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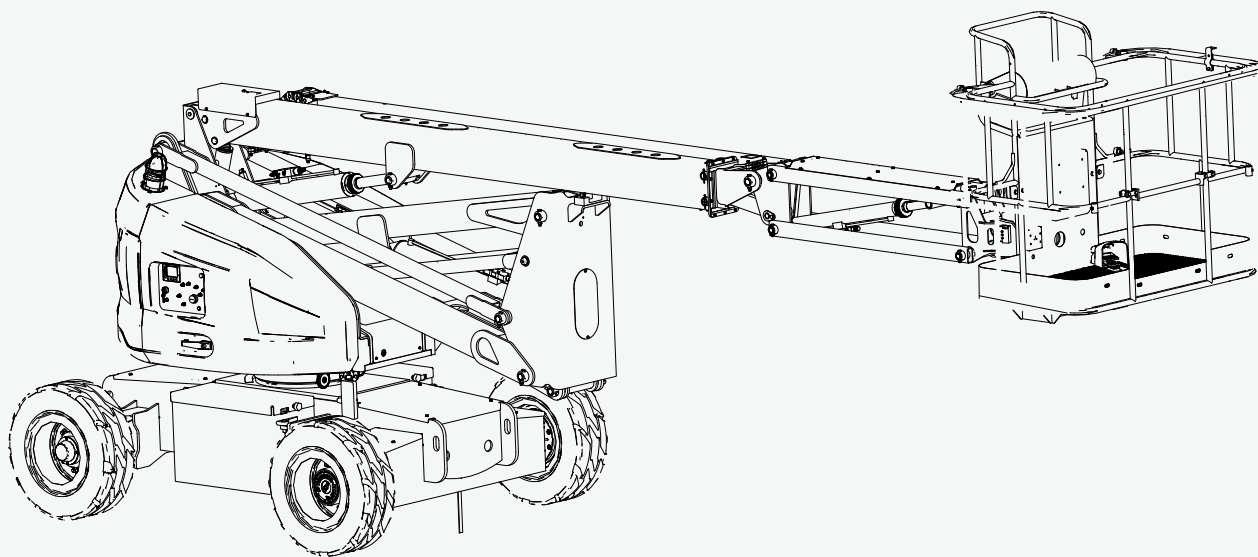
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Aug 2020

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.

Manual revision history :

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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	AB480EJ	From 030060010 to present
GTZZ16EJ	AB16EJ	AB520EJ	From 030070010 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, obtain proper training on safe machine operation and make sure you can safely control and operate the machine.

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.

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.

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

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](#), [page 1-2](#).

SAFETY

 **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](#), [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.

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

Table 1-1

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)

TIPPING HAZARDS AND RATED LOAD

Maximum rated load bearing capacity of the platform:

Table 1-2

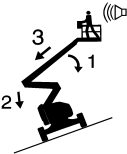
GTZZ14EJ	
Metric	230kg (unrestricted/2 persons & tools)

⚠ WARNING

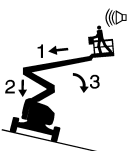
TIPPING HAZARDS



- 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 (55kg[121 lb]) or lithium battery (75kg[165 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

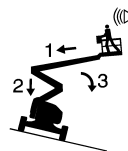
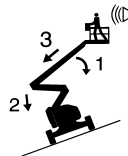
TIPPING HAZARDS

- 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 (18 mph). If the wind speed exceeds 12.5 m/s (18 mph) after the platform is lifted, fold the platform and do not continue to operate 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.

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.

UNSAFE OPERATION HAZARDS

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

SAFETY

 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 tiedown/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 the ones 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 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, it also serves as a counterweight. The battery is vital to maintaining the stability of the machine.
- Do not place or attach any suspended load onto any part of the machine.

 WARNING**UNSAFE OPERATION HAZARDS**

- 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 rope 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 a 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.

FALL HAZARDS

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

⚠ 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.

⚠ 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.
- Limit the speed of travel according to ground conditions, crowding, gradients, the presence and location of personnel and any

COLLISION HAZARDS

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

SAFETY

 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.
- Never operate a machine dangerously or for fun.

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.

**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.

DAMAGED MACHINE HAZARDS**NOTICE**

To avoid machine damage, follow all operation and maintenance requirements in this 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 this manual and the corresponding *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 this 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.

⚠ 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.
- Always wear protective glasses or goggles and protective clothing when working with batteries. 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.

⚠ WARNING**BATTERY HAZARD**

- 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.
- During the assembling or disassembling process, never use the battery in a forcible manner, and never allow the battery to fall off.
- Never directly short-circuit the battery outputs with electrical cords.
- Should the battery acid spill out, use bicarbonate (baking soda) mixed with water to neutralize the acid.
- Never store the battery in water or humid atmosphere.
- Daily check the battery cable for damage, and replace any damaged parts before operating the machine.
- Do not expose the battery or charger to water/rain during charging.

NOTICE

After charging the battery, be sure that:

- *The battery cable connections are free of corrosion.*
- *The battery hold-down and cable connections are secured.*

Adding terminal protection and anti-corrosion sealants will help reduce corrosion of the battery terminals and cables.

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 this 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.

NOTICE

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

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.

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2 SPECIFICATIONS

PERFORMANCE PARAMETERS

Table 2-1 GTZZ14EJ specifications

MEASURE	AB14EJ (METRIC)	AB480EJ (IMPERIAL)
DIMENSION PARAMETERS		
Max platform height	14 m	45 ft 11 in
Max working height	16 mm	152 ft
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 240/55D17.5/foam-filled 240/55D17.5/foam-filled non-marking	
Platform dimension (L×W×H)	1.45×0.85×1.1 m	57×33.5×43 in
PERFORMANCE PARAMETERS		
Platform capacity	230 kg (unrestricted / 2persons&tools)	507 lb (unrestricted / 2persons&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
Turning radius (outside)	3.51 m	11 ft 6.2 in
Max allowable side force	400 N	90 lbf

SPECIFICATIONS

MEASURE	AB14EJ (METRIC)	AB480EJ (IMPERIAL)
Max operating noise level	72dB	
IP grade	IP54	
POWER PARAMETERS		
Engine (rated power, rated rpm)	3.56Kw, 29VAC	
Hydraulic tank capacity	40 L	8.8 gal (UK) / 10.6 gal (US)
Fuel tank capacity	52 L	11.4 gal (UK) / 13.7 gal (US)
Hydraulic system pressure	21 MPa	3045 Psi
Battery (number×voltage, capacity)	8×6V, 420Ah	
System voltage	12 VDC	
Control voltage	12 VDC	
GROUND BEARING DATA		
Max tire load	3580 kg	7893 lb
Tire contact pressure	724.9 kPa	105.1 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)	7100kg	15653 lb

Note :

- a) The working height adds 2m(6ft7in) of human height to platform height.
- b) The ground bearing data is approximate value, not factoring the different options, thus it serves only in adequately safe conditions
- c) In different areas, hydraulic oil, engine oil, coolant, fuel and lubrication should be added in accordance with the environmental temperature.
- d) In cold weather, auxiliary devices are needed to start the machines

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

MEASURE	AB16EJ (METRIC)	AB520EJ (IMPERIAL)
Max horizontal reach	9.3 m	30 ft 6 in
Max up and over height	7.8 m	25 ft 7 in
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 240/55D17.5/foam-filled 240/55D17.5/foam-filled non-marking	
Platform dimension (L×W×H)	1.83 × 0.85 × 1.1 m	72 × 33.5 × 43 in
PERFORMANCE PARAMETERS		
Platform capacity	230 kg (unrestricted / 2persons&tools)	507 lb (unrestricted / 2persons&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 grade	IP54	
POWER PARAMETERS		
Engine (rated power, rated rpm)	3.56Kw, 29VAC	
Hydraulic tank capacity	40 L	8.8 gal (UK) / 10.6 gal (US)
Fuel tank capacity	52 L	11.4 gal (UK) / 13.7 gal (US)
Hydraulic system pressure	21 MPa	3045 Psi
Battery (number×voltage, capacity)	8×6V, 420Ah	
System voltage	12 VDC	
Control voltage	12 VDC	

SPECIFICATIONS

MEASURE	AB16EJ (METRIC)	AB520EJ (IMPERIAL)
GROUND BEARING DATA		
Max tire load	3760 kg	8289 lb
Tire contact pressure	740.1 kPa	107.3 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 :

- a) The working height adds 2m(6ft7in) of human height to platform height.
- b) The ground bearing data is approximate value, not factoring the different options, thus it serves only in adequately safe conditions
- c) In different areas, hydraulic oil, engine oil, coolant, fuel and lubrication should be added in accordance with the environmental temperature.
- d) In cold weather, auxiliary devices are needed to start the machines

MAJOR COMPONENT WEIGHTS

 **WARNING**

UNSAFE OPERATION HAZARD



- Do not move heavy components without mechanical assistance.**
- Do not place heavy component upon instable surface.**

Table 2-3

Component	GTZZ14EJ	GTZZ16EJ
Chassis assembly	1856 kg(4091.8 lb)	1907 kg(4204.2 lb)
Turntable assembly	3408.4 kg(7514.2 lb)	3415.44 kg(7529.7 lb)
Boom assembly	1281.5 kg(2825.2 lb)	1351.2 kg(2978.9 lb)

Component	GTZZ14EJ	GTZZ16EJ
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	180.1 kg(397 lb)	180.1 kg(397 lb)
Linkage	25.5 kg(56.2 lb)	25.5 kg(56.2 lb)
Upper linkage frame	59 kg(130 lb)	59 kg(130 lb)
Upper foldable boom	92.7 kg(204.4 lb)	92.7 kg(204.4 lb)
Steer cylinder	24.9 kg(54.9 lb)	24.9 kg(54.9 lb)
Platform	146.3 kg(322.5 lb)	146.3 kg(322.5 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)
Main boom telescopic cylinder	51.3 kg(113 lb)	51.3 kg(113 lb)
Foldable boom telescopic cylinder	79.3 kg(174.8 lb)	79.3 kg(174.8 lb)
Main boom level cylinder, upper	17.7 kg(39 lb)	17.7 kg(39 lb)
Main boom level cylinder, lower	18.3 kg(40.3 lb)	18.3 kg(40.3 lb)
Main boom lift cylinder	77.4 kg(170.6 lb)	77.4 kg(170.6 lb)
Foldable boom lift cylinder	79.3 kg(174.8 lb)	79.3 kg(174.8 lb)

POWER SYSTEM SPECIFICATIONS

Table 2-4

ITEM	SPECIFICATION
Hydraulic Oil	
Normal temperature region (0°C~40°C [32°F~104°F])	L-HV32
Cold temperature region (-25°C~25°C [-13°F~77°F])	L-HV32
High temperature region (> 40°C [104°F])	L-HM68
Extremely cold temperature region (< -30°C [-22°F])	Special program to be determined
Hydraulic Pump	
Type	Gear pump
Flow (rated rpm=2200r/min)	9.9 L/min

SPECIFICATIONS

ITEM	SPECIFICATION
Max drive pressure	21 MPa (3045 Psi)
Function Manifold	
Boom function valve pressure	21 MPa (3045 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 2-5 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 2-6 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)
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 inch thread (British Standard Pipe [BSP]) must be torqued to the following specifications.

Table 2-7 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)	-

SPECIFICATIONS

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

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

Table 2-8 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)

THREAD SIZE	INSTALLED INTO ALUMINUM	INSTALLED INTO STEEL
	O-RING	O-RING
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 TORQUE PROCEDURE

The hydraulic hose and fitting must be torqued to the following requirements when they are installed.

1. Replace the O-ring if damaged. The O-ring cannot be reused if the fitting or hose end has been tightened beyond finger tight.
2. Lubricate the O-ring before installation.
3. Properly seat the O-ring.
4. Position the tube and nut squarely on the fitting. Then tighten the nut as required.
5. Tighten the nut or fitting to the torque specified in the appropriate table.
6. Operate 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 2-9 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)

SPECIFICATIONS

NOMINAL DIAMETER (MM)	PITCH (MM)	CLASS 8.8	CLASS 10.9	CLASS 12.9
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 2-10 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 2-11 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)

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3 SYSTEM DESCRIPTIONS

POWER SYSTEM

Machines are powered by eight 6V lead acid battery in series or two 24V lithium battery in series to drive a 48V DC motor. Gear pump and motor output shaft is splined to provide power to the system.

HYDRAULIC SYSTEM

The hydraulic system of the machine can be divided into two parts: one for boom functions, and the other for steering control.

When the machine is activated, the hydraulic pump sends pressure oil to the boom function manifold which is equipped with solenoid directional valves and proportional flow control valves for completing various boom functions. To protect relevant components and avoid pressure overload, the function manifold is provided with a relief valve.

ELECTRICAL SYSTEM

In the electrical system, machines are powered by eight 6V lead acid battery in series or two 24V lithium battery in series to drive a 48V DC motor for controlling boom functions and drive/steer functions.

MACHINE CONTROL SYSTEM

The machine functions are controlled by two controllers, one installed on the turntable (turntable control box), and the other on the platform (platform control box). The controller communicates signals through a high-speed data bus.

SAFETY MEASURES

A series of angle sensors and limit switches provide signals for the controller. The level sensor measures the inclinations in X axis and Y axis directions of the chassis. When the inclined angle in X axis or Y axis

exceeds 5°, the alarm will go off and restricts such functions as lift, travel and steer.

The weighing system is designed for restricting the load on platform. When the load on platform exceeds the platform capacity (see [Performance Parameters, page 2-1](#)), the buzzer beeps continuously, the weight indicator lamp flashes at an interval of 0.5s, and the screen indicates an overload. For the functions restricted, please refer to [C-2 Test Weighing System, page 5-14](#).

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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,

SERVICE AND GUIDELINES

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

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

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. Use adjustable lifting devices, whenever possible, if mechanical assistance is required. All slings (-chains, cables, etc.) should be parallel to each other and as near perpendicular as possible to top of part being lifted.
2. 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

SERVICE AND GUIDELINES

between the supporting structure and the component becomes less than 90 degrees.

3. 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.

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 2-9](#))

HYDRAULIC LINES AND ELECTRICAL WIRING

Clearly mark or tag hydraulic lines and electrical wiring, as well as 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.

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.

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.

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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.

Observe the following rules :

- Maintenance inspections shall be completed only by a person trained and qualified on the maintenance of this machine.
- Routine maintenance inspection contains the inspection items to be performed daily for normal machine operation. The service technician must perform the routine maintenance inspection and complete the report in details.
- Scheduled maintenance inspection shall be completed quarterly, half-yearly, and annually. The service technician must perform the scheduled maintenance inspection and complete the report in details.
- Timely tag and remove from service a damaged or malfunctioning machine.
- Repair any machine damage or malfunction before operating machine.
- Keep all inspection records for at least 10 years or until the machine has been removed from service or as required by the machine owner/company/keeper.
- Machines that have been out of service for a period longer than 3 months must complete the quarterly inspection.
- The replacement parts used in the maintenance should be identical or equivalent to the original parts.
- 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.
- Before releasing or removing the hydraulic components, release the hydraulic oil pressure in the hydraulic circuit, particularly with the counterweight valve.

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

MAINTENANCE PROCEDURES

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. 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

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

Check the machine for any damaged, improperly installed, loose or lost parts and unauthorized changes:

- Electrical components, wirings and cables
- 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)
- Guardrail and entry gate
- 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.

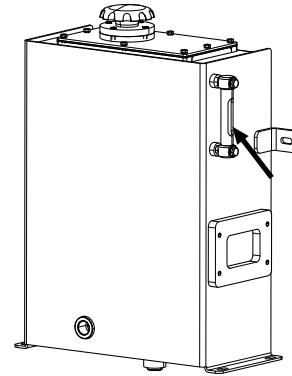


Figure 5-1

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

Table 5-3

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.

MAINTENANCE PROCEDURES

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
- All hydraulic valves
- Areas around the machine

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.

A-6 Functional Tests

Testing each machine function is vital to safe machine operation. If any function operates improperly, it will

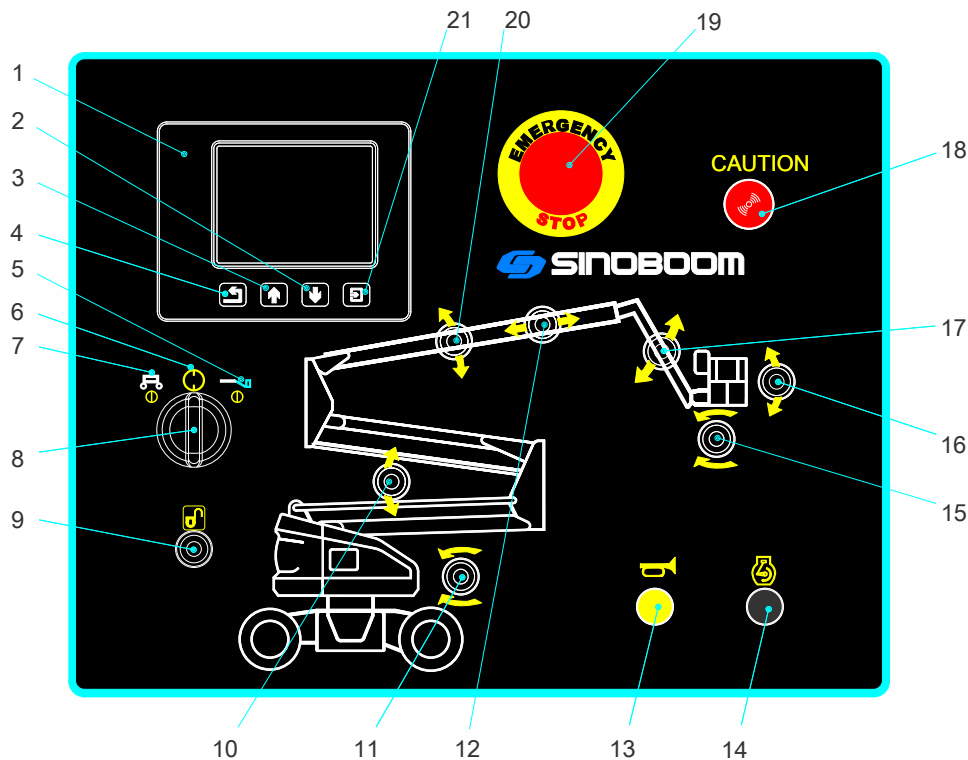
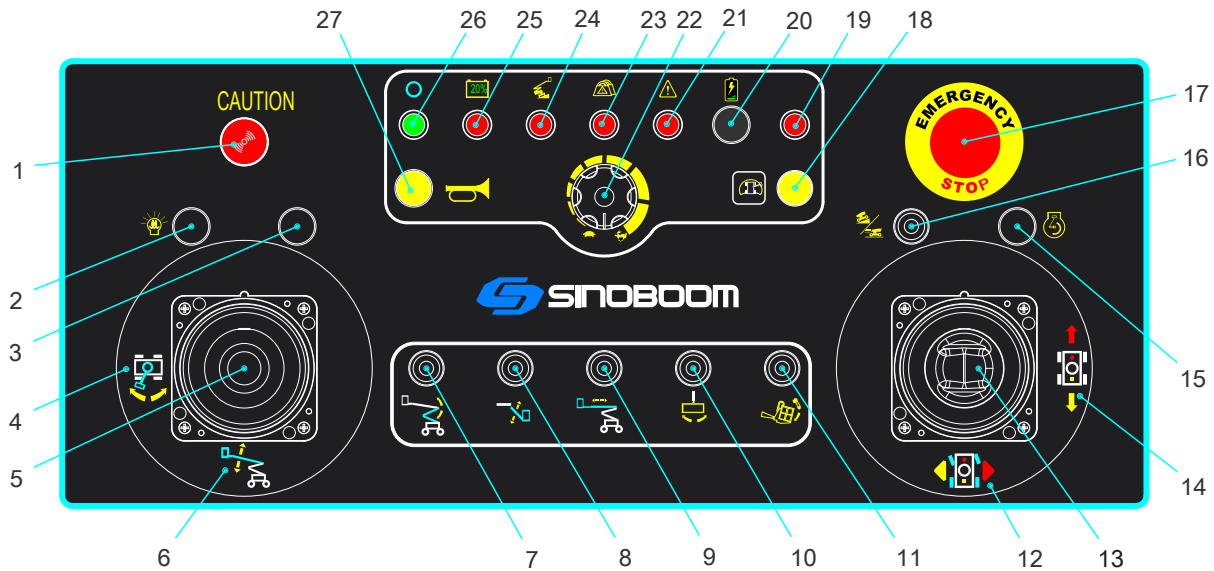


Figure 5-2 Ground Controller

Table 5-4

1. CAN bus diagnostic monitor (fault display)	8. Key switch (Ground/Platform select switch)	15. Platform swinging switch
2. Down key	9. Enable switch	16. Platform leveling switch

3. Up key	10. Foldable boom up/down switch	17. Jib up/down switch
4. Escape key	11. Turntable slewing switch	18. Buzzer
5. Platform control position	12. Main boom telescoping switch	19. Emergency stop button
6. OFF (neutral) position	13. Horn	20. Main boom up/down switch
7. Ground control position	14. Petrol generator switch (if equipped)	21. Enter key


Figure 5-3 Platform controller
Table 5-5

1. Buzzer	10. Platform rotate switch	19. Rear detection indicator
2. Work light switch (if equipped)	11. Platform level switch	20. Charge indicator (if petrol generator is equipped)
3. Unused	12. Drive orientation	21. System distress indicator
4. Turntable rotate orientation	13. Drive/Steer proportional control handle	22. Speed regulator knob
5. Main boom lift/turntable rotate proportional control handle	14. Steer orientation	23. Overload indicator
6. Main boom up/down orientation	15. petrol generator switch (if equipped)	24. Chassis tilt indicator
7. Foldable boom up/down switch	16. Drive high/low speed select switch	25. Low battery indicator
8. Jib boom up/down switch	17. Emergency stop button	26. Power indicator
9. Main boom telescoping switch	18. Reverse drive switch	27. Horn

MAINTENANCE PROCEDURES

A-7 Inspect Battery Level

The battery level is identified through CAN bus diagnostic monitor (fault display) on the turntable controller.

Table 5-6

Battery level	Description
90-100%	Full battery level
70%	Battery level 70%
50%	Battery level 50%
30%	Battery level 30%
20%	Low battery level, get charged ASAP
10%	Very low battery level, machine functions get slow

NOTICE

Recharge the battery when the battery charge level is about 20%, it must be charged. Never recharge a completely discharged battery.

A-8 Inspect the Raised Limit Function

1. Park the machine on flat, level and firm ground.
2. Operate on the ground controller and raise the platform to the highest position.
3. Check the height of the platform at this point.

The test results are shown in the table below:

Table 5-7

Model	Test Result
GJZZ14EJ	The platform height reaches 14m (45ft 11in)
GJZZ16EJ	The platform height reaches 15.7m (51ft 6in)

A-9 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 procedure :

- B-3 Inspect rims, tires and fasteners
- B-7 Inspect slewing bearing bolts

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 :
 - Battery wiring harness
 - Charger wiring harness
 - Scissor harness
 - Power unit wiring harness
 - Junction box at ground controller
 - Junction box at platform controller
2. Inspect each flexible joint to be free of loosening, and each sensor wiring free of damage.

B-2 Inspect the battery

NOTE: Perform this procedure every 125 hours.

Good battery condition is important for the proper and safe operation of the equipment. The equipment components may be damaged and it might lead to hazardous conditions if the electrolyte level is inappropriate and the battery cable is damaged or is not connected firmly.

WARNING**ELECTRICAL SHOCK HAZARD**

Touching battery charger conductor might lead to death or serious injuries. Remove all earrings, wristwatches and other jewelry.

WARNING**BODILY INJURY HAZARD**

Lead-acid batteries and lead-acid maintenance-free batteries contain acid. Avoid acid overflow or contact with acid in lead-acid batteries and lead-acid maintenance-free batteries.

If battery acid spills, use water mixed with bicarbonate (baking soda) to neutralize the acid.

NOTICE

After the battery is fully charged, wear protective gloves for inspection.

Ensure the connection of the battery cable is not corroded.

Ensure the battery is firmly in place and the cable wiring is fastened.

NOTE: Add wiring end protectors and antiseptic sealants to help eliminate corrosion of the battery terminals and cables.

NOTE: Be sure to fully charge the battery before testing.

There are three types of batteries: lead-acid battery, lead-acid maintenance-free battery and lithium battery. Lithium battery and lead-acid maintenance-free battery are maintenance-free batteries.

INSPECT THE LEAD-ACID BATTERIES

- Wear protective clothing and goggles properly.
- Ensure that the connections of battery cable are not corroded.
- Ensure that the battery is installed properly and the cable connections are tight.
- Open the vent caps and test the density of the electrolyte of individual battery cells with a liquid density tester.

Result: Replace the battery if the electrolyte density of any battery cell is below 1.026.

- Inspect the electrolyte level. Add distilled water if the level is low. Do not overflow.
 - Install the vent caps
 - Connect the battery charger cable to the correct post on the battery (red to positive, black to negative).
 - Connect the charging plug to 220V socket.
- Result: The battery should be recharged normally, and the charge indicator should illuminate.

INSPECT THE MAINTENANCE-FREE BATTERIES

- Wear protective clothing and goggles properly.
- Ensure that the connections of the battery cable are not corroded.
- Ensure that the battery is installed properly and the cable is connected tightly.
- Connect the battery charger cable to the correct post on the battery (red to positive, black to negative).
- Connect the charging plug to 220V socket.

Result: The battery should be recharged normally, and the charge indicator should illuminate

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 6-6](#).
 - 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]).

MAINTENANCE PROCEDURES

NOTICE

Tighten the lug nuts prior to the first use or after each tire removal, inspect and retorque 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 5-16](#) for the replacement steps.

B-5 Test Braking Device

Braking device must operate smoothly and be in good condition for safe and proper operation of the machine. Do not operate the machine if the brakes make a grinding sound or other abnormal noise.

1. The machine only carries one person and is in the state of fully retracted.
2. Turn the key switch to the platform control position.
3. Operate the control handle to drive the machine on flat pavement at maximum speed. Then release the handle rapidly.
4. The machine brakes effectively.

5. The machine is fully loaded and is in the state of lifted.
6. Operate the control handle to drive the machine on flat pavement at maximum speed. Then release the handle rapidly.
7. The machine brakes effectively.

NOTICE

Park the machine on a slope with maximum gradient. The machine must not be able to slide.

B-6 Inspect Brake Manual Release Function

When the drive wheel hub loses power, the parking brake will engage as a safety measure. If the machine needs to be pulled or pushed to a place where it can be repaired or recharged, the operator must release the brake manually.



WARNING

CRUSH HAZARDS



The machine is on any slope and must fully cover the wheels before releasing the brakes, any failure to comply with this warning may result in injury or even death.

Method 1:

1. Wedge the tires to prevent the machine from rolling.
2. Ensure the chassis is fastened and the area is free of obstructions.
3. Make sure the battery power off switch is in the "OFF" position.
4. Remove two end cover bolts and brake cover.

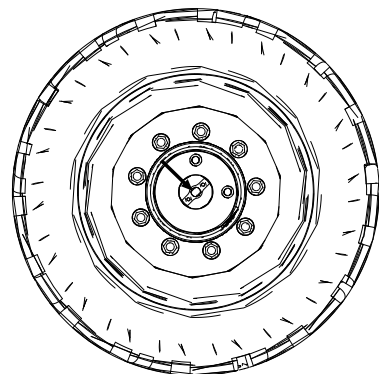


Figure 5-4

5. Insert the end cover bolt into the two separate holes on the brake housing.
6. Remove the center shaft and the brakes on the drive motor will detach.
7. The above steps are repeated in the drive of the other wheel. after the two drive motors have separated. the machine can be moved by human power.
8. After traction, pad the wheel and restore the center shaft and end cap.

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.

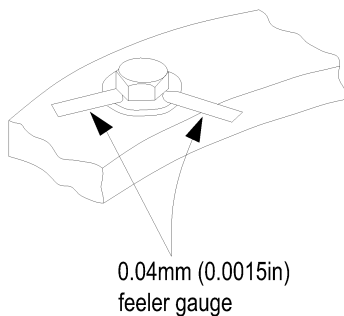


Figure 5-5

Inspecting the connecting bolts between chassis and slewing bearing

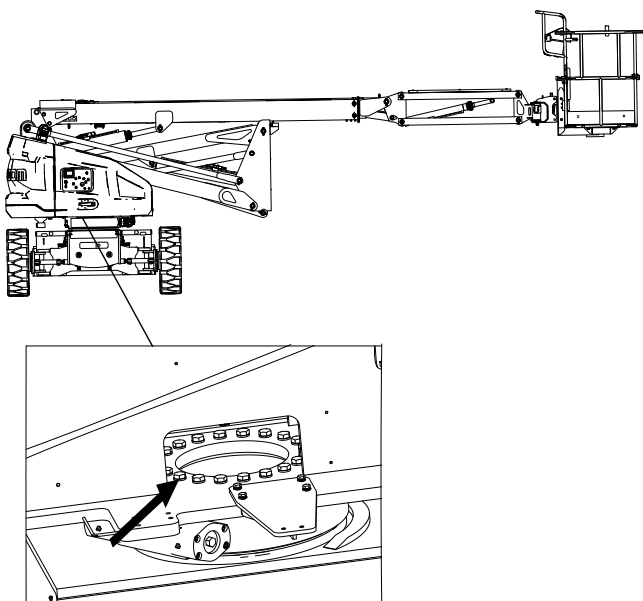


Figure 5-6

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 5-4 , page 5-9](#), 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

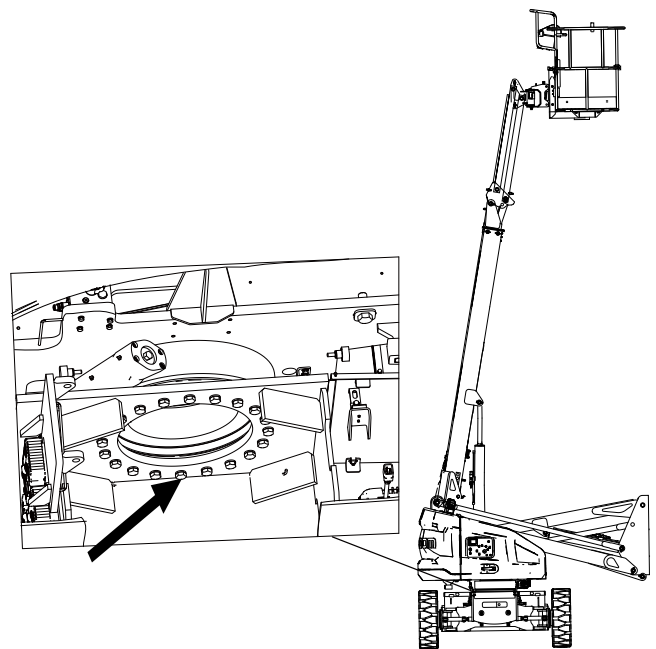


Figure 5-7

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 5-4 , page 5-9](#), 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 5-4 , page 5-9](#), insert 0.04mm feeler gauge in between the bolt and washer.

MAINTENANCE PROCEDURES

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 from 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.

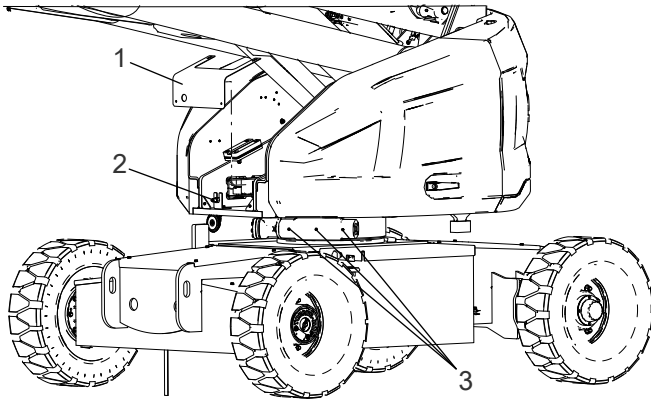


Figure 5-8

Table 5-8

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

1. To grease the slewing bearing from remote
 - 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 harsh operating environment.

NOTICE

Be sure to remove the key from the key switch. Never inspect on a machine that is in service.

1. Remove the air filter of hydraulic tank.

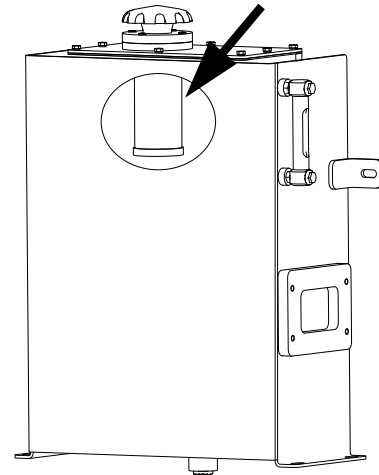


Figure 5-9

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

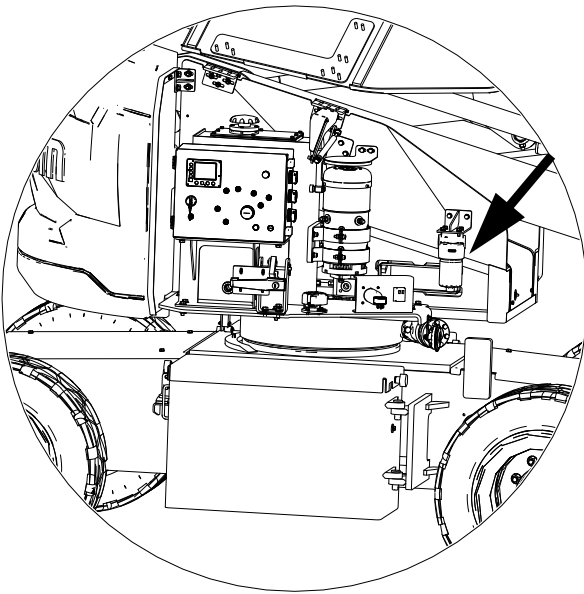
Replacing high-pressure filter on a regular basis is vital to proper machine operation and extending service life. A unqualified cleanliness or blocked filter could cause the machine to work improperly, and continued operation may result in component damage. The high-pressure filter should be replaced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

WARNING**BURN HAZARD**

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

NOTICE

Never inspect on a machine that is in service.

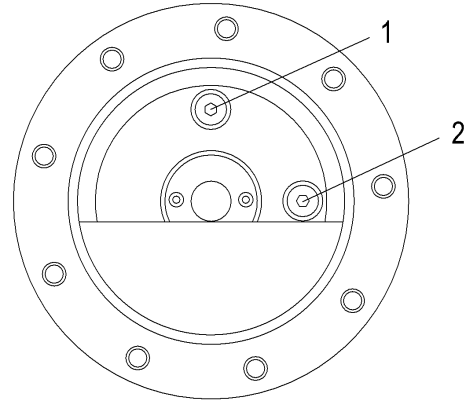


1. Open the left side cover of turntable, and locate the high-pressure filter.
2. Place a suitable vessel under the filter.
3. Remove the filter from the mounting bracket.
4. Replace the filter element as needed.
5. Clean up the hydraulic oil spills.
6. Start the machine from the ground controller.
7. 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 5-10**

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 Slewing Reducer Oil Level

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

1. Open the left side cover of turntable, and locate the slewing reducer.
2. Remove the plug of fill port to check the oil level.
3. The oil level should be even with the plug hole.
4. If the oil level is lower than the plug hole, add oil.
5. Add gear oil from the fill port until the oil level is even with the plug hole.
6. Install the plug back.
7. Clean up the gear oil spills during the inspection.

B-13 Test boom action time

Suitable lifting and lowering speed is vital to safe machine operation. The control and actuation functions should respond quickly and smoothly to the operator's operation without shakes, shocks or unusual sounds.

1. Place the machine on flat, level, obstacle-free and sold ground.

MAINTENANCE PROCEDURES

- Turn the Ground/Platform select switch on the ground controller to the ground control position.
- Pull out the emergency stop button on the ground controller to the ON position.
- Press and hold the enable button and foldable boom up/down switch to fully lift/lower the foldable boom.

Table 5-9

Model	Foldable boom up time	Foldable boom down time
GTZZ14EJ	40 ~ 48s	30 ~ 38s
GTZZ16EJ	40 ~ 48s	30 ~ 38s

- Press and hold the enable button and main boom up/down switch on turntable controller to fully lift/lower the main boom.

Table 5-10

Model	Main boom up time	Main boom down time
GTZZ14EJ	33 ~ 39s	29 ~ 35s
GTZZ16EJ	33 ~ 39s	29 ~ 35s

- Press and hold the enable switch and main boom telescope switch on turntable controller to fully extend/retract the main boom.

Table 5-11

Model	Main boom extend time	Main boom retract time
GTZZ14EJ	32 ~ 38s	19 ~ 25s
GTZZ16EJ	32 ~ 38s	19 ~ 25s

- 拨动转台控制箱的“使能开关”及“转台回转开关”在平台举升和收车两种状态下进行转台回转动作。

Table 5-12

Model	Turntable rotation time, platform raised	Turntable rotation time, platform stowed
GTZZ14EJ	115 ~ 125s	90 ~ 100s
GTZZ16EJ	115 ~ 125s	90 ~ 100s

- Press and hold the enable button and turntable slewing switch on turntable controller to rotate the turntable with platform raised and towed respectively.

Table 5-13

Model	Jib boom up time	Jib boom down time
GTZZ14EJ	28 ~ 33s	25 ~ 30s
GTZZ16EJ	28 ~ 33s	25 ~ 30s

- Press and hold the enable button and jib boom up/down switch on turntable controller to fully lift/lower the jib boom.

Table 5-14

Model	Platform 160° rotation time, left to right	Platform 160° rotation time, right to left
GTZZ14EJ	7 ~ 12s	7 ~ 12s
GTZZ16EJ	7 ~ 12s	7 ~ 12s

- Press and hold the enable button and platform swinging switch on turntable controller to rotate the platform leftward or rightward by 160°.

Table 5-15

Model	Platform leveling time, raised	Platform leveling time, stowed
GTZZ14EJ	45 ~ 55s	35 ~ 45s
GTZZ16EJ	45 ~ 55s	35 ~ 45s

B-14 Test Drive Speed

- Turn the Ground/Platform select switch on the ground controller to the platform position.
- Pull out the emergency stop buttons on both the ground and platform controllers to the ON position.
- Depress the footswitch.
- Move the drive high/low speed select switch on the platform controller to select the drive high speed.
- Slowly push forward the drive/steer control handle to full drive speed.
- The test results are shown in the table below:

Table 5-16

MODELS	TEST RESULTS
GTZZ14EJ	With main boom fully retracted, main boom and foldable boom fully lowered, the max travel speed is in the range of 4.5 ~ 6.0km/h (2.8 ~ 3.7mph). With main boom or foldable boom lifted or main boom extended, operate any travel switch (for foldable boom full lowering /main boom full lowering/main boom full retracting), the max travel speed is in the range of 0.77 ~ 0.83km/h (0.48 ~ 0.51mph).
GTZZ16EJ	With main boom fully retracted, main boom and foldable boom fully lowered, the max travel speed is in the range of 4.5 ~ 6.0km/h (2.8 ~ 3.7mph). With main boom or foldable boom lifted or main boom extended, operate any travel switch (for foldable boom full lowering /main boom full lowering/main boom full retracting), the max travel speed is in the range of 0.77 ~ 0.83km/h (0.48 ~ 0.51mph).

NOTICE

If the drive speed exceeds the test results as shown above, 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.

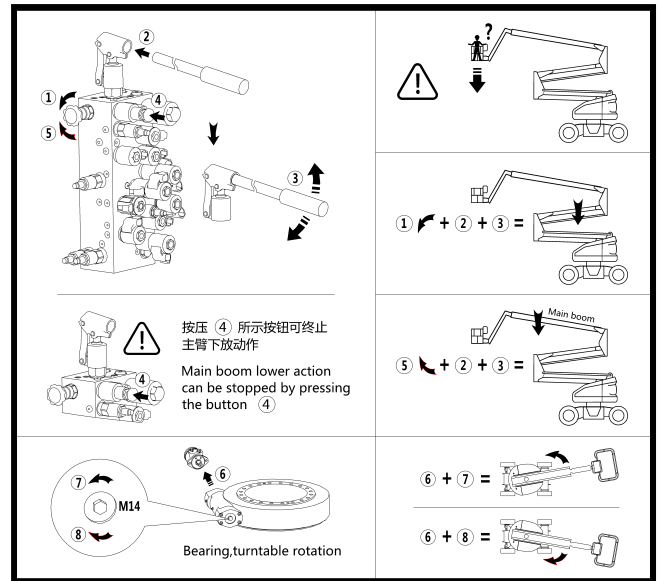


Figure 5-11

B-16 Test Tilt Protection System

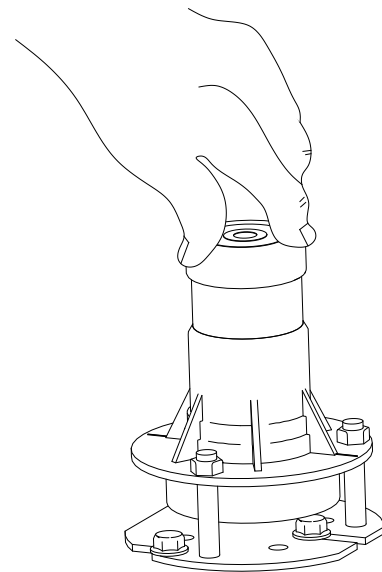


Figure 5-12

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.

MAINTENANCE PROCEDURES

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 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.

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.
2. Install new air filter and tighten.

C-2 Test 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. With the machine in 2 different positions (boom fully retracted and positioned below the horizontal by 15°, and boom lifted over the horizontal by 15°), add loads to the platform. The test results are shown in the table below:

Table 5-17

MODELS	TEST RESULTS
GTZZ14EJ	When the load does not exceed 230kg (507 lb), ensure that the platform is able to lift to the highest position. In the position of boom fully retracted and positioned below horizontal by 15°: 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, such functions as machine driving , boom raising and extending will be restricted. In the position of boom lifted over horizontal by 15° (for GB models): 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. In the position of boom lifted over horizontal by 15° (for CE models): 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.
GTZZ16EJ	When the load does not exceed 230kg (507 lb), ensure that the platform is able to lift to the highest position. In the position of boom fully retracted and positioned below horizontal by 15°: 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, such functions as machine driving , boom raising and extending will be restricted. In the position of boom lifted over horizontal by 15° (for GB models): 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. In the position of boom lifted over horizontal by 15° (for CE models): 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.

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.

1. Start the machine from ground controller.
2. Elevate the lift boom to appropriate height.
3. Turn off the machine.
4. Remove the dust cover at the lift boom end.
5. Measure each wear pad.
6. If the thickness is under specification, replace the wear pad.

7. Remove the lift boom end bolts and detach the end cover from the machine.
8. Remove check cover bolts of all side plates of lift boom, and detach the side plate check cover from the machine.
9. Measure each wear pad.
10. If the thickness is under specification, replace the wear pad.
11. Telescope the lift boom within its motion range and inspect the key positions that may catch the lift boom

NOTICE

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

MAINTENANCE PROCEDURES

D-2 Lubricate turntable slewing bearing and slewing gear

Lubrication of turntable slewing bearing and slewing gear on yearly basis is vital to normal functioning and extended service life of the machine. Continued use of poorly lubricated turntable slewing bearing and gear may cause component damage.

1. Remove the fastening bolts of slewing gear cover, and detach the cover from the machine.
2. Open the ground control side turntable shield.
3. Locate the grease nipple behind ground control box.
4. Fill lubricant into the slewing bearing, and repeatedly rotate the bearing 10-13cm (3.9–5.1 in) until the entire bearing is fully lubricated.
5. Add lubricant to in between the teeth of slewing gear.
6. Re-install the slewing bearing cover.

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. 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

This procedure requires to be performed with platform fully stowed.

1. Open the cover of battery holder, and remove the storage battery cables.

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.

Remove all earrings, wristwatches and other jewelry.

2. Open the left side cover of turntable, and locate the hydraulic tank.
3. Close the hydraulic shutoff valve located on the side of hydraulic tank.
4. 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 reference [Performance Parameters, page 2-1](#).

WARNING

HIGH PRESSURE HAZARD



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

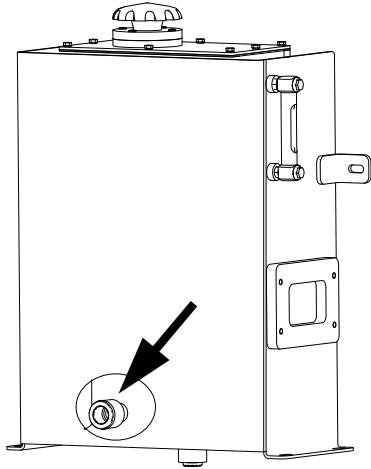
5. Disconnect and plug the suction hoses.
6. Disconnect and plug the return hoses.
7. Remove the retaining fasteners from the hydraulic tank, and remove the hydraulic tank.
8. Rinse out the inside of the tank using a mild solvent, and dry it up.
9. Install the hydraulic tank onto the machine.
10. Attach the suction hoses and return hoses to the hydraulic tank.

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 5-16**, the hydraulic tank suction filter must also be replaced.

Figure 5-13



D-5 Inspect Key Structures

Properly maintaining the key structures is vital to safe machine operation. The cracked or deformed key structures may cause component damage and hazardous operation situations.

Table 5-18

Key Structures	Inspection Criteria
Platform	No permanent deformation and cracks
Boom	No permanent deformation, cracks and interference
Turntable	No permanent deformation and cracks
Cushion	No deformation and damage
Lift cylinder	The lift cylinder and the valve block and tubes on the cylinder free of leaks , the mounting shaft free of deformation, cracks or interference
Chassis	Chassis free of oil stains and debris; the sliding chute free of deformation; no loose bolt connection; no cracked structures

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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 boom is positioned in operating position, the drive motors are automatically restricted to the low 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.

REPAIR PROCEDURES

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

Footswitch

NOTICE

Perform this procedure with the machine in stowed position.

1. Disconnect the foot switch cable connectors at the platform bottom.
2. Remove the fitting bolts of foot switch protective cover.
3. Remove the fitting bolts connecting foot switch and foot switch protective cover.
4. Remove the cover plate close to the foot switch cable terminal from the bottom of foot switch.
5. With foot switch not depressed, use an ohmmeter to test the continuity of circuit.
6. Depress the foot switch and test circuit continuity with ohmmeter.

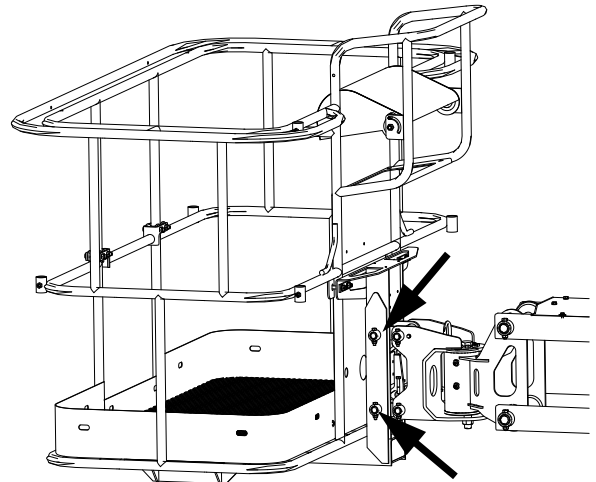


Figure 6-1

4. Move away the welding cable from the platform (if equipped).
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

NOTICE

Perform this procedure with the machine in stowed position.

1. Remove the platform controller and footswitch from the platform. For the specific procedure, please reference [Platform Controller, page 6-1](#) and [Footswitch, page 6-2](#).
2. Use suitable supporting equipment to support the platform.
3. Remove the platform mounting bolts.

Platform Swing Motor

NOTICE

Perform this procedure with the machine in stowed position.

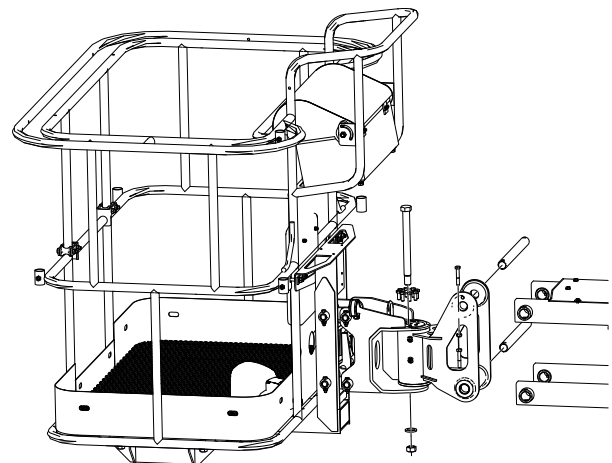


Figure 6-2

1. Remove the platform. See [Platform, page 6-2](#).
2. Disconnect the socket from platform angle sensor.
3. Disconnect, plug and tag the oil ports of swing motor valves.

4. Remove the fitting bolts of platform valve stand, and put the valve stand aside.
5. Remove the power source cover from the cable box, do not disconnect the cable.
6. Remove the cable box from the platform and put it aside.
7. Remove the welding cable (if equipped).
8. Support the platform mounting weldment, do not apply any pressure.
9. Remove the bolts from platform mounting weldment.
10. Remove the center bolt to detach the platform rotator from the platform mounting weldment.
11. Support the platform rotator, do not apply any pressure.
12. Remove the bolts securing the axis pins to piston rod end and to the rotator.
13. Use a brass hammer to remove the two axis pins and remove the platform rotator from the machine

Jib Boom Assembly

WARNING

MOVING OBJECT HAZARD



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

NOTICE

When removing the hose and fitting, the O-ring on the fitting and hose end must also be removed and tagged.

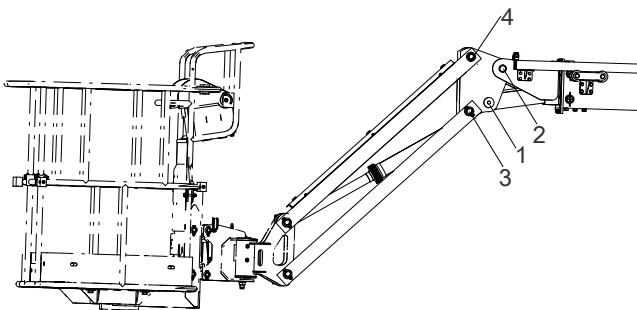


Figure 6-3

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

1. Remove the platform and platform swing motor.
2. Raise the main boom to a horizontal position, and use suitable lifting equipment to hoist the jib boom assembly.
3. Remove the retaining pin from the axis pin of upper leveling cylinder, and use suitable brass drift and hammer to remove the cylinder axis pin from the jib boom.
4. Remove the retaining pin from the axis pin connecting the jib boom, and use suitable brass drift and hammer to remove the axis pin from the jib boom assembly.
5. Use suitable lifting equipment to detach the jib boom assembly from the main boom.
6. Remove the retaining pin from jib boom axis pin, and use suitable brass drift and hammer to remove the axis pin from the pin weldment of jib boom.

Cable Track Assembly

NOTICE

Perform this procedure only when the machine is in stowed position.

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.

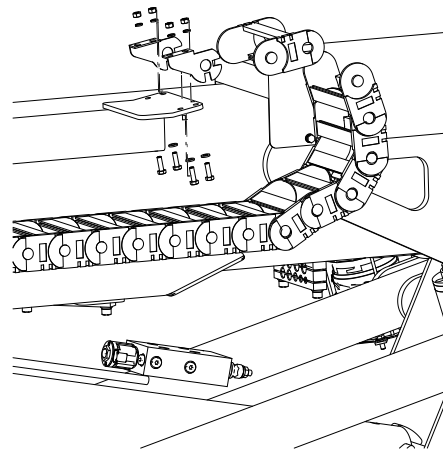


Figure 6-4

1. Loosen the fastening bolts from cable track guide tube, and remove the guide tube from the machine.
2. Remove the protective sleeve from the platform end of guide tube harness.
3. Tag, disconnect and plug all hydraulic hoses from the guide tube to cable track inlet and outlet.

REPAIR PROCEDURES

4. Tag and disconnect the black socket at the bottom of control box.
5. Place blocks in between cable track and guide tube.
6. Tie down the guide tube, wooden blocks and cable track.
7. Loosen the fastening bolts from the limit switch cover on the top of the platform end of the 2nd boom section, and remove the limit switch cover.
8. Tag and disconnect the electrical connectors from the proximity and limit switches on the top of the platform end of the 2nd boom section.
9. Remove the mounting bolts from the platform end of inner guide tube on the ground control side of the machine.
10. Remove the inner guide tube from the guide tube bracket on the right side of the machine.
11. Tag, disconnect and plug the hydraulic hoses supported by the cable track.
12. Loosen the nut from the fitting of hydraulic hoses supported by the cable track, and remove and plug the fitting.
13. Tag and disconnect the electrical connectors.
14. Tag, disconnect and plug the hydraulic hoses from the telescope cylinder, and plug the fitting on the cylinder.
15. Loosen the mounting bolts from the cable track bracket.
16. Remove the side cover from the cable track.
17. Remove the hydraulic hose and cable cover, and move away the cover.
18. Move away the hydraulic hoses and cable clamps.
19. Tag and disconnect the cables.
20. Pull the hydraulic hose out from the cable track guide tube.
21. Place blocks in between the cable track and the guide tube bracket.
22. Tie down the guide tube, wooden blocks and cable track.
23. Tie down the both cable track components.
24. Secure the overhead crane hook to the both ends of the cable track, take care to lift the cable track and place it onto the structure of adequate supporting capacity.

Main Boom Assembly



WARNING

MOVING OBJECT HAZARD



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

NOTICE

When removing a hose or fitting, the O-ring on the fitting or hose end must also be removed and tagged.



WARNING

UNSAFE OPERATION HAZARD



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

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

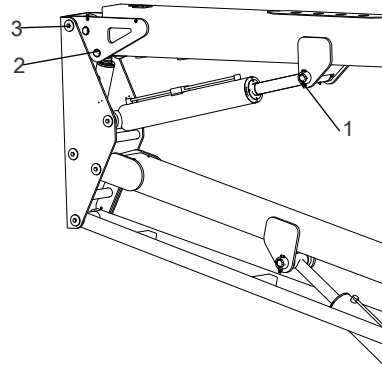


Figure 6-5

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

1. Remove the platform.
2. Remove the platform swing motor.
3. Remove the jib boom assembly.
4. Remove the cable track.
5. Raise the main boom approx. 1.2m.
6. Attach a strap from an overhead crane to the piston rod end of main boom up/down cylinder.

7. Attach an at least 2-ton overhead crane to the tail of main boom.
8. Place a wooden block under the main boom up/down cylinder.
9. Remove the safety pin from the axis pin connecting the main boom up/down cylinder to the main boom.
10. Lift the main boom with an overhead crane until the axis pin connecting the cylinder and the boom can be removed.
11. Lower the main boom up/down cylinder with caution and rest it on the wooden block.
12. Slowly lower the main boom to the horizontal position.
13. Attach another at least 2-ton overhead crane to the tail of the main boom, yet no lifting force should be imposed.
14. Remove the safety pin from the axis pin connecting the turntable to the main boom.
15. Use soft material to remove the axis pin connecting the turntable to the main boom.
16. Take extreme care to remove the main boom from the machine and rest it on the structure with adequate supporting capacity.

1. Remove the platform.
2. Remove the platform swing motor.
3. Remove the jib boom assembly.
4. Remove the cable track.
5. Remove the main boom assembly.
6. Remove the pin securing the telescope cylinder to the boom head.
7. Remove the dust brush at the boom tail.
8. Remove the cotter pins and sliding blocks on the top and both sides of the boom tail.
9. Pull the telescope boom along with the telescope cylinder out from the base boom tail. Take care not to rotate the telescope cylinder, and place them on a suitable support.
10. Remove the pin securing the piston rod of telescope cylinder to the telescope boom, and pull the telescope cylinder out from the telescope boom tail.
11. Place the telescope cylinder on a suitable support.

Telescope Boom Assembly

 **WARNING**

MOVING OBJECT HAZARD



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

NOTICE

When removing a hose or fitting, the O-ring on the fitting or hose end must also be removed and tagged.

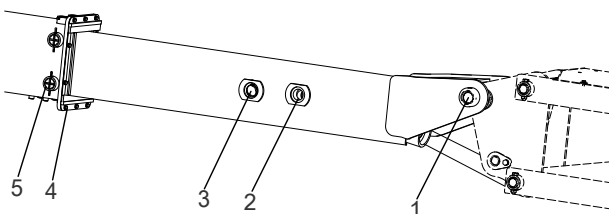


Figure 6-6

Note: the numbers in the figure indicate the removal sequence of telescope boom.

Foldable Boom Assembly

 **WARNING**

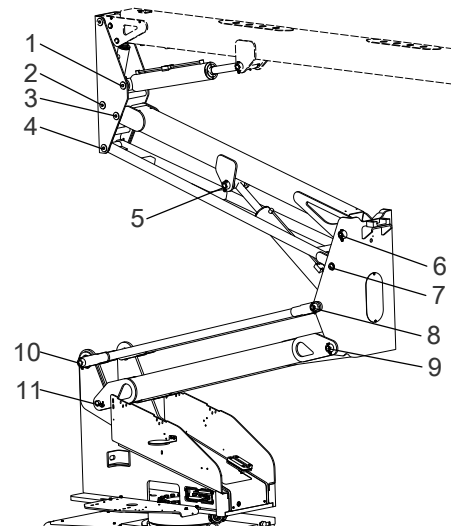
MOVING OBJECT HAZARD



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

NOTICE

When removing a hose or fitting, the O-ring on the fitting or hose end must also be removed and tagged.



REPAIR PROCEDURES

Figure 6-7

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

1. Remove the platform.
2. Remove the platform swing motor.
3. Remove the jib boom assembly.
4. Remove the cable track.
5. Remove the main boom assembly.
6. Use a crane to support the foldable boom head as well as the lower leveling cylinder and main lift cylinder.
7. Remove the retaining pin and axis pin connecting the piston rod of main lift cylinder to the upper linkage frame, and remove the retaining pin and axis pin connecting the upper leveling cylinder to the linkage frame.
8. Use a crane to lift the main lift cylinder and upper leveling cylinder away.
9. Remove the retaining pin and axis pin connecting the foldable boom with the linkage frame, remove the linkage frame, and lift the upper linkage frame away to place it to designated location.
10. Properly support the lower lift cylinder, and remove the retaining pin and axis pin connecting the foldable boom with the lower lift cylinder.
11. Remove the retaining pin and axis pin connecting the foldable boom with the lower linkage frame, and lift the upper foldable boom and boom link clear of the boom assembly.
12. Properly support the lower foldable boom head, remove the retaining pin and axis pin connecting the lower lift cylinder with the lower linkage frame, and lift the lower lift cylinder clear of the boom assembly.
13. Remove the retaining pin and axis pin connecting the lower foldable boom with the lower linkage frame, lift the lower linkage frame clear of the turntable, and place it to the designated location.
14. Remove the retaining pin and axis pin connecting the lower foldable boom with the turntable, lift the lower foldable boom clear of the turntable, and place it to the designated location.

Adjust Boom Clearance

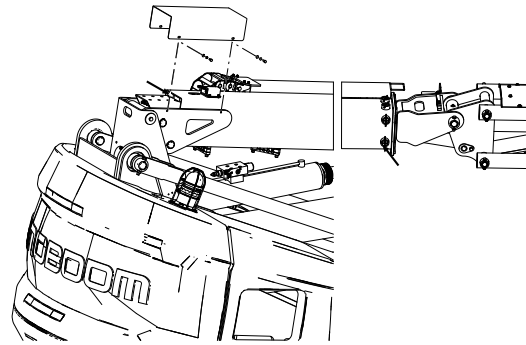


Figure 6-8

1. Measure each top, side and bottom sliding block.
2. Loosen the fastening bolts from the dust cover at the main boom end, and remove the dust cover.
3. Adjust the telescope boom until the sliding blocks are accessible.
4. Loosen the fastening screws from sliding blocks.
5. Install shims at the top and bottom sliding blocks until the clearance between sliding block and boom is 1–1.5mm (0.04–0.06 in).
6. Install shims at the side sliding block until the clearance between sliding block and boom is 1–1.5mm (0.04–0.06 in).
7. Tighten the mounting screws.
8. Telescope the boom within the entire range to check the key locations that may cause jamming.

NOTICE

When the wear of the sliding block is greater or equal to 3mm (0.12 in), immediately change the sliding block.

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 cross-threading. Do not use a lubricant on threads or nuts.
2. Tighten the nuts in the sequence as shown below.

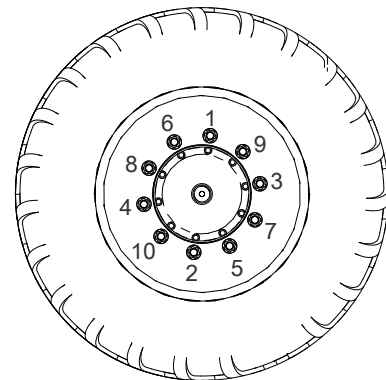


Figure 6-9

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

REPAIR PROCEDURES

Table 6-1

1st Stage	2nd Stage	3rd Stage
150Nm (110 ft-lb)	250Nm (185 ft-lb)	300Nm (221 ft-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.

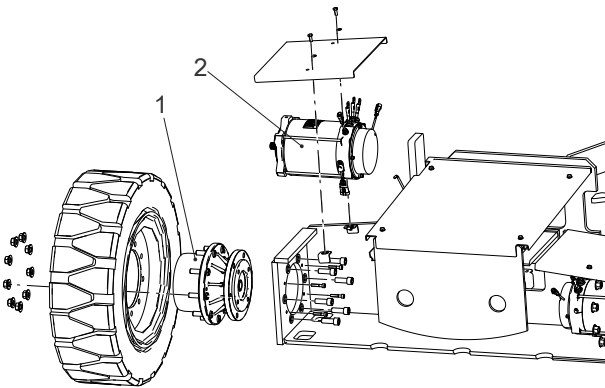


Figure 6-10

No.	Description
1	Reducer
2	Drive motor

Removal of reducer and drive motor

1. Place the machine on a solid, level surface.
2. Place a jack of sufficient capacity under the side of chassis to be removed. Lift the jack to make the wheel off the ground.
3. Remove the bolts and washers securing the wheel to the reducer. Use a suitable lifting device to remove the wheel.
4. Tag, disconnect and plug the hydraulic hoses to the drive motor.
5. 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.

6. Remove the flange for motor installation from the reducer. Take care not to damage the O-ring.
7. Remove the bolts securing the flange to the reducer.
8. Remove the bolts securing the flange to the drive motor.

Installation of reducer and drive motor

1. Use a lifting device with sufficient capacity to support the outrigger.
2. Install the drive motor, and use torque wrench to secure the bolts in diagonal sequence.
3. Align the reducer brake oil port with the nick of support.
4. Fit the washer with the mounting surface, apply threadlocker Loctite 272 to the bolts, and install in turns.
5. Tighten the bolts with a torque wrench.
6. After all installed, add a suitable level of gear oil.
7. 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.
8. Apply the threadlocker Loctite 272 to the bolts and torque the bolts after pretightening.
9. Attach the hydraulic hoses.
10. Install the wheel.

Steering System

The steering system is mainly composed of steer cylinder, steer link and axis pins, etc. The steering of chassis is accomplished by the coordination of extending and retracting motions of the steer cylinder.

When the machine is traveling straight, the traveling line of the left and right wheels coincide with that of the rear wheels to form a straight line. When the traveling of the machine in service is found out of a straight line, inspect whether the motions of steer cylinder are coordinated.

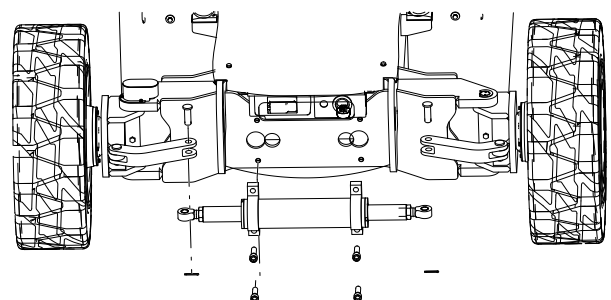


Figure 6-11

1. Remove the cotter pins at both ends of the link and the shaft assembly.
2. Use lifting strap or supporting tool to lift or support the steer cylinder, loosen the mounting bolts from steer cylinder and remove the steer cylinder.

Battery

NOTICE

Before removing the battery, be sure to cut off the charger power source and the total power source.

1. Open the battery cover on the chassis.
2. Stick warning signs, and disconnect the cable from the battery.
3. 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.

REPAIR PROCEDURES

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%.

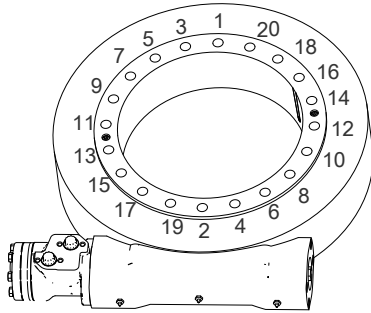


Figure 6-12

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.

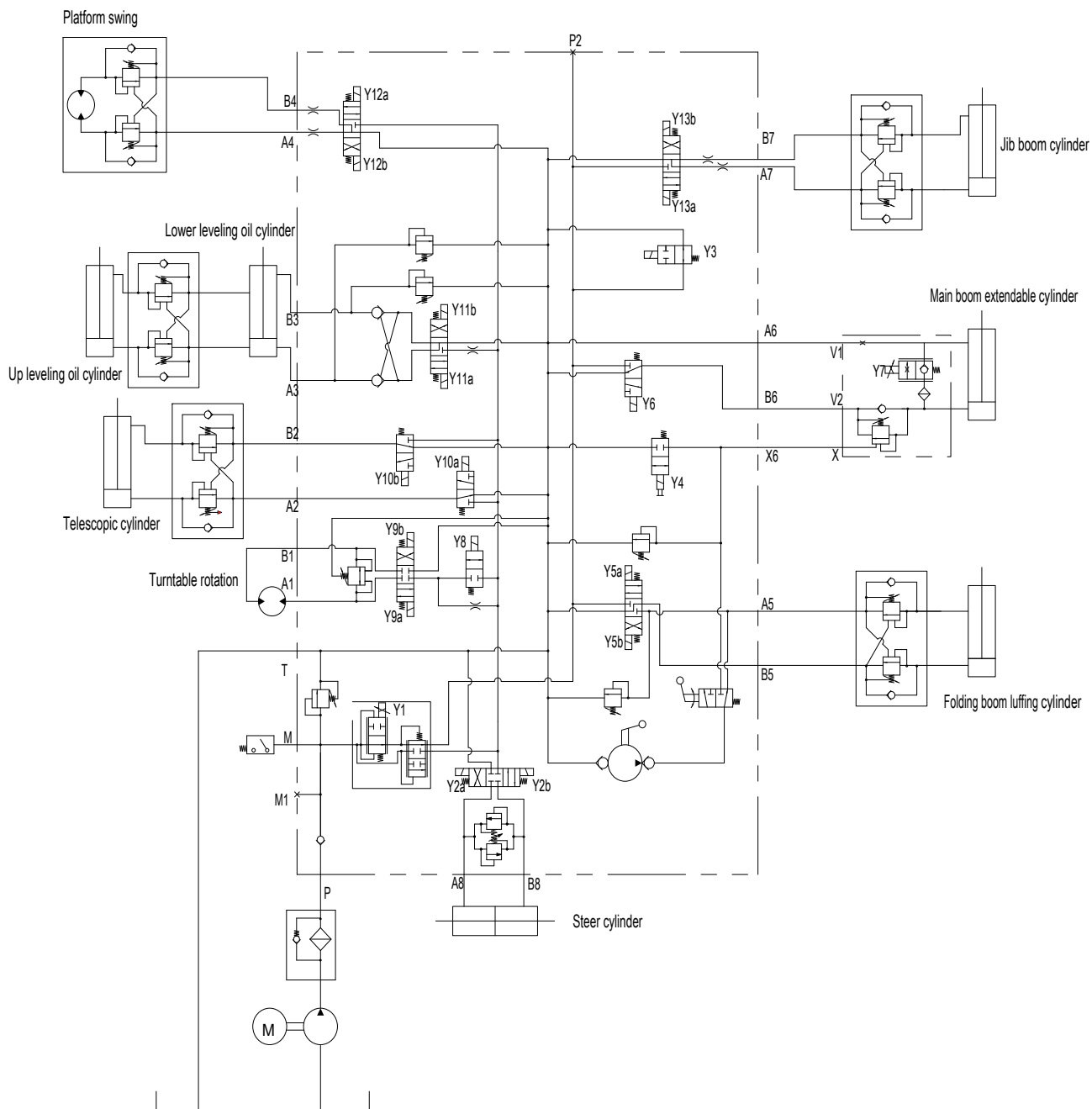
HYDRAULIC SYSTEM

Hydraulic Symbols

Table 6-2

Symbol	Description
	Filter
	Brake
	Power unit
	Hydraulic motor
	Overflow valve
	3-position 4-way solenoid directional valve
	2-position 4-way solenoid directional valve
	Pressure gradient control valve
	Check valve

Hydraulic Schematic Diagram



REPAIR PROCEDURES

ELECTRICAL SYSTEM

Use and Maintenance of Lead-Acid Battery (requires maintenance)

REQUIRED EQUIPMENT

- Protective goggles and gloves
- Wrench with rubber handle



Figure 6-13

- Sodium bicarbonate
- Terminal post protector (i.e., petroleum jelly and corrosion prevention spray, etc.)
- Voltmeter (for flooded/wet battery, colloid and AGM battery)



Figure 6-14

- Distilled or purified water (deionized water and reverse osmosis water, etc.)
- Discharge tester (if required)
- Specific gravity hydrometer (for flooded/wet battery)



Figure 6-15

BATTERY INSTALLATION SAFETY INSTRUCTIONS

- Always wear protective clothing, gloves and goggles when handling the battery.
- Do not smoke near the battery, and keep the battery away from sparks, flames and metal objects.
- Use a wrench with a rubber handle when connecting the battery.
- The electrolyte is the mixed solution of acid and water. Do not allow it to contact skin.
- Wash immediately with water if acid contacts the skin or the eyes.
- Be sure the battery cable connectors are properly tightened to the battery terminal. Battery cable connectors that are too tight or loose could damage the terminal or cause a fire.
- Avoid a short circuit by never placing objects on the battery and touching both battery terminals at the same time with a metal object.
- The wet lead-acid battery will release small amounts of gas in the process of use, particularly in the charging process. Be sure to charge the battery in a well-ventilated place.
- Do not add acid into the battery.
- Always keep the battery vertical. The electrolyte in the battery may spill from the battery if the battery is tilted or placed on its side.

BATTERY CONNECTION INSTRUCTIONS

Battery cable and torque value:

- The battery cable provides connection among and between battery, equipment and charging system. Connect the battery, the charging system and the equipment with a flexible cable. An improper connection could lead to poor performance, battery damage or cause a fire.
- The tightening torque of cable fixation nut shall be executed according to the following table:

Table 6-3

Nut specifications	Torque
M8	9 ~ 11 Nm (80 ~ 97 ft-lb)
M10	18 ~ 23 Nm (160 ~ 204 ft-lb)

- Be sure the battery cable connectors are properly tightened to the battery terminal. Battery cable connectors that are too tight or loose could damage the terminal or cause a fire.
- Battery terminals could become corroded if not kept clean and dry. To prevent corrosion, apply a thin layer of petroleum jelly or use a terminal protector.

PREVENTIVE MAINTENANCE

Inspection

- Inspect the battery. The top of the battery and terminal connections must be kept clean and free from dust and corrosion and must remain dry.
- Liquid on top of the battery could indicate there is too much water in the battery.
- Inspect the connections between the battery cables and other components. Tighten all loose connections.
- Replace damaged battery cables.
- Be sure the vent caps are properly installed on the battery.

Cleaning

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

Filling in Distilled Water

- If necessary, add distilled water into the battery. The frequency of adding water depends on the battery applications and working temperature. Inspect the battery every few weeks to determine if water needs

to be added. Generally, frequent battery use requires frequent additions of water.

- Fully charge the battery before filling it with distilled water. Only add distilled water into the discharged or partially charged battery if the plate electrode is exposed; in this case, fill it with distilled water to the level just above the plate. Then, charge the battery as follows:
 1. Clean the vent caps before removing them to prevent dirt and debris from entering the battery. Inspect the electrolyte level. If the level is higher than the plate, add water. If the level is lower than the plate, add distilled water or deionized water.
 2. With a standard battery, add water until the level is 3 mm (0.12 in) below the vent well (the plastic cover inside the vent).
 3. After filling the battery with water, install the vent caps on the battery.

BATTERY CHARGING

Proper charging is essential for maximizing the battery performance. Insufficient or excessive charging may shorten the service life of the battery significantly. Most chargers are automatic and pre-programmed, but some chargers allow the user to set the voltage and current values. Details about proper charging are as follows:

- The charge for this equipment is automatic and preprogrammed so that the user does not need to interfere with the charging process.
- Charge the battery fully after each use.
- The lead-acid battery does not have battery memory. It is unnecessary to fully discharge it before recharging it.
- Inspect the electrolyte level height and ensure the positive and negative electrode plates are not flooded by the water before charging.
- Before charging, be sure all the vent caps are properly installed.
- Charge the battery only in a well-ventilated place.
- The battery will discharge gas (bubble) at the end of charging. This bubbling indicates the electrolyte solution is charged.
- Avoid charging the battery when the temperature is above 49°C (120°F).

The following figure shows the battery charging process.

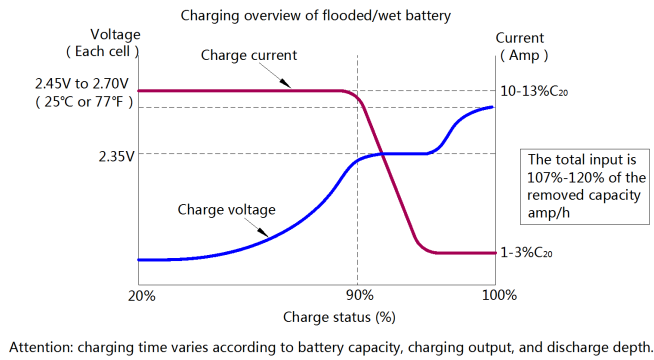


Figure 6-16

EQUALIZATION

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. Do not equalize other batteries. The conditions for equalizing a battery are as follows:

- Verify whether the battery is flooded/wet battery.

- Inspect the electrolyte level height to ensure that the positive and negative electrode plates have not been flooded before charging.
- Before charging, confirm that all the vent caps have been fixed on the battery properly.
- Set the charger to equalization mode.
- The battery will bleed air in the equalization process (forming bubbles).
- Measure the specific gravity every hour; stop charging in equalization mode when the specific gravity does not increase.

STORAGE

- Charge the battery before storage.
- Store the battery in a shady, cool and dry place that is free of the influence of the weather.
- 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 6-4

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.

TROUBLESHOOTING

Follow the battery testing guidelines to determine if the battery needs to be replaced.

Voltage Test When Charging

1. Disconnect and reconnect the DC plug to restart the charger.
2. Record the current in the last half an hour (if possible) and measure the voltage of the battery rack when charging.
3. At the end of charging, check if the current is lower than 5A and the voltage of the battery rack is higher than the following values:

56V for 48V system; 28V for 24V system; 14V for 12V system or 7V for 6V system; if so, proceed to the next step. Otherwise, inspect whether the output of the charger is correct and recharge the battery as required. If the voltage of the battery rack is still very low, a problem may exist with the battery.

4. Measure the voltage of each individual battery when the battery is in the charging state. If the voltage of any battery is lower than the following values, a problem could exist with the battery:

7V for 6V battery, the voltage difference between the battery and any other batteries in the battery rack is larger than 0.5V; 14V for 12V battery, the voltage difference between the battery and any other batteries in the battery rack is larger than 1.0V.

Test of Specific Gravity

1. Fill and drain the specific gravity hydrometer 2 ~ 3 times. Then, obtain a sample from the battery.
2. Measure the specific gravity of all battery cells.
3. When the temperature is above 27°C (80°F), add 0.004 to correct the reading of the specific gravity every 5°C (40°F) higher. When the temperature is below 27°C (80°F), deduct 0.004 to correct the reading of the specific gravity every 5°C (40°F) lower.
4. If the specific gravity of each battery in the battery rack is lower than 1.250, the battery rack may not be sufficiently charged. Recharge the battery rack.
5. If the specific gravity difference between any battery in the battery rack is over 0.050, equalize this battery rack.
6. The battery in the battery rack may have a problem if the difference still exists.

Open-Circuit Voltage Test (Rarely Used)

1. To obtain an accurate voltage reading, do not use the battery for at least 6 hours, but, it is best not to use the battery for 24 hours.
2. Measure the voltage of each individual battery.

3. Equalize the battery rack if the voltage of any battery is 0.3V higher than that of other batteries in the battery rack.
4. Re-measure the voltage of each individual battery.
5. The battery may have a problem if the voltage of any battery is 0.3V higher than that of other batteries in the battery rack.

There are other battery tests to evaluate battery performance, such as discharge tests, that are not described here.

HIGH-FREQUENCY BATTERY CHARGER

Relevant Technical Parameters:

- Input voltage: AC100 ~ 240V
- Output voltage: 24V

Precautions:

- Low-input voltage protection: The battery charger will shut down when the input AC voltage is lower than 85V. It will automatically resume charging when the voltage becomes normal.
- Reverse-polarity protection: In case of the reverse polarity of the battery, the battery charger will terminate the connection between the internal circuit and the battery to avoid charging and damaging the battery.
- Output short-circuit protection: When there is an accidental output short circuit of the battery charger, the battery charger will shut down the output automatically to troubleshoot the problem. Then, the battery charger will restart after a delay of 10 seconds.
- Charging indication: The yellow indicator lamp will illuminate when charging, the green indicator lamp will illuminate after charging and the red indicator lamp will illuminate if the battery has a problem.
- Charging brake: All functions of the machine will not operate when charging.

Use and Care of Lead-acid Battery (maintenance-free)

The use and care requirements for lead-acid maintenance-free batteries are as follows:

PREPARATION

- Before checking the fault, the operator must wear safety equipment, including insulating gloves, helmets and other necessary safety supplies and multimeters.
- Inspect the battery system cabinet for problems such as battery deformation, damage of the positive and negative terminals, etc.
- Check and confirm the fault description and analyze the cause.

REPAIR PROCEDURES

CHARGING

- Do not use an external charger.
- Charge using the correct AC input voltage indicated on the decal.
- Make sure the battery is connected before charging.
- Connect the battery charger to a grounded AC circuit.
- Charge the battery every time after using.

CARE

- While wearing proper hand and face protection, wipe the top and sides of the battery.
- Do not rinse or spray the battery pack with a water hose.
- Be sure the cable connector is tight on the terminal.
- Do not leave the battery in a discharged state during storage, as it will shorten the service life.

CAUTIONS

- Because there is a risk of high voltage, do not touch non-insulated terminals or connectors.
- The battery terminal and related accessories contain lead and lead components. Wash your hands after handling them.

Use and Care of Lithium Battery

The requirements for the use and care of lithium batteries are as follows:

PREPARATION

- Before checking the fault, the operator must wear safety equipment, including insulating gloves, face shields and other necessary safety supplies and special tools such as multimeters, communication tools (485 communication box or CAN) and computers, etc.
- Inspect the battery system cabinet for problems such as deformation of the cabinet, damage of the positive and negative terminals, loose connection of the communication navigation plug, etc.
- Check if the harness on the communication navigation plug is misaligned.
- When the system is powered, the battery information is read through 485 communication or CAN communication.
- Check and confirm the fault description and analyze the cause.

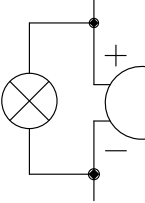
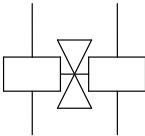
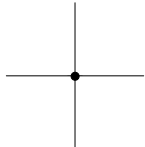
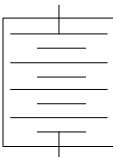
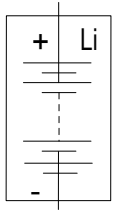
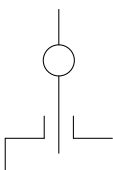
CAUTIONS

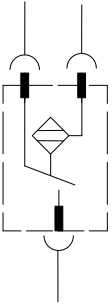
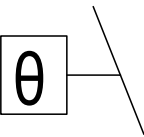
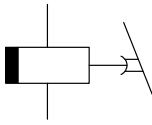
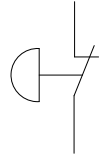
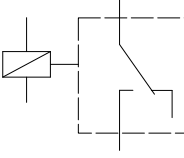
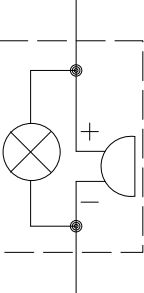
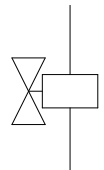
- In the driving process (traveling or lifting), if there is no emergency, do not arbitrarily disconnect the key to forcibly cut off the battery system main relay.

- When the display shows that the battery voltage is too low, charge the battery as soon as possible to prevent the battery from being over-discharged.
- After using the battery for a long period of time, charge the battery as soon as possible before leaving it for a long period of time to prevent the battery from over-discharging due to selfconsumption of the battery system.
- If there is heat, deformation, liquid leakage, odor or smoke while using the battery, immediately stop using the battery and place the battery in an open place away from anyone.
- The battery is only suitable for this particular product. Never use the battery with other equipment.
- Do not use a wire to directly short-circuit the battery output.
- Do not immerse the battery in water, acid, alkaline or a salt solution and avoid rain.
- Do not use or store the battery in environments such as corrosive, explosive and high-temperature areas. Keep the battery out of areas with high heat and exposure to fire or sun.
- Use a special charger when charging, and avoid charging under direct sunlight. Do not charge the battery repeatedly after the battery is full. Keep children away from the charging charger.
- The battery system is not suitable for extended use. It should be placed in a suitable environment (-temperature below 40°C, humidity less than 90%), and charged once with a dedicated charger for at least three months.
- Discarded batteries may cause danger to people and the environment. Be sure to properly discard them according to the rules of your workplace and your local laws.
- Do not apply external force to the battery or drop it from a high altitude.
- The lithium battery has an automatic protection function: if the cell voltage is higher than 3.4V, the battery system activates for a long period of time without an output current ($\leq 5A$) for 36H, or the cell voltage is lower than 3.4V, the battery is used for a long time. When the system is active and no current is output ($\leq 5A$) for 8H, the system will automatically cut off the contactor protection. If so, re-key the battery to activate it.

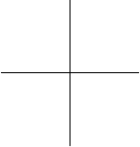
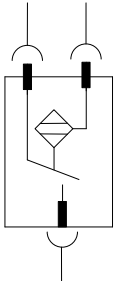
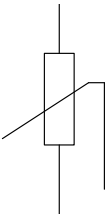
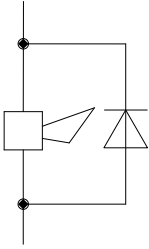
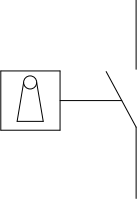
Electrical Symbols

Table 6-5

Symbol	Description
	Buzzer
	Valve
	Two lines connected
	Motor
	Storage battery
	Lithium battery
	Toggle switch

Symbol	Description
	Level switch
	Oil temperature switch
	Delay relay
	Power-off switch
	Relay
	Warning lamp
	Valve

REPAIR PROCEDURES

Symbol	Description
	Two lines non-connected
	Proximity switch/ Pressure sensor
	Fuel level sensor
	Horn
	Key switch
	Preheating wire

Electrical Schematic Diagram

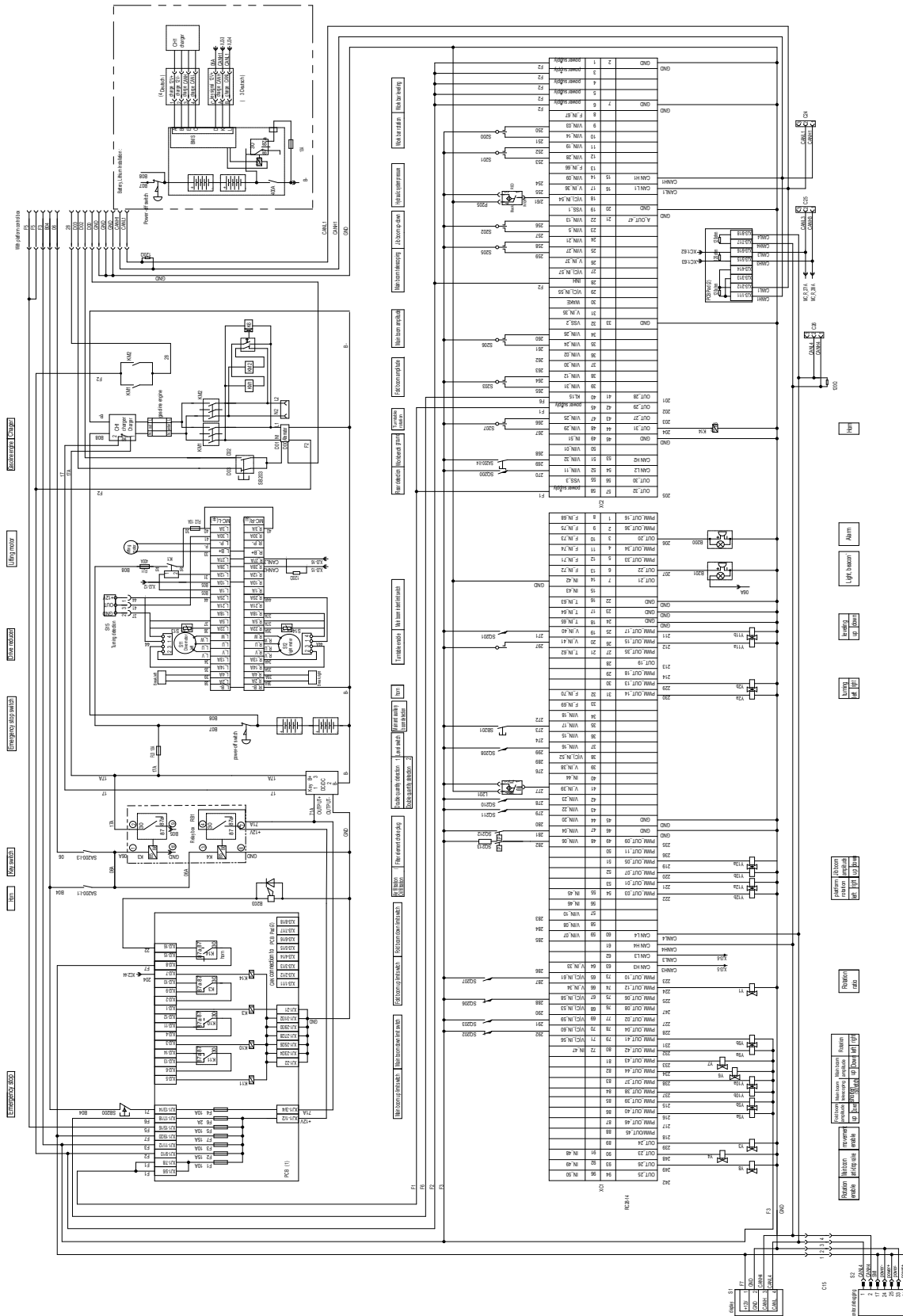


Figure 6-17 Electrical schematic diagram of turntable

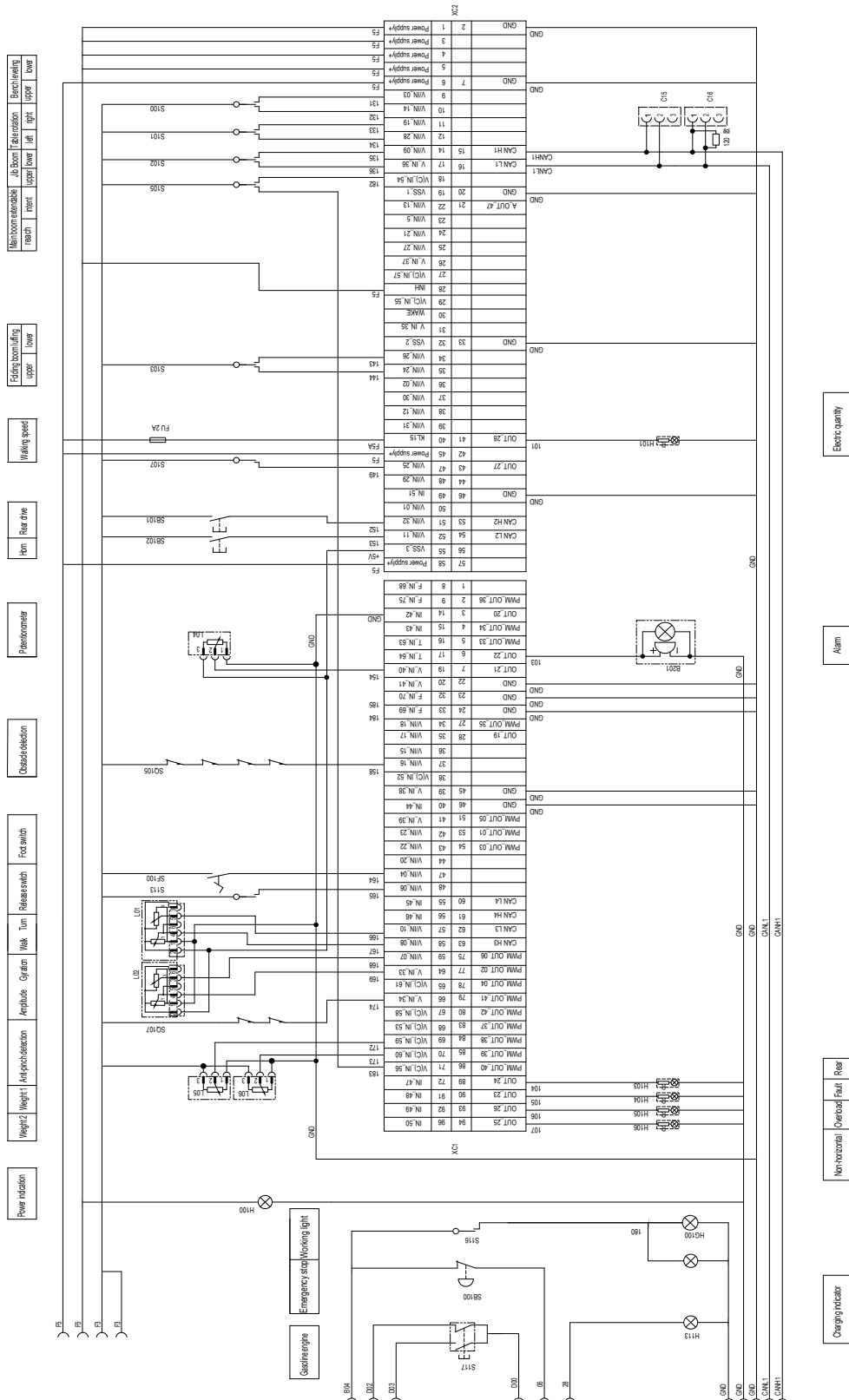


Figure 6-18 Electrical schematic diagram of platform

APPENDIX 1: PREPARE THE WORD 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 results are "NO", the machine must be stopped and re-inspected after repair is completed and marked in the box marked "inspection".			

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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 Inspect Battery Level				
A-8 Inspect the Raised Limit Function				
A-9 Perform Maintenance after 30 Days				
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 Test Braking Device				
B-6 Inspect Brake Manual Release Function				
B-7 Inspect Slewing Bearing Bolts				

REPAIR PROCEDURES

REPAIR & INSPECTION REPORT				
B-8 Lubricate Slewing Bearing				
B-9 Inspect Air filter of Hydraulic Tank				
B-10 Replace High-Pressure Filter				
B-11 Inspect Drive Reducer Oil Level				
B-12 Inspect Slewing Reducer Oil Level				
B-13 Test boom action time				
B-14 Test Drive Speed				
B-15 Test Emergency Lowering Function				
B-16 Test Cylinder Drift Test Tilt Protection System				
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 Lubricate turntable slewing bearing and slewing gear				
D-3 Replace Hydraulic Oil				
D-4 Replace Hydraulic Tank Suction Filter				
D-5 Inspect Key Structures				
User				
Inspector Signature				
Inspector Date				

REPAIR & INSPECTION REPORT	
Inspector Title	
Inspector Company	

Always for Better Access Solutions



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