

Part No.503007110002

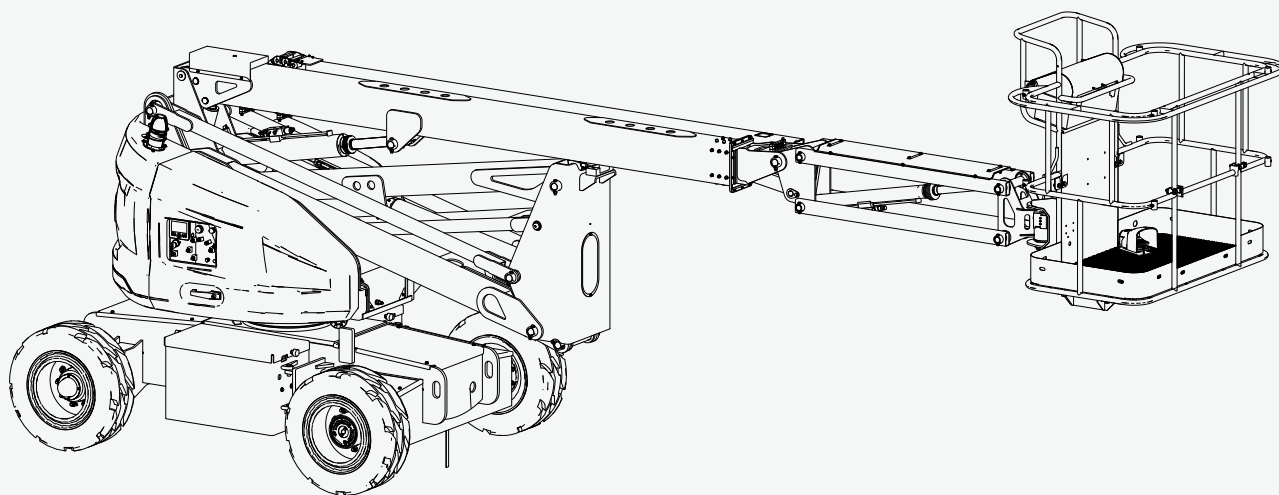
Rev: C

Nov. 2022

Maintenance Manual

GTZZ14EJ/AB14EJ/AB460EJ

GTZZ16EJ/AB16EJ/AB520EJ



CE  AS/NZS  EAC GB 

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, 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 follow your nation regulation.

Manual revision history:

REV	DATE	DESCRIPTION	REMARK
A	Aug. 2020	Original issue of the manual	
B	Dec. 2021	Updated manual	
C	Nov. 2022	Updated manual, implemented the BS EN 280-1:2022 standard requirements, revised the logic description of drive speed select switch, etc.	

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APPLICATION

Use the following table to identify the specific serial number for models included in this manual. Check the model of your machine before consulting the manual, and then use the correct manual according to the serial number of the model. See the nameplate on your machine to identify the model and serial number. (See ***Decals/Nameplates Inspection*** of the *Operation Manual* for details.)

Model	Trade Identification		Serial No.
	Metric	Imperial	
GTZZ14EJ	AB14EJ	AB460EJ	From 0300600596 to present
GTZZ16EJ	AB16EJ	AB520EJ	From 0300701188 to present

NOTE:

- Product model is applied in product nameplate for distinction of products of different main parameters.
- Product trade identification is applied in marketing and machine decals for distinction of products of different main parameters, and can be classified as metric type and imperial type: The metric type of trade identification is applicable to machines for countries/regions using metric system or as specially required by customers; The imperial type of trade identification is applicable to the machines for countries/regions using imperial system or as specially required by customers.

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STATEMENTS

Hunan Sinoboom Intelligent Equipment Co., Ltd. (Hereinafter referred to as Sinoboom) will upload the latest product manual information to the website www.sinoboom.com as soon as possible. However, due to continuous product improvement, the information in this manual is subject to change without prior notice.

This manual covers the basic parts information of one or more products. Therefore, please use this manual according to your needs. If you find problems in the manual or have suggestions for improvement, feel free to share your feedback with Sinoboom, and we will address these issues as soon as possible.

Feel free to consult and download the *Operation Manual*, *Maintenance Manual* and *Parts Manual* of the products you need online at www.sinoboom.com.

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INTRODUCTION

Thank you for choosing and using the machinery of Hunan Sinoboom Intelligent Equipment Co., Ltd. Always read, understand and become familiar with the operation requirements of the machine and its associated safety procedures before operating, maintaining and repairing the machine. Operating the machine without becoming familiar with its specific operation requirements and safety procedures poses serious risks. Operators who follow safety rules and operate the machine carefully and effectively will prevent personal injury, property loss and accidents.

Use this machine only to transport tools to work locations and for performing tasks on the work platform. Operators must be competent and must obtain training to carefully use the machine and follow safety procedures. Only trained and authorized personnel may operate the machine.

This manual guides the operator and authorized personnel in maintaining the machine. The operator is responsible for reading, understanding and implementing the maintenance and safety procedures in this manual and for following the manufacturer's instructions before beginning any work. Read, understand and follow all safety rules and operating instructions. The operator must also consider the machine's uses and limitations and the conditions at the jobsite before using this machine. Strictly following all safety requirements in this manual is critical.

Consider this manual a part of the machine, along with *Operation Manual* and *Parts Manual*, and always keep the manuals with the machine. The owner or administrator of the machine shall offer all manuals and other necessary information provided by the machine manufacturer regarding the daily inspection and maintenance to each of the renters. If the machine is sold, the owner or administrator must pass along the manuals and other necessary information to the purchaser. The owner or administrator of the machine shall also provide the manufacturer's maintenance information to the person responsible for maintaining the machine.

If you have any questions, contact Hunan Sinoboom Intelligent Equipment Co., Ltd..

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1 SAFETY

Read, understand and comply with the safety rules and regulations of your workplace and your government.

Before using the machine, ensure the operator is properly trained and qualified in safely operating the machine. The training includes but is not limited to :

- Warning and instruction decals on the machine
- Pre-operation inspection
- Any factors that may affect the machine stability
- Common hazards and countermeasures
- Jobsite inspection
- Functions of all controls and associated knowledge, including emergency control.
- Personal protection equipment that suits the task, workplace and environment.
- Safety operation
- Transporting the machine
- Measures against unauthorized use
- Operating instructions

Understand that as the operator you have the responsibility and right to shut down the machine in case of failure with the machine or other emergency at your workplace.

NOTICE

People suffering from heart disease, hypertension, epilepsy and other diseases and people who fear heights must never operate or use this machine. Also, people who have alcohol or drugs in their system, or experience excessive fatigue or depression, are prohibited from operating or using this machine.

SAFETY DEFINITIONS



This safety alert symbol appears with most safety statements. It means attention, become alert, your safety is involved! Please read and abide by the message that follows the safety alert symbol.

DANGER

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

WARNING

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

CAUTION

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

NOTICE

Indicates a situation that can cause damage to the engine, personal property and/or the environment, or cause the equipment to operate improperly.

NOTE: Indicates a procedure, practice or condition that should be followed in order for the engine or component to function in the manner intended.

REPORTING ACCIDENTS

In case of any accident involving the machinery of Hunan Sinoboom Intelligent Equipment Co., Ltd., notify Hunan Sinoboom Intelligent Equipment Co., Ltd. Immediately, even if no personal injury or property damage occurs during the accident. Contact Hunan Sinoboom Intelligent Equipment Co., Ltd. by telephone and provide all necessary details. Failure to notify the manufacturer within 48 hours of the incident involving the machinery of Hunan Sinoboom Intelligent Equipment Co., Ltd. may void the product's warranty.

NOTICE

Thoroughly inspect the machine and all its functions after any accident, being sure to test first from the ground controller and then from the platform controller. Ensure the machine's lifting height does not exceed 3 m(9.8 ft) until all damage has been repaired and all controllers operate properly.

ELECTROCUTION HAZARDS

NOTE: This machine is not insulated and does not have an electric shock protection function.

All operators and managers shall comply with national or local regulations regarding the minimum safe distance of live conductors above the ground. In the absence of such requirements, operators and managers should follow the minimum safety distance requirements in [Table 1-1 Minimum Safe Distance, page 1-2](#).

⚠ WARNING

ELECTRICAL SHOCK HAZARDS





- Always maintain a safe distance from power lines and electrical equipment in accordance with applicable government regulations and see [Table 1-1 Minimum Safe Distance, page 1-2](#).
- Consider platform and boom movement, wire swinging or drooping, beware of strong winds or gusts, and do not operate the machine when there is lightning or heavy rain.
- If the machine comes into contact with live wires, keep away from the machine. Personnel on the ground or on the platform must not touch or operate the machine until the power is switched off.
- Do not use the machine as a ground wire during welding and polishing operations.

TIPPING HAZARDS AND RATED LOAD

Maximum rated load bearing capacity of the platform:

Table 1-2

GTZZ14EJ	
Metric	230kg (unrestricted/2 persons & tools)
Imperial	507 lb (unrestricted/2 persons & tools)
GTZZ16EJ	
Metric	230kg (unrestricted/2 persons & tools)
Imperial	507 lb (unrestricted/2 persons & tools)

Table 1-1 Minimum Safe Distance

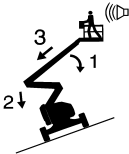
Voltage (Phase to Phase, kV)	Minimum Safe Distance (m/ft)
0-50	3.05 (10)
50-200	4.60 (15)
200-350	6.10 (20)
350 -500	7.62 (25)
500 -750	10.67 (35)
750 -1000	13.725 (45)

WARNING

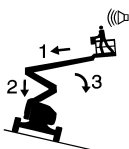
TIPPING HAZARDS



- Personnel, equipment and materials on the platform must not exceed the maximum load capacity.
- Only raise or extend the boom when the machine is on solid, level ground.
- Select only the low speed when driving the machine on a slope.
- Do not use the tilt alarm as a level indicator. The tilt alarm on the platform will sound only if the machine is heavily tilted.
- If the tilt alarm sounds when the machine drives up a slope, please lower the boom per the following procedure and move the machine onto firm level ground. Be sure not to rotate the boom when lowering.



1. Lower the main boom;
2. Lower foldable boom;
3. Retract the telescopic boom.



- If the tilt alarm sounds when the machine drives down a slope, please lower the boom per the following procedure and move the machine onto firm level ground. Be sure not to rotate the boom when lowering.
- Do not drive faster than 0.8 km/h (0.5 mph) when the platform is raised.
- When the platform is raised, the machine cannot travel on uneven terrain, unstable surfaces or in other dangerous conditions.
- Do not operate the machine during strong winds or gusts, and do not increase the surface area of the platform or load. Increasing the area exposed to the wind will reduce the stability of the machine.
- When the machine is on rough ground, with gravel or other uneven surfaces, or near holes

WARNING

TIPPING HAZARDS

- and steep slopes, maintain a minimum distance of 0.6m (2ft) and reduce the speed.
- When on the platform do not push and pull objects outside of it. The maximum lateral force allowed is: 400 N (90 lbf).
- Tow the machine only from the tiedown/lifting points on the chassis.
- Never use the boom or platform to stabilize or support any objects outside of the machine.
- Do not change any machine parts that may affect safety and stability.
- Do not replace key parts that affect machine stability with different weights or specifications.
- Do not modify or change moving aerial platforms without the manufacturer's prior written permission.
- On the platform, do not attach an additional device for placing tools or other materials to the guardrail. This will increase the platform weight, surface area and load.
- Do not place on, or fasten any overhanging load to any part of this machine.
- Do not place ladders or scaffolding on the platform or any parts of the machine.
- Do not use the machine on a moving or active surface or on a vehicle. Ensure all tires are in good condition, the slotted nuts tightened and the cotter pins complete.
- Do not use a battery that weighs less than the original lead acid battery (50kg[110 lb]) or lithium battery (65kg[143 lb]), and do not remove or modify the counterweight or other parts of the battery box. The battery not only provides power, it also serves as a counterweight. The battery is vital to maintaining the stability of the machine.

⚠ WARNING

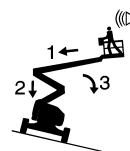
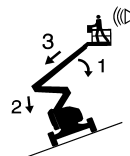
TIPPING HAZARDS

- Do not use the platform or boom assembly to push other machines or objects.
- Do not let the platform or boom assembly touch the nearby structures.
- Do not tie off the platform with rope or other binding materials to the nearby structures.
- Do not put a load outside the platform.
- When the platform is caught or stuck or when other objects in the vicinity impede its normal movement, do not use the platform controller to lower the platform. If you intend to lower the platform with a ground controller, you must operate it only after all personnel have left the platform.

WORK ENVIRONMENT HAZARDS

⚠ WARNING

UNSAFE JOBSITE HAZARDS



- Do not operate the machine on surfaces, edges or potholes that cannot bear the weight of the machine. Raise or extend the boom only when the machine is on firm, flat ground.
- Never travel on uneven terrain or unstable surfaces or in other dangerous conditions when raising the platform.
- When the machine is on rough ground, with gravel or other uneven surfaces, or near holes and steep slopes, maintain a minimum distance of 0.6m(2ft) and reduce the speed.
- Do not use the tilt alarm as a horizontal indicator. The tilt alarm on the platform will sound only when the machine is heavily tilted.
- If the tilt alarm sounds when the machine drives up a slope, lower the boom per the following procedure and move the machine onto firm level ground. Be sure not to rotate the boom while lowering.
 1. Lower the main boom;
 2. Lower foldable boom;
 3. Retract the telescopic boom.
- If the tilt alarm sounds when the machine drives down a slope, lower the boom per the following procedure and move the machine onto firm level ground. Be sure not to rotate the boom while lowering.
 1. Retract the telescopic boom;
 2. Lower foldable boom;
 3. Lower the main boom.
- Running speed should not exceed 0.8 km/h (0.5 in./second) when the platform rises.
- If the machine can be used outdoors, never operate it during strong winds or gusts. Do not lift

⚠ WARNING

UNSAFE JOBSITE HAZARDS

the platform when the wind speed exceeds 12.5 m/s (28 mph). If the wind speed exceeds 12.5 m/s (28 mph) after the platform is lifted, fold the platform and do not continue to operate the machine.

- Do not use any device that may increase the wind load on the machine.
- Do not drive or lift the machine on slopes, steps or vaulted surfaces that exceed the maximum gradeability of the machine.

⚠ WARNING

UNSAFE JOBSITE HAZARDS

- Do not lift the machine on slopes of more than 5° and do not drive laterally on slopes of more than 5°.

Before or during machine operation, check the possible hazards on the jobsite and beware of the restrictions within the environment, including flammable and explosive gas/dust. If the machine is used in any other applications, or by any other means, as specified by **Sinoboom**, it must be approved or guided by the manufacturer.

Table 1-3

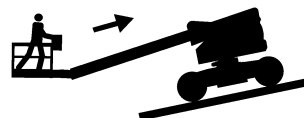
BEAUFORT NUMBER	METERS/SECOND	MILE/HOUR	DESCRIPTION	GROUND CONDITION
0	0 ~ 0.2	0 ~ 0.5	Calm	Calm. Smoke rises vertically.
1	0.3 ~ 1.5	1 ~ 3	Light air	Wind motion visible in smoke.
2	1.6 ~ 3.3	4 ~ 7	Light breeze	Wind felt on exposed skin. Leaves rustle.
3	3.4 ~ 5.4	8 ~ 12	Gentle breeze	Leaves and smaller twigs in constant motion.
4	5.5 ~ 7.9	13 ~ 18	Moderate breeze	Dust and loose paper rise. Small branches begin to move.
5	8.0 ~ 10.7	19 ~ 24	Fresh breeze	Smaller trees sway.
6	10.8 ~ 13.8	25 ~ 31	Strong breeze	Large branches in motion. Flags waving near horizontal. Umbrella use becomes difficult.
7	13.9 ~ 17.1	32 ~ 38	Near gale/moderate gale	Whole trees in motion. Effort needed to walk against the wind.
8	17.2 ~ 20.7	39 ~ 46	Fresh gale	Twigs broken from trees. Cars veer on road.
9	20.8 ~ 24.4	47 ~ 54	Strong gale	Light structure damage.

NOTICE

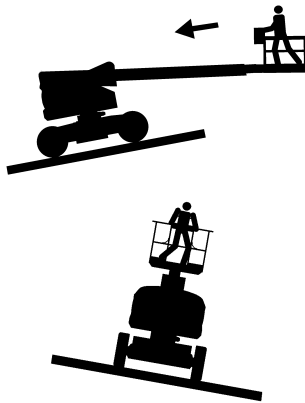
Maximum gradeability is suitable for machines with platform retracted. Gradeability: 30%/17°

Gradeability means the maximum allowable tilt angle of the machine when it is on solid ground and the platform is only capable of carrying one person. As the weight of the machine's platform increases, the machine's climbing capacity reduces.

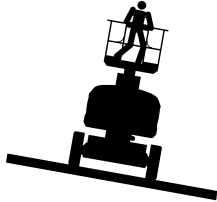
Maximum gradeability:



Uphill: 30%/17°



Downhill: 30%/17°



Side slope: 9%/5°

UNSAFE OPERATION HAZARDS

At a minimum, operators must operate and maintain the machine as stated in the *Operation Manual* and the *Maintenance Manual* in addition to following more stringent industry regulations and workplace rules. Never engage in unsafe machine operation.

Do not use the machine in the following situations:

- Unrelated personnel/equipment is present in the working envelope of the machine.
- Use as a crane (except the custom-made ones with such functions).
- Use on the truck, trailer, tracked vehicle, ship, scaffold and the like without written consent by the manufacturer or a qualified professional.
- Improper securing of the machine to another object by just sitting it against, fastening or binding.
- Stunt or imprudent use of the machine.
- Overloaded or over-moment situation.
- Other situations as specified in the *Operation Manual* and *Maintenance Manual*.



WARNING

UNSAFE OPERATION HAZARDS



- Do not push any object outside the platform. The maximum lateral force allowed is 400N (90 lbf).
- Tow the machine only from the tie-down/lifting points on the chassis.
- Never use the boom or platform to stabilize or support any objects outside of the machine.
- Do not modify any component that may affect the machine safety and stability.
- Do not replace key parts that affect machine stability with parts of different weights or specifications.
- Do not change or modify moving aerial platforms without the manufacturer's written permission.
- On the platform, do not attach an additional device for placing tools or other materials to the guardrail. This will increase the platform weight, surface area and load.
- Do not put ladders or scaffolding on the platform or any part of this machine.
- Do not use additional devices to increase the working height of the machine.
- Do not use the machine on any mobile or movable surface or vehicle. Ensure all tires are in good condition, the slotted nuts tightened and the cotter pins complete.
- Do not use a battery that weighs less than the original lead acid battery (55kg [121 lb]) or lithium battery (75kg [165 lb]), and do not remove or modify the counterweight or other parts inside the battery box. The battery not only provides power, but also serves as a counterweight. The battery is vital to maintaining the stability of the machine.

⚠ WARNING

UNSAFE OPERATION HAZARDS

- Do not place or attach any suspended load onto any part of the machine.
- Do not use the machine as a crane.
- Do not use the platform to push the machine or other objects.
- Do not allow the platform or boom to touch structures.
- Do not use ropes or other binding materials to tie the platform or boom onto nearby structures.
- Do not put the load outside the platform.
- When the platform is caught or stuck or when other objects in the vicinity impede its normal movement, do not use the platform controller to lower the platform. If you intend to lower the platform with the ground controller, you must operate it only after all personnel have left the platform.
- When one or more of the machine's tires are off the ground, evacuate all personnel before attempting to stabilize the equipment. Use a crane, forklift or other suitable equipment to stabilize the machine.

⚠ WARNING

FALL HAZARDS



- Each person on the platform must wear harnesses or use safety equipment consistent with government regulations. Fasten the cable to the fixed point of the platform. Never fasten the cable of more than one person to a fixed point on the platform.
- Do not sit, stand or crawl on the guardrails. When on the platform always remain standing on the platform floor.
- Do not enter or exit the platform through the boom.
- Keep the platform floor free of obstacles.
- Do not allow mud, oil stains, grease or other slippery substances reside on the footwear or platform floor.
- Do not enter or exit the platform unless the machine is fully in stowed position.
- Close the platform entrance door before operating the machine.
- Do not operate the machine if the handrails are not properly installed and the platform entry door is not closed.

FALL HAZARDS

At a minimum, operators must operate and maintain the machine as stated in the operation manual and in the maintenance manual in addition to following more stringent industry regulations and workplace rules.

COLLISION HAZARDS

At a minimum, operators must operate and maintain the machine as stated in the *Operation Manual* and the *Maintenance Manual* in addition to following more stringent industry regulations and workplace rules.

⚠ WARNING**COLLISION HAZARDS**

- Pay attention to the field of sight and the presence of blind spots when moving or operating the machine.
- The non-staff must maintain a minimum of 1.8m (5.9ft) distance from the machine while it is travelling or swinging.
- When the work platform of a moving machine is approx. 2m away from the obstructions, use the boom lifting/lowering function (rather than the driving function) to get close to the obstructions.
- Switch to the low speed gear before parking the machine that drives at high speed.
- Do not use the high speed gear when the machine is driving reverse or in restricted or enclosed work area.
- Check the work area to avoid ground and overhead obstructions or other possible risks.
- Be sure to exercise caution when using the platform controller and ground controller. Color-marked directional arrows show the function of travel, lift and steering.
- Users must comply with user, workplace and government rules regarding the use of personal protective equipment (hard hats, safety belts and gloves, etc.).
- Place the machine on level ground or in a secured position before releasing the brakes.
- Only lower the platform when there are no people or obstructions in the area beneath it.
- When the machine is conducting aerial work, warn the staff/non-staff not to work, stand or walk under the raised boom or platform.
- Control the speed of travel according to ground conditions, crowding, gradients, the presence and location of personnel and any

**⚠ WARNING****COLLISION HAZARDS**

- other factors that may cause collisions.
- Do not operate the machine on any crane or overhead traveling device unless the crane control is locked or precautions have been taken to prevent any potential collision.
- Try to prevent the machine from touching stationary objects (- buildings etc.) or mobile objects (- vehicles, cranes etc.).
- Never operate a machine in a dangerous way or for fun.

CRUSH HAZARDS

A potential crush hazard exists during movement of the machine. Always keep body parts and clothing a safe distance from the machine during machine operation.

⚠ WARNING**CRUSH HAZARDS**

- Do not place your hands and arms where they may become crushed or trapped.
- Do not work under the platform or the boom when the boom is not protected by a crane.
- Maintain good judgment and planning when using the controller on the ground to operate the machine. Maintain proper distance between operator, machine and fixed object.

EXPLOSION AND FIRE HAZARDS

⚠ WARNING

EXPLOSION AND FIRE HAZARDS



- Do not use the machine or charge the battery in hazardous or potentially flammable or explosive atmospheres.



- For the engine-powered machines, never add fuel while the engine is still running, and only add fuel when the place is well ventilated and free of flame, spark or any other hazards that may cause explosion.
- Never spray ether on the engine equipped with glow plug.

DAMAGED MACHINE HAZARDS

NOTICE

To avoid machine damage, follow all operation and maintenance requirements in the Operation Manual and the Maintenance Manual.

⚠ WARNING

DAMAGED MACHINE HAZARDS



- Do not use the machine if it is damaged or not in proper operating condition.
- Thoroughly inspect and test for all functions of the machine before use. Immediately mark and stop damaged or faulty machines.
- Ensure that all maintenance operations have been performed in accordance with the *Operation Manual* and the *Maintenance Manual*.
- Make sure all labels are in place and are legible.
- Ensure that the *Operation Manual* and *Maintenance Manual* are sound, easy to read and stored in the storage compartment on the platform.

BODILY INJURY HAZARDS

Always follow all operation and maintenance requirements in the Operation Manual and the Maintenance Manual.

⚠ WARNING

BODILY INJURY HAZARDS



- Do not operate the machine when there are oil spills/leaks. Oil spills or leaks in hydraulic fluids may penetrate and burn the skin.
- Always operate the machine in well ventilated atmosphere to prevent carbon monoxide poisoning.
- Be extremely careful when entering or exiting the platform. Fully lower the elevated boom and get the platform close to the ground to facilitate entry and exit. When entering or exiting the machine, face towards the machine and always keep three-point contact with the machine using two feet and one hand or two hands and one foot.

NOTE: The operator must carry out maintenance during the pre-operation inspection only. During operation, keep the left and right doors of the chassis closed and locked. Only trained service personnel can open the left and right doors to repair the machine.

BATTERY HAZARDS

WARNING

FIRE AND EXPLOSION HAZARD



- Batteries contain sulfuric acid and generate explosive mixtures of hydrogen and oxygen gases. Keep any device that may cause sparks or flames (including cigarettes/smoking materials) away from the battery to prevent explosion.
- Do not touch the battery terminals or cable clips with tools that may cause sparks.
- Avoid charging the battery in direct sunlight.
- The battery shall be charged at a well-ventilated place.
- In case of heating, deformation, leakage, abnormal smell or smoke during the use of the battery, stop using the battery and place the battery in an open place away from the crowd.
- Do not throw the battery into the fire or heater.

WARNING

ELECTRICAL SHOCK HAZARDS



- Contact with live circuits may lead to death or serious injury. Always wear protective glasses or goggles and protective clothing
- Remove all rings, watches and other accessories.



WARNING

CHEMICAL BURN HAZARD



- Avoid spilling or contacting battery acid with unprotected skin. Seek medical attention immediately if battery acid contacts skin.
- Should the battery acid spill out, use bicarbonate (baking soda) mixed with water to neutralize the acid.

⚠ WARNING**BATTERY HAZARD**

- Be sure to read and follow the recommendations given by the battery manufacturer regarding how to correctly use and maintain the battery.
- The battery charger can only be connected to the grounded three-plug AC power socket. Ensure that the charger is in normal working state before charging.
- Please use the charger provided by the manufacturer to charge the battery.
- The battery is only applicable for its matched equipment. Do not use the battery in other cases.
- Only the properly trained personnel authorized by the workplace are allowed to remove the battery from the machine.
- Before replacing the battery, be sure to identify the appropriate number of personnel and the lifting method.
- Do not allow sharp objects to contact with the battery, otherwise the battery membrane will easily get damaged.
- Other objects and tools shall not be placed on the battery to prevent short circuit of the battery.
- Please always keep the battery upright. If the battery is placed sideways or obliquely, the liquid in the battery may overflow.
- Do not short circuit the positive and negative poles of the battery.
- Do not use the battery with the positive or negative poles installed inversely.
- Do not directly connect the battery to a power outlet.
- Do not knock, throw or step on the battery.
- Do not immerse the battery into the water, acidic, alkaline and salt-containing solutions. Keep the battery away from rain.
- Never modify the battery system to avoid serious accidents.

⚠ WARNING**BATTERY HAZARD**

- Turn off the main power switch on the battery if the machine is unused for a long time.
- Waste batteries may cause danger. Please do not discard them at will. Please contact the battery recycling company for discarding.
- Non-professional personnel are not allowed to repair and maintain the system, otherwise personal injury or battery damage may be caused.
- Non-professional personnel are not allowed to modify parameters and detect signal lights when the system is operating, otherwise personal injury or battery damage may be caused.
- Non-professional personnel are not allowed to dismantle the battery case, otherwise damage may be caused.

NOTICE

The battery capacity attenuation and failure caused by over-discharge (continued use with less than 10% power) or power loss from long-term non-charging (- failure to charge in time for more than 3 days with less than 10% power) due to customer's errors are not covered by the warranty.

HYDRAULIC HAZARDS

 **WARNING**

BURN AND SPRAY HAZARDS




- When the hydraulic system is hot, do not touch to avoid severe skin burn.
- After the machine shutdown, thoroughly clean the spilled hydraulic oil. Do not throw the oil on the ground. Once the maintenance and repair is complete, immediately clean any oil on the skin. Dispose of the used oil as per the governing laws and regulations.
- Do not use your hand to block the hydraulic leaks. If the leakage occurs, please first release the system pressure and maintain only after the hydraulic oil cools down. If any injury is caused by the spray of hydraulic oil, go to the doctor immediately, otherwise severe complication may develop.

WELDING AND POLISHING REQUIREMENTS

Before welding, grinding and polishing operations, always ensure you read and understand all operation and maintenance requirements in the *Operation Manual* and the *Maintenance Manual*.

 **WARNING**

WELDING HAZARDS



- Comply with the welder manufacturer's recommendations for procedures concerning proper use of the welder.
- Welding leads or cables may only be connected after turning off the power unit.
- Carry out welding operations only after the welding cable has been correctly connected.
- Do not use the machine as a ground wire during welding operation.
- At all times, make sure that the power tools are completely stored in the working platform. Do not hang the power tools on the railing of the working platform or the work area outside the working platform, or hang the power tools directly by the wire.

Before performing welding, grinding and polishing work, welders must seek permission of the responsible department at the workplace.

AFTER USING THE MACHINE

1. Choose a safe parking location that is on sturdy, level ground and that is free of obstructions. Avoid areas with heavy traffic.
2. Ensure the boom is lowered over the rear drive outrigger, and all maintenance panels and gates are closed and secured.
3. Do not allow the hydraulic cylinders to be in fully extended position before the machine is shut down or kept idle for a long period.
4. Push in the emergency stop button at the platform controls to the OFF position.
5. Close the cover of platform controls to protect the control panel, handle and controller from hostile weather conditions.
6. Push in the emergency stop button at ground controls to the OFF position.
7. Turn the key switch at the ground controls to OFF position and remove the key to avoid unauthorized operation of the machine.

8. Turn off the main power switch.
9. Charge the battery.

NOTICE

After using the machine, the main power switch must be disconnected.

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2 SPECIFICATIONS

MACHINE SPECIFICATIONS

Table 2-1 GTZZ14EJ specifications

MEASURE	AB14EJ (METRIC)	AB460EJ (IMPERIAL)
DIMENSION PARAMETERS		
Max platform height	14 m	45 ft 11 in
Max working height	16 m	52 ft 6 in
Max horizontal reach	7.6 m	24 ft 11 in
Max up and over height	7.8 m	25 ft 7 in
Overall length (stowed)	6 m	19 ft 8 in
Overall width (stowed)	1.73 m	5 ft 8 in
Overall height (stowed)	2 m	6 ft 7 in
Wheelbase	1.9 m	6 ft 3 in
Ground clearance	0.22 m	8.7 in
Tire size (spec / type)	Optional 250–15 (non-marking) 250–15 (solid) 240/55D17.5/foam-filled 240/55D17.5/foam-filled, non-marking 27×10.5-15 (off-road, splayed, foam-filled) 27×10.5-15 (off-road, splayed, non-marking, foam-filled)	
Platform dimension (L×W×H)	Optional 1.45×0.85×1.1 m 1.83x 0.85 x 1.1 m	Optional 57×33.5×43 in 72×33.5×43 in
PERFORMANCE PARAMETERS		
Platform capacity	230 kg (unrestricted / 2 persons&tools)	507 lb (unrestricted / 2 persons&tools)
Turntable rotation / continuous	355° / uncontinuous	
Platform rotation	160°	
Max drive speed (stowed)	5.2 km/h	3.2 mph
Max drive speed (raised)	0.8 km / h	0.5 mph
Drive mode (drive×steer)	2WD×2WS	
Gradeability	30% / 17°	
Turntable tailswing	0 m	0 in
Max allowable inclination	5°	
Turning radius (inside)	1.15 m	3 ft 9.2 in

MEASURE	AB14EJ (METRIC)	AB460EJ (IMPERIAL)
Turning radius (outside)	3.51 m	11 ft 6.2 in
Max allowable side force	400 N	90 lbf
Max operating noise level	72dB	
IP rating	IP54	
POWER PARAMETERS		
Motor (rated power, rated rpm)	5kW, 48VAC	
Hydraulic tank capacity	40 L	8.8 gal (UK) / 10.6 gal (US)
Hydraulic system pressure	21 MPa	3045 psi
Battery (number×voltage, capacity)	Optional 8×6V, 390Ah 2×24V, 315Ah	
System voltage	48 VDC	
Control voltage	12 VDC	
GROUND BEARING DATA		
Max tire load	3580 kg	7893 lb
Tire contact pressure	725 kPa	105.2 psi
ENVIRONMENT REQUIREMENT		
Max allowable wind speed	12.5 m/s	28 mph
Max allowable altitude	1000 m	3280 ft
Allowable ambient temperature (lead-acid battery)	-10°C ~ 40°C	14°F ~ 104°F
Allowable ambient temperature (-lithium battery)	-20°C ~ 40°C	-4°F ~ 104°F
Max allowable RH	90%	
Storage environment	Stored at -20°C to 50°C (-4°F to 122°F) in a well-ventilated environment with 90% relative humidity (20°C [68°F]), and away from rain, sun, corrosive gas, inflammables and explosives.	
WEIGHT		
Gross weight (unladen)	7100 kg	15653 lb

Table 2-2 GTZZ16EJ specifications

MEASURE	AB16EJ (METRIC)	AB520EJ (IMPERIAL)
DIMENSION PARAMETERS		
Max platform height	15.7 m	51 ft 6 in
Max working height	17.7 m	58 ft 1 in
Max horizontal reach	9.3 m	30 ft 6 in
Max up and over height	7.8 m	25 ft 7 in

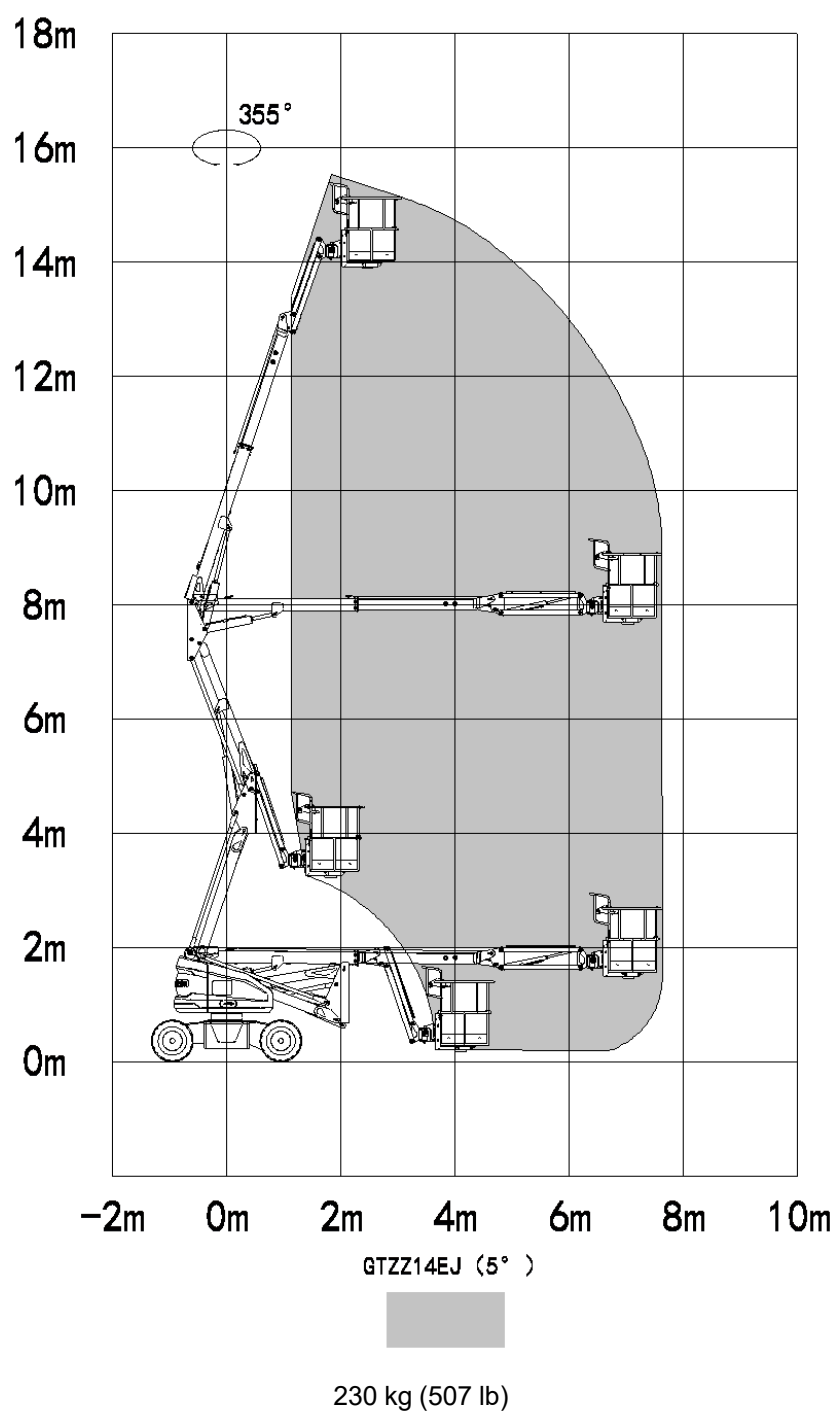
MEASURE	AB16EJ (METRIC)	AB520EJ (IMPERIAL)
Overall length (stowed)	6.8 m	22 ft 4 in
Overall width (stowed)	1.9 m	6 ft 3 in
Overall height (stowed)	2 m	6 ft 7 in
Wheelbase	1.9 m	6 ft 3 in
Ground clearance	0.22 m	8.7 in
Tire size (spec / type)	Optional 250–15 (non-marking) 250–15 (solid) 240/55D17.5/foam-filled 240/55D17.5/foam-filled, non-marking 27×10.5-15 (off-road, splayed, foam-filled) 27×10.5-15 (off-road, splayed, non-marking, foam-filled)	
Platform dimension (L×W×H)	Optional 1.45 x 0.85 x 1.1 m 1.83 × 0.85 × 1.1 m	Optional 57×33.5×43 in 72 × 33.5 × 43 in
PERFORMANCE PARAMETERS		
Platform capacity	230 kg (unrestricted / 2 persons&tools)	507 lb (unrestricted / 2 persons&tools)
Turntable rotation / continuous	355° / uncontinuous	
Platform rotation	160°	
Max drive speed (stowed)	5.2 km/h	3.2 mph
Max drive speed (raised)	0.8 km / h	0.5 mph
Drive mode (drive×steer)	2WD×2WS	
Gradeability	30% / 17°	
Turntable tailswing	50 mm	2 in
Max allowable inclination	5°	
Turning radius (inside)	0.7 m	2 ft 3.5 in
Turning radius (outside)	3.31 m	10 ft 10.3 in
Max allowable side force	400 N	90 lbf
Max operating noise level	72dB	
IP rating	IP54	
POWER PARAMETERS		
Motor (rated power, rated rpm)	5kW, 48VAC	
Hydraulic tank capacity	40 L	8.8 gal (UK) / 10.6 gal (US)
Hydraulic system pressure	21 MPa	3045 psi
Battery (number×voltage, capacity)	8×6V, 390Ah 2×24V , 315Ah	
System voltage	48 VDC	

MEASURE	AB16EJ (METRIC)	AB520EJ (IMPERIAL)
Control voltage	12 VDC	
GROUND BEARING DATA		
Max tire load	3760 kg	8289 lb
Tire contact pressure	715 kPa	103.7 psi
ENVIRONMENT REQUIREMENT		
Max allowable wind speed	12.5 m/s	28 mph
Max allowable altitude	1000 m	3280 ft
Allowable ambient temperature (lead-acid battery)	-10°C ~ 40°C	14°F ~ 104°F
Allowable ambient temperature (-lithium battery)	-20°C ~ 40°C	-4°F ~ 104°F
Max allowable RH	90%	
Storage environment	Stored at -20°C to 50°C (-4°F to 122°F) in a well-ventilated environment with 90% relative humidity (20°C [68°F]), and away from rain, sun, corrosive gas, inflammables and explosives.	
WEIGHT		
Gross weight (unladen)	7300 kg	16094 lb

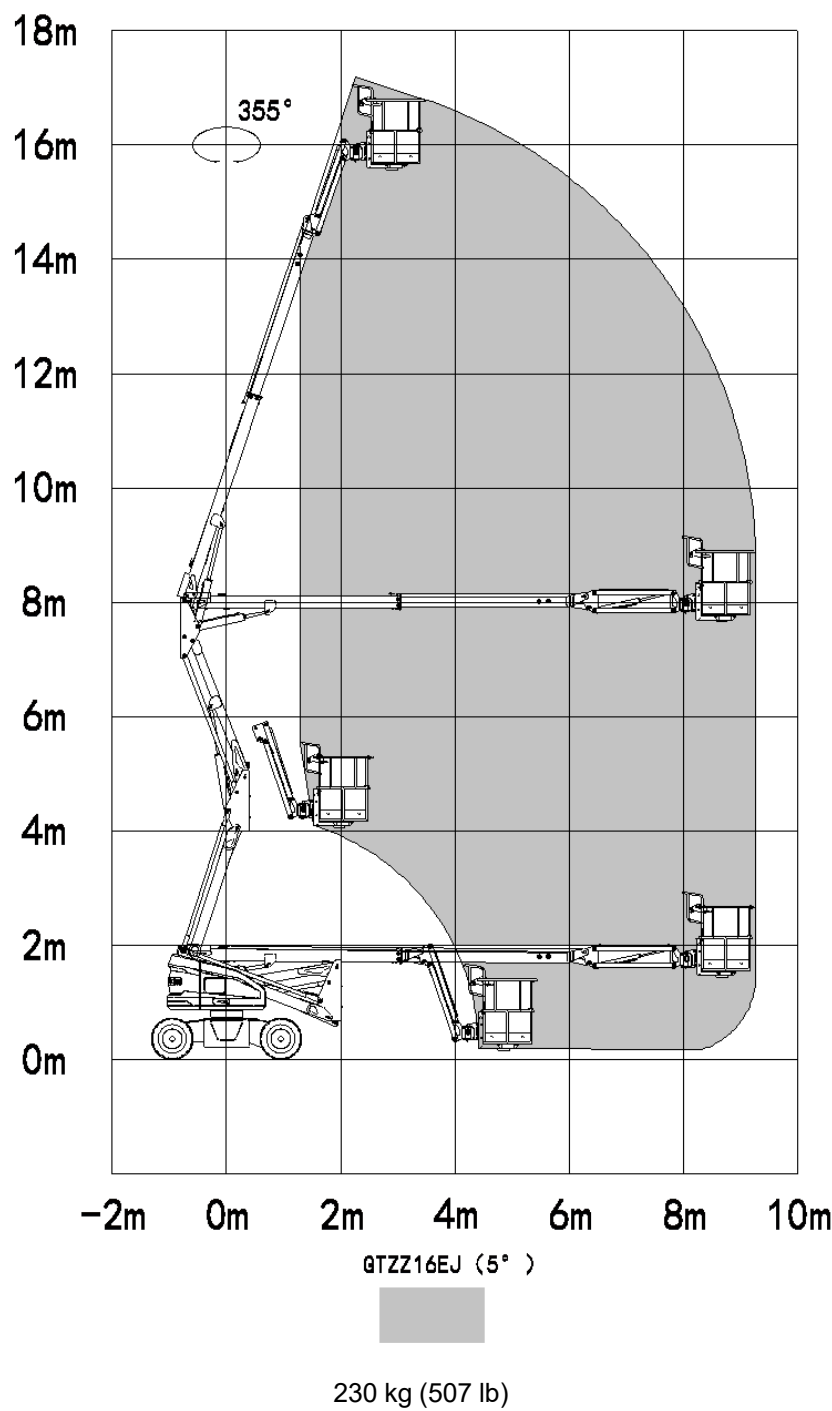
Note:

- The platform height plus the operator height (taken as 2m [6ft 7in]) is the working height.
- The ground bearing data is approximate, not factoring the different options, thus it serves only in adequately safe conditions.
- In different areas, hydraulic oil, engine oil, coolant, fuel and lubrication should be added in accordance with the environmental temperature.
- In cold weather, auxiliary devices are needed to start the machines.
- The loads of persons, accessories, tools and materials are factored into the rated platform capacity.
- The total vibration value of the platform does not exceed 2.5m/s², and the maximum root-mean-square value of the weighted acceleration of the entire machine does not exceed 0.5m/s².

GTZZ14EJ (5°) Chart of motion



GTZZ16EJ (5°) Chart of motion



MOTOR SPECIFICATIONS

Table 2-3 DC motor

Power	5kW
Voltage	48V

Torque	19.5Nm
RPM	2500rpm
Current	140A

Table 2-4 Travel motor

Power	3.56kW
Voltage	29V
RPM	3400rpm
Frequency	120Hz
Current	125A

FUNCTION SPEED

Table 2-5

ITEM	GTZZ14EJ	GTZZ16EJ
Boom up	33 ~ 39s	33 ~ 39s
Boom down	29 ~ 35s	29 ~ 35s
Foldable boom up	40 ~ 48s	40 ~ 48s
Foldable boom down	30 ~ 38s	30 ~ 38s
Turntable rotation (355°)-fully retracted	90 ~ 100s	90 ~ 100s
Turntable rotation (355°)-fully extended	115 ~ 125s	115 ~ 125s
Boom extended	22 ~ 28s	32 ~ 38s
Boom retracted	14 ~ 20s	19 ~ 25s
Platform rotating (160°)	12 ~ 18s	12 ~ 18s
Platform leveling up	45 ~ 55s	45 ~ 55s
Platform leveling down	35 ~ 45s	35 ~ 45s
Jib up	28 ~ 33s	28 ~ 33s
Jib down	20 ~ 25s	20 ~ 25s
Max drive speed (30m) -stowed	18 ~ 24s	18 ~ 24s
Max drive speed (30m) -extended	130 ~ 140s	130 ~ 140s

ITEM	GTZZ14EJ	GTZZ16EJ
Braking distance at full drive speed	S≤2m	S≤2m

- a) The function speed depends on the start and end point of the movement rather than the controls/ 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 higher than 40°C. If the hydraulic oil temperature is too low, the test results will be affected.

Test requirements:

Boom up/down: Fully lower the foldable boom and fully retract the telescopic boom, and then raise (from the lowest point to the maximum angle) and lower (from the maximum angle to the lowest point) the boom twice respectively.

Foldable boom up/down: Raise (from the lowest point to the maximum angle) and lower (from the maximum angle to the lowest point) the foldable boom twice respectively.

Turntable rotating: With the boom in center position, rotate the turntable for one turn and test it twice.

Boom telescoping*: With the boom in the horizontal position, fully extend the fully-retracted boom twice and fully retract the fully-extended boom twice.

Platform rotating: With the platform in the horizontal position, rotate the platform from the far left to the far right, and from the far right to the far left twice respectively.

Jib up/down: Position the platform horizontally and the jib boom to the lowest, and then raise and lower the jib boom twice respectively.

Driving-stowed: With the machine retracted on a level surface, select the high driving speed, deflect the drive control handle to the maximum to drive forward and backward for 30m twice respectively.

Driving-extended: With the machine extended on a level surface, deflect the drive control handle to the maximum to drive forward and backward for 30m twice respectively.

Braking distance at full drive speed : According to the above test requirements of driving-stowed, release the handle immediately after the machine reaches the maximum driving speed (start calculation) until the machine stops for two times.

MAJOR COMPONENT WEIGHTS

 **WARNING**

 **UNSAFE OPERATION HAZARD**

- Do not move heavy components without mechanical assistance.

 **WARNING**

UNSAFE OPERATION HAZARD

- Do not place heavy component upon instable surface.

Table 2-6

Component	GTZZ14EJ	GTZZ16EJ
Chassis assembly	3092 kg (6817 lb)	3143 kg(6929 lb)
Turntable assembly	3511 kg(7740 lb)	3511 kg(7740 lb)
Boom assembly	1301 kg(2868 lb)	1371 kg(3023 lb)
Base boom	103.3 kg(227.7 lb)	127.7 kg(281.5 lb)
Telescopic boom	70.1 kg(154.5 lb)	87.3 kg(192.5 lb)
Lower linkage frame	150 kg(330.7 lb)	150 kg(330.7 lb)
Lower foldable boom	180.9 kg(399 lb)	180.9 kg(399 lb)
Linkage	25.4 kg(56 lb)	25.4 kg(56 lb)
Upper linkage frame	57.5 kg(126.8 lb)	57.5 kg(126.8 lb)
Upper foldable boom	86 kg(190 lb)	86 kg(190 lb)
Steer cylinder	24.9 kg(54.9 lb)	24.9 kg(54.9 lb)
Platform	157.6 kg(347.4 lb)	157.6 kg(347.4 lb)
Counterweight	2627.5 kg(5792.6 lb)	2627.5 kg(5792.6 lb)
Slewing mechanism	123.7 kg(272.7 lb)	123.7 kg(272.7 lb)
Turntable cover assembly	41 kg(90.4 lb)	41 kg(90.4 lb)
Telescopic cylinder	51.3 kg(113 lb)	68 kg(150 lb)
Level cylinder, upper	17.7 kg(39 lb)	17.7 kg(39 lb)
Level cylinder, lower	18.3 kg(40.3 lb)	18.3 kg(40.3 lb)
Lift cylinder	77 kg(170 lb)	77 kg(170 lb)
Lift cylinder	79.5 kg(175 lb)	79.5 kg(175 lb)
Jib boom cylinder	28kg(62 lb)	28kg(62 lb)
Rotate cylinder	26kg(57 lb)	26kg(57 lb)
Wheel assembly	82kg(181 lb)	82kg(181 lb)
Travel motor	37.5kg(82.7 lb)	37.5kg(82.7 lb)

Component	GTZZ14EJ	GTZZ16EJ
Travel reducer	41kg(90 lb)	41kg(90 lb)
Note: The component weight may vary with different configurations selected.		

HYDRAULIC SYSTEM SPECIFICATIONS

Table 2-7

ITEM	SPECIFICATION
Hydraulic Oil	
Normal temperature region (0°C~40°C [32°F~104°F])	L-HV32
Low temperature region (-25°C~25°C [-13°F~77°F])	L-HV32
High temperature region (> 40°C [104°F])	L-HM68
Extremely low temperature region (< -30°C [-22°F])	Special program to be determined
Hydraulic Pump	
Type	Gear pump
Displacement	4.5mL/r
Max drive pressure	30 MPa (4351 psi)
Function Manifold	
Boom function valve pressure	21 MPa (3045 psi)
Relief pressure of rotation relief valve	10 Mpa (1450 psi)
High-pressure Filter	
High-pressure filter bypass pressure	0.7 MPa (101.5 psi)

NOTICE

The factory-filled hydraulic oil can be selected to suit the customer's demand. Do not intermix different types of hydraulic oil.

HYDRAULIC HOSE AND FITTING SPECIFICATIONS

HYDRAULIC HOSE TORQUE

Hydraulic hoses must be torqued to the following specifications.

Table 2-8 Hydraulic Hose Torque

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

HYDRAULIC FITTING TORQUE

Hydraulic fittings with metric thread must be torqued to the following specifications.

Table 2-9 Hydraulic Fitting Torque – Metric

THREAD SIZE	INSTALLED INTO ALUMINUM	INSTALLED INTO STEEL	
	ED, O-RING + CIRCLIP	ED, O-RING + CIRCLIP	O-RING
L (LIGHT-DUTY)			
M10×1	18 ± 1 Nm (13 ± 1 ft-lb)	20 ± 2 Nm (15 ± 2 ft-lb)	18 ± 1 Nm (13 ± 1 ft-lb)
M12×1.5	30 ± 2 Nm (22 ± 2 ft-lb)	35 ± 2 Nm (26 ± 2 ft-lb)	30 ± 2 Nm (22 ± 2 ft-lb)
M14×1.5	42 ± 3 Nm (31 ± 2 ft-lb)	48 ± 4 Nm (35 ± 3 ft-lb)	35 ± 2 Nm (26 ± 2 ft-lb)
M16×1.5	55 ± 4 Nm (41 ± 3 ft-lb)	60 ± 4 Nm (44 ± 3 ft-lb)	40 ± 3 Nm (30 ± 3 ft-lb)
M18×1.5	75 ± 5 Nm (55 ± 4 ft-lb)	75 ± 5 Nm (55 ± 4 ft-lb)	45 ± 3 Nm (33 ± 4 ft-lb)
M22×1.5	90 ± 6 Nm (66 ± 4 ft-lb)	130 ± 8 Nm (96 ± 6 ft-lb)	60 ± 4 Nm (44 ± 3 ft-lb)
M27×2	120 ± 8 Nm (89 ± 6 ft-lb)	185 ± 12 Nm (136 ± 9 ft-lb)	100 ± 7 Nm (74 ± 5 ft-lb)
M30×2	140 ± 8 Nm (103 ± 6 ft-lb)	245 ± 15 Nm (181 ± 11 ft-lb)	135 ± 8 Nm (100 ± 6 ft-lb)
M33×2	180 ± 10 Nm (133 ± 7 ft-lb)	320 ± 20 Nm (236 ± 15 ft-lb)	160 ± 10 Nm (118 ± 7 ft-lb)
M42×2	240 ± 15 Nm (177 ± 11 ft-lb)	450 ± 25 Nm (332 ± 18 ft-lb)	210 ± 13 Nm (155 ± 10 ft-lb)
M48×2	280 ± 20 Nm (207 ± 15 ft-lb)	540 ± 30 Nm (398 ± 22 ft-lb)	260 ± 15 Nm (192 ± 11 ft-lb)

THREAD SIZE	INSTALLED INTO ALUMINUM	INSTALLED INTO STEEL	
	ED, O-RING + CIRCLIP	ED, O-RING + CIRCLIP	O-RING
S (HEAVY-DUTY)			
M12×1.5	33 ± 2 Nm (24 ± 2 ft-lb)	43 ± 3 Nm (32 ± 2 ft-lb)	35 ± 2 Nm (26 ± 2 ft-lb)
M14×1.5	42 ± 3 Nm (31 ± 2 ft-lb)	50 ± 4 Nm (37 ± 3 ft-lb)	45 ± 3 Nm (33 ± 2 ft-lb)
M16×1.5	55 ± 4 Nm (41 ± 3 ft-lb)	75 ± 5 Nm (55 ± 4 ft-lb)	55 ± 4 Nm (41 ± 3 ft-lb)
M18×1.5	75 ± 5 Nm (55 ± 4 ft-lb)	95 ± 6 Nm (70 ± 4 ft-lb)	70 ± 5 Nm (52 ± 4 ft-lb)
M22×1.5	90 ± 6 Nm (66 ± 4 ft-lb)	140 ± 8 Nm (103 ± 6 ft-lb)	100 ± 10 Nm (74 ± 7 ft-lb)
M27×2	120 ± 8 Nm (89 ± 6 ft-lb)	185 ± 12 Nm (136 ± 9 ft-lb)	160 ± 10 Nm (118 ± 7 ft-lb)
M30×2	140 ± 8 Nm (103 ± 6 ft-lb)	245 ± 15 Nm (181 ± 11 ft-lb)	210 ± 13 Nm (155 ± 10 ft-lb)
M33×2	180 ± 10 Nm (133 ± 7 ft-lb)	320 ± 20 Nm (236 ± 15 ft-lb)	260 ± 15 Nm (192 ± 11 ft-lb)
M42×2	240 ± 15 Nm (177 ± 11 ft-lb)	450 ± 25 Nm (332 ± 18 ft-lb)	330 ± 20 Nm (243 ± 15 ft-lb)
M48×2	280 ± 20 Nm (207 ± 15 ft-lb)	540 ± 30 Nm (398 ± 22 ft-lb)	420 ± 25 Nm (310 ± 18 ft-lb)

Hydraulic fittings with British Standard Pipe (BSP) thread) must be torqued to the following specifications.

Table 2-10 Hydraulic Fitting Torque – British Standard Pipe (BSP)

THREAD SIZE	INSTALLED INTO ALUMINUM	INSTALLED INTO STEEL	
	ED, O-RING + CIRCLIP	ED, O-RING + CIRCLIP	O-RING
L (LIGHT-DUTY)			
G1/8A	20 ± 1 Nm (15 ± 1 ft-lb)	20 ± 1 Nm (15 ± 1 ft-lb)	-
G1/4A	35 ± 2 Nm (26 ± 2 ft-lb)	40 ± 2 Nm (30 ± 2 ft-lb)	-
G3/8A	50 ± 3 Nm (37 ± 2 ft-lb)	75 ± 5 Nm (55 ± 2 ft-lb)	-
G1/2A	75 ± 5 Nm (55 ± 2 ft-lb)	95 ± 6 Nm (70 ± 4 ft-lb)	-
G3/4A	120 ± 8 Nm (89 ± 6 ft-lb)	185 ± 12 Nm (136 ± 9 ft-lb)	-
G1A	180 ± 10 Nm (133 ± 7 ft-lb)	320 ± 20 Nm (236 ± 15 ft-lb)	-
G1-1/4A	240 ± 15 Nm (177 ± 11 ft-lb)	450 ± 25 Nm (332 ± 18 ft-lb)	-
G1-1/2A	280 ± 20 Nm (207 ± 15 ft-lb)	540 ± 30 Nm (398 ± 22 ft-lb)	-
S (HEAVY-DUTY)			
G1/4A	40 ± 3 Nm (30 ± 2 ft-lb)	43 ± 3 Nm (32 ± 2 ft-lb)	-
G3/8A	55 ± 3 Nm (41 ± 2 ft-lb)	85 ± 5 Nm (63 ± 4 ft-lb)	-
G1/2A	80 ± 5 Nm (59 ± 4 ft-lb)	120 ± 8 Nm (89 ± 6 ft-lb)	-
G3/4A	120 ± 8 Nm (89 ± 6 ft-lb)	185 ± 12 Nm (136 ± 9 ft-lb)	-
G1A	180 ± 10 Nm (133 ± 7 ft-lb)	320 ± 20 Nm (236 ± 15 ft-lb)	-

THREAD SIZE	INSTALLED INTO ALUMINUM	INSTALLED INTO STEEL	
	ED, O-RING + CIRCLIP	ED, O-RING + CIRCLIP	O-RING
G1-1/4A	240 ± 15 Nm (177 ± 11 ft-lb)	450 ± 25 Nm (332 ± 18 ft-lb)	-
G1-1/2A	280 ± 20 Nm (207 ± 15 ft-lb)	540 ± 30 Nm (398 ± 22 ft-lb)	-

Hydraulic fittings with Unified Thread Standard (UNC/UNF) thread must be torqued to the following specifications.

Table 2-11 Hydraulic Fitting Torque – Unified Thread Standard (UNC/UNF)

THREAD SIZE	INSTALLED INTO ALUMINUM	INSTALLED INTO STEEL
	O-RING	O-RING
L (LIGHT-DUTY)		
7/16-20	21 ± 2 Nm (15 ± 2 ft-lb)	21 ± 2 Nm (15 ± 2 ft-lb)
9/16-18	34 ± 2 Nm (25 ± 2 ft-lb)	35 ± 2 Nm (26 ± 2 ft-lb)
11/16-12	40 ± 3 Nm (30 ± 2 ft-lb)	50 ± 4 Nm (37 ± 3 ft-lb)
3/4-16	50 ± 3 Nm (37 ± 2 ft-lb)	65 ± 4 Nm (48 ± 3 ft-lb)
7/8-14	75 ± 5 Nm (55 ± 4 ft-lb)	110 ± 8 Nm (81 ± 6 ft-lb)
1-1/16-12	110 ± 8 Nm (81 ± 6 ft-lb)	140 ± 10 Nm (103 ± 7 ft-lb)
1-5/16-12	160 ± 10 Nm (118 ± 7 ft-lb)	210 ± 15 Nm (155 ± 11 ft-lb)
S (HEAVY-DUTY)		
7/16-20	21 ± 2 Nm (15 ± 2 ft-lb)	23 ± 2 Nm (17 ± 2 ft-lb)
9/16-18	34 ± 2 Nm (25 ± 2 ft-lb)	40 ± 3 Nm (30 ± 2 ft-lb)
11/16-12	40 ± 3 Nm (30 ± 2 ft-lb)	65 ± 4 Nm (48 ± 3 ft-lb)
3/4-16	50 ± 3 Nm (37 ± 2 ft-lb)	80 ± 6 Nm (59 ± 4 ft-lb)
7/8-14	75 ± 5 Nm (55 ± 4 ft-lb)	125 ± 10 Nm (92 ± 7 ft-lb)
1-1/16-12	110 ± 8 Nm (81 ± 6 ft-lb)	185 ± 15 Nm (136 ± 11 ft-lb)
1-5/16-12	160 ± 10 Nm (118 ± 7 ft-lb)	280 ± 20 Nm (207 ± 15 ft-lb)

HYDRAULIC HOSE AND FITTING TIGHTENING PROCEDURE

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

- 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. The seal cannot be reused if the fitting or hose end has been tightened beyond specifications.
- If the seal is to be replaced, lubricate the seal before installation.
- Position the hose and nut squarely on the fitting. Then tighten the nut as required.
- Tighten the nut or fitting to the torque specified in the appropriate table.
- After installation, perform all machine functions and inspect the hose, fittings and related components to confirm there are no leaks.

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 2-12 Fastener Torque Specifications – Metric

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

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

Table 2-13 Bolt Torque Specifications Unified – Thread Standard (UNC)

NOMINAL DIAMETER (IN)	OPPOSITE NUT SIZE (S)	CLASS 5	CLASS 8
1/4-20	7/16"	10 Nm (7 ft-lb)	14 Nm (10 ft-lb)
5/16-18	1/2"	21 Nm (15 ft-lb)	29 Nm (21 ft-lb)
3/8-16	9/16"	37 Nm (27 ft-lb)	51 Nm (38 ft-lb)
7/16-14	5/8"	60 Nm (44 ft-lb)	82 Nm (60 ft-lb)
1/2-13	3/4"	90 Nm (66 ft-lb)	130 Nm (96 ft-lb)
9/16-12	13/16"	130 Nm (96 ft-lb)	180 Nm (133 ft-lb)
5/8-11	15/16"	178 Nm (131 ft-lb)	250 Nm (184 ft-lb)
3/4-10	1-1/8"	315 Nm (232 ft-lb)	445 Nm (328 ft-lb)
7/8-9	-	509 Nm (375 ft-lb)	715 Nm (527 ft-lb)

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

Table 2-14 Bolt Torque Specifications – Thread Standard (UNF)

NOMINAL DIAMETER (IN)	OPPOSITE NUT SIZE (S)	CLASS 5	CLASS 8
1/4-28	7/16"	11.5 Nm (8 ft-lb)	16 Nm (11 ft-lb)
5/16-24	1/2"	23 Nm (17 ft-lb)	32 Nm (24 ft-lb)
3/8-24	9/16"	41 Nm (30 ft-lb)	58 Nm (43 ft-lb)
7/16-20	5/8"	65 Nm (48 ft-lb)	92 Nm (68 ft-lb)
1/2-20	3/4"	100 Nm (74 ft-lb)	145 Nm (107 ft-lb)
9/16-18	13/16"	145 Nm (107 ft-lb)	200 Nm (148 ft-lb)
5/8-18	15/16"	200 Nm (148 ft-lb)	280 Nm (207 ft-lb)
3/4-16	1-1/8"	350 Nm (258 ft-lb)	495 Nm (365 ft-lb)
7/8-14	-	560 Nm (413 ft-lb)	780 Nm (575 ft-lb)

3 SYSTEM DESCRIPTIONS

POWER SYSTEM

The machine is driven by the DC motor (main power).

HYDRAULIC SYSTEM

The machine is driven by a DC motor which drives the oil pump to provide high-pressure oil. The hydraulic system controls the boom movements, turntable rotation and steering.

When the motor operates, the gear pump sends high-pressure oil to the electric proportional flow valve and solenoid directional valve on the boom function manifold to drive the hydraulic actuator to perform different functions.

ELECTRICAL SYSTEM

The electrical system uses eight 6V lead-acid batteries in series or two 24V lithium batteries in series to drive the travel motor and DC motor to perform boom movements, turntable rotation, travel and steer functions, and provides 12V control power for the whole machine through a DC convertor.

The batteries are charged from an external power supply. The machine is equipped with a breaker to protect the control system.

MACHINE CONTROL SYSTEM

The machine functions are controlled by two controllers, one installed on the left side of turntable to control the turntable rotation and boom functions, the other on the platform to control the machine drive, turntable rotation and boom functions. The controller communicates signals through a high-speed data bus.

SAFETY MEASURES

A series of sensors and limit switches provide signals for the controller.

- The level sensor measures the angles along the X-axis and Y-axis of the machine body. In case of angle along the X-axis or Y-axis exceeding 5°, an alarm will sound, and raising, travel and steer functions will be inoperative. For more information, see [B-13 Inspect Tilt Protection System, page 5-17](#).
- The length sensor measures the extending length of the boom, and limits the boom to further extend when the boom extends beyond the maximum horizontal extending length range. For more information, see [B-6 Inspect the Maximum Operating Range Restriction, page 5-13](#).
- The angle sensor measures the luffing angle of the boom, and limits the boom to further luff when the boom luffing exceeds the allowable angle range. For more information, see [B-6 Inspect the Maximum Operating Range Restriction, page 5-13](#).
- The weighing sensor measures the loads on the platform, and limits certain functions when the loads on the platform exceed certain capacity. For more information, see [C-2 Inspect Weighing System, page 5-19](#).

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4 SERVICE AND GUIDELINES

MACHINE PREPARATION, INSPECTION AND MAINTENANCE

GENERAL

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

Machine positions

Operating/raised position :

Main boom telescoping/luffing or foldable boom luffing, and the display indicating the working status.

Non-operating position :

Main boom and foldable boom both retracted to non-working status and the display indicating the non-working status.

Storage/stowed position :

Main boom, foldable boom and jib boom all retracted to storage/stowed status.

Transport position :

Main boom and foldable boom both retracted, jib boom and platform adjusted as necessary for transport by trailer.

PREPARATION, INSPECTION AND MAINTENANCE

It is important to establish and conform to a comprehensive inspection and preventive maintenance program. This manual outlines the scheduled machine inspections and maintenance recommended by Hunan Sinoboom Intelligent Co., Ltd., Consult your national, regional or local regulations for aerial work platforms. The frequency of inspections and maintenance must be increased as environment, severity and frequency of usage requires.

QUALIFIED SINOBOOM EQUIPMENT MECHANIC

Qualified Sinoboom equipment mechanic is a person recognized by Sinoboom as one who, by possession of a recognized degree, certificate, training, has successfully demonstrated the ability and proficiency to service, repair and maintain the subject Sinoboom product model.

PRE-OPERATION INSPECTION

Prior to daily use or work shift of operators, the user or operator should perform a pre-operation inspection. Refer to the *Operation Manual* for the complete procedure for the pre-operation inspection. The *Operation Manual* must be entirely read and understood before performing the pre-operation inspection.

PRE-DELIVERY INSPECTION AND FREQUENT INSPECTION

The pre-delivery inspection shall be performed by qualified Sinoboom equipment mechanic. The pre-delivery inspection and the frequent inspection are performed in the same manner, but at different times. The pre-delivery inspection shall be performed before each sale, lease or rental delivery. The frequent inspection shall be accomplished for each machine in service for 3 months or 150 hours (whichever comes first); out of service for a period of more than 3 months; or when purchased used. The frequency of this inspection must be increased as environment, severity and frequency of usage requires.

Reference the *Prepare the Word Record before Delivery* and *Repair & Inspection Report* for items requiring inspection. Reference the *Inspection Procedures* in appropriate areas of this manual to perform the inspection and maintenance procedures.

ANNUAL MACHINE INSPECTION

The annual machine inspection must be performed on an annual basis, 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,

training, has successfully demonstrated the ability and proficiency to service, repair and maintain the subject Sinoboom product model.

Reference the *Repair & Inspection Report* for items requiring inspection. Reference the *Inspection Procedures* in appropriate areas of this manual to perform the inspection and maintenance procedures.

For the purpose of receiving the safety-related bulletins, it is important that Hunan Sinoboom Intelligent Equipment Co., Ltd. has updated ownership information for each machine. When performing each annual machine inspection, notify Hunan Sinoboom Intelligent Equipment Co., Ltd. of the current machine ownership information.

PREVENTIVE MAINTENANCE

The preventive maintenance must be performed by a qualified Sinoboom equipment mechanic.

Reference the *Repair & Inspection Report* and *Maintenance Schedule* in this manual for the inspection items and intervals. Reference the *Inspection Procedures* in appropriate areas of this manual to perform the inspection and maintenance procedures.

Table 4-1

Type	Frequency	Primary Responsibility	Service Qualification	Reference
Pre-operation Inspection	Prior to use each day; or at each operator change.	User or operator	User or operator	Operation Manual
Pre-delivery Inspection	Prior to each sale, lease or rental delivery.	Owner, dealer or user	Qualified Sinoboom mechanic	Maintenance Manual, Pre-delivery Preparation Form, and Maintenance Inspection Report
Frequent Inspection	In service for 3 months or 150 hours, whichever comes first; or out of service for a period of more than 3 months; or purchased used.	Owner, dealer or user	Qualified Sinoboom mechanic	Maintenance Manual and Maintenance Inspection Report
Annual Machine Inspection	Annually, no later than 13 months from the date of the prior annual inspection.	Owner, dealer or user	Factory-trained service technician	Maintenance Manual, Pre-delivery Preparation Form, and Maintenance Inspection Report
Preventive Maintenance	At intervals as specified in the Maintenance Manual.	Owner, dealer or user	Qualified Sinoboom mechanic	Maintenance Manual, Maintenance Inspection Report, and Maintenance Schedule

STORAGE

Please observe the following recommendations to ensure the best performance of cylinders and avoid corrosion due to an extended period of storage (indoor/outdoor):

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

MAINTENANCE AND SERVICING PRECAUTIONS

GENERAL

This section assists you in the use and application of the maintenance and servicing procedures contained in this manual.

SAFETY AND WORKMANSHIP

Before servicing the machine, take the following preventive measures:

1. Cut off the power source to disable the machine and set up a sign in a readily visible place.
2. Place all controls in OFF position to prevent unintended activation of the controls.
3. Lower the platform to the lowest position if possible, or at least ensure it won't fall off.
4. Before releasing or removing any hydraulic component, dissipate the hydraulic pressure in the hydraulic circuit.

If the machine is not serviced in the state as above for the sake of the particular nature of the maintenance task, it should at least observe the safety rules regarding the maintenance and repair of the machine contained in this manual and the Operation Manual.

Your safety, and that of others, is the first consideration when engaging in the maintenance of equipment. Never attempt to move heavy parts without the aid of a mechanical device. Do not allow heavy objects to rest in an unstable position. When raising a portion of the equipment, ensure that adequate support is provided.

CLEANLINESS

1. The most important single item in preserving the service life of a machine is to keep dirt and foreign materials out of the vital components. Precautions have been taken to safeguard against this. Shields, covers, seals and filters are provided to keep air, fuel and oil supplies clean; however, these items must be maintained on a scheduled basis to function properly.
2. When air, fuel or oil lines are disconnected, clean the adjacent areas as well as the openings and fittings. As soon as a component or line is disconnected, cap or cover all openings to prevent entry of foreign matter.
3. Clean and inspect all parts during servicing and maintenance, and assure that all passages and openings are unobstructed. Cover all parts to keep them clean. Be sure all parts are clean before they are installed. New parts should remain in their containers until they are ready to be used.

COMPONENT REMOVAL AND INSTALLATION

1. Establish as per this manual a safe and reasonable program appropriate to the on-site conditions for installation of the machine.
2. The personnel engaging in disassembly and installation of this machine should be competent in the task and understand how to use the personal protection equipment in a correct manner.
3. The qualified personnel should not install the machine unless a thorough inspection of the ground for installation, the hidden foundation as well as the anchored parts is made or sufficiently evidenced to comply with the manufacturer's requirements.
4. The wind speed at the installation location should not be more than 8.3m/s.
5. Check the on-site conditions like power supply, foundation, track, etc., and install only when all are eligible.
6. All parts should be checked before installation to verify they are in good condition.
7. The high-strength bolts should be tightened as required in this manual.
8. The requirements for the reception of the on-site installed machine are as follows:
 - Conduct the required inspection and function test to confirm the machine is properly installed for the purpose of the particular application and all safety devices operate smoothly.
 - The static and dynamic load tests of the machine suggest a compliance with the relevant standard.

- The qualified personnel should sign on the handover document to evidence the integrity of the machine. All inspection/test results should be documented (including the inspector name, title, organization and date).
9. The disassembly of the machine should also follow the same safety requirements for the installation of the machine.
 10. If mechanical assistance is required for the disassembly of the machine, please choose the suitable lifting points, lifting tools, and lifting equipment according to this manual and the onsite conditions. The lifting equipment that allows adjustment is preferred. All lifting tools (chains, sling, etc.) should be parallel to each other and should better remain vertical to the top of the component being lifted.
 11. Should it be necessary to remove a component on an angle, keep in mind that the capacity of an eyebolt or similar bracket lessens, as the angle between the supporting structure and the component becomes less than 90 degrees.
 12. If a part resists removal, check to see whether all nuts, bolts, cables, brackets, wiring, etc., have been removed and that no adjacent parts are interfacing.

COMPONENT DISASSEMBLY AND ASSEMBLY

When disassembling or reassembling a component, complete the procedural steps in sequence. Do not partially disassemble or assemble one part, then start on another. Always recheck your work to assure that nothing has been overlooked. Do not make any adjustments, other than those recommended, without obtaining proper approval.

SCRAP OF STRUCTURAL PARTS

- When some major component fails to fulfill the safety requirements due to corrosion, wear, etc., it should be refitted or reinforced, otherwise it should be scrapped.
- When the stressed structure suffers a permanent deformation and a repair is impossible, it should be scrapped.
- When the major stressed structure loses stability at large, it should never get repaired and must be scrapped.
- When a crack is present on a structure or a weld, it can be properly reinforced according to the stress and crack conditions, and continued use is only allowed when it meets the original design requirements, otherwise it should be scrapped.

PRESSURE-FIT PARTS

When assembling pressure-fit part, use a molybdenum disulfide base compound or equivalent to lubricate the mating surface.

BEARINGS

1. When a bearing is removed, cover it to keep out dirt and abrasives. Clean bearings in nonflammable cleaning solvent and allow to drip dry. Compressed air can be used but do not spin the bearing.
2. Discard bearings if the races and balls (or rollers) are pitted, scored, or burned.
3. If bearing is found to be serviceable, apply a light coat of oil and wrap it in clean (waxed) paper. Do not unwrap reusable or new bearings until they are ready to install.
4. Lubricate new or used serviceable bearings before installation. When pressing a bearing into a retainer or bore, apply pressure to the outer race. If the bearing is to be installed on a shaft, apply pressure to the inner race.

GASKETS

Check that holes in gaskets align with openings in the mating parts. If it becomes necessary to hand-fabricate a gasket, use gasket material or stock of equivalent material and thickness. Be sure to cut holes in the right location, as blank gaskets can cause serious system damage.

BOLT USAGE AND TORQUE APPLICATION

NOTICE

Self-locking fasteners, such as nylon insert and thread deforming locknuts, are not intended to be reinstalled after removal.

1. Always use new replacement hardware when installing locking fasteners. Use bolts of proper length. A bolt which is too long will bottom before the head is tight against its related part. If a bolt is too short, there will not be enough thread area to engage and hold the part properly. When replacing parts, use only those having the same specifications of the original, or one which is equivalent.
2. Unless specific torque requirements are given within the text, standard torque values should be used on heat-treated bolts, studs, and steel nuts, in

accordance with recommended shop practices.
(See [Fastener Torque Specifications, page 2-13](#))

HYDRAULIC LINES AND ELECTRICAL WIRING

Clearly mark or tag hydraulic lines and electrical wiring, as well as their receptacles, when disconnecting or removing them from the unit. This will assure that they are correctly reinstalled.

HYDRAULIC SYSTEM

1. The primary enemy of a hydraulic system is contamination. Contaminants enter the system by various means, e.g., using inadequate hydraulic oil, allowing moisture, grease, filings, sealing components, sand, etc., to enter when performing maintenance.
2. Keep the system clean. If evidence of metal or rubber particles are found in the hydraulic system, drain and flush the entire system.
3. Disassemble or reassemble parts on clean work surface. Clean all metal parts with non-flammable cleaning solvent. Lubricate components, as required, to aid assembly.

LUBRICATION

Service applicable components with the amount, type, and grade of lubricant recommended in this manual, at the specified intervals. When recommended lubricants are not available, consult your local supplier for an equivalent that meets or exceeds the specifications listed.

BATTERY

Clean battery, using a non-metallic brush and a solution of baking soda and water. Rinse with clean water. After cleaning, thoroughly dry battery and coat terminals with an anti-corrosion compound.

PINS AND COMPOSITE BEARING

1. Pinned joints should be disassembled and inspected if the following occurs:
 - Excessive sloppiness in joints.
 - Noise originating from the joint during operation.

2. The composite bearing should be replaced if the following occurs:
 - Frayed or separated fibers on the liner surface.
 - Cracked or damaged liner backing.
 - Bearing that have moved or spun in their housing.
 - Debris embedded in liner surface.
3. Pins should be replaced if any of the following is observed (pin should be properly cleaned prior to inspection):
 - Detectable wear in the bearing area.
 - Flaking, peeling, scoring, or scratches on the pin surface.
 - Rusting of the pin in the bearing area.
4. Reassembly of pins and composite bearing:
 - Housing should be blown out to remove all dirt and debris. Bearings and bearing housings must be free of all contamination.
 - Bearing/pins should be cleaned with a solvent to remove all grease and oil. The composite bearing is a dry joint and needs no lubricating.
 - Pins should be inspected to ensure it is free of burrs, nicks, and scratches which would damage the bearing during installation and operation.

NOTICE

The 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 at the outside of the connector to prevent short circuit. Besides, the joint between the male and female connectors should also been applied with silicone grease. Other joints that may allow entry 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 solvent is superior to that of water, it is mostly likely that this will occur when using pressure cleaning method to clean the machine.

3. Silicone grease should be applied to each contact of the connectors for battery case 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.

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 pins and female pins.
- Avoiding electrical failure due to low conductivity between the pins in humid environment.

The following procedure should be observed to apply the insulating silicone grease to the electrical connections. The procedure applies 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.

5 MAINTENANCE PROCEDURES

This section provides specific procedures for scheduled maintenance inspection.

**WARNING**

**UNSAFE OPERATION HAZARD**
Improper maintenance may result in death, severe injury or machine damage.

**WARNING**

**HIGH PRESSURE HAZARD**
Before releasing or removing the hydraulic components, release the hydraulic oil pressure in the hydraulic circuit, particularly with the counterweight valve.

Observe the following rules :

- Preventive maintenance procedure should be established by the user according to the manufacturer's recommendations, machine operational environment and intensity of use, which should include both the regular inspection and the annual inspection.
- Professionally trained, qualified personnel must conduct routine maintenance inspections on this machine.
- Daily routine maintenance inspections must occur during normal operation of the machine. Maintenance inspectors must carry out inspection and maintenance according to the repair & inspection report and must complete the repair & inspection report.
- Regular maintenance inspections must occur by operators and at quarterly, biannual and annual intervals by qualified, trained personnel. Qualified, trained personnel must check and maintain the machine according to the repair & inspection report and must complete the repair & inspection report.
- Immediately remove a damaged or malfunctioning machine, mark it and stop using it.
- Repair any damaged or malfunctioning machine before operating it.
- Keep all machine inspection records for at least 10 years or until the machine is no longer in use or as required by machine owner/company/custodian.

- The inspection and maintenance intervals depend on the manufacturer's recommendations, and should also be appropriate to the operational conditions and environment.
- Conduct a quarterly inspection on machines that have been out of service for a period lasting longer than three months.
- While maintaining the machine, replace any parts on the machine using the same parts or the same parts of the original machine.
- Unless otherwise specified, perform the maintenance procedures according the following terms and conditions:
 - Park the machine on flat, level and solid ground.
 - Place the machine in non-operating position.
 - Turn the key switch on ground controller to OFF position and remove the key to prevent unauthorized use of the machine.
 - Pull out the red emergency stop buttons on ground and platform controls to OFF position to avoid unintended start-up of the operating system.
 - Turn off the main power switch.
 - Disconnect all DC power supply.
 - Lock all wheels to prevent movement of the machine.

CONDUCTING A PRE-DELIVERY INSPECTION

When the machine owner/company changes, in addition to conducting a pre-delivery inspection, the corresponding inspection shall be carried out according to the maintenance schedule requirement and repair & inspection report. When conducting a pre-delivery inspection, comply with the following requirements:

1. It is the responsibility of the machine owner/company to perform a pre-delivery inspection.
2. Follow this procedure each time before delivery. Performing a pre-delivery inspection could reveal potential problems with the machine before you begin putting the machine into service.
3. Never use a damaged or malfunctioning machine. Tag the machine and do not use it.

4. Only professionally trained, qualified personnel may repair the machine and must follow the procedures as stated in *operation manual* and *maintenance manual*.
5. A competent operator must conduct daily maintenance on this machine as stated in *operation manual* and *maintenance manual*.

Before delivering the machine, complete the following record using these instructions:

1. Prepare the machine before delivery, which includes performing a pre-delivery inspection, following maintenance procedures and performing functional inspections.
2. Use the following table to note the results. After each section is complete, mark the appropriate box.
3. Record the inspection results. If any inspection results are "NO", the machine must be stopped and re-inspected after repair is completed and marked in the box marked "inspection".

Table 5-1

PREPARE THE WORK RECORD BEFORE DELIVERY			
Model			
Serial No.			
Inspection Item	YES/Machine is in Good Condition	NO/Machine Has Damage or Malfunction	REPAIRED/Machine Has Been Repaired
Pre-operational Inspection			
Maintenance Procedure			
Functional Inspection			
Machine Buyer/ Renter			
Inspector Signature			
Inspector Title			
Inspector Company			

FOLLOWING A MAINTENANCE SCHEDULE

Regular maintenance inspections must occur daily, quarterly, biannually (every 6 months) and annually, and must be performed by the personnel qualified in the maintenance and service of the machine models involved. Use the table to help you adhere to a routine maintenance schedule.

Table 5-2

INSPECTION INTERVAL	INSPECTION PROCEDURES
Every day or every 8 hours	A
Every quarter or every 250 hours	A+B
Every half a year or every 500 hours	A+B+C
Every year or every 1000 hours	A+B+C+D

COMPLETING A REPAIR & INSPECTION REPORT

1. Divide the Repair & Inspection Report into four sections (A, B, C and D) according to the time requirements of the maintenance schedule and the maintenance procedure requirements.
2. The Repair & Inspection Report shall include the inspection table of each regular inspection.
3. Duplicate the Repair & Inspection Report for each inspection. Store the completed tables for 10 years or until the machine is no longer in use or as required by machine owner/company/custodian.
4. Use the following table to note the results. After each section is complete, mark the appropriate box.
5. Record the inspection results. If any inspection results are "NO", the machine must be stopped, and re-inspected after repair is completed, and the box marked "REPAIRED" shall be checked. Select the appropriate inspection procedure based on the inspection type.

Table 5-3

REPAIR & INSPECTION REPORT				
Model				
Serial No.				
Checklist A Procedures				
Items	YES/Machine is in Good Condition	NO/Machine Has Damage or Malfunction	REPAIRED/Machine Has Been Repaired	Problem Description
A-1 Inspect All Manuals				
A-2 Inspect All Decals				
A-3 Inspect Damaged, Loose or Lost Parts				
A-4 Inspect Hydraulic Oil Level				
A-5 Inspect Hydraulic Oil Leakage				
A-6 Functional Tests				
A-7 Perform Maintenance after 30 Days				
A-8 Check Battery Level				
Checklist B Procedures				
Items	YES/Machine is in Good Condition	NO/Machine Has Damage or Malfunction	REPAIRED/Machine Has Been Repaired	Problem Description
B-1 Inspect Electrical Wiring				
B-2 Inspect the Battery				
B-3 Inspect Rim, Tire and Fasteners				
B-4 Inspect Hydraulic Oil				
B-5 Inspect and Replace Return Filter Element				
B-6 Inspect Maximum Operating Range				
B-7 Inspect Slewing Bearing Bolts				
B-8 Lubricate Slewing Bearing				
B-9 Inspect Air filter of Hydraulic Tank				
B-10 Replace High-Pressure Filter				

REPAIR & INSPECTION REPORT				
B-11 Inspect Drive Reducer Oil Level				
B-12 Inspect Platform Rotate Cylinder Fasteners				
B-13 Test Tilt Protection System				
B-14 Test Drive Speed				
B-15 Test Emergency Lowering Function				
B-16 Test Cylinder Drift				
B-17 Test Braking Distance				
Checklist C Procedures				
Items	YES/Machine is in Good Condition	NO/Machine Has Damage or Malfunction	REPAIRED/Machine Has Been Repaired	Problem Description
C-1 Replace Hydraulic Oil Tank Air Filter				
C-2 Test Weighing System				
Checklist D Procedures				
Items	YES/Machine is in Good Condition	NO/Machine Has Damage or Malfunction	REPAIRED/Machine Has Been Repaired	Problem Description
D-1 Inspect Boom Wear Pads				
D-2 Replace Drive Reducer Gear Oil				
D-3 Replace Hydraulic Oil				
D-4 Replace Hydraulic Tank Suction Filter				
User Inspector Signature Inspection Date Inspector Title Inspector Company				

MAJOR MODIFICATION AND REPAIR RECORD

1. A major modification/repair is a modification/repair made to all or part of a machine that affects the stability, strength or performance of the machine.
2. Each time the machine owner/company makes a major modification/repair to the machine, it should be documented using the form below. Keep the form properly until the machine is taken out of service, or as requested by the machine owner/company.
3. Major modifications/repairs to the machine must be performed by a qualified service technician.
4. The machine must be inspected and verified after major modifications/repairs, with the inspection items including but not limited to all items in the maintenance and inspection report.
5. If the inspection result of each item in the Maintenance and Inspection Report is "YES", the "Machine Status after Modification/Repair" in the form will be "Good" and the machine can be used. If either inspection result is "NO", the machine must be re-inspected after the repair is completed until the machine is in "Good" condition before continuing to use the machine.

Table 5-4

Major Modification and Repair Record					
Model					
Serial No.					
Date	Problem Description	Modification/Repair Item	Machine Status after Change	Repairman's Company and Position	Repairman Signature

CHECKLIST A PROCEDURES

A-1 Inspect All Manuals

Keeping the *Operation Manual* and *Maintenance Manual* in appropriate place is vital to safe machine operation. The manuals should be kept at all times in the manual storage container on the platform. If the manual is missing or illegible, it will fail to provide the information necessary for safe machine operation.

- Verify the manual storage container is properly installed on the platform.
- Verify the *Operation Manual* and *Maintenance Manual* are in good condition and placed inside the storage container.
- Verify each page of the manuals is legible and intact.
- Return the manual to the storage container after each use.

Note: If the manuals need to be replaced, please contact Hunan Sinoboom Intelligent Equipment Co., Ltd..

A-2 Inspect All Decals

Ensuring all decals in good condition is vital to safe machine operation. Decals serve not only to alert the operator to potential hazards but also to provide the user with information regarding operation and maintenance. An illegible decal will fail to provide correct instructions for the operator, which may lead to the occurrence of unsafe operation.

- Refer to the Decals/Nameplate Inspection in *Operation Manual* and use the list and chart of decals to determine the correct location of a decal.
- Verify all decals are legible and free of damage, and replace in time if necessary.

Note: If the decals on the machine need to be replaced, please contact Hunan Sinoboom Intelligent Equipment Co., Ltd..

A-3 Inspect Damaged, Loose or Lost Parts

Before each use or work shift, check the machine for any damaged, improperly installed, loose or lost parts and unauthorized changes:

- Electrical components, wirings, cables and safety ropes

- Hydraulic hoses & fittings, hydraulic cylinder and valve block
- hydraulic tank
- Storage battery pack and its connection
- Drive motor & brake
- Turntable swing motor and hydraulic pump
- Boom wear pads and telescopic axle wear pads
- Limit switch and horn
- Tire and rim
- Alarms and lighting (if equipped)
- Platform (including rails, floor plate, safety lock, brackets and entry door)
- Personal protection equipment
- Emergency control equipment
- Operation instructions, warning and control decals
- Structure and welding cracks
- Nuts, bolts and other fasteners

NOTICE

If damaged parts, incorrect installation or missing parts are discovered, please replace immediately and install correctly; if the fasteners are found detached or loose, please secure immediately.

A-4 Inspect Hydraulic Oil Level

Ensuring appropriate hydraulic oil level is vital to proper operation of the machine. If too high, the oil will spill out from the oil tank during machine operation, if too low, the oil pump will suction air and damage hydraulic components. Performing daily inspection of the hydraulic oil level will help you determine if a problem exists in the hydraulic system.

Perform the following procedures with the boom in stowed position:

1. Open the left turntable cover to make visual inspection of the sides of hydraulic tank, the hydraulic oil level should be within the marking range of oil level indicator.

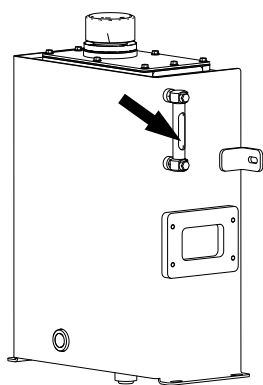


Figure 5-1

2. Ensure the hydraulic tank body and its connections are free of leaks.
3. Add oil as needed. Never overfill the tank.

Table 5-5

CUSTOMER REQUIREMENTS	HYDRAULIC OIL MARK
Normal-temperature region 0°C to 40°C (32°F to 104°F)	L-HV32
Cold region -25°C to 25°C (-13°F to 77°F)	L-HV32
High-temperature region greater than 40°C (104°F)	L-HM68
Extremely cold region less than -30°C (-22°F)	Special programmes need to be identified.

NOTICE

Different hydraulic oils can be added according to customer requirements upon factory delivery, but cannot be mixed.

A-5 Inspect Hydraulic Leakage

Preventing the hydraulic oil from leaking is vital to safe and normal machine operation. If the hydraulic leaks fail to be discovered, it will lead to hazardous situations, reduce the machine performance and damage components.

Inspect the area on or around the following components for hydraulic spill, dripping or residues:

- Hydraulic tank, filters, hoses, fittings, and emergency power unit
- All hydraulic cylinders, manifolds and pumps
- Boom
- Slewing bearing
- Drive chassis
- Areas around the machine

A-6 Functional Tests

Testing each machine function is vital to safe machine operation. If any function operates improperly, it will pose dangers to safe operation. Ensure any function operates smoothly and reliably, without shaking, sharp or unusual noise.



WARNING

UNSAFE OPERATION HAZARD



Be sure to observe the instructions and safety rules noted in this manual and *Operation Manual*, otherwise it may lead to death or severe injury.

For the specific procedure for function tests, please reference the Pre-operation Function Test section in *Operation Manual*. Before performing the function test, ensure that the safety rules in the operation manual are fully read and understood.

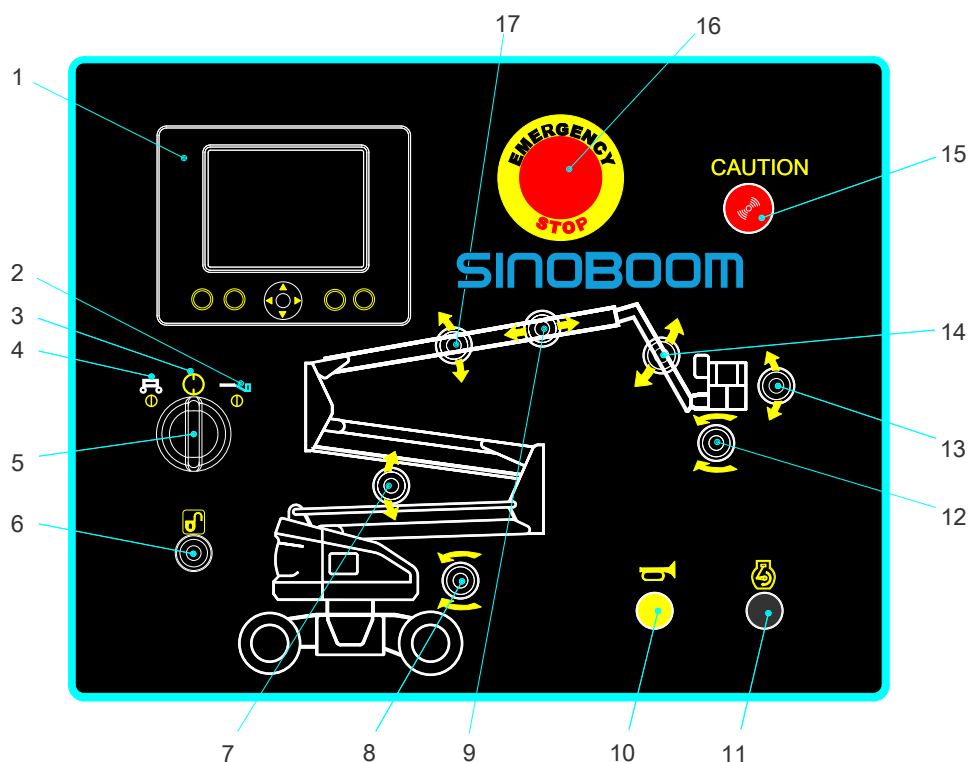


Figure 5-2 Ground Controller

Table 5-6

1. Display screen (see the figure and table below)	7. Foldable boom up/down switch	13. Platform leveling switch
2. Platform control	8. Turntable rotate function button	14. Jib boom up/down function button
3. Off position	9. Main boom telescoping switch	15. Buzzer
4. Ground control position	10. Horn	16. Emergency stop button
5. Key switch (ground/platform control select switch)	11. Petrol generator switch (if equipped with a generator)	17. Main boom up/down switch
6. Enable switch	12. Platform rotation switch	

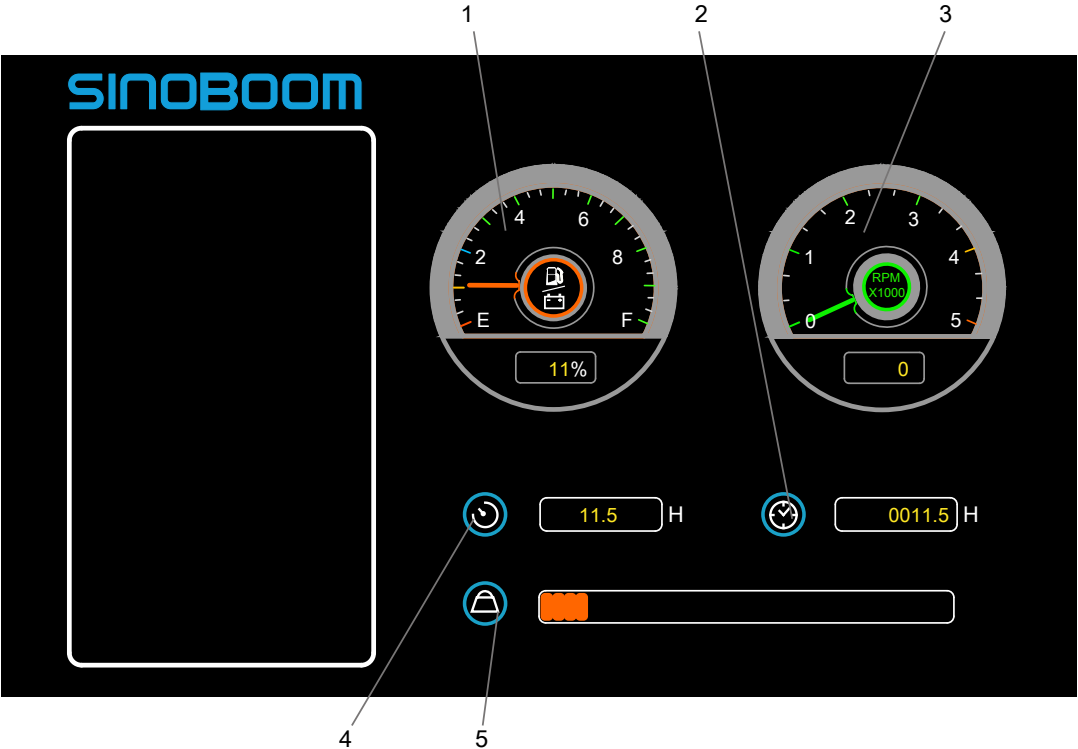


Figure 5-3 Turntable controller screen

Table 5-7

1. Diesel oil gauge/battery indicator	3.Tachometer	5.Platform load
2.Cumulative working hours	4.Current working hours	

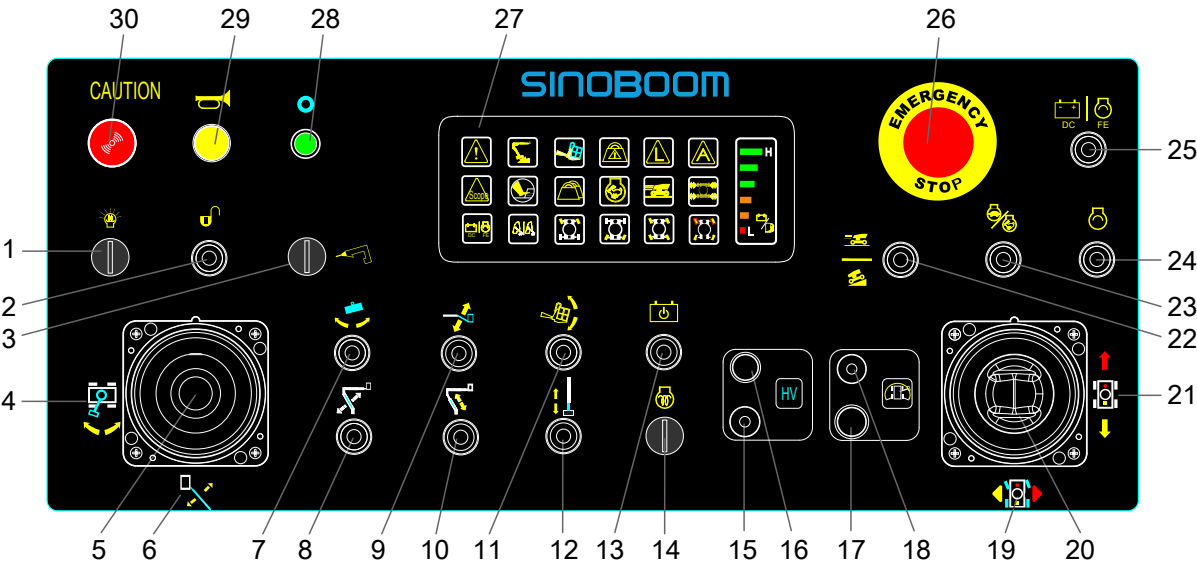


Figure 5-4 Platform controller

Table 5-8

1. Working light switch (if equipped)	11. Platform leveling switch	21. Drive direction control
2. Anti-pinch/soft touch unlock switch (if equipped)	12. Main boom telescoping switch	22. Drive high/low speed select switch
3. Hydraulic generator switch (if equipped)	13. Unused	23. Unused
4. Turntable rotation direction proportional control	14. Unused	24. Unused
5. Main boom up/down/turntable slewing proportional control handle	15. Unused	25. Unused
6. Main boom up/down proportional control	16. Unused	26. Emergency stop switch
7. Platform rotate switch	17. Rear position travel drive switch	27. Fault panel indicator light
8. Articulating boom up/down switch	18. Rear position indicator light	28. Power indicator light
9. Jib up/down switch	19. Steer direction proportional control	29. Horn button
10. Unused	20. Drive/steer proportional control handle	30. Buzzer

A-7 Perform Maintenance after 30 Days

Perform maintenance on a new machine after the machine is operated for 30 days or 50 hours. After performing the 30-day maintenance, continue performing maintenance as scheduled.

Perform the following procedures :

- B-3 Inspect rims, tires and fasteners
- B-5 Inspect and replace return filter
- B-7 Inspect slewing bearing bolts
- B-12 Inspect platform rotate cylinder fasteners

A-8 Check Battery Level

1. Turn the ground/platform select switch at the ground controller to the ground control position, pull out the emergency stop button on the ground controller to the ON position, and then turn the key switch at the ground controller to the ON position, then the display panel of the ground controller will display the battery level in percentage.

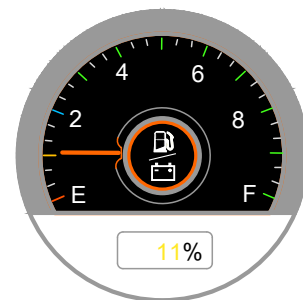


Figure 5-5

2. Or turn the ground/platform select switch at the ground controller to the platform control position, pull out the emergency stop button at the ground controller and platform controller to the ON position, and then turn the key switch at the ground controller to the ON position, then the display panel of the platform controller will display the battery capacity with progress bar.

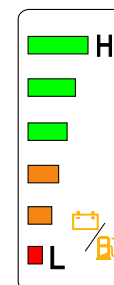


Figure 5-6

NOTICE

When the battery level is about 20%, the battery must be charged. It is forbidden to charge the battery after the it runs out.

CHECKLIST B PROCEDURES

B-1 Inspect Electrical Wiring

Maintaining electrical wiring in good condition is vital to safe operation and good machine performance. Continued use of the machine with damaged electrical wiring or in corrosive environment will cause severe injury. Before operating the machine, be sure to replace or repair the damaged or corroded electrical wires.

WARNING

ELECTROCUTION HAZARD



Before inspecting the electrical wires, be sure to disconnect the battery and the charger on the AC outlet. Contact with hot or live circuits could result in death or serious injury.

1. Inspect the following areas for damage or corrosion :
 - Turntable manifold harness
 - Ground controller
 - Platform controller
2. Check the cable track system for damaged or corrosive wiring.
3. Inspect each flexible joint to be free of loosening, and each sensor wiring free of damage.

B-2 Inspect the battery

The condition of the battery affects the performance of the machine. Improper levels of battery electrolyte or damaged cable and wiring may damage battery parts and may lead to dangerous conditions.

WARNING

ELECTROCUTION HAZARD



- Contact with live circuit may cause serious injury or death. Be sure to wear goggles, gloves and protective clothing.
- Remove all rings, watches and other jewelry.

WARNING

CHEMICAL BURN HAZARD



- Avoid the battery acid escaping out and contact with skin, If so, clean with large amount of clear water and seek medical assistance.
- If battery acid spills, use water mixed with bicarbonate (baking soda) to neutralize the acid.

Note : Before performing this procedure, fully charge the battery, and hold it still for 24 hours to equalize the battery cells.

1. Ensure the battery cells are wire reliably with the locking nuts torqued to the specifications as below:

Nut type	Torque
M8	9 ~ 11Nm (6.6 ~ 8.1ft-lb)
M10	18 ~ 23Nm (13.2 ~ 17ft-lb)

NOTICE

Improper connection may cause reduced performance, damaged terminals, fusions and even fires.

2. Ensure the battery negative and positive poles are correctly connected.
3. Ensure the battery connections are not corroded.

Note: Adding a terminal protector and anti-corrosion agent will prevent the terminals from corrosion.

The instructions below are applied only for batteries requiring maintenance :

4. Wear goggles, gloves and protective clothing.
5. Remove the ventilation cover.

6. Fill up the liquid gravity meter and drain it for two or three times, then take a sample from the battery electrolyte.
7. Measure the gravity of all battery cells successively and note down the readings.
8. If the ambient temperature is above 27°C(80°F), add 0.004 to calibrate the gravity reading for every 5°C(40°F) higher; if the ambient temperature is below 27°C(80°F), minus 0.004 to calibrate the gravity reading for every 5°C(40°F) lower;
 - Result 1: if the gravity readings of all battery cells are 1.250 or higher, and the difference of the gravity readings is less than 0.050, proceed with the next step.
 - Result 2 : if the gravity readings of one or more battery cells are below 1.250, it indicates the battery is running low and needs charging. After charging, measure the gravity reading, if it meets the Result 1, proceed with the next step.
 - Result 3 : if the difference in the gravity readings between any battery cells is greater than 0.050, equalize the battery pack and hold it still for 6 hours before re-measurement of the gravity readings, if satisfying the Result 1, proceed with the next step.

Note: if the Result 1 cannot be met even after many attempts, the battery may have malfunctions.

9. Check the battery electrolyte level, add distilled water to the required level if needed.
10. Install the ventilation cover to the battery.

B-3 Inspect Rim, Tire and Fasteners

Good maintenance of rims and tires is vital to safe machine operation. The machine might tip over if the rim or the tire has problems. Repair any problems with the rims and tires before operating the machine.

The machine is equipped with solid tires that do not need to be inflated.

1. Inspect the tires on a daily basis for damage or excessive wear. If any of the following condition occurs, immediately remove the machine from service and replace tires or tire assembly (including rims). For the requirements and procedure for the replacement, please reference [Tires and Rims, page 6-8](#).
 - Play separation of tires, i.e., circumferential rips or lamination occurring to in between the rubbers.
 - Detachment from rims: the rubber comes off from the steel rims.
 - Rubber surface locally peeling off in lumps.
 - Rubber cracks in radial direction.

- Rubber worn to the wear mark.
2. Inspect the lug nuts are torqued to specification (300Nm[221.5ft-lb]).

NOTICE

Tighten the lug nuts prior to the first use or after each tire removal, and inspect and torque them every 3 months or 150 hours of operation.

B-4 Inspect Hydraulic Oil

Inspecting and replacing the hydraulic oil is vital to proper machine operation and extending service life. The machine may be unable to operate properly if the hydraulic oil with unqualified cleanliness, and the hydraulic parts may be damaged if using contaminated oil. Replace the hydraulic oil often, especially when the service environment is very harsh.

Note: Due to wear and tear on the mesh components, metal particles may appear in the hydraulic fluid or filter of the new machine.



WARNING

BURN HAZARD



Before maintaining the hydraulic system, allow the hydraulic fluid to cool to room temperature.

Replace the hydraulic oil if any of the following conditions exist :

- The hydraulic oil is milky white and cloudy.
- The hydraulic oil is blackened.
- Obtain a sample of the hydraulic oil and inspect it in sunlight. Rub the oil between two fingers to determine if it contains metal particles.
- The hydraulic oil has an abnormal smell.

See [D-3 Replace Hydraulic Oil, page 5-21](#) for the replacement steps.

B-5 Inspect and Replace Return Filter Element

Replacing the return filter on a regular basis is vital to proper machine operation and extending service life. A filter with unqualified cleanliness or blocked filter could cause damage to the machine components. Replace the return filter element more frequently in harsh environments.

⚠ WARNING

BURN HAZARD



Allow the hydraulic oil to cool down to room temperature before servicing the hydraulic system.

NOTICE

Shut off the machine before inspection.

1. Open the right side cover of the turntable to locate the return filter.

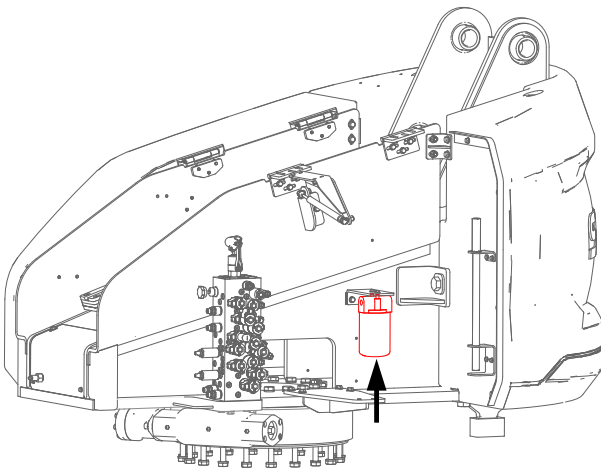


Figure 5-7

2. Place a proper container under the filter.
3. Remove the return filter from the mounting bracket.

⚠ WARNING

HIGH PRESSURE HAZARD



Slowly remove the hydraulic components to reduce hydraulic oil pressure. High-pressure hydraulic oil could penetrate the skin. Seek medical attention immediately.

4. Install a new element, and then re-install the return filter.
5. Clean the oil that may spill during the procedure.
6. Start the machine from the ground controller.
7. Verify that the filter and hydraulic components are free of leaks.

B-6 Inspect the Maximum Operating Range Restriction

Regular inspection of maximum operating range restriction is vital to the safe operation of the machine.

Inspect the maximum horizontal extending length

0kg ≤ platform loading capacity ≤ 230kg (507 lb)

1. Turn the ground/platform select switch on the ground controller leftwards to the ground control position.
2. Push the emergency stop button on the ground controller to the position ON.
3. Use the foldable boom luffing function to adjust the foldable boom to the maximum angle.
4. Use the main boom telescoping function to extend the boom.
5. GTZZ14EJ: the boom will stop when it reaches the farthest position (with the length of 7.6m), and then the upper and lower buzzers will sound, the boom can't be further extended or changed in angle but can be retracted, and the turntable can be slowly rotated.
6. GTZZ16EJ: the boom will stop when it reaches the farthest position (with the length of 9.3m), and then the upper and lower buzzers will sound, the boom can't be further extended or changed in angle but can be retracted, and the turntable can be slowly rotated.
7. Retract the boom using the main boom telescoping function.
8. The boom can be retracted in place.

Inspect the maximum luffing angle of main boom

1. Turn the ground/platform select switch on the ground controller leftwards to the ground control position.
2. Push the emergency stop button on the ground controller to the position ON.
3. Use the foldable boom luffing function to adjust the foldable boom to the maximum angle.
4. Adjust the main boom to the horizontal position and the jib upwards to the highest position using the main boom luffing and jib up/down functions respectively.
5. Adjust the main boom to the maximum angle using the main boom luffing function.
6. The main boom will stop luffing when it reaches the maximum angle ($72^{\circ}[\pm 1^{\circ}]$).
7. The main boom will stop luffing when it reaches the minimum angle ($0^{\circ}[\pm 1^{\circ}]$).
8. Retract and luff the boom downwards using the boom telescoping function and boom luffing function respectively.
9. The boom can be retracted in place.

Note: The maximum allowable tolerance of the angle sensor in the whole range of measurement shall be no greater than 0.5° .

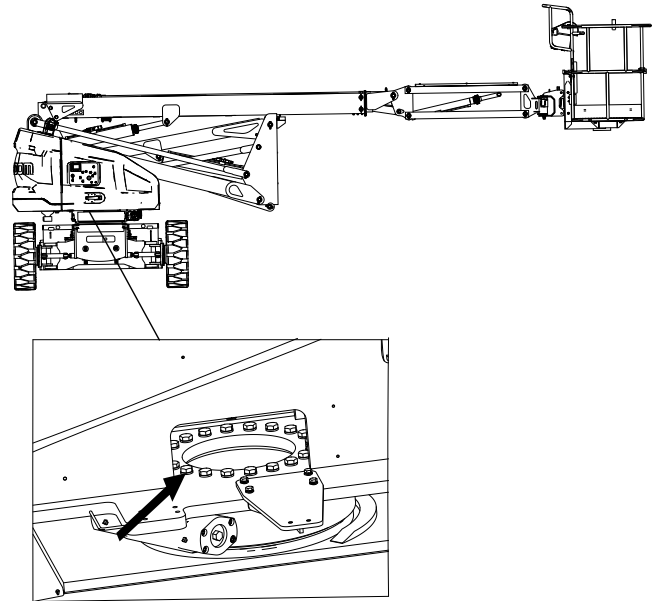


Figure 5-9

1. Fully retract the foldable boom, fully extend main boom, and fully lift the jib boom.
2. Locate the connecting bolts between chassis and slewing bearing.
3. As indicated by the arrow [Fig 5-7 , page 5-14](#), insert 0.04mm feeler gauge in between the bolt and washer.
4. Ensure the feeler gauge won't go through the outside of bolt head to the bolt shank.
5. Rotate the turntable to inspect all the bolts.

Inspecting the connecting bolts between turntable and slewing bearing

B-7 Inspect Slewing Bearing Bolts

Regularly inspecting the slewing bearing bolts is vital to proper machine operation. This inspection should be performed after the first 50 hours of operation and every 600 hours thereafter. If the bolts come off or get loose, replace with new ones. Apply threadlocker Loctite 272 to the new bolts and torque to specification. After the bolts are replaced and torqued, re-inspect the bolts for tightness.

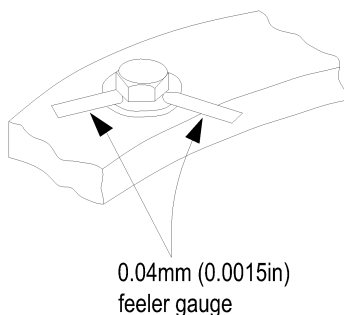


Figure 5-8

Inspecting the connecting bolts between chassis and slewing bearing

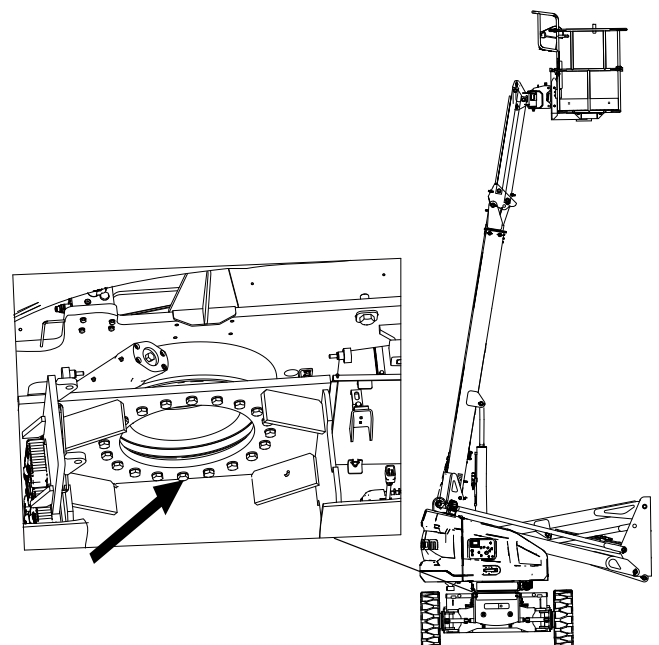


Figure 5-10

1. Fully retract the foldable boom, fully retract main boom and raise it to full height, and fully lift the jib boom.
2. Locate the connecting bolts between turntable and slewing bearing.
3. As indicated by the arrow **Fig 5-7 , page 5-14**, insert 0.04mm feeler gauge in between the bolt and washer.
4. Ensure the feeler gauge won't go through the outside of bolt head to the bolt shank.
5. Lower the main boom to horizontal position, and fully extend the main boom.
6. As indicated by the arrow **Fig 5-7 , page 5-14**, insert 0.04mm feeler gauge in between the bolt and washer.
7. Ensure the feeler gauge won't go through the outside of bolt head to the bolt shank.

B-8 Lubricate Slewing Bearing

Regularly lubricating the slewing bearing with a long distance is vital to proper machine operation. The Lubricating frequency and the amount of lubricant used should be increased if the machine is operated on successive work shifts or in hostile environment.

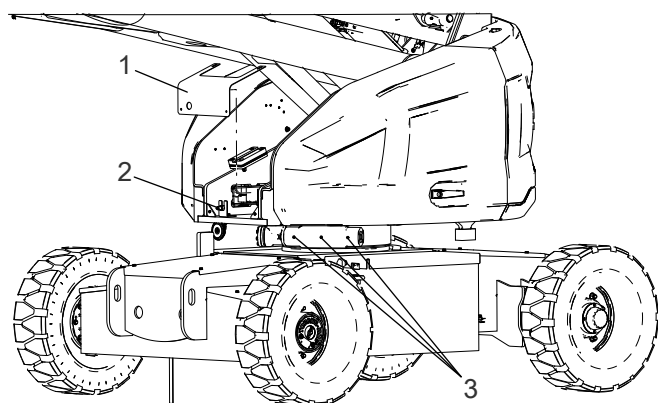


Figure 5-11

Table 5-9

No.	Description
1	Cover plate
2	Grease nipple
3	Grease nipple

1. To grease the slewing bearing with a long distance

- Remove the cover plate #1 as shown in the figure
 - Lube point: 1 grease nipple (#2)
 - Amount: as needed
 - Lubricant: ZL-3 lithium based grease
 - Interval: quarterly or every 150 hours of operation
2. To grease the reducer
 - Lube point: 3 grease nipple (#3)
 - Amount: as needed
 - Lubricant: ZL-3 lithium based grease
 - Interval: quarterly or every 150 hours of operation

B-9 Inspect Air filter of Hydraulic Tank

Keeping the breather cap of hydraulic tank in well-ventilated condition is vital to normal operation of hydraulic pump and extending service life. Unqualified cleanliness or blocked air filter of hydraulic tank may cause the hydraulic pump to suction improperly, and continued operation may result in component damage. The air filter of hydraulic tank should be inspected more often in extremely harsh operating environment.

NOTICE

Shut off the machine before inspection.

1. Remove the air filter of hydraulic tank.

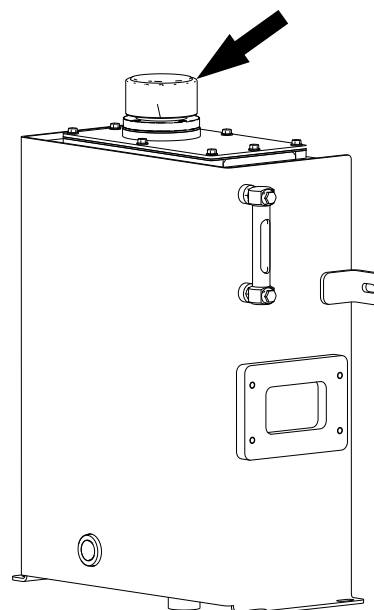


Figure 5-12

2. Check the air filter of hydraulic tank.
3. The air should pass through the air filter smoothly.
4. If the air has difficulty in passing through the air filter, observe the following steps to clean the air filter.
5. Use neutral solvent to clean the air filter, then blow dry and repeat the Step 2.
6. Install the air filter back to the hydraulic tank.

B-10 Replace High-Pressure Filter

Replacing high-pressure filter on a regular basis is vital to proper machine operation and extending service life. A unqualified cleanliness or blocked filter could cause the machine to work improperly, and continued operation may result in component damage. The high-pressure filter should be replaced more often in extremely harsh operating environment.

⚠ WARNING

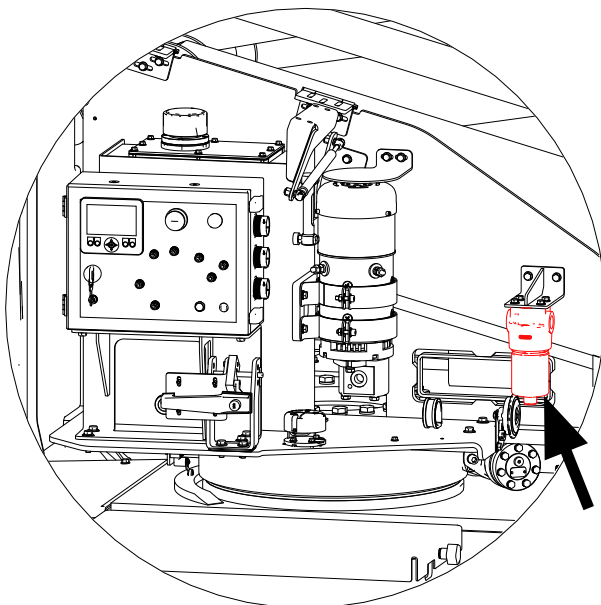


BURN HAZARD

Be cautious of hot hydraulic oil. Bodily contact with hot hydraulic oil may result in severe burn.

NOTICE

Shut off the machine before inspection.



1. Open the left side cover of turntable, and locate the high-pressure filter.
2. Place a suitable vessel under the filter.

3. Remove the filter from the mounting bracket.
4. Replace the filter element as needed.
5. Clean up the hydraulic oil spills.
6. Start the machine from the ground controller.
7. Inspect the high-pressure filter and relevant components for leakage.

B-11 Inspect Drive Reducer Oil Level

Inappropriate gear oil level of drive reducers will reduce the machine performance, and continued use could result in component damage.

1. Drive the machine to rotate the reducer until one bolt at top and the other one at 90 degrees, as shown in the figure below.

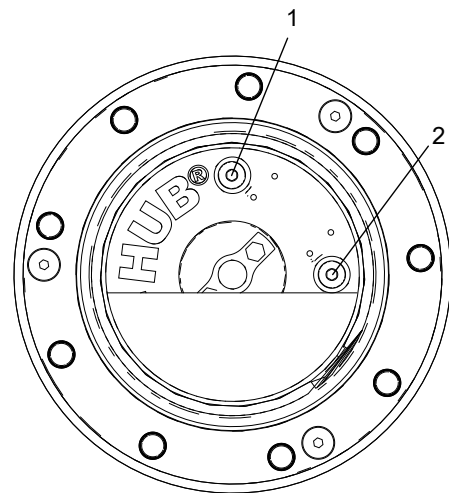


Figure 5-13

2. Remove the bolt #2, and check the oil level.
3. The oil level should be even with the bolt hole.
4. If necessary, add oil to the bolt hole.
5. Remove the bolt #1, add gear oil to the bolt hole #1 until the oil level is even with that of the bolt hole #2.
6. Install the bolts back.
7. Clean up the gear oil spills during the inspection.
8. Perform this inspection procedure to all drive reducers of the machine.

B-12 Inspect Platform Rotate Cylinder Fasteners

Regularly inspecting the platform rotate cylinder fasteners is vital to proper and safe machine operation.

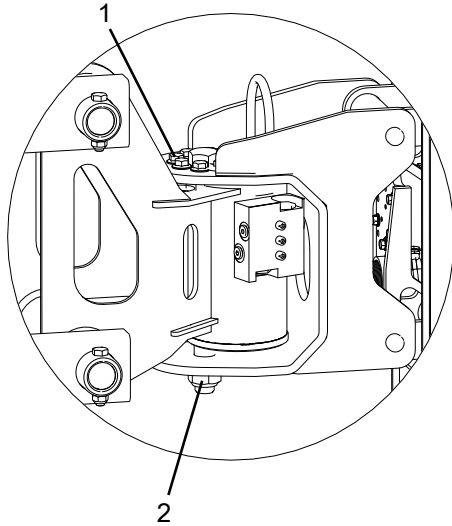


Figure 5-14

1. Place the machine in stowed position.
2. Locate the platform rotate motor.
3. Inspect whether the bolt #1 as indicated in the above figure is properly torqued to specification (70Nm[52ft-lb]).
4. If necessary, replace the bolt, torque to specified value, and apply threadlocker Loctite 272.
5. Inspect whether the bolt #2 as indicated in the above figure is properly torqued to specification (600Nm[443ft-lb]).
6. If the bolt needs to be replaced, be sure to torque to specification.

B-13 Inspect Tilt Protection System

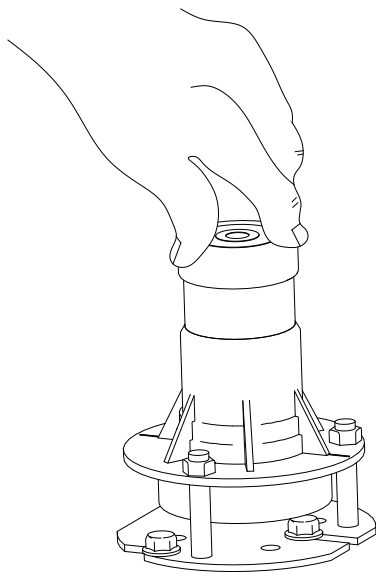


Figure 5-15

1. Turn the Ground/Platform select switch to the ground control position.
2. Pull out the emergency stop button on the ground controller to the ON position.
3. With the machine in non-operating position, flip the level switch to exceed 5° in X (left-to-right)/Y (front-to-back) direction.
4. The tilt alarm sounds and the chassis tilt indicator light flashes, no functions are restricted.
5. With the machine in operating position, flip the level switch to exceed 5° in X (left-to-right)/Y (front-to-back) direction.
6. The tilt alarm sounds and the chassis tilt indicator light flashes, some functions are restricted, but the boom retracting, lowering and turntable rotating are allowed.
7. With the machine in non-operating position, place two wooden blocks under the two wheels on the front or back side of the machine, and then drive the machine onto the two wooden blocks. The wooden block should measure 750mm L×250mm W×166mm H.
8. The tilt alarm sounds and the chassis tilt indicator light flashes, no functions are restricted.
9. Drive the machine off the blocks, extend the telescopic boom by slightly over 1.2m (3.9ft) or raise/lower the foldable boom by slightly over 15°.
10. place these two wooden blocks under the two wheels on the front or back side of the machine, and then drive the machine onto the two wooden blocks.
11. The tilt alarm sounds and the chassis tilt indicator light flashes, some functions are restricted, but the boom retracting, lowering and turntable rotating are allowed.
12. Retract and lower the boom, drive off the machine in non-operating position and remove the wooden blocks.

B-14 Test Drive Speed

1. Turn the Ground/Platform select switch on the ground controller to the platform position.
2. Pull out the emergency stop buttons on both the ground and platform controllers to the ON position.
3. Depress the footswitch.
4. Slowly push forward the drive/steer control handle to full drive speed.
5. Move upward the drive high/low speed select switch on the platform controller to select the drive high speed.

6. The test results are shown in the table below:

Table 5-10

State	Max drive speed
Non-operating	0.8km/h (0.5 mph)
Operating	5.2km/h (3.2 mph)

NOTICE

If the drive speed exceeds the test results as shown above by 10%, please immediately remove the machine from service and have it tagged.

B-15 Test Emergency Lowering Function

1. Turn the Ground/Platform select switch on the ground controller to the ground control position.
2. Pull out the emergency stop button on the ground controller to the ON position.
3. Operate the boom function switches on turntable controller to raise the platform to a certain height.
4. Operate as indicated by the emergency decent decal.

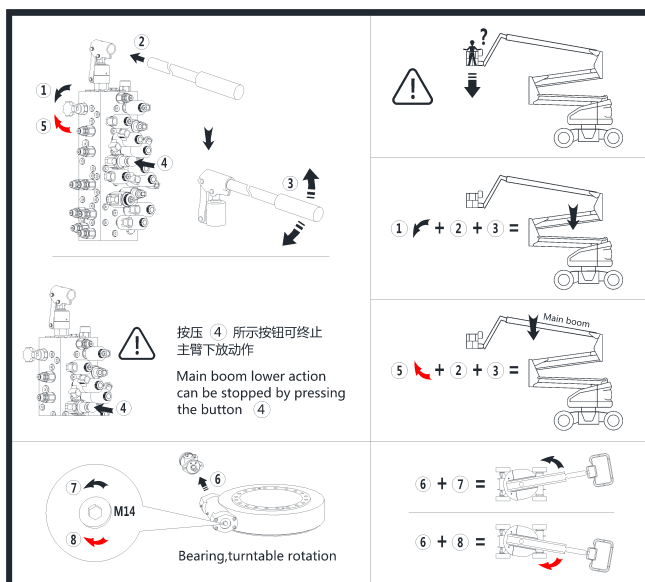


Figure 5-16

B-16 Test Cylinder Drift

Platform drift

Measuring the drift from platform to ground: with rated load on platform and power off, fully extend the main boom. The maximum allowable drift in 10 minutes is 50mm (1.97 in). If the test result exceeds this value, please proceed as below.

Cylinder drift

Table 5-11

Cylinder Bore Diameter (mm/in)	Maximum Allowable Drift in 10 Minutes (mm/in)
63/2.48	0.96/0.037
80/3.15	0.63/0.025
100/3.94	0.39/0.015
125/4.92	0.23/0.009
160/6.30	0.14/0.006
180/7.09	0.13/0.005
200/7.87	0.10/0.0038
220/8.66	0.08/0.0030

- Measure drift at cylinder rod with a calibrated dial indicator.
- The oil in cylinder must be at ambient temperature and consistent.
- The cylinder must be applied with normal load from the platform.
- The cylinder is acceptable if it passes this test.

NOTE: This information is based on 6 drops per minute cylinder leakage. Since the hydraulic oil expands or contracts due to thermal effect, thus the test value of cylinder drift may have a tolerance of 7/10000 for each temperature change of 1°C.

B-17 Test Braking Distance

The brake device must be kept in good condition and work smoothly to ensure the normal and safe operation of the machine.

1. Depress the foot switch.
2. Slowly deflect the drive/steer proportional control joystick to full drive speed position.
3. Push upward the drive high/low speed select switch on the platform controller to switch the drive speed to high speed.
4. Quickly release the drive/steer proportional control joystick after the machine runs stably.
5. Measure the braking distance of the machine.

Result: the braking distance should be: $s \leq 2\text{m}$ (6.56 ft).

NOTICE

The brake must be able to hold the machine on any slope it is able to climb.

CHECKLIST C PROCEDURES

C-1 Replace hydraulic oil tank air filter

Keeping the breather cap of hydraulic tank in well-ventilated condition is vital to normal operation of

hydraulic pump and extending service life. Unqualified cleanliness or blocked air filter of hydraulic tank may cause the hydraulic pump to suction improperly, and continued operation may result in component damage. The air filter of hydraulic tank should be replaced more often in harsh operating environment.

1. Use a wrench to remove the air filter from the hydraulic tank (with the location as shown in [Fig 5-11](#), [page 5-15](#)).
2. Install and tighten the new air filter.

C-2 Inspect Weighing System

Before the test, move the boom fully up and down and telescope in and out for at least twice to ensure the pulley and track are adequately lubricated. The test results are shown in the table below:

Table 5-12

MODES	TEST RESULTS
KG	When the load does not exceed 230kg (507 lb), ensure that the platform is able to lift to the highest position. When the load exceeds 230kg (507 lb), the buzzer will sound continuously, the overload indicator light will flash, the display screen will indicate platform overload, all the functions will be restricted. The machine will not resume all the functions until the excessive load is removed.
Non-KG	When the load does not exceed 230kg (507 lb), ensure that the platform is able to lift to the highest position. When the load exceeds 230kg (507 lb), the buzzer will sound continuously, the overload indicator light will flash, the display screen will indicate platform overload, some functions will be restricted but boom retracting, lowering and turntable rotating is allowed, main boom/ foldable boom down only when main boom is fully retracted.

WARNING

TIPPING HAZARD



While performing override operation on the machine, please avoid operation in a dangerous direction.

For overseas models, with the machine in the KG mode, if activating any function switch while flipping the emergency power switch after an overload alarm, the override operation should be performed, and the corresponding action can be performed. The time of the override operation and the actual weight on the platform are recorded on the display.

NOTICE

Override operation is an emergency operation in an emergency state. Before conducting any override operation, please make sure the surrounding area and the whole machine are in a safe state, try to avoid operation in a dangerous direction and ensure personal safety.

CHECKLIST D PROCEDURES

D-1 Inspect Boom Wear Pads

Regularly inspecting the boom wear pads is vital to safe machine operation. Friction pair develops between each wear pad and the telescope boom surface. Improperly shimmed wear pads or continued use of

extremely worn wear pads may result in component damage and unsafe operating conditions.

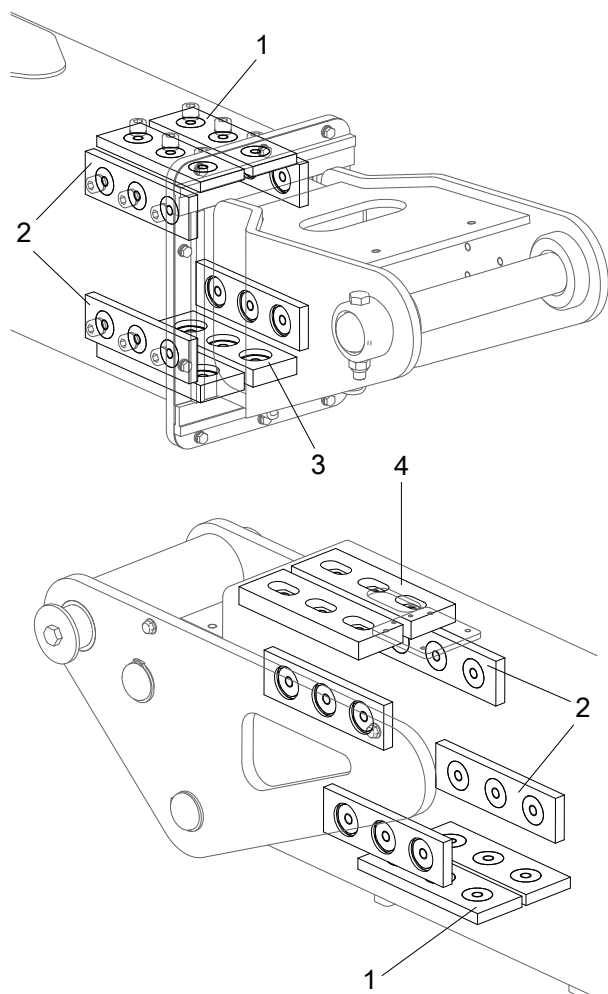


Figure 5-17

1. Remove the covers or nylon brushes at both ends of the boom.
2. Measure the thickness of each wear pad as indicated in the above figure. The wear pad thickness specifications are listed in the table below.

Table 5-13

NO.	Thickness Specifications
1	11mm (0.43in)
2	11mm (0.43in)
3	18mm (0.71in)
4	18mm (0.71in)

3. If the wear extent of the wear pad is greater or equal to 3mm (0.118in), the wear pad assembly should be timely replaced.

NOTICE

The wear pad disassembled from the boom should never be reused. Be sure to replace with a new wear pad assembly.

D-1 Replace Drive Reducer Gear Oil

Regularly replacing drive reducer gear oil is vital to good machine performance and extending service life of the reducer.

1. Drive the machine to rotate the reducer to the position with one bolt at the bottom, as shown in the figure below.

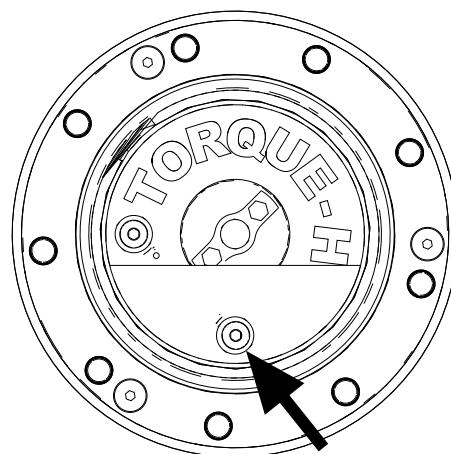


Figure 5-18

2. Place a suitable vessel under the bolt as indicated by the arrow in the figure.
3. Remove the bolt as indicated by the arrow in the figure.
4. Fully drain the drive reducer gear oil to the vessel.
5. Mount back the loosened bolt.
6. Drive the machine to rotate the reducer until one bolt is at the top and the other is at 90 degrees to the former.

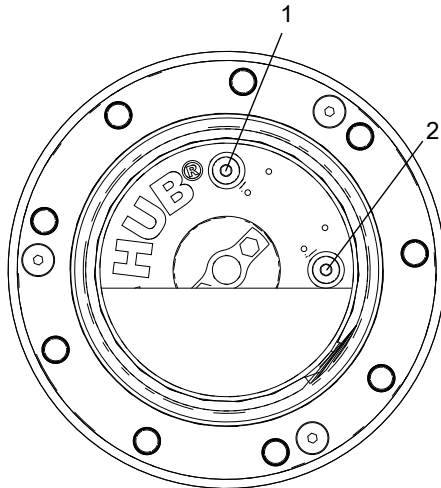


Figure 5-19

7. Remove the bolts #1 and #2.
8. Add new gear oil to the port #1 until the oil level is even with that of the port #2.
9. Mount back the bolts.
10. Clean up the oil spills in performing the inspection procedure.
11. Perform the same procedures on all drive reducers of the machine.

D-3 Replace Hydraulic Oil

Regularly replacing hydraulic oil is vital to good machine performance and extending service life. Unqualified cleanliness oil may cause the machine to perform poorly and continued use may result in hydraulic component damage. It is recommended to change the hydraulic oil every year or every 1,000 hours. Extremely harsh condition requires the oil changes to be performed more frequently.

WARNING

BURN HAZARD

Before servicing the hydraulic system, allow the hydraulic oil to cool down to room temperature.

NOTICE

The inspection must be performed with the machine off. Before re-installing the removed hoses and fittings, check whether the seals on the hoses and fittings are broken or missing; if any seal is damaged or missing, replace the seal with a new one, or replace the hose assembly and fittings directly. When installing hoses and fittings, tighten them according to the specified torque. See [Hydraulic Hose and Fitting Specifications, page 2-9](#).

1. Open the left side cover of turntable, and locate the hydraulic tank.
2. Close the hydraulic shutoff valve located on the side of hydraulic tank.
3. Remove the drain plug at the bottom of the tank, and completely drain the oil into a suitable vessel. For the capacity of hydraulic tank, please refer to [Machine Specifications, page 2-1](#). After completely draining the oil, re-install the drain plug.

WARNING

HIGH PRESSURE HAZARD

Slowly remove the hydraulic elements to reduce the oil pressure. High-pressure oil may penetrate the skin. Should any injury occur, go to a doctor at once.

4. Disconnect and plug the suction hoses.
5. Disconnect and plug the return hoses.
6. Remove the retaining bolts from the hydraulic tank cover, and remove the hydraulic tank cover.
7. Rinse out the inside of the tank using a mild solvent, and remove the drain plug to empty the solvent.
8. After the hydraulic tank has been dried up, re-install the hydraulic tank cover, and re-attach the suction hoses and return hoses onto the hydraulic tank.
9. Fill new hydraulic oil as needed.

D-4 Replace Hydraulic Tank Suction Filter

Regularly replacing hydraulic tank suction filter is vital to good machine performance and extending service life. Unqualified cleanliness hydraulic oil may cause the machine to function improperly and continued use may result in hydraulic component damage. Extremely harsh condition requires the oil changes to be performed more frequently.

When performing the procedure [D-3 Replace Hydraulic Oil, page 5-21](#), the hydraulic tank suction filter must also be replaced.

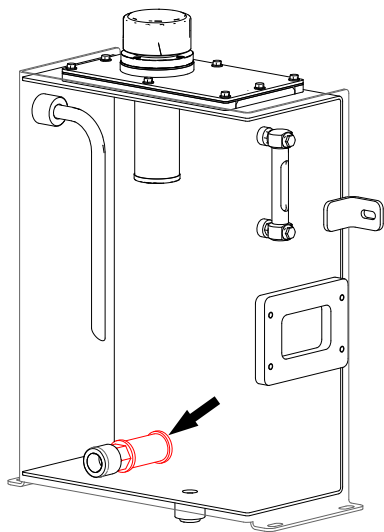


Figure 5-20

6 REPAIR PROCEDURES

WARNING



Repair procedures shall be completed by a person trained and qualified on the repair of this machine.

Immediately tag and remove from service a damaged or malfunctioning machine.

Repair any machine damage or malfunction before operating the machine.

Before machine startup :

- **Read, understand and obey the safety rules and operating instructions contained in operation manual.**
- **Read all procedures and rules.**
- **Unless otherwise specified, perform each repair procedure with the machine in the following configuration:**
 - **Machine parked on a firm, level surface.**
 - **Platform in the stowed position.**
 - **Key switch in the OFF position with the key removed.**
 - **All wheels chocked.**

BOOM AND PLATFORM COMPONENTS

Boom and Platform Systems

Platform Control Enable System

The platform controls make use of a time dependent enable circuit to limit the time availability of “live” or enabled controls. When the footswitch is depressed, the controls are enabled and the operator has 7 seconds to operate any function. The controls will remain enabled as long as the operator continues to use any function and will remain enabled 7 seconds after the last function has been used. While the controls

are “live”, the enabled light will be illuminated in the platform display panel. When the time limit has been reached, the enabled light will turn off and the controls will be “dead” or disabled. To continue use of the machine the controls must be re-enabled to start the timer system over again. This is done by releasing all functions, then releasing and re-depressing the footswitch.

Boom Position Sensing System

The boom position sensing system uses the boom angle sensor and boom length sensor mounted to indicate the boom position. The boom operating position is recognized when the angle sensor reads more than 15° with respect to gravity or the length sensor reads more than 1.2m extension, otherwise it indicates that the boom is in the non-operating position. The jib boom position is excluded from consideration.

This system is used to control the following systems :

- Drive Speed Cutback System

Drive Speed Cutback System

When the boom is positioned in operating position, the drive motors are automatically restricted to the operating speed mode.

Platform Controller

WARNING

ELECTROCUTION HAZARD



Before performing this procedure, be sure to disconnect the battery and the charger on AC outlet. Contact with live conductors may result in death or serious injury.

NOTICE

Perform this procedure with the machine in stowed position.

1. Disconnect external power supply, and push in the emergency stop buttons on the platform and ground controllers to OFF position.
2. Locate the cable connected to the bottom of the platform controller.
3. Disconnect and tag the cable from the bottom of the platform controller.

4. Remove the retaining bolts from the platform controller.
5. Remove the platform controller from the machine.

Platform

1. Remove the platform controller from the platform. For the specific procedure, please refer to [Platform Controller, page 6-1](#).
2. Remove the footswitch.
3. Use the lifting rope of a suitable lifting device to tie down the platform..
4. Remove the platform mounting bolts.

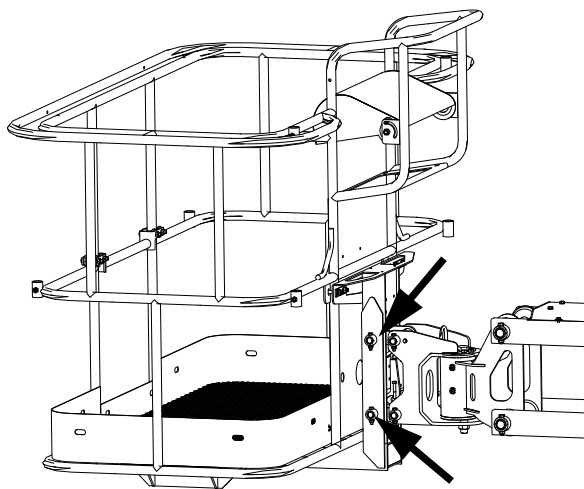


Figure 6-1

5. Use a brass drift or wooden hammer to tap the connecting pin out.
6. Slowly move the platform away with a lifting device.

Platform Swing Motor

NOTICE

Perform this procedure with the machine in stowed position.

NOTICE

Before re-installing the removed hoses and fittings, check whether the seals on the hoses and fittings are broken or missing; if any seal is damaged or missing, replace the seal with a new one, or replace the hose assembly and fittings directly. When installing hoses and fittings, tighten them according to the specified torque. See [Hydraulic Hose and Fitting Specifications, page 2-9](#).

The swing cylinder is used to rotate the platform within 160°.

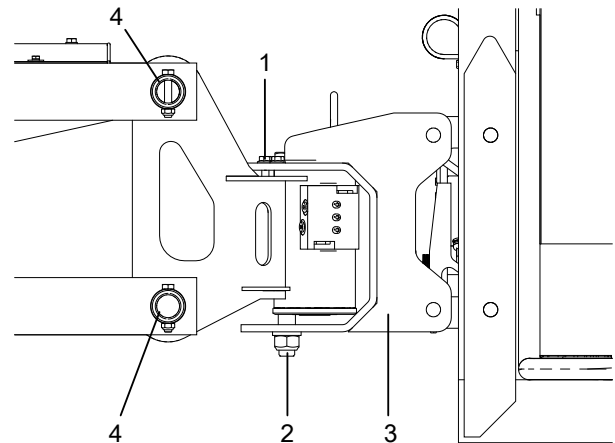


Figure 6-2

1. Remove the platform.
2. Tag, disconnect and plug the hoses of the two oil ports on the swing cylinder and plug the pipe connector on the valve block.
3. Use suitable equipment to support the connecting bracket #3 of swing motor.
4. Remove the retaining bolt #1 and pivot pin #2, and remove the connecting bracket #3 of swing motor.
5. Use suitable equipment to support the swing motor.
6. Remove the retaining screw and nut at the pivot pin #4 of swing motor.
7. Remove the platform swing motor.

Jib Boom Assembly

WARNING

MOVING OBJECT HAZARD



Wear eye protection when tapping the brass drift with a wooden hammer.

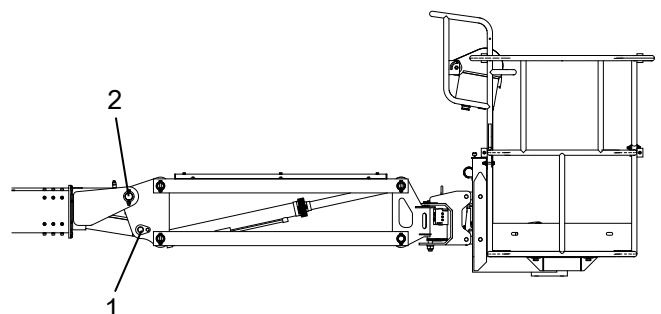


Figure 6-3

Removing

NOTICE

Before re-installing the removed hoses and fittings, check whether the seals on the hoses and fittings are broken or missing; if any seal is damaged or missing, replace the seal with a new one, or replace the hose assembly and fittings directly. When installing hoses and fittings, tighten them according to the specified torque. See [Hydraulic Hose and Fitting Specifications, page 2-9](#).

1. Raise the main boom to a horizontal position, and use suitable lifting equipment to hoist the jib boom assembly.
2. Use suitable equipment to support the upper leveling cylinder.
3. Remove the bolts at the pivot pin #1 of the upper leveling cylinder, and knock out the pivot pin #1 with a brass drift and wooden hammer.
4. Remove the bolts and nuts at the pivot pin #2 of the upper leveling cylinder, and knock out the pivot pin #2 with a brass drift and wooden hammer.
5. Use suitable lifting equipment to detach the jib boom assembly from the main boom.

Inspection

Notice

For the inspection of pivot pin and bearing, please refer to [Pins and composite bearing, page 4-5](#).

- Check the pivot pin of jib for wear, scratches, taper, ovality or other damage. Replace the pivot pin if necessary.
- Check the inner diameter of the jib pivot pin bearing for scratches, distortion, wear or other damage. Replace the bearing if necessary.
- Check the pivot pin of jib lift cylinder for wear, scratches, taper, ovality or other damage. Before installation, make sure the surface of the pivot pin has been protected. Replace the pivot pin if necessary.
- Check the inner diameter of bearing of platform swing motor for scratches, distortion, wear or other damage. Replace the bearing if necessary.
- Check all threaded parts for damage such as stretching, thread deformation or distortion. Replace the parts if necessary.
- Check the structural device of jib boom assembly for bending, cracks, welding separation or other damage. Replace the jib boom if necessary.

Platform Leveling Cylinder

WARNING

MOVING OBJECT HAZARD



Wear eye protection when tapping the brass drift with wooden hammer.

NOTICE

When removing the cylinder, special care should be taken to avoid the fall of the cylinder and component damage.

The machine is configured with 2 platform leveling cylinders located at the boom upper end and lower end.

The platform leveling cylinder is used for maintaining the platform level (in relation to the turntable) through the entire range of motion.

1. Extend the boom until the platform leveling cylinder rod-end pivot pin is accessible.
2. Slightly raise the boom and place a support under the platform.
3. Lower the boom until the platform sits on the support. Take special care not to press the total weight of boom over the support.
4. Tag, disconnect and plug the hydraulic hoses to the platform leveling cylinder. Plug the pipe fittings.
5. Remove the retaining screw from the rod-end pivot pin #1 of the platform leveling cylinder, and do not move the pivot pin.

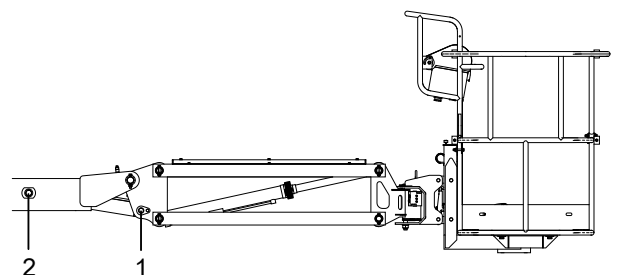


Figure 6-4

6. Remove the retaining ring from the pivot pin #2, and do not move the pivot pin.
7. Support the platform leveling cylinder with an appropriate supporting device to protect the piston rod from damage.
8. Use a brass drift and wooden hammer to tap the pivot pin #1 out.

9. Use a brass drift and wooden hammer to tap the pivot pin #2 out.
10. Carefully remove the cylinder from the boom.

The cable track and the guide tube intend for protecting the moving cables and hoses. It can be repaired link by link without removing the cables and hoses that run through it. Removing the entire cable track is only necessary when performing major repairs.

Cable Track Assembly

NOTICE

Before re-installing the removed hoses and fittings, check whether the seals on the hoses and fittings are broken or missing; if any seal is damaged or missing, replace the seal with a new one, or replace the hose assembly and fittings directly. When installing hoses and fittings, tighten them according to the specified torque. See [Hydraulic Hose and Fitting Specifications, page 2-9](#).

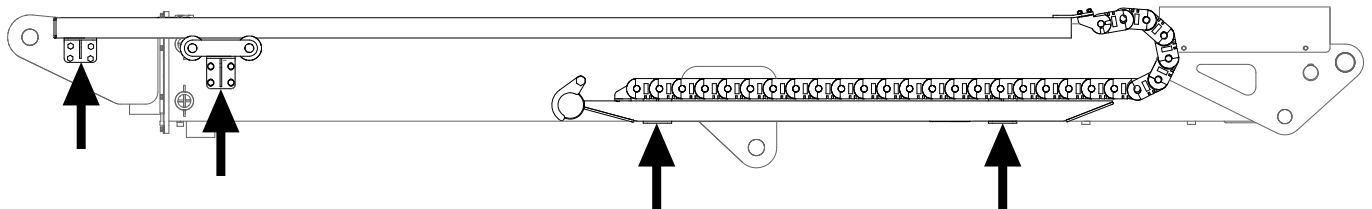


Figure 6-5 Cable track removing-GTZZ14EJ

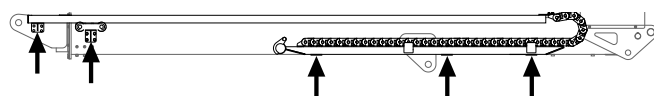


Figure 6-6 Cable track removing-GTZZ16EJ

1. Tag, disconnect and plug all hydraulic hoses and cables from cable track guide to the platform.
2. Remove the hydraulic hoses and cables from the cable track guide.
3. Using suitable lifting equipment, fully support the cable track along the entire length.
4. Remove the bolts as indicated by the arrows in the above figure.
5. Use the lifting equipment to slowly move the cable track away from the boom.

Main Boom Assembly

WARNING

MOVING OBJECT HAZARD



Wear eye protection when tapping the brass drift with a wooden hammer.

NOTICE

Before re-installing the removed hoses and fittings, check whether the seals on the hoses and fittings are broken or missing; if any seal is damaged or missing, replace the seal with a new one, or replace the hose assembly and fittings directly. When installing hoses and fittings, tighten them according to the specified torque. See [Hydraulic Hose and Fitting Specifications, page 2-9](#).

WARNING

UNSAFE OPERATION HAZARD



Before removing the main boom assembly and cylinder, verify that:

- The boom is positioned in the chassis drive direction.
- The counterweight is adequately supported by a rigid structure.

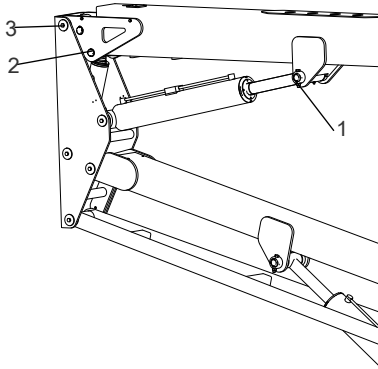


Figure 6-7

1. Place the machine on firm and level ground.
2. Slightly raise the boom until the main boom lift cylinder and lower leveling cylinder of platform is accessible.
3. Tag, disconnect and plug the hydraulic hoses and cables to the boom assembly.
4. Using a suitable lifting device (capacity not less than 5t), secure the lifting straps to the main boom end.
5. Remove the retaining bolts and nuts at the pivot pin #1 connecting the main boom lift cylinder rod end with the boom.

WARNING

UNSAFE OPERATION HAZARD



In this process, use appropriate support equipment to reliably support the main boom luffing cylinder to avoid injury or machine damage caused by the movement of the cylinder.

6. Use a brass drift and wooden hammer to tap the pivot pin #1 out.
7. Remove the retainer ring of the pivot pins #2 connecting the lower leveling cylinder rod end of the platform with the main boom.

WARNING

UNSAFE OPERATION HAZARD



In this process, use appropriate support equipment to reliably support the lower leveling cylinder of the platform to avoid injury or machine damage caused by the movement of the cylinder.

8. Using a suitable lifting device (capacity not less than 5t), secure the lifting straps to the bottom end of the main boom.
9. Remove the bolts and stop block of the pivot pins #3 connecting the boom assembly with the support arm.
10. Using a brass drift and wooden hammer, tap the pivot pins #2 and #3 out.
11. Using a lifting device, slowly move the boom assembly away from the turntable.

Telescopic Boom Assembly



WARNING

MOVING OBJECT HAZARD



Wear eye protection when tapping the brass drift with a wooden hammer.

NOTICE

Before re-installing the removed hoses and fittings, check whether the seals on the hoses and fittings are broken or missing; if any seal is damaged or missing, replace the seal with a new one, or replace the hose assembly and fittings directly. When installing hoses and fittings, tighten them according to the specified torque. See [Hydraulic Hose and Fitting Specifications](#), page 2-9.

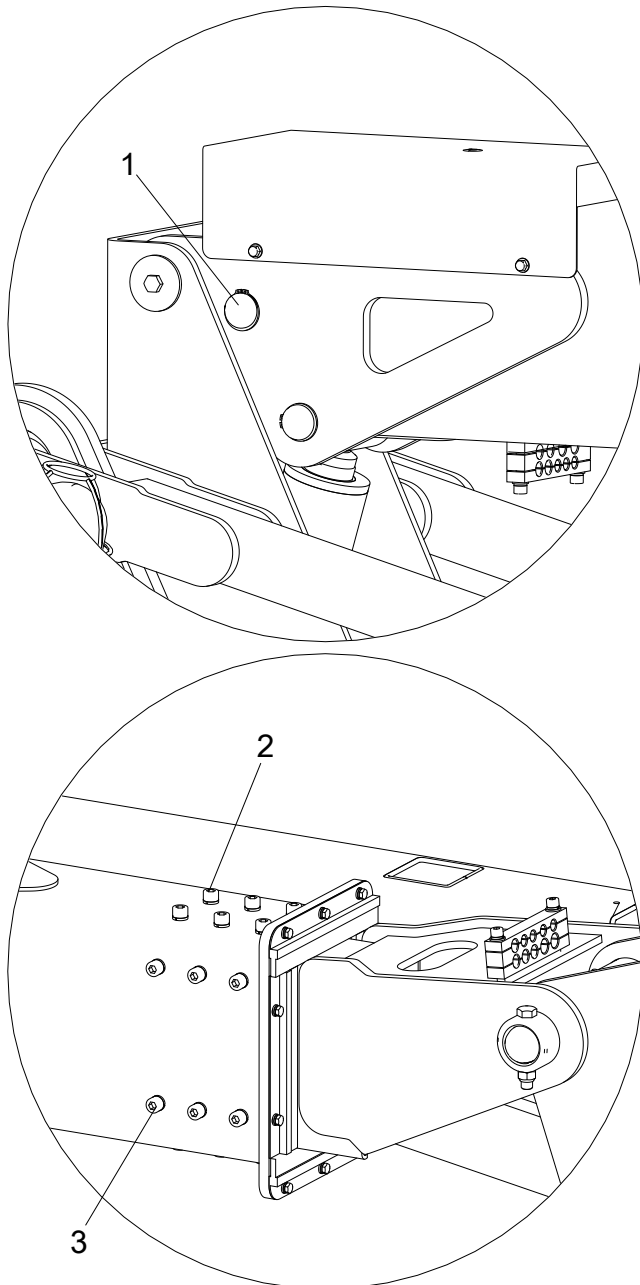


Figure 6-8

1. Remove the retainer ring of the pivot pins #1 connecting the boom assembly with the telescopic cylinder.
2. Remove the screws, gaskets and sliding blocks at the upper and lower surfaces #3 and both sides #2 of the boom tail.
3. Pull out the telescopic boom together with the telescopic cylinder of the main boom from the main boom tail, and place it on a suitable support.

WARNING

UNSAFE OPERATION HAZARD



Take care not to rotate the telescopic cylinder.

4. Remove the bolts securing the telescopic cylinder end, and pull out the telescopic cylinder from the telescopic boom head.
5. Place the telescopic cylinder on a suitable support.

Foldable Boom Assembly

WARNING

MOVING OBJECT HAZARD



Wear eye protection when tapping the brass drift with a wooden hammer.

NOTICE

Before re-installing the removed hoses and fittings, check whether the seals on the hoses and fittings are broken or missing; if any seal is damaged or missing, replace the seal with a new one, or replace the hose assembly and fittings directly. When installing hoses and fittings, tighten them according to the specified torque. See [Hydraulic Hose and Fitting Specifications, page 2-9](#).

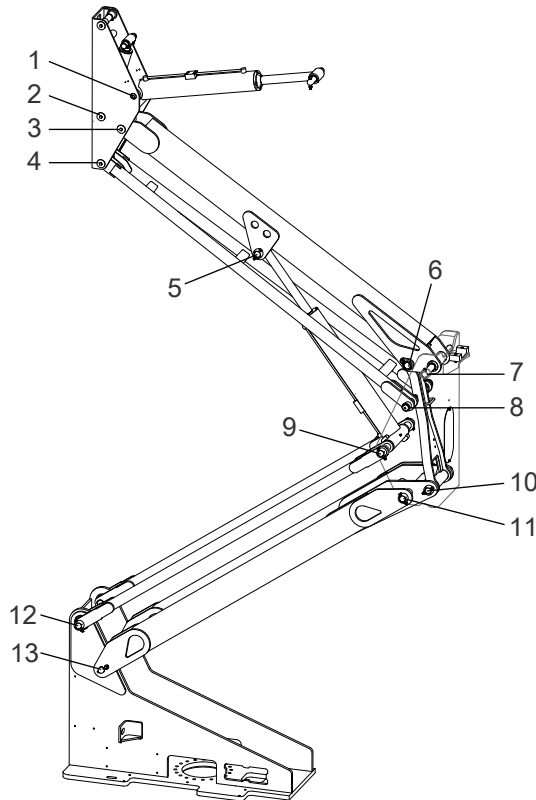


Figure 6-9

Note: the numbers in the figure indicates the removal sequence of foldable boom.

1. Remove the main boom assembly.
2. Support the foldable boom head, lower leveling cylinder of platform, main boom luffing cylinder and upper linkage with a suitable lifting device.
3. Remove the retaining bolts and stop blocks at the pin assembly #1 connecting the main boom luffing cylinder end with the upper linkage, and remove the retaining bolts and stop blocks at the pin assembly #2 connecting the upper leveling cylinder end with the upper linkage.
4. Remove pin assemblies #1 and #2.
5. Remove the main boom luffing cylinder and lower leveling cylinder of platform with a lifting device.
6. Support the upper linkage frame with a suitable lifting device.
7. Remove the retaining bolts and stop blocks at the pin assembly #3 connecting the upper linkage frame with the upper foldable boom, and remove the retaining bolts and stop blocks at the pin assembly #4 connecting the upper linkage frame with the upper linkage.
8. Remove pin assemblies #3 and #4.
9. Remove the upper linkage frame with a lifting device.
10. Remove the retainer ring at the pivot pin #8 connecting the upper linkage with the upper linkage frame.
11. Knock the pivot pin #8 out with a brass drift and wooden hammer.
12. Remove the upper linkage with a lifting device.
13. Support the lower linkage with a suitable lifting device.
14. Remove the bolts and nuts at the pivot pin #9 connecting the lower linkage with the lower linkage frame.
15. Remove the bolts and nuts at the pivot pin #12 connecting the lower linkage with the turntable.
16. Knock the pivot pins #9 and #12 out with a brass drift and wooden hammer successively.
17. Remove the lower linkage with a lifting device.
18. Support the upper foldable boom, foldable boom luffing cylinder, linkage, lower linkage frame and lower foldable boom with a suitable lifting device.
19. Remove the bolts and nuts at the pivot pin #5 connecting the upper foldable boom with the foldable boom luffing cylinder.
20. Knock the pivot pin #5 out with a brass drift and wooden hammer.
21. Remove the bolts and keeper pins of the pivot pins #6 connecting the upper foldable boom with the linkage.
22. Knock the pivot pin #6 out with a brass drift and wooden hammer.
23. Remove the bolts and nuts at the pivot pin #7 connecting the upper foldable boom with the lower linkage.
24. Knock the pivot pin #7 out with a brass drift and wooden hammer.
25. Remove the upper foldable boom with a lifting device.
26. Remove the bolts and nuts at the pivot pin #9 connecting the lower foldable boom luffing cylinder with the lower linkage frame.
27. Knock the pivot pin #9 out with a brass drift and wooden hammer.
28. Remove the foldable boom luffing cylinder with a lifting device.
29. Remove the bolts and nuts at the pivot pin #11 connecting the lower linkage frame with the lower foldable boom.
30. Knock the pivot pin #11 out with a brass drift and wooden hammer.
31. Remove the lower linkage frame with a lifting device.

32. Remove the bolts and nuts at the pivot pin #10 connecting the lower linkage with the lower foldable boom.
33. Knock the pivot pin #10 out with a brass drift and wooden hammer.
34. Remove the linkage with a lifting device.
35. Remove the bolts and keeper pins of the pivot pins #13 connecting the lower foldable boom and the turntable.
36. Knock the pivot pin #13 out with a brass drift and wooden hammer.
37. Remove the foldable boom with a lifting device.

CHASSIS AND TURNTABLE COMPONENTS

Tires and Rims

Replacing tires and rims

Hunan Sinoboom Intelligent Equipment Co., Ltd. recommends the replacement tires be of the same size, ply rating and brand as the original tires. For the part number of a specific machine model, please reference the Part Manual. If the replacement tires are not as Hunan Sinoboom Intelligent Equipment Co., Ltd. recommends, the following requirements of tires should be met :

1. Ply rating/rated load and dimension equal or greater than original.
2. Tire tread contact width equal or greater than original.
3. Wheel diameter, width and offset dimensions equal to the original.
4. Approved for the application by the tire manufacturer (including intended purposes, maximum drive speed and maximum tire load, etc.).
5. Due to size variations between different tire brands, both tires on the same axle should be the same.

 **WARNING**



UNSAFE OPERATION HAZARD

The tires and rims installed on each product model have been designed for stability requirements. Size changes such as rim width, center piece location, diameter, etc., without written factory recommendations, may result in an unsafe condition regarding stability.

Installing tires and rims

It is extremely important to apply and maintain proper wheel mounting torque.

 **WARNING**



UNSAFE OPERATION HAZARD

- Use the wheel nuts that suit the rim bolts. The wheel nuts must be installed and maintained at the proper torque to prevent loose wheels, broken studs and possible dangerous separation of wheels from the axle. Be sure to only use the nuts matched to the cone angle of the wheel.
- Tighten the lug nuts to the proper torque to prevent wheels from coming loose. Use a torque wrench to tighten the fasteners. If you do not have a torque wrench, tighten the fasteners with a socket wrench, then immediately have a service garage or dealer tighten the lug nuts to the proper torque. Over-tightening will result in breaking the studs or permanently deforming the mounting stud holes in the wheels.

The proper procedure for attaching wheels is as follows:

1. First apply the threadlocker Loctite 272 to the nuts, then hand tighten all nuts to prevent bolts and nuts from loosening. Do not use a lubricant on threads or nuts.
2. Tighten the nuts in the sequence as shown below.

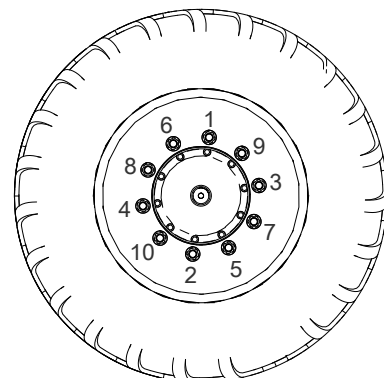


Figure 6-10

- The tightening of the nuts should be done in steps. Following the recommended sequence, tighten nuts per wheel torque as listed in the table below.

Front wheels

Table 6-1

1st Stage	2nd Stage	3rd Stage
120Nm (89ft-lb)	195Nm (144ft-lb)	246Nm (181ft-lb)

Rear wheels

Table 6-2

1st Stage	2nd Stage	3rd Stage
140Nm (103ft-lb)	225Nm (166ft-lb)	283Nm (209ft-lb)

NOTICE

Wheel nuts should be torqued prior to first use of machine and after each wheel removal. Check torque every 3 months or 150 hours of operation.

Reducer and Drive Motor

The reducer and drive motor act not only the role of driving the machine but also the role of securing the rear wheel. Before removing the reducer and motor, secure the machine on a suitable structure or support the machine by a jack of ample capacity.

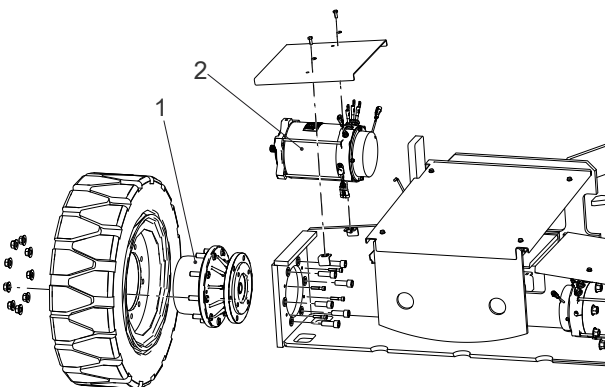


Figure 6-11

No.	Description
1	Reducer
2	Drive motor

Removal of reducer and drive motor

- Place the machine on a solid, level surface.
- Place a jack of sufficient capacity under the side of chassis to be removed. Lift the jack to make the wheel off the ground.
- Remove the bolts and washers securing the wheel to the reducer. Use a suitable lifting device to remove the wheel.
- Tag, disconnect and plug the hydraulic hoses to the drive motor.
- Remove the flange to secure the reducer and the fasteners to secure the outrigger, and lift the flange and reduce that are removed clear of the base frame.
- Remove the flange for motor installation from the reducer. Take care not to damage the O-ring.
- Remove the bolts securing the flange to the reducer.
- Remove the bolts securing the flange to the drive motor.

Installation of reducer and drive motor

- Use a lifting device with sufficient capacity to support the outrigger.
- Install the drive motor, and use torque wrench to secure the bolts in diagonal sequence.
- Align the reducer brake oil port with the nick of support.
- Fit the washer with the mounting surface, apply threadlocker Loctite 272 to the bolts, and install in turns.
- Tighten the bolts with a torque wrench.
- After all installed, add a suitable level of gear oil.
- Clean the mount surface, lift the motor and align it with the reducer: the motor spline shaft in mesh with the inner gear of reducer, the motor mounting slot aligned with the reducer mounting screw by slowly rotating the motor housing.
- Apply the threadlocker Loctite 272 to the bolts and torque the bolts after pretightening.
- Attach the hydraulic hoses.
- Install the wheel.

Battery Box

⚠ WARNING



ELECTROCUTION HAZARD

- Before removing the battery box, cut off the power to the charger and machine.
- Contact with hot circuit may cause serious injury or death. Be sure to wear goggles, gloves and protective clothing.
- Remove all rings, watches and other jewelry.



The machine is equipped with two battery boxes located on the left and right sides of the chassis.

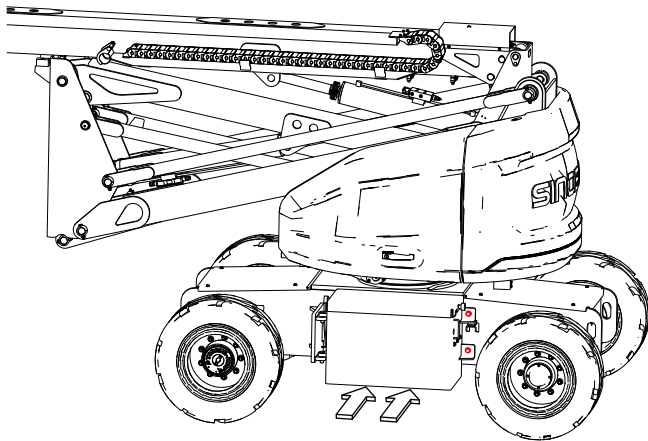


Figure 6-12

1. Locate the battery boxes on the sides of the chassis.
2. Tag and disconnect the battery cables.
3. Place the fork of a forklift under the battery box (as indicated by the arrow in the figure [Fig 6-11 , page 6-10](#)) to be removed to support it.
4. Remove the mounting bolts on one side of the battery box.
5. Slowly lift the fork to remove the battery box from the chassis.

Battery

⚠ WARNING



ELECTROCUTION HAZARD

- Before removing the battery, cut off the power to the charger and machine.
- Contact with hot circuit may cause serious injury or death. Be sure to wear goggles, gloves and protective clothing.
- Remove all rings, watches and other jewelry.



1. Remove the battery box. Refer to [Battery Box, page 6-10](#) for details.
2. Remove the battery with lifting assistance.

Turntable Slewing Mechanism

⚠ WARNING



UNSAFE OPERATION HAZARDS

Never work under the foldable boom if the foldable boom safety prop is not set up or no suitable overhead support /separation is in place.

Removal of slewing bearing

1. Attach suitable supporting sling to the foldable boom and tension the sling. If possible, provide support or separation for the foldable boom. After disconnecting the hydraulic lines, immediately plug the hydraulic line and fitting to prevent contaminants entering the hydraulic system.
2. Tag and disconnect the hydraulic lines from the retainer on the top of the slewing connection. Use suitable vessel to collect the remainder of hydraulic fluid, and immediately plug the hydraulic line and fitting.
3. Use suitable overhead crane to lift the turntable.
4. Use suitable tool to mark a line on the inner ring of the slewing bearing as a reference to align the slewing bearing while installing. Remove the bolts and washers securing the turntable to the inner ring of the slewing bearing. Noted that the bolts cannot be reused.
5. Use a crane to lift the entire turntable assembly away from the slewing bearing. Be sure the

turntable, slewing bearing and the components mounted on the frame are not damaged.

6. Carefully place the turntable on a suitably supported structure.
7. Use suitable tool to mark a line on the outer ring as a reference to align the bearing while installing. Remove the bolts and washers securing the turntable to the slewing bearing. Be noted that the bolts cannot be reused. Use suitable crane to lift the slewing bearing from the frame, and then transport the slewing bearing to the suitably supported clean working area.
8. Remove the two bolts securing the slewing bearing to the base, and inspect respectively.

Installation of slewing bearing

1. Clean the parts that pass the inspection. Use the cleaning liquid (like diesel, gasoline, etc.) to clean the outside of the mount surface. Note that the cleaning liquid should not damage the sealing performance of the rubber seals.
2. Install the slewing bearing to the base with two screws. Within the allowable range of the bolt type, try to get the oil plug of the slewing bearing as close to the gear as possible. Do not tighten the bolts.
3. Align the high point (blue) of the slewing bearing with the center tooth of worm gear. Keep the side clearance at 0.20 - 0.25mm (0.0079–0.0098 in).
4. Apply high-temp grease to the slewing bearing and the teeth of worm gear. The grease nipple is located in the inside wall of the slewing bearing.
5. Use suitable lifting equipment to install the slewing bearing onto the frame, with the soft point (red) vertical to the load axle. If the slewing bearing is reused, be sure the mark of the outer ring of the slewing bearing is aligned with the stamp mark of the frame.

NOTICE

Hunan Sinoboom Intelligent Equipment Co., Ltd. recommends the loosened nuts and bolts be not reused; instead, new nuts and bolts should be used. Since the slewing bearing is the only structural connector jointing the frame and the turntable, thus the replacement of this spare part should strictly meet the specification. It is strongly recommend the Hunan Sinoboom Intelligent Equipment Co., Ltd. original parts be used.

6. Apply a coat of threadlocker Loctite 272 to the new bolt, and thread the bolt and washer through the frame and the outer ring of the slewing bearing for installation.

NOTICE

If compressed air or socket wrench is used to tighten the bolts of bearing, inspect the torque setting of the tool before use.

7. Pre-tighten the bolts and washers in diagonal sequence as shown below. First tighten to 30% of specified torque, then 50% and lastly 100%.

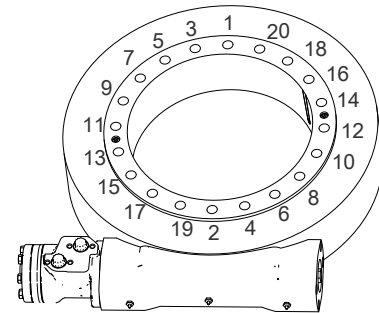


Figure 6-13

8. After the bolts are tightened, please mark on the bolt head or other connections for the convenience of future inspection of the bolts for loosening. Finally detach the lifting equipment from the bearing.
9. Use suitable lifting equipment to place the turntable assembly over the frame. Carefully lower the turntable onto the slewing bearing. Be sure the mark line on the inner ring of the slewing bearing is aligned with the stamp mark on the turntable. If a new slewing bearing is used, be sure the grease nipple forms an angle of 90° with the motion centerline of the turntable.
10. Apply a coat of threadlocker Loctite 272 to the new bolt, and run it through the turntable and the inner ring of slewing bearing for installation.
11. Following the tightening sequence as shown in the above figure, tighten all bolts to 30% of specified torque, then 50% and lastly 100%.
12. Detach the lifting equipment.
13. Run the hydraulic lines through the turntable and frame center, and connect as marked before the removal.
14. With all applicable safety measures in place, start the hydraulic system to inspect whether the slewing mechanism is working properly.

HYDRAULIC SYSTEM

Hydraulic Element Layout

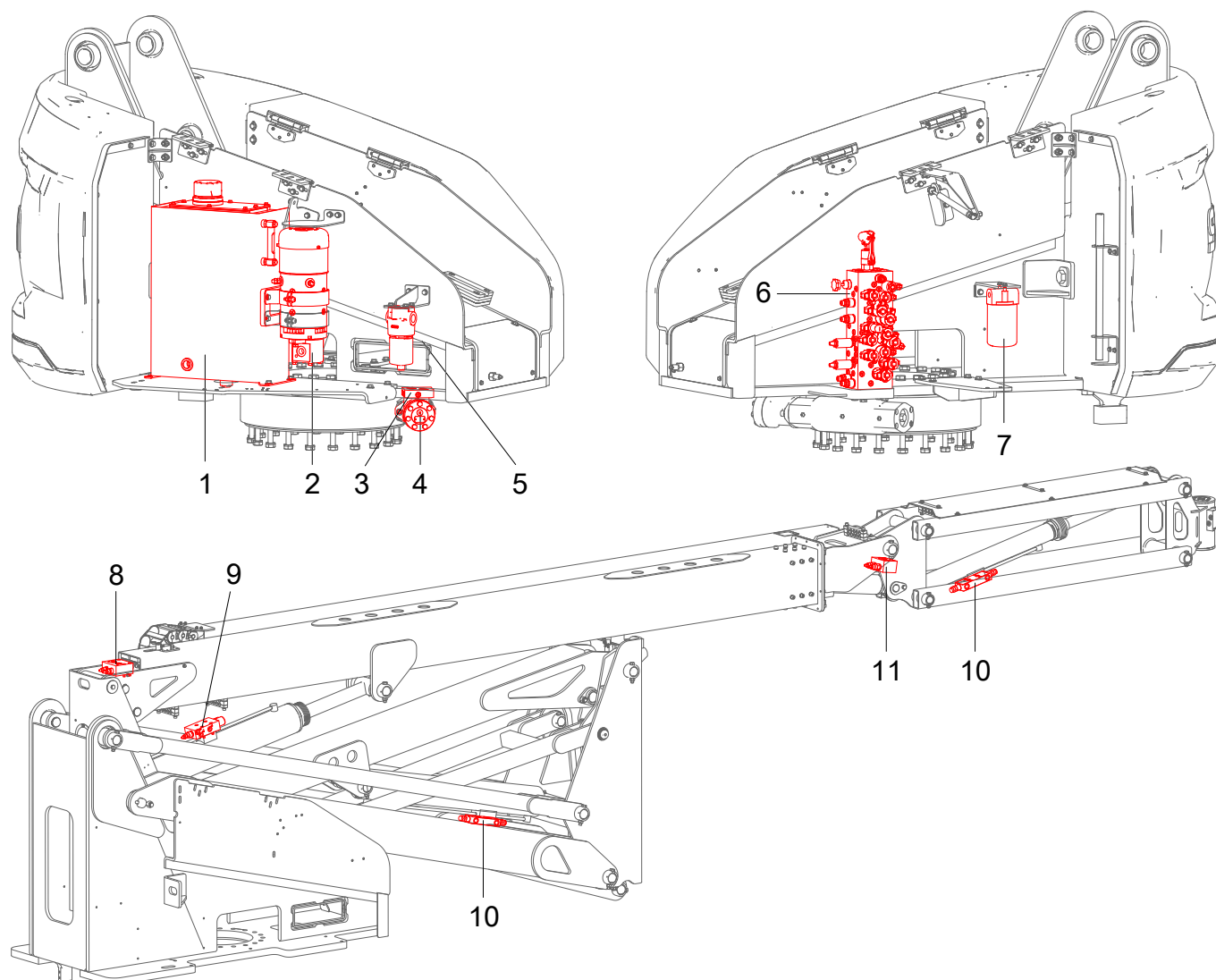


Table 6-3

1. Hydraulic oil tank	5. High-pressure filter	9. Luffing balance valve of main boom
2. Power unit	6. Boom function manifold	10. 2-way balance valve
3. Slewing transition block	7. Return filter	11. Leveling balance valve
4. Cycloid motor	8. Telescoping balance valve	

Function Valves

Boom function manifold (PN.202040003489)

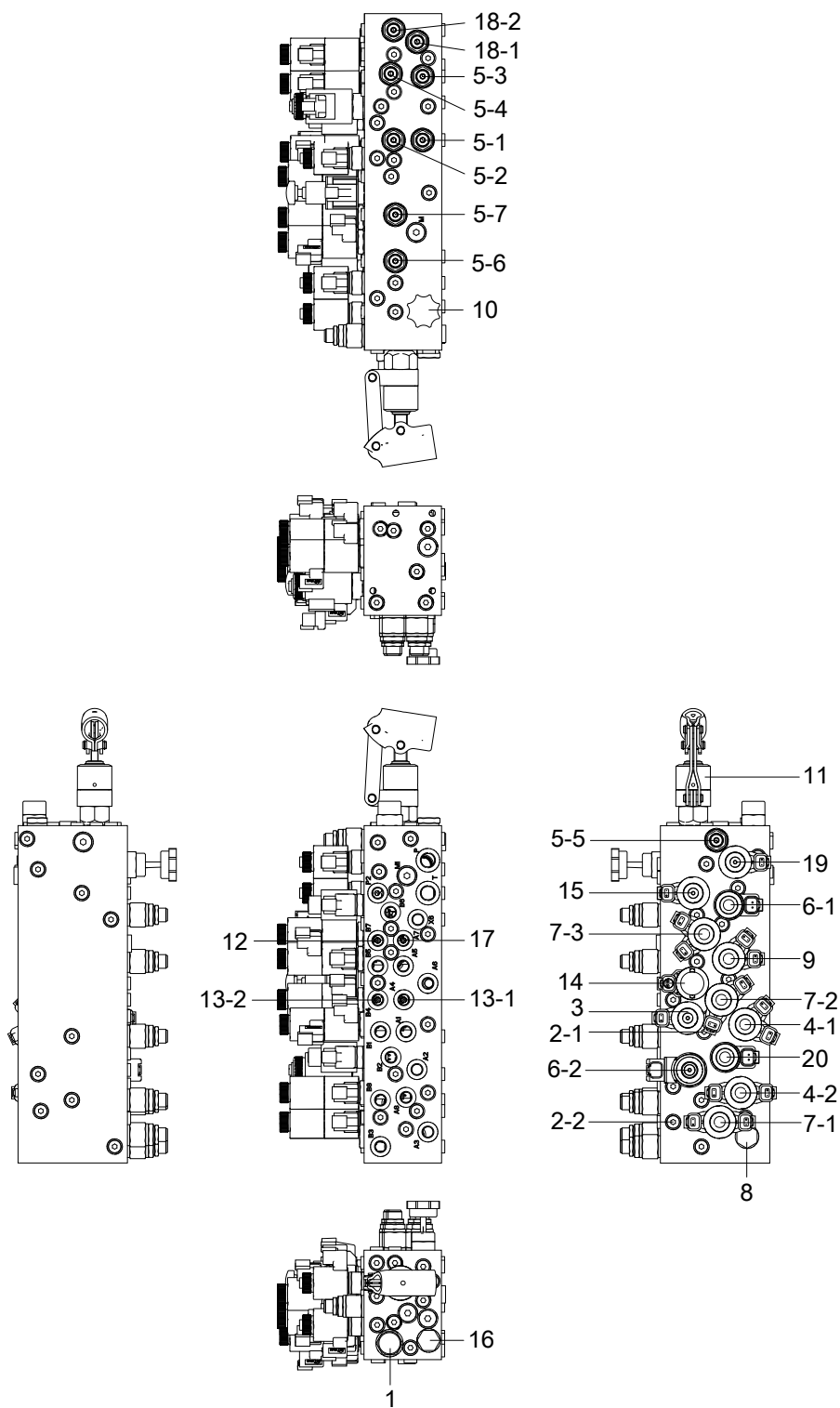


Figure 6-14 Boom function manifold (PN.202040003489)

Table 6-4 Boom function manifold (PN.202040003489)

No.	Name	Torque	Function
1	Compensator valve	40Nm (30ft-lb)	Release power unit pressure, control the differential pressure and control the flow
2	Damper	5Nm (3.7ft-lb)	\
3	Switch solenoid valve	30Nm (22ft-lb)	Control the rotation speed of turntable
4-1	Solenoid valve	30Nm (22ft-lb)	Control the rotation direction of turntable
4-2	Solenoid valve	30Nm (22ft-lb)	Control the steering direction
5-1	Relief valve	40-45Nm (30-33ft-lb)	Control the rotation pressure of turntable
5-2	Relief valve	40-45Nm (30-33ft-lb)	Control the rotation pressure of turntable
5-3	Relief valve	40-45Nm (30-33ft-lb)	Control the steering pressure
5-4	Relief valve	40-45Nm (30-33ft-lb)	Control the steering pressure
5-5	Relief valve	40-45Nm (30-33ft-lb)	Control the pressure of hydraulic system
5-6	Relief valve	40-45Nm (30-33ft-lb)	Control the lowering pressure of main boom in an emergency
5-7	Relief valve	40-45Nm (30-33ft-lb)	Control the lowering pressure of articulated boom
6-1	Solenoid valve	35-40Nm (26-30ft-lb)	Control the rising direction of main boom
6-2	Solenoid valve	35-40Nm (26-30ft-lb)	Control the retracting direction of main boom
7-1	Solenoid valve	30Nm (22ft-lb)	Control the leveling direction of platform
7-2	Solenoid valve	30Nm (22ft-lb)	Control the rotation direction of platform
7-3	Solenoid valve	30Nm (22ft-lb)	Control the up/down direction of jib boom
8	Hydraulic lock	43-47Nm (32-35ft-lb)	\
9	Solenoid valve	27Nm (20ft-lb)	Control the luffing direction of articulated boom
10	Manual directional valve	37-40Nm (27-33ft-lb)	Switch emergency movements
11	Manual pump valve	37-40Nm (27-33ft-lb)	Emergency power unit
12	Damper	5Nm (3.7ft-lb)	\
13	Damper	5Nm (3.7ft-lb)	\
14	Solenoid valve	30Nm (22ft-lb)	Control the lowering operation of main boom in an emergency
15	Switch solenoid valve	30Nm (22ft-lb)	Enable main boom rising, articulated boom luffing and jib boom luffing
16	Check valve	40-45Nm (30-33ft-lb)	Keep fluid flowing in one way
17	Damper	5Nm (3.7ft-lb)	\
18-1	Relief valve	40-45Nm (30-33ft-lb)	Control the rising pressure of platform

No.	Name	Torque	Function
18-2	Relief valve	40–45Nm (30–33ft-lb)	Control the lowering pressure of platform
19	Solenoid valve	27Nm (20ft-lb)	Control the speed of turntable rotation, main boom extending/retracting, platform rotation/leveling and steering
20	Solenoid valve	40Nm (30ft-lb)	Control the extending direction of main boom

Telescoping balance valve (PN.202040003012)

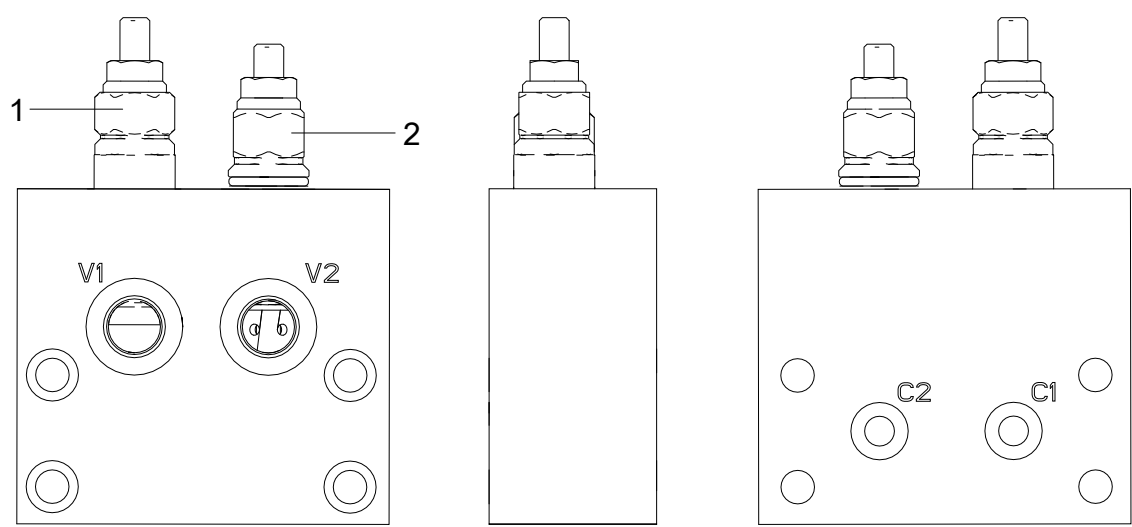


Figure 6-15 Telescoping balance valve (PN.202040003012)

Table 6-5 Telescoping balance valve (PN.202040003012)

No.	Name	Torque	Function
1	Balance valve	40–45Nm (30–33ft-lb)	To keep the load balanced
2	Balance valve	45–50Nm (33–37ft-lb)	To keep the load balanced

Luffing balance valve of main boom (PN.202040003055)

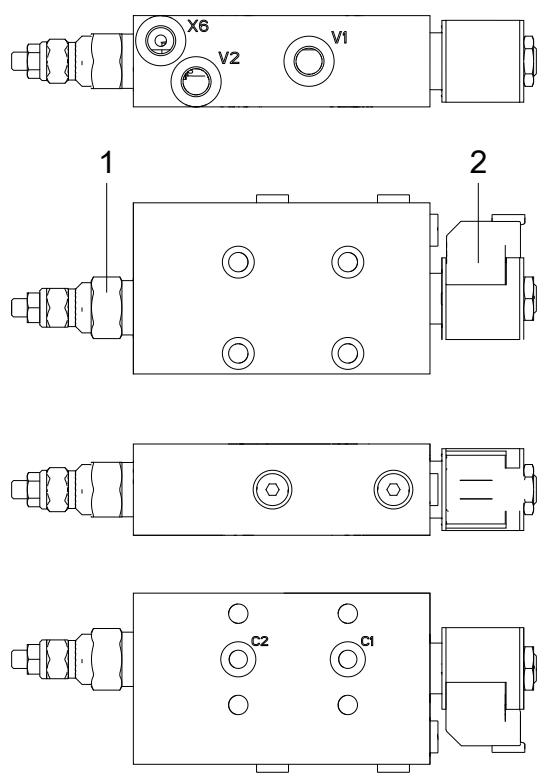


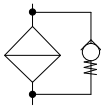
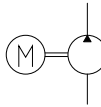
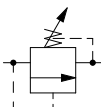
Figure 6-16 Luffing balance valve of main boom (PN.202040003055)

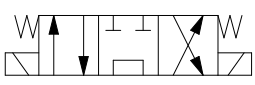
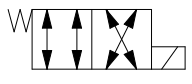
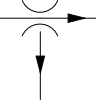
Table 6-6 Luffing balance valve of main boom (PN.202040003055)

No.	Name	Torque	Function
1	Balance valve	34–41Nm (25–30ft-lb)	To keep the load balanced
2	Solenoid valve	25.8–28.5Nm (19–21ft-lb)	To control the luffing speed of main boom

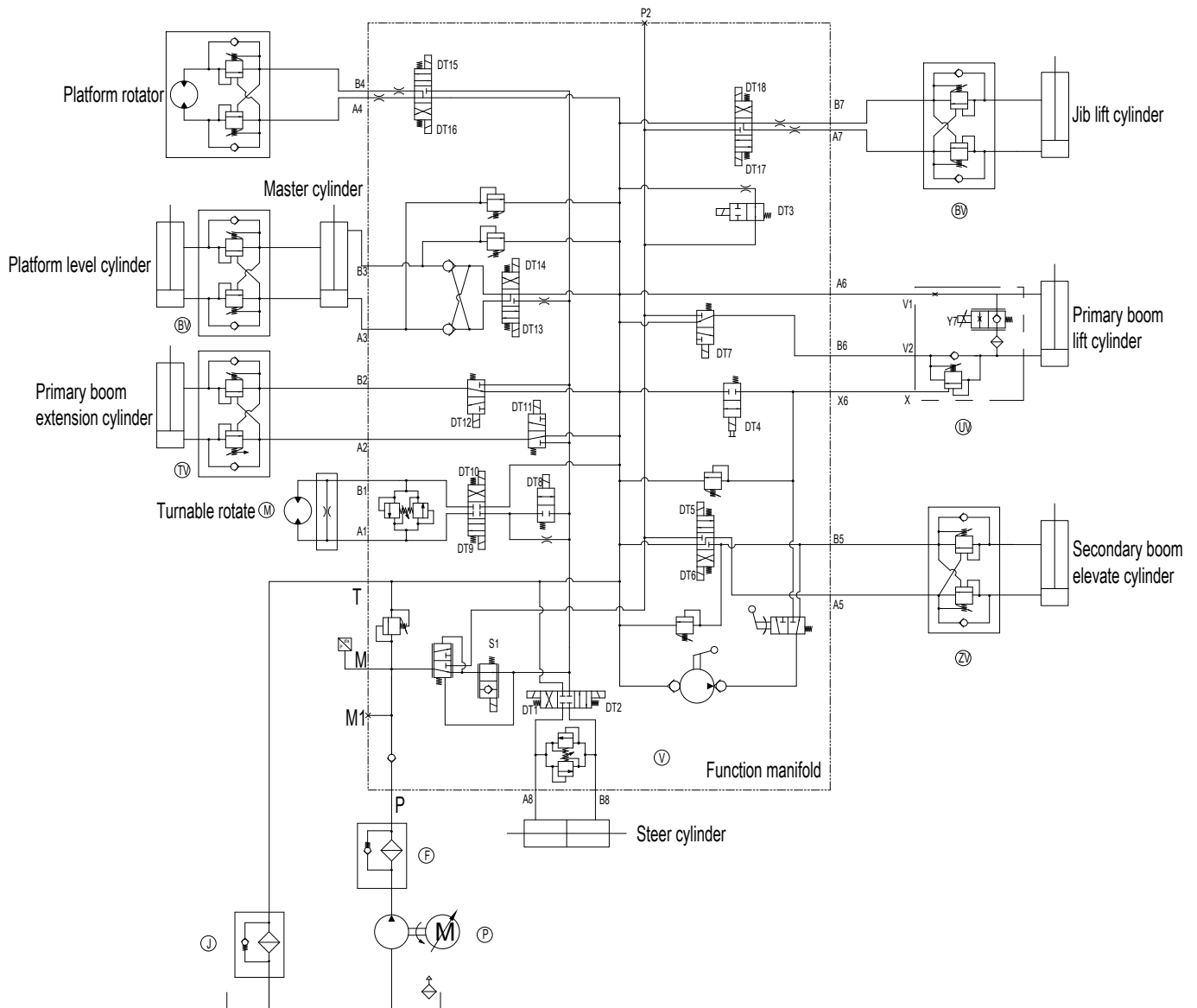
Hydraulic Symbols

Table 6-7

Symbol	Description
	Filter
	Brake
	Power unit
	Hydraulic motor
	Relief valve

Symbol	Description
	3-position 4-way solenoid directional valve
	2-position 4-way solenoid directional valve
	Initiative valve
	Check valve

Hydraulic Schematic Diagram



ELECTRICAL SYSTEM

Fault Code Description

In case of machine malfunctions, please enter the fault display interface on the ground controller to check the fault codes.

Table 6-8 Machine fault code description

Fault Code	Description	Cause	Solution
01	Platform communication fault	Abnormal communication between platform and ground controllers	Check the signal lines between platform and ground controllers, and ensure the power supply is normal.
02	Drive controller communication fault	Abnormal communication between driver and ground controllers	Check the signal lines between ground and drive controllers, and ensure the power supply is normal.
03	Turntable tilt alarm	Turntable tilt alarm	Check whether the machine tilts exceeding 5° or the level switch becomes disconnected
04	Overload alarm	Overload alarm	Check whether the platform load exceeds the rating.
05	Weighing sensor fault	Weighing sensor fault	Check whether the Weighing sensor functions properly.
06	Drive joystick error	Drive joystick data error	Check the drive joystick data
07	Steer joystick error	Steer joystick data error	Check the steer joystick data
08	Main boom luffing joystick error	Main boom luffing joystick data error	Check the main boom luffing joystick data
09	Slewing joystick error	Slewing joystick data error	Check the slewing joystick data
10	Telescoping joystick error	Telescoping joystick data error	Check the telescoping joystick data
11	Jib rotation joystick error	Jib rotation joystick data error	Check the jib rotation joystick data
12	Hydraulic system pressure sensor error	Hydraulic system pressure sensor error	Check whether the hydraulic system pressure sensor functions properly
13	Level switch fault	Level switch fault	Check whether the level switch functions properly
14	Lift controller communication fault	Lift controller communication fault	Check the signal lines between platform and drive controllers, and ensure the power supply is normal.
15	Footswitch or Enable switch 7-second limit alarm	Footswitch or Enable switch 7-second limit alarm	Check whether the footswitch or enable switch function properly
16	Obstacle detection alarm	Obstacle detection alarm	Check whether the obstacle detection switch functions properly
17	Drive controller error alarm	Drive controller error alarm	Check the associated error of drive controller
18	Lift controller error alarm	Lift controller error alarm	Check the associated error of lift controller
19	Heavy load alarm	Heavy load alarm	Check the platform load and the actual measurement of sensor AD value
20	Envelope alarm	Envelope alarm	Check the boom position and the actual measurement of sensor AD value

Fault Code	Description	Cause	Solution
21	Broken rope alarm	Broken rope alarm	Check the wire ropes of boom and the wiring of proximity switch
22	Weighing sensor comparison error	Weighing sensor comparison error	Check the weighing sensor actual values and AD value, and check the wiring
23	Platform tilt alarm	Platform tilt alarm	Check whether the platform tilt angle out of range
24	Solenoid clutch fault	Solenoid clutch fault	Check whether the solenoid clutch functions properly or the wiring harness is disconnected
25	Turntable slewing left solenoid valve error	Turntable slewing left solenoid valve error	Check the wiring of turntable slewing left solenoid valve
26	Turntable slewing right solenoid valve fault	Turntable slewing right solenoid valve fault	Check the wiring of turntable slewing right solenoid valve
27	Main boom extending solenoid valve fault	Main boom extending solenoid valve fault	Check the wiring of main boom extending solenoid valve
28	Main boom retracting solenoid valve fault	Main boom retracting solenoid valve fault	Check the wiring of main boom retracting solenoid valve
29	Main boom lifting solenoid valve fault	Main boom lifting solenoid valve fault	Check the wiring of main boom lifting solenoid valve
30	Main boom lowering solenoid valve error	Main boom lowering solenoid valve error	Check the wiring of main boom lowering solenoid valve
31	Articulated boom lifting solenoid valve fault	Articulated boom lifting solenoid valve fault	Check the wiring of articulated boom lifting solenoid valve
32	Articulated boom lowering solenoid valve fault	Articulated boom lowering solenoid valve fault	Check the wiring of articulated boom lowering solenoid valve
33	Steer left solenoid valve fault	Steer left solenoid valve fault	Check the wiring of steer left solenoid valve
34	Steer right solenoid valve fault	Steer right solenoid valve fault	Check the wiring of steer right solenoid valve
35	Platform swing left solenoid valve fault	Platform swing left solenoid valve fault	Check the wiring of platform swing left solenoid valve
36	Platform swing right solenoid valve fault	Platform swing right solenoid valve fault	Check the wiring of platform swing right solenoid valve
37	Platform leveling up solenoid valve fault	Platform leveling up solenoid valve fault	Check the wiring of platform leveling up solenoid valve
38	Platform leveling down solenoid valve fault	Platform leveling down solenoid valve fault	Check the wiring of platform leveling down solenoid valve
39	Jib up solenoid valve fault	Jib up solenoid valve fault	Check the wiring of jib up solenoid valve
40	Jib down solenoid valve fault	Jib down solenoid valve fault	Check the wiring of jib down solenoid valve

Fault Code	Description	Cause	Solution
41	Function enable valve fault	Function enable valve fault	Check the wiring of function enable valve
42	Main boom anti-fall valve fault	Main boom anti-fall valve fault	Check the wiring of main boom anti-fall valve
43	Drive enable valve fault	Drive enable valve fault	Check the wiring of drive enable valve
44	Brake valve fault	Brake valve fault	Check the wiring of brake valve
45	Slewing enable valve fault	Slewing enable valve fault	Check the wiring of slewing enable valve
46	Front pump unloading valve fault	Front pump unloading valve fault	Check the wiring of front pump unloading valve
47	Rear pump unloading valve fault	Rear pump unloading valve fault	Check the wiring of rear pump unloading valve
48	Electrically proportional relief valve fault	Electrically proportional relief valve fault	Check the wiring of electrically proportional relief valve
49	Articulated boom angle sensor comparison error	Articulated boom angle sensor comparison error	Check whether the articulated boom angle sensor is correctly installed
50	Articulated boom angle sensor fault	Articulated boom angle sensor fault	Check the wiring of articulated boom angle sensor
51	Main boom angle sensor comparison error	Main boom angle sensor comparison error	Check whether the main boom angle sensor is correctly installed
52	Main boom angle sensor fault	Main boom angle sensor fault	Check the wiring of main boom angle sensor
53	Articulated boom relative angle sensor comparison error	Articulated boom relative angle sensor comparison error	Check whether the articulated boom relative angle sensor is correctly installed
54	Articulated boom relative angle sensor fault	Articulated boom relative angle sensor fault	Check the wiring of articulated boom relative angle sensor
55	Main boom relative angle sensor comparison error	Main boom relative angle sensor comparison error	Check whether the main boom relative angle sensor is correctly installed
56	Main boom relative angle sensor fault	Main boom relative angle sensor fault	Check the wiring of main boom relative angle sensor
57	Low battery level alarm	Low battery level alarm	Check whether the battery voltage is too low
58	Front right steer sensor fault	Front right steer sensor fault	Check the wiring of front right steer sensor

Fault Code	Description	Cause	Solution
59	Clutch fault	Clutch fault	Check whether the clutch can be properly engaged or the sensor is correctly wired.
60	Low fuel level fault	Low fuel level fault	Check whether the fuel level is too low or the sensor is correctly wired.

Table 6-9 General fault code description for electric motor controller

String	Fault Code	Description	Cause	Solution
NONE	0000h	No error	/	/
WATCHDOG	6010h	Device software reset (watchdog)	Watchdog fault.	Replace the drive.
EEPROM KO	5530h	Device hardware data storage EEPROM	Hardware data storage fault.	Replace the drive.
LOGIC FAILURE #3	FF11h	Internal logic card failure	Current flow is detected when the drive axle does not transmit driving force.	Hardware problem. Replace the drive.
LOGIC FAILURE #2	FF12h	Internal logic card failure	The electric controller detects a deviation between the voltage feedback of the motor and the request signal.	Hardware problem. Replace the drive.
LOGIC FAILURE #1	5114h	Voltage supply on key input is too low or too high	The electric controller detects the voltage lower than 11V or higher than 35V at the key switch interface (driving electric controller A3, pump electric controller A10) if equipped with a 24V motor.	Temporary low voltage or high voltage during power-on and operation must be caused by external factors, such as relay and DC/DC failure. An oscilloscope, rather than a multimeter, is required for measurement due to high detection speed. If this failure persists, it's caused by the hardware problem and the drive needs to be replaced.
VMN LOW PUMP	FF1Ch	Mains under-voltage	Before the contactor is closed, the software will check the power bridge circuit, which alternately turns on the phase voltage at the high side of the power MOSFET and increases the phase voltage to the capacitor voltage value. If the phase voltage is lower than 66% of the capacitor voltage value, an alarm will be triggered.	Replace the drive. Pump motor or its wiring has a problem. Pump motor or its wiring has electric leakage.
VMN HIGH PUMP	FF1Dh	Mains over-voltage	Before the contactor is closed, the software will check the power bridge circuit, which turns on the phase voltage at the low side	Replace the drive. Pump motor or its wiring has a problem. Pump motor or its wiring has electric leakage.

String	Fault Code	Description	Cause	Solution
			of the power MOSFET in turn and decreases the phase voltage to -BATT. If the phase voltage is higher than 10% of the standard battery voltage value, an alarm will be triggered.	
VMN LOW	3120h	Mains under-voltage	Before the contactor is closed, the software will check the power bridge circuit, which alternately turns on the phase voltage at the high side of the power MOSFET and increases the phase voltage to the capacitor voltage value. If the phase voltage is lower than 66% of the capacitor voltage value, an alarm will be triggered.	Replace the drive. Drive motor or its wiring has a problem. Drive motor or its wiring has electric leakage.
VMN HIGH	3110h	Mains over-voltage	Before the contactor is closed, the software will check the power bridge circuit, which turns on the phase voltage at the low side of the power MOSFET in turn and decreases the phase voltage to -BATT. If the phase voltage is higher than 10% of the standard battery voltage value, an alarm will be triggered.	Replace the drive. Drive motor or its wiring has a problem. Drive motor or its wiring has electric leakage.
CONTACTOR CLOSED	5442h	Line contactor is closed at startup	The main contactor is closed when power-on.	Check whether the contactor, its large wire and small wire connections, and the fuse are normal. If OK, replace the drive.
CONTACTOR OPEN	5441h	Device hardware contact 1 = manufacturer specific	The main contactor is open-circuited.	Check whether the contactor, its large wire and small wire connections, and the fuse are normal. If OK, replace the drive.
I = 0 EVER PUMP	2312h	No pump current	Pump current failure.	Replace the drive.
STBY I HIGH	2311h	Current on device output side continues over current No.1	During the waiting phase, the current sensor detects a current value other than 0A. The current sensor or its wiring is damaged.	Replace the drive.
CAPACITOR CHARGE	3130h	Voltage phase failure	When the key switch is closed, the controller charges the capacitor through a series of thermistors and power resistors and checks whether the capacitor is charged	The internal hardware of the drive is damaged and cannot be charged. Replace the drive.

String	Fault Code	Description	Cause	Solution
			overtime. If the capacitor voltage is less than 20% of the standard battery voltage, an alarm will be triggered. The drive cannot charge the internal capacitor through the key switch interface.	Check whether the drive motor or its wiring has a problem. Check whether the drive motor or its wiring has electric leakage.
HIGH TEMPERATURE	4210h	Excess temperature device	The drive has excessively high temperature.	The actual temperature exceeds the drive protection value. The drive is faulted, replace the drive.
MOTOR TEMPERAT.	FF41h	Motor at high temperature	The drive detects that the high temperature protection for motor is triggered.	If the motor is overheated, wait for the temperature to drop. If the motor is not overheated, check the motor temperature sensor and its wiring. If the motor temperature sensor and its wiring are normal and the motor is not overheated, replace the drive.
BATTERY LOW	FF42h	Battery is discharged	The battery level is below the threshold of the drive.	Check whether the battery level is too low.
DRIVER SHORTED	3211h	A1 output shorted/ DC link over-voltage No.1	A short circuit is detected in two lines of the contactor coil.	Check for a short circuit or low impedance between NMC and -BATT. Check whether the drive circuit on the logic board is damaged and needs to be replaced.
CONTACTOR DRIVER	3221h	A1 output opened/ DC link under-voltage No.1	The main contactor coil cannot drive its load.	Check whether the contactor, its large wire and small wire connections, and the fuse are normal. If OK, replace the drive.
COIL SHORTED	2250h	Coil short-circuited	The main contactor or the electrical braking/auxiliary coil has damaged short-circuiting.	Check whether the contactor, its large wire and small wire connections, and the fuse are normal. If OK, replace the drive.
LC COIL OPEN	FF4Dh	Coil open-circuited	The main contactor coil is energized, but the contactor does not close.	Check whether the contactor, its large wire and small wire connections, and the fuse are normal. If OK, replace the drive.
FORWARD +BACKWARD	FF50h	Forward and Reverse request direction together	It is detected than the forward and backward travel signals are received simultaneously.	Check the Can signal.
ENCODER ERROR	FFE2h	Encoder failure	The signal fed back from the encoder jumps or loses in tens of milliseconds.	Check for encoder failure. Check whether the encoder terminal line is normal.

String	Fault Code	Description	Cause	Solution
STEERING SENSOR KO	FF54h	Steering sensor is out of range	Steering sensor failure.	Check whether the steering sensor wiring is normal.
WRONG RAM	5520h	Checsum ram failed	The software finds errors in the main memory.	Turn off and turn on the power. If the problem persists, replace the drive.
EVP1 COIL OPEN	5002h	Proportional valve 1 open-circuited	For A24, the parameter EVP TYPE is set to "digital" or "analog", but the drive does not detect load connection.	Check whether the valve load is connected. If OK, replace the drive.
EVP2 COIL OPEN	5003h	Proportional valve 2 open-circuited	For proportional valve 2 (A23), the parameter EVP TYPE has been set to "digital" or "analog", but the drive does not detect load connection.	Check whether the valve load is connected. If OK, replace the drive.
AUX COIL OPEN	FF27h	Auxiliary coil open-circuited	The electrical braking/ auxiliary coil cannot drive its load.	Check whether the device or the drive circuit is normal. Check whether the electromagnetic brake is normal. If OK, replace the drive.
PUMP I NO ZERO	FFD9h	Pump current is not 0	In the static state without driving signal, the pump current is not 0, so the current sensor is faulted.	Replace the drive.
MOT. THERMIC SENS. KO	4311h	Sensor temperature device broken (- manufacturer specific)	An open circuit is detected in the motor temperature sensor.	Check whether the motor temperature sensor is normal. Check if the line is disconnected. If OK, replace the drive.
KEY OFF SHORTED	5101h	Key switch short-circuited	At startup diagnostics, the controller detects a low logic signal with the key switch turned off.	Incorrect wiring of external load causes low voltage of key switch power supply. With excessive line voltage drop, check the line connection to find the drive is faulted. Replace the drive.
CHECKSUM	6101h	Checking failure	Software flashing incorrectly or the chip damaged	Replace the drive.
SMARTDRIVER KO	3302h	Smart driver failure	Built-in brake drive broken-circuited	A2 is connected to the negative pole. The drive is faulted, replace the drive.
COIL SHORTED	2250h	Short circuit	A short circuit is detected in the contactor or the electromagnetic brake coil.	The contactor coil or the electromagnetic coil is faulted. The drive is faulted, replace the drive.
WAITING FOR NODE	8120h	Waiting node	A drive is waiting for a signal from another drive.	The other drive is faulted, replace it. There is a problem with the Can signal or wiring in both drives.

String	Fault Code	Description	Cause	Solution
CURRENT SENSOR KO	FF45h	Current sensor broken-circuited	The current sensor in the drive is broken-circuited	Replace the drive.
TILLER OPEN	FFE4h	Handle open-circuited	This is not a fault, but a prompt sent by the system when the drive disconnects the contactor in a static state.	/
POS EB SHORTED	3223h	Electromagnetic coil positive short-circuited	A short circuit is detected in the electromagnetic coil positive.	A2 interface is shorted to the positive pole. The drive is faulted, replace the drive.
EMERGENCY	3101h	Emergency failure	A3 interface voltage is inconsistent with the battery voltage.	A3 wiring error. The fuse of A3 coil is burned.
WATCHDOG2	6010h	Watchdog failure 2	The drive detects that the internal hardware is faulted.	Replace the drive.
CONT DRV EV 1-5	FFE8h	Valve1 and/or valve5 driver open	The line of valve 1 or valve 5 is open-circuited.	Check if the line is normal. Check if the valve is normal. If OK, replace the drive.
CONT DRV EV 2	FFE8h	valve2 driver open	The line of valve 2 is open-circuited.	Check if the line is normal. Check if the valve is normal. If OK, replace the drive.
CONT DRV EV 3	FFE8h	valve3 driver open	The line of valve 3 is open-circuited.	Check if the line is normal. Check if the valve is normal. If OK, replace the drive.
CONT DRV EV 4	FFE8h	valve4 driver open	The line of valve 4 is open-circuited.	Check if the line is normal. Check if the valve is normal. If OK, replace the drive.
POWER MOS SHORTED	FFE9h	Power MOS tube short-circuited	The MOS tube of the drive power module is short-circuited and cannot be switched on and off based on the command.	Replace the drive.
DRV SHOR EV 1-5	FFF9h	valve1 and/or valve5 driver shorted (always on)	The line of valve 1 or valve 5 is short-circuited.	Check if the line is normal. Check if the valve is normal. If OK, replace the drive.
DRV SHOR EV2	FFF9h	valve2 (always on)	The line of valve 2 is short-circuited.	Check if the line is normal. Check if the valve is normal. If OK, replace the drive.
DRV SHOR EV3	FFF9h	valve3 (always on)	The line of valve 3 is short-circuited.	Check if the line is normal. Check if the valve is normal. If OK, replace the drive.
DRV SHOR EV4	FFF9h	valve4 (always on)	The line of valve 4 is short-circuited.	Check if the line is normal. Check if the valve is normal. If OK, replace the drive.
COIL SHORT EV	2251h	Valve coil short-circuited	Valve coil is short-circuited.	Any one valve coil or line is short-circuited. The drive is faulted, replace the drive.

String	Fault Code	Description	Cause	Solution
CURRENT GAIN	6302h	Current failure	The paramter “adjustment1” or “2” is not set to the correct value, which is set by the factory.	The drive is problematic and needs to be reset by a ZAPI technician.
ANALOG INPUT	FFFAh	Analog input failure	An analog input signal problem is detected.	Replace the drive.
TILLER ERROR	FF40h	Handle failure	Drive problem	Replace the drive.
EVP2 NOT OK 0	FF2Fh	evp2 driver open	Proportional valve 2 drive broken-circuited.	The line of proportional valve is broken-circuited. Replace the drive.
EVP2 NOT OK 1	FF2Fh	evp2 driver shorted	Proportional valve 2 drive short-circuited.	The line of proportional valve is short-circuited. Replace the drive.
EVP1 NOT OK 0	FFF8h	evp1 driver open	Proportional valve 3 drive broken-circuited.	The line of proportional valve is broken-circuited. Replace the drive.
EVP1 NOT OK 1	FFF8h	evp1 driver shorted	Proportional valve 4 drive short-circuited.	The line of proportional valve is short-circuited. Replace the drive.
PHASE KO	3301h	Motor phase disconnected	A disconnected motor phase is detected.	The motor wires are not connected properly. The motor wires have electric leakage. The drive is faulted, replace the drive.
AUX DRIVER OPEN	3224h	Auxiliary drive broken-circuited	A broken circuit is detected in the electromagnetic brake.	Replace the drive.
DATA ACQUISITION	0000h	Data acquisition failure	The drive is being debugged.	Power off and on the key switch, and if the problem persists, replace the drive.
CAN BUS KO	8130h	Periodic PDO_RX are not received	CAN BUS communication problem.	Can bus line problem. The drive is faulted, replace the drive.
CHECK UP NEEDED	0000h	Maintenance failure	It is detected that the drive has been used for a certain period of time and needs maintenance.	Change “check up done” to ON, and power off and on the key switch.
THERMIC SENS. KO	4211h	Sensor temperature device broken (- manufacturer specific)	Temperature sensor inside the drive is faulted.	Replace the drive.
WRONG SET BATTERY	3100h	Wrong battery setting	The parameter “battery type” in the drive is not set to be consistent with the battery used.	Check if the parameter setting is correct, if not, reset the parameter.
WRONG ZERO	3201h	Current sensor detection failure	Current sensor feedback signal problem.	Replace the drive.

String	Fault Code	Description	Cause	Solution
SLIP PROFILE	6301h	Slip setting failure	Wrong slip value setting in the drive.	Reset the parameter.
AUX DRIVER SHORTED	3222h	A3 output broken/ DC link under-voltage No.2	The drive detects a short circuit in the electromagnetic brake.	A4 interface is shorted to the negative pole. The drive is faulted, replace the drive.

Table 6-10 Lithium battery BMS fault code description

Fault Code	Description	Fault Code	Description
0x101	Total Voltage Overvoltage-First Level	0x208	Discharge at High Temperature-Second Level
0x201	Total Voltage Overvoltage-Second Level	0x308	Discharge at High Temperature-Third Level
0x301	Total Voltage Overvoltage-Third Level	0x109	Charging at High Temperature-First Level
0x102	Total Voltage Undervoltage-First Level	0x209	Charging at High Temperature-Second Level
0x202	Total Voltage Undervoltage-Second Level	0x309	Charging at High Temperature-Third Level
0x302	Total Voltage Undervoltage-Third Level	0x10A	Large Temperature Difference-First Level
0x103	Battery Cell Overvoltage Threshold-First Level	0x20A	Large Temperature Difference-Second Level
0x203	Battery Cell Overvoltage Threshold-Second Level	0x30A	Large Temperature Difference-Third Level
0x303	Battery Cell Overvoltage Threshold-Third Level	0x10B	Charging Overcurrent Threshold-First Level
0x104	Battery Cell Undervoltage Threshold-First Level	0x20B	Charging Overcurrent Threshold-Second Level
0x204	Battery Cell Undervoltage Threshold-Second Level	0x30B	Charging Overcurrent Threshold-Third Level
0x304	Battery Cell Undervoltage Threshold-Third Level	0x10C	Discharge Overcurrent Threshold-First Level
0x105	Battery Cell Voltage Difference-First Level	0x20C	Discharge Overcurrent Threshold-Second Level
0x205	Battery Cell Voltage Difference-Second Level	0x30C	Discharge Overcurrent Threshold-Third Level
0x305	Battery Cell Voltage Difference-Third Level	0x10D	Low SOC-First Level
0x106	Discharge of Low Temperature-First Level	0x20D	Low SOC-Second Level
0x206	Discharge of Low Temperature-Second Level	0x30D	Low SOC-Third Level
0x306	Discharge of Low Temperature-Third Level	0x10E	High SOC-First Level

Fault Code	Description	Fault Code	Description
0x107	Charging at Low Temperature-First Level	0x20E	High SOC-Second Level
0x207	Charging at Low Temperature-Second Level	0x30E	High SOC-Third Level
0x307	Charging at Low Temperature-Third Level	0x20F	BMS Communication Fault-Second Level
0x108	Discharge at High Temperature-First Level	0x210	Abnormal Communication with Charger-Second Level

Notes: In case of any fault alarm, please contact Sinoboom after-sales personnel.

Use and Maintenance of Battery

The battery falls into 3 types: lead acid, lead acid maintenance-free and lithium batteries. The lithium battery and lead acid maintenance-free battery are free of maintenance.

! WARNING

FIRE AND EXPLOSION HAZARD



- Batteries contain sulfuric acid and generate explosive mixtures of hydrogen and oxygen gases. Keep any device that may produce sparks or flames (- including cigarettes/smoking materials) away from the battery to prevent explosion.



- Do not touch the battery terminals or cable clips with tools that may produce sparks.

! WARNING

ELECTROCUTION HAZARD



- Contact with hot circuits may cause serious injury or death. Be sure to wear goggles, gloves and protective clothing.



- Remove all rings, watches and other accessories.

! WARNING

CHEMICAL BURN HAZARD



- Avoid spilling battery acid on unprotected skin or unprotected skin in contact with battery acid. Seek medical attention immediately if the skin comes in contact with battery acid .
- If the battery acid escapes, please use baking soda to neutralize the acid.

⚠ WARNING**UNSAFE OPERATION HAZARD**

- Strictly follow the manufacturer's recommendations on how to properly use and maintain the battery.
- Cut off the battery main switch if the battery is not to be used for an extended period.
- The waste battery may pose danger, so do not discard batteries at will. If it needs to be scrapped, contact a battery recycling company.
- Except for the professionals, do not perform a systematic maintenance or service to the battery, otherwise it may cause bodily injuries or damage to the battery system.
- Except for the professionals, do not tamper with the settings or service a signal light, otherwise it may cause bodily injuries or damage to the battery system.
- Except for the professionals, do not remove the battery housing, otherwise it may cause damage to the battery system.

NOTICE

It will not be covered by the warranty if the battery attenuates or fails due to customer's overuse (- continued use after battery level less than 10%) or battery out of charge for a long time (not timely charged for 3 days or longer when the battery level less than 10%).

Inspection

See the **Inspect the Battery** section in this manual.

Cleaning

1. Clean the top, terminals and connections of the battery with a cloth or brush and mixed solution of sodium bicarbonate and water. Do not let the cleaning solution enter the battery.

2. Clean the top, terminals and connections with water and wipe them dry with a cloth. Apply a thin layer of petroleum jelly to the terminals or use terminal protector.

3. Keep the area around the battery clean and dry.

Charging

See the **Charging the Battery** section of Operation Manual.

Equalizing

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

Note :

- Verify whether the battery is flooded/wet battery.
 - To prevent battery damage, the battery must be equalized within a maximum of 3 months storage after delivery.
1. Inspect the electrolyte level height to ensure a proper electrolyte level.
 2. Verify 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 gravity of all battery cells, if the gravity doesn't increase, stop the charging in equalization mode.

Storage

- Fully charge the battery before storage.
- The battery should be stored in cool and dry environment (temperature 10°C~25°C, RH less than 90%), and charge the battery every 3 months using the charger provided by the manufacturer.
- Disconnect the power-off plug to prevent potential parasitic loading, which may 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 charging state with specific gravity and open-circuit voltage is shown in the following table.

Table 6-11

Percentage Charging (%)	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

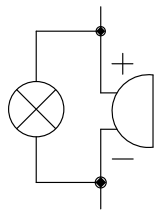
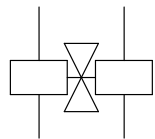
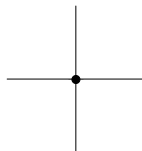
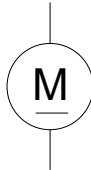
- Recharge the battery in quick mode when the battery level is 70% or lower.
- Recharge the battery before use after removing it from storage.
- Storage in hot environments (above 32°C [90°F]): During storage, do not expose the battery directly to the heat source. The self-discharge process will accelerate in warmer temperatures. If storing the battery in hot temperatures or during hot weather, monitor the specific gravity or the voltage more frequently (about every 2 - 4 weeks).
- Storage in cold environments (below 0°C [32°F]): During storage, do not store the battery in a place with an estimated temperature reaching the freezing point; if the battery has not been fully charged, it may freeze in cold temperatures. If storing the battery in cold temperatures or during cold weather, **fully charge** the battery. This point is very important.

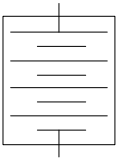
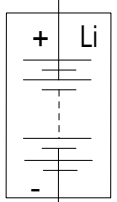
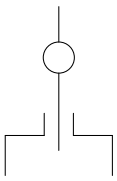
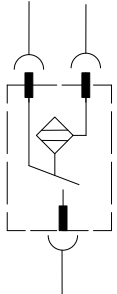
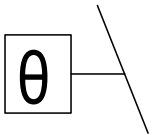
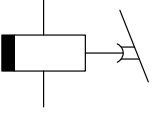
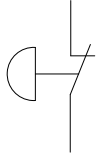
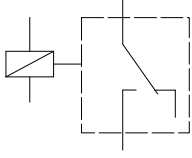
NOTICE

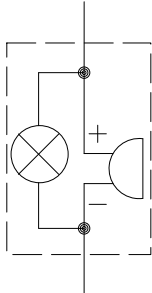
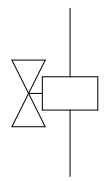
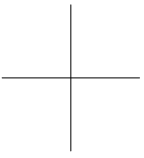
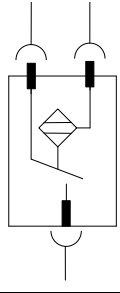
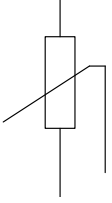
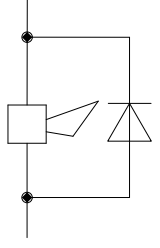
- Do not store more than 6 months in hot or cold environment.
- It will not be covered by the warranty if the battery attenuates or fails due to customer's overuse (- continued use after battery level less than 10%) or battery out of charge for a long time (not timely charged for 3 days or longer when the battery level less than 10%).

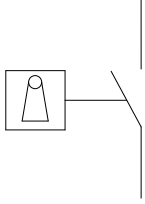
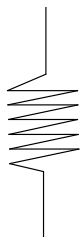
Electrical Symbols

Table 6-12

Symbol	Description
	Buzzer
	Valve
	Two lines connected
	Motor

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

Symbol	Description
	Warning lamp
	Valve
	Two lines non-connected
	Proximity switch/ Pressure sensor
	Fuel level sensor
	Horn

Symbol	Description
	Key switch
	Preheating wire

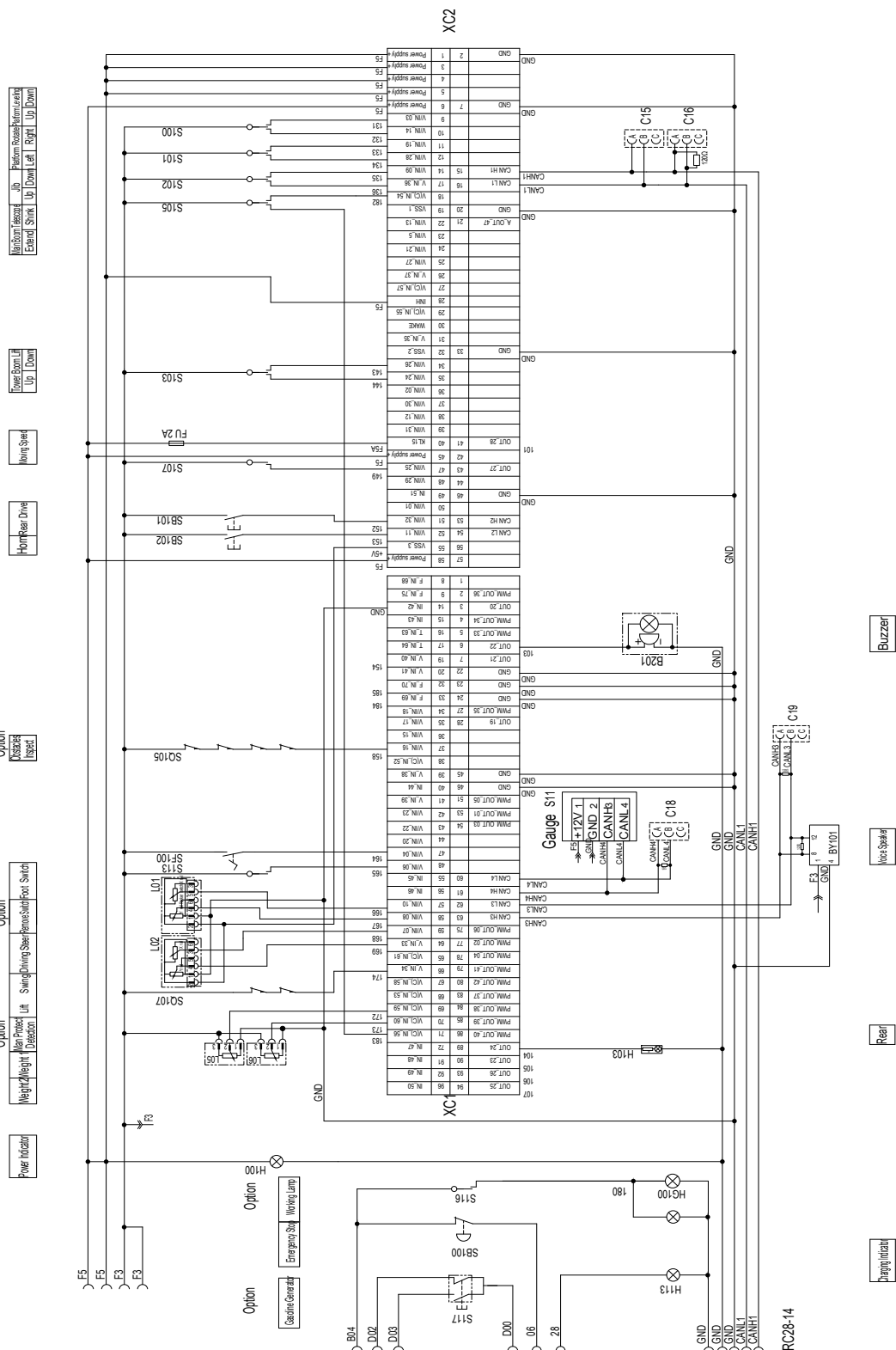


Figure 6-18 Electrical schematic diagram of platform (PN.103006063035)

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7 REXROTH 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.

This section is applicable to Rexroth control system.

DISPLAY INTERFACE

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).

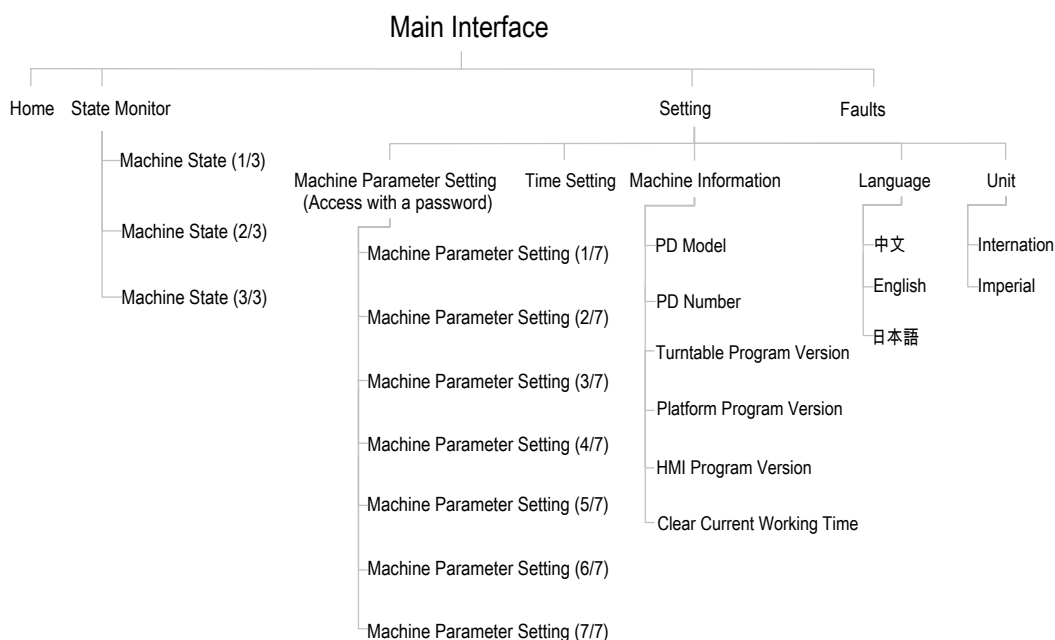


Figure 7-1 Display interface navigation diagram

HOME INTERFACE AFTER BOOTING

emergency stop button to the ON position, and turn the key switch to the ON position, the system will be powered on.

Turn the ground/platform select switch on the ground controller to the ground control position, pull out the



Figure 7-2 Home interface after booting

Table 7-1

1. Home	4. OK button	7. Right shift key/next page
2. State monitor/next page	5. Down shift key	8. Setting
3. Left shift key	6. Up shift key	9. Faults

STATE MONITOR

1. On the Home interface, press the corresponding button of “State Monitor” to enter the Machine State (1/3) interface.

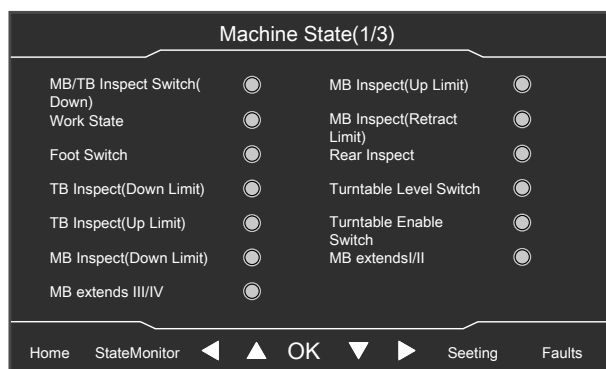


Figure 7-3 Machine State (1/3) interface

- The Machine State (1/3) interface is mainly used to query the signal detection status of the detection switches (such as travel switches and proximity switches) configured on the machine, to determine whether the detection switches are working normally and whether the working status of the machine meets the requirements. When the indicator light corresponding to one option lights up with the symbol , it means that the switch has detected a signal; when the indicator light is off, it means the switch has not detected a signal.
 - The configuration of switches is subject to the actual machine configurations.
2. On the Machine State (1/3) interface, press the right shift key to enter the Machine State (2/3) interface.

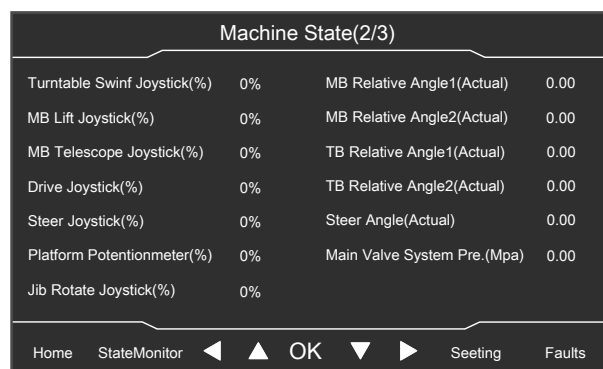


Figure 7-4 Machine state (2/3) interface

- This interface is mainly used to query the current actual value of each joystick/potentiometer and the actual value of the sensors configured on the machine, to check whether the position status of each joystick/potentiometer is normal, and to determine whether each sensor is working normally.
 - The configuration of switches is subject to the actual machine configurations.
3. On the Machine State (2/3) interface, press the right shift key to enter the Machine State (3/3) interface.

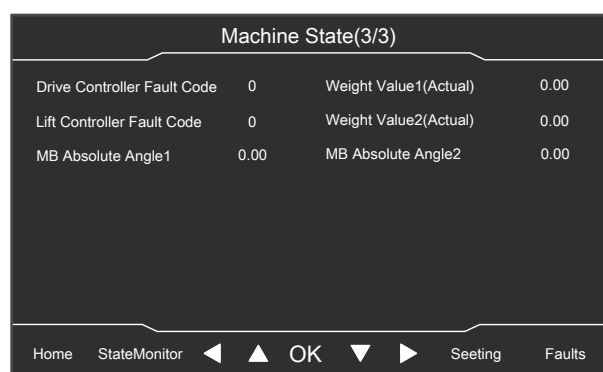


Figure 7-5 Machine state (3/3) interface

- This interface is mainly used to query the current fault codes of each motor controller and the actual value of the sensors configured on the machine, to check whether the status of each motor controller is normal, and to determine whether each sensor is working normally.

- 4. Press the corresponding button of Home interface to return to the Home interface, and power off the machine as needed.

FAULT INQUIRY

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

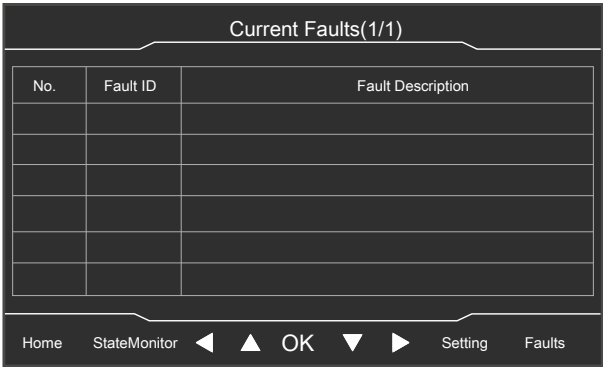


Figure 7-6 Current Faults interface

- 2. Press the corresponding key of Home interface to return to the Home interface, and power off the machine as needed.

PARAMETER SETTING



Personnel who have not been professionally trained and authorized by Sinoboom are not allowed to modify the options in parameter setting (including joystick calibration, sensor calibration, standardization setting, overload limit setting, travel limit setting, interlock unlocking and position parameter setting); otherwise they will be responsible for the consequences.

On the Home interface, press the corresponding key of “Setting” to enter the System Setting interface.

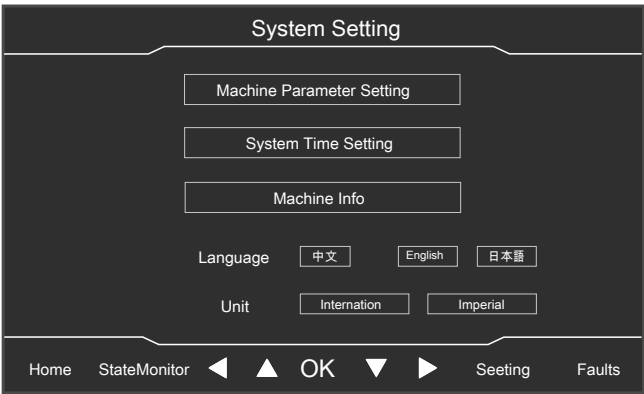


Figure 7-7 System Setting interface

Machine Parameter Setting

- 1. On the System Setting interface, select Machine Parameter Setting through the up shift key and down shift key, and press OK button to enter Machine Parameter Setting (1/7) interface.

Note: A password is required to enter this interface. Use the left shift key and right shift key to change the selected item, and use the up shift key and down shift key to adjust the value of the selected item.

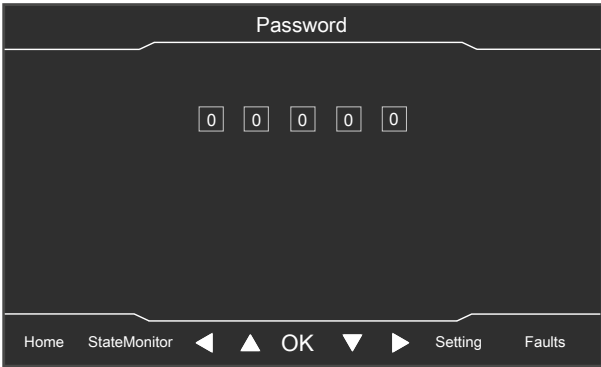


Figure 7-8 Password interface

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

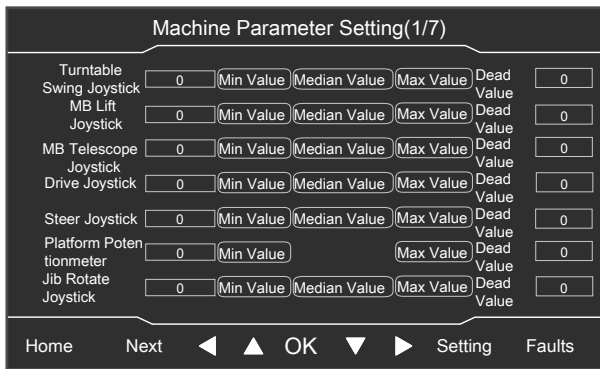


Figure 7-9 Machine Parameter Setting (1/7) interface

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

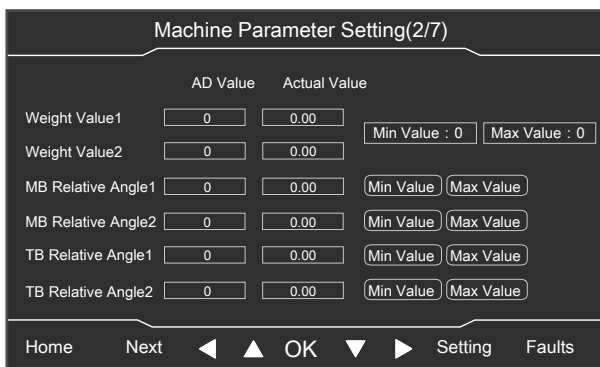


Figure 7-10 Machine Parameter Setting (2/7) interface

- **Weight calibration**

NOTICE

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

- 1) Make sure that no heavy objects are placed on the platform and that the platform is stable without shaking.
- 2) Enter the Machine Parameter Setting (2/7) interface, select the "Min Value" through the up shift key, down shift key, left shift key and right shift key, adjust the value to 0 through the up shift key and down shift key, press and hold the OK button for 3 seconds to complete the no-load calibration.
- 3) Place a heavy object with the weight equal to the rated load of the machine on the platform, and ensure that the platform is stable without shaking.
- 4) Select the "Max Value" through the left shift key and right shift key, adjust the value to the weight value of the heavy object on the platform through the up shift key and down shift key, press and hold the OK button for 3 seconds to complete the full-load calibration (the actual value corresponding to the weight value on the left side of the display screen is equal to the weight value of loads on the platform).
- 5) If re-calibration is required, press the corresponding button of Setting to return to the System Setting interface, then re-enter the Machine Parameter Setting (2/7) interface, and repeat the previous steps.
- 6) Press the corresponding button of Home interface to return to the Home interface, and power off the machine as needed.

- **Sensor calibration**

NOTICE

If the machine is equipped with a dual-channel sensor, only 1 channel is needed to be selected for maximum and minimum value calibration.

- 1) Enter the Machine Parameter Setting (2/7) interface, select the position to be calibrated through the up shift key, down shift key, left shift key and right shift key, press and hold the OK button for 3 seconds to complete the calibration (after successful calibration, the corresponding actual value will be changed).

- 2) If re-calibration is required, press the corresponding button of Setting to return to the System Setting interface, then re-enter the Machine Parameter Setting (2/7) interface, and repeat the previous steps.
- 3) Press the corresponding button of Home interface to return to the Home interface, and power off the machine as needed.
4. On the Machine Parameter Setting (2/7) interface, press the corresponding button of next page to enter Machine Parameter Setting (3/7) interface, which is mainly used for sensor calibration. Perform calibration referring to the above steps.

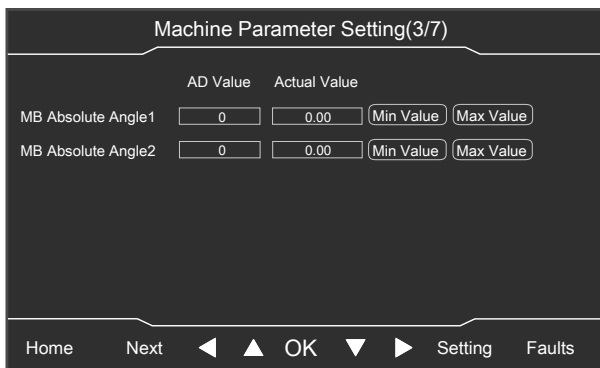


Figure 7-11 Machine Parameter Setting (3/7) interface

5. On the Machine Parameter Setting (3/7) interface, press the corresponding button of next page to enter Machine Parameter Setting (4/7) interface.

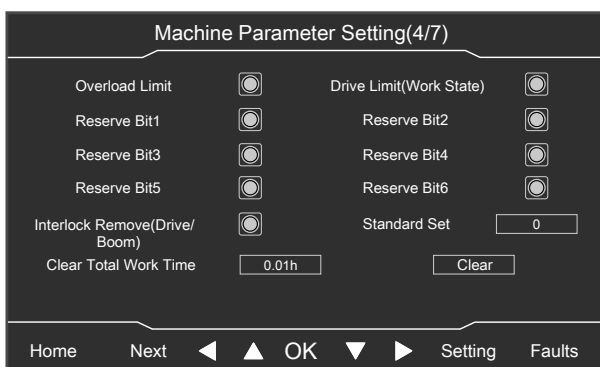


Figure 7-12 Machine Parameter Setting (4/7) interface

- 1) On the interface, select the required standard or function through the up shift key, down shift key, left shift key and right shift key.
- 2) **Overload limit setting:** Select the Overload Limit option, and press and hold the OK button for 3s to confirm the setting. The corresponding indicator light will be light up with  after

successful setting , and the KG icon () will be displayed in the upper right corner of the Home interface.

- 3) **Drive Limit (work state) setting:** Select the Drive Limit option, and press and hold the OK button for 3s to confirm the setting. The corresponding indicator light will be light up with  after successful setting, and the DR icon () will be displayed in the upper right corner of the Home interface.

- 4) **Interlock Remove (Drive/Boom) setting:** Select the Interlock Remove (Drive/Boom) option, and press and hold the OK button for 3s to confirm the setting. The corresponding indicator light will be light up with  after successful setting, and the D/B icon () will be displayed in the upper right corner of the Home interface.

- 5) **Standard setting:** Select the Standard Set option, change the value through the up shift key and down shift key, and press and hold the OK button for 3s to confirm the setting. The corresponding indicator light will be light up with  after successful setting.

- After changing the value to “0” and confirming the setting, the program will not implement any standard restrictions.
- After changing the value to “1” and confirming the setting, the program will implement the restrictions of CE standard, and the icon of CE standard () will be displayed in the upper right corner of the Home interface.
- After changing the value to “2” and confirming the setting, the program will implement the restrictions of ANSI standard, and the icon of ANSI standard () will be displayed in the upper right corner of the Home interface.
- After changing the value to “3” and confirming the setting, the program will implement the restrictions of CSA standard, and the icon of CSA standard () will be displayed in the upper right corner of the Home interface.
- After changing the value to “4” and confirming the setting, the program will implement the restrictions of AS standard, and the icon of AS standard () will be displayed in the upper right corner of the Home interface.
- After changing the value to “5” and confirming the setting, the program will implement the restrictions of KCS standard, and the icon of KCS standard () will be

displayed in the upper right corner of the Home interface.

- After changing the value to “6” and confirming the setting, the program will implement the restrictions of JIS standard, and the icon of JIS standard () will be displayed in the upper right corner of the main interface.
- After changing the value to “7” and confirming the setting, the program will implement the restrictions of EAC standard, and the icon of EAC standard () will be displayed in the upper right corner of the main interface.
- After changing the value to “8” and confirming the setting, the program will implement the restrictions of UKC standard, and the icon of UKC standard () will be displayed in the upper right corner of the main interface.

- 6) **Reserve Bit setting:** the reserve bit is reserved for later use. Select the Reserve Bit option, and press and hold the OK button for 3s to confirm the setting. The corresponding indicator light will be light up with  after successful setting.
- 7) **Clear Total Work Time setting:** Select the Clear option, and press and hold the OK button for 3s to complete the clearing. The total work time can only be cleared once (after clearing, the total work time is about 36.5h), so please use the function with caution.
- 8) If re-selection is required, press the corresponding button of Setting to return to the System Setting interface, then enter the Machine Parameter Setting (4/7) again and repeat the previous steps to select the required option.
- 9) Press the corresponding button of Home interface to return to the Home interface, and power off the machine as needed.

Note:

- Under the KG mode, all motions of the machine in operating position will be restricted when the platform is overloaded. For the differences between the KG mode and non-KG mode, refer to the **Test Weighing System** section in the maintenance procedures of this manual.
- Under the DR mode, the drive function will be restricted when the machine is in operating position.
- Under the D/B mode, the drive function and boom movement can be performed at the same time.

6. On the Machine Parameter Setting (4/7) interface, press the corresponding button of next page to enter Machine Parameter Setting (5/7) interface.

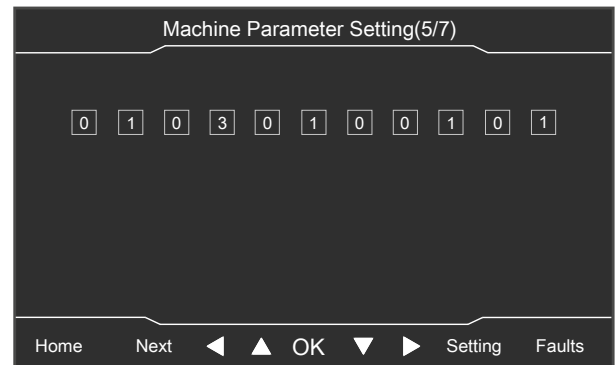


Figure 7-13 Machine Parameter Setting (5/7) interface

- 1) On the interface, the machine number can be set. Change the selected option through the left shift key and right shift key, and adjust the value through the up shift key and down shift key, press the OK button to confirm and save the setting.
 - 2) If re-setting is required, press the corresponding button of Setting to return to the System Setting interface, then enter the Machine Parameter Setting (5/7) again and repeat the previous steps.
 - 3) Press the corresponding button of Home interface to return to the Home interface, and power off the machine as needed.
7. On the Machine Parameter Setting (6/7) interface, press the corresponding button of next page to enter Machine Parameter Setting (7/7) interface. On the interface, select the “Restore Total Hour” option, then press the OK button, and 6 minutes later, the total work time of the machine can be restored.

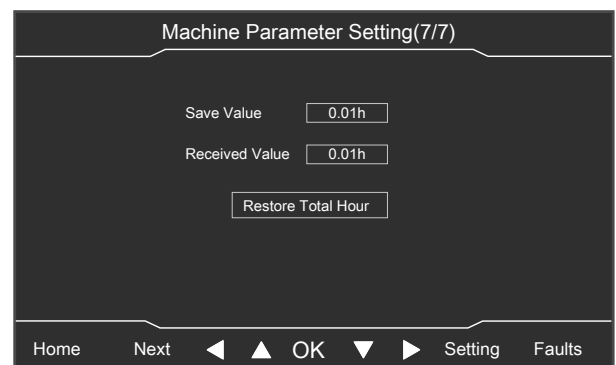


Figure 7-14 Machine Parameter Setting (7/7) interface

Note:

- The controller collects the working time of the machine and sends data to the display screen every 6 minutes. The Received Value is the data received by the display screen; the Save Value is the data saved by the display screen. The Received Value and Save Value are the same normally.
- If a new controller is installed after the machine operates for a period of time, the Received Value will be 0, and the Save Value is the total working hour of the machine. Select the "Restore Total Hour" option, then press the OK button, and 6 minutes later, the Received Value can be restored to the total working hour of the machine.

Time setting

- On the System Setting interface, select Time Setting through the up shift key and down shift key, and press the OK button to enter Time Setting interface.

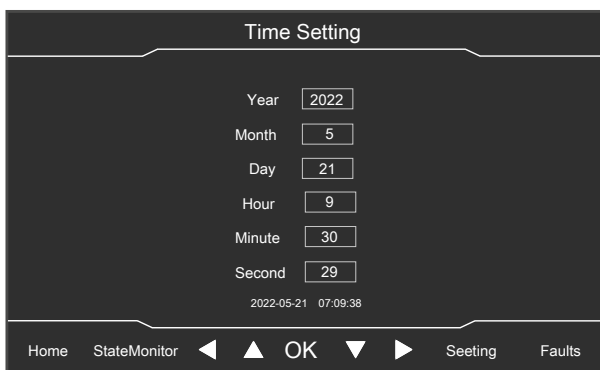


Figure 7-15 Time Setting interface

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

Machine information

- On the System Setting interface, select the "Machine Info" through the up shift key and down shift key to enter the Machine Information interface.

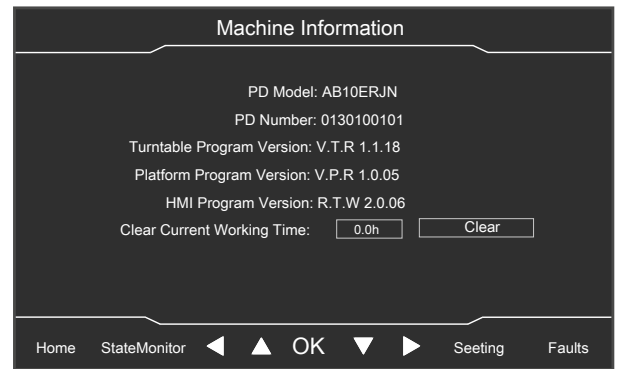


Figure 7-16 Machine Information interface

- This interface is mainly used to query the detailed information of the current software program version of the machine and to clear the current working time.
- Select the "Clear" option, press and hold the OK button for 3 seconds to complete the clearing of the current working time.
- Press the corresponding button of Home interface to return to the Home interface, and power off the machine as needed.

Language setting

- On the Home interface, press the corresponding button of "Setting" to enter the System Setting interface.

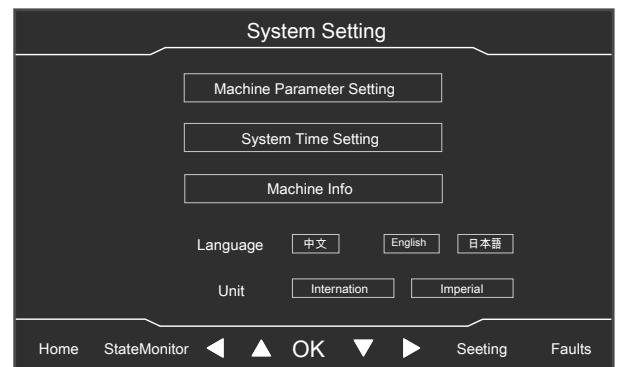


Figure 7-17 System Setting interface

- Change the selected item through the up shift key, down shift key, left shift key and right shift key, and press the OK button to complete language setting.

Unit setting

- On the Home interface, press the corresponding button of "Setting" to enter the System Setting interface.

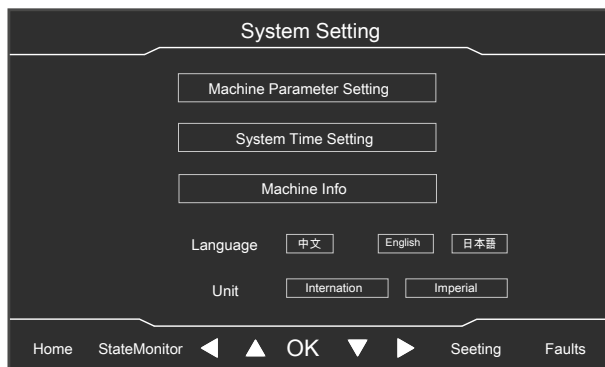


Figure 7-18 System Setting interface

2. Change the selected item through the up shift key, down shift key, left shift key and right shift key, and press the OK button to complete unit setting.

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APPENDIX 1: PREPARE THE WORK RECORD BEFORE DELIVERY

PREPARE THE WORK RECORD BEFORE DELIVERY			
Model			
Serial No.			
Inspection Item	YES/Machine is in Good Condition	NO/Machine Has Damage or Malfunction	REPAIRED/Machine Has Been Repaired
Pre-operational Inspection			
Maintenance Procedure			
Functional Inspection			
Machine Buyer/ Renter			
Inspector Signature			
Inspector Title			
Inspector Company			
NOTE: 1. Prepare the machine before delivery, which includes performing a pre-delivery inspection, following maintenance procedures and performing functional inspections. 2. Use the table to record the results. After each section is complete, mark the appropriate box. 3. Record the inspection results. If any inspection result is "NO", the machine must be stopped, and then re-inspected after repair is completed, and the box marked "REPAIRED" shall be checked.			

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APPENDIX 2: REPAIR & INSPECTION REPORT

Repair & Inspection Report				
Model				
Serial No.				
Checklist A Procedures				
Items	YES/Machine is in Good Condition	NO/Machine Has Damage or Malfunction	REPAIRED/ Machine Has Been Repaired	Problem Description
A-1 Inspect All Manuals				
A-2 Inspect All Decals				
A-3 Inspect Damaged, Loose or Lost Parts				
A-4 Inspect Hydraulic Oil Level				
A-5 Inspect Hydraulic Oil Leakage				
A-6 Functional Tests				
A-7 Perform Maintenance after 30 Days				
A-8 Check Battery Level				
Checklist B Procedures				
Items	YES/Machine is in Good Condition	NO/Machine Has Damage or Malfunction	REPAIRED/ Machine Has Been Repaired	Problem Description
B-1 Inspect Electrical Wiring				
B-2 Inspect Battery				
B-3 Inspect Rim, Tire and Fasteners				
B-4 Inspect Hydraulic Oil				
B-5 Inspect and Replace Return Filter Element				
B-6 Inspect Maximum Operating Range				
B-7 Inspect Slewing Bearing Bolts				
B-8 Lubricate Slewing Bearing				

Repair & Inspection Report				
B-9 Inspect Air Filter of Hydraulic Tank				
B-10 Replace High-Pressure Filter				
B-11 Inspect Drive Reducer Oil Level				
B-12 Inspect Platform Rotate Cylinder Fasteners				
B-13 Test Tilt Protection System				
B-14 Test Drive Speed				
B-15 Test Emergency Lowering Function				
B-16 Test Cylinder Drift				
B-17 Test Braking Distance				
Checklist C Procedures				
Items	YES/Machine is in Good Condition	NO/Machine Has Damage or Malfunction	REPAIRED/ Machine Has Been Repaired	Problem Description
C-1 Replace Hydraulic Tank Air Filter				
C-2 Test Weighing System				
Checklist D Procedures				
Items	YES/Machine is in Good Condition	NO/Machine Has Damage or Malfunction	REPAIRED/ Machine Has Been Repaired	Problem Description
D-1 Inspect Boom Wear Pads				
D-2 Replace Drive Reducer Gear Oil				
D-3 Replace Hydraulic Oil				
D-4 Replace Hydraulic Tank Suction Filter				
User				
Inspector Signature				
Inspection Date				
Inspector Title				
Inspector Company				

APPENDIX 3: MAJOR MODIFICATION AND REPAIR RECORD

Major Modification and Repair Record					
Model					
Serial No.					
Date	Problem Description	Modification/Repair Item	Machine Status after Change	Repairman's Company and Position	Repairman Signature

Note:

1. A major modification/repair is a modification/repair made to all or part of a machine that affects the stability, strength or performance of the machine.
2. Use this form to record major modifications/repairs made to the machine. 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 maintenance and inspection report.
4. If the inspection result of each item in the Maintenance and Inspection Report is "YES", the "Machine Status after Modification/Repair" in the form will be "Good" and the machine can be used. If either inspection result is "NO", the machine must be re-inspected after the repair is completed until the machine is in "Good" condition before continuing to use the machine.

Always for Better Access Solutions



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