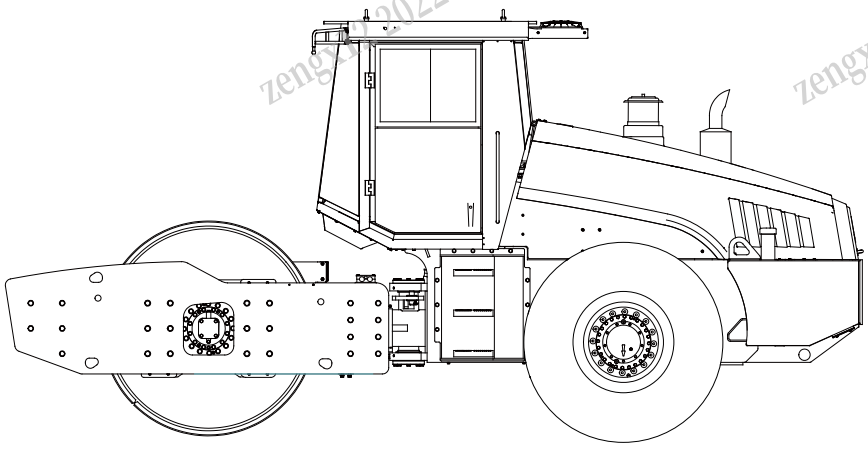
Quality Changes the World

SANY

Single Drum Roller

SSR200C-8H
SSR220C-8H



Safety, Operation and Maintenance Manual

SANY

SSR200/220 Series Single Drum Roller

Safety, Operation and Maintenance Manual

⚠ WARNING

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

Sany Group

SANY Automobile Manufacturing CO.,LTD

Sany Industry Zone
Economic & Technical Development Zone
Changsha, Hunan, China 410100

http://www.sanyglobal.com

Tel: 0086-4006098318

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RESPONSIBILITY

SPECIFIC DECLARATION

The single drum roller is used to compacting operation. Any other use or any operation beyond the specified working range is not authorized use. Sany expressly bears no liability for any consequence due to any unauthorized use.

Information on this manual is used to guide qualified operators to operate and maintain rollers correctly. Sany expressly bears no liability for any consequence due to any use not observing the information on this manual.

It is forbidden to convert the roller without authorization. Sany expressly bears no liability for any consequence. When crack or electrical malfunction on the roller occurs, please contact the supplier, and don't conduct welding or make changes without permission, or else, for any consequence due to such contravention, Sany shall not bear any liability.

Use genuine spare parts from Sany. Sany expressly bears no liability for any machine damage or accident due to the use of untested or unauthorized spare parts or tools.

Operate and maintain parts (such as engine, a/c) on the roller, and observe related regulations on Users' guide supplied from their manufacturer.

Sany expressly bears no liability for any machine failure or damage due to force majeure of natural disasters (earthquake, typhoon) and wars.

Sany can not predict every circumstance that might involve a potential hazard in operation or maintenance. Operators and owners should highly attach importance to safety. Local specific safety rules of the countries may be stricter. If they differ from the regulations in this manual, observe the stricter one.

Duty of Sany

- Be responsible for providing qualified products and correct documents.
- Fulfill their promises on after-sales service, and document all maintenance and repair working done by after-sales service personnel.
- Train the operation and maintenance personnel based on their needs.

Duty of owners or other authorized personnel

- Only after each person involved in the product's operation, maintenance and repair is trained and fully understands the Parts Book and Operation and Maintenance Manual, can they operate and maintain the roller.

- Ensure the operation and maintenance personnel are qualified and know their related responsibilities.
- Periodically check related personnel's safety consciousness during working.
- If any fault which will lead to unsafe situation occurs, stop the roller immediately
- If necessary Sany service personnel have the right to check the roller for safety.
- Besides check items regulated by Sany, observe local laws and regulations to check the roller.
- Ensure timely maintenance and repair on the roller.
- Carefully plan the use of the roller.

Duty of All Working Personnel

- If there is any abnormal symptom which may cause abnormal working of the roller or potential hazard, report to your leader. If possible, correct fault in time.
- All personnel working around the roller must observe all warning signals and take care of their own and others' safety.
- All personnel should know their working tasks and procedures.
- Watch something like high voltage wire, unrelated personnel and poor ground for potential danger, and report to the operators and signalmen.

Duty of Managers

- Ensure the operators are trained and fully understand the Safety, Operation and Maintenance Manual supplied by Sany. Ensure they are in physical fitness and have the certification of operation. Otherwise, it is forbidden to operate the roller.
- Ensure the operators have good judgement, teamwork consciousness and psychological quality. Otherwise, it is forbidden to operate or repair the roller.
- Ensure the signalmen have good vision and acoustic judgement, master standard command signals. At the same time, they should have enough experience in recognizing danger factors correctly, and inform the operators of danger factors to avoid them in time.
- Ensure assistant workers can identify the model and working condition to choose a proper roller.
- Publicize safety consciousness to working personnel, and make them aware of safety precautions and their related responsibilities.

Table of Contents

Introduction

1.Introduction

1.1 Overview

- SANY-built equipment offers high-quality performance and excellent after-sales service support.
- Sany-built equipment is widely used throughout the industry for various types of applications.
- Sany is a leading manufacturer of heavy construction machine worldwide.

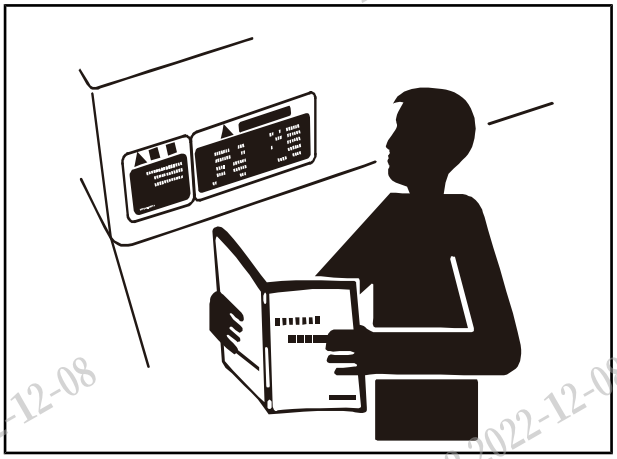

Fig 1-1

This operator's manual provides safety, operation, maintenance, troubleshooting and specifications. In order to properly use your equipment, it is important to read and understand this manual before using the equipment.

Items addressed in this manual are designed to help you:

- Understand the structure and performance of your equipment.
- Reduce improper operation and point out possible hazardous situations when using equipment.
- Increase equipment efficiency during operation.
- Prolong the service life of your equipment.
- Reduce maintenance costs.

Always keep this manual nearby and have all personnel involved with any work operations read it periodically. If this manual becomes damaged or lost and cannot be read, it is advised to request a replacement copy from your SANY distributor as soon as possible. If you sell the equipment, be sure to give this manual to the new owner. Continuingimprovements in the design can lead to changes in details which may not be reflecte in this manual. Always consult your SANY distributor for the latest available information on your

equipment or if you have questions regarding information in this manual.

1.2 Your Documentation Package

1.2.1 Introduction

The documentation includes:

- Safety,Operation and Maintenance Manual.
- Parts Book–including the Parts List and the Drawings needed when ordering parts. If the Parts Book is not attached with the equipment, contact SANY.

1.2.2 Recommendations on Using the Documentation

- The documents only apply to the equipment and should not be used with any other equipments.
- Ensure that documents are complete and up to date.
- Put all data in a folder (if including leaflets).
- Print and replace the lost, damaged and blotted pages.
- Add the latest SANY data in time and destroy the inapplicable old documents.

1.2.3 Documentation Storage

- Always keep the *Operation and Maintenance Manual* in the net pocket behind the operator cabin's seat.
- The *Parts Book* is best left either shelved in the workshop area or office. It should always be available to the maintenance and service personnel as required.

1.2.4 Organization of this Manual

This operator's manual covers operation and maintenance of your equipment. Get familiar with it before performing any operations. Put this manual within easy reach for your reference and replace it if it is lost or damaged. Due to improvement and updating of products, some information may differ from your equipment. If you have any question on the use and maintenance of your equipment, contact your SANY distributor.

1. **Introduction**

This section provides an overview of what is covered in the rest of this manual, including equipment label information and SANY contact information.

2. **Safety**

This section covers basic safety information relating to this equipment. Make sure you fully understand all the precautions described in this manual and the safety decals on the equipment before operating or maintaining this equipment. Failure to do so may result in serious injury or death.

3. **System functions**

This section provides an overview of all the controls and prompt & operating systems on your equipment. Only when you are familiar with all systems, can you operate and maintain the equipment safely.

4. **Operation**

This section provides the basic operating procedures for the equipment. It is important to study and become familiar with all procedures before performing any operations with the equipment.

5. **Maintenance**

This section provides all general maintenance and repair procedures. It is important to study and become familiar with all the maintenance and repair procedures before performing any maintenance or repair operations on the equipment.

6. **Troubleshooting**

This section includes common malfunctions and fault diagnostic procedures for the operating system of this single drum roller. The basic troubleshooting methods for mechanical, hydraulic and electrical systems are included.

7. **Specifications**

This section provides the general information about this equipment. Some information may change as design modification.

1.3 Your SANY Equipment

1.3.1 Equipment Directions

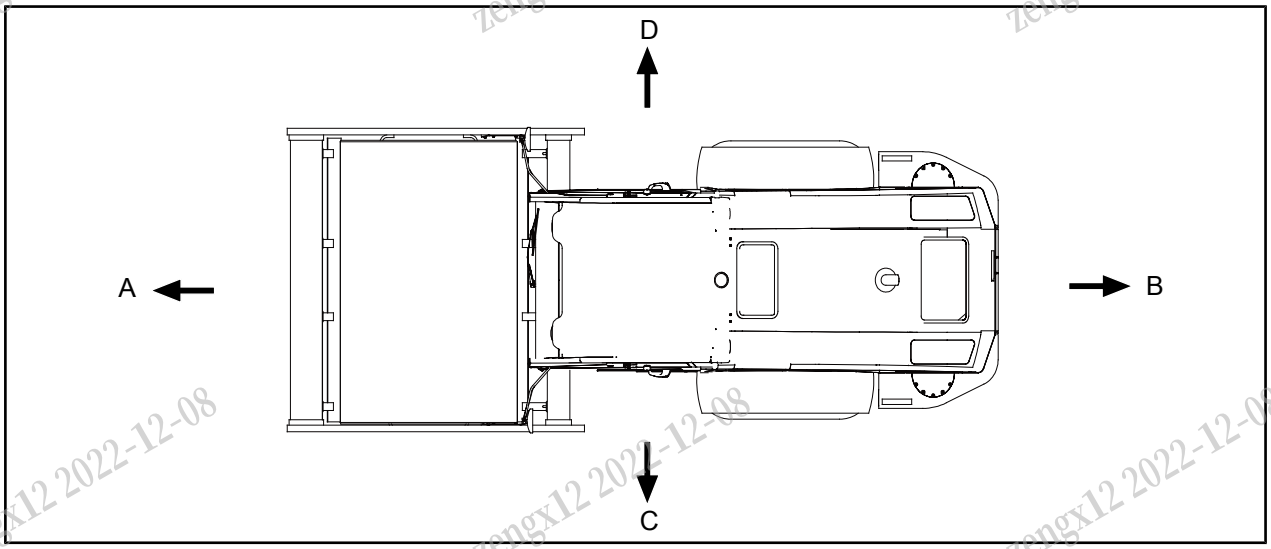

Fig 1-2

A. Front B. Back C. Left D. Right

1.3.2 Breaking in a New Equipment

Your equipment has been well adjusted and tested before delivery. However, initial operation on the equipment in severe conditions will seriously affect the performance or reduce the service life of the equipment. Thus SANY recommends you to perform 100- hour test run before putting the equipment into production use.

During the break-in period:

- Let the equipment warm up prior to any operation.
- Avoid operating or running the equipment at a high speed in overload working conditions.
- Avoid sudden starting, rapid movement or abrupt stop of the equipment.
- Cool down the equipment system at the end of every working day.

1.3.3 Equipment Information

The serial numbers and model numbers on the components are the only numbers that your SANY distributor will need when ordering replacement parts or requiring assistance for your equipment. You can find the related information on the data plate. It is a good idea to record this information in this manual for future use.

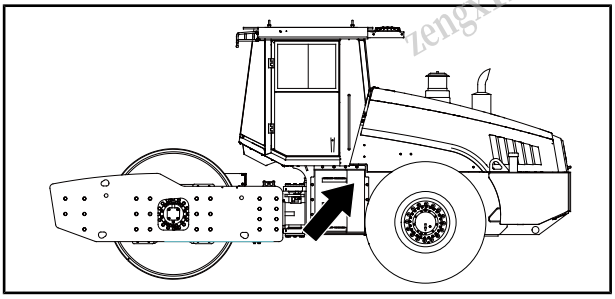

Fig 1-3

Product identification plate is riveted on the left side of the rear frame.

1.3.4 Serial Number and Distributor Information

This location is for you to record information relating to your machine. It is suggested that you keep this manual with your machine at all times for reference.

Product Type	
Serial No.	
Date of Production	
Vehicle Identification Number (V.I.N.)	

Distributor Name:

Address:

Phone Numbers:

1.4 Contact Information

Thank you for purchasing a SANY product. In the event that you need to contact us for any reason, you can reach us as follows.

Our address:

Sany Industry Zone,

Economic & Technical Development Zone Changsha, Hunan, China 410100

Tel: 0086 4006098318

E-mail: crd@sany.com.cn

1.5 Abbreviations

- GPS – Global positioning system
- ISO – International Organization for Standardization
- A/C – Air condition
- rpm – Revolutions per minutes
- MIN – Minimum
- MAX – Maximum
- OAT –Organic Acid Technology

1.6 Glossary

- Single Drum Roller–A machine with one vibratory drum.
- Serial Number – Unique machine designation. On machine nameplate.
- Refrigerant – The intermediary substance used in various heat engines to complete energy conversion
- Cab – The small cabin where the operator stays in and control the equipment.

Safety

2.Safety

2.1 General

2.1.1 Introduction

This Safety, Operation and Maintenance Manual is a guide for you to operate your equipment properly.

It contains technical and safety information necessary for operation of your equipment. Read and understand each section of the manual.

Always operate your equipment according to national, provincial, prefectural and municipal laws and regulations. The safety information for operation in this manual are just suggestive.

SANY cannot anticipate every possible circumstance that might involve a potential hazard during operation and maintenance. The safety messages in this manual and on the product are, therefore, not all inclusive. If a procedure, work method or operating technique that is not specifically recommended in this manual is used, you must be sure that it is safe for you and for others. You should also ensure that the product will not be damaged or be made unsafe by the operation, lubrication, maintenance or repair procedures that you choose.

The equipment must not be towed.

Equipments covered by this manual are used for various operations under normal conditions.

Never use the equipment in flammable or explosive environment, or in areas containing asbestos dust.

Select a SANY single drum roller with a configuration suitable for high-plateau operation when operating in areas 2000 meters above the sea level.

The information, specifications, and illustrations in this publication are on the basis of information that was available at the time that the publication was written. Sany reserves the right to change these information at any time without prior notice. Consult Sany dealer to obtain the latest information or if you have any question on the information provided in this manual.

Before starting operation and maintenance, operator and maintainer shall observe the following items.

- Read and understand the whole manual.
- Read and understand the safety notices contained in this manual and the safety messages on the equipment.
- Never apply or operate your equipment under any circumstances in a manner that is prohibited in this manual.
- If the amount of fuel added, content of particulates ,or latitude is beyond the specification of this type of equipment, damage could occur and the warranty of your equipment would become invalid.

Fig 2-1

The manual should be kept in the cab all the time for operator to refer to at any time. Contact Sany dealer to obtain a new manual if the original one is missing or cannot be read.

This manual should be regarded as a permanent component of your equipment. If the equipment is sold to a third party, give this manual to the new owner. The equipment provided by SANY Road Machinery Co., Ltd to its buyer is in line with all specifications and standards of buyer's country. If the equipment is purchased from another country or someone of a third country, it might be lacking of some safety devices or technical requirements necessary for using the equipment in your country. In case you question whether the equipment is in accordance with the standards and specifications of your country, contact SANY distributor before operating the equipment.

2.1.2 Intended Use

The rollers with smooth vibratory drum are mainly designed for the following operations.

- Compacting different kinds of pavements, such as pebble, sandy soil, moraine soil, blasting rock and cohesive soil.

- Compacting foundation materials such as concrete and stabilized soil in various large-scale projects.
- Compacting work on airports, ports, dams, high-grade highways and other industrial construction sites.

Do not use rollers with welded or removable padfoot for compacting stone materials such as gravels, blasting rocks and rockfill. Pdafoots culd wear or crack for such operation. All those consequences will be born by the user.

2.1.3 Unintended Use

- Operation by untrained personnel in an unprofessional manner or using the equipment for purposes unmentioned in this manual may pose hazard.
- Avoid starting vibration on asphalt pavement and pavement with thick ice.
- Avoid starting and operating the equipment in an explosive environment.

2.1.4 Qualifications of Operators and Maintainers

- The equipment can only be operated by trained and authorized persons who are at least 18 years old.
- The operator must fully understand and observe the operation rules of the equipment.
- Persons under the influence of alcohol, medication or drugs are not allowed to operate, service or repair the equipment.
- Only trained and qualified personnel can carry out maintenance and repair tasks of the equipment.

Fig 2-2

2.1.5 Unauthorized Modification

Any modification to the machine without authorization from SANY may have an adverse effect on the machine's performance or pose more serious hazard. Improper operation or unauthorized application may lead to equipment failure, personal injury or possible death. SANY assumes no responsibility for such losses.

2.2 Safety Message

2.2.1 Introduction

The following warning decals and safety messages are used on the machine.

- Make sure that you get familiar with the locations and information of all safety decals on the machine.
- All warning decals must be placed in the proper locations on the machine. They must be kept clean for readability. Never use organic solvent or gasoline to clean the warning decals, which may cause the paints on the safety decal to fall.
- Other signs are also on the machine besides safety decals and safety messages, which must be kept clean and intact.
- Use a new safety decal or safety message in a timely manner to replace the old one which is damaged or missing.

2.2.2 Safety Message Introduction

For using the machine safely and properly, this manual has provided you with the detailed illustrations to the decals on the machine to make you be aware of potential hazards and prevent the hazards.

All operators or maintenance personnel involved with the use of this machine must read this manual thoroughly and fully understand the safety message on the machine prior to operating or maintaining this machine. Strictly observe the safety rules provided in this manual to avoid personal injury and damage to the machine.

2.2.3 Safety Message Locations

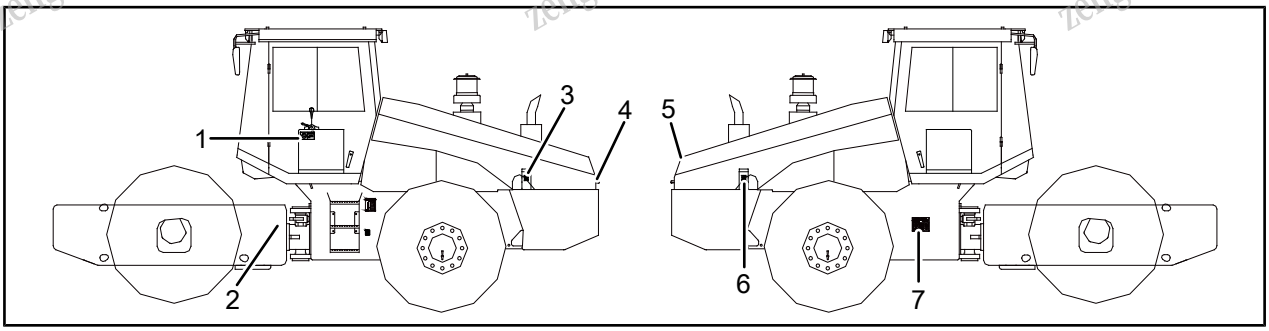

Fig 2-3

1. Vibration caution sign
2. Keep away
3. Diesel oil tank indication
4. Note for hood lock
5. Power switch notice
6. Hydraulic oil tank indication
7. Diagram of lubrication points

2.2.4 Signal Words

The following signal words are used to inform you there may be potential dangers that lead to personal injury or damage.

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 Safety Decal and Explanation

Safety Decal	Explanation
DANGER	Indicates an imminent hazard which, if not avoided, will result in serious injury or death.
WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in injury or possibly death.
CAUTION	Indicates a possible potential hazardous situation which, if not avoided, could result in minor or major injury.
NOTICE	Indicates a situation which can cause damage to the equipment, personal property and/or the environment, or cause the equipment to operate improperly.
	This hazard alert symbol appears with most hazard alerts. It means attention, become alert, your safety is involved! Please read and abide by the message that follows the hazard alert symbol.
	Indicate the operation disobeys the safety regulations, which may cause personal injury or death and is prohibited.

2.2.5 An Example of Signal Words

NOTICE

If the hydraulic oil level is found to have dropped during the daily check, check all lines and hydraulic elements for leaks, or it may cause failure in operation and environment pollution.

2.2.6 Safety Decals

Safety signs are fixed to the equipment, which are used to alert local operator or maintenance workers that potential danger might be involved when operating or servicing the equipment.

The equipment uses "safety words" and "safety symbols" to indicate safety measures.

Safety words

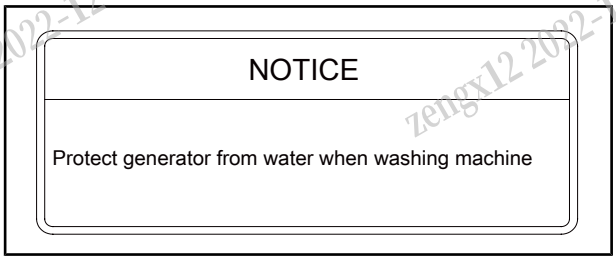

Fig 2-4

Safety symbols

Safety symbol uses an image to indicate a hazardous situation that is equivalent to a signal word. To make an operator or serviceman understand the type and level of a hazardous situation at any time, these safety signs are presented with images. The safety symbol indicates the type of dangerous situation when the operator or serviceman does some work on the equipment that the safety symbol is fixed to.

Fig 2-5

- Diesel oil tank indication

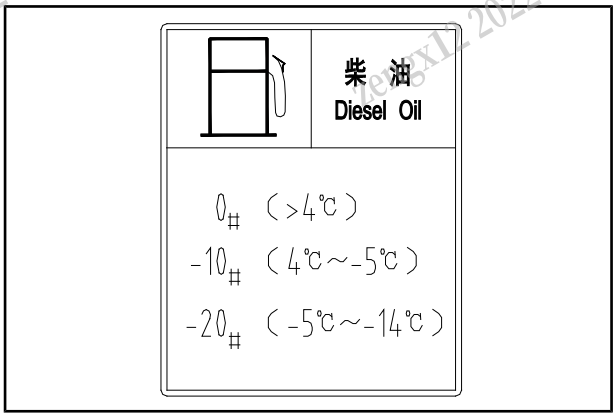

Fig 2-6

- Filter element caution

Fig 2-7

- Power switch notice

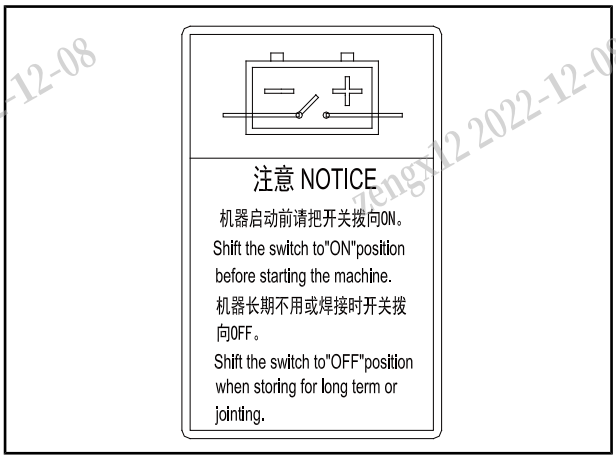

Fig 2-8

- Hydraulic oil tank indication

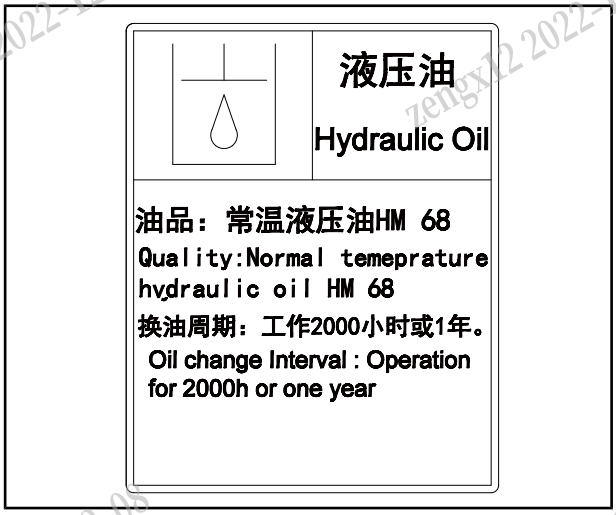

Fig 2-9

- Vibration caution sign

Fig 2-10

- Keep away

Keep away from the center articulation frame when the roller is working, or you may be squeezed.

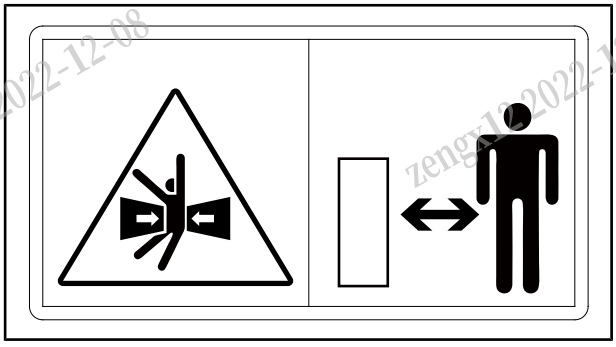

Fig 2-11

- Note for hood lock

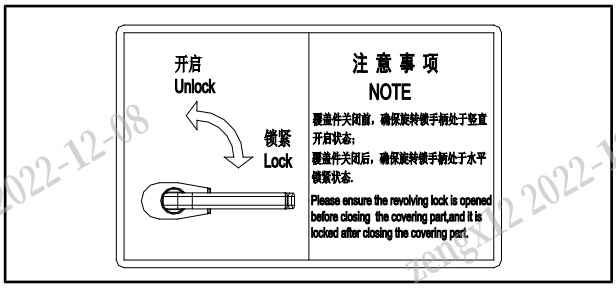

Fig 2-12

2.3 General Precautions

2.3.1 Safety Rules

- Only trained personnel are allowed to operate and service the equipment.
- Never operate the roller that has fault.
- Never operate the roller in a hazardous situation.
- All safety rules, precautions and instructions must be followed when operating and servicing the equipment.
- Taking alcohol or drug could seriously impair one's ability in operating or repairing the equipment, and it is hazardous for you and other persons.
- When working with another operator or traffic signalman on the worksite, be sure t make all people understand all gestures to be used.

2.3.2 Abnormal Case

In case of any abnormalities found during operation and maintenance, such as noise, odor, incorrect gauge display, smoke, or oil leakage, you are obligated to inform your boss and take necessary measures. Never operate the equipment before the faults are eliminated.

2.3.3 Safety Devices

To protect yourself and others around you, your roller may be equipped with the following safety devices. See that each item is securely in place and in operating condition.

- Headlights, rear lights, turn lights
- Alert lights
- Rearview mirror
- Windshield wipers & washers
- Horn
- Safety decals

2.3.4 Protective Measures for Personal Safety

⚠ WARNING

Risk of personal injury!

- Wearing loose fitting clothes and decorative ornaments, you could easily get caught by the control lever or other protruding parts.
- Letting the long hair outside of the safety hat, you could be entangled by rotating parts.
- Listening to the radio or wear music earphones when operating could easily distract your attention and cause accidents.
- Working around noise for a long time could cause damage or failure to hearing.

Avoid above improper behavior and check all protective devices for proper function prior to operation.

Wear all work clothes and personal safety devices issued to you or called for your job conditions. You may need:

- Hard hat
- Hearing protection
- Reflective clothing
- Protective gloves
- Safety shoes

If necessary, wear respirator or filter mask.

Wear necessary equipment, and other safety equipment required by your employer, public and governmental administrations, laws and regulations. Never take a risk.

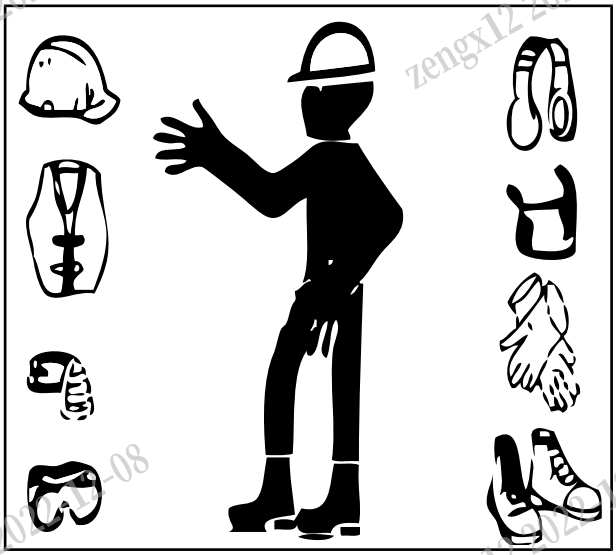

Fig 2-13

Working around noise for a long time will cause damage or failure to hearing. When the roller with no cabin is used or the noise on the worksite is beyond 85 dB, please wear the audition protection device as earplugs. This would reduce the damages to human ears.

Fig 2-14

2.3.5 Precautions against Emergency

Fully read the operation regulations and local driving laws, mastering the meaning of signal, gesture, symbol, and notification. Before driving the roller, it is forbidden to take excitant drink or drugs.

Find out the places placing fire extinguisher, emergency apparatus, and alarm telephone as well.

Avoid commonsense accidents. If accident occurs, try to adopt effective measures rapidly. First of all, it is most important to guarantee the personal safety, and then, consider reducing losses of goods and materials.

Use the emergency stop switch correctly

NOTICE
Risk of machine damage! If the emergency stop switch use frequently, which could shorten the service life of the engine and other important parts. Except for emergency, do not use emergency stop switch.

When an emergency incident happens, the operator can press down the emergency stop switch immediately to stop the roller. The switch is installed on the side box.

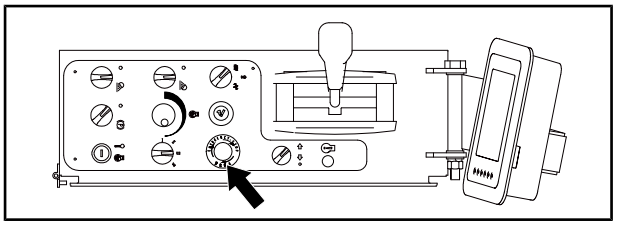

Fig 2-15

When the incident is eliminated, the operator can release the switch by rotating it clockwise and start the roller again.

Evacuation in fire accident

Evacuate the equipment with the following methods in case of fire accident :

If time is sufficient.

1. Move the travel control lever to STOP position.

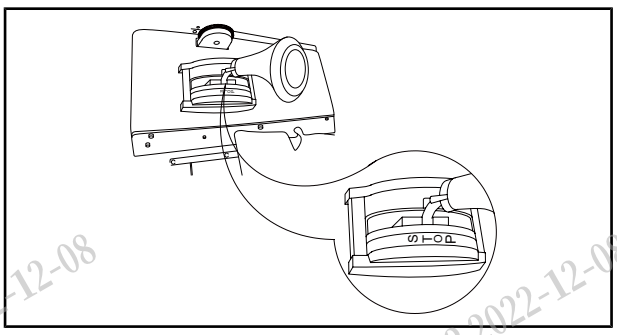

Fig 2-16

2. Turn the park brake switch (on the panel) to P position.

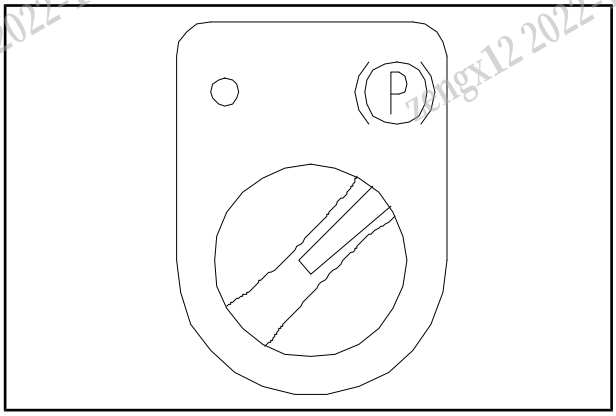

Fig 2-17

3. Turn the key switch to P/O position. Remove the key.

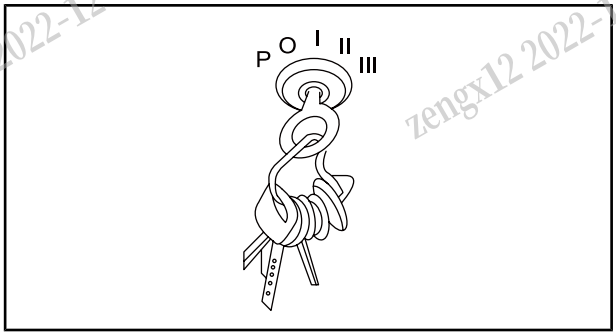

Fig 2-18

4. Evacuate the equipment.

Fig 2-19

5. Use the fire extinguisher

If time is insufficient, press down the emergency stop switch and evacuate the roller. Then use extinguishers or call fire fighters for help.

Fig 2-20

Touching high-voltage lines

When working near high-voltage lines, the operator should take extreme care. If the roller touches them during traveling, take measures as follows.

- Never leave the operator's seat.
- Warn other people to stay away from the roller.
- If possible, drive the roller away from the dangerous area.
- Cut off the power supply of the roller.

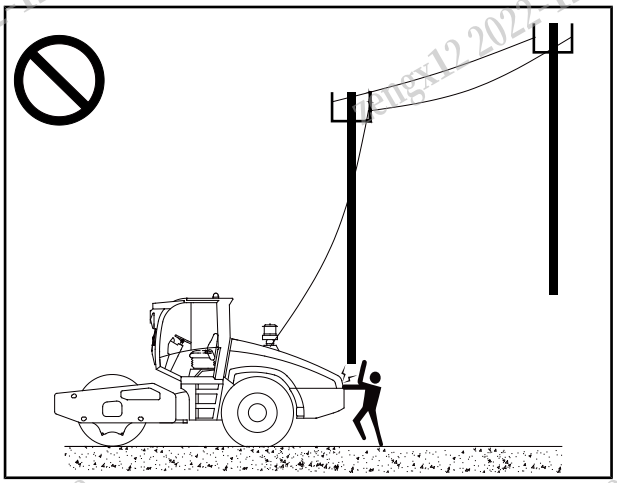

Fig 2-21

Falling object protection

If at a worksite the cabin has the danger of being hit or invaded by falling objects and scattered materials, protective cover must be used to protect operator according to the operating condition.

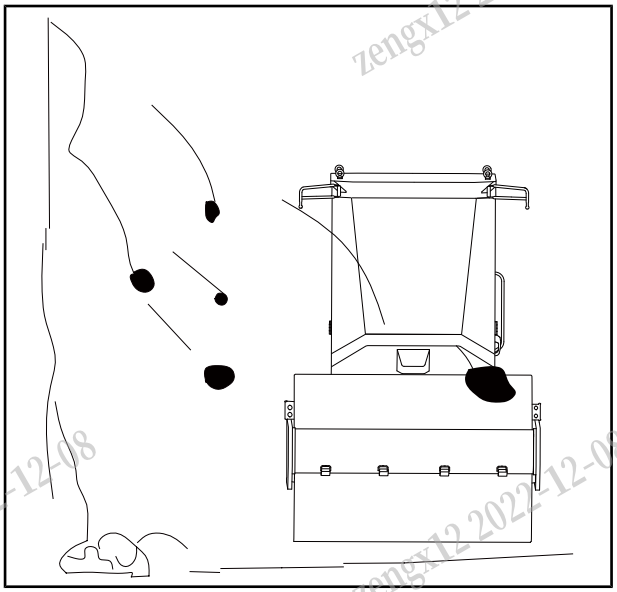

Fig 2-22

2.4 Precautions During Operation

2.4.1 Safe Starting

1. **Safe mounting**

When you mount or dismount the equipment:

- Always face the roller and maintain a three-point contact (one hand and two feet or two hands and one foot).
- Never jump on/off the roller. Never mount a moving roller.
- Never use any control lever as a handrail.
- Remove the mud, oil dirt and water from pedal, handrails and shoes at any time.

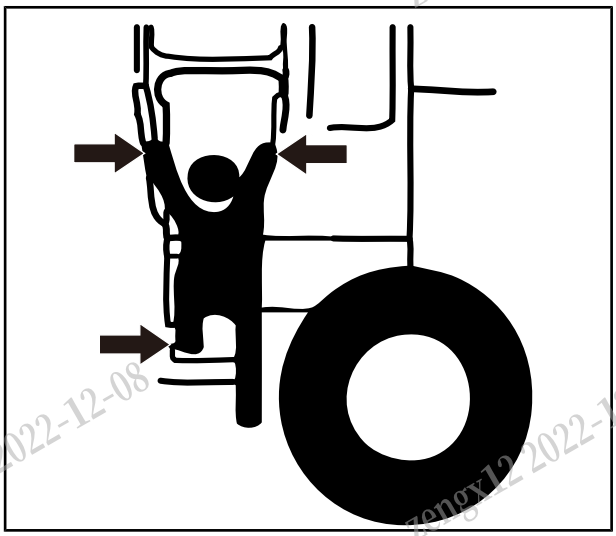

Fig 2-23

2. **Seat adjusting**

Uncomfortable seat position can easily lead to operator fatigue and operating mistake.

The seat position should be adjusted upon change of operator.

Leaning against the back of seat, operator shall be able to operate the control lever properly. Otherwise, the seat should be readjusted by moving it forward or reverse.

Fig 2-24

3. **Seat belt**

In case of tipping-over of the equipment, the operator could be injured or thrown out of the cabin, or be crushed by roller, causing serious injury or death. Before operating the roller, check the buckles for seat belt and fastening fittings carefully. In case of any damage or wear, the seat belt and other attachments should be replaced prior to operation. When the equipment is running, be seated in operator seat and fasten your seat belt to avoid accidents.

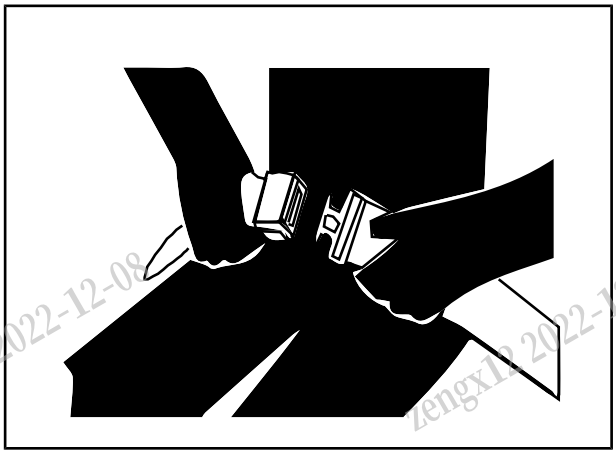

Fig 2-25

The seat belt should be replaced every three years regardless of its condition.

4. **Before starting the engine**

Before starting your daily work, the following items are to be observed prior to start of the engine.

- Check the levels of engine oil, hydraulic oil and coolant.
- Check if the lubrication points are lubricated properly.
- Check air filter for blocking。
- Check wires for damage.
- Set all control switches and levers to "0" position or "NEUTRAL" position except the emergency stop switch.
- Adjust the seat to a position easy for operation; check seat belts and buckles for damage and wear.
- Adjust the rearview mirrors so as to see clearly from the driver's seat what is happening behind the roller.
- Clean the windows to ensure a good vision.
- Clean the headlights and work lights, and check them for regular functions.

5. **Engine starting**

Before starting, be sure there is nobody under or around the roller. Sound the horn for warning.

- Start or operate the roller in a seated position.
- No one is allowed to stay on the roller except the operator.
- Never start the engine if you think there could be a short circuit, which is dangerous and can cause damage to the roller.

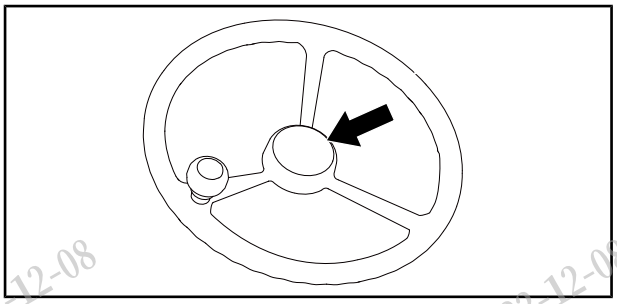

Fig 2-26

To understand proper starting steps of the roller, **see** “Normal Start” on page 4-12.

In cold weather, sufficient warm-up operation is necessary. Incomplete warm-up may result in slow reaction and accidents.

Before starting, check the battery to see if its electrolyte is frozen or leaks. In case of frozen electrolyte, never charge the battery.

⚠ WARNING

Risk of death or personal injury!
Improper operation could lead to battery explosion or roller out of control, and could lead to serious accident.
Never use the jump-start personally. Contact Sany dealer when necessary

The use of jump-start must be carried out according to the instructions in operation section. **See** “Jump-start” on page 4-13. Improper operation can lead to battery explosion or roller out of control, hence personal injury and death.

6. **After starting the engine**

⚠ WARNING

Risk of death or serious injury!
Roller out of control could cause death or serious injury.
Prior to operation, make sure you could properly control the speed, direction, braking, turning and working mode of the roller.

Fig 2-27

Observe the pressure gauges, instrument and warning lights to ensure they are properly functioning, with all readings within specific ranges.

2.4.2 Safe Operation

1. **Surveying the worksite in advance**

⚠ WARNING

Risk of death or serious injury!
The machine can roll over when working at the ditch edge or on road shoulder, which could cause machine rollover, serious injury or death.

- Don’t use the machine on the ground not solid enough or with holes, nor use the machine along the channel or incline road.
- Check the worksite and road conditions in advance to prevent the machine from overturning, or even the ground, material stockpile or bank from collapse.

Check the worksite and road conditions in advance to prevent the roller from overturning, or even the ground, material stockpile or bank from collapse. Reinforce the ground, ditch-edge and road shoulder according to requirements and keep a certain distance between the roller and the ditch edge or road shoulder. Formulate a working plan and use the roller applicable to the work and construction site.

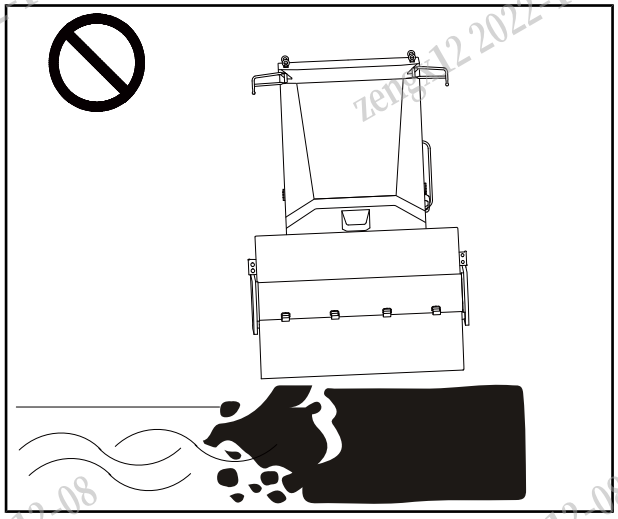

Fig 2-28

For the multi-roller operation, the united signals are required to be applied. Appoint a signalman to organize the operation, and make sure all workers obey the guide of the signalman. A signalman is also on demand when working on a slope or on a road shoulder.

Fig 2-29

Keep especially alert when working on an icy road, since the rise of the ambient temperature will make the foundation soft and slippery.

NOTICE

Risk of machine damage!
Run the machine beyond its allowable gradeability, which could affect the service of the engine
Run the machine within the allowed gradeability.

See “Specifications of the Equipment” on page 7-4 for the roller's gradeability.

Don’t operate the roller on the ground not solid enough or with holes.

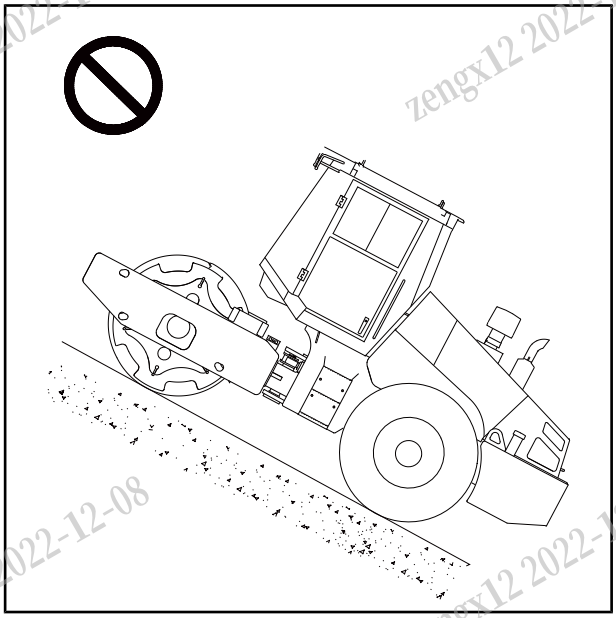

Fig 2-30

Never start up and operate the roller in a combustible and explosive environment. For example, avoid operating it in a narrow or unventilated space. Keep good ventilation in any conditions.

Make sure when the vibratory roller is working, there is not any vulnerable building and equipment around. The damage caused by the vibratory roller can affect certain distance range.

If the rolling materials will induce dust, install ventilation devices, water the pavement or wear a gauze mask.

Fig 2-31

2. **Before operation**

Test the roller before operation.

- When conducting inspection, move the equipment to a spacious area without barriers and operate slowly. Any other person is not allowed to approach the equipment.
- Check the roller for abnormality such as abnormal noise, vibration, smoke, odor or gauge reading and leakage.

- When the travel control lever is at the "STOP" position, rotate the throttle switch to test the engine's speed and then operate the switch to check the machine works normally.

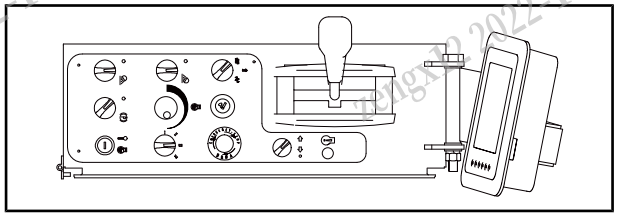

Fig 2-32

- Fully understand the working mode of the roller.
- In case of any abnormality, stop operation and take corrective measures immediately.

NOTE：

When hearing abnormal noise, first check the noise to see if it comes from inside. If it really comes from inside, shut down the roller immediately, or it may lead to further fault.

3. **Safe traveling**

When driving the roller, the operator should observe the following provisions:

- It’s forbidden to carry people on the roller except the operator.
- It’s forbidden to mount or jump off a moving roller.
- Operate the equipment only on the operator’s seat. Keep the seat belt fastened and the cabin door closed during working.
- Do not adjust operator’s seat when driving.
- Sound the horn to warn persons around, and make sure there’s no person or obstacle nearby.

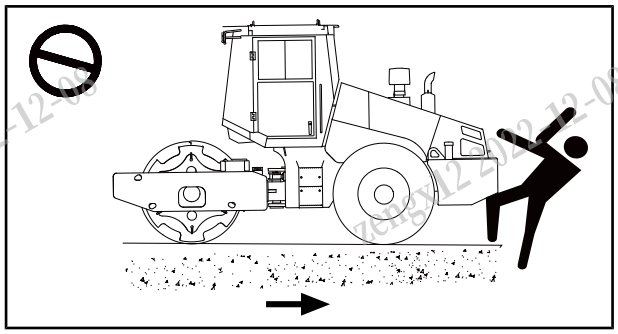

Fig 2-33

- The driving speed should match the working condition. When the road is flat and straight, high speed is allowed; when the road is getting worse, the low speed is demanded.
- Do not operate the machine continuously for more than one hour at high speed (rabbit gear), otherwise the machine can only work at low speed (tortoise gear) or stop at least 20 minutes.

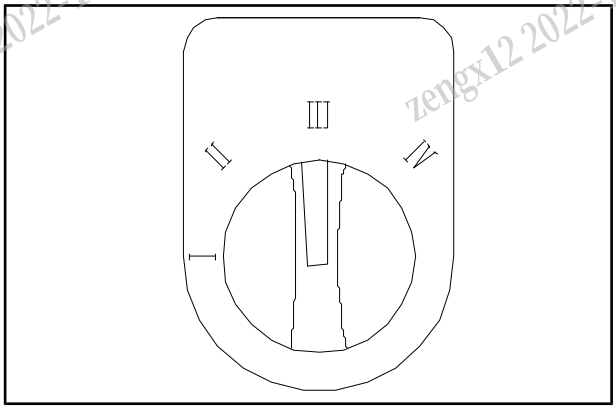

Fig 2-34

- Only when the roller is stopped can the operator change the gear.
- When traveling on a slope, make sure the degree of the slope is not beyond the roller's allowable gradeability. **See** “Specifications of the Equipment” on page 7-4 for more details.

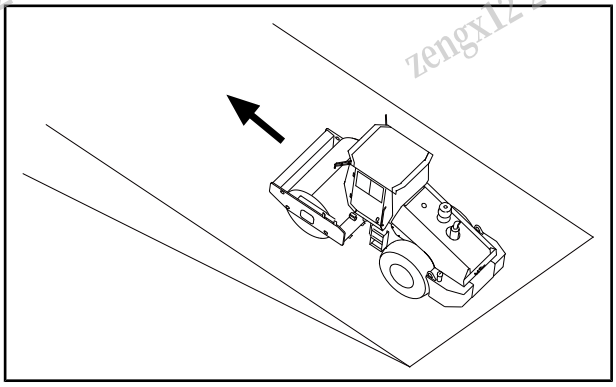

Fig 2-35

- When driving on a slope, it's only allowed to drive upward or downward in a straight line at a low speed. Traveling across a slope is prohibited.
- Do not run the machine on a slope at high speed (rabbit gear). On a slope, the control lever should be operated slowly to drive the machine.

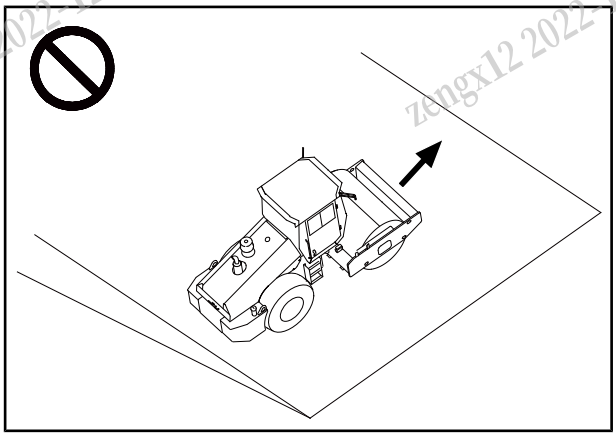

Fig 2-36

- When danger occurs, press down the emergency stop switch immediately. Do not use the emergency stop switch as the normal brake. The emergency stop switch should only be used in an emergency.
- Restart the equipment only after the danger is eliminated.

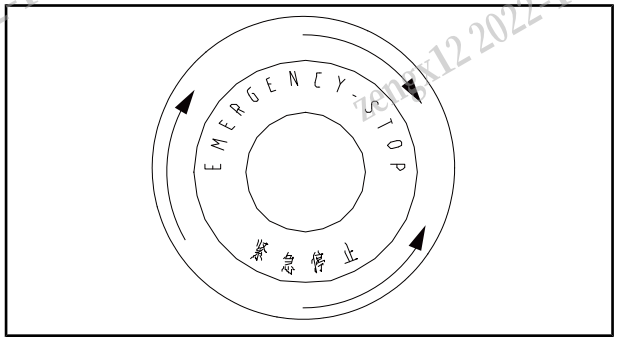

Fig 2-37

- Do not apply P (Parking) knob before the machine stops completely.
- In poor visibility conditions, turn on the work lights for clearer vision.

4. **Safe turning**

When making turning, the operator should observe the following provisions:

- When changing direction, make sure there is no person near the center articulation frame.

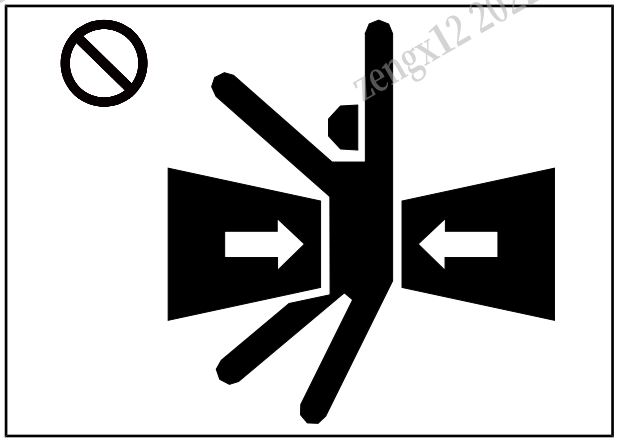

Fig 2-38

- Only when the roller is at the low speed can the operator change the direction.
- Don't make any abrupt turning.

5. **Safe vibrating**

When the roller starts vibrating, the operator should observe the following provisions:

- Never start vibration without traveling.
- Never start vibration on hard ground.
- Take the nearby buildings and underground facilities into consideration before vibration.
- Don't start vibration on sloppy road, for it will increase the danger of side sliding.

- When compacting the road edges adjacent to pavement, ensure that more than 2/3 of drum width (1) is on the road compacted previously.

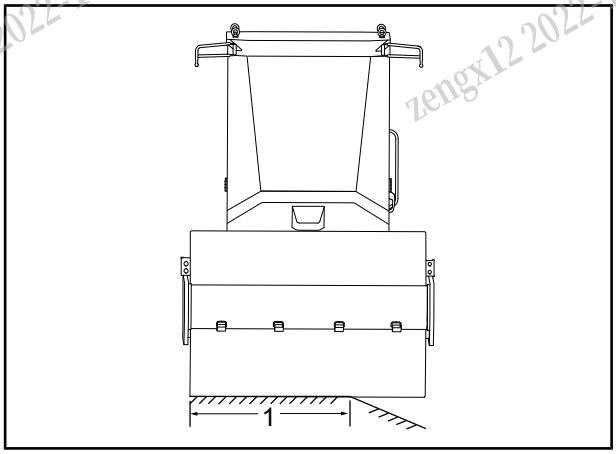

Fig 2-39

1. 2/3 of drum width

- Only when the roller stops vibrating can the operator change vibration frequency or working mode.

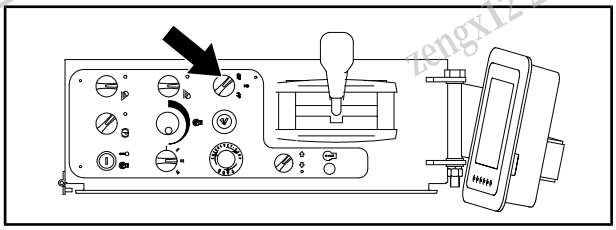

Fig 2-40

2.4.3 Safe Parking

1. **Requirements for parking area**

When parking the roller, the operator should observe the following provisions:

- Try to park the roller on flat and solid ground.
- Try to park the roller indoors, avoiding direct sunlight and precipitation.
- If it is required to park on a slope, make sure that the gradient of the slope is not beyond the roller's grade ability. **See** “Specifications of the Equipment” on page 7-4 for more details.
- If parking the road roller in the open air in rain or snow, please protect the control console and the instrument panel in the cab with waterproof covers.

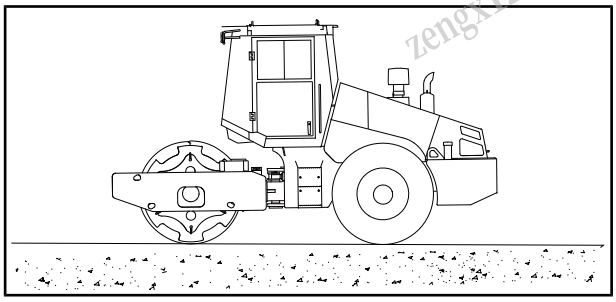

Fig 2-41

2. **Parking rules**

- Follow the parking steps to park the roller. **See** “Park Brake” on page 4-18.
- Do not park the machine on a slope. If unavoidable, operate the control lever until the machine stops completely, and then apply P knob for parking brake, and take measures to prevent sliding. The gradient of slope should be within the allowed scope.

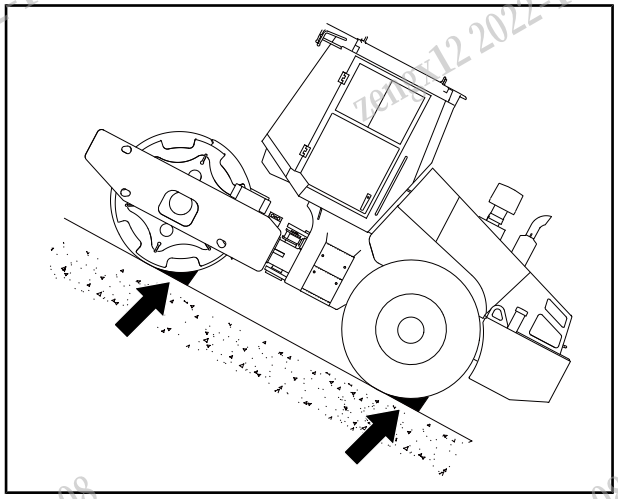

Fig 2-42

2.5 Maintenance Precautions

2.5.1 Basic Rules

- It is forbidden to use a damaged roller or the one with potential troubles.
- Only the qualified and authorized aintenance staff can maintain the equipment.
- Observe the maintenance regulations, including spare parts replacement.

2.5.2 Lockout/Tagout Procedures

Only authorized employees performing repairs on the roller shall perform lockout/tagout in accordance with the procedure listed below.

If the employee performing repairs to the roller is issued a lock and key, the employee shall not share the lock or key with other employees until all repair procedures are complete and the machine is ready to put back into service.

The following steps shall be performed in the sequence listed when the roller is to be locked out and tagged-out for service or repair.

Fig 2-43

Locking out of service

- Notify all employees who may be potentially affected by the repair or maintenance on the roller.

- Secure the machine in a safe position. Set the park brake switch to "P" position.
- Identify, remove or disconnect all power or energy sources and be sure to install a lock-out/tagout device on them.
- Be sure all employees involved in the repairs have installed the lock on the power source before performing any repairs. Once an employee has completed the repair procedure, they must remove the lock and not access the roller in any manor.

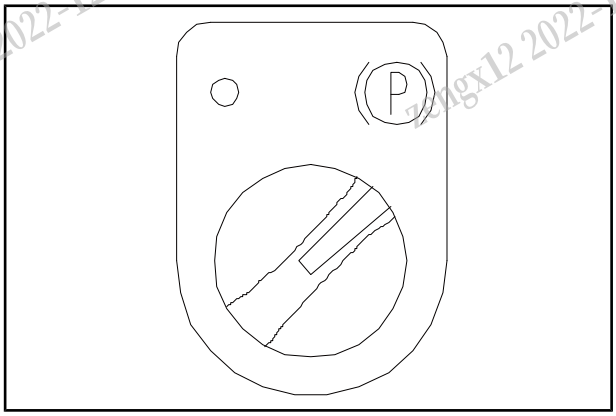

Fig 2-44

Returning to service

- The authorized person who performed the lockout/tagout procedure shall check the area around the roller to ensure that no one is exposed to any hazard before start-up.
- The authorized person who performed the lockout/ tagout shall ensure that all guards have been reinstalled to their proper place, all tools and equipment have been removed and all locks are removed.
- The authorized person who performed the lockout/tagout shall verify that all controls are at the "NEUTRAL" or “0” position and all personnel are aware of the time the roller will be back in service.
- Remove the Lockout/Tagout mechanisms and all tags and re-energize the roller for return to service.

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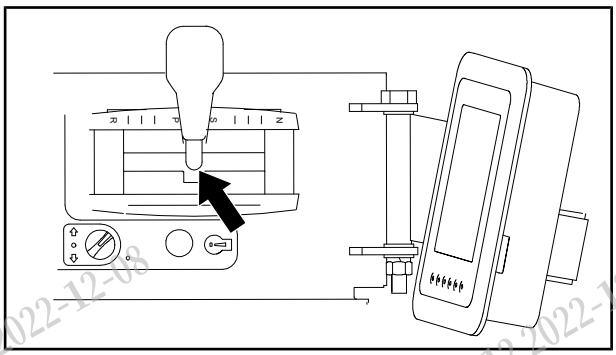


Fig 2-45

2.5.3 Working Area Preparation

CAUTION

Risk of personal injury!
If a clean and tidy working area cannot be guaranteed, there could be risk of tipping, thus resulting in personal injury.

- For maintenance work, select a spacious, clean and flat area with ample sunlight and good ventilation.
- Clean the working area by removing fuel, lubricant and water. Cover slippery ground with sand or other absorptive materials.

- For maintenance work, select a clean flat area with plenty of space, ample sunlight and good ventilation.
- Clean the working area by removing fuel, lubricant and water, and covering slippery ground with sand or other absorptive materials.

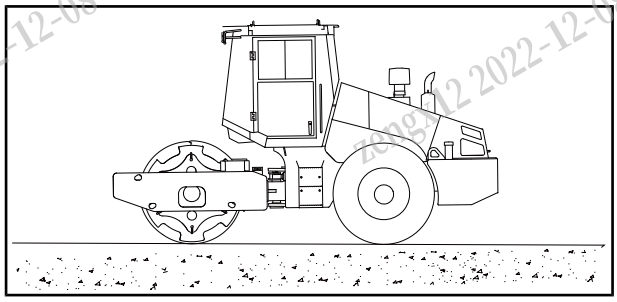


Fig 2-46

2.5.4 Self-Preparation

Only approved personnel can maintain or repair the equipment. An observer could be assigned if necessary.

Wear protective clothing and shoes necessary for the job.

- Wear rubber apron and rubber gloves when handling corrosive materials. Wear heavy gloves when handling wooden materials, wire ropes or sharp-edged metals.
- Wear a face shield when removing spring or elastic parts, or adding acid to battery.
- Wear safety hat and goggles when you weld or cut with a torch.
- Never carry out grinding, flame cutting or welding without aspirator and ventilation equipment.

Fig 2-47

2.5.5 Washing the Equipment

When washing the equipment, always do as follows.

- Wear non-slip shoes to prevent yourself from slipping on the wet surface.
- When using high-pressure steam to wash the equipment, always wear protective clothing. This will protect you from being hit by high-pressure water, and cutting your skin or getting mud or dust into your eyes.
- Never spray water directly onto the electrical system (sensors, connectors). If water gets into the electrical system, there is danger that it will cause defective operation and malfunction.

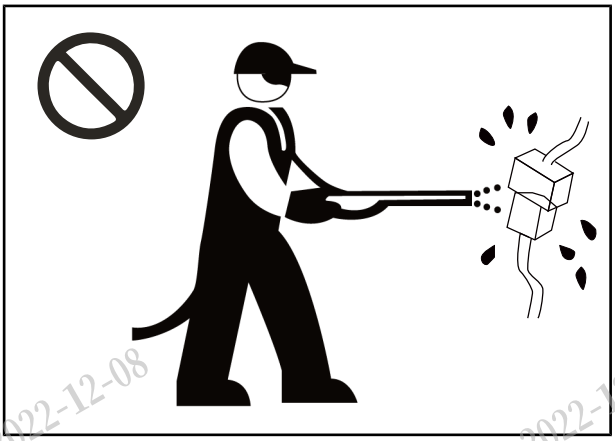


Fig 2-48

2.5.6 Proper Tool

Use proper tools and use them correctly. Using damaged, inferior, defective, temporary tools or using the tools incorrectly could lead to serious accidents.

Be careful when using the following kinds of tool.

- When using a spanner to disassemble bolts and nuts, please refer to the torque table 5-1 and Table 5-2 (**See** “Torque Values” on page 5-6).
- When using instruments, please follow their instructions.
- When using gas cutting or gas welding equipment, make sure that the work won't lead to explosion or cause the precise parts to lose precision.
- When using grinding wheel to burnish parts, it is prohibited to stay at the tangent direction of the grinding wheel.

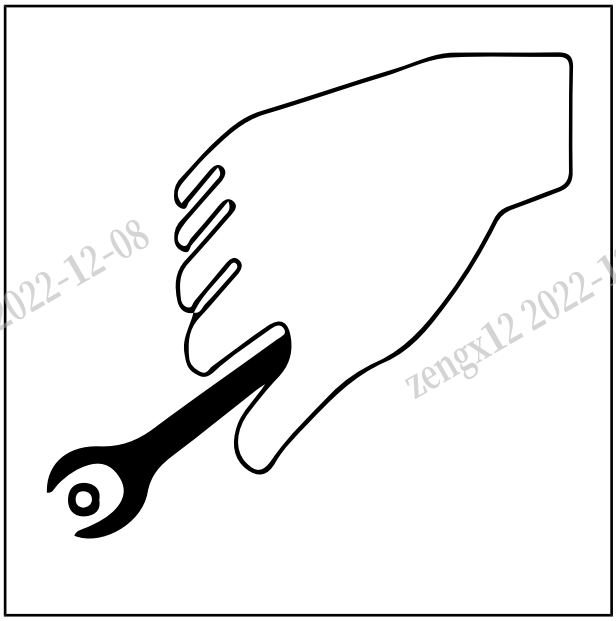


Fig 2-49

2.5.7 Maintenance with Engine Running

In most cases, the engine should be shut down prior to the maintenance work. If maintenance has to be done on a running engine, there should be at least two people handling the maintenance according the following rules.

- One person should always be seated in operator's seat and ready to shut down the engine at any time. All personnel must keep in touch.
- Place the travel control lever to "STOP" position in order to prevent movement of work equipment. If it must be used, send signal to others and warn them to move quickly to a safe area.

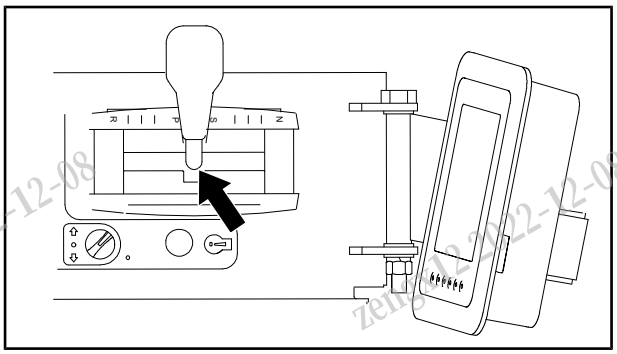


Fig 2-50

- Pay special attention to rotating parts like fan and conveyor belt, people may get caught by them when staying close.
- Never leave or insert any tool or other objects in fan or conveyor belt, which may cause the parts to break or fly.

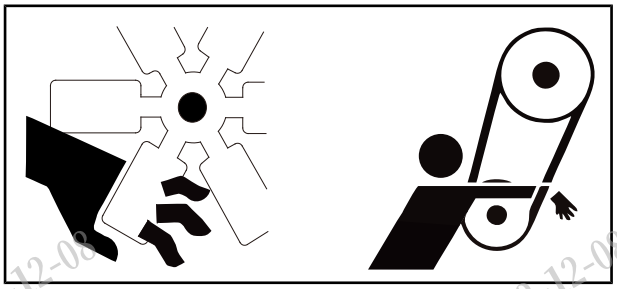


Fig 2-51

2.5.8 Working under the Roller

- No maintenance shall be carried out before the roller is well supported. Ensure that the the roller and its accessories are safely, stably and reliably supported.
- Never use bricks or wood blocks to support the roller.
- Never use the device which may slide to support the roller.
- Never use slag bricks, hollow tires or shelves to support the roller, as they may collapse under continuous load.

Fig 2-52

- If the roller or the accessories must be raised up for maintenance, the roller or its working device shall be supported with multiple jacks or iron columns.

2.5.9 Working in Noisy Environment

If noise of the roller is too big, it will cause permanent or temporary hearing disability.

When maintaining the engine, wear ear covers or ear plugs if you have to work in noise for a long time.

Fig 2-53

2.5.10 Removing Paint before Welding or Heating

- Poisonous gas will be produced by paint heating during the fusion welding, soldering or gas torch application.
- Remove the paint outdoors or in the places with good ventilation.
- If using sand paper or grinding wheels to remove the paint, wear a qualified respirator to protect yourself from inhaling dust.
- If the solvent or the rust remover is used, the paint and solvent shall be handled in a proper way. Wait for at least 15 minutes for volatilization of volatile gas before welding or heating.

2.5.11 Correct Welding

⚠ WARNING

Risk of personal injury!
It could catch fire and endanger the worker's safety, during welding or other operations inducing abundant heat or open fire without draining the oil tank.
Oil in the oil tank should be drained out completely, and dry it as well before welding or similar operations.

⚠ CAUTION

Risk of personal injury!
Welding near the plastic and rubber materials could produce toxic fume and it could do harm to the worker's health.
Welding near the plastic and rubber materials is forbidden, such as, near the scraper made by polyurethane.

The correct welding procedures must be used to protect the electronic control and the bearings from being damaged. When carrying out welding on the roller equipped with the electronic control, comply with the following procedures:

1. Stop the engine, and remove the key after turning the key switch to the “0” position.

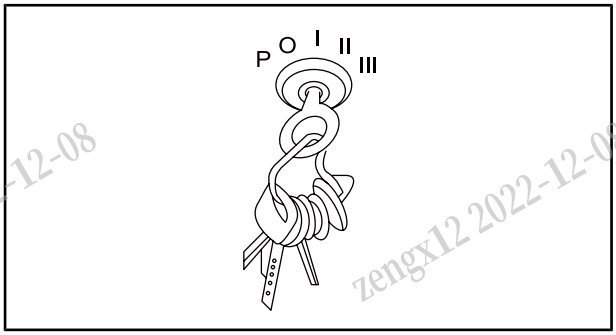


Fig 2-54

2. Remove the negative cable of the battery. Never use the grounding point of electric spare part (including electric control modules or sensors) as the grounding point of the electric welder.
3. Clip the components to be welded with the grounding wire clamp of the welder. Set the clamp near the welding point to make sure the current flow is away from the key components, such as transmission system bearing, hydraulic parts, electrical parts, and so on.
4. Protect the wire harness from contacting scraps and splashes produced during the welding.
5. Weld the materials together by following standard welding process.

2.5.12 No Heating beside Hydraulic Pipeline

- Heating beside the pressure pipe will produce combustible spray, which may cause the operator and the bystanders to be seriously burned.
- Fusion welding, soldering or usage of gas torch beside hydraulic pipeline or other combustible materials are not allowed.
- When the heat goes beyond the direct combustion area, the hydraulic pipeline may be cut off at any time. Establish a temporary fire protective sleeve when performing fusion welding or soldering to protect hoses or other materials.

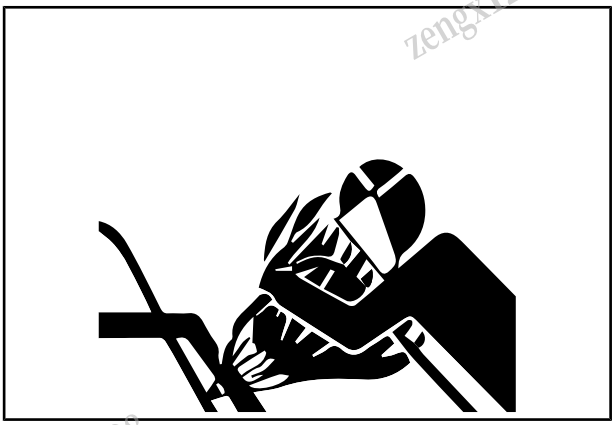


Fig 2-55

2.5.13 No Heating the Pipes with Combustible Liquid

- Welding or gas cutting of the pipeline or hose with combustible liquid is not allowed.
- Remove the combustible liquid completely with noncombustible solvent before welding or gas cutting the pipeline.

2.5.14 Correctly Operating the Hydraulic System

- Periodical maintenance to the hydraulic system is very important. The hydraulic system of the roller works under high oil pressure, small damages and cracks at the rubber hose and the adaptor will cause disastrous results. As the hydraulic tube is made up of rubber, cracks will appear after a certain period; in any circumstances, if the service life of the rubber tube is uncertain, replace it with a new rubber hose provided by SANY.
- Never fill oil directlyto the hydraulic oil tank, otherwise the cleanness of the hydraulic system may be influenced, and the valid life of the equipment may be reduced! When filling the hydraulic oil tank, use a filtering equipment with a filtration precision of 10μm.
- Make sure the pressure control valve is set correctly. High pressure will result in hydraulic line leakage. Low pressure will result in difficult operation of the roller.
- Adjustment of the system pressure, main oil pump as well as assembly, disassembly or replacement of the valve block only can be done under the instruction of a hydraulic engineer or an after-sales engineer. Unauthorized persons are forbidden to adjust by themselves.
- As the rubber hose is an easily-corrosive product, do not store it for a long time.
- When dismantling the oil pipes, close the port and keep the hydraulic pipeline clean.
- Check the filter element frequently.

- The hydraulic parts are essential to the system. Use the original hydraulic parts produced by our company.

2.5.15 Being Aware of High-pressure Liquid

- The hydraulic system may still have pressure even when operation has been stopped; such liquid as diesel oil and hydraulic oil spurting out under pressure may penetrate the skin or eyes resulting in serious injury, blindness or even death.

Fig 2-56

- Release pressure before disassembling the hydraulic parts or other pipelines to avoid such dangers caused by high-pressure liquid.
- Fasten all joints before pressurizing.
- Wear protective goggles, masks and gloves when checking the hydraulic system. Use cardboard when checking for leaks.

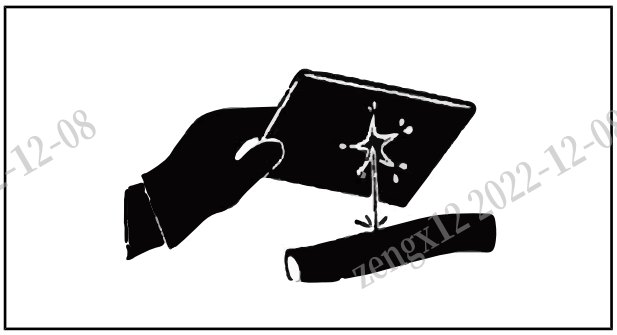


Fig 2-57

- Protect your hands and body from contacting with high-pressure liquid. If the hydraulic liquid spatters onto the skin or into the eyes, seek medical care immediately.
- If any liquid jets into skin, remove it within several hours by surgical treatment from a professional surgeon.

2.5.16 Regularly Replacing the Rubber Hoses

- Rubber hoses with combustible liquid may break under pressure due to aging and excessive abrasion. The ageing and abrasion of the rubber hoses are difficult to be judged only through check. Regularly replace the rubber hose.

2.5.17 Avoiding Scald by High-temperature Liquid

- After operation, the coolant in the engine becomes hot with pressure, and the water pipes of the engine and the radiator are full of hot water and vapor. Avoid scald by possibly jetting hot water. Hot water or vapor overflowed will result in serious cald.
- Before removing the radiator cover, stop the engine and let the system cool down. The radiator cover could only be removed after the cooling fluid has cooled down.
- The hydraulic oil tank is pressurized after operation. Release the pressure before removing the cover.
- The engine, gear and hydraulic oil will turns hot during operation; meanwhile, the engine, hose, pipeline and other parts will turn hot. Check or maintain the equipment after the oil and parts cool down.

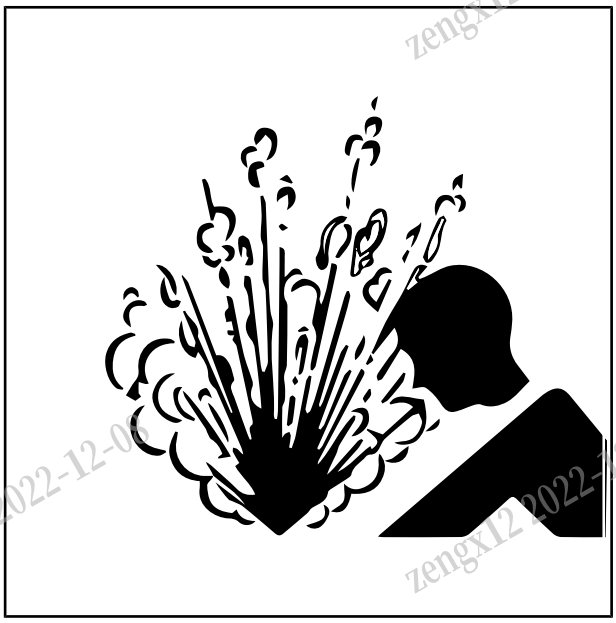


Fig 2-58

2.5.18 Preventing Battery from Explosion

⚠ WARNING

Risk of personal injury!
Charge a frozen battery could lead to explosion, which could result in serious injury or fire.
Warm the battery to 16℃ at first before charging the frozen battery. Keep the battery away from open fire or sparkle.

- The battery contains toxic and corrosive sulfuric acid. If the battery explodes, the electrolyte may spatter into eyes, which may cause blindness. Always wear goggles before checking the electrolyte.

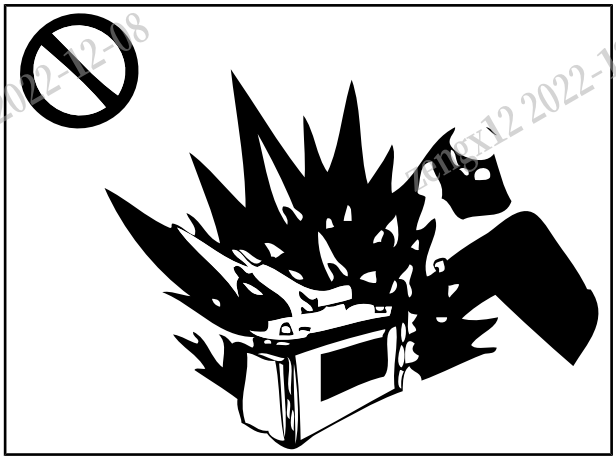


Fig 2-59

- Wear gloves when operating on the battery. Battery electrolyte is strongly corrosive. If your clothing and skin are contaminated by electrolyte, flush immediately with large amount of water and then seek medical treatment immediately.
- Don't charge a frozen battery, which may lead to explosion. Warm the battery to 16℃ at first.
- The gas produced by the battery is easily explosive; if the battery is very close to open fire or sparkle, explosion will possibly occur.
- Take extreme care when installing and replacing battery so as to avoid short circuit. When removing the connection of the battery, first cut off the negative terminal.
- When charging the battery, first disconnect the power supply of the charger before connecting the charger with the cable of the battery.

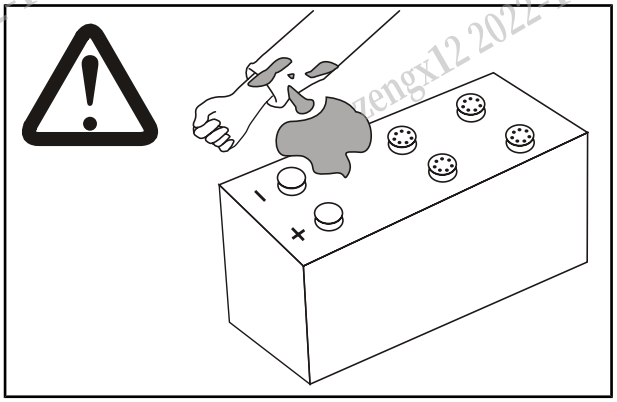


Fig 2-60

2.5.19 Preventing Components from Flying Out

Since the components may fly out, keep your body and face away from the valve body to avoid injury.

Fig 2-61

2.5.20 Safe Storage of Parts

- The stored parts may fall off, resulting in severe injury or death.
- Store the parts and instruments properly to prevent them from falling. Keep children and other persons away from the storage area.

Fig 2-62

2.5.21 Safe Treatment of Liquid

- No smoking when refilling the fuel tank

Fig 2-63

- Stop the engine before refilling
- Refill outdoors
- Store the combustible liquid away from the places where fire easily bursts out
- Don’t burn or pierce the pressure container.
- Don’t store the oily cloth for it is easily ignited or easily burns spontaneously.

2.5.22 Safe Treatment of Chemicals

- Contacting hazardous chemicals directly will cause serious personal injury. The chemicals used for this equipment include lubricant, coolant, paint and adhesive.
- Check and understand the hazardous character of the chemical before using it. Use recommended instrument in accordance with the regulations.

2.5.23 Proper Disposal of Wastes

- The improper disposal of wastes will endanger the environment and ecology. The toxic substances hidden in the equipment of SANY involve oil, fuel, coolant, brake fluid, filter and battery and so on.
- Use a leak-proof container to drain fluid. Never use the container used for food or drink.
- Never pour waste fluid on the ground, into the sewer or any water sources.
- Consult the local environmental protection or recycle center or your appointed distributor for correct recycle and disposal methods of wastes.

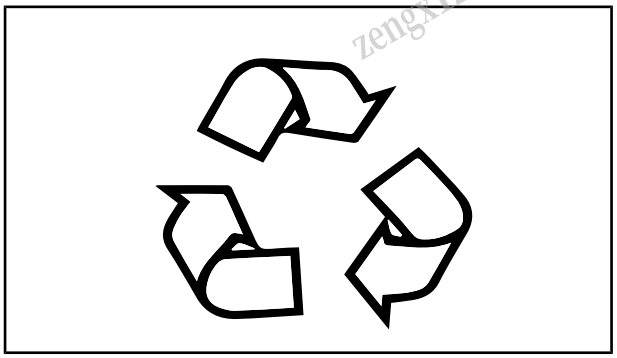


Fig 2-64

2.6 Safe Transportation

2.6.1 Load/Unload the Roller

When loading or unloading the roller from the truck or platform trailer, the roller may overturn.

Provide a truck or platform trailer with suitable size and load to transport the roller.

Precautions during the loading/unloading of the roller.

- Choose the solid and level ground.
- Adopt a platform or incline.
- Assign a signalman to guide the loading/ unloading of the roller.
- Since it is quite dangerous to steer on the incline, avoid steering when driving upward or downward on the incline. If necessary, drive the roller back to the ground and correct the direction before driving on the incline.
- Carefully drive over the convex adaptor between the incline top and the flat plate.
- For more details on how to load and unload the roller, see “Using a Slope” on page 4-22.

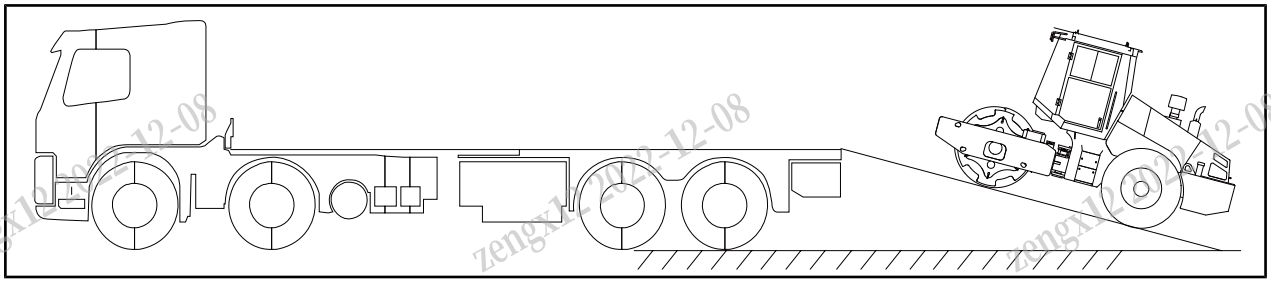


Fig 2-65

2.6.2 Transport the Roller

Observe the local laws and regulations when transporting the equipment by highway.

Wedge the wheels with triangle wood blocks and fasten the roller with other measures during the transportation by sea and by road. Besides, drain the water tank of the diesel engine, reserve some fuel for loading, unloading and transportation, and then disconnect the circuit between the storage battery and the frame.

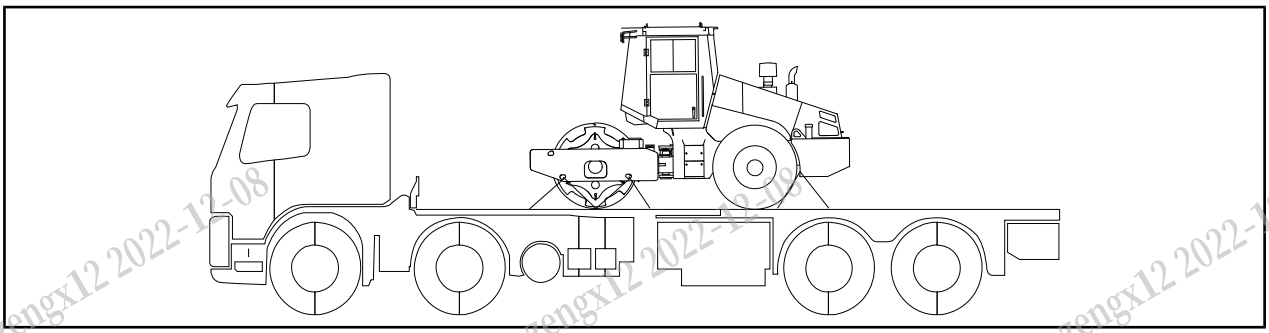


Fig 2-66

2.6.3 Lift the Roller

Small-sized roller can be loaded to the truck by a crane.

- In any small-sized roller there are lifting eyes. Use qualified lifting hooks and ropes appropriately.

⚠ WARNING

Improper lifting may cause damage to the machine, even severe personal injury or death.

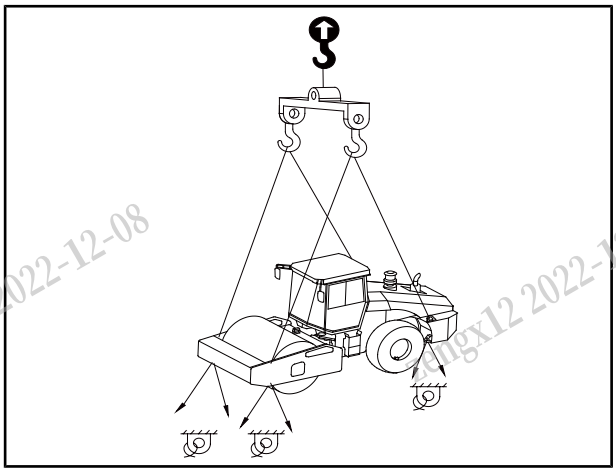


Fig 2-67

- Before lifting the roller, lock the center articulation frame by a limit plate (1) to avoid turning.

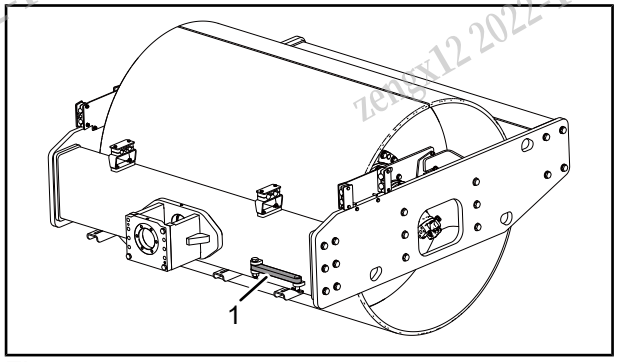


Fig 2-68

1. Limit plate

- The total weight of the roller is marked on the nameplate. When lifting the roller, check the weight on the nameplate and operate in consistence with the safety regulations of the crane.

System functions

3.System functions

3.1 Exterior Components

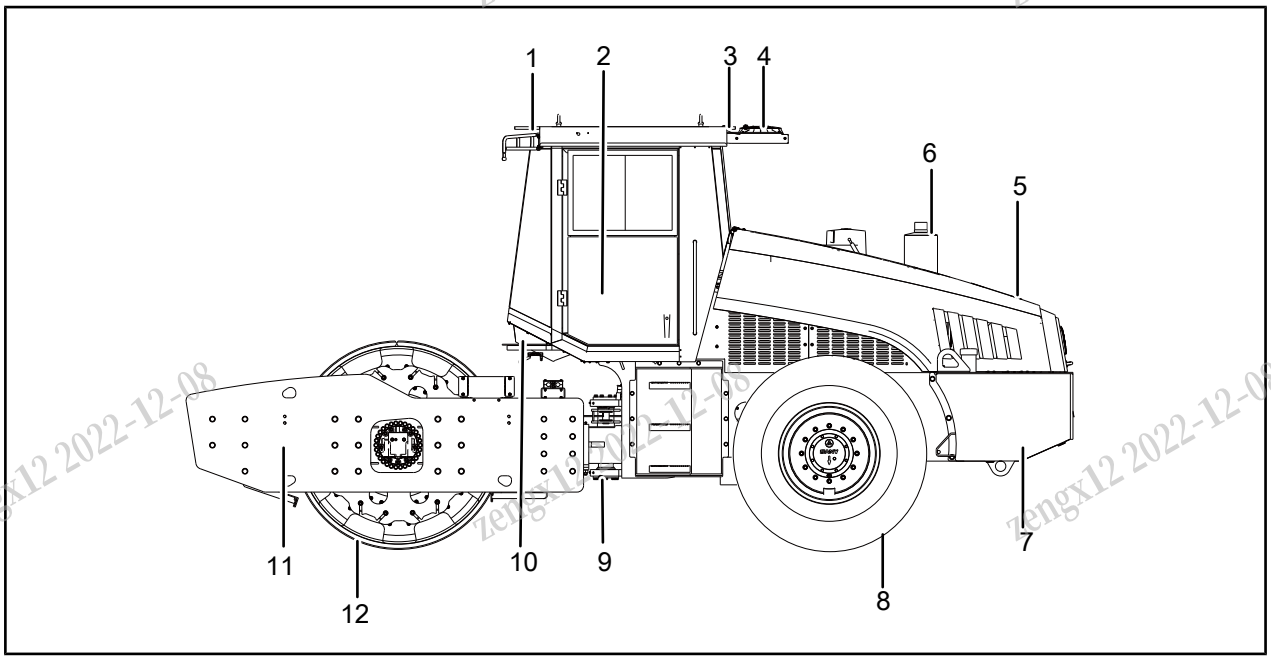


Fig 3-1

1. Cab
2. Control system
3. Electrical system
4. Air conditioning system
5. Hood
6. Power system
7. Rear frame
8. Rear axle assembly
9. Central articulation frame
10. Hydraulic system
11. Front frame
12. Vibratory drum

- The above figure shows a machine with the cab, A/C and smooth drum.
- Client may select operation platform, drum with pad foot or other optional components as demanded by construction conditions.
- If the machine is used at an altitude of 2500 m – 4500 m, plateau adaptive components for the machine should be selected for such work condition to ensure normal running of the machine and its engine.

3.2 Control Console

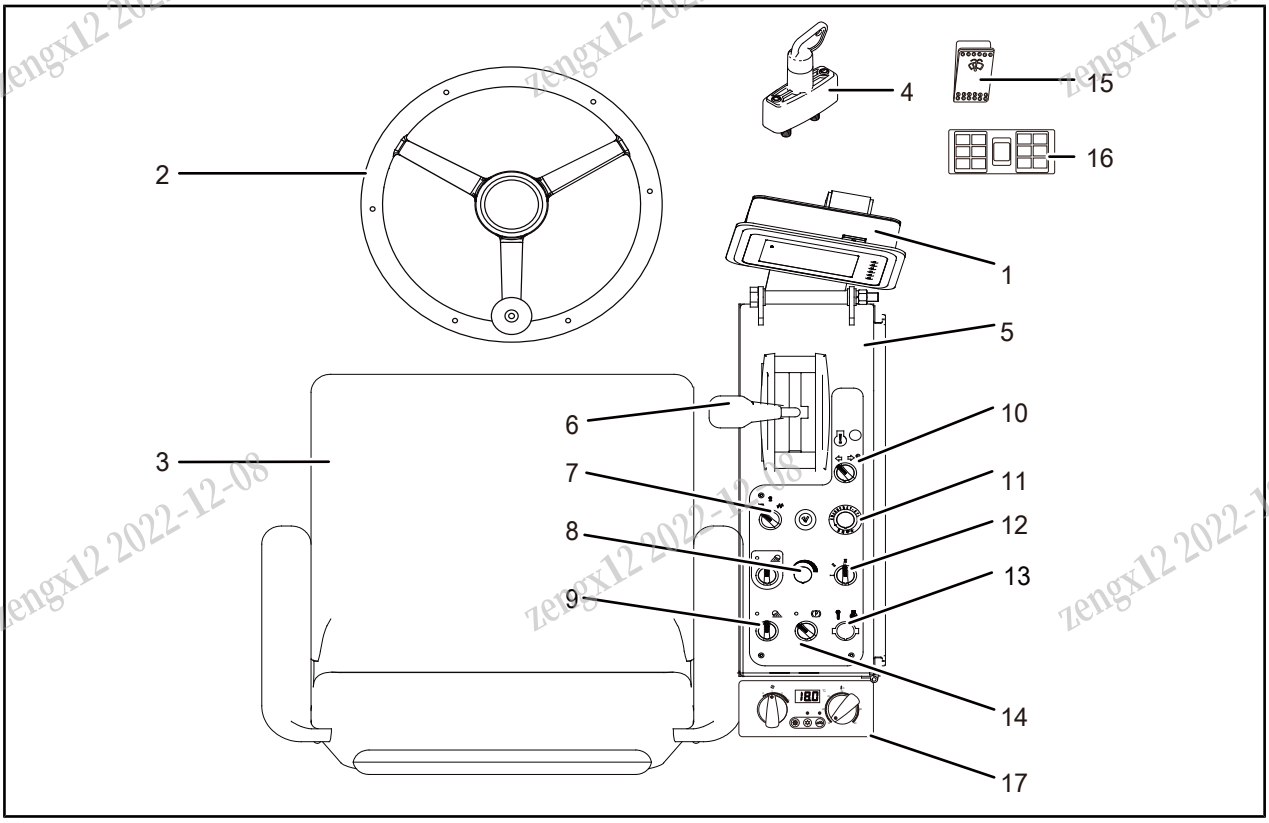


Fig 3-2

1. Display
2. Steering wheel
3. Seat
4. Master power switch
5. Side control box
6. Propel control lever
7. Vibration frequency selection switch
8. Throttle control switch
9. Working lamp switch
10. Turning lamp switch
11. Emergency stop switch
12. Gear selection switch
13. Ignition key switch
14. Parking brakes witch
15. Windshield wiper switch
16. Dome lamp switch
17. A/C panel

If the actual installations are not in accordance with the figure, take the machine as the reference.

Steering wheel

Rotate the steering wheel to the target direction for the roller steering.

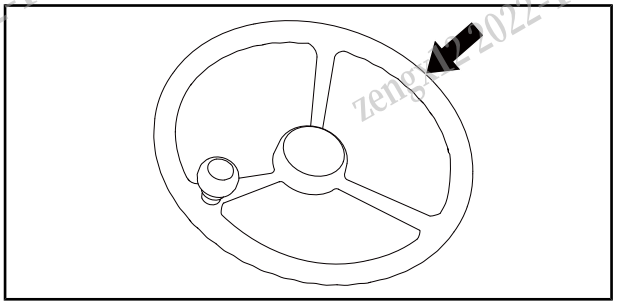


Fig 3-3

Horn button

Press the horn button, the horn sounds to warning the people.

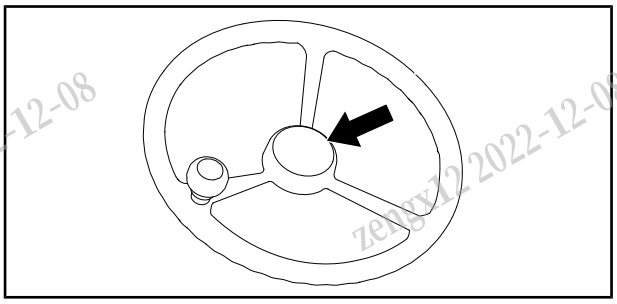


Fig 3-4

Driver's seat

The driver's seat can be adjusted forward and backward to set proper position. Its backrest can be adjusted with the lift lever.

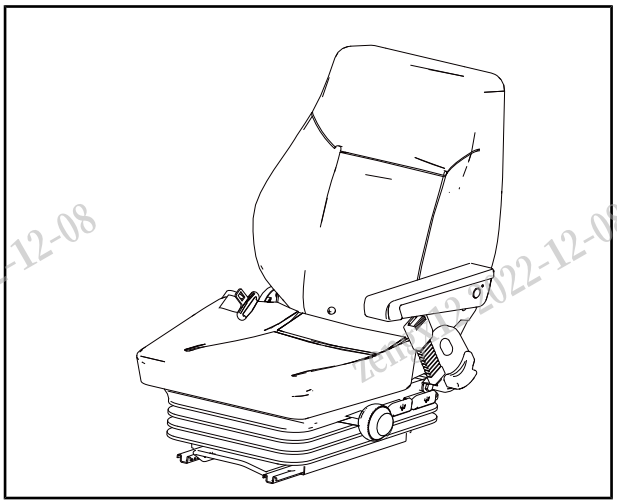


Fig 3-5

Master power switch

The master power switch controls the power supply for the whole roller. Ensure to connect the master power switch before the engine is started. Disconnect the master power switch after daily work has been finished.

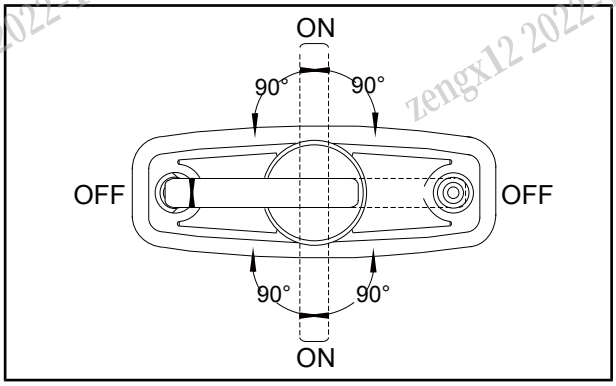


Fig 3-6

Throttle control switch

Turn the throttle control switch to adjust the throttle. When starting and stopping the engine, the throttle control switch should be at the "MIN" position to make the engine idle for 3-5 minutes.

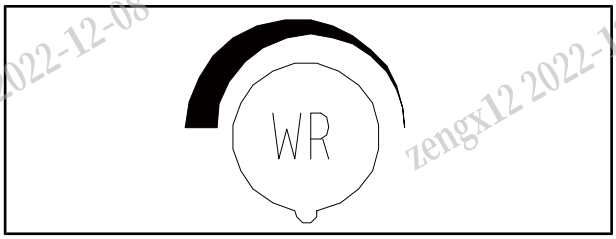


Fig 3-7

NOTE：

If the roller has not been in use for a long time, the warm up time of the engine should be properly increased. During winter, the idle warm up time should be prolonged to 8 min - 10 min.

Propel control lever

When engine starts, the propel control lever controls the movement of the roller.

- Position STOP: Roller stays stationary.

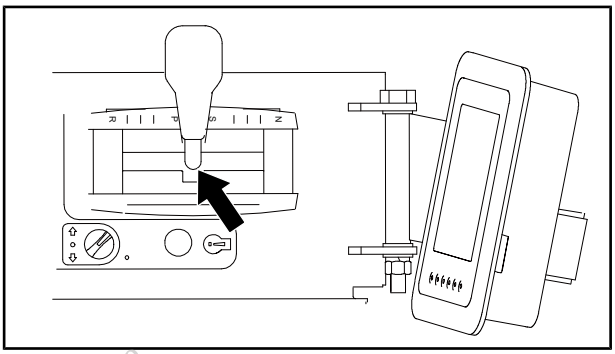


Fig 3-8

- Push forward from position STOP: Roller drives forward.

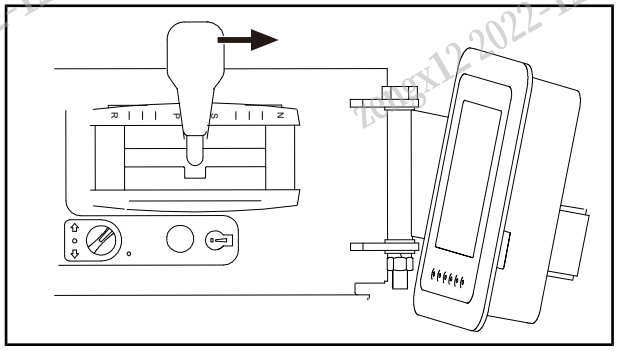


Fig 3-9

- Pull backward from position STOP: Roller drives reverse.

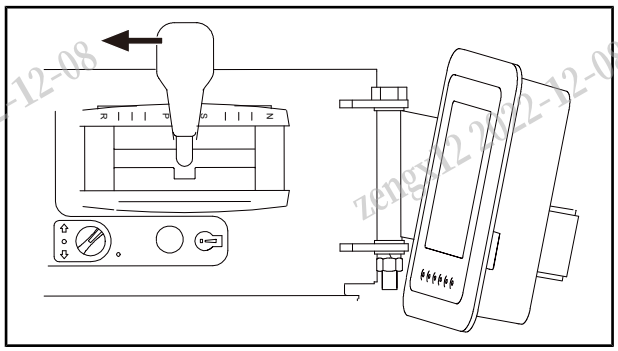


Fig 3-10

Distance of the lever from the "STOP" position determines the speed of the roller.

Vibration button

The vibration button is installed on the propel control lever. It controls directly the startup or shutoff of vibration.

- Press down: Vibration startup.
- Press again: Vibration shutoff.

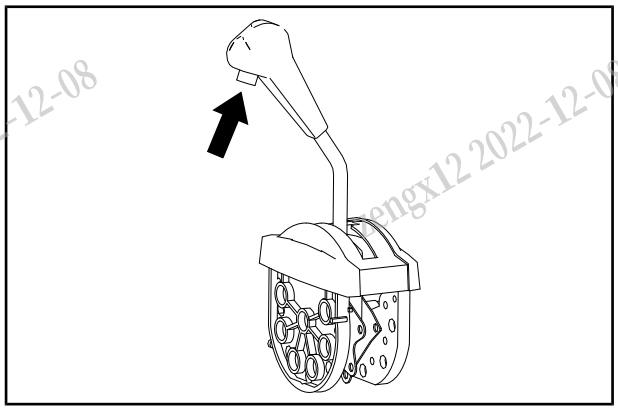


Fig 3-11

NOTICE

Risk of machine damage!
If you operate the vibration while the machine is stationary. It could damage the bearings.
Do not operate vibration while the machine is stationary.

Vibration frequency selection switch

There are two vibratory compaction frequencies: high frequency and low frequency.

- Position (Left): High frequency, small amplitude and small centrifugal force.
- Position (Right): Low frequency, large amplitude and large centrifugal force.

NOTICE

Risk of machine damage!
If the vibration has not gone to stop before switching the frequency mode, which could cause significant impact to the hydraulic system.
Before switching the frequency mode, make sure the vibration has gone to complete stop.

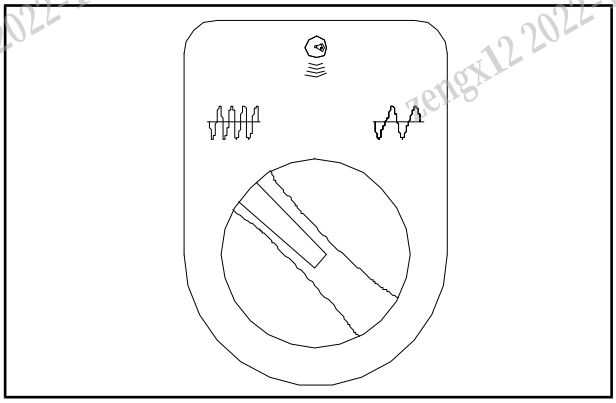


Fig 3-12

Working lamp switch

Working lamp switch includes front working lamp switch and rear working lamp switch, When the visibility conditions are poor, the working lamps should be turned on.

- Position (right): Lights are turned on.
- Position (left): Lights are turned off.

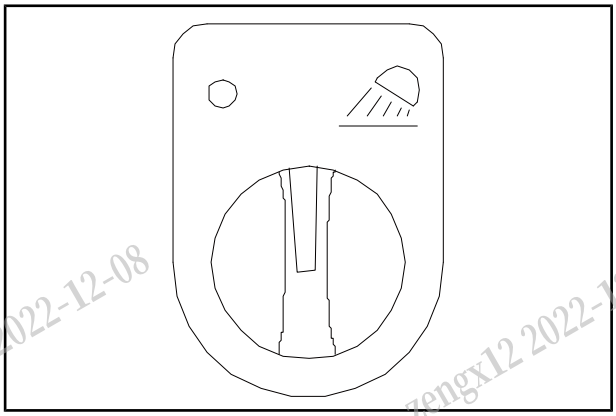


Fig 3-13

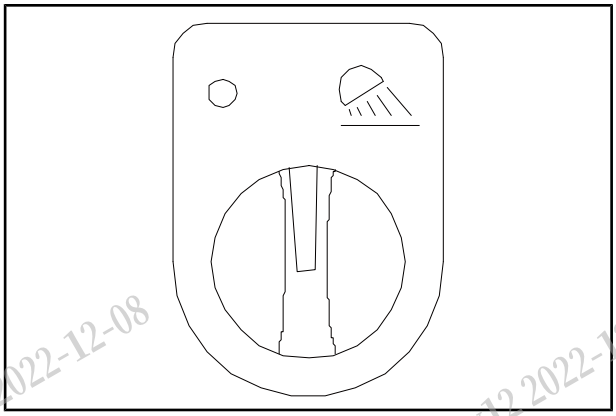


Fig 3-14

Turning lamp switch

When making a turning, the turning lamp at the turning side should be switched on to inform other people.

- Position (Left): The left turning lamp is flicking.
- Position (Middle): The turning lamps are off.
- Position (Right): The right turning lamp is flicking.

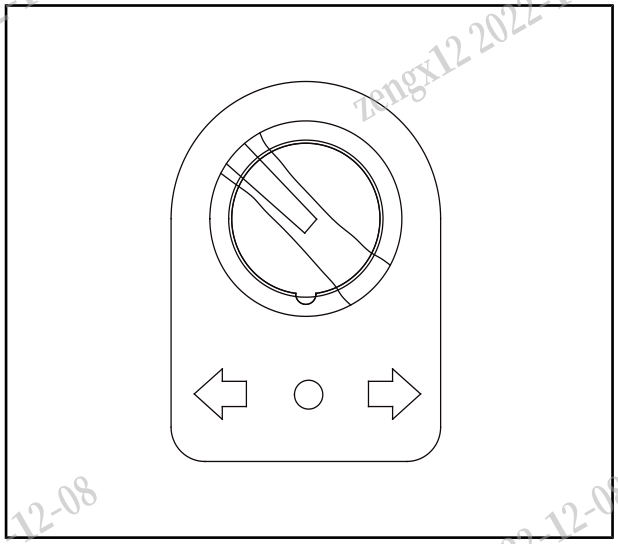


Fig 3-15

Emergency stop switch

NOTICE

Risk of machine damage!
If the emergency stop switch is used as a service brake, which could shorten the service life of the engine and other important parts.
Except for emergency, do not use emergency stop switch.

- In case of an emergency, press the switch down to shut down the engine.

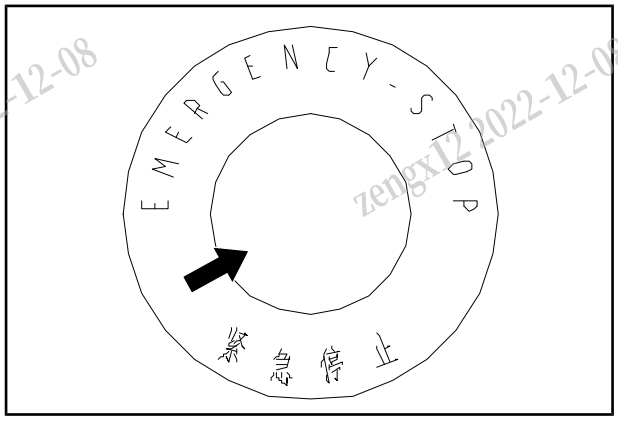


Fig 3-16

- Rotate the switch clockwise to release the emergency stop.

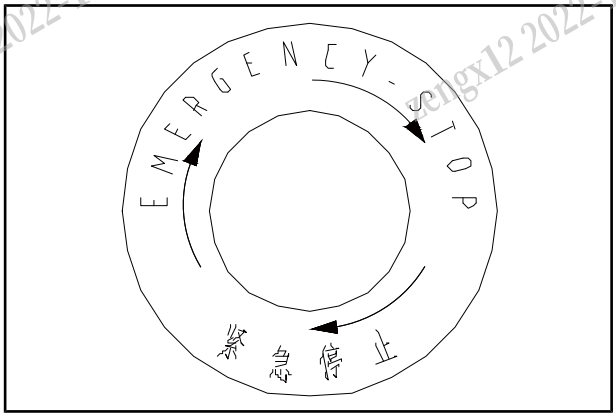


Fig 3-17

If the roller needs to be restarted, first switch the propel control lever to the neutral position and then power on the engine. Push the lever to make the roller run.

NOTE：

Only when the propel control lever is in the neutral position, can the engine be started. Only after the troubleshooting has been eliminated, can the roller be started.

Gear selection switch

- Low speed: gear I (0~3.5 km/h); gear II (0~4.5 km/h)
- High speed: gear III (0~5.5 km/h); gear IV (0~7.5 km/h).

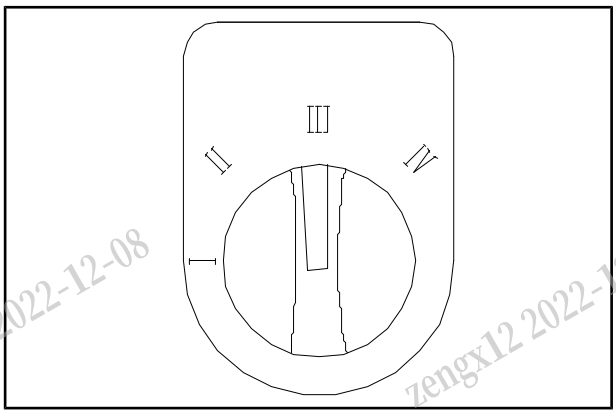
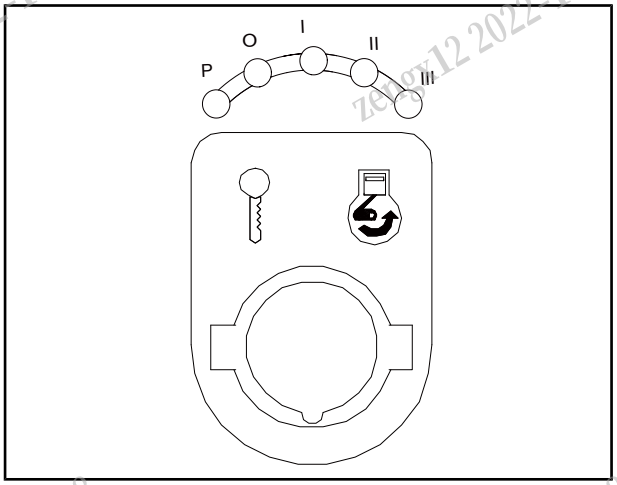


Fig 3-18

NOTICE

Risk of machine damage!
If the vibration has not gone to stop before changing gear, which could cause significant impact to the hydraulic system.
Before changing gear, make sure the vibration has gone to stop.

Ignition key switch



The ignition key switch is powering on or off the engine.

- Position (P/O):Stop position. It allows you to insert or remove the key. The electrical system is off and the engine is shut down.
- Position (I): Working position. The control system and circuits are energized. Keep the ignition key switch in the "I" position when operating the engine.
- Position (II): Preaheating position. No preheating function.
- Position (III): Ignition position. Activates the starter, and keep the key in the "III" position. Until engine starts, release the key immediately after it is started. The key will return to the "I " position automatically.

NOTICE

Risk of the engine damage!
If the engine does not stop at low idle speed, which could shorten the service life of engine.
Except for emergency, do not shut off the engine while it is running at high speed.

NOTICE

Risk of the engine damage!
If each starting time exceed 10 seconds and the interval less than 5 minutes, which could shorten the service life of engine.
Stop starting and find out the cause If it cannot be started after 3 attempts continuously.

Parking brake switch

- Position (Left): Parking brake is released;
- Position (Right): Parking brake is applied.

When parking the roller, operate the propel control lever to the "STOP" position to stop the roller slowly. Then rotate the parking brake switch to the "P" position to apply the parking brake.

Before starting the roller, assure that the propel control lever is in the “STOP” position, then rotate the parking brake switch to the left to release the brake.

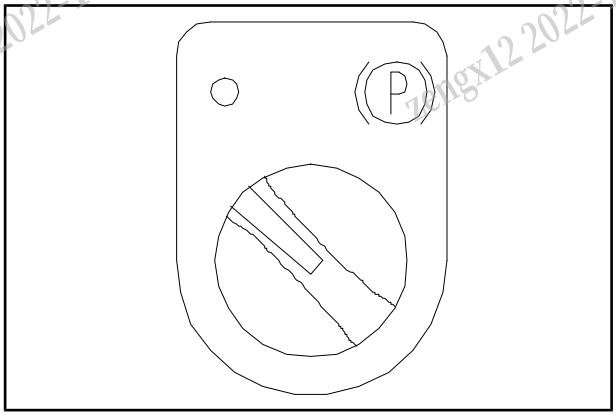


Fig 3-19

Windshield wiper and washer switch

In order to get a clearer visibility, the windshield can be washed by the washer and the front wiper system.

- Press the position (Up): The washer sprays water onto the front windshield and wipers work.

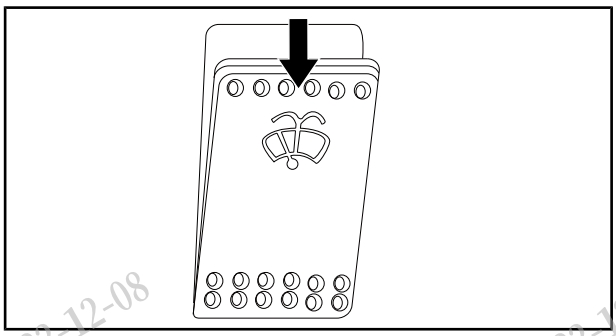


Fig 3-20

- Press the position (Middle): The front wiper wipes the front windshield.

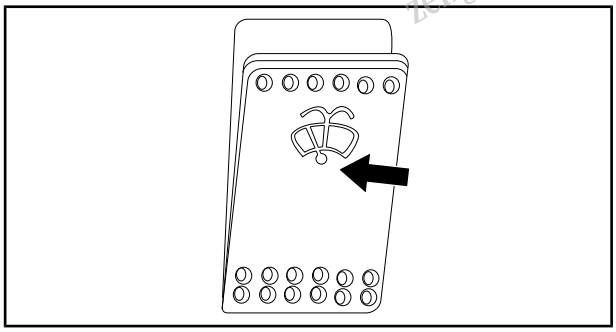


Fig 3-21

- Press the position (Down): The front wiper stops movement.

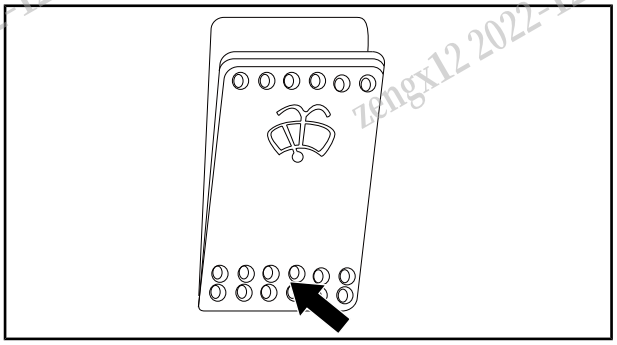


Fig 3-22

Every day before you operate the roller, you must check the water level of this water tank. Once the water level is less than the 2/3 of the water tank, it should be filler it up. Assure sufficient antifreeze agent content.

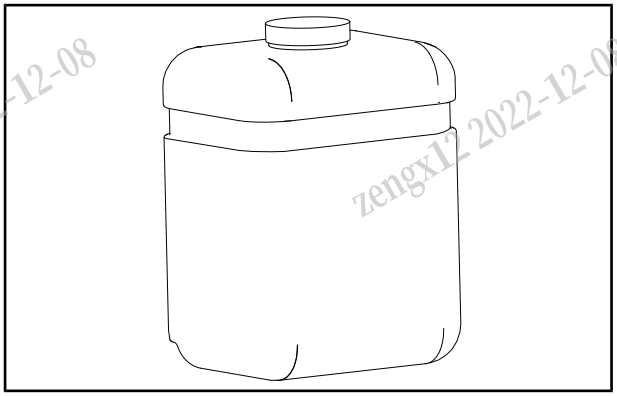


Fig 3-23

Dome lamp switch

The dome lamp is installed on the top in the front cab. Its switch is integrated on the lamp.

- Position (ON): The dome lamp is on.
- Position (OFF): The dome lamp is off.

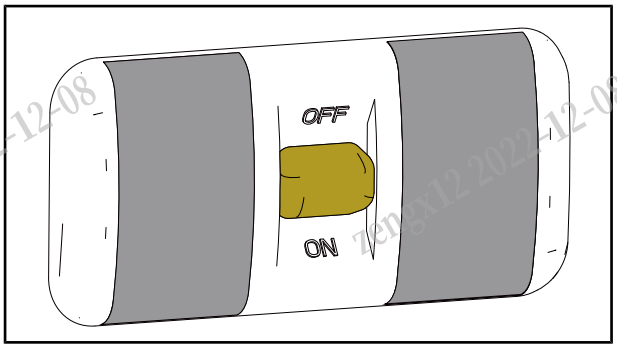


Fig 3-24

3.3 Display Screen

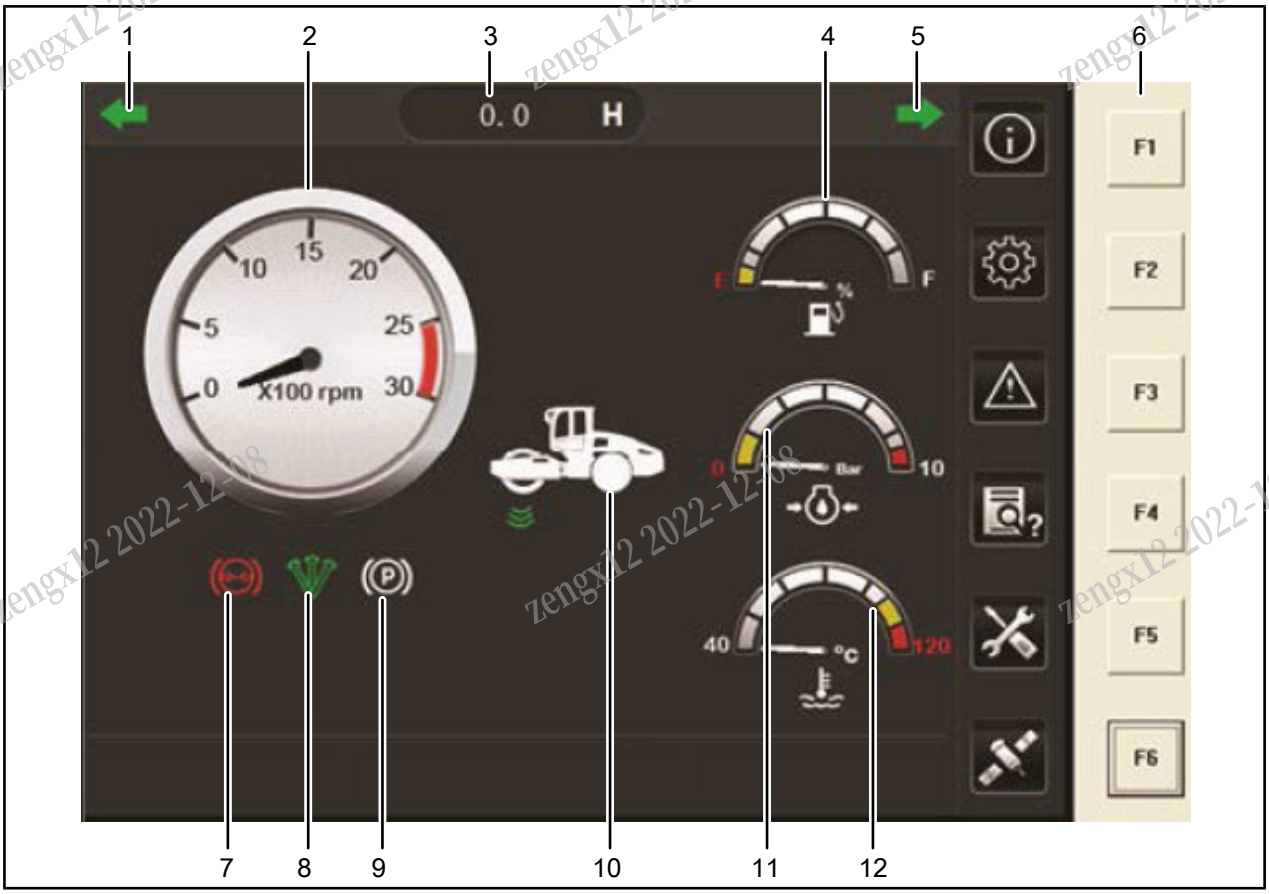


Fig 3-25

1. Left turn indicator
2. Engine tachometer
3. Hourmeter
4. Fuel level gauge
5. Right turn indicator
6. Fuction keys (F1-F6)
7. Brake pressure indicator
8. Neutral position indicator
9. Parking indicator
10. Model indication
11. Engine oil pressure gauge
12. Coolant temperature gauge

Engine tachometer

When the engine is started, the real-time engine speed is indicated in 100 rpm within the range of 0 rpm - 2500 rpm.

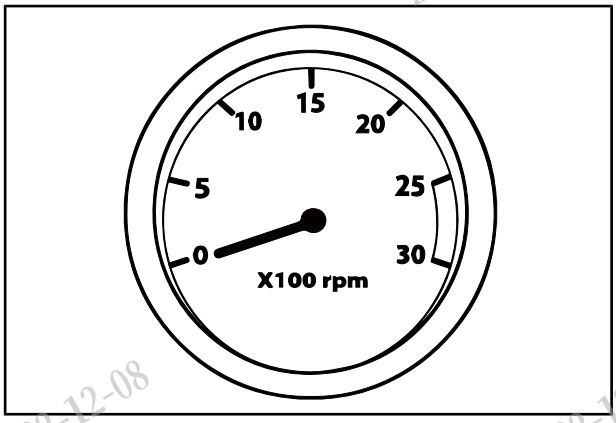


Fig 3-26

Fuel level gauge

The fuel gauge indicates the fuel level in the fuel tank at a real time basis. If the fuel is insufficient, its alarm light will light up and it is required to refill it timely in case of shutdown.

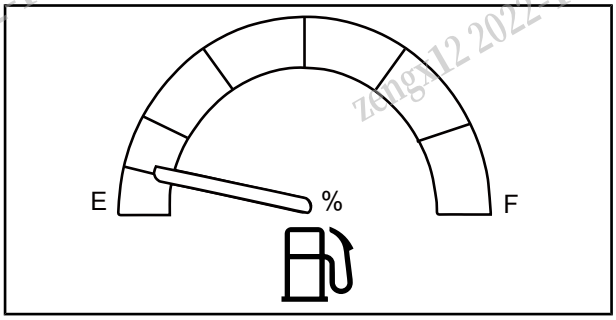


Fig 3-27

Coolant temperature gauge

The water temperature gauge indicates the coolant temperature on a real time basis within the range of 40℃ - 120℃ . If the coolant temperature is above 105℃ , its alarm light will light up.

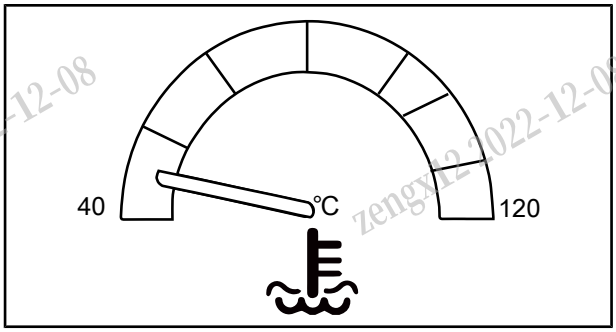


Fig 3-28

Engine oil pressure gauge

The engine oil pressure gauge indicates the engine oil pressure on a real time basis. If the engine oil pressure is not above 0.1 MPa, its alarm light will light up.

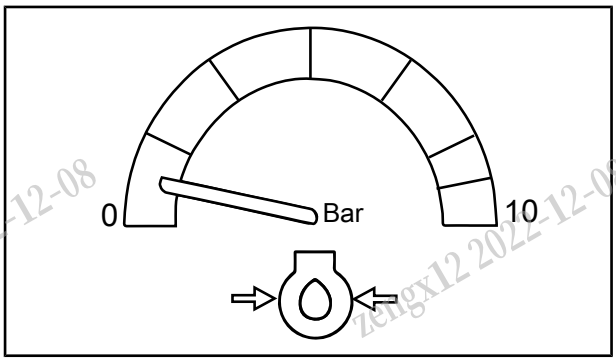


Fig 3-29

Left turn indicator

The left turn indicator flashes in green with the left turn light at a frequency. It indicates the status of the left turn light.

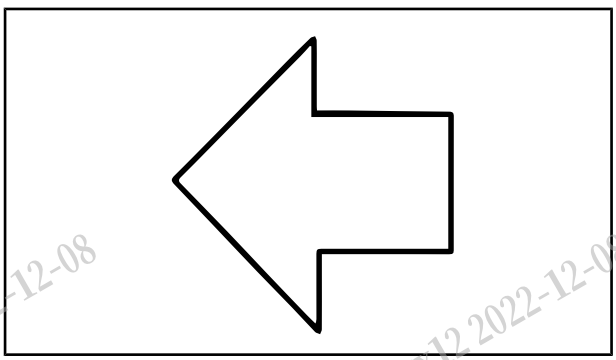


Fig 3-30

Right turn indicator

The right turn indicator flashes in green with the right turn light at a frequency. It indicates the status of the right turn light.

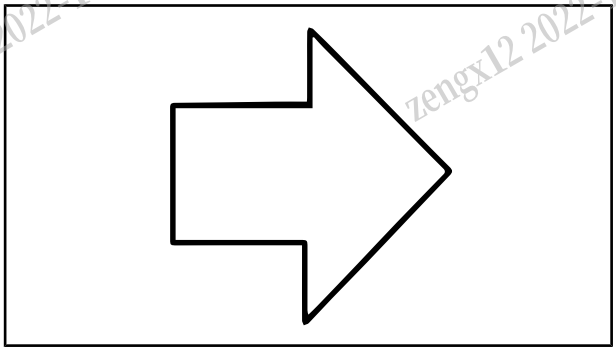


Fig 3-31

Oil level alarm indicator

When the fuel level is too low, the oil level alarm indicator lights up to remind the operator of refilling.

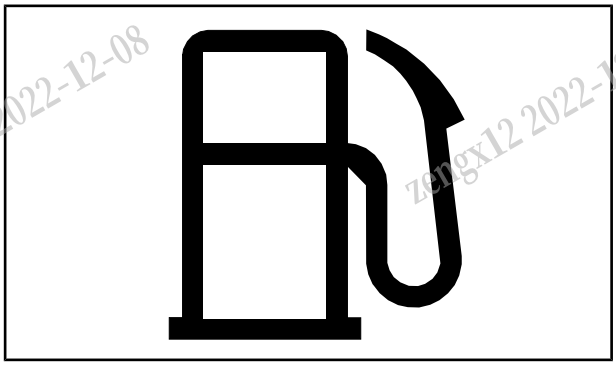


Fig 3-32

Coolant temperature alarm indicator

When the coolant temperature is above 105℃ , the alarm indicator will light up.

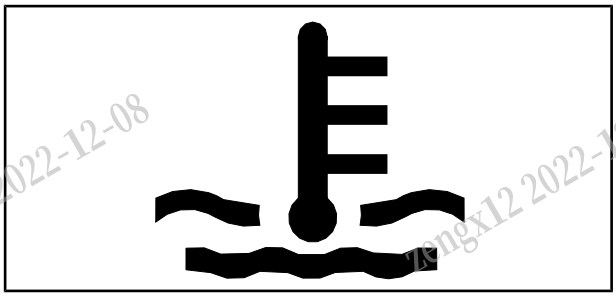


Fig 3-33

Engine pressure alarm indicator

If the engine oil pressure is equal to or less than 0.06 MPa, its alarm light will be in red.

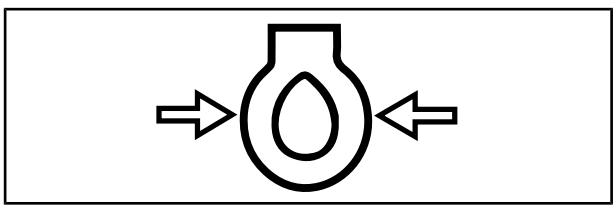


Fig 3-34

Hourmeter

The hourmeter is used to record the working hours of the engine, providing the basis for repair and maintenance.

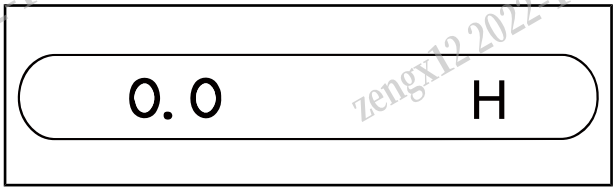


Fig 3-35

Brake pressure indicator

When the brake pressure is too low, it is in red.

When the brake pressure is normal, it is in white.

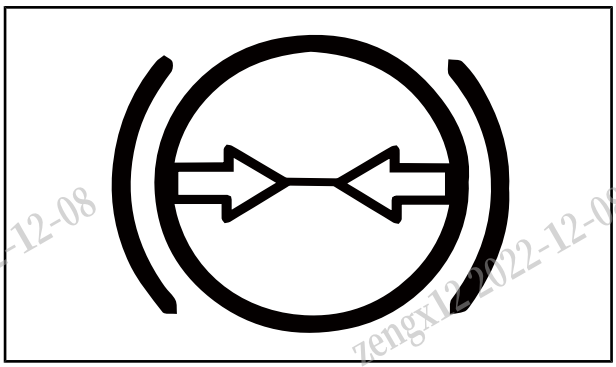


Fig 3-36

Neutral position indicator

When the propel level is in the neutral position, it lights up in green.

When the propel level is off the neutral position, it lights up in white.

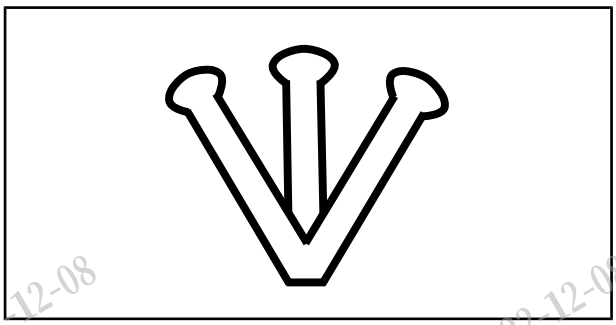


Fig 3-37

Brake system alarm indicator

If the indicator is in red, it indicates the brake system has not been released. The operator should release the parking brake.

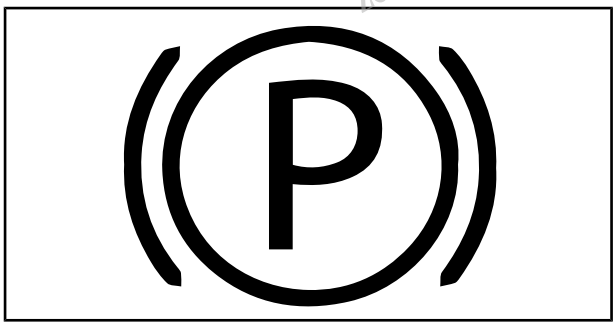


Fig 3-38

Model indication

When it is a model of SSR series, the icon of the single drum roller appears.

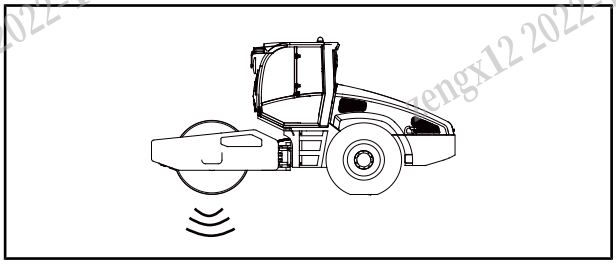


Fig 3-39

Function keys

Press F1 on the homepage into the system information page.

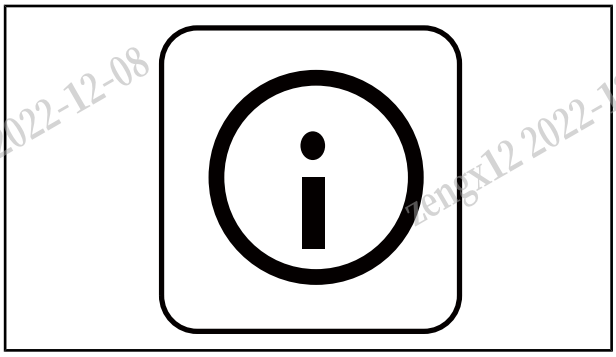


Fig 3-40

Press F2 on the homepage into the setting page.

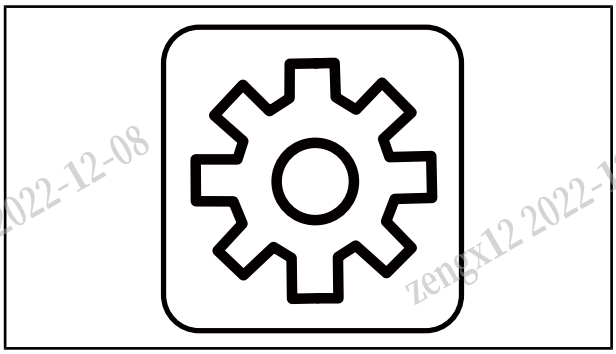


Fig 3-41

Press F3 on the homepage into the fault information page.

Fig 3-42

Press F4 on the homepage into the interface status page.

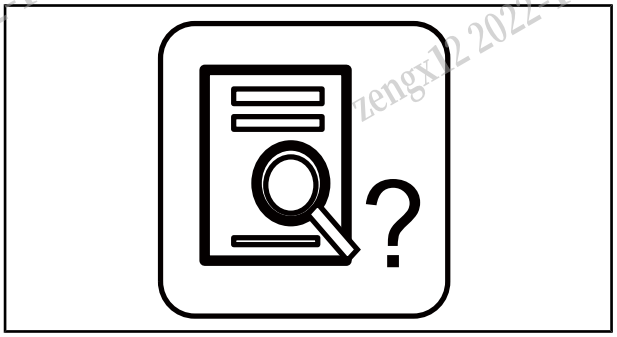


Fig 3-43

Press F5 on the homepage into the maintenance page.

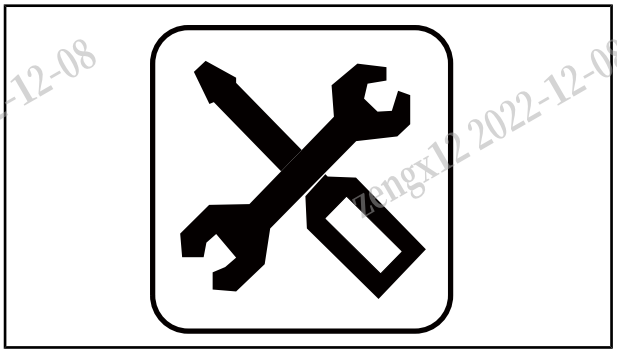


Fig 3-44

Press F6 on the homepage into the GPS information page.

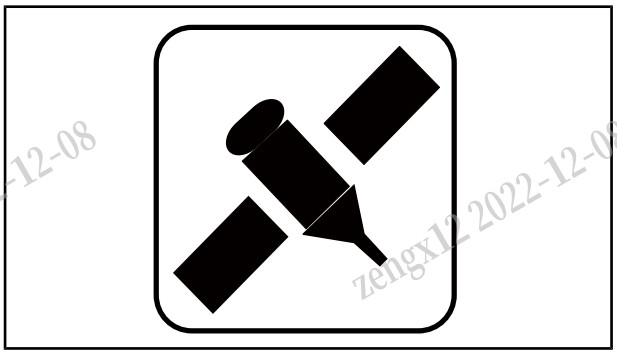


Fig 3-45

3.4 A/C Panel

The air conditioner is mainly composed of evaporator, condenser, compressor, heat exchange valve and control panel. It can be used for cooling and warming. The control panel is at the left front side of the cab top.

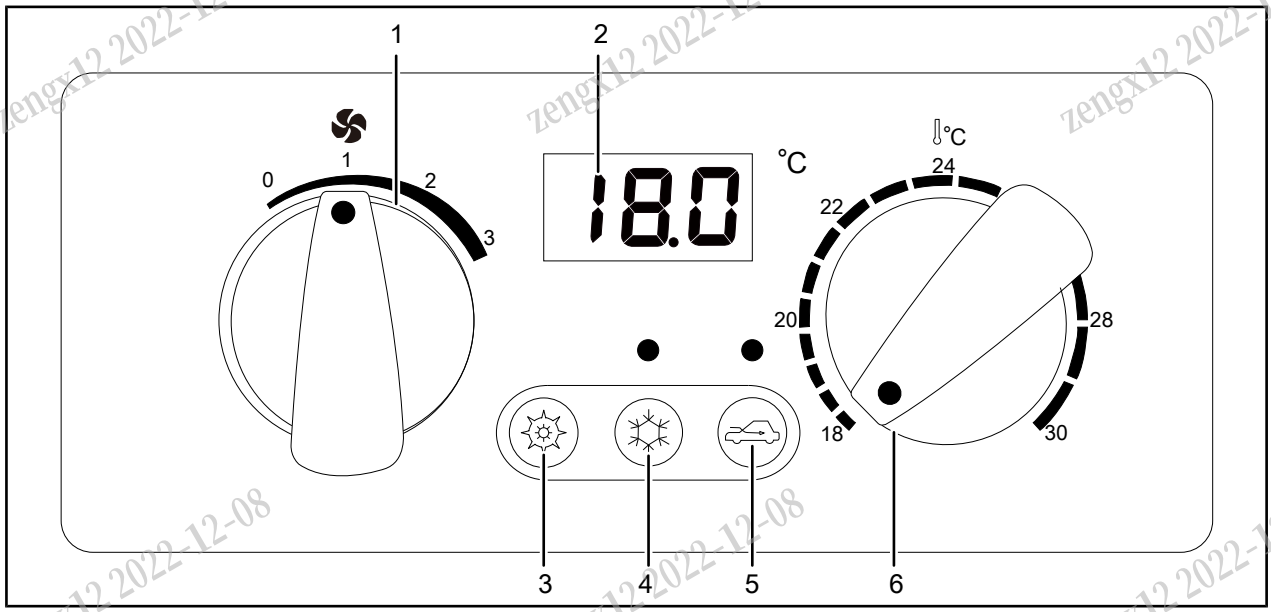


Fig 3-46

1. Fan speed control switch
2. Display
3. Warm mode switch
4. Cool mode switch
5. Outer air circulation switch
6. Temperature control switch

Table 3–1 Instruction for A/C Switches

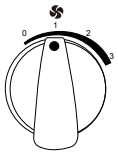
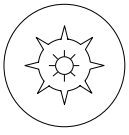
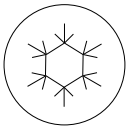
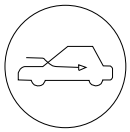
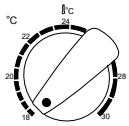
Switch	Icon	Function	Operation
Fan speed control switch		To turn on/off the A/C system	When the switch is turned at 0 gear, the A/C system is off. When the switch is turned at t other gears, the A/C is on; There are three gears. The 1 gear stands for minimum fan speed and the 3 gear stands for maximum speed.
Display		To show the room temperature and fault code	When the system is on, the display shows the room temperature 5 seconds after there is on operation on the system.
Warm mode switch		To turn on/off the electrical water valve	The switch is to turn on/off the warm mode. When the A/C system is on, press the switch to turn on the warm mode.
Cool mode switch		To turn on/off the air compressor	The switch is to turn on/off the cool mode. When the A/C system is on, press the switch to turn on the cool mode.

Table 3–1 Instruction for A/C Switches (continue)

Switch	Icon	Function	Operation
Outer air circulation switch		To start the air circulation inside and outside the machine	The switch is to turn on/off the outer air circulation. When the A/C system is on, press the switch to start the outer air circulation for fresh air. Press the switch again to turn the outer air circulation off.
Temperature control switch		To set the room temperature	The room temperature range is 18℃-30℃

NOTICE

When the A/C is in use, never turn the temperature control switch to the "COOL" position while turning the fan speed control switch to the "L" position. this will lead the evaporator to frost.

3.5 Radio

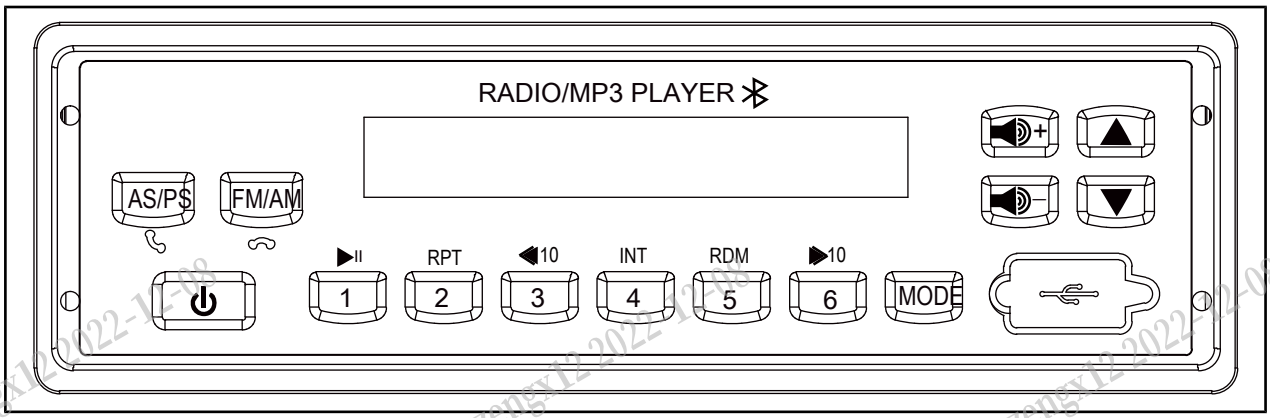


Fig 3-47

Table 3–2 Key Function

Key	State	Basic Operation	Function Description
POWER	RADIO/USB/BT	Short press	Turn on/Mute (After turn on)
		Long press	Turn off
FM/AM	RADIO	Short press	Radio channel switch
	BT on the phone	Short press	Hand up phone
	RADIO/USB/BT	Long press	BAS/TRE/BAL select adjust function

Table 3–2 Key Function (continue)

Key	State	Basic Operation	Function Description
AS/PS	RADIO	Short press	Browse radio station stored in M1~M6
		Long press	Save station after automatically searching
	BT on the phone	Short press	Put phone through
MODE	RADIO/USB/BT	Short press	Switching in RADIO/ USB/BT mode
VOL —/+	RADIO/USB/BT	Short press	Volume control/BAS/ TRE/BAL adjust function
◀ ▶	RADIO	Short press	Forward / backward automatic Search radio frequency
		Long press	Manual search radio frequency
	USB/BT music	Short press	Upper/Next
1/Pause	RADIO	Short press	Load station 1 frequency
		Long press	Store frequency into station 1
	USB/BT music	Short press	Pause/play
	BT on the phone	Short press	Mobile, Radio phone switch
2/RPT	RADIO	Short press	Load station 2 frequency
		Long press	Store frequency into station 2
	USB	Short press	Turn on / off single repeat function
3/-10	RADIO	Short press	Load station 3 frequency
		Long press	Store frequency into station 3
	USB/BT music	Short press	Upper 10
4/INT	RADIO	Short press	Load station 4 frequency

Table 3–2 Key Function (continue)

Key	State	Basic Operation	Function Description
		Long press	Store frequency into station 4
	USB/BT music	Short press	Browse and play
5/RDM	RADIO	Short press	Load station 5 frequency
		Long press	Store frequency into station 5
	USB/BT music	Short press	Random play
6/+10	RADIO	Short press	Load station 6 frequency
		Long press	Store frequency into station 6
	USB	Short press	Next 10

NOTE：
Press AS/PS two seconds to search and save station.

Radio operation

- Radio Mode
  - Default radio mode in the first time device turn on. In USB play mode, press [MODE] switch to radio mode.
- Band selection
  - Short press [FM/AM], enter in turn FM1/FM2/FM3/AM1/AM2 band.
- Automatically search station and store station
  - Long press [AS/PS], start automatically search station and store station, stations store in [1~6].
- Manual search station
  - Long press [◂] and [▸] can manual search station backward or forward until find the station.

NOTE：
When the overall signal intensity is weak, the manual search station may turn into the noise station because of its high sensitivity.

- Manual sharp turning station

- Short press [◂] or [▸], can manual sharp turning station frequency.

- Manual store station
  - After press above step 4 and step 5 to find the station, long press(3 second) one of [1~6], then store the station into the Corresponding place [1~6].

- Preset station
  - Press station [1~6], turn into preset station under corresponding frequency.

USB operation

- In radio mode, press [MODE] tune into USB mode.
  - Insert U disk, automatically search MP3 and play. short press[◂] or[▸], play last or next track.

- U disk/RADIO select
  - Press [MODE]，switch USB/RADIO mode.

- Play/Pause control
  - In USB mode, short press[1] to play or pause.

- [Mode] key
  - In RADIO/USB state, long press [Mode] to show clock.

- Browse play track
  - In USB mode，short press[4/INT]，'INT' display on the screen, can browse U disk，play 5 second for each song.

- Repeat
  - Short press [3/RPT] to repeat. 'RPT' display on the screen.

- Random play
  - Short press[4/RDM],'RDM' display on the screen, random play MP3.

- Upper/Next10
  - In USB mode, press[3/-10] or [6/+10]，select play upper or next 10 of MP3.

Basic operation of bluetooth

NOTE：
Name is CAR KIT. Default password is 0000.

- Key function

- Press“2”: Disconnect bluetooth device.
- On phone status
  - Press“1”: Voice switching between bluetooth and mobile phone.
  - Press AS/PS : Answer the phone.
  - Press FM/AM : Hand up phone.

- Music status
  - Press“1”: Music play/pause.
  - Press“PRE”▲: Upper song.
  - Press “NEXT”▼: Next song.

Operation

4.Operation

4.1 Check before Starting the Engine

4.1.1 Inspection (walk-around)

- Check the motors, cylinders, hoses for cracks, excessive wear or looseness. Repair or replace it according to the fact.
- Remove the dirt and debris around the engine, battery and radiator. Check the surrounding of engine and radiator for buildup of dirt. Check the surrounding of muffler, turbocharger or other hot components for flammable materials like dr leaves and thin branches. Remove them if any dirt or flammable materials are found.
- Check for any leaks of coolant or oil around the engine. Repair it in case of any problem.
- Check the hydraulic unit, hydraulic tank, hoses and joints for any leaks of oil. Repair the leaks if any.
- Check the handrails and step for any problem like loose bolts. Repair it in case of any problem.

4.1.2 Inspection before Starting

1. **Check the engine oil level**

The steps for checking engine oil have been described. **See** “Engine Oil-Check/Refill/Change” on page 5-29.

2. **Check the coolant level of the engine**

The steps for checking the engine coolant level have been described. **See** “Engine Coolant-Check/Change” on page 5-38.

3. **Check the oil water separator**

The steps for checking oil water separator have been described. **See** “Oil Water Separator–Check/Drain/Replace” on page 5-33.

Besides, check the hoses and pipe connector for looseness to avoid the air going into the pipeline.

4. **Check the hydraulic oil level**

The steps for checking the hydraulic oil level have been described. **See** “Hydraulic Oil-Check/Refill/Change” on page 5-48.

NOTE：
The oil level will change after startup of engine, check the level again before working.

NOTE：
The oil level may change as the oil temperature varies. While in operation, keep the oil level about 2/3 of the level meter.

5. **Check the washer**

The container of washer is mounted at the rear right side in the cab.

The steps for checking the fluid level have been described. **See** “Windshield Washer Fluid–Check/Fill” on page 5-60

6. **Check the air filter**

Take the following steps to remove the accumulated dust.

1) Open the access door at the side of the covering part, and then the air filter can be seen.

2) Empty dust by pressing the dust evacuator (14).

3) Close the access door.

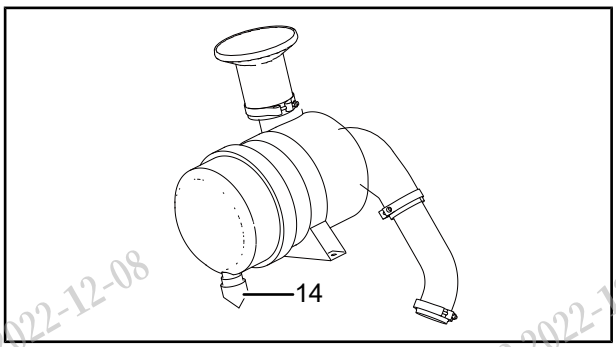


Fig 4-1

14. Dust evacuator

7. **Check the tire pressure**

Check the tire pressure with a pressure gauge. The steps for checking the tire pressure has been described. **See** “Tires and Rims-Check” on page 5-67

8. **Check the position of limit plate**

Make sure the limit plate for front and rear frames is unlocked. Then the roller can steer.

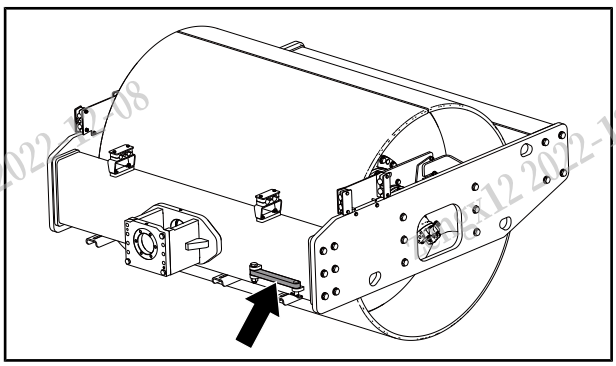


Fig 4-2

9. **Check the vibratory drum and dampers**

Steps for checking drums and dampers have been given. **See** “Damper-Check/Replace” on page 5-63.

10. **Check the cables**

NOTE :

If any fuse burns frequently or any cable shows the sign of short circuit, contact SANY distributor to find the cause and eliminate the trouble.

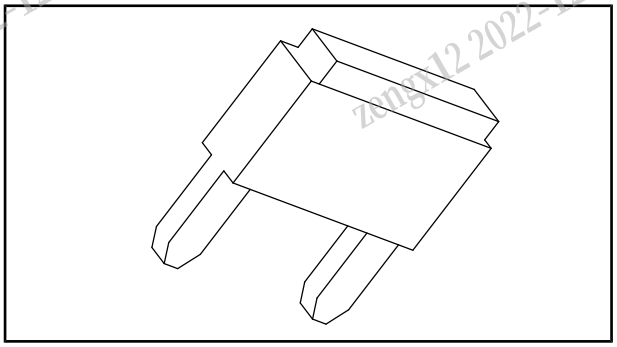


Fig 4-3

Check whether the fuse is damaged; whether the fuse with proper capacity is used; whether any wire connection is off. Check for loose terminals. Fix it if any.

Moreover, pay special attention to the cables when checking battery, engine, start motor and alternator. Make sure to check for flammable materials around battery. Immediately remove them if any.

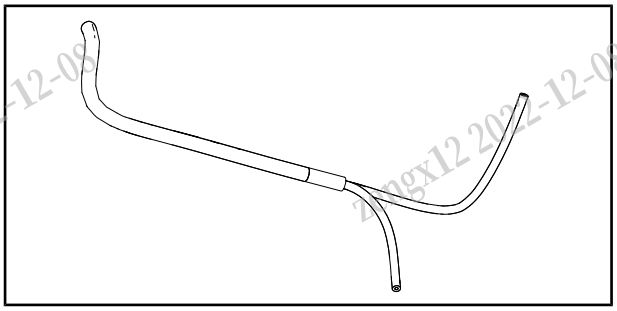


Fig 4-4

4.2 Adjustments Prior to Startup

4.2.1 Seat Adjustment

This machine is equipped with an adjustable seat. To prevent operator fatigue, adjust the seat to the correct position for the current operator.

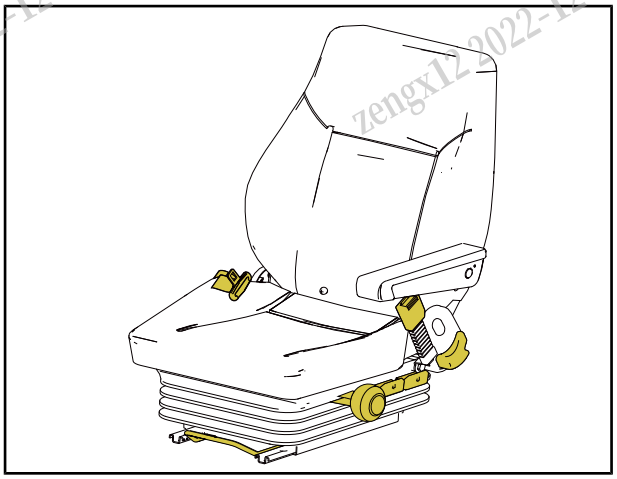


Fig 4-5

The operator's seat can be adjusted as follows.

Horizontal adjustment

Pull the horizontal adjustment handle (1) upward, slide the seat to the suitable position and release the handle.

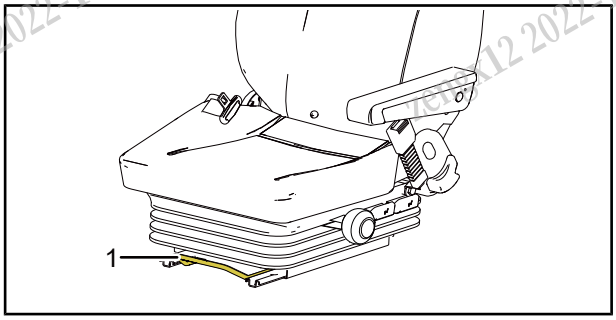


Fig 4-6

1. Horizontal adjustment handle

Weight adjustment

Turn the weight adjustment button (2) until reach the number range that matches your own weight.

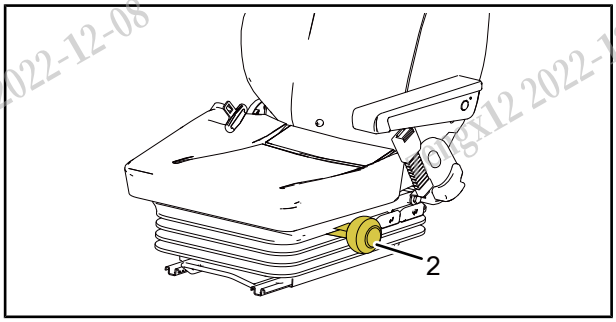


Fig 4-7

2. Weight adjustment button

Front height and rake adjustment

Raise the end of the front height and rake adjustment handle (3) upward until the seat front is up to the suitable height and release the adjustment handle.

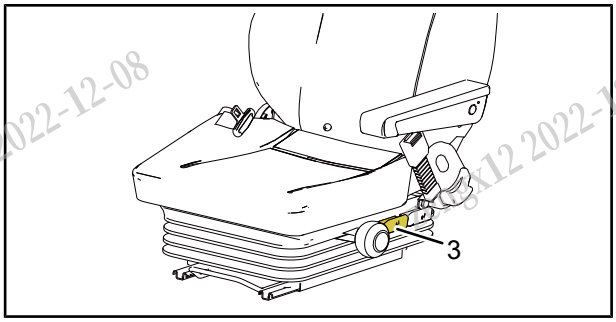


Fig 4-8

3. Front height and rake adjustment handle

Back height and rake adjustment

Raise the end of the back height and rake adjustment handle (4) upward until the seat back is up to the suitable height and release the adjustment handle.

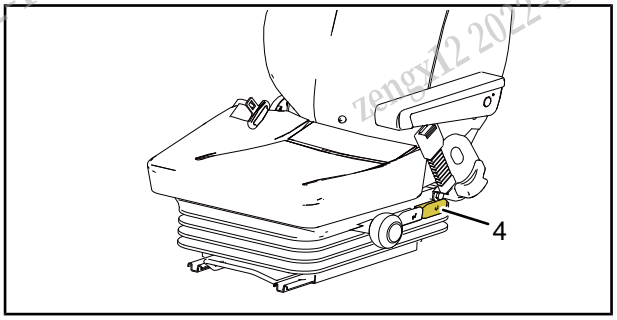


Fig 4-9

4. Back height and rake adjustment handle

Backrest adjustment

Raise the backrest adjustment handle (5) upward, lean against the backrest to the suitable angle position, and release the handle.

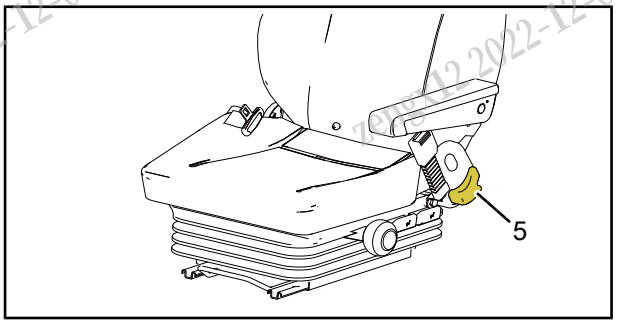


Fig 4-10

5. Backrest adjustment handle

Seat belt

Grasp the latch plate (10) and pull upward to lengthen the belt. Insert the latch plate into the buckle (11) until it locks.

The belt should be placed as low as possible on your hips, not on your waist. The belt will retract to adjust belt slack.

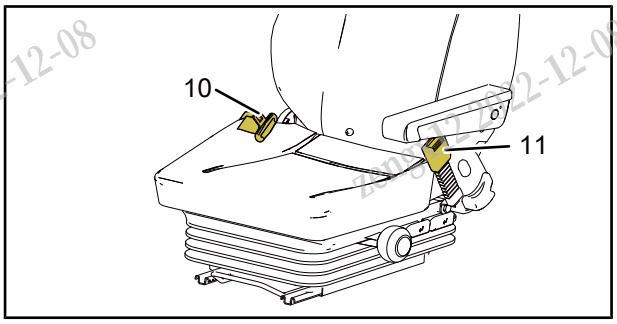


Fig 4-11

10. Latch plate 11. Buckle

4.2.2 Rearview Mirror Adjustment

Adjust the angle of rearview mirror so that the operator can see the rear situations clearly.

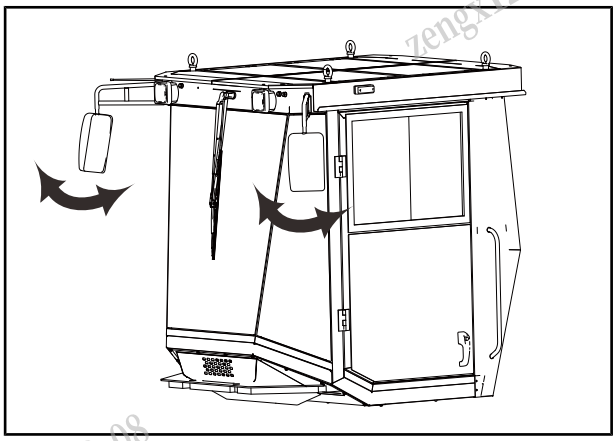


Fig. 4-12

4.3 Equipment Check Prior to Startup

4.3.1 Introduction

Before starting up the engine, you need to check some equipment to see whether they are in good condition or not.

4.3.2 Power on the Control System

In order to check the equipment, first you have to power on the control system.

1. Connect the master disconnect switch of power supply.

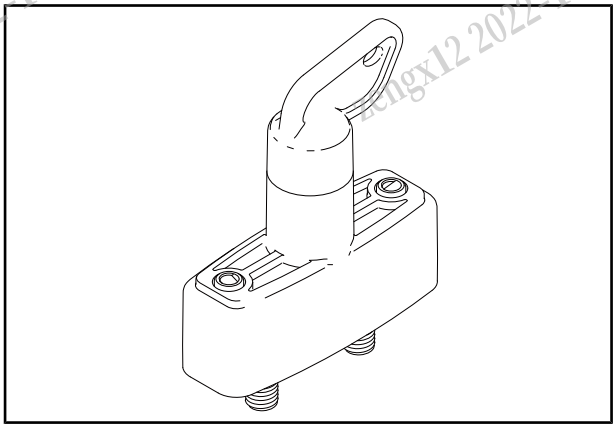


Fig 4-13

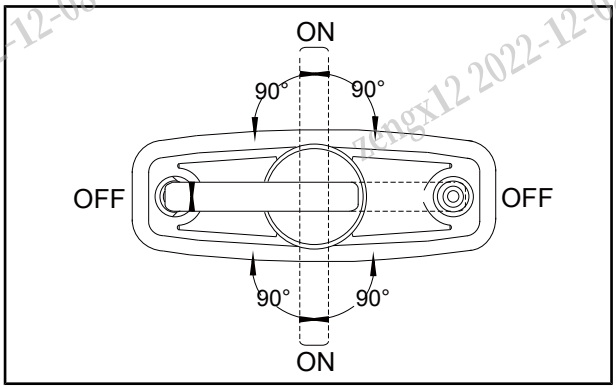


Fig 4-14

2. Insert the key, and turn to position "I". So the control system will be powered on, and the display shows icons.

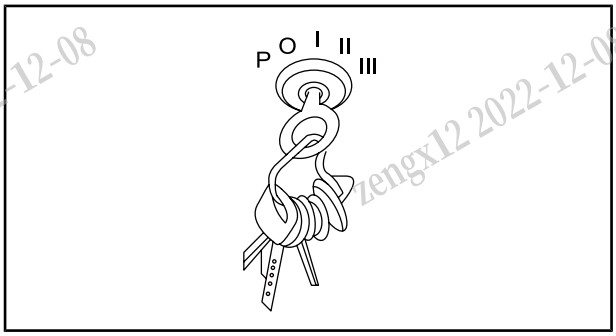


Fig 4-15

At this moment, if the park brake indicator, the neutral position indicator, the battery charging indicator and engine oil pressure indicator light up, while other indicators are off. This indicates the circuit is ready.

Fig 4-16

4.3.3 Check the Fuel Level

The steps for checking fuel have been described. **See** "Fuel-Check/Refill/Replace" on page 5-42.

4.3.4 Check the Propel Control Lever

Before starting the engine, the propel control lever should be placed at STOP position, or else the roller will suddenly run when engine is started. And the impact will cause not only danger to the operator, but also harm to engine and pump.

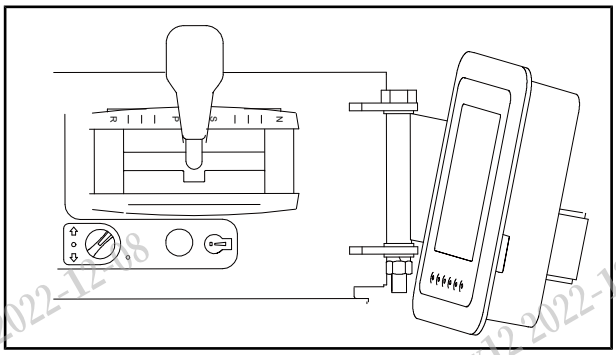


Fig 4-17

4.3.5 Check the Emergency Stop Switch

Before starting the engine, the emergency stop switch should be released, or else the engine can not be started.

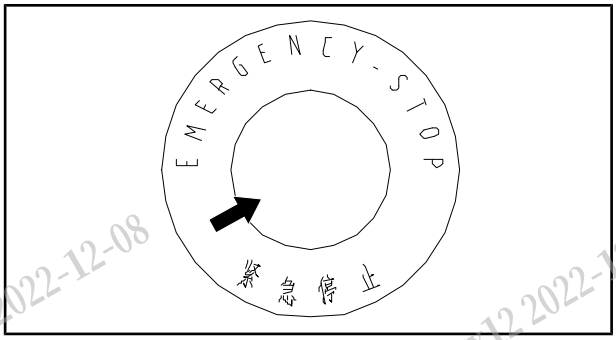


Fig 4-18

4.3.6 Check the Park Brake Switch

Before starting the engine, check the switches, indicators and working device to see whether they are in control or not. Fix if any problem appears.

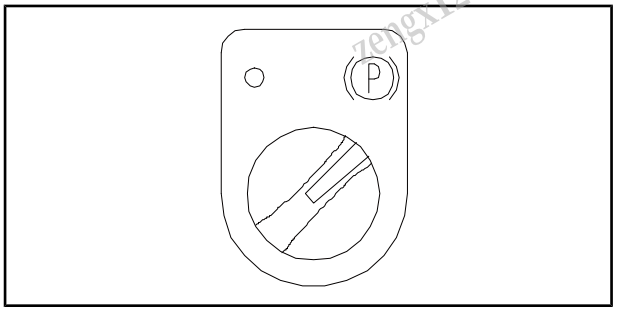


Fig 4-19

4.3.7 Check the Switches

Before starting the engine, check the switches, indicators and working device to see whether they are in control or not. Fix if any problem appears.

- The work light switch

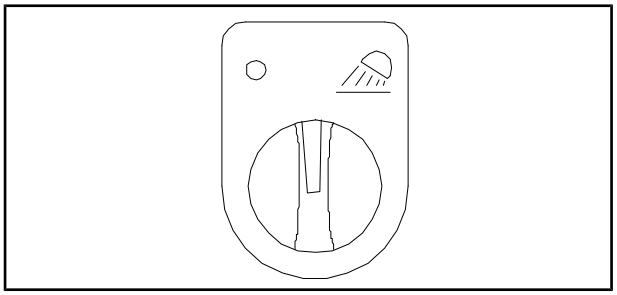


Fig 4-20

- The warning light switch (optional)
- The horn switch

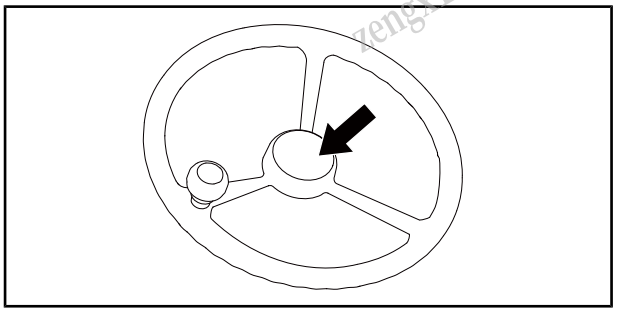


Fig 4-21

- The wiper and the washer switches

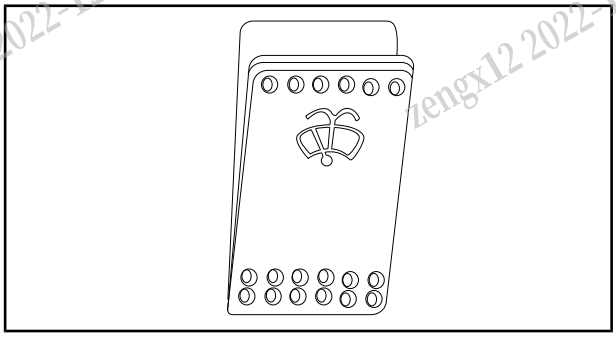


Fig 4-22

4.4 Engine Starting

4.4.1 Introduction

After checking the items above and eliminating malfunction, you can start up the engine.

4.4.2 Normal Start

After checking the items above and eliminating malfunction, you can start up the engine.

1. Turn the key to position "III".

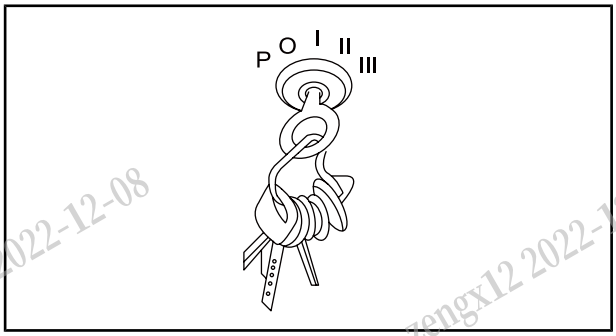


Fig 4-23

2. Hold the key at position "III".
3. Release the key immediately after the engine is started. The key will return to position "I" automatically.

4.4.3 Jump-start

If the batteries are short of energy, you can start up the engine according to the steps as follows.

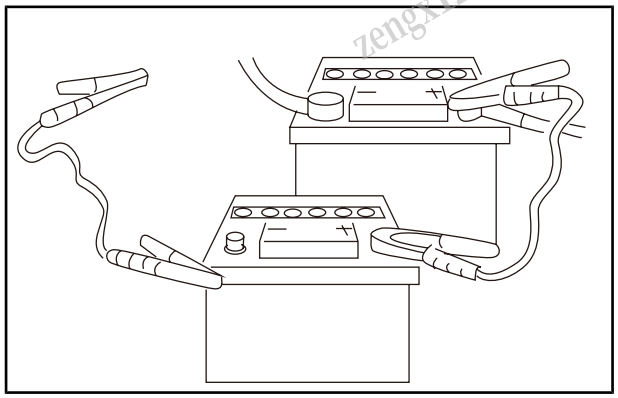


Fig 4-24

1. Using jumper cable to start engine requires two persons working together (One is seated in the operator's seat and the other handles the battery).

2. Always wear goggles and rubber gloves when starting a machine with jump start cables.

3. Jump start only with an energy source of the same voltage as the stalled machine.

4. When using jumper cables, always connect the positive (+) jumper cable to the positive (+) battery terminal first. Next, connect the negative (-) jumper cable to the frame away from the batteries.

5. Do not allow the jump start cable ends to contact each other or the machine.

4.4.4 Engine Start in Cold Weather (optional)

In cold weather, the engine may not be started as normal because of the low temperature. At this moment, you can warm up the engine before starting. Keep the key at the “II”gear for about 10s to preheat. After that, turn the key to the gear “III”.

4.5 After Engine Starting

After starting the engine, the roller shouldn't be used to work at once. There should be 3-5 minutes for the engine to run in idling speed.

Push the throttle control lever to the MIN position, then the engine will run in idle speed.

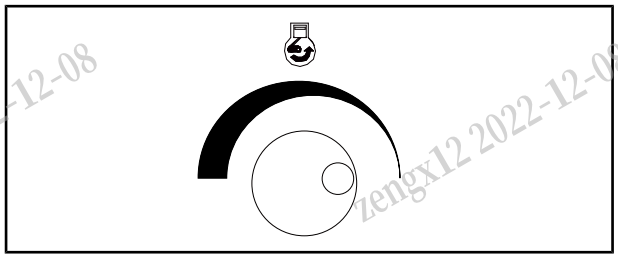


Fig 4-25

Observe the pressure gauges, instruments and warning lights to ensure they are properly functioning, with all readings within specific ranges.

NOTE：

After the engine is started up, generally the hydraulic oil level will be lower. If the hydraulic oil level is lower than 1/2 of the range, stop the roller. Wait for the engine cooling down, and then fill the hydraulic oil tank to the recommended mark.

If any problem appears, rotate the key to position P/O to stop the engine. Check out and eliminate the fault.

If everything is ok, pull the throttle control lever to the MAX position to run the engine at rated speed.

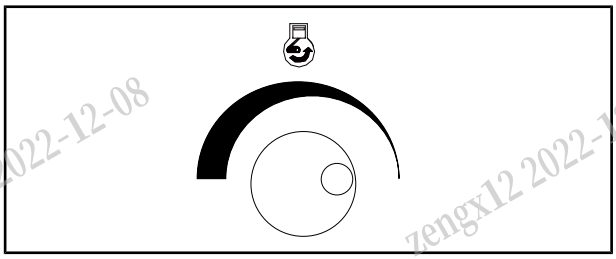


Fig 4-26

4.6 Test Running

If all the checking items above are qualified for working, you can drive the roller to make some simple movements such as moving forward slowly, making a turning for testing. Before testing running, turn the switch to the gear "I" or "II".

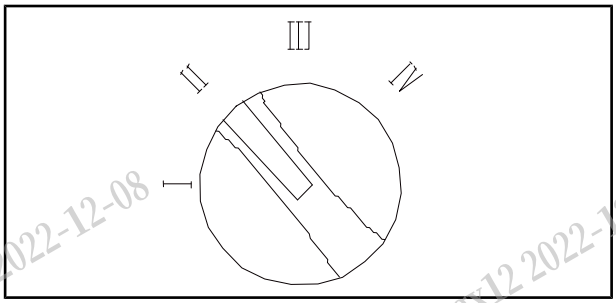


Fig 4-27

If there is any problem such as abnormal noise, vibration, smell, smoke, stop the engine and check faults out. If everything is ok, the roller can be used to work.

4.7 Travel Operation

4.7.1 Travel Forward

Take the following steps to travel forward.

1. Select speed gear according to the road condition.

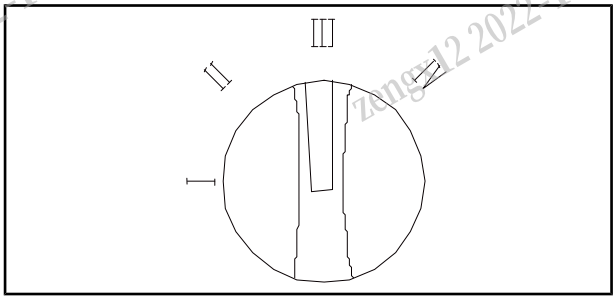


Fig 4-28

2. Push the propel control lever forward from the neutral position.

⚠ CAUTION

It's forbidden to push/pull the propel control lever without holding the steering wheel, or this will lose direction control of the roller and may cause accidents.

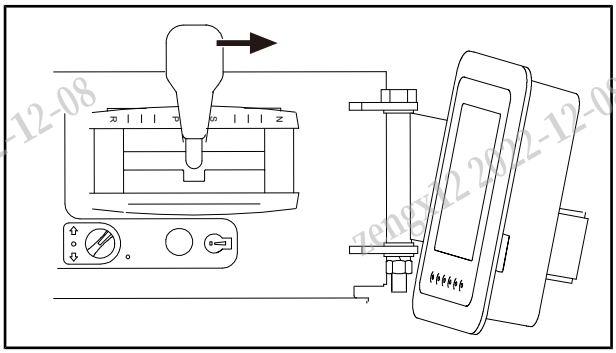


Fig 4-29

4.7.2 Travel Backward

1. Make the same settings as travel forward.

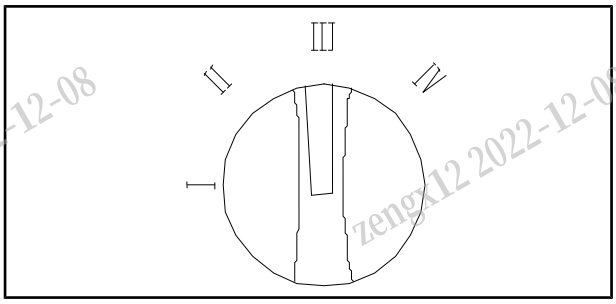


Fig 4-30

2. Then pull the propel control lever backward from the neutral position.

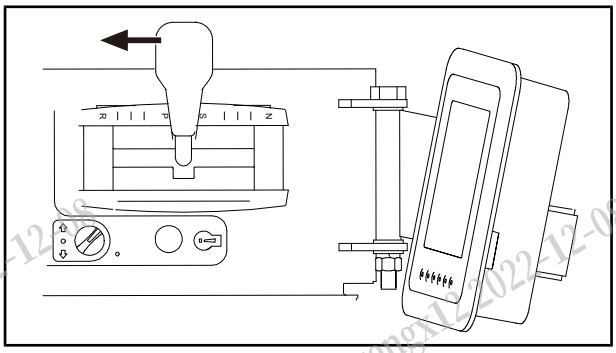


Fig 4-31

4.8 Vibration Operation

NOTE :
Only when the gear is at the I or II position, can the roller vibrate.

Take the following steps to vibrate.

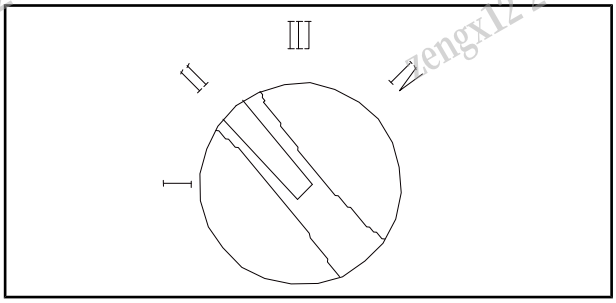


Fig 4-32

1. Choose gear I or II.

2. Choose vibration frequency according to the working requirements.

- High frequency with small amplitude and small compaction force.
- Low frequency with big amplitude and big compaction force.

Before switching the vibration mode, stop vibration first.

The single drum roller is often used to compact the foundations of the road. Different vibration frequency is chosen according to the working procedure. Generally, the working procedure could be static rolling, high-frequency rolling, low-frequency rolling and a final static rolling.

3. Push the propel control lever forward slowly to speed up the roller.

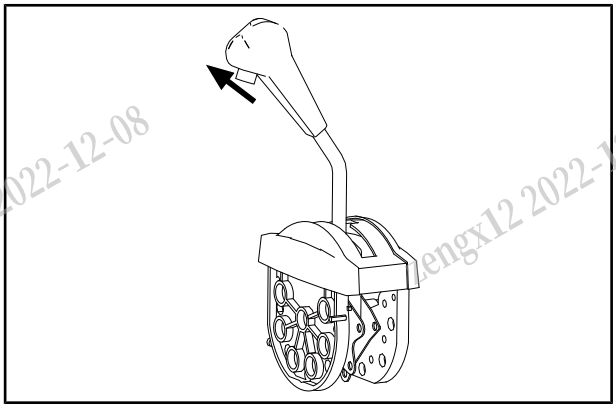


Fig 4-33

4. Press down the vibration button to vibrate.

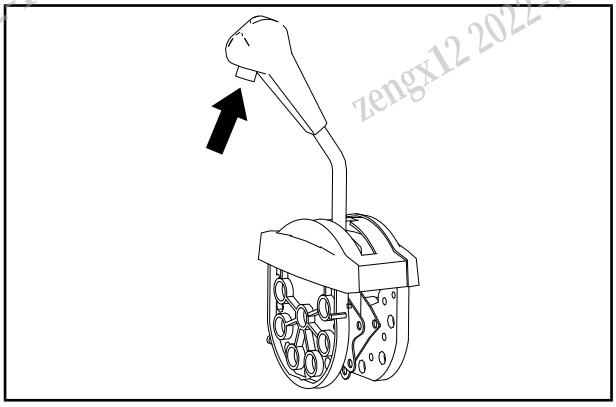


Fig 4-34

5. After work, press down the vibration button again to stop vibration.

4.9 Parking Operation

4.9.1 Service Brake

Service brake is used to stop the roller but not the engine. Service brake should be carried out before switching speed gears. Take the following steps to do service brake.

1. If the roller is vibrating, press down the vibration button to stop vibration.

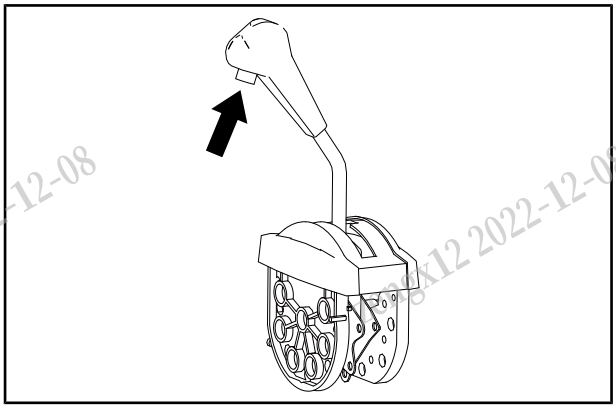


Fig 4-35

2. Move the propel control lever slowly to STOP position.

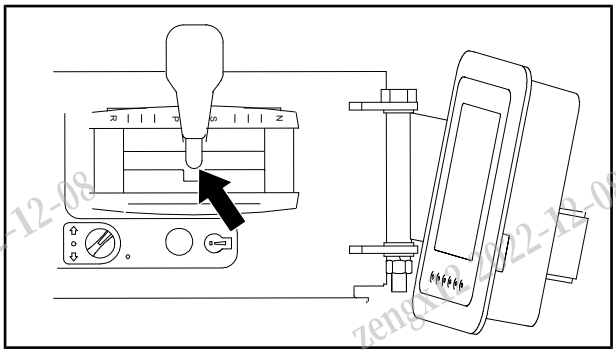


Fig 4-36

4.9.2 Park Brake

Park brake is used to stop the roller completely. Apply the park brake on a slope if the roller needs to be parked. After everyday's work, park brake will be carried out. Take the following steps to do park brake.

1. Select an applicable place for parking. Usually a flat ground is recommended.

2. Do service brake.

3. Rotate the park brake switch to position "P".

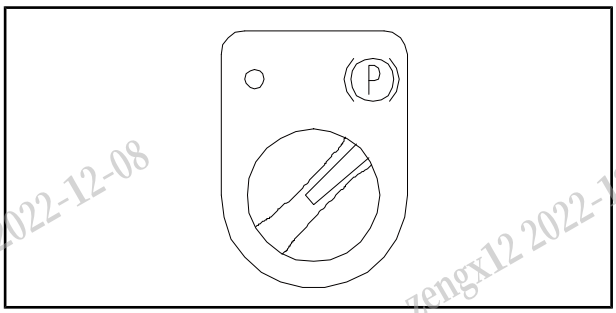


Fig 4-37

4. Turn the throttle knob to the MIN position for engine's idle warm-up for 3 min - 5 min.

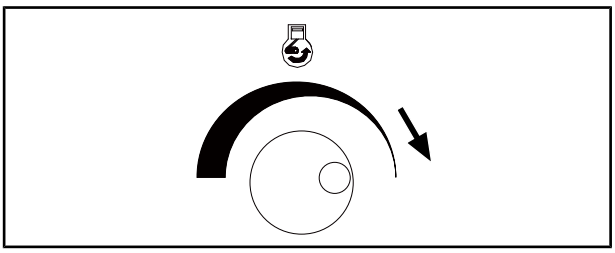


Fig 4-38

5. After 3 - 5 minutes' idle warm-up, rotate the key to position P/O, and take off the key.

6. Turn off the master disconnect switch of power supply. Lock the cabin's door.

4.9.3 Emergency Brake

NOTICE
Risk of machine damage! If the emergency stop switch use normally, which could shorten the service life of the engine and other important parts. Except for emergency, do not use emergency stop switch.

The emergency brake is used to stop the roller immediately, and the engine will be shutdown too. Whenever come across a dangerous situation, press down the emergency stop switch at once.

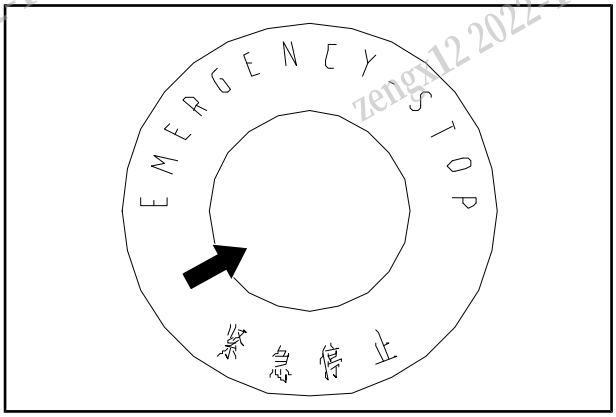


Fig 4-39

⚠ CAUTION

Risk of personal injury!
If you restart the roller under emergency, which could cause personal injury.
Eliminate the emergency, then restart the roller.

NOTICE

Risk of machine damage!
If you restart the roller under emergency, which could cause machine damage.
Eliminate the emergency, then restart the roller.

After pressing the emergency stop button, it is forbidden to start the engine. Rotate the button clockwise along the arrow in figure to relieve emergency brake.

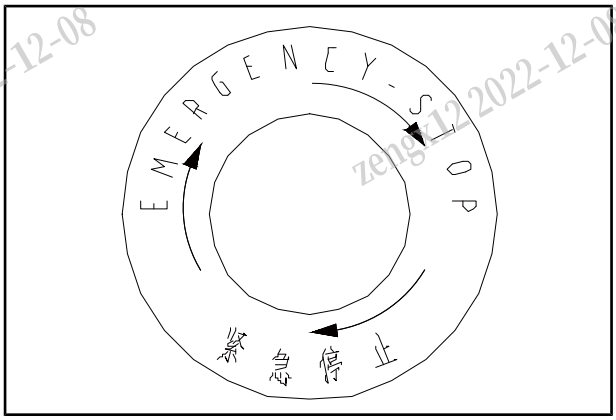


Fig 4-40

4.10 Correct Driving According to the Road Condition

4.10.1 Working near Ditch Edge and Road Shoulder

When working near ditch edge, keep a safe distance to the edge. If necessary, reinforce it prior to work. When working near road shoulder, low speed gear is recommended. The operator should pay attention to the traveling direction to avoid destroying the road shoulder.

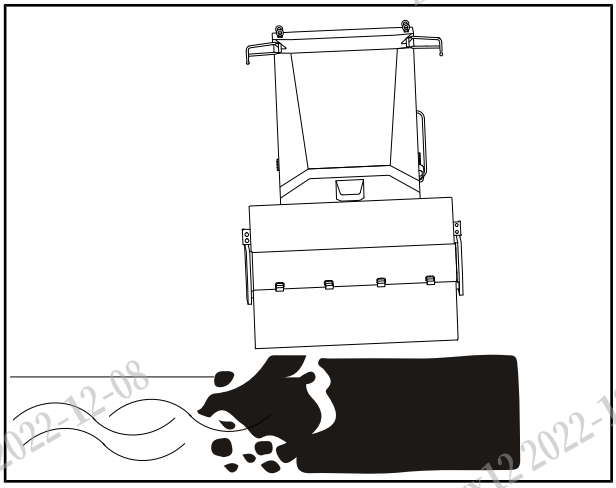


Fig 4-41

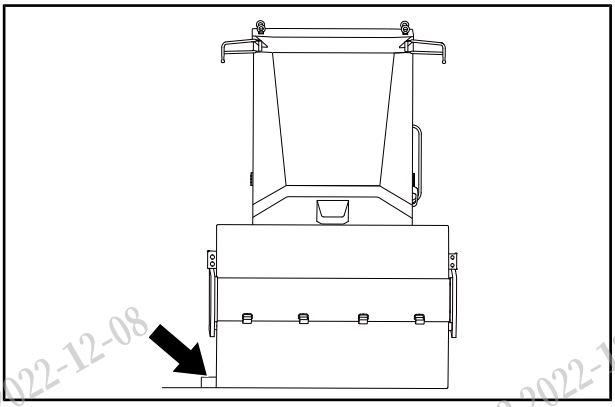


Fig 4-42

4.10.2 Working near Buildings Vulnerable to Vibration

When working near buildings such as overbridge and subway, generally the operator shouldn't start vibration to keep them from the vibration wave.

4.10.3 Working on the Slope

Before working on the slope, survey the gradient of the slope. When the value of gradient is beyond the roller's gradeability, the roller shouldn't be used to work without other facilities.

While the gradient of the slope is in the range of the roller's gradeability, the operator can drive upward or downward in a straight line at low gear.

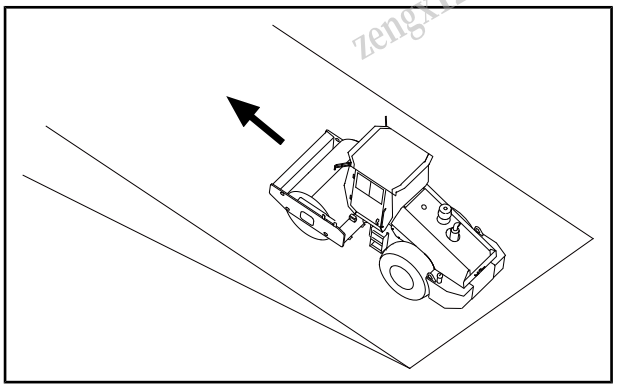


Fig 4-43

Vibration operation would increase the potential danger of slipping on the iced slope in winter.

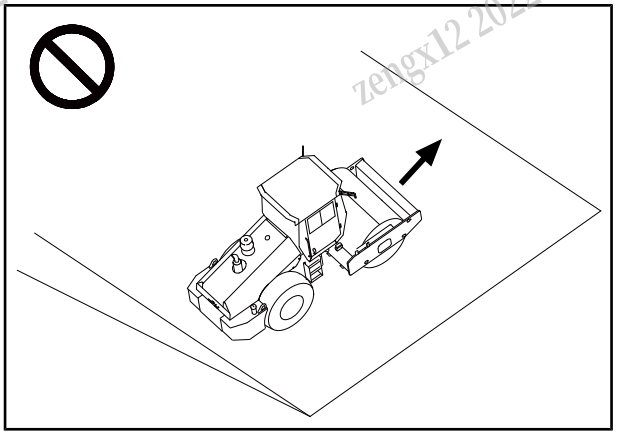


Fig 4-44

4.11 Check after Each Work Day

- Inspect your roller and check the work equipment of roller. Check for leaks of oil or coolant. Repair it in case of any problem.
- Refuel the tank to maximum level.
- Check the engine compartment for any paper or other debris. Remove them, if any, in order to prevent fire.
- If the ambient temperature is below -35°C, make sure to drain the cooling water of radiator and engine (SANY uses the type of antifreeze liquid that freezes at -35°C).

4.12 Transportation

4.12.1 Transport Vehicle

- No matter road or railway transport is applied, select vehicles with appropriate volume and loading capacity to transport the roller. The vehicle must be qualified in maximum loading capacity,

engine power, brake capability and others. It would be the best to exclusively transport the product without other machines each time.

- In transportation, take necessary measures to avoid sliding and rolling of the roller.
- Keep a certain distance when passing buildings, bridges, culverts, electric facilities, etc.
- Use the transport vehicle for long-distance machine transportation.

4.12.2 Using a Slope

1. Use slopes for the loading and unloading for heavy machines and ensure the slope is in the best status. Try to use a metal slope the one has been long laid aside and gone bad must not be used. The slope shall have sufficient width and strength to support the machine and a gradient less than 15%.

Ensure the slope is placed between the transport vehicle and the ground correctly. Ensure the slope is not covered with oil, snow, ice or mud. Ensure foundations are laid for the transport vehicle.

2. Start the roller. Select the low gear. Adjust its position to make its front align with the slope. Drive it onto the transport vehicle slowly. Place sleepers (1) at the specified parking position on the transport vehicle in advance.

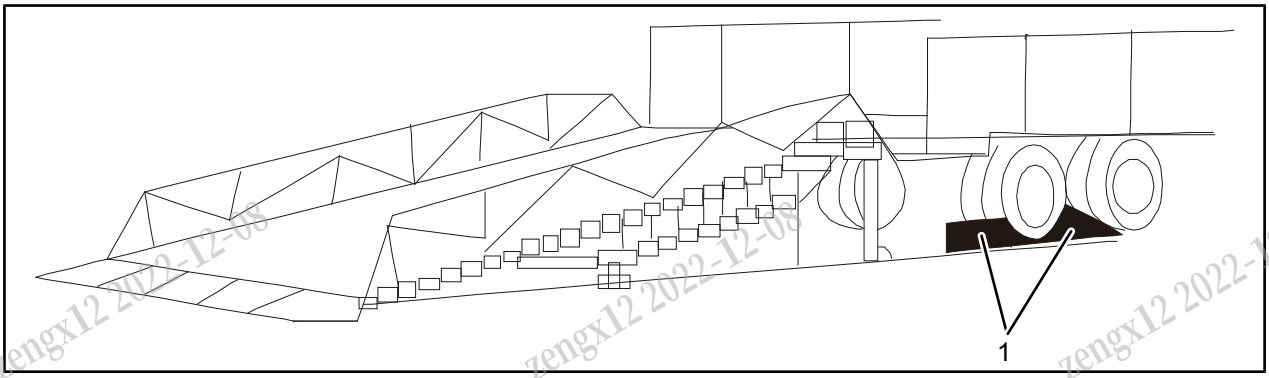


Fig 4-45

1. Sleepers

3. Fasten slings to fix the front and rear frames.

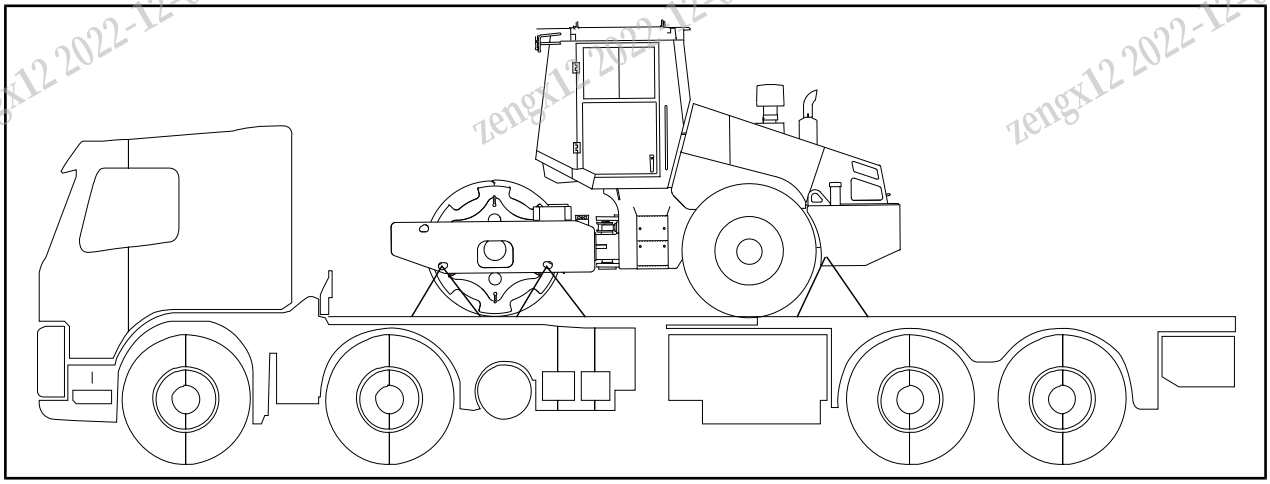


Fig 4-46

4.12.3 Shipping

1. **Container shipping**

1) Preparation

- Disconnect the washer water pipe from the cabin. Fix the water pipe at the cab carrier.
- Disconnect the harnesses.
- Remove the cover on the mounting bracket of hood, and disconnect joints connecting the cab harness and the frame harness.
- Remove the interior trims in the cab (each at the left and right sides). Reinstall them after the cab is secured on the carrier.
- Remove the two side plates on the cab bottom (each at the left and right sides). Reinstall them after the cab is secured on the carrier.
- Remove the plates in the cab.
- Remove the connecting bolts between the cab and cab floor .
- Lift the cab and fix it onto the cabin carrier with bolts.

(a) Protection of removed extra high and wide parts

Wrap up the removed interior trim clasp nails, floor screws, hood screws and cover plate with bubble film. Place them in the carton together with the rearview mirror package box. Then put the carton on the bottom plate of cabin.

(b) Check before protection

Before protection, ensure the roller coating is qualified and has been dried completely. Ensure the surfaces are clean, dry and without any dust, water, oil or rust.

Ensure the fasteners connecting the roller parts have been treated against rust and are fixed at their original positions.

2) Protection process

Cleaning - rust-proof treatment to exposed non-coated parts - protection of engine - protective coating of complete machine - drying- partial protection - container loading.

(a) Cleaning

- Use solvent gasoline or paint diluent to clean the exposed non-coated parts such as lamp-shades, fasteners and tube connectors. Make sure: a. the cloth and paint brushes to be used are clean; b. the cleaned parts are clean and without any dust, rust or other foreign objects.
- After cleaning, dry them with compressed air or clean soft paper/car cleaning paper. Carry out protective treatment after 5-10 min.

(b) Rust-proof treatment to exposed non- coated parts

- Apply anti-rust oil 377-HF evenly to the exposed plated parts and aluminum parts such as tube connectors, hydraulic valves, screws, and the coupling disc seat, primary filter support and secondary filter support of the diesel engine.
- Cover the oil cylinder piston rod in advance and remove the cover after applying protective coat. Use a piece of clean cloth dipped with diluent to clean these parts. After the solvent volatilizes, coat these parts with anti-rust oil 377-HF evenly.

(c) Protection of engine

Apply protective coat AP1520 to the engine and the internal surfaces of hood for sealing in accordance with Article 5.5 in Q/SY 042 025-2008 Specification for the Protection of Exported Engineering Machinery.

(d) Drying

Dry the coated complete machine.

(e) Partial protection

Wrap up the control handle and control console with bubble film and tape. Then place silica-gel desiccant in the package.

3) Export container loading

(a) Container loading of basic machine

Start the roller. Adjust the engine speed to 1500rpm. Select gear 1. Adjust the roller position to be aligned with the container entrance. Drive the roller at a low speed into the container. Set a sleeper at the sill of the container for transition. Carefully observe the distances between the machine sides and the container to avoid the paint damage caused by interference. Stop driving when the front wheels contact with the limit sleeper. At last, shut down the machine and disconnect it from the power supply.

(b) Fixing of basic machine

Park the roller at the center in the container. Set wedge blocks before/behind the drums and at the points of contact with container. Fix the wedge blocks with round steel nails. Connect the fixing

hole on the machine with the hook in container by iron wires. This is to prevent roller bounce. Set wearable cloth in the fixing hole for protection.

(c) Container loading and Fixing of cabin

Use a forklift truck to load the cabin together with the cabin bracket into the container. Then fix them with(4) Fixing of removed parts box.

Seal the parts box containing the removed parts. Then put it on the platform at the left upper corner in the cabin.

(d) Fixing of attached accessories box

Lift the wooden box containing the attached accessories to the middle under the cabin bracket with a forklift truck. Then, fix the bottom wood slats of the box to the container floor with steel nails.

(e) Lifting of container with a reach stacker

Use a reach stacker to lift the container stably. Later, keep the reach stacker stationary and drive the flatcar to the place just under the container. Stably lower the container to the flatcar and fasten it.

(f) Delivery: Carry out final check before Delivery. After getting out of the container, lock the container door.

4) Oil level standard

Table 4–1 Oil Level Standard

No.	Item	Standard
1	Hydraulic oil	Between 1/2 ~ 2/3 of the level gauge scale
2	Lubricating oil	Between the marks Min and Max of the oil dipstick
3	Reducer gear oil	Just at the beginning of oil overflow from the overflow out
4	Diesel oil	1/8 at the electronic fuel gauge

5) Key management

Table 4–2 Key List

No.	Name	Qty	Unit	Remarks
1	Ignition key	2	Piece	
2	Cabin door key (left and right)	2	Piece	These 5 kinds of keys are interchangeable.
3	Fuel tank key			
4	Electric control cabinet key			
5	Battery box key			

Table 4–2 Key List (continue)

No.	Name	Qty	Unit	Remarks
6	Engine hood key			
Total		4	Piece	

2. **Non-container shipping**

1) Preparation

Before protection, make sure the roller coating is qualified and has been dried completely. Make sure the surfaces are clean, dry and without any dust, water, oil or rust.

Make sure the fasteners connecting the roller parts have been treated against rust and are fixed at their original positions.

2) Protection process

Cleaning - rust-proof treatment to exposed non- coated parts - protection of engine - protective coating of complete machine - drying - partial protection - hand over at the port - shipping.

(a) Cleaning

- Use solvent gasoline or paint diluent to clean the exposed non-coated parts such as lamp-shades, fasteners, tube connectors, bolts and nuts. Make sure: a. the cloth and paint brushes to be used are clean; b. the cleaned parts are clean and without any dust, rust or other foreign objects.
- After cleaning, dry them with compressed air or clean soft paper/car cleaning paper. Carry out protective treatment after 5-10 min.

(b) Rust-proof treatment to exposed non- coated parts

Apply anti-rust oil 377-HF evenly to the exposed plated parts and aluminum parts such as tube connectors, hydraulic valves, screws, and the coupling disc seat, primary filter support and secondary filter support of the diesel engine. Then wrap them up with polyethylene film (or bags) against wate.

Cover the oil cylinder piston rod in advance and remove the cover after applying protective coat. Use a piece of clean cloth dipped with diluent to clean these parts. After the solvent volatilizes, coat these parts with anti-rust oil 377-HF evenly. Then wrap it up with cylinder sleeve. At last, fasten it with bandage.

(c) Protection of engine

Apply protective coat AP1520 to the engine and the internal surfaces of hood for sealing.

(d) Protective coating of complete machine

Apply protective wax AP585 to the following parts: cabin, front frame, rear frame, center articulation frame, hood, axles, hydraulic elements, tube connectors, plated parts, and spare parts without

anti-rust oil and made of anticorrosive materials such as stainless steel, copper, nickel and chrome.

(e) Drying

Dry the coated complete machine.

(f) Partial protection

- Wrap up the operation box with bubble film and tape. Place silica-gel desiccant in the package.
- Seal the electrical connectors with tape against water. Protect parts of cabin connectors by the same means.
- Wrap up the 4 lamps at the front and rear parts of cabin with polyethylene film.
- Wrap up the products to be stepped on with bubble film and tape.
- Wrap up the cylinder axis pin with sleeve. Fix the related parts with hose clamps.

3) Hand over at the port

Carry out inspection after the goods arrive at the port and before shipping. Accept the goods only after the following conditions are met.

- The overall paint is undamaged.
- The seals for the rearview mirror carton, attached accessories box and document box are intact and undamaged.
- The cabin doors and windows and the hood are closed and locked.
- The articulation fixing rod is locked.

4) Shipping

(a) Equipment shipping

- General cargo ship
  Carry out lifting according to the lifting nameplate. Wrap the steel rope at the lifting eye with wearable cloth to protect the paint there. Lift and lower the roller slowly to protect its structure against damage.
- Roll-on-roll-off ship
  For roll-on-roll-off ships, a platform or slope shall be used to connect the ship and wharf. The gradient of the platform or slope shall not exceed 35°. This is to avoid steering when driving up/down the slope. If steering is required, drive the machine back to the ground. After correcting the direction, drive it onto the slope.

(b) Equipment fixing

Fix the roller with solid pull rods. Wedge the front and rear drums with triangle timber blocks. Take other measures to fix the machine firmly . In addition, drain the engine water tank. Reserve some fuel for dispatch. Disconnect the circuit between the battery and the frame.

5) Oil level standard

See Table 4–1 for the oil level standards.

6) Key management

Complete the key hand over procedures. **See** Table 4–2 for the key list.

Maintenance

5.Maintenance

5.1 Maintenance Information

5.1.1 Introduction

Do not perform any maintenance and/or repairs not authorized in this Safety, Operation & Maintenance Manual or the Shop Manual for this machine. Always observe and follow all safety precautions and use the proper tools when performing any maintenance procedures.

5.1.2 Pre-maintenance Roller-Check

Observe and understand these points to ensure your safety:

- Read and understand the Safety section of this manual — including the Lockout/Tagout procedure — before proceeding with any inspection or maintenance procedures. See “Lockout/Tagout Procedures” on page 2-25.
- Do not perform any maintenance not authorized in this operator’s manual maintenance section for this machine. If unauthorized maintenance on this machine must be done, contact your SANY distributor before proceeding.
- Avoid working on the machine while the engine is running unless required to do so in the procedure. If the engine must remain running during a procedure, always have a person in the cabin who can correctly operate the machine and who is in clear contact with you at all times.
- Contact your SANY distributor if you are unable to perform the procedures listed in this manual or if additional procedures are required.
- Always use the proper tools when performing any maintenance procedures.
- Obtain the maintenance record for this machine before proceeding with any repair work.
- Always use the maintenance record for this machine to keep a daily record of the hour meter reading, then refer to it when determining your schedule of maintenance procedures.
- Always use genuine SANY parts, coolants and lubricants when maintaining this machine. Failure to do so may result in premature system or component failure.
- Always use clean “EP” (extreme pressure) grease when lubricating the machine. Avoid using low viscosity greases.
- If any access covers must be open when working on this machine, be sure those covers are properly supported.

5.1.3 Checks after Maintenance or Repairs

Always do the following after performing any maintenance to the machine.

With the machine running:

- Check for any leakage in the system you have serviced.
- Be sure there are no abnormal sounds coming from the engine or hydraulic system.

- Check for any loose or abnormal movement in the system you have repaired.
- Check for any overheating of the system you have serviced.

With the engine off:

- Be sure you have completed all the steps in the maintenance or repair of the machine.
- If necessary, have a coworker inspect your work for correct and proper completion.
- Be sure the covers are reinstalled, close tightly and latch securely in place after completion of maintenance. Be sure that any locks are properly latched for security.
- Always inventory your tools, parts used and nuts and bolts after completing maintenance to ensure that none of these items were left on or inside the machine. Failure to do so could result in unexpected failure or damage to the machine.
- If any hydraulic components have been replaced or removed, always bleed the air from the system before resuming and work operations. Be sure there are no leaks and the hoses or lines are not twisted and do not rub on any other components.
- Complete the maintenance record for this machine and return it to its permanent storage location.
- Follow the Lockout/Tagout procedure for returning the unit to service. **See** “Lockout/Tagout Procedures” on page 2-25

5.1.4 Notes on Maintenance

Read all applicable safety instructions when you service the roller.

The reliability of roller will be increased and the lifetime of essential components will be prolonged with thorough machine maintenance. The faults result from not observing the safety instructions will cause more effort than maintenance work.

During maintenance, you should:

- Completely clean the roller and engine before maintenance.
- Park the roller on level ground for maintenance.
- When carrying out maintenance work, shut down the engine.
- Depressurize the hydraulic lines before working on them.
- Cut off the battery power supply before working on the electrical parts.
- Collect the effluent lubricant, coolant and fuel to prevent contamination.

5.1.5 Notes on Fuel System

The service life of diesel engine mainly depends on the fuel purity. During maintenance, you should:

- Make sure the engine is free of dirt and water or the injection parts may be damaged.
- Never use a galvanized iron barrel to store fuel.
- Before drawing the fuel out from a barrel, store the barrel for a long time.
- Prevent the fuel suction pipe from churning the fuel barrel.
- Never draw the fuel out on the bottom of the barrel.
- The fuel left at the bottom of the barrel cann't be used by engine. It is used for cleaning.

5.1.6 Notes on Engine Performance

The rate between combustion air and fuel injection of the diesel engine has been carefully adjusted. Engine’s performance, temperature level and the quality of the exhaust gas are determined by that.

You should consult the service department of our company or engine manufacturer if the machine has to work with full load in the thin air (at high altitude).

5.1.7 Notes on Hydraulic System

Keep the hydraulic system from contaminating. Make sure no dirt or any other dirty substance enters the system, as even tiny particles may scratch the valve, make pumps to seize or block the throttle or guide hole, resulting in high repair cost.

- If the oil level is found to have dropped during the daily check, check all lines and hydraulic elements for leaks.
- Seal the external leakage at once. If necessary, inform the relevant after-sales service department for repair.
- Never leave the barrel containing hydraulic oil in the open air. The water may enter the barrel through the oil outlet because of weather changes.
- Use oil filling and filtering devices to refill hydraulic oil. This device is equipped with a filter that can filter the hydraulic oil and prolong the lifetime of the filter.
- Before removing the connector and oil tank cover, clean them and the surfaces around to prevent dirt from entering the system.
- Unless it is necessary, do not leave the oil filler of the hydraulic oil tank open. Otherwise, the dirt may enter the oil tank.

5.1.8 Torque Values

Always refer to this table if the tightening torque value is not listed or specified in the procedure.

Table 5–1 Torque table for T clamp

Bolts	Tightening torque value (N.m)	Location
T clamp φ86-φ95	8±2Nm	Cooling system assembly
T clamp φ54-φ67	8±2Nm	Cooling system assembly
T clamp φ140-φ149	8±2Nm	Air inlet and exhaust system assembly
T clamp φ90-φ114	8±2Nm	Air inlet and exhaust system assembly
Clamp φ20-φ32JB8870	8±2Nm	Hose of AC system

Table 5–2 Torque table for bolts or screws

Bolts or screws	Tightening torque value (N.m)	Location
Screw M10×30GB70.1 12.9	90±10Nm	Linkage disc seat
Screw M10×40GB70.1 12.9	75±5Nm	Crescent-shaped plate
Screw M12×30GB70.1 10.9	123±10Nm	Elastic leg
Screw M12×35GB70.1 12.9	150±10Nm	Coupling
Bolt M12×35GB5783 10.9	123±10Nm	Duplex pump
Screw M12×35GB70.1 12.9	123±10Nm	Damper
Screw M12×40GB70.1 12.9	150±10Nm	Vibration motor
Screw M16×40GB70.1 12.9	300±15Nm	Cover
Bolt M10×25GB5783	50±5Nm	Fan
Bolt M10×30GB5783	50±5Nm	Steer
Bolt M10×35GB5783 10.9	75±5Nm	Compressor bracket
Bolt M12×130 GB5782	90±10Nm	Elastic leg
Bolt M16×50GB5783 10.9	300±15Nm	Piston motor
Bolt M12×25GB5783	90±10Nm	Muffler bracke
Bolt M12×30GB5783 10.9	123±10Nm	Damper
Bolt M12×40GB5783	90±10Nm	Instrument console
Bolt M12×40GB5783 10.9	123±10Nm	Support plate
Bolt M12×70GB5782 10.9	123±10Nm	Radio
Bolt M16×1.5×55GB5786 10.9	314±15Nm	Seat of damper
Bolt M16×1.5×60GB5786 10.9	300±15Nm	End cover

Table 5–2 Torque table for bolts or screws (continue)

Bolts or screws	Tightening torque value (N.m)	Location
Bolt M16×1.5×60GB5786 10.9	314±15Nm	Travel support
Bolt M16×50GB5783 10.9	300±15Nm	Mounting seat
Bolt M16×70GB5782 10.9	300±15Nm	Bearing cover
Bolt M20×120GB5782 10.9	570±35Nm	Compressor
Bolt M20×130GB5782	410±30Nm	Bearing baffl
Bolt M20×160GB5782 10.9	570±35Nm	Cabin
Bolt M20×170GB5782 10.9	570±35Nm	Cabin
Bolt M20×2×80GB5785 10.9	640±35Nm	Bearing seat
Bolt M20×260GB5782	595±35Nm	Drive axle
Bolt M24×100GB5782 10.9	1030±70Nm	Side plate
Bolt M24×60GB5783 10.9	1096±50Nm	Side plate

5.2 Requirements on Use of Oil and Fluids

5.2.1 Introduction of Functional Oil & Fluids

Engine oil

Choose engine oil according to the function and type. Other engine oil meeting the required specifications also can be chosen.

As the viscosity of engine oil varies with the temperature, the local ambient temperature is extremely important for the selection of viscosity grade.

If the ambient temperature is occasionally lower than the applicable temperature limit (for example, using SAE 15W/40 engine oil at -15℃), only the engine cold start capability but not the engine will be affected.

The multi-grade oil does not require frequent oil change according to the temperature change. The synthetic oil is better since it can be used under higher temperature and it is more reliable.

The maximum allowable duration for the engine oil is 1 year. If the oil change intervals exceed 1 year, the oil shall be changed at least once a year.

The engine oil used by this machine shall be changed every 250 working hours. This change interval is only applicable for engine adopting diesel oil with sulfur content below 0.5% and in temperature above -10°C.

When the sulfur content is 0.5% - 1% or the temperature is below -10°C, the oil change interval should be shortened half. If the sulfur content is 1% - 1.5%, the engine oil shall contain TBN, 12 times more sulfur content, with the change interval shortened half.

Fuel

⚠ WARNING

Risk of death or personal injury!
Explosion could be caused if diesel is mixed with gasoline or alcohol, which could cause death or personal injury.
Do not mix diesel with gasoline, alcohol or mixture of gasoline and alcohol.

NOTICE

Risk of machine damage!
The water and impurities in the fuel system could cause serious damage to engine pump and nozzle.
Fuel quality should be controlled strictly.

Regular diesel oil meeting national and local emission standard is recommended.

The diesel oils below are permitted:

- GB252
- DINEN590
- BS 2869: A1 and A2
- ASTM D 975-78: 1-D and 2-D
- NATO Code F-54 and F-75

Refill the tank to avoid running out of oil. Otherwise, the lube filter and injection lines need to discharge.

Only commercially available diesel fuel can be used. Ensure that the sulfur content is less than 0.5% and no contamination when filling in. Higher sulfur content has negative effect on oil change intervals.

To avoid blocking caused by paraffin, only winter diesel fuel can be used in temperature below 5 ℃ . The mixture of diesel oil and proper additive can also be used.

Lubricant

Lubricant includes engine oil, gear oil, transmission oil, hydraulic oil, etc.

The proper viscosity grade is determined not only by the minimum outside temperature when the machine is started, but also by the maximum outside temperature while the machine is operated.

Parts that are continuously operated should use the oil with higher viscosity in order to maintain the highest possible oil film thickness.

Grease

Use lithium-based high pressured saponified grease.

Coolant

Antifreeze of organic acid technology (OAT) is adopted.

NOTICE
• Do not mix coolant with additives of different types. • The protective agent of cooling system must be disposed environmentally.

5.2.2 Oil & Fluids Selection

1. **General requirements**

1) SANY special oil and fluids are recommended.

2) Select oil and fluids with proper quality grade, technical specifications and viscosity as per latest standard of related authorities according to this manual.

3) Failing to use the oil and fluids according to this manual, machine performance may be affected and fault may be caused to relevant parts.

4) To ensure machine performance, oil and fluids of different brands should not be mixed; otherwise, sediments or layers may be caused, which lead to performance degradation or failure, even fault of machine and parts.

5) Disposal of oil and fluids should comply with local laws and regulations.

6) Viscosity selection

a. Ambient temperature

Ambient temperature refers to the air temperature surrounding the machine. Do check the local temperature and possible air temperature before selection.

Generally, viscosity selection is based on the higher temperature in the standard. When the machine starts, the max. allowable viscosity under ambient temperature could be selected. In extreme cold area, it's better to use parts heating system and oil and fluids of higher viscosity.

b. Viscosity grade

Proper viscosity depends on the min. ambient temperature, which is the temperature for machine startup and operation.

To determine proper viscosity grade under the min. Ambient temperature for startup and operation, refer to the "Min. Temp." In the following tables. To determine proper viscosity grade under the max. Ambient temperature for startup and operation, refer to the "Max. Temp." In the following tables. Unless specially specified, the max. Allowable viscosity grade under ambient temperature should be selected for machine startup.

For long-term operation, oil and fluids of higher viscosity should be selected for transmission and differential, so as to maintain the thickest film.

7) Oil and fluids used under low temperature.

a. Before start-up of the machine, ensure engine oil, transmission oil, hydraulic oil and other fluids are fully flowing. Take out the dipstick, check that the oil or fluid flows down the dipstick easily. Oil or fluid diluted by kerosene is prohibited.

b. If different oil or fluid is replaced under low temperature, the filter element should be replaced too. Otherwise, the filter element and housing will be solidified. Drain the oil and fluids in hydraulic cylinder and pipelines. After replacement, run the machine to circuit the oil and fluid.

c. Select proper viscosity according to this manual.

d. In case of change of temperature, change proper oil and fluids according to this manual.

2. **Requirements of oil and fluids**

Table 5–3 Engine Oil Under Different Ambient Temperature

Part/ System	**Type, quality grade & technical spec. of oil & fluids**	**Viscosity grade of oil & fluids**	**Ambient temp.** (℃)	
			Min. Temp	**Max. Temp.**
Engine crankcase	Diesel Engine Oil • API CI-4 • GB 11122	SAE 0W-20	-40	10
		SAE 0W-30	-40	30
		SAE 0W-40	-40	40
		SAE 5W-30	-30	30
		SAE 5W-40	-30	40
		SAE 10W-30	-20	40
		SAE 10W-40	-20	50
		SAE 15W-40	-15	50
Note	1. Unless specially specified, this machine adopts Diesel Engine Oil CI-4 15W-40 when delivery. It is specially used for SANY machine with applicable temperature of -15℃ to 50℃ . 2. For engine with emission of China II or Euro II standard for off-road machine, API CH-4 or lubricant of higher grade should be used. 3. For engine with emission of China III or Euro III standard for off-road machine, API CH-4 or lubricant of higher grade should be used. 4. For engine with emission of Euro IV standard for off-road machine, API CJ-4 or lubricant of higher grade should be used.			

Table 5–4 Gear Oil Under Different Ambient Temperature

Part/System	Type, quality grade & technical spec. of oil & fluids	Viscosity grade of oil & fluids	Ambient temp. (℃)	
			Min. Temp	Max. Temp.
Transfer case/ Reducer	Industrial Enclosed Gear Oil (mineral oil) • DIN 51517 Part 3-group CLP • ISO 12925-1 CKD • AIST 224 • AGMA 9005-E02:EP • GB 5903	150	-10	40
		220	-5	50
	Industrial Enclosed Gear Oil (PAO) • DIN 51517 Part 3=>group CLP • NF-ISO 6743-6 Category CKD • AIST 224 • AGMA 9005-E02 • GB 5903	150	-40	50
		220	-40	50
Note	1. Unless specially specified, this machine adopts Industrial Enclosed Gear Oil L-CKD 220 when delivery. It is specially used for SANY machine with applicable temperature of -10 ℃ to 50℃ .			

Table 5–5 Automotive Gear Oil Under Different Ambient Temperature

Part/ System	Type, quality grade & technical spec. of oil & fluids	Viscosity grade of oil & fluids	Ambient temp. (℃)	
			Min. Temp	Max. Temp.
Rear axle	Heavy-duty Automotive Gear Oil • API GL-5 • GB 13895	SAE 75W-90	-40	30
		SAE 80W-90	-20	40
		SAE 85W-90	-15	40
		SAE 85W-140	-10	50
		SAE 90	0	40
Note	1. Unless specially specified, this machine adopts Heavy-duty Automotive Gear Oil GL-5 80W-90 when delivery. It is specially used for SANY machine with applicable temperature of -10 ℃ to 50℃ .			

Table 5–6 Hydraulic Oil Under Different Ambient Temperature

Part/System	Type, quality grade & technical spec. of oil & fluids	Viscosity grade of oil & fluids	Ambient temp. (℃)	
			Min. Temp	Max. Temp.
Hydraulic system	Normal Temperature Hydraulic Oil HM / L-HM Anti-wear Hydraulic Oil • AFNOR NF E 48-603 HM • ISO 11158 L-HM • CINCINNATI P68、P69、P70 • EATON-VICKERS M-2950 S、I-286 S • PARKER-DENISON HF-0、HF-1、HF-2 • Q/SH303 0550 • GB 11118.1	32	-20	5
		46	-20	10
		68	-15	50
	Wide-temperature Hydraulic Oil HV / L-HV Low-temperature Hydraulic Oil • AFNOR NF E-48-603 HV • ISO 67434/4 HV • DIN 51524 P3 HVLP • CINCINNATI P68、P69、P70 • EATON(VICKERS) M-2950S、I-286 S	32	-30	10
		46	-30	15
		68	-25	50

Table 5–6 Hydraulic Oil Under Different Ambient Temperature (continue)

Part/System	Type, quality grade & technical spec. of oil & fluids	Viscosity grade of oil & fluids	Ambient temp. (℃)	
			Min. Temp	Max. Temp.
	• Q/SH303 0661 • GB 11118.1			
	Aircraft hydraulic oil • SH 0358 • Q/SH PRD0476	10#	-40	5
Note	1. Unless specially specified, this machine adopts Normal Temperature Hydraulic Oil HM 68/L-HM Anti-wear Hydraulic Oil when delivery. It is specially used for SANY machine with applicable temperature of -15 ℃ to 50℃ .			

Table 5–7 Grease Under Different Ambient Temperature

Part/ System	Type, quality grade & technical spec. of oil & fluids	Speed with load	NLGI grade	Ambient temp. (℃)	
				Min. Temp	Max. Temp.
Motor spline	EP Lithium-based Lubricating Grease • ISO 6743-9: L-XBCEB 2 • DIN 51502: KP2K-25 • SH/T 0587	/	2	-25	50
	EP Lithium-based Lubricating Grease • ISO 6743-9: L-XBCEB 3 • DIN 51502: KP1K-20 • SH/T 0587		3	-20	50
Travelling bearings/ articulated frame	EP Lithium-based Lubricating Grease • ISO 6743-9: L-XBCEB 1 • DIN 51502: KP1K-30	High	1	-30	40
	EP Lithium-based Lubricating Grease • ISO 6743-9: L-XBCEB 2 • DIN 51502: KP1K-25 • GB/T 7323	High	2	-25	50
		Mid	2	-20	40
		Low	2	-25	40

Table 5–7 Grease Under Different Ambient Temperature (continue)

Part/ System	Type, quality grade & technical spec. of oil & fluids	Speed with load	NLGI grade	Ambient temp. (℃)	
				Min. Temp	Max. Temp.
	Tank Lithium-based Lubricating Grease GJB 4364	/	2	-50	50
Note	1. Unless specially specified, this machine adopts the following fluid. a. Motor spline: EP Lithium-based Lubricating Grease 3# With Molybdenum Disulfie. It is speciallyused for SANY machine with applicable temperature of -20℃ to 50℃ . b. Centralized lubricating device and guide device: Extreme Pressure Lithium-based Lubricating Grease 2#. It is specially used for SANY machine with applicable temperature of -25℃ to 50℃ .				

Table 5–8 Coolant Under Different Ambient Temperature

Part/System	Type, quality grade & technical spec. of oil & fluids	Viscosity grade of oil & fluids	Ambient temp. (℃)	
			Min. Temp	Max. Temp.
Cooling system (Engine radiator)	Antifreeze • OAT • GB 29743	-35	-30	50
		-45	-40	50
Note	1. Unless specially specified, this machine adopts Antifreeze OAT -45 when delivery. It is specially used for SANY machine with applicable temperature of -40℃ to 50℃ .			

Table 5–9 Diesel Oil Under Different Ambient Temperature

Part/System	Type, quality grade & technical spec. of oil & fluids	Grade of oil (as per condensation point)	Ambient temp. (℃)	
			Min. Temp	Max. Temp.
Fuel system (Diesel engine)	Regular diesel oil GB 252	Diesel Oil 5#	8	50
		Diesel Oil 0#	4	50
		Diesel Oil -10#	-5	50
		Diesel Oil -20#	-14	50
		Diesel Oil -35#	-29	50
		Diesel Oil -50#	-44	50
Note	1. Unless specially specified, this machine adopts Diesel Oil 0# when delivery. 2. Regular diesel oil meeting national and local emission standard is recommended.			

5.2.3 Filling Capacities

Table 5–10 Oil & Fluids Filling Capacities

Part/System	Type, quality grade & technical spec. of oil & fluids	Dosage (L)
Fuel tank	Diesel oil 0#	about 300
Reducer	Industrial enclosed gear oil L-CKD 220	about 3.5
Diesel engine crankcase	Diesel engine oil CI-4 15W-40	about 20
Vibratory drum		about 10
Rear axle	Heavy-duty vehicle gear oil GL-5 85W-140	about 20
Travelling earings/ articulated frame	EP lithium-based lubricating grease 2#	about 3
Hydraulic oil tank	Normal temperature hydraulic oil HM 68	about 150
Water tank of diesel engine	Antifreeze OAT -45	about 40
Note	1. Without special requirements, above liquids are used for this equipment; 2. Proper liquid types should be selected according to different environment temperature	

5.3 Test Run Instructions

The maintenance below must be applied for the new machine or overhauled engine.

Check the engine oil level twice a day after every 250 working hours.

According to the load, the engine oil consumption become normal after running for 100-250 h.

After running for 250h, you should do as follows:

- Check the engine for leaks.
- Tighten bolts on the intake/exhaust pipes, oil sump and engine base.
- Tighten the screws on the machine.
- Change the oil for drum vibration bearing.
- Change the engine oil. Change the engine oil filter.
- Change engine fuel filter and fuel-water separator filter element.

After running for 500h, you should do as follows:

- Change the oil for drum vibrating bearing.
- Change main element and safety element of air filter.
- Add lubricant for propel bearing and center articulation frame.
- Check the condition of key welding parts, power train parts and damping block. In case of any damage, repair, adjust or change them.
- Replace the lubricant in vibratory drum reducer.

5.4 Maintenance Schedule

5.4.1 Introduction

- The technical maintenance for the roller is divided into three kinds, namely routine maintenance, regular maintenance and one-off maintenance (troubleshooting).
- The intervals regulated in regular technical maintenance are the same with those specified in the Engine User's Guide.
- The engine shall be maintained in accordance with the Engine User's Guide.

5.4.2 Roller Maintenance Locations

The following view is a general guide for service or maintenance locations on the roller.

NOTICE
Risk of machine damage! Failure to perform the outlined maintenance listed in this maintenance section could result in shortened service life of the machine or a system failure during operation. Strictly maintain the machine under the guidance of this manual.

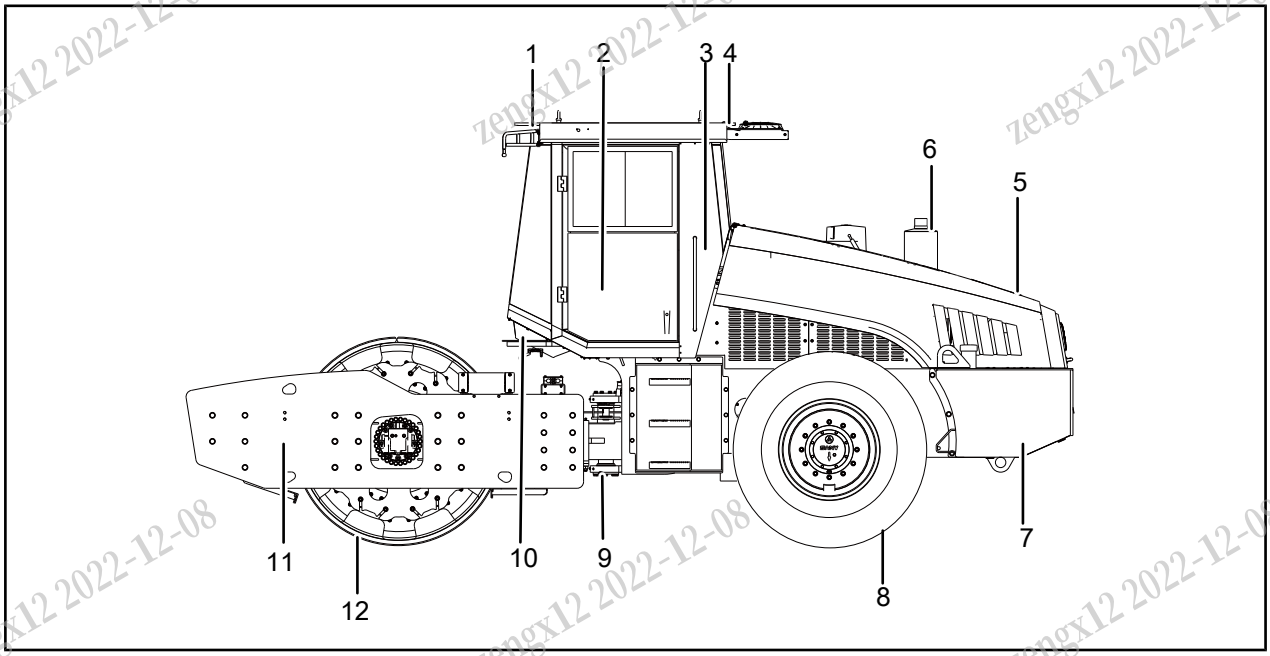


Fig 5-1

1. Cab	4. Electrical system	7. Rear frame	10.Hydraulic system
2. Control system	5. Hood	8. Rear axle assembly	11.Front frame
3. Air conditioning system	6. Power system	9. Central articulation frame	12.Vibratory drum

5.4.3 Routine Maintenance

NOTE：

The time for regular maintenance is calculated from the engine start. Every time after 1000 h regular maintenance, the roller enters into the next new cycle of regular maintenance.

Prior to any maintenance, confirm the following items:

- Place the machine on even ground, shut down the engine, and remove the iginition switch key.
- Apply the parking brake switch.
- Ensure all components of the roller cool down.
- Prepare proper container.

NOTE：

Only when the engine' running is required during lubrication and maintenance, can the engine keep running.

1. Clean the roller.

- Remove the mud, sands and gravels on the roller.
- Remove the sands and mud on the engine and hydraulic elements.
- Remove the sands on the tires.
- Keep all oil fillers clean.

NOTE：

Do not use corrosive detergent for cleaning. Non-fiber cloth is recommended.

2. Check the parts for tightness

Check the connection bolts and pipe clamps for looseness and breakage. Tighten or replace the loose or broken bolts and pipe clamps.

3. Check for oil leakage

- Check under and around all sides of the roller.
- Check the pump, motor, multi-way valve, valve body, hose, flange and other connections for leakage.
- Check the engine for leakage.
- Check the muffler line for leakage.
- Check the A/C lines for leakage.

4. Check electric circuit

- Frequently check the harness connectors for water and oil. Keep them clean.
- Check the connectors and nuts at lamps, sensors, horn and brake pressure switch for looseness.
- Check the harness for short circuit, open circuit and damage. Keep the harness in good condition.
- Check the wiring in electric control cabinet for looseness.

5. Check key welding parts/power train parts

- Check welding parts of the frame and the drum for crack. If any, weld or repair them.
- Check power train parts for deformation.
- If you shall perform welding work on the machine, pay attention to protection and treatment of painting, electrical cables or hydraulic hoses. If the parts to be welded is close to the fuel tank, be careful of catching fire.

6. Check oil and water level

- Check the level of lubricant, fuel and hydraulic oil. Fill new fuel/oil up to the specified mark.
- Check the water level in combined radiator, and fill water to the required volume.

7. Check light

Check whether the forward working light, steering light and other lights are on, whether there is dirt or damage.

8. Check Horn

Check the function of the horn, be sure it is operational.

9. Check operating functions

Check that all functions in the operating cabin work correctly.

10. Check vibratory drum

Check the connection of the hydraulic hoses on the motor and the reducer for the vibratory drum, and ensure that they are in good condition.

5.4.4 Long-time Stored Engine-Maintain

If the engine will not be used for a long time, we recommend to store the engine according to the following procedures to prevent corrosion.

1. Clean the engine including the cooling system with cold detergent and water gun, or best of all, steam.
2. Run the engine until the moisture on the surface is evaporated .
3. Drain the warm engine oil and fill anticorrosion oil.
4. Drain the coolant and fill antifreeze and coolant.
5. Drain the fuel in the fuel tank, mix it with anti-corrosion oil at a ratio of 10:1 and then fill the mixed fuel into the tank again.
6. Run the engine for 10 minutes till the anticorrosion mixed diesel enters all pipelines, filters, pumps and nozzles and the new engine oil is distributed to all parts.
7. Turn the engine crankshaft (the engine not started) for several times to make the anti-corrosion mixed fuel injected into the combustion chamber.
8. Remove belts, spray anti-rust oil into the belt pulley oil groove and loosen the belts of alternator, cooling fan and A/C compressor. Clear away all anti-rust oil before restarting the engine.
9. Seal the air filter inlet and engine exhaust port. Reopen the inlet and exhaust port before restarting the engine.

5.4.5 Short-time Storage of Machine

If the roller storage time is less than 3 months, **see** “Park Brake” on page 4-18.

5.4.6 Long-time Stored Roller-Maintain

If the roller is to be stored for 3 months or even longer, maintain it in accordance with the following instructions:

- Perform the maintenance for long-time storage and rust-proof treatment in accordance with the Engine User’s Guide.

- Clean the inner and outer surfaces of the roller. Park it in the garage if available or at a ventilated place in the open air and cover it with canvas.
- Block up the front and rear frames in parallel. Adjust the adjusting pads until the damp blocks are not under stress. Connect and fix the front and rear frames with the limit plate.
- Lubricate the roller through each lubricating point.
- Clean the surface of vibratory drum. Wipe it with a piece of cloth and then coat some anti-rust paint. Apply anti-rust oil on the exposed machined parts of vibratory drum.
- Remove the storage battery and check the electrolyte level. Charge the battery once a month.
- Seal the air filter, dust port and exhaust pipe outlet with plastic or paper tape to keep the engine free of moist air.
- Fill up the fuel tank to avoid condensation and rust.
- Fill the hydraulic oil tank up to the mark “Max”.
- Turn on/off the A/C for about 10 minutes monthly.
- Turn on/off the heating system for about 10 minutes monthly.

5.4.7 Post-maintenance Roller-Check

Always do the following after performing any maintenance to the machine.

With the machine running:

- Check for any leakage in the system you have serviced.
- Be sure there are no abnormal sounds coming from the engine or hydraulic system.
- Check for any loose or abnormal movement in the system you have repaired.
- Check for any overheating of the system you have serviced.

With the engine off:

- Be sure you have completed all the steps in the maintenance or repair of the machine.
- If necessary, have a coworker inspect your work for correct and proper completion.
- Be sure the covers are reinstalled, close tightly and latch securely in place after completion of maintenance. Be sure that any locks are properly latched for security.
- Always inventory your tools, parts used and nuts and bolts after completing maintenance to ensure that none of these items were left on or inside the machine. Failure to do so could result in unexpected failure or damage to the machine.
- If any hydraulic components have been replaced or removed, always bleed the air from the system before resuming and work operations. Be sure there are no leaks and the hoses or lines are not twisted and do not rub on any other components.
- Complete the maintenance record for this machine and return it to its permanent storage location.
- Follow the Lockout/Tagout procedure for returning the unit to service. **See** “Lockout/Tagout Procedures” on page 2-25.

5.4.8 Roller in Freezing Condition-Check

NOTICE

In cold weather, always drain the water from water spraying system and add antifreeze. Failure to do so may cause damage to the water spraying system. Pay attention to water pump, solenoid and filter which are easily damaged due to frost.

- Dismount the water suction pipe before the filter in the water spraying system drain the water.
- Reconnect the water suction pipe properly.
- Add antifreezing coolant.
- Start the water spraying system to spray water until the antifreezing coolant is sprayed from the nozzle.
- After the ice period, drain the antifreezing coolant and dispose it in an environment- friendly way.

5.4.9 Roller in Adverse Work Conditions-Check

If the machine will be operating under dusty or adverse conditions, always do as follows:

- Clean the radiator and oil cooler core to avoid any clogging.
- Clean or replace the fuel filters and air filters more frequently than recommended later in this section.
- Check and clean any electrical components to avoid any accumulated corrosion.
- Check and clean any areas where extreme heat is present, such as the exhaust system, manifold and turbocharger.

5.4.10 Regular Technical Maintenance Intervals

Before the next maintenance interval, finish all maintenance items for the current maintenance interval.

Table 5–11 Regular Technical Maintenance

Working Hours	Maintenance Items	Link
When require	Install/check battery	**See** “Battery-Maintain” on page 5-57
	Replace fuse	**See** “Fuse-Replace” on page 5-59
	Fill washing fluid	**See** “Windshield Washer Fluid–Check/Fill” on page 5-60
	Replace compressor V-belt	**See** “Compressor V- belt-Check/Replace” on page 5-55
	Maintain long-time storage.	**See** “Long-time Stored Roller-Maintain” on page 5-19

Table 5–11 Regular Technical Maintenance (continue)

Working Hours	Maintenance Items	Link
	Maintain long-time storage.	**See** “Long-time Stored Engine-Maintain” on page 5-19
	Check the machine after works in adverse condition.	**See** “Roller in Adverse Work Conditions-Check” on page 5-21
	Check the machine in freezing condition.	**See** “Roller in Freezing Condition-Check” on page 5-21
Every day	Check the machine before maintenance.	**See** “Pre-maintenance Roller-Check” on page 5-3
	Check the machine after maintenance	**See** “Post-maintenance Roller-Check” on page 5-20
	Check/clean air filter	**See** “Air Filter–Clean/Replace” on page 5-25
	Check engine air intake pipeline	**See** “Engine Air Intake Pipeline-Check” on page 5-42
	Check engine oil level	**See** “Engine Oil-Check/Refill/Change” on page 5-29
	Check engine coolant level	**See** “Engine Coolant-Check/Change” on page 5-38
	Check engine belt	**See** “Engine Belt-Check/Replace” on page 5-40
	Check A/C system	**See** “A/C-Check/Maintain” on page 5-52
	Check hydraulic oil level	**See** “Hydraulic Oil-Check/Refill/Change” on page 5-48
	Check fuel level	**See** “Fuel-Check/Refill/Replace” on page 5-42
	Check electric box	**See** “Electric Box-Maintain” on page 5-58
	Check crankcase vent line	**See** “Crankcase Vent Line-Check” on page 5-47
	Check oil tank and pipes	**See** “Oil tank and Pipes–Check” on page 5-47
	Check damper	**See** “Damper-Check/Replace” on page 5-63
	Check tires and rims	**See** “Tires and Rims-Check” on page 5-67
Every 50 working hours	Change engine oil	**See** “Engine Oil-Check/Refill/Change” on page 5-29
	Change rear axle lubricant	**See** “Lubricant for Rear Axle-Change” on page 5-65
	Change reducer lubricant	**See** “Lubricant for Reducer-Change” on page 5-64

Table 5–11 Regular Technical Maintenance (continue)

Working Hours	Maintenance Items	Link
	Change drum vibration bearing lubricant	**See** “Lubricant for Drum Vibration -Change” on page 5-66
	Check tension of engine belt	**See** “Engine Belt-Check/Replace” on page 5-40
	Check tension of compressor V-belt	**See** “Compressor V- belt-Check/Replace” on page 5-55
	Check and clean radiator	**See** “Radiator-Check/Clean” on page 5-37
Every 250 working hours	Change engine oil	**See** “Engine Oil-Check/Refill/Change” on page 5-29
	Change rear axle lubricant	**See** “Lubricant for Rear Axle-Change” on page 5-65
	Change reducer lubricant	**See** “Lubricant for Reducer-Change” on page 5-64
	Change drum vibration bearing lubricant	**See** “Lubricant for Drum Vibration -Change” on page 5-66
	Replace engine oil filter element	**See** “Engine Oil Filter Element-Replace” on page 5-32
	Replace fuel filter	**See** “Fuel Filter-Replace” on page 5-46
	Replace oil water separator	**See** “Oil Water Separator– Check/Drain/ Replace” on page 5-33
	Check engine belt, replace it if necessary	**See** “Engine Belt-Check/Replace” on page 5-40
	Check compressor V-belt, replace it if necessary replace it	**See** “Compressor V- belt-Check/Replace” on page 5-55
	Check and clean radiator	**See** “Radiator-Check/Clean” on page 5-37
Every 500 working hours	Change engine oil	**See** “Engine Oil-Check/Refill/Change” on page 5-29
	Change reducer lubricant	**See** “Lubricant for Reducer-Change” on page 5-64
	Replace engine oil filter element	**See** “Engine Oil Filter Element-Replace” on page 5-32
	Replace fuel filter	**See** “Fuel Filter-Replace” on page 5-46
	Replace oil water separator	**See** “Oil Water Separator– Check/Drain/ Replace” on page 5-33
	Check central articulation frame and change lubricant	**See** “Grease for Central Articulation Frame-Fill” on page 5-62

Table 5–11 Regular Technical Maintenance (continue)

Working Hours	Maintenance Items	Link
	Check propel bearing and change lubricant	**See** “Grease for Propel Bearing-Fill” on page 5-61
	Check engine belt, replace it if necessary	**See** “Engine Belt-Check/Replace” on page 5-40
	Check compressor V-belt, replace it if necessary replace it	**See** “Compressor V- belt-Check/Replace” on page 5-55
	Check damper, replace it if necessary	**See** “Damper-Check/Replace” on page 5-63
	Check and clean radiator	**See** “Radiator-Check/Clean” on page 5-37
Every 750 working hours	Check central articulation frame and change lubricant	**See** “Grease for Central Articulation Frame-Fill” on page 5-62
	Check propel bearing and change lubricant	**See** “Grease for Propel Bearing-Fill” on page 5-61
	Check engine belt, replace it if necessary	**See** “Engine Belt-Check/Replace” on page 5-40
	Check compressor V-belt, replace it if necessary replace it	**See** “Compressor V- belt-Check/Replace” on page 5-55
	Check damper, replace it if necessary	**See** “Damper-Check/Replace” on page 5-63
	Check and clean radiator	**See** “Radiator-Check/Clean” on page 5-37
Every 1000 working hours	Change hydraulic oil	**See** “Hydraulic Oil-Check/Refill/Change” on page 5-48
	Change hydraulic oil filter	**See** “Hydraulic Oil Filter-Replace” on page 5-51
	Replace coolant	**See** “Engine Coolant-Check/Change” on page 5-38
	Check A/C system, clean or replace it if necessary	**See** “A/C-Check/Maintain” on page 5-52
	Check and clean radiator	**See** “Radiator-Check/Clean” on page 5-37
Every year	Replace engine oil	**See** “Engine Oil-Check/Refill/Change” on page 5-29
	Check/clean air filter	**See** “Air Filter–Clean/Replace” on page 5-25
	Replace coolant	**See** “Engine Coolant-Check/Change” on page 5-38

5.5 Maintenance Procedures

5.5.1 Air Filter–Clean/Replace

Air filter–clean

NOTICE

Risk of machine damage!
Dust is drawn into the engine. And this could badly shorten the service life of the engine.
Never start the engine after the air filter is removed.

NOTICE

Risk of machine damage!
Clean the filter element with gasoline or hot liquid could cause damage to the air filter.
Never clean the filter element with gasoline or hot liquid. After cleaning, check the filter element for damage with a pocket lamp. Replace the filter element if its paper dusting ball or seal lip is damaged.

1. Open the covering parts.

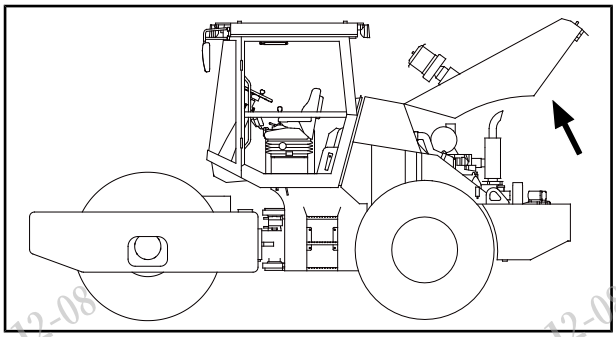


Fig 5-2

2. Remove the end cover of the air filter.

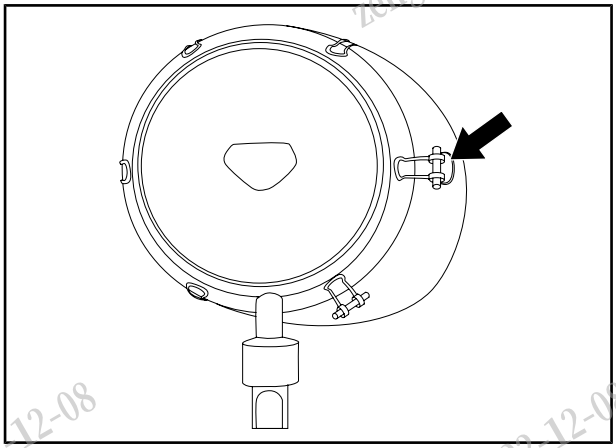


Fig 5-3

3. Clean the end cover and the dust evacuator.

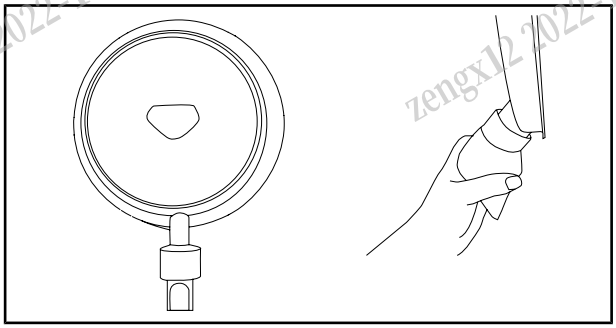


Fig 5-4

Air filter–replace

NOTICE

Risk of engine damage!
Cleaning 3 times or blackening of the main filter element turns black could be harmful to engine.
Replace the main filter element with a new one.

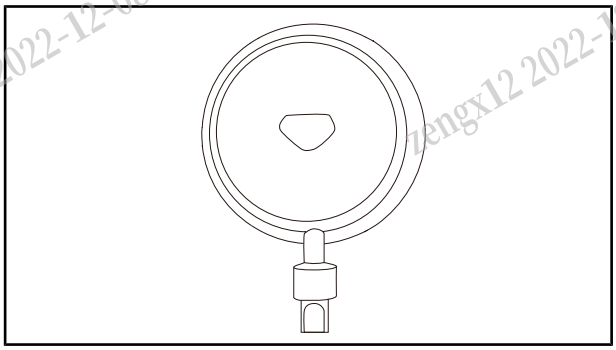


Fig 5-5

When the engine is in operation, if the air filter warning lamp flashes, you should maintain the air filter.

Take the following steps to maintain the air filter.

1. Open the covering parts.
2. Take off the cover of the air filter.

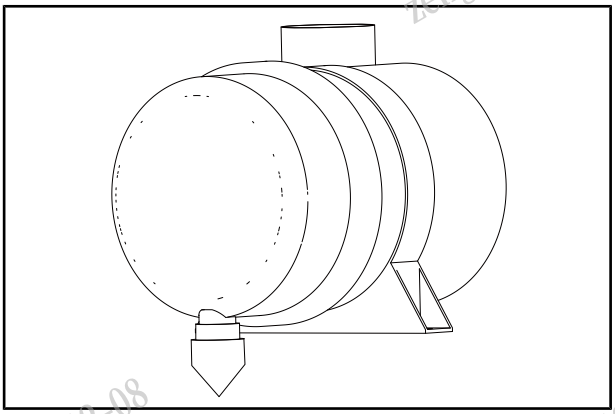


Fig 5-6

3. Clean the end cover and the dust valve.

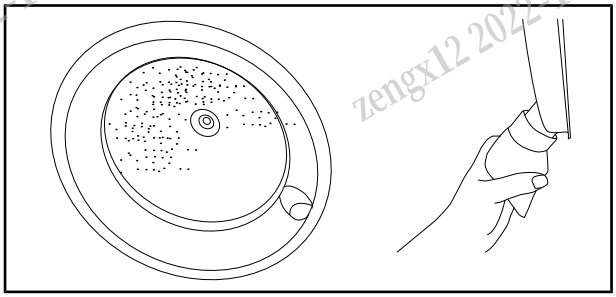


Fig 5-7

4. Carefully pull the dirty air filter main element out of the air filter housing, then discard the dirty air filter main element properly. Pull the main filter element out of the housing carefully to avoid contact between the filter elements and the housing.

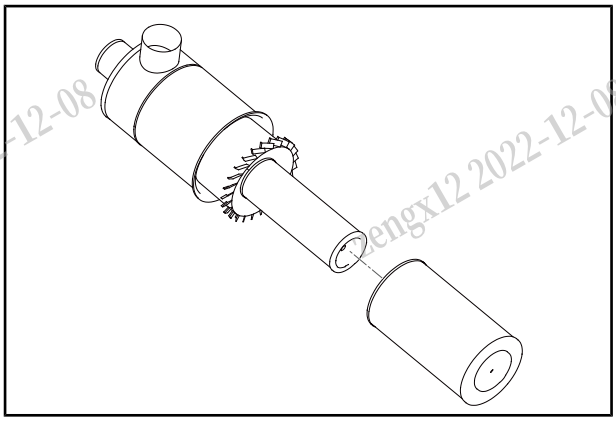


Fig 5-8

NOTE :

The main filter is installed on the air intake port for sealing the interior filter cover. Take off the element with care to reduce released dust. If the air filter element is dirty or looks abnormal, it is at the end of its service life. Replace the element with a new one. If the air filter main element shows no signs of excess dirt accumulation or if no abnormalities are found, leave air filter main element in place. The safety element will be replaced with the main element together.

5. Check the used main filter element. The main filter element used can display foreign particles causing leakage on the sealing surface. The linear dust on the air side of the filter may leak. Clear the items before fixing a new filter.

NOTICE
Risk of machine damage! Clean the filter element by knocking and tapping could cause damage to filter paper. Clean the filter element by dry compressed air (pressure less than 0.5 Mpa) when the air filter alarm sounds.

6. Use dry compressed air (pressure less than 0.5 Mpa) to blow along the inside of the pleats toward the main filter element, and then direct the compressed air along the outside of the pleats to blow from interior to exterior. The safety filter element is not allowed to be cleaned.

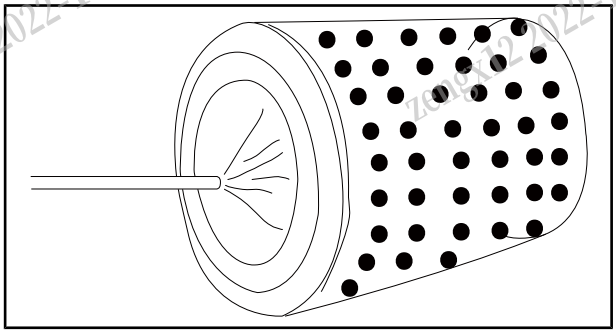


Fig 5-9

7. It's advised to change the main filter element if it has been cleaned for three times. Meanwhile the safety filter element should be changed as well.

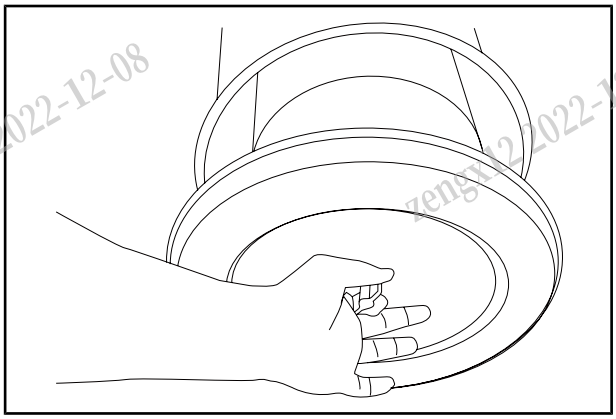


Fig 5-10

8. If the main filter element is damaged, the main filter element and safety element must be replaced regardless the cleaning times is three or not.

9. Reinstall the air filter.

NOTICE

Risk of machine damage!
Never install a damaged filter element, otherwise it could lead to engine fault and shorten service life of the engine.
Inspect the filter carefully and install a filter element in good shape.

1) Insert the filter element. See in right figure. Check the filter element, especially inside face of opening for damage due to transportation, clean and improper hold.

2) Install the front housing cover and tighten the mounting clamps. The dust evacuator is vertically downwards.

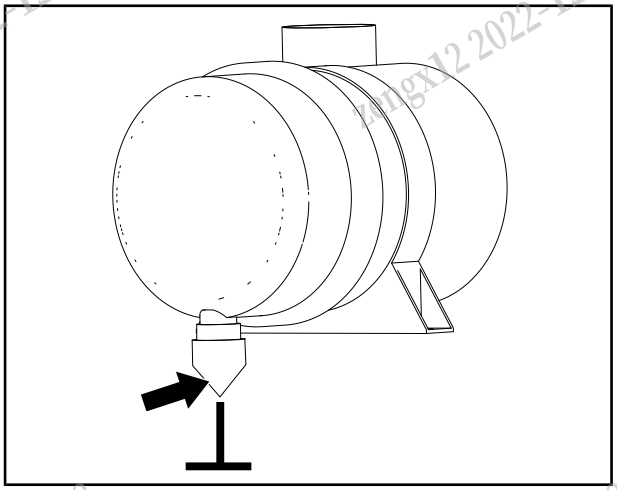


Fig 5-11

NOTE :

In harsh environment with high intensity of dust , shorten the maintenance and change interval.

It is recommended to inform SANY service personnel of maintaining air filter. Customer is responsible for any consequences caused by his own wrong maintenance for air filter.

5.5.2 Engine Oil-Check/Refill/Change

Engine oil-check/refill

⚠ CAUTION

Risk of personal injury!
If you drain the engine oil when the engine has just been shut down and the engine oil is still hot, you could be burned by the hot engine oil.
Draining the engine oil after the oil gets cold.

Take the following steps to check the engine oil level :

1. Take out oil dipstick (1) and wipe the oil off the dipstick with clean cloth.

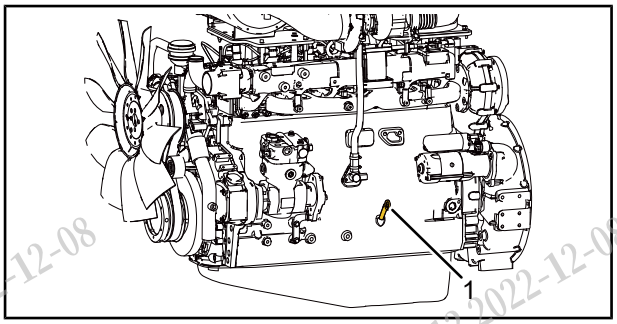


Fig 5-12

1. Oil dipstick

2. Insert the oil dipstick (1) to bottom and then pull it out.

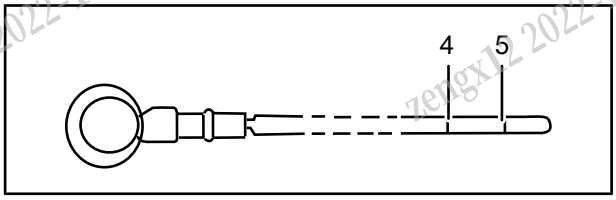


Fig 5-13

4. MAX mark 5. MIN mark

3. Oil level should be between the MAX mark (4) and MIN mark (5) on dipstick. Add appointed engine oil through filler (2) if oil level is below the MIN mark (5).

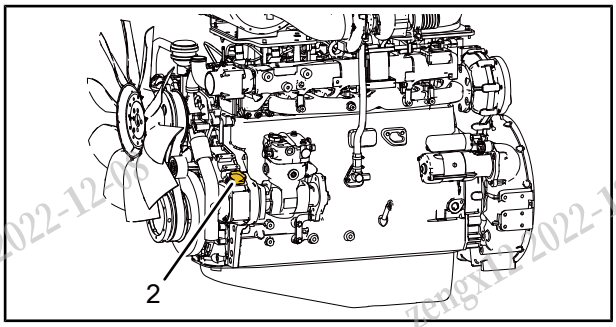


Fig 5-14

2. Filler

4. If oil level is above MAX mark (4), open the plug of oil outlet (3) to drain extra engine oil. Check oil level again.

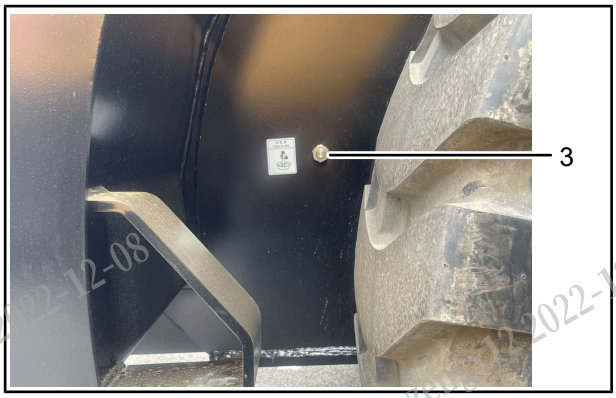


Fig 5-15

3. Oil outlet

Engine Oil-change

⚠ CAUTION

Risk of personal injury!
The hot engine oil could lead to scald if it contacts with skin.
Avoid the engine oil contacting your skin.

NOTICE

Risk of machine damage!
If the engine is turned on while the oil is being drained, the engine could suffer serious damage.
Never start the engine when draining the engine oil.

1. Place the machine on even ground.

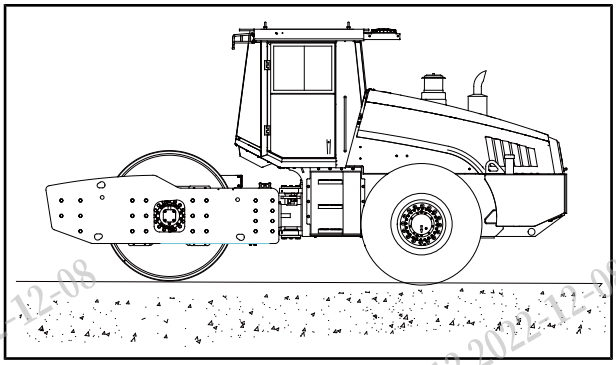


Fig 5-16

2. Start the engine and warm up for a while. Then switch the ignition switch to the "0" position to stop the engine.

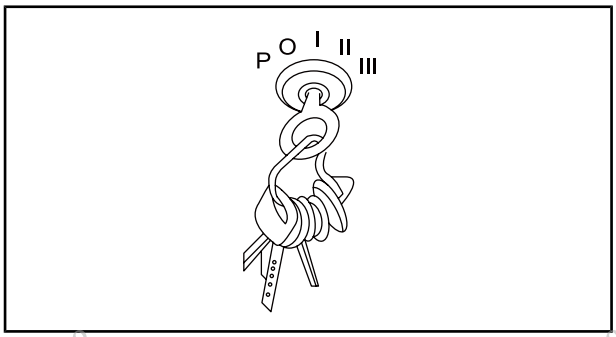


Fig 5-17

3. Put the oil receiving vessel below the tail end of the oil drain pipe at the right side of the complete machine.

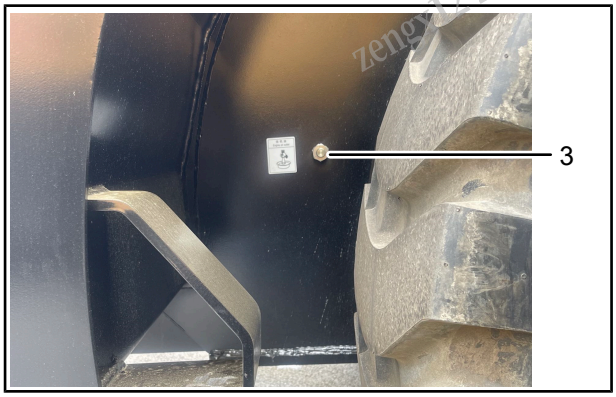


Fig 5-18

3. Oil outlet

4. Unscrew the plug at the oil outlet (3).

5. Discharge the engine oil .

6. Screw the plug back. Then fill the appointed (**see** “Filling Capacities” on page 5-15) engine oil through the inlet (2).

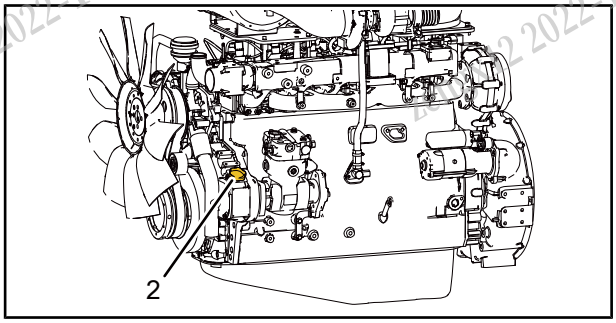


Fig 5-19

2. Inlet

7. Start the engine and check the plug for leakage. If leakage appears, screw the plug again.

8. Shut down the engine. Wait until the engine cools down, then check the engine oil level.

5.5.3 Engine Oil Filter Element-Replace

⚠ CAUTION

Risk of personal injury!
The hot engine oil could badly burn you if it spills onto your skin .
Wait until the engine cools down before maintenance and use protective equipment to protect yourself from the engine oil.

NOTICE

Risk of machine damage!
If you start the engine when the engine oil filter is removed, the engine oil will flow from the pipeline and make the engine lack of lubrication.
Never start the engine when the engine oil filter element is removed.

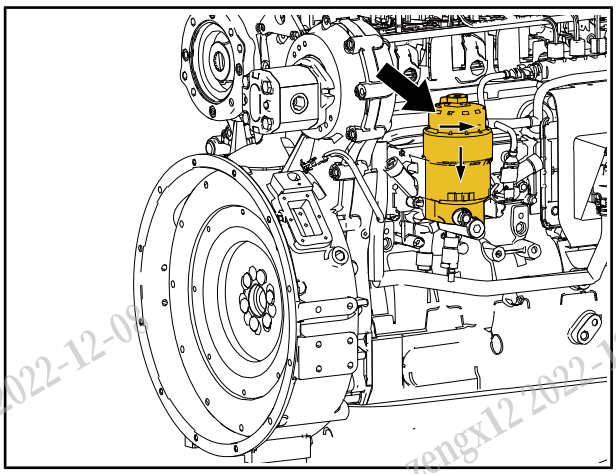


Fig 5-20

1. Thoroughly clean the outside of the filter.

2. Use a proper tool (belt spanner)to clamp the filter element.

3. Remove the filter element.

4. Clean the sealing on the filter carrier from any dirt.

5. Slightly oil the rubber seal on the new filter.

6. Screw up the new filter element by hand until the seal contacts.

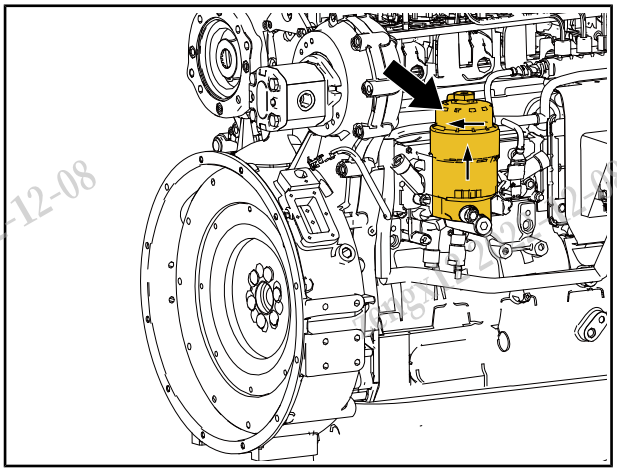


Fig 5-21

7. Tighten the filter element for another half turn.

8. Check the filter element for leak.

5.5.4 Oil Water Separator–Check/Drain/Replace

The oil water separator–check/drain

⚠ WARNING

Risk of death or personal injury!
Fire could be caught when working on the fuel system with open fire, which could result in death or personal injury.
When working on the fuel system, do not use open fire, smoke or spill any fuel.

Take the following steps to check the oil water separator.

1. Open the hood (6).

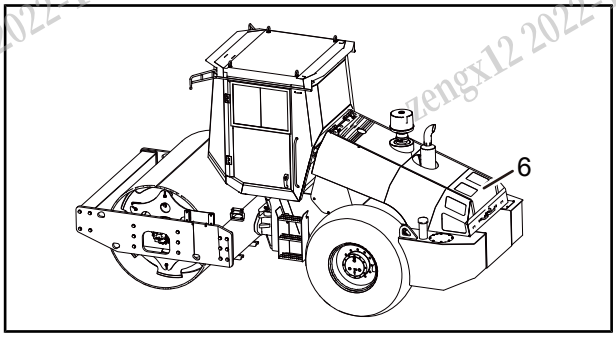


Fig 5-22

6. Hood

2. The oil water separator (7) is on the left side of the roller. Through transparent cover (8) you can observe water level and volume of sediment. In case of water or sediment built up at bottom, place a vessel under drain hoses (10) to receive drainage.

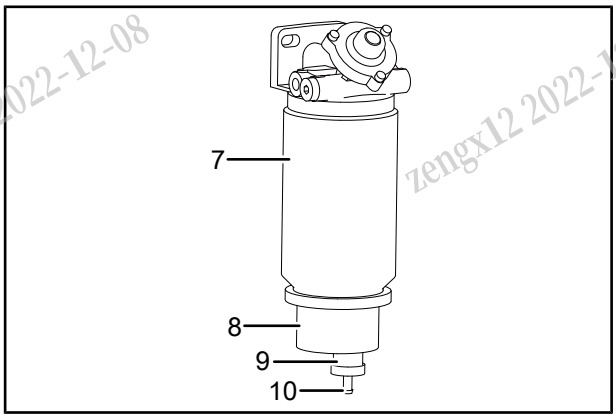


Fig 5-23

7. Oil water separator
8. Transparent cover
9. Drain valves
10. Drain hoses

3. Open drain valves (9) to discharge water.

4. When fuel is seen coming out of the drain hoses, close the drain valves immediately.

Besides, check the hoses and pipe connector for looseness to avoid the air going into the pipeline.

The oil water separator–replace

⚠ WARNING

Risk of death or personal injury!
Open fire and smoke could cause fire when working on the fuel system, which could result in death or personal injury
When working on the fuel system do not use open fire, smoke or spill any fuel.

NOTICE

Risk of machine damage!
Insufficient fuel could cause the engine to work inefficiently or even shut down. This could shorten the service life of the engine.
The engine must be shut down before changing the oil water separator.

Take the following steps to change the oil water separator.

1. Put a container under the filter and disassemble the filter with a special spanner.

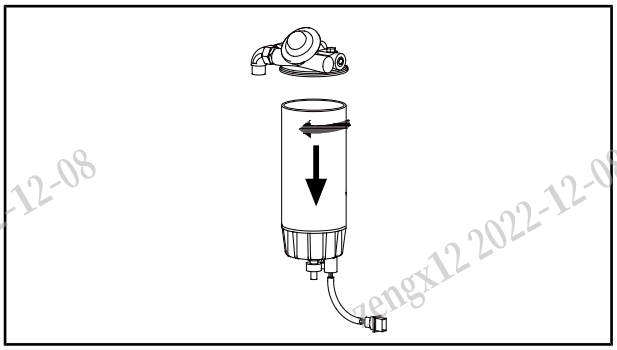


Fig 5-24

2. Clean the sealing on the filter carrier from any dirt.

3. Unscrew the water separator from the filter cartridge.

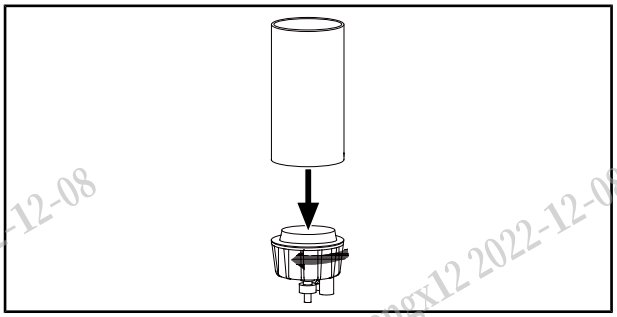


Fig 5-25

4. Apply a thin coat of oil to the rubber seal of the water separator.

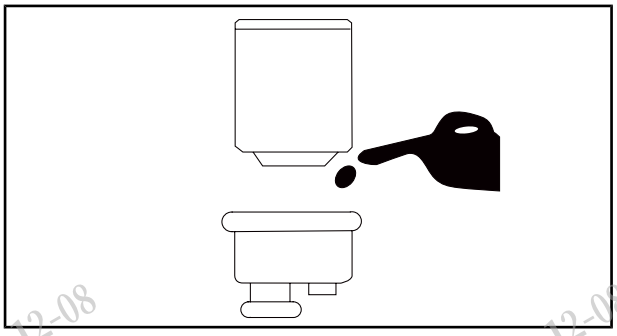


Fig 5-26

5. Screw the water separator on by hand, until the seal contacts.

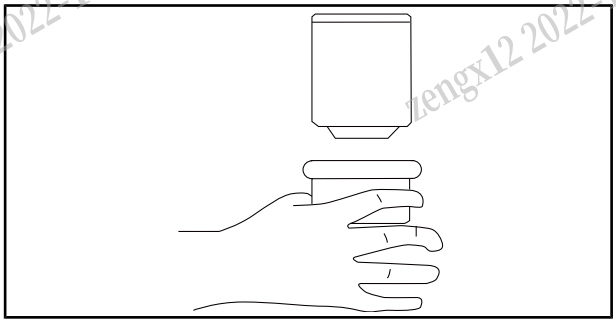


Fig 5-27

6. Tighten the water separator for another half turn.

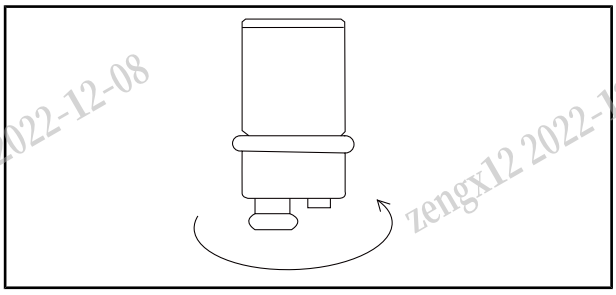


Fig 5-28

7. Fill the filter cartridge with clean fuel.

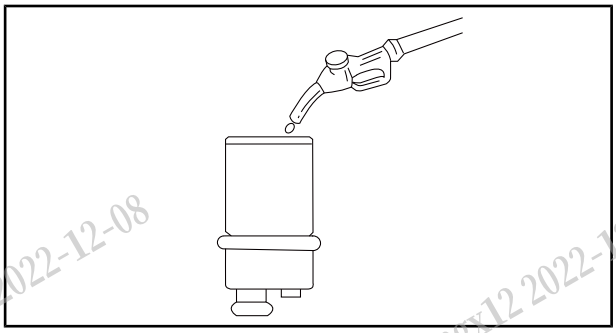


Fig 5-29

8. Apply some oil to the rubber seal of the filter element and screw it on by hand, until the seal contacts.

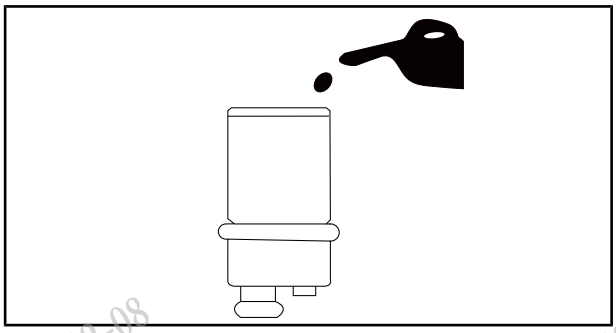


Fig 5-30

9. Tighten the filter element for another half turn.

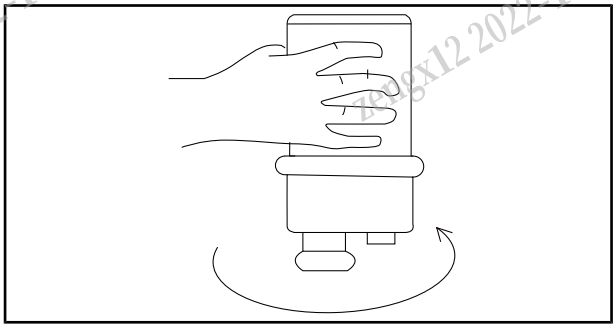


Fig 5-31

10. Release the air that possibly mixed in the fuel pipeline by pressing the manual pump (1) up and down before starting the engine.

Take the following steps to exhaust.

1) Unscrew the screw (2) on the filter.

2) Operate the manual pump (1) until the fuel runs out from the screw (2) without any bubble.

3) Tighten the screw (2).

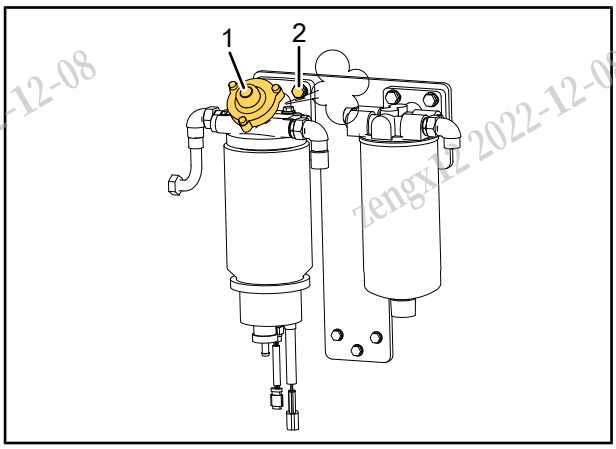


Fig 5-32

1. Manual pump 2. Screw

11. Check the filter element for leaks after a short-time test run.

5.5.5 Radiator-Check/Clean

⚠ CAUTION

Risk of personal injury!
Hot engine and radiator could cause burn.
Perform cleaning work only after the engine and radiator have cooled down and with the engine stopped.

Check the radiator core daily and clean radiator core regularly. When lots of sundries exist in the working site, shorten the cleaning interval by half.

Take the following steps to clean the radiator under different block conditions :

1. When the radiator core is blocked, but the air outlet at the air outlet side is relatively uniform (under rated speed), and the sundries are relatively loose :

1) Clean the sundries on the surface.

2) Clean the air inlet and outlet sides with compressed air until no sundries are blown out and the outlet air is uniform before use.

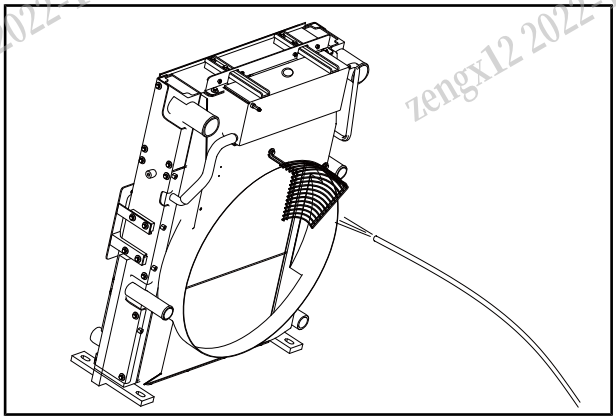


Fig 5-33

2. When the radiator core is blocked, the air outlet at the air outlet side is very small (under rated speed), and the sundries are relatively firm :

1) Empty the engine coolant.

2) Remove various pipelines and fan covers.

3) Remove the radiator from the complete machine.

4) Remove the wind scooper of the radiator.

5) Clean it with compressed air or water gun.

3. When the foreign substances are tightly adhered on the radiator or can't feel any air :

- Put hand on the air outlet of the radiator (the engine is running at rated rotation speed), clean the radiator assembly, hydraulic oil radiator and engine coolant radiator separately, and then re-assemble them.

When cleaning the radiator core (fins), the pressure of the compressed air should be not more than 0.2 MPa, the distance between the air outlet face and the radiator core should be not less than 50 mm, the pressure of the high pressure water should be not more than 0.27 MPa, and the distance between the high pressure water outlet face and the radiator core should be not less than 100 mm.

During the cleaning process, do not spray water directly to the generator, cables and electrical parts. After cleaning, start the engine after the moisture is evaporated.

5.5.6 Engine Coolant-Check/Change

Liquid level of engine coolant-check

⚠ CAUTION

Risk of burn!
People could easily be burned by the hot coolant spilling from radiator.
Change the coolant only after the engine cools down.

Take the following steps to check engine coolant level.

1. Open the cover of the radiator(1) when engine is in cool condition.

2. The level of the coolant is 15 millimeters below the inner top surface of the radiator.

3. When coolant in radiator is not enough, ill it with the appointed coolant (**see** "Filling Capacities" on page 5-15) to the required level.

4. Check the sealing of the water intake port (2) and water outlet port (3).

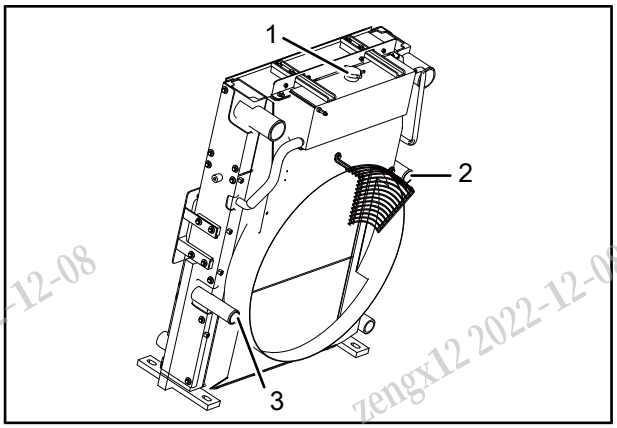


Fig 5-34

1. Cover of the radiator 3. Water outlet port
2. Water intake port

The coolant-change

Take the following steps to change the coolant:

1. Unscrew the cover after the coolant cools down lower than 50 ℃

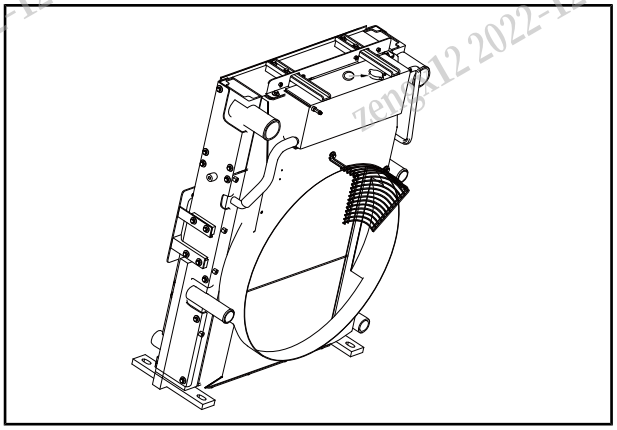


Fig 5-35

2. Place a vessel (volume should be more than 40 L) under the coolant outlet. Remove the plug on the left side of the rear frame.

Fig 5-36

3. Screw the plug back. Then fill the new coolant (**See** "Filling Capacities" on page 5-15) through the inlet.

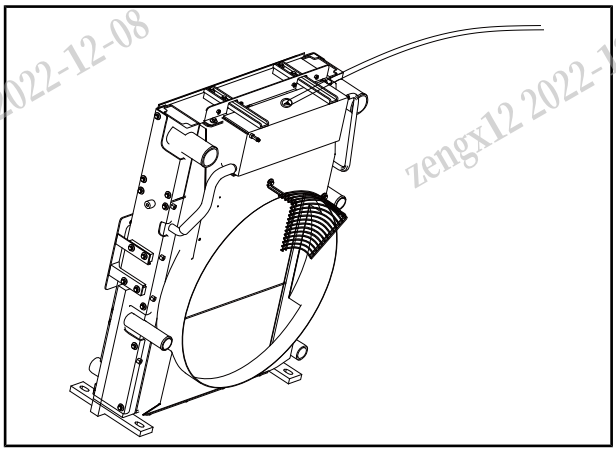


Fig 5-37

4. Screw the cover back.

5. Wait until the engine cools down, then check the coolant level. If the coolant level is lower than the specified height, add it again.

5.5.7 Engine Belt-Check/Replace

⚠ WARNING

Risk of personal injury!
Work on the engine belt during its operation could cause personal injury.
Work on the engine belt only when the engine shut down.

Check the condition of the engine belt . If excessive wear happens, replace the engine belt at once.

When check the tension of the belt, use the tester for the work.

1. Press the indicator arm (3) of the tester a into the gap of the measuring scale.

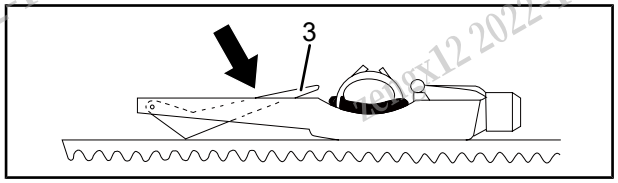


Fig 5-38

3. Indicator arm

2. Lay the measuring unit loosely onto the back of the engine belt.

NOTE :

To measure the engine belt tension a free length of at least 20 mm is required.

3. Operate measuring unit (4) with a finger, until the pressure spring disengages audibly or noticeably.

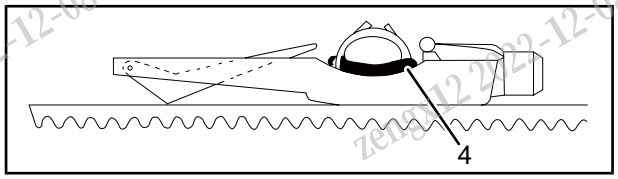


Fig 5-39

4. Measuring unit

NOTE :

The indicator arm (3) remains in the measured position.

4. Remove the measuring unit carefully, without moving the indicating arm.

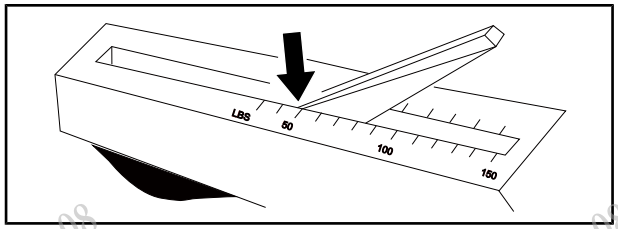


Fig 5-40

5. Read the engine belt tension where the upper edge of the indicating arm intersects with the measuring scale.

Take the following steps to tension the engine belt .

1. Unscrew the bolt (5).

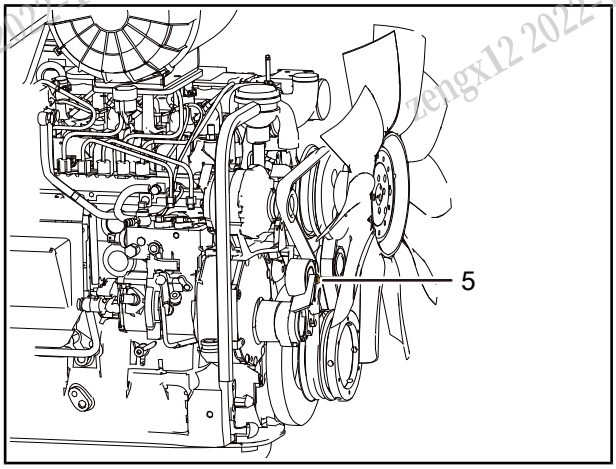


Fig 5-41

5. Bolt

2. Push the tensioner to the left to proper position.

3. Screw the bolt (5) tightly.

Take the following steps to replace the excessively worn belt.

1. Unscrew the bolt (5).

2. Push the tensioner to the right to disassemble to belt.

3. Replace the new belt and tension it to proper position.

4. Screw the bolt (5).

5.5.8 Engine Air Intake Pipeline-Check

1. Check the T clamp (1) for looseness. In case of loose clamp, tighten it.

2. Check the connecting pipe (2) for damage or leakage. If any, replace them.

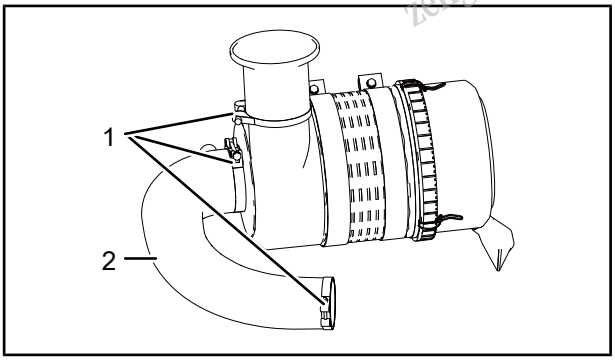


Fig 5-42

1. T clamp 2. Connecting pipe

5.5.9 Fuel-Check/Refill/Replace

Fuel-check/refill

If fuel level indicator flashes yellow, it means the fuel is going to use up. You have to fill the fuel tank (7) with the appropriate fuel.

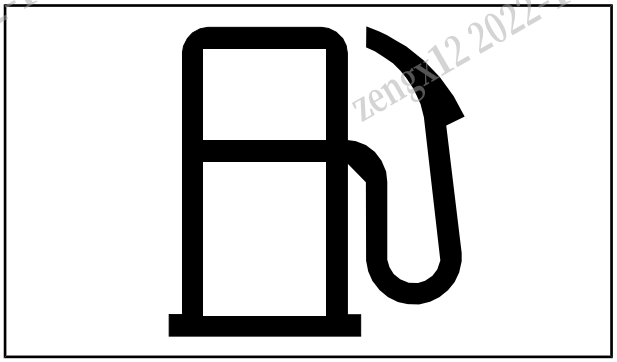


Fig 5-43

The fuel tank is welded on the left side of the rear frame. Take the following steps to fill the fuel tank (7).

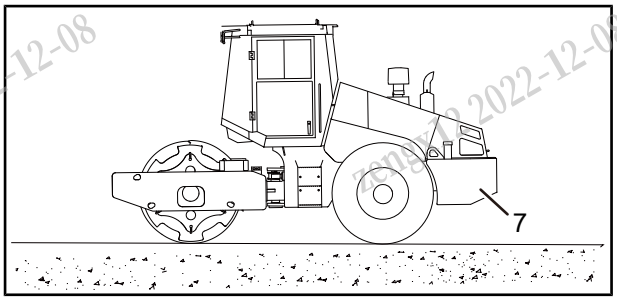


Fig 5-44

7. Fuel tank

1. Select a well-ventilated place.

2. Clean the dust around the filler.

3. Open the lock cover (1) of fuel tank, and fill the fuel tank with appointed fuel through the gas pipe (2).

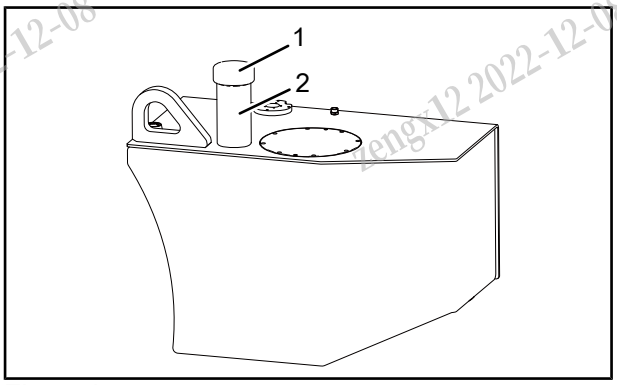


Fig 5-45

1. Lock cover 2. Gas pipe

4. While the fuel level pointer leaves the "E" area, the fuel level alarm indicator icon goes out. When the fuel level pointer gets the point that you want, stop filling.

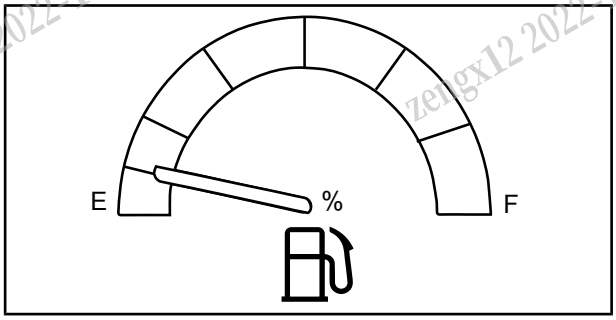


Fig 5-46

5. Install the lock cover (1) of fuel tank.

⚠ WARNING

Risk of fire hazard!
Fire could be caught during operation on the fuel tank.
When operating on the fuel tank, keep away from fire.

Fuel-change

⚠ WARNING

Risk of fire hazard!
Open fire and smoke could cause fire during working on the fuel system.
When working on the fuel system do not use open fire, smoke and spill any fuel.

NOTICE

Risk of shut-down or even shorten service life of engine!
Insufficient fuel will be sucked into the engine if it's still working when changing the duplex fuel filter, which could cause the engine to work inefficiently or even shut down. This could shorten the service life of the engine.
The engine must be shut down before changing the fuel.

The following steps show how to change the fuel :

1. Blow the outside of tank with compressed air to remove the dust.

NOTE :

The purity of the fuel should be guaranteed. Otherwise the impurity such as dust will make the oil water separator to invalidate more easily and bring big resistance of fuel suction.

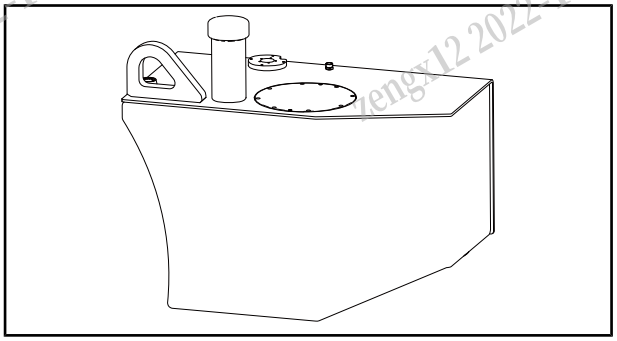


Fig 5-47

2. Place a container under the drain port of the fuel tank. Unscrew the bolts (3) and remove the cover plate (4) at bottom of tank to drain the dirty oil.

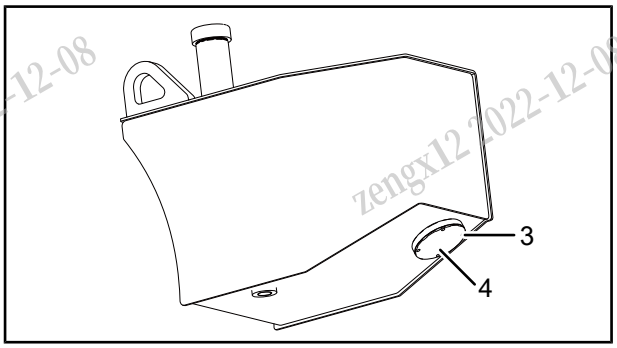


Fig 5-48

3. Bolts 4. Cover plate

3. Unscrew the bolts (5) and open the cover plate (6) of the tank. Blow out the oil and grain materials left in the fuel tank, especially the blind corner with compressed air.

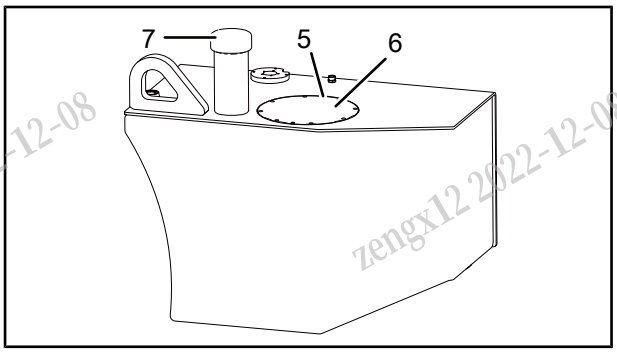


Fig 5-49

5. Bolts 7. Lock cover

6. Cover plate

4. Refill an appropriate amount of clean diesel oil (or kerosene) into the fuel tank. Use a new brush to clean the tank up and down. When the oil gets dirty, change it with new oil and continue cleaning till no dirt and sediment are found on the wall and bottom of tank.

5. Install the bottom cover plate (4) and screw the bolts (3) tightly.

6. Open the lock cover (7) and refill the tank with appointed fuel (**see**"Filling Capacities" on page 5-15) through the filter.

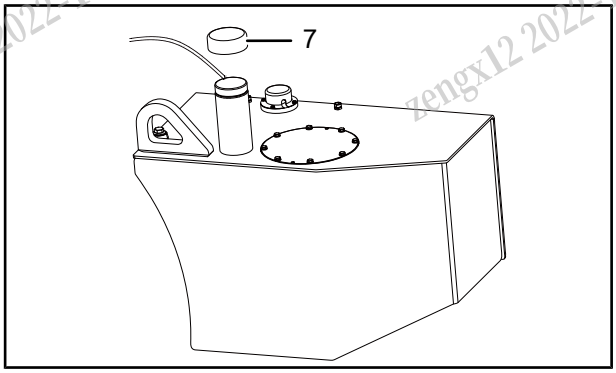


Fig 5-50

7. Lock cover

7. Before starting the engine, operate the manual oil pump on oil-water separator to discharge the air in the fuel pipeline.

5.5.10 Fuel Filter-Replace

⚠ WARNING

Risk of death or personal injury!
Open fire and smoke could cause fire when working on the fuel system, which could result in death or personal injury.
When working on the fuel system do not use open fire, smoke or spill any fuel.

NOTICE

Risk of machine damage!
Insufficient fuel will be sucked into the engine if it's still working when changing the duplex fuel filter, which could cause the engine to work inefficiently or even shut down and shorten the service life of the engine.
The engine must be shut down before changing the fuel filter.

Take the following steps to change the fuel filter.

1. Put a container under the filter and disassemble the filter with a special spanner.

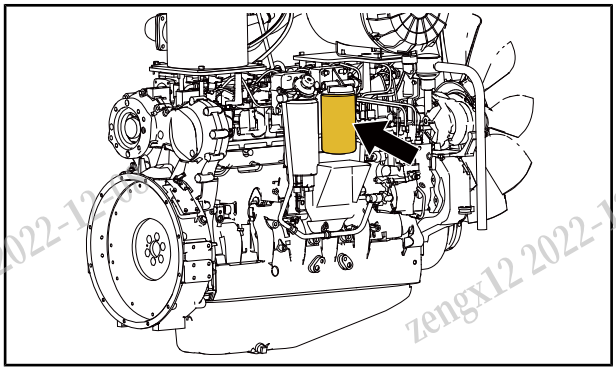


Fig 5-51

2. Slightly oil the rubber seal on the new filter.

3. Screw up the new filter element by hand until the seal contacts.

4. Tighten the filter element for another half turn.

5. Release the air that possibly mixed in the fuel pipeline by pressing the manual pump up and down before starting the engine.

6. Check the filter element for leaks after a short test run.

5.5.11 Crankcase Vent Line-Check

Check the crankcase vent line for leakage or blockage. If any, do troubleshooting.

NOTE :

If any leakage or blockage in the crankcase vent line occurs, contact your SANY distributor. It is forbidden to perform any maintenance on the engine by yourself. In reference to any key parts of the engine and the engine faults, please consult your SANY distributor. Otherwise SANY bears no liability

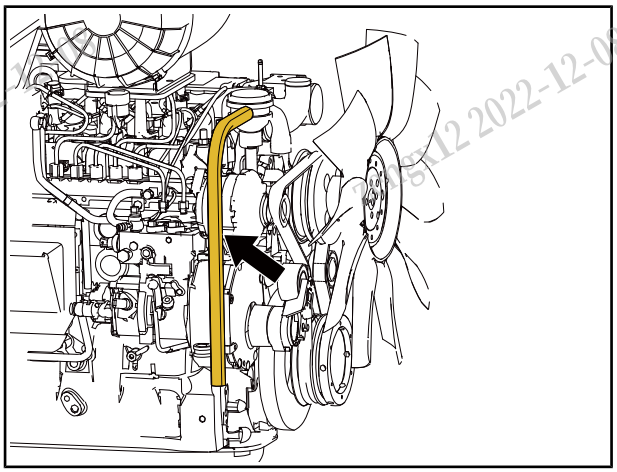


Fig 5-52

5.5.12 Oil tank and Pipes–Check

Check oil tank and pipes for damage or leakage. If any, repair or replace them immediately in accordance with required safety procedures.

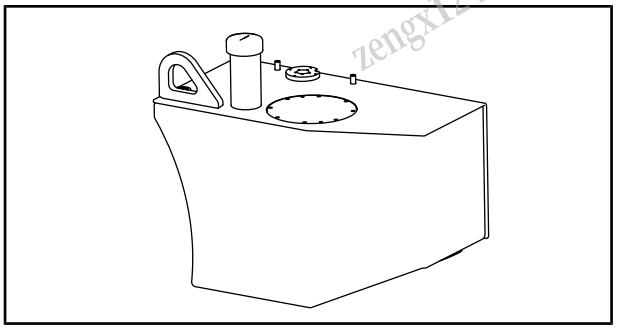


Fig 5-53

5.5.13 Hydraulic Oil-Check/Refill/Change

CAUTION

Risk of burn!
The temperature of hot hydraulic oil is very high, and it could badly burn your skin if it spills onto your skin.
Protect yourself from the hot hydraulic oil.

NOTICE

Risk of hydraulic element damage!
Impurity could cause great damage to the hydraulic element.
Change the hydraulic oil under the working temperature.

NOTE：
Except for the regular hydraulic oil change, replacement should be made as well after overhaul. Otherwise the hydraulic elements will be worn more easily.

Hydraulic oil-check/refill

1. Stop the machine on a flat ground and straighten the wheels.

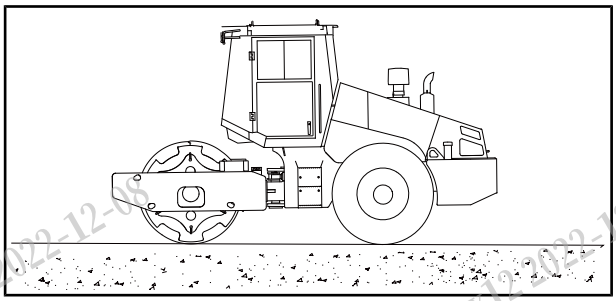


Fig 5-54

2. Do service brake and turn the key to position 0.

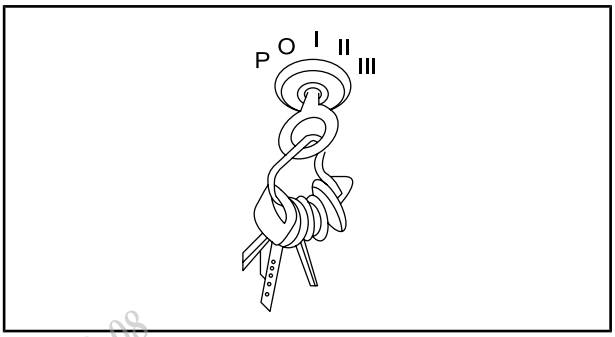


Fig 5-55

3. The hydraulic oil tank is welded on the right side of the rear frame. A level meter (1) is mounted on the hydraulic oil tank to show the level in the tank. Normally, the level is about 2/3 of the level meter (1).

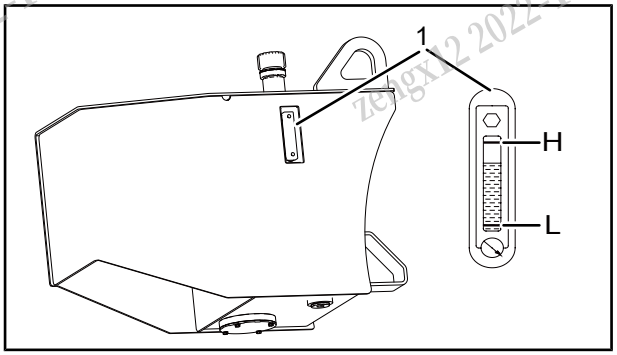


Fig 5-56

1. Level meter L. Low level
H. High level

When the level is lower than the low level (L), take the following steps to fill the hydraulic tank.

1. Clean around the hydraulic oil tank.

2. Remove the filter (2).

3. Fill the tank with the appointed hydraulic oil.

4. When the level is about 2/3 of the level meter, stop filling.

5. Clean and install the filter of hydraulic oil tank with a small amount of hydraulic oil.

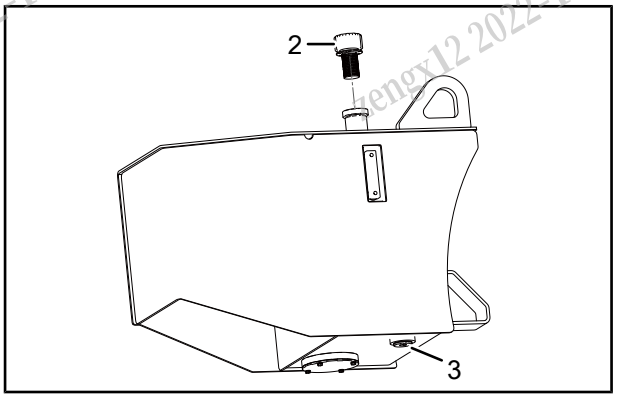


Fig 5-57

2. Filter 3. Oil outlet port

When the level is higher than the high level (H), take the following steps to drain the extra hydraulic oil.

1. Clean around the hydraulic oil tank.

2. Place a vessel under the oil outlet port (3) .

3. Open the drain plug to release the extra hydraulic oil from the oil outlet port (3).

4. When the level is about 2/3 of the level meter, stop draining.

5. Clean and install the oil drain plug (monkey wrench) with a small amount of hydraulic oil.

NOTE :
The hydraulic oil level will be different before and after the start of the engine. Inspect the hydraulic oil level before formal construction.

NOTE：

Changes in ambient temperature will also cause the changes in hydraulic oil level.

Hydraulic oil-change

NOTICE
Risk of hydraulic system damage! Start the engine when draining the hydraulic oil could cause damage to the whole hydraulic system. Never start the engine when draining the hydraulic oil.

Changing procedures:

1. Start the engine till the hydraulic oil warms up. Then stop the engine.

2. Clean around the hydraulic oil tank and oil filler.

3. Place a container under the oil outlet port (3). Remove the oil-drain at the bottom of the oil tank. Drain the oil.

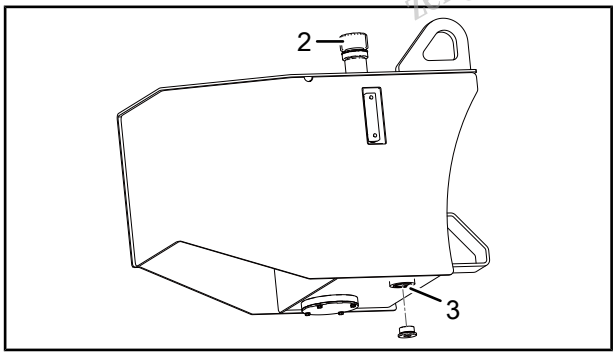


Fig 5-58

2. Filter 3. Oil outlet port

4. Replace the filter screen on the filler (2) tube of the oil tank. Wash the filter screen with clean nonflammable solvent and dry it in the air.

5. Clean and fit the drain plug.

6. Fit the oil filling plug and filter screen.

7. Refill new oil to 1/2~2/3 of the level gauge (**see** “Filling Capacities” on page 5-15) into the hydraulic oil tank.

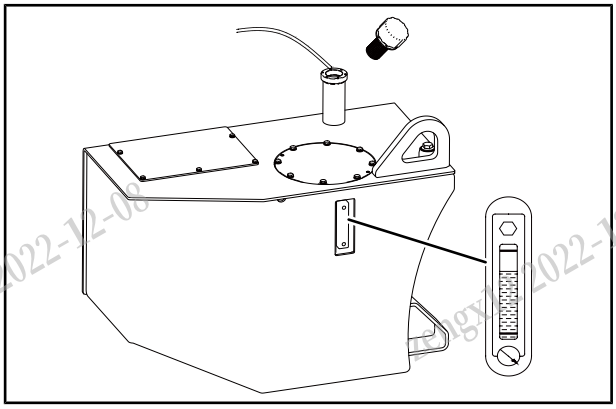


Fig 5-59

8. Check the gaskets at the filler cap. Replace the damaged filler cap.

9. Install the filler cap of the hydraulic oil tank.

10. Start the engine and run the engine for 5 minutes.

11. The oil level should be between the middle and upper marks on the gauge. If necessary, fill hydraulic oil through the filler port.

NOTE：
There should be no bubbles in the oil. The bubble in the oil indicates that there is air in the hydraulic system. In this case, check the suction hose and hose hoop.

12. Shut down the engine.

13. If necessary, tighten the loose hose hoop and connector. Replace the damaged hose.

5.5.14 Hydraulic Oil Filter-Replace

Replace the hydraulic oil filter element every time when you change the hydraulic oil. Otherwise the hydraulic oil may be contaminated by the impurity on the old hydraulic oil filter.

NOTE：
Keep the oil fillers and elements clean in the process of replacement. The old element should be discarded and can't be reused after cleaning.

Steps of changing the element of oil fill filter.

1. Disassemble the element

1) Loosen the hexagon bolt (1) at the bottom of filter (2) by with a special spanner and then remove it.

2) Pull out the element by hand.

3) Drain off the rest of the hydraulic oil and clean the filter housing and cover.

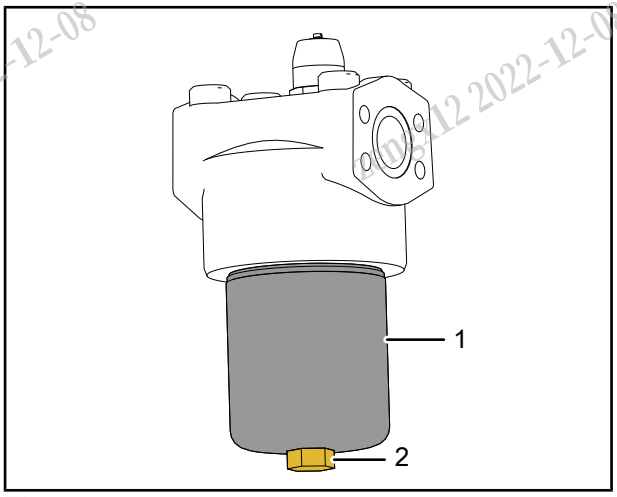


Fig 5-60

1. Hexagon bolt 2. Filter

2. Install a new element

1) Insert the new filter element into the filter cover.

2) Screw up the filter housing by S36 spanner, and then loosen it in the opposite direction for 1/4 circle.

5.5.15 A/C-Check/Maintain

In order to keep good performance, reliability and prolong the service life of the A/C, pay attention to the following items when using the A/C.

1. **Instructions for using the A/C**

- Maintain the A/C according to the producer's instructions.
- Before turning on the A/C, first you have to start the engine. Wait a few minutes for the engine to work smoothly, then you can start the A/C and choose the proper fan speed and temperature.
- Close the window and doors when using the A/C. Save the energy.
- When exchanging the air without opening the window or doors, you can just turn on the fan speed control.

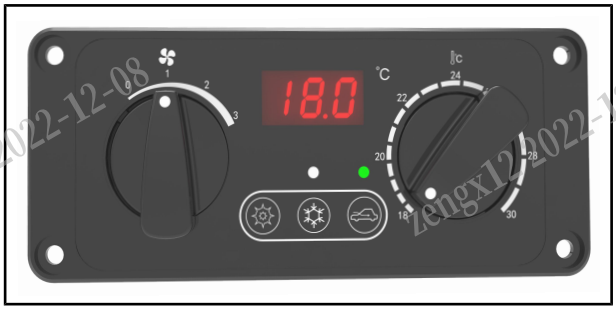


Fig 5-61

2. **Maintaining intervals for the A/C**

(a) Compressor

- Check and maintain it once every two years generally. Mainly check the inlet/discharge pressure and the fasteners for looseness and air leak.
- Disassemble the compressor to check the inlet/discharge valve for damage and distortion. If any, repair or replace the relevant valve.
- Replace the seal ring and shaft seal if the compressor is disassembled and repaired. Otherwise, it may cause leak at the compressor seal.

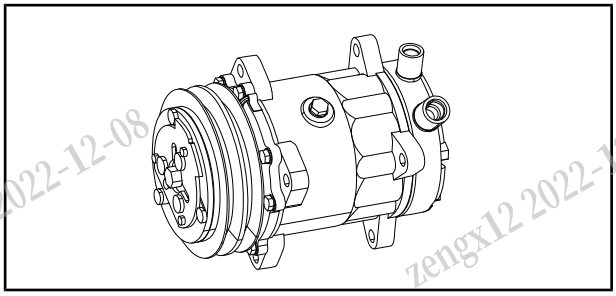


Fig 5-62

(b) Condenser and cooling fan

The condenser is installed behind the radiator.

- Check and maintain them once a year generally. Clean the condenser plate with compressed air and cold water; rectify and repair the radiator gill by a pair of flat- nosed pliers; carefully check the condenser surface for abnormity; check for refrigerant leak with a leak detector.
- Recoat the antirust paint in case of peeling-off to prevent leak due to rusting and perforation.
- Check whether the cooling fan can normally run and whether the electric brush of fan motor is overly worn

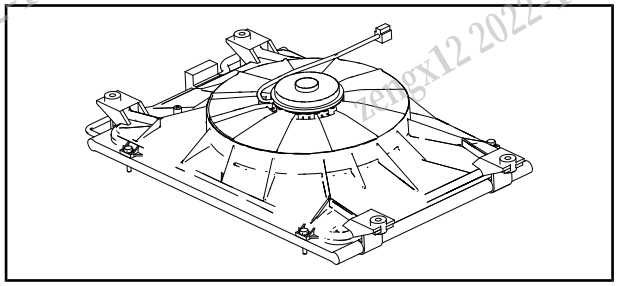


Fig 5-63

(c) Evaporator

- Generally, check it for leak with a leak detector once a year.
- Open it to clean the inner and the air duct once every 2~3 years.

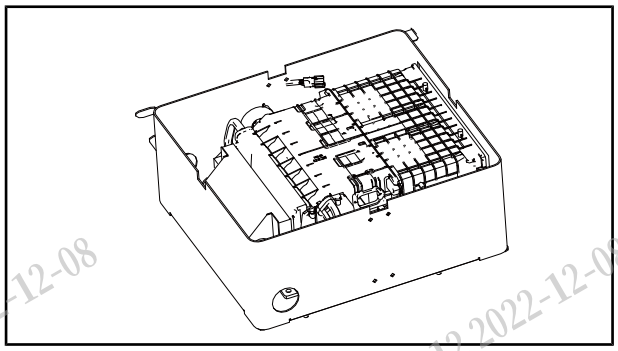


Fig 5-64

(d) Liquid storage drier

Refrigerant level checking procedures:

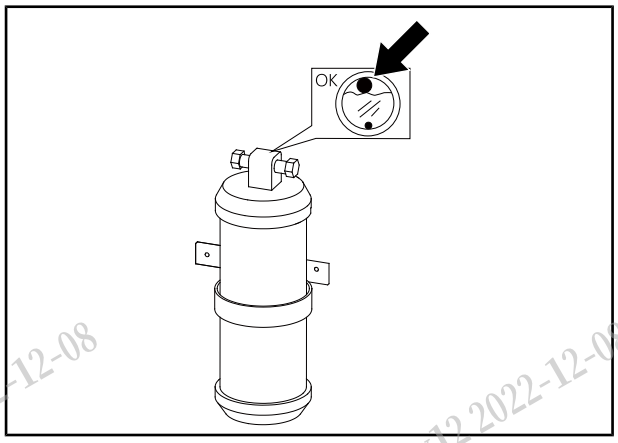


Fig 5-65

1) Start the engine.

2) Turn on the A/C for refrigeration. Turn on the temperature control switch to check if the air is cold.

3) Check the inspection window of the drier/ collector to see if the white float is at the top.

If the white float is at the bottom, inform the service department.

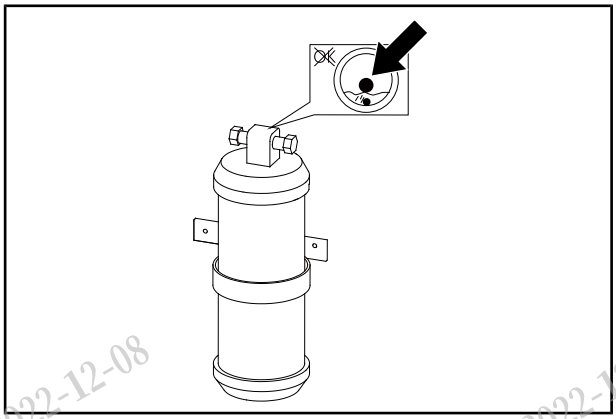


Fig 5-66

4) Fill the refrigerant. If necessary, check the A/C system for leakage.

5) Check the water indicator inside the inspection window of the drier/collector.

Blue: normal drier.

Purple: too much water content.

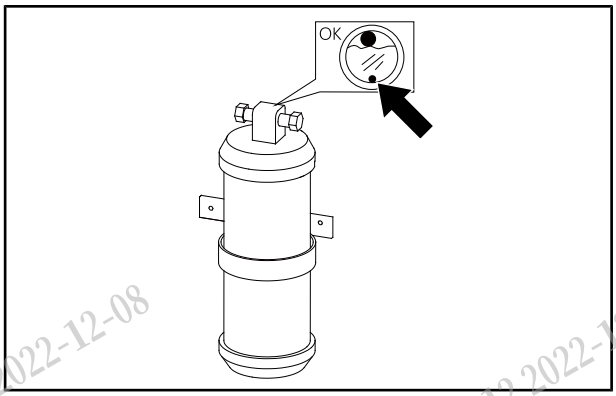


Fig 5-67

Inform the service department to replace the drier/collector. Check the A/C system.

NOTICE

Before yearly operation season, ask the service department to replace the drier/ collector. Otherwise it will affect the performance of the A/C.

⚠ WARNING

In case of corrosion or mechanical damage, replace the drier/collector to avoid explosion and further damage.

(e) Refrigeration pipeline

- Pipe connectors: Check them once every year, and check its sealing with a leak detector.

- Pipes: Check them for collision with other parts; check the rubber hoses for aging and crack. Replace the rubber hoses every 3 5 years.

Table 5–12 Checking intervals for the A/C

Item	Maintenance	Interval
Pipeline connector	Check the locking nuts for looseness; check the rubber hoses and connectors for refrigerant leak and oil stain; check the rubber hoses and pipes for crack, aging, embrittlement, damage by compression, and collapsing.	Once/month
Condenser	Check the fin for distortion and make it in order if any; check the core for blockage and clean it if any.	Once/month
	Check the fan for damage and abnormality.	Once/month
Evaporator	Clean the air-in/out ducts; check the bottom drain pipe for blockage and smoothen it if necessary	Once/year
Liquid storage	Check the pressure switch connector for looseness.	Once/quarter
	Replace the liquid storage after the A/C has been used for some time	Every 1000 h
Refrigerant volume	Check the refrigerant volume from the inspection window when the A/C runs. There shall be few or no air bubble; otherwise, add refrigerant.	Once/month
Compressor	Check the fastening bolts for looseness.	Once/month
	Check the fitting surface and the rotary shaft seal of main shaft for refrigerant leak and oil stain.	Once/month
	Check the compressor belt for wear and replace it if necessary.	Once/month
	Check the belt for tension and tension it if necessary.	Once/month
	Start and run the A/C for a few minutes in the seasons when the A/C is unused.	Once/month

5.5.16 Compressor V-belt-Check/Replace

⚠ WARNING

Work on the V-belt must only be performed with the engine shut down. Otherwise people will be badly hurt by the belts.

V-belt-check

1. Inspect the entire circumference of the V-belt visually for damage and cracks. Replace damaged or cracked V-belts.

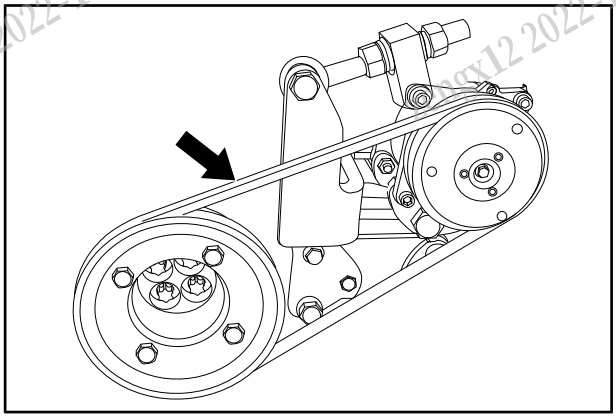


Fig 5-68

2. Check with thumb pressure whether the V-belt can be depressed more than 10 mm - 15 mm) between the V-belt pulleys, retighten if necessary

V-belt-tighten

1. Slightly slacken fastening screws (6), (7), (8), (9).

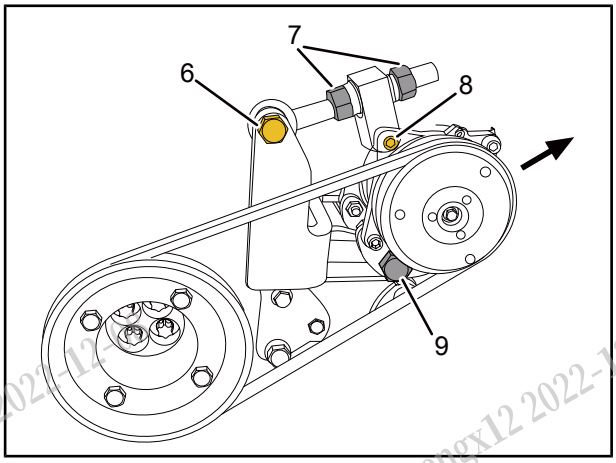


Fig 5-69

6. Screw
7. Screw
8. Screw
9. Screw

2. Press the compressor in direction of arrow, until the correct V-belt tension is reached.

3. Retighten all fastening screws.

V-belt-change

1. Slightly slacken fastening screws (6), (7), (8), (9).

2. Push the compressor against the direction of arrow completely against the engine.

3. Remove the radiator net cover, loosen the installation bolt of the engine fan from the end face with a wrench, remove the fan and take out the compressor belt.

4. Fit the new V-belt to the V-belt pulleys.

5. Tension the V-belt as previously described.

6. Check the V-belt tension after a running time of 30 min.

5.5.17 Battery-Maintain

⚠ WARNING

Risk of explosion!
Open fire and smoke could cause explosion when working on the batteries.
When working on the batteries, do not use open fire or smoke.

⚠ CAUTION

Risk of erosion!
Batter acid could erode skin.
Wear proper clothes to avoid skin from erosion by acid when filling acid to the batteries.

NOTICE

Risk of short circuit!
Leave tools on the batteries could cause short circuit and influence the electric devices.
Never leave tools on the batteries.

The battery is located near the hydraulic oil tank. The battery must be securely installed on the roller:

1. Connect to the positive electrode (+).

2. Connect to the negative electrode (-), and apply a small amount of lubricating grease to the wiring terminal.

3. When taking out the battery, first cut off the positive wire (+) and then cut off the positive wire (+).

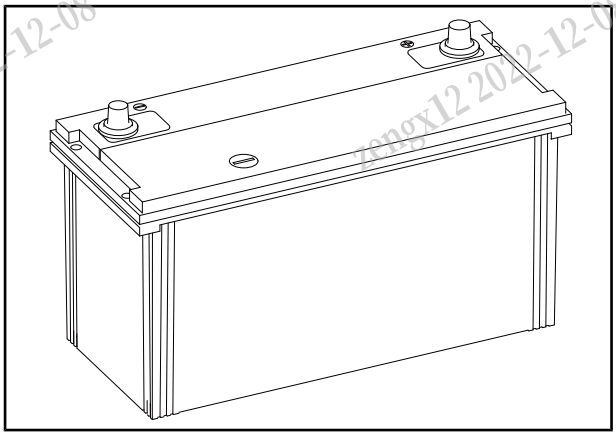


Fig 5-70

Maintenance steps for battery:

1. Open the cover of battery tank.

2. Clean the battery tank and battery surface.

3. Clean the battery electrode and electrode holder, and apply the lubricating grease for lubrication.

4. Inspect the fastening of electrode terminal of battery.

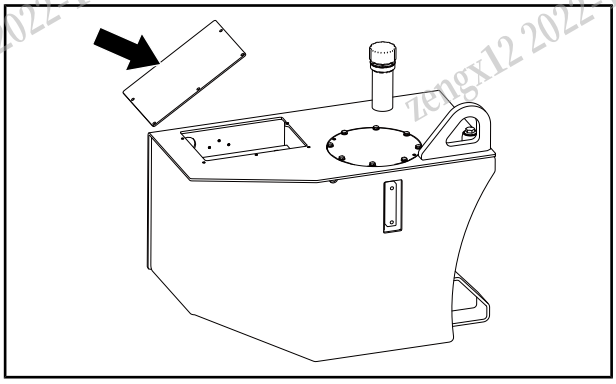


Fig 5-71

The following maintenance is conducive to extending the service life of the battery:

- Switch off all electrical appliances (such as ignition switch, lamps, indoor lamp and radio).
- Inspect the open-circuit voltage of the battery on a regular basis, at least once a year.
- When the open-circuit voltage is 12.25 V or below, please recharge the battery once again immediately without supercharging.
- After recharging each time, it is necessary to rest the battery for 1 h before use.
- If the battery is not used for more than one month, disconnect the battery and do not forget to inspect the open-circuit voltage on a regular basis.

5.5.18 Electric Box-Maintain

NOTICE
Risk of machine damage! Control module could become invalidated if the electric box gets wet. Keep the electric box dry when maintaining the electric box.

Take the following steps to maintain the electric box.

1. Unscrew two screws (1) on the electric box, open the door (2) of the electric box.

2. Use a dry brush to clean out the dust lightly.

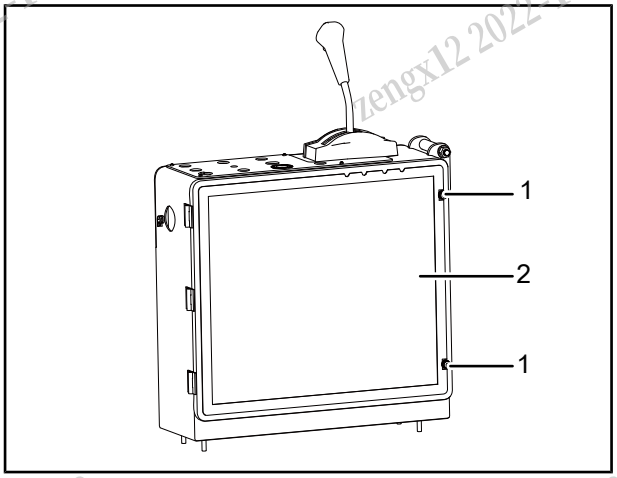


Fig 5-72

1. Screws 2. Door

3. Check the connection of each electric contact point.

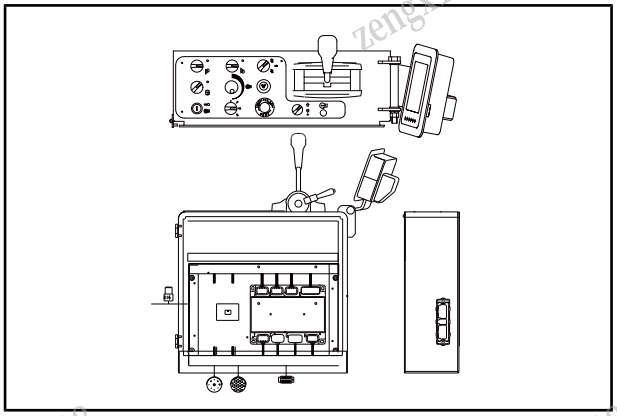


Fig 5-73

4. Lock the door (2) of the electric box and screw up two screws (1) on the electric box.

5.5.19 Fuse-Replace

Check the fuse to see whether they are in good condition or not.

NOTICE
Risk of electric circuit trouble! Improper fuse could melt easily or be not easy to melt when circuit is overloading. This could influence the electric system. Use proper fuse with right capacity when replacing a new fuse.

The inspection and replacement steps are as follows:

1. Open the centralized control box in the cab.

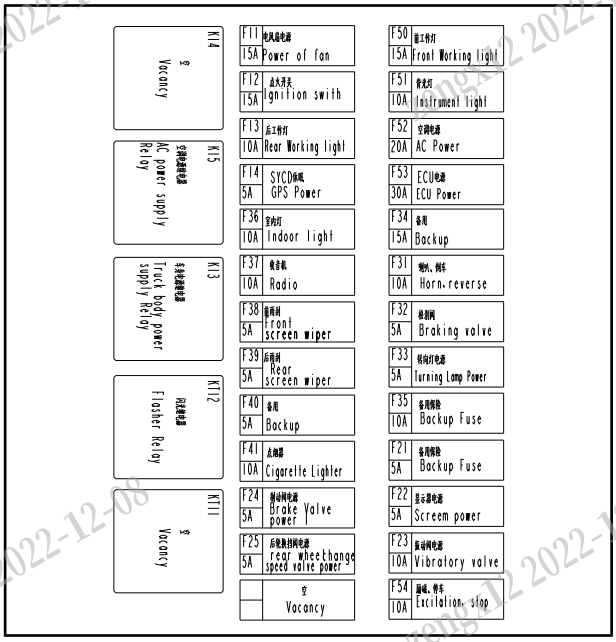


Fig 5-74

2. Take out the fuse inserted in the central control box with tweezers.

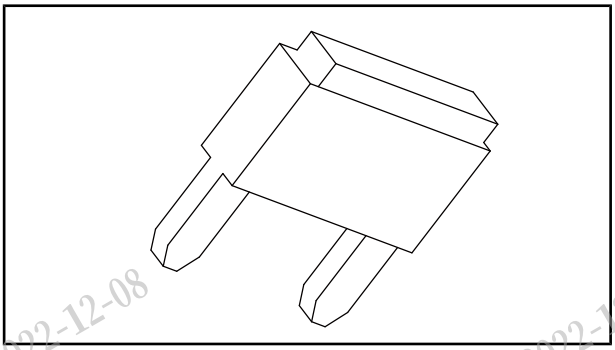


Fig 5-75

3. Observe if the fuse is damaged by looking forward the light.

4. If the fuse is damaged, take out the corresponding standby fuse above central control box with tweezers.

5. Insert the corresponding standby fuse with tweezers for the replacement.

5.5.20 Windshield Washer Fluid–Check/Fill

The windshield washer reservoir is located in the cab.

Take the following steps to check the windshield washer fluid level and fill:

1. Open the right door of the cab and see the washer reservoir located at the back of the seat.
2. Observe the liquid level of the detergent in the washing storage tank. If the liquid level is lower than 1/3, the detergent requires to be supplemented.

3. Unscrew the cover over the washing storage tank and add the detergent to fully.

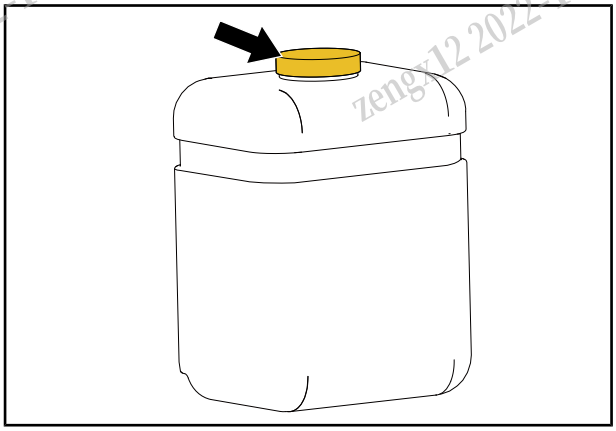


Fig 5-76

4. Fasten the cover over the washing storage tank after the filling of the detergent is completed.

NOTE：

The spray nozzle of the windshield washer can be adjusted to spray the washing fluid to the desired direction.

NOTICE
Risk of machine damage! In cold weather, water pump, solenoid and filter could freeze up, which could cause machine damage. Drain the water from water spraying system and add antifreeze in cold weather.

NOTE：

Start the water spraying system to spray water until the antifreeze is sprayed from the nozzle, after the ice period, drain the antifreeze and dispose it in an environment- friendly way.

5.5.21 Grease for Propel Bearing-Fill

Take the following step to fill the propel bearing with grease:

1. Set the machine levelly.

2. Remove the bolt (1) of oil port on the propel bearing.

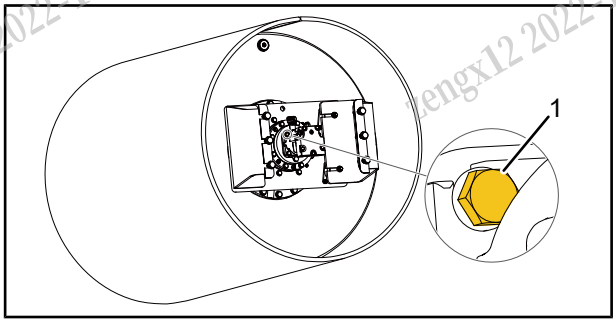


Fig 5-77

1. Bolt

3. Fill 2/3 of the bearing chamber with appointed lithium grease through the oil cup (1) (**see** “Filling Capacities” on page 5-15), until you can see oil out of the oil port (2).

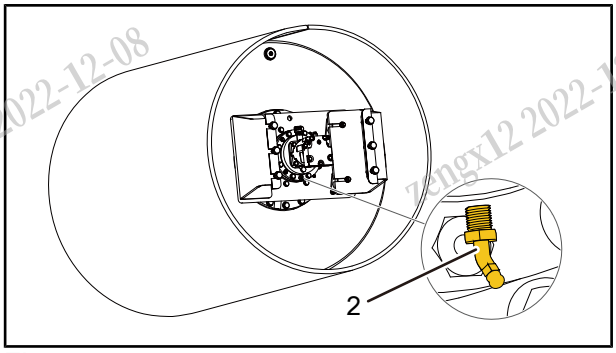


Fig 5-78

2. Oil cup

4. Fit them back.

5.5.22 Grease for Central Articulation Frame-Fill

NOTICE

Risk of machine damage!
If not regularly grease nipples of the central articulation frame with grease gun, which could cause early dysfunction of bearings.
Regularly grease nipples of the central articulation frame with grease gun.

- The fight figure shows the location of grease fittings.
- Fill them with appointed grease. **See** “Filling Capacities” on page 5-15.

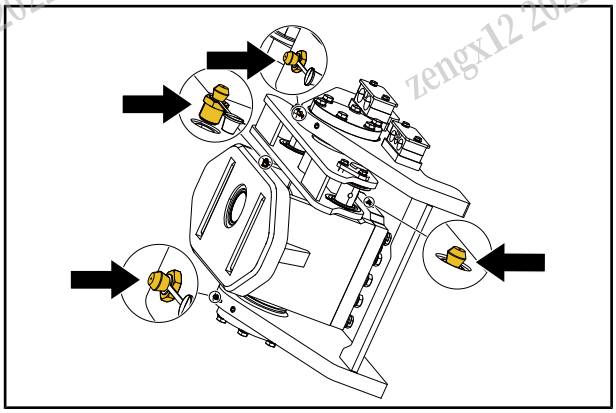


Fig 5-79

5.5.23 Damper-Check/Replace

- Check the damper under the compressed condition. If necessary, adjust it.
- Check the damper for cracks. If there is any crack more than 15 mm, replace it.
- Check the damper for elasticity. Replace the cracked or deformed damper.

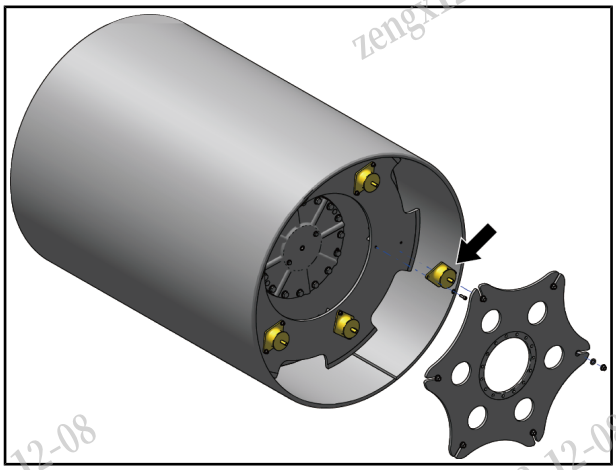


Fig 5-80

Take the following step to replace damper :

1. Unsrew the bolts and washer (2) on the side panel (1) by wrench and remove them.

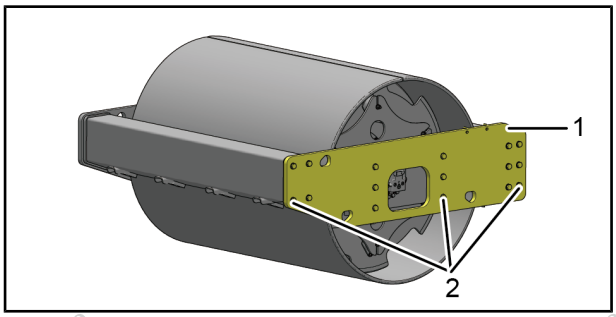


Fig 5-81

1. side panel 2. Bolts and washer

2. Unsrew the bolts and washer (4) on the frame connections struts (3) by wrench and remove them.

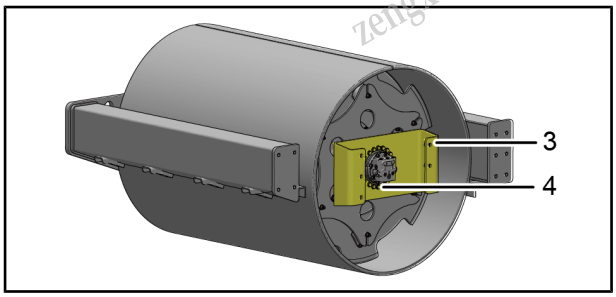


Fig 5-82

3. Frame connections struts 4. Bolts and washer

3. Unsrew the nuts (6) on the plum plate (5) and remove them, unsrew and remove bolts (7) on both side of the damper (8) to be replaced.

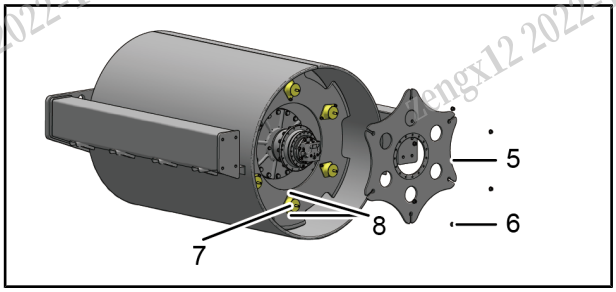


Fig 5-83

5. Plum plate
6. Nuts
7. Bolts
8. Damper

4. Replace the new damper and tighten the bolts (8) on both sides.

5.5.24 Lubricant for Reducer-Change

The maintenance for the reducer is mainly to add and drain lubricant.

Take the following step to drain the lubricant.

1. When draining the lubricant in the reducer, first make the outlet at the lowest position.

Fig 5-84

2. Place a vessel (volume should be more than **5L**) under the outlet. Remove the plug.

3. After draining the lubricant, screw the plug back tightly.

Take the following step to add the lubricant.

1. When adding lubricant to the reducer, first make the oil inlet at the highest position.

Fig 5-85

2. Remove the plug of oil inlet and plug of oil port(6).

3. Add appointed lubricant through inlet . The filling capacity is 3.5 L. When oil overflows from the inlet, then stop adding oil.

5.5.25 Lubricant for Rear Axle-Change

The right figure shows the oil filler and the oil drain.

Central reducer assembly and main reducer:

- Oil drain: unscrew the plug (9) at the bottom of the shell to drain oil.
- Oil filling: unscrew the plug (10) at the rear, fill oil through the port (8) until oil flows to the oil level port (11) at the rear, screw up the plug (11) and continue to fill until oil flows to the hole at the rear of the plug (10).

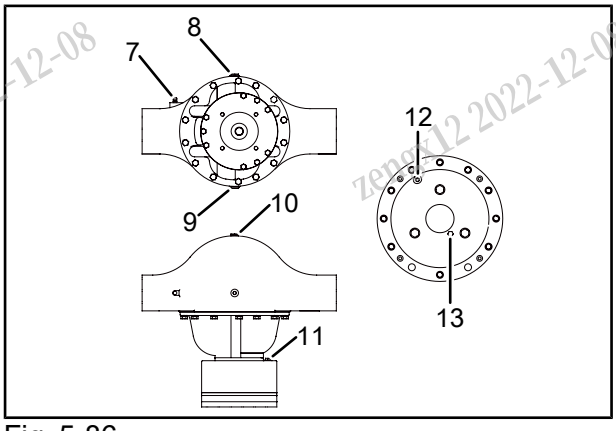


Fig 5-86

7. Hole
8. Port
9. Plug
10. Plug
11. Plug
12. Port
13. Hole

Wheel end

- Oil drain: unscrew the plug on the wheel end cover.
- Oil filling: rotate the wheel end to the position as shown in the figure and make the hole (7) upwards. Fill oil through the port (12) to the hole (13). Pay attention to the

position of the oil level hole and the shaft hole of the planetary wheel. The oil level hole shall be between the shaft holes of the planetary wheel.

The table as follows shows the oil brand, change intervals and dosage.

Table 5–13 Oil change intervals for rear axle

Item		Intervals	Oil brand and dosage	
Level check	Main reducer	Every month		Heavy-duty vehicle gear oil GL-5 85W-140
	Central shell	Every month		
	Wheel side reducer	Every 250 h		
Oil change	Main reducer	Every 1000 h, 50 h at first time	2 L	
	Central shell	Every 1000 h, 50 h at first time	10 L	
	Wheel side reducer	Every 1000 h, 50 h at first time	4 L×2	

5.5.26 Lubricant for Drum Vibration -Change

Take the following step to change lubricant.

1. Set the machine levelly.

2. Turn the vibratory drum assembly to set one outlet on the drum bearing seat at the lowest position.

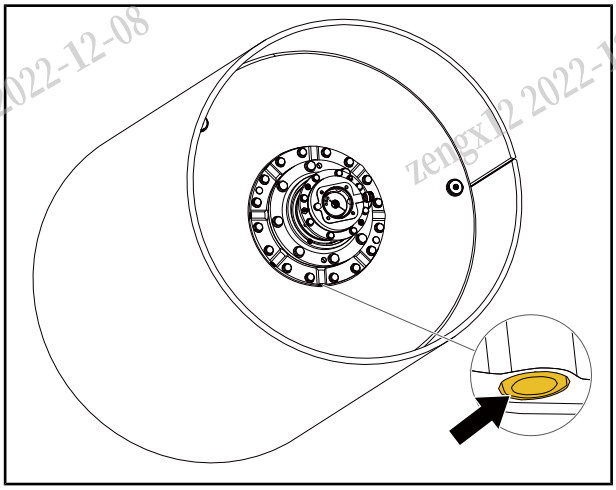


Fig 5-87

3. Place a vessel (volume should be more than 13 L) under the outlet. Undo the oil drain plug, oil level plug and packing plate to drain the oil.

4. Fit them back.

5. Rotate the drum to make the place marked with ▲ mark (1) at the middle top in the vertical direction.

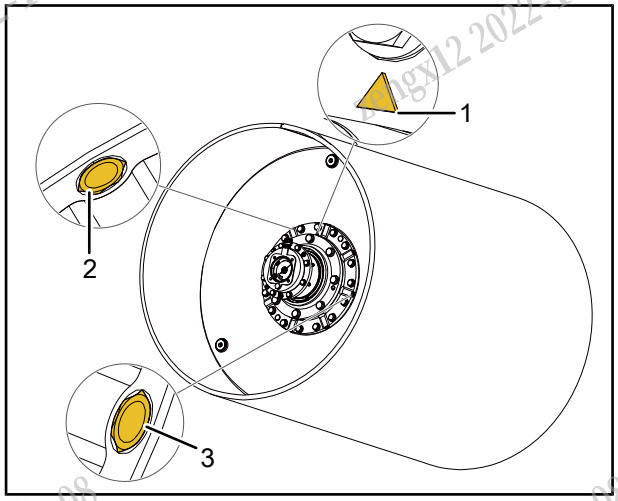


Fig 5-88

1. ▲ mark
2. Outlet
3. Outlet

6. Remove all plugs and washers of the higher outlet (2) and lower outlet (3).

7. Fill the drum with appointed lubricant (**see** “Filling Capacities” on page 5-15) through the higher outlet (2) until lubricant flows out a little from the lower outlet (3).

8. Clean the plugs, reinstall and tighten them.

5.5.27 Tires and Rims-Check

- Check every tire (1) for proper inflation, excessive wear, damaged or cut surface and foreign matter penetration.
- Check every rim (2) for loose or missing lug nuts and damaged surfaces.

NOTE :
If any problems with the tires or rims are found, contact your SANY distributor for repairs.

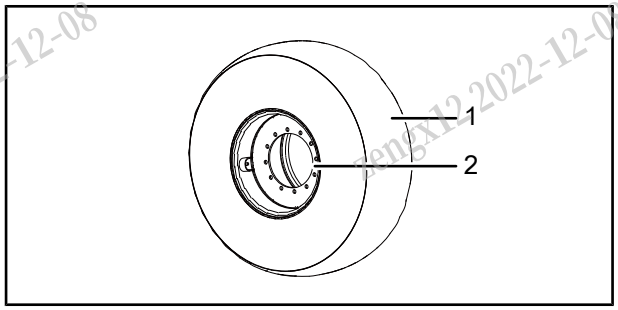


Fig 5-89

1. Tire
2. Rim

Tire pressure-check

NOTICE

Risk of tire blowing up!
The tire pressure could increase if the tire is exposed to the sun. Too much inflation on pressure could cause the tire to blow up.
Avoid the tire exposed to the sun.

Check the tire pressure with a pressure gauge. Generally, the range of tire pressure should be 1.4 ±0.3 kgf/cm². When the tire pressure is lower , you have to charge the tires. The recommended maximum pressure shall be 1.7 kgf/cm².

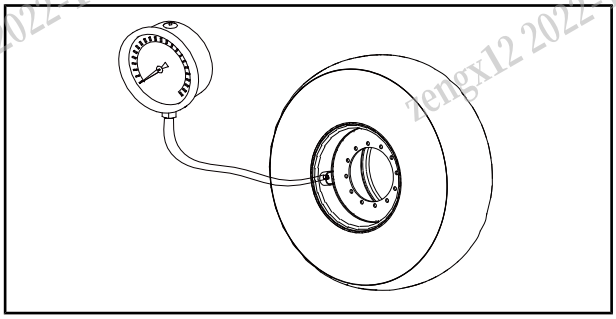


Fig 5-90

Troubleshooting

6.Troubleshooting

6.1 Mechanical Parts

6.1.1 Engine

Table 6–1 Fault Analysis and Troubleshooting for Engine

Fault Symptom	Cause	Remedy
Engine can not be started.	Fuel used up.	Fill up fuel and bleed system.
	Fuel filter blocked.	Replace (**see** "Fuel Filter-Replace" on page 5-46).
	Leakage of fuel pipe.	Check and tighten all connections.
Difficult startup or unstable working power of engine.	Engine oil with excessive viscosity, especially in winter.	Use appropriate engine oil (**see** "Oil & Fluids Selection" on page 5-9).
	Block in fuel system caused by the paraffin in winter, unsmooth fuel supply,	Replace fuel filter (**see** "Fuel Filter-Replace" on page 5-46), check all oil pipes and use the winter-grade diesel when it turns cold (**see** "Oil & Fluids Selection" on page 5-9).
	Dirty air filter.	Clean or replace (**see** "Air Filter–Clean/Replace" on page 5-25).
	Too tight throttle cable.	Adjust the nut on throttle cable.
	Defective vacuum switch.	Check vacuum switch (**see** "Oil Water Separator– Check/Drain/Replace" on page 5-33).
Too much smoke discharged.	Too much engine oil.	Drain redundant engine oil (**see** "Engine Oil-Check/Refill/Change" on page 5-29).
	Dirty air filter.	Clean or replace (**see** "Air Filter–Clean/Replace" on page 5-25).
Engine too hot or shut down suddenly.	Cylinder or cooling fan of radiator at the top of cylinder blocked by dirt.	Clean cooling fan of the radiator, esp. the vertical fin at the top of cylinder (**see** "Radiator-Check/Clean" on page 5-37).
	Block in air filter.	Clean or replace (**see** "Air Filter–Clean/Replace" on page 5-25).

Table 6–1 Fault Analysis and Troubleshooting for Engine (continue)

Fault Symptom	Cause	Remedy
Charging alarm indicator of storage battery lit on during operation.	Too low engine speed.	Check, adjust or replace the engine belt (**see** "Engine Belt-Check/Replace" on page 5-40).
Insufficient power of engine.	Too much engine oil.	Discharge redundant engine oil (**see** "Engine Oil-Check/Refill/Change" on page 5-29).
	Dirty air filter.	Clean or replace (**see** "Air Filter–Clean/Replace" on page 5-25).
	Leakage of pressure tube.	Tighten the screws and nuts of tube.
Crankshaft rotates slowly and can not be started.	Loose and eroded wiring of battery.	Clean and tighten the wiring.
	Incorrect lubricating oil model.	Change it with the lubricating oil of specified grade (**see** "Oil & Fluids Selection" on page 5-9).
Crankshaft rotates normally but can not be started.	No fuel in oil tank.	Refill (**see** "Fuel-Check/Refill/Replace" on page 5-42).
Unstable idling.	Improper adjustment of throttle cable.	Adjust throttle cable to natural condition.
	Fuel leakage.	Check and tighten the leaked part. If can't resolve it, please contact Sany or Sany dealer.

6.1.2 Vibratory Drum

Table 6–2 Fault Analysis and Troubleshooting for Vibratory Drum

Fault Symptom	Cause	Remedy
No vibration or small vibration at both positions of vibration switch.	Incorrect position of vibration switch.	Set switch to position I (**see** "Control Console" on page 3-4).
Air in hydraulic system.	Insufficient oil in hydraulic oil tank.	Check oil level and refill new oil (**see** "Hydraulic Oil-Check/Refill/Change" on page 5-48).
	Oil-suction tube not sealed.	Check oil-suction tube and tighten connecting elements.

6.1.3 Propel System

Table 6–3 Fault Analysis and Troubleshooting for Propel System

Fault Symptom	Cause	Remedy
Air in hydraulic system	Insufficient oil in hydraulic oil tank	Check oil level and refill new oil (**see** "Hydraulic Oil-Check/ Refill/Change" on page 5-48).
	Oil-suction tube not sealed	Tighten connecting elements
Large impact in transmission system or torpid steering	Insufficient lubricating grease	Fill grease (**see** "Grease for Propel Bearing-Fill" on page 5-61).

6.2 Electrical Parts

6.2.1 Basic Electrical System

Table 6–4 Fault Analysis and Troubleshooting for Basic Electrical System

Fault Symptom	Cause	Remedy
No power supply of complete machine.	Fuse burnt.	Open fusebox, pull out the damage fuse, and insert the spare fuse of the same model.
Failure of engine startup.	Fuse (F12、F53、F54、F11) burnt.	Open fusebox, pull out the damage fuse, and insert the spare fuse of the same model.
	Traveling handle and vibration selection switch not set at neutral position.	Set traveling handle and vibration selection switch to the neutral position (**see** "Control Console" on page 3-4).

6.2.2 Electrical System of Working Devices

Table 6–5 Fault Analysis and Troubleshooting for Electrical System of Working Devices

Fault Symptom	Cause	Remedy
No traveling or sluggish traveling.	Brake switch and emergency stopping switch not reset.	Reset brake switch and emergency stopping switch (**see** "Control Console" on page 3-4).
No vibration.	Emergency stopping switch not reset.	Reset emergency stopping switch (**see** "Check the

Table 6–5 Fault Analysis and Troubleshooting for Electrical System of Working Devices (continue)

Fault Symptom	Cause	Remedy
		Emergency Stop Switch" on page 4-10).
	Traveling speed is over 1.5 km/h.	Adjust the gear switch to change the speed to less than 1.5 km/h (**see** "Control Console" on page 3-4).
	Vibration button have been pressed.	Press down the vibration button. Stop vibration forcibly (**see** "Vibration Operation" on page 4-16).

6.2.3 Fuses

Table 6–6 Fuses

Code	Part	Current	Code	Part	Current
F11	Power of fan	15 A	F50	Front working light	15 A
F12	Ignition switch	15 A	F51	Instrument light	10 A
F13	Rear working light	10 A	F52	A/C power	20 A
F14	GPS power	5 A	F53	ECU power	30 A
F36	Indoor light	10 A	F34	Backup	15 A
F37	Radio	10 A	F31	Horn, reverse	10 A
F38	Front screen wiper	5 A	F32	Braking valve	5 A
F39	Rear screen wiper	5 A	F33	Turning lamp power	5 A
F40	Backup	5 A	F35	Backup fuse	10 A
F41	Cigarette lighter	10 A	F21	Backup fuse	5 A
F24	Brake valve power	5 A	F22	Screen power	5 A

Table 6–6 Fuses (continue)

Code	Part	Current	Code	Part	Current
F25	rear wheel change speed valve power	5 A	F23	Screen power supply	10 A
			F54	Excitation, stop	10 A

6.3 Air Conditioning System

6.3.1 Air Conditioning System

The common faults of air conditioning system generally are electrical faults, mechanical faults and refrigerant and freezing lubricant failures.

The symptoms are no cooling or insufficient cooling or abnormal noise.

Table 6–7 Common Faults and Troubleshooting of Air Conditioning System

Fault Symptom	Cause	Remedy
Abnormal sound in conveyor belt.	Too loose conveyor belt.	Adjust belt tightness (**see** "Compressor V- belt-Check/ Replace" on page 5-55).
Abnormal sound in evaporator.	Foreign matter enters the evaporator.	Open evaporator cover and take out foreign objects (**see** "A/C-Check/Maintain" on page 5-52).
The fan operates normally but the air volume is too small.	There are barriers on the air suction side.	Clean (**see** "A/C-Check/Maintain" on page 5-52).
	The fin of evaporator or condenser is blocked.	
The compressor does not work or it is difficult for the compressor to operate.	The tension of compressor belt is insufficient, and the belt is too loose.	Tension (**see** "Compressor V-belt-Check/Replace" on page 5-55).
The condensation effect of condenser is poor.	The condenser is blocked up by dust or foreign matters.	Clean the condenser and clear the blocking (**see** "A/C-Check/ Maintain" on page 5-52).

Specifications

7.Specifications

7.1 Dimension of the Equipment

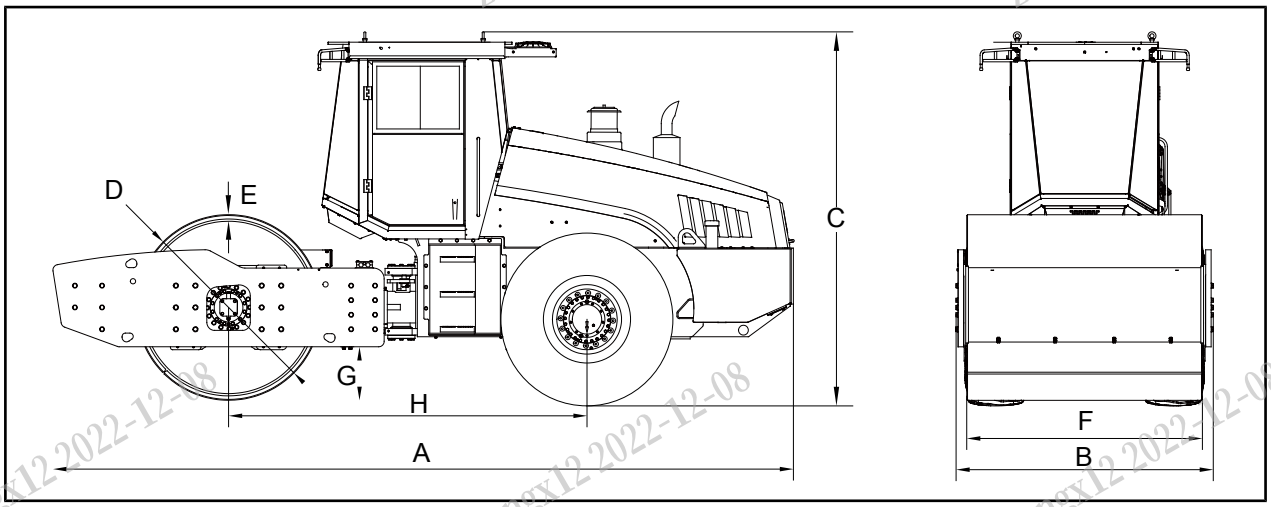


Table 7–1 Dimension of the equipment

Item		Unit	SSR200	SSR220
A	Length	mm	6797	6797
B	Width	mm	2318	2318
C	Height	mm	3330	3330
D	Vibratory drum diameter	mm	1600	1600
E	Thickness of vibratory drum rim	mm	40	40
F	Vibratory drum width	mm	2130	2130
G	Min. ground clearance	mm	410	410
H	Wheel base	mm	3182	3182

NOTE：

The above data are specifications of standard machine. Materials and specifications are subject to change without notice in accordance with our continuous technical innovations.

7.2 Specifications of the Equipment

Table 7–2 Technical Specifications

	Technical Parameters		SSR200	SSR220
Mass and load	Operating mass (kg)		20000	22000
	Distributing mass of vibratory drum (kg)		13600	14600
	Distributing mass of drive axle (kg)		6400	7400
	Static linear load of vibratory drum (N/cm)		638	678
Compaction mechanism	Vibration frequency (Hz)		29/35	29/35
	Nominal amplitude (mm)		2.0/1.0	2.0/1.0
	Exciting force (kN)		380/275	390/280
Power-driving performance	Travel speed (km/h)	Low speed	0 ~ 3.5 0 ~ 4.5	0 ~ 3.5 0 ~ 4.5
		High speed	0 ~ 5.5 0 ~ 7.5	0 ~ 5.5 0 ~ 7.5
	Theoretical gradeability (%)		45	45
	Steering angle (°)		±35	±35
	Swing angle (°)		±12	±12
	Min. turning outside diameter (mm)		12350	12350
Engine	Manufacturer		WEICHAI	WEICHAI
	Model		WP6G200E331	WP6G200-E331
	Rated power (kW)		147	147
Capacity	Battery (VxAh)		24×120	24×120
	Fuel tank (L)		300	300
	Hydraulic oil tank (L)		150	150

NOTE：

The above data are specifications of standard machine. Materials and specifications are subject to change without notice in accordance with our continuous technical innovations.

www.sanyglobal.com

Sany Automobile Manufacturing Co., Ltd.

SANY Industry Town, Economic and Technological Development Zone, Changsha, Hunan, China

Zip Code: 410100

Tel: 0086 4006098318

Website: www.sanyglobal.com