

Maintenance Manual

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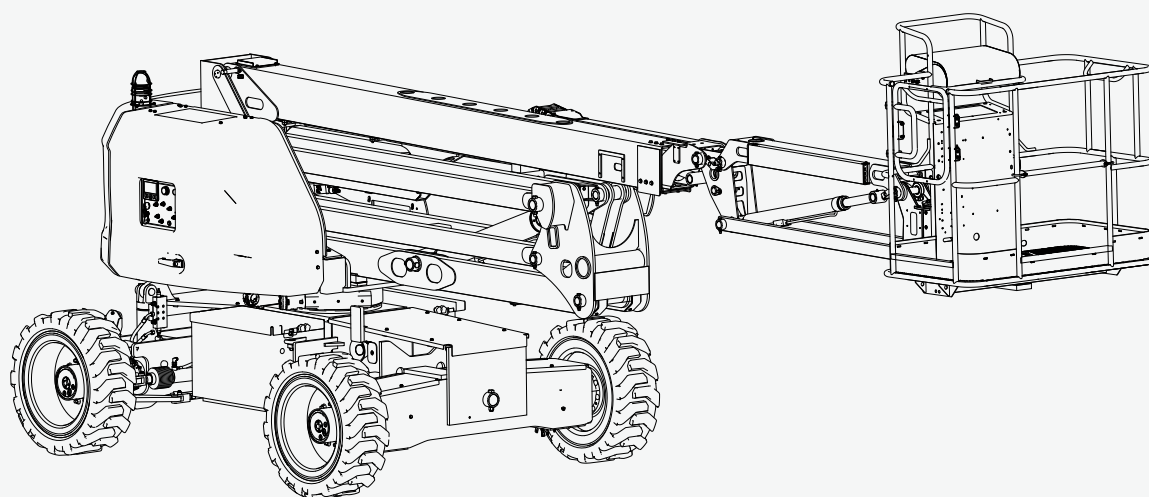
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Translated version

AB16EJ Plus/AB520EJ Plus

0301100389/PL0301100100/MX0301100100 to current



CE GB EAC  AS/NZS 

SINOBOOM



WARNING

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

For disposal, please comply with local regulations.

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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:

[illegible]

Applicability

The manual applies to the following models and serial numbers:

Model	Metric Trade Name	Imperial Trade Name	Serial No.
AB16EJ Plus	AB16EJ Plus	AB520EJ Plus	0301100389 to current PL0301100100 to current MX0301100100 to current

Notes:

- Check the machine model and serial number on the machine nameplate. The location of the nameplate can be found in the **Decals Diagram** section of the Operation Manual.
- Product model numbers are indicated on the nameplates to distinguish products with different main technical parameters.
- Product trade names (product commercial codes) are used for marketing purposes and machine decals for the differentiation of products with different main technical parameters. Product trade names are categorized as metric and imperial trade names: metric trade names are applicable to regions/countries using the metric system or as specifically requested by customers; imperial trade names are applicable to regions/countries using the imperial system or as specifically requested by customers.
- Prefix-to-manufacturing location correspondence:
 - "PL" prefix: manufactured in Poland
 - "MX" prefix: manufactured in Mexico
 - Absence of the above prefixes: manufactured in China

Manufacturer's Declaration

This product may be manufactured in multiple configurations, each independently produced by the following manufacturers in accordance with the same technical standards:

Manufacturer Name	Manufacturer Address
Hunan Sinoboom Intelligent Equipment Co., Ltd.	No.128, East Jinzhou Avenue, Ningxiang High-tech Industrial Park, Changsha, Hunan, China
Sinoboom Poland sp.z o.o.	ul. Feliksa Tychowskiego 5A 61-248 Poznań, Poland
SINOBOOM LATIN AMERICA, S. DE R. L. DE C. V.	Camino a Napoles Km. 2+370(LI) entronque a brecha Km.1(LI) del Ejido San Miguel del Arenal, Silao de la Victoria, Gto.

Notes:

- In accordance with EU regulations, the Chinese manufacturer Hunan Sinoboom Intelligent Equipment Co., Ltd. designates Sinoboom B.V. (Registered address: Nikkelstraat 26, NL-2984 AM Ridderkerk, The Netherlands) as its EU Authorized Representative.
- For models intended for the EU market, the operation manual includes sample Declarations of Conformity provided by each manufacturer. Customers should refer to the declaration file corresponding to the actual manufacturer of the purchased product.
- Each manufacturer strictly adheres to relevant EU or North American regulations and assumes full compliance and legal responsibility for its respective products. For after-sales service, please contact the corresponding manufacturer's support channels based on the manufacturer information indicated on the product's nameplate.
- This manual applies to the same model produced by the above manufacturers, with consistent technical parameters and operational guidelines.

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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.



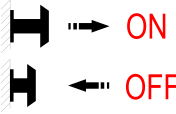
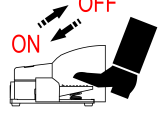
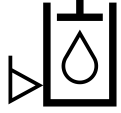
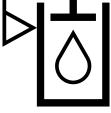
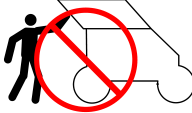
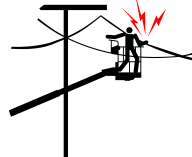
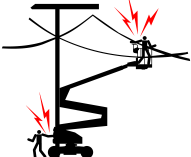
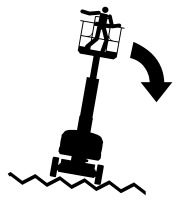
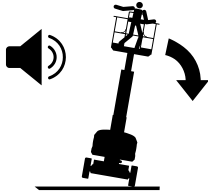
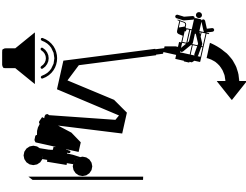
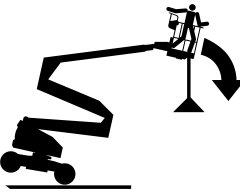
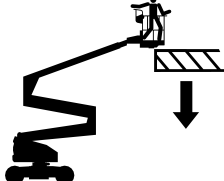
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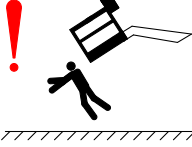
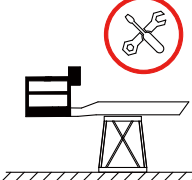
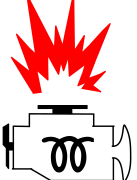
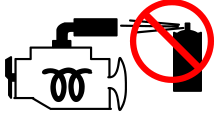
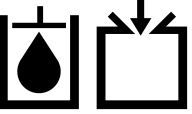
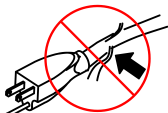
Indicates an imminently hazardous situation that, if not avoided, could result in minor or moderate injury or machine damage.

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 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
				
Crushing and collision hazard—Do not stand under platform	Place supports under boom during maintenance	Keep clear from the rotating platform	Engine preheating explosion hazard	Never use ether or other starting additives for machines equipped with a glow plug
				
Fuel explosion hazard	Lateral force	Electrocution hazard	Battery explosion hazard	No smoking or open flames/sparks
				
No smoking or open flames/sparks	Lifting point	Lashing point	Tire ground pressure	Hydraulic oil filler
				
Platform load capacity	Do not use damaged power cords	Tool or weight	Fast/high speed	Slow/low speed
				
Only qualified maintenance personnel may perform maintenance work	Wear protective clothing and safety goggles			

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2 MAINTENANCE SAFETY PRECAUTIONS

2.1 GENERAL

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



WARNING

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

2.2 INSTRUCTIONS BEFORE MAINTENANCE

Requirements for Maintenance Personnel

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

Maintenance personnel shall:

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

- be familiar with the safety precautions and related operating procedures for maintenance work on this machine.

NOTICE

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

Precautions before Maintenance

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

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

- Before carrying out inspection and maintenance work, check that the safety equipment is in good condition and is used correctly.
 - Safety equipment must be inspected regularly and needs to be replaced in case of damage.
3. Choose appropriate repair tools.
- Before conducting any inspection and/or maintenance work, maintenance personnel shall prepare appropriate tools as required for the type of work, such as wrenches, screwdrivers, pliers, multimeter, pressure gauge, lubrication device, jack and lifting equipment.
 - For maintaining high-voltage equipment, it is necessary to use insulated tools with an insulating handle that can withstand a voltage of over 1000V.
 - Verify that the load capacity of jacks or lifting equipment is suitable for the planned task. Refer to the **Weight of Major Components** section to select a device with sufficient load capacity.
 - Service tools must be kept clean and in good condition.
4. After the machine is parked, use blocks (such as triangular wedges) to secure the wheels to prevent the machine from moving accidentally.
5. Do not perform inspection and/or maintenance work after the machine has been started.
- Before performing inspection and/or maintenance work, make sure the machine has turned off, remove the key and set the power-off switch to 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.

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.



WARNING

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

- If inspection or maintenance work must be carried out while the machine is running at least two people should work together. One person must be close to the turntable control panel or platform control panel so as to be able to turn off the machine any time if necessary while a second person carries out inspection or maintenance work, both persons shall maintain close contact with each other at all times.
6. Before carrying out maintenance work on electrical components, always set the power-off switch to OFF position. If the machine is equipped with high-

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.
- 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 switch and power switch before proceeding. Only turn the power back on after ensuring the machine is completely dry.

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

High Temperature and High Pressure Hazards

WARNING



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

WARNING

immediately, serious complications may result.

Welding and Grinding Operation Hazards

WARNING



- When performing welding operations on the machine body or using this machine to transport personnel for external structural work (such as welding, grinding, or polishing), all applicable local safety procedures must be followed.
- If welding on the machine body, disconnect both the positive and negative battery terminals first, and ensure proper grounding of the structure to be welded.
- Before performing welding, grinding and polishing operations on external structures, turn off the machine's power, and ensure that all wires or cables are connected correctly.
- When conducting welding, grinding, or similar operations on external structures, never use the machine as a ground connection.
- Always make sure that all power tools are placed completely within the perimeter of the platform. Do not hang the cords of power tools on the guardrail of the platform or in any work area outside the platform, and do not hang the power tools directly by their cords.

Fire and Explosion Hazards

WARNING



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

Battery Hazard

WARNING



- Be sure to read and adhere to the battery manufacturer's recommendations on proper battery use and maintenance procedures.



- Individuals without adequate professional qualification should not repair and maintain the battery system, otherwise this may cause personal injury or damage to the battery system.



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



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



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

- Before replacing the battery, be sure to select an appropriate number of personnel and suitable lifting methods.

- It is forbidden to modify or dismantle the battery system without approval to avoid serious accidents.

- When maintaining electrical components, the battery should be disconnected.

- Do not short-circuit the battery terminals by connecting them with tools or other metal objects.

- The battery charger can only be connected to a grounded three-wire AC power outlet. Make sure the charger is working properly 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.

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.

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.

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3 TECHNICAL CHARACTERISTICS

3.1 MACHINE SPECIFICATIONS

Table 3-1 Specifications

Item	Metric	Imperial
Product Category		
Power type	Battery	
Axle type	Oscillating axle	
Dimensions		
Maximum platform height	15.8 m	51 ft 10 in
Maximum working height	17.8 m	58 ft 5 in
Max. horizontal reach (250 kg/ 340 kg/454 kg)	9 m/8.1 m/7 m	29 ft 6 in/26 ft 7 in/23 ft
Max. horizontal working envelope (250 kg/340 kg/454 kg)	9.6 m/8.7 m/7.6 m	31 ft 6 in/28 ft 7 in/24 ft 11 in
Overall length (stowed)	7.6 m	24 ft 11 in
Overall length (transport)	6.1 m	20 ft
Overall width (stowed)	2.3 m	7 ft 7 in
Overall width (transport)	2.3 m	7 ft 7 in
Overall height (stowed)	2.25 m	7 ft 5 in
Overall height (transport)	3.1 m	10 ft 2 in
Wheelbase	2.3 m	7 ft 7 in
Ground clearance	0.35 m	1 ft 2 in
Maximum up and over height	7.9 m	25 ft 11 in
Platform dimensions (L×W×H)	Options 1.45×0.85×1.1 m 1.83×0.85×1.1 m	Options 4 ft 9 in×2 ft 9 in×3 ft 7 in 6 ft×2 ft 9 in×3 ft 7 in
Performance		
Rated platform capacity	250 kg (unrestricted)/340 kg (restricted)/454 kg (restricted)	551 lb (unrestricted)/750 lb (restricted)/1000 lb (restricted)
Max. number of people on the platform (restricted/unrestricted)	3 persons/2 persons	
Travel speed (stowed)	0 – 5.5 km/h	0 – 3.4 mph
Travel speed (elevated)	0 – 1.1 km/h	0 – 0.68 mph
Gradeability (4WD)	40%	
Turntable slewing (angle/continuity)	355°/non-continuous	
Platform rotation angle	180 °	

Table 3-1 Specifications (continued)

Item	Metric	Imperial
Max allowable inclination	5 °	
Turning radius (inside/outside)	1.8 m/4.78 m	5 ft 11 in/15 ft 8 in
Turntable tailswing	0.3 m	1 ft
Tire (spec/type)	33×12 D610 (foam-filled) 33×12-20 (solid)	
Maximum operating noise level	72 dB	
IP rating	IP54	
Maximum total vibration on the platform	2.5 m/s²	
Maximum whole body vibration value (WBV)	0.5 m/s²	
Power		
Drive × steer	4WD×2WS	
Hydraulic tank capacity	64 L	14 gal (UK)/17 gal (US)
Hydraulic oil refueling volume	55 L	12 gal (UK)/14.5 gal (US)
Hydraulic system pressure	22 MPa	3191 Psi
Battery (voltage/capacity)	8×6 V, 335 Ah (5 h)/390 Ah (20 h) (lead-acid battery) 48 V/315 Ah (lithium battery)	
Control voltage	12 VDC	
Weight		
Gross weight	7750 kg	17086 lb
Ground Bearing Data		
Maximum tire load	4800 kg	10582 lb
Ground pressure	700 kPa	102 Psi
Environment		
Maximum allowable lateral force (restricted/unrestricted)	400 N	90 lbf
Maximum allowable wind speed	12.5 m/s	28 mph
Maximum allowable altitude	1000 m	3280 ft
Allowable ambient temperature range (lead-acid battery)	-10°C–40°C	14°F–104°F
Allowable ambient temperature range (lithium battery)	-20°C–40°C	-4°F–104°F
Maximum allowable relative humidity	90 %	

Table 3-1 Specifications (continued)

Item	Metric	Imperial
Storage environment	Store at -20°C to 50°C (-4°F to 122°F) in a well-ventilated environment with 90% relative humidity (max.) (20°C [68°F]), 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, thus 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. In cold weather, auxiliary devices are needed to start the machine.
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).
7. It is recommended not to use a lead acid battery with an ambient temperature below 0 °C (32°F); otherwise the battery capacity will decay rapidly, and battery life will be affected.

3.2 SPECIFICATIONS OF MAJOR COMPONENTS

Electric Motor

Table 3-2 Travel Motor (PN.203010003176)

Rated power	2 kW
Rated voltage	32 V
Rated current	49 A
Rated speed	1733 rpm
Rated frequency	61.9 Hz

Table 3-3 Travel Motor (PN.203010003107)

Model	JXQ-2-2B
Rated power	2 kW
Rated voltage	32 V
Rated current	50 A
Rated speed	1733 rpm
Rated frequency	60 Hz
Rated torque	20 Nm (14.75 ft-lb)

Table 3-4 Pump Motor (PN.203010003172)

Rated power	7 kW
Rated voltage	32 V
Rated current	170 A
Rated speed	3333 rpm
Rated frequency	113.9 Hz
IP rating	IP54

Table 3-5 Pump Motor (PN.203010003108)

Model	JXQD-7-4B
Rated power	7 kW
Rated voltage	32 V
Rated current	165 A
Rated speed	3333 rpm
Rated frequency	114 Hz
Rated torque	20 Nm (14.75 ft-lb)
IP rating	IP54

Reducer

Table 3-6 Slewing Reducer (PN.204020000045)

Model	SE17-102-H-25R-WY
Type	Worm gear reducer
Output torque (Max)	10000 Nm (7375 ft-lb)
Output RPM	≤1 rpm (rated) ≤2.5 rpm (Max.)
Overturning moment (Max.)	135600 Nm (100005 ft-lb)
Holding moment	72300 Nm (53321 ft-lb)
Reduction ratio	102:1

Table 3-7 Slewing Reducer (PN.204020000015)

Model	SE17-102-25H-R-1037
Type	Worm gear reducer
Output torque (Max)	10000 Nm (7375 ft-lb)
Output RPM	< 2.5 rpm
Tip-over moment (Max)	135600 Nm (100005 ft-lb)
Holding moment	72300 Nm (53321 ft-lb)
Reduction ratio	102:1

Table 3-8 Travel Reducer (PN.204020003019)

Model	IFT007T2062
Maximum output torque	7000 Nm (5163 ft-lb)
Rated output torque	3500 Nm (2581 ft-lb)
Maximum input torque	112 Nm (82.6 ft-lb)
Maximum input RPM	4000 rpm
Speed ratio	62.33

Table 3-9 Travel Reducer (PN.204020000039)

Model	4HB001F0B30064B
Maximum output torque	5649 Nm (4166 ft-lb)

**Table 3-9 Travel Reducer (PN.204020000039)
(continued)**

Maximum input RPM	4000 rpm
Speed ratio	64.08

Battery

**Table 3-10 Maintenance-free AGM Battery
(PN.203100003158)**

Rated voltage	12 V
Rated capacity	100 Ah
Low-temperature starting current	830 A @ -18°C (0°F)

**Table 3-11 Maintenance-free AGM battery
(PN.203100003128)**

Model	3-DF-320
Rated voltage	6 V
Capacity (5 h)	320 Ah
Capacity (20 h)	400 Ah

**Table 3-12 Maintenance-free AGM battery
(PN.203100003000)**

Model	EVL16A-A
Rated voltage	6 V
Rated capacity	390 Ah
Low-temperature starting current	1485A@0°C (32°F) 1235A@-18°C (0°F)

**Table 3-13 Maintenance-free AGM Battery
(PN.203100003293)**

Rated voltage	12 V
Capacity	125 Ah
Cold starting current	950CCA

**Table 3-14 Maintenance-free AGM Battery
(PN.203100003346)**

Voltage	6 V
Capacity	390 Ah
Weight	53 kg (117 lb)

Table 3-15 Lithium Battery Primary Box (PN.203100003024) and Secondary Box (PN.203100003025)

Rated voltage	51.2 V
Rated capacity	315 Ah
Standard charge current	60A
Continuous discharge current	300 A continuous 450 A for 5min

Table 3-18 Cycloidal Hydraulic Motor (PN.202020003090) (continued)

Maximum continuous flow rate	60 L/min
Maximum continuous differential pressure	20 MPa (2901 psi)
Maximum continuous torque	332 Nm (245 ft-lb)

Hydraulic Pump

Table 3-16 Gear Pump (PN.202010003053)

Displacement	5.6 ml/rev
Rated pressure	28 MPa (4061 Psi)
Maximum pressure	31 Mpa (4496 Psi)
Speed range	600–4000 rpm

Table 3-19 Cycloidal Hydraulic Motor (PN.202020000014)

Model	255130A6312BAAAA
Displacement	130cc/r

3.3 FUNCTION SPEED

Motor

Table 3-17 Cycloidal Hydraulic Motor (PN.202020003114)

Model	GR125A2S1G1ACA
Displacement	125 ml/r
Maximum continuous speed	475 rpm
Maximum continuous flow rate	60 L/min
Maximum continuous differential pressure	20 MPa (2901 psi)
Maximum continuous torque	330 Nm (244 ft-lb)

Table 3-18 Cycloidal Hydraulic Motor (PN.202020003090)

Model	HRD130A24S2ABAA04
Displacement	125 ml/r
Maximum continuous speed	481 rpm

Table 3-20

Item	Parameter
Raise main boom	33 – 39 s
Lower main boom	29 – 35 s
Raise articulating boom	41 – 49 s
Lower articulating boom	32 – 38 s
Rotate the turntable (355°) – with boom fully retracted	90 – 100 s
Rotate the turntable (355°) – with boom extended	115 – 125 s
Extend the main boom	32 – 38 s
Retract the main boom	22 – 27 s
Rotate the platform (180°)	18 – 22 s
Level platform upward	45 – 55 s
Level platform downward	35 – 45 s
Raise jib	32 – 38 s
Lower jib	22 – 28 s
Travel – stowed	18 – 22 s
Travel – operating	89 – 109 s

Table 3-20 (continued)

Item	Parameter
Braking distance	≤2 m (6.6 ft)

Note:

1. The function speed depends on the start and end point of the movement rather than the controls/ switches.
2. The travel speed test results will vary with tires of different specifications.
3. All speed tests should be conducted from the platform controller. 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 °C (122–140 °F). If the hydraulic oil temperature is too low, the test results will be affected.

Test requirements:

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

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

Rotate the turntable : With the boom centered, rotate the turntable through one full cycle for two times.

Extend/retract the 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.

Rotate platform : With the platform horizontal, rotate the platform from the leftmost to the rightmost, and rotate the platform from the rightmost to the leftmost 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 : With the platform horizontal, 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. With the machine in stowed position, switch to the high speed gear, and push the travel 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. With the machine in operating position, push the travel 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 drive 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 3-21

Component	Metric (kg)	Imperial (lb)
Chassis assembly	3100	6834
Turntable assembly	2500	5512
Boom assembly	1800	3968
Main boom	201	443
Telescopic boom section	137	302
Upper articulating boom	169	373
Lower articulating boom	206	454

Table 3-21 (continued)

Component	Metric (kg)	Imperial (lb)
Jib assembly	178	392
Cable track system	25	55
Platform (medium size)	160	353
Platform (small size)	152	335
Counterweight	1400	3086
Slewing mechanism	123	271
Main boom telescopic cylinder	75	165
Upper leveling cylinder	32	71
Lower leveling cylinder	34	75
Main boom lift cylinder	75	165
Articulating boom lift cylinder	76	168
Jib cylinder	31	68
Swing cylinder	41	90
Slewing reducer	105	231
Travel reducer	41	90
Travel motor	26	57
Pump motor	27	60
Tire and wheel assembly	161	355

Note: The weight of certain components will vary with the machine's option configuration.

3.5 OIL SPECIFICATIONS

NOTICE

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



WARNING

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

Hydraulic Oil

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

Table 3-22

Ambient temperature range	Hydraulic oil grade
> 40°C (104°F)	HM-68
0°C–40°C (32°F–104°F)	HM-46
-15°C–25°C (5°F–77°F)	HV-32
-22°C–25°C (-7.6°F–77°F)	L-HS32
< -22°C (-7.6 °F)	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 3-23

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

Note: Sinoboom recommends Mobil gear oil.

3.6 TORQUE SPECIFICATIONS

Special Torque Requirements

Please refer to the table below for special torque requirements:

Table 3-24 Special torque requirements

No.	Description	Torque value
1	Wheel nut	300 Nm (221 ft-lb)
2	Travel reducer bolt	300 Nm (221 ft-lb)
3	Slewing bearing fastening bolt	300 Nm (221 ft-lb)
4	Counterweight fastening bolt	730 Nm (538 ft-lb)
5	Cable fastening nut M8	9–11 Nm (6.6–8.1 ft-lb)
6	Cable fastening nut M10	18-23 Nm (13.2-17 ft-lb)
7	Swing cylinder fastening bolt	100 Nm (74 ft-lb)
8	Swing cylinder fastening nut	630 Nm (465 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 3-25 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)

Table 3-25 Fastener torque specifications—metric (continued)

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

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

Table 3-26 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)

Table 3-26 Fastener torque specifications—Unified Thread Standard (UNC) (continued)

Nominal diameter (in)	Opposite nut size (s)	Class 5	Class 8
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 3-27 Fastener torque specification—Unified Thread Standard bolts (UNF)

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

Hydraulic Hose Torque

The hydraulic hoses must be installed with the following torques.

Table 3-28 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)

Table 3-28 Hydraulic Hose Torque (continued)

Metric thread	L (light-duty)	S (heavy-duty)
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)

Hydraulic Fitting Torque

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

Table 3-29 Hydraulic Fitting Torque – Metric

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

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

Table 3-30 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 3-31 Hydraulic Fitting Torque – Unified Thread Standard (UNC/UNF)

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

Table 3-31 Hydraulic Fitting Torque – Unified Thread Standard (UNC/UNF) (continued)

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

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4 MAINTENANCE INSTRUCTIONS

4.1 INSPECTION AND PREVENTIVE MAINTENANCE SCHEDULE

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

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

Pre-delivery Inspection

The pre-delivery inspection shall be performed by qualified Sinoboom technicians.

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 pre-delivery inspection. 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.

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.

Responsible Persons and Qualifications for Performing 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 <i>Inspection and Preventive Maintenance Schedule</i>	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
Travel motor	1, 2	1, 2	1, 2
Travel reducer	1, 2, 6	1, 2, 6	1, 2, 6, 11
Steering components	1, 2	1, 2	1, 2
Axles/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
Pump motor	1, 2	1, 2	1, 2
Central rotary 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
Boom assembly			
Boom weldment	1, 2	1, 2	1, 2
Hose or wire rope brackets	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
Hydraulic system			
Hydraulic pump	1, 2, 3, 6	1, 2, 3, 6	1, 2, 3, 6
Hydraulic cylinder	1, 2, 3, 5, 6, 12	1, 2, 3, 5, 6, 12	1, 2, 3, 5, 6, 12
Bleeding the oscillating cylinder (if equipped)	10 ^{NO.1}	10 ^{NO.1}	10 ^{NO.1}
Hydraulic valves	1, 2, 3, 5, 6	1, 2, 3, 5, 6	1, 2, 3, 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

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

Item	Interval		
	Before each delivery ¹ or quarterly ²	Semiannually ³	Annually ⁴
Suction filter	1, 5, 6	1, 5, 6	1, 5, 6, 11
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 controller	1, 3, 4, 7, 10	1, 3, 4, 7, 10	1, 3, 4, 7, 10
Turntable controller	1, 3, 4, 7, 10	1, 3, 4, 7, 10	1, 3, 4, 7, 10
Function control lock, secondary guarding device and brake	1, 3, 10	1, 3, 10	1, 3, 10
Foot switch	1, 3, 10	1, 3, 10	1, 3, 10
Emergency stop switch (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

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

Item	Interval		
	Before each delivery ¹ or quarterly ²	Semiannually ³	Annually ⁴
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. Check for normal return to neutral or “off” position (self-resetting switches return to neutral or “off” position after released) 5. Clean and free of foreign objects 6. Check for correct level, sealing and leaks 7. Labels complete, clear and secure 8. Check for appropriate tolerances 9. Fully charged 10. Verify/perform 11. Replace the oil or filter element 12. Correctly lubricated			

4.2 GENERAL MAINTENANCE INSTRUCTIONS

Safety and Operating Standards

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

1. Disconnect the power source to prevent inadvertent start up of the machine and tag the machine accordingly.
2. All controls should be turned off to avoid accidental actuation of the control system.

3. If possible, lower the work platform to the lowest position. If this is not possible, secure the work platform to prevent it from falling.

4. Before loosening or removing hydraulic components, the oil pressure in the hydraulic lines should be released.

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

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

Cleaning

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

Components Disassembly and Installation

1. A safe and appropriate plan for the installation of machine components should be developed based on this manual, taking the site conditions into account.
2. Personnel carrying out disassembly and installation work must be appropriately qualified and must be able to use safety equipment correctly.
3. Before carrying out installation work, qualified personnel should inspect the ground, concealed foundations and anchors, or review reliable documentation verifying that the manufacturer's requirements are met.
4. Wind speed at the installation site must not exceed 8.3 m/s (18.6 mph).
5. Before installation, check the site conditions such as power supply and ground conditions to make sure the installation requirements are met.
6. All components should be inspected prior to installation to verify they are in good condition.
7. High-strength bolts should be tightened in strict accordance with the requirements of this manual.
8. Requirements for the acceptance of onsite machine installation work:

- 1) Relevant inspections and functional tests should be carried out to confirm that the components have been installed correctly, that specific functional requirements are met and that all safety devices are operating properly.
- 2) Static and dynamic load tests should follow and comply with the relevant standards.
- 3) Before putting the machine into service, a qualified person shall issue a handover certificate confirming the integrity of the machine. All test/inspection results should be recorded and an inspection report should be prepared (including the inspector's name, title, company, and inspection date).
9. Disassembly work should meet the same safety requirements as installation work.
10. If lifting tools are required to dis-assemble the machine, use the correct lifting points, lifting equipment and additional tools. Only use tested and certified tools and equipment.
11. If the lifting gear strands have to be attached at an angle of less than 90° when lifting a component exercise special caution since the eye bolt or similar bracket cannot provide adequate lateral support.
12. If components are difficult to be removed check that all nuts, bolts, cables, brackets, wiring, etc. have been removed, and that adjacent components are not obstructing the removal.

Components Disassembly and Reassembly

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

Storage

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

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

Disposal of Structural Components

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

Pressure-fit and Mating Parts

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

Bearings

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

Gaskets

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

Bolt Use and Torque Requirements

NOTICE

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

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

Hydraulic Pipeline and Electrical Wiring

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

Hydraulic Hose and Fitting Tightening Procedures

The following requirements apply when installing hydraulic hoses and fittings:

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

Application of Insulating Silicone Grease to Electrical Connections

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

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

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

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

NOTICE

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

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

NOTICE

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

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

NOTICE

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

Lubrication

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

Hydraulic System

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

NOTICE

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

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

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

Pins and Composite Bearing

1. The connecting pins should be removed and inspected in case any of the following defects is found:
 - Excessively tilted joint
 - Noise originating from the joint during operation.
2. The composite bearing should be replaced in any of the following conditions:
 - Frayed or separated fiber on the sleeve surface
 - Cracked or damaged sleeve housing
 - Bearing moved or rotated into the housing
 - Debris embedded in the sleeve surface.
3. Replace the pivot pin if any of the following is detected (properly clean the pivot pin before inspection):
 - Wear in the bearing area
 - Flaking, peeling, 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 measures the 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 drive system consists of four independently-controlled asynchronous AC motors, each connected to a corresponding drive reducer. Each motor is equipped with a speed sensor that transfers speed information to the corresponding motor controller. The operator provides drive speed and direction inputs to the control system through the joystick at the platform controls, the system then calculates the allowable travel speed according to the travel distance of the joystick and the position of the boom, see [Page 37, 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.

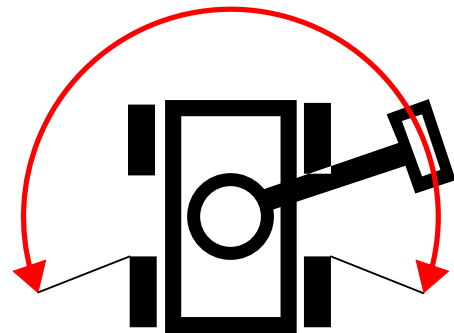


Fig. 1 Reverse position diagram

Auxiliary Power System

The batteries in one of the two battery boxes provide power to a 24 V DC motor which drives the gear pump to provide auxiliary power for the machine. 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.

Chassis Oscillating System

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

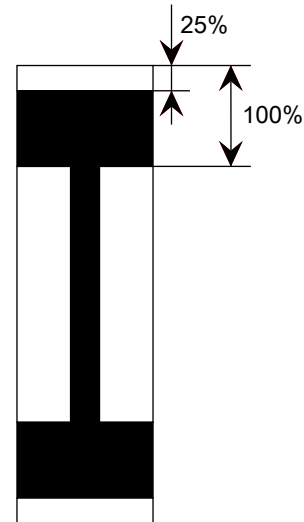


Fig. 2

5.2 TIRE AND WHEEL ASSEMBLY

NOTICE

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

Check Tires and Rims

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

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

Check Wheel Nuts

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

Replacement Requirements



WARNING

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

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

- The ply rating/rated load capacity and size should be the same as the original tire or superior to it.
- The tire tread contact width should be the same as or superior to the original tire.
- The wheel diameter, width, offset dimensions and weight must be the same as the original tires.
- The replacement tire must be approved for the application by the tire manufacturer (including intended purpose, maximum travel speed, maximum tire load, etc.).
- Due to size differences between different tire brands, both tires on the same axle should be of the same brand.
- Different tire types have their own performance characteristics. Random mixing or substitution is prohibited. Tire types can be identified by appearance:
 - Foam-filled tires: The tire body is fully filled and plump. The rim usually has a filling valve, and the tread is equipped with anti-slip screws. There are no ventilation holes on the sidewall. Sinoboom designates tires with black treads as foam-filled tires, while those with other colors (such as gray or white) are designated as foam-filled non-marking tires.



Fig. 3 Filling Valve



Fig. 4 Anti-slip Screw

- Solid tires: The tire body is flat and even. There is no filling valve on the rim, and the tread has no screws. Ventilation holes are usually designed on the sidewall (very few have no ventilation holes). Sinoboom designates tires with black treads as solid tires, while those with other colors (such as gray or white) are designated as solid non-marking tires.



Fig. 5 Ventilation Holes

NOTICE

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

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

- Firstly checking the markings on the tire sidewall: If there is a directional arrow indicating the installation direction, the installation direction can be directly determined based on the arrow.
- If there is no clear directional marking, the direction should be determined based on the tread pattern structure: The tip (open end) of the pattern should point in the forward direction of the machine, as indicated by the arrow direction in the figure below.

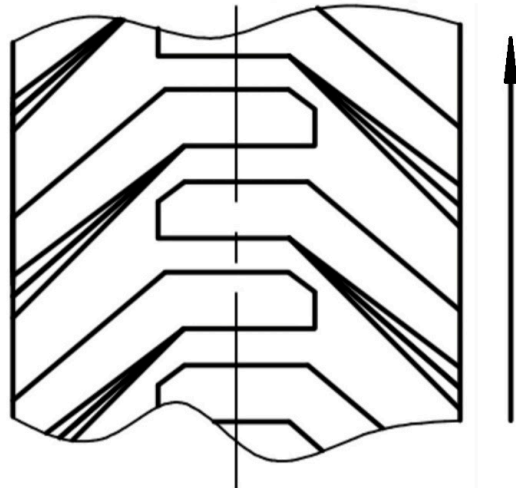


Fig. 6

WARNING

Installing tires incorrectly on the left and right sides during replacement will not only affect the machine's driving performance but also pose serious safety hazards, potentially endangering the operator. Installation must strictly follow the specifications.

Replace Tire and Wheel Assembly**WARNING**

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

Performing tire replacement on flat, level, and solid ground:

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 partially loosen the wheel nuts (leave 2–3 full threads engaged to prevent sudden detachment).

4. Use a jack with sufficient load capacity (rated load $\geq$ 1.5 times the machine's weight) to steadily lift the machine frame until the tire is about 50 mm (2 in) off the ground. The jacking point is the flat reinforced weld areas near the wheel positions.



WARNING

Always maintain machine balance while jacking. Improper operation may cause tipping hazards.

5. Remove all nuts in a diagonal sequence and then detach the tire.
6. Align the mounting holes of the new tire and wheel assembly with the corresponding mounting holes on the drive reducer.
7. Apply medium-to-high strength threadlocking adhesive to bolt threads, and hand-tighten all bolts to ensure even initial load distribution. Never apply grease to threads or nuts.
8. Then tighten the nuts to the specified torque in three stages using a wrench, following the sequence shown in the diagram below. Refer to the following torque tables.

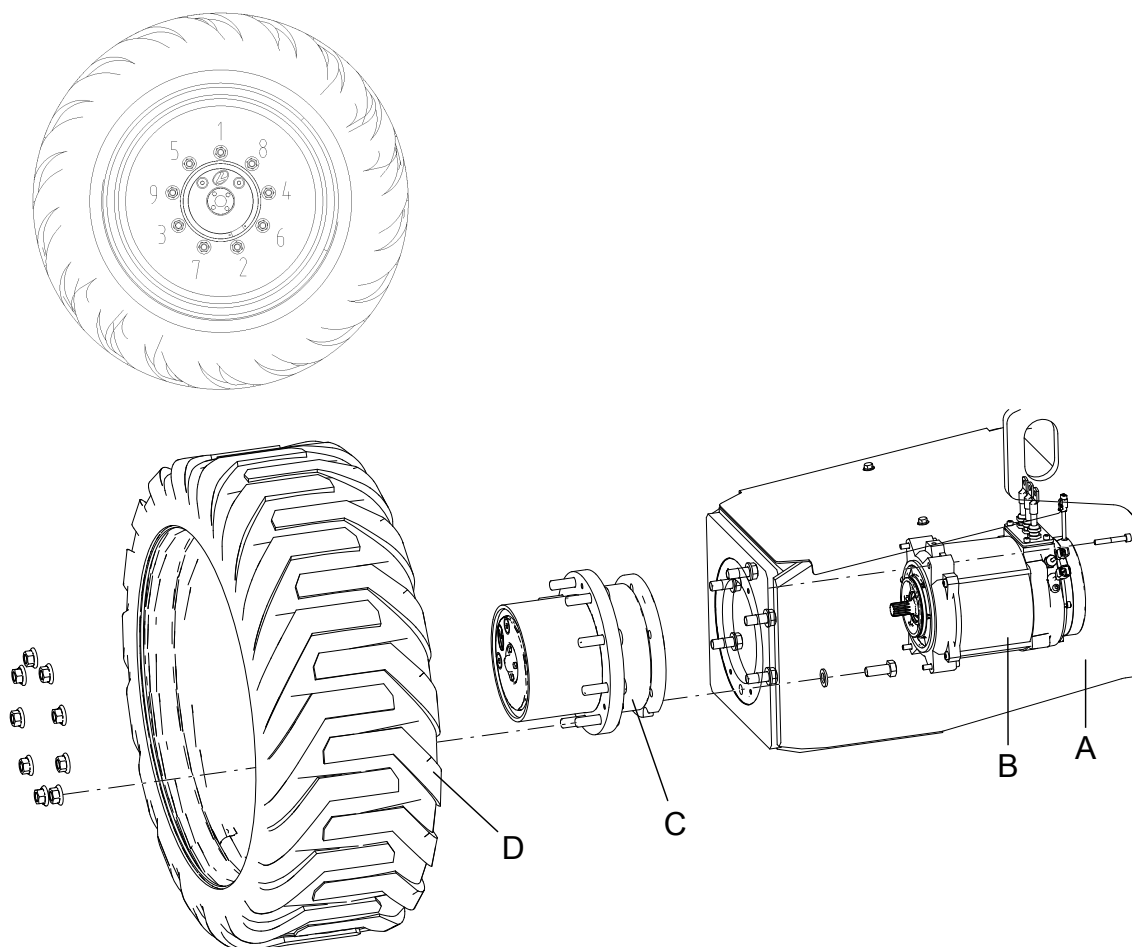


Fig. 7 Diagram – Wheel Nuts Tightening Sequence

Table 5-1 Table of Wheel Nuts Tightening Torque

First step	Second step	Third step
150 Nm (110 ft-lb)	240 Nm (177 ft-lb)	300 Nm (221 ft-lb)

5.3 TRAVEL DRIVE DEVICE

The drive system is mainly composed of the travel reducer and the travel motor.

Fig. 8 Travel Drive Device

Table 5-2 Travel Drive Device Components

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

Check Travel Reducer Disconnect Cap

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

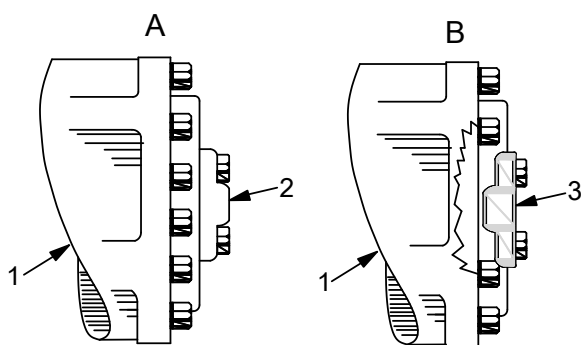


Fig. 9

A Normal position - engaged

B Reverse position - disengaged

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

The travel 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 travel reducer visually before operation.

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

For detailed procedures of mounting the disconnect cap in 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 Travel Reducer

Insufficient gear oil in the travel reducer will lead to degraded machine performance and potential component damage. It's recommended to check the oil level in the travel 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 travel reducers by repeating the above steps.

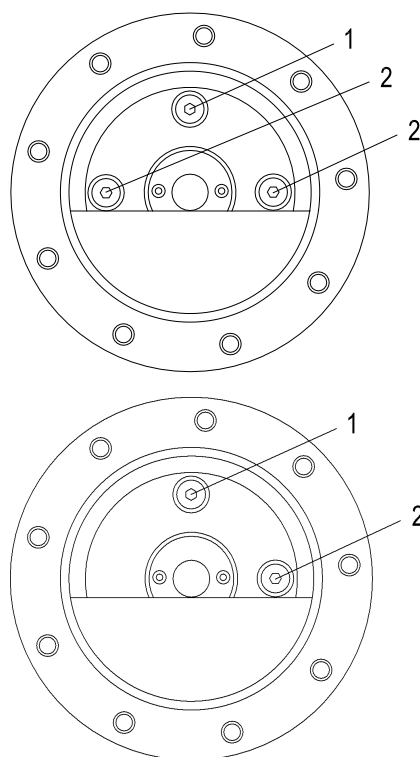


Fig. 10 Diagram – Travel Reducer Gear Oil Check

1. Oil port 1

2. Oil port 2

Replace the Gear Oil in Travel Reducer

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

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

Drain oil from the travel reducer:

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 travel 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. Using an oil gun or oil can, add new gear oil to the oil port 1 until the oil level is even with the oil port 2 (refer to **Oil Specifications** for viscosity grade).
4. Reinstall the oil plug.
5. Clean up any gear oil spills.

Disassembly and Installation

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.
3. Place a jack of sufficient capacity under the chassis side to be removed.
4. Remove the tires and place them in an appropriate area using suitable lifting equipment.
5. Mark and disconnect the wire harness connections on the drive motor.
6. Use suitable lifting equipment to support the travel motor.
7. Remove the drive motor mounting bolts and slowly remove the drive motor from the chassis with the assistance of lifting equipment.

8. Use suitable lifting equipment to support the travel reducer.
9. Remove the mounting bolts and washers on the travel reducer, and slowly remove the travel reducer from the chassis with the assistance of lifting equipment.

Installation

1. Use suitable lifting equipment to support the chassis side to be installed.
2. Use suitable lifting equipment to lift the drive reducer to the correct installation position, fit the washer face with the mounting surface, apply Loctite 272 threadlocking adhesive to the mounting bolts of the drive reducer and install them one by one.
3. Tighten the bolts to the specified torque with a torque wrench.
4. After installation, fill appropriate amount of gear oil (refer to the **Oil Specifications** for the viscosity grade).
5. After cleaning the mounting surface, mesh the motor spline shaft with the inner teeth of the reducer, and slowly rotate the motor housing to align the motor mounting groove with the mounting hole on the chassis.
6. After applying Loctite 272 threadlocking adhesive to the drive motor mounting bolts, install them one by one and pre-tighten them.
7. Tighten the bolts to the specified torque with a torque wrench.
8. Reconnect the electrical harness.

5.4 SLEWING MECHANISM

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

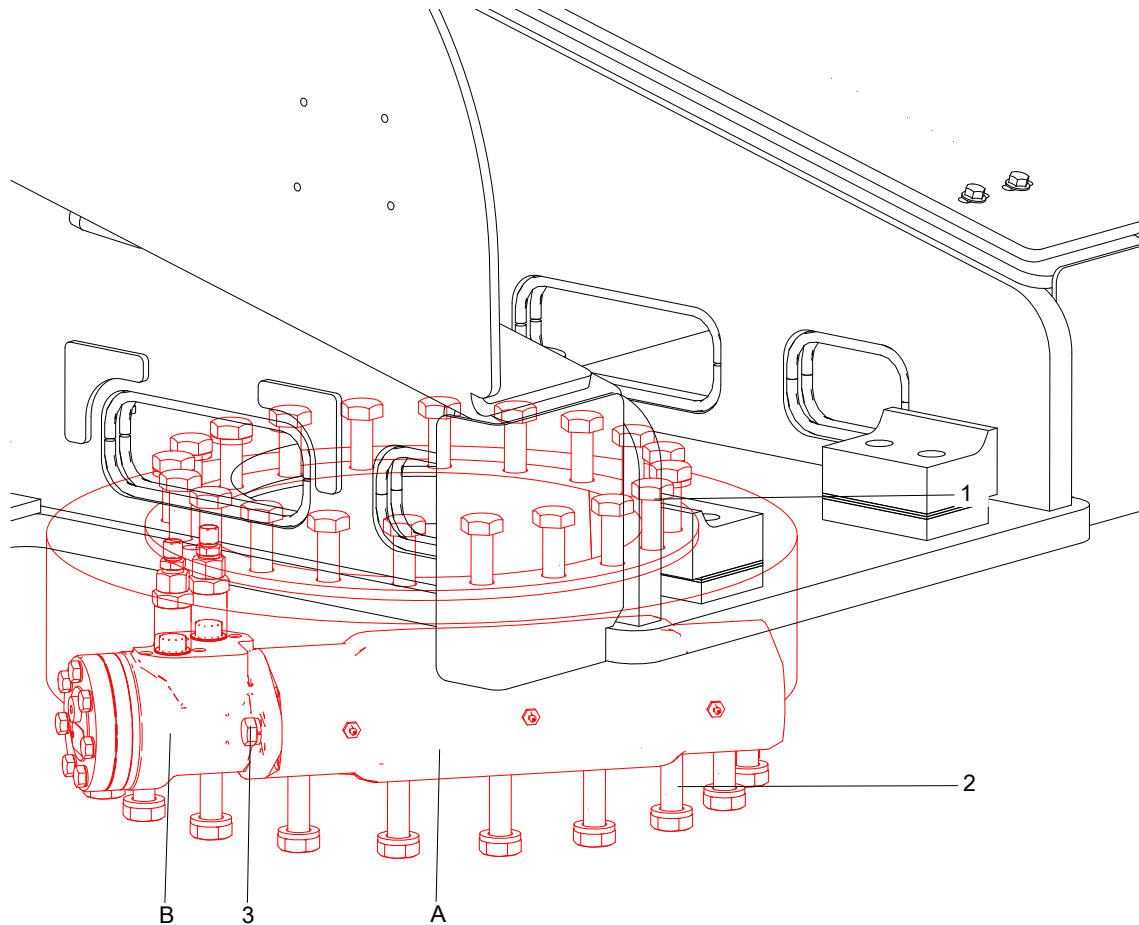


Fig. 11 Slewing Mechanism

Table 5-3 Slewing Mechanism Components

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

Lubricate Slewing Bearing

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

1. As shown in the figure below, connect the grease nipple on the slewing bearing and the nipple at position #1 using a hose.

2. Place the grease gun nozzle on the grease nipple at position #1 and inject ZL-3 lithium-based grease. Through the rubber hose, transfer the grease to the slewing bearing of the turntable.
3. Then, rotate the turntable by 100-130 mm (4-5 in) each time until the whole slewing bearing is fully lubricated.
4. Place the grease gun nozzle on the grease nipple at position #2 and fill with ZL-3 lithium-based grease until the worm gear is fully lubricated.
5. Remove excess grease.

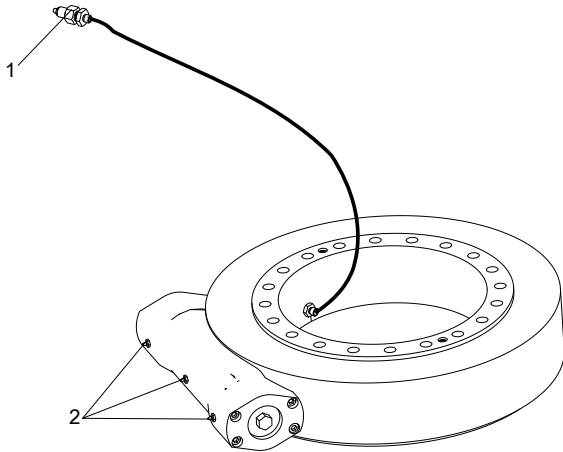


Fig. 12 Slewing Bearing Lubricating Diagram

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.

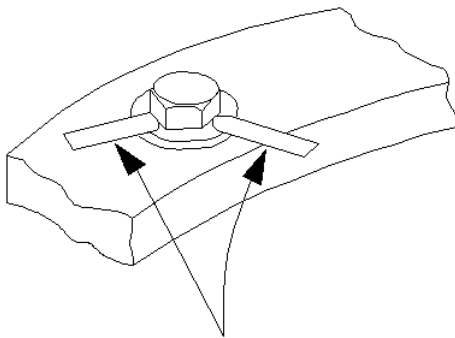


Fig. 13 Instruction for inserting a feeler gauge

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 side.
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 semi-circle of the turntable counterweight side.
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 (opposite to the turntable counterweight side).
7. Make sure that the feeler gauge does not penetrate under the bolt head to the bolt shaft.

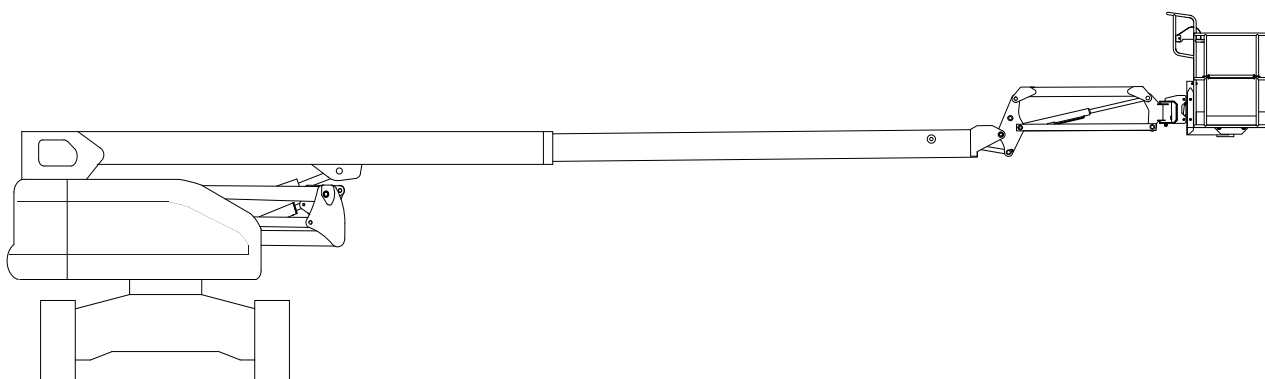


Fig. 14 Check Slewing Bearing Connecting Bolts (a)

1. Main boom fully extended;
2. Main boom horizontal.

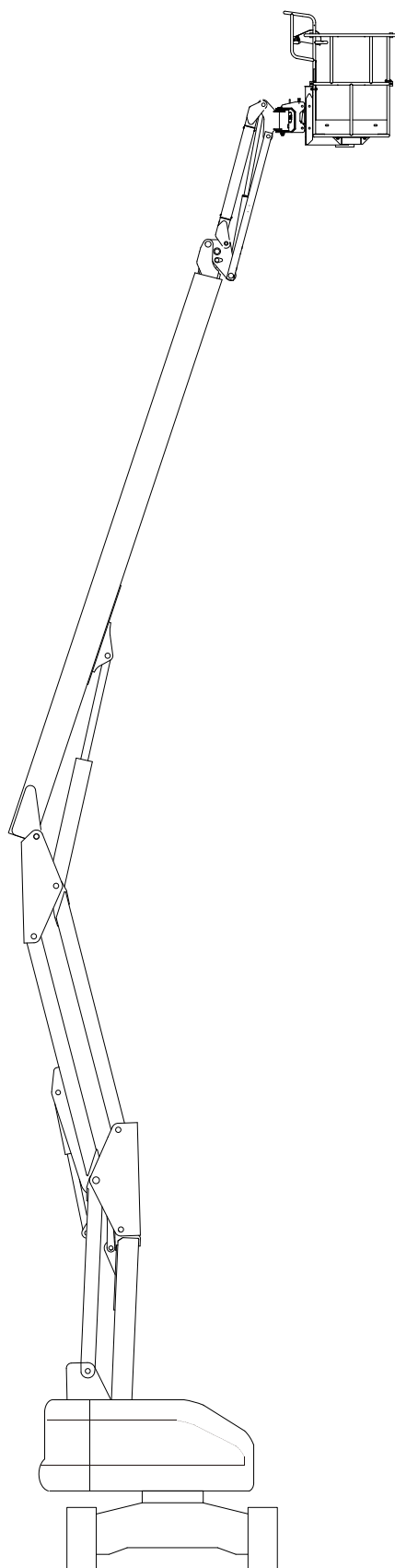


Fig. 15 Check Slewing Bearing Connecting Bolts (b)

1. Main boom fully retracted;
2. Boom fully lifted.

Disassembly and Installation

Disassembling the slewing motor

1. Make sure the turntable is locked (lock the slewing pin if so equipped).
2. Mark and disconnect the hydraulic lines on the slewing motor and collect the hydraulic oil from the lines with a suitable container. Plug the lines and the ports.
3. Remove the slewing motor from the slewing bearing by removing the mounting bolts at position #3.

Disassembling the slewing bearing

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

NOTICE

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

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

NOTICE

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

Install slewing bearing

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

NOTICE

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

5. Tighten the bolts in the sequence shown in the following diagram and follow the steps in the table below.
6. After the bolts are tightened, mark the bolt head and its surrounding material with an appropriate tool to facilitate later inspection of the bolts for looseness.
7. Rotate the inner ring of the slewing bearing by hand to ensure smooth movement.
8. Remove the lifting equipment from the slewing bearing.
9. Lift the turntable assembly to the top of the chassis using suitable lifting equipment, carefully lower the turntable onto the slewing bearing, and align the inner ring of the slewing bearing with the marking line on the turntable. If replacing the slewing bearing with a new one, make sure that the grease nipple

joint is positioned at a 90° angle to the left-right symmetrical line of the turntable.

10. Using special high-strength washers for high-strength bolts, fit the washer face with the mounting surface, and apply medium-to-high strength threadlocking adhesive, then install the bolts one by one by passing it through the turntable and the inner ring of the slewing bearing.
11. Tighten the bolts in the sequence shown in the following diagram and follow the steps in the table below.
12. After the bolts are tightened, mark the bolt head and its surrounding material with an appropriate tool to facilitate later inspection of the bolts for looseness.
13. Remove the lifting equipment and reconnect the hydraulic hoses according to the marks applied before disassembly.

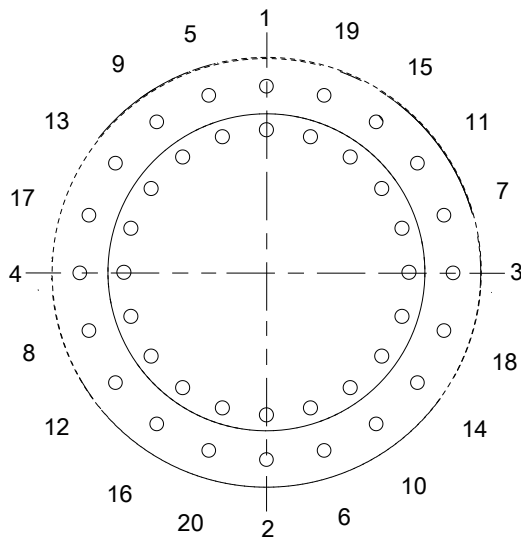


Fig. 16 Tightening Sequence of Slewing Bearing Bolts

Table 5-4 Table of Slewing Bearing Bolt Tightening Torques

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

5.5 COUNTERWEIGHT

WARNING

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

Disassembly

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

Installation

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

5.6 BATTERY

WARNING

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

The batteries are installed inside the right turntable cover and in the battery boxes on both sides of the chassis.

To remove batteries from inside the right turntable cover:

1. Place the machine in a ventilated and spark-free environment.
2. Open the right turntable cover 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.

To remove batteries from the battery boxes on both sides of the chassis:

1. Place the machine in a ventilated and spark-free environment.
2. Locate the battery boxes on the sides of the chassis.
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. Place a forklift fork below the battery box to be removed to provide support for the battery box.
5. Remove the fasteners on the left and right sides of the battery box.
6. Slowly lower the fork to remove the battery box from the chassis.
7. After securing the battery with slings, remove the battery from the battery box using suitable lifting equipment.

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 detects the position of the boom tube by means of the angle sensor on the boom head (near the turntable) and the travel switch on the boom tail (near the platform). When the angle sensor detects that the main boom is raised more than 4° above the fully lowered position, or the articulated boom is raised more than 5° above the fully lowered position, or the main boom full-retraction travel switch is not engaged, the machine is considered in operating position, otherwise, it is considered in non-operating position. The position of the jib is not taken into account.

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

Load Sensing System

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

6.2 PLATFORM AND JIB

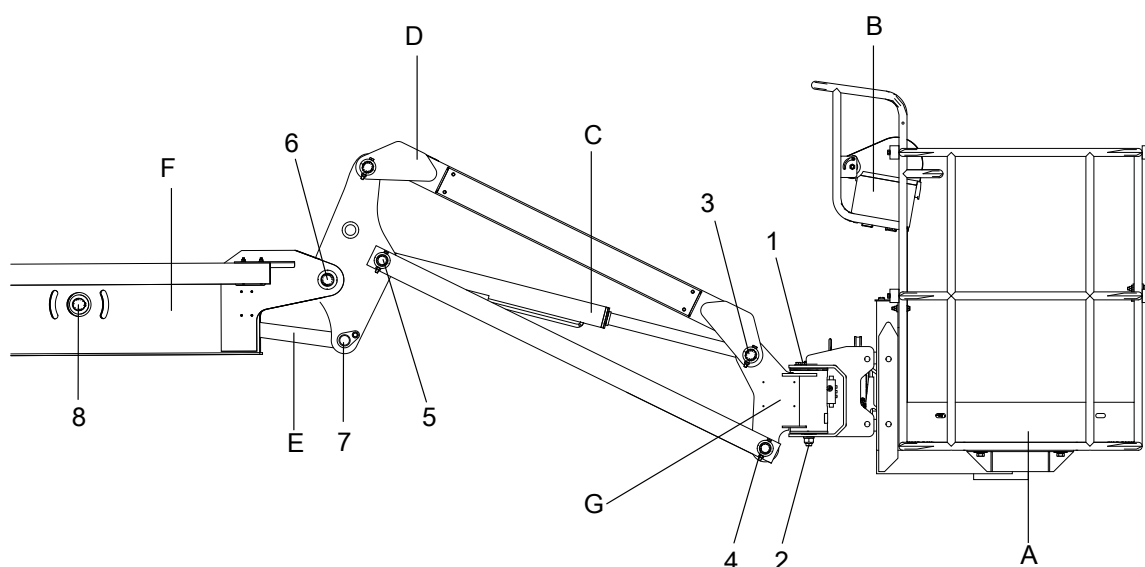


Fig. 1 Platform and Jib Structure

Table 6-1 Platform and Jib Structure Components

No.	Description
A	Platform
B	Platform controller
C	Jib lift cylinder
D	Jib
E	Upper 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 upper 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 upper leveling cylinder, and drive out pivot pin #7 with a brass rod and a mallet.
5. Remove the bolt and nut from pivot pin #6, and drive out pivot pin #6 with a brass rod and mallet.
6. Slowly remove the jib assembly with the aid of the lifting equipment.

Removing the jib lift cylinder

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

WARNING

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

Inspection

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

Installation

For installation, follow the disassembly procedure in reverse order.

Swing Cylinder

Check the swing cylinder fasteners

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

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

Disassembly

1. Remove the platform assembly.

2. Mark and disconnect the hydraulic lines from the swing cylinder and collect the hydraulic oil from the lines with a suitable container. Plug the lines and the ports.
3. Support the swing cylinder with suitable lifting equipment.
4. Remove the fastening bolts and nuts from the pivot pins #3 and #4 of the swing cylinder.
5. Knock out pivot pins #3 and #4 with a brass rod and mallet.
6. Using suitable lifting equipment, slowly remove the swing cylinder.

Installation

For installation, follow the disassembly procedure in reverse order.

Upper Leveling Cylinder

WARNING

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

Disassembly

1. Set the main boom and the jib to a horizontal position, extend the main boom slightly until the connecting pivot pin at the cylinder bottom is accessible and can easily be removed.
2. Mark and disconnect the hydraulic lines from the upper 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 upper 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 upper 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 upper 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.

For installation, follow the disassembly procedure in reverse order.

6.3 BOOM

Cable Track Assembly

Installation

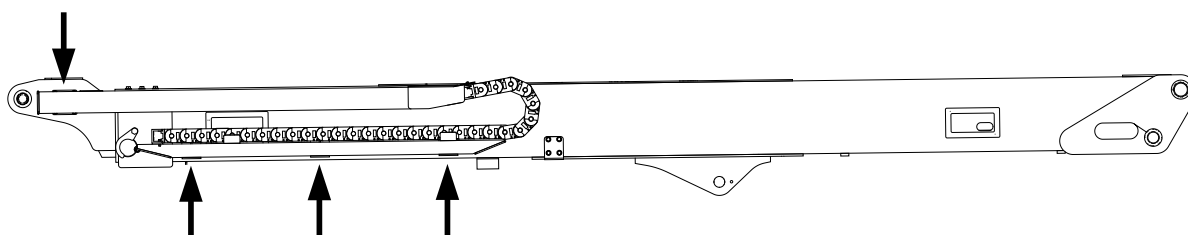


Fig. 2 Fastening Bolts on Cable Track Assembly

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. Plug the lines and the ports.
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 with the aid of the lifting equipment.
8. To disassemble the cable track separately, simply remove the fastening bolts at both ends of the cable track.

Inspection

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

Installation

For installation, follow the disassembly procedure in reverse order.

Lower Leveling Cylinder

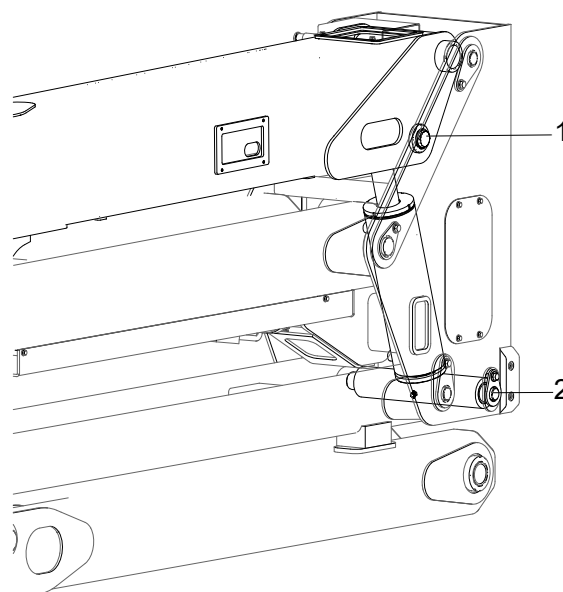


Fig. 3 Lower Leveling Cylinder

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. Raise the boom tube slightly until the lower leveling cylinder is accessible and can be removed easily.
2. Mark and disconnect the hydraulic lines on the lower leveling cylinder and collect the hydraulic oil from the lines with a suitable container. Plug the lines and the ports.
3. Support the lower leveling cylinder with suitable lifting equipment.
4. Remove the retaining ring at pivot pin #1 and drive out pivot pin #1 with a brass rod and mallet.
5. Remove the retaining bolt at pivot pin #2, and drive out pivot pin #2 with a brass rod and mallet.
6. Slowly remove the lower leveling cylinder using the lifting equipment.

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.

Main Boom Lift Cylinder

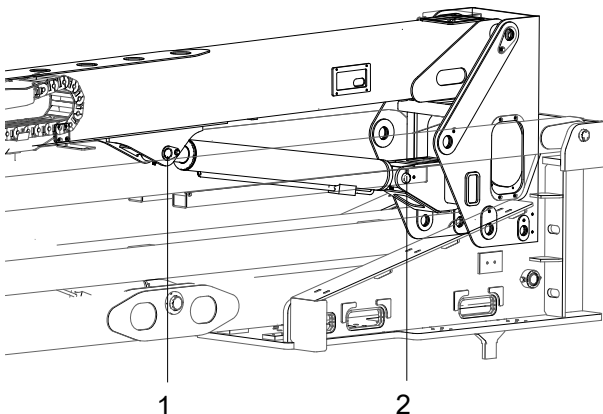


Fig. 4 Main Boom Lift Cylinder

Disassembly

WARNING

- Before disassembling the lift cylinder, rotate the boom to be parallel to the travel direction of the chassis, and make sure the turntable is locked (lock the slewing pin if so equipped).
- Before disassembling the lift cylinder, place sufficiently strong jacks under the counterweight for support, otherwise the machine may tip over causing severe personal injury and/or machine damage.
- When lifting the boom assembly using lifting equipment, never pass the sling through the cable track to avoid crushing and breaking the cable.

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.

1. Properly raise the boom to move the pivot shaft connecting the lift cylinder to the turntable outward until it is visible and accessible.
2. Use lifting equipment with sufficient capacity to hoist the main boom assembly (minimum lifting capacity: 5t [11,023 lb]) and support it near the approximate center of gravity to prevent the boom from falling during disassembly.
3. Mark and disconnect the hydraulic lines on the main boom lift cylinder and collect the hydraulic oil from the lines with a suitable container. Plug the lines and the ports.
4. Support the two ends of the main boom lifting cylinder with suitable lifting equipment.
5. Remove the bolt at pivot pin #1 connecting the lift cylinder to the boom tube, and drive out pivot pin #1 with a brass rod and mallet.
6. Remove the screw at pivot pin #2, and drive out pivot pin #2 with a brass rod and mallet.
7. Slowly remove the main boom lift cylinder using the lifting equipment.
8. Slowly lower the boom to stowed position using the lifting equipment.

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.

WARNING

After installing a new lift cylinder, perform one full lifting movement to fill the cylinder with hydraulic oil and purge any trapped air.

Installation

For installation, follow the disassembly procedure in reverse order.

Main Boom Assembly

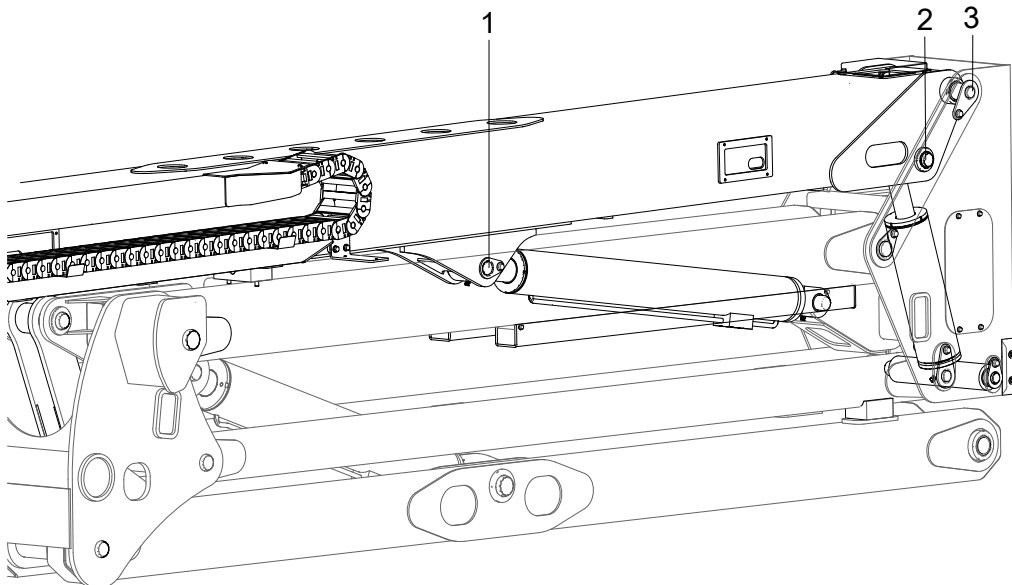


Fig. 5 Main Boom Assembly

Disassembly

WARNING

- Before disassembling the main boom assembly, rotate the boom to be parallel to the travel direction of the chassis, and make sure the turntable is locked (lock the slewing pin if so equipped).
- Before disassembling the main boom assembly, place sufficiently strong jacks under the counterweight for support; otherwise the machine may tip over causing severe personal injury and/or machine damage.

1. Make sure to remove the platform assembly, the jib assembly and the upper leveling cylinder.
2. Raise the boom slightly until the main boom lift cylinder is accessible and the main boom can be removed easily.
3. Mark and disconnect all harness connections on the main boom assembly.
4. Mark and disconnect all hydraulic lines on the main boom assembly and collect the hydraulic oil from the lines with a suitable container. Plug the lines and the ports.
5. Use suitable lifting equipment (with a lifting capacity not less than 5 t/11023 lb) to support the main boom tail (near the platform).
6. Use suitable lifting equipment to provide reliable support for the main boom lift cylinder.
7. Remove the screw at the pivot pin #1 connecting the main boom lift cylinder to the boom, and drive out pivot pin #1 with a brass rod and mallet.
8. Use suitable lifting equipment (with a lifting capacity not less than 5 t/11023 lb) to support the main boom head (near the turntable).
9. Safely support the upper connecting weldment and the lower leveling cylinder using suitable lifting equipment.
10. Remove the retaining ring from pivot pin #2 connecting the lower leveling cylinder to the main boom, and drive out pivot pin #2 with a brass rod and mallet.

11. Remove the bolt at pivot pin #3 connecting the upper connecting weldment to the main boom, and drive out pivot pin #3 with a brass rod and mallet.
12. With the assistance of the lifting equipment, slowly remove the main boom assembly from the turntable and carefully place it on a suitable support.

Installation

For installation, follow the disassembly procedure in reverse order.

Articulating Boom Lift Cylinder

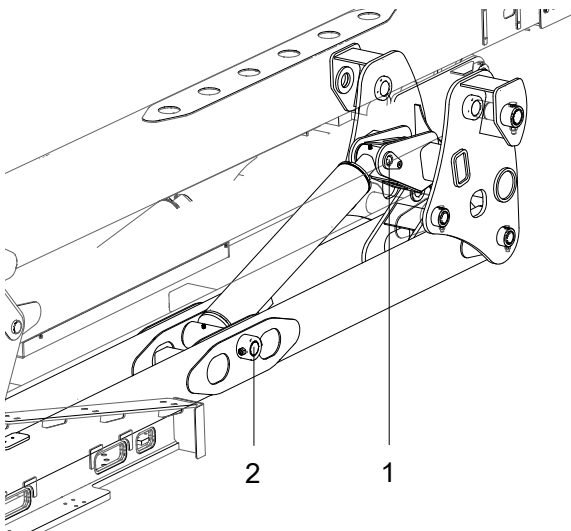


Fig. 6 Articulating Boom Lift Cylinder

Disassembly

WARNING

- Before disassembling the lift cylinder, rotate the boom to be parallel to the travel direction of the chassis, and make sure the turntable is locked (lock the slewing pin if so equipped).
- Before disassembling the lift cylinder, place sufficiently strong jacks under the counterweight for support, otherwise the machine may tip over causing severe personal injury and/or machine damage.

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.

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.

1. Place the main boom into horizontal, fully retracted position.
2. Raise the articulated boom slightly until the articulating boom lift cylinder is accessible and can be easily removed.
3. Use suitable equipment to support the main boom and the upper connecting weldment to prevent the boom from falling during disassembly.
4. Mark and disconnect the hydraulic lines on the articulating boom lift cylinder and collect the hydraulic oil from the lines with a suitable container. Plug the lines and the ports.
5. Support the two ends of the articulating boom lift cylinder with suitable lifting equipment.
6. Remove the screw at pivot pin #1 connecting the articulating boom lift cylinder to the lower connecting weldment, and drive out the pivot pin #1 with a brass rod and mallet.
7. Remove the bolt at pivot pin #2 connecting the articulating boom lift cylinder to the lower articulating boom, and drive out pivot pin #2 with a brass rod and mallet.
8. Slowly remove the articulating boom lift cylinder using the lifting equipment.
9. Slowly lower the boom to stowed position using the lifting equipment.

Installation

For installation, follow the disassembly procedure in reverse order.

Articulating Boom Assembly

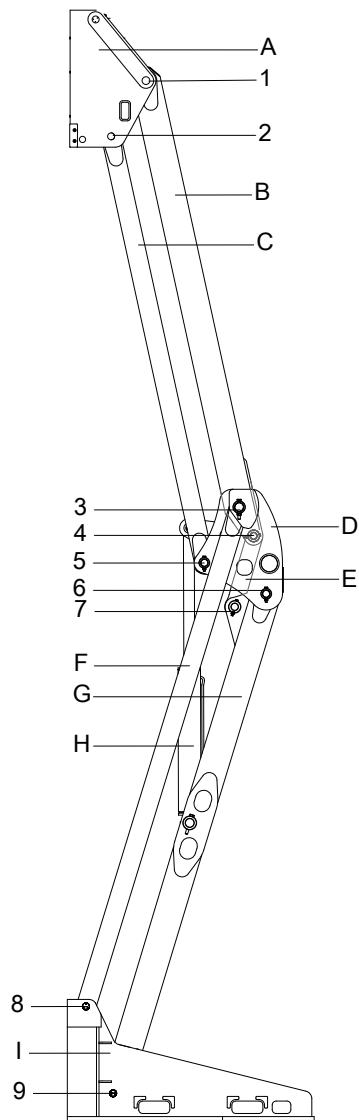


Fig. 7 Articulating Boom Assembly

Table 6-2 Articulating boom assembly

No.	Description
A	Upper connecting weldment
B	Upper articulating boom
C	Upper connecting rod
D	Lower connecting weldment
E	Pull rod
F	Lower connecting rod
G	Lower articulating boom

Table 6-2 Articulating boom assembly (continued)

H	Articulating boom lift cylinder
I	Turntable

Disassembly

WARNING

- Before disassembling the articulating boom assembly, rotate the boom to be parallel to the travel direction of the chassis, and make sure the turntable is locked (if equipped with a rotary pin, make sure the rotary pin is locked).
- Before disassembling the articulating boom assembly, place sufficiently strong jacks under the counterweight for support; otherwise the machine may tip over causing severe personal injury and/or machine damage.

1. Raise the boom slightly until the articulating boom assembly can be removed easily.
2. Remove the main boom assembly, main boom lift cylinder, and lower leveling cylinder.
3. Mark and disconnect all harness connections on the articulating boom assembly.
4. Mark and disconnect all hydraulic lines on the articulating boom assembly and collect the hydraulic oil from the lines with a suitable container. Plug the lines and the ports.
5. Safely support the upper and lower connecting weldments with suitable lifting equipment.
6. Use suitable lifting equipment to safely support the lower connecting rod and the upper articulating boom.
7. Remove the bolt and nut at pivot pin #3 connecting the lower connecting rod to the lower connecting weldment, and drive out the pivot pin #3 with a brass rod and mallet.
8. Remove the bolt and nut at pivot pin #8 connecting the lower connecting rod to the turntable, and drive out pivot pin #8 with a brass rod and mallet.
9. Slowly remove the lower connecting rod by means of the lifting equipment.
10. Remove the bolt and nut at pivot pin #4 connecting the upper articulating boom to the pull rod, and drive out pivot pin #4 with a brass rod and mallet.
11. Remove the bolt at pivot pin #1 connecting the upper articulating boom to the upper connecting weldment, and drive out pivot pin #1 with a brass rod and mallet.
12. Slowly remove the upper articulating boom by means of the lifting equipment.

13. Remove the articulating boom lift cylinder.
14. Use suitable lifting equipment to support the upper connecting rod.
15. Remove the bolt at pivot pin #2 connecting the upper connecting rod to the upper connecting weldment, and drive out pivot pin #2 with a brass rod and mallet.
16. Slowly remove the upper connecting weldment by means of the lifting equipment.
17. Remove the bolt and nut at pivot pin #5 connecting the upper connecting rod to the lower connecting weldment, and drive out pivot pin #5 with a brass rod and mallet.
18. Slowly remove the upper connecting rod by means of the lifting equipment.
19. Use suitable lifting equipment to safely supported the lower articulating boom.
20. Remove the bolt and nut at pivot pin #6 connecting the lower articulating boom to the lower connecting weldment, and drive out pivot pin #6 with a brass rod and mallet.
21. Slowly remove the lower connecting weldment by means of the lifting equipment.
22. Remove the bolt and nut at pivot pin #9 connecting the lower articulating boom to the turntable, and drive out pivot pin #9 with a brass rod and mallet.
23. Slowly remove the articulating boom by means of the lifting equipment.

Installation

For installation, follow the disassembly procedure in reverse order.

Boom Wear Pads

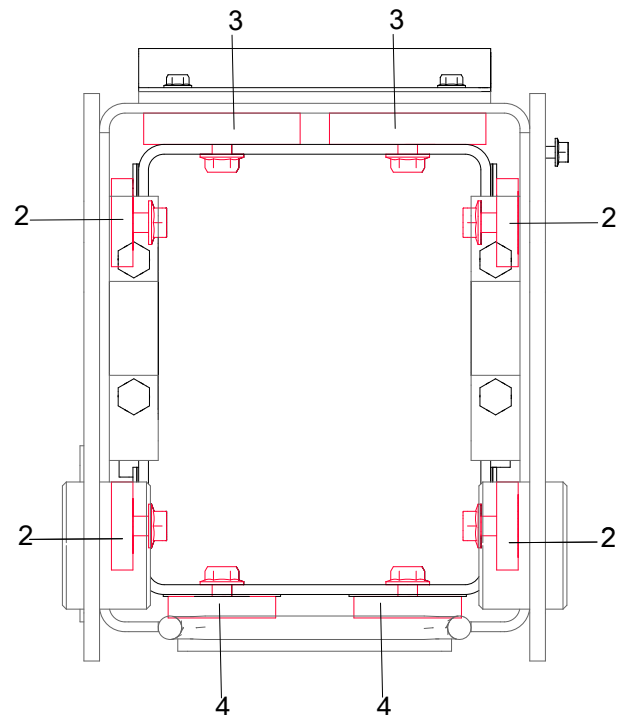


Fig. 8 Boom Head Wear Pads

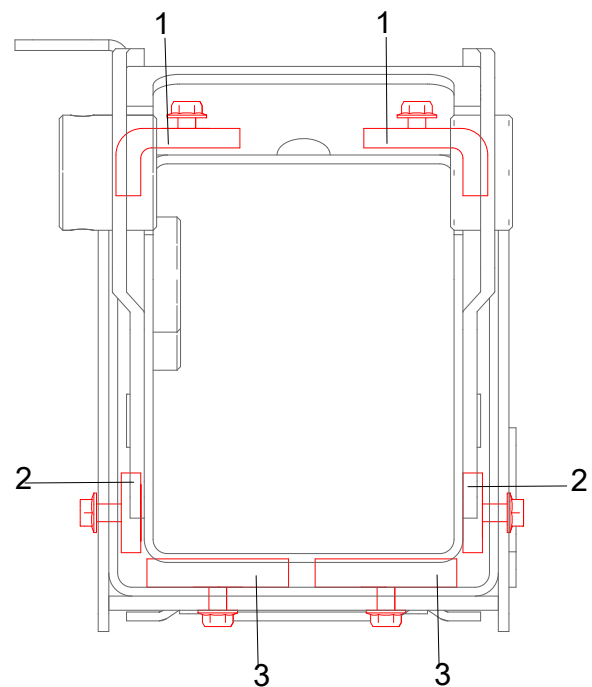


Fig. 9 Boom Tail Wear Pads

Table 6-3 Boom Wear Pad Thickness

No.	Wear Pads Thickness
1	11mm (0.43in)/ 14mm (0.55in)
2	11 mm (0.43 in)
3	16 mm (0.63 in)
4	11mm (0.43in)
Telescopic cylinder wear pad	17 mm (0.67 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.

Telescopic Cylinder

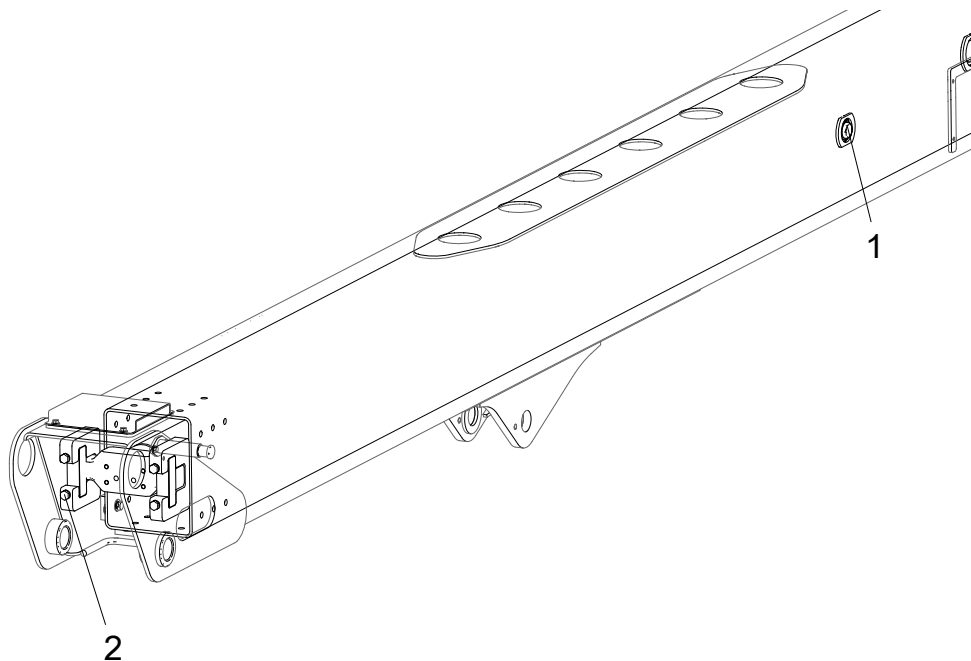


Fig. 10 Telescopic Cylinder

Disassembly

1. Extend the telescopic boom section until the telescopic cylinder pivot pin #1 is just accessible.
2. Remove the main boom and place it on a suitable support.
3. Remove the retaining ring at pivot pin #1 that secures the telescopic cylinder piston rod to the telescopic boom section, and drive out pivot pin #1 with a brass rod and mallet.
4. Remove the bolt at pivot pin #2 that secures the telescopic cylinder to the base boom, and remove the stop bracket and shims.
5. Use suitable lifting equipment to support the front end of the telescopic cylinder and carefully and slowly pull the cylinder out of the main boom head.

NOTICE

When pulling the telescopic cylinder out of the main boom, take use extreme caution to avoid damaging other parts of the boom.

6. Before the telescopic cylinder is fully pulled out of the main boom, position/adjust the lifting equipment to provide sufficient support for the entire cylinder.
7. Using the lifting equipment, slowly remove the cylinder from the main boom and carefully place it on a suitable support.

Installation

For installation, follow the disassembly procedure in reverse order.

**WARNING**

After installing a new telescopic cylinder, perform one full extending movement for the main boom to fill the cylinder with hydraulic oil and purge any trapped air.

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7 HYDRAULIC SYSTEM

The machine is powered by an oil pump motor, which drives the gear pump to supply high-pressure hydraulic oil. All functions of the machine are driven by a hydraulic system, which can be divided into two parts: the boom movement and turntable slewing control system, and the steering and oscillation control system for machine travel.

When the oil pump motor operates, high-pressure oil from the gear pump outlet flows through, electro-proportional flow control valves and solenoid directional valves on the boom function valve manifold to actuate hydraulic actuators. To accommodate varying flow requirements for different boom movements, the electronic control system adjusts the oil pump motor speed to deliver corresponding high-pressure oil output. Pressure-limiting relief valves are installed throughout the hydraulic system to prevent excessive pressure that could damage components. In addition, the hydraulic system is equipped with an emergency power unit, which allows for emergency operations of the boom movements.

7.1 LAYOUT OF HYDRAULIC ELEMENTS

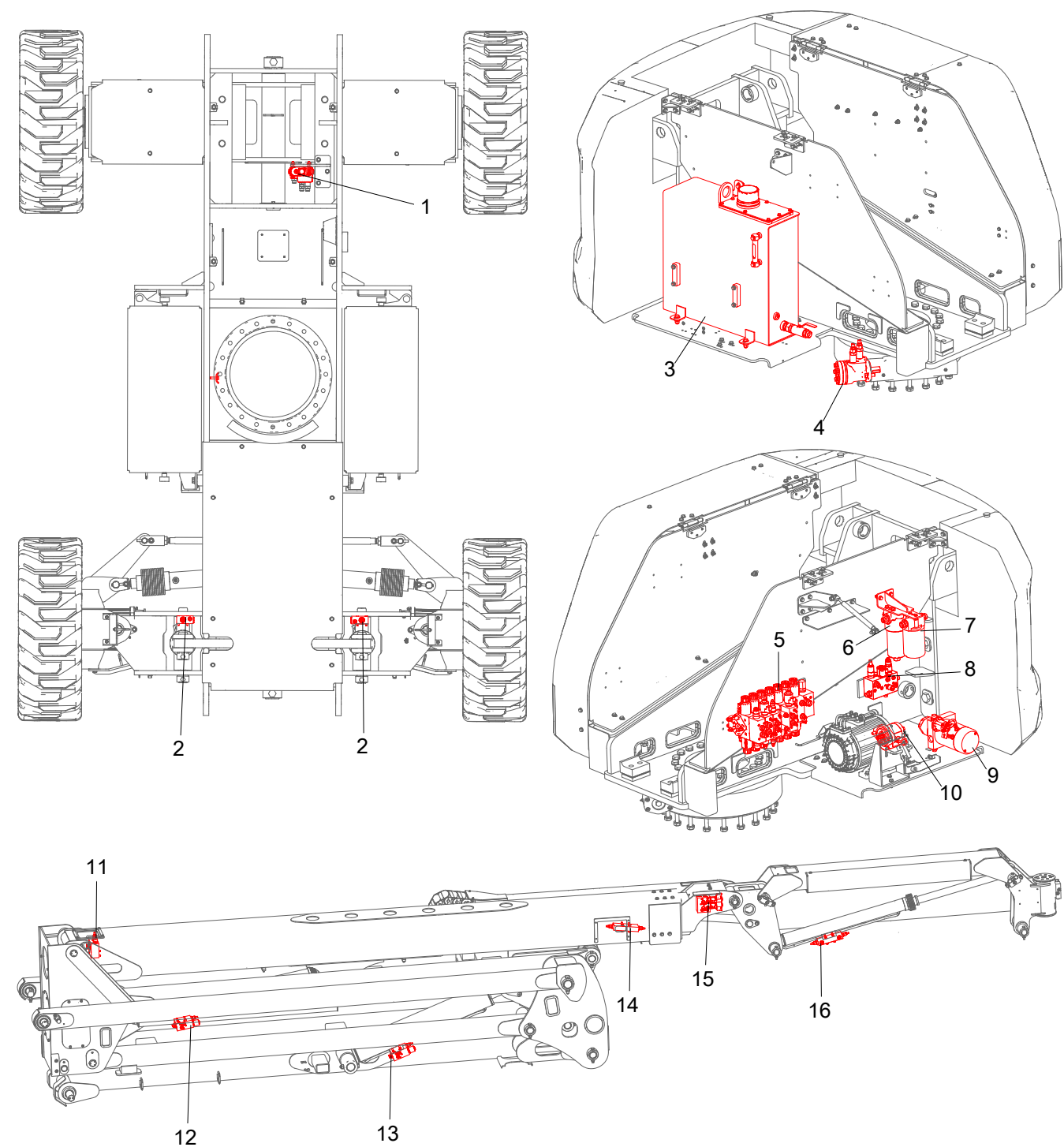


Fig. 1

Table 7-1

1. Oscillating multi-way valve	7. Return filter	13. Lift control valve
2. Oscillating counterbalance valve	8. Oscillating control valve	14. Leveling counterbalance valve

Table 7-1 (continued)

3. Hydraulic tank	9. Auxiliary power unit	15. Platform duplex valve manifold
4. Hydraulic motor	10. Gear pump	16. Leveling counterbalance valve
5. Hydraulic manifold	11. Telescoping counterbalance valve	
6. High-pressure filter	12. Lift control valve	

7.2 FUNCTION VALVE MANIFOLD

Seven-section Electric Proportional Multi-way Valve (PN.103011053048&103011053219)

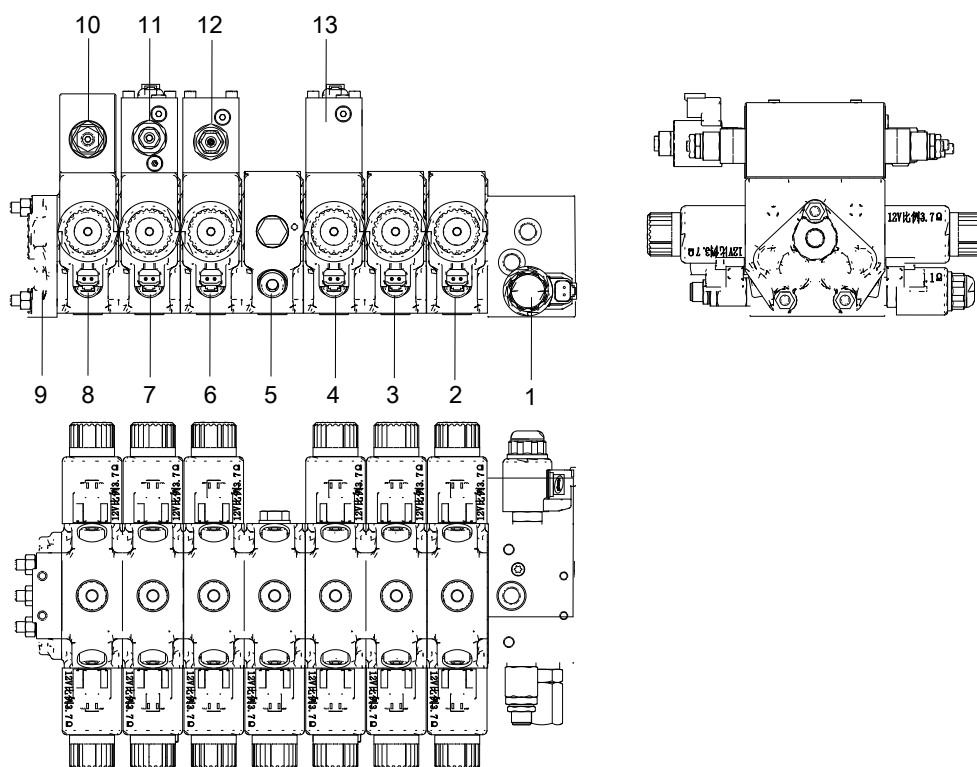


Fig. 2

Table 7-2

No.	Description	Function
1	Oil inlet section	Limits the maximum pressure, releases pressure for pump outlet flow, releases pressure for LS oil line
2	Articulating boom luffing section	Controls articulated boom lifting/lowering
3	Main boom luffing section	Controls direction and speed of main boom lifting/lowering movements
4	Boom telescoping section	Controls direction and speed of boom extension/retraction

Table 7-2 (continued)

No.	Description	Function
5	Common proportion section	Provides oil flow for platform movement and controls the speed of platform movement
6	Platform leveling section	Controls platform leveling upwards/downwards
7	Turntable rotation section	Controls direction and speed of turntable rotation
8	Steering section	Controls left/right wheel steering
9	End section	/
10	Steering – secondary overflow valve	Limits the maximum working pressure of steering actions
11	Relief valve	Limits the maximum working pressure of the rotation action
12	Bidirectional counterbalance valve	Keep the load balanced
13	Relief valve	If the main spool of the boom telescoping section is stuck, the pressure of the oil port can be released to prevent the spool from being stuck and causing malfunction

Lift Control Valve Manifold (PN.202040003866)

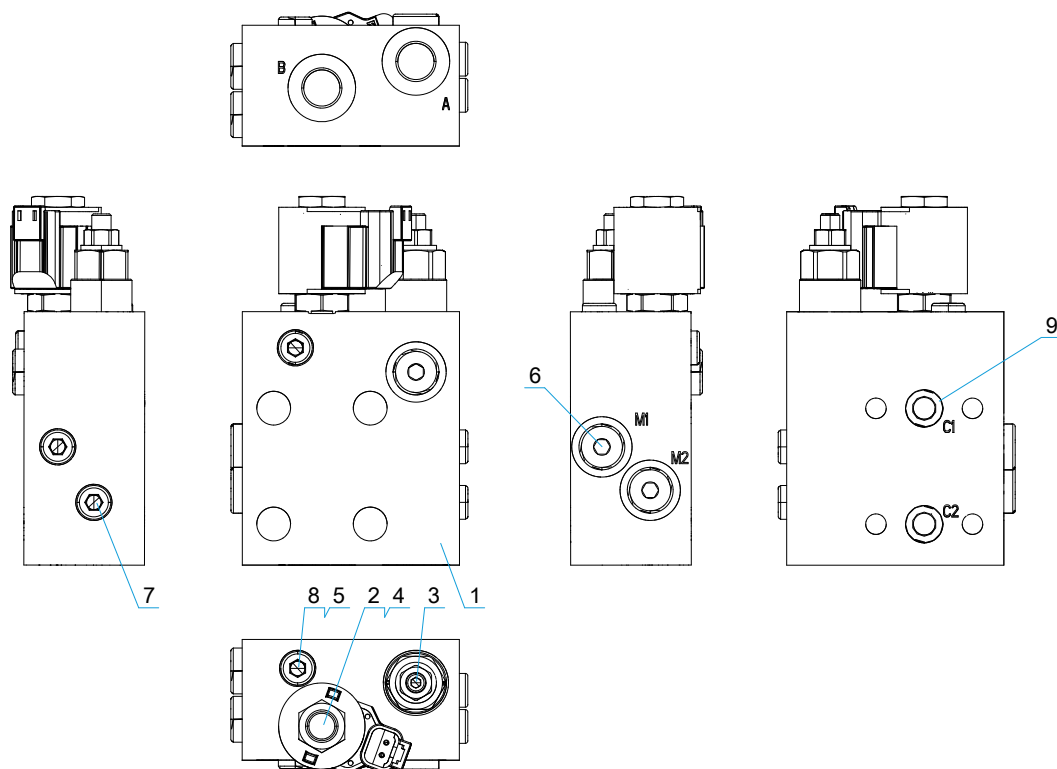
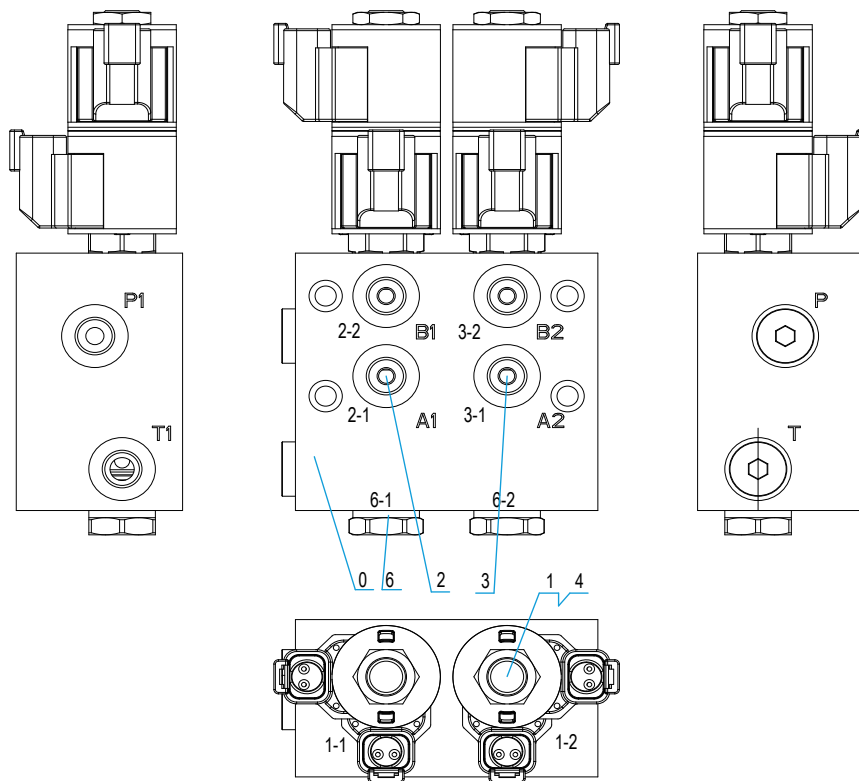


Fig. 3

Table 7-3

No.	Description	Installation torque	Function
2	Solenoid valve	25.8-28.5 Nm (19-21 ft-lb)	Control the speed of lowering by gravity
3	Counterbalance valve	70 – 75 Nm (52 – 55 ft-lb)	Keep the load balanced
4	Coil	4 Nm (3 ft-lb)	\
7	Orifice plug (ø0.8)	5 Nm (4 ft-lb)	\
8	Damping hole plug (ø2.2)	5 Nm (4 ft-lb)	\
9	O-ring	\	\

Platform Duplex Valve Manifold (PN.202040000329)


Fig. 4 Platform Duplex Valve Manifold (PN.202040000329)
Table 7-4 Platform Duplex Valve Manifold (PN.202040000329)

No.	Description	Installation torque	Function
1-1	Solenoid valve	27.1 Nm (20 ft-lb)	Control the direction of platform rotation
1-2	Solenoid valve	27.1 Nm (20 ft-lb)	Control the direction of jib up/down movement
2	Damper (ø0.8)	5 Nm (9 ft-lb)	\

Table 7-4 Platform Duplex Valve Manifold (PN.20204000329) (continued)

No.	Description	Installation torque	Function
3	Damper ($\varnothing 1.5$)	5 Nm (9 ft-lb)	\
6	Check valve	40 – 45 Nm (30 – 33 ft-lb)	Keep oil flowing in one direction

Platform Duplex Valve Manifold (PN.202040003259)

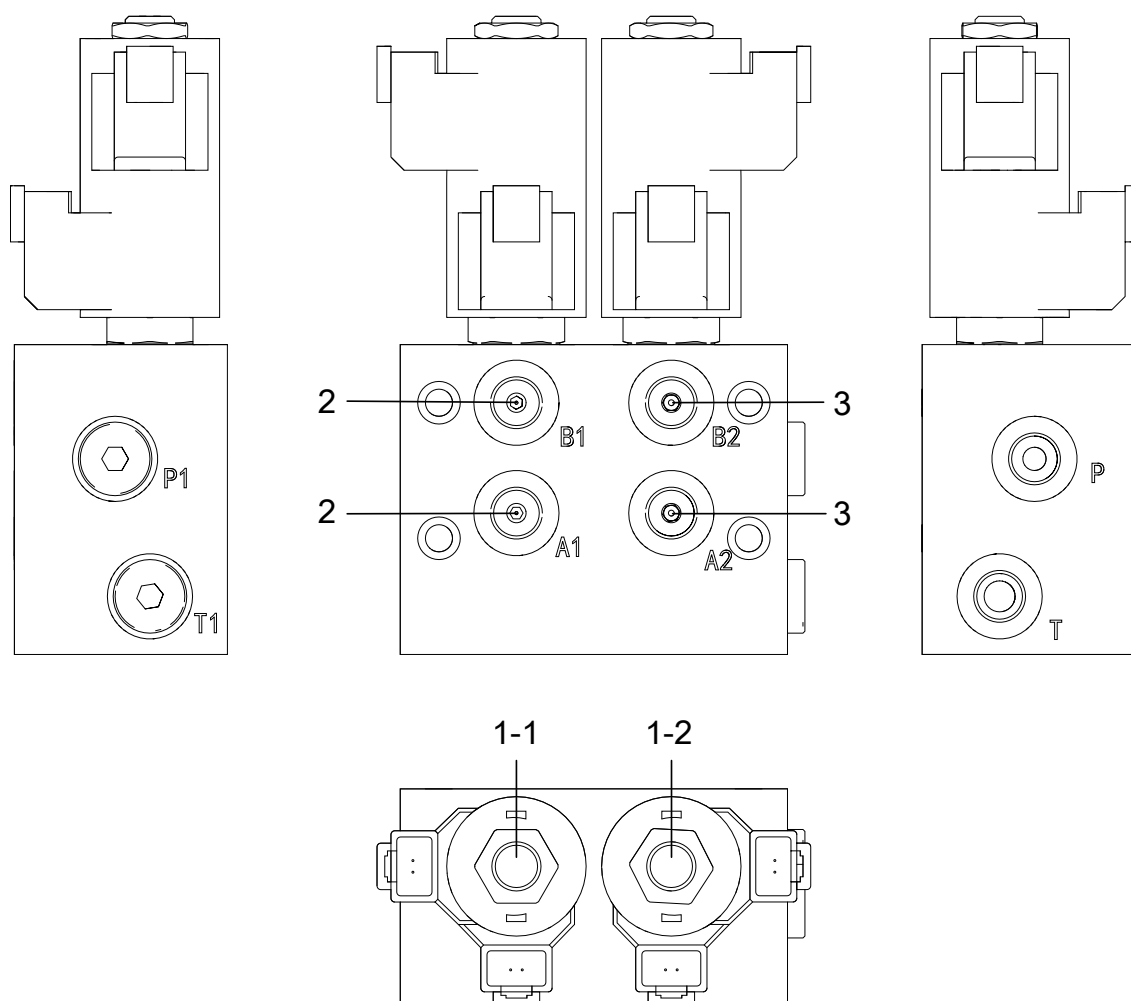


Fig. 5 Platform Duplex Valve Manifold (PN.202040003259)

Table 7-5 Platform Duplex Valve Manifold (PN.202040003259)

No.	Description	Installation torque	Function
1-1	Solenoid valve	40 – 45 Nm (30 – 33 ft-lb)	Control the direction of platform rotation
1-2	Solenoid valve	40 – 45 Nm (30 – 33 ft-lb)	Control the direction of jib up/down movement
2	Damper ($\varnothing 0.8$)	5 Nm (3.7 ft-lb)	\
3	Damper ($\varnothing 1.5$)	5 Nm (3.7 ft-lb)	\

Platform Duplex Valve Manifold (PN.202040003548)

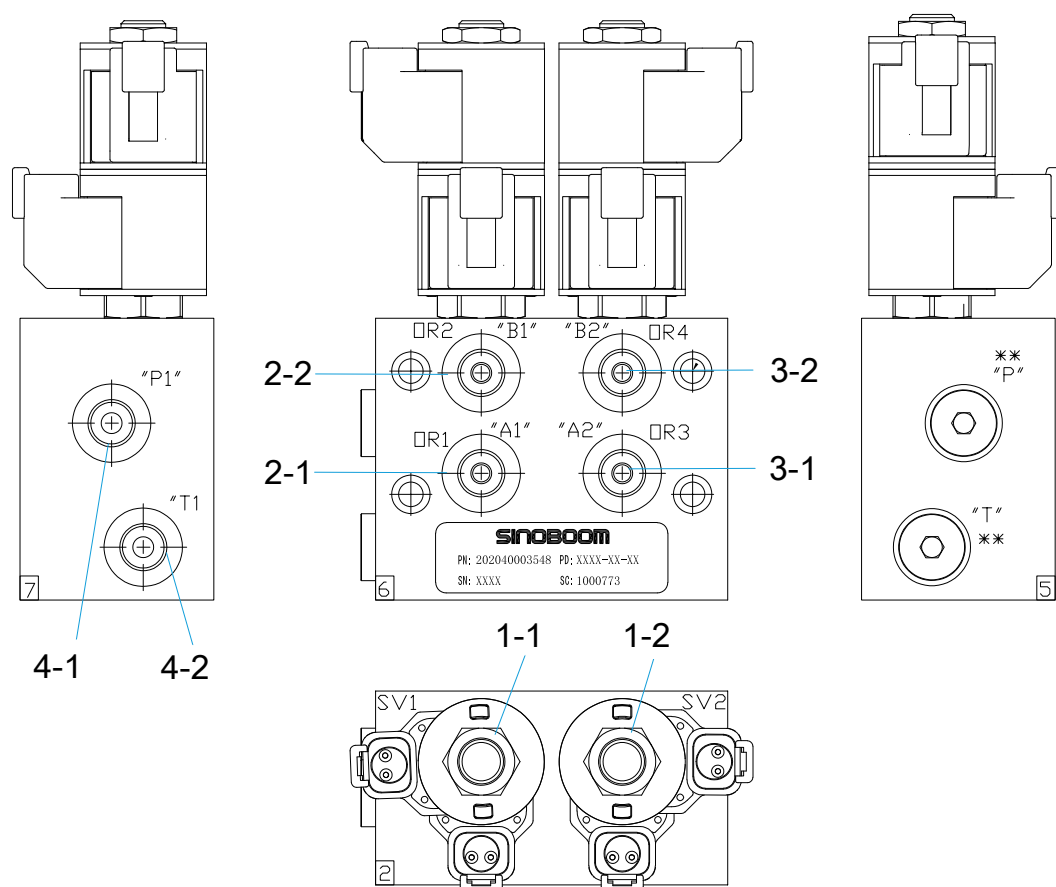


Fig. 6

Table 7-6

No.	Description	Installation torque	Function
1-1	Solenoid valve	27.1 Nm (20 ft-lb)	Control the direction of platform rotation
1-2	Solenoid valve	27.1 Nm (20 ft-lb)	Control the direction of jib up/down movement
2	Damper	5 Nm (9 ft-lb)	/
3	Damper	5 Nm (9 ft-lb)	/
4	Plug	/	/

Platform Duplex Valve Manifold (PN.202040003871)

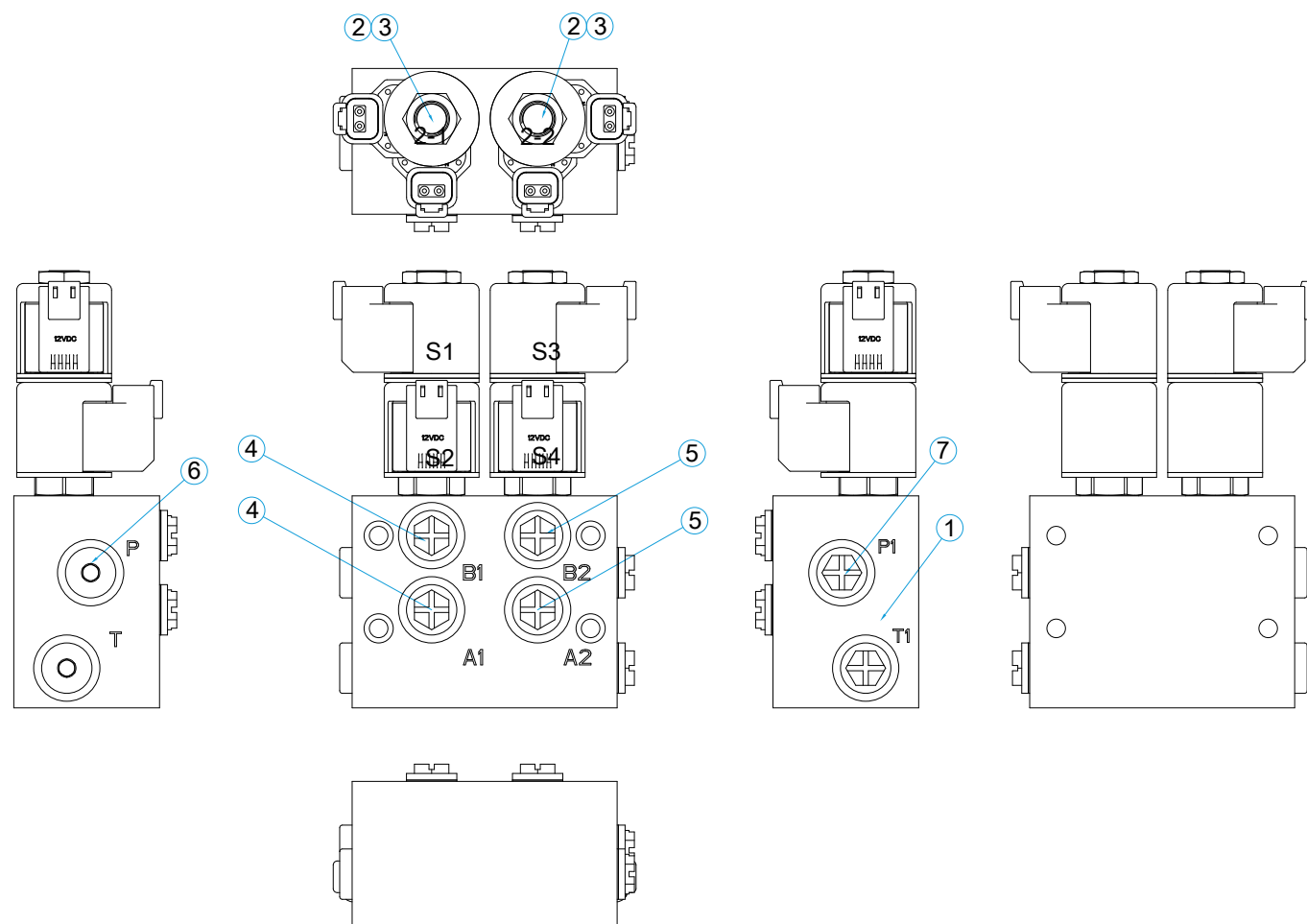


Fig. 7 Platform Duplex Valve Manifold (PN.202040003871)

Table 7-7 Platform Duplex Valve Manifold (PN.202040003871)

No.	Description	Installation torque	Function
2-1	Solenoid valve	23 – 27.2 Nm (17 – 20 ft-lb)	Control the direction of platform rotation
2-2	Solenoid valve	23 – 27.2 Nm (17 – 20 ft-lb)	Control the direction of jib up/down movement
4	Damper (ø0.8)	2.5 – 3.5 Nm (1.8 – 2.6 ft-lb)	\
5	Damper (ø1.5)	2.5 – 3.5 Nm (1.8 – 2.6 ft-lb)	\

Oscillation Control Valve Manifold (PN.202040003521)

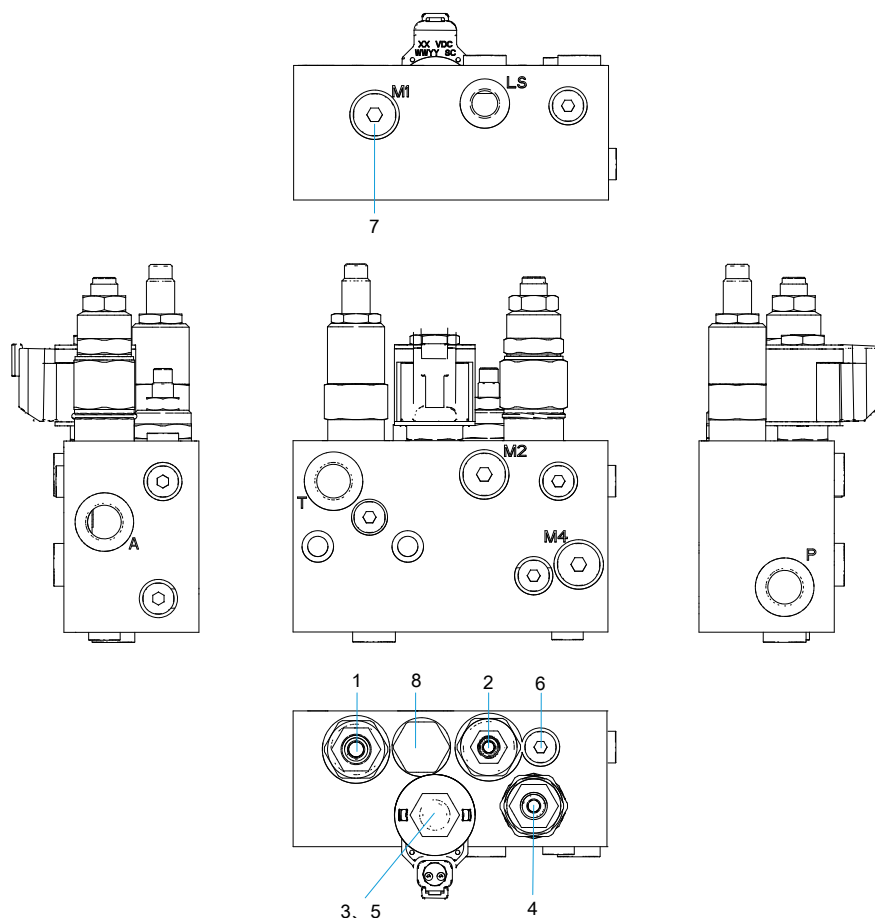


Fig. 8 Oscillation Control Valve Manifold (PN.202040003521)

Table 7-8 Oscillation Control Valve Manifold (PN.202040003521)

No.	Description	Installation torque	Function
1	Pressure-relief valve	40 Nm (30 ft-lb)	Control oscillating pressure
2	Flow valve	33.9 Nm (25 ft-lb)	Control fuel flow
3	Solenoid valve	25.8 – 28.5 Nm (19 – 21 ft-lb)	Control oscillating
4	Pilot-operated valve	45 – 50 Nm (33 – 37 ft-lb)	Limit the maximum pressure for oscillating system
6	Damper (ø0.6)	5 Nm (9 ft-lb)	\
8	Check valve	40 – 45 Nm (30 – 33 ft-lb)	Keep oil flowing in one direction

Oscillating Control Valve Manifold (PN.202040003875)

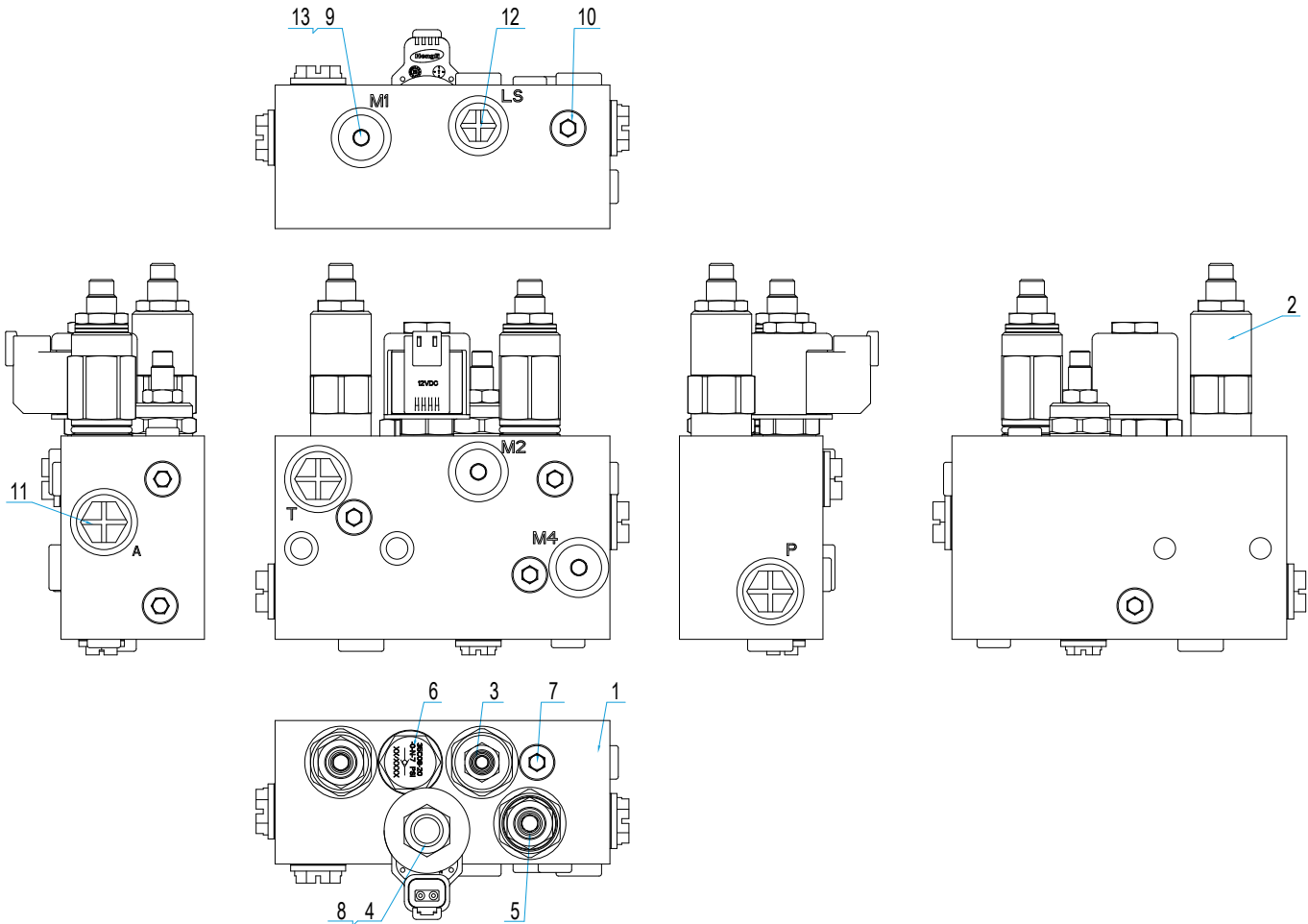


Fig. 9 Oscillating Control Valve Manifold (PN.202040003875)

Table 7-9 Oscillating Control Valve Manifold (PN.202040003875)

No.	Description	Installation torque	Function
2	Pressure-relief valve	40 Nm (30 ft-lb)	Control oscillating pressure
3	Flow valve	33.9 Nm (25 ft-lb)	Control oil flow
4	Solenoid directional valve	25.8 – 28.5 Nm (19 – 21 ft-lb)	Control oscillating
5	Pilot-operated directional-control valve	45 – 50 Nm (33 – 37 ft-lb)	Limit the maximum pressure for oscillating system
6	Check valve	40 – 45 Nm (30 – 33 ft-lb)	Keep oil flowing in one direction
7	Damper (ø0.6)	5 Nm (9 ft-lb)	\

Oscillating Counterbalance Valve (PN.202040003870)

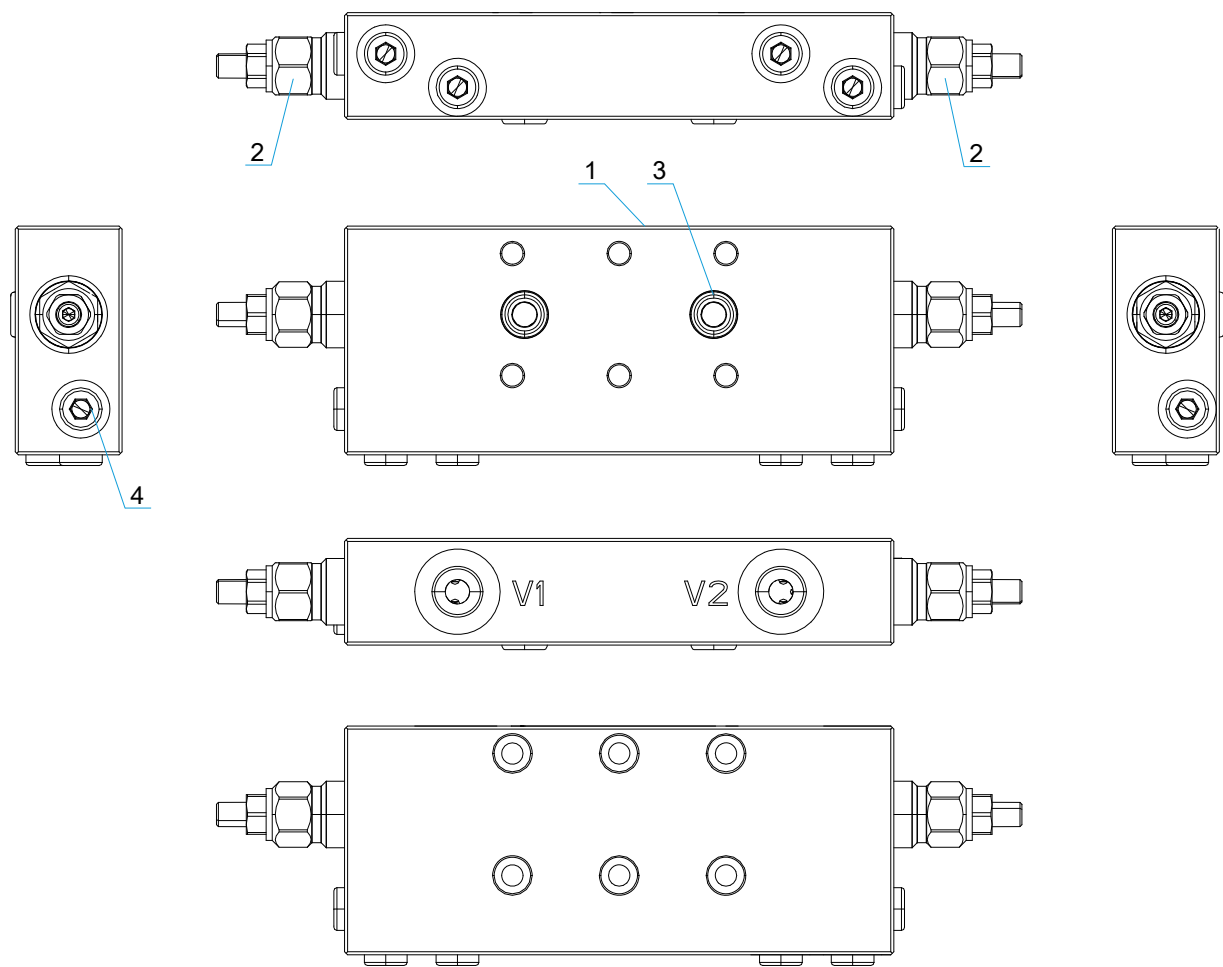


Fig. 10 Oscillating Counterbalance Valve (PN.202040003870)

Table 7-10 Oscillating Counterbalance Valve (PN.202040003870)

No.	Description	Installation torque	Function
2	Counterbalance valve	40 – 45 Nm (30 – 33 ft-lb)	Keep the load balanced

Oscillating Counterbalance Valve (PN.202040003032)

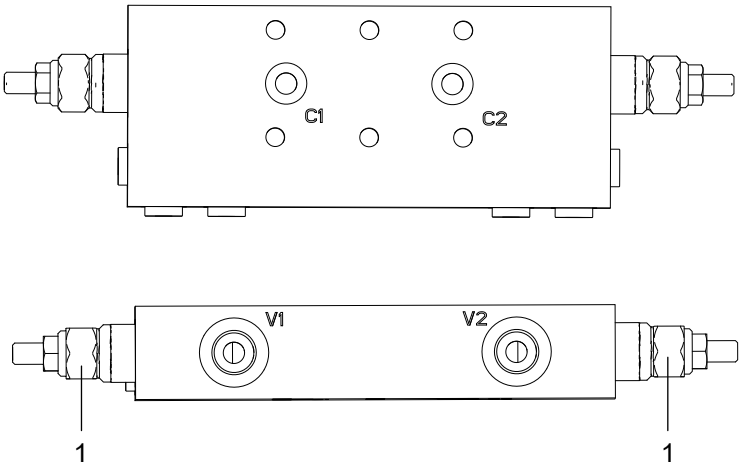


Fig. 11 Oscillating Counterbalance Valve (PN.202040003032)

Table 7-11 Oscillating Counterbalance Valve (PN.202040003032)

No.	Description	Installation torque	Function
1	Counterbalance valve	40 – 45 Nm (30 – 33 ft-lb)	Keep the load balanced

Oscillating Counterbalance Valve (PN.202040003786)

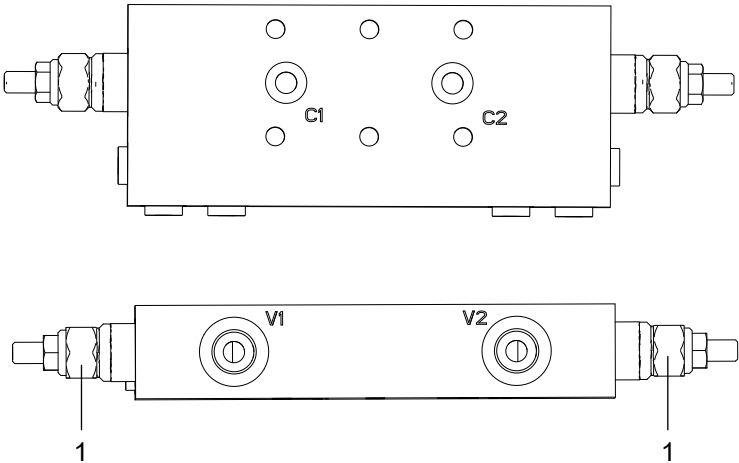


Fig. 12 Oscillating Counterbalance Valve (PN.202040003786)

Table 7-12 Oscillating Counterbalance Valve (PN.202040003786)

No.	Description	Installation torque	Function
1	Counterbalance valve	40 – 45 Nm (30 – 33 ft-lb)	Keep the load balanced

Leveling Counterbalance Valve (PN.20204000011)

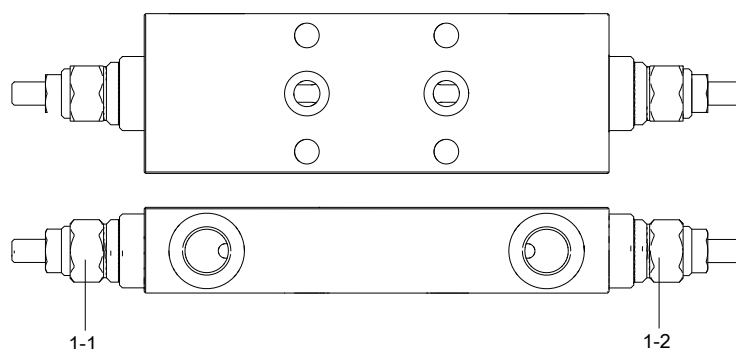


Fig. 13 Leveling Counterbalance Valve (PN.20204000011)

Table 7-13 Leveling Counterbalance Valve (PN.20204000011)

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

Telescoping Counterbalance Valve (PN.202040003869)

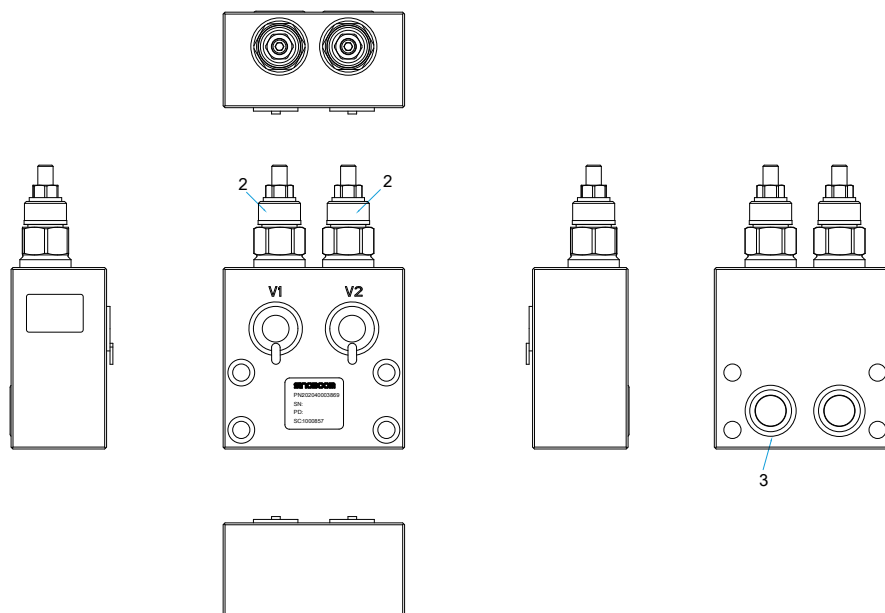


Fig. 14 Telescoping Counterbalance Valve (PN.202040003869)

Table 7-14 Telescoping Counterbalance Valve (PN.202040003869)

No.	Description	Installation torque	Function
1	Counterbalance valve	34–41 Nm (25.1–30.2 ft-lb)	Keep the load balanced
3	O-ring	\	\

Telescoping Counterbalance Valve (PN.202040000026)

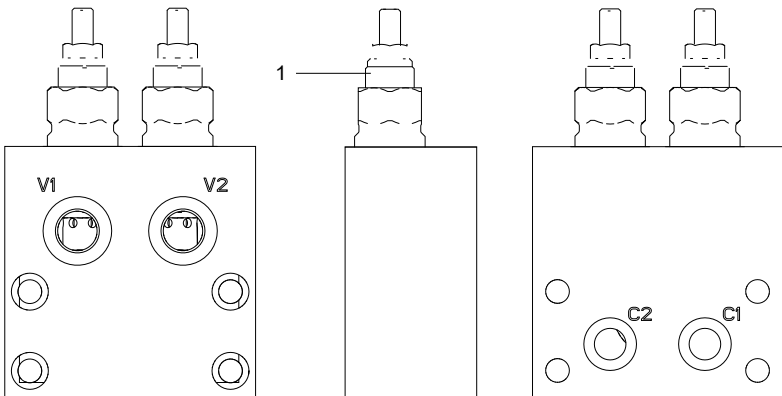


Fig. 15 Telescoping Counterbalance Valve (PN.202040000026)

Table 7-15 Telescoping Counterbalance Valve (PN.202040000026)

No.	Description	Installation torque	Function
1	Counterbalance valve	45 – 50 Nm (33 – 37 ft-lb)	Keep the load balanced

Bidirectional Counterbalance Valve (PN.202040003614)

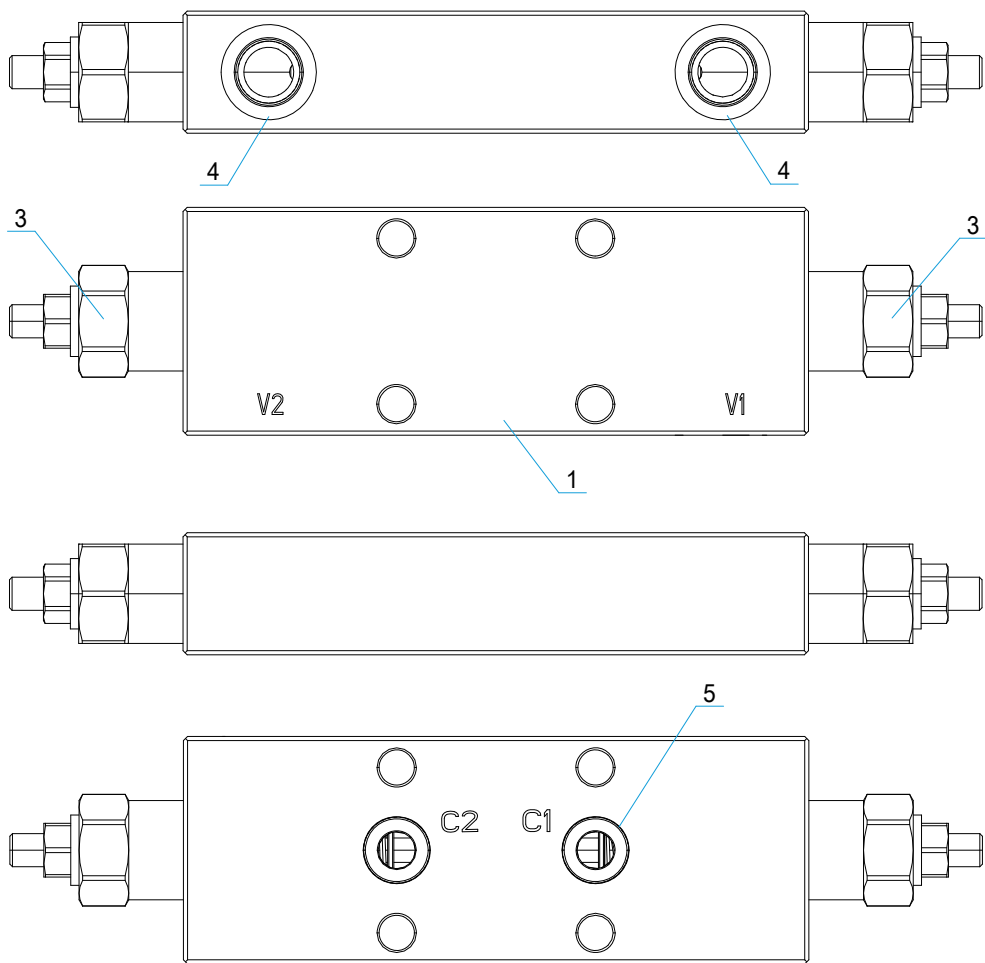


Fig. 16 Bidirectional Counterbalance Valve (PN.202040003614)

Table 7-16 Bidirectional Counterbalance Valve (PN.202040003614)

No.	Description	Installation torque	Function
3	Counterbalance valve	40 – 45 Nm (30 – 33 ft-lb)	Keep the load balanced

Lift Control Valve Manifold (PN.202040003366)

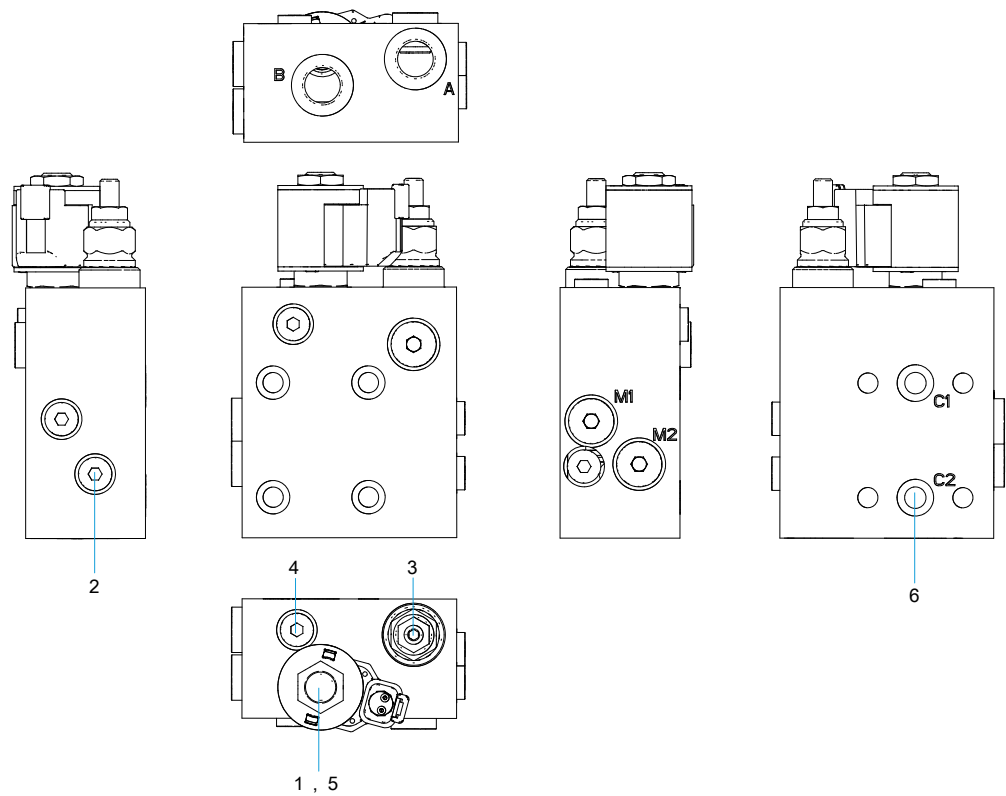


Fig. 17 Lift Control Valve Manifold (PN.202040003366)

Table 7-17 Lift Control Valve Manifold (PN.202040003366)

No.	Description	Installation torque	Function
1	Solenoid valve	25.8-28.5 Nm (19-21 ft-lb)	Control the speed of lowering by gravity
2	Damper (ø0.8)	5 Nm (4 ft-lb)	\
3	Counterbalance valve	70 – 75 Nm (52 – 55 ft-lb)	Keep the load balanced
4	Damper (ø2.2)	5 Nm (4 ft-lb)	\
5	Coil	4 Nm (3 ft-lb)	\
6	O-ring	\	\

7.3 HYDRAULIC TANK

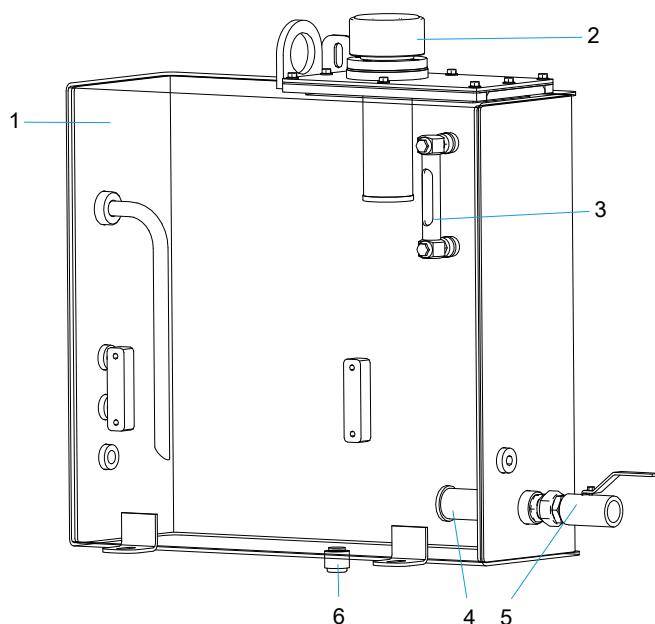


Fig. 18 Hydraulic Tank Structure

Table 7-18 Hydraulic Tank Components

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

Air Filter

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

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

1. Turn off the machine.
2. Locate the air filter at the top of the hydraulic tank.
3. Remove the air filter.
4. Check the hydraulic tank air filter: air should pass through the air filter smoothly.
5. If the air cannot pass through the air filter smoothly, clean the air filter with a neutral solvent and dry it using an air gun.

6. Check the air filter again, repeat as necessary until the air passes through the filter smoothly.
7. Install the air filter back onto the tank.

Oil Suction Filter

It is recommended to replace the hydraulic tank oil 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.

7.4 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 drain plug at the bottom of the tank.
5. Remove the drain plug at the bottom of the tank and completely drain the oil into the container.
6. Install the 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 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.

7.5 HYDRAULIC OIL RETURN FILTER

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

1. Turn off the machine.
2. Open the turntable cover and locate the return filter.
3. Place a suitable container under the return 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 and tighten it securely.
8. Clean up any hydraulic oil that was spilled during the process.

9. Start the machine from the ground.
10. Check the return filter and related components for leakage.

7.6 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.

7.7 LEVELING CYLINDER BLEEDING

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

1. Make sure the platform is unloaded.
2. Turn the ground/platform control selector switch to the ground control position, and perform the following operations from the ground control position.
3. Operate the boom to lower into position.
4. Perform upward/downward platform leveling for 3–5 cycles:
 - 1) Activate platform leveling switch for upward leveling, hold at maximum position for 3–5 sec.
 - 2) Activate platform leveling switch for upward leveling, hold at minimum position for 3–5 sec.

5. Operate the boom to lift into position.
6. Perform upward/downward platform leveling for 3–5 cycles:
 - 1) Activate platform leveling switch for upward leveling, hold at maximum position for 3–5 sec.
 - 2) Activate platform leveling switch for upward leveling, hold at minimum position for 3–5 sec.
7. Perform 3–5 complete cycles (Steps 1–4) until leveling movements exhibit no overshooting and no response lag.

7.8 BLEED THE OSCILLATING CYLINDER

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

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

7.9 OSCILLATING 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 measuring 120mm (4.7 in) in height in front of the machine.

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

Check the Tie Rod of the Oscillating Multi-way Valve

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

Oscillating Axle Function Test

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

7.10 LUBRICATE CYLINDER TRUNNIONS

The cylinder is connected to other components via trunnions at both ends. These connection points are typically equipped with grease fittings. It is recommended to lubricate these areas every 3 months or after 250 hours of operation.

NOTICE

If there is no grease fitting on the trunnion, lubrication is not required.

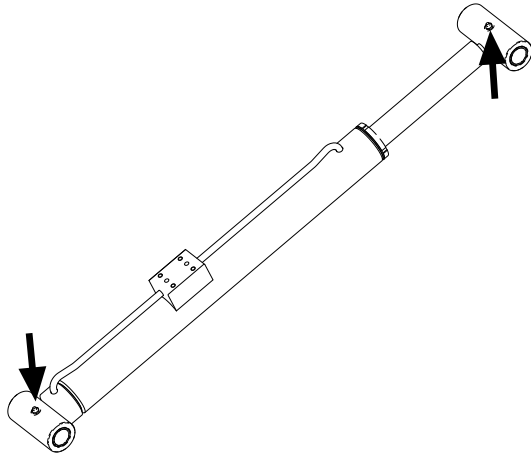


Fig. 19 Grease Fitting Diagram

1. Locate the grease fitting on the cylinder.
2. Remove the grease fitting cap and wipe away any dust from the fitting and surrounding area using a clean cloth.
3. Connect the grease gun securely to the fitting and slowly inject grease until a small amount seeps out from the bearing area.
4. Disconnect the grease gun and wipe off any excess grease around the fitting and bearing.
5. Replace the grease fitting cap, reinstall it securely, and ensure a proper seal.

7.11 CYLINDER DRIFT INSPECTION

Minor cylinder drift within specified tolerances is considered normal operation, while excessive drift may indicate hydraulic leakage. 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.

Place rated load on the platform, fully extend the main boom. 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. Place rated load on the platform, fully extend the main boom.
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 7-19 Maximum allowable drift for different cylinder bore diameters

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

NOTICE

The data is based on a cylinder leakage value of 6 drops per minute. Since the hydraulic oil expands and contracts depending on temperature, the tolerance for the cylinder drift is up 7/10000 or 0.07 % for each temperature change of 1°C.

7.12 HYDRAULIC SYMBOLS

Table 7-20

Symbols	Name
	Filter
	Brake

Table 7-20 (continued)

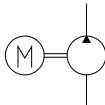
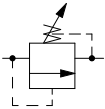
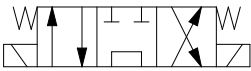
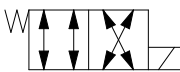
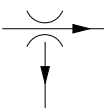
Symbols	Name
	Emergency power unit
	Hydraulic motor
	Pressure-relief valve
	3-position 4-way solenoid directional valve

Table 7-20 (continued)

Symbols	Name
	2-position 4-way solenoid directional valve
	Priority valve
	Check valve

7.13 HYDRAULIC SCHEMATIC DIAGRAM

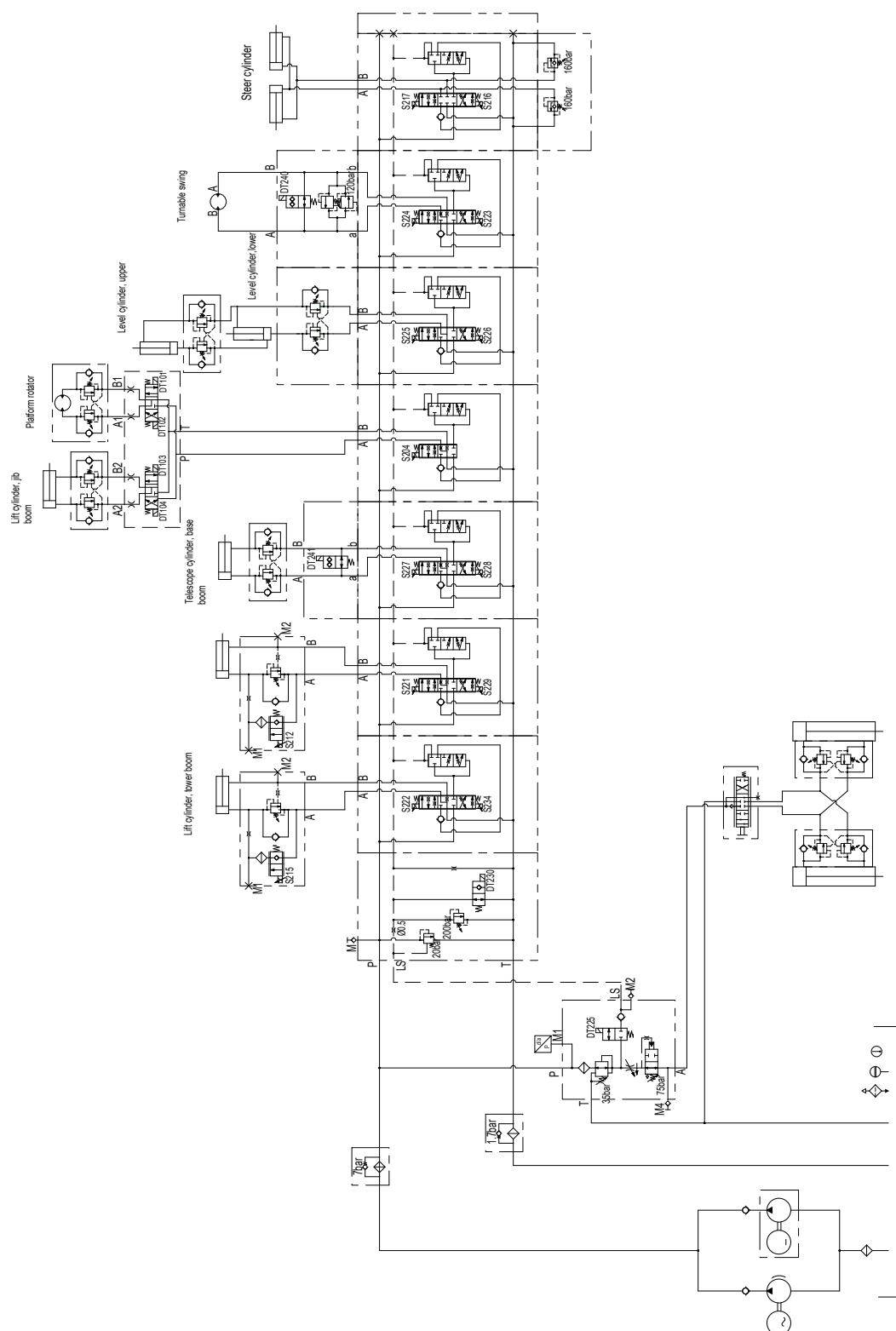


Fig. 20 Hydraulic Schematic Diagram

8 ELECTRICAL SYSTEM

The machine is powered by lead-acid or lithium batteries (for battery specifications, please refer to the **Machine Specifications**) to drive the travel motor and DC motor, enabling functions such as boom movements, turntable slewing, and travel steering. Additionally, it provides a 12V control power supply for the entire machine through a DC converter.

One 12V maintenance-free AGM battery is used to provide emergency power and auxiliary control power for the whole machine.

All power batteries are charged with external mains power through a charger. 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. Continued operation of the machine with damaged or corroded electrical components may lead to unsafe situations or severe injuries.

8.1 BATTERY MAINTENANCE

There are three types of batteries that may be used in this machine: Lead-acid battery, maintenance-free lead-acid battery, and lithium battery. The latter two types do not require maintenance.

Maintenance-free Lead-acid Battery

- Check cable connections and securing nuts for looseness monthly.
- Inspect the battery casing for bulging, leakage, or cracks quarterly.
- Clean terminals to prevent oxidation quarterly (use a baking soda solution, then apply petroleum jelly or anti-oxidation grease). Disconnect the battery before cleaning, and wear proper hand/face protection.
- Avoid storing the battery in a discharged state, as this will shorten its lifespan.

Maintenance-required Lead-acid Battery

Inspection

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

Daily maintenance

- Checking the battery level. The battery should be charged immediately after each discharge or if the SOC is less than 20 %.
- Check 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.
- Check and record the specific gravity of electrolyte and temperature of all battery cells after charging. 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 $\leq 30 \mu\text{S/cm}$.
- 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.

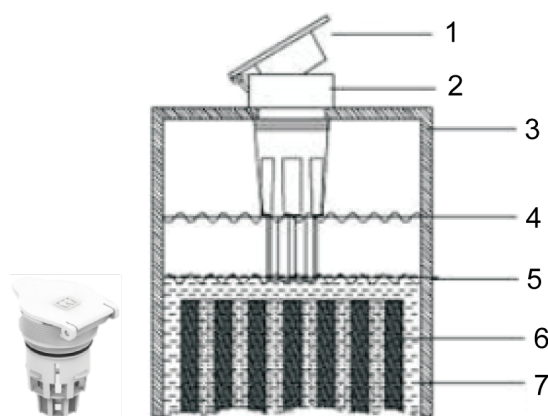


Fig. 1 Electrolyte level diagram

Table 8-1 Electrolyte Level Description

No.	Description
1	Flip-top cap
2	Filling plug

Table 8-1 Electrolyte Level Description (continued)

No.	Description
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)

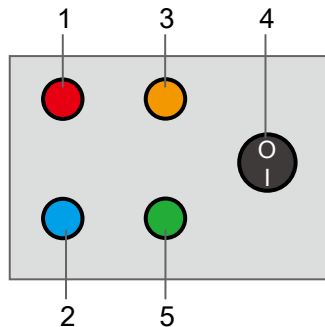


Fig. 2 Diagram of water refilling device panel

Table 8-2 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

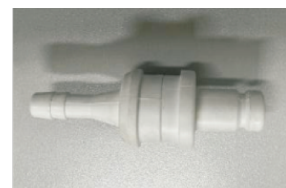
Table 8-2 Description of water refilling device panel (continued)

No.	Description
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 the water refilling device.
- When the water refilling device is fully charged, the saturation indicator (green) will light up. Please unplug the charging plug, and the water refilling device can continue to work.
- Position and status of the water refilling device switch:
 - “O”: the switch is in the "OFF" position (closed state).
 - “I”: the switch is in the "ON" position (open 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 abnormality 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.

A



B



C



Fig. 3 Diagram of male joint and female joint connection

Table 8-3 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 common diameters of male and female joints are 6mm and 100mm respectively. Ensure the male joint size, female joint size, and filling hose inner diameter are properly matched.

- 4. Set the switch #4 of water refilling device to the "ON" position to initiate automatic water refilling, and the operating indicator (orange) will illuminate steadily during the process.
- 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. To stop automatic filling, set switch #4 to the "OFF" position.



A

B

Fig. 5 Diagram of white buoy position

Table 8-4 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 $\geq 3\text{ m}$.



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.

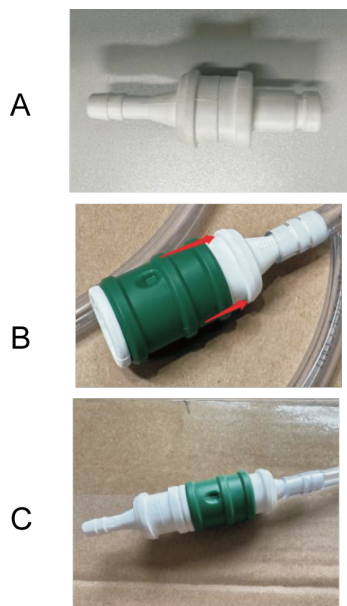


Fig. 7 Diagram of male joint and female joint connection

Table 8-5 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 common diameters of male and female joints are 6mm and 100mm respectively. Ensure the male joint size, female joint size, and filling hose inner diameter are properly matched.

- 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

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



Fig. 9 Diagram of white buoy position

Table 8-6 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.

- 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.
- The battery should be stored in a cool and dry environment (temperature 10°C–25°C/50–77°F, 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.

Storage

- Fully charge the battery before placing the machine into storage.

Table 8-7

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
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°C/90°F): 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°C/32°F): 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.

Lithium Battery

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

Daily maintenance

- Checking the battery level. The battery should be charged immediately after each discharge or if the SOC is less than 20 %.
- Charging operations must be supervised by professionals. During the charging process, ensure that the plug and socket are in good contact, that the charging equipment is functioning normally, and that all connection points of the battery pack are in good contact. If any abnormalities occur, they must be repaired before charging can proceed.
- Before charging and discharging, check the battery voltage, temperature, and pressure differences displayed on the BMS monitor to ensure that all values are within the normal range.

NOTICE

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

- If there is a significant amount of dust, metal shavings, or other debris on the battery pack cover and post, clean it promptly using compressed air; avoid using water or wet objects for cleaning.
- During charging and discharging, prevent water or other conductive objects from splashing onto the battery cover and post, such as when exposed to heavy rain.
- Estimate the required charging and discharging time based on the actual usage state of the battery or battery pack. Pay attention to any abnormalities in the battery or battery pack towards the end of the charging and discharging cycles, such as voltage differences.

Regular maintenance

- Check the voltage data on the BMS display against the actual battery voltage monthly to ensure the accuracy of the BMS voltage collection; if they do not match, calibration is necessary, with the difference between the collected voltage and the actual voltage not exceeding 5mV.
- Check the temperature collection data on the BMS against the actual temperature values monthly; the difference should not exceed 3°C to prevent the battery from being charged or discharged at excessively high or low temperatures.
- Check the current collection data on the BMS against the actual current values monthly; the difference should not exceed 1% to prevent the battery from being charged or discharged by overcurrent.
- Inspect the conductive band, voltage collection terminals, and other connections for looseness, detachment, rust, or deformation monthly to ensure the reliability of the series and parallel wiring harnesses used in the battery pack.
- Check for any cracks, deformation, loose post, or bulging in the battery case monthly.
- Verify the reliability of the charging equipment monthly, ensuring that it follows the voltage and current adjustment signals from the BMS to prevent overcharging.
- Check the discharge protection devices, such as high-speed fuses, DC contactors, relays, and air switches monthly, to ensure that the battery pack can be quickly disconnected from the main circuit in case of short circuits or over-currents.
- Test the communication and execution functions of high-voltage electrical equipment like motor controllers monthly to ensure that all high-voltage electrical equipment stop using power promptly when the BMS issues a cutoff signal to prevent over-discharging.
- Check the insulation resistance status between the battery pack and the machine body monthly to ensure that the resistance values meet Chinese national standards ($\geq 500\Omega/V$) to prevent any leakage.

8.2 CHANGE THE CHARGING CURVE

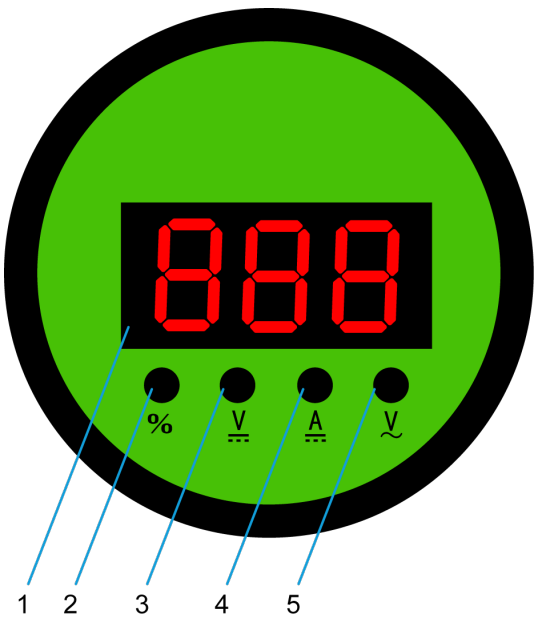


Fig. 10 Charge indicator

Table 8-8 Charge indicator description

No.	Name
1	Display screen
2	Battery charge indicator
3	Output voltage indicator
4	Output current indicator
5	Mains voltage indicator

Note: The charging curve of the charger for lithium batteries does not require any settings, so the following instructions apply to the charger for lead-acid batteries only.

1. Determine the corresponding charging curve code according to the material codes on the battery nameplate and charger nameplate (refer to the **Chart of Battery Charging Curve Codes** for details).
2. Prepare an empty USB drive (32GB or smaller) and copy the required charging curve upgrade file (provided by Sinoboom) to the root directory.
3. Ensure the charger power plug is disconnected from the mains supply, then insert the USB drive.
4. Connect the charger power plug to the mains supply. The charging indicator display will show **UPD**.

5. After the upgrade is complete, the charging indicator display will show **001**.
6. Remove the USB drive. The display characters will disappear, indicating the charging curve has been successfully updated.
7. Verify successful charging curve update:
 - 1) Disconnect from mains power.
 - 2) Reconnect to mains power.
 - 3) Check the output voltage indicator and output current indicator. When both indicators illuminate simultaneously, the display will show the current charging curve code.

Table 8-9 Chart of Battery Charging Curve Codes

Charger code (PN)	Battery code (PN)	Charging curve code
/	203100003083	276
/	203100003092	288
/	203100000017	b04
/	203100003019	009
203100003248	203100000094	264
	203100003120	176
	203100003262	177
	203100003265	b06
	203100003355	159
	203100003008	179
203100003159	203100000094	020
	203100003128	001
	203100003000	002
	203100003120	003
	203100003355	021
	203100003008	006
203100003244	203100003000	007
	203100003008	008
	203100003128	013
	203100003120	012
203100003243	203100003000	007
	203100003008	008
	203100003128	013
	203100003120	012
203100003290	203100000094	020
	203100003128	001

Table 8-9 Chart of Battery Charging Curve Codes (continued)

Charger code (PN)	Battery code (PN)	Charging curve code
	203100003000	002
	203100003120	003
	203100003008	006
	203100003288	019

8.3 ELECTRICAL SYMBOLS

Table 8-10

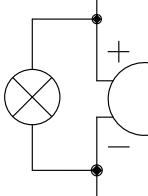
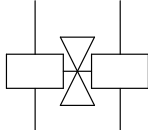
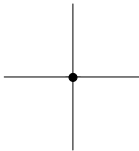
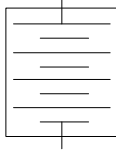
Symbols	Description
	Buzzer
	Valve
	Two lines, connected
	Electric motor
	Storage battery

Table 8-10 (continued)

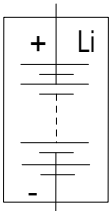
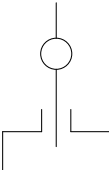
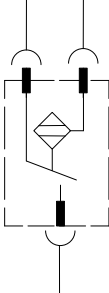
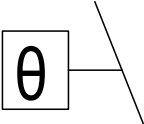
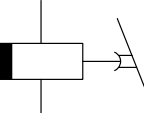
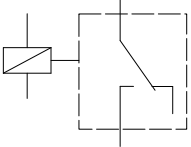
Symbols	Description
	Lithium battery
	Toggle switch
	Level switch
	Oil temperature switch
	Delay relay
	Power-off switch
	Relay

Table 8-10 (continued)

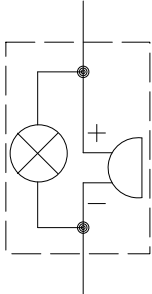
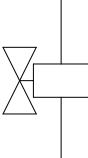
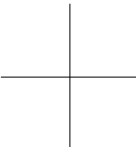
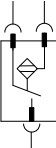
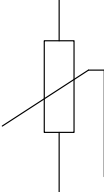
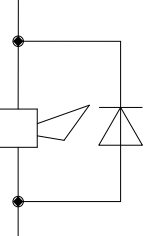
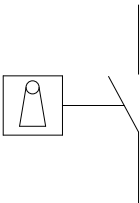
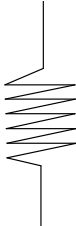
Symbols	Description
	Warning light
	Valve
	Two lines, not connected
	Proximity switch pressure sensor
	Fuel level sensor
	Horn

Table 8-10 (continued)

Symbols	Description
	Key switch
	Preheating wire

8.4 ELECTRICAL SCHEMATIC
DIAGRAM

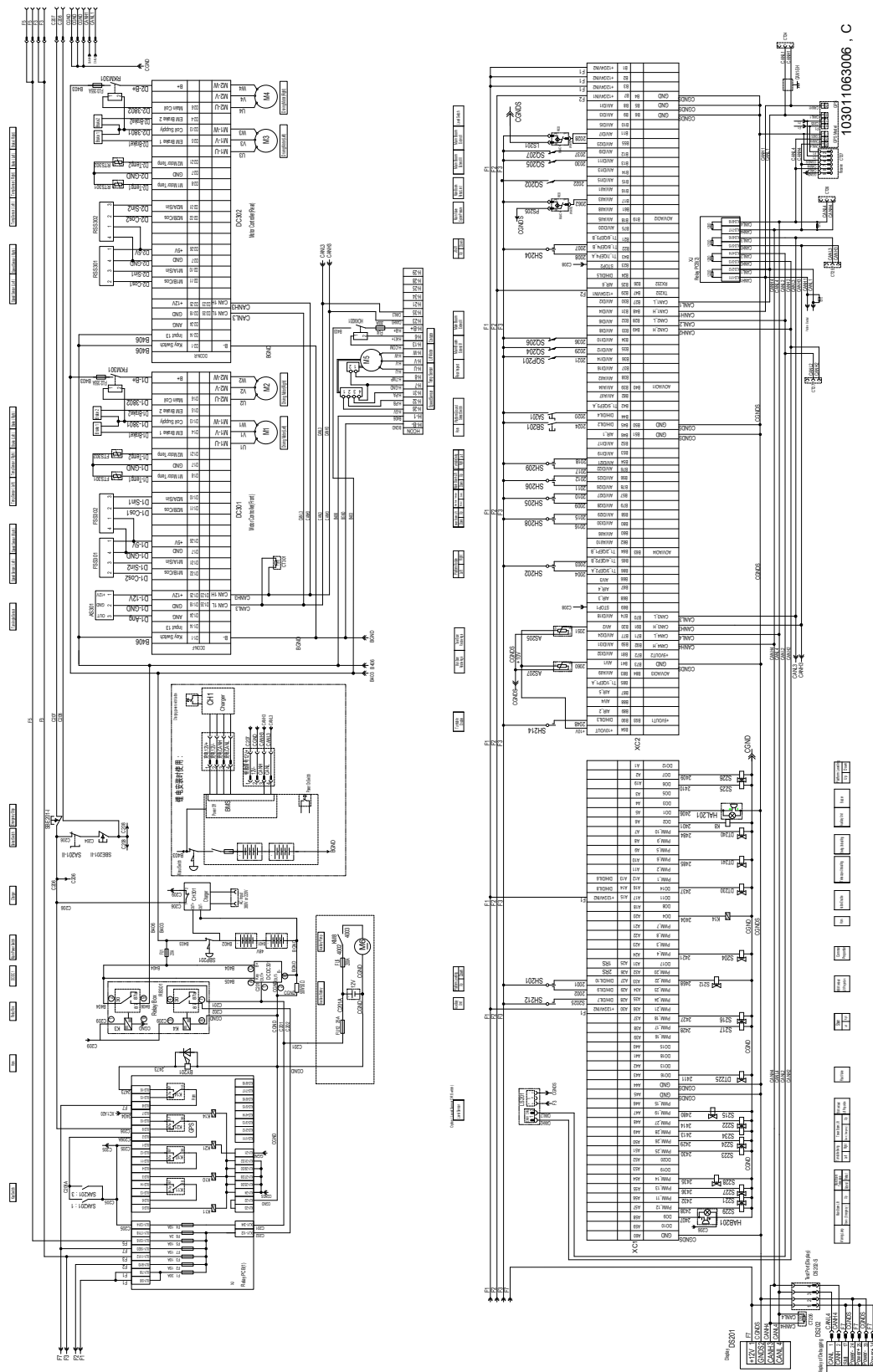


Fig. 11 Electrical Schematic Diagram – Turntable (HX)

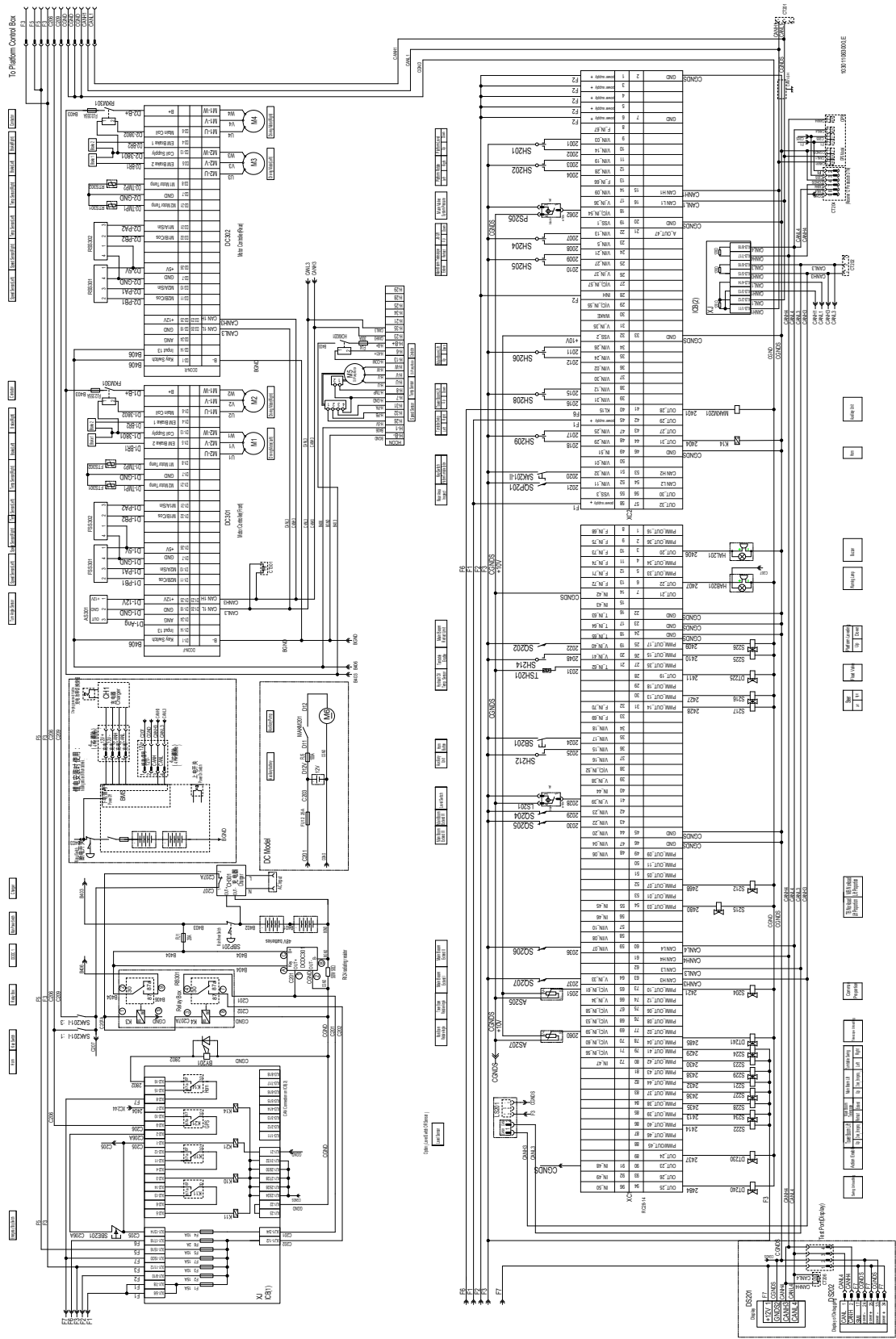


Fig. 12 Electrical Schematic Diagram – Turntable (Rex)

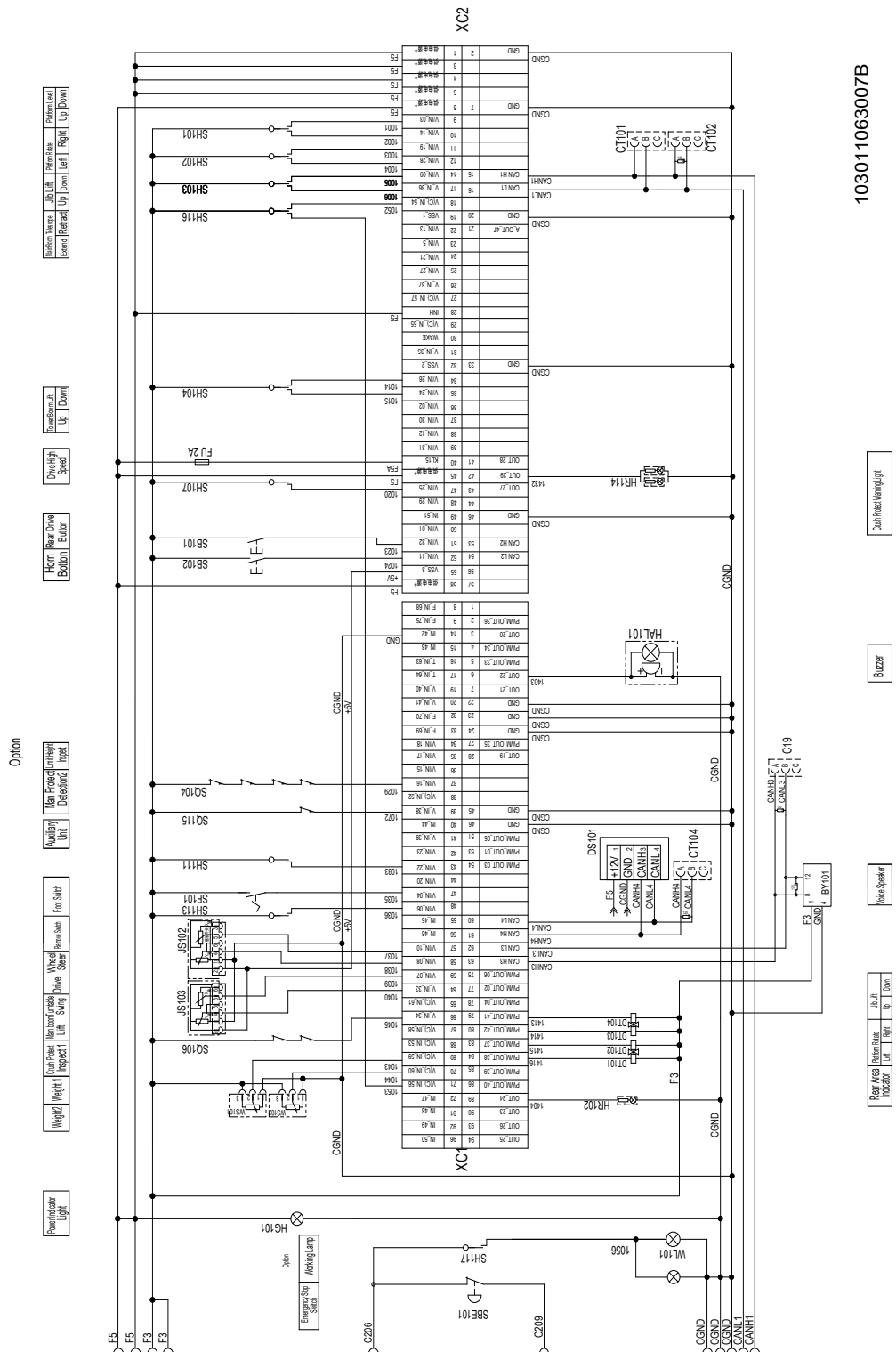


Fig. 13 Electrical Schematic Diagram – Platform (Rex)

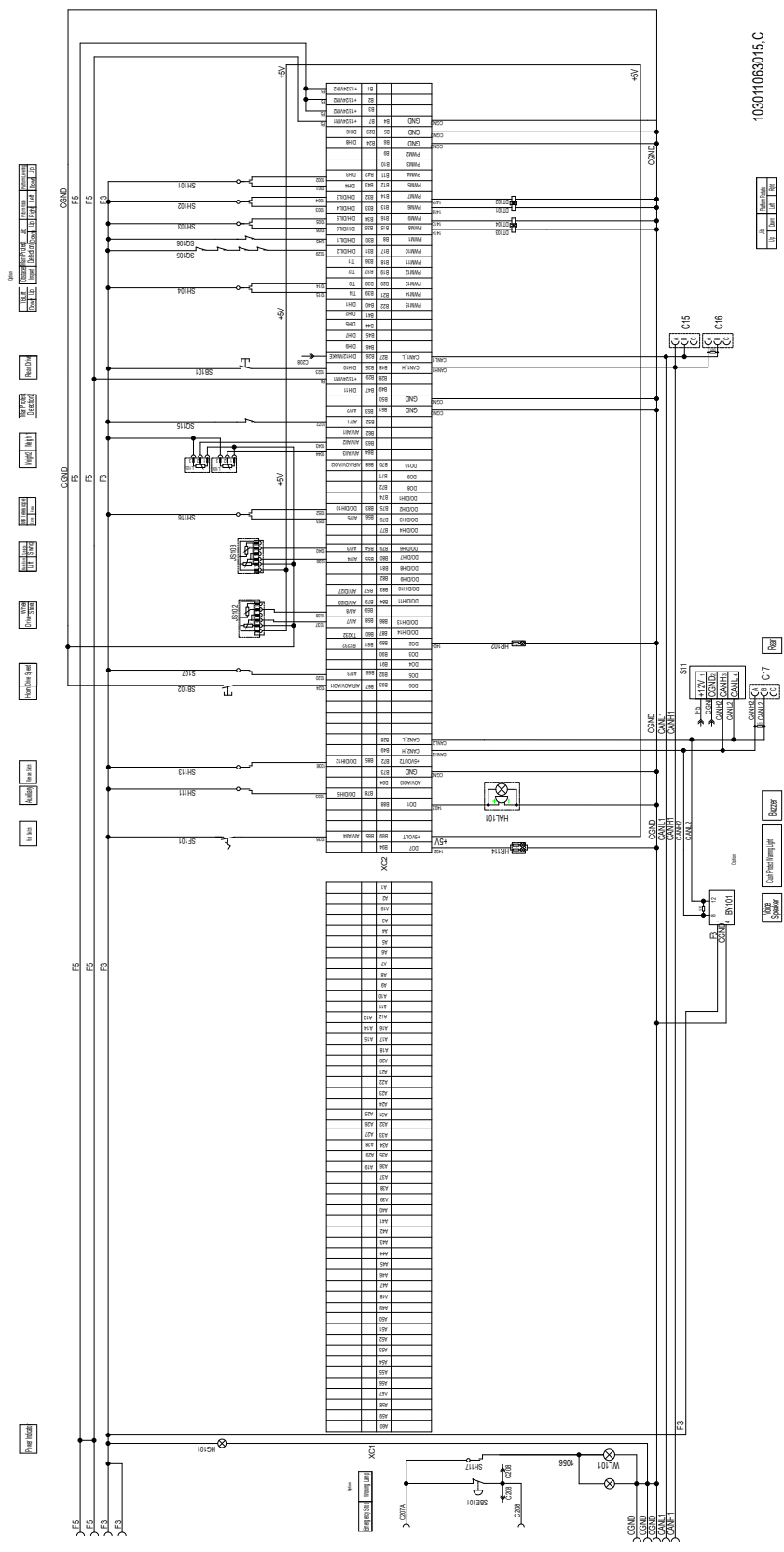


Fig. 14 Electrical Schematic Diagram – Platform (HX)

9 TROUBLESHOOTING GUIDE

9.1 CHARGING FAULTS AND SOLUTIONS

In case of charging faults, all four indicator lights of the charger will illuminate.

Table 9-1 Charging Faults and Solutions

Fault code	Cause	Solution
E00	Abnormal CAN communication	1. Check whether the CAN wiring is normal; 2. Test if 12V activation voltage is normal. 3. Check if the correct charging curve has been selected; select the correct charging curve and then charge the battery.
E01	Battery voltage undetected/battery reversely connected	1. Check whether the battery terminals are locked properly; 2. Check if the battery is in normal condition. 3. Check whether the battery has correct wiring sequence.
E02	Abnormal mains voltage	1. Detect the AC input voltage; 2. Check whether the AC wiring is normal.
E03	Charger over-temperature cutoff	1. The power supply temperature or ambient temperature is too high, leading to power supply disconnecting, and the overheat protection mode is activated. Put the power supply in a well-ventilated environment. 2. Disconnect the power source, and reconnect the AC power supply after 15 - 30 mins.
E04	Charger over-temperature protection	When the battery temperature exceeds the preset value, the power supply will stop output to prevent battery damage due to overtemperature; after the battery temperature drops, the power supply will charge the battery automatically.
E05	Output overcurrent	1. Disconnect and reconnect AC power supply, and check whether the fault is cleared; 2. Check the battery for damage.
E06	Battery overvoltage	1. Disconnect and reconnect AC power supply, and check whether the fault is cleared; 2. Check the battery for damage.
E07	Charger fan fault	1. Check whether the fan is blocked by any foreign matter. 2. Check whether the fan terminals have poor contact.
E08	Charger charging curve error	Select the correct curve.

Table 9-1 Charging Faults and Solutions (continued)

Fault code	Cause	Solution
E09	Main contactor fault	Disconnect and reconnect AC power supply, and check whether the fault is cleared.
E10	Output overvoltage cutoff	Disconnect and reconnect AC power supply, and check whether the fault is cleared.
E11	Low temperature protection for battery	Charging protection has been triggered by low temperature, it's necessary to stop charging and disconnect the AC plug cable, and after the ambient temperature rises, reconnect the power supply and the fault will be cleared.

9.2 FAULT CODES DESCRIPTION

Machine Fault Codes

In case of failure, query the fault code on the fault inquiry interface of the turntable control box.

Table 9-2 Description of Machine Fault Codes

Fault code	Fault description	Inspection method
01	Platform communication fault	Communication anomaly between the platform controller and the turntable controller: Check the signal lines between the platform controller and the turntable controller, and check the power supply.
02	Drive controller communication fault	Communication anomaly between the travel controller and the turntable controller: Check the signal lines between the turntable controller and drive controller, and check the power supply.
03	Turntable Tilt Alarm	Check whether the machine tilt angle has exceeded the maximum allowable inclination (see Machine Specifications), and check the wiring harness.
04	Overload alarm	Check whether the platform load exceeds the rated load, and whether the weighing sensor has been calibrated normally
05	Weighing sensor fault	Check the weighing sensor and its wiring harness for proper function.
06	Drive Joystick Fault	Check the travel joystick data, and check the CAN communication between the turntable and platform
07	Steer Joystick Fault	Check the steer joystick data, and check the CAN communication between the turntable and platform
08	MB Lift Joystick Fault	Check the main boom lift joystick data, and check the CAN communication between the turntable and platform
09	Slew joystick error	Check the slew joystick data, and check the CAN communication between the turntable and platform
10	Telescope joystick error	Check the telescope joystick data, and check the CAN communication between the turntable and platform
11	Jib rotate joystick error	Check the jib rotate joystick data, and check the CAN communication between the turntable and platform
12	Hydraulic system pressure sensor error	Check the hydraulic system pressure sensor and its wiring harness for proper function

Table 9-2 Description of Machine Fault Codes (continued)

Fault code	Fault description	Inspection method
13	Level switch fault	Check the level switch and its wiring harness for proper function
14	Lift controller communication fault	Check the signal lines between platform controller and drive controller, and check the power supply.
15	Footswitch or enable switch 7-second limit alarm	Check the foot switch or enable switch for proper function.
16	Obstacle Inspect Alarm	Check the obstacle detection switch and its wiring harness for proper function
17	Travel Controller Error Alarm	Check the drive controller for errors.
18	Lift Controller Error Alarm	Check the lift controller for errors.
19	Heavy Load Warning	Check the platform load and the actual measurement of the sensor's AD value, check the wiring harness, and check whether the weighing sensor has been correctly calibrated
20	Scope Alarm	Check the boom position and the actual measurement of the sensor's AD value, and check the wiring harness
21	Broken rope alarm	Check the boom wire ropes and the wiring of the proximity switch, and check the harness
22	Weighing sensor comparison error	Check the actual value and AD value of weighing sensor 1 and 2, and check the harness
23	Platform tilt alarm	Check whether the platform tilt angle exceeds the limit.
24	Electromagnetic Clutch Fault	Check the solenoid clutch for proper operation and check the wiring harness.
25	Turntable slew (left) solenoid valve error	Check the wiring of the turntable slew (left) solenoid valve, and check the solenoid valve
26	Turntable slew (right) solenoid valve fault	Check the wiring of the turntable slew (right) solenoid valve, and check the solenoid valve
27	Main boom extension solenoid valve fault	Check the wiring of the main boom extension solenoid valve, and check the solenoid valve
28	Main boom retraction solenoid valve fault	Check the wiring of the main boom retraction solenoid valve, and check the solenoid valve
29	Main boom lift solenoid valve fault	Check the wiring of the main boom lift solenoid valve, and check the solenoid valve
30	Main boom lower solenoid valve fault	Check the wiring of the main boom lower solenoid valve, and check the solenoid valve
31	Articulating boom lift solenoid valve fault	Check the wiring of the articulating boom lift solenoid valve, and check the solenoid valve
32	Articulating boom lower solenoid valve fault	Check the wiring of the articulating boom lower solenoid valve, and check the solenoid valve
33	Steer left solenoid valve fault	Check the wiring of the solenoid valve for left steer, and check the solenoid valve
34	Steer right solenoid valve fault	Check the wiring of the solenoid valve for right steer, and check the solenoid valve
35	Platform swing left solenoid valve fault	Check the wiring of the solenoid valve for left platform swing, and check the solenoid valve

Table 9-2 Description of Machine Fault Codes (continued)

Fault code	Fault description	Inspection method
36	Platform swing right solenoid valve fault	Check the wiring of the solenoid valve for right platform swing, and check the solenoid valve
37	Platform level up solenoid valve fault	Check the wiring of the solenoid valve for platform leveling up, and check the solenoid valve
38	Platform level down solenoid valve fault	Check the wiring of the solenoid valve for platform leveling down, and check the solenoid valve
39	Jib up solenoid valve fault	Check the wiring of the jib up solenoid valve, and check the solenoid valve
40	Jib down solenoid valve fault	Check the wiring of jib down solenoid valve, and check the solenoid valve
41	Function enable valve fault	Check the wiring of the function enable valve, and check the valve
42	Main boom anti-drop valve fault	Check the wiring of the main boom anti-drop valve, and check the valve
43	Drive enable valve fault	Check the wiring of the drive enable valve, and check the valve
44	Brake valve fault	Check the wiring of the brake valve, and check the valve
45	Slew enable valve fault	Check the wiring of the slewing enable valve, and check the valve
46	Front pump unloading valve fault	Check the wiring of the front pump unloading valve, and check the valve
47	Rear pump unloading valve fault	Check the wiring of the rear pump unloading valve, and check the valve
48	Electro-proportional relief valve fault	Check the wiring of the electro-proportional relief valve, and check the valve
49	Articulating boom angle sensor comparison error	Check whether the articulating boom angle sensor is correctly installed
50	Articulating boom angle sensor fault	Check the wiring of the articulating boom angle sensor
51	Main boom angle sensor comparison error	Check whether the main boom angle sensor is correctly installed
52	Main boom angle sensor fault	Check the wiring of the main boom angle sensor
53	Articulating boom relative angle sensor comparison error	Check whether the articulating boom relative angle sensor is correctly installed
54	Articulating boom relative angle sensor fault	Check the wiring of the articulating boom relative angle sensor, and check the solenoid valve
55	Main boom relative angle sensor comparison error	Check whether the main boom relative angle sensor is correctly installed
56	Main boom relative angle sensor fault	Check the wiring of the main boom relative angle sensor, and check the sensor
57	Low Battery Level Alarm	Check the battery voltage, and check whether the battery has been damaged
58	Front Right Steering Sensor Failure	Check whether the wiring of the front right steering sensor is normal and whether the sensor is abnormal.

Table 9-2 Description of Machine Fault Codes (continued)

Fault code	Fault description	Inspection method
59	Clutch engagement fault	Check whether the clutch can be properly engaged or the sensor is correctly wired
60	Low fuel level alarm	Check whether the fuel level is too low and if the sensor is correctly wired, and check the sensor for proper function
61	Operator Protection Alarm	Check if the operator protection function is activated, whether the wiring of the operator protection limit switch is normal, and whether the limit switch is faulty.
62	Main Boom Extension Limit Switch I/II Fault	Check whether the wiring of the main boom extension limit switch I/II is normal and whether the limit switch is faulty.
63	Main Boom Extension Limit Switch III/IV Fault	Check whether the wiring of the main boom extension limit switch III/IV is normal and whether the limit switch is faulty.
64	Pothole Protection Plate Fault	Check whether the wiring of the pothole protection limit switch is normal and whether the limit switch is faulty.
65	T-Box Communication Fault	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.
66	Emergency stop switch disengaged	Check whether the emergency stop switch is disengaged and whether the wiring is normal.

Motor Controller Fault Codes

Check the nameplate on the electric motor controller; if the supplier code (SC) is 1000182, 1000688 or 1000724, the following electric motor controller fault codes apply.

Table 9-3 General Fault Codes of the Motor Controller

Fault code	Description	Cause	Solution
0012	Overcurrent of pump motor	1. Encoder fault or circuit interference; 2. Motor UVW short-circuited; 3. Mismatched motor parameters; 4. Controller fault.	1. Check the motor UVW 3-phase cable for short circuit or damage, check the controller UVW 3-phase cable for damage using a multimeter; 2. Monitor the controller current under full load, recalibrate the motor if necessary; 3. If no problem can be identified carrying out the above checks, replace the controller.
0112	Overcurrent of FL motor controller		
0212	Overcurrent of FR motor controller		
0312	Overcurrent of RL motor controller		
0412	Overcurrent of RR motor controller		
0013	Current sensor fault of pump motor controller	1. Motor UVW short-circuited; 2. Failure of the controller's current sensor.	1. Check the UVW 3-phase cable for short circuit or current leakage; 2. If no problem can be identified carrying out the above checks, replace the controller.
0113	Current sensor fault of FL motor controller		
0213	Current sensor fault of FR motor controller		
0313	Current sensor fault of RL motor controller		

Table 9-3 General Fault Codes of the Motor Controller (continued)

Fault code	Description	Cause	Solution
0413	Current sensor fault of RR motor controller		
0014	Pre-charging fault of pump motor controller	1. Voltage drop due to loads connected to the B+ circuit; 2. Controller damaged.	1. Check whether other high-power loads are connected to the controller's B+ circuit; 2. Check the KSI wiring, and measure the voltage using a multimeter to check for abnormal conditions; 3. If no problem can be identified carrying out the above checks, replace the controller.
0114	Pre-charging fault of FL motor controller		
0214	Pre-charging fault of FR motor controller		
0314	Pre-charging fault of RL motor controller		
0414	Pre-charging fault of RR motor controller		
0015	Low temperature of pump motor controller	The controller operates at ambient temperatures below -40 °C.	1. 1. Raise the ambient temperature above -40 °C, power up the machine and test the operation again; 2. If no problem can be identified carrying out the above checks, replace the controller.
0115	Low temperature of FL motor controller		
0215	Low temperature of FR motor controller		
0315	Low temperature of RL motor controller		
0415	Low temperature of RR motor controller		
0016	High temperature of pump motor controller	1. Controller temperature above 95°C; 2. Machine overloaded and motor issue; 3. Controller damaged.	1. Check the controller's heat dissipation devices; 2. Monitor the operating current of the controller (monitor/controller menu/current), recalibrate the motor if the current is too high, reset the inflection point and slip value, properly restrict the current if needed. 3. If no problem can be identified carrying out the above checks, replace the controller.
0116	High temperature of FL motor controller		
0216	High temperature of FR motor controller		
0316	High temperature of RL motor controller		
0416	High temperature of RR motor controller		
0017	Severe undervoltage of pump motor controller	1. Battery parameter set-up error; 2. Excessive battery resistance; 3. Damaged fuse; 4. Damaged main contactor.	1. Measure the battery voltage and the voltage of the KSI and B+ circuits with a multimeter; 2. Check the fuse and contactor; 3. Check the battery system voltage (program/battery menu nominal voltage) and (user undervoltage) undervoltage setting. 4. If the drive controller fails (main contactor not engaged) the pump controller will report fault 1.7.
0117	Severe undervoltage of FL motor controller		
0217	Severe undervoltage of FR motor controller		
0317	Severe undervoltage of RL motor controller		
0417	Severe undervoltage of RR motor controller		
0018	Severe overvoltage of pump motor controller	1. Battery parameter set-up error;	1. Check the battery with a multimeter for proper voltage; 2. Check the fuse and contactor;

Table 9-3 General Fault Codes of the Motor Controller (continued)

Fault code	Description	Cause	Solution
0118	Severe overvoltage of FL motor controller	- Excessive battery resistance; - Battery disconnected when regenerative brake engages.	- Check the battery system voltage (program/battery menu nominal voltage) and (user undervoltage) undervoltage setting. - Check the regenerative brake current limit setting (program/current limits menu regen current limit).
0218	Severe overvoltage of FR motor controller		
0318	Severe overvoltage of RL motor controller		
0418	Severe overvoltage of RR motor controller		
0021	Declined battery current of pump motor controller	Battery current attenuation activated.	The power generation current limit value sent by the host computer is less than the actual value.
0121	Declined battery current of FL motor controller		
0221	Declined battery current of FR motor controller		
0321	Declined battery current of RL motor controller		
0421	Declined battery current of RR motor controller		
0022	Reduced over-temperature performance of pump motor controller	The controller operates in a hot environment with the radiator blade temperature exceeding 85°C	- Use the machine under normal operating conditions to increase the cooling effect for the controller. - Once the ambient temperature is normal check the controller current. Excessively high controller current may cause an abrupt rise in temperature.
0122	Reduced over-temperature performance of the FL motor controller		
0222	Reduced over-temperature performance of the FR motor controller		
0322	Reduced over-temperature performance of the RL motor controller		
0422	Reduced over-temperature performance of the RR motor controller		
0023	Reduced undervoltage performance of pump motor controller	- Low battery level; - Battery parameter set-up error; - Battery aging.	- Check the battery with a multimeter for proper voltage; - Check the fuse and contactor; - Check the battery system voltage (program/battery menu nominal voltage) and (user undervoltage) undervoltage setting.
0123	Reduced undervoltage performance of the FL motor controller		
0223	Reduced undervoltage performance of the FR motor controller		
0323	Reduced undervoltage performance of the RL motor controller		
0423	Reduced undervoltage performance of the RR motor controller		

Table 9-3 General Fault Codes of the Motor Controller (continued)

Fault code	Description	Cause	Solution
0024	Reduced overvoltage performance of the pump motor controller	1. Battery parameter set-up error; 2. Regenerative brake current results in voltage rise.	1. Check the battery with a multimeter for proper voltage; 2. Check the fuse and contactor; 3. Check the battery system voltage (program/battery menu nominal voltage) and (user undervoltage) undervoltage setting. 4. Check the regenerative brake current limit setting (program/current limits menu regen current limit).
0124	Reduced overvoltage performance of the FL motor controller		
0224	Reduced overvoltage performance of the FR motor controller		
0324	Reduced overvoltage performance of the RL motor controller		
0424	Reduced overvoltage performance of the RR motor controller		
0025	Invalid 5 V internal power supply of pump motor controller	Malfunction of externally connected device	1. Check the externally connected device for damage; 2. Check the device (monitor/outputs menu/5 Volts) using a handheld unit; 3. Disconnect externally connected 5V devices. If the fault persists replace the external devices. Notes: Pin #26 of the 35-pin controller connector is for 5V output.
0125	Invalid 5 V internal power supply of FL motor controller		
0225	Invalid 5 V internal power supply of FR motor controller		
0325	Invalid 5 V internal power supply of RL motor controller		
0425	Invalid 5 V internal power supply of RR motor controller		
0026	Driver 6 output error of pump motor controller	Malfunction of externally connected device	1. Using a handheld unit monitor the output (monitor/digital out6) to check the driver 6 signal output percentage; 2. Check the driver 6 device for malfunctions, correct wiring, and whether the current exceeds 1A. Note: Pin #19 of the 35-pin controller connector is for driver 6 output.
0126	Driver 6 output error of FL motor controller		
0226	Driver 6 output error of FR motor controller		
0326	Driver 6 output error of RL motor controller		
0426	Driver 6 output error of RR motor controller		
0027	Driver 7 output overcurrent of pump motor controller	Malfunction of externally connected device	1. Using a handheld unit monitor the output (monitor/digital out7) to check the driver 7 signal output percentage; 2. Check the driver 7 device for malfunctions, correct wiring, and whether the current exceeds 1A. Notes: Pin #20 of the 35-pin controller connector is for driver 7 output.
0127	Driver 7 output overcurrent of FL motor controller		
0227	Driver 7 output overcurrent of FR motor controller		
0327	Driver 7 output overcurrent of RL motor controller		

Table 9-3 General Fault Codes of the Motor Controller (continued)

Fault code	Description	Cause	Solution
0427	Driver 7 output overcurrent of RR motor controller		
0028	Reduced overheat performance of pump motor controller	1. Motor temperature reaching the preset limit; 2. Improper motor temperature setup.	1. Check the motor temperature sensor for damage; 2. Check the overheat performance attenuation value setup (program/motor menu/temperature control temperature hot) for errors; 3. Monitor the machine operating current to determine whether the overheat results from an excessively high current, recalibrate the motor if necessary. Notes: The pins #7 and #8 of the 35-pin controller connector are for the motor temperature sensor.
0128	Reduced overheat performance of FL motor controller		
0228	Reduced overheat performance of FR motor controller		
0328	Reduced overheat performance of RL motor controller		
0428	Reduced overheat performance of RR motor controller		
0029	Temperature sensor fault of pump motor controller	1. Motor temperature sensor fault; 2. Motor temperature sensor type setup error.	1. Check the wiring of the motor temperature sensor; 2. Check the setup of motor temperature sensor (program/motor menu/temperature control sensor type). 3. Replace the motor temperature sensor. Notes: The pins #7 and #8 of the 35-pin controller connector are for the motor temperature sensor.
0129	Temperature sensor fault of FL motor controller		
0229	Temperature sensor fault of FR motor controller		
0329	Temperature sensor fault of RL motor controller		
0429	Temperature sensor fault of RR motor controller		
0031	Open/short-circuited driver 1 output or open/short-circuited main contactor of pump motor controller	1. Driver 1 wiring fault; 2. Pre-charge fault; 3. Contactor fault.	1. Check if the wiring is correct and check whether pins are stained or damaged; 2. Monitor the output signal (monitor menu/outputs menu/Driver 1 PWM) to check whether there is an output control signal; 3. Check the coil of the contactor; 4. Replace the contactor. Notes: Pin #6 of the 35-pin controller connector is for driver 1 output.
0131	Open/short-circuited driver 1 output or open/short-circuited main contactor of the FL motor controller		
0231	Open/short-circuited driver 1 output or open/short-circuited main contactor of the FR motor controller		
0331	Open/short-circuited driver 1 output or open/short-circuited main contactor of the RL motor controller		
0431	Open/short-circuited driver 1 output or open/short-circuited main contactor of the RR motor controller		

Table 9-3 General Fault Codes of the Motor Controller (continued)

Fault code	Description	Cause	Solution
0032	Open/short-circuited driver 2 of the pump motor controller	1. Driver 2 wiring fault; 2. Pre-charge fault; 3. Contactor fault.	1. Check if the wiring is correct and check whether pins are stained or damaged; 2. Monitor the output signal (monitor menu/ outputs menu/Driver 2 PWM) to check whether there is an output control signal; 3. Check the coil of the contactor; 4. Replace the contactor. Notes: The pin #5 of the 35-pin controller connector is for driver 2 output.
0132	Open/short-circuited driver 2 of the FL motor controller		
0232	Open/short-circuited driver 2 of the FR motor controller		
0332	Open/short-circuited driver 2 of the LR motor controller		
0432	Open/short-circuited driver 2 of the RR motor controller		
0033	Open/short-circuited solenoid brake/coil 3 output of pump motor controller	1. Open/short circuited coil of solenoid brake; 2. Stained/damaged/broken wiring.	1. Check if the wiring is correct and check whether pins are stained or damaged; 2. Monitor the output signal (monitor menu/ outputs menu/Driver 3 PWM) to check whether there is an output control signal; 3. Check the coil of the contactor; 4. Replace the solenoid brake. Notes: The pin #4 of the 35-pin controller connector is for driver 3 output.
0133	Open/short-circuited solenoid brake/coil 3 output of FL motor controller		
0233	Open/short-circuited solenoid brake/coil 3 output of FR motor controller		
0333	Open/short-circuited solenoid brake/coil 3 output of RL motor controller		
0433	Open/short-circuited solenoid brake/coil 3 output of RR motor controller		
0034	Open/short-circuited coil 4 output of the pump motor controller	1. Open/short-circuited coil 4; 2. Stained/damaged/broken wiring.	1. Check if the wiring is correct and check whether pins are stained or damaged; 2. Monitor the output signal (monitor menu/ outputs menu/Driver 4 PWM) to check whether there is an output control signal; 3. Check the driver coil.
0134	Open/short-circuited coil 4 output of FL motor controller		
0234	Open/short-circuited coil 4 output of FR motor controller		
0334	Open/short-circuited coil 4 output of RL motor controller		
0434	Open/short-circuited coil 4 output of RR motor controller		
0035	Proportional drive error of pump motor controller	1. Open/short-circuited loading device; 2. Stained/damaged/broken wiring; 3. Improper wiring.	1. Check if the wiring is correct and check whether pins are stained or damaged; 2. Monitor the output signal "monitor menu/ outputs menu/PD PWM" to check whether there is an output control signal; 3. Check the loading devices, such as the driver coil, for damage.
0135	Proportional drive error of FL motor controller		
0235	Proportional drive error of FR motor controller		
0335	Proportional drive error of RL motor controller		

Table 9-3 General Fault Codes of the Motor Controller (continued)

Fault code	Description	Cause	Solution
0435	Proportional drive error of RR motor controller		
0036	Encoder error of pump motor controller	1. Encoder power supply failure; 2. Damaged encoder; 3. Improper wiring.	1. Check the encoder power supply; 2. Check the pulse count setting of the encoder (program/motor menu/encoder steps); 3. Check the encoder feedback speed signals (monitor/motor menu/motor speed A/B); 4. If the above checks fail to identify the problem replace the motor. Notes: Pins #31 and #32 of the 35-pin controller connector are for the encoder AB phase output signals.
0136	Encoder error of FL motor controller		
0236	Encoder error of FR motor controller		
0336	Encoder error of RL motor controller		
0436	Encoder error of RR motor controller		
0037	Open-circuited pump motor controller	1. Missing phase in motor; 2. Improper wiring; 3. Controller damaged.	1. Make sure UVW 3-phase wiring is not open-circuited; 2. Use a multimeter to check whether the UVW power module works properly; 3. If no problem can be identified applying the above checks, replace the motor.
0137	Open-circuited FL motor controller		
0237	Open-circuited FR motor controller		
0337	Open-circuited RL motor controller		
0437	Open-circuited RR motor controller		
0038	Fused main contactor of the pump motor controller	1. Fused contact of the main contactor; 2. Improper wiring.	1. Check the main contactor for fused contact; 2. Measure the coil voltage for abnormality; 3. Check for correct wiring; 4. If the motor is missing a phase check if the UV phase of the motor is disconnected.
0138	Fused main contactor of FL motor controller		
0238	Fused main contactor of FR motor controller		
0338	Fused main contactor of RL motor controller		
0438	Fused main contactor of RR motor controller		
0039	Main contactor engaging failure of pump motor controller	1. Large voltage drop in KSI voltage and battery voltage; 2. An high-power component is connected in series in the KSI circuit, causing the voltage drop; 3. Contactor damaged.	1. Monitor KSI and capacitor voltage using handheld unit: monitor/outputs menu capacitor voltage: Capacitor voltage; key-switch voltage: Keyswitch voltage; ensure that the difference between the two is less than the set value of program/main contactor/main DNC threshold 2. Check whether a high-power component is connected in the KSI circuit, which causes the voltage drop; 3. Replace the contactor to check if it is damaged.
0139	Main contactor engaging failure of FL motor controller		
0239	Main contactor engaging failure of FR motor controller		
0339	Main contactor engaging failure of RL motor controller		
0439	Main contactor engaging failure of RR motor controller		

Table 9-3 General Fault Codes of the Motor Controller (continued)

Fault code	Description	Cause	Solution
0041	High voltage at slider end of accelerator of pump motor controller	1. Accelerator wiring disconnected; 2. Excessively high output voltage at slider end of accelerator.	Measure the output voltage at the slider end of the accelerator to check if it is too high, replace the accelerator if necessary. Notes: Pin #16 of the 35-pin controller connector is for the accelerator slider end input.
0141	High voltage at slider end of accelerator of FL motor controller		
0241	High voltage at slider end of accelerator of FR motor controller		
0341	High voltage at slider end of accelerator of RL motor controller		
0441	High voltage at slider end of accelerator of RR motor controller		
0042	Low voltage at slider end of accelerator of pump motor controller	Output voltage at the slider end of the accelerator too low.	Measure the output voltage at the slider end of the accelerator to check if it is too low, replace the accelerator if necessary. Note: Pin #16 of the 35-pin controller connector is for the accelerator slider end input.
0142	Low voltage at slider end of accelerator of FL motor controller		
0242	Low voltage at slider end of accelerator of FR motor controller		
0342	Low voltage at slider end of accelerator of RL motor controller		
0442	Low voltage at slider end of accelerator of RR motor controller		
0043	High voltage at the slider end of pot2 of pump motor controller	Excessively high output voltage at the slider end of pot2.	Measure the voltage at the slider end of pot2, replace if necessary. Note: Pin #17 of the 35-pin controller connector is for the pot2 slider end input.
0143	High voltage at the slider end of pot2 of FL motor controller		
0243	High voltage at the slider end of pot2 of FR motor controller		
0343	High voltage at the slider end of pot2 of RL motor controller		
0443	High voltage at the slider end of pot2 of RR motor controller		
0044	Low voltage at the slider end of pot2 of pump motor controller	Output voltage at the slider end of pot2 to low.	Measure the voltage at the slider end of pot2, replace if necessary. Note: Pin #17 of the 35-pin controller connector is for the pot2 slider end input.

Table 9-3 General Fault Codes of the Motor Controller (continued)

Fault code	Description	Cause	Solution
0144	Low voltage at the slider end of pot2 of FL motor controller		
0244	Low voltage at the slider end of pot2 of FR motor controller		
0344	Low voltage at the slider end of pot2 of RL motor controller		
0444	Low voltage at the slider end of pot2 of RR motor controller		
0045	Pot-low overcurrent of pump motor controller	Potentiometer resistance too low	Potentiometer low-end overcurrent. Replace if necessary.
0145	Pot-low overcurrent of FL motor controller		
0245	Pot-low overcurrent of FR motor controller		
0345	Pot-low overcurrent of RL motor controller		
0445	Pot-low overcurrent of RR motor controller		
0046	Invalid EEPROM of pump motor controller	- Software error; - Controller fault.	- Download the correct software version; - Replace the controller.
0146	Invalid EEPROM of FL motor controller		
0246	Invalid EEPROM of FR motor controller		
0346	Invalid EEPROM of RL motor controller		
0446	Invalid EEPROM of RR motor controller		
0047	Operation sequence error of pump motor controller	- Input sequence error of key switch, interlock switch, directional switch and accelerator; - Failure of key switch, interlock switch, directional switch and accelerator; - Improper wiring.	- Check the input sequence of the switches to rule out operational issues; - Use a handheld unit to check each switch condition; - Use a handheld unit to check the accelerator signal; - Replace defective switches.
0147	Operation sequence error of FL motor controller		
0247	Operation sequence error of FR motor controller		
0347	Operation sequence error of RL motor controller		
0447	Operation sequence error of RR motor controller		
0049	Setup change of pump motor controller	The key switch must be restarted after changing certain parameters.	Restart the key switch to eliminate the fault.
0149	Setup change of FL motor controller		

Table 9-3 General Fault Codes of the Motor Controller (continued)

Fault code	Description	Cause	Solution
0249	Setup change of FR motor controller		
0349	Setup change of RL motor controller		
0449	Setup change of RR motor controller		
0068	VCL run error of pump motor controller	Software problem	1. Update the software to the correct version; 2. Replace the controller.
0168	VCL run error of FL motor controller		
0268	VCL run error of FR motor controller		
0368	VCL run error of RL motor controller		
0468	VCL run error of RR motor controller		
0069	Power supply of pump motor controller exceeding the range	1. Excessively high/low current of external loads; 2. Check the setup.	1. Check the external loads of 5V and 12V components for short circuit or damage; 2. Check the setup (external supply max and external supply min); 3. Replace defective devices.
0169	Power supply of FL motor controller exceeding the range		
0269	Power supply of FR motor controller exceeding the range		
0369	Power supply of RL motor controller exceeding the range		
0469	Power supply of RR motor controller exceeding the range		
0071	Operation software fault of pump motor controller	1. Software problem; 2. Controller failure.	1. Update the software to the correct version; 2. Replace the controller.
0171	Operation software fault of FL motor controller		
0271	Operation software fault of FR motor controller		
0371	Operation software fault of RL motor controller		
0471	Operation software fault of RR motor controller		
0072	PDO timeout of pump motor controller	1. Software problem; 2. CAN bus communication error	1. Update the software to the correct version, and ensure the bus is free of interference; 2. Ensure the bus terminal resistance is 60 ohm, the bus voltage approx. 2.5V;
0172	PDO timeout of FL motor controller		

Table 9-3 General Fault Codes of the Motor Controller (continued)

Fault code	Description	Cause	Solution
0272	PDO timeout of FR motor controller		3. Ensure the devices on the bus are correctly connected; 4. Check the on-bus devices are correctly programmed; 5. Use the exclusion method to replace the failed devices.
0372	PDO timeout of RL motor controller		
0472	PDO timeout of RR motor controller		
0073	Motor stalling of pump motor controller	1. Motor stalling; 2. Encoder fault; 3. Improper wiring or motor damaged.	1. Check the power supply and wiring of the motor encoder to ensure the speed signal can be transmitted properly; 2. Ensure the brake is fully disengaged; 3. Check the motor and the controller.
0173	Motor stalling of FL motor controller		
0273	Motor stalling of FR motor controller		
0373	Motor stalling of RL motor controller		
0473	Motor stalling of RR motor controller		
0077	System distress of pump motor controller	1. The processor detects invalid and redundant data; 2. The processor inside the controller fails; 3. The processor detects that the switching value signal exceeds the threshold by 100 ms (if the fault occurs repeatedly, please check if the switch is wet or damaged).	1. Check the internal micro-processor for damage; 2. Check input signals of all switches, and check the switches for humidity or damage.
0177	System distress of FL motor controller		
0277	System distress of FR motor controller		
0377	System distress of RL motor controller		
0477	System distress of RR motor controller		
0078	Incompatible system of pump motor controller	Incompatible operating system	Check the software for compatibility.
0178	Incompatible system of FL motor controller		
0278	Incompatible system of FR motor controller		
0378	Incompatible system of RL motor controller		
0478	Incompatible system of RR motor controller		
0082	Calibration error in pump motor controller	Internal controller fault	Check the internal controller for faults.
0182	Calibration error in FL motor controller		
0282	Calibration error in FR motor controller		

Table 9-3 General Fault Codes of the Motor Controller (continued)

Fault code	Description	Cause	Solution
0382	Calibration error in RL motor controller		
0482	Calibration error in RR motor controller		
0083	Power supply fault of pump motor controller	1. Internal voltage fault of the controller; 2. Power supply failure – drive circuit.	Check the internal controller for faults.
0183	Power supply fault of FL motor controller		
0283	Power supply fault of FR motor controller		
0383	Power supply fault of RL motor controller		
0483	Power supply fault of RR motor controller		
0087	Motor matching failure of pump motor controller	Description of motor matching failure codes: 0=Normal; 1=Encoder signal received, pseudo not identified, manual setup of the encoder pulse required; 2=Motor temp sensor failure; 3=Motor high-temp response failure; 4=Motor overheat response failure; 5=Motor low-temp response failure; 6=Low-volts response failure; 7=High-volts response failure; 8=Controller fails to detect the encoder signal; 9=Motor setup exceeding the range	Check the encoder and motor for correct wiring.
0187	Motor matching failure of FL motor controller		
0287	Motor matching failure of FR motor controller		
0387	Motor matching failure of RL motor controller		
0487	Motor matching failure of RR motor controller		
0088	Encoder pulse fault of pump motor controller	The encoder parameters do not match the actual motor encoder.	Check the encoder parameters.
0188	Encoder pulse fault of FL motor controller		
0288	Encoder pulse fault of FR motor controller		
0388	Encoder pulse fault of RL motor controller		
0488	Encoder pulse fault of RR motor controller		
0089	Motor type error of pump motor controller	Motor type parameter setting out of range	Correct the motor type parameters.

Table 9-3 General Fault Codes of the Motor Controller (continued)

Fault code	Description	Cause	Solution
0189	Motor type error of FL motor controller		
0289	Motor type error of FR motor controller		
0389	Motor type error of RL motor controller		
0489	Motor type error of RR motor controller		
0091	VCL/OS mismatch of pump motor controller	Controller program error	Update the program to the correct version.
0191	VCL/OS mismatch of FL motor controller		
0291	VCL/OS mismatch of FR motor controller		
0391	VCL/OS mismatch of RL motor controller		
0491	VCL/OS mismatch of RR motor controller		
0092	Invalid solenoid brake setup of pump motor controller	1. The machine moves freely once the solenoid brake was activated; 2. The holding force of the solenoid brake is too weak.	1. Ensure the solenoid brake and the accelerator are set up correctly; 2. Check the brake disc of the solenoid brake to determine whether it needs adjusting.
0192	Invalid solenoid brake setup of FL motor controller		
0292	Invalid solenoid brake setup of FR motor controller		
0392	Invalid solenoid brake setup of RL motor controller		
0492	Invalid solenoid brake setup of RR motor controller		
0093	Restricted encoder operation of pump motor controller	1. Motor stall or encoder malfunction activates a restricted operational state of the encoder; 2. Improper wiring; 3. Motor stall.	1. Check the encoder power supply and ensure correct wiring; 2. Check the pulse count setting of the encoder (program/motor menu/encoder steps); 3. Check the encoder feedback speed signals (monitor/motor menu/motor speed A/B); 4. Replace the encoder.
0193	Restricted encoder operation of FL motor controller		
0293	Restricted encoder operation of FR motor controller		
0393	Restricted encoder operation of RL motor controller		
0493	Restricted encoder operation of RR motor controller		
0094	Emergency reverse response timeout of pump motor controller	1. Emergency reverse switch always in closed position;	1. Use a handheld unit to monitor emergency reverse (monitor /inputs menu/emerg Rev),

Table 9-3 General Fault Codes of the Motor Controller (continued)

Fault code	Description	Cause	Solution
0194	Emergency reverse response timeout of FL motor controller	2. EmerTimer expires, which leads to the activation of the emergency reverse timeout.	if it remains in the ON position, check the emergency reverse switch; 2. Check the wiring of the emergency reverse switch; 3. Check the programming of emergency reverse.
0294	Emergency reverse response timeout of FR motor controller		
0394	Emergency reverse response timeout of RL motor controller		
0494	Emergency reverse response timeout of RR motor controller		
0098	Model error of pump motor controller	1. Controller model unidentifiable; 2. Controller software error; 3. Controller damaged.	1. Check the controller model; 2. Check the software version; 3. Replace the controller.
0198	Model error of FL motor controller		
0298	Model error of FR motor controller		
0398	Model error of RL motor controller		
0498	Model error of RR motor controller		
0099	2WD machine motor setup mismatch of pump motor controller	When the dual-motor is on, the control mode is not set as 0 or 1.	When the dual-motor is on, the control mode shall be set as 0 or 1. Check the parameter setting.
0199	2WD machine motor setup mismatch of FL motor controller		
0299	2WD machine motor setup mismatch of FR motor controller		
0399	2WD machine motor setup mismatch of RL motor controller		
0499	2WD machine motor setup mismatch of RR motor controller		

Table 9-4 Special fault codes for the motor controller

Fault code	Description	Cause	Solution
0052	CAN communication timeout of pump motor controller	Communication timeout 1 sec between motor controller and machine main controller	Check CAN3 signal lines between pump motor controller and the machine's main controller.
0053	Charging voltage overload of pump motor controller	Pump motor controller voltage 59 V and timeout 3 sec	Check CAN3 signal lines between pump motor controller and the machine's main controller.

Table 9-4 Special fault codes for the motor controller (continued)

Fault code	Description	Cause	Solution
0152	CAN communication timeout of FL motor controller	Communication timeout 1 sec between FL motor controller and machine main controller.	Check CAN3 signal lines between FL motor controller and machine main controller.
0153	Communication timeout between FL and FR motor controllers	Communication timeout 1 sec between FL and FR motor controllers	Check CAN3 signal lines between FL and FR motor controllers.
0154	Communication timeout between FL and RL motor controllers	Communication timeout 1 sec between FL and RL motor controllers	Check CAN3 signal lines between FL and RL motor controllers.
0155	Communication timeout between FL and RR motor controllers	Communication timeout 1 sec between FL and RR motor controllers	Check CAN3 signal lines between FL and RR motor controllers.
0252	CAN communication timeout of FR motor controller	Communication timeout 1 sec between FR motor controller and machine main controller.	Check CAN3 signal lines between FR motor controller and machine main controller.
0257	Communication timeout between FR motor and main controller (FL)	FR motor controller timeout 1 sec to receive signal from FL motor controller	Check CAN3 signal lines between FR and FL motor controllers.
0352	CAN communication timeout of RL motor controller	Communication timeout 1 sec between RL motor controller and machine main controller.	Check CAN3 signal lines between RL motor controller and machine main controller.
0356	Communication timeout between RL motor and main controller (FL)	RL motor controller timeout 1 sec to receive signal from FL motor controller	Check CAN3 signal lines between RL and FL motor controllers.
0452	CAN communication timeout of RR motor controller	Communication timeout 1 sec between RR motor controller and machine main controller.	Check CAN3 signal lines between RR motor controller and machine main controller.
0458	Communication timeout between RR motor and main controller (FL)	RR motor controller timeout 1 sec to receive signal from FL motor controller	Check CAN3 signal lines between RR and FL motor controllers.

Lithium Battery BMS Fault Codes

Table 9-5 Explanation of Lithium Battery BMS Fault Codes

No.	Fault name	Fault code	Troubleshooting
1	Low Discharge Total Voltage	16#202	1. Open the battery box and measure the voltage by setting the multimeter to the voltage mode, and measuring the total positive and total negative voltage of the battery internal modules. 2. Contact Sinoboom after-sales personnel for confirmation. If the total positive and total negative voltage of the module is too low and there are no other faults, charge the battery directly.
		16#302	
2	Low Cell Discharge Voltage	16#204	1. Contact Sinoboom after-sales personnel to confirm the specific pin positions. 2. After removing the MSD, open the battery box and measure the voltage with the multimeter set to the voltage mode. Remove the BMS collection plug and measure the specific series voltage through the plug pins.
		16#304	
3	High Discharge Total Voltage	16#201	1. Open the battery box and measure the voltage by setting the multimeter to the voltage mode, and measuring the total positive and total negative voltage of the battery internal modules. 2. Contact Sinoboom after-sales personnel for confirmation. If the total positive and total negative voltage of the module is too high and there are no other faults, use emergency power to perform machine actions, then power on, and use emergency power to lower the battery voltage. 3. Wait for the voltage to decrease to the fault clear condition.
		16#301	
4	High Cell Feedback Voltage	16#203	1. After removing the MSD, open the battery box and measure the voltage with the multimeter set to the voltage mode. Remove the BMS collection plug and measure the specific series voltage through the plug pins; 2. Contact Sinoboom after-sales personnel to confirm the specific pin positions before measuring. If there are no other faults, use emergency power to perform machine actions, then power on, and use emergency power to lower the battery voltage; 3. Wait for the voltage to decrease to the fault clear condition.
		16#303	
5	Cell Discharge Voltage Difference	16#105	1. After removing the MSD, open the battery box and measure the voltage with the multimeter set to the voltage mode. Remove the BMS collection plug and measure the specific series voltage through the plug pins; 2. Contact Sinoboom after-sales personnel for confirmation. If the total positive and total negative voltage of the module is too low and there are no other faults, charge the battery directly.
		16#205	
		16#305	
6	High Discharge Temperature	16#208	Contact Sinoboom after-sales personnel to check the specific backend data and determine whether there is a fault. If there
		16#308	

Table 9-5 Explanation of Lithium Battery BMS Fault Codes (continued)

No.	Fault name	Fault code	Troubleshooting
			are no other faults, the temperature will naturally decrease after resting for a while.
7	Low Discharge Temperature	16#206	Contact Sinoboom after-sales personnel to check the specific backend data and determine whether there is a fault. If there are no other faults, get charged directly.
		16#306	
8	Discharge Temperature Difference	16#20A	Contact Sinoboom after-sales personnel to check the specific backend data and determine whether there is a fault. If there are no other faults, the temperature difference will naturally decrease and the fault will be cleared after resting for a while.
9	Instantaneous Discharge Overcurrent	16#20C	Use a clip-on ammeter to measure whether the total circuit current has reached the fault triggering condition. This is a battery protection item, which can be restored by restarting the battery.
		16#30C	
10	High Total Charge Voltage	16#201	This item is to prevent overcharging of the battery and does not require any operations. After being fully charged, this alarm will naturally be triggered to stop charging.
		16#301	
11	High Cell Charge Voltage	16#203	This item is to prevent overcharging of the battery and does not require any operations. After being fully charged, this alarm will naturally be triggered to stop charging.
		16#303	
12	Cell Charge Voltage Difference	16#105	Contact Sinoboom after-sales personnel to check the specific backend data and determine whether there is a real pressure difference. If the pressure difference is too large, it needs to be recharged. This is an alarm prompt to prevent voltage inconsistency in battery cells, which will not affect normal charging.
		16#205	
		16#305	
13	High Charge Temperature	16#209	Contact Sinoboom after-sales personnel to check the specific backend data and determine whether there is a fault. If there are no other faults, the temperature will naturally decrease and the fault will be cleared after resting for a while.
		16#309	
14	Low Charge Temperature	16#207	Contact Sinoboom after-sales personnel to check the specific backend data and determine whether there is a fault. If there are no other faults, it will automatically switch to charging mode after charging and heating.
		16#307	
15	Charge Temperature Difference	16#20A	Contact Sinoboom after-sales personnel to check the specific backend data and determine whether there is a fault. If there are no other faults, no operations are required as it will not affect normal charging.
16	Charge Overcurrent (Fast Charging)	16#20B	Use a clip-on ammeter to measure whether the total circuit current has reached the fault triggering condition. This is a battery protection item, which can be restored by restarting the battery.
		16#30B	
17	Charge Overcurrent (Slow Charging)	16#20B	Use a clip-on ammeter to measure whether the total circuit current has reached the fault triggering condition. This is a battery protection item, which can be restored by restarting the battery.
		16#30B	
18	Voltage Cable Detached	16#313	1. After unplugging MSD, open the box and check the voltage and check if the temperature sensing collection wire connector and BMS collection port have any loose or false

Table 9-5 Explanation of Lithium Battery BMS Fault Codes (continued)

No.	Fault name	Fault code	Troubleshooting
			connections. If there is any looseness or false connection, unplug and insert the plug; 2. Contact the Sinoboom after-sales personnel to replace the BMS, and observe whether the fault will appear again.
19	Charger Communication Fault	16#210	1. Observe whether there is a sudden interruption of charging in the charger and whether the mains power is stable. Try replacing the charger and charging plug; 2. Contact Sinoboom after-sales personnel to determine the charging backend data. If the message can be collected, send it to Sinoboom after-sales personnel for confirmation.
20	BMS Initialization Fault	16#20F	1. After unplugging MSD, open the box and check if the BMS plug is connected properly; 2. Contact Sinoboom after-sales personnel to determine the charging backend data.
21	BMS Relay Adhesion Fault	16#311	After unplugging MSD, open the box for inspection, find the corresponding relay, use a multimeter to measure whether the two ends of the relay are connected. • Temporary strategy: Disassemble the relay, tap the bottom of relay until the two ends of the relay are no longer connected, which is a temporary method. • Final solution: Replace the relay.
		16#312	
		16#314	
22	Insulation Leakage Fault	16#216	Contact SINOBOOM aftersales staff.
		16#316	
23	Low SOC	16#10D	Check the battery level on the screen. If it is below 20%, this fault will be triggered, but it will not affect the normal output of the battery. Charging will clear the fault.
		16#20D	Check the battery level on the screen. If it is below 15%, this fault will be triggered, and the machine can only be used for 5 minutes. After 5 minutes, the battery will be powered off and can be restarted to continue using. Charging will clear the fault.
		16#30D	Check the battery level on the screen. If it is below 7%, this fault will be triggered, and the machine will not be able to operate. Charging will clear the fault.
25	Heating Fault	16#215	Contact SINOBOOM aftersales staff.

9.3 BASIC TROUBLESHOOTING

If encountering a special malfunction not mentioned in this manual, repairs must be conducted by professional personnel. Please contact our after-sales service staff for assistance.

Table 9-6 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 Inspect whether the emergency stop button at the turntable or platform 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
	CAN equipment offline	Inspect whether the leads between the power supply and communication are inserted properly and reliably. Inspect whether all pins of the Deutsch plugs for the connecting cables between platform and turntable are wired according to the drawing. Inspect whether the platform plug or the plug of the connecting cable between the platform and turntable are in good contact. Check whether the platform controller is malfunctioning. Inspect whether the Deutsch plug of the turntable controller is wired firmly and/or correctly.
Tilt alarm sounds even with the machine in level position	The level switch is disconnected or defective The machine tilt angle exceeds the maximum allowable inclination	Check whether the level switch is inserted properly and firmly. Check the level switch for malfunctions. Check if the machine is parked on a level surface
Platform fails to be leveled	Electrical failure	Check whether the circuit and the control program have any abnormalities
Platform leveling function not responding	Electrical failure	Check whether the wiring and the control program have any abnormalities
Boom movement switches on platform controller not responding	The switch is not in the correct position	Check whether the key switch is in the middle position or in the "OFF" position Check whether the ground/platform control selector switch on the turntable has been set to the ground control position. Inspect whether the emergency stop button at the turntable or platform is pressed down
	Boom function switch not enabled with the foot switch depressed	Depress the foot switch again
	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
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 Check whether the ground/platform control selector switch on the turntable has been set to the platform control position. Inspect whether the emergency stop button at the turntable or platform is pressed down

Table 9-6 Electrical System Troubleshooting (continued)

Fault	Cause	Solution
	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
	Electrical failure	Check whether the circuit and the control program have any abnormalities
Turntable rotating abnormally to the left/right	Insufficient lubrication for slewing bearing	Lubricate as needed
	Slewing bearing excessively worn	Replace the slewing bearing
	Electrical failure	Check whether the wiring and the control program have any abnormalities
Steering function has no response	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 Check whether the ground/platform control selector switch on the turntable has been set to the 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.
	Movement disabled	Check whether the machine is overloaded or tilted leading to travel function disabled Inspect whether the brake has not been released
	Travel motor damaged	Replace the travel motor
	Motor controller damaged	Replace the motor controller
Forward traveling function fails without warning	Forward traveling function is malfunctioning	Check whether the PWM plug of the turntable controller is inserted correctly and solidly. Inspect the turntable controller for malfunctions Inspect the turntable controller for malfunctions

Table 9-6 Electrical System Troubleshooting (continued)

Fault	Cause	Solution
Reverse traveling function fails without warning	Reverse traveling function is malfunctioning	Check whether the PWM plug of the turntable controller is inserted correctly and solidly. Inspect the turntable controller for malfunctions Inspect the turntable controller for malfunctions
Tilt warning	Level switch not functioning properly	Check if the level switch air bubble is 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 if the weighing sensor is not calibrated Check the wiring of the weighing sensor for any abnormalities Check whether the sensor is malfunctioning.
Intermittent stalling during travel	Battery level low/incorrect calibration	Re-calibrate the steering angle sensor Check whether the battery level is low.
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 9-7 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
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
	Upper and lower leveling cylinders have internal leaks	Inspect and repair the leaking cylinder
	The upper 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
	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

Table 9-7 Hydraulic System Troubleshooting (continued)

Fault	Cause	Solution
	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
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
	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

10 FUNCTIONAL TEST

10.1 MACHINE POSITIONS

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

- **Stowed position:** The articulating boom is fully lowered, and the main boom is fully retracted and lowered.
- **Transport position:** The articulating boom is fully lowered, and the main boom is fully retracted and lowered. The jib and the platform are positioned as appropriate for transportation by trailer or other means.
- **Operating position:** The main boom is raised more than 4° above the fully lowered position, or the articulating boom is raised more than 5° above the fully lowered position, or the main boom retraction limit switch is not activated.
- **Non-operating position:** The main boom is raised no more than 4° above the fully lowered position, or the articulating boom is raised no more than 5° above the fully lowered position, or the main boom retraction limit switch is activated.

10.2 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.

10.3 BRAKING FUNCTION

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

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

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

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

NOTICE

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

10.4 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 movements 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°. Then, the tilt alarm

should be triggered, the chassis tilt indicator should flash, and certain movements will be restricted. But the following movements are allowed: main boom retracting and lowering, articulating boom lowering, and slow slewing of turntable.

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 movements will be restricted; but the following movements are allowed: main boom retracting and lowering, articulating boom lowering, and slow slewing of turntable.
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 movements will be restricted; but the following movements are allowed: main boom retracting and lowering, articulating boom lowering, and slow slewing of turntable.
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.

10.5 MAXIMUM WORKING ENVELOPE LIMIT FUNCTION

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

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

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

NOTICE

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

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.

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

Working Envelope Diagram

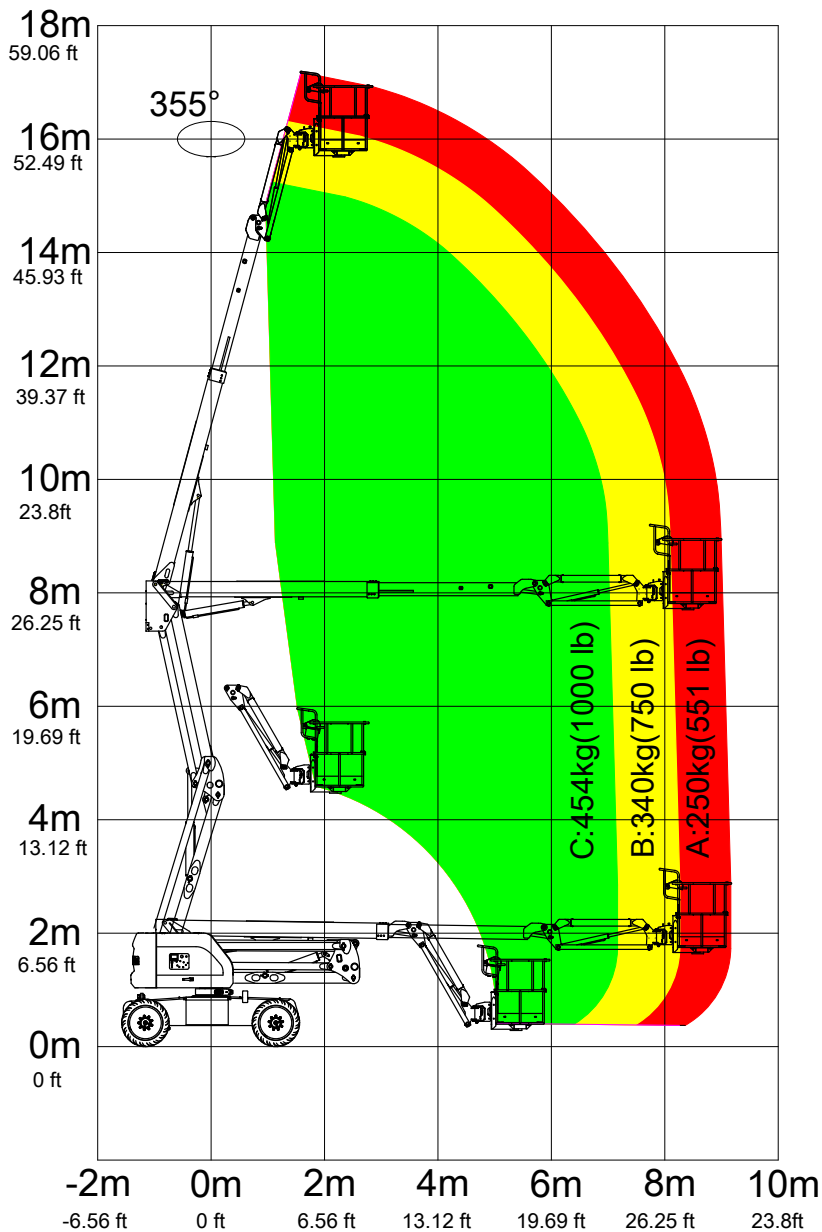


Fig. 1 Working envelope diagram (-5°)

Horizontal Reach Restriction and Overload Limit Functions

Zone A+B+C: 0 kg < platform load ≤ 250 kg (551 lb)

1. Test the horizontal reach restriction function from the ground control position.
 - 1) Operate the articulating boom to be fully retracted (if telescopic) and fully lowered.
 - 2) Adjust the main boom and jib 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 260 kg (573 lb) loads at the center of platform, the buzzer on the turntable and platform controllers should sound, and the overload alarm indication icon will illuminate on the display.
 - In KG mode (with the “KG” icon 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 “KG” icon 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 can lift and lower, the platform can be leveled manually within $\pm 10^\circ$, the turntable can slew slowly while in the operating position (it can slew at normal speed while in the non-operating position), and the main boom and articulating 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+C: 250 kg (551 lb) ≤ platform load ≤ 340 kg (750 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) Operate the articulating boom to be fully retracted (if telescopic) and fully lowered.
 - 2) Adjust the main boom and jib 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.
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 “KG” icon 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 “KG” icon 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 can lift and lower, the platform can be leveled manually within $\pm 10^\circ$, the turntable can slew slowly while in the operating position (it can slew at normal speed while in the non-operating position), and the main boom and articulating 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 C: 340 kg (750 lb) ≤ platform load ≤ 454 kg (1000 lb)

1. Apply 380 kg (838 lb) loads at the center of platform.

2. Test the horizontal reach restriction function from the ground control position.
 - 1) Operate the articulating boom to be fully retracted (if telescopic) and fully lowered.
 - 2) Adjust the main boom and jib 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.
3. Test the overload limit function from the ground control position. Apply 485 kg (1069 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 “KG” icon 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 “KG” icon 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 can lift and lower, the platform can be leveled manually within $\pm 10^\circ$, the turntable can slew slowly while in the operating position (it can slew at normal speed while in the non-operating position), and the main boom and articulating 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.

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11 CONTROL SYSTEM

DANGER

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

WARNING

Unsafe Operation Hazard



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

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

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

NOTICE

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

11.1 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).

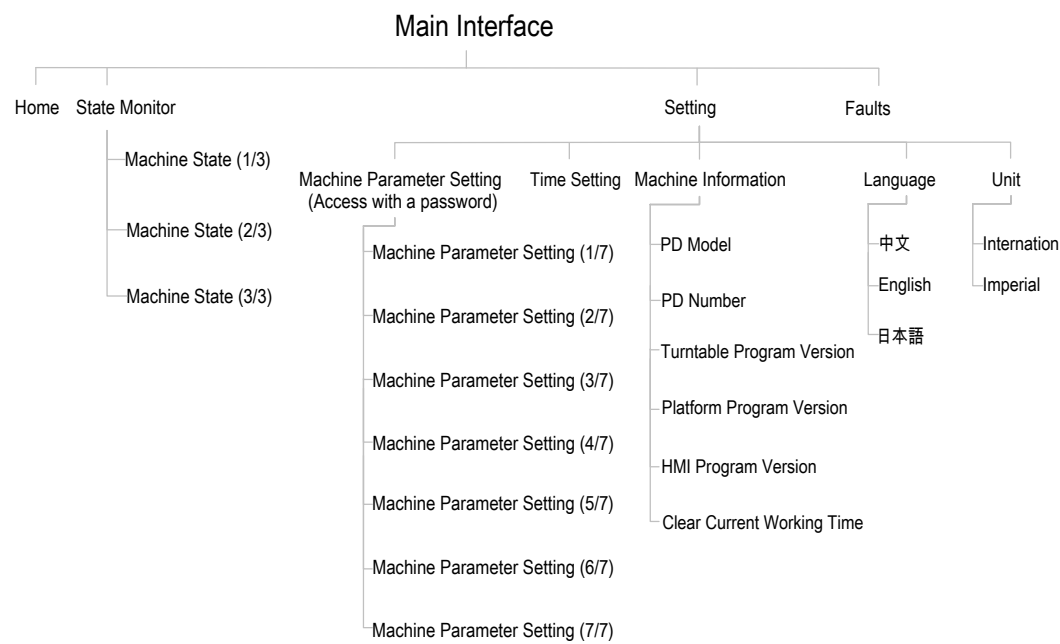


Fig. 1 Display interface navigation diagram

11.2 HOME INTERFACE – AFTER BOOTING

Turn the ground/platform selector switch at the turntable control box to the ground control position,pull outthe emergency stop button to the ON position:the system will be powered on.

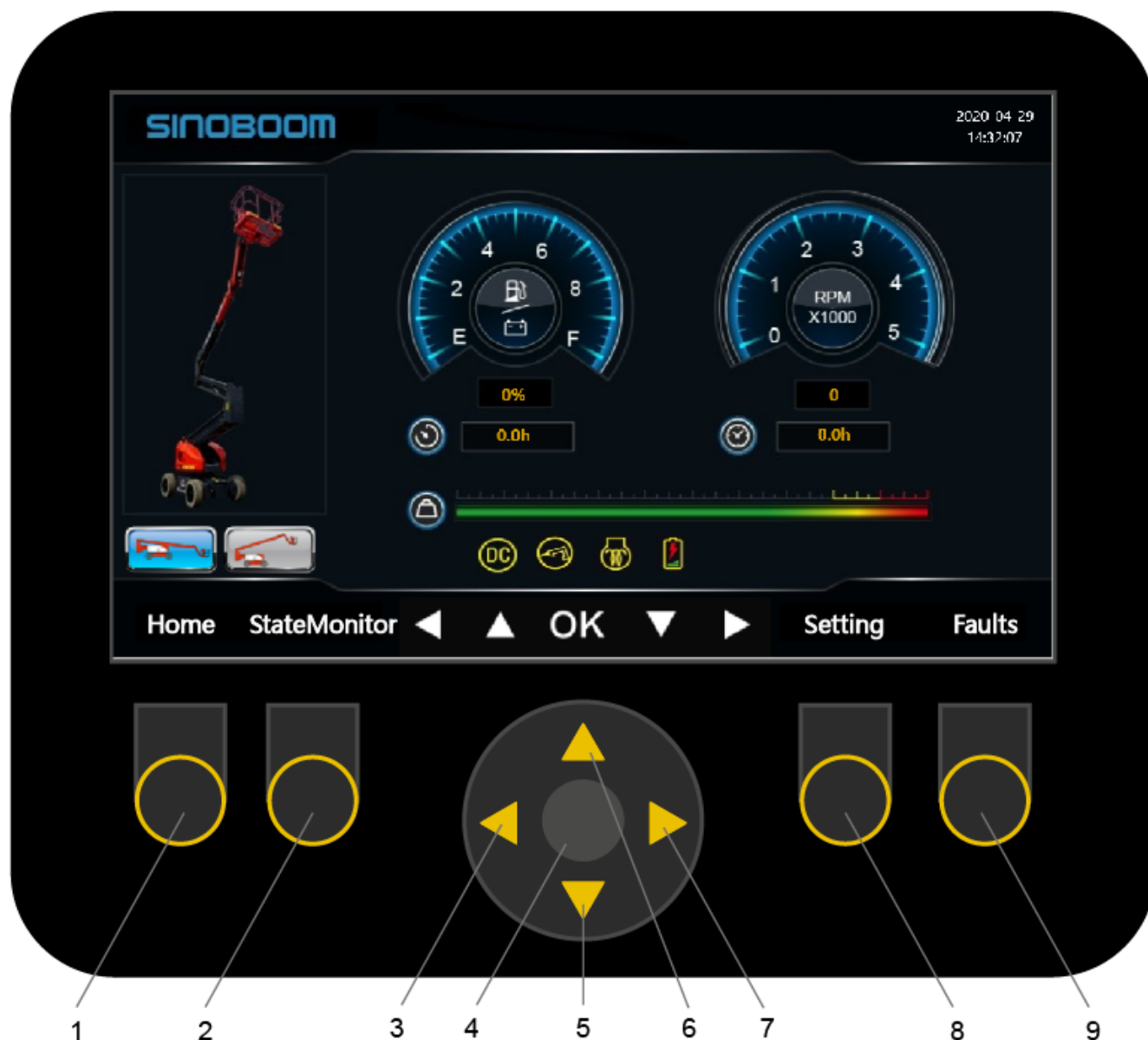


Fig. 2 Home Interface – After Booting

Table 11-1

1. Home	4. OK button	7. Right arrow key/next page
2. Status monitor/next page	5. Down arrow key	8. Setting
3. Left arrow key	6. Up arrow key	9. Fault diagnosis

11.3 STATUS MONITOR

1. On the Home interface, press the Status Monitor button to enter the Machine Status (1/3) interface.

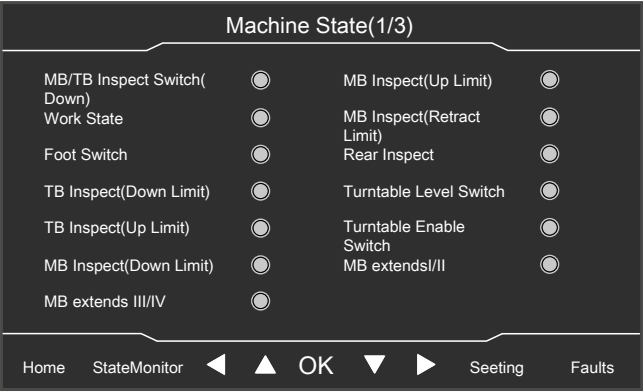


Fig. 3 Machine Status (1/3) interface

- The Machine State (1/3) interface is mainly used to query the signal detection status of the detection switches (such as travel switches and proximity switches) configured on the machine, to determine whether the detection switches are working normally and whether the working status of the machine meets the requirements. When the indicator light corresponding to the respective parameter illuminates  the detector switch has detected a signal. When the indicator light is off the detector switch has not detected a signal.
 - The configuration of switches is subject to the actual machine configurations.
2. On the Machine Status (1/3) interface, press the right arrow key to enter the Machine Status (2/3) interface.

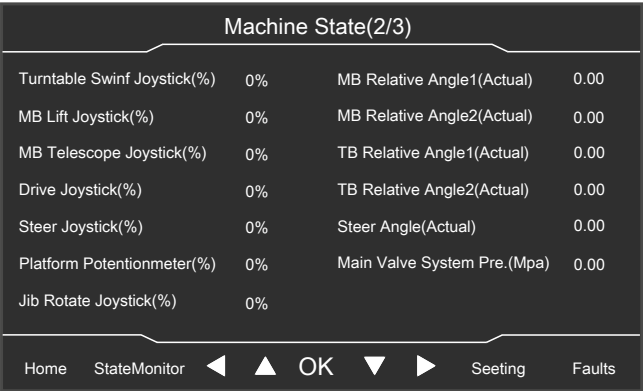


Fig. 4 Machine Status (2/3) interface

- This interface is mainly used to query the current actual value of each joystick/potentiometer and the actual value of the sensors configured on the machine. It is used to check whether the position status of each joystick/potentiometer is normal, and to determine whether each sensor is working normally.
- The configuration of switches is subject to the actual machine configurations.

3. On the Machine Status (2/3) interface, press the right arrow key to enter the Machine Status (3/3) interface.

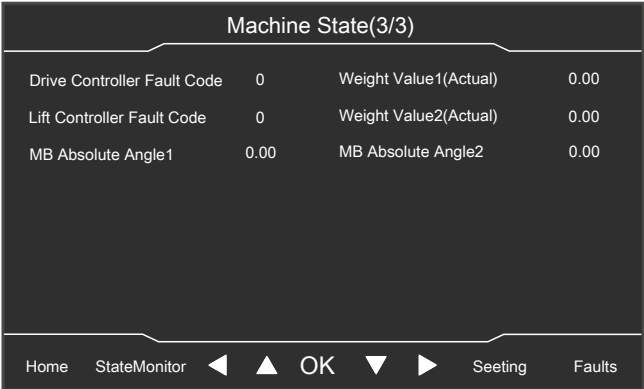


Fig. 5 Machine Status (3/3) interface

- This interface is mainly used to query the current fault codes of each motor controller and the actual value of the sensors fitted on the machine, It is used to check whether the status of each motor controller is normal, and to determine whether each sensor is working normally.
4. Press the Home button to return to the Home interface, and power off the machine as needed.

11.4 FAULT DIAGNOSIS

1. In the Home interface, press the Faults button to enter the “Current Faults (1/1)” interface, which is mainly used to query the current faults of the machine. For detailed fault descriptions, see the **Fault Code Description** section in the Maintenance Manual.

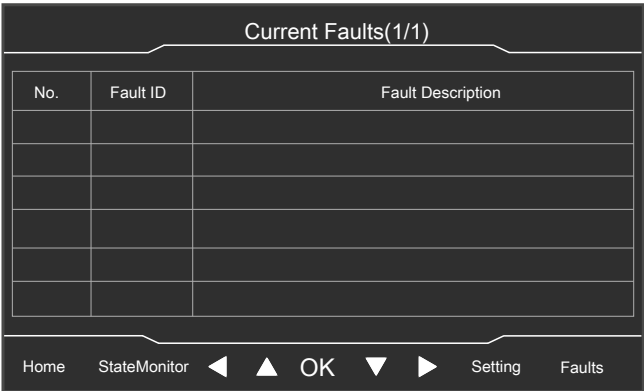


Fig. 6 Current Faults (1/1) interface

2. Press the Home button to return to the Home interface, and power off the machine as needed.

11.5 SETTING

 **DANGER**

Modifying the options in the parameter settings (including joystick calibration, sensor calibration, standardization setting, overload limit setting, travel limit setting, interlock unlocking and position parameter setting) must be carried out only by authorized and qualified personnel who have undergone professional training by Sinoboom. Not meeting this requirement bears significant risks.

On the Home interface, press the Settings button to enter the System Setting interface.

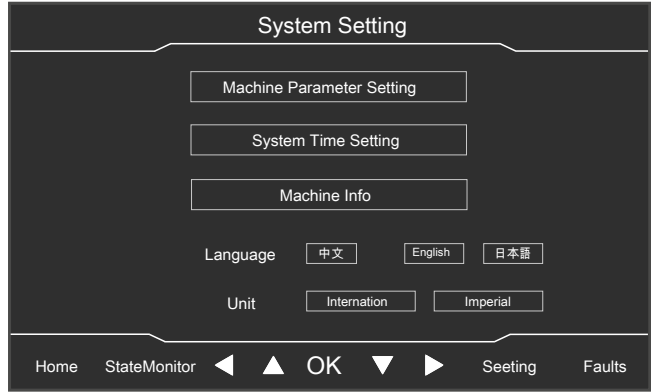


Fig. 7 System Setting interface

Machine Parameter Setting

1. On the System Setting interface, select Machine Parameter Setting by pressing the up shift key or down shift key until Machine Parameter Setting is displayed and press the OK button to enter the Machine Parameter Setting (1/7) interface.
- Note:** A password is required to enter this interface. Use the left shift key or right shift key to change the selected item, and use the up key or down key to adjust the value of the selected item.

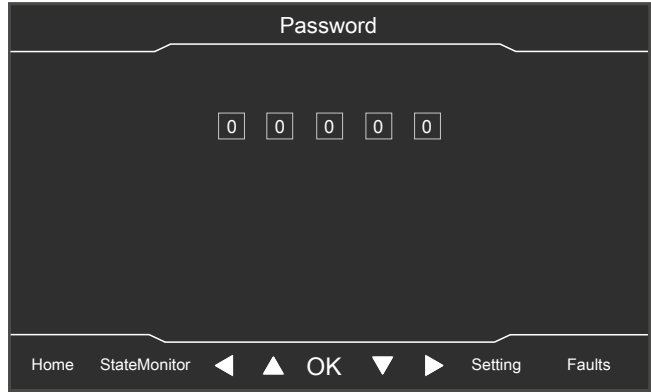


Fig. 8 Password interface

2. The Machine Parameter Setting (1/7) interface is mainly used for joystick calibration.

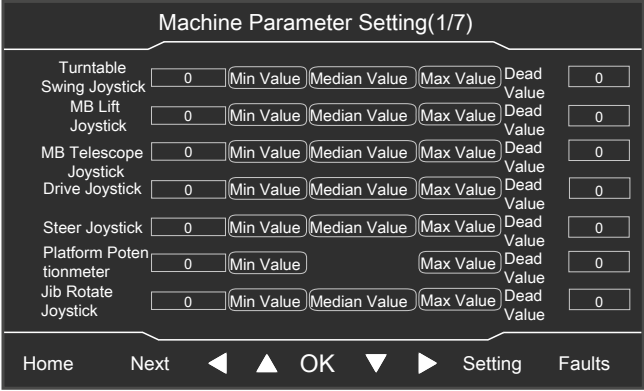


Fig. 9 Machine Parameter Setting (1/7) interface

- 1) Select the calibration item by pressing the up key, down shift key, left shift key or right shift key, push the joystick to the corresponding position, and press and hold the OK button for 3 seconds to save and complete the calibration.
- 2) If certain parameters of this element need to be re-calibrated, press the Setting button to return to the System Setting interface, then re-enter the Machine Parameter Setting (1/7) interface, and repeat the previous steps.
- 3) Press the Home button to return to the Home interface, and power off the machine as needed.
3. On the Machine Parameter Setting (1/7) interface, press the Next button to enter the Machine Parameter Setting (2/7) interface, which is mainly used for sensor calibration.

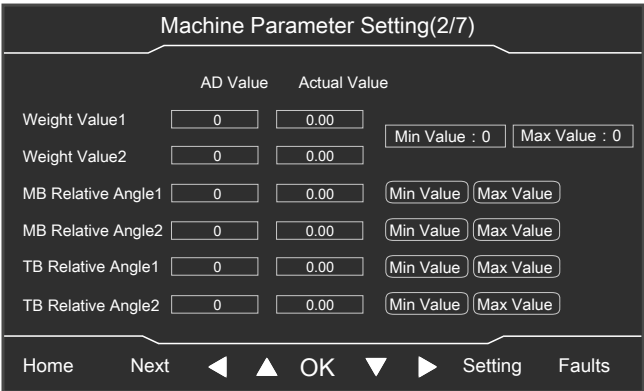


Fig. 10 Machine Parameter Setting (2/7) interface

- Weight calibration

NOTICE

If the machine is equipped with a dual-channel sensor, when pressing and holding the OK button for 3 sec for no-load and heavy-load calibration, both channels will be calibrated at the same time.

- 1) Make sure that no heavy objects are placed on the platform, and that the platform is stable/not moving/shaking.
- 2) Enter Machine Parameter Setting (2/7) interface.
- 3) Please perform the corresponding operation according to the configuration of the accessory devices:
 - If no accessory device is installed on the platform: select the “Min Value” by pressing the up key, down shift key, left shift key or right shift key, adjust the value to 0 by pressing the up key and down shift key, press and hold the OK button for 3 seconds to complete the no-load calibration.
 - If an accessory device is installed on the platform: select the “Min Value” by pressing the up key, down shift key, left shift key or right shift key, adjust the value to weight value of accessory tools by pressing the up key and down shift key, press and hold the OK button for 3 seconds to complete the no-load calibration.
- 4) Place a heavy object with the weight equal to the rated load of the machine on the platform making sure that the platform is stable/not moving/shaking.
- 5) Please perform the corresponding operation according to the configuration of the accessory devices:
 - If no accessory device is installed on the platform: Select the “Max Value” by pressing the left or right arrow key until Max Value is displayed, adjust the value to the weight value of the load on the platform by pressing the up and down arrow key, press and hold the OK button for 3 seconds to complete the full-load calibration (the actual weight value on left side of the display screen is equal to the weight value of the load on the platform).
 - If an accessory device is installed on the platform: Select the “Max Value” by pressing the left or right arrow key until Max Value is displayed, adjust the value to the sum of the platform load weight and accessory device weight by pressing the up and down arrow key, press and hold the OK button for 3 seconds to complete the

full-load calibration (the actual weight value on left side of the display screen is equal to the sum of the platform load weight and accessory device weight).

NOTICE

- ◆ *It is recommended to keep the combined weight of the platform load and accessory device below 500 kg (1102 lb). If this limit is exceeded, the system will not be able to record a valid “heavy-load” value, in which case it is advisable to appropriately reduce the load weight placed on the platform.*
- ◆ *Please refer to the attached **Accessory Device Weight Table** for the weight of accessory devices.*

- 6) If certain parameters of this element need to be re-calibrated, press the Setting button to return to the System Setting interface, then re-enter the Machine Parameter Setting (1/7) interface, and repeat the previous steps.
- 7) Press the Home button to return to the Home interface, and power off the machine as needed.

• Sensor calibration

NOTICE

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.

- 1) Enter the Machine Parameter Setting (2/7) interface, select the position to be calibrated by pressing the up key, down shift key, left shift key or right shift key, press and hold the OK button for 3 seconds to complete the calibration (after successful calibration, the actual value will be changed).
 - 2) If certain parameters of this element need to be re-calibrated, press the Setting button to return to the System Setting interface, then re-enter the Machine Parameter Setting (1/7) interface, and repeat the previous steps.
 - 3) Press the Home button to return to the Home interface, and power off the machine as needed.
4. On the Machine Parameter Setting (2/7) interface, press the Next button to enter the Machine Parameter Setting (3/7) interface, which is mainly used for sensor calibration. Perform calibration according to the above steps.

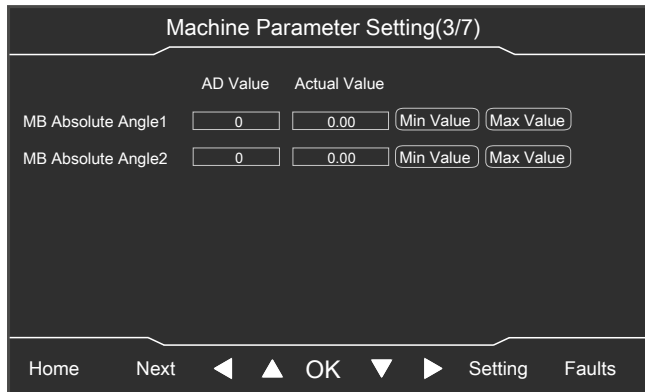


Fig. 11 Machine Parameter Setting (3/7) interface

5. On the Machine Parameter Setting (3/7) interface, press the Next button to enter the Machine Parameter Setting (4/7) interface.

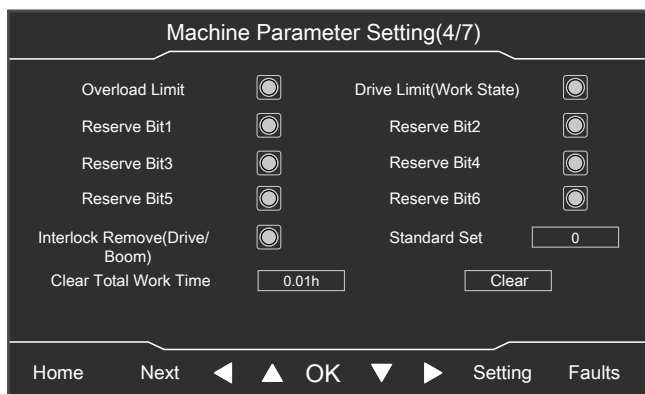


Fig. 12 Machine Parameter Setting (4/7) interface

- 1) On the interface, select the required standard or function by pressing the up, down, left, or right arrow key.
- 2) **Overload limit setting:** Select the Overload Limit option, and press and hold the OK button for 3 sec to confirm the setting. The corresponding indicator light will illuminate , and the upper right corner of the main interface will show **KG**. All movements will be limited when the platform is overloaded.
- 3) **Drive Limit (operating position) setting:** Select the Drive Limit (operating position) option, then press and hold the OK button for 3 sec to confirm the setting. The corresponding indicator light will illuminate , and the upper right corner of the main interface will show **DR**. Drive movement is restricted when the machine is in operating position.
- 4) **Interlock Remove (Drive/Boom) setting:** Select the Interlock Remove (Drive/Boom) option, and press and hold the OK button for 3 sec to

confirm the setting. The corresponding indicator light will illuminate , and the upper right corner of the main interface will show **D/B**. Drive and boom movements can be performed simultaneously.

- 5) **Standard Set:** Select the Standard Set option, change the value by pressing the up or down arrow keys, and press and hold the OK button for 3 sec to confirm the setting.
 - If the value is set to “0”, no standard icon will be displayed in the upper right corner of the main interface.
 - If the value is set to “1”, the upper right corner of the main interface will show **CE**.
 - If the value is set to “2”, the upper right corner of the main interface will show **ANSI**.
 - If the value is set to “3”, the upper right corner of the main interface will show **CSA**.
 - If the value is set to “4”, the upper right corner of the main interface will show **AS**.
 - If the value is set to “5”, the upper right corner of the main interface will show **KCS**.
 - If the value is set to “6”, the upper right corner of the main interface will show **JIS**.
 - If the value is set to “7”, the upper right corner of the main interface will show **EAC**.
 - If the value is set to “8”, the upper right corner of the main interface will show **UKC**.
- 6) **Reserve Bit setting:** The reserve bit is reserved for later use. Select the Reserve Bit option, and press and hold the OK button for 3 sec to confirm the setting. The corresponding indicator light will illuminate .
- 7) **Clear Total operating hours (Work Time):** Select the Clear option, and press and hold the OK button for 3 sec to complete clearing the operating hour (work time) value. The total operating hours can only be cleared once (after clearing, the total operating hours will be about 36.5 h), please use the function with caution.
- 8) If re-selection is required, press the Setting button to return to the System Setting interface, then enter the Machine Parameter Setting (4/7) interface again and repeat the previous steps to select the required option.
- 9) Press the Home button to return to the Home interface, and power off the machine as needed.
6. In the Machine Parameter Setting (4/7) interface, press the Next button to enter the Machine Parameter Setting (5/7) interface.

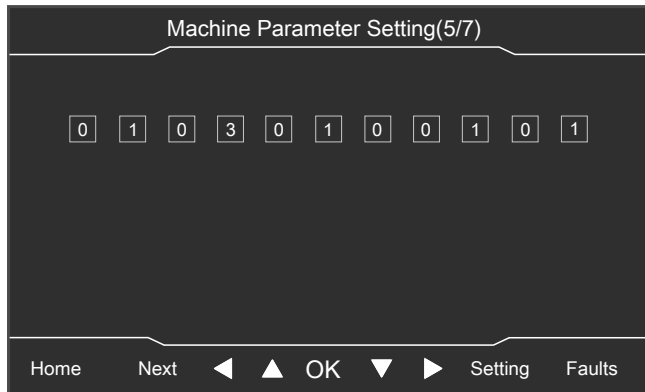


Fig. 13 Machine Parameter Setting (5/7) interface

- 1) On the interface, the machine serial number can be set. Change the selected option by pressing the left or right arrow key, and adjust the value by pressing the up and/or down key, press the OK button to confirm and save the setting.
- 2) If re-setting is required, press the Setting button to return to the System Setting interface, then enter the Machine Parameter Setting (4/7) again and repeat the previous steps.
- 3) Press the Home button to return to the Home interface, and power off the machine as needed.
7. In the Machine Parameter Setting (6/7) interface, press the Next button to enter the Machine Parameter Setting (7/7) interface. In the interface, select the "Restore Total Operating Hours" (Restore Total Hour) option, then press the OK button. The total operating hours of the machine can be restored after six minutes of waiting time.

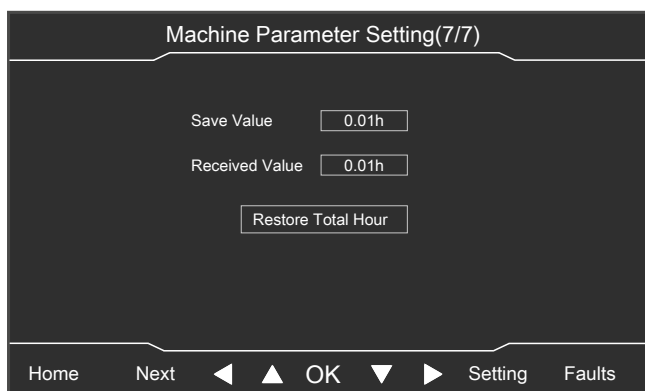


Fig. 14 Machine Parameter Setting (7/7) interface

Notes:

- The controller logs the machine's operating hours and sends data to the display screen every six minutes. The Received Value is the data received by the display screen; the Save Value is the data saved by the display screen. The

Received Value and Save Value are usually identical.

- If a new controller is installed after the machine has been in operation for a certain period of time the Received Value will be 0, and the Save Value will be the total operating hours of the machine. Select the "Restore Total Operating Hours" option, then press the OK button. The Received Value can then be restored to the total operating hours of the machine after a waiting time of six minutes.

Time Setting

1. On the System Setting interface, select Time Setting by pressing the up or down arrow key until the Time Setting is displayed, then press the OK button to enter the Time Setting interface.

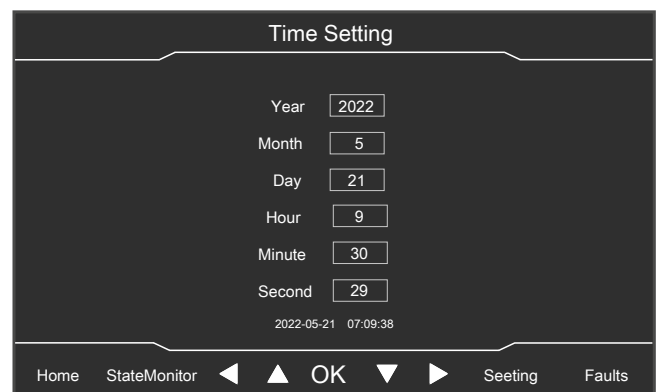


Fig. 15 Time Setting interface

2. On the interface, change the selected item by pressing the left shift key or right shift key, adjust the value by pressing the up key or down shift key, and press the OK button to confirm and save the setting.
3. If resetting is required, press the Setting button to return to the System Setting interface, then enter Time Setting interface, and repeat the above steps.
4. Press the Home button to return to the Home interface, and power off the machine as needed.

Machine Information

1. On the System Setting screen, select the "Machine Info" by pressing the up or down arrow key until Machine Info is displayed, and press the OK button to enter the Machine Information interface.

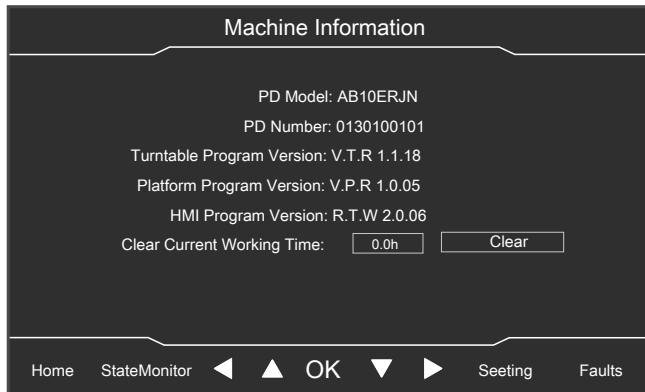


Fig. 16 Machine Information interface

2. This interface is mainly used to inquire detailed information on the machine's current software version and to clear the current operating hours (working time).
3. Select the "Clear" option, press and hold the OK button for 3 seconds to complete clearing the current operating hours.
4. Press the Home button to return to the Home interface, and power off the machine as needed.

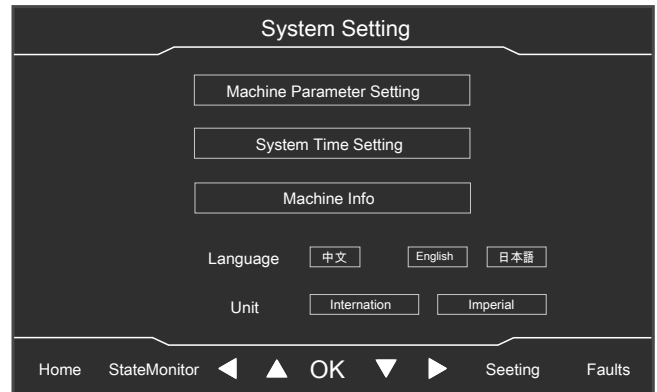


Fig. 18 System Setting interface

2. Change the selected item by pressing the up, down, left, and/or right arrow key, and press the OK button to complete the system setting.

Language Setting

1. On the Home interface, press the Settings button to enter the System Setting interface.

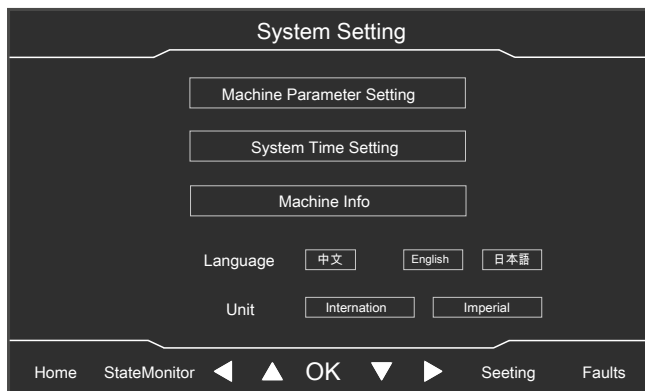


Fig. 17 System Setting interface

2. Change the selected item by pressing the up, down, left, or right arrow key, and press the OK button to complete the language selection.

Unit Setting

1. On the Home interface, press the Settings button to enter the System Setting interface.

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12 APPENDIX

12.1 ACCESSORY DEVICE WEIGHT TABLE

To meet diverse operational requirements, this machine supports the installation of accessory devices on the platform, allowing customers to configure them flexibly according to actual working conditions. The table below details the weights of various accessory devices. For more instructions and installation guidelines, please refer to the **Boom Lift Accessories Manual**.

Table 12-1 Accessory Device Weight Table

No.	Accessory Code	Accessory Name	Weight (kg)	Remarks
1	103010043276	Operator protective device	12	For 1.15m (3.77') platform, without protective cover
2	103010043323	Operator protective device	12	For 1.15m (3.77') platform, with protective cover
3	105070043057	Operator protective device	12	For standard platform, without protective cover
4	105070043063	Operator protective device	12	For standard platform, with protective cover
5	105070043033	Operator protective device	12	Legacy version (discontinued)
6	105065043018	Operator protective device	12	For shipyard models, without height detection bar
7	105065043009	Electrical height-limit operator protective device	28	For shipyard models, with height detection bar
8	103010043331	Half-height platform mesh	9	For 1.15m (3.77') platform with swing gate
9	105068043056	Half-height platform mesh	4	For 1.45m (4.76') platform with single gate
10	103006043015	Half-height platform mesh	10	For 1.45m (4.76') platform with swing gate
11	105068043041	Half-height platform mesh	10	For 1.83m (6') platform with swing gate
12	105064043033	Half-height platform mesh	12	For 2.44m (8') platform with swing gate
13	105064043113	Full-height platform mesh	26	For 2.44m (8') platform with swing gate
14	103010040004	Anti-pinch rail	8	For 1.15m (3.77') platform with swing gate
15	105068043067	Anti-pinch rail	9	For 1.45m (4.76') platform with single gate
16	105068043064	Anti-pinch rail	11	For 1.83m (6') platform with swing gate
17	105068043071	Anti-pinch rail	14	For 2.44m (8') platform with swing gate
18	105017040003	Manual storage container	1	/
19	104009040011	Manual storage container	1	Legacy version (discontinued)

Table 12-1 Accessory Device Weight Table (continued)

No.	Accessory Code	Accessory Name	Weight (kg)	Remarks
20	105017060062	Limit device	13	Legacy version (discontinued)
21	103010060038	Overhead protection device	14	For 1.15m (3.77') platform
22	114002060083	Overhead protection device	14	For 1.45m (4.76') platform
23	114002060084	Overhead protection device	14	For 1.83m (6') platform
24	114002060086	Overhead protection device	14	For 2.44m (8') platform
25	105064043064	Tool box	5	For standard platform
26	103010043262	Tool box	4	For 1.15m (3.77') platform
27	103013170030	Welder bracket package	7	For 1.83m (6') platform
28	105069170010	Welder bracket package	9	For 2.44m (8') platform
29	114006040008	Pipe cradle	29	U-shaped
30	105064043135	Pipe cradle	4	Y-shaped
31	104029170001	Glass panel cradle	13	For 1.83m (6') platform with swing gate
32	105064043022	Glass panel cradle	17	For 2.44m (8') platform
33	105090040013	Anemometer	3	/
34	105064043307	Access deck	25	/
35	105017060065	Work light	1	/

Note:

- Standard platform: All platforms with heights other than 1.15m (3.77').

12.2 MAJOR MODIFICATION AND REPAIR RECORD

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

[illegible]

12.3 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 12-2 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
Travel motor	1, 2	1, 2	1, 2
Travel reducer	1, 2, 6	1, 2, 6	1, 2, 6, 11
Steering components	1, 2	1, 2	1, 2
Axles/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
Pump motor	1, 2	1, 2	1, 2
Central rotary 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
Boom assembly			
Boom weldment	1, 2	1, 2	1, 2
Hose or wire rope brackets	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

Table 12-2 Inspection and Preventive Maintenance Schedule (continued)

Item	Interval		
	Before each delivery ¹ or quarterly ²	Semiannually ³	Annually ⁴
Hydraulic system			
Hydraulic pump	1, 2, 3, 6	1, 2, 3, 6	1, 2, 3, 6
Hydraulic cylinder	1, 2, 3, 5, 6, 12	1, 2, 3, 5, 6, 12	1, 2, 3, 5, 6, 12
Bleeding the oscillating cylinder (if equipped)	10 ^{NO.1}	10 ^{NO.1}	10 ^{NO.1}
Hydraulic valves	1, 2, 3, 5, 6	1, 2, 3, 5, 6	1, 2, 3, 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
Suction filter	1, 5, 6	1, 5, 6	1, 5, 6, 11
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 controller	1, 3, 4, 7, 10	1, 3, 4, 7, 10	1, 3, 4, 7, 10
Turntable controller	1, 3, 4, 7, 10	1, 3, 4, 7, 10	1, 3, 4, 7, 10
Function control lock, secondary guarding device and brake	1, 3, 10	1, 3, 10	1, 3, 10
Foot switch	1, 3, 10	1, 3, 10	1, 3, 10
Emergency stop switch (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

Table 12-2 Inspection and Preventive Maintenance Schedule (continued)

Item	Interval		
	Before each delivery ¹ or quarterly ²	Semiannually ³	Annually ⁴
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
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 12-2 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. Check for normal return to neutral or "off" position (self-resetting switches return to neutral 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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