

Maintenance Manual

Manual No: 515008110002-EN

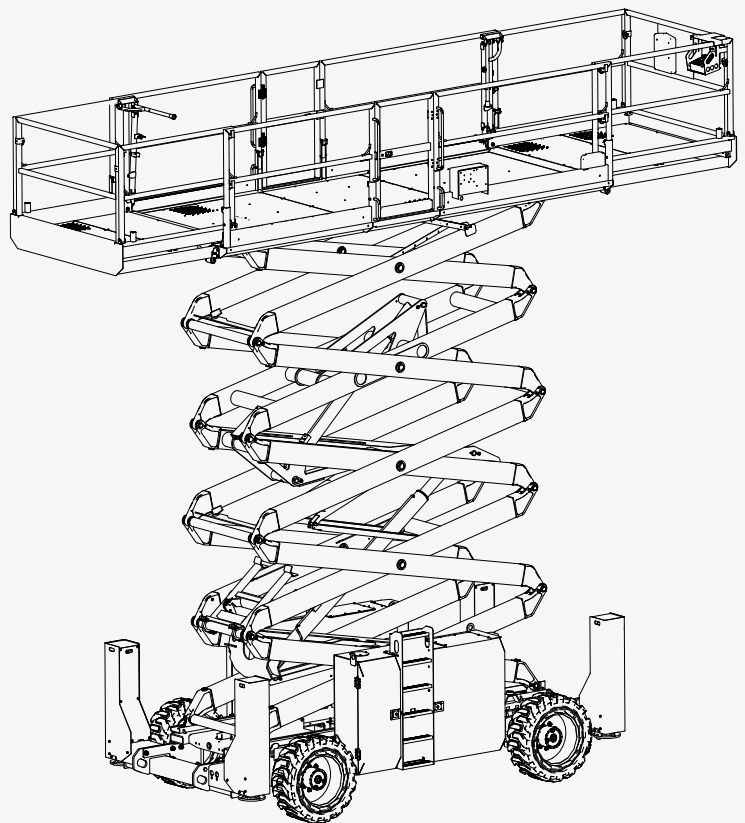
Manual Version: B

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Translated version

1323RE/4389RE

1623RE/5389RE



GB **CE** **ANSI** **AS/NZS** **EAC** **SP**

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 the State of California 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 more information, go to: www.P65warnings.ca.gov.

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 operating regulations that conflict with this manual. The stricter safety operating 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.cn 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]

Applicable Models

The manual applies to the following models and serial numbers:

Model	Metric Trade Name	Imperial Trade Name	Serial No.
1323RE	1323RE	4389RE	1500700001 to present
1623RE	1623RE	5389RE	1500800100 to present

Note:

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

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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.



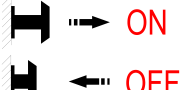
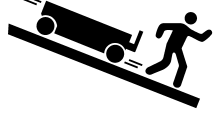
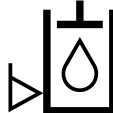
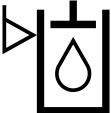
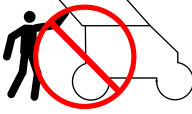
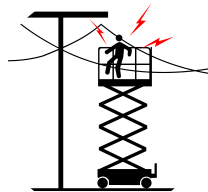
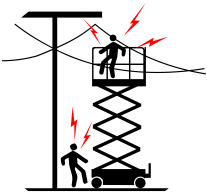
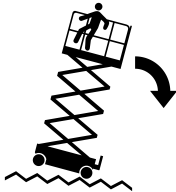
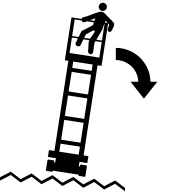
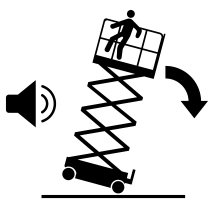
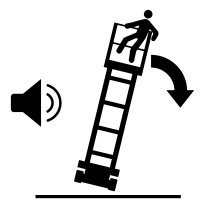
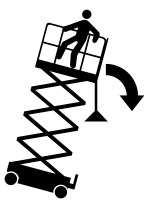
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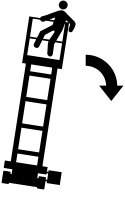
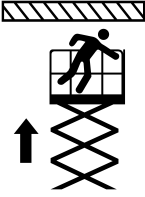
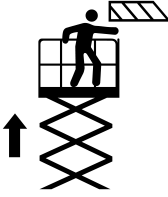
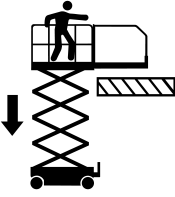
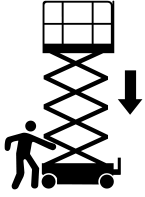
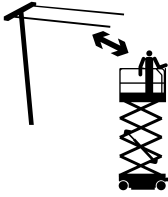
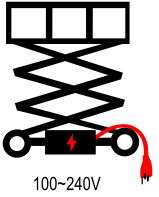
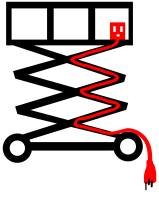
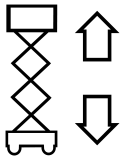
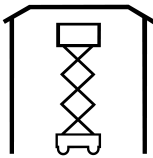
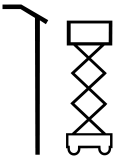
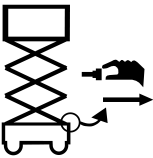
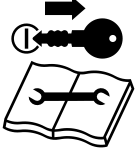
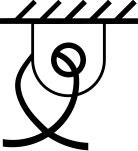
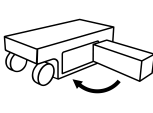
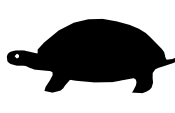
Indicates an imminently hazardous situation that, if not avoided, could result in minor or moderate injury.

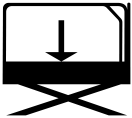
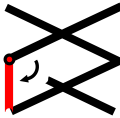
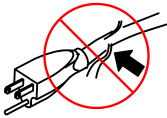
NOTICE

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	 Wedge the wheel
 Refer to the Operation Manual	 Add lubricant	 Crushing hazard – safety shoes required	 Danger of hot, high-pressure fluid spray	 Wind
 Press the directional-control valve	 Repeatedly operate the manual brake release valve	 Release the brake	 Alarm sounding	 Horn
 Noise level	 Burn hazard	 Keep a safe distance from high temperatures	 Pull out-ON Press-OFF	 Collision hazards - never release the brake on slope
 Hydraulic oil filler	 Hydraulic oil level low	 Hydraulic oil level high	 Temperature	 Replace with tires of the same specification
 Only trained maintenance personnel can check 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

 Tipping hazard – never leave the door open	 Collision hazard – keep head clear of overhead obstacles when raising platform	 Crushing hazard – keep hands clear from overhead obstacles when raising platform	 Collision hazard – keep the platform clear of obstacles below when lowering the platform	 Crushing hazards – keep hands away from scissor arms when lowering the platform
 Fall hazard – never climb on platform guardrails	 Fall hazards – never climb on scissor arms	 Keep a safe distance from power lines	 Battery charging plug	 Platform power plug
 Platform up and down movement	 Indoor use	 Outdoor use	 Emergency lowering handle position	 Maximum platform height
 Only qualified maintenance personnel may perform maintenance work	 Wear protective clothing and safety goggles	 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
 Forklift pocket position	 Close the chassis door	 Tool or weight	 Fast/high speed	 Slow/low speed

 Platform load capacity	 Respective load capacity of main platform and platform extension	 Engage the safety strut	 Do not use damaged power cables	
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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 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 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. Always park the machine on level, firm ground for maintenance, and ensure that the maintenance area is clean and unobstructed.
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.
 - 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.
 - 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.

2.3 MAINTENANCE SAFETY

4. Lock the wheels once the machine is parked to prevent it from moving inadvertently.
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 is turned off, and remove the key. An "Out of Service" warning sign can be placed next to the ground controls and platform controls, or the main power switch can be pressed to prevent unrelated personnel from inadvertently starting the machine.



WARNING

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

- 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 press (shut off) the main power switch.
 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.

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 scissor arms are stowed, and do not carry out maintenance with the scissor arms raised. If maintenance must be carried out with the scissor arms raised, take appropriate protective measures to avoid dangerous conditions.
- When lifting or moving heavy parts of the machine, use equipment with sufficient capacity, and never place heavy objects in unstable positions after moving.
- 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.
- Do not wash the machine with water. The machine contains 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 main 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

WARNING

hydraulic oil, and avoid allowing it to be spilled on the ground.

- After maintenance is completed, immediately wash off any hydraulic oil that may have come into contact with your skin.
- Waste hydraulic fluids, fuels, coolants and refrigerants must be recycled or disposed as per local regulations.

High Temperature and High Pressure Hazards

WARNING



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

Welding and Grinding Operation Hazards

WARNING



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

Fire and Explosion Hazards

WARNING



- Do not operate the machine, charge the battery or refuel the machine in places where potentially flammable or explosive gases may be present.
- Refueling and charging should be carried out in a well-ventilated place without flames, sparks, and other hazards that may cause fire or explosion.
- For engine-powered machines, do not refuel the machine while the engine is running.
- Never spray ether or other starting agents into glow-plug-equipped engines (engine-powered machines).
- Never touch the battery terminals or cable clamps with tools that can generate sparks.
- Only approved non-flammable cleaning solutions should be used on the machine.

Battery Hazard

WARNING



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



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



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



- 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 the battery system without approval to avoid serious accidents.

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

- Do not place tools or other metal objects across the two terminals of the battery.

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

- Batteries contain sulfuric acid and can produce explosive

WARNING

mixtures of hydrogen and oxygen. Keep any materials (including cigarette/smoking materials) that can cause sparks or flames away from batteries to prevent explosion.

- 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, then the machine power switch should be turned off.

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 level of less than 10%) or battery under-voltage caused by long-term non-charging (battery with level 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.

3 TECHNICAL CHARACTERISTICS

3.1 MACHINE SPECIFICATIONS

Table 3-1 1323RE Specifications

Item	Metric	Imperial
Product Category		
Power type	Lead-acid battery/lithium battery	
Travel drive type	AC motor	
Outrigger type	H-type	
Dimensions		
Max. platform height	13.1 m	42 ft 11.7 in
Max. working height	15.1 m	49 ft 6.5 in
Maximum horizontal reach (rear platform extension)	1.2 m	3 ft 11.2 in
Maximum horizontal reach (front platform extension)	1.5 m	4 ft 11.1 in
Overall length	4.88 m	16 ft
Overall width	2.28 m	7 ft 5.7 in
Overall height (with guardrails folded)	2.2 m	7 ft 2.6 in
Overall height (with guardrails not folded)	2.96 m	9 ft 8.5 in
Wheelbase	2.84 m	9 ft 3.8 in
Track width	1.95 m	6 ft 4.7 in
Ground clearance	0.36 m	1 ft 2.2 in
Platform dimensions (L×W×H) -6.5 m platform	3.96 m×1.82 m×1.1 m	13 ft×6 ft×3 ft 7 in
Platform dimensions (L×W×H) -7.4 m platform	4.84 m×1.82 m×1.1 m	15 ft 10.6 in×6 ft×3 ft 7 in
Performance		
Rated platform capacity	680 kg	1499 lb
Rated platform extension capacity	227 kg	500 lb
Maximum number of occupants	7 persons	
Travel speed (stowed)	0 – 5.3 km/h	0 – 3.3 mph
Travel speed (raised)	0 – 1.1 km/h	0 – 0.68 mph
Platform lifting time (unloaded)	50 – 60 s	
Platform lowering time (unloaded)	34 – 44 s	

Table 3-1 1323RE Specifications (continued)

Item	Metric	Imperial
Gradeability	40%	
Maximum allowable tilt angle (front-rear, outrigger retracted/extended)	3°/0.5°	
Maximum allowable tilt angle (left-right, outriggers retracted/extended)	2°/0.5°	
Maximum outrigger leveling angle (front-rear/left-right)	7°/12°	
Turning radius (inside/outside)	2.2 m/5.3 m	7 ft 2.6 in/17 ft 4.7 in
Tire size (diameter×width/type)	33×12-20/solid	315/55D20/foam-filled
Maximum operating noise level	72dB (without range extender) 86dB (with range extender)	
IP rating	IP 54	
Maximum total vibration on the platform	2.5 m/s ²	
Maximum whole body vibration value (WBV)	0.5 m/s ²	
Power		
Drive x steer	4 WD×2 WS	
Hydraulic tank volume	110 L	24 gal (UK)/29 gal (US)
Hydraulic system pressure	24 MPa	3481 psi
Battery specifications (voltage, capacity, rate of discharge)	Lead-acid battery – 48 V, 480 Ah, 5 hr Lithium battery – 51.2 V, 500 Ah, 0.2 C	
System voltage	48 VDC	
Control voltage	12 VDC	
Charger (input voltage/output current)	100 – 240 V AC/60 A	
Lift motor (voltage/power)	48 V DC/8 kW	
Drive motor (voltage/power)	29 V AC/1.5 kW	
Weight		
Gross weight (without range extended charging package)	7970 kg	17571 lb
Gross weight (with range extended charging package)	8360 kg	18431 lb
Ground bearing data		
Maximum tire load	3900 kg	8598 lb
Tire ground pressure	720 kPa	104 psi
Maximum outrigger ground load	3200 kg	7055 lb
Outrigger ground pressure	630 kPa	91 psi

Table 3-1 1323RE Specifications (continued)

Item	Metric	Imperial
Environment		
Maximum allowable lateral force	400 N	90 lbf
Maximum allowable wind speed (indoor/outdoor)	0/12.5 m/s	0/28 mph
Maximum allowable altitude	1000 m	3280.8 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 %	
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.	

Table 3-2 1623RE Specifications

Item	Metric	Imperial
Product Category		
Power type	Lead-acid battery/lithium battery	
Travel drive type	AC motor	
Outrigger type	H-type	
Dimensions		
Max. platform height	16.2 m	53 ft 1.8 in
Max. working height	18.2 m	59 ft 8.5 in
Maximum horizontal reach (rear platform extension)	1.2 m	3 ft 11.2 in
Maximum horizontal reach (front platform extension)	1.5 m	4 ft 11.1 in
Overall length	4.88 m	16 ft
Overall width	2.28 m	7 ft 5.7 in
Overall height (with guardrails folded)	2.42 m	7 ft 11.3 in
Overall height (with guardrails not folded)	3.18 m	10 ft 5.2 in
Wheelbase	2.84 m	9 ft 3.8 in
Track width	1.95 m	6 ft 4.7 in
Ground clearance	0.36 m	1 ft 2.2 in
Platform dimensions (L×W×H) -6.5 m platform	3.96 m×1.82 m×1.1 m	13 ft×6 ft×3 ft 7 in
Platform dimensions (L×W×H)	4.84 m×1.82 m×1.1 m	15 ft 10.6 in×6 ft×3 ft 7 in

Table 3-2 1623RE Specifications (continued)

Item	Metric	Imperial
-7.4 m platform		
Performance		
Rated platform capacity	680 kg	1499 lb
Rated platform extension capacity	227 kg	500 lb
Maximum number of occupants	4 persons	
Travel speed (stowed)	0 – 5.3 km/h	0 – 3.3 mph
Travel speed (raised)	0 – 1.1 km/h	0 – 0.68 mph
Platform lifting time (unloaded)	70 – 90 s	
Platform lowering time (unloaded)	45 – 55 s	
Gradeability	40%	
Maximum allowable tilt angle (front-rear, outrigger retracted/extended)	3°/0.5°	
Maximum allowable tilt angle (left-right, outriggers retracted/extended)	2°/0.5°	
Maximum outrigger leveling angle (front-rear/left-right)	7°/12°	
Turning radius (inside/outside)	2.2 m/5.3 m	7 ft 2.6 in/17 ft 4.7 in
Tire size (diameter×width/type)	33×12-20/solid	315/55D20/foam-filled
Maximum operating noise level	72dB (without range extender) 86dB (with range extender)	
IP rating	IP 54	
Maximum total vibration on the platform	2.5 m/s²	
Maximum whole body vibration value (WBV)	0.5 m/s²	
Power		
Drive x steer	4 WD×2 WS	
Hydraulic tank volume	110 L	24 gal (UK)/29 gal (US)
Hydraulic system pressure	24 MPa	3481 psi
Battery specifications (voltage, capacity, rate of discharge)	Lead-acid battery – 48 V, 480 Ah, 5 hr Lithium battery – 51.2 V, 500 Ah, 0.2 C	
System voltage	48 VDC	
Control voltage	12 VDC	
Charger (input voltage/output current)	100 – 240 V AC/60 A	
Lift motor (voltage/power)	48 V DC/8 kW	
Drive motor (voltage/power)	29 V AC/1.5 kW	

Table 3-2 1623RE Specifications (continued)

Item	Metric	Imperial
Weight		
Gross weight (without range extended charging package)	8800 kg	19400 lb
Gross weight (with range extended charging package)	9190 kg	20260 lb
Ground bearing data		
Maximum tire load	3900 kg	8598 lb
Tire ground pressure	720 kPa	104 psi
Maximum outrigger ground load	3200 kg	7055 lb
Outrigger ground pressure	630 kPa	91 psi
Environment		
Maximum allowable lateral force	400 N	90 lbf
Maximum allowable wind speed (indoor/outdoor)	0/12.5 m/s	0/28 mph
Maximum allowable altitude	1000 m	3280.8 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 %	
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:

- a) The platform height plus the operator height (taken as 2 m/6 ft 7 in) equals the working height.
- b) In different areas, hydraulic oil, engine oil, coolant, fuel and lubricant should be added in accordance with the environmental temperature.
- c) In cold weather, auxiliary devices are needed to start the machine.
- d) The ground bearing data is approximate, without considering different options, thus it is applicable only when taking an adequate safety factor into account.
- e) Rated platform load capacity refers to the maximum allowable load on the platform, including the weight of persons, materials, tools, accessories and other objects.
- f) The hydraulic tank capacity is the maximum volume of the tank.

3.2 SPECIFICATIONS OF MAJOR COMPONENTS

Drive Reducer

Table 3-3 Drive Reducer (PN.204020003074)

Model	IFT007T3110A
Maximum input speed	4800 r/min
Maximum output torque	7000 Nm (5163 ft-lb)
Speed ratio	109.5

Battery

Table 3-4 Lead-acid Battery (PN.203100003008)

Rated voltage	24 V
Rated capacity	480 Ah

Table 3-5 Lithium Battery (PN.203100003225) & (PN.203100003226)

Rated voltage	51.2 V
Rated capacity	500 Ah
Standard charge current	80 A
Continuous discharge current	400 A

Table 3-6 Maintenance-free AGM Battery (PN.203100000061)

Rated voltage	12 V
Capacity	110 Ah
Cold starting current	925 CCA @ -18°C (0°F)

Range Extender (if equipped)

Table 3-7 Range Extender (PN.201010003125)

Unit parameters	
Model	SK6-DC48-SS-O
Operating environment temperature	-25 – 45°C (-13 – 113°F)

Table 3-7 Range Extender (PN.201010003125) (continued)

Unit noise	88 dB
Rated output power	6 kW
Rated output voltage	51 V
Rated power consumption	2.6 L/h
Rated speed	2600 rpm
Protection level	IP 23
Engine parameters	
Brand	Kubota
Model	Z482-E48-SWT-1
Type of cooling	Water-cooled
Coolant	50% ethylene glycol + 50% distilled water
Engine oil capacity	5 L 1.1 gal (Imperial) 1.32 gal (US)
Emission standard	EU Stage V, Tier 4
Electric motor system	
Model	SCM-04
Rated power	6 kW
Rated torque	24 Nm (17.7 ft-lb)
Rated speed	2600 rpm
Type of cooling	Water-cooled
Protection level	IP 67

Hydraulic Pump

Table 3-8 Gear Pump (PN.202010003037)

Nominal displacement	8 mL/r
Rated pressure	25 MPa (3626 psi)
Maximum pressure	28 MPa (4061 psi)
Rated speed	2500 r/min
Speed range	600 – 3500 r/min

3.3 FUNCTION SPEED

Table 3-9

Item	Parameter
Raise the platform - 1323RE	50 – 60 s
Raise the platform - 1623RE	70 – 90 s
Lower the platform - 1323RE	34 – 44 s
Lower the platform - 1623RE	45 – 55 s
Travel in high gear – stowed	25 – 30 s
Travel in low gear – stowed	60 – 72 s
Travel – operating	60 – 72 s
Braking distance	S≤1.2 m (3 ft 11 in)

- a) The function speed depends on the start and end point of the movement rather than the controls/ switches.
- b) The drive speed test results will vary with tires of different specifications.
- c) All speed tests should be conducted from the platform controller. Test results will differ if tested from the ground controller.
- d) All tests should be conducted with the hydraulic oil temperature higher than 30 - 40 °C (86 - 104 °F). If the hydraulic oil temperature is too low the test results will be affected.

Test requirements:

Raise the platform: After all outriggers have been extended to the ground and leveled, with the platform unloaded, raise the platform (with the scissor arms from fully retracted position to fully raised position). Perform this maneuver for two times.

Lower the platform: After all outriggers have been extended to the ground and leveled, with the platform unloaded, lower the platform (with the scissor arms from fully raised position to fully retracted position). Perform this maneuver for two times.

Travel in high gear – stowed: With the machine stowed on a level surface, switch to high gear, and push the travel joystick to the maximum travel distance to drive the machine forward and reverse for 40 m (131.2 ft) respectively for two times.

Travel in low gear - stowed: With the machine stowed on a level surface, switch to low gear, and push the travel joystick to the maximum travel distance to drive the machine forward and reverse for 20 m (65.6 ft) respectively for two times.

Travel - operating: With the machine in operating position on a level surface, push the travel joystick to the maximum forward position to drive the machine forward and reverse for 20 m (65.6 ft) respectively for two times.

Braking distance : As described in the “travel in high gear - stowed” test requirements, once the machine reaches the maximum drive speed, immediately release the control handle (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 3-10

Component	Metric (kg)	Imperial (lb)
Chassis assembly	5074	11186
Scissor assembly – 1323RE	2323	5121
Scissor assembly – 1623RE	3060	6746
Platform assembly	939	2070
Tire and wheel assembly	136	300
Steering connection plate	22	48.5
Drive reducer	50	110
Drive motor	47	104

Table 3-10 (continued)

Component	Metric (kg)	Imperial (lb)
Left box assembly	350	772
Right box assembly	323	712
Power battery (lead-acid cell)	375	827
Power battery (lithium cell)	133	293
Starting battery (maintenance-free AGM cell)	26	57
Steering cylinder	8	18
Oscillating cylinder	12	26
Outrigger cylinder	69	152
Upper lift cylinder – 1623RE	97	214
Lower lift cylinder	191	421
Range extender (if equipped)	130	287
Note: The weight of certain components will vary with the machine's option configuration.		

3.5 PRESSURE SETTINGS

Table 3-11

Movement	Maximum pressure
Platform lifting	21 MPa (3046 psi)
Steering	15.5 MPa (2248 psi)
Outrigger retracting/ extending	12 MPa (1740 psi)



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.

3.6 OIL SPECIFICATIONS

NOTICE

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

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 3-12

Ambient temperature range	Hydraulic oil grade
> 40°C (104°F)	Sinopec HM-68
0°C – 40°C (32°F – 104°F)	Sinopec HM-46

Table 3-12 (continued)

Ambient temperature range	Hydraulic oil grade
-15°C – 25°C (5°F – 77°F)	Sinopec HV-32
-22°C – 25°C (-7.6°F – 77°F)	Sinopec L-HS32
< -22°C (-7.6°F)	Sinopec 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 3-13

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

Note: Sinoboom recommends Mobil gear oil.

Fuel Oil

WARNING

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

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

Table 3-14

Grade	Recommended ambient temperature
0#	0 – 40°C (32 – 104°F)
-35#	-30 – 25°C (-22 – 77°F)

NOTICE

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

Engine Oil

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

Table 3-15

Engine type	Recommended service category*	Recommended viscosity grade**
Engines meeting China III emission standards	CH-4	5W-40/15W-40
Yanmar engines meeting China III emission standards	CJ-4	5W-40/15W-40

Table 3-15 (continued)

Engine type	Recommended service category*	Recommended viscosity grade**
Engines meeting China IV, Euro V and EPA Tier 4 emission standards	CJ-4/CK-4	5W-40/15W-40

*The letters "H", "J" and "K" represent engine oil service category, and the oil specifications become more severe as the letters climb the alphabet. Select appropriate engine oil based on the table recommendations above, which shall be at least not lower than the recommended service category.

**Engine oil with viscosity grade 5W-40 is suitable for ambient temperature range -25 – 25°C (-13 – 77°F), and that with viscosity grade 15W-40 is suitable for ambient temperature range 0 – 40°C (32 – 104°F). Select engine oil with viscosity grade that suitable for your local ambient temperature.

Antifreeze

Factory-filled antifreeze is based on engine brand:

Table 3-16

Engine brand	Antifreeze type
Deutz	-45°C antifreeze
Yanmar	-40°C antifreeze
Other brands	-35°C antifreeze

The antifreeze types above could meet the requirements of areas with ambient temperature range 35 – 40°C (-31 – 104°F). If the machine is to be operated in special environments where the above antifreeze types are not applicable, contact Sinoboom for appropriate antifreeze.

3.7 TORQUE SPECIFICATIONS

Special Torque Requirements

Please refer to the table below for special torque requirements:

Table 3-17 Special torque requirements

No.	Description	Torque value
1	Wheel nut	265 Nm (196 ft-lb)
2	Drive reducer bolt	300 Nm (221 ft-lb)
3	Drive motor bolt	27 Nm (20 ft-lb)
4	Cable fastening nut M8	9 – 11 Nm (6.6 – 8.1 ft-lb)
5	Cable fastening nut M10	18 – 23 Nm (13.2 – 17 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 3-18 Fastener torque specifications – metric

Nominal diameter (mm)	Pitch (mm)	Class 8.8	Class 10.9	Class 12.9
5	0.8	7 Nm (5 ft-lb)	9 Nm (7 ft-lb)	10 Nm (7 ft-lb)
6	1	12 Nm (9 ft-lb)	15 Nm (11 ft-lb)	18 Nm (13 ft-lb)
8	1.25	30 Nm (22 ft-lb)	35 Nm (26 ft-lb)	42 Nm (31 ft-lb)
	1	30 Nm (22 ft-lb)	37 Nm (27 ft-lb)	45 Nm (33 ft-lb)

Table 3-18 Fastener torque specifications – metric (continued)

Nominal diameter (mm)	Pitch (mm)	Class 8.8	Class 10.9	Class 12.9
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: UNF) to the values specified in the table below.

Table 3-19 Fastener torque specifications – Unified Thread Standard (UNC)

Nominal diameter (in)	Opposite nut size (s)	Class 5	Class 8
1/4-20	7/16"	10 Nm (7 ft-lb)	14 Nm (10 ft-lb)
5/16-18	1/2"	21 Nm (15 ft-lb)	29 Nm (21 ft-lb)
3/8-16	9/16"	37 Nm (27 ft-lb)	51 Nm (38 ft-lb)
7/16-14	5/8"	60 Nm (44 ft-lb)	82 Nm (60 ft-lb)
1/2-13	3/4"	90 Nm (66 ft-lb)	130 Nm (96 ft-lb)
9/16-12	13/16"	130 Nm (96 ft-lb)	180 Nm (133 ft-lb)
5/8-11	15/16"	178 Nm (131 ft-lb)	250 Nm (184 ft-lb)
3/4-10	1-1/8"	315 Nm (232 ft-lb)	445 Nm (328 ft-lb)
7/8-9	-	509 Nm (375 ft-lb)	715 Nm (527 ft-lb)

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

Table 3-20 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 3-21 Hydraulic Hose Torque

Metric thread	L (light-duty)	S (heavy-duty)
M12 × 1.5	19±1 Nm (14±1 ft-lb)	
M14 × 1.5	26±2 Nm (19±2 ft-lb)	
M16 × 1.5	40±3 Nm (30±2 ft-lb)	
M18 × 1.5	50±4 Nm (37±3 ft-lb)	
M20 × 1.5	-	60±4 Nm (44±3 ft-lb)
M22 × 1.5	70±5 Nm (52±4 ft-lb)	-
M24×1.5	-	85±6 Nm (63±4 ft-lb)
M26 × 1.5	90±6 Nm (66±4 ft-lb)	-
M30 × 2	120±8 Nm (89±6 ft-lb)	140±10 Nm (103±7 ft-lb)
M36 × 2	150±12 Nm (111±9 ft-lb)	180±12 Nm (133±9 ft-lb)
M42 × 2	-	260±16 Nm (192±12 ft-lb)
M45 × 2	240±15 Nm (177±11 ft-lb)	-
M52 × 2	250±16 Nm (184±12 ft-lb)	280±18 Nm (207±13 ft-lb)

Hydraulic Fitting Torque

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

Table 3-22 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 3-23 Hydraulic Fitting Torque - British Standard Pipe (BSP)

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

Table 3-23 Hydraulic Fitting Torque - British Standard Pipe (BSP) (continued)

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

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

Table 3-24 Hydraulic Fitting Torque - Unified Thread Standard (UNC/UNF)

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

4 MAINTENANCE INSTRUCTIONS

4.1 INSPECTION AND PREVENTATIVE 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 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 (PDI)

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 PDI. 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 PDI. 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 (PDI)	Before each sale, lease or rental delivery	Owner, dealer or user	Qualified Sinoboom technician
Regular Inspections	In service for 3 months or 250 hours (whichever comes first) or out of service for more than 3 months	Owner, dealer or user	Qualified Sinoboom technician
Annual Inspection	Once a year and no later than 13 months from the date of the previous annual inspection	Owner, dealer or user	Factory-trained service technician
Preventive Maintenance	At intervals specified in the Inspection and Preventive Maintenance Schedule	Owner, dealer or user	Qualified Sinoboom technician

Inspection and Preventive Maintenance Schedule

Perform inspection and preventive maintenance for the items in the table below at the specified intervals. Maintenance and inspection intervals are calculated based on the months of service or the “accumulated operating hours” (cumulative working time) displayed on the ground 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
Platform assembly			
Platform	1	1	1
Guardrails and floor	2	2	2
Access gate	1, 2, 3	1, 2, 3	1, 2, 3
Locking handle for platform extension	1, 2, 3	1, 2, 3	1, 2, 3
Platform wear pads (at the connection with scissor arm) and fasteners	1, 2	1, 2	1, 2
Safety belt anchorage point	1, 2, 7	1, 2, 7	1, 2, 7
Scissor arms assembly			

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

Item	Interval		
	Before each delivery ¹ or quarterly ²	Semiannually ³	Annually ⁴
Scissor arms	1, 2	1, 2	1, 2
Safety strut	1, 2, 3	1, 2, 3	1, 2, 3
Bearings	1, 2, 5, 12	1, 2, 5, 12	1, 2, 5, 8, 12
Pivot pins, retaining rings and fasteners	1, 2	1, 2	1, 2
Chassis assembly			
Chassis	2	2	2
Chassis wear pads (at the connection with scissor arm)	1, 2, 5	1, 2, 5	1, 2, 5, 8
Tires	1, 2	1, 2	1, 2
Wheel nuts	1 ⁵⁰	1 ⁵⁰	1 ⁵⁰
Traveling and steering components	1, 2, 5	1, 2, 5	1, 2, 5
Bearings	1, 2, 5, 12	1, 2, 5, 12	1, 2, 5, 12
Chassis door at both sides	1, 2, 3	1, 2, 3	1, 2, 3
Ladder	1, 2, 5	1, 2, 5	1, 2, 5
Drive motor	1, 5, 6	1, 5, 6	1, 5, 6
Drive reducer	1, 2, 5, 6	1, 2, 5, 6	1, 2, 5, 6, 11
Electric motor	1, 2, 3, 6	1, 2, 3, 6, 13	1, 2, 3, 6, 13
Gear pump	1, 2, 3, 6	1, 2, 3, 6	1, 2, 3, 6
Power system			
Refer to the machine's maintenance manual for inspection and preventive maintenance schedule, and the engine manual provided with the machine for detailed instructions.			
Hydraulic system			
Hydraulic pump	1, 2, 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
Hydraulic tank air filter	1, 5, 6	1, 5, 6, 11	1, 5, 6, 11
Suction filter	1, 5, 6	1, 5, 6	1, 5, 6, 11

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

Item	Interval		
	Before each delivery ¹ or quarterly ²	Semiannually ³	Annually ⁴
Return filter (if equipped)	1, 5, 6, 11 ⁵⁰	1, 5, 6, 11 ⁵⁰	1, 5, 6, 11 ⁵⁰
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	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
Ground 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
Emergency stop button (ground and platform)	1, 3, 10	1, 3, 10	1, 3, 10
Limit switches and power switch	1, 3, 10	1, 3, 10	1, 3, 10
Overload limit function	1, 3, 10	1, 3, 10	1, 3, 10
Tilt alarm	1, 3, 10	1, 3, 10	1, 3, 10
Emergency lowering device	1, 3, 10	1, 3, 10	1, 3, 10
Drive function	1, 3, 10	1, 3, 10	1, 3, 10
Brake function	1, 3, 10	1, 3, 10	1, 3, 10
Other			
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

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

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

Note:

¹ Before each sale, lease or shipment delivery;

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

³ In service for 6 months or 500 hours;

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

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

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

NO.1 Before the machine is put into service for the first time

Inspection activity (numerical codes):

1. Check for correct installation (accurate position, firmly installed, tightened to the specified torque)
2. Visual inspection 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 dimensions/tolerances
9. Fully charged
10. Verify/perform
11. Replace the oil or filter element
12. Correctly lubricated
13. Inspect the carbon brush

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 Parts

When assembling pressure-fit 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. An 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.

Battery

Clean the battery with a non-metallic brush and sodium bicarbonate aqueous solution, then rinse it with clean water. After cleaning, allow the battery to dry completely, and apply anti-corrosion compound to the battery terminals.

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.

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5 PLATFORM COMPONENTS

The figure below shows platform components. Your machine may have different platform components due to different configuration.

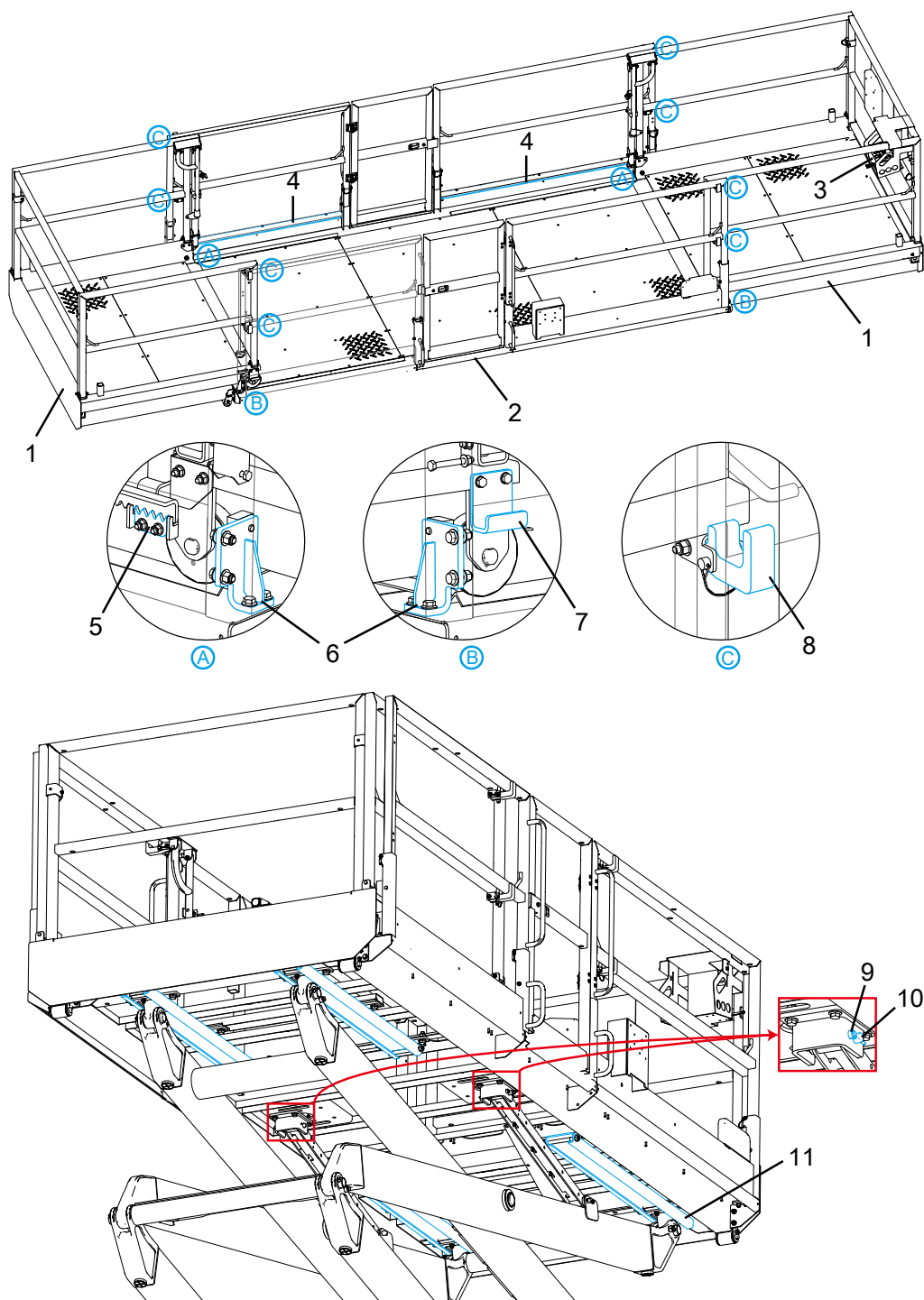


Fig. 1 Diagram of Platform Components

Table 5-1

1. Platform extension	2. Main platform	3. Platform controller
4. Long rack	5. Small rack	6. Limit base
7. Folded plate	8. Limit block	9. Scissor arms assembly installation fastener
10. Pivot pin	11. Chute	

5.1 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 ground 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. Carefully remove the platform controller.

Installation

For installation, follow the disassembly procedure in reverse order.

5.2 PLATFORM ASSEMBLY

The platform assembly is composed of the main platform and platform extension. The platform assembly shall be disassembled and installed as follows:

Disassembly

1. Make sure the machine is in stowed position.
2. Remove the platform controller from the platform.
3. Lift the scissor arms until the connecting shaft between the scissor arms and platform can be accessible.
4. Erect the safety strut and ensure that the safety strut provides effective support.

5. Use suitable lifting equipment to support the scissor arm assembly to prevent it from falling during the disassembly process.
6. Mark and disconnect the harness connections on the platform assembly.
7. Use suitable lifting equipment to support the work platform.
8. Remove the retaining fasteners at the pivot pin between the scissor arms assembly and the platform assembly bottom, and knock out the pivot pin with a brass rod and mallet.
9. With the assistance of the lifting equipment, slowly lift the platform slightly and push the platform so that the wear pad at the top of scissor arms gets out of the chute at the bottom of the platform.
10. Slowly remove the platform assembly with the aid of the lifting equipment.

Installation

For installation, follow the disassembly procedure in reverse order.

5.3 PLATFORM EXTENSION

Disassembly

1. Extend the platform appropriately, and ensure that the platform extension is effectively supported.
2. Use suitable lifting equipment to support the work platform.
3. From the roller assembly on one side of platform extension, remove the retaining fastener of small rack, and then remove the small rack meshing with the long rack on the main platform.
4. From the roller assembly on the other side of platform extension, remove the retaining fastener of folded plate mounted on the platform extension, and then remove the folded plate.
5. From the roller assembly on both sides of platform extension, remove the retaining fastener of limit base mounted on the main platform, and then remove the limit base.

6. From the guardrails on both sides of platform extension, remove the retaining fastener of limit block, and then remove the limit block.
7. With the assistance of lifting equipment, slowly remove the platform extension from the platform assembly.

Installation

For installation, follow the disassembly procedure in reverse order.

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6 SCISSOR ARMS COMPONENTS

The diagram below shows the scissor arms components of the model 1623. Your machine may have different scissor arms components due to different configuration.

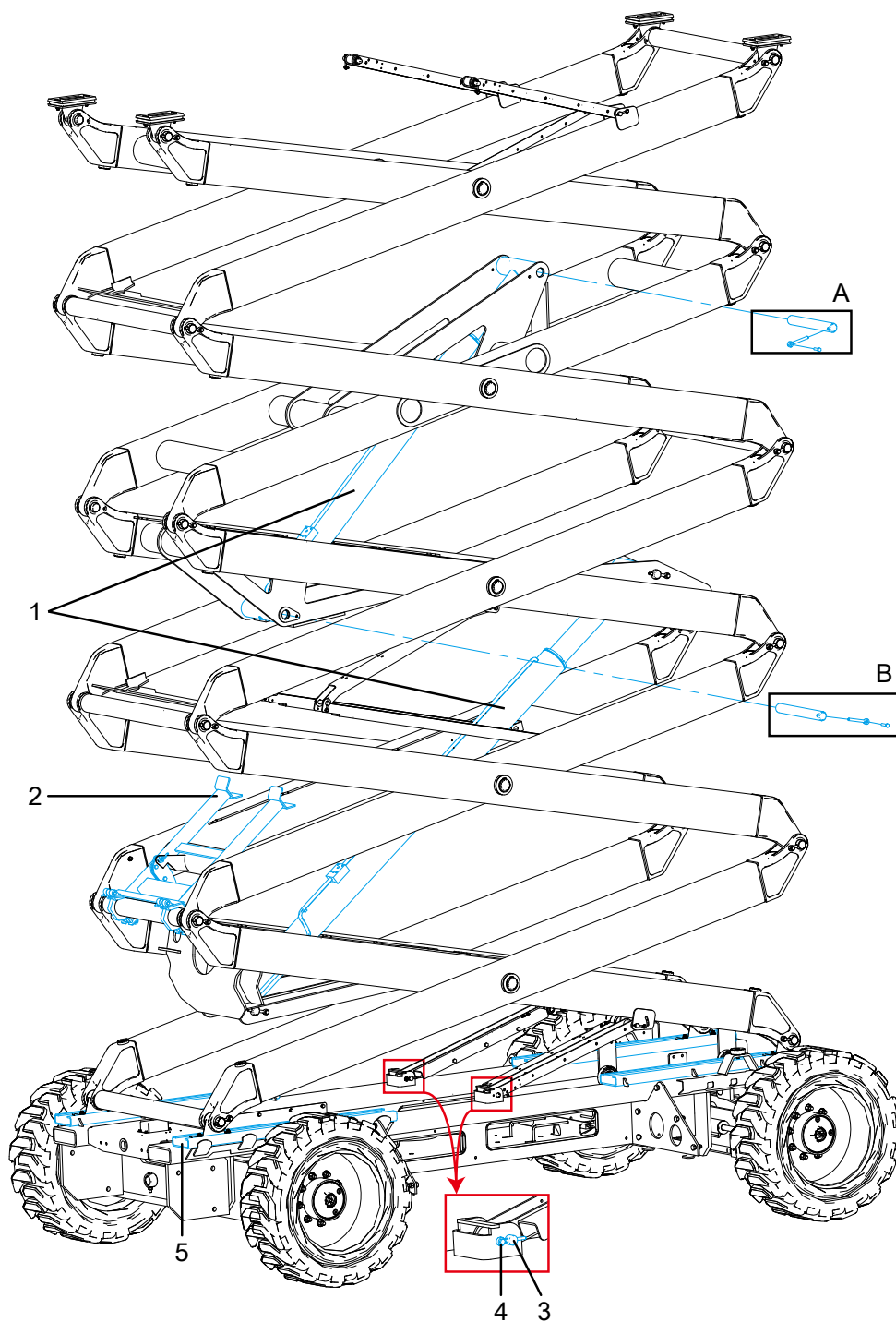


Fig. 1 Diagram of Scissor Arms Components

Table 6-1

A. Cylinder upper end installation (including pivot pin, pin, bolt and nut)		
B. Cylinder lower end installation (including pivot pin, pin, bolt and nut)		
1. Lift cylinder	2. Safety strut	3. Scissor arm assembly fasteners
4. Pivot pin	5. Chute	

6.1 DISASSEMBLY AND INSTALLATION

Disassembly

1. Remove the platform assembly.
2. Mark and disconnect the harness connections on the scissor arm assembly.
3. Mark and disconnect the hydraulic pipelines on the scissor arm assembly and collect the hydraulic oil in the pipelines with a suitable vessel. Then seal the pipelines and ports.
4. Use suitable lifting equipment to support the scissor arm assembly.
5. Remove the retaining fasteners at the pivot pin between the scissor arms assembly and the chassis, and knock out the pivot pin with a brass rod and mallet.
6. With the assistance of the lifting equipment, slightly lift up the scissor arms assembly, and push to slide the scissor arms assembly away from chassis chute.
7. Slowly remove the scissor arms assembly with the aid of the lifting equipment.

Installation

For installation, follow the disassembly procedure in reverse order.

6.2 SAFETY STRUT



WARNING

If you need to work under the raised scissor arms, make sure that the safety strut sets up and provides effective support.

1. Start the machine on the ground to raise the platform appropriately so that the safety strut can be fully erected.

2. Erect the safety strut and lower the platform appropriately to ensure that the safety strut provides effective support.
3. Lower the platform until the upper scissor sleeve contacts the safety strut.

6.3 LIFT CYLINDER



WARNING

- **Before loosening or disassembling hydraulic parts, 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 hydraulic oil from splashing and injuring people.**

1. Raise the scissor arms appropriately until the lift cylinder is accessible and can be easily removed.
2. Erect the safety strut and ensure that the safety strut provides effective support.
3. Use suitable lifting equipment to support the scissor arm assembly to prevent it from falling during the disassembly process.
4. Mark and disconnect the hydraulic pipelines on the lift cylinder and collect the hydraulic oil in the pipelines with a suitable vessel. Then seal the pipelines and ports.
5. Support the two ends of the lift cylinder with suitable lifting equipment.
6. Remove the bolt and stop pin at the pivot pin connecting the lift cylinder upper end with the scissor arm, and knock out the pivot pin with a brass rod and mallet.
7. Remove the bolt and stop pin at the pivot pin connecting the lift cylinder lower end with the scissor arm, and knock out the pivot pin with a brass rod and mallet.
8. Slowly remove the lift cylinder with the aid of the lifting equipment.

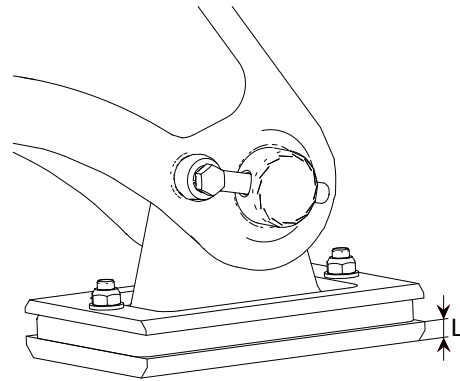
9. Slowly lower the scissor arm to stowed position with the aid of the lifting equipment.

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.



L=12 mm (0.47 in)

Fig. 2

6.4 SCISSOR ARMS WEAR PADS

The wear pads at the connections of scissor arms with chassis chute and platform chute are essential for the safe operation of the machine. As a friction pair will develop between the wear pads and the chassis chute as well as the platform chute while the platform is elevating or lowering. Improper wear pads or continued use of extremely worn wear pads may result in component damage and unsafe operation. It is recommended to check the chassis wear pad thickness once a year or after 1000 hours of operation.

1. Raise the platform appropriately to make the wear pads at the top and bottom of scissor arms accessible.
2. Measure the thickness of each wear pad at the sliding end of the scissor arms.
3. Compare the measured thickness value of each wear pad with the reference thickness (L) below, and replace the wear pad in time if the difference between the two values is greater than 3 mm (0.118 in).

NOTICE

If the wear pad on one side is excessively worn, the wear pads on both sides must be replaced together.

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7 CHASSIS COMPONENT

7.1 TRAVEL DRIVE AND STEERING DEVICE

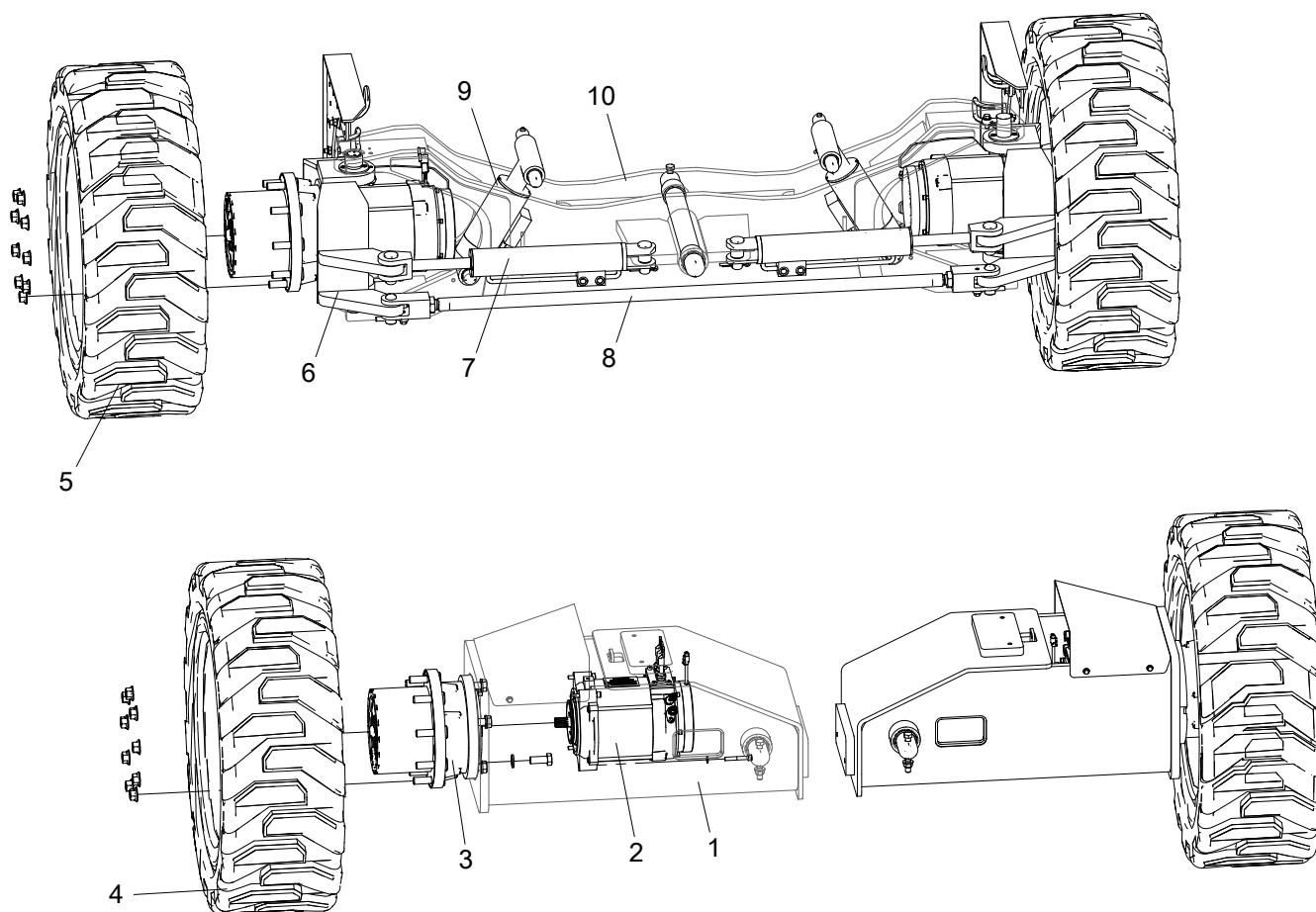


Fig. 1 Diagram of Travel Drive and Steering Device

Table 7-1

1. Rear axle	2. Drive motor	3. Drive reducer
4. Rear wheel	5. Front wheel	6. Steering connection plate
7. Steering cylinder	8. Steering connecting rod	9. Oscillating cylinder
10. Front axle		

Check Drive Reducer Disconnect Cap

The drive 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 drive reducer in the normal or in the reverse position, as shown below.

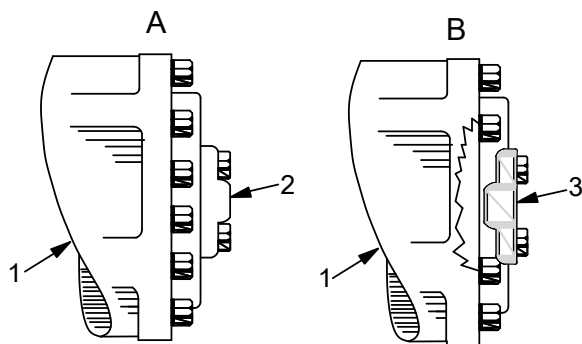


Fig. 2

A Normal position - engaged

B Reverse position - disengaged

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

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

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

For 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 Drive Reducer

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

1. Drive the machine to rotate one oil port on the reducer to the top (as shown below).
2. Remove the oil plug from the oil port 2, and check the oil level in the reducer, it should be level with the oil port.
3. Add oil as needed, until the oil is level with oil port 2.
4. Check the oil level in the other drive reducers by repeating the above steps.

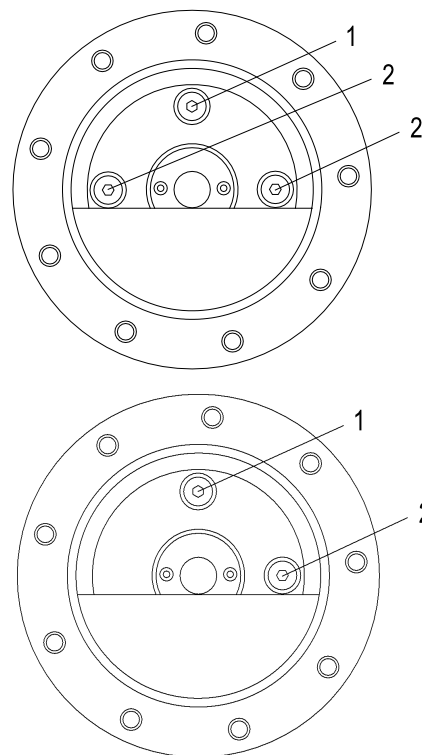


Fig. 3 Diagram – Drive Reducer Gear Oil Check

1. Oil port 1
2. Oil port 2

Replace the Gear Oil in Drive Reducer

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

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

Drain oil from the drive 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 drive reducer into the container.
4. Reinstall the oil plug.

Fill with clean oil:

1. Drive the machine to rotate one oil port on the reducer to the top (as shown above).
2. Remove the oil plugs from the oil port 1 and oil port 2.

3. 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 switch off and disconnect all power sources (such as battery charger) from 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 drive 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.
2. Use suitable lifting equipment to lift the travel reducer to the correct installation position, fit the washer face with the mounting surface, apply Loctite 272 threadlocking adhesive to the mounting bolts of travel reducer and install them one by one.
3. Tighten the bolts with a torque wrench according to the specified torque.
4. After installation, fill appropriate amount of industrial 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.

7.2 TIRE ASSEMBLY

NOTICE

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

Check Tires and Rims

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

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

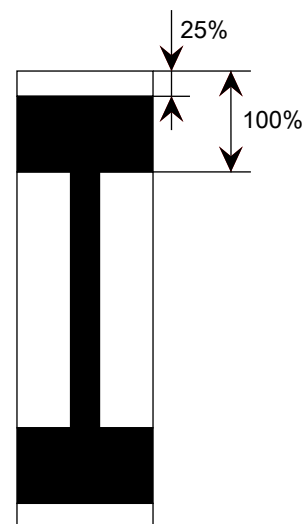


Fig. 4

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 and offset dimensions must be the same as the original tires.
- The replacement tire must be approved for the application by the tire manufacturer (including intended purpose, maximum travel speed, maximum tire load, etc.).
- Due to size differences between different tire brands, both tires on the same axle should be of the same brand.

NOTICE

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

Replace Tire and Wheel Assembly

WARNING

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

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

1. Make sure the machine is in stowed position.
2. Turn the power switch off and disconnect all power sources (such as battery charger) from the machine.
3. Use a wrench to loosen but do not remove the wheel nuts yet.
4. Use a jack with sufficient load capacity to lift the frame to an appropriate height so that the tire and wheel assembly is off the ground.
5. Remove the wheel nuts in an alternating sequence, then remove the tire and wheel assembly.
6. Align the mounting holes of the new tire and wheel assembly with the corresponding mounting holes on the drive reducer.
7. Apply Loctite 272 thread locking adhesive to the bolts and nuts, then install the nuts in sequence.
8. Tighten all nuts by hand first to prevent loosening of the bolts and nuts. Never apply lubricant to threads or nuts.
9. Then tighten the nuts step by step in the sequence as shown below. Please refer to the recommended torque settings in the table below.

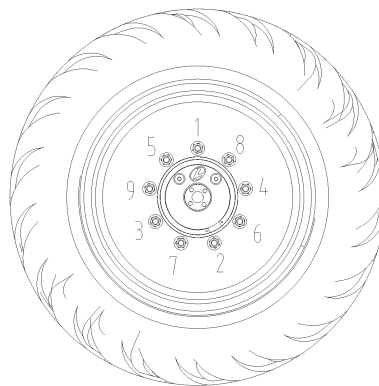


Fig. 5 Diagram – Wheel Nuts Tightening Sequence

Table 7-2 Table of Wheel Nuts Tightening Torque

First step	Second step	Third step
150 Nm (110 ft-lb)	210 Nm (155 ft-lb)	265 Nm (196 ft-lb)

7.3 BATTERY



WARNING

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

1. Place the machine in a ventilated and spark-free environment.
2. Open the box on both sides of chassis 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.

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8 POWER SYSTEM

The machine is driven by power battery (acting as main power) and equipped with an auxiliary power system.

Besides, if the machine is equipped with a range extender system, it can be used to charge the battery. The range extender system consists of a diesel engine, a generator and an electric motor controller. This manual only provides brief maintenance instructions of the engines. For detailed instructions, please refer to the engine maintenance manual provided with the machine.

8.1 AUXILIARY POWER SYSTEM

The auxiliary power system relies on one 12V battery to provide power for a 12V DC motor which drives the gear pump to work. When the main power source fails, the auxiliary power system can be used to lower the operator on 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.

8.2 RANGE EXTENDER 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 bears significant risk.

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.
- This manual only covers some operation instructions of range extender, for more instructions, contact SINOBOOM aftersales staff.

Range Extender Controller (if equipped)

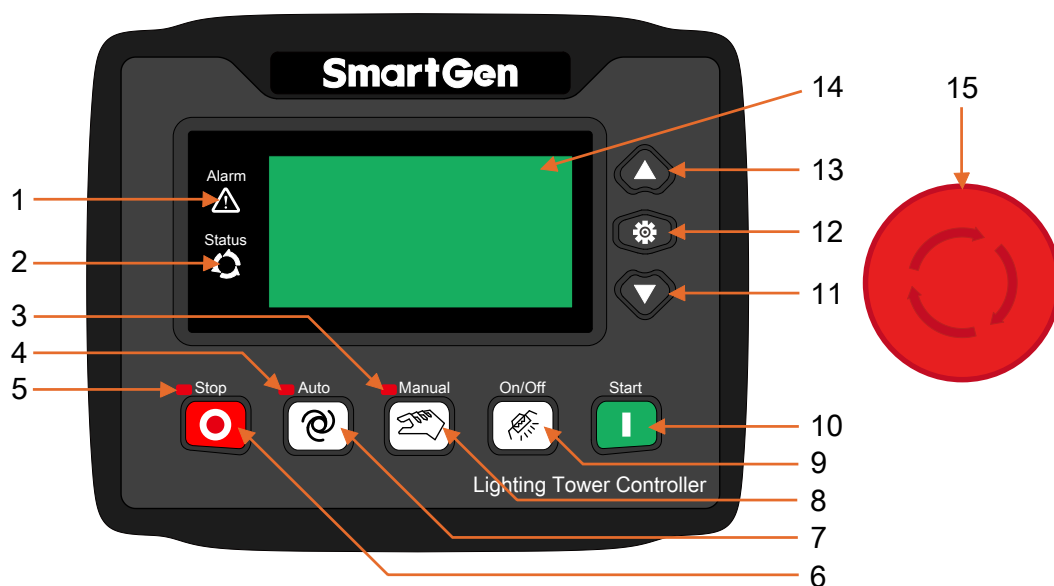


Fig. 1 Controller

Table 8-1 Controller Description

No.	Name	Description
1	Alarm indicator	Indicates alarm or fault information of range extender controller (on the right side of the icon)
2	Status indicator	Indicates the operating status of range extender controller (on the right side of the icon)
3	Manual mode indicator light	This indicator light illuminates steadily to indicate that the range extender controller is in manual start mode.
4	Auto mode indicator light	This indicator light illuminates steadily to indicate that the range extender controller is in automatic start mode.
5	Stop mode indicator light	This indicator light illuminates steadily to indicate that the range extender controller is in stop mode.
6	1) Stop key 2) Reset key	1) Pressing this key will bring the range extender controller to stop; 2) When an engine fault alarm is triggered, press and hold this key - the alarm will be cleared.
7	Auto key	Press this key - the range extender controller will enter automatic start mode, and the auto mode indicator light will illuminate.
8	Manual key	Press this key - the range extender controller will enter manual start mode, and the manual mode indicator light will illuminate.
9	Background light On/Off key	Pressing this key to turn on or off the background light of the screen.
10	Start key	Press this key - the engine will be started.
11	1) Down arrow key	1) Pressing this key to scroll down the menu screen

Table 8-1 Controller Description (continued)

No.	Name	Description
	2) Configuration (-) key	2) Pressing this key to decrease the configuration parameter value.
12	1) Menu key 2) Configuration confirm key	1) Pressing this key to enter the controller setting screen 2) Pressing this key to confirm or save the selected or modified configuration parameter.
13	1) Up arrow key 2) Configuration (+) key	1) Pressing this key to scroll up the menu screen 2) Pressing this key to increase the configuration parameter value.
14	Display screen	Displays status, alarms and other service information of range extender.
15	Emergency stop button	When pulled to the "ON" position the range extender can be started normally; Pushing the button to the "OFF" position will deactivate the range extender.

Note:

- When the range extender is in standby status, the status indicator lights #3, #4 and #5 go off.
- When the range extender is starting or stopping, the status indicator lights #3, #4 and #5 flash once per second.
- When the range extender is operating normally, the status indicator lights #3, #4 and #5 illuminate steadily.



Fig. 2 Home Screen

Table 8-2 Description of Home Screen

No.	Name	Description
1	Not used	\
2	Output voltage	Indicates the current output voltage of range extender controller
3	Generator frequency	Indicates the current frequency of generator
4	Operating status	Indicates the current operating status of range extender controller
5	Not used	\
6	Not used	\

Table 8-2 Description of Home Screen (continued)

No.	Name	Description
7	Not used	\
8	Battery voltage	Indicates the current voltage of machine's starting battery

Setting Menu

1. Turn the ground/platform selector switch at the turntable controller to the ground control position, pull out the emergency stop button to the ON position, and turn the key switch to the ON position, and the system will be powered on. Pull out the emergency stop button on the range extender to the ON position, and the range extender will be powered on.

NOTICE

Before the range extender controller is set up, ensure the range extender is in standby status.

2. On the Home screen, press to enter Setting Menu screen which includes Set Parameters, Time Calibration, Language Select, Event Log and Information Query options.

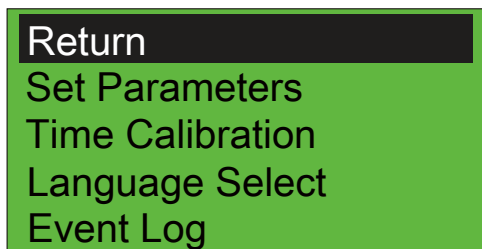


Fig. 3 Setting Menu screen

3. Press or until the desired option is displayed, and press to enter corresponding screen.

Time Parameters Setting

1. On the Setting Menu screen, press or until Set Parameters is displayed, and press to enter the next screen.
2. Enter the password on the Enter Password screen (the password can only be provided to personnel professionally trained and authorized by Sinoboom). The figure in reverse display can be modified. Press or to increase or decrease the value, and press to confirm the modified value and shift right to the next figure.

Parameter Config Enter Password

Fig. 4 Enter Password screen

3. After the password has been entered, enter the Parameter Config screen to set up parameters for range extender controller.

Return Timers Configure Engine Configure Generator Configure Mains Configure

Fig. 5 Parameter Config screen

4. Press or until Timers Configure is displayed, and press to enter the Timers Configure screen.

Timers Configure Return Start Delay Stop Delay Preheat Delay

Fig. 6 Timers Configure screen

- Start delay parameter setting: Press or until Start Delay is displayed, and press to enter the Start Delay screen. Press or to increase or decrease the value, and press to confirm the modified value and shift right to the next figure.

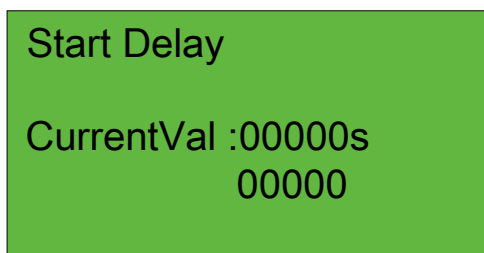


Fig. 7 Start Delay screen

- Preheat delay parameter setting: Press  or  until Preheat Delay is displayed, and press  to enter the Preheat Delay screen. Press  or  to increase or decrease the value, and press  to confirm the modified value and shift right to the next figure.

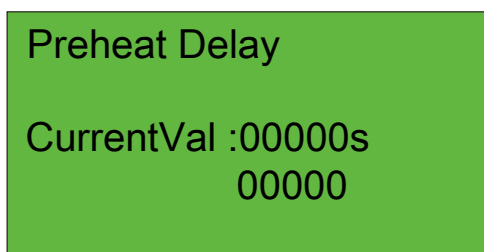
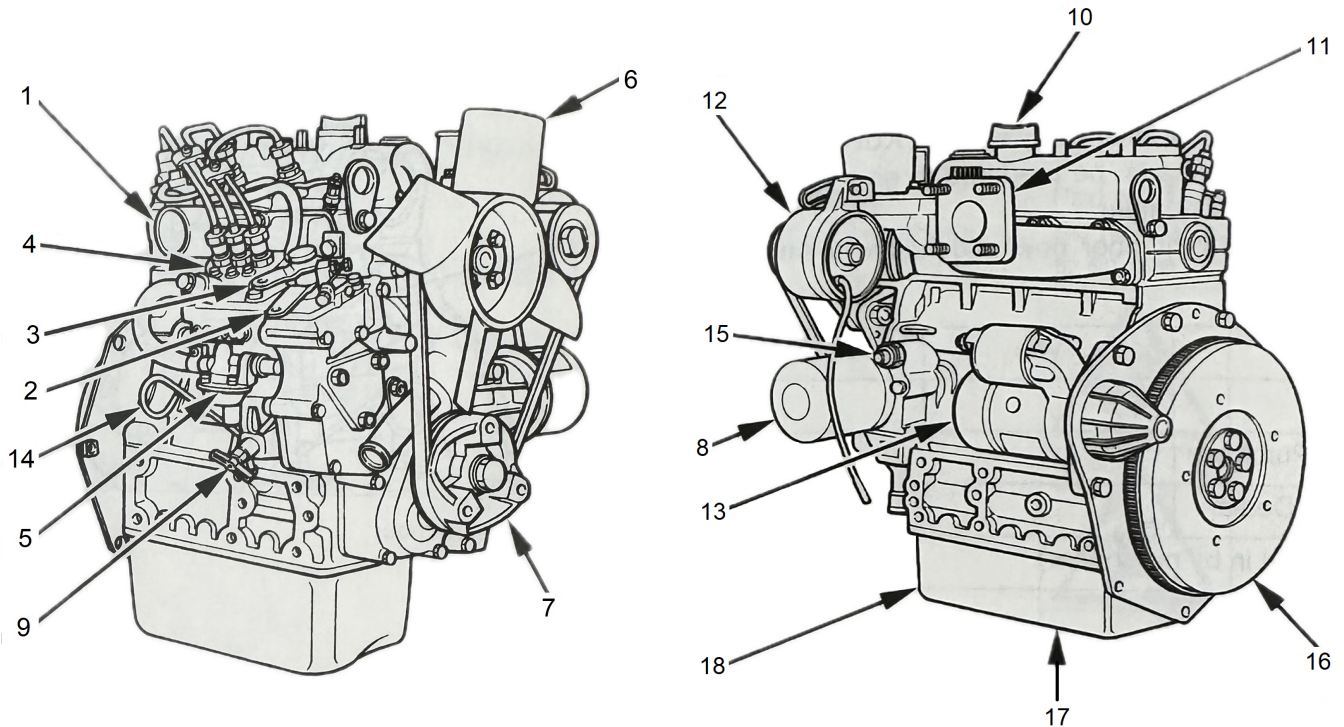


Fig. 8 Preheat Delay screen

Note: During setting, pressing  could interrupt the current setting immediately, and pressing  again will return to the previous screen.

8.3 KUBOTA ENGINE Z482-E4 SERIES



1. Intake manifold
2. Speed control lever
3. Engine stop lever
4. Injection pump
5. Fuel feed pump
6. Cooling fan
7. Fan drive pulley
8. Oil filter cartridge
9. Water drain cock
10. Oil filler plug
11. Exhaust manifold
12. Alternator
13. Starter
14. Oil level gauge
15. Oil pressure switch
16. Flywheel
17. Oil drain plug
18. Oil pan

Periodic Maintenance Chart

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

Table 8-3 Periodic Maintenance Chart

Interval	Item		
Every 50 hours	Check of fuel pipes and clamp bands		@
See Note	Change of engine oil (depending on the oil pan)	⊙	
Every 100 hours	Cleaning of air cleaner element	*1	@
	Cleaning of fuel filter		
	Check of fan belt tightness		
	Draining water separator		
Every 200 hours	Replacement of oil filter cartridge (depending on the oil pan)	⊙	
	Check of intake air line		@
Every 200 hours of operation or six months	Check of radiator hoses and clamp bands		
Every 400 hours	Replacement of fuel filter element		@
	Cleaning of water separator in fuel tank		
Every 500 hours	Cleaning of water jacket (radiator interior)		
	Replacement of fan belt		
Every year or every 6 cleanings of air cleaner element	Replacement of air cleaner element	*2	@
Every 800 hours	Check of valve clearance	*3	
Every 1500 hours	Check of fuel injection nozzle injection pressure	*3	@
Every 3000 hours	Check of injection pump	*3	@

Table 8-3 Periodic Maintenance Chart (continued)

Interval	Item		
Every two years	Replacement of radiator hoses and clamp bands		
	Replacement of fuel pipes and clamps	*3	@
	Change of radiator coolant		
	Replacement of intake air line	*4	@

- ◎ After the first 50 hours of operation.
 - *1 Air cleaner should be cleaned more often in dusty conditions than in normal conditions.
 - *2 After 6 times of cleaning.
 - *3 Consult your local Kubota dealer for this service.
 - *4 Replace only if necessary.
- @ The items listed above (@ marked) are registered as emission related critical parts by Kubota in the U.S. EPA non-road emission regulation. As the engine owner, you are responsible for the performance of the required maintenance on the engine according to the above instruction.

Note:

Table 8-4 Changing Interval of Engine Oil and Oil Filter Cartridge

		* Oil pan depth	
		*101 mm (3.98 in)	121 mm (4.76 in)
Z482-E4	Engine oil	50 hours (Initial)	
		75 hours	100 hours
	Oil filter cartridge	150 hours	200 hours

* 101 mm (3.98 in) oil pan depth is optional for Z482-E4.

Fuel System

Check the Fuel Level

Visual check of the level gauge of the fuel tank could find out the current fuel level. The fuel level should be within the scale range of the tank's level gauge.

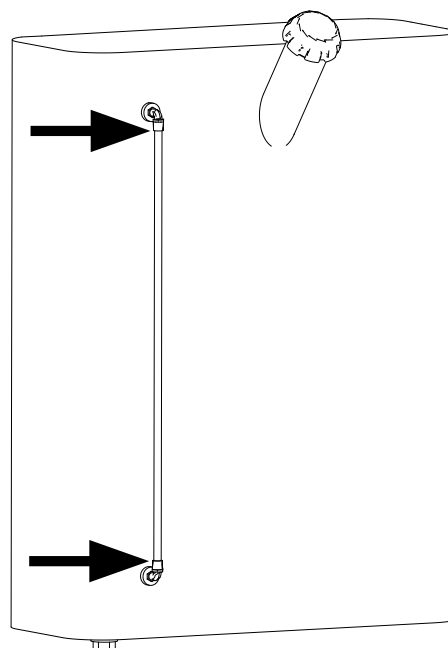


Fig. 9 Fuel oil level

Fill the Fuel Tank

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

WARNING

- Do not mix gasoline, alcohol, or their mixture with diesel fuel.
- Do not refuel the machine while the engine is running.
- Due to the extremely accurate tolerance match of the diesel injection system, it is critical to keep the fuel clean and free of dirt or water. The dirt or water entering the combustion system can cause severe damage to the fuel pump and injectors.

Air Bleed the Fuel System

WARNING

Do not bleed a hot engine as this could cause fuel to spill onto a hot exhaust manifold creating a danger of fire.

Air bleeding of the fuel system is required:

- After the fuel filter and pipes have been detached and refitted;
 - After the fuel tank has become empty;
 - Before the engine is to be used after a long storage.
1. Fill the fuel tank to the fullest extent. Open the fuel filter lever.
 2. Loosen air vent plug of the fuel filter a few turns.
 3. Screw back the plug when bubbles do not come up any more.
 4. Open the air vent plug on top of the fuel injection pump.
 5. Retighten the plug when bubbles do not come up any more.

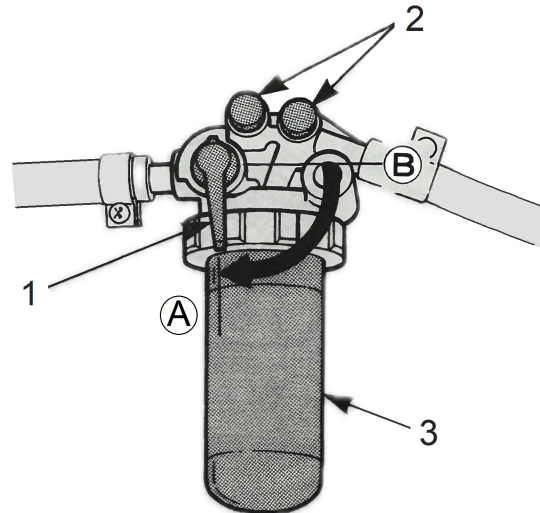


Fig. 10 Fuel filter

- | | |
|----------------------|-------------------|
| 1. Fuel filter lever | A. "ON" position |
| 2. Air vent plug | B. "OFF" position |
| 3. Fuel filter pot | |

Check and Replace the Fuel Pipes

WARNING

Check or replace the fuel pipes after stopping the engine. Broken fuel pipes can cause fires.

Check the fuel pipes every 50 hours of operation.

1. If the clamp band is loose, apply oil to the screw of the band, and tighten the band securely.
2. If the fuel pipes, made of rubber, become worn out, replace them and clamp bands every 2 years.
3. If the fuel pipes and clamp bands are found worn out or damaged before 2 years' pass, replace or repair them at once.
4. After replacement of the pipes and bands, air-bleed the fuel system.

NOTICE

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

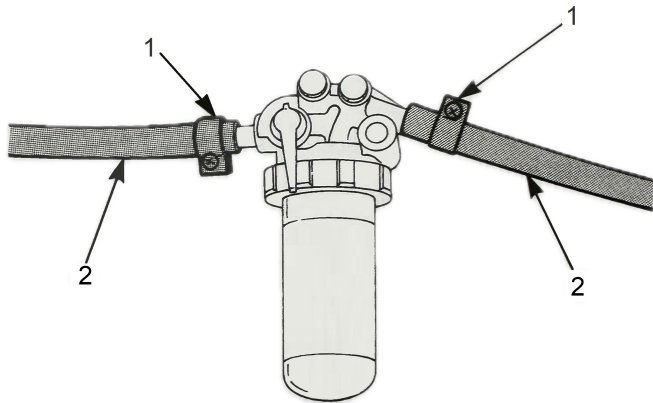


Fig. 11 Fuel pipes and clamp bands

1. Clamp band 2. Fuel pipe

Clean the Fuel Filter Pot

Every 100 hours of operation, clean the fuel filter in a clean place to prevent dust intrusion.

1. Close the fuel filter lever.

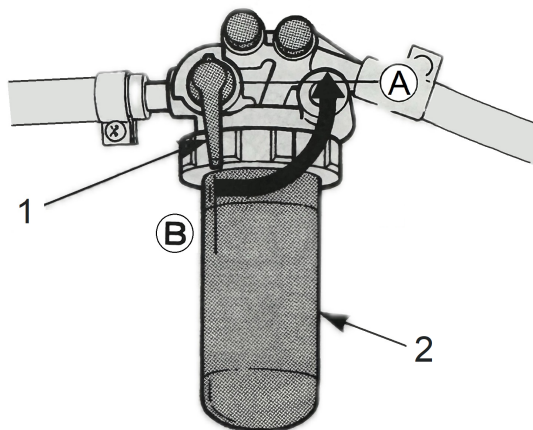


Fig. 12 Fuel filter

- | | |
|----------------------|-------------------|
| 1. Fuel filter lever | A. "OFF" position |
| 2. Fuel filter pot | B. "ON" position |
2. Remove the top cap, and rinse the inside with diesel fuel.
 3. Take out the element, and rinse it with diesel fuel.
 4. After cleaning, reinstall the fuel filter, keeping out of dust and dirt.
 5. Air-bleed the injection pump.

NOTICE

Entrance of dust and dirt can cause a malfunction of the fuel injection pump and the injection nozzle. Wash the fuel filter cup periodically.

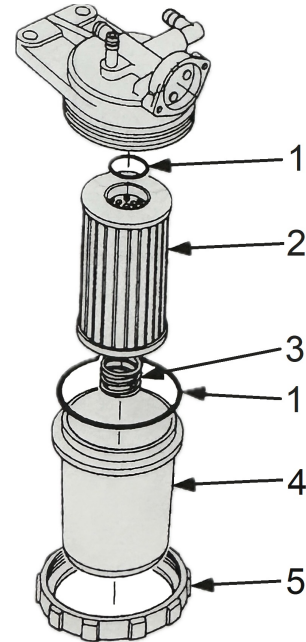


Fig. 13 Fuel filter

- | | |
|---------------|-------------------|
| 1. O-ring | 2. Filter element |
| 3. Spring | 4. Filter bowl |
| 5. Screw ring | |

Lubrication System

Check the Engine Oil Level

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

Change the Engine Oil

Change oil after the initial 50 hours of operation and every 100 hours thereafter.

NOTICE

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

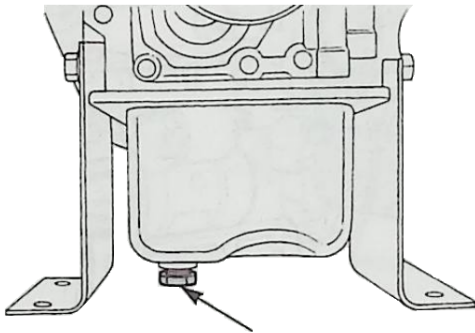


Fig. 14 Oil drain plug

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



WARNING

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

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

Replace Oil Filter Cartridge

Replace the oil filter cartridge after the initial 50 hours of operation and every 200 hours thereafter.

NOTICE

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

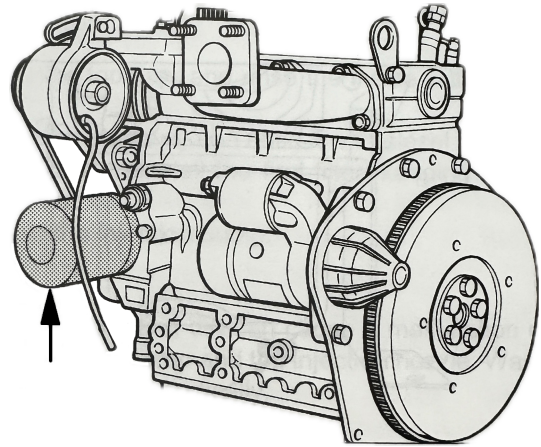


Fig. 15 Oil filter cartridge

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

Cooling System

It is recommended to change the coolant every two years.

Check the Coolant Level

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

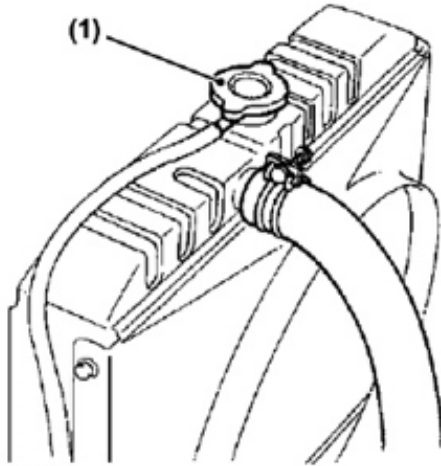


Fig. 16 Radiator cap

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

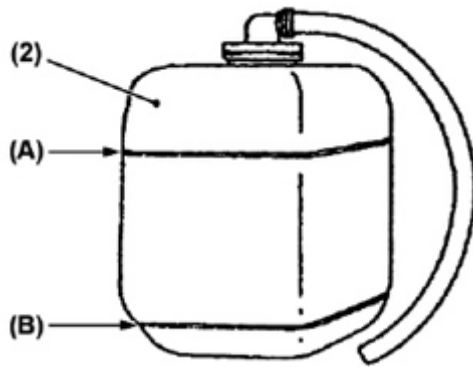


Fig. 17 Recovery tank

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

Empty the Cooling System

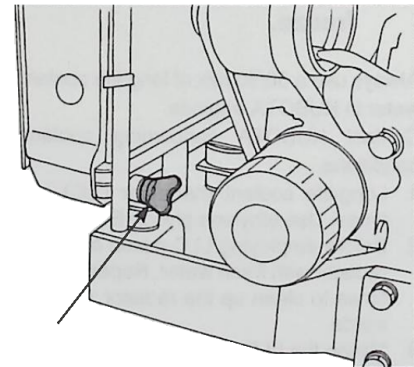
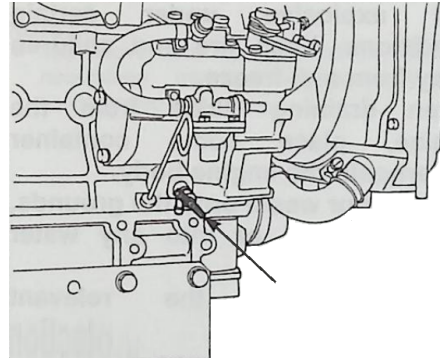


Fig. 18 Coolant drain cock

1. Let the engine and radiator cool off completely (below 50°C (122°F)).
2. Check to see that two drain cocks: one is at the crankcase side and the other is at the lower part of the radiator.
3. Place an appropriate container under the drain ports.
4. To drain coolant, always open both drain cocks and simultaneously open the radiator cap as well. With the radiator cap kept closed, a complete drain of water is impossible.
5. Remove the overflow pipe of the radiator pressure cap to drain the recovery tank.
6. Reinstall the drain cocks, radiator pressure cap and overflow pipe.

Fill Coolant

1. After the engine and radiator have cooled sufficiently (to the temperature below 50°C/122°F), remove the radiator cap.
2. Add correct coolant until the coolant level is even with the engine coolant supply port according to the **Oil Specifications** . Make sure that air bubbles do not develop as you add coolant.
3. Reinstall the radiator cap.

4. With recovery tank: Pour coolant into the recovery tank slowly until the coolant level reaches the FULL (A) mark. Make sure that air bubbles do not develop as you add coolant.
5. Run the engine until it reaches operating temperature. Check the coolant level in the radiator and recovery tank, and fill with coolant as needed.

Check Radiator Hoses and Clamp Bands

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

Replace hoses and hose clamps every 2 years.

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

Clean the Radiator

Radiator outside

If dust is between the fin and tube, wash it away with running water.

NOTICE

Do not clean radiator with firm tools such as spatulas or screwdrivers. They may damage specified fin or tube. It can cause coolant leaks or decrease cooling performance.

Radiator inside

1. Clean up the coolant line inside in the following cases:
 - As per the **Periodic Maintenance Chart**.
 - When changing the coolant.
2. Use a radiator cleaning agent. This helps wash away scale deposits.

Intake System

Inspect and Replace Intake Air Hose

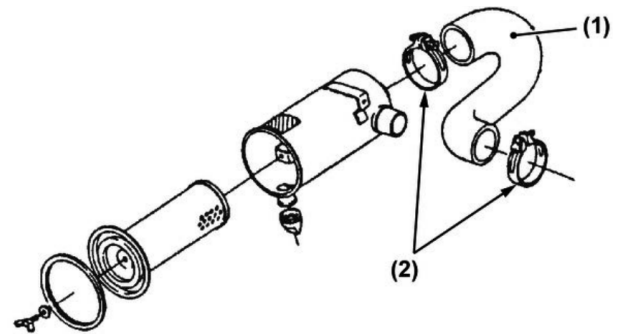


Fig. 19 Radiator

1. Intake air hose

2. Clamp

Inspection

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

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

Replacement

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

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

Clean and Replace the Air Cleaner Element

As the element of the air cleaner employed on this engine is a dry type, never apply oil to it.

Open the evacuator valve once a week under ordinary conditions or daily when used in a dusty place to get rid of large particles of dust and dirt.

Clean the air cleaner element every 100 hours of operation.

Replace the air cleaner element every year or after 6 cleanings.

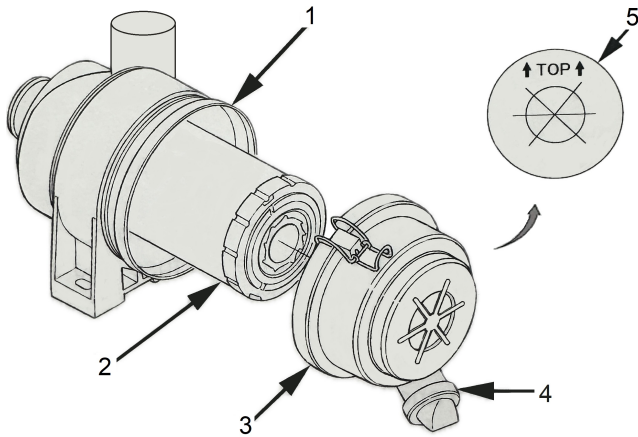


Fig. 20 Air cleaner

- | | |
|---------------------|--------------------|
| 1. Air cleaner body | 2. Element |
| 3. Cover | 4. Evacuator valve |
| 5. "TOP" mark | |

Cleaning

- Wipe the inside air cleaner clean with cloth or the like if it is dirty or wet.
- When dry dust adheres to the element, blow compressed air from the inside turning the element. Pressure of compressed air must be under 205 kPa (30 psi).

NOTICE

Avoid touching the element except when cleaning.

Replacement

- Remove the air cleaner element.
- Replace with a new air cleaner element.

NOTICE

Make sure the hooking clip for cover for the element is tight enough. If it is loose, dust and dirt may be sucked, wearing down the cylinder liner and piston ring earlier and thereby resulting in poor power output.

Belt Drive

WARNING

- Do not carry out work on the belt drive unless the engine is at standstill.
- After repairs: Check that all protective devices have been installed and that all tools have been removed from the engine.

Adjust Fan Belt Tension

- Stop the engine.
- Apply moderate thumb pressure to the belt between the pulleys.
- If tension is incorrect, loosen the alternator mounting bolts and, using a lever placed between the alternator and the engine block, pull the alternator out until the deflection of the belt falls within acceptable limits.
- Replace fan belt if it is damaged.

NOTICE

If belt is loosen or damaged and the fan is damaged, it could result in overheats or insufficient charging. Correct or replace belt.

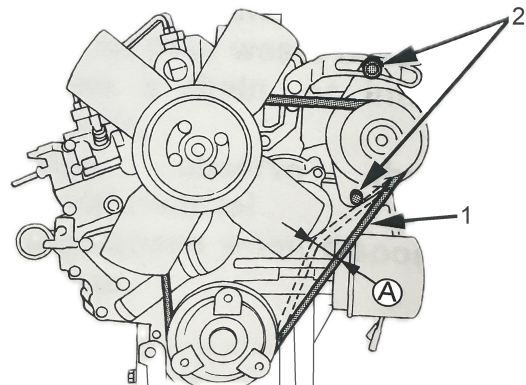


Fig. 21 Adjust Fan Belt Tension

- | | |
|---|-----------------|
| 1. Fan belt | 2. Bolt and nut |
| A. Under load of 10 kg (22.1 lb): 7 ~ 9 mm (0.28 ~ 0.35 in) | |

9 HYDRAULIC SYSTEM

9.1 LAYOUT OF HYDRAULIC ELEMENTS

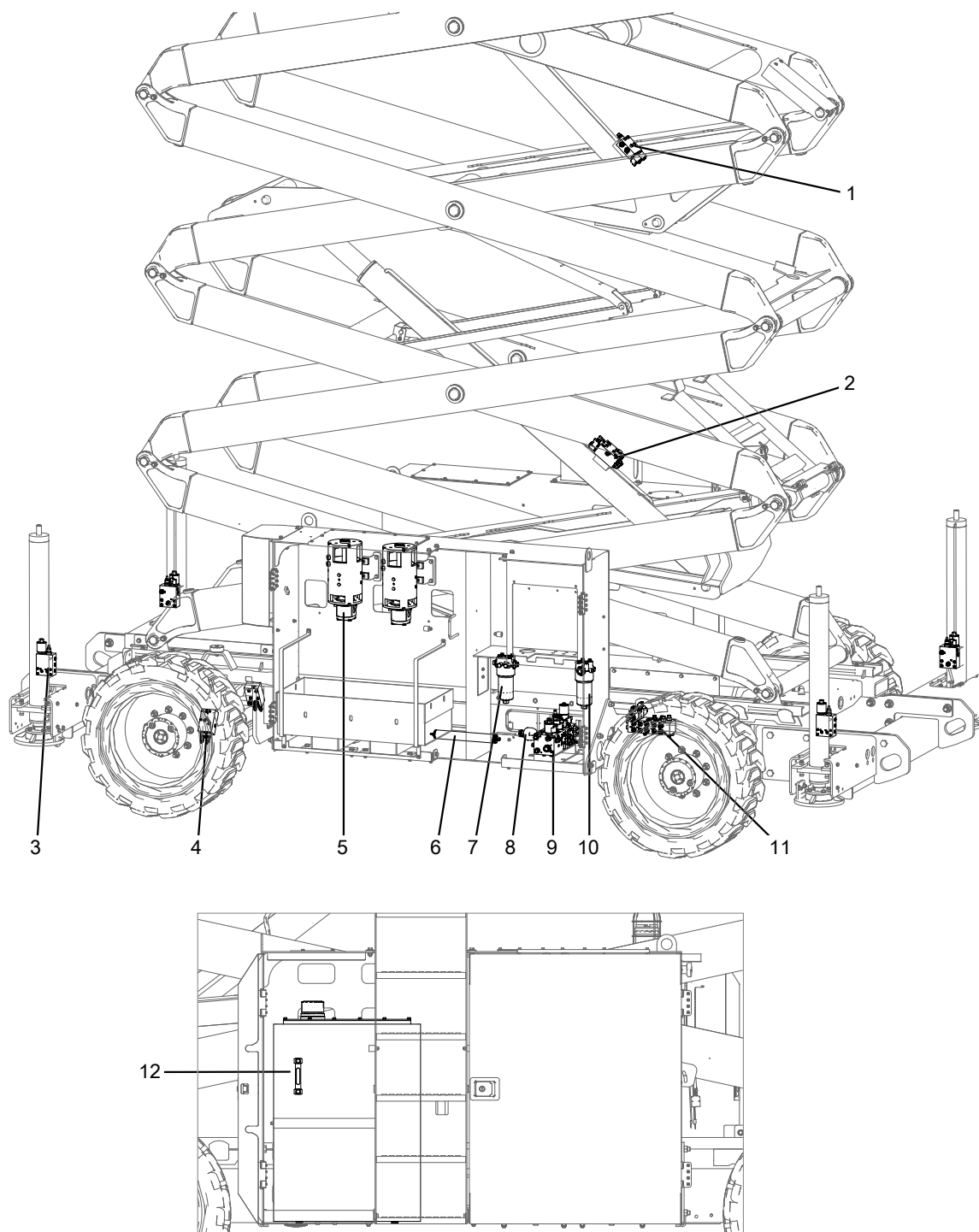


Fig. 1

Table 9-1

1. Upper lift control valve (only 1623RE)	2. Lower lift control valve	3. Outrigger solenoid valve
4. Bidirectional counterbalance valve	5. Power unit	6. Piston accumulator (only 1323RE)
7. High-pressure filter	8. Accumulator	9. Platform control valve manifold
10. Return filter (high-pressure filter)	11. Outrigger control manifold	12. Hydraulic tank

9.2 FUNCTION VALVES

Platform Control Valve Manifold (PN.202040003796)

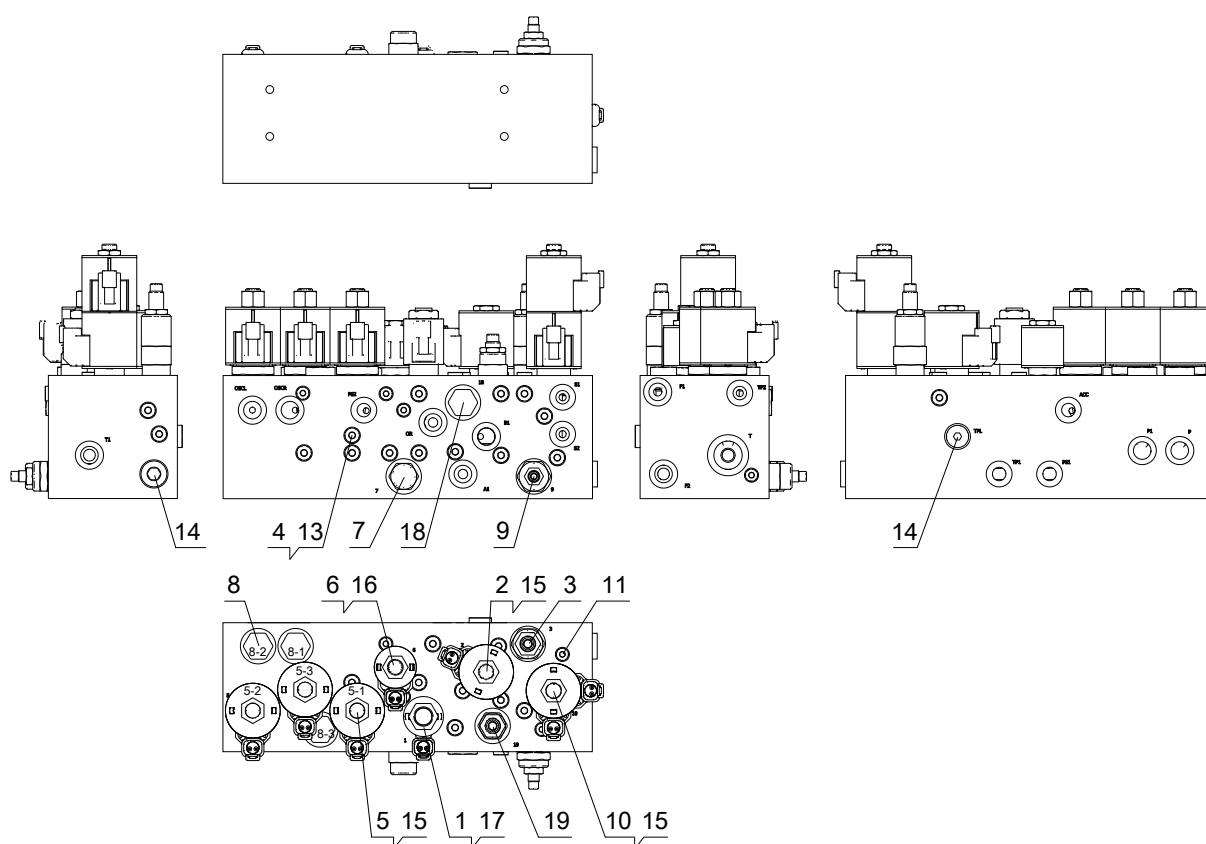


Fig. 2 Platform Control Valve Manifold (PN.202040003796)

Table 9-2 Platform Control Valve Manifold (PN.202040003796)

No.	Description	Installation torque	Function
1	Proportional overflow valve	25.8 – 28.5 Nm (19 – 21 ft-lb)	Releases system pressure, and controls pressure for machine movements
2	Solenoid valve	32.5 – 35.3 Nm (24 – 26 ft-lb)	Controls lifting direction
3	Overflow valve	25.8 – 28.5 Nm (19 – 21 ft-lb)	Controls steering pressure
4	Damper	\	\

Table 9-2 Platform Control Valve Manifold (PN.202040003796) (continued)

No.	Description	Installation torque	Function
5-1	Solenoid valve	25.8 – 28.5 Nm (19 – 21 ft-lb)	Controls oscillation accumulator
5-2	Solenoid valve	25.8 – 28.5 Nm (19 – 21 ft-lb)	Controls left oscillation movement
5-3	Solenoid valve	25.8 – 28.5 Nm (19 – 21 ft-lb)	Controls right oscillation movement
6	Solenoid valve	25.8 – 28.5 Nm (19 – 21 ft-lb)	Controls oscillation enabling
7	Flow valve	24 – 27 Nm (17.7 – 20 ft-lb)	Controls flow for oscillation
8	Check valve	25.8 – 28.5 Nm (19 – 21 ft-lb)	Keeps oil flowing in one direction
9	Pressure-gradient control valve	33 – 35 Nm (24.3 – 25.8 ft-lb)	Controls flow for steering
10	Solenoid valve	32.5 – 35.3 Nm (24 – 26 ft-lb)	Controls left and right steering
15	Coil	5.4 – 6.8 Nm (4 – 5 ft-lb)	\
16	Coil	5.4 – 6.8 Nm (4 – 5 ft-lb)	\
17	Coil	5.4 – 6.8 Nm (4 – 5 ft-lb)	\
18	Check valve	25.8 – 28.5 Nm (19 – 21 ft-lb)	Keeps oil flowing in one direction
19	Overflow valve	25.8 – 28.5 Nm (19 – 21 ft-lb)	Controls lifting pressure

Lower Lift Control Valve (PN.202040003568)

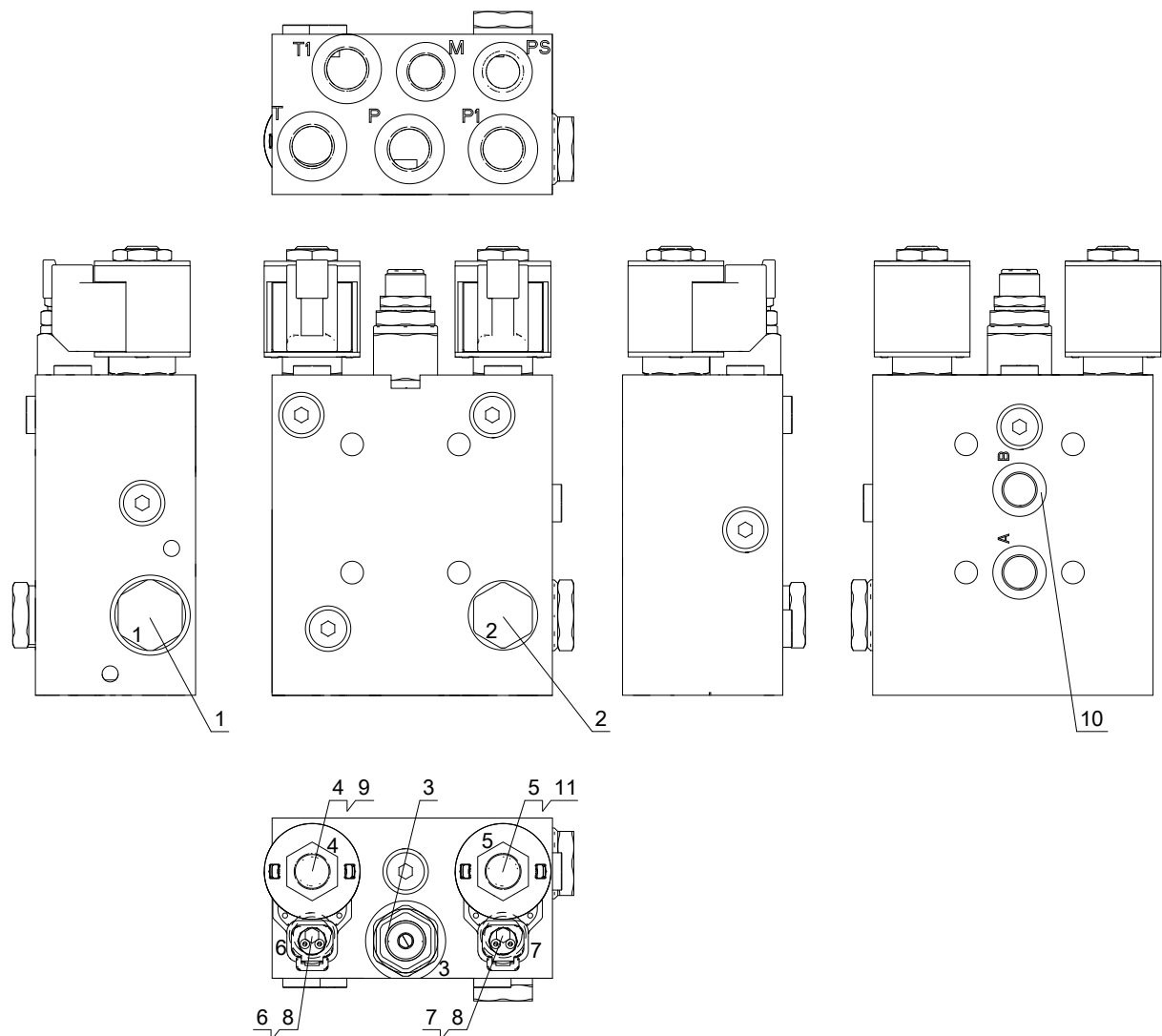


Fig. 3 Lower Lift Control Valve (PN.202040003568)

Table 9-3 Lower Lift Control Valve (PN.202040003568)

No.	Description	Installation torque	Function
1	Check valve	55 – 65 Nm (41 – 47 ft-lb)	Keeps oil flowing in one direction
2	Check valve	40 – 45 Nm (29 – 33 ft-lb)	Keeps oil flowing in one direction
3	Overflow valve	40 – 45 Nm (29 – 33 ft-lb)	Acts as safety valve
4	Solenoid valve	27 Nm (20 ft-lb)	Controls platform lowering
5	Solenoid valve	30 Nm (22 ft-lb)	Controls emergency lowering
6	Damper	4 Nm (2.9 ft-lb)	\
7	Damper	4 Nm (2.9 ft-lb)	\
9	Coil	4 Nm (2.9 ft-lb)	\

Table 9-3 Lower Lift Control Valve (PN.202040003568) (continued)

No.	Description	Installation torque	Function
10	O-ring	\	\
11	Coil	4 Nm (2.9 ft-lb)	\

Upper Lift Control Valve (PN.202040003567)

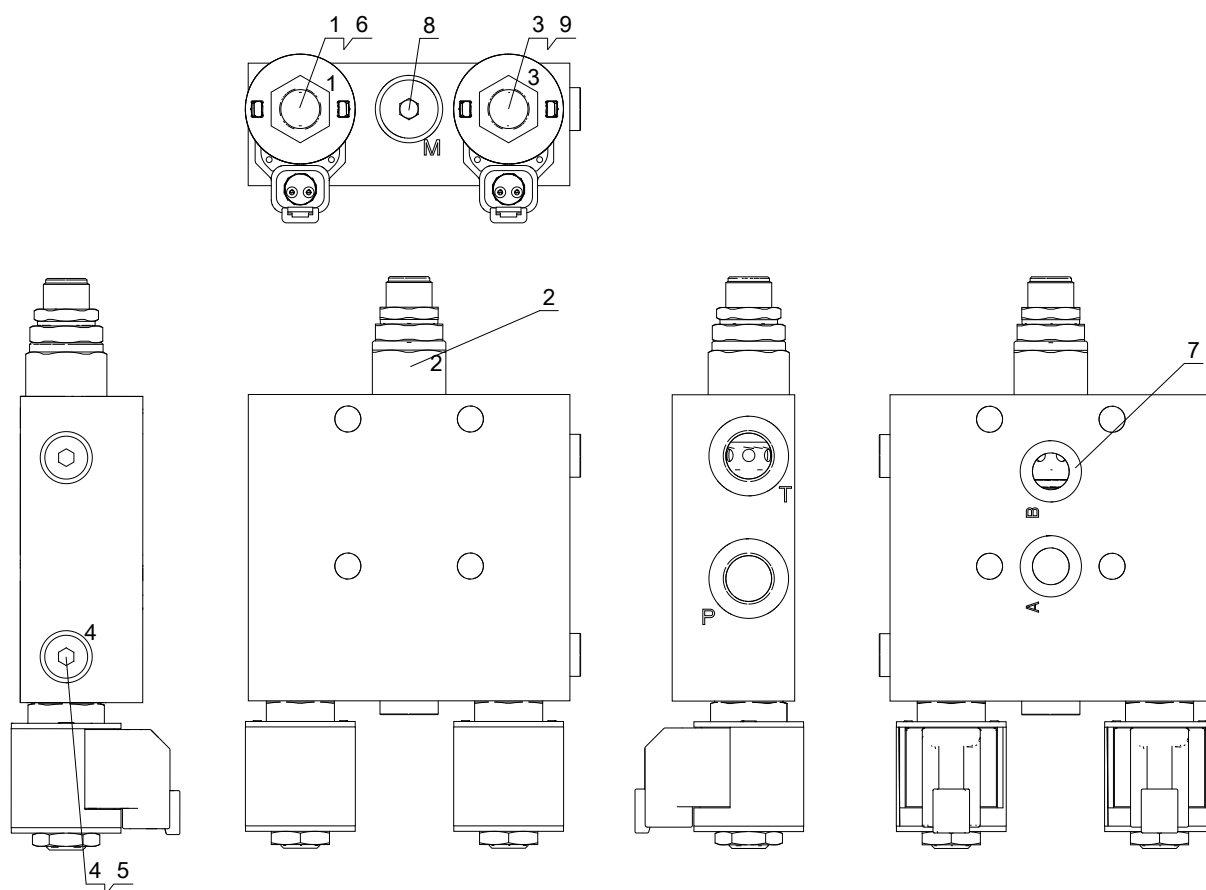


Fig. 4 Upper Lift Control Valve (PN.202040003567)

Table 9-4 Upper Lift Control Valve (PN.202040003567)

No.	Description	Installation torque	Function
1	Solenoid valve	27 Nm (20 ft-lb)	Lower the platform
2	Overflow valve	40 – 45 Nm (29 – 33 ft-lb)	Acts as safety valve
3	Solenoid valve	30 Nm (22 ft-lb)	Emergency Lowering
4	Damper	4 Nm (2.9 ft-lb)	\
6	Coil	4 Nm (2.9 ft-lb)	\
7	O-ring	\	\
9	Coil	4 Nm (2.9 ft-lb)	\

Bidirectional Counterbalance Valve (PN.202040003137)

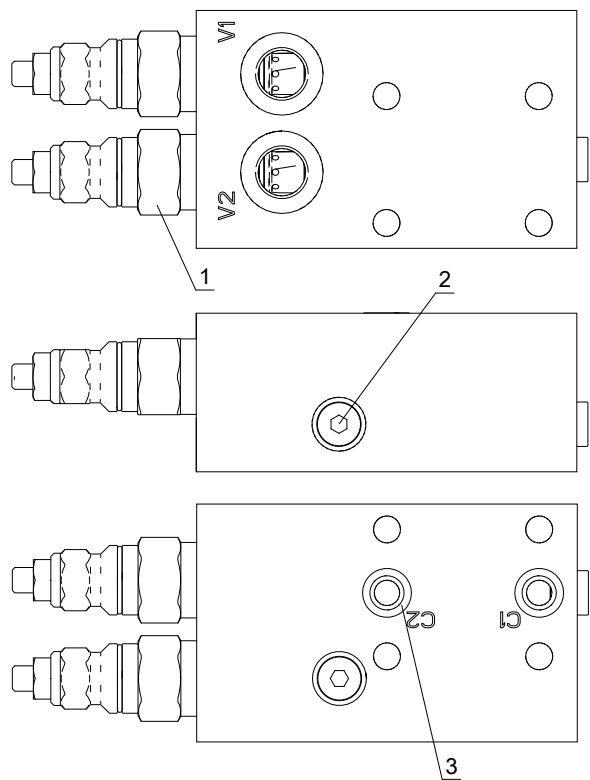


Fig. 5 Bidirectional Counterbalance Valve (PN.202040003137)

Table 9-5 Bidirectional Counterbalance Valve (PN.202040003137)

No.	Description	Installation torque	Function
1	Counterbalance valve	34 – 41 Nm (25 – 30 ft-lb)	Keeps the load balanced
3	O-ring	\	\

Outrigger Solenoid Valve (PN.202040003479)

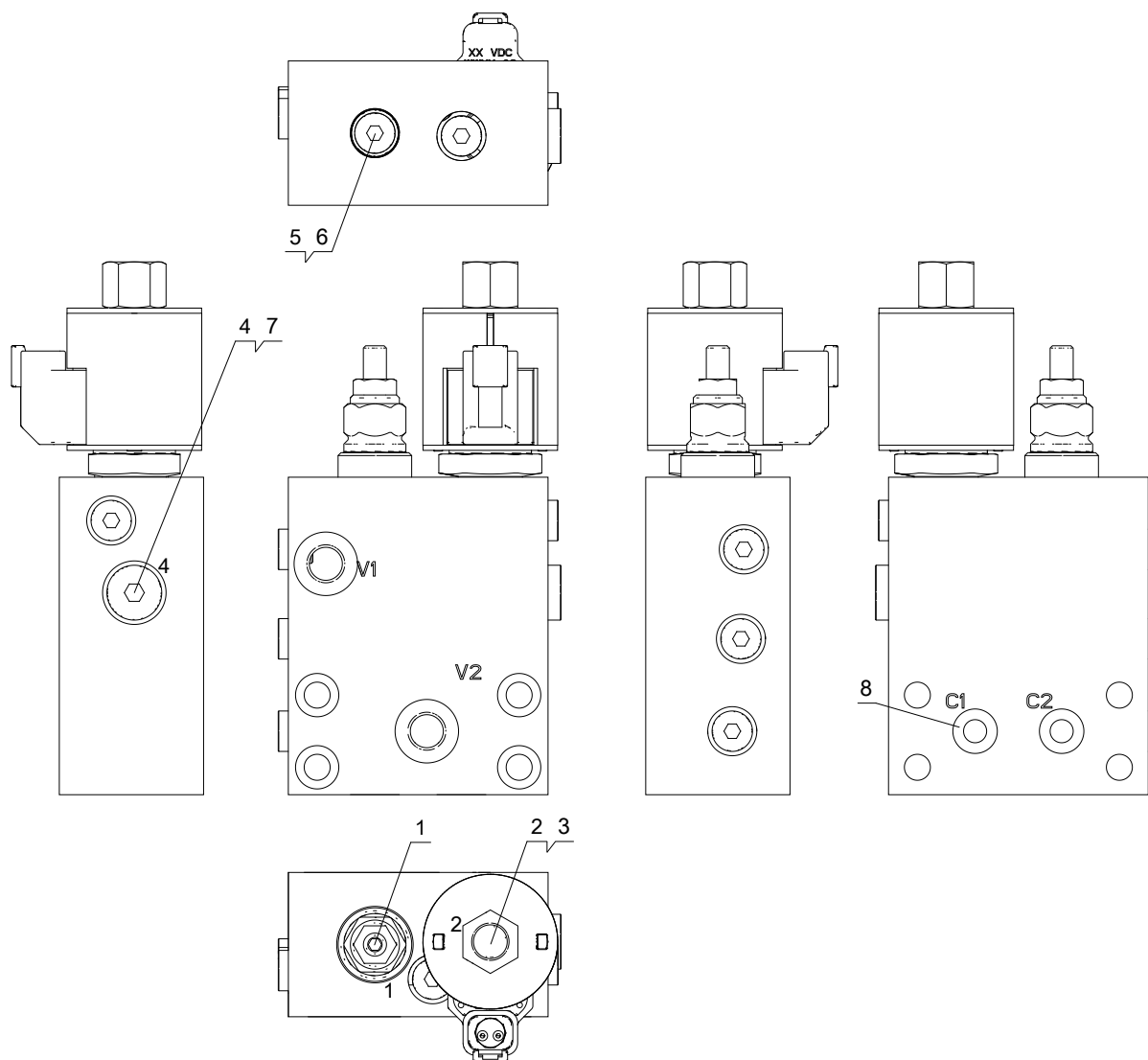


Fig. 6 Outrigger Solenoid Valve (PN.202040003479)

Table 9-6 Outrigger Solenoid Valve (PN.202040003479)

No.	Description	Installation torque	Function
1	Counterbalance valve	70 – 75 Nm (52 – 55 ft-lb)	Keeps the load balanced
2	Solenoid valve	27.1 Nm (20 ft-lb)	Controls the telescoping direction of outriggers
3	Coil	4 Nm (2.9 ft-lb)	\
4	Filter screen	5 Nm (3.7 ft-lb)	\
5	Damper	5 Nm (3.7 ft-lb)	\
8	O-ring	\	\

9.3 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 suitable hydraulic oil according to the **Oil Specifications** , 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 suitable hydraulic oil according to the **Oil Specifications** , never overfill the tank.
- 12. Open the hydraulic shut-off valve.

9.4 HYDRAULIC TANK

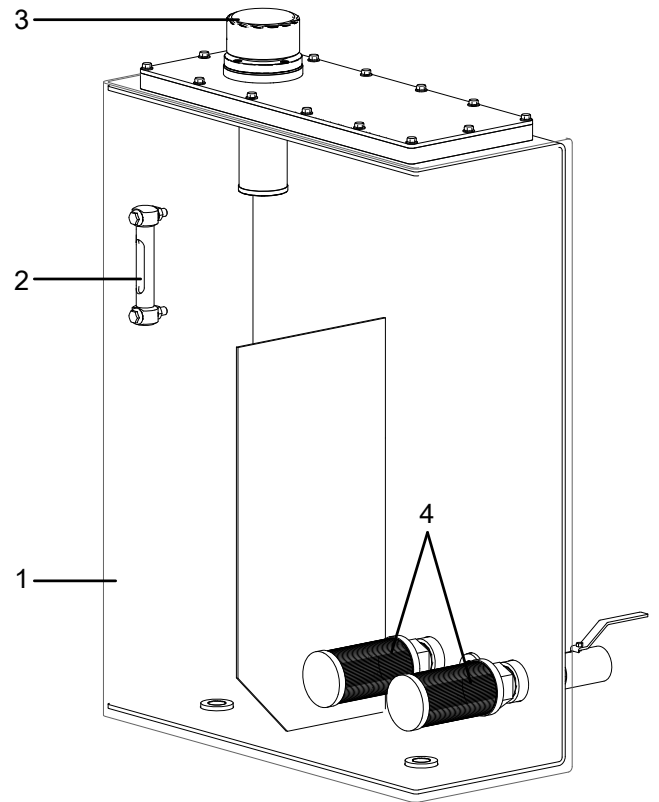


Fig. 7 Schematic Diagram – Hydraulic Tank Structure

Table 9-7 Hydraulic tank structure	
No.	Description
1	Tank body
2	Level indicator

Table 9-7 Hydraulic tank structure (continued)

3	Air filter
4	Suction filter

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.

Suction Filter

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

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

9.5 HYDRAULIC OIL HIGH-PRESSURE FILTER

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

1. Turn off the machine.
2. Locate the high-pressure filter.
3. Place a suitable container under the high-pressure filter.
4. Use a wrench to remove the filter housing.
5. Remove the filter element from the housing.

6. Check the seal on the mounting surface of the housing and, if necessary, replace the seal.
7. Install a new filter element into the housing.
8. Tighten the housing onto the filter fully and then loosen it by 1/4 turn.
9. Clean up any hydraulic oil that was spilled during the process.
10. Start the machine.
11. Check the high-pressure filter and related components for leakage.

9.6 HYDRAULIC PUMP

The hydraulic pump connects with the electric motor to serve as the power source.



WARNING

- **Before loosening or disassembling hydraulic parts, 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.**

Inspect the hydraulic pump

1. Make sure the machine is in stowed position.
2. Connect a pressure gauge (40 MPa) to the platform control manifold TPL.
3. Locate the lift control manifold on the platform control manifold, and remove the lift coil, but do not disconnect the coil harness.
4. Turn the ground/platform control selector switch on the ground controller to ground control position.
5. Pull out the emergency stop button at the ground and platform controller to the ON position.
6. Operate the machine to lift, but the platform will not lift, and the pressure will increase. Note down the reading on the pressure gauge which should be about 21 MPa (3046 psi). If the pressure value is lower than 20 MPa (2901 psi) and the machine movements operate without strong power, the hydraulic pump may be damaged and needs to be replaced.
7. Reinstall the coil to the original position.
8. Remove the pressure gauge.

Disassemble the hydraulic pump

1. Mark and disconnect the hydraulic lines from the pump and collect the hydraulic oil from the lines with a suitable container. Plug the lines and the ports.
2. Dismount the mounting bolts on the pump and remove the pump carefully.

NOTICE

After the hydraulic pump is changed, make sure to restore the lifting speed and drive speed to the factory settings.

9.7 BLEED THE OSCILLATING CYLINDER

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

1. Make sure the machine is in stowed position.
2. Place a beveled wooden block with the height of 100 mm (3.9 in) in front of the machine.
3. Drive machine to place the left front wheel onto the wooden block, and then drive off the wooden block.
4. Drive machine to place the right front wheel onto the wooden block, and then drive off the wooden block.
5. Repeat steps 3 and 4 until bleeding of the left/right oscillating cylinders is complete.
6. Perform a counterbalance valve locking check.

9.8 OSCILLATION FUNCTION CHECK

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

Check Counterbalance Valve Locking

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

1. Make sure the machine is in stowed position.

2. Place a beveled wooden block with the height of 100 mm (3.9 in) in front of the machine.
3. Drive machine to place the left front wheel onto the wooden block until the left front wheel reaches the top of the wooden block.
4. Check if the oscillation cylinder has retracted, and ensure four wheels have firm contact with the ground/wooden block.
5. Unplug the left/right oscillation solenoid valve on the platform control manifold.
6. Drive machine to drive off the wooden block.
7. Have an assistant on the ground check whether the left front wheel is still off the ground and remains raised.
8. Plug in the left/right oscillation solenoid valve on the platform control manifold.
9. Before driving the machine forward or backward on level ground, release the left front wheel oscillation cylinder allowing the wheel to be lowered until it has reached firm contact with the ground.
10. Repeat the above steps to check the right front wheel oscillation cylinder.
11. If the oscillation cylinder does not work properly have qualified maintenance personnel rectify the issue before you continue to operate the machine.

Oscillating Axle Function Test

NOTICE

This test shall be performed using the platform controller on the ground. The machine must travel at maximum speed at all times during the test.

- In stowed position
 1. Place a beveled wooden block with the height of 100 mm (3.9 in) in front of the machine.
 2. Make sure the machine is in stowed position.
 3. Drive machine to place the left steering wheel onto the wooden block with the height of 100 mm (3.9 in).
 4. The remaining three wheels should have close contact to the ground.
 5. Drive machine to place the right steering wheel onto the wooden block with the height of 100 mm (3.9 in).
 6. The remaining three wheels should have close contact to the ground.
- In operating position
 1. Place a beveled wooden block with the height of 100 mm (3.9 in) in front of the machine.

2. Lift the platform to the operating position.
3. Drive machine to place the left steering wheel onto the wooden block with the height of 100 mm (3.9 in).
4. The remaining three wheels should have close contact to the ground.
5. Drive machine to place the right steering wheel onto the wooden block with the height of 100 mm (3.9 in).
6. The remaining three wheels should have close contact to the ground.

9.9 LUBRICATE THE OIL CYLINDER

Regularly lubricating the oil cylinder is quite important to keep the machine in normal working condition. It is recommended to lubricate the oil cylinder every 3 months or after 250 hours of operation.

1. Locate the grease nipple on the oil cylinder.
2. Remove the oil cap.
3. Wipe the grease nipple with clean cloth to remove dust.
4. Connect the grease gun to the grease nipple and fill the oil cylinder with lubricating oil until a small amount of lubricating oil flows from the fitting or around the bearing.
5. Disconnect the grease gun.
6. Wipe off the spilled lubricating oil from the grease nipple or bearing.
7. Change the oil cap.

9.10 CYLINDER DRIFT INSPECTION

A drift of the cylinder is normal within a certain range. 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.

Raise the platform to the highest position, and place a weight equivalent to the rated load on the platform to 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 10 minutes, perform a cylinder drift inspection as per the following procedures.

1. Place the machine in an environment with stable ambient temperature.
2. Raise the platform to the highest position, and place a weight equivalent to the rated load on the platform.
3. Measure drift at the cylinder piston rod with a calibrated dial indicator.
4. The maximum allowable drift for cylinders with different bores is shown in the table below. If the measured value is less than the maximum allowable drift, the cylinder is operating normally. If the measured value is greater than the maximum allowable drift the cylinder is not operating normally. Contact qualified service technicians for inspection and repair.

Table 9-8 Maximum allowable drift for different cylinder bore diameters

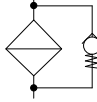
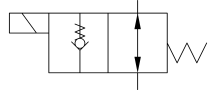
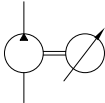
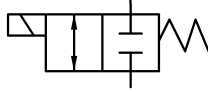
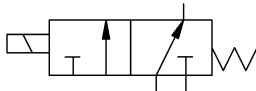
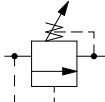
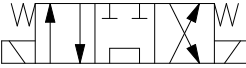
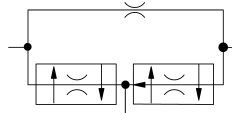
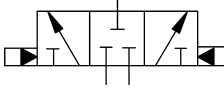
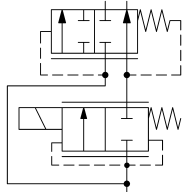
Cylinder bore diameter (mm/in)	Maximum allowable drift in 10 minutes (mm/in)
76/3	0.66/0.026
89/3.5	0.48/0.019
102/4	0.38/0.015
127/5	0.22/0.009
152/6	0.15/0.006
178/7	0.13/0.005

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 to 7/10000 or 0.07 % for each temperature change of 1°C.

9.11 HYDRAULIC SYMBOLS

Table 9-9

Symbols	Description	Symbols	Description
	Filter		Gear pump
	Brake		2-position 2-way solenoid directional valve
	Power unit		2-position 2-way solenoid directional valve
	Hydraulic motor		2-position 3-way solenoid directional valve
	Overflow valve		Accumulator
	3-position 4-way solenoid directional valve		Flow divider/flow-combining valve
	Check valve		Flush valve
	Proportional flow valve		

9.12 HYDRAULIC SCHEMATIC DIAGRAM

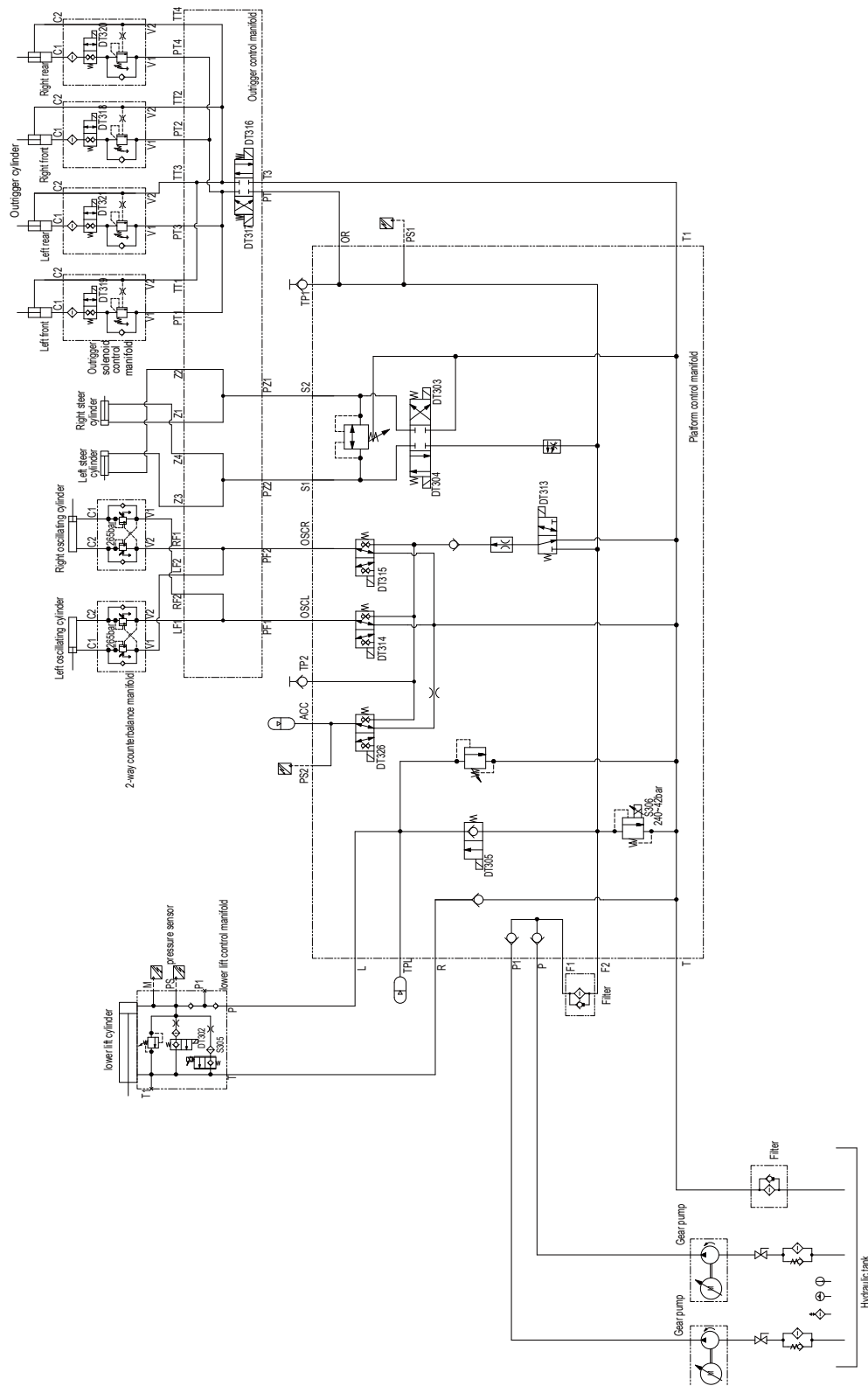


Fig. 8 Hydraulic Schematic Diagram - 1323RE

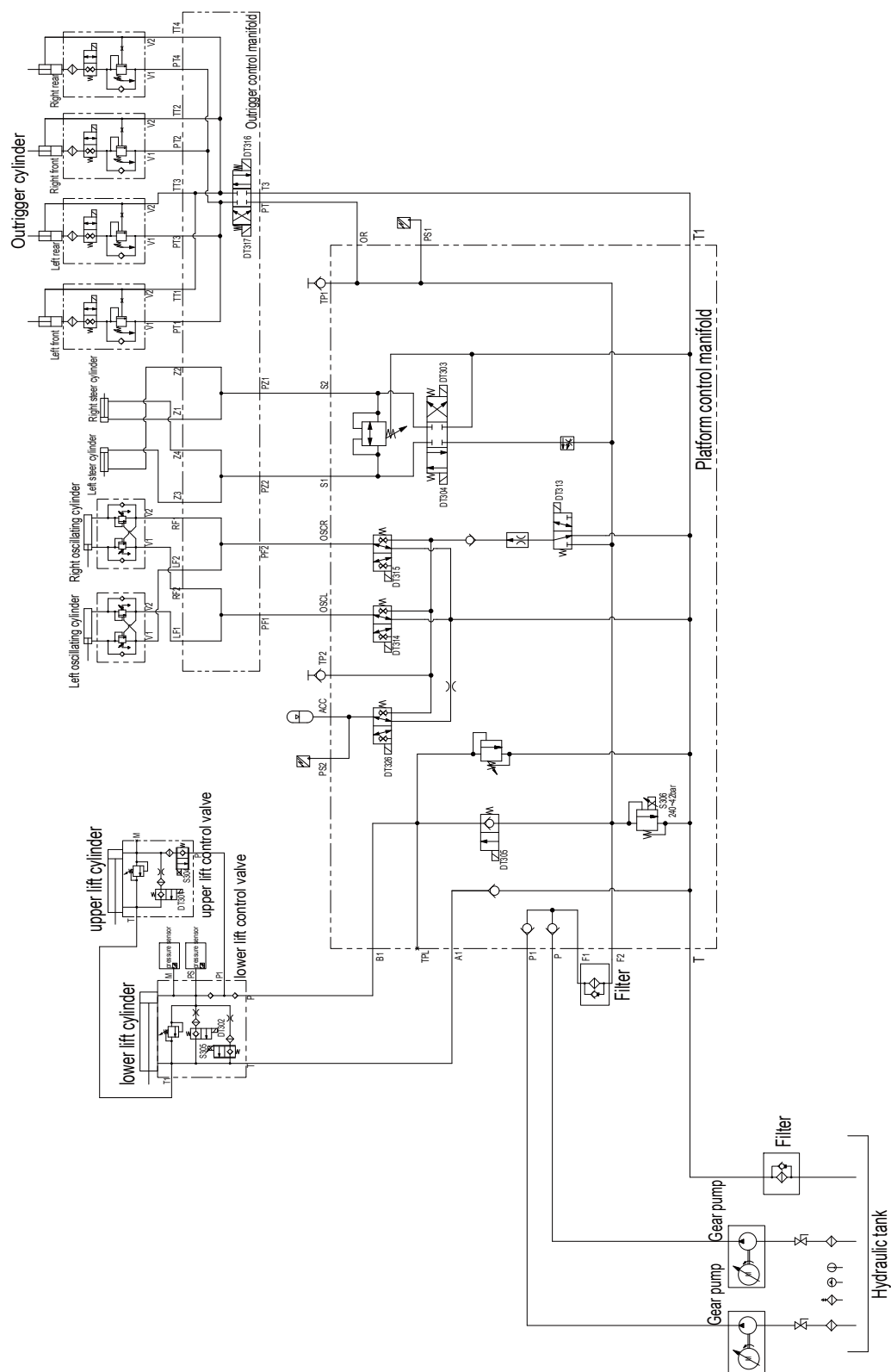


Fig. 9 Hydraulic Schematic Diagram - 1623RE

10 ELECTRICAL SYSTEM

Two 24V lead-acid batteries in series or the lithium batteries in the primary and secondary compartments in series are used to drive the drive motor and lift motor to realize platform lifting/lowering, steering while traveling and outrigger retracting/extending, and provide 12V control power for the whole machine through DC converter.

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

All batteries are charged via external power source. If the machine is configured with range extender, it can be used to charge the battery. The control system is protected by emergency stop button and power 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.

10.1 BATTERY

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

Inspection

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

Daily maintenance

- Check the battery level. The battery should be charged immediately after each discharge or if the SOC is less than 20%.
- Check battery electrolyte level (if equipped with batteries requiring maintenance). 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.
 - If equipped with batteries requiring maintenance, 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.

Adding 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.

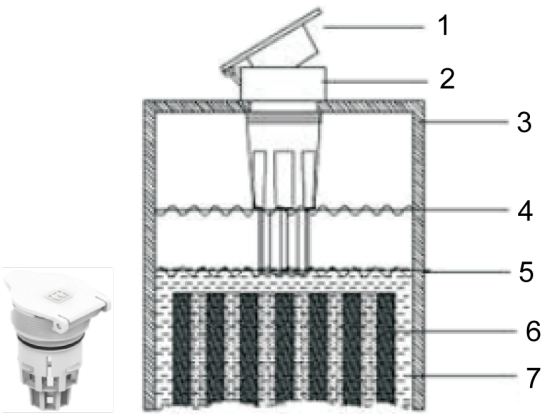


Fig. 1 Electrolyte level diagram

Table 10-1 Electrolyte Level Description

No.	Description
1	Flip-top cap
2	Filling plug

Table 10-1 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)

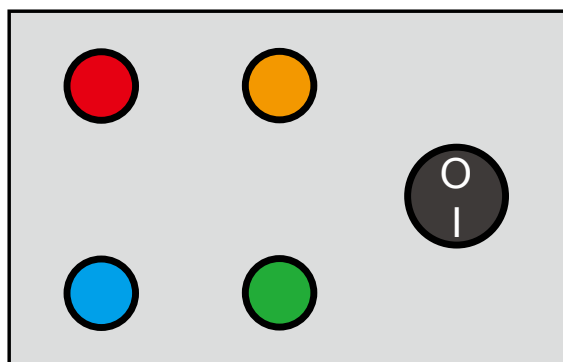


Fig. 2 Diagram of water refilling device panel

Table 10-2 Description of water refilling device

No.	Description
1	Power indicator
2	Undervoltage indicator
3	Operating indicator
4	Switch, water refilling device
5	Saturation indicator
- During normal operation, the power indicator and operating indicator illuminate steadily; - If the undervoltage indicator lights up, charge the water refilling device until the saturation indicator lights up.	

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.

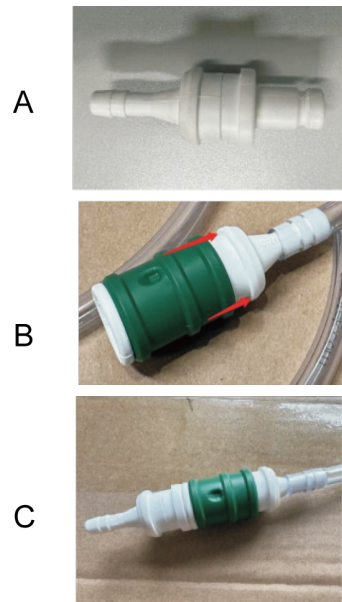


Fig. 3 Diagram of male joint and female joint connection

Table 10-3 Description of male joint and female joint connection

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

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

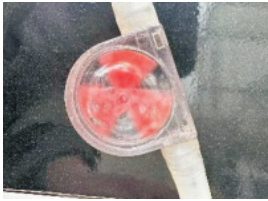


Fig. 4 Red rotating wheel

6. After the white buoy on the automatic water refilling valve floats up to the top, stop the water refilling device to complete water refilling.



Fig. 5 Diagram of white buoy position

Table 10-4 Description of white buoy position

No.	Description
A	Water refilling completed
B	Water refilling uncompleted

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

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



Fig. 6 Connect the water hose to the water outlet

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



Fig. 7 Diagram of male joint and female joint connection

Table 10-5 Description of male joint and female joint connection

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

- 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.



A

B

Fig. 9 Diagram of white buoy position

Table 10-6 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.
- Verify that all vent caps are properly secured to the battery.
- Set the charger to equalization mode.
- Charge the battery in equalization mode. The battery will bleed air in the equalization process (forming bubbles).
- Remove the vent cap every hour to measure the specific gravity of all battery cells, stop charging in equalization mode if the specific gravity doesn't increase any further.

Storage

- Fully charge the battery before placing the machine into storage.
- The battery should be stored in a cool and dry environment (temperature 10°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.

Table 10-7

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

NOTICE

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

10.2 ELECTRICAL SYMBOLS

Table 10-8

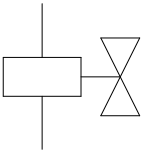
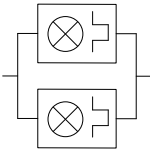
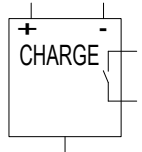
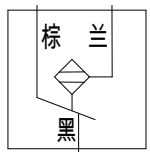
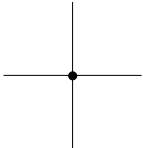
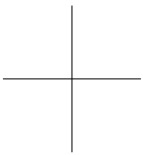
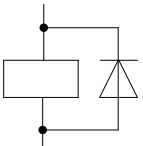
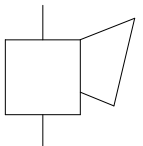
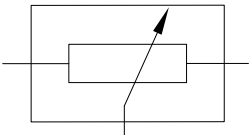
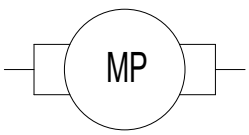
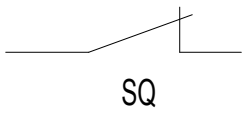
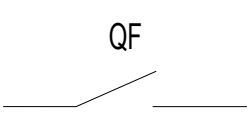
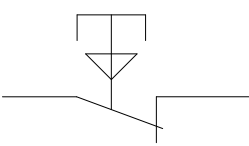
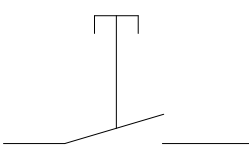
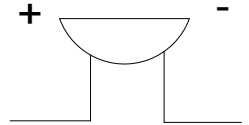
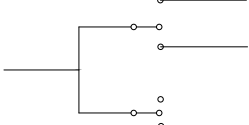
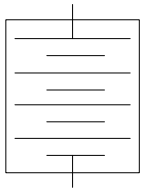
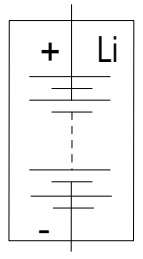
Symbols	Description	Symbols	Description
	Solenoid coil		Warning light
	Charger		Level switch

Table 10-8 (continued)

Symbols	Description	Symbols	Description
	Two lines, connected		Two lines, not connected
	Relay		Horn
	Sensor		Pump-controlled motor
	Limit switch		Power-off switch
	Emergency stop button		Button
	Buzzer		Key switch
	AGM battery		Lithium battery
	Fuse		

10.3 ELECTRICAL SCHEMATIC
DIAGRAM

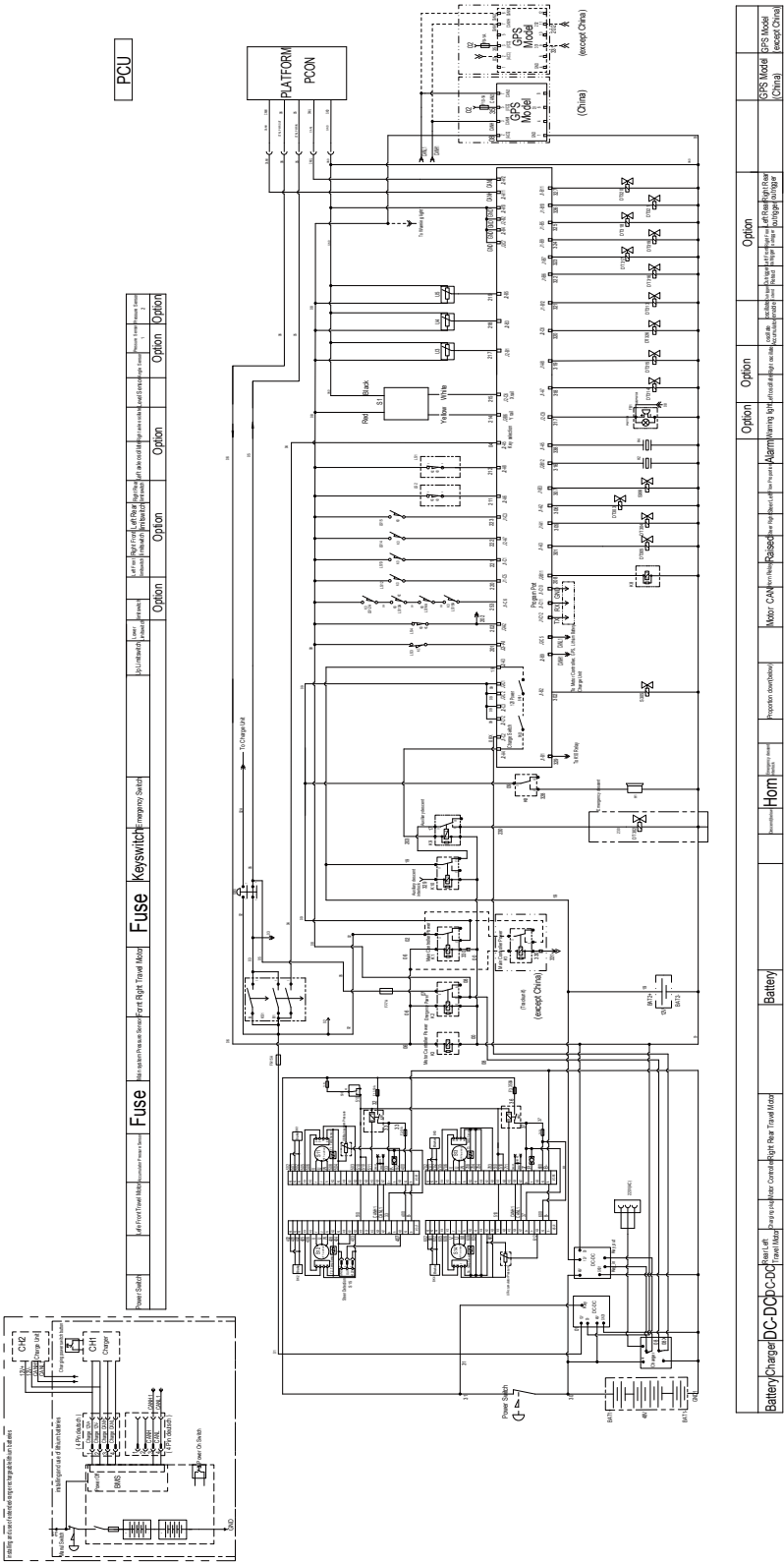


Fig. 10 Electrical Schematic Diagram - 1323RE



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11 TROUBLESHOOTING GUIDE

11.1 CHARGING FAULTS AND SOLUTIONS

Charging Faults and Solutions (Lead-acid Battery)

In case of a charging failure, the 50% light, 75% light and 100% light will flash simultaneously 1-6 times.

Table 11-1 Charging Faults and Solutions (Lead-acid Battery)

Fault code	Indication	Cause	Solution
E01 bAt	3 lights flash once	Output not connected to battery or connected in reverse	Check whether the battery pack is connected correctly. Check whether the charger is properly connected. Inspect the individual cells in the battery pack for damage.
E02 AC	3 lights flash two times	Abnormal utility supply (voltage)	Check whether the AC power cable from the AC outlet to the charger is connected properly. Make sure that the AC plug is firmly inserted into the AC outlet.
E03 Hot	3 lights flash three times	Charger overtemperature cutoff	The charger's internal or ambient temperature is too high. The charger will shut down and enter the overheat protection mode. Place the charger in a well-ventilated site. Disconnect the charger and wait 15-20 min before starting a new charging process.
E04 bAt	3 lights flash four times	High temperature protection for the battery	When the battery temperature exceeds the preset value, the charger will shut down to prevent overheat. After the battery temperature drops, the charger will restart automatically.
E05 Err	3 lights flash five times	Output overcurrent	Return the battery for repair.
E06 bAt	3 lights flash six times	Battery overvoltage	Check and make sure the correct output battery voltage is connected.
E10 Err	/	Relay close timeout	Return the battery for repair.
E11 bAt	/	Charging failure	Disconnect and reconnect the charger and try charging again
		Battery cell damaged	Replace the battery.

Charging Faults and Solutions (Lithium Battery)

In case of charging faults, the red LED indicator light will flash.

Table 11-2 Charging Faults and Solutions (Lithium Battery)

Flash count	Cause	Solution
1	Output not connected to the battery or connected in reverse, short circuit, damaged cell	1. Check whether the battery pack is connected correctly. 2. Check whether the battery is connected correctly; 3. Inspect the individual cells in the battery pack for damage.
2	Abnormal utility supply (voltage)	1. Check whether the AC power cable from the AC outlet to the battery is connected properly. 2. Make sure that the AC plug is firmly inserted into the AC outlet.
3	High temperature protection for battery	1. The battery's internal or ambient temperature is too high. The battery will shut down and enter the high temperature protection mode. Place the battery in a well-ventilated site. 2. Disconnect the battery, wait 15-20 minutes and then reconnect the power supply.
4	High temperature protection for battery	1. When the battery temperature exceeds the preset value, the battery will shut down to prevent overheat. 2. After the battery temperature drops, the battery will restart automatically.
5	Excessively high output current	Return the battery for repair.
6	Excessively high battery voltage	Check and make sure the correct output battery voltage is connected.
8	Reading memory address error	Return the battery for repair.
10	Relay unable to close	Return the battery for repair.
11	Battery error (damaged cell or battery system error)	Replace the battery.

11.2 FAULT CODES DESCRIPTION

Machine Faults and Solutions

The machine has a display screen at the ground controls and platform controls respectively for displaying machine parameter information and fault types.

Table 11-3 Sinoboom Control System

Fault code	Fault	Cause and solution
E002	System Communication Fault	Cause: Communication interrupted between the controller and the PCU. Solution: 1. Check whether the wiring between the ECU controller and the PCU joystick is disconnected; 2. Check whether the plugs of ECU controller and PCU joystick are in good contact.
SL	Sleeping mode	Not a fault
E008	Left Oscillate Solenoid Valve Fault	Inspect related harness
E009	Right Oscillate Solenoid Valve Fault	Inspect related harness
E014	Angle Sensor Fault	Inspect related harness
E015	Pressure Sensor Fault	Inspect related harness
E020	Chassis Start Switch Fault at Power-up	ECU button error
E025	Platform Left Turn Button Error at Power-up	The ECU button is pressed at power-up
E026	Platform Right Turn Button Error at Power-up	Inspect the button and related harness
E027	Platform Enable Button Error at Power-up	Inspect the button and related harness
E028	Joystick Not In Neutral at Power-up	Inspect the button and related harness
E031	Glow Plug Button ON Error at Power-up	Inspect the button and related harness
E032	Platform Start Button ON Error at Power-up	Inspect the button and related harness
E033	LF Outrigger Switch ON at Power-up	Inspect the button and related harness
E034	RR Outrigger Switch ON at Power-up	Inspect the button and related harness
E035	LR Outrigger Switch ON at Power-up	Inspect the button and related harness
E036	RR Outrigger Switch ON at Power-up	Inspect the button and related harness
E037	Auto Leveling Button ON at Power-up	Inspect the button and related harness
E043	Outrigger Extend Error	Inspect related harness
E044	Oscillate Enable Solenoid Valve Fault	Inspect related harness
E045	Oscillation Accumulator Solenoid Valve Fault	Inspect related harness
E054	Lift Up Solenoid Valve Fault	Inspect related harness
E055	Lift Down Coil Fault	Inspect related harness

Table 11-3 Sinoboom Control System (continued)

Fault code	Fault	Cause and solution
E056	Right Turn Coil Fault	Inspect related harness
E057	Left Turn Coil Fault	Inspect related harness
E066	Engine Oil Pressure Fault	Inspect related harness
E067	High Coolant Temperature Fault	Inspect related harness
E081	LF Outrigger Coil Fault	Inspect related harness
E082	LR Outrigger Coil Fault	Inspect related harness
E083	RF Outrigger Coil Fault	Inspect related harness
E084	RR Outrigger Coil Fault	Inspect related harness
E085	Outrigger Extend Coil Fault	Inspect related harness
E086	Outrigger Retract Coil Fault	Inspect related harness
E090	Lock 1 Pre-warning	GPS information
E091	Lock 2 Pre-warning	GPS information
E092	Lock 2	GPS information
E093	Lock 3 Pre-warning	GPS information
E094	Lock 3	GPS information
E0OL	Overloaded Platform Fault	The platform is overloaded, check the load.
E0LL	Chassis Tilt Fault	The chassis is tilted, operate the outriggers to level the chassis.

When the electrical control system detects an fault, the fault code will be displayed on the PCU, and the fault name will be displayed on the GCU. The fault code, name and description are as follows:

Table 11-4 DTC K120 Control System

Fault code	Display	Description	Solution
01	01 Internal ECU Fault	Main system fault	Change ECU
02	02 Platform ECU Fault	Ground and platform controller communication fault	Inspect the wiring; if the wiring is normal, replace the ground controller and then the platform controller to find out the fault source.
08	08 Floating Coil Left Fault	Left floating solenoid valve coil fault	Inspect the wiring, and replace solenoid valve.
09	09 Floating Coil Right Fault	Right floating solenoid valve coil fault	Inspect the wiring, and replace solenoid valve.
14	14 Angle Sensor Fault	Angle sensor fault	Inspect the wiring and sensor.
15	15 Pressure sensor fault	Pressure sensor fault	Inspect the wiring and sensor.
20	20 Chassis Start Sw Fault	Chassis start switch fault at power-up	Inspect the switch and wiring.

Table 11-4 DTC K120 Control System (continued)

Fault code	Display	Description	Solution
21	21 Chassis Choke Sw Fault	Glow plug switch ON error at power-up	Inspect the switch and wiring.
22	22 Chassis Up Sw Fault	Up switch ON error at power-up	Inspect the switch and wiring.
23	23 Chassis Enable Sw Fault	Enable switch ON error at power-up	Inspect the switch and wiring.
24	24 Chassis Down Sw Fault	Down switch ON error at power-up	Inspect the switch and wiring.
25	25 Left Turn Switch Fault	Left turn switch ON error at power-up	Inspect the switch, or replace the upper controls.
26	26 Right Turn Switch Fault	Right turn switch ON error at power-up	Inspect the switch, or replace the upper controls.
27	27 Drive Enable Sw Flt	Platform enable switch ON error at power-up	Inspect the switch, or replace the platform controller.
28	28 Off Neutral Drive Joystick	Joystick not in neutral at power-up	Inspect the joystick, or replace the platform controller.
31	31 Platform Choke Sw Fault	Platform choke switch ON error at power-up	Inspect the switch, or replace the upper controls.
32	32 Platform Start Sw Fault	Platform start switch ON error at power-up	Inspect the switch, or replace the upper controls.
33	33 Left Front Outrig Sw Flt	Left front outrigger switch ON error at power-up	Inspect the switch, or replace the upper controls.
34	34 Right Front Outrig Sw Flt	Right front outrigger switch ON error at power-up	Inspect the switch, or replace the upper controls.
35	35 Left Rear Outrig Sw Flt	Left rear outrigger switch ON error at power-up	Inspect the switch, or replace the upper controls.
36	36 Right Rear Outrig Sw Flt	Right rear outrigger switch ON error at power-up	Inspect the switch, or replace the platform controller.
37	37 Auto Level Switch Fault	Auto leveling switch ON error at power-up	Inspect the switch, or replace the upper controls.
42	42 9M Limit Switch Fault	9m limit switch fault	Inspect the 9m limit switch, the lower limit switch and the wiring.
43	43 Outrig Not Extended	Outrigger not extended fault	Extend the outriggers or lower the platform
45	45 Float Enable Valve Fault	Float enable valve fault	Inspect the wiring, and replace solenoid valve.
46	46 Float Energy Storage Valve Fault	Float energy storage valve fault	Inspect the wiring, and replace solenoid valve.
53	53 Func Prop Coil Fault	Proportional valve coil fault	Inspect the wiring, and replace solenoid valve.
54	54 Up Coil Fault	Up valve coil fault	Inspect the wiring, and replace solenoid valve.
55	55 Down Coil Fault	Down valve coil fault	Inspect the wiring, and replace solenoid valve.

Table 11-4 DTC K120 Control System (continued)

Fault code	Display	Description	Solution
56	56 Right Turn Coil Fault	Right turn valve coil fault	Inspect the wiring, and replace solenoid valve.
57	57 Left Turn Coil Fault	Left turn valve coil fault	Inspect the wiring, and replace solenoid valve.
58	58 Brake Coil Fault	Brake valve coil fault	Inspect the wiring, and replace solenoid valve.
66	66 Low Oil Pressure	Low oil pressure fault	Inspect the wiring, and replace pressure sensor.
68	68 Low Voltage	Low battery level fault	Inspect the wiring and battery, or replace battery.
75	75 Left-front MC fault	Left front motor driver fault	Inspect the electric motor driver.
76	76 Right-front MC fault	Right front motor driver fault	Inspect the electric motor driver.
77	77 Left-rear MC fault	Left rear motor driver fault	Inspect the electric motor driver.
78	78 Right-rear MC fault	Right rear motor driver fault	Inspect the electric motor driver.
81	81 Left Front Otrg Coil Flt	Left front outrigger solenoid valve coil fault	Inspect the wiring, and replace solenoid valve.
82	82 Left Rear Otrg Coil Flt	Left rear outrigger solenoid valve coil fault	Inspect the wiring, and replace solenoid valve.
83	83 Right Front Otrg Coil Flt	Right front outrigger solenoid valve coil fault	Inspect the wiring, and replace solenoid valve.
84	84 Right Rear Otrg Coil Flt	Right rear outrigger solenoid valve coil fault	Inspect the wiring, and replace solenoid valve.
85	85 Outrigger Ext Coil Flt	Outrigger extend solenoid valve coil fault	Inspect the wiring, and replace solenoid valve.
86	86 Outrigger Ret Coil Flt	Outrigger retract solenoid valve coil fault	Inspect the wiring, and replace solenoid valve.
OL	OL Platform Overload	Overloaded platform error	Check the load.
LL	Chassis Tilt	Chassis tilted	Operate the outriggers to level the chassis.
OP	OP System Over Pressure	System over-pressure	
GR	GR Engine Generator Fault	Engine generator alarm	Inspect the engine wiring.
EO		Generator operating prompt	
CL		Charging switch ON prompt (external charging cable plugged)	
CH		Ground control mode selection prompt	

11.3 BASIC TROUBLESHOOTING

Table 11-5

Fault	Cause	Solution
Machine has no power	Machine is not powered on.	• Check whether the ground/platform control selector switch is in the center position. • Check whether the emergency stop button on the platform controller or ground controller has been pressed down • Check whether the platform controller is malfunctioning. • Check whether the ground controller is malfunctioning
Machine communication fault	CAN equipment offline	• Check whether the power supply cable or communication cables are inserted incorrectly or loosely. • Check whether the plug pins of the connecting cable between the platform and chassis are wired incorrectly, or whether the connection is not secure. • Check whether the platform controller is malfunctioning. • Check whether the controller plug of the ground/platform controller is wired incorrectly, or whether the connection is not secure.
No response to ground controller operations	/	• Check whether the ground/platform control selector switch has been set to the ground control position. • After the software was re-downloaded to the ground controller, the system was not reset (power off/restart). • Check whether the ground controller is malfunctioning
No response to platform controller operations	/	• Check whether the ground/platform control selector switch has been set to the platform control position. • After the software was re-downloaded to the platform controller, the system was not reset (power off/restart). • Check whether the platform controller is malfunctioning.
A tilt alarm occurs with the machine in level position.	Level sensor error	• Check whether the level sensor is inserted incorrectly or loosely. • Check whether the level sensor is malfunctioning.
With the unloaded machine in a level position, the platform cannot be lowered using the ground controls.	Lowering valve malfunction	• Check whether the digital input plug is inserted properly and firmly • Check whether the wiring of the plug switch is malfunctioning • Check whether the lowering valve is malfunctioning or whether the lead is connected properly.

Table 11-5 (continued)

Fault	Cause	Solution
The platform cannot be lowered using the platform controller; no alarm present.	Staged lowering function	Reset the handle and perform the lowering operation again.
With no load and the platform in its lowest position, the platform cannot be raised using the ground controls.	Height calibration is wrong/the lift valve is malfunctioning	- Check whether the digital input plug is inserted properly and firmly - Check whether the wiring of the plug switch is malfunctioning - Check whether the lifting valve is malfunctioning or whether the lead is not connected. - Repeat the height calibration.
In indoor mode and with no load, the platform cannot be lifted to its maximum height.	The height has not been calibrated/the travel switch is incorrectly set.	- Carry out height calibration. - Change the settings of the travel switch.
The platform has not reached its maximum height but stops rising further.	The upper limit travel switch is set incorrectly/the machine is in outdoor mode.	- Check the calibration status of the upper limit travel switch - Check whether the machine is in outdoor mode.
An overload alarm is present despite the fact that there is no load on the platform.	No weight calibration has been carried out yet/first time lifting.	Calibrate weight
Forward traveling function fails without warning	Forward traveling function malfunction	- Check whether the PWM plug of the ground controller is inserted correctly and firmly. - Check whether the forward valve has been connected wrongly or is malfunctioning. - Check whether the ground controller is malfunctioning
Reverse traveling function fails without warning	Reverse traveling function malfunction	- Check whether the PWM plug of the ground controller is inserted correctly and firmly. - Check whether the reverse valve has been connected wrongly or is malfunctioning. - Check whether the ground controller is malfunctioning
The machine is overloaded but no overload alarm is present.	Pressure sensor malfunction	- Perform pressure sensor calibration - Check the wiring of the pressure sensor for any abnormalities. - Check whether the pressure sensor is malfunctioning.

Table 11-5 (continued)

Fault	Cause	Solution
No continuous machine travel possible after tires installed (machine travels intermittently).	Battery level low/incorrect calibration	• Re-calibrate parameters • Check the battery level
Parameters after setting could not be saved successfully after several attempts.	Saving error	• Check whether the set parameters are within the threshold values. • Check whether the ground controller is malfunctioning • Software error, program needs to be upgraded

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12 FUNCTIONS AND CONTROLS

12.1 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 scissor arms are fully retracted.
- **Transport position:** the scissor arms, the platform extension and the outriggers are fully retracted.
- **Operating position (raised):** the scissor arms are elevated until disengaged from the down limit switch.
- **Non-operating position:** the scissor arms are not disengaged from the down limit switch.

Note: when the scissor arms are disengaged from the down limit switch, the platform height (from the ground to the platform floor) shall be: 3 ± 0.3 m (9 ft 10 in $\pm$ 10 in).

12.2 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 40 m (131.2 ft) from each other as the test start and stop lines.
2. Start the machine.
3. Set the machine to drive and steer mode and high travel speed mode. Press and hold the enable button on the joystick and push the joystick forward to the full drive position.

NOTICE

Before operating the joystick, make sure the engine (if equipped) is running at high speed.

4. Ensure the machine is traveling at the maximum travel speed when the front wheel touches the test start line, start timing.
5. Stop the timer when the front wheel touches the test stop line.
6. 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.

12.3 BRAKE 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. Verify that the machine's brakes have not been released.
2. Mark a test line on the ground as a reference.
3. Start the machine.
4. Set the machine to drive and steer mode and high travel speed mode. Press and hold the enable button on the joystick and push the joystick forward to the full drive position.
5. Ensure the machine is traveling at high speed when the front wheels touch the test start line, then release the joystick quickly.
6. Measure the horizontal distance between the test line and the contact point between the front wheel and the ground, which is the braking distance.
7. 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.

12.4 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:

• With the outriggers retracted:

1. Start the machine.
2. Drive the machine so the two wheels on the left (or right) side travel on a slope with an angle greater than 2°.
3. From the ground using the platform controller, lift the platform to operating position. Once the machine has reached the operating position, the buzzer sounds, the display shows the machine tilt fault code "LL", the lifting and driving functions are restricted, and the platform can only be lowered.
4. After lowering the platform to a 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 3°.
6. From the ground using the platform controller, lift the platform to operating position. Once the machine has reached the operating position, the buzzer sounds, the display shows the machine tilt fault code "LL", the lifting and driving functions are restricted, and the platform can only be lowered.
7. After lowering the platform to a non-operating position, drive the machine off the slope.

• With the outriggers extended:

1. Start the machine.
2. Activate the outrigger auto leveling function, the outrigger auto leveling enable switch indicator shall illuminate after the machine becomes level.
3. Adjust an individual outrigger manually using the platform controller on the ground to tilt the machine more than 0.5° along the X-axis (left-right direction), and lift the platform to operating position. Once the machine has reached the operating position, the buzzer sounds, the display shows the machine tilt

fault code "LL", the lifting and driving functions are restricted, and the platform can only be lowered.

4. Activate the outrigger auto leveling function, the outrigger auto leveling enable switch indicator shall illuminate after the machine becomes level.
5. Adjust an individual outrigger manually using the platform controller on the ground to tilt the machine more than 0.5° along the Y-axis (front-rear direction), and lift the platform to operating position. Once the machine has reached the operating position, the buzzer sounds, the display shows the machine tilt fault code "LL", the lifting and driving functions are restricted, and the platform can only be lowered.
6. Lower the platform to the stowed position.
7. Activate the outrigger auto leveling function, retract all outriggers and turn off the machine after the machine becomes level.

NOTICE

While adjusting an individual outrigger manually, tilt the machine only by means of extending an outrigger, not by retracting an outrigger.

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.

12.5 OVERLOAD LIMIT FUNCTION

The rated load capacity of the platform is clearly specified in the **Machine Specifications** section of this manual. Machine operation should be restricted if the platform is overloaded.

The overload limit function is essential for the safe operation of the machine. Any malfunction may affect the stability of the machine. It is recommended to check the overload limit function every 3 months or after 250 hours of operation.

Select a flat, level, unobstructed and solid surface to perform the following tests with no load on the platform:

For models not equipped with pressure sensor

1. Start the machine.
2. Fully raise and lower the platform twice from the ground controls to ensure that the machine displays no obvious vibration or abnormalities, and is properly lubricated.

3. After lowering the platform to the stowed position, gradually apply load to the platform based on the machine's rated load capacity.
4. As long as the weight on the platform is less than or equal to the rated load capacity the platform can be lifted to its highest position.
5. When the platform load weight exceeds 1.25 times the platform's rated load capacity, the platform lifting action is restricted. Once the excess load is removed, lifting will resume normal.

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.

NOTICE

Low temperature will increase the viscosity of hydraulic oil; thicker oil will significantly impact the pressure detection. If the temperature difference between the place of delivery and the manufacturer's facilities is $\geq 10^{\circ}\text{C}$ (50°F), or if the temperature of the hydraulic oil is less than 15°C (59°F) the machine may not be able to lift a platform that is loaded to the rated capacity.

For models equipped with pressure sensor

1. Start the machine.
2. Fully raise and lower the platform twice from the ground controller to ensure that the machine displays no obvious vibration or abnormalities, and is properly lubricated.
3. As long as the weight on the platform is less than or equal to the rated load capacity the platform can be lifted to its highest position.
4. After lifting the platform to the non-operating position, gradually apply load to the platform according to the rated load capacity of the platform. When the platform load weight is greater than 1.2 times of the rated platform load, the buzzer will sound, the display shows the platform overload fault code "PL", the lifting and travel functions will be restricted, but the platform is only allowed to lower. After the excess load is removed, all functions will be resumed.
5. After lifting the platform to the operating position, gradually apply load to the platform according to the rated load capacity of the platform. When the platform load weight is greater than 1.2 times of the rated platform load, the buzzer will sound, the display shows the platform overload fault code "OL", and all functions will be disabled. After the excess load is removed, all functions will be resumed.

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.

NOTICE

Low temperature will increase the viscosity of hydraulic oil; thicker oil will significantly impact the pressure detection. If the ambient temperature difference between the place of end customer and that of the machine manufacturer is $\geq 10^{\circ}\text{C}$ (50°F), or if the hydraulic oil temperature is lower than 15°C (59°F), the actual rated load will be smaller than the standard rated load and an alarm will be triggered (the "OL" symbol appears on the platform or the ground controller screens). Please re-calibrate the weighing sensor.

12.6 STAGED LOWERING FUNCTION

In order to reduce the risk of crushing and collision with obstacles while lowering the platform, the machine is equipped with a staged lowering function to be used while lowering the platform from the platform controls. It is recommended to check the staged lowering function every 3 months or after 250 hours of operation.

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

1. Start the machine and raise the platform to the highest position.
2. Activate the platform lift mode from the ground using the platform controller, press and hold the enable button on the joystick and pull the joystick back. The platform will lower.
3. Once the platform is lowered to the non-operating position, the machine will stop lowering automatically.
4. Release the joystick to the neutral position.
5. Repeat step 2 to re-activate the platform lowering function, the platform will continue lowering 5 sec later.

NOTICE

If during testing it is found that the staged lowering function is not working, immediately lower the platform to the stowed position, turn off and mark the machine, and contact a qualified service technician for inspection and repair.

12.7 EMERGENCY LOWERING FUNCTION

When the power unit fails, the emergency lowering function can be used to lower the platform into place. It is recommended to check the emergency lowering function every 3 months or after 250 hours of operation.

Test the emergency lowering function as per the **Emergency Lowering** section in the Operation Manual.

NOTICE

If the emergency lowering function is found to not be working properly, immediately lower the platform to the stowed position, turn off and tag the machine, and contact a qualified service technician for inspection and repair.

13 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 bears significant risk.



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

PCU, ECU, 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.

13.1 SINOBROOM MAIN CONTROL SYSTEM

This section is applicable to machines configured with a Sinoboom main control system.

System Interface

Pull out the emergency stop button at the ground controller to the ON position and turn the key switch to ground control position. Press the Enter key on the main interface of the ground controller to enter the ECU menu selection mode. Select and enter different function interfaces by pressing the PgUp /PgDn keys. The system interface is described 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).

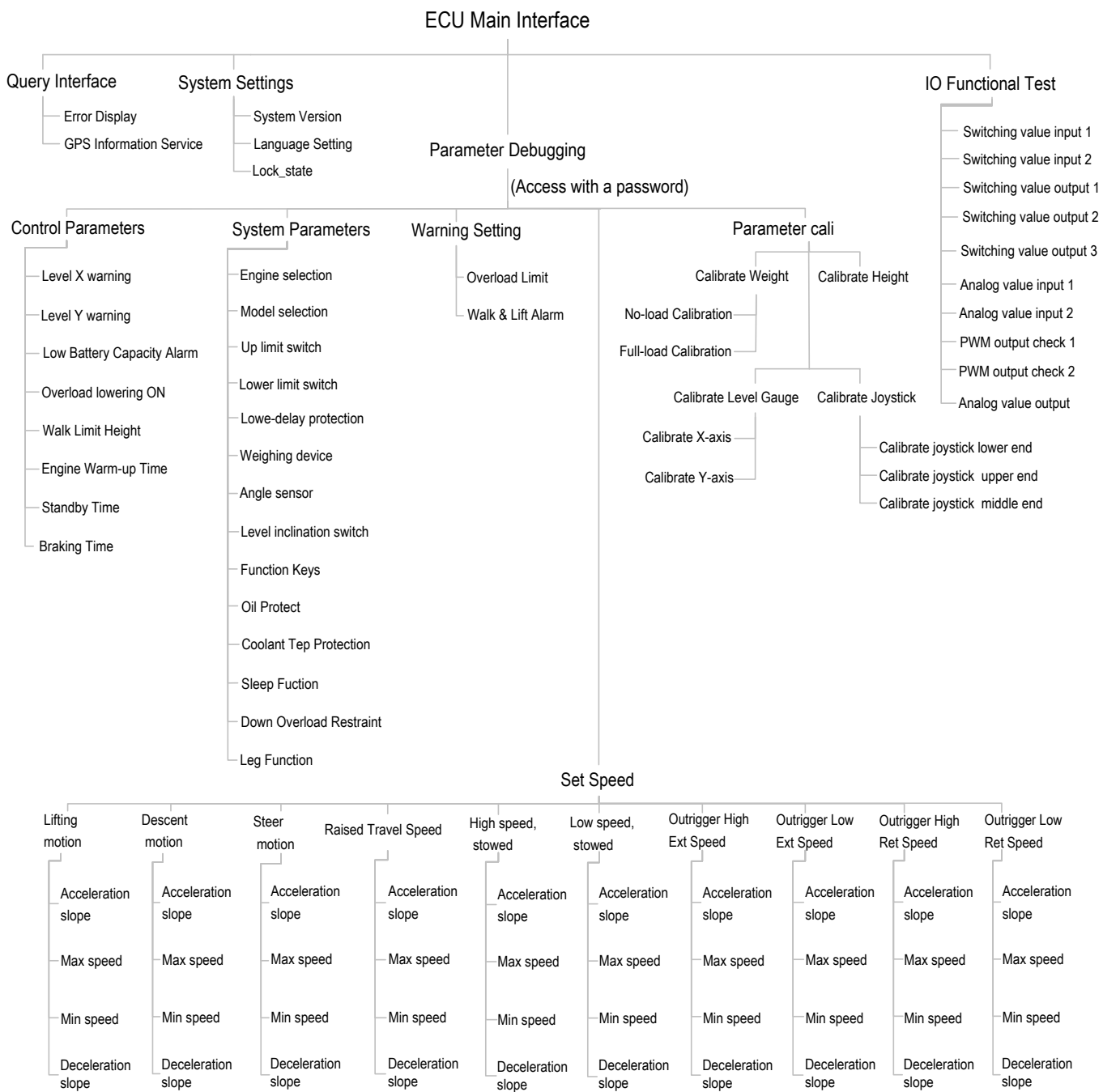


Fig. 1 System interface

Checking the Program Version

After entering the ECU menu selection mode, select and the System Settings interface, then select System Version to identify the current program version.

Updating the Program

 **WARNING**

Updating the program will restore the system parameters set by the original owner/user/ Sinoboom to the original parameters set by the control system manufacturer. Updating the program without prior authorization from Sinoboom is strictly forbidden. Please contact SINOBOOM after-sales personnel to update the program.

Query Interface

In the Query Interface, users can query GPS information and fault code information (for fault causes and solutions please refer to **Fault Codes** section).

Parameters Calibration Setting

The weight, height, level gauge and joystick parameters of the machine can be calibrated in the Parameter Calibration menu of Parameter Debugging.

Weight Calibration

NOTICE

- To ensure the accuracy of the weight calibration, a height calibration must be performed in advance.
- Weight calibration includes no-load and full-load calibration. Please complete the calibration using the ECU panel within one cycle as per the following procedures.

• No-load calibration

- Lower the platform to the stowed position. Make sure there is sufficient overhead space to allow the platform to be lifted to the maximum height safely.
- Make sure that no heavy objects are placed on the platform.
- Enter the ECU menu selection mode, then select and enter No-load Calibration interface, press the Enter key to start automatic calibration.

No-load calibration

Fig. 2

- The platform will raise and lower twice automatically: it will raise to the highest position and lower to the stowed position.
- Once the screen displays “No-load Calibration Complete”, the no-load calibration was successful.

No-load calibration complete

Fig. 3

- Return to the Weight Calibration interface through the Esc key.

• Full-load calibration

- Place heavy objects on the platform that have the same weight as the rated load of the machine.
- Select and enter the Full-load calibration interface, then press the Enter key to start automatic calibration.

Full-load calibration

Fig. 4

- The platform will raise and lower twice automatically: it will raise to the highest position and lower to the stowed position.
- When the screen displays “Full-load calibration complete!”, the full-load calibration was successful.

Full-load calibration complete

Fig. 5

- Return to the main interface through the Esc key, and power off the machine as needed.

Height Calibration

- Lower the platform to the stowed position. Make sure there is sufficient overhead space to allow the platform to be lifted to the maximum height safely.
- Make sure that no heavy objects are placed on the platform.
- Enter the ECU menu selection mode, then select and enter the Calibrate Height interface and press the Enter key.

Calibrate height

Fig. 6

4. The platform will automatically raise to the highest position, and then lower to the stowed position.
5. When the screen displays "Height Calibration Done", the height calibration was successful.

Height calibration
done

Fig. 7

6. Return to the main interface through the Esc key, lower the platform to the stowed position, and power off the machine as needed.

Joystick Calibration

NOTICE

The joystick calibration includes calibrating the joystick upper end, middle end and lower end. Please perform the calibration with the ECU panel within one cycle as per the following procedure.

1. Enter the ECU menu selection mode.
2. **Calibrate joystick upper end:** push the joystick to the uppermost end and hold it, select and enter Calibrate Joystick Upper End (as shown in the figure below), then press and hold the enter key. Once "OK" is displayed in the lower right corner of the screen, the joystick upper end is successfully calibrated. Press the Esc key to return to the Joystick Calibration interface.

Calibrate joystick
upper end

Fig. 8

3. **Calibrate joystick middle end:** push the joystick to the middle position and hold it, select and enter Calibrate Joystick Middle End (as shown in the figure below), then press and hold the enter key. Once "OK" is displayed in the lower right corner of the screen, the joystick middle end is successfully calibrated. Press the Esc key to return to the Joystick Calibration interface.

Calibrate joystick
middle end

Fig. 9

4. **Calibrate joystick lower end:** push the joystick to the lowermost end and hold it, select and enter Calibrate Joystick Lower End (as shown in the figure below), then press and hold the enter key. Once "OK" is displayed in the lower right corner of the screen, the joystick lower end is successfully calibrated.

Calibrate joystick
lower end

Fig. 10

5. Return to the main interface through the Esc key, and power off the machine as needed.

Set Speed

In the Set Speed menu of Parameter Debugging, the speed parameters of Lifting Motion, Descent Motion, Steer motion, Raised Travel Speed, High Speed, Stowed, Low Speed, Stowed, Outrigger High Ext Speed, Outrigger Low Ext Speed, Outrigger High Ret Speed and Outrigger Low Ret Speed can be set.

System Parameters

In the System Parameters menu of Parameter Debugging, the engine and machine model can be selected, and the upper limit switch, lower limit switch, low-delay protection, weighing device, angle sensor, level inclination switch, function keys, oil pressure protection, coolant temperature protection, sleep function, down overload restraint, and leg function can be switched on or off.

Note: The engine type, oil pressure protection, and coolant temperature protection option will be invalid for electric models.

Control Parameters

In the Control Parameters menu of Parameter Debugging, the parameters of level X warning (in 0.1°), level Y warning (in 0.1°), low battery capacity alarm (in percentage), overload lowering ON (in 0.1m), walk limit height (in 0.1m), engine warm-up time (in s) standby time (in min), and braking time (in ms) can be set.

Note:

- The low battery capacity alarm option will be invalid for diesel engine models.
- The engine warm-up time option will be invalid for electric models.

Warning Setting

In the Warning Setting menu of Parameter Debugging, the user could turn on or off the overload limit and walk & lift alarm functions.

13.2 DTC-K120 MAIN CONTROL SYSTEM

This section is applicable to machines configured with DTC-K120 main control system.

System Interface

Pull out the emergency stop button to the ON position, press the PgUp key and PgDn key on the ECU panel and turn the key switch to Ground control position to power up the machine. The machine will enter the ECU menu selection mode. Select and enter different function interfaces by pressing the PgUp /PgDn keys. The system interface is described 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).

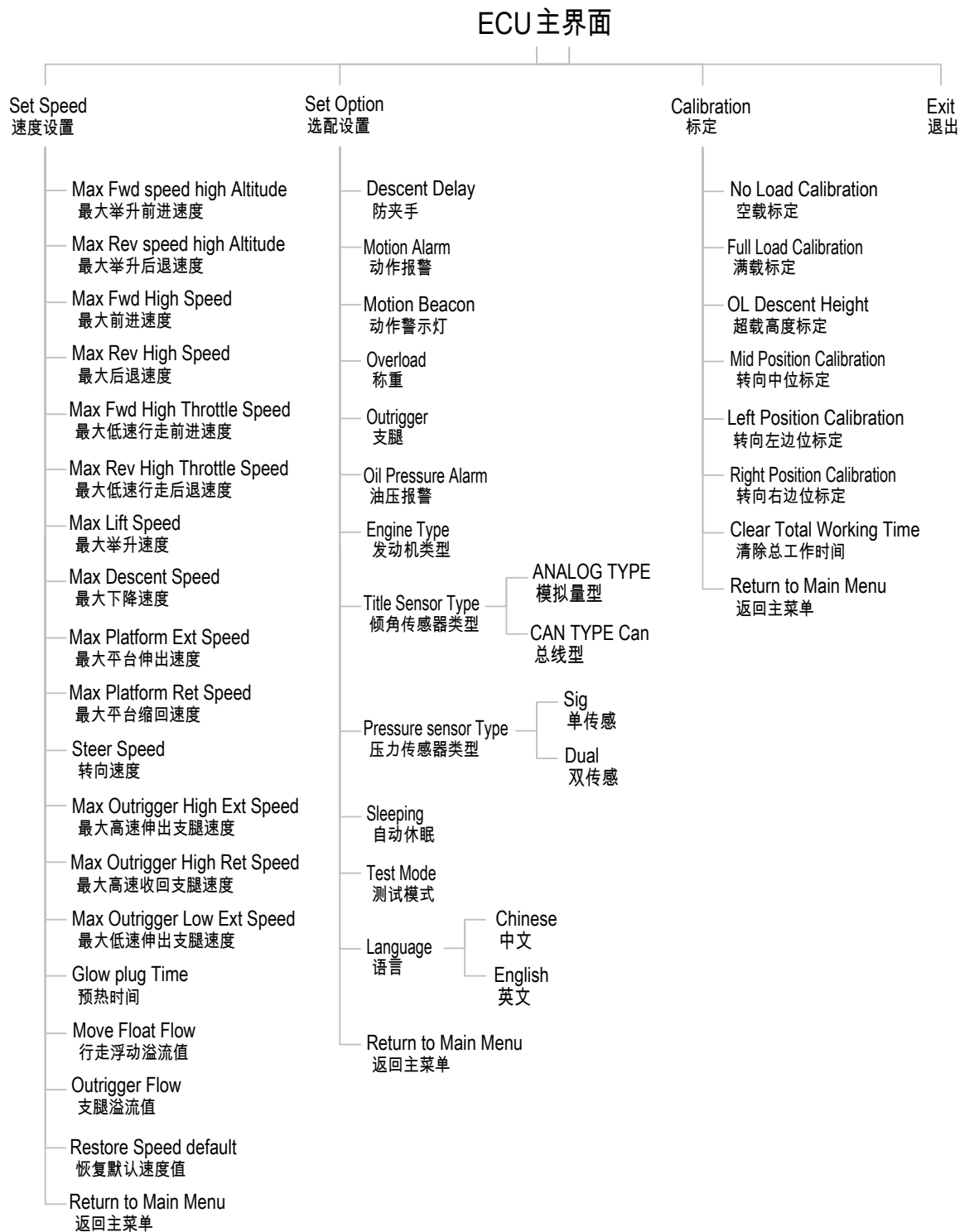


Fig. 11 System interface

Checking the Program Version

When the machine is powered on, the screen will display the current program version in the first 2s of startup.

Updating the Program

WARNING

Updating the program will restore the system parameters set by the original owner/user/Sinoboom to the original parameters set by the control system manufacturer. Updating the program without prior authorization from Sinoboom is strictly forbidden. Please contact SINOBOOM after-sales personnel to update the program.

Set Option

- In the “Set Option” menu, the Descent Delay, Motion Alarm, Motion Beacon, Overload, Outrigger, Oil Pressure Alarm and Test Mode can be turned on or off. However, these functions are switched on by default. Even if these functions are turned off manually, they will return to the default ON state when the machine is powered on again.
- In the “Set Option” menu, the Engine Type, Tilt Sensor Type and Pressure Sensor Type and Language can be selected.
- In the “Set Option” menu, the Sleeping Time can be set.

Note: The Engine Type option will be invalid for electric models.

Set Speed

In the “Set Speed” menu, the Max Fwd speed high Altitude, Max Rev speed high Altitude, Max Fwd High Speed, Max Rev High Speed, Max Fwd High Throttle Speed, Max Rev High Throttle Speed, Max Lift Speed, Max Descent Speed, Max Platform Ext Speed, Max Platform Ret Speed, Steer Speed, Max Outrigger High Ext Speed, Max Outrigger High Ret Speed, Max Outrigger Low Ext Speed, Glow plug Time, Move Float Flow, Outrigger Flow and Restore Speed default can be set.

Weight and Height Calibration

NOTICE

- The height calibration will be carried out automatically while the weight calibration is performed.
- Weight calibration includes no-load calibration and full-load calibration. Please complete the calibration with the ECU panel within one cycle as per the following procedures.

No-load calibration (& height calibration)

1. Lower the platform to the stowed position, and ensure that the space above the platform allows the platform to be safely lifted to the maximum height.
2. Make sure that no heavy objects are placed on the platform.
3. After entering the ECU menu selection mode, select and enter No Load Calibration interface, and press the Enter key for confirmation.

No Load Calibration

Fig. 12

4. The machine will start the no-load calibration (& height calibration) automatically: The platform will rise and lower for three times automatically: rise to the highest position and descend to the stowed position (the first, second and third ascending and descending movements are for height calibration, static calibration and dynamic calibration respectively).
5. When the platform is lowered into place and the horn stops sounding, the no-load calibration (& height calibration) is successfully done.
6. Return to the Calibration interface through the Esc key.

Calibration

Fig. 13

Full-load calibration

1. Place heavy objects on the platform that have the weight of 1.1 times the rated load of the machine.
2. Select and enter Full Load Calibration interface, and press the Enter key for confirmation.

Full Load Calibration

Fig. 14

3. The machine will start the full-load calibration automatically: The platform will rise and lower for three times automatically: rise to the highest position and descend to the stowed position (the first, second and third ascending and descending movements are for height calibration, static calibration and dynamic calibration respectively).

4. When the platform is lowered into place and the horn stops sounding, the full-load calibration is successfully done.
5. Return to the main interface through the Esc key, and power off the machine as needed.

14 APPENDIX

14.1 MAJOR MODIFICATION AND REPAIR RECORD

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

Major Modification and Repair Record

Note:

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

14.2 INSPECTION AND PREVENTIVE MAINTENANCE SCHEDULE

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.

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” (cumulative working time) displayed on the ground controls (whichever comes first).

Table 14-1 Inspection and Preventive Maintenance Schedule

Item	Interval		
	Before each delivery ¹ or quarterly ²	Semiannually ³	Annually ⁴
Platform assembly			
Platform	1	1	1
Guardrails and floor	2	2	2
Access gate	1, 2, 3	1, 2, 3	1, 2, 3
Locking handle for platform extension	1, 2, 3	1, 2, 3	1, 2, 3
Platform wear pads (at the connection with scissor arm) and fasteners	1, 2	1, 2	1, 2
Safety belt anchorage point	1, 2, 7	1, 2, 7	1, 2, 7
Scissor arms assembly			
Scissor arms	1, 2	1, 2	1, 2
Safety strut	1, 2, 3	1, 2, 3	1, 2, 3
Bearings	1, 2, 5, 12	1, 2, 5, 12	1, 2, 5, 8, 12
Pivot pins, retaining rings and fasteners	1, 2	1, 2	1, 2
Chassis assembly			
Chassis	2	2	2

Table 14-1 Inspection and Preventive Maintenance Schedule (continued)

Item	Interval		
	Before each delivery ¹ or quarterly ²	Semiannually ³	Annually ⁴
Chassis wear pads (at the connection with scissor arm)	1, 2, 5	1, 2, 5	1, 2, 5, 8
Tires	1, 2	1, 2	1, 2
Wheel nuts	150	150	150
Traveling and steering components	1, 2, 5	1, 2, 5	1, 2, 5
Bearings	1, 2, 5, 12	1, 2, 5, 12	1, 2, 5, 12
Chassis door at both sides	1, 2, 3	1, 2, 3	1, 2, 3
Ladder	1, 2, 5	1, 2, 5	1, 2, 5
Drive motor	1, 5, 6	1, 5, 6	1, 5, 6
Drive reducer	1, 2, 5, 6	1, 2, 5, 6	1, 2, 5, 6, 11
Electric motor	1, 2, 3, 6	1, 2, 3, 6, 13	1, 2, 3, 6, 13
Gear pump	1, 2, 3, 6	1, 2, 3, 6	1, 2, 3, 6
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
Hydraulic tank air filter	1, 5, 6	1, 5, 6, 11	1, 5, 6, 11
Suction filter	1, 5, 6	1, 5, 6	1, 5, 6, 11
Return filter (if equipped)	1, 5, 6, 11 ⁵⁰	1, 5, 6, 11 ⁵⁰	1, 5, 6, 11 ⁵⁰
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	1, 3	1, 3	1, 3

Table 14-1 Inspection and Preventive Maintenance Schedule (continued)

Item	Interval		
	Before each delivery ¹ or quarterly ²	Semiannually ³	Annually ⁴
Functions and controls			
Platform controller	1, 3, 4, 7, 10	1, 3, 4, 7, 10	1, 3, 4, 7, 10
Ground 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
Emergency stop button (ground and platform)	1, 3, 10	1, 3, 10	1, 3, 10
Limit switches and power switch	1, 3, 10	1, 3, 10	1, 3, 10
Overload limit function	1, 3, 10	1, 3, 10	1, 3, 10
Tilt alarm	1, 3, 10	1, 3, 10	1, 3, 10
Emergency lowering device	1, 3, 10	1, 3, 10	1, 3, 10
Drive function	1, 3, 10	1, 3, 10	1, 3, 10
Brake function	1, 3, 10	1, 3, 10	1, 3, 10
Other			
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 14-1 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			
Inspection activity (numerical codes): 1. Check for correct installation (accurate position, firmly installed, tightened to the specified torque) 2. Visual inspection 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 dimensions/tolerances 9. Fully charged 10. Verify/perform 11. Replace the oil or filter element 12. Correctly lubricated 13. Inspect the carbon brush			

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