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Maintenance Manual

GTJZ0608E/0608E/2132E
GTJZ0808E/0808E/2732E

CE GB ANSI SA AS/NZS EAC

SINOBOOM

⚠ WARNING

Operating, servicing and maintaining this vehicle or equipment can expose you to chemicals including engine exhaust, carbon monoxide, phthalates and lead, which are known to 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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Contact us:

Website: www.sinoboom.com.cn / www.sinoboom.com

Sales Tel: 400-601-5828/0086-0731-87116222

Service Tel: 400-608-1289/0086-0731-87116333

E-mail: info@sinoboom.com/sales@sinoboom.com

Address: No.128, East Jinzhou Avenue, Ningxiang High-tech Industrial Park, Changsha, Hunan, China

Postal code: 410600

To Users

Thank you for choosing and using the machine 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 training on MEWP can 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 different regulations for the operation of the machine, which may conflict with the manual, and in such case, the stricter operation 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. Consider this manual as a part of the machine, and always keep the manual with the machine. Without the written permission of Sinoboom, do not copy, spread, sell or alter the manual.

Due to continuous improvement and upgrading of product design and different product models covered, some charts and texts in the manual may be not applicable to your machine. Our company reserves the right to revise the manual due to technical improvement, and the manual is subject to change without further notice. Please contact Sinoboom or its authorized agent for the latest 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:

REV	DATE	DESCRIPTION
A	July 2020	Original issue
B	March 2021	Updated manual, added GTJZ0808E outdoor use with limited height, etc.
C	October 2021	Updated manual
D	March 2022	Updated manual, added controller display operation instructions
E	March 2023	Comprehensively revised manual

Applicable Models

The manual is applicable to machines with the following models and serial numbers:

Model	Metric Trade ID	Imperial Trade ID	Serial No.
GTJZ0608E	0608E	2132E	0105300355 to present
GTJZ0808E	0808E	2732E	0105401253 to present

Note:

- Check the machine model and serial number on the machine nameplate, and whose position can be found in the ***Diagram of Decals Positions*** section of the Operation Manual.
- Product model is indicated on the nameplate for distinction of products with different main parameters.
- Product trade identification is indicated on marketing materials and machine decals for distinction of products with different main parameters, and can be classified as metric type and imperial type: the metric trade identification is applicable to the machines for countries/regions using metric system or as specially required by customers; the imperial trade identification is applicable to the machines for countries/regions using imperial system or as specially required 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. Please observe all safety instructions that follow the symbol to avoid possible injuries.

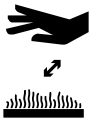
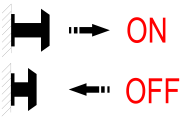
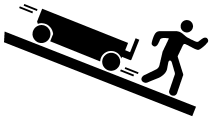
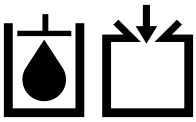
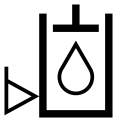
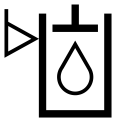
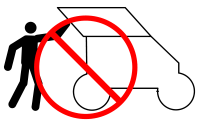
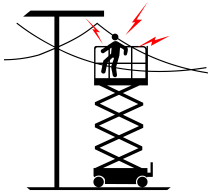
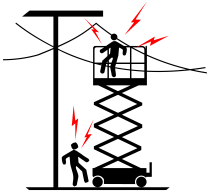
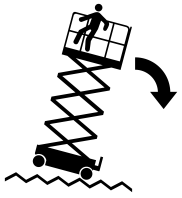
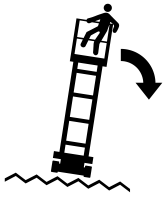
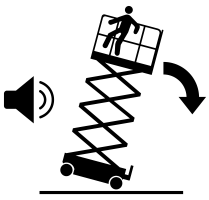
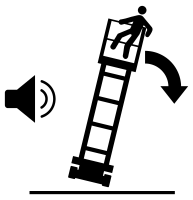
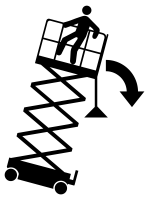
DANGER
Indicates an imminently hazardous situation that, if not avoided, *will* result in death or serious injury.

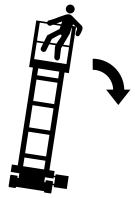
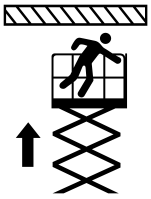
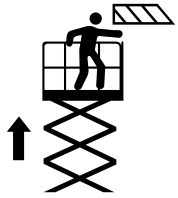
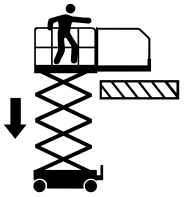
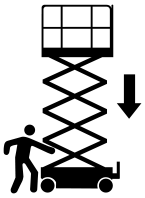
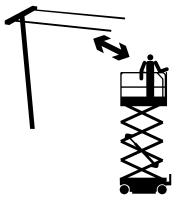
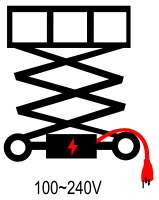
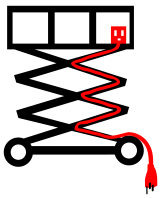
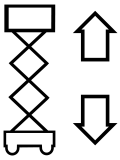
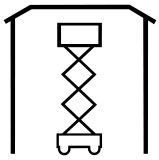
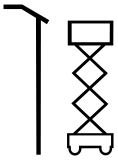
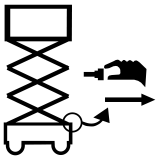
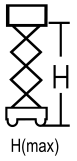
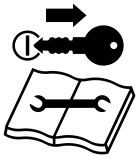
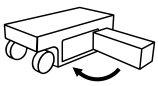
WARNING
Indicates an imminently hazardous situation that, if not avoided, *could* result in death or serious injury.

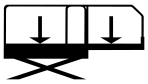
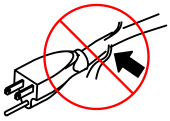
CAUTION
Indicates an imminently hazardous situation that, if not avoided, *could* result in minor or moderate injury.

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:

 Read maintenance manual	 Anchor point only for 1 person	 Wind speed	 Chemical burns hazard	 Wedge the wheel
 Read operation manual	 Add lubricant	 Crushing hazard-Please wear work shoes	 Danger of hot, high-pressure fluid sprays	 Wind
 Press the directional valve	 Repeatedly operate the manual brake release valve	 Release the brake	 Alarm sounds	 Horn
 Noise level	 Burns hazard	 Keep a safe distance from high temperatures	 Pull out-ON Press-OFF	 Collision hazards-Release the brake on ramp
 Hydraulic oil filler	 Hydraulic oil level-low level	 Hydraulic oil level-high level	 Temperature	 Replace with tires of the same specification
 Only trained maintenance personnel can access the compartment	 Electrocution hazard on platform	 Electrocution hazard on the ground and platform	 Tipping hazard-Avoid uneven ground	 Tipping hazard-Avoid uneven ground
 Tipping hazard-Never use machine in strong, gusty wind	 Tipping hazard-Never use machine in strong, gusty wind	 Tipping hazard-Never push or pull objects outside platform	 Tipping hazard-Never suspend objects from platform	 Tip-over hazard-Never place ladders and scaffolding on platform

 Tipping hazards-Never leave the chassis box open	 Collision hazard-Keep head away from overhead obstacles when raising platform	 Crushing hazard-Keep hands away from overhead obstacles when raising platform	 Collision hazard-Keep extended platform away from obstacles below when lowering platform	 Crushing hazards-Keep hands away form scissor arms when lowering the platform
 Fall hazard-Never climb on guardrails of platform	 Fall hazards-Never climb on scissor arms	 Keep a safe distance from power lines	 Battery charging plug	 Platform power plug
 Platform up&down movement	 Indoor use	 Outdoor use	 Emergency lowering handle position	 Maximum platform height
 Only professional maintenance personnel can perform maintenance	 Wear protective clothing and glasses	 Side force	 Electrocution hazard	 Battery explosion hazard
 No fire	 No smoking	 Lifting point	 Lashing point	 Tire-to-ground load
 Forklift fork position	 Close the chassis box	 Tool or weight	 Fast/high speed	 Slow/low speed

 Platform carrying capacity	 Respective carrying capacity of fixed platform and extensible platform	 Engage the safety arm	 Do not use damaged cords	

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, the maintenance personnel must carefully read and understand all warnings and precautions, and follow the maintenance instructions in this manual to perform all necessary maintenance on the mobile elevating work platform.

⚠ WARNING

Without the written permission of Hunan Sinoboom Intelligent Equipment Co., Ltd., it is forbidden to alter or modify the machine.

2.2 INSTRUCTIONS BEFORE MAINTENANCE

Requirements for Maintenance Personnel

The maintenance personnel are responsible for maintaining the machine and ensuring its safe use and normal operation. Before inspecting and maintaining this machine, the maintenance personnel should read, understand and comply with all applicable regulations and requirements of employers, local authorities and governments related to the application of this machine, and read and fully understand this manual.

The maintenance personnel shall:

- obtain appropriate qualification or authorization
- be experienced professional technicians or engineers
- be familiar with the machine being repaired and its hazards
- 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 maintaining this machine

NOTICE

- *Only authorized personnel who have received appropriate training and obtained qualifications can repair this machine.*
- *People who have consumed alcohol or taken medicine, those who are overtired or depressed, and those who are physically unwell are prohibited from repairing the machine.*

Precautions before Maintenance

Before inspecting and maintaining the machine as well as during the process of maintenance, maintenance personnel must be careful 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 site is clean and unobstructed.
2. Choose appropriate safety protective devices.
   - The maintenance personnel must find out various potential hazards that may arise during the inspection and maintenance work, and select appropriate safety protective devices according to the work type and 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 protective devices are not damaged and are used correctly.
   - Safety protective devices must be inspected regularly and replaced if any damage is found.
3. Choose appropriate repair tools.
   - Before conducting any inspection and maintenance work, the maintenance personnel shall prepare appropriate maintenance tools as required by the work, such as wrench, screwdriver, pliers, multimeter, pressure gauge, lubrication device, jack and lifting equipment.
   - While choosing a jack or lifting equipment, confirm whether its carrying capacity can meet the requirements of use. Refer to the ***Weight of Major Components*** section to select the device

with sufficient load capacity.

- Service tools must be kept clean and in good condition.

4. Lock the wheels after the machine is parked to prevent it from rolling.
5. Do not perform inspection and maintenance work after the machine is started.
   - Before performing inspection and maintenance work, make sure the machine is turned off, and remove the key. A “No Operation” warning sign can be placed next to the ground controller and platform controller, or the main power switch can be pressed to prevent unrelated personnel from inadvertently starting the machine.

> **⚠ WARNING**
>
> **If an unrelated person inadvertently starts the machine during inspection or maintenance, it may cause machine damage or personal injury.**

   - If inspection or maintenance work must be carried out after the machine is started, at least two people should work together. One person must stand in front of the ground or platform controller panel so as to turn off the machine at any time if necessary, another person shall carry out inspection or maintenance work, and they shall maintain close contact with each other.
6. Before maintaining electrical components, always press the main power switch.
7. Before carrying out inspection and maintenance work, clean the machine. Prevent dust or debris from getting into the machine parts during maintenance to affect machine performance.

Please strictly follow the above requirements during the maintenance process. In addition, take other measures to ensure safety during the maintenance process as appropriate for the working environment.

2.3 MAINTENANCE SAFETY

Unsafe Maintenance Hazard

⚠ WARNING

- Before performing any adjustment or service operations, power off all control units and ensure that all moving parts are securely secured and free from accidental movement.
- 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 people under and around the equipment.
- When striking the brass rod with a mallet, make sure to wear goggles.
- If you need to replace parts, use the original parts specified by Sinoboom.
- Do not wash the machine with water. The machine contains many electronic components such as solenoid valves and sensors, which may fail or work poorly after water ingress. If water washing is necessary, please turn off the main power switch firstly, and dry the machine thoroughly before connecting the power.
- Make sure the machine is turned off before using flushing equipment (such as high-pressure water gun) to clean the machine. It is forbidden to direct the water or vapor ejected from the flushing equipment at the electrical components, or short circuit or electric shock may result.
- After maintenance, clean the spilled hydraulic oil thoroughly and do not spill the hydraulic oil on the ground.
- After maintenance, immediately wash any hydraulic oil on the skin.
- Waste hydraulic fluids, fuels, coolants and refrigerants should be recycled or disposed as per local regulations.

⚠ WARNING

High Temperature and High Pressure Hazards

⚠ WARNING

- Some parts may have high surface temperature when the machine is running or after the machine has running for some time, which may cause burns through skin contact. Do not touch any hot parts!
- It is forbidden to repair or tighten hydraulic hoses or seals while the machine is live or when the oil system is under pressure.
- Before loosening or disassembling the hydraulic parts (especially the counterbalance valve on the cylinder), the hydraulic pressure of all hydraulic lines should be released and ensure that the hydraulic oil is completely cooled down.
- Disassemble the hydraulic components slowly to prevent the hydraulic oil from splashing and injuring people.
- It is forbidden to check the hydraulic leakage point by hand. Use a piece of cardboard or stiff paper to find leaks, and wear gloves to protect your hands from hydraulic fluid sprays.
- Do not operate the machine in case of hydraulic oil or air leaks. Oil or air leaked from the hydraulic system may penetrate and burn the skin.
- It is forbidden to plug leaking hydraulic oil by hand. If there is a leak, the pressure of the hydraulic system should be released first, and the maintenance should be carried out after the hydraulic oil has cooled down.
- If you are injured by ignoring the dangers of high temperature and high pressure, seek immediate medical attention. If treatment is not carried out immediately, serious complications can result.

Welding and Polishing Operation Hazards

⚠ WARNING

- Welding, grinding and polishing operations must follow the appropriate local safety operating procedures.
- Before performing welding, grinding and polishing operations, the machine should be powered off, and ensure that the 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 completely placed within the perimeter of the platform. Do not hang the wires of power tools on the guardrail of the platform or in any work area outside the platform, or hang the power tools directly with wires.

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 machines powered by an engine, do not refuel the machine while the engine is running.
- Never spray ether into the engine with a glow plug (if the machine is equipped with an engine).
- 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 follow the battery manufacturer's recommendations on proper battery use and maintenance procedures.
- Non-professionals should not repair and maintain the battery system, otherwise it may cause personal injury or damage to the battery system.

- Non-professionals should not modify parameters, detection lights, etc. during the operation of the battery system, otherwise it 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 appropriate 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.
- Never connect tools or other metal objects between the two binding posts of the battery.
- The battery charger can only be connected to a grounded three-wire AC power outlet. Please make sure the charger is working properly before charging. Do not connect the battery directly into a power outlet.
- In the use of the battery, if there is any abnormal conditions such as heating, deformation, leakage, peculiar smell or smoke, the battery must be stopped from use immediately and such conditions must be reported to the relevant maintenance personnel in time.
- Batteries contain sulfuric acid and can produce explosive mixtures of hydrogen and oxygen. Keep any materials (including cigarette/smoking materials) that can cause sparks or flames away from batteries to prevent explosion.
- 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 battery acid spillage or 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 diagonally, liquid may spill out of the battery.
- End-of-life batteries may cause danger, so please do not discard them at will. Please contact the battery recycling company if you need to scrap batteries.

NOTICE

- Please use the charger provided by the manufacturer to charge the battery.
- The charging process must be complete, and frequent intermittent charging can damage the battery.
- The battery is only applicable for the mated equipment supplied together at delivery, so do not use the battery for other purposes.
- Do not reverse the positive and negative poles of the battery for use.
- Do not short-circuit the positive and negative poles of the battery system.

NOTICE

- **It is forbidden to place other objects and tools on the battery to prevent short circuit in the battery.**
- **It is forbidden to tap, throw or step on the battery, or hit it with sharp parts.**
- **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, and then the machine power switch should be turned off.**

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, shall not be covered by the warranty.

2.4 CONSIDERATIONS AFTER MAINTENANCE

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

NOTICE

All maintenance work should include mandatory confirmation that the machine is operating properly.

⚠ WARNING

- **It is forbidden to dump waste liquids at will. Waste liquids should be discharged into appropriate containers.**
- **Waste hydraulic fluids, fuels, coolants and refrigerants should be recycled or disposed as per local regulations.**

3 TECHNICAL CHARACTERISTICS

3.1 MACHINE SPECIFICATIONS

Table 3-1 GTJZ0608E specifications

ITEM	Metric	Imperial
Product Category		
Battery type	Maintenance-free lead-acid battery/lithium battery	
Travel drive type	DC motor	
DIMENSION		
Max. platform height	6.3m	20ft 8in
Max. working height	8.3m	27ft 3in
Max. horizontal reach	0.9m	3ft
Overall length	2.46m	8ft
Overall width	0.83m	2ft 8.7in
Overall height (with guardrails folded)	1.84m	6ft
Overall height (with guardrails not folded)	2.24m	7ft 4in
Wheelbase	1.88m	6ft 2in
Wheel track	0.7m	2ft 3.6in
Ground clearance (with pothole protective device retracted)	0.1m	4in
Ground clearance (with pothole protective device extended)	0.025m	0.98in
Platform dimension (L×W×H)	2.30m×0.8m×1.1m	7ft 6.5in×2ft 7.5in×3ft 7in
PERFORMANCE		
Rated platform capacity	380kg	838lb
Maximum load capacity of extensible platform	120kg	265lb
Maximum number of people in the platform (indoor/outdoor)	2 persons/1 person	
Drive speed (stowed)	0 ~ 4km/h	0 ~ 2.5mph
Drive speed (raised)	0 ~ 0.8km/h	0 ~ 0.5mph
Platform lift time (unloaded)	25 ~ 30s	
Platform descend time (unloaded)	30 ~ 35s	
Gradeability (2WD)	25%	

Table 3-1 GTJZ0608E specifications (Continued)

ITEM	Metric	Imperial
Max allowable tilt angle (front-rear/ left-right)	3°/1.5°	
Turning radius (inside/outside)	0m/2.1m	0/6ft 10.7in
Tire (spec/type)	φ380×125mm/solid	φ15×5in/solid
Max. operating noise level	72dB	
IP rating	IP65	
Max. total vibration value of the platform	2.5m/s²	
Max. root-mean-square value of the weighted acceleration of the entire machine	0.5m/s²	
POWER		
Drive×steer	2WD×2WS	
Power unit motor (voltage/power)	24V DC, 3.3kW	
Hydraulic tank capacity	15L	3.3gal (Imperial)/4gal (US)
Hydraulic system pressure	21MPa	3046psi
Battery (voltage, capacity, rate of discharge)-lead-acid battery	24V, 220Ah, 20hr	
Battery (voltage, capacity, rate of discharge)-lithium battery	25.6V, 156Ah, 1hr	
System voltage	24VDC	
Control voltage	24VDC	
Charger (input voltage/output current)	100 ~ 240V AC/30A	
Drive motor (voltage/power)-DC	24V/0.85kW	
WEIGHT		
Gross weight (indoor/outdoor)	2090kg	4608lb
GROUND BEARING DATA		
Max. tire load	900kg	1984lb
Pressure against ground	1075kPa	156psi
ENVIRONMENT		
Max. allowable side force (indoor/ outdoor)	400N/200N	90lbf/45lbf
Maximum allowable wind speed (indoor/outdoor)	0/12.5m/s	0/28mph
Max. allowable altitude	1000m	3280.8ft
Allowable ambient temperature (lead-acid battery)	-10℃ ~ 40℃	14℉ ~ 104℉

Table 3-1 GTJZ0608E specifications (Continued)

ITEM	Metric	Imperial
Allowable ambient temperature (lithium battery)	-20℃ ~ 40℃	-4℉ ~ 104℉
Max. allowable relative humidity	90%	
Storage environment	Stored at -20℃ to 50℃ (-4℉ to 122℉) in a well-ventilated environment with 90% relative humidity (20℃ [68℉]), and away from rain, sun, corrosive gas, inflammables and explosives.	

Table 3-2 GTJZ0808E specifications

ITEM	Metric	Imperial
Product Category		
Battery type	Maintenance-free lead-acid battery/lithium battery	
Travel drive type	DC motor	
DIMENSION		
Max. platform height (indoor)	8.1m	26ft 7in
Max. platform height (outdoor)	6m	19ft 8in
Max. working height (indoor)	10.1m	33ft 2in
Max. working height (outdoor)	8m	26ft 3in
Max. horizontal reach	0.9m	3ft
Overall length	2.46m	8ft
Overall width	0.83m	2ft 8.7in
Overall height (with guardrails folded)	1.96m	6ft 5in
Overall height (with guardrails not folded)	2.36m	7ft 9in
Wheelbase	1.88m	6ft 2in
Wheel track	0.7m	2ft 3.6in
Ground clearance (with pothole protective device retracted)	0.1m	4in
Ground clearance (with pothole protective device extended)	0.025m	0.98in
Platform dimension (L×W×H)	2.30m×0.8m×1.1m	7ft 6.5in×2ft 7.5in×3ft 7in
PERFORMANCE		
Rated platform capacity	250kg	551lb
Maximum load capacity of extensible platform	120kg	265lb
Maximum number of people in the platform (indoor/outdoor)	2 persons/1 person	
Drive speed (stowed)	0 ~ 4km/h	0 ~ 2.5mph

Table 3-2 GTJZ0808E specifications (Continued)

ITEM	Metric	Imperial
Drive speed (raised)	0 ~ 0.8km/h	0 ~ 0.5mph
Platform lift time (unloaded)	30 ~ 35s	
Platform descend time (unloaded)	34 ~ 39s	
Gradeability	25%	
Max allowable tilt angle (front-rear/ left-right)	3°/1.5°	
Turning radius (inside/outside)	0/2.1m	0/6ft 10.7in
Tire size (diameter×width/type)	φ380×125mm/solid	φ15×5in/solid
Max. operating noise level	72dB	
IP rating	IP65	
Max. total vibration value of the platform	2.5m/s²	
Max. root-mean-square value of the weighted acceleration of the entire machine	0.5m/s²	
POWER		
Drive×steer	2WD×2WS	
Power unit motor (voltage/power)	24V DC, 3.3kW	
Hydraulic tank capacity	15L	3.3gal (Imperial)/4gal (US)
Hydraulic system pressure	21MPa	3046psi
Battery (voltage, capacity，rate of discharge)-lead-acid battery	24V, 220Ah, 20hr	
Battery (voltage, capacity，rate of discharge)-lithium battery	25.6V, 156Ah, 1hr	
System voltage	24VDC	
Control voltage	24VDC	
Charger (input voltage/output current)	100 ~ 240V AC/30A	
Drive motor (voltage/power)-DC	24V/0.85kW	
WEIGHT		
Gross weight (indoor/outdoor)	2265kg	4994lb
GROUND BEARING DATA		
Max. tire load	900kg	1984lb
Pressure against ground	1075kPa	156psi
ENVIRONMENT		
Max. allowable side force (indoor/ outdoor)	400N/200N	90lbf/45lbf

Table 3-2 GTJZ0808E specifications (Continued)

ITEM	Metric	Imperial
Maximum allowable wind speed (indoor/outdoor)	0m/s / 12.5m/s	0mph/28mph
Max. allowable altitude	1000m	3280.8ft
Allowable ambient temperature (lead-acid battery)	-10℃ ~ 40℃	14℉ ~ 104℉
Allowable ambient temperature (lithium battery)	-20℃ ~ 40℃	-4℉ ~ 104℉
Max. allowable relative humidity	90%	
Storage environment	Stored at -20℃ to 50℃ (-4℉ to 122℉) in a well-ventilated environment with 90% relative humidity (20℃ [68℉]), and away from rain, sun, corrosive gas, inflammables and explosives.	

Note:
a) The platform height plus the operator height (taken as 2m/6ft 7in) is 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 in adequately safe conditions.
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.
g) It's recommended not to use the lead-acid battery under the ambient temperature below 0℃, otherwise the battery capacity will decay rapidly and the battery life will be affected.

3.2 MOVEMENT SPEED

Table 3-3 GTJZ0608E

Movement	Time
Raise the platform	25 ~ 30s
Lower the platform	30 ~ 35s
Max drive speed in high gear-stowed	24.5 ~ 30s
Max drive speed in low gear-stowed	49 ~ 60s
Max drive speed-operating	123 ~ 150s
Brake distance at maximum drive speed in high gear	S≤0.4m (1.31ft)

Table 3-4 GTJZ0808E

Movement	Time
Raise the platform	30 ~ 35s
Lower the platform	34 ~ 39s
Max drive speed in high gear-stowed	24.5 ~ 30s

Table 3-4 GTJZ0808E (Continued)

Movement	Time
Max drive speed in low gear-stowed	49 ~ 60s
Max drive speed-operating	123 ~ 150s
Brake distance at maximum drive speed in high gear	S≤0.4m (1.31ft)

a) The movement speed depends on the start point and end point of the movement, rather than on the controls or switches.
b) The test results of drive speed vary with tires of different specifications.
c) All the speed tests should be conducted from the platform controller. The test results will differ if tested from the ground controller.
d) All the tests should be conducted with the hydraulic oil temperature at 20 ~ 30℃ (68 ~ 86℉). If the hydraulic oil temperature is too low, the test results will be affected.

Test requirements:

Raise the platform: With the platform unloaded, raise the platform (with the scissor arm from fully retracted position to fully raised position) twice.

Lower the platform: With the platform unloaded, lower the platform (with the scissor arm from fully raised position to fully retracted position) twice.

Drive in high gear-stowed position: With the machine in stowed position on level surface, switch to high gear, and push the drive control handle to the maximum travel distance to drive forward and reverse for 30m (98.4ft) respectively for two times.

Drive in low gear-stowed position: With the machine in stowed position on level surface, switch to low gear, and push the drive control handle to the maximum travel distance to drive forward and reverse for 30m (98.4ft) respectively for two times.

Drive-operating position: With the machine in operating position on level surface, push the drive control handle to the maximum travel distance to drive forward and reverse for 30m (98.4ft) respectively for two times.

Brake distance: With the machine in stowed position on level surface, switch to high gear, and then release the control handle once the machine reaches the maximum drive speed in high gear.

Note: For models with Japanese configuration, the machine cannot travel while elevated to operating position.

3.3 SPECIFICATIONS OF MAJOR COMPONENTS

Travel Reducer

Table 3-5 DC travel reducer (PN.203010003036)

DC motor	
Rated voltage	24V
Rated power	1.1kW
Reducer	
Maximum continuous operating output torque	395Nm (292ft-lb)
Maximum short-time operating output torque	800Nm (591ft-lb)
Reduction ratio	45.13:1
Brake	
Operating voltage	24V
Operating current	0.8A
Braking torque	20Nm (14.8ft-lb)

Motor

Table 3-6 DC motor (PN.203010003001)

Model	XQ-4.5-HP
Rated power	3.3kW
Rated voltage	24V
Rated current	180A
Rated RPM	3040r/min

Table 3-7 Pump motor (PN.202020000001)

Type	DC motor
Rated power	3kW
Rated voltage	24V

Hydraulic Pump

Table 3-8 Gear pump (PN.202010000034)

Displacement	4mL/r
Rated pressure	28Mpa (4061Psi)
Maximum pressure	31Mpa (4496Psi)
RPM	600 ~ 4000r/min

Table 3-9 Gear pump (PN.202010003054)

Displacement	4mL/r
Rated pressure	25Mpa (3626psi)
Maximum pressure	30Mpa (4351psi)
RPM	600 ~ 4000r/min

Table 3-10 Gear pump (PN.202010003015)

Displacement	4mL/r
Rated pressure	25Mpa (3626psi)
Maximum pressure	28Mpa (4061psi)
RPM	600 ~ 4000r/min

Battery

Table 3-11 Maintenance-free storage battery (PN.203100000017)

Model	EVGC6A-A
Rated voltage	6V
Rated capacity (at room temperature of 25℃)	200Ah (10hR) 170Ah (3hR)

Table 3-11 Maintenance-free storage battery (PN.203100000017)(Continued)

Standard charge current	60A
Voltage at end of discharge by 80%	5.7V
Charging curve code	b48 (Longsheng charger)

Table 3-12 Maintenance-free storage battery (PN.203100003092)

Model	3–DF-240
Rated voltage	6V
Rated capacity (at room temperature of 25℃)	240Ah (5hr)
Standard charge current	48A
Voltage at end of discharge by 80%	5.25V
Charging curve code	165 (Longsheng charger)

Table 3-13 Maintenance-free storage battery (PN.203100003104)

Model	3–EV-200
Rated voltage	6V
Rated capacity (at room temperature of 25℃)	200Ah (3hr)
Standard charge current	30A
Voltage at end of discharge by 80%	5.7V
Charging curve code	b71 (Longsheng charger) 16 (Yiyuan charger)

Table 3-14 Lithium battery (PN.203100003086)

Rated voltage	25.6V
Rated capacity	156Ah
End-of voltage	20V
Standard charge current	36A
Continuous discharge current	156A

Table 3-15 Lithium battery (PN.203100003055)

Rated voltage	25.6V
Rated capacity	162Ah
End-of voltage	21.6V
Standard charge current	30A
Continuous discharge current	160A

Table 3-16 Lithium battery (PN.203100003061)

Rated voltage	25.6V
Rated capacity	160Ah
End-of voltage	21.6V
Standard charge current	30A
Continuous discharge current	160A

Table 3-17 Lithium battery (PN.203100003051)

Rated voltage	25.6V
Rated capacity	156Ah
End-of voltage	20V
Standard charge current	36A
Continuous discharge current	156A

3.4 WEIGHT OF MAJOR COMPONENTS

⚠ WARNING

- **Never attempt to move heavy components without the assistance of mechanical equipment.**
- **It is forbidden to place heavy components in an unstable position.**

Table 3-18

Component	Metric (kg)	Imperial (lb)
Chassis assembly	1225	2700
Scissor assembly-GTJZ0608E	539	1188
Scissor assembly-GTJZ0808E	682	1504
Platform assembly	250	551
Solid tire	30	66
Travel reducer	43	95
Left chassis box	61	134
Right chassis box	52	115
Wheel carrier	22	49
Lift motor	13	29
Lift cylinder	54	119
Steering cylinder	13	29
Lead-acid battery	30	66
Lithium battery	50	110
Note: The weight of certain components will vary with the options configured on the machine.		

3.5 PRESSURE LIMITS

Table 3-19

Movement	Maximum pressure
Raise and lower the platform	21MPa (3046psi)
Steer	15MPa (2176psi)

3.6 OIL REQUIREMENTS

NOTICE

- *Please choose appropriate oil according to the ambient temperature and local regulations, and the use of unqualified oil will damage the machine components.*
- *Oils of different grades or viscosities should not be mixed. The oil to be added must have the same grade and viscosity as that of the oil being used by the machine.*
- *If special oil is required by the environments or users, please contact Sinoboom.*

⚠ WARNING

- **Before filling oil, wait until the temperature of the machine drops to room temperature, otherwise it may cause splashes, burns or other personal injury.**
- **It is strictly forbidden to use inferior oils. The use of inferior oils will bring damage to the machine, and the resulting failure will not be guaranteed by Sinoboom.**

Hydraulic Oil

The hydraulic oil filled when the machine leaves the factory is generally L-HV32 or L-HM46 or other hydraulic oil required by customers. The environment temperature varies from region to region, so choose the hydraulic oil suitable for your region as suggested by the following table.

Table 3-20

Applicable environment temperature	amer	Mobil	Shell	Castrol
> 40℃ (104℉)	L-HM46	DTE 10 Excel 46	S2M46	Hyspin AWH-M46
-25℃ ~ 40℃ (-13℉ ~ 104℉)	L-HV32	DTE 10 Excel 32	TELLUS-S3VE32	Hyspin HVI-32
< -30℃ (-22℉)	Special oil to be determined.			

3.7 TORQUE SPECIFICATIONS

Special Torque Requirements

Please refer to the table below for special torque requirements:

Table 3-21 Special torque requirements

No.	Description	Torque value
1	Tire installation	126Nm (93ft-lb)
2	Travel reducer installation (at the wheel carrier)	51Nm (38ft-lb)
3	Bearing housing installation (at the chassis weldment)	126Nm (93ft-lb)
4	Steering cylinder installation	230Nm (170ft-lb)
5	Cable fastening nut M8	9 ~ 11Nm (6.6 ~ 8.1ft-lb)
6	Cable fastening nut M10	18 ~ 23Nm (13.2 ~ 17ft-lb)

Fastener Torque Specifications

Unless special torque requirements are stated in this manual or other instructions, torque metric bolts to the values listed in the table below.

Table 3-22 Fastener torque specifications-Metric

Nominal diameter (mm)	Pitch (mm)	Class 8.8	Class 10.9	Class 12.9
5	0.8	7Nm (5ft-lb)	9Nm (7ft-lb)	10Nm (7ft-lb)
6	1	12Nm (9ft-lb)	15Nm (11ft-lb)	18Nm (13ft-lb)

Table 3-22 Fastener torque specifications-Metric (Continued)

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

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

Table 3-23 Fastener torque specifications-Unified Thread Standard (UNC)

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

Table 3-23 Fastener torque specifications-Unified Thread Standard (UNC)(Continued)

Nominal diameter (in)	Opposite nut size (s)	Class 5	Class 8
3/4-10	1-1/8"	315Nm (232ft-lb)	445Nm (328ft-lb)
7/8-9	-	509Nm (375ft-lb)	715Nm (527ft-lb)

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

Table 3-24 Fastener torque specification-Unified Thread Standard bolts (UNF)

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

Hydraulic Hose Torque

The hydraulic hose must be removed or installed as per the following torque.

Table 3-25 Hydraulic Hose Torque

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

Table 3-25 Hydraulic Hose Torque(Continued)

Metric thread	L (light-duty)	S (heavy-duty)
M45×2	240±15Nm (177±11ft-lb)	-
M52×2	250±16Nm (184±12ft-lb)	280±18Nm (207±13ft-lb)

Hydraulic Fitting Torque

The hydraulic fitting with metric thread must be removed or installed as per the following torque.

Table 3-26 Hydraulic Fitting Torque-Metric

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

The hydraulic fitting with British Standard Pipe (BSP) thread must be removed or installed as per the following torque.

Table 3-27 Hydraulic Fitting Torque-British Standard Pipe (BSP)

Thread size	Installed to aluminum	Installed to steel	
	ED, O-ring + Circlip	ED, O-ring + Circlip	O-ring
L (light-duty)			
G1/8A	20±1Nm (15±1ft-lb)	20±1Nm (15±1ft-lb)	-
G1/4A	35±2Nm (26±2ft-lb)	40±2Nm (30±2ft-lb)	-
G3/8A	50±3Nm (37±2ft-lb)	75±5Nm (55±2ft-lb)	-
G1/2A	75±5Nm (55±2ft-lb)	95±6Nm (70±4ft-lb)	-
G3/4A	120±8Nm (89±6ft-lb)	185±12Nm (136±9ft-lb)	-
G1A	180±10Nm (133±7ft-lb)	320±20Nm (236±15ft-lb)	-
G1-1/4A	240±15Nm (177±11ft-lb)	450±25Nm (332±18ft-lb)	-
G1-1/2A	280±20Nm (207±15ft-lb)	540±30Nm (398±22ft-lb)	-
S (heavy-duty)			
G1/4A	40±3Nm (30±2ft-lb)	43±3Nm (32±2ft-lb)	-
G3/8A	55±3Nm (41±2ft-lb)	85±5Nm (63±4ft-lb)	-
G1/2A	80±5Nm (59±4ft-lb)	120±8Nm (89±6ft-lb)	-
G3/4A	120±8Nm (89±6ft-lb)	185±12Nm (136±9ft-lb)	-
G1A	180±10Nm (133±7ft-lb)	320±20Nm (236±15ft-lb)	-
G1-1/4A	240±15Nm (177±11ft-lb)	450±25Nm (332±18ft-lb)	-
G1-1/2A	280±20Nm (207±15ft-lb)	540±30Nm (398±22ft-lb)	-

The hydraulic fitting with Unified Thread Standard (UNC/UNF) thread must be removed or installed as per the following torque.

Table 3-28 Hydraulic Fitting Torque-Unified Thread Standard (UNC/UNF)

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

Table 3-28 Hydraulic Fitting Torque-Unified Thread Standard (UNC/UNF)(Continued)

Thread size	Installed to aluminum	Installed to steel
	O-ring	O-ring
9/16-18	34±2Nm (25±2ft-lb)	40±3Nm (30±2ft-lb)
11/16-12	40±3Nm (30±2ft-lb)	65±4Nm (48±3ft-lb)
3/4-16	50±3Nm (37±2ft-lb)	80±6Nm (59±4ft-lb)
7/8-14	75±5Nm (55±4ft-lb)	125±10Nm (92±7ft-lb)
1-1/16-12	110±8Nm (81±6ft-lb)	185±15Nm (136±11ft-lb)
1-5/16-12	160±10Nm (118±7ft-lb)	280±20Nm (207±15ft-lb)

4 MAINTENANCE INSTRUCTIONS

4.1 INSPECTION AND PREVENTATIVE MAINTENANCE SCHEDULE

This section provides safety and other necessary information for machine operators. For maximum service life and safe operation of the machine, ensure that all necessary inspection and maintenance works have been completed before placing the machine into service.

It is quite important to establish and implement a comprehensive inspection and preventive maintenance schedule. This manual outlines the frequent inspection and maintenance works 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 the environment, requirements and frequency of usage.

Pre-delivery Inspection

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

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

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

Pre-operation Inspection

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

Frequent Inspection

The frequent inspection shall be performed by qualified Sinoboom equipment mechanics.

The frequent inspection shall be performed for each machine in service for 3 months or 150 hours (whichever comes first) or out of service for more than 3 months. The frequency of this inspection must be increased as required by the environment, requirements and frequency of usage.

The items included in the frequent inspection are the same as those in the pre-delivery inspection.

Annual Machine Inspection

An annual machine inspection must be performed once a year and no later than 13 months from the date of the prior annual machine 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 possession of a recognized degree, certificate and training, has successfully demonstrated the ability and proficiency to service, repair and maintain the subject Sinoboom product model.

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

Preventive Maintenance

The preventive maintenance operation shall be performed by qualified Sinoboom equipment mechanics. The frequency of the inspection and maintenance must be increased as required by the environment, requirements and frequency of usage.

Refer to the ***Inspection and Preventative Maintenance Schedule*** for items requiring this inspection. Refer to the corresponding section of this manual to perform the 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 each start of work, restart of work and change of user, and after each maintenance operation	User or operator	Properly trained user or operator
Pre-delivery Inspection	Before each sale, lease or rental delivery	Owner, dealer or user	Qualified Sinoboom mechanic
Frequent Inspection	In service for 3 months or 150 hours (whichever comes first) or out of service for more than 3 months	Owner, dealer or user	Qualified Sinoboom mechanic
Annual Machine Inspection	Once a year and no later than 13 months from the date of the prior annual machine inspection	Owner, dealer or user	Factory-trained service technician
Preventive Maintenance	At intervals specified in the ***Inspection and Preventative Maintenance Schedule***	Owner, dealer or user	Qualified Sinoboom mechanic

Inspection and Preventative Maintenance Schedule

Perform inspection and preventive maintenance for the items in the table below at prescribed intervals. The intervals of inspection and maintenance are calculated based on the months elapsed since the machine has been put into service or the “cumulative working time” on the ground controller display (whichever comes first).

The inspection cycle is based on the use of machine under normal working conditions, and the cycle should be shortened accordingly if the machine is used in harsh working conditions.

Table 4-2 Inspection and Preventative Maintenance Schedule

Items	Intervals		
	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
Pedal for extensible platform	1, 2, 3	1, 2, 3	1, 2, 3
Platform slider (at the connection with scissor arm) and its fastener	1, 2	1, 2	1, 2
Safety belt anchor point	1, 2, 7	1, 2, 7	1, 2, 7
Scissor arm assembly			
Scissor arm	1, 2	1, 2	1, 2

Table 4-2 Inspection and Preventative Maintenance Schedule (Continued)

Items	Intervals		
	Before each delivery[1] or quarterly[2]	Semiannually[3]	Annually[4]
Safety arm	1, 2, 3	1, 2, 3	1, 2, 3
Bearing	1, 2, 5, 12	1, 2, 5, 12	1, 2, 5, 8, 12
Pivot pin, retaining ring and fastener	1, 2	1, 2	1, 2
Chassis assembly			
Chassis	2	2	2
Chassis slider (at the connection with scissor arm)	1, 2, 5	1, 2, 5	1, 2, 5, 8
Tire	1, 2	1, 2	1, 2
Wheel fastener	1[50]	1[50]	1[50]
Traveling and steering component	1, 2, 5	1, 2, 5	1, 2, 5
Bearing	1, 2, 5, 12	1, 2, 5, 12	1, 2, 5, 12
Chassis boxes 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
Brake and braking release device	1, 5, 6	1, 5, 6	1, 5, 6
Lift 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	1, 2, 3, 5, 6	1, 2, 3, 5, 6
Hydraulic valve	1, 2, 3, 5, 6	1, 2, 3, 5, 6	1, 2, 3, 5, 6
Hydraulic connecting pin and retaining ring	1, 2	1, 2	1, 2
Hydraulic hose, pipeline and fitting	1, 2, 6	1, 2, 6	1, 2, 6
Hydraulic tank and breather	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
Hydraulic oil return filter	1, 5, 6	1, 5, 6	1, 5, 6, 11[50]
Hydraulic oil	5, 6	5, 6	5, 6, 11
Electrical system			
Electrical wiring, connector	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

Table 4-2 Inspection and Preventative Maintenance Schedule (Continued)

Items	Intervals		
	Before each delivery[1] or quarterly[2]	Semiannually[3]	Annually[4]
Instrument, meter, switch, lamp, 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, protective 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 switch and main 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 device	1, 3, 10	1, 3, 10	1, 3, 10
Pothole protective device	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
Braking function	1, 3, 10	1, 3, 10	1, 3, 10
Other inspection items			
Operation Manual in the manuals storage box	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 included	10	10	10
General structural components and welds	2	2	2
All fasteners, pins, protective guards and covers	1, 2	1, 2	1, 2
Grease and lubricating 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	/	/	10

Table 4-2 Inspection and Preventative Maintenance Schedule (Continued)

Items	Intervals		
	Before each delivery[1]or quarterly[2]	Semiannually[3]	Annually[4]
Note: [1] Before each sale, lease or shipment; [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 prior annual machine inspection; [50] The first inspection work shall be performed after the machine has been in service for 50 hours for the first time; This only happens once in the service life of the machine; [250] The first inspection work shall be performed after the machine has been in service for 250 hours for the first time. This only happens once in the service life of the machine. [NO.1] Before the machine is put into service for the first time			
Performance code: **1.** Check for correct installation (accurate position, firmly installed, tightened according 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.** Return to neutral position or “off” position normally (the self-reset switch can return to neutral position or “off” position after released) **5.** Clean and free of foreign objects **6.** Check for correct sealing, leaking and level **7.** Labels complete, clear and secure **8.** Check for appropriate dimensions/tolerances **9.** Fully charged **10.** Validation/Execution **11.** Replace the oil or filter element **12.** Correctly lubricated **13.** Inspect the carbon brush			

4.2 GENERAL MAINTENANCE INSTRUCTIONS

Safety and Operating Standards

Before adjusting and repairing the machine, the following precautions should be taken:

1. Cut off the power source to make the machine unable to start, and have the machine marked.
2. All controls should be turned off to avoid accidental actuation of the operating system.
3. If possible, lower the work platform to the lowest position; if not possible, ensure that the work platform will not fall.
4. Before loosening or removing the hydraulic components, the hydraulic oil pressure in the hydraulic lines should be released.

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

During machine maintenance, personal safety should always be put first. Always take the weight of the parts into consideration and never attempt to move heavy parts without the assistance of mechanical equipment. It is forbidden to place heavy objects in an unstable position. Before lifting any machine parts, ensure the parts are sufficiently supported.

Cleaning

1. The most important point to extend the service life of the machine is to avoid dirt or impurities entering the critical parts of the machine. Protective measures have been taken for the machine to prevent such ingress. Protective plates, covers, seals, and filters are installed to keep the air, fuel and oil supply clean. However, in order to ensure that protective measures function properly, they should be maintained at the prescribed interval.
2. When air, fuel, or oil lines are disconnected, adjacent areas, openings and fittings should be cleaned. And immediately cover all openings to prevent foreign objects from entering.
3. During repair or maintenance, all components should be cleaned and inspected, and all piping and openings should be made clear. 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 reasonable plan should be developed for the installation of machine components based on this manual and the site conditions.
2. The personnel carrying out the disassembly and installation should have appropriate ability, and should be able to use safety protection devices correctly.
3. Before installation, qualified personnel should inspect the ground, all concealed foundations and anchors, or there should be reliable documentation proving that the manufacturer's requirements are met.
4. The wind speed at the installation site should not be greater than 8.3m/s (18.6mph).
5. Before installation, check the site conditions such as power supply, foundation and track 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. Acceptance of machine installed on site shall meet the following requirements:
   1) Relevant inspections and functional tests should be carried out to confirm that the machine has been installed correctly, that specific functional requirements are fulfilled and that all safety components are operating properly.
   2) Static and dynamic load tests should meet the relevant standards.
   3) Before putting the machine into service, the 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 and company and inspection date).
9. Machine disassembly should also meet the safety requirements for installation.
10. If mechanical assistance is required when disassembling the machine, reasonable lifting points, spreaders and lifting equipment should be selected as required by this manual and site conditions. Use adjustable lifting devices whenever possible. All spreaders (chains, slings, etc.) should be parallel to each other and perpendicular to the tip of the part being lifted whenever possible.
11. If a component with the assembly angle relative to the support less than 90° needs to be removed, take special care since the eye bolt or similar bracket cannot provide adequate supporting force in such case.
12. If certain component is difficult to remove, check that all nuts, bolts, cables, brackets, wiring, etc. have been removed, and that adjacent components are not blocking removal.

Components Disassembling and Reassembling

When disassembling or reassembling a component, follow the steps one by one. If the disassembly or assembly of one component has not been completed, do not proceed with another component. Always review the disassembly or 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 the best performance of cylinders and avoid corrosion due to long-term storage (indoor/outdoor):

- The machine should be stored in stowed position with all tires adjusted to keep aligned.
- Fully raise and lower the platform and steer left and right twice a week to lubricate the cylinders.

Scrap of Structural Parts

- When certain major structural part fails to meet the requirements for safe use due to corrosion, wear and other reasons, it should be repaired or reinforced; otherwise it should be scrapped.
- When certain stressed structural part is permanently deformed and cannot be repaired, it should be scrapped.
- When certain major stressed structural part loses overall stability and cannot be repaired, it must be scrapped.
- When certain structural part or weld is cracked, the cause should be analyzed and reinforcing measures should be taken as appropriate for the force and cracks. Continued use is only allowed if the structural part and weld meet the original design requirements, or they should be scrapped.

Pressure-fit Parts

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

Bearing

1. After a bearing is removed, cover it to avoid dust and abrasives. Use non-flammable cleaning solvent to clean bearings and allow them to dry in the shade. Compressed air can be used, but do not rotate the bearings.
2. If the races and balls (or rollers) have pits, notches or burn marks, the bearing should be scrapped.
3. If the bearing is still serviceable, apply a coat of oil and wrap it with clean paper (or wax paper). Do not unwrap reusable bearings or new bearings until they are ready for installation.
4. Before installation, lubricate new or serviceable bearings. When pressing the bearing into the retainer or bore, pressure should be applied on the outer race. If the bearing is to be mounted to a shaft, pressure should be applied to the inner race.

Gaskets

Check if the hole in the gasket is aligned with the opening in the mating part. If a handmade gasket is required, use gasket material or stock of equivalent material and thickness. Make sure to cut a hole in the correct position, as unsealed gaskets can cause serious system damage.

Bolt Use and Torque Application

NOTICE

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

1. When reinstalling locking fasteners, a new replacement should always be used. Use bolts with appropriate length. If the bolt is too long, it may be pressed against the adjacent part before tightening its head to the part to be mounted; If the bolt is too short, it will not have enough threads to bite and secure the parts. The replacement bolt must have the same or equivalent size as the original bolt.
2. In addition to the specific torque requirements given in this manual, standard torque values should be used on heat-treated bolts, studs, and steel nuts in accordance with recommended factory practice (see ***Page 19, Fastener Torque Specifications***).

Hydraulic Pipeline and Electrical Wiring

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

Hydraulic Hose and Fitting Tightening Procedures

The hydraulic hose and fitting must be installed as per the following requirements:

1. Before installation, check the seals on the hose and fitting, and replace the seal or even the hose assembly and fitting if the seal is found to be damaged or oil spills out of the seal; if not, clean the hose and fitting before installation.
2. If the seal is to be replaced, lubricate the replacement seal before installation.
3. For installation, align the fitting, hose and hose nut, and tighten the nut with the torque specified in ***Page 21, Hydraulic Hose Torque*** and ***Page 22, Hydraulic Fitting Torque***. Once the tightening torque of the fitting or hose exceeds the specified value, its seal cannot be reused.
4. After installation, test all machine functions and inspect the hose, fitting and related components for 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 mechanical joints between the male pin and female pin.
- Avoiding electrical failure due to low conductivity between the pins in humid environment.

The following instructions should be observed to apply the insulating silicone grease to the electrical connections. Those instructions apply to all plugged connections outside of the power distribution box. The silicone grease is not suitable for the connectors with enclosed outer surface.

1. Prior to the machine assembling, apply silicone grease around the male pins and female pins inside the connectors to prevent oxidization. An injector may be used for the convenience of operation.

NOTICE

Oxidization exceeding a certain period will increase the resistance of the connector and eventually lead to electrical failure.

2. Silicone grease should be applied to each electrical cord that is exposed outside the connector to prevent short circuit. Besides, the joint between the male connector and female connector should also been applied with silicone grease. Other joints that may allow ingress of water into the connectors, like the area around the anti-pull buckle, should be properly sealed as well.

NOTICE

Since the electrical conductivity of cleaning solvents is superior to that of water, the conditions above are mostly likely to happen when using pressure cleaning method to clean the machine.

3. Silicone grease should be applied to each contact of the connectors for battery box and charger.

NOTICE

The setting-type sealant can be used to avoid short circuit and keep the connections tidy, but it will make the future removal of pins more difficult.

Lubrication

The relevant components should be lubricated at defined intervals using the lubricant with the quantity, type and grade as recommended in this manual. If the recommended lubricant is not available, contact local supplier to purchase the recommended or other satisfactory lubricant.

Hydraulic System

1. Contaminants are the primary hazard to 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, sand, etc. entering the system during maintenance, or cavitation of the hydraulic pump due to insufficient system preheating or leakage of pump supply (suction) lines.
2. Oil in cloudy color indicates a high moisture or air content. This oil contributes to organic growth, leading to oxidation or corrosion. In such case, drain the waste oil in the hydraulic system, and fill with clean hydraulic oil after rinsing the hydraulic system.
3. Frequently check the filter 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 often lead to malfunction during machine operation. 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 pipeline 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 the new machine due to wear of hydraulic components.

5. Disassemble or reassemble parts on clean work surfaces. 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. Because they may contain different essential additives or may have different oil viscosity. It is recommended to use high-quality mineral oil with the viscosity that is suitable for the operating environment temperature of the machine.
7. Unless expressly stated in this manual, the filter element must be replaced at least once a year or every 1000 working hours, and 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 the hydraulic oil with same type as that supplied with the machine is not available, consult local supplier to help you select the appropriate hydraulic oil. Do not mix petroleum with synthetic base oil.

8. Take all precautions to keep the hydraulic oil clean. If hydraulic oil must be poured from the original vessel into another vessel, ensure that the vessel 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 system hydraulic oil.
9. After the machine is shut down, carry out proper preventive maintenance measures, thoroughly check all hydraulic components, piping, fittings, etc., and check each system for functionality before putting the machine into service again.

Battery

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

Pins and Composite Bearing

1. The connecting pin 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 after any of the following is detected (properly clean the pivot pin before inspection):
   - Wear in the bearing area
   - Flaking, pealing, scratches or abrasions on the pivot pin surface
   - Rusty 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 made to the entire machine or its parts that affects the stability, strength or performance of the machine.

Each time the machine owner/company makes a major modification/repair to the machine, it should be recorded using the ***Major Modification/Repair Record*** in the attachment to this manual. Keep the record properly 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, with the inspection items including but not limited to all items in the ***Inspection and Preventative Maintenance Schedule*** . After all the inspection and verification results are good, 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.

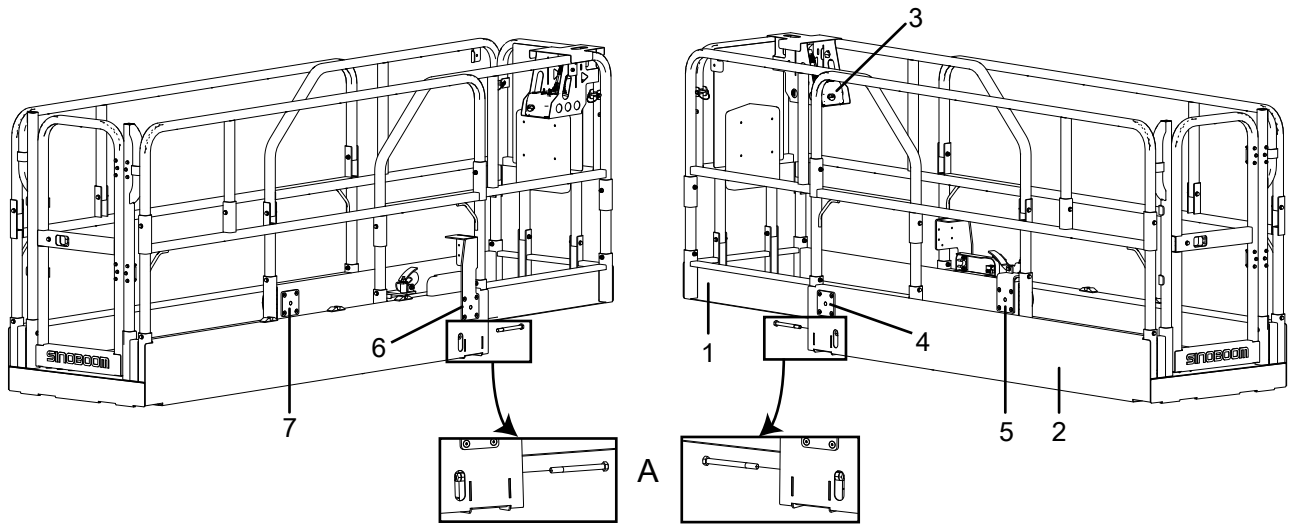


Fig 1 Diagram of platform components

Table 5-1

A: Platform slider fixed end mounting assembly (including bolts, nuts)		
1: Extendable platform	2: Fixed platform	3: Platform controller
4, 5, 6, 7: Slider support		

5.1 PLATFORM CONTROLLER

Disassembly

⚠ WARNING

Before operation, be sure to disconnect the battery on the machine and the charger on 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 on the platform controller and ground controller.
3. Mark and disconnect the harness connections on the platform controller.
4. Remove the fastening bolts on the bottom of the platform controller.
5. Slowly remove the platform controller.

Installation

Follow the reverse order of the disassembly procedures.

5.2 PLATFORM ASSEMBLY

The platform assembly is composed of the fixed platform and extendable platform. 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. Mark and disconnect the harness connections on the platform assembly.
4. Use suitable lifting equipment to support the work platform.

5. Remove the mounting bolt and nut from the platform slider fixed end.
6. With the assistance of the lifting equipment, slowly lift the platform slightly and push the platform so that the slider at the mobile end gets to the chute notch at the bottom of the platform.
7. Slowly remove the platform assembly with the aid of the lifting equipment.

Installation

Follow the reverse order of the disassembly procedures.

5.3 EXTENDABLE PLATFORM

Disassembly

1. Extend the platform appropriately to ensure that the extendable platform can be effectively supported.
2. Use suitable lifting equipment to support the work platform.
3. Remove the mounting screws on the 4 pulley supports of the platform assembly.
4. Remove the pulley supports.
5. With the assistance of lifting equipment, slowly remove the extendable platform from the platform assembly.

Installation

Follow the reverse order of the disassembly procedures.

6 SCISSOR ARM COMPONENT

The figure below shows scissor arm components on the model GTJZ0808E. Your machine may have different scissor arm components due to different configuration.

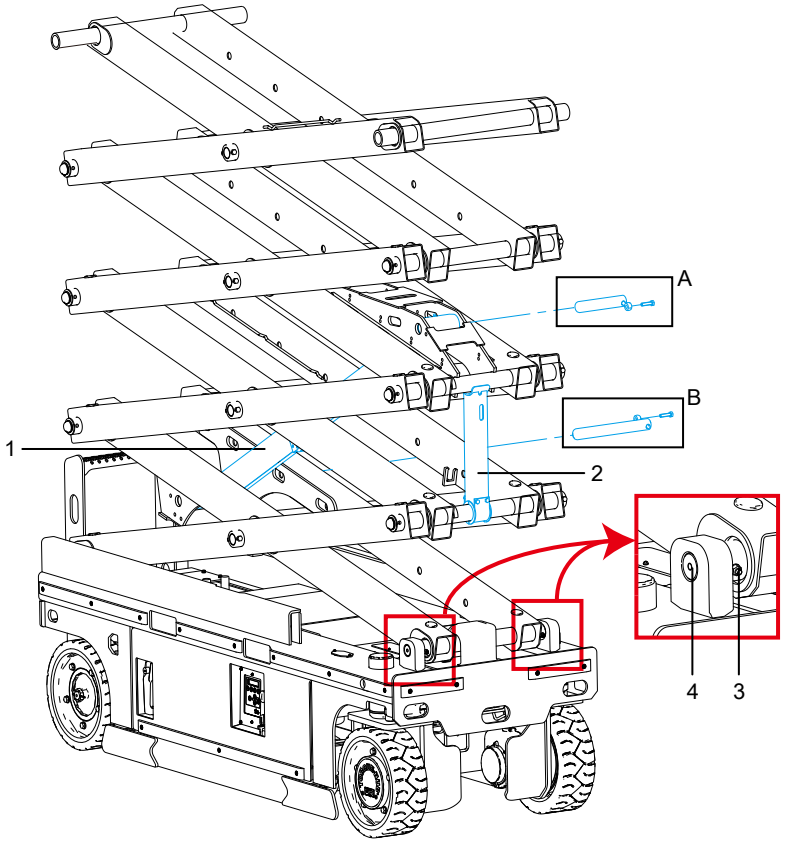


Fig 1 Diagram of scissor arm components

Table 6-1

A. Cylinder upper end mounting assembly (including pivot pin, pin, bolt and nut)		
B. Cylinder lower end mounting assembly (including pivot pin, pin, bolt and nut)		
1. Lift cylinder	2. Safety arm	3. Scissor arm assembly fastener
4. Pivot pin		

6.1 DISASSEMBLY AND INSTALLATION

Disassembly

1. Make sure the machine is in stowed position.
2. Remove the platform assembly.
3. Mark and disconnect the harness connections on the scissor arm assembly.
4. 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.
5. Use suitable lifting equipment to support the scissor arm assembly.

6. Remove the fasteners securing the scissor arm assembly on both sides of the chassis.
7. Use tools to pull out the pivot pin securing the scissor arm assembly with the chassis.
8. With the assistance of the lifting equipment, horizontally remove the scissor arm assembly from chassis chute slowly and carefully place it at a suitable position.

Installation

Follow the reverse order of the disassembly procedures.

6.2 SAFETY ARM

⚠ WARNING

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

1. Start the machine on the ground to raise the platform appropriately so that the safety arm can be fully erected.
2. Erect the safety arm and lower the platform appropriately to ensure that the safety arm provides effective support.
3. Lower the platform until the upper scissor sleeve contacts the safety arm.

6.3 LIFT CYLINDER

⚠ WARNING

- **Before loosening or disassembling the hydraulic parts, ensure that the hydraulic pressure in all hydraulic lines is released and that the hydraulic oil is completely cooled down.**
- **Disassemble the hydraulic components slowly to prevent the hydraulic oil from splashing and injuring people.**

1. Raise the scissor arm appropriately until the lift cylinder is accessible and can be easily removed.
2. Erect the safety arm and ensure that the safety arm 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, take care to prevent damage caused by the cylinder falling and impacting, and also prevent the high-pressure oil leakage due to impacting.

Installation

Follow the reverse order of the disassembly procedures.

7 CHASSIS COMPONENT

7.1 TRAVEL DRIVE AND STEERING DEVICE

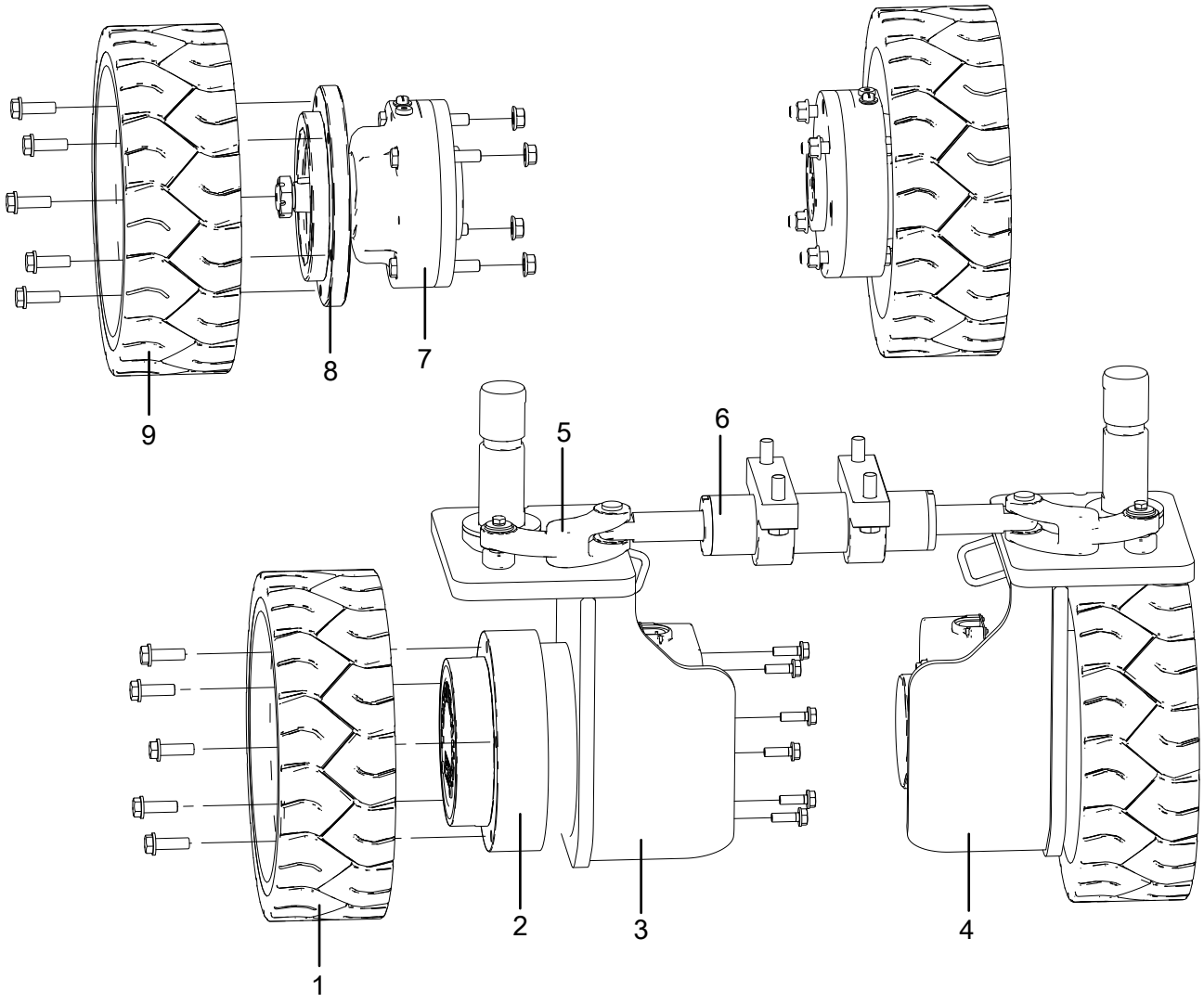


Fig 1 Diagram of travel drive and steering device

Table 7-1

1. Front tire	2. Travel motor & reducer	3. Right wheel carrier
4. Left wheel carrier	5. Steering linkage	6. Steering cylinder
7. Bearing housing	8. Wheel disc	9. Rear tire

Travel Motor & Reducer

Disassembly

1. Make sure the machine is in stowed position.
2. Press the main power switch and disconnect all

power sources (such as battery charger) connected to the machine.

3. Place a jack of sufficient capacity under the chassis side to be removed, and support the chassis.
4. Remove the tire assembly.
5. Mark and disconnect the harness connections on the travel motor and reducer.
6. Mark and disconnect the hydraulic pipelines on the travel motor and reducer and collect the hydraulic oil in the pipelines with a suitable vessel. Then seal the pipelines and ports.
7. Use suitable lifting equipment to support the travel motor and reducer.
8. Remove the bolts and washers securing the travel motor and reducer on the wheel carrier, and slowly remove the travel motor and reducer with the assistance of lifting equipment.

Installation

1. Place a jack of sufficient capacity under the chassis side to be removed, and support the chassis.
2. Align the mounting hole on the travel motor and reducer with that on the wheel carrier.
3. Fit the washer face with the mounting surface, and apply Loctite 272 threadlocking adhesive, and then install the bolts one by one.
4. Tighten the bolts with a torque wrench according to the specified torque.
5. Connect the hydraulic hoses and cable harness.
6. Install the tire assembly as needed.

Steering Cylinder

⚠ WARNING

- **Before loosening or disassembling the hydraulic parts, ensure that the hydraulic pressure in all hydraulic lines is released and that the hydraulic oil is completely cooled down.**
- **Disassemble the hydraulic components slowly to prevent the hydraulic oil from splashing and injuring people.**

1. Make sure the machine is in stowed position.
2. Place a jack of sufficient capacity under the chassis to support the chassis.
3. Mark and disconnect the hydraulic pipelines on the steering cylinder and collect the hydraulic oil in the pipelines with a suitable vessel. Then seal the pipelines and ports.
4. Support the steering cylinder with suitable lifting equipment.
5. Remove the retainer ring and pivot pin securing the steering cylinder with the steering linkage.
6. Remove the bolts securing the steering cylinder to the chassis.
7. Slowly remove the steering cylinder with the aid of the lifting equipment.

⚠ WARNING

When disassembling the cylinder, take care to prevent damage caused by the cylinder falling and impacting, and also prevent the high-pressure oil leakage due to impacting.

Installation

1. Place a jack of sufficient capacity under the chassis to support the chassis.
2. Align the mounting hole on the steering cylinder with that on the chassis.
3. Apply Loctite 272 threadlocking adhesive, and then install the bolts one by one.
4. Tighten the bolts with a torque wrench according to the specified torque.
5. Reinstall the retainer ring and pivot pin securing the steering cylinder with the steering linkage.
6. Connect the hydraulic hoses.

7.2 TIRE ASSEMBLY

Check Tires and Rims

Maintaining the tires and rims is essential for the normal and safe operation of the machine. The machine may tip over if any tire or rim malfunctions, so check the tires and rims each time before operating the machine and repair any faulty tires and rims timely.

This machine is equipped with solid tires without requiring inflation.

- Check each tire for cuts, cracks, punctures and abnormal wear. Replace the tire if necessary.
- Check each rim for damage, bending, deformation and cracked weld. Replace the rim if necessary.

Check Wheel Fasteners

The wheel fasteners 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 fasteners to the specified torque every 3 months or 250 working 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, so their models, rim width, installation center surface, diameter, etc. must not be changed, otherwise it may result in an unsafe condition regarding stability.**
- **Use the special wheel nut that suits the rim bolt. The wheel nuts must be installed and maintained with the proper tightening torque to prevent loose rims, broken studs and tire detachment from the axle. Be sure to only use the nut that matches the cone angle of the wheel.**

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 number of a specific machine model, please reference its Parts Manual. If the replacement tire is not as Hunan Sinoboom Intelligent Equipment Co., Ltd. recommends, the following requirements should be met:

- With the ply rating/rated load capacity and dimension equal to or greater than the original.
- With the tire tread contact width equal to or greater than the original.
- With the wheel diameter, width and offset dimensions equal to the original.
- Approved for the application by the tire manufacturer (including intended purposes, applicable working conditions, maximum drive speed and maximum tire load).
- Due to the size difference 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 solid tires with foam-filled tires.

Replace Tire

⚠ WARNING

Tighten the nut to the proper torque to prevent the wheel from loosening. Use a torque wrench to tighten the fastener, if you don't have a torque wrench, use a socket wrench to tighten the fastener and then immediately have a service station or dealer to tighten the fastener to the correct torque. Over-tightening will cause the bolts to break or permanently deform the bolt holes in the wheels.

The correct steps to replace a tire are as follows:

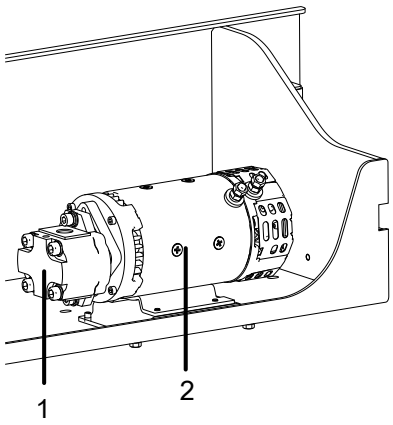
1. Make sure the machine is in stowed position.
2. Press the main power switch/pull out the main power handle and disconnect all power sources (such as battery charger) connected to the machine.
3. Use a wrench to loosen but do not remove the tire retaining nut.
4. Use a jack with sufficient load capacity to lift the machine frame to the appropriate height so that the tire assembly is off the ground.
5. Reliably support the tire assembly with suitable lifting equipment.
6. Remove the fasteners alternately, and then remove the tire.
7. Align the mounting hole of the new tire with that in the reducer (front tire)/wheel disc (rear tire), and fit the washer face with the mounting surface.
8. After applying Loctite 272 threadlocking adhesive to the bolts, install the bolts sequentially, and tighten the bolts diagonally to the torque as specified in ***Torque Specifications*** .

NOTICE

The disassembled cotter pin cannot be reused and must be replaced with a new one.

7.3 LIFT DRIVE DEVICE

The power system for lifting movement is composed of the lift motor and gear pump in the right chassis box.



1. Gear pump
2. Lift motor

Inspect Motor Carbon Brush

Checking and replacing the motor carbon brush regularly is essential for improving the operating stability of motor and extending its service life. It is recommended to check the motor carbon brush every 3 months or after 250 hours of operation.

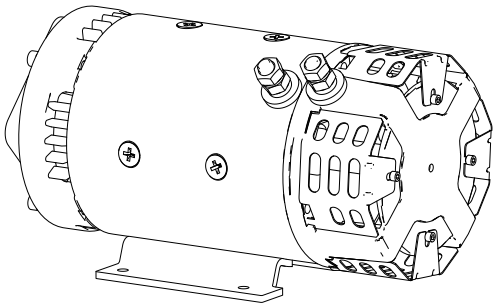


Fig 2 Diagram of motor

Check and replace the carbon brush

1. Remove the bolts on the back cover of motor.
2. Remove the back cover.
3. Remove the bolts from the back end cap.
4. Remove the mounting bolts on the carbon brush.
5. Use a hook to pull up the spring, and press and hold it to take out the old carbon brush.
6. Check the carbon brush for wear. If the brush becomes damaged or is close to or less than the minimum length, please replace the carbon brush. Take out the old carbon brush, clean the brush box, and put the new carbon brush into the brush box.
7. Put down the spring to press the carbon brush tightly.
8. Move the carbon brush to ensure the carbon brush can move freely inside the brush box.
9. Install the mounting bolt of carbon brush.
10. Install the mounting bolt of back end cap.
11. Install the back cover.

NOTICE

After the new motor is installed, idle the motor to fit in the arc surface of carbon brush so that the carbon brush comes in well contact with the reverser.

Clean the slip ring

1. Visually inspect the slip ring, which should be dark brown in normal condition.
2. If the slip ring gets corroded or has uneven surface, please remove the belt, and turn the axle by hand to clean it. Use sand paper to clean the slip ring so that less material will be removed.
3. If the slip ring is deeply dented, replace with a new one instead of cleaning.

7.4 CHASSIS SLIDER

The chassis sliders connecting with the scissor arm is essential for the safe operation of the machine. As a friction pair will develop between the slider and the grooved steel surface of chassis while the platform is elevating or lowering. Improper sliders or continued use of extremely worn sliders may result in component damage and unsafe operation. It is recommended to check the chassis slider thickness once a year or after 1000 hours of operation.

1. Raise the platform appropriately to perform the following measurement.
2. Measure the distance (L) from the bottom surface of each slider at the scissor arm sliding end to the center of the axle hole. (Reference size: 68mm/2.7in)

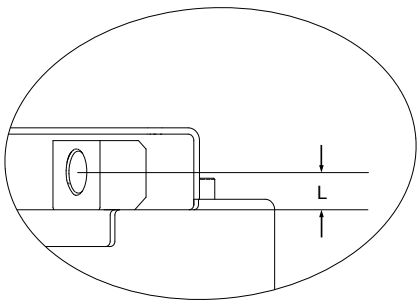


Fig 3

3. Replace the slider when its wear extent is more than 3mm (0.12in) (the measured distance (L) is less than 65mm/2.6in).

NOTICE

If the slider on one side is excessively worn, the sliders on both sides must be replaced together.

7.5 BATTERY

⚠ WARNING

- **Before removing the battery, the charger power supply and the working power of the whole machine must be cut off.**
- **Except professionals, other people shall not disassemble the battery case; otherwise it may cause system damage.**

1. Place the machine in a ventilated and spark-free environment.
2. Open the left chassis box to locate the battery.
3. Mark and disconnect the harness connection on the negative terminal of the battery, and then disconnect the harness connection on the positive terminal of the battery.
4. Fasten the battery with the sling of appropriate lifting equipment and remove it from the machine.

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8 HYDRAULIC SYSTEM

The hydraulic system of the machine can be divided into two parts: one part is for the control of steering function and the other part for the control of platform lifting/lowering function.

The motor drives the hydraulic pump to transfer hydraulic oil to function valve blocks which are equipped with directional valve for the control of different movements. To protect relevant components and avoid pressure overload, the valve block is provided with an overflow valve.

Maintaining the hydraulic system is essential for the proper and safe operation of the machine. Failure to maintain the hydraulic components timely may lead to components damage, thus affecting the safe operation of the machine.

8.1 LAYOUT OF HYDRAULIC ELEMENTS

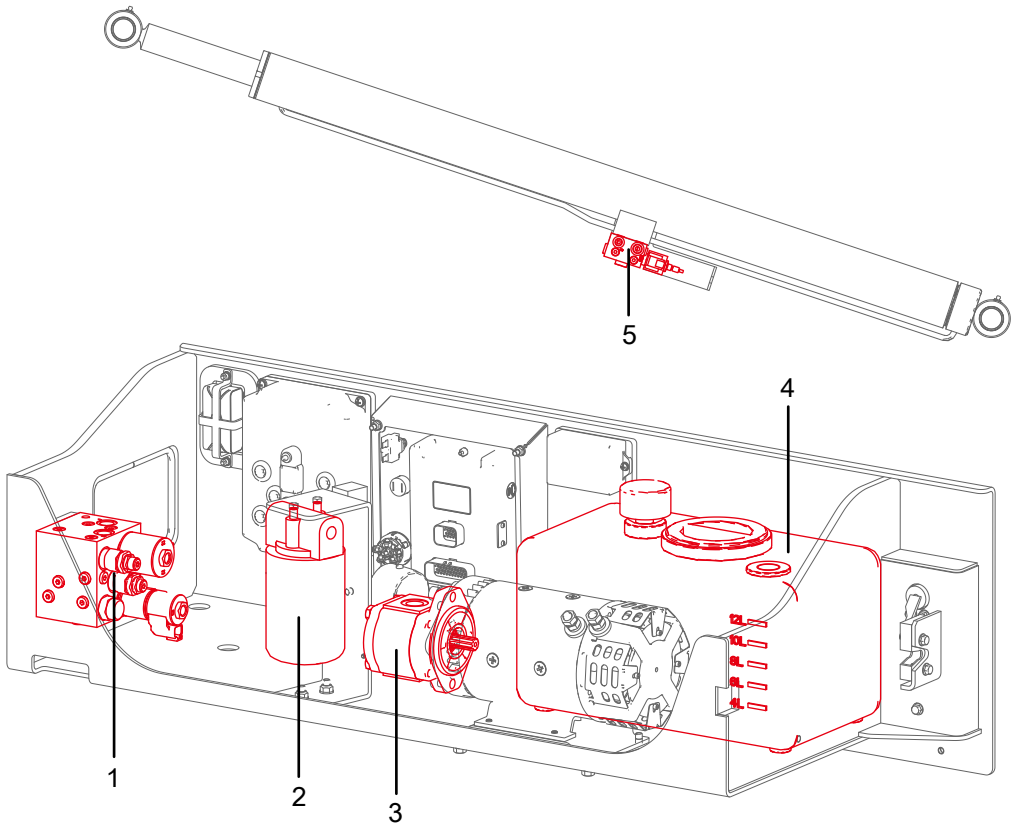

Fig 1

Table 8-1

1. Platform control valve	**2.** Filter	**3.** Gear pump
4. Hydraulic tank	**5.** Lift control valve	

8.2 FUNCTION VALVES

Platform Control Valve (PN.202040003322&202040003049)

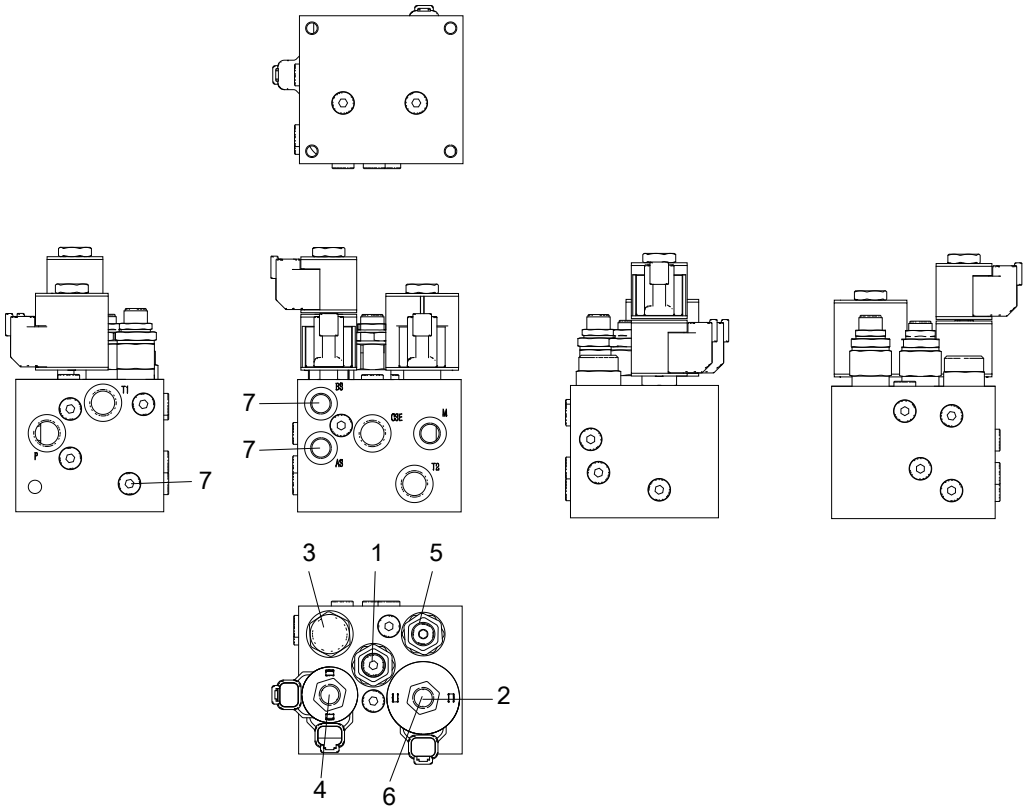

Fig 2 Platform control valve (PN.202040003322&202040003049)

Table 8-2 Platform control valve (PN.202040003322&202040003049)

No.	Name	Torque	Function
1	Overflow valve	40 ~ 45Nm (30 ~ 33ft-lb)	Limit the lift pressure
2	Solenoid valve	33.9Nm (25ft-lb)	Shift the direction of oil lines
3	Flow valve	33.9Nm (25ft-lb)	Regulate the flow
4	Solenoid valve	27.2Nm (20.1ft-lb)	Control the flow direction of oil lines
5	Overflow valve	40 ~ 45Nm (30 ~ 33ft-lb)	Limit the steering pressure
6	Throttle sleeve	\	\
7	Throttle screw (standard φ1.0)	2Nm (1.5ft-lb)	\

Platform Control Valve (PN.202040003331&202040003134)

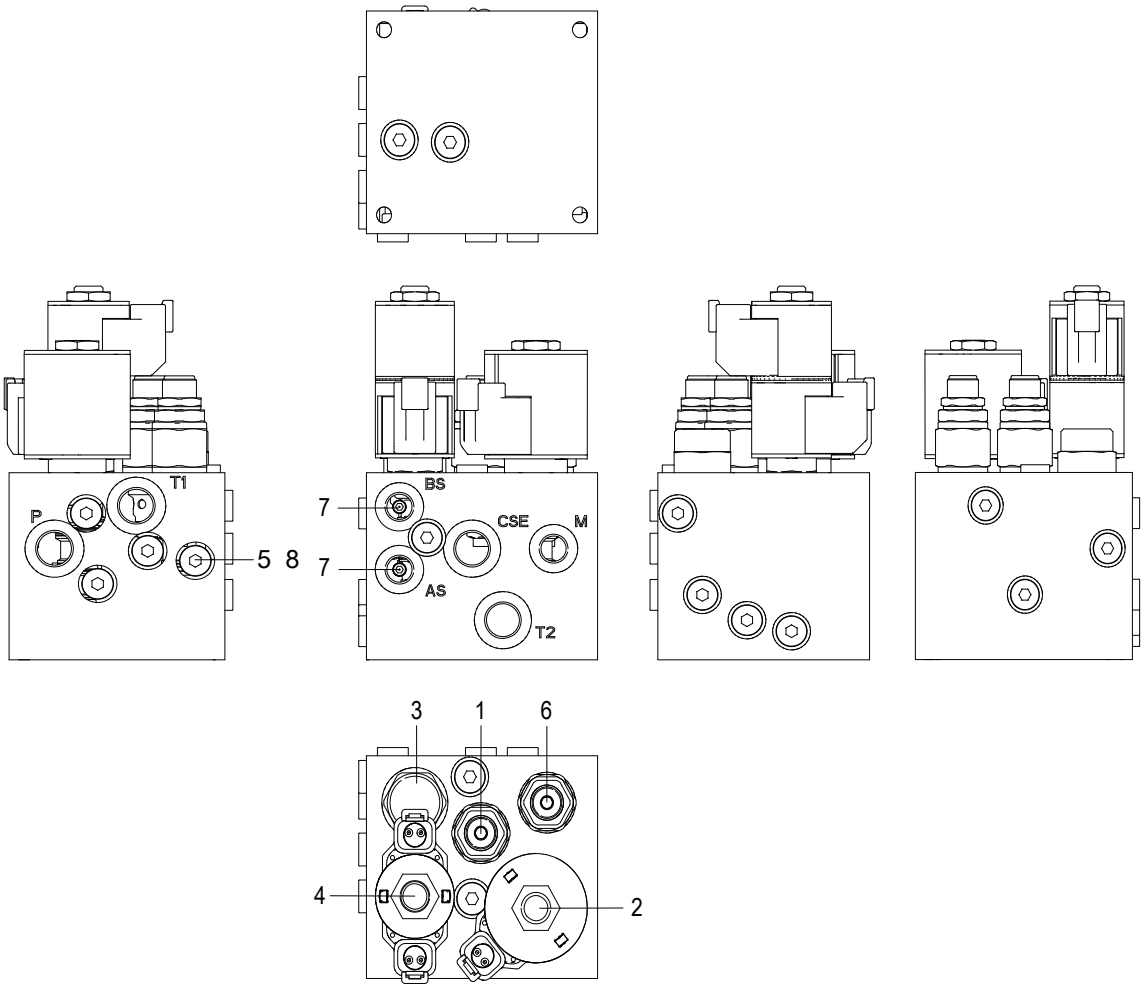

Fig 3 Platform control valve (PN.202040003331&202040003134)

Table 8-3 Platform control valve (PN.202040003331&202040003134)

No.	Name	Torque	Function
1	Overflow valve	40 ~ 45Nm (30 ~ 33ft-lb)	Limit the lift pressure
2	Solenoid valve	33.9Nm (25ft-lb)	Shift the direction of oil lines
3	Pressure-gradient control valve	33.9Nm (25ft-lb)	Regulate the flow
4	Solenoid valve	27.2Nm (20.1ft-lb)	Control the flow direction of oil lines
5	Damper	4Nm (3ft-lb)	\
6	Overflow valve	40 ~ 45Nm (30 ~ 33ft-lb)	Limit the steering pressure
7	Damper	4Nm (3ft-lb)	\
8	Damper	4Nm (3ft-lb)	\

Lift Control Valve (PN.202040003295&202040003323)

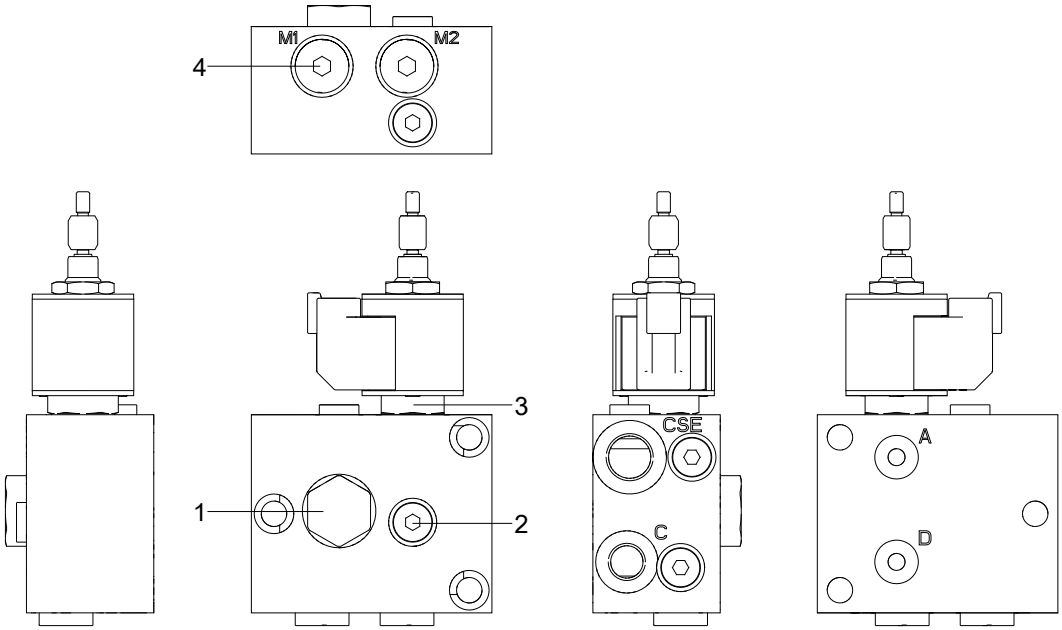

Fig 4 Lift control valve (PN.202040003295&202040003323)

Table 8-4 Lift control valve (PN.202040003295&202040003323)

No.	Name	Torque	Function
1	Check valve	27.1Nm (20ft-lb)	Keep the fluid flowing in one direction
2	Damper	4Nm (3ft-lb)	\
3	Solenoid valve	22.7Nm (17ft-lb)	Lower the platform
4	Damper	4Nm (3ft-lb)	\

Lift Control Valve (PN.202040003293&202040003315)

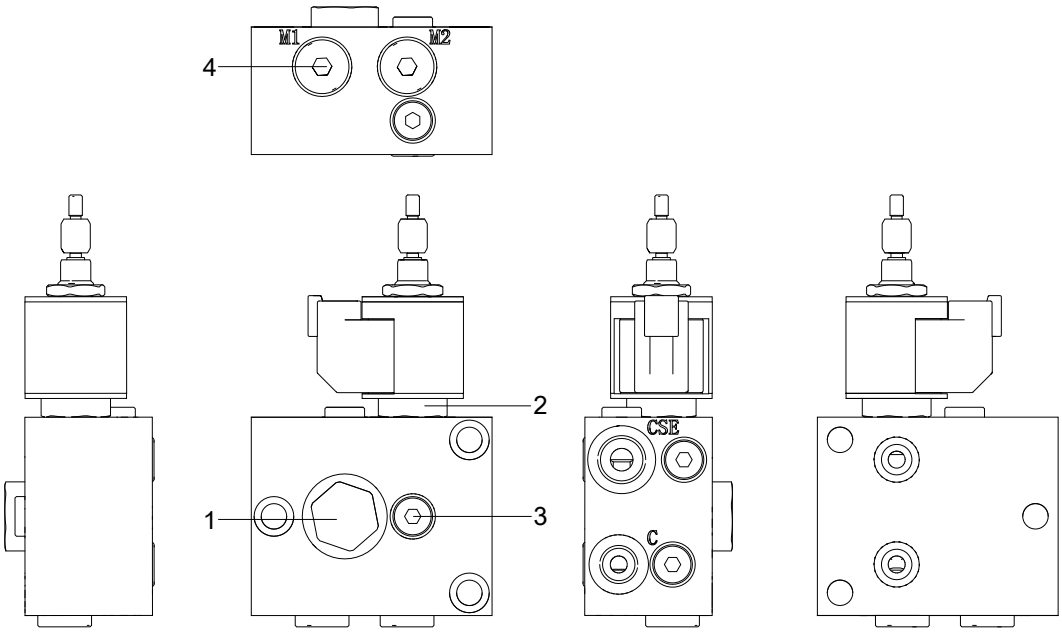

Fig 5 Lift control valve (PN.202040003293&202040003315)

Table 8-5 Lift control valve (PN.202040003293&202040003315)

No.	Name	Torque	Function
1	Check valve	27Nm (20ft-lb)	Keep the fluid flowing in one direction
2	Solenoid valve	27Nm (20ft-lb)	Lower the platform
3	Throttle screw (standard φ1.0)	2Nm (1.5ft-lb)	\
4	Throttle screw (standard φ0.9)	2Nm (1.5ft-lb)	\

8.3 HYDRAULIC OIL

Check the Oil Level

Maintaining the hydraulic oil at the right level is essential for the normal operation of the machine. If the hydraulic oil level is too high, the oil will overflow from the oil tank during the operation of the machine; if the hydraulic oil level is too low, the oil pump will have entrained air during the operation of the machine and hydraulic components will be damaged.

1. Make sure the platform is in stowed position.
2. Open the right chassis box and visually inspect the side of the hydraulic tank. The hydraulic oil level should be within the “10L” and “12L” scale line range of level indicator in the tank.
3. If necessary, fill with correct hydraulic oil according to the ***Oil Requirements*** , and do not overfill the tank.
4. Check the hydraulic tank body and joints for leakage.

Check the Cleanliness of Hydraulic Oil

Check the hydraulic oil, and if any of the following conditions are found, replace the hydraulic oil:

- The hydraulic oil is milky white and cloudy.
- The hydraulic oil is black.
- Take some hydraulic oil and check it in the sun to find there are luminous metal spots, or rub the hydraulic oil with two fingers to find there are metal particles obviously.
- The hydraulic oil stinks.

Replace the Hydraulic Oil

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

1. Turn off the machine and make sure the hydraulic oil has cooled to room temperature.
2. Open the right chassis box and place a proper container under the drain plug at the bottom of hydraulic tank.
3. Remove the drain plug carefully to drain all the oil into the container.
4. After all oil has been drained, reinstall the drain plug.
5. Mark, disconnect and plug the hydraulic tank suction pipe and return pipe.
6. Remove the hydraulic tank from the right chassis box after removing the fastening bolts from the hydraulic tank.

> **NOTICE**
>
> *Be extremely careful while removing the hydraulic tank; or other components around the tank may get damaged.*

7. After cleaning the inside of the tank with a neutral solvent, drain the solvent.
8. After the hydraulic tank is dry, reinstall the hydraulic tank.
9. Reinstall suction pipe and return pipe.
10. Fill with correct hydraulic oil according to the ***Oil Requirements*** , and never overfill the tank.

8.4 HYDRAULIC TANK

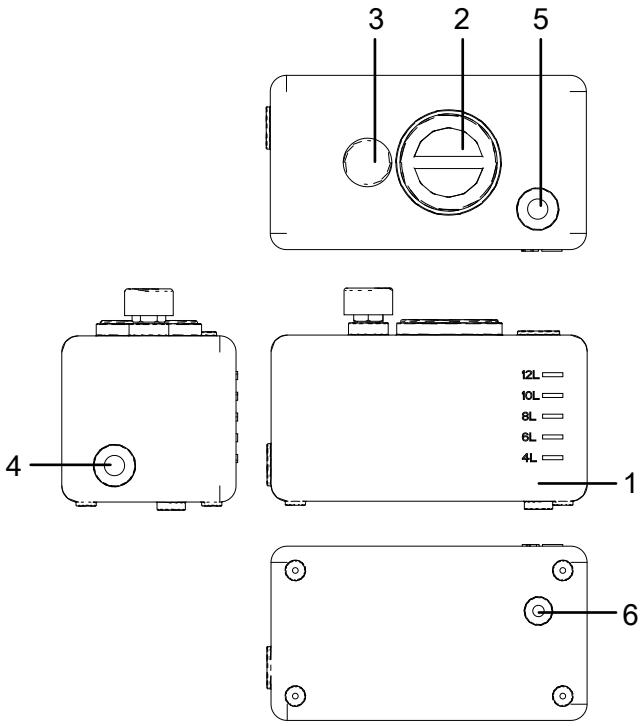

Fig 6 Schematic diagram of hydraulic tank structure

Table 8-6 Hydraulic tank structure

No.	Description
1	Tank body
2	Filler cap
3	Air filter
4	Oil suction port
5	Oil return port
6	Drain plug

Air Filter

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

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

1. Turn off the machine.
2. Locate the air filter on 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 then blow dry with an air gun.
6. Check the air filter again until the air can pass through the air filter smoothly.
7. Install the air filter back onto the tank.

8.5 HYDRAULIC OIL RETURN FILTER

It is recommended to replace the hydraulic oil return filter element after the first 50 hours of operation and every year or 1000 hours of operation thereafter. The replacement interval should be shorter in harsh working environments.

1. Turn off the machine.
2. Open the right chassis box and locate the return filter.
3. Place an appropriate oil-collecting vessel under the return filter.
4. Use a wrench to remove the filter.
5. Check the seal on the mounting surface of the filter and, if necessary, replace the seal.
6. Apply a thin layer of hydraulic oil on the sealing gasket of the new filter.
7. Install the new filter and tighten it securely.
8. Clean the hydraulic oil spilled during the process.
9. Start the machine from the ground.
10. Check the return filter and related components for leakage.

8.6 REGULATE THE PRESSURE OF HYDRAULIC VALVE

⚠ WARNING

- **Regulating the pressure improperly may cause machine damage and even serious injury or death.**
- **Do not set the pressure to values beyond the specified range.**
- **After all valves have been properly regulated, be sure to verify the values to avoid potential mistakes.**
- **All overflow valves have been well regulated before the delivery of machine, so never modify the pressure unless authorized.**

Regulate the Pressure of Lift Overflow Valve

1. Make sure the machine is in stowed position.
2. Place the rated load on the platform properly.
3. Turn the ground/platform control selector switch on the ground controller to ground control position.
4. Pull out the emergency stop button on the ground and platform controller to ON position.
5. Locate the lift overflow valve on the platform control valve.
6. Hold the lift overflow valve with a hex wrench and loosen the nut.
7. While moving the platform lift switch on the ground controller, turn the inner hex of the lift overflow valve clockwise until the platform rises to the highest position.
8. Lower the platform completely.
9. Place a load 1.2 times of the rated load on the platform properly.
10. Try to raise the platform from the ground controller, and the platform cannot be elevated.
11. If the platform can be elevated, adjust the pressure of the lift overflow valve:
    - Turn the inner hex of the lift overflow valve counterclockwise until the platform cannot be elevated.
12. Hold the lift overflow valve with a hex wrench and tighten the nut on the valve.
13. Remove the load from the platform and raise the platform to the highest position.

14. If there is entrained air in the pump or if the platform cannot be lifted to the highest position, add hydraulic oil to the tank until the pump properly operates.

NOTICE

Do not keep running the machine if there is entrained air in the pump.

Regulate the Pressure of Steer Overflow Valve

⚠ WARNING

This procedure must be performed using the platform controller on the ground, instead of on the platform.

1. Connect a pressure gauge (0-40MPa) to the pressure diagnostic coupling.
2. Turn the ground/platform control selector switch on the ground controller to the platform control position.
3. Pull out the emergency stop button on the ground and platform controller to the ON position.
4. Locate the steer overflow valve on the platform control valve.
5. Using the platform controller on the ground, press and hold the steer switch to steer the machine to the right limit, and then note down the pressure reading on the pressure gauge (for the specified pressure value, see the ***Pressure Requirements*** section).
6. Using the platform controller on the ground, press and hold the steer switch to steer the machine to the left limit, and then note down the pressure reading on the pressure gauge (for the specified pressure value, see the ***Pressure Requirements*** section).
7. If the measured values do not match the specified values, regulate the pressure of steer overflow valve as follows:
   - Hold the steer overflow valve with a wrench and loosen the nut.
   - Regulate the steer overflow valve pressure with a wrench. Turn the steer overflow valve clockwise to increase the pressure or counterclockwise to reduce the pressure until the pressure gauge indicates the specified value.
   - Hold the steer overflow valve with a hex wrench and tighten the nut on the valve.
   - Repeat the Steps 5 and 6 to verify the pressure of the overflow valve.
8. Remove the pressure gauge.

8.7 INSPECT CYLINDER DRIFT

The cylinder will drift down due to leakage, and the drift is normal within a certain range. In order to ensure the normal operation of the machine, it is recommended to conduct drift inspection on the platform every 3 months or after 250 hours of operation to determine whether cylinder drift inspection is required.

Elevate the platform to the highest position, and place 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 50mm (1.97in) in 10 minutes, carry out cylinder drift inspection as per the following procedures.

1. Place the cylinder in an environment with stable ambient temperature.
2. Elevate the platform to the highest position, and place the rated load on the platform.
3. Measure drift at 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 working normally. If the measured value is greater than the maximum allowable drift, it indicates that the cylinder is not working normally. Contact qualified service technicians for inspection and repair.

Table 8-7 Maximum allowable drift for different cylinder bore

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 cylinder leakage of 6 drops per minute. Since the hydraulic oil expands with heat and contracts with cold, the test value of cylinder drift may have a tolerance of 7/10000 for each temperature change of 1℃.

8.8 HYDRAULIC SCHEMATIC DIAGRAM

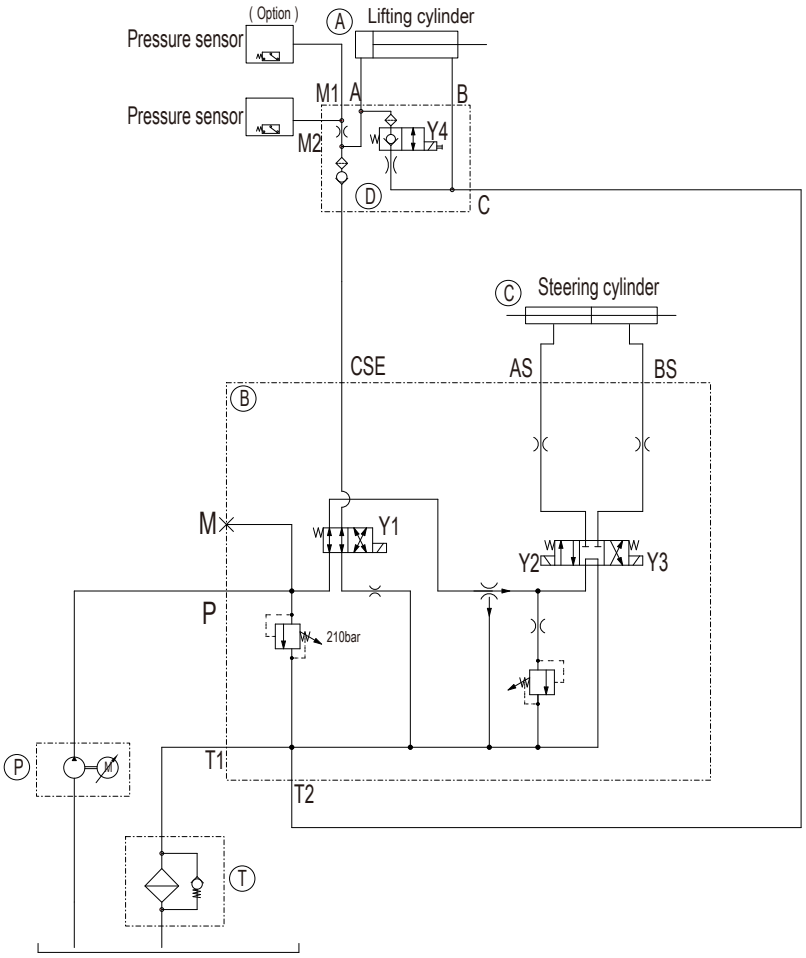

Fig 7 Hydraulic Schematic Diagram

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9 ELECTRICAL SYSTEM

Four 6V lead-acid batteries in series or one 24V lithium battery are used to drive the travel motor and lift motor to realize traveling, steering and platform lifting/ lowering.

The batteries are charged via external power source. A circuit breaker is used to protect the control system.

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

9.1 BATTERY

The batteries used include 3 types: lead acid battery, lead acid maintenance-free battery and lithium battery, and the latter two batteries do not need maintenance.

Inspection

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

- Check the battery level. The battery should not be discharged more than 80% of the total capacity, and should be charged immediately after each discharge.
- Check the harness retaining nuts between the battery cells. Make sure that the retaining nuts are tightened with the correct torque, and refer to the ***Torque Specifications*** section for the tightening torques.
- Check the battery harness connections. Make sure that the battery harness connections are firmly connected and not corroded, and the positive and negative poles are not reversed.

NOTICE

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

- Check whether the inside and outside paint of the battery is damaged. If any damage is found, repair the paint immediately to protect the outer box insulation and avoid corrosion.
- Check the battery box for water accumulation. If any, blot up the accumulated water immediately.
- Clean the area around the battery regularly. Use cloths or brushes to regularly clean the top, terminals and connections of the battery with mixed liquid of baking soda and water, dry it with cloths after cleaning, and apply a thin layer of petroleum jelly or add terminal protectors to prevent cleaning solution from entering the battery.

NOTICE

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

The instructions below are applicable only for batteries requiring maintenance. Before performing inspection, please fully charge the battery and hold it still for 24 hours to equalize the battery cells.

1. Wear protective clothing, protective gloves and protective glasses.
2. Remove the battery vent cover.
3. Top up the hydrometer and drain it two or three times, and then take a sample from the battery electrolyte with the hydrometer.
4. Measure the specific gravity of all battery cells in sequence and note down the readings.
5. If the ambient temperature is above 27℃ (80℉), add 0.004 to calibrate the specific gravity reading for every 5℃ (40℉) higher; if the ambient temperature is below 27℃ (80℉), reduce 0.004 to calibrate the specific gravity reading for every 5℃ (40℉) lower.
   - 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 the 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 hold it still for 6 hours before re-measurement of the specific gravity readings. If satisfying the Result 1, proceed with the next step.

NOTICE

If the Result 1 cannot be met even after several attempts, the battery may have malfunctions.

6. Check the battery electrolyte level. Make sure the electrolyte level is at the right height and add distilled water to the required level if needed.
7. Install the battery vent cover.

Adding Water

NOTICE

- *For lead-acid batteries (requiring maintenance), the electrolyte level should be checked after each charging, and if the level is found to be low, add water in time.*
- *The water shall be added after charging. Adding water before charging may cause acid overflow during charging.*

- For batteries equipped with an automatic water refilling system, when the electrolyte is at the lowest level with the battery fully charged (the white dot of the battery observation hole is not at the top), add water immediately. It is recommended to use an automatic water refilling machine for refilling, with the operation steps as follows:
  1. Open the bucket cover of the water refilling machine.
  2. Add deionized water.
  3. Put back the bucket cover and connect the water refilling plug.
  4. Connect the quick connector between the water refilling machine and the battery and turn on the power switch to start automatic water refilling.
  5. After water refilling is completed, the automatic water refilling system will automatically stop.
  6. Turn off the power switch and disconnect the water refilling plug to complete water refilling.
- If the battery is not equipped with an automatic water refilling system, check the electrolyte level after charging. If the level is lower than the allowable height (the white dot of the battery observation hole is not at the top), wear gloves to add conforming distilled water or deionized water to the standard level (1-2cm above the minimal level of the water filler plug). Never add any acid solution.

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 (greater than 0.030) after the battery is fully charged.

NOTICE

- *Verify whether the battery is flooded/wet battery.*
- *To prevent battery damage, the battery must be equalized after a storage period of up to three months from the date of delivery.*

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

Storage

- Fully charge the battery before storage.
- The battery should be stored in cool and dry environment (temperature 10℃-25℃/50–77℉, RH < 90%), and charged every 3 months using the charger provided by the manufacturer.
- Disconnect the main power switch to eliminate potential hazards that could cause electrical leakage of the battery.
- The battery will self-discharge gradually during storage. Monitor the specific gravity or the voltage every 4 ~ 6 weeks. The comparison of the state of charge, specific gravity and open-circuit voltage is shown in the following table.

Table 9-1

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 removing it from storage.
- Storage in hot environments (above 32℃/90℉): Direct exposure of the battery to heat sources should be avoided during battery storage, and the battery self-discharges faster at high temperatures. If storing the battery in hot summer months, monitor the specific gravity or voltage more frequently (approximately every 2-4 weeks).
- Storage in cold environments (below 0℃/32℉): Avoid placing batteries in places where the temperature is expected to reach the freezing point during storage, as batteries may freeze at low temperatures if not fully charged. If the battery is to be stored in the icy winter months, the battery must be fully charged.

NOTICE

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

9.2 CHANGE THE CHARGING CURVE

Note: The charging curve of the charger for lithium batteries needs no setting, so the following instructions are only for the charger of lead-acid batteries.

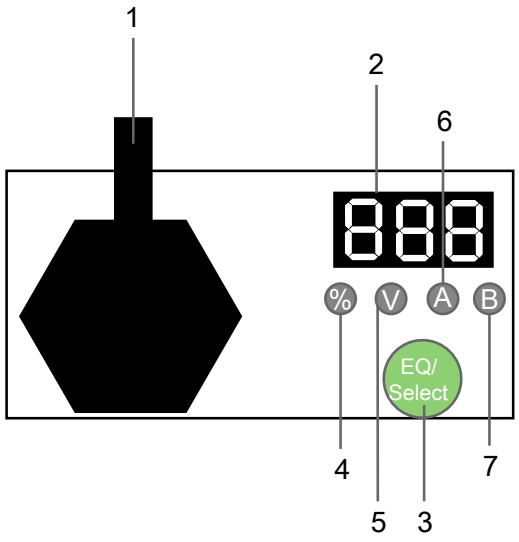


Fig 1

Table 9-2

No.	Description
1	Battery program update interface (if equipped)
2	Digital display
3	EQ/Select key
4	Capacity indicator light
5	Charging voltage indicator
6	Charging current indicator
7	Battery voltage indicator

Change the curve:

NOTICE

*The default curve code of the charger is b04. Please select an appropriate charging curve code for your machine as per the battery specifications in the **Technical Characteristics** section in this manual.*

1. Press and hold the Select key for 5s until the display indicates the current charging curve code.
2. Press and hold the key for 1s to change the charging curve code.
3. After selecting the charging curve code, press and hold the Select key for 5s until the charging curve code flashes quickly, and the charging curve will be set.
4. Repeat the steps above if you want to change the charging curve again.

Enter EQ mode manually:

1. Press and hold the Select key for 10s until the EQ characters flash quickly on the display, and the charger will enter the EQ mode.
2. To exit the EQ mode, press and hold the Select key for 10s until the OFF characters flash quickly on the display, and the charger will exit the EQ mode.

9.3 FAULT CODES DESCRIPTION

Machine Faults and Solutions

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

Table 9-3 Machine Faults and Solutions (Sinoboom Control System)

Code	Description	Disabled functions	Solution
01	System Initialization Fault	All functions	System Initialization Fault: ECU may be malfunctioning, replace it.
02	System Communication Fault	All functions	System Communication Fault: Check communications cable connections and other wiring. If the problem still exists, try replacing the PCU or ECU.
04	AC Drive Motor Heartbeat Lost	All functions	Calibration Fault: Re-calibrate the system, or check the angle and pressure sensor.
06	Multi-angle Sensor Heartbeat Lost	All functions	Multi-angle Sensor Heartbeat Lost: Check whether the wiring between the sensor terminal and the ECU terminal is disconnected. Also check to make sure that the correct function option is selected for angle sensing. If that does not resolve the problem, replace the angle sensor.
07	Platform Highest Position Warning	Lift and travel	Check the communication cables for short circuit and open circuit, and check relevant parameters setting.
08	Multi-angle Sensor Fault	All functions	Multi-angle Sensor Fault: Check whether the wiring between the sensor terminal and the ECU terminal is disconnected. Also check to make sure that the correct function option is selected for angle sensing. If that does not resolve the problem, replace the angle sensor.
09	GPS Communication Fault	All functions	GPS Communication Fault: Check communications cable connections and other wiring. If the problem still exists, check the bound relationship or replace the GPS module.
10	Indoor Models Switch Outdoor Mode Fault	Alarm only	Switch outdoor model to indoor model

Table 9-3 Machine Faults and Solutions (Sinoboom Control System) (Continued)

Code	Description	Disabled functions	Solution
12	ECU Key Fault	Chassis Control	Chassis Up or Down Switch Fault: Make sure nothing is pressing the chassis toggle switch or ECU button, and check the wiring of the chassis toggle switch. If the problem still exists, try replacing the ECU.
18	Pothole Guard Fault	Lift and travel	Pothole Guard Fault: Check that the pothole guards are extended, and check the pothole limit switches. Check wires to the switches, and check the down limit switch and connections.
20	BMS Comm. Fault	Lift and travel	BMS Comm. Fault: Check communications cable connections and other wiring.
21	Discharge Temperature Fault 1	Alarm only	Discharge Temperature Fault 1: Inform BMS factory to check battery.
22	Discharge Current High Fault 1	Alarm only	Discharge Current High Fault 1: Inform BMS factory to check battery.
23	Total Voltage Low Fault 1	Lift disabled, restricted to low travel speed	Total Voltage Low Fault 1 Inform BMS factory to check battery.
24	Cell Voltage Low Fault 1	Lift disabled, restricted to low travel speed	Cell Voltage Low Fault 1: Inform BMS factory to check battery.
25	Cell Voltage Low Fault 2	Lift and travel	Cell Voltage Low Fault 2: Inform BMS factory to check battery.
26	Sharp Difference in Voltage	Lift and travel	Sharp Difference in Voltage: Inform BMS factory to check battery.
27	Sharp Difference in Temperature	Lift and travel	Sharp Difference in Temperature Inform BMS factory to check battery.
28	Discharge Current High Fault 2	Lift and travel	Discharge Current High Fault 2 Inform BMS factory to check battery.
29	Discharge Temperature Fault 2	Lift and travel	Discharge Temperature Fault 2: Inform BMS factory to check battery.
30	GPS Lock I	Alarm only	Contact SINOBOOM after-sales staff.
31	Pressure Sensor 1 Fault	All functions	Pressure Sensor 1 Fault: Check the wiring to the sensor and then the sensor itself. Also check to make sure that the correct option is properly selected for load sensing.
32	Angle Sensor Fault	All functions	Angle Sensor Fault: Check the wiring to the sensor and then the sensor itself. Also check to make sure that the correct option is properly selected for load sensing.
33	PCU Key Fault	All functions	PCU Key Fault: Check that nothing is pressing the buttons on the handle. If no, consider replacing the PCU.
35	Pressure Sensor 2 Fault	All functions	Pressure Sensor 2 Fault: Check the wiring to the sensor and then the sensor itself. Also check to make sure that the correct option is properly selected for load sensing.

Table 9-3 Machine Faults and Solutions (Sinoboom Control System) (Continued)

Code	Description	Disabled functions	Solution
36	Battery Drain Alarm	Lift disabled, restricted to low travel speed	Battery Drain Alarm: Battery voltage is low, charge the battery.
37	Battery Drain Shutdown	Lift and travel	Battery Drain Shutdown: Battery enters into sleep mode. Operate the joystick or button on ECU controller to quit the mode.
38	GPS Lock II pre-warning	Alarm only	Contact SINOBOOM after-sales staff.
39	GPS Lock II	Lift	Contact SINOBOOM after-sales staff.
40	GPS Lock III pre-warning	Alarm only	Contact SINOBOOM after-sales staff.
41	GPS Lock III	All functions	Contact SINOBOOM after-sales staff.
42	Platform Left Button ON	Alarm only	Platform Left Turn Switch ON at Power-up Message: Ensure that nothing is holding the Joystick Toggle Switches down. If no, consider replacing the Joystick or PCU.
43	Platform Right Button ON	Alarm only	Platform Right Turn Switch ON at Power-up Message: Ensure that nothing is holding the Joystick Toggle Switches down. If no, consider replacing the Joystick or PCU.
45	Huge Difference in Oil Pressure	Lift and travel	
46	Platform Enable Button ON	Platform Control	Platform Joystick Enable Switch ON at Power-up Fault: Ensure that nothing is holding the Enable Switch closed. Also check the neutral zone parameters. If the problem still exists, consider replacing the Joystick or PCU.
47	Joystick Not In Neutral	Lift and travel	Platform Joystick not in Neutral at Power-up Message: Make sure that the Joystick is in the neutral (upright) position. Check the neutral zone parameter setting in the LabView Programmer. If no, consider replacing the Joystick or PCU.
50	Input-output Comparison Error	Lift and travel	Input-output Comparison Error: Check whether the wiring between each sensor terminal and the ECU terminal is open or short-circuited, and whether the relevant parameters are turned on. If the problem cannot be solved, replace the ECU.
52	Forward Coil Fault	Lift and travel	Forward Coil Fault: Check the connections to the Coil's terminals and make sure they are tight. If so, check the coil for open circuit or short circuit.
53	Reverse Coil Fault	Lift and travel	Reverse Coil Fault: Check the connections to the Coil's terminals and make sure they are tight. If so, check the coil for open circuit or short circuit.
54	Lift Up Coil Fault	Lift and travel	Lift Up Coil Fault: Check the connections to the Coil's terminals and make sure they are tight. If so, check the coil for open circuit or short circuit.
55	Lift Down Coil Fault	All functions	Lift Down Coil Fault: Check the connections to the Coil's terminals and make sure they are tight. If so, check the coil for open circuit or short circuit.

Table 9-3 Machine Faults and Solutions (Sinoboom Control System) (Continued)

Code	Description	Disabled functions	Solution
56	Left Turn Coil Fault	Lift and travel	Right Turn Coil Fault: Check the connections to the Coil's terminals and make sure they are tight. If so, check the coil for open circuit or short circuit.
57	Right Turn Coil Fault	Lift and travel	Left Turn Coil Fault: Check the connections to the Coil's terminals and make sure they are tight. If so, check the coil for open circuit or short circuit.
68	Battery Drain Alarm (Lithium)	All functions	Total Voltage Low Fault 2: Check battery voltage and charge the battery if necessary. Check the battery connections, and have it tightened or cleaned. Check the voltage to the ECU and PCU.
69	High Neutral Current Fault (Zapi Only)	Lift and travel	High Neutral Current Fault (Zapi Only): The MC is sensing current in the motors when there should not be. This could occur when the MC thinks the brakes are on and the motors are still running. This message sometimes comes just before other faults but can be ignored in such cases.
70	Steer Input Out of Range (Zapi Only)	Lift and travel	Steer Input Out of Range: There is an inappropriate voltage at the steer input of the ZAPI motor controller. The ZAPI may need to be "trained". Re-train the ZAPI and/or check for fluctuating voltages due to lose wires, etc.
71	Motor Controller Main Contactor Fault	Lift and travel	Motor Controller Main Contactor Fault: Check the connections to the main contactor. Replace the contactor if necessary. Replace the Motor Controller if necessary.
72	Motor Controller Over Voltage Fault	Lift and travel	Motor Controller Over Voltage Fault: Check battery voltage and make sure the battery charger is not on. Then cycle power to the lift. If that does not resolve the issue, try replacing the Motor Controller.
73	Motor Controller Thermal Cutback Fault	Lift and travel	Motor Controller Thermal Cutback Fault: Drive or Lift Motor may be overheating. Let the lift cool down. If that does not help, cycle power to reset the Motor Controller. If that doesn't resolve the issue, replace the Motor Controller.
74	Motor Controller Over Heat Fault	Lift and travel	Motor Controller Over Heat Fault: Check connections to the motors. Cycle power to the lift and if that does not resolve the issue, replace the Motor Controller.
75	Motor Controller Pump Motor Fault	Lift and travel	Motor Controller Pump Motor Fault: Check connections to the Pump Motor. Cycle power to the lift and if that does not resolve the issue, replace the Motor Controller.
76	Motor Controller Left Drive Motor Fault	Lift and travel	Motor Controller Left Drive Motor Fault: Check connections to the motor. Cycle power to the lift and if that does not resolve the issue, replace the Motor Controller.
77	Motor Controller Right Drive Motor Fault	Lift and travel	Motor Controller Right Drive Motor Fault: Check connections to the motor. Cycle power to the lift and if that does not resolve the issue, replace the Motor Controller.

Table 9-3 Machine Faults and Solutions (Sinoboom Control System) (Continued)

Code	Description	Disabled functions	Solution
78	Pump Motor Short Fault	Lift and travel	Pump Motor Short Fault: Check connections to the Pump Motor. Cycle power to the lift and if that does not resolve the issue, replace the Motor Controller.
80	Over 80% Load Warning	Alarm only	Over 80% Load Warning: Platform is getting close to its maximum load. Do not add any load.
81	Drive Motor Short Fault	Lift and travel	Drive Motor Short Fault: Check the Motor connections and make sure they are tight. Check the Motor for short circuit.
82	Left Brake Coil Fault	Lift and travel	Left Brake Coil Fault: Check the connections to the Coil's terminals and make sure they are tight. If so, check the coil for open circuit or short circuit.
83	Right Brake Coil Fault	Lift and travel	Right Brake Coil Fault: Check the connections to the Coil's terminals and make sure they are tight. If so, check the coil for open circuit or short circuit.
84	Motor Post Shorted	Lift and travel	Motor Post shorted: Check the connections of the controller and motor. Make sure the wiring is not shorted.
93	BMS System Fault	Lift and travel	BMS System Fault: Check the communication cables for short circuit and open circuit, and check relevant parameters setting.
CL	Anti-collision switch warning	Lift and travel	Anti-collision switch warning: When lifting up and close to an obstacle, a warning is given. Check the anti-collision switch.
Ft	Foot pedal no action	Platform Control	Foot pedal no action: When operating the joystick to drive and lift, there is no action on foot pedal, so please check the switch of foot pedal.
LL	Machine Tilted	Lift and travel	Machine Tilted Beyond Safe Limits Fault: If the machine is tilted, try to make it level. If the machine is level, check the wiring to the tilt sensor and then the sensor itself.
OL	Overloaded Platform Fault	Lift and travel	Overloaded Platform Fault: Remove the excess load immediately.

Table 9-4 Machine Faults and Solutions (DTC Control System)

Code	Description	Disabled functions	Solution
01	System Initialization Fault	All functions	System Initialization Fault: ECU may be malfunctioning, replace it.
02	System Communication Fault	All functions	System Communication Fault: Check communications cable connections and other wiring. If the problem still exists, try replacing the PCU or ECU.
03	Invalid Option Setting Fault	All functions	Invalid Option Setting Fault: Set appropriate options for this lift.
04	Calibration Fault	All functions	Calibration Fault: Re-calibrate the system, or check the angle and pressure sensor.

Table 9-4 Machine Faults and Solutions (DTC Control System) (Continued)

Code	Description	Disabled functions	Solution
06	Faulty Communication Match with Electric Controller	All functions	Check the CAN communication wiring between the electric driver and the main controller, or restart the system. Replace the controller if necessary.
07	Wrong Setting of Motor Driver	Lift and travel	Check the setting of motor driver. Replace the controller if necessary.
09	GPS Communication Fault	Lift	GPS Communication Fault: Check communication cable connections and other wiring. If the problem still exists, check the bound relationship or replace the GPS module.
12	Chassis Up or Down Switch ON	Chassis control	Chassis Up or Down Switch Fault: Make sure nothing is pressing the chassis toggle switch or ECU button, and check the wiring of the chassis toggle switch. If the problem still exists, try replacing the ECU.
13	Level Sensor CAN Comm. Lost	Lift and travel	Check the CAN communication wiring between the main controller and the level senor, or restart the system. Replace the controller if necessary.
18	Pothole Guard Fault	Lift and travel	Pothole Guard Fault: Check that the pothole guards are extended, and check the pothole limit switches. Check wires to the switches, and check the down limit switch and connections.
20	BMS Comm. Fault	Lift and travel	BMS Comm. Fault: Check communication cable connections and other wiring.
21	Discharge Temperature Fault 1	Diagnostic message only	Discharge Temperature Fault 1: Inform BMS factory to check battery.
22	Discharge Current High Fault 1	Diagnostic message only	Discharge Current High Fault 1: Inform BMS factory to check battery.
23	Total Voltage Low Fault 1	Lift disabled, restricted to low travel speed	Total Voltage Low Fault 1 Inform BMS factory to check battery.
24	Cell Voltage Low Fault 1	Lift disabled, restricted to low travel speed	Cell Voltage Low Fault 1: Inform BMS factory to check battery.
25	Cell Voltage Low Fault 2	Lift and travel	Cell Voltage Low Fault 2: Inform BMS factory to check battery.
26	Sharp Difference in Voltage	Lift and travel	Sharp Difference in Voltage: Inform BMS factory to check battery.
27	Sharp Difference in Temperature	Lift and travel	Sharp Difference in Temperature Inform BMS factory to check battery.
28	Discharge Current High Fault 2	Lift and travel	Discharge Current High Fault 2 Inform BMS factory to check battery.
29	Discharge Temperature Fault 2	Lift and travel	Discharge Temperature Fault 2: Inform BMS factory to check battery.
31	Pressure Sensor 1 Fault	All functions	Pressure Sensor 1 Fault: Check the wiring to the sensor and then the sensor itself. Also check to make sure that the correct option is properly selected for load sensing.

Table 9-4 Machine Faults and Solutions (DTC Control System) (Continued)

Code	Description	Disabled functions	Solution
32	Angle Sensor Fault	All functions	Angle Sensor Fault: Check the wiring to the sensor and then the sensor itself. Also check to make sure that the correct option is properly selected for angle sensing.
35	Pressure Sensor 2 Fault	All functions	Pressure Sensor 2 Fault: Check the wiring to the sensor and then the sensor itself. Also check to make sure that the correct option is properly selected for load sensing.
36	Battery Drain Alarm	Restricted to low travel speed	Battery Drain Alarm: Battery voltage is low, charge the battery.
37	Battery Drain Shutdown	All functions	Battery Drain Shutdown: Battery enters into sleep mode. Operate the joystick or button on ECU controller to quit the mode.
39	Level Sensor Fault	Lift and travel	Check the CAN communication wiring between the main controller and the level senor, or restart the system. Replace the level sensor if necessary.
42	Platform Left Button ON	Diagnostic message only	Platform Left Turn Switch ON at Power-up Message: Ensure that nothing is holding the Joystick Toggle Switches down. If no, consider replacing the Joystick or PCU.
43	Platform Right Button ON	Diagnostic message only	Platform Right Turn Switch ON at Power-up Message: Ensure that nothing is holding the Joystick Toggle Switches down. If no, consider replacing the Joystick or PCU.
46	Platform Enable Button ON	Platform control	Platform Joystick Enable Switch ON at Power-up Fault: Ensure that nothing is holding the Enable Switch closed. Also check the neutral zone parameters. If the problem still exists, consider replacing the Joystick or PCU.
47	Joystick Not In Neutral	Restricted to low travel speed	Platform Joystick not in Neutral at Power-up Message: Make sure that the Joystick is in the neutral (upright) position. Check the neutral zone parameter setting in the LabView Programmer. If the problem still exists, consider replacing the Joystick or PCU.
52	Forward Coil Fault	Lift and travel	Forward Coil Fault: Check the connections to the Coil's terminals and make sure they are tight. If so, check the coil for open circuit or short circuit.
53	Reverse Coil Fault	Lift and travel	Reverse Coil Fault: Check the connections to the Coil's terminals and make sure they are tight. If so, check the coil for open circuit or short circuit.
54	Lift Up Coil Fault	Lift and travel	Lift Up Coil Fault: Check the connections to the Coil's terminals and make sure they are tight. If so, check the coil for open circuit or short circuit.
55	Lift Down Coil Fault	Lift and travel	Lift Down Coil Fault: Check the connections to the Coil's terminals and make sure they are tight. If so, check the coil for open circuit or short circuit.
56	Right Turn Coil Fault	Lift and travel	Right Turn Coil Fault: Check the connections to the Coil's terminals and make sure they are tight. If so,

Table 9-4 Machine Faults and Solutions (DTC Control System) (Continued)

Code	Description	Disabled functions	Solution
			check the coil for open circuit or short circuit.
57	Left Turn Coil Fault	Lift and travel	Left Turn Coil Fault: Check the connections to the Coil's terminals and make sure they are tight. If so, check the coil for open circuit or short circuit.
58	General Brake Coil Fault	Lift and travel	General Brake Coil Fault: Check the connections to the Coil's terminals and make sure they are tight. If so, check the coil for open circuit or short circuit.
59	Parallel Coil Fault	Lift and travel	Parallel Coil Fault: Check the connections to the Coil's terminals and make sure they are tight. If so, check the coil for open circuit or short circuit.
60	Motor Controller Fault	Lift and travel	Motor Controller Fault: Check the connections to the motor ， and make sure they are tight. If so, check for other faults.
61	Motor Controller Current Sensor Fault	Lift and travel	Motor Controller Current Sensor Fault: Drive or Lift Motor may be overheating. Let the lift cool down. If that does not help, cycle power to reset the Motor Controller. If the problem persists, check the wiring. If the wiring is normal, try replacing the Motor Controller.
62	Motor Controller Hardware Failsafe Fault	Lift and travel	Motor Controller Hardware Failsafe Fault: Cycle power. If that does not resolve the problem, check for noise sources. If the problem still exists, try replacing the Motor Controller.
63	Motor Controller Motor Short Fault	All functions	Motor Controller Motor Short Fault: Check wiring first, and then cycle power. If needed, replace controller.
64	Motor Controller SRO Fault	Lift and travel	Motor Controller SRO Fault: Check motor enable delay with the Scissor Programmer, it may be too short. Make sure other Motor Controller parameters are properly selected.
65	Motor Controller Throttle Fault	All functions	Motor Controller Throttle Fault: Check wiring. Make sure the correct throttle type is selected in the Motor Controller.
66	Motor Controller Emergency Reverse Fault	All functions	Motor Controller Emergency Reverse Fault: Ensure that the Emergency Reverse Check parameter is set as off in the Motor Controller.
67	Motor Controller HPD Fault	All functions	Motor Controller HPD Fault: Check motor enable delay with the Scissor Programmer, it may be too short. Make sure other Motor Controller parameters are properly selected.
68	Total Voltage Low Fault 2	All functions	Total Voltage Low Fault 2: Check battery voltage and charge the battery if necessary. Check the battery connections, and have it tightened or cleaned. Check the voltage to the ECU and PCU.
69	High Neutral Current Fault (Zapi Only)	Lift and travel	High Neutral Current Fault (Zapi Only): The MC is sensing current in the motors when there should not be. This could occur when the MC thinks the brakes are on and the motors are still running. This message sometimes comes just before other faults

Table 9-4 Machine Faults and Solutions (DTC Control System) (Continued)

Code	Description	Disabled functions	Solution
			but can be ignored in such cases.
70	Steer Input Out of Range (Zapi Only)	Lift and travel	Steering Input Out of Range: There is an inappropriate voltage at the steering input of the ZAPI motor controller. The ZAPI may need to be “trained”. Re-train the ZAPI and/or check for fluctuating voltages due to lose wires, etc.
71	Motor Controller Main Contactor Fault	Lift and travel	Motor Controller Main Contactor Fault: Check the connections to the main contactor. Replace the contactor if necessary. Replace the Motor Controller if necessary.
72	Motor Controller Over Voltage Fault	Lift and travel	Motor Controller Over Voltage Fault: Check battery voltage and make sure the battery charger is not on. Then cycle power to the lift. If that does not resolve the issue, try replacing the Motor Controller.
73	Motor Controller Thermal Cutback Fault	All functions	Motor Controller Thermal Cutback Fault: Drive or Lift Motor may be overheating. Let the lift cool down. If that does not help, cycle power to reset the Motor Controller. If that doesn’t resolve the issue, replace the Motor Controller.
74	Motor Controller Over Heat Fault	All functions	Motor Controller Over Heat Fault: Check connections to the motors. Cycle power to the lift and if that does not resolve the issue, replace the Motor Controller.
75	Motor Controller Pump Motor Fault	All functions	Motor Controller Pump Motor Fault: Check connections to the Pump Motor. Cycle power to the lift and if that does not resolve the issue, replace the Motor Controller.
76	Motor Controller Left Drive Motor Fault	All functions	Motor Controller Left Drive Motor Fault: Check connections to the motor. Cycle power to the lift and if that does not resolve the issue, replace the Motor Controller.
77	Motor Controller Right Drive Motor Fault	Lift and travel	Motor Controller Right Drive Motor Fault: Check connections to the motor. Cycle power to the lift and if that does not resolve the issue, replace the Motor Controller.
78	Pump Motor Short Fault	Lift and travel	Pump Motor Short Fault: Check connections to the Pump Motor. Cycle power to the lift and if that does not resolve the issue, replace the Motor Controller.
79	Left Drive Motor Short Fault	All functions	Left Drive Motor Short Fault: Check the Motor connections and make sure they are tight. Check the Motor for short circuit.
80	Over 80% Load Warning	Diagnostic message only	Over 80% Load Warning: Platform is getting close to its maximum load. Do not add any load.
81	Right Drive Motor Short Fault	All functions	Right Drive Motor Short Fault: Check the Motor connections and make sure they are tight. Check the Motor for short circuit.
82	Left Brake Coil Fault	Lift and travel	Left Brake Coil Fault: Check the connections to the Coil’s terminals and make sure they are tight. If so, check the coil for open circuit or short circuit.

Table 9-4 Machine Faults and Solutions (DTC Control System) (Continued)

Code	Description	Disabled functions	Solution
83	Right Brake Coil Fault	Lift and travel	Right Brake Coil Fault: Check the connections to the Coil's terminals and make sure they are tight. If so, check the coil for open circuit or short circuit.
84	Motor Post Shorted	Lift and travel	Motor Post shorted: Check the connections of the controller and motor. Make sure the wiring is not shorted.
85	Brake Release Switch On	Diagnostic message only	Brake Release Switch On: Check the wires to brake release switch or check if the switch is stuck.
86	Brake Release Switch On	Diagnostic message only	Brake Release Not Stowed: Check if the platform is below down limit height. Check the down limit switch and connections.
87	Brake Release Not Stowed	Diagnostic message only	Brake Release Need Switch On: Check the wires to brake release switch or check if the switch is stuck. Check the wires to the Toggle Switch or check if the Toggle Switch is stuck.
89	Motor Field Open	Lift and travel	Motor Field Open: The field voltage is different from 1/2 Vbatt. Check connections of the field wires or leakage to the vehicle frame.
90	Over 90% Load Warning	Warning Only	Over 90% Load Warning: Platform is getting close to its maximum load. Do not add any load.
91	Left Motor Field Short	Lift and travel	Left Motor Field Short: Check connections of the field wires or leakage to the vehicle frame.
92	Right Motor Field Short	Lift and travel	Right Motor Field Short: Check connections of the field wires or leakage to the vehicle frame.
99	Over 99% Load Warning	Warning Only	Over 99% Load Warning: Platform has reached its limit of weight. Do not add any load.
OL	Overloaded Platform Fault	All functions	Overloaded Platform Fault: Remove the excess load immediately.
OH	Platform Highest Position Warning	Lift	Platform Highest Position Warning: Lower the machine.
LL	Machine Tilted	Lift and travel	Machine Tilted Beyond Safe Limits Fault: If the machine is tilted, try to make it level. If the machine is level, check the wiring to the tilt sensor and then the sensor itself.
Ft	Foot pedal no action	PCU Control	Foot pedal no action: When operating the joystick to drive and lift, there is no action on foot pedal, so please check the switch of foot pedal.
CL	Anti-collision switch warning	Lift and travel	Anti-collision switch warning: When lifting up and close to an obstacle, a warning is given. Check the anti-collision switch.

Charging Faults and Solutions

Fault code	Cause	Solution
E01 bAt	Output not connected to the battery or connected reversely, short circuit, damaged cell	Check that the battery pack is connected correctly. Check the charger is properly connected. Inspect the individual cells in the battery pack for damage.
E02 AC	Abnormal utility supply (voltage)	Check the AC power cable is connected between the charger and AC outlet. Make sure that the AC plug is firmly inserted into the AC outlet.
E03 Hot	Overtemp cutout of charger	When the charger inside or ambient temperature is too high, the charger will cut out and enter the overtemp cutout mode. Please place the charger in a well-ventilated site. Disconnect the charger and wait 15-20min before recharging.
E04 bAt	High temperature protection for battery	When the battery temperature exceeds the preset value, the charger will cut out to prevent overheat. After the battery temperature drops, the charger will restart automatically.
E05 Err	Excessively high output current	Return the battery for repair.
E06 bAt	Excessively high battery voltage	Check and make sure the correct output battery voltage is connected.

9.4 BASIC TROUBLE SHOOTING

Table 9-5

Fault	Cause	Solution
Machine power off	The machine has not been powered on.	• The key switch is in the OFF position. • The emergency stop button on the platform controller or the ground controller is in the OFF position. • The platform controller is malfunctioning or not powered off after program downloading. • The ground controller is malfunctioning or not powered off after program downloading.
Machine communication fault	CAN equipment offline	• Inspect whether the leads between the power supply and communication are inserted properly and reliably. • Inspect whether all pins of the Deutsch plugs for the connecting cables between platform controller and ground controller are wired according to the drawing. • Inspect whether the platform controller plug or the plug of the connecting cable between the platform controller and ground controller are in good contact. • Inspect whether the platform controller is malfunctioning. • Inspect whether the Deltatech plug of ground controller is wired firmly or correctly.

Table 9-5 (Continued)

Fault	Cause	Solution
Operation of the ground controller is invalid	The key switch has not been turned to the ground control position.	• The key switch is not turned to the ground control position. • The system has not been powered off after the program is downloaded to the ground controller.
Operation of the platform controller is invalid.	The key switch has not been turned to the platform control position.	• The key switch is not turned to the ground control position. • The system has not been powered off after the program is downloaded to the platform controller. • Inspect whether the platform controller is malfunctioning.
Tilt alarm always sounding while in level status	The level switch is not connected or faulty.	• Inspect whether the level switch is inserted properly and firmly. • Inspect whether the level switch is malfunctioning.
The ground controller cannot control lowering when the machine has no load and is level	The lowering valve has trouble.	• Inspect whether the digital input plug is inserted properly and firmly. • Inspect whether the wiring of the plug switch is malfunctioning. • Inspect whether the lead of the lowering valve is wrongly wired, and whether the lowering valve is malfunctioning.
The platform controller cannot control lowering when there is no alarm.	The lowering height is limited to 1.2m.	Reset the handle and perform lowering again.
The ground controller cannot control lifting when the platform is level and unladen and at the lowest position.	Height calibration is wrong/the lift valve is malfunctioning.	• Inspect whether the digital input plug is inserted properly and firmly. • Inspect whether the wiring of the plug switch is malfunctioning. • Re-calibrate the height. • Inspect whether the lead of the lift valve is wrongly wired, and whether the lift valve is malfunctioning.
The platform cannot lift to the highest position when the machine is unladen and work indoors.	The height has not been calibrated/the travel switch is incorrectly set.	• Re-calibrate the height. • Change the setting of the travel switch.
The platform refuses to rise further after reaching a certain position	The travel switch setting is incorrect	Recalibrate the travel switch.
An overload warning appears when the machine has no load	The weight sensor has not been calibrated/this is the first lifting/lowering	• Re-calibrate the load coefficient. • Forcibly lift and lower it several times.
Forward function failed while with no warning	Forward traveling function is malfunctioning.	• Check whether the PWM plug of the ground controller is inserted correctly and solidly.

Table 9-5 (Continued)

Fault	Cause	Solution
		• Check whether the forward valve is correctly wired or working normally. • Inspect whether the ground controller is malfunctioning.
Backward function failed while with no warning	Backward traveling function is malfunctioning.	• Check whether the PWM plug of the ground controller is inserted correctly and solidly. • Check whether the forward valve is correctly wired or working normally. • Inspect whether the ground controller is malfunctioning.
No warning after descending to the lowest position, high travel speed function failed	Pothole protection	• The high-speed hydraulic valve is connected incorrectly. • The travel switch is incorrectly installed/ malfunctioning. • The hydraulic valve is malfunctioning.
Tilt warning	The level switch is abnormal	• The air bubble of the level switch is not in the middle position. • The level switch is not connected properly or inserted firmly. • The ground controller is malfunctioning.
No overload warning	Weight sensor not calibrated for rated load or calibrated with wrong lift height	• The sensor has not been calibrated. • The wiring of the load sensor is incorrect. • The sensor is in poor condition.
Machine travels and then stops intermittently	The battery level is low/the calibration is incorrect	• Re-calibrate the parameters. • The battery is out of power, not as indicated by the battery gauge.
Parameters after setting could not be saved successfully after several attempts.	Abnormal storage	• The parameters exceed the limit. • The lower controller is malfunctioning.

9.5 ELECTRICAL SYMBOLS

Table 9-6

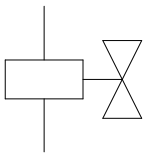
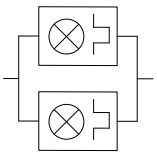
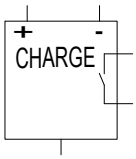
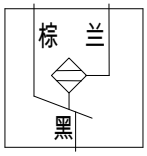
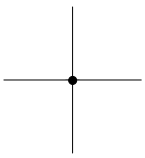
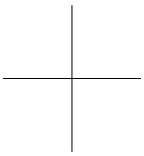
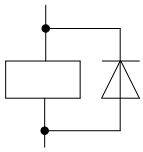
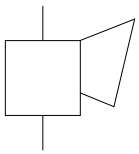
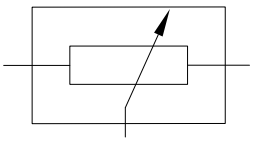
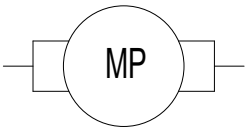
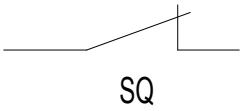
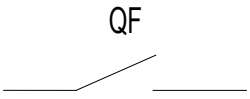
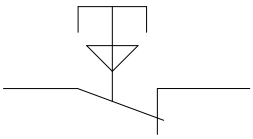
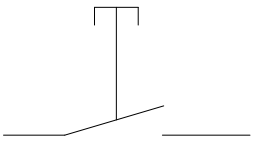
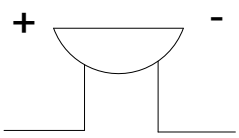
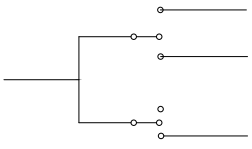
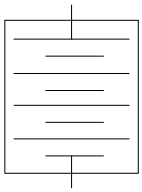
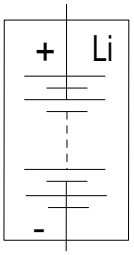
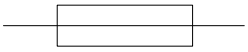
Symbols	Description	Symbols	Description
	Solenoid coil		Warning light
	Charger		Level switch
	Two lines connected		Two lines not connected
	Relay		Horn
	Sensor		Pump-controlled motor
	Limit switch		Main power switch
	Emergency stop button		Button
	Buzzer		Key switch

Table 9-6 (Continued)

Symbols	Description	Symbols	Description
	Storage battery		Lithium battery
	Fuse		

9.6 ELECTRICAL SCHEMATIC DIAGRAM

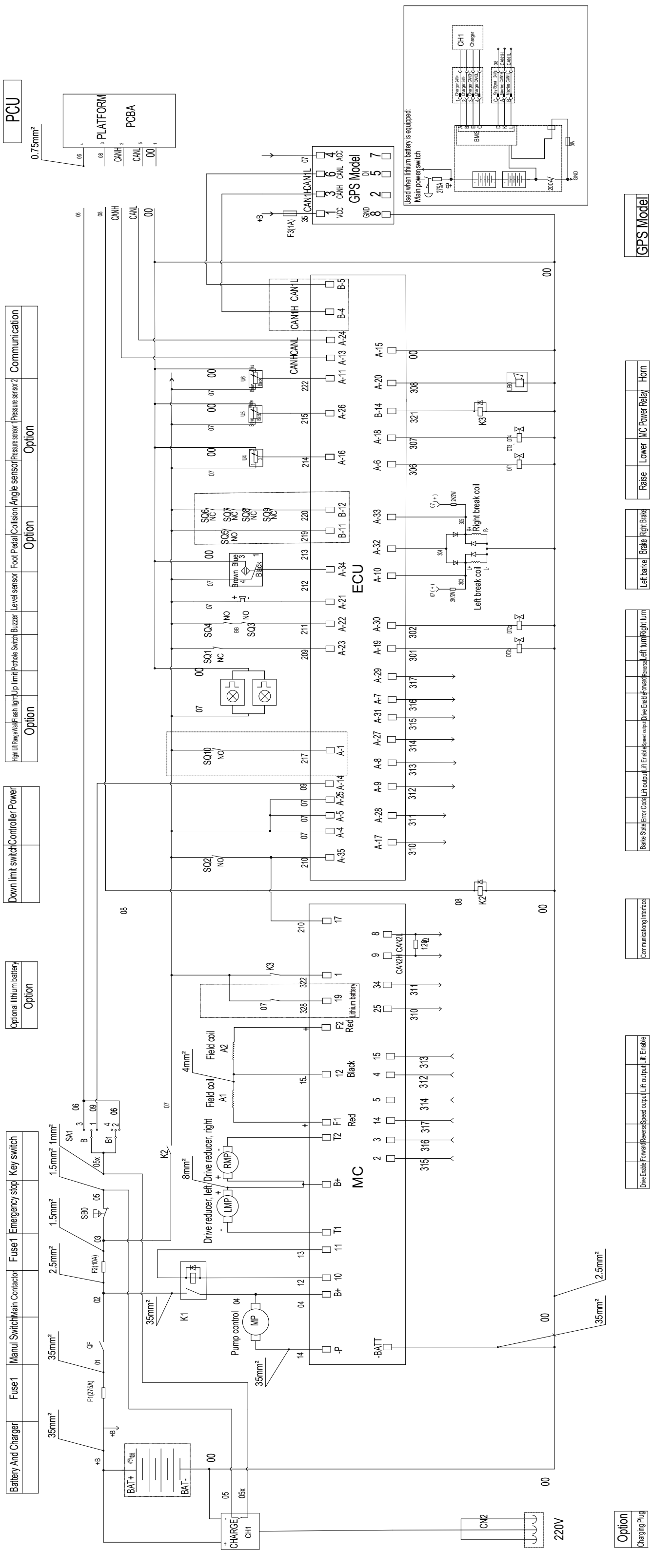


Fig 2 Electrical Schematic Diagram

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10 FUNCTIONS AND CONTROLS

10.1 DRIVE FUNCTION

Driving at reasonable speed is essential for ensuring machine safety. The drive function should respond quickly and smoothly to the control of the operator. The machine should travel without shaking, shocks and abnormal noise over the controllable speed range. To ensure that the drive unit runs smoothly and keeps good condition, it is recommended to check the drive function every 3 months or after 250 hours of operation.

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

1. Mark two straight lines with the distance of 30m (98.4ft) on the ground as the test start and stop lines.
2. Start the machine.
3. In the travel and steer mode, press and hold the enable button on the joystick and push the joystick forward to the full drive position.
4. Ensure the machine is traveling at high speed when the front wheel contacts with the test start line, and press the timer to start timing.
5. Keep the machine running at high speed until the contact point between the front wheel and the ground reaches the test stop line, and stop timing.
6. Calculate the travel speed with the measured data and compare it with the specified maximum travel speed in the stowed position.

NOTICE

If the above calculation result exceeds the maximum travel speed in the stowed position by 10%, immediately lower the platform to the stowed position, turn off and mark the machine, and contact a qualified service technician for inspection and repair.

10.2 BRAKING FUNCTION

Proper braking function is essential for the safe operation of the machine. The braking device should respond quickly and smoothly without any abnormal noise to the control of the operator. To ensure that the brake device works smoothly and keeps good condition, it is recommended to check the brake device every 3 months or after 250 hours of operation.

The braking distance of the machine controlled within the normal range is an important indicator of the normal braking function of the machine. Select flat, level, unobstructed and solid ground to perform the following tests with the platform stowed and carrying one person:

1. Check to make sure the drive hub is engaged.
2. Mark a test line on the ground as a reference.
3. Start the machine.
4. In the travel and steer 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 wheel contacts with the test start line, and release the joystick quickly.
6. Measure the vertical 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.

10.3 POTHOLE PROTECTION DEVICE

Function of pothole protection device: when the platform rises to a certain height, the pothole protection device will be extended to the vertical position and get close to the ground, and rested on the ground to prevent the machine from tipping when the machine is driven into a pothole. It is recommended to check the pothole protection device every 3 months or after 250 hours of work.

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

1. Start the machine.
2. When raising the platform from the stowed position to the operating position, the pothole protection devices on the left and right sides of the chassis should be fully extended to be perpendicular to the ground.

3. Push the pothole protection device hard which should not be flipped.
4. When the platform is lowered to the non-operating position, the pothole protection device will be retracted.
5. Place a 50mm (2in)-high wooden block under the pothole protection device on the left side of the chassis.
6. Raise the platform to the operating position, the buzzer will sound, and the display will show the pothole protection fault code, with the platform lift and traveling/steering functions disabled.
7. Lower the platform to the stowed position and remove the wooden block under the pothole protection device on the left side of the chassis.
8. Perform the same test from step 5 on the pothole protection device on the right side of the chassis.

NOTICE

If the pothole protection device is found to be ineffective during the test, please immediately lower the platform to the stowed position, turn off and mark the machine, and contact a qualified service technician for inspection and repair.

10.4 TILT PROTECTION FUNCTION

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

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

In the non-operating position:

1. Start the machine.
2. Push the level switch in the X (left-right) direction by more than 1.5°. Then, the buzzer will sound, the tilt alarm will be displayed on the platform display, and no actions will be restricted.
3. Push the level switch in the Y (front-rear) direction by more than 3°. Then, the buzzer will sound, the tilt alarm will be displayed on the platform display, and no actions will be restricted.
4. Place two wooden blocks #1 before the two wheels on the left (or right) side of the machine and drive the machine onto these two blocks. Then, the buzzer will sound, the tilt alarm will be displayed on the platform display, and no actions will be restricted.
5. Drive the machine off the wooden blocks and remove the wooden blocks.
6. Place two wooden blocks #2 before the two front (or rear) wheels of the machine and drive the machine onto these two blocks. Then, the buzzer will sound, the tilt alarm will be displayed on the platform display, and no actions will be restricted.
7. Drive the machine off the wooden blocks and remove the wooden blocks.

In the operating position:

1. Start the machine.
2. Push the level switch in the X (left-right) direction by more than 1.5°. Then, the buzzer will sound, the tilt alarm will be displayed on the platform display, and platform lifting function will be restricted.
3. Push the level switch in the Y (front-rear) direction by more than 3°. Then, the buzzer will sound, the tilt alarm will be displayed on the platform display, and platform lifting function will be restricted.
4. Place two wooden blocks #1 before the two wheels on the left (or right) side of the machine and drive the machine onto these two blocks. Then, the buzzer will sound, the tilt alarm will be displayed on the platform display, and platform lifting function will be restricted.
5. Lower the platform to the non-operating position, drive the machine off the wooden blocks and remove the wooden blocks.
6. Place two wooden blocks #2 before the two front (or rear) wheels of the machine and drive the machine onto these two blocks. Then, the buzzer will sound, the tilt alarm will be displayed on the platform display, and platform lifting function will be restricted.
7. Lower the platform to the non-operating position, drive the machine off the wooden blocks and remove the wooden blocks.

NOTICE

If the machine operation cannot be accurately restricted during the test, please immediately lower the platform to the stowed position, turn off and mark the machine, and contact a qualified service technician for inspection and repair.

The wooden blocks for tilt protection function test shall have the following dimensions:

Table 10-1 Wooden block dimension

Wooden block position	Length	Width	Height
Wooden block #1 under the left (or right) wheel	100mm (4in)	50mm (2in)	22mm (0.87in)
Wooden block #2 under the front (or rear) wheel	100mm (4in)	50mm (2in)	100mm (4in)

10.5 OVERLOAD LIMIT FUNCTION

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

The proper functioning of the overload limit system is essential for the safe operation of the machine, which 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 flat, level, unobstructed and solid ground to perform the following tests with the platform unloaded:

1. Start the machine.
2. Fully raise and lower the platform twice on the ground to ensure that the machine has no obvious shaking and abnormalities, and is properly lubricated.
3. After lowering the platform to the stowed position, gradually apply load to the platform based on the rated load capacity of the platform.
4. The platform can be lifted to the highest position before the load on the platform exceeds the rated load capacity of the platform.
5. When the load on the platform exceeds the rated load capacity of the platform, the buzzer will sound, the overload indicator light will flash, and all functions will be disabled. After the excess load is removed, all functions will be resumed.

NOTICE

If the machine operation cannot be accurately restricted during the test, please immediately lower the platform to the stowed position, turn off and mark the machine, and contact a qualified service technician for inspection and repair.

NOTICE

Low temperature will increase the viscosity of hydraulic oil, and 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 ≧10℃ (50°F), or if the hydraulic oil temperature is lower than 15℃ (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 controller screen or the ground controller screen). Please re-calibrate the weighing sensor.

10.6 STAGED LOWERING FUNCTION

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

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

1. Start the machine and raise the platform to the highest position.
2. Activate the platform lift mode with the platform controller from the ground, press and hold the enable button on the joystick and pull the joystick back. The platform will go down.

3. When the platform is lowered to the non-operating position, the machine will stop lowering automatically.
4. Release the joystick to restore it to the neutral position. Re-activate the platform down function from the platform controller, and 5s later, the platform will continue to go down.

NOTICE
If the staged lowering function becomes ineffective during the test, please immediately lower the platform to the stowed position, turn off and mark the machine, and contact a qualified service technician for inspection and repair.

10.7 EMERGENCY LOWERING FUNCTION

When the power device fails, the emergency lowering function can be used as appropriate 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 becomes ineffective, immediately lower the platform to the stowed position, turn off and mark the machine, and contact a qualified service technician for inspection and repair.

11 CONTROL SYSTEM

⚠ DANGER

All operations in this section must be performed by qualified personnel who have been professionally trained and authorized by Sinoboom, otherwise the consequences will be at your own risk.

⚠ WARNING

Unsafe Operation Hazard

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

  Due to different machine configurations, certain descriptions below may be inapplicable to your machine. In case of any operational questions when operating the machine as per the manual, please stop operation and contact Sinoboom after-sales personnel in time.

- **Incorrect operation may result in death, serious injury or machine damage.**

NOTICE

PCU, ECU, sensors, etc. are precisely adjusted and protectively treated before delivery. Therefore, personnel who have not been professionally trained and authorized by Sinoboom cannot disassemble their housings, otherwise moisture and dust will enter the internal mechanism and normal operation will not be guaranteed.

11.1 SINOBOOM MAIN CONTROL SYSTEM

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

System Interface

Pull out the emergency stop button on the ground controller to 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 key and PgDn key. 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).

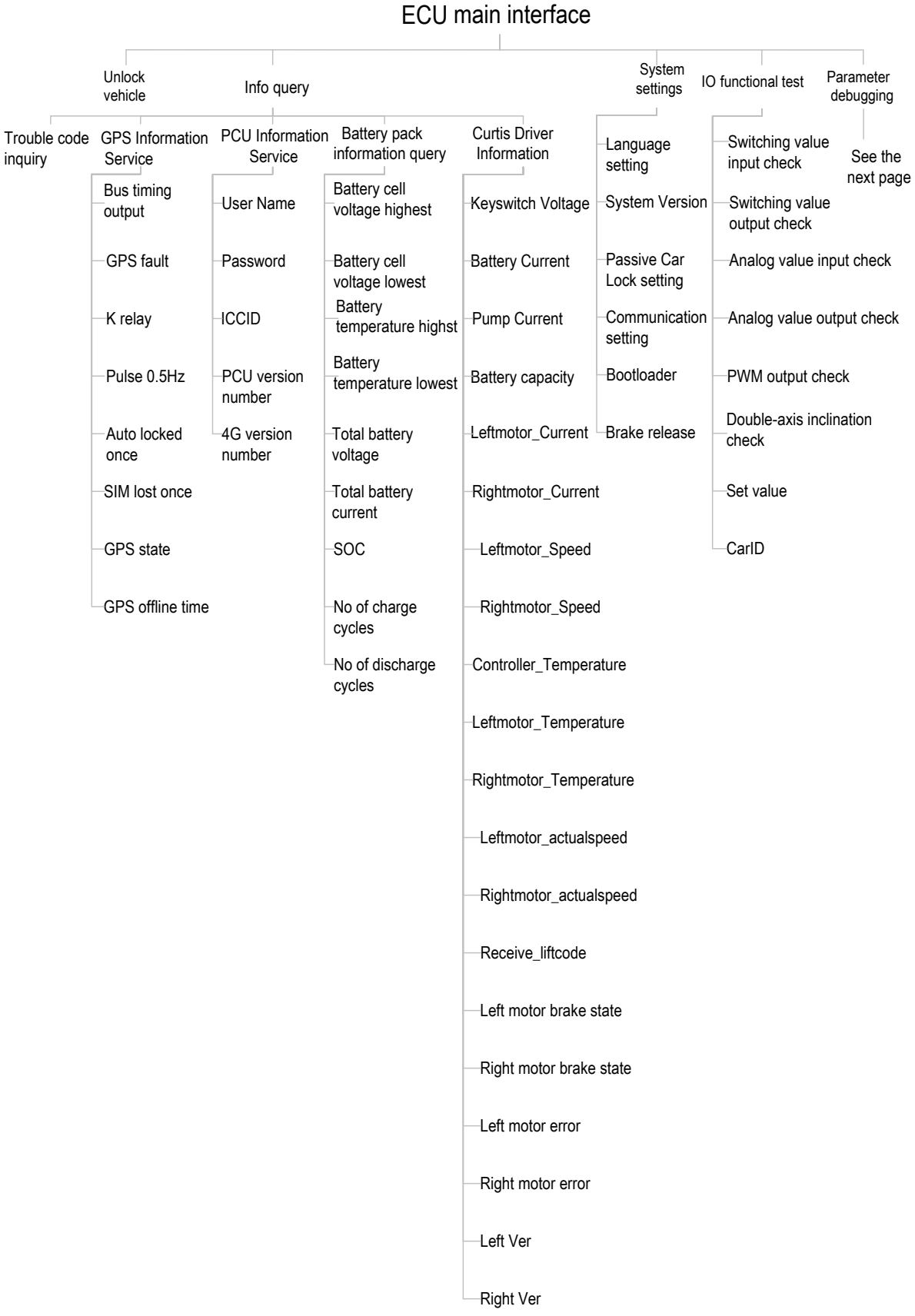

Fig 1 System interface

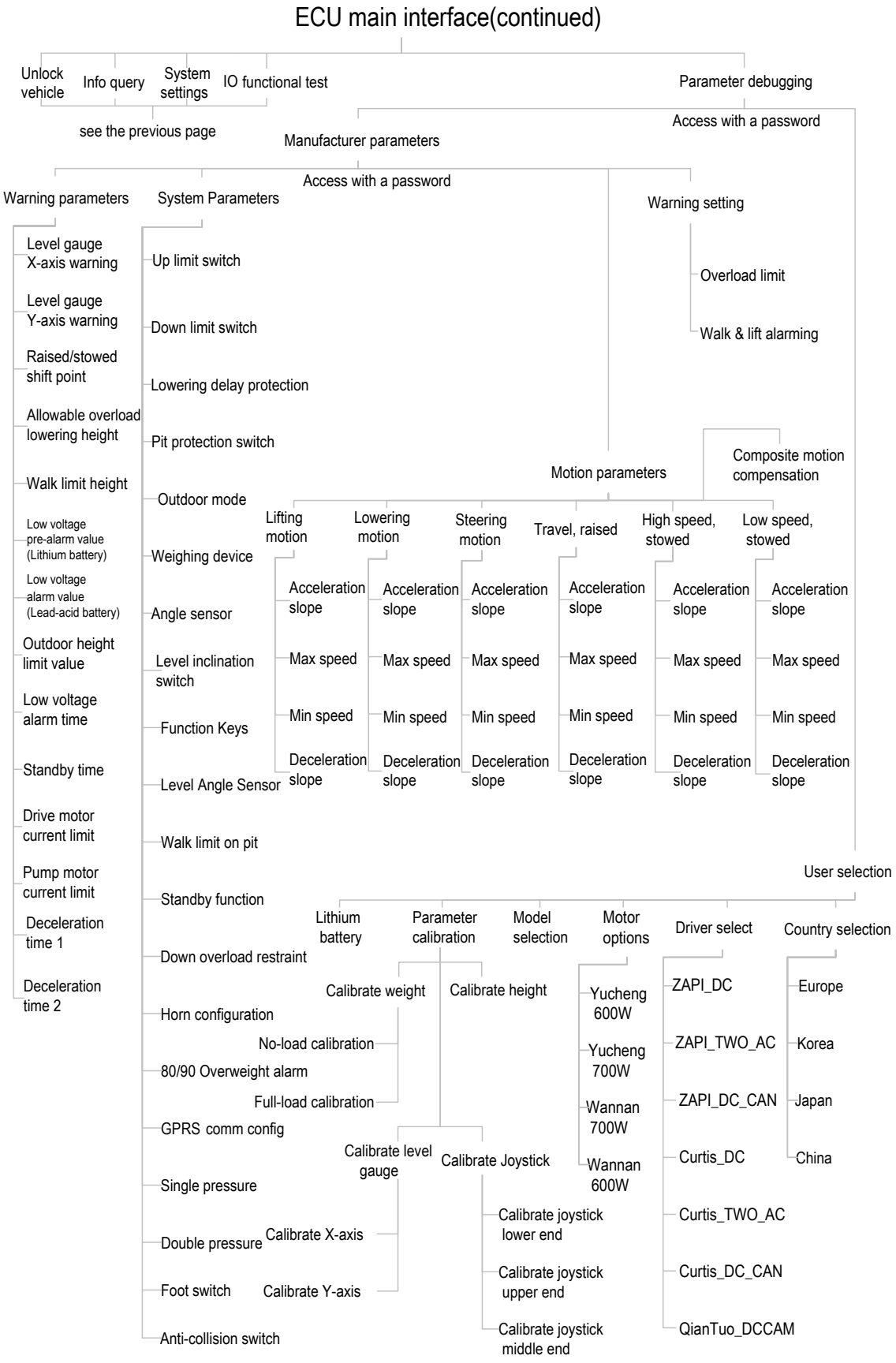

Fig 2 System interface (continued)

Update 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, so it's forbidden to update the program without authorization from Sinoboom. Please contact SINOBOOM after-sales personnel to update the program.

1. Prepare a 4-32GB USB flash disk, and format its file system into FAT32 format.
2. Upload the ECU program to the root directory of the USB flash disk: ECU_MAIN.bin.

   Note: please contact Sinoboom after-sales personnel to get the program.
3. Turn off the machine, and insert the USB flash disk into the program updating port (protected by a rubber plug) at the back of ECU.
4. Press and hold the Esc key on the ECU panel while powering on the machine. Release the Esc key 5s after power-on, and the program will be updated automatically.
5. After the program is updated, power off the machine.

Check Program Version

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

Info Query Interface

In the Info Query Interface, users can query the GPS information service, PCU information service, battery pack information, Curtis driver information and trouble code of the machine (for the causes and solutions of fault codes, please refer to ***Fault Codes*** section).

Brake Release

Only electric models are equipped with the brake release function.

1. Place the machine on solid level ground and secure the wheels with chocks to prevent the machine from moving.
2. Make sure that the machine is stowed, the machine has no loose or unfixed parts, no people or any tools are on the platform, and there are no obstacles in the surrounding passage.
3. After entering the ECU menu selection mode, select and enter Brake Release interface, and press the Enter key for 5s.

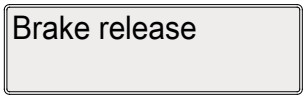

Fig 3

4. The buzzer will sound, and the message "Brake Release Succeeded" will be shown on the display, indicating brake released successfully.

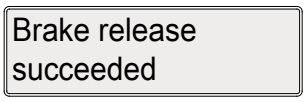

Fig 4

5. Then the machine can be towed or dragged by external force.
6. Return to the main interface through the Esc key, and power off the machine as needed. The setting will reset automatically after power-off and restart.

User Selection Setting

- Users can select the applicable country, driver and model of the machine in the User Selection menu of Parameter Debugging.
- The parameters (weight, height, level gauge and joystick) of the machine can be calibrated in the User Selection menu of Parameter Debugging.
- The lithium battery of the machine can be configured (if necessary) in the User Selection menu of Parameter Debugging.

Country Selection

1. After entering the ECU menu selection mode, select and enter the Country Selection interface, then select the desired country through PgUp key and PgDn key, and press the Enter key for confirmation.
2. Select one country to open the corresponding configurations for the country. See the table below for the configurations for each country.

Item	China	Europe & America	Korea	Japan
Single/dual pressure	OFF	Dual pressure	Dual pressure	Dual pressure

sensor				
Outdoor mode	ON (depend on models)	ON	ON	ON
Weighing device	OFF	ON	ON	ON
Angle sensor	ON (depend on models)	ON	ON	ON
Down overload restraint	OFF	ON	ON	ON
Travel limit on pithole	OFF	OFF	ON	ON
Foot switch	OFF	OFF	ON	ON
80/90 overload alarm	OFF	OFF	OFF	OFF

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

Calibrate Joystick

NOTICE

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

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 the Calibrate Joystick Upper End (as shown in the figure below), and then press and hold the Enter key. When “OK” is prompted in the lower right corner of the screen, the joystick upper end is successfully calibrated. Press the Esc key to return to the Calibrate Joystick interface.

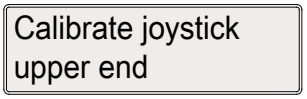

Fig 5

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

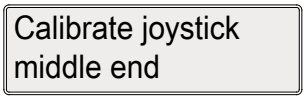

Fig 6

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

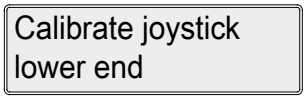

Fig 7

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

Calibrate Weight

NOTICE

- *To ensure the accuracy of weight calibration, please perform height calibration before weight calibration.*
- *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**

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 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 to start automatic calibration.

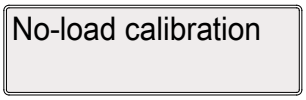

Fig 8

4. The platform will rise and descend twice automatically: rise to the highest position and descend to the stowed position.
5. When the screen displays “No-load Calibration Complete”, the no-load calibration is successfully done.

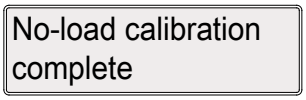

Fig 9

6. Return to the Calibrate Weight interface through the Esc key.

- **Full-load calibration**

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

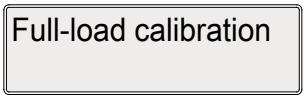

Fig 10

3. The platform will rise and descend twice automatically: rise to the highest position and descend to the stowed position.
4. When the screen displays “Full-load Calibration Complete”, the full-load calibration is successfully done.

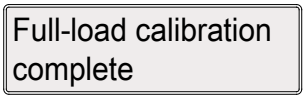

Fig 11

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

Calibrate Height

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 no heavy objects are placed on the platform.
3. After entering the ECU menu selection mode, select and enter Calibrate Height interface, and press the Enter key.

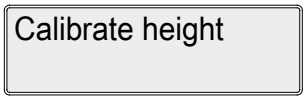

Fig 12

4. The platform will automatically rise to the highest position, and then descend to the stowed position.
5. When the screen displays “Height Calibration Done”, the height calibration is successfully done.

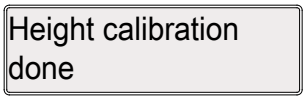

Fig 13

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

Manufacturer Parameters

DANGER

Personnel who have not been professionally trained and authorized by Sinoboom cannot modify the system parameters (including alarm parameters, function configuration, speed parameters), otherwise they will be responsible for the consequences.

Warning Parameters

In the Warning Parameters menu of Parameter Debugging, the parameters of level gauge X-axis warning, level gauge Y-axis warning, raised/stowed shift point, allowable overload lowering height, walk limit height, low voltage pre-alarm value, low voltage alarm value, outdoor height limit value, low voltage alarm time, standby time, drive motor current limit, pump motor current limit, deceleration time 1 and deceleration time 2 can be set.

Note:

- The input angle setting value needs to be multiplied by 10 times. For example, if the input value is 20, the actual angle value is 2°.
- The height setting value is in decimeter (dm).
- The input voltage setting value needs to be multiplied by 10 times. For example, if the input value is

20, the actual voltage value is 2 volts (V).

- The setting value of low voltage alarm time is in seconds (s), and the setting value of standby time is in minutes (min).

System Parameters

In the System Parameters menu of Parameter Debugging, the up limit switch, down limit switch, pit protection switch, lowering delay switch, outdoor mode configuration, weighing device, angle sensor, level inclination switch, function keys, level angle sensor, walk limit on pit, standby function, double pressure configuration, single pressure configuration, down overload restraint, horn configuration, GPRS communication configuration, foot switch configuration, anti-collision switch configuration and 80/90 overweight alarm can be switched on or off.

Motion Parameters

In the Motion Parameters menu of Parameter Debugging, the speed parameters of lifting motion, lowering motion, steering motion, raised travel speed, high speed (stowed) and low speed (stowed) can be set.

11.2 DTC-K500 MAIN CONTROL SYSTEM

This section is applicable to machines configured with DTC-K500 main control system.

System Interface

Pull out the emergency stop button to ON position and turn the key switch to Ground control position. Press the Enter key on the ECU panel while powering up the machine to enter the ECU menu selection mode. Select and enter different function interfaces through the PgUp key and PgDn key. 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).

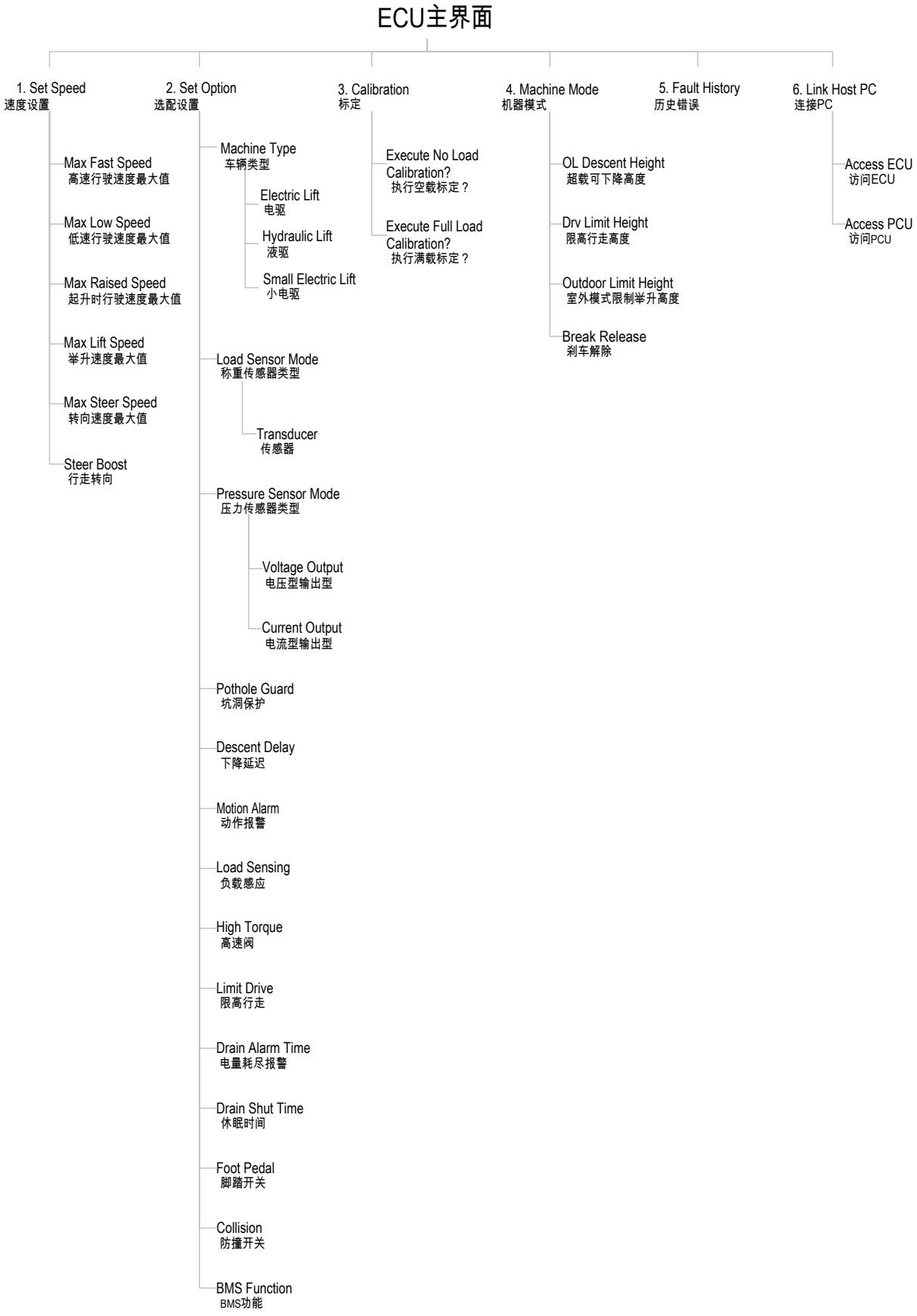

Fig 14 System interface

Check Program Version

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

Update 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, so it's forbidden to update the program without authorization from Sinoboom. Please contact SINOBOOM after-sales personnel to update the program.

Set Speed

In the "1.Set Speed" menu, the Max Fast Speed, Max Low Speed, Max Raised Speed, Max Lift Speed, Max Steer Speed and Steer Boost can be set.

Set Option

- In the "2.Set Option" menu, the Machine Type, Load Sensor Mode and Pressure Sensor Mode can be selected.
- In the "2.Set Option" menu, the Drain Alarm Time, Drain Shut Time can be set.
- In the "2.Set Option" menu, the Pothole Guard, Descent Delay, Motion Alarm, Load Sensing, High Torque, Limit Drive, Foot Pedal, Collision and BMS Function can be switched on or off. However, the Pothole Guard, Load Sensing and Motion Alarm 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.

Brake Release

Only electric models are equipped with the brake release function.

1. Place the machine on solid level ground and secure the wheels with chocks to prevent the machine from moving.
2. Make sure that the machine is stowed, the machine has no loose or unfixed parts, no people or any tools are on the platform, and there are no obstacles in the surrounding passage.
3. After entering the ECU menu selection mode, select and enter "Brake Release" interface, and press the Enter key for 5s.

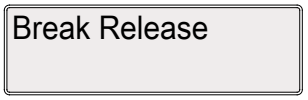

Fig 15

4. When the screen displays "Brake is Released" and the horn sounds, the brake release is successfully done.

Fig 16

5. Then the machine can be towed or dragged by external force.
6. Return to the main interface through the Esc key, and power off the machine as needed. The setting will reset automatically after power-off and restart.

Calibration Setting

Calibrate joystick

Ensure the joystick is in neutral position before power-on.

Calibrate Weight and Height

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 no heavy objects are placed on the platform.
3. After entering the ECU menu selection mode, select and enter Calibration interface, and press the Enter key for confirmation.

Fig 17

4. When the screen displays “Execute No Load Calibration?”, press the Enter key for 5s to start automatic no-load calibration.

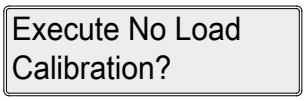

Fig 18

5. The platform will rise and descend 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).
6. When the screen displays “No Load Calibration Complete!”, the no-load calibration (& height calibration) is successfully done.

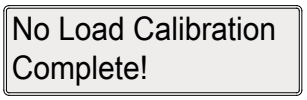

Fig 19

7. Return to the Calibration interface through the Esc key.

Full-load calibration

1. Place heavy objects with the same weight as the rated load of the machine on the platform.
2. Select and enter Execute Full Load Calibration? interface, and press the Enter key for 5s to start automatic full-load calibration.

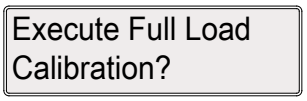

Fig 20

3. The platform will rise and descend 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 screen displays “Sensors Have Been Changed!”, the full-load calibration is successfully done.

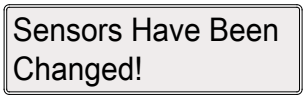

Fig 21

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

Machine Mode Setting

Set OL Descent Height

1. Ensure that the space above the platform allows the platform to be safely lifted to the maximum height and the machine is horizontally positioned.
2. After entering the ECU menu selection mode, select and enter “OL Descent Height” interface.

Fig 22

3. Raise the platform to a certain height (the desired OL descent height) with the ground controller.
4. After pressing the Enter key for 5s, the system will return to the previous interface. Then the OL descent height is set successfully, and the current height is set as the OL descent height.
5. Return to the main interface through the Esc key, lower the platform to the stowed position, and power off the machine as needed.

Set Drive Limit Height

1. Ensure that the space above the platform allows the platform to be safely lifted to the maximum height and the machine is horizontally positioned.
2. After entering the ECU menu selection mode, select and enter “Drv Limit Height” interface.

Fig 23

3. Raise the platform to a certain height (the desired drive limit height) with the ground controller.
4. After pressing the Enter key for 5s, the system will return to the previous interface. Then the drive limit height is set successfully, and the current height is set as the drive limit height.

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

Set Outdoor Limit Height

1. Ensure that the space above the platform allows the platform to be safely lifted to the maximum height and the machine is horizontally positioned.
2. After entering the ECU menu selection mode, select and enter “Outdoor Limit Height” interface.

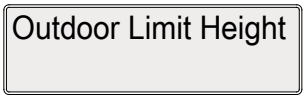

Fig 24

3. Raise the platform to a certain height (the desired outdoor limit height) with the ground controller.
4. After pressing the Enter key for 5s, the system will return to the previous interface. Then the outdoor limit height is set successfully, and the current height is set as the outdoor limit height.
5. Return to the main interface through the Esc key, lower the platform to the stowed position, and power off the machine as needed.

Check Fault History

1. After entering the ECU menu selection mode, select and enter “5.Fault History” interface.

Fig 25

2. Press the Enter key to view fault history (10 faults can be viewed. For the causes and solutions of fault codes, please refer to ***Page 58, Machine Faults and Solutions***).
3. To clear fault history, press the Enter key for 5s in the interface displaying fault history, and the screen will display “Clear Fault History?”. Then press the Enter key for 5s again to clear fault history. If not, skip this step and proceed to the next step.

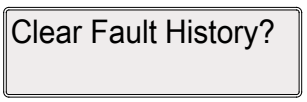

Fig 26

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

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12 OPTIONS

12.1 SPILL GUARD

Parts List

A small amount of hydraulic oil may drip from the hydraulic components in the chassis, which can be collected with a spill guard.

⚠ WARNING

Unsafe Operation Hazard

- **Except for designated models and corresponding markets, it is forbidden to install the spill guard on products with other models or in other markets than specified.**
- **Before using the spill guard, the safety rules and all operating instructions should be read, understood and observed. This manual should always be kept as an integral part with the spill guard.**

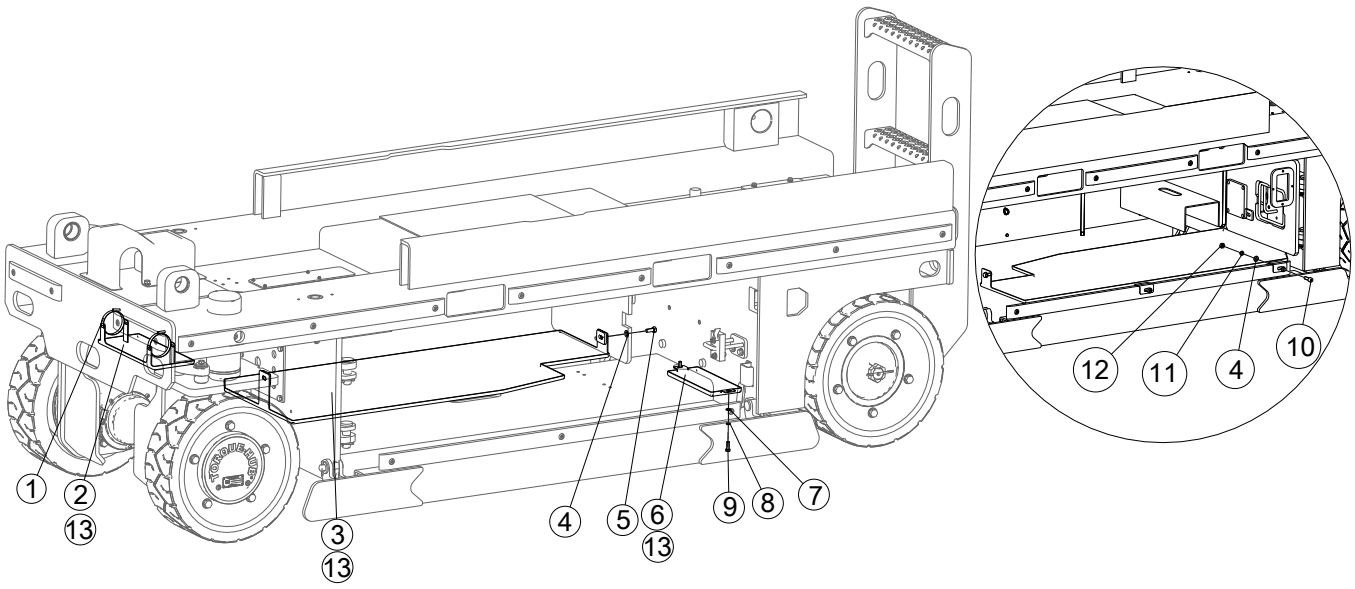

Fig 1

Table 12-1

No.	Part Number	Part Name	Quantity	Comment
1	216020000007	Non-perforated hose clamp, DIN-type	2	
2	101056033008	Spill guard, cylinder	1	
3	101054033053	Spill guard, motor box	1	
4	215040000034	Washer 8-200HV-ZnD GB/T 97.1	2	
5	215010000057	Bolt M8×20-8.8-ZnD GB/T 5783	1	
6	101054033054	Spill guard, counterweight	1	
7	215040000033	Washer 6-A2 GB/T 97.1	2	
8	215040000004	Spring washer	2	
9	215010000051	Bolt M6×20-A2-70 GB/T 5783	2	
10	215020000024	Screw M8×25-8.8-ZnD GB/T 70.1	2	
11	215040000005	Washer 8-ZnD GB/T 93	2	
12	215030000005	Nut M8-8-ZnD GB/T 6170	2	
13	\	Oil absorbent paper	\	

Installation and Removal

⚠ WARNING

Unsafe Operation Hazard

Except for designated models and corresponding markets, it is forbidden to install the spill guard on products with other models or in other markets than specified.

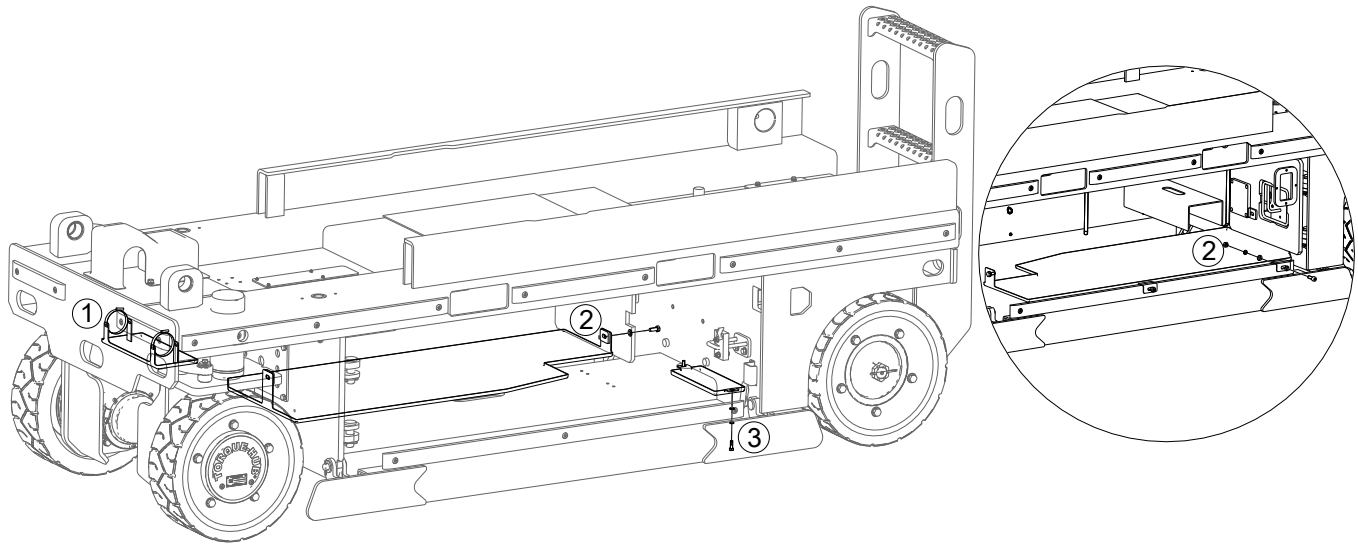

Fig 2

1. Spill guard for front wheel steering cylinder

Fit the non-perforated DIN-type hose clamp through the hole in the spill guard to clamp the front wheel steering cylinder. After installation, spread a piece of clean oil absorbent paper in the spill guard.

2. Spill guard for motor box

Align the holes in the folded plate of the spill guard with the holes in the anti-collision plate, and use hex nuts, washers and screws to secure them together. Use washers and hex bolts to secure the spill guard for motor box and the chassis mounting plate. After installation, spread a piece of clean oil absorbent paper in the spill guard.

3. Spill guard for counterweight

Use washers and hex bolts to secure the spill guard for counterweight on the chassis. After installation, spread a piece of clean oil absorbent paper in the spill guard.

Removal instructions

Disassemble the spill guard in the reverse order of the installation instructions.

Frequent Inspection

NOTICE

Check the spill guard before each use of the machine.

1. Locate the spill guard.
2. Check if there is too much oil in the spill guard.
3. If so, remove the oil absorbent paper that has been soaked with oil in the spill guard.
4. Spread a piece of new oil absorbent paper in the spill guard.

Regular Maintenance

The spill guard needs to be cleaned every year, or more frequently if it is often used in harsh environments.

1. Locate the spill guard.
2. Check if there is a visible layer of debris or turbid sediment at the bottom of the spill guard.
3. If so, remove the spill guard.
4. Wash the spill guard with cleaning solution and plenty of clean water, and then wipe off excess water.
5. Reinstall the spill guard.

12.2 FOOT SWITCH

The foot switch can be used as another enable switch of the control circuit, and in such case, the foot switch must be depressed and then the joystick enable switch must be pressed to operate the machine function when using the platform controller. When the foot switch is released, the platform controls will be disconnected from power source.

⚠ WARNING

Unsafe Operation Hazard

- **Except for designated models and corresponding markets, it is forbidden to install the foot switch on products with other models or in other markets than specified.**
- **Before using the foot switch, the safety rules and all operating instructions should be read, understood and observed. This manual should always be kept as an integral part with the foot switch.**

Parts List

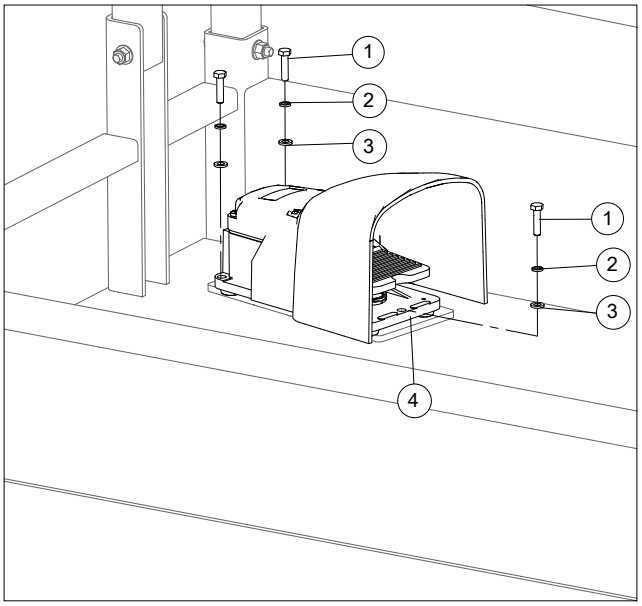

Fig 3

Table 12-2

No.	Part Number	Part Name	Quantity	Comment
1	215010000052	Bolt M6×25-A2-70 GB/T 5783	3	
2	215040000004	Washer 6-A2-70 GB/T 93	3	
3	215040000033	Washer 6-A2 GB/T 97.1	3	
4	203060003001	Foot switch	1	
5	101053063010	Foot switch harness	1	Not indicated in the figure

Installation and Removal

⚠ WARNING

Unsafe Operation Hazard

Except for designated models and corresponding markets, it is forbidden to install the foot switch on products with other models or in other markets than specified.

Installation instructions

1. Position the foot switch at its mounting position on the platform floor, align the foot switch with the platform floor mounting hole, and fix it with washers and bolts.
2. Connect the foot switch harness.

Removal instructions

Disassemble the foot switch in the reverse order of the installation instructions.

Instructions for Use

1. Depress the foot switch and activate any action switch/handle at the same time, and the corresponding action shall operate normally.
2. Activate any action switch/handle without depressing the foot switch, and the corresponding action cannot operate.

12.3 LIFTING ANTI-COLLISION DEVICE

Lifting anti-collision device provides safety protection by restricting the lifting height of machine. When an obstacle is detected during platform lifting, the lifting anti-collision device can prevent the platform from continuing to rise, thus protecting the operator.

⚠ WARNING

Unsafe Operation Hazard

- **Except for designated models and corresponding markets, it is forbidden to install the lifting anti-collision device on products with other models or in other markets than specified.**
- **Before using the lifting anti-collision device, the safety rules and all operating instructions should be read, understood and observed. This manual should always be kept as an integral part with the lifting anti-collision device.**

Parts List

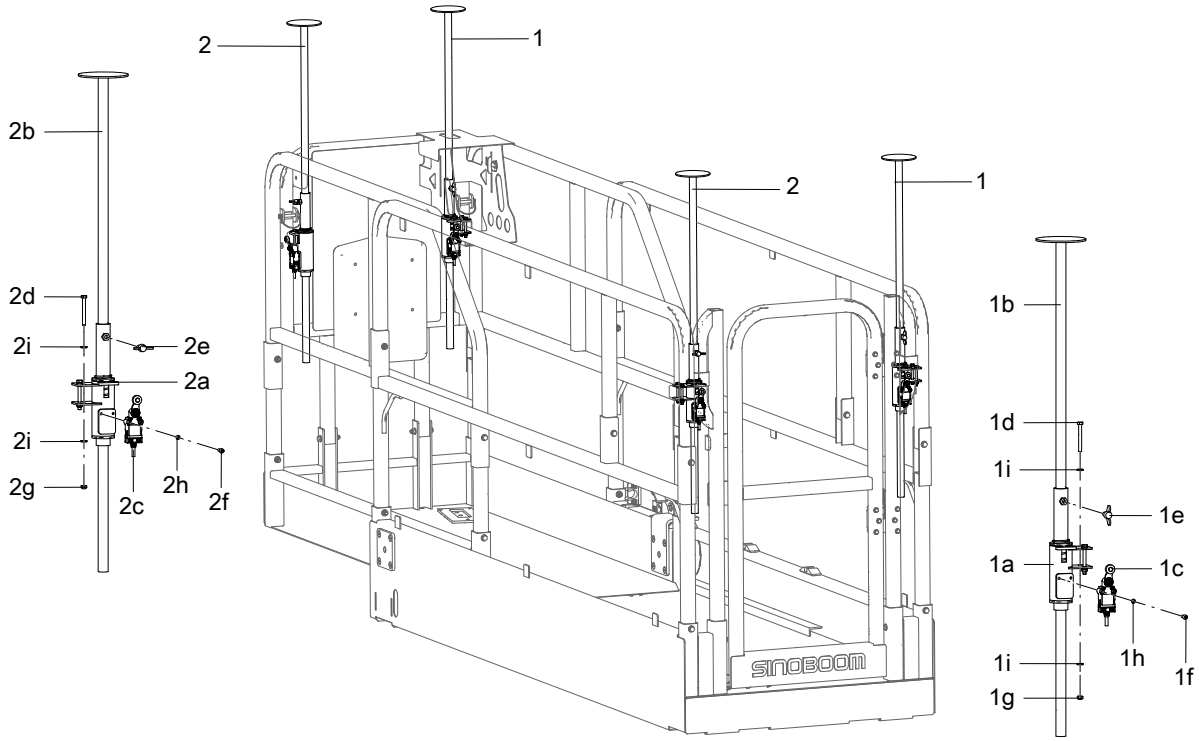

Fig 4

Table 12-3

No.	Part Number	Part Name	Quantity	Comment
1	101038040060	Right anti-collision device	2	
1a	101038040059	Right guide joint	1	
1b	101038040071	Limit bar	1	
1c	203060000151	Travel switch	1	
1d	215010000205	Bolt M6×55-A2-70 GB/T5783	2	
1e	215010000228	Wing screw M8x20-8.8-ZnD DIN 316	1	
1f	215020000007	Screw M5×16-A2-70 GB/T 70.1	2	
1g	215030000025	Nut M6-8-A2-70 GB/T 6184	2	
1h	215040000003	Washer 5-A2-70 GB/T 93	2	
1i	215040000033	Washer 6-A2 GB/T 97.1	4	
2	101038040070	Left anti-collision device	2	
2a	101038040072	Left guide joint	1	
2b	101038040071	Limit bar	1	
2c	203060000151	Travel switch	1	
2d	215010000205	Bolt M6×55-A2-70 GB/T5783	2	
2e	215010000228	Wing screw M8x20-8.8-ZnD DIN 316	1	
2f	215020000007	Screw M5×16-A2-70 GB/T 70.1	2	
2g	215030000025	Nut M6-8-A2-70 GB/T 6184	2	
2h	215040000003	Washer 5-A2-70 GB/T 93	2	
2i	215040000033	Washer 6-A2 GB/T 97.1	4	
3	101014063053	Height limit harness	1	Not indicated in the figure

Installation and Removal

Installation instructions

1. Insert the limit bar into the guide sleeve and secure it with the wing bolt.
2. Align the hole in the travel switch with that in the guide joint and secure them with screw and washer.
3. Place the platform guardrail between the upper and lower mounting plates of the anti-collision device and align it with the hole in the mounting plate, and then tighten it with bolt, washer and nut. Install the left and right anti-collision devices in this way.
4. Connect the height limit harness.

Removal instructions

Disassemble the anti-collision devices in the reverse order of the installation instructions.

Instructions for Use

- The machine will operate normally if the limit bar does not bump into an obstacle.
- When the limit bar bumps into an obstacle, the limit bar will shift downward, and the travel switch will be triggered to limit the lifting of the machine.

12.4 LIFTING TRAVEL LIMIT DEVICE

The lifting travel limit device provides safety protection by prevent the machine from traveling in the lifting state.

⚠ WARNING

Unsafe Operation Hazard

- **Except for designated models and corresponding markets, it is forbidden to install the lifting travel limit device on products with other models or in other markets than specified.**
- **Before using the lifting travel limit device, the safety rules and all operating instructions should be read, understood and observed. This manual should always be kept as an integral part with the lifting travel limit device.**

Parts List

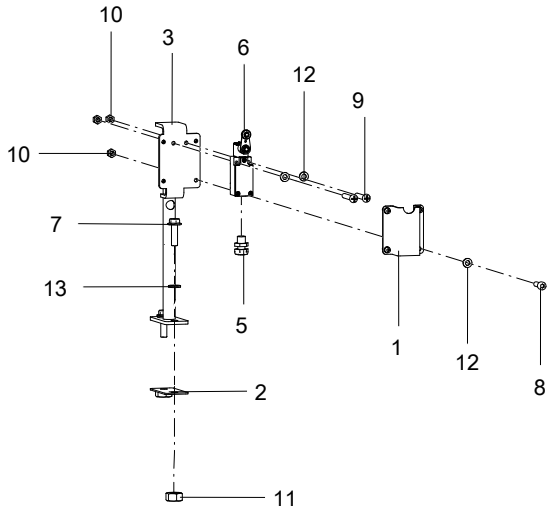

Fig 5

Table 12-4

No.	Part Number	Part Name	Quantity	Comment
1	101014033011	Grooved plate	1	
2	101014033014	Spacer	1	
3	101038063043	Lifting travel limit support options		
3–1	101041033010	Support	1	GTJZ0608/0612
3–2	101038033007	Support	1	GTJZ0608S/M
3–3	101014033012	Support	1	GTJZ0808/0812

Table 12-4 (Continued)

No.	Part Number	Part Name	Quantity	Comment
3–4	101045033008	Support	1	GTJZ1012
3–5	101016033002	Support	1	GTJZ1212
3–6	101046033022	Support	1	GTJZ1414
4	101038063044	Lifting travel limit harness options		Not indicated in the figure
4–1	101038063002	Lifting travel limit harness	1	GTJZ0608S/M
4–2	101042063002	Lifting travel limit harness	1	GTJZ0608/0808
4–3	101039063006	Lifting travel limit harness	1	GTJZ0612/0812/1012/1212/1414
5	201990003005	Waterproof nylon connection	1	
6	203060000108	Travel switch	1	
7	215010000248	Bolt M10x35-8.8 ZnD GB/T 5789	2	
8	215020000008	Screw M5×20-A2-70 GB/T 70.1	4	
9	215020000214	Screw M5×35-A2-70 GB/T 818	2	
10	215030000003	Nut M5-A2-70 GB/T 6170	6	
11	215030000006	Nut M10-8-ZnD GB/T 6170	2	
12	215040000032	Washer 5-A2 GB/T 97.1	6	
13	215040000035	Washer 10-200HV-ZnD GB/T 97.1	2	

Installation and Removal

Installation instructions

1. Align the hole in the travel switch with that in the support and fix them with screw, washer and bolt.
2. Align the hole in the grooved plate with that in the support and fix them with screw, washer and bolt.
3. Fit the washer and bolt on the bottom mounting plate of the support, and align them with the holes in the washer and support bottom sequentially, and tighten them with bolts.
4. Connect the lifting travel limit harness.

Removal instructions

Disassemble the lifting travel limit device in the reverse order of the installation instructions.

Instructions for Use

- When the machine is in retracted position, the lower edge of the platform is in contact with the travel switch, the travel switch is closed, and the machine can travel normally.
- When the machine is in operating position (raised position), the lower edge of the platform is in contact with the travel switch, and the travel switch is disconnected, limiting the traveling function.

12.5 MANUAL BRAKING RELEASE SWITCH

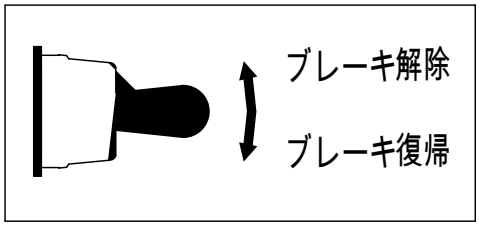

Fig 6

1. Place the machine on solid level ground and secure the wheels with chocks to prevent the machine from moving.
2. Make sure that the machine is stowed, the machine has no loose or unfixed parts, no people or any tools are on the platform, and there are no obstacles in the surrounding passage.

3. Move the manual release switch up to release braking.
4. Then the machine can be towed or dragged by external force.
5. After towing, place the machine on solid level ground and secure the wheels with chocks to prevent the machine from moving.
6. Move the manual release switch down, and then the brake can work normally.

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13 APPENDIX

13.1 MAJOR MODIFICATION AND REPAIR RECORD

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

Major Modification and Repair Record			

Note:

1. A major modification/repair is a modification/repair made to the entire machine or its parts that affects the stability, strength or performance of the machine.
2. A major modification/repair to the machine should be documented with the form below. Keep the form properly until the machine is taken out of service, or as requested 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. After all the inspection and verification results are good, the machine can be put back into service.

13.2 INSPECTION AND PREVENTATIVE MAINTENANCE SCHEDULE

Perform inspection and preventive maintenance for the items in the table below at prescribed intervals. The intervals of inspection and maintenance are calculated based on the months elapsed since the machine has been put into service or the “cumulative working time” on the ground controller display (whichever comes first).

The inspection cycle is based on the use of machine under normal working conditions, and the cycle should be shortened accordingly if the machine is used in harsh working conditions.

Table 13-1 Inspection and Preventative Maintenance Schedule

Items	Intervals		
	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
Pedal for extensible platform	1, 2, 3	1, 2, 3	1, 2, 3
Platform slider (at the connection with scissor arm) and its fastener	1, 2	1, 2	1, 2
Safety belt anchor point	1, 2, 7	1, 2, 7	1, 2, 7
Scissor arm assembly			
Scissor arm	1, 2	1, 2	1, 2
Safety arm	1, 2, 3	1, 2, 3	1, 2, 3
Bearing	1, 2, 5, 12	1, 2, 5, 12	1, 2, 5, 8, 12
Pivot pin, retaining ring and fastener	1, 2	1, 2	1, 2
Chassis assembly			
Chassis	2	2	2

Table 13-1 Inspection and Preventative Maintenance Schedule (Continued)

Items	Intervals		
	Before each delivery[1] or quarterly[2]	Semiannually[3]	Annually[4]
Chassis slider (at the connection with scissor arm)	1, 2, 5	1, 2, 5	1, 2, 5, 8
Tire	1, 2	1, 2	1, 2
Wheel fastener	1[50]	1[50]	1[50]
Traveling and steering component	1, 2, 5	1, 2, 5	1, 2, 5
Bearing	1, 2, 5, 12	1, 2, 5, 12	1, 2, 5, 12
Chassis boxes 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
Brake and braking release device	1, 5, 6	1, 5, 6	1, 5, 6
Lift 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	1, 2, 3, 5, 6	1, 2, 3, 5, 6
Hydraulic valve	1, 2, 3, 5, 6	1, 2, 3, 5, 6	1, 2, 3, 5, 6
Hydraulic connecting pin and retaining ring	1, 2	1, 2	1, 2
Hydraulic hose, pipeline and fitting	1, 2, 6	1, 2, 6	1, 2, 6
Hydraulic tank and breather	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
Hydraulic oil return filter	1, 5, 6	1, 5, 6	1, 5, 6, 11[50]
Hydraulic oil	5, 6	5, 6	5, 6, 11
Electrical system			
Electrical wiring, connector	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
Instrument, meter, switch, lamp, 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, protective device and brake	1, 3, 10	1, 3, 10	1, 3, 10

Table 13-1 Inspection and Preventative Maintenance Schedule (Continued)

Items	Intervals		
	Before each delivery[1]or quarterly[2]	Semiannually[3]	Annually[4]
Emergency stop button (ground and platform)	1, 3, 10	1, 3, 10	1, 3, 10
Limit switch and main 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 device	1, 3, 10	1, 3, 10	1, 3, 10
Pothole protective device	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
Braking function	1, 3, 10	1, 3, 10	1, 3, 10
Other inspection items			
Operation Manual in the manuals storage box	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 included	10	10	10
General structural components and welds	2	2	2
All fasteners, pins, protective guards and covers	1, 2	1, 2	1, 2
Grease and lubricating 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	/	/	10

Table 13-1 Inspection and Preventative Maintenance Schedule (Continued)

Items	Intervals		
	Before each delivery[1]or quarterly[2]	Semiannually[3]	Annually[4]

Note:

[1] Before each sale, lease or shipment;

[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 prior annual machine inspection;

[50] The first inspection work shall be performed after the machine has been in service for 50 hours for the first time; This only happens once in the service life of the machine;

[250] The first inspection work shall be performed after the machine has been in service for 250 hours for the first time. This only happens once in the service life of the machine.

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

Performance code:

1. Check for correct installation (accurate position, firmly installed, tightened according 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. Return to neutral position or “off” position normally (the self-reset switch can return to neutral position or “off” position after released)
5. Clean and free of foreign objects
6. Check for correct sealing, leaking and level
7. Labels complete, clear and secure
8. Check for appropriate dimensions/tolerances
9. Fully charged
10. Validation/Execution
11. Replace the oil or filter element
12. Correctly lubricated
13. Inspect the carbon brush

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Always for Better Access Solutions

Hunan Sinoboom Intelligent Equipment Co., Ltd.

No.128, East Jinzhou Avenue, Ningxiang High-tech Industrial Park, Changsha, Hunan, China

0086-0731-87116222 (Sales) & 0086-0731-87116333 (Service)
sales@sinoboom.com
www.sinoboom.com

North American Subsidiary

Sinoboom North American LLC

310 Mason Creek Drive
unit #100
Katy, TX 77450, US
Tel: (281) 729–5425
E-mail: info@sinoboom.us

Europe Subsidiary

Sinoboom B.V.

Nikkelstraat 26, NL-2984 AM Ridderkerk,
The Netherlands
Tel: +31 180 225 666
E-mail: info@sinoboom.eu

Korea Subsidiary

Sinoboom Korea Co., Ltd.

95, Docheong-ro, Yeongtong-gu, Suwon-si,
Gyeonggi-do, Republic of Korea
Tel: 010–8310–8026
E-mail: ka1@sinoboom.com

Australia Subsidiary

Sinoboom Intelligent Equipment Pty Ltd.

50/358 Clarendon St, South Melbourne VIC
3205, Australia
E-mail: au@sinoboom.com

Singapore Subsidiary

Star Access Solutions Pte. Ltd.

112 Robinson Road #03-01 Robinson 112
Singapore 068902

Poland Subsidiary

Sinoboom Poland sp. z o.o.

Ul. Bolesława Krzywoustego 74A
61-144 Poznań, Poland