines are widely used in industry for different types of applications.
- SANY is a leading manufacturer of global construction industry.

This operation manual provides safety, operation, maintenance, troubleshooting and technical specifications. In order to use the machine properly, it is important to read this manual carefully before beginning any operation.

1. This manual are designed to help the operator.

- Understand the structure and performance of the concrete mixer truck.
- Reduce improper operation and point out possible hazardous situations.
- Increase machine efficiency during operation.
- Prolong the service life of machine.
- Reduce maintenance costs.

2. Always keep this manual within easy reach. Ensure all personnel involved with related procedure read it periodically.

3. Continuing design improvements of this machine can lead to changes in detail which may not be covered in this manual. Consult the SANY distributor for the latest available information on the machine or questions regarding this manual.

4. If selling the machine, give this manual to the new owner.

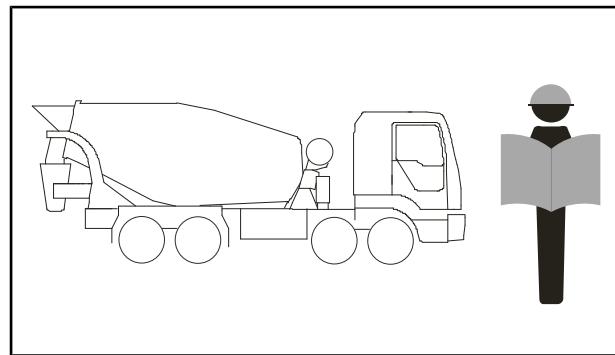


Fig.1-1 Read this manual carefully

1.2 Documentation package

1.2.1 Introduction of manual structure

This manual mainly includes the following sections:

Introduction

This section provides an overview of this manual, including manual function, structure, documentation storage, equipment information and SANY contact information.

Safety

This section provides the basic safety information relating to this machine. Make sure all the precautions in this manual and the safety labels on the machine are fully understood before any operations or maintenances. Failure to do so may result in serious injury or death.

System function

This section provides the composition of some important system functions with the machine.

Operation

This section provides the basic operating procedures for this machine. Study and be familiar with all the procedures before performing any job functions with the machine.

Maintenance

This section provides the general maintenance and repair procedures (Detailed rebuild/replace-ment/repair information are covered in a separate shop manual). Study and be familiar with all the procedures before any maintenances or repairs.

Troubleshooting

This section provides the common malfunctions and fault diagnostics procedures for all systems of superstructure and chassis.

Technical specifications

This section provides the general required machine information for this concrete truck mixer. Some information may vary due to design changes.

1.2.2 Recommendations on using the manual

This manual applies only to this machine and should not be used with other machine.

Make sure that the documentation is always complete and up to date. Keep all pages inside its binder (if shipped loose leaf). Insert SANY replacement pages immediately into the appropriate book and destroy old versions of those pages.

1.2.3 Documentation storage

The manual and parts book are packed in the premium file pocket, placed on the passenger seat. For the daily storage, SANY recommends that place it in the **storage box (1)** in front of the passenger seat.

Always keep the operator manual in the operator cab.

The parts book is best shelved in the workshop area or placed in the office. It should always be available to the maintenance and service personnel as required.

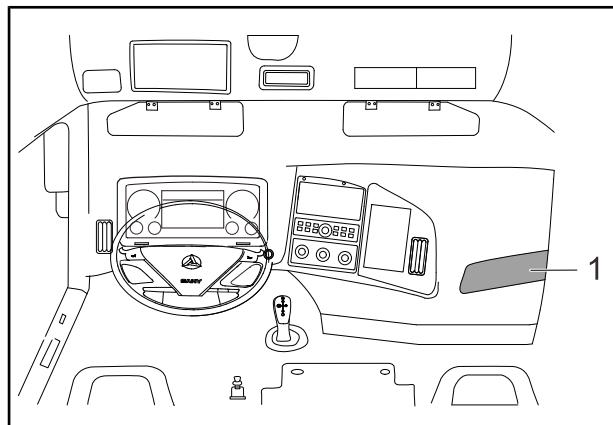


Fig.1-2

1. Storage box

1.3 SANY machine

1.3.1 Breaking in a new machine

The machine has been thoroughly tested and adjusted before shipment. However, initial operation of the machine under severe conditions can adversely affect the performance of the machine or shorten the machine life. SANY recommends that check a new machine before any operation.

During the initial 1000 km, the engine speed and the maximum speed of truck during running-in should not exceed 50 km/h. Thereafter, increase engine speed from low to high gradually to complete running-in.

1.3.2 Data plate locations

When ordering replacement parts or requiring assistance for the machine, the serial numbers and model numbers on the components are the only numbers that the SANY distributor need. It is best to record the information in this manual for future use.

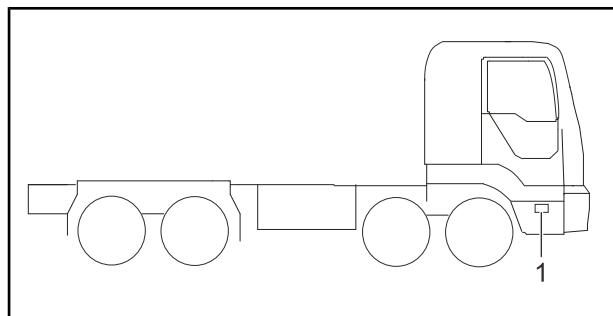


Fig.1-3 Location of chassis nameplate

1. Chassis nameplate



Fig.1-4 Information of chassis nameplate

The **chassis nameplate (1)** is riveted to the front bearer of the front suspension outside the right longitudinal beam of frame. The vehicle identification number (VIN) is carved near the **chassis nameplate (1)**.

1.4 Precautions during purchasing spare parts

When purchasing spare parts for SANY machine, give proper information on the truck as follows:

- Product type
- Serial number of machine
- Part number
- Model and serial number of engine (if purchasing parts for engine)
- Model and serial number of cab (if purchasing parts for cab)
- Serial number of chassis

Product type and serial number of machine are marked on the nameplate of the whole truck. Chassis serial number is on the frame. Model and serial number of engine are on the cylinder body. Model and serial number of cab are on the nameplate of cab.

1.5 Applicable product type

This manual applies to product type including but not limited to the following:

SYM1250T3-310C6WSJR

1.6 How to contact SANY

Thanks for purchasing the SANY machine. You can contact us for any reason. Reach us as follows:

Address: SANY Industry Town, Economic and Technological Development Zone,

Changsha, Hunan China

Zip code: 410100

Website: <http://www.sanygroup.com.cn>

Email: crd@sany.com.cn

Service hotline: 0086 4006 09 8318

1.7 Intended use

The vehicle is only used in load and transportation of Sany equipment. Beyond the specified use of other uses, such as mixing cylinder loading corrosive, flammable and explosive chemicals, are not within the scope of use. Sany shall not be liable for the consequences caused by its failure to comply with the prescribed purpose.

1.8 Abbreviation

Term	Description
VIN	Vehicle identification number
ACC	Supply power to on-board auxiliary equipment in the cab, such as audio-visual system, in strument lights, lights and so on.
LCD	Liquid crystal display
ABS	Anti-lock braking system
PTO	Power takeoff
NFPA	National Fire Protection Association
OBD	On-Board Diagnostics

1.9 Terms

Term	Description
Chassis nameplate	Record the brand, product type, engine model, serial numbers and model numbers of the machine. It is in the front suspension outside the right longitudinal beam of frame.
Serial number	Unique machine designation. On the chassis nameplate.

Chassis	Support the upper part assembly to transport concrete reliably. Composed of transmission system, running system, steering system and brake system.
Running system	Support the truck, mitigate impact, receive the power of the transmission system and produce traction to make the truck run. Composed of frame, axles, suspension, wheels and so on.
Steering system	Change or restore the direction of the truck.
Transmission system	Transfer power from the engine to the driving wheels. Composed of clutch, gearbox, universal transmission device, drive axle and so on.
Brake system	Make the truck slow down or stop.
Mixing drum	Rotate to mix the concrete.
Chute	Deliver the concrete from the mixing drum to pumping device or to working surface.
Assistant chute	Increase the length of the chute. On the right wheel cover.
Loading hopper	Accept concrete from the mixing plant and delivers it to the mixing drum.
Mixer truck	A special vehicle used to transport concrete for construction.
Upper part	The component combination of mixed concrete. Composed of transmission assembly, mixing drum drive system, water supply system, operating system, side guard rail and so on
Subframe	Connect the chassis cross beam and supports the mixing drum.



Safety

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 **WARNING**

Read and understand all safety precautions and instructions in this manual before reading any other manuals provided with this machine and before operation or maintaining it. Failure to do this could result in death or serious injury.

2. Safety

2.1 Danger area

When the mixer drum is working, the danger area is around the mixer drum, keep at least a distance of 1 m from the mixer drum and the discharge port. The work area is where the concrete is being poured and the area surrounding the machine. Do not extend hands into any rotating mixing cylinder and connecting parts.

2.2 Safety symbols

Most accidents are usually caused by failure to obey fundamental safety rules for operation and maintenance. It is important to read and understand all information outlined in this manual before operation or maintenance.

The following (ANSI/ISO) signal words are used to tell the user that there is a potentially hazardous situation that can lead to machine damage, personal injury or even death. In this manual and on the machine decals, different signal words or illustrations are used to express the potential level of hazard.

Table 2-1 Typical signal words

Signal word	Description	Sign
Danger	A hazardous situation which, if not avoided, will cause death or serious injury.	 DANGER
Warning	A hazardous situation which, if not avoided, could cause death or serious injury.	 WARNING
Caution	A hazardous situation which, if not avoided, could cause minor or moderate injury.	 CAUTION
Notice	A situation which can cause damage to the machine, personal property and/or the environment, or cause the machine to operate improperly.	 NOTICE

This symbol shows the general warning. It is used to tell the user to potential hazards. All safety messages that follow this sign shall be obeyed to avoid possible harm.

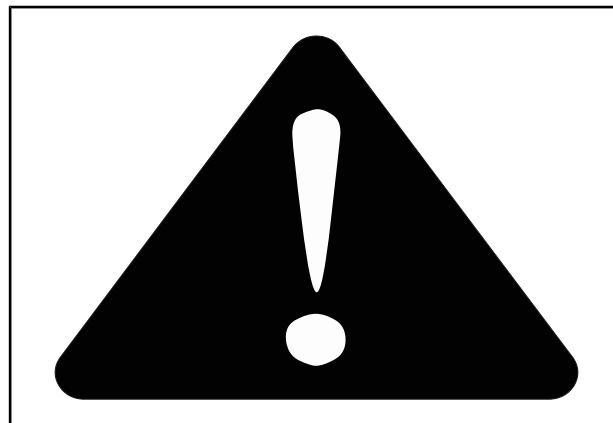


Fig.2-1 General warning sign

This symbol shows that the operation is not in conformity to the safety regulations and is prohibited. Failure to obey the symbol can cause injuries or fatalities.

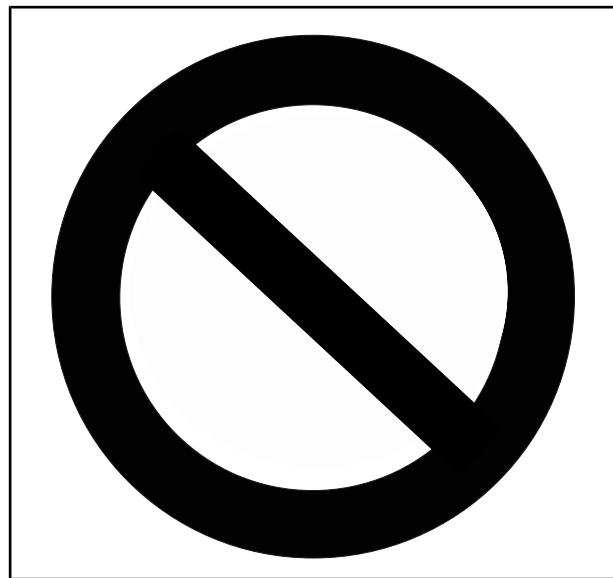


Fig.2-2 Prohibition

This symbol shows that the operation is in conformity to the safety regulations.

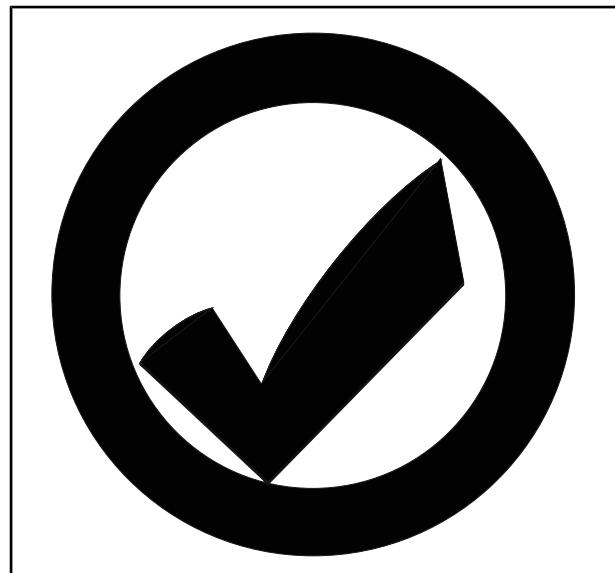


Fig.2-3 Correct operation

SANY can not predict every circumstance that can involve a potential hazard in operation or maintenance. Safety message in this manual and on the machine may not include all possible safety precautions.

If one procedure or action not specified, recommended or allowed in this manual is used, make sure that the user can perform such procedure and action safely without damaging the machine or causing injury to the personnel. If unsure about the safety of some procedures, contact the local SANY distributor.

2.3 Safety messages

The equipment uses “safety alerts” and “safety message” to indicate safety measures. See below figure.

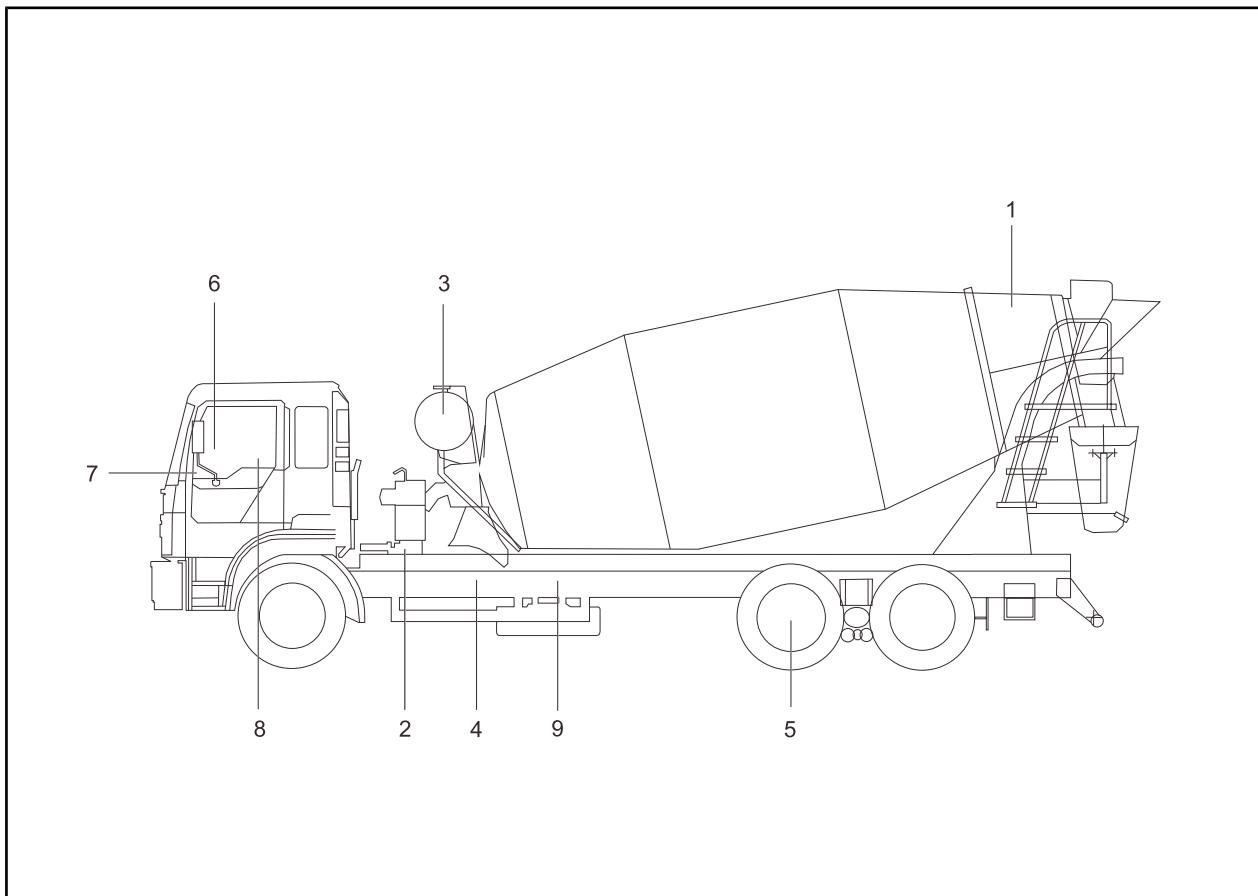


Fig.2-4 Safety messages

1. Caution for moving parts	4. Caution for burn	7. Caution for air/oil pressure
2. Caution for chemical burn	5. Caution for tyre damage	8. Caution for traffic accident
3. Caution for high-pressure fluid leakage	6. Caution for limit position	9. Caution for fire

2.4 Safety requirements and special dangers

2.4.1 Safety requirements

- It is not allowed to operate the mixer truck without any fire extinguisher. All the fire extinguishers must be placed beside the cab seat. Unless for putting out a fire, it is prohibited to move any fire extinguisher. Before operating the mixer truck, the operators must know the location and quantity of fire extinguisher.
- Only use specified passages and ladders. Make sure that the passages and ladders are installed firmly and free of snow, water, ice, and obstacles before using.
- It is prohibited to extend hands into the actuating device.
- Do not walk on the cab roof.
- Securing devices should be used to prevent unexpected closing of doors.
- Do not let hands or feet or articles touch the engine fan. All articles dropped into the fan will be chop up and ejected, and this may increase risk of serious injuries.

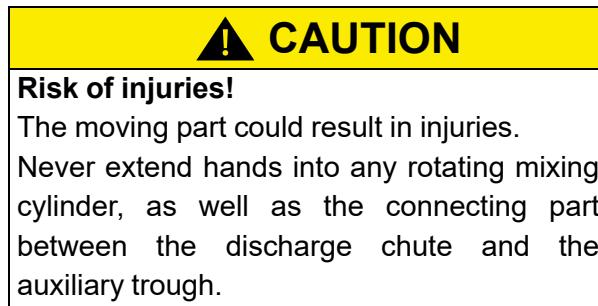
In addition to the safety, operating and maintenance instructions, operators must also observe safety regulations in the relevant countries and areas, and other provisions on prevention of accidents and environmental protection.



Fig.2-5 Location of fire extinguisher

2.4.2 Specific dangers

2.4.2.1 Danger of moving parts



Do not enter into moving parts.

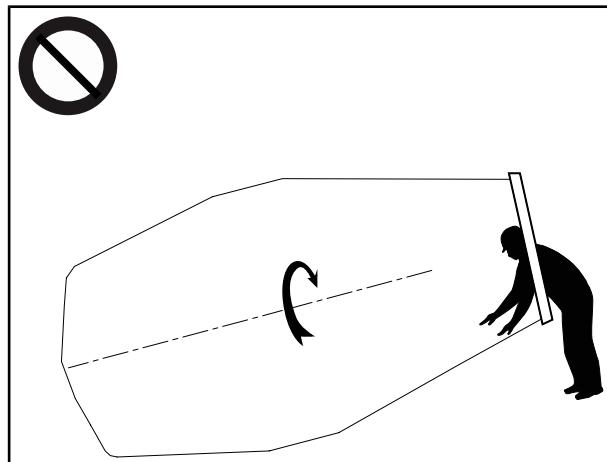


Fig.2-6 No entry

Never extend hands into any rotating mixing cylinder and the connecting parts.

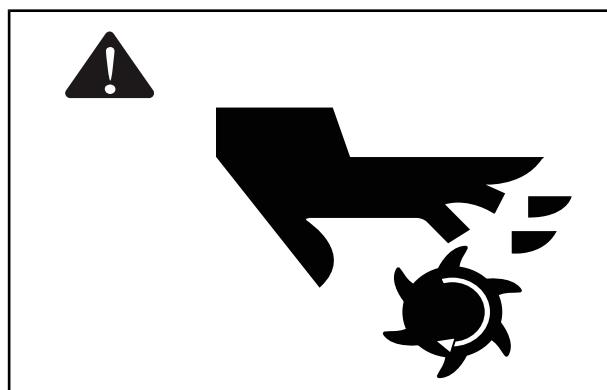


Fig.2-7 No touching

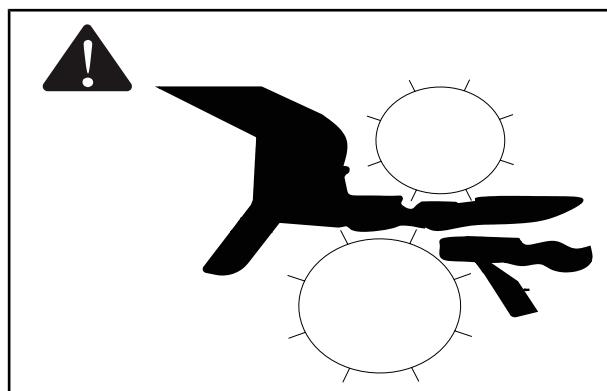


Fig.2-8 No touching

2.4.2.2 Danger of chemical burn

⚠ CAUTION

Risk of cement water burn and corrosive injuries!

The cement water could burn eyes and skin, and corrode clothes.

When working near a batching plant, take enough protective measures. Wear hard hat and protective suit.

First-aid measures after contacting the cement water:

- Rinse eyes and contacted skin parts with large amount of flowing water (for 2 minutes at least).
- Get medical help immediately after the skin gets inflamed, reddish and swelling, or cement water is splashed into eyes.

Always remove all jewelry (rings, watches, chains and so on). Keep all sparks, flames, smoking materials and ignition sources away from the battery.

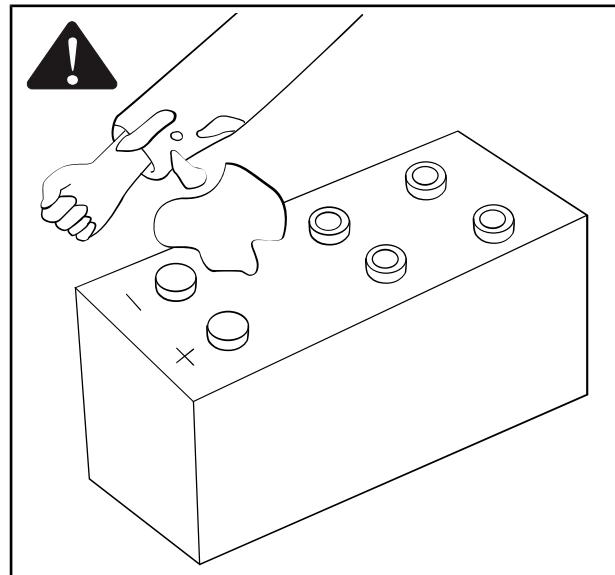


Fig.2-9

Never let tools or metal objects touch the battery.

⚠ CAUTION

Risk of battery burn and corrosive injuries!

Batteries contain acid could cause burns or other serious injuries.

Wearing protective clothing and using the correct safety tools.

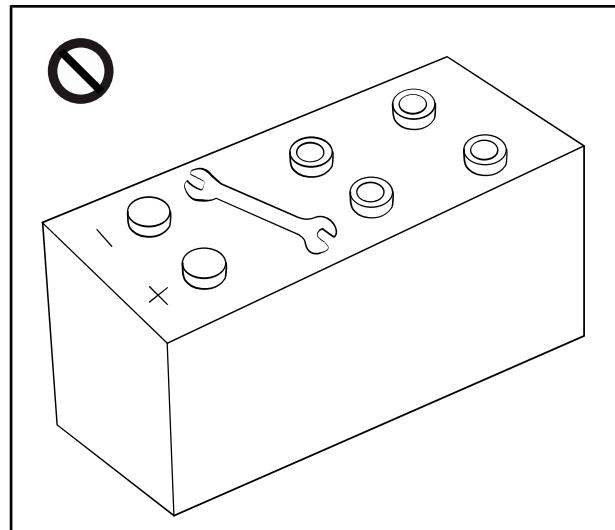


Fig.2-10 No metal objects

First-aid measures after contacting battery acid:

- Skin contact: immediately remove contaminated clothing, rinse the area thoroughly with water, and get medical attention if required.
- Eye contact: immediately rinse thoroughly for at least 15 minutes with large amounts of water and get medical attention.
- Acid spill: use bicarbonate of soda or an emergency spill kit to neutralize the acid.

Battery storage precautions:

- Store the battery in a dry, cool location. Make sure that the area is not exposed to extremes of temperature or humidity.
- Recharge the battery periodically.

2.4.2.3 Danger of high-pressure fluid leakage

Replace a pipe or hose if a leakage is found or failure occurs. Always remember that this system is highly pressurized during normal operation.

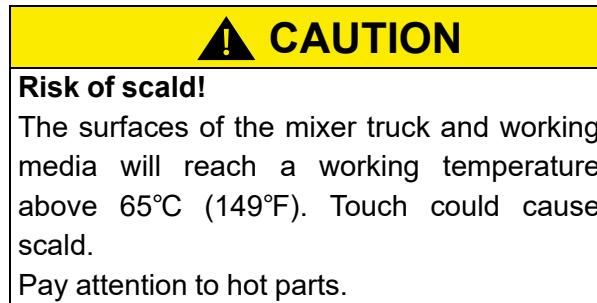
Always do as follows:

- Check for cracks in the pipe or hose and swelling in the hose.

Note: if there is any leakage from a pipe or hose, the surrounding area will be wet.

- Never perform inspections or replace items while the system is under pressure. Working on a system still under pressure could lead to serious injury.
- Never use any body part to check or feel for leakage. Wear safety glasses and leather gloves when checking for leaks. Use a piece of wood or cardboard when checking leakage from small holes.
- If high-pressure fluids penetrate skin or get into eyes, seek medical attention immediately.

2.4.2.4 Danger of burn



Pay attention to the following points in order to avoid getting scalded or burned:

- Wear protective gloves when working near hot parts.
- Cool the engine first and then check the level of the water tank.
- Avoid touching the following articles: cooling fluid or parts with hydraulic oil, hot hydraulic oil or engine oil, hot exhaust and turbocharger.
- Perform the cleaning and maintaining tasks after the mixer truck cools down.

First aid for accidental burn:

- Immediately pour cold water onto the burned part.
- Bind up the burned part with antibiotic bandage and ask for medical care.

2.4.2.5 Danger of fire

If a fire occurs on the machine, escape from the machine as follows:

- Immediately turn the ignition key to the OFF position to stop the engine and machine.
- Do not attempt to move or continue operating the machine.
- Exit the area immediately and remain clear of the machine until the fire department gives permission to come near the machine.

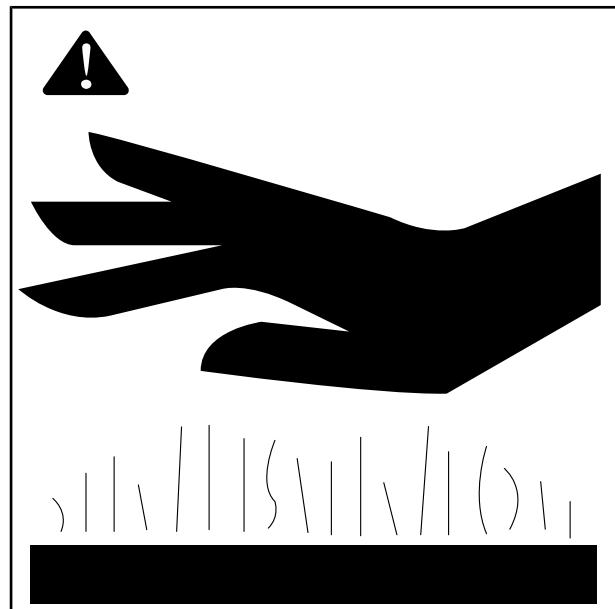


Fig.2-11 No touching

- Call for help immediately.
- When using a fire extinguisher, always aim the extinguisher nozzle at the base of the fire.
- Have a list of emergency phone numbers available in case of fire or an accident.

2.4.2.6 Harm to environment

If fuel, oil, spent battery, plastics, tyre and similar rubber pieces, and detergent and similar liquid enter into soil, water, and sewer system, they will damage and contaminate the environment.

In order to avoid harming environment, pay attention to the following matters:

- Each leakage on the mixer truck must be repaired.
- Degreasing agent must be used to neutralize the oil or fuel leaked.
- National regulations on environmental protection relating to fuel and lubricant must be enforced. In case of any doubt, consult a qualified collection site or center and discuss appropriate measures to treat every fuel and lubricant.
- When draining fuel and lubricant, use containers big enough, that do not leak and resistant to oil.
- Use separate containers to collect and treat different fuels and lubricants.



Fig.2-12 No dumping

2.4.2.7 Danger of electric shock

Keep all parts of this machine from all electrical power lines and other electrical power sources as shown on the following table:

Table 2-2 Minimum distances between machine and power lines

Cable voltage, kV (kilovolts)	Minimum required clearance, ft (m)
350 or less	20 (6.10)
Over 350-500	25 (7.62)

Table 2-2 Minimum distances between machine and power lines (continue)

Over 500-750	35 (10.67)
Over 750-1000	45 (13.72)

Contact the power utility company for assurance that the power has been turned off before operating this machine, which is in the vicinity of electrical power lines or any electrical power sources.

Note: This machine is not insulated.

Treat all overhead power lines as being energized and not insulated, unless contrary information from the utility company or owner is available.

The requirements stated in this manual must be followed at all times, even if the electrical power lines or electrical power source have been turned off.

The operator is responsible for alerting all personnel of dangers associated with electrical power lines and electrical power source. Do not allow unnecessary personnel in the vicinity during operation. The operator must prevent everyone from touching the machine.

It is not always necessary to contact a power line or power source. Depending on magnitude, electricity can arc or jump to any part of the machine if it comes too close to an electrical power source.

The use of electrocution hazard devices (insulated links, insulated boom cages or guards, proximity warning devices or mechanical limit stops) do not assure that electrical contact will not occur.

Grounding of the machine which is little or no protection from electrical hazards. The effectiveness of grounding is limited by the size of the conductor (wire) used, the condition of the ground, the magnitude of the voltage and current present, and numerous other factors.

Because of the voltages involved, overhead power lines present an extremely high risk of fatal electric shock. If contact occurs, proper safety procedures should be followed. The danger posed by overhead power lines at the job site is often compounded by other factors, such as uneven ground that could cause the machine to weave or bob into power lines, and windy conditions that can make the power lines sway.

To address these risks:

- Identify overhead power lines and mark safe routes where the machine must repeatedly travel.
- Operate the machine at a slower than normal speed in the vicinity of power lines.
- De-energize and ground overhead power lines or take other protective measures such as guarding or insulating the lines.
- If the power lines are not de-energized, operate the machine in the area only if a safe minimum clearance is maintained.
- If maintaining safe clearance by visual means is difficult, designate a person to observe the clearance and to give immediate warning when the machine approaches the limits of safe clearance.

- All personnel should keep away from the machine whenever it is close to power lines.
- Do not touch the machine until a signal person indicates that it is safe to do so.
- The use of electrocuting hazard devices is not a substitute for de-energizing lines, or maintaining safe clearance.

When working near communication towers where the machine is close enough for an electrical charge to be induced in the machine or materials being handled, the communication must be de-energized or the following precautions must be taken:

- The machine must be provided with an electrical ground.
- If tag lines are used, they must be non-conductive.

If the machine or any of its components contacts an energized power source:

- Remain calm and do not panic.
- Immediately warn personnel in the vicinity to stay away.
- If in the operator cab, stay there until the power company has been contacted and the power source has been de-energized. Do not attempt to come close to the machine until the power has been turned off.

2.4.2.8 Danger of getting poisoned and choked

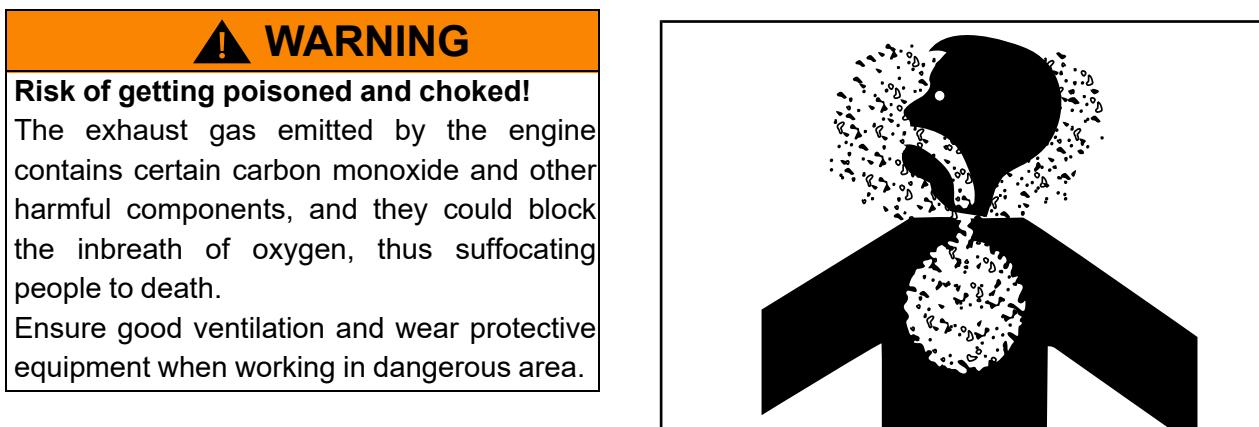


Fig.2-13 Poison and choke

The manhole cover should be opened to operate inside or repair the mixing cylinder.

In order to prevent similar dangers, pay attention to the following matters during working:

- Ensure enough ventilation before operating the mixer truck in a closed space.
- Wear appropriate protective equipment when working in an area with dangerous articles.

- If a respiratory mask is required, always wear it and replace the filter element as needed.

2.4.2.9 Danger of earthquake

When an earthquake happens, take the following measures:

- Stop operation.
- Notify all personnel to leave far away from the mixer truck.

After the earthquake, check the mixer before any operation:

- Check whether all functions are available.
- Check whether electric components and hydraulic parts work normally.

2.4.3 Safety equipment

1. Fire extinguisher

The fire extinguisher is on the back wall of the cab.

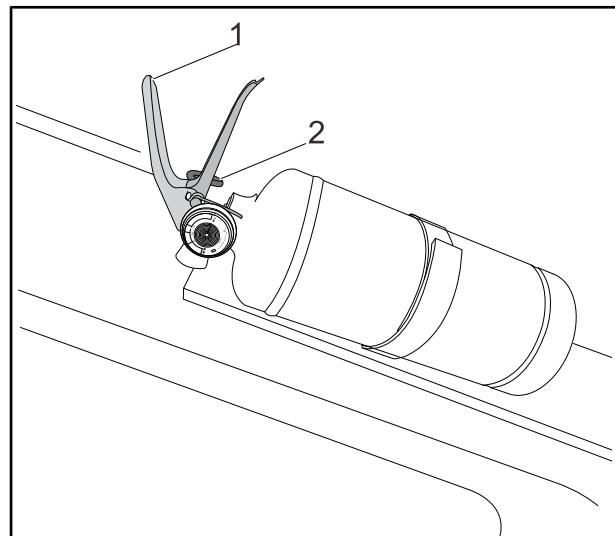
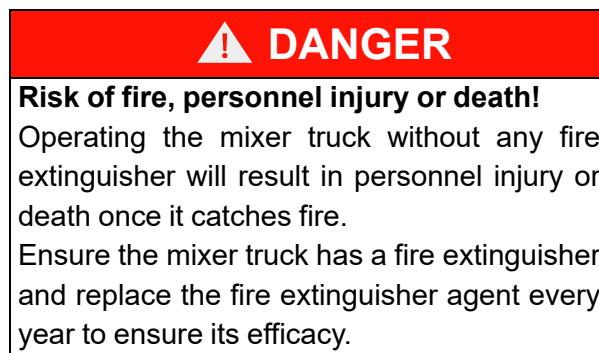


Fig.2-14 Fire extinguisher

1. Shake upward and downward the fire extinguisher for 3 times.

2. Stand at the windward, pull out the **safety pin (2)**, target the fire extinguisher at the fire source and then hold down the **handle (1)**.

Fire extinguisher storage temperature range: -20°C–50°C (-4°F–122°F). Fire extinguisher should not be under sun, rain and high temperature.

Check the fire extinguisher once a month. When the pressure gauge **pointer (3)** is not in the **green zone (4)** or open outdated, the fire extinguisher should be taken to the professional maintenance department to maintain or refill.

1. Handle

2. Safety pin

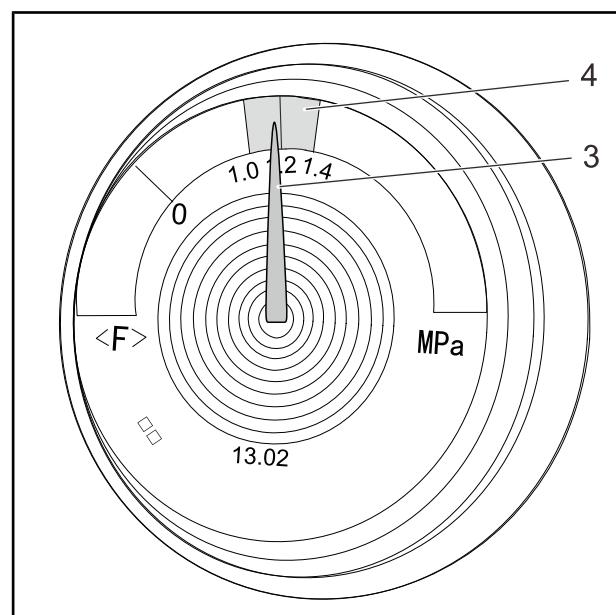


Fig.2-15 Pressure gauge

3. Pointer

4. Green zone

2.5 Safety responsibility statements

2.5.1 Driver of mixer truck

Job responsibility: driving the mixer truck.

The following qualifications must be met:

- Trained on this specific mixer. Controls and design may vary among models. Training is essential for proper operation and safety.
- Mentally and physically fit to operate this machine. Never attempt to operate this machine while under the influence of medication, narcotics, or alcohol. Any type of drug could impair physical, visual, mental reactions, and capabilities.

2.5.2 Operator of mixer truck

Job responsibilities:

- Concentrate on operating mixer truck.
- Control the mixer truck during operation.
- Remind personnel to pay attention to safety and keep away from the mixer during traveling and working.
- Check carefully that the wheel covers, handrails and ladder do not have any dirt, grease or debris.

The following qualifications must be met:

- Trained on this specific mixer truck. Controls and design may vary among models. Training is essential for proper operation and safety.
- Wear the appropriate personal protective equipment.
- Avoid any loose clothing, jewelry and loose hair. These can get caught up in moving parts or the controls, and could cause serious injury.
- Mentally and physically fit to operate this mixer truck. Never attempt to operate this truck while under the influence of medication, narcotics, or alcohol. Any type of drug could impair physical, visual, mental reactions, and capabilities.

2.5.3 Division of responsibility

2.5.3.1 Statement

The mixer truck is exclusively used for loading and transporting concrete. The mixer truck is designed only as a loading and transporting vehicle for conveying concrete from the batching plant to the job site. All other purposes, such as loading chemicals which are strongly corrosive, inflammable and explosive, are beyond the service.

The manufacturer shall not be liable for any consequence arising from improper operation or operating the truck for those purposes other than specified. Operators and employers shall be fully liable for such operations.

Never modify any component, system or surface. Any modification without authorization from SANY can create a hazard. SANY will not be responsible for any injury or damage caused by an unauthorized modification.

2.5.3.2 Responsibilities of employer and other personnel authorized

- Only after sufficient training and understanding the support parts book, safety instructions, operating instructions and maintenance instructions of the mixer truck, relevant personnel may operate and maintain the truck.

- Confirm that all personnel are fully qualified to operate and maintaining the mixer truck and know the corresponding responsibilities.
- Inspect regularly the safety awareness of relevant personnel.
- In case of an unsafe condition, stop to operating the mixer truck immediately.
- In addition to the inspections required by SANY, perform every inspection required by local governing agencies.
- Ensure prompt maintenance and repairing of the mixer truck.
- Ensure to report each accident of mixer truck to the manufacturer, which has caused serious injuries or property losses.
- Allow service personnel of the manufacturer inspecting the manufacturer without limitation according to the responsibilities of production inspection.
- Establish a good planning for the use of mixer truck carefully and consciously.

2.5.3.3 Responsibilities of operating staff

- If there is any unusual circumstance which may cause misoperation or indicate potential risks, report to the director immediately so as to make corrections in time.
- All personnel working around the mixer truck must observe all warning signals and be aware of safety.
- Report any unsafe condition to the operator and signaler immediately, such as high-voltage wires, unauthorized personnel, equipment, ground conditions and so on.

⚠ WARNING

Risk of property loss, serious injury or death!

Failure to follow the stop signal could result in property loss, serious injury or death.

No matter who gives out a stop signal at any time, the operator should follow it.

2.5.3.4 Responsibilities of managerial staff

- Ensure that operators have been trained and fully understand the safety instructions, operating instructions and maintenance instructions. The operators should have good health and hold operation certificates, otherwise the operators should not be allowed to operate the mixer truck.
- Ensure that signalers have good vision and hearing, have mastered standard mixer truck command signals and can give clear and accurate signals. The signalers can identify risks and notify the operator.
- All operating personnel should be assigned with corresponding safety responsibilities and are required to report unsafe factors to their directors.

2.6 Lockout/tagout procedures

2.6.1 Notes of lockout/tagout

Never work on the machine without lockout/tagout process. Contact the supervision or SANY with questions.

Only authorized personnel performing maintenance on the machine shall perform lock-out/tag-out process in accordance with the procedure listed below.

If the person is issued with a lock and key when perform maintenance to the machine, they will not share the lock or key with others until all procedures are complete and the machine is ready to be put back into operation.



Fig.2-16 Lockout/tagout alert tag

2.6.2 Lockout of operation

1. Notify all personnel who may be effected by maintenance on the machine.
2. Secure the machine on a flat, level surface in a safe location where there is no danger of falling objects or interference with other machine, personnel or pedestrian traffic.
3. Stop the engine and remove the ignition key.

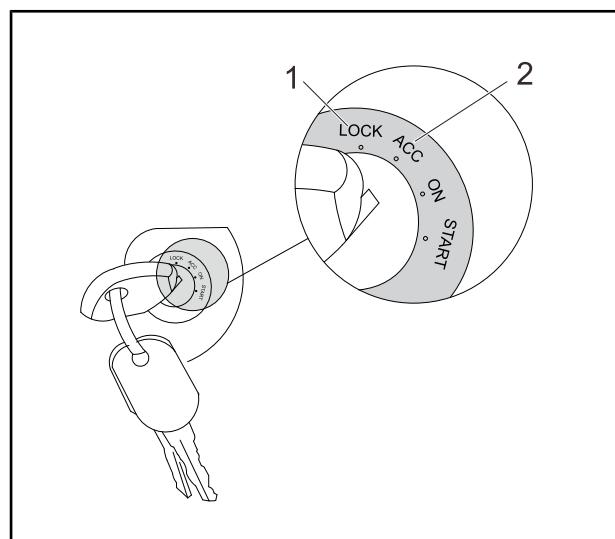


Fig.2-17 Key position

- Run the truck at the idle speed for 3 minutes–5 minutes after it is parked.
- Turn the ignition key to **ACC position (2)** after the engine cools down to proper temperature.
- Pause for 30 seconds, then turn the key to **LOCK position (1)**.

4. Attach a maintenance alert tag to the machine controls.

5. Make sure that all personnel involved in the maintenance have installed their own locks on the power source before performing repairs. Each person who completes a repair must remove the lock and not access the machine further.

1. LOCK position

2. ACC position



Fig.2-18 Maintenance alert tag

2.6.3 Return to operation

The authorized person who performed the lockout/tagout procedure shall do the followings:

- Check the area around the machine to ensure that no one is exposed to any hazard before returning the machine to operation.
- Ensure that all guards have been properly reinstalled to their respective locations.
- Ensure all tools, equipment and locks have been removed.
- Verify that all controls are in the neutral or off position.

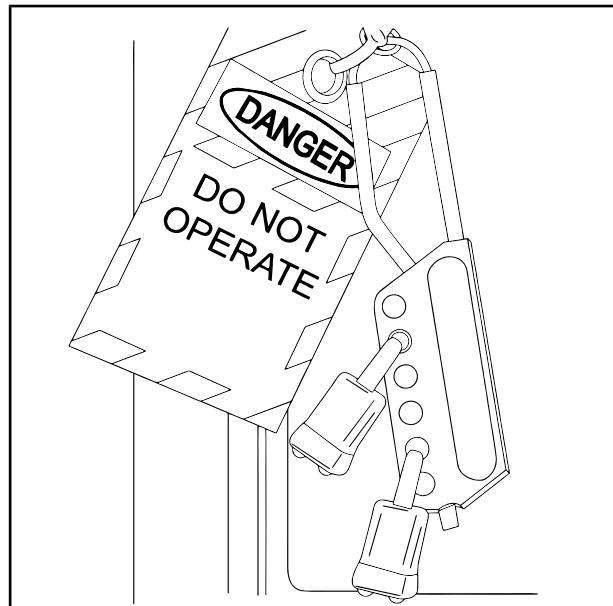


Fig.2-19 Lockout/tagout alert tag

5. Alert all personnel will be back in operation in time.
6. Remove the lockout/tagout mechanisms and all tags and return the machine to operation.
7. Complete the appropriate section of the maintenance log.

2.7 Precautions for chassis

2.7.1 Notes for safe operation

Do not install tires of **different specifications** (1) on one truck.

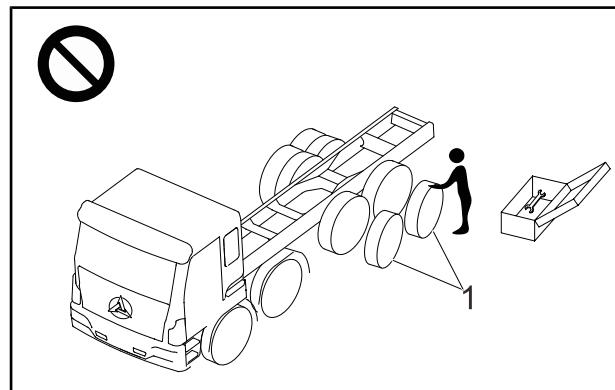


Fig.2-20 Tires installing

1. Different specifications

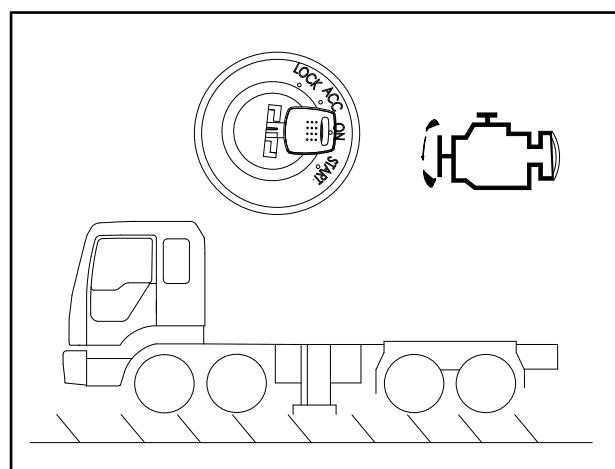


Fig.2-21 Idling speed

It is prohibited to push down the start button when the engine is running.

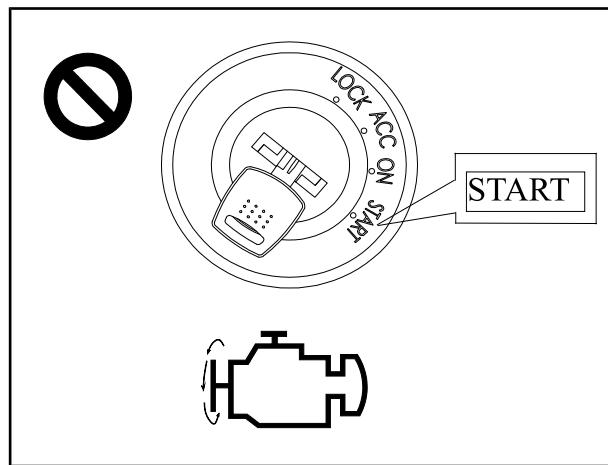


Fig.2-22 Engine starting

The differential lock must be released immediately after the truck passes a road with unfavorable pavement. Otherwise turning and traveling at a high speed could damage the axle and accidents may happen.

Note: V > 20 km/h

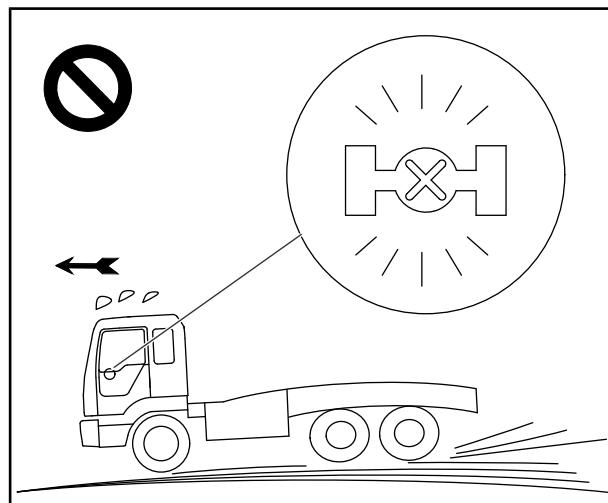


Fig.2-23 Differential lock

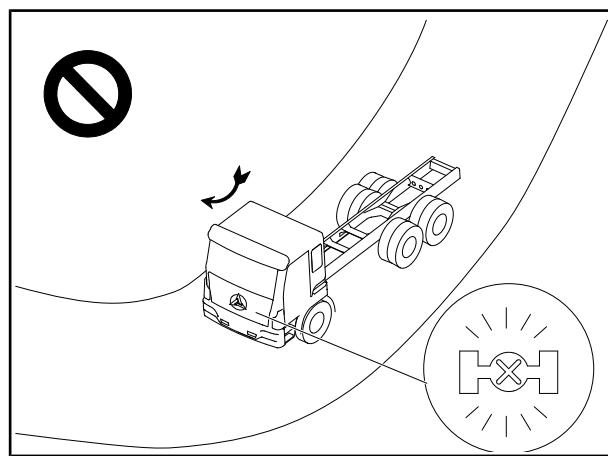


Fig.2-24 Differential lock

The **transmission shaft (4)** must be dismounted when the truck is pulled to travel, so as to avoid damaging the transmission.

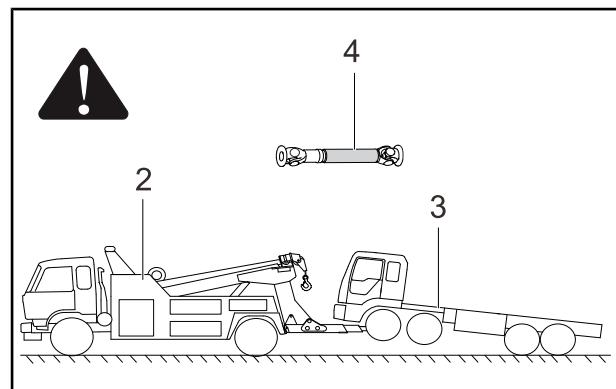


Fig.2-25 Towing

2. Rescuing truck 4. Transmission shaft
3. Rescued truck

The truck should be in gear when travelling. It is prohibited to slide the truck in neutral gear or while the engine off.

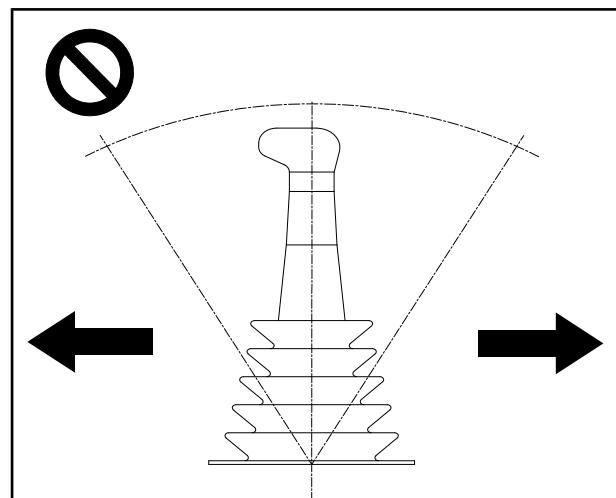


Fig.2-26 No gliding in neutral

It is not permitted to keep the retaining time over 10 seconds when the steering wheel is turned to the limit position.

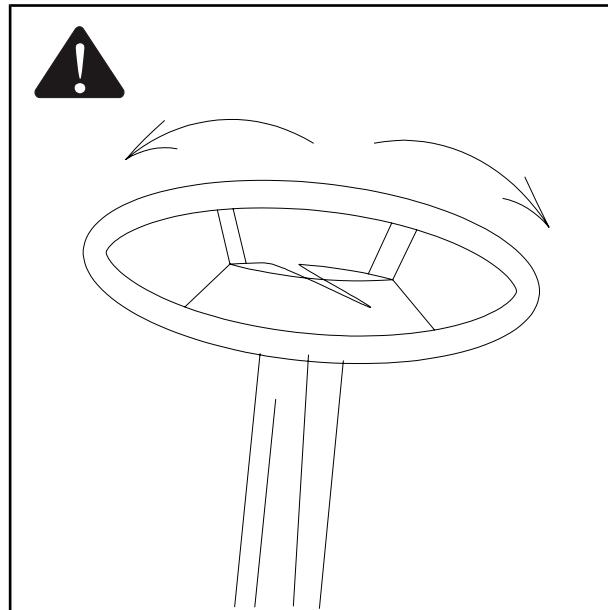


Fig.2-27 Limit position

If the emergency brake is applied on a slope, there is a front tipping risk.

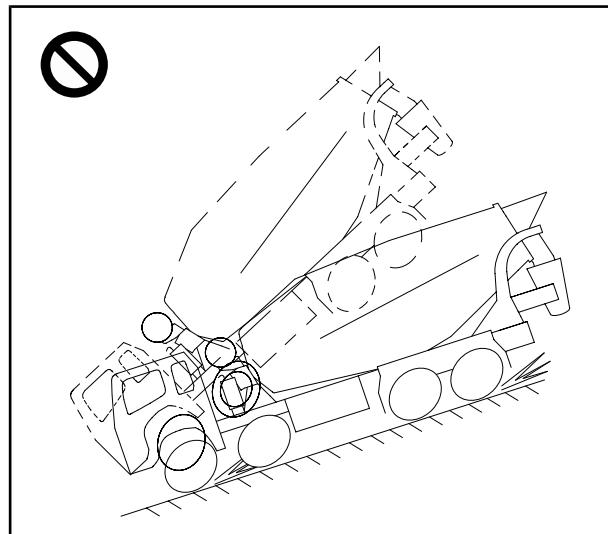


Fig.2-28 Front tipping risk

If the mixer truck travels at high speed around a turn, there is a risk of side rollover.

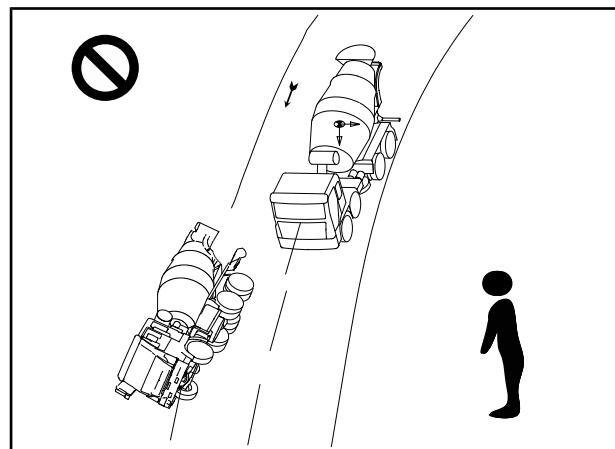


Fig.2-29 Side rollover risk

Cross **speed bump** (5) at a low speed.

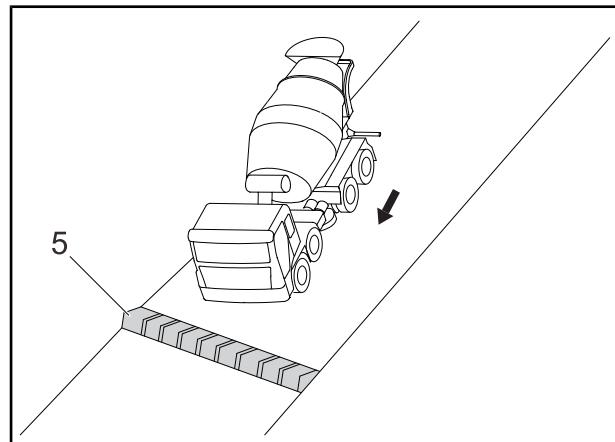


Fig.2-30 Slow down

5. Speed bump

Place the cab operating handle in the **stop position** (6) before starting the engine.

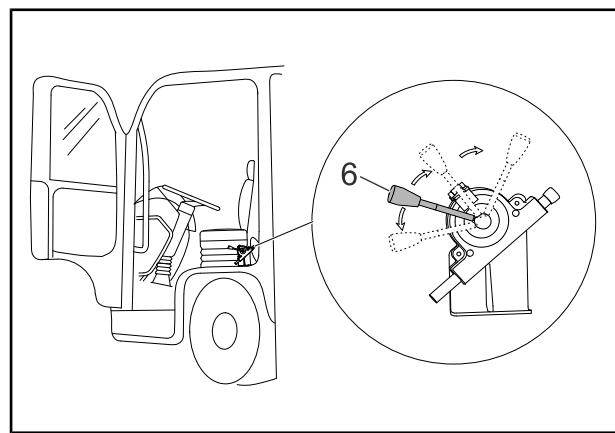


Fig.2-31 Cab operating handle

6. Stop position

2.7.2 Driving precautions

Before driving, make sure the window, the outside rearview mirrors and lamps are clean. Check the tyres and whether there is oil leakage under the truck. If reversing the truck, make sure there is no barrier behind it.

Wear proper shoes when driving. Unsuitable shoes (such as high-heel shoes, slippers, ski boots and so on) will disturb the operation of brake pedal, throttle pedal and clutch pedal.

Precautions for the use of transmission:

- Stop the truck only when it is in neutral gear.
- Do not jump gear when changing it.
- Strictly prohibit slipping when it is in neutral gear.
- If there is unusual phenomenon such as unusual sound in the transmission, or it is obvious to operate the transmission heavy, stop to check the truck immediately. Go on driving until all faults are removed.
- Use double clutching method.
 1. Step the clutch pedal to the lowest position.
 2. Shift the present gear back to the neutral.
 3. Release the clutch pedal to the highest position.
 4. Step to the lowest position again.
 5. Shift the lever to the needed gear.

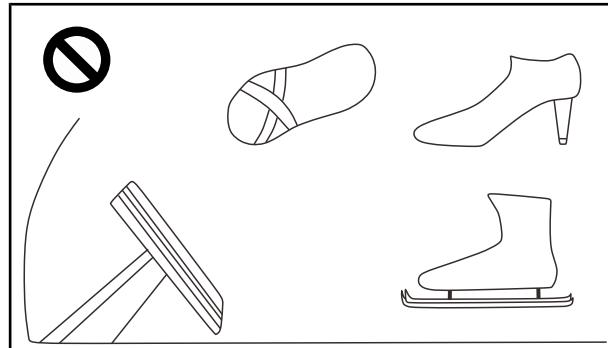


Fig.2-32 Wear proper shoes

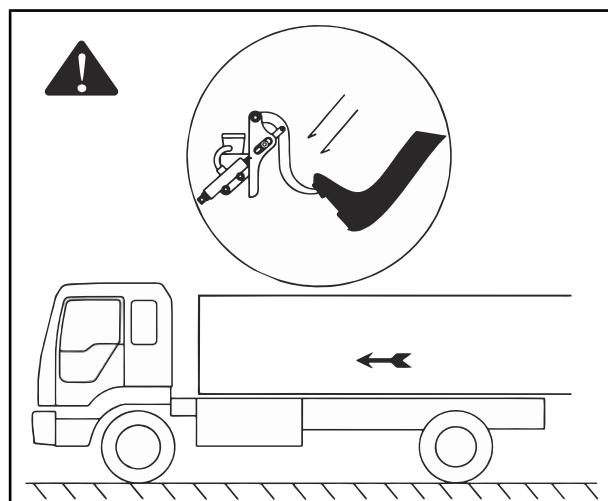


Fig.2-33 Use double clutching

During the normal running, the air pressure indicated in the barometer must be kept higher than 0.55 MPa. The **air pressure signal (1)** and the **parking brake signal (2)** must be closed.

Note: $P \geq 0.55 \text{ MPa}$

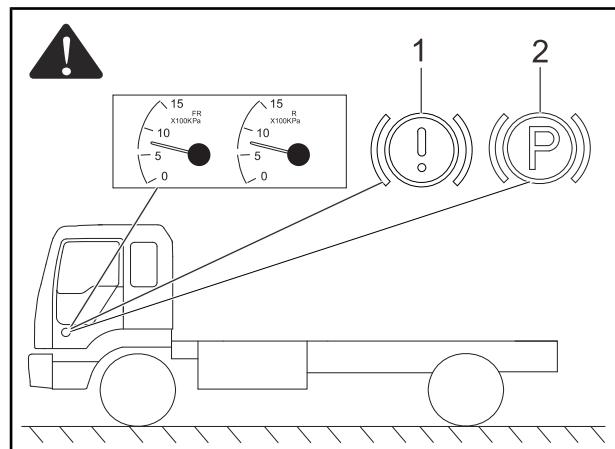


Fig.2-34 Air pressure

1. Air pressure signal 2. Parking brake signal

The oil pressure of the engine must be kept in the range of 180 kPa–750 kPa.

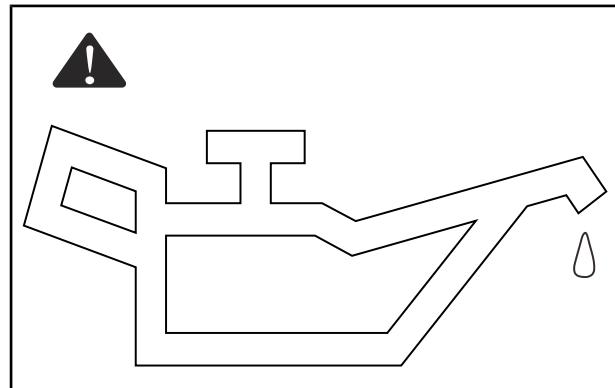


Fig.2-35 Low oil pressure indicator

Keep the **temperature of the engine coolant** in **normal range (3)**, generally less than 95°C.

Do not run the engine in the no load condition for a long time.

There should not be unusual sound, vibration and smell or other phenomenon in the engine and driving system.

If the engine extinguishes automatically during driving, calm down and step the brake pedal. Stop the truck in safe place.

Check and make sure the brake can work normally and the parking brake is released.

The engine can not extinguish during the downhill or running of the truck. When the

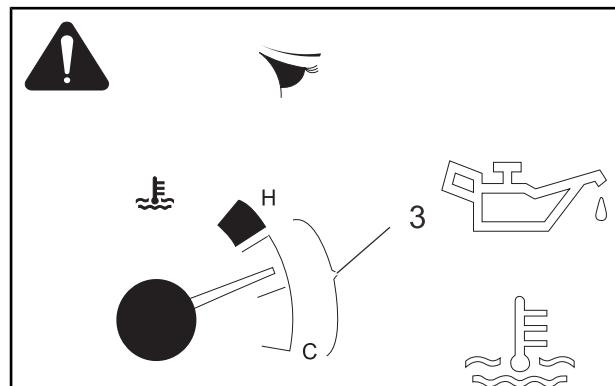


Fig.2-36 Temperature of engine coolant

3. Normal range

engine does not work, the power-assisted steering system and the brake booster can not work normally. If the extinguishing switch is closed during running, the steering would be out of control which will lead to serious injury or death.

When there is no need to use the clutch during the running, strictly prohibit putting foot on the clutch pedal to prevent the wear of the friction plate.

During the uphill, do not stop the truck on the ramp by stepping the **clutch pedal (4)** with half foot. It will lead to needless wear of the friction plate. Stop the truck by stepping the brake pedal or using the parking brake. Do not step the clutch pedal fast and repeatedly.

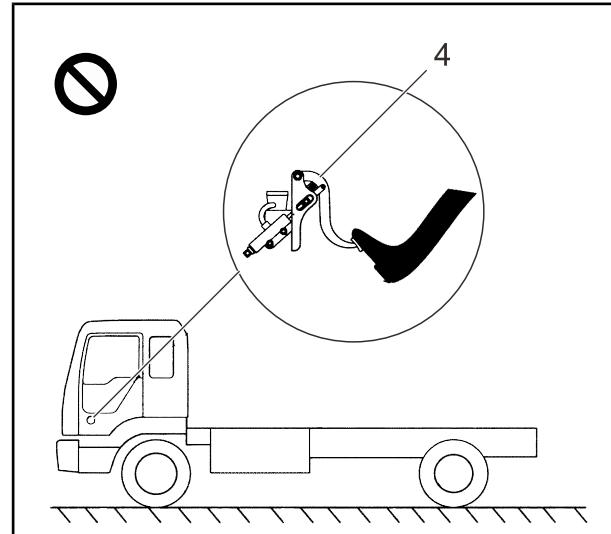


Fig.2-37 No feet on pedal

4. Clutch pedal

Drive the truck at a low speed in terrible weathers such as raining, snow and so on.

When driving on the potholes, muddy road, wading road and turning road, always be alert and drive at a low speed.

Always be alert when driving the truck on the smooth road, especially when braking, accelerating or shifting the gears. The sudden speed change on smooth road will lead to the force loss of the driving tires and make the truck out of control.

Avoid turning the truck at a high speed, do not operate the steering wheel fast, do not change the lane at a high speed or reverse the truck rapidly and suddenly. Slow down the speed before running in the traffic lane, do not drive the truck at a speed which surpasses the official speed.

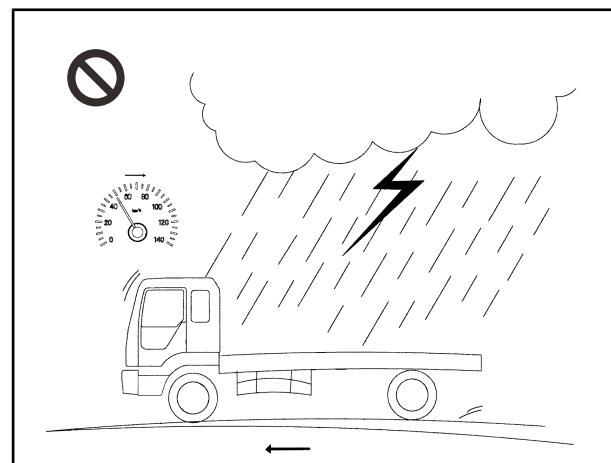


Fig.2-38 Slow down

If there is unusual smell, sound and vibration during the running, stop the truck at safe place rapidly and check it.

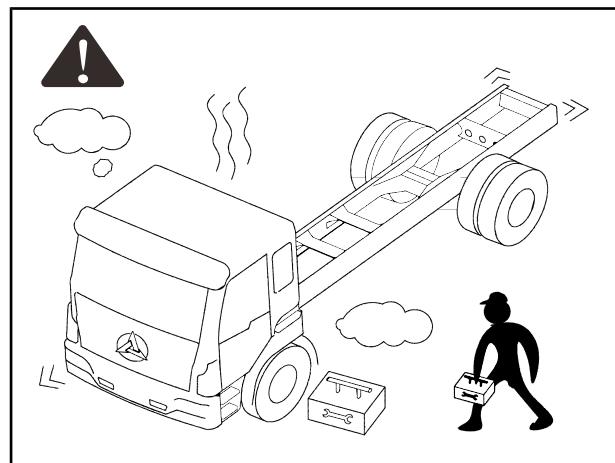


Fig.2-39 Check the unusual

2.7.3 Parking precautions

Before parking, run the engine at idle speed for 3 minutes–5 minutes. Before the engine is off, step the throttle pedal slightly for 2–3 times to lubricate the components completely. Then press the extinguishing switch to turn off the engine. Make sure that the engine does not extinguish rapidly in high temperature conditions. It is against for the engine to cool down and will decrease the lifetime of the engine.

Close all the electric equipment, then close the master switch of the electric power source to prevent the electric discharge of the battery.

After parking, push the parking brake lever rearward to locking position to prevent the accident movement of the truck and injury of the driver or the pedestrian. See “[Parking brake](#)” on page 4-21.

Shift the gear to the neutral place after parking. See [Gearshift operation](#) on page 4-13.

Do not stop the truck on the steep slope. Lock the tyres with **wedges (1)** if required.

Do not stop the truck near to the fire goods such as withered grass in case of fire caused by the high temperature of exhausting pipes.

Close the engine when resting in the cab.

Prohibit putting the cigarette lighters, carbonic bottles in the cab in high-temperature weather.

Turn off the key, the lock and the cab door when leaving the truck.

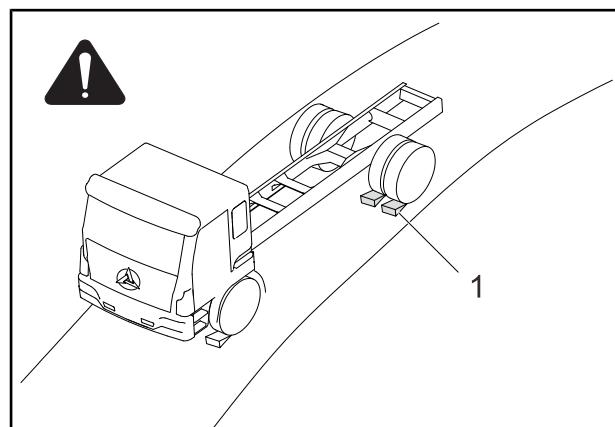


Fig.2-40 Lock tyres with wedges

1. Wedges

2.8 Treatment of emergencies

2.8.1 Brake failure

When it is confirmed that the brake of truck failed, the following measures may be taken according to specific circumstances:

Brake failure on the highway

1. Turn on the right turn indicator immediately and turn into the emergency parking lane safely.
2. Turn on the double jump lights and shift the transmission from mid to low gear.
3. Decelerate the truck through shifting to the 3rd gear, 2nd gear and 1st gear.
4. Stop the truck through the handbrake when the traveling speed is below 30 km/h.

Brake failure before cornering or turning

- Control the direction and shift to the low gear quickly.
- If appropriate, use the handbrake to slow down before entering the corner.
- Release the handbrake as you enter the corner before turning the steering wheel.
- Do not use the handbrake when turning.

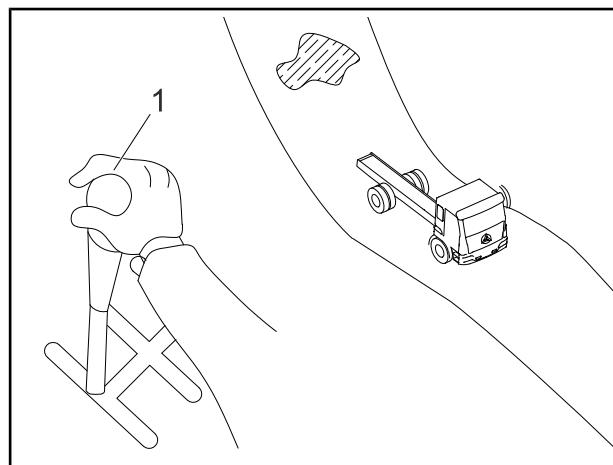


Fig.2-41 Hung low gear

1. Low speed shift

Brake failure on uphill

- Change gear quickly to slow down and stop the truck.
- If the road conditions are favorable, drive to the slope top slowly, and then stop the truck with the handbrake.
- If it is necessary to stop the truck halfway on the slope, retain the advancing low gear, push down the clutch, and then tension the handbrake to stop the truck.
- If the truck tends to go backward, the clutch pedal may be loosened a bit so as to

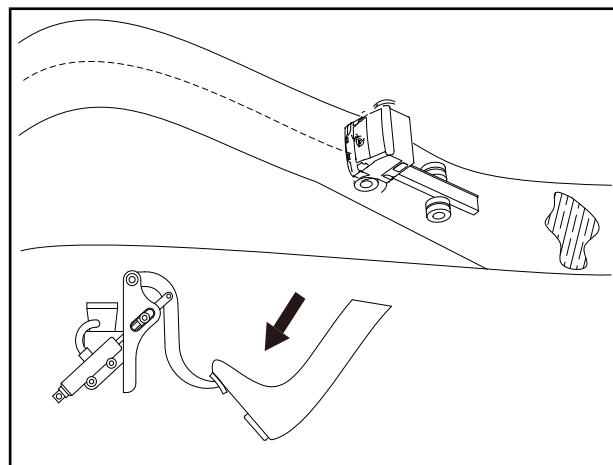


Fig.2-42 Depress the clutch

control the truck on the slope by taking advantage of the half linkage of the clutch.

- After stopping at the halfway point, have the wheels chocked up with hard articles, then shift to the neutral gear, tighten the parking brake, and shut off the engine to stop.

Brake failure on downhill

- Change gear quickly to slow down and stop the truck.
- If it is impossible to stop the truck, and the situation is very critical, put the unmanned side of the car against the roadside fence or obstacles as far as possible. There is collision to slow down the speed to ensure personnel safety first.
- Do not lean directly against surrounding objects without slowing down. High speed and violent collision will directly damage the vehicle and easy to be bounced by objects.
- Learn to use the traction resistance of the motor brake to control the speed.

Predictive braking

- Before going downhill, brake to check the braking performance.
- If the brake failure is found, time of controlling gains, panic minimizes and operator could control the vehicle calmly.

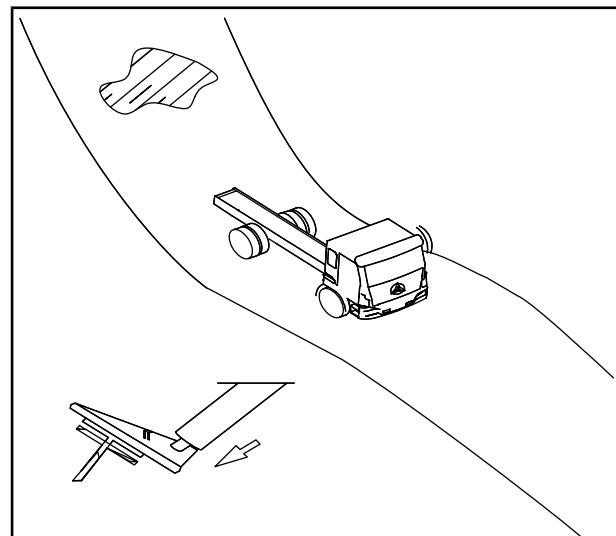


Fig.2-43 Predictive braking

2.8.2 Tyre leakage and flat tyre

If the truck suffers air leak and flat tyre during operation, the following methods may be taken:

Leak in the tyre

- The driver should tightly hold the steering wheel, apply the brake to decelerate gradually.

- Control the traveling direction to the utmost, and drive out of the carriage way as soon as possible.
- Do not apply emergency braking so as to avoid traffic accidents.

Rear tyre blowing out

- The driver should tightly hold the steering wheel and get into low gear quickly.
- Control the truck to the utmost to keep it traveling on a straight line, and decelerate the truck until stop it.

Front tyre blowing out

- The driver should tightly hold the steering wheel, get into low gear quickly.
- Point on the brake pedal, try to control the car driving in a straight line, slow down to stop gradually.
- When the truck sheers off, do not make excessive rectification. Push the brake pedal slightly to decelerate gradually while controlling the traveling direction.

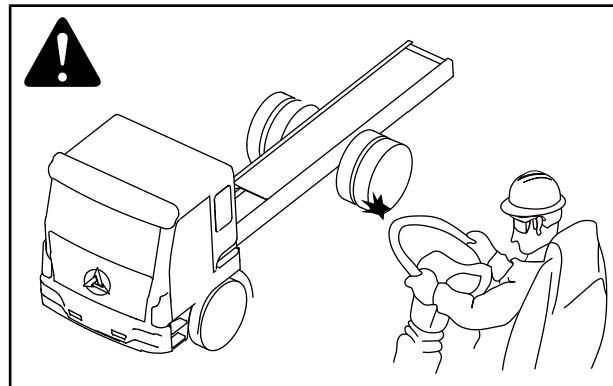


Fig.2-44 Hold the steering wheel

Methods of avoiding flat tyre

- Check tyres regularly.
- Replace damaged tyres in time.

Matters after flat tyre

- Do not slam on the brake.
- Shift gears to decelerate gradually by using the brake.

2.8.3 Engine stalling during travel

When the engine stalls during travel, the driver shall do the steps:

1. Decelerate gradually and keep the truck traveling on a straight line.
2. Drive the truck off highway carefully and park it at the safe place.
3. Turn on the emergency flash lamp.
4. Re-start the engine. If it cannot be started, dial the after-sales service line for help.

2.8.4 Engine overheating during travel

If the thermometer indicates that the engine is overheated or the power is not enough, and there is clear sound of knock or deflagration, this means that the engine becomes too hot. In case of any above phenomena, the following procedures must be enforced:

CAUTION

Risk of injuries!

When the engine works, any moving part, such as fan, drive belt and so on, could result in crushing injuries.

When the engine works, keep hair, hands and clothes far from any moving part.

1. Drive the truck off highway and park it at a safe place as soon as possible.
2. Turn the gear shifter to the neutral gear, set parking brake, and shut down the air conditioner.
3. Check whether the cooling water runs off and the cooling fan works. If the fan does not work, shut down the engine.
4. Check whether the pump drive belt is missing. If it is not missing, check the tension of the belt. If there is no problem, check whether the cooling water is leaked from the radiator, hose, or underbody.
5. If the pump drive belt is damaged or the cooling water gets leaked, stop the engine immediately and dial the after-sales service line of SANY for help.
6. If the cause for engine overheating is not found, wait until the engine recovers. If the cooling water is not enough, add cooling water into the water tank carefully to the two-thirds part between upper body and lower limits.

Note: excessive consumption of the cooling water for engine indicates that the cooling system has leakage. Check at the designated service point as soon as possible.

2.8.5 Treatment of special driving circumstances

2.8.5.1 Dangerous road conditions

When encountering dangerous road conditions, such as rain, snow, ice, sludge, sand, and the other conditions, obey the following suggestions:

- Drive the truck carefully and keep a big brake distance.
- Prevent sudden braking or steering.
- Push down the brake pedal until the truck stops.

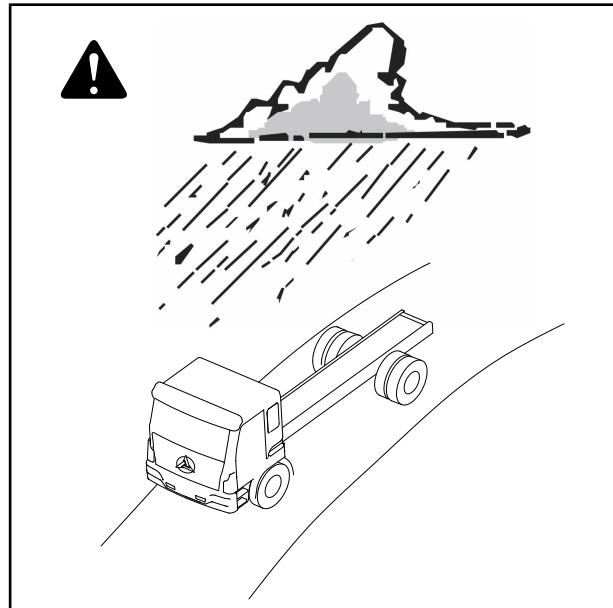


Fig.2-45 Dangerous road conditions

! CAUTION

Risk of bystanders injuries!

When the truck is fixed, wheel idling at high speed could cause bystanders to get hurt. Never make wheels idle at high speed.

NOTICE

Risk of tyres damage!

When the truck is fixed, wheel idling at high speed could lead to tyres overheating which could cause damage to tyres.

Do not make wheels idle at high speed.

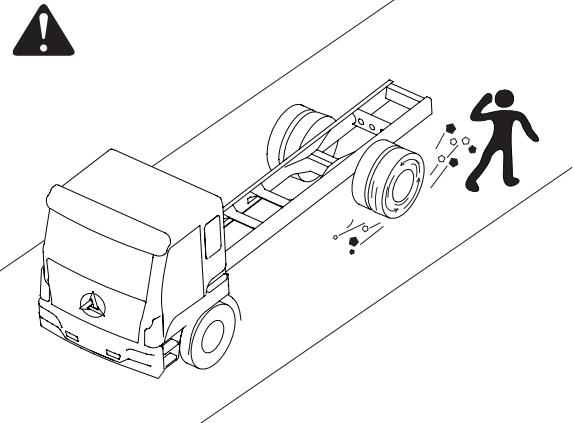


Fig.2-46 No high speed idling

- Shift to the second gear to accelerate slowly so as to avoid idling the driving wheel when the truck gets stuck in snow, mud or sand.
- When the truck gets stuck in snow, mud, or sand, place sand, rock salt, tyre antiskid chain or other antiskid articles below the

driving wheel, so as to provide tractive force.

2.8.5.2 Turning

Avoid pushing down brake pedal or shifting gear when making a turn, especially when the road is wet. Try to turn with slight acceleration. The wear rate of tyre and probability of accident may be minimized by observing these opinions.

2.8.5.3 Driving at night

It is more dangerous to drive at night than during daytime, so observe the following essentials for driving:

- Reduce the truck speed and keep a big safe distance from other vehicles. It is especially important when there are no street lamps on the road.
- Adjust the position of the rearview mirror to reduce the light from headlights of vehicles behind.
- When the headlight does not focus automatically, keep the headlight clean and focusing. A dirty headlight or improper focusing will lead to a worse vision.
- Avoid watching the headlight of a vehicle coming head-on, otherwise it will lead to temporary blindness and it requires several seconds to adapt to a black environment.

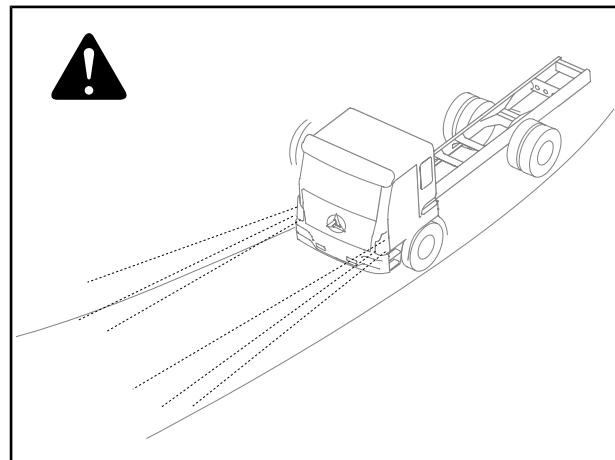


Fig.2-47 Driving at night

2.8.5.4 Driving in rainy days

It is very dangerous to drive the truck in a rainy day or on a wet and slippery road, especially when not prepared for such a road. The following precautions should be taken to drive in a rainy day:

- A downpour will lead to a bad vision. Increase the brake distance, and travel at a reduced speed by all means.
- Keep the windshield wiper in a good state. Replace the blade of the windshield wiper

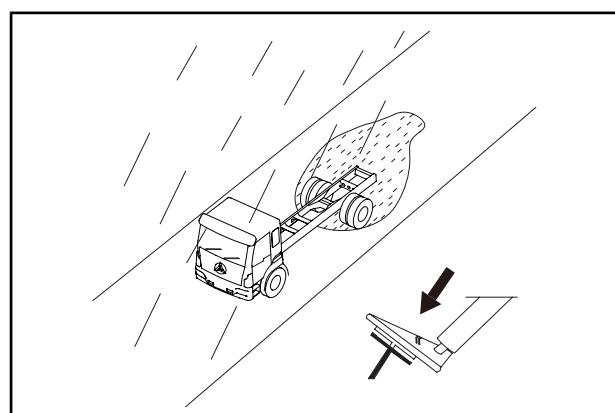


Fig.2-48 Driving in rainy days

when there are strips on the windshield or areas missed.

Keep all tyres in a good condition.

Open the headlight of the truck so that other people may see the truck.

Rapid travel on a road with gathered water will influence the brake, so reduce the speed by all means when traveling on such a road.

If the brake is sloppy, push down the brake pedal slightly when driving, until the truck resumes its normal braking operation.

Unless confirming that the submerging height does not reach beyond the lower edge of the hub, do not drive the truck to pass a submerged area. Always travel at a reduced speed when driving the truck across water areas. Since the braking performance may be impacted, it requires a sufficient brake distance.

When driving the truck across a submerged area, push the brake pedal down slightly several times when the truck travels slowly, so as to dry the brake.

2.8.5.5 Driving in winter

⚠ CAUTION

Risk of traffic accident, personnel injury or death!

Installing tyre antiskid chains could provide a bigger driving force, but it could not prevent side skidding which could cause traffic accidents, personnel injury or death.

Drive carefully on the road with snow or ice.

The bad driving environment in winter may increase abrasion of tyres or cause other faults, which will increase the accident rate. In order to reduce accidents in winter, obey the following suggestions:

- It is necessary to use antiskid tyres or antiskid chains to drive the truck in deep snow. The antiskid tyres must be of the same size and specification as the original tyres specification. Install the proper size of antiskid chain correctly. An improper size and installation of antiskid chain will damage the brake piping, suspension, truck body and wheel.
- Make a full use of the braking function to reduce speed. On the road with snow or ice, emergency braking will result in the truck gets drifted and skidded. Keep a

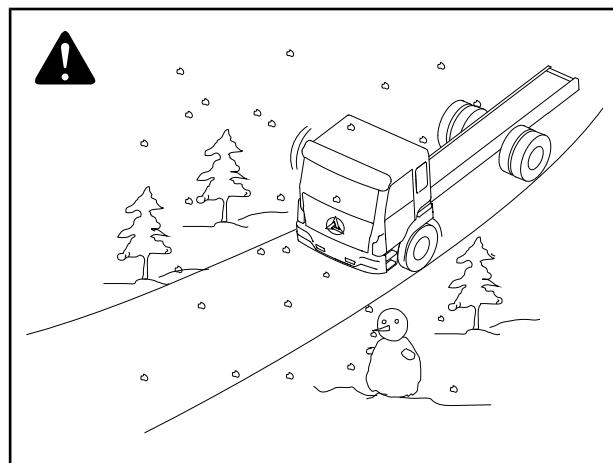


Fig.2-49 Driving in winter

proper safe distance from the vehicle ahead and push down the brake pedal slightly.

2.9 Precautions with tyres

2.9.1 Handling tyres

Explosive separation of a tyre or rim parts can cause serious injury or death. To ensure safety, always do as follows.

- When carrying out maintenance, disassembly, repair, or assembly of the tyre or rim, special tools and procedures must be used. Ask the local distributor to do the work.
- Use only specified tyres and inflate them to the specified pressure.
- When pumping up the tyres, insure that no one is near the tyre, install an air chuck that can be secured to the air valve. Measure the pressure from time to time with an air gauge to prevent the tyre inflation pressure from becoming too high.
- If the pressure goes down abnormally or the rim parts do not fit the tyre, or there is a problem with the tyres or rim parts, always contact the Komatsu distributor for repairs.
- If the rim parts are not fitted properly when the tyre is being pumped up, there is danger that the rim parts may fly off, so set up a protective fence around the tyre, and do not stand directly in front of the rim. Stand beside the tread when pumping up the tyre.
- Do not adjust the tyre inflation pressure immediately after traveling at high speed or operations under heavy load.
- Never weld or light a fire near the tyre.



Fig.2-50 Explosive separation

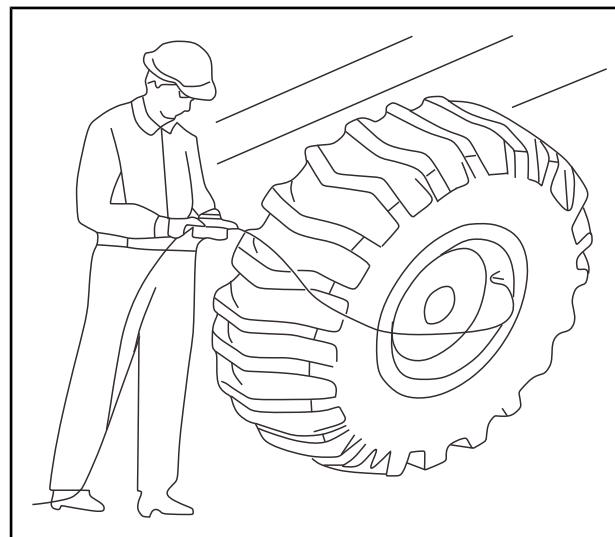


Fig.2-51 Stand beside the tread

- Always release all pressure from a single tyre, or from both tyres of a dual assembly, prior to removing any rim components.

2.9.2 Safe using

- Do not discharge air immediately after tyres running in high speed.
- Slow down and take care in special climate or environment.
- Do check, maintenance, transposition, repair frequently.
- Do not use the repaired tyres in the front wheel.
- Change tyres immediately when faults happen.

2.9.3 Storing tyres

- Store the tyre in a warehouse where unauthorized persons can not enter. Always erect a fence and put up **No Entry** signs if the tyre must be stored outside.
- Stand the tyre on level ground, and block it securely so that it cannot roll or fall over if any person should touch it.
- Place the tyre against a wall at an angle of **60°–70° (A)** and hold the tyre against the wall with a **block (1)**.
- If the tyre should fall over, do not attempt to stop it. Get out of the way quickly.

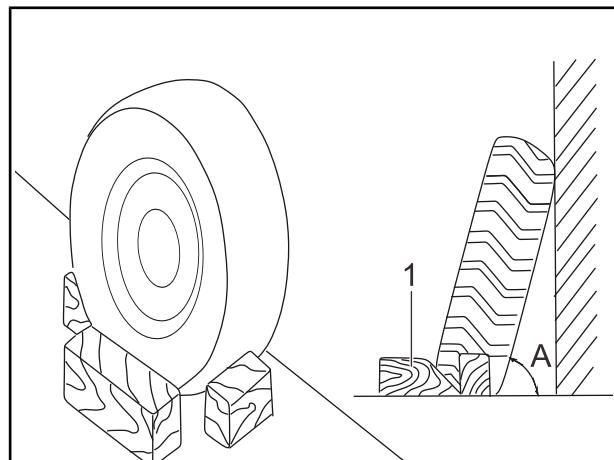


Fig.2-52 How to place tyres

1. Block

A. 60°–70°



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⚠ WARNING

Read and understand all safety precautions and instructions in this manual before reading any other manuals provided with this machine and before operation or maintaining it. Failure to do this could result in death or serious injury.

3. System function

3.1 Chassis assembly

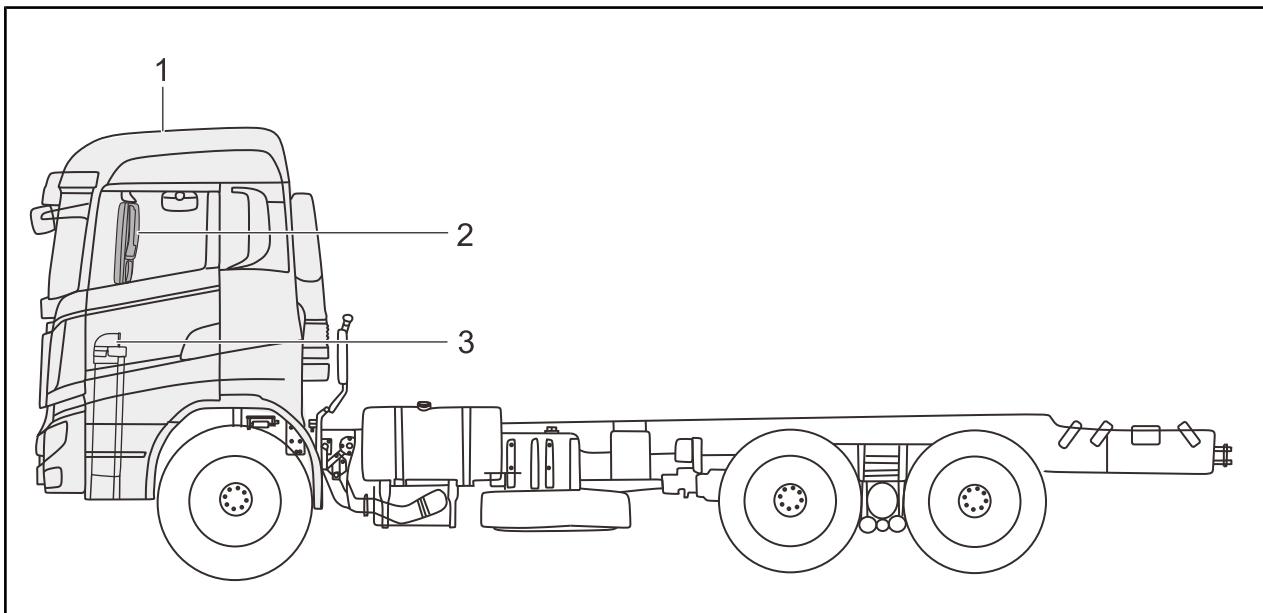


Fig.3-1 Chassis assembly

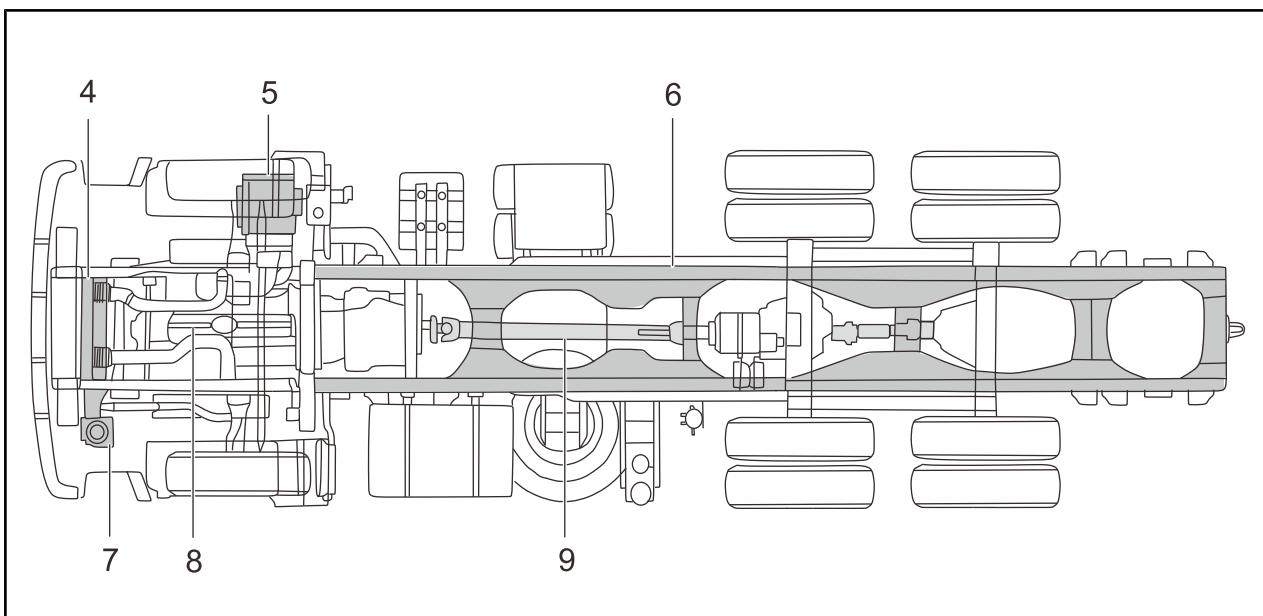


Fig.3-2 Chassis assembly

1. Cab assembly	4. Cooling system	7. Steering system
2. Rear view mirror	5. Air cleaner system	8. Engine
3. Air conditioner	6. Frame assembly	9. Drive shafts

3.2 Cab assembly

3.2.1 Overview of cab assembly

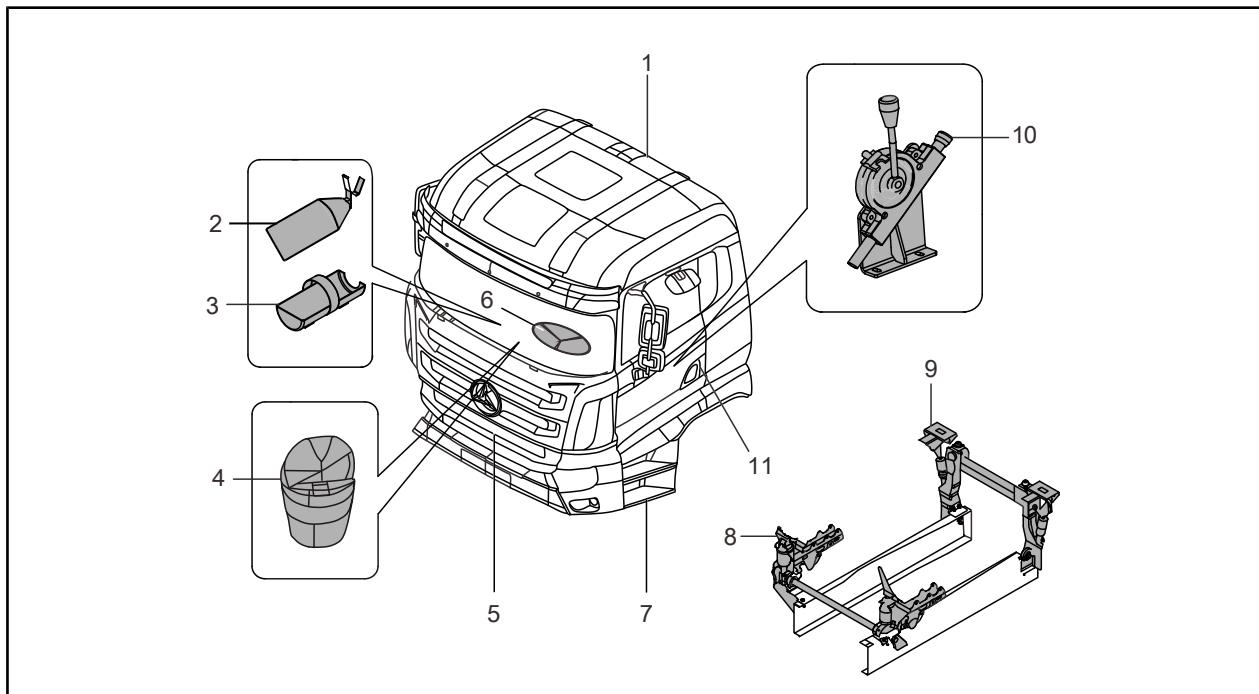


Fig.3-3 Cab

1. Cab assembly	5. Front panel assembly	9. Rear suspension
2. Fire extinguisher	6. Steering wheel	10. Control mechanism
3. Fire extinguisher bracket	7. Footplate assembly	11. Truck door
4. Ashtray	8. Front suspension	

3.2.2 Truck door

3.2.2.1 Opening and closing door with a key

Opening door

1. Insert the key to the **keyhole (2)** of door lock.
2. Rotate the key clockwise.
3. After hearing a snap, pull the **handle (1)** slightly to open the door.

The locks are the same on both sides of truck door. The user can open the door only from one side at a time in order to prevent unauthorized person from entering the truck from the other side.

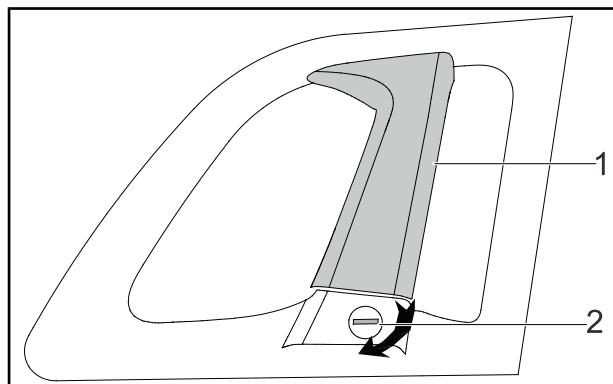


Fig.3-4 Door

1. Handle

2. Keyhole

Closing door

1. Push the **handle (1)** towards the cab with some force to close the door.
2. Insert the key to the **keyhole (2)** of door lock.
3. Turn the key counterclockwise.
4. After hearing the locking sound, the door is locked.

3.2.2.2 Opening and closing door with remote controller

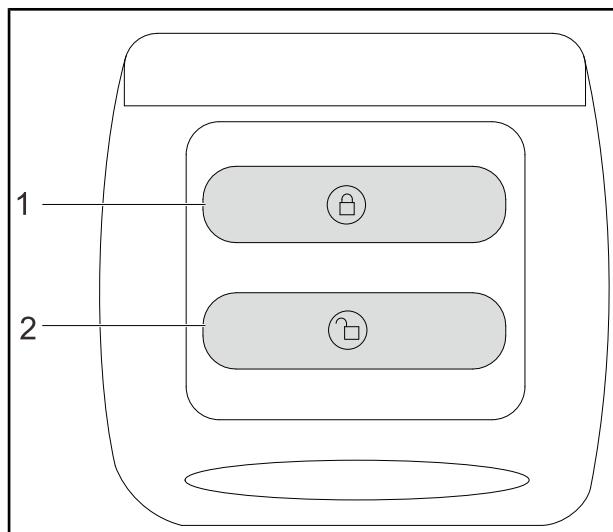


Fig.3-5 Remote controller

Opening door

1. Locking button 2. Release button

1. Push the **release button (2)** on remote controller, then alarm light flickers. Both doors are opened at the same time.
2. Keep pushing the **release button (2)** for seconds, then door glass descends to the bottom automatically.

Closing door

1. Push the handle towards the cab with some force to close the door.
2. Push the **locking button (1)** on remote controller, then alarm light flickers and the door is locked.
3. Keep pushing the **locking button (1)** for seconds, then door glass is lifted to the top automatically.

3.2.2.3 Opening and closing door from inside

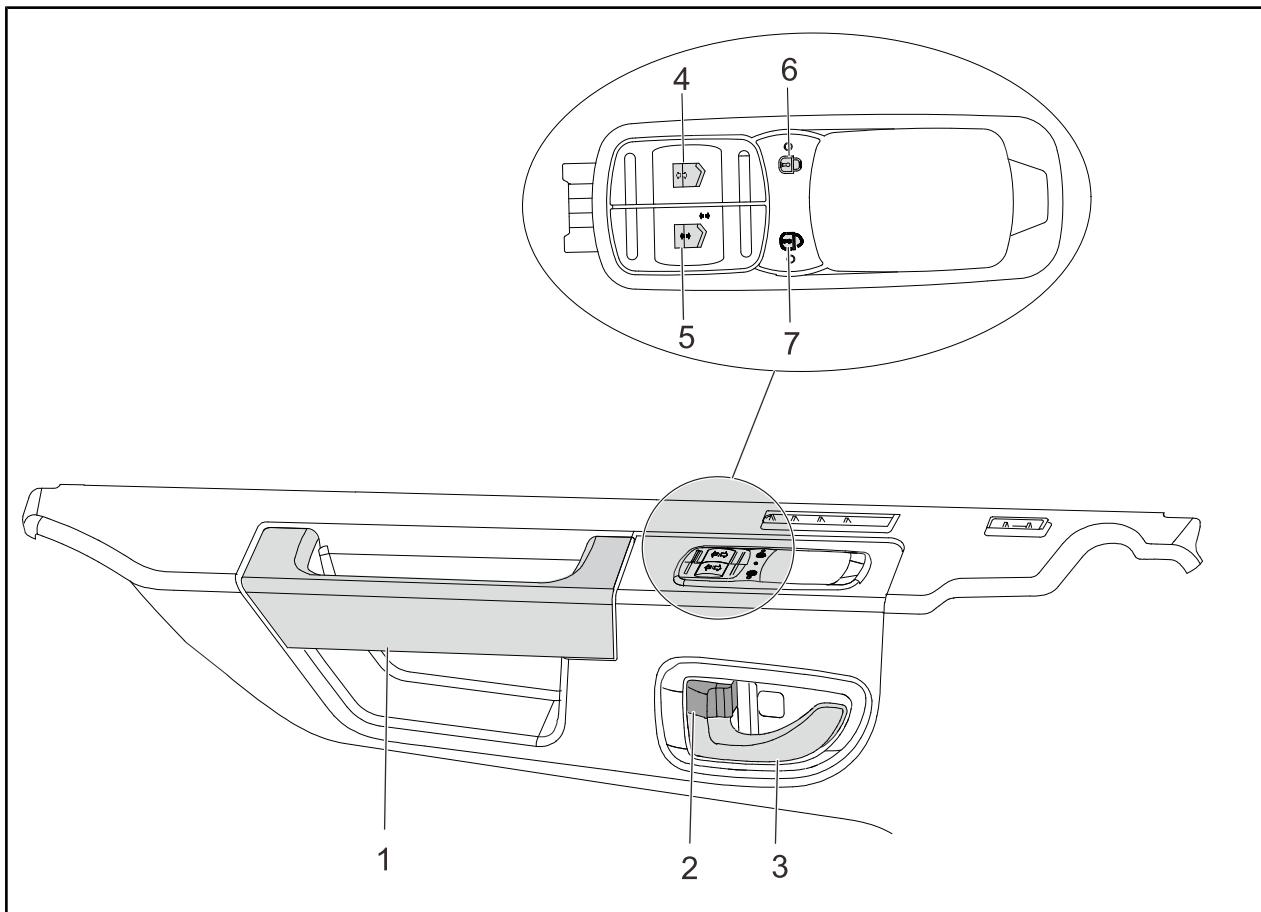


Fig.3-6 Truck door

1. Handle	3. Internal handle	5. Right glass switch	7. Unlocking key
2. Unlocking button	4. Left glass switch	6. Locking key	

The electric glass lifter is in the truck door. The left door switch can control the glass lifting of left door and right door. The right door switch can only control the glass lifting of right door.

Opening door

1. Pull the **unlocking button (2)** of **internal handle (3)** or push the **unlocking key (7)** to unlock the door.
2. Pull the **internal handle (3)** and push the door outwards with proper force.

Closing door

1. Hold the **handle (1)** and pull inward to close the door with proper force.
2. Push the **unlocking button (2)** of **internal handle (3)** or Push the **locking key (6)** to lock the door.

3.2.2.4 Glass lifting switch

1. Rotate the key to **ON** position and the device switches from locking state to working state.

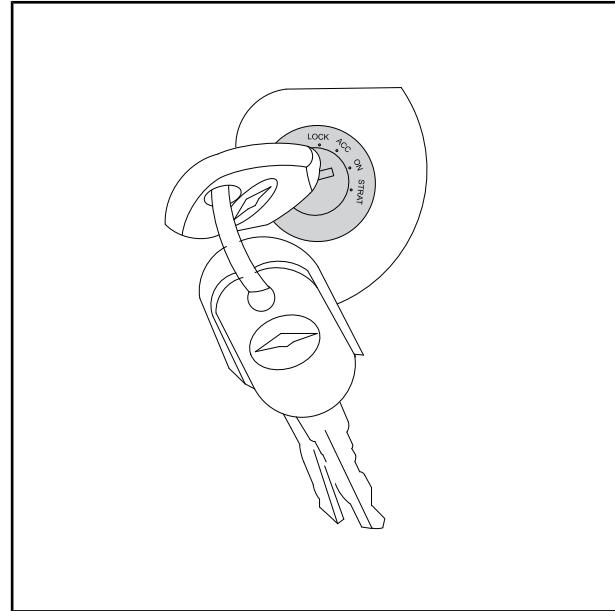


Fig.3-7 Key

2. Lift or lower the glass through pressing **right glass lift switch (2)** and **left glass lift switch (1)**.

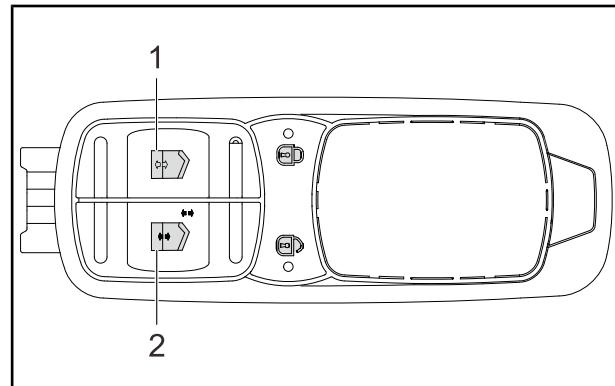


Fig.3-8 Glass lifting switch

1. Left glass lift switch

2. Right glass lift switch

3.2.3 Cab interior

3.2.3.1 Overview of cab interior

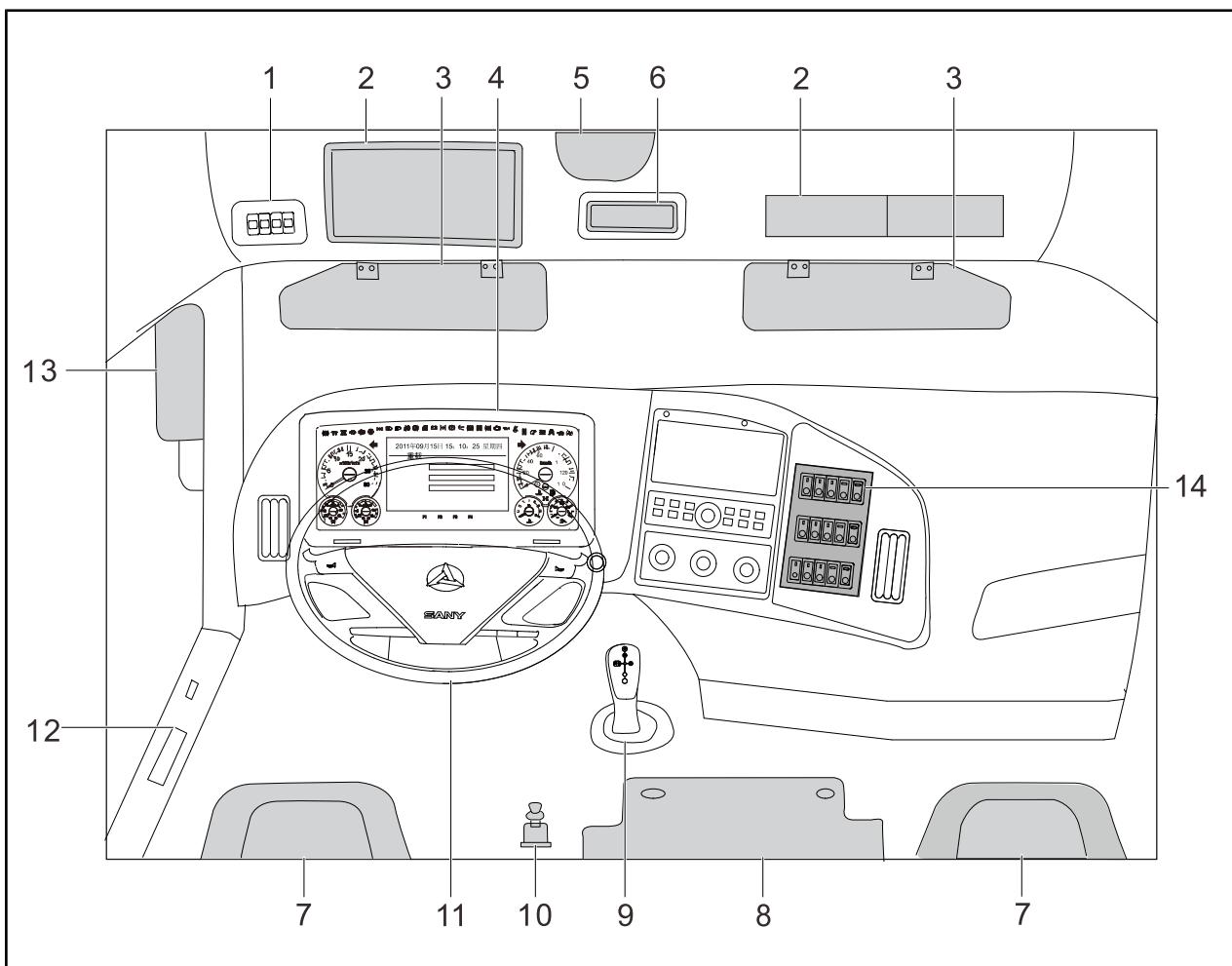


Fig.3-9 Cab interior

1. Reserved switch position	6. Running recorder (optional)	11. Steering wheel
2. Storage compartment	7. Seat	12. Door
3. Sunshade board	8. Cup holder	13. Rear-view mirror
4. Instrument control panel	9. Shift control rod	14. Operating switch
5. Ceiling lamp	10. Parking brake valve	

3.2.3.2 Seat

WARNING

Risk of traffic accident!

Loosening of the seat during driving could cause serious accident.

Do not adjust the seat when the truck is running. After adjusting the seat, push the handle back to the original position and make sure each component is locked steadily.

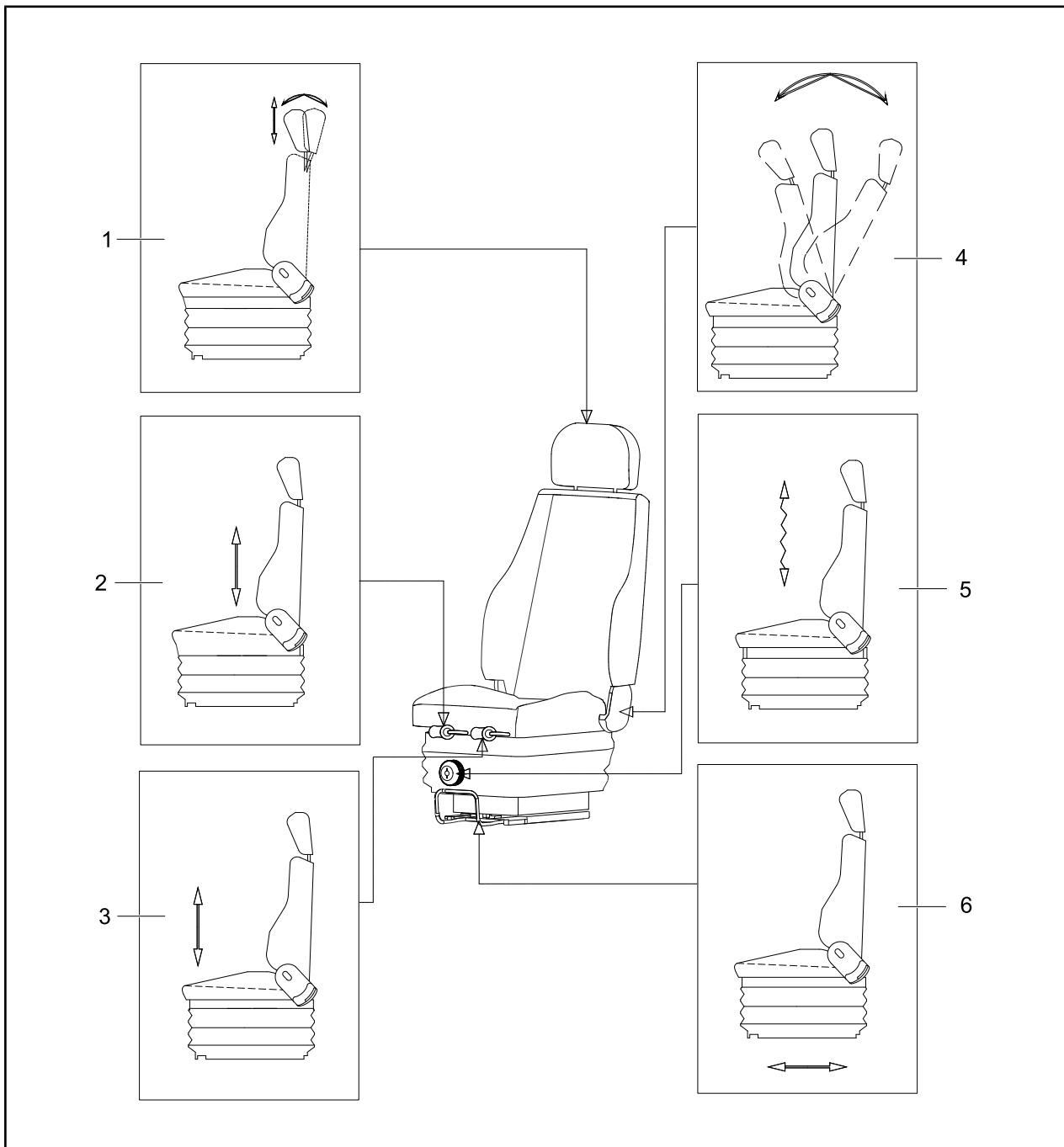


Fig.3-10 Seat adjustment

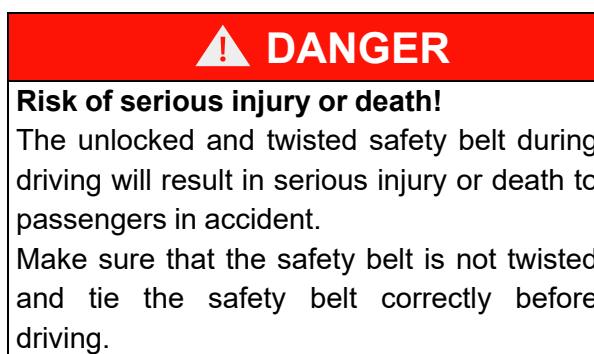
1. Headrest	3. Front end	5. Rigidity
2. Back end	4. Backrest	6. Front and rear position

Before adjustment, pull the handle to specified position and ensure that the suspension is complete.

1. Adjusting the height of **headrest (1)**: pull the headrest to the desired position.
2. Adjusting the height (tilt) of **back end (2)**: pull the handle upward and apply appropriate force to the back end of the seat, then release the handle in desired position.

3. Adjusting the height (tilt) of **front end (3)**: pull the handle upward and apply appropriate force to the front end of the seat, then release the handle in desired position.
4. Adjusting the elevation of **backrest (4)**: rotate the handle, and apply backward (forward) force to the backrest to move the backrest to required position, then release the handle.
5. Adjusting the **rigidity (5)**: rotate the hand wheel clockwise to increase the weight of driver, rotate the hand wheel counterclockwise in the opposite way to decrease the weight of driver.
Adjusting range: 40 kg–130 kg.
6. Adjusting the **front and rear position (6)**: pull up the handle, move the seat forward or backward to required position.

3.2.3.3 Safety belt



Tie the safety belt as follows:

1. Adjust the backrest to vertical position.
2. Sit well on the seat and make the back lean on the backrest.
3. Pull out the safety belt steadily, round the shoulder, hold the **buckle (1)** and insert it into the **lock catch (3)**.

Make sure that the shoulder belt wraps around the shoulder in the middle, tie the belt correctly, the backrest is nearly vertical. Otherwise the safety belt could not play a role in protection.

Release the safety belt as follows:

1. Push the **release button (2)** on **lock catch (3)** to take out **buckle (1)**.

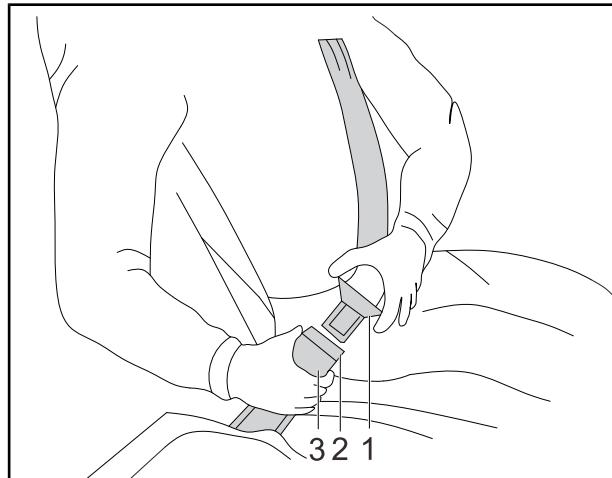


Fig.3-11 Adjust safety belt

1. Buckle
2. Release button
3. Lock catch

2. Place the **lock catch (3)** and **buckle (1)** to the original position.

3.2.3.4 Steering wheel

Steering wheel can control vehicle steering and horn.

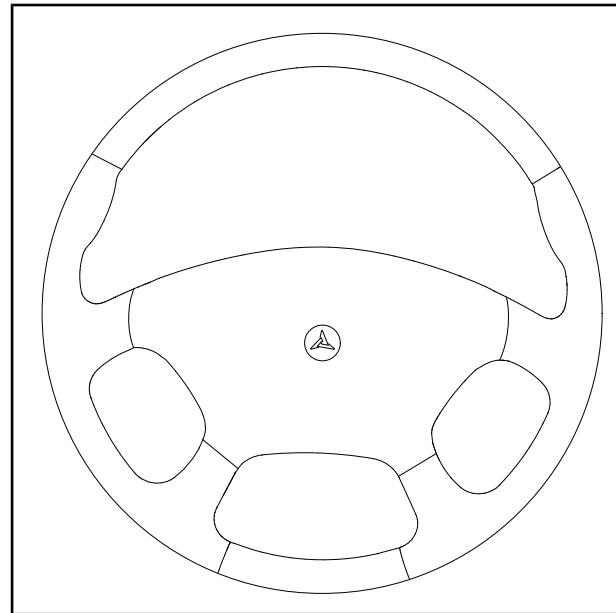


Fig.3-12 Steering wheel

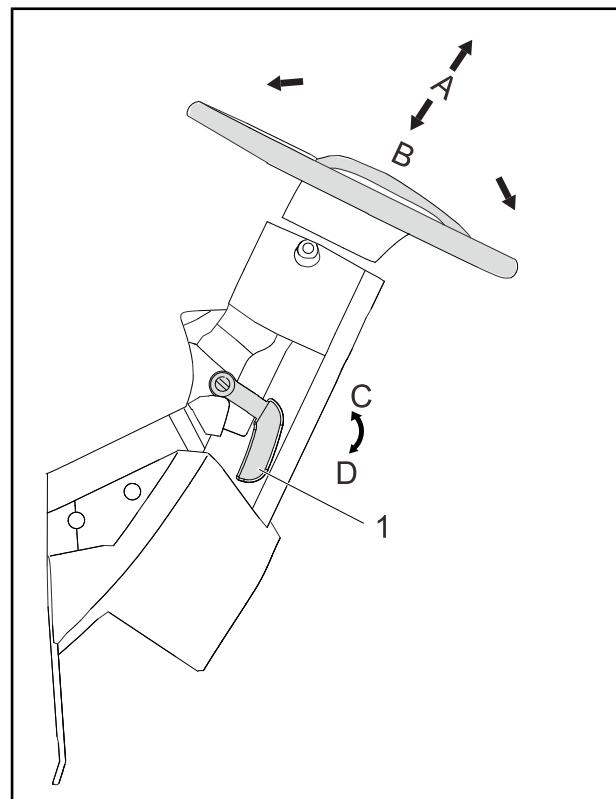


Fig.3-13 Steering wheel adjustment

Steering wheel adjustment.

⚠ WARNING

Risk of accidents!

Adjusting the steering wheel when driving could result in accidents.

Adjust the steering wheel only when parking. Tighten the lock button instantly after adjusting the steering wheel.

1. Lock knob
- A. ± 25 mm upward and downward
- B. $\pm 5^\circ$ forward and backward
- C. Release
- D. Lock

1. The **lock knob (1)** is on the left side of steering column. Rotate up the **lock knob (1)** 90° to **release (C)** the steering wheel.
2. Adjust it to the required height and angle.
3. The adjustment range of steering wheel is **± 25 mm upward and downward (A)**, and **$\pm 5^\circ$ forward and backward (B)**.
4. After adjusting, rotate down the lock knob 90° to **lock (D)** the steering wheel.

3.2.3.5 Ignition switch

Use the ignition switch to turn on or turn off the engine. The ignition switch has four gears: LOCK, ACC, ON and START.

LOCK

Cut off the power supply, except for the signal lights.

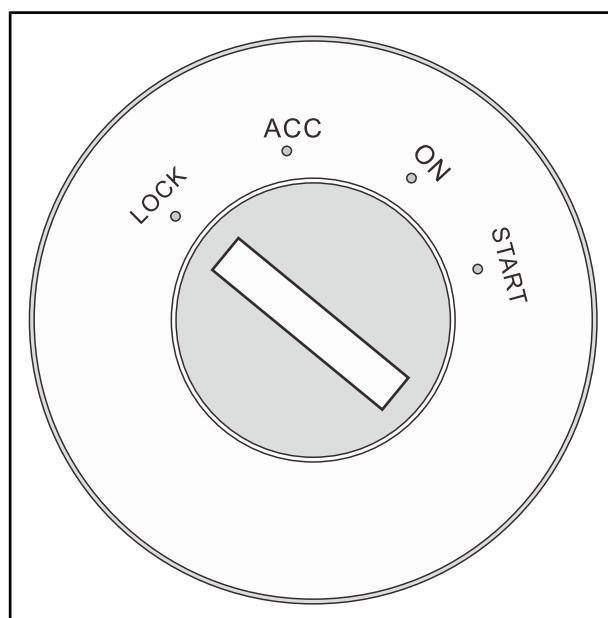


Fig.3-14 LOCK

ACC

Supply power to on-board auxiliary equipment in the cab, such as audio-visual system, instrument lights, lights and so on.

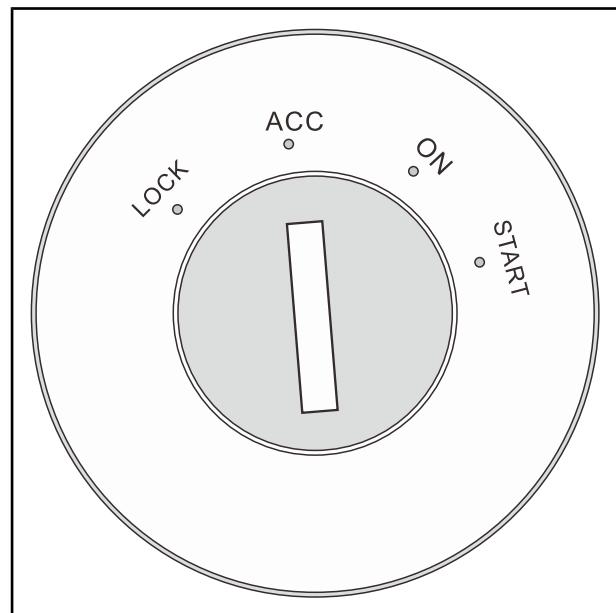


Fig.3-15 ACC

ON

Perform the ignition operation on the basis of ACC power supply.

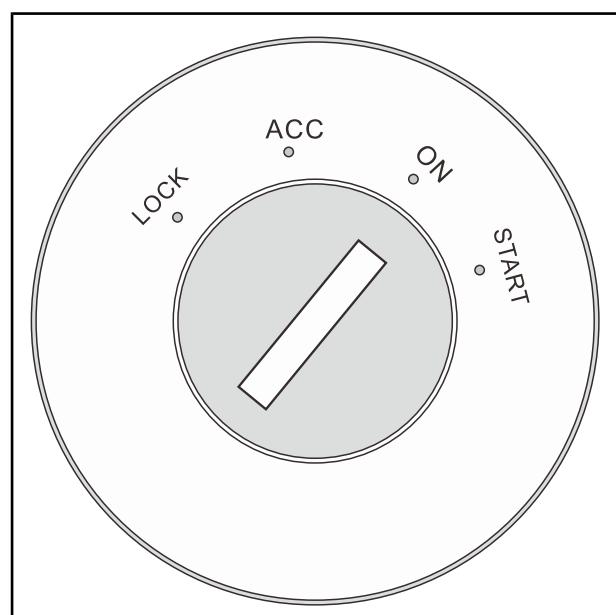


Fig.3-16 ON

START

Provide power for the engine starting system.

After starting the engine, the ignition key will return to **ON** position automatically.

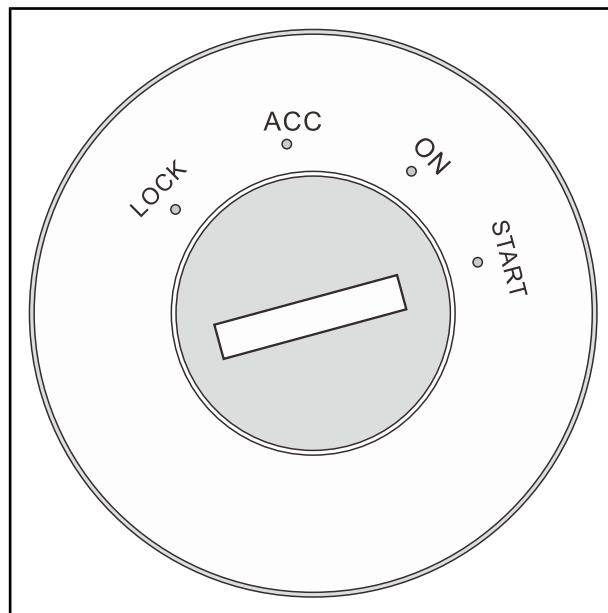


Fig.3-17 START

3.2.3.6 Fire extinguisher

The fire extinguisher is on the back wall of the cab.

DANGER

Risk of fire, personnel injury or death!

Operating the mixer truck without any fire extinguisher will result in personnel injury or death once it catches fire.

Ensure the mixer truck has a fire extinguisher and replace the fire extinguisher agent every year to ensure its efficacy.

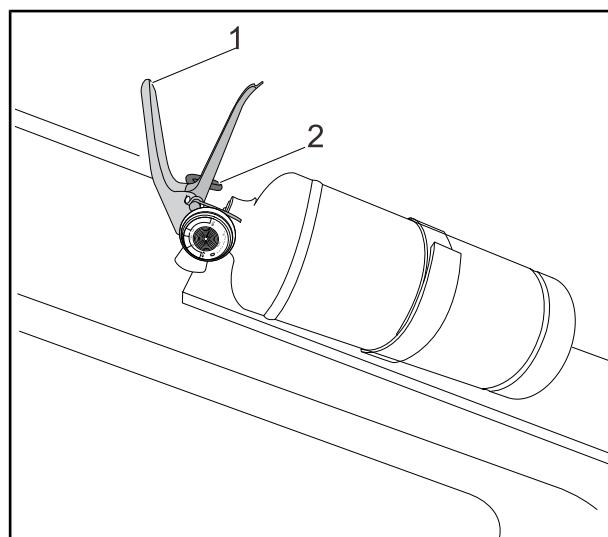


Fig.3-18 Fire extinguisher

1. Shake upward and downward the fire extinguisher for 3 times.

2. Stand at the windward, pull out the **safety pin (2)**, target the fire extinguisher at the fire source and then hold down the **handle (1)**.

Fire extinguisher storage temperature range: -20°C~50°C (-4°F~122°F). Fire extinguisher should not be under sun, rain and high temperature.

Check the fire extinguisher once a month. When the pressure gauge **pointer (3)** is not in the **green zone (4)** or open outdated, the fire extinguisher should be taken to the professional maintenance department to maintain or refill.

1. Handle

2. Safety pin

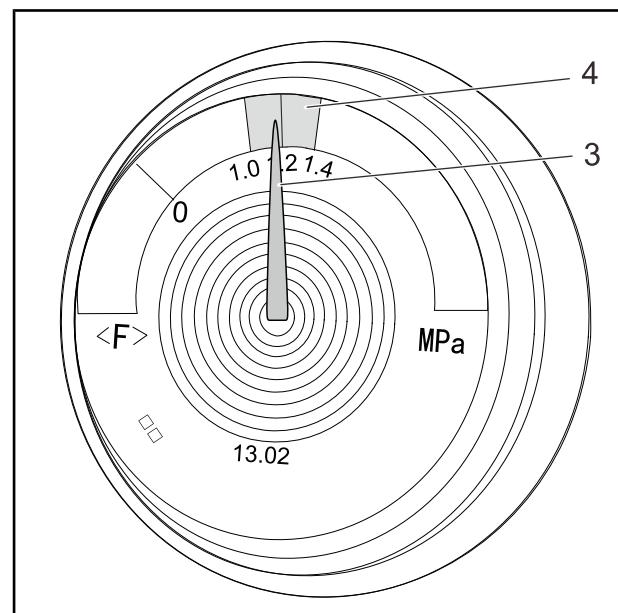


Fig.3-19 Pressure gauge

3. Pointer

4. Green zone

3.2.3.7 Sleeper

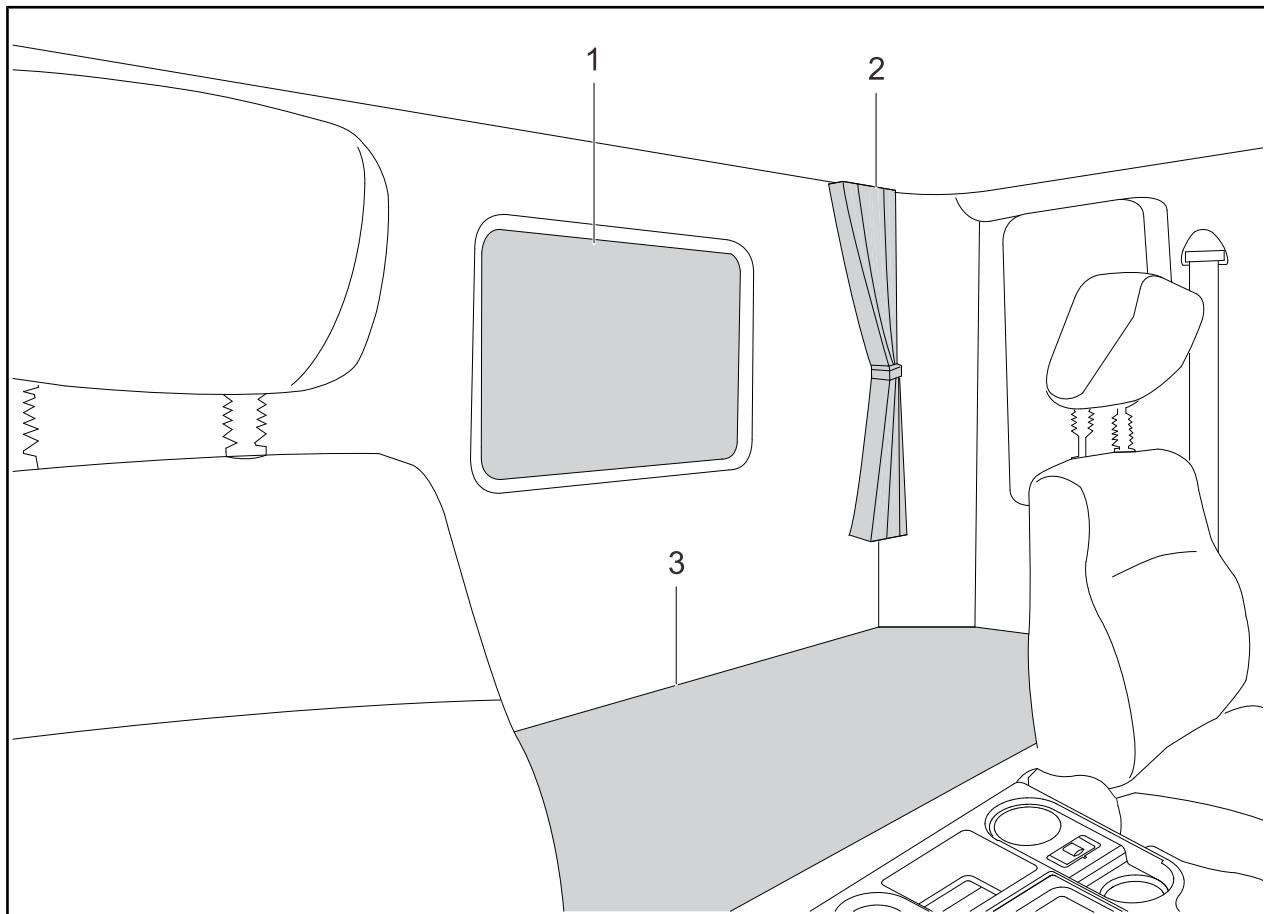


Fig.3-20 Sleeper

1. Rear window 2. Curtain 3. Sleeper

Sleeper (3): the driver can sleep at night or during noon break.

Curtain (2): shield off sunshine from the **rear window (1)**.

3.2.3.8 Plastic bin

Reading light switch (1): turn on this switch and reading light above the sleeper is on.

Power outlet (2): supply 24 V power.

⚠ CAUTION

Risk of scald!

The cigarette lighter is very hot after it is heated. Touching it could result in scald. Only hold the handle of the cigarette lighter. Do not press the cigarette lighter after it is heated.

NOTICE

Risk of socket or fuse damage!

Electrical accessories which do not match the **cigarette lighter (3)** could result in damage to the socket or fuses.

Use electronic accessories that match the cigarette lighter.

Cigarette lighter (3):

1. Turn the ignition switch to the ACC position or ON position.
2. Push the cigarette lighter button until a locking sound. When the heating element is red, cigarette lighter will pop up automatically.
3. Remove the cigarette lighter cover.
4. Use the heater winding to fire the object.

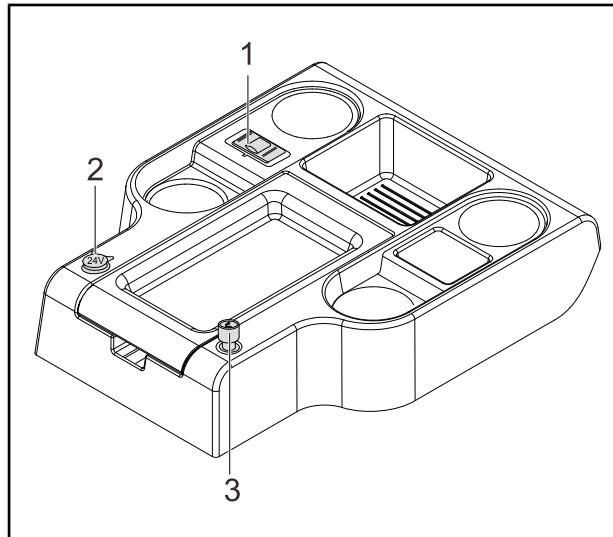


Fig.3-21 Plastic bin

1. Reading light switch	3. Cigarette lighter
2. Power outlet	

3.2.4 Instrument control panel

3.2.4.1 Overview of instrument control panel

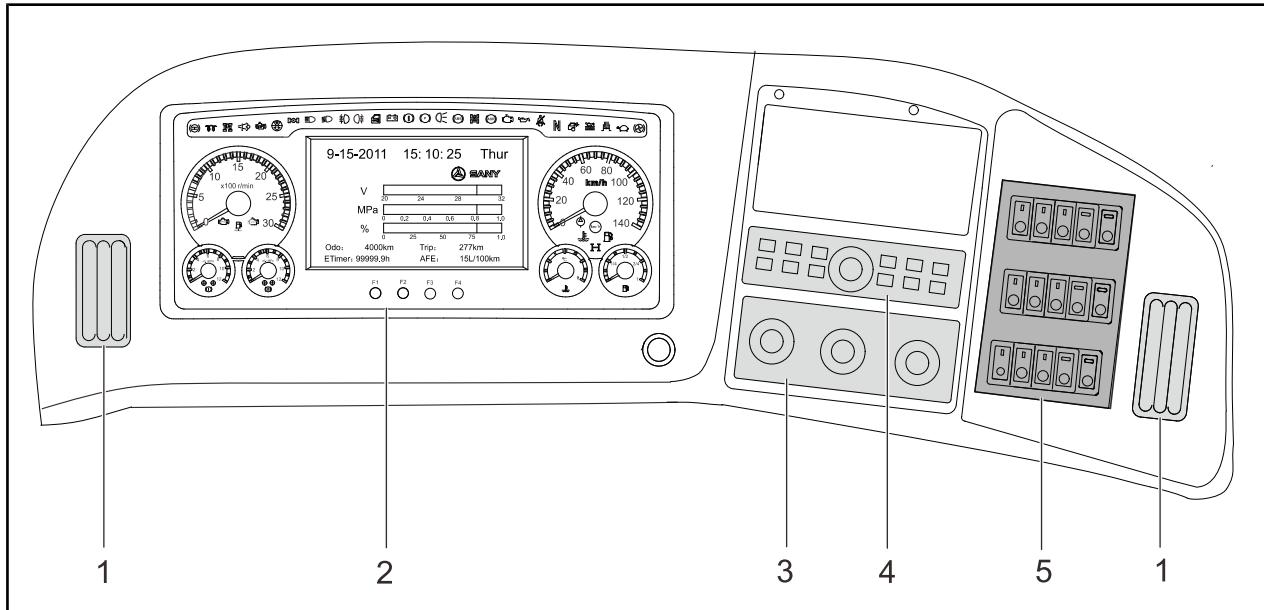


Fig.3-22 Instrument control panel

1. Air conditioner vent	3. Air conditioner	5. Operating switch
2. Instrument panel	4. Radio	

3.2.4.2 Instrument panel

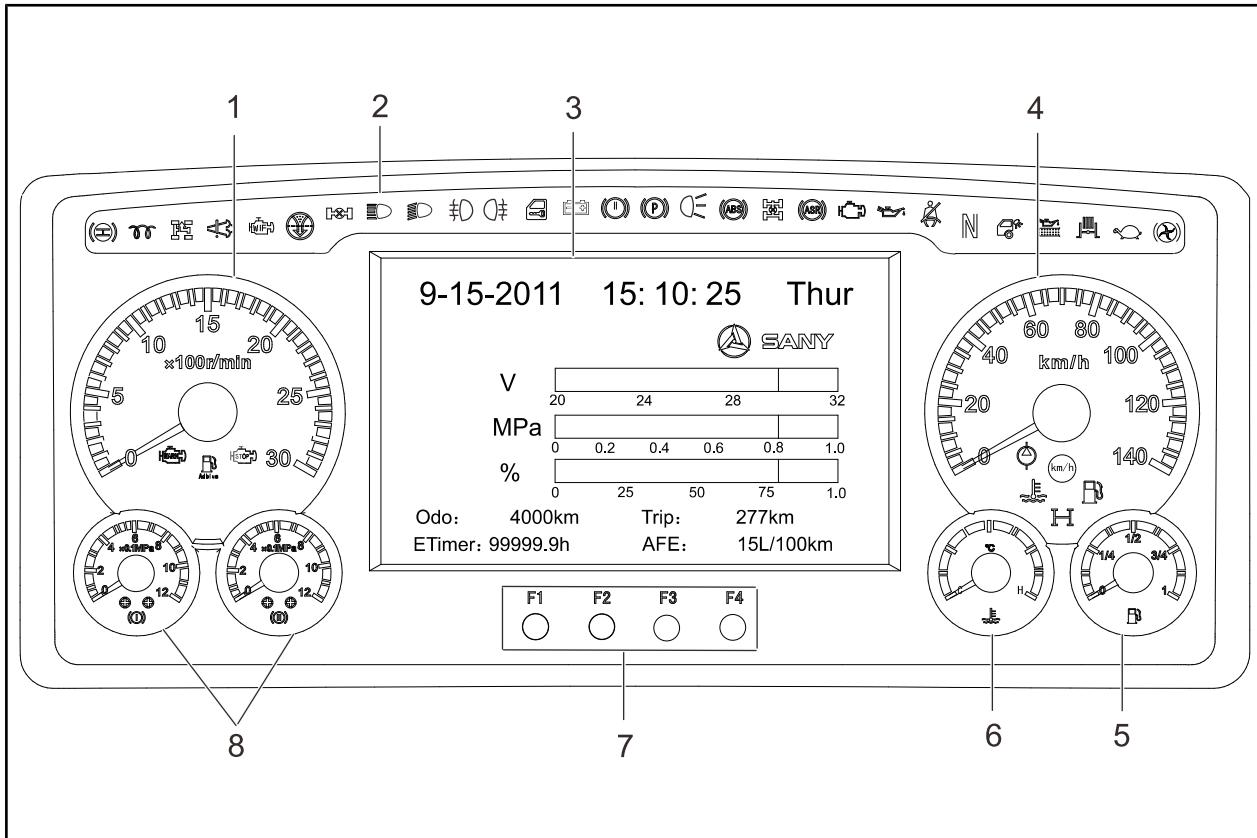


Fig.3-23 Instrument panel

1. Engine tachometer	4. Speedometer	7. Instrument operating button
2. Indicator lights	5. Fuel gauge	8. Air pressure gauge
3. Multi-function display screen	6. Coolant temperature gauge	

1. Engine tachometer

It indicates the engine rotary speed per minute. The area between 2200 r/min and 3000 r/min is red which means alarm area and alarm point. When the speed exceeds the set value, the screen displays warning text "engine over speed".

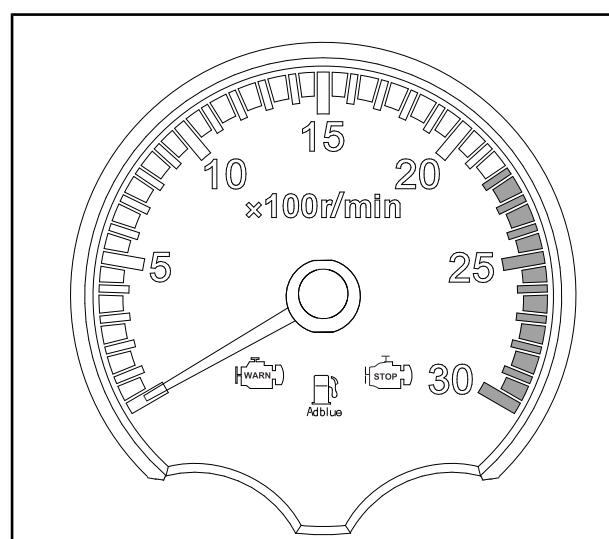


Fig.3-24 Engine tachometer

2. Speedometer

It indicates the travel speed, subtotal kilometers and total kilometers.

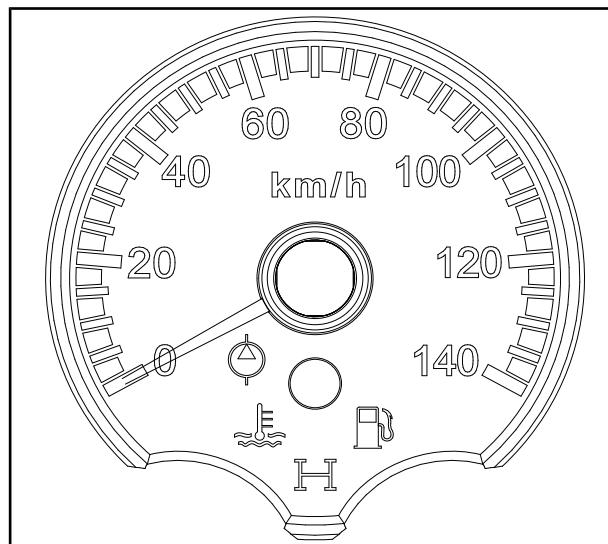


Fig.3-25 Speedometer

3. Fuel gauge

It indicates the fuel quantity in the fuel tank. The gauge only displays when the key switch is at **ON** position.

- The area nearby **0** indicates that the fuel is running out and reminds the driver to refuel the truck.
- The area nearby **1** indicates that the fuel is full.
- The fuel alarm indicator will light with a small quantity of fuel.

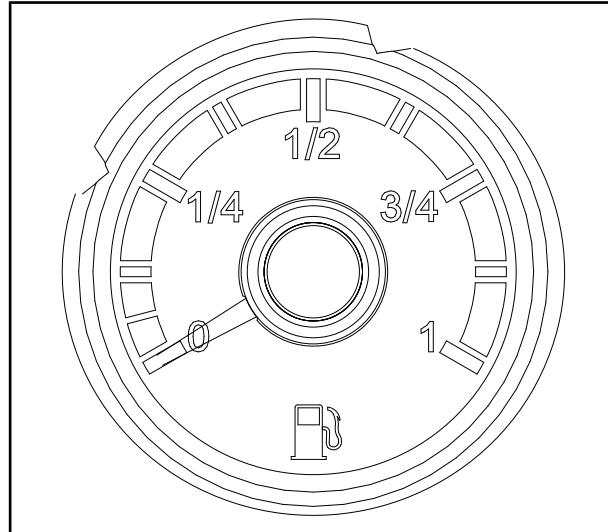


Fig.3-26 Fuel gauge

4. Coolant temperature gauge

It indicates the temperature of engine coolant. It works only when the key switch is at **ON** position.

- The **green area (1)** indicates normal condition.
- The **yellow area (2)** indicates early warning.
- The **red area (3)** indicates warning.

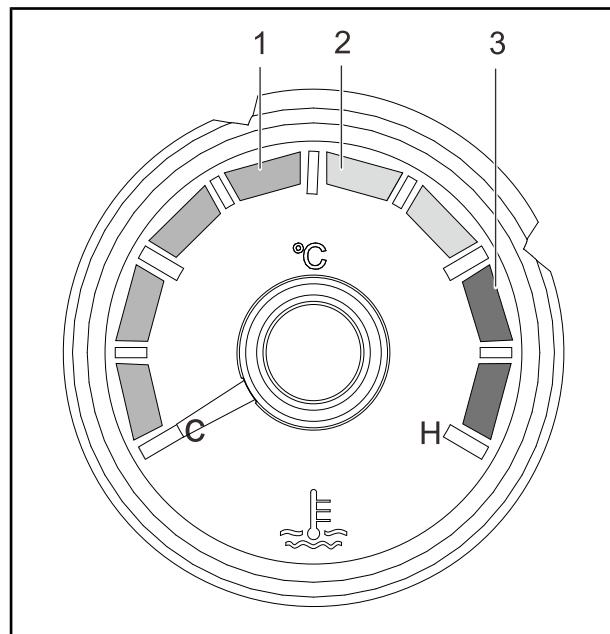


Fig.3-27 Coolant temperature gauge

1. Green area	3. Red area
2. Yellow area	

5. Air pressure gauge

It indicates the pressure of compressed air in the air reservoir.

- When the finger is within the green area (air pressure > 0.52 MPa), it indicates the air pressure is normal.
- When the finger is within the red area (air pressure ≤ 0.52 MPa), it indicates the air pressure is too low and air should be charged.

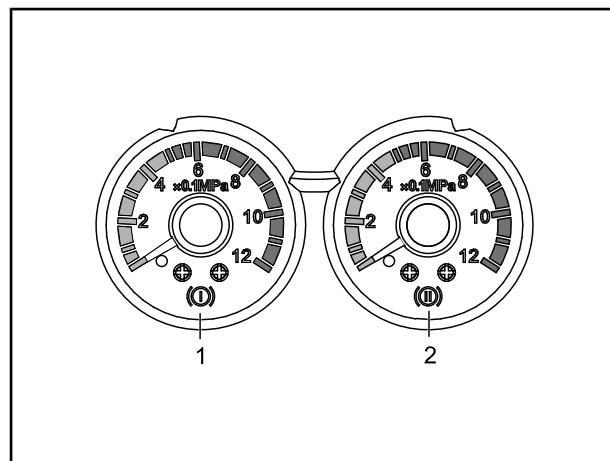


Fig.3-28 Air pressure gauge

1. Front axle barometer	2. Rear axle barometer
-------------------------	------------------------

3.2.4.3 Multi-function display screen

1. Start interface

Rotate ignition key to **ON** position. The instrument displays **SANY** activated interface 3 seconds later, the instrument displays the main screen.

The start interfaces of Hino and WP (different brands of engines) are different.



Fig.3-29 Start interface

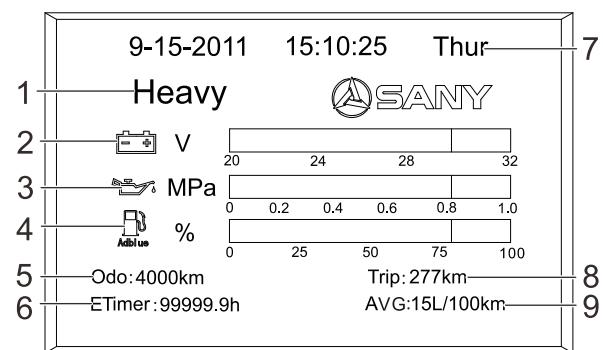


Fig.3-30 Start interface of Hino

1. Load	6. Working time
2. Voltage indicator	7. Date and time
3. Pressure indicator	8. Subtotal mileage
4. Urea level gauge	9. Average oil consumption
5. Total mileage	

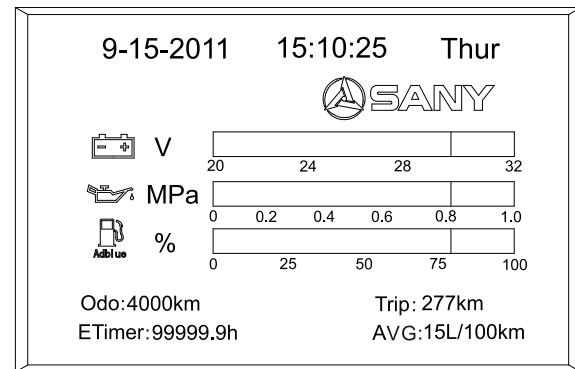


Fig.3-31 Start interface of WP

2. Key functions

F1	F3
Return key	Up key
F2	F4
Confirmation key	Down key

3. System function interface

In the main interface, push **F2** key to enter the system function interface. In the main interface, push **F1** key to return to the main interface.

- Engine type and mileage parameters have been set before the vehicle leaving the factory, and changes are not allowed.

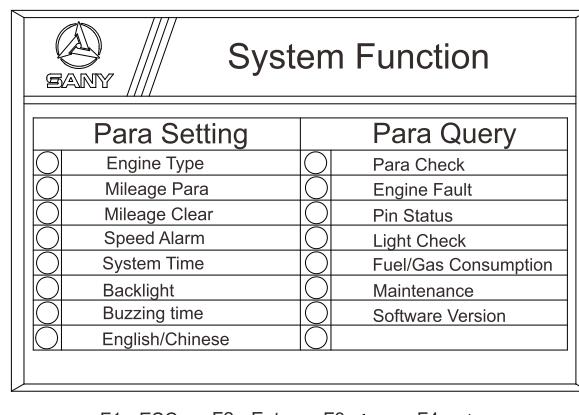


Fig.3-32 System function interface

- Mileage subtotal clear interface

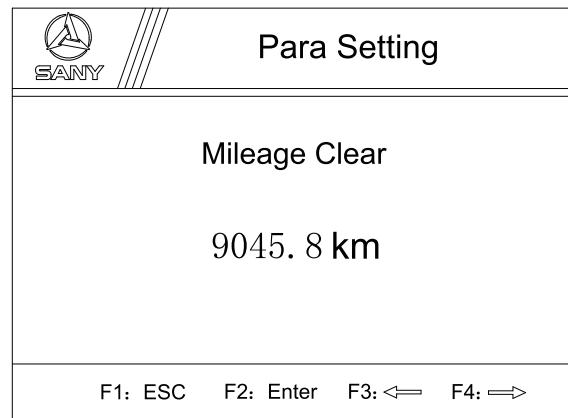


Fig.3-33 Mileage clear interface

In the system function interface, push **F3** or **F4** key to move the cursor to **Mileage Clear**.

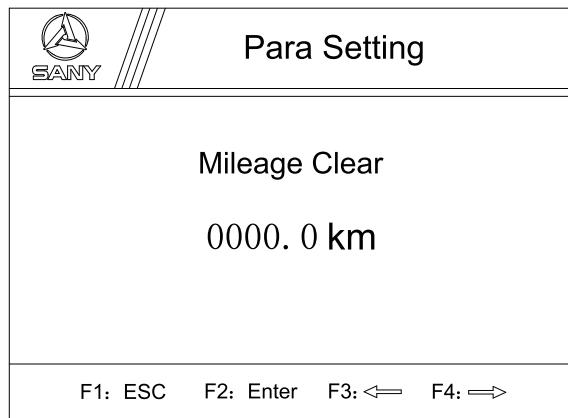


Fig.3-34 Mileage clear interface

Push **F2** key to enter the interface. Press the **F2** key again to clear them.

- Speed alarm setting, system time setting, backlight setting, buzzing time setting.

Select speed alarm/system time/backlight/buzzing time item, then push the **F2** key to enter the modified interface. Press **F3** or **F4** key to select the number. Push the **F2** key again to enter the modified interface, then push the **F3** or **F4** key to change the digital.

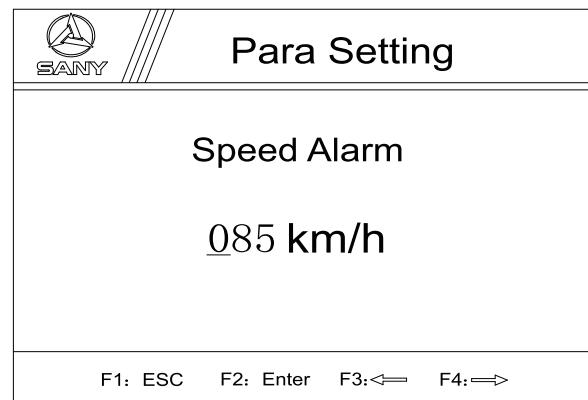


Fig.3-35 Parameter setting interface

After selecting the number, push **F2** key to move cursor to the next one. After finishing the digital modification, the green square icon "□" will appear.

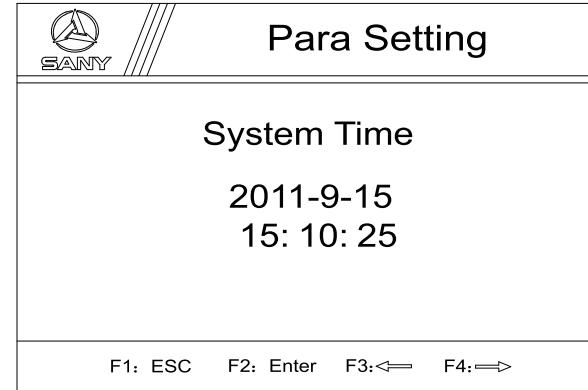


Fig.3-36 Parameter setting interface

After modifying, push **F1** key to return mileage parameter selection.

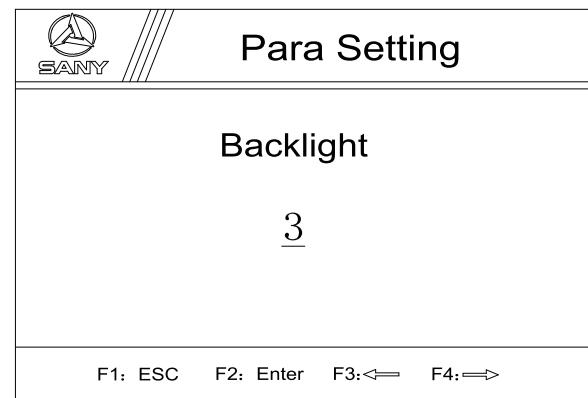


Fig.3-37 Parameter setting interface

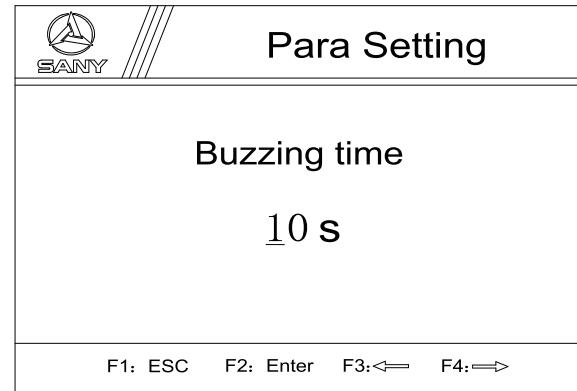


Fig.3-38 Parameter setting interface

- Parameter check

In the system function interface, push **F3** or **F4** key to move the cursor to **Para Check**, and push **F2** key to confirm entry. In the instrument parameter check interface, the engine type, speed alarm and other major parameters can be queried.

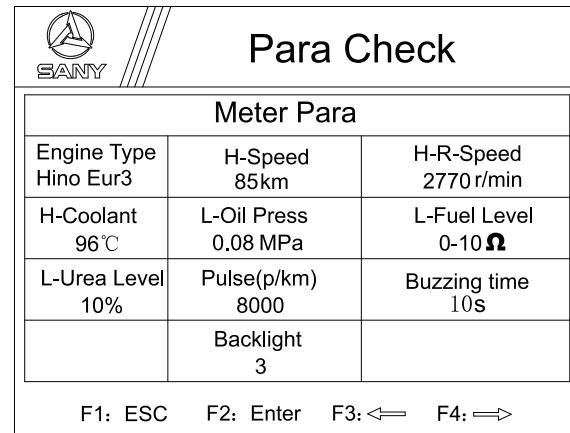


Fig.3-39 Parameter check interface

- Engine fault information query interface

In the system function interface, push **F3** or **F4** key to move the cursor to **Engine Fault**, then push **F2** key to confirm entry.

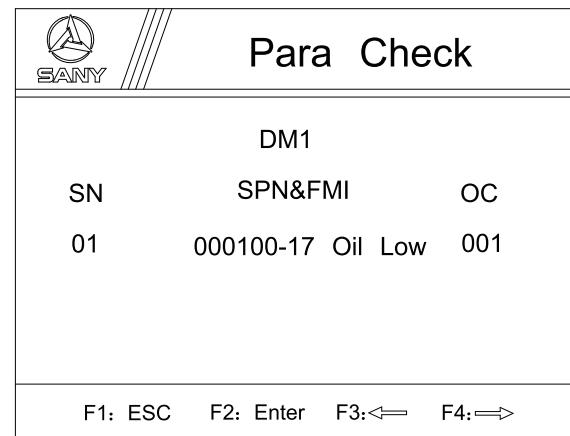


Fig.3-40 Engine fault interface

- Signal lamp self check

Enter the **Signal lamp self check** interface. Push the **F2** key to enter the procedure. All signal lights are lit for 5 seconds. After checking, press **F1** key to exit interface.

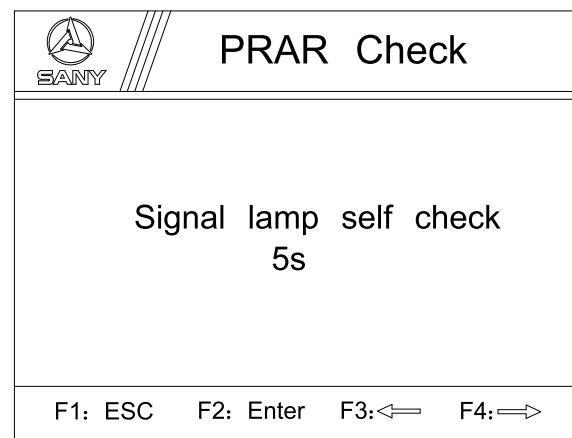


Fig.3-41 Signal lamp self check

- Fuel/gas consumption query

Enter the interface, push **F3** or **F4** key to choose the query options.

The method of operation is the same as the method of modifying the mileage impulse.

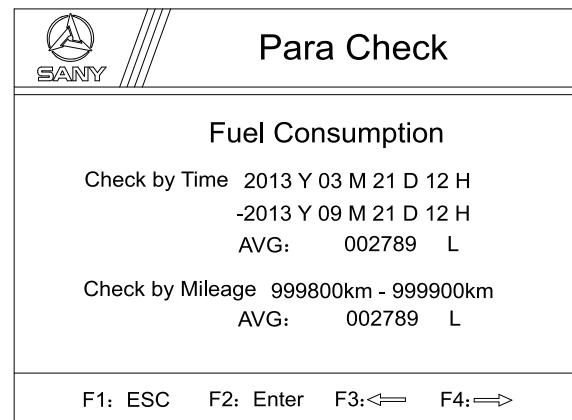


Fig.3-42 Fuel consumption query

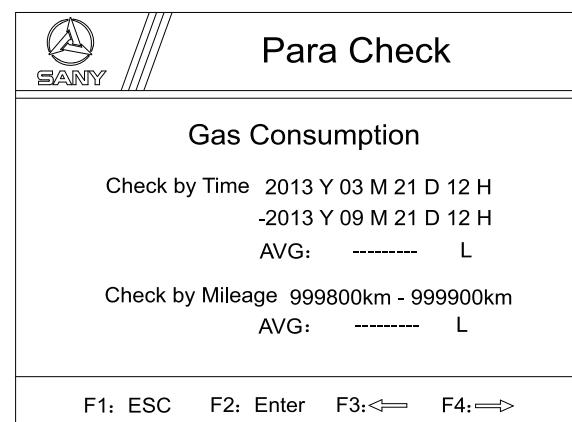


Fig.3-43 Gas consumption query

- Maintenance information query

Enter the **Maintenance** interface and push **F3** or **F4** key to the selection of maintenance information interface. Check current specific maintenance items from the maintenance explanation.

In the engine missing state, keep pushing **F2** key for 5 seconds or more to clear maintenance information.

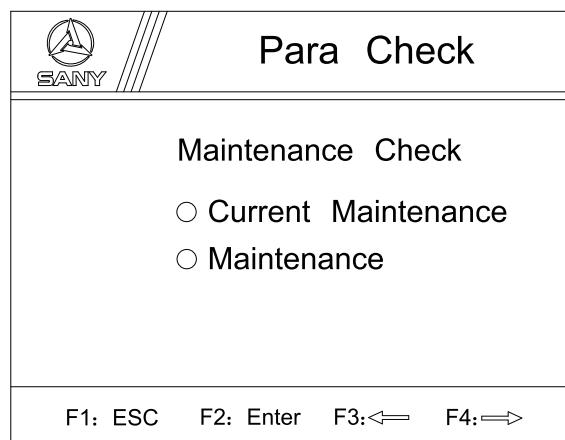


Fig.3-44 Maintenance information query

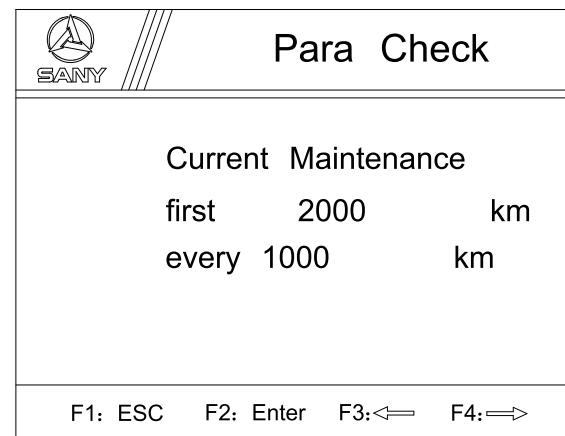


Fig.3-45 Current maintenance interface

- Instrument software version query

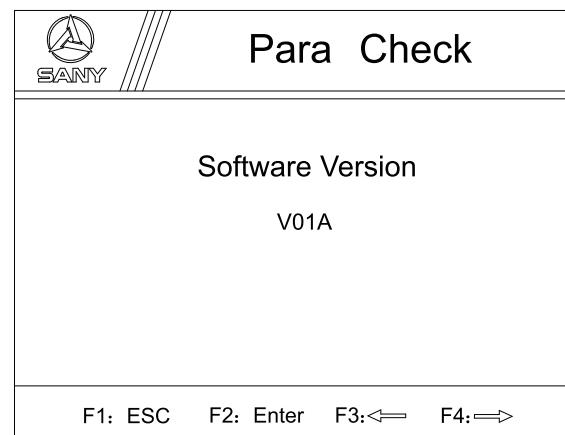


Fig.3-46 Software version query

- Chinese/English switch

In the system function interface, push **F3** or **F4** key to move the cursor to **English/Chinese**. Push **F2** key to switch.

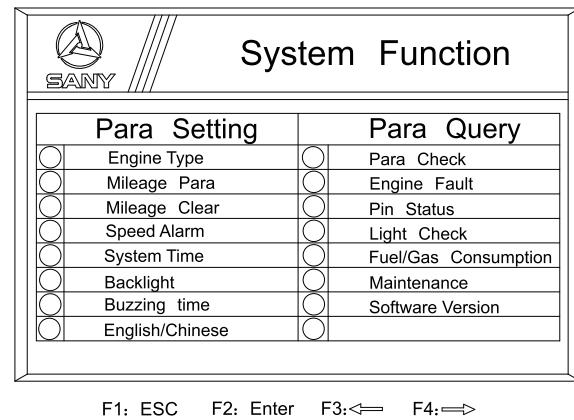


Fig.3-47 Chinese/English switch

- Fuel system maintenance interface

When the fuel system requires maintenance, red text **M for oil** is displayed below the screen. Carry out maintenance on the fuel system timely in order to ensure that the engine works.

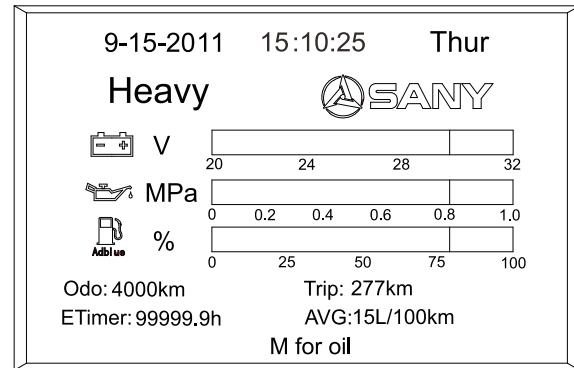


Fig.3-48 Fuel system maintenance interface

- Vehicle maintenance system interface

When the vehicle requires maintenance, red text **M for vec** is displayed below the screen. The vehicle needs regular maintenance.

The specific maintenance items are in the maintenance chapter: regular maintenance check list.

In the engine missing state, keep pushing **F2** key for 5 seconds or more, then the maintenance information is cleared out.

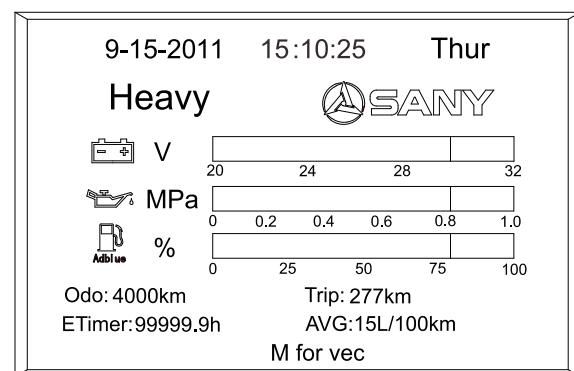


Fig.3-49 Vehicle maintenance interface

When the fuel system maintenance and vehicle maintenance occur simultaneously, the interface is shown in right figure, for example by Hino.

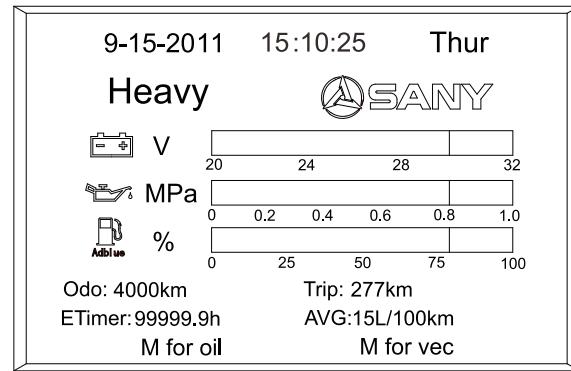


Fig.3-50 Fuel system/vehicle maintenance

When the fuel system maintenance, engine over speed and vehicle maintenance occur simultaneously, the interface is shown in right figure, for example by Hino.

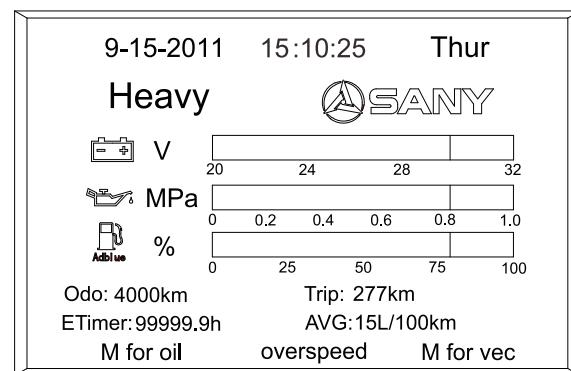


Fig.3-51 Fuel system/vehicle/overspeed

- Auxiliary interface

In the main interface, push **F4** key to turn to auxiliary interface.

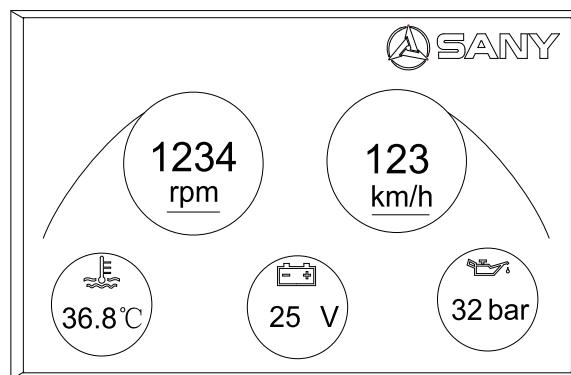


Fig.3-52 Auxiliary interface

3.2.4.4 Indicator light

Fuel alarm indicator light

- **ON:** short of fuel. Refuel as soon as possible.
- **OFF:** fuel is sufficient.

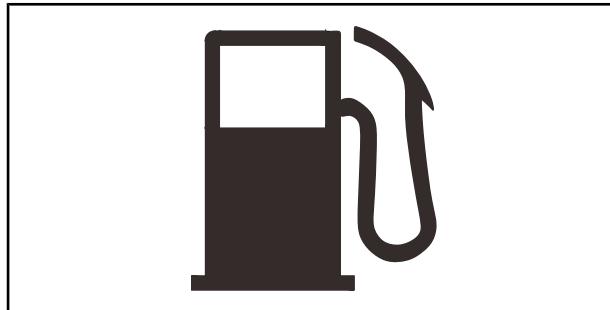


Fig.3-53 Fuel alarm indicator light

Parking brake indicator light

- **ON:** apply the parking brake.
- **OFF:** release the parking brake.

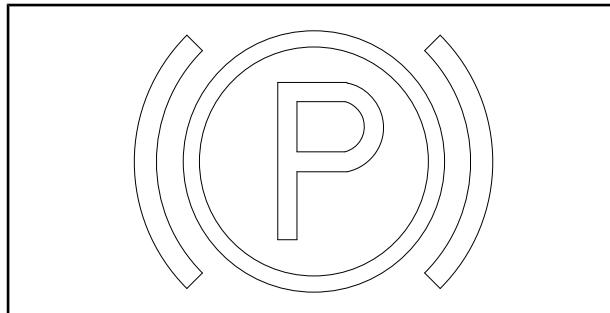


Fig.3-54 Parking brake indicator light

Low air pressure alarm indicator light

- **ON:** air pressure of the braking system is lower than 0.52 MPa. Stop driving immediately.
- **OFF:** air pressure of the braking system is higher than 0.52 MPa.

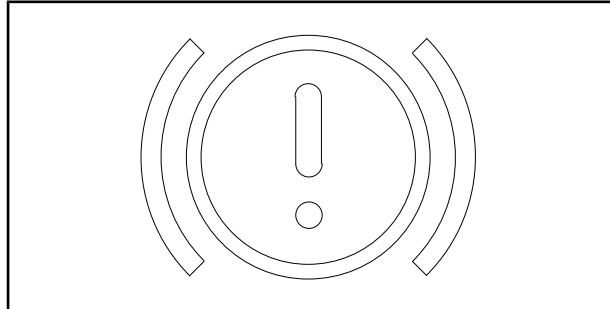


Fig.3-55 Low air pressure alarm indicator light

Speed limit indicator light

- **ON:** the vehicle speed is greater or equal to 90 km/h. The instrument LCD displays the signal to warn the driver that the speed has been over 90 km/h. (Hino)
- **OFF:** the vehicle speed is lower or equal to 90 km/h.

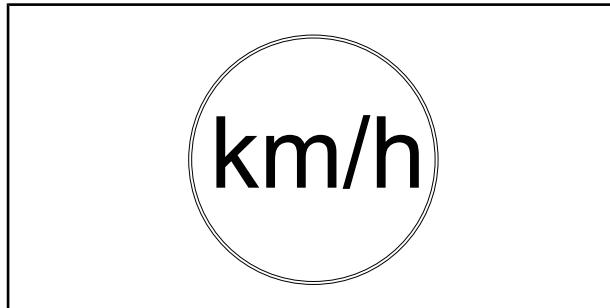


Fig.3-56 Speed limit indicator light

Charge indicator light

- **ON:** the alternator does not work or the charge and generation circuit is at fault.
- **OFF:** the alternator works or the charge and generation circuit is normal.

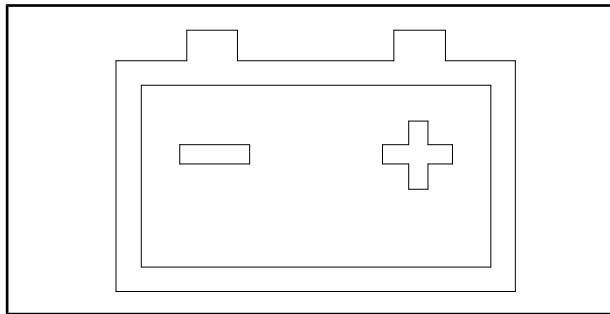


Fig.3-57 Charge indicator light

Door switch indicator light

- **ON:** the door is open or not closed.
- **OFF:** the door is closed.



Fig.3-58 Door switch indicator light

Water temperature alarm indicator light

- **ON:** engine water temperature exceeds 103°C. The engine water temperature is too high.
- **OFF:** engine water temperature within 103°C. The engine water temperature is normal.

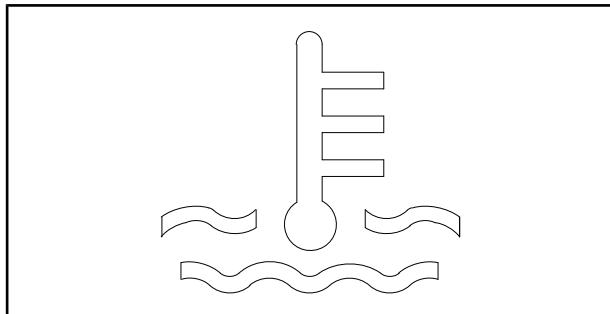


Fig.3-59 Water temperature alarm indicator light

Engine oil pressure indicator light

- The engine oil pressure is normal when the light is on before the engine starts and the light is off after the engine starts.
- If the light is on after the engine starts, stop the truck to examine.

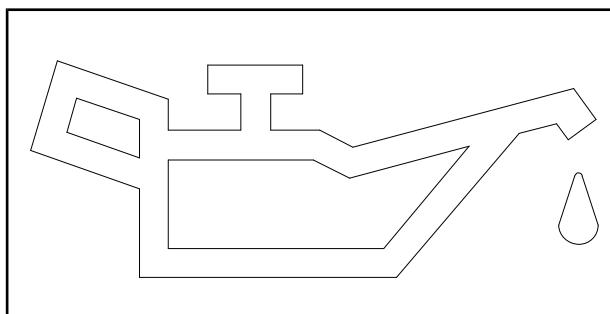


Fig.3-60 Engine oil pressure indicator light

Engine start or fault indicator light

- After the main power switch turns on, the indicator light is on. After the engine starts, the light is off. If the engine is at fault, the light is on.
- If the light is on after the engine starts, stop the truck to examine.

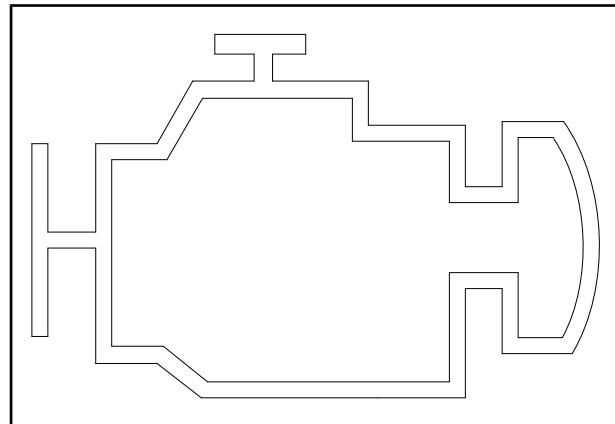


Fig.3-61 Engine start or fault indicator light

Engine stop indicator light

- **ON:** stop the engine immediately. Otherwise, the engine will burn off. (Cummins)
- **OFF:** engine works normally.

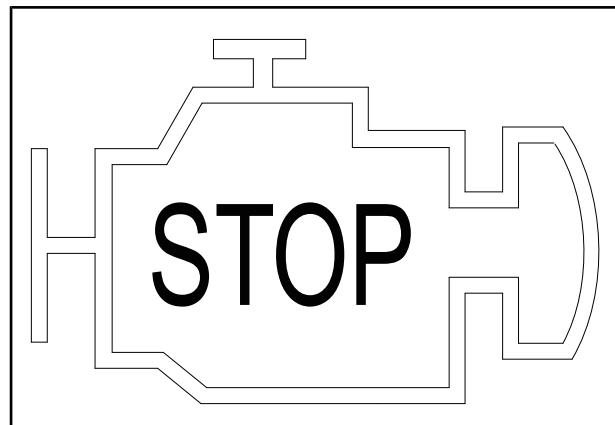


Fig.3-62 Engine stop indicator light

Exhaust brake indicator light

- **ON:** the exhaust brake is on for working.
- **OFF:** the exhaust brake is off for working.

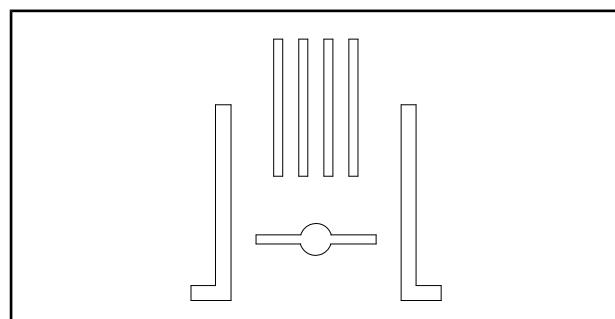


Fig.3-63 Exhaust brake indicator light

Engine oil blocking indicator light

- **ON:** the engine oil filter is blocked.
- **OFF:** the engine oil filter is un-blocked.



Fig.3-64 Engine oil blocking indicator light

Inter-axles differential lock indicator light

- **ON:** the inter-axles differential lock is working.
- **OFF:** the inter-axles differential lock is not working.

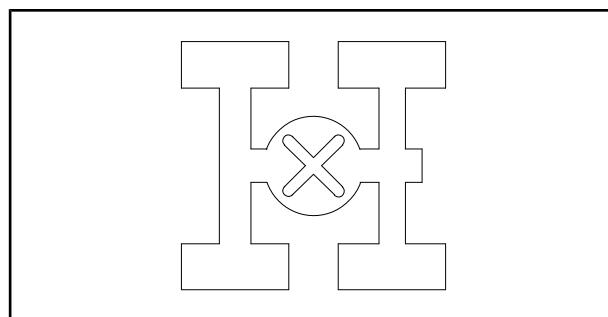


Fig.3-65

Inter-wheel differential lock indicator light

- **ON:** the inter-wheel differential lock is working.
- **OFF:** the inter-wheel differential lock is not working.

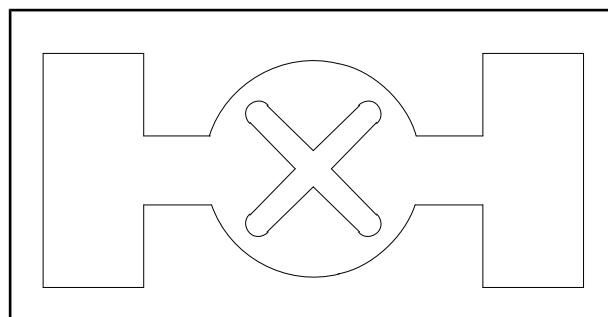


Fig.3-66

ABS indicator alarm light

- **ON:** ABS at automatic inspection or at work (if available).
- **OFF:** ABS do not at automatic inspection nor at work (if available).

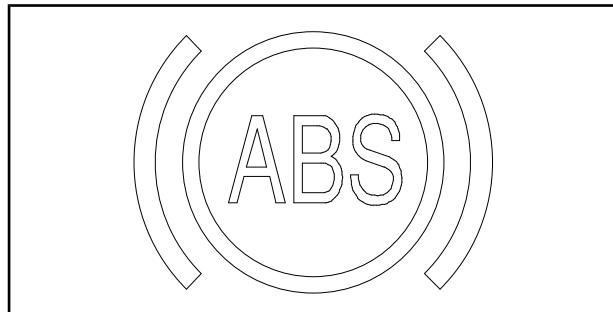


Fig.3-67 ABS indicator alarm light

ABS diagnostic alarm indicator light

- **ON:** after turnning on the key.
- **OFF:** ABS is normal and the light is off with ABS indicator light (if available).

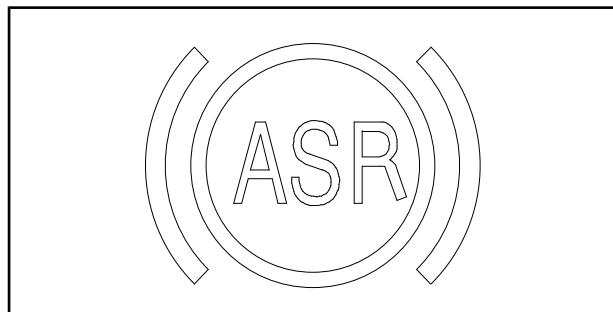


Fig.3-68 ABS diagnostic alarm indicator light

Oil-water separator indicator light

- **ON:** the oil-water separator have excessive water. The oil-water separator needs drain maintenance.
- **OFF:** the oil-water separator is normal.

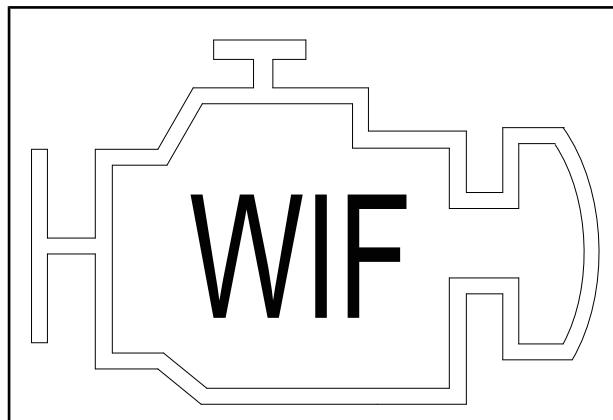


Fig.3-69 Oil-water separator indicator light

Air filter restriction indicator light

- **ON:** too much dust in the air filter. The air filter needs repairing.
- **OFF:** the air filter is normal.

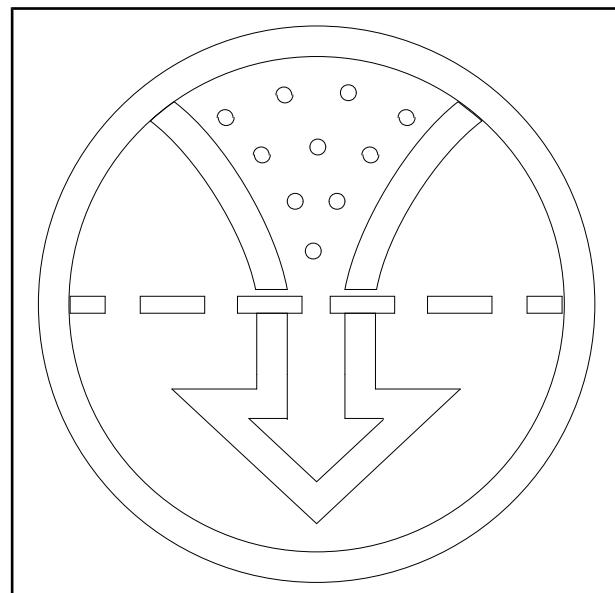


Fig.3-70 Air filter restriction indicator light

Neutral indicator light

- **ON:** the gear is in neutral.
- **OFF:** the gear is not in neutral.

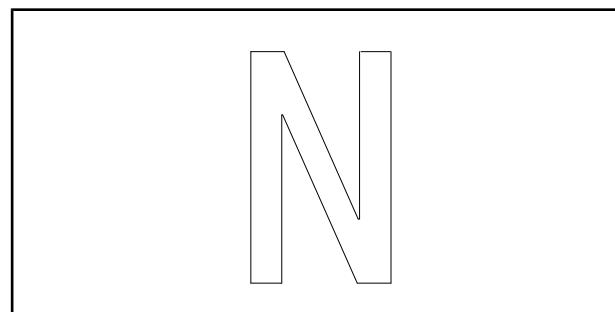


Fig.3-71 Neutral indicator light

Low gear indicator light

- **ON:** the low gear is engaged.
- **OFF:** the low gear is disengaged.

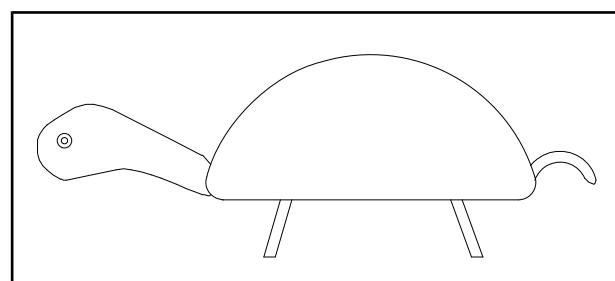


Fig.3-72 Low gear indicator light

Left turn indicator light

- **ON:** the left turn lamp is on.
- **OFF:** the left turn switch is reset.

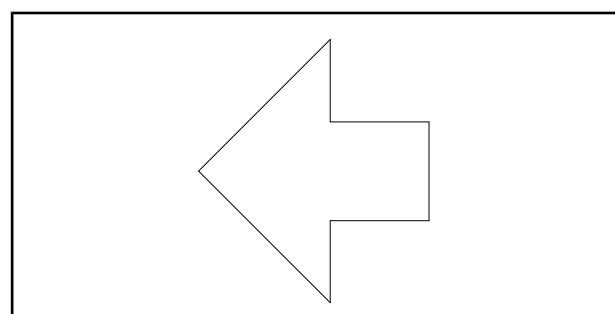


Fig.3-73 Left turn indicator light

Right turn indicator light

- **ON:** the right turn lamp is on.
- **OFF:** the right turn switch is reset.

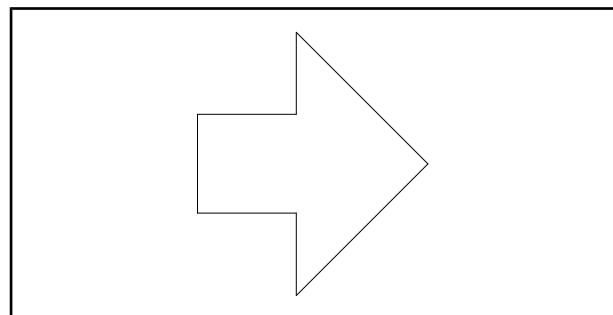


Fig.3-74 Right turn indicator light

Low beam indicator light

- **ON:** the low beam is applied.
- **OFF:** the low beam is not applied.

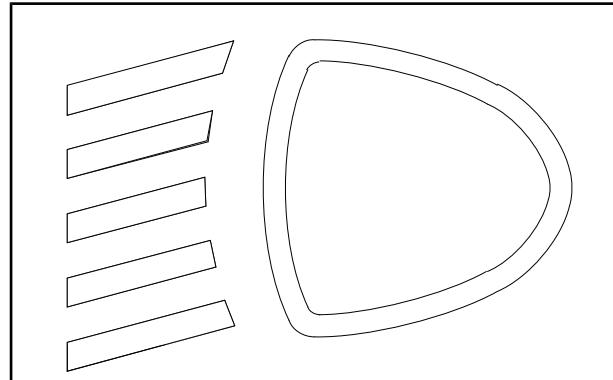


Fig.3-75 Low beam indicator light

High beam indicator light

- **ON:** the high beam is applied.
- **OFF:** the high beam is not applied.

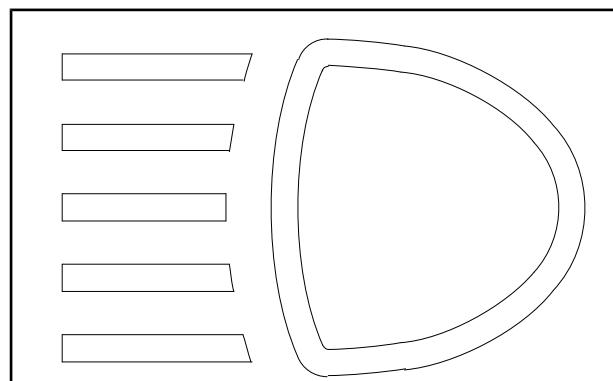


Fig.3-76 High beam indicator light

Backing alarm indicator light

- **ON:** the back gear is engaged.
- **OFF:** the back gear is disengaged.

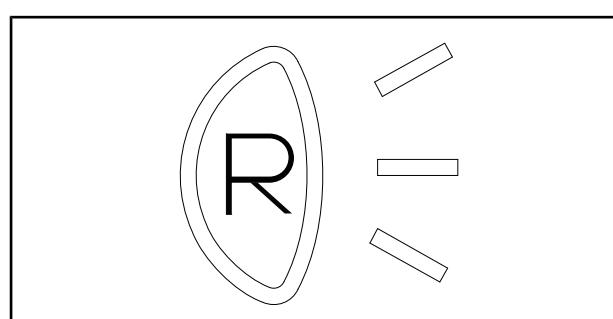


Fig.3-77 Backing alarm indicator light

Back fog lamp indicator light

- **ON**: the back fog lamp is on.
- **OFF**: the back fog lamp is off.

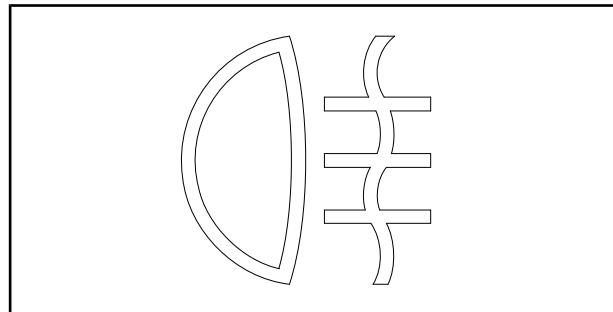


Fig.3-78 Back fog lamp indicator light

Engine pre-heating indicator light

- **ON**: the engine is pre-heated before start.
- **OFF**: the engine is not pre-heated before start.

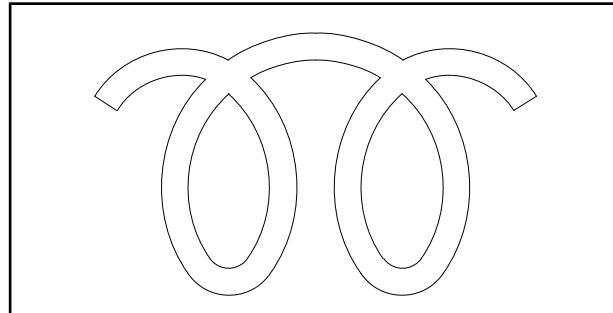


Fig.3-79 Engine pre-heating indicator light

PTO indicator light

- **ON**: PTO is working.
- **OFF**: PTO is not working.

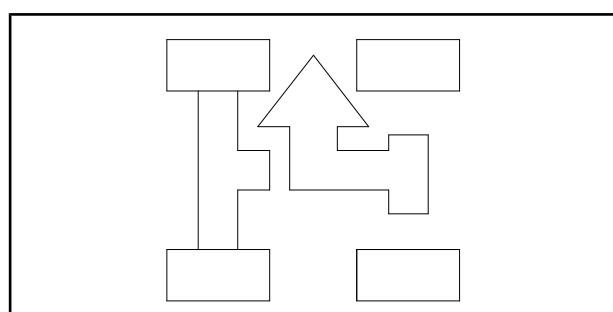


Fig.3-80 PTO indicator light

Urea level low indicator light

- **ON:** the urea level is too low in urea tank of exhaust system. Need to replenish the urea solution.
- **OFF:** the urea level is normal.

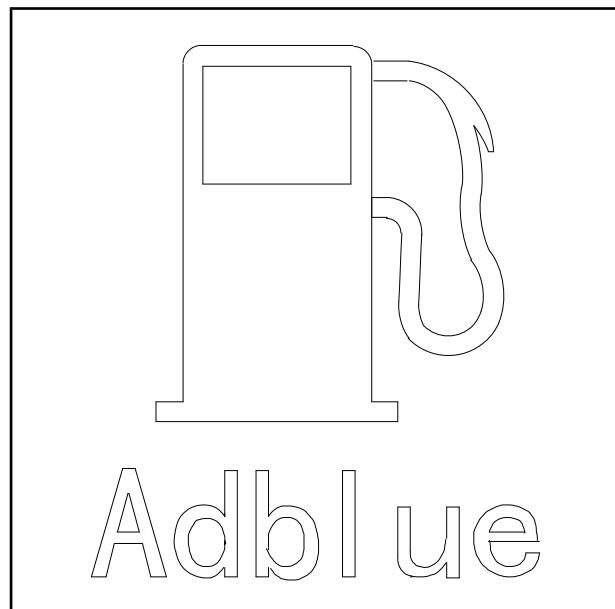


Fig.3-81 Urea level low indicator light

Retarder indicator light

- **ON:** the retarder is working.
- **OFF:** the retarder is not working.

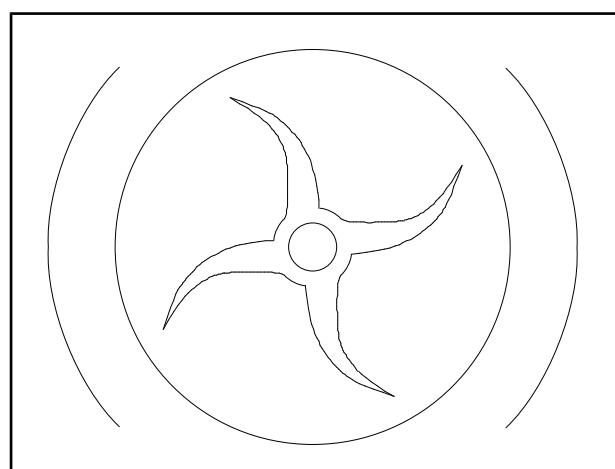


Fig.3-82 Retarder indicator light

OBD working light

- **ON:** when Europe Vexhaust treatment system SCR is at fault. Need to troubleshoot.
- **OFF:** when Europe Vexhaust treatment system SCR is normal.

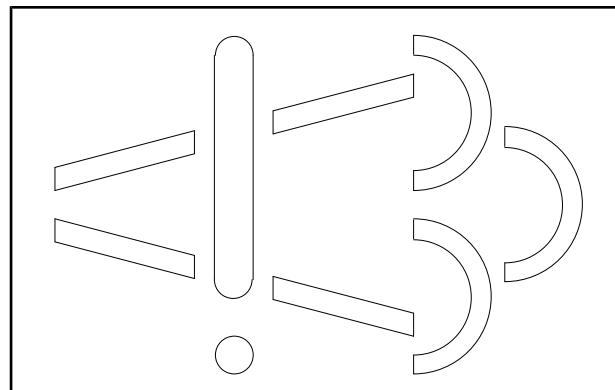


Fig.3-83 OBD working light

Retarder fault indicator light

- **ON:** the retarder is at fault. Need to troubleshoot.
- **OFF:** the retarder is normal.

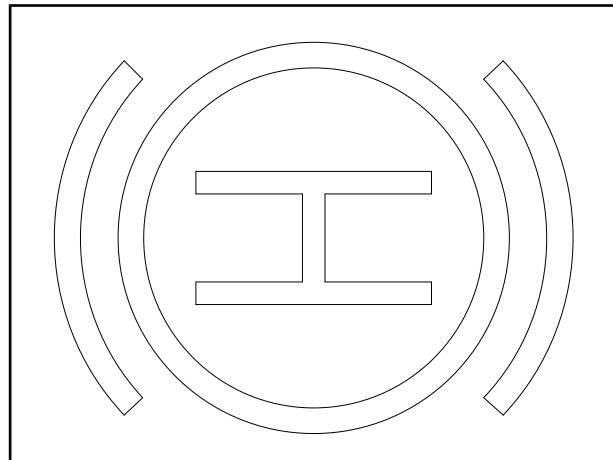


Fig.3-84 Retarder fault indicator light

Engine alarm indicator light

- **ON:** the engine fails. Need to troubleshoot in order to ensure that the engine is on normal operating conditions. (Cummins)
- **OFF:** the engine is normal.

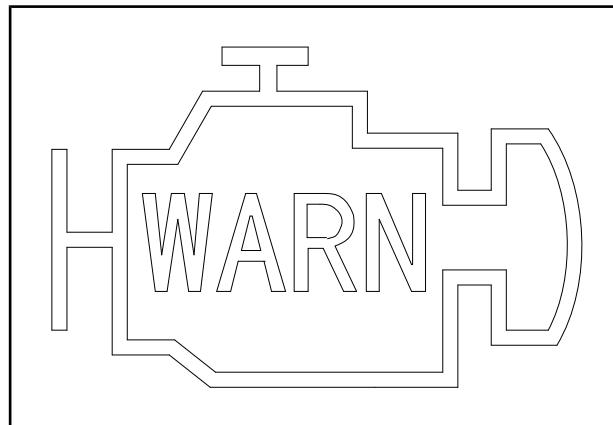


Fig.3-85 Engine alarm indicator light

Cab flip indicator light

- **ON:** the cab flips.
- **OFF:** the cab not flips.

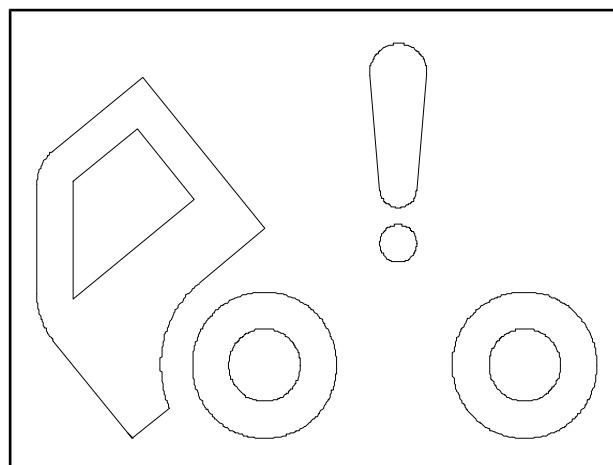


Fig.3-86 Cab flip indicator light

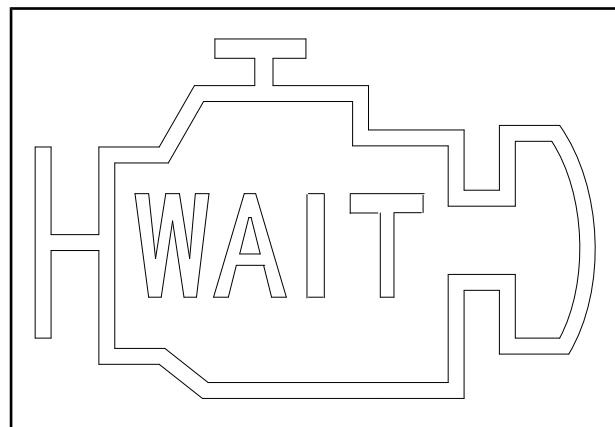
Waiting to start (Cummins)

Fig.3-87 Waiting to start (Cummins)

Seat belt indicator light

- **ON**: the seat belt is unlocked.
- **OFF**: the seat belt is locked.

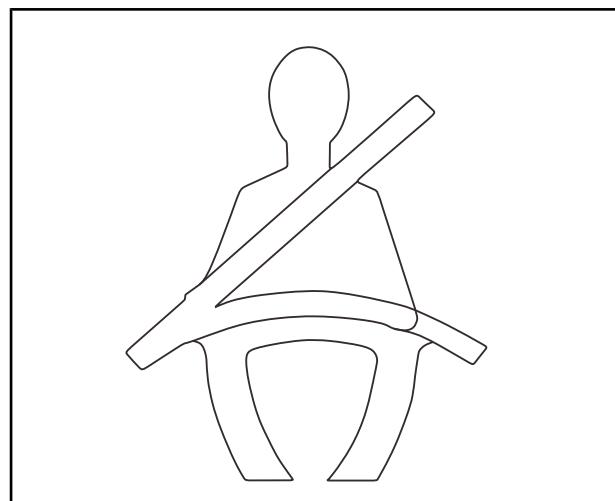


Fig.3-88 Seat belt indicator light

Working lamp indicator light

- **ON**: the working lamp is on.
- **OFF**: the working lamp is off.



Fig.3-89 Working lamp indicator light

3.2.4.5 Operating switch

Alert light switch

- Two gears, non self-resetting.
- **Turn on:** the outside small lights flash. It indicates the truck is in alert state.

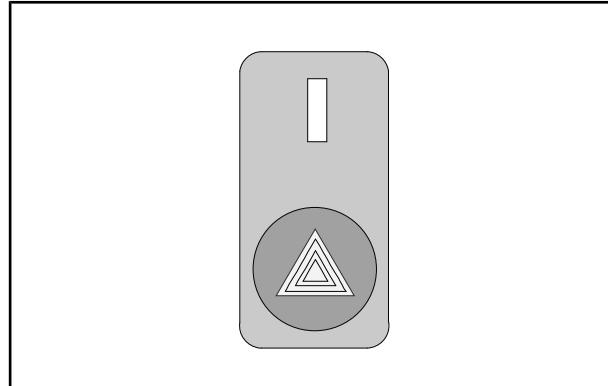


Fig.3-90 Alert light switch

Engine fault diagnosis switch

- Two gears, non self-resetting.
- **Turn on:** self-diagnosis state of the engine. The instrument indicator light will display current fault code.

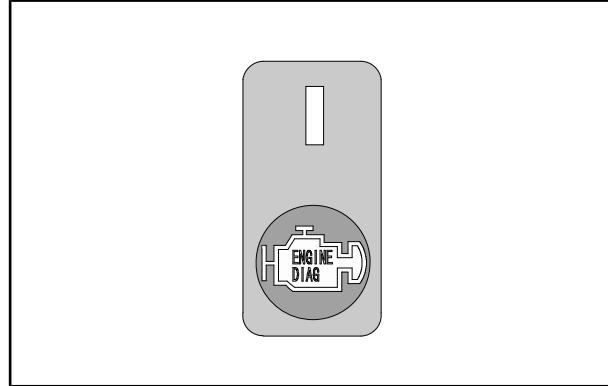


Fig.3-91 Engine fault diagnosis switch

Electric/air horn diverter switch

- Two gears, non self-resetting.
- **Turn on:** the horn transform the electric (air) horn from air (electric) horn. The default setting is electric horn, press down the switch to use the air horn in the country.

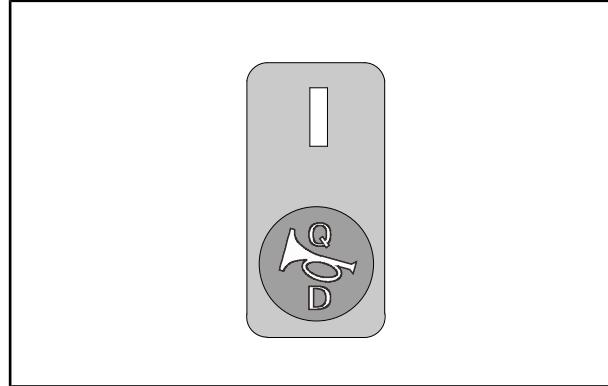


Fig.3-92 Electric/air horn diverter switch

Inter-axle differential switch

- Self-locking function, two gears, non self-resetting.
- **Turn on:** the differential is adjusting between the front and rear axles.

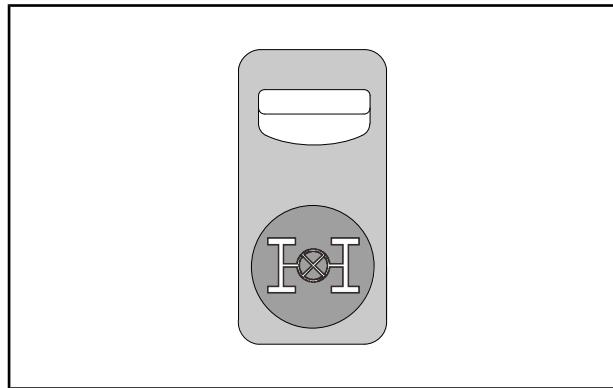


Fig.3-93 Inter-axle differential switch

Inter-wheel differential switch

- Self-locking function, two gears, non self-resetting.
- **Turn on:** the differential is adjusting between the left and right wheels.

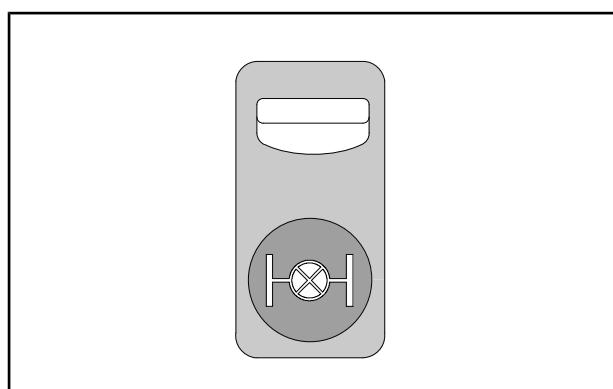


Fig.3-94 Inter-wheel differential switch

Emergency fan switch

- Start the radiator fan manually in the case of the failure of radiator thermostat in upper body.

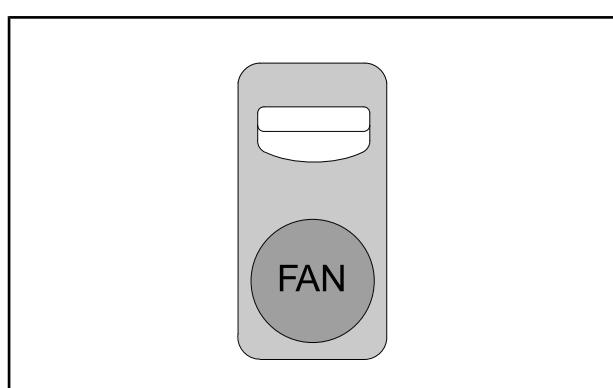


Fig.3-95 Emergency fan switch

Back working light switch

- Two gears, non self-resetting.
- **Turn on:** the back working light is on. Use it for night work.

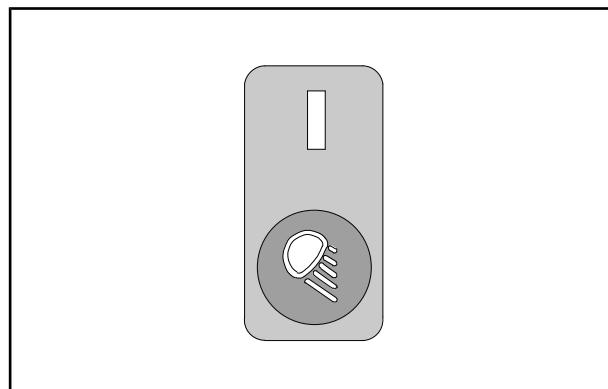


Fig.3-96 Back working light switch

Ceiling light switch

- Two gears, non self-resetting.
- **Turn on:** the ceiling light is on.

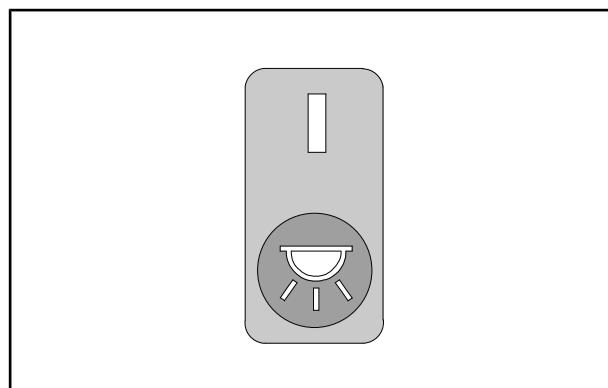


Fig.3-97 Ceiling light switch

Idle speed adjustment switch

- Three gears, self-resetting.
- Default setting is off. When trigger another two gears, idle speed increases or decreases respectively. This switch is optional.

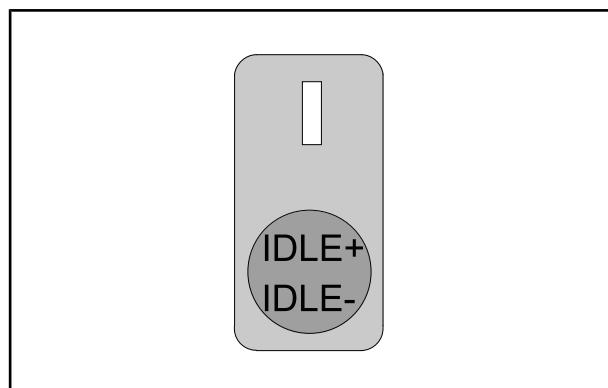


Fig.3-98 Idle speed adjustment switch

Power mode diverter switch

- Two gears, non self-resetting.
- Default state is heavy duty state.
- **Turn on:** light-duty state and the engine converts into the fuel-efficient mode. When mixer is unloaded, turn on this switch to save fuel.

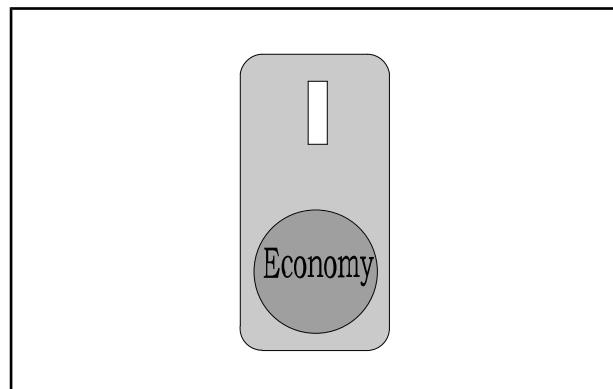


Fig.3-99 Power mode diverter switch

ABS diagnostic switch

- Two gears, non self-resetting.
- **Turn on:** carry out ABS diagnostics for the vehicle. The corresponding indicator light is on in the instrument.

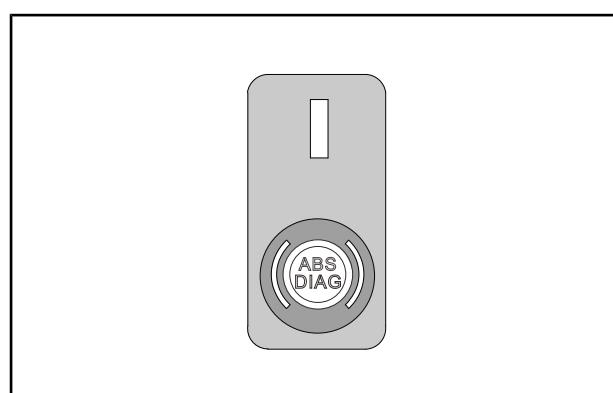


Fig.3-100 ABS diagnostic switch

Back light switch

- Open or close the back lights.

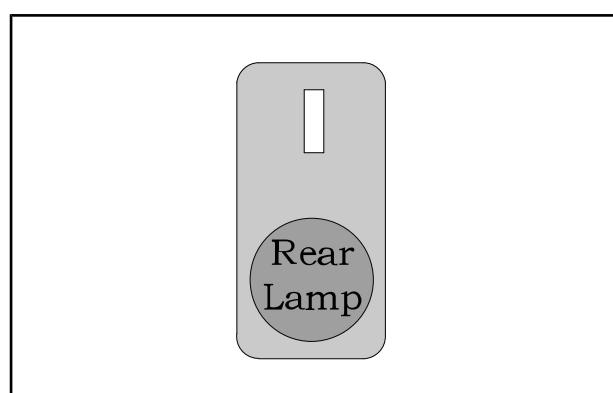


Fig.3-101 Back light switch

Front fog light switch

- **Turn on:** the front fog light turns on in thick foggy weather.

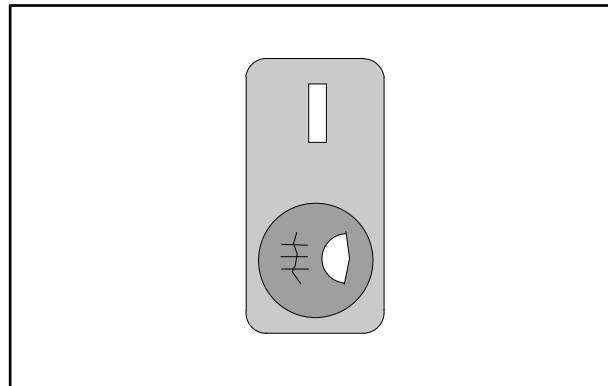


Fig.3-102 Front fog light switch

Back fog lamp switch

- **Turn on:** the back fog lamp turns on in thick foggy weather.

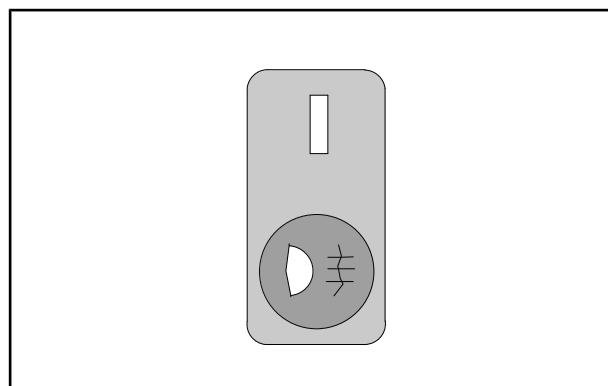


Fig.3-103 Back fog lamp switch

Idle speed adjustment knob

- Rotate clockwise to increase engine speed.
- Rotate counterclockwise to decrease engine speed.

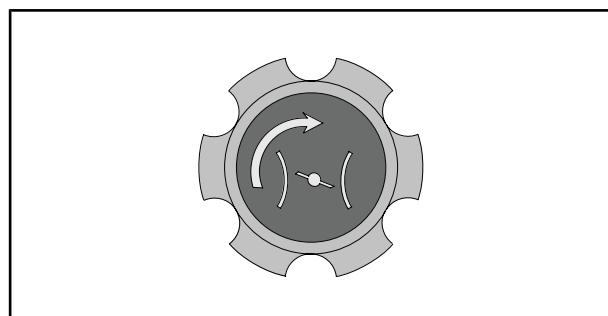


Fig.3-104 Idle speed adjustment knob

3.2.4.6 Air conditioner

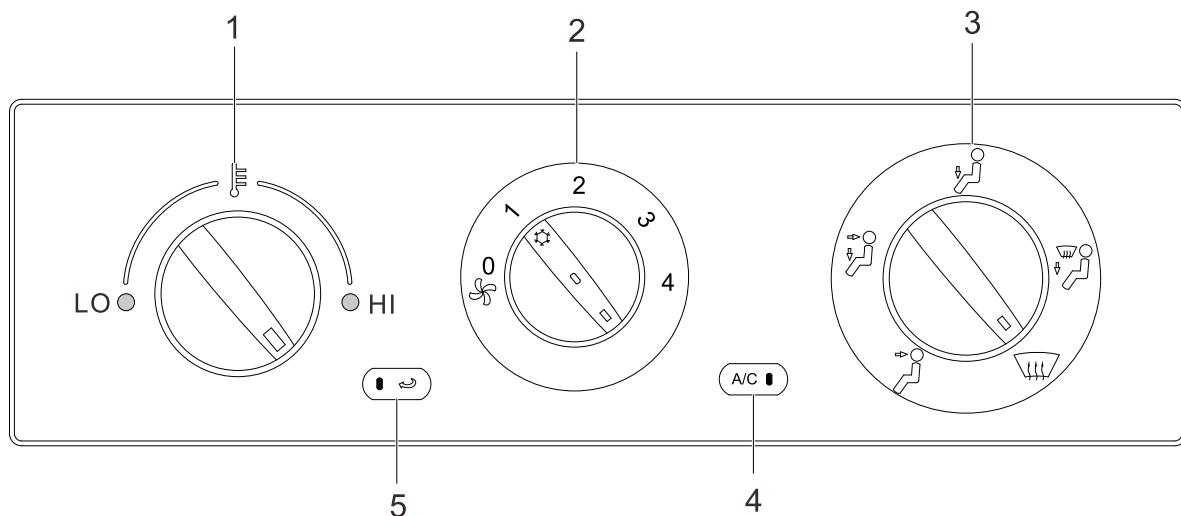


Fig.3-105 Air conditioner

1. Temperature adjustment knob	3. Air-out mode knob	5. Loop button
2. Air volume knob	4. A/C button	

Temperature adjustment knob (1)

Adjust clockwise to increase the temperature, and adjust counterclockwise to lower the temperature.

LO: the lowest temperature.

HI: the highest temperature.

Air volume knob (2)

Position 0: fan is off.

Position 1: minimum fan speed.

Position 4: maximum fan speed.

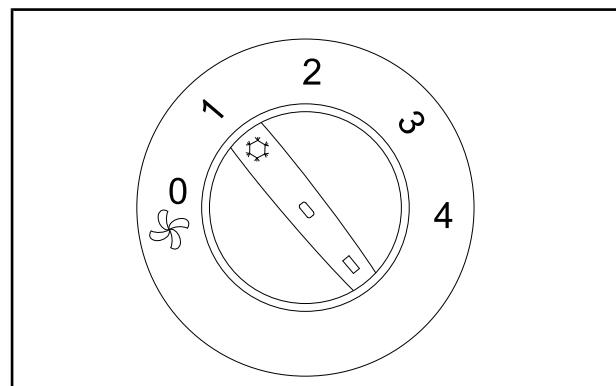


Fig.3-106 Air volume knob

Air-out mode knob (3)

Control the opening and closing of each outlet. There are five modes:

- **Face and feet blowing (6)**
- **Feet blowing (7)**
- **Feet blowing with defrosting (8)**
- **Defrosting (9)**
- **Face blowing (10)**

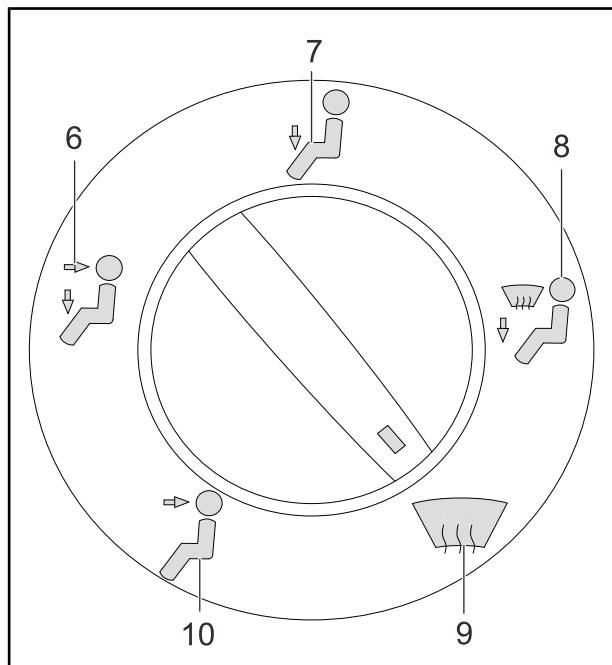


Fig.3-107 Air-out mode knob

6. Face and feet blowing	9. Defrosting
7. Feet blowing	10. Face blowing
8. Feet blowing with defrosting	

A/C button (4)

- Air conditioning compressor start button. When the compressor turns on, the A/C indicator light is on.
- The compressor can not start when the blower is off. Turn off the A/C indicator light.
- The compressor can not start when the controller detects the blower circuit breaks. Turn off A/C indicator light.
- When pressing the A/C button, the compressor starts. If the evaporation temperature is below 0.5°C, the compressor turns off but the A/C indicator is on. If the evaporation temperature is above 5.5°C, the compressor turns on.
- When rotating the temperature adjustment knob to maximum heating, turn off the compressor. And A/C indicator light turns off.

Loop button (5)

Control the inner and outer loop states. Operate the button to switch loop outlet between inner and outer loops states. When it is the inner loop, the indicator light is on.

3.2.4.7 Radio

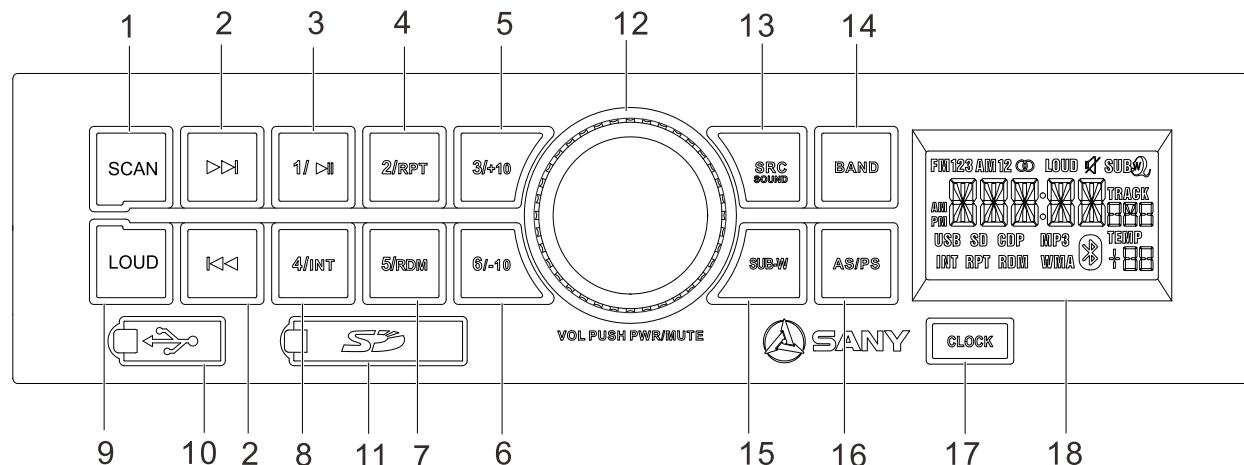


Fig.3-108 Radio

1. Radio browse broadcast	7. Reserved station 5	13. Mode shift
2. Automatic turning/song selection	8. Reserved station 4	14. FM/AM shift
3. Reserved station 1	9. Low-frequency gain	15. Subwoofer on/off
4. Reserved station 2	10. USB interface	16. Automatic searching/song shift
5. Reserved station 3	11. SD interface	17. Clock display/setup
6. Reserved station 6	12. Power switch	18. LCD display screen

Refer to the manual of radio for operation details.

3.2.4.8 Sound alarm

1. Speed alarm

When the vehicle speed exceeds the speed alarm (85 km/h), the buzzer sounds the alarm for 10 seconds, and alarm sounds at intervals of 5 seconds, which alert the driver to reduce speed in order to ensure road safety.

2. Revolution speed alarm

When engine revolution speed exceeds 2770 r/min, the screen displays the red warning text "over speed", the buzzer sounds the alarm for 10 seconds, and alarm sounds at intervals of 5 seconds, which alert the driver to make the engine revolution speed down to a reasonable range.

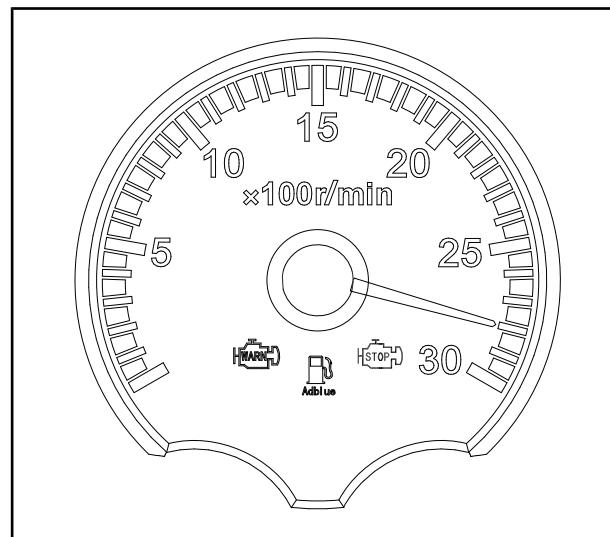


Fig.3-109 Engine revolution speed

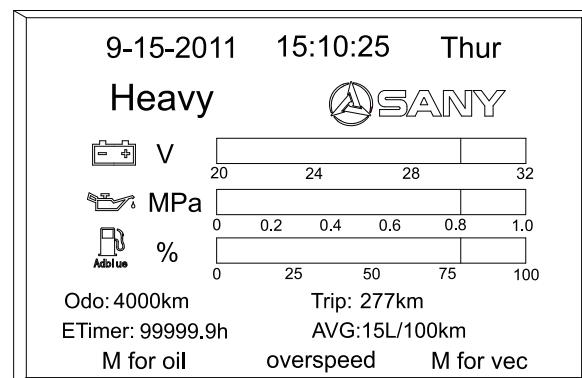


Fig.3-110 Overspeed interface

3. Underpressure alarm

When the pressure falls below the alarm value, the alarm symbol always lights. The alarm buzzer always sounds and the alarm sounds at intervals of 0.25 seconds, which reminds the driver to start the engine to charge air.

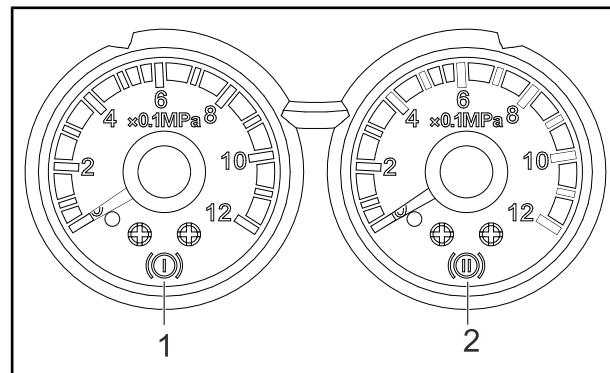


Fig.3-111 Underpressure alarm

1. Front axle barometer	2. Rear axle barometer
----------------------------	---------------------------

4. CAN communication failure alarm

When the CAN connection is lost, the buzzer will sound alarm 10 seconds, and alarm sounds at intervals of 0.5 seconds, then call the SANY service hot line for troubleshooting the instrument.

3.3 Mirrors

Mirrors adjustment

Adjust the angle of mirrors by rotating bracket or casing along the installation axis.

Touch the mirror slightly to adjust its angle for 8° upward, downward, forward and backward.

Supplementary blank off mirror (2) can only rotate along the horizontal axis.

Front lower view mirror (4) can rotate in the entire space.

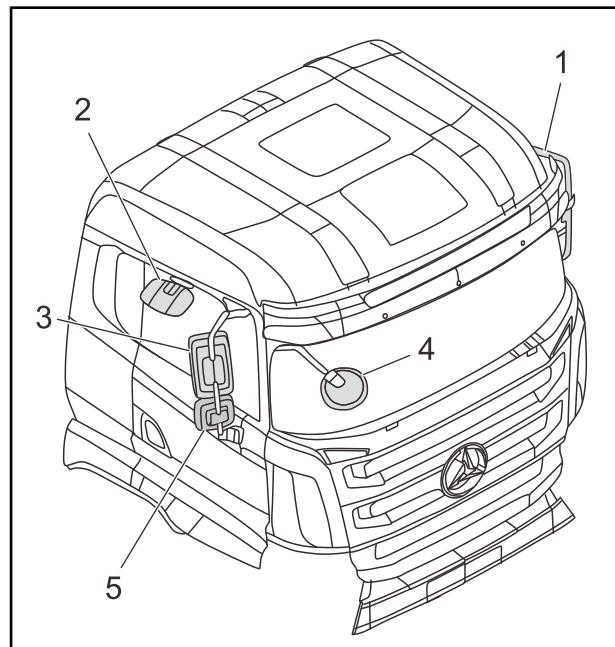


Fig.3-112 Mirrors

1. Left rear view mirror	4. Front lower view mirror
2. Supplementary blank off mirror	5. Right wide angle mirror
3. Right rear view mirror	

3.4 Powertrain

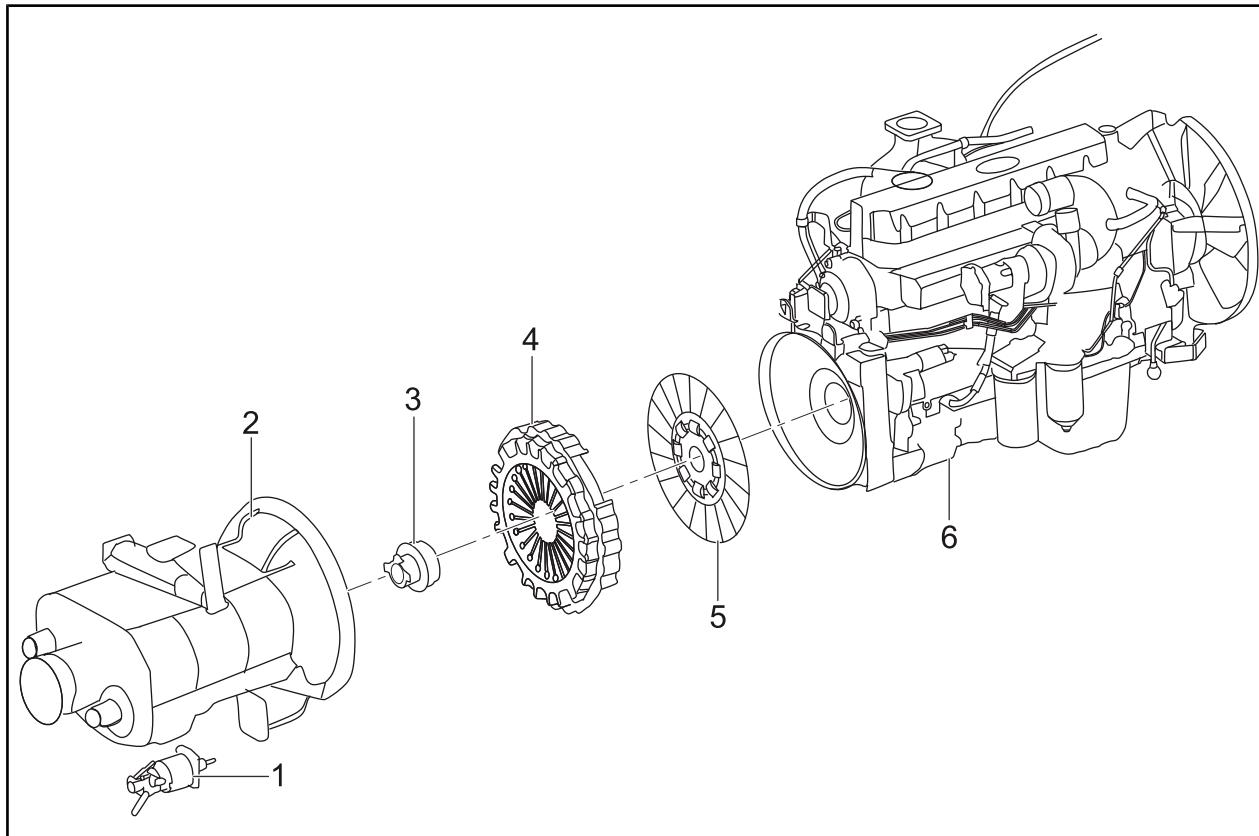


Fig.3-113 Powertrain

1. Clutch actuator	3. Clutch release bearing	5. Clutch driven disc assembly
2. Transmission	4. Pressure plate	6. Engine

3.5 Air conditioning system

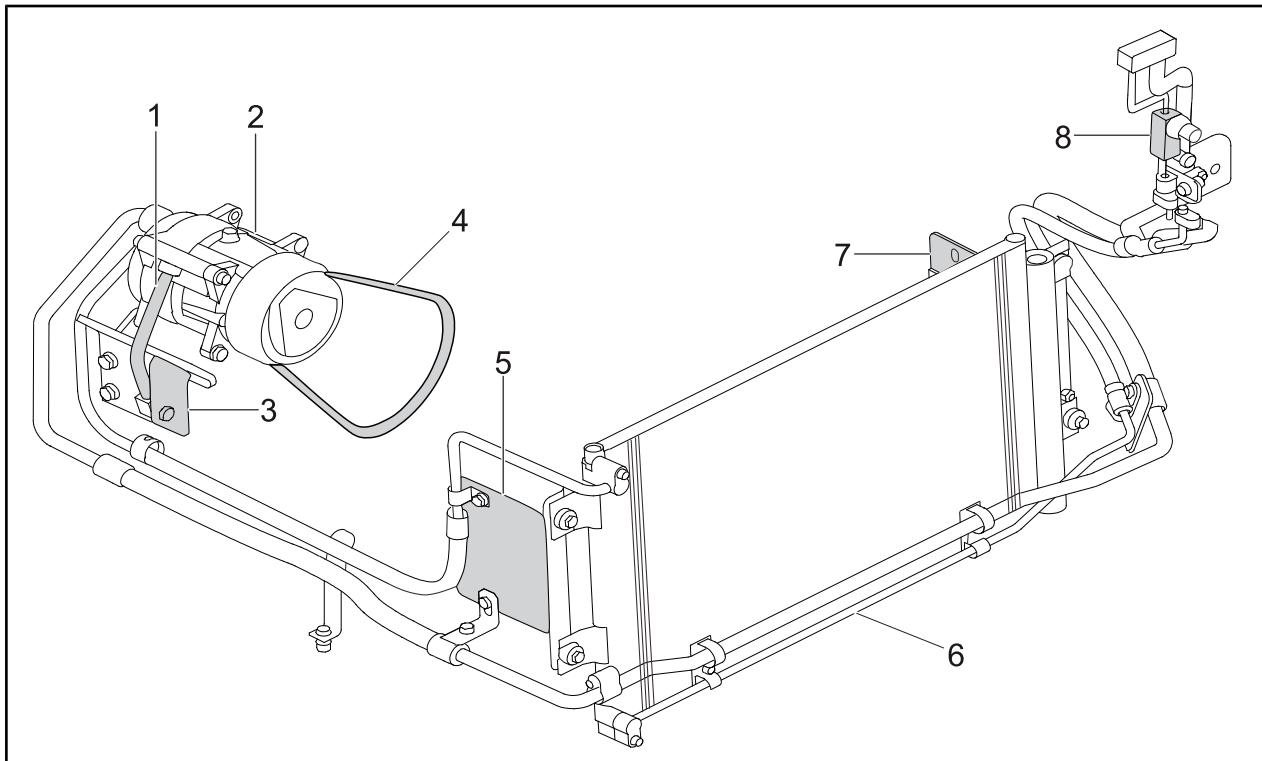


Fig.3-114 Air conditioning system

1. Support arm	4. V belt	7. Condenser right bracket
2. Compressor	5. Condenser left bracket	8. Pressure switch
3. Compressor bracket	6. Condenser	

3.6 Air intake system

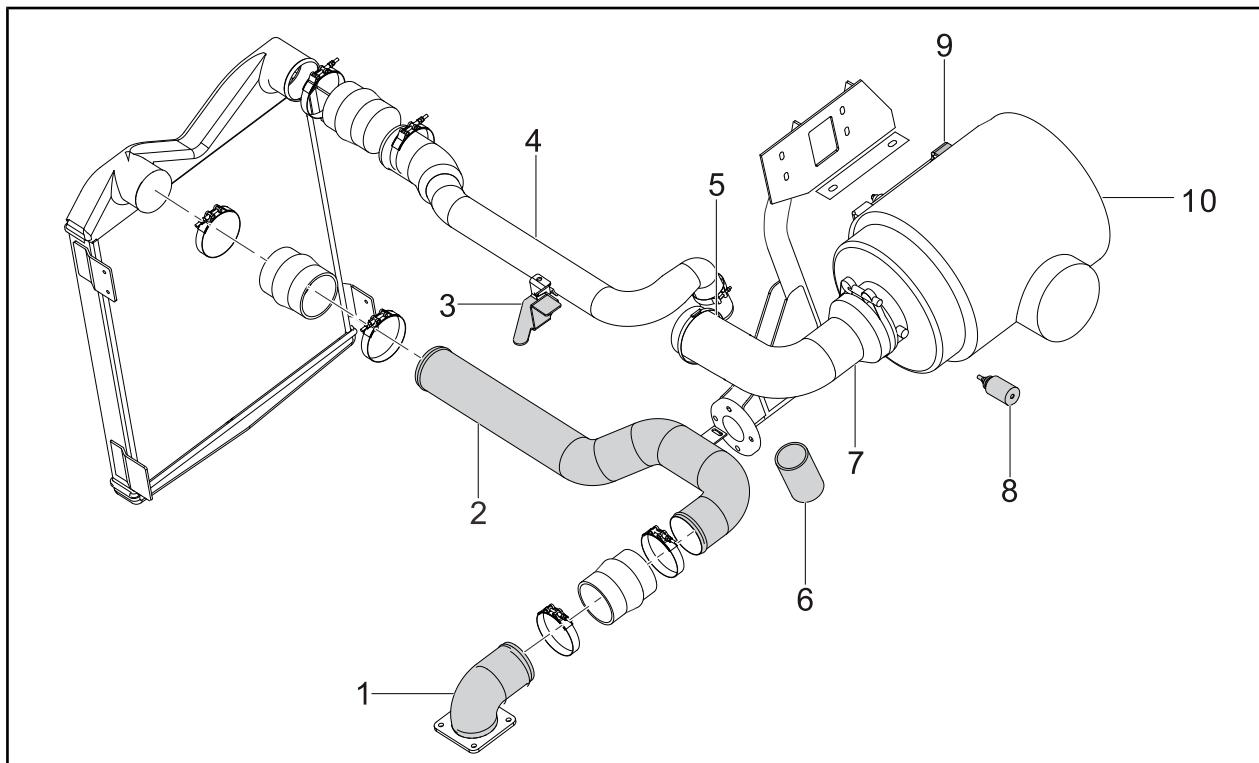


Fig.3-115 Air intake system

1. Engine intake tube elbow	5. Air filter outlet tube	9. Air cleaner bracket
2. Intercooler outlet tube	6. Intercooler intake tube	10. Air cleaner
3. Tube support	7. Air filter outlet elbow	
4. Intercooler inlet tube	8. Air restriction indicator	

3.7 Cooling system

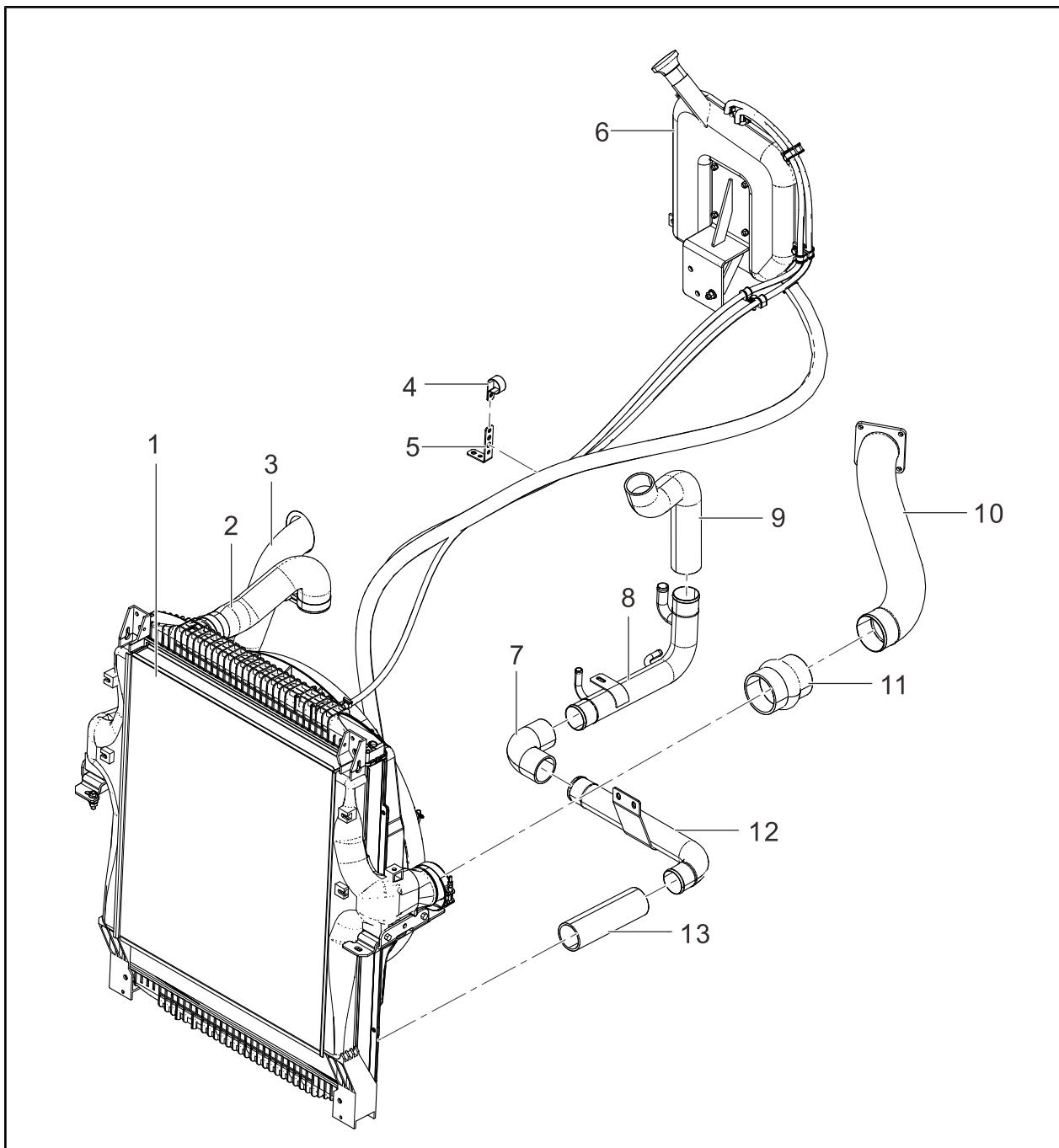


Fig.3-116 Cooling system

1. Radiator assembly	6. Expansion tank	11. Intercooled rubber hose
2. Water supply tube	7. Connecting rubber hose	12. Front lower steel tube
3. Intercooled air intake tube	8. Lower steel tube	13. Radiator drainpipe
4. Clip	9. Engine water supply hose	
5. Bracket	10. Intercooled air outlet tube	

3.8 Steering system

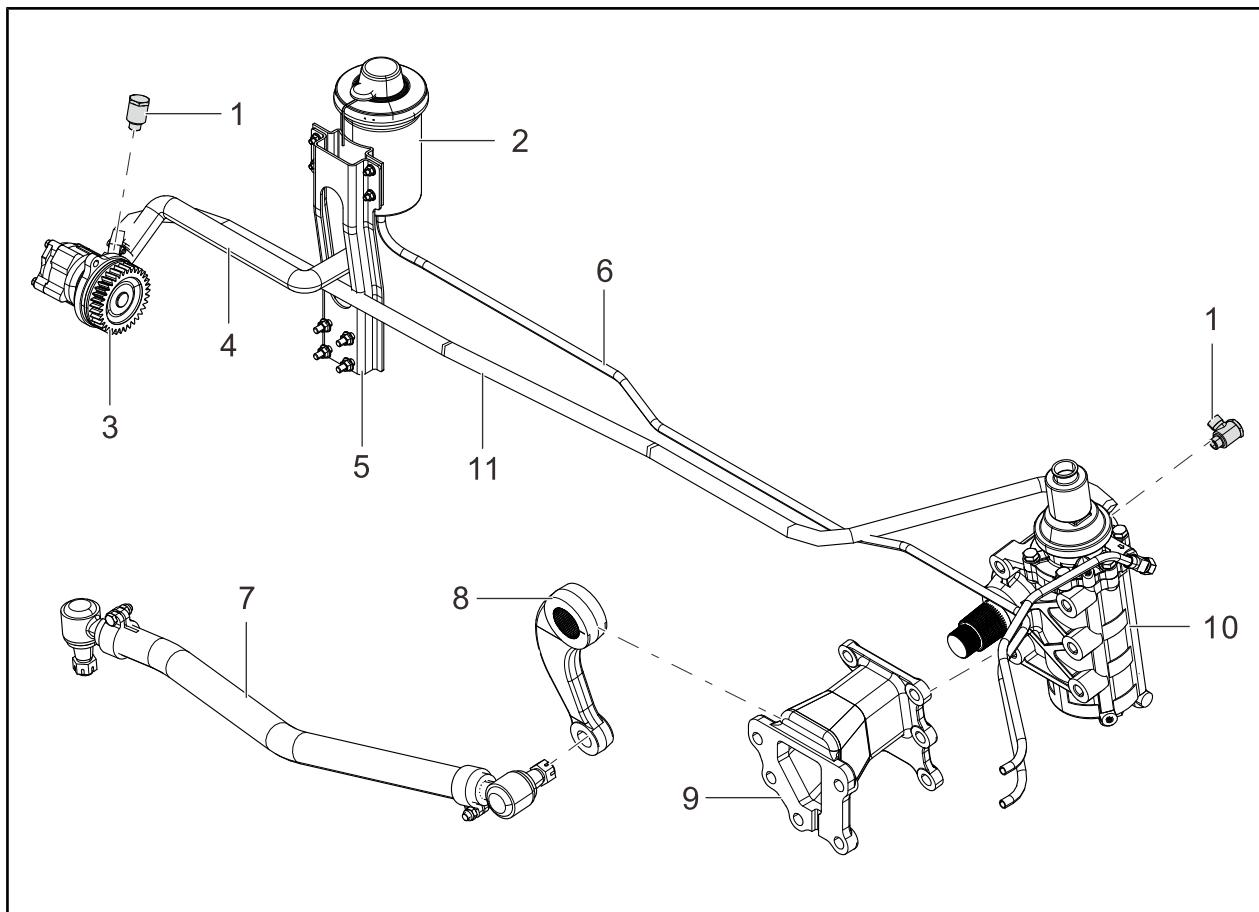


Fig.3-117 Steering system

1. Fitting	5. Reservoir bracket	9. Bracket
2. Power steering reservoir	6. Return tube	10. Steering gear box
3. Steering oil pump	7. Drag link	11. Power steering hose
4. Pump supply tube	8. Pitman arm	

3.9 Transmission shaft system

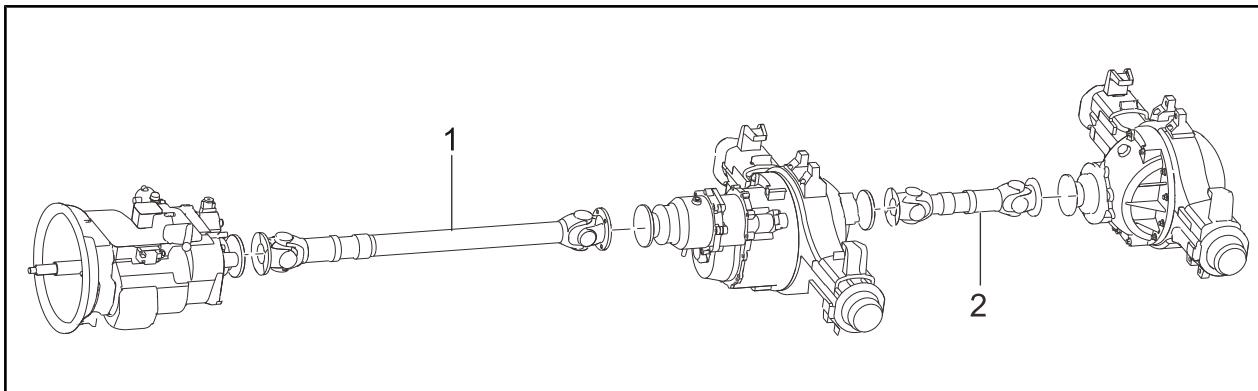


Fig.3-118 Transmission shaft system

1. Middle transmission shaft assembly

2. Rear transmission shaft assembly

3.10 Fuses

The **fuse box (1)** is on the right side of instrument panel in the cab.

NOTICE

Risk of machine damage!

Replacing a fuse with one of a higher capacity can result in damage to the machine.

Always replace a fuse with one of the same capacity.

- Replace the fuse if it is corroded, has white powder or becomes loose in the fuse panel.
- Before replacing a fuse, make sure that the ignition switch is in the OFF position and the batteries are disconnected.

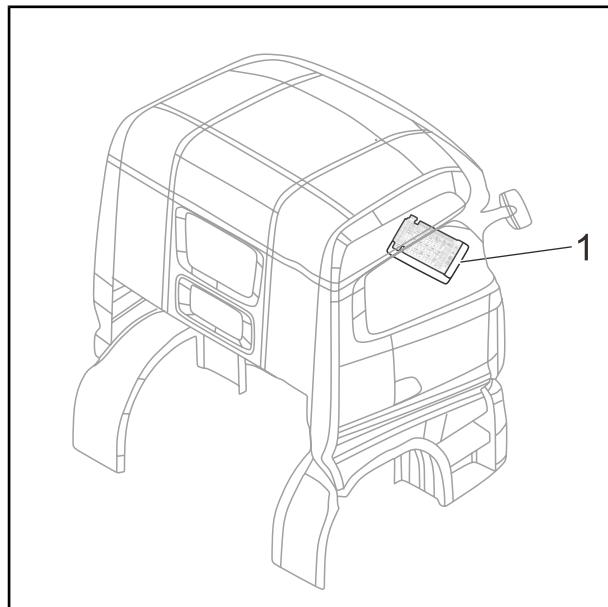


Fig.3-119 Location of fuse box

1. Fuse box

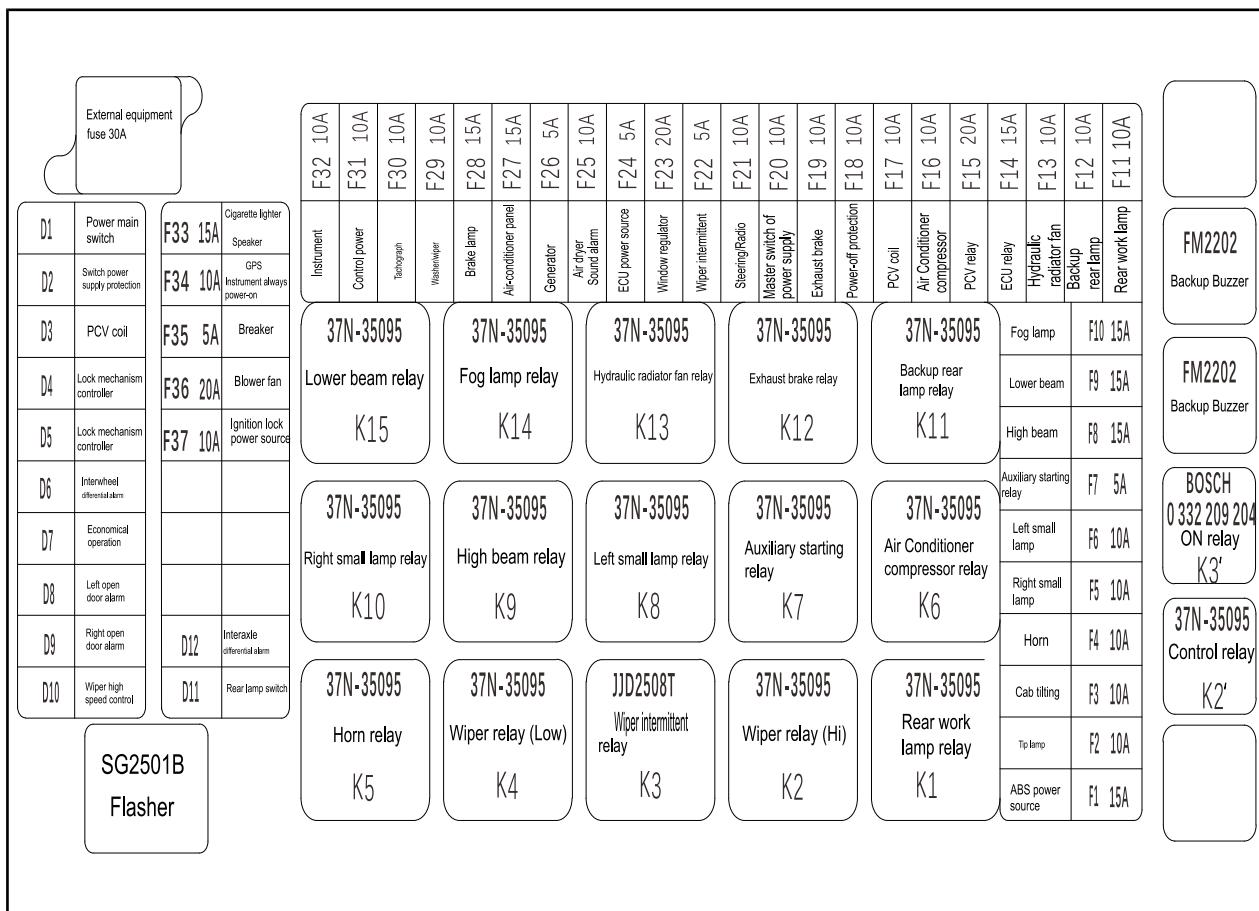


Fig.3-120 Fuses description

Table 3–1 Fuses description in detail

Fuse locations, circuits & amperages	
F1, ABS power source, 15 A	F2, Tip lamp, 10 A
F3, Cab tilting, 10 A	F4, Horn, 10 A
F5, Right small lamp, 10 A	F6, Left small lamp, 10 A
F7, Auxiliary starting relay, 5 A	F8, High beam, 15 A
F9, Lower beam, 15 A	F10, Fog lamp, 15 A
F11, Rear work lamp, 10 A	F12, Backup rear lamp, 15 A
F13, Hydraulic radiator fan, 15 A	F14, ECU relay, 15 A
F15, PCV relay, 20 A	F16, Air Conditioner compressor, 10 A
F17, PCV coil, 10 A	F18, Power-off protection, 10 A
F19, Exhaust brake, 10 A	F20, Master switch of power supply, 10 A
F21, Steering/Radio, 10 A	F22, Wiper intermittent, 5 A
F23, Window regulator, 20 A	F24, ECU power source, 5 A
F25, Air dryer/Sound alarm, 10 A	F26, Generator, 5 A

Table 3-1 Fuses description in detail (continue)

Fuse locations, circuits & amperages	
F27, Air-conditioner panel, 15 A	F28, Backup lamp, 15 A
F29, Washer/Wiper, 10 A	F30, Tachograph, 10 A
F31, Control power, 10 A	F32, Instrument, 10 A
F33, Cigarette lighter/Speaker, 15 A	F34, GPS/Instrument always power-on, 10 A
F35, Breaker, 5 A	F36, Blower fan, 20 A
F37, Ignition lock power source, 10 A	
K1, Rear work lamp relay, 37N-35090	K2, Wiper relay (high), 37N-35095
K3, Wiper intermittent relay, JJD2508T	K4, Wiper relay (low), 37N-35090
K5, Horn relay, 37N-35090	K6, Air Conditioner compressor, 37N-35090
K7, Auxiliary starting relay, 37N-35090	K8, Left small lamp relay, 37N-35090
K9, High beam relay, 37N-35090	K10, Right small lamp relay, 37N-35090
K11, Backup rear lamp relay, 37N-35095	K12, Exhaust brake relay, 37N-35090
K13, Hydraulic radiator fan relay, 37N-35090	K14, Fog lamp relay, 37N-35090
K15, Lower beam relay, 37N-35090	
K2', Control relay, 37N-35095	K3', ON relay, BOSCH 0 332 209 204
Backup buzzer, FM2202	Backup buzzer, FM2202
D1, Power main switch	D2, Switch power supply protection
D3, PCV coil	D4, Lock mechanism controller
D5, Lock mechanism controller	D6, Inter-wheel differential alarm
D7, Economical operation	D8, Left open door alarm
D9, Right open door alarm	D10, Wiper high speed control
D11, Rear lamp switch	D12, Inter-axle differential alarm
External equipment fuse, 30 A	Flasher, SG2501B

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Operation

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⚠ WARNING

Read and understand all safety precautions and instructions in this manual before reading any other manuals provided with this machine and before operation or maintaining it. Failure to do this could result in death or serious injury.

4. Operation

4.1 Cab control device

4.1.1 Operation of combination switch

4.1.1.1 Left arm operation of combination switch

Horn button (1)

Press the button, then vehicle electric horn or air horn works.

Light rotary switch (2)

- Turn the light switch to small light position, then 4 kinds of lights are on: the front and rear position lights, front clearance lights, side marker lights, each switch background lights.
- Turn the light switch to head lamps position, then small lights and head lights are on. At this time, adjusting the vertical position of the left lever can turn on the high beam or lower beam. When the left lever in the middle position, the lower beam light is on. Push left lever down to the lower position, then the high beam is on.

Turn signal switch

- When the key switch is in ON position, push forward the left arm of combination switch to R position to turn on the **right turn light (4)**. When steering wheel returns, the switch automatically resets, the right turn light is off.
- Push the left arm of combination switch to L position to turn on the **left turn light (3)**. When steering wheel returns, the switch automatically resets. The left turn light is off.

High beam flash

Push upward on the left arm of combination switch, the high beam headlight turns on momentarily and the car sends a signal of overtaking. Do not need to activate the headlight switch.

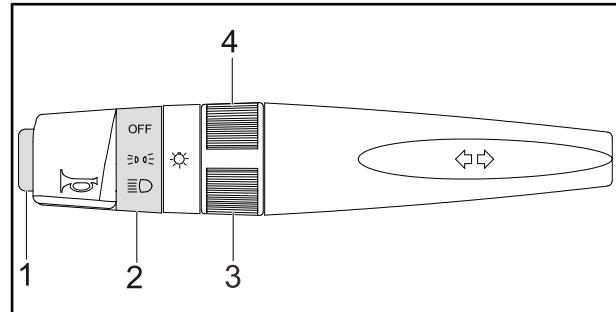


Fig.4-1 Left arm

1. Horn button	3. Left turn light
2. Light rotary switch	4. Right turn light

4.1.1.2 Right arm operation of combination switch

Wiper spray switch (1)

When the ignition switch is in ON position, press this switch, then washing pump starts to spray washing fluid on the windshield.

Wiper rotary switch (2)

When the ignition switch is in ON position, rotate the switch to control wiper. Wiper switch has four positions:

HI: High speed wiping

LO: Low speed wiping

INT: Intermittent wiping

OFF: Stop wiping

Intermittent cycle adjust knob (3)

Rotate this knob to change the intermittent cycle.

Exhaust brake switch (4)

When the engine is working, push forward the right arm of the combination switch to open the exhaust brake. Exhaust brake function turns on and the engine speed reduces. Move the right lever to the middle position horizontally, then the exhaust brake is off.

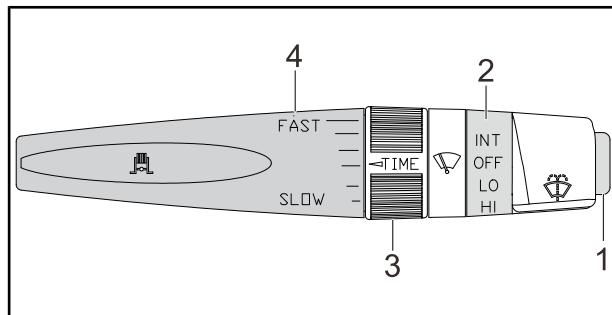


Fig.4-2 Right arm

1. Wiper spray switch	3. Intermittent cycle adjust knob
2. Wiper rotary switch	4. Exhaust brake switch

4.1.2 Use of key

LOCK: rotate the key to LOCK position. Pull out the key by pressing the lock button and the steering wheel locks.

ACC: rotate the key to ACC position to switch on circuits of the entire truck. Then the driver can use the radio, ignition key and window regulator.

ON: rotate the key to ON position. The instrument, wiper and warm air power are electrified and the ignition lock relay works.

START: after starting the engine, the key automatically returns to the ON position.

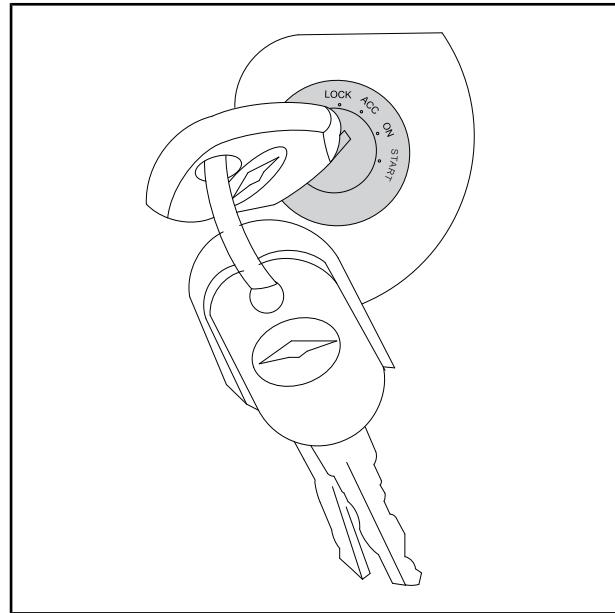


Fig.4-3 Key

4.1.3 Opening and closing cab front panel

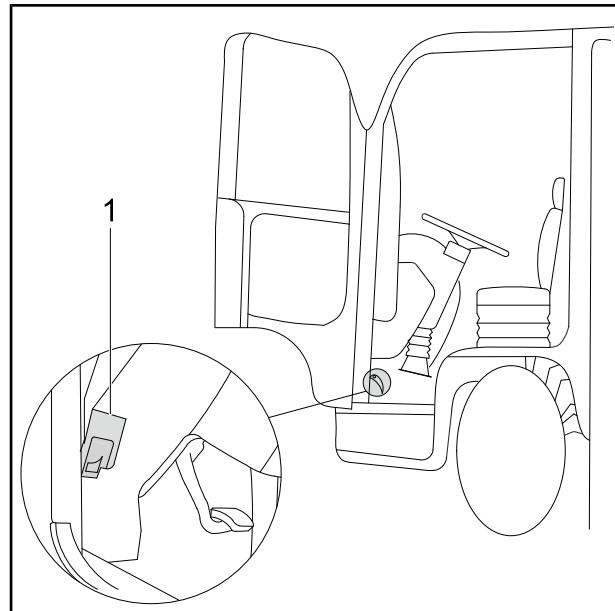


Fig.4-4 Unlocking handle

Opening the front panel: lift the **unlocking handle (1)** of the front panel inside the cab. After releasing the lock, open the front panel by hand.

Closing the front panel: push the front panel to the original position until there is locking sound.

1. Unlocking handle

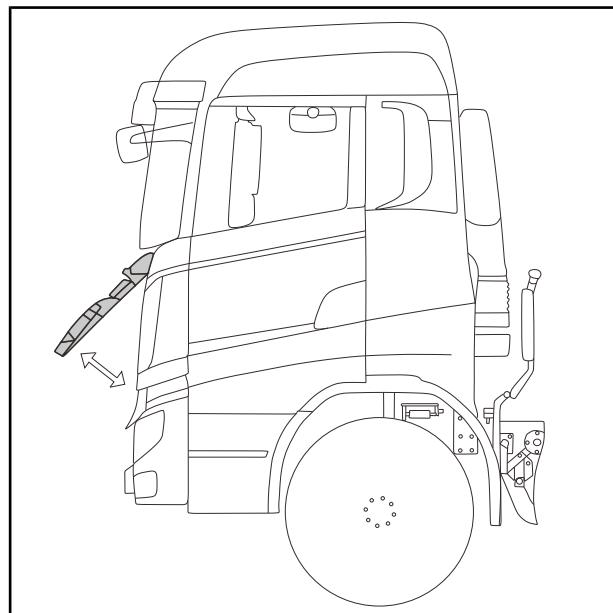


Fig.4-5 Cab front panel

4.1.4 Cab tilting operation

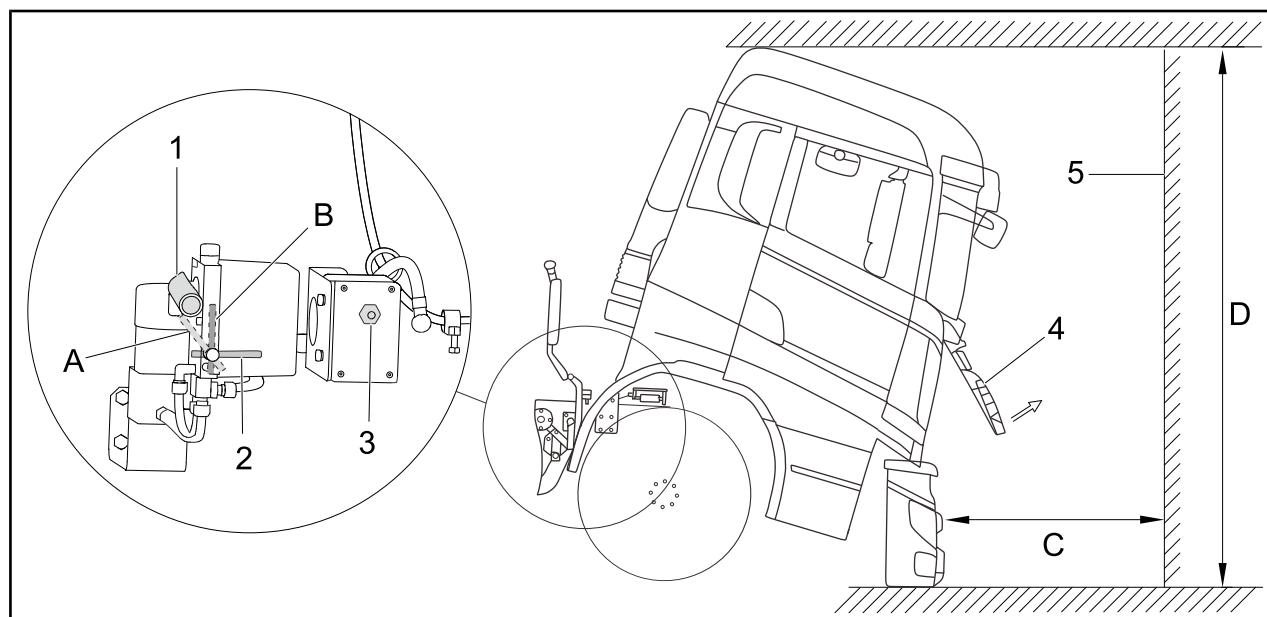


Fig.4-6 Cab lifting operation

1. Manual rocking handle	4. Cab front panel	B. Lifting position
2. Reversing handle	5. Barrier	C. $L \geq 3000$ mm
3. Electric lifting button	A. Descending position	D. $H \geq 4000$ mm

Cab lifting operation

1. Before lifting operation, park the truck on a broad area and make sure that there is no **barrier (5)** or pedestrian before the cab within 3 meters. Pull up parking brake. Start the main switch of power supply.
2. Place the movable objects inside the cab at the front of the floor or fasten them, then open the **cab front panel (4)**.
3. Pull the **reversing handle (2)** of combination oil pump to **lifting position (B)**.
4. Push the **electric lifting button (3)** on the electric controller to lift the cab in place.

Cab descending operation

1. Pull the **reversing handle (2)** of combination oil pump to **descending position (A)**.
2. Push the **electric lifting button (3)** and the cab begins to descend. Loosen the button until the locking sound is heard.
3. After descending the cab in place, make sure the connection of **intake port fitting place (6)** is good.
4. Close the **cab front panel (4)** with balance force.

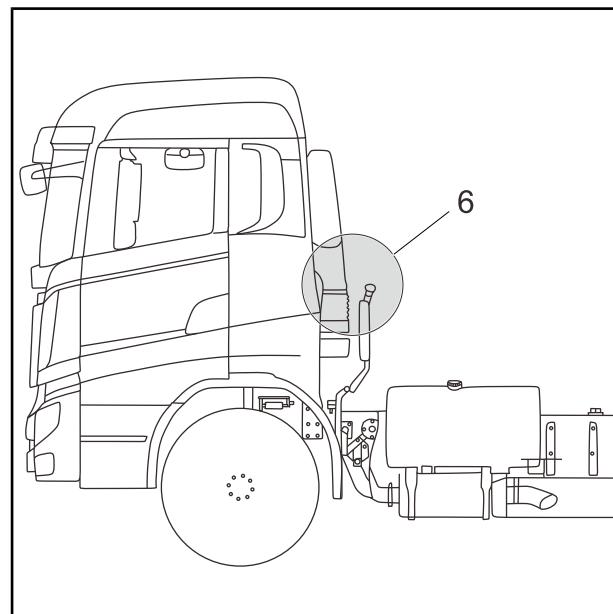


Fig.4-7 Cab descending operation

6. Intake port fitting place

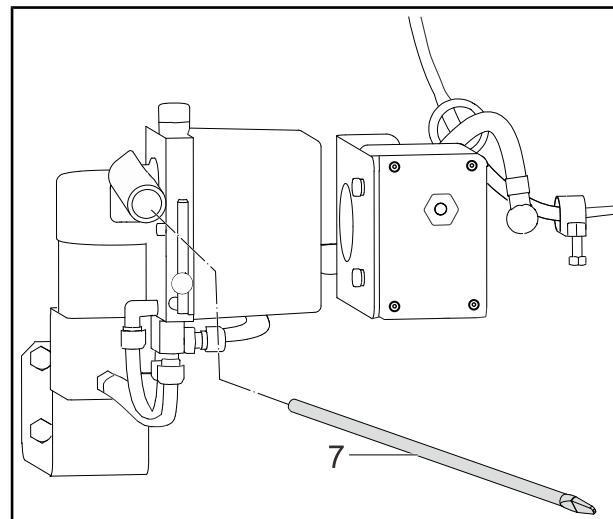


Fig.4-8 Manual pump

Auxiliary functions of manual pump**7. Crowbar**

1. When the electric pump cannot work or there is no electricity, take out a **crowbar (7)** from the toolbox and insert it to the **manual rocking handle (1)**.

2. Then shake the manual rocking handle reciprocally instead of pressing the electric lifting button on lifting controller, so as to lift or descend the cab.

4.2 Pre-start checking

⚠ CAUTION**Risk of minor or moderate injury!**

Failure to do the pre-start checking could cause minor or moderate injury.

Before operation, perform this inspection strictly and have needed issues resolved.

Always complete a walk-around visual inspection of the machine with special attention to structural damage, loose parts, leaks or other conditions that require immediate correction for safe operation.

Ensure that the safety, operation and maintenance manual is in the cab.

1. Exterior

Make sure that mirrors, **window (2)** and **footboard (3)** are clean.

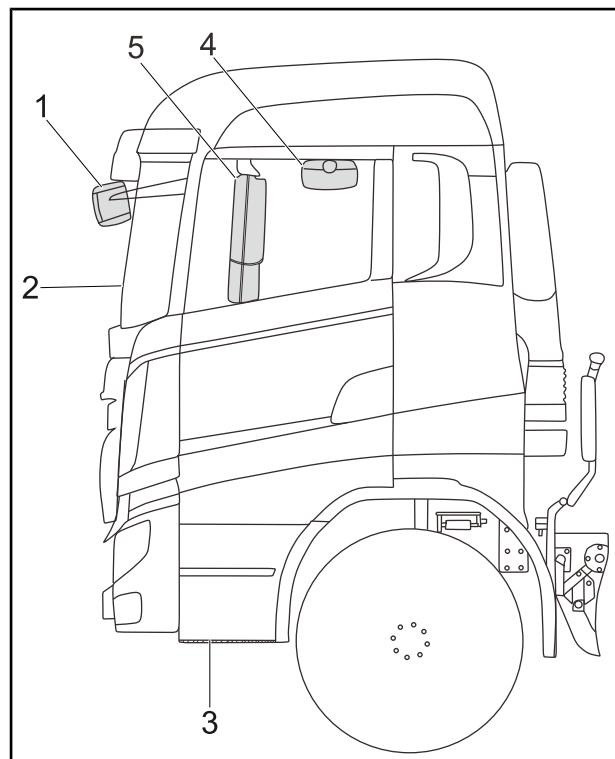


Fig.4-9 Clean the exterior

1. Front lower view mirror	4. Supplementary blank off mirror
2. Window	5. Left rear view mirror
3. Footboard	

2. Safety belt

Fasten the safety belt.

3. Mirrors

Adjust both sides of the rear view mirrors for clear vision and safe driving.

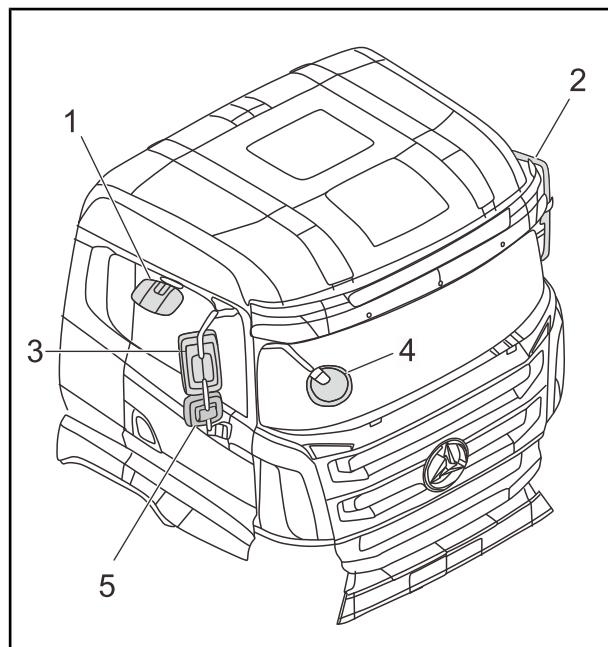


Fig.4-10 Mirrors

1. Supplementary blank off mirror	4. Front lower view mirror
2. Left rear view mirror	5. Right wide angle mirror
3. Right rear view mirror	

4. Fire extinguisher

Make sure that the fire extinguisher is on the back wall of the cab.

Note: make sure the fire extinguisher is at least a three pound A, B, C fire-rated extinguisher (NFPA 10 standard for portable fire extinguishers).

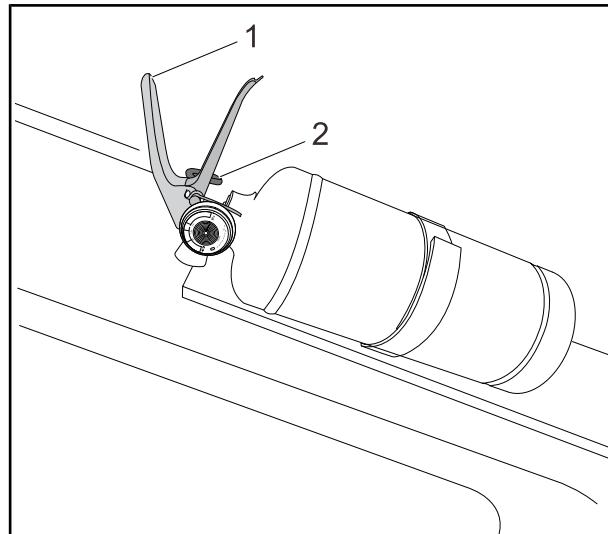


Fig.4-11 Fire extinguisher

1. Handle	2. Safety pin
-----------	---------------

4.3 Driving operation

4.3.1 Engine start procedure

1. Make the shifting lever to neutral gear.

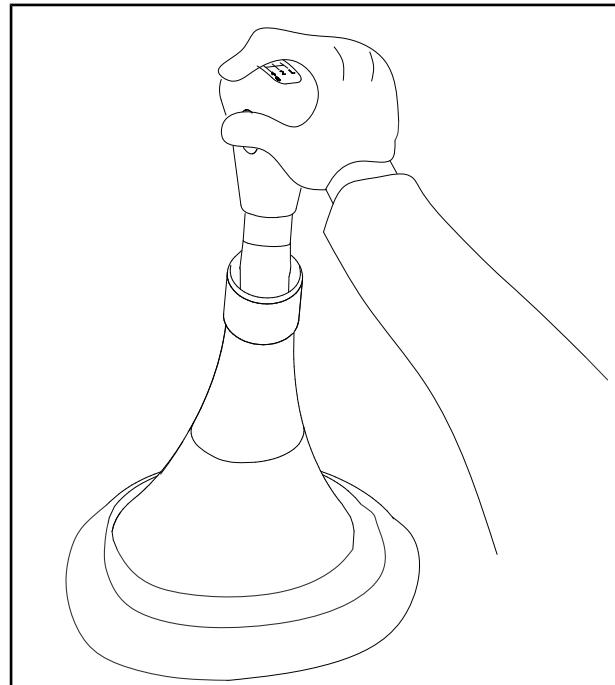


Fig.4-12 Pushing to neutral gear

2. Rotate ignition key to **ON position**.

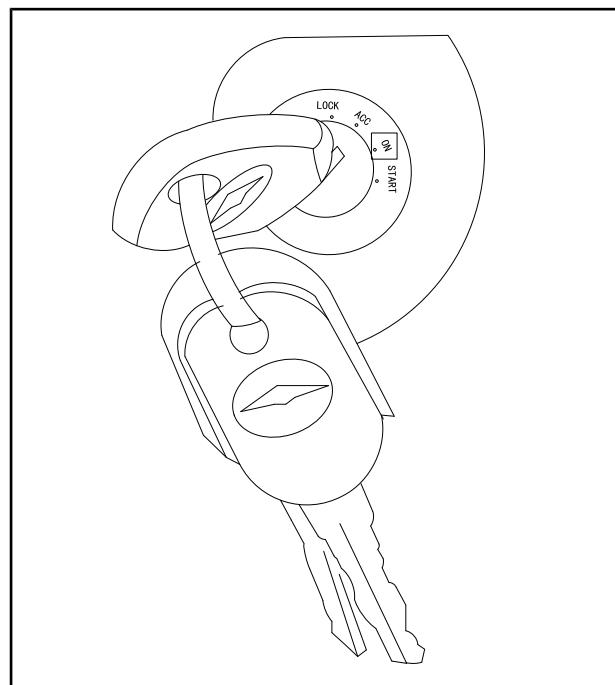


Fig.4-13 Rotating ignition key

3. Rotate ignition key to **START position** and start the engine. Then the key returns to **ON position** automatically.

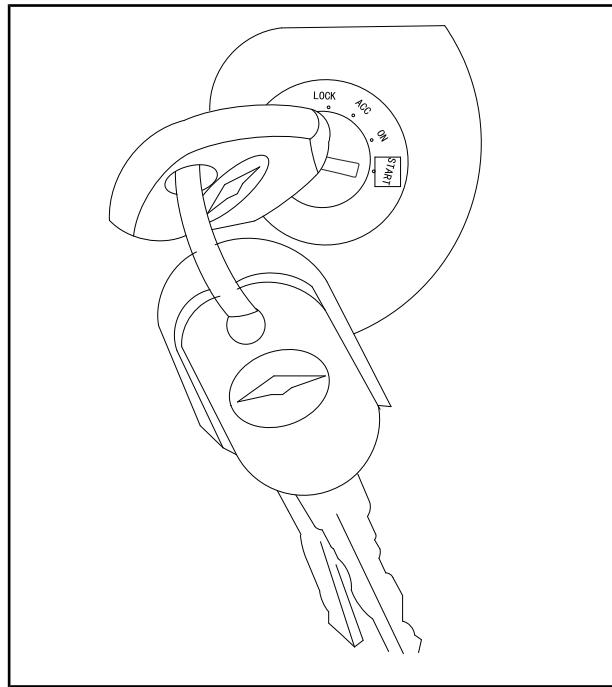


Fig.4-14 Rotating ignition key

NOTICE

Risk of engine damage and gearbox damage!

If using high speed gear for starting, it could damage the engine and gearbox.

Use low speed gear for starting.

4. Choose the first gear or **L gear** for starting.

See "[Introduction of gearshift](#)" on page 4-13.

The starting time of engine shall not exceed 7 seconds. If the engine does not start in one time, wait additional 30 seconds before starting again.

After the engine starts, keep the engine at idle speed for 3 minutes–5 minutes in order to establish normal machine oil pressure, normal lubricating and proper water temperature.

4.3.2 Engine shutdown procedure

1. Make the shifting lever to neutral gear.

See "[Introduction of gearshift](#)" on page 4-13.

2. Apply the parking brake. The parking brake lever is guarded to prevent accidental activation.

See “[Parking brake](#)” on page 4-21.

3. Run the engine at fast idle for about five minutes to decrease internal temperature and dissipate the heat. Extend this cool-down time in hot weather.

4. Turn off the ignition switch of the cab and shut down the engine. Then remove the key.

See “[Use of key](#)” on page 4-5.

4.3.3 Gearshift operation

4.3.3.1 *Introduction of gearshift*

SANY truck mixer mainly adopts mechanical transmission with 9 gears.

Low gear area: R1, L, 1, 2, 3, 4

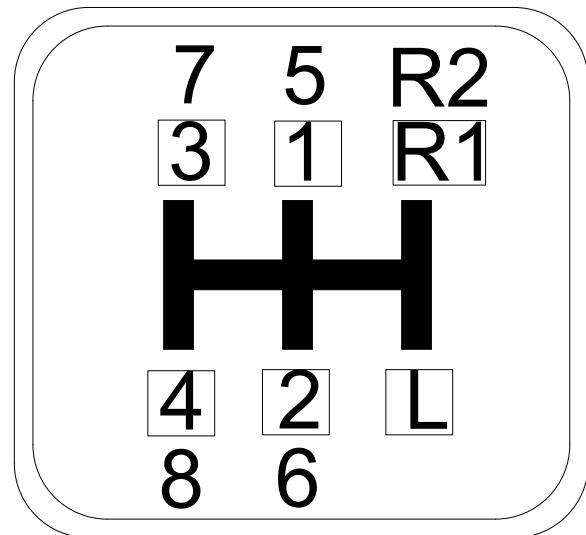


Fig.4-15 Low gear area

High gear area: R2, 5, 6, 7, 8

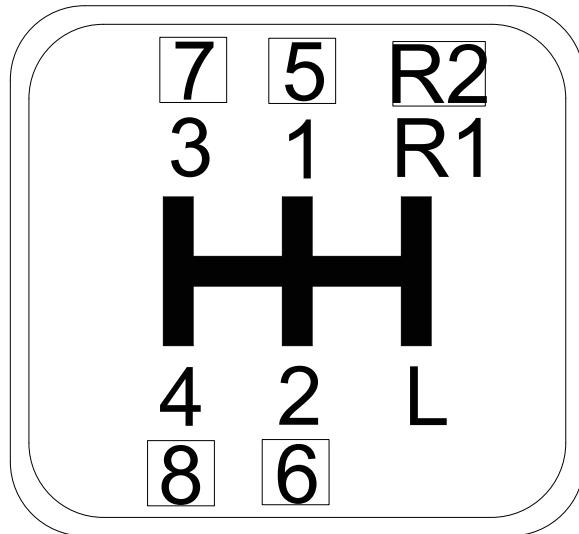


Fig.4-16 High gear area

When the gear is at low gear area, the **low gear indicator light (1)** on instrument panel is on.

When the gear is at high gear area, the low gear indicator light is off.

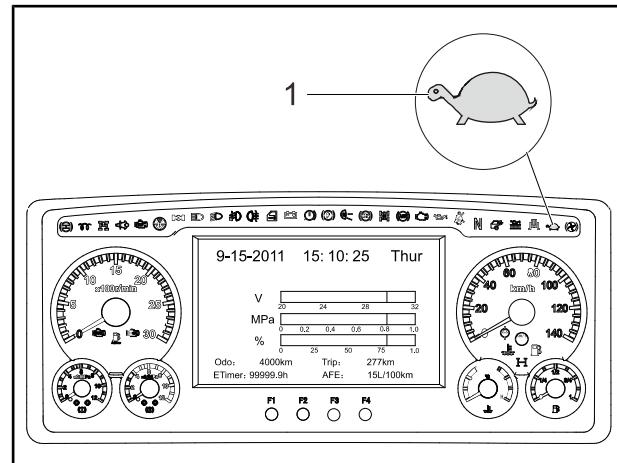


Fig.4-17 Indicator light

1. Low gear indicator light

The **high-low gear switch (2)** changes the **low gear (3)** and **high gear (4)**.

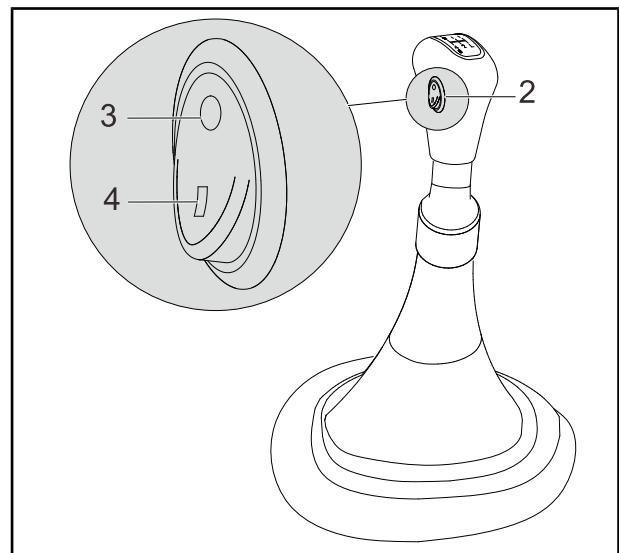


Fig.4-18 High-low gear switch

- 2. High-low gear switch
- 4. High gear
- 3. Low gear

4.3.3.2 Shift operation

1. Release the **throttle pedal (1)**.

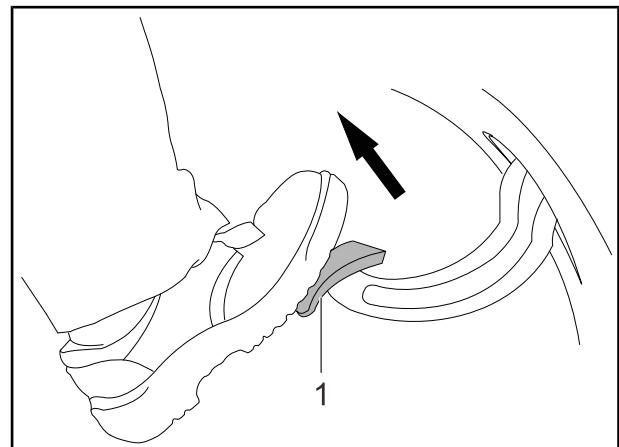


Fig.4-19 Release throttle pedal

1. Throttle pedal

2. Step on the **clutch pedal (2)** to the end quickly.

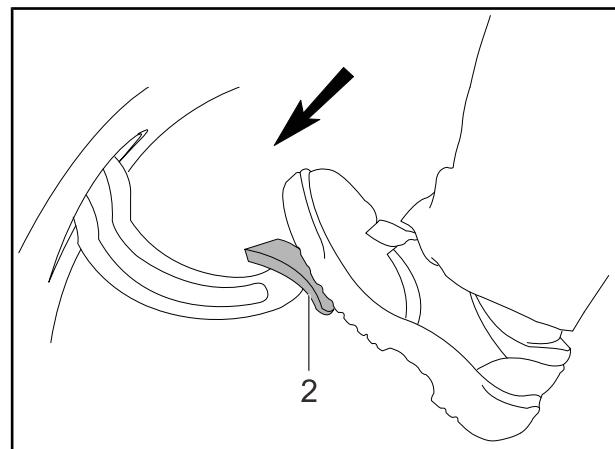


Fig.4-20 Step on clutch pedal

2. Clutch pedal

3. Push the gear lever to neutral position.

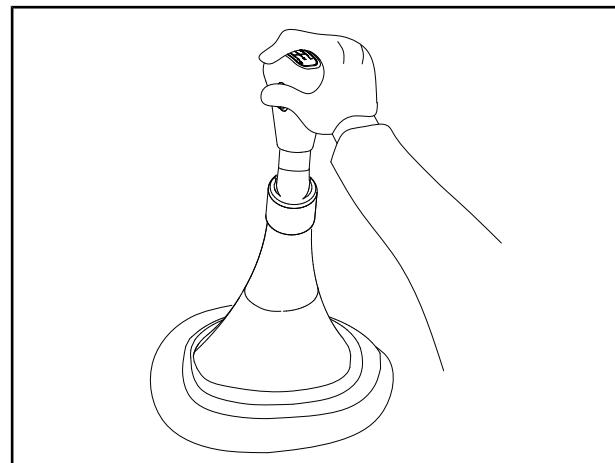


Fig.4-21 Push to neutral position

4. Push the gear lever to the target gear.

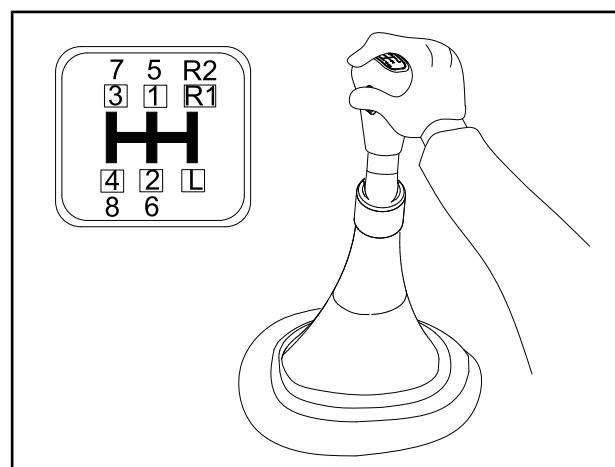


Fig.4-22 Push to target position

5. Loose the **clutch pedal (2)** and stepping on the **throttle pedal (1)** smoothly.

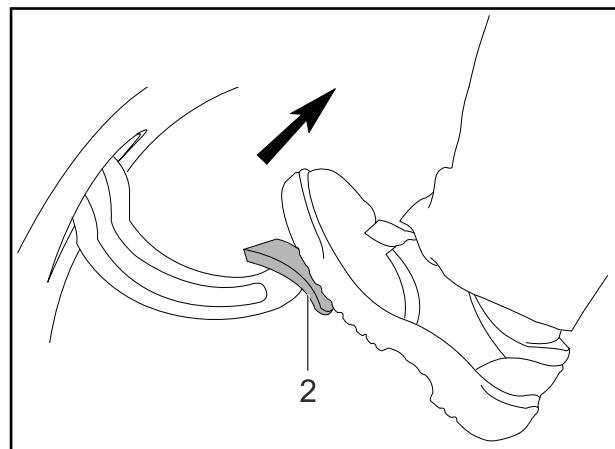


Fig.4-23 Loose clutch pedal

2. Clutch pedal

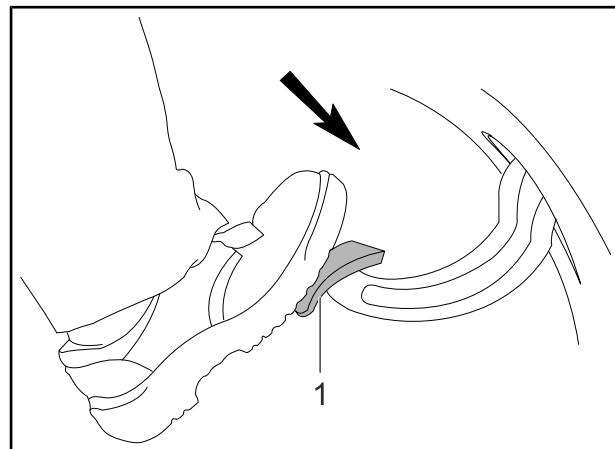


Fig.4-24 Step on throttle pedal

1. Throttle pedal

4.3.3.3 High and low shift switching

NOTICE

Risk of gearbox damage!

Coasting in neutral or clutch disengaging, and pressing the high-low gear switch while reversing could damage the gearbox.

Do not slide in neutral or clutch disengaging. Do not press the high-low gear switch while reversing.

Switching 4th gear to 5th gear

1. Step on clutch pedal to the end.

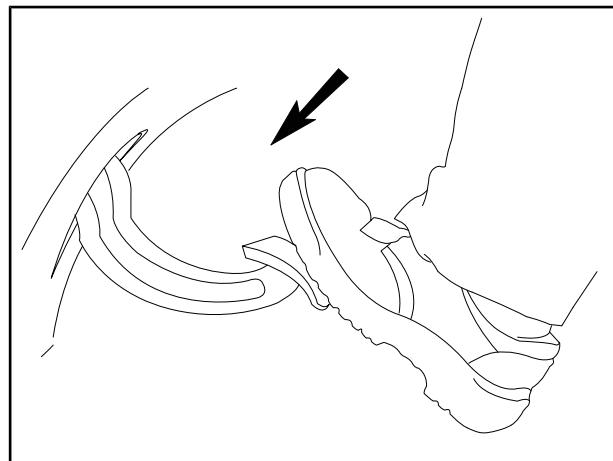


Fig.4-25 Step one

2. Turn high-low gear switch to **high gear (2)** zone.

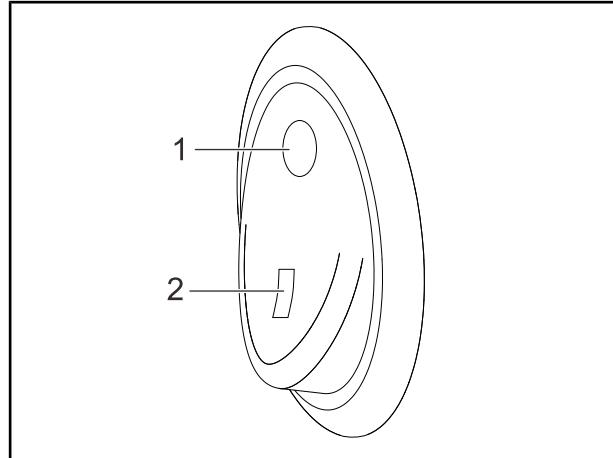


Fig.4-26 Step two

1. Low gear

2. High gear

3. Retreat 4th gear to neutral.

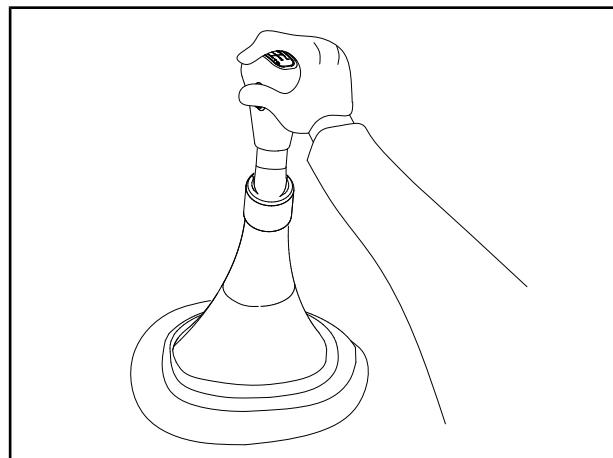


Fig.4-27 Step three

4. Pause for about 0.5 seconds and push to 5th gear.

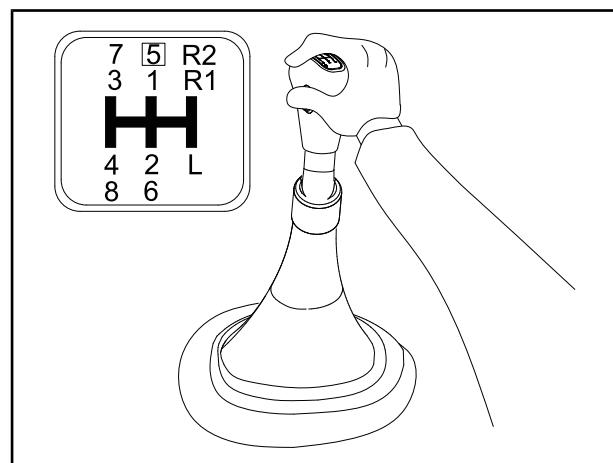


Fig.4-28 Step four

Switching 5th gear to 4th gear

1. Step on clutch pedal to the end.

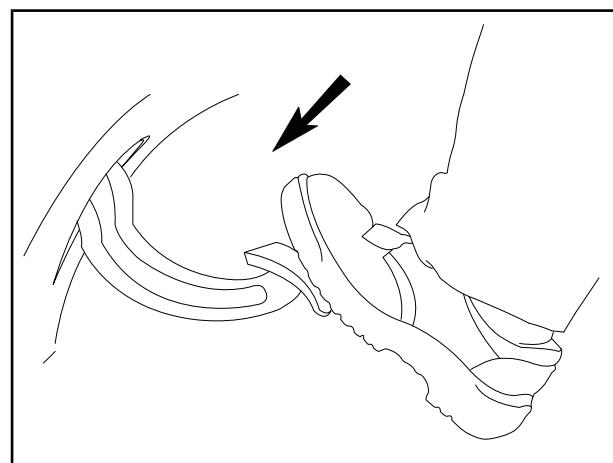


Fig.4-29 Step one

2. Turn high-low gear switch to **low gear (1)** zone.

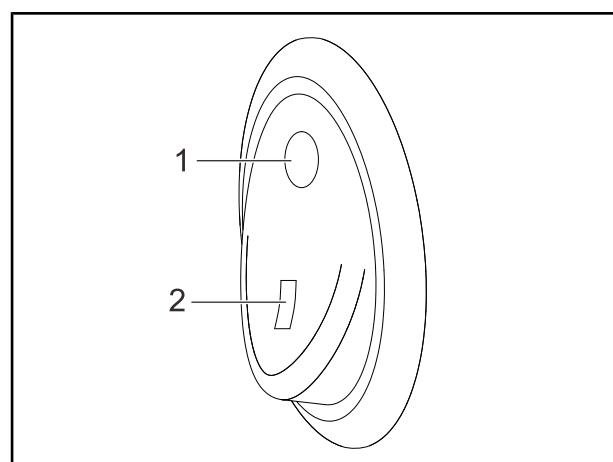


Fig.4-30 Step two

1. Low gear

2. High gear

3. Retreat 5th gear to neutral.

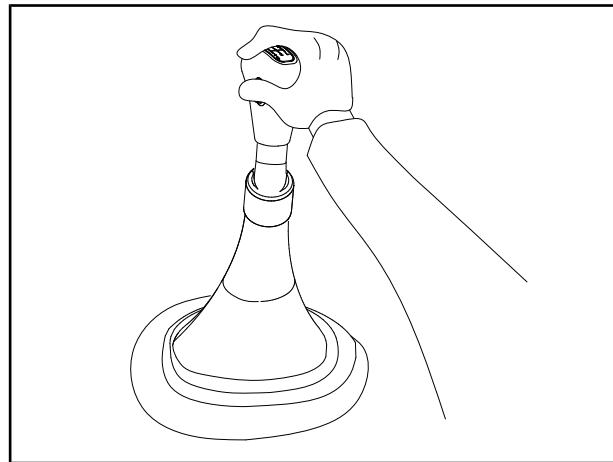


Fig.4-31 Step three

4. Pause for about 1 second and push to 4th gear.

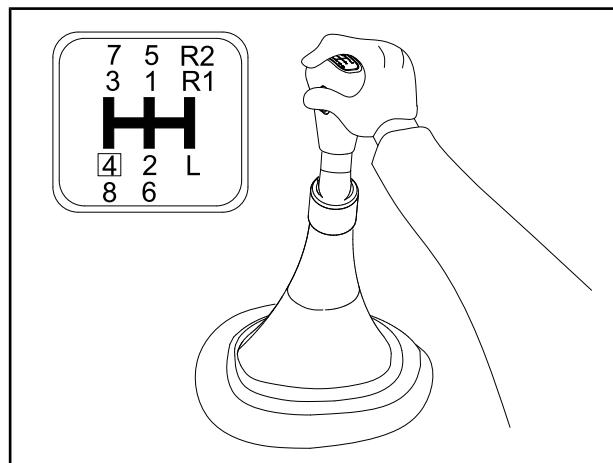


Fig.4-32 Step four

4.3.4 Brake operation

4.3.4.1 Service brake

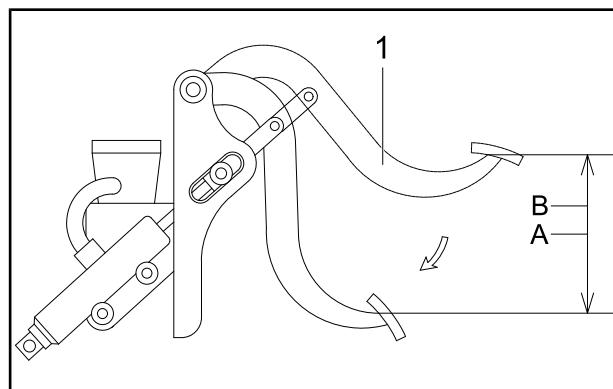


Fig.4-33 Service brake

1. During the process of traveling, step on the brake pedal to lower the driving speed or stop the truck.
2. When the truck is 40 m–50 m away from the parking site, step on the **brake footplate (1)** with proper force. The suggested journey is about **1/3 (B)** to **1/2 (A)** of the entire brake footplate journey.
3. When the truck is 5 m–6 m away from the parking site, step on the **brake footplate (1)** slowly and park steadily.

1. Brake footplate

A. 1/2
B. 1/3

4.3.4.2 Parking brake

Push the parking brake handle backward to limiting position, then release the handle. The parking brake comes into effect.

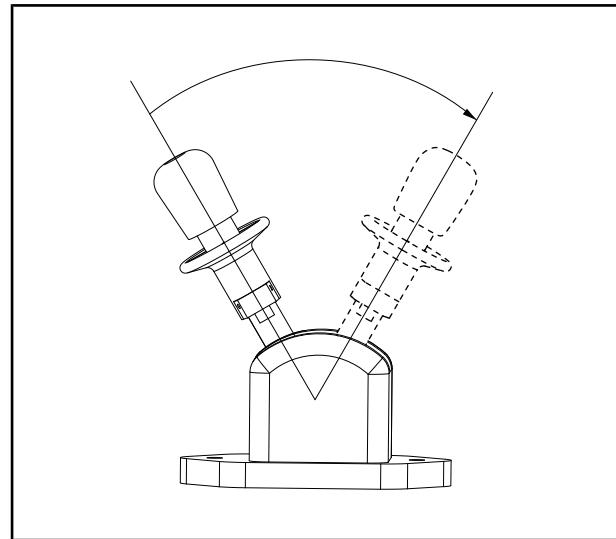


Fig.4-34 Push to limiting position

When the air pressure is higher than 0.55 MPa, operate the truck as follows:

- A: Pull the handle upward.
- B: Rotate the handle forward for 5°.
- C: The handle automatically returns to the front end and the parking brake releases.

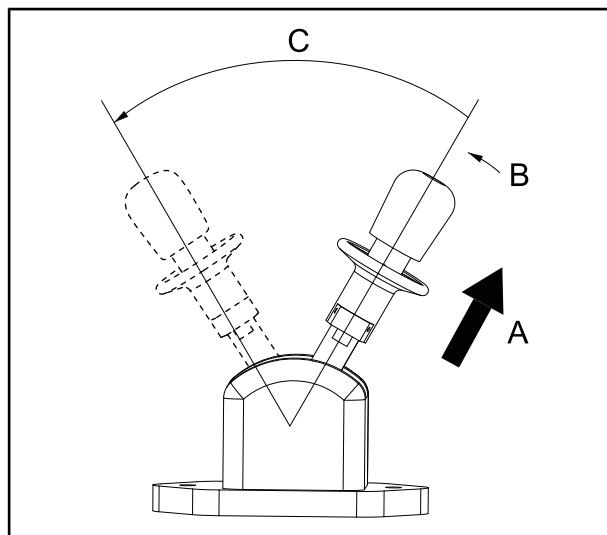


Fig.4-35 Release parking brake

Under emergent situation, step on the brake pedal and pull up the parking brake handle for emergency braking.

When parking on a ramp, prop up the wheel with wheel limiter so as to prevent the truck from gliding.

4.3.4.3 Exhaust brake

When the vehicle travelling down a long slope, opening the exhaust brake can reduce the using frequency of foot brake pedal. The brake tellurium film can be protected effectively.

1. Make the **engine speed** beyond starting speed: Hino 500 r/min (National III), Hino 850 r/min (National IV), WP 800 r/min.

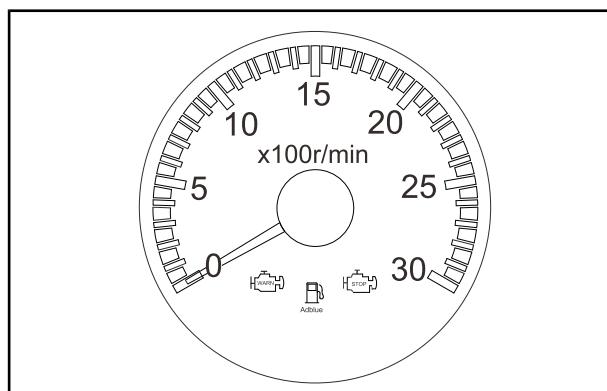


Fig.4-36 Engine speed

2. Release the **throttle pedal**.

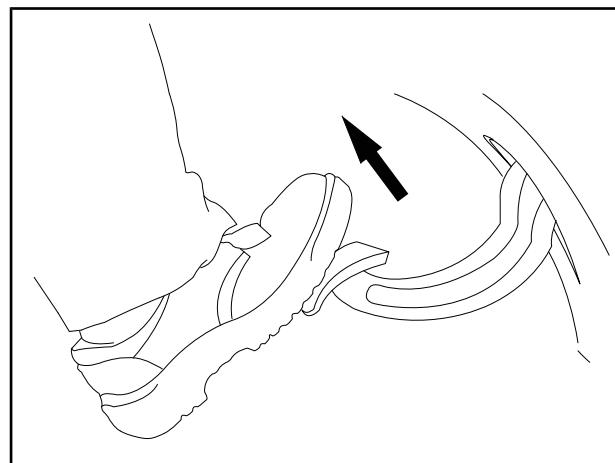


Fig.4-37 Release throttle pedal

3. Release the **clutch pedal**.

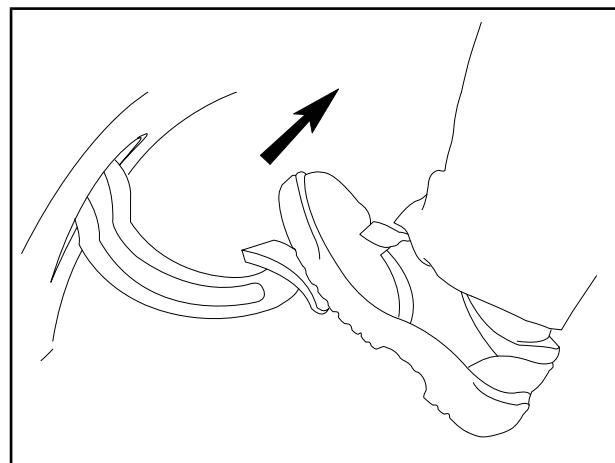


Fig.4-38 Release clutch pedal

4. Pull forward the **right arm combination switch** horizontally, then the exhaust brake feature turns on.

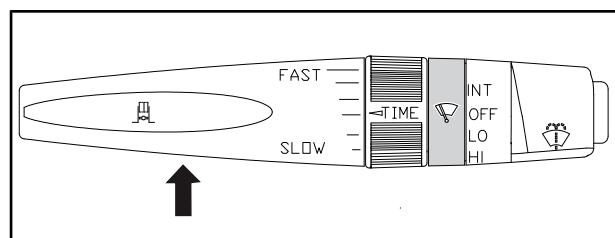


Fig.4-39 Right arm combination switch

5. The **exhaust brake indicator** in the dashboard lights.

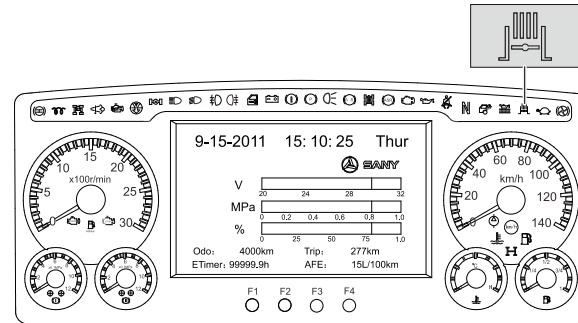


Fig.4-40 Exhaust brake indicator

4.3.5 Differential lock

NOTICE

Risk of truck damage!

Improper use of differential lock could damage the truck.

During normal running, disconnect the differential lock and do not use differential lock at a turning. After passing slippery road surface, release differential lock immediately.

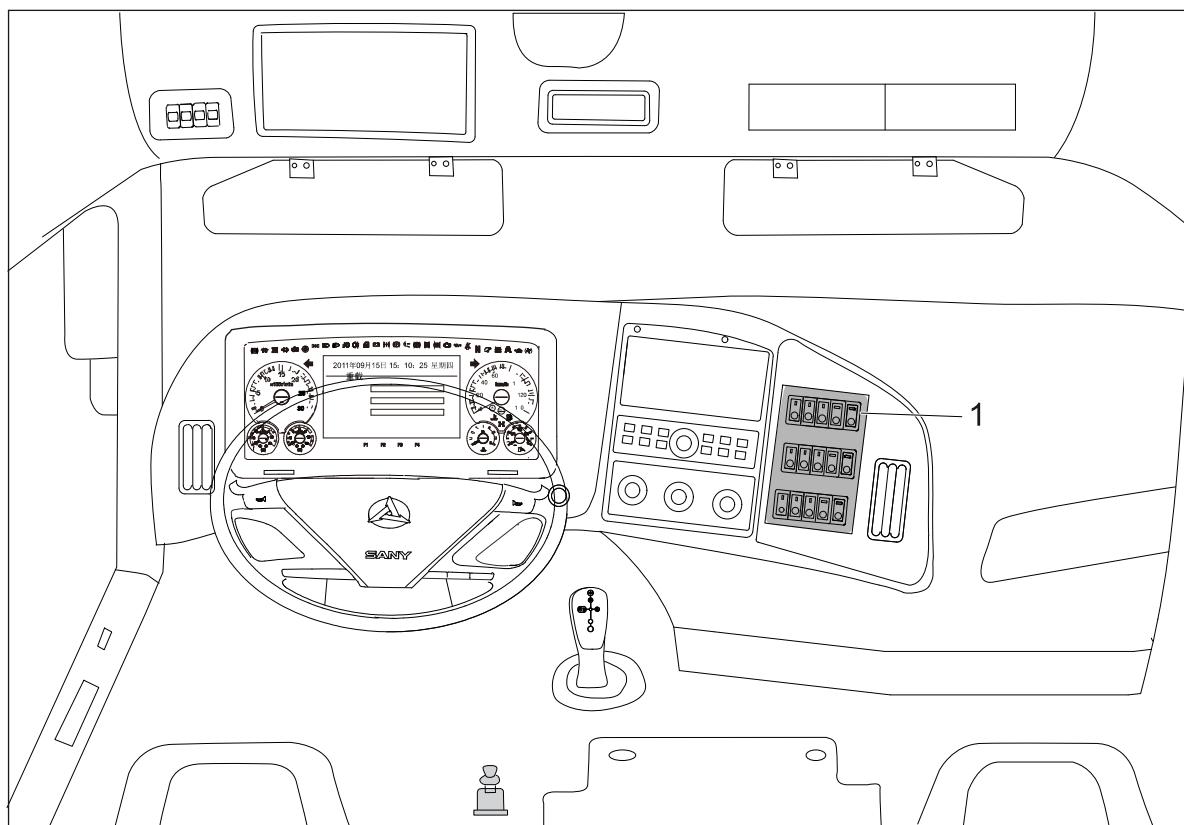


Fig.4-41 Operating switch

1. Operating switch

The differential lock is in the **operating switch (1)** area as the figure above.

1. Differential lock between wheels

- When the unilateral tires of double rear axle are trapped in the mud road, press the wheels differential lock switch to lock the wheel differential.

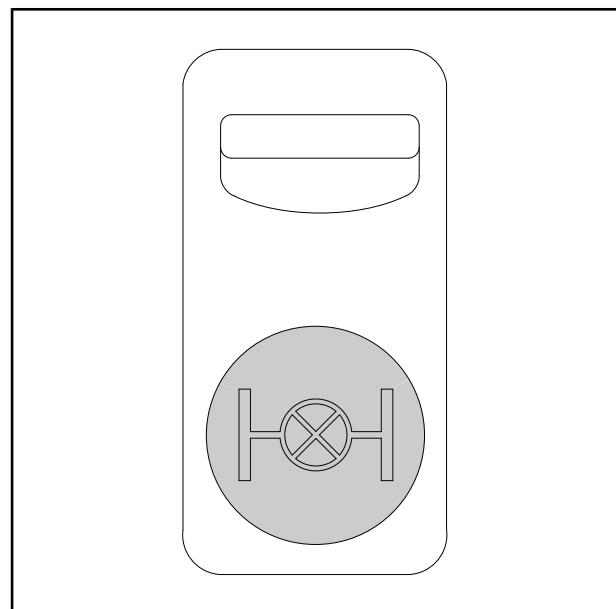


Fig.4-42 Differential lock between wheels

- When the indicator is on, operate the truck to move forward.

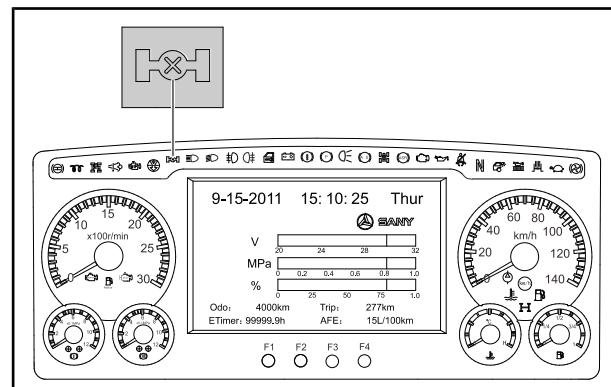


Fig.4-43 Indicator

2. Differential lock between axles

- When a single drive axle is trapped in the mud road, press the axles differential lock switch to lock the axles differential.

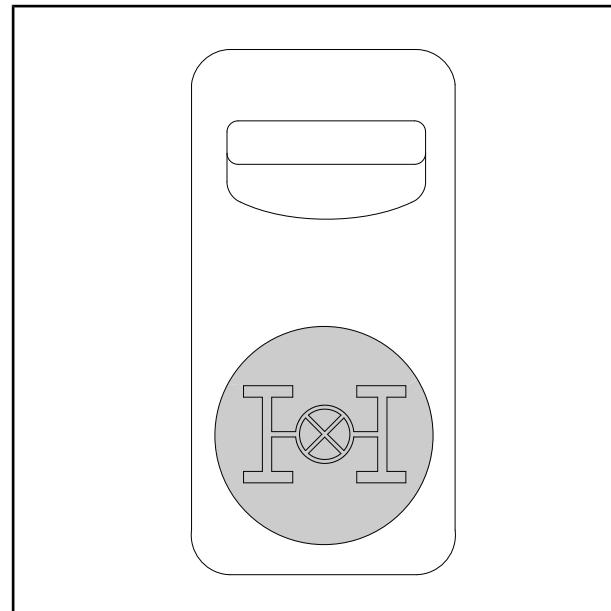


Fig.4-44 Differential lock between axles

- When the indicator is on, operate the truck to move forward.

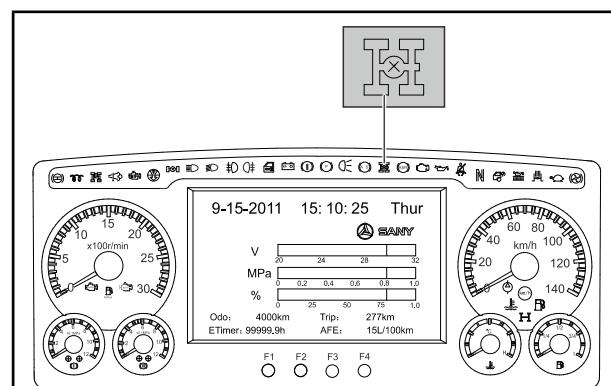


Fig.4-45 Indicator

3. Unlocking differential lock

When the truck returns normal running, step on the clutch and press down the wheels or axles differential lock switch for unlocking the differential lock.

4.4 Fuel addition

4.4.1 Fuel amount – check

The fuel amount is indicated by the **fuel gauge (1)** in the cab instrument panel.

- **0** indicates fuel deficiency and replenish immediately.
- **1/2** indicates half empty.
- **1** indicates full.

When fuel is deficient, the **fuel alarm indicator (2)** in the instrument panel will prompt replenishing fuel.

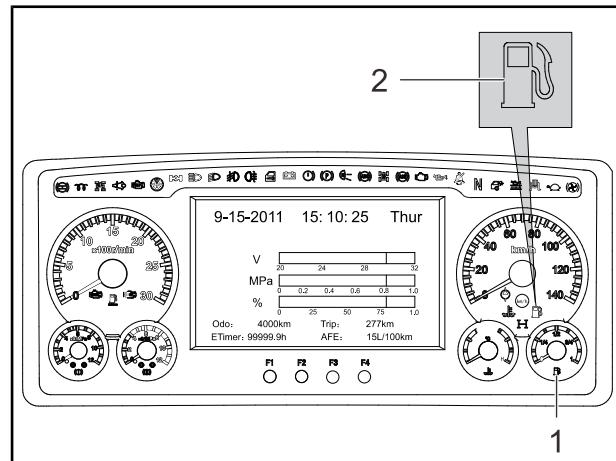


Fig.4-46 Instrument panel

1. Fuel gauge 2. Fuel alarm indicator

4.4.2 Usage of fuel tank cover

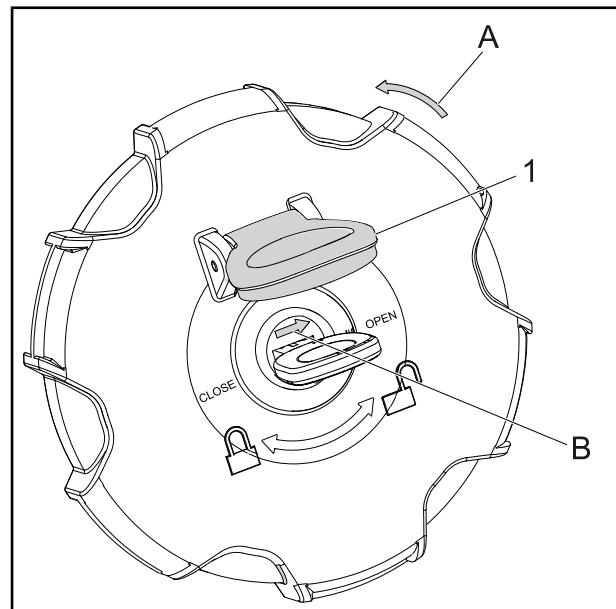


Fig.4-47 Remove

Remove the fuel tank cover.

1. Lift the **dust cover** (1), then insert the key and rotate it anticlockwise until the head of the **arrow** (B) directs at the **OPEN** position.

2. **Rotate the fuel tank cover anticlockwise (A)** until it is open.

Lock the fuel tank cover.

1. Lift the **dust cover** (1), then insert the key and rotate it anticlockwise until the head of the **arrow** (B) directs at the **OPEN** position.

Then remove the fuel tank cover.

1. Dust cover

A. Rotate the fuel tank cover anticlockwise

B. Arrow

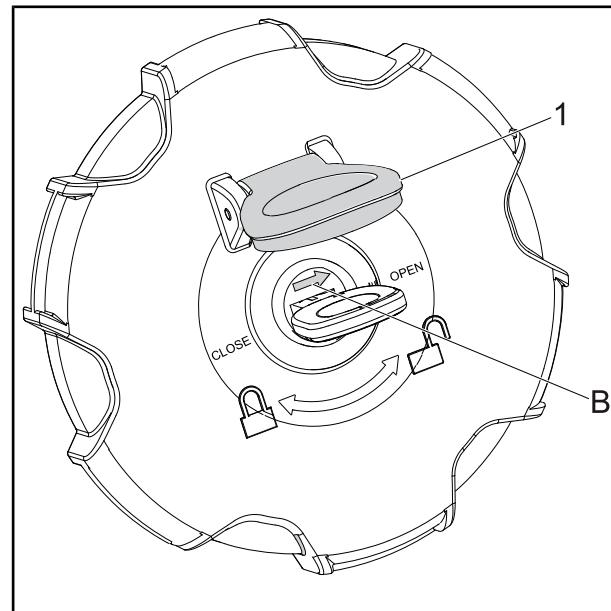


Fig.4-48 Remove

1. Dust cover

B. Arrow

2. Make the three **clips** (2) of fuel tank cover directs at the three corresponding **jaws** (3) of fuel tank port.

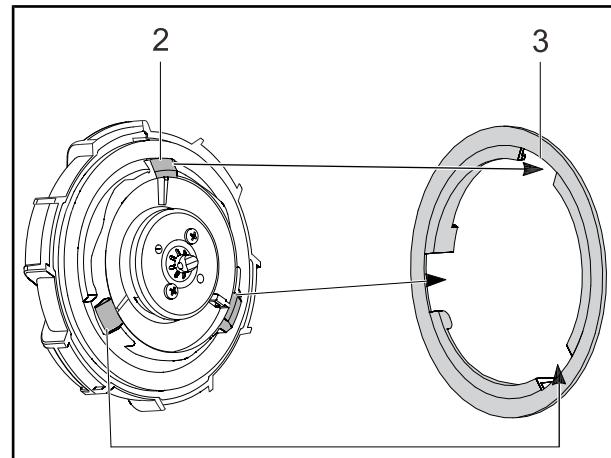


Fig.4-49 Lock

2. Clips

3. Jaws

3. Rotate the fuel tank cover clockwise (C) until listening the sound.

4. Rotate the key clockwise until the head of the **arrow (B)** directs at the **CLOSE** position, then pull off the key and close the **dust cover (1)**.

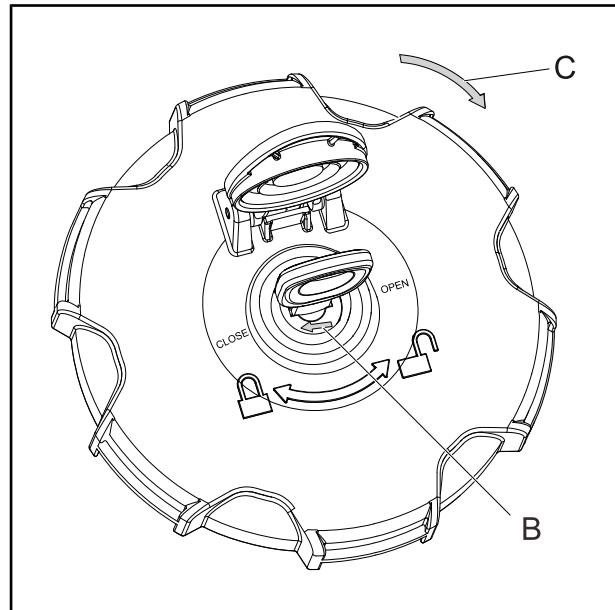


Fig.4-50 Lock

B. Arrow

C. Rotate the fuel tank cover clockwise

If the **outside cover (4)** can not rotate freely, it means that the fuel tank cover is not locked completely and other people unauthorized may open the fuel tank. Repeat the four steps as above.

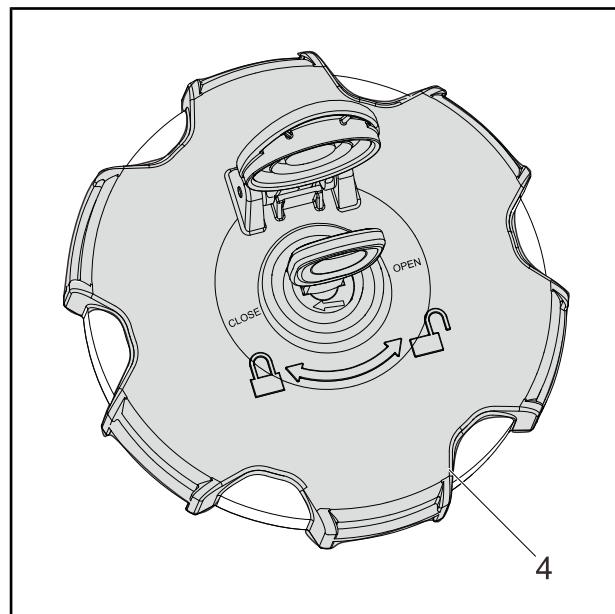


Fig.4-51 Lock

4. Outside cover

4.5 Transport

4.5.1 Transport guidelines

Before transport, make sure the operator read and fully understand the precautions and information.

- Set traveling speed switch to low gear and do not operate the switch to avoid danger caused by high-speed movement.
- Turn engine speed dial to low speed.
- When loading or unloading the machine, choose solid and level ground and keep a safe distance from road edge.
- Use a slope with sufficient width, length, thickness and strength, its maximum slope angle being 15°. When using a soil slope, compact the soil. When using the trailer's ramp, its angle from the ground shall not exceed 15°.
- When using ramp or a platform, place spacer blocks under trail wheels to prevent trailer from moving.
- It is extremely dangerous to change direction when driving up or down a ramp. Drive back to ground or trailer plate to change traveling direction.
- When the mixer truck is traveling on a slope, never operate any control lever other than traveling lever.

4.5.2 Loading

1. Start the engine. Align tracks with ramp or slope, and drive truck in reverse onto the trailer.
2. With the help of a guide person, drive mixer truck slowly onto ramp or slope. Drive it onto trailer plate at its minimum speed.
3. Stop the truck at a suitable position on the trailer plate. Ensure that the tracks of both sides have an equal clearance from trail sides.
4. Stop the engine. Shift the gear to the neutral place after parking and remove the key.
5. Shut cab window, ventilator and door, and cover air vent to shield wind or rain.
6. Install swing locking connecting rod.

4.5.3 Towing

1. Only use existing towing hitches for towing and observe the regulations of truck manufacturer.
2. Comply with the prescribed driving position, permitted speed and itinerary when towing.

3. Observe the stipulations of manufacturer of chassis when towing the truck with other towing machines.
4. Use the towing eye to tow the truck. The towing eye is fixed on the traction hook seat at the forepart of the truck.
5. Use the outrigger drag loop to tow the truck. But the outriggers shall be retracted and put at the axle of towing direction. When towing the truck, if the outrigger swings out or is at an angle to the towing direction, it may cause a serious accident.

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⚠ WARNING

Read and understand all safety precautions and instructions in this manual before reading any other manuals provided with this machine and before operation or maintaining it. Failure to do this could result in death or serious injury.

5. Maintenance

5.1 Maintenance information

5.1.1 Introduction

Do all inspection and maintenance items strictly so as to lower the failure rate, improve the service life of fragile parts and reduce maintenance cost. In this manner, the truck can work normally and prevent influencing construction, then create more benefit.

Do not perform any maintenance or repair unapproved. Obey all safety precautions.

5.1.2 Check before maintenance

Read and understand the safety section of this manual before proceeding with each inspection or maintenance procedures. Including the lockout/tagout procedure, see "["Notes of lockout/tagout" on page 2-21.](#)

Review the maintenance log and obey these points to guarantee the safety:

- Do not operate any unapproved maintenance in this manual. If maintenance is required that is not listed in this manual, contact the SANY dealer before proceeding.
- Do not work on the machine in motion. If it is necessary, make sure that there is an operator who can operate the machine correctly and keep in touch with the operator.
- Contact the SANY dealer when unable to operate the procedures listed in this manual or if additional procedures are required.
- Use the correct tools when operating each maintenance procedure.

5.1.3 Check after maintenance

Always do the following items after performing any maintenance.

1. Turn off the engine:

- Ensure all steps listed in this manual have been followed.
- Inspect all works for correct completion.
- Complete the maintenance log for this machine and return it to its storage location.
- Follow the **lockout/tagout procedure** for returning the unit to operation.
Refer to "["Notes of lockout/tagout" on page 2-21.](#)

2. Turn on the machine:

- Check for leaks which have been maintained.
- Ensure that there is no unusual sound coming from the engine or hydraulic system.
- Check for every loose or abnormal movement which have been maintained.
- Check for any overheating which have been maintained.

5.2 Inspection and maintenance in adverse environments

Check and clean every electrical component to prevent accumulated corrosion.

Check and clean every area where extreme heat is present, such as the exhaust system, manifold and turbocharger.

1. Mud, rain or snow conditions

Before operating the machine, inspect each connector for looseness.

After operating the machine, clean the machine, inspect for missing or loose bolts and nuts. Add oil and lubricating grease as needed.

2. Near ocean (salt air) environments

Before operating the machine, inspect each plug and pin for looseness. Apply grease where rust is found, especially at cylinder rods and control levers.

After operating the machine, thoroughly wash away the salt residue, apply grease where rust is found, and perform maintenance carefully on the electric components to prevent corrosion.

3. Rocky ground surface

Inspect the wheels and tires for damage, such as cracks, abrasions, scars, loose bolts and missing bolts.

4. Cold environments

In the environment that the air temperature is below 0°C (32°F) or water is prone to freeze, drain off the water in water tank and pipelines to avoid frost crack.

Before starting the truck at cold environments, clear the ice in the water tank, valve, pipelines and other elements.

Perform the following warm-up procedure.

- Start the engine and run it at idle speed for 7 minutes–10 minutes. Then increase the engine speed to 1200 r/min till the hydraulic oil temperature is at least 20°C (68°F).
- Proceed with usual operation only after completing warm-up procedure as above.
- Adjust the warm-up period according to the ambient temperature.

During usual construction operation, take care to operate the controls slowly and observe the traveling system for any sign of trouble.

5. Other weather environments

If there is evidence of bearings or bushings overheating, loose parts or rust during regular inspection, increase the frequency of lubrication. [“Lubricants and fluids” on page 5-16](#). The table applies only to usual operating conditions. Shorten the lubricating intervals in harsh environments,

including dusty and corrosive air, unusual external temperature, extremely heavy overload, frequent operating times, longtime duty cycle and so on.

5.3 Maintenance overview

5.3.1 Periodic table of maintenance

The maintenance period is calculated by mileage and time, whichever comes first. Refer to the maintenance period and projects to maintain your truck for its best technical state.

NOTICE

Risk of machine damage!

Lengthening the maintenance interval could result in machine damage.

When carrying out the maintenance as required, the drivers should shorten the mileage or time according to the environment and working condition of the district.

Table 5-1 Periodic table of maintenance

Period	Maintenance item	Reference
Per day	Check engine oil level.	"Engine oil level – check" on page 5-27
	Check cooling fluid level.	"Cooling fluid level – check" on page 5-31
	Check clutch fluid level.	"Fluid level – check" on page 5-44
	Check the fastening state of engine intake tube.	"Engine air intake tube – examine" on page 5-36
	Check and fasten cooling system tube.	"Cooling system pipeline – examine and fasten" on page 5-33
	Check and eliminate the sedimentary water in fuel supply system.	"Sedimentary water – drain" on page 5-39
	Check windshield washing fluid volume.	"Windshield washing fluid – check" on page 5-23
	Check the transmission and clutch leakage and unusual sound.	"Gearbox and clutch – check" on page 5-43
	Check the clutch pedal.	"Clutch pedal – check" on page 5-44
	Check the leakage and unusual sound of middle and rear axles.	"Middle and rear axles – examine" on page 5-48
	Check tyre (air pressure, sundries, crack and wear).	"Tyres and wheels – check" on page 5-70
	Check alternator.	"Alternator – check" on page 5-36

Table 5-1 Periodic table of maintenance (continue)

Period	Maintenance item	Reference
	Check brake air pressure, air path leakage, air charging, pressure maintaining and drain off seeper from air reservoir.	"Air pressure and seal condition – check" on page 5-77 "Air charging – check" on page 5-79 "Air tank – drain" on page 5-86
	Check the exhaust brake working state.	"Exhaust brake – check" on page 5-88
	Check steering hydraulic pipeline leakage, steering oil quantity and quality.	"Oil reservoir – check" on page 5-93
	Check steering wheel.	"Steering wheel – check" on page 5-97
	Check engine speed meter, vehicle speed mete, fuel meter, air pressure meter, water temperature meter, voltmeter, engine oil pressure meter, signal indicator lamp group and multi-function display screen.	"Instrument panel – check" on page 5-99
Per week	Maintain air filter element.	"Air filter – maintain" on page 5-33
	Check the tightening torque of wheel nuts.	"Tyres and wheels – check" on page 5-70
	Check wear state of brake friction lining.	"Brake lines and hoses - check" on page 5-85
	Adjust brake clearance.	"Brake clearance – adjust" on page 5-91
	Check battery terminal fixing, vent obstruction, voltage and electrical quantity.	"Battery – maintain" on page 5-101
	Check air conditioner refrigerant volume.	"Volume of refrigerant – check " on page 5-104
	Check air conditioner pipeline connection and wear state.	"Pipelines of air conditioner – check " on page 5-105
	Clear the condenser.	"Cleanliness of condenser – check " on page 5-105
	Maintain heater water valve core.	"Heater valve – maintain" on page 5-106
	Clear air conditioner air inlet filter.	"Air-in strainer – check " on page 5-107

Table 5-1 Periodic table of maintenance (continue)

Period	Maintenance item	Reference
Per 1 month (per 2000 km)	Inject grease into drive shaft (universal joint, spline, intermediate support).	"Drive shaft – examine" on page 5-46
	Inject grease into suspension system and front, middle and rear axles.	"Axles and suspension system – lubricate" on page 5-50
Per 3 months (per 5000 km)	Fill grease to cab front suspension and check fastener.	"Cab fasteners – check" on page 5-26
	Check the drive shaft.	"Drive shaft – examine" on page 5-46
	Fasten U bolts and track bar bolts.	"Bolts of axles and suspension systems – check" on page 5-48
	Check and adjust V type belt.	"V type belt – check and adjust" on page 5-37
	Fasten connecting bolts on the front, middle and rear axles.	"Bolts of axles and suspension systems – check" on page 5-48
	Check the wear state of front and rear suspension limited block.	"Buffer block – check" on page 5-53
	Check gear-box oil and vent plug.	"Gear oil of gearbox – check and change" on page 5-45
	Check air plug and gear oil quantity of middle and rear axles.	"Gear oil of middle axle and rear axle – check" on page 5-56
	Check and adjust toe in.	"Toe-in – check" on page 5-68 "Toe-in – adjust" on page 5-69
	Fasten and check bolts on brake air chamber bracket.	"Bolts of brake chamber bracket – check" on page 5-89
Per 6 months (per 10000 km)	Change the engine oil and oil filter element.	"Requirement of engine oil " on page 5-26 "Engine oil – change" on page 5-28
	Check and adjust V type belt.	"V type belt – check and adjust" on page 5-37
	Change air filter element.	"Air filter – maintain" on page 5-33
	Check gear-box oil and vent plug.	"Gear oil of gearbox – check and change" on page 5-45
	Change the hydraulic oil of cab turnover system.	"Hydraulic oil for cab turnover – change" on page 5-24
	Fill grease to cab front suspension and check fastener.	"Cab fasteners – check" on page 5-26

Table 5-1 Periodic table of maintenance (continue)

Period	Maintenance item	Reference
Per 12 months (per 20000 km)	Check the drive shaft.	"Drive shaft – examine" on page 5-46
	Fasten U bolts and track bar bolts.	"Bolts of axles and suspension systems – check" on page 5-48
	Fasten connecting bolts on the front, middle and rear axles.	"Bolts of axles and suspension systems – check" on page 5-48
	Check the wear state of front and rear suspension limited block.	"Buffer block – check" on page 5-53
	Check and change middle and rear axles differential gear oil.	"Gear oil of middle axle and rear axle – check" on page 5-56 "Gear oil of middle axle and rear axle – replace" on page 5-58
	Check air plug and gear oil quantity of middle and rear axles.	"Gear oil of middle axle and rear axle – check" on page 5-56
	Check hub bearing of middle and rear axles.	"Hub bearings of middle and rear axle – maintain" on page 5-60
	Check hub bearing of front axles.	"Hub bearing of front axle – maintain" on page 5-65
	Change tyre position.	"Tyres – transpose" on page 5-71
	Change bearing grease of front, middle and rear wheel hub and check brake return spring.	"Brief of hub bearings" on page 5-60
	Check and adjust toe in.	"Toe-in – check" on page 5-68 "Toe-in – adjust" on page 5-69
	Check brake return spring.	"Return spring – check" on page 5-93
	Check air dryer working state.	"Draining of air dryer – check" on page 5-86
	Fasten and check bolts on brake air chamber bracket.	"Bolts of brake chamber bracket – check" on page 5-89
Per 12 months (per 20000 km)	Change the engine oil and oil filter element.	"Requirement of engine oil " on page 5-26 "Engine oil – change" on page 5-28
	Check and adjust V type belt.	"V type belt – check and adjust" on page 5-37
	Change air filter element.	"Air filter – maintain" on page 5-33
	Adjust valve clearance.	"Brake clearance – adjust" on page 5-91
	Check gear-box oil and vent plug.	"Gear oil of gearbox – check and change" on page 5-45

Table 5-1 Periodic table of maintenance (continue)

Period	Maintenance item	Reference
	Eliminate the air in fuel system.	“Air of fuel system – eliminate” on page 5-40
	Change fuel precision of filter element.	“Fuel filter core – change” on page 5-41
	Change filter element of oil-water separator.	“Fuel-water separator – change ” on page 5-42
	Change the hydraulic oil of cab turnover system.	“Hydraulic oil for cab turnover – change” on page 5-24
	Fill grease to cab front suspension and check fastener.	“Cab fasteners – check” on page 5-26
	Check the drive shaft.	“Drive shaft – examine” on page 5-46
	Fasten U bolts and track bar bolts.	“Bolts of axles and suspension systems – check” on page 5-48
	Fasten connecting bolts on the front, middle and rear axles.	“Bolts of axles and suspension systems – check” on page 5-48
	Check the wear state of front and rear suspension limited block.	“Buffer block – check” on page 5-53
	Check and change middle and rear axles differential gear oil.	“Gear oil of middle axle and rear axle – check” on page 5-56 “Gear oil of middle axle and rear axle – replace” on page 5-58
	Check hub bearing of middle and rear axles.	“Hub bearings of middle and rear axle – maintain” on page 5-60
	Check hub bearing of front axles.	“Hub bearing of front axle – maintain” on page 5-65
	Check air plug and gear oil quantity of middle and rear axles.	“Gear oil of middle axle and rear axle – check” on page 5-56
	Change tyre position.	“Tyres – transpose” on page 5-71
	Change bearing grease of front, middle and rear wheel hub and check brake return spring.	“Brief of hub bearings” on page 5-60
	Check and adjust toe in.	“Toe-in – check” on page 5-68 “Toe-in – adjust” on page 5-69
	Check brake return spring.	“Return spring – check” on page 5-93
	Check air dryer working state.	“Draining of air dryer – check” on page 5-86

Table 5-1 Periodic table of maintenance (continue)

Period	Maintenance item	Reference
	Fasten and check bolts on brake air chamber bracket.	"Bolts of brake chamber bracket – check" on page 5-89
	Change steering hydraulic oil and filter element.	"Steering hydraulic oil and strainer – change" on page 5-94
Per 18 months (per 40000 km)	Change the engine oil and oil filter element.	"Requirement of engine oil " on page 5-26 "Engine oil – change" on page 5-28
	Check and adjust V type belt.	"V type belt – check and adjust" on page 5-37
	Change air filter element.	"Air filter – maintain" on page 5-33
	Adjust valve clearance.	"Brake clearance – adjust" on page 5-91
	Clean radiator and intercooler surface.	"Radiator and intercooler – maintain" on page 5-43
	Check gear-box oil and vent plug.	"Gear oil of gearbox – check and change" on page 5-45
	Eliminate the air in fuel system.	"Air of fuel system – eliminate" on page 5-40
	Change fuel precision of filter element.	"Fuel filter core – change" on page 5-41
	Change filter element of oil-water separator.	"Fuel-water separator – change " on page 5-42
	Change the hydraulic oil of cab turnover system.	"Hydraulic oil for cab turnover – change" on page 5-24
	Fill grease to cab front suspension and check fastener.	"Cab fasteners – check" on page 5-26
	Check the drive shaft.	"Drive shaft – examine" on page 5-46
	Fasten U bolts and track bar bolts.	"Bolts of axles and suspension systems – check" on page 5-48
	Fasten connecting bolts on the front, middle and rear axles.	"Bolts of axles and suspension systems – check" on page 5-48
	Check the wear state of front and rear suspension limited block.	"Buffer block – check" on page 5-53
	Check and change middle and rear axles differential gear oil.	"Gear oil of middle axle and rear axle – check" on page 5-56 "Gear oil of middle axle and rear axle – replace" on page 5-58

Table 5-1 Periodic table of maintenance (continue)

Period	Maintenance item	Reference
	Check air plug and gear oil quantity of middle and rear axles.	"Gear oil of middle axle and rear axle – check" on page 5-56
	Check hub bearing of middle and rear axles.	"Hub bearings of middle and rear axle – maintain" on page 5-60
	Check hub bearing of front axles.	"Hub bearing of front axle – maintain" on page 5-65
	Change tyre position.	"Tyres – transpose" on page 5-71
	Change bearing grease of front, middle and rear wheel hub and check brake return spring.	"Brief of hub bearings" on page 5-60
	Check and adjust toe in.	"Toe-in – check" on page 5-68 "Toe-in – adjust" on page 5-69
	Check brake return spring.	"Return spring – check" on page 5-93
	Check air dryer working state.	"Draining of air dryer – check" on page 5-86
	Fasten and check bolts on brake air chamber bracket.	"Bolts of brake chamber bracket – check" on page 5-89
	Change steering hydraulic oil and filter element.	"Steering hydraulic oil and strainer – change" on page 5-94
18 months (per 60000 km)	Change cooling fluid.	"Cooling fluid – change" on page 5-31
First maintenance item (running-in maintenance)	Change the engine oil and oil filter element.	"Requirement of engine oil" on page 5-26 "Engine oil – change" on page 5-28
	Change air filter element.	"Air filter – maintain" on page 5-33
	Eliminate the air in fuel system.	"Air of fuel system – eliminate" on page 5-40
	Change fuel precision of filter element.	"Fuel filter core – change" on page 5-41
	Change filter element of oil-water separator.	"Fuel-water separator – change" on page 5-42
	Fill grease to cab front suspension and check fastener.	"Cab fasteners – check" on page 5-26
	Check and adjust clutch pedal travel.	"Clutch pedal – check" on page 5-44
	Check the drive shaft.	"Drive shaft – examine" on page 5-46

Table 5-1 Periodic table of maintenance (continue)

Period	Maintenance item	Reference
	Inject grease into drive shaft (universal joint, spline, intermediate support).	"Drive shaft – examine" on page 5-46
	Check the tightening torque of wheel nuts.	"Tyres and wheels – check" on page 5-70
	Inject grease into suspension system and front, middle and rear axles.	"Axles and suspension system – lubricate" on page 5-50
	Change middle and rear axles differential gear oil.	"Gear oil of middle axle and rear axle – check" on page 5-56
	Change bearing grease of front, middle and rear wheel hub and check brake return spring.	"Brief of hub bearings" on page 5-60
	Check and adjust toe in.	"Toe-in – check" on page 5-68
	Check wear state of brake friction lining.	"Brake lines and hoses - check" on page 5-85
	Adjust brake clearance.	"Brake clearance – adjust" on page 5-91
	Check brake return spring.	"Return spring – check" on page 5-93
	Check air dryer working state.	"Draining of air dryer – check" on page 5-86
	Inject grease into front, middle, rear air chamber bracket, cam-shaft bracket base, adjusting arm and brake shoe pin.	"Grease of brake assembly – fill" on page 5-89
	Fasten and check bolts on brake air chamber bracket.	"Bolts of brake chamber bracket – check" on page 5-89
	Change steering hydraulic oil and filter element.	"Steering hydraulic oil and strainer – change" on page 5-94
	Inject grease into steering control mechanism, steering straight drawing, pole steering knuckle kingpin and strain pull rod ball stud, and check fasteners.	"Fastness – check" on page 5-96

5.3.2 Maintenance intervals

The periodic maintenance have two parts: routine inspection per 5000 km and maintenance per 10000 km. Look up the interval range ($\times 1000$ km) between routine inspection and every class maintenance in the table.

- Initial routine inspection at 5000 km, routine inspection per 10000 km.

Table 5-2 Routine inspection interval

The number of routine inspection	1	2	3	4	5
Mileage (km)	5	15	25	35	45

- Initial first-class maintenance at 10000 km, first-class maintenance per 20000 km.

Table 5-3 First-class maintenance interval

The number of first-class maintenance	1	2	3	4	5
Mileage (km)	10	30	50	70	90

- Initial second-class maintenance at 20000 km, second-class maintenance per 40000 km.

Table 5-4 Second-class maintenance interval

The number of second-class maintenance	1	2	3	4	5
Mileage (km)	20	60	100	140	180

- Initial third-class maintenance at 40000 km, third-class maintenance per 40000 km.

Table 5-5 Third-class maintenance interval

The number of third-class maintenance	1	2	3	4	5
Mileage (km)	40	80	120	160	200

Note: If the running range exceeds the value in table, do the maintenance according to the interval kilometers maintenance rules.

5.3.3 New truck – maintain

When the running range of new truck reaches 2000 km–3000 km or the service time reaches two months (subject to the first arrival), the compulsory maintenance must be applied to the truck. SANY can supply new truck with running-in compulsory maintenance with free labor cost. SANY can offer free engine oil filter and fuel filter, whereas the other material cost (such as engine oil,

transmission gear oil, middle and rear axle gear oil, wheel hub grease and superstructure maintenance oil) must be paid.

- Before starting the truck, do the ordinary check and make sure that every system is usual.
- In the running period, drive the truck on the flat road as possible.
- In the running period, the appropriate engine speed range is 1200 r/min–1600 r/min.
- Do not accelerate immediately after engine starting. Accelerate smoothly after the engine temperature reaches usual working state through 3 minutes–5 minutes idle running, and the maximum vehicle speed is below 50 km/h.
- Do not let the engine flamed out at the hot state, and maintain machine after 3 minutes–5 minutes idle running and engine temperature descending to the usual working state.
- Do not accelerate and brake rapidly, the clutch must be engaged smoothly.
- In order to avoid the engine working at lower speed, shift gears to low gear before uphill.
- In the first 3000 km period, the load must be below 60% of nominal load capacity, and strictly prohibit overload.
- In the running-in period, check the temperature and working noise of engine, transmission, rear axle wheel hub, brake hub and riding wheel. If the unusual state appears, identify the cause and troubleshoot it.
- If the looseness and interference appear, check the position of oil pipelines, air pipelines and circuit. Clear them immediately.

5.4 Lubricants and fluids

Table 5–6 Lubricants and fluids in details

Project	Grade of oil and grease	Standard of capacity	Oil volume
Hydraulic oil for cab tilting system	VG32# antifriction hydraulic oil	Fill up the oil pump.	800 mL–1000 mL
Fuel	Diesel engine (light diesel): 0# (district above 4°C/39.2°F) -10# (district above -5°C/23°F) -20# (district -5°C/23°F – -14°C/6.8°F) -35# (district -14°C/6.8°F – -29°C/-20.2°F) -50# (districts -29°C/20.2°F – -44°C/-47.2°F) Gas engine: LNG	Fill up the fuel tank. The pressure of air tank reaches to the valve required.	Fuel: 300 L or 200 L Gas: 450 L

Table 5-6 Lubricants and fluids in details (continue)

Project	Grade of oil and grease	Standard of capacity	Oil volume
Engine oil	Grade: CH-4 Viscosity recommended: 15W-40 (-20°C/-4°F – 40°C/ 104°F) 10W-30 (-25°C/-13°F – 30°C/ 86°F) 5W-30 (-30°C/-22°F – 30°C/86°F)	The oil level is in the recess of the oil dip stick.	Hino: 29.5 L Weichai: 30 L Cummins: 27.6 L
Coolant	-45#	2/3 of the highest scale mark.	42 L–45 L
Brake fluid	DOT3 or DOT4	Between the highest and lowest scale mark.	1.0 L
Urea	AUS32 conformed to GB29518 (the urea content is 32.5%).	Fill the urea to 90% of the tank, lower than the highest scale mark.	Hino engine with Kailong after treatment: 35 L Hino engine with Bosch after treatment: 28 L Weichai: 28 L
Gear oil of transmission	85W-140 (GL-5) Tropical region (above 30°C/86°F) 85W-90 (GL-5) Normal temperature region (-15°C/5°F – 30°C/86°F) 80W-90 (GL-5) Cold region (-30°C/-22°F – 15°C/59°F) 75W-90 (GL-5) High-cold region (below -30°C/-22°F)	The oil level flushes the low plane of the filler.	13 L–14 L

Table 5-6 Lubricants and fluids in details (continue)

Project	Grade of oil and grease	Standard of capacity	Oil volume
Oil of differential of middle axle and rear axle	85W-140 (GL-5) Tropical region (above 30°C/86°F) 85W-90 (GL-5) Normal temperature region (-15°C/5°F – 30°C/86°F) 80W-90 (GL-5) Cold region (-30°C/-22°F – 15°C/59°F) 75W-90 (GL-5) High-cold region (below -30°C/-22°F)	The oil level flushes the low edge of the observation hole.	13T single reduction final drive of middle axle: 18 L Inter-axial differential: 2 L 13T single reduction final drive of rear axle: 16 L Final drive of STR middle axle: 8.3 L Final drive of STR rear axle: 6 L One-sided wheel reductor: 2 L
Hydraulic oil of steering gear	46# antifriction hydraulic oil or 8# hydraulic drive oil	The level should be above the upside margin of the observation hole.	Truck with 3 axle: 8 L Truck with 4 axle: 15 L
Coolant of air condition	HFC-134a	-	730 g
Refrigerant oil of air condition	PAG100	-	Refrigerant recharged: 30 mL Parts replacement: HVAC assemble: 50 mL condenser: 30 mL pipe line: 10 mL accumulator: 30 mL Oil mass in the new compressor: add 30 mL on the mass in the old compressor.

Table 5-6 Lubricants and fluids in details (continue)

Project	Grade of oil and grease	Standard of capacity	Oil volume
Bearing grease of front, middle and rear wheel hub.	Heavy duty vehicles: wheel hub grease NO.3	Apply a layer of grease on the surface of the inner chamber of the wheel hub: 10 mm–20 mm, the bearing grease overflows from other side.	Oil mass used in one-sided wheel hub is about 800 g to 1000 g.
Grease of steel plate pin, sleeve and damper.			-
Grease of the front suspension of cab.			-
Grease of operation rod of transmission.			-
Grease of universal joint, spline and intermediate support.			-
Grease of bracket of front, middle and rear chamber, bracket bearing of camshaft, adjusting arm and axle pin of brake shoe.	Extreme pressure lithium base grease MEP-II or extreme pressure synthetic lithium base grease.	The lithium base grease does not outflow.	-
Grease of steering operation structure, steering tie rod, drag link, steering knuckle king pin and ball pin of tie rod.			-

5.5 General torque values

5.5.1 Tightening torques of bolts without lubrication

Table 5–7 Tightening torques of bolts (without lubrication)

Thread specification	Strength grade (8.8)	Strength grade (10.9)	Strength grade (12.9)
	Tightening torque (N·m)	Tightening torque (N·m)	Tightening torque (N·m)
M8	23±2	34±2	39±2
M10	45±5	67±5	78±5
M12	85±5	118±8	137±8
M16	210±10	290±10	339±15
M20	408±15	568±18	666±18
M24	710±18	984±20	1147±25
M30	1410±25	1956±25	2280±25
M36	2470±30	3412±30	3988±30

5.5.2 Pre-tightening torques of pipe connectors

Do not apply excessive force when disassembling pipe connectors. When tightening pipe connector, the pre-tightening torques should be moderate to ensure that there is no leakage.

Table 5–8 Tightening torques of pipe connectors (close to rubber hose and steel pipe)

Number	Metric thread	Tightening torque (N·m)	Number	Metric thread	Tightening torque (N·m)
1	M12×1.5	15–25	8	M26×1.5	85–125
2	M14×1.5	30–45	9	M30×2	115–155
3	M16×1.5	38–52	10	M36×2	140–192
4	M18×1.5	43–85	11	M42×2	210–270
5	M20×1.5	50–65	12	M45×2	255–325
6	M22×1.5	60–88	13	M52×2	280–380
7	M24×1.5	60–88	–	–	–

Table 5-9 Tightening torques of pipe connectors (close to oil port)

Series	Thread G	Type A seal (metal washer)	Type B Seal (metal plain washer)	Type E seal (elastic-ED)	Type F seal (o- ring)
		Tightening tor- que (N·m)	Tightening tor- que (N·m)	Tightening torque (N·m)	Tightening tor- que (N·m)
L	M10×1.0	9	18	18	15
	M12×1.5	20	30	25	25
	M14×1.5	35	45	45	35
	M16×1.5	45	65	55	40
	M18×1.5	55	80	70	45
	M20×1.5	65	140	125	60
	M27×2	90	190	180	100
	M33×2	150	340	310	160
	M42×2	240	500	450	210
	M48×2	290	630	540	260
S	M12×1.5	20	35	35	35
	M14×1.5	35	55	55	45
	M16×1.5	45	70	70	55
	M18×1.5	55	110	90	90
	M20×1.5	55	150	125	80
	M22×1.5	65	170	135	100
	M27×2	90	270	180	170
	M33×2	150	410	310	310
	M42×2	240	540	450	330
	M48×2	290	700	540	420

5.6 Safety preparation

5.6.1 Work place preparation

The maintenance area should be dedicated, separate, large and ventilated.

The machine should be transferred to maintenance area, and there are certain distance or anti-clash device between the machine and surroundings.

5.6.2 Machine safety measures

- Stop the truck and pull off the keys which must be kept by operator to avoid irregular operation of unauthorized people.
- Shift gears to neutral gear, then pull up parking brake valve and jam the tyre with wedge-shaped blocks.
- Clean the oil, fuel and antiseptic before maintenance, and check whether all fuel, engine and hydraulic pipelines leak or not.
- Clean the mud, snow and ice on handle, step, flat floor and ladder.
- Use proper jack to jack up the truck. The jack is used to change the tyre.
- Use the proper tools, device and measure tools.
- Do not trample any pipeline and assistant device to avoid parts damage or failure.
- After maintenance, check all components and make sure that all is normal.
- Ask service station for help about the situation unmentioned in the manual.

5.6.3 Personnel safety measures

- The operator must wear safety device: safety shoes, safety gloves, safety helmet and so on.
- The dedicated operator must be according to work requirements.

5.7 Maintenance attentions

5.7.1 Attentions of lubricating oil

Adding and changing lubricating oil or grease periodically can improve performance and reduce downtime.

5.7.2 Attentions of checking or changing grease

Attentions of adding and changing lubricating oil or grease:

- Stop the truck and wait a moment. When the oil temperature drops to the normal, check and change the lubricating oil of engine, transmission and differential gear.
- Before adding lubricating oil, check whether there are leakages or not. If leakages appear, contact the local SANY service station and check the trouble.
- Discharge the unused grease and cooling liquid to a container. Do not pour the stuff to an unauthorized place (such as floor or barrel-drain). Dispose the unused stuff according to the local law regulation and environment protection requirement.
- Clear the splashed oil to avoid corrosion, environment pollution and fire.
- Clear the engine oil splashed on the surrounding, including engine oil filler lid, engine oil filler tap and drain plug after adding and changing the oil, which is convenient to inspect leakage.
- Clear the dust and soil on oil gun nozzle and lubricated parts before filling grease.

- Use the long-term good lubrication to avoid abnormal abrasion. Grease deficiency can cause excessive free clearance and larger friction between parts, and the abnormal sound and part abrasion.
- Check whether there are leakages or not by truck running test after adding and changing grease.

5.7.3 Attentions of truck cleaning

- When flushing, avoid the electric joint, electric element, electronic device, plug and loudspeaker. Meanwhile, do not splash water into the air inlet when using the water-pipe to flush off the truck.
- Do not wash the chassis wiring joint with water gun directly. The high pressure water can make the waterproof rubber distorted and cause water inflow. Because of the waterproof structure, the water inside joints is so hard to vaporize that the wires break for being rusted and corroded.
- Clear the whole truck after running on the road which is corroded by salt (like seawater) or chemical stuff.
- Check the brake system after truck clearing: if the brake system is abnormal, drive the truck slowly, meanwhile step the brake pedal lightly and repeatedly until the brake become dry and safe, and keep safety all time.
- Do not splash water on any engine electronic element to prevent them from damage, which can cause engine start trouble.
- Do not use sharp or pointed tools to clean the truck, otherwise the paint can be damaged.
- Do not pour or sprinkle the water into cab, otherwise the splashed water can damage electronic elements.
- Do not use organic solvent to clean safety belt and do not blanch or color the safety belt, otherwise the safety belt performance can be discounted. Clean the safety belt with cleanser which have no organic solvent and use the belt after complete dry.
- Do not use organic solvent to clean the elements inside cab, otherwise, some elements can be discolored and polluted. Some cleanser in common use have organic solvent, identify them to use.

5.8 Cab – maintain

5.8.1 Windshield washing fluid – check

NOTICE

Risk of spraying device damage!

When temperature is lower than 0°C (32°F), residual washing fluid could cause frost crack.

When the temperature is lower than 0°C (32°F), drain off washing fluid in reservoir to avoid frost crack of spraying device. In the north where the temperature is low, add some alcohol to prevent the fluid from freezing.

The washing fluid is usually water without impurities. If there is impurity, it may cause blocking of **washer nozzle (1)**, **fluid reservoir (2)** and pipelines.

1. Before the first run of each day, open front panel and check the volume of windshield washing fluid in **fluid reservoir (2)** located on the right side. If it is not enough, remove **fluid reservoir (2)** cover and replenish washing fluid.

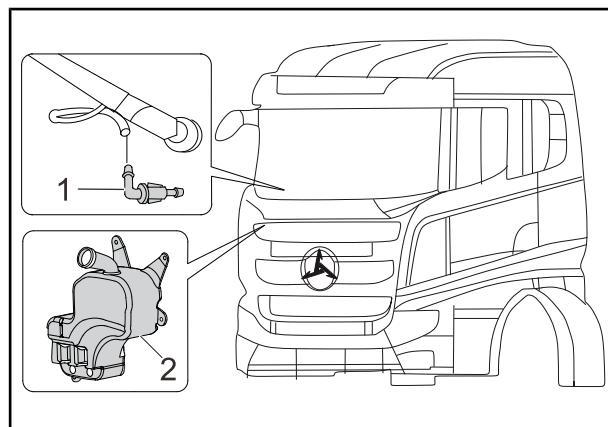


Fig.5-1 Windshield

2. Press the **wiper spray switch (5)** to check whether washing fluid sprays on windshield normally. If not, check the **washer nozzle (1)**, **fluid reservoir (2)** and pipelines.

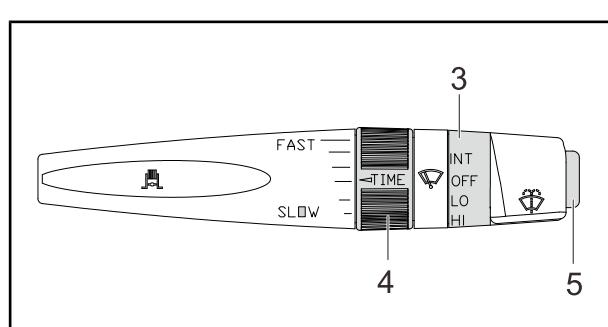


Fig.5-2 Handle

3. Wiper rotary switch	5. Wiper spray switch
4. Wiper cycle adjusting knob	

5.8.2 Hydraulic oil for cab turnover – change

NOTICE

Risk of the hydraulic components damage!

Using hydraulic oil of unspecified brand could cause damage to the hydraulic components. Use hydraulic oil of the approved brand.

Change hydraulic oil for cab turnover oil pump per 10000 km.

NOTICE

Risk of environmental pollution!

The undisposed waste oil could cause environmental pollution.

Drain off the waste oil to a proper vessel, and dispose of waste oil in right way.

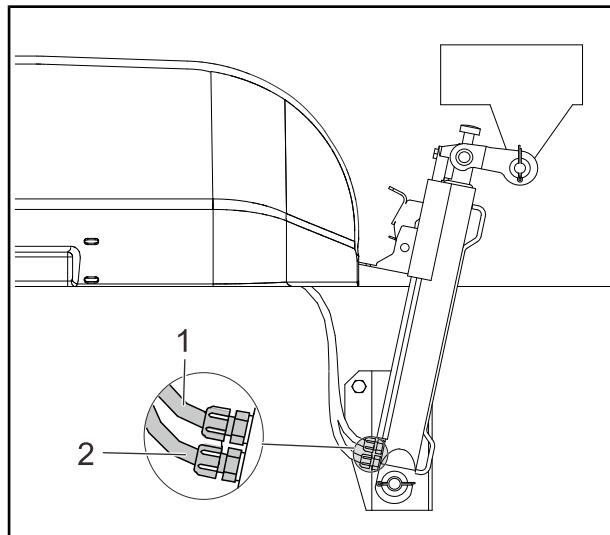
Steps of changing hydraulic oil:

1. Disconnect **A pipe (1)** and rotate reverse lever to the **lifting position (4)**. Drain off waste oil in oil pump by pressing down electric pump or rotating manual pump.
2. Fill 300 mL clean hydraulic oil (1/3 of the total volume) and drain off waste oil in oil pump. Repeat the process 2–3 times until there is no waste oil in oil pump.
3. Fill oil pump with clean oil.
4. Connect **A pipe (1)** and disconnect **B pipe (2)**.
5. Rotate reverse handle to the **lifting position (4)** and lift the cab to upper end point, then drain off waste oil in **B pipe (2)**.
6. Replenish cleaning hydraulic oil to full-level volume and connect **B pipe (2)**.
7. Rotate reverse handle to the **lowering position (3)** and restore the cab to its original position.

Hydraulic oil type: VG-32 hydraulic oil

Hydraulic oil capacity: 800 mL–1000 mL

Details to see “[Lubricants and fluids](#)” on page [5-16](#).



1. A pipe

2. B pipe

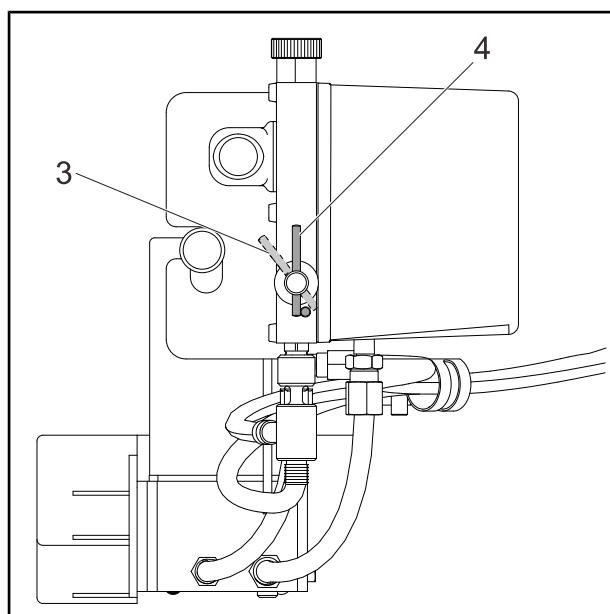


Fig.5-3 Reverse handle

3. Lowering position 4. Lifting position

5.8.3 Cab fasteners – check

- Check whether the **fasteners (1)** of front and rear suspensions and cab turnover mechanism are loose or missing.
- Check whether the cab turnover mechanism and **hydraulic pipes (2)** leak.
- If **fasteners (1)** and **hydraulic pipes (2)** are loose or broken, tighten or change fasteners and hydraulic pipes immediately.

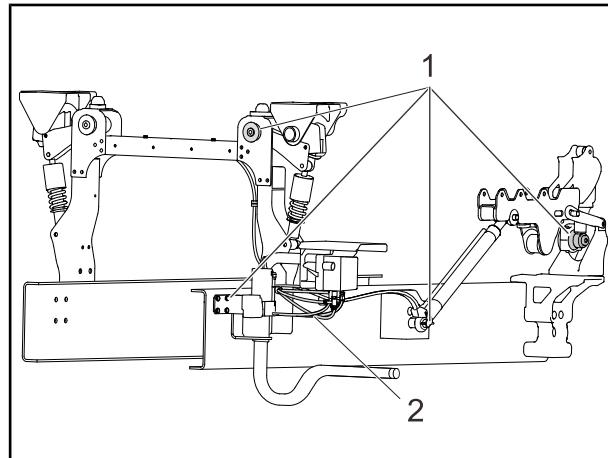


Fig.5-4 Rear suspension and tilt mechanism

1. Fasteners

2. Hydraulic pipes

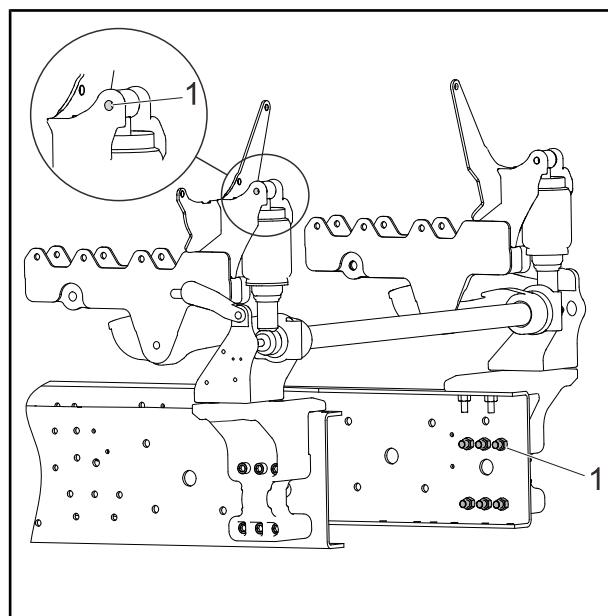


Fig.5-5 Front suspension

1. Fasteners

5.9 Engine – maintain

5.9.1 Engine oil – maintain

5.9.1.1 Requirement of engine oil

- Do not use the unapproved engine oil.

- The oil viscosity rating must accord with the environment temperature. Select the engine oil based on climate condition.
- Do not mix normal engine oil into generic oil or winter thickened oil, so as to prevent influencing low-temperature start.
- Check and maintenance of the engine oil filter can prevent oil deterioration.
- Changing engine oil periodically can keep good lubricant performance. Otherwise, there are unusual lubrication and cooling problems.

The approved engine oil type of SANY mixer truck is CH-4.

Find the engine oil corresponding viscosity grade and usage temperature in the following:

15 W-40 (-20°C–40°C)

10 W-30 (-25°C–30°C)

5 W-30 (-30°C–30°C)

5.9.1.2 Engine oil level – check

1. Stop a truck on the flat road.
2. Start the engine and keep idle running until reaching the normal working temperature.
See “[Engine start procedure](#)” on page 4-11.

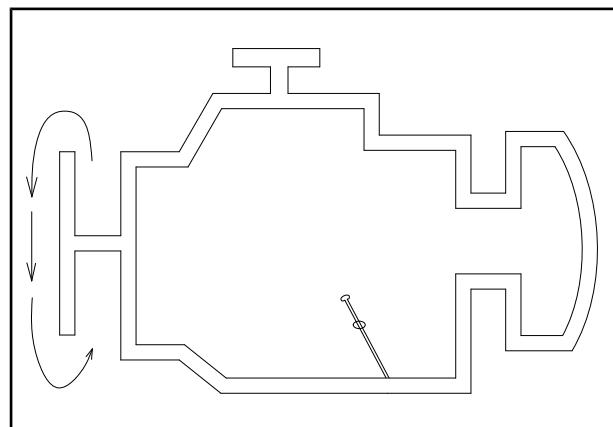


Fig.5-6 Start the engine

3. Stop the engine and wait about 5 minutes until the engine oil reflows into the oil pan.

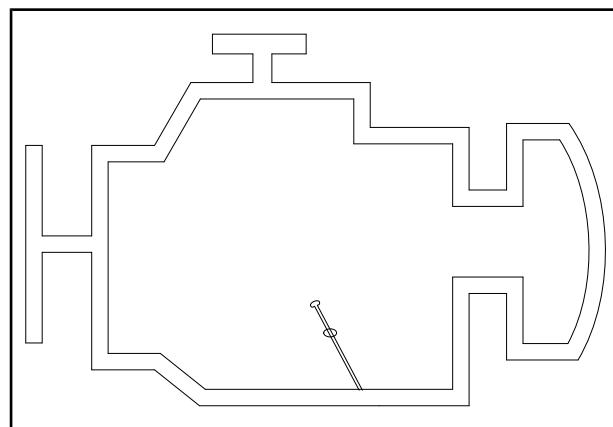


Fig.5-7 Stop the engine

4. Pull off the engine oil ruler, then clean and install it.

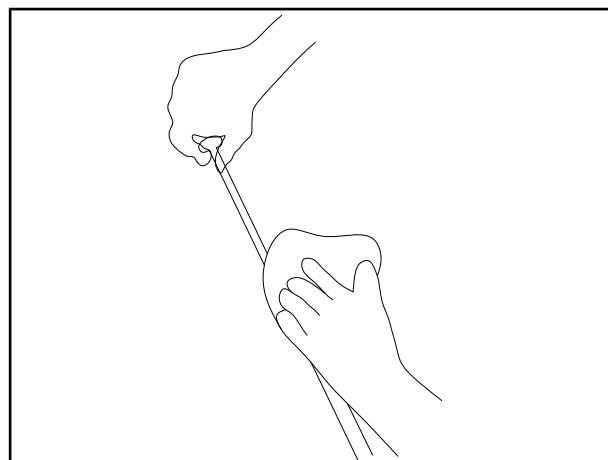


Fig.5-8 Clean and install engine oil ruler

5. Remove the engine oil dipstick again and observe the oil level. If oil level is in the **groove zone (1)**, it is normal.

6. Fill same brand and type engine oil as the last time added. Drain off extra oil through drain plug when the oil level is excessive.

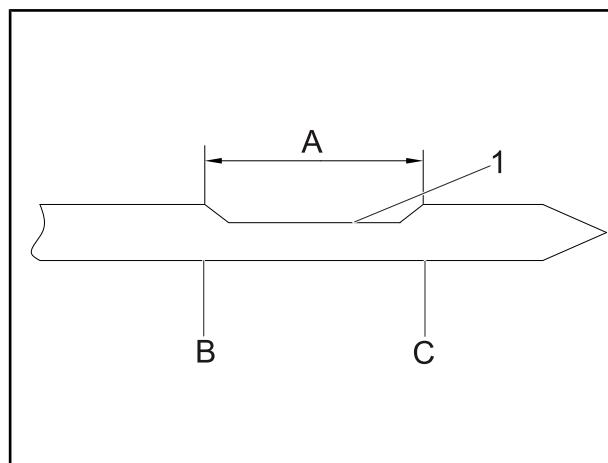


Fig.5-9 Engine oil level

1. Groove zone	B. Maximum
A. Normal	C. Minimum

5.9.1.3 Engine oil – change

The first maintenance range of engine oil is 2000 km–3000 km. Subsequent maintenance is done per 10000 km.

DANGER

Risk of death or serious injury!

Engine oil is toxic. If drunk by accident, it will cause death or serious injury.

Keep engine oil away from children and pets.

⚠ WARNING

Risk of burns or serious injuries!

When the engine is hot, changing engine oil could cause burns or other serious injuries.

Do not operate this task when the engine is hot. Wait for the engine to cool to ambient temperature before operating.

The method of changing engine oil:

1. Stop the engine and wait 10 minutes. Then remove the **drain plug (4)** at the bottom of **oil pan (5)** and drain off the oil into a correct container.

NOTICE

Risk of machine damage!

Unapproved filters could cause improper operation and damage to the machine. Only use approved filters.

NOTICE

Risk of environmental pollution!

Discarding the used filters casually could cause damage to the environment.

Dispose of the used filters in accordance with local environmental regulations.

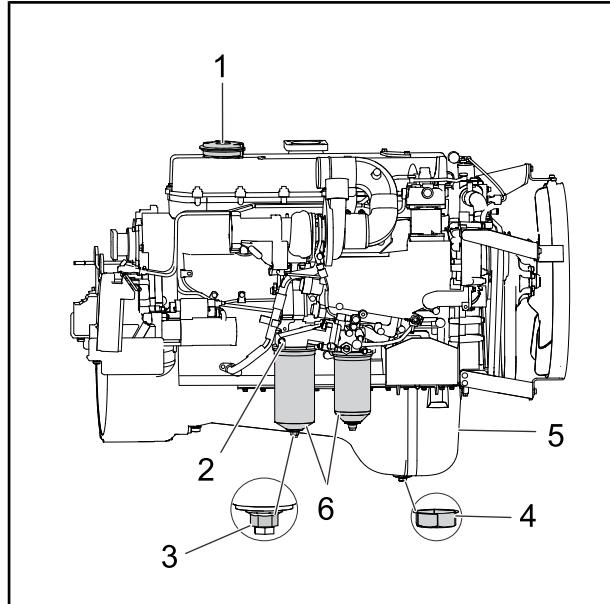


Fig.5-10 Changing engine oil

1. Engine oil filling port	4. Drain plug
2. Filter seat	5. Oil pan
3. Nuts	6. Engine oil filters

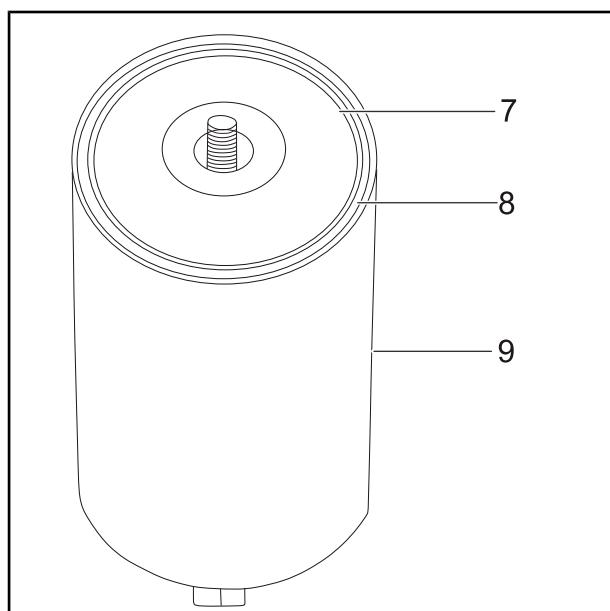


Fig.5-11 Engine oil filter

2. Clean the washers of **filter seat (2)**, and change **engine oil filters (6)**:

1) Remove the **nuts (3)** at the bottom of engine oil filters by inner hexagon spanner, then remove the large and small filters.

2) Drain off the oil in the large and small filters and take out **filter element (7)** and **seal washer (8)**.

3) Clean the inside of the **filter body (9)**.

4) Install a new filter element and seal washer into the filter body, and daub clean engine oil on the new seal washer.

5) Fill filters with clean engine oil.

6) Install filters on the base, and tighten the bolts by hand until the seal washer meet the base, then tighten the nuts until the torque reaches the value defined by filter manufacturer ((25±5) N·m) with a filter spanner.

NOTICE

Risk of machine damage!

Overfilling the engine oil could cause machine damage.

Do not overfill the engine oil.

3. Clean sump with a small amount of engine oil of the same brand and model from the **engine oil filling port (1)**.

4. Clean the drain plug and reinstall it, and add about 29.5 L engine oil.

5. Start the engine. Check whether the filter and drain plug leak at the idle state.

6. Stop the engine and wait 5 minutes–10 minutes, then pull off the oil dipstick to check oil level until oil level reaches the normal level.

7. Filter element

9. Filter body

8. Seal washer

5.9.2 Cooling system – maintain

5.9.2.1 Cooling fluid level – check

⚠ DANGER

Risk of death or serious injuries!

The cooling fluid is venomous. If mistake drinking or splashed into eyes and skin, it will cause serious injuries or death.

Do not drink the cooling fluid. Screw down cooling fluid tank and keep it in a safety area where children can not touch.

1. Check the cooling fluid level every day, and the fluid level should be between the **max line (MAX)** and **min line (MIN)**.
2. If the fluid level is below **min line (MIN)**, check whether engine and cooling system leak or not. If they leak, repair them.
3. After eliminating the leakage, open **tank cover (1)**, and replenish the cooling fluid until the fluid level reaches the **2/3 of max line (A)**.
4. Check whether the fluid level is in the normal position again after heating engine.

Note: when adding or replacing antifreeze in the natural gas engine, pay attention to the vent at the outlet of the carburetor to prevent gas blocking and affect the gasification of liquefied natural gas.

5.9.2.2 Cooling fluid – change

Change the cooling fluid per 6000 km or 18 months (subject to the first arrival).

⚠ CAUTION

Risk of getting scalded!

When the engine temperature is hot, changing or replenishing cooling fluid could get scalded.

Do not open the tank cover when the engine is hot. Change and replenish cooling fluid when the engine temperature is proper (below 50°C/122°F).

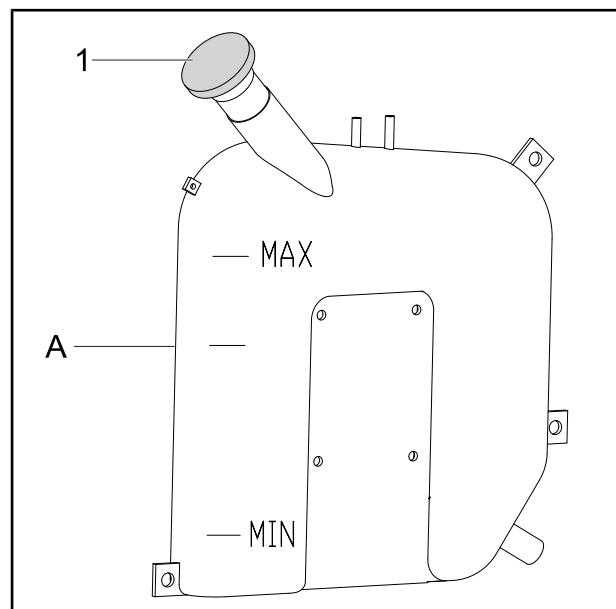


Fig.5-12 Cooling fluid tank

1. Tank cover

A. 2/3 of max line

1. Open the radiator **drain valve (1)** and drain the cooling fluid into a container.
2. Open the expansion tank cover, then fill the tank with some cooling fluid of the same type and wash about 1 minute.

NOTICE

Risk of engine overheating and corrosion!

The cooling fluid deficiency could cause engine overheating, corrosion and so on. Using water instead of cooling fluid could cause the corrosion of cooling system element.

Replenish the authorized type cooling fluid immediately and strictly forbid using water.

3. Close drain valve and replenish the cooling fluid until the fluid level reaches the 2/3 of max line, then screw the cover.

Cooling fluid type: -45#

NOTICE

Risk of engine overheating and cooling system leakage!

The cooling fluid with air could cause engine overheating and cooling system leakage.

Add the fluid slowly to prevent mixing the air into cooling fluid.

If air mixes into the cooling fluid, eliminate it.

Elimination method: start the engine and keep it in idle running at about 525 r/min for 10 minutes.

NOTICE

Risk of vehicle paint corrosion!

The cooling fluid on the vehicle paint could cause corrosion.

Wash the cooling fluid on the vehicle paint immediately.

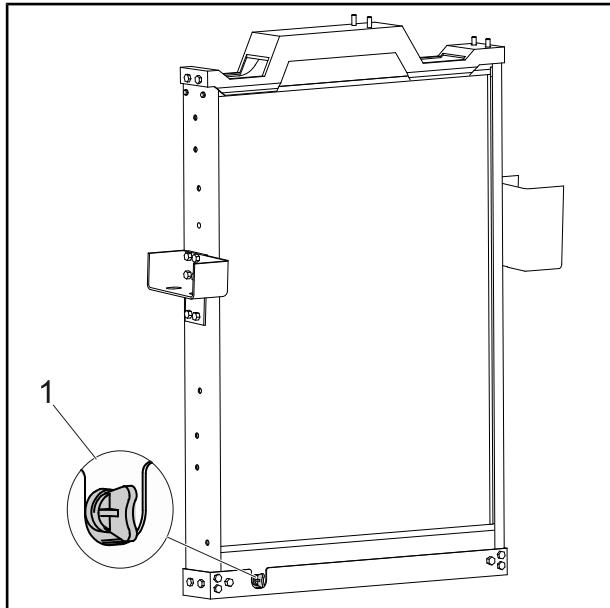


Fig.5-13 Radiator

1. Drain valve

4. Reserve the cooling fluid with a container and dispose of it correctly.

5.9.2.3 Cooling system pipeline – examine and fasten

Examine all fasteners and pipes of cooling system per week.

- Examine whether the **fasteners** (7) of cooling system are loose or missing.
- Examine whether the pipes are broken or there is leakage.
- If **fasteners** (7) and pipes are loose or broken, tighten or change parts immediately.

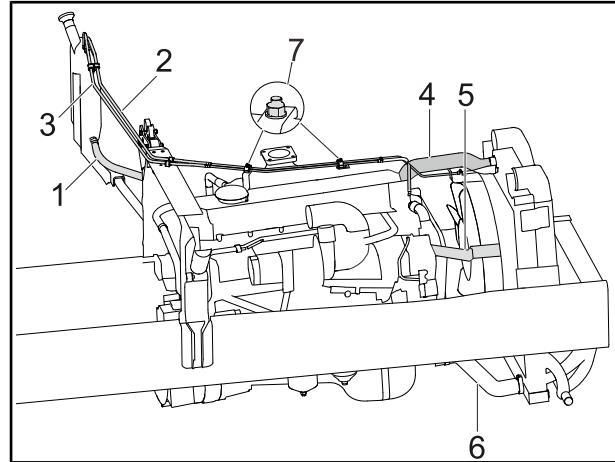


Fig.5-14 Cooling system pipeline

1. Engine downcomer	5. Fan bracket
2. Engine degassing steel pipe	6. Water tank downcomer
3. Radiator degassing steel pipe	7. Fasteners
4. Water tank top pipe	

5.9.3 Air inlet system – maintain

5.9.3.1 Air filter – maintain

Examine the air filter indicator light every day.

The green indicator window means correct working. The red indicator window means incorrect working and the filter element needs maintenance. Do the maintenance per week.

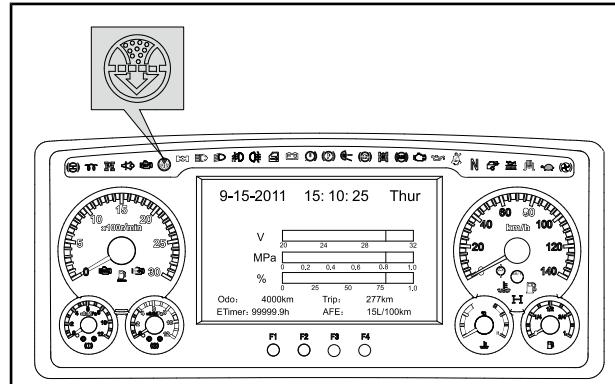


Fig.5-15 Air filter indicator light

Change the filter element per 10000 km. Change the outer and inner filter together.

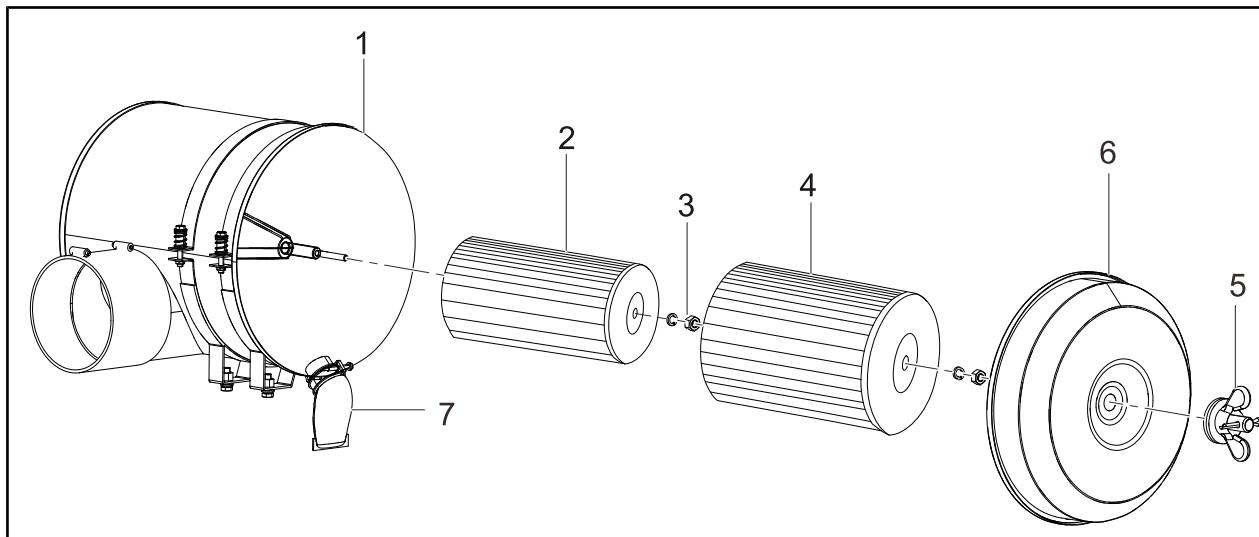


Fig.5-16 Air filter core

1. Filter body	3. Filter element nut	5. Butterfly nut	7. Dust exhaust valve
2. Inner filter element	4. Outer filter element	6. Filter fixed cover	

NOTICE

Risk of engine damage!

The incorrect installation of the filter element and filter outer shell could shorten the service life of engine. Washing the filter element with petroleum or water and knocking the dust on filter element could cause damage to the engine.

Install the filter element and filter outer shell correctly and clean it with overpressure air.

Maintenance methods of filter element:

1. Take off the **butterfly nut (5)** and **filter fixed cover (6)**.
2. Take off the **filter element nut (3)** and take out **inner filter element (2)** and **outer filter element (4)**.

3. Clean the **filter fixed cover (6)** and the inner surface of the **filter body (1)**, then check whether it is broken.

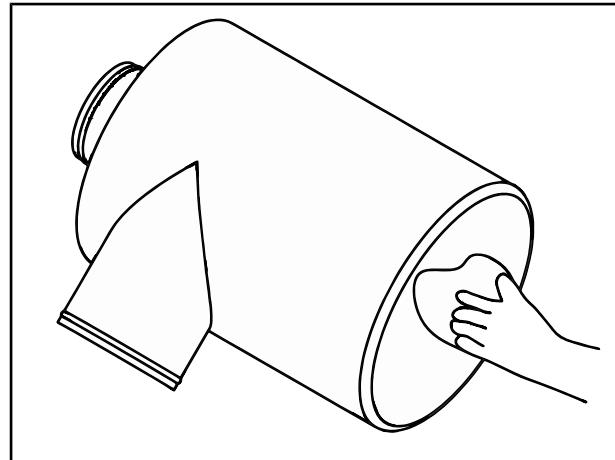
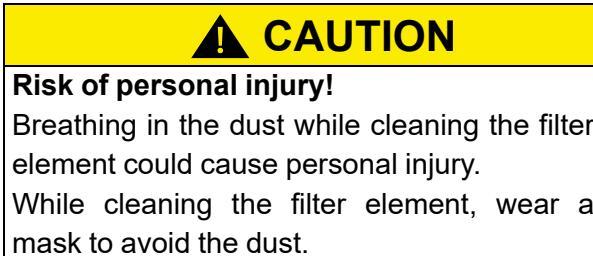


Fig.5-17 Wipe the filter

4. Clean the **dust exhaust valve (7)**, and do not damage or lose it.



5. Clean the dust and mud with compress air whose pressure is below 690 kPa, and blow the dust from inside to outside.

6. Install the filter element as the inverse order of taking off, screw down nuts and examine whether all sealing rings are correct.

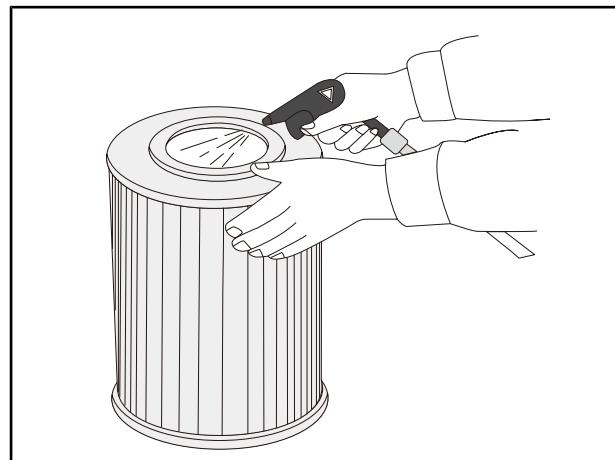


Fig.5-18 Clean dust and mud

5.9.3.2 Engine air intake tube – examine

- Examine whether the **air intake hose (1)** and **air intake steel tube (2)** is broken.
- If broken, repair them immediately. Clean them with compressed air before changing.
- Examine whether the nut connection state is fastened, and screw down **clip bolt (3)** of air inlet connection tube periodically.

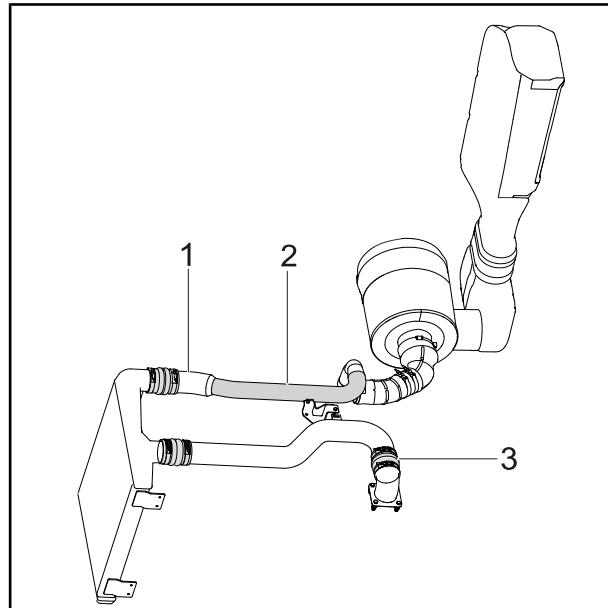


Fig.5-19 Engine air intake tube

1. Air intake hose	3. Clip bolt
2. Air intake steel tube	

5.9.4 Alternator – check

The voltage indicator must be in the normal voltage (24 V–26 V) range while engine is working.

If the indicator is in the red range (below 24 V) and charging indicator light is bright, it means that the accumulator discharge excessively or is broken.

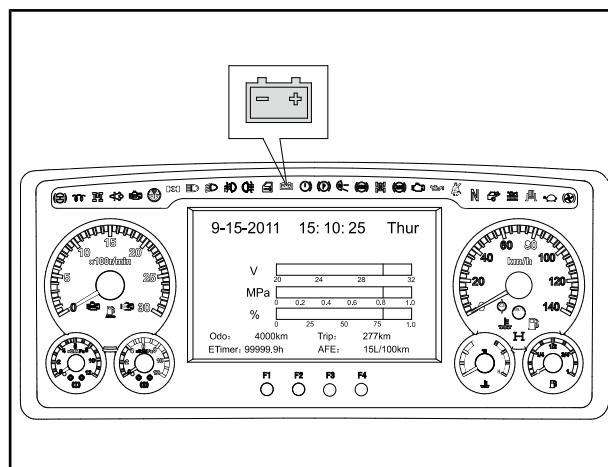


Fig.5-20 Charge indicator light

1. Monitor the battery **charging indicator (3)**.

Battery charging indicator status:

- **Green**: the battery is normal.
- **Black**: the battery needs to charge.
- **White**: the battery needs to replace.

2. Examine whether the tensity of alternator belt is proper, and adjust it when it is over loose or over tight. If the accumulator and belt tension are proper, inspect and repair the truck in service station.

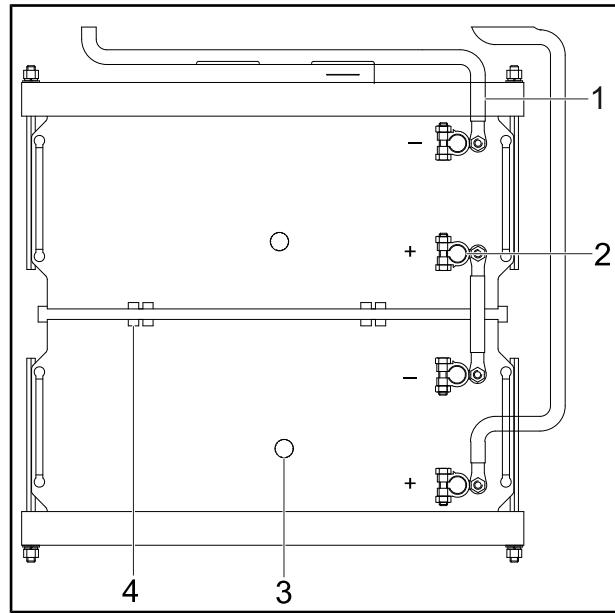


Fig.5-21 Charge indicator light structure

1. Negative cable (ground wire)	3. Charging indicator
2. Connection pole	4. Vent

5.9.5 V type belt – check and adjust

⚠ WARNING

Risk of serious injuries!

While the engine is running, touching or approaching any rotating part could tangle hands or clothing and cause serious injuries. Check the V type belt when the engine stops working.

Check the deformation amount of engine V type belt per 5000 km. Loose or tight belt can cause engine and air conditioner abnormal working or invalidation. Adjust the tension according to defined value. If the belt is broken, change it immediately.

Methods of checking alternator belt tension:

Apply force to the **measure point (D)** on the alternator belt, then the deformation amount should accord with the follow regulars:

- The deformation amount of new belt should be about 12 mm–13 mm.
- In general condition, the deformation amount of belt should be 14 mm–16 mm.

Adjust alternator belt tension as follows:

1. Screw down belt **fastener nut (1)**.
2. Increase the belt tension by rotating the **adjusting nut (2)** clockwise.
3. Tighten the fastener nut after tension adjustment.

Methods of checking compressor belt tension:

Apply force to the **measure point (D)** on the alternator belt, then the deformation amount should accord with the follow regulars:

- The deformation amount of new belt should be about 8 mm–10 mm.
- In general condition, the deformation amount of belt should be 6 mm–9 mm.

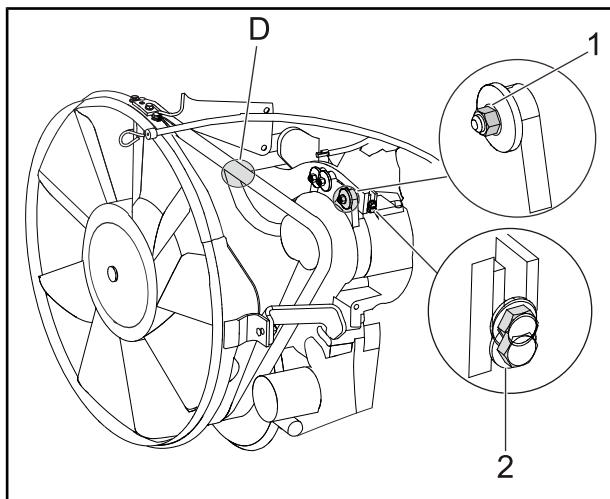


Fig.5-22 Check alternator belt tension

1. Fastener nut	D. Measure point
2. Adjusting nut	

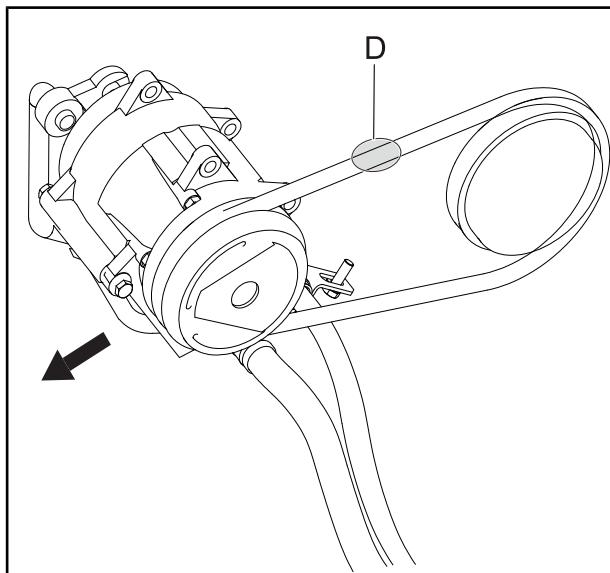


Fig.5-23 Check compressor belt tension

D. Measure point

Adjust compressor belt tension as follows:

1. Screw down the **nuts (3)**, and remove the **bolt (4)**.
2. Increase the belt tension by rotating the **support arm (5)** at the arrow direction.
3. Tighten the bolt and nuts after tension adjustment.

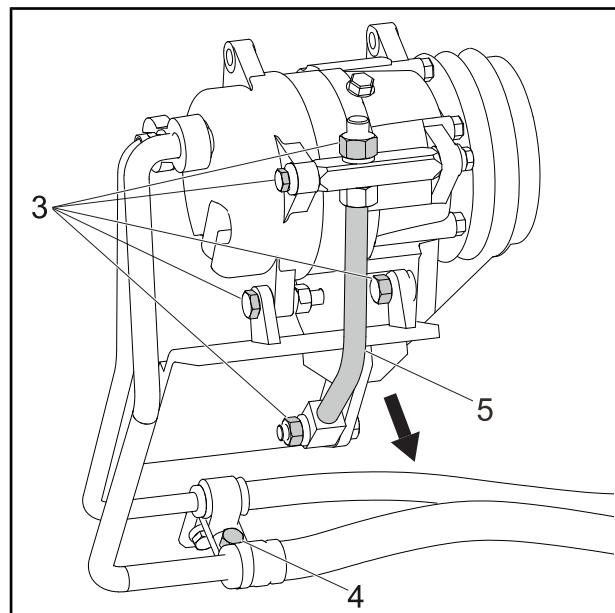


Fig.5-24 Adjust compressor belt tension

3. Nuts

5. Support arm

4. Bolt

5.9.6 Fuel supply system – maintain

5.9.6.1 Sedimentary water – drain

If the fuel-water separator indicator light is on, it means the water content of separator is over standard. Maintain it timely.

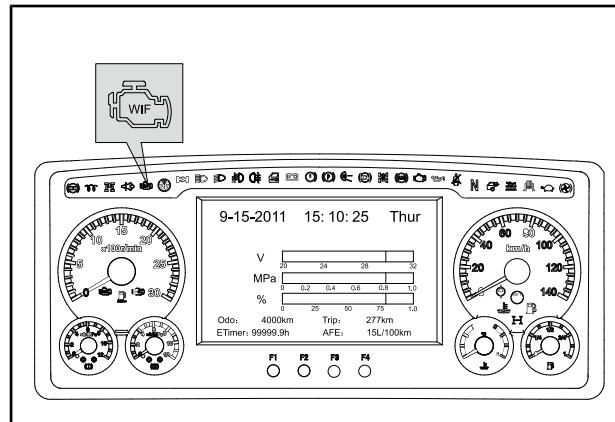


Fig.5-25 Fuel-water separator indicator light

⚠ DANGER

Risk of death or serious injury!

Maintaining the fuel system while smoking or near an open fire will result in death or serious injury.

Do not maintain the fuel system near an open fire or smoke.

Methods of draining off water in the fuel supply system of engine:

1. Open the **drain plug (2)** at the bottom of the **fuel-water separator (1)**.
2. Drain off the sedimentary water.

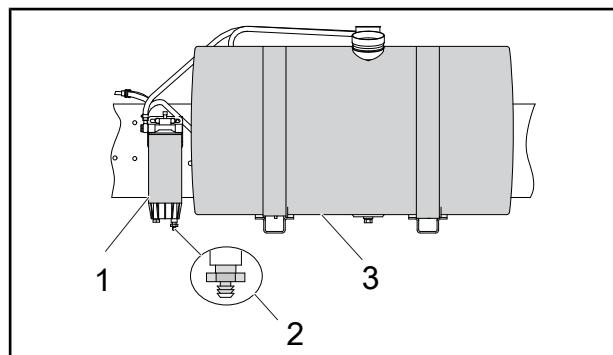


Fig.5-26 Fuel-water separator

1. Fuel-water separator	3. Fuel tank
2. Drain plug	

NOTICE

Risk of engine failure!

Air may get into the fuel supply system while draining off water which can cause the engine failure.

Remove air from the fuel supply system timely.

NOTICE

Risk of drain plug (2) damage!

Tightening the **drain plug (2)** with a tool can damage the drain plug.

Do not use any tool to screw down the drain plug.

3. Close the fuel-water separator by hand.

5.9.6.2 Air of fuel system – eliminate

NOTICE

Risk of environment pollution and fires!

The splashed fuel can pollute the environment and cause fires.

Clean up the splashed fuel in time.

Methods of air elimination in fuel supply system:

1. Remove the **air bleed plug (1)** on fuel filter.
2. Loosen the **manual pump (2)** button, and repeatedly press it until there is no air in the fuel supply system.
3. Screw down the air bleed plug with a torque spanner. The defined torque is 7 N·m.
4. Repeatedly press manual pump button for 3–4 times, then push manual pump handle to original position and screw it down.

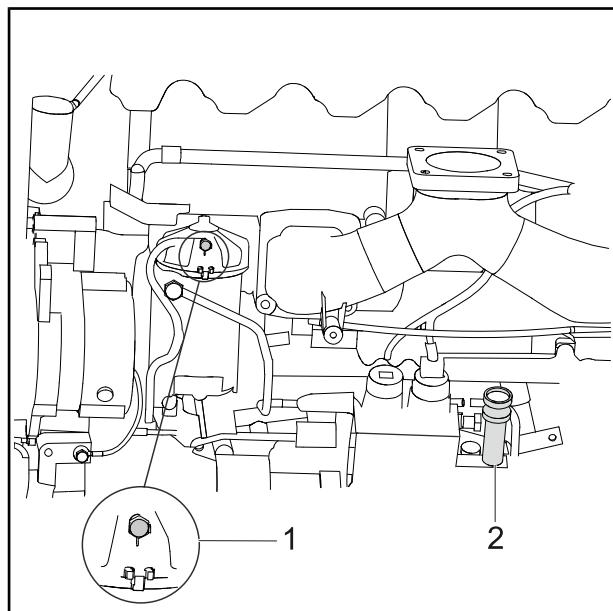


Fig.5-27 Fuel supply system

1. Air bleed plug 2. Manual pump

5.9.6.3 Fuel filter core – change

NOTICE

Risk of fire and environment pollution!

The waste fuel could pollute the environment and cause fire.

Drain off all the waste fuel to a container and dispose of it correctly. Wipe the splashed fuel immediately to avoid fire.

Change the fuel **filter core (4)** per 20000 km.

Methods of changing fuel filter core:

1. Remove the **top cover bolt (1)** and open the **top cover (2)**.
2. Take out the old **filter core (4)** and **washer (3)**.
3. Apply a thin layer of fuel oil on the new **washer (3)**. Then install the new **washer (3)** to the sealing position of the filter body.

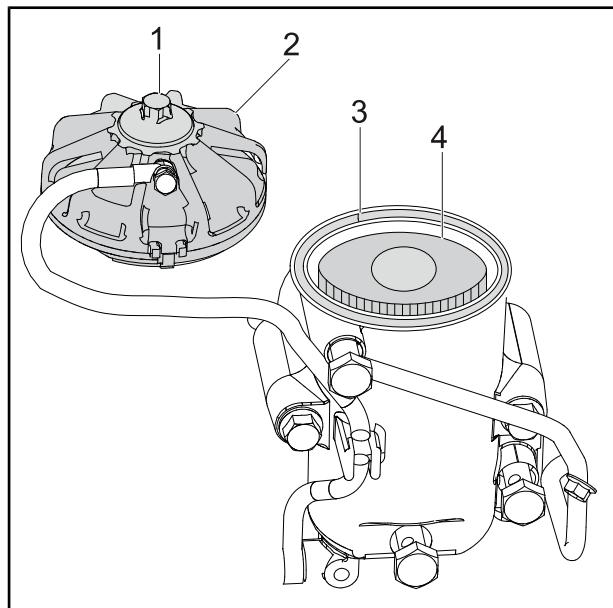


Fig.5-28 Fuel filter core

1. Top cover bolt 3. Washer
2. Top cover 4. Filter core

4. Install the new filter core. Then install the **top cover (2)** and tighten the **top cover bolt (1)**.

5. Exhaust the air from the fuel supply system.

5.9.6.4 Fuel-water separator – change

Change the filter core of **fuel-water separator (4)** per 20000 km.

NOTICE

Risk of fire and environment pollution!

The waste fuel could pollute the environment and cause fire.

Drain off all oil to a container and dispose of it correctly. Wipe the splashed oil immediately.

1. Rotate the **fuel-water separator (4)**, take it out from **filter seat (1)** and drain off the oil from the separator to a waste oil basin.

2. Take out the **washer (2)** from filter core coping and wash it with clean oil. If the washer is broken, change it with a new one.

3. Get a new filter core and daub the clean oil on **O type groove (3)**.

4. Daub clean oil on the washer, and install it in the **O type groove** which is on the top of filter core. Make the inclined angle of washer upturned and rotate it rightwards by hand lightly until it is completely sealed and fitted.

NOTICE

Risk of filter damage!

Using a wrench to fix the fuel-water separator could make the thread deformation and filter damage.

Do not fix the fuel-water separator with a spanner.

5. Install the fuel-water separator on base and screw it down by hand.

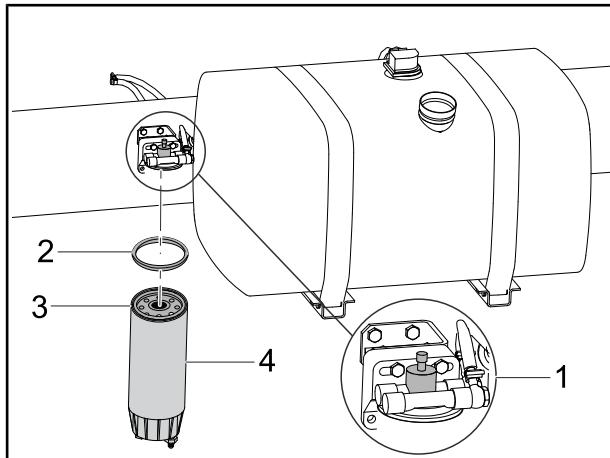


Fig.5-29 Fuel-water separator

1. Filter seat	3. O type groove
2. Washer	4. Fuel-water separator

6. Start the engine and check whether the fuel-water separator leaks or not.

5.9.7 Radiator and intercooler – maintain

NOTICE

Risk of parts corrosion and leakage!

Operating on the seaside or on salt roads could corrode radiator and intercooler. The radiator corrosion could result in leakage of the intake system and cooling system.

Wash the intercooler and radiator completely after running on the seaside or salt road and do not damage the radiator fin while washing.

- Check the fastening state of the **radiator** (2) and its connectors every day. If the leakage appears, inspect and repair them in the service station.
- In order to guarantee the cooling performance and prevent the cores of radiator and **intercooler** (1) from being rusted, check whether the front ends of intercooler and radiator are jammed by dust or mud. Clean them immediately, and wash the intercooler and radiator once a year at least.

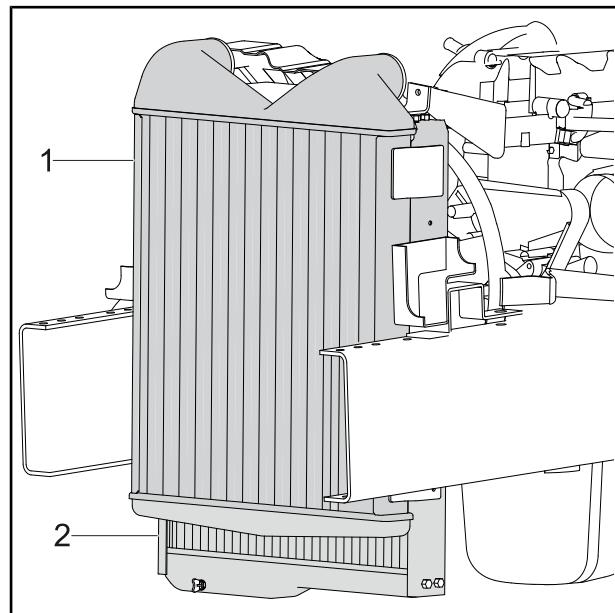


Fig.5-30 Radiator and intercooler

1. Intercooler

2. Radiator

5.10 Transmission system – maintain

5.10.1 Gearbox and clutch – check

- Check whether the gearbox leaks oil or has abnormal sound before running every day.
- Check whether the clutch has abnormal sound, quiver, skid and abnormal smell before running every day.
- Check whether the gearshift operation and gear switch are normal or not. If the gear shifting is heavy, blocked, tripping stop or it cannot be switched gears, overhaul the vehicle.

5.10.2 Fluid level – check

NOTICE

Risk of hydraulic components damage!

Using the unapproved brand of brake fluid could cause damage to the hydraulic components. Corrosive brake fluid that splashes on other parts could cause damage to other parts. Use brake fluid of specified brand. Wipe the corrosive brake fluid that splashes on other parts in time.

1. Open the **front panel (1)** of the cab.

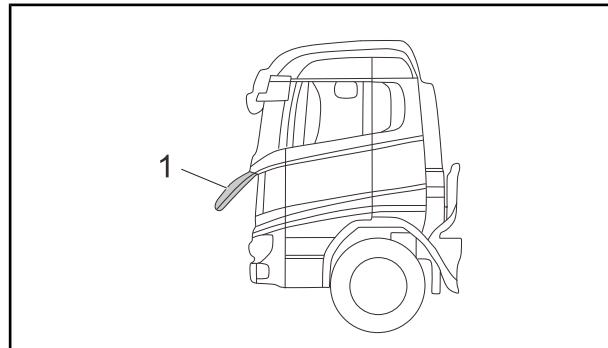


Fig.5-31 Open the front panel

2. Monitor the brake fluid level in **clutch oil reservoir (1)**. The fluid level should be between the **max (A)** and **min (B)** scale line.

Note: do not make the fluid exceed the max scale line, otherwise the brake fluid will leak out.

If the level is too low:

1. Examine pipelines for leakage.
2. After confirming no leakage, replenish the brake fluid. When replenishing the brake fluid, do not exceed the max scale line and cover the **oil can cap (2)** tightly.

Brake fluid type: DOT3 or DOT4.

1. Front panel

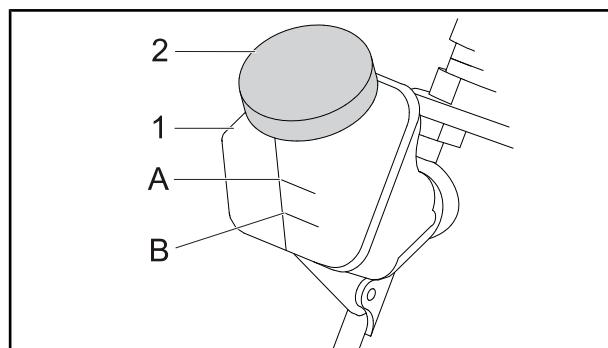


Fig.5-32

1. Clutch oil reservoir	A. Max
2. Oil can cap	B. Min

5.10.3 Clutch pedal – check

Check the clutch pedal travel:

- Check whether the clutch pedal is too hard or too soft, or there is noise when stepping on the pedal.

- Check whether the operation of clutch is steady and smooth while shifting gear.
- After shifting gear, loosen the clutch pedal gradually. Joining of the clutch should be smooth and steady, without shock, vibration and slipping.

Pedal free travel: 15 mm–25 mm

Pedal total travel: 130 mm–140 mm

Pedal ground clearance: 135 mm–145 mm

5.10.4 Gear oil of gearbox – check and change

Examine the gear oil of gearbox.

1. Park the truck on the level ground and examine the oil level after stalling for 1 minute.

2. Remove the **bolt of observation hole** (3) and examine whether the liquid level is flush with the lower edge of observation hole.

3. If the gear oil is deficient, replenish gear oil from the **filler cover** (1) until the oil overflows the observation hole. Then reinstall the filler cover.

Examine the **vent plug** (2).

If the vent plug is clogged, clean it with compressing air.

Change the gear oil of gearbox per 20000 km.

⚠ CAUTION

Risk of scald!

The temperature of gear oil is very high and it could cause scald.

Wait until the gear oil cools down before operation.

1. After heating the engine, remove the drain plug and drain the gear oil.

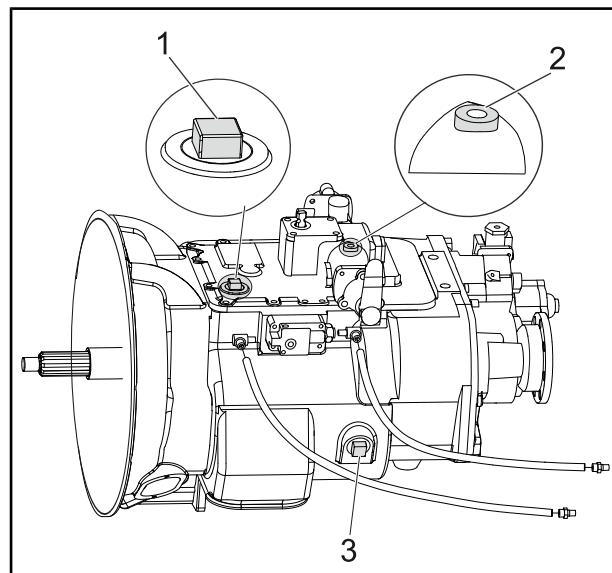


Fig.5-33 Gearbox

1. Filler cover

3. Bolt of observation hole

2. Vent plug

2. Rinse the drain plug and install it.
3. Dismantle the filler cover and replenish the new gear oil from the oil filler until the oil level is flush with the lower edge of observation hole.
4. Reinstall the filler cover.

NOTICE**Risk of damage to the gearbox!**

Using different brands of gear oil could cause damage to the gearbox.

Use the approved brand of gear oil.

Gear oil type:

85W-90 (GL-5) (above -15°C/5°F)

80W-90 (GL-5) (above -25°C/-13°F)

75W-90 (GL-5) (above -40°C/-40°F)

Using amount: 13 L–14 L

5.10.5 Drive shaft – examine

Examine the drive shaft per 5000 km. If there is noise or shaking, park the truck immediately for check.

NOTICE**Risk of damage to gearbox!**

If the drive shaft is connecting during towing, it could cause damage to the gearbox.

When towing the truck, disconnect the drive shaft.

1. Before the vehicle overhaul, examine the loose volume of **universal joint (2)** cross axle, the wear of **spline (1)**, the rubber wear of **middle support (3)** and the working performance of bearing.

2. When the radial and axial clearances of cross shaft are oversize, or there is serious wear of spline gear and middle support, replace the corresponding assembly or replace the drive shaft assembly if required.

Infuse grease into the drive shaft:

Infuse automotive general lithium grease into the **universal joint (2)**, **spline (1)** and **middle support (3)** every 2000 km.

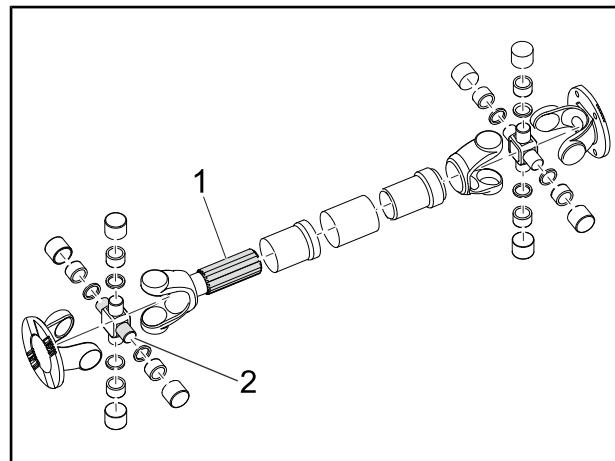


Fig.5-34 Drive shaft

1. Spline

2. Universal joint

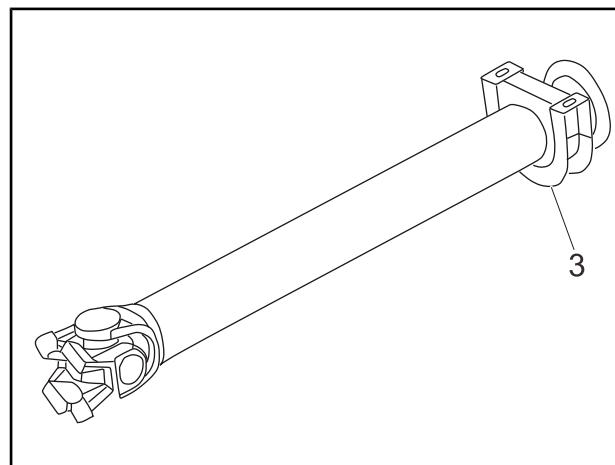


Fig.5-35

3. Middle support

5.11 Running system - maintain

5.11.1 Middle and rear axles – examine

Examine whether there is oil leakage in screw plug of oil inlet and outlet, oil seal of half axle, oil seal of main reducer, oil seal of through axle and so on.

Examine whether axles have unusual sound. If there is oil leakage or unusual sound, repair it in service station timely.

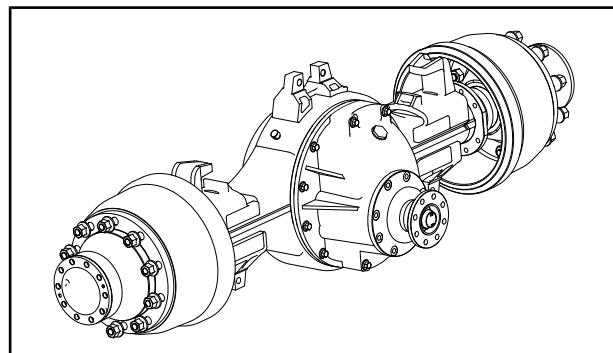


Fig.5-36 Rear axle

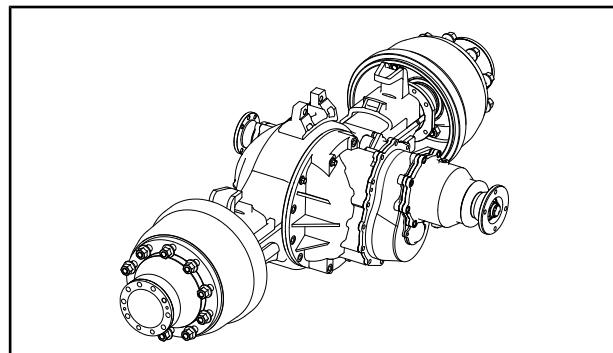


Fig.5-37 Middle axle

5.11.2 Bolts of axles and suspension systems – check

Examine and tighten the **U bolt (1)** and **bolt of torque rod (2)** per 5000 km.

Tighten the **U bolt (1)** by torque spanner with oil lubricant way. The oil must be Shell hypoid gear oil 80W/90GL-5.

1. Tightening torque of the front suspension **U bolt (1)**: 550 N·m–600 N·m.

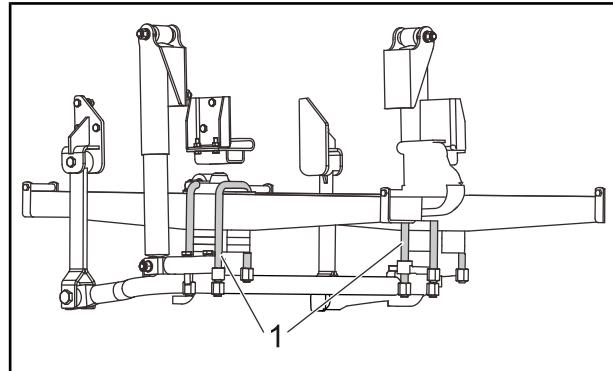


Fig.5-38 Front suspension

1. U bolt

Tightening torque of the rear suspension **U bolt (1)**: 800 N·m–850 N·m.

Tightening torque of the **bolt of torque rod (2)**: 400 N·m–440 N·m.

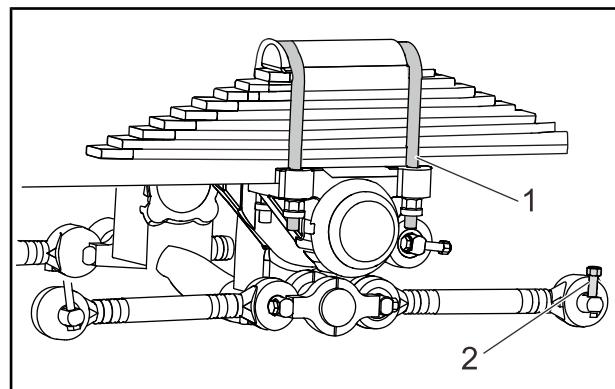


Fig.5-39 Rear suspension

1. U bolt

2. Bolt of torque rod

Check the **connecting bolts (3)** of front axle per 5000 km.

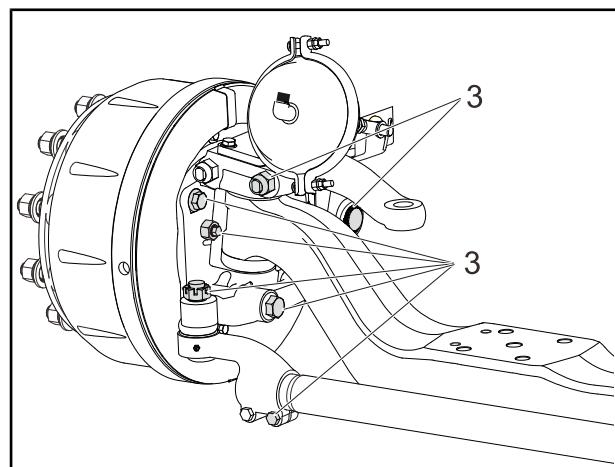


Fig.5-40 Front axle

3. Connecting bolts

Check the **connecting bolts (3)** of rear axle per 5000 km.

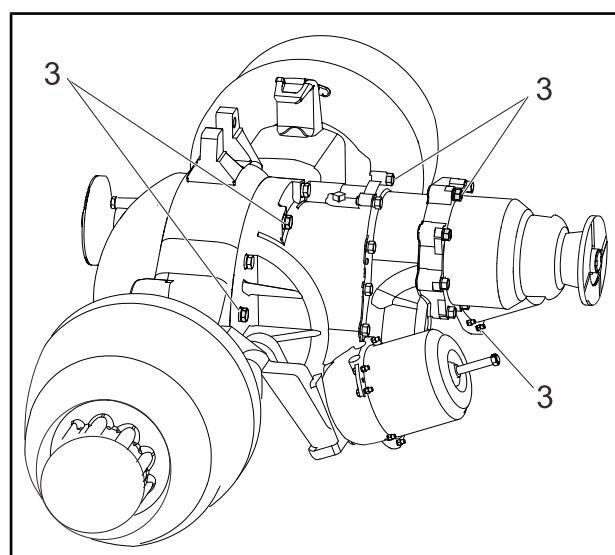


Fig.5-41 Rear axle

3. Connecting bolts

5.11.3 Axles and suspension system – lubricate

Per 2000 km or 1 month, inject general lithium base grease into all lubrication points of axles and suspension system, such as main pin, main pin bushing and tie rod ball pin of front axle, adjusting arm, camshaft, lower bracket of front suspension damper, steel pin, leaf spring base of balance suspension.

The method of filling up grease into the front axle main pin:

1. Support front axle with a jack.
2. One person rotates steering wheel to swing wheels, the other person fills grease.

- Fill grease into the **main pin bushing nipple (1)** and **ball pin nipple (2)**.

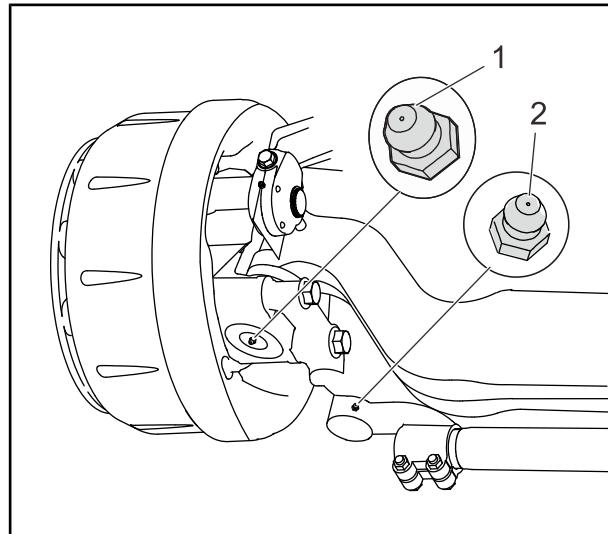


Fig.5-42

1. Main pin bushing nipple 2. Ball pin nipple

- Fill grease into the **main pin nipple (3)**.

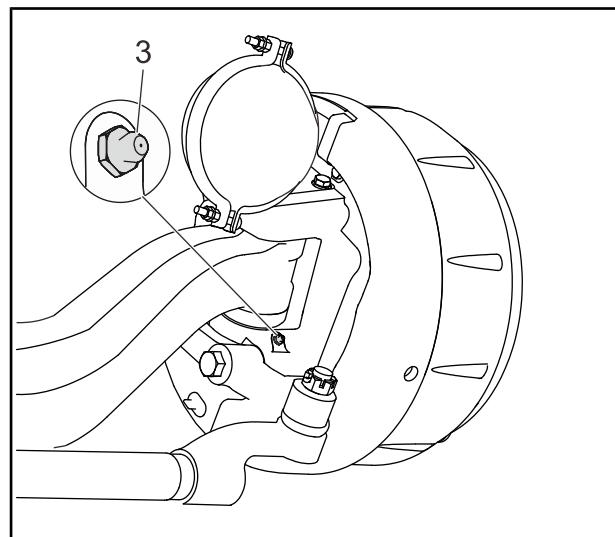


Fig.5-43 Main pin nipple

- Fill grease into **adjusting arm nipple (4)** and **camshaft nipple (5)**.

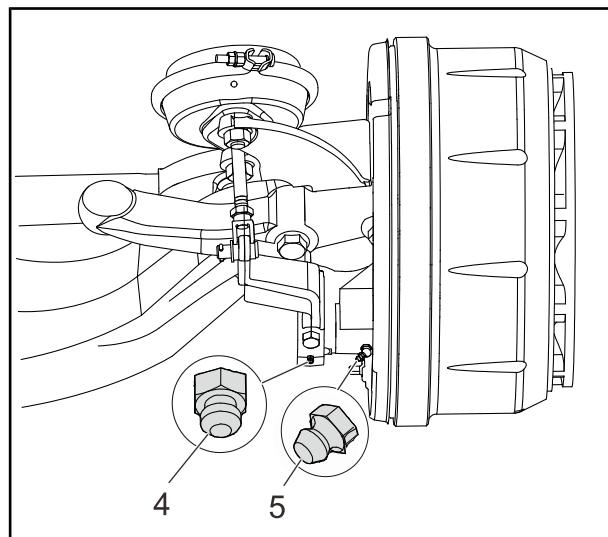


Fig.5-44 Adjusting arm and camshaft

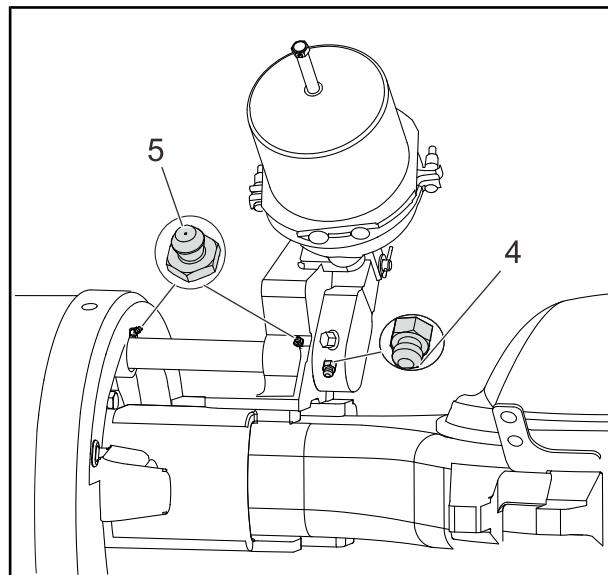


Fig.5-45 Adjusting arm and camshaft

4. Adjusting arm nipple 5. Camshaft nipple

- Fill grease into **steel pin nipple (6)** and **damper nipple (7)**.

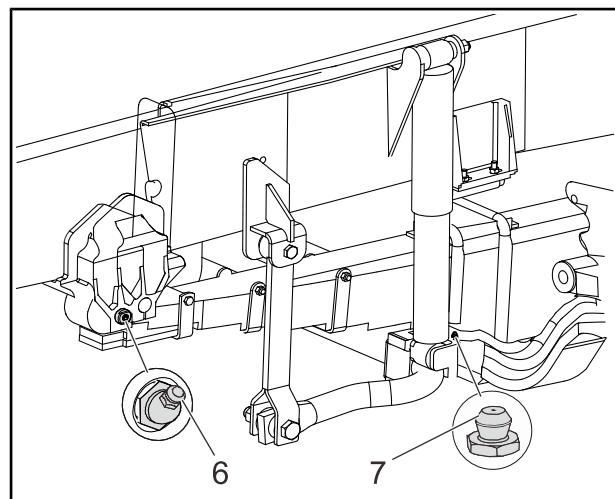


Fig.5-46 Lower bracket of suspension

6. Steel pin nipple 7. Damper nipple

- Fill grease into **leaf spring base nipple (8)**.

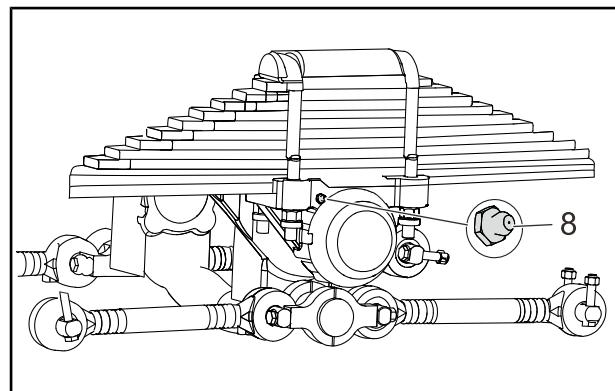


Fig.5-47 Balance suspension

8. Leaf spring base nipple

3. Stop filling grease until grease overflows from the interface between knuckle and flange beam.

5.11.4 Buffer block – check

Check rubber parts installed on chassis during daily inspection and maintenance. If there are abnormal wear, crack or peeling, aging and so on, replace immediately.

Check whether the bolts are loosen. If bolts are loosen, screw them down immediately.

- Check the **front suspension cushion (2) of engine (3)**.

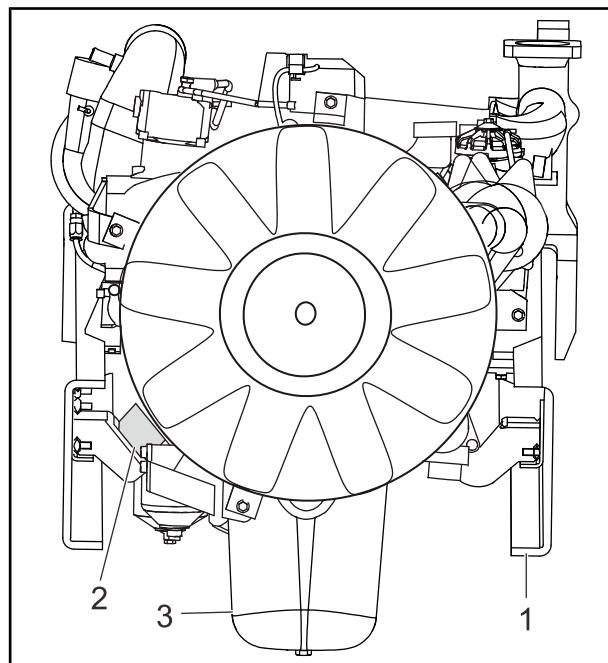


Fig.5-48 Engine

- 1. Frame
- 2. Front suspension cushion
- 3. Engine

- Check the **rear suspension cushion (4)** of engine.

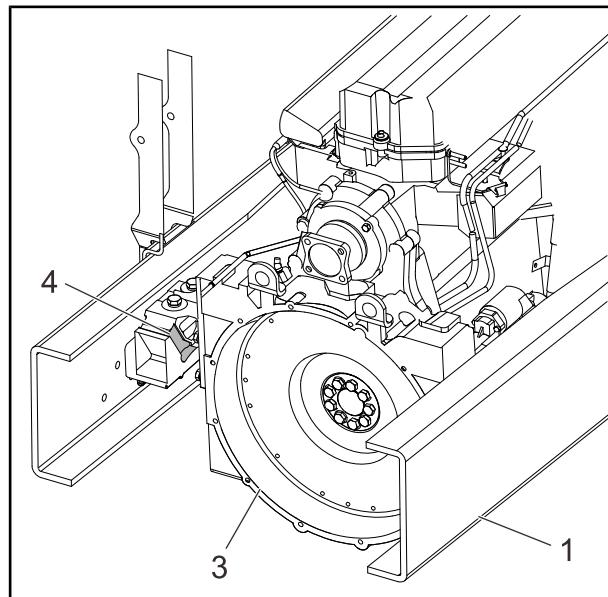


Fig.5-49 Engine

- 1. Frame
- 3. Engine
- 4. Rear suspension cushion

- Check the **gearbox auxiliary suspension (5)**.

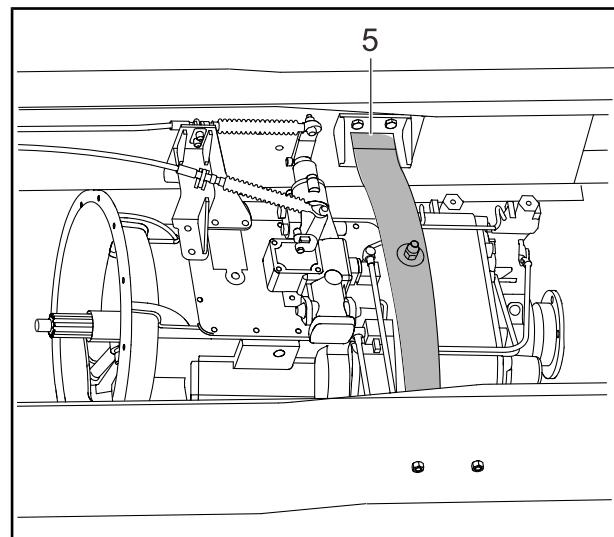


Fig.5-50 Gearbox

5. Gearbox auxiliary suspension

- Check the **rubber limit block (6)** of rear suspension.

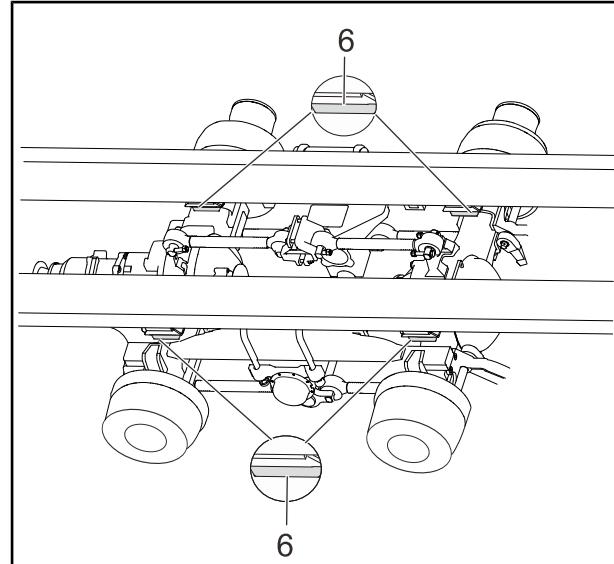


Fig.5-51 Rear suspension

6. Rubber limit block

- Check the **rubber limit block (6)** of front suspension.

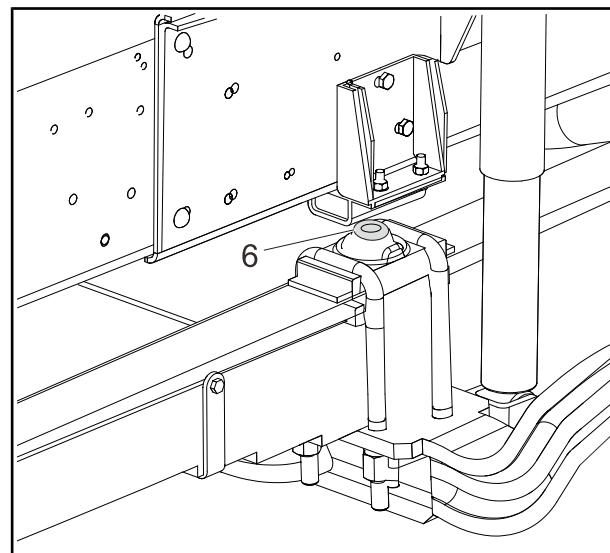


Fig.5-52 Front suspension

6. Rubber limit block

5.11.5 Gear oil of middle axle and rear axle – check

Check the gear oil level of drive axles per 5000 km.

Check the gear oil of rear axle.

WARNING

Risk of personnel injuries or death!

The temperature of gear oil is very high. The improper disposing way of the waste oil could cause fire, personnel casualties or death.

Wait for the gear oil to cool to ambient temperature. Drain off the waste oil in a proper container and dispose of at the way according with local laws.

NOTICE

Risk of axles damage!

The dust or other stuff in oil, and blocking of **breather plug (2)** could cause axles damage. Always keep the oil clear and breather plug unblocked.

1. Remove the bolt of **observation hole (1)** and check the gear oil level. The oil level should be in the normal position. Either too high or too low can influence the using.

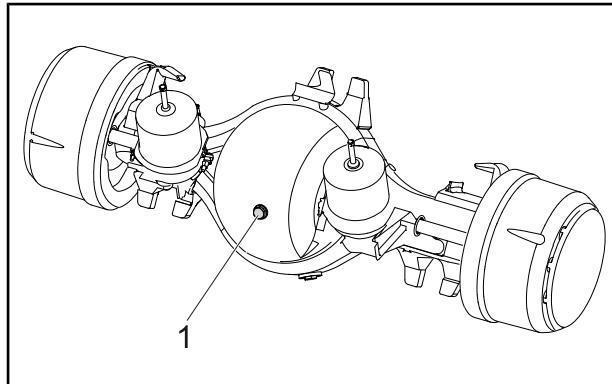


Fig.5-53 Rear axle

2. If the oil level is 10 mm lower than the **observation hole (1)**, check whether there is oil leakage and repair the leak site. Then replenish gear oil from the **filler (3)** until the oil level is flush with the lower edge of the **observation hole (1)**.
3. If the oil level is higher than **observation hole (1)**, drain unnecessary gear oil from the **oil outlet (4)**.
4. Check whether the **breather plug (2)** is unblocked. If it is blocked, clean or replace it.

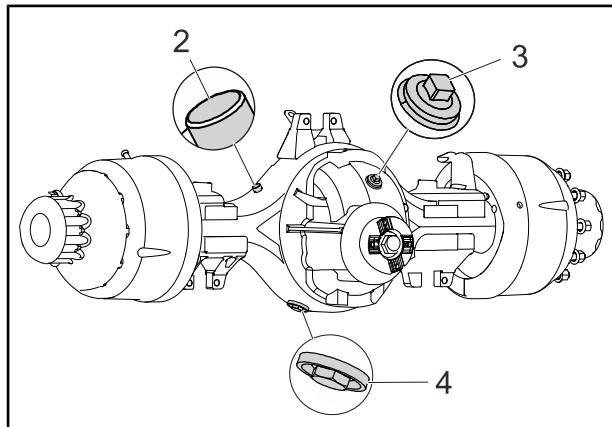


Fig.5-54 Rear axle

2. Breather plug 4. Oil outlet
3. Filler

Check the gear oil of middle axle.

Check the gear oil of middle axle as the same way above.

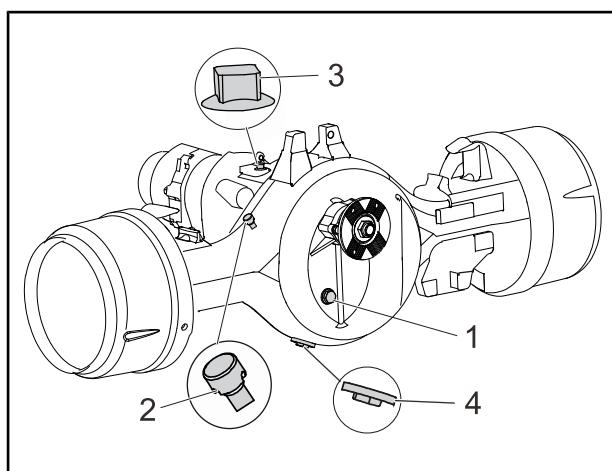


Fig.5-55 Middle axle

1. Observation hole 3. Filler
2. Breather plug 4. Oil outlet

5.11.6 Gear oil of middle axle and rear axle – replace

Change gear oil of middle and rear axle at the initial maintenance, thereafter change it per 10000 km or 6 months.

The replacement of middle and rear axle gear oil includes the reducer gear oil and inter-axial differential gear oil.

Change the reducer gear oil as follows.

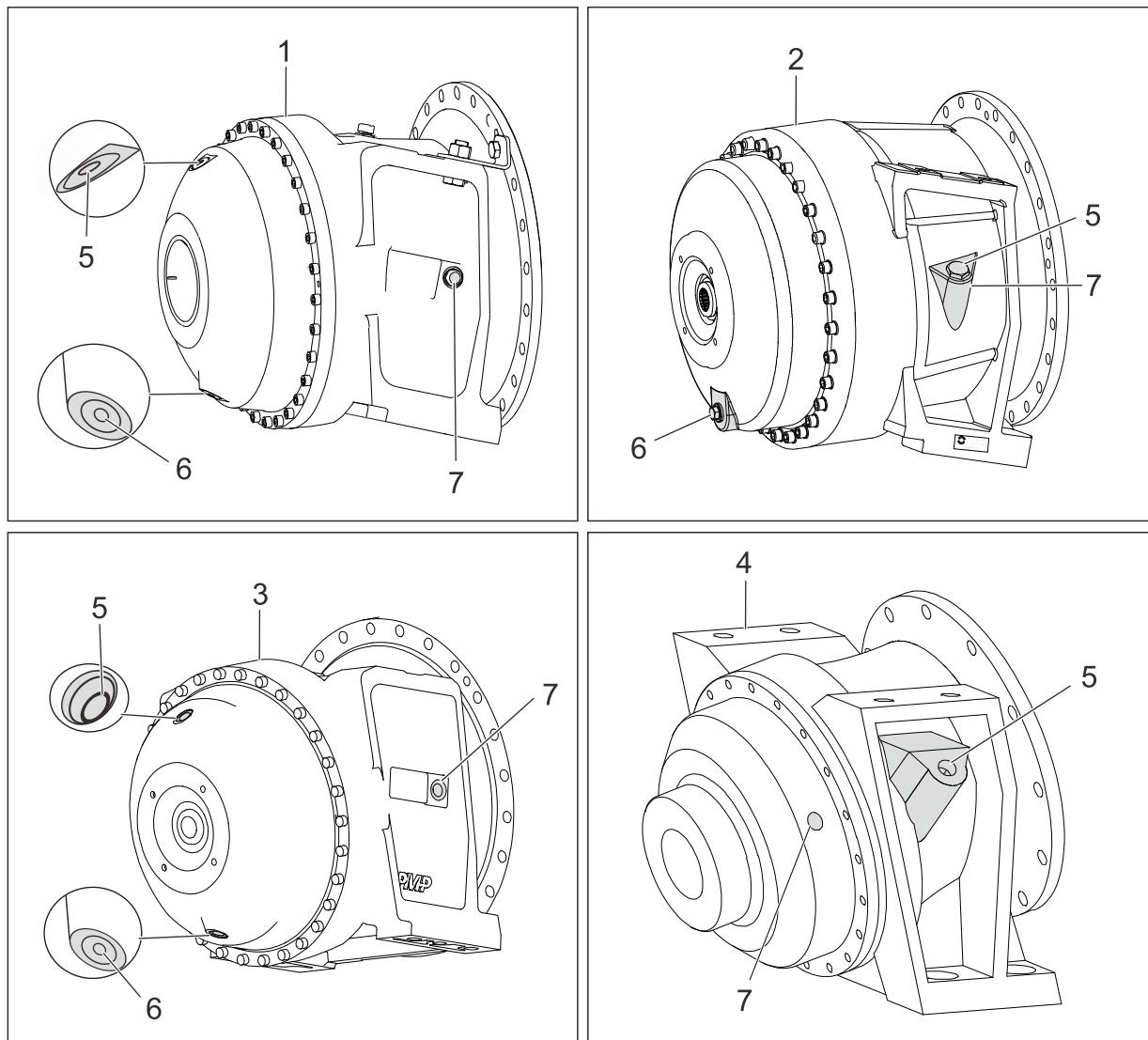


Fig.5-56 Different brands of reducer

1. Suote reducer	3. PMB reducer	5. Reducer oil filler	7. Reducer observation hole
2. TOP reducer	4. Jiuzhou reducer	6. Reducer oil outlet	

1. Wait for the temperature of axles to cool to 40°C.

2. Remove the plug of **reducer oil outlet (6)**.
3. Drain off the gear oil.
4. Clean the drain plug and reassemble it.
5. Add gear oil into the **reducer oil filler (5)** until the oil level is flush with the lower edge of the **reducer observation hole (7)**.

Change the inter-axial differential gear oil as follows.

1. Remove the plug of the **oil outlet** (9).
2. Drain off the gear oil.
3. Clean the drain plug and reassemble it.
4. Add 2 L gear oil into the **filler** (8).

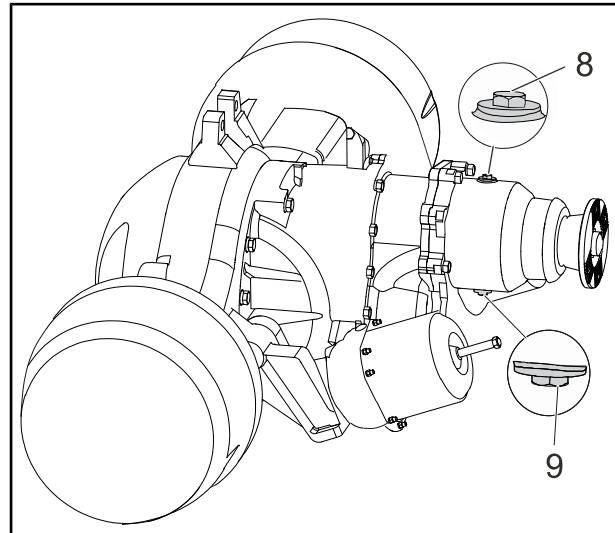


Fig.5-57 Inter-axial differential

Change the gear oil of multistage reduction axle as follows.

The multistage reduction axle has two oil holes. The **filler (8)** is near the center. The **oil outlet (9)** is near the wheel.

1. Turn the **oil outlet (9)** to the lower position.
2. Remove the drain bolt to drain off the oil.
3. Turn the **filler (8)** to the upright lower position. The oil level should be flush with the **filler (8)**.
4. Add 2 L gear oil into **filler (8)**.

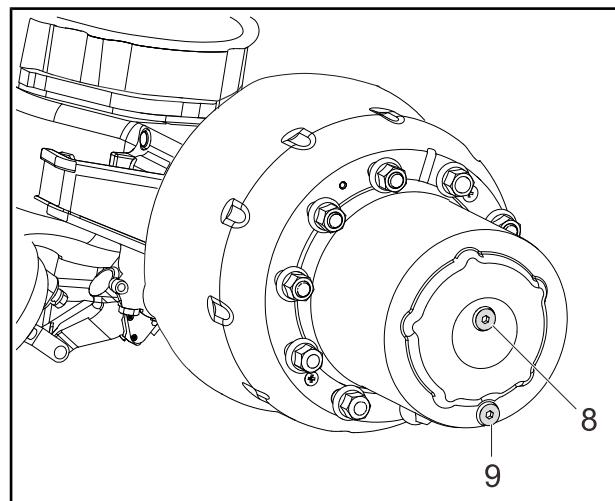


Fig.5-58 Multistage reduction axle

Gear oil type of middle and rear axles:

85W-90 (GL-5) lube (above -15°C/5°F)

80W-90 (GL-5) lube (above -25°C/-13°F)

75W-90 (GL-5) lube (above -40°C/-40°F)

Table 5-10 Type of gear oil

Axe type	Middle axle		Rear axle	Wheel	Remark
	Main reducer	Inter-axial differential	Main reducer		
457 axle	17 L	2 L	13.5 L	-	The oil level should be flush with the bottom edge of observation hole.
STR axle	8 L	-	6 L	Both left and right sides are 2 L	

5.11.7 Grease of hub bearing – replace

5.11.7.1 Brief of hub bearings

The first maintenance kilometer of hub bearings is 2000 km to 3000 km. Thereafter maintain in the interval of 10000 km or 6 months.

Select the grease according to the climate, operating environment and so on.

The brand recommended in normal environment: Extreme pressure lithium base grease NO.2 or NO.3 of Changcheng, Kunlun, Shell, Mobil and so on.

5.11.7.2 Hub bearings of middle and rear axle – maintain

Dismounting

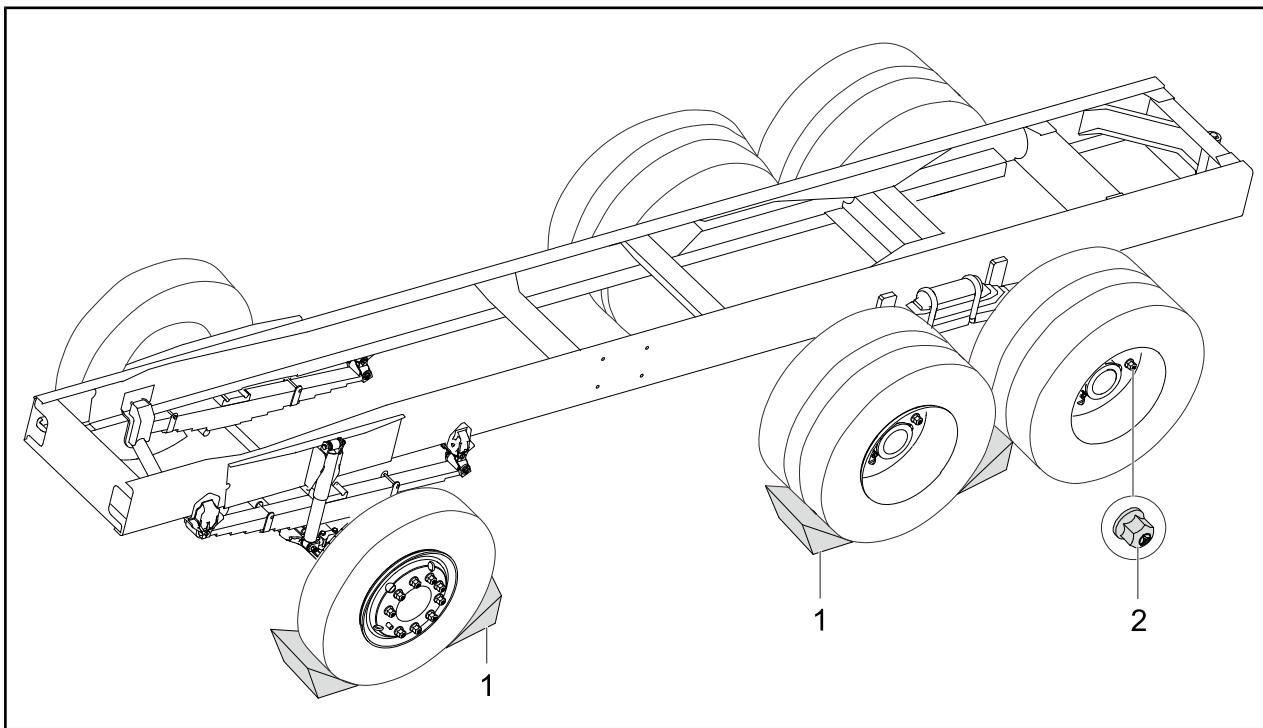


Fig.5-59 Hub bearings dismounting

1. Triangle wood 2. Wheel bolt

1. Park the vehicle on the flat place.
2. Plug the wheels of the front axle and the middle axle (or the rear axle) with the **triangle wood** (1).
3. Release the parking brake.
4. Lift the rear axle (or the middle axle) with the jack.
5. Unscrew the **wheel bolt** (2) with the air spanner, then dismount the wheels.

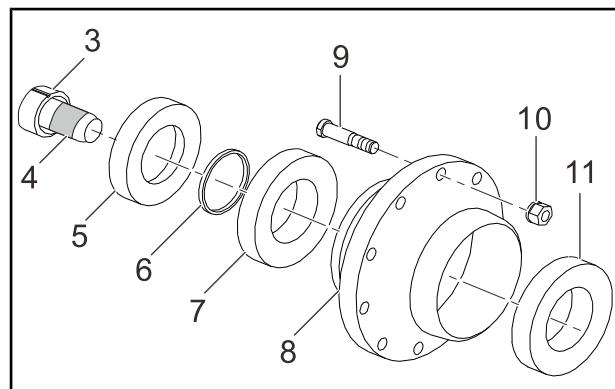


Fig.5-60 Hub bearings dismounting

6. Dismount in turn the **half shaft (4)**, the **space ring (5)**, the **seal ring (6)**, the **outer bearing (7)** cones, the **wheel hub (8)** assembly, the **inner bearing (11)** cones and so on.

3. Half shaft sleeve	8. Wheel hub
4. Half shaft	9. Hub bolt
5. Space ring	10. Hub nut
6. Seal ring	11. Inner bearing
7. Outer bearing	

Cleaning and changing grease

1. Clean the **half shaft sleeve (3)** with the cleaner.

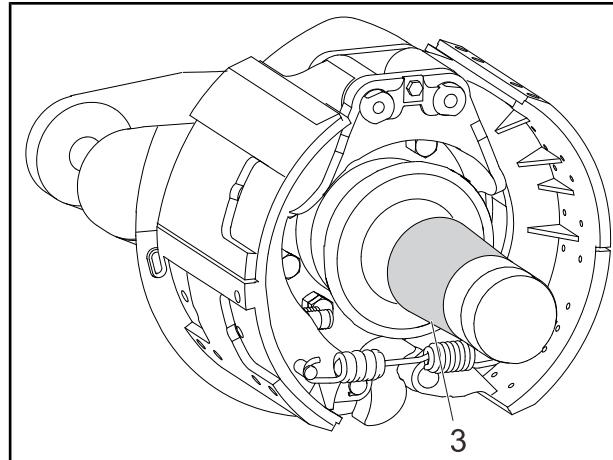


Fig.5-61 Half shaft sleeve

2. Check the abrasion, ablation and discoloration in the hub and the outer bearing. If the bearing is normal, clean it with the cleaner. Otherwise, change the bearing.

3. Dismount the **oil seal of hub (14)** and the **outer bearing (12)** by repeating knocking it symmetrically.

4. Clean the bearing location and the **inner cavity (13)**.

5. Mount the new **outer bearing (12)** and **oil seal of hub (14)**.

6. Apply a layer of grease on the surface of the hub **inner cavity (13)**. The oil mass used in the single side of **wheel hub (8)** assembly is from 800 g to 1000 g.

3. Half shaft sleeve

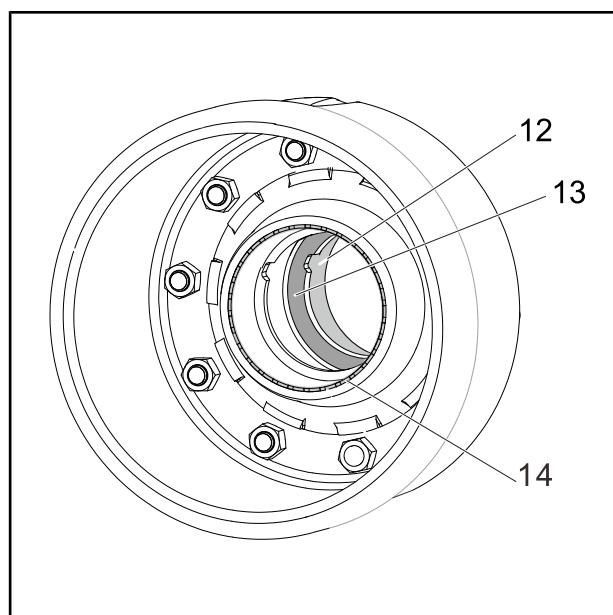


Fig.5-62 Outer bearing

12. Outer bearing	14. Oil seal of hub
13. Inner cavity	

7. Fill up the grease in the inner circle of **outer bearing (7)** and **inner bearing (11)**.

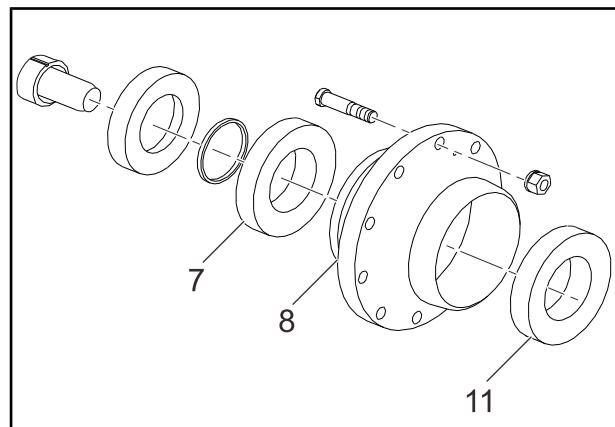


Fig.5-63 Filling grease

7. Outer bearing

11. Inner bearing

8. Wheel hub

Mounting and adjusting

1. Mount the inner bearing circle, the wheel hub assembly and the outer bearing circle in turn.

2. Mount the **locking nut (16)**. Screw up the locking nut by rotating the wheel hub assembly with the torque of 500 N·m around.

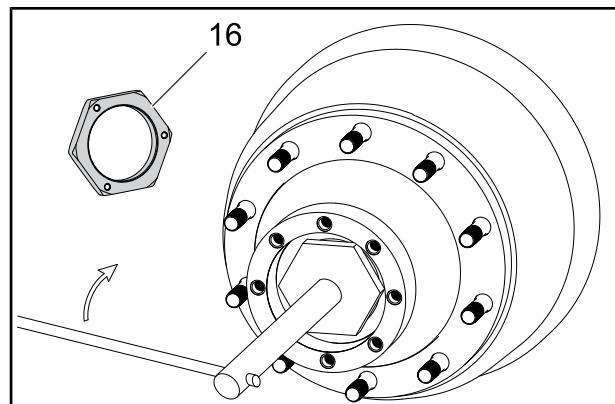


Fig.5-64 Mounting the locking nut

16. Locking nut

3. Adjust the pre-tightening force of the bearing.

- Loose the **locking nut (16)** with a backspace of about 30°– 45°. Rotate the brake drum two circles. Wind one circle around the wheel with a rope and pull up it with the spring balance. The starting force should be between 45 N and 90 N.

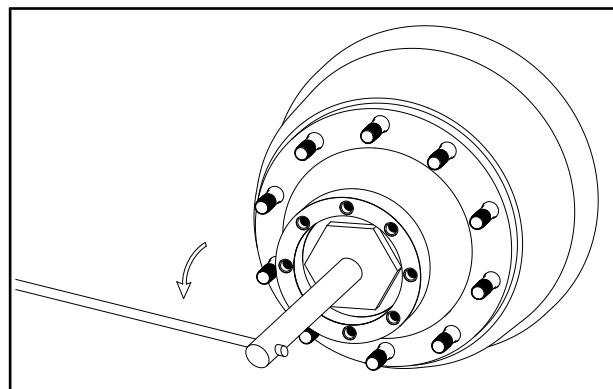


Fig.5-65 Loose the locking nut

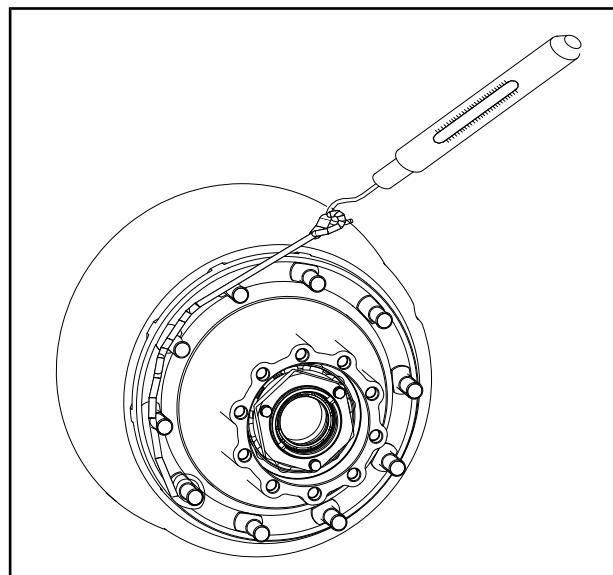


Fig.5-66 Measure the starting force

- If there is no spring balance, adjust as follows:

A: Lock the wheel hub assembly until it can not be rotated by one hand.

B: Loose the locking nuts with a backspace of about 30°–45°.

C: Rotate the wheel three or five circles.

D: Lock the nuts in about 15°.

E: Rotate the wheel hub assembly with one hand until there is no axial moving.

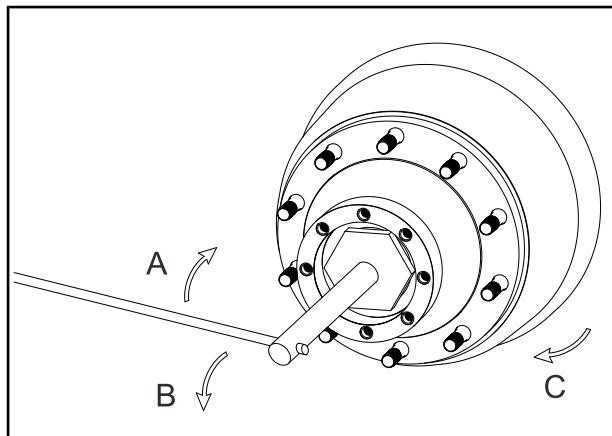


Fig.5-67 Without spring balance

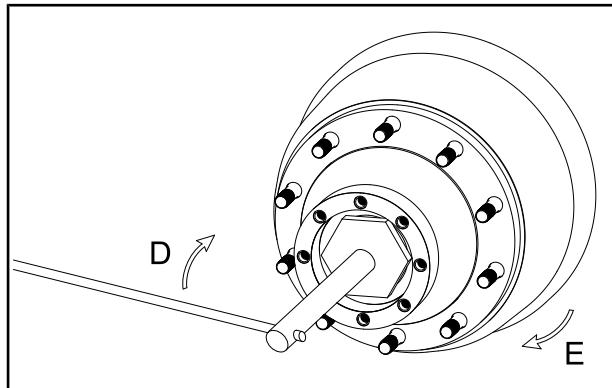


Fig.5-68 Pre-tightening force adjustment

4. Mount the seal ring, space ring and half shaft in turn, with the tightening torque of 140 N·m–180 N·m.

5.11.7.3 Hub bearing of front axle – maintain

Dismounting

1. Park the vehicle on the flat place and engage the parking brake.
2. Block the wheels of the middle and rear axle with the **triangle wood (1)**.

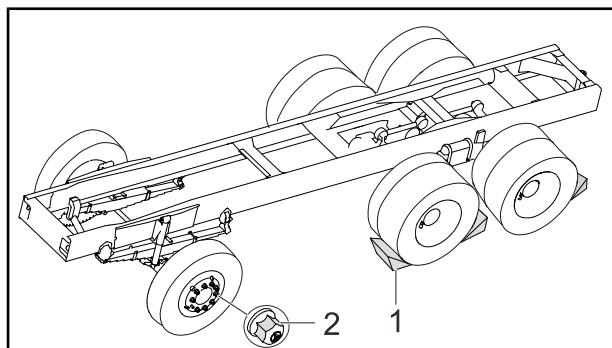


Fig.5-69 Block the wheels

1. Triangle wood 2. Nut

3. Lift the **front axle (4)** with the **jack (3)**.
4. Unscrew the **nut (2)** with the air spanner and dismount the wheels.

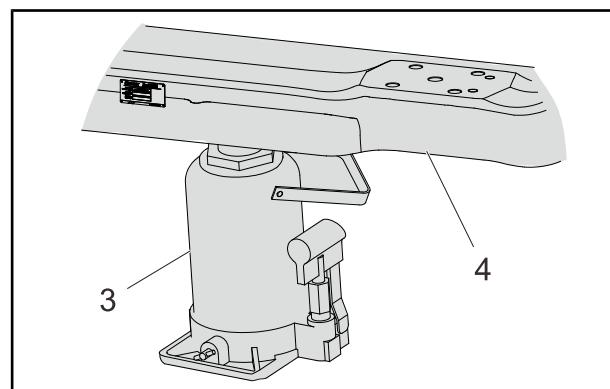


Fig.5-70 Lift the front axle

3. Jack

4. Front axle

5. Dismount the **outer bearing (5)** circle, the **hub nut (12)**, the **front hub (6)** assembly, the **inner bearing (7)** circle, the **seal ring (9)** and so on.

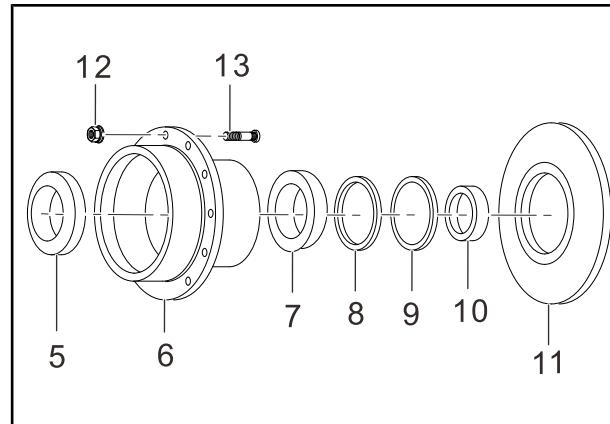


Fig.5-71 Dismount

5. Outer bearing	10. Space ring
6. Front hub	11. Brake disc
7. Inner bearing	12. Hub nut
8. Radial seal ring	13. Hub bolt
9. Seal ring	

Cleaning and changing

1. Clean the **steering knuckle (14)** with the cleaner.
2. Check the abrasion, ablation and discoloration in the wheel hub and the outer bearing. If the bearing is normal, clean it with the cleaner, otherwise change the bearing. See "[Hub bearings of middle and rear axle – maintain](#)" on page 5-60.
3. Dismount the **oil seal** and the bearing cup of the wheel hub. Clean the bearing cup and the inner chamber of the wheel hub, then mount the oil seal and bearing cup.
4. Apply a layer of grease on the surface of the hub inner cavity. The oil mass used in the single side of wheel hub assembly is from 800 g to 1000 g. See "[Hub bearings of middle and rear axle – maintain](#)" on page 5-60.
5. Fill up the lubricant in the outer and inner bearing cones.

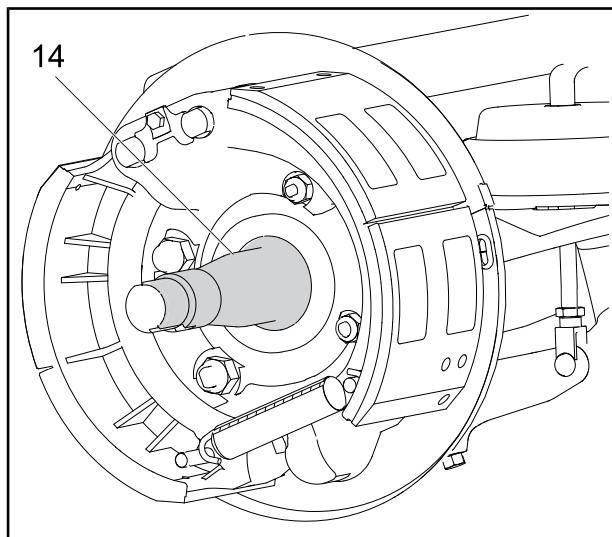


Fig.5-72 Steering knuckle

14. Steering knuckle

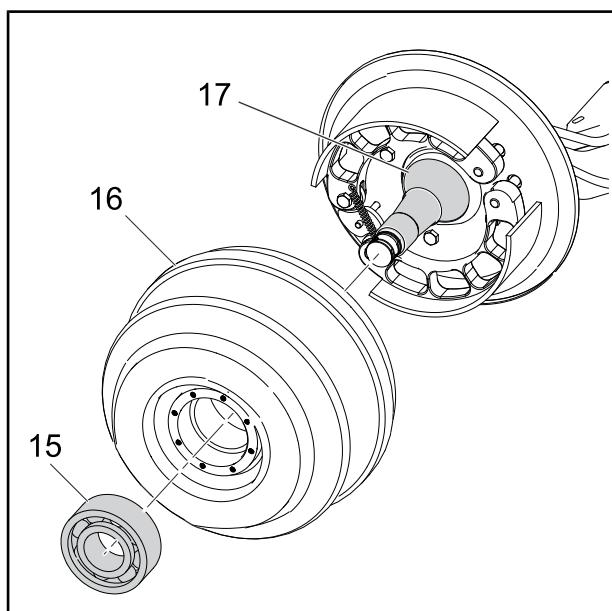


Fig.5-73 Mounting

Mounting and adjusting

1. Mount the **inner bearing circle (15)**, **hub assembly (16)** and the **outer bearing circle (17)** in turn.
2. Mount the **anti-friction plate (18)**. Screw up the **locking nut (19)** by rotating the wheel hub assembly with the torque of 200 N·m around.
3. Adjust the pre-tightening force of the bearing.
4. Mount the locking gasket, the sealing gasket and the wheel hub cup in turn.

15. Inner bearing circle	17. Outer bearing circle
16. Hub assembly	

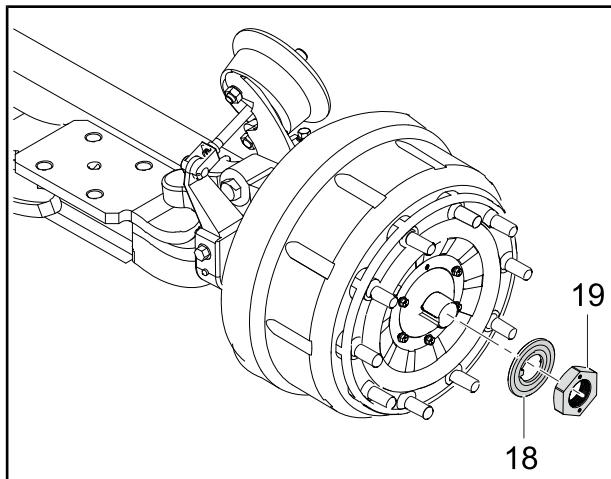


Fig.5-74 Mounting anti-friction plate

18. Anti-friction plate 19. Locking nut

5.11.8 Toe-in – maintain

5.11.8.1 Toe-in – check

Examine the toe-in of the front wheel after the running-in period of 2000 km to 3000 km, and from then on, examine the toe-in every 5000 km. Make sure that the toe-in of front wheel is in 0 mm-2 mm. Examine the toe-in as follows:

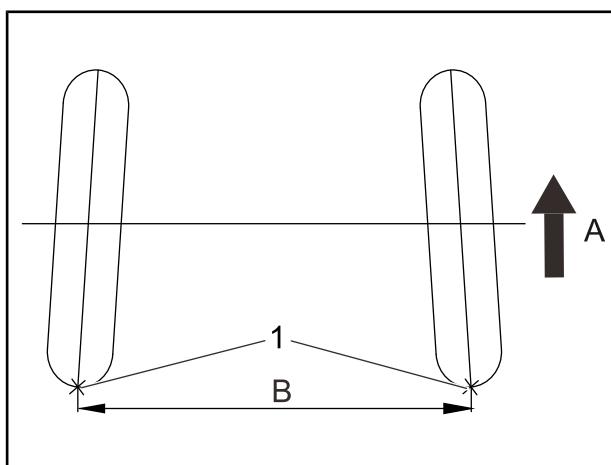


Fig.5-75 Measure value B

1. Park the vehicle on the flat place and turn the front wheel in position.
2. Mark a **gauge point (1)** on the thread pattern of the left and right wheels with the chalk, measure the **rigging aft breadth (B)** directly behind the front axle.
3. Rotate the vehicle half a circle frontward to turn the sign to the rigging ahead (rotating the tyre 180°), measure the **rigging ahead breadth (C)**. Do not rotate the steering wheel during driving, drive slowly and brake lightly.
4. The toe-in is the value of B subtract C.

1. Gauge point
A. Forward

B. Rigging aft breadth

5.11.9 Tyres and wheels – maintain

5.11.9.1 Tyres and wheels – check

⚠ WARNING

Risk of accident and personal injury!

During air charging, the inappropriate mounting position of retainer, and no safeguard on the wheel rim could cause accident and personal injury.

Before air charging, check whether the retainer is at the correct mounting position or not. Add safeguard on the wheel rim during air charging.

NOTICE

Risk of freight damage and abnormal abrasion of tyres!

If the air pressure of tyres is too low or too high, uncomfortable driving and abnormal abrasion of tyres could occur, and the freight could be damaged easily. Especially when the air is not enough, the tyre could be easy to cause overheating and bursting on the earth point.

Check the air pressure of tyres everyday. Charge the air in the maintenance station timely if it is too low.

- Check the air pressure of the tyres everyday. Charge the air in the maintenance station timely if it is not enough.

The standard for the air pressure of tyres:

Nominal section width of the tyre 11.00: 1.1

± 0.1 MPa

Nominal section width of the tyre 12.00: 1.3

± 0.1 MPa

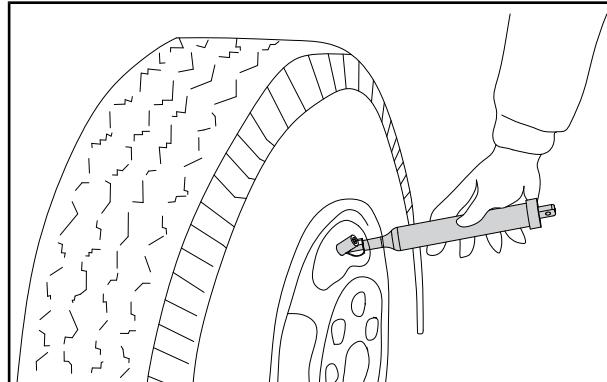


Fig.5-78 Check air pressure

- Check everyday and make sure that there are no metal pieces, nails or other things sticking into the tyres. Check everyday and ensure that there are no stones or other sundries inserting the tyre thread or between two tyres.
- Check the looseness of the **wheel nut (1)** every week. Tighten them immediately if there is looseness.
The torque with oil lubrication : (600 ± 30) N•m.
The torque without oil lubrication: (700 ± 35) N•m.
- Check whether there is crack, deformation or other defects or not on the tyre surface every week.
- Check the depth of the tyre pattern every week. Change the tyres when the depth is smaller than 2.0 mm.
- Check whether there is abnormal abrasion or not on the tyre surface. If there is, contact SANY service station to check the vehicles.

5.11.9.2 Tyres – transpose

Because of the different load distribution on the front and rear axles and the braking patterns, transpose the position of tyres every 10000 km. This can minimize abnormal wearing of the tyres and lengthen the service lift.

1. Transposition pattern for 2-axle trucks

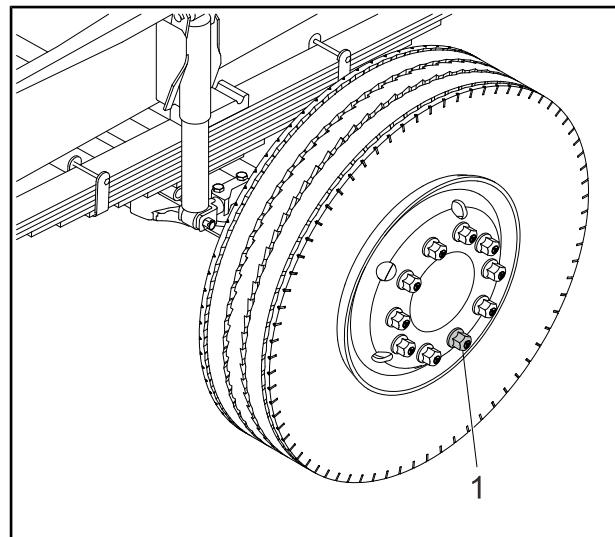


Fig.5-79 Wheel nut

1. Wheel nut

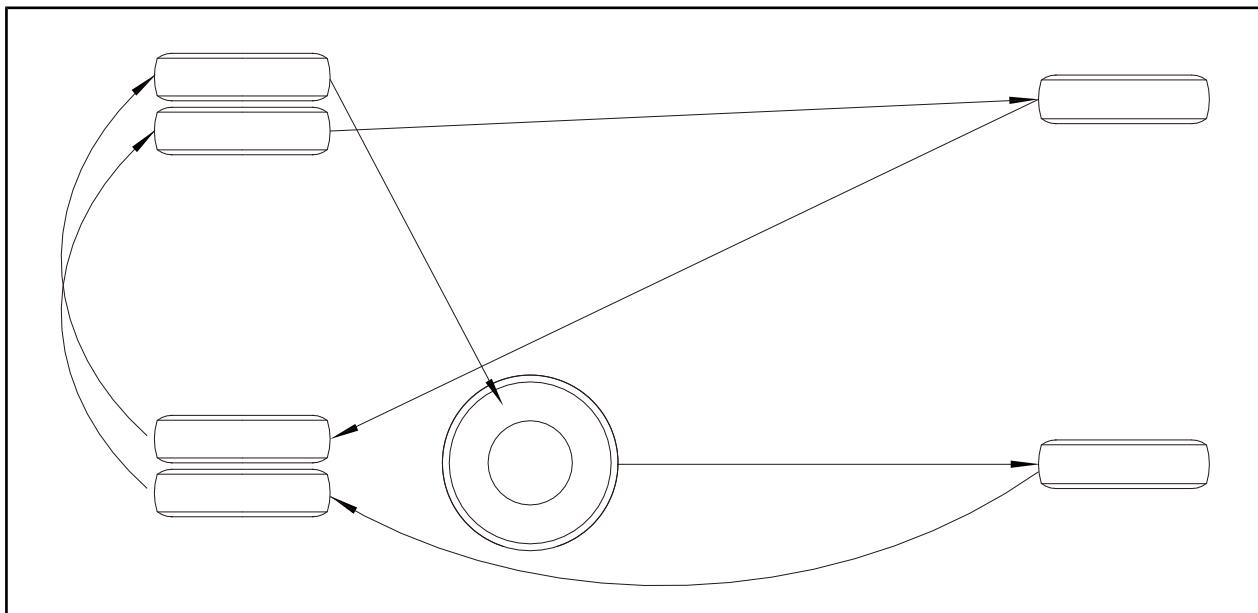


Fig.5-80 2-axle trucks

2. Transposition pattern for 3-axle trucks

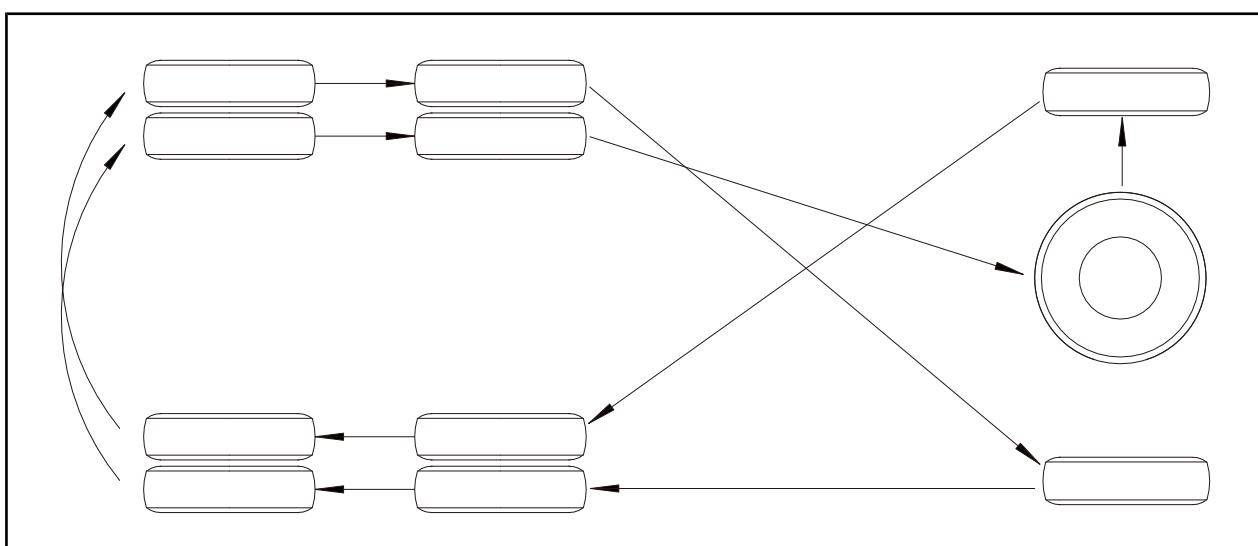


Fig.5-81 3-axle trucks

3. Transposition pattern for 4-axle trucks

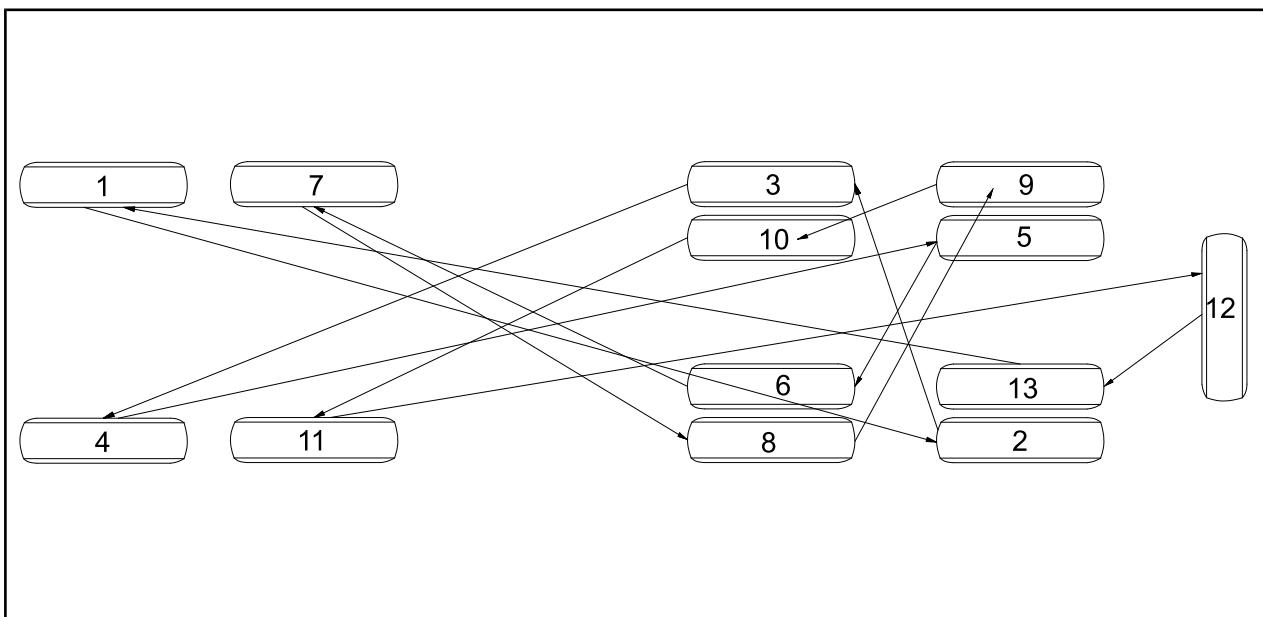


Fig.5-82 4-axle trucks

5.11.9.3 Tyres and wheels – replace

! DANGER

Risk of death or personnel injuries!

Changing a tyre on the public road or highway lane will lead to a serious accident which will cause death or personnel injuries.

Do not change tyre on the carriage way of the public road or the expressway. Be away from the carriage way thoroughly and park the vehicle on the shoulder of the road before changing tyre. Light the warning lamp and use the triangle warning mark to attract attention of other vehicles.

There should be spare tyre, jack, the hand lever of jack and the spanner of the wheel nut on the vehicle for available replacement of wheels.

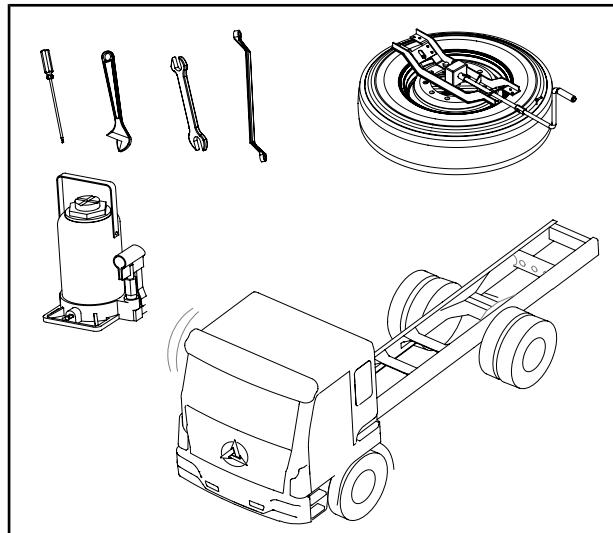


Fig.5-83 Tools

Mounting and dismounting the spare tyre

1. Remove the **locking nut (1)** holding the **stowing bracket (3)** to the hanger.
2. Attach the crank handle to the **winch rod (2)**.
3. Turn the handle counterclockwise to lower the spare tyre.

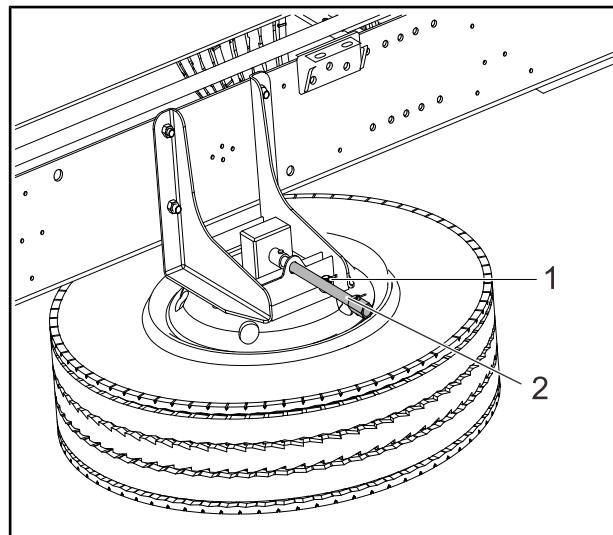


Fig.5-84 Spare tyre

1. Locking nut 2. Winch rod

4. Remove the spare tyre from the **stowing bracket (3)**.

5. Mounting the spare tyre to the carrier is the reverse of the dismounting procedure.

Note: always keep the spare tyre available.

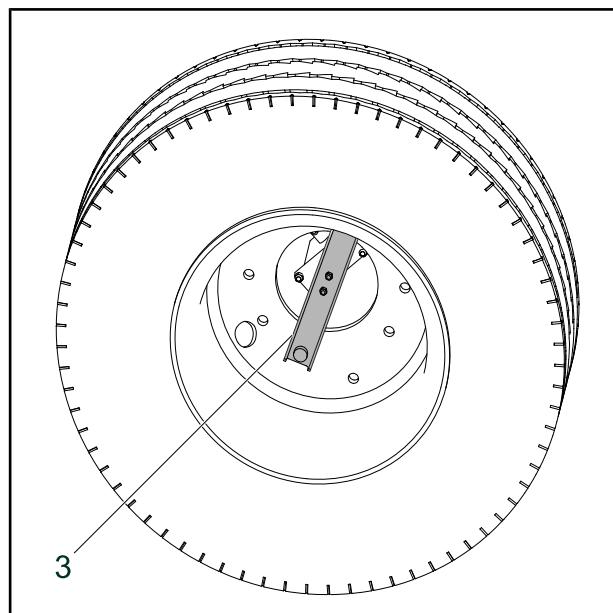


Fig.5-85 Spare tyre

3. Stowing bracket

Dismounting the wheel

1. Pull up the parking brake when dismounting the front wheel tyres. Plug the front and back of the middle and rear axles tyres with triangle stow-wood to prevent the movement of the vehicles. When dismounting the tires of the middle and rear axles, plug the left and right front wheels with triangle stow-wood.

2. Loose the **wheel nut (4)** with the socket spanner in the tool box.

3. Lift one side of the axles with the jack to separate the wheel from the ground slightly.

- Do use the jack on stiff road.
- Ensure the jacking position correct and do not support the jack on the bumper or other places.
- Do not keep it jacking for long time. If the vehicle can not be jacked because of the heavy load, discharge it or ask help from the trailer companies.
- Do not get into the bottom of the jacked vehicles. In the case of jacking, forbid anyone to start the engine and get into the cab, and make sure that children are far away from the jacked vehicles.

4. Clean the nuts of the wheel bolts with water, then soak them in the oil or apply them with lubricant to make it easy for the wheel to roll out of the hub.

5. Dismount the wheel after all the nuts detached.

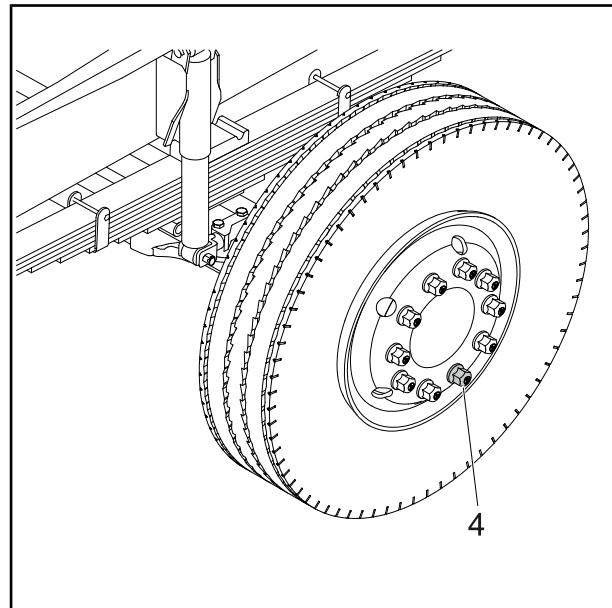


Fig.5-86 Wheel nut

4. Wheel nut

Mounting the wheel

1. Justify the **bolt hole (5)** of the rim with the **wheel bolt (7)** with the crow bar.

NOTICE

Risk of wheel damage!

The dirty wheel nut pressing surface could damage the wheel.

Keep the seal face of the wheel nuts clean, without dirties and grease. Apply some grease or oil on the thread of the wheel bolts and nuts.

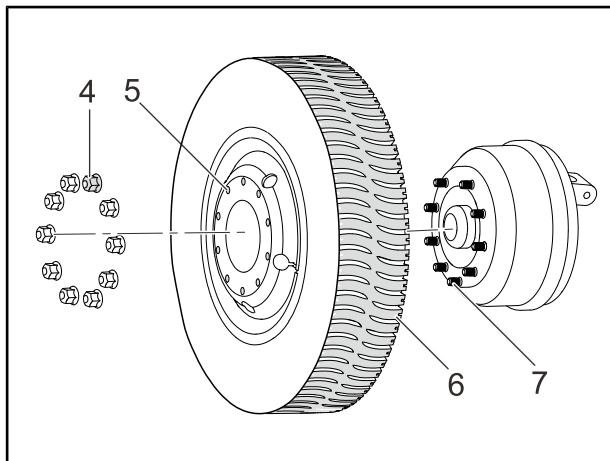


Fig.5-87 Tire installed

2. Keep the tyre non-tilting when pushing it to the **wheel (6)**, then apply a layer of lubricating oil on the bolt thread, initially tighten the **wheel nut (4)**.

The type of the lubricating oil: Shell hyperbolic gear oil 80W/90GL-5.

NOTICE

Risk of vehicle damage!

Turning the release valve too fast could cause the vehicle body dropping sharply and the jack slipping. The vehicle body could get damaged.

After the tyre replacement, turn the releasing valve slowly to fall down the vehicle body. Do not mix diagonal tyres with radial tyres.

3. Fall down the jack slowly until the tyre touches the ground.

CAUTION

Risk of accident and personnel injuries!

The looseness of the wheel nuts could result in the damage of bolts, abrupture of the rim and detachment of the tyre. It could cause an accident and personnel injuries.

Tighten the nuts as required.

4. Tighten the nuts with specified torque in three times according to the diagonal sequence.
5. After the first replacement, the tyres would be loose. Tighten the nuts again with specified torque after running 50 km to 100 km.

5.12 Brake system – maintain

5.12.1 Air pressure and seal condition – check

Check the **barometer (1)** on the instrument panel. The buzzer of low air pressure would send an alarm if the air pressure is lower than 0.52 MPa. Drive the vehicle until the air pressure is above 0.9 MPa.

Check the alarm function of air pressure as follows.

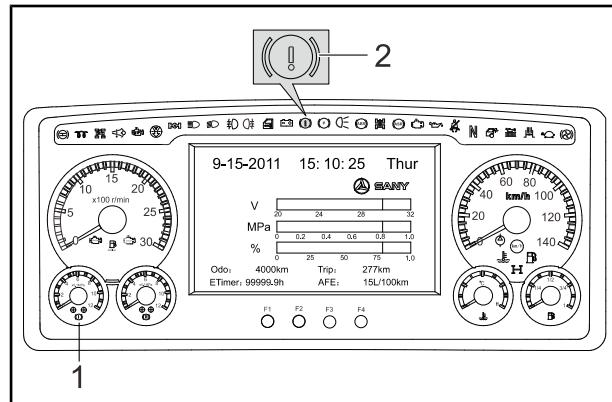


Fig.5-88 Instrument panel

1. Barometer

2. Low air pressure indicator

1. Start the engine to increase the air pressure to 0.91 MPa, then stop the engine. Step the baking pedal to decrease the air pressure, the **low air pressure indicator (2)** would work when the air pressure is lower than 0.52 MPa.

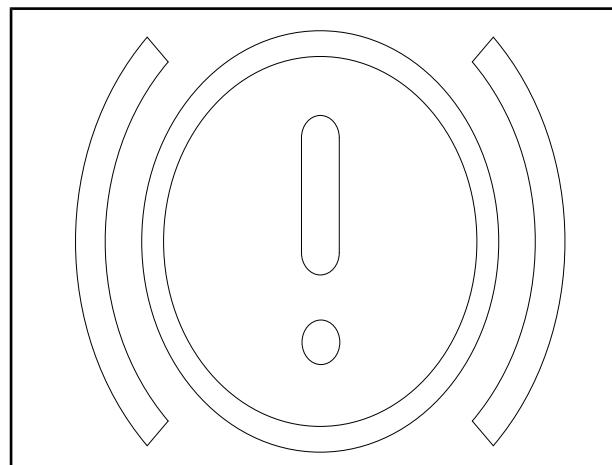


Fig.5-89 Low air pressure indicator

2. Release the hand lever of the parking brake.

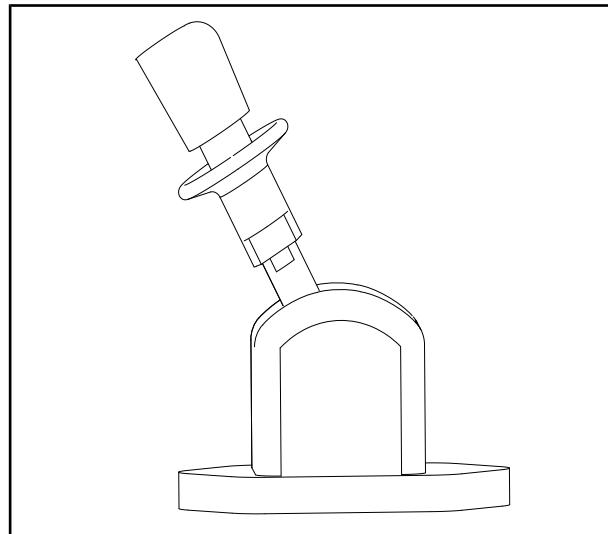


Fig.5-90 Release parking brake

3. The alarm function is normal if the buzzer sounds.



Fig.5-91 Buzzer calling

Shut down the buzzer as follows.

1. After releasing the hand lever of parking brake, start the engine.
2. Step the throttle lightly to increase the rotating speed of the engine to improve the air pressure to 0.52 MPa.

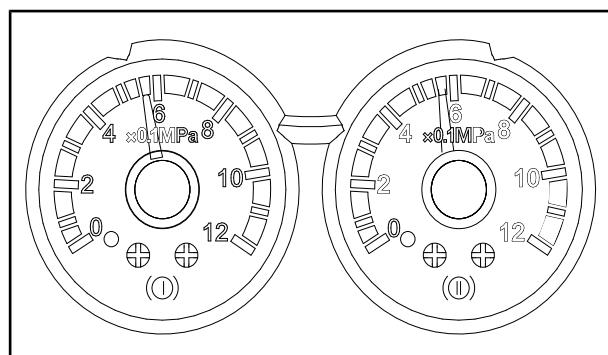


Fig.5-92 Barometer

3. Then the buzzer stops working and the low air pressure indicator light is off.



Fig.5-93 Buzzer stopping

Check the seal of air pressure as follows.

Charge air into the air tank till the air pressure is 0.91 MPa. Lay it for 3 minutes. The seal of the brake system is normal if the air pressure drop is less than 0.02 MPa. Otherwise check the air pipelines.

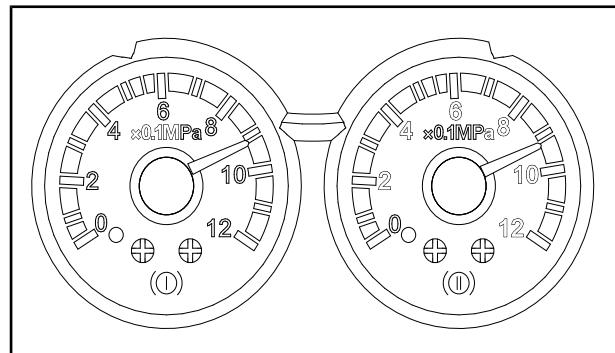


Fig.5-94 Barometer

5.12.2 Air charging – check

1. Pull the **draining valve hoop** (2) left-right to exhaust air in the **air tank** (1).

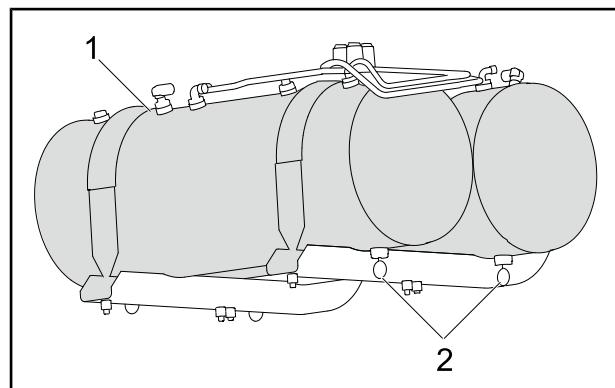


Fig.5-95 Air tank

1. Air tank

2. Draining valve hoop

1. Start the engine and run it at the speed of 1500 r/min, the air pressure should be ≥ 0.5 MPa in 3.5 minutes.

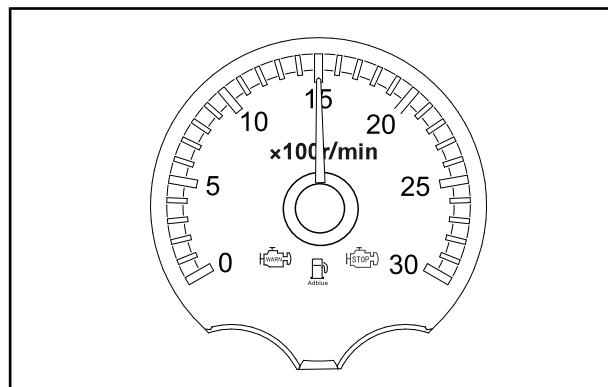


Fig.5-96 Start the engine

2. Continue charging air into the tank. When the pointer indicates that the pressure is between 0.91 MPa–0.95 MPa, the desiccator will cut the air charging automatically.

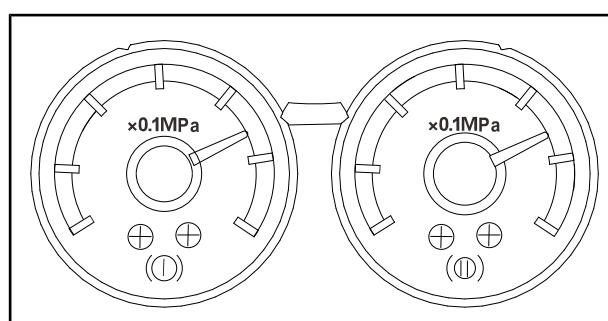


Fig.5-97 Air charging

5.12.3 Pressure maintaining – check

Pressure maintaining when locking parking brake.

1. Lock the parking brake.

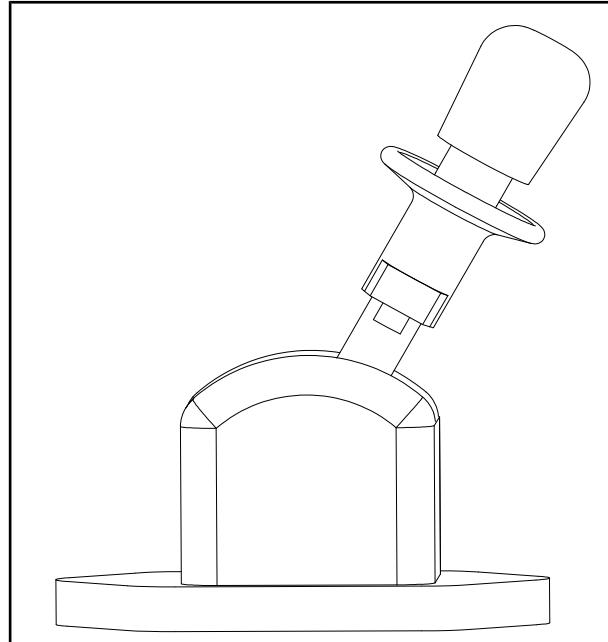


Fig.5-98 Lock the parking brake

2. Charge air into the tank till the pressure is 0.91 MPa.

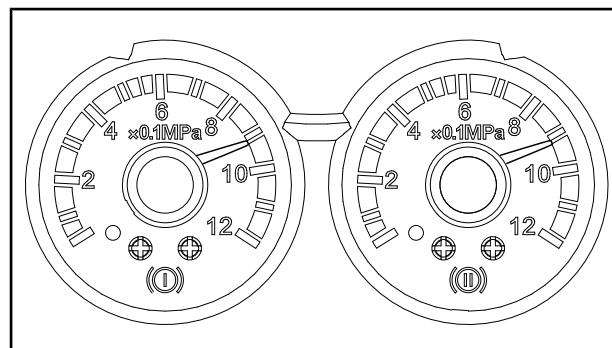


Fig.5-99 Pressure panel

3. Stop the engine.

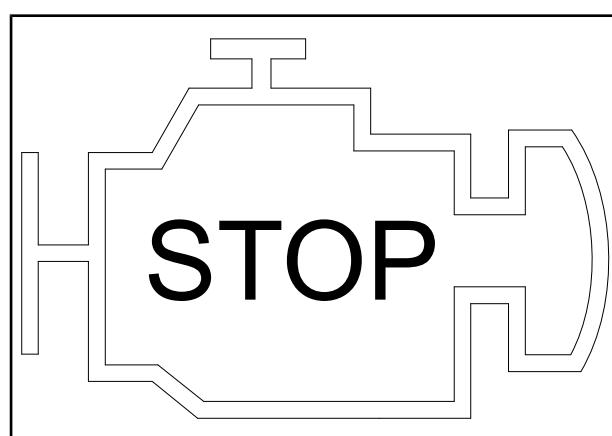


Fig.5-100 Stop the engine

4. Step the braking pedal to the lowest, then release it. Repeat for 5 times.

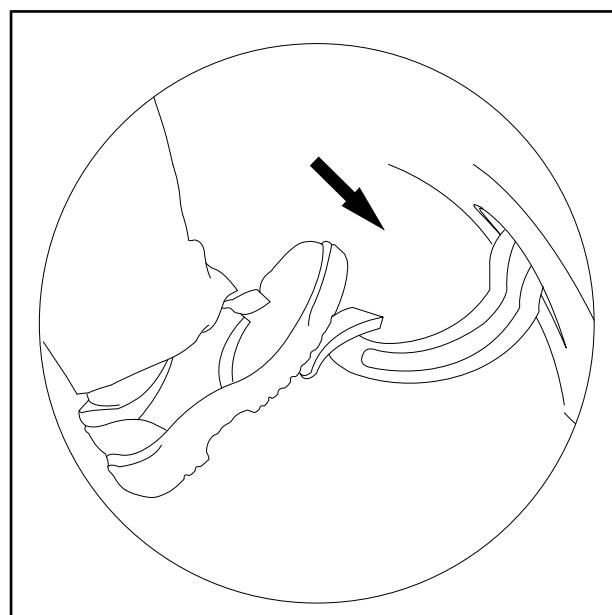


Fig.5-101 Step the braking pedal

5. The air pressure should be ≥ 0.5 MPa.

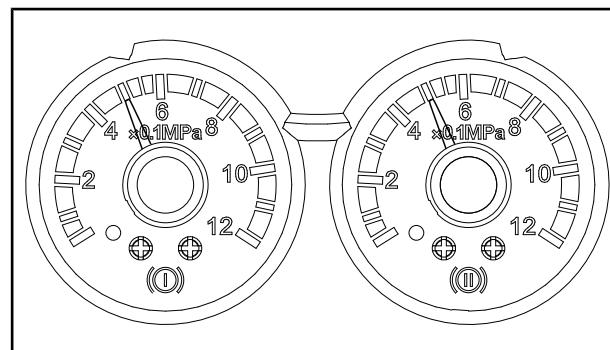


Fig.5-102 Pressure panel

Pressure maintaining when switching locking and releasing parking brake.

1. Lock the parking brake.

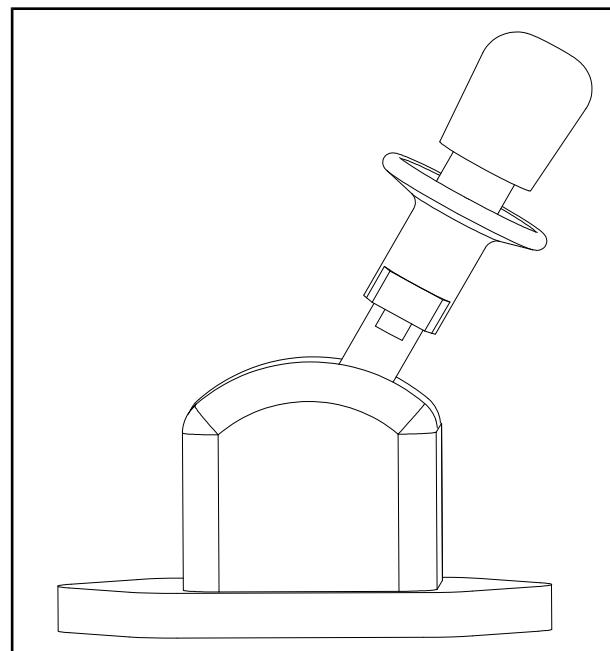


Fig.5-103 Lock the parking brake

2. Charge air into the tank till the pressure is 0.91 MPa.

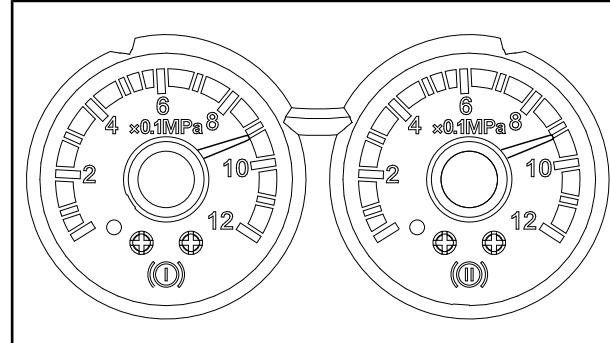


Fig.5-104 Pressure panel

3. Stop the engine.

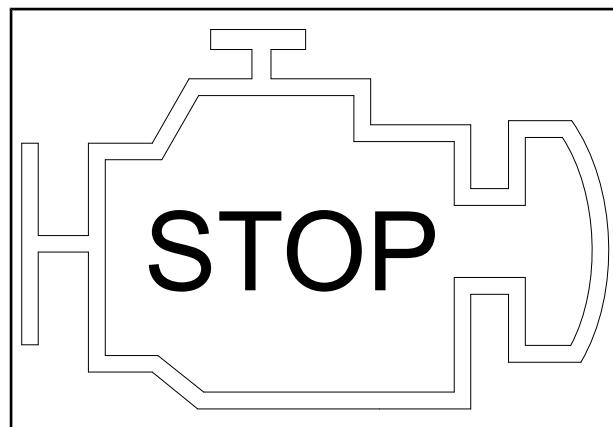


Fig.5-105 Stop the engine

4. Release the parking brake till the air pressure is stable, then lock the parking brake. Repeat for 3 times.

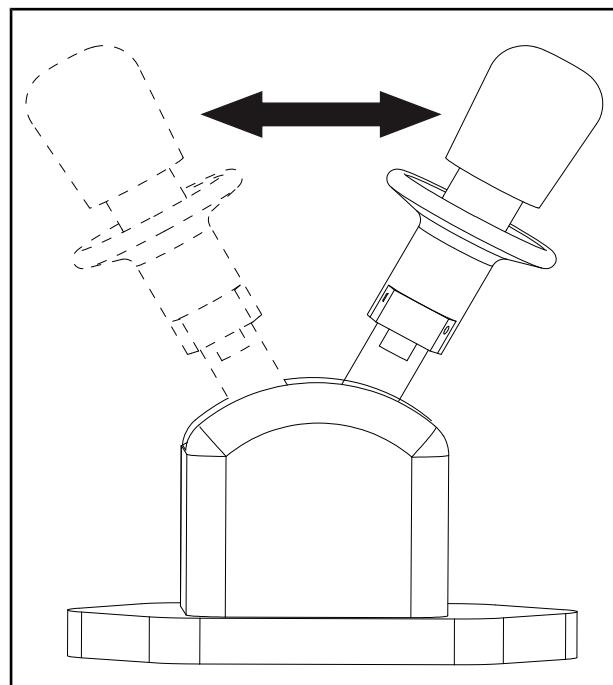


Fig.5-106 Lock the parking brake

5. The air pressure should be ≥ 0.5 MPa.

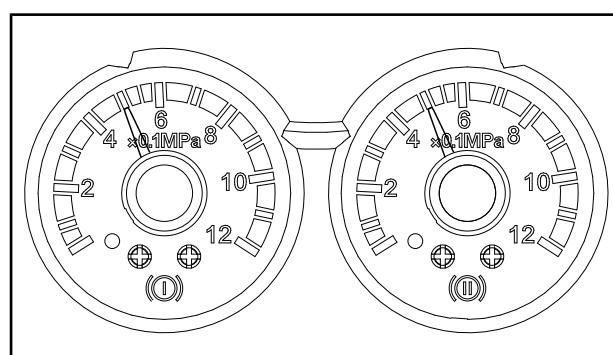


Fig.5-107 Pressure panel

Pressure maintaining when releasing the parking brake.

1. Release the parking brake.

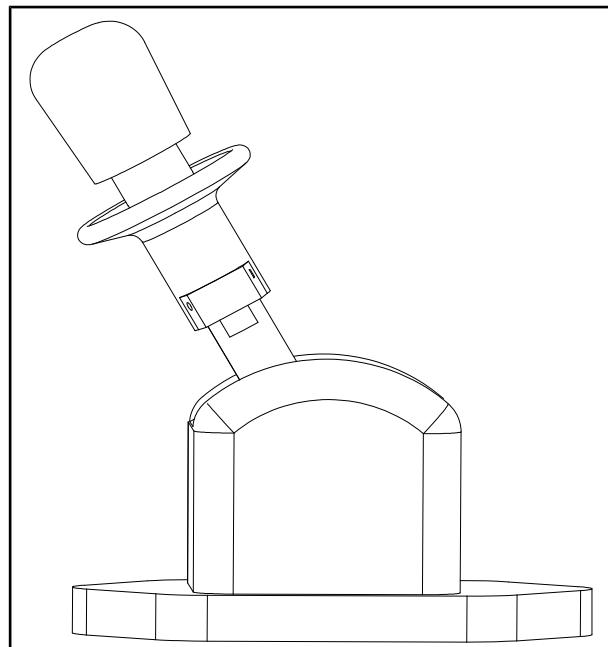


Fig.5-108 Release the parking brake

2. Charge air into the tank till the pressure is 0.91 MPa.

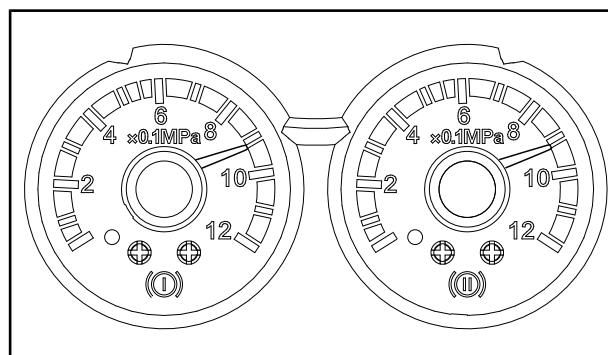


Fig.5-109 Pressure panel

3. Run the engine at idling speed.

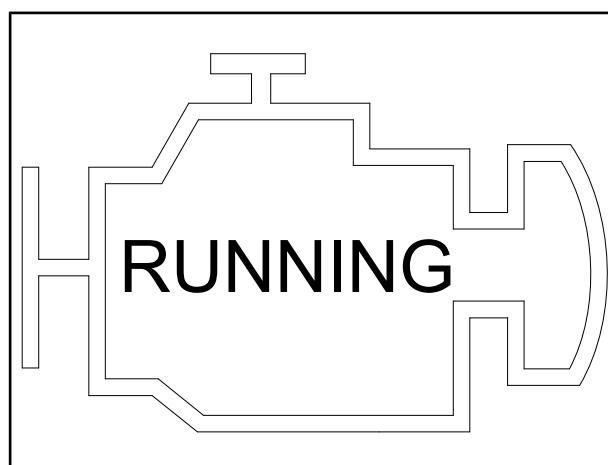


Fig.5-110 Run the engine

4. Step the braking pedal to the lowest, then release it. Repeat for 8 times.

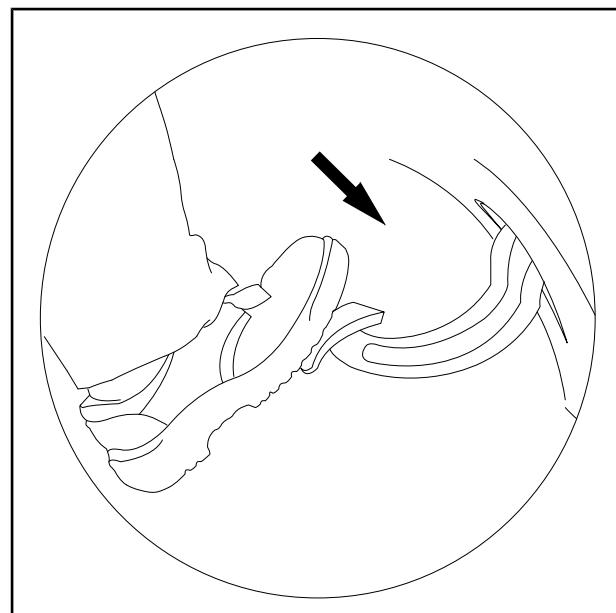


Fig.5-111 Step the braking pedal

5. The air pressure should be ≥ 0.5 MPa.

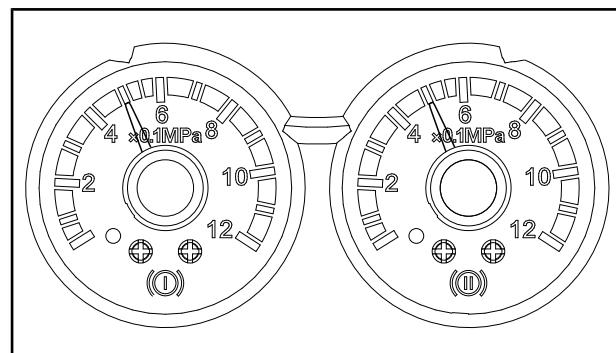


Fig.5-112 Pressure panel

5.12.4 Brake lines and hoses - check

Check periodically the brake lines and hoses which are easy to wear out. Repair them immediately if there are damages.

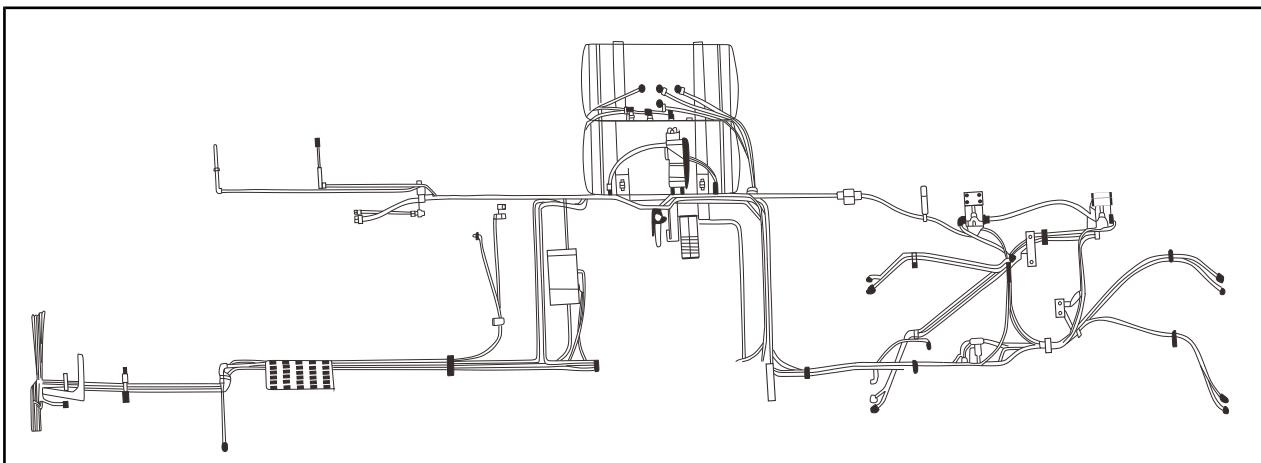


Fig.5-113 Brake lines

5.12.5 Air tank – drain

There is some water in the outlet in raining days or during days that the temperature difference between day and night is large.

Drain the water in the air tank everyday.

- Pull the **draining valve hoop (1)** left to right.

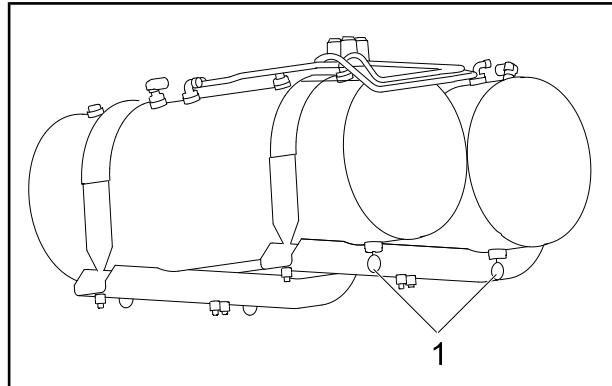


Fig.5-114 Air tank

1. Draining valve hoop

5.12.6 Draining of air dryer – check

Check the draining of air dryer every 10000 km.

1. Pull the draining valve hoop of air tank left to right. If there is a lot of water exhausting, the air dryer is out of order . Change it at once.

2. If there is oil in the water, check whether there is oil exhausted in the outlet of the air dryer. If there is oil, check whether there is oil

flowing out of the air compressor and maintain it immediately.

Change the drying drum every 20000 km.

1. Remove the **drying drum (3)** from the **valve body (1)** with the **belt spanner (2)**.
2. Clean the **valve body (1)** with a cleaning cloth.

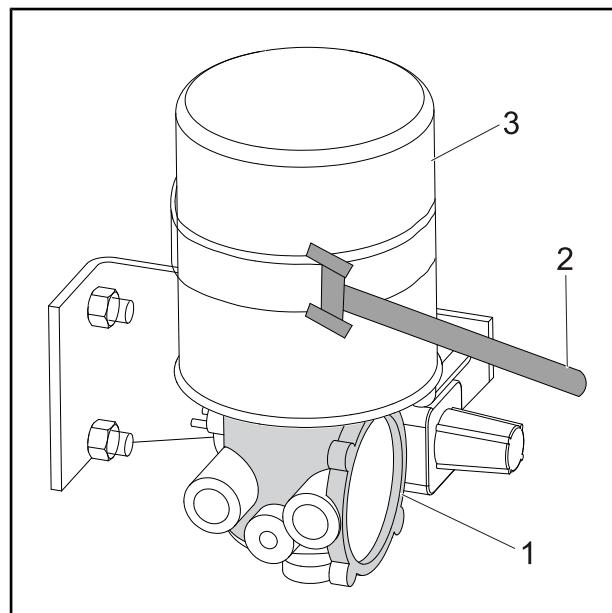


Fig.5-115 Remove the drying drum

- 1. Valve body
- 2. Belt spanner
- 3. Drying drum

3. Apply a layer of grease on the **sealing and fitting section (4)** of the new **drying drum (3)** and the **valve body (1)**.
4. Screw up the new **drying drum (3)** on the **valve body (1)** with the **belt spanner (2)**. The maximal torque is 15 N·m.

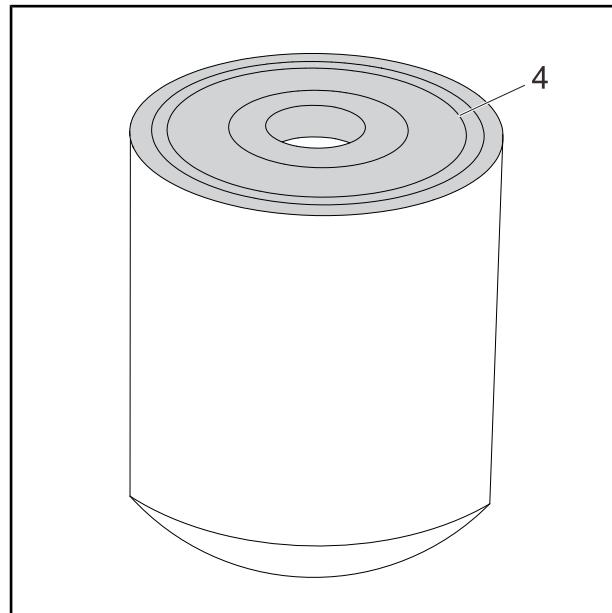


Fig.5-116 Grease application

4. Sealing and fitting section

5.12.7 Exhaust brake – check

Check the manual opening of exhaust brake.

1. Run the engine till it is above the opening speed (800 r/min).
2. Release the pedals of the accelerator and the clutch.
3. Push the **combination switch (right side)** horizontally forward to start the exhaust brake.
4. The exhaust brake indicator light working normally indicates that the manual opening pattern works fine. Otherwise overhaul it.

Check the linking opening of exhaust brake.

1. Run the engine till it is above the opening speed (800 r/min).
2. Release the pedals of the accelerator and the clutch.
3. Step the braking pedal and the exhaust brake works.
4. The exhaust brake indicator light working normally indicates that the linking opening pattern is normal. Otherwise overhaul it.

Check the working condition of exhaust brake.

Step the pedal of the accelerator or the clutch to shut down the exhaust brake. If the engine noise returns to the same noise as before and the exhaust brake indicator light puts out, the exhaust brake is normal. Otherwise overhaul it.

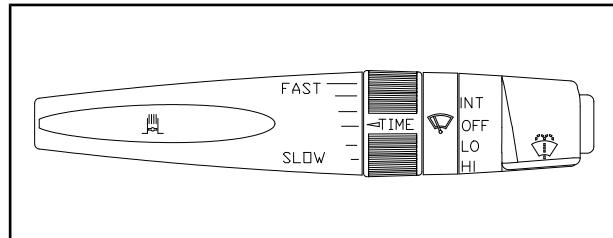


Fig.5-117 Combination switch (right side)

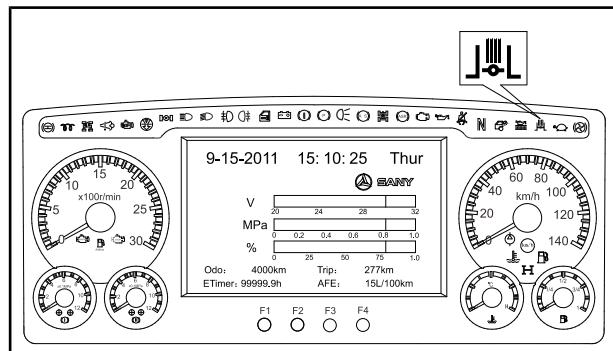


Fig.5-118 Exhaust brake indicator light

5.12.8 Bolts of brake chamber bracket – check

Check and tighten the bracket **bolts (1)** of brake chamber with a torque spanner every 5000 km or 3 months.

The tightening torque of the **bolts (1)** on the front brake chamber bracket: 80 N·m– 100 N·m.

The tightening torque of the **bolts (1)** on the rear brake chamber bracket: 170 N·m– 230 N·m.

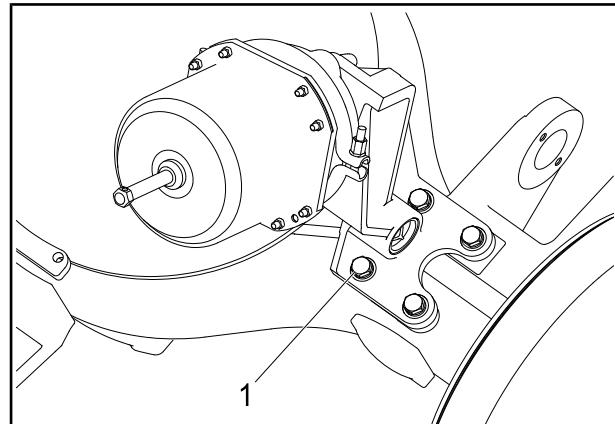


Fig.5-119 Brake chamber bracket

1. Bolts

5.12.9 Grease of brake assembly – fill

Fill the grease in the brake assembly every 2000 km or one month.

Fill grease in the front, middle and rear **brake chamber bracket nipple (1)**, the **adjusting arm nipple (2)** and the **brake bottom plate nipple (3)** with the oil gun.

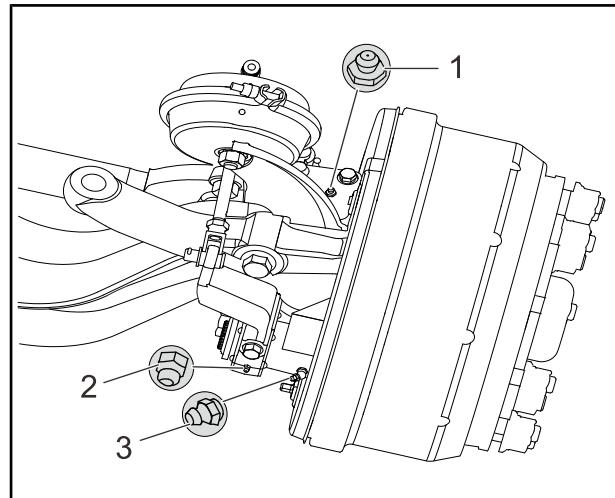


Fig.5-120 Nipple

1. Brake chamber bracket nipple	3. Brake bottom plate nipple
2. Adjusting arm nipple	

5.12.10 Free path of brake pedal – check

Examine the working condition of brake pedal everyday. Stepping the pedal to the lowest should be smooth and there is sound of air exhausting when releasing the pedal.

The ground clearance of brake pedal: (125±5) mm.

The free path of brake pedal: 20 mm–25 mm.

If it is not in the correct range, contact SANY service engineers.

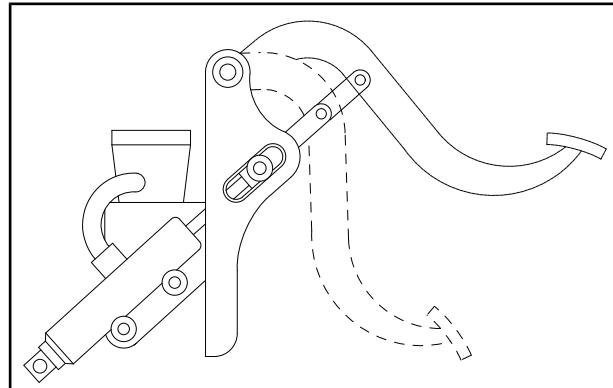


Fig.5-121

5.12.11 Brake friction plate – check

WARNING

Risk of accidents, personnel injuries and death!

Failure to check the brake and adjust the brake clearance in time could result in accidents, personnel injuries and death.

The more frequent using of the brake, the more frequent of the check. Adjust the brake clearance immediately.

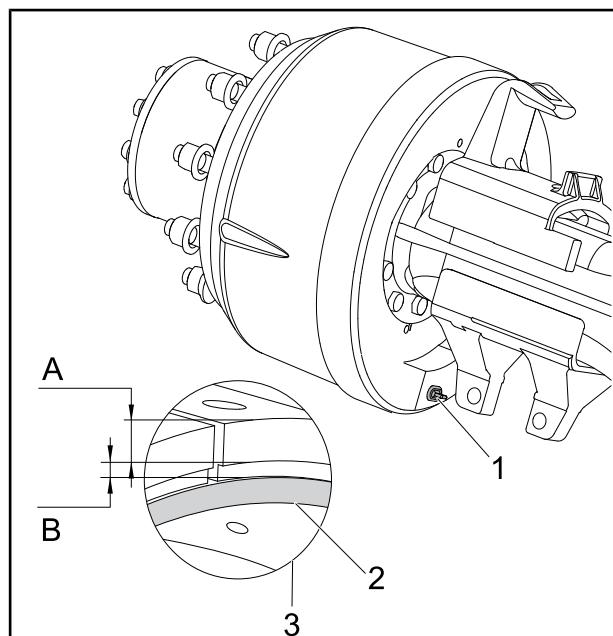
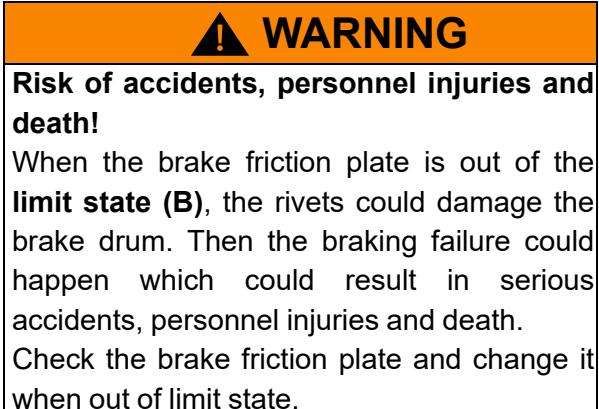


Fig.5-122 Brake friction plate

Check the abrasion of **brake friction plate (2)** and the clearance between brake friction plate and brake drum every week.

1. Unload the **rubber plug (1)** in the **observation hole (3)** of the brake.

2. There is **indicating step (A)** of abrasion degree from the side of the brake friction plate. Check whether **indicating step (A)** exists.



3. If the abrasion degree is on the **indicating step (A)**, change the **brake friction plate (2)** immediately.

4. Mount the **rubber plug (1)** to the **observation hole (3)** after the check.

During checking, support and lift the vehicle with the axles, and add limiting stoppers in front and rear of the tires.

5.12.12 Brake clearance – adjust



- Adjust the brake clearance after 2000 km–3000 km running-in for the new driving axles.
- In the urban area where the brake is used frequently, check the brake clearance every week. In the mountain area, check the brake state before driving.

- Adjust the brake clearance after changing the brake friction plate.
- Check the brake clearance of both sides for a same axle.

Adjust the brake clearance of 457 middle and rear axles.

1. Stop the vehicle on the flat place.
2. Make sure the pressure of the air tank is \geq 0.7 MPa. Plug the wheels with the arris fillets and release the parking brake.
3. Wrench the **adjusting bolt (2)** of the **adjusting arm (1)** of the middle and rear axles with the spanner. Turn and tighten the bolt anticlockwise to make the clearance zero, then reverse it in 180°. The brake clearance should be 0.5 mm–1 mm.

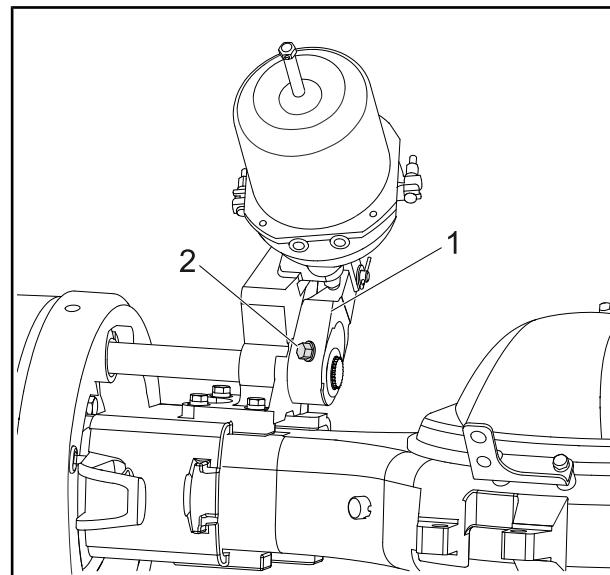


Fig.5-123 Middle and rear axles

1. Adjusting arm 2. Adjusting bolt

Adjust the brake clearance of the front axle.

1. Wrench the **front axle adjusting bolt (4)** of the **front axle adjusting arm (3)** with the spanner.
2. Turn and tighten the bolt clockwise to make the clearance zero, then reverse it in 180°. The brake clearance should be 0.5 mm–1 mm.

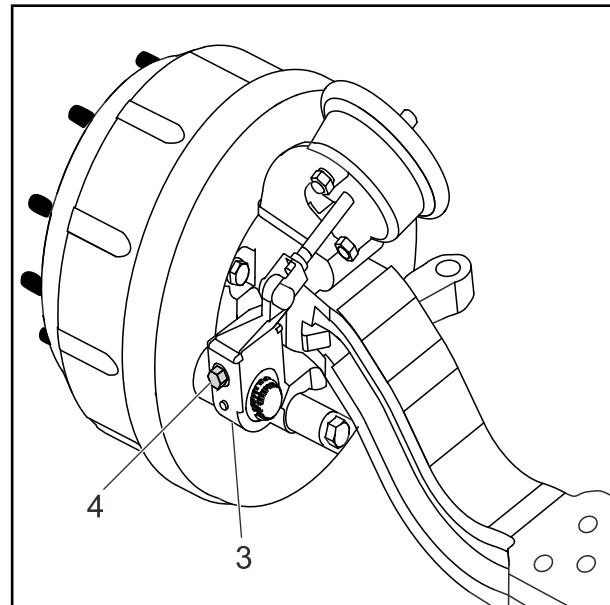


Fig.5-124 Front axle

3. Front axle
adjusting arm 4. Front axle
adjusting bolt

5.12.13 Return spring – check

Maintain the wheel hub bearing in every 10000 km and check the return of the brake shoe.

- If it is slow, take down the spring and measure its length.
- If the permanent extension is more than 4% of the original length (the length of the spring in YIMU brake is less than 215 mm), change the spring.

While changing the brake friction plate, change the **return spring (1)** simultaneously.

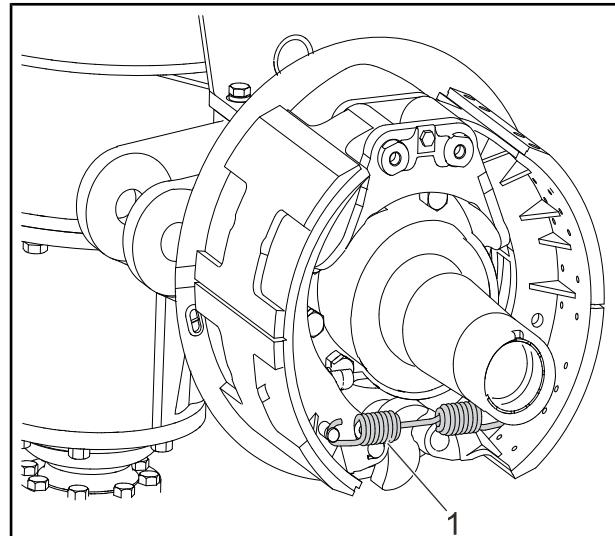


Fig.5-125 Return spring

1. Return spring

5.13 Steering system – maintain

5.13.1 Oil reservoir – check

Check the quantity and quality of the oil in the reservoir before driving everyday. Turn the key switch to ON position and start the engine. Check the oil through the **observation window (2)** in the reservoir.

! DANGER

Risk of dangerous accidents, personnel injuries and death!

Mixing the hydraulic oil of different brands will damage the hydraulic parts and cause steering failure which will result in dangerous accidents, personnel injuries and death.

Do not mix the hydraulic oil of different brands.

1. Check whether the hydraulic oil is black or deteriorated. If black or deteriorated, change the hydraulic oil.

2. Check the level of the hydraulic oil. It is normal when the lever is between the upper edge and lower edge of the **observation window (2)**.

3. If the oil level is lower than the lower edge, check whether there is oil leakage. Check all the connections of the hydraulic pipelines and tubes whether there is damage.

- If there is leakage, ask the service station to repair it.
- If there is no leakage, open the **filler cap (1)** and fill the hydraulic until the level is in 2/3 of the **observation window (2)**.

The hydraulic oil: 46# antifriction hydraulic oil or 8# hydraulic drive oil

Filling mass of trucks with 3 axles: 8 L

Filling mass of trucks with 4 axles: 15 L

5.13.2 Steering hydraulic oil and strainer – change

Change the steering hydraulic oil and strainer when do the running-in maintenance of a new truck and clean the pipelines thoroughly. Then change the steering hydraulic oil and strainer in every 20000 km.

The method of changing the hydraulic oil and strainer:

WARNING

Risk of accidents!

When lifting the vehicle, the sliding or falling could result in dangerous accidents.

In addition to jacks, add limit blocks to the front and rear tyres to prevent the vehicle from sliding or falling.

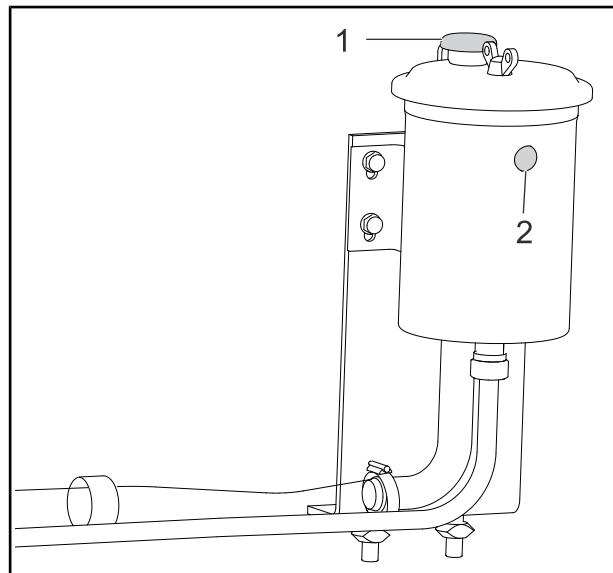


Fig.5-126 Oil reservoir

1. Filler cap

2. Observation window

1. When the engine puts out, lift the front axle with the jack. Dismount the **drain plug (1)** at the bottom of the power steering gear, then load the waste oil with a basin.
2. Start the engine at idling speed in less than 5 seconds and do not step the fuel throttle. Turn the steering wheel repeatedly and exhaust the hydraulic oil.

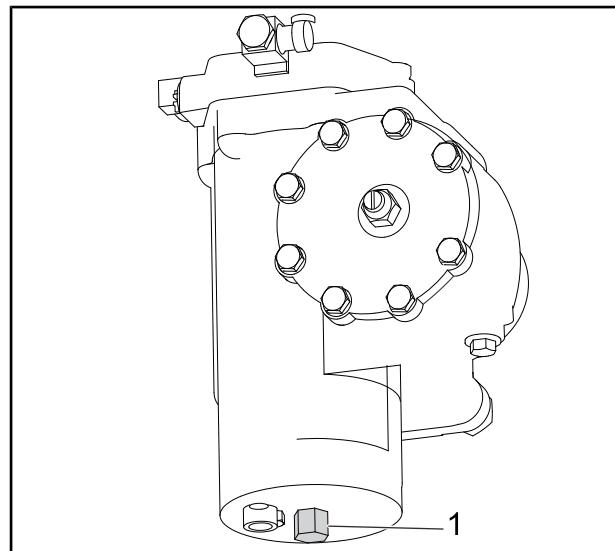
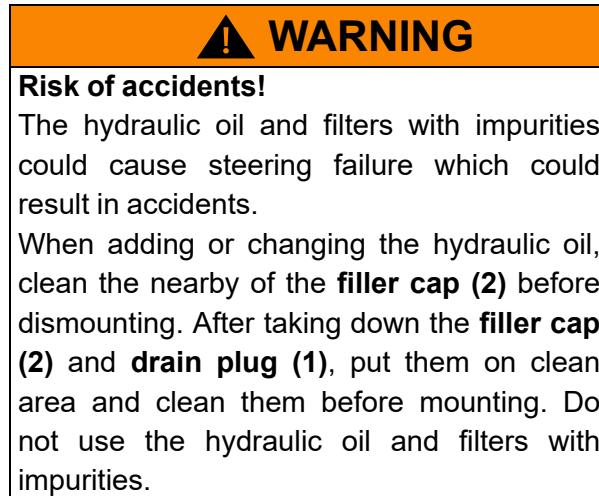


Fig.5-127 Power steering gear

1. Drain plug



3. Open the **filler cap (2)** to fill some new hydraulic oil and clean the hydraulic pipelines.
4. After exhausting the hydraulic oil, mount the **drain plug (1)** to the bottom of the power steering gear.
6. Dismount the **top cap (3)** of the oil reservoir. Then mount a new **strainer (4)** instead of the old one and mount the **top cap (3)**.
7. Fill new hydraulic oil into the oil reservoir till it is full.

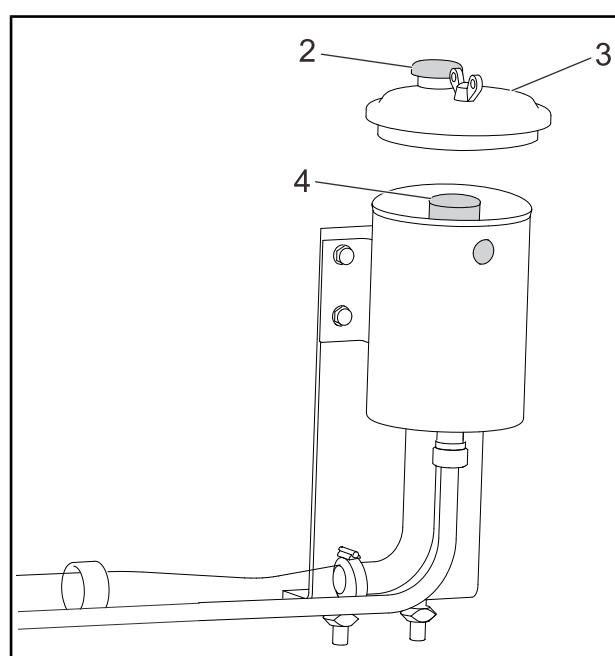


Fig.5-128 Oil reservoir

2. Filler cap	4. Strainer
3. Top cap	

8. Start the engine and turn the steering wheel to the limiting positions in less than 5 seconds to make the oil be full of the system. The other person adds the hydraulic oil at all times till the oil level is between the upper edge and lower edge and does not drop.

9. Mount the **filler cap (2)**.

5.13.3 Fastness – check

Check the fastness of the connections of **steering vertical arm (1)**, **drag link (2)**, **steering knuckle arm (3)**, **tie rod arm (4)** and **tie rod (5)**.

Lubricate them in every 2000 km or one month.

Check the items periodically as follows.

- Check the looseness, flaw, abrasion and deformation of every connection.
- Check the looseness and clamping stagnation of the **drag link (2)** balls and **tie rod (5)** balls. And check for lack of grease in the ball assembly.

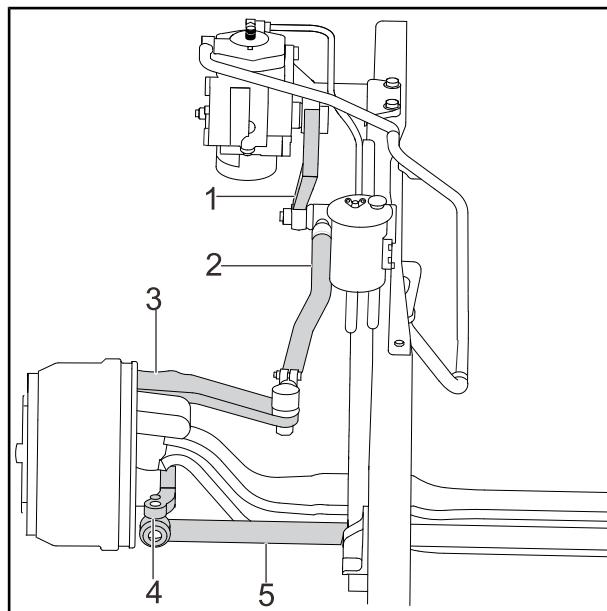


Fig.5-129 Steering system

1. Steering vertical arm	4. Tie rod arm
2. Drag link	5. Tie rod
3. Steering knuckle arm	

Check the pipelines of the hydraulic system.

- Before driving the vehicle, check whether there is damage or oil leakage in the connection between the **hydraulic pipelines (6)** and hoses everyday.
- When the temperature is too high in summer, steering booster fails or abnormal noise of hydraulic pipelines happens. Check whether hydraulic pipelines are blocked due to the hot hydraulic oil.
- When using the vehicle in winter and difficult flow of hydraulic oil happens, remove the ice and snow on the hydraulic pipelines. Then start the vehicle to preheat. Run it after the steering is normal.

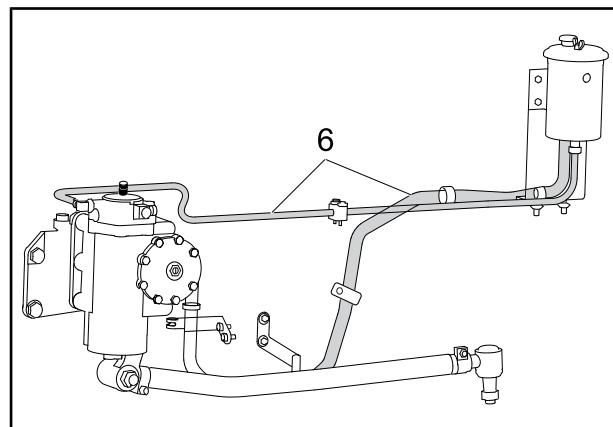


Fig.5-130 Hydraulic system

6. Hydraulic pipelines

5.13.4 Steering wheel – check

WARNING

Risk of injuries or death!

If the free clearance of the steering wheel is too big, the maneuvering performance could be affected seriously which could cause personnel injuries or death.

Examine and adjust the free clearance strictly.

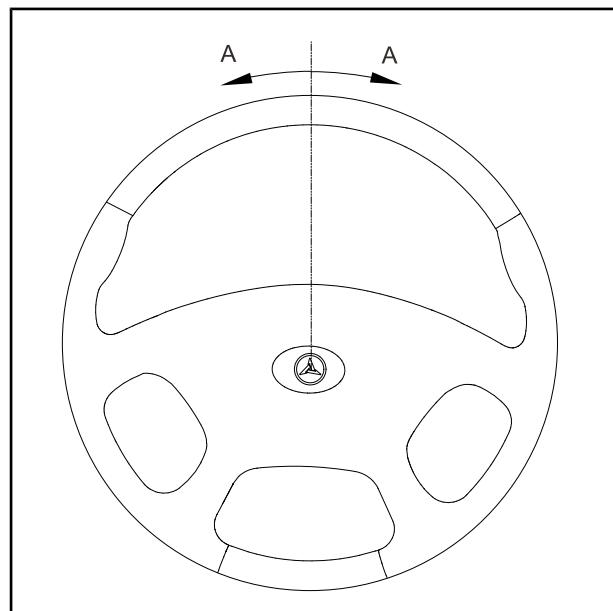


Fig.5-131 Free path

1. Examine the free path.A. 10° – 15°

- Free path: when the whole car is in a straight line, turn the ignition key to ON position and start the engine. Turn the steering wheel to the maximum angle when the steering axle does not rotate.
- The free path of the steering system is **10° – 15° (A)**. If it is more than 15° , ask help from the service station and adjust the free path.

2. Examine the looseness.

Shake the steering wheel. Examine whether there is looseness in the steering column and other relevant parts.

3. Examine and confirm the excursion of the steering system.

- The normal state: drive the truck 100 m on a flat and straight road without operating the steering wheel and the deviation is in 2 m.
- If there is excursion, examine the looseness of the steering tie rod and ball of the drag link. Adjust or change them if looseness happens. If it still fails, go to the service station to examine the location parameter of the front axle and the parallelism of the middle and rear axles.

4. Examine the heavy and jammed condition.

There should be no heavy and jammed condition. Otherwise examine the parts of the steering system.

5. Examine the horn.

Make sure that the sound of the horn is usual and there is no unusual conditions between the horn button and the steering wheel.

5.14 Electrical system – maintain

5.14.1 Instrument panel – check

Turn the key to ON position, then examine the working condition of instrument panel. Examine the following items:

- Engine tachometer
- Speedometer
- Fuel gauge
- Air pressure gauge
- Coolant temperature gauge
- Indicator lights
- Multi-function display screen

See “Instrument panel” on page 3-23.

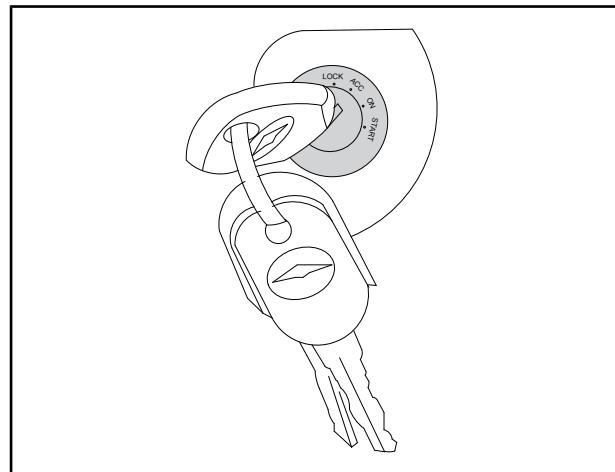


Fig.5-132 Key

5.14.2 Windshield wiper – check

1. Press the **wiper spray switch (3)** on the right of the combination switch in the cab.
2. Open the **wiper rotary switch (1)** of the windshield wiper.

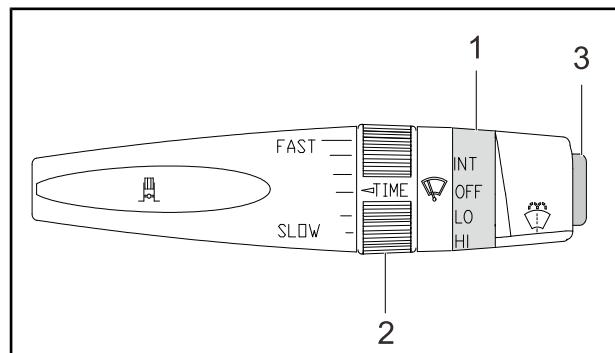


Fig.5-133 Right combination switch

1. Wiper rotary switch	3. Wiper spray switch
2. Cycle adjust knob	

3. Examine the windshield **wiper arm (4)** and the **water injector (5)**.

4. Rotate the **cycle adjust knob (2)** to adjust the cycle of windshield wiper.

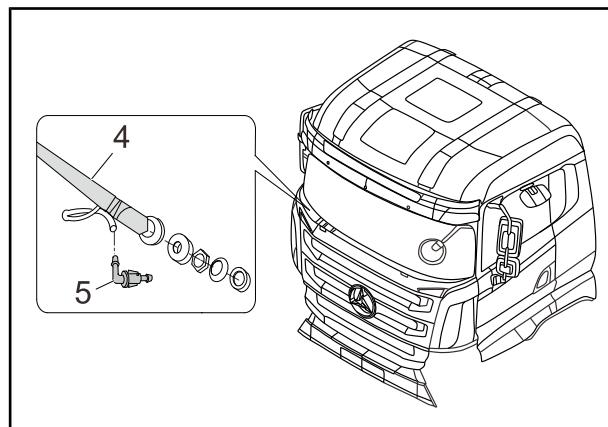


Fig.5-134 Windshield wiper

4. Wiper arm

5. Water injector

5.14.3 Lighting system of lamp signal – check

1. Open the switch of the steering lamp and examine the lighting state. See “[Left arm operation of combination switch](#)” on page 4-3.

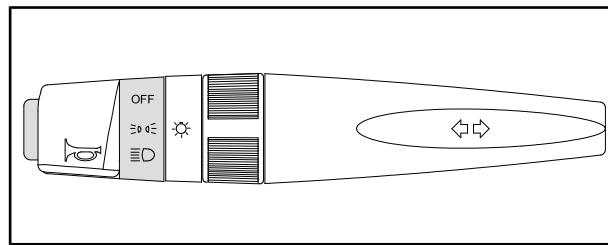


Fig.5-135 Left arm combination switch

2. Examine all lamps as follows:

- Lighting and flashing function of all lamps
- Brake lamp
- Reversing light
- Warning lamp and indicating lamp
- Dirt, water penetration or damage

5.14.4 Circuits – check

Check the fastness and abrasion of the following wiring harness:

- Headlight wiring harness
- Fusible line
- Restrictor wiring harness
- Main wiring harness below the fuse box
- High-low gear switch wiring harness
- Over line protection of cab main wiring harness
- Battery wiring harness

5.14.5 Battery – maintain

⚠ WARNING

Risk of death or serious injury!

The battery acid is toxic which could result in death or serious injury.

Keep the battery away from children and pets. While operating the battery maintenance, put the lockout/tagout tags to notify others that the machine is not to be used.

1. Check the fastness of the battery **connection pole (2)**.

2. Check whether the **vent (4)** is obstructed.

3. Detect the open circuit voltage between the positive and **negative pole (1)** of the battery with a voltmeter. If the voltage is lower than 12.4 V, unload the battery and charge it with dedicated device.

If there is no voltmeter, check the state of the battery by observing the **state indicator (3)**. If it indicates green, it is normal. If it indicates black, charge the battery. If it indicates white, change the battery.

Before any battery maintenance procedure, remember and follow these requirements:

- Recycle the used battery as the requirements of local government. Do not set them on ground, in lake or at any other unapproved places.

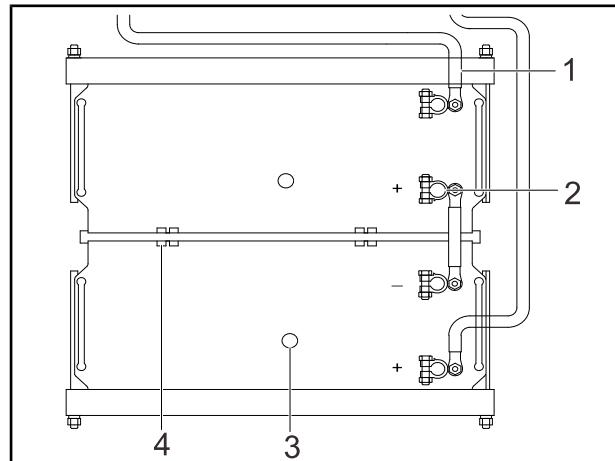


Fig.5-136 Battery

1. Negative pole	3. State indicator
2. Connection pole	4. Vent

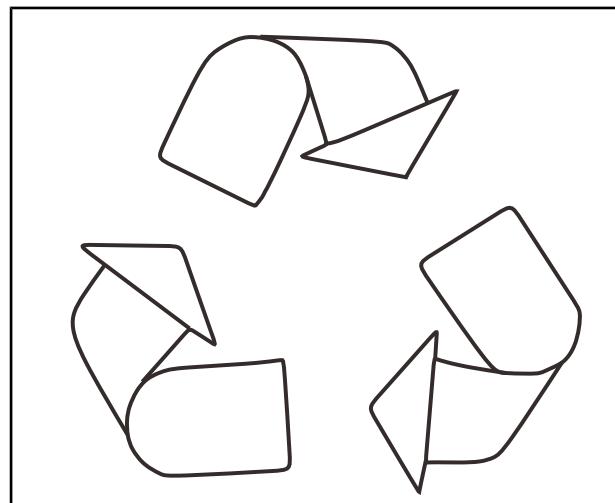


Fig.5-137 Environmental protection

- If battery acid contacts skin or eyes, flush the area immediately with fresh water and seek medical attention.
- Wear personal protective equipment when working with batteries.

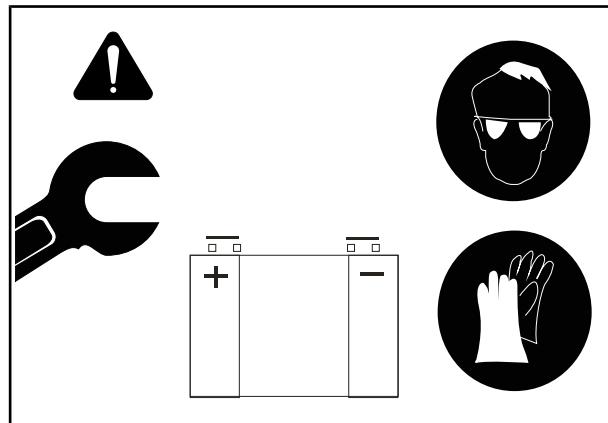


Fig.5-138 Wear protective equipment

- Battery gases are explosive. Never smoke around batteries. Never expose them to sparks or open flames.



Fig.5-139 No smoking

- Keep unshielded light away from the battery.

- Do not place metal tools or hard objects on the battery.

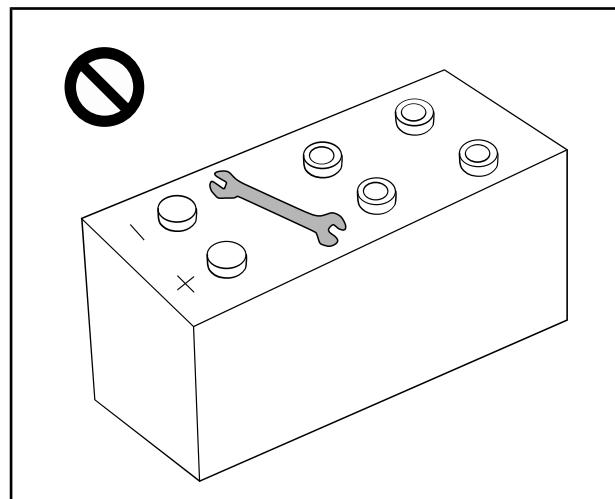


Fig.5-140 No metal

5.15 Air conditioner – maintain

5.15.1 Working condition – check

Open the air conditioner and check whether the working condition is normal. Check the function of the cooling and heating modes, temperature adjusting, air volume adjusting, blowing mode, internal and external cycles, defrosting, automatic and manual modes.

See “[Air conditioner](#)” on page 3-51.

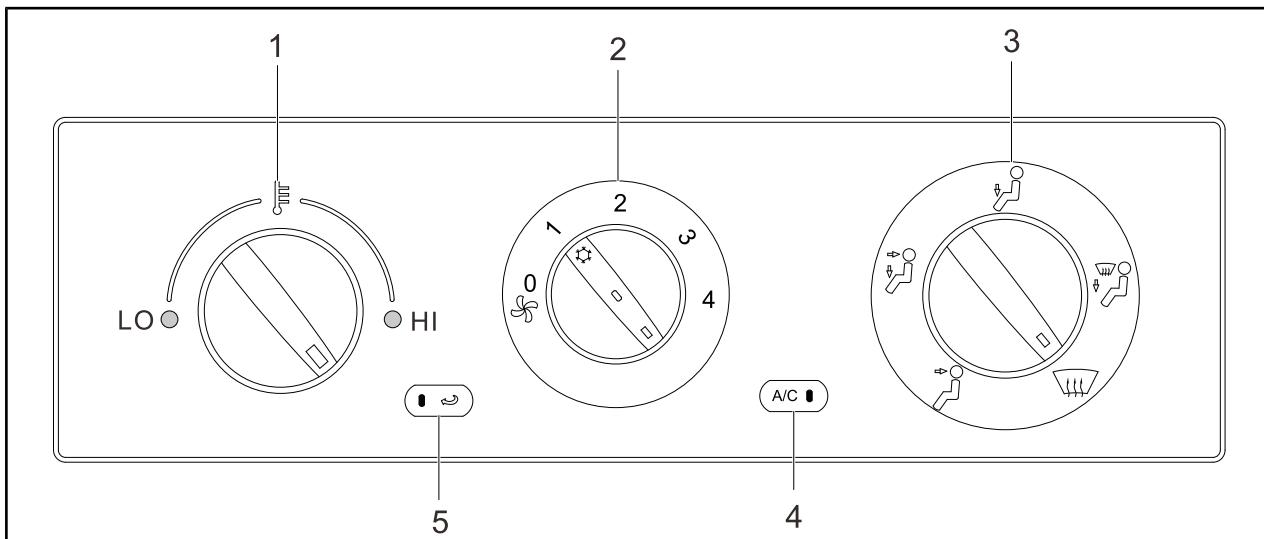


Fig.5-141 Air conditioner

1. Temperature adjustment knob	3. Air-out mode knob	5. Loop button
2. Air volume control knob	4. A/C button	

5.15.2 Volume of refrigerant – check

Check the refrigerant by observing the bubbles through the pipeline vision mirror.

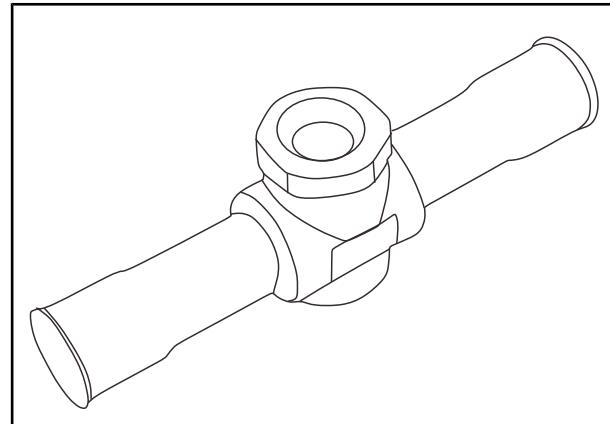


Fig.5-142 Pipeline vision mirror

1. Start the engine and run it at the idling speed of 1500 r/min–2000 r/min.
2. Start the air conditioner. Adjust the temperature to the lowest and adjust the air volume to the biggest.
3. After running for 5 minutes, check the volume of refrigerant by observing the bubbles as the following table:

Table 5–11 Check the volume of refrigerant

Phenomenon	Cause	Solution
The pipeline vision mirror is clear. There is cold air in the outlet. When the rotating speed increases or decreases, there may be some bubbles. After closing the air conditioner, bubble immediately. Then the bubbles disappear slowly (in about 45 seconds).	Normal	—
The pipeline vision mirror is clear. There is cold air but not enough. After closing the air conditioner, there is no bubble in 15 seconds.	Overmuch	Release some of the refrigerant.

Table 5-11 Check the volume of refrigerant (continue)

Phenomenon	Cause	Solution
There is a small amount of bubbles below the pipeline vision mirror or in every 1 second–2 seconds.	Not enough	Check whether there is leakage of the refrigerant. Repair it and add refrigerant to the proper.
There is a lot of bubbles or the bubbles disappear below the pipeline vision mirror. There is oil fog or stripes in the pipeline vision mirror.	Short of refrigerant or no refrigerant.	Check whether there is leakage of the refrigerant. Repair it and add the refrigerant to the proper.

5.15.3 Pipelines of air conditioner – check

Check the pipelines every day.

Check whether there is oil leakage in every joint. It is normal if there is no oil dirt around the joints.

Check the looseness of the brackets.

Check the damage of the pipelines.

See “[Air conditioning system](#)” on page 3-57.

5.15.4 Cleanliness of condenser – check

Check the cleanliness of condenser every week. If there is dirt, clean the surface.

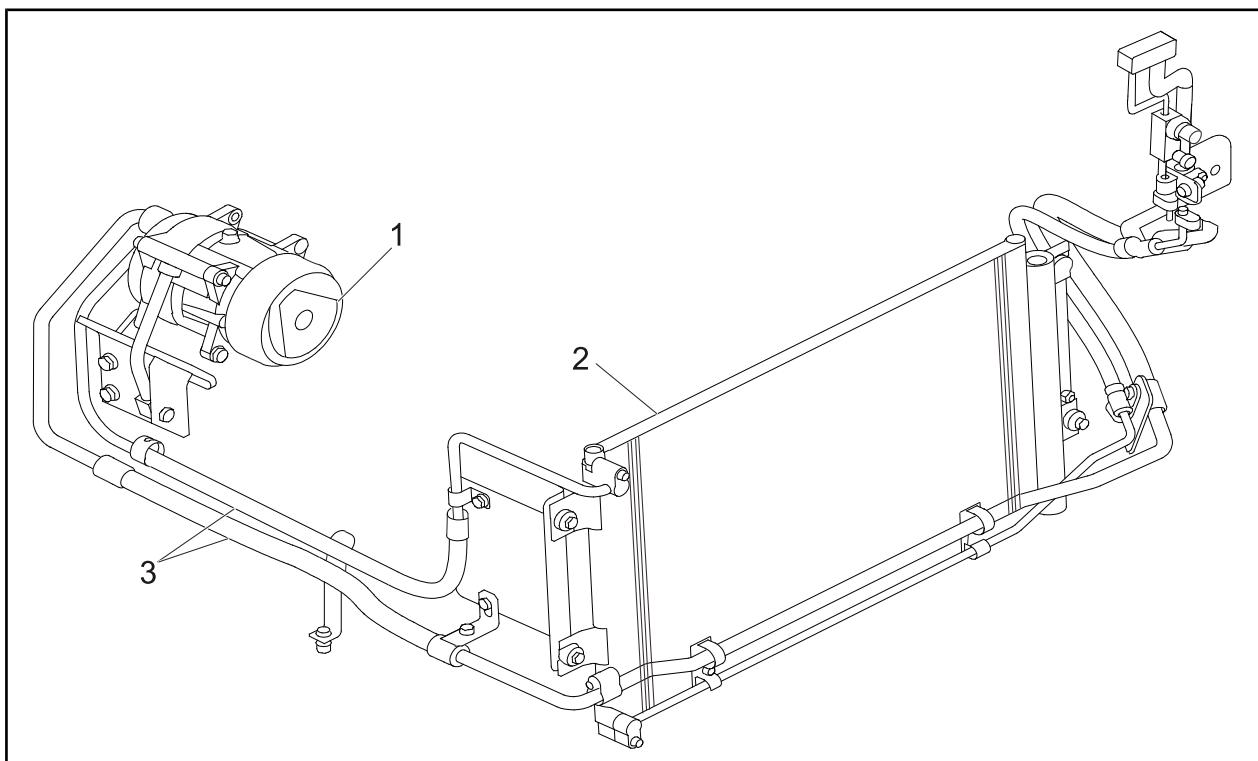


Fig.5-143 Condenser

1. Compressor 2. Condenser 3. Air conditioner pipelines

5.15.5 Heater valve – maintain

In order to prevent the spool of heater valve from jam, do the following operations:

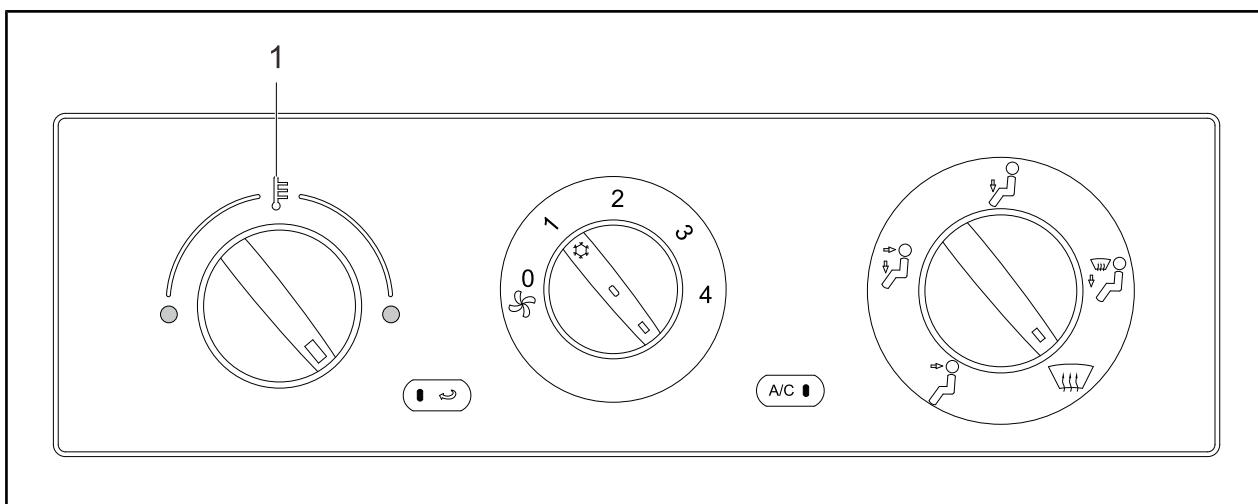


Fig.5-144 Temperature adjustment

1. Temperature adjustment knob
1. Adjust the **temperature adjustment knob (1)** to L0, then increase to HI for 5 seconds.

2. Decrease it to L0 for 5 seconds, then increase it to H1 for 5 seconds.
3. Repeat the work for 5 times.

5.15.6 Air-in strainer – check

Check the cleanliness of the strainer. If it is covered by dirt, unload it and clean it with water or blow it with high pressure air rifle.

Matters needing attention:

- Whether the air conditioner is in use or not, check and maintain the pipelines and other devices.
- If the air conditioner is not in use in several months, start it one time every month and last for about 10 minutes.
- When the air conditioner is not in use for a long time, do the first start at idling speed. Otherwise the high engine speed may cause the high speed of compressor and it can not return oil immediately.

5.16 Long-term shutdown or storage

1. The vehicle should be stored in a ventilated and moisture-proof garage when it is out of service for a long time, and should not be stored in the open air. Drain the coolant and fuel, cut off the power supply, and lock the doors and windows. For short-term storage in the open air, cover with canvas to prevent vehicle corrosion.

2. Run the engine idling for 30 min every month to avoid serious corrosion of parts due to long periods of non-operation.

3. If the vehicle is not used for a long time, the entire vehicle needs to be maintained regularly. In order to prevent corrosion, paint surface coating is required.

4. Battery maintenance:

a) If the vehicle is stored for more than 15 days, the negative connection of the battery should be disconnected;

b) For stock vehicles that have not disconnected the battery connection, they need to be charged once a month, and the charging time is not less than 30 min;

c) Disconnect the battery connected to the vehicle and recharge it every 45 days. The charging current is one-tenth of the battery capacity and the charging time is 8 to 10 hours.

5. Air conditioning maintenance:

a) Regardless of whether the air conditioner is used or not, pipelines and other devices should be inspected and maintained.

- b) If the air conditioner is not used for several months, the air conditioner should be turned on once a month for about 10 min each time to facilitate the normal operation of the system.
- c) If the air conditioner is turned on for the first time after it has not been used for a long time, be sure to start the air conditioner system at idling speed to avoid excessive engine speed, resulting in excessive compressor speed and untimely compressor oil return, causing seizure failure.

6. Long-term parking of natural gas vehicles (parking more than 10 hours) maintenance:

- a) All parts should be kept away from corrosive environment, and the storage place should not be in the open air.
- b) Keep the original dry nitrogen sealed (0.02 - 0.05) MPa pressure, and it is not permitted to open any valve to release the internal pressure. Do not open the vacuum connector of the gas cylinder (which is also the explosion-proof port of the outer container), otherwise the vacuum of the gas cylinder will be lost and the gas cylinder will lose its heat preservation effect.
- c) The lead seal of the safety valve shall not be damaged, unless the storage time of the gas cylinder exceeds the regular inspection period of the safety valve (within 12 months from the last calibration), and it needs to be sent to the technical supervision department for inspection.
- d) All parts of the dust-proof device (such as filling cap, vent cap, etc.) must not be opened at will, otherwise it may be blocked during use due to the entry of air. Due to the entry of dust particles, the valve will leak and the engine will be damaged.
- e) For liquid gas cylinders that are expected to be stored for more than 5 days, the liquid must be drained before storage, the pressure must be set to 0 MPa, all valves should be closed, and it should be placed in an open or ventilated space, electrical appliances in the space should be explosion-proof type.
- f) Cylinders containing liquefied natural gas are strictly prohibited to be stored in a closed space. If it must be stored in a confined space, a combustible gas alarm should be installed. The minimum alarm limit of the alarm is when the content of natural gas in the air in the space reaches 1% by volume. The alarm signal should be able to emit sound, light, and the driver can see the warning display.



Troubleshooting

6 Troubleshooting	6-1
6.1 Treatment of common troubles on chassis	6-3
6.2 Jump-start the engine with exchange battery	6-6

 **WARNING**

Read and understand all safety precautions and instructions in this manual before reading any other manuals provided with this machine and before operation or maintaining it. Failure to do this could result in death or serious injury.

6.Troubleshooting

6.1 Treatment of common troubles on chassis

Table 6-1 Treatment of common troubles on chassis

Fault content		Fault analysis	Measures	
Engine can not be started.	Startup fails or is too slow.	Earth wire disconnects.	Connect properly	"Alternator – check" on page 5-36
		Lubrication viscosity of engine is too high.	Change with recommended lubricant.	"Lubricants and fluids" on page 5-16
	Starter works normally.	Engine parking fuse blows out.	Replace	"Fuses" on page 3-61
		Abnormal preheating.	Follow proper preheating steps.	"Engine start procedure" on page 4-11
		Insufficient fuel.	Fill	Go to gas station
		Dirty fuel filter.	Replace	"Fuel filter core – change" on page 5-41
		Air enters oil supply system.	Exhaust air	"Air of fuel system – eliminate" on page 5-40
		Air filter is blocked.	Clean or replace	"Air filter – maintain" on page 5-33
Engine run at low speed or stalls.	Engine can not be shut down.	Air intake pipe is deformed.	Replace	"Air intake system" on page 3-58
		Insufficient fuel.	Fill	Go to gas station
		Dirty tank filter.	Replace	"Fuel filter core – change" on page 5-41
		Air enters oil supply system.	Exhaust air	"Air of fuel system – eliminate" on page 5-40
		Air filter is blocked (indicating lamp is red).	Clean or replace	"Air filter – maintain" on page 5-33
		Air intake pipe is deformed.	Replace	"Air intake system" on page 3-58
		Dirty fuel filter.	Replace	"Fuel filter core – change" on page 5-41
Insufficient power of engine.	Air enters oil supply system.	Exhaust air		"Air of fuel system – eliminate" on page 5-40
	Air filter is blocked.	Clean or replace		"Air filter – maintain" on page 5-33

Table 6-1 Treatment of common troubles on chassis (continue)

Fault content	Fault analysis	Measures	
	Tank contains no diesel oil.	Pour oil in tank thoroughly, and then fill diesel oil.	Go to gas station
	Air intake pipe is deformed.	Replace	"Air intake system" on page 3-58
	Fuse blows out.	Replace	"Fuses" on page 3-61
	Parking brake is not relieved.	Fully relieve parking brake lever.	"Parking brake" on page 4-21
	Clutch slides.	Check free travel of clutch pedal.	"Clutch pedal – check " on page 5-44
Engine overheats.	Check quantity of cooling fluid.	Replenish	"Cooling fluid level – check" on page 5-31
	Front radiator is blocked. Front cold-warm automatic adjustment radiator is blocked.	Clean	"Radiator and intercooler – maintain" on page 5-43
	Radiator is blocked by scale.	Clean radiator with detergent.	"Radiator and intercooler – maintain" on page 5-43
Exhaust black tail gas.	Air filter is blocked (indicating lamp is red).	Clean or replace	"Air filter – maintain" on page 5-33
	Air intake pipe is deformed.	Replace	"Air intake system" on page 3-58
Excessive fuel consumption.	Air filter is blocked.	Clean or replace	"Air filter – maintain" on page 5-33
	Air intake pipe is deformed.	Replace	"Air intake system" on page 3-58
	Low tyre pressure.	Regulate tyre pressure as per requirements.	"Tyres and wheels – check" on page 5-70
	Clutch slides.	Check free travel of clutch pedal.	"Clutch pedal – check " on page 5-44
Excessive engine oil consumption.	Unacceptable engine oil is used.	Change with recommended engine oil.	"Engine oil – change" on page 5-28
	Excessive engine oil amount.	Drain redundant engine oil.	"Engine oil level – check" on page 5-27

Table 6-1 Treatment of common troubles on chassis (continue)

Fault content	Fault analysis	Measures	
	Engine oil has not been changed for a long time.	Change as per proper mileage or time.	"Engine oil – change" on page 5-28
	Engine oil filter is blocked.	Replace	"Engine oil – change" on page 5-28
	Time for preheating engine is excessively long.	Preheat properly	"Engine start procedure" on page 4-11
Steering wheel can not reset properly.	Insufficient lubricant for steering system.	Fill lubricant	"Fastness – check" on page 5-96
It is difficult to steering.	Tyre pressure is too low.	Regulate tyre pressure properly as per requirements.	"Tyres and wheels – check" on page 5-70
	Lack power steering oil.	Replenish	"Oil reservoir – check" on page 5-93
Free gap of steering wheel in cab is too big.	Connecting parts of steering system loosen.	Retighten	"Fastness – check" on page 5-96
	Uneven tyre pressure.	Regulate to proper pressure value as per requirements.	"Tyres and wheels – check" on page 5-70
	Uneven wear of tyres.	Replace	"Tyres and wheels – replace" on page 5-73
	Nut of wheels loosens.	Tighten to specified torque.	"Tyres and wheels – check" on page 5-70
Brake functions badly.	Uneven tyre pressure.	Regulate to proper pressure value as per requirements.	"Air pressure and seal condition – check" on page 5-77
	Uneven wear of tyres.	Replace	"Tyres and wheels – replace" on page 5-73
Parking brake is inferior.	Brake liner has reached service limit.	Replace	"Brake friction plate – check" on page 5-90
	Oil or other grease drops on brake liner.	Remove oil or grease, or replace liner.	"Brake friction plate – check" on page 5-90

Table 6-1 Treatment of common troubles on chassis (continue)

Fault content	Fault analysis	Measures	
Battery overdischarges frequently.	V-drive belt is excessively loose or slides.	Adjust to specified tension or replace it.	"V type belt – check and adjust" on page 5-37
Abnormal noise appears during normal running.	Abnormal tyre pressure.	Regulate tyre pressure to specified value as per requirements.	"Tyres and wheels – check" on page 5-70
	Locknut of tyre loosens.	Tighten locknut of tyre as per specified torque.	"Tyres and wheels – check" on page 5-70
	V-drive belt is loose.	Adjust to specified tension.	"V type belt – check and adjust" on page 5-37
	Insufficient engine oil (noise from engine).	Replenish	"Engine oil – change" on page 5-28
	Insufficient power steering oil.	Replenish	"Oil reservoir – check" on page 5-93

6.2 Jump-start the engine with exchange battery

NOTICE

Risk of a truck damage!

Failure to observe and follow this notice can result in damage to the machine or cause the machine to operate improperly.

- The starting system voltage and the battery voltage in the boosting machine should be no more than 24 VDC. Always jump-start the engine with equal voltages.
- The jumper cables and their clamps must be undamaged, have no corrosion and be suitable for the battery amperage. All clamps must be securely attached to their jumper cable ends.
- Set all controls to their neutral positions.
- Never allow the jumper cable clamps to touch each other.
- Ensure that all jumper cables are clamped to their connections securely.

1. Ensure that the ignition switches of both machines are in the OFF position.
2. Clamp one end of a jumper cable to the positive red terminal (+) of the **drained battery (3)**.
3. Clamp the other end of the same jumper cable to the positive red terminal (+) of the **charged battery (2)**.
4. Clamp one end of a second jumper cable to the ground black terminal (-) of the **charged battery (2)**.
5. Clamp the other end of the second jumper cable to the ground black terminal (-) of the **drained battery (3)**.
6. Start the engine of the machine with the **charged battery (2)** and run it at a medium engine speed.
7. Attempt to start the engine of the machine with the **drained battery (3)**. Retry after 3 minutes if the engine dose not start.
8. Disconnect the jumper cables from the machine that had the **drained battery (3)** in reverse order as shown above. Then disconnect the cables from the machine with the **charged battery (2)** in the same way. The disconnection order is from C to B to A to D.

Note: Pay attention to safety when dealing with batteries. Refer to "[Danger of chemical burn](#)" on page 2-11.

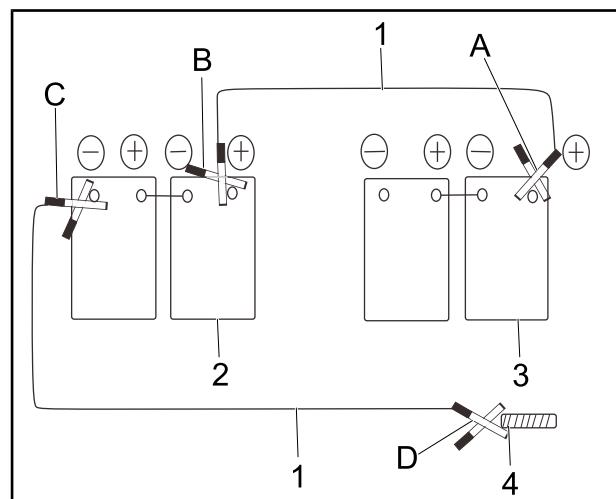


Fig.6-1 Jump-start the engine

1. Booster cable	3. Drained battery
2. Charged battery	4. Frame

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Technical specification

7 Technical specification	7-1
7.1 Chassis technical parameters	7-3

⚠ WARNING

Read and understand all safety precautions and instructions in this manual before reading any other manuals provided with this machine and before operation or maintaining it. Failure to do this could result in death or serious injury.

7. Technical specification

7.1 Chassis technical parameters

Table 7-1 Chassis technical parameters

Chassis type	Fuel type	Emis-sion stand-ard	Engine model: Capacity (L) Rated power (kW)	Axle load (kg)	Tire type	Quantity of leaf spring (front/rear)	Max grade ability
SYM1255T1E	Diesel	China V	P11C-WB 10.52 240	7000/ 18000 (double axle)	11.00- R20	10/12	30%
SYM1160T1E	Diesel	China V	YC4E- G140-50 4.73 105	6000/ 10000	9.00R- 20	10/10+3	40%
SYM1250T1E	Diesel	China V	YC6A270- 50 7.52 199	7000/ 18000 (double axle)	11.00- R20	4/10	30%
SYM1250T3	Diesel	China III	WP10.340- E32 9.726 250	7000/ 18000 (double axle)	11.00- R20	10/12	30%
SYM1310T	Diesel	China III	P11C-UJ 10.52 259	6485/ 6500/ 18000 (double axle)	315/ 80R2- 2.5	9/9/12	32%
SYM1310T1E	Diesel	China V	J08E-YA 7.684 224	6500/ 6500/ 18000 (double axle)	11.00- R20	4/4/10	30%

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