Service Manual

A45JE

Articulated Boom Mobile Elevating Work Platform

⚠WARNING

Operators and maintenance personnel must read and understand this manual before operating and maintaining this machine,otherwise it may lead to casualties! This manual shall be properly kept for reference and check by relevant personnel.

LINGONG HEAVY MACHINERY CO., LTD.

Articulated Boom Mobile Elevating Work Platform

Service Manual

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Foreword

You are welcome to purchase and use the products produced by Lingong Heavy Machinery Co., Ltd. This manual introduces the technical parameters and maintenance adjustment data of Articulated Boom elevating work platform, and explains the troubleshooting and maintenance process for reference by qualified professional maintenance professionals. The information contained in this manual are correct at the time of publication, but due to the continuous improvement of the structure and performance of our products, the design as well as operation and maintenance instructions of the product may be subject to change without notice. For the latest information about the machine and any questions about this manual, please consult our company. In additions, readers of this manual are encouraged to feedback the errors and put forward suggestions to Lingong Heavy Machinery Co., Ltd., which will be carefully considered in the future publication and printing of this manual.

⚠ WARNING

- Only the personnel who have professionally trained and qualified are allowed to operate and maintain the machine.
- Incorrect operation, maintenance and repair are dangerous and can lead to personal injury or death.
- Before operating or maintaining the machine, the operator should read this manual carefully. Do not operate, maintain or repair the platform without reading and understanding this manual.
- Please load the machine in strict accordance with the rating, otherwise all the consequences arising from overloading or unauthorized modification will be borne by the user.
- The operation instructions and precautions in this manual apply only to the intended use of the machine. If the machine is used for an operation that is out of the specification herein but not prohibited, always make sure that this operation will not cause personal injury to yourself or others.

Safety Notices

The operator shall understand and abide by the current national and local safety regulations. If such regulations are not available, the safety instructions in this manual shall prevail.

Most of the accidents are caused by failure to comply with the regulations on the operation and maintenance of the machine. In order to avoid accidents, please read, understand and observe all warning requirements and precautions in this manual and on the machine before operation and maintenance. Failure to comply with the instructions and safety rules in this manual and the corresponding manual on the machine may result in serious injury or even death.

Considering the fact that not all possible hazards are foreseeable, it is impossible for safety notices in this manual and on the machine to cover all safety precautions. If it is necessary to take steps and operations not recommended herein, always protect the safety of yourself and others, and keep the machine from any damage. If the safety of some operations remains uncertain, please consult us or dealers.

Not only basic mechanical, hydraulic and electrical skills are required to perform most operations. Specialized skills, tools, lifting equipment and suitable workshops are also required for some maintenance processes. Considering this, it is strongly recommended for you to get the machine maintained and repaired in the service center authorized by LINGONG HEAVY MACHINERY CO.，LTD.

The operation and maintenance precautions referred to herein apply only to the intended use of this machine. If the machine is to be used for other purposes than those listed herein, it is the user or operator instead of us that shall take the safety liabilities therefrom. In no case shall any operations expressively prohibited herein be performed.

For the purpose of this manual, the following signal words are applied to identify safety instructions:

⚠ DANGER - Indicating any existing dangers that, if not avoided, will cause serious injury or even death. This term is also used for the danger that, if not avoided, may cause serious damage to the machine.

⚠ WARNING - Indicating any potential dangers that, if not avoided, may cause serious injury or even death. This term is also used for the danger that, if not avoided, may cause serious damage to the machine.

⚠ CAUTION - Indicating situations that, if not avoided, may cause minor or moderate injury. This term is also used for the danger that, if not avoided, may cause damage to the machine or shorten the life of the machine.

Chapter I Safety and Environment

1.1 Terms and definitions

Administrator:

The entity or individual that directly controls the use and application of the lifting platform, which usually refers to the owner, the renter or the authorized personnel of owner who obtains the control right of the lifting platform;

Operator:

Personnel who has been professionally trained and mastered qualified knowledge and practical experience to operate the lifting platform.

Qualified personnel:

Personnel who has recognized academic qualifications, certificates, professional status or relevant professional knowledge, has been professionally trained and experienced.

Safety announcement:

Relevant safety information issued by Lingong Heavy Machinery Co., Ltd.

1.2 Before maintenance

1. Read and follow the safety rules and maintenance instructions in the corresponding operation manuals on the machine.
2. Ensure that all necessary tools and parts are in place.
3. Do not use parts not sold by Lingong Heavy Machinery Co., Ltd.
4. Please read each step thoroughly and follow the instructions, and do not try to perform repair by shortcut, as this is dangerous.

1.3 Workplace requirements

The machine shall be able to work under the following safety conditions:

1. The environment humidity shall be less than 90%(+25 ℃).
2. The machine shall be able to work normally under the following safety conditions:

   -The ambient temperature shall be -20 ℃ ~ +40 ℃;

   - The wind speed shall not be greater than 12.5 m/s/28mph;
   - The vehicle shall never be used in corrosiveness environment with such materials as inflammable and explosive or acid and alkali.
3. During normal operation or repair, the movement of the mechanism and components and parts may cause danger to the human body, and protective device shall be set.
4. Measures shall be taken to prevent danger caused by components and parts falling on the platform.
5. When repairing, place a qualified fire extinguisher in a readily available position.
6. Keep the work site clean and tidy to prevent dirt from entering the machine and causing damage to the components and parts.

7. Please ensure that the forklift, crane or other lifting or supporting equipment are strong enough to support and stabilize the weight to be lifted.

8. During repair, please do not reuse disposal fastener (such as cotter pin and self-locking nut), so as to avoid abnormal functioning due to reuse of such parts.

9. Please dispose of the discarded fluid correctly in an environmentally friendly way.

10. Make sure the work site is well ventilated and well lit.

1.4 Maintenance and repair safety specification

1. The following precautions shall be taken before the adjustment and repair of the machine:

- Park the machine on a solid and level ground;
- Block the front and rear of the wheel to ensure that the wheel will not rotate or move;
- Cut off the power supply and ensure that the machine is in a non-start status;
- Set all control devices in the "off" status to avoid unexpected start of operating system;
- If possible, lower the platform to the lowest position, otherwise, ensure that it will not fall;
- Before loosening or removing the hydraulic component, release the hydraulic oil pressure of the hydraulic pipeline;
- Place the safety support as required.

2. Maintenance personnel training:

Maintenance personnel must be trained by qualified personnel to inspect and maintain the machine in accordance with the requirements of this manual.

3. Replacement of parts

The parts for replacement shall be genuine parts of our company, otherwise we will refuse to maintain or repair the product.

4. Service Bulletin

The machine maintenance and repair by users shall be in strict accordance with the service bulletin issued by the Lingong Heavy Machinery Co., Ltd.

5. Vehicle welding repair

1) First, shut down the engine and cut off the low-voltage power supply;

2) The worker shall have special operation certificate;

3) Clean up the surrounding flammables and apply for welding permit;

4) Protect the vehicle body to prevent splashing and fire;

5) Operate in strict accordance with the welding process;

6. Precautions of the battery maintenance

1) Battery run-out is strictly prohibited during storage. It is strictly prohibited to keep the battery in the run-out status during storage. Please charge the battery immediately after the battery runs out.

2) Correctly control the charging time. In the process of use, accurately control the charging time according to the actual situation, and control the charging frequency with reference to the usual use frequency and driving mileage.

3) Prevent exposure to the sun. Environment with too high temperature will increase the internal pressure and electrolyte loss of the battery, causing battery activity reduction and accelerating polar plate aging. Therefore, the vehicle is strictly prohibited from being exposed to the sun and should be parked in a cool place.

4) Check regularly. If there is a problem with the battery during use, please promptly go to the sales center or maintenance department of the dealer for inspection and repair. This can relatively extend the servicing life of battery pack and maximize your maintenance cost.

7. Coolant

When the radiator is overheated, it is not allowed to open the radiator cap to prevent scalding by boiling water. Please wait until the water cools down before opening the radiator cap.

1.5 Intended purpose

This machine is only intended for lifting personnel and their tools and materials to the high-altitude work site.

1.6 Compliance

1. Maintenance procedures shall be completed by qualified personnel trained in maintenance of this machine.

2. Immediately mark the machine if it is damaged or faulty, and withdraw it out of service.

3. Repair any damage or fault before operating the machine.

1.7 Description

Most of the repair process can only be carried out by trained professional service personnel in properly equipped workshops. After the fault is eliminated, select the appropriate repair step.

Carry out the disassembly steps until the repair can be completed. Then reassemble in the order reverse to disassembly.

Maintenance and repair in authorized service center of the dealer of Lingong Heavy Machinery Co., Ltd. are strongly recommended.

Chapter II Product introduction

2.1 A45JE（A1408JDTAE30）Machine parameters

Machine performance parameters

Item		Parameter/description	Item	Parameter/description
Rated load (kg/lbs)		230/510	Rotary table rotation time per circle (stowed) (s)	95-125
Overall mass (kg/lbs)		7500/16535	Rotary table rotation time per circle (extended) (s)	95-125
Max. allowed workers		2	Boom lifting time (s)	32-40
Maximum working height (m/ft)		15.8/51.8	Boom lowering time (s)	26-30
Maximum platform height (m/ft)		13.8/45.3	Articulated boom lifting time (s)	40-52
Max. horizontal reach (m/ft)		7.81/25.6	Articulated boom lowering time (s)	38-46
Max. span height (m/ft)		7.26/23.8	Boom extension time (s)	22-28
Min. turning radius (inner wheel) (m/ft)		1.83/6	Boom retraction time (s)	25-28
Min. turning radius (outer wheel) (m/ft)		4.1/13.5	Jib lifting time (s)	38-50
Max. braking distance (no-load, stowed) (m/ft)		1≤s≤1.5 /3.3≤s≤4.9	Jib lowering time (s)	22-28
Max. travel speed (retracted)(km/h/mph)		4.8±0.25 /3±0.16	Platform rotation time (s)	6-12
Max. travel speed (lifting) (km/h/mph)		1±0.05 /0.62±0.03	Maximum manual force	400
Maximum allowable pour angle of chassis	Along the boom	3°	Max. allowable wind speed (m/s/mph)	12.5/28
	Orthogonal to boom	3°	Driving form	Two-wheel drive
Theoretical maximum gradeability (retracted under no load)		30%		Front wheel steering

Main dimensions

Item	Parameter/description	Item	Parameter/description
Overall length (mm/ft)	6660/21.9	Wheel track (mm/in)	2030/80
Overall width (mm/ft)	1800/5.9	Wheelbase (mm/in)	1559/61
Overall height (mm/ft)	1980/6.5	Min. ground clearance（ (middle) (mm/ft)	240/0.79
Dimension of working platform (L×W) (mm/ft)	1830×760 /5.9×2.6	Tire specification	9-14.5

Transmission system

Item		Parameter/description
Walking reducer	Rated output torque（N•m）	2825
	Speed ratio	64.08：1
Slewing reducer	Rated output torque（N•m）	820
	Speed ratio	1:1

Hydraulic system

Item			Parameter/description
Functional system	Type		Open
	Pump displacement (ml/r)		3
	Lifting system	Maximum working pressure(MPa/psi)	23.5/3408
	Slewing system	Maximum working pressure (MPa/psi)	23.5/3408
		Motor displacement (ml/r)	475
	Steering system	Maximum working pressure (MPa/psi)	23.5/3408

Electrical system

Item		Parameter/description
Driving motor	Rated voltage (V)	29AC
	Rated current (A)	125

	Rated power（KW）	3.56
	Rated speed（r/min）	3400
Functional motor	Rated voltage (V)	48
	Rated current (A)	71.32
	Rated power（KW）	2.6
	Rated speed（r/min）	2650
Battery	Output voltage (V)	48
	Capacity (Ah)	390 (20-hour discharge rate)
Charger	Nominal AC input voltage (V)	100-240AC
	Maximum AC input current (A)	15
	Nominal DC output voltage (V)	48
	Maximum DC input current（A）	35
Control system	Voltage (V)	24

Oil filling amount

Item	Parameter/description	Item	Parameter/description
Hydraulic oil (L)	30	Gearbox oil（L）	0.68×2

2.2 Lift platform torque specification

The tightening torque tolerance range is 10% for all hydraulic seals, important transmission connectors and key processes with defined torque tightening requirements, and 20% for non-essential reference torques, which is to be rounded to the nearest integer when necessary;

Table 1: Tightening torques of metric and English joint bodies and plugs (N•m)

Tightening torque of metric-threaded oil ports					Tightening torque of imperial-threaded oil ports				
Pipe diameter	Thread specification (mm)	Fitting type		Plug	Pipe diameter	Thread specification (Inch)	Fitting type		Plug
		Type E	Type F	VSTI-E			Type E	Type F	VSTI-ED
6L	M10X1.0	27	22	16	6L	G1/8A	22	16	16
8L	M12X1.5	37	32	27	8L	G1/4A	37	32	32
10L	M14X1.5	58	48	37	10L	G1/4A	37	32	/
12L	M16X1.5	75	58	58	12L	G3/8A	75	58	63
15L	M18X1.5	95	75	70	15L	G1/2A	120	95	85
18L	M22X1.5	140	115	95	18L	G1/2A	120	95	/
22L	M28X2.0	190	160	140	22L	G3/4A	190	160	140
28L	M33X2.0	325	220	235	28L	G1A	325	220	210
35L	M42X2.0	470	295	380	35L	G11/4A	470	315	470
42L	M48X2.0	565	380	/	42L	G11/4A	565	380	470
6S	M12X1.5	42	37	/	6S	G1/4A	42	37	/
8S	M14X1.5	53	48	/	8S	G1/4A	42	37	/
10S	M16X1.5	75	58	/	10S	G3/8A	85	63	/
12S	M18X1.5	95	75	/	12S	G3/8A	85	63	/
14S	M20X1.5	130	85	/	14S	G1/2A	120	95	/
16S	M22X1.5	140	105	/	16S	G1/2A	120	95	/
20S	M27X2.0	190	180	/	20S	G3/4A	190	160	/
25S	M33X2.0	325	325	/	25S	G1A	325	220	/
30S	M42X2.0	470	345	/	30S	G11/4A	470	315	/
38S	M48X2.0	565	440	/	38S	G11/2A	565	380	/

Table 2: Tightening torque of American joint body and plug (N•m)

Product Series	Thread UN/UNF	Non-directional assembly torque N.m	Adjustable assembly torque N.m
EO-L	7/16-20 UN(F)	23	18
	1/2-20 UN(F)	28	28
	9/16-18 UN(F)	34	34
	3/4-16 UN(F)	60	55
	7/8-14 UN(F)	115	80

	1-1/16-12 UN(F)	140	100
	1-5/16-12 UN(F)	210	150
	1-5/8-12 UN(F)	290	290
	1-7/8-12 UN(F)	325	325
EO-S	7/16-20 UN(F)	20	20
	1/2-20 UN(F)	40	40
	9/16-18 UN(F)	46	46
	3/4-16 UN(F)	80	80
	7/8-14 UN(F)	135	135
	1-1/16-12 UN(F)	185	185
	1-5/16-12 UN(F)	270	270
	1-5/16-12 UN(F)	270	270
	1-5/8-12 UN(F)	340	340
	1-7/8-12 UN(F)	415	415

Description:

1. Table 1 gives the torques for metric-threaded joints and inch-threaded joints, and Table 2 gives the torques for UN-threaded joints, and for those torques, an error of 10% is allowed;

2. The torque values given in Table 1 and Table 2 are based on the condition that the connected part is made of steel, and for connected part made of aluminum, the tightening torque equal to 60% of the corresponding torque in Table 2 and Table 3 shall apply and shall be rounded to the nearest integer after calculation;

3. For Parker joints, the torque is to be selected according to the name and specification, and for ordinary joints, the torque is to be selected according to the thread specification.

Specific examples are as follows:

1) GE for straight-through joint, 28 for pipe diameter, L for normal pressure, M for metric thread, ED for E-type elastic seal, OMD for no nut sleeve, A3C for galvanizing; According to 28L MED, the torque selected from Table 1 is 325N•m

2) GE O 22L R 3/4 OMDA3C: O for F-type O-ring, R for inch thread, and 3/4 for thread specification G3/4; According to O 22L R3/4, the torque selected from Table 2 is 160N•m;

3) GE O 20S R OMDCF: S represents the heavy pressure, and the torque value selected according to O 20S R is 160 N•m;

Table 3: Metric thread rotating nut torque (N•m)

Pipe diameter	Thread specifications	Tightening torque	Pipe diameter	Thread specifications	Tightening torque N•m
06L	M12X1.5	16	06S	M14X1.5	27
08L	M14X1.5	22	08S	M16X1.5	42
10L	M16X1.5	32	10S	M18X1.5	53
12L	M18X1.5	42	12S	M20X1.5	63
15L	M22X1.5	58	14S	M22X1.5	80
18L	M26X1.5	90	16S	M24X1.5	85
22L	M30X2	115	20S	M30X2	125
28L	M36X2	135	25S	M36X2	180
35L	M45X2	220	30S	M45X2	260
42L	M52X2	345	38S	M52X2	370

Description:

1. For torques given in Table 3, an error of 10% is allowed;
2. The torque values given in Table 4 are based on the condition that the connected part is made of steel, and for connected part made of aluminum, the tightening torque equal to 60% of the corresponding torque in Table 3 shall apply and shall be rounded to the nearest integer after calculation;
3. For Parker rubber hoses, right-angle joints and tee joints, the torque is to be selected according to the name and specification, and for ordinary rubber hoses, right-angle joints and tee joints, the torque is to be selected according to the thread specification.

Specific examples are as follows:

1) F481 CACF 2815 16: F481 for crimping form and hose type, CACF for joint type at both ends, CA for 24° conical swivel nut with O-ring, CF for 90° elbow of 24° conical swivel nut with O-ring, and 2815 for connection specification of joint at both ends of hose. According to this, the torque selected for end 28 is 135N•m, and the torque selected for end 15 is 58N•m;
2) SN for heavy pressure hose. According to this, the torque selected for end 12 is 63N•m, and the torque selected for end 10 is 53N•m;
3) SN for heavy pressure hose. According to this, the torque selected for end 12 is 63N•m, and the torque selected for end 10 is 53N•m;

Table 4: Tightening torque of ordinary bolts (N•m)

Strength grade of bolt	Yield strength N/MM²	Nominal diameter of bolt mm				
		6	8	10	12	14
		Tightening torque N·m				
4.6	240	4～5	10～12	20～25	36～45	55～70
5.6	300	5～7	12～15	25～32	45～55	70～90
6.8	480	7～9	17～23	33～45	58～78	93～124
8.8	640	9～12	22～30	45～59	78～104	124～165
10.9	900	13～16	30～36	65～78	110～130	180～210
12.9	1080	16～21	38～51	75～100	131～175	209～278
Strength grade of bolt	Yield strength N/MM²	Nominal diameter of bolt mm				
		16	18	20	22	24
		Tightening torque N·m				
4.6	240	90～110	120～150	170～210	230～290	300～377
5.6	300	110～140	150～190	210～270	290～350	370～450
6.8	480	145～193	199～264	282～376	384～512	488～650
8.8	640	193～257	264～354	376～502	521～683	651～868
10.9	900	280～330	380～450	540～650	740～880	940～1120
12.9	1080	326～434	448～597	635～847	864～1152	1098～1464
Strength grade of bolt	Yield strength N/MM²	Nominal diameter of bolt mm				
		27	30	33	36	39

		Tightening torque N·m				
4.6	240	450～530	540～680	670～880	900～1100	928～1237
5.6	300	550～700	680～850	825～1100	1120～1400	1160～1546
6.8	480	714～952	969～1293	1319～1759	1694～2259	1559～2079
8.8	640	952～1269	1293～1723	1759～2345	2259～3012	2923～3898
10.9	900	1400～1650	1700～2000	2473～3298	2800～3350	4111～5481
12.9	1080	1606～2142	2181～2908	2968～3958	3812～5082	4933～6577

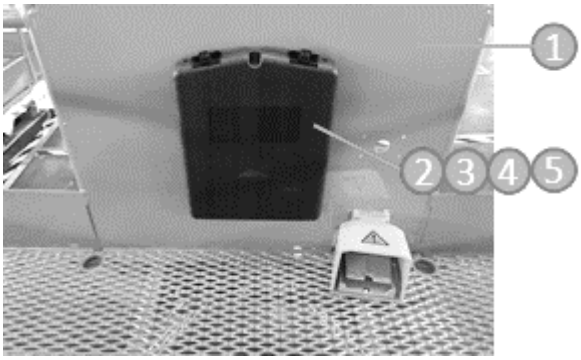
2.3 Key component moment table

No.	Position	Torque Value		Interval Hours (h)	Remark
		Ft.lbs	N.m		
1	Oil return filter assembly	-	-	-	The installation direction of the high-pressure filter faces the turntable
2	Assembling of slewing ring	225±18	305±25	100	First re-tightening at 50h, and thereafter every 100h.
3	Hoisting of turntable weldment	225±18	305±25	100	First re-tightening at 50h, and thereafter every 100h.
4	Assembling of wheel	225±18	305±25	250	
5	Central Pivot Assembly	67±7	91±9	250	
6	Upper 2# Boom Assembly	67±7	91±9	250	
7	Upper Pivot Assembly	67±7	91±9	250	
8	Counterweight	1113±111	1508±150	250	
9	Assembling of swing cylinder	38±4	52±5	250	
10	Load cell	-	-	250	Adjustment nut length: 53-55mm.
11	Hoisting of platform assembly	53±5 439±41	72±7 595±55	250	

Chapter III Service

3.1 Platform assembly

3.1.1 Assembling the file box



1. Platform frame 2. File box 3. Bolt 4. Washer 5. Nut

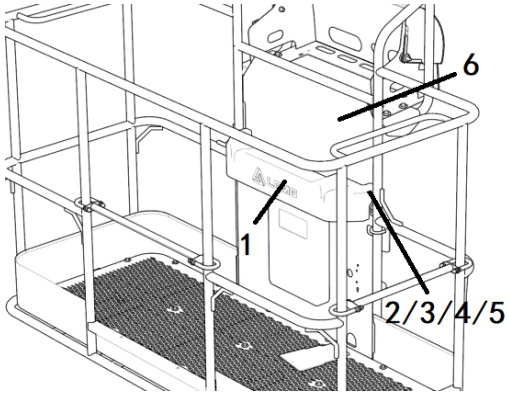
1) Release the clip of part 2 and open part 2;
2) Assemble part 2 with part 3/4 (nut end)/5 to the mounting position in the middle to the part 1, and tighten the bolts.

Reference tightening torque of part 3: 12± 1N• m;

Tools: open-end wrench 8-10.

Note: Pay attention to that the simple removal process will not be described. Please refer to the assembling process.

3.1.2 Assembling the platform tool box

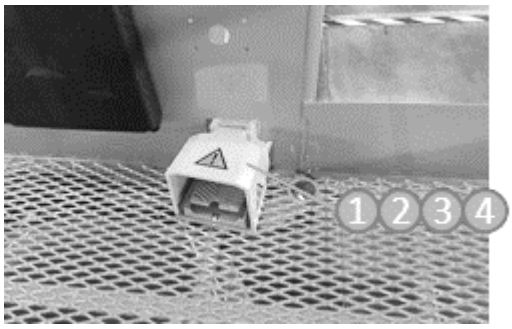


1. Platform tool box 2. Screw 3. Washer 4. Washer 5. Nut 6. Platform frame

1) Assemble part 1 with part 2/3/4/5 to the mounting position in the middle to the part 6, and tighten the screws.

Reference tightening torque of part 2: 4N• m;

3.1.3 Assembling the foot switch

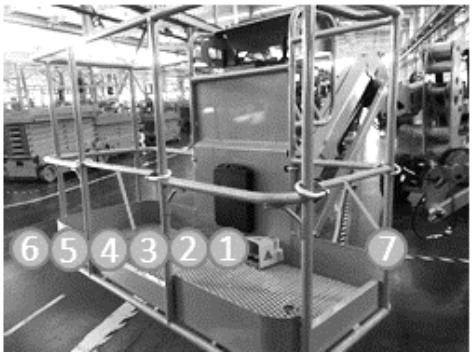


1. Foot switch 2. Screw 3. Nut 4. Washer

1) Assemble part 1 with part 2/3/4 to the assembling position at the bottom of the platform frame, and tighten the screws.

Tools: Allen wrench M4.

3.1.4 Assembling the lifting cross bar



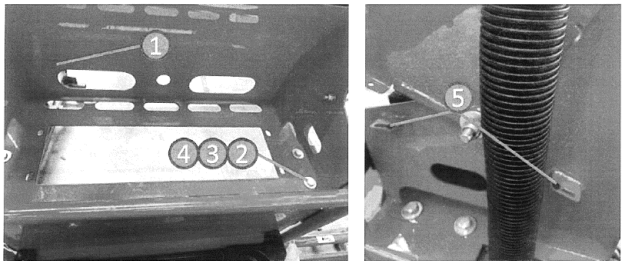
1. Lifting cross bar 2. U-bolt 3. Rubber hose 4. Nut 5 Washer 6. Nut 7. Lifting side bar

1) First pre-install part 3 on part 2 and pre-screw part 4, then fix part 1 to the front door fence of the platform with part 2/5/6, and assemble part 7 to the side door fence in the same way.

Reference tightening torque of part 6: 12± 1N• m

Tools: open-end wrench 13-16

3.1.5 Assembling the protective mount



1. Protective mount 2. Bolt 3. Washer 4. Nut 5. Foot mat

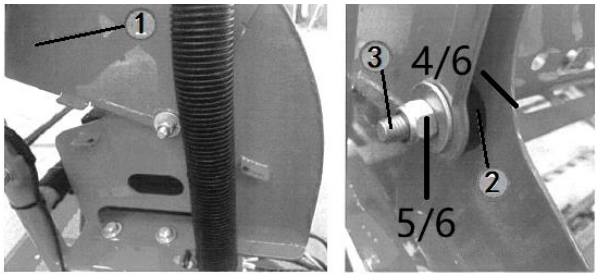
1) Install part 1 with part 2 (from top to bottom) 3/4 to the mounting position on the platform control unit of the platform frame assembly.

Note: The protective mount opening is towards the inside of the platform frame.

2) Install part 5 into the lug mounting holes on both sides of the protective mount.

Reference tightening torque of part 2: 52± 5N• m

3.1.6 Assembling the arc shield



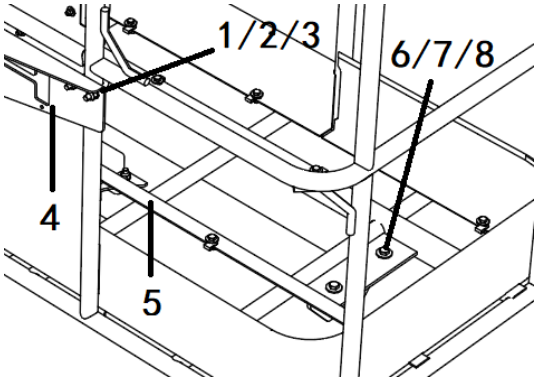
1. Arc shield 2. Spacer 3. Double-end stud 4. Washer 5. Washer 6. Nut

1) Press-fit part 2 into the mounting hole of part 1, and then use part 3 to connect part 1 to the protective mount, use part 4/6 to tighten the inner side, and use part 5/6 to tighten the outer side.

Note: The handle of the arc shield faces to inner side of the platform frame; after the installation is completed, the arc shield should be rotated smoothly without jamming.

Reference tightening torque of part 6: 15± 1N• m;

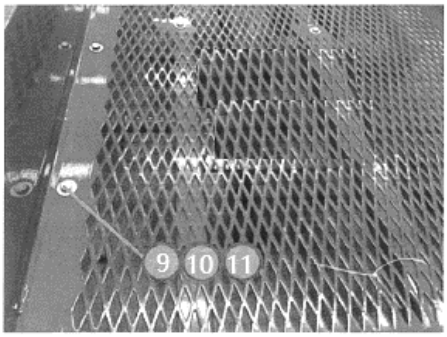
3.1.7 Assembling the platform assembly



1. U-bolt 2. Washer 3. Nut 4. Platform support 5. Platform frame assembly 6. Bolt 7. Washer 8. Nut

1) Lift part 5 and place it on part 4, and use part 6 (from top to bottom)/7 (for both bolt end and nut end)/8 to fix it.

2) Fix part 5 with part 1/2/3 to the platform support.



9. Bolt 10. Washer 11. Circlip nut

3) Finally, fix the base plate with part 9/10 (for both bolt end and nut end)/11 to the bottom of the platform.

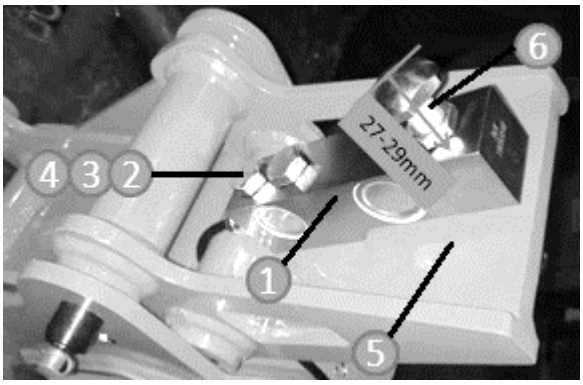
Reference tightening torque of part 1: 24± 2N• m;

Reference tightening torque of part 6: 52± 5N• m;

Reference tightening torque of part 9: 15± 1N• m.

Tools: ratchet torque wrench QSP100N4; open-end ratchet wrench 16; socket wrench 1/2-16mm.

3.1.8 Assembling the load cell



1. Load cell 2. Bolt 3. Washer 4. Nut 5. Triangle bracket assembly 6. Tumbler adjustment leg

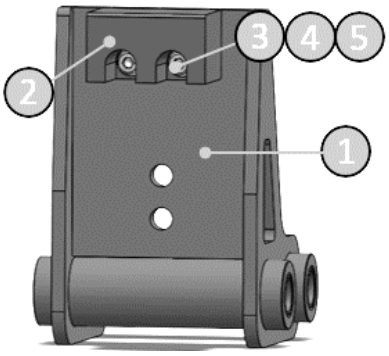
1) Install part 1 with part 2/3 (nut end)/4 to part 5, install part 6 to part 1 with the farthest end of part 6 about 27-29mm from the surface of the load cell, and tighten part 6 with the nut on part 6 to the load cell.

Reference tightening torque of part 2: 90± 9N• m;

Reference tightening torque of part 6: 52± 5N• m;

Tools: open-end wrench 16-18, open-end wrench 13-16; socket wrench 1/2-18mm; QSP100N4; S6 Allen wrench.

3.1.9 Assembling the stop block



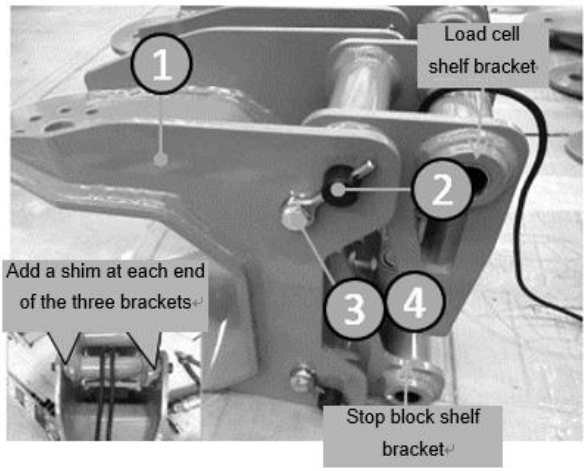
1. Triangular bracket assembly 2. Limit plate 3. Screw 4. Washer 5. Nut

1) Assemble part 2 with part 3/4/5 to part 1.

Reference tightening torque of part 3: 12± 1N• m

Tools: Allen wrench M4; open-end ratchet wrench 13.

3.1.10 Assembling the swing motor mounting bracket



1. Swing motor mounting bracket 2. Transition bracket pin 3. Safety pin 4. Bolt

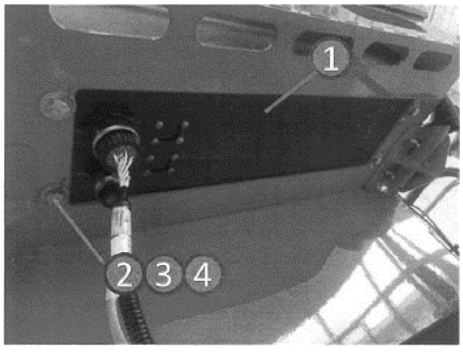
1) Use part 2/3 (coated with threadlock)/4 to assemble the shelf bracket for assembling the load cell and the shelf bracket for assembling the stop block to part 1 (the safety pin hole is to the left), and use shim to adjust the gap between the shelf bracket and the swing motor mounting bracket, add a shim at each end of the shelf bracket.

2) Use part 2/3 (coated with threadlock)/4 to attach the subassembled swing motor bracket to the platform assembly.

Reference tightening torque of part 4: 52± 5N• m;

Tools: QSP100N4; socket wrench 1/2-16mm; open-end wrench 13-16.

3.1.11 Assembling the platform control unit (PCU)



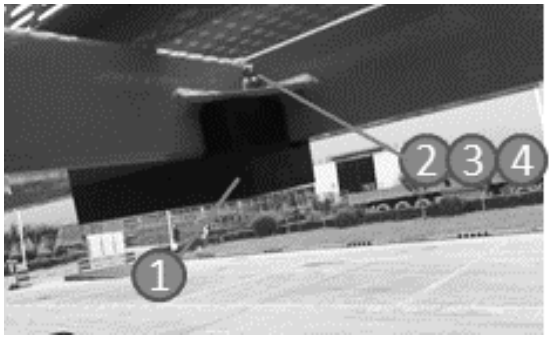
1. PCU assembly 2. Bolt 3. Washer 4. Nut

1) Assemble part 1 with part 2 (from bottom to top)/3/4 to the platform frame, and tighten it.
2) Connect the PCU harness to part 1 firmly.

Reference tightening torque of part 2: 28± 3N• m.

Tools: open-end ratchet wrench 16.

3.1.12 Assembling the anti-collision rubber pad



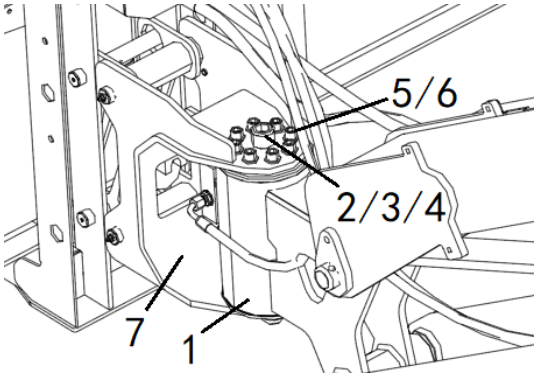
1. Anti-collision rubber pad 2. Screw 3. Washer 4. Nut

1) Assemble part 1 with part 2 (from top to bottom)/3/4 to the assembling position at the bottom of the platform support.

Reference tightening torque of part 1: 15± 1N• m;

Tools: 9-piece Allen wrench set; open-end wrench 13-16.

3.1.13 Assembling the platform



1. Swing cylinder 2. Screw 3. Washer 4. Nut 5. Screw 6. Washer 7. Platform support

1) Lift the platform to the assembling position of the swing cylinder, insert the part 2 through the platform support and the swing cylinder, manually screw on part 2/3/4 (do not tighten part 2), adjust the perpendicularity between the platform and the fly jib, and after the adjustment, apply sealant to part 5 and pre-tighten it symmetrically (do not torque tighten it), then apply sealant to part 2 and torque tighten it and finally torque tighten part 4:

⚠ WARNING: Risk of crushing

The swing cylinder may fall off due to loss of balance.

Reference tightening torque of part 2: 595± 55N• m;

Reference tightening torque of part 5: 71± 7N• m;

Tools: Open-end wrench 30-32/QLE-750N/QSP100N4.

1) Connect the platform harness to connectors of PCU and load cell and platform valve block, and connect the corresponding oil pipes to the platform.

3.2 Axle assembly

3.2.1 Removing the front axle assembly

⚠ CAUTION:

Before refitting, the O-ring of the removed fitting and/or hose assembly must be replaced and then tightened to the specified torque. Please refer to hydraulic hose and fitting torque specifications.

1) Fix the non-steered wheels and place the jack in the middle of the steering end (i.e., front axle) of the chassis.
2) Unscrew the wheel nuts, but do not remove them.
3) Raise the machine by 5 cm, and place the bracket under the chassis for the purpose of supporting.
4) Fix the sling connected to the crane to the

front axle securely.

CAUTION: Risk of crushing.

With the wheels removed, the front axle could fall off due to the loss of balance.

5) Unscrew the wheel nuts and remove the tires.
6) Remove the securing fastener of center shaft for connecting the front axle to the chassis, and knock the pin out with the copper bar.
7) Move away the front axle slowly with the crane.

CAUTION: Risk of crushing.

If not supported correctly by the sling, the front axle may fall off due to the loss of balance.

3.2.2 Removing the rear axle assembly

1) Fix the non-steered wheels and place the jack in the middle of the steering end (i.e., rear axle) of the chassis.
2) Unscrew the wheel nuts, but do not remove them.
3) Raise the machine by 5 cm. Place the bracket under the chassis for the purpose of supporting.
4) Fix the sling connected to the crane to the rear axle securely.
5) Unscrew the wheel nuts and remove the tires.
6) Mark and disconnect the motor connecting harness.
7) Remove the securing fastener of center shaft for connecting the rear axle to the chassis, and knock the pin out with the copper bar.
8) Move away the rear axle slowly with the crane.

Caution: Risk of crushing.

If not supported correctly by the sling, the rear axle may fall off due to the loss of balance.

3.2.3 Removing the wheels

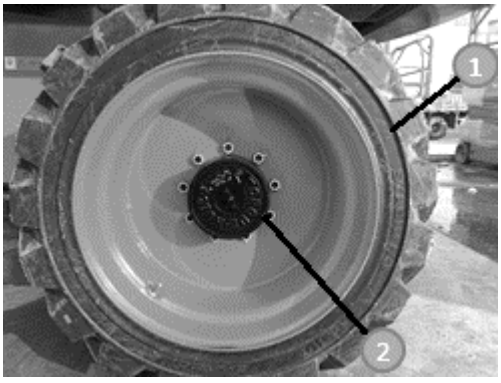
1) Unscrew the wheel nuts, but do not remove them.
2) Block the non-steered wheel, and place a jack with sufficient bearing capacity under the steering axle
3) Raise the machine by 15 cm, and place a cushion block under the chassis for the purpose of supporting.

CAUTION: Risk of crushing.

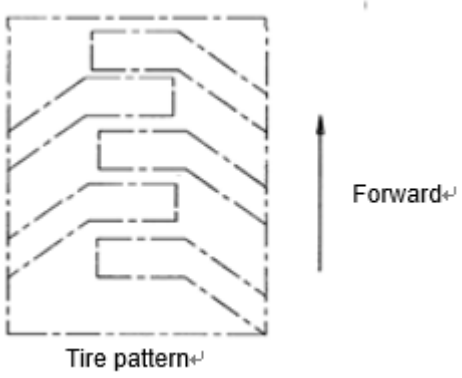
If improperly supported, the machine may fall off.

4) Unscrew the wheel nuts and remove the wheel.

3.2.4 Assembling the wheels



1. Tire 2. Hexagon cone nut



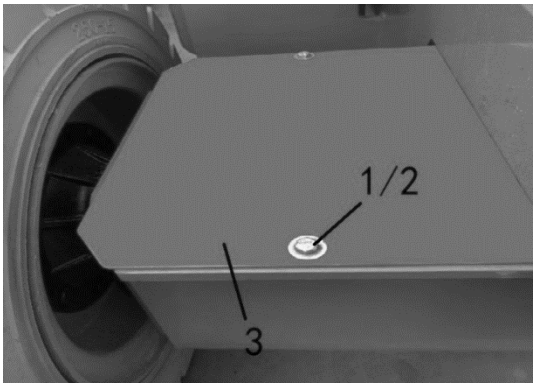
Note: Pay attention to the tire pattern when installing the left and right tires.

1) Lift the tire with the crane, and adjust the angle of tire to make the tire bolt holes coincident with the axle assembly bolts.
2) Push in the tire horizontally and make it fit closely. Then pretighten the tire with part 2 (coated with threadlock before pretightening).
3) Tighten all nuts to specified torque diagonally.

Reference tightening torque of part 2: 305± 25N• m;

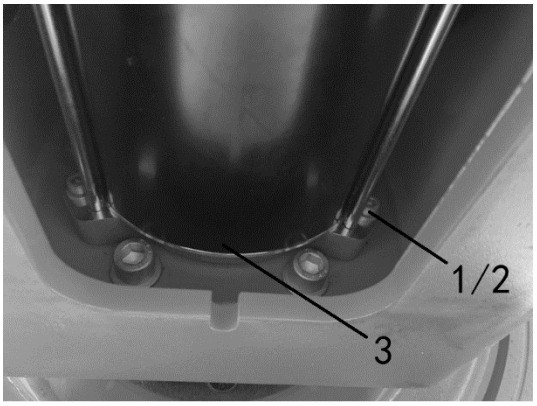
Tool: QSP400N4; socket wrench 24.

3.2.5 Removing the motor



1. Bolt 2. Washer 3. Rear axle cover

1) Remove the fixing part 1/2 of part 3 on the rear axle and take off part 3.



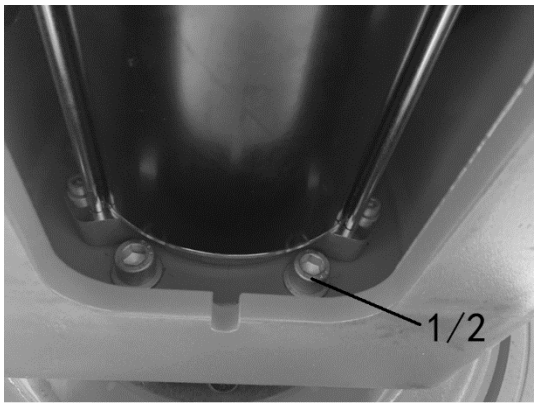
1. Screw 2. Washer 3. Motor

1) Secure part 3 with the straps.
2) Remove the fixing part 1/2 of part 3 and take off part 3.

⚠ CAUTION: Risk of crushing.

If not supported correctly by the sling, the motor may fall off due to the loss of balance.

3.2.6 Removing the reducer assembly



1. Screw 2. Washer

1) Remove the motor. Refer to removing the motor.
2) Remove the wheels. Refer to removing the wheels.
3) Secure the reducer assembly with the straps.
4) Remove the fixing part 1/2 of the reducer assembly and take off the reducer assembly.

⚠ CAUTION: Risk of crushing.

If not supported correctly by the sling, the reducer assembly may fall off due to the loss of balance.

3.3 Jib assembly

3.3.1 Removing the swing cylinder

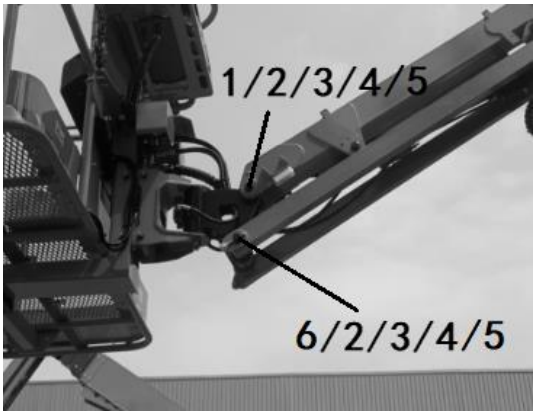
⚠ CAUTION: This procedure should be implemented when the boom is retracted.

1) Remove the platform assembly.
2) Mark, disconnect and plug swing cylinder hose.

⚠ WARNING: Risk of personal injury

Sprayed hydraulic oil can penetrate and burn the skin. Therefore, please loosen the hydraulic fitting connection very slowly to reduce the oil pressure gradually. Do not spray or eject the oil.

3) Attach the sling from the overhead crane to the swing cylinder.



1. Pin 2. Safety pin 3. Bolt 4. Washer 5.Nut 6. Pin

4) Remove the fastener of fixing pin of the swing cylinder and knock out the pin.

5) Removing the saddle swing cylinder.

⚠ WARNING: Risk of crushing

If not properly supported by the crane, the saddle swing cylinder may fall due to loss of balance after the pin has been knocked out.

3.3.2 Removing the jib assembly

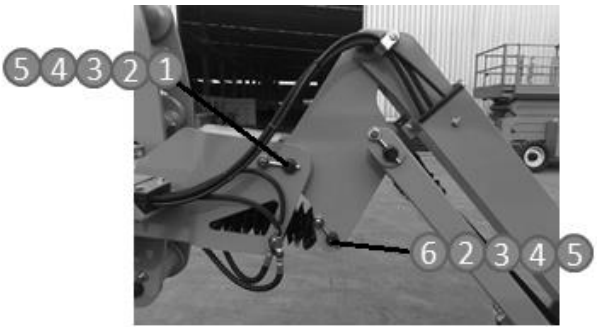
1) Remove the platform assembly.

2) Remove the left side guard plate and pipe clamp of the upper link of the jib, and remove the hose and harness fixed to the jib.

⚠ CAUTION: Risk of part damage

If being kinked or squeezed, the cable harness and hose may be damaged.

3) Attach the sling from the overhead crane to the swing cylinder for the purpose of supporting.



1. Pin 2. Safety pin 3. Bolt 4. Washer 5. Nut 6. Pin

4) Remove the pin fastener 2/3/4/5, knock out the pin and remove the jib assembly.

⚠ WARNING: Risk of crushing

If not properly supported by the crane, the jib assembly may fall due to loss of balance after the pin has been knocked out.

3.3.3 Removing the fly jib cylinder

1) Mark, disconnect and plug the hose of the fly jib cylinder.

⚠ WARNING: Risk of personal injury

Sprayed hydraulic oil can penetrate and burn the skin. Therefore, please loosen the

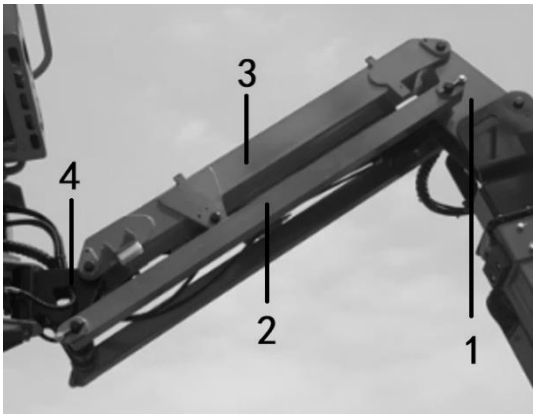
hydraulic fitting connection very slowly to reduce the oil pressure gradually. Do not spray or eject the oil.

1) Remove the fasteners of the lower connecting frame assembly and the lower link pin.
2) Knock out the lower link pin in half, so that the lower link hangs down, and remove the lower link on the other side in the same way.
3) Attach the sling from the overhead crane to the fly jib cylinder for the purpose of supporting.
4) Remove the fixing fasteners of the fly jib cylinder and the upper link pin, knock out the pins at both ends of the fly jib cylinder, and remove the fly jib cylinder.

WARNING: Risk of crushing

If not properly supported by the crane, the fly jib cylinder may fall due to loss of balance after the pin has been knocked out.

3.3.4 Assembling the swing cylinder, the fly jib cylinder and the jib



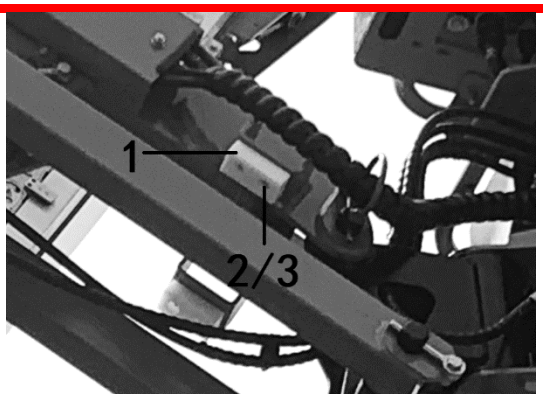
1. Lower connecting bracket assembly 2. Lower link 3. Upper link 4. Swing cylinder

1) Place part 1/2/3/4 onto the jib subassembly tooling.

1. Pin 2. Safety pin 3. Bolt 4. Washer 5. Nut

1) Connect the lower connecting bracket assembly and the swing cylinder to the upper link with part 1, and then fix them with part 2/3/4/5.

Tools: open-end ratchet wrench 16

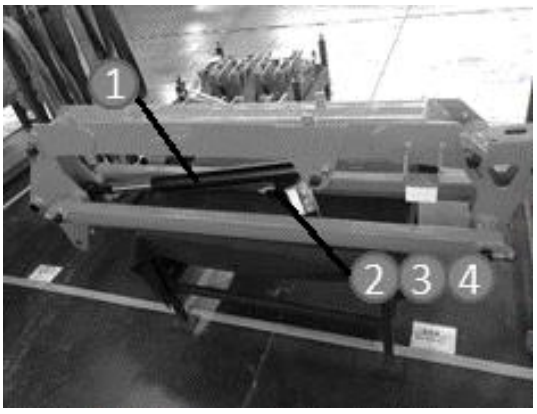


1. Cushion block 2. Bolt 3. Washer

1) Assemble the cushion block, use part 2/3 to install part 1 to the assembly position at front end of upper link, and tighten the bolt.

Reference tightening torque of part 2: 12± 1N• m;

Tools: open-end ratchet wrench 13.



1. Fly jib cylinder 2. Jib luffing balance valve 3. Straight fitting 4. Bolt

1) Assemble part 2 to part 1, and fasten it with part 4. Then remove the attached plugs at balance valve ports V1 and V2, assemble part 3 to the two ports, and tighten them to specified torque.

Reference tightening torque of part 3: 32± 3N• m;

Reference tightening torque of part 4: 19± 2N• m;

Tools: electric impact wrench (SATA 51082); socket wrench 1/2-10mm.

1. Shaft 2. Safety pin 3. Bolt 4. Washer 5. Nut 6.Shaft 7.Bolt

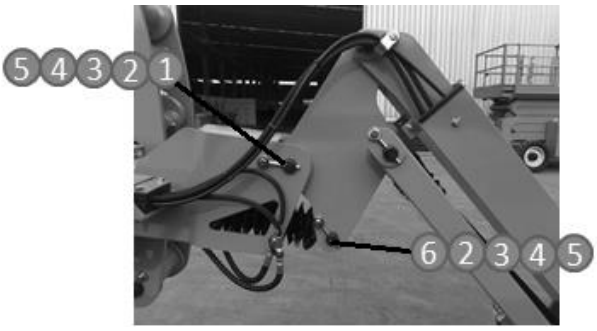
1) Connect the fly jib cylinder link end, the lower connecting bracket assembly and the lower link with part 1, and then fix them with part 2/3 (coated with threadlock)/4/5.

2) Connect the cylinder barrel end to the upper link with part 6, and fix it with part 2/4/5/7 (coated with threadlock).

3) Use part 1/2/3 (coated with threadlock)/4/5 to connect the lower link to the swing cylinder,

Torque of part 3/7: 52± 5N• m;

Tools: socket wrench 1/2-16mm; open-end wrenches 16-18.



1. Shaft 2. Safety pin 3. Bolt 4. Washer 5. Nut 6. Shaft

4) Lift the subassembled jib assembly to the mounting position of telescopic boom, connect the telescopic boom to the lower connecting bracket assembly with part 1, and fix it with part 2/3 (coated with threadlock)/4/5.

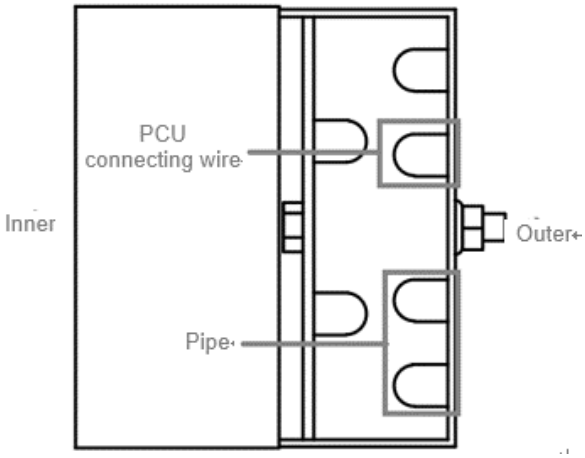
5) Use part 6 to connect the upper leveling cylinder with the lower connecting bracket assembly, and fix it with part 2/3 (coated with threadlock)/4/5.

Reference tightening torque of part 3: 52± 5N• m;

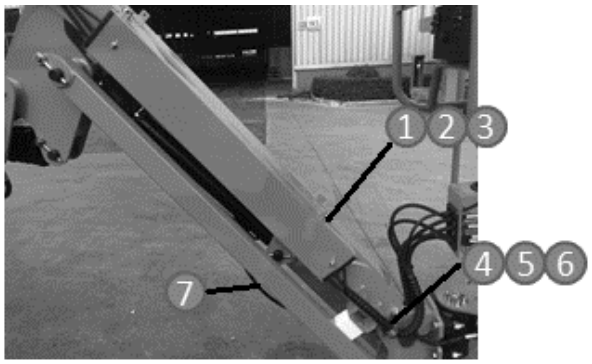
Tools: open-end wrench 16-1; open-end wrench 16-1.

1. Pipe clamp 2. Cushion collar 3. Spacer ring

6) Bundle up the PCU connecting wire and the fly jib valve block pipe at the illustrated positions with the straps, and fix the pipe at the jib with part 1/2/3.



7) Arrange the oil pipe and harness at the fly jib in the direction shown in the figure.



1. Bolt 2. Washer 3. Nut 4. Pipe clamp 5. Cushion collar 6. Spacer ring 7. Spacer ring

8) Assemble the guard plate with part 1/2/3 to the upper link of the fly jib.

9) Thread the pipe and harness through the pipe clamp, wind 600PVC around them at the point 100 mm from the pipe clamp, and fix them with black insulating tape. Afterwards, fix the pipe at the fly jib with part 4/5/6.

Reference tightening torque of part 1: 12± 1N• m;

Tools: socket wrench 1/2-10mm; socket

wrench 1/2-16mm; QSP100N4; QSP25N4.

3.4 Cable carrier assembly

3.4.1 Removing the cable carrier

CAUTION:

The O-ring (if any) of the removed fitting and/or hose assembly must be replaced. During installation, all connections must be tightened to specified torque. Please refer to the specification for selection of tightening torque of the lifting platform.

1) Determine the position of cable from the cable carrier to the PCU, and mark each cable and its entry to the PCU.
2) Disconnect the cable from the PCU.
3) Remove the clamp and guard plate from the jib upper link side, and then take off the hose and harness.
4) Remove the clamps fixing harness at both ends of the wiring beam on the boom.
5) Pull out all hose and harnesses from the wiring beam.

WARNING: Risk of personal injury

Sprayed hydraulic oil can penetrate and burn the skin. Therefore, please loosen the hydraulic fitting connection very slowly to reduce the oil pressure gradually, and do not spray or eject the oil.

WARNING: Risk of crushing

If not properly fixed, the upper and lower cable carriers may become unbalanced and fall during removal from the machine.

6) Remove the fixing fasteners at the connection between the upper wiring beam and the cable carrier, and remove the fixing fasteners of the cable carrier at the platform end of the lower wiring beam.
7) Pull the hose and harness out of the cable carrier, remove the cable carrier from the machine and place it on a structure that will support it.

WARNING: Risk of crushing

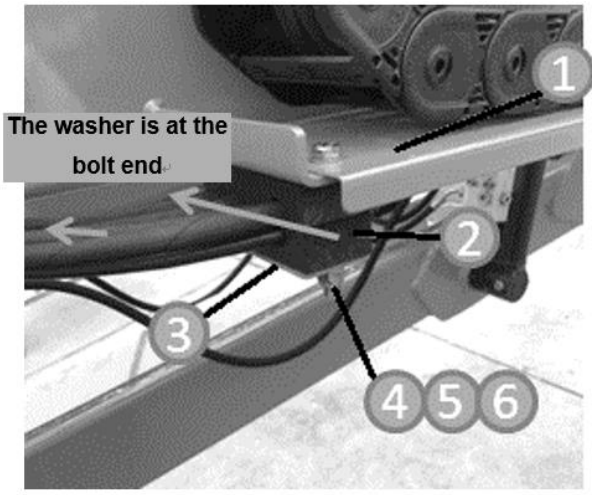
If not properly connected to the overhead crane, the cable carrier may become unbalanced and fall.

CAUTION: Risk of part damage

1. If being kinked or squeezed, the cable harness and hose may be damaged.

2. If being twisted, the boom cable carrier may be damaged.

3.4.2 Assembling the cable carrier

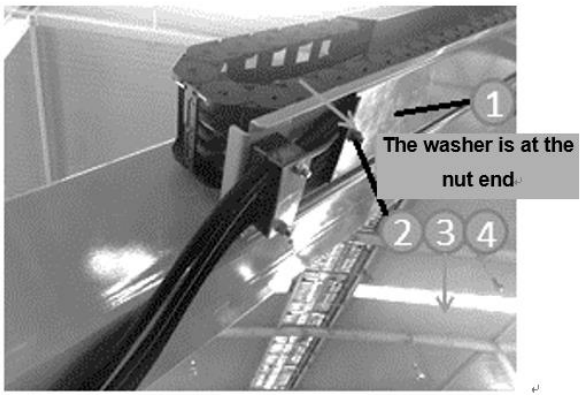


1. Cable carrier support plate 2. Pipe clamp 3. Pipe clamp pressure plate 4. Bolt 5. Washer 6. Nut

1) Assemble part 1 on the side mounting plate of the boom, then assemble part 2/3 on the lower end of the mounting plate of the support plate, then pre-tighten them with part 4/5/6 (do not tighten them), arrange the boom oil pipe harness, and then tighten the pipe clamp bolt (part 4).

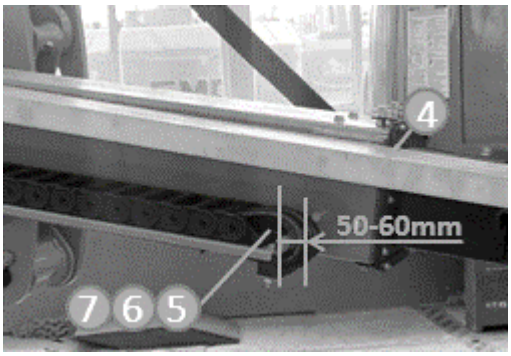
Reference tightening torque of part 4: 15± 2N• m;

Tool: 13mm open-end ratchet wrench.



1. Cover plate weldment 2. Bolt 3. Nut 4. Washer

1) Arrange the oil pipes and harnesses under the support plate, then install clip rubber strips (coated with threadlock) at both ends of part 1, and then fix part 1 with part 2/3/4 (the insertion direction of the bolt is shown in the figure).

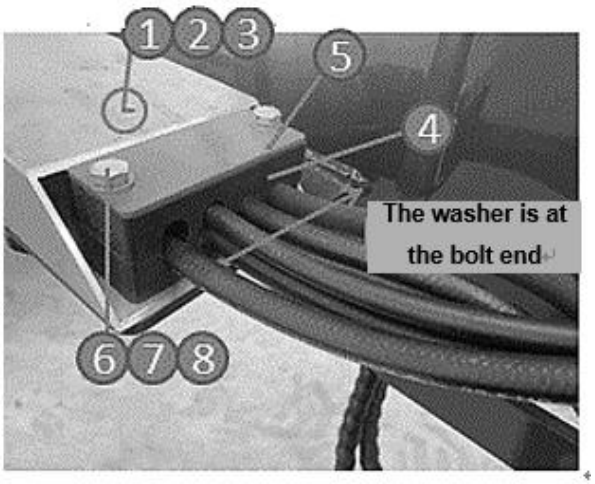


4. Aluminum pipe 5. Screw 6. Washer 7. Nut

1) Install one end of the cable carrier on the support plate with part 5/6/7 and the other end on the aluminum pipe with part 5/6/7 (with the screw at the cable carrier end and the washer at the nut end, and tighten the screw), then install the oil pipe and harness into the cable carrier from under the support plate, reserve the oil pipe and harness to be fixed at both ends of the cable carrier with straps according to the length as shown, and then wrap the reserved pipes and harnesses with 100mm long PVC (PVC ends are wrapped with black insulating tape) for protection.

Reference tightening torque of part 5: 12± 1N• m;

Tools: open-end ratchet wrench 10



1. Screw 2. Washer 3. Nut 4. Pipe clamp 5. Pipe clamp pressure plate 6. Bolt 7. Washer

1) Install the front end of the aluminum tube onto the telescopic boom mounting plate (indicated position) with part 1/2/3, and then tighten part 4/5 with part 6/7/8.

3.5 Boom assembly

3.5.1 Removing the boom assembly

⚠ WARNING: Risk of personal injury

This procedure requires specific maintenance skills, lifting equipment and a suitable workshop. Carrying out this procedure without these skills and tools may result in death or serious injury, as well as serious component damage. Therefore, it is strongly recommended that this service is performed by dealers.

⚠ CAUTION:

1. **This procedure should be implemented when the boom is retracted.**
2. **The O-ring (if any) of the removed fitting and/or hose assembly must be replaced. During installation, all connections must be tightened to specified torque. Please refer to the specification for selection of tightening torque of the lifting platform.**

1) Remove the platform.

2) Remove the jib assembly. Refer to Removing the jib assembly.

3) Remove the cable carrier. Refer to Removing the cable carrier.

4) Remove the upper/lower leveling cylinder. Refer to Removing the lower leveling cylinder.

5) Connect a 5 ton/5000 kg overhead crane to both ends of the boom for support.

6) Remove the boom luffing cylinder. Refer to Removing the boom luffing cylinder.

7) Mark and disconnect the travel switch harness and remove the travel switch.

8) Mark, disconnect and plug the hydraulic hose of the boom telescopic cylinder, and install the fitting on the cylinder.

⚠ WARNING: Risk of personal injury

Sprayed hydraulic oil can penetrate and burn the skin. Therefore, please loosen the hydraulic fitting connection very slowly to

reduce the oil pressure gradually, and do not spray or eject the oil.

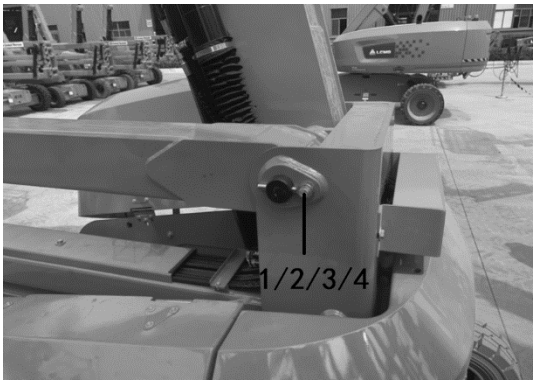
9) Remove the fixing fasteners on the right side of pivot pin on the boom.

10) Use a brass hammer to knock out half of the upper pivot pin, then carefully remove the boom from the machine and place it on a structure capable of supporting the boom.

⚠ WARNING: Risk of crushing

If it is not properly connected to the overhead crane, the boom may become unbalanced and fall when removed from the machine.

3.5.2 Assembling the boom assembly



1. Pin 2. Safety pin 3. Bolt 4. Washer

1) Lift the boom assembly onto the left side of the boom subassembly tooling.

Note: Ensure the balance of the telescopic boom assembly during hoisting. The operator shall not stand at either end;

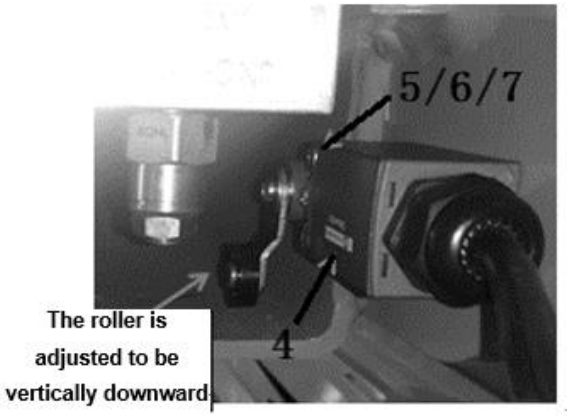
2) Align the mounting hole of the boom with the upper pivot hole, and smash into the pin.

3) Use fasteners to fix the pins on the right side of the machine (the safety pin fixing bolts are coated with AT262 threadlock).

Note: There shall be no gap between the inner surface of the safety pin and the plate surface after tightening.

Reference tightening torque of part 2: 90± 9N• m;

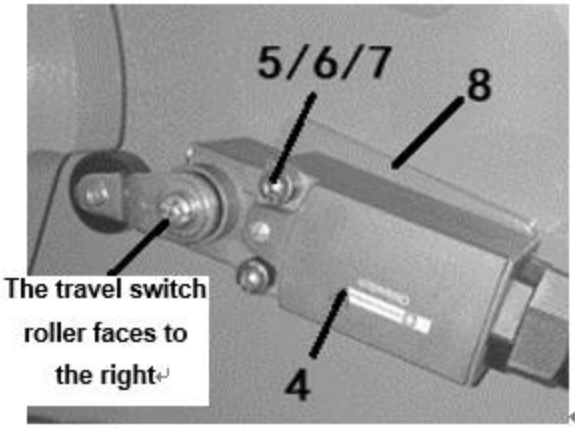
Tools: QSP100N4; socket wrench 18#.



4. Travel switch 5. Screw 6. Nut 7. Washer

4) Assemble the part 4 onto the inner side of the boom upper pivot, and fix it with part 5/6/7.

Note: It is necessary to adjust the travel switch roller to be vertically downward.



4. Travel switch 5. Screw 6. Nut 7. Washer 8. Boom luffing limit packing plate

5) Assemble part 4 onto the right inner side of the upper pivot, and fix it with part 5/6/7/8.

Note:

1. In this step, the travel switch roller faces to the right;

2. In this step, it is necessary to use the packing plate (part 8) on the right side of the travel switch.

Reference tightening torque of part 5: 3± 0.3N• m;

Tools: open-end wrench 8-10.

6) Connect the boom oil pipe and travel switch harness, and check whether they are connected firmly.

7) Assemble the boom luffing cylinder. Refer to Assembling the boom luffing cylinder.

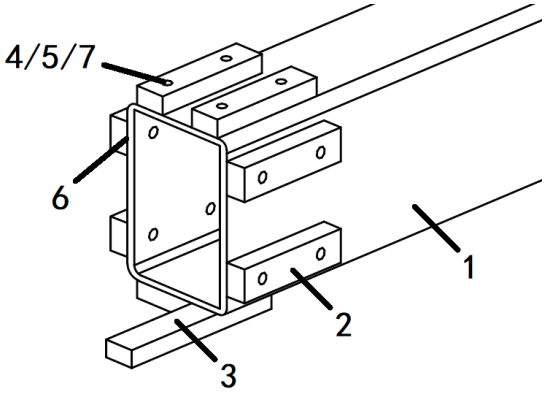
8) Assemble the upper/lower leveling cylinder. Refer to Assembling the upper/lower leveling cylinder.

9) Assemble the cable carrier. Refer to Assembling the cable carrier.

10) Assemble the jib assembly. Refer to Assembling the jib assembly.

11) Assemble the platform assembly. Refer to Assembling the platform assembly.

3.5.3 Subassembling the boom assembly



1. Extension jib 2. Slider 3. Slider 4. Bolt 5. Washer 6. Shim 7. Nut

1) Lift the extension jib (part 1) onto the assembly tooling;

⚠ WARNING: Risk of crushing

Ensure the balance of the workpiece during lifting and placement. The operator shall not stand at either end of the workpiece.

2) Assemble the slider (part 2/3) to the rear end of the extension jib respectively, and assemble part 3 to the bottom of the extension jib.

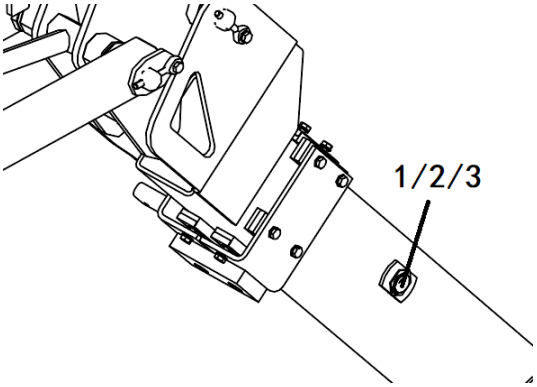
3) After the slider is installed, measure the outer dimensions of the upper, lower, left and right sliders, then measure the front end dimensions of the boom at the corresponding positions, and determine the number of washers (part 6) used according to the dimension difference;

Control criteria: The gap between the sliders on both sides and the boom shall be ≤ 1mm.

4) Remove the slider bolt, then apply 242 threadlock, and fix the slider again;

Reference tightening torque of part 4: 23± 2N• m;

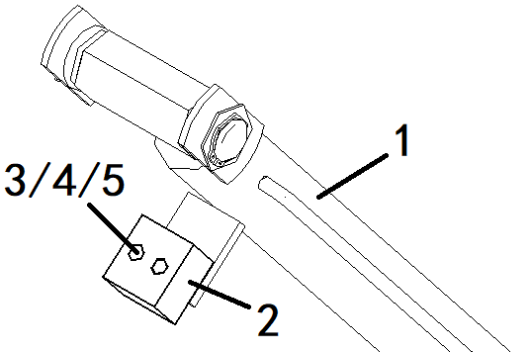
Tools: QSP50N3; socket wrench 16#.



1. Washer 2. Pin 3. Retaining ring

5) Assemble the upper leveling cylinder to the platform end of the extension jib, adjust the shaft hole at the barrel end of the upper leveling cylinder to be coaxial with the first group of holes at the front end of the extension jib rectangular tube, and fix it with part 1/2/3.

Note: Perform visual inspection for confirmation, rather than touch with hands.



1. Boom telescopic cylinder 2. Support slider for telescopic cylinder 3. Bolt 4. Nut 5. Washer

6) Use part 3/4/5 to install part 2 to the riser (part 1) and apply 242 threadlock to the bolt ends.

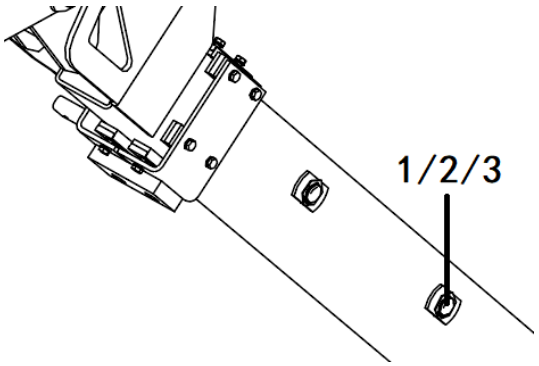
Note: The bolt penetrates from the riser (part 1).

Reference tightening torque of part 3: 23± 2N• m;

Tools: Open-end wrench 13-16; socket 16.

7) Remove the self-contained blocking plate at the fixed end of the boom telescopic cylinder, and clean the surface.

8) Pull out the link end of the boom telescopic cylinder by about 1500mm;

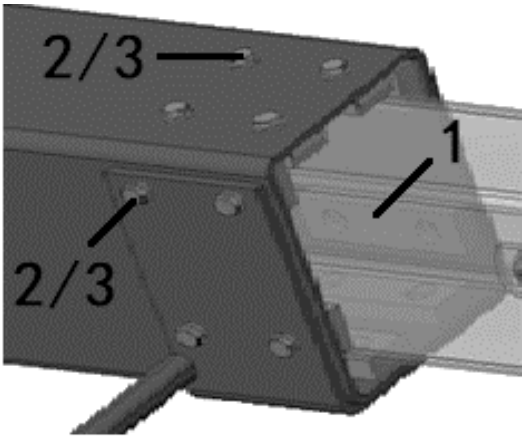


1. Washer 2. Pin 3. Retaining ring

9) Adjust the shaft hole at the link end of the boom telescopic cylinder to be coaxial with the second group of holes at the front end of the extension jib rectangular tube, and use part 1/2/3 to fix it.

10) Install the front end of the extension jib assembly from the rear end of the boom, and the front end of the telescopic cylinder should exceed the stop block inside the front end of

the boom after installation.



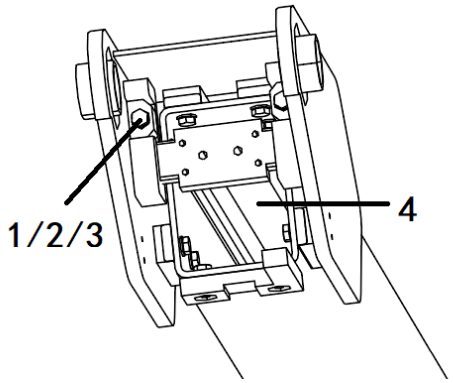
1. Slider 2. Washer 3. Bolt

11) Assemble part 1 to the inside of the front end of the boom and fix it with part 2/3.

Note: Perform visual inspection for confirmation, rather than touch with hands.

12) Check the gap between the slider and the telescopic boom with a feeler gauge. The gap between the sliders on both sides and the telescopic boom shall be ≤ 1mm, otherwise shims should be added for adjustment;

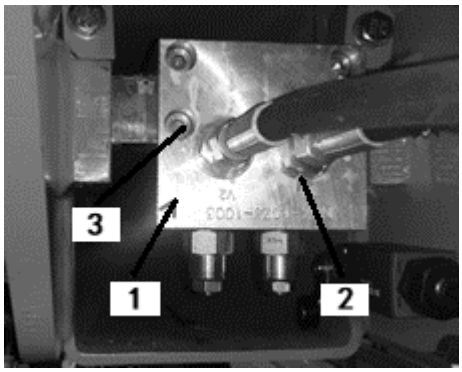
13) After adjustment according to the gap requirements, apply 242 threadlock to all fixing parts;



1. Bolt 2. Washer 3. Nut 4. Telescopic cylinder

14) Clamp the front end of part 4 inside the stop block, and assemble part 3 onto the limit plate at the front end of the boom with part 1/2.

Note: Do not pry the rear end face of the telescopic cylinder directly with hard objects.



1. Telescopic balance valve 2. Straight fitting 3. Screw

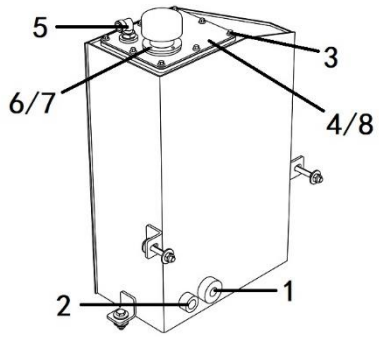
15) Install part 2 to part 1.

16) Install part 1 to the fixed end of the telescopic cylinder with part 3.

Tools: QSP100N4; QSP50N3; socket wrench 22#; socket wrench 16#.

3.6 Hydraulic tank

3.6.1 Assembling the hydraulic tank

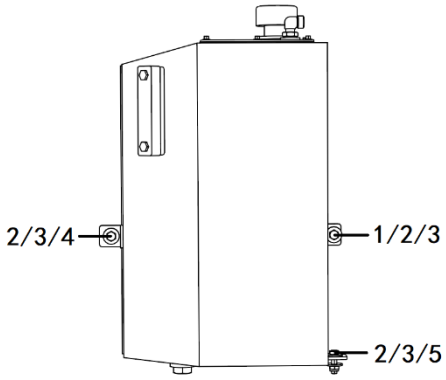


1. Oil suction flange 1 2. Oil suction flange 2 3. Bolt 4. Cover plate weldment body 5. Oil return steel pipe assembly 6. Air filter 7. Bolt 8. Rubber pad

1) Assemble part 2 to the hydraulic tank weldment body.

2) Install the oil suction filter into the hydraulic tank weldment body, and fasten it with the part 1 from the outside of the tank.

3) Assemble part 5/6/7 to part 4 and assemble part 4/8 with part 3 to the hydraulic tank weldment body.



1. Bolt 2. Washer 3. Nut 4. Bolt 5. Bolt

4) Connect the oil suction hose to the hydraulic tank firmly, assemble the subassembled hydraulic tank to the left side of the rotary table with bolts and tighten them.

Reference tightening torque of part 1/4/5:

52± 5N• m;

Tools: QSP100N4; socket wrench 16; open-end wrench 16.

3.6.1 Removing the hydraulic tank

Risk of part damage.

The working area and surface for performing this procedure must be clean. If debris enters the hydraulic system, serious damage may be caused to the components. Therefore, it is recommended that this service is performed by dealers.

The O-rings (if any) of the fittings and/or hoses must be replaced. During installation, all connections must be tightened to the specified torque. Please refer to torque specifications of hydraulic hoses and fittings.

1) Mark, disconnect and plug the fuel return pipe at the fuel tank.

WARNING: Risk of personal injury

Sprayed hydraulic oil can penetrate and burn the skin. Therefore, please loosen the hydraulic fitting connection very slowly to relieve the oil pressure gradually, and do not spray or eject the oil.

2) Remove the plug from the hydraulic tank, and completely drain hydraulic oil into a suitable container.

3) Support the hydraulic tank and fix it to appropriate lifting equipment.

4) Remove the fasteners that fix the hydraulic tank.

5) Disconnect the suction hose.

CAUTION: Risk of part damage

The machine shall not be started when the valve of the hydraulic tank is closed, otherwise parts may be damaged. If the valve is closed, remove the key from the key switch

and put a label on the machine to inform related personnel.

6) Mark, disconnect and plug the hose.

7) Remove the hydraulic tank from the machine.

⚠ WARNING: Risk of crushing

If not properly supported and fixed on the lifting equipment during removal from the machine, the hydraulic tank may become unbalanced and fall.

3.7 Cylinder assembly

3.7.1 Removing the boom luffing cylinder

⚠ WARNING: Danger of injury

This procedure requires professional maintenance skills, lifting equipment and a suitable workshop. Carrying out this process without these skills and tools may result in death or serious injury, as well as serious component damage. Therefore, it is strongly recommended that this service is performed by dealers.

⚠ CAUTION:

The O-ring (if any) of the removed fitting and/or hose assembly must be replaced. During installation, all connections must be tightened to specified torque. Please refer to the specification for selection of tightening torque of the lifting platform.

1) Lift the telescopic boom to a horizontal position.

2) Lift the folding jib until the pin at the barrel end of the boom luffing cylinder is higher than the cover.

3) Connect a 5 ton/5000 kg overhead crane to the telescopic boom for support.

4) Lift the boom slightly with the overhead crane to release the pressure of the mounting pin of the boom luffing cylinder.

5) Support the link end and barrel end of the boom luffing cylinder with the second overhead crane or similar lifting equipment.

6) Mark, disconnect and plug the hydraulic hose of the boom luffing cylinder, and install the fitting on the cylinder.

⚠ WARNING: Risk of personal injury

Sprayed hydraulic oil may penetrate and burn the skin. Therefore, please loosen the hydraulic fitting connection very slowly to release the oil pressure gradually. Do not spray or eject the oil.

7) Remove the fixing part from the link end pin of the boom luffing cylinder, and use a copper hammer to knock out the luffing cylinder pin.

WARNING: Risk of crushing

During removal of the boom luffing cylinder pin, the boom will be lowered if it is not supported properly.

8) Retract the link end of the boom luffing cylinder into the cylinder. Protect the cylinder rod from damage.

9) Place the support block under the boom luffing cylinder across the two covers for support.

WARNING: Risk of crushing

If not properly supported by the lifting device, the boom luffing cylinder may become unbalanced and fall.

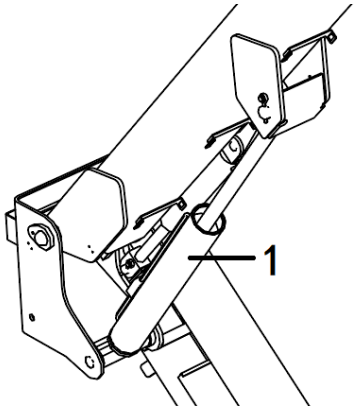
10) Remove the fixing part of pin at the barrel end of the boom luffing cylinder.

11) Use a brass hammer to knock out the cylinder pin at the barrel end. Carefully remove the boom luffing cylinder from the machine.

WARNING: Risk of crushing

If not properly supported and fixed on the lifting equipment, the lift cylinder may fall off due to loss of balance.

3.7.2 Assembling the boom luffing cylinder



1. Boom luffing cylinder

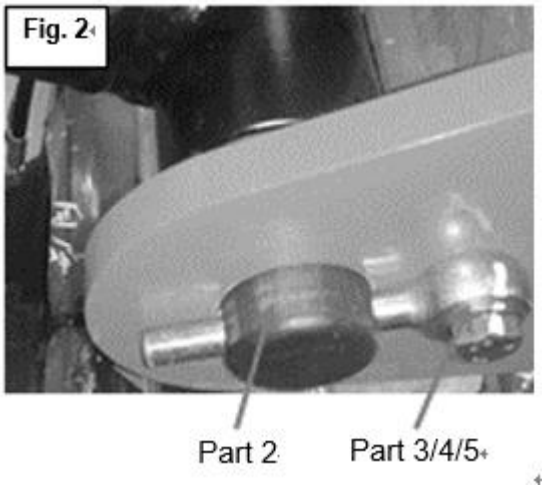
1) Use a crane to lift part 1 to the upper pivot mounting position.

2) The link end of the cylinder is placed on the tooling support beam (polyurethane board is provided).

WARNING: Risk of crushing

Ensure the balance of the cylinder during lifting. The operator shall not stand at either end of the workpiece.

CAUTION: Hook can only be removed after the pin at the link end of the cylinder is knocked in.



2. Pin 3. Safety pin 4. Bolt 5. Washer

3) Install the link end of part 1 to the boom, tap part 2 in, and secure it with part 3/4/5.

4) Align the mounting hole of the barrel end of part 1 with the mounting hole of the upper pivot, knock the part 2 in, and secure it with part 3/4/5.

Note: 1. The part fixing pin is located on the left side of the upper pivot.

2. After tightening, there should be no gap between the bolt and the upper pivot.

Reference tightening torque of part 20: 90± 9N• m;

Tools: QSP100N4; socket wrench 18.

3.7.3 Removing the boom telescopic cylinder

The boom telescopic cylinder is intended to make the boom retractable. The boom telescopic cylinder is provided with a balance valve to prevent boom lowering in case of hydraulic pipeline failure.

⚠ WARNING: Risk of personal injury

This procedure requires maintenance skills, lifting equipment and a suitable workshop. Carrying out this process without these skills and tools may result in death or serious injury, as well as serious component damage. Therefore, it is strongly recommended that this service is performed by dealers.

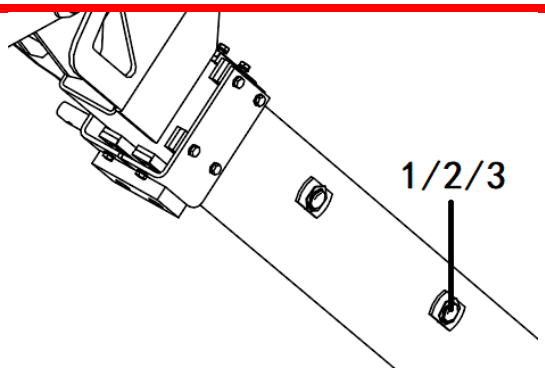
⚠ CAUTION:

The O-ring (if any) of the removed fitting and/or hose assembly must be replaced. During installation, all connections must be tightened to specified torque. Please refer to the specification for selection of tightening torque of the lifting platform.

1) Lift the boom to a horizontal position.
2) Extend the boom until the pin at the link end of the boom telescopic cylinder can be removed.
3) Disconnect the cable harness from the upper pivot end.
4) Mark, disconnect and plug the hydraulic hose of the boom telescopic cylinder. Cover the fittings on the cylinder.

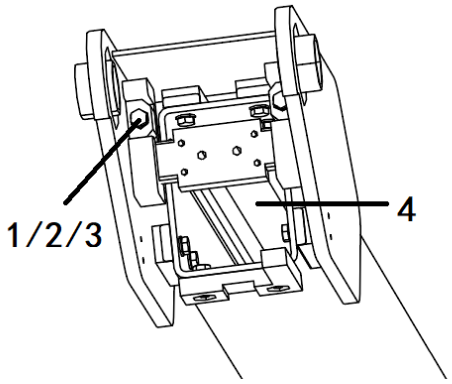
⚠ WARNING: Risk of personal injury

Sprayed hydraulic oil can penetrate and burn the skin. Please loosen the hydraulic fitting connection very slowly to relieve the oil pressure gradually, and do not spray or eject the oil.



1. Washer 2. Pin 3. Retaining ring

5) At the platform end of the boom, remove the fixing part 1/3 from the pin at the link end of the telescopic cylinder, and knock out part 2.



1. Bolt 2. Washer 3. Cylinder pressure plate 4. Telescopic cylinder

6) Remove the fixing part 1/2/3 of pin at the barrel end of the cylinder.
7) Support 4 and pull it out of the boom.

⚠ WARNING: Risk of crushing

If the support is improper, the telescopic cylinder may fall off when it is removed from the telescopic boom.

⚠ CAUTION: Risk of part damage

When removing the cylinder from the boom, be careful not to damage the balance valve on the boom extension cylinder.

Note:

1、 Pay attention to the length of cylinder after removal. The mounting spacing of cylinders must be the same.

2、 For the assembling method of the boom telescopic cylinder, refer to Subassembling the boom assembly.

3.7.4 Removing the lower leveling cylinder

The lower leveling cylinder are in the same hydraulic circuit as the upper leveling cylinder, and is intended for leveling the work gate. It is a part of the closed-loop hydraulic circuit, which keeps the platform level throughout the movement range of the boom. The lower leveling cylinder is located on the base of the boom.

⚠ WARNING: Danger of injury

This procedure requires specific maintenance skills, lifting equipment and a suitable workshop. Carrying out this process without these skills and tools may result in death or serious injury, as well as serious component damage. Therefore, it is strongly recommended that this service is performed by dealers.

⚠ CAUTION:

The O-ring (if any) of the removed fitting and/or hose assembly must be replaced.

During installation, all connections must be tightened to specified torque. Please refer to the specification for selection of tightening torque of the lifting platform.

1) Lift the articulated boom until it can come into contact with the link end and barrel end pivots of the lower leveling cylinder.
2) Mark, disconnect and plug the hydraulic hoses of the lower leveling cylinder. Plug the fittings on the cylinder.

⚠ WARNING: Risk of personal injury

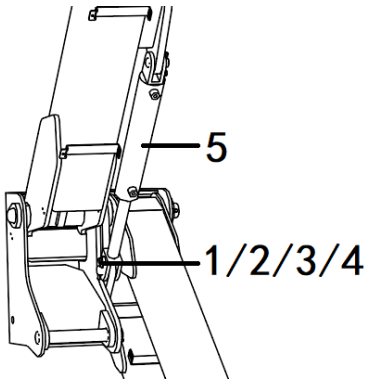
Sprayed hydraulic oil can penetrate and burn the skin. Therefore, please loosen hydraulic connectors very slowly to reduce the oil pressure gradually. Do not spray or eject the oil.

3) Connect the overhead crane or similar lifting equipment to the lower leveling cylinder.
4) Remove the pin fasteners at both ends of the lower leveling cylinder, and use a tool to knock out the pins.
5) Remove the lower leveling cylinder from the machine.

⚠ WARNING: Risk of crushing

If not properly connected to the overhead crane, the lower leveling cylinder may fall off due to loss of balance.

3.7.5 Assembling the lower leveling cylinder



1. Pin 2. Safety pin 3. Bolt 4. Washer 5. Lower leveling cylinder

1) Lift part 5 to the mounting position of the upper pivot, align the mounting hole of pin at the link end of part 5 with the mounting hole of the middle plate of the upper pivot, use a copper hammer to knock in part 1, and tighten it with part 2/3/4 on the left side (apply AT262 threadlock on part 3).
2) In the same way, fix the barrel end of the lower leveling cylinder to the boom, and fix part 2/3/4 to the right side of part 1.

Note: There shall be no gap between the inner surface of the safety pin and the plate surface after tightening.

Reference tightening torque of part 3: 52± 5N• m;

Tools: QSP100N4; socket wrench 16#

3.7.6 Removing the leveling cylinder

Note:

The O-ring (if any) of the removed fitting and/or hose assembly must be replaced. During installation, all connections must be tightened to specified torque. Please refer to the specification for selection of tightening torque of the lifting platform.

1) Extend the boom until it can contact with the pin at the barrel end of the upper leveling cylinder;

2) Place the cushion block under the platform for support, and lower the boom until the platform rests on the cushion block supporting the platform.

Note: Do not completely lower the boom on the cushion block.

3) Mark, disconnect and plug the hydraulic hoses on the upper leveling cylinder.

⚠ WARNING: Danger of injury

Sprayed hydraulic oil can penetrate and burn the skin. Therefore, please loosen the hydraulic fitting connection very slowly to reduce the oil pressure gradually. Do not spray or eject the oil.

4) Remove the pin fasteners at both ends of the upper leveling cylinder, and do not remove the cylinder pin.
5) Place a cushion block under the upper leveling cylinder for support to protect the cylinder rod from damage.
6) Knock out pins on both sides of the cylinder with a copper hammer.

⚠ WARNING: Risk of crushing

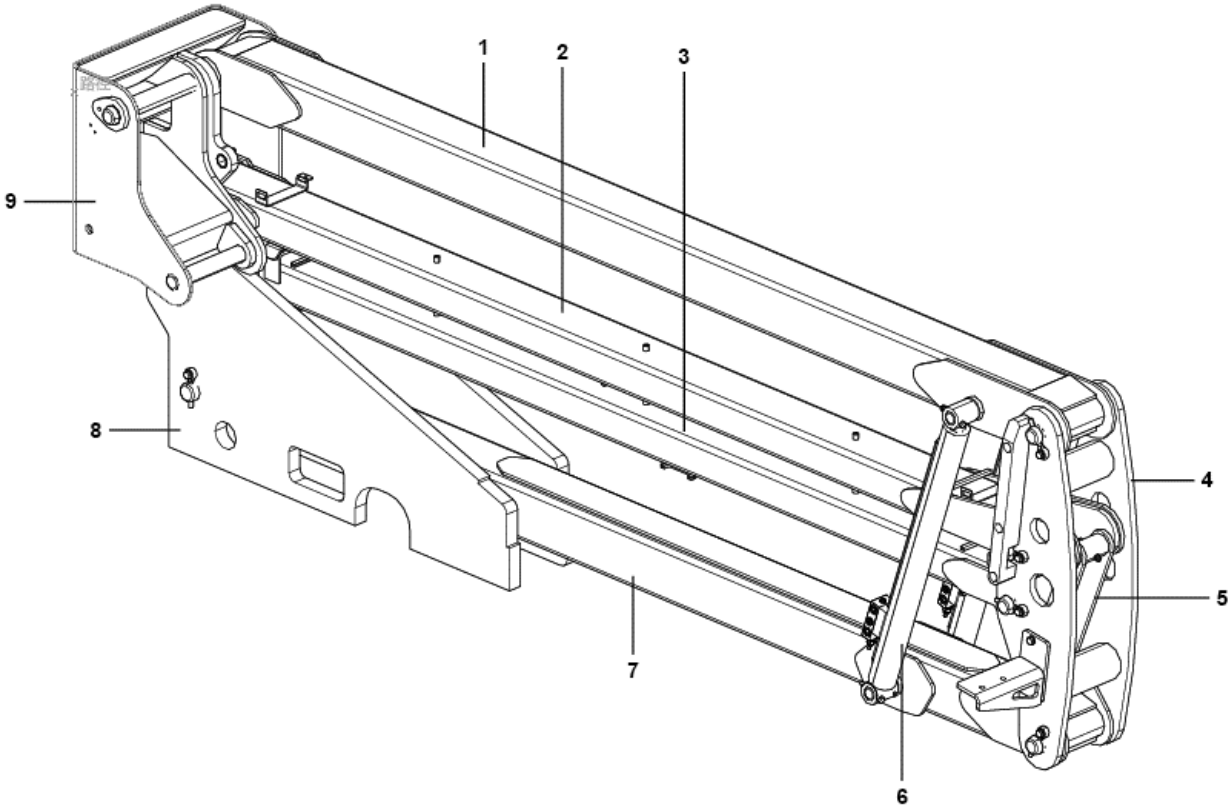
If not properly supported, the platform may fall when the upper leveling cylinder is removed.

⚠ CAUTION: Risk of part damage

If the lifting equipment is not properly supported, the upper leveling cylinder may fall off and be damaged.

7) Carefully pull the cylinder out of the boom.

3.8 Articulated boom assembly



1. Upper 2nd jib assembly (1# jib)
2. Upper 1st jib assembly (2# jib)
3. Lower 1st jib assembly (3# jib)
4. Middle pivot
5. Link
6. Articulated boom cylinder
7. Lower 2nd jib assembly (4# jib)
8. Rotary table assembly
9. Upper pivot

3.8.1 Removing the articulated boom assembly

⚠ CAUTION: Risk of personal injury

This procedure requires specific service skills, lifting equipment and a suitable workshop. Otherwise, performing this procedure may lead to death or serious injury and damage to important parts. Therefore, it is strongly recommended that this service is performed by dealers.

⚠ CAUTION:

Before refitting, the O-ring of the removed fitting and/or hose assembly must be replaced and then tightened to the specified torque. Please refer to hydraulic hose and fitting torque specifications.

1) Remove the platform assembly.
2) Remove the jib. Refer to Removing the jib assembly.
3) Remove the boom assembly. Refer to Removing the boom assembly.
4) Remove the lower leveling cylinder. Refer to Removing the lower leveling cylinder.
5) Remove the boom luffing cylinder. Refer to Removing the boom luffing cylinder.
6) Mark, disconnect and plug the hydraulic hoses on the two articulated boom lift cylinders, cover the fitting on the cylinder.

⚠ WARNING: Risk of personal injury

Spilled hydraulic oil can penetrate and burn skin. Therefore, please loosen hydraulic connectors very slowly to reduce the oil pressure gradually. Do not spray or eject the oil.

7) Remove the pin fasteners at both ends of the articulated boom lift cylinder, and do not remove pin.
8) Connect the sling from the crane to the link end of the articulated boom lift cylinder for support, and do not apply any lifting force.
9) Use a copper hammer to knock out the pivot pin at the barrel end of the articulated boom lift cylinder, lower the barrel end of the articulated boom lift cylinder on both sides of the crank arm, and make it flap down.
10) Knock out half of the pivot pin at the link end with a copper hammer.
11) Remove the articulated boom lift cylinders on both sides from the machine.

⚠ WARNING: Risk of part damage

1. If not properly supported, the articulated boom lift cylinder may fall off due to loss of balance during removal from the machine.

2. When removing the articulated boom lift cylinder from the machine, be careful not to damage the balance valve at the cylinder barrel end.

12) Connect the sling from the crane to the upper pivot for support. Do not lift it.
13) Connect the sling of another overhead crane to the 1# jib.
14) Remove the pin fasteners at both ends of the 1# jib, and knock out the pins at both ends with a copper hammer.

15) Remove the 1# jib from the machine.

WARNING: Risk of part damage

If not properly supported, the 1# jib may fall off due to loss of balance during removal from the machine.

16) Connect an overhead crane to the upper pivot to raise the articulated boom assembly by about 76cm.
17) Insert a 10 x 10 x cushion block between the 2# jib and the boom, and lower the articulated boom assembly onto the cushion block.

WARNING: Risk of crushing

If not properly supported, the 2# jib may fall off due to loss of balance during removal from the machine.

18) Pull out all cables and hoses through the upper pivot.
19) Remove the hose and cable sheaths from the top of 2# jib.
20) Pull all hoses and cables out of the upper pivot through the middle pivot, and place them on the ground.

WARNING: Risk of part damage

If being kinked or squeezed, the parts may be damaged.

21) Remove the pin fastener securing the 2# jib of the upper pivot, and use a cropper hammer to remove the pin.
22) Remove the upper pivot.

WARNING: Risk of crushing

If not properly supported, the upper pivot may fall off due to loss of balance when the 2# jib is removed from the machine.

23) Connect the sling from the overhead crane to the 2# jib at the upper pivot end.
24) Lift the 2# jib slightly and remove the 10×10×28cm cushion block.
25) Lower the 2# jib to the boom support pad.
26) Insert a 10×10×22cm cushion block at the middle pivot end of 3# and 4# jibs.
27) Connect the sling from the overhead crane to the middle pivot for support. Do not lift it.
28) Remove the pivot end pin fasteners for 2#/3/4 jib.
29) Connect the sling from the overhead crane to the center point of the 2# jib for support and do not lift it.
30) Connect the sling from another overhead crane to the center point of the 4# jib for support. Do not lift it.
31) Knock out the pivot pin with a copper hammer. Then remove the pivot from the articulated boom assembly.

WARNING: Risk of crushing

If not properly supported, the pivot may fall off due to loss of balance during removal from the machine.

32) Support the link with appropriate lifting equipment.
33) Remove the pin fasteners from both ends of the link and use a copper hammer to remove the link pins at 2# and 4# jibs.
34) Remove the link from the machine.

WARNING: Risk of crushing

Without proper support, the link may fall during removal from the boom assembly.

WARNING: Risk of crushing

If not properly supported, the 2# jib may fall off due to loss of balance when the link is removed from the 2# jib.

35) Remove the 2# jib from the machine.
36) Remove the upper and lower hose harnesses on the 3# jib.

CAUTION: Risk of part damage

If being kinked or squeezed, the cables and hoses may be damaged.

37) Remove the counterweight.

WARNING: Risk of crushing

The counterweight may fall off due to loss of balance.

38) Connect the sling from the overhead crane to the center point of the 3# jib for support. Do not lift it.
39) Remove the fastener of the 3# jib , knock out the pin, and remove the 3# jib from the machine.

WARNING: Risk of crushing

If not properly supported by the crane, the 3# jib may fall off due to loss of balance during removal from the machine.

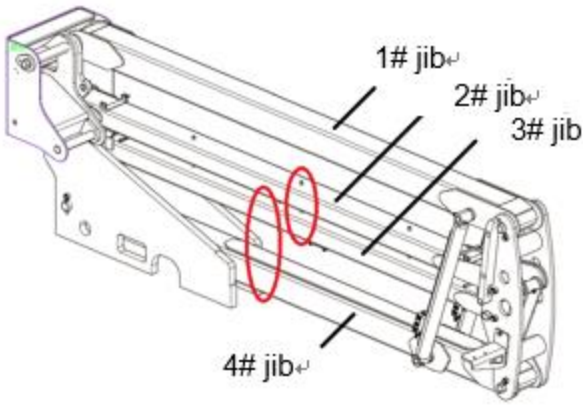
40) Disconnect the travel switch at the 4# jib pivot end.
41) Connect the sling from the overhead crane to the center point of the 4# jib. Do not lift it.
42) Remove the pin fastener at rotary table end from the 4# jib.
43) Use a copper hammer to remove the 4# jib pin from the rotary table end.
44) Remove the 2# jib from the machine.

WARNING: Risk of crushing

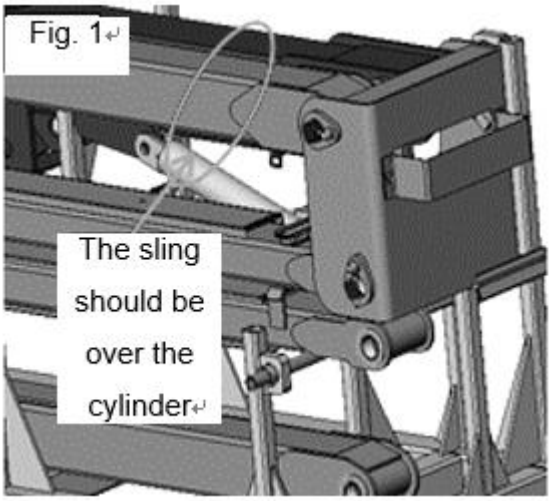
If not properly supported by the crane, the 4# jib may fall off due to loss of balance during removal from the machine.

3.8.2 Assembling the articulated boom assembly

1) Subassembled boom assembly

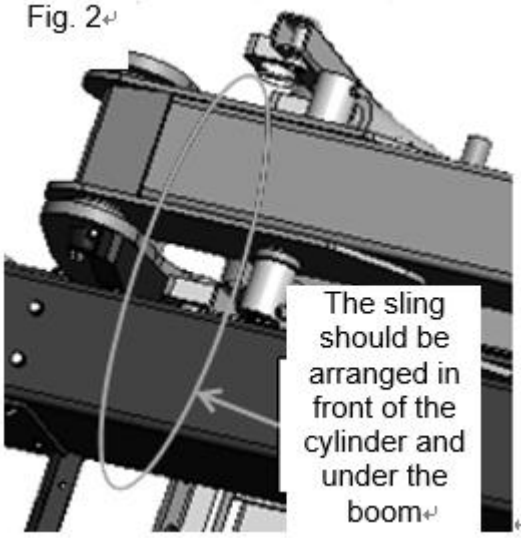


2) As shown in the red circle, use the sling to tie the 2# jib to the 3# jib, and the 3# jib to the 4# jib.



3) The lifting point of boom upper pivot is the rear end of the lower leveling cylinder mounting plate, and the sling passes through the upper part of the oil cylinder.

Fig. 2

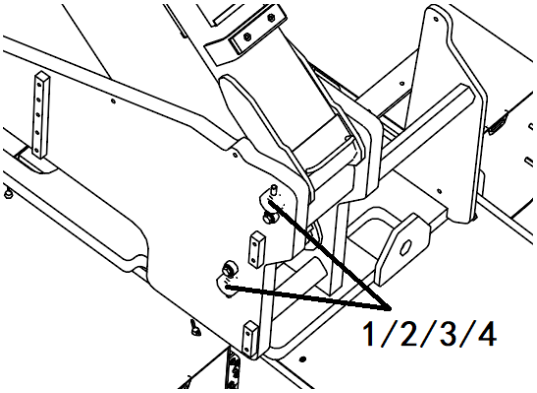


4) The lifting point of boom platform end is the rear end of the articulated boom luffing cylinder, and it should be lifted together with the boom;

Note:

1. The front and rear ends of the boom should be basically horizontal, and the boom should be basically vertical during lifting;

2. During lifting, no one should stand at both ends, and it is forbidden to pass it over the person. The operator should stand obliquely behind.



1. Pin 2. Safety pin 3. Bolt 4. Washer

5) Lift the boom assembly to the rotary table, make the mounting holes at the rotary table end of the 3# jib and 4# jib coaxial with the mounting holes of the rotary table, pass part 1 through the mounting holes of the rotary table and the boom, and use part 2/3 (applied sealant) on the right side of the machine to fix it.

Reference tightening torque of part 3: 90± 9N• m;

Tools: QSP100N4; open-end ratchet wrench 10; socket wrench 1/2-18mm.

Note:

1. Confirm visually instead of by hands whether the mounting holes are aligned, and do not stand in front of the boom;

2. The shaft should be pushed in from the left to the right, and the end with the safety pin hole is on the left.

Arrange the pipelines at the rear end of the boom in the rotary table in the order shown in the following table.

6) Wrap the oil pipe arranged above the 3# jib with the canvas, and wrap the oil pipe and harness arranged below the lower 3# jib with PVC.

7) Assemble the counterweight to the front side of the rotary table weldment.

3.8.3 Removing the articulated boom lift cylinder

There are two articulated boom lift cylinders in the articulated boom assembly. The two cylinders work in parallel and extend and retract by hydraulic pressure. Each articulated boom lift cylinder is equipped with a balance valve to prevent movement in the event of a hydraulic pipe failure.

WARNING: Risk of personal injury

Removal requires specific maintenance skills, lifting equipment and a suitable workshop. Carrying out removal without these skills and tools may result in personal injury or death, as well as serious component damage. Be sure to contact the dealer service.

Note:

The O-ring (if any) of the removed hose assembly or fitting must be replaced. During installation, all connections must be tightened to the specified torque. Please refer to the specification for selection of tightening torque of the lifting platform.

1) Lower the articulated boom to the retracted position.
2) Lift the boom so that it is higher than the oil at the link end of the articulated boom lift cylinder.
3) Mark, disconnect and plug the hydraulic hoses of articulated boom lift cylinder.

WARNING: Risk of personal injury

Sprayed hydraulic oil can penetrate and burn the skin. Please loosen hydraulic connectors very slowly to release the oil pressure gradually. Do not spray or eject oil.

4) Connect the sling from the crane to the articulated boom lift cylinder and do not apply any lifting force.
5) Remove the pin fasteners at both ends of the articulated boom cylinder, knock out half of the pivot pin at the barrel end with a copper hammer, and lower the barrel end so that it flaps down.
6) Knock out half of the pivot pin at the link end with a copper hammer.
7) Remove the articulated boom lift cylinder from the machine.
8) Remove the cylinder on the other side in the same way.

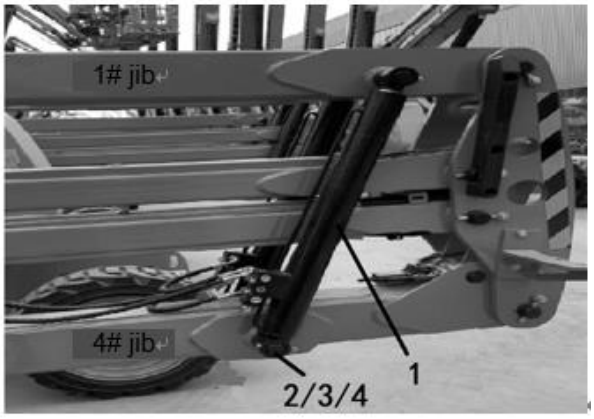
WARNING: Risk of crushing

The articulated boom lift cylinder may fall off due to loss of balance after the fasteners are removed.

CAUTION: Risk of part damage

When removing the articulated boom lift cylinder from the machine, be careful not to damage the balance valve at the cylinder barrel end.

3.8.4 Assembling the articulated boom lift cylinder



1. Articulated boom luffing cylinder 2 Pin 3. Bolt 4. Nut

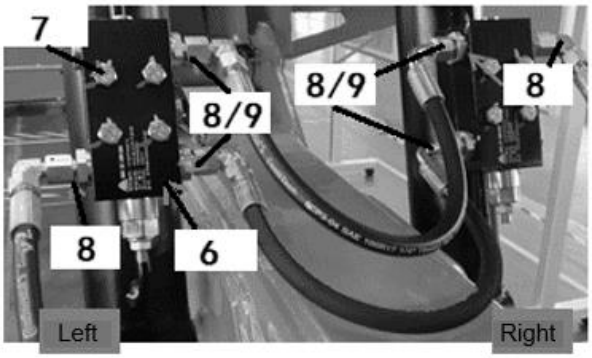
1) Assemble the articulated boom lift cylinder to both sides of the boom pivot end.
2) Pass part 2 through the left articulated boom lift cylinder barrel end and fix it and 4# jib together with part 3/4;
3) Adjust the position of the left articulated boom lift cylinder link end hole, use part 2 to fix it to the 1# jib, and use part 3/4 to fix it.

CAUTION: The shaft fixing bolts of both

cylinders are at the outside, and should be passed from back to front.

Reference tightening torque of part 3: 52± 5N• m;

Tools: QSP100N4; socket wrench 16 #; open-end wrench 13-16.



6. Articulated boom luffing balance valve 7. Bolt 8. Straight fitting 9. Right-angle joint

4) Install part 6 to the lower parts of the cylinder on both sides with part 7.

CAUTION: Before installation, make sure that the supplied O-ring on the mounting surface of the balance valve does not fall off or be damaged.

5) Assemble parts 8/9 to the balance valves of the left and right cylinders.

Note: Left side end of the articulated boom luffing balance valve oil pipe should be connected to V2 port, and right side end should be connected to V1 port;

Reference tightening torque of part 6: 32± 3N• m;

Reference tightening torque of part 7/8/9: 75± 8N• m;

Tools: QSP50N3; socket wrench 13; socket wrench 22; QSP100N4; SP120N*22.

3.9 Rotary table swing assembly

3.9.1 Removing the slewing drive assembly

CAUTION: The O-ring (if any) of the removed hose assembly and/or fitting must be replaced. **During installation, all connections must be tightened to the specified torque. Please refer to the specification for selection of tightening torque of the lifting platform.**

WARNING: Risk of personal injury

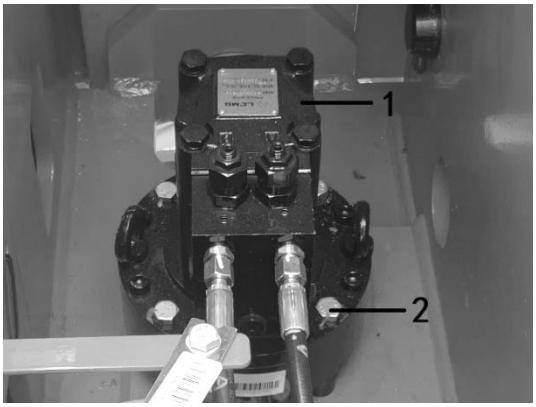
This procedure requires specific maintenance skills, lifting equipment and a suitable workshop. Carrying out this procedure without these skills and tools may result in death or serious injury, as well as serious component damage. Therefore, it is strongly recommended that this service is performed by dealers.

1) Mark, disconnect and plug the hydraulic hose of the rotary table slewing drive assembly, and plug the joints.

WARNING: Risk of personal injury

Sprayed hydraulic oil may penetrate and burn the skin. Therefore, please loosen the hydraulic fitting connection very slowly to release the oil pressure gradually. Do not spray or eject oil.

2) Connect the sling and overhead crane or other suitable lifting device to the slewing drive assembly.



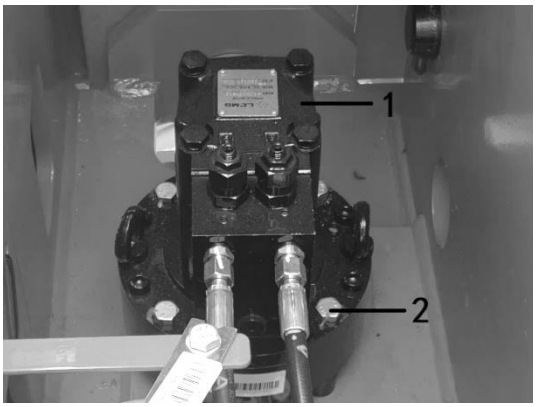
1. Slewing drive assembly 2. Bolt

3) Remove the slewing drive assembly mounting fastener 2.
4) Carefully remove the slewing drive assembly from the machine.

WARNING: Risk of crushing

If not properly supported by the overhead crane, the rotary table rotation assembly may fall off due to loss of balance during removal from the machine.

3.9.2 Assembling the slewing drive assembly



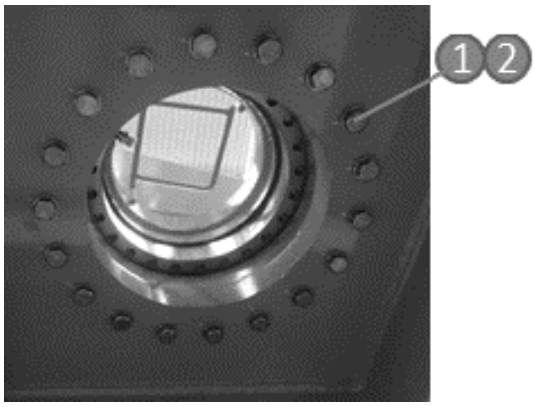
1. Slewing drive assembly 2. Bolt

1) Securely connect the two oil ports of part 1 to the hose.
2) Lift the slewing drive assembly to the slewing assembly tooling, and assemble the slewing drive assembly to the rotary table with part 2 (coated with threadlock).

Reference tightening torque of part 2: 305± 25N• m;

Tools: QSP420N; QSP100N4; socket wrench 24; socket wrench 18.

3.9.3 Lowering the rotary table



1. Bolt 2. Washer

1) Lift the rotary table weldment the mounting position of the chassis assembly.
2) Adjust the mounting position of the slewing bearing, and fix the slewing bearing to the chassis using part 1 (coated with threadlock)/2 from under the chassis.

WARNING: Risk of crushing

The rotary table weldment may fall off due to loss of balance during lifting.

Reference tightening torque of part 1: 305± 25N• m;

Tools: QSP420N; socket wrench 24.

3.10 Other components

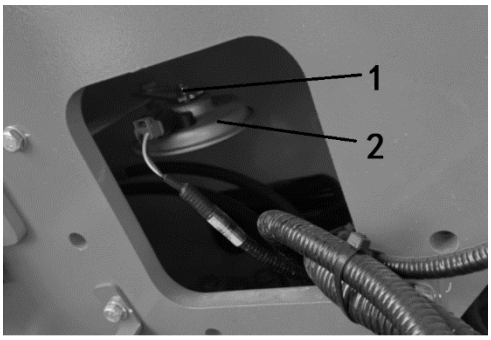
3.10.1 Assembling the battery

1 Battery

1) Open the battery box assemblies on both sides of the chassis, install the batteries into

the battery box assemblies, and secure the cover with butterfly nuts.

3.10.2 Assembling the horn



1. Nut 2. Mono cone horn

1) Turn off the power of the whole machine, open the hood on the right side of the machine, assemble part 2 with part 1 to the horn fixing plate and tighten it, and connect part 2 to the harness plug.

3.10.3 Assembling the ground control unit (GCU) assembly

1. GCU assembly 2. Bolt 3. Washer

1) Open the hood on the left side of the machine, and assemble part 1 with part 2/3 into the hood on the left side of the rotary table weldment.
2) Connect the harness at the marked place firmly.

Reference tightening torque of part 2: 28± 3N• m;

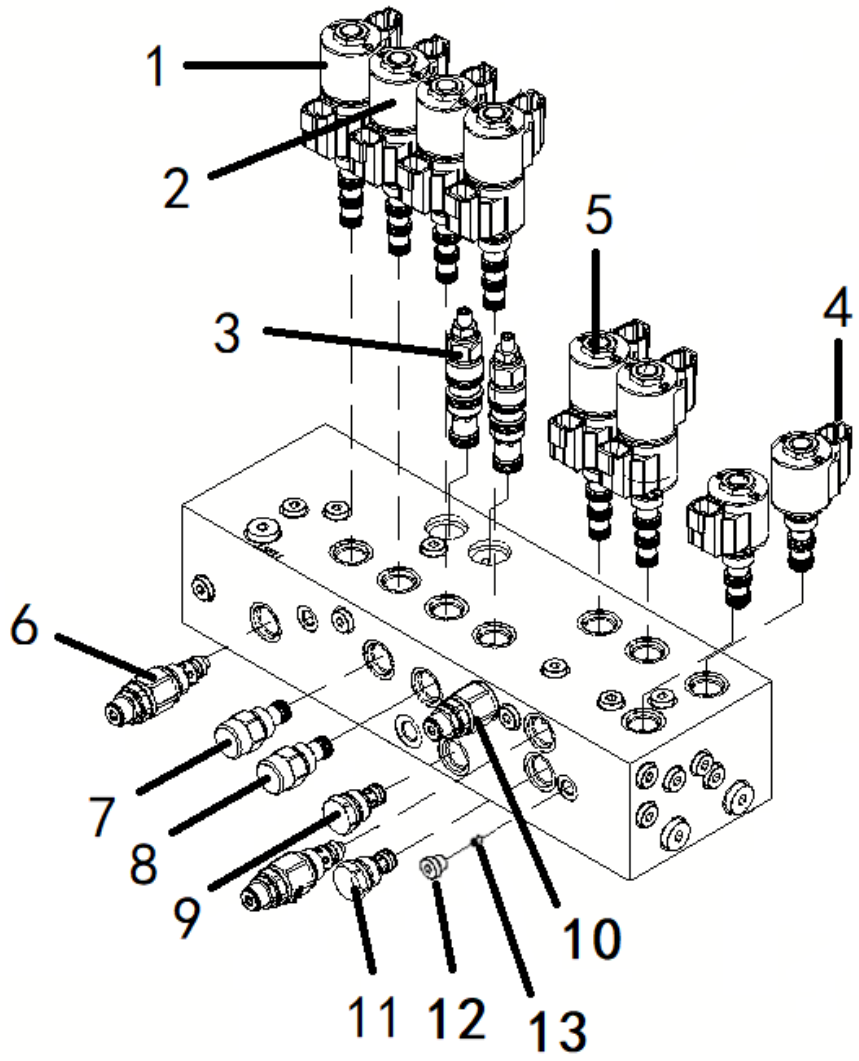
Tools: QSP50N3; socket wrench 13.

3.11 Valve group

3.11.1 Installing the spool

1. Immerse the spool in clean oil to lubricate the O-ring.
2. Manually screw in the spool until it reaches the top of the O-ring, and then adjust the torque to meet specification requirements.
3. If necessary, install the solenoid coil on the valve stem. Fix the coil to the valve stem with nuts and adjust the torque to meet the specification requirements.

3.11.2 Boom function valve block

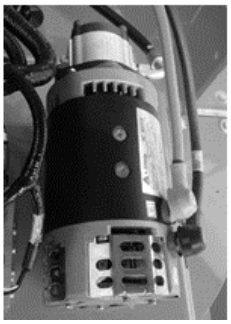
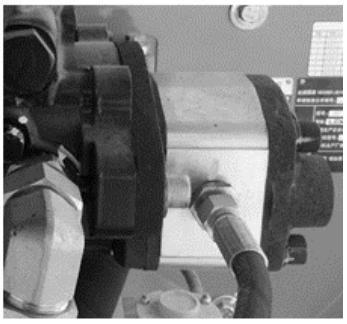


No.	Description	Function of valve spool	Torque (Nm)
1	Solenoid valve	Controlling oil circuit connection	27.1
2	Solenoid valve	Controlling oil circuit connection	27.1
3	Balance valve	Maintaining back pressure to prevent the load from free fall	40-45
4	Solenoid valve	Controlling oil circuit connection	27.1
5	Solenoid valve	Controlling oil circuit connection	27.1
6	Relief valve	Restricting refilling pressure	40-45
7	Flow valve	Controlling flow	27.1
8	Flow valve	Controlling flow	27.1
9	Check valve	Unidirectional oil flow, reverse cut-off	40-45
10	Relief valve	Restricting refilling pressure	40-45
11	Check valve	Unidirectional oil flow, reverse cut-off	40-45
12	Plug	Plugging oil port	22-26
13	M6 Damper	Restricting flow	3

3.12 Bleeding cylinder

3.12.1 Bleeding function pump

1. After each cylinder is replaced, it is necessary to carry out bleeding. After checking the "key switch", activate the ground control mode;
2. Activate the “Turtle” position to keep the machine at a low speed;
3. Activate the platform swing button to keep the function pump running at a low speed for 1-2min;

Bleeding function pump

3.12.2 Bleeding slewing motor

1. Keep the “Turtle” position, and activate the rotary table slewing button to carry out left and right slewing for 1~2min. The machine should not swing greatly to ensure safety;

3.12.3 Bleeding driving motor

1. Use the platform control mode and activate the “Turtle” position;
2. Operate the machine to walk back and forth for 1-2min under no load.

3.12.4 Bleeding steering cylinder

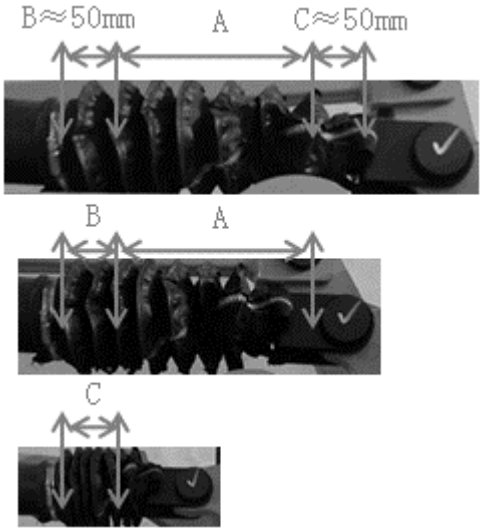
1. Use the platform control mode and activate the “Turtle” position;
2. Activate the steering button, and operate the machine to turn left and right. The steering cylinder can be divided into three parts, as shown. The extension and retraction of piston rod should count as one cycle. The operation steps are as follows:

   Step 1: Operate the machine so that the piston rod of the steering cylinder moves slowly 5 times in area A;

   Step 2: Operate the machine so that the piston rod of the steering cylinder moves slowly twice in the minimum (C) and maximum (B) stroke areas;

Precautions:

Take care when bleeding the machine, and operate the machine gently;



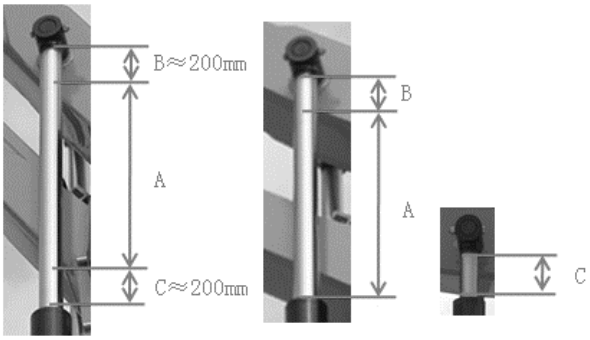
Bleeding steering cylinder

3.12.5 Bleeding folding jib luffing cylinder

1. Activate the “Rabbit” position to keep the machine at a high speed;
2. Activate the folding jib lifting button, and operate the machine to retract and extend the folding jib luffing cylinder. The folding jib luffing cylinder can be divided into three parts, as shown. The extension and retraction of piston rod should count as one cycle. The operation steps are as follows:

   Step 1: Operate the machine so that the piston rod of the folding jib luffing cylinder moves slowly 5 times in area A;

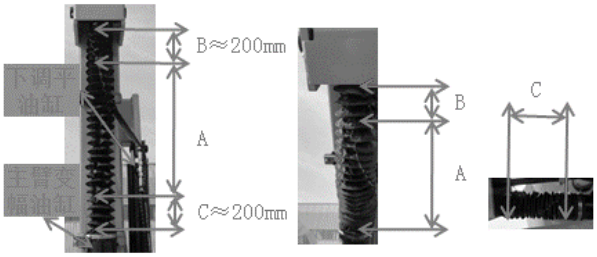
   Step 2: Operate the machine so that the piston rod of the folding jib luffing cylinder moves slowly twice in the minimum (C) and maximum (B) stroke areas;



Bleeding folding jib luffing cylinder

3.12.6 Bleeding main boom luffing cylinder and lower leveling cylinder

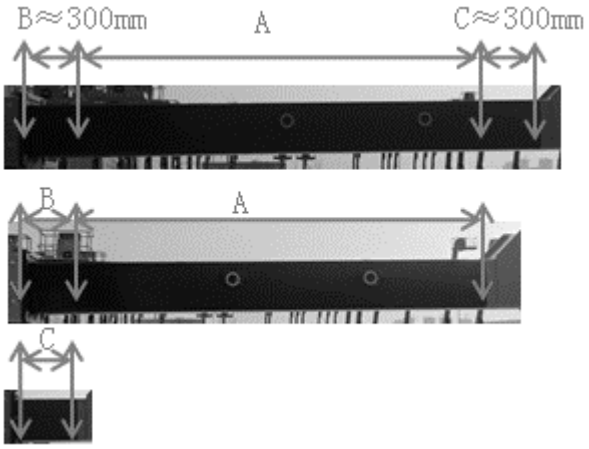
1. Activate the main boom luffing lifting button to bleed the main boom luffing cylinder and lower leveling cylinder;
2. Taking the main boom luffing cylinder as the reference, it can be divided into three parts, as shown. Refer to "Bleeding folding jib luffing cylinder" for the bleeding steps and requirements.



Bleeding main boom luffing cylinder and lower leveling cylinder

3.12.7 Bleeding main boom telescopic cylinder

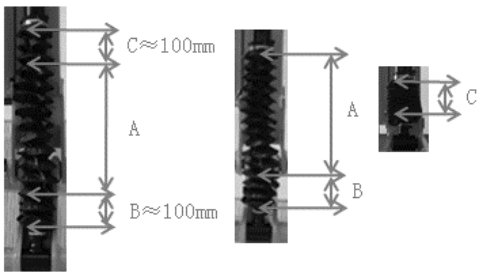
1. Activate the main boom telescoping button to bleed the main boom telescopic cylinder;
2. The main boom luffing cylinder can be divided into three parts by taking the extension jib as the reference, as shown. Refer to "Bleeding folding jib luffing cylinder" for the bleeding steps and requirements.



Bleeding main boom telescopic cylinder

3.12.8 Bleeding fly jib luffing cylinder and upper leveling cylinder

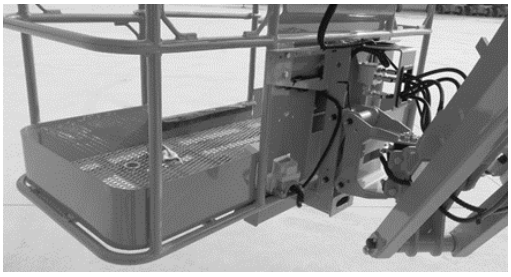
1. Activate the fly jib luffing lifting button to bleed the fly jib luffing cylinder and upper leveling cylinder;
2. Taking the fly jib luffing cylinder as the reference, it can be divided into three parts, as shown. Refer to "Bleeding folding jib luffing cylinder" for the bleeding steps and requirements.



Bleeding fly jib luffing cylinder

3.12.9 Bleeding platform swing cylinder

1. Activate the platform rotation button, and carry out left and right slewing for 1~2 min. The machine should not swing greatly to ensure safety.



Bleeding platform swing cylinder

Chapter IV Maintenance

4.1 Compliance and Obedience

1) The operator can only perform routine maintenance items as specified in this manual.
2) Regular maintenance inspections should be performed by qualified authorized service technicians as required by the manufacturer

Maintenance symbol legend

The following symbols appear in this manual to indicate the relevant meaning in the operation instructions. When one or more symbols appear in front of the maintenance procedure, the meanings expressed are as follows.

It indicates that a tool is required to perform this procedure.

It indicates that a new part is required to perform this procedure.

It indicates that this procedure should be performed by the dealer.

4.2 Checking the Safety Manual

It is necessary for safe equipment operation to keep the Operator and Safety Manual in good condition. The manual shall be stored in a container in the working platform provided by each machine. An illegible or missing manual will not provide the necessary safety and operation information for safe operation.

1) Check that the storage container is on site and in good condition.
2) Check that the Operator, Responsibility, and Safety Manual is complete in the storage container on the work platform.
3) Check that each page of the manual is identifiable and in good condition.
4) Put the manual in the storage file box after use.

⚠ If you need to replace the manual, please contact the company's service personnel.

4.3 Check the Labels and Signs

It is necessary for safe operating equipment to keep all safety and instructions labels and signs in good conditions. Labels are used to remind operators and staff of the possible hazards when operating this equipment. User operation and maintenance information is also provided. An illegible label does not remind the staff of steps or hazards, and may also result in unsafe operating conditions.

Refer to the label section in this manual and use the label menu and instructions to check whether all labels are in place.

Check all the labels for clarity and damage and immediately replace any damaged or illegible ones.

⚠ If you want to replace the label, please contact the company's service personnel.

4.4 Check for Damaged, Loose or Missing Parts

This step is performed every 8 hours or every day, whichever comes first.

Carrying out daily equipment status check is necessary for ensuring safe equipment operation and maintaining good equipment performance. Incorrect positioning, repairing damaged equipment, and loose or missing parts may result in unsafe operating conditions.

1) Check for damaged parts for the whole

platform, and check for incorrect installation or missing parts and components, including:

Electrical components, wirings and cables

Hydraulic hoses, connectors, valve blocks and hydraulic cylinders

Hydraulic tanks

Wear-resistant pads

Tires and wheels

Limit switch and horn

Nuts, bolts and other fasteners

Platform entrance door

Indicators and alarms

Platform controller

2) Check the entire machine for:

Cracks in welds or structural components

Whether the platform, boom and chassis are deformed or have cracked weld joints.

Indentation or damage to the machine

Ensure that all structural components and other key components are complete and all relevant fasteners and pins are in the correct position and tightened.

4.5 Check the Hydraulic Oil Level and Leakage

Inspect hydraulic oil level every 8 h or every day.

Maintaining the hydraulic fluid at the proper oil level is essential for machine operation. If the hydraulic oil is at an unsuitable oil level, the hydraulic components may be damaged. Through daily inspections, the inspector can determine changes in the hydraulic oil level which can indicate problems with the hydraulic system.

⚠ Caution: This step should be performed when the platform is in the retracted state.

- Park the vehicle on the flat site.
- Fully retract the boom.

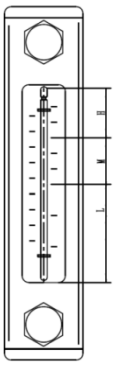


Figure 1-1 Oil Level Sight Gauge

- Examine the oil level on the hydraulic oil tank, i.e., level shall fall within the “M” range shown as Figure 1-1, and in the case of level lower than “M”, it is necessary to add hydraulic oil.

Inspect hydraulic oil leakage every 8 h or daily.

⚠ Caution: Personal injury danger, leaking hydraulic oil can penetrate or burn skin. Wear goggles and protective gloves.

- Leakage of high-pressure oil may be invisible to eyes, use cardboard or wooden boards as a search tool for hydraulic oil leakage. Hands shall be prohibited from being used for leakage confirmation. Inspect oil drops or residual oil on the following components:
- Hydraulic oil tank, filter, pump, hydraulic oil cylinder, motor, reduction gear, valve block and hydraulic tubing.
- Inspect oil drops or residual oil at the following areas:
- Rear of boom, fly jib, upper side of turntable, upper and lower sides of chassis, and ground underneath equipment.

4.6 Check the Pivoting Support

Check lubrication in the turntable bearing and

the swing gearbox at intervals of 100 hours. It is necessary for maintaining performance and maintenance life to lubricate the turntable bearing frequently. Incorrect lubrication will cause damage to components. Find the grease port on the side of the hydraulic oil tank, swing the turntable multiple times while filling grease until grease overflows from the upper and lower fixed surfaces of the bearing. Lubricating grease must be: Lubrication EP2 or equivalent.

Inspect the lubrication of the turntable bearing and the swing motor, if necessary, clean the gear surface, and recoat with grease.

⚠ Caution: In the case of an extremely dirty working environment, increase the oil filling frequency.

4.7 Checking the Battery

This check should be performed every 250h or three month, whichever comes first.

Good battery condition is critical to normal vehicle performance and safe operation. Improper electrolyte levels or damaged cables and wires may result in component damage and dangerous situations.

⚠ Risk of electric shock

Any live operation can cause serious personal injury or death. Remove all rings, watches and other accessories before operation.

⚠ Risk of bodily injury

The battery electrolyte is corrosive. Avoid contact with spilled electrolytes on your hands or other parts of your body for fear of injury. The spilled electrolyte can be neutralized with soda and water.

1) Wear protective clothing and goggles.
2) Make sure the battery cable is securely wired and not corroded.
3) Charge the battery in a balanced way or fully charge the battery and stay the battery still for at least 6h (preferably 24h).

⚠ Caution: This check is not required for machines that are equipped with sealed or maintenance-free batteries.

4) Remove the battery vent cap, check the specific weight with a specific gravity hydrometer and make the record.
5) Check the ambient temperature and adjust the specific liquid gravity of each battery according to the instructions below:

   Increase the specific liquid gravity by 0.004 per 5℃, if the temperature is higher than 27℃.

   Decrease the specific liquid gravity by 0.004 per 5℃, if the temperature is lower than 27℃.

   Result: the specific liquid gravity of each battery is greater than 1.277 after the adjustment. Fully charge the battery and turn to Step 9.

   Result: the specific liquid gravity of more than one battery cell is less than 1.217, turn to Step 6.
6) Charge the battery in a balanced way or fully charge the battery and stay the battery still for at least 6h (preferably 24h).
7) Open the battery cover, check the specific weight with a specific gravity hydrometer and make the record.
8) Check the ambient temperature and adjust the specific liquid gravity of each battery according to the instructions below:

   Increase the specific liquid gravity by 0.004 per 5℃, if the temperature is higher than 27℃.

   Decrease the specific liquid gravity by 0.004 per 5℃, if the temperature is lower than 27℃.

Result: the specific liquid gravity of each battery is greater than 1.277 after the adjustment. Fully charge the battery and turn to Step 9.

Result: the specific liquid gravity difference between the battery cells is greater than 0.1 or the specific liquid gravity of more than one battery cell is less than 1.217. In such case, please replace the battery.

9) Check the battery electrolyte height. If necessary, add the distilled water to the highest liquid level indicator and do not add the excessive distilled water.

10) Close the battery cover and neutralize the spilled electrolyte with the sodium bicarbonate solvent.

⚠ **Caution: Adding terminal protectors and anti-corrosion sealants will help eliminate corrosion on battery terminals and cables.**

4.8 Check the Wires

This check should be performed every 250 h or quarterly, whichever comes first.

It is important for safe operation and good machine performance to keep the wires in good conditions. Failure to find and replace the burn-out, scratched, corroded or bent wires will result in unsafe operating conditions and damage to the parts.

Risk of electric shock/explosion

Contact with live circuits may cause serious injury or death. Do not wear rings, watches or other jewelry.

1) Check if the ground wire under the chassis is missing or damaged.

2) Check the following areas for burn-out, scratched, corroded, bent or loose wires:

Rear axle: Driving motor, limit switch

Under the hatch cover: Ground control unit inside, wire harness connection,

Under the rear cover of chassis: motor control unit, main contactors

Battery box: Battery

Machine: Platform, platform control unit, wire harness connection

3) Check whether all wire harness connectors are coated with insulating grease:

Ground control unit
Platform control unit
Motor Control unit
Valve component
Limit switch
Sensor

4.9 Check the Electrical Contactors

This check should be performed every 250 h or quarterly, whichever comes first.

It is important for safe operation of the machine to keep the electrical contactor in good condition. Failure to find the worn or damaged contactors in a timely manner may endanger the work conditions and cause component damage.

1) Remove the cover form the non-steering end of the machine and locate the electrical contactor.

2) Visually check the following aspects of the contactor:

- Transitional burning
- Transitional bending
- Transitional pitting

⚠ **Warning: Risk of burn. Contact with an electrical circuit may result in death or serious personal injury.**

Remove all rings, watches or other accessories.

⚠ Caution: In the event of any damage, the contactor should be replaced.

4.10 Check the Tires and Wheels

This check should be performed every 250 h or quarterly, whichever comes first.

It is important for safe operation and good performance to keep the tires and wheels in good conditions. Failure of the tires and wheels may cause the machine to roll over. Failure of finding and repairing the problem in time may cause damage to the machine.

1) Check the tire treads and sides for scratches, cracks, punctures or other abnormal wear.
2) Check the wheels for damage, bending or cracking.
3) Check each lug nut for proper torque: 305±25N.m.

4.11 Check the Drive Hub Oil Level

Inspect the oil level of the drive hubs every 250 h or quarterly, whichever comes first.

Improper oil level will result in reduced performance. Continuous use will result in damage to components.

Inspect oil level

Figure 1-1 Traveling slowdown

1. Oil filler 2. Viewing port

- Drive the machine until one plug is located at the horizontal position as shown as shown in Figure 1-1.
- Remove the viewing port plug at the horizontal position, and inspect oil level.
- Result: Oil level shall be flush with the bottom of the viewing port.
- If necessary, add oil at the oil filler until the oil level is flush with the bottom of the viewing port, select gear oil by referring to Machine Specifications section.
- Coat the plugs with pipe thread sealant and install the plugs.

Repeat this step for every drive hub

4.12 Check for Exhaust Cover of Hydraulic Oil Tank

This check item shall be conducted every 250 hours or quarterly, whichever comes first.

An unobstructed hydraulic oil tank cap is essential for good mechanical performance and long service life of the platform. A dirty or clogged exhaust cover may result in poor platform performance. Given harsh working environment, more frequent check is required.

① Remove the exhaust cover from the hydraulic oil tank cap.

② Check for ventilation.

Result: Air can pass through the exhaust cover.

Result: If air does not pass through the exhaust cover, continue with Step 3.

⚠ Notice: Air is supposed to pass freely while checking ventilation of the oil tank cap.

③ Carefully clean the tank exhaust cover with mild solvent and dry it with low pressure compressed air. Repeat Step 2.

Install the exhaust cover of the hydraulic oil tank.

4.13 Visual Inspection of the Hydraulic Oil

This check item shall be conducted every 250 hours or quarterly, whichever comes first.

Collect a sample of hydraulic oil and place in a clear container. Visually inspect the hydraulic oil for the following:

- Color: oil should be a clear, light-honey colored.
- Appearance: oil should be clear and not cloudy or visibly distorts the view through the sight glass or container.
- Contains no particles, foreign objects, or other contamination.
- The hydraulic oil can be inspected by smell (can smell “hot” but not “burnt”) or rubbing between fingers (should feel viscous and free of any rough feel due to particles) If the hydraulic oil passes all of the above inspections, continue the scheduled maintenance intervals. If the hydraulic oil fails any of the above inspections, the hydraulic oil must be tested by an oil distributor or replaced.

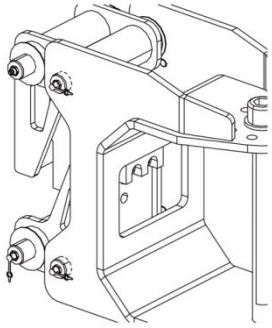
Note: If the hydraulic oil has not been replaced for two years, the oil must be tested every quarter by an oil distributor until the oil fails the test and is replaced. After the oil has been replaced, continue the scheduled quarterly maintenance inspection.

Note: When replacing the hydraulic oil, it is recommended that all hydraulic filters be replaced at the same time.

4.14 Platform weighing structure lubrication

This operation is performed every 500 hours or every six months, whichever comes first. Shorten the maintenance interval in harsh working environments.

Regular lubrication of the platform weighing structure is necessary to maintain good equipment performance and safe operation. Incorrect lubrication will lead to component damage.



- Locate the pin grease nipple at the triangle bracket assembly.
- Fill grease until grease spills on both sides of the triangle bracket assembly. (Lithium base grease)

Wipe off spilled grease.

4.15 Checking the hydraulic filter

It should be checked or replaced every 500 h or half a year, whichever comes first.

⚠ If the working environment is dusty, this check should be performed more frequently.

⚠ Replacing the hydraulic filter is necessary to maintain good machine performance and long service life. A dirty or clogged filter may cause the machine performance degradation, and continuous operation may result in

component damage. The filter should be replaced more frequently in extremely dirty working conditions.

⚠ Risk of personal injury.

Be careful of hot oil. Exposure to hot oil may cause severe burns.

⚠ Caution: This step should be performed when the platform is in the retracted state.

Replace the hydraulic tank return filter

① Remove the filter with a wrench. Clean the area of contact between the hydraulic filter and the filter head.

② Apply a thin layer of new oil to the gasket of the new hydraulic filter.

③ Install a new filter and tighten it.

④ Record the date of replacement on the filter with a marker.

⑤ Remove all traces of oil spilled in the replacement process.

⑥ Turn the key switch to the ground control unit and pull out the red emergency stop buttons on the ground and platform control units.

⑦ Lifting and lower the boom.

⑧ Check the filter components for oil leakage.

4.16 Replace the Reducer Gear Oil

The first maintenance should be performed after 50 h, and thereafter should be performed at an interval of 1000 h or annually, whichever comes first.

Changing the gear oil of the under is necessary to maintain good equipment performance and long service life. Failure to change the gear oil each year may result in performance degradation and continuous operation may result in component damage.

1) Select the reducer to be serviced and drive the equipment till one of the two plugs is at the lowest point.
2) Remove the two plugs and drain the oil completely in a suitable container.
3) Rotate the drive unit until one plug is at the highest position and has an angle of 90 degrees with the other plug.
4) Fill the oil from the reducer's filler hole at a high point till the oil level is the same as that in the side hole at the bottom. Install the plug.
5) Repeat this step for oil filling of each reducer.

4.17 Replace the Air Cleaner

Perform this step once every 1000 h or every year, whichever comes first.
In a dusty working environment, this step should be performed more frequently.

⚠ This step shall be performed when the machine is stopped.

1) Remove the old air cleaner.
2) Install a new air cleaner.

4.18 Replace the Hydraulic Oil and Filter

Test or replace hydraulic oil every 1,000 h or annually.

⚠ Caution: If the oil isn't replaced after the two year interval, it must be tested quarterly and replaced when it no longer passes the testing.

Replace hydraulic oil suction filter every 1000 h or every year. It is necessary to replace the hydraulic filter to maintain performance and

service life of the machine. Dirt or a clogged filter may cause performance degradation of hydraulic components, and continuous use will cause damage to components. In dirty work environments it is necessary to increase the change intervals.

4.19 Regular maintenance

1) Maintenance work on a quarterly, annual and biennial basis must be performed by those who are trained and qualified in the vehicle maintenance according to the procedures specified in this manual.
2) If a machine has been idle for more than three months, a quarterly maintenance must be performed before it is operated.

4.20 Fault code of Li-battery

Fault code	Displayed information	Fault description	Restricted actions	Troubleshooting suggestions
BMS FLT=1/10	BMS FLT=1/10	Low SOC 1	The buzzer sounds	Charge
BMS FLT=2/11	BMS FLT=2/11	Low SOC 2	The buzzer sounds, boom lifting is restricted, but lowering is allowed	Charge
BMS FLT=3/12	BMS FLT=3/12	Low SOC 3	The buzzer sounds, and all actions are restricted	Charge
BMS FLT=1/13	BMS FLT=1/13	Total discharge overvoltage 1	The buzzer sounds	Stop the machine, have it walk slowly after restarting, and do not drive it downhill
BMS FLT=2/14	BMS FLT=2/14	Total discharge overvoltage 2	The buzzer sounds, boom lifting is restricted, but lowering is allowed	Stop the machine, have it walk slowly after restarting, and do not drive it downhill
BMS FLT=3/15	BMS FLT=3/15	Total discharge overvoltage 3	The buzzer sounds, and all actions are restricted	Stop the machine, have it walk slowly after restarting, and do not drive it downhill
BMS FLT=1/16	BMS FLT=1/16	Total charge overvoltage 1	The buzzer sounds	Stop charging
BMS FLT=2/17	BMS FLT=2/17	Total charge overvoltage 2	The buzzer sounds, boom lifting is restricted, but lowering is allowed	Stop charging
BMS FLT=3/20	BMS FLT=3/20	Total charge overvoltage 3	The buzzer sounds, and all actions are restricted	Stop charging
BMS FLT=1/21	BMS FLT=1/21	Total discharge undervoltage at room temperature 1	The buzzer sounds,	Charge
BMS FLT=2/22	BMS FLT=2/22	Total discharge undervoltage at room temperature 2	The buzzer sounds, boom lifting is restricted, but lowering is allowed	Charge
BMS FLT=3/23	BMS FLT=3/23	Total discharge undervoltage at room temperature 3	The buzzer sounds, and all actions are restricted	Charge
BMS FLT=1/24	BMS FLT=1/24	Total discharge undervoltage at low temperature 1	The buzzer sounds	Charge
BMS FLT=2/25	BMS FLT=2/25	Total discharge undervoltage at low temperature 2	The buzzer sounds, boom lifting is restricted, but lowering is allowed	Charge
BMS FLT=3/26	BMS FLT=3/26	Total discharge undervoltage at low temperature 3	The buzzer sounds, and all actions are restricted	Charge
BMS FLT=2/27	BMS FLT=2/27	Total charge undervoltage 2	The buzzer sounds, boom lifting is restricted, but lowering is allowed	Charge, and contact professional after-sales personnel in case of charge failure
BMS FLT=3/30	BMS FLT=3/30	Total charge undervoltage 3	The buzzer sounds, and all actions are restricted	Charge, and contact professional after-sales personnel in case of charge failure
BMS FLT=1/31	BMS FLT=1/31	Charge overcurrent 1	The buzzer sounds	Stop charging, and charge again

BMS FLT=2/32	BMS FLT=2/32	Charge overcurrent 2	The buzzer sounds, boom lifting is restricted, but lowering is allowed	Stop charging, and charge again
BMS FLT=3/33	BMS FLT=3/33	Charge overcurrent 3	The buzzer sounds, and all actions are restricted	Stop charging, and charge again
BMS FLT=1/34	BMS FLT=1/34	Discharge overcurrent 1	The buzzer sounds	Stop discharging, and have the machine walk slowly after restarting
BMS FLT=2/35	BMS FLT=2/35	Discharge overcurrent 2	The buzzer sounds, boom lifting is restricted, but lowering is allowed	Stop discharging, and have the machine walk slowly after restarting
BMS FLT=3/36	BMS FLT=3/36	Discharge overcurrent 3	The buzzer sounds, and all actions are restricted	Stop discharging, and have the machine walk slowly after restarting
BMS FLT=1/37	BMS FLT=1/37	Single cell discharge overvoltage 1	The buzzer sounds	Stop discharging, and have the machine walk slowly after restarting
BMS FLT=2/40	BMS FLT=2/40	Single cell discharge overvoltage 2	The buzzer sounds, boom lifting is restricted, but lowering is allowed	Stop discharging, and have the machine walk slowly after restarting
BMS FLT=3/41	BMS FLT=3/41	Single cell discharge overvoltage 3	The buzzer sounds, and all actions are restricted	Stop discharging, and have the machine walk slowly after restarting
BMS FLT=1/42	BMS FLT=1/42	Single cell charge overvoltage 1	The buzzer sounds,	Stop charging, and charge again
BMS FLT=2/43	BMS FLT=2/43	Single cell charge overvoltage 2	The buzzer sounds, boom lifting is restricted, but lowering is allowed	Stop charging, and charge again
BMS FLT=3/44	BMS FLT=3/44	Single cell charge overvoltage 3	The buzzer sounds, and all actions are restricted	Stop charging, and charge again
BMS FLT=1/45	BMS FLT=1/45	Single cell discharge undervoltage at room temperature 1	The buzzer sounds, screen displays fault information in a scrolling way	Charge
BMS FLT=2/46	BMS FLT=2/46	Single cell discharge undervoltage at room temperature 2	The buzzer sounds, boom lifting is restricted, but lowering is allowed	Charge
BMS FLT=3/47	BMS FLT=3/47	Single cell discharge undervoltage at room temperature 3	The buzzer sounds, and all actions are restricted	Charge
BMS FLT=1/50	BMS FLT=1/50	Single cell discharge undervoltage at low temperature 1	The buzzer sounds	Charge
BMS FLT=2/51	BMS FLT=2/51	Single cell discharge undervoltage at low temperature 2	The buzzer sounds, boom lifting is restricted, but lowering is allowed	Charge
BMS FLT=3/52	BMS FLT=3/52	Single cell discharge undervoltage at low temperature 3	The buzzer sounds, and all actions are restricted	Charge
BMS FLT=2/53	BMS FLT=2/53	Single cell charge undervoltage 2	The buzzer sounds, boom lifting is restricted, but lowering is allowed	Charge, and contact professional after-sales personnel in case of charge failure
BMS FLT=3/54	BMS FLT=3/54	Single cell charge undervoltage 3	The buzzer sounds, and all actions are restricted	Charge, and contact professional after-sales personnel in case of charge failure

BMS FLT=2/55	BMS FLT=2/55	High charge temperature 2	The buzzer sounds, boom lifting is restricted, but lowering is allowed	Stop charging for a period of time, and wait until the temperature drops to a reasonable temperature, such as 25°C before restarting charging
BMS FLT=3/56	BMS FLT=3/56	High charge temperature 3	The buzzer sounds, and all actions are restricted	Stop charging for a period of time, and wait until the temperature drops to a reasonable temperature, such as 25°C before restarting charging
BMS FLT=1/57	BMS FLT=1/57	Low charge temperature 1	The buzzer sounds	Charge, and wait for a while for normal charging after temperature rises
BMS FLT=2/60	BMS FLT=2/60	Low charge temperature 2	The buzzer sounds, boom lifting is restricted, but lowering is allowed	Charge, and wait for a while for normal charging after temperature rises
BMS FLT=3/61	BMS FLT=3/61	Low charge temperature 3	The buzzer sounds, and all actions are restricted	Charge, and wait for a while for normal charging after temperature rises
BMS FLT=1/62	BMS FLT=1/62	High discharge temperature 1	The buzzer sounds	Stop discharging and discharge again after the temperature drops
BMS FLT=2/63	BMS FLT=2/63	High discharge temperature 2	The buzzer sounds, boom lifting is restricted, but lowering is allowed	Stop discharging and discharge again after the temperature drops
BMS FLT=3/64	BMS FLT=3/64	High discharge temperature 3	The buzzer sounds, and all actions are restricted	Stop discharging and discharge again after the temperature drops
BMS FLT=1/65	BMS FLT=1/65	Low discharge temperature 1	The buzzer sounds	If the SOC is high, wait for battery self-heating
BMS FLT=2/66	BMS FLT=2/66	Low discharge temperature 2	The buzzer sounds, boom lifting is restricted, but lowering is allowed	If the SOC is high, wait for battery self-heating
BMS FLT=3/67	BMS FLT=3/67	Low discharge temperature 3	The buzzer sounds, and all actions are restricted	If the SOC is high, wait for battery self-heating
BMS FLT=1/70	BMS FLT=1/70	Large discharge temperature difference 1	The buzzer sounds	Stop discharging, and wait for a while before re-discharging
BMS FLT=2/71	BMS FLT=2/71	Large discharge temperature difference 2	The buzzer sounds, boom lifting is restricted, but lowering is allowed	Stop discharging, and wait for a while before re-discharging
BMS FLT=3/72	BMS FLT=3/72	Large discharge temperature difference 3	The buzzer sounds, and all actions are restricted	Stop discharging, and wait for a while before re-discharging
BMS FLT=1/73	BMS FLT=1/73	Large charge temperature difference 1	The buzzer sounds,	Stop charging, and wait for a while before re-charging
BMS FLT=2/74	BMS FLT=2/74	Large charge temperature difference 2	The buzzer sounds, boom lifting is restricted, and lowering is allowed	Stop charging, and wait for a while before re-charging
BMS FLT=3/75	BMS FLT=3/75	Large charge temperature difference 3	The buzzer sounds, and all actions are restricted	Stop charging, and wait for a while before re-charging
BMS FLT=1/76	BMS FLT=1/76	Large discharge voltage difference 1	The buzzer sounds	Stop discharging and charge, and if there is any fault, contact the

				manufacturer
BMS FLT=2/77	BMS FLT=2/77	Large discharge voltage difference 2	The buzzer sounds, boom lifting is restricted, but lowering is allowed	Stop discharging and charge, and if there is any fault, contact the manufacturer
BMS FLT=3/80	BMS FLT=3/80	Large discharge voltage difference 3	The buzzer sounds, and all actions are restricted	Stop discharging and charge, and if there is any fault, contact the manufacturer
BMS FLT=1/81	BMS FLT=1/81	Large charge voltage difference 1	The buzzer sounds	Stop discharging and charge, and if there is any fault, contact the manufacturer
BMS FLT=2/82	BMS FLT=2/82	Large charge voltage difference 2	The buzzer sounds, boom lifting is restricted, but lowering is allowed	Stop discharging and charge, and if there is any fault, contact the manufacturer
BMS FLT=3/83	BMS FLT=3/83	Large charge voltage difference 3	The buzzer sounds, and all actions are restricted	Stop discharging and charge, and if there is any fault, contact the manufacturer

4.21 Routine Inspection and Maintenance Intervals

⚠ Note: The working hours are based on the hourmeter, and the operation cycle is calculated from the date of production.

Maintenance period

Maintenance level	Routine inspection	Level 1	100h	Level 2 maintenance	Level 3 maintenance	Level 4 maintenance	Level 5 maintenance
Maintenance period	Daily	50h	100h	250h	500h	750h	1000h

Table of Maintenance Inspection Items

System	Operation	Maintenance level							Remarks
		Routine inspection	Level 1 maintenance	100h maintenance	Level 2 maintenance	Level 3 maintenance	Level 4 maintenance	Level 5 maintenance	
Electrical system	Check the battery for undervoltage	•							
	Check if the battery terminals are loose or rusted	•							
	Check if buttons on the PCU panel operate normally	•							
	Check if the PCU harness connector is connected firmly	•							
	Check if the PCU harness connector is stained	•							
	Check if the PCU harness is extruded or broken	•							

	Check the position of the limit switch rocker arm and if it is wired loosely	•							
	Check if the motor is wired normally	•							
	Check if buttons on the ground control panel operate normally	•							
	Check if the warning lamp and horn function normally	•							
	Check if the solenoid valve coils of main valve block are wired normally or loose	•							
	Check for wear、loose or damaged harness	•							
	Check the electrolyte level of battery				•	•	•	•	This item is not apply to maintenance free batteries and seal batteries
	Check for electric contactor				•	•	•	•	
	Check the insulating grease layer of the harness				•	•	•	•	
	Load cell zero calibration				•	•	•	•	
Hydraulic system	Check if the system pressure is normal			•	•	•	•	•	
	Check if the steering system pressure is normal			•	•	•	•	•	
	Check if the traveling system pressure is normal			•	•	•	•	•	
	Check the gear oil level of reducer				•	•	•	•	
	Check if the oil pipes and joints are loose	•							
	Check if the oil cylinder leaks oil	•							
	Check if the valve spools leak oil	•							
	Check if the ball valve at the suction port at the bottom of the hydraulic tank are open	•							
	Check if the walking oil pipe fixing clip is loose	•							
	Check the oil level in the hydraulic tank	•							Add hydraulic oil L-HV32 when the oil level is lower
	Check the permeability of the hydraulic oil tank exhaust cap			•	•	•	•	•	
	Replace the hydraulic oil	Every 1,000h or every year, whichever comes first. Replace it, if it fails to the test.							Hydraulic oil L-HV32
	Replace the suction filter	Every 1,000h or every year, whichever comes first							
	Check the hydraulic tank vent cap for leakage	Daily							
	Replace the air cleaner	Every 1,000 hours or every year, whichever comes first							
	Check the reducer for oil leakage	Daily							

	Change the reducer gear oil	First 150h, thereafter every 1,000h or every year, whichever comes first.							
	Replace the return oil filter element	Every 500h or every six months, whichever comes first.							
Machine	Check if the attached documents are complete, easy to read, and if they are in the file box	Daily							
	Check if the safety identification is correct or stained	Daily							
	Check the machine bolts, nuts and other fasteners for looseness or abnormal noise	Daily							
	Check the structural parts of the machine for cracks and if there is any open weld	Daily							
	Check if the machine paint for falling off, serious rust, corrosion or oxidation	Daily							
	Check if the slider is loose and if there is zero clearance between the slider and the boom						•	•	
	Check for tires and hubs				•	•	•	•	
Lubrication	Lubricate the slewing bearing			•	•	•	•	•	Lithium-based grease
	Grease the slewing bearing and the gears of the slewing mechanism			•	•	•	•	•	Lithium-based grease
	Grease the platform load cell mechanism					•		•	Lithium-based grease

Chapter V Commissioning

5.1 Safety instructions

Before commissioning, please make sure to refer to the *Operation and Maintenance Manual*, familiarize yourself with the relevant safety precautions and basic operating requirements, and be particularly familiar with the following safety matters:

1. It is strictly forbidden for alcoholics, drug users, and those taking inhibition reaction drugs to approach and operate the machine;
2. Before operating the machine, please ensure that you have equipped with protection equipment, such as helmet, safety belts (five-point), safety shoes, and your body is in good condition;
3. The machine cannot be operated with the hood open. Before starting the engine, confirm the surrounding environment of the machine to ensure that the engine is unmanned to avoid the danger of starting the engine. and these instructions will not be repeated below;
4. Before operating the machine, sound the horn to ensure that there are no people or obstacles around, so as to avoid safety damage to others, yourself, the machine or obstacles, and other people are not allowed to operate the machine during commissioning;
5. This machine is not insulated, and does not provide protection against electric shock when it is in contact with or near wires, power supplies or electrical equipment.

Please follow the applicable laws and regulations and the instructions in the table below to maintain a sufficient safety distance from wires, power supplies, and electrical equipment.

Voltage	Required safety distance
0V～50KV	3.05m/10ft
50V～200KV	4.60m/15ft
200V～350KV	6.10m/20ft
350V～500KV	7.62m/25ft
500V～750KV	10.67m/35ft
750V～1000KV	13.72m/43.3ft

If the machine comes into contact with a live wire, stay away from the machine immediately. Before the power of the wire is cut off, personnel are forbidden to touch or operate the machine. Do not operate or use the machine during lightning or storms.

6. Do not raise the arm rod when the wind speed may exceed 12.5m/s/28mph. If the wind speed exceeds 12.5m/s/28mph after the arm rod is raised, lower the arm rod and do not continue to operate the machine;
7. Do not operate the machine in strong winds or gusts. Do not increase the surface area of the platform or load. Enlarging the area exposed to the wind will reduce the stability of the machine;
8. Do not operate the machine via the PCU box when the platform is tripped, stuck, or other objects nearby hinder its normal movement. If it is expected to operate the machine via the ground control unit, this operation can be done only after all personnel have left the platform;
9. In the retracted state, be very careful and reduce the speed when the machine is driven on gravel, unstable or smooth surfaces, near openings or steep slopes, etc.;
10. Do not sit, stand or climb on the protective guard of the platform. Stand steadily on the platform base plate at all times.

5.2 Machine inspection

Pick-up inspection

1. Check the machine to be tested: basic information, appearance of the machine, configuration of the machine, oil and water volume, electrical components, etc.; any problem found should be recorded in time.
2. The following electrical components should be carefully checked: key switch, emergency stop button, ground control system button, platform control button, foot switch;
   Inspection criteria: effective in use.

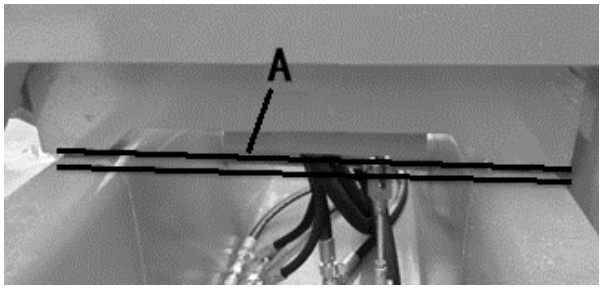
Visual inspection

Check the appearance of the vehicle as follows:

1. The top coat has no bumps, scratches, or color difference;
2. Anti-rust treatment on exposed metal should be done;
3. There should be no porosity, undercut, crack, burn through, etc. after welding;
4. The hydraulic pipelines should be arranged neatly and reasonably, the connection should be tight and firm;
5. No oil and water leakage is found;
6. Signs and marks are installed firmly, and they should be upright, eye-catching, correct and clear.

Gap inspection

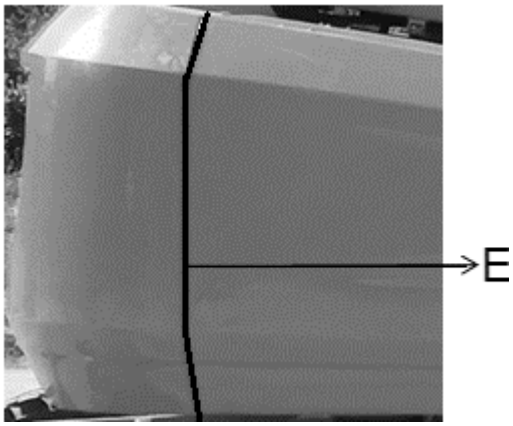
1. Check the gap of the rear axle



1) Insert a feeler into the gap between the rear axle and the chassis, and measure the gap between the left and right sides of the rear axle;

Control criteria: 4≤A≤5mm

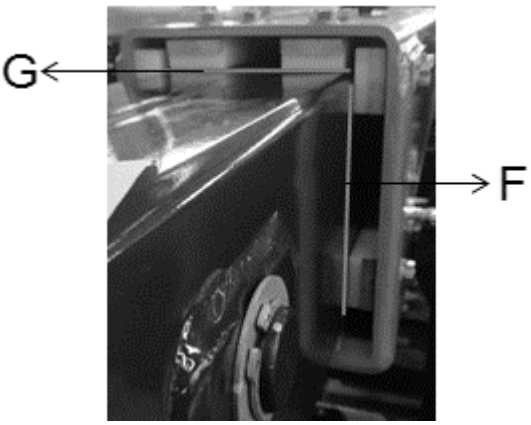
2. Check the gap between the left and right covers and the counterweight



1) Use a feeler to measure the gap between the left and right covers and the counterweight, and the upper and lower gap should be even.

Control criteria: E gap requirement: 6-9mm, the upper and lower gap difference should not be more than 2mm;

3. Check the gap between the slider and the arm rod

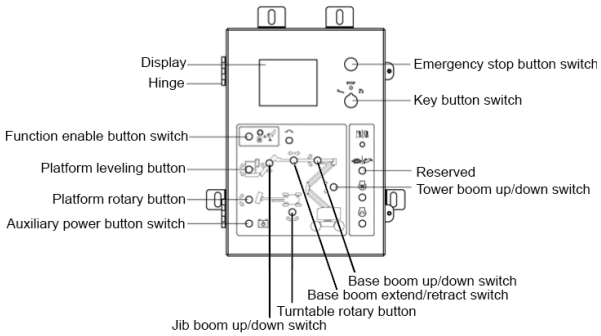


1) Insert a feeler into the gap between the telescopic boom and the slider, and measure the sum of the left and right gaps and the sum of the upper and lower gaps of the boom

Control criteria: F/G＜1mm.

5.3 Basic test

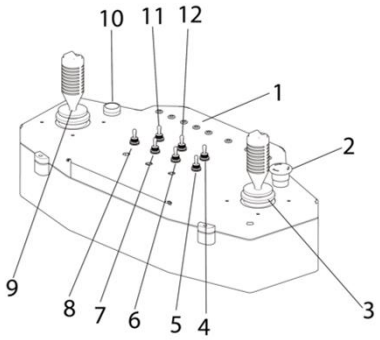
5.3.1 Start test



1. After the key is inserted into the key switch socket and turned to "PCU", the beacon will flash, the screen will light up, and the platform control unit will run;
2. After the key switch is turned to the neutral position, the machine will be turned off, and the beacon will be turned off, the screen will be off;
3. After the key is turned to "GCU", the beacon will flash, the screen will light up, and the ground control unit will run;

Control criteria: effective in use

5.3.2 Emergency stop switch



1. Indicator light
2. Emergency stop button
3. Drive/steer control handle
4. Drive enable switch
5. Tower boom up/down Switch
6. Jib boom up/down Switch
7. Platform swing switch
8. Platform up/down leveling switch
9. Base boom up/down/ extend/retract and Turntable Swing control handle
10. Horn button
11. Speed regulation switch
12. Auxiliary power button switch

1. If the emergency stop switch of the GCU is pressed, and the enable button and the control button are toggled, the machine will not run;
2. If the PCU and GCU emergency stop switches are pulled out, and the enable button and the control button are toggled, the machine will run;
3. If the PCU emergency stop switch is pressed, the GCU emergency stop switch is pulled out at the same time, and the enable button and the control button are toggled, the machine will not run;
4. In the working state of the machine, press the emergency stop switch to stop the action;
5. After the test, press the PCU and GCU emergency stop switches, and power off the GCU.

Control criteria: conforming to requirements

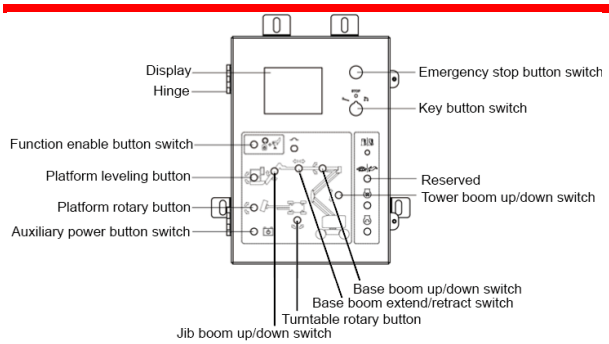
5.3.3 Horn switch

The horn will sound if the horn switch is pressed after power on;

Control criteria: effective in use

5.3.4 Basic operation test of ground control unit

Rotate the key to "GCU", unscrew the emergency stop switch, start the machine, and press and hold the enable button (this operation is required for the following basic action tests)

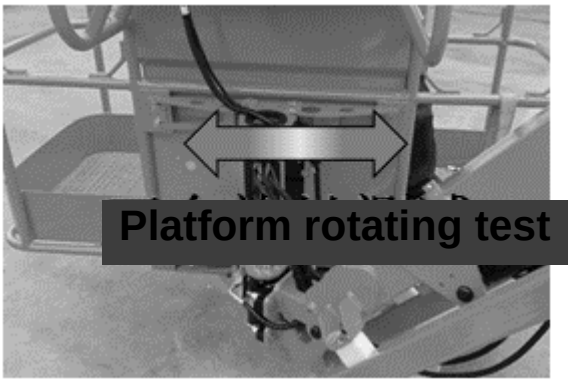


GCU panel

1. Platform leveling button

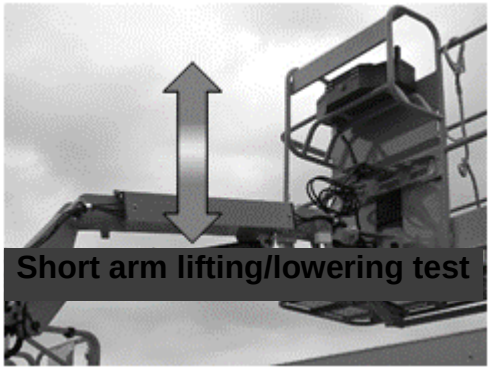
The platform level will rise if the platform leveling button is moved upwards; the platform level will drop if the platform leveling button is moved downwards.

2. Platform rotary button



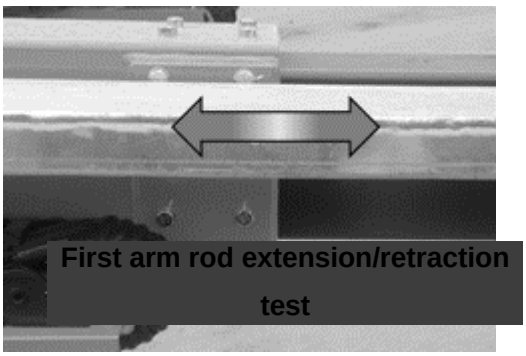
The platform will rotate to the right if the platform rotary button is moved to the right; the platform will rotate to the left if the platform rotary button is moved to the left.

3. Jib lift switch



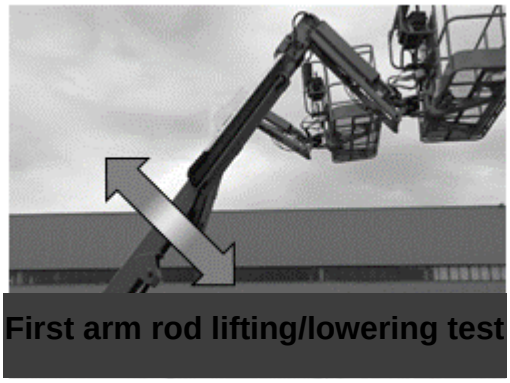
The jib will rise if the jib lift switch is moved upwards; the jib will drop if the jib lift switch is moved downwards.

4. Boom telescopic switch



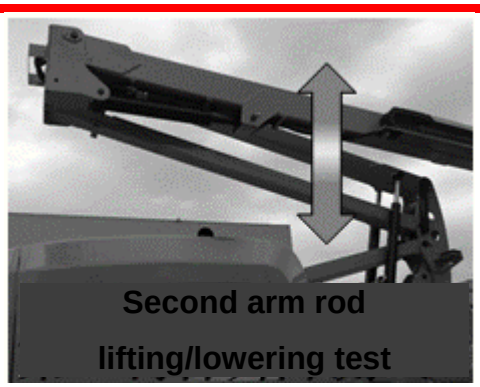
The boom will extend if the boom telescopic switch is moved to the left ; the boom will retract if the boom telescopic switch is moved to the right.

5. Boom lift switch



The boom will rise if the boom lift switch is moved upwards; the boom will drop if the boom lift switch is moved downwards.

6. Articulated boom lift switch

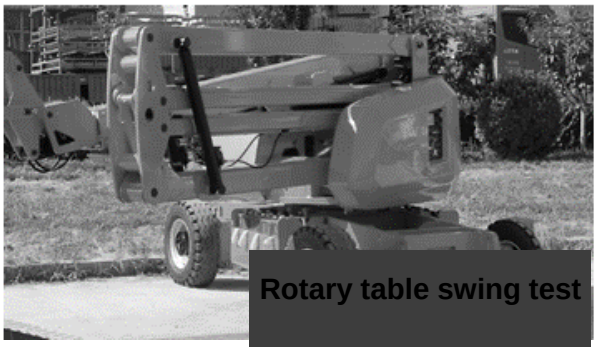


Second arm rod lifting/lowering test

The articulated boom will rise if the articulated boom lift switch is moved upwards; the articulated boom will drop if the articulated boom lift switch is moved downwards.

7. Rotary table rotary switch

The rotary table will rotate to the right if the rotary table rotary switch is moved to the right; the rotary table will rotate to the left if the rotary table rotary switch is moved to the left.



Rotary table swing test

⚠ CAUTION:

1. **Commissioning shall be done by a dedicated person, and during the commissioning period, no one else is allowed to operate the machine;.**
2. **Each commissioning should be done separately, two or more operations cannot be carried out at the same time.**
3. **The commissioning time of each operation should be 3-5S, the commissioning is visible to the naked eye, and it should be stopped when it is effective.**
4. **After the all commissioning operations are completed, the buttons and switches shall be returned to their positions.**

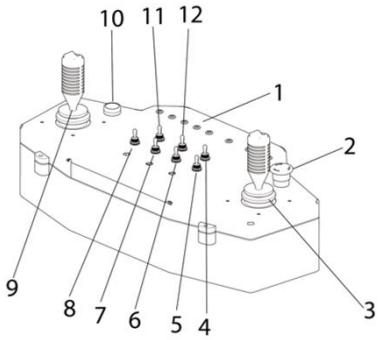
8. Auxiliary power switch

Turn the key switch to "GCU"; pull the red "emergency stop" button outward to "ON"; move the auxiliary power switch to either side, repeat all the above operations until all operations can be achieved.

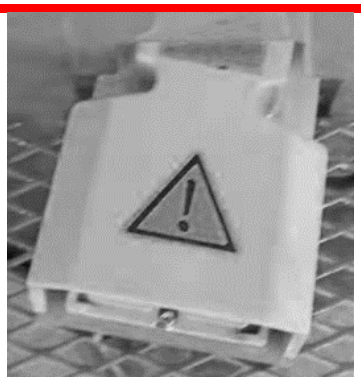
Note:

1. **When testing the auxiliary power switch, in order to save battery power, please test each function in a part of the cycle.**
2. **The drive function shall not work with the auxiliary power supply.**

5.3.5 Basic operation test of platform control unit



1. Indicator light
2. Emergency stop button
3. Drive/steer control handle
4. Drive enable switch
5. Tower boom up/down Switch
6. Jib boom up/down Switch
7. Platform swing switch
8. Platform up/down leveling switch
9. Base boom up/down/ extend/retract and Turntable Swing control handle
10. Horn button
11. Speed regulation switch
12. Auxiliary power button switch



Foot switch

After the machine is started, the key is turned to "PCU", and the foot switch is depressed, the control handles or buttons or switches of functions of the machine under test make response; the control handles or button or switches of functions of the machine under test have no response if the foot switch is released.

1. Horn switch

The horn will sound if the horn button is pressed after power on; the horn will stop sounding if the horn button is released.

Control criteria: The horn sounds.

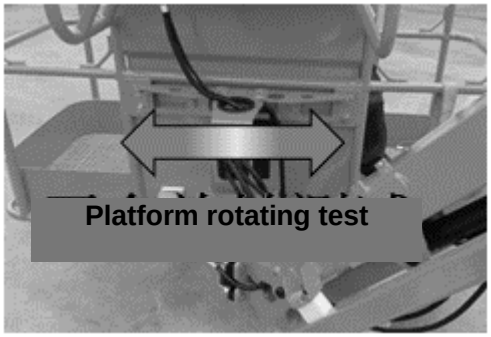
CAUTION:

1. **Commissioning shall be done by a dedicated person, and during the commissioning period, no one else is allowed to operate the machine;**
2. **Each commissioning should be done separately, two or more operations cannot be carried out at the same time;**
3. **The commissioning time of each operation should be 3-5S, the commissioning is visible to the naked eye, and it should be stopped when it is effective;**
4. **After the all commissioning operations are completed, the buttons and switches shall be returned to their positions.**

2. Press and hold the platform leveling switch.

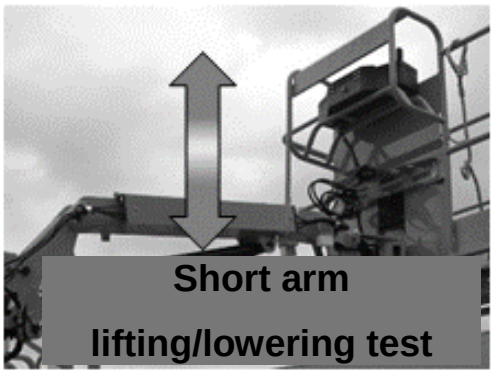
The platform level will rise if the platform leveling switch is moved upwards; the platform level will drop if the platform leveling switch is moved downwards.

3. Press and hold platform rotary switch.



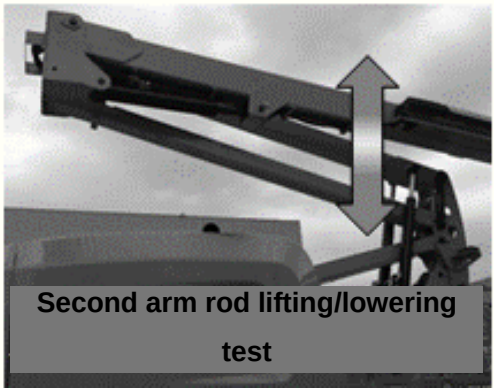
The platform will rotate to the right if the platform rotary switch is moved to the right; the platform will rotate to the left if the platform rotary switch is moved to the left.

4. Jib lift switch



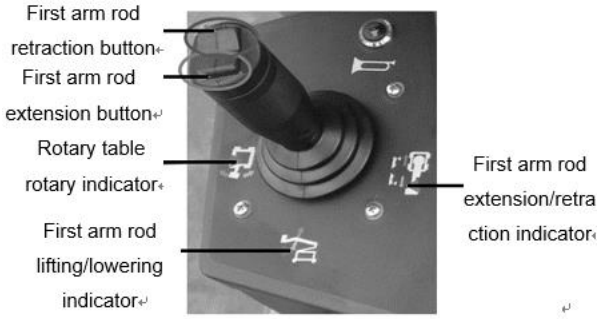
The jib will rise if the jib lift switch is moved upwards; the jib will drop if the jib lift switch is moved downwards.

5. Articulated boom lift switch



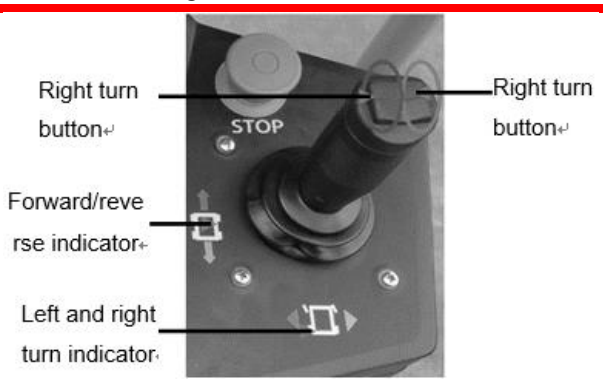
The articulated boom will rise if the articulated boom lift switch is moved upwards; the articulated boom will drop if the articulated boom lift switch is moved downwards.

6. Left control lever



1) The rotary table will rotate to the left if the left control lever is moved to the left; the rotary table will rotate to the right if the left control lever is moved to the right.
2) The boom will rise if the left control lever is moved upwards, the boom will drop and the alarm will sound if the left control lever is moved downwards.
3) The boom will extend if the underside (yellow circle) of the left control lever is pressed with thumb; the boom will retract if the upper side (green circle) of the left control lever is pressed with thumb.

7. Right control lever



1) The machine will be driven forward if the right control lever is moved upwards; the machine will be driven backward if the right control lever is moved downwards
2) The machine will turn to the left if the left button (green circle) of the right control lever is pressed with thumb. The machine will turn to the right if the right button (yellow circle) of the right control lever is pressed with thumb.

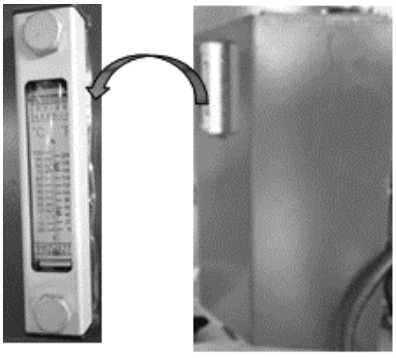
8. Drive speed selector switch

1) The machine is on a slope. Symbol: Climbing position, driving at low speed.
2) The machine is on a horizontal plane. Symbol: driving at high speed

⚠ CAUTION:

In the case of a large slope, engage climbing gear for operation, and for other road conditions, please select the horizontal gear.

5.3.6 Hydraulic oil level test



1. Retract the boom in place, lower the short arm to the lowest position, push the

emergency stop switch to the “OFF” position, pull open the rubber hook under the right cover by hands, open the right cover, and snap the support rod into the rubber groove.

2. After parking for 5 min, observe the oil level of the hydraulic tank.

Control criteria: The amount of oil in the hydraulic tank is higher than 1/3 of the scale of the level gauge, but not higher than 1/2 of the level of the level gauge.

5.3.7 Travel speed (high speed) test

1. Press down the foot switch in the platform control mode;
2. Drive the machine to the test road at a low speed, adjust the direction of the machine to ensure that the machine is straight and travels in a straight line;
3. Slowly move the drive control lever 5m in front of start line of test road to the high speed position; start timing when the center of front wheels of the machine crosses the test start line, and stop timing when the center of front wheels of the machine crosses the finish line, i.e. record the time for the trolley to travel through the test road for a total of 20m/65.6ft. Stop the machine safely and record the time.

Control criteria: 7.2±0.2km/h，i.e. time: 9.7＜t＜10.3

5.3.8 Braking distance test

1. Follow the travel speed test closely;
2. When the center of the front wheel of the machine passes the 20m/65.6ft test line, turn off the power switch and let the machine stop automatically.

Control criteria:1.0m-1.5m/3.28-4.92 ft.

Note：

1. The machine under test shall be kept in the no-load state, with the boom retracted;

1. Pay attention to driving safety.

5.3.9 Drive speed limit test

1. Select the platform control mode, and depress the foot switch, and after that, the boom is lifted by about 90cm (or the articulated boom is lifted by about 90cm, or the boom is extended by 30cm);
2. Adjust the traveling direction of the machine to ensure that the machine is straightened and driven on a straight line;
3. Slowly move the drive control lever about 5m in front of start line of test road to the full drive position; start timing when the center of front wheels of the machine crosses the test start line, and stop timing when the center of front wheels of the machine crosses the finish line, i.e. record the time for the trolley to travel through the test road for a total of 20m. Stop the machine safely and record the time.

Control criteria: 0.8km/h, i.e. time: 80＜t＜102.8 S

⚠ CAUTION:

1. **Conduct timing in one of the three states. For other two states, determine that the speed limit function can be achieved under specific conditions;**
2. **Expect the arm rod under the test, the other arm rods are retracted;**
3. **Pay attention to driving safety.**

5.3.10 Braking distance test (at slow speed)

1. Follow the travel speed (low speed) test closely;
2. When the center of the front wheel of the machine passes the 20m/65.6ft test line, turn off the power switch and let the machine stop automatically. Use a tape measure to measure the distance from the 10m/32.8ft line to the center line of the front wheel (stopped), and the measured distance is the braking distance

Control criteria:：≤0.5m/1.64ft

Note：

1. **The machine under test shall be kept in the no-load state, with the boom retracted;**
2. **Pay attention to driving safety.**

5.3.11 Drive enable system test

Drive enable system test

1. Start the machine, and operate it using the platform control system;
2. Adjust the arm rod to the retraction position, keep the vehicle retracted, and depress the foot switch; rotate the rotary table until the arm rod moves over one non-steered wheel (in both directions);

Control criteria: the drive indicator light is on at any position within the rotation range. Move the drive control lever away from the center, after which the drive function cannot be achieved.

3. Turn and hold the drive enable toggle switch to one side, and move the drive control lever away from the center slowly, after which the drive function can be achieved normally.

Note：

1. The machine travels in the opposite direction of the travel and direction control lever movement；
2. Pay attention to safety during the rotation test.

5.3.12 Gradeability test（30%）

30%

1. Drive the machine to the front of a 30% slope, and adjust the machine state, with the platform at the upper part of slope and the counterweight at the lower part of slope;
2. Turn the drive speed selector switch on the platform control panel to the “Climbing” position;
3. Adjust the platform height, and drive the machine to the 45% slope.

Control criteria: the machine climbs to the top normally, the tires do not slip and the machine does not tip over.

4. During downhill driving, apply the brake to test the braking distance.

Control criteria：≤0.8m/2.62ft

5.3.13 Operation time test

1. Start the machine, keep it restarted in situ, and adopt the ground control mode for the test;
2. Press the enable button and rotary table rotary switch (to the left) at the same time, move the rotary table to the leftmost side; then start the rotary table rotary switch in the opposite direction, rotate the rotary table, start timing at the same time, rotate the rotary table to the rightmost side, stop the rotary table, and stop timing.

Control criteria：95S-125S.

Note：

1. **The control criterion of operation time test is based on an oil temperature of 40°C. The time will be affected when the oil temperature changes.**
2. **Carry out the test for each operation separately. After the test, retract and return each part, and then perform the next test.**
3. Press the enable button and the first arm rod lift switch (up) at the same time to lift the boom and start timing simultaneously; when the boom is lifted to the highest position, stop lifting and timing.

Control criteria：32S-40S.

4. Press the enable button and the first arm rod lift switch (down) at the same time to lower the boom and start timing simultaneously; when the boom is retracted, stop lowering and timing.

Control criteria:26S-30S.

5. Press the enable button and the second arm rod lift switch (up) at the same time to lift the folding jib and start timing simultaneously; when the folding jib is lifted to the highest position, stop lifting and timing.

Control criteria:25S-35S.

6. Press the enable button and the second arm rod lift switch (down) at the same time to lower the folding jib and start timing simultaneously; when the folding jib is retracted, stop lowering and timing.

Control criteria:26S-40S.

7. Press the enable button and the first arm rod extension switch (leftward) at the same time to extend the boom and start timing simultaneously; when the boom is extended to the limit, stop extending and timing.

Control criteria:22S-28S.

8. Press the enable button and the first arm rod extension switch (rightward) at the same time to retract the boom and start timing simultaneously; when the boom is retracted, stop retracting and timing.

Control criteria:25S-28S。

9. Press the enable button and the short arm lift switch (up) at the same time to lift the short arm and start timing simultaneously; when the short arm is lifted to the highest position, stop lifting and timing.

Control criteria:38-50S.

10. Press the enable button and the short arm lift switch (down) at the same time to lower the short arm and start timing simultaneously; when the short arm is retracted, stop lowering and timing.

Control criteria:22S-28S.

11. Press the enable button and the platform rotary switch (left) at the same time, and rotate the platform to the leftmost side; then

start the platform rotary switch in the opposite direction, rotate the platform and start timing simultaneously; when the platform is rotated to the rightmost side, stop rotating and timing.

Control criteria:6S-12S.

Note：

1. **The control criterion of operation time test is based on an oil temperature of 40±5°C. The time will be affected when the oil temperature changes;**
2. **Carry out the test for each operation separately. After the test, retract and return each part, and then perform the next test;**

5.3.14 Lifting height test

1. Move the machine under test at rated load to a level ground in the test area；
2. In the ground control mode, lift the platform to the highest point, make it horizontal, and measure the distance from the ground to the bottom of the platform with a laser range finder;

Test target value：13.8±0.14m.

3. Instructions for use of the laser range finder:

Press the upper middle red (MEAS) button of the laser range finder, align the laser dot with the bottom surface of the extended platform, press the upper left blue (Timer) button of the laser range finder, and press the red (MEAS) button again for 5s (adjustable). In this case, the height data is shown on the display screen;

5.3.15 Load test (1.1 times)

1. When the machine is stopped, fix the counterweight trolley with a load 1.1 times rated load (253Kg) on the working platform.

Control criteria: the overload indicator come on, the buzzer sounds, and there is no response when the functions of the machine are operated.

5.3.16 Load test (1.25 times)

1. Place a load 1.25 times the rated load (287.5Kg) on the lifting platform, and connect the seat belt to the platform guardrail.
2. Release the PCU and GCU emergency stop switches and turn the key to “GCU”, and operate the machine on the ground;
3. Lift the articulated boom, telescopic boom, boom and JIB respectively to raise the platform to the highest position, and when each boom part reaches the highest position, stay for 5-10s, check whether the machine has oil leakage or structural interference and whether the oil pipe harness incurs squeezing, wear, etc.

Control criteria: the machine has no oil leakage or structural interference, and the oil pipe harness is free of squeezing, wear, etc.;

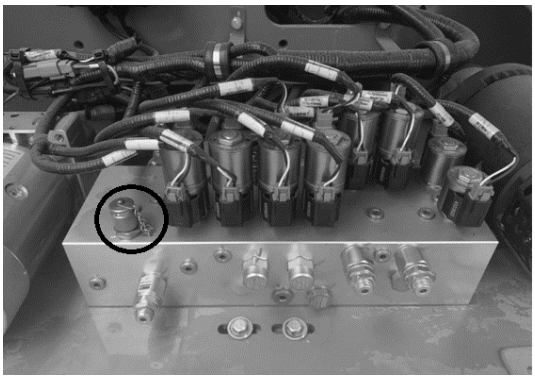
4. Lift the platform to the highest point, measure the platform height with a laser range finder, and wait for 60s to confirm whether there is any change in the platform height. Wait for 15min, and test the retraction of hydraulic cylinder piston rods and the sinkage of the platform.

Control criteria: the retraction of hydraulic cylinder piston rods is not more than 2mm, and the sinkage of the platform is not more than 1% of the height of the platform under the working condition.

5.3.17 Rated load calibration

1. After the tests are completed, park the machine on a solid ground;
2. Use the ground control mode, enter the system design interface, and calibrate the no load;
3. Hang the rated load of 230kg/507.1 lbs at the platform end, and calibrate the rated load.

5.3.18 Boom pressure test



1. Remove the pressure measuring port plug of the control valve and install the pressure tap;
2. Connect the pressure gauge to the pressure tap;
3. Lift the platform to the limit height, observe the lifting pressure until the pressure gauge reaches the maximum value and keep it for 5s. At this time, the value is the system overflow pressure value, and the pressure value should be recorded.

Control criteria: 235 bar ± 10 bar.

4. In case of inconsistency with the control criteria, do correction as follows:

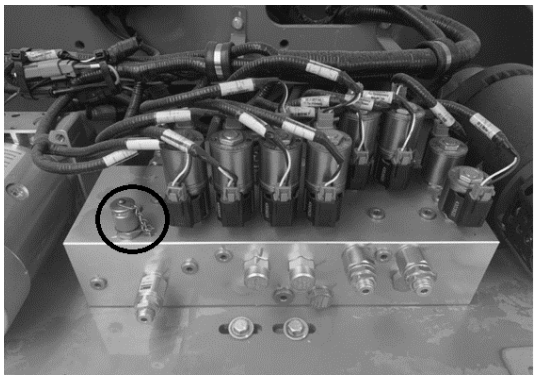
Unscrew the fastening nut of the lift relief valve, and rotate the valve spool clockwise or counterclockwise with the Allen wrench to increase or decrease the pressure as appropriate until the pressure is consistent with the target value;

5. Keep the position of the Allen wrench unchanged, and tighten the fastening nut of the lift relief valve; restore the rocker arm to the normal position.

⚠ CAUTION:

Pressure tap of the control valve: the old one is the plug-type pressure tap, the new one is the test pressure tap, and pay attention to distinguishing them.

5.3.19 Articulated boom pressure test



1. Remove the pressure tap plug (red indication) of the control valve and install the pressure tap;
2. Connect the pressure gauge to the pressure tap;
3. Lift the articulated boom to the limit height, and the rest are in the retracted state; lower the articulated boom, observe the lifting pressure until the pressure gauge reaches the maximum value, at this time the value is the system overflow pressure value, and the pressure value should be recorded;

Control criteria: 235 bar ± 10 bar.

4. In case of inconsistency with the control criteria, do correction as follows:

Unscrew the fastening nut of the lift relief valve, and rotate the valve spool clockwise or counterclockwise with the Allen wrench to increase or decrease the pressure as appropriate until the pressure is consistent with the control criteria;

5. Keep the position of the Allen wrench unchanged, and tighten the fastening nut of the lift relief valve; restore the rocker arm to the normal position.

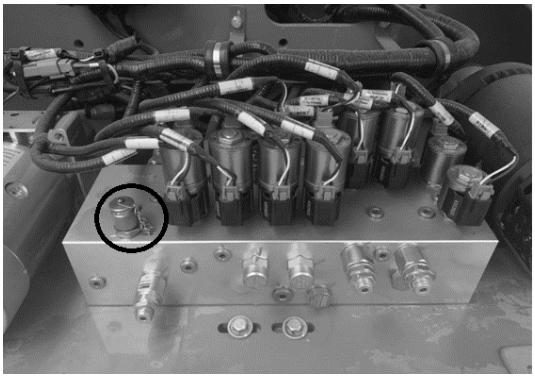
Note:

1. **The ground in the test area shall be solid and flat, with a gradient not more than 1%; during operation, the ground shall not subside, and there shall be no obstacles that affect the lifting, lowering**

and slewing of articulated lifting platform around it.

2. **The laser range finder shall be placed on a flat ground; the platform test position shall be the steel plate on the bottom of the extended platform rather than the reinforcing rib.**

5.3.20 Slewing pressure test



1) Remove the pressure tap plug (red indicator) of the control valve and install the pressure tap;
2) Connect the pressure gauge to the pressure tap;
3) In the GCU mode, press the enable button and the rotary table rotation button at the same time to perform the steering action (check on both the left and right sides), use the pin to hold the pressure, check the pressure value of the pressure gauge; detect and correct the pressure on the steering function valve.

Control criteria: 235 bar ± 10 bar.

4) In case of inconsistency with the control criteria, do correction as follows:

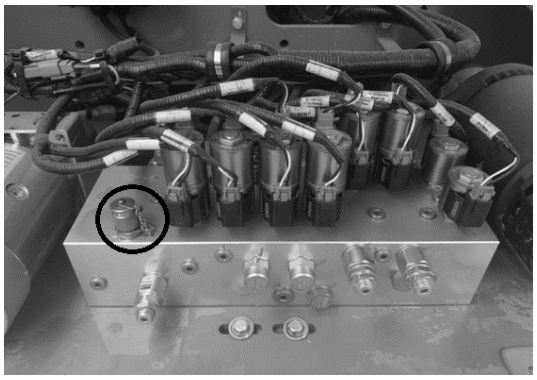
Unscrew the fastening nut of the rotary table relief valve, and rotate the valve spool clockwise or counterclockwise with the Allen wrench to increase or decrease the pressure as appropriate until the pressure is consistent with the target value;

5) Keep the position of the Allen wrench unchanged, and tighten the fastening nut of the lift relief valve; restore the rocker arm to the normal position.

CAUTION:

Pressure tap of the control valve: the old one is the plug-type pressure tap, the new one is the test pressure tap, and pay attention to distinguishing them.

5.3.21 Steering pressure test



1) Remove the pressure tap plug (red indicator) of the control valve and install the pressure tap;
2) Connect the pressure gauge to the pressure tap;

In the PCU mode, press the enable button and the steering handle button at the same time to perform the steering pressure holding action (test on both the left and right sides); detect and correct the pressure on the steering function valve (two people need to work together, one person observes the pressure gauge, the other performs steering pressure holding). Unscrew the fastening nut of the relief valve, and rotate the valve spool clockwise or counterclockwise with the Allen wrench to increase or decrease the pressure as appropriate until the pressure is consistent with the target value;

3) Lift the platform to the limit height, observe the lifting pressure until the pressure gauge reaches the maximum value and keep it for 5s. At this time, the value is the system

overflow pressure value, and the pressure value should be recorded.

Control criteria: 235 bar ± 10 bar.

4) In case of inconsistency with the control criteria, do correction as follows:

Unscrew the fastening nut of the lift relief valve, and rotate the valve spool clockwise or counterclockwise with the Allen wrench to increase or decrease the pressure as appropriate until the pressure is consistent with the target value;

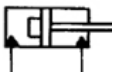
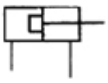
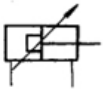
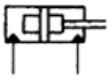
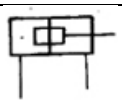
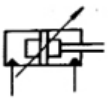
5) Keep the position of the Allen wrench unchanged, and tighten the fastening nut of the lift relief valve; restore the rocker arm to the normal position.

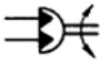
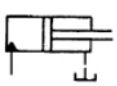
Chapter VI Appendix

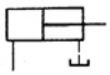
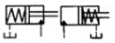
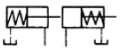
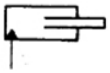
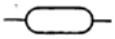
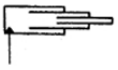
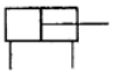
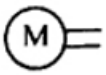
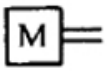
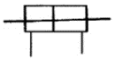
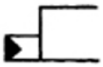
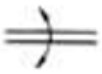
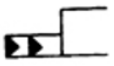
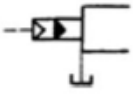
6.1 System fault code

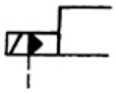
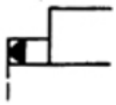
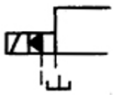
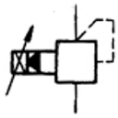
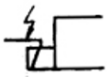
Display	Error code	Description and solution
EVERYTHING OK 0/0	0/0	Normal
GROUND MODE ACTIVE!,0/0	0/0	Ground mode
STARTUP!,0/0	0/0	Startup
MOVING PLATFORM!,0/0	0/0	Moving platform
MOVING JIB!,0/0	0/0	Moving jib
SWINGING!,0/0	0/0	Swinging
TELESCOPING!,0/0	0/0	Telescoping
LIFTING!,0/0	0/0	Lifting
LOWERING!,0/0	0/0	Lowering
DRIVING!, 0/0	0/0	Driving
RELEASE FSW!, 2/2	1/1	Foot switch
NOT CALIBRATED, 1/1	1/1	No calibrated
HEIGHT NOT CALIBRATED, 1/1	1/1	Height is not calibrated
VEHICLE TILTED, 0/0	0/0	Vehicle tilt
FUNCTIONS LOCKED - TEST MODE SELECTED, 2/2	2/2	Function lock, select test mode
SOME FUNCTIONS MUST BE USED ALONE!, 2/2	2/2	Some functions must be used alone
FUNCTIONS LOCKED - EMERGENCY PUMP, 2/2	2/2	Function lock - emergency pump
FUNCTIONS LOCKED -ARMGUARD, 2/2	2/2	Function lock - anti-pinch
FUNCTIONS LOCKED - OVERLOADED, 2/2	2/2	Function lock - overload
FUNCTIONS LOCKED - UNDERLOADED, 2/2	2/2	Function lock - underload
FUNCTIONS LOCKED - TILTED, 2/2	2/2	Function lock - tilted
FUNCTIONS LOCKED - TOO HIGH, 2/2	2/2	Function lock - too high
FUNCTIONS LOCKED - OUTRIGGERS, 2/2	2/2	Function lock - outrigger
FUNCTIONS LOCKED - EXTERNAL SHUTDOWN, 2/2	2/2	Function lock - external shutdown
FUNCTIONS LOCKED - TOO HOT!, 4/2	4/2	Function lock - too hot
DRIVE LOCKED - SEM PROBLEM, A/A	A/A	Function lock - too hot
FAULT: CAN BUS - SEM, 6/6	6/6	Error: Can bus-SEM
FUNCTIONS LOCKED - NO VALVE SUPPLY!, 2/3	2/3	Function lock - no valve supply
FAULT: CHECK ELEVATION SWITCH, 6/3	6/3	Error: Check the lifting switch
FAULT: CHECK HEIGHT1 SENSOR, 6/1	6/1	Error: Check the height switch
CHECK CELL#4 P3B, 6/2	6/2	Check the load cell #4
CHECK CELL#3 P3A, 6/2	6/2	Check the load cell #3
CHECK CELL#2 P2,6/2	6/2	Check the load cell #2
CHECK CELL#1 P1,6/2	6/2	Check the load cell #1
FUNCTIONS LOCKED - NOT CALIBRATED, 1/1	1/1	Function lock - not calibrated
FACTORY OVERRIDE, F/F	F/F	Start safety
CHECK DRIVE / STEER SWITCHES!, 2/2	2/2	Check driving/steering switch
CHECK LIFT SWITCHES!, 2/2	2/2	Check the lifting switch
CHECK JIB SWITCHES!, 2/2	2/2	Check the jib switch
CHECK PLATFORM SWITCHES!, 2/2	2/2	Check platform switch
CHECK TELE SWITCHES!, 2/2	2/2	Check the telescopic switch
CHECK SWING SWITCHES!, 2/2	2/2	Check the swinging switch
FUNCTIONS LOCKED - P600 PROBLEM, 7/7	7/7	Function lock - P600 problem
FAULT: PUMP MOTOR OVERLOAD!,7/7	7/7	Error: Pump motor overload
FAULT: CAPBANK VOLTAGE TOO LOW!,7/7	7/7	Voltage is too low
FAULT: CAPBANK VOLTAGE TOO HIGH!,7/7	7/7	Voltage is too high
FAULT: BATTERY VOLTAGE TOO LOW!, 4/4	4/4	Error: Battery voltage is too low
FAULT: BATTERY VOLTAGE TOO HIGH!,4/4	4/4	Error: Battery voltage is too high
FAULT: CAN BUS - LOADCELL, 6/6	6/6	Error: Can bus load cell
FAULT: CAN BUS - MATRIX, 6/6	6/6	Error: Can bus matrix
FAULT: CAN BUS - P440, 6/6	6/6	Error: Can bus-P440
FAULT: CAN BUS - P600, 6/6	6/6	Error: Can bus P600
FAULT: ENERGIZED VALVE - CHECK WIRING!, 3/2	3/2	Error: Hydraulic valve - check wiring
FAULT: BAD INTERNAL SAFETY SWITCH!, 3/4	3/4	Error: Bad internal safety switch
FAULT: VALVE FEEDBACK HIGH!, 3/2	3/2	Error: Valve feedback height
FAULT: CUSTOMER, 1/1	1/1	Error: Customer password

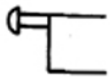
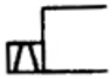
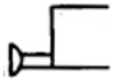
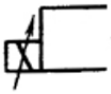
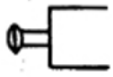
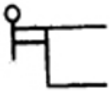
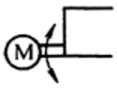
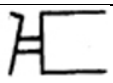
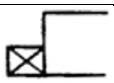
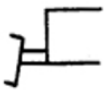
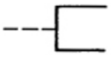
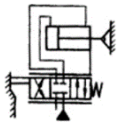
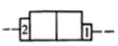
6.2 Diagram of common hydraulic part symbols

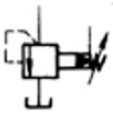
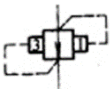
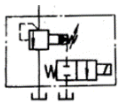
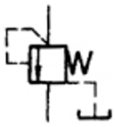
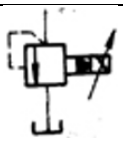
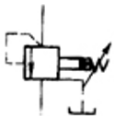
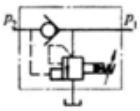
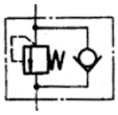
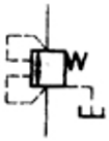
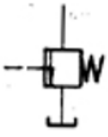
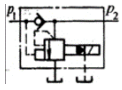
(1) Hydraulic pump, hydraulic motor and hydraulic cylinder							
Name		Symbol	Description	Name		Symbol	Description
Hydraulic pump	Hydraulic pump		General symbol	Double-acting cylinder	Non-adjustable one-way bounce cylinder		Detailed symbol
	One-way fixed displacement hydraulic pump		One-way rotation, one-way flow and fixed displacement				Simplified symbol
	Two-way fixed displacement hydraulic pump		Two-way rotation, two-way flow, fixed displacement		Adjustable one-way bounce cylinder		Detailed symbol
	One-way variable hydraulic pump		One-way rotation, two-way flow, variable displacement				Simplified symbol
	Two-way variable displacement hydraulic pump		Two-way rotation, two-way flow, variable displacement		Non-adjustable two-way bounce cylinder		Detailed symbol
Hydraulic motor	Hydraulic motor		General symbol				Simplified symbol
	One-way fixed displacement hydraulic motor		One-way flow, one-way rotation		Adjustable two-way bounce cylinder		Detailed symbol
	Two-way fixed displacement hydraulic		Two-way flow, two-way rotation,				Simplified symbol

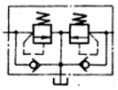
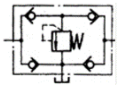
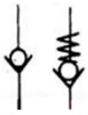
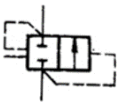
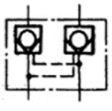
	motor		fixed displacement				
	One-way variable displacement hydraulic motor		One-way flow, one-way rotation, variable displacement		Telescopic bar		
	One-way variable displacement hydraulic motor		Two-way flow, two-way rotation, variable displacement	Pressure converter	Gas-liquid converter		One-way action
	Swing motor		Two-way swing, fixed angle				Continuous action
Pump-motor	Fixed displacement hydraulic pump-motor		One-way flow, one-way rotation, fixed displacement		Turbocharger		One-way action
	Variable displacement hydraulic pump-motor		Two-way flow, two-way rotation, variable displacement, external oil drain				Continuous action
	Hydraulic integral transmission		Unidirectional rotation, variable displacement, fixed displacement motor	Accumulator	Accumulator		General symbol
Single-acting cylinder	Single piston rod cylinder		Detailed symbol		Gas isolation type		

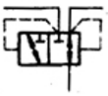
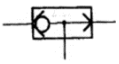
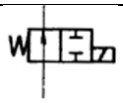
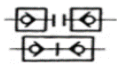
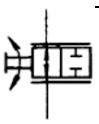
			Simplified symbol		Weight-loaded type		
	Single piston rod cylinder (with return spring)		Detailed symbol		Spring type		
			Simplified symbol	Auxiliary gas cylinder			
	Plunger rod r			Gas tank			
	Telescopic cylinder				Hydraulic pressure source		General symbol
Double-acting cylinder	Single piston rod cylinder		Detailed symbol	Energy source	Air pressure source		General symbol
			Simplified symbol		Motor		
	Double piston rod cylinder		Detailed symbol		Prime motor		Except motor
			Simplified symbol				
(2) Mechanical control device and control methods							
Mechanical control parts	Straight moving rod		Arrows can be omitted	Pilot pressure control method	Hydraulic pilot pressure control		Internal pressure control
	Axle of rotary motion		Arrows can be omitted		Hydraulic pilot pressure control		External pressure control
	Positioning device				Hydraulic secondary pilot pressure control		Internal pressure control, internal oil drain
	Locking device		* Control method for unlocking		Gas-liquid pilot pressure control		External control of air pressure, hydraulic internal control, external oil drain

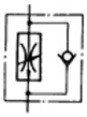
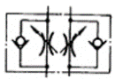
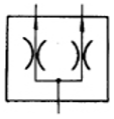
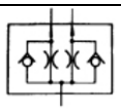
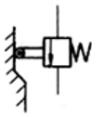
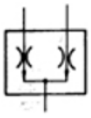
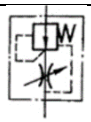
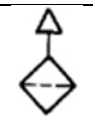
	Bounce mechanism				Electro-hydraulic pilot pressure control		Hydraulic external control, internal oil drainage
	Ejector rod type				Hydraulic pilot pressure relief control		Internal pressure control, internal oil drain
	Variable travel control type						External pressure control (with remote relief outlet)
	Spring control type				Electro-hydraulic pilot control		Electromagnet control, external pressure control, external oil drain
	Roller type		Two-direction operation		Pilot pressure control valve		With pressure regulating spring, external oil drain and with remote relief outlet
	One-way roller type		It's only operated in one direction, so the arrow can be omitted.		Pilot proportional solenoid pressure control valve		Priority is controlled by proportional electromagnet with internal oil drainage
Manual control method	Manual control		General symbol	Electrical control method	Single-acting electromagnet		The electrical lead can be omitted, and the slash can also be directed to the lower right.

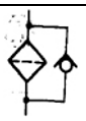
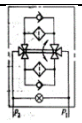
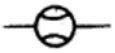
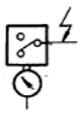
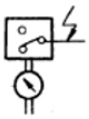
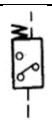
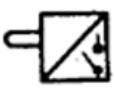
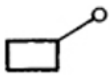
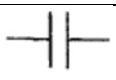
	Button type				Double-acting electromagnet		
	Button type				Single-acting adjustable electromagnetic operation (proportional electromagnet)		
	Press-pull type				Double-acting adjustable electromagnetic operation (torque motor, etc.)		
	Handle type				Rotary motion electrical control device		
	One-way pedal type			Feedback control method	Feedback control		General symbol
	Two-way pedal type				Electrical feedback		The position is detected by potentiometer, differential transformer, etc.
	Pressurization or relief control				Internal mechanical feedback		Such as follower valve profiling control circuit
	Differential control						
	Internal pressure control		The control channel is inside the original				

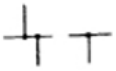
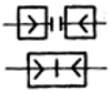
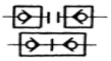
	External pressure control		The control channel is outside the original				
(3) Pressure controller							
Relief valve	Relief valve		General symbols or direct-acting relief valve	Pressure reducing valve	Pilot proportional solenoid pressure reducing valve		
	Pilot relief valve				Proportional pressure reducing valve		Pressure reducing ratio: 1/3
	Pilot electromagnetic relief valve		(Normally closed)		Constant difference pressure reducing valve		
	Direct-acting proportional relief valve			Sequence valve	Sequence valve		General symbols or harmonious-acting sequence valve
	Pilot proportional relief valve				Pilot sequence valve		
	Unloading relief valve		Unloading it when p2>p1		One-way sequence valve (balance valve)		
	Two-way relief valve		Direct-acting, external oil drain	Unloading valve	Unloading valve		General symbols or direct-acting unloading valve
Pressure reducing valve	Pressure reducing valve		General symbols or direct-acting pressure reducing		Pilot electromagnetic unloading valve		p1>p2

			valve				
	Pilot pressure reducing valve			Brake valve	Double overflow brake valve		
	Relief pressure reducing valve				Overflow oil bridge brake valve		
(4) Directional control valve							
Check valve	Check valve		Detailed symbol	Reversing valve	Two-position five-way hydraulic valve		
			Simplified symbol (spring can be omitted)		Two-position four-way motorized valve		
Hydraulic check valve	Hydraulically controlled check valve		Detailed symbol (controlling pressure shutoff valve)		Three-position four-way solenoid valve		
			Simplified symbol		Three-position four-way electro-hydraulic valve		Simplified symbol (internal leakage and external control)
			Detailed symbol (controlling pressure opening valve)		Three-position six-way hand valve		
			Simplified symbol (spring can be omitted)		Three-position five-way solenoid valve		
	Double hydraulically controlled				Three-position four-way		External control and internal

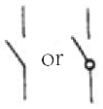
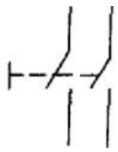
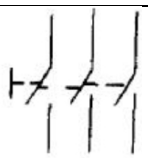
	check valve				electro-hydraulic valve		leakage (with manual emergency control device)
Shuttle valve	Or gate valve		Detailed symbol		Three-position four-way proportional valve		Throttling type, overlapped center
			Simplified symbol		Three-position four-way proportional valve		Underlapped center
Reversing valve	Two-position two-way solenoid valve		Normally closed		Two-position four-way proportional valve		
			Normally open		Four-way servo valve		
	Two-position three-way solenoid valve				Four-way electro-hydraulic servo valve		Level 2
	Two-position three-way solenoid ball valve						Live feedback level 3
	Two-position four-way solenoid valve						
(5) Flow control valve							
Throttle valve	Adjustable throttle valve		Detailed symbol	Flow regulating valve	Flow regulating valve		Simplified symbol
			Simplified symbol		Bypass type flow regulating		Simplified symbol

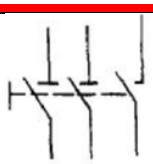
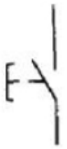
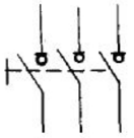
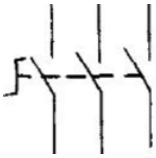
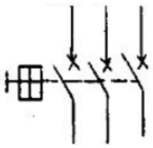
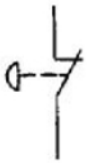
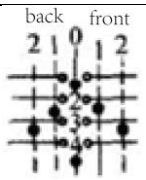
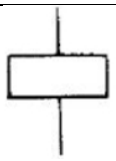
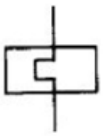
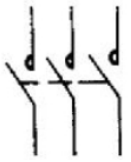
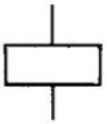
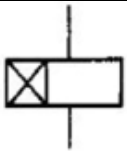
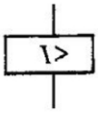
					valve		
	Non-adjustable throttle valve		General symbol		Temperature compensated flow regulating valve		Simplified symbol
	One-way throttle valve				One-way flow regulating valve		Simplified symbol
	Double one-way throttle valve			Synchronous valve	Flow divider valve		
	Stop valve				One-way flow divider valve		
	Roller-controlled throttle valve (deceleration valve)				Flow combiner valve		
Flow regulating valve	Flow regulating valve		Detailed symbol		Diverter collector valve		
(6) Oil tank							
Atmospheric type	Pipe end above the liquid level			Oil tank	Pipe end at the bottom of the oil tank		
	Pipe end above the liquid level		With air cleaner		Local oil drain or return		
				Pressurized oil tank or closed oil tank			Three oil circuits
(7) Fluid regulator							
Filter	Filter		General symbol	Air cleaner			
	Filter with pollution indicator			Temperature regulator			

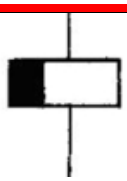
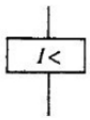
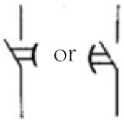
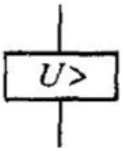
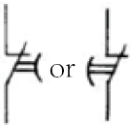
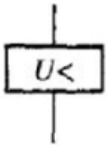
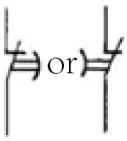
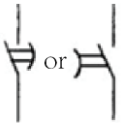
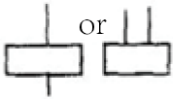
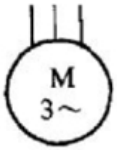
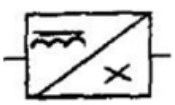
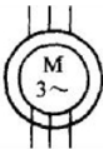
	Magnetic filter			Cooler	Cooler		General symbol
	Filter with bypass valve				Cooler to the coolant pipeline		
	Duplex filter		P1: oil inlet P2: oil return	Heater			General symbol
Pressure detector	Pressure indicator			Flow detector	Galvanometer (liquid flow indicator)		
	Pressure gauge				Flowmeter		
	Electric contact pressure gauge (pressure display controller)				Accumulated flowmeter		
	Differential pressure control gauge			Thermometer			
Level gauge				Tachometer			
				Torque meter			
(9) Other auxiliary components							
Pressure relay (pressure switch)			Detailed symbol	Differential pressure switch			
			General symbol	Sensor	Sensor		General symbol
Travel switch			Detailed symbol		Pressure sensor		
			General symbol		Temperature sensor		
Coupling	Coupling		General symbol	Amplifier			

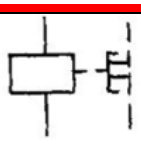
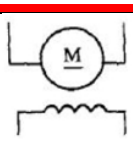
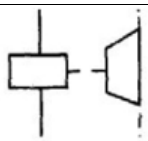
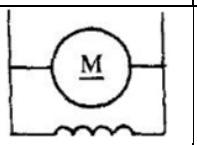
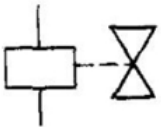
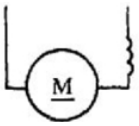
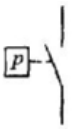
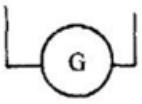
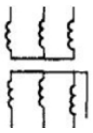
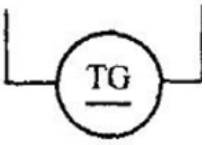
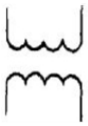
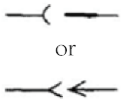
	Flexible coupling						
(10) Pipeline, pipeline joints and connectors							
Pipeline	Pipeline		Pressure pipeline and return pipeline	Pipeline	Cross pipeline		The two pipelines are crossed and unconnected
	Control pipeline		Two pipelines intersected and connected		Flexible pipeline		
	Control pipeline		It can represent an oil draining pipeline		One-way air bleeder		
Quick-change connector	Quick connector without check valve			Rotary connector	Single-channel rotary connector		
	Quick connector with check valve				Three-way rotary connector		

6.3 Diagram of common electrical part symbols

Socket	Name	Graphic symbol	Letter symbol	Category	Name	Graphic symbol	Letter symbol
Switch	Unipolar control switch		SA	Position switch	Normally open contact		SQ
	General symbols of manual switch		SA		Normally closed contact		SQ
	Three-level control switch		QS		Composite contact		SQ

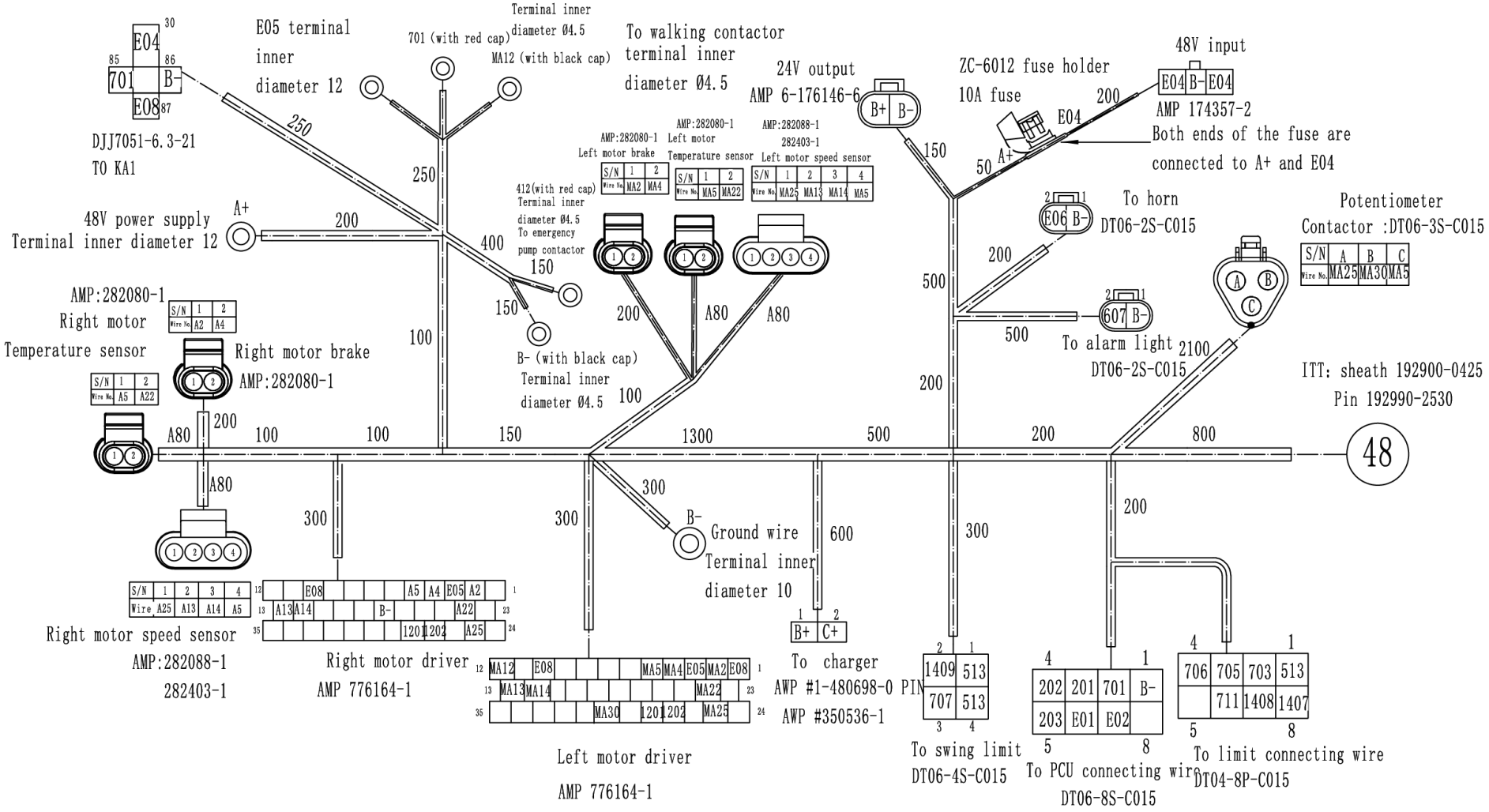
	Three-level isolating switch		QS	Button	Normally open button		SB
	Three-level load switch		QS		Normally closed button		SB
	Combination knob switch		QS		Composite button		SB
	Low voltage circuit breaker		QF		Emergency stop button		SB
	Controller or operating switch		SA		Key-operated button		SB
Contactor	Coil operating device		KM	Thermal relay	Thermal element		FR
	Normally open main contact		KM		Normally closed contact		FR
	Normally open auxiliary contact		KM	Intermediate relay	Coil		KA
	Normally closed auxiliary contact		KM		Normally open contact		KA
Time relay	Power-on delay (slow pull-in) coil		KT		Normally closed contact		KA
	Power-off delay (slow release) coil		KT	Current relay	Overcurrent coil		KA

					Undercurrent coil		KA
	Normally open contact which is Instantaneously closed		KT		Normally open contact		KA
	Normally closed contact which is instantaneously disconnected		KT		Normally closed contact		KA
	Normally open contact which is closed with delay		KT	Voltage relay	Overvoltage coil		KV
	Normally closed contact which is disconnected with delay		KT		Undervoltage coil		KV
	Normally closed contact which is closed with delay		KT		Normally open contact		KV
	Normally open contact which is disconnected with delay		KT		Normally closed contact		KV
Electromagnetic operator	General symbol of electromagnet		YA	Motor	Three-phase cage asynchronous motor		M
	Electromagnetic chuck		YH		Three-phase wound rotor asynchronous motor		M

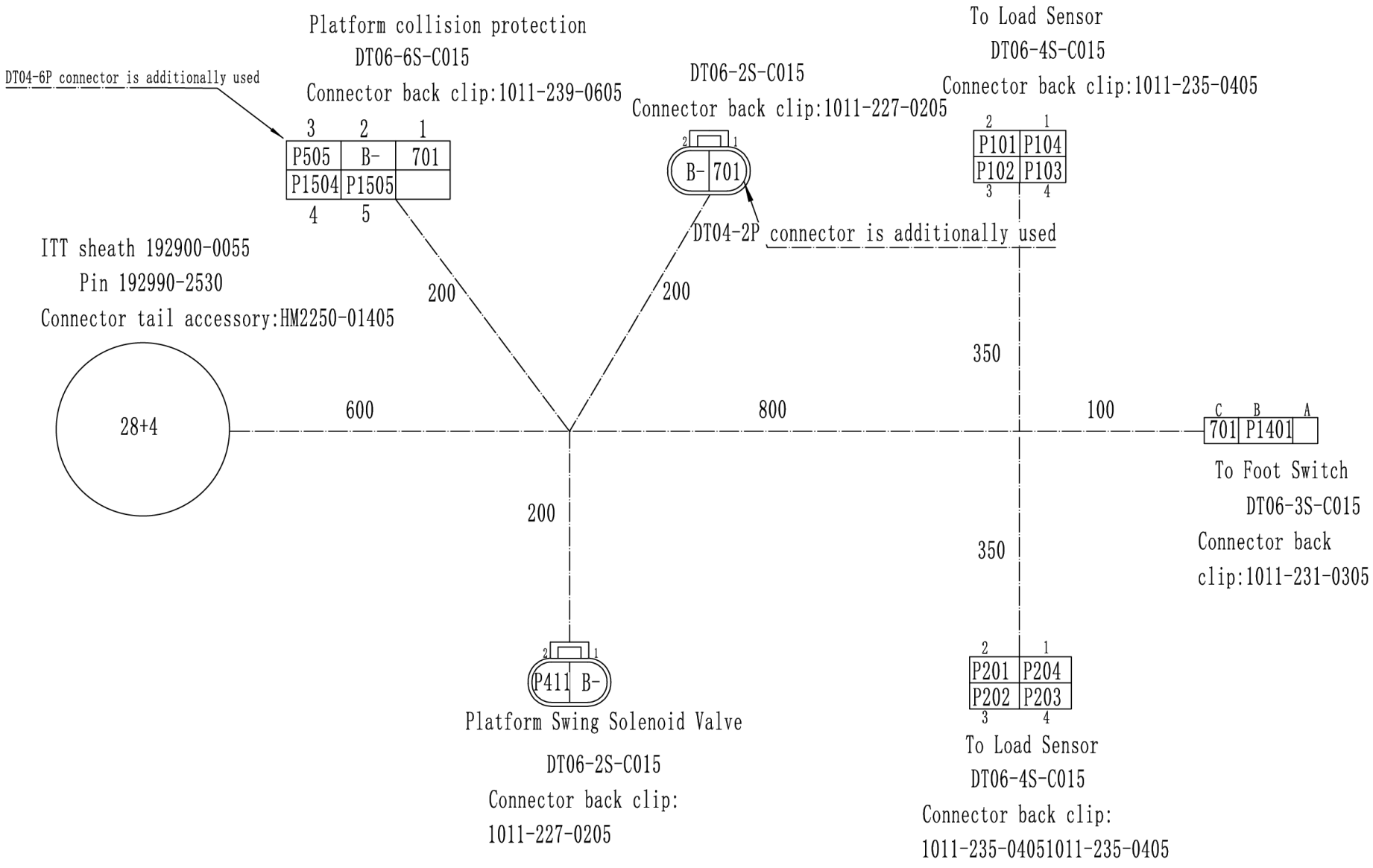
	Electromagnetic clutch		YC		Separately excited DC motor		M
	Electromagnetic brake		YB		Shunt DC motor		M
	Solenoid valve		YV		Series DC motor		M
Non-electricity-controlled relay	Speed relay normally open contact		KS	Fuse	Fuse		FU
	Pressure relay normally open contact		KP	Transformer	Single-phase transformer		TC
Generator	Generator		G		Three-phase transformer		TM
	DC tachometer generator		TG	Transformer	Voltage transformer		TV
Lamp	Signal lamp (indicator lamp)		HL		Current transformer		TA
	Lighting lamp		EL	Connector	Plug and socket		X Plug XP Socket XS

6.4 Wire harness number description

6.4.1 Main harness



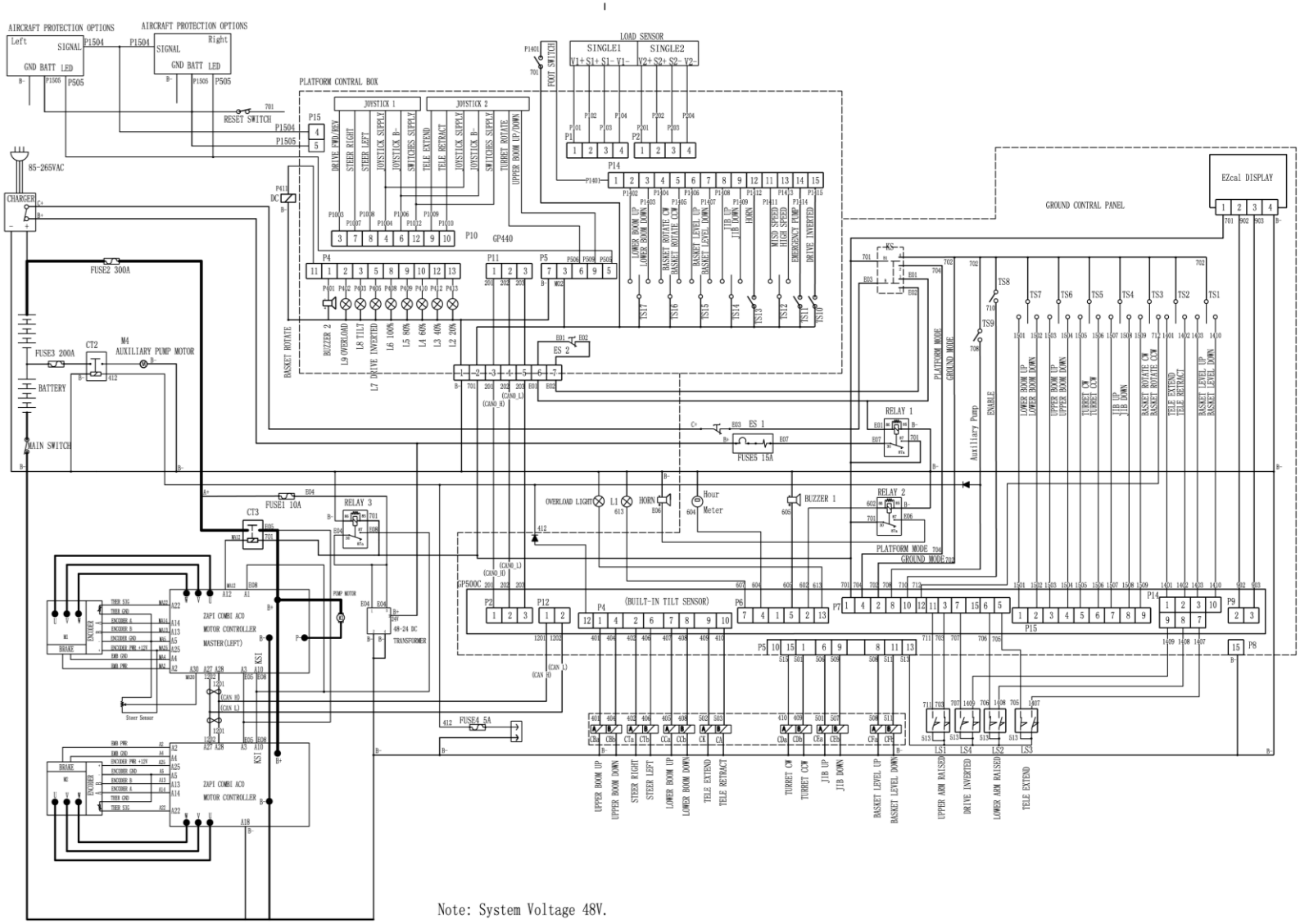
6.4.2 Platform wire



Wire size	Function	Colour	Wire size	Function	Colour
P101	Load power supply	Red	701	PCU power supply	Red
P104	Load ground wire	Black	P1401	Foot switch	White
P102	Signal 1+	White	P411	Workbar swing	White
P103	Signal 1-	White	B-	Ground wire	Black
P201	Load power supply	Red	P1504	Proximity switch signal line	White
P204	Load ground wire	Black	P505	Beacon power supply	Red
P202	Signal 2+	White	P1505	Overtaking signal	White
P203	Signal 2-	White			

6.5 Schematic diagram

6.5.1 Electrical schematic diagram



Note: System Voltage 48V.

6.5.2 Hydraulic schematic diagram