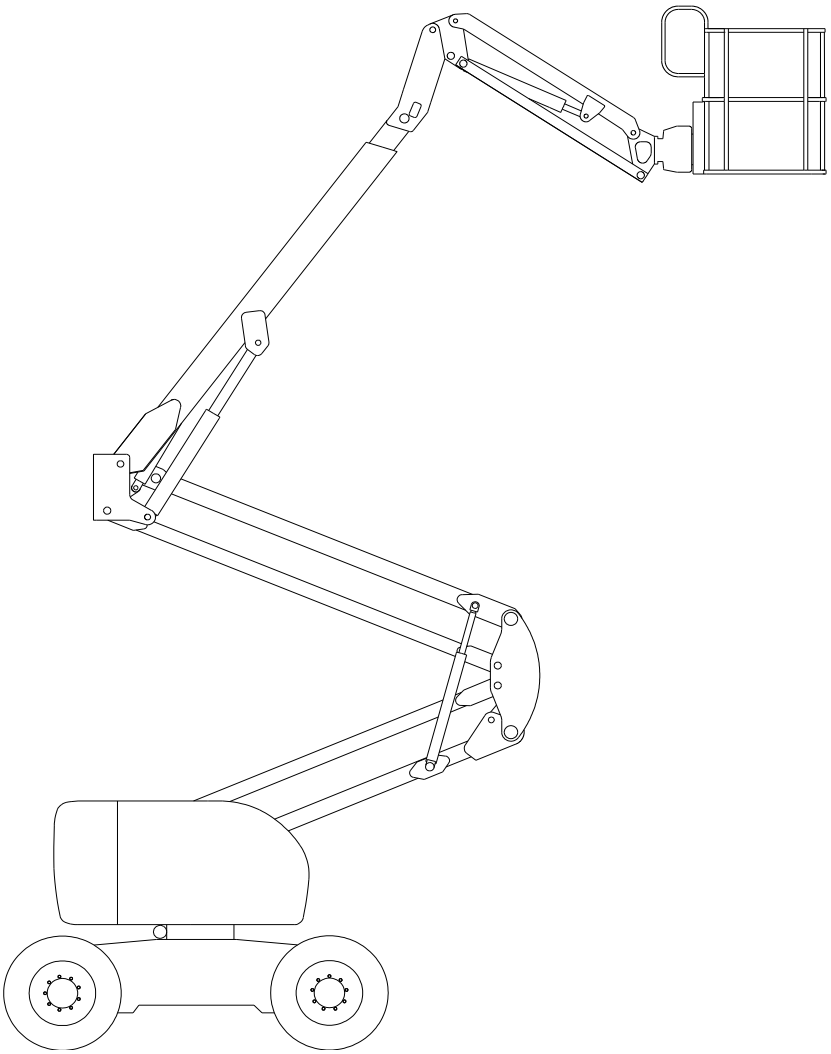
SINOBOOM
星邦重工

Service Manual

GTZZ15 & GTZZ15J



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The third edition: Apr, 2011

Content

Importance

You shall read, understand and obey the related safety rules and operator's manual before any maintenance or repair procedures are to be done on the GTZZ15 and GTZZ15J.

This manual is for GTZZ15&GTZZ15J.

This manual is to provide detailed maintenance instruction for the owner and manufacturer of the product and solutions and procedures to the faults inspection and maintenance for the qualified servicemen.

It shall first know the basic information about the mechanism, hydraulic and electricity to carry out the maintenance procedures; and some particular skills, tools, lifting devices and suitable work places will be required for some maintenance procedures meanwhile. Thus, it is recommended to maintenance and repair the product in the assigned service centers by Sinoboom.

Sinoboom will greatly provide you with the accurate information and excellent service. However, it is Sinoboom's policy to constantly improve our products and the technical specifications may vary without notice, so please update your maintenance books timely.

Sinoboom encourages the readers to inform us the defects and provide the solutions and we will carefully consider all the opinions and make it as the reference for the maintenance books the other manuals revise and updating.

Please be free to contact Sinoboom if you get any question for Sinoboom products.

Contact information

Website: www..sinoboom.com
Email: overseas@sinoboom.com
Telephone: 0086 731 8525 2820
Fax: 0086 731 8525 2826

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Safety rules

Danger

It will cause death or badly injury if you do not obey and instructions in this manual and other related operator's manuals.

It should be noticed of many unsafe operations referred in this operator's manual for the maintenance and repair procedures.

Do NOT operate, unless:

- You have already known and practiced the rules for safe operation in this manual.
- You should read, understand and obey

  —the instruction and safety rule by the manufacturer

  —the safety and workplace rules for the users

  —the applicable governmental regulations
- You should get the suitable tools, lifting devices and workplace.

Personnel Safety

Every work staff on or around the machine should be aware of the possible potential safety hazards. What is the most important is that personnel safety and to continuously and safely operate the machine

Carefully read all the procedures. The meanings of the labels used in this manual and on the machine are as following:

Safety warning---- to indicate the potential personnel injury existed. It should obey all the safety instructions in the label, to avoid the possible personnel injury or death occurred.

Red----to indicate the emergency dangers. It will cause death or badly injury if not avoided.

Orange----to indicate the potential dangers existed. It will cause death or badly injury if not avoided.

Yellow with safety warning----to indicate the potential dangers existed. It may cause slight or moderate personnel injury if not avoided.

Yellow without safety warning----to indicate potential dangers existed. If may cause damage if not avoided.

Green----to indicate operation or maintenance information.

To indicate that it should wear the safety glasses and other protective work jacks.

To indicate the potential dangers, such as: mobile parts, freely rotating or loose parts, and raised or moving heavy objects. Remember to wear the thick working shoes.

Workplace Safety

Be sure that all the sparks, flame and lighted cigarettes are far away from the inflammable or explosive materials, such as the battery and engine fuel. It shall be equipped with the qualified extinguishers.

Keep all the tools and workplaces in good condition for the use and ensure the workplaces clean to avoid impurities or pieces fall into the components, which may cause damages to the machine.

Be sure that all the forklifts, cranes or other lifting, supporting devices have the enough supporting and lifting capacity. It should only use the intact wire ropes and belts with the enough load capacity.

To process the used fuel and other liquids properly with authorized containers. Please protect the environment from pollution.

Be sure that your workplaces and the work areas are well-ventilated and in good light conditions.

Be sure that disposable fasteners (such as cotter pins and lock nuts etc.) will not be used repeatedly. To repeat using may result in parts invalidation.

Product Specification Description

GTZZ15

Stowed dimension	
Length	5560mm
Width	2300mm
Height	2180mm
Weight	7700kg
Ground clearance	400mm
Working dimension	
Platform height max.	14.8m
Horizontal reach max.	7.62m
Turntable tailswing stowed axle max.	0mm
Wheelbase	2200mm
Turning radius(inside)	1700mm
Turning radius(outside)	4500mm
Turntable rotation	359°
Platform rotation	160°
Load capacity max.	250kg
Lateral force max.	400N
Platform size	
Length	1.83m
Width	0.76m
diameter	823mm
width	256mm

Stowed dimension	
Screw Wrenching Torque（2WD）	280Nm
Screw Wrenching Torque（4WD）	170Nm
Liquid volume	
Fuel tank volume	70L
Hydraulic tank volume	110L
Hydraulic system volume(tank included)	135L
Allowable noise max. at normal working hours	80dB(A)
Driving speed max.(stowed)	5.5km/h
Travel speed (raised or extended)	1.1km/h
Grade ability	30%（2WD） 42% (4WD）
Main Boom raised	24~28sec
Main Boom descend	24~28sec
Auxiliary Boom raised	24~28sec
Auxiliary Boom descend	24~28sec
Main Boom extend	s
Main Boom extract	s
Turntable rotation 359（Main Boom extrac fully）	62~68sec
Platform rotation	180°

GTZZ15J

Stowed dimension	
Length	7680mm
Width	2100mm
Height	2160mm
Weight	6570kg
Ground clearance	400mm
Working dimension	
Platform height max.	15m
Horizontal reach max.	8.5m
Turntable tailswing stowed axle max.	0mm
Wheelbase	2030mm
Turning radius(inside)	1800mm
Turning radius(outside)	4500mm
Turntable rotation	355°
Platform rotation	160°
Load capacity max.	250kg
Lateral force max.	400N
Platform size	
Length	1.83m
Width	0.76m
diameter	823mm
Tire	
width	256mm
Screw Wrenching Torque（2WD）	280Nm
Screw Wrenching Torque（4WD）	170Nm
Liquid volume	
Fuel tank volume	70L
Hydraulic tank	110L

Stowed dimension	
volume	
Hydraulic system volume(tank included)	135L
Allowable noise max. at normal working hours	80dB(A)
Driving speed max.(stowed)	5.5km/h
Travel speed (raised or extended)	1.1km/h
Grade ability	30%（2WD） 42% (4WD）
Main Boom up	24~28sec
Main Boom down	24~28sec
Auxiliary Boom raised	24~28sec
Auxiliary Boom descend	24~28sec
Main Boom extend	16~24s
Main Boom extract	13~23s
Turntable rotation 359（Main Boom extrac fully）	62~68sec
Jib boom up	30~40s
Jib boom down	18~23s

Hydraulic system description

Hydraulic oil	L-HM46
Drive pump	
Type	variable plunger pump
Flow(2200rpm)	61.6L/min
Drive force max.	280bar
Drive device	
Brake	15bar
Drive Motor	
Flow(2200rpm)	56L/min
Flow per revolutions	28cc/rev
Function valve	
Function safety valve force	210 bar
Overflow valve force for boom descend	160bar
Auxiliary pump	
Type	gear pump
Flow(2200rpm)	22L/min
Auxiliary pump overflow pressure	
Pump	20bar

Engine Description

Engine	**Yanmar 4TNV94L-SFN**	**Yuchai YC4F45-T10**
Displacement	3.054L	2.655L
Cylinder amount	4	4
Horsepower	35.5kW@2200r/min	33Kw@2200r/min
Burning order	1-2-4-3	1-2-4-3
Intake way	Natural intake	Natural intake
Low rotating speed—no load	1100 r/min	1100 r/min
High rotating speed—no load	2400 r/min	2400 r/min
Lubricating oil system		
Fuel pressure	2.9-3.9bar	1.0-6.0bar
Fuel capacity	10.5L	9L
Fuel viscosity requirement		
Below 32°F/0℃	0W	0W
-13°F to 68°F /-25℃ to 20℃	5W-20	5W-20
10°F to 104°F /-12℃ to 40℃	10W-30	10W-30
14°F to 122°F /-10℃ to 50℃	15W-40	15W-40
Over 23°F/-5℃	20W-50	20W-50
Generator output	40A，12V	35.7A,28V
Battery system		
Voltage	12V	24V
Quantity	1	2
Cooling system		
Engine volume	3.054L	5L
Fan belt deflection	9-12mm	9-12mm

Engine	**Perkins404D-22T**	**Deutz 2011L03i**
Displacement	2.216L	2.331L
Cylinder amount	4	3
Horsepower	37.3kW@2800r/min	36.3Kw@2800r/min
Burning order	1-2-4-3	1-2-3
Intake way	Natural intake	Natural intake
Low rotating speed—no load	1100 r/min	1100 r/min
High rotating speed—no load	2400 r/min	2400 r/min
Lubricating oil system		
Fuel pressure	2.9-3.9bar	1.0-6.0bar
Fuel capacity	10.5L	9L
Fuel viscosity requirement		
Below 32°F/0℃	0W	0W
-13°F to 68°F /-25℃ to 20℃	5W-20	5W-20
10°F to 104°F /-12℃ to 40℃	10W-30	10W-30
14°F to 122°F /-10℃ to 50℃	15W-40	15W-40
Over 23°F/-5℃	20W-50	20W-50
Generator output	40A，12V	60A,14V
Battery system		
Voltage	12V	12V
Quantity	1	1
Cooling system		
Engine volume	5L	6L
Fan belt deflection	9-12mm	9-12mm

Instructions for Hydraulic Hoses and Couplings Installation

This machine is equipped with the o-rings hydraulic hoses and couplings on the surface. When removing or equipping them, it shall be removed or equipped the hoses and couplings according to the stipulations in the manuals.

Instruction for the hydraulic hoses and couplings installation		
Couplings		
Dash size	Installing into	Torque (Nm)
-4	Aluminum	14.9
	Steel	21.7
-6	Aluminum	31.2
	Steel	47.5
-8	Aluminum	54.2
	Steel	81.3
-10	Aluminum	93.6
	Steel	142.4
-12	Aluminum	126.1
	Steel	190
-16	Aluminum	188.5
	Steel	284.7
-20	Aluminum	233.2
	Steel	352.5
-24	Aluminum	282
	Steel	427.1

Instruction for the hydraulic hoses and couplings installation	
Hose	
Dash size	Torque Nm
-4	24.4
-6	36.6
-8	54.2
-10	85.4
-12	122
-16	162.7
-20	190
-24	223.7

Torque procedure

1. Replace the O-ring. The O-ring must be replaced anytime the seal has been broken. The O-ring cannot be re-used if the coupling or hose end has been tightened beyond finger tight.
2. Lubricate the O-rings before the installation.
3. Be sure that the seal o-rings on the surface are properly settled and fixed.
4. Position the tube and nut squarely on the face seal end of the fitting and tighten the nut finger tight.
5. Tighten the nut or fitting to the appropriate torque per given size as shown in the table above.
6. Operate all the machine functions and inspect the hoses, couplings and other related parts to make sure no leakage occurred.

Theory of Operation

The power source

GTZZ15&GTZZ15J is driven by Yanmar, yuchai, perkins and deutz diesel engines

Hydraulic system

All machine functions are performed by the hydraulic system. The hydraulic system is divided into two groups: Articulated Boom/Steer functions and Drive functions.

Active Boom are driven by a gear pump, rated at 26.5 L/min. When the engine is running, this pump supplies hydraulic fluid under pressure to the function valve, where the directional and flow control valves are located. In order to protect from over-pressurization of the Boom/Axle system, overflow valve located in valves. The pressure defined as 205.8 bar.

Drive functions are powered by a bi-directional, variable output piston pump rated at 0~61.6L/min@2200/min. Two overflow valves are used to prevent over-load of the closed loop drive system.

The boom lift cylinder, boom extend cylinder, platform leveling slave cylinder, platform rotator and jib boom cylinder incorporate counterbalance valves to prevent boom or platform movement in the event of a hydraulic line failure.

Electrical system

The active boom function worked by choosing a switch or a controller, output a voltage to directional control valve. These directional control valve decides direction of hydraulic oil flow, which controlled by ratio valve or flow valve. When ratio valve receives changeable voltage signal, the voltage increase, flow increase.

Walking drive worked by foot switch and operating shaft.

Limit Switch

There are two limit switch installed in different place of Machine, that is speed limit switch and drive limit switch respectively. Speed limit function: When main boom raised more than 0.6m or extend more than 457mm,the driving speed less than 0.6km/h;Drive limit switch function: Machine couldn’t move when boom rotation exceed non-wheel steering

Machine controls

The machine is equipped with operational controls which are found in two locations: the ground control and the platform control.

All raise, return, driving are controlled by platform controller. Boom raise and return action are controlled by ground control

Ground control: All function are controlled by switch, The active direction of boom are displayed in control board. A print indicates that boom function is comply with action.

Platform operation: All action will be operated by choosing switch and shaft simultaneously. Drive control adjusts the flow of drive pump.

Scheduled Maintenance Procedures

Observe and Obey

- Maintenance inspections shall be completed by a person trained and qualified on the maintenance of this machine.
- Scheduled maintenance inspections shall be completed daily, quarterly, annually and every 2 years and it should be recorded on the Maintenance Inspection Report.

⚠WARNING Failure to perform each procedure as presented and scheduled may cause death, serious injury or substantial machine damage.

- Immediately tag and remove from service a damaged or failed machine.
- Repair any machine damage or failure before operating machine.
- Keep all the machine inspections records for three years.
- It shall be completed the quarter inspections to the machines with no maintenance service during three months.

Unless otherwise specified, perform each procedure with the machine in the following configuration:

- Machine parked on a flat, level surface
- Boom in the stowed position
- Turntable rotated with the boom between the non-steering wheels
- Turntable secured with the turntable rotation lock pin
- Key switch in the “OFF” position with the key removed
- Wheels chocked

About this section

This section contains detailed procedures for each scheduled maintenance inspection. Each procedure includes a description, safety warnings and step-by-step instructions.

Each procedure includes a description, safety warnings and step-by-step instructions.

Labels illustrations

Safety alert symbol—used to alert personnel to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

Red—to indicate the presence of an imminently hazardous situation which, if not avoided, will result in death or serious injury.

Orange—to indicate the presence of a potentially hazardous situation which, if not avoided, could result in death or serious injury.

Yellow with safety alert symbol—to indicate the presence of a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

Yellow without safety alert symbol—to indicate the presence of a potentially hazardous situation which, if not avoided, may result in property damage.

Green—to indicate operation or maintenance information.

Maintenance labels illustrations

NOTICE

The following symbols have been used in this manual to help communicate the intent of the instructions. When one or more of the symbols appear at the beginning of a maintenance procedure, it conveys the meaning below:

Indicates that tools will be required to perform this procedure.

Indicates that new parts will be required to perform this procedure.

Indicates that a cold engine will be required to perform this procedure.

Indicates that a warm engine will be required to perform this procedure.

Indicates that dealer service is required to perform this procedure.

Maintenance timetable

There are five types of maintenance inspections that must be performed according to a schedule— daily, quarterly, six months, annual, and two year. The Scheduled Maintenance Procedures Section and the Maintenance Inspection Report have been divided into five subsections—A, B, C, D and E. Use the following chart to determine which group(s) of procedures are required to perform a scheduled inspection.

Inspection	Table or Checklist
Daily or every 8 hours	A
Quarterly or every 250 hours	A+B
Six month or every 500 hours	A+B+C
Annual or every 1000 hours	A+B+C+D
Two year or every 2000 hours	A+B+C+D+E

Maintenance inspection report

The maintenance inspection report contains checklists for each type of scheduled inspection.

Make copies of the Maintenance Inspection Report to use for each inspection. Store the completed forms for three years.

Procedures A

A-1. Check all the manuals

Maintaining the operator’s and safety manuals in good condition is essential to safe machine operation. Manuals are included with each machine and should be stored in the container provided in the platform. An illegible or missing manual will not provide safety and operational information necessary for a safe operating condition.

1. Check to be sure that the storage container is present and in good condition.
2. Check to make sure that the operator's, responsibilities and safety manuals are present and complete in the storage container in the platform.
3. Examine the pages of each manual to be sure that they are legible and in good

condition.

4. Always return the manuals to the storage container after use.

NOTICE Please contact SINOBOOM if replacement manuals are needed.

A-2. Check all the labels.

Maintaining all of the safety, instructional decals and placards in good condition is mandatory for safe machine operation. Decals alert operators and personnel to the many possible hazards associated with using this machine. They also provide users with operation and maintenance information. An illegible decal will fail to alert personnel of a procedure or hazard and could result in unsafe operating conditions.

1、Refer to the labels section in the Sinoboom GTZZ15 & GTZZ15J Operator's Manual and use the label list and illustrations to determine that all labels are in place.

2、Check all decals for legibility and damage. Replace any damaged or illegible decal immediately.

NOTICE Please contact SINOBOOM if replacement manuals are needed.

A-3. Check the damaged and loosen or missing parts

Daily machine condition inspections are essential to safe machine operation and good machine performance. Failure to locate and repair damage, and discover loose or missing parts may result in an unsafe operating condition.

Observe the whole machine to check the damaged and improperly installed or missing parts including:

- Electrical components, wiring and electrical cables
- Hydraulic hoses, power units, fittings, cylinders and manifolds
- Fuel and hydraulic tanks
- Drive and turntable motors and drive hubs
- Boom wear pads and the extend / stowed wear pads
- Dents and damage to the machine
- Tires and wheels

- Engine and related components
- Limit switches and horn
- Alarm and beacon
- Nuts, bolts and other fasteners
- Platform entry mid-rail and gate
- Structural components and cracks in welds
- Compartment covers and latches

A-4. Check the engine oil level

Maintaining the proper engine oil level is essential to good engine performance and service life. Operating the machine with an improper oil level can damage engine components.

NOTICE Check the oil level with the engine off.

NOTICE Check the engine oil dipstick and fill it when necessary

Result: The oil level should be within the two marks on the dipstick.

A-5. Check the engine coolant level

Maintaining the engine coolant at the proper level is essential to engine service life. Improper coolant level will affect the engine's cooling capability and damage engine components. Daily checks will allow the inspector to identify changes in coolant level that might indicate cooling system problems.

NOTICE Check the coolant liquid level and fill it when necessary.

Result: the coolant liquid level is with the full range.

⚠WARNING The coolant liquid in the tank is under high pressure and getting hot. Beware of hot engine parts and coolant when opening the covers and filling the liquid.

A-6. Check the engine fuel leakage

Failure to detect and correct fuel leakage will result in an unsafe condition. An explosion or fuel fire may cause death or serious injury.

Danger: Engine fuels are combustible. Inspect the machine in an open, well ventilated area away from heaters, sparks, flame and lighted tobacco. Always have an approved fire extinguisher within easy reach.

A-7. Check the hydraulic oil level

Maintaining the hydraulic oil at the proper level is essential to machine operation. Improper hydraulic oil levels can damage hydraulic components. Daily checks allow the inspector to identify changes in oil level that might indicate the presence of hydraulic system problems.

NOTICE It shall be performed this procedure as the boom is in the load position with the axle is extended.

NOTICE Visually inspect the sight gauge located on the side of the hydraulic oil tank.

The hydraulic oil level should be below the top 19mm of the level gauge.

A-8. Check the hydraulic leakage

Detecting hydraulic fluid leaks is essential to operational safety and good machine performance. Undiscovered leaks can develop into hazardous situations, impair machine functions and damage machine components.

Inspect for hydraulic oil puddles, dripping or residue on or around the following areas:

- Hydraulic oil tank—filter, pipe joint, tubing, auxiliary power unit
- Engine—pipe joint, tubing, pump, filter
- all the hydraulic cylinders
- all the hydraulic manifolds
- the booms
- rotary bearing
- drive chassis
- ground area around the machine

A-9. Test axle tilted

Safety operation is essential to tilted angle inspection. The machine stability will be influent if the machine tilted angle too larger, moreover may tip-over.

1、Start engine

2、The machine turned right, make the right tire press a obstacle of 152mm height.

Result: The other three tires should be closed to ground, and chassis kept levelly.

3、The machine turned left, make the left tire press a obstacle of 152mm height.

Result: The other three tires should be closed to ground, and chassis kept levelly.

4、Two directional tire press the obstacle of 152mm height simultaneously.

Result: Non-directional tires should be closed to ground.

A-10. Test the Platform and Ground Controls

Testing the machine functions and the Emergency Stop buttons for malfunctions is essential for safe machine operation. An unsafe working condition exists if any function fails to operate properly or either Emergency Stop button fails to stop all the machine functions and shut off the engine. Each function should activate, operate smoothly and be free of hesitation, jerking and unusual noise.

Result: boom should be stowed.

Test the ground control

1. Turn key switch to the ground control.

2. Free the function starting button and press boom and platform function button.

Result: boom and platform have no function operated moves.

Test the platform control

3. Turn the key switch to platform control.

4. Loosen foot switch.

5. Press each functional control handle and turn ON/OFF button or button.

Result: No jib boom and platform should be operated.

6. Press down foot switch

7. Press down each function control handle and turn ON/OFF or button.

Result: all boom and platform functions should be operated properly.

A-11. Test the auxiliary power operation

Detection of auxiliary power system malfunctions is essential for safe machine operation. An unsafe working condition exists if the auxiliary powered functions do not operate in the event of a main power loss. When operating the machine on engine power, selecting auxiliary power will stop the engine immediately. Auxiliary power is designed for short term use only, and excessive use will result in battery drain and component damage.

NOTICE Operate this move with engine off.

1、Turn the key switch to ground control and pull out the Emergency Stop button to the ON position.

2、Simultaneously hold the auxiliary power toggle switch ON and activate each boom function toggle switch.

Result: All boom functions should operate.

3、 Turn the key switch to platform control.

4、 Press down the foot switch.

5、 Simultaneously hold the auxiliary power toggle switch ON and activate each function controller or toggle switch.

Result: All boom functions should operate.

A-12. Test tilted SENSOR

When machine drives in a slope continually, turn table tilted exceed sensor rating, platform ought to alarm.

1、 Open a cover in Engine side.

2、Push key switch to platform control. and turn the urgent stop switch in platform and ground to “ON” condition.

3、Install the tilted sensor in the right of auxiliary pump.

4、Press one end of sensor.

Result: Platform alarm rings.

A-13. Test limit switch

Drive limit switch

Test limit switch is essential to safety operation. When boom raised or extended, drive limit switch used for limit speed. It will result a serious safety consequences if operating without functional limit switch.

1、Move the oil tube and cable cover from the top connection frame.

2、Install the main boom drive limit switch besides the tope connection frame.

3、Check drive limit switch from other aspect outside.

Damaged or lack of roller, boom etc.

Lack of connection parts.

Cables loosening.

4、Push drive limit switch by hand.

Result: Main limit switch boom could be easily rotate or recover to central location, and hear the connection point sound obviously.

5、The installation of auxiliary boom drive limit switch located in one end of platform of down connection frame.

6、Check drive limit switch from other aspect outside.

Damaged or lack of roller, boom etc.

Lack of connection parts.

Cables loosening.

7、Push drive limit switch by hand.

Result: Main limit switch boom could be easily rotate or recover to central location, and hear the connection point sound obviously.

8、Telescopic limit switch located in that of main boom.

9、Check drive limit Switch from other aspect outside.

Damaged or lack of roller, boom etc.

Lack of connection parts.

Cables loosening.

10、Start engine from ground control box, and extend the main boom around 610mm.

11、Shut down engine.

12、Push drive limit switch by hand.

Result: Main limit switch boom could be easily rotate or recover to central location, and hear the connection point sound obviously.

13、 Start engine from platform control

14、 Turn the choice switch to raise position.

15、 Press foot switch, extract main boom totally.

16、 Turn the choice switch to walking position.

17、 Press foot switch then push shaft forward slowly.

Result: Machine worked normally.

18、 Turn the choice switch to raise position.

19、 Press foot switch and raid main boom to 610mm height.

20、 Turn the choice switch to walking position.

21、 Press foot switch then push shaft forward slowly.

Result: Machine worked low speed.

22、 Turn the choice switch to raise position.

23、 Press foot switch, extract main boom totally, then raise to about 610mm height.

24、 Turn the choice switch to walking position.

25、 Press foot switch then push shaft forward slowly.

Result: Machine worked normally.

26、 Turn the choice switch to raise position.

27、 Press foot switch, turn auxiliary boom to the lowest position, then extend main boom to about 610mm length.

28、 Turn the choice switch to walking position.

29、 Press foot switch then push shaft forward slowly.

Result: Machine worked low speed.

Raise or extend, max. walking speed
1.0km/h

Steering limit switch

Steering limit switch function is essential to safety operation and working condition. When boom rotation exceeds non-steering tire, the steering switch could stop machine and warming operator. The actual machine walking direction will be opposite to what you operate.

1、Start engine from ground control, turn boom rotation to the middle of steering tire and non-steering tire, then turn off the engine.

2、Check drive limit Switch from other aspect outside.

Damaged or lack of roller, boom etc.

Lack of connection parts.

Cables loosening.

3、Push drive limit switch by hand.

Result: Main limit switch boom could be easily rotate or recover to central location, and hear the connection point sound obviously.

4、Start engine from platform control.

5、 Turn the choice switch to raise position.

6、Press foot switch, turn platform to the middle of main boom and non-steering tire.

Result: drive light shut.
7、Turn the choice switch to walking position.
8、Press foot switch then push shaft forward slowly.
Result: drive function could be operated.
9、Turn the choice switch to raise position.
10、Press foot switch, turn platform to left until the main boom exceeded left steering-tire.
Result: drive light shut.
11、Turn the choice switch to walking position.
12、Press foot switch then push shaft forward slowly.
Result: drive function couldn't be operated.

A-14. Check the engine belt—Yanmar,Yuchai,Perkins and deutz engine

Maintaining the engine belt is essential to good engine performance and service life. The machine will not operate properly with a loose or defective belt and continued use may cause component damage.

⚠WARNING Do not check while the engine is running. Remove the key to secure from operation.

⚠CAUTION Beware of hot engine components. Contact with hot engine components may cause severe burns.

1、Remove the engine pivot plate retaining bolts. Swing the engine pivot plate away from the machine to access the front engine access cover mounting fasteners.

2、Inspect the engine belt for:

- ◆ Cracking
- ◆ Glazing
- ◆ Separation
- ◆ Breaks

3、Replace the belts immediately if any damage is found.

4、Swing the engine pivot plate back to its original position

5、Install the two engine pivot plate retaining bolts.

⚠WARNING It may cause death or badly injury if it is not installed the fasten bolts to lock the engine.

A-15. Clean the engine air filter

Maintaining the engine air filter in good condition is essential to good engine performance and service life. Failure to perform this procedure can lead to poor engine performance and component damage.

Perform this procedure with the engine off.

1、Open the engine side cover and remove the retaining ring from the end cap of the air filter canister. Clean it if necessary.

2、Remove the end cap from the air cleaner canister.

3、Remove the filter element.

4、Clean the inside of the canister and the gasket with a damp cloth.

5、Inspect the filter element. If needed, blow out from inside out using low pressure dry compressed air, or tap dust out taking care not to damage the element.

6、Install the air filter element.

7、Install the end cap onto the canister. Install and tighten the retaining ring.

A-16. Replace the fuel filter/water separator element

Replacing the fuel filter and water filter core are essential to good engine performance and service life. A dirty or clogged filter may cause the engine to perform poorly and continued use may cause component damage. Extremely dirty conditions may require that the filter be replaced more often.

⚠DANGER Engine fuels are combustible. Replace the fuel filter in an open, well ventilated area away from heaters, sparks, flames and lighted tobacco. Always have an approved fire extinguisher within easy reach.

NOTICE Extremely dirty conditions and poor fuel quality may require that the filter be replaced more often.

NOTICE Perform this procedure with the engine off.

1、Disconnect and plug the fuel supply hose from the fuel tank to the fuel filter/water separator head.

2、Loosen the vent plug located on the fuel filter/ water separator head.

3、Place a suitable container under the filter bowl.

4、Loosen the drain plug located at the bottom of the bowl. Completely drain the fuel.

5、Rotate the filter element counterclockwise and remove it from the filter head.

6、Install the filter bowl onto the new filter element.

7、Apply a thin layer of fresh oil on the filter or element.

8、Apply a thin layer of oil onto the element gasket.

9、Install the filter/bowl assembly onto the filter head. Tighten the drain plug and vent plug.

NOTICE Before bleeding the system, fill the fuel tank.

10、Tighten the head bolt.

11、Tighten the vent plug.

12、Clean up any diesel fuel that may have spilled during the installation procedure.

13、Use a permanent ink marker to write the date and number of hours from the hour meter on the filter element.

14、Connect the fuel hose from the fuel tank to the fuel filter/water separator. Tighten the clamp.

A-17. Check the engine coolant tank

Maintaining the engine coolant tank is essential to good engine performance and service life. The machine will not operate properly with a loose or defective tank and continued use may cause component damage.

⚠WARNING Do not check while the engine is running which may cause the body injury.

⚠CAUTION Beware of hot engine components. Contact with hot engine components may cause severe burns.

1、 Open the covers of the side turntable on the engine and find the engine coolant tank.

2、 Inspect the engine belt for:

- broken
- rivets loosen
- blades tilted or loosen

3、 Check whether the coolant tank is stably installed. Tighten the fasten bolts on the coolant tank.

4、 Replace the coolant tank immediately if any damage is found.

A-18. Change the lubricating oil and filter of engine

Engine requires the maintenance of regular changing lubricating oil and filter of engine at 500 hours intervals. If engine oil is not enough or didn`t change engine oil and filter when the machine is operating, the engine parts maybe ruined.

Operated this part should be in the condition of engine stop and low temperature.
1、Loosen the coupling bolt of engine chassis and turntable
2、Turn engine chassis to 45 degree and put a safety stick.
3、Remove filter cover.
4、Open fuel tube from engine bottom.
5、Open the drain plug then put the oil to suitable container.(Container size refer to manual)
6、Close drain plug.
7、Put a container under filter
8、Adopt a wrench move the filter.
9、Change a new filter ring then install a new filter, fasten it.

A-19. Execute 30 days maintenance procedure

The machine should receive some maintenance after working 30 days or 50 hours, which should be done internally.
Execute the maintenance procedures as follows,

A-20. Check and adjust rotation rate engine.

One of an essential factor to make engine in good performance and long life span is to keep the engine in a

reasonable situation. When operate the machine, The spare parts could be damaged if the engine rotation rate worked continuously abnormal. This operation needs two people.

NOTICE

1. Install a tachometer in engine, start engine from ground control.

Result: Race engine in low speed 1100r/min。

2. Push switch to high speed position(Rabbit sign)

Result: Race engine in high speed:2400 r/min。

A-21. Check the engine fastener

NOTICE The engine manual requires that operate this procedure after using the machine in 40 hours

Proper screwing the engine fastener is essential to the normal and safe work. Loosing fastener or screwing improperly may cause damage to the engine components and dangerous condition.

1、Remove the standing bolts on engine pivot plate and swing it to make engine separate from the engine.

2、Screw all surface fastener. Toque: 12Nm

3、Screw all intake clamps. Toque: 12Nm

4、Screw all intake valve standing bolts. Toque: 23Nm.

5、Screw all vent valve fastener bolts. Toque: 40Nm.

6、Screw engine install bolts. Toque between engine and pivot plate bolts: 73Nm; toque between pivot plate and turntable bolts: 273Nm.

7、Swing engine pivot plate to turn engine back to its original condition.

8、Install standing bolts to lock engine.

⚠WARNING It may cause death and severe damage if no standing bolt lock is installed.

Procedures B

B-1. Check the Battery

NOTICE Sinoboom requires that this procedure be performed every 125 hours.

Proper battery condition is essential to good engine performance and operational safety. Improper fluid levels or damaged cables and connections can result in engine component damage and hazardous conditions. There are two groups batteries to start engine and drive the control system.

⚠WARNING Contact with hot or live circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

Batteries contain acid. Avoid spilling or contacting battery acid. Neutralize battery acid spills with baking soda and water.

1、Put on protective clothes and eye wear.

2、Be sure that the battery cable connections are free of corrosion.

3、Be sure that the battery hold downs and cable connections are tightly connected.

4、Be sure that the leads of the battery separator are tightly connected.

5、Remove the battery vent caps and check the specific gravity of each battery cell with a hydrometer.

Result: If any battery cell displays a specific gravity of less than 1.086, the battery must be replaced.

6、Check the battery acid level of each cell. If needed, replenish with distilled water to the bottom of each battery fill tube. Do not overfill.

7、Install the battery vent caps.

B-2. Check the Electrical Wiring

Maintaining electrical wiring in good condition is essential to safe operation and good machine performance. Failure to find and replace burnt, chafed, corroded or pinched wires could result in unsafe operating conditions and may cause component damage.

⚠WARNING Contact with hot or live circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

1、Inspect the following areas for burnt, chafed, corroded and loose wires:

- ◆ Engine wiring harness
- ◆ Ground controller wiring box
- ◆ Turntable valve wiring

2、Start the engine from the platform controls.

3、Turn key switch to ground control and raise boom to above the turntable.

⚠WARNING Do not touch by finger or get close to the cylinders and all moving parts when the boom is decreased.

4、Stop Engine.

5、Loose boom chain cover fastener and chain cover.

6、Inspect the chain areas for burnt, chafed, corroded and loose wires.

7、Install boom chain and fastening bolts.

8、Start engine and lower jig boom to load position.

9、Stop the engine.

10、Inspect the following areas for burnt, chafed, corroded and loose wires:

- ◆ Platform controller wiring box
- ◆ Platform valve wires

B-3 Check the Exhaust System

Maintaining the exhaust system is essential to good engine performance and service life. Running the engine with a damaged or leaking exhaust system can cause component damage and unsafe operating conditions.

⚠WARNING Do not inspect while the engine is running. Remove the key to secure from operation.

NOTICE Beware of hot engine components. Contact with hot engine components may cause severe burns.

Engine:

1、Be sure that all bolts are tight.

2、Inspect all welds for cracks.

3、Inspect for exhaust leaks.

B-4.Check the hydraulic filter indicator

Maintaining the hydraulic tank filter in good condition is essential to good system performance and safe machine operation. The filter condition indicator will show when the hydraulic flow is bypassing a clogged filter. If the filter is not frequently checked and replaced, impurities will remain in the hydraulic system and cause component damage.

NOTICE There are all together three hydraulic tank filter: one is suction oil filter on the side tank; one is oil return filter; the rest is high pressure filter.

1、Start the engine from the platform controls.

Oil return filter

2、Move the engine speed control switch to high idle (rabbit symbol).

3、Inspect the filter condition indicator.

Result: The filter should be operating with the plunger in the green area. If the display shows the plunger in the red area, this indicates that the hydraulic filter is being bypassed and the filter should be replaced

High pressure filter

NOTICE The high pressure filters are installed beside the engine and the filter indicator should be the top of other filters.

4、Inspect the filter condition indicator

Result: The filter should be operating with the plunger in the green area. If the display shows the plunger in the red area, this indicates that the hydraulic filter is being bypassed and the filter should be replaced

B-5. Check the Tires and Wheels (including lug nut torque)

Maintaining the tires and wheels in good condition is essential to safe operation and good performance. Tire and/or wheel failure could result in a machine tip-over. Component damage may also result if problems are not discovered and repaired in a timely fashion.

NOTICE The tires equipped on this machine are foam filled and do not need air added to them.

1、Check all tire treads and sidewalls for cuts, cracks, punctures and unusual wear.

2、Check each wheel for damage, bends and cracked welds.

3、Check each lug nut for proper torque.

B-6. Check the key switch

Using flexible for the key switch is very important to the safe operation of the machine. It is possible that the key switch losing its function will cause the dangerous operation.

The key switch on the machine could choose the operation control on earth or the control on the platform.

1. Open the side turntable cover of the earth control.
2. Turn the key switch to platform controls and pull out the Emergency Stop button to the ON position at both the ground and platform controls.
3. Turn the key switch to ground control, start the engine and turn the key switch to the platform control.
4. Check any function through ground control.

Result: the machine function should not operate.

5. Turn the key switch to ground control.
6. Check any function through platform control.

Result: the machine function should not operate.

B-7. Test the emergency stop buttons

Properly functioning Emergency Stop buttons are essential for safe machine operation. An improperly operating Emergency Stop button will fail to shut off power and stop all machine functions, resulting in a hazardous situation for ground and platform personnel.

NOTICE Selecting and operating the ground controls will override the platform controls, including the platform Emergency Stop button.

1、Start the engine from the ground controller.

2、Push in the Emergency Stop button to the OFF position.

Result: The engine should stop and no machine function should be operated.

3、Start the engine from the platform controller.

4、Push in the Emergency Stop button to the OFF position.

Result: The engine should stop and no machine function should be operated.

NOTICE The ground control Emergency Stop button will stop all machine operation, even if the key switch is switched to platform control.

B-8. Test the Ground Control Override

A properly functioning ground control override is essential to safe machine operation. The ground control override function is intended to allow ground personnel to operate the machine from the ground controls whether or not the red Emergency Stop button at the platform controls is in the on or off position. This function is particularly useful if the operator at the platform controls cannot return the boom to the stowed position.

1、Push in the red Emergency Stop button at the platform controls to the off position.

2、Start the engine from the ground controls.

3、Operate each boom function.

Result: All boom functions should operate.

B-9. Test the platform self-leveling

Automatic platform self-leveling throughout the full cycle of boom raising and lowering is essential for safe machine operation. The platform is maintained at level by the platform leveling slave cylinder which operates in a closed loop hydraulic circuit with the master cylinder located at the base of the boom. A platform self-leveling failure creates an unsafe working condition for platform and ground personnel.

1、Start the engine from the platform controls and extend boom, and restrict the boom to the stowed position.

2. Put the function start button and use the platform leveling button adjust to the leveling position.

3. put the function start button make the boom raising, from the min angle to the max angle.

Result: the platform should keep leveling all the time and the slope should in 5 degree.

B-10. Test the horn

The function of a horn is essential to safe machine operation. The horn is activated at the platform controls and sounds at the ground as a warning to ground personnel. An improperly functioning horn will prevent the operator from alerting ground personnel of hazards or unsafe conditions.

1、Turn the key switch to platform controls and pull out the Emergency Stop button to the ON position at both the ground and platform controls.

2、Push down the horn button at the platform controls.

Result: The horn should sound.

NOTICE If necessary, the horn can be adjusted to obtain the loudest volume.

B-11. Test the foot switch

A properly functioning foot switch is essential to safe machine operation. Machine functions should activate and operate smoothly as long as the foot switch is pressed down, and promptly stop when the foot switch is released. An improperly functioning foot switch can cause an unsafe working condition and endanger platform and ground personnel.

NOTICE The engine should not start if the foot switch is pressed down

1、Turn the key switch to platform controls and pull out the Emergency Stop button to the "ON" position at both the ground and platform controls.

2、Press down the foot switch and attempt to start the engine by moving the start toggle switch to either side.

Result: the engine should not be started.

3、Do not press down the foot switch and attempt to start the engine.

4、Do not press down the foot switch and operate the machine functions.

Result: the machine functions will not be performed.

5、Press down the foot switch.

6、Press down the functions control joysticks, slide switches and buttons.

Result: all the functions should be normally performed.

B-12. Test the Engine Idle Select selection

A properly operating engine idle select switch is essential to good engine performance and safe machine operation.

Low idle (turtle symbol) allows operators simultaneously operate boom and/or drive function. This setting maintains a consistent high idle.

High idle activated by the foot switch (rabbit symbol) should be used for normal machine operation. This setting activates high idle only when the foot switch is pressed down.

1、Turn the key switch to platform controls

2、Pull out the Emergency Stop button to the "ON" position at both the ground and platform controls.

3、Start the engine from the ground controller.

4、Press the high idle select button (rabbit symbol)

Result: the engine turns to high idle speed.

5、Release high idle button.

Result: Engine turns to low idle speed.

6、Turn key switch to platform control.

7、Hold the function enable toggle switch in the low idle (turtle symbol).

Result: the engine turns to low idle.

8、Press engine idle speed choose button until foot switch activate high idle (rabbit symbol) is chosen.

Result: the engine does not turn to high idle.

9. Press foot switch.

Result: the engine should turn to high idle.

B-13. Confirm the Proper Brake Configuration

Proper brake configuration is essential to safe operation and good machine performance.

The hydraulic brake devices are attached in the drive torque hubs of this machine.

Check each drive hub disconnect cap to be sure it is in the engaged position.

B-14.Test the speed in stowed position

Proper drive enable system operation is essential to safe machine operation. During the operation, the machine must to react quickly and stable. In the limit speed range, the operation should be without hesitation, abnormal and loud noise.

1. Mark two lines on the ground, the distance between them is 12.2m.
2. Start the engine on the platform.
3. Turn the switch to the high speed tap position and restrict the boom to the load position.
4. Put the mark on the tires for reference.
5. Once the mark on the tires at the start position, driving in max speed, and timing.
6. When the mark on the tires at the end, write down the record.

the max speed in stowed position
12.2m/5.7s

B-15. Test the speed when the boom raising and extending

Proper drive enable system operation is essential to safe machine operation. During the operation, the machine must to react quickly and stable. In the limit speed range, the operation should be without hesitation, abnormal and loud noise.

1. Mark two lines on the ground, the distance between them is 12.2m.
2. Start the engine on the platform.
3. Turn the choosing switch to raising tap position.
4. Turn the choosing switch to raising tap position and step the foot switch, raise the boom above the leveling position.
5. Turn the choosing switch to walking tap position.
6. Put the mark on the tires for reference.
7. Once the mark on the tires at the start position, driving in max speed, and timing. When the mark on the tires at the end, write down the record.
8. When the mark on the tires at the end, write down the record
9. Turn the choosing switch to raising tap position.
10. Step the foot switch, the machine in the stowed position.
11. Put the boom extend 300mm.
12. Turn the choosing switch to walking tap position.
13. Put the mark on the tires for reference.
14. Once the mark on the tires at the start position, driving in max speed, and timing. When the mark on the tires at the end, write down the record.
15. When the mark on the tires at the end, write down the record.

the max speed in the boom raising and extending
1Km/h

B-16. Replace the hydraulic tank return filter

Replacement of the hydraulic tank return filter is essential for good machine performance and service life. A dirty or clogged filter may cause the machine to perform poorly and continued use may cause component damage. Extremely dirty conditions may require that the filter be replaced more often.

⚠CAUTION Beware of hot oil. Contact with hot oil may cause severe burns.

NOTICE Perform this procedure with the engine off.

NOTICE There are two return filters on the machine. One is system return filter, the other is driving motor return filter.

1、Unfold ground control turntable covers and find return filter.

2、Place a suitable container under the hydraulic tank return filter.

3、Remove the filter with an oil filter wrench.

4、Apply a thin layer of fresh oil to the new oil filter gasket.

5、Install the new filter and tighten it securely by hand.

6、Install the now drive motor and tighten it securely by hand.

7、Clean up any oil that may have spilled during the installation procedure.

8、Use a permanent ink marker to write the date and number of hours from the hour meter on the oil filter.

9、Start the engine from the ground controls.

10、Inspect the filter and related components to be sure that there are no leaks.

B-17. Check the fuel tank cap venting systems

Free-breathing fuel tank caps are essential for good machine performance and service life. A dirty or clogged tank cap may cause the machine to perform poorly and continued use may cause component damage. Extremely dirty conditions may require that the caps be inspected more often.

DANGER Engine fuels are combustible. Perform this procedure in an open, well ventilated area away from heaters, sparks, flame and lighted tobacco. Always have an approved fire extinguisher within easy reach.

NOTICE Perform this procedure with the engine off.

1、Remove the cap from the fuel tank.

2、Check for proper venting.

Result: Air passes through the fuel tank cap.

Procedures C

C-1. Clean the fuel pump strainer

Cleaning the fuel pump strainer is essential for good engine performance and service life. A dirty or clogged strainer may cause the engine to perform poorly and continued use may cause component damage. Extremely dirty conditions or not operating the machine for extended periods of time may require that the strainer be cleaned more often.

⚠DANGER Engine fuels are combustible. Perform this procedure in an open, well ventilated area away from heaters, sparks, flame and lighted tobacco. Always have an approved fire extinguisher within easy reach.

NOTICE Perform this procedure with the engine off.

1、Disconnect and plug up the fuel hose between the fuel tank and fuel filter/water separator.

2、Remove the fastener on the engine pivot plate and rotate it away from the machine.

3、Insert standing fastener on engine pivot plate.

4、Find fuel pump.

5、Remove fastener bolt from fuel pump cover and carry down the cover and sealed ring.

6、Carry down trap valve.

7、Use neutral liquid to clean the inner pump carefully.

8、Use neutral liquid to clean trap valve, sealed ring and pump cover.

9、Install the trap valve and sealed ring on pump.

10、Install the pump cover and screw bolts.

C-2. Replace the fuel filter element

Replacing the diesel fuel filter element is essential for good engine performance and service life. A dirty or clogged filter may cause the engine to perform poorly and continued use may cause component damage. Extremely dirty conditions may required that the filter be replaced more often.

⚠DANGER Engine fuels are combustible. Perform this procedure in an open, well ventilated area away from heaters, sparks, flame and lighted tobacco. Always have an approved fire extinguisher within easy reach.

NOTICE Perform this procedure with the engine off. And immediately clean up any fuel that may have spilled during this procedure.

1、Post decal and disconnect and plug up the fuel hose between the connection of fuel tank and fuel filter.

2、Remove the fastener on the engine pivot plate and rotate it away from the machine.

3、Insert standing fastener on engine pivot plate.

4、Find fuel filter and thoroughly clean the outside surfaces of the fuel filter assembly.

5、Remove the element and dispose of properly.

6、Clean the inside surfaces of the filter head and the bottom cover.

7、Lightly lubricate the upper seal and the o-ring with clean diesel fuel and install them into the filter head.

8、Clean up any fuel that may have spilled during this procedure.

9、Install the element.

C-3. Check the Engine coolant density

Check the engine coolant is essential to good engine performance and service life. Old or dirty coolant may cause the engine to perform poorly and continued use may cause engine damage.

⚠CAUTION Beware of hot engine parts and coolant. Contact with hot engine parts and/or coolant may cause severe burns.

NOTICE Perform this procedure with platform on horizontal ground.

NOTICE Perform this procedure with the engine off.

1、Put on protective clothes and eye wear.

2、Operate engine to make coolant liquid circling in coolant system.

3、Turn off the engine.

4、Make sure that engine is cool to below 60℃.

NOTICE Beware of hot coolant. Contact with hot engine parts and/or coolant may cause severe burns.

5、Remove the radiator input cap and check any damage on it. Replace it if necessary.

6、Drain some coolant to suitable container from coolant system.

7、Use professional coolant density gauge to check the temperature and density.

8、Adjust coolant mixture to make engine temperature up to -37℃ if necessary.

9、Install the radiator input cap.

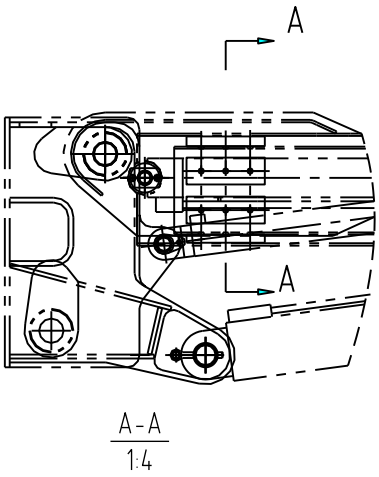
Procedures D

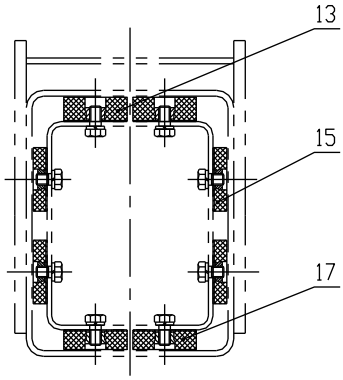
D-1. Check the telescopic boom slide block

The maintenance of telescopic boom slide block is very essential for the safety operation of the machine. Each slide block located on the telescopic boom surface and forms friction pairs. Inappropriate boom slide block or continued operation with old slide block may lead to parts damage and unsafe operation.

NOTICE The telescopic boom must fully extend before doing this operation.

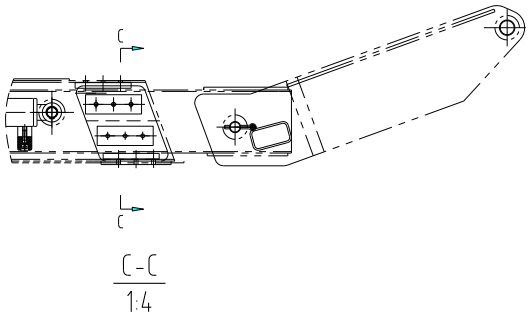
1. Start the engine from the ground controller and extend the boom.
2. Measure the thickness of each slide block.

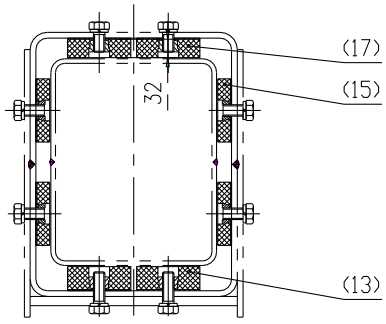




The parameter of Telescopic axis slide block

No.13	20mm
No.15	11mm
No.17	16mm





3. If the thickness smaller than the illustrate size, please change the slide block.

In the whole movement range, checking the telescopic boom may be cause the main part

jammed.

D-2. Check the oil Level in drive torque hub

Improper oil level in the hubs will cut down the machine performance. Keep using will cause damage to components.

Drive torque hub

1、Drive machine to rotate reducer and make the upper plug on the top, and the other is vertical to the upper one.

2、Remove the horizontal plug and check the oil level.

Result: the oil level is at the same level as the bottom of the plug.

3、Remove the upper plug and add oil if necessary, Make the new oil surface reaches the end of the vertical plug.

4、Install the oil plug properly.

5、Repeat the above procedures on other drive reducer.

Turntable return torque hub

NOTICE Turntable return reducer is below the turntable ground control side covers. Remove covers before performing the procedure.

1、Open the ground control side covers.

2、Remove the plug below the brake equipment and check the oil level.

Result: the oil level reaches the end of the plug.

3、Add oil till the oil level reaches the end of the plug.

4、Install the plug.

D-3 Checking slewing bearing

To make the fasteners bolts of slewing bearing keeping a reasonable torque is very essential to machine safety operation. Improper torque will result in a dangerous working condition and parts ruined.

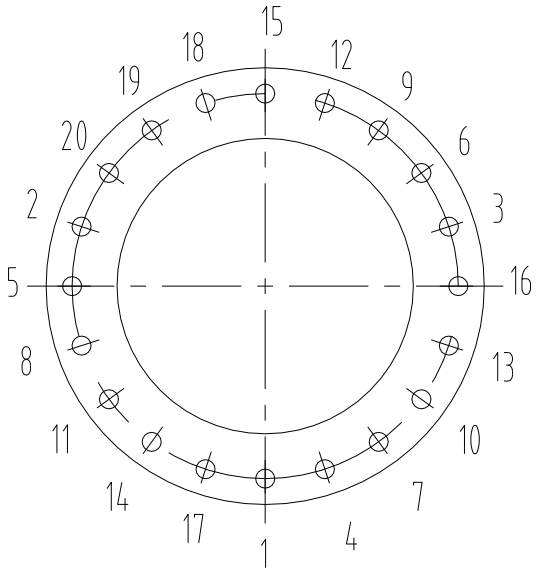
1、Raise auxiliary boom, put s wedge shaped wood block in raise cylinder, then descend boom to wedge shaped wood block carefully.

2、Turn off engine.

3、Loosen the coupling bolt of engine chassis and turntable

4、Turn engine chassis to 45 degree and put a safety stick.

5、To make the fastener torque be 320Nm ,in which every fastener bolt connected with slewing bearing. The sequence as follows,



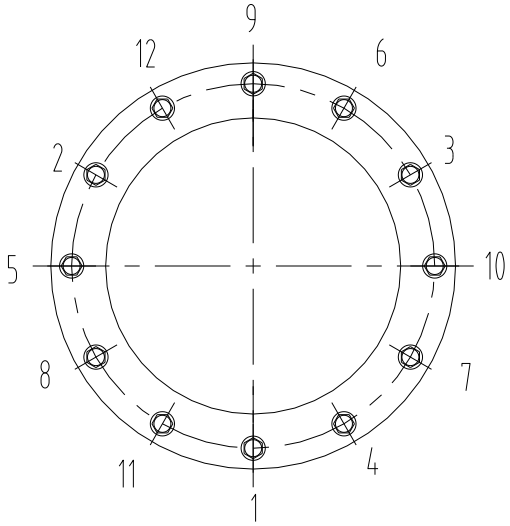
6、Start engine from platform control.

7、raise auxiliary boom and move wood block.

8、Descend auxiliary boom then machine stowed.

9、Remove the cover from Steering end and non-steering end of machine chassis.

10、Located in chassis, e fastener torque of every fastener bolt connected with slewing bearing and chassis should be 320Nm.The sequence as follows,



Procedures E

E-1. Check and replace the hydraulic oil

Checking and replacing hydraulic oil is very essential for normal operation of the machine and working lift. Dirty hydraulic oil and filter may cause malfunctioning. Continued operation under such situation will lead to damaged parts. Frequent replacement of hydraulic oil will be required under very dirty workplace.

NOTICE

Implement this program when the boom is stowed and the axle is retracted. The O-ring on the hose and pipe connector must be replaced when the hose and connector is removed.

1、 Open the side turntable cover of the ground controller.

2、 Close the hydraulic cut-off valve on the oil tank.

3、 Take off the oil plug, row the oil to proper container, and check the content manual.

4、 Disconnected the wires of horn, take off the fixed bolts, and remove the horn.

5、 Disconnect and plug two oil pipes.

6、 Disconnect and plug oil pipes of auxiliary power units.

7、 Disconnect and plug oil pipes of scavenge oil filter.

8、 Take off the air cleaner of hydraulic oil talk.

9、 Unscrew the fixed bolts of hydraulic oil tank.

10、 Take off the oil tank.

11、 Take off the scavenge oil filter from the hydraulic oil tank.

12、 Take off the oil drain filter.

13、 Take off the oil absorbing filter and clean it with proper liquid.

14、 Clean the inner surface of the oil tank with proper liquid.

15、 Install the oil tank on the machine.

16、 Screw the fixed bolts on the oil tank.

17、 Install the horn and connect wires.

18、 Install the pipeline to the scavenge oil filter.

E-2. Replace or repair the engine cooler

Replacing or repairing the engine cooler is very essential for the normal machine work and working life. Old or dirty cooler may cause malfunctioning. Continued operation under such situation may lead to engine damage. Frequent replacement for coolers are required if it is very dirty.

⚠CAUTION Pay attention to heat engine parts and coolant. Severe burns may be caused by touching heat engine parts and/ or coolant.

NOTICE Implement this program when the engine is shut down and cool.

1、Unscrew the fixed bolts on the engine mounting plate, and rotate the mounting plate to move the engine out of the machine.

2、Wear protective overalls and glasses.

3、Disconnect the return hose of the cooler, drain the water in the hose to a proper container. Please refer to the capacity declaration.

4、Remove the water tank cover from the water tank slowly.

5、Open the drain valve and drain the coolant of the water tank to proper container.

6、Close the drain valve after all the coolant drain out.

7、Replace the coolant tubes and tube folders.

8、Add appropriate coolant to the water tank.

9、Add coolant to make the oil tank recover to the required temperature.

10、Clean the overflow of coolant during the implementation of this program.

11、Start the engine from the ground controller and let it run until the engine reaches its operating temperature. Continue to run the engine until the coolant cycle normally in the cooling system.

12、Shut down the engine.

13、Cool the engine.

14、Rotate the engine mounting plat and move it back to the machine.

15、Check the coolant liquid level and add coolant as required.

E-3. Replace the fuel hose

Maintenance for the fuel hose is very essential for the normal machine work and safety operation. Unsafe operation may be caused if old, broken or leaking fuel hose were not found.

⚠DANGER Engine fuel is flammable and this program must be implementing in an outdoor, ventilated place which is far from the fire source. And a standard fire extinguisher must be ensured to be prepared at your fingertips.

NOTICE Clean the overflow of fuel during the implementation of this program.

NOTICE Implement this program when the engine is shut down.

1、Open the side turntable cover of the ground controller.

2、Unscrew the fixed bolts of the engine mounting plate and rotate the mounting plate to move the engine out of machine.

3、Disconnect the connector of pipeline and fuel tank at the fuel filter/ water separator and plug the pipe

4、Remove and replace the following fuel hoses and hose folders.

Engine:

- Pipeline between oil tank and fuel filter/water separator
- Pipeline between fuel filter/water separator and fuel pump
- Pipeline between fuel pump and fuel filter

5、Clean the overflow of fuel during the implementation of this program

6、Install the hose between fuel tank and fuel filter/water separator, and tighten the hose folder.

7、Empty the fuel system and replace fuel filter/water separator filter element.

Maintenance procedures

Observe and obey:

- Maintenance program will be implement by qualified personnel with professional training of machine maintenance.
- Damaged or malfunctioning machine should be labeled and removed timely.
- Repair all the damage or malfunction of the machine before operation.

Before start maintenance:

- Read, understand and obey the safety rules and operating instructions in the operation manuals of GTZZ15 &GTZZ15J.
- Prepare all the necessary tools and parts.
- Read each program and annexes. Any behavior of shout-cuts may cause dangerous situation.
- Please implement the maintenance program of this machine according to the following instructions unless special declaration is provided.

  Park the machine on a flat, horizontal surface.

  The boom is stowed.

  Rotate the turntable with the boom at the end range of the wheel

  Lock the turntable with turntable lock pins.

  The key switch is on the “OFF” position and takes the key off.

  Lock the wheels.

About this section:

The majority of these programs should be implementing in the specialized maintenance centers. Choose the appropriate maintenance program after the detection of the failure.

Label illustrations

Security warning signs---to indicate the potential personal injury. Comply all the safety tips after this sign to avoid possible personal injury or death.

Red—to indicate the existence of emergency hazardous situation. It will cause persona death or serious injury if not avoided.

Orange—to indicate the existence of potential dangerous situation. It will cause personal death or serious injury if not avoided.

Yellow and with safety warning sign—to indicate the existence of potential dangerous situation. It will cause minor or moderate personal injury if not avoided.

Yellow and without safety warning sign—to indicate the existence of potential dangerous situation. It will cause property damage if not avoided.

Green—to indicate operating or maintenance information.

1. Platform controller

Platform controller consists of two PCB.

Sticker circuit wafer is installed under the control box cover, contains sundry function buttons and indicator lights. Sticker circuit wafer transport the control signals inputted by the operator to the platform control ECM circuit board. ECM circuit board transports the data to turntable control box for further processing.

Platform control ECM circuit board transport the signals to turntable controller. The joy stick on the platform controller using Hall effect and don't need regulation. Control parameter of the joy stick is stored in the turntable controller. If the joy stick is replaced or any errors have slipped in, then it needs to be adjusted before the machine started.

The operator should operate the joy stick placidly within its action scope proportionally.

1-1.Circuit board

How to unload ECM circuit board

1. Press both emergency stop switches of the ground controller and platform controller to "OFF"

2. Unload the bolt fixed to the controller box, remove the box.

NOTICE The cable may be damaged if knotted or pressed.

3. Find the cables connected to the bottom of the control box, count the quantity and the position of each one.
4. Disconnect the cables from the bottom of the platform controller.
5. Unload the plug fixing the cables from the bottom of the platform controller.
6. Open the cover of the control box.
7. Find the ECM circuit board in the platform control box.

⚠CAUTION Touch the live circuit may lead to death or damage. Please take off all your earrings, watches and other ornaments.

8. Unload fixing bolt of ECM circuit board.
9. Remove ECM circuit board off the control box carefully.

How to unload sticker circuit wafer

1. Press both emergency stop switches of the ground controller and platform controller to “OFF”
2. Open the control box cover
3. Find the sticker circuit wafer in the box

⚠CAUTION Touch the live circuit may lead to death or damage. Please take off all your earrings, watches and other ornaments.

4. Disconnect the three cables on the circuit board carefully.
5. Unload the fixing bolt of the circuit board.
6. Unload the circuit board from the cover of the control box carefully.

1-2. Sticker Labels

Sticker label is a special label with electronic stickers on the back side. The sticker contains sensitive regions—the machine function will be activate when click these regions. This sticker activated function is similar as button switch but with no moving parts.

How to remove the sticker labels

1. Press the two emergency stop switches on the ground controller and platform

controller to the position of “OFF”.

2. Open the cover of controller box.
3. Disconnect 3 ribbon cables on the sticker circuit wafer.

⚠CAUTION Touch the live circuit may lead to death or damage. Please take off all your earrings, watches and other ornaments.

4. Unload all the handles and switches of the control box.
5. Remove the labels from the control box.
6. Remove the sticker labels from the control box using soft solvent.

NOTICE The sticker label circuit board can not be infected with any solvent.

7. Install new sticker label.
8. Open the control box cover, connect the ribbon cable to the sticker circuit wafer carefully.

1-3. Foot switch

How to test footswitch

NOTICE Implement this program when the key switch is on the position of “OFF”.

1、Disconnect the cable connector of footswitch at the bottom of the platform.

2、Unscrew the mounting bolts of the footswitch shield from the platform.

3、Unscrew the mounting bolts that connected with footswitch and footswitch shield.

4、Remove the cover near the end of footswitch cable from the bottom of footswitch.

5、Detect circuit continuity by Ohmmeter without pressing footswitch.

6、Detect circuit continuity by Ohmmeter with pressing footswitch.

2. Platform components

2-1. Platform

How to unload platform

1、Remove footswitch.

2、Support the platform with appropriate support equipment.

3、Find the cables connected with the bottom of controller box. Count the quantity of the cables and remember their locations.

4、Disconnect the cables from the bottom of controller box.

5、Unscrew the fixed bolts of platform controller box. Remove platform controller box and put aside.

6、Unscrew the fixed bolts of platform bracket.

7、Remove the cable for welding. (If equipped.)

⚠WARNING Death or serious injury may be caused by touching live circuit. Take off all the rings, watches and ornaments.

8、Unscrew the platform mounting bolts and remove the platform from the machine.

2-2. Platform leveling cylinder

Platform leveling cylinder ensures the boom keep horizontal status in the scope of entire movement. The platform keeps the horizontal status relative to the turntable status.

How to remove the platform leveling cylinder

NOTICE The O-rings of the hose or pipe connector must be removed when unload the hose and pipe connector.

1、Extend the boom until the connecting pin on the end of the platform leveling cylinder can be touched.

2、Raise the boom slightly and put support equipment under the platform.

3、Low the boom until the platform place on the support equipment.

NOTICE Please do not load all the weight of the boom on the support equipment.

4、Label and disconnect the hydraulic hose located on the boom cylinder and plug hose connector.

5、Unscrew the fixed bolts of connecting pin at the tailpiece of the piston rod of platform leveling cylinder. Don't remove the pin.

6、Remove the closing ring but do not remove the pin.

7、Support platform leveling cylinder with appropriate support equipment. Protect piston rod against damage.

8、Remove the connecting pin at the tailpiece of the piston rod with brass hammer.

9、Remove the connecting pin at the end of cylinder with brass hammer.

10、Pull out the platform leveling cylinder from the boom carefully.

2-3. Platform revolving solid

Platform revolving solid is used for rotate the platform, the helical gear of hydraulic drive in the range of 160°.

How to remove the platform revolving solid

NOTICE

The O-rings of the hose or pipe connector must be removed when unload the hose and pipe connector.

1、 Unload platform. Please refer to 2-1 to check how to unload the platform.

2、 Disconnect the socket from the platform angle sensor.

3、 Label, disconnect and plug “V1” and “V2” fracture hoses of the platform rotating valve. Plug the pipe connector on the valve table.

4、 Unscrew the mounting bolts of the platform valve table. Put the valve table aside.

5、 Remove the cover of the platform battery from the wiring box. Do not disconnect the wires.

6、 Remove the wiring box from the platform and put it aside.

7、 Remove the welding cable. (If equipped.)

8、 Support the platform and install welded parts but do not apply any support pressure.

9、 Unscrew 8 bolts from the welded parts of the platform.

10、 Unscrew the center bolts and remove the platform mounting welded parts from the platform revolving solid.

11、 Support platform revolving solid and do not apply any support pressure.

12、 Support the tailpiece of the piston rod of the platform leveling cylinder. Protect the cylinder piston rod against damage.

13、 Unscrew the fixed bolts of the pins from the connecting pin of the tailpiece of the piston rod of platform leveling cylinder and platform revolving solid.

14、 Unscrew the two pins with brass hammer and remove platform revolving solid from the machine.

How to drain liquid from the platform revolving solid

NOTICE

Do not start the engine. Using auxiliary power during the implementation of this program.

1、 Press auxiliary power button and platform right rotation button on the ground controller at the same time until the platform rotate to the rightmost side.

2、 Connect a clean hose to the top drain valve. Put the other side of the hose in a container to collect discharging liquid. Fix the container on the boom.

3、Open the drain valve on the top of revolving solid slowly. Do not remove the drain valve from the revolving solid.

4、Press the platform left rotating button until the platform rotate to the leftmost side. Continued to press the button until the air discharged from the drain valve. Then close the drain valve.

5、Connect clean hose to the bottom of drain valve and open the drain valve slowly. Do not remove the drain valve.

6、Press the platform right rotating button until the platform rotate to the rightmost side. Continue to press the button until the air discharge from the drain valve. Then close the drain valve.

7、Remove the hose from the drain valve and clean the overflow of hydraulic oil.

8、Rotate the platform from the left to the right and check the leakage of the drain valve.

9、Clean the oil overflow during the implementation of this program.

3. Boom and its components

3-1. Towline

The towline and boom guide rail is for the protection of cable and hose in the movement. The towline can be repaired without unload the cables and hoses. It is necessary to unload the towline for overhaul implementation.

How to remove the towline

The O-rings of the hose or pipe connector must be removed when unload the hose and pipe connector.

NOTICE Implement this program when the boom is stowed.

1、Unscrew the fixed bolts of towline guide rail and remove the guide rail from the machine..

2、Unload the protective shaft from the hose wiring harness of the boom towline guide rail at the end of the platform.

3、Label, disconnect and plug all the hydraulic hose from the boom towline guide rail to the platform valve table.

4、Label and disconnect the black socket at the bottom of the controller box.

5、Unscrew the fixed bolts of the boom towline guide rail at the side of engine located in the end of platform.

6、 Place backstop between towline and guide rail.

7、 Bind guide rail, wooden backstop and towline.

8、 Unscrew the fixed bolts of the towline guide rail from the platform terminal at the side of the ground controller

9、Unload the inner guide rail from the towline guide rail bracket at the side of machine engine.

10、 Label, disconnect and plug the hydraulic hose supported on the towline.

11、 Unscrew the relax nut at the hydraulic hose joint supported by the towline, unscrew and plug the hose joint.

12、 Label and disconnect wire connector.

13、 Label, disconnect and plug the hose of telescopic cylinder. Plug the hose connector.

14、 Remove the mounting bolts of towline from the towline bracket.

15、 Remove the side board from the bottom of the towline.

16、 Remove the hose and cable cover. Remove the cover.

17、 Remove the hose and wire clip.

18、 Label and disconnect cable.

19、 Pull out the hydraulic hose from the towline guide rail.

20、 Place backstop under the towline and towline guide rail bracket

21、 Binding guide rail, wooden support and towline.

22、 Bind two parts of the towline.

23、 Lock the two ends of towline with traveling crane. Lift the towline carefully and place it on the backstop with adequate capacity.

3-2. Boom

How to adjust the clearance between booms

1. Measure the slide blocks from the upside, side and bottom of the booms.
2. Unscrew the fastening bolts from the dustproof cover at the end of the boom. Remove the dustproof cover.
3. Extend the boom until the slide block can be touched.
4. Loose the fastening bolts of the slide block.
5. Install the mat for the slide blocks at the top and the bottom of the boom until they are very close to the boom.

6. Install the mat for the slide blocks at the two sides of boom until they are very close to the boom.
7. Fastening the mounting bolts.
8. Extend and stow the boom in the whole range. Inspect the key positions which may cause stick.

How to unload the boom

1、Unload the platform. Please refer to 2-1.

2、Unload the platform revolving solid. Please refer to 2-3.

3、Unload the towline. Please refer to 3-1.

4、Lift the boom up to about 1.2 meters.

5、Tie down the terminal of the cylinder rod of the luffing cylinder with the gallus of the traveling crane.

6、Tie down the platform parts for the support of the end boom with traveling crane of more than 5 tons of capacity.

7、Place wooden support block under the luffing cylinder.

8、Unscrew the fixed pin bolts connected with the luffing cylinder and boom.

9、Lift the boom with traveling crane until the pin roll connected with the luffing cylinder and boom can be unloaded.

10、Low the luffing cylinder carefully and place it on the supported wooden blocks.

11、Low the boom to the horizontal place.

12、Unscrew the bolts of the cover at the end of the boom. Remove the cover.

13、Disconnect the wires and hydraulic hoses used for the telescopic function of the boom.

14、Fasten the end of the boom with a traveling crane of 5 ton capacity as a support, but do not lift it.

15、Unscrew the fixed bolts of pin rolls connected with the turntable and the boom.

16、Unscrew the pin rolls connected with the turntable and boom by soft material.

17、Remove the boom from the machine carefully and place it on the support frame with adequate capacity.

4. Engine

4-1. Flexible shaft coupling

Flexible shaft coupling connect with engine and pump. It connected with the flywheel of the engine by bolts and there are spline slots in the center of it for the connection of pump.

How to remove the flexible shaft coupling

1、Disconnect the electric proportional control wire pin plug located on the drive pump.

2、Unload the hose clip of the air filter hose from the air filter.

3、Unscrew the mounting bolts of the air filter. Remove the air filter from the machine.

4、Remove the fuel filter/water separator from the pump mounting plate. Do not disconnect the fuel hose.

5、Remove the pump of fuel filter/water separator and place it on the side.

6、Support the drive pump with adequate support equipment. Remove all the bolts of the pump mounting plate.

7、Withdraw the pump from the engine carefully.

8、Remove the mounting bolts for the flexible shaft coupling, and remove the flexible shaft coupling from the flywheel.

How to install the flexible shaft coupling

1、Install the flexible shaft coupling connected with spline slots.

2、Spread pine glue on the mounting bolts. Fasten the mounting bolts with 41Nm torque moment.

3、Install the pump and spread pine glue on the mounting bolts. Fasten the mounting bolts with 41Nm torque moment.

5. Limit Switch

5-1. How to test limit switch

There are two kinds of limit switch: mechanical limit switch and proximity limit switch, Mechanical limit switch activated by machine parts moving the switch cylinder. Proximity limit switch is a magnetic type, activated by approaching magnetic metal.

Mechanical limit switch

1. Activate the limit switch by manual

   Result: The limit switch can move optionally and reset automatically. The ticktack is clear to be heard.
2. Use an ohmmeter to test the resistance between the switch joints, confirm its continuity.
3. Activate the limit switch. Use a ohmmeter to test the resistance between the switch joints, confirm its continuity.

Proximity Switch

1. Use an ohmmeter to test the resistance between the switch joints, confirm its continuity.
2. Find the magnetic area of the switch.
3. Place a magnetic metal block in 12.7mm front of the magnetic area.
4. Use an ohmmeter to test the resistance between the switch joints, confirm its continuity.
5. Move the magnetic metal block 12.7mm away from the magnetic area.
6. Use an ohmmeter to test the resistance between the switch joints, confirm its continuity.

6. Hydraulic pump

6-1.Functional Pump

There are three pumps connected with the engine. Among them one variable pump is used for the drive function and the other two rational pump attached on the drive pump for the other functions of the machine.

How to remove the functional pumps

NOTICE O-rings at the end of hose or hose connector must be discharged when remove the hose and hose connector.

1、Close the cut-off valves at the two ends of the hydraulic oil tank.

2、Label, disconnect and plug the hose from the functional pump. Plug the hose connectors of the pump.

3、Support the functional pump with the lift jack.

4、Unscrew the mounting bolts of the pump. Remove the pump carefully.

6-2. Drive pump

The drive pump is a two-way variable pump. The output of the pump was controlled by the electrical displacement controller located on the pump.

How to remove the drive pump

1、Remove the functional pump. Please refer to “how to remove the functional pump”.

2、Disconnect the connection of electrical displacement controller located on the drive pump.

3、Close the two cut-off valves on the hydraulic oil tank.

4、Label, disconnect, and plug the hydraulic hose from the drive pump. Plug the hydraulic hoses.

5、Support the drive pump with adequate support equipment and remove the mounting bolts of the two drive pumps.

6、Pull out the drive pump carefully until the spline slot of the pump axle off the flexible shaft coupling.

7、Remove the drive pumps from the machine.

7.Fuel and hydraulic oil tank

7-1. Fuel tank

How to remove the fuel tank

1、Remove the side turntable cover of the engine.

2、Label, disconnect and plug the hoses for the fuel supply and fuel return. Plug the hose connector on the fuel tank.

3、Remove the supply oil cover from the oil tank.

4、Discharge the fuel to the adequate container with manual pump. Check the capacity declaration.

5、Unscrew the fastening bolts of the fixing strap on the fuel tank. Remove the fixing strap from the fuel tank.

6、Support with adequate lift equipment to fixed the fuel tank.

7、Remove the fuel tank from the machine.

7-2. Hydraulic oil tank

How to remove the hydraulic oil tank

1、Remove the side turntable cover of the engine.

2、Close the two cut-off valves on the hydraulic oil tank.

3、Remove the oil drain plug and discharge all the fuel to the adequate container. Check the capacity declaration.

4、Unscrew the fastening bolts of the ground control bracket. Remove the ground controller from the machine.

5、Label and disconnect the wires from the horn.

6、Unscrew the fixed bolts of the horn. Remove the horn from the machine.

7、Label, disconnect and plug the oil suction hose attached to the cut-off valves of the hydraulic oil tank.

8、Label, disconnect and plug the oil supply hoses for the auxiliary power unit. Plug the hose connectors on the oil tank.

9、Disconnect and plug the T-type tube union connected with two hoses on the scavenge oil filter. Plug the tube union of the hydraulic oil tank.

10、Remove the fixed bolts of the hydraulic oil tank.

11、Tie two ends of the hydraulic oil tank tightly with the lifting gallus of traveling crane.

12、Remove the hydraulic oil tank from the machine.

8. Rotary parts of turntable

8-1. Rotary hydraulic motor and rotary reducer of the turntable

How to remove the rotary hydraulic motor of the turntable

1、Lock the turntable with the turntable fixed pin.

2、Label and disconnect the hydraulic hoses of the turntable.

3、Remove the mounting bolts of the motor/ brake system. Remove the motor from the brake system.

How to unload the slewing bearing

1. Unscrew the fixed bolt between slewing bearing and turntable.

2. Lift and move away the boom and the turntable, using a traveling crane at least 5

Tons.

3. Unscrew the fixed bolt between the slewing bearing and the chassis.
4. Bind the slewing bearing with the strap of the traveling crane.
5. Unload the fixed bolt of the reducer from the chassis, and remove the slewing bearing from the machine.

9. Electrical parts

9-1. Steering sensor

The steering sensor measure the steering angle and transmit signals to the ground controller. The steering sensors are placed in the upside of each steering joint plate.

NOTICE At least two people needed for this performance.

How to test the tire parallelism:

1. Start the engine from the platform controller.
2. Press the foot switch and the engine speed option switch to high-speed mode.

Test the rounded sign tire

3. Press the square sign steering mode button
4. Measure the distance between the inner side of the rounded sign tire to the outer side of the chassis side board. (Both side of the axle must be measured)

Result: If the distance is equal, the tire is parallel to the chassis.
If the distance is not equal or the tire is not parallel to the chassis, then please adjust the steering sensor. Please refer to “how to adjust steering sensor”.

5. Repeat the 4th step to the other rounded sign tire.

Test the square sign tire

6. Press the rounded sign steering mode button.
7. Measure the distance from the inner side of the square sign tire to the outer side of the chassis sideboard. (Both side of the axle should be measured).

Result: If the distance is equal, then the tire is parallel to the chassis.
If the distance is not equal or the tire is not parallel to the chassis, then please adjust the steering sensor. Please refer to “how to adjust steering sensor”.

8. Repeat the 7th step to the other square sign tire.

How to adjust the steering sensor

Square sign steering sensor:

1. Press the rounded sign steering mode button on the platform controller.
2. Find the sensor at the upside of the steering joint plate.
3. Loosen the fixed bolt of the steering sensor cover, but don't move it.
4. Turn the steering sensor cover clockwise or anticlockwise. Measure the distance between the inner side of the square sign tire and the outer side of the chassis side board. (Both side of the axle should be measured).
5. Repeat the 4th step until the tire is parallel to the chassis.
6. Fasten the fixed bolt of the steering sensor cover.
7. Repeat the 2nd and the 6th step to the other square sign steering sensor.

Rounded sign steering sensor:

8. Press the square sign steering mode button on the platform controller.
9. Find the sensor at the upside of the steering joint plate.
10. Loosen the fixed bolt of the steering sensor cover, but don't move it.
11. Turn the steering sensor cover clockwise or anticlockwise. Measure the distance from the inner side of the rounded sign tire to the outer side of the chassis side board. (Both side of the axle should be measured).
12. Repeat the 11th step until the tire is parallel to the chassis.
13. Fasten the fixed bolt of the steering sensor cover.
14. Repeat the 9th and 13th step to the other rounded sign steering sensor.

9-2. Steering wheel and reducer

How to unload steering wheel and reducer

The self-lubricating bearing installed on the steering wheel should be replaced frequently. There is another steering sensor in the upside of the steering wheel.

NOTICE The O-rings of the hose or pipe connector must be removed when unload the hose and pipe connector.

1. Unscrew the fixed bolt of the hose bracket, remove the bracket at the top of the steering wheel.
2. Label, disconnect and plug the hose of the driving motor and braking device, plug the hose joint of the driving motor and braking device.
3. Label the position where the steering sensor of the steering wheel installed.
4. Unscrew the fixed bolt of the sensor cover, remove the cover aside carefully.

5. Put the hose and the sensor cable aside.
6. Loosen the bolt of the wheel felloe, but don't remove it.
7. Place a powerful jack under the support leg, but don't lift the machine.
8. Place steel bar under the wheel felloe deviating the machine.
9. Lift the machine about 15cm and place the steel bar under the chassis to support the machine.
10. Remove the nut, tire and wheel felloe.
11. Unload the fixed bolt of the driving motor.
12. Slip the driving motor axle out of the reducer and remove the driving motor from the machine.
13. Unload the locating pin of the connecting pin on the steering cylinder.
14. Unload the connecting pin.

9-3. Driving motor

How to unload driving motor

NOTICE The O-rings of the hose or pipe connector must be removed when unload the hose and pipe connector.

1. Label, disconnect and plug the hydraulic hose of the driving motor, plug the hose joint of the driving motor.
2. Unload the fixed bolt of the driving motor.
3. Slip the driving motor out of the braking device and reducer.

9-4. Driving reducer

How to unload the driving reducer

NOTICE The O-rings of the hose or pipe connector must be removed when unload the hose and pipe connector.

1. Unload the driving motor.
2. Label, disconnect and plug the hydraulic hose of the braking device.
3. Unscrew the nut of the tire, but don't remove them.
4. Place a powerful jack under the supporting leg of the driving reducer, but don't lift the machine.
5. Place steel bar at the reverse terminal of the machine.

6. Lift the machine about 15cm and place the steel bar under the chassis to support.
7. Unload the nut of the tires, remove the tire and the wheel felloe.
8. Place another jack under the driving reducer to support.
9. Unload the fixed bolt of the driving reducer and steering knuckle, remove the driving reducer from the machine.