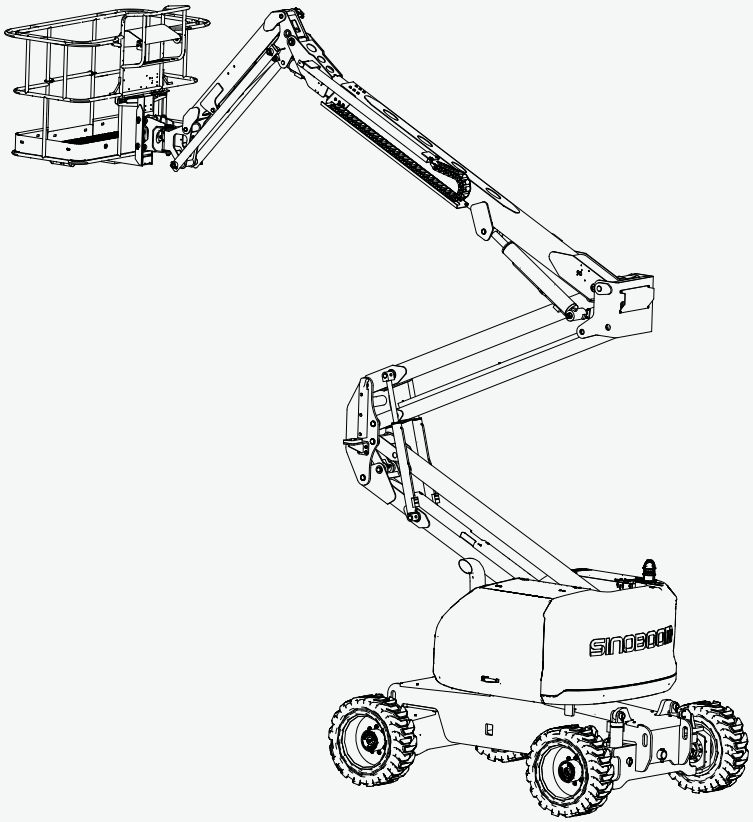
Maintenance Manual

Manual No: 504030110002-EN
Manual Version: B
May 2025
Translated version

AB15J Plus/AB480J Plus *0403000120/0403600100 to current*



CE SA GB EAC

SINOBOOM

⚠ WARNING

Operating, servicing and maintaining this vehicle or equipment can expose you to chemicals including engine exhaust, carbon monoxide, phthalates and lead, which are known to cause cancer and birth defects or other reproductive harm. To minimize exposure and avoid breathing exhaust, do not idle the engine except as necessary, service your vehicle or equipment in a well-ventilated area and wear gloves or wash your hands frequently when servicing.

For disposal, please comply with local regulations.

SINOBOOM

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To Users

Dear users, firstly thanks for choosing and using the machines of **Hunan Sinoboom Intelligent Equipment Co., Ltd.**

This machine is limited to transporting personnel, tools to work locations and performing safe operations on the work platform. Only authorized personnel who have received appropriate MEWP training may operate this machine. Before using the machine, carefully read and fully understand this manual and strictly follow its relevant instructions. Different countries, regions, or governments may have equipment relevant regulations that conflict with this manual. The stricter safety regulations should be followed. Our company will not be liable for any adverse consequences arising from the failure to operate and use the machine in accordance with this manual or other relevant regulations.

This manual provides necessary safety precautions and maintenance instructions for users. This manual covers the basic configuration information of one or more models. Please refer to the information applicable to your machine model. Treat this manual as an integral part of the machine and keep it with the machine at all times. This manual may not be copied, distributed, sold, or altered without written permission from Sinoboom.

Due to continuous improvement and upgrading of product design and different product models covered, some charts and textual content in the manual may be not applicable to your machine. Our company reserves the right to revise the contents of this manual due to technological improvements. Changes will be made without prior notice. Contact Sinoboom to obtain the most current version of the manual.

Please go to www. sinoboom. com to download your desired Operation Manual, Maintenance Manual and Parts Manual.

If any questions, please contact **Hunan Sinoboom Intelligent Equipment Co., Ltd.**

Manual Revision History:

Version	Date	Description
A	Jan. 2024	Original issue
B	May 2025	Update technical parameters, troubleshooting guidelines, control systems, and schematic diagrams. Add content related to engine options and the low temperature version (LTV).

Applicability

The manual applies to the following models and serial numbers:

Model	Metric Trade Name	Imperial Trade Name	Serial No.
AB15J Plus	AB15J Plus	AB480J Plus	0403000120 to current (except LTV) 0403600100 to current (LTV)

Note:

- Check the machine model and serial number on the machine nameplate. The location of the nameplate can be found in the ***Decals Diagram*** section of the Operation Manual.
- Product model numbers are indicated on the nameplates to distinguish products with different main technical parameters.
- Product trade names (product commercial codes) are used for marketing purposes and machine decals for the differentiation of products with different main technical parameters. Product trade names are categorized as metric and imperial trade names: metric trade names are applicable to regions/countries using the metric system or as specifically requested by customers; imperial trade names are applicable to regions/countries using the imperial system or as specifically requested by customers.
- “LTV” stands for “Low-Temperature Version,” indicating the low-temperature configured model of this product series. Contents marked with “LTV” in the text apply only to low-temperature configured models. Unmarked content applies to all configurations of this model.

CONTENTS

1 SAFETY WARNING SYMBOLS AND SIGNS

The safety warning symbols used on the machine and in the manuals have the following meanings:

Safety warning symbol. This symbol is used to alert you to potential hazards. Observe all safety instructions following a symbol to avoid possible injuries.

⚠ DANGER

Indicates an imminently hazardous situation that, if not avoided, *will* result in death or serious injury.

⚠ WARNING

Indicates an imminently hazardous situation that, if not avoided, *could* result in death or serious injury or serious damage to the machine.

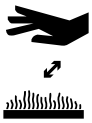
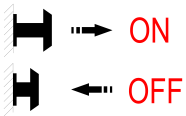
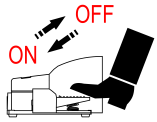
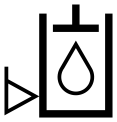
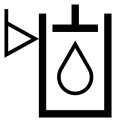
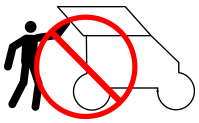
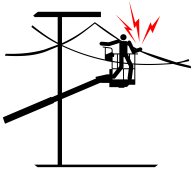
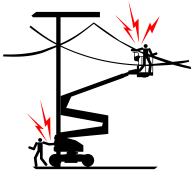
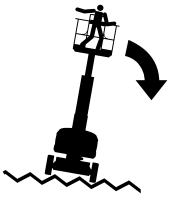
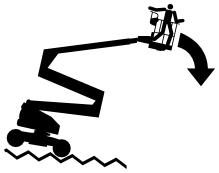
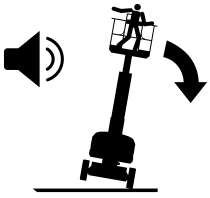
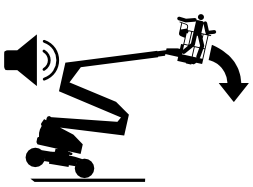
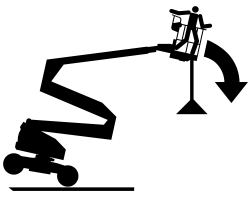
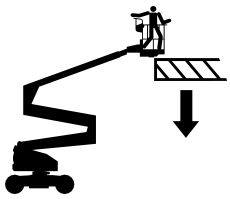
⚠ CAUTION

Indicates an imminently hazardous situation that, if not avoided, *could* result in minor or moderate injury or machine damage.

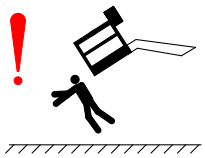
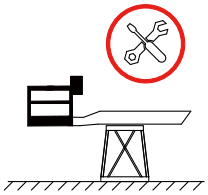
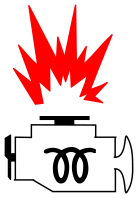
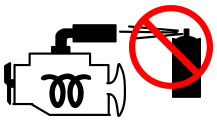
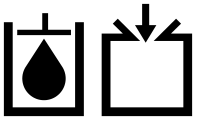
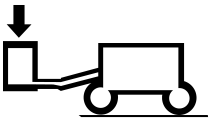
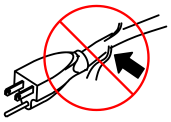
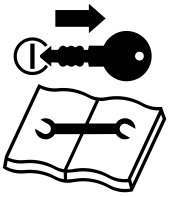
NOTICE

Indicates information directly or indirectly related to personal safety, machine damage, or property loss.

The safety signs used on the machine and in the manuals have the following meanings:

 Please Read Maintenance Manual	 Anchor point only for 1 person	 Wind speed	 Chock the wheels	 Chock the wheels
 Please read Operation Manual	 Add lubricant	 Crushing hazard – safety shoes required	 Danger of hot, high-pressure fluid spray	 horn
 Noise Level	 Burn Hazard	 Keep a safe distance from high temperatures	 Pull out – ON Press – OFF	 Alarm sounding
 Depress – ON Release – OFF	 Hydraulic oil level low	 Hydraulic oil level high	 Temperature	 Replace with tires of the same specification
 Only qualified maintenance personnel may access the compartment	 Telectrocution hazard – be cautious on the platform	 Electrocution hazard – be cautious on the platform	 Tipping hazard – the uneven ground	 Tipping hazard – the uneven ground
 Tipping hazard – never use machine in strong, gusty winds	 Tipping hazard – never use machine in strong, gusty winds	 Tipping Hazard – never push and pull some objects beyond the platform	 Tipping Hazard - never hang some objects beyond the platform	 Tipping hazard – never place ladders and scaffolding on the platform
				

SAFETY WARNING SYMBOLS AND SIGNS

Collision hazard – keep extending platform clear of obstacles down below when descending platform	Collision hazard – keep head clear of overhead obstacles when raising platform	Crushing hazard – keep hands clear from overhead obstacles when raising platform	Fall hazard – never climb on the plaform	Fall hazard – never climb on the boom
 Crushing and Collision Hazard-never stand under the platform	 Supports are placed under the boom during maintenance	 Keep clear from the rotating platform	 Engine preheating explosion hazard	 Never use ether or other starting additives for machines equipped with a glow plug
 Fuel explosion hazard	 Lateral force	 Electrocution hazard	 Battery explosion hazard	 No smoking or open flames/sparks
 No smoking or open flames/sparks	 Lifting Point	 Lashing Point	 Tire Ground Pressure	 Hydraulic Oil Filler
 Platform Load Capacity	 Do not use damaged power cords	 Tool or weight	 Fast/high speed	 Slow/low speed
 Only qualified maintenance personnel may perform maintenance work	 Wear protective clothing and safety goggles			

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2 MAINTENANCE SAFETY PRECAUTIONS

2.1 GENERAL

This chapter covers safety precautions that must be taken when servicing the mobile elevating work platform. Before carrying out any repair work, maintenance personnel must carefully read and understand all warnings and precautions, and follow the instructions in this manual when performing maintenance on the mobile elevating work platform.

⚠ WARNING

It is forbidden to alter or modify the machine or any components without the written permission of Hunan Sinoboom Intelligent Equipment Co., Ltd.

2.2 INSTRUCTIONS BEFORE MAINTENANCE

Requirements for Maintenance Personnel

Maintenance personnel is responsible for maintaining the machine so that it can be operated safely and normally. Before performing inspection and maintenance work on this machine, maintenance personnel should read, understand and comply with all applicable regulations and requirements of employers, local authorities, and governments related to the operation of this machine. Maintenance personnel must also read and fully understand this manual.

Maintenance personnel shall:

- obtain appropriate qualification and authorization
- be experienced professional technicians or engineers
- be licensed electricians to install and connect high-voltage electrical equipment;
- be familiar with the machine and its associated risks
- receive appropriate training, including but not limited to training on the use of special equipment
- be familiar with the safety precautions and related operating procedures for maintenance work on this machine.

NOTICE

- *Only authorized personnel who have received appropriate training and obtained qualifications may repair this machine.*
- *Individuals who have consumed alcohol or medication, who experience physical or mental fatigue or are unwell may not carry out any work on the machine.*

Precautions before Maintenance

Before and during inspection and maintenance procedures personnel shall use caution and take measures to avoid dangerous situations. Those measures include, but are not limited to, the following:

1. Choose an appropriate location for the maintenance procedures.
   - Always park the machine on level, firm ground for maintenance, and ensure that the maintenance area is clean and unobstructed.
   - If the machine uses the engine as the main power source, ensure that the maintenance site is open and well ventilated. The exhaust gases from the engine contain chemicals that may cause suffocation or poisoning, so forced ventilation measures must be taken if it is necessary to start the engine in a restricted indoor area. A hose can be connected to the exhaust pipe to discharge the exhaust gases to the outside, and the doors and windows shall be opened for air circulation.
2. Choose appropriate safety equipment.
   - Maintenance personnel must identify risks in conjunction with inspection and maintenance work, and select appropriate safety equipment that is suitable for the type of work and the work place conditions, such as safety helmets, protective masks, protective gloves, goggles, protective clothing, safety belts and safety shoes.
   - For maintaining high-voltage equipment, the maintenance personnel must wear insulated protective supplies (insulated clothing, insulated gloves, insulated shoes, etc.).

- Before carrying out inspection and maintenance work, check that the safety equipment is in good condition and is used correctly.
- Safety equipment must be inspected regularly and needs to be replaced in case of damage.

3. Choose appropriate repair tools.
   - Before conducting any inspection and/or maintenance work, maintenance personnel shall prepare appropriate tools as required for the type of work, such as wrenches, screwdrivers, pliers, multimeter, pressure gauge, lubrication device, jack and lifting equipment.
   - For maintaining high-voltage equipment, it is necessary to use insulated tools with an insulating handle that can withstand a voltage of over 1000V.
   - Verify that the load capacity of jacks or lifting equipment is suitable for the planned task. Refer to the ***Weight of Major Components*** section to select a device with sufficient load capacity.
   - Service tools must be kept clean and in good condition.
4. After the machine is parked, use blocks (such as triangular wedges) to secure the wheels to prevent the machine from moving accidentally.
5. Do not perform inspection and/or maintenance work after the machine has been started.
   - Before performing inspection and maintenance work, make sure the machine has turned off, remove the key and press the power-off switch to the “OFF” position. If the machine is equipped with high-voltage lithium batteries, the lithium battery service switch needs to be disconnected. An “Out of Service” warning sign can be placed next to the turntable control box and platform control box. No one is allowed to start the machine or reset a removed fuse.

     ⚠ WARNING

     Inadvertently starting the machine during inspection or maintenance may cause machine damage or personal injury/death.

   - If inspection or maintenance work must be carried out while the machine is running at least two people should work together. One person must be close to the turntable control panel or platform control panel so as to be able to turn off the machine any time if necessary while a second person carries out inspection or maintenance work, both persons shall maintain close contact with each other at all times.
6. When maintaining electrical components, the power-off switch must be turned to the “OFF” position. If the machine is equipped with high-voltage lithium batteries, the lithium battery service switch must be disconnected.
7. The machine should be cleaned before carrying out inspection and/or maintenance work. Avoid letting dust or debris enter internal machine components during the maintenance process, as this can affect the machine's performance.

The above listed requirements must be adhered to strictly during maintenance/inspection work. In addition, all other appropriate measures must be taken to ensure safety during maintenance work, taking account of the working environment.

2.3 MAINTENANCE SAFETY

Unsafe Maintenance Hazards

⚠ WARNING

- **Before performing any adjustment or service operations, power off all control units and ensure that all moving parts are safely secured and cannot move unintentionally.**
- **Before performing any adjustment or service operations, ensure that the boom is stowed. Never work under a raised platform/boom. If it becomes necessary to work under the raised platform/boom, the platform and boom must be supported with appropriate safety supports.**
- **When lifting or moving heavy components of the machine, use equipment with sufficient capacity for assistance, and it should be operated by professionals with the qualifications. The lifting or moving operation shall be done gently, and pay attention to objects on the ground to prevent tripping or falling. Lift the components smoothly and at a constant speed to avoid vibration or shock, and do not allow the components to overturning or remain suspended for a long time. After moving, do not place heavy components at an unstable position.**
- **Before vertical lifting, ensure that all components of the assembly are securely fastened with screws. It is strictly forbidden to unscrew the fasteners of the components in the assembly.**
- **When machine parts are lifted by other equipment, ensure that there are no persons under and/or around the equipment.**
- copper rod **When striking brass rods with a mallet, make sure to wear eye protection.**
- **If you need to replace parts, use only original parts specified by Sinoboom. Parts replaced during maintenance should be the same or equivalent to the original machine's components.**
- **Do not wash the machine with water. The machine contains**

⚠ WARNING

electronic components such as solenoid valves and sensors, which may fail or operate erratically after water ingress. If it is necessary to wash with water, turn off the emergency stop button and power-off switch before proceeding. Only turn the power back on after ensuring the machine is completely dry.

- Make sure the machine is turned off before using flushing equipment (such as a high-pressure water gun) to clean the machine. Do not direct water or steam ejected from the flushing equipment at electrical components, as this may cause short circuits or electrical shocks.
- After maintenance is completed, thoroughly clean up any spilled hydraulic oil, and avoid allowing it to be spilled on the ground.
- After maintenance is completed, immediately wash off any hydraulic oil that may have come into contact with your skin.
- Waste hydraulic fluids, fuels, coolants and refrigerants must be recycled or disposed as per local regulations.

High Temperature and High Pressure Hazards

⚠ WARNING

- While the machine is in operation or after running for a period of time, components may generate high surface temperatures, which can cause burns upon contact. Do not touch any hot parts!
- It is forbidden to repair or tighten hydraulic hoses or seals while the machine is operating or when the oil system is under pressure.
- Before loosening or disassembling hydraulic parts (especially the counterbalance valve on the cylinder), the hydraulic pressure of all hydraulic lines should be released and the hydraulic oil should completely cool down.
- After the hydraulic pressure has been released, take protective measures first, and then disassemble the hydraulic components slowly to prevent the hydraulic oil from splashing and causing injuries.
- Never check for hydraulic leakages by hand. Use a piece of cardboard or stiff paper to locate leaks, and wear gloves to protect your hands from spraying hydraulic fluid.
- Do not operate the machine in case of hydraulic or air leaks. Oil or air leakage from the hydraulic system may penetrate and burn the skin.
- Never plug hydraulic leaks by hand. If there is a leak, the pressure of the hydraulic system should be released first, maintenance/repair should be carried out after the hydraulic oil has cooled down.
- If the machine is equipped with a radiator, do not attempt to unscrew the radiator cover or touch the radiator while the coolant is still at high temperature.
- If injury occurs due to high temperature and/or high pressure, seek immediate medical attention. If treatment is not carried out

⚠ WARNING

immediately, serious complications may result.

Platform welding and grinding operation hazards

⚠ WARNING

- **Welding, grinding and polishing operations must follow the appropriate local safety procedures.**
- **Before performing welding, grinding and polishing operations, turn off the machine's power, and ensure that all wires or cables are connected correctly.**
- **Do not use the machine as a ground wire during welding and grinding operations.**
- **Always make sure that all power tools are placed completely within the perimeter of the platform. Do not hang the cords of power tools on the guardrail of the platform or in any work area outside the platform, and do not hang the power tools directly by their cords.**

Fire and Explosion Hazards

⚠ WARNING

- **Do not operate the machine, charge the battery or refuel the machine in places where potentially flammable or explosive gases may be present.**
- **Refueling and charging should be carried out in a well-ventilated place without flames, sparks, and other hazards that may cause fire or explosion.**
- **For engine-powered machines, do not refuel the machine while the engine is running.**
- **Never spray ether or other starting agents into glow-plug-equipped engines (engine-powered machines).**
- **The electrolyte in the battery can produce explosive gases. Avoid any actions that may produce flames or sparks near the battery. Never touch the battery terminals or cable clamps with tools that can generate sparks.**
- **Never reverse the positive and negative terminals of the batteries.**
- **Only approved non-flammable cleaning solutions should be used on the machine.**
- **In case the machine catches fire, do not use the "water drenching method"; use a "dry powder extinguisher" to extinguish the fire.**

Battery Hazard

⚠ WARNING

- Be sure to read and adhere to the battery manufacturer's recommendations on proper battery use and maintenance procedures.
- Individuals without adequate professional qualification should not repair and maintain the battery system, otherwise this may cause personal injury or damage to the battery system.

- Individuals without adequate professional qualification should not modify parameters, signal lights, etc. during the operation of the battery system, otherwise this may cause personal injury or damage to the battery system.

- When the BMS issues an alarm, do not use the machine. Ensure that the fault has been resolved before the machine can be used.

- Always wear goggles, protective gloves and protective clothing, and remove all rings, watches and other accessories before servicing the battery. Contact with live circuits may result in death or serious injury.

- Before replacing the battery, be sure to select an appropriate number of personnel and suitable lifting methods.
- It is forbidden to modify or dismantle the battery system without approval to avoid serious accidents.
- When maintaining electrical components, the battery should be disconnected.
- Do not short-circuit the battery terminals by connecting them with tools or other metal objects.
- The battery charger can only be connected to a grounded three-wire AC power outlet. Make sure the charger is in the proper operating position before charging. Do not connect the battery directly to a power outlet.
- If the battery becomes hot, deformed, leaks, emits an unusual smell, or produces smoke during use, stop using the battery immediately and report to the relevant maintenance personnel promptly.

⚠ WARNING

- Batteries contain sulfuric acid and can produce explosive mixtures of hydrogen and oxygen. Keep any materials (including cigarette/smoking materials) that can cause sparks or flames away from batteries to prevent explosion.
- It is strictly prohibited to expose the battery to extremely high temperatures or to throw it into a fire.
- Never touch the battery terminals or cable clamps with tools that can generate sparks.
- Never charge the battery in direct sunlight. The battery should be charged in a well-ventilated place.

⚠ CAUTION

- Avoid spilling battery acid or allowing it to come into contact with unprotected skin. If battery acid spills, use water mixed with bicarbonate (baking soda) to neutralize the acid. In case of contact with battery acid, rinse the acid off immediately with plenty of water and seek medical attention promptly.
- Always keep the battery upright. If the battery is placed on its side or at an angle, liquid may spill from the battery.
- Discarded batteries can be hazardous, and must not be treated like regular waste. If you need to discard them, please contact a battery recycling company.

NOTICE

- **Please use the charger provided by the manufacturer to charge the battery.**
- **The charging process must be completed in full. Frequent intermittent charging can damage the battery.**
- **The battery is only suitable for use with the equipment it was provided with at the time of manufacture. Do not use the battery for other purposes.**
- **Do not reverse the positive and negative terminals of the battery for use.**
- **Do not short circuit the positive and negative terminals of the battery system.**
- **Do not place objects or tools on the battery to prevent short circuiting it.**
- **Do not strike, throw, step on, or hit the battery with sharp objects.**
- **Do not immerse the battery in water, acidic, alkaline or salty solutions, and protect the battery from rain.**
- **The battery should be fully charged immediately after each use of the machine. During charging, keep the power-off switch closed.**

NOTICE

Battery over-discharge (continued use of battery with levels of less than 10 %) or battery under-voltage caused by long-term non-charging (battery with levels of less than 10 % not charged for more than three days), resulting in battery capacity attenuation and failure, are not covered by the warranty.

2.4 CONSIDERATIONS AFTER MAINTENANCE

1. Check the machine functions so that faults such as oil leakage or poor operation can be detected as early as possible.
2. After maintenance, all maintained parts must be checked for abnormal operation, oil leakage, loose bolts and other problems.
3. The safety protective device needs to be restored or reinstalled, and if necessary, be recalibrated.
4. After maintenance, clear up the tools and equipment for maintenance, remove the replaced parts and loose objects, and clean up the site.
5. Record inspections and maintenance as required.

NOTICE

All maintenance work must include a verification that the machine is operating properly.

⚠ WARNING

- **Waste liquids must not be dumped or disposed of randomly. Waste liquids shall be discharged into appropriate containers.**
- **Waste hydraulic fluids, fuels, coolants and refrigerants must be recycled or disposed as per local regulations.**

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3 TECHNICAL CHARACTERISTICS

3.1 MACHINE SPECIFICATIONS

Table 3-1 Specifications

Item	Metric	Imperial
Product Category		
Power type	Diesel engine-powered	
Axle type	Oscillating axle	
Dimensions		
Maximum platform height	14.7 m	48 ft 3 in
Maximum working height	16.7 m	54 ft 9 in
Maximum horizontal reach	8.5 m	27 ft 11 in
Maximum horizontal working envelope	9.1 m	29 ft 10 in
Maximum up and over height	7.3 m	23 ft 11 in
Overall length (stowed)	7.49 m	24 ft 7 in
Overall length (transport position)	5.75 m	18 ft 10 in
Overall width (stowed)	2.3 m	7 ft 7 in
Overall width (Transport position)	2.3 m	7 ft 7 in
Overall height (stowed)	2.28 m	7 ft 6 in
Overall height (Transport position)	2.66 m	8 ft 9 in
Wheelbase	2.3 m	7 ft 7 in
Ground clearance	0.37 m	1 ft 3 in
Platform dimensions (L×W×H)	1.83×0.85×1.1 m	6 ft×2 ft 9 in×3 ft 7 in
Performance		
Rated platform capacity	300 kg	661 lb
Maximum number of occupants of the platform	2 persons	
Travel speed (stowed)	0 – 4.5 km/h	0 – 2.8 mph
Travel speed (elevated)	0 ~ 1.0 km/h	0 ~ 0.6 mph
Gradeability (4WD)	40%	
Turntable slewing (angle/continuity)	360°/continuous 355°/noncontinuous(selectable)	
Platform slewing angle	180°	
Maximum allowable inclination	5°	

Table 3-1 Specifications (continued)

Item	Metric	Imperial
Turning radius (inner/outer)	1.82 m/4.78 m	6 ft/15 ft 8 in
Turntable tailswing	0.1 m	4 in
Tire (spec/type)	33×12D610 (foam-filled) 33×12-20 (solid)	
Maximum operating noise level	104dB	
IP rating	IP54	
Maximum Total Vibration on the Platform	2.5m/s²	
Maximum Whole Body Vibration Value (WBV)	0.5m/s²	
Power		
Drive × steer	4WD×2WS	
Engine (power/rpm/spec/brand/emission standard)	18.2kW/3000rpm/D1105-EF02/Kubota/EU stage V, EPA Tier 4F 43.2kW/2400rpm/V2403-CR-TIE4B-SBM-2/Kubota/EPA Tier 4 36kW/2600rpm/V2403BM-DI-CT04/Kubota/China IV	
Hydraulic tank capacity	112 L	24.6 gal (UK)/29.6 gal (US)
Hydraulic tank refueling volume	95 L	20.9 gal (UK)/25.1 gal (US)
Diesel tank capacity	55 L	12.1 gal (UK)/14.5 gal (US)
Hydraulic system pressure	28 MPa	4061 Psi
Battery (voltage, capacity)	12 V，100 Ah (Engine power=18.2kW)/200 Ah (Engine power ≥36kW)	
System voltage	12 VDC	
Control voltage	12 VDC	
Weight		
Gross weight	7700 kg(Engine power=18.2kW 8070 kg（ Engine power ≥36kW ）	16976 lb(Engine power=18.2kW) 17791 lb (Engine power ≥36kW)
Ground Bearing Data		
Maximum tire load	4320 kg	9523 lb
Ground pressure	1512 kPa	219 Psi
Environment		
Maximum allowable lateral force (restricted/unrestricted)	400 N	90 lbf
Maximum Allowable Wind Speed	12.5 m/s	28 mph
Maximum Allowable Altitude	1000 m	3280 ft
Allowable ambient temperature range (except for LTV)	-20℃ – 40℃	-4℉ – 104℉
Allowable ambient temperature range(LTV)	-30℉ ~ 40℉(Complete cold weather heating package)	-22℉ ~ 104℉(Complete cold weather heating package)
Maximum allowable relative humidity	90%	

Table 3-1 Specifications (continued)

Item	Metric	Imperial
Storage environment(non-LTV)	Store at -20℃ to 50℃ (-4℉ to 122℉) in a well-ventilated environment with 90% relative humidity (max.) (20℃ [68℉]), protected from rain, sun, corrosive gas, flammable or explosive materials.	
Storage environment(LTV)	Store at -30℃ to 50℃ (-22℉ to 122℉) in a well-ventilated environment with 90% relative humidity (max.) (20℃ [68℉]), protected from rain, sun, corrosive gas, flammable or explosive materials.	

Note:

1. The platform height plus the operator height (assumed to be 2m/6ft 7in) equals the working height.
2. The maximum horizontal reach plus the arm length of the operator (assumed to be 0.6 m [1ft 11in]) is the maximum horizontal working envelope.
3. The ground bearing information is approximate, without considering different options. It is applicable only when taking an adequate safety factor into account.
4. Different regions should use hydraulic oil, engine oil, coolant, fuel, lubricating oil, etc., that are suitable for the environmental temperature requirements.
5. The machine requires auxiliary starting devices for operation in cold climates.
6. Rated platform load capacity refers to the maximum allowable load on the platform, including the weight of persons, materials, tools, accessories and other objects. The mass of one person shall be taken as 80 kg (176 lb).

3.2 FUNCTION SPEED

Table 3-2

Item	Parameters
Main boom lift up	30 ~ 40 s
Main boom lift down	35 ~ 45 s
Raise articulating boom lift	40 ~ 55 s
Lower articulating boom lift	30 ~ 40 s
Rotate the turntable (355°) – noncontinuous	70 ~ 90 s
Rotate the turntable (360°) – continuous	75 ~ 95 s
main boom extend	26 ~ 32 s
main boom retract	24 ~ 30 s
Platform rotation (180°)	18 – 22 s
Level platform upward	50 – 60 s
Level platform downward	40 – 50 s
Raise jib	30 – 38 s
Lower jib	25 – 32 s
Travel – stowed	21 ~ 27 s
Travel – Operating position	98 - 120 s

Table 3-2 (continued)

Item	Parameters
Braking distance	≤1.2m (3.9ft)

Note:

1. Start and stop are determined by the action itself, not by the controller or switch.
2. Travel test results vary depending on tire specifications.
3. All speed tests should be conducted from the platform control box. Test results will differ if tested from the ground controller.
4. All tests should be conducted with the hydraulic oil temperature higher than 50 - 60 ℃ (122 - 140 ℉). If the hydraulic oil temperature is too low, the test results will be affected.

Test requirements:

Main boom lift : For this test, the articulating boom lift must be fully lowered, the telescoping boom of the boom must be fully retracted. Raise the main boom lift from the lowest to the highest position, and lower it again from the highest to the lowest position. Perform these maneuvers for two times.

Articulating boom lift : Raise the articulating boom lift from the lowest to the highest position, and lower it again from the highest to the lowest position. Perform these maneuvers for two times.

Slew turntable : With the main boom fully retracted and engine at low idle, rotate the turntable through one full cycle for two times.

Extend/retract main boom : With the main boom horizontally positioned, extend the main boom from the fully retracted to the fully extended position, and retract it from the fully extended to the fully retracted position again. Perform this maneuver for two times.

Platform rotation : With the platform horizontal, rotate the platform from the full left to the full right position, and rotate it again from the full right to the full left position. Perform this maneuver for two times.

Platform levels out : Level the platform upward from the lowest to the highest position, and level the platform downward from the highest to the lowest position. Perform this maneuver for two times.

Jib lifts and descends : The platform is horizontal, starting with the jib at the lowest position. raise the jib from the lowest to the highest position, and lower the jib again from the highest to the lowest position. Perform this maneuver for two times.

Travel – stowed : The test shall be done on a level surface. Switch to high engine speed and high travel speed, and push the drive joystick to maximum travel distance to drive forward and reverse for 30m (98.4ft) separately for two times.

Travel-operating position : The test shall be done on a level surface. Switch to high engine speed, and push the drive joystick to maximum travel distance to drive forward and reverse for 30m (98.4ft) separately for two times.

Braking distance : As described in the “travel – stowed” test requirements, once the machine reaches the maximum travel speed, immediately release the joystick (starting timing) until the machine stops. Perform this maneuver for two times.

3.3 WEIGHT OF MAJOR COMPONENTS

⚠ WARNING

- **Never attempt to move heavy components without the assistance of mechanical equipment.**
- **Never place heavy components at an unstable position.**

Table 3-3

Component	Metric (kg)	Imperial (lb)
Chassis assembly	2553	5628
Turntable Assembly	2916	6429
Boom assembly	831	1832
Base boom	179	395
Telescoping boom	92	203
Jib Assembly	148	326
Cable track system;	26	57
Platform (medium size)	149	328
Platform (small size)	158	345
Working Platform (1.83m[6ft] revolving door)	159	350
Working Platform (1.45m[4.6ft)	145	320
Counterweight	1804	3977
Slewing Mechanism	133	293
Telescopic Cylinder	60	132
Lifting Leveling Cylinder	22	49
Downward Leveling Cylinder	20	44

Table 3-3 (continued)

Component	Metric (kg)	Imperial (lb)
Main lift cylinder	74	163
Articulating boom lift cylinder	32	71
Jib Cylinder	26	57
Swing Cylinder	32	71
Travel Motor	17	37
Travel Reducer	50	110
Tire and Wheel Assembly	160	353
Slewing reducer	105	231
Engine-V2403-CR-TIE4B	232	511
Engine-D1105	93	205
Engine-V2403BM-DI-CT04	184	406
Note: The weight of certain components will vary with the machine's option configuration.		

3.4 PRESSURE SETTINGS

Table 3-4

Movement	Maximum pressure
Steering	16 MPa (2321 psi)
Upward/downward platform leveling	21 MPa (3046 psi)
Main boom lowering	24 MPa (3481 psi)
Articulating boom lowering	8.5 MPa (1233 psi)
Boom extending	14.5 MPa (2103 psi)
Turntable slewing	12 MPa (1740 psi)

3.5 OIL SPECIFICATIONS

NOTICE

- *Please choose suitable oil according to the ambient temperature and local regulations; the use of unsuitable oil will damage the machine components.*
- *Oils of different grades or viscosities should not be mixed. When refilling oil, the oil being added must be of the same grade and viscosity as that of the oil currently in use in the machine.*
- *To fill with oil with a different grade or viscosity, the remaining oil in the circuit must be drained out completely.*
- *The oil recommendations in this manual are for general operating conditions. For special environments or special operating requirements please contact Sinoboom for special oil.*

⚠ WARNING

- **Before refilling oil, wait until the temperature of the machine drops to room temperature, otherwise it may cause splashes, burns or other personal injury.**
- **The use of inferior oils is strictly prohibited. Using inferior oil may damage the machine, and faults caused by this are not covered by Sinoboom's warranty.**

Hydraulic Oil

Factory-filled hydraulic oil is usually based on the ambient temperature of the delivery place or as specified by customers. If the factory-filled hydraulic oil is not applicable for the machine operating environments, change to other hydraulic oil suitable for actual operating environment. The following table shows the recommended hydraulic oil grade for different ambient temperature ranges:

Table 3-5

Ambient temperature range	Hydraulic oil grade
> 40℃ (104℉)	HM-68
0℃ – 40℃ (32℉ – 104℉)	HM-46
-15℃ – 25℃ (5℉ – 77℉)	HV-32
-22℃ – 25℃ (-7.6℉ – 77℉)	L-HS32
< -22℃ (-7.6 ℉)	AE-VX

Gear Oil

This machine is filled with heavy-duty vehicle gear oil (GL-5). Choose the oil viscosity grade that suits your region's ambient temperature. The following table shows the recommended ambient temperature for different viscosity grades of gear oil:

Table 3-6

Viscosity grade	Recommended ambient temperature
75W-90	-35 – 40℃ (-31 – 104℉)
80W-90	-25 – 40℃ (-13 – 104℉)
85W-90	-12 – 50℃ (10.4 – 122℉)

Note: Sinoboom recommends Mobil gear oil.

3.6 TORQUE SPECIFICATIONS

Special Torque Requirements

Please refer to the table below for special torque requirements:

Table 3-7 Special torque requirements

No.	Name	Torque value
1	Wheel nut	300 Nm (221ft-lb)
2	Drive reducer bolt	300 Nm (221ft-lb)
3	Rear outrigger tightening bolt (at the connection with chassis weldment)	300 Nm (221ft-lb)
4	Slewing bearing fastening bolt (at the connection with chassis)	300 Nm (221ft-lb)
5	Slewing bearing fastening bolt (at the connection with turntable)	300 Nm (221ft-lb)
6	Counterweight fastening bolt	730 Nm (538 ft-lb)
7	Swing cylinder top bolt M10	70Nm (52ft-lb)
8	Swing cylinder bottom nut M22	630Nm (465ft-lb)
9	Cable nut M8	9 – 11Nm (6.6 – 8.1ft-lb)
10	Cable fastening nut M10	18 – 23 Nm (13.2 – 17ft-lb)

Hydraulic Fitting Torque

The hydraulic fittings with metric thread must be installed with the following torques.

Table 3-8 Hydraulic Fitting Torque – Metric

Thread size	Installed with aluminum	Installed with steel	
	ED, O-ring + Circlip	ED, O-ring + Circlip	O-ring seal
L (light-duty)			
M10×1	18 ± 1 Nm(13 ± 1 ft-lb)	20 ± 2 Nm (15 ± 2 ft-lb)	18 ± 1 Nm (13 ± 1 ft-lb)
M12 × 1.5	30 ± 2 Nm (22 ± 2 ft-lb)	35 ± 2 Nm (26 ± 2 ft-lb)	30 ± 2 Nm (22 ± 2 ft-lb)
M14 × 1.5	42 ± 3 Nm (31 ± 2 ft-lb)	48 ± 4 Nm (35 ± 3 ft-lb)	35 ± 2 Nm (26 ± 2 ft-lb)
M16 × 1.5	55 ± 4 Nm (41 ± 3 ft-lb)	60 ± 4 Nm (44 ± 3 ft-lb)	40 ± 3 Nm (30 ± 3 ft-lb)
M18 × 1.5	75 ± 5 Nm (55 ± 4 ft-lb)	75 ± 5 Nm (55 ± 4 ft-lb)	45 ± 3 Nm (33 ± 4 ft-lb)
M22 × 1.5	90 ± 6 Nm (66 ± 4 ft-lb)	130 ± 8 Nm (96 ± 6 ft-lb)	60 ± 4 Nm(44 ± 3 ft-lb)
M27 × 2	120 ± 8 Nm (89 ± 6 ft-lb)	185 ± 12 Nm (136 ± 9 ft-lb)	100 ± 7 Nm (74 ± 5 ft-lb)
M30 × 2	140 ± 8 Nm (103 ± 6 ft-lb)	245 ± 15 Nm (181 ± 11 ft-lb)	135 ± 8 Nm (100 ± 6 ft-lb)
M33 × 2	180 ± 10 Nm (133 ± 7 ft-lb)	320 ± 20 Nm (236 ± 15 ft-lb)	160 ± 10 Nm(118 ± 7 ft-lb)
M42 × 2	240 ± 15 Nm (177 ± 11 ft-lb)	450 ± 25 Nm (332 ± 18 ft-lb)	210 ± 13 Nm (155 ± 10 ft-lb)
M48 × 2	280 ± 20 Nm (207 ± 15 ft-lb)	540 ± 30 Nm (398 ± 22 ft-lb)	260 ± 15 Nm (192 ± 11 ft-lb)
S (heavy-duty)			
M12 × 1.5	33 ± 2 Nm (24 ± 2 ft-lb)	43 ± 3 Nm (32 ± 2 ft-lb)	35 ± 2 Nm (26 ± 2 ft-lb)
M14 × 1.5	42 ± 3 Nm (31 ± 2 ft-lb)	50 ± 4 Nm (37 ± 3 ft-lb)	45 ± 3 Nm (33 ± 2 ft-lb)
M16 × 1.5	55 ± 4 Nm (41 ± 3 ft-lb)	75 ± 5 Nm (55 ± 4 ft-lb)	55 ± 4 Nm (41 ± 3 ft-lb)
M18 × 1.5	75 ± 5 Nm (55 ± 4 ft-lb)	95 ± 6 Nm (70 ± 4 ft-lb)	70 ± 5 Nm (52 ± 4 ft-lb)
M22 × 1.5	90 ± 6 Nm (66 ± 4 ft-lb)	140 ± 8 Nm (103 ± 6 ft-lb)	100 ± 10 Nm (74 ± 7 ft-lb)
M27 × 2	120 ± 8 Nm (89 ± 6 ft-lb)	185 ± 12 Nm (136 ± 9 ft-lb)	160 ± 10 Nm (118 ± 7 ft-lb)
M30 × 2	140 ± 8 Nm (103 ± 6 ft-lb)	245 ± 15 Nm (181 ± 11 ft-lb)	210 ± 13 Nm (155 ± 10 ft-lb)
M33 × 2	180 ± 10 Nm (133 ± 7 ft-lb)	320 ± 20 Nm (236 ± 15 ft-lb)	260 ± 15 Nm (192 ± 11 ft-lb)
M42 × 2	240 ± 15 Nm (177 ± 11 ft-lb)	450 ± 25 Nm (332 ± 18 ft-lb)	330 ± 20 Nm (243 ± 15 ft-lb)
M48 × 2	280 ± 20 Nm (207 ± 15 ft-lb)	540 ± 30 Nm (398 ± 22 ft-lb)	420 ± 25 Nm (310 ± 18 ft-lb)

The hydraulic pipe fittings with British Standard Pipe (BSP) thread must be installed with the following torques.

Table 3-9 Hydraulic Fitting Torque - British Standard Pipe (BSP)

Thread size	Installed with aluminum	Installed with steel	
	ED, O-ring + Circlip	ED, O-ring + Circlip	O-ring seal
L (light-duty)			
G1/8A	20 ± 1 Nm (15 ± 1 ft-lb)	20 ± 1 Nm (15 ± 1 ft-lb)	-
G1/4A	35 ± 2 Nm (26 ± 2 ft-lb)	40 ± 2 Nm (30 ± 2 ft-lb)	-
G3/8A	50 ± 3 Nm (37 ± 2 ft-lb)	75 ± 5 Nm (55 ± 2 ft-lb)	-
G1/2A	75 ± 5 Nm (55 ± 2 ft-lb)	95 ± 6 Nm (70 ± 4 ft-lb)	-
G3/4A	120 ± 8 Nm (89 ± 6 ft-lb)	185 ± 12 Nm (136 ± 9 ft-lb)	-

Table 3-9 Hydraulic Fitting Torque - British Standard Pipe (BSP) (continued)

Thread size	Installed with aluminum	Installed with steel	
	ED, O-ring + Circlip	ED, O-ring + Circlip	O-ring seal
G1A	180 ± 10 Nm (133 ± 7 ft-lb)	320 ± 20 Nm (236 ± 15 ft-lb)	-
G1-1/4A	240 ± 15 Nm (177 ± 11 ft-lb)	450 ± 25 Nm (332 ± 18 ft-lb)	-
G1-1/2A	280 ± 20 Nm (207 ± 15 ft-lb)	540 ± 30 Nm (398 ± 22 ft-lb)	-
S (heavy-duty)			
G1/4A	40 ± 3 Nm (30 ± 2 ft-lb)	43 ± 3 Nm (32 ± 2 ft-lb)	-
G3/8A	55 ± 3 Nm (41 ± 2 ft-lb)	85 ± 5 Nm (63 ± 4 ft-lb)	-
G1/2A	80 ± 5 Nm (59 ± 4 ft-lb)	120 ± 8 Nm (89 ± 6 ft-lb)	-
G3/4A	120 ± 8 Nm (89 ± 6 ft-lb)	185 ± 12 Nm (136 ± 9 ft-lb)	-
G1A	180 ± 10 Nm (133 ± 7 ft-lb)	320 ± 20 Nm (236 ± 15 ft-lb)	-
G1-1/4A	240 ± 15 Nm (177 ± 11 ft-lb)	450 ± 25 Nm (332 ± 18 ft-lb)	-
G1-1/2A	280 ± 20 Nm (207 ± 15 ft-lb)	540 ± 30 Nm (398 ± 22 ft-lb)	-

The hydraulic pipe fittings with Unified Thread Standard (UNC/UNF) thread must be installed with the following torques.

Table 3-10 Hydraulic Fitting Torque - Unified Thread Standard (UNC/UNF)

Thread size	Installed with aluminum	Installed with steel
	O-ring seal	O-ring seal
L (light-duty)		
7/16-20	21 ± 2 Nm (15 ± 2 ft-lb)	21 ± 2 Nm (15 ± 2 ft-lb)
9/16-18	34 ± 2 Nm (25 ± 2 ft-lb)	35 ± 2 Nm (26 ± 2 ft-lb)
11/16-12	40 ± 3 Nm (30 ± 2 ft-lb)	50 ± 4 Nm (37 ± 3 ft-lb)
3/4-16	50 ± 3 Nm (37 ± 2 ft-lb)	65 ± 4 Nm (48 ± 3 ft-lb)
7/8-14	75 ± 5 Nm (55 ± 4 ft-lb)	110 ± 8 Nm (81 ± 6 ft-lb)
1-1/16-12	110 ± 8 Nm (81 ± 6 ft-lb)	140 ± 10 Nm (103 ± 7 ft-lb)
1-5/16-12	160 ± 10 Nm (118 ± 7 ft-lb)	210 ± 15 Nm (155 ± 11 ft-lb)
S (heavy-duty)		
7/16-20	21 ± 2 Nm (15 ± 2 ft-lb)	23 ± 2 Nm (17 ± 2 ft-lb)
9/16-18	34 ± 2 Nm (25 ± 2 ft-lb)	40 ± 3 Nm (30 ± 2 ft-lb)
11/16-12	40 ± 3 Nm (30 ± 2 ft-lb)	65 ± 4 Nm (48 ± 3 ft-lb)
3/4-16	50 ± 3 Nm (37 ± 2 ft-lb)	80 ± 6 Nm (59 ± 4 ft-lb)
7/8-14	75 ± 5 Nm(55 ± 4 ft-lb)	125 ± 10 Nm (92 ± 7 ft-lb)
1-1/16-12	110 ± 8 Nm (81 ± 6 ft-lb)	185 ± 15 Nm (136 ± 11 ft-lb)
1-5/16-12	160 ± 10 Nm (118 ± 7 ft-lb)	280 ± 20 Nm (207 ± 15 ft-lb)

Fastener Torque Specifications

Torque metric bolts to the values specified in the table below unless special torque requirements are stated in this manual or other instructions.

Table 3-11 Fastener torque specifications – metric

Nominal diameter (mm)	Pitch (mm)	Class 8.8	Class 10.9	Class 12.9
5	0.8.	7 Nm (5 ft -lb)	9 Nm (7 ft -lb)	10 Nm (7 ft -lb)
6	1	12 Nm (9 ft-lb)	15 Nm (11 ft-lb)	18 Nm (13 ft-lb)
8	1.25	30 Nm (22 ft-lb)	35 Nm (26 ft-lb)	42 Nm (31 ft-lb)
	1	30 Nm (22 ft-lb)	37 Nm (27 ft-lb)	45 Nm (33 ft-lb)
10	1.5	55 Nm (41 ft-lb)	75 Nm (55 ft-lb)	85 Nm (63 ft-lb)
	1.25	56 Nm (41 ft-lb)	77 Nm (57 ft-lb)	87 Nm (64 ft-lb)
	1	60 Nm (44 ft-lb)	80 Nm (59 ft-lb)	92 Nm (68 ft-lb)
12	1.75	95 Nm (70 ft-lb)	125 Nm (92 ft-lb)	150 Nm (111 ft-lb)
	1.5	100 Nm (74 ft-lb)	130 Nm (96 ft-lb)	155 Nm (114 ft-lb)
	1.25	105 Nm (77 ft-lb)	135 Nm (100 ft-lb)	160 Nm (118 ft-lb)
14	2	150 Nm (110 ft-lb)	200 Nm (148 ft-lb)	230 Nm (170 ft-lb)
	1.5	165 Nm (122 ft-lb)	210 Nm (155 ft-lb)	250 Nm (184 ft-lb)
16	2	230 Nm (170 ft-lb)	300 Nm (221 ft-lb)	360 Nm (266 ft-lb)
	1.5	250 Nm (184 ft-lb)	320 Nm (236 ft-lb)	380 Nm (280 ft-lb)
18	2.5	320 Nm (236 ft-lb)	420 Nm (310 ft-lb)	500 Nm (369 ft-lb)
	1.5	360 Nm (266 ft-lb)	470 Nm (345 ft-lb)	550 Nm (406 ft-lb)
20	2.5	450 Nm (332 ft-lb)	600 Nm (443 ft-lb)	700 Nm (516 ft-lb)
	1.5	500 Nm (369 ft-lb)	650 Nm (479 ft-lb)	770 Nm (568 ft-lb)
22	2.5	600 Nm (443 ft-lb)	800 Nm (590 ft-lb)	980 Nm (723 ft-lb)
	2	650 Nm (479 ft-lb)	850 Nm (627 ft-lb)	1050 Nm (774 ft-lb)
24	3	750 Nm (553 ft-lb)	1050 Nm (774 ft-lb)	1250 Nm (923 ft-lb)
	2	800 Nm (590 ft-lb)	1100 Nm (811 ft-lb)	1300 Nm (959 ft-lb)
27	3	1150 Nm (848 ft-lb)	1500 Nm (1106 ft-lb)	1800 Nm (1327 ft-lb)
30	3.5	1500 Nm (1106 ft-lb)	2000 Nm (1475 ft-lb)	2400 Nm (1770 ft-lb)

Unless special torque requirements are specified in this manual or other instructions, torque Unified Thread Standard bolts (label: UNC) to the values specified in the table below.

Table 3-12 Fastener torque specifications – Unified Thread Standard (UNC)

Nominal diameter (in)	Opposite nut size (s)	Class 5	Class 8
1/4-20	7/16"	10 Nm (7 ft -lb)	14 Nm (10 ft-lb)
5/16-18	1/2"	21 Nm (15 ft-lb)	29 Nm (21 ft-lb)
3/8-16	9/16"	37 Nm (27 ft-lb)	51 Nm (38 ft-lb)

Table 3-12 Fastener torque specifications – Unified Thread Standard (UNC) (continued)

Nominal diameter (in)	Opposite nut size (s)	Class 5	Class 8
7/16-14	5/8"	60 Nm (44 ft-lb)	82 Nm (60 ft-lb)
1/2-13	3/4"	90 Nm (66 ft-lb)	130 Nm (96 ft-lb)
9/16-12	13/16"	130 Nm (96 ft-lb)	180 Nm (133 ft-lb)
5/8-11	15/16"	178 Nm (131 ft-lb)	250 Nm (184 ft-lb)
3/4-10	1-1/8 "	315 Nm (232 ft-lb)	445 Nm (328 ft-lb)
7/8-9	-	509 Nm (375 ft-lb)	715 Nm (527 ft-lb)

Unless special torque requirements are specified in this manual or other instructions, torque Unified Thread Standard bolts (label: UNF) to the values listed in the table below.

Table 3-13 Fastener torque specification – Unified Thread Standard bolts (UNF)

Nominal diameter (in)	Opposite nut size (s)	Class 5	Class 8
1/4-28	7/16"	11.5 Nm (8 ft-lb)	16 Nm (11 ft-lb)
5/16-24	1/2"	23 Nm (17 ft-lb)	32 Nm (24 ft-lb)
3/8-24	9/16"	41 Nm (30 ft-lb)	58 Nm (43 ft-lb)
7/16-20	5/8"	65 Nm (48 ft-lb)	92 Nm (68 ft-lb)
1/2-20	3/4"	100 Nm (74 ft-lb)	145 Nm (107 ft-lb)
9/16-18	13/16"	145 Nm (107 ft-lb)	200 Nm (148 ft-lb)
5/8-18	15/16"	200 Nm (148 ft-lb)	280 Nm (207 ft-lb)
3/4-16	1-1/8 "	350 Nm (258 ft-lb)	495 Nm (365 ft-lb)
7/8-14	-	560 Nm (413 ft-lb)	780 Nm (575 ft-lb)

Hydraulic Hose Torque

The hydraulic hoses must be installed with the following torques.

Table 3-14 Hydraulic Hose Torque

Metric thread	L (light-duty)	S (heavy-duty)
M12 × 1.5	19 ± 1 Nm (14 ± 1 ft-lb)	
M14 × 1.5	26 ± 2 Nm (19 ± 2 ft-lb)	
M16 × 1.5	40 ± 3 Nm (30 ± 2 ft-lb)	
M18 × 1.5	50 ± 4 Nm (37 ± 3 ft-lb)	
M20 × 1.5	-	60 ± 4 Nm (44 ± 3 ft-lb)
M22 × 1.5	70 ± 5 Nm (52 ± 4 ft-lb)	-
M24 × 1.5	-	85 ± 6 Nm (63 ± 4 ft-lb)
M26 × 1.5	90 ± 6 Nm (66 ± 4 ft-lb)	-

Table 3-14 Hydraulic Hose Torque (continued)

Metric thread	L (light-duty)	S (heavy-duty)
M30 × 2	120 ± 8 Nm (89 ± 6 ft-lb)	140 ± 10 Nm (103 ± 7 ft-lb)
M36 × 2	150 ± 12 Nm (111 ± 9 ft-lb)	180 ± 12 Nm (133 ± 9 ft-lb)
M42 × 2	-	260 ± 16 Nm (192 ± 12 ft-lb)
M45 × 2	240 ± 15 Nm (177 ± 11 ft-lb)	-
M52 × 2	250 ± 16 Nm (184 ± 12 ft-lb)	280 ± 18 Nm(207 ± 13 ft-lb)

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4 MAINTENANCE INSTRUCTIONS

4.1 INSPECTION AND PREVENTIVE MAINTENANCE SCHEDULE

This section provides safety and other vital information for machine operators. To extend the service life of the machine and ensure safe operation, all necessary inspections and maintenance work must be completed before the machine is put into service.

It is crucial to develop and adhere to a comprehensive inspection and preventive maintenance program. This manual outlines the regular inspections and maintenance procedures recommended by Hunan Sinoboom Intelligent Equipment Co., Ltd. Consult your national, regional or local regulations for aerial work platforms. The frequency of the inspection and maintenance must be increased as required by environmental conditions, requirements and frequency of usage.

Pre-delivery Inspection

The pre-delivery inspection shall be performed by qualified Sinoboom technicians who are recognized by Hunan Sinoboom Intelligent Equipment Co., Ltd..

A pre-delivery inspection shall be performed before each sale, lease or rental delivery.

Refer to the ***Inspection and Preventive Maintenance Schedule*** for items requiring a preventive maintenance. Refer to the corresponding section of this manual to perform inspection and maintenance procedures.

Pre-operation Inspection

A pre-operation inspection must be performed before each start or restart of work, change of operator, and after each maintenance operation. Refer to the pre-operation inspection section of the Operation Manual for detailed information. The Operation Manual must be entirely read and understood before performing the pre-operation inspection.

Regular Inspections

Regular inspections shall be performed by qualified Sinoboom technicians who are recognized by Hunan Sinoboom Intelligent Equipment Co., Ltd..

Regular inspections must be performed after the machine has been in service for 3 months or 250 hours, whichever comes first, or if it has been out of service for more than 3 months. The frequency of the inspection and maintenance must be increased as required by environmental conditions, requirements and frequency of usage.

The items included in the regular inspections are identical to the pre-delivery inspection.

Annual Inspection

An annual machine inspection must be performed once a year and no later than 13 months from the date of the previous annual inspection. Hunan Sinoboom Intelligent Equipment Co., Ltd. recommends this task be performed by a factory-trained service technician, a person recognized by Sinoboom as one who, by qualification, certificate and training, has successfully demonstrated the ability and proficiency to service, repair and maintain the Sinoboom model in question.

Refer to the ***Inspection and Preventive Maintenance Schedule*** for items requiring annual inspection, and refer to the corresponding section of this manual to perform inspection and maintenance procedures.

Preventive Maintenance

Preventive maintenance procedures shall be performed by qualified Sinoboom technicians. The frequency of the inspection and maintenance must be increased as required by environmental conditions, requirements and frequency of usage.

Refer to the ***Inspection and Preventive Maintenance Schedule*** for items requiring a preventive maintenance. Refer to the corresponding section of this manual to perform inspection and maintenance procedures.

Responsibilities and qualifications for inspection and maintenance

Table 4-1

Inspection Type	Inspection Frequency	Primary Responsible Persons	Service Qualifications
Pre-operation Inspection	Before starting/restarting work, change of user, after each maintenance activity.	User or operator	Properly trained user or operator
Pre-delivery Inspection	Before each sale, lease or rental delivery	Owner, dealer or user	Qualified Sinoboom technician
Regular Inspections	In service for 3 months or 250 hours (whichever comes first) or out of service for more than 3 months	Owner, dealer or user	Qualified Sinoboom technician
Annual Inspection	Once a year and no later than 13 months from the date of the previous annual inspection	Owner, dealer or user	Factory-trained service technician
Preventive Maintenance	At intervals specified in the ***Inspection and Preventive Maintenance Schedule***	Owner, dealer or user	Qualified Sinoboom technician

Inspection and Preventive Maintenance Schedule

Perform inspection and preventive maintenance for the items in the table below at the specified intervals. Maintenance and inspection intervals are calculated based on the months of service or the “accumulated operating hours” displayed on the turntable controls (whichever comes first).

Inspection intervals are based on the use of the machine under normal operating conditions. The intervals should be shortened accordingly when operating in harsh environmental conditions.

Table 4-2 Inspection and Preventive Maintenance Schedule

Item	Interval		
	Before each delivery[1]or quarterly[2]	Semiannually[3]	Annually[4]
Chassis assembly			
Chassis	2	2	2
Tires	1, 2	1, 2	1, 2
Wheel nuts	1[50]	1[50]	1[50]
Drive motor	1, 6	1, 6	1, 6
Drive reducer	1, 2, 6	1, 2, 6	1, 2, 6, 11
Steering components	1, 2	1, 2	1, 2
Outriggers/extending axles (if equipped)	1, 2, 3	1, 2, 3	1, 2, 3
Bearings	1, 2, 5, 12	1, 2, 5, 12	1, 2, 5, 12
Turntable assembly			

Table 4-2 Inspection and Preventive Maintenance Schedule (continued)

Item	Interval		
	Before each delivery[1] or quarterly[2]	Semiannually[3]	Annually[4]
Turntable	2	2	2
Slewing bearing or slewing reducer	1[50], 2, 6, 12	1[50], 2, 6, 12	1[50], 2, 6, 8, 12
Slewing reducer (if equipped)	1, 2, 6	1, 2, 6	1, 2, 6, 11
Central slewing joint	6	6	6
Slewing motor	1, 6	1, 6	1, 6
Turntable slewing pin (if equipped)	1, 2, 3	1, 2, 3	1, 2, 3
Turntable cover assembly	1, 2, 3	1, 2, 3	1, 2, 3
Hydraulic generator (if equipped)	1, 3, 6, 10[NO.1]	1, 3, 6, 10[NO.1]	1, 3, 6, 10[NO.1]
Boom assembly			
Boom weldment	1, 2	1, 2	1, 2
Hose, wire rope bracket	1, 2	1, 2	1, 2
Pulley and wear pad assembly	1, 2	1, 2	1, 2
Bearings	1, 2, 5, 12	1, 2, 5, 12	1, 2, 5, 12
Cover or protective guard (if equipped)	1, 2	1, 2	1, 2
Cable track or wire rope system (if equipped)	1, 2, 3, 5	1, 2, 3, 5	1, 2, 3, 5
Pivot pins and retaining rings	1, 2	1, 2	1, 2
Platform assembly			
Guardrails	2	2	2
Access gate	1, 2, 3	1, 2, 3	1, 2, 3
Floor	2	2	2
Swing cylinder	1, 2, 5, 6	1, 2, 5, 6	1, 2, 5, 6
Safety belt anchorage point	1, 2, 7	1, 2, 7	1, 2, 7
Power system			
Refer to the machine's Maintenance Manual for inspection and preventive maintenance schedule, and the engine manual provided with the machine for detailed instructions.			
Hydraulic system			
Hydraulic pump	1, 2, 6	1, 2, 6	1, 2, 6
Hydraulic cylinder	1, 2, 5, 6	1, 2, 5, 6	1, 2, 5, 6
Bleeding the oscillating cylinder (if equipped)	10[NO.1]	10[NO.1]	10[NO.1]
Hydraulic valves	1, 2, 5, 6	1, 2, 5, 6	1, 2, 5, 6
Counterbalance valve, check of the locking function (if equipped)	10[NO.1]	10[NO.1]	10[NO.1]

Table 4-2 Inspection and Preventive Maintenance Schedule (continued)

Item	Interval		
	Before each delivery[1] or quarterly[2]	Semiannually[3]	Annually[4]
Hydraulic hoses, pipelines and fittings	1, 2, 6	1, 2, 6	1, 2, 6
Hydraulic tank	1, 2, 3, 5, 6	1, 2, 3, 5, 6	1, 2, 3, 5, 6
Hydraulic tank suction filter	1, 5, 6	1, 5, 6	1, 5, 6, 11
Hydraulic tank return filter	1, 5, 6, 11[50]	1, 5, 6, 11[50]	1, 5, 6, 11[50]
Hydraulic tank air filter	1, 5, 6	1, 5, 6, 11	1, 5, 6, 11
Hydraulic oil high-pressure filter	1, 5, 6, 11	1, 5, 6, 11	1, 5, 6, 11
Hydraulic oil	5, 6	5, 6	5, 6, 11
Electrical system			
Electrical harness, connectors	1, 2	1, 2	1, 2
Battery	1, 2, 6, 9, 12	1, 2, 6, 9, 12	1, 2, 6, 9, 12
Electrolyte	6	6	6
Charging function	3	3	3
Instruments, gauges, switches, lamps, horn, contactor, relay	1, 3	1, 3	1, 3
Functions and controls			
Platform control box	1, 3, 4, 7, 10	1, 3, 4, 7, 10	1, 3, 4, 7, 10
Turntable controller	1, 3, 4, 7, 10	1, 3, 4, 7, 10	1, 3, 4, 7, 10
Function control lock, secondary guarding device and brake	1, 3, 10	1, 3, 10	1, 3, 10
Foot switch	1, 3, 10	1, 3, 10	1, 3, 10
Emergency stop button (ground and platform)	1, 3, 10	1, 3, 10	1, 3, 10
Limit switches and power-off switch	1, 3, 10	1, 3, 10	1, 3, 10
Pothole protection device (if equipped)	1, 3, 10	1, 3, 10	1, 3, 10
Overload limit system	1, 3, 10	1, 3, 10	1, 3, 10
Tilt alarm	1, 3, 10	1, 3, 10	1, 3, 10
Drive brake	1, 3, 10	1, 3, 10	1, 3, 10
Slewing brake	1, 3, 10	1, 3, 10	1, 3, 10
Others			
Operation Manual in the manuals compartment	10	10	10
All decals/labels complete, clear and secure	10	10	10

Table 4-2 Inspection and Preventive Maintenance Schedule (continued)

Item	Interval		
	Before each delivery[1]or quarterly[2]	Semiannually[3]	Annually[4]
Annual inspection date of the machine	/	/	10
No unapproved changes or additions	10	10	10
All safety publications taken into account	10	10	10
General structural components and weldments	2	2	2
All fasteners, pins, protective guards and covers	1, 2	1, 2	1, 2
Greasing and lubricating according to specifications	10	10	10
Functional test of all systems	10	10	10
Paint and appearance	5	5	5
Inspection date stamped on the chassis	/	/	10
Notify Sinoboom of machine ownership (change)	/	/	10

Table 4-2 Inspection and Preventive Maintenance Schedule (continued)

Item	Interval		
	Before each delivery[1]or quarterly[2]	Semiannually[3]	Annually[4]
Note: [1] Before each sale, lease or shipment delivery; [2] In service for 3 months or 250 hours; or out of service for more than 3 months; [3] In service for 6 months or 500 hours; [4] Once a year and no later than 13 months from the date of the previous annual machine inspection; [50] The first inspection shall be performed once the machine reaches 50 hours in service for the first time. This occurs only once in the service life of the machine. [250] The first inspection shall be performed once the machine reaches 250 hours in service for the first time. This occurs only once in the service life of the machine. [NO.1] Before the machine is put into service for the first time, or before the first use after the oscillating cylinder or counterbalance valve has been replaced.			
Inspection activity (numerical codes): **1.** Check for correct installation (accurate position, firmly installed, tightened to the specified torque) **2.** Check for damage (cracks, cracked welds, deformation, wear, corrosion, excessive wear, gouges, abrasions and exposed threads) **3.** Check for normal function **4.** Return to neutral position or “off” position normally (the self-reset switch can return to neutral position or “off” position after released) **5.** Clean and free of foreign objects **6.** Check for correct level, sealing and leaks **7.** Labels complete, clear and secure **8.** Check for appropriate tolerances **9.** Fully charged **10.** Verify/perform **11.** Replace the oil or filter element **12.** Correctly lubricated			

4.2 GENERAL MAINTENANCE INSTRUCTIONS

Safety and Operating Standards

The following precautions should be taken before carrying out adjustment and repair work on the machine:

1. Disconnect the power source to prevent inadvertent start up of the machine and tag the machine accordingly.
2. All controls should be turned off to avoid accidental actuation of the control system.
3. If possible, lower the work platform to the lowest position. If this is not possible, secure the work platform to prevent it from falling.
4. Before loosening or removing hydraulic components, the oil pressure in the hydraulic lines should be released.

Some maintenance work may require the machine to be in a state other than the ones described in 1 - 4 above. Such work should be carried out in accordance with the specific safety measures listed in the Operation Manual and this manual.

Safety of personnel always has the highest priority, also when performing maintenance work on the machine. Always take the weight of components into consideration, and never attempt to move heavy parts without the assistance of mechanical equipment. Never place heavy objects in an unstable position. Before lifting any machine components, ensure the parts are sufficiently supported.

Cleaning

1. To extend the service life of the machine it is crucial to prevent dirt or impurities from entering critical components of the machine. A number of protective measures have been taken to prevent such ingress. Protective plates, covers, seals, and filters are installed to keep intake air, fuel and oil clean. Such protective devices must be serviced/maintained at prescribed intervals to ensure their proper function.
2. When air, fuel, or oil lines are disconnected, their adjacent areas, openings and fittings should be cleaned. Openings should be covered immediately to prevent foreign objects from entering.
3. During repair or maintenance, all components should be cleaned and inspected, make sure all pipes/tubes and openings are unobstructed. Cover all parts to keep them clean. All parts must be clean before installation. New parts should be stored in containers before use.

Components Disassembly and Installation

1. A safe and appropriate plan for the installation of machine components should be developed based on this manual, taking the site conditions into account.
2. Personnel carrying out disassembly and installation work must be appropriately qualified and must be able to use safety equipment correctly.
3. Before carrying out installation work, qualified personnel should inspect the ground, concealed foundations and anchors, or review reliable documentation verifying that the manufacturer's requirements are met.
4. Wind speed at the installation site must not exceed 8.3 m/s (18.6 mph).
5. Before installation, check the site conditions such as power supply and ground conditions to make sure the installation requirements are met.
6. All components should be inspected prior to installation to verify they are in good condition.
7. High-strength bolts should be tightened in strict accordance with the requirements of this manual.
8. Requirements for the acceptance of onsite machine installation work:
    1) Relevant inspections and functional tests should be carried out to confirm that the components have been installed correctly, that specific functional requirements are met and that all safety devices are operating properly.
    2) Static and dynamic load tests should follow and comply with the relevant standards.
    3) Before putting the machine into service, a qualified person shall issue a handover certificate confirming the integrity of the machine. All test/inspection results should be recorded and an inspection report should be prepared (including the inspector’s name, title, company, and inspection date).
9. Disassembly work should meet the same safety requirements as installation work.
10. If lifting tools are required to dis-assemble the machine, use the correct lifting points, lifting equipment and additional tools. Only use tested and certified tools and equipment.
11. If the lifting gear strands have to be attached at an angle of less than 90° when lifting a component exercise special caution since the eye bolt or similar bracket cannot provide adequate lateral support.
12. If components are difficult to be removed check that all nuts, bolts, cables, brackets, wiring, etc. have been removed, and that adjacent components are not obstructing the removal.

Components Disassembly and Reassembly

When disassembling or reassembling components, follow the steps one by one. If assembly/disassembly of a certain component has not been completed, do not proceed with another component. Always check the disassembly/assembly operation to make sure nothing is missing. No adjustments (unless recommended) may be made without prior approval.

Storage

Please follow the recommendations below to ensure best performance of the cylinders and to avoid corrosion during long-term storage (indoor/outdoor):

- The machine should be stored in stowed position with the wheels aligned.
- Fully raise and lower the platform, and steer left and right to the full steering angle twice a week in order to keep the respective cylinder components lubricated.

Disposal of Structural Components

- Major structural components that no longer meet the requirements for safe use due to corrosion, wear or other reasons should be repaired, reinforced, or replaced and discarded.
- Load-bearing structural components that are permanently deformed and cannot be repaired must be replaced and discarded.
- Load-bearing structural components that have lost overall stability and cannot be repaired must be replaced and discarded.
- Cracks in structural components or welds should be analyzed to understand the cause. The components/welds should be reinforced as appropriate considering the load and the characteristics of the cracks. Continued use is only allowed if the structural component/weld meet the original design requirements; otherwise they should be discarded.

Pressure-fit and Mating Parts

When assembling pressure-fit and mating parts, use anti-seize or molybdenum disulfide-based compounds to lubricate the mating surface.

Bearings

1. Cover bearings that have been removed from the machine to keep the bearing clean from dust and abrasives. Use non-flammable cleaning solvent to clean bearings and allow them to dry in a shaded area. Compressed air may be used but the bearings should not be rotated.
2. If the races and balls (or rollers) display pits, notches or burn marks, the bearing should be replaced and discarded.
3. If the bearing is still serviceable, apply a coat of oil and wrap it in clean paper (or wax paper). Do not unwrap reusable bearings or new bearings until they are ready for installation.
4. Lubricate new or serviceable bearings before installation. When pressing the bearing into the retainer or bore, pressure should be applied only to the outer race. If the bearing is to be installed on a shaft, pressure should be applied only to the inner race.

Gaskets

Check if the opening in the gasket is aligned with the opening in the component that is to be sealed.

Bolt Use and Torque Requirements

NOTICE

Self-locking fasteners such as nylon inserts and thread locking nuts must not be reinstalled after removal.

1. Always use a new self-locking fastener when installing locking fasteners. Use bolts of appropriate lengths. If a bolt is too long it may be pressed against the adjacent part before being properly tightened. If the bolt is too short it is likely to not have enough thread area to properly secure the parts. Replacement bolts must be of the same or equivalent size as the original bolt.
2. In addition to the specific torque requirements provided in this manual, standard torque values should be used on heat-treated bolts, studs, and steel nuts in accordance with recommended factory practice (see ***Fastener Torque Specifications***).

Hydraulic Pipeline and Electrical Wiring

When unplugging or removing hydraulic hoses and electrical wires from the machine, the hydraulic hoses and electrical wires and their sockets should be clearly marked so that their reinstallation will be correct.

Hydraulic Hose and Fitting Tightening Procedures

The following requirements apply when installing hydraulic hoses and fittings:

1. Before installation, check the seals on hoses and fittings, and replace the seal or even the hose assembly and the fitting if the seal is found to be damaged or oil spills out of the seal. Clean hoses and fittings before installation.
2. If a seal is to be replaced, lubricate the replacement seal before installation.
3. To install a hose nut and fitting, align the fitting, hose and hose nut, and tighten the nut with the torque specified in ***Hydraulic Hose Torque*** and ***Hydraulic Fitting Torque*** . If the tightening torque of a fitting or hose exceeds the specified value its seal cannot be reused.
4. After installation, test all machine functions and check to ensure the hose, fitting and related components are free from leaks.

Application of Insulating Silicone Grease to Electrical Connections

Insulating silicone grease should be applied to all electrical connections for the purpose of:

- Avoiding oxidization of the connecting points between the male pin and female pin.
- Avoiding electrical failure due to low conductivity between the pins in humid environments.

The following instructions should be observed when applying insulating silicone grease to the electrical connections. This procedure applies to all plug connections installed outside the distribution cabinet. The silicone grease is not suitable for the connectors with a sealed outer surface.

1. Prior to the machine assembling, apply silicone grease around the male and female pins of the connectors to prevent oxidization. A grease syringe may be used for this procedure.

NOTICE

Oxidization that is allowed to progress over a certain period will increase the resistance of the connectors and eventually lead to electrical failure.

2. Silicone grease should be applied to each electrical cord that is exposed outside the connectors to prevent short circuit. Silicon grease should also be applied to the connecting points of male and female connectors. Sealing measures should also be applied to other connectors that may be subject to water ingress, such as around strain relief clamps.

NOTICE

Due to the higher conductivity of cleaning solvents compared to water, situations of water ingress are especially likely to occur when cleaning the machine with a pressure washing method.

3. The connectors between battery and charger should be sealed with silicone grease at each contact point.

NOTICE

Solidifying sealants can also be used to prevent short circuits and help maintain cleanliness, but they will make it more difficult to remove the pins later on.

Lubrication

The relevant components should be lubricated at defined intervals using the lubricant of the quantity, type and grade as recommended in this manual. If the recommended lubricant is not available, contact your local supplier who can help you obtaining the recommended lubricant or a satisfactory alternative.

Hydraulic System

1. Contaminants are the primary hazard for the hydraulic system. Contaminants can enter the hydraulic system in various ways, such as improper use of hydraulic oil, moisture, grease, metal chips, sealing elements and sand entering the system during maintenance, or cavitation of the hydraulic pump due to insufficient system preheating or leakage in the pump supply (suction) lines.
2. Oil that appears clouded indicates a high moisture or air content, which contributes to organic growth, leading to oxidation or corrosion. In such case, drain the oil from the hydraulic system, and fill with clean hydraulic oil after rinsing the hydraulic system.
3. Check the filter frequently for the presence of metal particles. Because hydraulic components are designed and manufactured to very tight tolerances, even a small amount of contaminants entering the system can cause wear or damage to hydraulic components and lead to malfunctions. Hydraulic system filters should be inspected, cleaned or replaced as needed at required intervals.
4. Keep the hydraulic system clean. After disconnecting the hydraulic lines, seal the tube ports immediately to prevent contaminants from entering the hydraulic system. If signs of metal or rubber particles are found in the hydraulic system, the hydraulic oil should be drained immediately and the entire system flushed.

NOTICE

Metal particles may appear in the hydraulic oil or filter of a new machine due to wear of new hydraulic components.

5. Disassemble or reassemble parts on clean workbenches. Clean all metal parts using a non-flammable cleaning solvent. Lubricate parts as needed to facilitate assembly.
6. Hydraulic oils of different brands or types should not be mixed. Different oils may contain different essential additives or may have different viscosity. It is recommended to use high-quality mineral oil with a viscosity suitable for the temperature of the environment the machine is operating in.
7. Unless otherwise expressly stated in this manual, the filter element must be replaced at least once a year or every 1000 working hours; the replacement interval should be shorter in harsh working conditions.If hydraulic oil needs to be changed, use hydraulic oil meeting or exceeding the type and specification requirements in this manual. If hydraulic oil of the same type as that supplied with the machine is not available, consult your local supplier to help you select the appropriate hydraulic oil. Do not mix petroleum-based oils with synthetic oils.

8. Take all precautions to keep the hydraulic oil clean. If hydraulic oil must be poured from the original container into another container, ensure that the second container is kept clean and does not contain any contaminants. Make sure to clean the filter screen, and replace the filter element when changing the hydraulic oil.
9. After the machine is shut down, take proper preventive maintenance measures, thoroughly check all hydraulic components, piping, fittings, etc., and perform a function test for each system before putting the machine into service again.

Pins and Composite Bearing

1. The connecting pins should be removed and inspected in case any of the following defects is found:
   - Excessively tilted joint
   - Noise originating from the joint during operation.
2. The composite bearing should be replaced in any of the following conditions:
   - Frayed or separated fiber on the sleeve surface
   - Cracked or damaged sleeve housing
   - Bearing moved or rotated into the housing
   - Debris embedded in the sleeve surface.
3. Replace the pivot pin if any of the following is detected (properly clean the pivot pin before inspection):
   - Wear in the bearing area
   - Flaking, pealing, scratches or abrasions on the pivot pin surface
   - Corroded pivot pin in the bearing area
4. Reassemble the connecting pin and composite bearing
   - Blow off the dirt and debris on the housing. Remove any foreign objects on the bearing and housing.
   - Clean the bearing and pivot pin with a cleaning agent to remove all grease and oil. The composite bearing uses dry coupling which does not require lubrication.
   - During installation and operation, inspect the pivot pin to ensure that there are no burrs, nicks or abrasions that could damage the bearing.

4.3 MAJOR MODIFICATION AND REPAIR

A major modification/repair is a modification/repair of the entire machine or its components that affects the stability, strength or performance of the machine.

Each major modification/repair to the machine by the machine owner/company should be recorded using the ***Major Modification/Repair Record*** in the attachment to this manual. This record should be retained until the machine is taken out of service or as required by the machine owner/company.

Major modifications/repairs to the machine must be performed by a qualified service technician. The machine must be inspected and verified after major modifications/repairs, the inspection items include but are not limited to all items in the ***Inspection and Preventive Maintenance Schedule*** . Once inspection and verification are complete the machine can be put back into service.

5 CHASSIS AND TURNTABLE ASSEMBLY

5.1 CHASSIS AND TURNTABLE SYSTEM

Chassis Inclination Sensing System

The chassis inclination sensing system measurestheinclination of the chassis relative to the horizontal plane by means of a level sensor mounted in the turntable. The chassis inclination indicator on the platform display panel indicates if the chassis inclination exceeds the maximum allowable tilt angle. When the chassis inclination sensing system detects that the chassis inclination exceeds the maximum allowable tilt angle, the chassis tilt indicator will flash, allmovementswill be disabled. Refer to ***Inclination Protection Function*** for details.

Travel Drive System

This machine is equipped with four-wheel drive. The four-wheel drive system consists of one closed-circuit variable-displacement pump, four variable-displacement plunger motors, four drive reducers and one travel control valve manifold. The drive speed depends on the closed-circuit variable-displacement pump, engine speed and motor displacement. Full-time control is applied for traction control. The drive function is limited by the position of the boom, see ***Travel Speed Reduction System*** for details.

Travel Speed Reduction System

When the boom is in operating position, the travel speed of the machine is automatically limited to the operating travel speed.

Reverse Drive Confirmation System

The reverse drive confirmation system warns the operator of a situation in which the machine travels and steers in the direction opposite to the travel direction of the joystick. The reverse position indicator on the platform controller indicates such situation. When the boom is positioned between the two rear wheels, the system does not impose any restrictions on the travel of the machine. If the boom is positioned beyond any rear wheel while the machine is traveling, the reverse position indicator will flash, and the machine's travel and steer functions will be blocked. To restore the travel and steer functions, press the reverse position travel drive switch at the platform controller. The reverse position indicator will then illuminate, indicating that the machine’s actual travel and steer direction is opposite to the travel direction of the joystick.

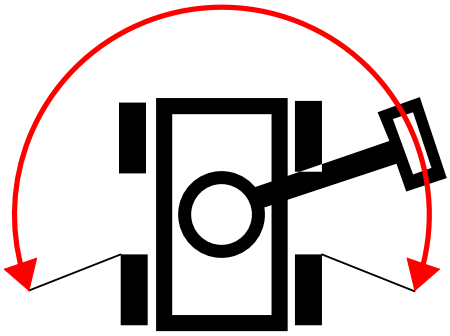

Fig. 1 Reverse position diagram

Chassis Oscillating System

If the machine is equipped with oscillating function, it must have chassis oscillating system. The oscillating system controls the axle's oscillating function. Both the front and the rear axle shafts are connected to the chassis; the telescoping action of the oscillating cylinders on the left and right part of the front axle is controlled by the multi-way oscillating valves at the rear of the chassis. If there is relative displacement between the chassis and the rear axle, the multi-way oscillating valves will be triggered and will control the oscillating cylinder's telescoping movements. This function does not require auxiliary electrical components, nor is it subject to any conditions. The oscillating function operates in all working conditions. With this function the machine's four wheels maintain constant ground contact, even when driving on rough and uneven terrain, which greatly improves maneuverability and operating comfort.

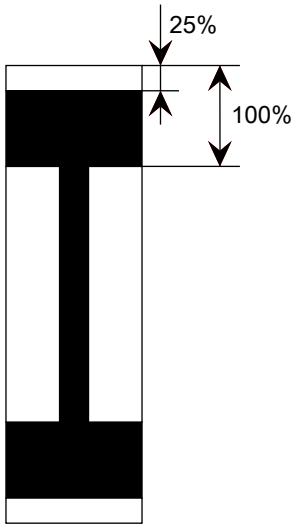

Fig. 2

5.2 TIRE ASSEMBLY

NOTICE

Non-marking tires shall be used indoor only on ground sufficient to support the total mass of the machine (machine weight + platform load).

Check Tires and Rims

Check the tires and rims daily and replace a tire if any of the following defects is found:

- The tire is severely cracked, broken, deformed or shows other abnormalities.
- The tire ply shows a smooth, uniform cut with a total length of more than 75 mm (3 in).
- The tire ply shows a crack or fissure that exceeds 25 mm (1 in) in either direction.
- The tire has a puncture with a diameter of more than 25 mm (1 in).
- The tire shows severe bulging.
- The wear extent of the tire's ground-supporting surface exceeds 25%.

Check Wheel Nuts

The wheel nuts should be tightened before the machine is put into service for the first time and after each tire is removed. Check and tighten the wheel nuts to the specified torque every 3 months or 250 operating hours.

Replacement Requirements

⚠ WARNING

- **The tires and rims on the machine have been designed and selected according to the overall performance and load stability requirements of the machine. Therefore, the model specifications, rim width, installation center surface, diameter, etc. must not be changed, otherwise this could lead to an unstable and hazardous condition.**
- **Wheel-specific nuts must be used that match the wheel bolts. The wheel nuts must be installed and maintained with the proper tightening torque to prevent loose rims, broken bolts and wheels loosening from the axle. Be sure to only use nuts that match the mounting angle of the rim holes.**

Hunan Sinoboom Intelligent Equipment Co., Ltd. recommends the replacement tire be of the same size, ply rating and brand as the original tire. For the tire part numbers of specific machine models, please refer to the Parts Manual of the corresponding machine. If you choose not to use the replacement tires recommended by Hunan Sinoboom Intelligent Equipment Co., Ltd., the following specifications should be adhered to:

- The ply rating/rated load capacity and size should be the same as the original tire or superior to it.
- The tire tread contact width should be the same as or superior to the original tire.
- The wheel diameter, width, offset dimensions and weight must be the same as the original tires.
- The replacement tire must be approved for the application by the tire manufacturer (including intended purpose, maximum travel speed, maximum tire load, etc.).
- Due to size differences between different tire brands, both tires on the same axle should be of the same brand.
- Different tire types exhibits distinct performance characteristics. Random mixing or substitution is strictly prohibited. Tire types can be identified by visual inspection.
  - Foam-filled tire: The tire carcass is fully inflated with no vent holes on the sidewalls, and the tread is equipped with anti-slip screws. Singboom designates black-tread tires as ‘foam-filled tires', while other colors, such as gray and white are classified as ‘foam-filled non-marking tires'.

Fig. 3

  - Solid tire The tire carcass is smooth, with sidewalls typically designed with cooling vent holes (rare exceptions without vents), and the tread is free of screws. Singboom designates black-tread tires as ‘solid tires', while other colors, such ad gray and white are classified as ‘solid non-marking tires'.

Fig. 4

NOTICE

Unless specifically approved by Sinoboom, do not replace foam-filled tires with pneumatic tires.

Specifically, determining the correct tire direction during replacement is crucial. The left and right installation positions of the tires can be identified by the following methods:

- Prioritize verifying the tire's sidewall markings: If there is a directional arrow indicating the mounting orientation, you can directly determine the installation direction based on the arrow.
- If there is no clear directional marking, the tread pattern should be used to determine the correct orientation： The tip (open end) of the pattern points in the direction of the machine's movement, which is as indicated by the arrow in the following picture.

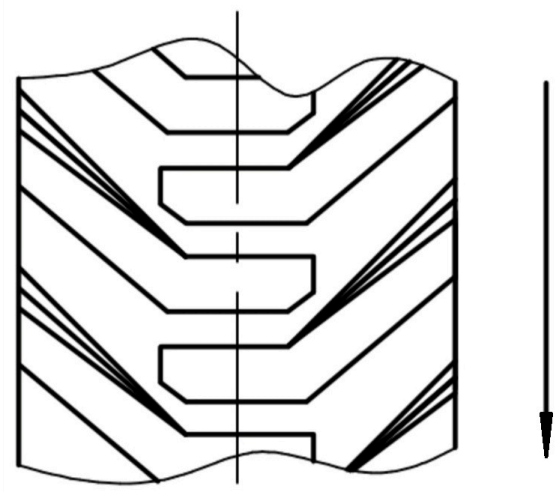

Fig. 5

⚠ WARNING

When replacing tires, installing them in the wrong left-right direction will not only affect the performance of the machine, but also pose serious safety risks, even endangering the safety of the operators. Therefore, it is necessary to install them strictly in accordance with the specifications.

Replace Tire and Wheel Assembly

⚠ WARNING

Tighten the wheel nuts to the specified torque to prevent the wheel from loosening. Use a torque wrench to tighten the nuts. If no torque wrench is available use a socket wrench to tighten the nuts and then immediately have a service station or dealer tighten the nuts to the specified torque. Over-tightening will cause the nuts to break or permanently deform the bolt holes in the rims.

The correct steps to replace a tire and wheel assembly are as follows:

1. Make sure the machine is in stowed position.
2. Turn the power-off switch to the OFF position and disconnect all power sources (such as battery charger) connected to the machine. If the machine is equipped with high-voltage lithium batteries, the lithium battery service switch needs to be disconnected.
3. Use a wrench to pre-loosen the tire fastening nuts (leaving 2-3 complete threads to prevent sudden detachment).
4. Use a jack with sufficient load capacity(1.5 times the weight of the equipment under rated load) to lift the frame steadily until the tires are about 50mm(2 inches) off the ground. The lifting position is generally at the flat support point of the welded reinforcement part of the frame near the tire.
5. Remove all fastening nuts in diagonal order and remove the tires.
6. Align the mounting holes of the new tire and wheel assembly with the corresponding mounting holes on the drive reducer.
7. After applying medium to high viscosity threadlocking adhesive to the bolt thread parts, manually pretighten all mounting bolts to ensure that all bolts are evenly stressed at the initial level. Never apply lubricant to threads or nuts.
8. Then, use the wrench in the order shown in the following figure to tighten the nut in three stages to the standard torque value. For specific values, please refer to the table below.

5.3 DRIVE SYSTEM COMPONENTS

The travel drive device is mainly composed of a drive reducer and a drive motor.

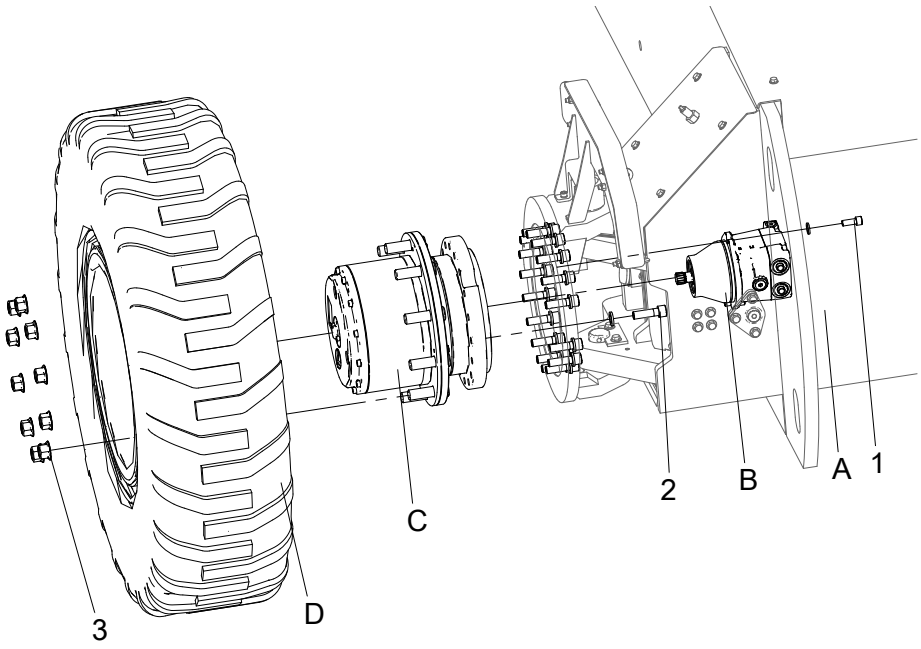

Fig. 6 Travel Drive Device

Table 5-1 Travel Drive Device Components

No.	Description
A	Chassis structure
B	Travel Motor
C	Drive reducer
D	Tire

Checkthe disconnection cap of the travel reducer

The travel reducer in the travel driven systemcan be engaged and disengaged. The two positions can be achieved by mounting thedisconnect cap on the side of the drive reducer in thenormal or in the reverse position, as shown below.

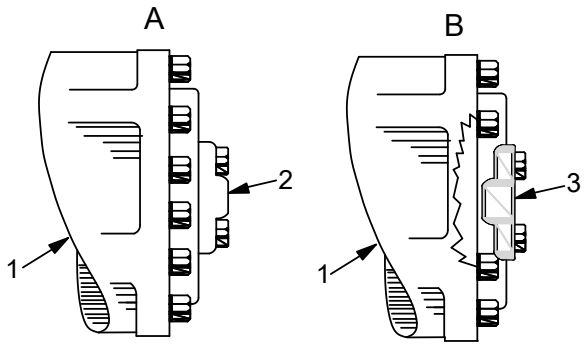

Fig. 7

A Normal position -engaged

B Reverse position -disengaged

1. Travel Reducer
2. Disconnect cap(normal position)
3. Disconnect cap(reverse position)

The drive reducer must be engaged for the machine to operate normally. To ensure the normal and safe operation of the machine, check the disconnect cap on the side of the drive reducer visually before operation.

The drive reducer must be disengaged for the machine to be towed or dragged. To ensure safety, check and ensure that the drive reducer is disengaged before towing or dragging, and return the drive reducer to its original position once the towing or dragging procedure is completed.

For disconnect capin normal and reverse position as well as towing and dragging, refer to the section ***Emergency Towing*** in the Operation Manual.

Check the Oil Level in Drive Reducer

Insufficient gear oil in the drive reducer will lead to degraded machine performance and potential component damage. It's recommended to check the oil level in the drive reducer every 3 months or after 250 operating hours.

1. Drive the machine to rotate one oil port on the reducer to the top (as shown below).

2. Remove the oil plug from the oil port 2, and check the oil level in the reducer, it should be level with the oil port.
3. Add oil as needed, until the oil is level with oil port 2.
4. Check the oil level in the other drive reducers by repeating the above steps.

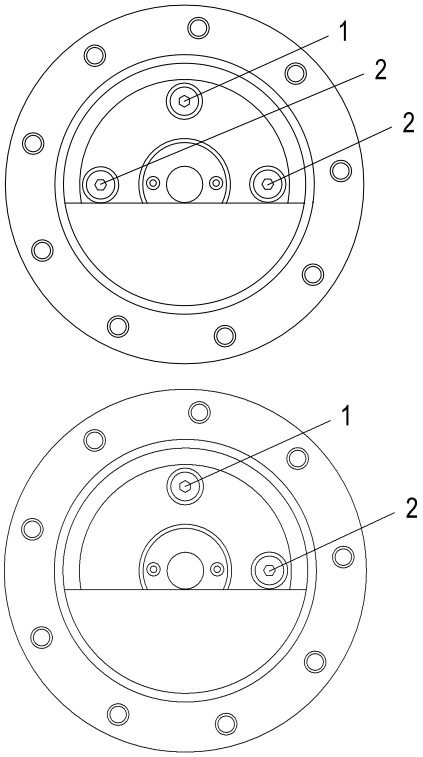

Fig. 8 Diagram – Drive Reducer Gear Oil Check

1. Oil Port 1 **2.** Oil Port 2

Replace the Gear Oil in Drive Reducer

Regularly replacing the gear oil in the drive reducer is vital to maintaining machine performance and extending service life of the machine. It's recommended to replace the gear oil in the drive reducer every year or after 1000 working hours.

Replace the gear oil in the drive reducer by draining the oil and filling with clean oil as follows:

Drain waste oil

1. Drive the machine to rotate one oil port on the reducer to the bottom.
2. Place a suitable container under the oil port at the bottom of reducer.
3. Remove the oil plug from the oil port at the bottom to drain the gear oil from the drive reducer into the container.
4. Reinstall the oil plug.

Fill with clean oil

1. Drive the machine to rotate one oil port on the reducer to the top (as shown above).
2. Remove the oil plug from oil ports 1 and 2.
3. Add clean gear oil from port 1Gear Oil(for the viscosity reference, refer to the ***Oil Specifications***) until the oil is level with oil port 2.
4. Reinstall the oil plug.
5. Clean up any gear oil spills.

Drive Reducer and Drive Motor

Disassembly

1. Make sure the machine is in stowed position.
2. Turn the power switch off and disconnect all power sources (such as battery charger) from the machine. If the machine is equipped with high-voltage lithium batteries, the lithium battery service switch needs to be disconnected.
3. Place a jack of sufficient capacity under the chassis side to be removed.
4. Remove the tires and place them in an appropriate area using suitable lifting equipment.
5. Mark and disconnect the hydraulic pipelines on the travel motor and collect the hydraulic oil in the pipelines with a suitable vessel. Seal all pipelines and ports after completion of collection.
6. Remove the travel motor after removing the mounting bolts and gaskets.
7. Use suitable lifting equipment to support the drive reducer.
8. Remove the mounting bolts and washers on the drive reducer, and slowly remove the drive reducer from the chassis with the assistance of lifting equipment.

NOTICE

Each of the four reducers on the chassis is installed in different directions. Mark the direction of each reducer brake oil port before removing the reducer for the convenience of future installation. The position of brake oil port is as indicated by the arrow in the below figure of ***Brake Oil Port – Drive Reducer*** *.*

Installation

1. Use suitable lifting equipment to support the chassis side to be installed.
2. Align the reducer brake oil port with the marked direction.
3. Fit the washer face with the mounting surface, and apply medium to high viscosity threadlocking adhesive, and then install the bolts one by one.

4. Tighten the bolts to the specified torque with a torque wrench.
5. After installation, fill appropriate amount of gear oil (refer to the ***Oil Specifications*** for the viscosity grade).
6. Install an O-ring on the motor brake oil port, mesh the motor spline shaft with the inner teeth of the reducer, and slowly rotate the motor housing to align the motor oil port with the brake oil port on the reducer and align the motor mounting groove with the mounting hole on the reducer.
7. Fit the washer face with the mounting surface, and apply medium to high viscosity threadlocking adhesive, and then install the bolts one by one and pretighten them.
8. Tighten the bolts to the specified torque with a torque wrench.
9. Connect the hydraulic hoses.

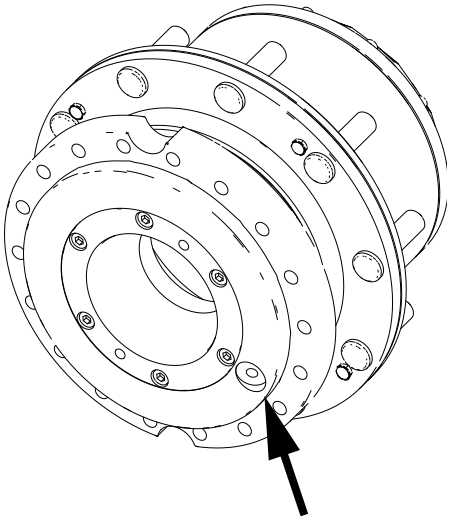

Fig. 9 Oil Control Port of Drive Reducer

5.4 SLEWING MECHANISM

The slewing mechanism, installed on the turntable, is mainly composed of a slewing bearing (slewing reducer) and a motor, and acts as the drive device for slewing action. The inner ring (worm gear) of the slewing bearing is bolted to the turntable, the outer ring is bolted to the chassis. The reducer drives the inner ring (worm gear) of the slewing bearing through the motor to achieve the rotation of the turntable.

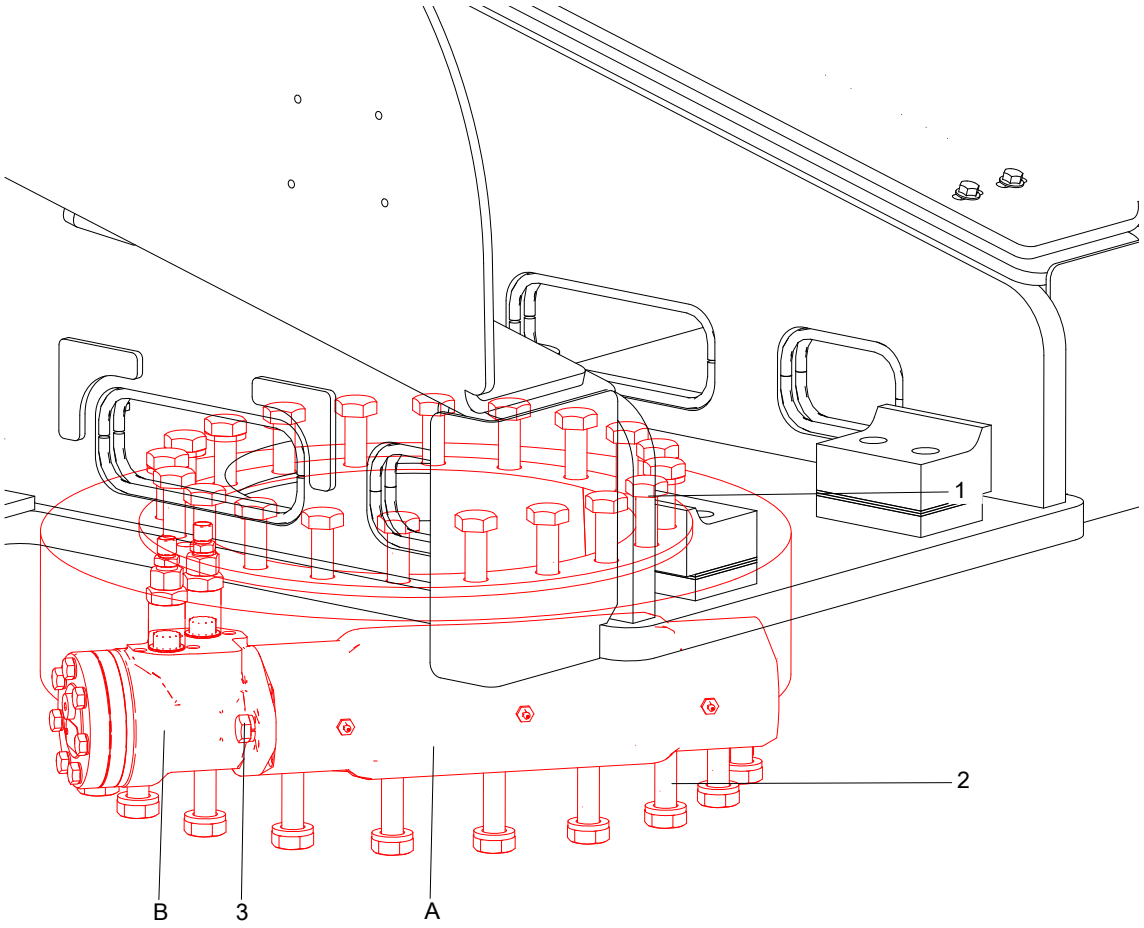

Fig. 10 Slewing Mechanism

Table 5-2 Slewing mechanism

No.	Description
A	Slewing bearing (slewing reducer)
B	Slewing motor

Check the Oil Level in Slewing Reducer

An inappropriate gear oil level in the slewing reducer will lead to reduced machine performance and even component damage. It's recommended to check the oil level in slewing reducer every 3 months or after 250 operating hours.

1. Find the slewing reducer, as shown in the diagram of ***Slewing Mechanism*** .
2. Remove the oil filler plug from the reducer, and check the oil level, which should be even with the oil filler.
3. Remove the oil inlet plug from the brake, and check the oil level, which should be even with the oil inlet port.
4. Add oil as needed, until the oil is level with oil port.

Lubricate Slewing Bearing

Regular lubrication of the slewing bearing is essential for maintaining the machine's normal operation and for ensuring a long service life. Failure to lubricate the slewing bearing regularly may lead to abnormal operation of the machine and premature component damage. It is recommended to lubricate the slewing bearing every 3 months or after 250 hours of operation. When the machine operates in multiple shifts or is exposed to harsh environments, the lubrication frequency and the amount of lubricant should be increased accordingly.

1. As shown in the figure below, connect the grease nipple on the slewing bearing and the nipple at position #1 using a hose.
2. Place the grease gun nozzle on the grease nipple at position #1 and inject ZL-3 lithium-based grease. Through the rubber hose, transfer the grease to the slewing bearing of the turntable.

3. Then, rotate the turntable by 100-130 mm (4-5 in) each time until the whole slewing bearing is fully lubricated.
4. Place the grease gun nozzle on the grease nipple at position #2 and fill with ZL-3 lithium-based grease until the worm gear is fully lubricated.
5. Remove excess grease.

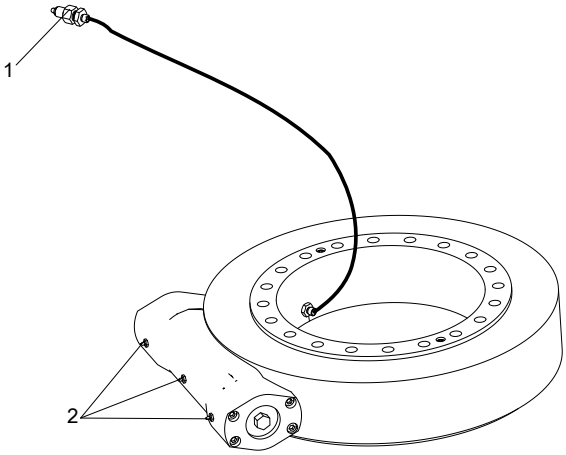

Fig. 11 Diagram, slewing bearing lubrication

Check Slewing Bearing Bolts

It is recommended to check the slewing bearing bolts after the first 50 hours of operation, and afterwards every 3 months or 250 hours of operation.

If any bolt is found to be missing or slack, replace it with a new bolt, apply medium-to-high strength threadlocking adhesive to the bolt thread and tighten the bolt with the torque specified in the ***Torque Specifications*** section. After replacing and tightening the slewing bearing bolt, re-inspect the bolt for tightness.

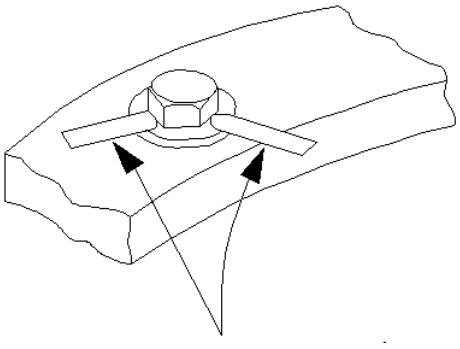

Fig. 12 Instruction for inserting a feeler gauge

Check the connecting bolt between the chassis and the slewing bearing

1. Set the machine to the position shown in the Figure ***(b)*** below.
2. Locate the connecting bolt between the chassis and the slewing bearing.
3. As indicated by***Page 43, Instruction for inserting a feeler gauge***, insert a 0.04 mm (0.0016 in) feeler gauge between the bolt and the washer in the quadrant opposite to the turntable counterweight.
4. Make sure that the feeler gauge does not penetrate under the bolt head to the bolt shaft.
5. Rotate the turntable 90° to check the bolts in the next quadrant.
6. Rotate the turntable 90°again until all bolts have been inspected.

Check the connecting bolts between the turntable and the slewing bearing

1. Set the machine to the position shown in the Figure ***(b)*** below.
2. Locate the connecting bolt between the turntable and the slewing bearing.
3. As indicated by***Page 43, Instruction for inserting a feeler gauge***, insert a 0.04 mm (0.0016 in) feeler gauge between the bolt and washer in the semicircle opposite to the turntable counterweight.
4. Make sure that the feeler gauge does not penetrate under the bolt head to the bolt shaft.
5. Set the machine to the position as shown in the Figure ***(a)*** below.
6. As indicated by***Page 43, Instruction for inserting a feeler gauge***, insert a 0.04 mm (0.0016 in) feeler gauge between the bolt and washer in the other semicircle (turntable counterweight).
7. Make sure that the feeler gauge does not penetrate under the bolt head to the bolt shaft.

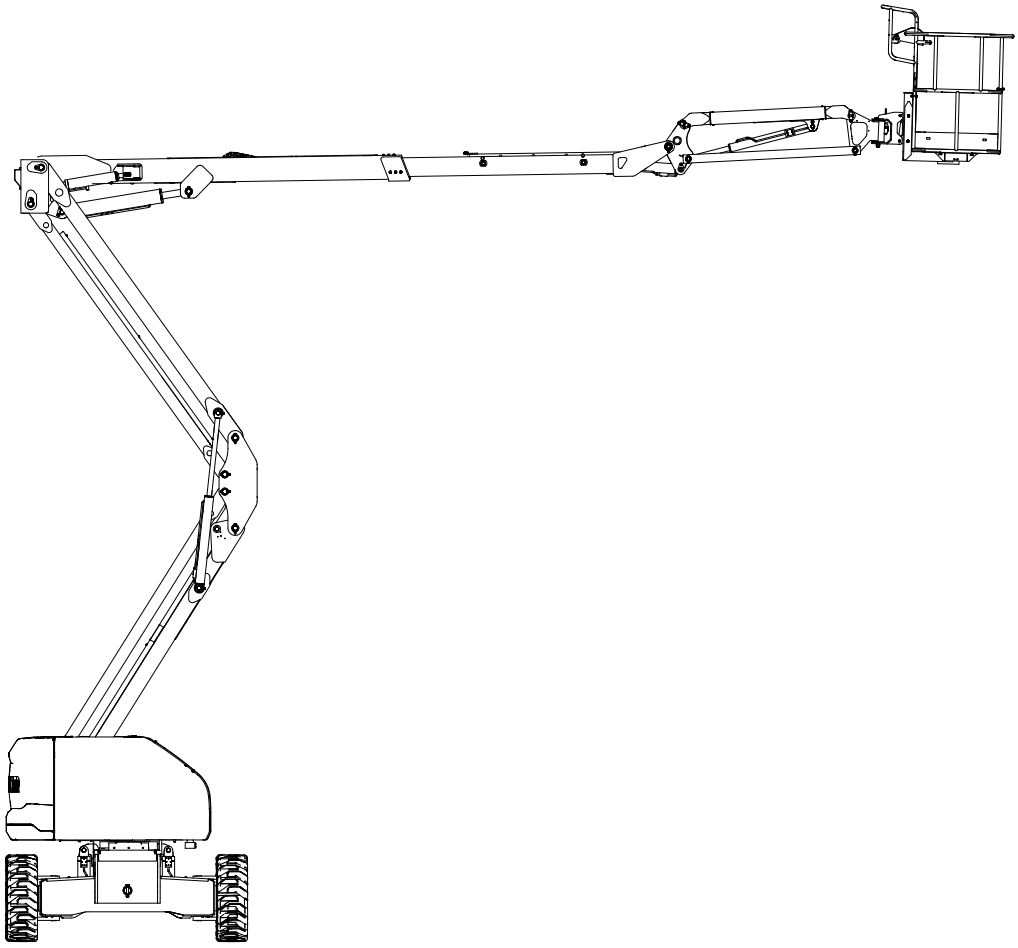

Fig. 13 Check Slewing Bearing Connecting Bolts (a)

1. Articulating boom fully lifted;
2. Main boom lifted to horizontal position;
3. Telescoping boom section fully extended
4. Jib raised to horizontal position;
5. Turntable rotated 90°;

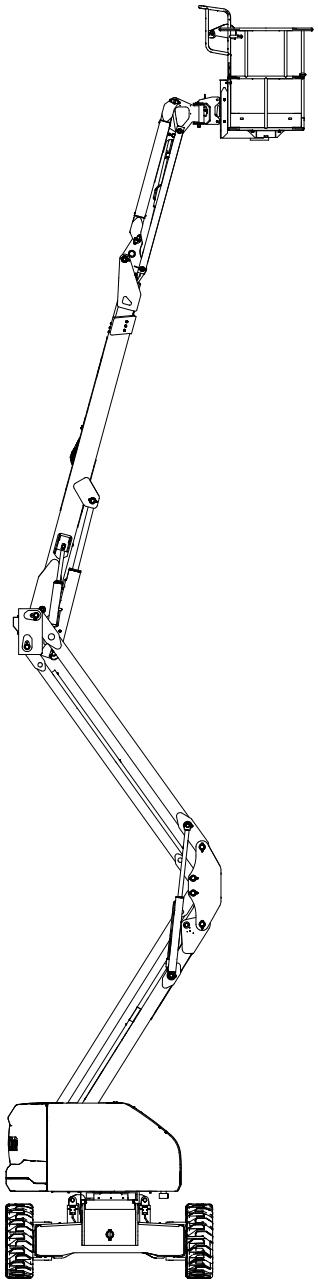

Fig. 14 Check Slewing Bearing Connecting Bolts (b)

1. Articulating boom fully lifted;
2. Main boom fully retracted and lifted;
3. Jib fully lifted;
4. Turntable rotated 90°;

Disassembly and Installation

Disassembling the slewing motor

1. Make sure the turntable is locked (lock the slewing pin if so equipped).
2. Mark and disconnect the hydraulic lines on the slewing motor and collect the hydraulic oil from the lines with a suitable container. Seal all pipelines and ports after completion of collection.

3. Remove the slewing motor from the slewing bearing by removing the mounting bolts at position #3.

Disassembling the slewing bearing

1. Use suitable lifting equipment to support the boom.
2. Mark and disconnect the hydraulic lines on the slewing mechanism and collect the hydraulic oil from the lines with a suitable container. Seal all pipelines and ports after completion of collection.
3. Use suitable lifting equipment to support the turntable.
4. Use appropriate tools to draw a line on the inner ring of the slewing bearing and at the bottom of the turntable as a mark to align the slewing bearing for installation.
5. Remove the bolts and washers at position #1 that connect the turntable to the inner ring of the slewing bearing.
6. Slowly remove the entire turntable assembly from the slewing bearing with the assistance of lifting equipment and place the turntable on a bracket that provides proper support.

NOTICE

Use caution when removing the turntable to avoid damage to the turntable, the slewing bearing, and other machine components.

7. Use appropriate tools to draw a line on the outer ring of the slewing bearing and on the upper part of the chassis as a mark to align the bearing for mounting.
8. Remove the bolts and washers at position #2 that connect the chassis to the outer ring of the slewing bearing.
9. Remove the slewing bearing from the chassis using suitable lifting equipment, place the slewing bearing in a clean work area that provides proper support.

NOTICE

Bolts and washers must not be reused; they must be replaced with new fasteners instead.

Installationion of the slewing bearing

1. Clean the removed slewing ring and use caution as to avoid hampering its sealing properties.
2. Use suitable lifting equipment to lift the slewing bearing onto the mounting surface of the chassis, aligning the outer ring of the slewing bearing with the marking line on the chassis.
3. Check the clearance between the slewing bearing mounting surface and the chassis mounting surface with a feeler gauge, ensuring the clearance ≤ 0.2 mm (0.008 in).
4. Using the special high-strength washers for high-strength bolts, fit the washer face with the mounting surface, and apply Loctite 272 threadlocking adhesive, then install the bolts one by one by passing it through the chassis and the outer ring of the slewing bearing.

NOTICE

- *Bolts and washers must not be reused; they must be replaced with new fasteners instead.*
- *The slewing bearing is the only structural connection between the chassis and the turntable, its replacement should meet the specification requirements. It is highly recommended that you use only original components.*

5. Tighten the bolts in the sequence shown in the following diagram and follow the steps in the table below.
6. After the bolts are tightened, mark the bolt head and its surrounding material with an appropriate tool to facilitate later inspection of the bolts for looseness.
7. Rotate the inner ring of the slewing bearing by hand to ensure smooth movement.
8. Remove the lifting equipment from the slewing bearing.
9. Lift the turntable assembly to the top of the chassis using suitable lifting equipment, carefully lower the turntable onto the slewing bearing, and align the inner ring of the slewing bearing with the marking line on the turntable. If replacing the slewing bearing with a new one, make sure that the grease nipple joint is positioned at a 90° angle to the left-right symmetrical line of the turntable.
10. Using special high-strength washers for high-strength bolts, fit the washer face with the mounting surface, and apply Loctite 272 threadlocking adhesive, then install the bolts one by one by passing it through the turntable and the inner ring of the slewing bearing.
11. Tighten the bolts in the sequence shown in the following diagram and follow the steps in the table below.
12. After the bolts are tightened, mark the bolt head and its surrounding material with an appropriate tool to facilitate later inspection of the bolts for looseness.
13. Remove the lifting equipment and reconnect the hydraulic hoses according to the marks applied before disassembly.

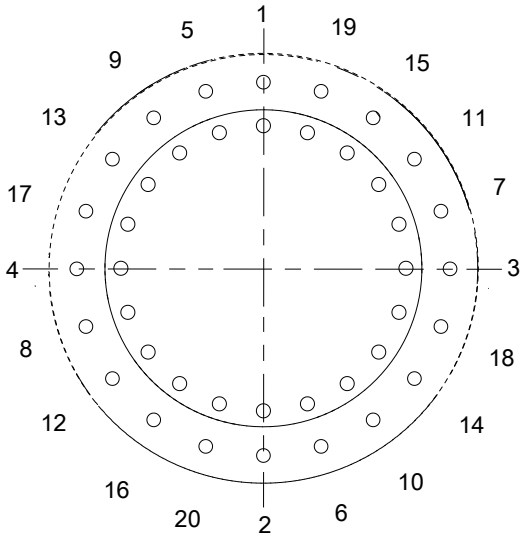

Fig. 15 Tightening Sequence of Slewing Bearing Bolts

Table 5-3 Table of Slewing Bearing Bolt Tightening Torques

The First step	The Second step	The Third step
160 Nm (118 ft-lb)	270 Nm (199 ft-lb)	300 Nm (221 ft-lb)

5.5 COUNTERWEIGHT

⚠ WARNING

The counterweight is essential for maintaining the stability of the machine. Do not modify or remove counterweight without the manufacturer's written authorization. Improperly assembled counterweights may cause the machine to tip over, causing serious injury, death, or machine damage.

Disassembly

1. Adjust the machine to the stowed position and make sure the turntable is locked (lock the slewing pin if so equipped).
2. Use suitable lifting equipment to provide reliable support for the boom and prevent the machine from tipping over once the counterweight is removed.
3. Use suitable lifting equipment to support the counterweight.
4. Remove the bolts securing the counterweight to the turntable.
5. Slowly remove the counterweight by means of the lifting equipment.

Installation

1. Use suitable lifting equipment to lift the counterweight to the installation position on the turntable.
2. Align the mounting holes of the counterweight with that of the turntable structure.
3. Apply medium-to-high strength threadlocking adhesive to the fastening bolt threads and counterweight threads, and install the bolts one by one.
4. Confirm that the bolts are tightened with the correct torque, refer to the ***Torque Specifications*** section for the tightening torque.

5.6 BATTERY

⚠ WARNING

- **Before removing the battery, the charger power supply and the entire machine's operating power must be cut off.**
- **The battery case may only be disassembled by qualified/authorized personnel; improper work may result in system damage.**

1. Place the machine in a ventilated and spark-free environment.
2. Open turntablecover to locate the batteries.
3. Mark and disconnect the wire harness connection on the negative terminal of the battery, then disconnect the wire harness connection on the positive terminal of the battery.
4. After securing the battery with slings, remove the battery from the machine using suitable lifting equipment.

5.7 COLD WEATHER HEATING PACKAGE (ONLY LTV MACHINE)

If your machine is equipped with a cryogenic heating device, it has passed rigorous commissioning and comprehensive performance testing before leaving the factory to ensure reliable operation in low temperature environments. When a heater fails, please contact your local after-sales service personnel immediately for professional testing. Heaters that have been confirmed to be faulty need to be replaced in time to ensure good heating performance of the low-temperature heating device.

⚠ WARNING

Do not attempt to perform maintance on cryogenic heating devices yourself.

Notes

When performing maintenance on cryogenic heating device, please note that:

- Make sure to cut off the AC power supply to the external mains of the cryogenic heating device.
- The coolant external circulation heater line is directly connnected to the internal coolant of the engine block, make sure that the ball value handle of the coolant heating line is open (the handle is perpendicular to the line) when performing maintence, that is, disconnect the coolant heating line. After the maintenance is complete, close the ball value handle (the handle is parallel to the line), connect the coolant heating line, and ensure that the coolant level is appropriate before the warm-up process can be stared normally.

Fig. 16 Handle in open position

Fig. 17 Handle in the closed position

For more detailed maintenance content, please check the “ Boom Truck Assistive Devices Manual”.

Electrical Schematic Diagram

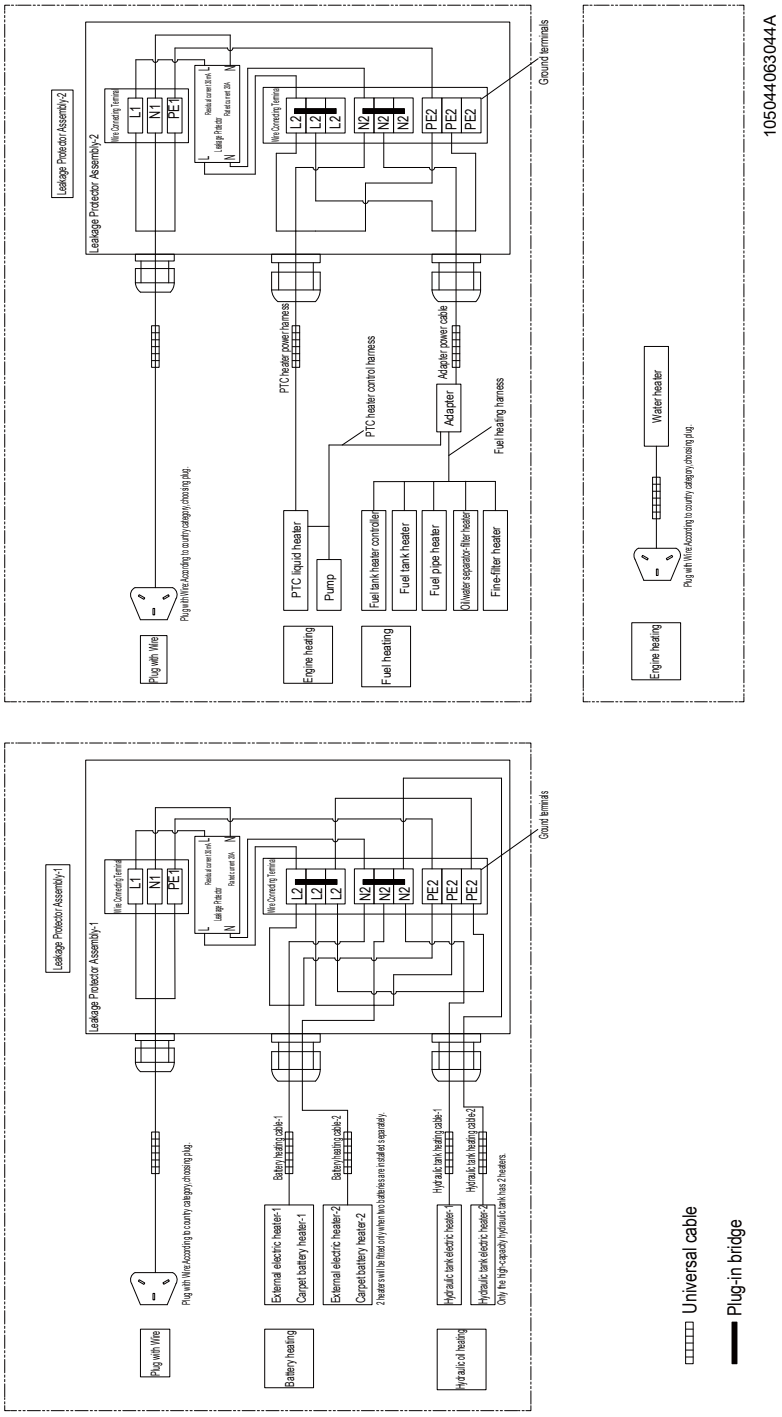

Fig. 18 Electrical Schematic Diagram

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6 BOOM AND PLATFORM ASSEMBLY

6.1 BOOM AND PLATFORM SYSTEM

Platform Control Enable System

The platform control system uses time-dependent support circuits, limiting the time availability for active or enabled controllers. The foot switch must be depressed before any movement can be performed. When the foot switch is depressed, the operator may perform any movement within 7 seconds. The controller will remain enabled as long as the operator keeps activating any function until 7 seconds after the last movement stops. When the controller is active, the indicator on the platform control panel will illuminate. After the preset time, the illuminated indicator will turn off, and all movements will be disabled. To continue operating the machine, the footswitch must be depressed again.

Transport Position Sensing System

The transport position sensing system can detect the position of the boom by means of the travel switch mounted on the boom tube. When the down limit switch of the main boom or the tower boom is not engaged, or the retraction limit switch of the main boom is not engaged, the machine is considered as in operating position; otherwise, it is considered as in non-operating position.. The position of the jib is not taken into account.

This system is used to control the travel speed reduction system.

Load Sensing System

The load sensing system on this machine detects the load on the platform through the load cell installed at the joint between platform and boom. The overload indicator on the platform display panel provides a warning when the load on the platform exceeds the rated load. When the load sensing system detects that the platform load exceeds the rated load, the overload indicator will flash, and all movements of the machine will be restricted in the KG (overload limit) mode. In other modes, the telescopic section of the boom may be retracted, the turntable may be rotated slowly, and the boom can be lowered once it is fully retracted. Once the excess load is removed, the overload indicator will go out, and all machine movements may be resumed.

6.2 PLATFORM AND JIB

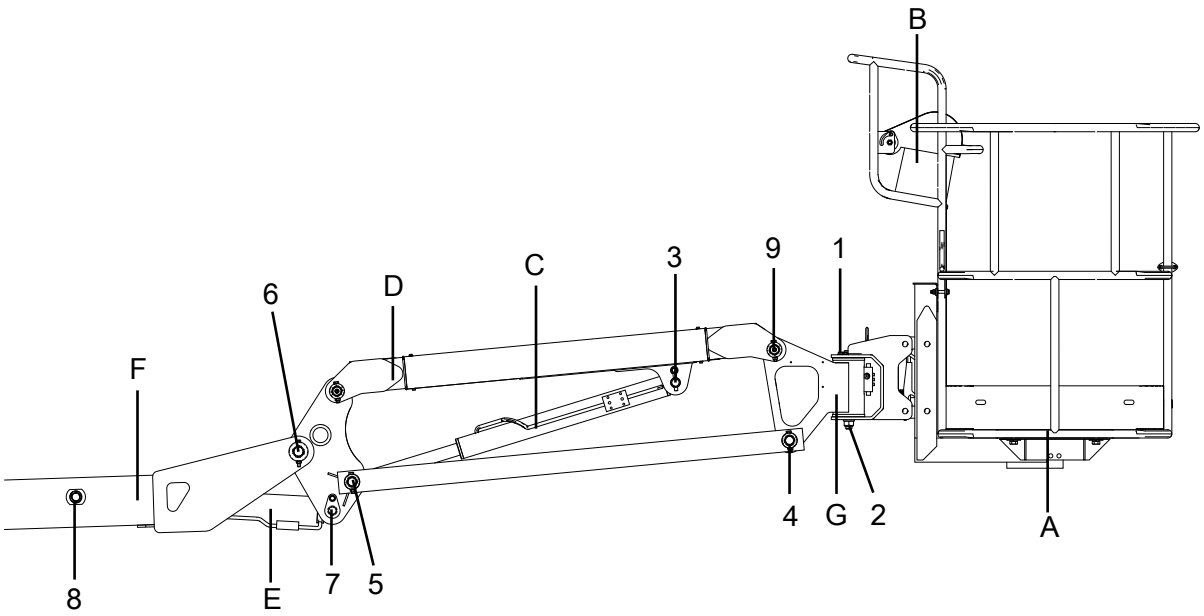

Fig. 1 Diagram of Platform and Jib Structure

Table 6-1 Description of platform and jib structure

No.	Description
A	Platform
B	Platform control box
C	Jib lift cylinder
D	Jib
E	Upward leveling cylinder
F	Boom
G	Swing cylinder

Platform Controller

Disassembly

⚠ WARNING

Before performing such disassembly tasks, disconnect the battery and disconnect the charger from the AC outlet. Contact with live conductors may result in serious injury or death.

1. Make sure the machine is in stowed position.
2. Turn off the machine and press the emergency stop button at the platform controller and turntable controller.
3. Mark and disconnect the harness connections in the platform controller.
4. Remove the fastening bolts on the bottom of the platform controller.
5. Slowly remove the platform controller.

Installation

For installation, follow the disassembly procedure in reverse order.

Platform Assembly

Disassembly

1. Remove the platform controller from the platform.
2. Remove the foot switch from the platform.
3. Use suitable lifting equipment to support the work platform.
4. Remove the fastening bolt #1 from the swing cylinder and the nut from pivot pin #2.
5. Knock out pivot pin #2 with a brass rod and a mallet.
6. Slowly remove the platform assembly with the aid of the lifting equipment.

Installation

For installation, follow the disassembly procedure in reverse order.

Note: Make sure that the bolt at position #1 and the nut at position #2 of the swing cylinder have been tightened with the correct torque. Refer to the ***Torque Specifications*** section for the tightening torque.

Jib Assembly

⚠ WARNING

- **Before loosening or disassembling hydraulic parts (especially the counterbalance valve on the cylinder), the hydraulic pressure of all hydraulic lines should be released and the hydraulic oil should completely cool down.**
- **Disassemble the hydraulic components slowly to prevent the hydraulic oil from splashing and causing injuries.**

Removing the jib assembly

1. Play the main boom in horizontal position and remove the platform assembly.
2. Support the jib and upward leveling cylinder using suitable lifting equipment.
3. Mark and disconnect the hydraulic lines from the jib and collect the hydraulic oil from the lines with a suitable container. Plug the lines and the ports.
4. Remove the bolt from pivot pin #7 of the upward leveling cylinder, and drive out pivot pin #7 with a brass rod and a mallet.
5. Remove the bolt and nut from pivot pin #6, and drive out pivot pin #6 with a brass rod and mallet.
6. Slowly remove the jib assembly with the aid of the lifting equipment.

Removing the jib lift cylinder

1. Support the jib lift cylinder with suitable lifting equipment.
2. Remove the bolt and nut from pivot pin #3 and drive out pivot pin #3 with a brass rod and a mallet.
3. Remove the bolt and nut from pivot pin #5 and drive out pivot pin #5 with a brass rod and a mallet.
4. Using suitable lifting equipment, slowly remove the jib lift cylinder from the jib.

⚠ WARNING

When disassembling the cylinder, use caution to prevent it from falling and getting damaged, and also to avoid impacts that could lead to high-pressure oil leaks.

Inspection

- Inspect the jib pivot pin for wear, scratches, deformation or other damage. Replace the pivot pin if necessary.
- Check the inner race of the pivot pin bearing for scratches, deformation, wear or other damage. Replace the bearing if necessary.
- Check the connecting pin of the jib lift cylinder for wear, scratches, deformation or other damage. Before installation, ensure that the surface of the pin has received protective treatment. Replace the pivot pin if necessary.
- Check the inner race of the platform swing cylinder bearing for scratches, deformation, wear or other damage. Replace the bearing if necessary.
- Check all threaded parts for elongation, thread deformation, torsion or other damage. Replace the part if needed.
- Check all structures of the jib assembly for deformation, cracks, weld separation or other damage. Replace the structure if necessary.

Installation

For installation, follow the disassembly procedure in reverse order.

Swing Cylinder

Check the swing cylinder fasteners

The swing cylinder fasteners are essential for the normal and safe operation of the machine. It is recommended to check the swing cylinder fasteners every 3 months or 250 hours of operation.

1. Make sure the machine is in stowed position. Locate the swing cylinder at the joint between platform and boom.
2. Check if the bolts at positions #1 and #2 of the cylinder are tightened with the correct torque. Refer to the ***Torque Specifications*** section for the tightening torques.
3. If any fastener is replaced, make sure to tighten the fastener with the torque as indicated in the ***Torque Specifications*** section and apply Loctite 272 threadlocking adhesive.

Disassembly

1. Remove the platform assembly.
2. Mark and disconnect the hydraulic lines from the swing cylinder and collect the hydraulic oil from the lines with a suitable container. Seal all pipelines and ports after completion of collection.
3. Support the swing cylinder with suitable lifting equipment.
4. Remove the fastening bolts and nuts from the pivot pins #4 and #9 of the swing cylinder.
5. Knock out pivot pins #4 and #9 with a brass rod and a mallet.
6. Using suitable lifting equipment, slowly remove the swing cylinder.

Installation

For installation, follow the disassembly procedure in reverse order.

Upward Leveling Cylinder

⚠ WARNING

- **Before loosening or disassembling hydraulic parts (especially the counterbalance valve on the cylinder), the hydraulic pressure of all hydraulic lines should be released and the hydraulic oil should completely cool down.**
- **Disassemble the hydraulic components slowly to prevent the hydraulic oil from splashing and causing injuries.**

Disassembly

1. Set the main boom and the jib to a horizontal position, extend the main boom slightly until the connecting pivot pin at the cylinder bottom is accessible and can easily be removed.
2. Mark and disconnect the hydraulic lines from the upward leveling cylinder and collect the hydraulic oil from the lines using a suitable container. Seal all pipelines and ports after completion of collection.
3. Use suitable lifting equipment to support the platform and jib assembly.
4. Remove the fastening bolt at pivot pin #7 at the piston rod end of the upward leveling cylinder. Do not remove the pivot pin at this time.
5. Remove the retaining ring at shaft #8. Do not remove the shaft at this time.
6. Use suitable lifting equipment to support the piston rod head of the upward leveling cylinder to protect the piston rod from damage.
7. Knock out pivot pin #7 and shaft #8 with a brass rod and mallet.
8. Using suitable lifting equipment, slowly remove the upward leveling cylinder from the main boom.

⚠ WARNING

When disassembling the cylinder, use caution to prevent it from falling and getting damaged, and also to avoid impacts that could lead to high-pressure oil leaks.

Installation

For installation, follow the disassembly procedure in reverse order.

6.3 BOOM

Cable Track Assembly

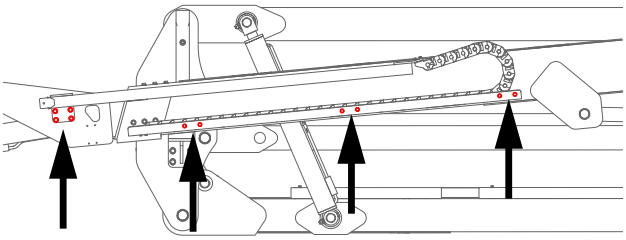

Fig. 2 Fastening Bolts on Cable Track Assembly

Disassembly

1. Make sure the machine is in stowed position.
2. Mark and disconnect the harness connections on the cable track assembly.
3. Mark and disconnect all hydraulic lines from the cable track guide to the platform and collect the hydraulic oil from the lines with a suitable container. Seal all pipelines and ports after completion of collection.
4. Remove the hydraulic lines and wiring harnesses from the cable track guide.
5. Support the cable track assembly along its length with suitable lifting equipment.
6. Remove the fastening bolts as indicated by the arrows above.
7. Take appropriate preventive measures and slowly remove the cable track assembly from the boom tube with the aid of the lifting equipment.
8. To disassemble the cable track separately, simply remove the fastening bolts at both ends of the cable track.

Inspection

- Check all threaded parts for elongation, thread deformation, torsion or other damage. Replace the part if needed.
- Check all components of the cable track assembly for deformation, cracks, weld separation or other damage. Replace the structure if necessary.

Installation

For installation, follow the disassembly procedure in reverse order.

Boom Wear Pads

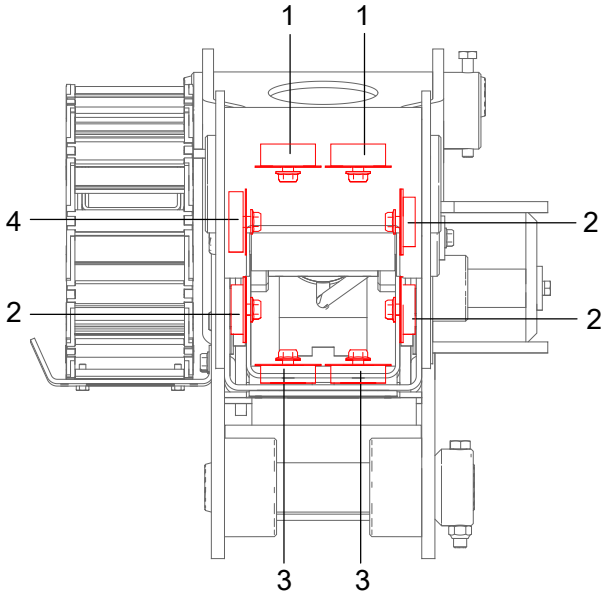

Fig. 3 Boom Head Wear Pads

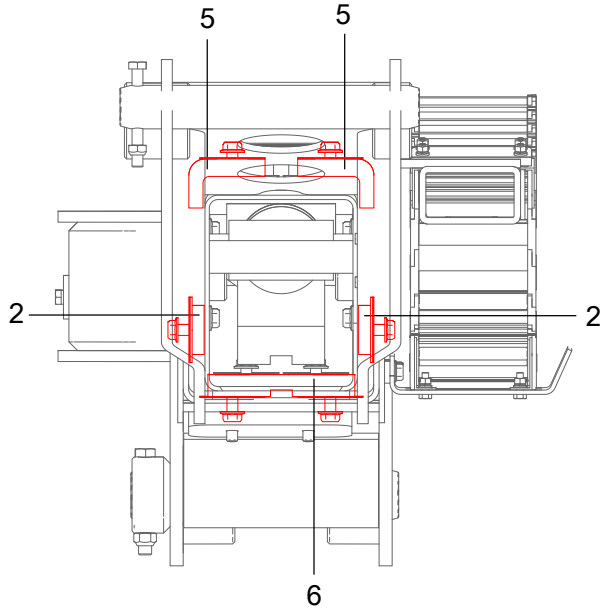

Fig. 4 Diagram of Boom Tail Wear Pads

Table 6-2 Boom Wear Pad Thickness

No.	Wear pad thickness
1	20 mm (0.79 in)
2	11mm (0.43in)
3	16 mm (0.63 in)
4	13 mm (0.51 in)
5	13 mm (0.51 in)/ 16 mm (0.63 in)
6	20 mm (0.79 in)

The boom wear pads are critical for the safe operation of the machine. As a friction pair will develop between each wear pad and the surface of the boom's telescopic section, improper gaskets or continued use of extremely worn pads may result in component damage and unsafe operation. It is recommended to check the boom wear pad thickness once a year or after 1000 hours of operation.

1. Remove the cover plate from the head of the main boom (near the turntable) or the nylon brush at the tail of the main boom (near the platform).
2. Measure the thickness of each wear pad at the head and tail of the main boom.
3. If the telescopic cylinder has wear pads, measure the wear pad thickness after the telescopic cylinder is removed.
4. Compare the measured thickness value of each wear pad with the value specified in the above table, and replace the wear pad assembly in time if the wear extent of the wear pad is greater than or equal to 3 mm (0.118 in).

NOTICE

The disassembled wear pad cannot be reused and must be replaced with a new wear pad assembly.

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7 POWER SYSTEM

The machine is powered by one of the following engine-sand equipped with an auxiliary power system. This manual only provides brief maintenance instructions of the engines. For detailed instructions, please refer to the engine maintenance manual provided with the machine.

7.1 KUBOTA ENGINE 05-E4B SERIES

Periodic Maintenance Chart

Daily and periodic maintenance is important to keep the engine in good operating condition. To ensure long-time safe operation of the engine, perform periodic maintenance as per the following chart.

Table 7-1 Periodic Maintenance Chart

Check Item	Periodic Maintenance Interval										
	every										
	50 hours	100 hours	200 hours	400 hours	500 hours	1 or 2 months	1 year	800 hours	1500 hours	3000 hours	2 years
* Check fuel hoses and clamp bands	☆										
* Change engine oil (oil pan depth: 110 mm (4.33 in) 125 mm (4.92 in) 130 mm (5.12 in))	★		☆								
* Clean air cleaner element (replace the element after 6 times cleaning)		☆									
Clean fuel filter element		☆									
Check fan belt tension and damage		☆									
Check battery electrolyte level		☆									
* Replace oil filter cartridge (oil pan depth: 110 mm (4.33 in) 125 mm (4.92 in) 130 mm (5.12 in))	★		☆	☆ (BG type)							
Check radiator hoses and clamp bands			☆								
* Check the intake air line			☆								

Table 7-1 Periodic Maintenance Chart (continued)

Check Item	Periodic Maintenance Interval										
	every										
	50 hours	100 hours	200 hours	400 hours	500 hours	1 or 2 months	1 year	800 hours	1500 hours	3000 hours	2 years
Replace fuel filter cartridge				☆							
Clean water jacket and radiator interior					☆						
Replace fan belt					☆						
Recharge battery						☆					
* Replace air cleaner element							☆				
Check valve clearance								☆			
* Check injection nozzle pressure									☆		
Check injection pump										☆	
Check injection timing										☆	
Change radiator coolant											☆
Replace radiator hoses and clamp bands											☆
* Replace fuel hoses and clamps											☆
* Replace intake air pipe											☆
Replace battery											☆

Please see the emission warranty statement in detail.
★ Change engine oil and replace oil filter cartridge after the first 50 hours of operation.
* The items listed above (* marked) are registered as emission related critical parts by Kubota in the U.S. EPA non-road emission regulation. As the engine owner, you are responsible for the performance of the required maintenance on the engine according to the above instruction.

Fuel System

Check the Fuel Level

The fuel level can be checked from the energized turntable or platform controller.

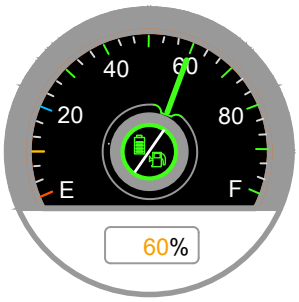


Fig. 1 Fuel level (at the turntable controller)

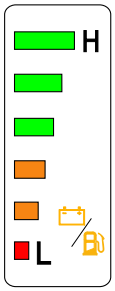


Fig. 2 Fuel Oil Level (At the Platform Control Box)

Fill the Fuel Tank

Turn off the engine, fill with correct diesel fuel according to the ***Oil Specifications*** , and never overfill the tank.

- **Do not mix gasoline, alcohol, or their mixture with diesel fuel.**
- **Before filling the fuel tank, always stop the engine. And keep it away from ignition sources.**
- **During refueling, take care to prevent fuel spillage. If fuel spills, wipe it clean immediately. Refuel only after the engine has cooled; otherwise, fire may occur.**
- **Stop the engine before refueling it. Do not smoke when working near the battery or refueling.**
- **Due to the extremely accurate tolerance match of the diesel injection system, it is critical to keep the fuel clean and free of dirt or water. The dirt or water entering the combustion system can cause severe damage to the fuel pump and injectors.**

Replace Fuel Filter Cartridge

NOTICE

Do not pre-fill the filter, or the filter may be contaminated.

Cartridge-type fuel filter

It is recommended to replace the fuel filter element after 400 hours of operation.

1. If twist protection is installed (optional), remove the clamp first.
2. Position an approved container under the fuel filter to collect the contaminants.
3. Use a special tool to loosen and unscrew the filter cartridge.
4. Collect the drained fuel.
5. Wipe the seal surface of the filter carrier with clean, non-fiber cloths.
6. Apply a thin layer of oil to the sealing surface of the new filter.
7. Screw on the new filter by hand until the gasket is touching, and then tighten it.
8. Secure the clamp on the twist protection (optional).
9. Vent the fuel line.
10. Start the engine to check for oil leakage.

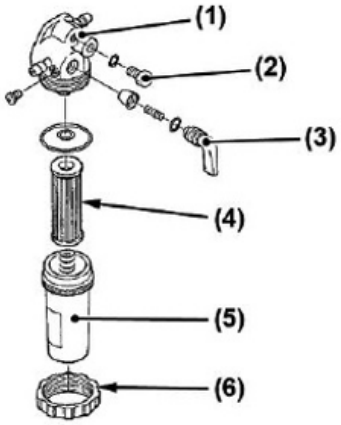
Element-type fuel filter

1. Position an approved container under the fuel filter to collect the contaminants.
2. Close the fuel cock.
3. Unscrew the retaining ring and remove the filter cup, and rinse the inside with kerosene.
4. Replace the filter element.
5. Reassemble the fuel filter, keeping out dust and dirt.
6. Vent the fuel lines.
7. Start the engine to check for oil leakage.

Clean Fuel Filter Element

This section is for element-type fuel filter only.

If dust and dirt enter the fuel, the fuel injection pump and injection nozzle will wear quickly. To prevent this, be sure to clean the filter cup periodically.



1. Cock body
2. Air vent plug
3. Fuel cock
4. Filter element
5. Filter cup
6. Retaining ring

Fig. 3 Fuel filter

1. Position an approved container under the fuel filter to collect the contaminants.

2. Close the fuel cock (3).
3. Unscrew the retaining ring (6) and remove the filter cup (5), and rinse the inside with kerosene.
4. Take out the element (4) and dip it in the kerosene to rinse.
5. After cleaning, reassemble the fuel filter, keeping out dust and dirt.
6. Vent the fuel system.

Bleed the Fuel Lines

NOTICE

Failure to bleed the fuel lines may bring damage to the high-pressure pump of the injection system.

To avoid false fault messages, do not attempt to start the fuel system while bleeding.

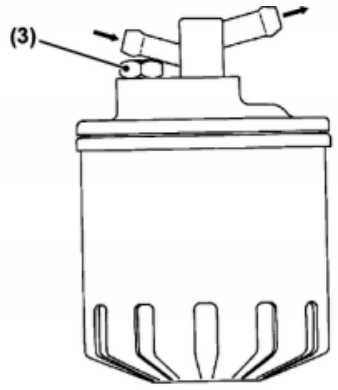


Fig. 4 Cartridge-type

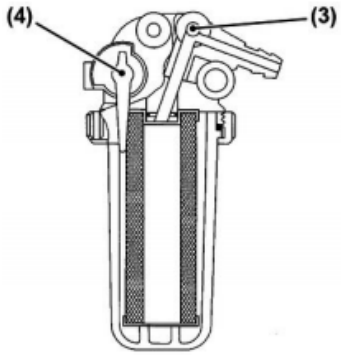


Fig. 5 Element-type

1. Fill the tank with fuel and open the cock (4).
2. Loosen the air vent plug (3) of the fuel filter a few turns.
3. When there is no more air bubbles in the fuel coming out of this air vent plug (3), tighten the air vent plug (3).
4. Open the air vent cock on the top of fuel injection pump.
5. If equipped with electrical fuel feed pump, turn the key on AC position and pump the fuel up for 10 to 15 seconds.
6. If equipped with mechanical fuel feed pump, set the stop lever on stop position and crank the engine for 10 to 15 seconds.
7. Close securely the air vent plug (3) after air bleeding.

Check and Replace Fuel Hose

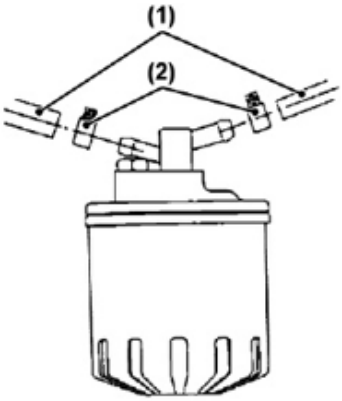


Fig. 6 Cartridge-type

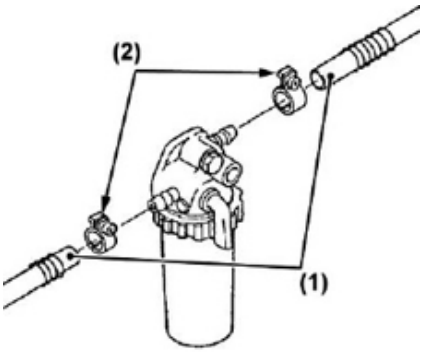


Fig. 7 Element-type

Check

Visually check the fuel hose (1) every 50 hours of operation for signs of wear, damage, breakage or loose clamps (2) that could damage the engine. If necessary, replace the damaged hose.

If the clamp (2) is loose, apply oil to the threads and securely retighten it.

Replace

The fuel hose (1) is made of rubber and ages regardless of the period service. Change the fuel hose together with the clamp every two years.

After the fuel hose and the clamps have been changed, bleed the fuel system.

Lubrication System

Check the Engine Fuel Level

1. Turn off the engine.
2. Make sure that the machine and engine are level.
3. Wait until the engine oil temperature drops to below 80℃ (176℉),Remove the oil dipstick from the engine and wipe it clean with non-fiber cleaning cloths.
4. Reinstall the clean oil dipstick back to its original position.
5. Take the oil dipstick out again and check the oil level, which should be between the Upper mark and Low mark on the dipstick.
6. If necessary, fill with correct engine oil to the Upper mark on the dipstick according to the ***Oil Specifications*** , and do not overfill the tank.

Change the Engine Oil

It is recommended to change the engine oil after the first 50 hours of operation, and afterwards every 200 hours of operation.

NOTICE

- *Every time the engine oil is changed, the engine oil filter must also be replaced.*
- *Changing the oil with the engine warmed up can make the engine oil flow smoother and remove more impurities.*

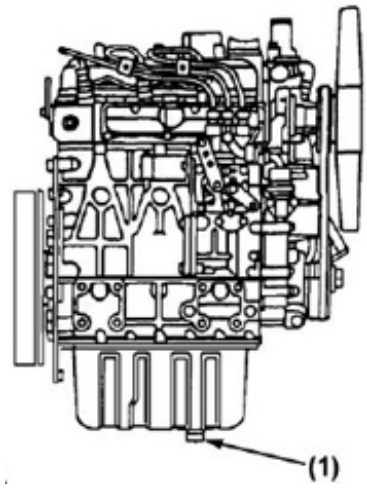


Fig. 8

1. Before changing the oil, warm up the engine so that the engine oil reaches approximately 80°C (176°F), and then turn off the engine.
2. Make sure that the machine and engine are level.
3. Place an appropriate oil-collecting vessel under the engine oil drain valve (1).
4. Open the drain valve (1) to allow the oil to flow out.

⚠ WARNING

Hot engine oil poses a risk of burns, so avoid contact with hot oil when draining oil.

5. Reinstall the drain valve after the oil is fully drained (1).
6. Fill with correct and clean engine oil according to the ***Oil Specifications*** , and never overfill the tank.
7. Warm up the engine so that the engine oil reaches approximately 80°C (176°F) and then shut down the engine.
8. Check the oil level, which should be in the proper position.

Replace the Engine Oil Filter Cartridge

It is recommended to replace the engine oil filter element after the first 50 hours of operation, and afterwards every 200 hours of operation (for BG engines: every 400 hours of operation thereafter).

NOTICE

Do not pre-fill the filter, or the filter may be contaminated.

1. Place an appropriate oil-collecting vessel under the oil filter.
2. Use a special tool to loosen and unscrew the filter cartridge.
3. Collect the drained fuel.
4. Wipe the seal surface of the filter carrier with clean, non-fiber cloths.
5. Apply a thin layer of oil to the sealing surface of the new filter.
6. Screw in the new filter by hand until the gasket contacts the seal surface, then tighten it with proper torque.

Cooling System

⚠ WARNING

- **Do not suddenly turn off the engine. It should be idled without load for 5 minutes before being turned off.**
- **Maintenance work can only be carried out after the engine and radiator have completely cooled down (more than 30 minutes after stopping)**
- **Do not remove the radiator cap when the coolant temperature is very high.When the coolant temperature is very high, do not remove the radiator cover. When it cools down to a touchable level, rotate the cover until the first stop to release the excess pressure. Then, completely remove the cover. If overheating occurs, steam may gush out from the radiator or water tank, causing severe burns.**

It is recommended to change the coolant every two years.

Check the Coolant Level

1. Turn off the engine.
2. Make sure that the machine and engine are level.
3. Without recovery tank: After the coolant temperature drops to below 50℃ (122°F), remove the radiator cap (1) slowly and check to see that the coolant level is just below the port.

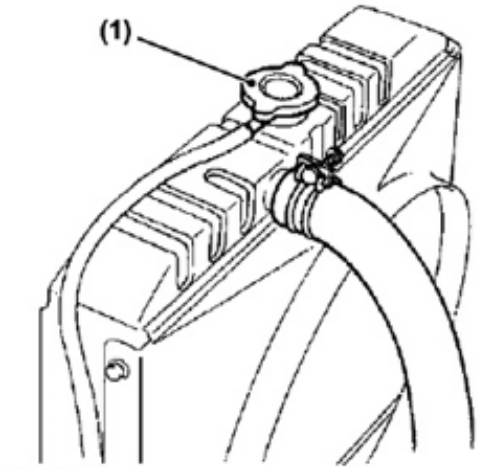


Fig. 9 Radiator cap

4. With recovery tank 2: (If equipped) Check to see that the coolant level lies between FULL (A) and LOW (B) marks.

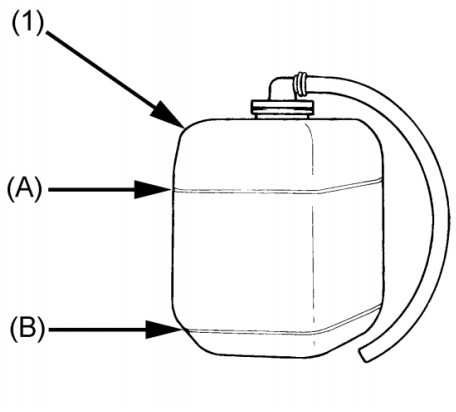


Fig. 10 Recovery tank

5. If necessary, fill with correct coolant according to the ***Oil Specifications*** , and do not overfill the tank.

Empty the Cooling System

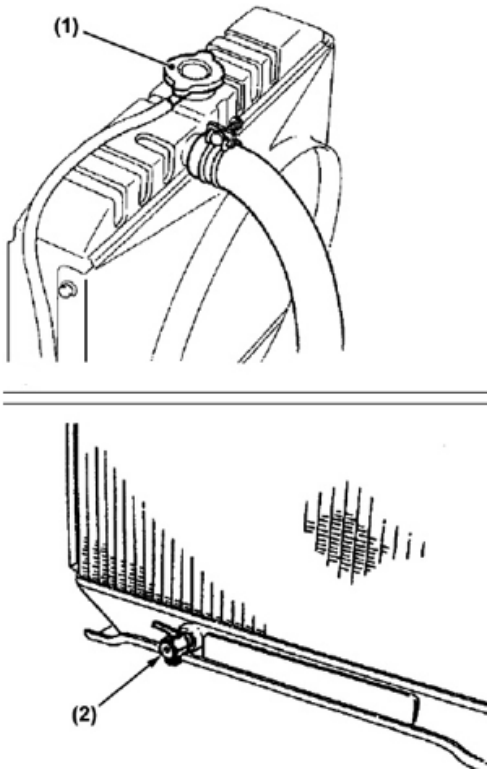


Fig. 11 Radiator

1. Radiator cap 2. Drain valve

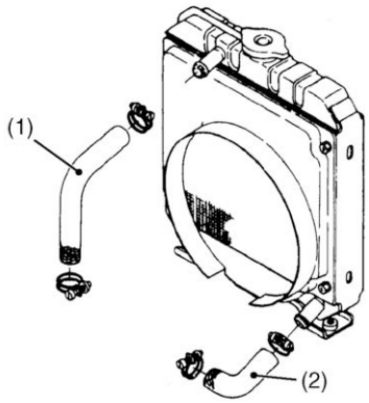
1. After the engine and radiator have cooled sufficiently (to the temperature below 50°C/122°F), carefully remove the radiator cap.
2. Place an appropriate vessel under the drain valve.

3. Remove the drain valve at the bottom of the radiator.
4. After all coolant is drained, close the drain valve.
5. Fill the radiatorwith clean water and cooling system cleaner at the radiator cap.
6. Follow directions of the cleaner instructions.
7. If necessary, fill with correct coolant according to the ***Oil Specifications*** , and do not overfill the tank.

Fill Coolant

1. After the engine and radiator have cooled sufficiently (to the temperature below 50°C/122°F), remove the radiator cap.
2. Add correct coolant until the coolant level is even with the engine coolant supply port according to the ***Oil Specifications*** . Make sure that air bubbles do not develop as you add coolant.
3. Reinstall the radiator cap.
4. With recovery tank: Pour coolant into the recovery tank slowly until the coolant level reaches the FULL (A) mark. Make sure that air bubbles do not develop as you add coolant.
5. Run the engine until it reaches operating temperature. Check the coolant level in the radiator and recovery tank, and fill with coolant as needed.

Check and Replace Radiator Hoses



1. Upper hose
2. Lower hose

Check

Visually inspect the radiator hoses after 6 months or every 200 hours of operation (whichever comes first.) for signs of wear, damage, breakage or loose clamps that could damage the engine. If necessary, replace the damaged hose.

If the clamp is loose, apply oil to the threads and securely retighten it.

Replace

The radiator hose is made of rubber and tends to age. Change the radiator hose together with the clamp every two years.

1. Drain the coolant.
2. Loosen the clamp.
3. Remove the upper hose and lower hose.
4. Replace with new upper and lower hoses and clamp.
5. Tighten the clamp.
6. Add correct coolant to the FULL mark according to the ***Oil Specifications*** .

Intake System

Inspect and Replace Intake Air Pipe

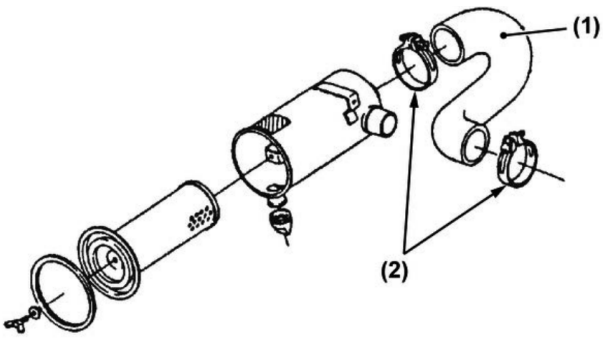


Fig. 12 Radiator

1. Intake air hose
2. Clamp

Check

Visually inspect the intake air pipe after 200 hours of operation for signs of wear, damage, breakage or loose clamps that could damage the engine. If necessary, replace the damaged hose.

If the clamp is loose, apply oil to the threads and securely retighten it.

Replace

The intake air hose is made of rubber and tends to age. Change the intake air hose together with the clamp every two years.

1. Loosen the clamp.
2. Remove the intake air hose and clamp.
3. Replace with a new intake air hose and clamp.
4. Tighten the clamp.

Clean and Replace Air Cleaner Element

The air cleaner uses a dry element. Never apply oil to it.

It is recommended to clean the air cleaner element after 100 hours of operation.

It is recommended to replace the air cleaner element every year or after 6 times of cleaning.

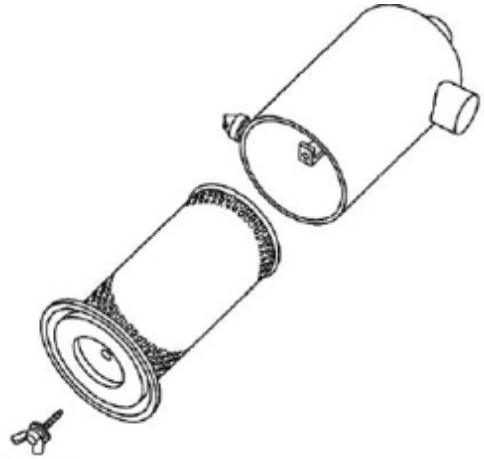


Fig. 13 Air cleaner

Cleaning

1. Remove the air cleaner element.
2. Use clean dry compressed air on the inside of the element. Pressure of compressed air must be under 205 kPa (30 psi).
3. Maintain reasonable distance between the nozzle and the filter.

Replace

1. Remove the air cleaner element.
2. Replace with a new air cleaner element.

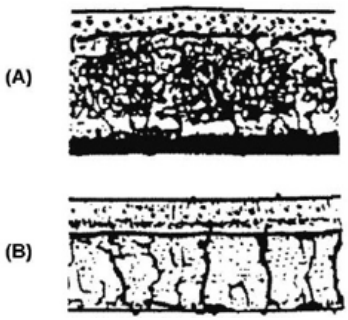
Belt Drive

⚠ WARNING

- **Do not carry out work on the belt drive unless the engine is at standstill.**
- **For double-belt drive divices, if wear occurs or one of the V-belts is damaged, please replace both belts simultaneously.**
- **After repairs: Check that all protective devices have been installed and that all tools have been removed from the engine.**

Check Fan Belt

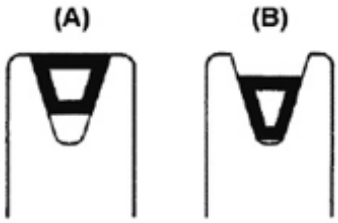
- **Check the fan belt for damage.** If the fan belt is damaged, replace it.



(A) Good

(B) Bad

- **Check if the fan belt is worn and sunk in the pulley groove.** If the fan belt is nearly worn out and deeply sunk in the pulley groove, replace it.



(A) Good

(B) Bad

- **Check if the fan belt tension is appropriate.**

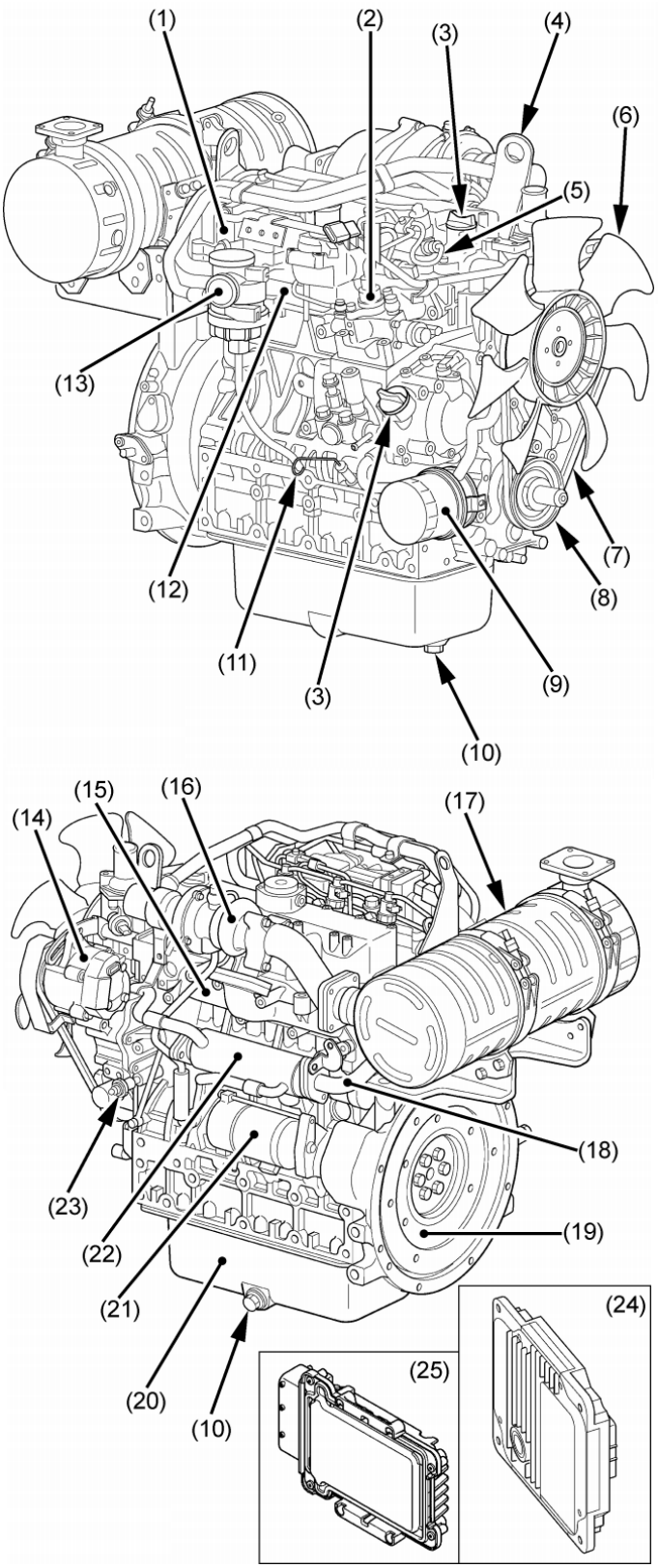
1. Measure the fan belt tension between the fan drive pulley and alternator pulley with a belt tensiometer.
2. If the belt tensiometer is not available, use the alternative method (deflection method): Measure the deflection, depressing the belt halfway between the fan drive pulley and alternator pulley at specified force.
3. If the measurement is not within the factory specifications, loosen the alternator mounting screws and relocate the alternator to adjust.

Replace Belt

It is recommended to replace the fan belt after 500 hours of operation.

1. Remove the alternator.
2. Remove the fan belt.
3. Replace with a new fan belt.
4. Install the alternator.
5. Check the fan belt tension.

7.2 KUBOTA ENGINE V2403-CR-TIE4



1. EGR valve
2. Feed pump
3. Oil filler plug
4. Engine lifting hook
5. Guide rail
6. Cooling fan
7. Fan belt
8. Fan drive pulley
9. Engine Oil Cartridge
10. Oil drain plug
11. Oil dipstick
12. Intake manifold
13. Oil-gas separator
14. Generator
15. Exhaust manifold
16. Turbocharger
17. Diesel Oxidation Catalytic Converter (DOC)
18. EGR valve
19. Flywheel
20. Oil pan
21. Starter
22. EGR cooler
23. Oil pressure switch
24. Engine control module (ECU)
25. Engine control module (ECU)

Note:#24 and #25 are common.

Periodic Maintenance Chart

Daily and periodic maintenance is important to keep the engine in good operating condition. To ensure long-time safe operation of the engine, perform periodic maintenance as per the following chart.

Table 7-2 Periodic Maintenance Chart

Check Item	Periodic Maintenance Interval										
	Daily	The first 50 hours	Every 50 hours	Every 250 hours	Every 400 hours	Every 500 hours	Every 1000 hours	Every 1500 hours	Every 3000 hours	Every 1 year	Every 2 years
Check the Engine Fuel Level	○										
Check the Fuel Level	○										
Check the Coolant Level	○										
Check Fan Belt	○										
Change the Engine Oil		○			○						
Change the engine oil filter element		○			○						
Check the fuel hoses and hoses clamps.			○								
Check and drain the fuel-water separator (type 1)			○								
Clean air cleaner element (replace the element after 6 times cleaning)				○							
Adjust Fan Belt Tension				○							
Check radiator hose and hose clamp				○							
Check Intake air hose				○						○	
Replace fuel filter						○					
Clean fuel-water separator (type 1)						○					

Table 7-2 Periodic Maintenance Chart (continued)

Check Item		Periodic Maintenance Interval										
		Daily	The first 50 hours	Every 50 hours	Every 250 hours	Every 400 hours	Every 500 hours	Every 1000 hours	Every 1500 hours	Every 3000 hours	Every 1 year	Every 2 years
	Clean the inside of the fuel tank						○					
	Clean the inside of the water pipe jacket and the radiator						○					
	Replace fan belt						○					○
	Replace the filter of the fuel-water separator (type 2)						○				○	
	Check valve clearance							○				
*1	Check fuel injector (by Diagmaster)								○			
*1	Check EGR cooler								○			
*1	Replace the filter cartridge of the fuel-water separator								○			
*1	Check the crankcase forced ventilation (PCV) valve								○			
*1	Check Turbocharger									○		
*1 *2	Clean DPF									○		
*2	Check EGR system (by Diagmaster)									○		
	Replace the Air Cleaner Element										○	
*1	Check the DPF differential pressure tube and hose										○	
	Check EGR piping										○	

Table 7-2 Periodic Maintenance Chart (continued)

Check Item		Periodic Maintenance Interval										
		Daily	The first 50 hours	Every 50 hours	Every 250 hours	Every 400 hours	Every 500 hours	Every 1000 hours	Every 1500 hours	Every 3000 hours	Every 1 year	Every 2 years
	Check Exhaust manifold (Cracks, air leaks and mounting screws)										○	
	Replace the rubber hose of the fuel-water separator											○
*2	Replace the rubber hose of the differential pressure sensor											○
	Replace the intake hose (after the air flow sensor) and the intercooler hose											○
	Replace EGR cooler hoses											○
	Replace the water delivery hose											○
	Replacement the lubrication hose											○
	Change of radiator coolant (long-term coolant)											○
	Replace radiator hose and hose clamp											○
	Replace Fuel hoses and hoses clamps											○

Table 7-2 Periodic Maintenance Chart (continued)

Check Item	Periodic Maintenance Interval										
	Daily	The first 50 hours	Every 50 hours	Every 250 hours	Every 400 hours	Every 500 hours	Every 1000 hours	Every 1500 hours	Every 3000 hours	Every 1 year	Every 2 years
Replacement intake air hose											○

Supplement:

- If the battery has been used for less than 100 hours in a year, its electrolyte should be checked once a year (rechargeable batteries only).
- According to the U.S. Environmental Protection Agency's (U.S.EPA) non-road emission standards, the above items (marked with *1) are classified as important contents related to emissions by Kubota. As the engine owner, you are responsible for the performance of the required maintenance on the engine according to the above instruction. Please refer to the Warranty Statement for details.
- The above-mentioned items not marked with 1 do not need to maintain the validity of the emission-related guarantees.
- *2：It is only for D1803-E4、-TE4、V2403-E4、-TE4.
- Failure to perform maintenance may cause problems, leading to a significant decline in engine performance.

Fuel System

Check the Fuel Level

The fuel level can be checked from the energized turntable or platform controller.

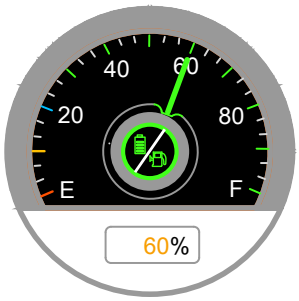


Fig. 14 Fuel level (at the turntable controller)

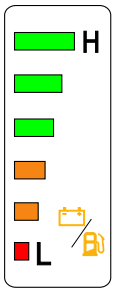


Fig. 15 Fuel Oil Level (At the Platform Control Box)

Fill the Fuel Tank

Turn off the engine, fill with correct diesel fuel according to the ***Oil Specifications*** , and never overfill the tank.

- **Do not mix gasoline, alcohol, or their mixture with diesel fuel.**
- **Before filling the fuel tank, always stop the engine. And keep it away from ignition sources.**
- **During refueling, take care to prevent fuel spillage. If fuel spills, wipe it clean immediately. Refuel only after the engine has cooled; otherwise, fire may occur.**
- **Stop the engine before refueling it. Do not smoke when working near the battery or refueling.**
- **Due to the extremely accurate tolerance match of the diesel injection system, it is critical to keep the fuel clean and free of dirt or water. The dirt or water entering the combustion system can cause severe damage to the fuel pump and injectors.**

Check the fuel hoses and hoses clamps.

Check the fuel hoese and hoses clamps every 50 hours of operation.

1. Check if the fuel hoses and hoses clamps are damaged.
2. Replace the fuel hoses and hoses clamps if they damaged.
3. Apply engine oil to the threads and retighten the hoses clamp if it is loose.

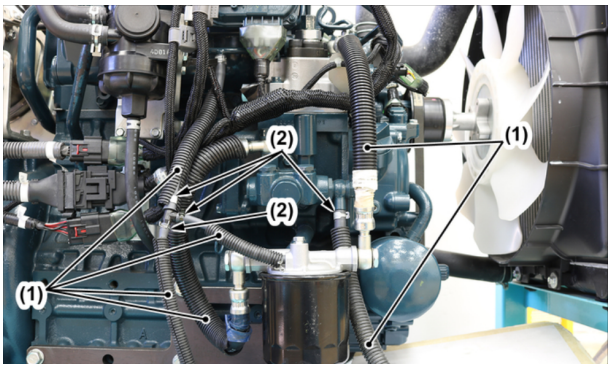


Fig. 16 Fuel hoses and hoses clamps

1) Fuel hoses and hoses clamps
2) Pipe clamp

Note:

- Replace hoses and hose clamps every 2 years.
- After replacement of the hoses and clamps, air-bleed the fuel system.

Replace Fuel filter

It is recommended to replace the fuel filter every 500 hours of operation.

1. Remove the fuel filter by using oil filter wrench.

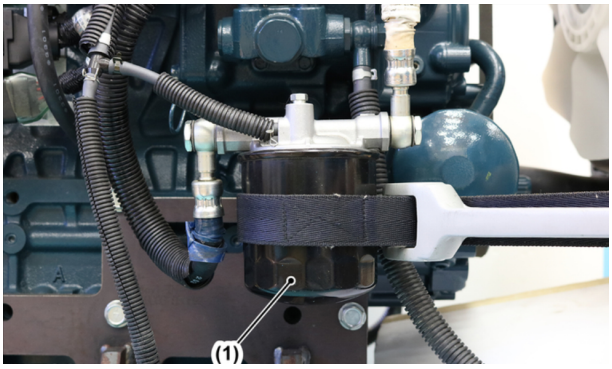


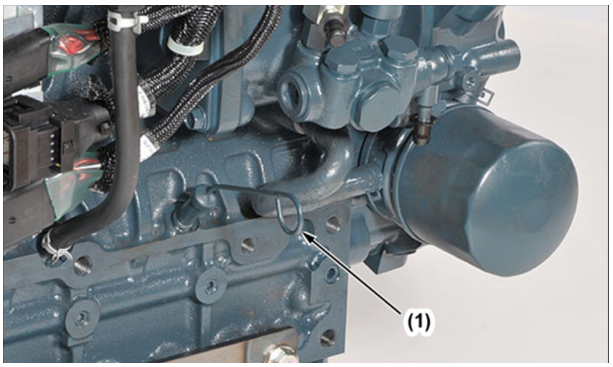
Fig. 17 Fuel filter element

2. Apply a thin layer of fuel evenly onto the surface of the new filter gasket.
3. By hand, screw the new filter element in until it fits against the sealing ring and tighten it in place.
4. Open the fuel valve and bleed the fuel system.
5. Running the engine for a while, then check if the filter is leaking oil.

Lubrication system

Check the Engine Fuel Level

1. Turn off the engine.
2. Make sure that the machine and engine are level.
3. Please check the oil level before starting or 5 minutes after stopping the engine.
4. Wait until the engine oil temperature drops to below 80℃ (176℉), remove the oil dipstick from the engine and wipe it clean with non-fiber cleaning cloths



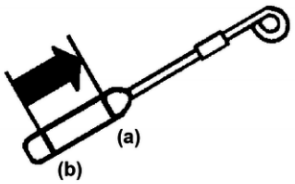


Fig. 18 Oil dipstick

5. Reinstall the clean oil dipstick back to its original position.
6. Take the oil dipstick out again and check the oil level, which should be between the Upper (a) mark and Low (b) mark on the dipstick.
7. If necessary, fill with correct engine oil to the “FULL mark” on the dipstick according to the ***Oil Specifications*** , and do not overfill the tank.

Change the Engine Oil

Replace the engine oil after the first 50 hours of operation, and then replace it every 400 hours or one year (whichever comes first).

1. Make sure that the machine and engine are level.
2. Start the engine and preheat it for about 5 minutes.
3. Place an appropriate oil-collecting vessel under the engine oil drain plug.

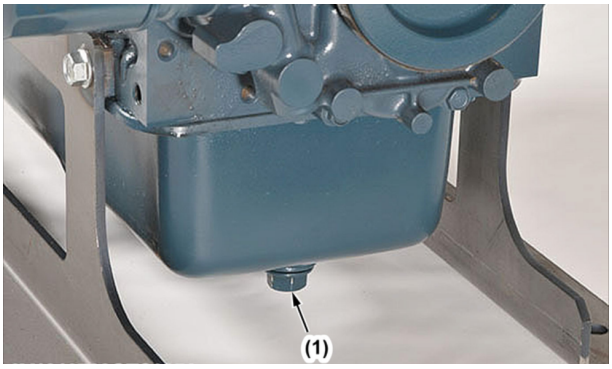


Fig. 19 Oil plug

4. Remove the oil plug under the bottom of engine and drain the oil thoroughly.
5. Tighten the oil plug.
6. If necessary, fill with correct engine oil to the “Upper mark” on the dipstick according to the ***Oil Specifications*** , and do not overfill the tank.

Change the engine oil filter element

Replace engine oil filter element after the machine is firstly put into service of 50 hours and every 400 hours of operation thereafter.

⚠ WARNING

Before replace the oil filter cartridge, always stop the engine and allow it fully cool down.

1. Remove the fuel filter element by using oil filter wrench.

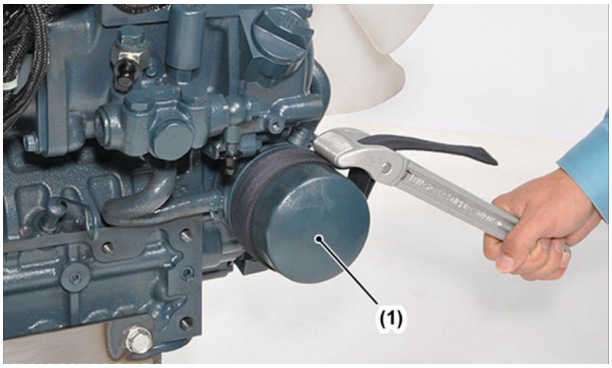


Fig. 20 Oil Filter Element

2. Apply a thin layer of fuel evenly onto the surface of the new filter gasket.
3. Install filter element manually. Do not overtighten as this will cause deformation of the rubber gasket.
4. Check for oil leakage from seals.
5. After a filter element replacement, the oil usually drops slightly. Check the engine oil level and add engine oil to the engine as needed until the level is between the Upper mark and Low mark shown on the dipstick.
6. Thoroughly wipe off any remaining oil from the machine.

Cooling system

⚠ WARNING

- **Do not suddenly turn off the engine. It should be idled without load for 5 minutes before being turned off.**
- **Maintenance work can only be carried out after the engine and radiator have completely cooled down (more than 30 minutes after stopping)**
- **Do not remove the radiator cap when the coolant temperature is very high.When the coolant temperature is very high, do not remove the radiator cover. When it cools down to a touchable level, rotate the cover until the first stop to release the excess pressure. Then, completely remove the cover. If overheating occurs, steam may gush out from the radiator or water tank, causing severe burns.**

It is recommended to change the coolant every two years.

Check the Coolant Level

NOTICE

- *Please do not remove the radiator cap when the temperature of the engine is high. The radiator cap should be slightly loosened to release the pressure after the engine has cooled down, and then the cap should be completely removed.*
- *When adding coolant, drain the air from the engine coolant channel. The air in the engine can be expelled by shaking the upper and lower hoses of the radiator.*
- *Make sure that the radiator cap has been closed properly. If the cap is loose or not closed properly, the engine can overheat due to coolant leakage.*

1. Make sure that the machine and engine are level.
2. Please remove the radiator cap after the engine has completely cooled down.

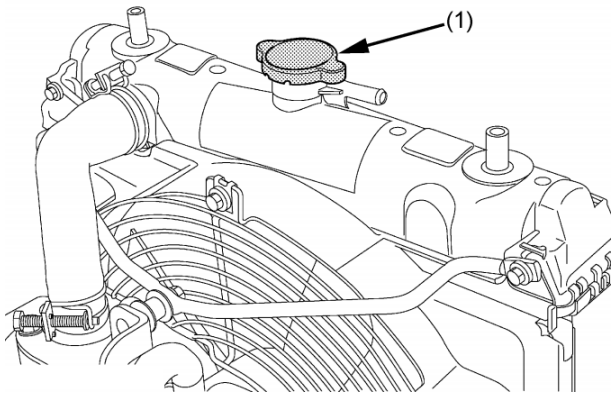


Fig. 21 Radiator cap

3. If a water storage tank is not provided, please ensure that the coolant level is just below the outlet.
4. Check to see that the coolant level lies between FULL (A) and LOW (B) marks if the radiator is equipped with water storage tank.

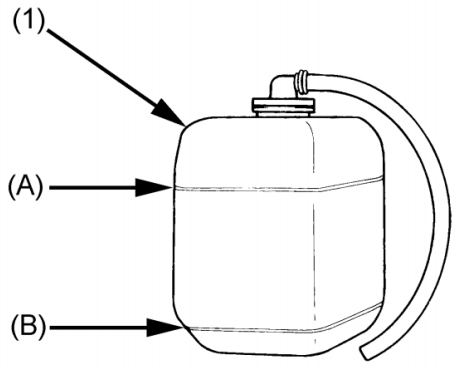


Fig. 22 Water storage tank

5. If necessary, fill with correct coolant to the appropriate level according to the ***Oil Specifications*** , and do not overfill the tank.

Change coolant

1. Please remove the radiator cap after the engine has completely cooled down.
2. Find the evacuator valve under the radiator, place an appropriate vessel under the drain plugs.

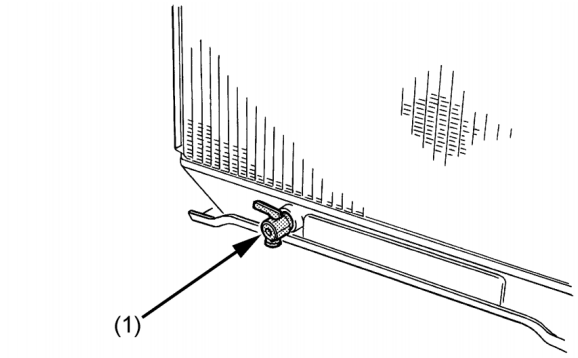


Fig. 23 Evacuator valve

3. Open evacuator valve, and remove EGR cooler hoses.

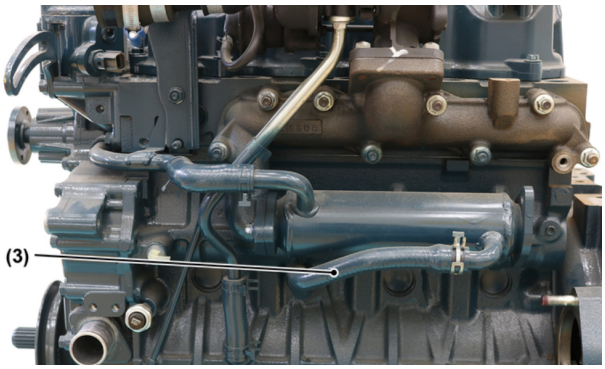


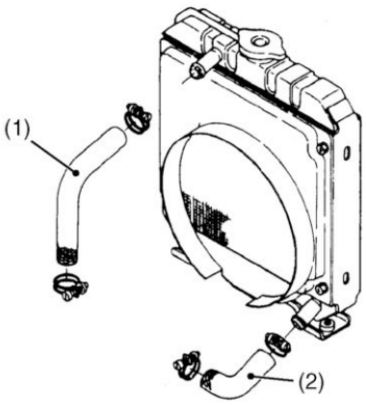
Fig. 24 EGR cooler hoses

4. After drain out all coolant, close the evacuator valve, and install EGR cooler hoses.
5. Fill with clean water and cooling system cleaning solution and follow the instructions in the cleaning solution manual.
6. After washing, according to the ***Oil Specifications*** use the correct coolant and fill the radiator with coolant until it is level with the filling port. Do not overfill the tank.
7. Reinstall the radiator cap.
8. If the radiator is equipped with the water storage tank, use the correct coolant and fill the water

storage with to the full mark A according to the ***Oil Specifications*** .

9. Start the engine and run it for a few minutes.
10. Stop the engine and lower the temperature of the coolant.
11. Check the coolant level in the radiator and water storage tank, and fill with coolant as needed.

Check and Replace Radiator Hoses



1. Upper hose
2. Lower hose

Check

Visually inspect the radiator hoses after 6 months or every 200 hours of operation (whichever comes first.) for signs of wear, damage, breakage or loose clamps that could damage the engine. If necessary, replace the damaged hose.

If the clamp is loose, apply oil to the threads and securely retighten it.

Replace

The radiator hose is made of rubber and tends to age. Change the radiator hose together with the clamp every two years.

1. Drain the coolant.
2. Loosen the clamp.
3. Remove the upper hose and lower hose.
4. Replace with new upper and lower hoses and clamp.
5. Tighten the clamp.
6. Add correct coolant to the FULL mark according to the ***Oil Specifications*** .

Intake system

Clean and Replace the Air Cleaner Element

NOTICE

- *Replace the first-stage air cleaner element every year or after 6 cleanings.*
- *The air cleaner uses a dry element and do not apply engine oil.*
- *Do not operate the engine after removing the element.*
- *Do not touch the secondary air cleaner element unless it needs to be replaced.*

The first-stage clean air cleaner element

1. Remove the dust cap.
2. Remove the first-stage cleaner element.
3. Use clean dry compressed air to clean the inside of the first-stage element.
4. Install the removed component.

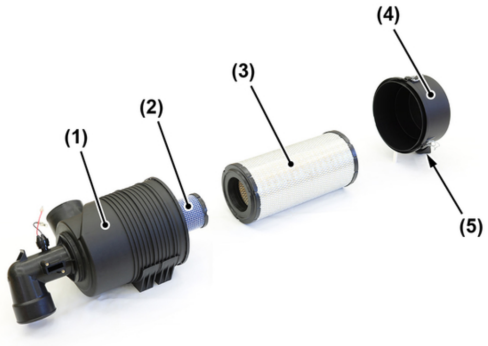


Fig. 25 Air cleaner

1) Air cleaner casing
2) Sencondary cleaner element
3) First-stage cleaner element
4) Dust cap
5) Evacuator valve

Replace the Air Cleaner Element

1. Remove the dust cap.
2. Remove the first-stage and secondary air cleaner element.
3. Replace with the first-stage and seondary new air cleaner element.

4. Install the removed component.

Inspect and Replace Intake Air Hose

NOTICE

Avoid damaging the engine seriously, keep the dust away from intake air pipe.

Check

1. Check if the intake air hose is connected correctly.
2. Visually inspect for cracks, air leaks, any other abnormalities.
3. Apply engine oil to the threads and retighten the hoses clamp if it is loose.

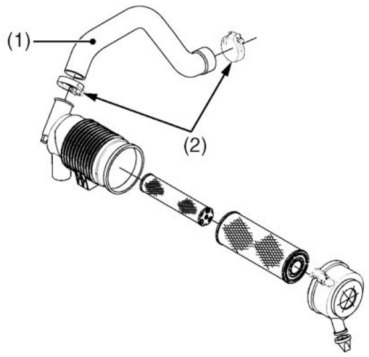


Fig. 26

1) Intake air hose
2) Pipe clamp

Replace

1. Loosen the clamp.
2. Remove the intake air hose and clamp.
3. Replace with a new intake air hose and clamp.
4. Tighten the hose clamp correclty.

Belt drive

⚠ WARNING

- **Do not carry out work on the belt drive unless the engine is at standstill.**
- **For double-belt drive divices, if wear occurs or one of the V-belts is damaged, please replace both belts simultaneously.**
- **After repairs: Check that all protective devices have been installed and that all tools have been removed from the engine.**

Adjust Fan Belt Tension

1. Turn off the engine.
2. Apply appropriate pressure on the belt between the pulleys with your thumb.
3. If tension is incorrect, loosen the alternator mounting bolts and, using a lever placed between the alternator and the engine units, pull the alternator out until the deflection of the belt falls within acceptable limits.
4. Replace fan belt if it is damaged.

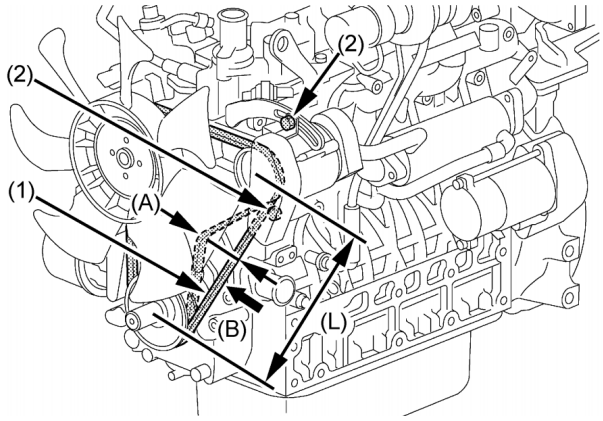


Fig. 27 Adjust Fan Belt Tension

1) Fan belt
2) Bolt and nut

Table 7-3 Fan Belt tension and flexure

Appropriate fan Belt tension	
Adjust	Replace
237 ~ 403N	460 ~ 680N

Table 7-3 Fan Belt tension and flexure (continued)

Flexure A
10 ~ 12mm(0.39 ~ 0.47in) (Under a load of 10kgf(22.1 lbs))

NOTICE

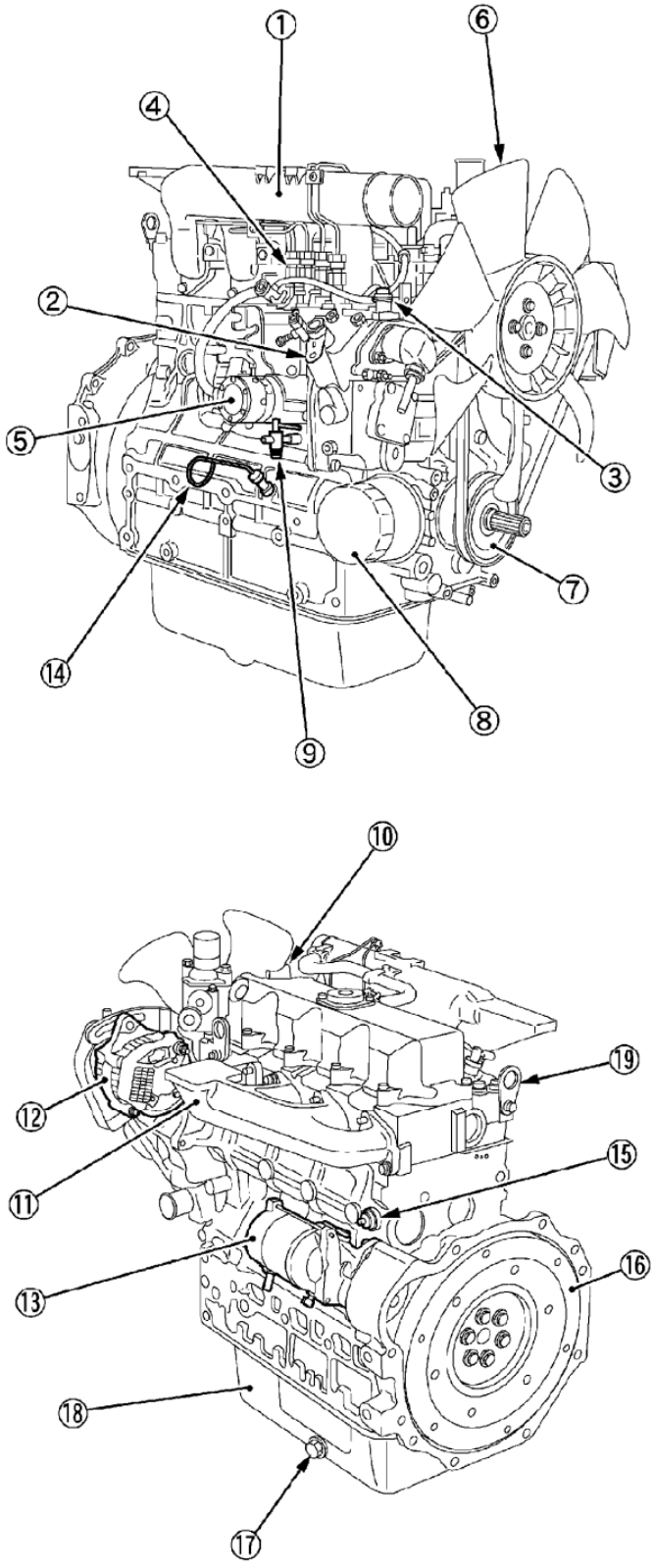
- *If belt is loosen or damaged and the fan is damaged, it could result in overheats or insufficient charging. Adjust or replace belt.*
- *After installing the belt, measurement should be carried out immediately. During the measurement, keep the belt in a non-rotating status. The measurement position should be the position of B in the figure, and the belt spacing should be L.*
- *It is not possible to use a tension meter, and it can be adjusted by deflection. When pressing the belt at the exact center of the belt spacing in the figure, the deflection should be A.*

Replace Belt

It is recommended to replace the fan belt after 500 hours of operation.

1. Remove the alternator.
2. Remove the fan belt.
3. Replace with a new fan belt.
4. Install the alternator.
5. Check the fan belt tension.

7.3 KUBOTA ENGINE V2403BM-DI-CT04



1. Intake manifold
2. Speed control rod
3. Engine shut-off lever
4. Injection pump
5. Fuel feed pump
6. Cooling fan
7. Fan drive pulley
8. Oil filter screen
9. Drain valve
10. Oil plug
11. Exhaust manifold
12. Alternator
13. Starter
14. Oil level gauge
15. Oil pressure switch
16. Flywheel
17. Oil plug
18. Oil pan
19. Engine lifting hook

Periodic Maintenance Chart

Daily and periodic maintenance is important to keep the engine in good operating condition. To ensure long-time safe operation of the engine, perform periodic maintenance as per the following chart.

Periodic Maintenance Interval	Item	Notes
Every 50 hours	Check Fuel pipe and pipe clamp	
the first 50 hours	Change the Engine Oil	◎
Every 200 hours	Change the Engine Oil (Oil pan depth in 90 mm (3.54 in.) is optional.)	
Every 400 hours	Change the Engine Oil (The standard oil pan depth is 124 mm (4.88 in.))	
Every 100 hours	Clean air cleaner element	*1
	Check battery electrolyte level	
	Check Fan belt tension	
Every 200 hours	Replace the engine oil filter element and use the standard oil pan.	◎
	Check the intake air pipeline	
Every 200 hours operation or six months operation	Check radiator hose and hose clamp	
Every 400 hours	Replace the engine oil filter element and use the standard oil pan.	◎
	Replace Fuel Filter Element	
Every 500 hours	Remove sediment from the fuel tank	
	Cleaning water pipe jacket (radiator inside)	
	Replace fan belt	
Every month or every two months	Recharge AGM battery	
Annually	Replace the Air Cleaner Element	*2
Every 800 hours	Check valve clearance	
Every 1500 hours	Check of fuel injection nozzle injection pressure	*3
Every 3000 hours	Check turbocharger	*3
	Check injection pump	*3

Periodic Maintenance Interval	Item	Notes
Every two years	Change of radiator coolant (L.L.C.)	
	Replace AGM battery	
	Replace radiator hose and hose clamp	
	Check Fuel pipe and pipe clamp	*3
	Replace intake air pipeline	*4

Important Issues:
◎The operation shown must be carried out 50 hours after the first run.
*1 In dusty conditions, the air cleaner should be cleaned more frequently.
*2 After cleaning 6 times.
*3 For this repair, please consult your local Kubota dealer.
*4 Replace only when necessary.
If the battery has been used for less than 100 hours in a year, its electrolyte should be checked once a year. (Rechargeable battery electrolyte only)

Fuel System

Check the Fuel Level

The fuel level can be checked from the energized turntable or platform controller.

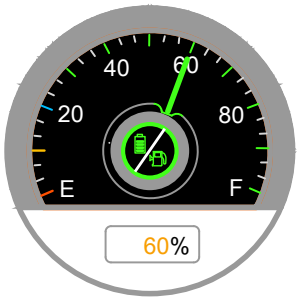


Fig. 28 Fuel level (at the turntable controller)

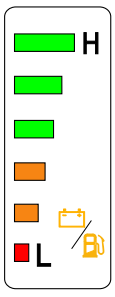


Fig. 29 Fuel Oil Level (At the Platform Control Box)

Fill the Fuel Tank

Turn off the engine, fill with correct diesel fuel according to the ***Oil Specifications*** , and never overfill the tank.

- **Do not mix gasoline, alcohol, or their mixture with diesel fuel.**
- **Before filling the fuel tank, always stop the engine. And keep it away from ignition sources.**
- **During refueling, take care to prevent fuel spillage. If fuel spills, wipe it clean immediately. Refuel only after the engine has cooled; otherwise, fire may occur.**
- **Stop the engine before refueling it. Do not smoke when working near the battery or refueling.**
- **Due to the extremely accurate tolerance match of the diesel injection system, it is critical to keep the fuel clean and free of dirt or water. The dirt or water entering the combustion system can cause severe damage to the fuel pump and injectors.**

Air bleeding of the fuel system.

⚠ WARNING

To avoid personal injury or death, do not bleed a hot engine as this could cause fuel to spill onto a hot exhaust manifold creating a danger of fire.

Air bleeding of the fuel system is required:

- After the fuel filter and fuel pipes have been detached and refitted;
- After the fuel tank has become empty;
- Before the engine is to be used after a long storage.

NOTICE

Always keep the bleed screw on top of the fuel injection pump closed (except when bleeding), as failure to do so may cause the engine to stall.

Method 1 (for gravity-feed fuel tanks only)

1. Fill the fuel tank to the fullest extent. Keep the fuel-water separator handle in the open posistion

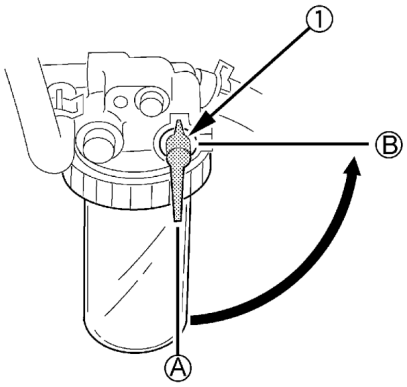


Fig. 30 Fuel-water separator handle

1) Fuel-water separator handle

A. “Turn on”
B. “Turn off”

2. Open the air vent plug on top of the fuel injection pump.

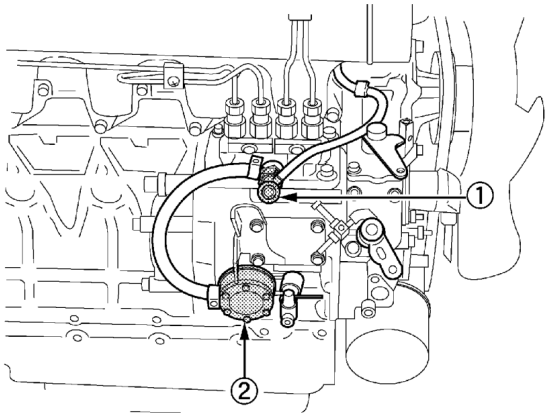


Fig. 31 Gravity-feed system

1) Air vent plug
2) Fuel feed pump

3. Operate the engine for 30 seconds after starting and then turn off it.
4. Close the air vent plug on top of the fuel injection pump.

Method 2 (Fuel tank is below the injection pump)

This method can be used when the fuel tank is below the injection pump.

1. The fuel system must be pressurized by the electric fuel supply pump of the fuel system.
2. If the electric fuel supply pump is not used, the pump must be manually driven to bleed the system.
3. If the fuel tank is below the injection pump, the main fuel filter must be on the pressure side of the pump.
4. Please bleed the system according to Steps 2 to 4 of Method 1.

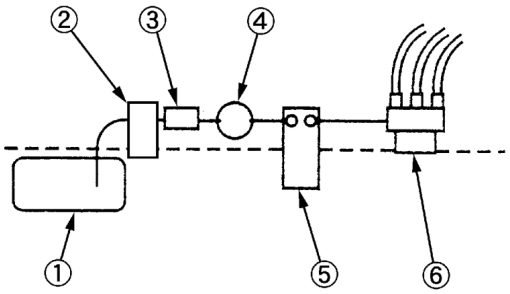


Fig. 32 When the fuel tank is positioned below the injection pump system

1) When the fuel tank is positioned below the injection pump system
2) Fuel-water separator
3) Prefilter
4) Electric pump or mechanical pump
5) Main fuel filter
6) Injection pump

Check Fuel pipe and pipe clamp

⚠ WARNING

- **Check the fuel system in a well-ventilated and spacious area.**
- **To avoid personal injury or death, check or replace the fuel pipes after stopping the engine. Broken fuel pipes can cause fires.**

Check the fuel pipes every 50 hours of operation.

- Apply engine oil to the threads and retighten the pipe clamp if it is loose.
- If the fuel pipe made of rubber is worn out, replace fuel pipes and pipe clamps every 2 years.
- If the fuel pipes and clamp bands are found worn out or damaged before 2 years' pass, replace or repair them at once.
- After replacement of the pipes and pipe clamps, air-bleed the fuel system.

NOTICE

When the fuel pipes are not installed, plug them at both ends with clean cloth or paper to prevent dirt from entering. Dust inside the fuel line can cause fuel injection pump failure.

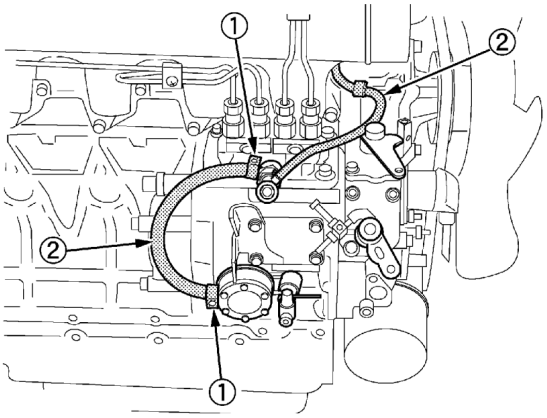


Fig. 33 Fuel pipe and pipe clamp

1. Pipe clamp
2. Fuel pipe

Replace Fuel Filter Element

⚠ WARNING

Stop the engine, when replace the fuel filter cartridge.

NOTICE

Replace the fuel filter cartridge regularly to prevent dust in the fuel from causing wear on the fuel injection pump plunger or injector nozzle.

1. Replace the old fuel filter cartridge.
2. Apply a thin layer of fuel evenly onto the surface of the new filter gasket.
3. By hand, screw the new filter element in until it fits against the sealing ring and tighten it in place.
4. Vent the fuel line.

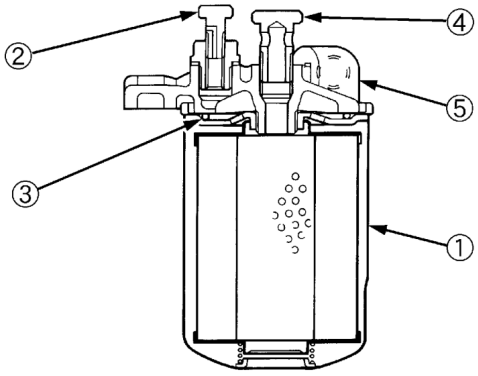


Fig. 34 Fuel filter.

1) Replace fuel filter cartridge
2) Air vent plug
3) O-Rings
4) Pipeline connection
5) Cover

Lubrication system

Check the Engine Fuel Level

⚠ WARNING

- **Before replace the oil filter cartridge, always stop the engine and allow it fully cool down.**
- **Please wear gloves as contact with the oil may damage your skin. If you come into contact with oil, wash it off immediately.**

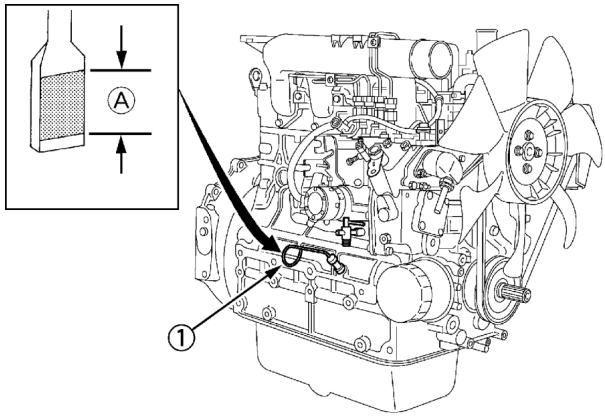


Fig. 35 Oil level gauge

A. The fuel level within this range is correct.

1. Make sure that the machine and engine are level.
2. Please check the oil level before starting or 5 minutes after stopping the engine.
3. remove the oil level gauge from the engine and wipe it clean with non-fiber cleaning cloths.
4. Reinstall the clean oil level gauge back to its original position.
5. Take out the oil guage again and check the oil level.
6. If the fuel level is low, remove the oil plug and fill with correct engine oil to the “Upper mark” on the gauge according to the ***Oil Specifications*** , and do not overfill the tank.

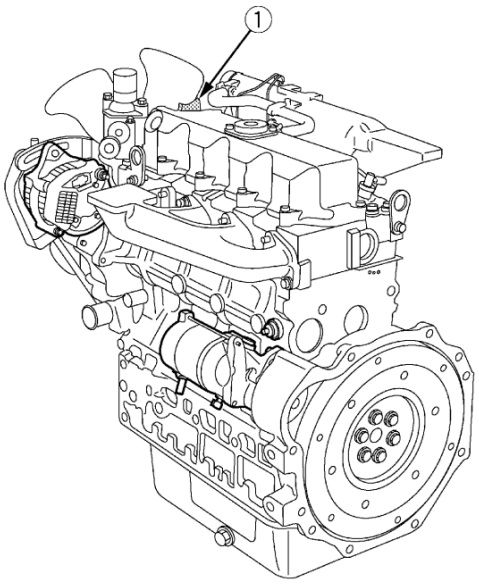


Fig. 36 Oil plug

7. After the engine oil is added, wait for more than 5 minutes and check the oil level again. It takes time for the oil to drain to the oil pan.

Change the Engine Oil

⚠ WARNING

- **Before drain the fuel, always stop the engine and allow it fully cool down.**
- **Hot engine oil poses a risk of burns, so avoid contact with hot oil.**
- **Please wear gloves as contact with the oil may damage your skin. If you come into contact with oil, wash it off immediately.**
- **Please handle the discharged engine oil in accordance with local regulations.**

1. Make sure that the machine and engine are level.
2. Place an appropriate oil-collecting vessel under the engine oil drain plug.

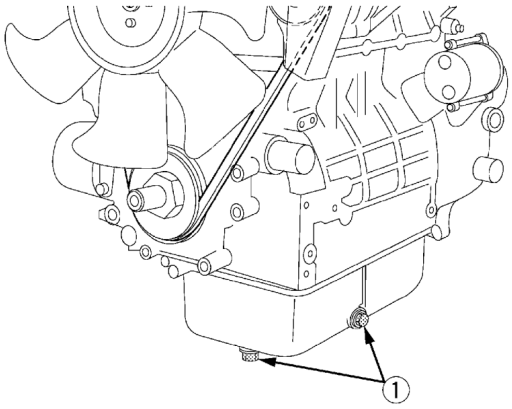


Fig. 37 Oil plug

3. Remove the oil plug under the bottom of engine and drain the oil thoroughly.

NOTICE

- *The oil drains more easily and thoroughly when it is warm.*
- *When draining the oil, remove the oil plug at the same time. If the oil plug is not removed, it will be difficult to drain the oil completely.*

4. If necessary, fill with correct engine oil to the “Upper mark” on the dipstick according to the ***Oil Specifications*** , and do not overfill the tank.
5. After the engine oil is added, wait for more than 5 minutes and check the oil level again. It takes time for the oil to drain to the oil pan.

Replace the Engine Oil Filter Cartridge.

⚠ WARNING

- **Before replace the oil filter cartridge, always stop the engine and allow it fully cool down.**
- **Hot engine oil poses a risk of burns, so avoid contact with hot oil.**
- **Please wear gloves as contact with the oil may damage your skin. If you come into contact with oil, wash it off immediately.**

1. Remove the old oil filter catridge with a wrench.

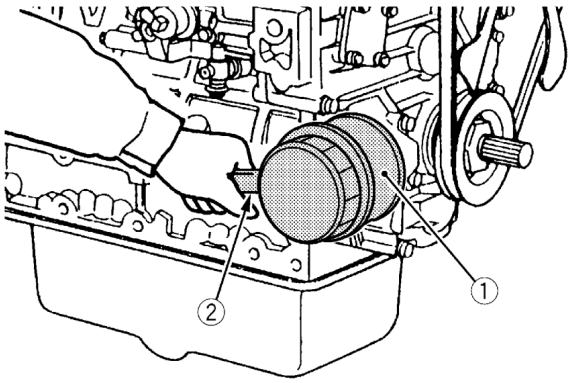


Fig. 38 Oil filter cartridge

1) Oil filter cartridge
2) Remove the old oil filter catridge with a wrench (Install the cartridge manually and tighten it)

2. Apply a thin layer of fuel evenly onto the surface of the new filter gasket.
3. Tighten the cartridge manually. When the gasket touches the sealing surface, manually tighten the filter cartridge thoroughly. Because if a wrench is used to tighten it, it might be over-tightened.
4. After a filter cartridge replacement, the oil usually drops slightly. Therefore, before checking the oil level, run the engine for a period of time and check the seals for oil leaks. If necessary, please add engine oil.
5. Thoroughly wipe off any remaining oil from the machine.

Cooling system

⚠ WARNING

- **Do not suddenly turn off the engine. It should be idled without load for 5 minutes before being turned off.**
- **Maintenance work can only be carried out after the engine and radiator have completely cooled down (more than 30 minutes after stopping)**
- **Do not remove the radiator cap when the coolant temperature is very high.When the coolant temperature is very high, do not remove the radiator cover. When it cools down to a touchable level, rotate the cover until the first stop to release the excess pressure. Then, completely remove the cover. If overheating occurs, steam may gush out from the radiator or water tank, causing severe burns.**

It is recommended to change the coolant every two years.

Check the Coolant Level

NOTICE

- *If the coolant is topped up before operation, the coolant will last for a day's work. As a common practice, check the coolant level before operation.*
- *Avoid mud water or seawater entering the radiator.*
- *Fill the reservoir with clean fresh water and 50% antifreeze.*
- *Make sure that the radiator cap has been closed properly. If the cap is loose or not closed properly, the coolant may leak and decrease rapidly.*

1. Make sure that the machine and engine are level.
2. Please remove the radiator cap after the engine has completely cooled down and check whether the coolant has reached the supply port.

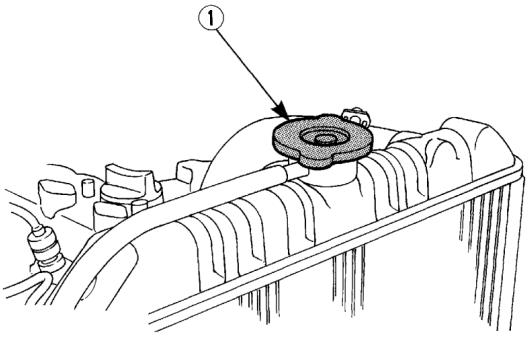


Fig. 39 Radiator cap

3. If the radiator is equipped with a water tank, check the coolant level in the tank. Check to see that the coolant level lies between FULL (A) and LOW (B) marks, the coolant will last for a day's work.

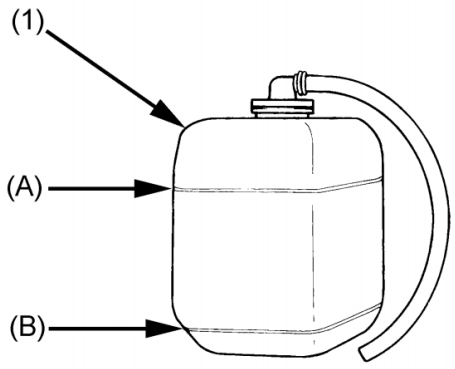


Fig. 40 Water storage tank

4. If necessary, fill with correct coolant to the mark (A) according to the ***Oil Specifications*** , and do not overfill the tank.

Change coolant

1. Please remove the radiator cap after the engine has completely cooled down.
2. Find two drain plugs. One should be on the crankcase side and the other should be at the bottom of the radiator. Place an appropriate vessel under the two drain plugs.

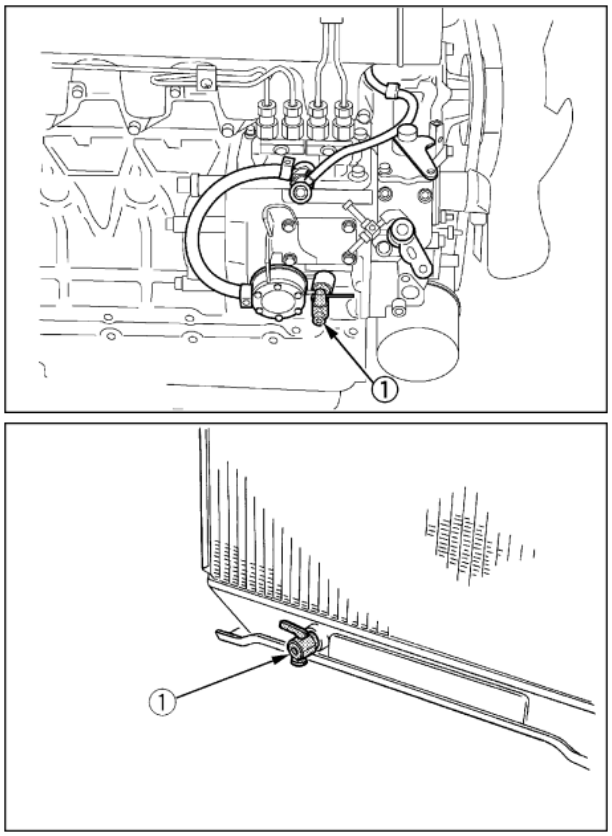


Fig. 41 Coolant drain plug

3. Open the two drain plugs.
4. If the radiator is equipped with a water tank, remove the overflow pipe of the radiator pressure cover to drain the water in the water tank .
5. Close the two drain plugs.
6. According to the ***Oil Specifications*** use the correct coolant and fill the radiator with coolant until it is level with the filling port. Do not overfill the tank.
7. Reinstall the radiator cap.
8. If the water storage tank is equipped, ccording to the ***Oil Specifications*** , use the correct coolant and fill the water storage with coolant to the full mark A.
9. Connect the overflow pipe of the radiator pressure cover.
10. Check and clean plug threads and surfaces, as well as the sealing gaskets of drain plugs, to prevent dirt and debris from entering the engine.

Check and Replace Radiator Hoses and Clamp Bands

Check to see if radiator hoses are properly fixed every 200 hours of operation or 6 months, whichever comes first.

Replace radiator hoses every 2 years.

1. If hose clamps are loose or water leaks, tighten hose clamp securely.
2. Replace hoses and tighten hose clamps securely, if radiator hoses are swollen, hardened or cracked.

Intake system

Clean air cleaner element

Since this engine uses a dry-type air cleaner, do not apply oil to it under any circumstances.

NOTICE

- *Avoid touching the main filter element except when cleaning it.*
- *Please ensure that the hook clamp on the filter cover is fully tightened. If it is loose, dust and dirt may be sucked, wearing down the cylinder liner and piston ring earlier and thereby resulting in poor power output.*
- *Do not frequently maintain the air cleaner filter element. Frequent maintainance cause that dust may be sucked into the engine and result in earlier wearing down.*
- *When reinstalling the cover, make sure that the arrow (on the back of the cover) points straight up. If the cover is reinstalled improperly, the suction valve will be malfunction, and dust will be sucked into the filter element.*

1. In normal conditions, open the suction valve once in a week. in the dusty environment, open it once every day. This will remove large particles of dust and dirt.
2. Wipe the inside air cleaner with cloth if it is dirty or wet.
3. Replace the air cleaner element every year or after 6 cleanings. If the main filter element is severely dirty, it should be replaced immediately, and the secondary filter element should also be replaced at the same time.
4. Remove the secondary filter element only when it needs to be replaced.
5. To protect the engine, do not remove the secondary filter element when servicing the main filter.

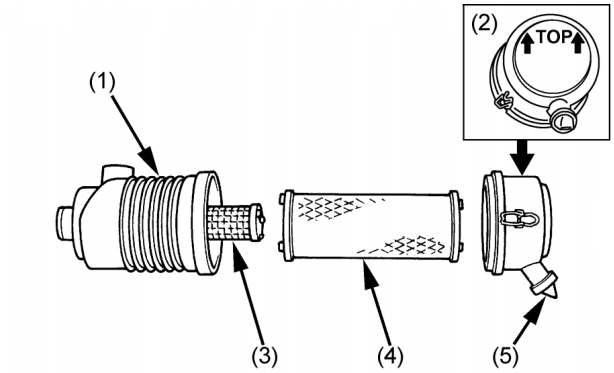


Fig. 42 Air cleaner

1) Air Cleaner Body
2) Cover
3) Sencondary cleaner element
4) Main filter element
5) Suction valve

Clean the manin air cleaner element.

1. Remove the main air cleaner element.
2. Use clean, dry compressed air to blow through the inside of the filter element and rotate it simultaneously. Pressure of compressed air of the nozzle must be under 205kPa (2.1kgf/cm2 ，30psi).
3. Keep the nozzle and the filter element in an appropriate distance during the cleaning porcess.

Belt drive

⚠ WARNING

- **Do not carry out work on the belt drive unless the engine is at standstill.**
- **For double-belt drive divices, if wear occurs or one of the V-belts is damaged, please replace both belts simultaneously.**
- **After repairs: Check that all protective devices have been installed and that all tools have been removed from the engine.**

Adjust Fan Belt Tension

1. Turn off the engine.
2. Apply appropriate pressure on the belt between the pulleys with your thumb.
3. If tension is incorrect, loosen the alternator mounting bolts and, using a lever placed between the alternator and the engine units, pull the alternator out until the deflection of the belt falls within acceptable limits.
4. Replace fan belt if it is damaged.

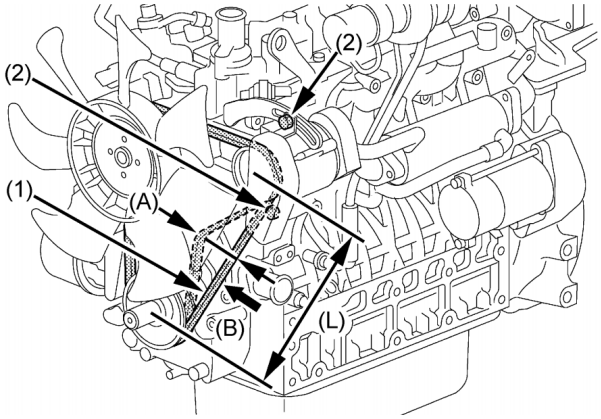


Fig. 43 Adjust Fan Belt Tension

1) Fan belt
2) Bolt and nut

Table 7-4 Fan Belt tension and flexure

Appropriate fan Belt tension	
Adjust	Replace
237 ~ 403N	460 ~ 680N
Flexure A	
10 ~ 12mm(0.39 ~ 0.47in) (Under a load of 10kgf(22.1 lbs))	

NOTICE

- *If belt is loosen or damaged and the fan is damaged, it could result in overheats or insufficient charging. Adjust or replace belt.*
- *After installing the belt, measurement should be carried out immediately. During the measurement, keep the belt in a non-rotating status. The measurement position should be the position of B in the figure, and the belt spacing should be L.*
- *It is not possible to use a tension meter, and it can be adjusted by deflection. When pressing the belt at the exact center of the belt spacing in the figure, the deflection should be A.*

Replace Belt

It is recommended to replace the fan belt after 500 hours of operation.

1. Remove the alternator.
2. Remove the fan belt.
3. Replace with a new fan belt.
4. Install the alternator.
5. Check the fan belt tension.

7.4 AUXILIARY POWER SYSTEM

The auxiliary power system relies on one 12V battery to provide power for a 12V DC motor which drives the gear pump to work. When the main power source fails, the auxiliary power system can be used to lower the platform to the ground. The auxiliary power system cannot be used as the main power source to drive the travel function, but can be used to return the machine to the stowed position in a short time. Besides, the auxiliary power system can also be utilized for override operation with an overloaded platform.

8 HYDRAULIC SYSTEM

8.1 LAYOUT OF HYDRAULIC ELEMENTS

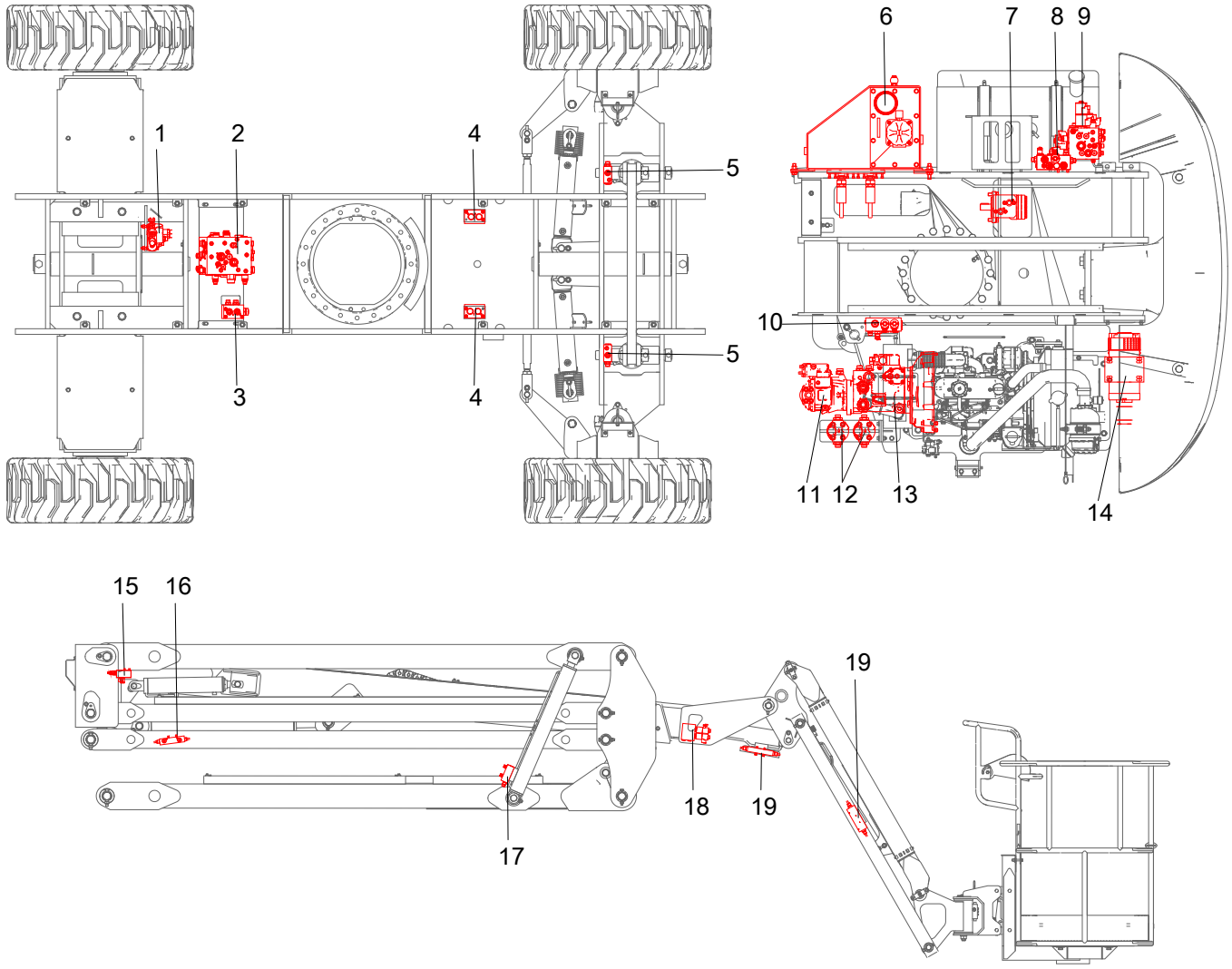


Fig. 1

Table 8-1

1. Oscillating multi-way valve	**2.** Travel Control Valve	**3.** Port L drain manifold
4. Two-speed/brake manifold	**5.** Oscillating counterbalance valve	**6.** Hydraulic Tank
7. Cycloid Motor	**8.** Oscillating control valve	**9.** Boom function valve manifold
10. Brake & two-speed control valve manifold	**11.** Open-circuit Variable Displacement Pump	**12.** High-pressure Filter
13. Closed-circuit Variable Displacement Pump	**14.** Emergency power unit	**15.** Telescopic Counterbalance Valve

Table 8-1 (continued)

16. Main boom lift counterbalance valve	**17.** Articulating boom lift counterbalance valve	**18.** Platform duplex valve manifold
19. Leveling Counterbalance Valve		

8.2 FUNCTION VALVES

Boom Function Valve Manifold (PN.202040003817)

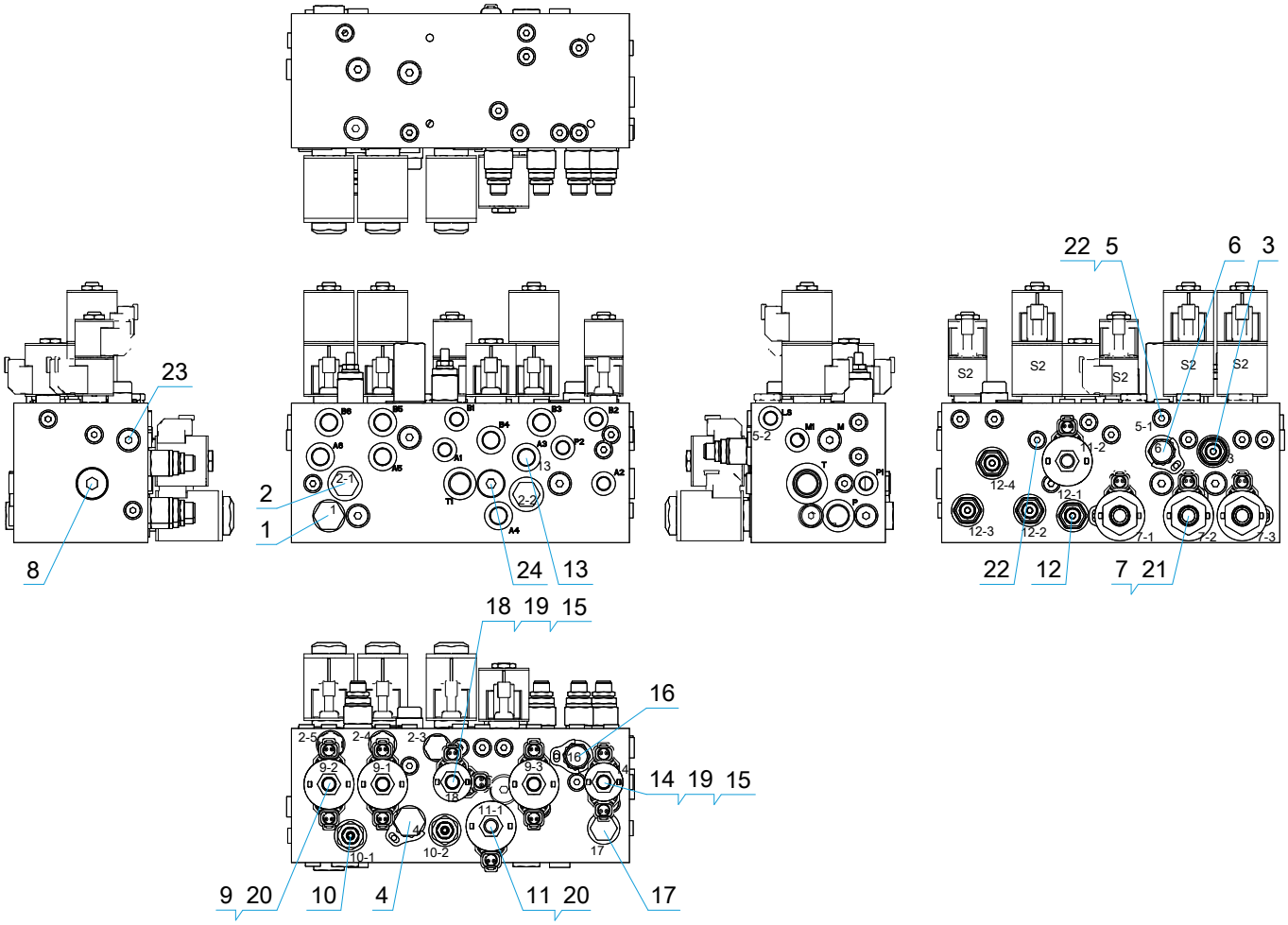


Fig. 2

Table 8-2

No.	Name	Installation torque	Function
1	Check Valve	55 – 65 Nm (41 – 48 ft-lb)	Keep oil flowing in one direction
2	Check valve	40 ~ 45Nm (30 ~ 33ft-lb)	Keep oil flowing in one direction
3	Overflow Valve	55 ~ 65Nm (41 ~ 48ft-lb)	Control system pressure
4	Compensator valve	32.5 ~ 67.8Nm (24 ~ 50ft-lb)	Provide fixed-differential overflow, releases pressure for emergency power unit

Table 8-2 (continued)

No.	Name	Installation torque	Function
5	Damper	\	\
6	Flow valve	45 ~ 50Nm (33 ~ 37ft-lb)	Release LS feedback pressure
7–1	Solenoid Valve	36.7Nm (27ft-lb)	Control the speed of main boom telescoping, articulating boom lifting/lowering, platform leveling, steering, jib boom lifting up/down and platform rotating
7–2	Solenoid Valve	36.7Nm (27ft-lb)	Control the speed of main boom lifting/lowering
7–3	Solenoid Valve	36.7Nm (27ft-lb)	Control the speed of turntable slewing
9–1	Solenoid Valve	32.5 – 35.3 Nm (24 – 26 ft-lb)	Control the direction of main boom lifting\lowering
9–2	Solenoid Valve	32.5 – 35.3 Nm (24 – 26 ft-lb)	Control the direction of turntable slewing
9–3	Solenoid Valve	32.5 – 35.3 Nm (24 – 26 ft-lb)	Control the direction of articulating boom lifting \lowering
10–1	Overflow Valve	40 ~ 45Nm (30 ~ 33ft-lb)	Control the pressure for turntable slewing
10–2	Overflow Valve	40 ~ 45Nm (30 ~ 33ft-lb)	Limit the steering pressure
11–1	Solenoid Valve	32.5 – 35.3 Nm (24 – 26 ft-lb)	Control main boom retracting
11–2	Solenoid Valve	32.5 – 35.3 Nm (24 – 26 ft-lb)	Control main boom extending
12–1	Overflow Valve	40 ~ 45Nm (30 ~ 33ft-lb)	Limit the pressure for boom extending
12–2	Overflow Valve	40 ~ 45Nm (30 ~ 33ft-lb)	Limit the pressure for articulating boom lowering
12–3	Overflow Valve	40 ~ 45Nm (30 ~ 33ft-lb)	Control the pressure for leveling the platform upward
12–4	Overflow Valve	40 ~ 45Nm (30 ~ 33ft-lb)	Control the pressure for leveling the platform downward
13	Damper	\	\
14	Solenoid Valve	25.8 ~ 28.5Nm (19 ~ 21ft-lb)	Control the direction of platform leveling upwards/ downwards manually
16	Flow valve	45 ~ 50Nm (33 ~ 37ft-lb)	Limit the flow rate for platform leveling
17	Hydraulic lock	27.1 Nm (20 ft-lb)	Lock the hydraulic oil circuit for platform leveling
18	Solenoid Valve	25.8 ~ 28.5Nm (19 ~ 21ft-lb)	Control steering direction

Travel Control Valve (PN.202040003985)

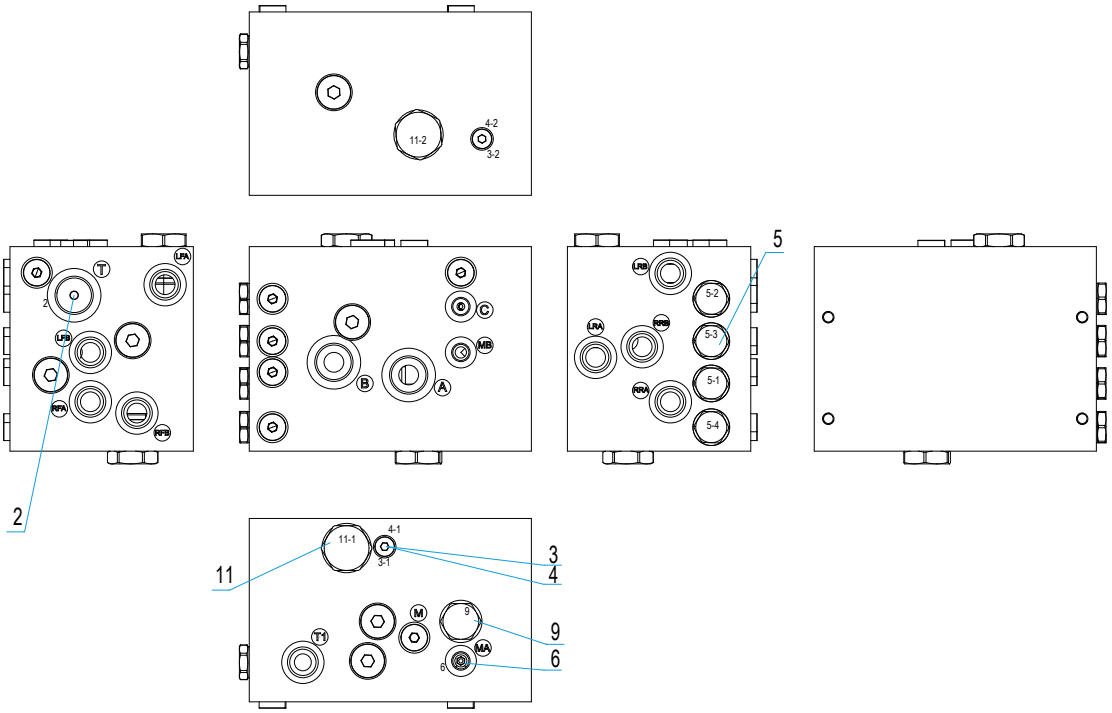


Fig. 3

Table 8-3

No.	Name	Installation torque	Function
2	Damper	\	\
3	Damper	\	\
4	Damper	\	\
5	Check Valve	40 ~ 45Nm (30 ~ 33ft-lb)	Keep oil flowing in one direction
6	Shuttle valve	\	Switch between oil lines
9	Flush valve	32.5–35.3Nm (24 ~ 26ft-lb)	Supply low-temperature hydraulic fluid
11–1	Flow divider/ flow-combining valve	99–104Nm (73 ~ 77ft-lb)	Control flow rate for left-front and left-rear wheels
11–2	Flow divider/ flow-combining valve	99–104Nm (73 ~ 77ft-lb)	Control flow rate for right-front and right-rear wheels

Brake & Two-speed Control Valve Manifold (PN.202040000006)

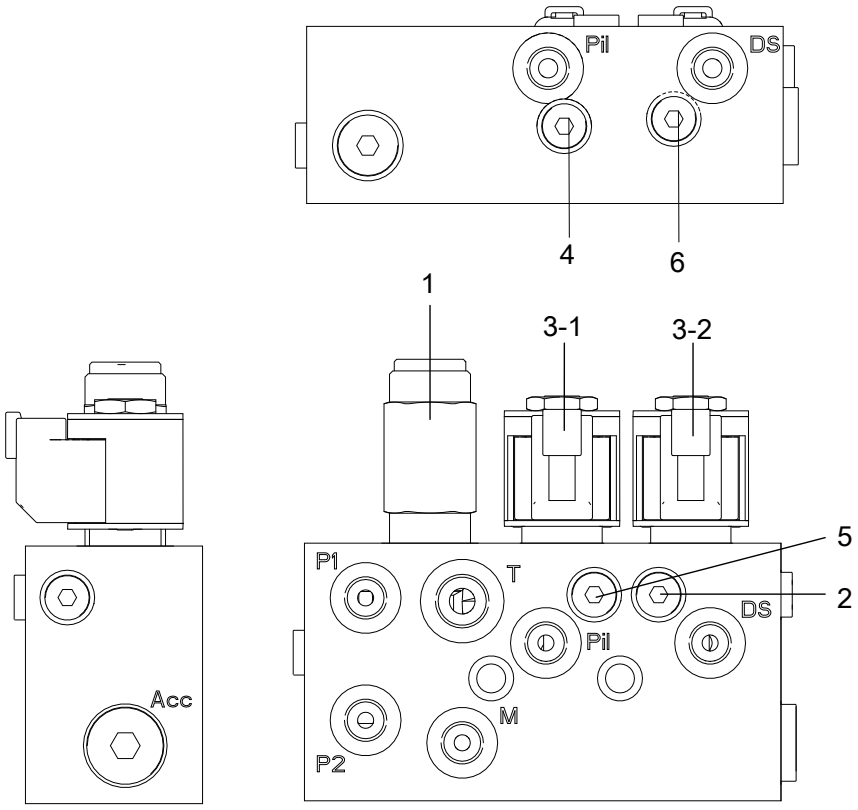


Fig. 4 Brake & Two-speed Control Valve Manifold (PN.202040000006)

Table 8-4 Brake & Two-speed Control Valve Manifold (PN.202040000006)

No.	Name	Installation torque	Function
1	Pressure-relief valve	33.9 Nm (25 ft-lb)	Control pressure of brake and high/low speed
2	Damper (⌀0.8)	\	\
3–1	Solenoid Valve	27.1 Nm (20 ft-lb)	Control high-low speed switching
3–2	Solenoid Valve	27.1 Nm (20 ft-lb)	Control braking
4	Damper (⌀1.3)	\	\
5	Damper (⌀2.0)	\	\
6	Damper (⌀1.5)	\	\

Oscillating counterbalance valve (PN.202040003786)

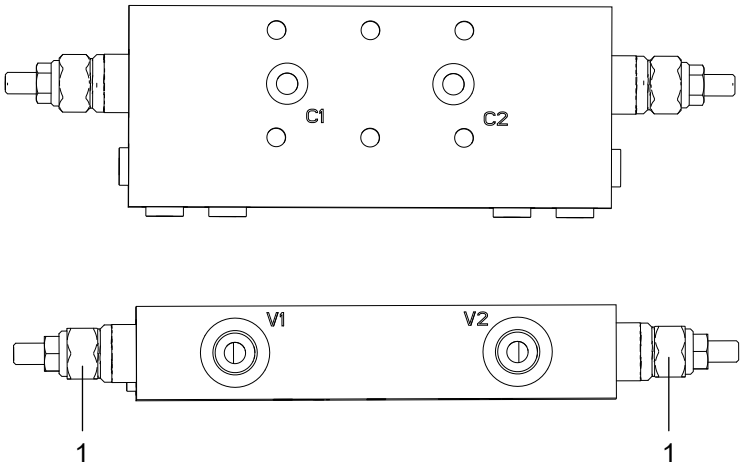


Fig. 5 Oscillating counterbalance valve (PN.202040003786)

Table 8-5 Oscillating counterbalance valve (PN.202040003786)

No.	Name	Installation torque	Function
1	Counterbalance Valve	40 ~ 45Nm (30 ~ 33ft-lb)	Keep the load balanced

Oscillating Control Valve (PN.202040003521)

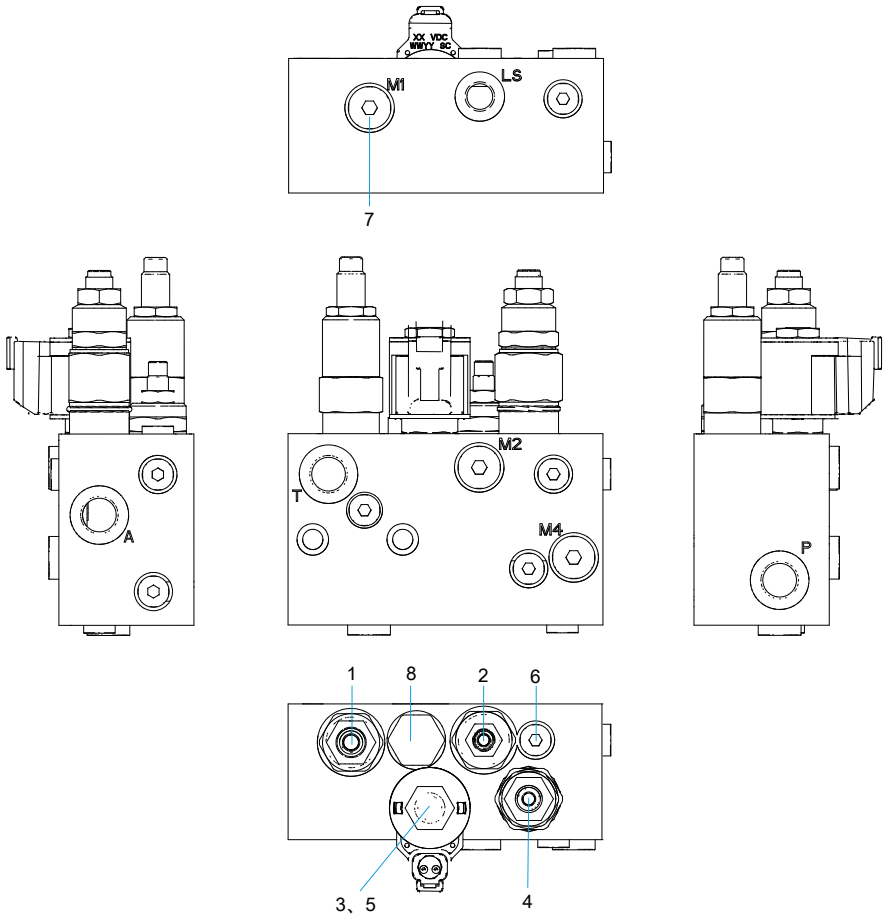


Fig. 6 Oscillating Control Valve (PN.202040003521)

Table 8-6 Oscillating Control Valve (PN.202040003521)

No.	Name	Installation torque	Function
1	Pressure-relief valve	40 Nm (30 ft-lb)	Control oscillating pressure
2	Flow valve	33.9 Nm (25 ft-lb)	Control fuel flow
3	Solenoid valve	25.8 – 28.5 Nm (19 – 21 ft-lb)	Control oscillating
4	Pilot-operated valve	45 ~ 50Nm (33 ~ 37ft-lb)	Limit the maximum pressure for oscillating system
6	Damper	5 Nm (9 ft-lb)	\
8	Check valve	40 ~ 45Nm (30 ~ 33ft-lb)	Keep oil flowing in one direction

Telescoping Counterbalance Valve (PN.202040003012)

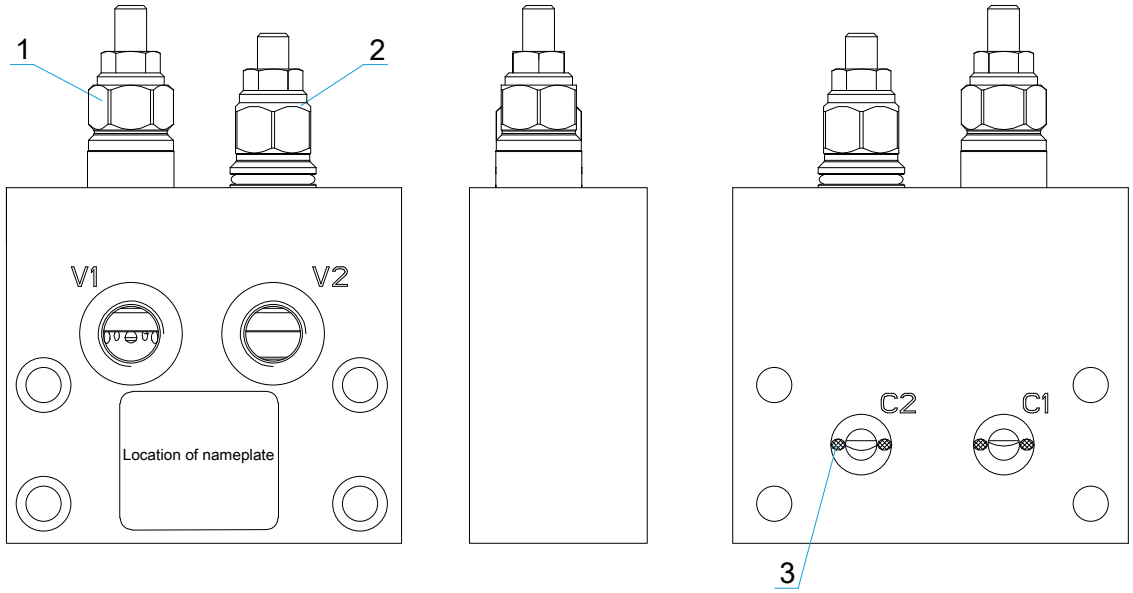


Fig. 7 Telescoping counterbalance valve (PN.202040003012)

Table 8-7 Telescoping counterbalance valve (PN.202040003012)

No.	Name	Installation torque	Function
1	Counterbalance valve	40 – 45 Nm (30 – 33 ft-lb)	Keep the load balanced
2	Counterbalance valve	45 – 50 Nm (33 – 37 ft-lb)	Keep the load balanced
3	O-ring	\	\

Telescoping Counterbalance Valve (PN.202040003374)

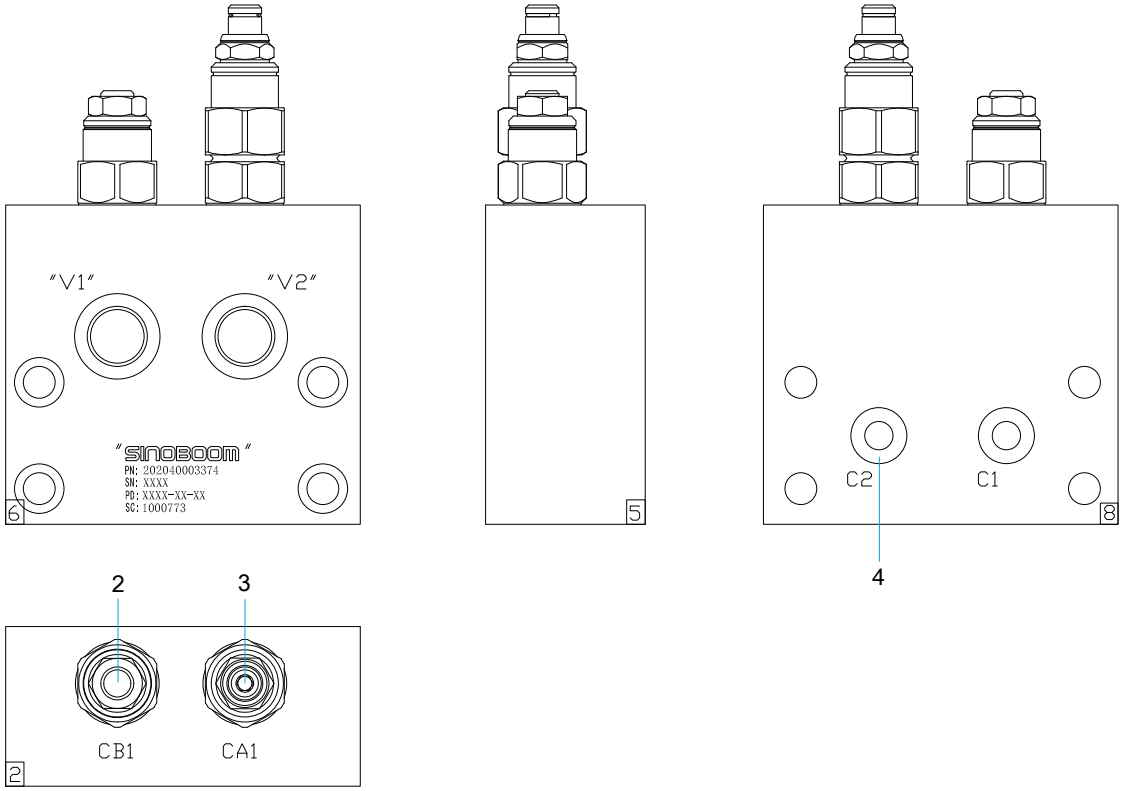


Fig. 8 Telescoping Counterbalance Valve (PN.202040003374)

Table 8-8 Telescoping Counterbalance Valve (PN.202040003374)

No.	Name	Installation torque	Function
2	Counterbalance Valve	\	Keep the load balanced
3	Counterbalance Valve	\	Keep the load balanced
4	O-ring	\	\

Platform Duplex Valve Manifold (PN.202040003259)

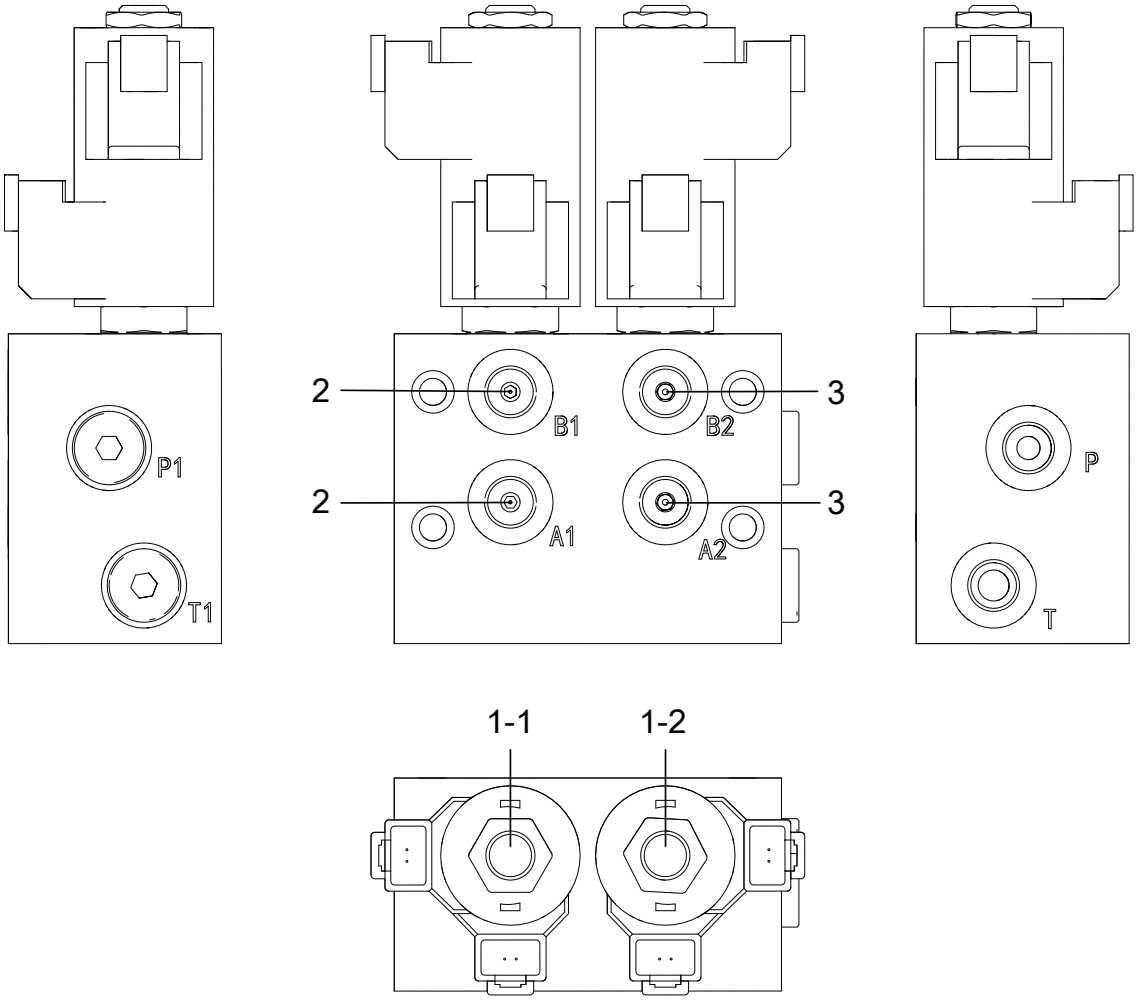


Fig. 9 Platform Duplex Valve Manifold (PN.202040003259)

Table 8-9 Platform Duplex Valve Manifold (PN.202040003259)

No.	Name	Installation torque	Function
1–1	Solenoid valve	40 ~ 45Nm (30 ~ 33ft-lb)	Control the direction of platform rotation
1–2	Solenoid valve	40 ~ 45Nm (30 ~ 33ft-lb)	Control the direction of jib up/down movement
2	Damper	5 Nm (3.7 ft-lb)	\
3	Damper	5 Nm (3.7 ft-lb)	\

Platform Duplex Valve Manifold (PN.202040000329)

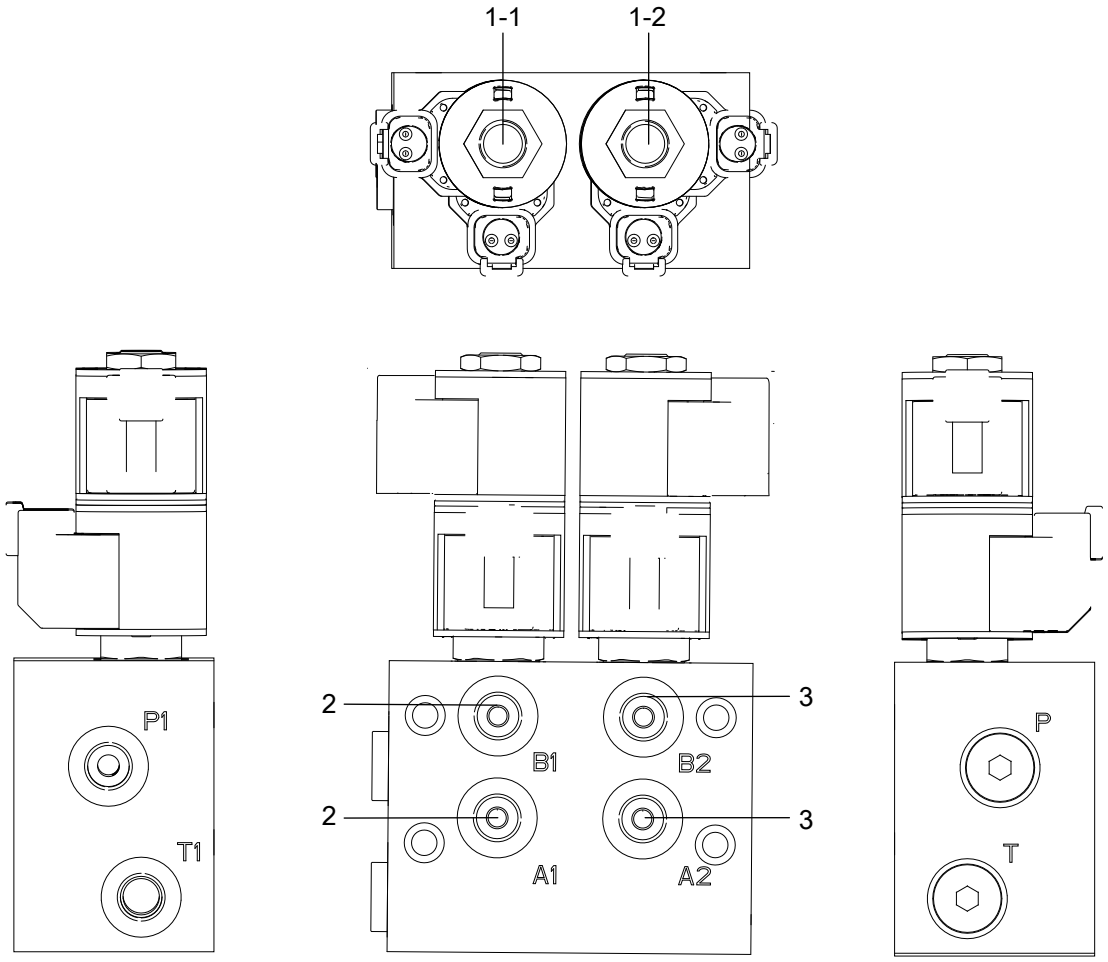


Fig. 10 Platform Duplex Valve Manifold (PN.202040000329)

Table 8-10 Platform Duplex Valve Manifold (PN.202040000329)

No.	Name	Installation torque	Function
1–1	Solenoid valve	40 ~ 45Nm (30 ~ 33ft-lb)	Control the direction of platform rotation
1–2	Solenoid valve	40 ~ 45Nm (30 ~ 33ft-lb)	Control the direction of jib up/down movement
2	Damper	5 Nm (9 ft-lb)	\
3	Damper	5 Nm (9 ft-lb)	\

Lift Counterbalance Valve (PN.202040000327)

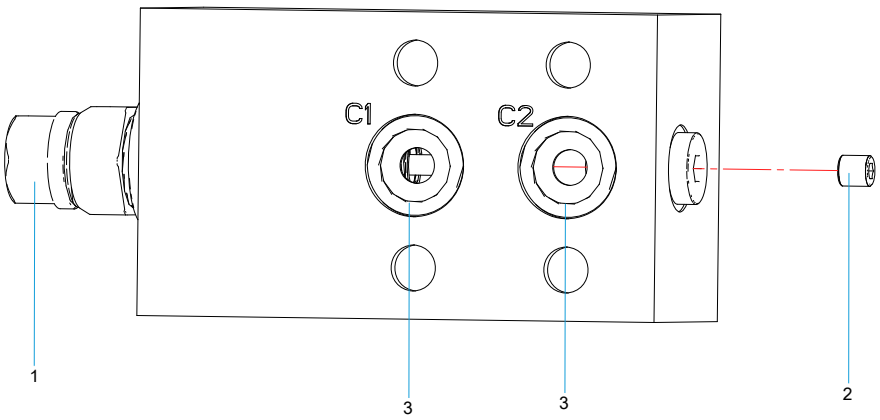


Fig. 11

Table 8-11

No.	Name	Installation torque	Function
1	Counterbalance Valve	50 – 60 Nm (37 – 44 ft-lb)	Keep the load balanced
2	Damper	5Nm (4ft-lb)	\

Lift Counterbalance Valve (PN.202040000309)

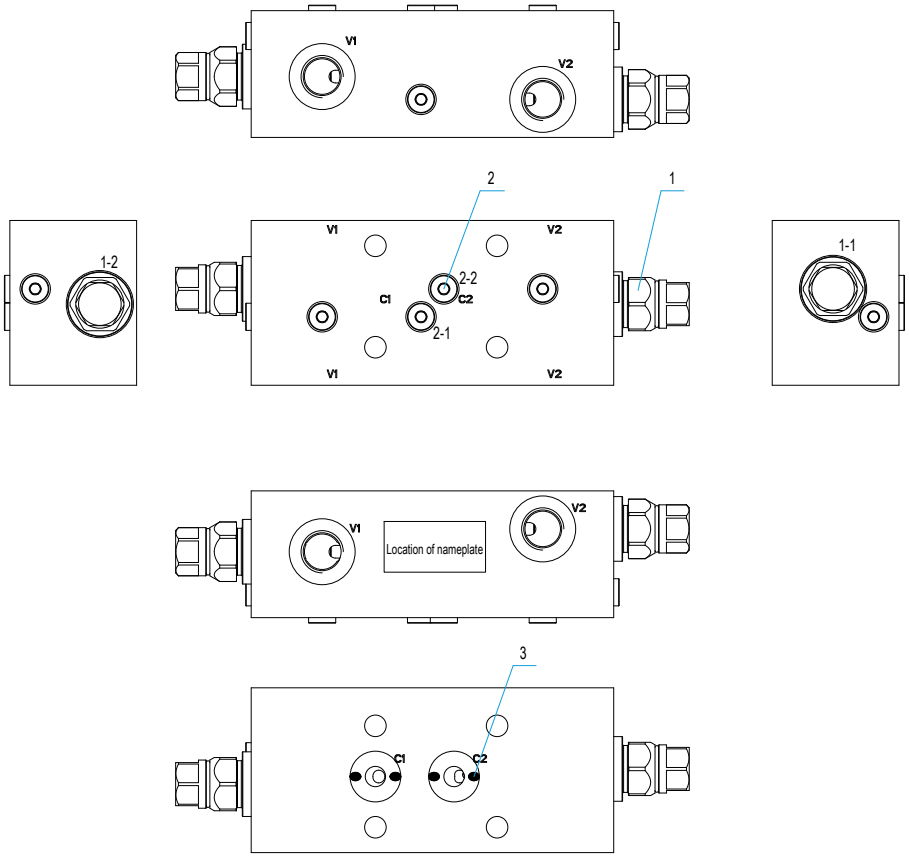


Fig. 12

Table 8-12

No.	Name	Installation torque	Function
1	Counterbalance Valve	50 – 60 Nm (37 – 44 ft-lb)	Keep the load balanced
2	Damper	5Nm (4ft-lb)	\

Leveling Counterbalance Valve (PN.202040000011)

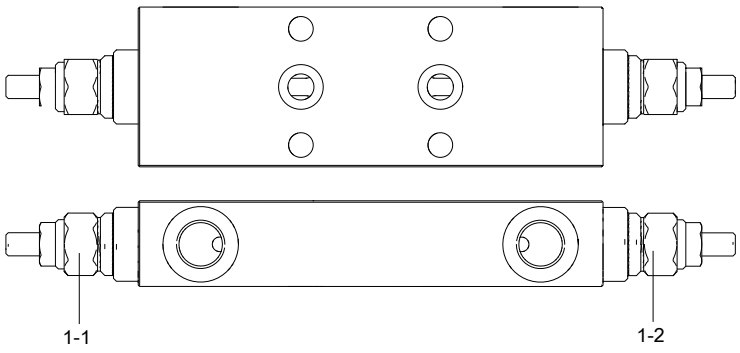


Fig. 13 Leveling Counterbalance Valve (PN.202040000011)

Table 8-13 Leveling Counterbalance Valve (PN.202040000011)

No.	Name	Installation torque	Function
1	Counterbalance Valve	70 – 75 Nm (52 – 55 ft-lb)	Keep the load balanced

8.3 HYDRAULIC TANK

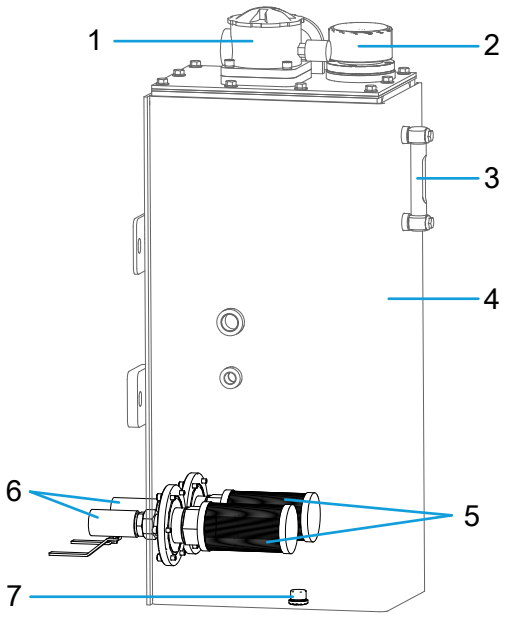


Fig. 14 Hydraulic Tank Structure

Table 8-14 Hydraulic Tank Structure

No.	Description
1	Return Filter
2	Air Filter
3	Level gauge
4	Tank body
5	Suction Filter
6	Shut-off valve
7	Oil Plug

Air Filter

It is recommended to clean the hydraulic tank air filter every 3 months or after 250 hours of operation, and replace it every 6 months or after 500 hours of operation. The replacement interval should be shorter in harsh operating environments.

The steps to check and clean the air filter are as follows:

1. Turn off the machine.
2. Locate the air filter at the top of the hydraulic tank.
3. Remove the air filter.
4. Check the hydraulic tank air filter: air should pass through the air filter smoothly.
5. If the air cannot pass through the air filter smoothly, clean the air filter with a neutral solvent and dry it using an air gun.
6. Check the air filter again, repeat as necessary until the air passes through the filter smoothly.
7. Install the air filter back onto the tank.

Return Filter

It is recommended to replace the hydraulic tank return filter element after the first 50 hours of operation and every 3 months or 250 hours of operation thereafter. The replacement interval should be shorter in harsh operating environments.

1. Turn off the machine.
2. Open turntablecover, and locate the return filter on top of the hydraulic tank.
3. Remove the return filter.
4. Loosen the cover at the top of the filter and remove the filter element.
5. Apply a thin film of oil to the gasket of the new return filter element.
6. Clean the return filter housing, install a new element and then reinstall the return filter.
7. Clean the hydraulic oil spilled during the process.
8. Start the machine from the ground.
9. Check the return filter and related components for leakage.

Suction Filter

It is recommended to replace the hydraulic tank suction filter screen every year or after 1000 hours of operation. The replacement interval should be shorter in harsh operating environments.

Every time the hydraulic oil is replaced, the hydraulic tank oil suction filter screen should also be replaced.

8.4 HYDRAULIC OIL

Check the Oil Level

Maintaining the hydraulic oil at a proper level is essential for the normal operation of the machine. If the hydraulic oil level is too high, oil will overflow from the tank during operation. If the hydraulic oil level is too low the oil pump will suck in air during operation, which will lead to component damage.

1. Make sure the machine is in stowed position.
2. Find hydraulic tank and visually check the side of hydraulic tank. The hydraulic oil level should be within the scale range of the tank's level gauge.
3. If necessary, fill with correct hydraulic oil according to the ***Oil Specifications*** , and do not overfill the tank.
4. Check the hydraulic tank and fittings for leakage.

Check the Cleanliness of the Hydraulic Oil

Check the hydraulic oil. If any of the following conditions are observed the hydraulic oil must be replaced.

- The hydraulic oil is milky white and cloudy.
- The hydraulic oil is black.
- Check a small sample of the hydraulic oil using a bright source of light to see if there are reflections of metal particles or rub the hydraulic oil with two fingers to locate metal particles.
- The hydraulic oil has an unusual smell.

Change the Hydraulic Oil

It is recommended to change the hydraulic oil every year or after 1000 hours of operation. The replacement interval should be shorter in harsh operating environments.

NOTICE

Every time the hydraulic oil is changed the hydraulic tank suction filter must be replaced.

1. Turn off the machine and make sure the hydraulic oil has cooled to room temperature.
2. Find Hydraulic Tank.
3. Close the hydraulic shut-off valve located on the side of the tank.
4. Place a suitable container under the oil plug at the bottom of the tank.
5. Remove the oil plug at the bottom of the tank and completely drain the oil into the container.
6. Install the oil plug.
7. Disconnect and plug the hydraulic tank suction pipe and return pipe.
8. Remove the cover from the tank after removing the upper cover fastening bolts of the hydraulic tank.
9. After cleaning the inside of the tank with a neutral solvent, open the oil plug to drain the solvent.
10. After the hydraulic tank is dry, install the cover and connect the suction pipe and return pipe to the hydraulic oil tank.
11. Fill with correct hydraulic oil according to the ***Oil Specifications*** , and never overfill the tank.
12. Open the hydraulic shut-off valve.

8.5 HYDRAULIC OIL HIGH-PRESSURE FILTER

It is recommended to replace the hydraulic oil high-pressure filter every 3 months or after 250 hours of operation. The replacement interval should be shorter in harsh operating environments.

1. Turn off the machine.
2. Find High-pressure filter.
3. Place a suitable container under the high-pressure filter.
4. Use a wrench to remove the filter housing.
5. Remove the filter element from the housing.
6. Check the seal on the mounting surface of the housing and, if necessary, replace the seal.
7. Install a new filter element into the housing.
8. Tighten the housing onto the filter fully and then loosen it by 1/4 turn.
9. Clean up any hydraulic oil that was spilled during the process.
10. Start the machine.
11. Check the high-pressure filter and related components for leakage.

8.6 BLEED THE OSCILLATING CYLINDER

Bleed the oscillating cylinder before the machine is put into service for the first time, and after replacing the oscillating cylinder or the counterbalance valve.

1. Make sure the machine is in stowed position.
2. Place a beveled wooden block measuring 120mm (4.7 in) in height in front of the machine.
3. Drive machine to place the left front wheel onto the wooden block, and then drive off the wooden block.
4. Drive machine to place the right front wheel onto the wooden block, and then drive off the wooden block.
5. Repeat steps 3 and 4 until bleeding of the left/right oscillating cylinders is complete.
6. Perform a counterbalance valve locking check.

8.7 OSCILLATION FUNCTION CHECK

After bleeding the oscillating cylinder perform a counterbalance valve locking check. The oscillating functiol must be checked every 3 months or 250 hours of operation, or after any system components have been replaced, or in case of abnormal system operation.

Check Counterbalance Valve Locking

It is recommended to check the counterbalance valve locking before the machine is put into use for the first time, and afterwards every 3 months or 250 hours of operation. If any hydraulic component such as the oscillating cylinder or the counterbalance valve is replaced later, the counterbalance valve must also be checked for locking.

1. Place a beveled wooden block measuring 120mm (4.7 in) in height in front of the machine.
2. Adjust the boom to horizontal and fully extended position, and slowly rotate the turntable to position the boom above the right front wheel.
3. Drive machine to place the left front wheel onto the wooden block.
4. Turn off the machine, and measure the extension and retraction length of right front oscillating cylinder immediately.
5. After 15 mins, measure the extension and retraction length of right front oscillating cylinder again.
6. Compare the two measured lengths: the oscillating cylinder on the load-bearing side shall not retract (the retraction length within 1mm is normal).
7. Repeat the above steps to check the left front wheel oscillating cylinder.
8. If the oscillating cylinder does not work properly have qualified maintenance personnel rectify the issue before you continue to operate the machine.

Check the Tie Rod of the Oscillating Multi-way Valve

Visually check whether the tie rod of the oscillating multi-way valve is properly tightened.

Oscillating Axle Function Test

1. Make sure the boom is in stowed position.
2. Place a beveled wooden block measuring 120mm (4.7 in) in height in front of the machine.
3. Drive machine to place the right steered wheel onto the wooden block.
4. Have an assistant check that the remaining three wheels have close contact to the ground.
5. Drive the machine off the wooden block.
6. Drive machine to place the left steered wheel onto the wooden block.
7. Have an assistant check that the remaining three wheels have close contact to the ground.

8.8 CYLINDER DRIFT INSPECTION

If there is a leakage in the oil cylinder, it will sinkand the drift within a certain range is a normal phenomenon. In order to ensure normal operation of the machine, it is recommended to conduct a drift inspection on the platform every 3 months or after 250 hours of operation to determine whether a drift inspection of the cylinder is required.

Fully extend the main boom after place a weight that matches the rated load onto the platform. Measure the drift from the platform to the ground with the machine powered off. If the platform drifts down more than 50 mm (1.97 in) in 15 minutes, perform a cylinder drift inspection as per the following procedures.

1. Place the machine in an environment with stable ambient temperature.
2. Fully extend the main boom after place a weight that matches the rated load onto the platform.
3. Measure drift at the cylinder piston rod with a calibrated dial indicator.
4. The maximum allowable drift for cylinders with different bores is shown in the table below. If the measured value is less than the maximum allowable

drift, the cylinder is operating normally. If the measured value is greater than the maximum allowable drift the cylinder is not operating normally. Contact qualified service technicians for inspection and repair.

Table 8-15 Maximum allowable drift for different cylinder bore diameters

Cylinder bore diameter (mm/in)	Maximum allowable drift in 15 minutes (mm/in)
63/2.48	0.96/0.037
80/3.15	0.63/0.025
100/3.94	0.39/0.015
125/4.92	0.23/0.009
160/6.30	0.14/0.006
180/7.09	0.13/0.005
200/7.87	0.10/0.0038
220/8.66	0.08/0.0030

NOTICE

- *The data is based on a cylinder leakage value of 6 drops per minute. Since the hydraulic oil expands and contracts depending on temperature, the tolerance for the cylinder drift is up 7/10000 or 0.07 % for each temperature change of 1℃.*
- *All cylinders that may cause the platform to sink should be taken into account, such as lift cylinders, leveling cylinders, and jib cylinders, etc.*

8.9 HYDRAULIC SYMBOLS

Table 8-16

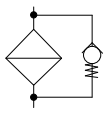
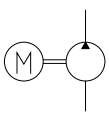
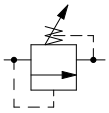
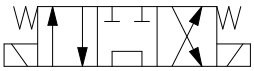
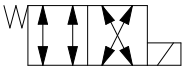
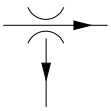
Symbols	Name
	Filter
	Brake
	Emergency Power Unit

Table 8-16 (continued)

Symbols	Name
	Hydraulic motor
	Overflow Valve
	3-position 4-way solenoid directional valve
	2-position 4-way solenoid directional valve
	Priority valve
	Check Valve

8.10 HYDRAULIC SCHEMATIC DIAGRAM

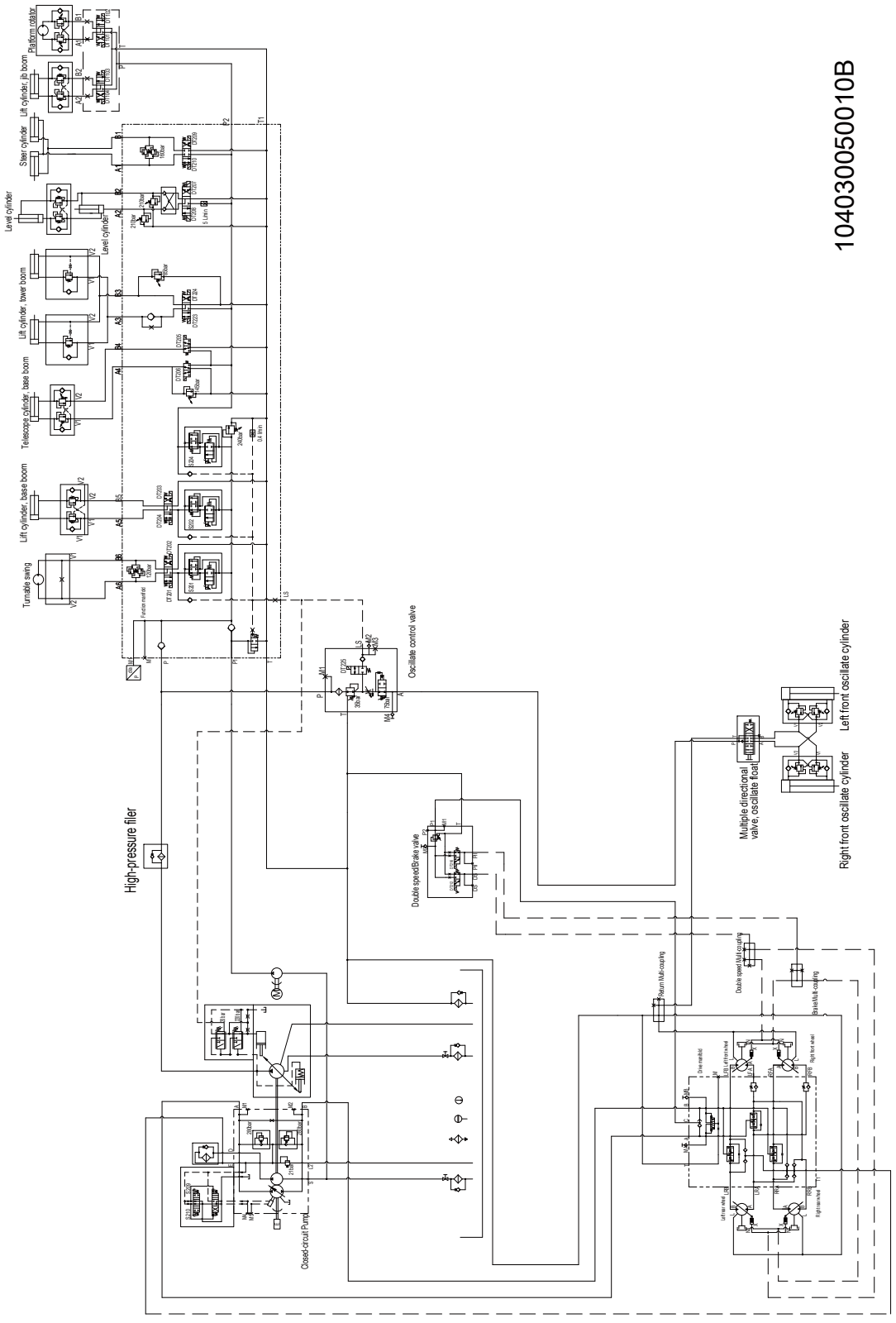


Fig. 15 Hydraulic Schematic Diagram (Non-continuous Slewing)

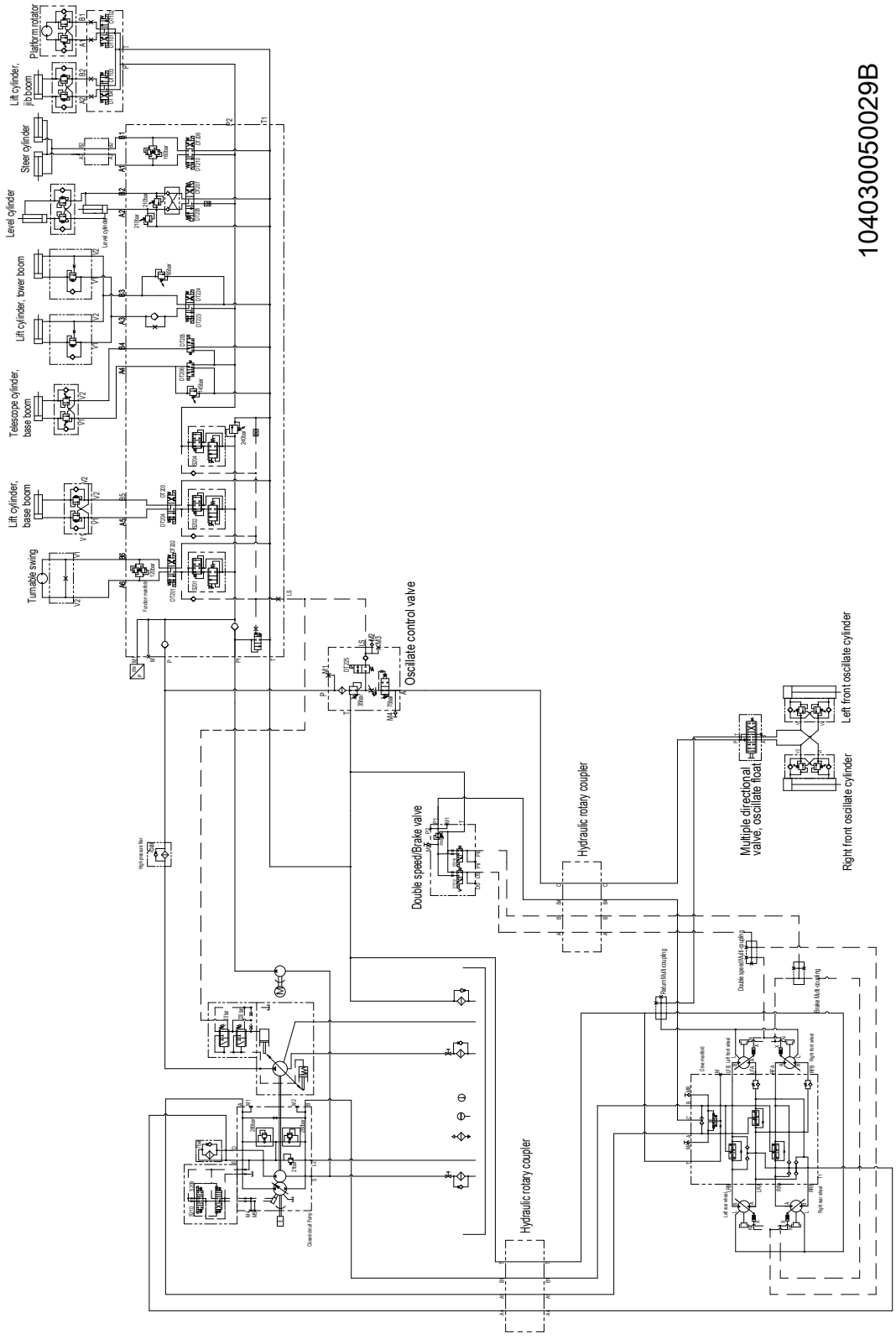


Fig. 16 Hydraulic Schematic Diagram (Continuous Slewing)

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9 ELECTRICAL SYSTEM

One 12V lead-acid battery provides power for the engine and electrical control system. The batteries are charged through the DC generator in the engine. The control system is protected by a power-off switch.

Proper maintenance of the electrical equipment is essential for the proper and safe operation of the machine. If the machine operates with the electrical components damaged or corroded, it may lead to unsafe operation or serious personal injury.

9.1 BATTERY

Check

The battery condition will affect machine performance and operation. The following checks should be performed on the battery at specified intervals.

Daily maintenance

- Check the battery level. The battery should be charged immediately after each discharge or if the SOC is less than 20 %.
- Check the electrolyte level. The electrolyte level should be checked after each charging. If the level is low, add water in time.

Weekly maintenance

- Check the wiring harness retaining nuts between the battery cells. Make sure that the retaining nuts are tightened with the correct torque. Refer to the ***Torque Specifications*** section for the tightening torques.
- Inspect the battery wire harness connections. Make sure that the battery harness connections are firmly secured and are free from corrosion. Positive and negative terminals must not be reversed.

NOTICE

Improper connection may result in reduced performance and damaged terminals, melting, or even fire.

- Check whether the inside and outside paint of the battery box shows any damage. If any damage is found, repair the paint immediately to protect the outer box insulation and to prevent corrosion.
- Check the battery compartment for accumulation of water. Clean up any accumulated water immediately.
- Clean the area around the battery. Regularly clean the top of the battery, terminals, and connection points with a mixture of baking soda and water using a cloth or brush. After cleaning, promptly dry with a cloth and apply a thin layer of Vaseline or use terminal protectors. Do not allow the cleaning solution to enter the battery's interior.

NOTICE

Adding terminal protectors and anti-corrosion sealants will protect the battery terminals and cables from corrosion.

Monthly maintenance

- After charging, check and record the voltage of all battery cells or battery pack.
- After charging, check and record the specific gravity of electrolyte and temperature of all battery cells. If there is obvious difference between the measured values of battery cells or between the measured value and previous value, contact professional after-sales staff for inspection and maintenance.

1. Before conducting the inspection, fully charge the battery and let it sit for 24 hours, allowing the battery cells to balance.
2. Wear protective clothing, protective gloves and protective glasses.
3. Remove the battery vent cover.
4. Top up the hydrometer and drain it two or three times, then take a sample of the battery electrolyte.
5. Measure the specific gravity of all battery cells in sequence and note down the readings.
6. If the ambient temperature is above 27 °C (80 °F), add 0.004 to the specific gravity reading for every increase of 5 °C (40 °F). If the ambient temperature is below 27 °C (80 °F), subtract 0.004 from the specific gravity reading for every decrease of 5 °C (40 °F).
   - Result 1: if the specific gravity reading of all battery cells is 1.250 or higher, and the reading difference between any two cells is less than 0.050 proceed with the next step.
   - Result 2: if the specific gravity reading of one or more battery cells is below 1.250, it indicates that the battery is running low and needs charging. After charging, measure the specific gravity reading; if it meets Result 1 proceed with the next step.

– Result 3: If the specific gravity reading difference between any two cells in the battery pack exceeds 0.050, equalize the battery pack and let it sit for 6 hours before measuring the specific gravity again. If the readings match Result 1 proceed to the next step.

NOTICE

If Result 1 cannot be achieved even after several attempts the battery may be malfunctioning.

7. Check the battery electrolyte level. Make sure the electrolyte level is correct. Add distilled water as needed.
8. Install the battery vent cover.

Annual maintenance

- Check the insulation resistance of the machine and battery.

Add Fluid

NOTICE

- *For lead-acid batteries (requiring maintenance), the electrolyte level should be checked after each charging. If the level is low, add water in time.*
- *The water shall be added after charging. Adding water before charging may cause acid overflows during charging, adversely affecting the usage and service life of battery.*
- *The deionized water or distilled water added shall have a conductivity ≤ 30 μS/cm.*
- *The specific gravity of electrolyte of a new AGM battery added with water shall be 1.27 - 1.29 kg/L.*
- *If excess deionized water has been added, suck it out.*
- *If excess deionized water has been added and electrolyte overflows result, dilute the electrolyte overflows with clear water and suck it dry with a straw.*

Without automatic liquid refilling system

1. Pour the deionized water or distilled water into a measuring glass, and prepare a injector or funnel.
2. Wear rubber gloves, goggles and other protective equipment.
3. Open the filling plug to check the current level. If the electrolyte level of cell is lower than the minimum level, add water immediately.

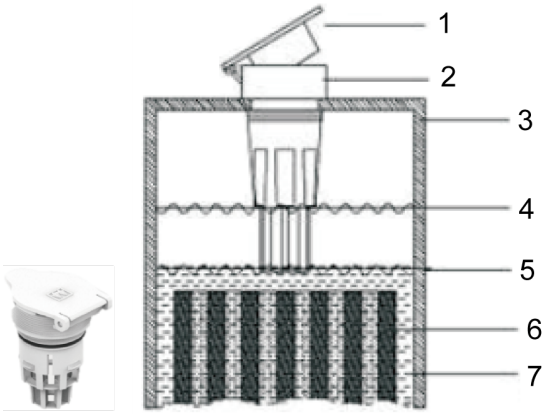


Fig. 1 Electrolyte level diagram

Table 9-1 Electrolyte Level Description

No.	Description
1	Flip-top cap
2	Filling plug
3	Battery housing
4	Maximum level
5	Minimum level (adding fluid is required at this level)
6	Electrode plate
7	Electrolyte

4. Use the injector or funnel to add water to the battery until the electrolyte level rises to between the maximum level and minimum level.

Equipped with automatic water refilling system (with water refilling device)

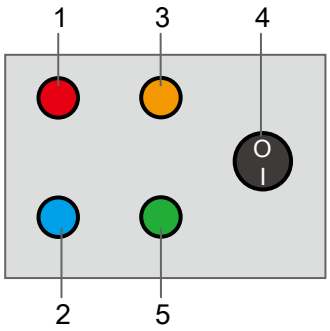


Fig. 2 Diagram of water refilling device panel

Table 9-2 Description of water refilling device panel

No.	Description
1	Power indicator (Red)
2	Undervoltage indicator (Blue)
3	Operating indicator (Orange)
4	Switch of water refilling device
5	Saturation indicator (Green)

- During normal operation, the power indicator (Red) and operating indicator (Orange) illuminate steadily;
- If the undervoltage indicator (Blue) lights up, stop using the water refilling device and charge it.
- When the water refilling device is fully charged, the saturation indicator (Green) will lights up. Disconnect the charging plug —the vehicle is now ready for operation.
- Switch Position and Status of water refilling device :
  - “O” : The water refilling device switch is in the “OFF” position (deactivated state) ;
  - “I” : The water refilling device switch is in the “ON” position (activated state).

1. Check if the water refilling device is energized and works normally, and if the water refilling bucket has enough deionized water or distilled water.
2. Before water refilling, visually check the pipelines of the water refilling system to eliminate abnormity and damage.
3. Pull down the latch on the female joint, connect the male joint and unlocked female joint, and then release the latch after connection. Connect the male joint and female joint of water refilling device and automatic water refilling system.

Fig. 3 Diagram of male joint and female joint connection

Table 9-3 Description of male joint and female joint connection

No.	Description
A	Male joint
B	Female joint
C	Male joint and female joint connected

Note: The standard diameters for male joint and female joint are typically 6mm and 100mm. Before use, please confirm the size of male joint, female jiont, and refill hose inner diameter (ID) are properly matched.

4. Set switch #4 of water refilling device to “ON” position to start automatic water refilling, and the operating indicator (Orange) will illuminate steadily.
5. During the automatic water refilling process, observe the red rotating wheel on the water refilling tube to determine if there is enough deionized water or distilled water in the water refilling bucket, to prevent idle running after the water refilling bucket has running out of water, otherwise the water refilling device may be damaged.

Fig. 4 Red rotating wheel

6. After the white buoy on the automatic water refilling valve floats up to the top, water refilling has been completed. Set switch #4 of the device to “OFF” position to deactivate the automatic water refilling system.

A B

Fig. 5 Diagram of white buoy position

Table 9-4 Description of white buoy position

No.	Description
A	Water refilling completed
B	Water refilling uncompleted

Equipped with automatic water refilling system (without water refilling device)

1. Pour enough deionized water or distilled water into the water refilling bucket, and connect the water hose to the water outlet. Place the water refilling bucket above the battery stably, ensuring the vertical distance between the battery upper surface and the bucket ≥ 3 m.

Fig. 6 Connect the water hose to the water outlet

2. Pull down the latch on the female joint, connect the male joint and unlocked female joint, and then release the latch after connection. Connect the male joint and female joint of water refilling bucket and automatic water refilling system for automatic water refilling. Observe the water flow in the water hose to determine if the water refilling system operates normally.

Fig. 7 Diagram of male joint and female joint connection

Table 9-5 Description of male joint and female joint connection

No.	Description
A	Male joint
B	Female joint
C	Male joint and female joint connected

Note: The standard diameters for male joint and female joint are typically 6mm and 100mm. Before use, please confirm the size of male joint, female jiont, and refill hose inner diameter (ID) are properly matched.

3. During the automatic water refilling process, observe the red rotating wheel on the water refilling tube to determine if there is enough deionized water or distilled water in the water refilling bucket, to prevent idle running after the water refilling bucket has running out of water, otherwise the water refilling device may be damaged.

Fig. 8 Red rotating wheel

4. After the white buoy on the automatic water refilling valve floats up to the top, water refilling has been completed.

A B

Fig. 9 Diagram of white buoy position

Table 9-6 Description of white buoy position

No.	Description
A	Water refilling completed
B	Water refilling uncompleted

NOTICE

- *After initial water refilling, check and verify if the battery has been refilled successfully, to prevent refilling failure due to error in water refilling valve model.*
- *Check the water refilling system each quarter to prevent refilling failure of certain cell caused by water refilling valve or pipeline damage.*

Equalization

Equalization is the deliberate process of overcharging the flooded/wet battery after it has been fully charged. Equalize the battery only when its specific gravity is low (less than 1.25) or its specific gravity exceeds the scope (more than 0.030) after the battery is fully charged.

NOTICE

- *Equalization can only be performed on flooded/ wet batteries. Do not balance other types of batteries.*
- *To prevent battery damage, the battery must be equalized after a storage period of up to three months from the date of delivery.*

1. Check the electrolyte level to ensure that it meets the specified requirements.
2. Verify that all vent caps are properly secured to the battery.
3. Set the charger to equalization mode.
4. Charge the battery in equalization mode. The battery will bleed air in the equalization process (forming bubbles).
5. Remove the vent cap every hour to measure the specific gravity of all battery cells, stop charging in equalization mode if the specific gravity doesn't increase any further.

Storage

- Fully charge the battery before placing the machine into storage.
- The battery should be stored in a cool and dry environment (temperature 10℃ - 25℃/50 - 77℉, RH < 90 %). Charge the battery every 3 months using the charger provided by the manufacturer.
- Switch off the main power switch and the emergency stop button to eliminate potential hazards associated with electrical leakage.
- The battery will self-discharge gradually during storage. Monitor the specific gravity or the voltage every 4 - 6 weeks. The equivalent values of the state of charge, specific gravity and open - circuit voltage are shown in the following table.

Table 9-7

State of charge (%)	Specific gravity	Open - circuit voltage (V)		
		Battery cell	6V	12V
100	1.277	2.122	6.37	12.73
90	1.258	2.103	6.31	12.62

Table 9-7 (continued)

State of charge (%)	Specific gravity	Open - circuit voltage (V)		
		Battery cell	6V	12V
80	1.238	2.083	6.25	12.50
70	1.217	2.062	6.19	12.37
60	1.195	2.040	6.12	12.24
50	1.172	2.017	6.05	12.10
40	1.148	1.993	5.98	11.96
30	1.124	1.969	5.91	11.81
20	1.098	1.943	5.83	11.66
10	1.073	1.918	5.75	11.51

- Recharge the battery in quick charging mode when the battery level is 70 % or lower.
- Recharge the battery before use after taking it out of storage.
- Storage in hot environments (above 32℃/90℉): Avoid exposing the battery to heat sources during storage since the battery self-discharges faster at higher temperatures. If it's necessary to store the battery at higher temperatures monitor the specific gravity or voltage more frequently (approximately every 2 to 4 weeks).
- Storage in cold environments (below 0℃/32℉): Avoid storing the battery in locations that may be exposed to freezing temperatures since the battery may freeze if not fully charged. If the battery is to be stored in cold environments it must be fully charged.

NOTICE

Do not store the battery longer than 6 months in hot or cold environments.

9.2 ELECTRICAL SYMBOLS

Table 9-8

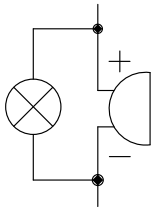
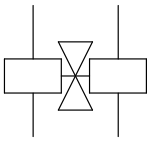
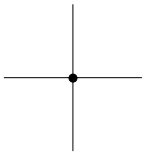
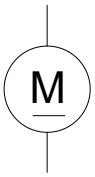
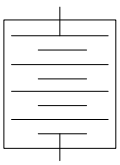
Symbols	Description
	Buzzer
	Valve
	Two lines connected
	Electric Motor
	AGM battery

Table 9-8 (continued)

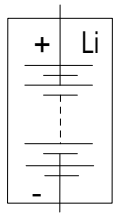
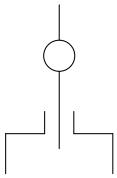
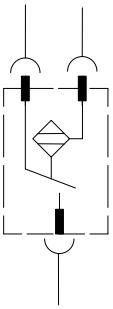
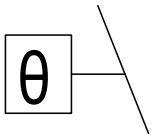
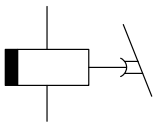
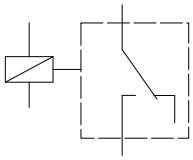
Symbols	Description
	Lithium Battery
	Toggle Switch
	Level Switch
	Oil temperature switch
	Delay relay
	Power-off Switch
	Relay

Table 9-8 (continued)

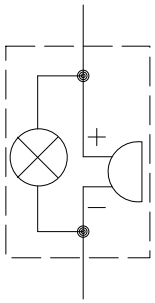
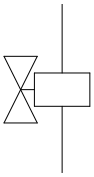
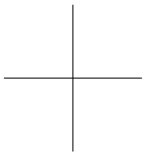
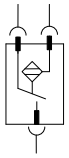
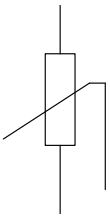
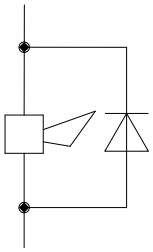
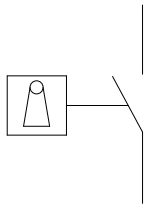
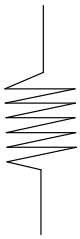
Symbols	Description
	Warning light
	Valve
	Two lines not connected
	Proximity switch pressure sensor
	Fuel level sensor
	Horn

Table 9-8 (continued)

Symbols	Description
	Key Switch
	Preheating wire

9.3 ELECTRICAL SCHEMATIC DIAGRAM

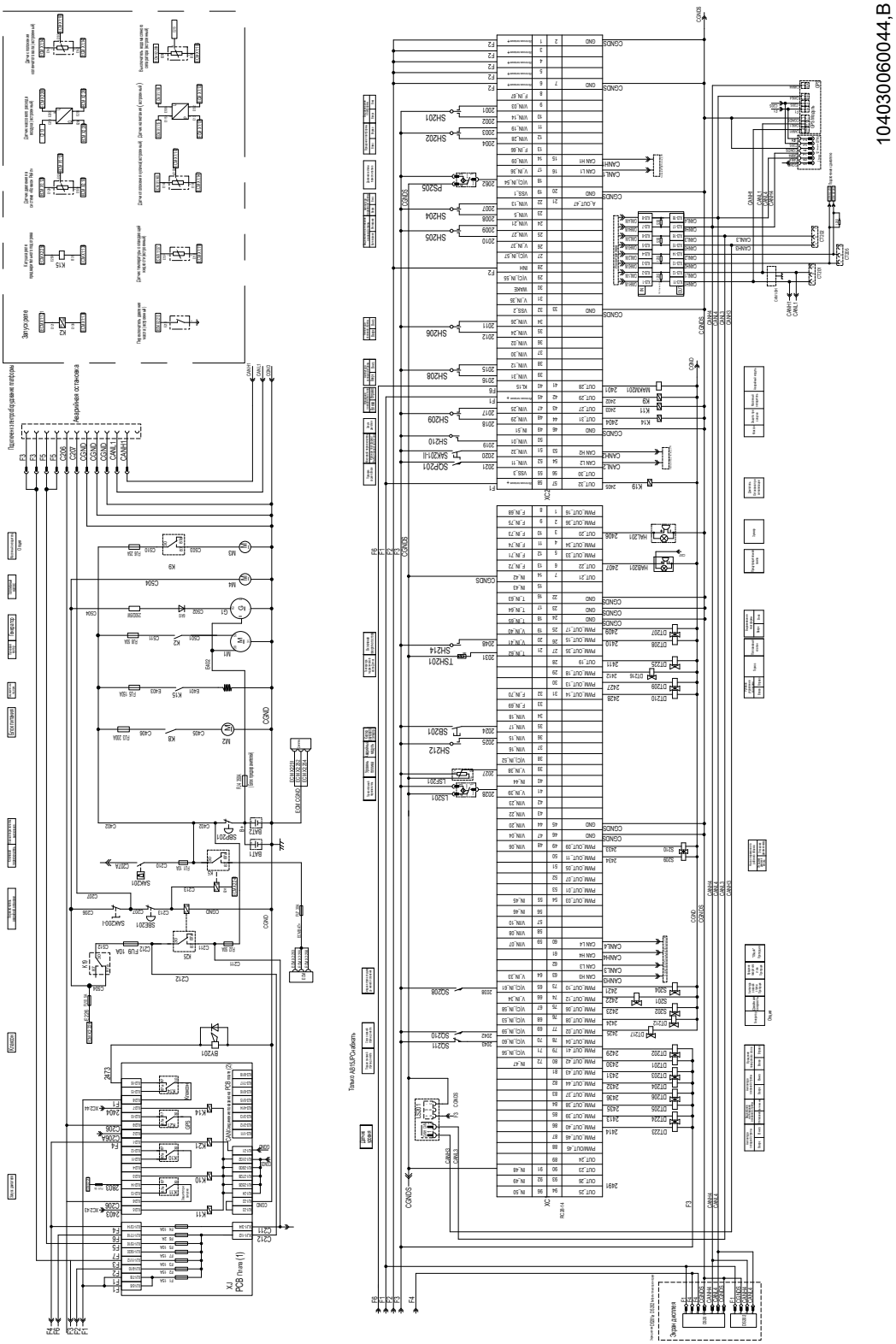


Fig. 10 Electrical Schematic Diagram – Turntable V2403-CR-TIE4B/43.2kw/US IV

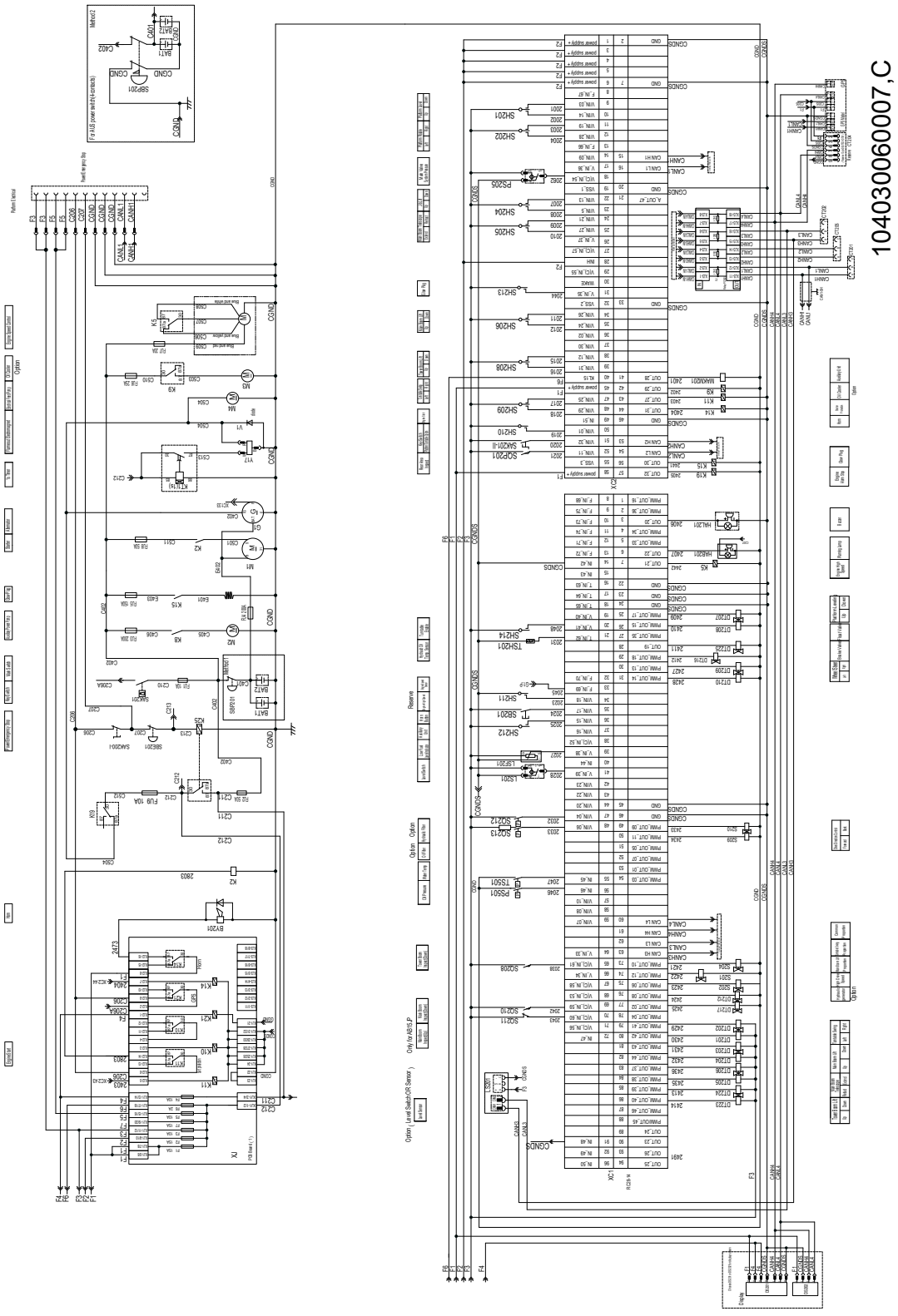


Fig. 11 Electrical Schematic Diagram – Turntable, KubotaD1105-E4B-CHN-1/18.2kW/Europe V/China IV

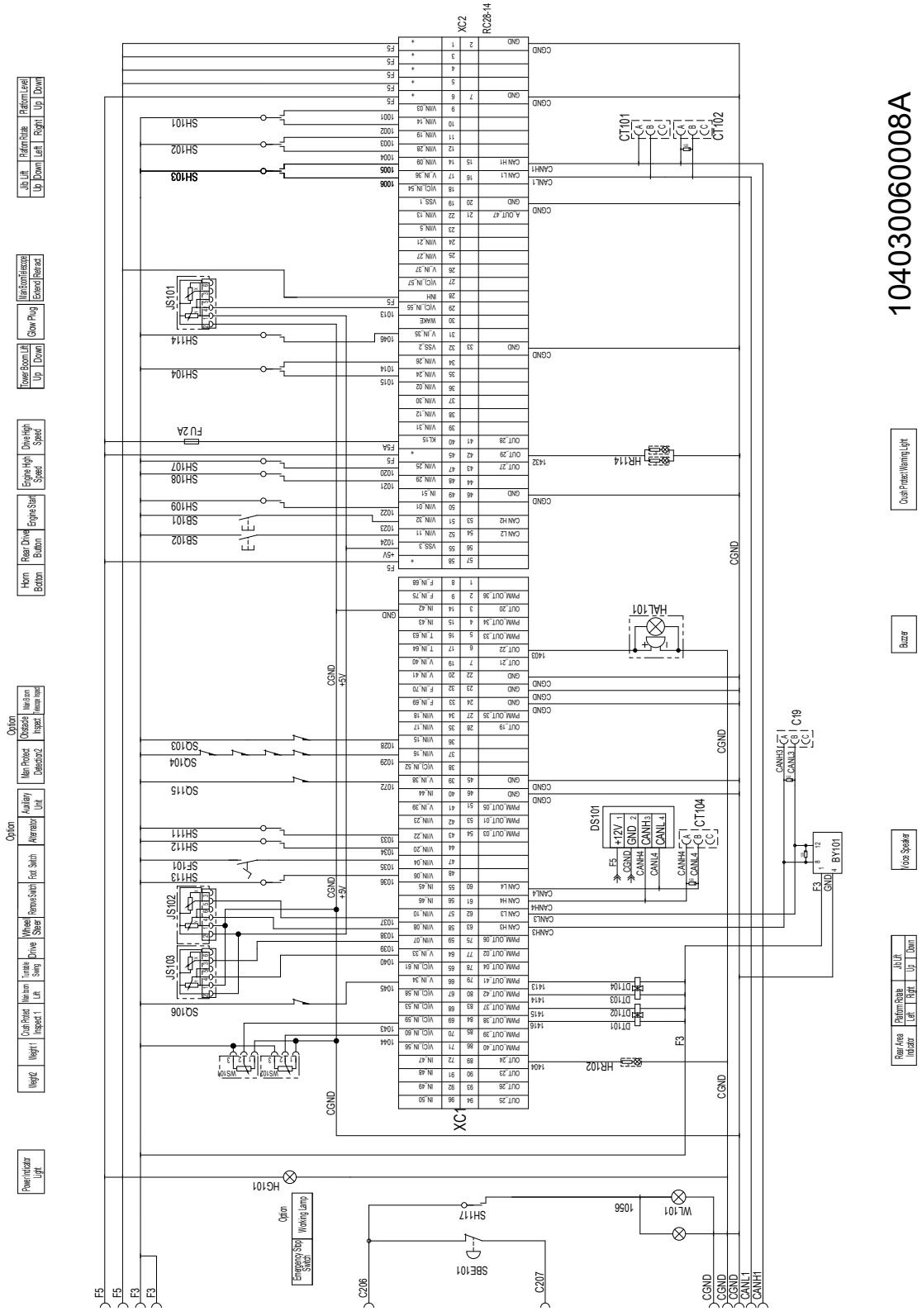


Fig. 12 Electrical Schematic Diagram – Platform

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10 TROUBLESHOOTING GUIDE

10.1 FAULTS DESCRIPTION

In case of an alarm or fault, you can check the alarm message on the ***ALARM INFO*** interface of the turntable controller.

Table 10-1 Faults Description

Fault description	Inspection method
Alarm message	
CAN Alarm	Check the CAN communication line for normal power supply and wiring.
Main Controller Alarm	Main controller fault: Check if the turntable controller works normally and if its program is correct.
Motor Controller Alarm	Electric motor controller communication fault: Check if the communication between the electric motor controller and the main controller is normal and if the electric motor controller works normally.
Chassis Controller Alarm	Chassis controller communication fault: Check if the communication between the chassis controller and the main controller is normal and if the chassis controller program is correct.
Platform Controller Alarm	Platform controller communication fault: Check if the communication between the platform controller and the main controller is normal and if the platform controller program is correct.
Engine ECU Alarm	Engine ECU communication fault: Check if the communication between the engine ECU and the main controller is normal and if the engine ECU program is correct.
TBox Alarm	TBox communication fault: Check the connection of the communication line and other wires; if the problem persists, try replacing the TBox module or the turntable controller.
Engine Water Temp. Alarm	Engine coolant temperature being too high: Check the temperature sensor and its wiring harness for proper function
Hydraulic Temp. Alarm	Hydraulic oil temperature being too high: Shut down the machine, allowing the hydraulic oil to cool down to normal temperature; check the temperature sensor and its wiring harness for proper function
Scope Alarm	Boom has exceeded the specified working envelope: Check the actual boom position and the actual value and AD value of the sensor, and check the wiring harness
Overload Alarm	Load on the platform has exceeded its rated load: Check whether the platform load exceeds the rated load, and whether the weighing sensor has been calibrated normally
Sys_Pressure Alarm	Check the system pressure sensor and its wiring harness for proper function
Air Filter Alarm	Air filter element clogged: Check if the air filter element is clogged; if so, change the air filter
Obstacle Inspect Alarm	Check the obstacle detection switch and its wiring harness for proper function

Table 10-1 Faults Description (continued)

Fault description	Inspection method
Heavy Load Warning	Load on the platform has exceeded the design load: Check the platform load and the actual value and AD value of the sensor.
Float Pressure Alarm	Check the oscillating pressure sensor and its wiring harness for proper function
Fuel Level/Battery Capacity	Check whether the fuel level is too low, whether the sensor is correctly wired, and whether the sensor works normally; Check if the battery voltage is too low, and if the battery has been damaged
Rope Broken Alarm	Check the boom wire ropes and the wiring of the proximity switch, and check the harness
Turntable Tilt Alarm	Check whether the machine tilt angle has exceeded the maximum allowable inclination (see ***Machine Specifications***), and check the wiring harness.
Engine Alarm	See ***Engine Fault Codes*** for details.
Crush Protect Alarm	The operator protective function has been triggered, you can release action restrictions and remove the alarm as follows: • Depress the foot switch while operating the release switch on the platform control box – the boom may be retracted and lowered, and the turntable may rotate slowly. • Ensure the machine is in a safe position, lift the round bar up until the angle brackets on both sides are attracted by the magnet again. Then, the strobe light will turn off, and the machine will resume all operations.
Engine Oil Pre. Alarm	Lubricating oil pressure being too low: Check the pressure sensor and its wiring harness for proper function
Platform Tilt Alarm	Check whether the platform tilt angle exceeds the limit.
Engine Fault Alarm	See ***Engine Fault Codes*** for details.
Fault message	
Action Enable Ab.	Footswitch or enable switch 7-second limit alarm: Check the foot switch or enable switch for proper function.
Platform SW Ab.	Check whether the platform switch has been pressed or pushed-down erroneously; if this does not solve the problem, please try to replace the platform controller.
Turntable SW Ab.	Check whether the turntable switch has been pressed or pushed-down erroneously; if this does not solve the problem, please try to replace the turntable controller.
Platform Potentionmeter Fa.	Check the platform potentionmeter data, and check the CAN communication between the turntable and platform
Engine Speed Fault	Check the engine speed signal or the engine for fault.
Fuel Level Fault	Check the fuel level sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the fuel level sensor.
MB Length 1 Fault	Check the length sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the main boom length sensor.
MB Length 2 Fault	Check the length sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the main boom length sensor.

Table 10-1 Faults Description (continued)

Fault description	Inspection method
MB Angle 1 Fault	Check the angle sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the main boom angle sensor.
MB Angle 2 Fault	Check the angle sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the main boom angle sensor.
TB Angle 1 Fault	Check the angle sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the articulating boom angle sensor.
TB Angle 2 Fault	Check the angle sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the articulating boom angle sensor.
Main Valve System Pre. Fa.	Check the main system pressure sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the main system pressure sensor.
MB Angle Comp. Fault	Check whether the actual value and AD value of main boom angle sensor 1 and 2 are normal, and whether the sensor wiring is proper; try to calibrate the main boom angle sensor.
MB Length Comp. Fault	Check whether the actual value and AD value of main boom length sensor 1 and 2 are normal, and whether the sensor wiring is proper; try to calibrate the main boom length sensor.
MB Telescope Joystick Fault	Check the main boom telescope joystick data, and check the CAN communication between the turntable and platform
MB Lift Joystick Fault	Check the main boom lift joystick data, and check the CAN communication between the turntable and platform
Turntable Swing Joystick Fault	Check the turntable slew joystick data, and check the CAN communication between the turntable and platform
Drive Joystick Fault	Check the travel joystick data, and check the CAN communication between the turntable and platform
Steer Joystick Fault	Check the steer joystick data, and check the CAN communication between the turntable and platform
Jib Rotate Joystick Fault	Check the jib rotate joystick data, and check the CAN communication between the turntable and platform
TB Angle Comp. Fault	Check whether the actual value and AD value of articulating boom angle sensor 1 and 2 are normal, and whether the sensor wiring is proper; try to calibrate the articulating boom angle sensor.
Axle Sensor Fault (Front-Left)	Check the front-left axle angle sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the front-left axle angle sensor.
Axle Sensor Fault (Front-Right)	Check the front-right axle angle sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the front-right axle angle sensor.
Axle Sensor Fault (Rear-Left)	Check the rear-left axle angle sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the rear-left axle angle sensor.
Axle Sensor Fault (Rear-Right)	Check the rear-right axle angle sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the rear-right axle angle sensor.

Table 10-1 Faults Description (continued)

Fault description	Inspection method
Sensor Weight 1 Fault	Check the weighing sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the weighing sensor.
Sensor Weight 2 Fault	Check the weighing sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the weighing sensor.
Sensor Level 1 Fault	Check the leveling sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the leveling sensor.
Sensor Level 2 Fault	Check the leveling sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the leveling sensor.
Jib Angle Fault	Check the angle sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the jib angle sensor.
Weight Sensor Comp. Fa.	Check whether the actual value and AD value of weighing sensor 1 and 2 are normal, and whether the sensor wiring is proper; try to calibrate the weight.
Level Sensor Comp. Fa.	Check whether the actual value and AD value of leveling sensor 1 and 2 are normal, and whether the sensor wiring is proper; try to calibrate the platform leveling relative angle sensor.
Steer Sensor Fault (Rear-Right)	Check the rear-right wheel angle sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the rear-right wheel angle sensor.
Steer Sensor Fault (Rear-Left)	Check the rear-left wheel angle sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the rear-left wheel angle sensor.
Steer Sensor Fault (Front-Right)	Check the front-right wheel angle sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the front-right wheel angle sensor.
Steer Sensor Fault (Front-Left)	Check the front-left wheel angle sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the front-left wheel angle sensor.
MB Relative Angle 1 Fault	Check the main boom relative angle sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the main boom relative angle sensor.
MB Relative Angle 2 Fault	Check the main boom relative angle sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the main boom relative angle sensor.
MB Relative Angle Comp. Fault	Check whether the actual value and AD value of main boom relative angle sensor 1 and 2 are normal, and whether the sensor wiring is proper; try to calibrate the main boom relative angle sensor.
TB Relative Angle 1 Fault	Check the articulating boom relative angle sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the articulating boom relative angle sensor.
TB Relative Angle 2 Fault	Check the articulating boom relative angle sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the articulating boom relative angle sensor.
TB Relative Angle Comp. Fault	Check whether the actual value and AD value of articulating boom relative angle sensor 1 and 2 are normal, and whether the sensor wiring is proper; try to calibrate the articulating boom relative angle sensor.

Table 10-1 Faults Description (continued)

Fault description	Inspection method
TB Telescope Pressure 1 Fault	Check the articulating boom telescope pressure sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the articulating boom telescope pressure sensor.
TB Telescope Pressure 2 Fault	Check the articulating boom telescope pressure sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the articulating boom telescope pressure sensor.
TB Lift Pressure 1 Fault	Check the articulating boom lift pressure sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the articulating boom lift pressure sensor.
TB Lift Pressure 2 Fault	Check the articulating boom lift pressure sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the articulating boom lift pressure sensor.
Connection Tilt Alarm	Check if the pivot has tilt; if so, reset the pivot.
Connection Angle Fault	Check the pivot angle sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the pivot angle sensor.
Turntable H-Sensor X Comp. Fault	Check whether the level sensor is normal, and whether the sensor wiring is proper; try to calibrate the turntable level sensor X.
Turntable H-Sensor X Fault	Check the level sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the turntable level sensor.
Turntable H-Sensor Y Fault	Check the level sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the turntable level sensor.
Turntable H-Sensor Y Comp. Fault	Check whether the level sensor is normal, and whether the sensor wiring is proper; try to calibrate the turntable level sensor Y.
TB Length 1 Fault	Check the articulating boom sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the articulating boom length sensor.
TB Length 2 Fault	Check the articulating boom sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the articulating boom length sensor.
TB Length Comp. Fault	Check whether the actual value and AD value of articulating boom length sensor 1 and 2 are normal, and whether the sensor wiring is proper; try to calibrate the articulating boom length sensor.
Electromagnetic Clutch Fault	Check the electromagnetic clutch for proper operation, and check if the wiring harness is disconnected.
Lift Motor Controller Fault	See ***Motor Controller Fault Codes*** for details.
Drive Motor Controller Fault	See ***Motor Controller Fault Codes*** for details.
BMS Fault	See ***Lithium Battery BMS Fault Codes*** for details.
Motor Driver Fault	See ***Motor Driver Fault Codes*** for details.

Table 10-1 Faults Description (continued)

Fault description	Inspection method
Cover not closed	The turntable cover is not closed properly, automatically disconnecting the high-voltage power supply. Re-close the turntable cover to engage the travel switch, then the lithium battery can be powered on normally.
Charging Pack Level 1 Fault	Contact Sinoboom after-sales personnel to check the specific backend data and find out the fault cause.
Battery pack maintenance switch disconnected	The maintenance switch at the bottom of the main lithium battery box has been disconnected. It is recommended to verify whether the machine meets the conditions for the installation of the maintenance switch.
Charging Pack Level 2 Fault	Contact Sinoboom after-sales personnel to check the specific backend data and find out the fault cause.
Low battery level	Check the battery voltage, and check whether the battery has been damaged
INSUFFICIENT FUEL	Check whether the fuel level is too low and if the sensor is correctly wired, and check the sensor for proper function
MB Angle Limit	Main boom lifting angle exceeded the specified angle: Check the actual lift angle of main boom and the actual value and AD value of the sensor, and check the wiring harness
Jib luffing relative angle fault	Check the jib luffing relative angle sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the jib luffing relative angle sensor.
Jib rotation relative angle fault	Check the jib rotating relative angle sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the jib rotating relative angle sensor.
Jib leveling relative angle fault	Check the jib leveling relative angle sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the jib leveling relative angle sensor.
Platform level relative angle fault	Check the platform level relative angle sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the platform level relative angle sensor.
MB luffing pressure 1 fault	Check the main boom lift pressure sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the main boom lift pressure sensor.
MB luffing pressure 2 fault	Check the main boom lift pressure sensor and sensor wiring for proper function; if this does not solve the problem, please try replacing the main boom lift pressure sensor.
Swing Limit Alarm	Turntable slewing angle exceeded the specified angle: Check the actual slewing angle of turntable and the actual value and AD value of the sensor, and check the wiring harness

10.2 ENGINE FAULT CODES

For the description of fault codes, please refer to the engine maintenance manual provided with the machine.

10.3 BASIC TROUBLESHOOTING

For any special malfunction not mentioned in this manual, it must be repaired by a professional. Please contact our after-sales personnel for assistance in resolving the issue.

Table 10-2 Electrical System Troubleshooting

Fault	Cause	Solution
Platform power indicator not ON	Machine is not powered on.	Check whether the power-off switch has been turned on Check whether the key switch is in the middle position or in the “OFF” position Check whether the emergency stop button on the platform controller or turntable controller is pressed down Check whether the platform controller has any abnormalities or if the system was not powered off and then restarted after downloading the program Check whether the turntable controller has any abnormalities, or if the system was not powered off and then restarted after downloading the program
	Electrical failure	Check whether the leads for power supply and communication are inserted incorrectly or securely Inspect whether each pin wiring of the Deutsch connector on the cables between the platform and turntable matches the drawings Check whether the platform controller plug or the plug of the connecting cable between the platform controller and the turntable controller are in good contact Check whether the platform controller is malfunctioning Check whether the Deutsch plug of the turntable controller is firmly and correctly connected Check if the starting battery is over-discharged or damaged Check if the fuse is burned out
Tilt alarm sounds even with the machine in level position	The level switch is not connected or is defective The machine tilt angle exceeds the maximum allowable inclination	Inspect whether the level switch is inserted properly and firmly Check the level switch for malfunctions Check if the machine is parked on a level surface
Platform fails to be leveled	Electrical failure	Check whether the circuit and the control program have any abnormalities
Platform leveling function not responding	Electrical failure	Check whether the wiring and the control program have any abnormalities
Boom movement switches on platform controller not responding	The switch is not in the correct position	Check whether the key switch is in the middle position or in the “OFF” position Inspect whether the ground/platform control selector switch at the turntable is in Ground control position Inspect whether the emergency stop button at the turntable or platform is pressed down
	Boom function switch not enabled in 7s after the foot switch depressed	Depress the foot switch again
	Electrical failure	Check whether the circuit and the control program have any abnormalities

Table 10-2 Electrical System Troubleshooting (continued)

Fault	Cause	Solution
	Boom function switch failure	Repair or replace the control switch and perform a system test
Boom movement switches on turntable controller not responding	The switch is not in the correct position	Check whether the key switch is in the middle position or in the “OFF” position Inspect whether the ground/platform control selector switch at the turntable is in platform control position Inspect whether the emergency stop button at the turntable or platform is pressed down
	Electrical failure	Check whether the circuit and the control program have any abnormalities
	Boom function switch failure	Repair or replace the control switch and perform a system test
Turntable fails to rotate into a certain direction	Rotation control handle malfunctioning	Clean, repair or replace the rotation control handle
	Foreign matters squeezed between the slewing reducer pinion and slewing bearing gear (only for non-integrated slewing bearing)	Clean foreign matters and check the gear for wear
	Electrical failure	Check whether the circuit and the control program have any abnormalities
Turntable rotating abnormally to the left/ right	Insufficiently lubricated slewing bearing or slewing reducer	Lubricate as needed
	Slewing bearing or slewing reducer excessively worn	Replace the slewing bearing
	Electrical failure	Check whether the circuit and the control program have any abnormalities
Machine fails to steer	The switch is not in the correct position	Check whether the key switch is in the middle position or in the “OFF” position Inspect whether the ground/platform control selector switch at the turntable is in Ground control position Inspect whether the emergency stop button at the turntable or platform is pressed down
	Steer control handle malfunctioning	Clean, repair or replace the steer control handle
	Electrical failure	Check whether the circuit and the control program have any abnormalities
Travel control not responding	The switch is not in the correct position	Check whether the key switch is in the middle position or in the “OFF” position Inspect whether the ground/platform control selector switch at the turntable is in Ground control position Inspect whether the emergency stop button at the turntable or platform is pressed down
	Electrical failure	Check the wiring and the control program Inspect whether the display screen has electrical output
	Equipment offline	Inspect whether the Deutsch plug of the platform or turntable controller is wired firmly and/or correctly.

Table 10-2 Electrical System Troubleshooting (continued)

Fault	Cause	Solution
	Movement disabled	Check whether the machine is overloaded or tilted leading to travel function disabled Inspect whether the brake has not been released
Forward traveling function fails without warning	Forward traveling function is malfunctioning	Check whether the PWM plug of the turntable controller is inserted correctly and securely Check whether the forward valve has correct wiring and normal function Check the turntable controller for malfunctions
Reverse travel function fails without warning	Reverse traveling function is malfunctioning	Check whether the PWM plug of the turntable controller is inserted correctly and securely Check whether the forward valve has correct wiring and normal function Inspect the turntable controller for malfunctions
Tilt warning	Level switch not functioning properly	Inspect whether the air bubble of level switch is not centered Inspect whether the level switch is not connected properly or firmly Inspect the turntable controller for malfunctions
No overload warning	Weight sensor not calibrated for rated load or calibrated with wrong lift height	Check whether the sensor is not calibrated Check whether the wiring of the weighing sensor is incorrect Check whether the sensor has any abnormalities
Machine travels and then stops intermittently after wheels assembled	Battery level low/incorrect calibration	Re-calibrate steering angle sensor Check if the battery level is too low (not as indicated by the battery gauge)
Parameters after setting could not be saved successfully after several attempts.	Saving error	Check whether the set parameters are within the threshold values Inspect the turntable controller for malfunctions Software error, program needs to be upgraded

Table 10-3 Hydraulic System Troubleshooting

Fault	Cause	Solution
Boom and steer movements at platform controller not responding	Oil tank ball valve is closed, and hydraulic oil is insufficient	Inspect whether the ball valve is open, fill with hydraulic oil
	The standby pressure of the variable pump is not 20 bar	Check the system main pressure value on the display screen; inspect if movements can be operated using emergency power, if so, inspect LS feedback pressure of check valve at main valve P-port; inspect variable pump or engine coupling
Platform fails to be leveled during operation	Air is entrained in the pipes of leveling system	Perform manual leveling to bleed air in the system
	Upward and downward leveling cylinders have internal leaks	Inspect and repair the leaking cylinder
	The upward leveling counterbalance valve of main valve has leaks	Replace the counterbalance valve
Oil cylinder lowers automatically	Excessive leakage in counterbalance valve	Replace the counterbalance valve

Table 10-3 Hydraulic System Troubleshooting (continued)

Fault	Cause	Solution
	Excessive internal leakage in cylinder	Inspect and repair the leaking cylinder
Machine fails to travel normally	Closed variable pump with no variable displacement	Inspect and repair the variable pump and motor
	Closed variable pump and coupling worn out	Inspect and repair the variable pump and coupling
	Travel valve fault	Inspect and repair the travel valve
	Brake and two-speed valve fault	Inspect and repair the brake and two-speed valve
	Speed reducer brake fault	Inspect and repair the speed reducer brake
	Excessive leakage in hydraulic motor	Inspect and repair the hydraulic motor
Machine travels normally but has trouble with climbing a slope	Two-speed valve element has seizure abnormally	Inspect if the pressure of traveling at high and low speeds on level ground is abnormal Inspect if the brake and two-speed valve element has seizure
	High-speed control pipe has abnormal pressure relief	Inspect if the damper of the brake and two-speed valve element has clogging
Long braking distance during traveling	Travel joystick has an abnormal neutral position value	Re-calibrate the joystick
	Inappropriate current parameters	Adjust the travel stopping proportion and minimum current value
Machine travels at low speed on level ground automatically after starting engine (if equipped with engine)	Variable pump with incorrect zero position	Measure the standby pressure of variable pump, inspect and repair the variable pump
	Inappropriate current parameter	Inspect the minimum travel current
Display screen shows main system over-pressure and engine can't start normally while starting the engine (if equipped with engine)	Abnormal LS feedback	Inspect or replace the proportional valve of main valve
Boom fails to retract	Proportional valve is not open	Inspect the proportional valve
	Switching valve is not open	Inspect the switching valve
Boom retracting with no buffering	Inappropriate current parameters	Adjust the retract limit speed proportion or retracting minimum current
	Abnormal length sensor	Re-calibrate the length sensor
System remains in high pressure after boom movements stop	The solenoid valve signal of related movements is not cut off in time	Inspect the power-off condition of the solenoid valve
	Proportional valve element has seizure	Replace or clean the proportional valve

Table 10-3 Hydraulic System Troubleshooting (continued)

Fault	Cause	Solution
	LS relief valve of main valve is clogged	Replace or clean the LS relief valve of main valve
	The LS valve of variable pump has seizure and fails to reset	Replace LS valve of variable pump
	The swash plate of variable pump has seizure	Repair or replace the variable pump

Table 10-4 Engine Troubleshooting

Fault	Cause	Solution
Engine fails to start	Starter motor fault	Inspect the starter motor Inspect the fuse of starter motor
	Engine harness protection diode breakdown	Inspect the protection diode on the harness (next to the electronic fuel feed pump) Replace the protection diode
	Abnormal engine oil, coolant	Check the engine oil level Check the coolant level and coolant temperature switch
	Starting battery damaged or low battery level or insufficient cold starting current	Inspect the battery voltage Replace the starting battery
	Electrical harness with poor contact or abnormal wiring	Inspect the harness connector Inspect the wiring circuit Re-plug the harness connector

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11 FUNCTIONS AND CONTROLS

11.1 MACHINE POSITIONS

The machine positions/states covered in this manual are stowed position, transport position, operating position, and non-operating position. Each position is described in detail below:

- **Stowed position:** The articulating boom is fully lowered, and the main boom is fully retracted and lowered.
- **Transport position:** The articulating boom is fully lowered, and the main boom is fully retracted and lowered. The jib and the platform are positioned as appropriate for transportation by trailer or other means.
- **Operating position (elevated):** The down travel switch of the main boom or the articulating boom is not engaged, or the retraction limit switch of the main boom is not engaged.
- **Non-operating position:** The down travel switch of the main boom and the articulating boom is engaged, and the retraction limit switch of the main boom is engaged.

11.2 DRIVE FUNCTION

Driving at a speed that is appropriate for the given circumstances is essential for ensuring machine safety. The drive function should respond quickly and smoothly to the operator's control inputs. Travel operation should be normal, without vibration, impact, and abnormal noise across the full controllable speed range. To ensure proper functioning of the drive system and to check its condition, it is recommended to check the drive functions every 3 months or every 250 hours of operation.

Select a flat, level, unobstructed and solid surface to perform the following tests with the stowed platform carrying one person:

1. Mark two straight lines on the ground at a distance of 30 m (98.4 ft) from each other as the test start and stop lines.
2. Start the machine.
3. Stamp "foot switch".
4. Slowly push the travel/steer joystick forward to the full drive position.
5. Move the high/low engine speed selector switch at the platform control box to switch the engine speed to high speed.
6. Push the high/low travel speed selector switch at the platform controller to the upper position to switch the travel speed to high speed.
7. When the front wheels touch the test start line, press a timer to start timing.
8. Keep the machine running at high speed. Stop the timer when the front wheel touches the test stop line.
9. Calculate the travel speed using the measured data, and compare it with the specified maximum travel speed in stowed position.

NOTICE

If the result exceeds the maximum stowed travel speed by 10 % or more, turn off and tag the machine, and contact a qualified service technician for inspection and repair.

11.3 BRAKING FUNCTION

Proper functioning of the brakes is essential for the safe operation of the machine. The brakes should respond to the operator's control inputs quickly and smoothly without any abnormal noise. To ensure proper brake functioning and to check their condition, it is recommended to check the brakes every 3 months or every 250 hours of operation.

Ensuring the machine's braking distance is within the normal range is an important indicator of the braking function being normal. Select a flat, level, unobstructed and solid surface to perform the following tests with the stowed platform carrying one person:

1. Check and make sure that brakes have not been released.
2. Mark a test line on the ground as a reference.
3. Start the machine.
4. Depress the foot switch.
5. Slowly push the travel/steer joystick forward to the full drive position.
6. Move the high/low engine speed selector switch at the platform control box to switch the engine speed to high speed.
7. Push the high/low travel speed selector switch at the platform controller to the upper position to switch the travel speed to high speed.

8. When the front wheel contacts with the test start line, ensure the machine is traveling at high speed and release the travel/steer joystick quickly.
9. Measure the horizontal distance between the test line and the contact point between the front wheel and the ground, which is the braking distance.
10. Compare the measured distance with specified braking distance at full travel speed.

NOTICE

If the measured distance exceeds the specified maximum braking distance, immediately lower the platform to the stowed position, turn off and mark the machine, and contact a qualified service technician for inspection and repair.

11.4 TILT PROTECTION FUNCTION

The proper functioning of the tilt sensing system is essential for the safe operation of the machine. It is recommended to check the tilt sensing system every 3 months or after 250 hours of operation.

Select a flat, level, unobstructed and solid surface to perform the following tests:

In the non-operating position:

1. Start the machine.
2. Push the level switch in the X (left-right)/Y (front-rear) direction by more than 5°. At this point, the tilt alarm should be triggered, the chassis tilt indicator light should flash, all functions should remain unrestricted.
3. Drive the machine so that the two left (or right) wheels are positioned on a slope with an angle greater than 5°. At this point, the tilt alarm should be triggered, the chassis tilt indicator light should flash, all functions should remain unrestricted.
4. Drive the machine off the slope.
5. Drive the machine so that the two front (or rear) wheels are positioned on a slope with an angle greater than 5°. At this point, the tilt alarm should be triggered, the chassis tilt indicator light should flash, all functions should remain unrestricted 。
6. Drive the machine off the slope.

In the operating position:

1. Start the machine.
2. Push the level switch in the X (left-right)/Y (front-rear) direction by more than 5°. At this point, the tilt alarm should be triggered, the chassis tilt indicator light should flash, and certain functions should be restricted. The main boom may be retracted, the articulating boom may be lowered, the turntable may be rotated slowly, and the main boom may be lowered after it has been retracted fully.
3. Drive the machine so that the two left (or right) wheels are positioned on a slope with an angle greater than 5°. At this point, the tilt alarm should be triggered, the chassis tilt indicator light should flash, certain functions should remain unrestricted. The main boom may be retracted, the articulating boom may be lowered, the turntable may be rotated slowly, and the main boom may be lowered after it has been retracted fully.
4. Adjust the boom to the non-operating position, drive the machine off the slope.
5. Drive the machine so that the two front (or rear) wheels are positioned on a slope with an angle greater than 5°. At this point, the tilt alarm should be triggered, the chassis tilt indicator light should flash, certain functions should remain unrestricted. The main boom may be retracted, the articulating boom may be lowered, the turntable may be rotated slowly, and the main boom may be lowered after it has been retracted fully.
6. Adjust the boom to the non-operating position, drive the machine off the slope.

NOTICE

If during the test it is found that the machine's movements are not restricted as expected, lower the platform to the stowed position, shut down the machine, tag it accordingly, and contact qualified maintenance technicians for inspection and repair.

11.5 WORKING ENVELOPE LIMIT AND OVERLOAD LIMIT FUNCTIONS

The machine’s system can detect the position of the boom by means of the travel switch. When the boom reaches the maximum position, the machine movement will be limited.

The system measures the platform load weight by means of the load sensor on the platform. When the platform is overloaded, the machine movement will be limited.

The working envelope limiting function and overload limiting function are essential for the safe operation of the machine. Their failure may affect the stability of the machine. It is required to check the maximum working envelope limit function and overload limit function every 3 months or after 250 hours of operation.

NOTICE

If the machine fails any of the following tests, immediately lower the platform to the stowed position, and turn off the machine. Contact a qualified service technician for inspection and repair.

Select flat, level, unobstructed and solid ground to perform the following procedures with the machine unloaded:

1. Start the machine.
2. Fully raise and lower the boom, retract and extend it twice to make sure that the machine operates free from obvious vibrations and other abnormalities, and is properly lubricated.

Horizontal Reach Restriction Function

From the ground control position:

1. Make sure to fully lower the tower boom and retract the main boom.
2. Adjust the main boom and jib (if equipped) to be level, and extend the main boom until it stops extending. At this time, the buzzer on the ground and platform controllers should sound.
3. Measure the distance from the center of the slewing bearing to the outermost edge of the platform: the tolerance of the measured value should not exceed the maximum horizontal reach ±200 mm (7.87 in).
4. Try to operate the main boom extend and lift/lower functions, which should be inoperative.
5. Try to operate the main boom retract and turntable slew functions, which should be operative normally.

Overload limit function

From the ground control position:

Apply loads higher than the rated load at the center of platform, the buzzer on the turntable and platform controllers should sound, and the overload alarm indication icon will illuminate on the display.

- In KG mode (with the icon KG displayed in the upper right corner of the turntable display):
  1. Try to operate the machine from the ground control position or platform control position, all functions will be inoperative except auxiliary power.
  2. After removing the loads from the platform, all functions will be operative.
- In non-KG mode (without the icon KG displayed in the upper right corner of the turntable display):
  1. While operating from the ground control position or platform control position, the main boom can be retracted, the tower boom is allowed to lower, the jib (if equipped) can lift and lower, the platform can be leveled manually within ±10°, the turntable can slew slowly, and the main boom can be lowered after fully retracted, but other functions will be inoperative.
  2. After removing the loads from the platform, all functions will be operative.

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12 CONTROL SYSTEM

DANGER

All operations in this section must be performed by authorized and qualified personnel who have undergone professional training by Sinoboom. Not meeting this requirement may lead to personal injury or death. Our company will not be liable for any adverse consequences arising from the failure to operate and use the machine in accordance with this manual.

WARNING

Unsafe Operation Hazard

- **The machine has been programmed before delivery. It's forbidden to modify the system settings and/or update the software without authorization from Sinoboom.**

  Due to different machine configurations, certain descriptions below may not apply to your machine. If questions arise during operation of the machine in accordance with the manual please hold the operation and contact Sinoboom after sales personnel in time.

- **Not operating the machine properly may result in death, serious injury or machine damage.**

NOTICE

Controllers, sensors, etc. are precisely adjusted and have received protective treatment before delivery. Therefore, persons who have not been professionally trained and authorized by Sinoboom may not disassemble the respective housings, otherwise moisture and dust ingress may affect proper functioning of these devices.

12.1 DISPLAY INTERFACE NAVIGATION

The system interface is as shown in the figure below:

Note: some interfaces can only be accessed with a password (the password can only be provided to personnel professionally trained and authorized by Sinoboom).

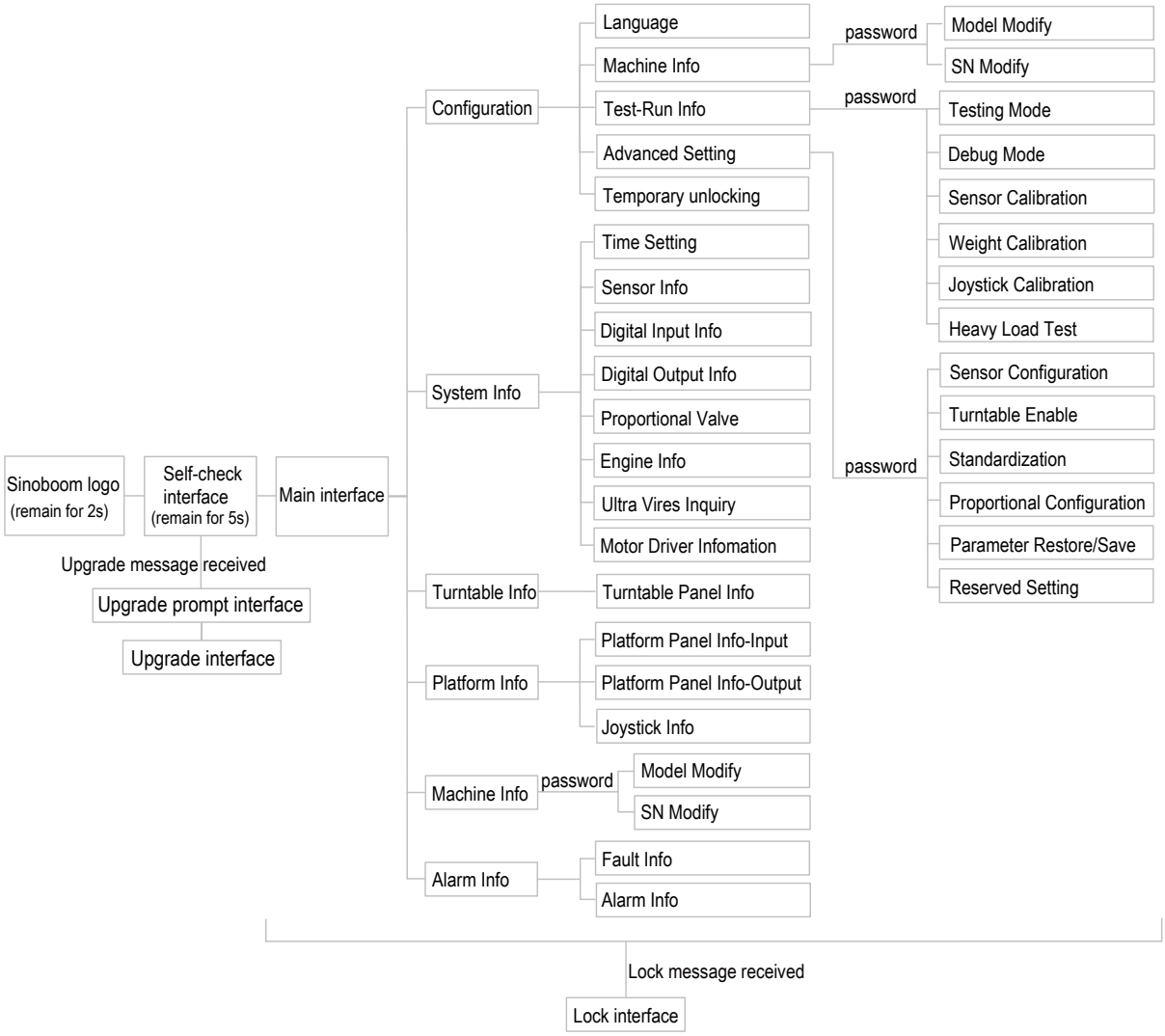

Fig. 1 Display interface navigation diagram

- “Engine Info” interface is only applicable to models equipped with engine meeting.
- “Motor Driver Information” interface is only applicable to HD models.

12.2 MAIN INTERFACE AFTER BOOTING

1. Turn the ground/platform selector switch at the turntable controller to the ground control position, pull out the emergency stop button to the ON position, and turn the key switch to the ON position, and the system will be powered on.
2. The display screen will show Sinoboom logo for 2s.

Fig. 2 Startup logo

3. The display screen will show self checking for 5s.

Fig. 3 Self Checking

4. After the self-checking is completed without errors, the display screen will show the main interface.

Fig. 4 Main Interface

12.3 CONFIGURATION

On the main interface, press  to enter CONFIGURATION interface.

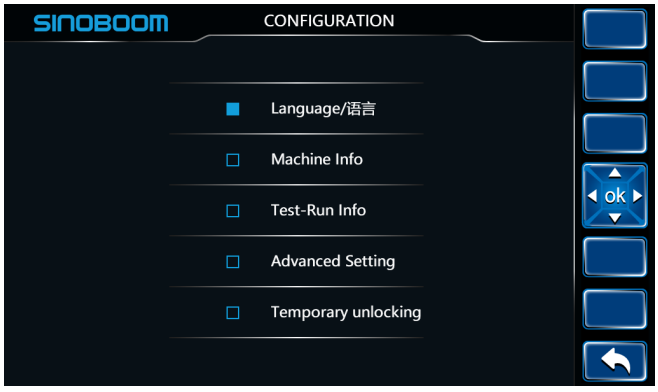

Fig. 5 Configuration

- Press  to enter the desired configuration page.
- Press  to return to the main interface.

LANGUAGE

On the CONFIGURATION interface, select “语言/Language”, and press OK button of  to enter “LANGUAGE” interface.

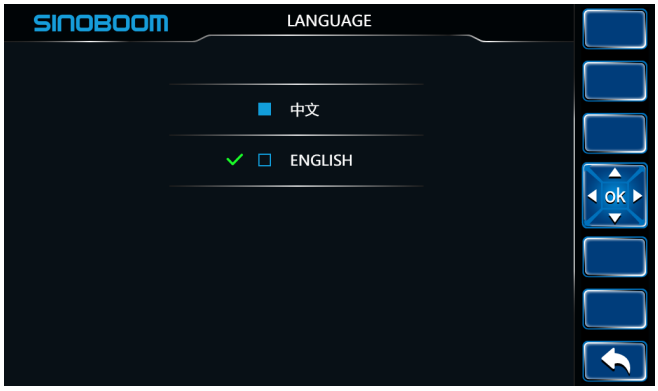

Fig. 6 LANGUAGE

- Press  to select your desired language, and press OK button for confirmation.
- Press  to return to CONFIGURATION interface.

Machine Information

On the “CONFIGURATION” interface, press  to select “Machine Info”, press OK button to enter the MACHINE INFO (1/2) interface.

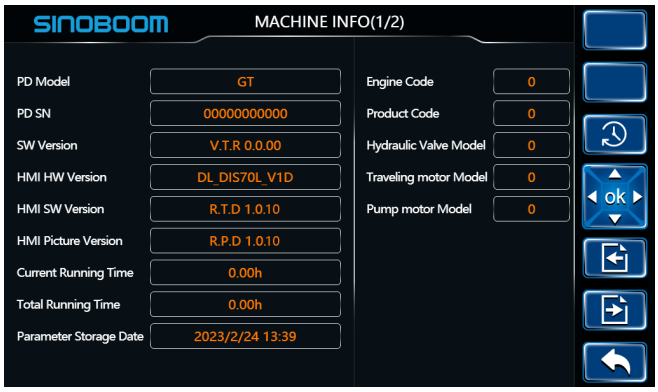

Fig. 7 MACHINE INFO (1/2)

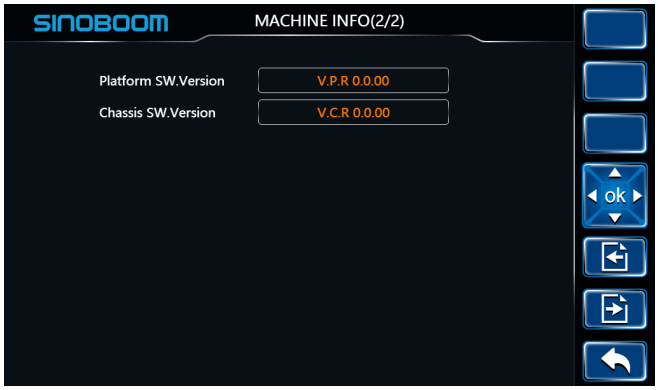

Fig. 8 MACHINE INFO (2/2)

- If you need to modify the product model, press to enter the corresponding interface.
- If you need to modify the product SN, press to enter the corresponding interface.
- Press or to change the interface.
- Press to return to CONFIGURATION interface.

Modify product model

1. Press to enter “MODEL MODIFY (1/2)” interface (password required).

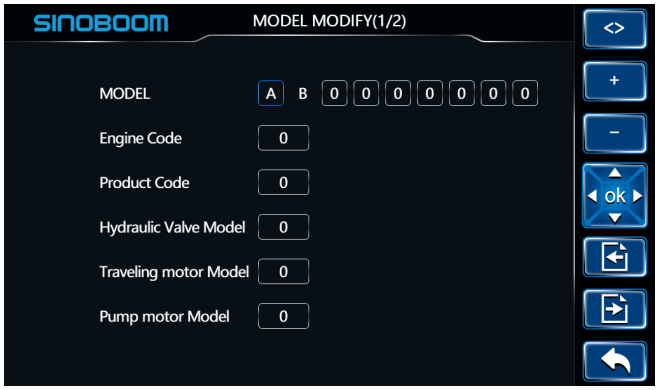

Fig. 9 MODEL MODIFY (1/2)

- Press or , , , , or other buttons to set the correct product model, press and hold OK button for 3s until the right top corner shows , indicating successful setting.
- Press or to switch to the “SN MODIFY (2/2)” interface.
- Press to return to CONFIGURATION interface.

Modify product SN

1. Press to enter “SN MODIFY (2/2)” interface (password required).

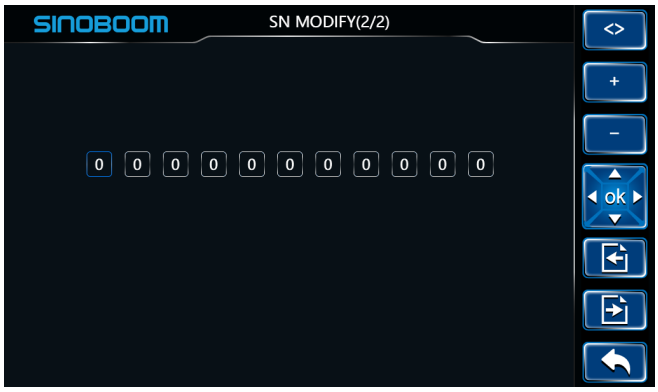

Fig. 10 SN MODIFY (2/2)

- Press or , , , , or other buttons to set the correct product SN, press and hold OK button for 3s until the right top corner shows , indicating successful setting.
- Press or to switch to the “MODEL MODIFY (1/2)” interface.
- Press to return to CONFIGURATION interface.

Test-run Information

DANGER

Test-run Information (including testing mode, debug mode, sensor calibration, weight calibration, joystick calibration and heavy load test) can only by modified by authorized and qualified personnel who have undergone professional training by Sinoboom. Not meeting this requirement may lead to personal injury or death. Our company will not be liable for any adverse consequences arising from the failure to operate and use the machine in accordance with this manual.

1. On the “CONFIGURATION” interface, press to select “Test-Run Info”, press OK button to enter the “TEST-RUN INFO” interface (password required).

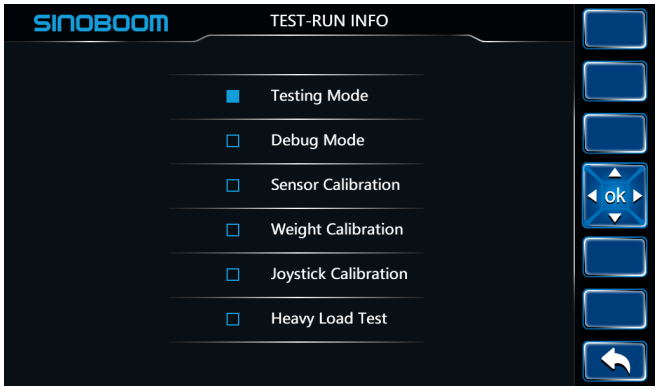

Fig. 11 TEST-RUN INFO

- Press ok to enter the desired test-run information page.
- Press to return to CONFIGURATION interface.

Testing Mode

DANGER

Testing mode can only be activated by authorized and qualified personnel who have undergone professional training by Sinoboom. Not meeting this requirement may lead to personal injury or death. Our company will not be liable for any adverse consequences arising from the failure to operate and use the machine in accordance with this manual.

Note:

- In testing mode, operations can only be performed at the turntable controller, and the travel alarm light will sound as a reminder. No movements will be restricted, so cautious operation is required.
- In testing mode, the "emergency power switch" or "enable switch" on the turntable controller must be turned on.
- To exit test mode:
  1. Turn the ground/platform control selector switch to the platform control position.
  2. Exit the “Test Mode” interface.
  3. Press the emergency stop button on the turntable control position and platform control position to “OFF” position.
  4. Turn the key switch to the OFF position and remove the key.
  5. Turn the power-off switch to the OFF position.

On the TEST-RUN INFO Interface, press ok to select Testing Mode, and press OK button to enter the testing mode. At this point, a safety warning will pop up.

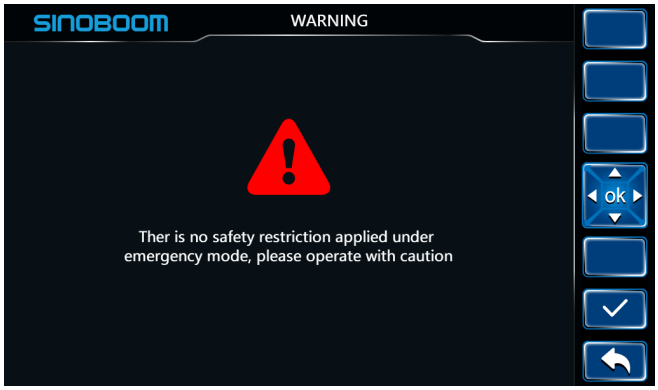

Fig. 12

- Press to enter the testing mode.
- Press to return to the “TEST-RUN INFO” Interface.

Debug Mode

DANGER

Debug mode can only be activated by authorized and qualified personnel who have undergone professional training by Sinoboom. Not meeting this requirement may lead to personal injury or death. Our company will not be liable for any adverse consequences arising from the failure to operate and use the machine in accordance with this manual.

Note:

- In debug mode, operations can only be performed at the turntable controller. No movements will be restricted, so cautious operation is required.
- In debug mode, the "emergency power switch" or "enable switch" on the turntable controller must be turned on.
- The debug mode is mainly used for checking the circuits and pipelines of each movement for any errors before the machines go off-line, and also used to find the minimum current of the proportional valve for the corresponding action during the debugging process. Besides, it can be used for emergency operations in emergency situations.
- When the control method for the selected action is "proportional valve + switching valve", it is necessary to first open the switching valve of the corresponding action (i.e., the output test item), then open the proportional valve of the corresponding action (i.e., the proportional valve test item), and set an appropriate

current proportional value, before the corresponding action can be performed.

- When testing the travel action, it is necessary to select and open the “Drive Brake Valve" test item first; otherwise, there will be no travel action or the travel may have a strong impact.
- To exit jog mode:
  1. Reset all test items to the non-output state.
  2. Turn the ground/platform control selector switch to the platform control position.
  3. Exit “jog mode” interface.
  4. Press the emergency stop button on the turntable control position and platform control position to “OFF” position.
  5. Turn the key switch to the OFF position and remove the key.
  6. Turn the power-off switch to the OFF position.

1. On the TEST-RUN INFO Interface, press ok to select Debug Mode, and press OK button to enter “OUTPUT TEST (1/3)” interface.

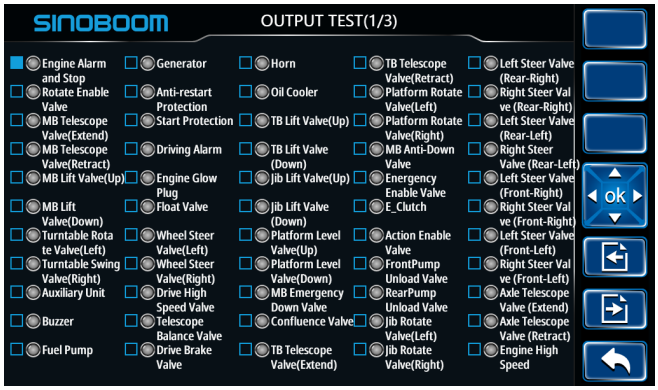

Fig. 13 OUTPUT TEST (1/3)

- Press ok to select the test item, and press OK button to make ○ changing to ●, to confirm the output, press OK button again to make ● changing to ○, resetting to non-output status.
- Press ◀ or ▶ to change the interface.
- Press ↩ to return to the “TEST-RUN INFO” Interface.

2. Switch to “PLATFORM OUTPUT TEST (2/3)” interface.

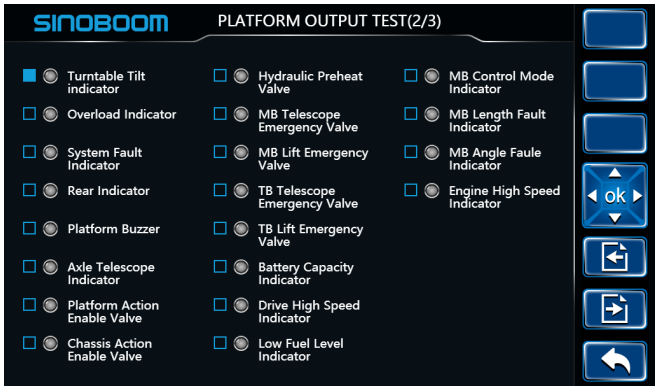

Fig. 14 PLATFORM OUTPUT TEST (2/3)

- Press ok to select the test item, and press OK button to make ○ changing to ●, to confirm the output, press OK button again to make ● changing to ○, resetting to non-output status.
- Press ◀ or ▶ to change the interface.
- Press ↩ to return to the “TEST-RUN INFO” Interface.

3. Switch to “PROPORTIONAL VALVE (3/3)” interface.

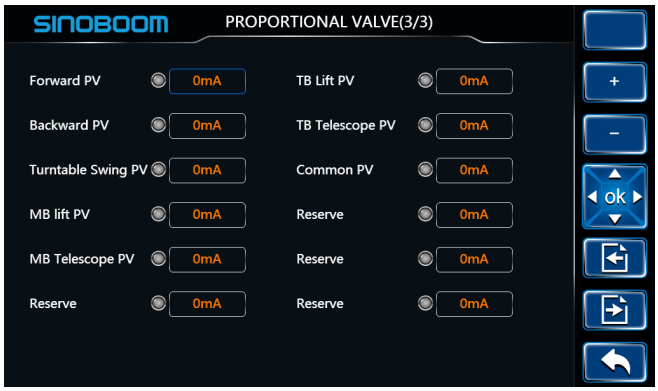

Fig. 15 PROPORTIONAL VALVE (3/3)

- Press ok to select the test item, and press +, − to set the current proportion, press OK button to make ○ changing to ●, to confirm the output, press OK button again to make ● changing to ○, resetting to non-output status.
- Press ◀ or ▶ to change the interface.
- Press ↩ to return to the “TEST-RUN INFO” Interface.

Sensor Calibration

- This operation is to calibrate sensors other than the weighing sensor (its calibration method will be described in detail in the ***Weight Calibration***).
- If the machine is equipped with a dual-channel sensor, it is sufficient to select only one channel for calibrating the maximum and minimum values and the calibration of both channels can be completed at the same time.

On the TEST-RUN INFO Interface, press ok to select “Sensor Calibration”, and press OK button to enter “SENSOR CALIBRATION (1/4)” interface.

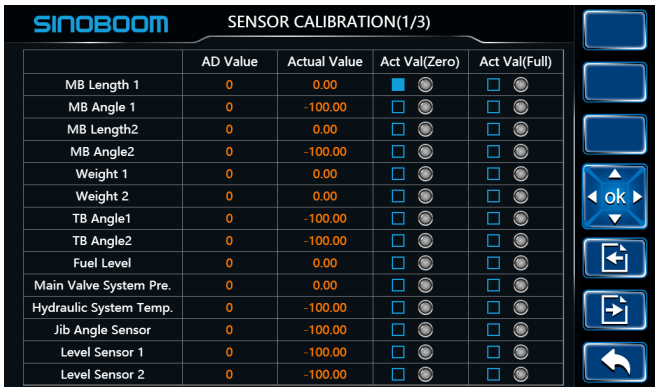

Fig. 16 SENSOR CALIBRATION (1/4)

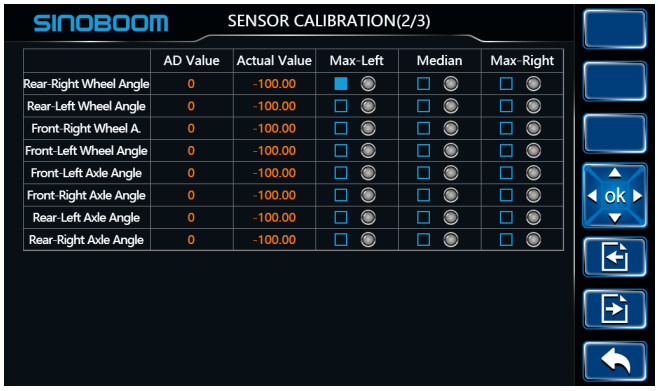

Fig. 17 SENSOR CALIBRATION (2/4)

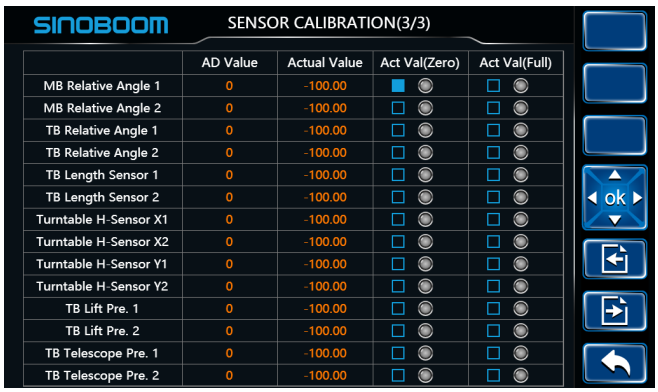

Fig. 18 SENSOR CALIBRATION (3/4)

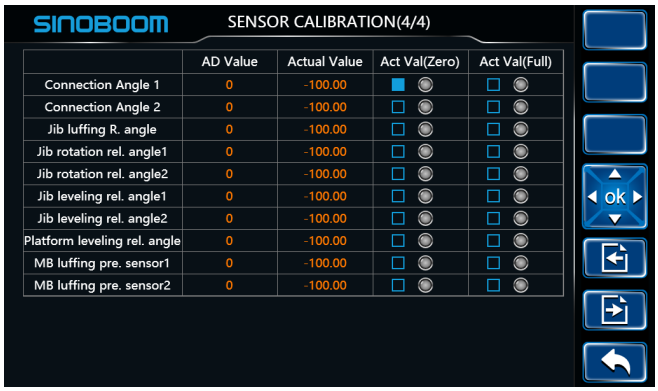

Fig. 19 SENSOR CALIBRATION (4/4)

- Press ok to select the item to be calibrated, press and hold OK button for 3s to make ● changing to ●, indicating successful calibration, the corresponding actual value will be changed.
- Press ◀ or ▶ to change the interface.
- Press ↩ to return to the “TEST-RUN INFO” Interface.

Length sensor calibration - TB

1. Ensure that there are no obstacles or unrelated personnel around and above the machine, and confirm that there is sufficient space for the boom to operate.
2. Start the machine.
3. If the machine is equipped with extending axles, fully extend the extending axles and confirm that the extending axle extend icon is illuminated on the display screen.
4. Enter the "SENSOR CALIBRATION" interface on the turntable display screen.
5. Make sure the machine is in stowed position.
6. Press ok to select “Act Val (Zero)” of “MB Length 1”, press and hold OK button for 3s until ● changing to ●, indicating successful calibration. Calibrate the “Act Val (Zero)” of “MB Length 2” using the same method.
7. Lift the main boom in place, and extend the main boom in place.
8. Press ok to select “Act Val (Full)” of “MB Length 1”, press and hold OK button for 3s until ● changing to ●, indicating successful calibration. Calibrate the “Act Val (Full)” of “MB Length 2” using the same method.

Length sensor calibration - MB

1. Ensure that there are no obstacles or unrelated personnel around and above the machine, and confirm that there is sufficient space for the boom to operate.
2. Start the machine.
3. If the machine is equipped with extending axles, fully extend the extending axles and confirm that the extending axle extend icon is illuminated on the display screen.
4. Enter the "SENSOR CALIBRATION" interface on the turntable display screen.
5. Make sure the machine is in stowed position.
6. Press ok to select “Act Val (Zero)” of “MB Length 1”, press and hold OK button for 3s until ● changing to ●, indicating successful calibration. Calibrate the “Act Val (Zero)” of “MB Length 2” using the same method.
7. Press ok to select “Act Val (Zero)” of “TB Length 1”, press and hold OK button for 3s until ● changing to ●, indicating successful calibration. Calibrate the “Act Val (Zero)” of “TB Length 2” using the same method.
8. Lift the articulating boom in place, and extend the articulating boom in place; lift the main boom in place, and extend the main boom in place.
9. Press ok to select “Act Val (Full)” of “MB Length 1”, press and hold OK button for 3s until ● changing to ●, indicating successful calibration. Calibrate the “Act Val (Full)” of “MB Length 2” using the same method.
10. Press ok to select “Act Val (Full)” of “TB Length 1”, press and hold OK button for 3s until ● changing to ●, indicating successful calibration. Calibrate the “Act Val (Full)” of “TB Length 2” using the same method.

Weight Calibration

On the TEST-RUN INFO Interface, press ok to select “Weight Calibration”, and press OK button to enter “WEIGHT CALIBRATION” interface.

Fig. 20 Weight Calibration

1. Make sure the platform is unloaded and stable.
2. Press ok to select “No-load” under “Loading” on the right side of the display screen, press +, - to set the value to 0, press and hold OK button for 3s until ✓ displaying next to the calibrated item, indicating successful calibration.
3. Place a load with the weight equal to the rated load of the machine on the platform, making sure that the platform is stable/not shaking.
4. Press ok to select “Heavy-load” under “Loading” on the right side of the display screen, press +, - to set the value to the platform load capacity, press and hold OK button for 3s until ✓, indicating successful calibration.

Joystick Calibration

On the TEST-RUN INFO Interface, press ok to select “Joystick Calibration”, and press OK button to enter “JOYSTICK CALIBRATION” interface.

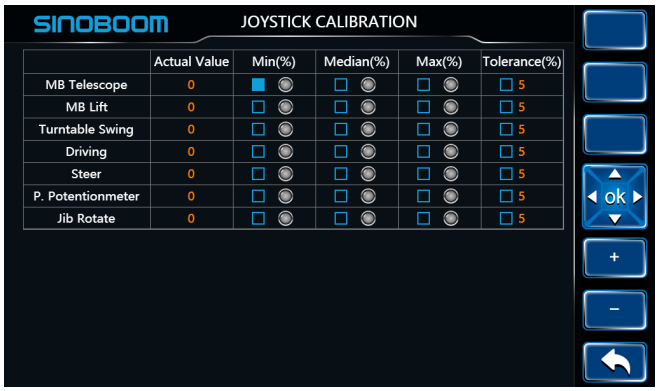

Fig. 21

- **Minimum value, median value, maximum value:** Press to select the item to be calibrated, press and hold OK button for 3s to make changing to , indicating successful calibration.
- **Tolerance:** Press to select the item to be calibrated, and modify the value by pressing , , press and hold OK button for 3s until displaying next to the calibrated item, indicating successful calibration.
- Press to return to the “TEST-RUN INFO” Interface.

Heavy Load Test

DANGER

Heavy load test can only be performed by authorized and qualified personnel who have undergone professional training by Sinoboom. Not meeting this requirement may lead to personal injury or death. Our company will not be liable for any adverse consequences arising from the failure to operate and use the machine in accordance with this manual.

On the TEST-RUN INFO Interface, press to select “Heavy Load Test”, and press OK button to enter “HEAVY LOAD TEST” interface.

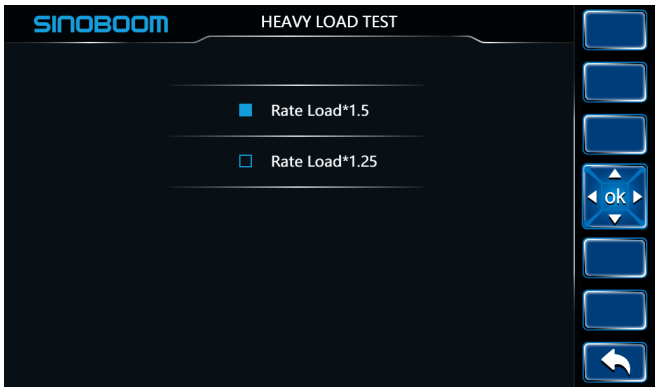

Fig. 22 HEAVY LOAD TEST

- Press to select the test item, and press OK button for confirmation until displays next to the test item.
  - If you exit this interface after confirmation, you will exit the selected test mode.
- Press to return to the “TEST-RUN INFO” Interface.

Advanced Setting

DANGER

Personnel who have not been professionally trained, examined and authorized by Sinoboom are not allowed to modify the advanced setting (including sensor setting, turntable enable setting, standardization setting, proportional configuration, parameter restore/save and reserved setting); not meeting this requirement may lead to personal injury or death. Our company will not be liable for any adverse consequences arising from the failure to operate and use the machine in accordance with this manual.

On the “CONFIGURATION” interface, press to select “Advanced Setting”, press OK button to enter the “ADVANCED SETTING” interface (password required).

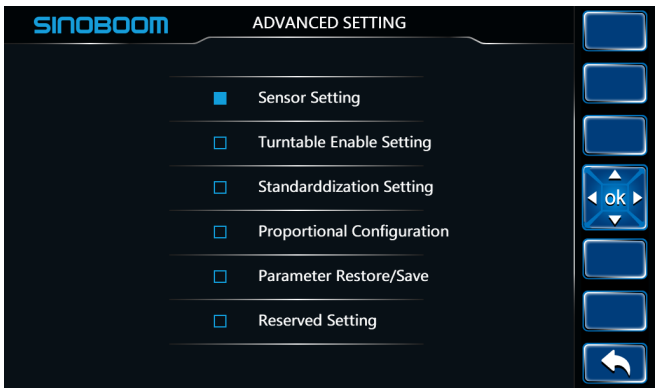

Fig. 23 Advanced Setting

- Press to enter the desired advanced setting page.
- Press to return to CONFIGURATION interface.

Sensor Configuration

- The sensor configuration is mainly used to turn on/off switches or sensors on the machine.
- The configuration of switches is subject to the actual machine configurations.

On the “ADVANCED SETTING” interface, press to select “Sensor Setting”, and press OK button to enter “SENSOR CONFIGURATION” interface.

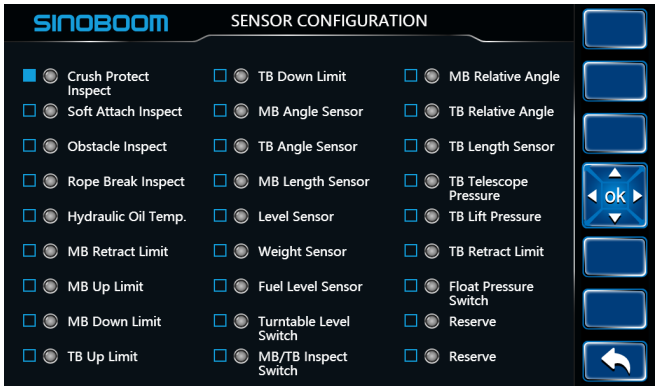

Fig. 24 Sensor Configuration

- Press ok to select the item to be set, press and hold OK button for 3s. The setting completion is indicated by the change of color of the indicator light. changing to indicate the setting item has been enabled, changing to indicate the setting item has been disabled.
- Press to return to ADVANCED SETTING interface.

Turntable Enable Setting

On the “ADVANCED SETTING” interface, press ok to select “Turntable Enable Setting”, and press OK button to enter TURNTABLE ENABLE Interface.

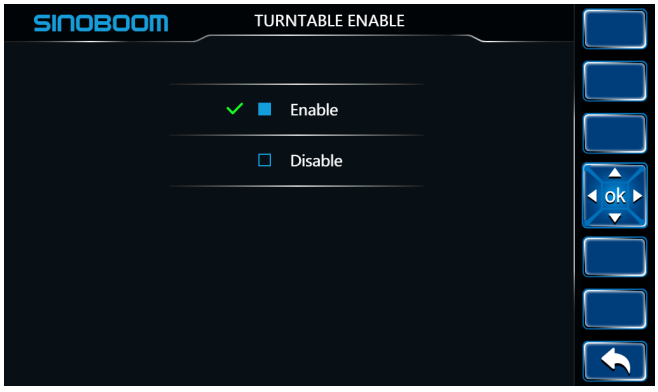

Fig. 25 Turntable Enable Setting

- Press ok to select the item to be set, press and hold OK button for 3s. displaying before the setting item indicate successful setting.
- Press to return to ADVANCED SETTING interface.

Standardization Setting

On the “ADVANCED SETTING” interface, press ok to select “Standardization Setting”, and press OK button to enter “STANDARDIZATION” interface.

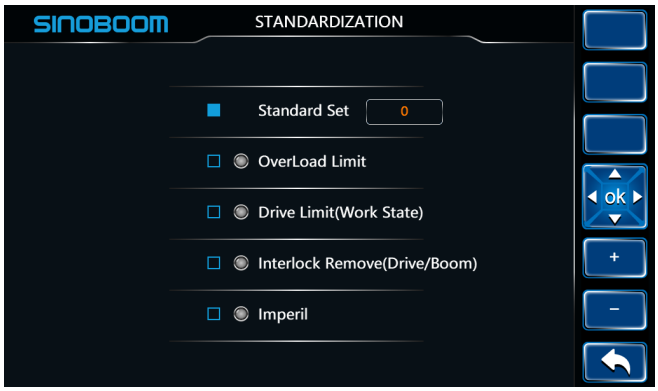

Fig. 26 STANDARDIZATION

- **Standard Set:** Press ok to select the item to be set, modify the value by pressing +, -, press and hold OK button for 3s until is displayed beside the setting item, indicating successful setting.
  - If the value is set to “0”, no standard icon will be displayed on top of the main interface.
  - If the value is set to “1”, the icon CE will be displayed on top of the main interface.
  - If the value is set to “2”, the icon ANSI will be displayed on top of the main interface.
  - If the value is set to “3”, the icon CSA will be displayed on top of the main interface.
  - If the value is set to “4”, the icon AS will be displayed on top of the main interface.
  - If the value is set to “5”, the icon KCS will be displayed on top of the main interface.
  - If the value is set to “6”, the icon JIS will be displayed on top of the main interface.
  - If the value is set to “7”, the icon EAC will be displayed on top of the main interface.
  - If the value is set to “8”, the icon UKC will be displayed on top of the main interface.
- **Other setting items:** Press ok to select the item to be set, press and hold OK button for 3s. The setting completion is indicated by the change of color of the indicator light. changing to indicate the setting item has been enabled, changing to indicate the setting item has been disabled.

– **Overload Limit** : Enable this item, KG will be displayed on top of the main interface. When the platform is overloaded, a series of actions of the machine in operating position will be restricted, see ***Functions and Controls*** section of this manual for details.

– **Drive Limit (Work State):** Enable this item, DR will be displayed on top of the main interface. Drive movement is restricted when the machine is in operating position.

– **Interlock Remove (Drive/Boom):** Enable this item, D/B will be displayed on top of the main interface. Drive and boom movements can be performed simultaneously.

- Press ↩ to return to ADVANCED SETTING interface.

Proportional Configuration

On the “ADVANCED SETTING” interface, press ok to select “Proportional Configuration”, press OK button to enter “PROPORTIONAL CONFIG (1/4)” interface.

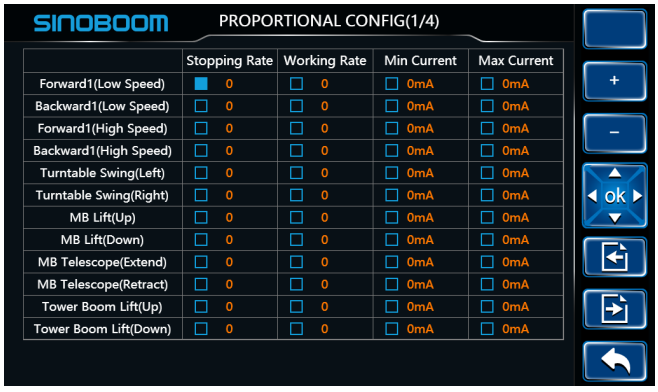

Fig. 27 PROPORTIONAL CONFIG (1/4)

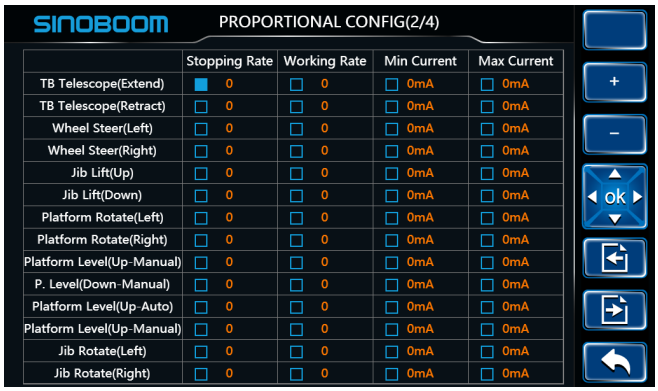

Fig. 28 PROPORTIONAL CONFIG (2/4)

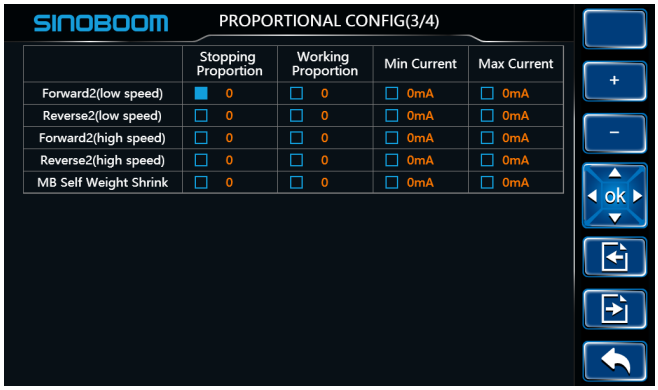

Fig. 29 PROPORTIONAL CONFIG (3/4)

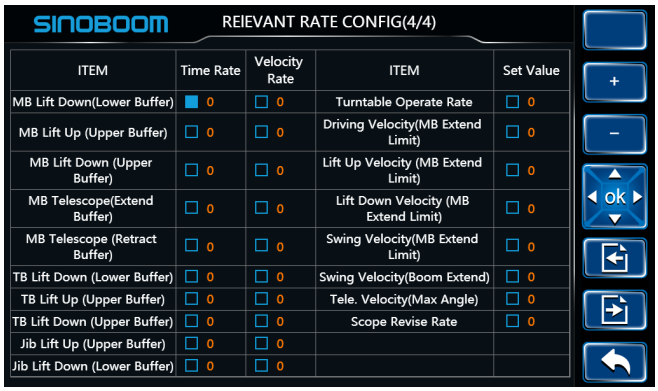

Fig. 30 RELEVANT RATE CONFIG (4/4)

- Press ok to select the item to be set, modify the value by pressing +, −, press and hold OK button for 3s until the right top corner shows ✓, indicating successful setting.
- Press ↩ or ↪ to change the interface.
- Press ↩ to return to ADVANCED SETTING interface.

Note:

The maximum current, minimum current, working rate, and stopping rate are only valid for actions controlled by proportional valves. For actions not controlled by proportional valves, please adjust the working rate and stopping rate to within 10, or the action response will be delayed.

- Minimum current: refers to the starting current of actions, which affects the starting of actions and micro-motion performance. The minimum current should be set to a value that allows the action to just get started, and it can be identified through the debug mode.
- Maximum current: refers to the maximum current of actions. If it is too low, the speed of actions will be affected, and if it is too high (exceeding the full-open

current of the proportional valve), the buffering performance of actions will be affected.

- Working rate: refers to the starting buffer slope of actions. The smaller the rate value, the bigger the starting buffer slope and the shorter the time required; the larger the rate value, the smaller the starting buffer slope and the longer the required time. This parameter can be used to improve the starting hysteresis and starting impact performance of actions.
- Stopping rate: refers to the stopping buffer slope of actions. The smaller the rate value, the bigger the stopping buffer slope and the shorter the time required; the larger the rate value, the smaller the stopping buffer slope and the longer the time required. This parameter can be used to improve the stopping hysteresis and stopping impact performance of actions.
- Time rate: omitted.
- Speed proportion: used to adjust the target current of action buffering. The smaller the rate value, the lower the target current and the slower the action; the larger the rate value, the higher the target current and the faster the action. This parameter can be used to adjust the action speed in the buffer zone.

Table 12-1 RELEVANT RATE CONFIG (4/4) description

No.	Item	Description	Applicable models
1	MB Lift Down (Lower Buffer)	To set the time and speed rate of main boom when fully lowered during lifting-down. Condition of fully lowering: down limit switch is triggered or the main boom is positioned at an angle smaller than the set value.	TB, AB
2	MB Lift Up (Upper Buffer)	To set the time and speed rate of main boom when fully raised during lifting-up. Condition of fully lifting: up limit switch is triggered or the main boom is positioned at an angle bigger than the set value.	TB, AB
3	MB Lift Down (Upper Buffer)	To set the time and speed rate of main boom when fully raised during lifting-down. Condition of fully lifting: up limit switch is triggered or the main boom is positioned at an angle bigger than the set value.	TB, AB
4	MB Telescope (Extend Buffer)	To set the time and speed rate of main boom when fully extended. Condition of fully extending: the extended length is bigger than the set value.	TB
5	MB Telescope (Retract Buffer)	To set the time and speed rate of main boom when fully retracted. Condition of fully retracting: the retracting limit switch is triggered or the extended length is smaller than the set value.	TB, AB
6	TB Lift Down (Lower Buffer)	To set the time and speed rate of tower boom when fully lowered during lifting-down. Condition of fully lowering: down limit switch is triggered or the tower boom is positioned at an angle smaller than the set value.	AB
7	TB Lift Up (Upper Buffer)	To set the time and speed rate of tower boom when fully raised during lifting-up. Condition of fully lifting: up limit switch is triggered or the tower boom is positioned at an angle bigger than the set value.	AB
8	TB Lift Down (Upper Buffer)	To set the time and speed rate of tower boom when fully raised during lifting-down. Condition of fully lifting: up limit switch is triggered or the tower boom is positioned at an angle bigger than the set value.	AB

Table 12-1 RELEVANT RATE CONFIG (4/4) description (continued)

No.	Item	Description	Applicable models
9	Jib Lift Up (Upper Buffer)	To set the time and speed rate of jib when fully raised during lifting-up. Condition of fully lifting: up limit switch is triggered or the jib is positioned at an angle bigger than the set value.	TB, AB
10	Jib Lift Down (Lower Buffer)	To set the time and speed rate of jib when fully lowered during lifting-down. Condition of fully lowering: down limit switch is triggered or the jib is positioned at an angle smaller than the set value.	TB, AB
11	Working Speed (Operation on Turntable)	To set the speed of turntable rotation.	TB, AB
12	Driving Velocity (MB Extend Limit)	To set the travel speed with the main boom fully extended.	TB
13	Lift Up Velocity (MB Extend Limit)	To set the lifting-up speed with the main boom fully extended (maximum angle).	TB
14	Lift Down Velocity (MB Extend Limit)	To set the lifting-down speed with the main boom fully extended (maximum angle).	TB
15	Swing RPM (MB Extend End)	To set the rotation speed with the main boom fully extended (maximum angle).	TB
16	Swing RPM (MB Extend)	To set the rotation speed with the main boom extended. Condition: the retracting limit switch disengages or the main boom is longer than 1.2m.	AB
17	Telescope Velocity (Maximum Angle)	To set the extending/retracting speed with the main boom at the max angle.	TB
18	Scope Revise Rate	To slightly adjust the operating range of telescopic boom (not used yet).	TB
Notes: All parameters can be adjusted within 0-100.			

Parameter Restore/Save

On the “ADVANCED SETTING” interface, press ok to select “Parameter Restore/Save”, and press OK button to enter “PARAMETER RESTORE/SAVE” interface.

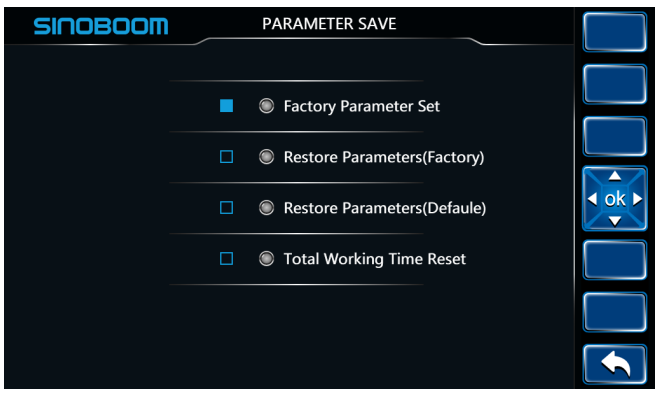

Fig. 31 Parameter Save

- Press ok to select the item to be set, press and hold OK button for 3s. changing to indicate successful setting.
- Press to return to ADVANCED SETTING interface.

Note:

- Factory Parameter Set: used to save the current parameters as factory parameters and the original factory parameters will be overwritten. Please use this function with caution.
- Restore Parameters (Factory): used to restore the current parameters to the factory parameters and the current parameters will be overwritten. Please use this function with caution.
- Restore Parameters (Default): used to restore the current parameters to the default parameters and the current parameters will be restored. This function

generally is only used in the initial installation and debugging.

- Total Working Time Reset: used to clear the total working time. Please use this function with caution.

Reserved Setting

On the “ADVANCED SETTING” interface, press to select “Reserved Setting”, and press OK button to enter “RESERVED SETTING (1/2)” interface.

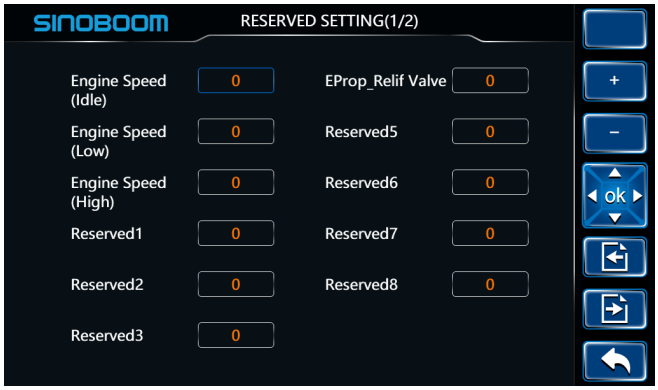

Fig. 32 RESERVED SETTING (1/2)

- Press to select the item to be set, modify the value by pressing +, −, press and hold OK button for 3s until the right top corner shows ✓, indicating successful setting.
- Press or to change the interface.
- Press to return to ADVANCED SETTING interface.

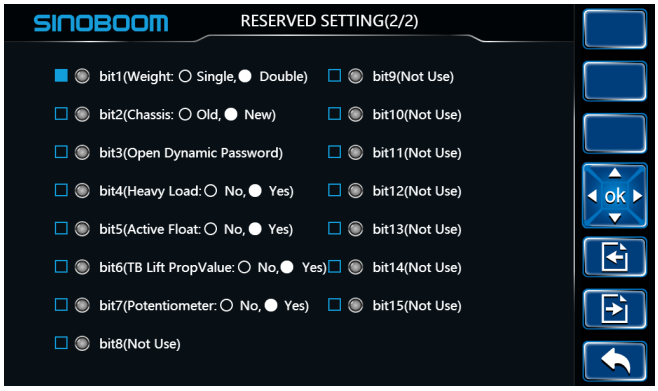

Fig. 33 RESERVED SETTING (2/2)

- Press to select the item to be set, press and hold OK button for 3s. The change of color of the indicator light (changing to , or changing to) indicate successful setting.
- Press or to change the interface.
- Press to return to ADVANCED SETTING interface.

Note: After dynamic password is enabled, it cannot be disabled, and only by re-installing the software can it be restored to a static password.

Temporary Unlocking

On the “CONFIGURATION” interface, press to select “Temporary Unlocking”, press OK button to enter “Temporary Unlocking” interface.

- If the machine is in locked state, enter the password verification interface, input the password by pressing to temporarily unlock the machine.
- If the machine is not locked, the screen will display “This device does not need to be temporarily unlocked".

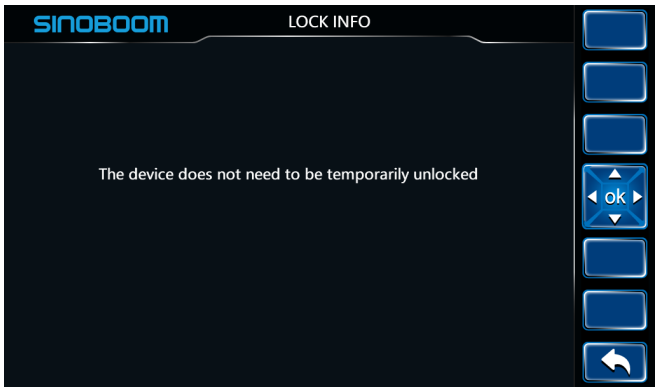

Fig. 34 Temporary Unlocking not Required

12.4 SYSTEM INFORMATION

On the main interface, press to enter “SYSTEM INFO” interface.

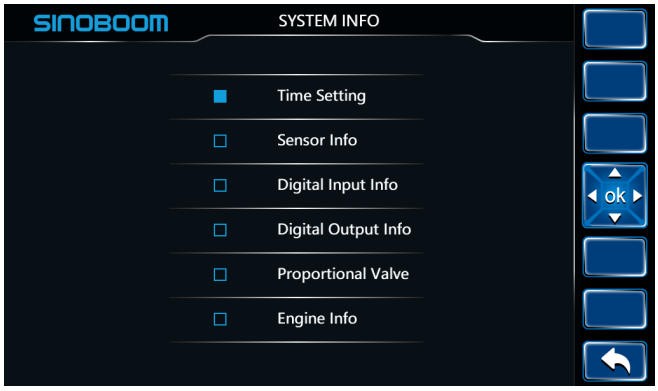

Fig. 35 SYSTEM INFO

- Press  to enter the desired information page.
- Press  to return to the main interface.
- For HD models, the interface will have an "Motor Driver Information" option.

Time Setting

On the SYSTEM INFO interface, select “Time Setting”, and press OK button of  to enter “TIME SETTING” interface.

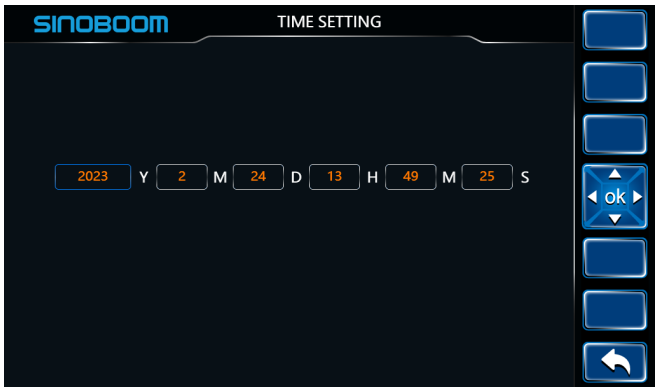

Fig. 36 Time Setting

- Press  to enter the current time, and press the OK button to confirm.
- Press  to return to “SYSTEM INFO” interface.

Sensor Information

- The sensor information option is mainly used to query the actual value of the sensor configured on the machine, thus determining whether each sensor is working normally.
- The configuration of switches is subject to the actual machine configurations.

On “SYSTEM INFO” interface, press  to select “Sensor Info”, press OK button to enter the SENSOR INFO (1/3) interface.

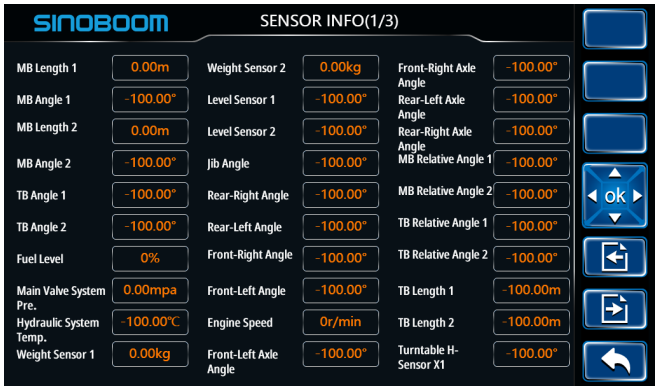

Fig. 37 SENSOR INFO (1/3)

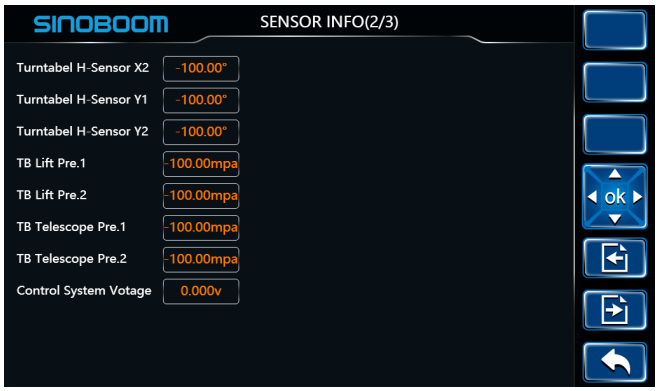

Fig. 38 SENSOR INFO (2/3)

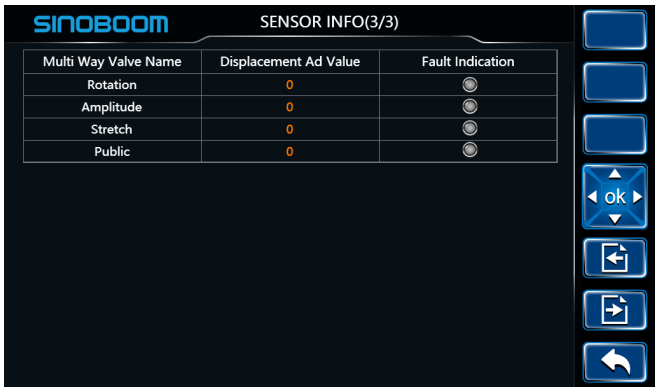

Fig. 39 SENSOR INFO (3/3)

- The corresponding values of the sensors are displayed in real-time.
-  indicates no fault, while  indicates a fault.
- Press  or  to change the interface.
- Press  to return to “SYSTEM INFO” interface.

Digital Input

- Digital Input Information option is mainly used to query the signal detection status of the detection switches (such as travel switches and proximity switches) configured on the machine, to determine whether the detection switches are working normally and whether the working status of the machine meets the requirements.
- The configuration of switches is subject to the actual machine configurations.

On “SYSTEM INFO” interface, press ok to select “Digital Input Info”, press OK button to enter the INPUT INFO interface.

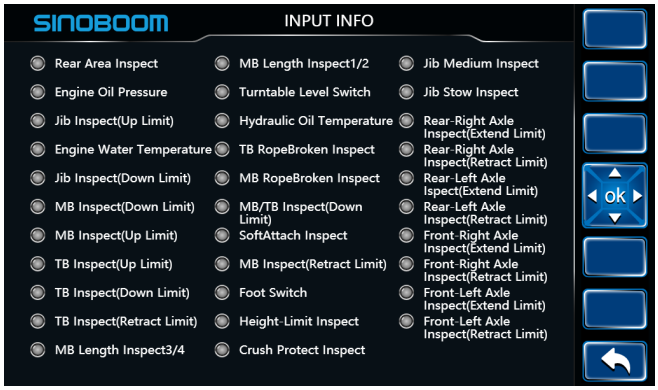

Fig. 40 INPUT INFO

- indicates no input signal, while indicates an input signal.
- Press to return to “SYSTEM INFO” interface.

Digital Output Information

- Digital Output Information option is mainly used to query the output status of the relay, switching valve and other output points configured on the machine, thus assisting in determining the trouble causes.
- The configuration of output points is subject to the actual machine configurations.

On “SYSTEM INFO” interface, press ok to select “Digital Output Info”, press OK button to enter the OUTPUT INFO (1/2) interface.

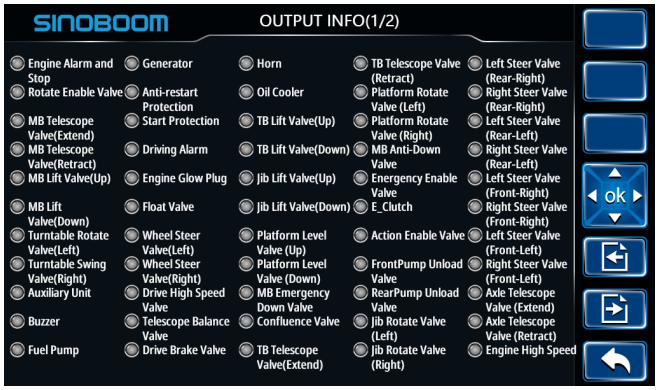

Fig. 41 OUTPUT INFO (1/2)

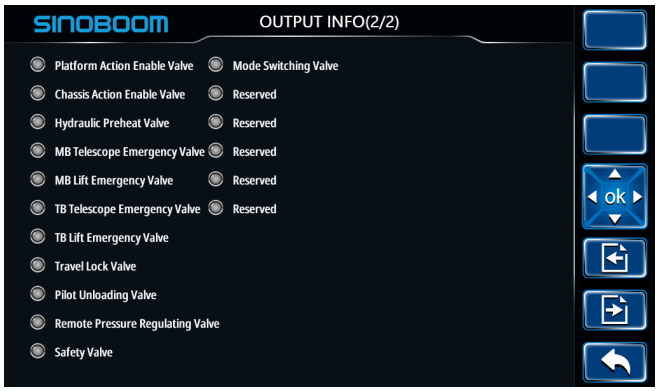

Fig. 42 OUTPUT INFO (2/2)

- indicates no output signal, while indicates an output signal.
- Press or to change the interface.
- Press to return to “SYSTEM INFO” interface.

Proportional Valve

On “SYSTEM INFO” interface, press ok to select “Proportional Valve”, press OK button to enter the PROPORTIONAL INFO interface.

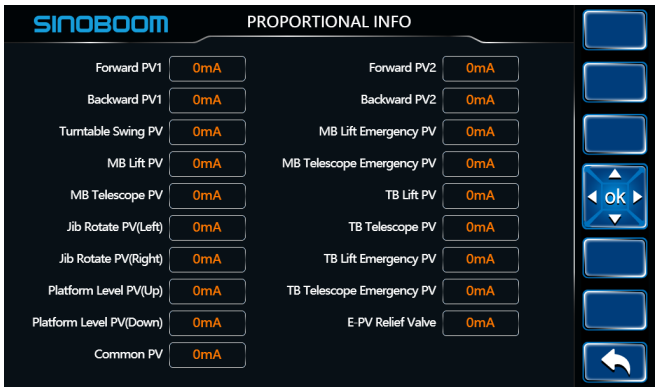

Fig. 43 PROPORTIONAL INFO

- The corresponding values of the proportional valves are displayed in real-time.
- Press  to return to “SYSTEM INFO” interface.

Engine Information

This section is applicable to models equipped with an engine.

- The engine information option is mainly used to query the status and fault information of the engine configured on the machine, so as to determine whether the engine is working normally.
- The configuration of engine is subject to the actual machine configuration.

On “SYSTEM INFO” interface, press  to select “Engine Info”, press OK button to enter ENGINE INFO interface.

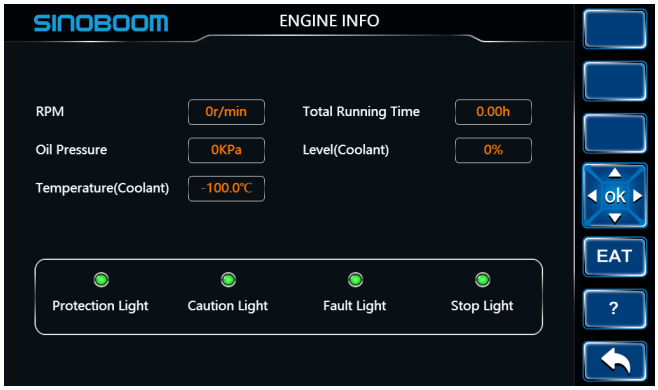

Fig. 44 ENGINE INFO

- On the ENGINE INFO interface, users can query the engine RPM, oil pressure, temperature (cooling water), total running time, level (cooling water), protection light, caution light, fault light and stop light.
- Press  to enter EAT INFO interface.
- Press  to enter ENGINE FAULT DIAGNOSES interface.
- Press  to return to “SYSTEM INFO” interface.

Fig. 45 EAT SYSTEM INFO (Deutz engine)

Table 12-2 Description of indicator lights for Deutz engine

No.	Indicator light	Status	Description	Symbol
1	SCR fault warning indicator light	Off	SCR system is working normally	
		Solid on	SCR system is faulted	
2	DEF level indicator light	Off	DEF level is normal	
		Solid on	DEF level is too low	
3	Standstill regeneration indicator light	Off	Standstill regeneration is not performed or requested	
		Solid on	Standstill regeneration is being performed	
		Slow flashing	Standstill regeneration is requested	

Table 12-2 Description of indicator lights for Deutz engine (continued)

No.	Indicator light	Status	Description	Symbol
		Fast flashing	Standstill regeneration is requested, but since the operator has ignored the request for a long time, the standstill regeneration can only be completed through the DEUTZ diagnostic tool.	
4	Standstill regeneration/high temperature indicator light	Off	Exhaust system temperature is normal	
		Solid on	Exhaust system temperature is abnormal	
5	DPF replacing required due to excessive ash content	Off	Ash content is normal	
		Solid on	Ash content is excessive	
6	Oil replacing required due to cumulative regeneration time being too long	Off	Cumulative regeneration time is within the normal range	
		Solid on	Oil replacing is required due to cumulative regeneration time being too long	

Fig. 46 EAT SYSTEM INFO (Yuchai, Yanmar engine)

Table 12-3 Description of indicator lights for Yuchai & Yanmar engines

No.	Indicator light	Status	Description	Symbol
1	Engine malfunction indicator light	Off	Engine works normally	
		Solid on	Engine malfunctions	
2	Regeneration request indicator light (Yanmar)	Off	Regeneration is not requested and need not to be performed	
		Solid on	Regeneration is requested, with a reminder that regeneration must be performed	
	DPF regeneration reminder indicator light (Yuchai)	Off	Regeneration is not performed or requested	
		Solid on	The carbon content in DPF is too high, so it is recommended to perform parked regeneration	
		Slow flashing	Since the carbon content in DPF is too high, perform parked regeneration or service regeneration immediately	

Table 12-3 Description of indicator lights for Yuchai & Yanmar engines (continued)

No.	Indicator light	Status	Description	Symbol
		Fast flashing	Since DPF is heavily clogged, perform service regeneration immediately	
3	High exhaust temperature indicator light	Off	Exhaust system is at normal temperature	
		Solid on	Exhaust system temperature exceeds the set limit	
4	Regeneration execution indicator light	Off	Regeneration execution is inactive	
		Solid on	Regeneration function is being executed	
5	NCD indicator light (Yanmar only)	Off	NCD is not working	
		Solid on	NCD is working	
6	Regeneration prohibiting indicator light (Yuchai only)	Off	Conditions prohibiting active regeneration do not exist	
		Solid on	ECU receives the set status of regeneration prohibiting switch, and active regeneration can't be performed	

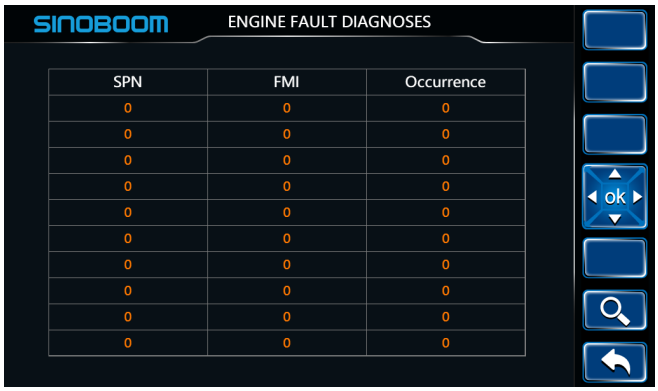

Fig. 47 ENGINE FAULT DIAGNOSES

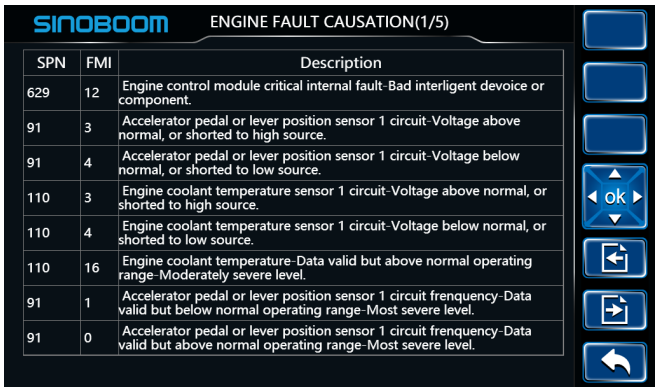

Fig. 48 ENGINE FAULT CAUSATION

- Press to enter the "ENGINE FAULT DIAGNOSES" interface, and search for the corresponding fault cause by checking the "Fault SPN" and "Fault FMI".
- Press to return to "SYSTEM INFO" interface.

- Press or to change the interface.
- Press to return to ENGINE FAULT DIAGNOSES interface.

Override Operation Query

The override operation query option is mainly used to check the historical information of the machine's override operations with an overloaded platform, which records the platform load weight and the occurrence time of each override operation with an overloaded platform.

On "SYSTEM INFO" interface, press to select "Ultra Vires Inquiry", press OK button to enter "Ultra Vires Inquiry" interface.

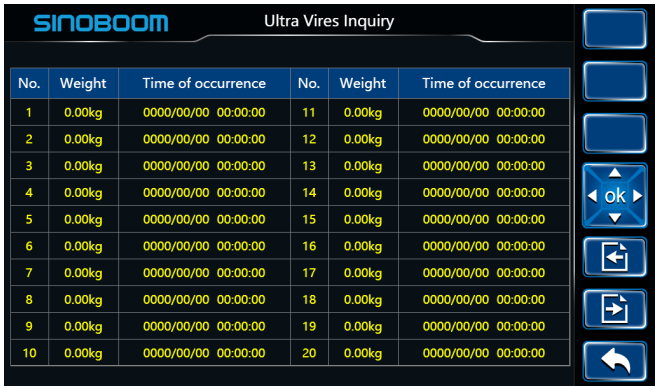

Fig. 49 Ultra Vires Inquiry

- Press  or  to change the interface.
- Press  to return to “SYSTEM INFO” interface.

Motor Driver Information

This section is applicable to HD models.

The motor driver information option is mainly used to query the status of the electric motor configured on the machine, thus determining whether the electric motor is working normally.

On “SYSTEM INFO” interface, press  to select “Motor Driver Info”, press OK button to enter the Motor Driver Info interface.

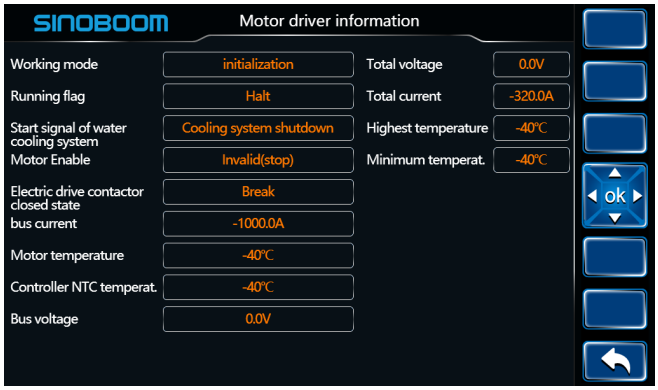

Fig. 50 Motor Driver Information

- Press  to return to “SYSTEM INFO” interface.

12.5 TURNTABLE PANEL INFORMATION

- The turntable panel information option is mainly used to query the input status of switches on the turntable control panel, so as to check whether the circuit from the switches to the controller, input signal, etc. are normal, thus assisting in determining the trouble causes.
- The configuration of switches on the turntable panel is subject to the actual machine configuration.

On the main interface, press  to enter TURNTABLE PANEL INFO interface.

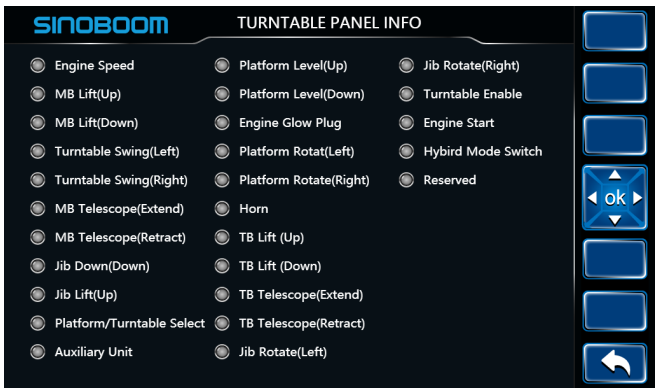

Fig. 51 TURNTABLE PANEL INFO

-  indicates no signal, while  indicates a signal.
- Press  to return to the main interface.

12.6 PLATFORM INFORMATION

- The platform information option is mainly used to query the input and output status of switches on the platform control panel and the status of joystick at the platform controls, so as to check whether the circuit from the switches to the controller, input signal, output signal, etc. are normal, thus assisting in determining the trouble causes.
- The configuration of switches and joystick on the platform panel is subject to the actual machine configuration.

On the main interface, press  to enter the PLATFORM PANEL INFO (1/3) interface.

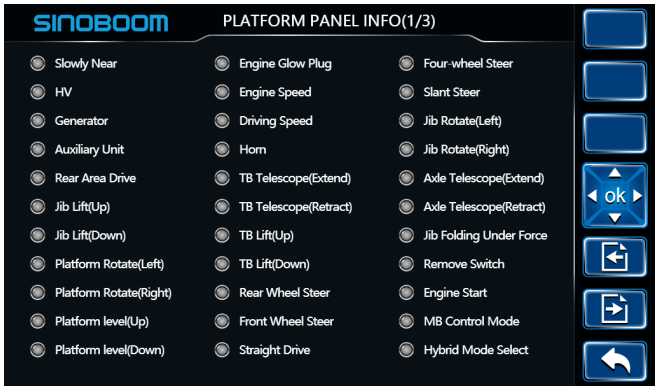

Fig. 52 PLATFORM PANEL INFO (1/3)

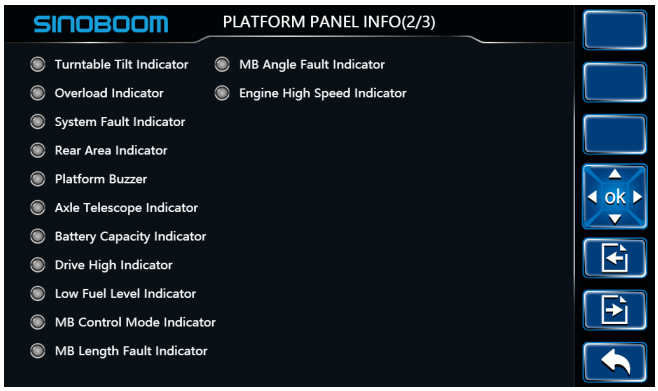

Fig. 53 PLATFORM PANEL INFO (2/3)

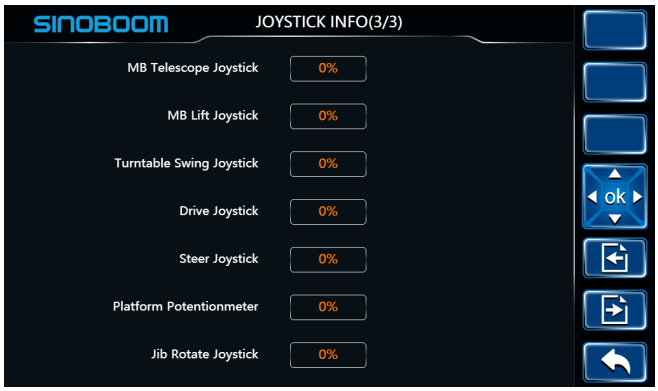

Fig. 54 PLATFORM PANEL INFO (3/3)

- The information of platform panel joysticks/potentiometers is displayed in real-time, so as to check whether the position status of joystick/potentiometer is normal.
- ⚫ indicates no signal, while 🟢 indicates a signal.
- Press ◀ or ▶ to change the interface.
- Press ↩ to return to the main interface.

12.7 MACHINE INFORMATION

On the main interface, press ⓘ to enter “MACHINE INFO (1/2)” interface.

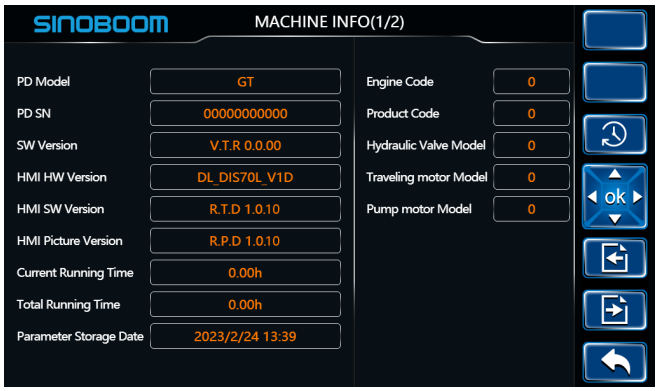

Fig. 55 MACHINE INFO (1/2)

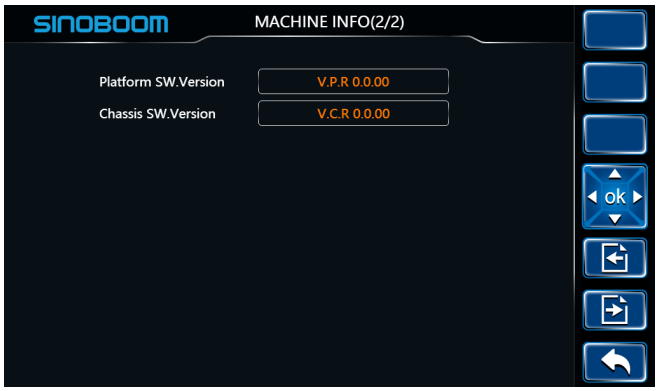

Fig. 56 MACHINE INFO (2/2)

Interface operations and button functions are detailed in the ***Configuration - Machine Information*** .

12.8 ALARM INFORMATION

The alarm information option is mainly used to query the alarm or fault status of the control system, so as to determine the cause of fault and facilitate troubleshooting.

On the main interface, press ⚠ to enter Real Time Faults (1/1) interface.

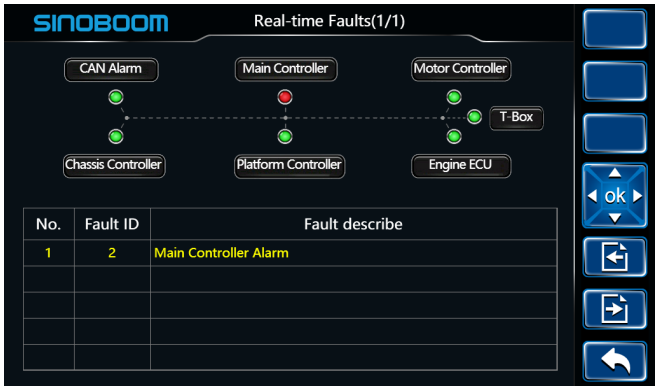

Fig. 57 Real Time Faults (1/1)

- indicates normal status, while indicates fault warning status.
- Press or to change the interface.
- Press to return to the main interface.
- In the form, yellow text indicates alarm information, and red text indicates fault information.
- If “Lift Motor Controller Fault” or “Drive Motor Controller Fault” is displayed in the form, refer to the ***Motor Controller Fault Codes*** section in the Maintenance Manual for details (if the machine is equipped with a motor controller).
- If “BMS Fault” is displayed in the form, refer to the ***Lithium Battery BMS Fault Codes*** section in the Maintenance Manual for details (if the machine is equipped with lithium batteries).
- If “Motor Driver Fault” is displayed in the form, refer to the ***Motor Driver Fault Codes*** section in the Maintenance Manual for details (if the machine is an HD model).
- If “Charging Pack Level 1 Fault” or “Charging Pack Level 2 Fault” is displayed in the form, contact Sinoboom after-sales personnel to check the specific backend data and find out the fault cause.

13 APPENDIX

13.1 MAJOR MODIFICATION AND REPAIR RECORD

Major Modification and Repair Record			
Model			
Serial No.			
Date	**Modified/Repaired Item**	**Machine Status after Change**	**Technician**

Major Modification and Repair Record			

Note:

1. A major modification/repair is a modification/repair of the entire machine or its components that affects the stability, strength or performance of the machine.
2. A major modification/repair to the machine should be documented using the form below. This record should be retained until the machine is taken out of service or as required by the machine owner/company.
3. The machine must be inspected and verified after major modifications/repairs, with the inspection items including but not limited to all items in the Inspection and Preventative Maintenance Schedule. Once inspection and verification are complete the machine can be put back into service.

13.2 INSPECTION AND PREVENTIVE MAINTENANCE SCHEDULE

Perform inspection and preventive maintenance for the items in the table below at the specified intervals. Maintenance and inspection intervals are calculated based on the months of service or the “accumulated operating hours” displayed on the turntable controls (whichever comes first).

Inspection intervals are based on the use of the machine under normal operating conditions. The intervals should be shortened accordingly when operating in harsh environmental conditions.

Table 13-1 Inspection and Preventive Maintenance Schedule

Item	Interval		
	Before each delivery[1] or quarterly[2]	Semiannually[3]	Annually[4]
Chassis assembly			
Chassis	2	2	2
Tires	1, 2	1, 2	1, 2
Wheel nuts	1[50]	1[50]	1[50]
Drive motor	1, 6	1, 6	1, 6
Drive reducer	1, 2, 6	1, 2, 6	1, 2, 6, 11
Steering components	1, 2	1, 2	1, 2
Outriggers/extending axles (if equipped)	1, 2, 3	1, 2, 3	1, 2, 3
Bearings	1, 2, 5, 12	1, 2, 5, 12	1, 2, 5, 12
Turntable assembly			
Turntable	2	2	2
Slewing bearing or slewing reducer	1[50], 2, 6, 12	1[50], 2, 6, 12	1[50], 2, 6, 8, 12
Slewing reducer (if equipped)	1, 2, 6	1, 2, 6	1, 2, 6, 11
Central slewing joint	6	6	6
Slewing motor	1, 6	1, 6	1, 6

Table 13-1 Inspection and Preventive Maintenance Schedule (continued)

Item	Interval		
	Before each delivery[1] or quarterly[2]	Semiannually[3]	Annually[4]
Turntable slewing pin (if equipped)	1, 2, 3	1, 2, 3	1, 2, 3
Turntable cover assembly	1, 2, 3	1, 2, 3	1, 2, 3
Hydraulic generator (if equipped)	1, 3, 6, 10[NO.1]	1, 3, 6, 10[NO.1]	1, 3, 6, 10[NO.1]
Boom assembly			
Boom weldment	1, 2	1, 2	1, 2
Hose, wire rope bracket	1, 2	1, 2	1, 2
Pulley and wear pad assembly	1, 2	1, 2	1, 2
Bearings	1, 2, 5, 12	1, 2, 5, 12	1, 2, 5, 12
Cover or protective guard (if equipped)	1, 2	1, 2	1, 2
Cable track or wire rope system (if equipped)	1, 2, 3, 5	1, 2, 3, 5	1, 2, 3, 5
Pivot pins and retaining rings	1, 2	1, 2	1, 2
Platform assembly			
Guardrails	2	2	2
Access gate	1, 2, 3	1, 2, 3	1, 2, 3
Floor	2	2	2
Swing cylinder	1, 2, 5, 6	1, 2, 5, 6	1, 2, 5, 6
Safety belt anchorage point	1, 2, 7	1, 2, 7	1, 2, 7
Power system			
Refer to the machine's Maintenance Manual for inspection and preventive maintenance schedule, and the engine manual provided with the machine for detailed instructions.			
Hydraulic system			
Hydraulic pump	1, 2, 6	1, 2, 6	1, 2, 6
Hydraulic cylinder	1, 2, 5, 6	1, 2, 5, 6	1, 2, 5, 6
Bleeding the oscillating cylinder (if equipped)	10[NO.1]	10[NO.1]	10[NO.1]
Hydraulic valves	1, 2, 5, 6	1, 2, 5, 6	1, 2, 5, 6
Counterbalance valve, check of the locking function (if equipped)	10[NO.1]	10[NO.1]	10[NO.1]
Hydraulic hoses, pipelines and fittings	1, 2, 6	1, 2, 6	1, 2, 6
Hydraulic tank	1, 2, 3, 5, 6	1, 2, 3, 5, 6	1, 2, 3, 5, 6
Hydraulic tank suction filter	1, 5, 6	1, 5, 6	1, 5, 6, 11
Hydraulic tank return filter	1, 5, 6, 11[50]	1, 5, 6, 11[50]	1, 5, 6, 11[50]

Table 13-1 Inspection and Preventive Maintenance Schedule (continued)

Item	Interval		
	Before each delivery[1] or quarterly[2]	Semiannually[3]	Annually[4]
Hydraulic tank air filter	1, 5, 6	1, 5, 6, 11	1, 5, 6, 11
Hydraulic oil high-pressure filter	1, 5, 6, 11	1, 5, 6, 11	1, 5, 6, 11
Hydraulic oil	5, 6	5, 6	5, 6, 11
Electrical system			
Electrical harness, connectors	1, 2	1, 2	1, 2
Battery	1, 2, 6, 9, 12	1, 2, 6, 9, 12	1, 2, 6, 9, 12
Electrolyte	6	6	6
Charging function	3	3	3
Instruments, gauges, switches, lamps, horn, contactor, relay	1, 3	1, 3	1, 3
Functions and controls			
Platform control box	1, 3, 4, 7, 10	1, 3, 4, 7, 10	1, 3, 4, 7, 10
Turntable controller	1, 3, 4, 7, 10	1, 3, 4, 7, 10	1, 3, 4, 7, 10
Function control lock, secondary guarding device and brake	1, 3, 10	1, 3, 10	1, 3, 10
Foot switch	1, 3, 10	1, 3, 10	1, 3, 10
Emergency stop button (ground and platform)	1, 3, 10	1, 3, 10	1, 3, 10
Limit switches and power-off switch	1, 3, 10	1, 3, 10	1, 3, 10
Pothole protection device (if equipped)	1, 3, 10	1, 3, 10	1, 3, 10
Overload limit system	1, 3, 10	1, 3, 10	1, 3, 10
Tilt alarm	1, 3, 10	1, 3, 10	1, 3, 10
Drive brake	1, 3, 10	1, 3, 10	1, 3, 10
Slewing brake	1, 3, 10	1, 3, 10	1, 3, 10
Others			
Operation Manual in the manuals compartment	10	10	10
All decals/labels complete, clear and secure	10	10	10
Annual inspection date of the machine	/	/	10
No unapproved changes or additions	10	10	10
All safety publications taken into account	10	10	10
General structural components and weldments	2	2	2

Table 13-1 Inspection and Preventive Maintenance Schedule (continued)

Item	Interval		
	Before each delivery[1]or quarterly[2]	Semiannually[3]	Annually[4]
All fasteners, pins, protective guards and covers	1, 2	1, 2	1, 2
Greasing and lubricating according to specifications	10	10	10
Functional test of all systems	10	10	10
Paint and appearance	5	5	5
Inspection date stamped on the chassis	/	/	10
Notify Sinoboom of machine ownership (change)	/	/	10

Note:

[1] Before each sale, lease or shipment delivery;

[2] In service for 3 months or 250 hours; or out of service for more than 3 months;

[3] In service for 6 months or 500 hours;

[4] Once a year and no later than 13 months from the date of the previous annual machine inspection;

[50] The first inspection shall be performed once the machine reaches 50 hours in service for the first time. This occurs only once in the service life of the machine.

[250] The first inspection shall be performed once the machine reaches 250 hours in service for the first time. This occurs only once in the service life of the machine.

[NO.1] Before the machine is put into service for the first time, or before the first use after the oscillating cylinder or counterbalance valve has been replaced.

Inspection activity (numerical codes):

1. Check for correct installation (accurate position, firmly installed, tightened to the specified torque)
2. Check for damage (cracks, cracked welds, deformation, wear, corrosion, excessive wear, gouges, abrasions and exposed threads)
3. Check for normal function
4. Return to neutral position or “off” position normally (the self-reset switch can return to neutral position or “off” position after released)
5. Clean and free of foreign objects
6. Check for correct level, sealing and leaks
7. Labels complete, clear and secure
8. Check for appropriate tolerances
9. Fully charged
10. Verify/perform
11. Replace the oil or filter element
12. Correctly lubricated

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