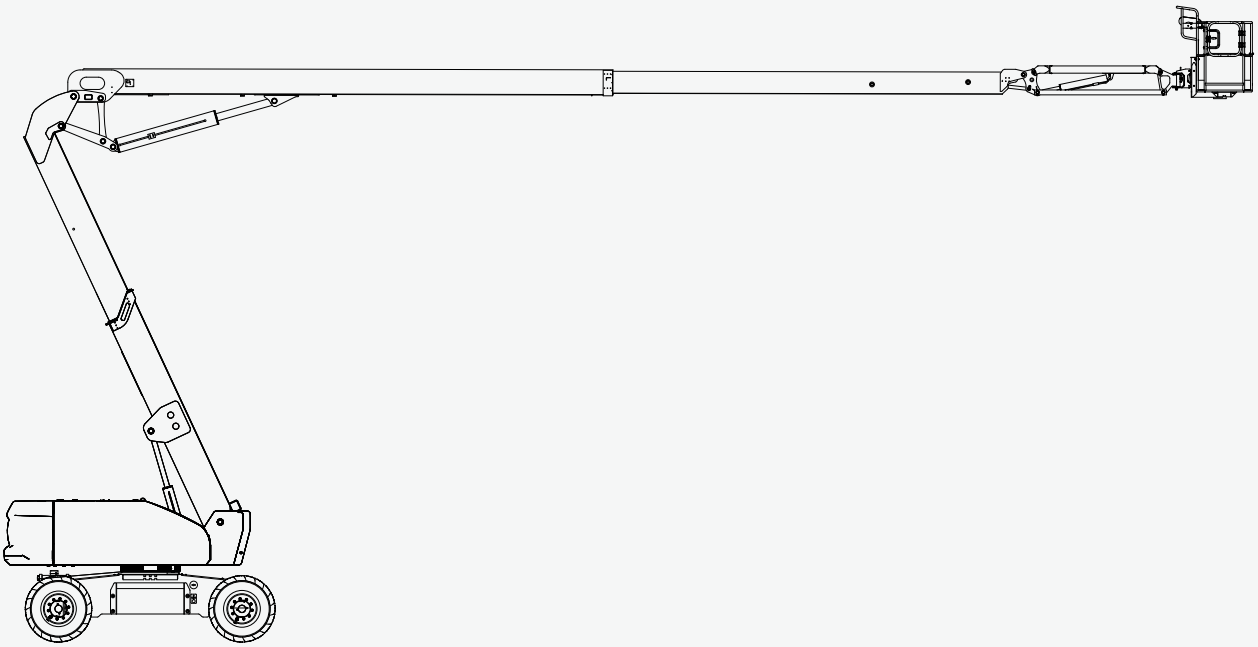
Maintenance Manual

Manual No: 504029110002-EN
Manual Version: C
April 2025
Translated version

AB26J Plus/AB850J Plus *0402900399 /0403400100 to current*



CE AS/NZS SA ANSI

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⚠ 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.

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To Users

Thank you for choosing and using the machinery of **Hunan Sinoboom Intelligent Equipment Co., Ltd.**

Use this machine only to transport tools to work locations and for performing tasks 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 you have any questions, contact **Hunan Sinoboom Intelligent Equipment Co., Ltd.**

Manual Revision History:

Version	Date	Description
A	Jan. 2024	Original issue
B	December 2024	Revised Troubleshooting Guide, Control System etc.
C	April 2025	Update technical parameters, schematic diagrams, and add content related to 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.
AB26J Plus	AB26J Plus	AB850J Plus	0402900399 to current (except LTV) 0403400100 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 (the abbreviation for product commercial tade names) 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.

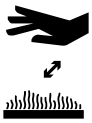
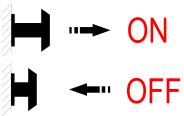
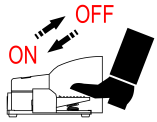
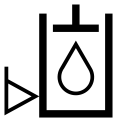
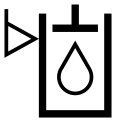
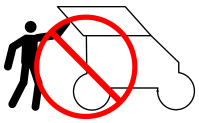
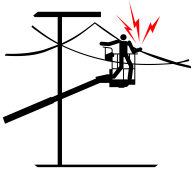
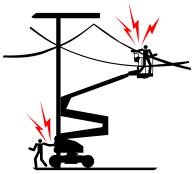
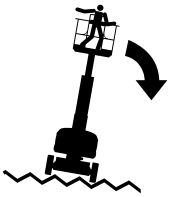
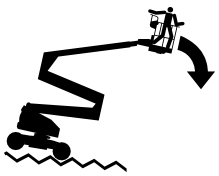
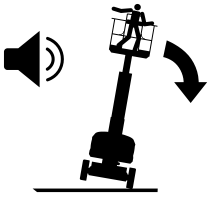
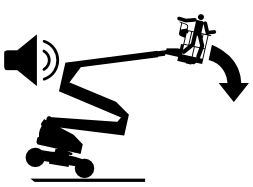
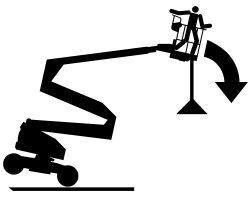
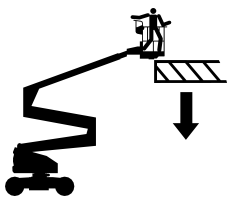
⚠ CAUTION

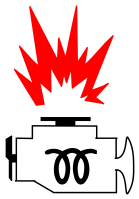
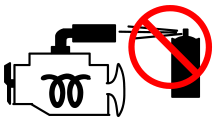
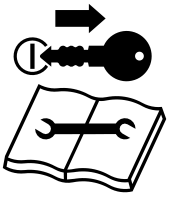
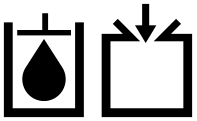
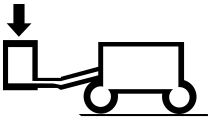
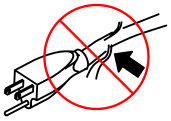
Indicates an imminently hazardous situation that, if not avoided, *could* result in minor or moderate injury or machine damage.

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:

 Refer to the Maintenance Manual	 Anchor point only for 1 person	 Wind speed	 Chemical burns hazard	 Chock the wheels
 Refer to the 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	 Electrocution hazard on platform	 Electrocution hazard on the ground and platform	 Tipping hazard – avoid uneven ground	 Tipping hazard – avoid uneven ground
 Tipping hazard – never use machine in strong, gusty winds	 Tipping hazard – never use machine in strong, gusty winds	 Tipping hazard – never push or pull objects outside the platform	 Tipping hazard – never suspend objects from the platform	 Tipping hazard – never place ladders and scaffolding on the platform
				

Collision hazard – keep the platform clear of obstacles below when lowering the extending 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 platform guardrails	Fall hazard – never climb on the boom
 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	 Wear protective clothing and safety goggles
 Only qualified maintenance personnel may perform maintenance work	 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

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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 any inspection or maintenance work, make sure the machine is turned off, remove the key and turn 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 controller 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. Before maintaining electrical components, always turn the power-off switch 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.
- For engine-powered machines, do not attempt to open the radiator cover while it is hot.
- 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 injury occurs due to high temperature and/or high pressure, seek immediate medical attention. If treatment is not carried out 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).
- Never touch the battery terminals or cable clamps with tools that can generate sparks.
- Only approved non-flammable cleaning solutions should be used on the machine.

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

⚠ WARNING

use, stop using the battery immediately and report to the relevant maintenance personnel promptly.

- 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	25.65 m	84 ft 2 in
Maximum working height	27.65 m	90 ft 9 in
Maximum horizontal reach	19.1 m/17 m	62 ft 8 in/55 ft 9 in
Maximum horizontal working envelope	19.7 m/17.6 m	64 ft 8 in/56 ft 9 in
Maximum up and over height	9.07 m	29 ft 9 in
Max. below ground reach	5.49 m	18 ft
Overall length (stowed)	12.09 m	39 ft 8 in
Overall length (Transport position)	9.49 m	31 ft 2 in
Overall width (stowed)	2.49 m	8 ft 2 in
Overall width (Transport position)	2.49 m	8 ft 2 in
Overall height (stowed)	2.93 m	9 ft 7 in
Overall height (Transport position)	3.28 m	10 ft 9 in
Wheelbase	3.0 m	9 ft 10 in
Ground clearance	0.46 m	1 ft 6 in
Platform dimensions (L×W×H)	2.44 m × 0.91 m × 1.1 m	8 ft×3 ft×3 ft 7 in
Performance		
Rated platform capacity (unrestricted/restricted)	230 kg/340 kg	507 lb/749 lb
Maximum number of occupants on the platform	2 persons	
Travel speed (stowed)	0 – 4.8 km/h	0 – 3.0 mph
Travel speed (raised)	0 – 1.1 km/h	0 – 0.7 mph
Gradeability (4WD)	45%	
Turntable slewing (angle/continuity)	360°/continuous	
Platform slewing angle	180 °	

Table 3-1 Specifications (continued)

Item	Metric	Imperial
Max allowable inclination	5 °	
Turning radius (inside/outside) – two-wheel steering	3.65 m/6.91 m	11 ft 12 in/22 ft 8 in
Turning radius (inside/outside) – four-wheel steering	2.25 m/4.60 m	7 ft 5 in/15 ft 1 in
Turntable tailswing	1.13 m	3 ft 8 in
Tire (spec/type)	385/65-22.5 (foam-filled)	
Maximum operating noise level	104 dB	
IP rating	IP 54	
Maximum total vibration on the platform	2.5m/s²	
Maximum whole body vibration value (WBV)	0.5m/s²	
Power		
Drive x steer	4WD×2WS (4WS)	
Engine (power/rpm/spec/brand/emission standard)	Options 43 kW / 2500 rpm /QSF2.8T3NA60/ Cummins /China III, EU Stage 3A 36.8 kW / 2200 rpm /YCF3050/ Yuchai / China IV 36.5 kW / 2400 rpm /YCF3050/ Yuchai /China III 55.4 kW /2600 rpm /TD2.9 L4 /Deutz /Euro V 55.4 kW /2600 rpm /TD2.9 L4 T4f/ Deutz /Tier4 36 kW /2500 rpm /F2.8CS449/Cummins /China IV	
Hydraulic tank capacity	180 L	39.6 gal (UK)/47.6 gal (US)
Hydraulic tank oil refueling volume	150 L	33.0 gal (UK)/39.6 gal (US)
Diesel tank capacity	150 L	33.0 gal (UK)/39.6 gal (US)
Hydraulic system pressure	28 MPa	4061 psi
Battery (voltage, capacity)	12 V, 220 Ah	
Control voltage	12 VDC	
Weight		
Gross weight (two-wheel steering)	18640 kg	41094 lb
Gross weight (four-wheel steering)	18760 kg	41358 lb
Ground Bearing Data		
Maximum tire load	10480 kg	23105 lb
Ground pressure	1317 kPa	191 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

Table 3-1 Specifications (continued)

Item	Metric	Imperial
Allowable ambient temperature range(non-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 %	
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 2 m/6 ft 7 in) equals the working height.
2. The maximum horizontal reach plus the arm length of the operator (assumed to be 0.6 m [1 ft 11 in]) 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 SPECIFICATIONS OF MAJOR COMPONENTS

Engine

Table 3-2 Deutz TD2.9 L4

Type	Water-cooled
Number of cylinders	4
Cylinder bore	92 mm (3.6 in)
Stroke	110 mm (4.3 in)
Total displacement	2.9 L 0.64 gal (Imperial) 0.77 gal (US)
Compression ratio	17.8 : 1
Firing order	1-3-4-2

Table 3-2 Deutz TD2.9 L4 (continued)

Output power	55.4kW@2600rpm
Torque	260 Nm (192 ft-lb)@1800 rpm
Cooling system capacity	3.5 L 0.77 gal (Imperial) 0.92 gal (US)
Engine oil capacity	8.5 L 1.87 gal (Imperial) 2.25 gal (US)
Idle speed	1000 rpm

Table 3-3 Yuchai YCF3050–T420 Engine

Type	In-line, water-cooled, 4-stroke
Number of cylinders	4
Cylinder bore	96 mm (3.78 in)
Stroke	103 mm (4.06 in)

Table 3-3 Yuchai YCF3050–T420 Engine (continued)

Total displacement	2.982L 0.66 gal (Imperial) 0.79 (US)
Compression ratio	17.5: 1
Firing order	1-3-4-2
Output power	36.8 kW@2200 rpm
Maximum torque	210 Nm (154.9 ft-lb)@1500 rpm
Cooling system capacity	4 L 0.88 gal (Imperial) 1.06 gal (US)
Engine oil capacity	8.5 L 1.87 gal (Imperial) 2.25 gal (US)
Idle speed	1000±25rpm

Table 3-4 Yuchai YCF3050–T307

Type	In-line, water-cooled, 4-stroke
Number of cylinders	4
Cylinder bore	96 mm (3.78 in)
Stroke	103 mm (4.06 in)
Total displacement	2.982L 0.66 gal (Imperial) 0.79 (US)
Compression ratio	17.5: 1
Firing order	1-3-4-2
Output power	36.5 kW@2400 rpm
Maximum torque	190 Nm (140 ft-lb) @1400~1700 rpm
Cooling system capacity	4 L 0.88 gal (Imperial) 1.06 gal (US)
Engine oil capacity	8.5 L 1.87 gal (Imperial) 2.25 gal (US)
Idle speed	1000±25rpm

Table 3-5 Cummins QSF2.8t3NA60

Type	Water-cooled
Number of cylinders	4

Table 3-5 Cummins QSF2.8t3NA60 (continued)

Cylinder bore	94 mm (3.7 in)
Stroke	100 mm (3.9 in)
Total displacement	2.8 L 0.62 gal (Imperial) 0.74 gal (US)
Compression ratio	16.7: 1
Firing order	1-2-4-3
Output power	43 kW @2500 rpm
Torque	186 Nm (137 ft-lb) @1100–1500 rpm
Cooling system capacity	3.5 L 0.77 gal (Imperial) 0.92 gal (US)
Engine oil capacity	8 L 1.76 gal (Imperial) 2.11 gal (US)
Low speed	1600 rpm
High speed	2200 rpm

Reducer

Table 3-6 Drive Reducer (PN.204020000024)

Model	IFT017T3B076A
Maximum withstand voltage	25 MPa (3926 psi)
Braking torque	285 Nm (210 ft-lb)
Maximum output torque	17000 Nm (12538 ft-lb)
Transmission ratio	75.6

Table 3-7 Slewing Reducer (PN.204020000031)

Model	IHKN6B56EA
Output torque	5040 Nm (3717 ft-lb)
Output speed	14.3rpm
Input torque	107 Nm (79 ft-lb)
Input speed	800rpm
Transmission ratio	56

Table 3-7 Slewing Reducer (PN.204020000031) (continued)

Static brake torque (without back pressure)	200 Nm (147.5 ft-lb)
Starting oil pressure	1.8 MPa (261 psi)

Hydraulic Motor

Table 3-8 Drive Motor (PN.202020003006)

Maximum displacement	45 ml/r
Minimum displacement	13.3 ml/r
Maximum speed (large displacement)	3500 rpm
Maximum speed (small displacement)	4650 rpm
Rated pressure	21 MPa (3046 psi)

Table 3-9 Travel Motor (PN.202020000023)

Model	HM3V45NS2RNNF1330
Large displacement	45ml/r
Small displacement	13.3ml/r
Rated speed (large displacement)	3500 rpm
Rated speed (small displacement)	4500rpm
Rated pressure	17.5 MPa (2538 psi)

Table 3-10 Hydraulic Motor (PN.202020000005)

Model	255060A6312BAAAA
Nominal displacement	60ml/r
Maximum continuous speed	890rpm
Maximum continuous flow rate	53L/min

Table 3-10 Hydraulic Motor (PN.202020000005) (continued)

Maximum continuous torque	138 Nm (102 ft-lb)
Maximum continuous differential pressure	15.5 MPa (2250 psi)

Battery

Table 3-11 Maintenance-free AGM battery (PN.203100003158)

Rated voltage	12 V
Rated capacity	100 Ah
Low-temperature starting current	830 A @ –18℃ (0℉)

Hydraulic Pump

Table 3-12 Open-circuit Variable-displacement Pump (PN.202010003068)

Type	Plunger pump
Maximum displacement	45 ml/r
Rated pressure	32 MPa(4641psi)
Switch-off pressure	22 MPa (3191 psi)
Rated speed	2700 rpm

Table 3-13 Closed-circuit Variable-displacement Pump (PN.202010000045)

Type	Plunger pump
Displacement	46 ml/r
Oil charging pump displacement	13.8 ml/r
Rated speed	3300 rpm
High-pressure overflow valve setting pressure	32 MPa (4641 psi)
Pressure shut-off valve setting pressure	30 MPa (4351 psi)

Table 3-14 Closed-circuit Variable-displacement Pump (PN.202010000054)

Type	Plunger pump
Displacement	45.9 ml/r
Oil charging pump displacement	13.9 ml/r
Rated speed	3000 rpm
Rated pressure	28 MPa (4060 psi)

3.3 FUNCTION SPEED

Table 3-15

Item	Parameters
Main boom lift up	55 – 65s
Main boom lift down	55 – 65s
Raise articulating boom lift	65 – 75 s
Lower articulating boom lift	65 – 75 s
Turntable slewing – Main boom fully retracted	95 – 103 s
Turntable slewing – Main boom not fully retracted	220 – 260 s
main boom extend	75 – 85 s
main boom retract	75 – 85 s
Extend the articulating boom	55 – 65s
Retract the articulating boom	55 – 65s
Rotate the platform (180°)	18 – 22 s
Level platform upward	50 – 60 s
Level platform downward	40 – 50 s
Raise jib	32 – 40 s
Lower jib	32 – 40 s
Travel – stowed	20 – 25 s
Travel – operating position	90 – 110 s

Table 3-15 (continued)

Item	Parameters
Braking distance	0.8 ~ 1.2m (2.6 ~ 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.

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

Turntable slewing – main boom not fully retracted : With the main boom not 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.

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

Rotate platform : 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.

Level the platform : 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.

Raise/lower the jib : 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.

3.4 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 3-16

Component	Metric (kg)	Imperial (lb)
Chassis assembly	7116	15688
Turntable assembly	7570	16689
Boom assembly	3771	8314
Base boom	705	1554
Telescopic boom section	332	732
Tower boom	626	1380
Telescopic boom section, tower boom	580	1279
Jib assembly	121	267
Cable track system	78	172
Platform	193	425
Counterweight	3852	8492
Slewing mechanism	330	728
Main boom telescopic cylinder	263	580
Tower boom telescopic cylinder	145	320
Leveling cylinder	38	84
Main boom lift cylinder	300	661
Tower boom lift cylinder	132	291
Jib cylinder	38	84
Swing cylinder	32	71
Drive motor	15	33
Drive reducer	116	256

Table 3-16 (continued)

Component	Metric (kg)	Imperial (lb)
Tire and wheel assembly	315	694
Slewing reducer	91	200
Engine-Cummins QSF2.8t3NA60	234	516
Engine-Yuchai YCF3050	280	617
Note: The weight of certain components will vary with the machine's option configuration.		

3.5 PRESSURE SETTINGS

Table 3-17

Movement	Maximum pressure
Steer	18 MPa (2610 psi)
Upward/downward platform leveling	21 MPa (3046 psi)
Main boom lowering	18 MPa (2610 psi)
Tower boom lowering	22 MPa (3190 psi)
Main boom extending	14.5 MPa (2103 psi)
Tower boom extending	16 MPa (2320 psi)
Turntable slewing	12 MPa (1740 psi)

3.6 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 3-18

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 3-19

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.

Fuel Oil

⚠ WARNING

- **The machine should be refueled in a well-ventilated place with no flames, sparks, and other hazards that may cause fire or explosion.**
- **Do not refuel the machine while the engine is running.**

This machine uses diesel oil as the fuel, and only a small amount of diesel oil is left in the fuel tank when the machine leaves the factory. The user needs to fill diesel oil timely with appropriate grade according to the ambient temperature and emission regulations. The following table shows the recommended ambient temperature for different grades of diesel oil:

Table 3-20

Grade	Recommended ambient temperature
0#	0 – 40℃ (32 – 104℉)
-35#	-30 – 25℃ (-22 – 77℉)

NOTICE

Please go to a certified gas station to purchase qualified fuel oil. It is recommended prepare an oil storage tank with fuel filter and store the fuel oil in the tank for more than two days to precipitate impurities and water before use.

Engine Oil

Engine oil should be selected based on the engine type and the local ambient temperature. The table below shows the recommended engine oil for different types of engine:

Table 3-21

Engine type	Recommended service category*	Recommended viscosity grade**
China III emission engine	CH-4	5W-40/15W-40
Yanmar engines meeting CHN Stage III emission standards	CJ-4	5W-40/15W-40
China IV, Euro V, and US Tier IV emission engines	CJ-4/CK-4	5W-40/15W-40

* The letters "H", "J" and "K" represent engine oil service category, and the oil specifications become more severe as the letters climb the alphabet. Select engine oil according to the recommendations in the table above, at least not below the service category of oil recommended in the table.
**The number before the "W" indicates the oil's fluidity at low temperatures, and subtracting 35 from it gives the minimum ambient temperature for use. For example, the minimum ambient temperature for use of 15W oil is -20°C (-4°F). Choose the oil viscosity grade according to your region's lowest ambient temperature.

Antifreeze

Factory-filled antifreeze is based on engine brand:

Table 3-22

Engine brand	Antifreeze type
Deutz	-45℃ antifreeze
Yanmar	-40℃ antifreeze
Other brands (except Deutz, Yanmar)	-35℃ antifreeze

The antifreeze types above could meet the requirements of areas with ambient temperature above -35℃ (-31℉). If the machine is to be operated in environments with temperature below -35℃ (-31℉), contact Sinoboom for appropriate antifreeze.

3.7 TORQUE SPECIFICATIONS

Special Torque Requirements

Please refer to the table below for special torque requirements:

Table 3-23 Special torque requirements

No.	Description	Torque value
1	Wheel nut	700 Nm (517 ft-lb)
2	Drive reducer bolt	300 Nm (221 ft-lb)
3	Slewing reducer bolt	450 Nm (332 ft-lb)
4	Slewing bearing fastening bolt (at the connection with chassis)	600 Nm (442 ft-lb)
5	Slewing bearing fastening bolt (at the connection with turntable)	600 Nm (442 ft-lb)
6	Counterweight fastening bolt	730 Nm (538 ft-lb)
7	Cable fastening nut M8	9 – 11 Nm (6.6 – 8.1 ft-lb)
8	Cable fastening nut M10	18 – 23 Nm (13.2 – 17 ft-lb)
10	Swing cylinder top bolt M10	70 Nm (52 ft-lb)
11	Swing cylinder bottom nut M22	630 Nm (465 ft-lb)

Hydraulic Fitting Torque

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

Table 3-24 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)

Table 3-24 Hydraulic Fitting Torque – Metric (continued)

Thread size	Installed with aluminum	Installed with steel	
	ED, O-ring + Circlip	ED, O-ring + Circlip	O-ring seal
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 3-25 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)	-
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 3-26 Hydraulic Fitting Torque - Unified Thread Standard (UNC/UNF)

Thread size	Installed with aluminum O-ring seal	Installed with steel 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 3-27 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)

Table 3-27 Fastener torque specifications – metric (continued)

Nominal diameter (mm)	Pitch (mm)	Class 8.8	Class 10.9	Class 12.9
	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 3-28 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)
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 3-29 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)

Table 3-29 Fastener torque specification – Unified Thread Standard bolts (UNF) (continued)

Nominal diameter (in)	Opposite nut size (s)	Class 5	Class 8
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 3-30 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)	-
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)

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 control box	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 working platform to a minimum position, otherwise it should be ensured that it does not fall.
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 measuresthe inclination 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, all movements will 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.

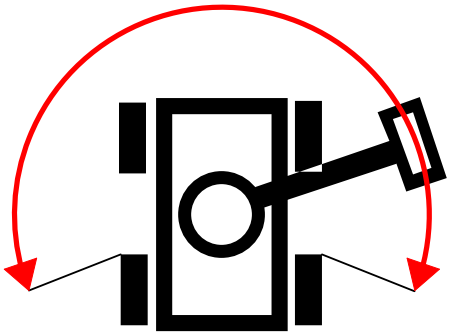

Fig. 1 Reverse position diagram

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 travel maneuverability and operating comfort.

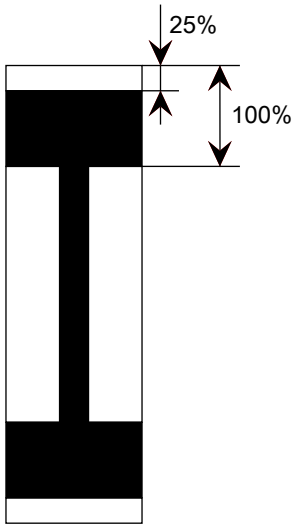

Fig. 2

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.

NOTICE

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

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 loosen but do not remove the wheel nuts yet.
4. Use a jack with sufficient load capacity to lift the frame to an appropriate height so that the tire and wheel assembly is off the ground.
5. Remove the wheel nuts in an alternating sequence, then remove the tire and wheel assembly.
6. Align the mounting holes of the new tire and wheel assembly with the corresponding mounting holes on the drive reducer.
7. Apply Loctite 272 threadlocking adhesive to the bolts and nuts, then install the nuts in sequence.
8. Tighten all nuts by hand first to prevent loosening of the bolts and nuts. Never apply lubricant to threads or nuts.
9. Then tighten the nuts step by step in the sequence as shown below. Please refer to the recommended torque settings in the table below.

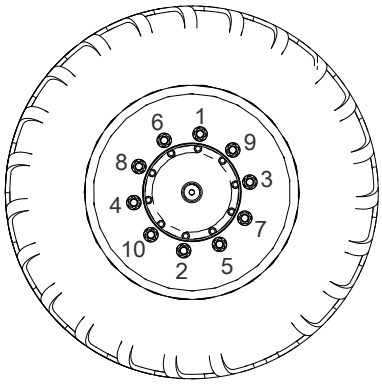

Fig. 3 Diagram – Wheel Nuts Tightening Sequence

Table 5-1 Table of Wheel Nuts Tightening Torque

First step	Second step	Third step
250 Nm (185 ft-lb)	550 Nm (406 ft-lb)	700 Nm (517 ft-lb)

5.3 TRAVEL DRIVE DEVICE

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

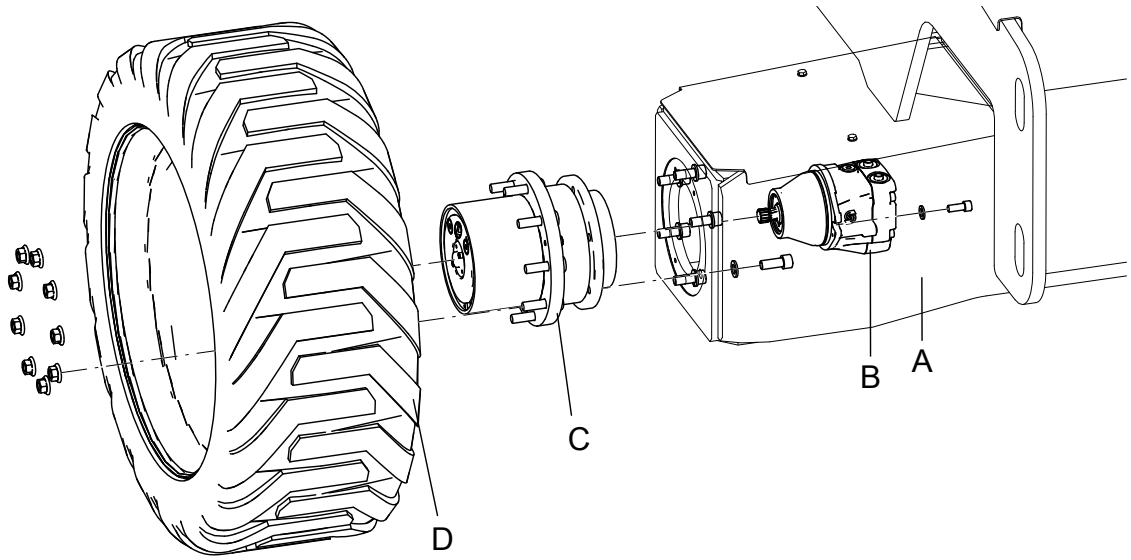

Fig. 4 Travel Drive Device

Table 5-2 Travel Drive Device Components

No.	Description
A	Axle
B	Travel motor
C	Travel reducer
D	Tires

Checkdrive reducer detailed procedures of mounting the disconnect cap

The travel reducer in theTravel Reducercan 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.

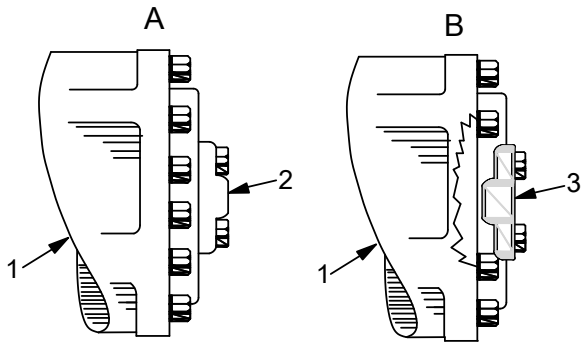

Fig. 5

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.

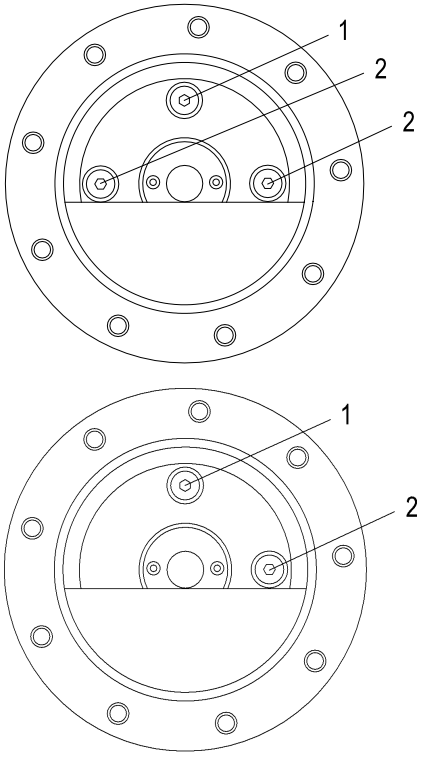

Fig. 6 Diagram – Drive Reducer Gear Oil Check

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. Use an oil gun or oil to add clean gear oil from port 1 (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

Remove and install the drive reducer and drive motor on a flat, level, solid surface

⚠ WARNING

When operating the jack, always ensure the machine remains balanced. Improper operation may lead to the danger of overturning

Disassembly

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 jack with sufficient load capacity (rated load ≥ 1.5 times the weight of the equipment) to smoothly jack the frame on the side to be disassembled up until the tires are about 50 mm (2 in) off the ground. The lifting position is generally at the flat support point of the welded reinforcement part of the frame near the tire.
4. Remove the tires(For specific operation steps, refer to ***"Tire Replacement"***), 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 washers from the motor.
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 a jack with sufficient load capacity (rated load ≥ 1.5 times the weight of the equipment) to securely support the machine frame on the 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 strength threadlocking adhesive, and then install and pre-tighten the bolts one by one in their designated position.
4. Tighten the bolts in three stages to the specified torque value according to the tightening sequence shown in ***Diagram of Tightening Sequence of Drive Reducer Bolts*** using a wrench. Refer to the ***Table of Drive Reducer Fastening Bolt Torques*** for specific values.
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 ensure:
   - The motor oil port aligns with the brake oil port on the reducer.(For details of the location of the brake oil port of the reducer, see the figure below) ;
   - 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 pre-tighten them.
8. Tighten the bolts to the specified torque with a torque wrench.
9. Reconnect the hydraulic hoses.

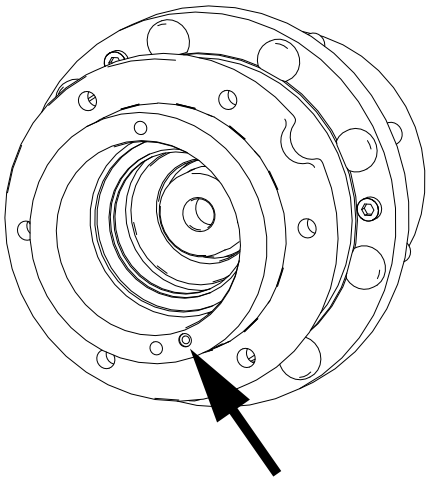

Fig. 7 Brake Oil Port – Drive Reducer

5.4 SLEWING MECHANISM

The slewing mechanism is installed on the turntable and consists of a slewing bearing, a slewing reducer and a slewing motor. It is the driving device for the slewing action of mobile elevating work platform. The inner ring of the slewing bearing is connected to the turntable by bolts, and the outer ring meshes with the pinion on the slewing reducer. The slewing reducer is driven by the motor to realize the rotation of the slewing bearing engaged, so as to rotate the turntable.

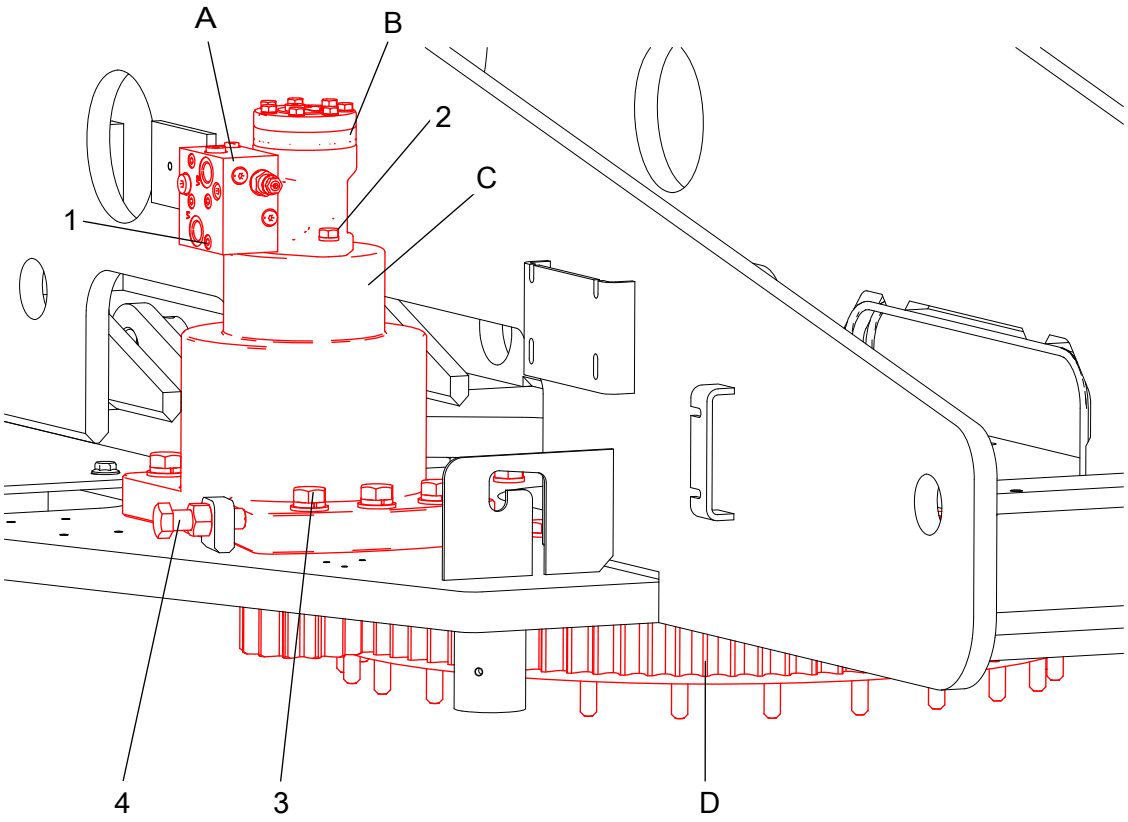

Fig. 8 Slewing Mechanism

Table 5-3 Slewing Mechanism Components

No.	Description
A	Slewing cushion valve
B	Slewing motor
C	Slewing reducer
D	Slewing bearing

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.

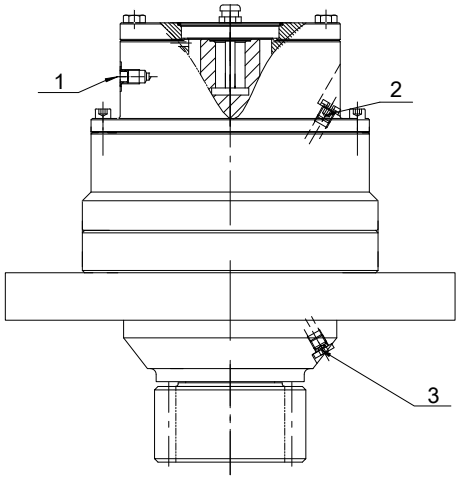

Fig. 9 Slew Reducer Oil Port Position

Table 5-4 Slew Reducer Oil Port Description

No.	Description
1	Oil Port of Brake
2	Oil Port
3	Oil Discharge Outlet

Change the Gear Oil in Slewing Reducer

Regularly changing the gear oil in slewing reducer is vital to maintaining machine performance and extending service life of the machine. It's recommended to change the gear oil in slewing reducer every year or after 1000 operating hours.

Drain waste oil from the drive reducer

1. Find the slewing reducer, as shown in the diagram of ***Slewing Mechanism*** .
2. Place a suitable vessel under the oil outlet of the slewing reducer.
3. Remove the drain plug to drain the gear oil in the reducer to the vessel.
4. Install the drain plug.

Fill with clean oil

1. Remove the oil filler plug from the reducer, add clean gear oil (refer to the ***Oil Specifications*** for viscosity grade) to the oil filler until the oil level is even with the oil filler, and then reinstall the oil filler plug.
2. Remove the oil filler plug from the brake, add clean gear oil (refer to the ***Oil Specifications*** for viscosity grade) to the oil filler until the oil level is even with the oil port, and then reinstall the oil filler plug.
3. Clean up any gear oil spills.

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 slewing bearing and the grease nipple with a hose.
2. Position the oil gun nozzle on the grease nipple and fill with ZL-3 lithium-based grease which will be transported to the turntable slewing bearing through the hose.
3. Then, rotate the turntable by 100-130mm (4-5in) each time until the whole slewing bearing is fully lubricated.
4. Apply lubricating grease on the outer gear of the slewing bearing and the gear on the slewing reducer evenly with a brush.
5. Remove excess grease.

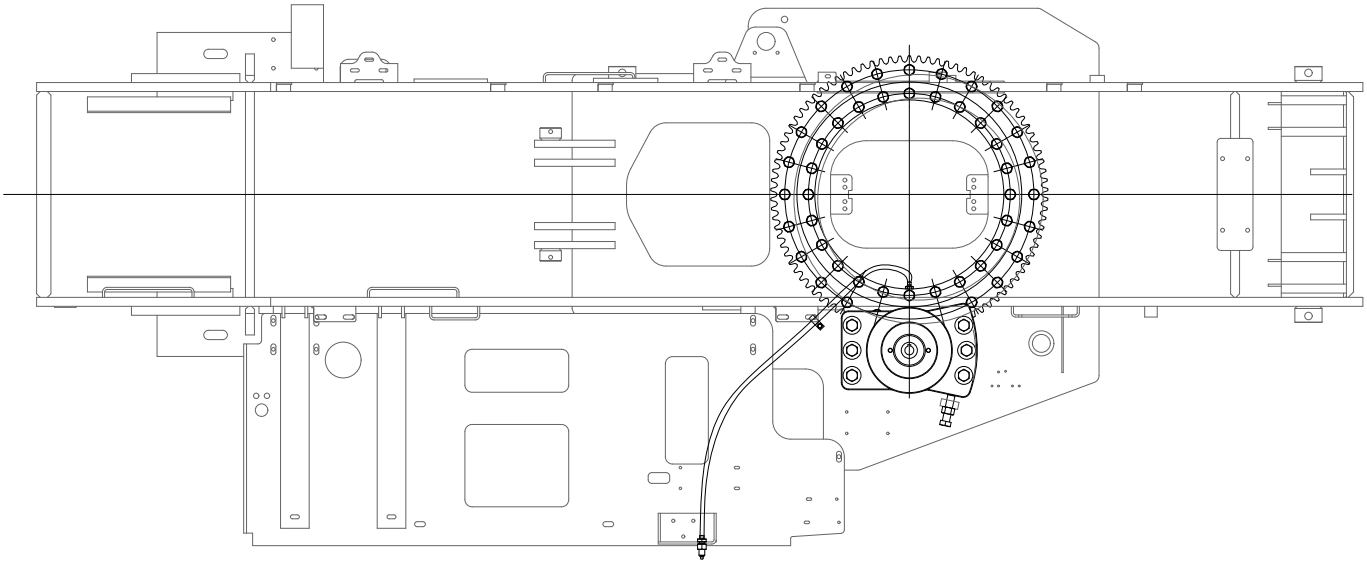

Fig. 10 Lubricating Slewing Bearing Remotely

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.

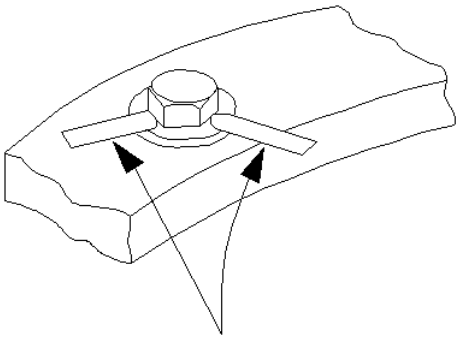

Fig. 11 Instruction for inserting a feeler gauge

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 45, 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 of 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 45, Instruction for inserting a feeler gauge***, insert a 0.04 mm (0.0016 in) feeler gauge between the bolt and washer in the semicircle of 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 45, 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 (in the opposite to the turntable counterweight).
7. Make sure that the feeler gauge does not penetrate under the bolt head to the bolt shaft.

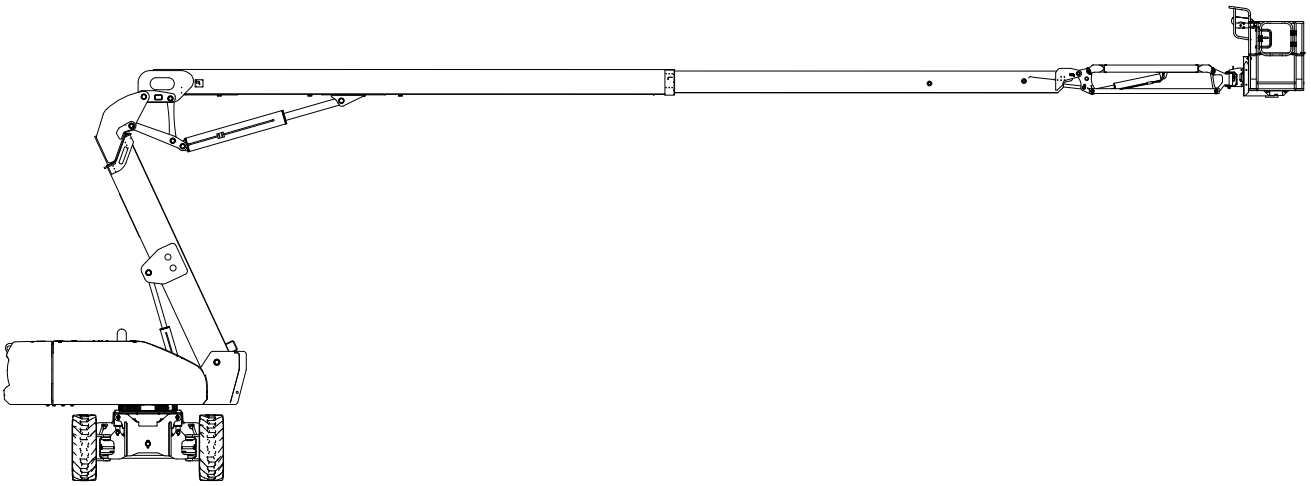

Fig. 12 Check Slewing Bearing Connecting Bolts (a)

1. Tower boom fully retracted and lifted;
2. Main boom horizontal and fully extended;
3. Jib lifted to horizontal position;
4. Turntable rotated 90°;

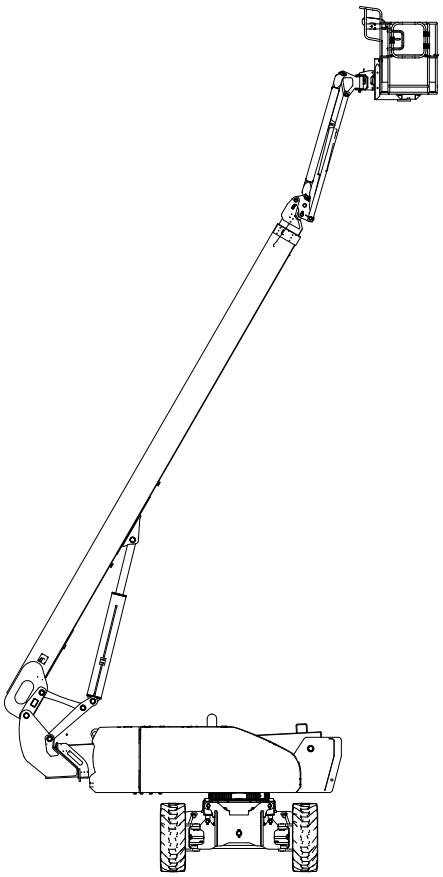

Fig. 13 Check Slewing Bearing Connecting Bolts (b)

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

Adjust the Gear Backlash of Slewing Mechanism

1. Make sure the turntable is locked (lock the slewing pin if turntable slewing pin is equipped).
2. Loosen the fastening bolt at position #3 securing the slewing reducer and turntable.
3. Push the slewing reducer mounting disc towards the slewing bearing as much as possible, so that the slewing reducer gears enter the slewing bearing gear ring.
4. Loosen the locking nut at position #4 and turn the adjusting bolt there.
5. Measure the gear backlash between the slewing reducer and the slewing bearing with a feeler gauge, and repeatedly adjust the adjusting bolt at position #4 until the gear backlash is within 0.15-0.25mm (0.006–0.01in).
6. Hold the adjusting bolt at position #4, and tighten the locking nut there.
7. Tighten the fastening bolt at position #3 securing the slewing reducer and the turntable.

Disassembly and Installation

Disassemble slewing drive device

1. Make sure the turntable is locked (lock the slewing pin if turntable slewing pin is equipped).
2. Mark and disconnect the hydraulic pipelines on the slewing drive device and collect the hydraulic oil in the pipelines with a suitable vessel. Seal all pipelines and ports after completion of collection.
3. Remove the slewing motor after disassembling the fastening bolt at position #2 connecting the slewing motor and the slewing reducer.
4. Loosen the locking nut and adjusting bolt at position #4.
5. Remove the slewing reducer after disassembling the fastening bolt at position #3 connecting the slewing reducer and the turntable.

Install slewing drive device

1. Make sure the turntable is locked (lock the slewing pin if turntable slewing pin is equipped).
2. Remove foreign objects and burrs on the mounting surface and gears of the slewing reducer.
3. Position the slewing reducer on the mounting surface of the turntable, and measure the gear backlash relative to the slewing bearing with a feeler gauge which should be kept within 0.15-0.25mm (0.006-0.01in).

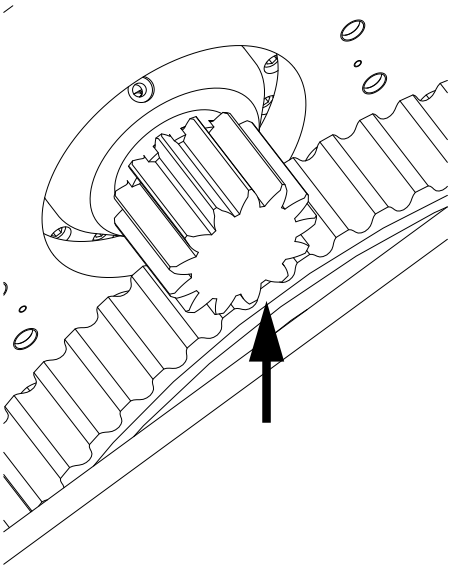

Fig. 14 Gear backlash

4. If the measured gear backlash exceeds the specified value, adjust the gear backlash to the specified value with the adjusting bolt and locking nut at position #4, and the specific method is described in ***Adjust the Gear Backlash of Slewing Mechanism*** .
5. Apply medium-to-high strength threadlocking adhesive to the bolts with washers fitted, install the bolts at position #3 one by one to secure the slewing reducer and the turntable, and then pre-tighten the bolts diagonally.
6. Ensure that the slewing reducer fits perfectly to the turntable mounting surface.
7. Tighten the bolts diagonally with a wrench.
8. Fill the slewing reducer with gear oil to cover the gear surface.
9. Clean the mounting surface of the slewing reducer, and match the slewing motor pivot pin with the reducer pin hole.
10. Turn the motor housing so that the bolt hole on the slewing motor is aligned with that on the reducer. Apply medium-to-high strength threadlocking adhesive to the bolts with washers fitted, install and tighten the bolts at position #2 according to the specified torque.

Installationion of the slewing bearing

1. Use suitable lifting equipment to lift the slewing bearing to the chassis mounting surface.
2. 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).
3. Using the special high-strength washers for high-strength bolts, fit the washer face with the mounting surface, and apply medium-to-high strength threadlocking adhesive, and then install the bolts to the outer ring of the slewing bearing.
4. Tighten the bolts in the sequence shown in the following diagram and follow the steps in the table below.
5. Rotate the inner ring of the slewing bearing by hand to ensure smooth movement.
6. Remove the lifting equipment from the slewing bearing.
7. Rotate the inner ring of slewing bearing so that the soft belt area on the inner ring and that on the outer ring are symmetrically distributed with the slewing bearing as the center.
8. Use suitable lifting equipment to lift the turntable to the slewing bearing mounting surface.
9. Check the clearance between the slewing bearing mounting surface and the turntable mounting surface with a feeler gauge, ensuring the clearance ≤ 0.2 mm (0.008in).
10. Using the special high-strength washers for high-strength bolts, fit the washer face with the mounting surface, and apply medium-to-high strength threadlocking adhesive, and then install the bolts to 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.

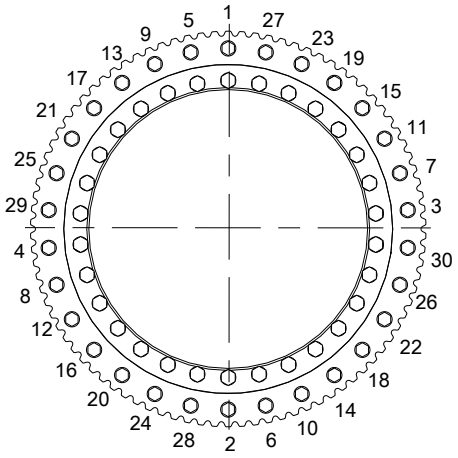

Fig. 15 Tightening Sequence of Slewing Bearing Bolts

Table 5-5 Table of Slewing Bearing Bolt Tightening Torques

First step	Second step	Third step
320 Nm (236 ft-lb)	540 Nm (398 ft-lb)	600 Nm (443 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 turntable 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

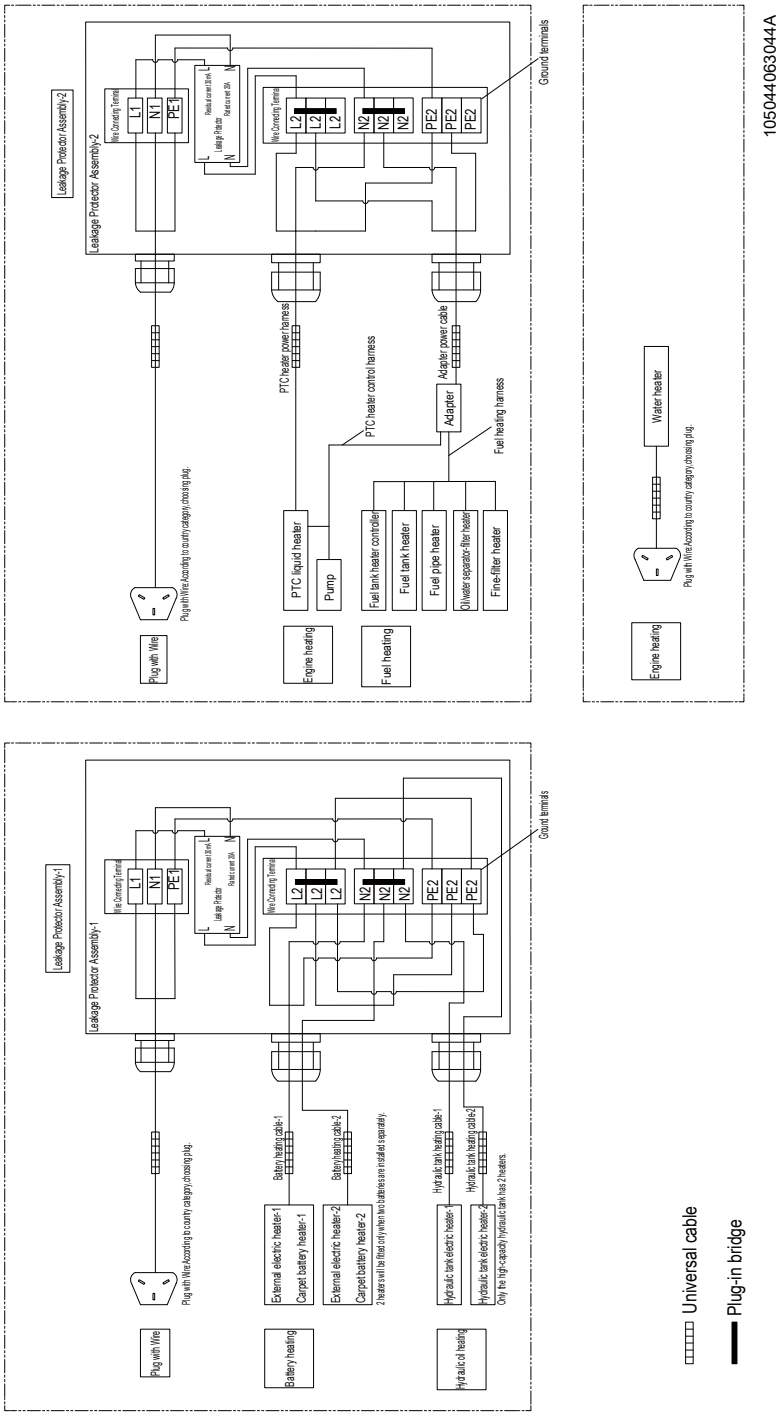

Fig. 18 Electrical Schematic Diagram

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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 slewed 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

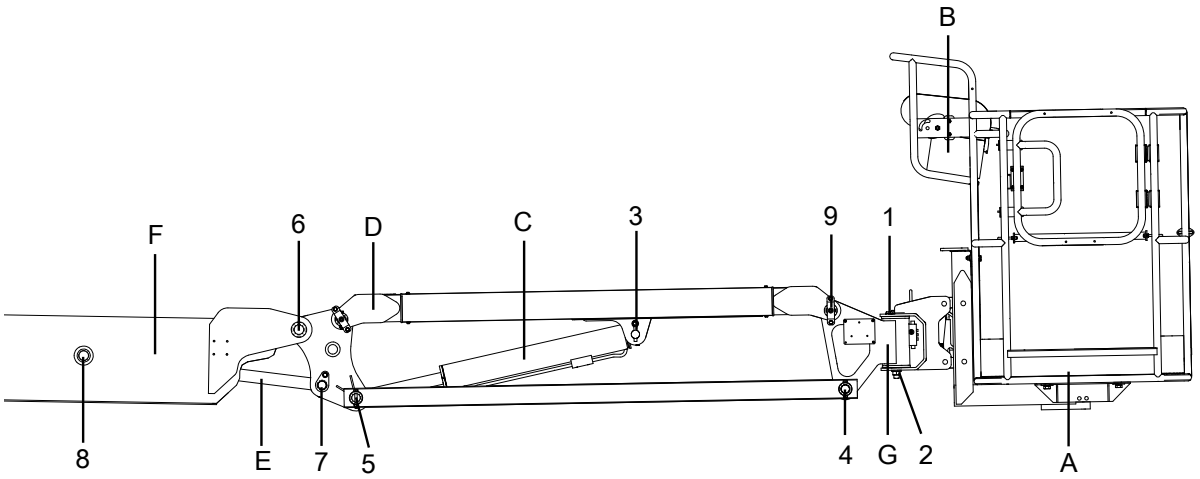


Fig. 1 Diagram of Platform and Jib Structure

Table 6-1 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 stop pin 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 leveling 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. Plug the lines and the ports.
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

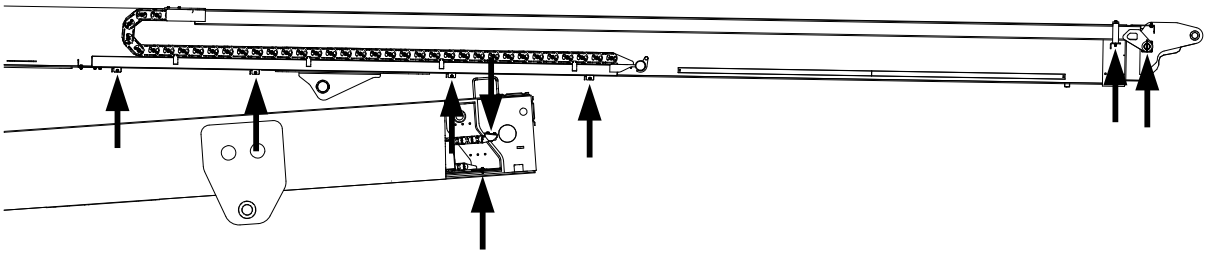


Fig. 2 Fastening Bolts on Cable Track Assembly

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.

Check

- 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

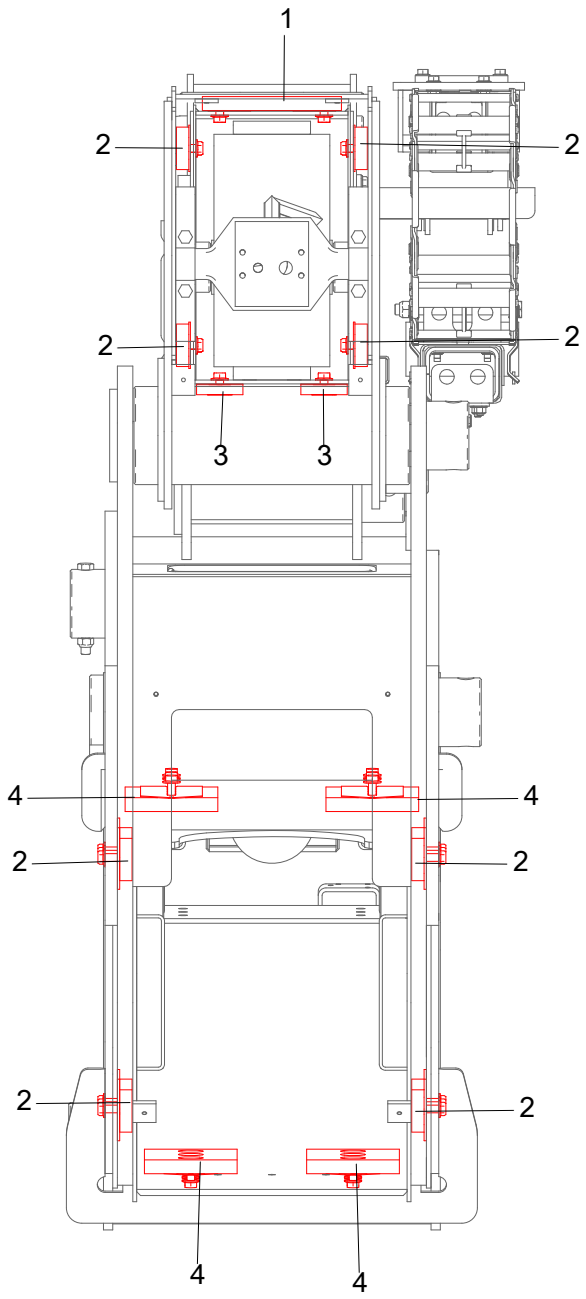


Fig. 3 Diagram of Boom Head Wear Pads

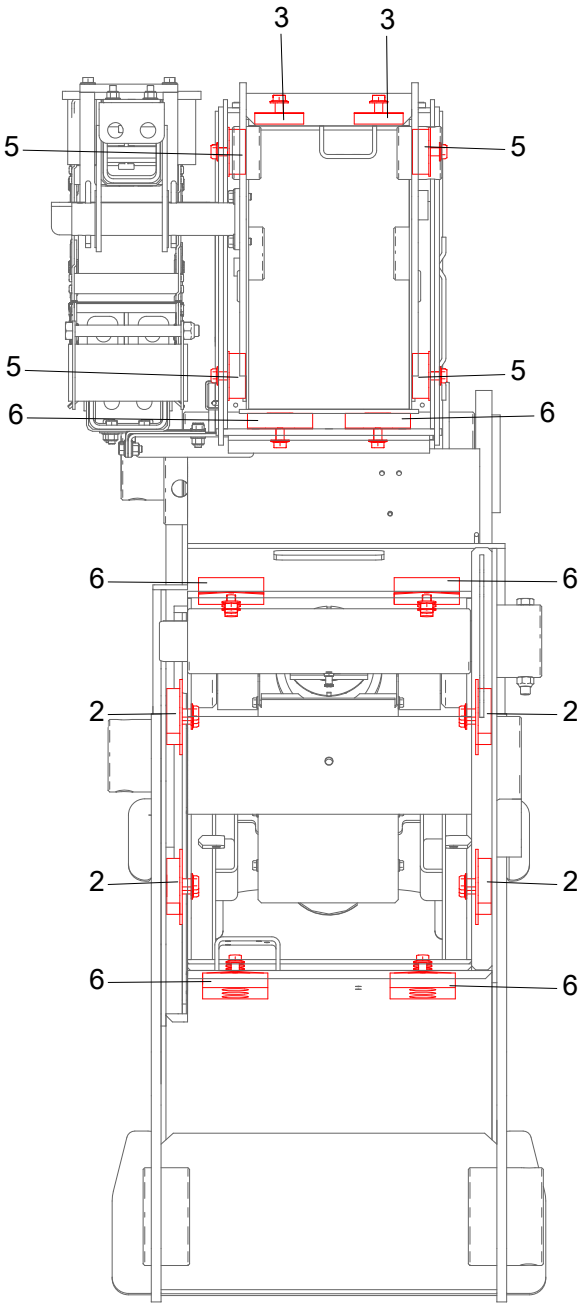


Fig. 4 Diagram of Boom Tail Wear Pads

Table 6-2 Boom Wear Pad Thickness

No.	Wear pad thickness
1	18 mm (0.71 in)
2	16 mm (0.63 in)
3	13 mm (0.51 in)
4	18 mm (0.71 in)
5	20 mm (0.79 in)
6	18 mm (0.71 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).

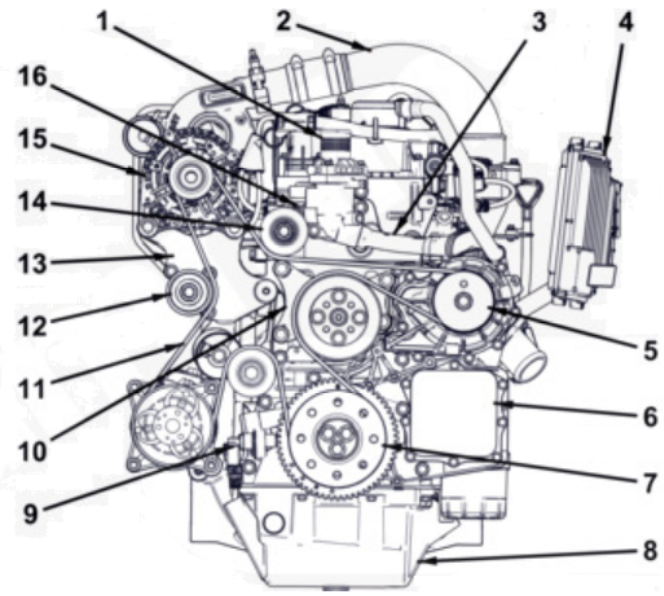
NOTICE

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

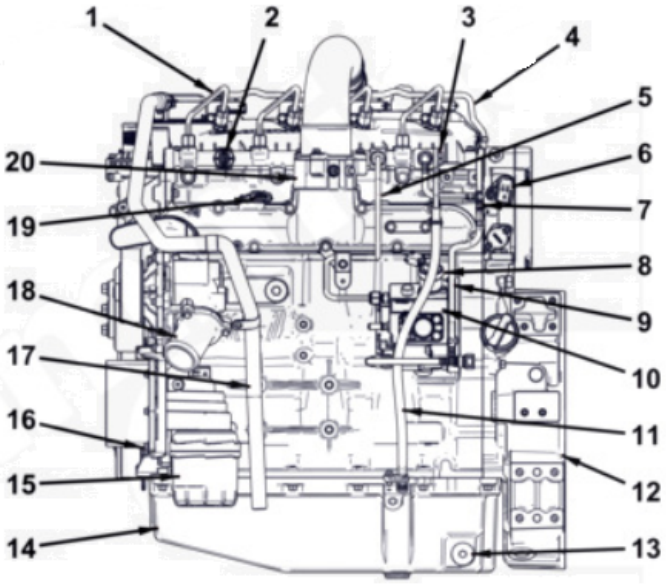
7 POWER SYSTEM

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.

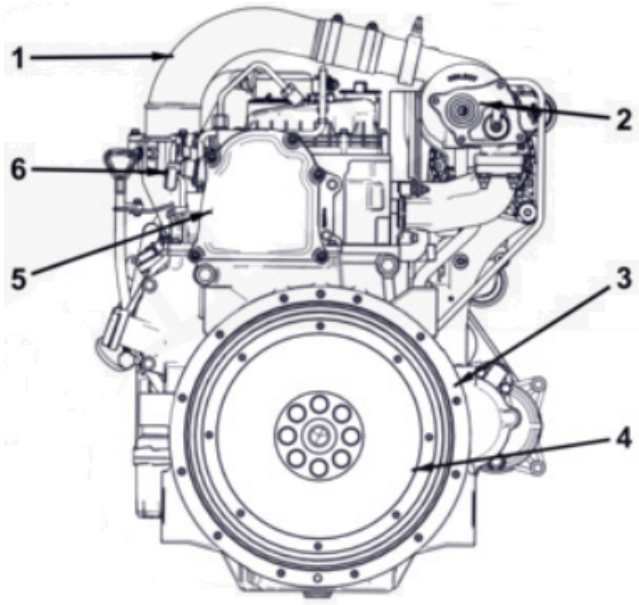
7.1 CUMMINS QSF2.8



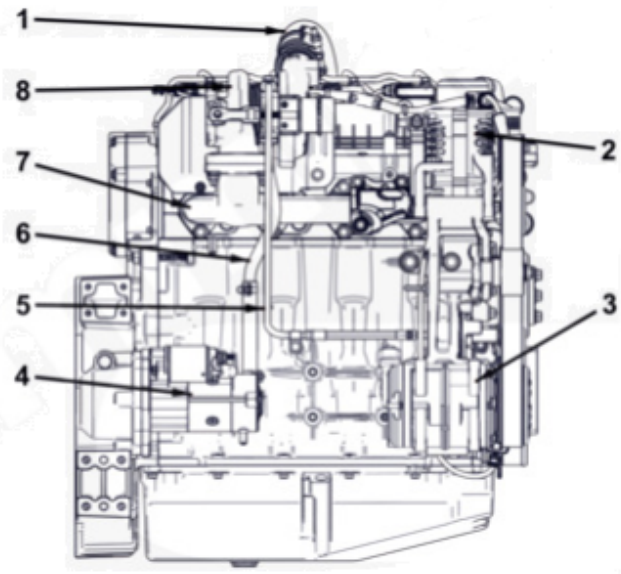
1. Coolant outlet connection
2. Air crossover tube
3. Thermostat housing pipeline
4. Engine control module (ECM)
5. Pump drive device
6. Front gear housing cover
7. Crankshaft pulley
8. Oil pan
9. Crankshaft position sensor
10. Fan hub bracket
11. Fan belt
12. Belt tensioner
13. Charger mounting bracket
14. Idler pulley
15. Electric Motor Charger
16. Coolant temperature sensor



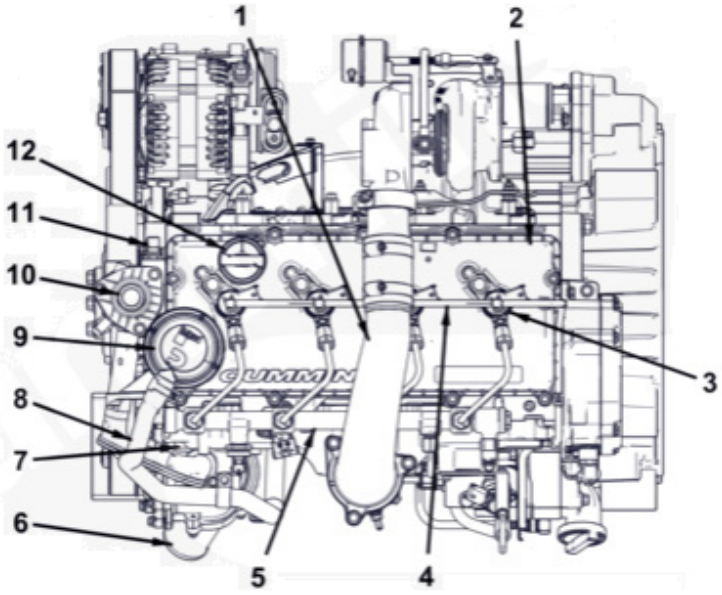
1. High-pressure fuel supply to oil injector
2. Fuel rail pressure sensor
3. Fuel rail pressure-reducing valve
4. Fuel rail return pipe
5. High-pressure fuel supply to fuel rail
6. Camshaft position sensor
7. Connecting fuel return pipe
8. Fuel pump actuator
9. Fuel pump return pipe
10. High-pressure fuel pump
11. Engine oil gauge (dipstick)
12. Flywheel housing
13. Oil discharge plug
14. Oil pan
15. Oil filter
16. Crankshaft position sensor
17. Crankcase breather pipe
18. Water inlet connection
19. Intake air temperature/pressure sensor
20. Intake connection



1. Air crossover tube
2. Exhaust outlet connection
3. Flywheel housing
4. Flywheel
5. Overhead camshaft sprocket housing cover
6. Camshaft position sensor



1. Air crossover tube
2. Electric Motor Charger
3. Refrigerant compressor (optional)
4. Starting motor
5. Turbocharger oil supply pipe
6. Turbocharger oil return pipe
7. Exhaust manifold
8. High level-mounted turbocharger



1. Air crossover tube
2. Rocker arm housing cover
3. Fuel injector
4. Fuel injector return pipe
5. High-pressure fuel rail
6. Water inlet connection
7. Coolant temperature sensor
8. Crankcase breather pipe
9. Crankcase breather
10. Water outlet connection
11. Coolant temperature sensor
12. Engine oil filling port

Periodic Maintenance Chart

Daily and periodic maintenance is important to keep the engine in good operating condition. The following is a summary of maintenance items by periodic maintenance intervals. Periodic maintenance intervals vary depending on engine applications, loads, diesel fuel and engine oil used. The following should be treated only as a general guideline.

Table 7-1 Periodic Maintenance Chart

○: Inspection ◇: Replacement

Systems	Check Item	Daily	Periodic Maintenance Interval			
			Every 250 hours	Every 500 hours	Every 1000 hours	Every 2000 hours
Cooling system	Check and refill engine coolant	○				
	Check cooling fan for normal operation	○				
	Check cooling system		○or every 3 months[1]			
	Check radiator hose					
	Check if the radiator pressure cap can be reused					
	Check the belt tensioner of cooling fan				○or every 1 year[1]	
	Check belt drive fan					
	Flush the cooling system					◇ or every 2 years[1]
Intake system	Check Intake Pipe	○				
	Check the air resistance of air cleaner		○or every 3 months[1]			
Belt drive	Check drive belt	○				
Fuel oil	Drain the Fuel-water Separator	○				
	Replace the fuel filter (cartridge)			◇ or every 6 months[1]		
Engine oil	Check the engine oil level	○				
	Change engine oil and filter			◇ or every 6 months[1]		

[1]: Whichever comes first.

Note: The above are general maintenance procedures, and the maintenance costs shall be borne by the user.

Fuel System

Check the Fuel Level

The current fuel level can be checked on the powered-on turntable control box display or platform control box display.

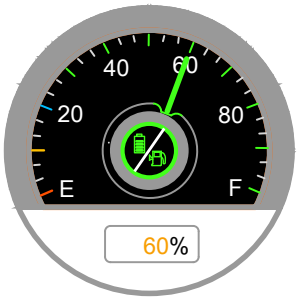


Fig. 1 Fuel level (at the turntable controller)

Fig. 2 Fuel level (at the platform controller)

Fill the Fuel Tank

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

⚠ WARNING

- **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 fuel filter on the pressure side. Pre-filling the pressure-side fuel filter can cause debris to enter the fuel system and damage fuel system components.*
- *After installing the fuel filter, the fuel system must be filled.*
- *Tightening the filter too tightly can cause thread distortion, or bring damage to the filter element gasket or filter tank.*

It is recommended to replace the fuel filter element every 6 months or after 500 hours of operation.

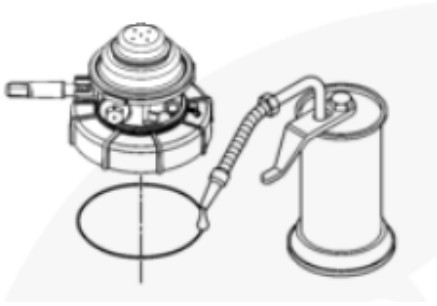


Fig. 3

1. Disconnect the battery.
2. If necessary, disconnect the fuel heater wire harness.
3. Disconnect the fuel pipe.
4. Loosen the top of the fuel filter housing and remove the O-ring and fuel filter element.
5. Lubricate the O-ring with clean oil.
6. Install the new fuel filter element into the fuel filter housing.
7. Reinstall the top of the fuel filter housing and tighten it by hand.
8. Connect the fuel pipe.
9. If necessary, connect the fuel heater wire harness.
10. Connect the battery.
11. Vent the fuel line.

Drain the Fuel-water Separator

It is recommended to drain the fuel-water separator daily.

Canned fuel-water Separator Drainage :

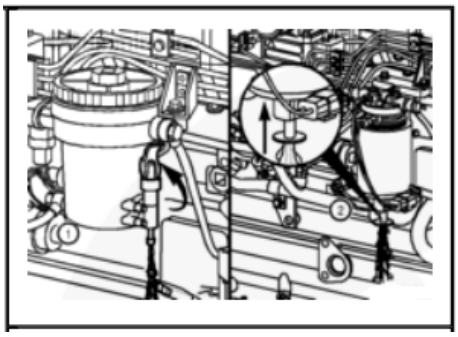


Fig. 4

1. Turn off the engine.
2. Place an appropriate oil-collecting vessel under the drain valve.
3. Disconnect the cable harness.

4. Lift the drain valve lever up until all liquid is drained from the drain pipe.
5. Drain the water from the separator until clean fuel is seen.
6. Push the drain valve up until all liquid is drained from the drain pipe.
7. Connect the cable connectors.

Rotary fuel-water Separator Drainage :

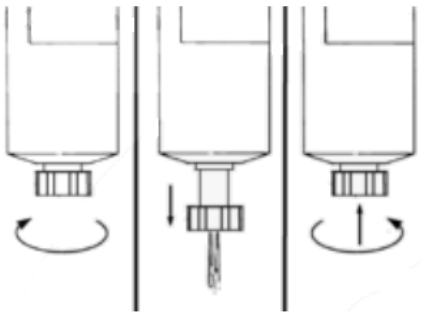


Fig. 5

1. Turn off the engine.
2. Place an appropriate oil-collecting vessel under the drain valve.
3. Disconnect the cable harness.
4. Open the drain valve until all liquid is drained from the drain pipe.
5. Drain the water from the separator until clean fuel is seen.
6. Lift the drain valve up and rotate it clockwise until tightened by hand.
7. Connect the cable connectors.

Bleed the Fuel Lines

NOTICE

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

The fuel lines are bled through the electric fuel supply pump.

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

1. Ignition: Turn on the electronic fuel supply pump for 20 seconds to bleed the fuel lines and build up the required fuel pressure.
2. Wait until the fuel supply pump is disconnected from the control unit.
3. Turn off the ignition.
4. Repeat the above steps at least 4 times until the fuel lines are fully bled.

Lubrication System

Check the Engine Oil 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 oil dipstick according to the ***Oil Specifications*** , and do not overfill the tank.

Change the Engine Oil

It is recommended to change the engine oil every 6 months or after 500 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.*

1. Before changing the oil, run the engine until the coolant reaches approximately 60°C (140°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.
4. Remove the drain plug to drain the oil. Make sure to remove all oil and suspended dirt from the engine.

⚠ WARNING

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

5. Clean and inspect the threads and sealing surfaces of the drain plug. If damaged, replace the O-ring with a new one.

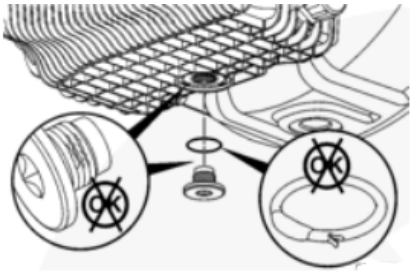


Fig. 6

6. Reinstall the drain plug after the oil is fully drained.
7. Fill with correct and clean engine oil according to the ***Oil Specifications*** , and never overfill the tank.
8. Idle the engine and check the drain plug for leakage.
9. Turn off the engine. Wait about 5 minutes for the oil to flow back from the upper parts of the engine.
10. Check the oil level, which should be in the proper position.

Replace the Engine Oil Filter Element

It is recommended to replace the engine oil filter element every 6 months or after 500 hours of operation.

1. Place an appropriate oil-collecting vessel under the oil filter.
2. Disassemble the oil filter with special tools.
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. Fill the filter with clean oil.
7. Mount the filter on the oil filter bracket.
8. Screw on the filter by hand until the gasket is touching, then tighten it.
9. Idle the engine and check the oil filter gasket for leakage.

Cooling System

It is recommended to replace the coolant every two years or after 2000 hours of operation.

Check the Coolant Level

1. Turn off the engine.
2. Make sure that the machine and engine are level.
3. Check the coolant level, which should be between the upper mark and lower mark.
4. If necessary, fill with correct coolant according to the ***Oil Specifications*** , and do not overfill the tank.

Empty the Cooling System

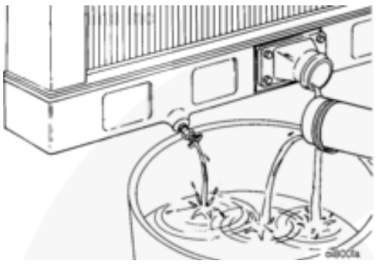


Fig. 7

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 container under the discharge outlet.
3. Remove the oil drain plug at the bottom of the radiator.
4. Drain the engine coolant.
5. Install the oil plug.

Fill Coolant

1. After the engine and radiator have cooled sufficiently (to the temperature below 50°C/122°F), carefully remove the pressure cap on the radiator.
2. Add correct coolant to the FULL mark according to the ***Oil Specifications*** .
3. Reinstall the pressure cap.
4. Run the engine to operating temperature.
5. Turn off the engine.
6. Check the coolant level in the cooled engine.

Intake System

Check Intake Pipe

Visually inspect the intake pipe daily for signs of wear, damaged pipelines or loose clamps that could damage the engine. If necessary, replace the damaged pipe and tighten the loose clamp to ensure that the air system does not leak.

Check the clamp and hose of the intake pipe for corrosion, which may allow the corrosive and dirt to enter the air intake system. If necessary, disassemble and clean the system.

Check the Resistance of Air Filter

Mechanical resistance indicator

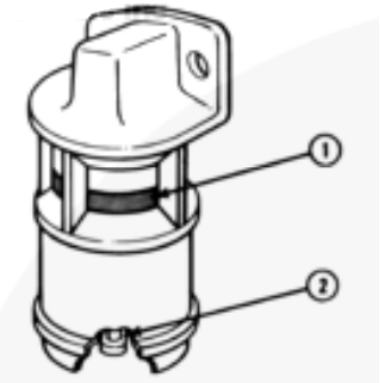


Fig. 8

Notes: Do not remove the felt washer of the indicator. The felt washer is used to absorb moisture.

The mechanical resistance indicator indicates if the resistance for air to go through the dry air filter is too high. The indicator can be mounted on the air filter outlet or the dashboard. As dirt accumulates in the filter element, the red mark (1) in the window will gradually rise. After replacing the filter element, press the reset button (2) to reset the indicator.

Vacuum indicator

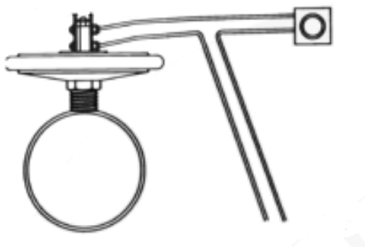


Fig. 9

The resistance or vacuum indicator should be installed as close as possible to the turbocharger inlet to obtain actual resistance. When the air resistance is too high, the vacuum switch will activate the alarm indicator on the dashboard.

Mechanical indicator for industrial gas

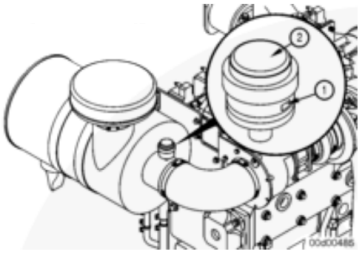


Fig. 10

The mechanical resistance indicator indicates if the resistance for air to go through the dry air filter is too high. The indicator can be mounted on the air filter outlet. As dirt accumulates in the filter element, the red mark (1) in the window will gradually rise. After replacing the filter element, press the reset button (2) to reset the indicator.

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 Belt

The belt should be replaced/reinstalled immediately if the belt has:

- Cracked or broken
- Worn or unaligned
- Come off
- Glazed or hardened

If the belt is not properly tensioned, it should be adjusted:

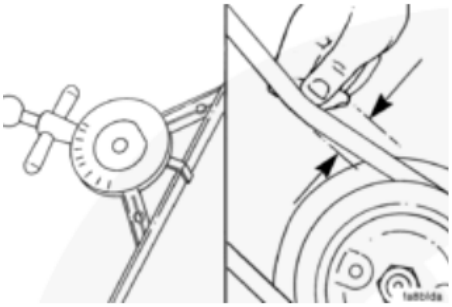


Fig. 11

1. Check the belt tension at its center.
2. Refer to the chart of engine belt tension to select the correct test gauge and tension value based on the width of the belt used.
3. Use alternative method (deflection method) to apply a force of 110N (25lbf) on the V-belt between two

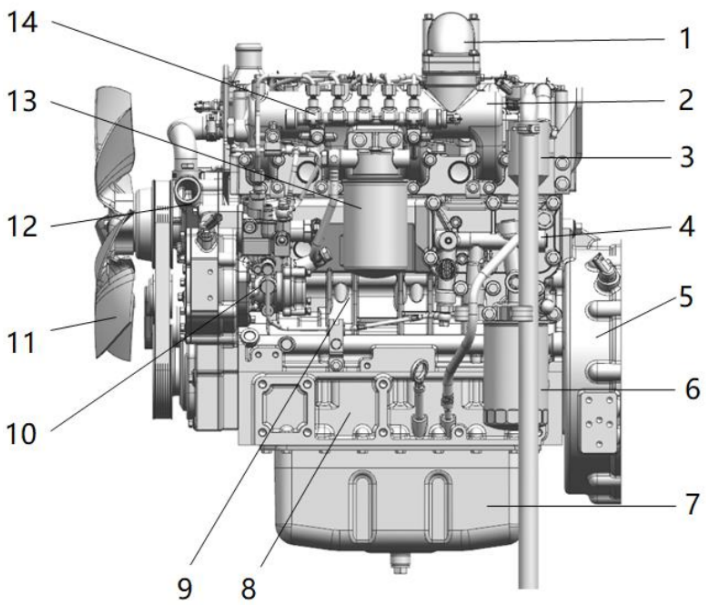
pulleys to check the belt tension. If the deflection of the pulley center distance per foot exceeds the belt thickness, the belt tension must be adjusted.

Replace the V-ribbed Belt

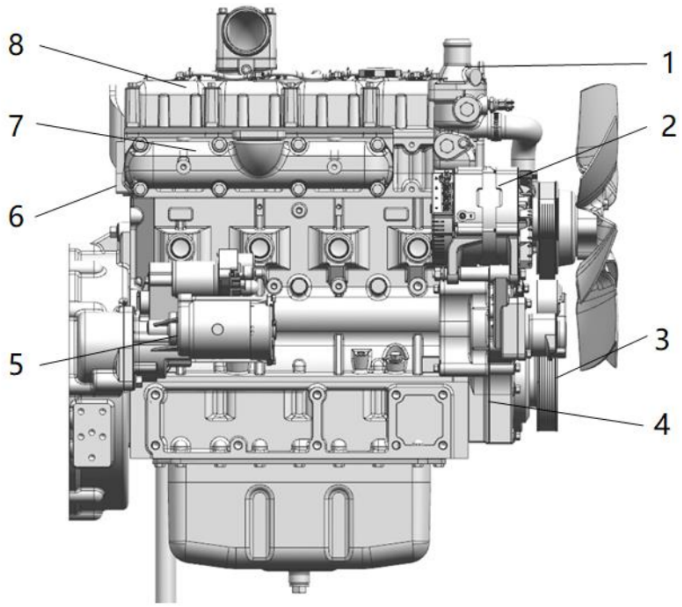
It is recommended to replace the V-ribbed belt every 2 years or after 2000 hours of operation.

7.2 YUCHAI YCF30

Naturally Aspirated Engine Series (vary with different models):

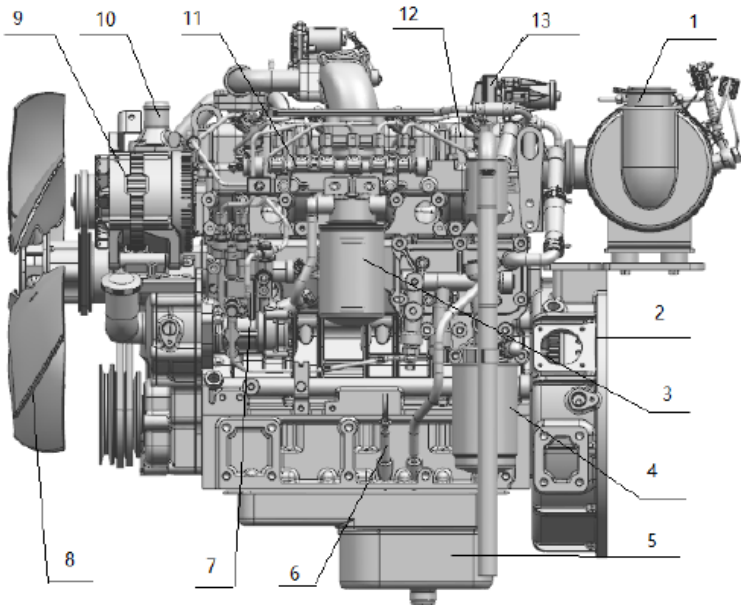


1. Intake connecting pipe
2. Intake pipe
3. Oil-gas separator
4. Oil cooler
5. Flywheel housing
6. Oil filter
7. Oil pan
8. Crankcase
9. Cylinder block
10. Fuel injection pump
11. Fan
12. Water pump
13. Diesel filter
14. Common rail pipe

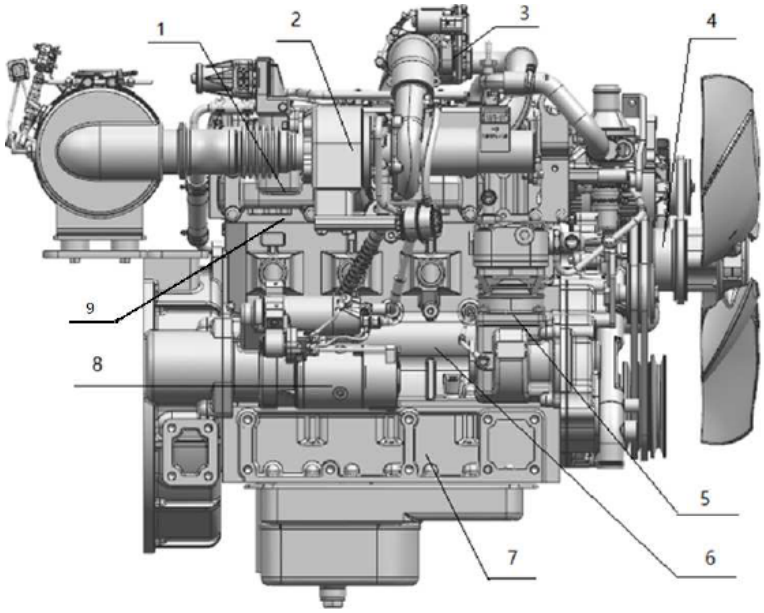


1. Thermostat cover
2. Electric Motor
3. Crankshaft Pulley
4. Gear housing and cover
5. Starter
6. Cylinder head
7. Exhaust pipe
8. Cylinder head cover

Turbocharged Engine Series (vary with different models):



1. Catalytic filter components
2. Flywheel housing
3. Diesel filter
4. Oil filter
5. Oil pan
6. Oil dipstick
7. Fuel injection pump
8. Fan
9. Electric motor
10. Thermostat
11. Common rail pipe
12. Cylinder head cover
13. EGR valve



1. Exhaust pipe
2. Turbocharger
3. Throttle valve
4. Water pump
5. Air compressor
6. Cylinder block
7. Crankcase
8. Starter
9. Cylinder head

Periodic Maintenance Chart

Daily and periodic maintenance is important to keep the engine in good operating condition. The following is a summary of maintenance items by periodic maintenance intervals. Periodic maintenance intervals vary depending on engine applications, loads, diesel fuel and engine oil used. The following should be treated only as a general guideline.

Table 7-2 Periodic Maintenance Chart

No.	Check Item	Daily	Periodic Maintenance Interval	
			Initial maintenance[2]	Every 500 hours
1	Check engine for leakage (water, oil and air leakage)	√	√	√
2	Check fuel level	√	√	√
3	Check the engine oil condition and level	√	√	√
4	Check and clean air cleaner element[1]	√	√	√
5	Check engine coolant level and color	√	√	√
6	Check wire connections for poor contact, interference and wear.		√	√
7	Check water pump for normal operating		√	√
8	Check the belt for wear and adjust belt tension		√	√
9	Check crankshaft position sensor, camshaft sensor head for foreign matters		√	√
10	Check pipe and wire connections			√
11	Change the engine oil		√	√
12	Change the engine oil filter element		√	√
13	Replace the fuel filter element (including fuel-water separator and fine filter)			√
14	Release water in the Fuel-water Separator	√	√	√
15	Clean diesel engine			√
16	Read fault codes of electronic control system with a fault diagnosis instrument and clear troubles		√	√
17	Check acceleration and deceleration performance and exhaust color		√	√

[1]: perform maintenance every 50 hours. Perform maintenance every 5-10 hours in harsh working conditions. The filter element must be changed if the element is deformed or after 3-4 times of maintenance, or as required in the air filter instructions.

[2]: initial maintenance shall be performed after the machine is put into service for 50–100 hours for the first time.

Fuel System

Check the Fuel Level

The current fuel level can be checked on the powered-on turntable control box display or platform control box display.

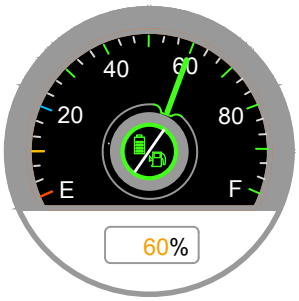


Fig. 12 Fuel level (at the turntable controller)

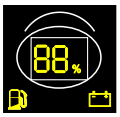


Fig. 13 Fuel level (at the platform controller)

Fill the Fuel Tank

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

⚠ WARNING

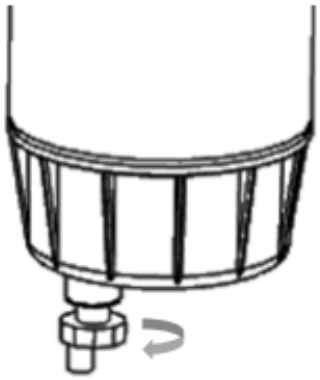
- **Do not mix gasoline, alcohol, or their mixture with diesel fuel.**
- **Before filling the fuel tank, always stop the engine. And keep it away from ignition sources.**
- **During refueling, take care to prevent fuel spillage. If fuel spills, wipe it clean immediately. Refuel only after the engine 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 Element

It is recommended toreplace the fuel filter element after 500 hours of operation.

Drain the Fuel Pre-filter and Replace Filter Element

It is recommended to drain the fuel pre-filter daily and replace the fuel pre-filter element after 500 hours of operation.



Empty the fuel pre-filter:

1. Turn off the engine.
2. Place an appropriate oil-collecting vessel under the drain valve.
3. Disconnect the cable harness.
4. Open the drain valve to allow the liquid to flow out completely.
5. Close the drain valve.
6. Connect the cable connectors.

Replace the fuel pre-filter element:

1. Turn off the engine.
2. Close the fuel shut-off valve to disconnect the fuel supply to the engine (with high-lying fuel tank).
3. Place an appropriate oil-collecting vessel under the drain valve.
4. Disconnect the cable harness.
5. Open the drain valve to allow all liquid to flow out.
6. Remove the filter element.
7. Clean any dirt off the sealing surface of the new filter element and opposite side of the filter head with clean, non-fiber cloths.
8. Apply a thin layer of oil to the sealing surface of the new filter element.
9. Screw on the new element by hand until the gasket is touching, then tighten it with proper torque.
10. Mount the drain valve.
11. Open the fuel shut-off valve to bleed the fuel lines.

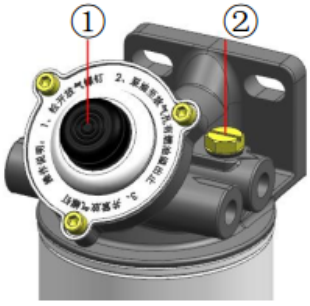
Bleed the Fuel Lines

NOTICE

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

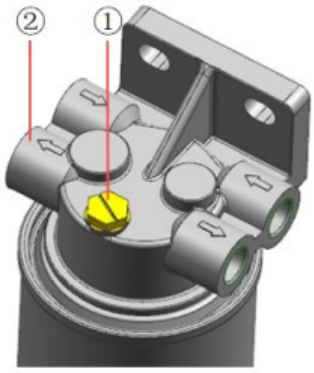
The fuel lines are bled through the electric fuel supply pump. If the pre-filter is of integrated electronic fuel transfer pump structure, this operation is not necessary.

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



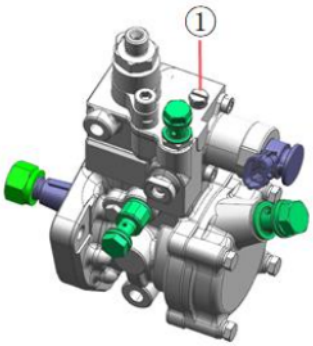
1. Hand pump (on pre-filter)
2. Venting Screw

Fig. 14 Fuel pre-filter



1. Venting screw
2. Oil outlet connection

Fig. 15 Fuel fine filter



1. Venting screw

Fig. 16 Fuel injection pump

1. Loosen the venting screw on the pre-filter, press the hand pump on the pre-filter, and tighten the venting screw on the pre-filter when there is continuous bubble-free fuel flowing out of the venting screw.
2. Loosen the venting screw on the fine filter (if there is no venting screw, loosen the oil outlet connection of the fine filter), press the hand pump on the pre-filter, tighten the venting screw (or oil outlet connection) on the fine filter when there is continuous bubble-free fuel flowing out of the venting screw (or fine filter oil outlet).

   Note: The oil outlet on the fine filter is generally indicated by an arrow, and what needs to be loosened is the connection with the oil pipe.
3. Loosen the venting screw on the fuel injection pump, press the hand pump on the pre-filter, and tighten the venting screw on the fuel injection pump after there is continuous bubble-free fuel flowing out of the venting screw.
4. Continuously press the hand pump on the pre-filter to keep more fuel flowing into the injection pump.
5. After the engine starts, it is recommended to run the engine at idle speed for 2min-3min, and then run it at 60%-80% of the rated speed for 3min-5min to fully empty the air in the fuel line.

Lubrication System

Check the Engine Oil 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 oil 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 - 100 hours of operation, and afterwards every 500 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.*

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.
4. Remove the drain plug 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 plug after the oil is fully drained.
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 Element

It is recommended to replace engine oil filter element after the machine is put into service for 50–100 hours for the first time, and every 250hours 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

It is recommended to replace the coolant every two years or after 2000 hours of operation.

Check the Coolant Level

1. Turn off the engine.
2. Make sure that the machine and engine are level.
3. After the coolant temperature drops below 50°C (122°F), slowly open the coolant filler cap to check the coolant level.
4. The coolant level should be between the MIN and MAX marks on the box body.
5. If necessary, fill with correct coolant according to the ***Oil Specifications*** , and do not overfill the tank.

Empty the Cooling System

1. After the engine and radiator have cooled sufficiently (to the temperature below 50°C/122°F), carefully remove the pressure cap on the radiator.

Fig. 17 Pressure cap on the radiator

2. Place an appropriate container under the discharge outlet.
3. Loosen the drain valve on the engine oil cooler.

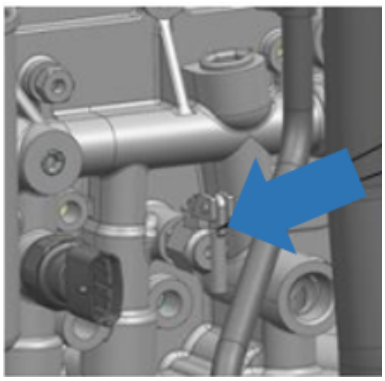


Fig. 18 Drain valve on the engine oil cooler

4. Drain the coolant.
5. Reinstall the pressure cap and drain valve.

Fill Coolant

1. After the engine and radiator have cooled sufficiently (to the temperature below 50°C/122°F), carefully remove the pressure cap on the radiator.
2. Add correct coolant to the FULL mark according to the ***Oil Specifications*** .
3. Install the coolant filler cap.
4. Run the engine to operating temperature.
5. Turn off the engine.
6. Check the coolant level in the cooled engine.

Intake System

Filtration Principle of Air Filter

- **Primary filter:** air director (to make the air form a vortex and remove dirt through the dust bag after the dust settles to the bottom under the action of gravity and centrifugal force).
- **Secondary filter:** main filter element (as major filtration, with the filtration rate of more than 95%).
- **Third-stage filter:** safety filter element (as auxiliary filtration while preventing foreign matter from entering).

Air Ceaner Maintenance Indicator

For machines equipped with air filter blockage alarm function, if the alarm is triggered, clean or replace the air filter.

For machines not equipped with air filter blockage alarm function, the user can find out the air filter blockage by checking the air resistance indicator installed on the intake pipe behind the air filter, and when the indication window of the air resistance indicator changes from green to red, it indicates that the air intake resistance exceeds the limit value and the filter needs to be cleaned or replaced.

Air Filter Maintenance

It is recommended tomaintainthe air filter after 50 hours of operation.

Air filter housing: Remove the dust in the filter cavity, air director and dust bag, and do not throw the air director away without recognizing its function.

Main filter element: Remove the dust from the surface of the filter element with a brush, then blow the element with compressed air (pressure of 0.4-0.6MPa/58-87psi) from the inside to the outside.

Safety filter element: Clean it by hand patting and avoid blowing with air.

Maintenance instructions for swirl tube air filter:

1. Shut down the machine for ash discharge if the scale mark of the dust cup is covered by impurities. It is recommended to perform ash discharge every 6 hours (or more frequently for harsh operating environments).
2. Turn off the engine, remove the ash cover from the dust cup, tap the outside of dust collector gently to remove the ash.
3. After ash discharge, check the rubber ring of ash cover for normal function and tighten the ash cover.

Replace Air Cleaner Filter Element

If the air filter element is deformed orafter the filter element is maintained for 3-4 times, the entire air filter must be replaced.

Before installing the element, check if the sealing gasket is damaged or missing. For tightening, first rotate the element to make it positioned in place, and ensure airtightness to avoid air flow short-circuit.

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 Belt

The belt should be replaced/reinstalled immediately if the belt has:

- Cracked or broken
- Worn or unaligned
- Come off
- Glazed or hardened

Check the tension of the belt frequently during use to ensure the belt is properly tensioned. If the belt is too loose, it will reduce the transmission efficiency and decrease the speed of the water pump, fan and generator, affecting the cooling effect, while the vibration generated will cause unnecessary wear of the belt and pulley. If the belt is too tight, it will shorten the service life of the belt, bearings and other parts.

Belt deflection detection: Generally, when a force of 40-50N (9-11lbf) is applied between two pulleys, the belt will deflect 3-5mm (0.1-0.2in).

Replace Belt

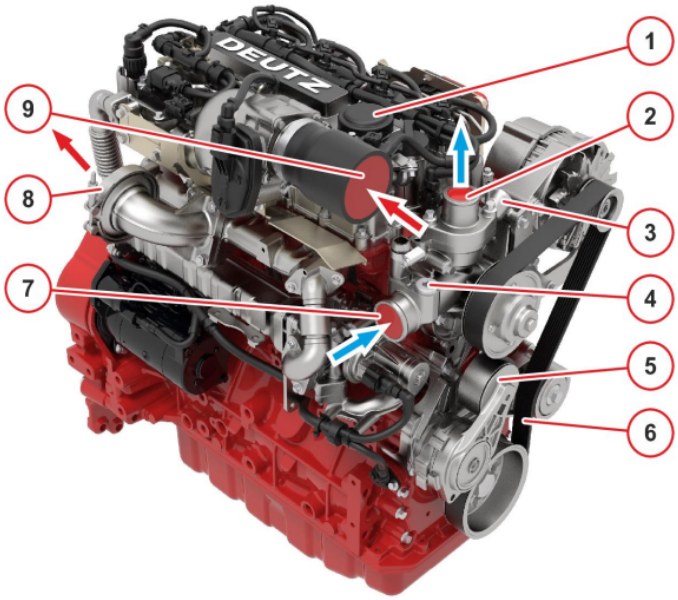
It is recommended to replace the belt every 2 years or after 2000 hours of operation.

NOTICE

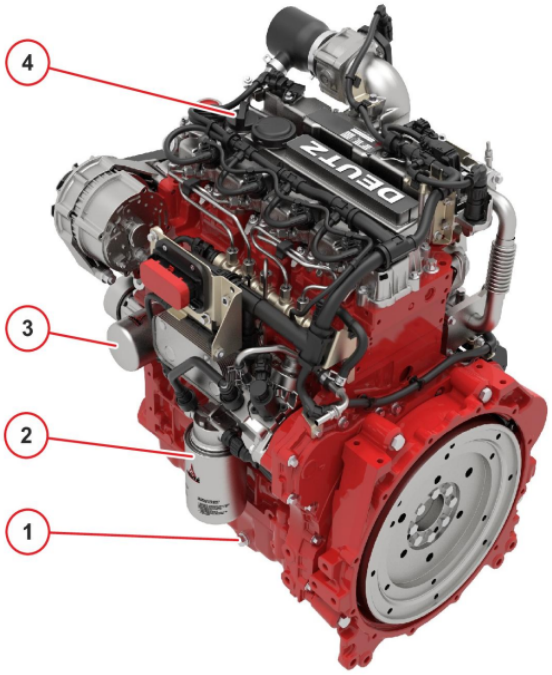
For applications with multiple belts, the entire set of drive belts needs to be replaced, and replacing only one belt in a set will make the new belt bear more loads, because the old belt has been stretched, and the additional load will be applied to the new belt, causing the new belt to break.

7.3 DEUTZ D&TD2.9L4

Deutz D2.9L4

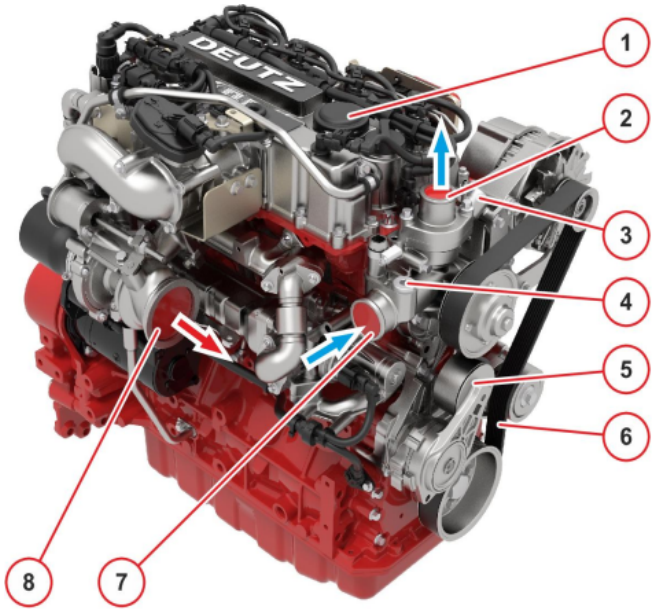


1. Crankcase ventilation
2. Coolant outlet
3. Coolant supply flow to the cab heating
4. Coolant return flow from the cab heating
5. Tensioning pulley
6. V-ribbed belt
7. Coolant inlet
8. Air outlet
9. Air inlet

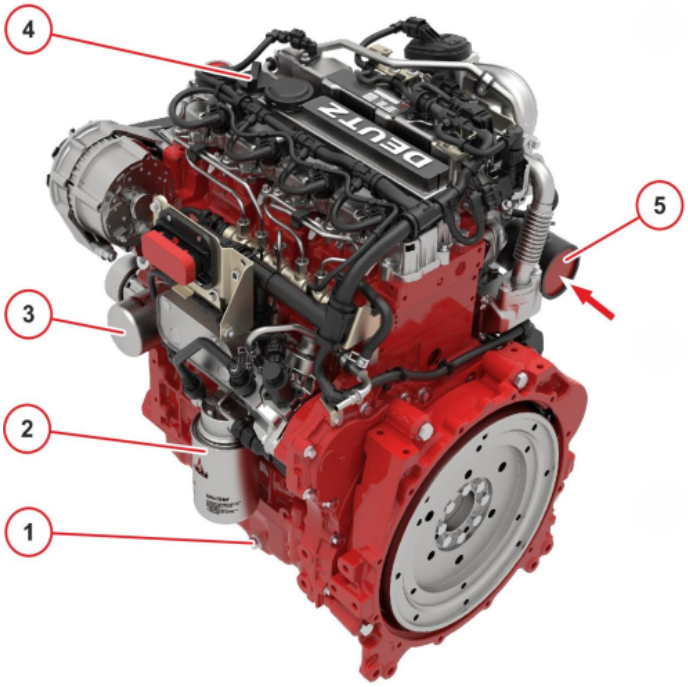


1. Engine oil drain plug
2. Fuel filter
3. Engine oil spare filter
4. Engine oil filler port

Deutz TD2.9L4



1. Crankcase ventilation
2. Coolant outlet
3. Coolant supply flow to the cab heating
4. Coolant return flow from the cab heating
5. Tensioning pulley
6. V-ribbed belt
7. Coolant inlet
8. Air outlet



1. Engine oil drain plug
2. Fuel filter
3. Engine oil spare filter
4. Engine oil filler port
5. Air inlet

Periodic Maintenance Chart

Daily and periodic maintenance is important to keep the engine in good operating condition. The following is a summary of maintenance items by periodic maintenance intervals. Periodic maintenance intervals vary depending on engine applications, loads, diesel fuel and engine oil used. The following should be treated only as a general guideline.

Table 7-3 Periodic Maintenance Chart

○: Inspection ◇: Replacement

Systems	Check Item	Daily	Periodic Maintenance Interval			
			Every 500 hours	Every 1000 hours	Every 3000 hours	Every 4 years
Cooling system	Check the coolant level (refill if needed)	○				
	Coolant (additive concentration)		○			
	Change coolant					◇
	Check the inlet area of charge air cooler (drain lubricating oil/condensation)			○		
	Check cold starting device			○		
Electrical equipment	Check battery and cable connectors			○		
Intake system	Check the intake pipe		○			
	Check the air filter	○				

Table 7-3 Periodic Maintenance Chart (continued)

○: Inspection ◇: Replacement

Systems	Check Item	Daily	Periodic Maintenance Interval			
			Every 500 hours	Every 1000 hours	Every 3000 hours	Every 4 years
	Change dry air filter			◇ or every 2 years[1]		
Belt drive	Check generator V-belt		○			
	Replace generator V-belt			◇ or every 2 years[1]		
	Check V-belt and adjust tension			○		
	Replace V-belt and adjust tension				◇	
Exhaust system	Check the exhaust system	○				
	Filter element of selective catalytic reduction pump			◇ or every 3 years[1]		
Fuel oil	Drain the fuel pre-filter	○				
	Replace the fuel pre-filter			◇ or annually[1]		
	Change fuel filter (for filter size 0.6 L)		◇ or annually[1]			
	Change fuel filter (for filter size 0.9 L)			◇ or annually[1]		
Lubrication system	Check the engine oil level (add if needed)	○				
	Change the engine oil		TD2.9L4: ◇ or annually[1]	D2.9L4: ◇ or annually[1]		
	Change engine oil filter element					
Diesel engine	Check the diesel engine for tightness	○				
	Check diesel engine bracket (retighten if necessary, or replace if damaged)			○		
	Check fasteners, hose connectors and clamps (change if damaged)			○		

[1]: Whichever comes first.

Notes: The above are general maintenance procedures, and the maintenance costs shall be borne by the user.

Fuel System

Check the Fuel Level

The current fuel level can be checked on the powered-on turntable control box display or platform control box display.

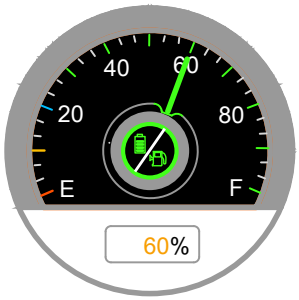


Fig. 19 Fuel level (at the turntable controller)

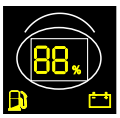


Fig. 20 Fuel level (at the platform controller)

Fill the Fuel Tank

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

⚠ WARNING

- **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 Element

It is recommended to replace the fuel filter element every year or after 500 hours of operation.

NOTICE

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

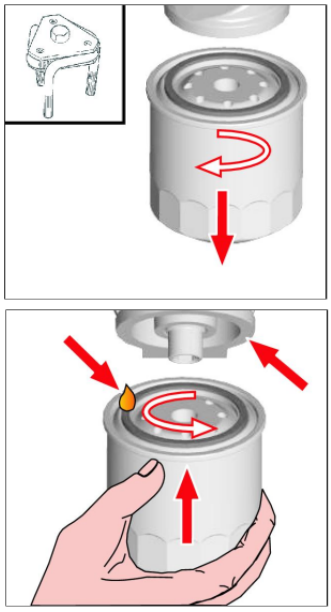
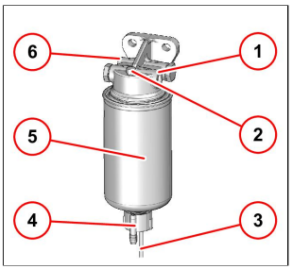


Fig. 21 Diagram of replacing fuel filter element

1. If twist protection is installed (optional), remove the clamp first.
2. Place an appropriate oil-collecting vessel under the fuel filter.
3. Use a special tool to loosen and unscrew the filter element.
4. Collect the drained fuel.
5. Wipe the seal surface of the filter holder 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, then tighten it with the torque of 10-12Nm (7-9ft-lb).
8. Secure the clamp on the twist protection (optional).
9. Vent the fuel line.

Replace and Drain Fuel Pre-filter

It is recommended to drain the fuel pre-filter daily, and replace the fuel pre-filter element every year or after 1000 hours of operation.



1. Fuel transfer pump
2. Venting bolt
3. Electrical connection for level sensor
4. Drain valve
5. Filter element
6. Fuel supply from fuel tank

Fig. 22 Fuel Pre-filter

Drain the fuel pre-filter:

1. Turn off the engine.
2. Place an appropriate collecting vessel under the drain valve.
3. Disconnect the cable harness.
4. Open the drain valve to allow the liquid to flow out completely.
5. Mount the drain valve.
6. Connect the cable connectors.

Replace the fuel pre-filter element:

1. Turn off the engine.
2. Close the fuel shut-off valve to disconnect the fuel supply to the engine (with high-lying tank).
3. Place an appropriate oil-collecting vessel under the drain valve.
4. Disconnect the cable harness.
5. Open the drain valve to allow all liquid to flow out.
6. Remove the filter element.
7. Clean any dirt off the sealing surface of the new filter element and opposite side of the filter head with clean, non-fiber cloths.
8. Apply a thin layer of oil to the sealing surface of the new filter element.
9. Screw on the new filter by hand until the gasket is touching, then tighten it with the torque of 17-18Nm (12.5-13.3ft-lb).
10. Mount the drain valve.
11. Open the fuel shut-off valve to bleed the fuel lines.

Bleed the Fuel Lines

NOTICE

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

The fuel lines are bled through the electric fuel supply pump.

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

1. Ignition: Turn on the electronic fuel supply pump for 20 seconds to bleed the fuel lines and build up the required fuel pressure.
2. Wait until the fuel supply pump is disconnected from the control unit.
3. Turn off the ignition.
4. Repeat the above steps at least 4 times until the fuel lines are fully bled.

Lubrication System

Check the Engine Oil 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 oil dipstick according to the ***Oil Specifications*** , and do not overfill the tank.

Change the Engine Oil

TD2.9L4: it is recommended to change the engine oil every year or after 500 hours of operation.
D2.9L4: it is recommended to change the engine oil every year or after 1000 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.*

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.

4. Remove the drain plug 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 plug after the oil is fully drained.
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 Element

TD2.9L4: it is recommended to replace the engine oil filter element every year or after 500 hours of operation.
D2.9L4: it is recommended to replace the engine oil filter element every year or after 1000 hours of operation.

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

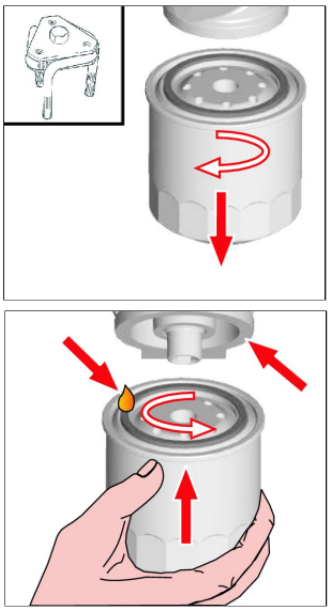


Fig. 23 Diagram of Replacing Engine Oil Filter Element

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 holder with clean, non-fiber cloths.
5. Apply a thin layer of oil to the sealing surface of the new filter.
6. Screw on the new filter by hand until the gasket is touching, then tighten it with the torque of 10-12Nm (7-9ft-lb).

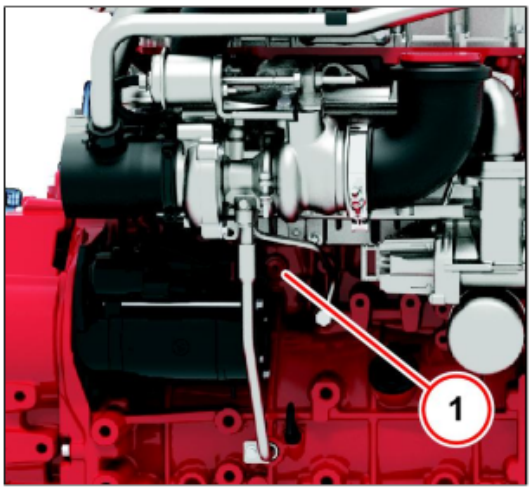
Cooling System

It is recommended to replace the coolant every four years.

Check the Coolant Level

1. Turn off the engine.
2. Make sure that the machine and engine are level.
3. After the coolant temperature drops below 50°C (122°F), slowly open the coolant filler cap to check the coolant level.
4. The coolant level should be between the MIN and MAX marks on the box body.
5. If necessary, fill with correct coolant according to the ***Oil Specifications*** , and do not overfill the tank.

Empty the Cooling System

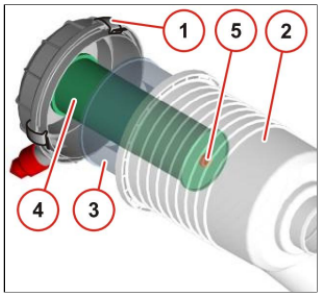


1. After the engine and radiator have cooled sufficiently (to the temperature below 50°C/122°F), carefully open the cooler locking cap.
2. Place an appropriate container under the discharge outlet.
3. Remove the locking screw #1 inside the crankcase.
4. Drain the coolant.
5. Install the locking screw #1 with a new sealing ring.
6. Install the cooler locking cap.

Fill Coolant

1. After the engine and radiator have cooled sufficiently (to the temperature below 50°C/122°F), carefully open the coolant filler cap.
2. If necessary, loosen the venting screw on the cooler.
3. Add correct coolant to the FULL mark according to the ***Oil Specifications*** .
4. Install the coolant filler cap.
5. Run the engine to operating temperature.
6. Turn off the engine.
7. Check the coolant level in the cooled engine.

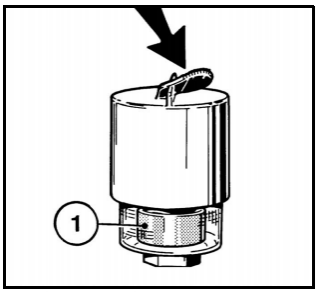
Intake System



1. Positioning plate
2. Filter Cover
3. cleaner components
4. Safety filter pipes
5. Hex Bolt

Fig. 24 Air cleaner

Air Cleaner Maintenance Indicator



1. Red Item Areas

Fig. 25 Air Cleaner Maintenance Indicator

Clean or replace the drying filter according to the maintenance switch or maintenance display installed on the air cleaner intake pipe. Cleaning or replacement is required:

- When the engine is operating, the yellow indicator light of the maintenance switch flashes.
- The red area of the maintenance display is fully visible.

After the maintenance work is completed, press the reset button of the maintenance indicator. The display of the maintaining shows the cleaner is ready for operating.

Check Air Cleaner

1. Open the positioning plate.
2. Remove the cleaner cover and uncrew the cleaner components.
3. Check the cleaner components:
   1) For minor contamination, purge from inside outward using dry compressed air (max. 0.5 MPa / 72.5 psi).
   2) For serious contamination, replace the components of cleaner.

Replacement safety filter of the air cleaner

It is recommended to replace the safety filter of the air cleaner every 3 months or after 250 hours of operation or replace it as prompted by the status indicator.

NOTICE
No cleaning of the safety filter

1. Unscrew the hexagon bolt and unscrew out the safety filter tube.
2. Insert the new safety filter and screw the hexagon bolts.
3. Install the filter element, position the filter cover, and secure it with the retainer plate.

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 Belt

The belt should be replaced/reinstalled immediately if the belt has:

- Cracked or broken

- Worn or unaligned
- Come off
- Glazed or hardened

If the belt is not properly tensioned, it should be adjusted:

Press firmly the belt midpoint of the longest extension between two pulleys, and the proper deflection is 10-15mm (0.4-0.6in).

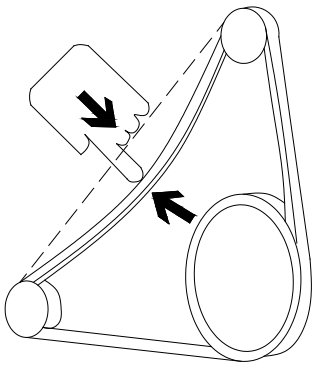
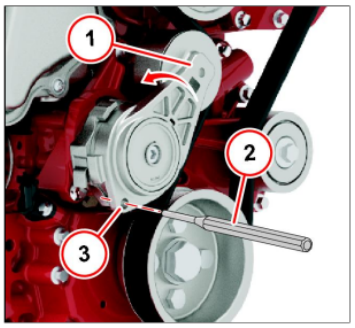


Fig. 26 Belt deflections

Replace the V-ribbed Belt

It is recommended to replace the V-ribbed belt after 3 000 hours of operation.



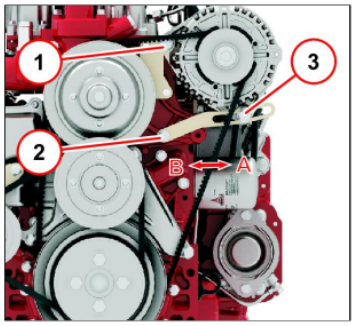
1. Tensioning pulley
2. Retaining pin
3. Assembly bore

Fig. 27 Engine V-ribbed belt

1. Press tensioning pulley with socket wrench in the direction of the arrow until the retaining pin can be fixed in the assembly bore. The V-ribbed belt is now tension-free.
2. First pull the V-ribbed belt off the tensioning pulley.
3. Mount new V-ribbed belt.
4. Retain the tensioning pulley using the pin wrench and remove the retaining pin.
5. Tension the V-ribbed belt using the tensioning pulley and socket wrench. Check whether the V-ribbed belt is correctly in its guide.

Replace Generator V-belt

It is recommended to replace the generator V-belt every 2 years or after 1000 hours of operation.



1. Screw
2. Screw
3. Screw

Fig. 28 Generator V-belt

1. Loosen all screws and locking nuts.
2. Move the generator in direction B until the V-belt slackens.
3. Remove the belt and install a new belt.
4. Move the generator in direction A until the V-belt is properly tensioned.
5. Check the tension of the V-belt.
6. Tighten all screws and locking nuts again.

Clean the Engine

The following causes of contamination make cleaning the engine necessary:

- High dust content in the air
- Chaff and chopped straw in the area of the engine
- Coolant leaks
- Lubricating oil leakage
- Fuel leaks

Because of the different application conditions, cleaning depends on the degree of soiling.

Cleaning with compressed air

Blowing dirt off or out. Always blow the cooler and cooling fins from the exhaust air side to the fresh air side.

Cleaning with cold cleaner

- Spray the engine with cold cleaner and leave it for about 10 minutes to take effect.

- Spray the engine clean with a high pressure water jet.
- Warm up the engine so that the water residues evaporate.

Cleaning with a high pressure cleaner

- Clean the engine with a steam jet with the maximum spray pressure of 6MPa (870psi), the maximum steam temperature of 90℃ (194℉), and the distance at least 1m (3.3ft).
- Warm up the engine so that the water residues evaporate.
- Always clean the cooler and cooling fins from the exhaust air side to the fresh air side.

7.4 AUXILIARY POWER SYSTEM

The auxiliary power system relies on two 12V batteries in parallel 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.

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8 HYDRAULIC SYSTEM

8.1 LAYOUT OF HYDRAULIC ELEMENTS

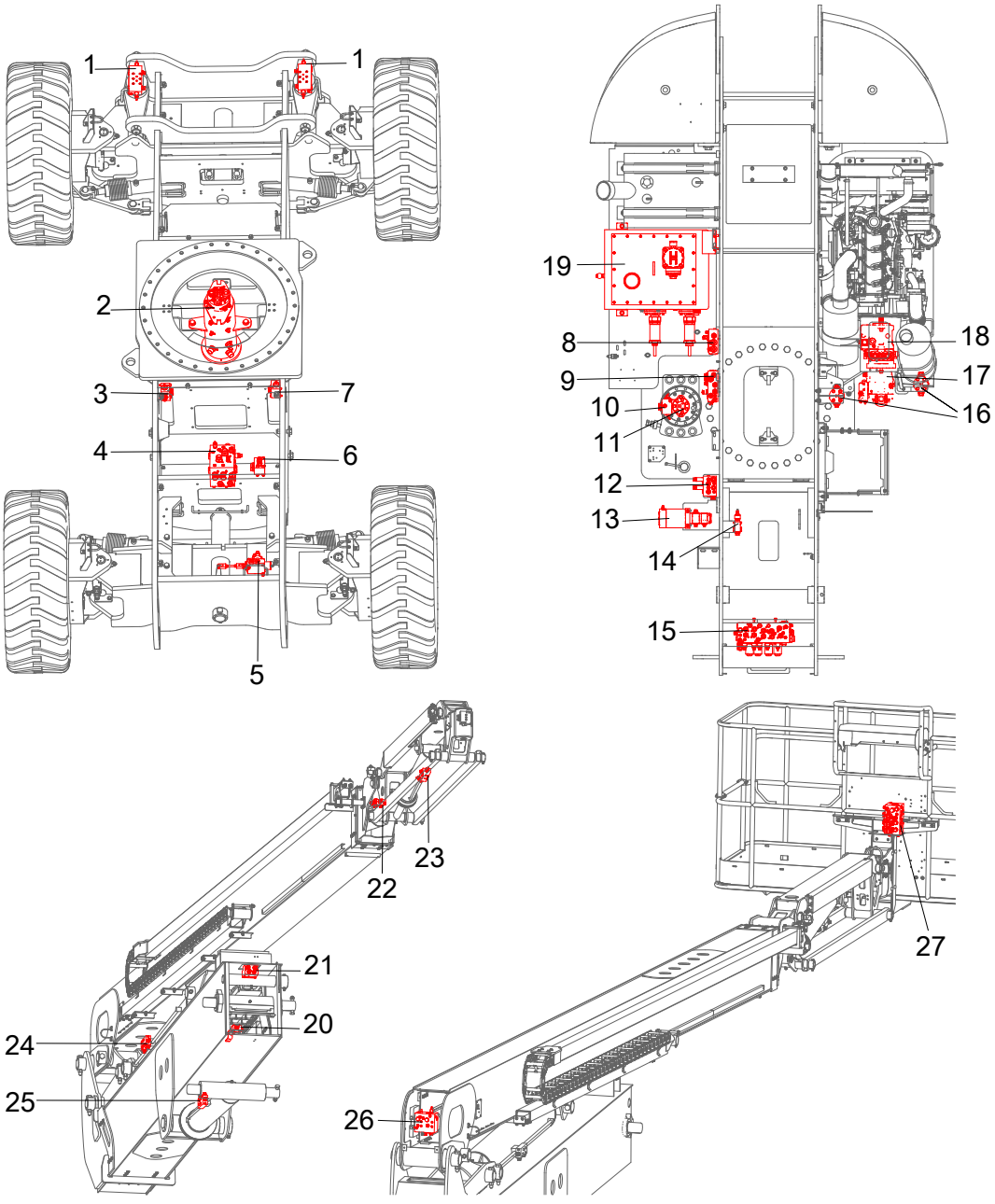


Fig. 1

Table 8-1

1. Oscillating counterbalance valve	**2.** Central rotary joint	**3.** Brake manifold – Port N
4. Travel control valve	**5.** Oscillating multi-way valve	**6.** Drain manifold – Port L
7. Two-speed manifold – Port X	**8.** Brake & two-speed control valve manifold	**9.** Oscillating control valve manifold
10. Slewing cushion valve	**11.** Cycloid motor	**12.** Steering control valve
13. Emergency power unit	**14.** Stroke control valve	**15.** Boom function valve manifold
16. High-pressure filter	**17.** Closed-circuit variable-displacement pump	**18.** Open-circuit variable-displacement pump
19. Hydraulic tank	**20.** Stroke control valve	**21.** Articulating boom telescoping counterbalance valve
22. Level counterbalance valve	**23.** Jib counterbalance valve	**24.** Main boom lift counterbalance valve
25. Articulating boom lift counterbalance valve	**26.** Main boom telescoping counterbalance valve	**27.** Platform control valve manifold

8.2 FUNCTION VALVES

Travel Control Valve Manifold (PN.202040003250)

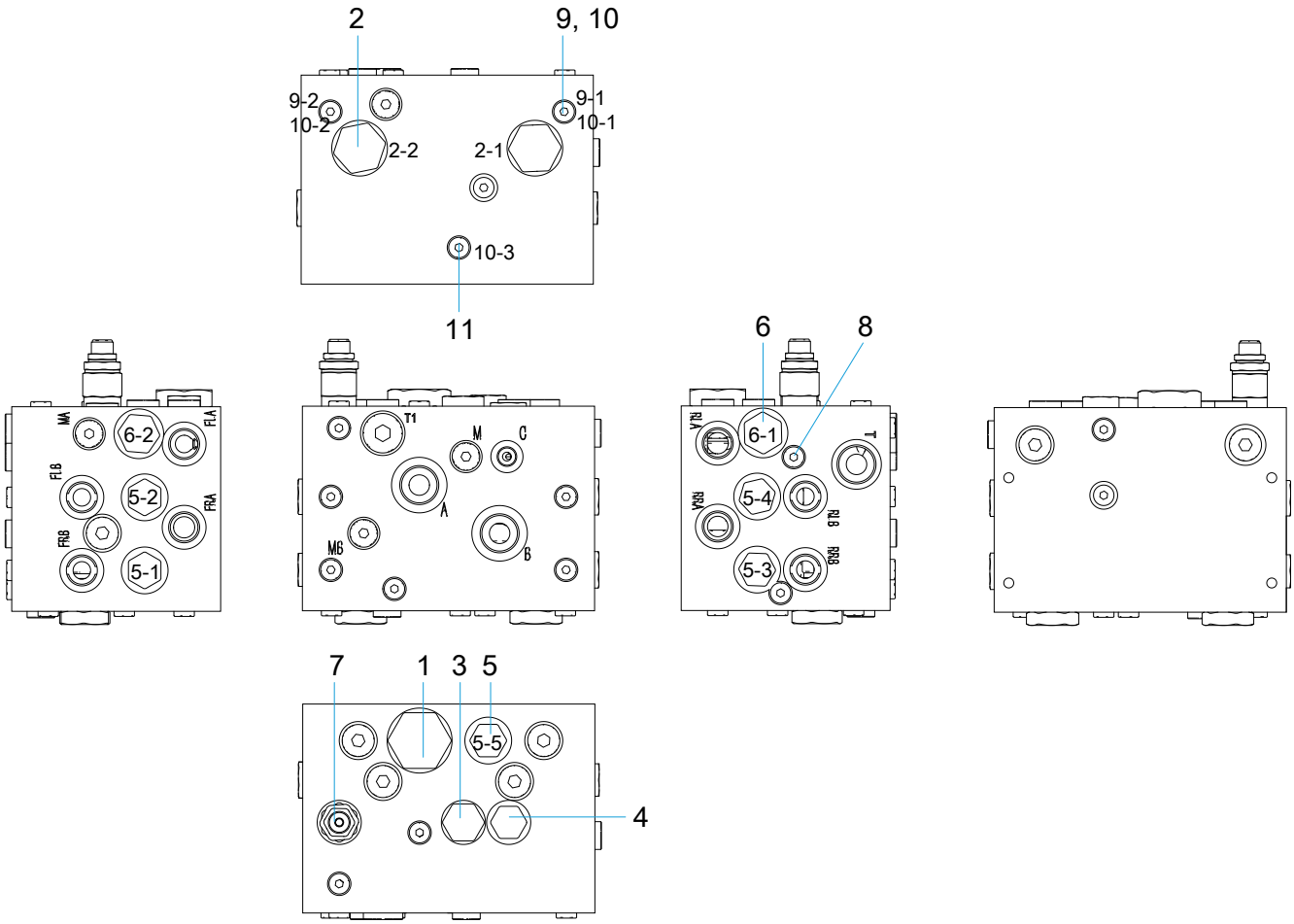


Fig. 2 Travel Control Valve Manifold (PN.202040003250)

Table 8-2 Travel Control Valve Manifold (PN.202040003250)

Serial number	Description	Function
1	Flow divider/flow-combining valve	Control flow rate for front and rear wheels
2-1	Flow divider/flow-combining valve	Control flow rate for left and right wheels of front axle
2–2	Flow divider/flow-combining valve	Control flow rate for left and right wheels of rear axle
3	Flush valve	Drain oil on the low-pressure side
4	Ball shuttle valve	Switch between oil lines
5	Check valve	Keep oil flowing in one direction
6	Check valve	Keep oil flowing in one direction
7	Overflow valve	Control flushing pressure
8	Damper	\

Table 8-2 Travel Control Valve Manifold (PN.202040003250) (continued)

Serial number	Description	Function
9	Damper φ1.0	\
10	Damper	\
11	Damper φ1.4	\

Travel Control Valve Manifold (PN.202040000153)

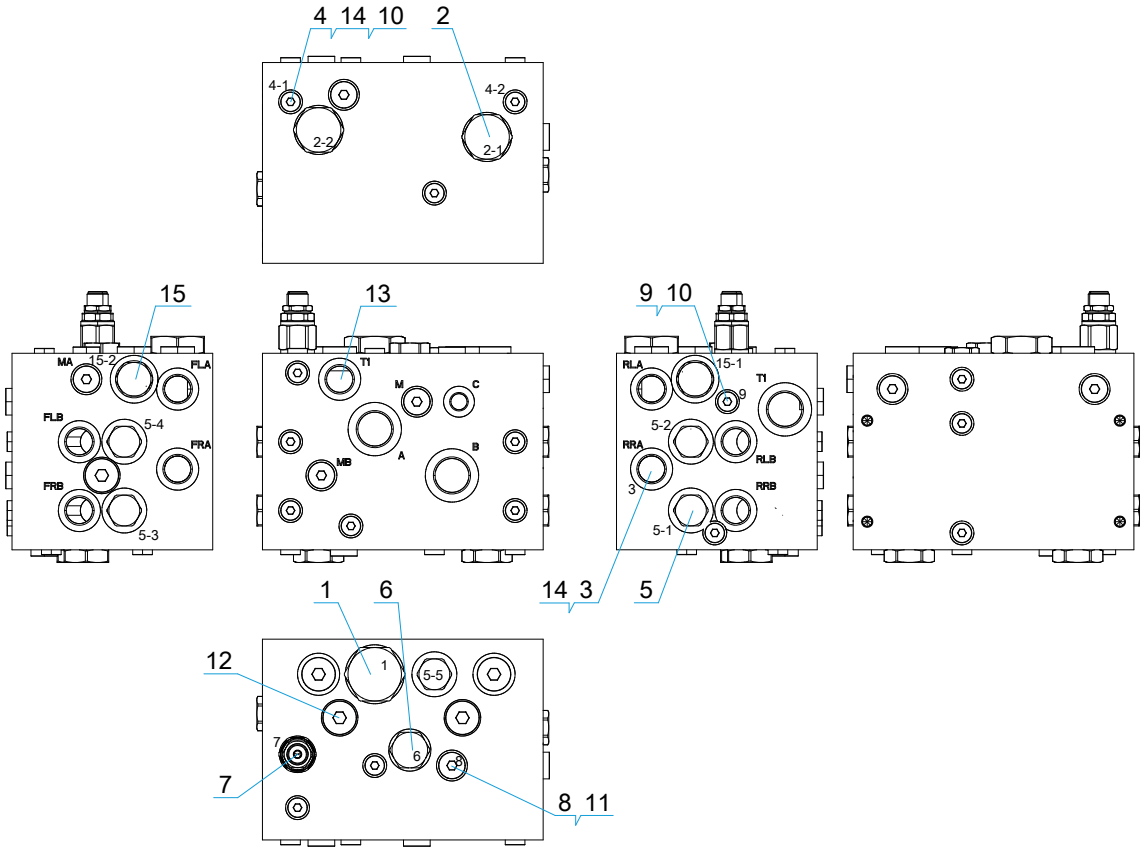


Fig. 3 Travel Control Valve Manifold (PN.202040000153)

Table 8-3 Travel Control Valve Manifold (PN.202040000153)

No.	Name	Installation torque	Function
1	Flow divider/ flow-combining valve	133 – 138 Nm (98 – 102 ft-lb)	Control flow rate for front and rear axles
2–1	Flow divider/ flow-combining valve	99 – 104 Nm (73 – 77 ft-lb)	Control flow rate for left and right wheels of front axle
2–2	Flow divider/ flow-combining valve	99 – 104 Nm (73 – 77 ft-lb)	Control flow rate for left and right wheels of rear axle
3	Damper (φ1.4)	5 Nm (4 ft-lb)	\

Table 8-3 Travel Control Valve Manifold (PN.202040000153) (continued)

No.	Name	Installation torque	Function
4	Damper (φ1.0)	5 Nm (4 ft-lb)	\
5	Check valve	40 ~ 45Nm (30 ~ 33ft-lb)	Keep oil flowing in one direction
6	Flush valve	33 – 35 Nm (24 – 26 ft-lb)	Drain oil on the low-pressure side
7	Overflow valve	40 – 45 Nm (30 – 33 ft-lb)	Control flushing pressure
8	Shuttle valve	12 ~ 15Nm (9 ~ 11ft-lb)	Switch between oil lines
9	Damper (⌀2.0)	5 Nm (4 ft-lb)	\
14	Damper (φ2.5)	5 Nm (4 ft-lb)	\
15	Check valve	55 ~ 65Nm (41 ~ 48ft-lb)	Keep oil flowing in one direction

Oscillating Counterbalance Valve (PN.202040003442)

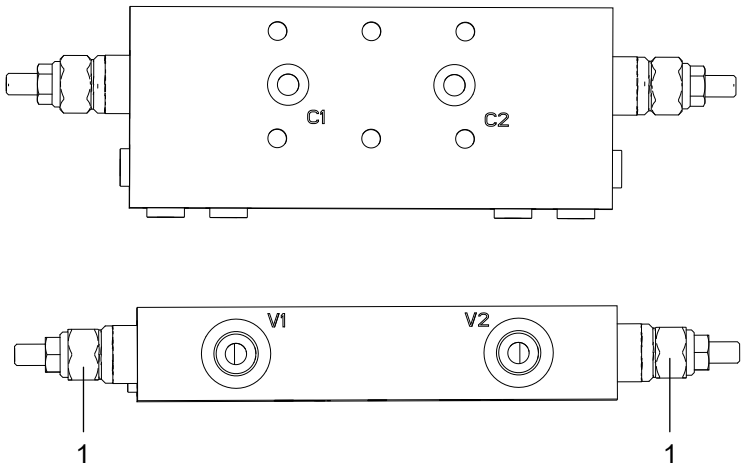


Fig. 4 Oscillating Counterbalance Valve (PN.202040003442)

Table 8-4 Oscillating Counterbalance Valve (PN.202040003442)

SN	Description	Installation torque	Function
1	Counterbalance valve	40 – 45 Nm (30 – 33 ft-lb)	Keep the load balanced

Oscillating Control Valve Manifold (PN.202040003514)

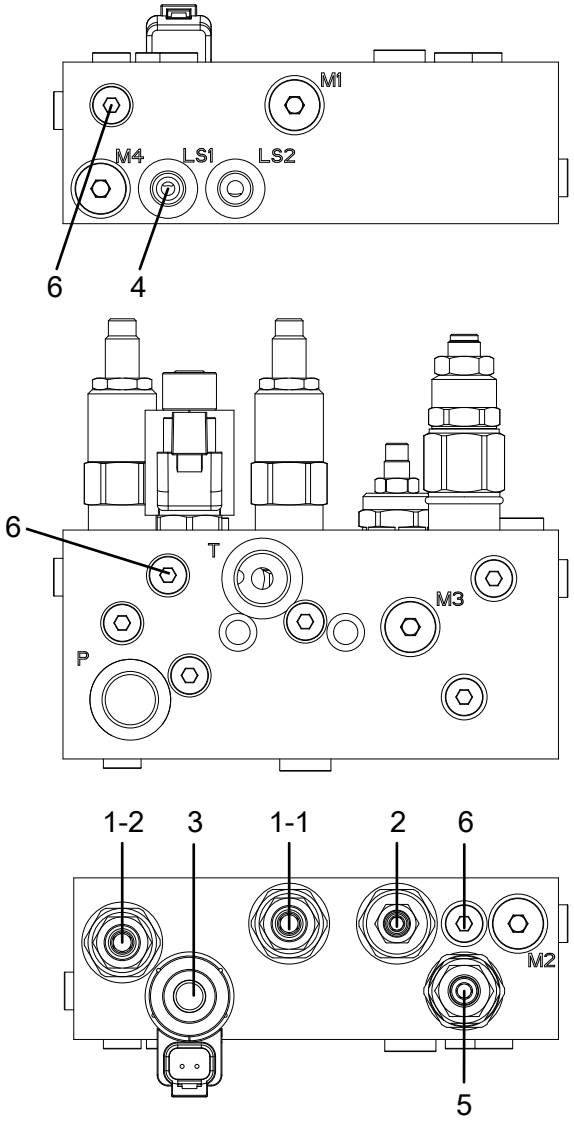


Fig. 5 Oscillating Control Valve Manifold (PN.202040003514)

Table 8-5 Oscillating Control Valve Manifold (PN.202040003514)

No.	Description	Installation torque	Function
1–1	Pressure-relief valve	40 Nm (30 ft-lb)	Control oscillating pressure
1–2	Pressure-relief valve	40 Nm (30 ft-lb)	Control oscillating standby pressure
2	Flow valve	33.9 Nm (25 ft-lb)	Control flow
3	Solenoid valve	27 Nm (20 ft-lb)	Control oscillating
4	Shuttle valve	12 – 15 Nm (9 – 11 ft-lb)	Switch between oil lines

Table 8-5 Oscillating Control Valve Manifold (PN.202040003514) (continued)

No.	Description	Installation torque	Function
5	Pilot-operated valve	45 – 50 Nm (33 – 37 ft-lb)	Limit the maximum pressure for oscillating system
6	Damper	5 Nm (4 ft-lb)	\

Steering Control Valve Manifold (PN.202040003804)

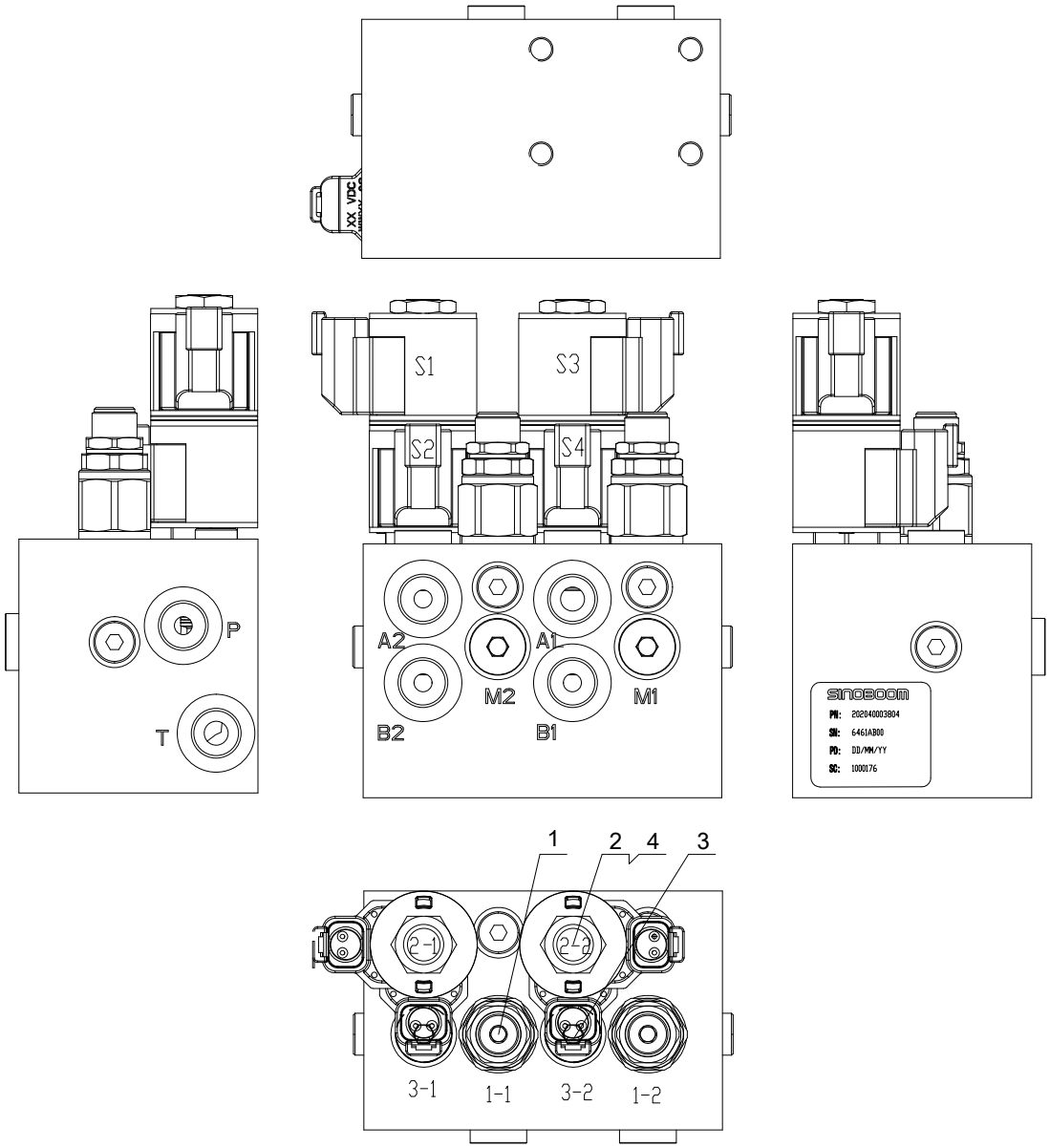


Fig. 6 Steering Control Valve Manifold (PN.202040003804)

Table 8-6 Steering Control Valve Manifold (PN.202040003804)

No.	Description	Installation torque	Function
1–1	Overflow valve	40 – 45 Nm (30 – 33 ft-lb)	Limits the steering pressure of rear axle
1–2	Overflow valve	40 – 45 Nm (30 – 33 ft-lb)	Limits the steering pressure of front axle
2-1	Solenoid valve	24.4 – 27.1 Nm (18 – 20 ft-lb)	Controls left and right steering direction of rear axle
2–2	Solenoid valve	24.4 – 27.1 Nm (18 – 20 ft-lb)	Controls left and right steering direction of front axle
3–1	Shuttle valve	\	Selects overflow pressure of left or right steering of rear axle
3–2	Shuttle valve	\	Selects overflow pressure of left or right steering of front axle
4	Coil	4 Nm (3 ft-lb)	\

Switching Control Valve Manifold (PN.202040003805)

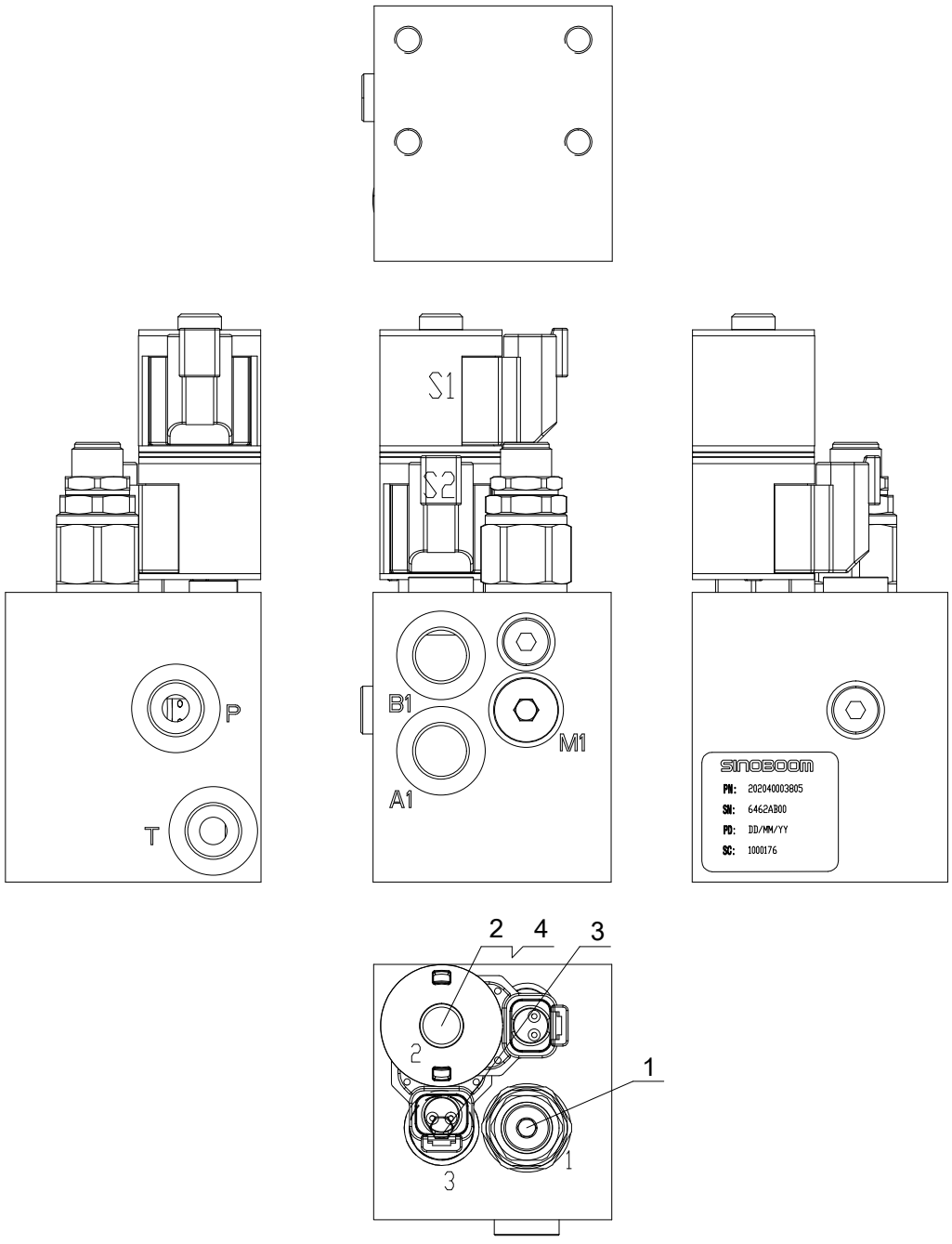


Fig. 7 Switching Control Valve Manifold (PN.202040003805)

Table 8-7 Switching Control Valve Manifold (PN.202040003805)

No.	Description	Installation torque	Function
1	Overflow valve	40 – 45 Nm (30 – 33 ft-lb)	Limits the steering pressure
2	Solenoid valve	24.4 – 27.1 Nm (18 – 20 ft-lb)	Controls left and right steering direction

Table 8-7 Switching Control Valve Manifold (PN.202040003805) (continued)

No.	Description	Installation torque	Function
3	Shuttle valve	\	Selects overflow pressure of left or right steering
4	Coil	4 Nm (3 ft-lb)	\

Boom Function Valve Manifold (PN.202040003803)

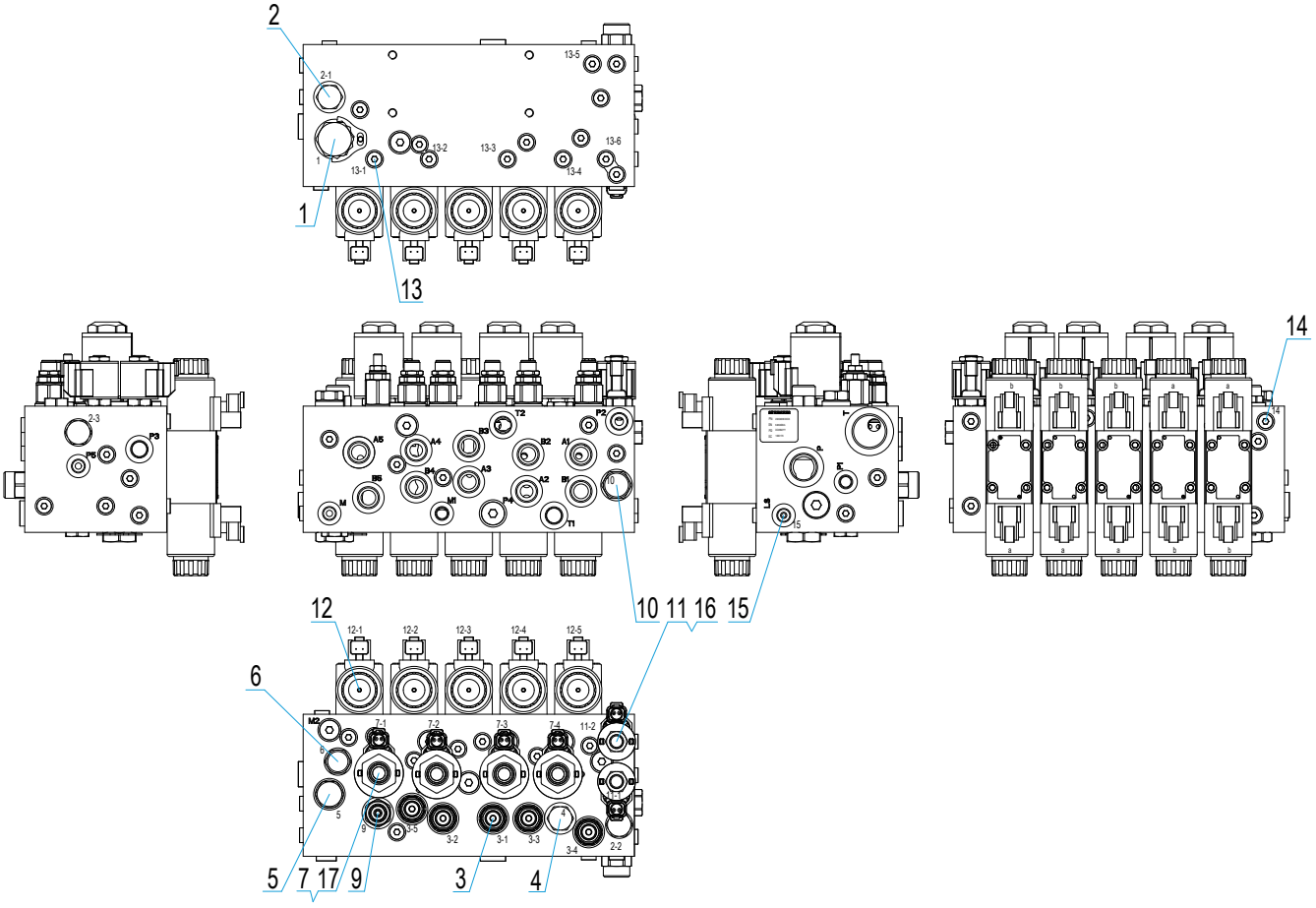


Fig. 8 Boom Function Valve Manifold (PN.202040003803)

Table 8-8 Boom Function Valve Manifold (PN.202040003803)

SN	Description	Installation torque	Function
1	Check valve	85 – 95 Nm (63 – 70 ft-lb)	Keep oil flowing in one direction
2	Check valve	40 – 45 Nm (30 – 33 ft-lb)	Keep oil flowing in one direction
3–1	Overflow valve	55 – 65 Nm (41 – 48 ft-lb)	Control system pressure
3–2	Overflow valve	55 – 65 Nm (41 – 48 ft-lb)	Limit the pressure for articulating boom lowering
3–3	Overflow valve	55 – 65 Nm (41 – 48 ft-lb)	Limit the pressure for main boom lowering
3–4	Overflow valve	55 – 65 Nm (41 – 48 ft-lb)	Limit the pressure for boom extending
3–5	Overflow valve	55 – 65 Nm (41 – 48 ft-lb)	Limit the pressure for articulating boom lifting

Table 8-8 Boom Function Valve Manifold (PN.202040003803) (continued)

SN	Description	Installation torque	Function
4	Check valve	40 – 45 Nm (30 – 33 ft-lb)	Keep oil flowing in one direction
5	Compensation valve	40 Nm (30 ft-lb)	Provide fixed-differential overflow, releases pressure for emergency power unit
6	Flow valve	30 Nm (22 ft-lb)	Release LS feedback pressure
7–1	Solenoid valve	36.7 Nm (27 ft-lb)	Control the speed of turntable slewing
7–2	Solenoid valve	36.7 Nm (27 ft-lb)	Control the speed of articulating boom telescoping and lifting/lowering
7–3	Solenoid valve	36.7 Nm (27 ft-lb)	Control the speed of main boom lifting/lowering
7–4	Solenoid valve	36.7 Nm (27 ft-lb)	Control the speed of main boom telescoping
9	Two-way overflow valve	40 - 45 Nm (30 - 33 ft-lb)	Control the pressure for turntable slewing
10	Flow valve	33.9 Nm (25 ft-lb)	Limit flow rate for platform movements
11–1	Solenoid directional valve	25.8 – 28.5 Nm (19 – 21 ft-lb)	Provide platform movement enabling
11–2	Solenoid directional valve	25.8 – 28.5 Nm (19 – 21 ft-lb)	Provide steering enabling
12–1	DN6 Y-subplate valve	8 Nm (6 ft-lb)	Control the direction of turntable slewing
12–2	DN6 Y-subplate valve	8 Nm (6 ft-lb)	Control the direction of articulating boom lifting \lowering
12–3	DN6 Y-subplate valve	8 Nm (6 ft-lb)	Control the direction of articulating boom retracting/ extending
12–4	DN6 Y-subplate valve	8 Nm (6 ft-lb)	Controls the direction of main boom lifting\lowering
12–5	DN6 Y-subplate valve	8 Nm (6 ft-lb)	Control the direction of main boom retracting/extending
14	Damper	5 Nm (4 ft-lb)	\
15	Damper	5 Nm (4 ft-lb)	\
16	Coil	14 Nm (10 ft-lb)	\
17	Coil	14 Nm (10 ft-lb)	\

Slewing Cushion Valve (PN.202040003257)

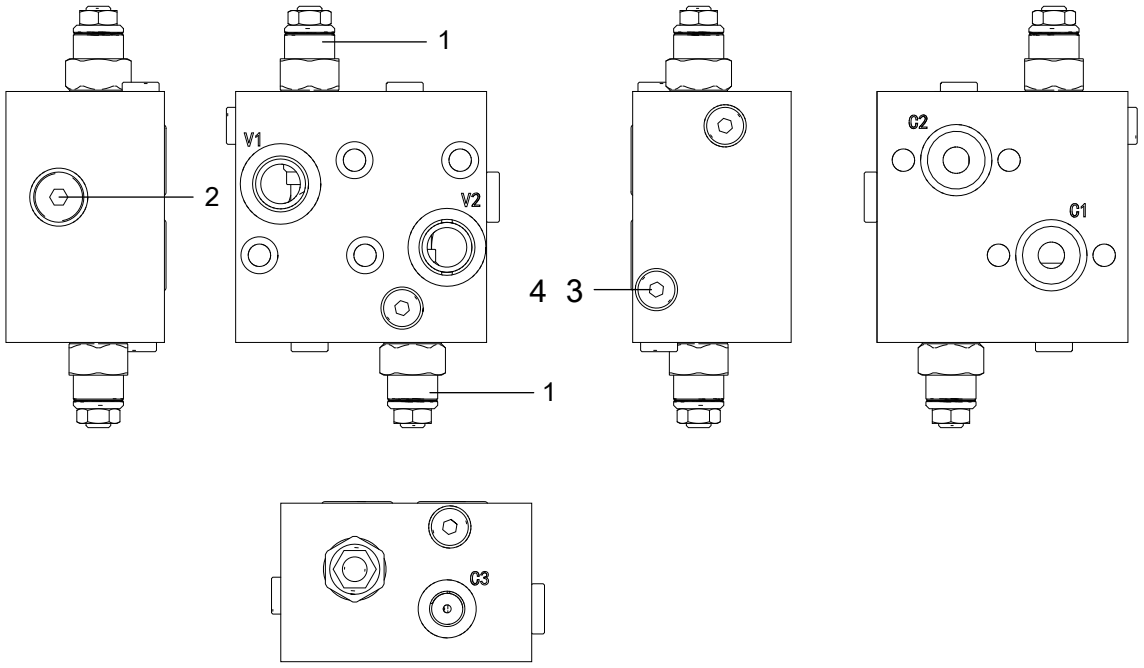


Fig. 9 Slewing Cushion Valve (PN.202040003257)

Table 8-9 Slewing Cushion Valve (PN.202040003257)

No.	Description	Installation torque	Function
1	Counterbalance valve	45 Nm (33 ft-lb)	Keep the load balanced
2	Shuttle valve	\	Switch between oil lines
3	Throttle screw	2 Nm (1.5 ft-lb)	\
4	Throttle screw	2 Nm (1.5 ft-lb)	\

Slewing Cushion Valve (PN.202040003061)

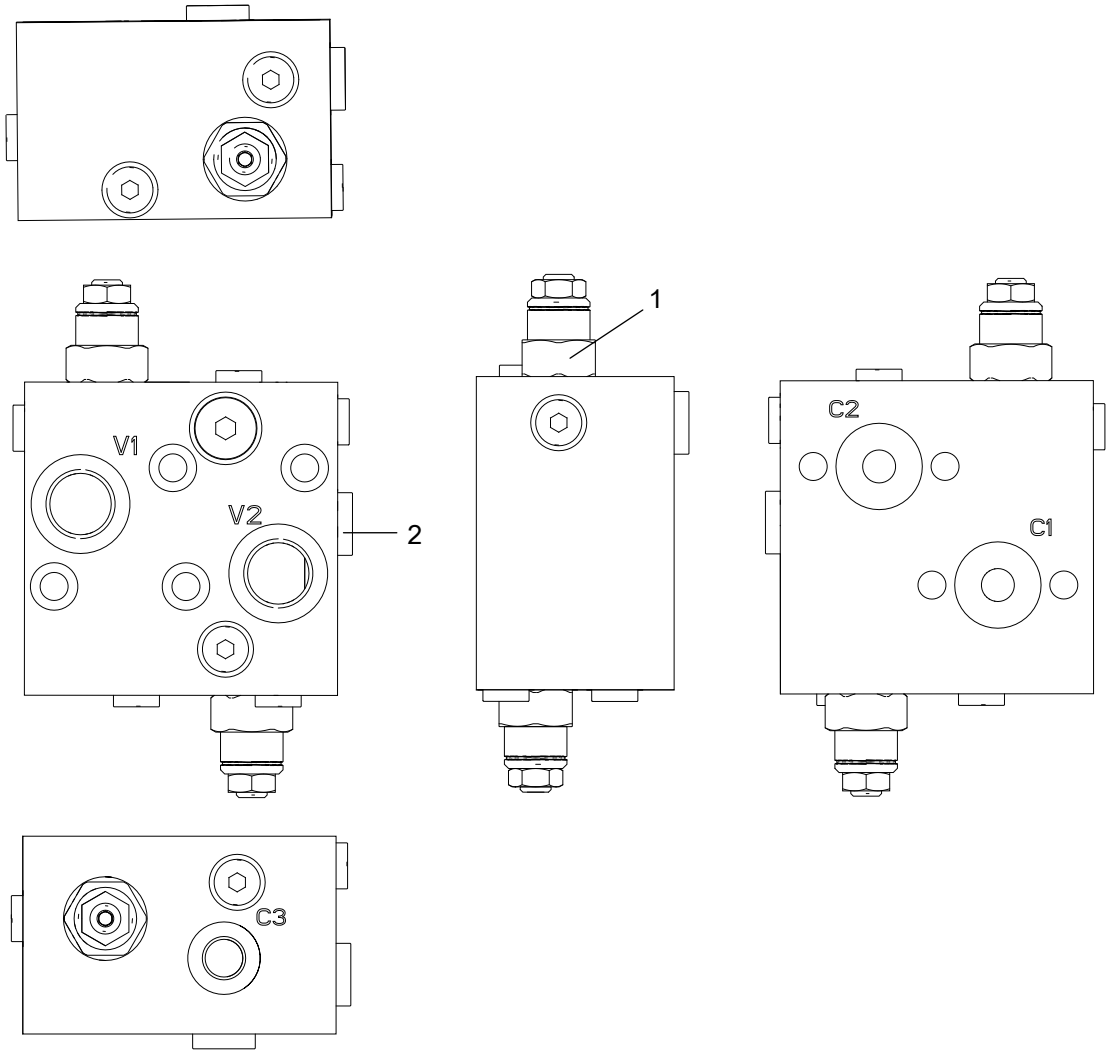


Fig. 10 Slewing Cushion Valve (PN.202040003061)

Table 8-10 Slewing Cushion Valve (PN.202040003061)

No.	Name	Installation torque	Function
1	Counterbalance valve	40~45 Nm (30~33 ft-lb)	Keep the load balanced
2	Shuttle valve	\	Switch between oil lines

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

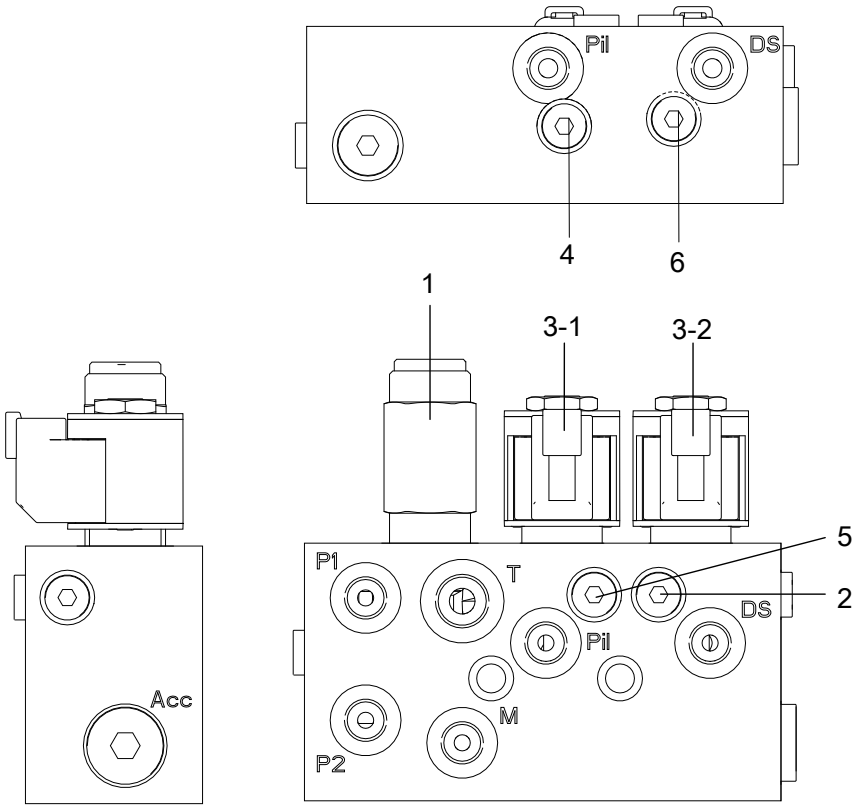


Fig. 11 Brake & Two-speed Control Valve Manifold (PN.202040000006)

Table 8-11 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)	\	\

Brake & Two-speed Control Valve Manifold (PN.202040003258)

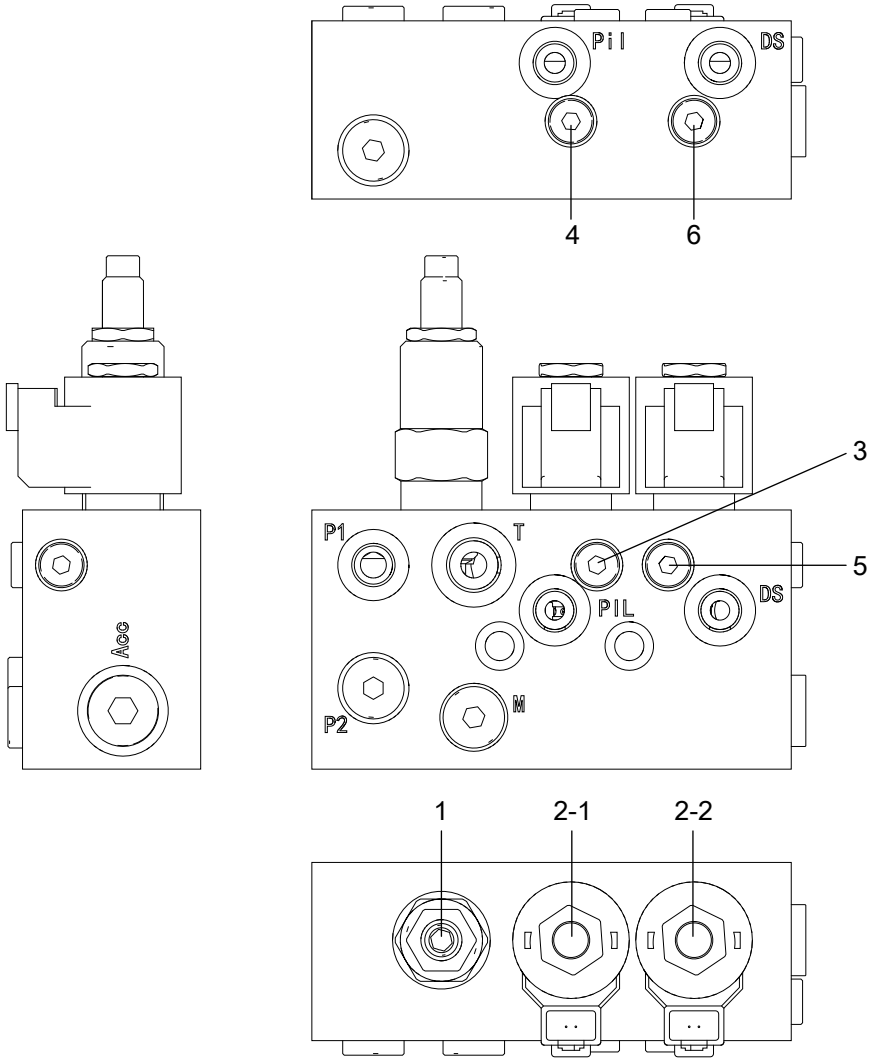


Fig. 12 Brake & Two-speed Control Valve Manifold (PN.202040003258)

Table 8-12 Brake & Two-speed Control Valve Manifold (PN.202040003258)

No.	Description	Installation torque	Function
1	Pressure relief valve	33 Nm (24 ft-lb)	Control pressure of brake and high/low speed
2-1	Solenoid directional valve	27 Nm (20 ft-lb)	Control braking
2–2	Solenoid directional valve	27 Nm (20 ft-lb)	Control high-low speed switching
3	Damper	2 Nm (1.5 ft-lb)	\
4	Damper	2 Nm (1.5 ft-lb)	\
5	Damper	2 Nm (1.5 ft-lb)	\
6	Damper	2 Nm (1.5 ft-lb)	\

Lift Counterbalance Valve (PN.202040000377)

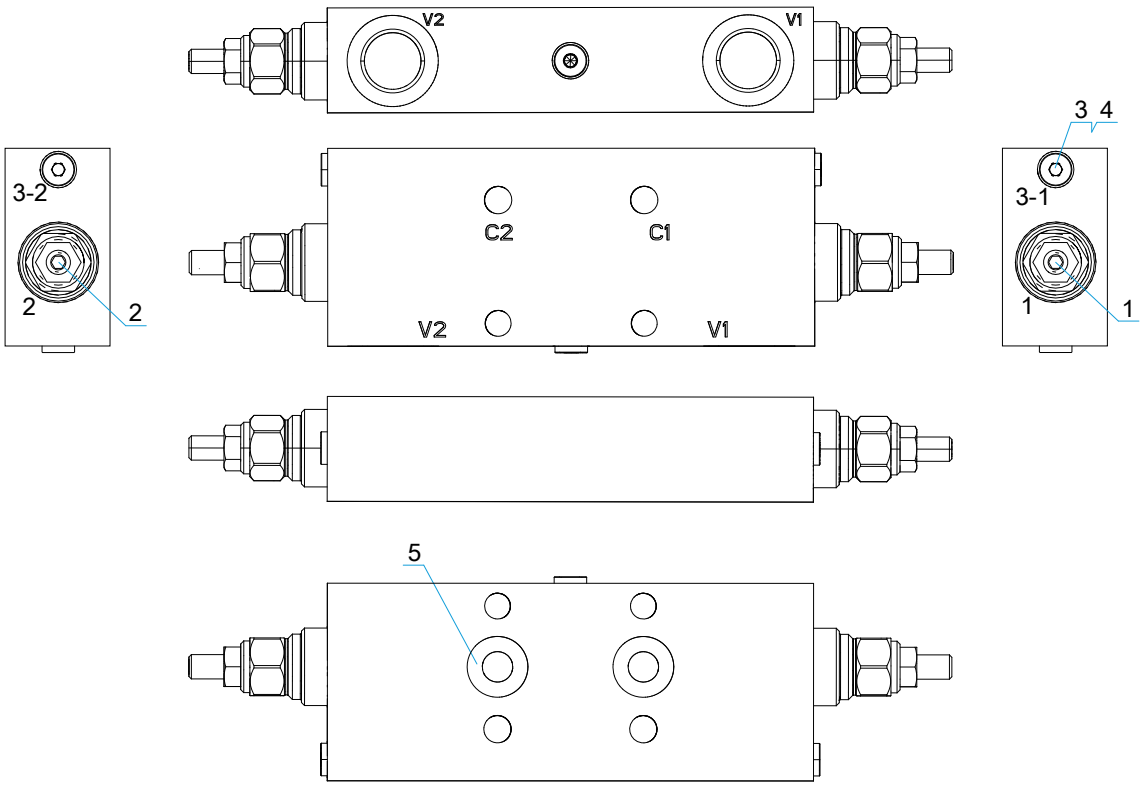


Fig. 13 Lift counterbalance valve (PN.202040000377)

Table 8-13 Lift counterbalance valve (PN.202040000377)

No.	Name	Installation torque	Function
1	Counterbalance valve	70~75 Nm (52~55 ft-lb)	Keep the load balanced
2	Counterbalance valve	70~75 Nm (52~55 ft-lb)	Keep the load balanced
3	Damper (⌀0.5)	5 Nm (4 ft-lb)	\
5	O-ring	\	\

Leveling Counterbalance Valve (PN.202040000011)

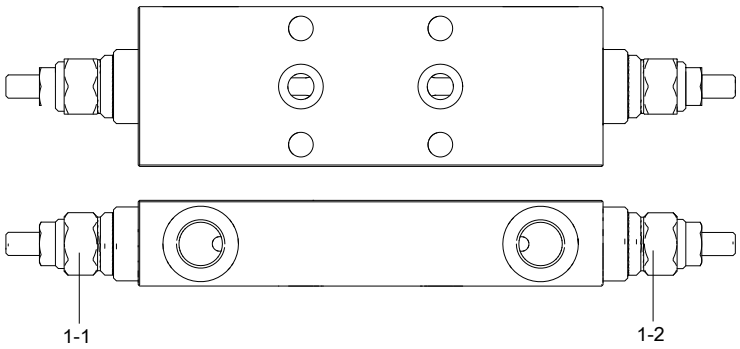


Fig. 14 Leveling Counterbalance Valve (PN.202040000011)

Table 8-14 Leveling Counterbalance Valve (PN.202040000011)

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

Telescoping Counterbalance Valve (PN.202040003821)

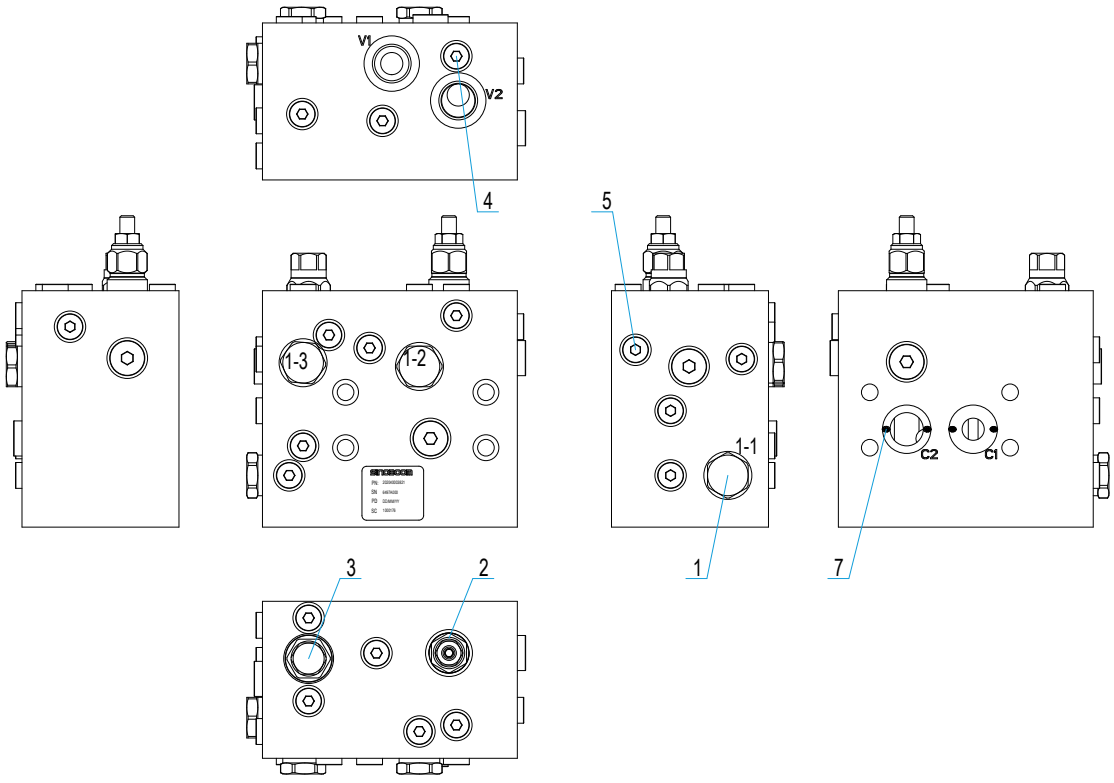


Fig. 15 Telescoping Counterbalance Valve (PN.202040003821)

Table 8-15 Telescoping Counterbalance Valve (PN.202040003821)

No.	Description	Installation torque	Function
1	Check valve	40 – 45 Nm (30 – 33 ft-lb)	Keeps oil flowing in one direction
2	Counterbalance valve	40 – 45 Nm (30 – 33 ft-lb)	Keeps the load balanced
3	Counterbalance valve	50 – 60 Nm (37 – 44 ft-lb)	Keeps the load balanced
4	Damper	4 Nm (3 ft-lb)	\
5	Damper	4 Nm (3 ft-lb)	\
7	O-ring	\	\

Articulating Boom Telescoping Counterbalance Valve (PN.202040003016)

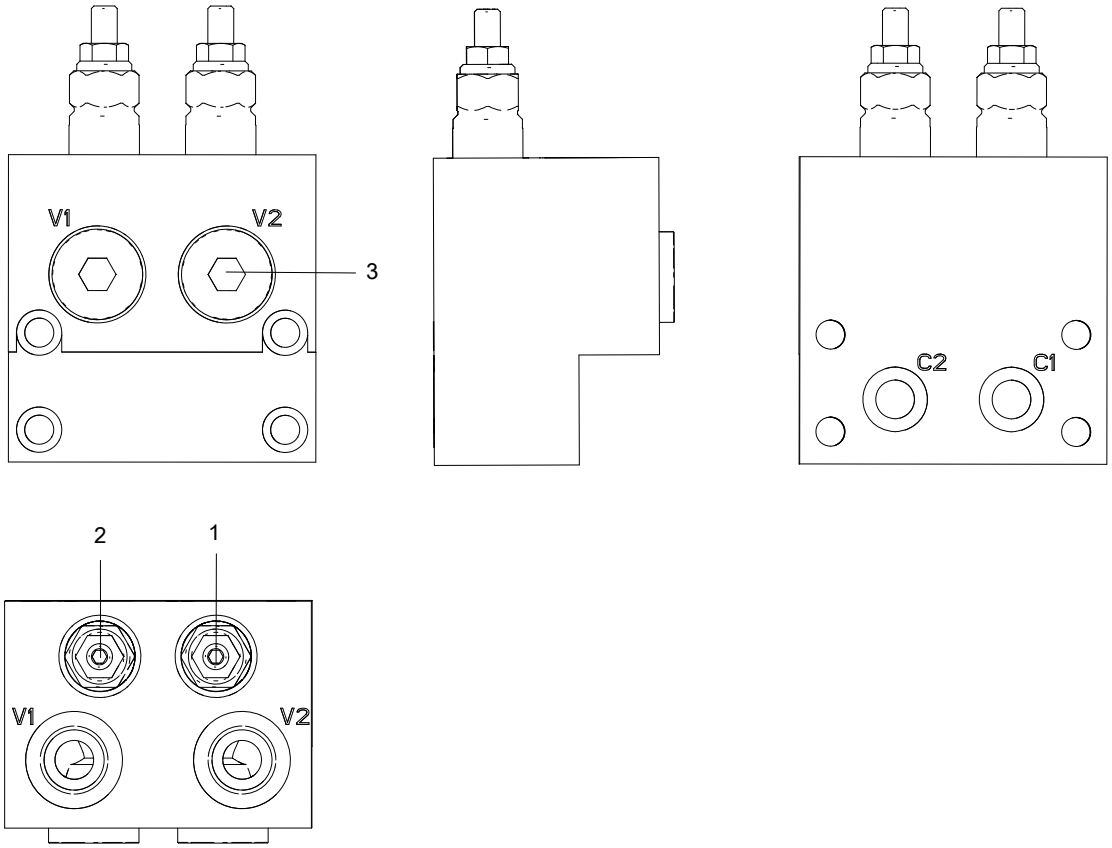


Fig. 16 Articulating Boom Telescoping Counterbalance Valve (PN.202040003016)

Table 8-16 Articulating Boom Telescoping Counterbalance Valve (PN.202040003016)

No.	Description	Installation torque	Function
1	Counterbalance valve	45 – 50 Nm (33 – 37 ft-lb)	Keep the load balanced
2	Counterbalance valve	45 – 50 Nm (33 – 37 ft-lb)	Keep the load balanced
3	Plug	72 – 82 Nm (51–61 ft-lb)	\

Counterbalance Valve (PN.202040003219)

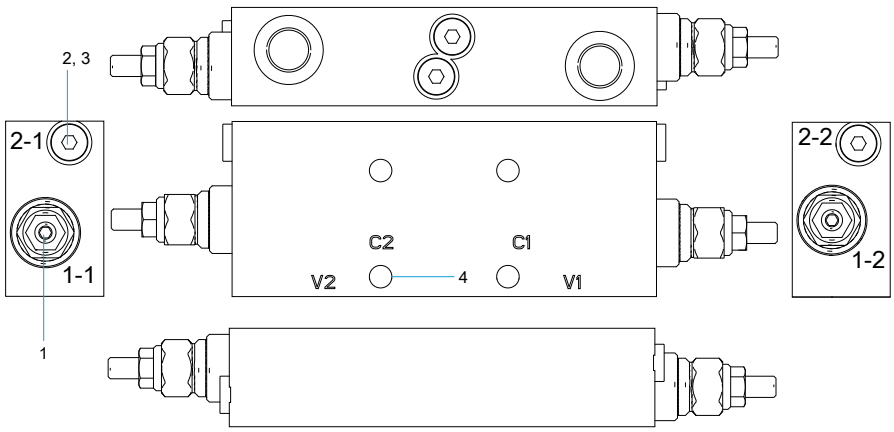


Fig. 17 Counterbalance Valve (PN.202040003219)

Table 8-17 Counterbalance Valve (PN.202040003219)

No.	Name	Installation torque	Function
1	Counterbalance valve	70~75 Nm (52~55 ft-lb)	Keep the load balanced
2	Damper (⌀0.6)	5 Nm (4 ft-lb)	\
3	O-ring	\	\

Platform Control Valve Manifold (PN.202040003806)

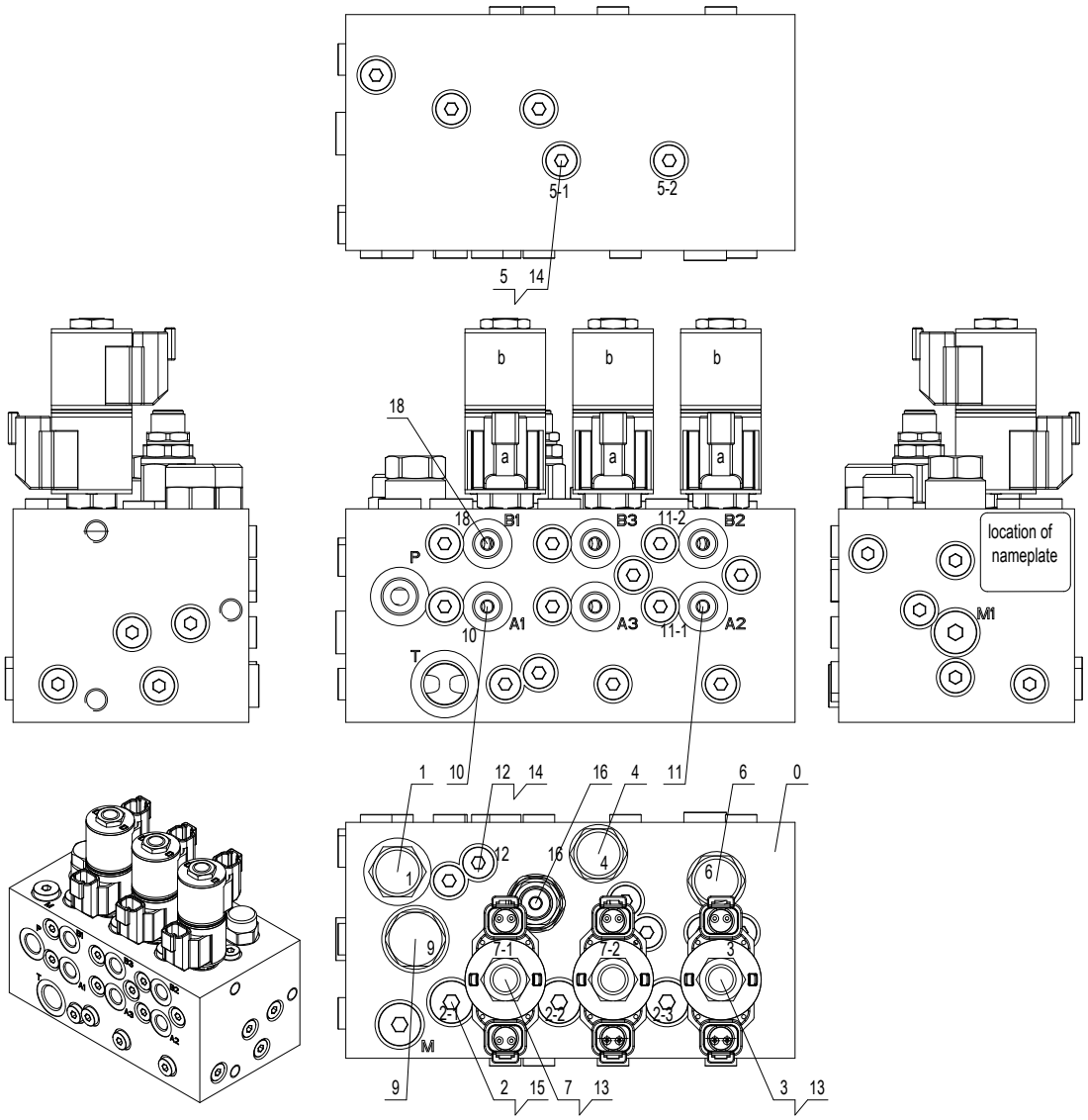


Fig. 18 Platform Control Valve Manifold (PN.202040003806)

Table 8-18 Platform Control Valve Manifold (PN.202040003806)

No.	Description	Installation torque	Function
1	Compensation valve	27.1 Nm (20 ft-lb)	Provides fixed-differential overflow, releases pressure for platform control manifold system
2-1	Shuttle valve	5 Nm (4 ft-lb)	Selects feedback pressure for upward or downward leveling
2–2	Shuttle valve	5 Nm (4 ft-lb)	Selects feedback pressure for jib up or down movement
2–3	Shuttle valve	5 Nm (4 ft-lb)	Selects feedback pressure for platform left or right rotating
3	Solenoid valve	25.8 – 28.5 Nm (19 – 21 ft-lb)	Controls the direction of platform left and right rotating

Table 8-18 Platform Control Valve Manifold (PN.202040003806) (continued)

No.	Description	Installation torque	Function
4	Flow valve	30 Nm (22 ft-lb)	Releases LS feedback pressure
5	Check valve	\	Keeps oil flowing in one direction
6	Flow valve	30 Nm (22 ft-lb)	Controls the speed of platform rotating
7–1	Solenoid valve	24.4 – 27.1 Nm (18 – 20 ft-lb)	Controls the direction and speed of platform leveling upward/downward
7–2	Solenoid valve	24.4 – 27.1 Nm (18 – 20 ft-lb)	Controls the direction and speed of jib up/down movement
9	Compensation valve	33 Nm (24 ft-lb)	Prioritizes flow rate for leveling
10	Damper	4 Nm (3 ft-lb)	\
11	Damper	4 Nm (3 ft-lb)	\
12	Damper	4 Nm (3 ft-lb)	\
13	Coil	4 Nm (3 ft-lb)	\
16	Overflow valve	40 – 45 Nm (30 – 33 ft-lb)	Acts as safety valve, releases pressure for platform control manifold system
18	Damper	4 Nm (3 ft-lb)	\

8.3 HYDRAULIC TANK

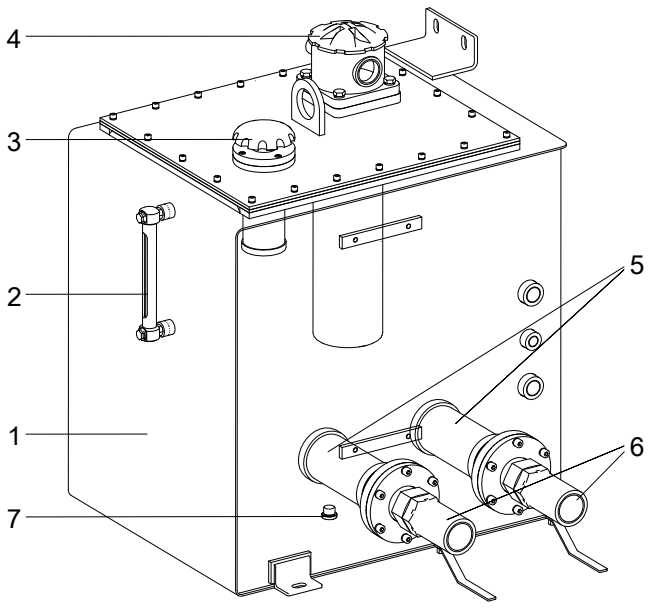


Fig. 19 Hydraulic Tank Structure

Table 8-19 Hydraulic Tank Components

No.	Description
1	Tank body
2	Level indicator
3	Air filter
4	Return filter
5	Oil suction filter
6	Shut-off valve
7	Drain plug

Air Cleaner

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. Locate the hydraulic tank, and visually inspect the side of the 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. Locate the hydraulic tank.
3. Close the hydraulic shut-off valve located on the side of the tank.
4. Place a suitable container under the oil drain plug at the bottom of the tank.
5. Remove the oil drain plug at the bottom of the tank and completely drain the oil into the container.
6. Install the oil drain 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 drain 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. Locate the 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 with the height of 180 mm (7.1 in) 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 function 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 with the height of 180 mm (7.1 in) 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 with the height of 180 mm (7.1 in) 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 8-20 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

Table 8-20 Maximum allowable drift for different cylinder bore diameters (continued)

Cylinder bore diameter (mm/in)	Maximum allowable drift in 15 minutes (mm/in)
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°C.

8.9 HYDRAULIC SYMBOLS

Table 8-21

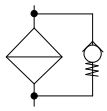
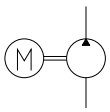
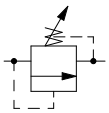
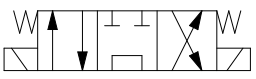
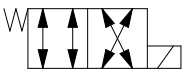
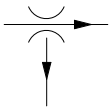
Symbols	Name
	Filter
	Brake
	Emergency power unit
	Hydraulic motor
	Overflow valve
	3-position 4-way solenoid directional valve
	2-position 4-way solenoid directional valve

Table 8-21 (continued)

Symbols	Name
	Priority valve
	Check valve

8.10 HYDRAULIC SCHEMATIC DIAGRAM

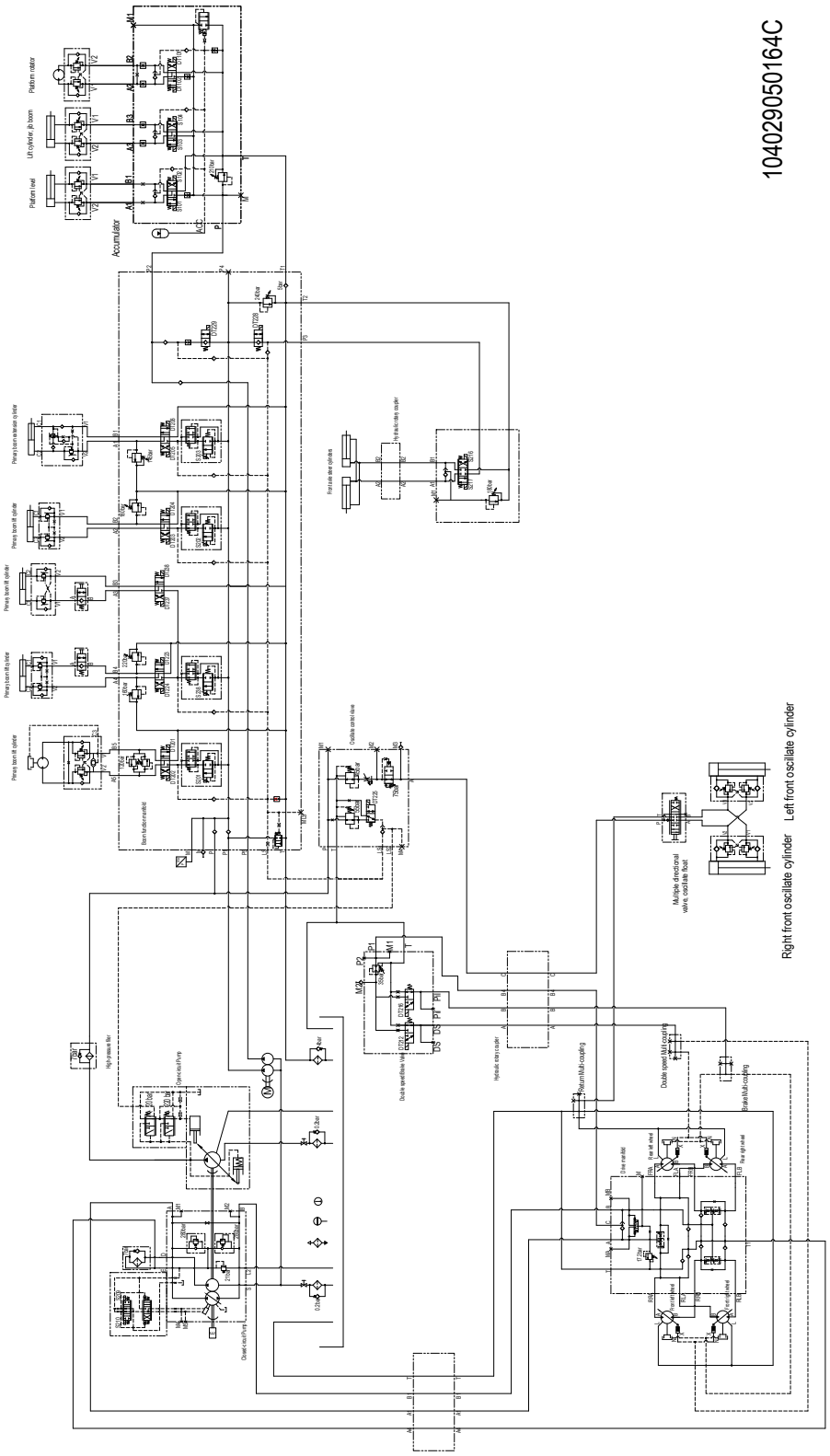


Fig. 20 Hydraulic Schematic Diagram (2WS)

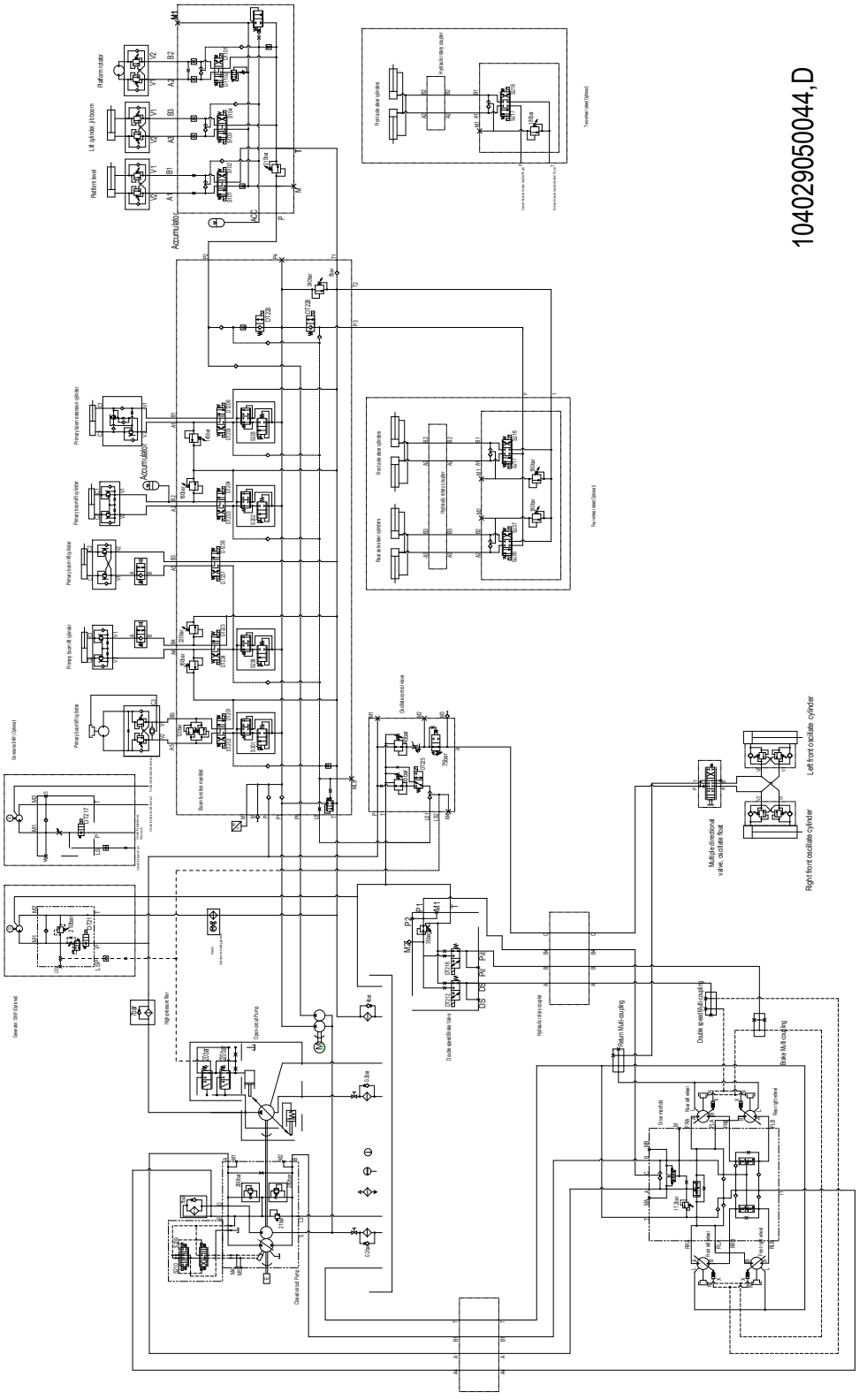


Fig. 21 Hydraulic Schematic Diagram

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9 ELECTRICAL SYSTEM

Two 12V lead-acid batteries in parallel provide power for the engine, emergency pump 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 LEAD-ACID 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.

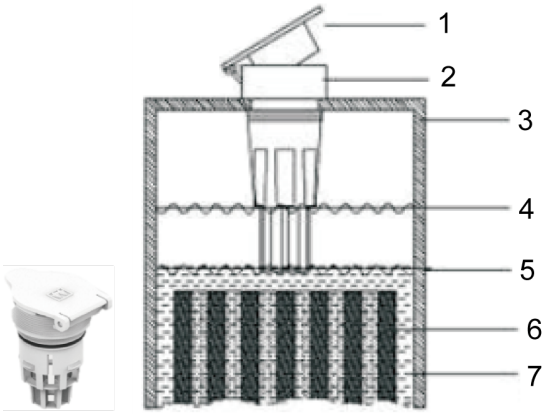


Fig. 1 Electrolyte level diagram

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)

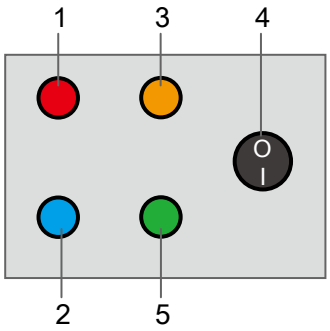


Fig. 2 Diagram of water refilling device panel

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	6 V	12 V
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	6 V	12 V
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

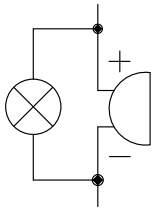
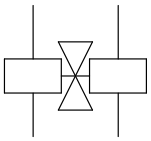
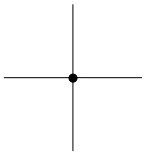
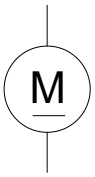
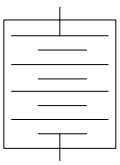
Symbols	Description
	Buzzer
	Valve
	Two lines connected
	Electric motor
	AGM battery

Table 9-8 (continued)

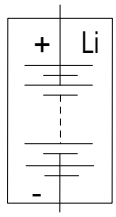
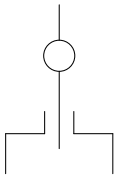
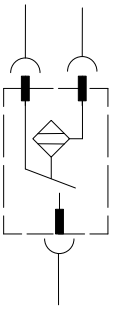
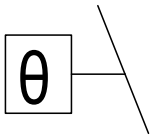
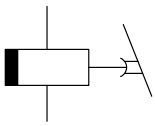
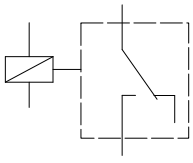
Symbols	Description
	Lithium battery
	Toggle switch
	Level switch
	Oil temperature switch
	Delay relay
	Power-off switch
	Relay

Table 9-8 (continued)

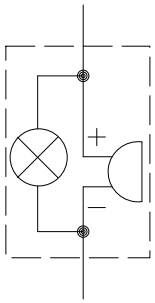
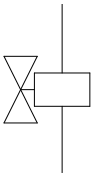
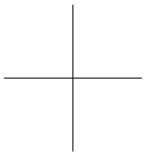
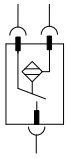
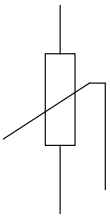
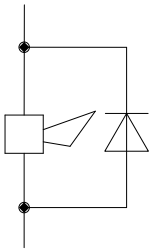
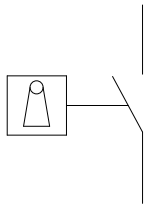
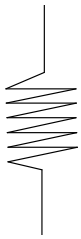
Symbols	Description
	Warning light
	Valve
	Two lines not connected
	Proximity switch pressure sensor
	Fuel level sensor
	Horn

Table 9-8 (continued)

Symbols	Description
	Key switch
	Preheating wire

9.3 ELECTRICAL SCHEMATIC DIAGRAM

Electrical Schematic Diagram of Turntable

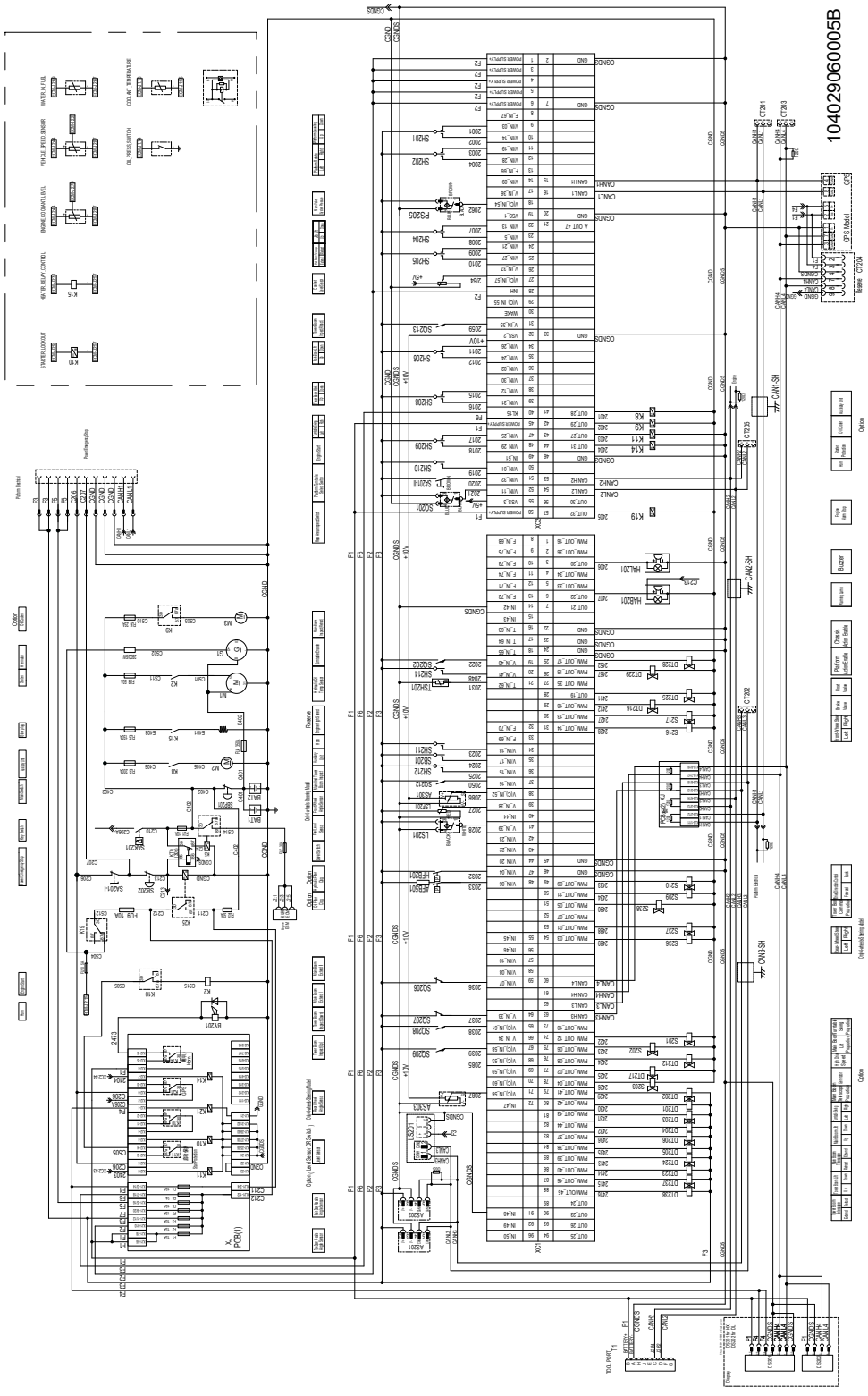


Fig. 10 Electrical Schematic Diagram of Turntable (Cummins QSF2.8/EU Stage III)

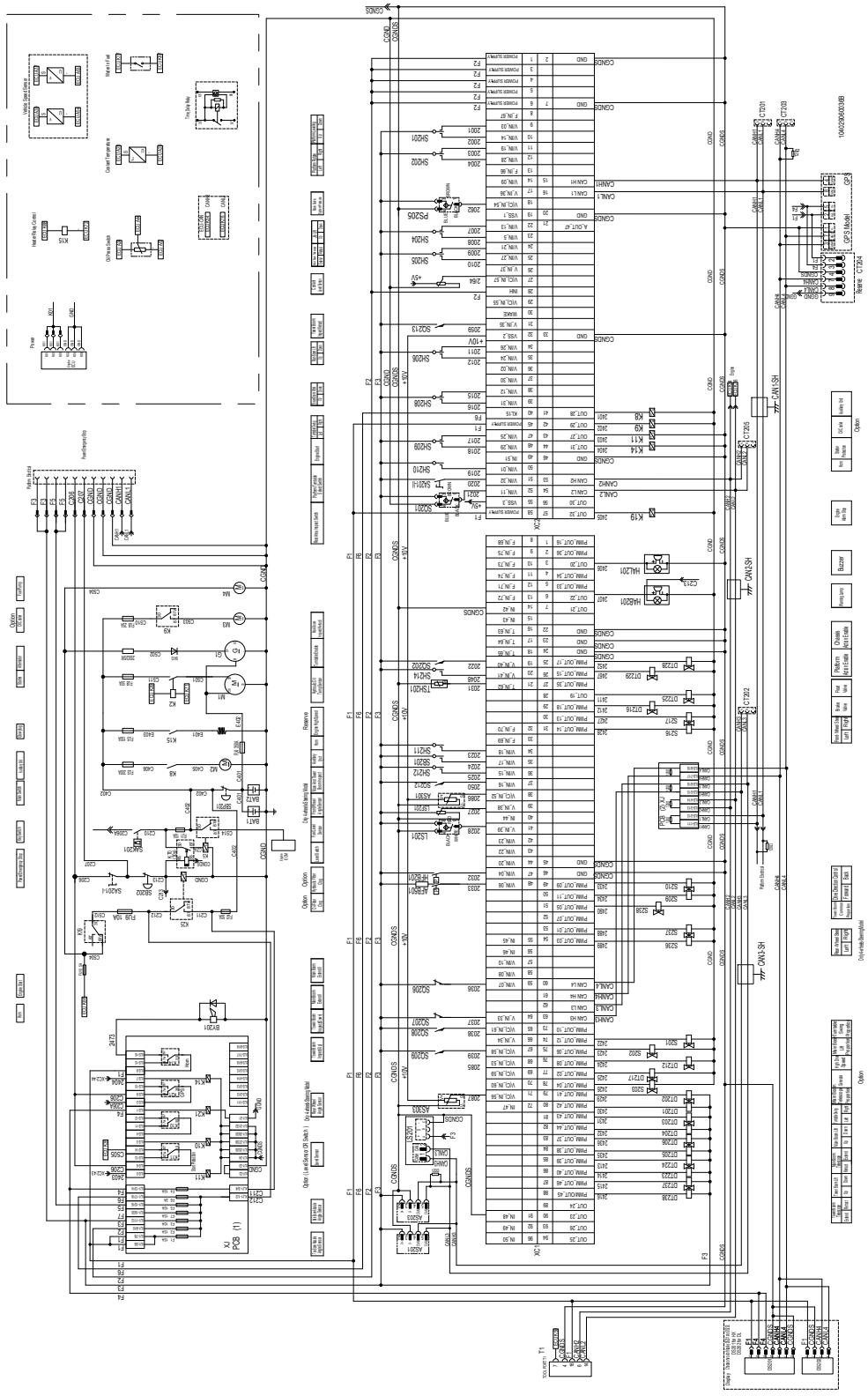


Fig. 11 Electrical Schematic Diagram – Turntable (Yuchai YCF3050/China IV,

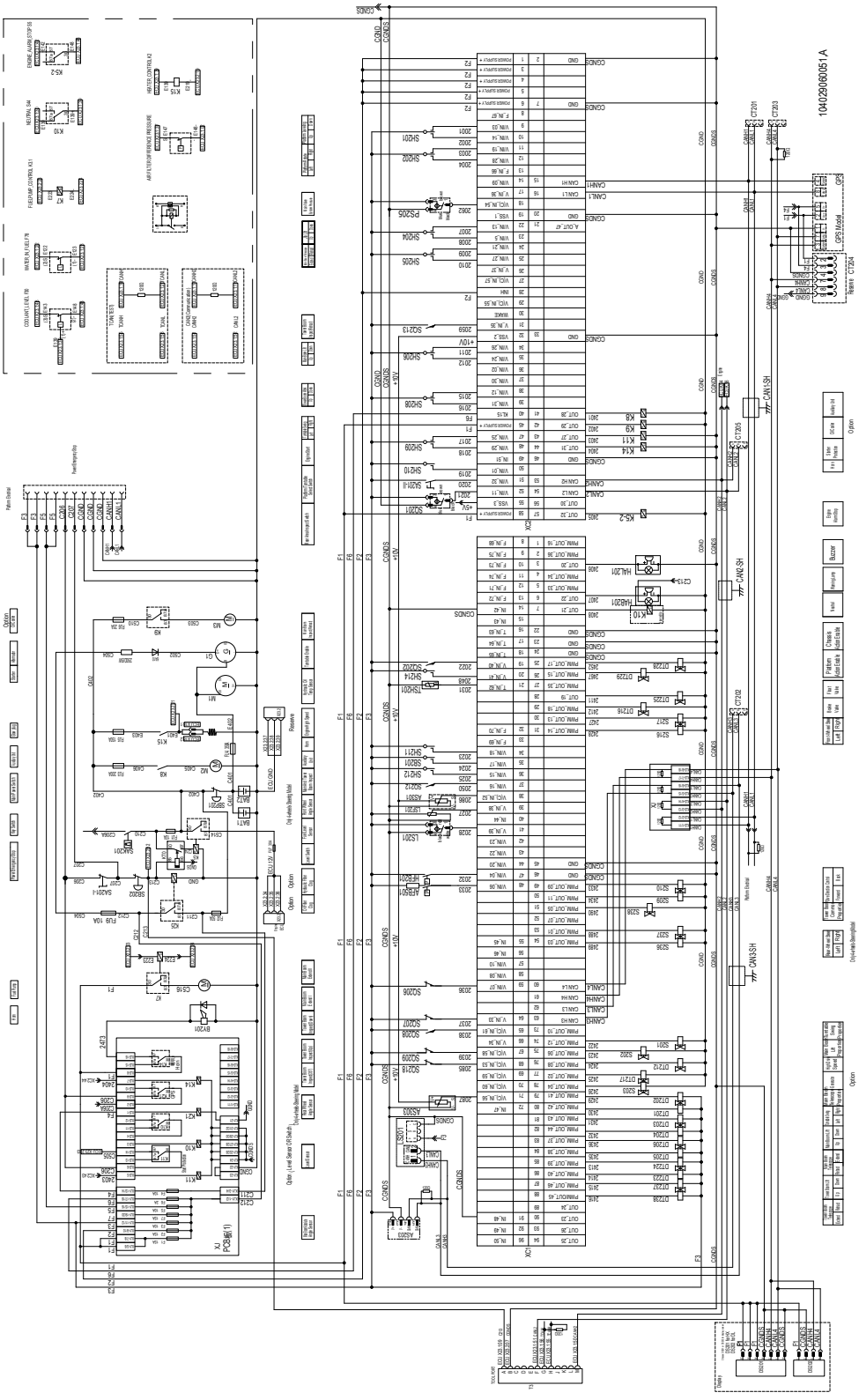


Fig. 12 Electrical Schematic Diagram – Turntable (Deutz TD2.9 L4, EPA 4)

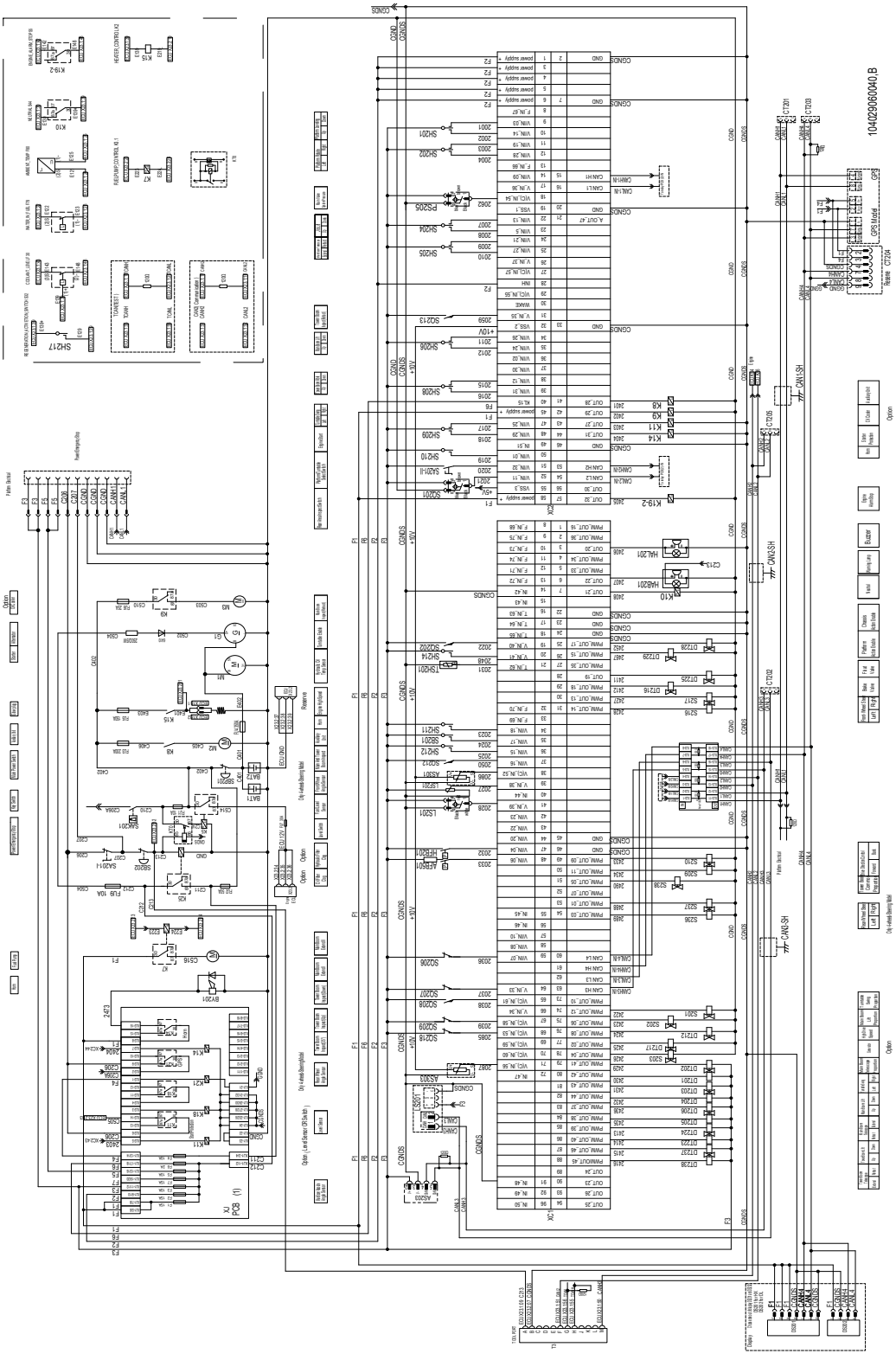


Fig. 13 Electrical Schematic Diagram – Turntable (Deutz TD2.9 L4/EU Stage V)

Electrical Schematic Diagram of Platform

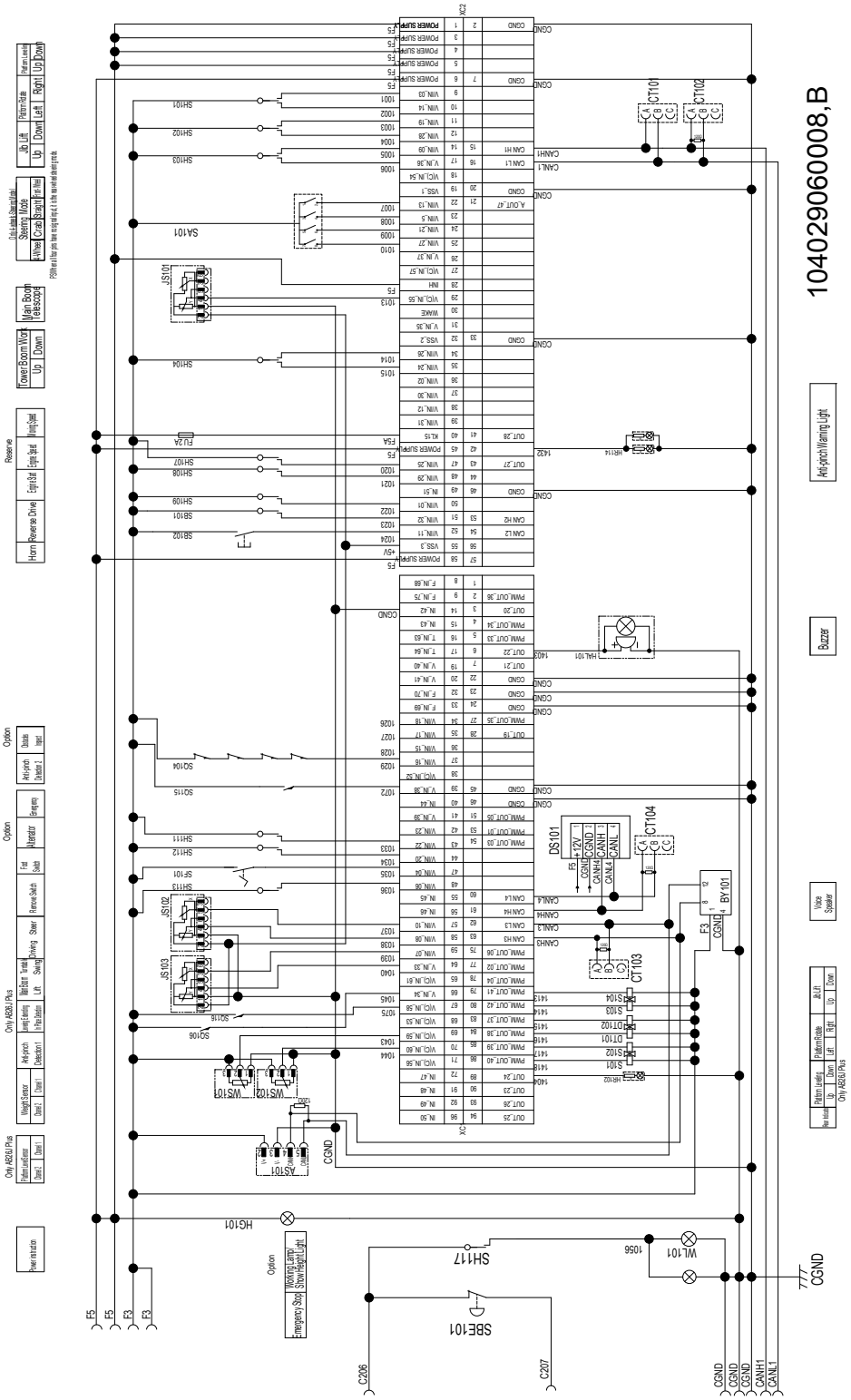


Fig. 14 Electrical Schematic Diagram-Platform

Electrical Schematic Diagram – Engine

105068063057, A

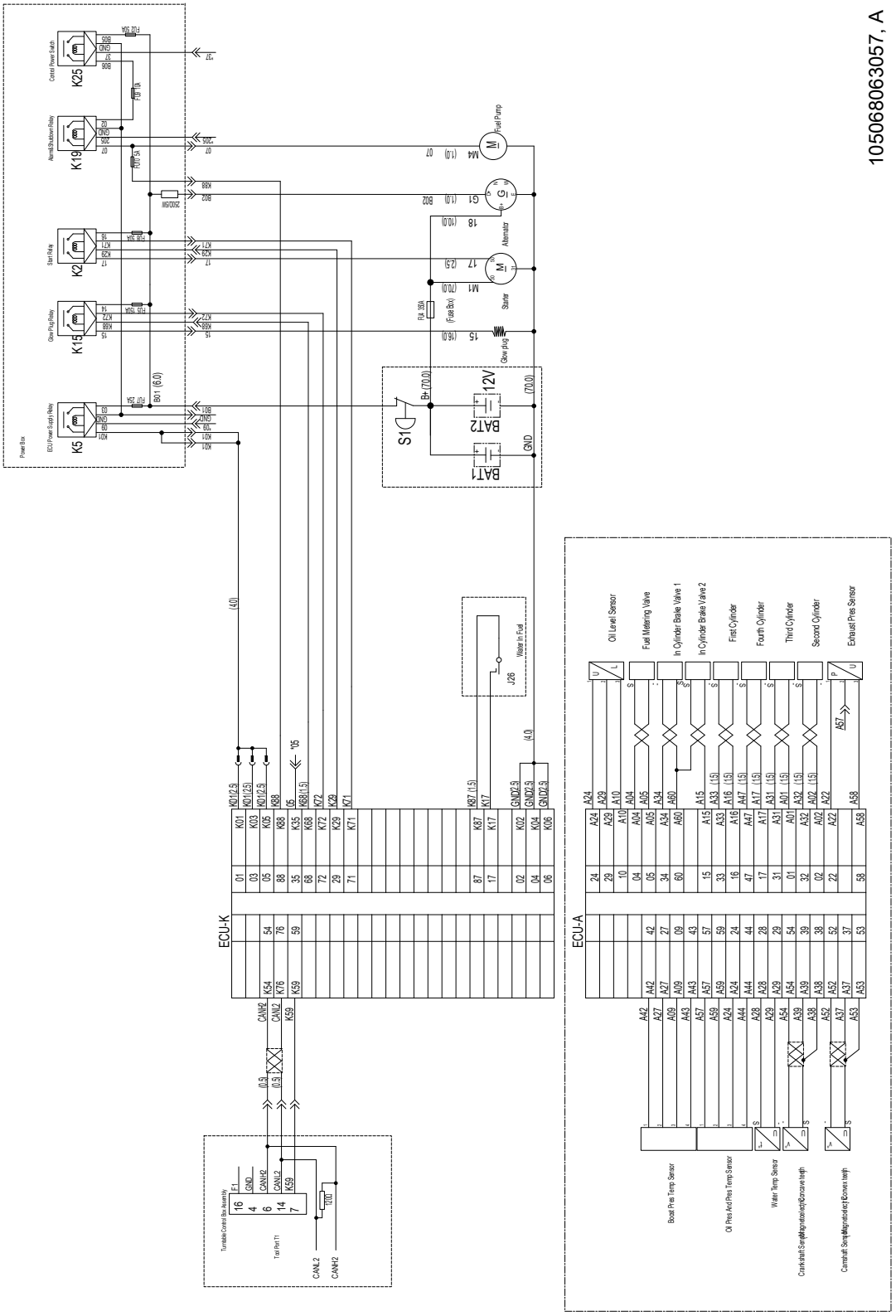


Fig. 15 Electrical schematic of engine (Yuchai YCF3050/China IV/China III)

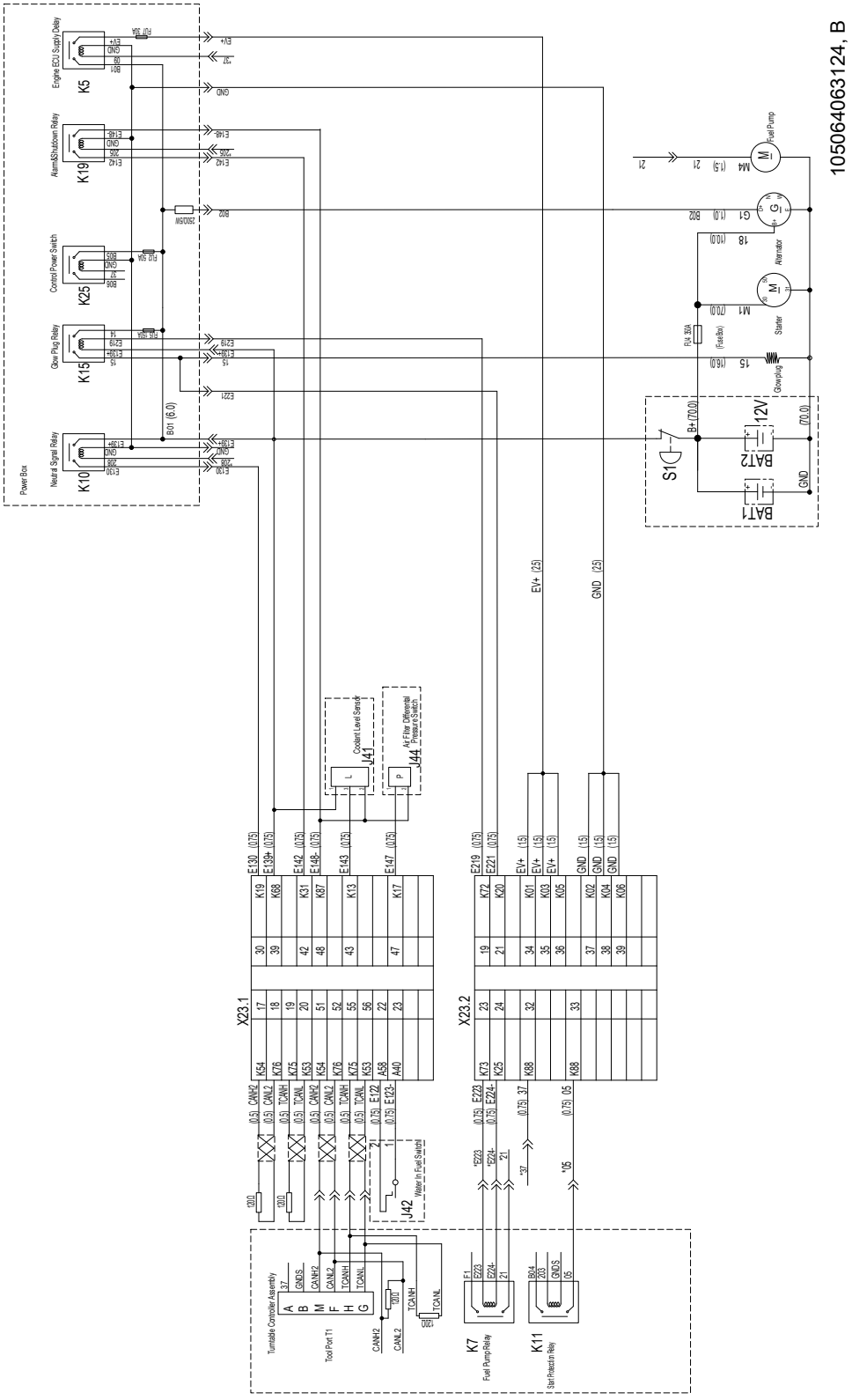


Fig. 16 Electrical Schematic Diagram – Turntable (Deutz TD2.9 L4, EPA 4)

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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.
Electric 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
Working Envelop 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.
Oscillating 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.
Operator Protective 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 slew slowly. • Ensure the machine is in a safe position, lift the round bar up until the folded plate 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 Lifting Joystick Fault	Check the main boom lift joystick data, and check the CAN communication between the turntable and platform
Turntable Slewing Joystick Fault	Check the turntable slew joystick data, and check the CAN communication between the turntable and platform
Travel 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 Sensor 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.
Level 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.
Level 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.
Travel 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
Turntable Cover is 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 lifting 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 lifting 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.
Slewing 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 circuit 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 parameters	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

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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 and main boom are fully lowered, and the main boom is fully retracted.
- **Transport position:** The articulating boom and main boom are fully lowered, and the main boom is fully retracted. 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. Depress the 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 the maximum 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 can detectes the travel switch by means of 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 tests firstly 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.

Working Envelope Diagram

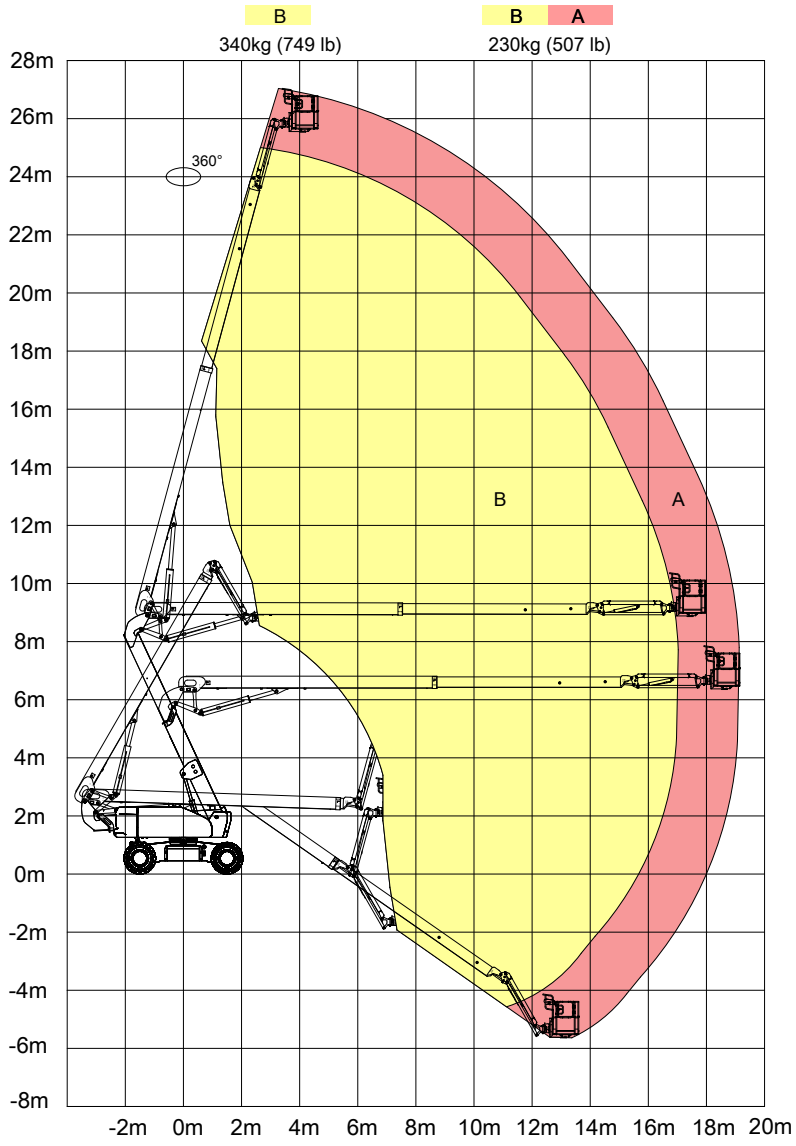


Fig. 1 Working Envelope Diagram (5°)

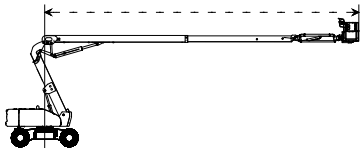
Horizontal Reach Restriction and Overload Limit Functions

Zone A+B: 0 kg < platform load≤230 kg (507 lb)

1. Test the horizontal reach restriction function from the ground control position.

1) Tower boom fully retracted and lifted;
2) Adjust the main boom and jib (if equipped) to be horizontal, and extend the main boom until it stops extending. At this time, the buzzer on the turntable 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.

2. Test the overload limit function from the ground control position. Extend the main boom until it stops extending. Apply 240 kg (529 lb) loads at the center of platform, the buzzer on the ground 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 jib (if equipped) can lift and lower, the platform can be leveled manually within ±10°, the turntable can slew slowly, and the main boom and tower boom can be lowered after the main boom has been fully retracted, but other functions will be inoperative.

  2) After removing the loads from the platform, all functions will be operative.

Zone B: 230 kg (507 lb) < platform load≤340 kg (749 lb)

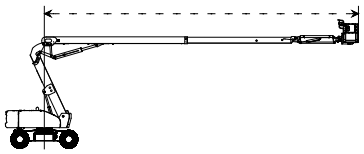
1. Apply 300 kg (661 lb) loads at the center of platform.

2. Test the horizontal reach restriction function from the ground control position.

1) Tower boom fully retracted and lifted;

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.

3. Test the overload limit function from the ground control position. Apply 345 kg (760 lb) loads at the center of platform. The buzzer should sound continuously, 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 jib (if equipped) can lift and lower, the platform can be leveled manually within ±10°, the turntable can slew slowly, and the main boom and tower boom can be lowered after the main boom has been fully retracted, but other functions will be inoperative.

  2) After removing the loads from the platform, all functions will be operative.

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 commissioned 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).

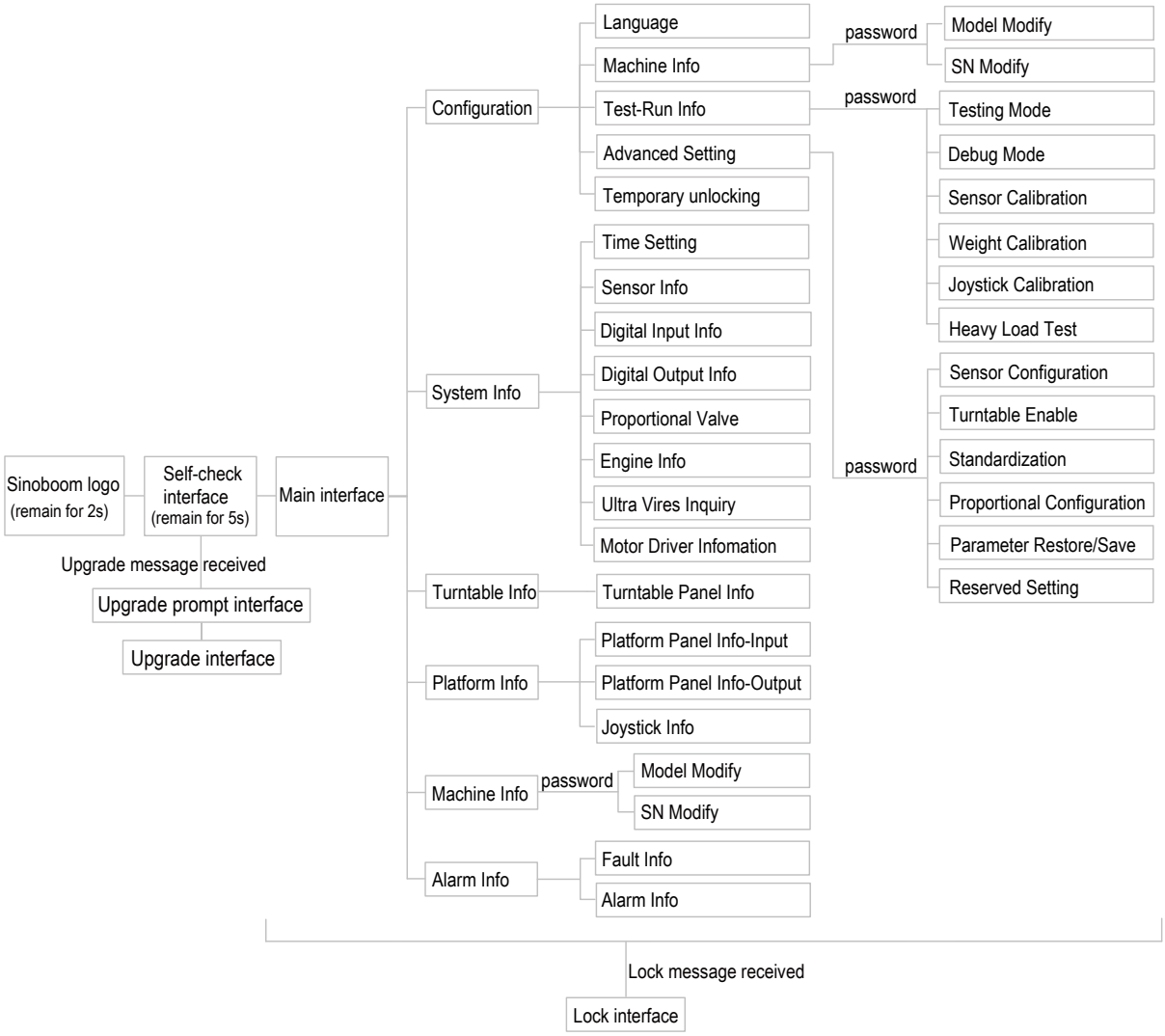


Fig. 1 Display interface navigation diagram

- “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.

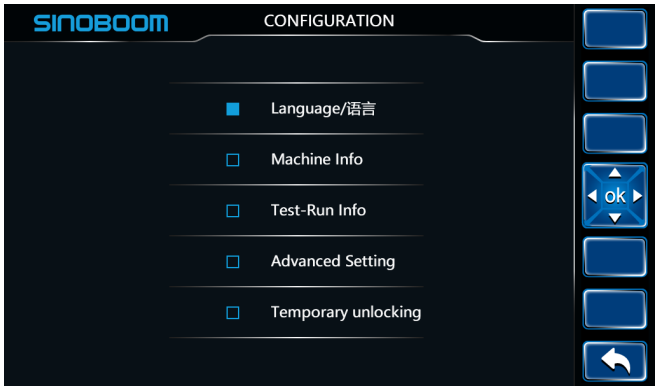


Fig. 5 Configuration

- 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.

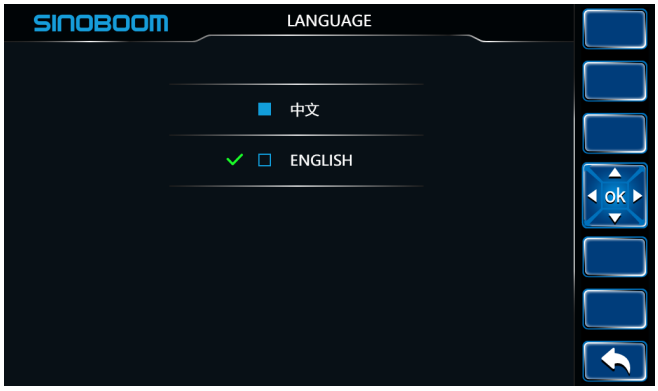


Fig. 6 LANGUAGE

- 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.

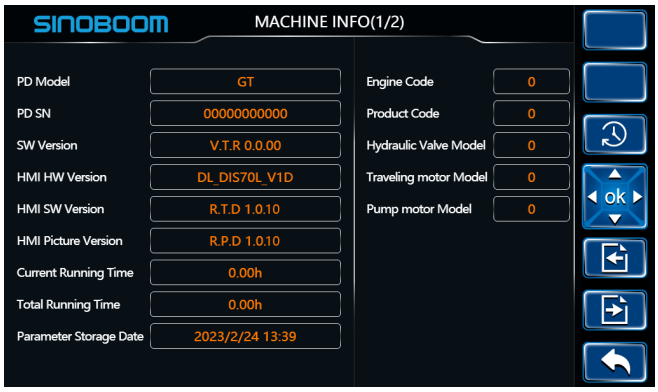


Fig. 7 MACHINE INFO (1/2)

- 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.
- The corresponding information for the engine configuration number is as follows:

Table 12-1

Engine configuration number	Description
0	Cummins electronic-controlled engine
1	Deutz electronic-controlled engine
2	Perkins Engine
3	Deutz mechanical engine
4	Hybrid Kubota mechnical engine
5	Yanmar Stage V engine
6	Yanmar 36kW mechnical engine meeting CHN Stage III emission standards
7	Yanmar electronic-controlled engine meeting CHN Stage III emission standards
8	Weichai/Yuchai engine meeting CHN Stage IV emission standards
9	Electrical driven models

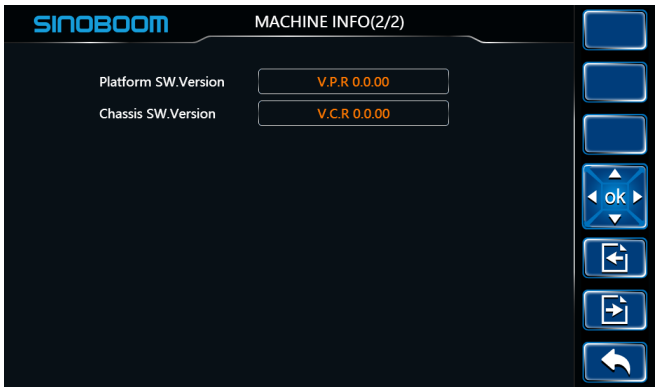


Fig. 8 MACHINE INFO (2/2)

- 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).

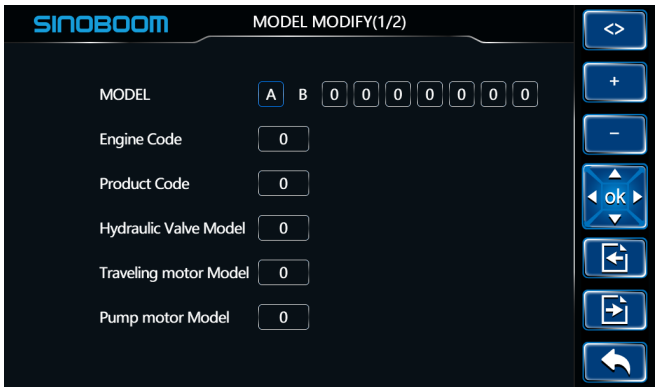


Fig. 9 MODEL MODIFY (1/2)

- 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).

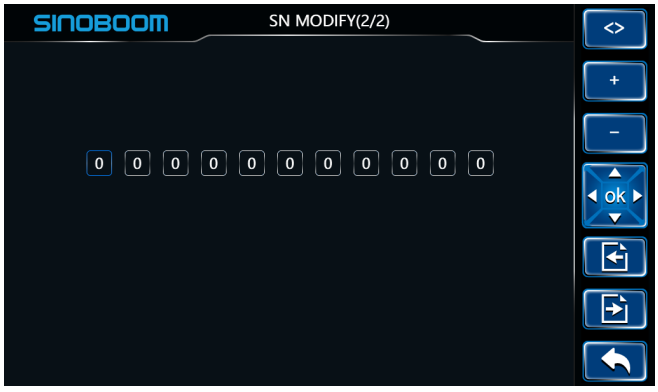


Fig. 10 SN MODIFY (2/2)

- 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

Commissioning 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).

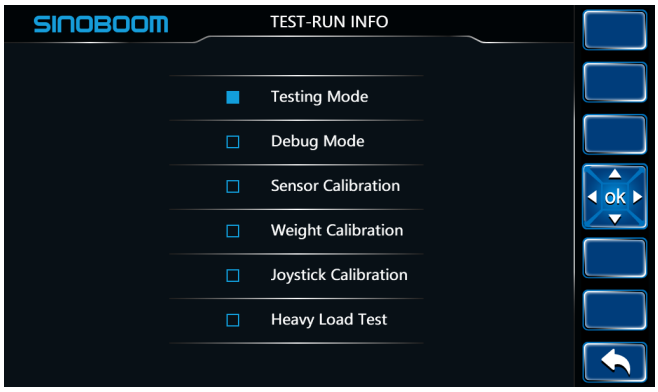


Fig. 11 Commissioning Information

- Press 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.**
- **In test mode, only qualified personnel are allowed to operate from the turntable control box, operation from the platform control box is prohibited. In this mode, the travel alarm light will sound as a reminder. No movements will be restricted, so be sure to operate with caution.**
- **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.**

Enter the testing mode.

1. Confirm that the operator is qualified to operate the machine in test mode and has a clear understanding that operation at the platform control box is prohibited in this mode.
2. Enable the "Emergency Power Switch" or "Enable Switch" on the turntable control box, and simultaneously select "Test Mode" by clicking on the "TEST-RUN INFO" interface. and then press the OK button.

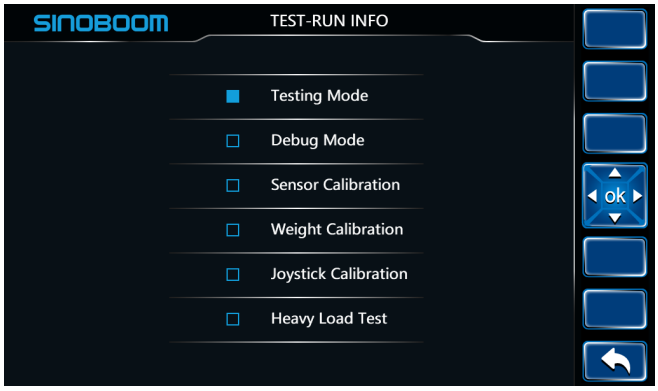


Fig. 12 Commissioning Information

3. Now a security warning appears, as below:
   - Press to enter the testing mode.
   - Press to return to the “TEST-RUN INFO” Interface.

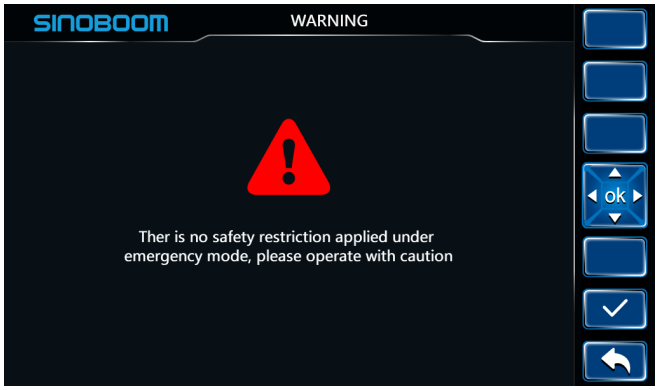


Fig. 13

Exit the Test mode

- Method 1: Press Exit the "Test Mode" screen.
- Method 2: Turn the "ground/platform control selector" to "ground control position".
- Method 3: Cycle power. Press the emergency stop buttons at the turntable control box and platform control position to "OFF" position, or turn the key switch to "OFF" position and remove the key, or switch the power-off switch to "OFF" position..。

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.**
- **In Debug Mode, only qualified personnel are allowed to operate from the turntable control box, operation from the platform control box is prohibited. In this mode,no movements will be restricted, so be sure to operate with caution.**
- **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:

- 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 commissioning 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.

Enter Debug Mode

1. Confirm that the operator is qualified to operate the machine in test mode and has a clear understanding that operation at the platform control box is prohibited in this mode.
2. Enable the "Emergency Power Switch" or "Enable Switch" on the turntable control box, and simultaneously select "Test Mode" by clicking on the "Debug Mode" interface. and then press the OK button to enter the "Debug Mode".

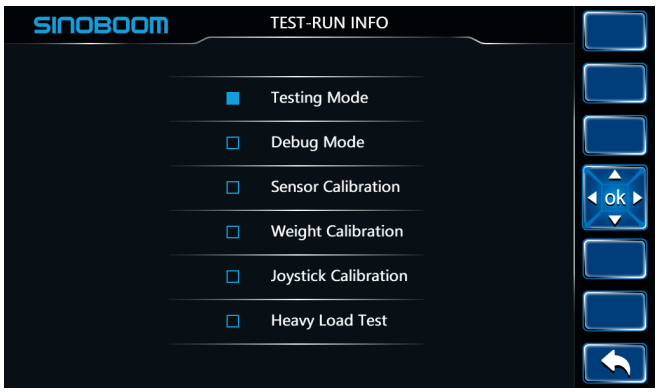


Fig. 14 Commissioning Information

3. After entering the Debug Mode, the "OUTPUT TEST (1/3)" will appear firstly, as shown below:
   - Press 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.

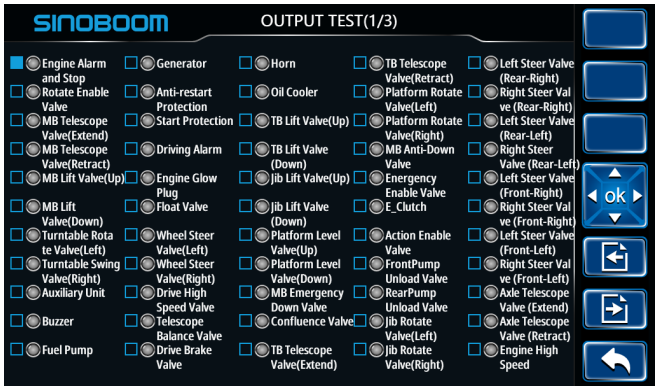


Fig. 15 OUTPUT TEST (1/3)

4. Press or You can switch to “PLATFORM OUTPUT TEST (2/3)” screen, as shown below:

   - Press 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.

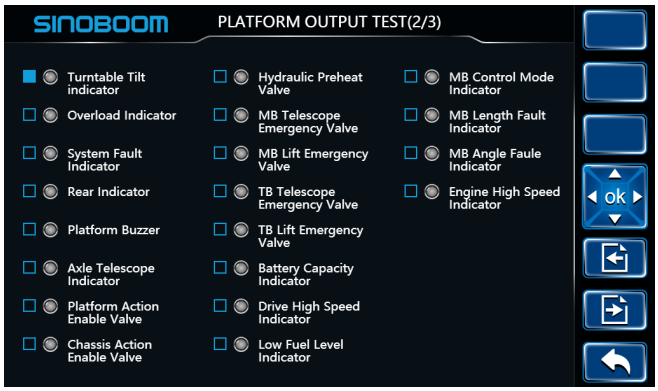


Fig. 16 PLATFORM OUTPUT TEST (2/3)

5. Press or You can switch to “PROPORTIONAL VALVE (3/3)” screen.

   - Press 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.

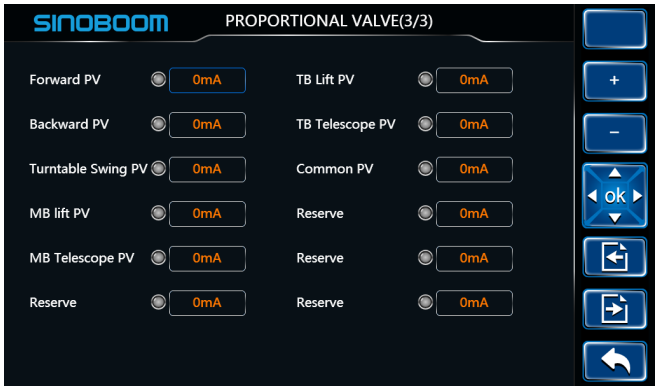


Fig. 17 PROPORTIONAL VALVE (3/3)

Exit Debug Mode

- Method 1: Press Exit the “Debug Mode” screen。
- Method 2: Turn the "ground/platform control selector" to "ground control position".
- Method 3: Cycle power. Press the emergency stop buttons at the turntable control box and platform control position to "OFF" position, or turn the key switch to "OFF" position and remove the key, or switch the power-off switch to "OFF" position.

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.

On the “Commissioning Information” Interface, press to select “Sensor Calibration”, and press OK button to enter “SENSOR CALIBRATION (1/4)” interface.

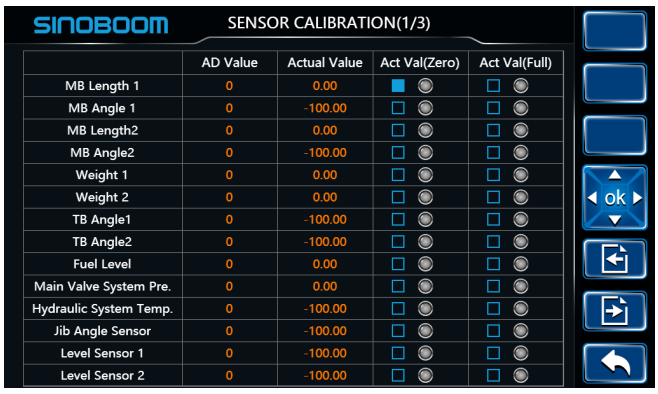


Fig. 18 SENSOR CALIBRATION (1/4)

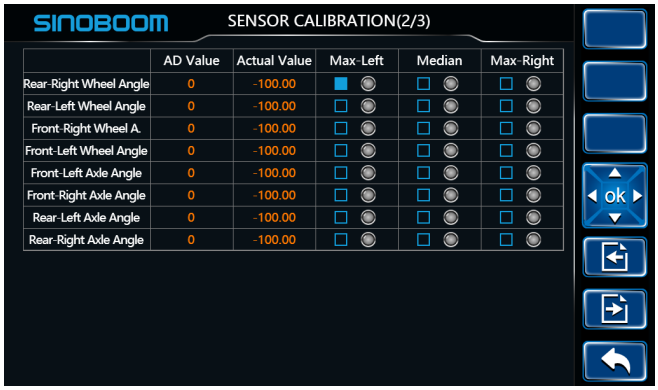


Fig. 19 SENSOR CALIBRATION (2/4)

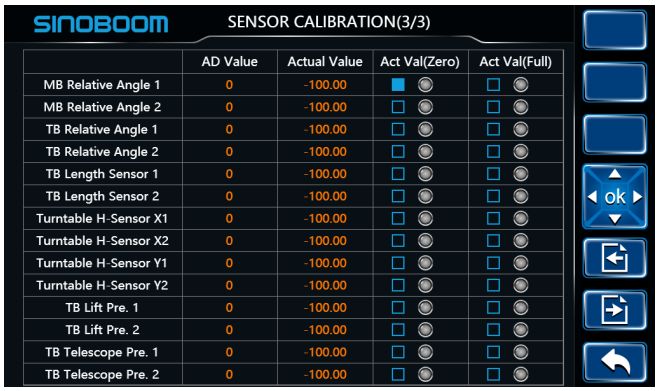


Fig. 20 SENSOR CALIBRATION (3/4)

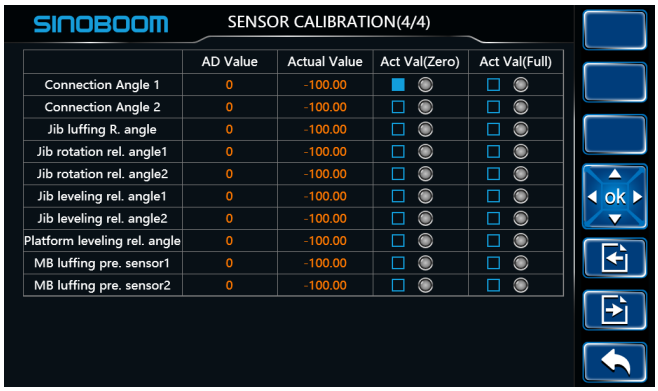


Fig. 21 SENSOR CALIBRATION (4/4)

- 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 “Commissioning Information” 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 chassis 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 Sensor 1”, press and hold OK button for 3s until ● changing to ●, indicating successful calibration. Calibrate the “Act Val (Zero)” of “MB Length Sensor 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 Sensor 1”, press and hold OK button for 3s until ● changing to ●, indicating successful calibration. Calibrate the “Act Val (Full)” of “MB Length Sensor 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 chassis 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 Sensor 1”, press and hold OK button for 3s until ● changing to ●, indicating successful calibration. Calibrate the “Act Val (Zero)” of “MB Length Sensor 2” using the same method.
7. Press ok to select “Act Val (Zero)” of “TB Length Sensor 1”, press and hold OK button for 3s until ● changing to ●, indicating successful calibration. Calibrate the “Act Val (Zero)” of “TB Length Sensor 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 Sensor 1”, press and hold OK button for 3s until ● changing to ●, indicating successful calibration. Calibrate the “Act Val (Full)” of “MB Length Sensor 2” using the same method.

10. Press ok to select “Act Val (Full)” of “TB Length Sensor 1”, press and hold OK button for 3s until ● changing to ●, indicating successful calibration. Calibrate the “Act Val (Full)” of “TB Length Sensor 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.

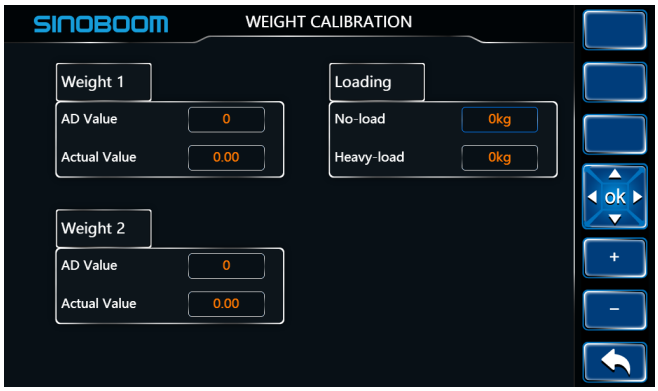


Fig. 22 Weight Calibration

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.

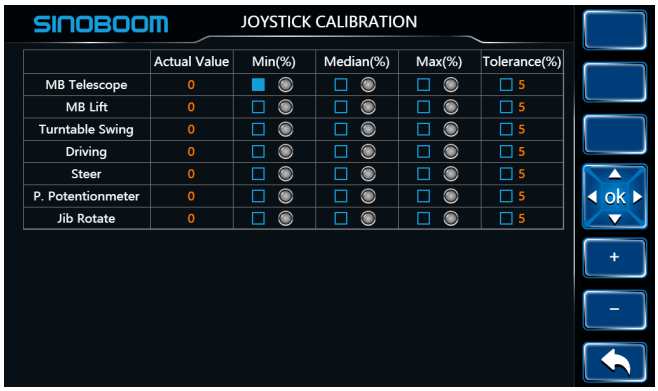


Fig. 23

- **Minimum value, median value, maximum value:** Press ok to select the item to be calibrated, press and hold OK button for 3s to make ● changing to ●, indicating successful calibration.

- **Tolerance:** Press ok 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 ok to select “Heavy Load Test”, and press OK button to enter “HEAVY LOAD TEST” interface.

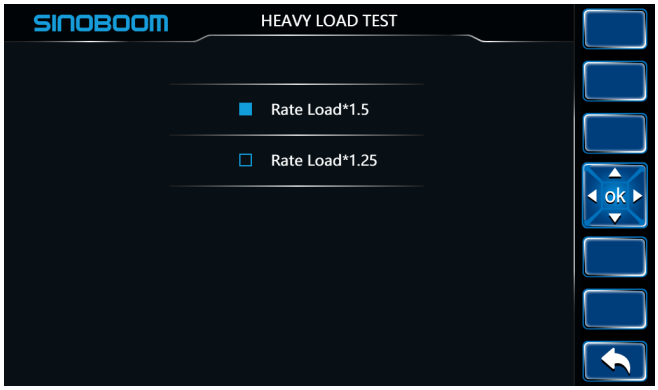


Fig. 24 HEAVY LOAD TEST

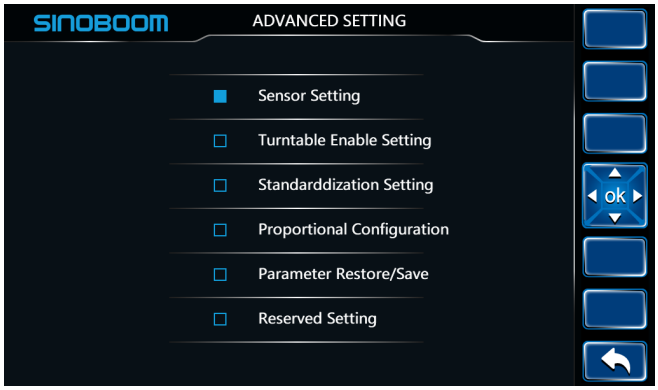


Fig. 25 Advanced Setting

- Press ok 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 valve 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 ok to select “Advanced Setting”, press OK button to enter the “ADVANCED SETTING” interface (password required).

- Press ok 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 ok to select “Sensor Setting”, and press OK button to enter “SENSOR CONFIGURATION” interface.

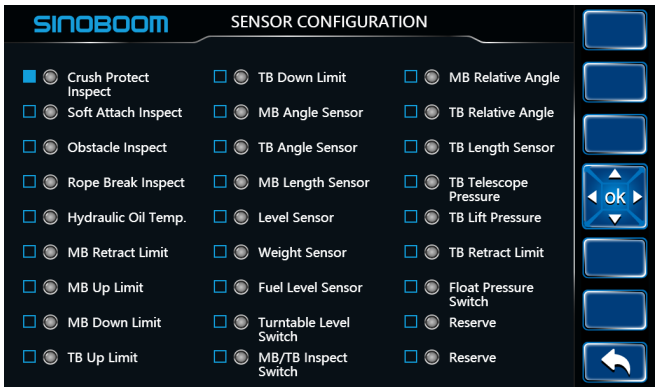


Fig. 26 Sensor Configuration

- 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 to select “Turntable Enable Setting”, and press OK button to enter TURNTABLE ENABLE Interface.

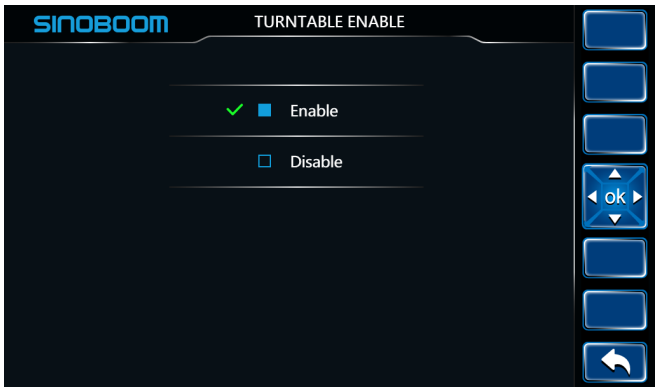


Fig. 27 Turntable Enable Setting

- Press 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 to select “Standardization Setting”, and press OK button to enter “STANDARDIZATION” interface.

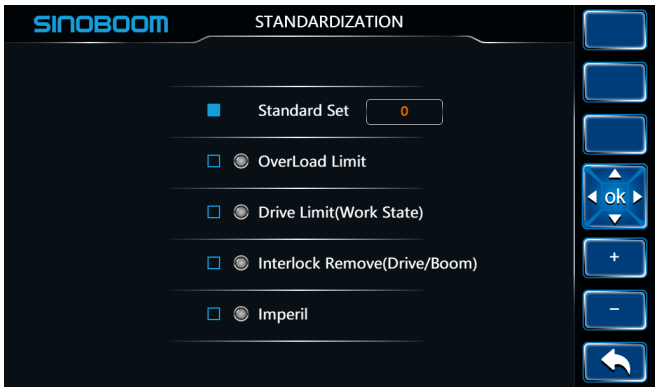


Fig. 28 STANDARDIZATION

- **Standard Set:** Press 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.
  - If the value is set to “3”, the icon CSA.
  - If the value is set to “4”, the icon AS.
  - If the value is set to “5”, the icon KCS.
  - If the value is set to “6”, the icon JIS.
  - If the value is set to “7”, the icon EAC.
  - If the value is set to “8”, the icon UKC.
- **Other setting items:** Press 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. 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.
  - **travel limits (Operating position)** : Enable this item, DR Travel is limited under 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 Valve Setup

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

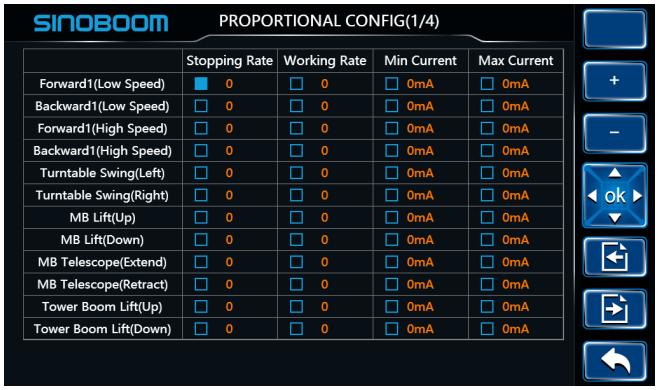


Fig. 29 Proportional Valve Configuration(1/4)

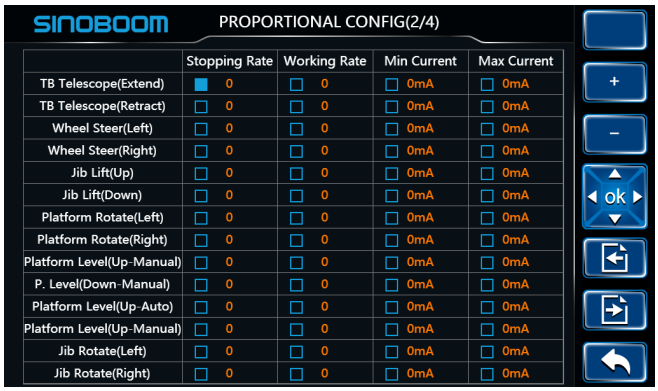


Fig. 30 Proportional Valve Configuration (2/4)

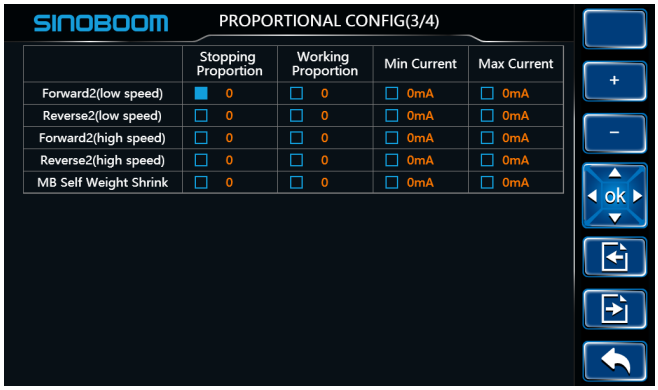


Fig. 31 Proportional Valve Configuration (3/4)

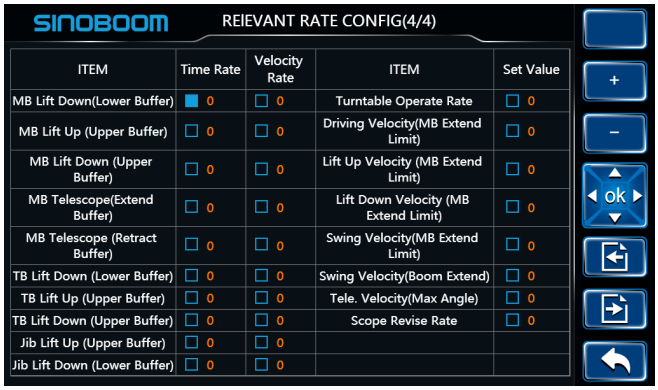


Fig. 32 RELEVANT RATE CONFIG (4/4)

- 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 12-2 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
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

Table 12-2 RELEVANT RATE CONFIG (4/4) description (continued)

No.	Item	Description	Applicable models
12	Travel Speed (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	Slewing RPM (MB Extend End)	To set the slewing speed with the main boom fully extended (maximum angle).	TB
16	Slewing RPM (MB Extend)	To set the rotation speed with the main boom fully extended (maximum angle). 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	Working Envelope Revise Rate	To slightly adjust the working envelope of telescopic boom (not used yet).	TB
Note: All parameters can be adjusted within 0-100.			

Parameter Restore/Save

DANGER

Before the implementation of parameter recovery, it is necessary to completely record information such as parameters or configurations indicated on all screens of the display, as a reference basis for accurate recovery of settings

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

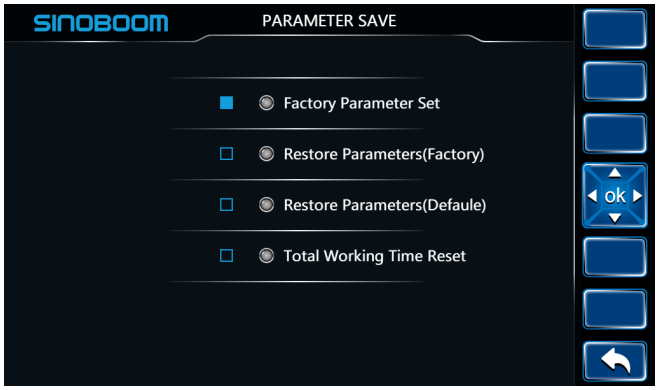


Fig. 33 Parameter Save

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

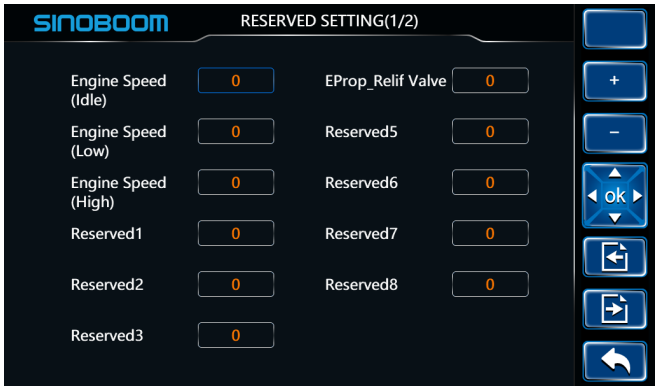


Fig. 34 RESERVED SETTING (1/2)

- 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.

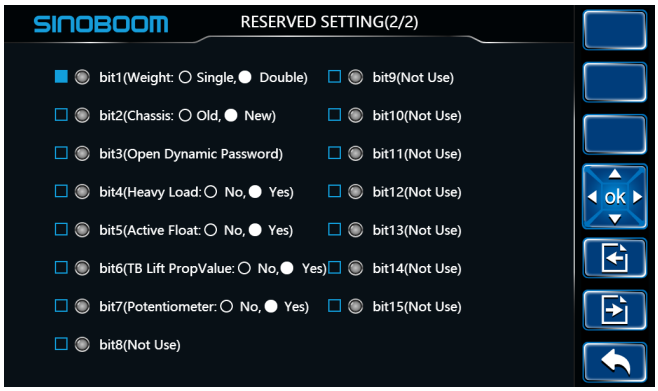


Fig. 35 RESERVED SETTING (2/2)

- Press ok 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 ok 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 ok to temporarily unlock the machine.
- If the machine is not locked, the screen will display “This device does not need to be temporarily unlocked".

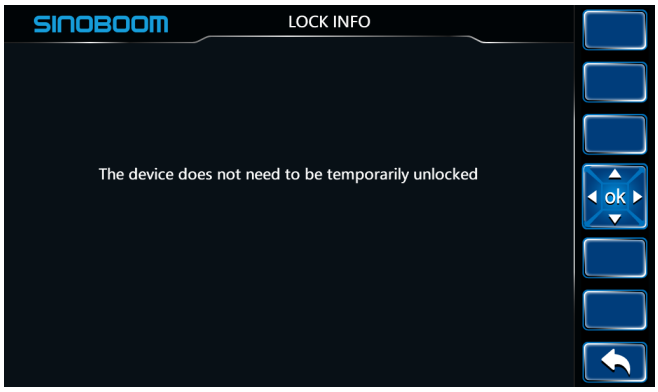


Fig. 36 Temporary Unlocking not Required

12.4 SYSTEM INFORMATION

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

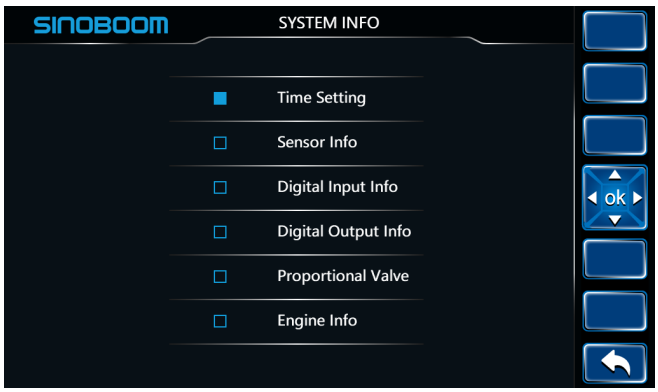


Fig. 37 SYSTEM INFO

- Press ok 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.

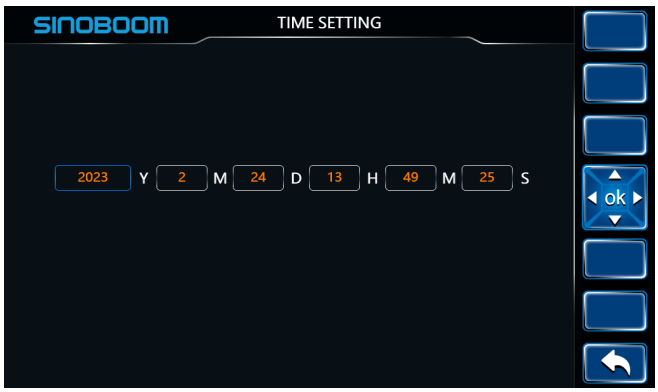


Fig. 38 Time Setting

- 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.

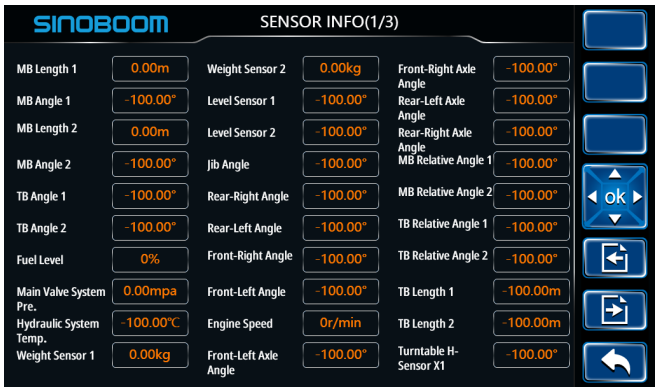


Fig. 39 SENSOR INFO (1/3)

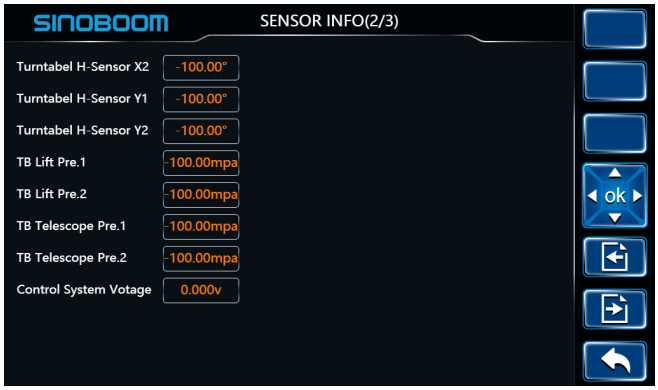


Fig. 40 SENSOR INFO (2/3)

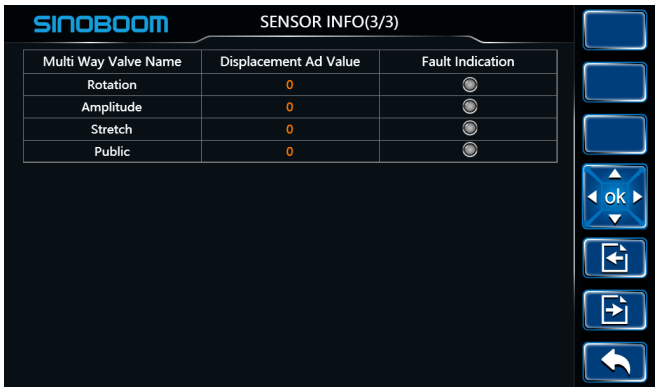


Fig. 41 SENSOR INFO (3/3)

- 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 Information

- 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 operating position of the machine meets the requirements.
- The configuration of switches is subject to the actual machine configurations.

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

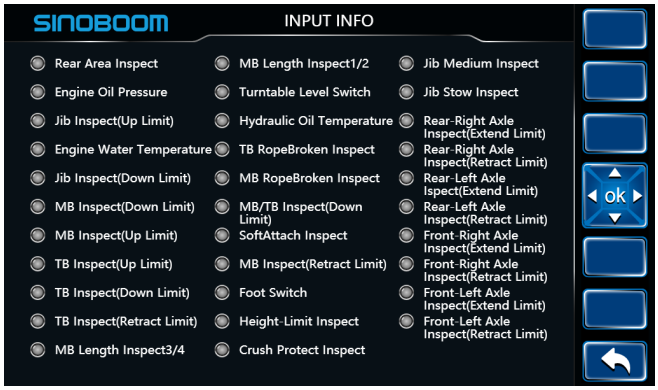


Fig. 42 INPUT INFO

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

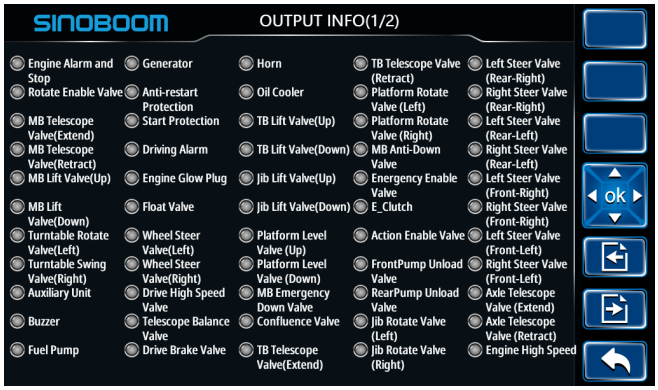


Fig. 43 OUTPUT INFO (1/2)

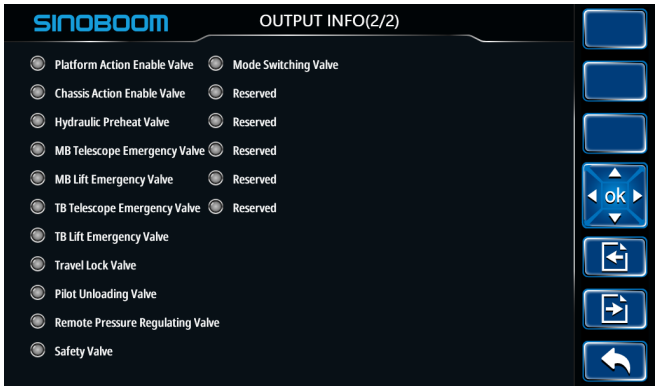


Fig. 44 OUTPUT INFO (2/2)

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

Proportional Valve Output Information

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

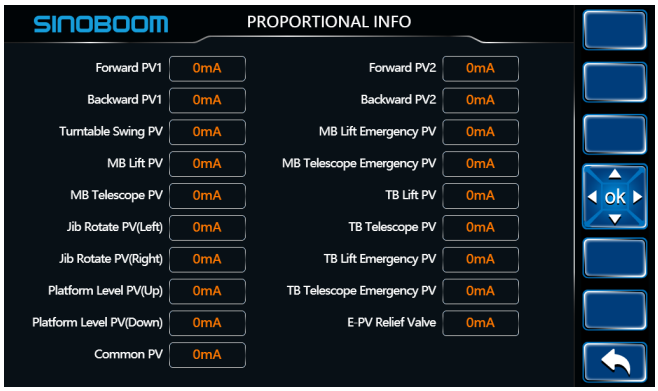


Fig. 45 PROPORTIONAL INFO

- 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 ok to select “Engine Info”, press OK button to enter ENGINE INFO interface.

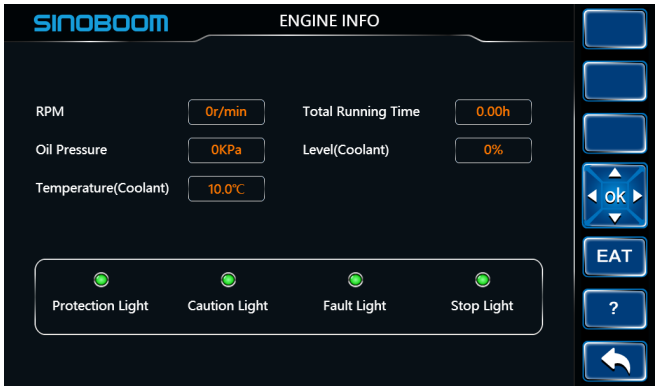


Fig. 46 Engine Status Information

- 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 EAT to enter EAT INFO interface.
- Press ? to enter ENGINE FAULT DIAGNOSES interface.
- Press to return to “SYSTEM INFO” interface.

Fig. 47 EAT SYSTEM INFO (Deutz engine)

Fig. 48 EAT SYSTEM INFO (Yuchai, Yanmar engine)

Table 12-3 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	
		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.	

Table 12-3 Description of indicator lights for Deutz engine (continued)

No.	Indicator light	Status	Description	Symbol
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	

Table 12-4 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	
		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	

Table 12-4 Description of indicator lights for Yuchai & Yanmar engines (continued)

No.	Indicator light	Status	Description	Symbol
		Solid on	ECU receives the set status of regeneration prohibiting switch, and active regeneration can't be performed	

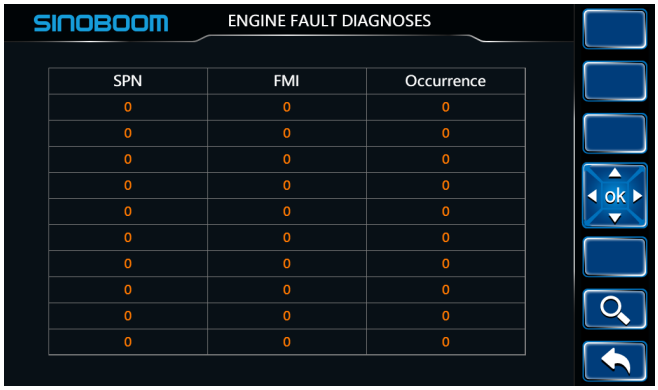


Fig. 49 ENGINE FAULT DIAGNOSES

- 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.

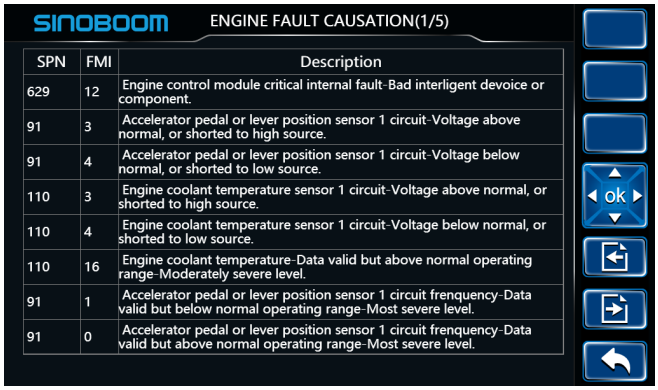


Fig. 50 ENGINE FAULT CAUSATION

- 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 ok to select "Ultra Vires Inquiry", press OK button to enter "Ultra Vires Inquiry" interface.

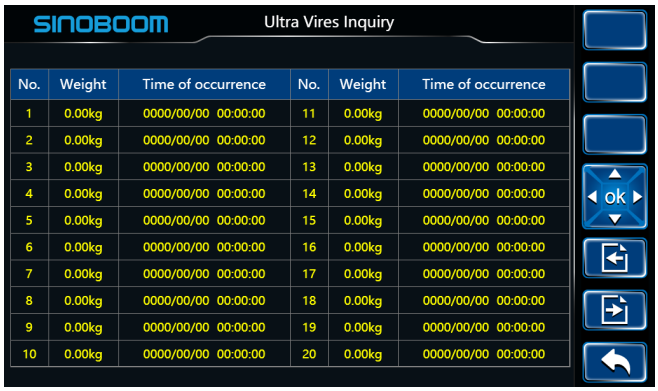


Fig. 51 Ultra Vires Inquiry

- 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 ok to select "Motor Driver Info", press OK button to enter the Motor Driver Info interface.

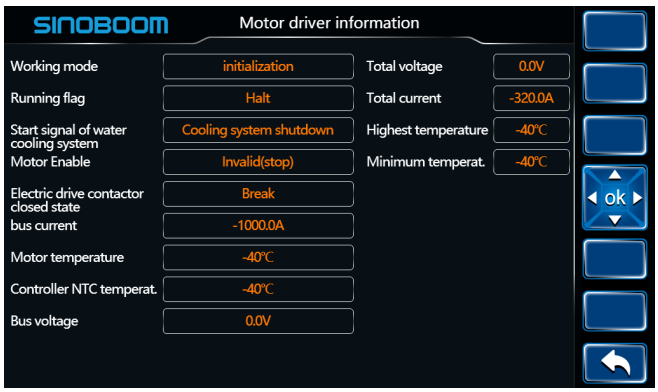


Fig. 52 Motor Driver Information

- 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.

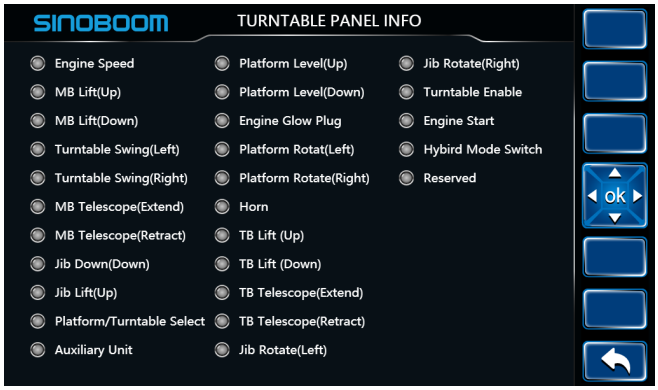


Fig. 53 TURNTABLE PANEL INFO

- ⚫ 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.

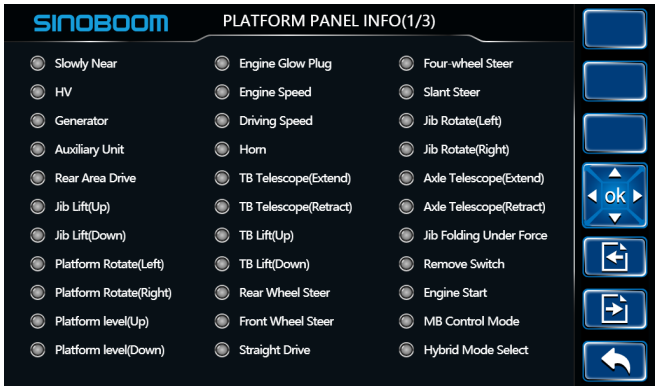


Fig. 54 PLATFORM PANEL INFO (1/3)

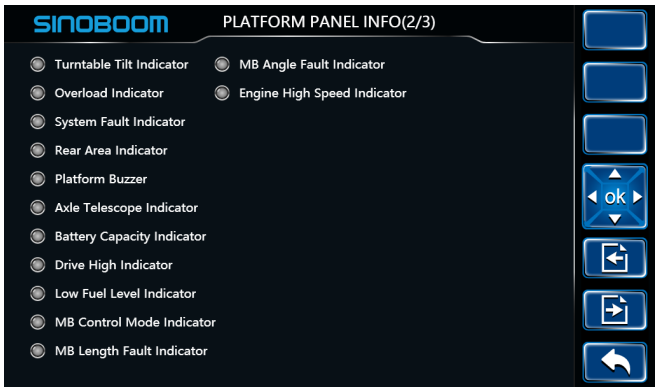


Fig. 55 PLATFORM PANEL INFO (2/3)

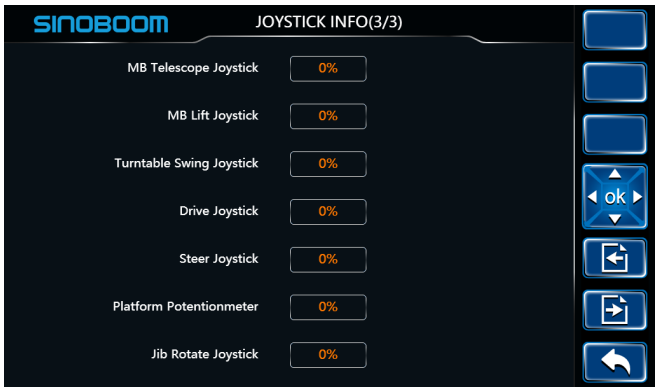


Fig. 56 PLATFORM PANEL INFO (3/3)

- 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.

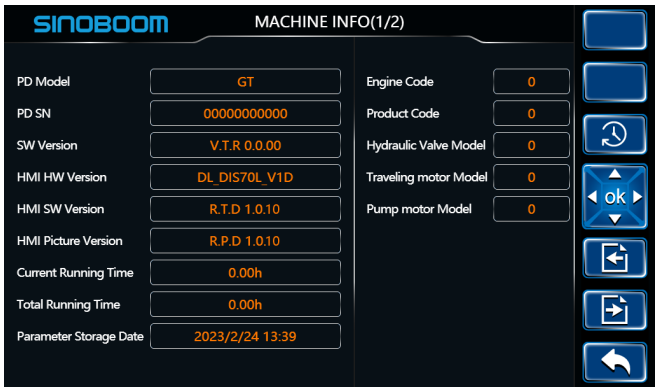


Fig. 57 MACHINE INFO (1/2)

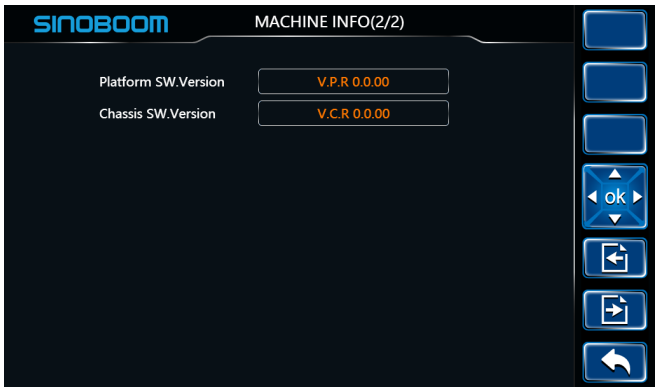


Fig. 58 MACHINE INFO (2/2)

Details of interface operation and key functions, please see ***Setup Information-Device Information*** .

12.8 ALARM MESSAGE

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.

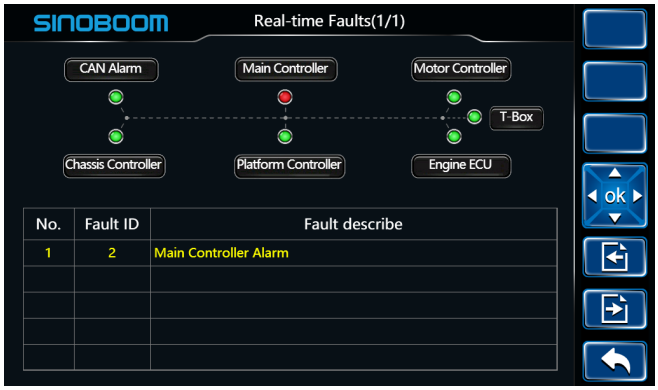


Fig. 59 Real Time Faults (1/1)

- 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 “Travel 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 control box	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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