



Maintenance Manual

Mobile Elevating Work Platform Model: XGS43



Part No. 165902781

XCMG FIRE-FIGHTING SAFETY EQUIPMENT CO., LTD.



Chapter A Maintenance Safety Instructions

A General

This chapter includes fundamental safety instructions to be followed during the maintenance of mobile elevating work platform. The maintenance personnel shall follow the safety warnings and precautions to prevent injuries to themselves or others and damages to the equipment. The maintenance plan shall be implemented to ensure safe operation of the machine.



Any modification without authorization to the machine shall not be allowed until it is approved by the competent authority that the machine remains at the same level of safety as the original equipment.

The manual is emphasizing the specific instructions and precautions to be followed during the maintenance procedures. In most circumstances, such precautions must be followed during the maintenance and repair for hydraulic system and large components.

In maintenance of the equipment, the consideration of safety of working personnel and others shall be of first priority. Do not attempt to move any heavy components without the assistance of machinery and equipment. Do not place any heavy objects on unstable positions. The sufficient support shall be ensured when elevating any parts of the equipment.



The owner/operator shall be responsible for the safety on maintenance site as the manufacturer is not capable to control the site inspection and maintenance procedures.

B Safety of Hydraulic System

The hydraulic system of the machine is operating under the pressure of extreme danger, therefore, please ensure to release the pressure of the system as much as possible prior to disassemble or remove certain parts of the system.

Under the condition of flame-out of the engine and power switch-on, please repeat the cycle op-



eration of proper control for several times and release the pressure of the system to guide the pressure from pipelines back to the oil tank. Please disconnect the hydraulic pipelines of the system components to minimize the loss of hydraulic oil.

C Maintenance



Any violations to the safety instructions of this chapter shall cause damages to machine or casualties to personnel.

- Ensure the replaced parts and components to be same or similar with the original ones.
- No smoking. No refueling during thunder and lightning. Ensure the fuel tank cap to be closed in safe conditions at any time.
- During maintenance, remove all rings, watches and jewelries.
- During maintenance, do not wear long hair or loose clothes or ties that are easy for winding to the equipment.
- Please follow all the safety warnings and precautions on the machine and written in the service manual.
- Clean any oil, grease and water on the standing surfaces and handrails.
- Please follow the instructions during the inspection of hot pressing coolant system.
- Prior to the operation below elevating big arm, the movement of the big arm shall be

fixed or restricted through stop blocks or slings, or the safety support shall be applied.

- Please lubricate or maintain other components and turn off all the switches prior to adjustment.
- The battery shall be removed for the replacement of electronic components.
- Ensure all the supporting equipments and accessories are in correct positions.
- Only approved non-flammable cleaners shall be used.



Revision

First Issue

DECEMBER 04, 2019



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Chapter 1 Specification

1-1 Operating Specifications

Table 1-1 Operating Specifications

Max. working load Unlimited Limited	230 kg 450kg	507.1 lb 992.1 lb
Max. running inclination (longitudinal)	45% downward platform 30% upward platform	
Max. running inclination (side)	5 °	
Max. vertical height of platform	41.6 m	136.45 ft
Max. operating radius	25 m	82 ft
Minimum turning radius (With shaft retracted/extended)	8.2/10.8m (Two-wheel steering) 5.8/6.8m (Four-wheel steering)	26.9/35.4ft (Two-wheel steering) 19.0/22.3ft (Four-wheel steering)
Max. running speed	5 km/h	3.11Mph
Max. hydraulic pressure	30Mpa	300 bar
Max. wind speed	12.5 m/s	28.0 Mph
Maximum manual operating force	400 N	
Electrical voltage	12V	
Weight of the vehicle (platform unoccupied)	22000 kg	48501.2 lb

1-2 Technical Specifications

Table 1-2 Technical Specifications

Rotation of platform	360 °	
Maximum tail wagging (With shaft retracted/extended)	2.39/1.73 m	7.84/5.67ft
Platform	0.90×2.40 m	2.95×7.87 ft
Overall width (With shaft retracted/extended)	2.49 /3.8 m	8.17/12.46 ft
Folding height	3.05 m	10.0 ft
Folding length	14.9 m	48.9 ft
Axle base	3.80 m	12.46 ft

Clearance to ground	0.32 m	1.05 ft
Running speed folding status elevating status	5 km/h 1.0 km/h	3.11 Mph 0.62 Mph
Ground bearing capacity	8 kg/cm ²	113.84 psi

1-3 Capacity

Table 1-3 Capacity

Fuel tank	180 L	46.80 gal
Hydraulic oil tank	260 L	67.60 gal

1-4 Specifications of Components

Specifications of Engine

Table 1-4 Perkins Engine

Type	liquid cooling (engine oil)	
Fuel oil	diesel	
Engine oil Capacity	9 L	2.34 gal
Cooling system	11 L	2.86 gal
Idling speed	800 rpm	
Low speed	1300 rpm	
High speed	2400 rpm	
Electric generator	85 A, belt drive	
Fuel consumption Low speed High speed	6.55 L/h 11.36 L/h	
Horsepower	75@2400 rpm, full load	

Battery

Table 1-5 Battery Specifications

Voltage	12V
Type	6-QW-200
Cold boot current	1000CCA@0°F (-18℃)



1-5 Tire

Table 1-6 Tire Specifications

Dimension	Type	Layer number	Weight
385/65D22.5	Foam	20	413 kg/910.5 lb

1-6 Function and Speed

Table 1-7 Function and Speed

Function	Time / s
Big arm elevation	110-135
Big arm declination	80-90
Turntable slewing	
Full extended	220-260
Full retracted	125-150
Extention	140-180
Retraction	60-100
Left or right rotation of platform	18-25
Rotate jib counter-clockwise	25-35
Rotate jib clockwise	25-35
Small arm elevation	35-45
Small arm delclination	25-35
Driving (forward)	41-45
Driving (backward)	41-45
Driving (elevating status)	59-72

Machine Positioning for Speed Test

Elevation: The extension arm is retracted. Complete elevation and record the time; complete declination and record the time.

Extension arm: The elevation of big arm is fully completed. The extension arm is retracted. The extension arm is extended and record the time. The extension arm is retracted and record the

time.

Driving (forward/backward): The test shall be conducted on smooth and level surface. The driving selection switch shall be set on the position of high speed rotation. During test, record the result on 60m (196.8 ft) straight driving path. Drive forward and record time. Drive backward and record time.

Driving (elevating status): The test shall be conducted on smooth and level surface. The driving selection switch shall be set on the position of high speed rotation. During test, record the result on 18 m (59 ft) straight driving path. Drive forward and record time. Drive backward and record time.

Platform rotation: The platform shall horizontally rotate in single direction. Rotate in certain direction and record the time. Rotate in reverse direction and record the time.

Small arm bending: The platform shall be maintained level with the big arm kept in middle position. Start after declining the small arm. Elevate small arm and record the time. Decline small arm and record the time.

Testing Precautions

1. The stop watch shall be started in accordance with actual functions, other than the controller or switch.
2. All the speed tests shall be operated through the actions of the platform. Such speed values shall not reflect any ground operations.
3. The motion joystick shall be pushed to the end during test.
4. The speed of functions may be different due to the temperature and thickness of hydraulic oil. The temperature of hydraulic oil shall exceed 100°F during the test.
5. When the rotary knob of speed is set on low speed position, parts of flow control may not be effective.

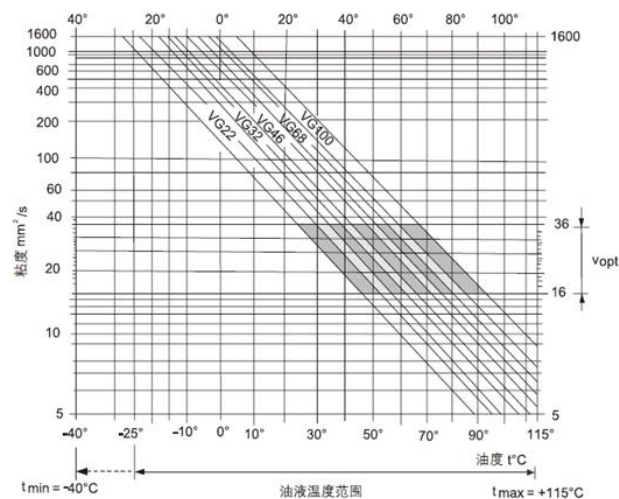
1-7 Torque Requirement

Table 1-8 Torque Requirement

Description	Torque value (dry)	Time interval (hr)
Hub fastening bolt	600-660N*m 442.5-486.7ft*lb	150
Swing bearing bolt	495-545N*m 365-402 ft*lb	50/600
Starter motor	9.5 N*m/ 7ft*lb	Depending on actual need.
Field coil	4 N*m/2.9ft*lb	
Contact coil		
* After initial operation for 50 hours, please check the swing bearing bolt once every 600 hours to ensure it is safe. (Refer to rolling bearing in Chapter 3)		
Note: In case the maintenance is required or fasteners become flexible, please refer to the Torque Table to confirm the proper torque value.		

1-8 Lubrication

Hydraulic Oil



Notice: The hydraulic oil must contain anti-wear additive at least conforming to GL-3 quality standard of API service classification and incorporate the chemical stability enough to meet the running needs of mobile hydraulic system. XCMG recommends using XCMG AE46 special anti-wear hydraulic oil.

Notice: Use HS22 hydraulic oil in regions with $\leq -15^{\circ}\text{C}$ environmental temperature. Besides the XCMG recommended product, it's recommended not mixing the oils of different trademarks or types, as they may contain different additives or different equivalent viscosities. To use any hydraulic oil other than AE46, please contact XCMG to acquire correct recommendation information.



1-9 Weight of Main Components

Table 1-9 Weight of Components

Component	Weight of Components	
	lb	kg
Rotating platform (excluding other components)	2828	6235
Balance weight	3500	7716
Third section arm (SJ)	488.3	1077
Second section arm (SJ)	706.7	1558
First section arm (SJ)	1224	2698
Big arm assembly	2480	5467
Extension cylinder	840.5	1853
Slave cylinder	53	117
Tire	413	910



Table 1-13 Torque Table (1/3)

For galvanized/chromium fasteners							
Level 8.8 metric bolt / level 8 metric nut							
Dimension	Pitch	Anti-tension stress area	Clamping load	Torque (dry or Loctite 263)	Torque (lubrication)	Torque (Loctite 262 glue)	Torque (Loctite 242 or 271)
		mm ²	kN	N.m	N.m	N.m	N.m
3	0.5	5.0	2.2	1.3	1.0	1.2	1.4
3.5	0.6	6.8	2.95	2.1	1.6	1.9	2.3
4	0.7	8.8	3.82	3.1	2.3	2.8	3.4
5	0.8	14.0	6.2	6.2	4.6	5.6	6.8
6	1	20.1	8.74	11	7.9	9.4	12
7	1	28.9	12.6	18	13	16	19
8	1.25	36.6	15.9	25	19	23	28
10	1.5	58.0	25.2	50	38	45	55
12	1.75	84.3	36.7	88	66	79	97
14	2	115	50.0	140	105	126	154
16	2	157	68.3	219	164	197	241
18	2.5	192	82.5	301	226	271	331
20	2.5	245	106	426	320	383	469
22	2.5	303	132	581	436	523	639
24	3	353	153	737	553	663	811
27	3	459	199	1080	810	970	1130
30	3.5	561	255	1460	1100	1320	1530
33	3.5	694	302	1990	1490	1790	2090
36	4	817	355	2560	1920	2300	2690
42	4.5	1120	487	4090	3070	3680	4290

Note: The above-mentioned torques are not applicable for cadmium-plated fasteners.



Table 1-13 Torque Table (2/3)

For galvanized/chromium fasteners							
Level 10.9 metric bolt / level 10 metric nut / below level 12.9 internal hexagonal M6							
Dimension	Pitch	Anti-tension stress area	Clamping load	Torque (dry or Loctite 263)	Torque (lubrication)	Torque (Loctite 262 glue)	Torque (Loctite 242 or 271)
		mm ²	kN	N.m	N.m	N.m	N.m
3	0.5	5.0	3.13	1.9	1.4	1.5	2.1
3.5	0.6	6.8	4.22	3.0	2.2	2.4	3.3
4	0.7	8.8	4.47	4.4	3.3	3.5	4.8
5	0.8	14.0	8.85	8.9	6.6	7.1	9.7
6	1	20.1	12.5	15	11	12	17
7	1	28.9	18.0	25	19	20	28
8	1.25	36.6	22.8	37	27	29	40
10	1.5	58.0	36.1	72	54	58	79
12	1.75	84.3	52.5	126	95	101	139
14	2	115	71.6	200	150	160	220
16	2	157	97.8	313	235	250	344
18	2.5	192	119.5	430	323	344	473
20	2.5	245	152.5	610	458	488	671
22	2.5	303	189	832	624	665	915
24	3	353	220	1060	792	845	1170
27	3	459	286	1540	1160	1240	1690
30	3.5	561	349	2100	1570	1680	2310
33	3.5	694	432	2600	2140	2280	2860
36	4	817	509	3660	2750	2930	4020
42	4.5	1120	598	5860	4400	4690	6440



Table 1-13 Torque Table (3/3)

For galvanized/chromium fasteners						
Above level 12.9 internal hexagonal M6						
Dimension	Pitch	Anti-tension stress area	Clamping load	Torque	Torque (Loctite 262 glue)	Torque (Loctite 242 or 271)
		mm ²	kN	N.m	N.m	N.m
3	0.5	5.0			1.5	2.1
3.5	0.6	6.8			2.4	3.3
4	0.7	8.8			6.5	4.8
5	0.8	14.0			7.1	9.7
6	1	20.1	12.5	11	12	17
7	1	28.9	18	19	20	28
8	1.25	36.6	22.8	27	29	40
10	1.5	58.0	36.1	54	58	79
12	1.75	84.3	52.5	95	101	139
14	2	115	71.6	150	160	220
16	2	157	97.8	235	250	344
18	2.5	192	119.5	323	344	473
20	2.5	245	152.5	458	488	671
22	2.5	303	189.0	624	665	915
24	3	353	220.0	792	845	1170
27	3	459	286.0	1160	1240	1690
30	3.5	561	349.5	1570	1680	2310
33	3.5	694	432.5	2140	2280	2860
36	4	817	509.0	2750	2930	4020
42	4.5	1120	697.0	4400	4690	6440



Chapter 2 Maintenance Safety Instruction



2-1 Responsibilities and Requirements of Maintenance Personnel and Security Equipment

1. Responsibilities

The maintenance personnel are responsible for the maintenance, safe use and normal operation of the aerial work platform. They shall comply with the maintenance and repair manual provided by XCMG FIRE-FIGHTING SAFETY EQUIPMENT and provide necessary maintenance for the aerial work platform under the safe operation system.

2. Basic Requirements

The maintenance personnel shall meet the following conditions:

- a. The inspection personnel and maintenance personnel shall have the relevant qualification or obtain the authorization.
- b. Professionals or expert engineers shall be experienced.
- c. Be familiar with the mobile elevating work platform to be repaired and its risk.
- d. Receive the relevant education and training, including courses related to how to use the spe-

cial equipment.

- e. Be familiar with the working procedure and safety protection measures related to the aerial work platform.



The personnel who have been trained and got the qualification certificate by passing the examination may repair the aerial work platform;

The personnel who can not do the regular work for illness, drinking or taking medicines shall not perform any repair work;

3. Personnel Security Equipment

- a. You must use the security equipment when operating the machine.
- b. Select the appropriate security equipment according to the working conditions, such as safety helmet, safety gloves, safety protective glasses, safety belt, safety shoes and hearing protective device, etc.;

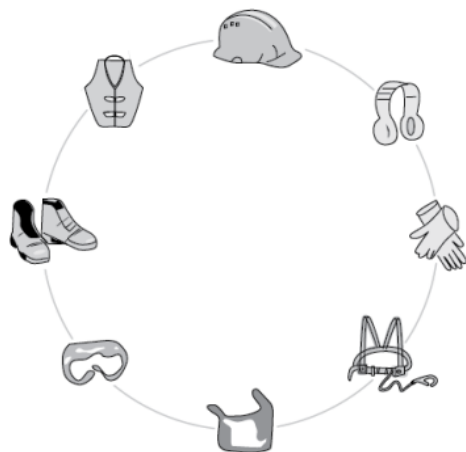
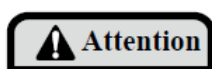


Figure 2-1 Individual Protective Equipment

- c. Inspect the security equipment before and after work, maintain or replace them as necessary according to the established procedure;
- d. Keep inspection and maintenance records where required;
- e. Some security equipment (such as safety helmet and belt) may be damaged after being used for a certain period, so they shall be inspected and replaced at regular intervals.



Inspect the security equipment at regular intervals and replace them immediately for any damages found.

All personal protective equipment can not provide 100% protection.

In order to protect the personnel safety of you

and other persons, please put on the protective equipment correctly and be familiar with the possible dangers in the operation process.

2-2 Precautions for Maintenance



Periodic repair and maintenance for the mobile elevating work platform shall be conducted by the professional maintenance personnel.

1. Pay attention to ventilation



It may result in poisoning to inspect or maintain in the place with limited space and poor ventilation conditions.

The forced ventilation measures shall be provided when the engine is started in the place with limited space. Connect a hose to the vent pipe for discharging smoke to the outdoor. Open the doors and windows for the sufficient circulation of the air.

2. Arrangement and Cleanness of the Workplace



It may result in personal injury or falling accident in case of inspecting or maintaining in the disordered place. Clear away all barriers before the work is started.

3. Stop the engine before the inspection or maintenance operation.

Don't inspect or maintain when the engine is running to prevent an accident.

Take down the start key before the inspection and maintenance operations and place a warning board "Do not operate" for warning on the door or the control lever of the control panel.



Starting of the engine by accident by any irrelevant personnel during the inspection or maintenance may result in the accidents, such as mechanical damages or loss of life and personal injury.

4. If the inspection or maintenance must be conducted when the engine is running, 2 persons shall be provided at least to complete the job together; one person must be standing in front of the control panel of the rotary table or platform so as to stop the engine at any time as necessary, the other per-

son shall inspect or maintain. Both of them shall keep in close contact and complete the operation task securely.

5. The aerial work platform shall be cleaned up before the inspection or maintenance operation.

The dust or chips on the mobile elevating work platform not only make it difficult to find the elements or parts out of order, but also can sneak into the interior of the elements or parts. In addition, the dust or mud will hurt the eyes or make person slip for injury accident.

6. Do not aim at the electrical control cabinet and circuit connectors directly when washing the machine with high pressure water, or it will short out the electrical system.



Strictly prohibit aiming at the electrical elements with water or steam jet! Electric Shock!



2-3 Precautions in Maintenance

1. Prevent fire

Use the nonflammable cleaning fluid to clean the components and elements.

The places where the fuel oil and grease-like matters are kept shall be far from all flame or spark source.

Prohibit anyone from smoking.

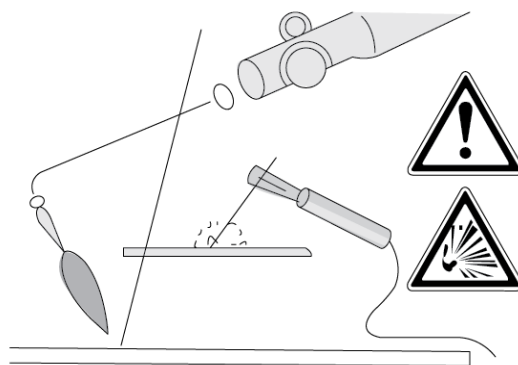
Prohibit any flame or spark source being close to any inflammable goods.

The ready-to-use fire extinguisher must be available and the method of application shall be known.

Use the explosion-proof lamp while the fuel oil, oils and batteries are inspected.

When grinding or welding, keep the inflammable goods far from the sparking or melting metal.

- Only the professionals can complete the welding and repair of each component or wear-resistant part of the mobile elevating work platform.



In order to prevent the positive and negative poles of the welding machine with the vehicle body forming circuit to burn out the electrical elements, such as controllers and sensors, the positive and negative poles wires must be removed when welding, or you will be fully responsible for the consequences caused.



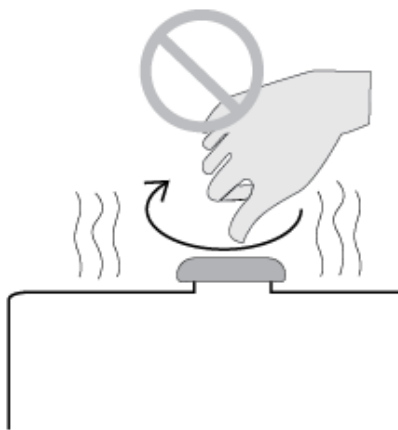
It is forbidden to use the machine as the ground wire when welding.

- Inspect or maintain after the temperature of the machine falling

When the machine running, the temperature of



all mechanical components is very high, you will get burn when contacting. These components include the engine, silencer, and cooling water of the engine, radiator, hydraulic oil, reducer, hydraulic equipment and parts. These components or parts shall be cooled before the inspection or maintenance is started.



4. When disassembling the components, pay attention to their installation location. In the installation process, ensure correct installation.



Strictly prohibit to dismantle the electronic components.

5. No tools or components is allowed to fall into the inspection hole

When operating through the inspection hole with the face downward, be sure not to drop any thing

into the hole. The things dropped will damage the machine or result in the misoperation of the machine.

Any tools or matters dropped into the inspection hole must be taken out.

6. If the electrical, gas circuit or hydraulic components (such as valves and pumps) are re-quired to be replaced, the new components to be installed shall be inspected and adjusted ac-cording to the data on the machine schematic diagram.



Only the components approved by the manufacturer can be used, especially those which affect the load-carrying properties and safety performance.

7. After getting the manufacturer's approval, the components which affect the stability, in-tension and usability of the platform may be transformed or modified, such as all structural components, load bearing parts, electric devices and hydraulic parts. If not, transforming or modifying of the mobile elevating work platform is prohibited.

8. Pay Attention to High Pressure Oil



High pressure fuel oil or hydraulic oil can cause serious damages to the skin or eyes. In order to avoid such dangers, the following instructions shall be observed:

- a. Firstly release the pressure inside the pipeline before such pipeline is disassembled;
- b. Put on the goggles and protective gloves when inspecting the leakage. The leakage of the high pressure oil may be not visible; the hardboard or wood chip shall be used as the tool to confirm the oil leakage. Don't confirm by hand.



9. Pay Attention to High Temperature Parts of the Cooling System

If the cover of the radiator is taken down in the state that the cooling water temperature of the engine is very high, the steam or hot water will erupt to cause burns.

Stay away the front of the radiator cover after waiting for the cooling water temperature reduction, slowly screw off such cover in an avoiding posture and take it down after the steam pressure is released.

10. Remove the cables of the battery before inspecting or maintaining the electrical system

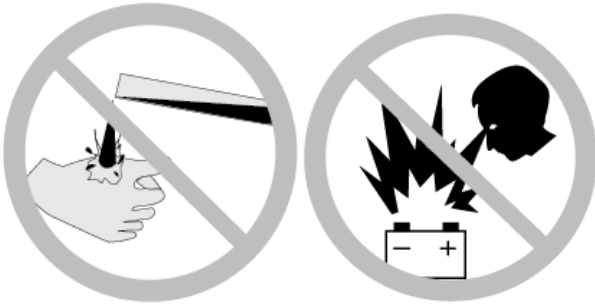
Inspection or maintenance of the electrical system without the removal of the cables of the battery may give rise to short out and damage the wirings, electrical elements and electronic components of the electrical system.

Before inspection or maintenance of the electrical system is started, the cables on the negative pole terminal side (ground side) must be removed.

11. Pay Attention to the Battery Electrolyte

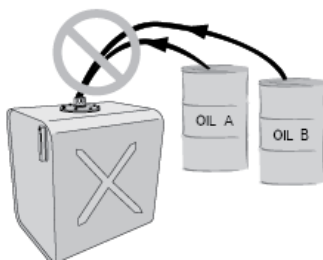
The battery electrolyte contains dilute sulphuric acid which causes blindness when entering the eye and causes burn when contacting with the skin. You must put on the goggles, protective gloves and long sleeve work clothes when disposing the battery.

If the eye or skin is contacted with the battery electrolyte, flush with water at once and consult the doctor.



12. Use the Specified Grease-like Items

When adding or replacing the grease-like items, the oil and lubricating grease with the recommended trade marks or with the same grade of those recommended shall be used. The chemical reaction of mixing the greases with different trade marks will change the characteristics of such greases which have negative effects on the mechanical properties. When using grease with the mark different from all marks in the machine, clear away the original grease thoroughly at first, and then add the new one.



13. Support the Lift Arm and Platform during Repair

Generally, it is prohibited to do maintenance operation when the platform is in lifting position; if

there is special requirement, the lift arm and platform shall be supported reliably so as to ensure the machine being safe and reliable during maintaining.

2-4 Precautions after Maintenance

1. The holding function must be confirmed after maintenance in order to early discover the faults such as oil leak or poor action.
2. The holding function, oil leak, bolt looseness and other problems of the parts maintained on the machinery must be confirmed after maintenance.
3. Recover or reinstall the security equipment, if necessary, the security equipment shall be calibrated again.
4. Remove the tools and equipment for maintenance, take away the components replaced and scattered objects for site clearing;
5. Keep in mind that all “maintenance operations” shall include the mandatory confirmation of the machinery in normal action.



Dispose the hazardous wastes, such as oils,



fuel oil, filter element, battery and hydraulic oil, etc. according to laws. The reasonable recycles of the oils, cooling agents or filter element used not only save resources but also protect the environment.

It is forbidden to pour waste liquid at will to the sewer lines, earth's surfaces and rivers. The waste liquid in the machine shall be discharged into the appropriate containers for proper disposal.

The hazardous substances should be disposed according to all regulations and rules for the environmental management at any time to prevent from being fined or punished by the relevant departments.



Memorandum



Memorandum



Chapter 3 Oils Lubrication and Maintenance



3-1 Lubrication

In order to guarantee the service life of the aerial work platform, every parts of the equipment with relative movement must be lubricated at regular intervals. See Figure 3-1 and 3-2 for the lubrication locations of this machine, see Table 3-1 for the cycle and method.



Mixing of lubricating grease with different trade marks will change their characteristics and damage the equipment. When the lubricating grease is supplied, the oil added must be of the same marks of those used for the aerial work platform now.

Dust in the lubricating grease will result in the abrasion of the sliding surface earlier than expected and shorten the operating life of the aerial work platform. The grease cup and other surfaces must be swept before the lubricating grease is added.

Nonobservance of lubrication interval or absence of lubrication will give rise to the equipment damage and increase the maintenance cost and downtime.



During lubricating, operation of vehicles by irrelevant personnel is prohibited. The unexpected gesture of the aerial work platform will bring the operating personnel serious fatal consequences.

In case that the lubricating grease enters into the eyes, immediately rinse thoroughly with water and see a doctor at once. In case that the skin is contacted with the lubricating grease, rinse thoroughly with water.

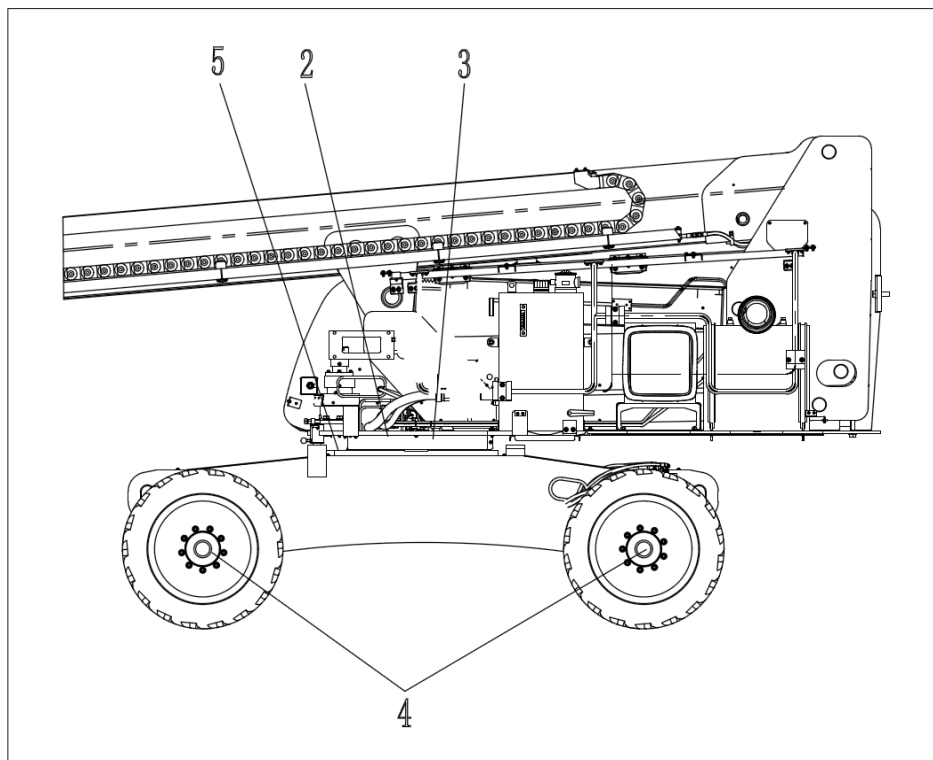


Figure 3-1 Upper Lubrication Positions Diagram

Table 3-1 Lubrication Cycle and Methods

S/N	Filling positions	Cycle	Makes of Lubrication oil and grease	Filling method
2	Slewing bearing raceway	Per 100h operation	Mobilux EP2 NLGI 2	Oil gun filling
3	Slewing bearing's gear	3 months	Mobilux EP2 NLGI 2	Packing
4	Running mechanism	6 months or per 500h operation	L-CKD220 gear oil (GB5903)	
5	Swing mechanism	6 months or per 500h operation	L-CKD220 gear oil (GB5903)	



The sliding surfaces that are not listed in the above table shall be applied with the lubricating grease at regular intervals.

When the hydraulic cylinder (derricking cylinder and support oil cylinder, etc.) is retracted completely, the piston rod part exposed in the air and connecting rod and slipper applied with the lubricating grease before leaving factory are also in need of proper lubricating maintenance.



The lubrication cycle is established on the basis of assuming the aerial work platform to be used in normal operating conditions. The cycle shall be relevantly shortened in case that the aerial work platform is used in harsh (such as the environment with more smoke) or improper conditions.

3-2 Oil Instructions

See Table 3-2 for the oil brand of each parts and its filling amount and maintenance period. See Table 3-3 for the models comparison of the similar oil in domestic and overseas.



Table 3-2 Oil Use

S/N	Filling position		Type	Applicable temperature and model	Theoretical filling amount /L	Oil change period/h	Remarks
1	Fuel tank		Fuel oil	Summer: 0# Winter: -10#	180	—	
2	Engine		Engine oil	Fill 15W/40 diesel engine oil when the environment temperature is above -10℃; Fill 10W/30 diesel engine oil when the environment temperature is between -20~-10℃; Fill 5W/40 diesel engine oil when the environment temperature is between -30~-20℃;	6~8	3 months or 250 hours	The use of API CH4/C14 compliant oil is recommended.
3	Cooling system		Antifreezes	Above -36℃	11~12	One year or 1000 hours operation	
4	Swing mechanism		Mechanism oil	L-CKD220	0.9	See replacement cycle of gear oil for details	
5	Axle	OMN2		L-CKD220	0.9		
		RR			0.6		
6	Hydraulic system		Hydraulic oil	1. Fill AE46 anti-wear hydraulic oil for the area with the environment temperature above -15℃ 2. Fill HS22 hydraulic oil for the area with the environment temperature is at and below -15℃ 3. Fill the hydraulic oil according to the specification for the users with special requirements	400L	Generally, 2 years of normal operation or 2000 hours working	

Table 3-3 Models Comparison of the Similar Oil in Domestic and Overseas

Classification	Engine oil	Slewing reducer Travelling reducer	Hydraulic oil
Name	Diesel engine oil	Industrial gear oil	Anti-wear hydraulic oil
Petrochina	CH-4	L-CKD220 L-CKD320	AE46, HS22
MOBIL	Delvac super	Mobilger630 Mobilger632	Mobil DTE 11M, 13M, 15M
SHELL	Rimula D	Omala220 Omala320	Tellus 22, 32, 46
CALTEX	EDLA500	Meropa220 Meropa320	Rando oil HD32, 46
CASTROL	RX Supper 15W/40 RX Super	Alpha Max220 Alpha Max320	Hyspin AWS 15, 32, 46 Hyspin AWH 15, 32, 46
TOTAL	Rubia XT	Carter EP220 Carter EP320	AZOLLAZS 32, 46
BP	Venellus c3 Extra	Energol GR-XF220 Energol GR-XF320	Bartran HV22 Energol HLP-HM 32, 46



Please use the lubricating oil, antifreezes and hydraulic oil recommended by XCMG FIRE-FIGHTING SAFETY EQUIPMENT.

No mixing use of oils with different brands is allowed.

The hydraulic oil shall not be used beyond 24 months. It can not be used more than 24 months even if being filtered.

Keep the level of oil and supplement when it is below the specified value.



Fill oil after the temperature of the equip-

ment falls to the indoor temperature; otherwise, it may give rise to splash and burn accident.

1. Fuel Oil

Liquid Level Inspection

For the inspection of the fuel oil level, put the key switch of power supply ON. The oil quantity of the fuel tank can be checked on the fuel gauge. Arrange the refueling quantity in accordance with the specific conditions.

Supply

The fuel tank is on the left side of the rotary table. See Table 3-2 or reference to Engine Specification for the fuel tank capacity and the selec-

tion of fuel oil.

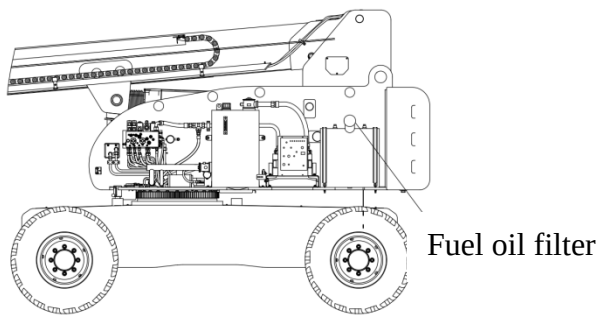


Figure 3-3 Refueling location of fuel tank



Turn off the engine before adding the fuel oil to prevent fires.

Tighten the fuel tank cap and lock after each refueling to prevent fuel tank cap from falling off or fuel oil from evaporating.

After refueling, the scattered fuel oil must be cleaned up. No diesel oil is allowed on the engine to prevent fires.

When refueling at emergency, the vessel used shall pass the safety inspection and meet the fire rating requirements if using the portable vessel to refuel. The portable vessel shall be able to lock the cap automatically to prevent

the leakage of the interior fuel oil.

2. Engine oil

Liquid Level Inspection

It is recommended to check the level of the engine oil according to the following steps:

- a. Open the right-side frame panel of the rotary table;
- b. Find out the engine dipstick (the engine head);
- c. Take down the oil scale from the engine;
- d. Observe whether the immersed part of the oil scale is in Identification Area b, as shown in Figure 3-4;

2. Supply

- a. If the oil level is too low, open the cap of the engine oil;
- b. Fill the engine oil. See Table 3-2 for the selection of the engine oil;
- c. Tighten the oil cap to prevent the engine oil leaking.

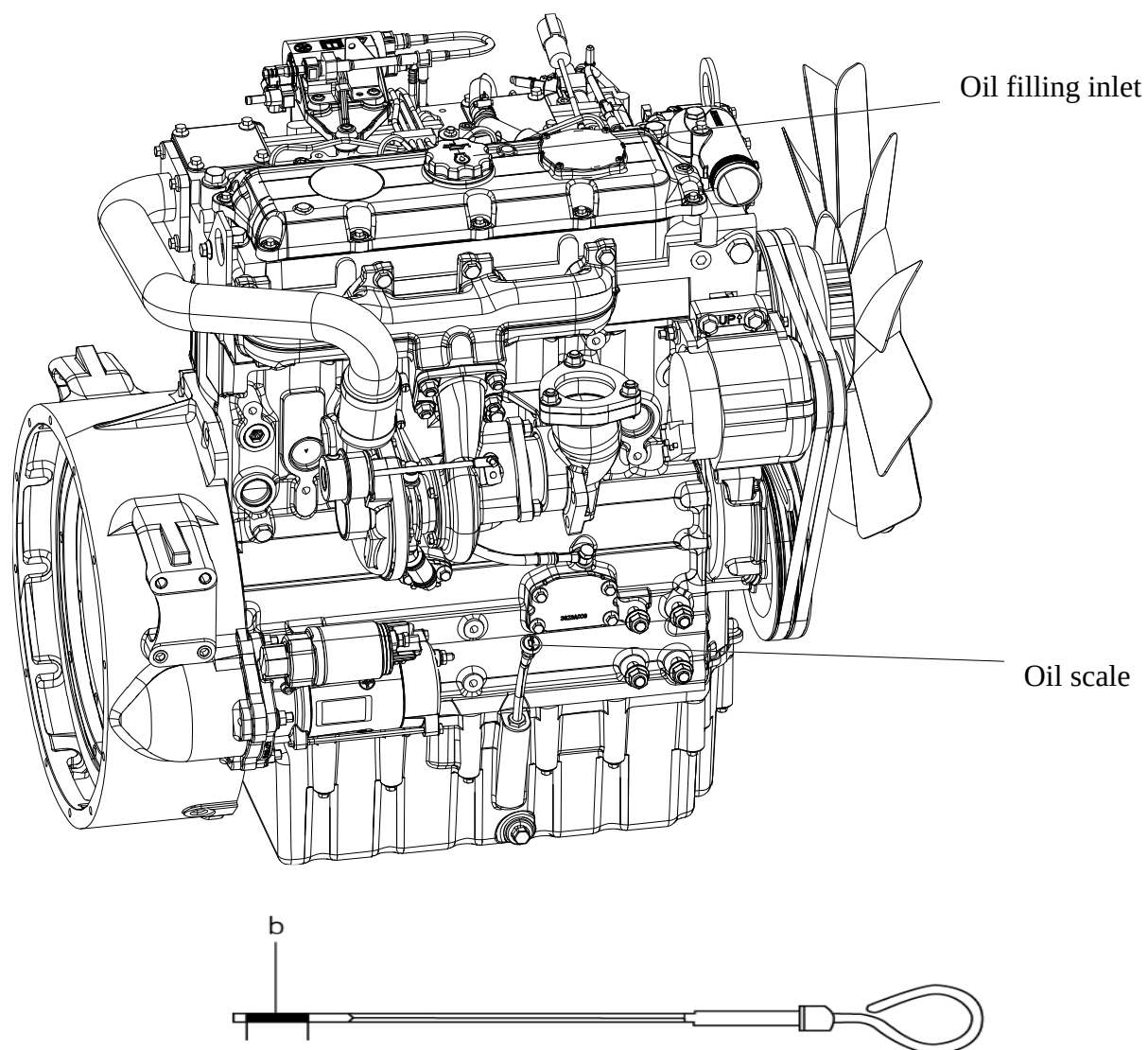


Figure 3-4 Engine Oil Scale



3. Antifreezes

Liquid Level Inspection

Open the radiator cap and observe the liquid level of the antifreezes. The antifreeze level shall be at the bottom of the filling neck of the radiator under normal circumstances.



When checking the engine fluid, the engine shall be in a stopped state and cooled to the environment temperature.

When the vehicle is in normal operation, if you want to check the fluid level of the antifreezes, it must be stopped and checked after the engine shuts down and the water temperature drops below 104°F (40°C) to prevent high temperature liquid and steam wounding risk. Slowly remove the filter cap to release the pressure of the cooling system.

Supply

The radiator of this vehicle is in front of the engine, as shown in Figure 3-5. When the antifreeze is insufficient, supplement it in time. See Table 3-2 for the selection of the antifreezes. The supplementary method of the antifreezes is as follows:

- a. Open the radiator cap in the engine-cooled state and supplement the antifreezes inwards to the bottom of the filling neck of the radiator;
- b. Cover the pressure cap completely, and then operate the engine until its temperature reach 82°C, check the cooling liquid for leakage.
- c. Check the level of the cooling liquid to ensure the cooling liquid of the cooling system is sufficient.

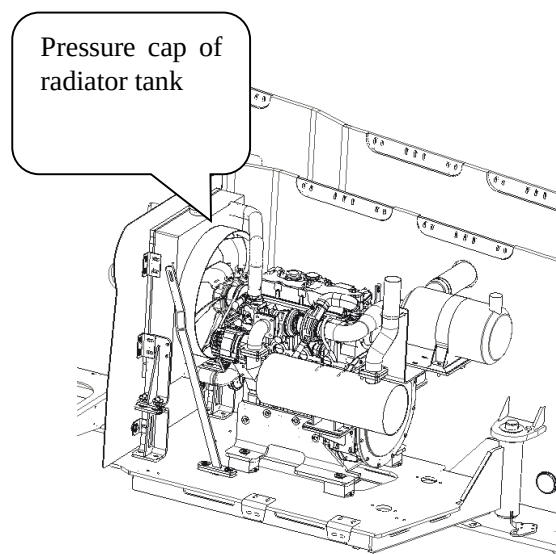


Figure 3-5 Radiator



When the engine is in condition of high temperature above 104°F (40°C), prohibit filling



the antifreezes, otherwise it may result in an engine explosion.

This vehicle is required to use the specialized antifreezes as the engine fluid and replaced with the antifreezes in different models according to the minimum temperature of the environment such vehicle exists. The purified water, tap water or seawater should not be used as the antifreezes even though the environment temperature is above 0°C. Since the lack of necessary preservatives, antirust agents and other additives in the water may cause the corrosion and blocking of the engine and cooling system to influence the use of the vehicle.



It is not suitable to use the antifreezes prepared with “ethyl alcohol - water” for the engine.

Prohibit using seawater to cool the engine directly.

The antifreezes can be added according to the Engine Specification. Its freezing point shall be 5°C below the minimum temperature of the using area when applying the antifreezes.

4. Gear Oil

Service Cycle

Upon the delivery of the vehicle, please conduct the filtration or replacement of gear oil once every three months, and conduct the same once every six months.



The gear oil shall be replaced even though the oil change period is ended whenever it is found being polluted seriously.

Make regular inspection of the oil quantity and supplement when the oil level is lower than the specified value.

No mixture of gear oil in different marks is allowed.

Use of Gear Oil

See the specific sections for the application method of the gear oil for every key position.

5. Hydraulic Oil

Service Cycle

Generally, the hydraulic oil change period is 2 years of normal operation or 2000 hours operation.

Users shall take samples of the hydraulic oil to



test at regular intervals. It is recommended to take samples once a year for the product in normal use; and take samples once a quarter for those which are frequently operated in the poor environment. The hydraulic oil shall be filtered or replaced whenever it is found being polluted seriously.



The hydraulic oil shall not be used beyond 24 months. It can not be used more than 24 month, even if being filtered.

The hydraulic oil shall be filtered or replaced whenever it is found being polluted seriously. Meanwhile, change the filter element of the oil filter on the hydraulic oil tank absorbing return oil.

Select and use the suitable hydraulic oil with the trade marks supplied according to the environment temperature.

The product is full hydraulic transmission. The quality, viscosity and cleanliness of the hydraulic oil are essential for the normal operation of the aerial work platform. Various faults of the machines may easily occur and seriously shorten their working lives if you

ignore the replacement of oil. The Company will not bear all the consequences caused due to your failure of changing oil and filtering the hydraulic oil according to this instruction.

The pollution degrees of the hydraulic oil solid particles are: No more than 17/14 when adding in the hydraulic oil tank and no more than 19/16 in the using process. See Table 3-4 for the judgment of hydraulic oil pollution.



Table 3-4 Judgment of Hydraulic Oil Pollution

Appearance color	Smell	Pollution status	Disposal measures
Transparent without change	Normal	No pollution	Continue to use
Transparent color deepening	Normal	Mixed with other kinds of oils	Continue to use if the viscosity is qualified
Transparent and flash	Normal	Mixed with metal filings	Filter or change oil
Transparent with black dot	Normal	Mixed with impurities	Filter or change oil
Black brown	Frowziness	Oxidative deterioration	Change oil
Milk white	Normal	Mixed with air or water	Separate water or change oil



If the hydraulic oil pollution is more severe but not goes bad, the hydraulic oil is required to be filtered before reusing. If the hydraulic oil has gone bad and can not be reused, it must be replaced. See Table 3-2 for the selection of hydraulic oil. The oil tank shall be washed while changing the hydraulic oil to prevent such oil from being polluted.



Take effective measures to prevent the sewage falling in the hydraulic system in the process of assembling, installation and maintenance.

Operating Temperature of Hydraulic Oil

a. Excess Operating Temperature

If being above 60°C for a long time, the hydraulic oil will go bad in an acceleratory speed, as a result, the hydraulic component life is reduced, and the filtration and replacement cycles are necessary to be shortened; when the temperature of hydraulic oil system exceeds 80°C, the volumetric efficiency of the power components (gear pump) used for the hydraulic system will sharply drop, so do the sealing property selected for such system. In particular, it may prevent the hydraulic system from operating when the engine is in

idle state.

b. Too Low Operating Temperature

When the oil temperature of the hydraulic system is below -20°C, the hydraulic system will delay to respond which may lead to the difficulty for starting the engine. In service, select to open and close the hydraulic oil radiator according to the environment temperature and viscosity of the hydraulic oil.

When the temperature of the hydraulic oil is very low, its viscosity will increase and the mobility gets worse. In cold weather, if the aerial work platform is allowed to be operated at high speed or with heavy load before the hydraulic oil temperature rising, the hydraulic components will be possibly damaged. Therefore, do not immediately start to operate when the environment temperature is lower. The aerial work platform shall be sufficiently heated by idling up to the hydraulic oil temperature rising around 20°C.

c. Selection of Hydraulic Oil

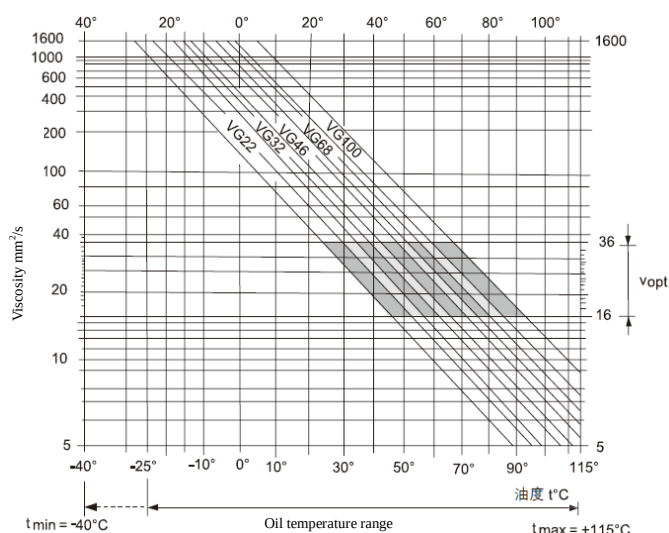


Figure 3-6 Hydraulic Oil Temperature-Viscosity Relation Curve

Note: The temperature viscosity curve of L-HM series hydraulic oil, of which the range of application is between AE46 anti-wear hydraulic oil and HS22 hydraulic oil is described Figure 3-6.

Use of Hydraulic Oils

a. Liquid Level Inspection

At the left side of the rotary table of the hydraulic oil tank, the oil quantity shall be checked when the aerial work platform is in running. The liquid temperature and liquid level meter can indicate oil level and the temperature. In case the oil level is checked, the liquid temperature and liquid level meter shall keep at above the scale of 100°C as shown in the Figure 3-7.

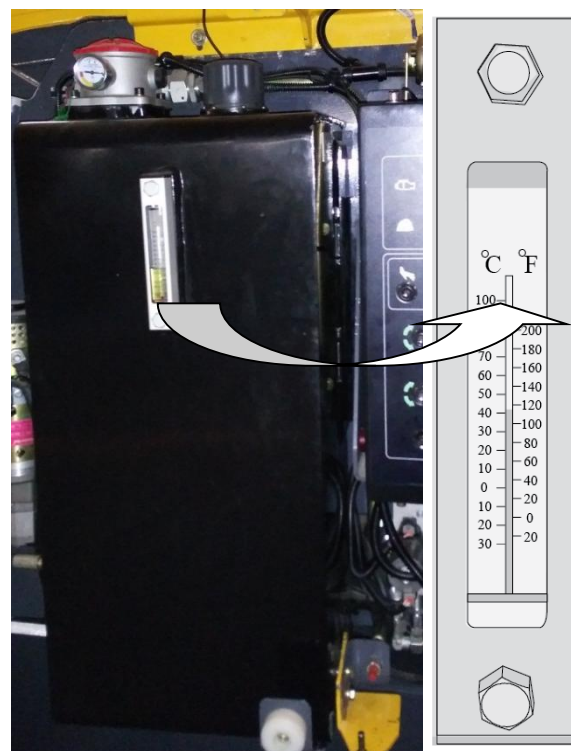
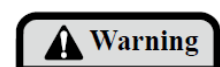


Figure 3-7 Liquid Temperature and Liquid Level Meter



In case the liquid level of the hydraulic oil is checked, the vehicle shall be in running and the boom shall be completely retracted.



The hydraulic oil level can only be checked when the mobile elevating work platform is in a stopped state and the hydraulic system is cooled to room temperature. Otherwise, you might be seriously burnt!

b. Supply

At transportation status, hydraulic oil level is not allowed to be lower than the scale of 80°C. If it's lower than the scale, hydraulic oil shall be filled promptly.

Method of Oil Supply: open the air filter cover at the top of the oil tank and fill in the hydraulic oil with same trade mark via the air filter gauze. See Table 3-2 for the selection of hydraulic oils.

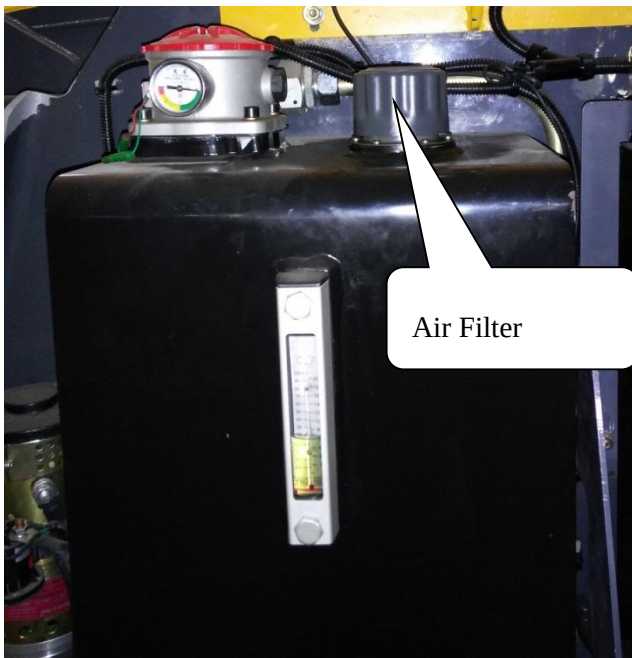


Figure 3-8 Air Filter of Hydraulic Oil Tank

The mixing use of oils with different brands will change the characteristics of oil and cause damages to the equipment. During oil supply, the oil added shall be of the same marks of those used for the mobile elevating work platform.

Change of Oil

Cleanness is the most important index to maintain the hydraulic system. Dust or other contaminations shall be prevented from entering the system. Even a very small particle will cause blocking of valves and pumps. Hydraulic oil shall be filled via a special filter rather than directly added into the oil tank.

a. Preparation before Change

Before changing the oil, the boom shall be lifted to the maximum working height and the engine shall be stopped. A container shall be prepared for collecting waste oil.

b. Steps

- 1) Place the prepared container below the drain plug of the oil tank.
- 2) Screw out the drain plug at the bottom of the oil tank to have oil drain out.

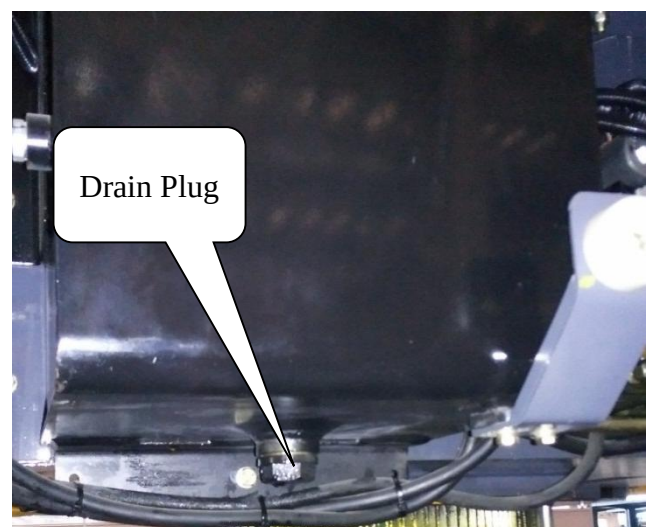




Figure 3-9 Drain Value of Oil Tank

- 3) Remove all hoses from the oil tank and exhaust all oil in the hoses as far as possible.



Clearly mark all of the hoses and the joints so as to facilitate re-installation.

Clean all joints.

- 4) Remove lining of the filter.
- 5) Replace filter element and re-install filter components.
- 6) Replace all hoses with defects.
- 7) Connect well oil suction pipes and oil return pipes and then fill the tank with oil.
- 8) Cut off the oil return passage into the oil tank and connect the oil return passage to another container.
- 9) Start the engine to separately drive the boom and the landing leg to running status. Let the engine run idly until new oil coming out of the oil return passage and then stop the engine.



When the engine keeps running, continuous

attention shall be paid to the oil left in the tank and the pump is prevented from sucking air.

- 10) Clean or replace oil return pipes of the oil tank.
- 11) Connect the oil return pipes well to the tank, check the oil level and fill oil to the required level.



According to national laws and regulations, hydraulic oil and filter lining used shall be effectively disposed.

Oil shall be added via filter into the tank.

Used hydraulic oil shall be well disposed so as to avoid flowing onto the ground.

When adding or replacing hydraulic oil, please make sure that the following cleaning standards are fulfilled. The pollution degree of solid particles in hydraulic oil added into the tank shall not be higher than 18/15. The volume of hydraulic oil tank is 260L and the total volume of hydraulic oil for replacing is about 420L.

Disposal of Waste Oil and Lubricating Grease



Various oils, including lubricating grease, fuel and antifreezes, used on aerial work platform will cause direct or indirect pollution to the surrounding. Antifreezes and lubricating oil are poisonous and shall be disposed according to local environmental laws if further use is impossible. Acceptable waste disposal equipment (including licensed facilities provided by urban maintenance points and automotive repair shops) shall be used to recycle waste antifreezes and lubricating oil. For any question, please contact with local environment protection department for assistance so as to facilitate proper disposal of used antifreezes and lubricating oil.



It's forbidden to randomly pour waste liquid into drainers, ground surface, rivers and so on. Please exhaust waste liquid from the machine into a suitable container for proper disposal.

In any case, please recycle any hazardous objects as far as possible. Otherwise, you may be fined or penalize by relevant departments.

3-4 Inspection and Adjustment of Extension Steel Wires

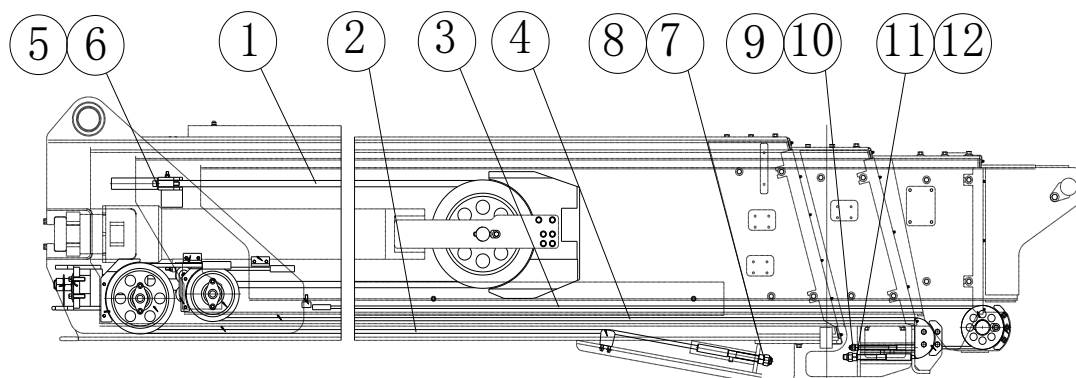
Inspection of steel wires

Do not use the steel wires if any following conditions happen:

1. Deformation or corrosion
2. Twisting
3. Breakage of more than 10% metal wire on any layer of the rope
4. The diameter of any part is reduced by more than 7% compared to the specified value
5. Thermal damages

Adjustment of steel wire

The long term used telescopic steel wires will be extended and stretched, causing multiple problems including wrong positioning of extension arm, steel wire falling off from the pulleys, vibration of third section arm during extension, steel wire striking against the arm frame, etc. Therefore, inspections and adjustments shall be conducted on regular basis for the tightness status of the steel wires. Please refer to Figure 3-10 for the assembly drawing of extension system.



- | | |
|--|--|
| 1. 3 rd section extending rope | 7. 3 rd section retracting rope adjustment nut |
| 2. 3 rd section retracting rope | 8. 3 rd section retracting rope lock nut |
| 3. 4 th section extending rope | 9. 4 th section extending rope adjustment nut |
| 4. 4 th section retracting rope | 10. 4 th section extending rope lock nut |
| 5. 3 rd section extending rope adjustment nut | 11. 4 th section retracting rope adjustment nut |
| 6. 3 rd section extending rope lock nut | 12. 4 th section retracting rope lock nut |

Figure 3-10 Assembly drawing of extension system



Inspection instructions:

1. Luff the telescoping boom to horizontal status, telescope the boom, and check the 2nd, 3rd, and 4th boom sections for simultaneous motion during the telescoping of boom. If the motion of 4th boom section is later than that of 2nd boom section, it's necessary to adjust the tension of wire rope.

2. Luff the telescoping boom to horizontal status and telescope the boom. Upon detection of vibration of 3rd or 4th boom section or whipping of wire rope on the boom (A “flap” sound can be heard at the start of motion) during the telescoping of boom, it's necessary to adjust the tension of corresponding wire rope.

Detailed procedures of adjustment are as follows:

1. Luff the boom to horizontal status and loosen the lock nuts 6, 8, 10, and 12.

2. Extend the boom and adjust the adjustment nuts 7 and 11 on left and right sides respectively to tension the retracting rope.

3. Retract the boom and adjust the adjustment nuts 5 and 9 on left and right sides respectively to tension the extending rope.

4. Repeat steps 2 and 3 as required, check the motions of boom as per above-mentioned checking method to ensure the proper adjustment of ropes, and securely tighten the lock nuts 6, 8, 10, and 12. The adjustment of wire ropes is completed.



Memorandum



Memorandum



Chapter 4 Maintenance



4-1 Periodic Inspection of Maintenance

The maintenance cycle of mobile elevating work platform are mainly divided into the following:

1. Daily Maintenance: before and after daily work.
2. 100h (or 1-month) Maintenance: every 100h (or 1 month) for aerial work platform.
3. 250h (or 3-month) Maintenance: every 250h (or 3 month) for aerial work platform.
4. 500h (or 6-month) Maintenance: every 500h (or 6 month) for aerial work platform.
5. 1000h (or 1-year) Maintenance: every 1000h (or 1 year) for aerial work platform.

Maintenance and inspection are conducted according to required cycles. The cycles of inspection and maintenance are based on chronometer reading or the lapse of months and the earlier prevails.

Inspection cycle is set forth base on the assumption that aerial work platform is under normal work condition. If aerial work platform is used under bad condition (e.g. environment with heavy dust) or at abnormal status, the cycle shall

be shortened accordingly.



Importance shall be attached to the pre-check before work and periodic inspection which is in favor of finding faults earlier so as to prevent an accident.

The habit of pre-check before work and periodic inspection shall be formed. Measures shall be taken immediately if any abnormality happens.



Table 4-1 Items of Periodic Inspection and Maintenance for Mobile Elevating Work Platform

System or Element	Project Item	Daily	Every 1 Month or 100hr	Every 3 Month or 250hr	Every 6 Month or 500hr	Every 1 Year or 1000hr	DRI	Method	Remark Inspection ✓ Maintenance ★ Replacement ●
Work Platform	Check if there is any crack, deformation or rail damage to the work platform and the installation status		✓	✓	✓	✓	Operator	Visual Inspection	
	Check if equipments operate abnormally, have oil leakage and are correctly installed (fulcrum pins, etc.)	✓	✓	✓	✓	✓	Operator	Visual Inspection and Operation	
	If pendulous equipments operate normally and have any abnormal noise or oil leakage	✓	✓	✓	✓	✓	Operator	Visual Inspection and Operation	
	Check if the joints of belt attachment have any damage or crack		✓	✓	✓	✓	Operator	Visual Inspection	
	Check if the bolts of weighing sensors is loosened			✓	✓	✓	Operator	Visual Inspection	
Boom and Retractable System	Boom: welding crack, damage, torsion, pressure mark at overlap joints, partial dents, cracks and damages, and installation status (fulcrum pins, etc.)		✓	✓	✓	✓	Operator	Visual Inspection	
	Retractable oil cylinder: operation, oil leakage and installation status (fulcrum pins, etc.)	✓	✓	✓	✓	✓	Operator	Visual Inspection and Operation	
	Wire rope: tension and connecting status	✓	✓	✓	✓	✓	Operator	Visual Inspection	
	Retractable oil cylinder: naturally retractable, dents and cracks					✓	Operator		

	Balance valves: Adjust nut relaxed status			✓	✓	✓	Operator	Visual Inspection and Operation	
Derricking System of Boom	Derricking cylinder: operation, oil leakage and installation status (fulcrum pins, etc.)	✓	✓	✓	✓	✓	Operator	Visual Inspection and Operation	
	Derricking cylinder: abnormal heating		✓	✓	✓	✓	Operator	Visual Inspection and Operation	
Delivery System of Cable Hydraulic Pipeline	Check if owing chains are damaged			✓	✓	✓	Operator	Visual Inspection	
Slewing Mechanism	Rotary tables: cracks, welding crack, deformation and locking action		✓	✓	✓	✓	Operator	Visual Inspection	
	Slewing drive: abnormal noise and oil leakage	✓	✓	✓	✓	✓	Operator	Visual Inspection and hearing	
	Hydraulic motor: oil leakage and abnormal noise	✓	✓	✓	✓	✓	Operator	Visual Inspection and hearing	
	Swivel joints: abnormal noise and oil leakage	✓	✓	✓	✓	✓	Operator	Visual Inspection and hearing	
	Slewing bearing: lubricant filling		✓	✓	✓	✓	Operator	Operation	
	If installation bolts on slewing bearing and slewing drive is loosened			✓	✓	✓	Operator	Visual Inspection	
	Slewing bearing and slewing drive: abnormal noise, gear crack and abrasion, and oil sealing damage					✓	Operator	Visual Inspection	
	Check and adjust spacing of slewing mechanism				✓★	✓★	Repair Department	Professional Maintenance	
	Weights: installation status and crack on lifting hook					✓	Operator	Visual Inspection	
	Slewing drive: replace lubricant				●	●	Operator	Visual Inspection and Operation	
	Slewing drive: abnormal noise, oil residual and pollution				✓	✓	Operator	Visual Inspection	



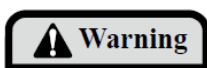
Power System	Engine								
	Engine	Strictly follow engine maintenance manual for inspection and maintenance							
	Engine starts with abnormal noise	✓					Operator	Visual Inspection and hearing	
	Check oil level and oil leakage	✓					Operator	See engine maintenance manual	
	Replace engine oil			●	●	●	Operator		At least once per year
	Replace oil filter or filter element			●When replacing engine oil			Operator		
	Check fuel level and oil leakage	✓					Operator		
	Check the fastening of fuel tank		✓	✓	✓	✓	Operator		
	Replace fuel filter or filter element			●	●	●	Operator		
	Clean fuel pump and rough filter			★	★	★	Operator		
Replace fuel rough filter				●	●	Operator			
Power System	Check and exhaust water from fuel rough filter	✓★	✓★	✓★	✓★	✓★	Operator	Visual Inspection and Operation	
	Check if the fuel tank is fastened, have oil leakage or torsion, and is at least 200mm far from any heat source or moving part		✓	✓	✓	✓	Operator	Visual Inspection Maintenance	
	Check belt fasteners		★	★	★	★	Operator	Visual Inspection and Operation	
	Check spacing between turbo-charger bearings					✓	Repair Department	Professional Maintenance	
	Check oil injection pump						Repair Department	Professional Maintenance	
	Exhaust air from oil injection pump				★	★	Operator	Operation	
	If battery charge is functioning		✓	✓	✓	✓	Operator	Visual Inspection	
	Air Filter								
	Check the negative pressure indicator of air filter	✓	✓	✓	✓	✓	Operator	Visual Inspection	
	Clean the dust cup of air filter		★	★	★	★	Operator	Operation	
Power System	Clean the main element of air filter	★Under negative pressure indicated by the air filter or every 250hr					Operator	Operation	
	Replace the main element of air filter	●When the main element is broken					Operator	Operation	
	Replace the safety element of air filter	●When the main element is cleaned for 3 times					Operator	Operation	

	Radiator								
	Check the volume of refrigerant and if any leakage happens	✓					Operator		
	Replace refrigerant	● Every 36 months					Operator		
	Check refrigerant pipeline and fasten pipe clamps		✓★				Operator		
	Clean/dedust radiators		★	★	★	★	Operator	Take Actions	
	Silencer								
	Check if silencers have abnormal noise	✓	✓	✓	✓	✓	Operator	Hearing	
	Air Intake System								
	Check and fasten air intake pipelines and the joints		✓★	✓★	✓★	✓★	Operator	Visual Inspection and Operation	
	Check if air intake hoses have cracking, holes and air leakage				✓	✓	Operator	Visual Inspection	
Running System	Car axle: damage, deformation and damages at dowel joints		✓	✓	✓	✓	Operator	Visual Inspection	
	Wheels (tyre): crack, damages, partial abrasion and foreign objects	✓	✓	✓	✓	✓	Operator	Visual Inspection	
	Wheels (tyre): rims have crack, damage and deformation		✓	✓	✓	✓	Operator	Visual Inspection	
	Wheels (tyre): bearing clearance, and abnormal and heating					✓	Operator	Hearing and Hand Feel	
	Reducer: abnormal noise and oil leakage	✓	✓	✓	✓	✓	Operator	Visual Inspection and hearing	
	Reducer: abnormal heating, oil level and pollution, and installation status				✓	✓	Operator	Visual Inspection and Hand Feel	
	Hydraulic motor: oil leakage and abnormal vibration	✓	✓	✓	✓	✓	Operator	Visual Inspection and hearing	
	Rods and arms: damage, bending, tear and damages on dirt-proof boot, and abrasion		✓	✓	✓	✓	Operator	Visual Inspection and Operation	
	Knuckle: clearance and cracks		✓	✓	✓	✓	Operator	Visual Inspection	



	Steering and wheels: steering angle, installation status of stop bolts and connection		✓	✓	✓	✓	Operator	Visual Inspection	
	Steering hydraulic cylinder: action and oil leakage	✓	✓	✓	✓	✓	Operator	Visual Inspection and Operation	
	Steering hydraulic cylinder: pressure marks, crack, bending, scratches and installation status (fulcrum pin etc.)		✓	✓	✓	✓	Operator	Visual Inspection and Operation	
	Break: efficiency	✓	✓	✓	✓	✓	Operator	Operation and Visual Inspection	
	Frame: deformation and welding crack		✓	✓	✓	✓	Operator	Visual Inspection	
	Axle balance/locking cylinder system					✓	Operator	Operation	
Hydraulic System	Hydraulic pump: oil leakage and abnormal noise	✓	✓	✓	✓	✓	Operator	Visual Inspection and hearing	
	Hydraulic pump: abnormal heating and installation status		✓	✓	✓	✓	Operator	Visual Inspection and Hand Feel	
	Hydraulic pump: pressure of relief valve					✓	Operator	Operation	
	Hydraulic oil tank: hydraulic oil level above the scale of 100°C of the liquid temperature and liquid level meter	✓	✓	✓	✓	✓	Operator	Visual Inspection	
	Hydraulic oil tank: air breather blocked and oil filter polluted					✓	Operator	Visual Inspection	
	Oil filter: installation status and oil leakage		✓	✓	✓	✓	Operator	Visual Inspection	
	Oil filter element: replace the element					●	Operator	Operation	
	Various values: action and oil leakage	✓	✓	✓	✓	✓	Operator	Visual Inspection and Operation	
	Various values: abnormal noise and heating					✓	Operator	Hearing and Hand Feel	
	Hard and soft tubes, joints: oil leakage		✓	✓	✓	✓	Operator	Visual Inspection	

	Hard and soft tubes, joints: crack, damage, loosening, aging and torsion					✓	Operator	Visual Inspection	
	Hydraulic oil radiator: oil leakage and motor with abnormal noise	✓	✓	✓	✓	✓	Operator	Visual Inspection and hearing	
	Hydraulic oil radiator: oil temperature and oil temperature sensing function					✓	Operator	Visual Inspection	
	Balance valves: adjusting nut loosening			✓	✓	✓	Operator	Visual Inspection and Operation	
Electric System	Control lever, switches, buttons, etc.: stroke and clearance		✓	✓	✓	✓	Operator	Visual Inspection and Operation	
	Check if various indicators, switches, instruments and so on are damaged and the installation status and damages of control level jackets	✓	✓	✓	✓	✓	Operator	Visual Inspection and Operation	
	Safety device								
	Overload alarming equipment: check before work, movement (automatically stop)	✓	✓	✓	✓	✓	Operator	Visual Inspection and Operation	
	Emergency stop switch: action	✓	✓	✓	✓	✓	Operator	Operation	
	Limit (Boom full-retracting) switch: Motion	✓	✓	✓	✓	✓	Operator	Operation	
	Inclination sensor: Motion	✓	✓	✓	✓	✓	Operator	Operation	
	Foot switch: action	✓	✓	✓	✓	✓	Operator	Operation	
	Car body tilt alarming equipment: action	✓	✓	✓	✓	✓	Operator	Operation	
	Vehicle body tilt alarming device: actions	✓	✓	✓	✓	✓	Operator	Operation	
	Power unit: Motion	✓	✓	✓	✓	✓	Operator	Operation	
	Audible alarm: action	✓	✓	✓	✓	✓	Operator	Operation	
	Display panel: damages		✓	✓	✓	✓	Operator	Visual Inspection	



Hydraulic oil shall not flow onto the ground during maintenance.

4-2 Work Platform

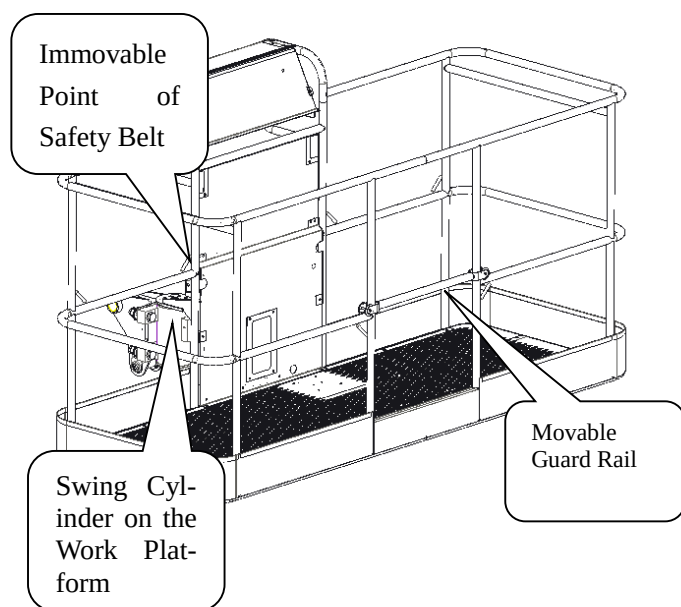


Figure 4-1 Work Platform

During vehicle operation, work platform shall be inspected and maintained periodically.

1. Check if the swing cylinder on the work platform has oil leaked out and if the rotation of the cylinder is smooth and stable.
2. Check if the immovable points of safety belt is damaged.
3. Check if the movable guard rail is damaged and check the abrasion status of guide

wheels.

4. Check the installation status of weighing sensor and if the functions and precision are within normal arrange.

4-3 Slewing Mechanism

Slewing mechanism is the driving equipment to realize the slewing action of aerial work platform. The slewing mechanism is installed on rotary table and composed of slewing reducer and rotary motor as below figure shows. High-speed hydraulic motor drives slewing reducer to output power from output pinion which gears with external teeth of slewing bearing on the frame and conducts both rotation and revolution so as to drive the slewing of the vehicle on mobile elevating work platform.

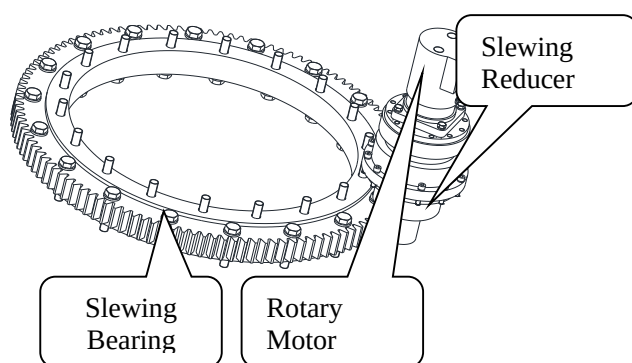


Figure 4-2 Composition of Slewing Mechanism

Rotary Motor



The rotary motor for this model is gerotor motor and the actuator element of the system.

1. Replace

Methods to remove and maintain the rotary motor:

- a. The hydraulic hoses connecting to the motor shall be well marked and blocked after removal and the motor oil ports shall be properly blocked.



When removing hoses, please slowly remove the joint to prevent high-pressure hydraulic oil from spreading, which will cause personal injury.

- b. Remove the connecting bolt between the motor and the reducer so as to remove the motor.



It's not advisable that users remove hydraulic motor by themselves. If there is any problem in the motor, please directly contact with the closest XCMG office.

You must remember the installation location of each joint and part during removing.

It's not allowed to remove the motor via violent stroke or with hard tools such as a hammer.

Before installation of any part inside of the motor, it shall be cleaned and any foreign objects in the motor is not allowed.

Slewing Reducer

1. Inspection and Maintenance

- a. When the reducer runs for the first 100h, please clean it and the inside of the brake with cleaning solution. And please replace oil every 2000-2500hr or at least once a year.



Check if there is any metal particles left in the reducer or the brake.

It's advisable to replace oil when the oil is still warm since it will do good the exhaust of oil from the tank.

Mixed oil is not allowed to use.

- b. There are more than one wet brake installed on the slewing reducer and the brakes are under normal close status. When pressure oil comes into the brake, the brake opens and the mechanism can freely slide. When any

part of the brake has any of below conditions, the part in question shall be replaced or the brake shall be scrapped:

- 1) Oil leakage happens at input end and the oil sealing on the brake shall be replaced due to damage.
- 2) Low braking torque: serious abrasion cause lower torque or the deformation of abrasion parts which shall be replace.

2. Replace Gear Oil

Please specify the correct position of each oil port of the reducers and the brakes

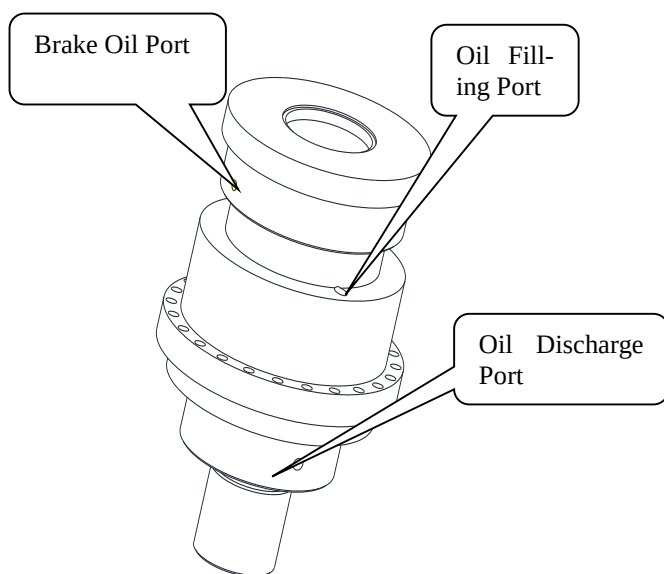


Figure 4-3 Illustration of Oil Ports of Reducer

Remove the drain stopper and filling plug to exhaust oil in the reducer as well as oil in the brake.



Before filling new oil, please clean the inside of the reducer and the brake with cleaning solution.

Pour cleaning solution into the slewing reducer and the brake, stuff filling plug, operate the machine at high speed for few minutes and then exhaust all of the cleaning solution.



The use of any erosive cleaning solution or improper lubricant products will change the characteristics of oil and accordingly cause damages to slewing track and related parts.

Slewing Bearing

Slewing bearing is the bearing equipment of the rotation part of the aerial work platform and the inner ring of the slewing bearing is connected to the rotary table. The external tooth ring is connected to the car frame. The slewing bearing can bear the weight and applied moment of the slewing part and the loads.

1. Lubrication of Slewing Bearing

Proper lubrication is a must to the durability of the track and gears. Lubrication cycle is subject to the operation conditions and the environment.



Generally, it's recommended to lubricate once per 100hr.



When the equipment will not be used for a long time, please lubricate the slewing bearing. At the places of tropical climate where temperature impact is irregular or with more wind or moisture, lubrication shall be more frequent.

- a. Use grease gun to inject Mobilux EP2 NLGI 2 into the slewing bearing raceway via the grease fitting until the lubricant flow out of the sealing and fill the raceway and the slewing bearing is lubricated. Generally, lubricant shall be added once per 100hr of operation.
- b. Gear Lubrication. In principle, the gear surface shall be cleaned once per 80h of operation and coated with graphite calcium base grease. No matter by spraying or brushing, the grease shall completely cover the gear surface of the pinion and toothed wheeling.

2. Inspection and Maintenance

- a. After the slewing bearing operates for 100h, check the pre-tightening force of bolt; in

case of any abnormality, timely fasten the bolt; for the tightening torque (250 ~ 280)N•m of bolt. Check the bolt one time after every 500h operation, maintain the bolt with enough pre-tightening force, and generally replace the bolt every 7 years or after 14,000h operation.

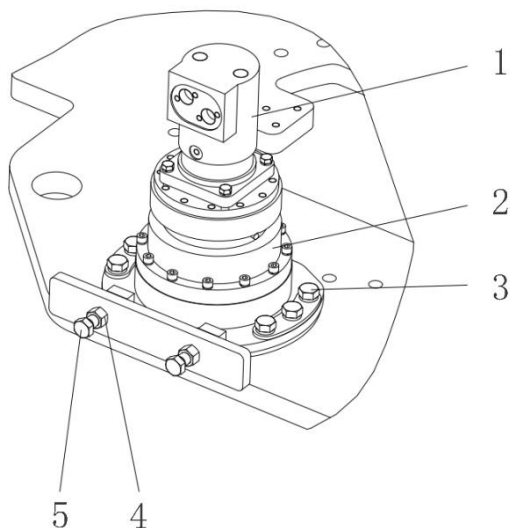
- b. Avoid the slewing bearing to be exposure to direct sunlight when in use, prohibit directly washing the slewing bearing with water, prevent water from flowing into raceway, and take strict precautions against hard foreign matters to approach to or access to mesh area.
- c. Check the intactness of slewing bearing; in case of any damage, timely repair or replace the slewing bearing.
- d. Check the mesh operation of slewing gears; to reduce the attrition between pinions and big gear wheels, adjust their mesh clearance within the range between 0.25mm and 0.4mm.

Adjustment of Slewing Mechanism Gear Clearance

The slewing mechanism gear clearance refers to the mesh clearance between pinion and slewing



bearing (big gear wheel) on the slewing reducer. If the clearance is too tight, it will cause unsmooth slewing or even component damage. If the clearance is too loose, it will cause fierce shaking during slewing braking. Sound gear clearance will put mechanical property to use and increase the service life of machine; therefore, it is necessary to adjust the gear clearance. Make adjustment according to the following diagram.



1. Motor 2. Reducer 3. Installation bolt
4. Locknut 5. Adjustable bolt

Figure 4-4 Adjustment of Slewing Gear Clearance

The adjustment procedures are as follows:

- a. Loosen the locknut (serial number 4), without screwing out completely;

- b. Loosen the installation bolt (serial number 3), without screwing out completely;
- c. Adjust the adjustable bolt (serial number 5), and measure the clearance between the slewing gear and the slewing bearing with plug gauge. Repeatedly adjust and measure the adjustable bolt until the clearance is between 0.2mm and 0.4mm;
- d. Tighten the installation bolt (serial number 3), and the tightening torque is (250-280) N m;
- e. Hold the adjustable bolt (serial number 5), tighten the locknut (serial number 4), and the tightening torque is (250-280) N m.

4-4 Power System

Engine

For details, see the Engine Specification.

Engine Oil Filter

Proper maintenance of engine oil filter is of great importance to ensure the smooth operation of engine. Improper maintenance of engine oil filter will cause the engine malfunction and component damage.

Replace filter after 200h-250h operation. The



replacement procedures are as follows:

1. Use the special filter wrench to dismantle the filter element to be replaced in the clockwise direction, and pour the oil of the filter element to the waste liquor barrel.



Please dispose the waste liquor and filter element in an environmental way.

2. Wipe the base erected with filter element with clean cloth, and particularly remove impurities of base mounting surface;
3. Pour the engine oil into new filter element, and refuel more than half volume;



The engine oil shall be poured into engine by passing through the fuel feed hole of filter element, rather than be directly poured

through the central threaded hole, so as to avoid unfiltered engine oil being access to the engine.

4. Smear some engine oil evenly on the sealing ring with brush;
5. Set the filter element upright and install to the base thread; after the upper surface of filter element sealing ring contacts the base mounting surface, turn it counterclockwise for 3/4 round to 4/5 round to tighten it, and check whether it leaks oil or not;



Check oil-resistant rubber washer and base sealing ring of filter element when replacing the filter element, replace the filter element if damaged or aged, otherwise, it would cause the engine oil to exosmose.

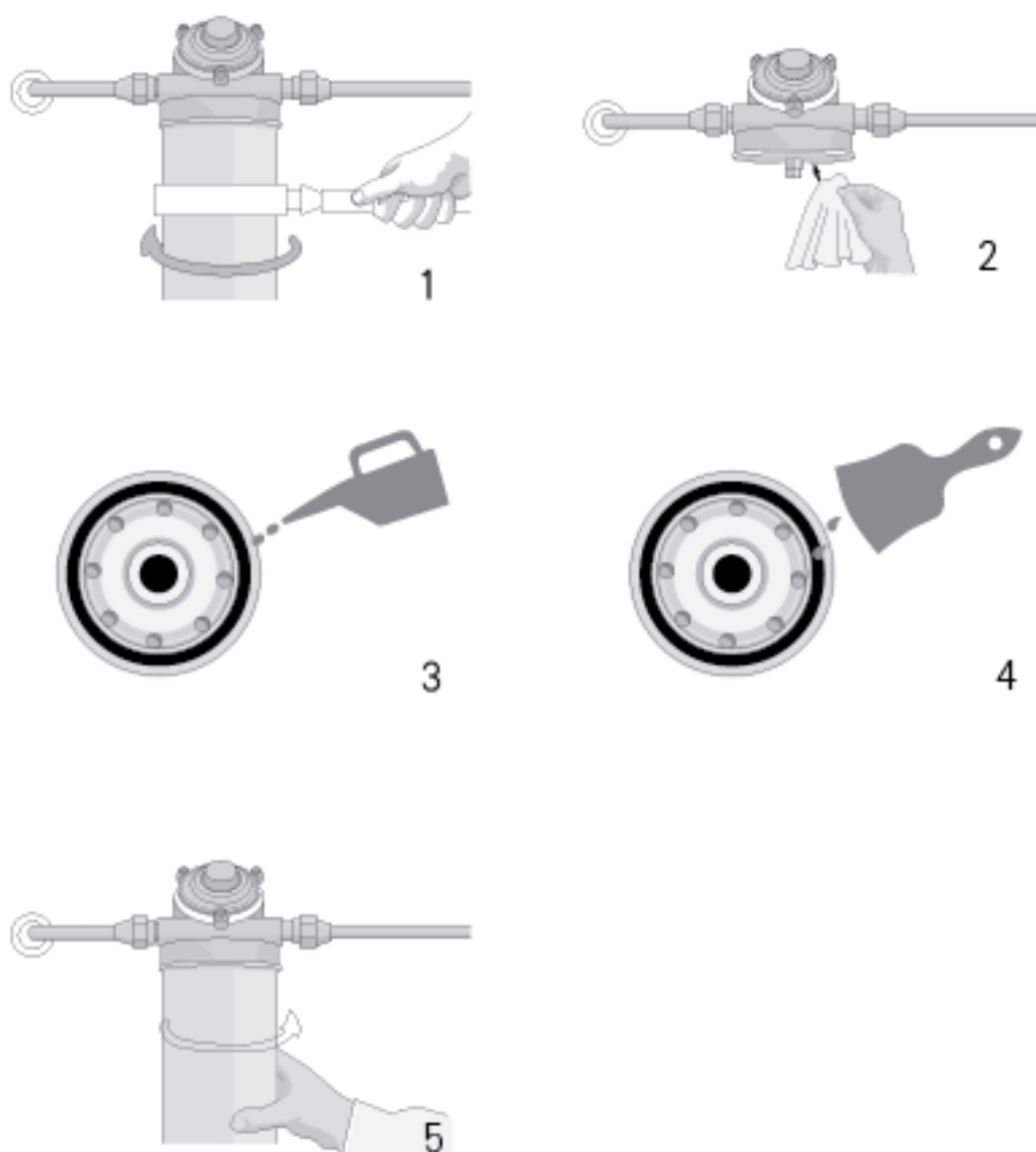


Figure 4-5 Replacement Method of Filter Element of Engine Oil Filter

Oil-water Separator

Proper maintenance of oil-water separator is of great importance to ensure the smooth operation of engine. Improper maintenance of oil-water separator will cause the engine malfunction and component damage.



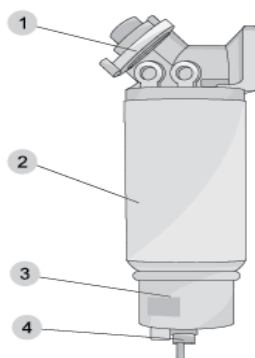
Engine fuel is inflammable, tending to explode and cause fire. Carry out such operation in a place which is open, well ventilated and far away from heater, spark, naked light and lighted cigarette. Prepare qualified fire extinguishers within easy reach for each operation.



Increase the testing frequency in case of inferior fuel quality or very moist environment.

Take such testing after the engine is shut off.

1. Structure of oil-water separator



1. Base assembly
2. Oil-water separator assembly
3. Catchment cup assembly
4. Drain plug

Figure 4-6

Oil-water Sepa-

rator

2. Discharge water from oil-water separator

The procedures for discharging water from oil-water separator are as follows:

- a. Open the dock cover plate at one side of fuel tank, and find out the oil-water separator.
- b. Loosen the drain plug at the bottom of filter bowl, discharge water to an appropriate container until the fuel begins to flow out, and immediately tighten the drain plug.

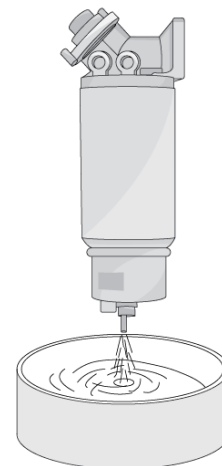


Figure 4-7 Discharge water to an appropriate container



Do not completely empty the filter bowl.

- c. Clean the diesel fuel spilt out during the operation process.



- d. Start the engine by turntable control panel, and check whether the oil-water separator has any leakage or not.



Dump and remove oil from the oil way if the engine can't be started or operates unsteadily.

3. Replace the filter element of oil-water separator

Replacing the filter element of oil-water separator is of great importance to ensure the satisfactory performance and service life of engine. Dirty or blocked filter will cause poor operation of engine, and continual use may cause the component damage. Operation at heavy dust site may require more frequent replacement of filter element.



Take such testing after the engine is shut off.

- a. Attach a label to fuel pipeline of fuel tank at the capping of oil-water separator, disconnect and block it.
- b. Put an appropriate container under the filter bowl, loosen the drain plug at the bottom of filter bowl, and completely drain away the

fuel oil at the filter bowl.

- c. Turn the filter element assembly counter-clockwise, and dismantle it from the filter base.
- d. Dismantle the filter bowl from old filter element and install it to new filter element. Tighten the drain plug.
- e. Fill the filter element and filter bowl with clean diesel oil.
- f. Smear a thin layer of oil on the filter element washer.
- g. Install the filter element/ filter bowl assembly to the top of filter, and screw it by hand safely.



When it is installed to the top of filter, the filter element/ filter bowl assembly must be injected with fuel, otherwise, it is necessary to exhaust air of oil way.

- h. Clean diesel oil which might be spilt out during the operation process.
- i. Write the dates and hours on filter hour meter with permanent marking pen.
- j. Properly connect oil pipe with the capping of oil-water separator, and lock the snap ring of oil pipe.

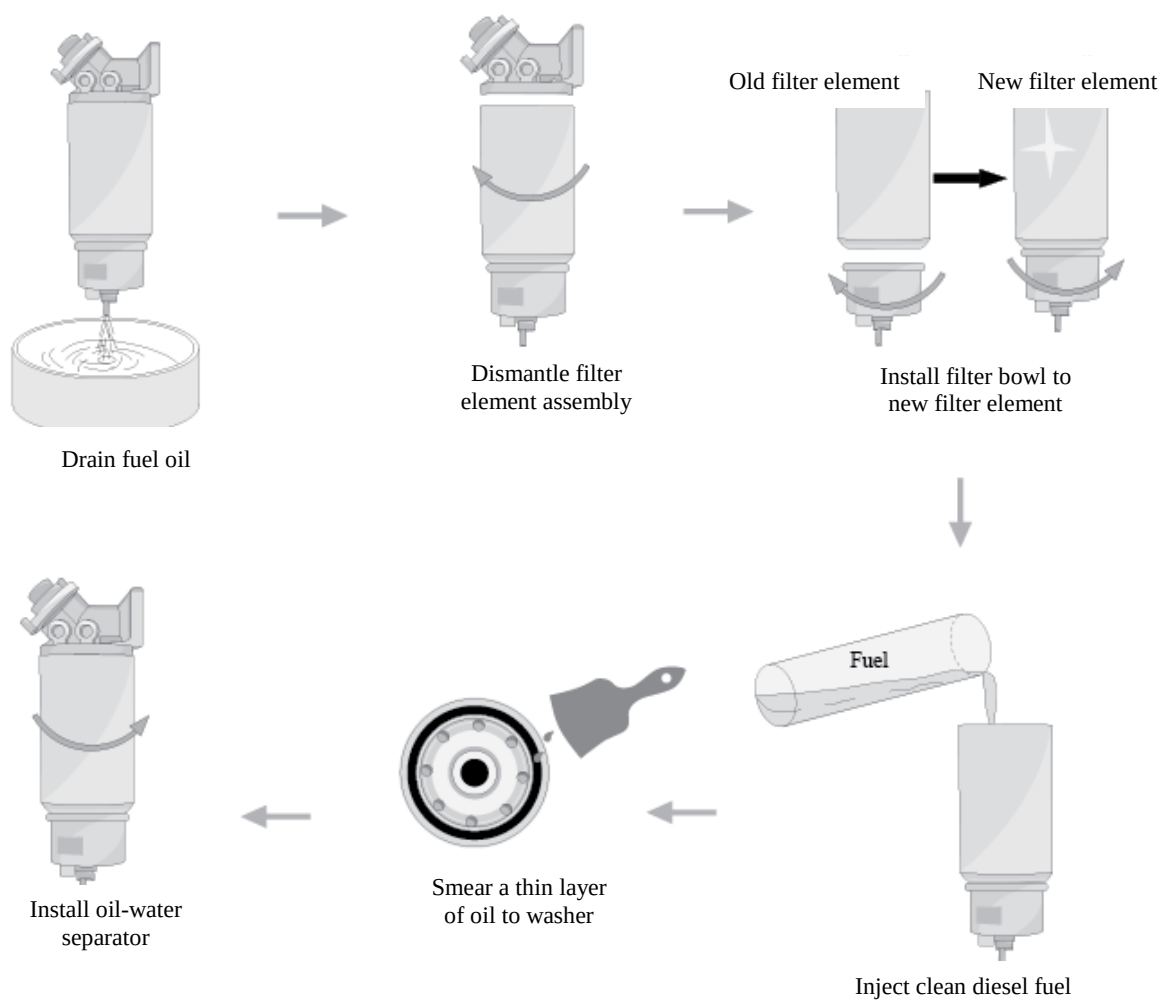
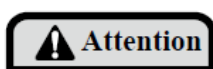


Figure 4-8 Schematic diagram of replacing filter element of oil-water separator



Air Filter of Engine

Maintaining the air filter of engine to be in good state is of vital importance to ensure smooth operation and service life of engine. Failure to implement the maintenance procedure will result in poor operation of engine and damage components.



Take such testing after the engine is shut off.

Use it in normal conditions, and maintain the primary filter element of air filter after operation for 50h-200h.



Figure 4-9 Air filter

Replacement of main element:

1. Open engine lid. At the same time, press down two sides of discharge hole for clearing dust discharge valve. Clean discharge hole, if necessary.
2. Break off buckle on the cover at the end of air filter and remove rear cover;
3. Take out main element carefully, avoiding any dust falling into the case of filter;
4. Clean the inside of air filter and use a clean and wet cloth to carefully wipe the inside of air filter assembly, ensuring no dust inside;
5. Check and clean element. When necessary, use dry compressed air that is no greater than 0.5MPa to blow out the dust in element from inside out, avoiding damaging element. If main element is found damaged, it shall be replaced with the new one.



Do not use oil or water for cleaning.

6. Install main element back and place gasket steadily, ensuring well sealing after installation; otherwise, no protection will be provided for the engine;
7. Install rear cover and tighten the buckle, ensure the correct position of rear cover and well sealing.



Safety element may not be removed during maintenance and require no maintenance.

Replacement for main element and safety element should be provided in following situations:

--Main element damaged;

--5 times of cleaning for main element;

--resistance alarm remains alarming after installation of maintained main element.

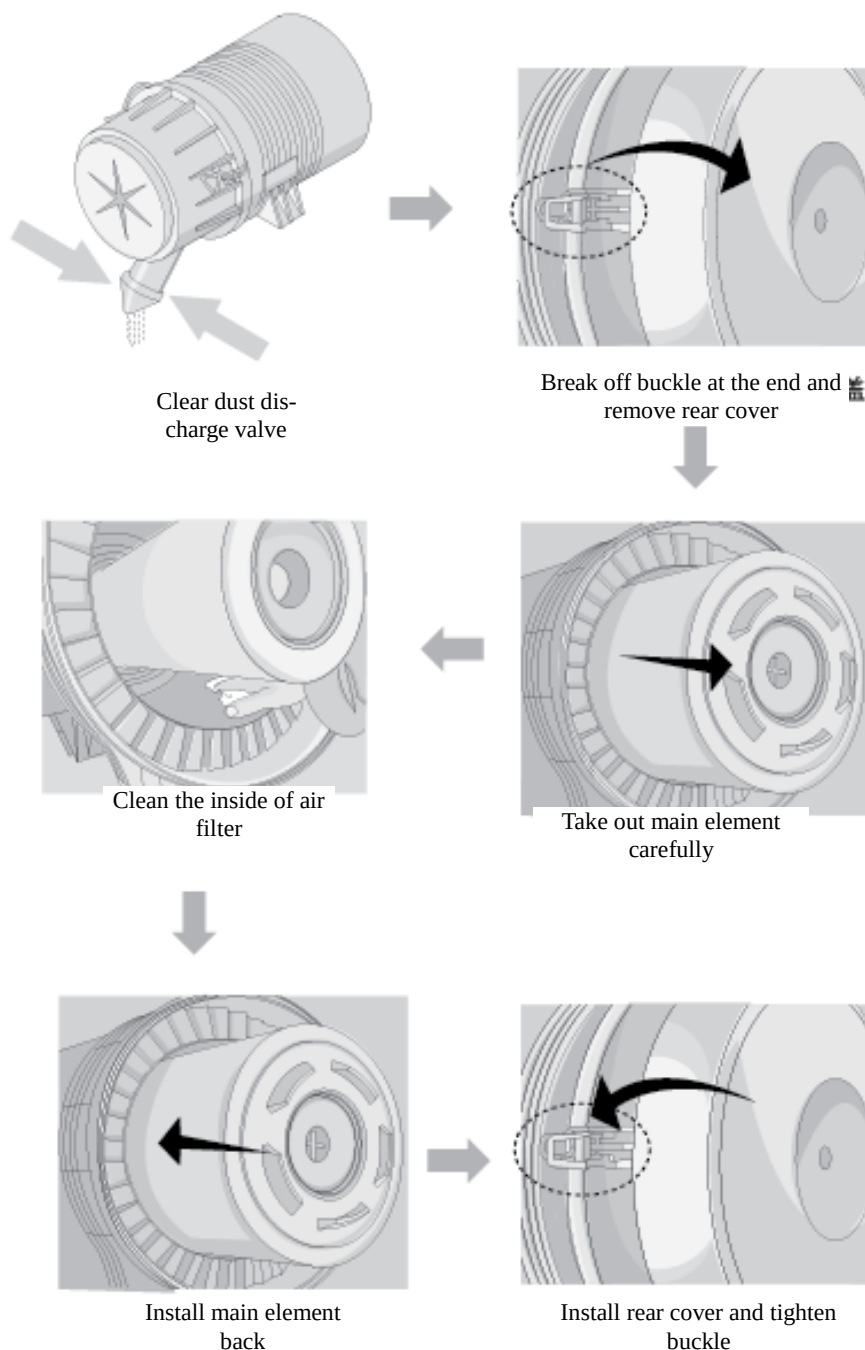


Figure 4-10 Replacement of Filter Element of Air Filter

Radiator

For radiator used for a long time or used in dusty conditions, dust and sundries in the system structure are required to be cleaned.

Use compressed air to blow out sundries (dust and bug) in the radiator or spray water (in the direction of cooling air flow) on the back of radiator to remove foreign matters. Only appropriate pressure is allowed to be used for cleaning; otherwise, radiator may be damaged. Water gun should continuously move in cleaning.

To avoid damaging parts, do not direct water gun to following parts:

1. Circuit components;
2. Connector;
3. Sealing elements;
4. Core pin of radiator.

4-5 Running System

Running system consists of wheel, travelling reducer and travelling motor.

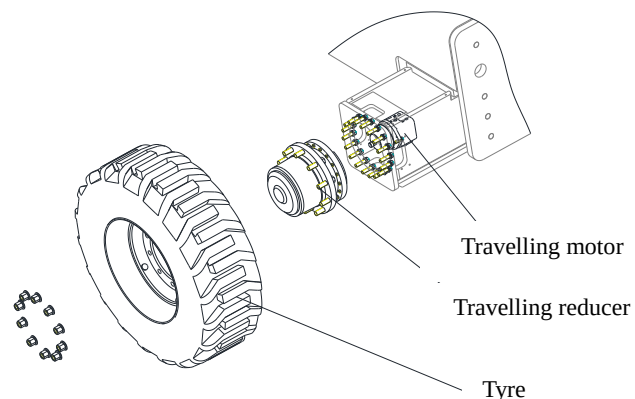


Figure 4-11 Running System Composition

Wheel

The wheel consists of tyre and rim. Its functions are: to support the vehicle; to ensure well adherence to road and transmit driving moment and retarding torque; to ensure the direction of vehicle; to moderate the impact produced during travel due to uneven road conditions; and to reduce vibration produced thereof.

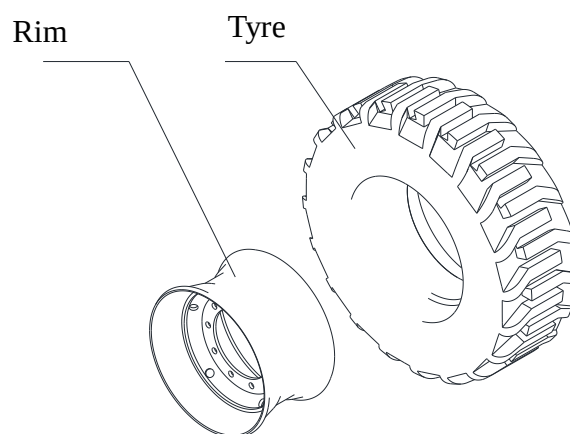


Figure 4-12 Wheel Composition

1. Rim check
 - a. Rim rust;



- b. Rim bending and deformation;
- c. Cracks on all parts of rim;
- d. Rim spigot, mounting hole and rim bolt and nut.
- e. If there is damage or deformed parts for the rim after inspection, repair or replacement should be provided. If it is only the peeling of paint, make-up may be provided after rust removal.



Do not weld and repair deformed wheel bolt at bolt connection and replacement the old with the new should be provided for conditions aforesaid.

- 2. Wheel should be subject to periodic inspection for:
 - a. Consistency of types and specification of wheels at two sides of the same axle.
 - b. The depth of wheel crown for no less than 3.2mm.
 - c. Local damage on tread for not exposing the body cord of wheel.
 - d. There should not be any crack and cut for 25mm in length or long enough to expose body

cord and other deficiency affecting use, abnormal wearing and deformation on the tread and side wall.

- e. Sufficiency and tightness of wheel bolt and semi-axle bolt.

3. Wheel replacement

Following aspects should be considered in wheel replacement

- a. Do not collide and damage thread on the wheel bolt.
- b. The seal face of wheel nut should be kept clean.
- d. Smear few grease or engine oil on threads of wheel bolt and nut and wheel spigot and its fitting surface.
- d. All of wheel nuts and their threads should be right-hand threads. After installing wheels, with the suspension of wheels, tighten nuts in a change order of symmetry, cross, in turn and in series. The tightening torque of wheel nut can be found in Attachment Table 6-2.
- e. After each installation of wheel, wheel nut should be re-tightened, as required, after vehicle travels 50km.



During tyre installation, attention should be paid to:

The types and threads of wheel at the same axle should be same.

Do not use retreaded tyre.

Travelling reducer

1. Oil injection

Replacement of driving wheel oil for reducer is vitally important for its good performance and service life. Incompliant (100h for first replacement and 2500h or 12 months for following replacement) replacement of driving wheel oil may cause bad working conditions of the equipment and sequential application may cause parts damaged.

See following figure for oil injection. Operation procedures are as follows:

- Rotate the reducer until the hole is in horizontal status, as shown Figure 4-13.
- The other refueling plug shall be above the horizontal plug.
- Remove two plugs.
- Refuel the reducer through the upper plug un-

til the oil overflows from the horizontal plug.

- Install plug back into the hole.
- Run for minutes and check oil level. Continue to inject oil, if necessary

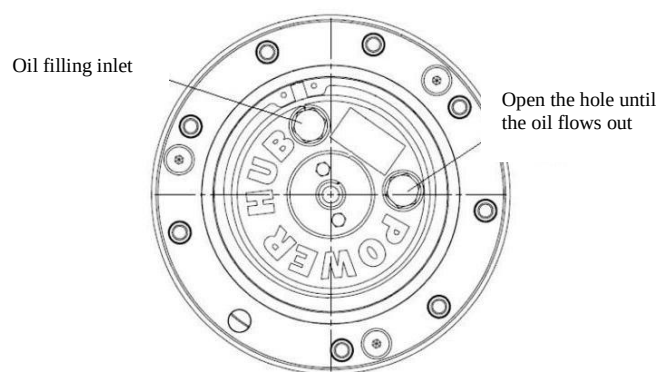


Figure 4-13 Oil Injection and Drainage for Travelling Reducer

2. Separation

See the diagram for separating unit of travelling reducer. Procedures of separation are as follows:

- Use spanner to remove the plug.
- Insert the M6 bolt into the threaded hole of the sun gear which located in low torque planetary gear train.
- Remove the sun gear.
- Tighten the plug.

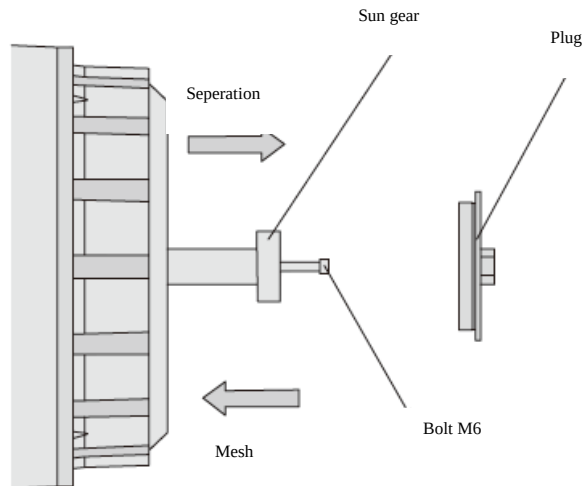


Figure 4-14 Travelling reducer separating unit

Travelling motor

1. Remove hydraulic hose connecting travelling motor, mark and properly seal. Seal the oil outlet of motor.



In removing oil hose, connector should be slowly removed and loosened, avoiding high hydraulic pressure spraying and causing damage.

2. Remove connecting screw of travelling motor and reducer and carefully remove travelling motor.

Axle Balance System

The front balance axle is connected to the frame through the hinge pin, to ensure the four wheels

to be maintained on the ground when driving on roads of unflatness. The balance axle is also using two balance cylinders located between the frame and the axle. The cylinders shall be adjusted only when the arm frame is in folding position and the driving operation is in progress, otherwise the axle will be locked by the balance cylinders. When the system is applying pilot pressure on the balance valve, it will be open and the cylinders will be unlocked, and vice versa. The pilot pressure is generated from the running system, controlled by electromagnetic directional valve installed on the frame.

Locking test of axle balance (if applicable)

When the arm frame is in folding position and driving mode is selected, the front axle will be balanced automatically.



The balance shaft locking test shall be implemented once every quarter, or after the replacement of any system components, or in case there is any suspicion on improper operations of the system.

Prior to balance cylinder locking test, the arm frame shall be retracted, declined and placed



in the middle of rear wheels.

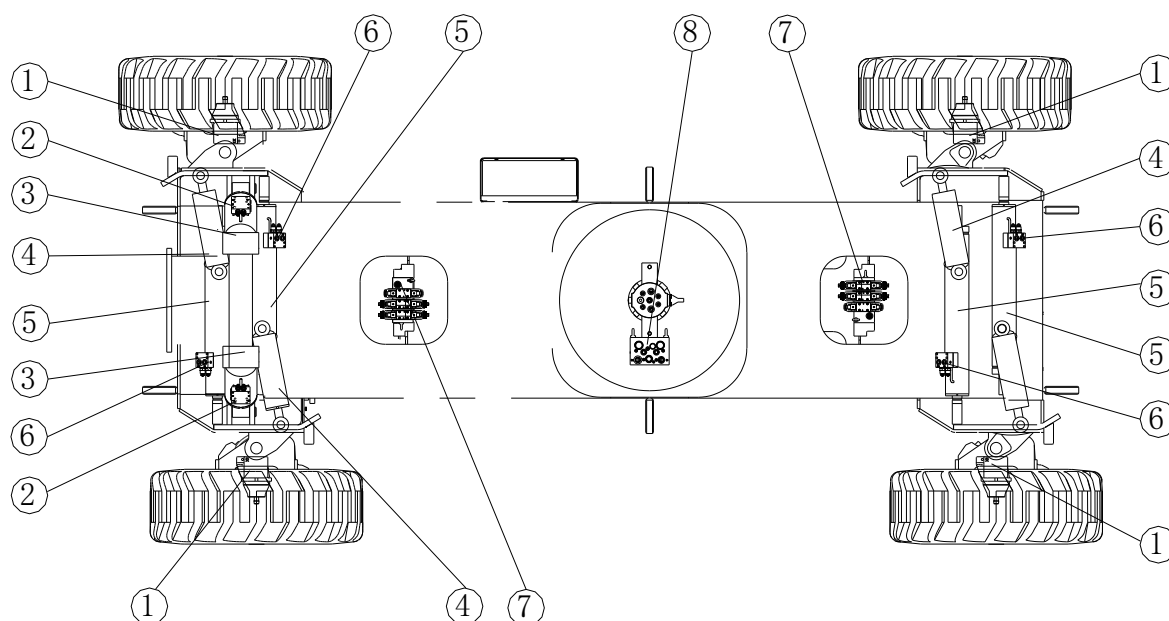
1. Place a 150mm high inclined stop block before the front left wheel.
2. Start the engine through control on the platform.
3. Place the function speed selection and torque selection control switch on position LOW. Place the driving joystick into forward position, drive on the equipment with care until front left wheel is on the top inclined surface of the stop block.
4. Extend the big arm carefully until it has just left the folding position.
5. When the above actions are completed, place the driving joystick into reverse position, drive the equipment to leave the block and inclined surface.
6. Ask the assistant to check if the front left wheel and rear right wheel are maintained off the ground.
7. Retract the big arm into the folding position carefully, then drive the vehicle slowly to loosen the axle balance cylinders. Then the wheels will be laid on the ground.
8. Repeat the same test procedures to check the right balance cylinder to confirm if the front right wheel and rear left wheel are maintained off the ground.
9. In case the locking hydraulic cylinder is in abnormal operation, the qualified maintenance personnel shall complete the troubleshooting before further operations.



4-6 Hydraulic system

Main hydraulic elements, regulating valve and pressure regulation

a. Locations of chassis main hydraulic parts and pressure adjustment valve



- | | | | | |
|---------------------------------|-----------------------------------|-----------------------------|----------------------|----------------------------------|
| 1. Running motor | 2. Axle balance valve | 3. Axle Balance oil | 4. Steering cylinder | 5. Horizontal outrigger cylinder |
| 6. Axle extending balance valve | 7. Wheel axle control valve group | 8. Travelling control valve | | |

Figure4-15 Positions of main hydraulic elements and regulating valve of lower vehicle

b. Positions of main hydraulic elements and regulating valve on rotary table

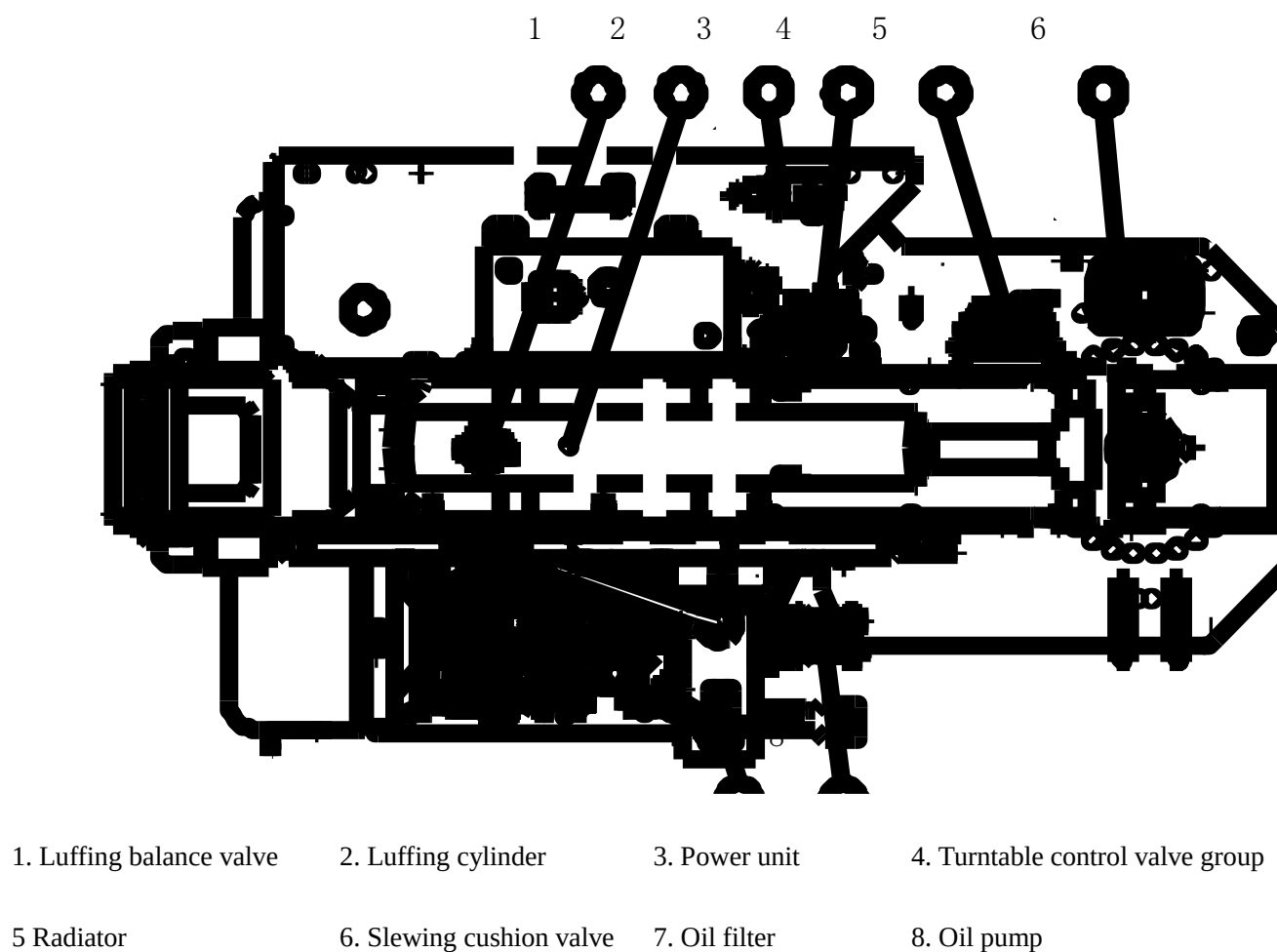
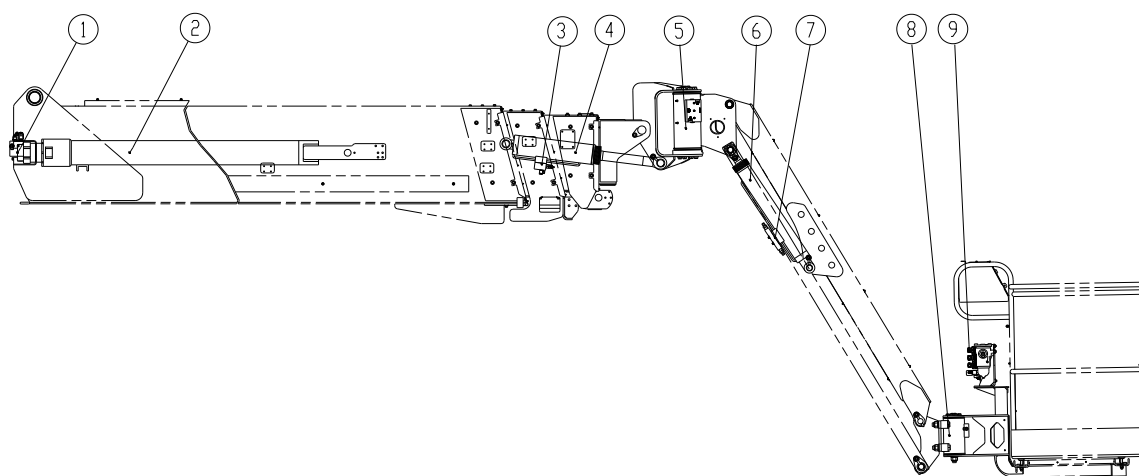


Figure 4-16 Positions of main hydraulic elements and regulating valve on rotary table



c. Positions of main hydraulic elements and regulating valve at boom



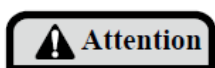
- | | | |
|------------------------------|----------------------------|---------------------------------|
| 1. Crank arm balance valve | 2. Crank arm cylinder | 3. Leveling balance valve |
| 4. Balance cylinder | 5. Jib swing cylinder | 6. Jib luffing cylinder |
| 7. Jib luffing balance valve | 8. Platform swing cylinder | 9. Platform control valve group |

Figure 4-17 Positions of main hydraulic elements and regulating valve at boom

2. See Table 4-1 for checking and regulating pressure for hydraulic system.

Table 4-1 Table of system pressure

Pressure cutoff value of closed traveling variable displacement pump (MPa)	Pressure cutoff value of open variable displacement pump (MPa)	Pressure of power unit (MPa)
30 MPa	21 MPa	23 MPa
300 bar	210 bar	230 bar



The pressure for variable pump and all balance valves are set in factory. If any regulation is required, our professional service staff

is supposed to be contacted.

Checking items:

- Check the valve stems and connectors of electro-hydraulic proportional valve for presence of oil permeation. If present, check and repair.
- Check the situation of pins and their locking devices at all hinged joints of electro-hydraulic proportional valve and timely repair or replace any problem detected.

Change of Oil

Cleanness is the most important index to main-



tain the hydraulic system. Dust or other contaminations shall be prevented from entering the system. Even a very small particle will cause blocking of valves and pumps. Hydraulic oil shall be filled via a special filter rather than directly added into the oil tank.

1 Model of hydraulic oil

1) Ensure to use appropriate hydraulic oil based on the environmental temperature:

a. Use AE46 hydraulic oil in regions with $>-15^{\circ}\text{C}$ environmental temperature.

b. Use HS22 hydraulic oil in regions with $\leq -15^{\circ}\text{C}$ environmental temperature.

c. For the customers with special requirements, use the hydraulic oil as per the specific requirements.

2) It's disallowed to mix the hydraulic oils of different trademarks for use. Before replacing with hydraulic oil of other trademark, ensure to fully drain the used hydraulic oil from the oil tank and system and then fill hydraulic oil of new trademark.

2 Preparation before Change

Before changing the oil, the boom shall be lifted to the maximum working height and the engine

shall be stopped.

3 Steps

1) Screw out the drain valve at the bottom of the oil tank to have oil drain out.

2) Remove all hoses from the oil tank and exhaust all oil in the hoses as far as possible.



Clearly mark all of the hoses and the joints so as to facilitate re-installation.

Wipe all openings by a clean cloth. Wipe as deep as possible. Bear in mind to wipe the concealed holes.

3) Remove lining of the filter.

4) Replace filter element and re-install filter components.

5) Replace all hoses with defects.

6) Connect well oil suction pipes and oil return pipes and then fill the tank with oil.

7) Cut off the oil return passage into the oil tank and connect the oil return passage to another container.

8) Start the engine to separately drive the boom and the landing leg to running status.



9) Clean or replace oil return pipes of the oil tank.

10) Connect the oil return pipes well to the tank, check the oil level and fill oil to the required level.

11) When adding or replacing hydraulic oil, please make sure that the following cleaning standards are fulfilled. The pollution degree of solid particles in hydraulic oil added into the tank shall not be higher than 18/15. The volume of hydraulic oil tank is 260L and the total volume of hydraulic oil for replacing is about 420L.



According to national laws and regulations, hydraulic oil and filter lining used shall be effectively disposed.

Oil shall be added via filter into the tank.

Used hydraulic oil shall be well disposed so as to avoid flowing onto the ground.

Replacement of Hydraulic Oil Filter Element

The replacement method for hydraulic oil filter element is as below:

- Thoroughly clean of the oil filter housing by diesel or other detergent.
- Place a container below the filter, for collecting oil fluid from the case.
- Screw off end cap of the filter. At this time, the self-closing valve in the filter will automatically close to isolate oil circuit in the tank, making the enclosure of oil fluid in the tank and easy for cleaning.

In screwing off and tightening end cap of the filter. Only a wrench is required at the slot in the end cap of the filter.

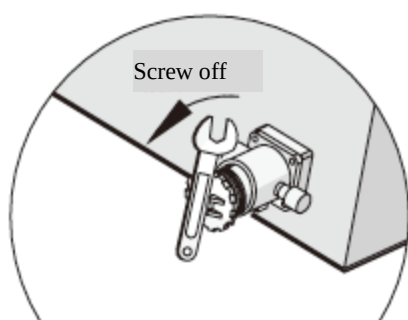


Figure 4-18 Screwing off filter end cap

- Pull out filter element and properly treat it.

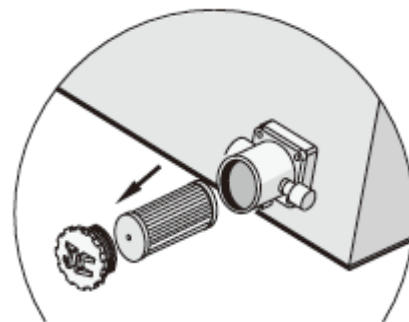
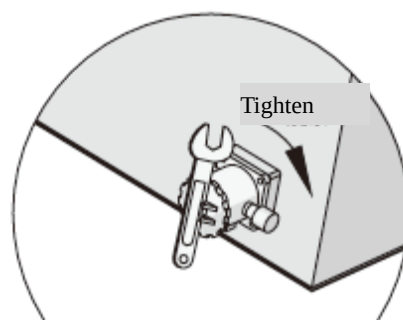


Figure 4-19 Pulling out filter element

- The filter element of this product is of paper structure, which can't be cleaned or repaired. If it is damaged or blocked by dirt (vacuum value of vacuum meter exceeding 0.018MPa), only replacement is allowed to be made. Our spare parts are the only selection of the filter element for replacement.
- Mount the new filter element into the case and mount the end cap and tighten.



Dismantling of Hydraulic Oil Pump

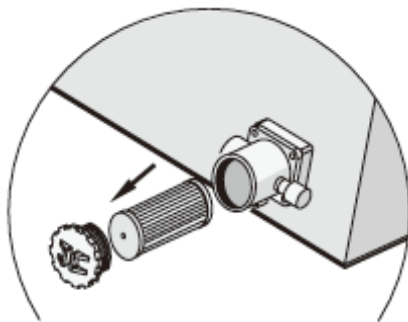
The main oil pump used in the vehicle is treble pumps that connect directly with engine. One of them is the variable pump used for driving func-



tion and controlling axle balancing system while another two are constant displacement pumps controlling other functions. In addition, there is a electric emergency pump as auxiliary power.

Repair and dismantling of main oil pump:

- a. Before dismantling oil pump, extract oil sucking filter element of hydraulic tank and cut out oil circuit.



- b. Remove hydraulic hose connecting function pumps, mark and properly seal it. Cover oil outlet on the pump.



In removing oil hose, connector should be slowly removed and loosened, avoiding high hydraulic pressure spraying and causing damage.

- c. Remove cable connecting the motor and mark. Properly protect cable connector.
- d. Remove the ribbon of electric emergency

pump and carefully remove the pump.

4-7 Electrical system

Rechargeable battery

Rechargeable battery can convert electric energy into chemical energy stored in the battery or convert chemical energy into electric energy consumed by load. Rechargeable battery is mainly used for supplying electric energy for the vehicle.

1. Precautions for periodic inspection and maintenance

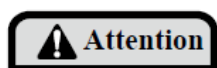
- a. It should be clean and dry. If any terminal is contaminated, it should be loosened for cleaning and use clean, acid free and acid resistant grease for lubricating;
- b. There should not be tools placed on the battery and long exposure under sunlight is undesirable;
- c. Regularly check air outlets at two sides of upper battery cover. Prevent the outlets from being blocked by dirt and ice water, causing the deformation of battery case.
- d. The battery should be kept away from spark and high temperature. Do not charge the battery



in confined space.

e. Do not remove accumulator connection while the engine is still running;

f. In removing accumulator connection, pay attention to remove negative lead first and then positive lead.



In removing accumulator connection, prevent positive lead from being connected with iron!

2. Battery charge of rechargeable battery

After storage of three months or when individual rechargeable battery voltage is lower than 12.6V, battery charge should be provided. Charge should be especially provided in cold seasons.

Direct current is used for charging. The positive pole of power is connected to that of battery and so as negative pole.

Constant voltage is used for charging rechargeable battery. The charge voltage is $14.4V \pm 0.5V$, with the maximum permitted charge current of $0.5C_{20}A$ (C_{20} is the 20 h capacity of the battery). When charge voltage does not rise, charge current is close to zero value and the stable state maintains for 2~3 h, charging is complete.

See notice for use on the battery for charging state.

3. Dismantling of rechargeable battery

Dismantling procedures are as follows:

- a. The dismantling should be done in ventilating conditions and spark should be eliminated;
- b. First cut off negative pole and then positive pole;
- c. Dismantle rechargeable battery;
- d. Touch the ground point in the cab, in order to prevent spark from incurring.



Rechargeable battery dismantling is only allowed to be done when the engine is dead.

All switches should be turned off.

Do not incline or knock the battery.

4. Installation of rechargeable battery

Installation procedures are as follows:

- a. Install the battery onboard;
- b. Touch the ground point in the cab, in order to prevent spark from incurring;
- c. Connect the positive pole of accumulator



first and then negative pole (bond end);

d. Check the connection at the terminal of accumulator for reliable fixing;

e. Use acid free and acid resistant grease to lubricate binding post.



Do not invert and vertically place battery.

Do not connect reversely! It will damage electric equipments onboard!

Check and test required after machine overhaul or replacement of major parts

After major replacement or major repair of the machine, to ensure the normal performance and smooth operation of the machine as before, users should look for professional institution reference standard GB25849-2010 Mobile Elevating Work Platform—Design Calculation, Safety Requirements and Test Method for checking and testing. The “major replacement” and “major repair” above means the complete or partial replacement that affects the stability, strength and performance of mobile elevating work platform.



Tests should be performed by professional in-

stitutions and qualified personnel.

Major replacement or major repair should be recorded and kept.

Results of checking and testing should be recorded and kept.



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Chapter 5 Common Faults and Trouble- shooting



For the repair of electric control system and hydraulic system, it should be performed by the professionals. If special faults that are not mentioned in this manual is encountered, please contact our after sales department for solution.

Table 5-1 Common faults of hydraulic system and troubleshooting

S/N	Fault	Possible Reason	Troubleshooting
1	The pressure of up vehicle hydraulic system is too low or too high	Under-low setting of pressure cutoff value for open variable displacement pump	Regulate pressure to 21 MPa(210 bar)
		Under-low pressure setting of main relief valve in turntable control valve	Regulate pressure to 23 MPa(230 bar)
2	Low chassis hydraulic system pressure	Under-low setting of pressure cutoff valve for closed traveling variable displacement pump	Regulate pressure to 30 MPa (300 bar)
		Under-low pressure setting of main relief valve in closed traveling variable displacement pump	Regulate pressure to 28 MPa(280 bar)
3	All up vehicle actuators are inoperative	No pressure in system or pressure is too low	Refer to Item 1 for checking
		Malfunction of electronic proportional pilot joystick	Check and repair electronic proportional pilot joystick
4	Individual up vehicle actuator is inoperative	Under-low pressure setting of motion control circuit for turntable control valve and platform control valve	Increase the pressure with reference to the pressure adjustment method of main hydraulic parts in section
5	Luffing cylinder could not be locked and automatically descends	The locking performance of balance valve is bad and inner leaking is serious	Check balance valve
		Inner leaking of the cylinder is serious	Check cylinder
		The lock pressure of balance valve is set too low	Increase the lock pressure
6	Electro proportion pilot handle stops operation and actuator stops or is irresponsive	Relevant balance valve closes too slow	Check relevant balance valve
7	Rotary table shakes or is unstable when up vehicle	The gap in gear engagement of rotary mechanism is too large	Regulate gear engagement gap



S/N	Fault	Possible Reason	Troubleshooting
	hicle rotates	The set pressure of rotary cushion valve is too high, causing the impact when opening	Regulate the set pressure of cushion valve
		The opening pressure of slewing reducer brake is too high, or is with fault	Check the brake
8	Emergency power installation can retrieve the vehicle after starting	Malfunction of electro-hydraulic proportional valve	Check and repair electro-hydraulic proportional valve.
		Internal leakage of power unit	Check and repair power unit.
9	Vehicle cannot move	System pressure is too low	Measure system pressure and regulate it to corresponding value
		Travel selector valve is with fault, causing travelling reducer brake cannot be opened	Check travel selector valve
10	Only one side can move	The motor or reducer at the side that cannot move is damaged	Check the motor or reducer
11	Lower vehicle cannot turn	Steering pressure is too low	Measure system pressure and regulate it to corresponding value
		Malfunction of axle control valve	Check and repair axle control valve.
		Steering mechanism is with fault	Check steering mechanism
12	The state of high-speed and low-speed in traveling cannot be shifted	Shifting electromagnetic valve is with fault	Check shifting electromagnetic valve and controlling electrical signal
		Control pressure is insufficient	Check control pressure
13	Platform cannot level in operation	The hydraulic oil in leveling system is insufficient	Supply hydraulic oil to leveling system
		The set pressure of leveling overload valve is too low	Increase to set pressure
14	Platform cannot swing	System pressure is too low	Increase system pressure



Table 5-2 Common faults of electric system and troubleshooting

S/N	Fault	Possible Reason	Troubleshooting
1	Entyre vehicle is with no power	Rechargeable battery is damaged or with no power or connecting line is peeled or fuse is burnt out	Replace accumulator, charge accumulator or connect line or replace fuse
2	Starter does not work	Fuse is burnt out	Replace fuse
		Starting button works abnormally	Repair or replace
		Conductors between elements are disconnected or plug-ins and connecting parts are peeled	Re-lay and re-fix
		Bond strap is badly connected or the strap is damaged	Re-bond or replace the strap
		Starting relay is damaged	Repair or replace
3	Generator does not produce power	Rechargeable battery has insufficient power	Repair or replace
		The connector of generator peels	Re-fix
		Generator is damaged	Replace generator
		Machine is with fault or generator is damaged	Check the belt for whether being loose
		Fuse is burnt out	Replace fuse
4	Generator does not strike spark	Emergency stop switch is damaged	Replace
		Shutdown electromagnetic valve is damaged	Replace
		Shutdown control circuit is with fault	Check faults in circuit
		Fuel oil filter element is blocked	Replace
		Oil-water separator is damaged	Replace
		Fuel line damaged and other oil line fault	Troubleshoot
5	Engine alarms faultily	Water temperature sensor (or switch) is damaged	Replace
		Sensor plug-ins and connecting parts are peeled or the pin is badly connected or line is disconnected	Find out loose point, closely insert plug-ins and connecting parts and eliminate line fault
		Water temperature sensor (or switch) is damaged	Replace
		Sensor plug-ins and connecting parts are peeled or the pin is badly connected or line is disconnected	Find out loose point, closely insert plug-ins and connecting parts and eliminate line fault



S/N	Fault	Possible Reason	Troubleshooting
6	Fuel meter displays abnormally	Meter sensor is damaged	Replace meter sensor
		Meter is damaged	Replace meter
		Meter sensor does not match meter	Replace with a meter sensor that matches meter parameters
		Line is damaged	Check faults in circuit
7	Up vehicle is with no power	Fuse is burnt out	Replace
		Power relay is burnt	Replace
		Conductor is in open circuit	Re-connect or re-lay
8	Rotary table does not work	Fuse is burnt out	Replace
		Electromagnetic valve failure	Repair or replace
		Conductor is in open circuit	Re-connect or re-lay
		The switch to shifting upper and lower vehicle is damaged	Replace
9	Platform does not work	Fuse is burnt out	Replace
		Pedal switch failure	Replace
		Conductor is in open circuit	Re-connect or re-lay
		The switch to shifting upper and lower vehicle is damaged	Replace
		System bus is with fault	Check faults in circuit
		Electromagnetic valve failure	Repair or replace
		Handle or button and switch is damaged	Replace



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Chapter 6 System Schematic Diagram

6-1 Hydraulic system schematic diagram

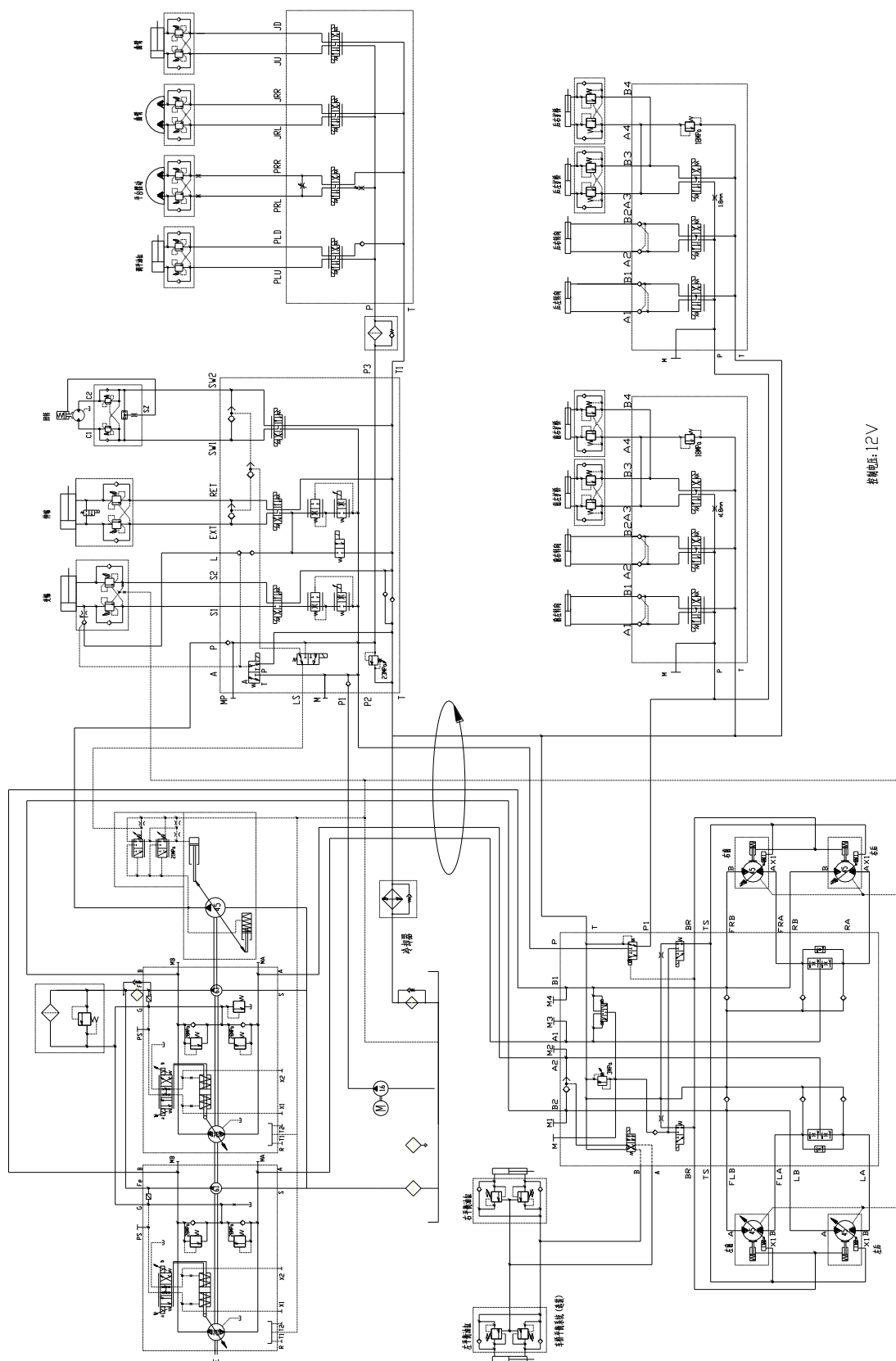


Figure 6-1 Hydraulic system schematic diagram

6-2 Electric system schematic diagram

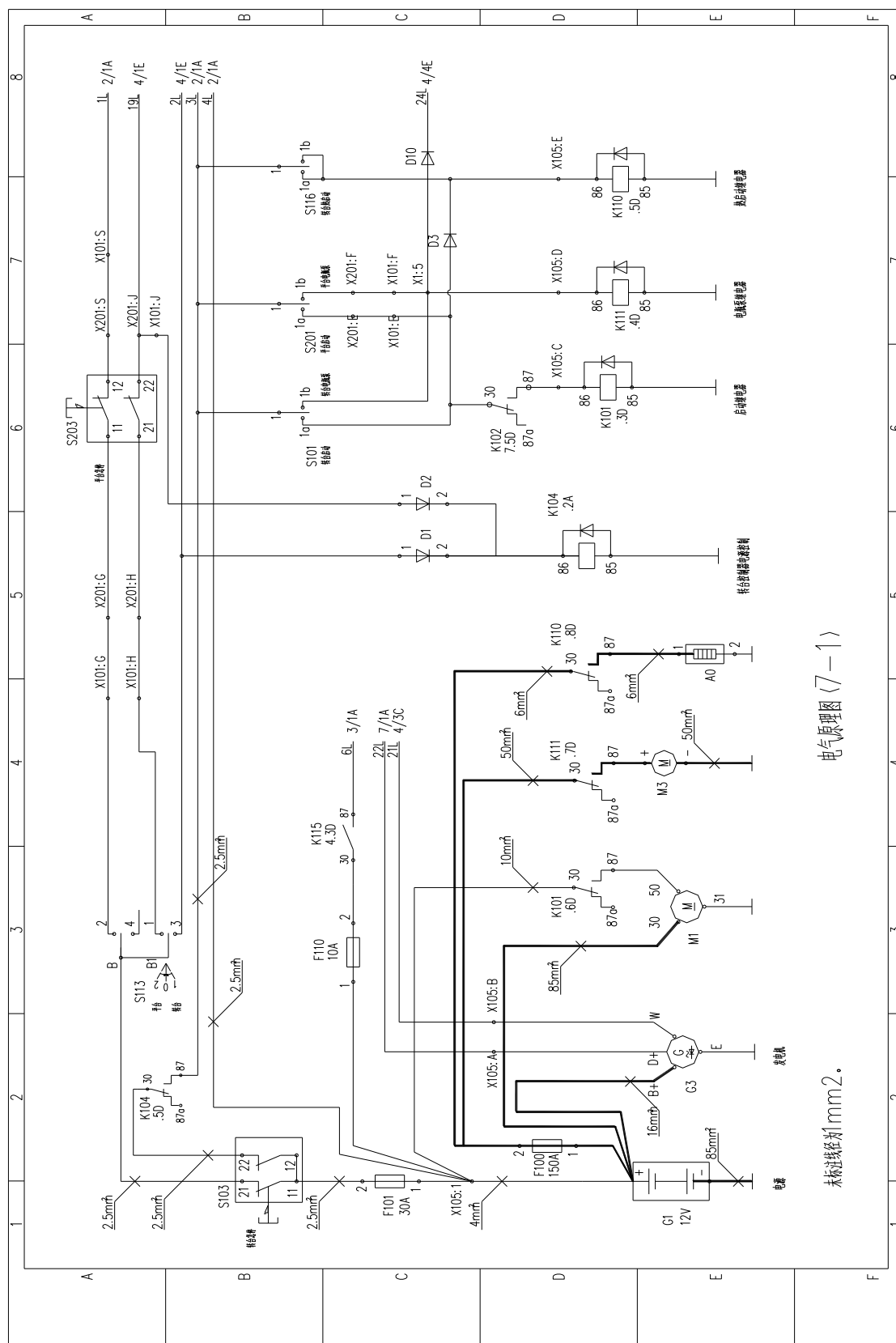


Figure 6-2 Electric system schematic diagram (1/7)

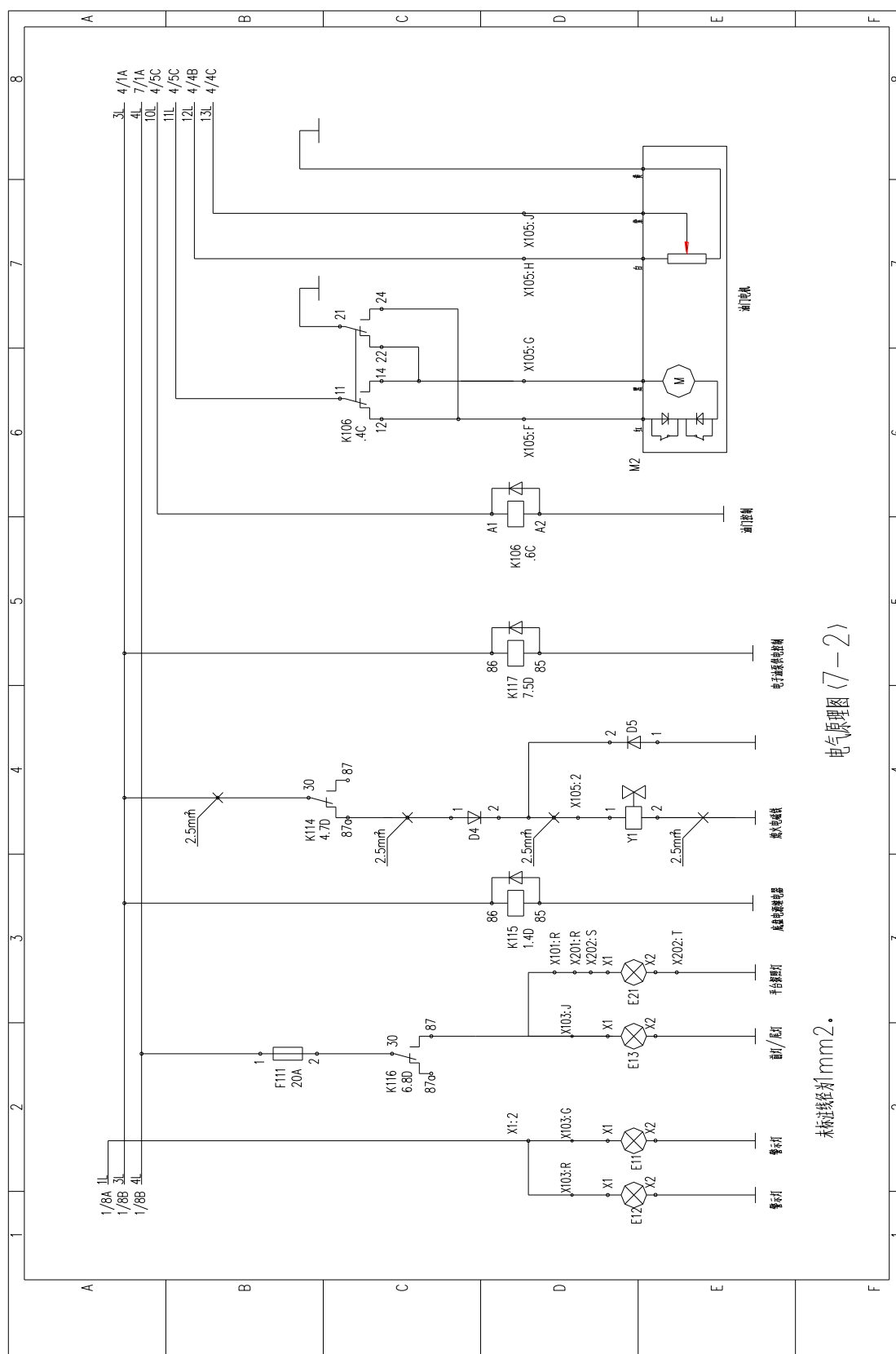
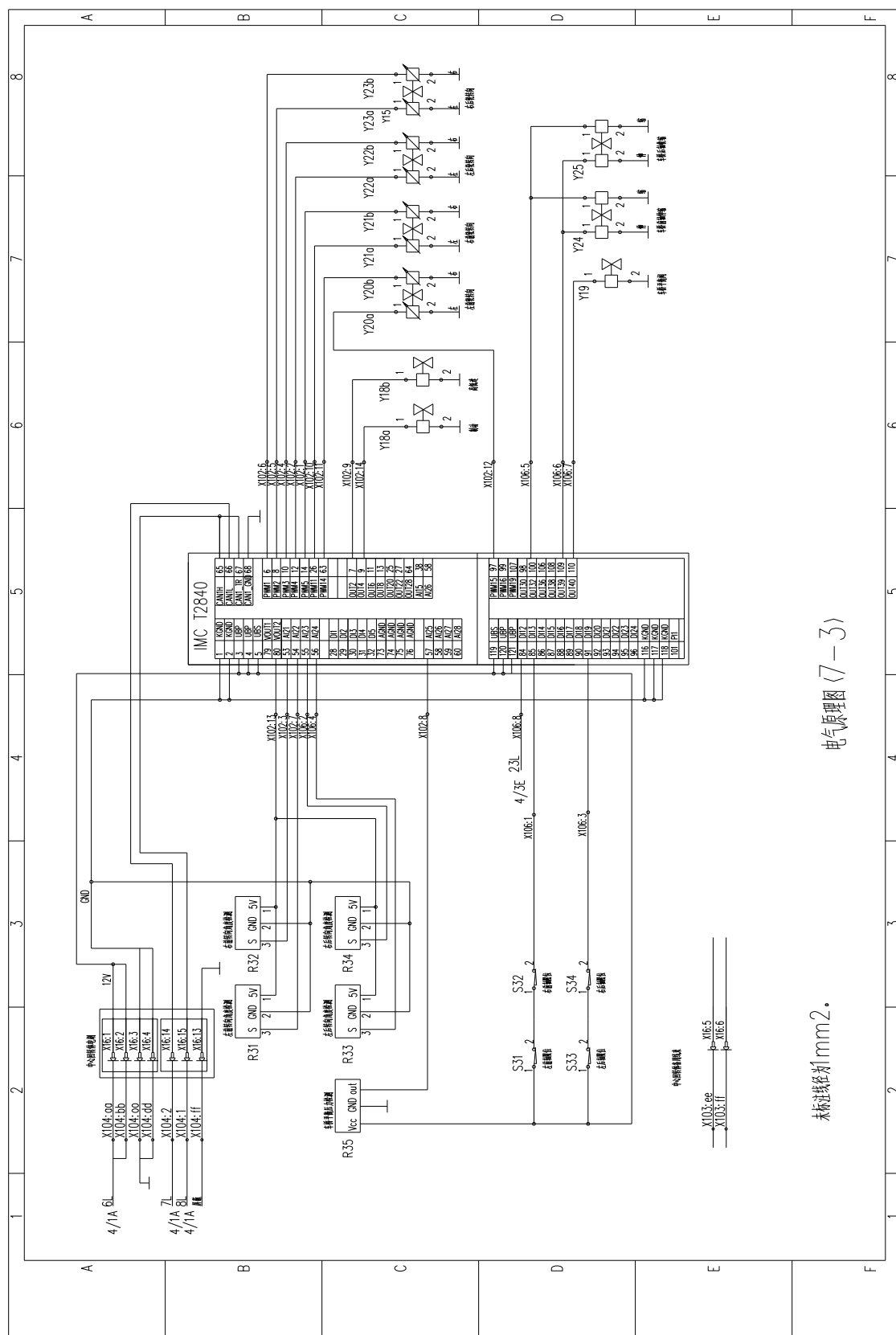


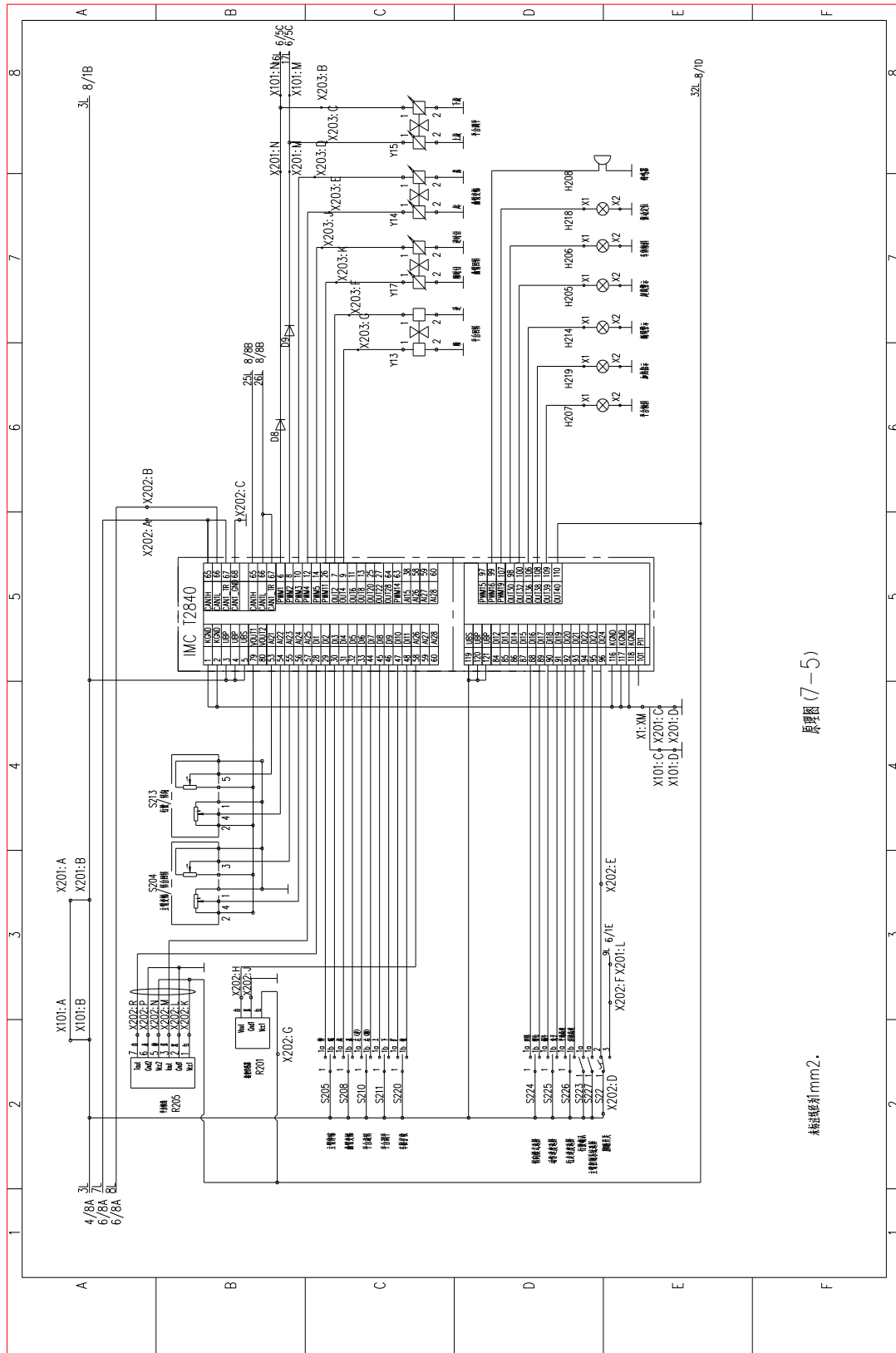
Figure 6-2 Electric system schematic diagram (2/7)



6-2 Electric system schematic diagram (3/7)



Figure 6-2 Electric system schematic diagram (4/7)



原理图 (7-5)

基准线为1mm2.

Figure 6-2 Electric system schematic diagram (5/7)



Figure 6-2 Electric system schematic diagram (6/7)

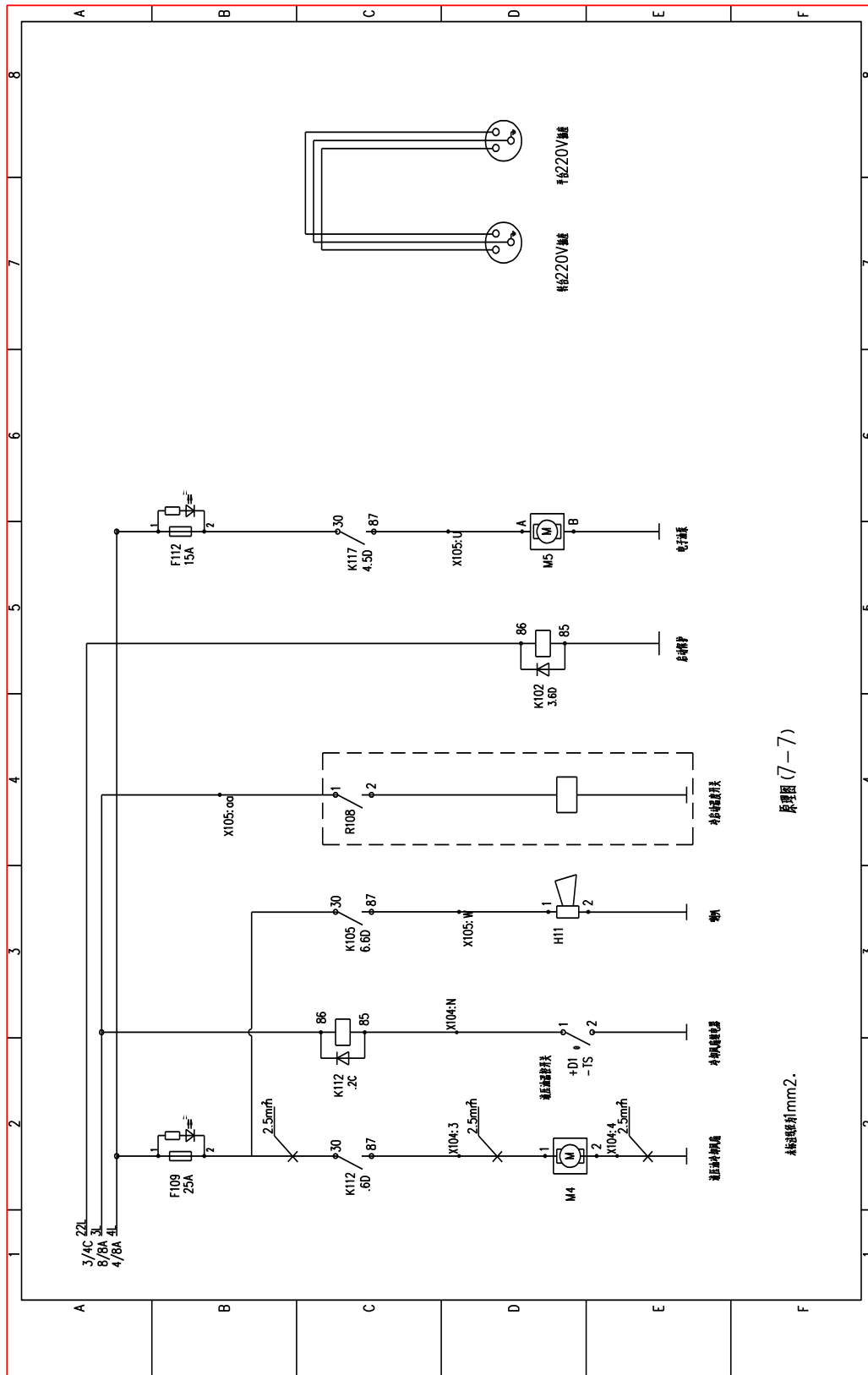


Figure 6-2 Electric system schematic diagram (7/7)



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Chapter 7 Appendix



7-1 Main parts and components

Table 7-1 Details of main parts and components

S/N	Name	Manufacturer	Certification	Remark
1	Slewing bearing	Maanshan Fangyuan Slewing Bearing Co., Ltd.		
2	Slewing reducer	Xuzhou Keyuan		
3	Main oil pump	REXROTH/DANFOSS		
4	Turntable control valve	SANT/Shengbang		
5	Platform control valve	SANT/Shengbang		
6	Luffing cylinder	Chengdu Chenggang Hydraulic Equipment Manufacturing Co., Ltd. /Xuzhou XCMG Hydraulic Parts Co., Ltd.		
7	Steering cylinder			
8	Leveling cylinder			
9	Jib cylinder			
10	Telescoping cylinder			
11	Rotary motor	Ningbo Zhongyi Hydraulic Motor Co., Ltd.		
12	Travelling reducer	RR		
13	Travelling motor	DANFOSS		
14	Engine	Perkins		

7-2 Record of maintenance and repair

Table 7-2 Record of maintenance and repair

[illegible]

[illegible]



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Version 1, DECEMBER, 2019