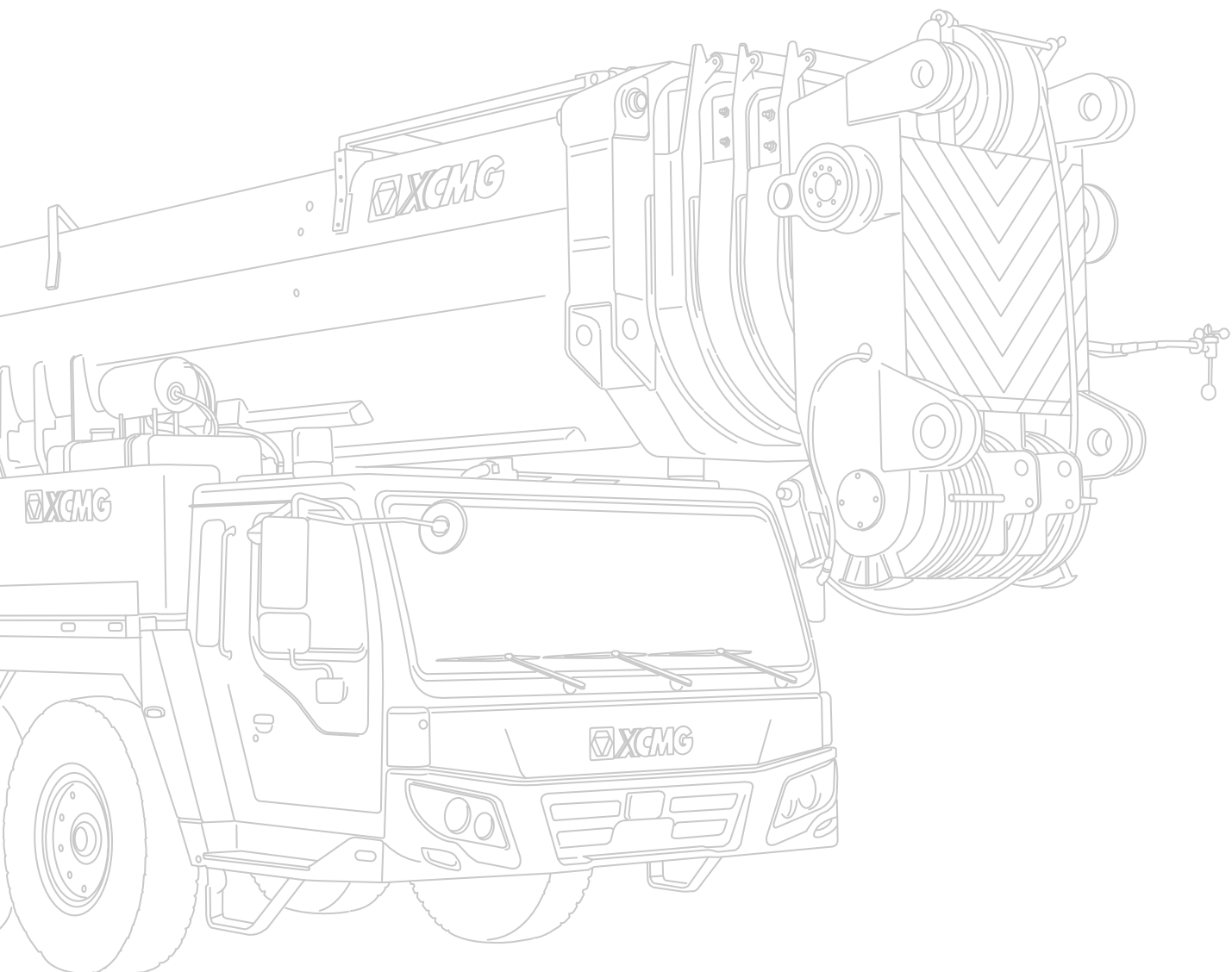




XCT80 Truck Crane Operation Manual





XCT80 Truck Crane Operation Manual

Vehicle identification number (VIN)	
Date of production	

The product service manual is part of the product, and should always be placed handy for future reference.

Please read the product service manual before using the product.

This product is designed and manufactured to comply with GB 6067.1-2010 “Safety regulations of hoisting machine” ,

GB 7258-2012 “Safety operation technical conditions of motor vehicles” , GB/T 6068-2008 “Test specifications of truck crane and tyre crane” , JB/T 9738-2000 “Technical requirements of truck crane and tyre crane” , and Q/320301JAF144 standard.

Xuzhou Construction Machinery Group Co., Ltd. Xuzhou Heavy Machinery Co., Ltd.

Address: No. 165Tongshan Road, Xuzhou City, Jiangsu Province, China

Tel: +86-516-83462242 83462350

Fax: +86-516-83461669

Post Code: 221004

Service Tel: +86-516-83461183

Service Fax: +86-516-83461180

Spare Parts Tel: +86-516-83461542



Contents

Preface	IX
Chapter1 Properly use the product manual.....	1-1
Chapter2 Crane logo	2-1
2-1 Composition and meaning of product models	2-1
2-2 Product nameplate	2-1
2-3 Chassis nameplate.....	2-2
2-4 Crane performance label.....	2-3
2-5 Indicating label	2-3
2-6 Warning label.....	2-3
Chapter3 Basic safety instructions.....	3-1
3-1 Properly use the crane.....	3-1
3-1-1 Abnormal use of the crane	3-1
3-1-2 General requirements of the crane safety operation	3-2
3-2 Personnel selection and qualification	3-4
3-2-1 Assignment personnel	3-4
3-2-2 Crane operator.....	3-4
3-2-3 Slingers	3-5
3-2-4 Command personnel	3-6
3-2-5 Installation personnel.....	3-7
3-2-6 Maintenance personnel	3-7
3-3 Personnel safety equipment.....	3-8
3-4 Safety passage and emergency escape.....	3-8
3-5 Crane driving safety instructions.....	3-9
3-5-1 Road traffic rules.....	3-9
3-5-2 Hook transportation	3-9
3-5-3 Passengers on driving crane.....	3-10
3-5-4 New crane running.....	3-10
3-6 Crane operation safety instructions	3-10
Chapter4 Construction instructions.....	4-1



4-1 Planning	4-1
4-2 Crane operation management	4-2
4-2-1 Safe working system	4-2
4-2-2 Crane operation plan	4-3
4-2-3 Faults and accidents report	4-3
4-3 Crane settings	4-3
4-3-1 Crane supporting conditions	4-3
4-3-2 Obstacles around crane	4-6
4-3-3 Wind load influence	4-8
4-3-4 Crane grounding	4-10
4-4 Multiple cranes lifting operation	4-10
4-5 lifting weight.....	4-11
4-6 Disaster Treatment and Emergency Measures.....	4-12
4-6-1 Natural disaster	4-12
4-6-2 Accident disaster	4-13
4-7 Operation instructions for the crane in out-of-service condition.....	4-14
Chapter 5 Main characteristics and technical parameters.....	5-1
5-1 Main purposes and characteristics	5-1
5-1-1 Main purpose and scope	5-1
5-1-2 Main characteristics of XCT80 truck crane	5-1
5-2 Conditions of use	5-1
5-3 XCT80 truck crane technical parameters and rated lifting weight chart	5-1
5-4 Crane main structure performance parameters	5-29
Chapter 6 Components and functions of lower crane portion	6-1
6-1 General overview	6-1
6-1-1 Power system	6-1
6-1-2 Transmission system	6-1
6-1-3 Driving system	6-1
6-1-4 Operating system	6-1
6-1-5 Cab and covering parts	6-1
6-1-6 Hydraulic system	6-1
6-1-7 Air conditioning system	6-1



6-1-8 Electrical system	6-1
6-1-9 Auxiliary system	6-1
6-2 Main components introduction.....	6-3
6-3 Cab and protective device.....	6-4
6-3-1 The cab interior equipments.....	6-4
6-3-2 Main function introduction of meters, switches and lights in the cab	6-15
6-3-3 Other device	6-20
6-3-4 Protective devices	6-22
Chapter 7 Traveling Status on Highway	7-1
7-1 Preparations before traveling.....	7-1
7-1-1 Crane traveling mode on highway	7-1
7-1-2 Inspection of vehicle condition.....	7-1
7-1-3 The use of air conditioning	7-4
7-2 Operation of lower crane portion engine.....	7-6
7-2-1 Check before starting the engine	7-6
7-2-2 Start lower crane portion engine	7-9
7-2-3 Inspection after the engine startup	7-10
7-2-4 Flameout of engine	7-10
7-3 General operation	7-11
7-3-1 Starting and gear shift.....	7-11
7-3-2 Trail operation.....	7-13
7-3-3 Clutch operating.....	7-13
7-3-4 Steering system	7-14
7-3-5 Braking system	7-16
7-4 Driving cranes in winter	7-17
7-4-1 Cooling system	7-17
7-4-2 Braking device	7-18
7-4-3 Battery.....	7-18
Chapter 8 Components and functions of upper crane portion	8-1
8-1 General overview.....	8-1
8-1-1 Lifting device	8-1
8-1-2 Safety device.....	8-1



8-1-3 Upper crane portion control room and rotary bearing system	8-1
8-1-4 Upper crane hydraulic system.....	8-1
8-1-5 Upper crane portion electric system	8-2
8-2 Main component introduction	8-3
8-3 Operating cab.....	8-5
8-3-1 Electric device.....	8-6
8-3-2 Instrument panel	8-7
8-3-3 Control handle.....	8-10
8-3-4 Relay	8-10
8-3-5 Electric system manual	8-11
8-4 Safety device.....	8-12
8-4-1 Lifting torque limiter	8-12
8-4-2 Three-coil protector (counter).....	8-12
8-4-3 Length and angle sensor	8-13
8-4-4 Groove jumping device (rope block).....	8-14
8-4-5 Level	8-14
8-4-6 Horn	8-14
8-4-7 Safety control switch	8-15
8-4-8 Hydraulic unloading valve.....	8-16
8-4-9 Hydraulic oil filter blocking alarm lamp.....	8-16
8-4-10 Rotary table lock device	8-17
Chapter9 Crane accessory.....	9-1
9-1 Crane accessory selection.....	9-1
9-2 Mounting and dismounting of auxiliary lifting mechanism	9-1
9-2-1 Operating Precautions.....	9-1
9-2-2 Mounting auxiliary lifting mechanism	9-2
9-2-3 Dismounting auxiliary lifting mechanism	9-3
9-3 Mounting and dismounting of auxiliary crane arm	9-4
9-3-1 Operating Precautions.....	9-4
9-3-2 Component name of auxiliary crane arm.....	9-5
9-3-3 Mounting auxiliary crane arm.....	9-7
9-3-4 Mounting angle adjustment of auxiliary crane arm.....	9-13



9-3-5 Auxiliary crane arm storage	9-15
9-4 Mounting and dismounting of balance weight	9-16
9-4-1 Operating Precautions	9-16
9-4-2 Balance weight combination	9-16
9-4-3 Mounting balance weight	9-17
9-4-4 Dismounting balance weight	9-20
9-5 Mounting and dismounting of arm end single pulley	9-20
9-5-1 Operating precautions	9-20
9-5-2 Mounting arm end single pulley	9-21
9-5-3 Storing arm end single pulley	9-23
9-5-4 Crane performance of arm end single pulley	9-23
9-6 Hook and steel wire rope	9-24
9-6-1 Hook selection	9-24
9-6-2 Hook basic structure	9-24
9-6-3 Steel wire rope magnification conversion	9-25
9-6-4 Crossing and winding method of steel wire rope	9-28
9-6-5 Crossing and winding of steer wire rope precautions	9-31
Chapter10 Crane operation	10-1
10-1 Crane operation preparations	10-1
10-1-1 Check before crane runing	10-1
10-1-2 Crane operation conditions check	10-1
10-1-3 Air conditioning equipment use	10-2
10-1-4 Operating cab seat adjustment	10-5
10-1-5 Check the winch steel wire rope position	10-7
10-1-6 Check safety device	10-7
10-2 Engine operation	10-9
10-3 Power take-off operation	10-10
10-4 Outrigger system operation	10-13
10-4-1 Operating precautions	10-13
10-4-2 Outrigger operation composition	10-14
10-4-3 Fold and unfold foot plate	10-18
10-4-4 Fold and unfold horizontal outrigger	10-18



10-4-5 Fold and unfold vertical outrigger	10-18
10-4-6 Leveling crane.....	10-19
10-5 Throttle operation	10-19
10-5-1 Operating precautions	10-19
10-5-2 Operating method	10-20
10-6 Lifting mechanism operation.....	10-21
10-6-1 Operating precautions	10-21
10-6-2 Main lifting mechanism operation (right handle)	10-21
10-6-3 Auxiliary lifting mechanism operation (left control handle)	10-22
10-6-4 Free trackslip operation	10-23
10-7 Main crane boom stretching operation	10-23
10-7-1 Operating precautions	10-23
10-7-2 Operating method	10-24
10-8 Main crane boom luffing operation	10-25
10-8-1 Operating precautions	10-25
10-8-2 Main crane boom luffing operation (right control handle)	10-26
10-8-3 Relations between main crane boom elevation angle and total crane weight and working radius	10-27
10-9 Slewing operation	10-27
10-9-1 Operating precautions	10-27
10-9-2 Slewing operation (left control handle)	10-28
10-10 Combined action instructions	10-29
Chapter 11 Oil and Grease	11-1
11-1 Fuel and engine oil.....	11-1
11-2 Hydraulic oil	11-1
11-3 Gear oil	11-2
11-4 Grease	11-4
11-5 Domestic and foreign grease comparison	11-7
11-6 Coolant.....	11-8
11-7 Waste oil, antifreeze processing.....	11-8
Chapter 12 Crane inspection and maintenance	12-1
12-1 Overview	12-1
12-2 Inspection items	12-1



12-2-1 Inspection of steel structure bearing weight	12-7
12-2-2 Daily inspection	12-8
12-2-3 Weekly inspection	12-8
12-2-4 Inspection for unusual use	12-9
12-2-5 Test requirements	12-9
12-3 Wire rope inspection	12-10
12-4 Hook inspection	12-17
12-5 Drum, pulley and brake inspection	12-18
12-5-1 Drum	12-18
12-5-2 Pulley	12-18
12-5-3 Brake	12-18
Chapter 13 Crane Transportation and Storage	13-1
13-1 Crane transportation mode	13-1
13-1-1 Highway transportation	13-1
13-1-2 Rail transportation	13-1
13-1-3 Shipping transportation	13-1
13-2 Lorry shipping parts	13-3
13-2-1 Balance weight transportation	13-3
13-2-2 Hook transport	13-3
13-3 Crane storage	13-4
Chapter 14 Appendix	14-1
14-1 Terms	14-1
14-2 Lifting commanding gestures diagram	14-3
14-2-1 Universal gesture signal	14-3
14-2-2 Special gesture signal	14-5





Preface

Cordially thanks to the trust and recognition of XCMG brands, and the use of the truck crane produced by XCMG heavy machinery Co., Ltd.

The operating service manual is applicable to XCT80 truck crane.

The operation service manual describes the operation, inspection and adjustment methods for XCT80 truck cranes (crane for short), and the installation and transportation methods for the crane attachments. The hoisting operation is a dangerous work. Therefore, in order to ensure the use safety and at the same time play the best performance of the crane, please carefully read this manual before operation, master and use the contents in the manual, and operate in strict accordance with the requirements of the manual. The operator should pay special attention to the contents labeled "danger", "warning", "caution" and "check" in the manual.

Before leaving the factory, the crane should be tested rigorously, and all control elements should pass rigorous adjustment and calibration. For your safety, please do not arbitrarily adjust by yourself.



Only trained personnel obtaining a qualification certificate and passing an examination can operate the crane.

Please pay special attention to regularly inspect the crane safety devices, which should not be used when any failure or abnormality exists. You must comply with the highest criteria: **safety first**.

The operating manual and other vehicle technical documents are part of the crane. Please preserve properly them within the life period of the product. This manual serves as the necessary basis for your operation and use of the crane. Our company will not be responsible for any adverse consequences due to operation not complying with this manual. For safe lifting in special circumstances, please contact with our company. We will provide you with a timely and effective technical support.



Our products have passed the national "3C" certification. To ensure "3C" product conformance requirements in the maintenance process, parts with the same manufacturer, same model and the original product configuration must be used when the user replaces the main supporting parts. Otherwise, our company will not assume the resulting loss.

Our company reserves the right to modify the contents of the "operating manual" due to technological improvements. The products are subject to changes without notice, and we hope you understand. In this manual some figures may be inconsistent with the practical products, but do not affect your use. The real product represents the state.

Version 1 in November, 2012



Signs and their meanings:



—The warning word "Danger" indicates the impending dangerous situation. If not avoided, it could result in death or serious injury.



—The warning word "Warning" indicates the potentially hazardous situation. If not avoided, it could result in death or serious injury.



—The warning word "Caution" indicates the potentially hazardous situation. If not avoided, it could result in minor or moderate damages.



—Carry out relevant checks according to the requirements.



Chapter 1 Properly use the product manual

1. Product instruction is a component of the product. Please safekeeping it for use in the product life period.
2. When you transfer this crane, product instruction together with the product should be simultaneously transferred to the new customer.
3. Before operating the crane, all documents along with the crane should be read and the inspection and maintenance requirements in the repair manual should be obeyed.
4. Before operating the crane, operators should read product instruction at first and then operate the lifting work to avoiding the unnecessary accidents happening due to the wrong operation.
5. In order to ensure that no mechanical damage accidents or casualties happen, you should continuously read product instruction until completely understand and know well the content of this book. If the method that not specifically recommended or allowed in this product instruction is adopted, it is your responsibility to take necessary arrangements to ensure the safety.



- **This manual is not provided of training manual for the crane driver! All operating instructions are aimed at professionals who have already received for crane driving training.**
- **This manual is just for reference: Also provides simple or detailed operation steps for trained drivers.**

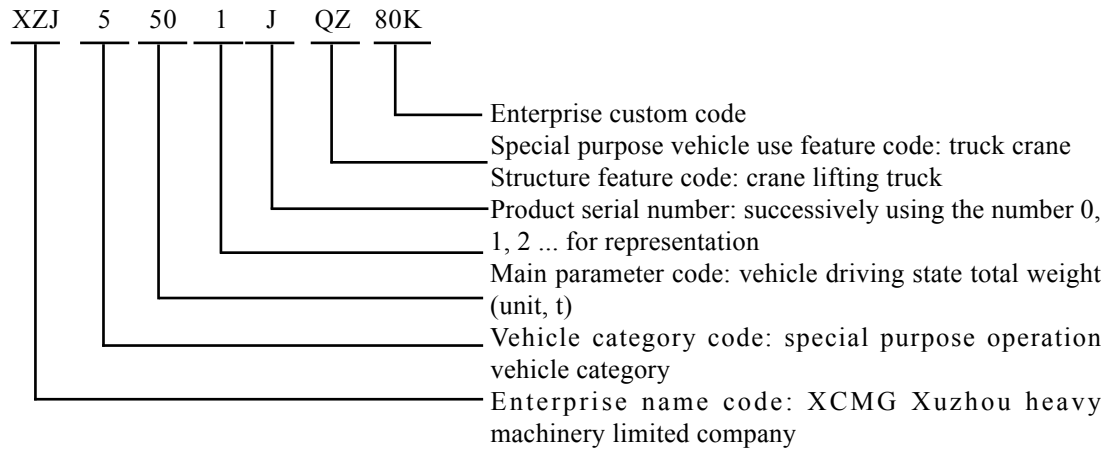


LOG



Chapter 2 Crane logo

2-1 Composition and meaning of product models



2-2 Product nameplate

Product nameplate is installed on the control room gate outside (see 2-1)

The product nameplate is marked with vehicle identification code (VIN code), name, model, rated crane weight, manufacturing date, manufacturers, engine manufacturing number, engine model etc.

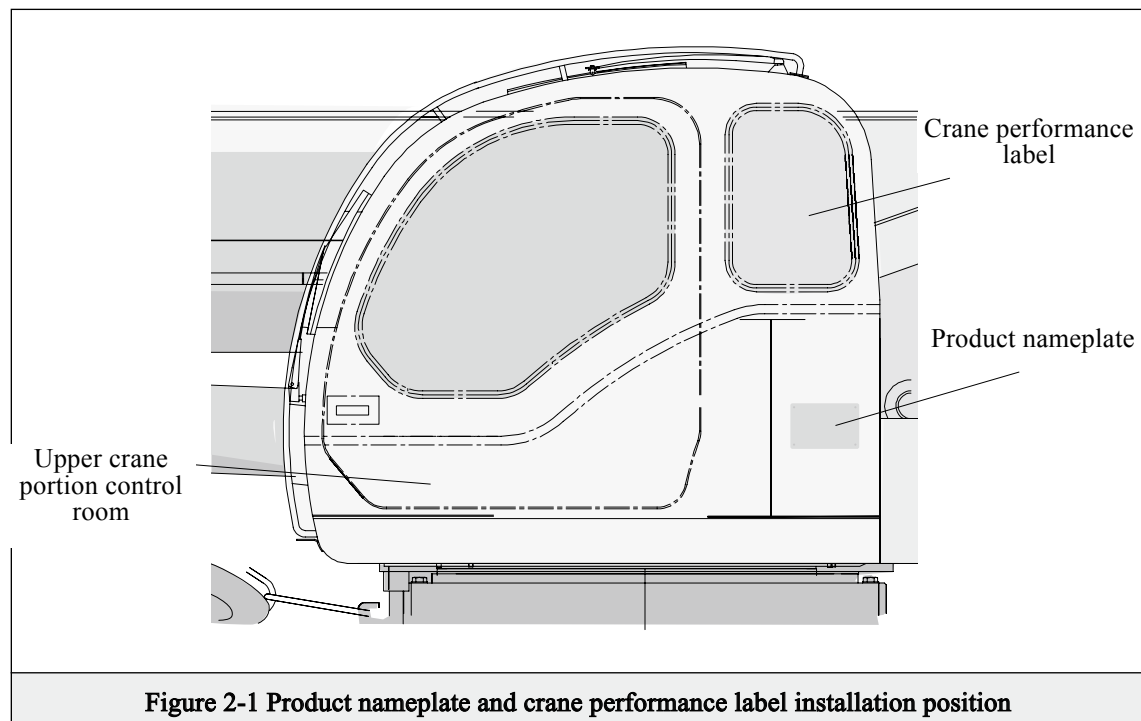
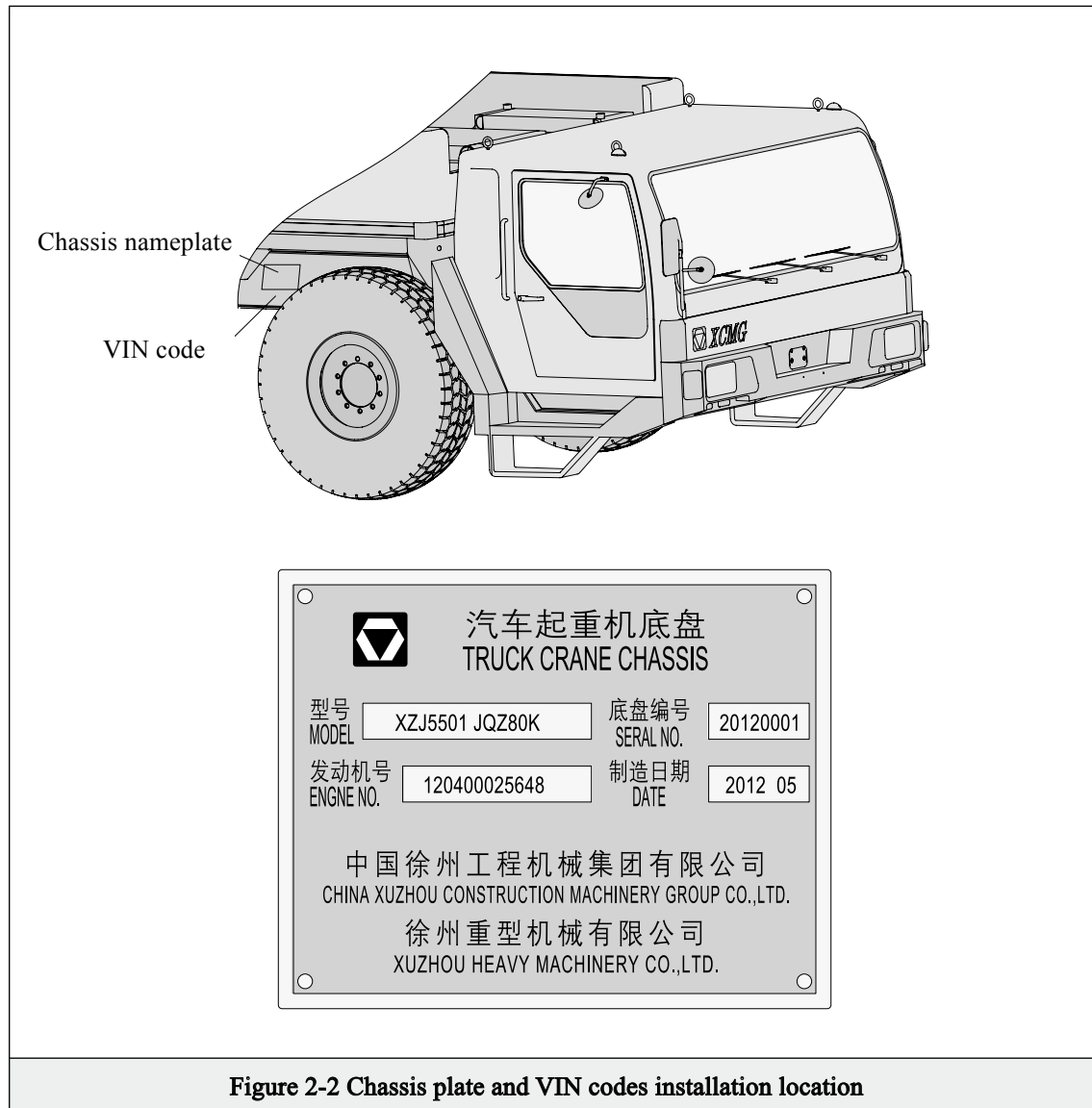


Figure 2-1 Product nameplate and crane performance label installation position



2-3 Chassis nameplate

The chassis nameplate is mounted on the right side front of the chassis frame, and VIN code is located on the product nameplate and under the chassis nameplate(see figure 2-1 and 2-2)





2-4 Crane performance label

The crane performance label (Performance of being equipped with 3.5t balance weight) is installed on the right side in control room so that it is convenient to observe for the operator (see figure 2-1). The crane performance label is an important basis for the crane operation, please strictly perform the crane operation in accordance with numerical values marked on the crane performance label, and the overload is forbidden.

The main content of crane performance label is:

1. Auto crane rated crane capability table;
2. Auto crane hoisting height curve;
3. Auto crane operation position area map.

Before lifting the weight, operators must choose proper operating working conditions after knowing about the weight of objects and working range, strictly prohibited beyond the numerical value in the table. When the amplitude and arm length are between two adjacent numerical values, one should determine the crane operation based on the smaller one of the two values.

2-5 Indicating label

The crane indicating label is located on the reducer and other maintenance positions. Indicating label content includes the type, oil mass, replacing time and precautions of lubricating oil used for the reducer or the transfer box.

2-6 Warning label

There are various warning labels on the important positions of the crane arm, balance weight and other to guide the operator for safety use and avoid damage, and the specific installation position and the warning content are as follows.

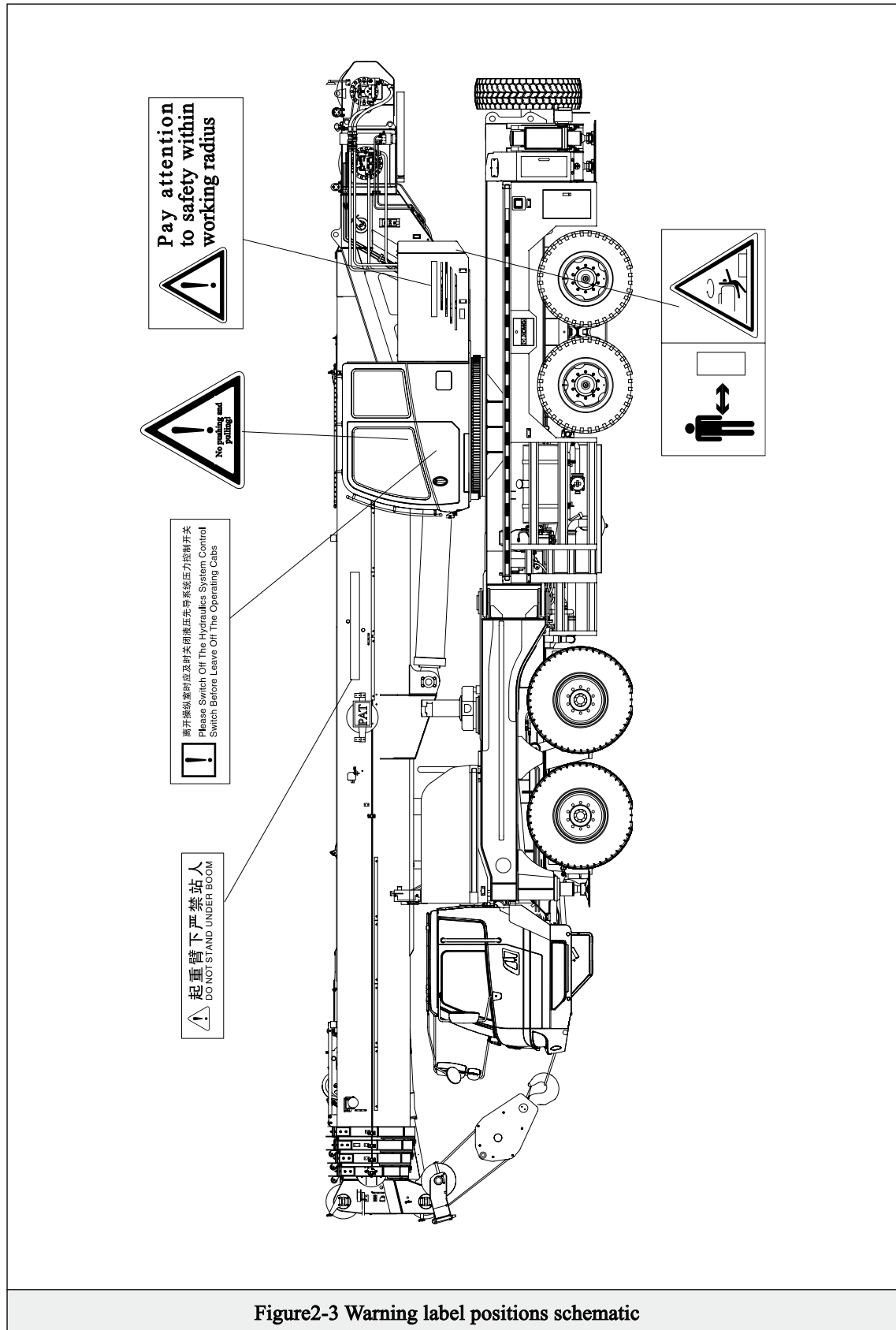
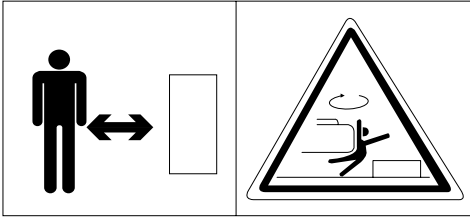


Figure2-3 Warning label positions schematic



Table 2-1 Warning label instructions

No	Graphical sign	Instruction
1	 	When operating the slewing, please keep a certain safety distance away from the machine to avoid the extrusion.
2		When entering or going out the control room, strictly prohibit the push and the pull of the handle and the handle control box
3		In order to prevent crane dangerous actions caused by wrongly touching the control handle when the operation personnel in and out of control room, one must close the switch before the formal operation just be able to establish the normal working pressure of hydraulic system, otherwise the crane can not work normally, and after finishing the operation, one must be close the switch when leaving the control room
4		Dangerous area, and forbidden for person standing under the crane arm to avoid hurting people by the falling weight



LOG



Chapter 3 Basic safety instructions

3-1 Properly use the crane

XCT80 truck crane (the following is abbreviated crane) is developed according to national technology and safety certification requirements. The human harm from the operator or the third-party may make the crane abnormal in the use process.

The crane modification is only implemented in case allowed by manufacturers.

Considering the safety and possible dangers, the crane only operates in proper working conditions and its specific lifting load range.

Faults May affect the normal operation of the crane should be eliminated in time.

If there is no corresponding special equipment, the crane only works at conditions of the temperature range from -20 °C to +40°C.

Our company does not assume any liability for the crane damage due to operation errors and incorrect use. Any associated risks are all assumed by the crane owners, operators and users alone.

3-1-1 Abnormal use of the crane

The crane operation is a dangerous job, in order to ensure your safety and at the same time play best performance of the crane, please avoid the abnormal use of the crane as follows:

1. Using the chassis to carry goods;
2. Pushing, pulling or lifting the load by adjusting the horizontal stretching arm or the outrigger cylinder;
3. Pushing, pulling or lifting the load by

slewing, luffing or the arm stretching;

4. Drawing away the connected object using the crane;
5. Two hooks operation;
6. Not extending the outrigger when operating (wheels are movable);
7. Overload operation;
8. Using the outrigger pressure display as safety monitoring of the crane overturning;
9. Road driving not according to the rules (contour size, complete crane total weight, shaft load, etc., beyond the prescribed license scope);
10. Driving with load;
11. Using parts or accessories without the crane manufacturer approval;
12. When the crane driving, carry person on the lifting equipment, heavy weight and upper crane portion control room;
13. Using the lifting device to transport person and standing person on the load;
14. Uninterruptedly operating the lifting and unloading work;
15. Working on the state not included in the prescribed crane configuration in the working condition table;
16. Working in the range not included in the prescribed working radius and slewing range in the working condition table;
17. The selected lifting weight not coincidence with the crane current working condition;
18. Using the crane as any forms of sports or entertainment, especially the "bungee jumping";



3-1-2 General requirements of the crane safety operation

The crane safety operation general requirements as follows:

1. When the operator operating the crane, not allowed engaging in other operations of distracting attention.

2. When the physical strength and spirit of the operator is uncomfortable, not operate the crane.

3. The line sight of the driver on the weight and the operation area should be clear and unobstructed. If not, the operator do the operation under the command of the slingers and the command personnel, and the slingers and the command personnel should be located on the apparent position where the line sight of the operator is not blocked. Operator and (or) the command personnel should ensure that the lifting steel wire rope completely avoids obstacles.

4. The operator should accept the command of the crane operation command signal from the crane operation personnel. When the crane operation does not need the signalman, drivers are responsible for the crane operation. Whenever, the driver should always perform stop signals issued from any person.

5. The operator is responsible for the operation by himself directly controlled. Whenever doubting about the unsafe condition, the operator should have a consultation with management before lifting goods.

6. Before leaving the unattended crane, the operator should do the following requirements

a. The lifted load should be put on the

ground, not suspended;

b. Switch on the operation mechanism brake or other safety device;

c. Lift the lifting appliance to the specified location;

d. According to the situations to disconnect the power or separate the main clutch;

e. Place all controllers in "zero" or neutral positions;

f. Fix the crane steady to prevent unwanted movement;

g. Before the power on or switching on the device, the operator should check all the controllers, so that they are all located in "zero" or neutral positions. All the field personnel are in the safe area.

7. If the power failure occurred during the operation, the operator should accomplish the following requirements:

a. In suitable conditions, switch on the operation mechanism brake or other safety device;

b. Cut off all the power supply or make the clutch be located in neutral position;

c. If feasible, can be with the help of the brake control to put the suspended load on the ground.

8. The operator should be familiar with the equipment and the equipment normal maintenance. Such as the crane needing debug or repair, the operator should report the situation rapidly to managers and inform the take-over personnel.

9. At the beginning of every working class, the operator should test all control apparatus, if the control device operation is abnormal, it should be debugged and repaired before the lifting machinery operation.



10. When the wind speed exceeds the prescribed maximum work speed, prohibit the crane operation.

11. When the crane operation in the conditions of icy on crane structure or around visibility reduced weather, one should slow down or provide effective communication means (such as radios etc.) to ensure the safe operation of the crane.

12. When the crane night-time operation, there should be sufficient brightness on operation site.

13. Please do changes or settings likely to affect the safety of the crane without informing the manufacturer. including:

- a. mount the safety device etc.
- b. set the safety device or safety valve etc.

14. The welding work about lifting weight parts must be conducted by the qualified personnel according to the provisions. In order to prevent injuries, when conducting any welding work one must be in accordance with the prescribed steps, especially for electronic components welding. Please contact Xugong after-sales service department before doing any welding work to learn about the related precautions

15. The lifting capacity calculation and judgment will affect the lifting operation safety performance, one should pay attention to the following contents:

a. the lifting weight in the rated crane weight table includes a hook, a steel wire rope and a lifting appliance weight. For example: the weight in the rated crane weight table is 80000kg, the hook weight is 1000kg, and the

lifting appliance weight and lifting steel wire rope weight are 100kg, so the actual lifting weight of the crane does not exceed $80000 - 1000 - 100 = 78900\text{kg}$.

b. recklessly lift the unknown heavy weight, possible for crane overturning accident.



- Prohibit using the crane to test object weight.
- Please strictly do the operation according to the rules in the rated capacity table, prohibit overload;
- Prohibit using the interpolation method to calculate the weight.



3-2 Personnel selection and qualification

3-2-1 Assignment personnel

The assignment personnel shall have the following responsibilities:

a. Examine and verify mechanical operations related matters, including present a work plan, crane mechanical, lifting mechanism and equipment selection; the work guidance and supervision. All these are necessary to ensure safe operation. Also including negotiation with other responsible parties and collaboration between each relevant organization ensured in necessities.

b. Ensure the comprehensive examination and inspection of the crane machinery, and make sure the device has been maintained.

c. Ensure report effective procedures of failures and accidents and take necessary correct processing method.

d. Responsible for the organization and control of the crane operation. Assure a governor assignment as the same as other crane operation personnel assignment.

The assignment personnel should be assigned the necessary rights of performing all the duties. Especially when one believe that the continued operations may lead to risks, in some operation conditions leading to dangerous things, the assignment personnel have the stop operating right.

In appropriate conditions, the appointer can trust his mission to others, but undertake other work duties.

When lifting heavy weights, the crane driver is not suitable for the crane mechanical operation management.

3-2-2 Crane operator

1. Duties

One is responsible for the crane safe operation according to products specification and safe working system provided by our company. In addition to receiving the stop signal, at any time one should only obey the obviously recognizable signal issued by slingers and command personnel.

2. Basic requirements

The operator should have the following conditions:

a. have the corresponding educational level;

b. over 18 years old;

c. qualified to this job in personal aspects of vision, hearing and reaction capacity;

d. have physical strength for safely operating the crane;

e. have the judgment abilities of the distance, height and clearance;

f. received professional training on the operation of crane machines and have rich knowledge in aspects of crane and the safety device;

g. received the crane operation command signals training, understand the crane operation command signal, and obey the command from slingers or command personnel;

h. familiar with the fire fighting equipment on the crane machine and received the use of training;

i. know very well about disposals in various emergencies and escape methods;

j. have the crane machine operation qualification.

One of the most important requirements



for the crane operator is control, operation and the crane adjustment, so that operators and other personnel around the crane are all not in danger. If not achieve this goal, our company is willing to offer you the following important safety musts:

Often happened and inappropriate operation processes are:

- a. Slewing too fast;
- b. Fast brake when lifting heavy weight;
- c. Slewing or driving before the lifted object leaving the ground;
- d. Steel wire rope on the winch in a mess;
- e. Overload;
- f. Slewing too fast when lifting the heavy weight, or lifting the heavy weight on uneven ground;
- g. Improper bundle of the heavy weight;
- h. Operating in unsuitable conditions, especially aslant pull the heavy weight or the sudden relax of the suspended heavy weight;
- i. Spinning of the suspended heavy weight;
- j. Collision with the bridge, ceiling and high voltage transmission line;



For interests of you and others, please correctly operate the crane and familiar with all the possible risks in work.

3-2-3 Slings

1. Duties

Slings are responsible for hanging and unloading weight to the lifting appliance of the crane machine, and choose the applicable lifting appliance and lifting equipment according to the corresponding load locating work plan.

Slings are responsible for the crane machine moving and the heavy weight carrying according to the plan. When there is more than one slinger, in any operation, only one person of them is responsible for according to their positions relative to the crane. When the slinger out of visible position of the driver, in order to ensure the operation signal continuity, the



command personnel must transmit signal to the driver and visual or auditory signals are both OK.

During the crane machine work, if the responsibilities of commanding the crane machine and moving load are taken over to other relevant personnel, slingers should explain the situation to the driver. Moreover, the driver and the taken-over person shall clear the respective duty of their own.

2. Basic requirements

Slingers should have the following conditions:

- a. have the corresponding educational level;
- b. over 18 years old;
- c. qualified to this job in personal aspects of vision, hearing and reaction capacity;
- d. have physical strength for moving the lifting appliance and components;
- e. have abilities of lifting Wuping quality estimation, load balance, and the distance, height and clearance judgments;
- f. received lifting technology training;
- g. have abilities of choosing appropriate lifting appliance and components according to the object conditions;
- h. received the crane operation command signal training, understand and proficiently use the crane operation command signal;
- i. when requiring the use of auditory equipment (such as walkie-talkie),can proficiently use the device and issue accurate and clear oral command;
- j. familiar with the crane performance and parameters, and have abilities of commanding a crane and moving the load safely;
- k. have the qualification of undertaking the work project.

3-2-4 Command personnel

1. Duties

The command personnel should have the responsibility of passing signals from slingers to the driver. The command personnel instead of slingers can command the crane machine and the load moving, but at any time only one person is responsible for.

In the crane mechanical work, if duties of commanding the crane machine safety operation and the load are taken over by the other relevant personnel, the command personnel should explain the situation to the driver. Moreover, the driver and the taken-over person shall clear the respective duty of their own.

2. Basic requirements

The command personnel should have the following conditions:

- a. have the corresponding educational level;
- b. over 18 years old;
- c. qualified to this job in personal aspects of vision, hearing and reaction capacity;
- d. have the judgment abilities of the distance, height and clearance;
- e. received the crane operation command signal training, understand and proficiently use the crane operation command signal;
- f. when requiring the use of auditory equipment (such as walkie-talkie),can proficiently use the device and issue accurate and clear oral command;
- g. familiar with the crane performance and parameters, and have abilities of commanding a crane and moving the load safely;
- h. have the qualification of undertaking the work project.



3-2-5 Installation personnel

1. Duties

The installation personnel is responsible for mounting the crane machine according to the installation plan and product manual, when need two or more installation personnel, one person should be designated as "installation supervisor" at any time to supervise the installation work.

2. Basic requirements

The installation personnel should have the following conditions:

- a. have the corresponding educational level;
- b. over 18 years old;
- c. qualified to this job in personal aspects of vision, hearing and reaction capacity;
- d. have physical strength of safe handling goods including the crane machine installation work;
- e. can be qualified to the working at height environment, except the operation in the training purpose of under the supervision of the professional and technical personnel ;
- f. have abilities of heavy weight quality estimation, load balance, and the distance, height and clearance judgments;
- g. received the lifting technology and the crane operation command signal training;
- h. have abilities of choosing appropriate lifting appliance and components according to the object conditions;
- i. received the qualified training aspects of the crane installation, disassembly and the installed crane operation;
- j. received the qualified training aspects of mounting safety device and commissioning on the installed crane operation.

3-2-6 Maintenance personnel

1. Duties

The maintenance personnel are responsible for maintenance of the crane machine and safety use of the crane machine and normal operation. They should do all necessary maintenance for the crane machine in accordance with the repair manual and under the safety work system.

2. Basic requirements

The maintenance personnel should have the following conditions:

- a. have the corresponding educational level;
- b. familiar with the repaired crane machine and its risks;
- c. received the corresponding education and training including learning courses related to the special equipment use;

Familiar with the work procedures and safety protection measures related to the crane machine maintenance.



3-3 Personnel safety equipment

1. Choose suitable things according to the work site condition, such as safety helmets, safety gloves, safety glasses, safety belt, safety boots and hearing protection device;

2. Check safety equipment before and after the work, and have maintenance according to the prescribed procedure or replace if necessary;

3. If necessary, kept the check and repair record;

4. Some safety equipment (such as safety helmet and safety belt) may be damaged for use a period of time; therefore it should be regularly inspected and replaced.



- Safety equipment should be replaced immediately due to impingement damage.

- All the personal protective devices can not provide 100% protection.

3-4 Safety passage and emergency escape

The safety passage and emergency escape device in the crane processes of operation, inspection, inspection, testing, maintenance, repair, installation and disassembly shall be in good conditions.



- Anyone boarding or leaving lifting machinery are required to report to the crane driver in work and obtained the license.

- It should be stated in the personnel instructions using only (and should use) formal safety passage and emergency escape mode.

- When unable to open the door for escape at crane accident, drivers can use the available broken hammer in cab or control room to break the glasses passing through and go away from danger.



3-5 Crane driving safety instructions

3-5-1 Road traffic rules

When the crane is driving on the road, one should obey the national and local road traffic rules. Before the crane is driving on the road, one must ensure that the complete crane quality, axle load and appearance size are in the scope of vehicle license provisions (specific requirement details see operation manual 13.1.1 and 13.2.1 about the driving state requirement).

The maximum allowable weight on the complete crane driving state is 50t, please don't carry other unspecified weights so as to avoid the axle load overload.

Axle load is separated for design value and the maximum allowable value of road traffic regulations, and the crane driving on the highway is not allowed exceeding the limit value of road traffic rules.



- Driving state overload may cause the following risks:
- Crane braking distance increasing may lead to the danger.
- Steering system parts damaged resulting in a steering failure.
- Brake drum may wear accelerately causing the braking ability reducing and increasing the driving risk.
- Parking brake (hand brake) can not ensure its normal function.

3-5-2 Hook transportation

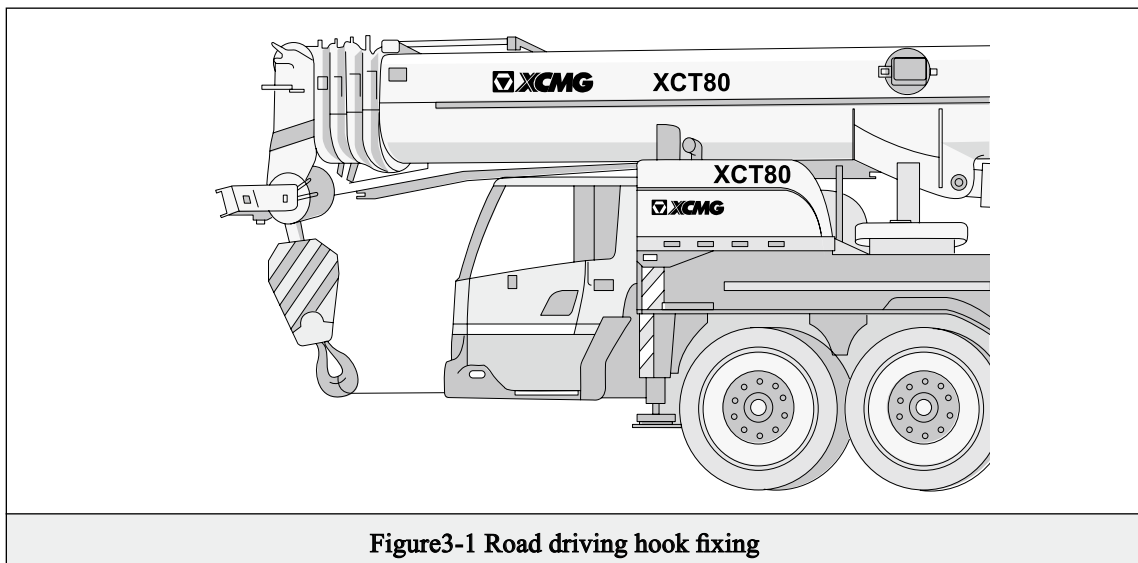


Figure3-1 Road driving hook fixing



3-5-3 Passengers on driving crane

During the crane driving, the cab is licensed to carry two persons, and prohibit carry people outside the cab.

3-5-4 New crane running

The new crane running mileage is 1500km. Before the running, have a routine check for the crane and ensure that the crane is in normal working condition.

1. Not immediately accelerated after the cold engine starts, firstly running at 1000r/min for 3 to 5 minutes, only reach to the normal working temperature, then can just be accelerated of rotation speed, and during the running period the engine rotation speed should be controlled within 1800r/min;

2. Driving on road selected as good as possible during the running period;

3. Choose the appropriate gear while avoid sudden acceleration or emergency braking according to the load and road conditions;

4. Check and control the engine oil pressure and coolant working temperature;

5. Often pay attention to the temperature of the middle and rear axle hub and brake drum, like heating severely, and should find out the reasons and immediately adjust or repair it;

6. In the initial 50km driving or after changing the tyre every time, check and screw the wheel nut tightly with the specified torque.

After the new crane running, do the check, maintenance and repair according to the repair manual "first check" content and the engine and gearbox specification requirements.

3-6 Crane operation safety instructions

Please be careful to choose safe space for the crane operation.

Before starting the work, firstly walk around the crane a circle to check. Please do not think the crane need not be checked out since it was in normal working condition at the end of the last time work.

Before starting the operation, please check if all the covers and safety devices are in the properly places and working normal.

Every day one should check the safety equipment before starting the work (specific safety equipment refers to safety device content of section 8.4 in operation manual).。



LOG



LOG



Chapter 4 Construction instructions

4-1 Planning

To ensure the crane in the best working condition, besides the operator must pass the professional training and obtain the qualification certificate, planning before using the crane is the important premise of safety operation.

The operator should verify the following necessary working data before driving the crane to the construction site, and before starting the crane operation, should pay special attention to the following content:

- a. Temperature and wind speed of the operation site;
- b. The operation site location (mileage need drive);
- c. Driving route;
- d. Driving space height and lateral side clearance;
- e. Overhead wires and cables conditions;
- f. Space requirements of the operation site;
- g. Surrounding buildings limits to the crane moving and the operation conditions;
- h. Total weight and shape size of the lifting heavy weight, and the required lifting height and amplitude;
- i. Geological conditions or ground bearing capacity of the operation site.

After obtained the more details above, the crane operators can just determine and select the appropriate accessories:

- a. Hook;
- b. Rigging;
- c. Auxiliary arm;
- d. Counter weight;
- e. Pad wood beneath foot plate etc.



The operator should grasp the full information, so that successfully finish the work. If to work with inadequate preparation, accidents may happen at any time.



4-2 Crane operation management

4-2-1 Safe working system

The crane safe working system should be established, whether for individual work or a group of repetitive task, all the crane operation shall comply with it. The safe working system shall include the following contents:

a. Work plan: work plans should be established for all cranes to ensure the safety of operation and all potential risks should be taken into consideration. The rich work experience and designated personnel shall draw up the work plan. For repetitive operations or cycle operations, the program should be developed at the first operation and is checked regularly to ensure the plan content unchanged.

b. Correct selection, provision and use of the crane.

c. Maintenance, inspection and test of the crane.

d. Develop specialized training programs and determine the supervisor clearing their own duties and other personnel related the crane operation.

e. Authorized personnel received specialized training and having the necessary permissions implement the overall supervision.

f. Acquired all the necessary certificates and other valid documents.

g. In without being approved conditions, prohibit use or move the crane at any time.

h. Security of personnel unrelated to the crane operation.

i. Cooperation with other relevant parties with the purpose of reaching consensus or relationship in aspects of avoiding the injury accident or security defending.

j. Install the communication system

understood by including the crane operators.

k. Should timely report and record the happened faults and accidents.

l. The use unit should establish necessary rules and regulations according to the specific case of the crane use. Such as the shift relief system, safe operation norms, tied and hung command procedures, maintenance system, periodic self-inspection system, overhaul system, training system, equipment and files system, etc.

m. The use unit shall establish equipment archives and equipment archives shall include the following contents:

1) Factory technical documents of cranes;

2) Installation, overhaul, modification record and acceptance check data;

3) Running inspection, repair maintenance and periodic self inspection records;

4) Supervision inspection report and periodic inspection report;

5) Equipment faults and accidents record;

6) Assessment reports related to the equipment safety.



4-2-2 Crane operation plan

The operation plan is an important prerequisite for safe and reliable operation of the crane. The crane operation plan should ensure safe operation and full consideration of various risk factors. Plans shall be made by experienced managers. If for repetitive or routine operations, the program can only be firstly developed, and then be conducted periodically review to ensure no changed factors.

The plan should include the following:

- a. Load characteristics and lifting method;
- b. Crane should be ensured that the working space complied with the relevant provisions is maintained between the load and the crane structure;
- c. When determining the crane lifting the load quality, it should include the lifting appliance quality;
- d. Crane and the load positions in the whole operation;
- e. The crane operation site should consider the possible risk factors, the actual operation space environment and the land suitability;
- f. Mounting and dismounting required for crane;
- g. When the operation site exists or appears unsuitable environment conditions for the operation, stop the operation.

4-2-3 Faults and accidents report

Assignment personnel shall ensure the persisting and effective faults and accidents report system. The system should include informing assignment personnel, recording faults removing results and permission procedures of the crane once again being put into use. The system also includes instantaneous notification of the following conditions:

- a. Daily check or periodically inspect found faults;
- b. Found faults at other time;
- c. Incidents or accidents regardless of the severity;
- d. Overload conditions regardless of the causes;
- e. Found risks or accidents report.

4-3 Crane settings

The crane settings should mainly consider the following factors affecting its safety operation:

- a. Crane supporting conditions;
- b. Other risk factors of field and nearby;
- c. Wind effects on working and non-working state;
- d. Provided with channels of settings on construction site or crane installation as well as dismounting and removing the crane after finishing the crane operation.

4-3-1 Crane supporting conditions

1. Crane operation site should satisfy requirements as follows:

- a. Guarantee the supporting point (outrigger plate) can reach stated position in the rated crane capacity table;
- b. Each action (for example: slewing, lifting, luffing etc.) is not blocked by any obstacles.
- c. Crane should be supported on solid and horizontal support plane, and the operation site should not sink, otherwise it will lead to the crane overturning.
- d. The inclination of complete crane is in the range of one degree, if necessary, the pad plate or mat wood are put beneath the foot plate, otherwise tipping risks will happen.

2. Operation on slopes or ditches

Crane should not be supported on the location near slopes or ditches places, if the operation must be there, a certain safe distance from the crane should kept according to the geology, and the safe distance depends on the soil type.

The safety distance must be counted starting from the groove bottom, and the minimum safety distance D can be determined by measuring the trench depth T, at the same time, basing on the specific circumstance case.

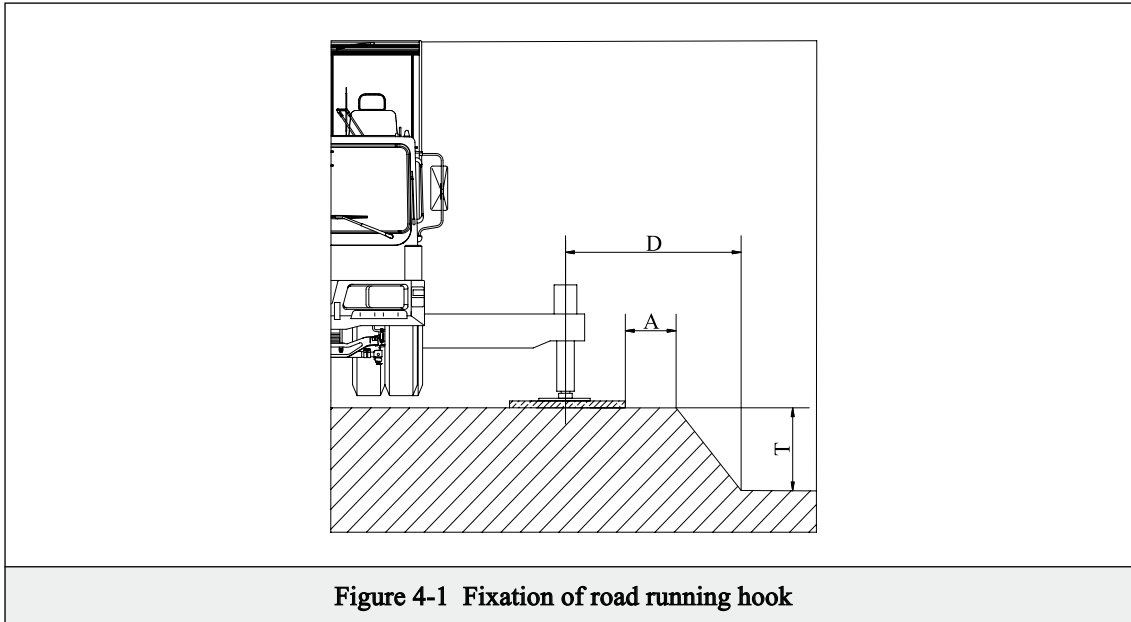


Figure 4-1 Fixation of road running hook

Parameter provision:

1. To soft and soil backfill ground, safety distance (D) must be greater than 2 times the depth (T):

$$D > 2 \times T;$$

2. To solid ground, safety distance (D) must be greater than the depth (T):

$$D > T$$

In addition, safe distance A between the mat plate and the slope gradient edge must be greater than 2m.



If can not keep a safe distance, slopes or ditches must be filled and compacted. Otherwise, slopes or ditches edges will have collapse danger.

3. Ground and outrigger bearing capacity

Before the crane operation, one should check the firmness and bearing capacity of operation ground, if bearing capacity of the supporting ground is not known, one must detect using the detection equipment (such as dynamic probing rod), and guarantee the supporting ground can withstand the force generated by the outrigger operation (the maximum pressure subjected by each supporting foot plate is 2.34MPa). If the compressive strength of supporting position ground is insufficient, one should add pad plate or sleepers to enlarge supporting area and reducing stress to the ground. Table 1-1 lists the compressive strength of various soil and only for reference.

Calculation equation: supporting area = outrigger force / ground bearing force



Table 4-1 ground bearing capacity reference

No	Soil texture type	kg/cm ²
A	Backfill soil and inartificial compacted ground	0~1
	Natural soil, not be significantly damaged:	
	1. Sludge, mud-coal and marsh land;	0
	2. Non-sticky and solid soil:	
	Moderate quality sand;	1.5
	A layer of sand gravel.	2
B	3. Cohesive soil:	
	Fertile;	0
	Soft;	0.4
	Close;	1
	Semi-solid;	2
	Hard.	4
	4. Rock with a small gap but strong and not weathered:	
	In a tightly compacted strata;	15
C	Solid or column strata structure.	30
	Artificial compaction ground:	
	1. Asphalt road	5~15
	2. Concrete:	
	General concrete (concrete BI type);	50~250
	High strength concrete (concrete BII type)	350~550

CAUTION

- If using insufficient strength plate, it may cause accidents of the crane overturning.
- When putting the pad plate or mat wood beneath the foot plate, one should press the outrigger plate on the central position of the steel plate or wood pad to avoid the uneven stress.

DANGER

Prohibit using the thin wood plate made of pine veneer or brick, because they cannot transfer the pressure to the ground.



4. Put up crane before operation

- a. During the crane operation, all the tires should be completely off the ground.
- b. The horizontal outrigger must depend on working conditions in the rated crane weight table to extend out, if only extend out the lifting lateral outrigger may lead to the following dangers:

1)The force of weight through the rope passes to the main crane boom, auxiliary arm and other parts, and if the sudden unloading or wire rope fracture happen, the force plus on the crane arm head suddenly released will cause the crane rearward tilting;

2)Turning the heavy weight to the outrigger not fully extended side leads to crane overturning;

3)Rearward tilting due to the crane arm and counterweight actions.



● The horizontal outrigger must extend to the specified value in rated crane weight table that can just support the crane;

● After the horizontal outrigger stretched out, it must be locked with pin, that is, the outrigger pin must be fully inserted to prevent the outriggers retracting and causing tilting;

4-3-2 Obstacles around crane

Crane operation should consider obstacles around it, such as nearby buildings, other cranes, vehicles or loading and unloading of vessels, ongoing stacking goods and public traffic area including highway, railway and river.

One should not neglect risks of facilities to or from the underground such as gas pipeline or cable. Measures should be taken to make the crane avoid any underground facilities, if not, protection steps should be taken to underground facilities and prevent accidents happening.

Crane or its lifting load pass through the obstacles place, one should observe the following conditions:

a. When the field conditions permits, the crane machine running route should be clearly marked to make it away from the obstacle. There is adequate clearance between any components of the crane machine and the obstacles. If unable to reach the required clearance requirements, effective measures should be taken to prevent any risks of barrier or being jammed.

b. The place where periodically stacking the crane machine accessories goods should be long-term marked its boundary line on the ground.

1. Overhead wire and cable

When the crane operation in close proximity of the overhead cable, the assignment personnel, the operator and other filed personnel should pay attention to the following points:

a. When working in unfamiliar areas, check whether there is the overhead line or not;

b. Confirm all overhead cable line whether they are electrified or not;

c. The occasion maybe contact with the electric power line, before starting work, one should at first consider the opinions of the local electric power administrative department;

d. During the crane operation, arm frame, lifting appliance, auxiliary devices, steel wire rope, and the load, the minimum distance from transmission line should be in accordance with the regulations in table 4-2.



Table4-2 the minimum distance between crane and transmission line

Transmission line voltage V/kV	<1	1~20	35~110	154	220	330
Minimum distance /m	1.5	2	4	5	6	7



Crane is not insulated. The main boom, steel wire rope, hook, lifting rigging or guide wire rope contacting with cable can cause very serious damage.

e. If the crane touches the live wire or cable, the following measures should be taken;

The personnel in driver room do not leave;

Warning all other staff away from the crane and do not touch any part of the crane, the rope or articles;

In the conditions of no any people close to the crane and one can ensure his own safety, the driver can attempt to independently drive the crane until the power wires or cables separating from crane;

If the crane can not move, the driver should stay in the cab. Try to immediately notify the power supply department. Before the unconfirmed safe state, do not take any action;

If fire on due to electric shock or some other factors, one should leave the cab and jump out from the crane as far as possible, since human body parts do not contact with the crane and the ground;

Immediately notify the relevant person in charge responsible for the project, or the field management. Before getting the help, someone should stay nearby the crane (within the secure area), to warn dangerous conditions.

2. Operation nearby launching tower

If there is a launching device near the operation site, so a strong electromagnetic field exists. When the crane is working near the launching tower, please consult the relevant government agent or expert advice. These fields may directly or indirectly cause risks to human and objects, such as:

a. higher temperature will lead to undesirable effect for human body;

b. higher temperature causes fire;

c. form an electric arc or spark;

d. electromagnetic interference affects the normal work of the crane torque limiter and other electric components.

To avoid high frequency radiation risk, operators should pay attention to the following requirements:

a. if crane need connect to "ground", one should be carefully inspected or tested to ensure the ladder, cab and steel wire rope completely connecting to "grounding";

b. the personnel working on the crane or larger metal plate must wear special insulating gloves and insulating clothing to prevent being burned;

c. do not touch other objects while the crane is moving so as to avoid the discharge, once happens, timely check and have a maintenance;

d. insulator must be placed on the middle of the hook and rigging, and could not be removed

casually;

e. lifting weight along the horizontal direction as much as possible to reduce high-frequency ray absorption;

f. when doing some necessary manual operations, firstly put it on the ground or insulation place;

g. use the appropriate detection equipment to test temperatures of the used tools, if the distance tool in the range of 1cm ~ 2cm is measured of 500V voltage, the tool may not be touched by hand;

h. processing the flammable objects requires that the distance far from massive metal plate of easy electric spark is at least 6m;

i. once the accident or special phenomena occur, one should be timely report to supervisor or safety engineer.

3. Crane machine management nearby airport

When the crane is used nearby the airport, one should obey the local laws and regulations.

4-3-3 Wind load influence

Before the crane operation, crane operators must determine if it is suitable for the crane operation according to meteorological data published by the authority. The maximum working wind force of crane is five scale (wind speed 14.1m/s and wind pressure 125N/m²).

1.Object anemometer

During the crane operation, the standard is the instantaneous wind speed of the working height. Relations of wind scale and wind speed of weather forecast in table 4-3.

After the calculation of 10min average wind speed at the height of 10m from the open ground times the conversion factor 1.5, the 3s instantaneous wind speed is obtained, that is, the working wind speed.

Table 4-3 Objective images wind speed table

Average wind speed(m/s)	Instantaneous wind speed(m/s)	Name	Scale	Instructions (land)
0.0~0.2	0.0~0.3	Calm	0	Still, smoke will rise vertically.
0.3~1.5	0.5~2.3	Light air	1	Rising smoke drifts, wind vane is inactive.
1.6~3.3	2.4~5.0	Light breeze	2	Can feel wind on your face, leaves rustle, wind vanes begin to move.
3.4~5.4	5.1~8.1	Gentle breeze	3	Leaves and small twigs move, light weight flags extend.
5.5~7.9	8.3~11.9	Moderate breeze	4	Small branches move, raises dust, leaves and paper.
8.0~10.7	12~16.1	Fresh breeze	5	Small trees sway.
10.8~13.8	16.2~20.7	Strong breeze	6	Large tree branches move, telephone wires begin to "whistle", umbrellas are difficult to keep under control.
13.9~17.1	20.9~25.7	Fresh gale	7	Large trees sway, becoming difficult to walk.
17.2~20.7	25.8~31.1	Moderate gale	8	Twigs and small branches are broken from trees, walking is difficult.
20.8~24.4	31.2~36.6	Strong gale	9	Slight damage occurs to buildings, shingles are blown off of roofs. (chimney top and flat top shake)
24.5~28.4	36.8~42.6	Whole gale	10	Rare on land, trees are broken or uprooted, building damage is considerable.
28.5~32.6	42.8~48.9	Storm	11	Much rare on land, extensive widespread damage.
>32.7	>49.1	Hurricane	12	Most rare on land, extreme destruction, devastation.



2. Wind pressure height change coefficient K_h

The crane operation is affected by wind speed, the higher away from the ground, the larger the wind speed and also the wind pressure value. Ground pressure times K_h (Wind pressure height change coefficient), that can get wind pressures at different heights. The ground wind speed is as 14.1m/s as an example, and the wind pressure and wind speed at different heights are shown in table 4-4.

Table4-4 Wind speed as arm frame height changing

Height from ground h/m	≤10	10 ~20	20 ~30	30 ~40	40 ~50	50 ~60	60 ~70	70 ~80	80 ~90	90 ~100	100 ~110	110 ~120	120 ~130	130 ~140	140 ~150
K_h value on land	1.00	1.13	1.32	1.46	1.57	1.67	1.75	1.83	1.90	1.96	2.02	2.08	2.13	2.18	2.23
Wind speed v_s m/s	14.1	15.03	16.25	17.09	17.72	20.02	20.49	20.96	21.35	21.69	22.02	22.34	22.61	22.87	23.13

Note 1: relation between crane wind pressure and wind speed: $p=0.625v_s^2$. Herein p is calculation wind pressure, unit N/m^2 ; v_s is average instantaneous wind speed, unit m/s.

Note 2: K_h is wind pressure height change coefficient.

3. Operation in strong breeze

The larger the lifting weight volume and the higher the lifting height, the bigger influence the wind to the complete crane stability. The following conditions should be given particular attention:

- When lifting the steel plate of larger windward area objects, the weight could hit the arm frame leading to damage or even the crane overturning accident.
- When no load, long arm frame and large elevation, the crane suffers the head-on wind which may make the arm frame to fall backward, so that the crane is overturning.



Before the operation, operators must obtain wind speed and wind force information from the meteorological department, if the wind speed exceeds the prescribed value, one should stop the operation to avoid the risk.

When the crane operation in strong breeze, operators must carefully observe and pay attention to wind speed, equipment state, operation environment and other aspects. In addition, operators must consider the very big differences of speed between the ground and high altitude as well as the ground and street area. The wind speed in here is the instantaneous wind speed. If the crane arm head is provided with an instantaneous wind speed instrument, the instantaneous wind speed can be measured directly, and also determined according to the objective images.



The instantaneous wind speed of working height is once more than five scale, namely the wind speed is 14.1m/s, one must stop the operation, place the lifting heavy weight onto the ground, loose hook, arm frame is fully retracted and place it on the crane arm bracket, and shut down the engine.



4-3-4 Crane grounding

When the crane is not properly grounding, there is the risk of electric shock. Electric shock produces serious damage!

4-3-5 Allowed slewing range during the crane operation

XCT80 truck crane can be of 360° rotation operation, and the specific is as shown in Figure 5-3 work area division diagram of section 5.3.

4-4 Multiple cranes lifting operation

During the joint lifting operation of multiple crane machines, the additional load may be produced acting on the crane, lifting weight and riggings due to the relative movement between these cranes, and monitoring the additional load is very difficult. Therefore, only when the lifting size, performance, quality, or lifting the required movement can not be operated by single crane, the multiple cranes operation can be just used. One should formulate the lifting operation plan for multiple cranes operation, and also carefully estimate the carried load of each crane according to the proportion. The basic requirement is to ensure the lifting rope keeping a vertical state. The resultant force suffered by multiple cranes should not exceed the rated load when the crane lifting operation alone.

The lifting operation of multiple cranes should consider factors of the following aspects:

1. Weight quality

Should understand or calculated total mass of weight and its distribution.

2. Mass center

Due to the influence of manufacturing tolerances, welding metal quality and various

factors, one can not determine the precise the mass center, resulting in inaccurate distribution of each crane load proportion. When necessary, relevant method should be adopted to accurately determine the mass center.

3. Load handling device quality

The load handling device quality should be as one part of the crane lifting load calculation, and subtract the load handling device quality from the crane rated lifting weight. Therefore one should accurately understand the load handling device as well as the necessary hook assembly quality and its distribution.

4. Bearing ability of load handling device

One should determine the distribution of the force generated from Load handling device interior during the lifting operation. In order to adapt to the distribution and the biggest direction change of the load or force generated during the combined lifting operation process, it may be necessary to use special load handling device.

5. Synchronization actions of cranes

During the multiple cranes lifting process, the direction and size variation of the force acting on cranes are kept to a minimum value, the same rated equal weight and performance of cranes should be use as possible as you can, measures should be taken to minimize various imbalances, such as cranes hardly achieve accurate synchronization and lifting speed unbalanced.

6. Supervision of lifting operation

The authorized personnel should take part in and overall manage joint lifting operation of multiple cranes, and only this staff can issue the operation instruction. However in an emergency event, people seeing the danger can issue the usual stop signal and this condition is an exception.



7. Bearing capacity requirements in joint lifting operation process

When the first to fifth related factors meet the prescribed qualified requirements and are recognized by assignment personnel, in that way, every day the crane operation can achieve the rated load.

When the above factors can not achieve the required qualification requirements, assignment personnel should decide to use the crane by reducing the rated load based on specific circumstances. It can be reduced to 75% of the rated load or more.

4-5 Lifting weight

Before lifting the lifting weight, the quality of the lifting weight should be confirmed through various means. At the same time, in order to ensure the lifting stability, the mass center of the lifting weight should be confirmed through various means. After establishing the mass center, one should adjust the lifting device, select the appropriate lifting hanging position, and ensure uniform and balance of the lifting weight when lifting and no tipping trend.

1. Quality of lifting weight should meet the following requirements:

a. Crane shall not lift objects exceeding the rated load;

b. When unable to determine the accurate mass of lifting weight, the personnel responsible for the operations ensures the lifting load not exceeding the rated load.

2. Hanging goods should meet the following requirements:

a. Crane ropes can not be wrapped around the object;

b. Objects are hung on the hook through the sling or other apparatus with sufficient load bearing capacity;

c. Slings should not be dragged along the ground.

3. Hovering lifting weight should meet the following requirements:

a. Drivers can not leave the control room when the lifting weight is hovering;

b. Anyone can stay or pass through under the hovering load.

4. Moving the lifting weight should meet the following requirements:

a. When commanding the lifting operation, the related personnel should notice the following requirements:

1) Use the suitable lifting riggings;

2) When the lifting weight is just lifted away from the ground, one should ensure the safety, and the lifting weight on the rigging or lifting device maintains the balance.

b. Before starting the lifting operation, one should notice the following requirements:

1) No entanglement of lifting steel wire rope;

2) Several steel wire ropes should not be winded together;

3) Make the lifting weight rotation minimum when using the hook for the lifting operation;

4) If the phenomenon of the rope slacking, it should be adjusted to ensure the steel wire rope on the winding drum or pulley position without relaxation phenomenon;

5) Consider wind effects on the lifting weight and crane;

6) No collisions of the lifting weight with surrounding other objects;

c. In the lifting process one should note:

1) No sudden acceleration and deceleration when lifting the heavy objects;

2) No collisions of the lifting weight and steel wire rope with any other obstacles;



d. The crane can not drag heavy objects in an inclined direction.

e. When lifting the lifting weight, no personnel pass through above.

f. When lifting objects close to the rated load every time, one should slowly operate, and lift the object off the ground at a smaller height to test the brake performance.

g. When the crane is slewing, luffing and running, a sudden start and stop should be avoided. The lifting speed should be controlled to make the object swinging radius in the prescribed range in rated crane weight figure. When the swing of the object is dangerous, the contour line should be marked or limited.

b. Close the brake device and the engine and cut off all power sources;

c. The operators should immediately evacuate to the safety.

4-6 Disaster Treatment and Emergency Measures

4-6-1 Natural disaster

If improper measures are taken and incorrect methods are adopted during the natural disasters, the accidents may also occur under the non-operational state of the natural disaster crane. Such as thunderstorms, wild winds, earthquakes, etc. will be harmful to the cranes. The thunderstorms will result in surface collapse of the cranes, foundation subsidence, lightning strike on the arm extensions and the like. The wild winds will give a strong irregular pressure on the arm extensions to cause shake, warp and collapse finally for the arm frames; the earthquakes will result in surface collapse, arm frame shake, even worse, crane collapse will occur.

Natural disaster occurrence is uncertain. When the natural disaster happens during the construction, we must handle it calmly:

a. Firstly, put the weight on the ground and retract wholly the arm frames to place on the holder of the crane arms;



When the cranes are located in the wild and in the higher position compared to the surrounding ground, avoidance from the lightning strike damage to their high-position components (such as the supporting cables of the arm frames, etc.), the rolling bearings and wheels connected between large-size components (such as rotary supporting bearings, wheel bearings, etc.) and the workers should be taken into account.



4-6-2 Accident disaster

1. High altitude drop: Avoid moving as blind as a bat so that no second injury will be caused. Press the major vascular of injured part to avoid any massive haemorrhage and dial emergency phone immediately to get help from local emergency center.

2. Electric shock: If the crane touches a live wire or cable, the person in the cab shall not get away and shall warn other people to stay away from the hoisting machineries and not to touch any part of hoisting machineries, ropes or items. In the condition that no one comes near to the hoisting machineries, the driver shall try to start the hoisting machinery by himself until the motive power wire or cable breaks away from the hoisting machinery. If the hoisting machinery cannot be started, the driver shall stay in the cab. Think of a way to notify the power supply department right away. Before confirming to be in a safe state, do not take any actions. If the fire is caused by electric shock or other factor, leave the cab and try to jump away from the hoisting machinery as possible as you can. The human body shall not touch the hoisting machinery and the ground at the same time. Notify the engineer who takes relevant responsibility for the engineering project or relevant management at site. Before getting any assistance, someone shall stay nearby the crane to alarm the dangerous situation to others.

3. Fire disaster: When the crane gets a fire, the operator shall stop the hoisting operation right away and leave the site immediately and dial the local fire reporting phone at the same time. The fire extinguisher stored in the crane can be used to save him in advance before the rescue worker gets to the site on the condition that this action will not get his life in danger.

After the accident, carefully check whether all the parts, instruments and meters and safety devices are operating smoothly before starting the crane again.



When the crane gets an accident and its door cannot be opened for escape, the driver can use the reserved breaking hammer to break the glass of enter close to get away from the danger.



4-7 Operation instructions for the crane in out-of-service condition

The out-of-service condition of the crane means the state in which the crane does not carry out any hoisting operation. The landing outriggers are in fully collapsed state and the assistant jib loading boom is in packed-up state and positioned on the right side of the suspension arm.

After the hoisting operation stops, the installation accessories like assistant arm, etc shall be parked up, stop the getting-on motor from working, switch off the power source in getting-on operation room, close and lock the operation room door and windows.

Stop the getting-off motor from working, switch off the getting-off power source, start the parking brake (hand braking) , close and lock the door and windows of the cab.

The crane must be parked on smooth and massy ground and stopped at a safe place.



LOG



LOG



Chapter 5 Main characteristics and technical parameters

5-1 Main purposes and characteristics

5-1-1 Main purpose and scope

It is mainly used for lifting operation and installation work.

The product is widely used in the lifting operation and installation work in urban and rural road conditions and field environment. Particularly, it can be applicable to the ports, docks, bridges and other large-scale projects, as well as other complex operating environment.

5-1-2 Main characteristics of XCT80 truck crane

XCT80 truck crane adopts the 4-axis chassis, features full head cab, full coverage plate, front-H and rear-H type outriggers, reasonable overall layout, compact structure, beautiful shape, large lifting capacity, and a wide range of operations.

This machine has the following characteristics:

- a. Five-section U-shaped telescopic boom, 4-axis chassis, first and second for steering, third and fourth axle for drive are adopted, four-axle chassis, Steering by 1st and 2nd axles, driven by 3rd and 4th axles. Starting switch, with powerful driving, flexible steering, and more reliable braking system. Key structural parts are made of high-strength steel, featuring light weight, high stiffness, and significantly improve machine operating performance.
- b. XCT80 adopts the vehicle combined counterweight technology, the counterweight mounting and consignment is even more convenient.
- c. The operating room is equipped additionally with the sliding doors, pedals and other assistant devices, providing protection for users' safe use.
- d. The whole machine has smooth line, and the circular shed is newly designed, with reasonable space layout and easy routine maintenance.

e. Special double-cylinder double-rope row telescopic mechanism technology is adopted, resulting in more stable and reliable working.

f. The machine adopts electro-hydraulic proportional control technology, multi-condition multi-mode smart steering technology, with more comfortable steering operation.

g. The whole structure shape topology is optimized, so the stress distribution is reasonable and structural strength is safe and reliable in working.

h. Auxiliary arm, auxiliary lifting mechanism, single pulley at arm end, and other accessories are provided for users' option.

i. The whole machine has low center of gravity, good stability, high travel speed, great climbing ability, flexibility, and fast transitions in working process.

5-2 Conditions of use

a. Support: in the lifting operation, the crane should be stopped on solid ground. The whole machine should be maintained the level state, and the ground subsidence shall not happened during the operation;

b. When outriggers are used for operation, the outriggers should be strongly supported on the firm and flat ground. The frame slewing ring mounting surface inclination should not more than 1% in the no-load case, and all tires should be off the ground;

c. Operating ambient temperature: $-20^{\circ}\text{C} \sim +40^{\circ}\text{C}$;

d. Workplace wind speed: grade 5 wind (wind speed of 14.1m/s , wind pressure below 125N/m^2).

5-3 XCT80 truck crane technical parameters and rated lifting weight chart

- a. Overall size: see Figure 5-1;
- b. Technical parameters: see Table 5-1 and Table 5-2;
- c. Main boom rated lifting weight: see Table 5-3;
- d. Auxiliary rating lifting weight: see Table 5-4;
- e. Lifting height curve: see Figure 5-2;
- f. Crane operation region division: see Figure 5-3.

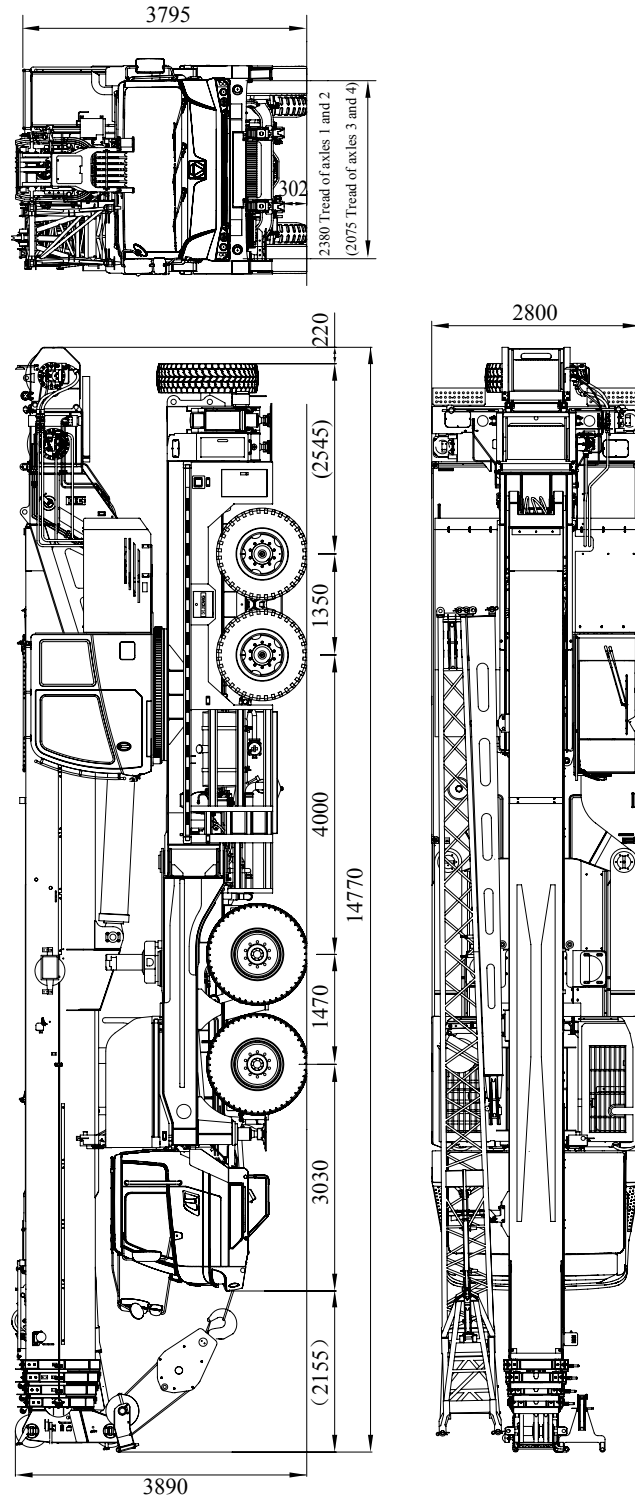


Figure 5-1 XCT80 crane traveling state dimension and parameters



Table 5-1 XCT80 crane traveling status and main technical parameters

Type	Item		Unit	Parameter	
Dimension parameters	Overall length		mm	14770	
	Overall width		mm	2800	
	Overall height		mm	3890	
	Wheelbase	Wheelbase between axle 1 and 2	mm	1470	
		Wheelbase between axle 2 and 3	mm	4000	
		Wheelbase between axle 3 and 4	mm	1350	
Weight parameters	Tread (front/rear)		mm	2380/2075	
	Maximum allowable total mass		kg	50000	
	Axle load	Front axle	kg	24000	
		Rear axle	kg	26000	
Traveling parameters	Traveling speed	Maximum speed	km/h	80	
		Minimum stable travel speed	km/h	3	
	Minimum turning diameter		m	24	
	Minimum ground clearance		mm	371	
	Approach angle		°	17	
	Departure angle		°	15.5	
	Braking distance (braking initial speed of 30km/h)		m	≤10	
	Gradeability		%	40	
	Acceleration traveling external noise		dB (A)	≤88	
	Noise beside driver's ear		dB (A)	≤90	
	Consumption per hundred kilometers		L	≤45	
Chassis structure parameters	Engine	Model	—	WP12.375N	MC11.39-30
		Rated power/ speed	kW/(r/min)	276/1900	290/1900
		Rated torque/ speed	N.m/(r/min)	1800/ (1000~1400)	1900/ (1000~1400)
		Maximum net power	kW	274/1900	287/1900
		Total displacement	mL	11596	10518
		Emission standard	—	National III	
	Wheel alignment value	Front wheel camber	°	1	
		Kingpin caster angle	°	0	
		Kingpin inclination	°	5	
		Front toe	mm	4~9	
	Drive type		—	8×4×4	
	Cab seats		Person	2	
	Kerb mass		kg	49870	



Table 5-1 continue XCT80 crane traveling status and main technical parameters

Type	Item	Unit	Parameter
Chassis structure parameters	Suspension type		Leaf spring
	Specification of leaf spring and number (front/rear)	—	Multiple, 8/8/-
	Leaf spring type	—	Vertical placement
	Tire specification(front/rear)	—	14.00R25/12.00R24
	Spare tire specification	—	14.00R25
	Number of tires (including the spare wheel)	Person	12 (1)

Table 5-2 XCT80 lifting operation status main technical parameters

Type	Item			Unit	Parameter
Main performance parameters	Maximum total rated lifting capacity			t	80
	Minimum rated magnitude			m	3
	Turntable tail rotary radius			mm	4670
	Maximum lifting moment	Base boom		kN.m	3000
		Longest main boom		kN.m	1411
		Longest main boom + auxiliary arm		kN.m	595.8
	Outrigger distance	Vertical		m	8075
		Horizontal		m	7900
	Lifting height	Base boom		m	12.8
		Longest main boom		m	47.5
		Longest main boom + auxiliary arm		m	64
	Boom length	Base boom		m	12.4
		Longest main boom		m	47.5
		Longest main boom + auxiliary arm		m	65
Installation angle of auxiliary arm			°	0、15、30	
Working speed parameters	Main boom full retraction time			s	70
	Main boom full extension time			s	150
	Slewing speed			r/min	2
	Outrigger telescoping time	Horizontal outrigger	20	s	20
			20	s	20
		Vertical outrigger	50	s	50
			40	s	40
	Lifting speed(single rope, floor 4)	Main lifting mechanism	No-load	m/min	130
Auxiliary lifting mechanism		No-load	m/min	110	
Noise	External			dB(A)	122
	Internal			dB(A)	90



Table 5-3 Main arm lifting performance of XCT80 truck crane

Note: unit of weight lifting: t, elevation angle unit: ° Height unit: m, amplitude unit: m.

Outrigger full extension 7.9m, counterweight 2.2t													
12.4			16.79			21.17			25.56			29.95	
Length	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Lifting weight	Elevation angle
Working amplitude													
3	80	67.8	12.8	65	74.4	17.5							
3.5	75	65.2	12.5	62	72.6	17.3	45	77	22				
4	68	62.5	12.2	59	70.7	17.1	45	75.3	21.8				
5	55	56.9	11.5	52	67	16.7	43	72.5	21.5	38	76.1	32	78.7
6	47	50.8	10.7	45	63.1	16.1	38	69.5	21	35	73.7	30	76.7
7	37.9	44.1	9.6	37	59	15.5	34	66.6	20.6	32	71.3	27	74.7
8	28.2	36.2	8.2	27.4	54.8	14.7	27	63.5	20	28	68.9	24	72.6
9	22	25.9	6.2	21.3	50.2	13.9	21	60.3	19.4	22.2	66.4	22.5	70.6
10				17.1	45.3	12.8	16.8	57	18.7	17.9	63.9	18.6	68.5
12				11.6	33.7	10	11.3	50	17	12.3	58.6	13	64.2
14							7.9	42	14.9	8.8	52.9	9.5	59.7
16							5.5	32.2	11.9	6.5	46.7	7.1	55
18										4.7	39.8	5.3	49.9
20												4	44.4
22												3	38.2
24													
26													
28													
30													
32													
Multiplying power		12			10			8			6		6

Continued Table 5-3 Main arm lifting performance of XCT80 truck crane

Note: unit of weight lifting: t, elevation angle unit: ° Height unit: m, amplitude unit: m.°

Outrigger full extension 7.9m, counterweight 2.2t												
Length		34.34			38.72			43.11			47.5	
Working amplitude		Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle
3												
3.5												
4												
5												
6		24.5	78.9	35								
7		22.5	77.2	34.7								
8		20	75.4	34.4	17.9	77.6	39					
9		18.9	73.7	34	16.9	76.1	38.7					
10		17.5	71.9	33.7	15.7	74.5	38.3	13.4	76.6	43	12.5	78.3
12		13.5	68.2	32.8	13.9	71.4	37.2	12.3	73.8	42.3	11	75.8
14		10	64.5	31.8	10.4	68.1	36.6	10.7	71	41.5	10	73.3
16		7.6	60.6	30.6	7.9	64.8	35.7	8.2	68.1	40.6	8.5	70.7
18		5.8	56.6	29.2	6.2	61.4	34.5	6.4	65.1	39.6	6.7	68
20		4.4	52.3	27.6	4.8	57.8	33.2	5.1	62	38.5	5.3	65.3
22		3.4	47.7	25.7	3.7	54.1	31.6	4	58.9	37.1	4.2	62.5
24		2.5	42.7	23.5	2.9	50.1	29.9	3.1	55.6	35.7	3.3	59.7
26		1.9	37.1	20.8	2.2	45.9	27.8	2.4	52.1	34	2.6	56.7
28		1.3	30.5	17.3	1.6	41.3	25.5	1.8	48.4	32.1	2	53.6
30					1.1	36.2	22.6	1.3	44.5	30	1.6	50.4
32												
Multiplying power			5			4			3		2	



Continued Table 5-3 Main arm lifting performance of XCT80 truck crane

Note: unit of weight lifting: t, elevation angle unit: ° Height unit: m, amplitude unit: m.

Outrigger full extension 7.9m, counterweight 2.2t																
Length		12.4			16.79			21.17			25.56			29.95		
Working amplitude	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	
3	80	67.8	12.8	65	74.4	17.5										
3.5	75	65.2	12.5	62	72.6	17.3	45	77	22							
4	68	62.5	12.2	59	70.7	17.1	45	75.3	21.8							
5	55	56.9	11.5	52	67	16.7	43	72.5	21.5	38	76.1	26.1	32	78.7	30.7	
6	47	50.8	10.7	45	63.1	16.1	38	69.5	21	35	73.7	25.8	30	76.7	30.4	
7	38	44.1	9.6	37.5	59	15.5	34	66.6	20.6	32	71.3	25.4	27	74.7	30.1	
8	29.7	36.2	8.2	28.9	54.8	14.7	28.6	63.5	20	28	68.9	25	24	72.6	29.7	
9	23.2	25.9	6.2	22.6	50.2	13.9	22.2	60.3	19.4	23.4	66.4	24.5	22.5	70.6	29.3	
10				18.1	45.3	12.8	17.8	57	18.7	18.9	63.9	23.9	19.2	68.5	28.9	
12				12.4	33.7	10	12.1	50	17	13.1	58.6	22.7	13.8	64.2	27.9	
14							8.6	42	14.9	9.5	52.9	21.1	10.2	59.7	26.6	
16							6.1	32.2	11.9	7	46.7	19.33	7.7	55	25.2	
18										5.2	39.8	16.9	5.9	49.9	23.5	
20													4.5	44.4	32.4	
22													3.4	38.2	18.8	
24																
26																
28																
30																
32																
Multiplying power	12			10			8			6			6			

Continued Table 5-3 Main arm lifting performance of XCT80 truck crane

Note: unit of weight lifting: t, elevation angle unit: ° Height unit: m, amplitude unit: m.

Outrigger full extension 7.9m, counterweight 3.5t												
Length Working amplitude	34.34			38.72			43.11			47.5		
	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height
3												
3.5												
4												
5												
6	24.5	78.9	35									
7	22.5	77.2	34.7									
8	20	75.4	34.4	17.9	77.6	39						
9	18.9	73.7	34	16.9	76.1	38.7						
10	17.5	71.9	33.7	15.7	74.5	38.3	13.4	76.6	43	12.5	78.3	47.5
12	14.3	68.2	32.8	14	71.4	37.2	12.3	73.8	42.3	11	75.8	47
14	10.6	64.5	31.8	11	68.1	36.6	11	71	41.5	10	73.3	46.3
16	8.1	60.6	30.6	8.5	64.8	35.7	8.8	68.1	40.6	9	70.7	45.5
18	6.3	56.6	29.2	6.7	61.4	34.5	6.9	65.1	39.6	7.2	68	44.6
20	4.9	52.3	27.6	5.2	57.8	33.2	5.5	62	38.5	5.7	65.3	43.3
22	3.8	47.7	25.7	4.1	54.1	31.6	4.4	58.9	37.1	4.6	62.5	42.4
24	2.9	42.7	23.5	3.2	50.1	29.9	3.5	55.6	35.7	3.7	59.7	41.1
26	2.2	37.1	20.8	2.5	45.9	27.8	2.8	52.1	34	3	56.7	39.7
28	1.6	30.5	17.3	1.9	41.3	25.5	2.2	48.4	32.1	2.4	53.6	38.1
30				1.4	36.2	22.6	1.6	44.5	30	1.8	50.4	36.3
32							1.2	40.3	27.5	1.4	47	34.3
Multiplying power	5			4			3			2		



Continued Table 5-3 Main arm lifting performance of XCT80 truck crane

Note: unit of weight lifting: t, elevation angle unit: ° Height unit: m, amplitude unit: m.

Outrigger full extension 7.9m, counterweight 8t																
Length		12.4			16.79			21.17			25.56			29.95		
Working amplitude	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	
3	80	67.8	12.8	65	74.4	17.5										
3.5	75	65.2	12.5	63	72.6	17.3	45	77	22							
4	68	62.5	12.2	61	70.7	17.1	45	75.3	21.8							
5	57	56.9	11.5	54	67	16.7	43	72.5	21.5	38	76.1	26.1	32	78.7	30.7	
6	48.5	50.8	10.7	46	63.1	16.1	38	69.5	21	35	73.7	25.8	30	76.7	30.4	
7	42.6	44.1	9.6	41.2	59	15.5	34	66.6	20.6	32	71.3	25.4	28	74.7	30.1	
8	34.9	36.2	8.2	34.2	54.8	14.7	30.6	63.5	20	28	68.9	25	25.5	72.6	29.7	
9	27.5	25.9	6.2	26.9	50.2	13.9	26.5	60.3	19.4	26.5	66.4	24.5	23.8	70.6	29.3	
10				21.8	45.3	12.8	21.5	57	18.7	22.6	63.9	23.9	21.8	68.5	28.9	
12				15.2	33.7	10	14.9	50	17	15.9	58.6	22.7	16.6	64.2	27.9	
14							10.8	42	14.9	11.8	52.9	21.1	12.4	59.7	26.6	
16							8	32.2	11.9	8.9	46.7	19.33	9.6	55	25.2	
18										6.9	39.8	16.9	7.5	49.9	23.5	
20													5.9	44.4	32.4	
22													4.7	38.2	18.8	
24																
26																
28																
30																
32																
34																
Multiplying power	12			10			8			6			6			

Continued Table 5-3 Main arm lifting performance of XCT80 truck crane

Note: unit of weight lifting: t, elevation angle unit: ° Height unit: m, amplitude unit: m.

Outrigger full extension 7.9m, counterweight 8t												
Length Working amplitude	34.34			38.72			43.11			47.5		
	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height
3												
3.5												
4												
5												
6	24.5	78.9	35									
7	22.5	77.2	34.7									
8	20	75.4	34.4	17.9	77.6	39						
9	18.9	73.7	34	16.9	76.1	38.7						
10	17.7	71.9	33.7	15.7	74.5	38.3	13.4	76.6	43	12.5	78.3	47.5
12	16.6	68.2	32.8	14.9	71.4	37.2	12.3	73.8	42.3	11	75.8	47
14	12.9	64.5	31.8	12.7	68.1	36.6	11	71	41.5	10	73.3	46.3
16	10	60.6	30.6	10.4	64.8	35.7	9.5	68.1	40.6	9	70.7	45.5
18	8	56.6	29.2	8.3	61.4	34.5	8.4	65.1	39.6	8	68	44.6
20	6.4	52.3	27.6	6.7	57.8	33.2	7	62	38.5	7.2	65.3	43.3
22	5.1	47.7	25.7	5.5	54.1	31.6	5.7	58.9	37.1	5.9	62.5	42.4
24	4.1	42.7	23.5	4.5	50.1	29.9	4.7	55.6	35.7	4.9	59.7	41.1
26	3.3	37.1	20.8	3.6	45.9	27.8	3.9	52.1	34	4.1	56.7	39.7
28	2.6	30.5	17.3	2.9	41.3	25.5	3.2	48.4	32.1	3.4	53.6	38.1
30				2.4	36.2	22.6	2.6	44.5	30	2.8	50.4	36.3
32							2.1	40.3	27.5	2.3	47	34.3
34							1.6	35.6	24.5	1.8	43.4	32
Multiplying power	5			4			3			2		



Continued Table 5-3 Main arm lifting performance of XCT80 truck crane

Note: unit of weight lifting: t, elevation angle unit: ° Height unit: m, amplitude unit: m.

Outrigger full extension 7.9m, counterweight 11.5t																
Length		12.4			16.79			21.17			25.56			29.95		
Working amplitude	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	
3	80	67.8	12.8	65	74.4	17.5										
3.5	75	65.2	12.5	63	72.6	17.3	45	77	22							
4	68	62.5	12.2	61	70.7	17.1	45	75.3	21.8							
5	58	56.9	11.5	54	67	16.7	43	72.5	21.5	38	76.1	26.1	32	78.7	30.7	
6	51	50.8	10.7	47	63.1	16.1	38	69.5	21	35	73.7	25.8	30	76.7	30.4	
7	43.5	44.1	9.6	42	59	15.5	34.5	66.6	20.6	32	71.3	25.4	28	74.7	30.1	
8	37	36.2	8.2	36.8	54.8	14.7	31.6	63.5	20	28	68.9	25	25.5	72.6	29.7	
9	30.5	25.9	6.2	29.9	50.2	13.9	28.2	60.3	19.4	26.5	66.4	24.5	23.8	70.6	29.3	
10				24.3	45.3	12.8	24	57	18.7	23.7	63.9	23.9	21.8	68.5	28.9	
12				17.1	33.7	10	16.9	50	17	17.9	58.6	22.7	18.6	64.2	27.9	
14							12.4	42	14.9	13.3	52.9	21.1	14	59.7	26.6	
16							9.3	32.2	11.9	10.3	46.7	19.33	10.9	55	25.2	
18										8	39.8	16.9	8.7	49.9	23.5	
20													7	44.4	32.4	
22													5.6	38.2	18.8	
24																
26																
28																
30																
32																
34																
36																
Multiplying power		12			10			8			6			6		

Continued Table 5-3 Main arm lifting performance of XCT80 truck crane

Note: unit of weight lifting: t, elevation angle unit: ° Height unit: m, amplitude unit: m.

Outrigger full extension 7.9m, counterweight 11.5t												
Length Working amplitude	34.34			38.72			43.11			47.5		
	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height
3												
3.5												
4												
5												
6	24.5	78.9	35									
7	22.5	77.2	34.7									
8	20	75.4	34.4	17.9	77.6	39						
9	18.9	73.7	34	16.9	76.1	38.7						
10	17.7	71.9	33.7	15.7	74.5	38.3	13.4	76.6	43	12.5	78.3	47.5
12	16.6	68.2	32.8	14.9	71.4	37.2	12.3	73.8	42.3	11	75.8	47
14	14.5	64.5	31.8	12.7	68.1	36.6	11	71	41.5	10	73.3	46.3
16	11.4	60.6	30.6	11	64.8	35.7	9.5	68.1	40.6	9	70.7	45.5
18	9.1	56.6	29.2	9.5	61.4	34.5	8.4	65.1	39.6	8	68	44.6
20	7.4	52.3	27.6	7.7	57.8	33.2	7.3	62	38.5	7.2	65.3	43.3
22	6	47.7	25.7	6.2	54.1	31.6	6.4	58.9	37.1	6.4	62.5	42.4
24	5	42.7	23.5	5.2	50.1	29.9	5.3	55.6	35.7	5.4	59.7	41.1
26	4.1	37.1	20.8	4.3	45.9	27.8	4.5	52.1	34	4.7	56.7	39.7
28	3.2	30.5	17.3	3.4	41.3	25.5	3.7	48.4	32.1	3.9	53.6	38.1
30				2.9	36.2	22.6	3.1	44.5	30	3.3	50.4	36.3
32							2.6	40.3	27.5	2.8	47	34.3
34							2.1	35.6	24.5	2.3	43.4	32
36										1.8	39.4	29.4
Multiplying power	5			4			3			2		



Continued Table 5-3 Main arm lifting performance of XCT80 truck crane

Note: unit of weight lifting: t, elevation angle unit: ° Height unit: m, amplitude unit: m.

Outrigger half extension 5.6m, counterweight 2.2t																
Length		12.4			16.79			21.17			25.56			29.95		
Working amplitude	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	
3	80	67.8	12.8	65	74.4	17.5										
3.5	75	65.2	12.5	62	72.6	17.3	45	77	22							
4	68	62.5	12.2	59	70.7	17.1	45	75.3	21.8							
5	55	56.9	11.5	52	67	16.7	43	72.5	21.5	38	76.1	26.1	32	78.7	30.7	
6	29.7	50.8	10.7	28.8	63.1	16.1	28.4	69.5	21	29.9	73.7	25.8	30	76.7	30.4	
7	21.2	44.1	9.6	20.5	59	15.5	20.1	66.6	20.6	21.4	71.3	25.4	22.3	74.7	30.1	
8	16	36.2	8.2	15.3	54.8	14.7	15	63.5	20	16.1	68.9	25	17	72.6	29.7	
9	12.5	25.9	6.2	11.9	50.2	13.9	11.5	60.3	19.4	12.6	66.4	24.5	13.4	70.6	29.3	
10				9.4	45.3	12.8	9	57	18.7	10	63.9	23.9	10.8	68.5	28.9	
12				5.9	33.7	10	5.7	50	17	6.6	58.6	22.7	7.3	64.2	27.9	
14							3.5	42	14.9	4.4	52.9	21.1	5	59.7	26.6	
16							2	32.2	11.9	2.8	46.7	19.33	3.4	55	25.2	
18										1.7	39.8	16.9	2.3	49.9	23.5	
20													1.4	44.4	32.4	
22													0.6	38.2	18.8	
24																
26																
Multiplying power	12			10			8			6			6			



Continued Table 5-3 Main arm lifting performance of XCT80 truck crane

Note: unit of weight lifting: t, elevation angle unit: ° Height unit: m, amplitude unit: m.

Outrigger half extension 5.6m, counterweight 2.2t												
Length	34.34			38.72			43.11			47.5		
	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	
Working amplitude												
3												
3.5												
4												
5												
6	24.5	78.9	35									
7	22.5	77.2	34.7									
8	17.6	75.4	34.4	17.9	77.6	39						
9	13.9	73.7	34	14.4	76.1	38.7						
10	11.3	71.9	33.7	11.7	74.5	38.3	12	76.6	43	12.3	78.3	
12	7.7	68.2	32.8	8.1	71.4	37.2	8.4	73.8	42.3	8.7	75.8	
14	5.5	64.5	31.8	5.8	68.1	36.6	6.1	71	41.5	6.3	73.3	
16	3.9	60.6	30.6	4.2	64.8	35.7	4.5	68.1	40.6	4.7	70.7	
18	2.7	56.6	29.2	3	61.4	34.5	3.3	65.1	39.6	3.5	68	
20	1.8	52.3	27.6	2.1	57.8	33.2	2.4	62	38.5	2.6	65.3	
22	1.1	47.7	25.7	1.4	54.1	31.6	1.6	58.9	37.1	1.8	62.5	
24				0.8	50.1	29.9	1	55.6	35.7	1.2	59.7	
26												
Multiplying power	5			4			3			2		



Continued Table 5-3 Main arm lifting performance of XCT80 truck crane

Note: unit of weight lifting: t, elevation angle unit: ° Height unit: m, amplitude unit: m.

Outrigger half extension 5.6m, counterweight 3.5t																
Length		12.4			16.79			21.17			25.56			29.95		
Working amplitude	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	
3	80	67.8	12.8	65	74.4	17.5										
3.5	75	65.2	12.5	62	72.6	17.3	45	77	22							
4	68	62.5	12.2	59	70.7	17.1	45	75.3	21.8							
5	55	56.9	11.5	52	67	16.7	43	72.5	21.5	38	76.1	26.1	32	78.7	30.7	
6	31.6	50.8	10.7	30.7	63.1	16.1	30.3	69.5	21	31.8	73.7	25.8	30	76.7	30.4	
7	22.7	44.1	9.6	22	59	15.5	21.6	66.6	20.6	22.8	71.3	25.4	23.7	74.7	30.1	
8	17.2	36.2	8.2	16.5	54.8	14.7	16.2	63.5	20	17.3	68.9	25	18.1	72.6	29.7	
9	13.5	25.9	6.2	12.9	50.2	13.9	12.5	60.3	19.4	13.6	66.4	24.5	14.4	70.6	29.3	
10				10.2	45.3	12.8	9.9	57	18.7	10.9	63.9	23.9	11.6	68.5	28.9	
12				6.6	33.7	10	6.3	50	17	7.3	58.6	22.7	7.9	64.2	27.9	
14							4	42	14.9	4.9	52.9	21.1	5.5	59.7	26.6	
16							2.4	32.2	11.9	3.3	46.7	19.33	3.9	55	25.2	
18										2.1	39.8	16.9	2.7	49.9	23.5	
20													1.7	44.4	32.4	
22													1	38.2	18.8	
24																
26																
Multiplying power	12			10			8			6			6			



Continued Table 5-3 Main arm lifting performance of XCT80 truck crane

Note: unit of weight lifting: t, elevation angle unit: ° Height unit: m, amplitude unit: m.

Outrigger half extension 5.6m, counterweight 3.5t												
34.34			38.72			43.11			47.5			
Length	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height
Working amplitude												
3												
3.5												
4												
5												
6	24.5	78.9	35									
7	22.5	77.2	34.7									
8	18.8	75.4	34.4	17.9	77.6	39						
9	14.9	73.7	34	15.4	76.1	38.7						
10	12.1	71.9	33.7	12.6	74.5	38.3	12.9	76.6	43	12.5	78.3	47.5
12	8.4	68.2	32.8	8.8	71.4	37.2	9.1	73.8	42.3	9.3	75.8	47
14	6	64.5	31.8	6.4	68.1	36.6	6.6	71	41.5	6.9	73.3	46.3
16	4.3	60.6	30.6	4.7	64.8	35.7	4.9	68.1	40.6	5.2	70.7	45.5
18	3.1	56.6	29.2	3.4	61.4	34.5	3.7	65.1	39.6	3.9	68	44.6
20	2.1	52.3	27.6	2.5	57.8	33.2	2.7	62	38.5	2.9	65.3	43.3
22	1.4	47.7	25.7	1.7	54.1	31.6	2	58.9	37.1	2.2	62.5	42.4
24	0.8	42.7	23.5	1.1	50.1	29.9	1.3	55.6	35.7	1.5	59.7	41.1
26							0.8	52.1	34	1	56.7	39.7
Multiplying power	5			4			3			2		



Continued Table 5-3 Main arm lifting performance of XCT80 truck crane

Note: unit of weight lifting: t, elevation angle unit: ° Height unit: m, amplitude unit: m.

Outrigger half extension 5.6m, counterweight 8t															
Length	12.4			16.79			21.17			25.56			29.95		
	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height
Working amplitude															
3	80	67.8	12.8	65	74.4	17.5									
3.5	75	65.2	12.5	63	72.6	17.3	45	77	22						
4	68	62.5	12.2	61	70.7	17.1	45	75.3	21.8						
5	57	56.9	11.5	54	67	16.7	43	72.5	21.5	38	76.1	26.1	32	78.7	30.7
6	38.3	50.8	10.7	37.4	63.1	16.1	37	69.5	21	35	73.7	25.8	30	76.7	30.4
7	27.8	44.1	9.6	27	59	15.5	26.7	66.6	20.6	27.9	71.3	25.4	28	74.7	30.1
8	21.3	36.2	8.2	20.6	54.8	14.7	20.3	63.5	20	21.4	68.9	25	22.3	72.6	29.7
9	16.9	25.9	6.2	16.3	50.2	13.9	16	60.3	19.4	17	66.4	24.5	17.8	70.6	29.3
10				13.2	45.3	12.8	12.9	57	18.7	13.9	63.9	23.9	14.6	68.5	28.9
12				8.9	33.7	10	8.7	50	17	9.6	58.6	22.7	10.2	64.2	27.9
14							6	42	14.9	6.8	52.9	21.1	7.5	59.7	26.6
16							4.1	32.2	11.9	4.9	46.7	19.33	5.5	55	25.2
18										3.5	39.8	16.9	4.1	49.9	23.5
20													3	44.4	32.4
22													2.1	38.2	18.8
24															
26															
28															
30															
Multiplying power	12			10			8			6			6		

Continued Table 5-3 Main arm lifting performance of XCT80 truck crane

Note: unit of weight lifting: t, elevation angle unit: ° Height unit: m, amplitude unit: m.

Outrigger half extension 5.6m, counterweight 8t												
34.34			38.72			43.11			47.5			
Length	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height
Working amplitude												
3												
3.5												
4												
5												
6	24.5	78.9	35									
7	22.5	77.2	34.7									
8	20	75.4	34.4	17.9	77.6	39						
9	18.4	73.7	34	16.9	76.1	38.7						
10	15.1	71.9	33.7	15.5	74.5	38.3	13.4	76.6	43	12.5	78.3	47.5
12	10.7	68.2	32.8	11.1	71.4	37.2	11.4	73.8	42.3	11	75.8	47
14	7.9	64.5	31.8	8.3	68.1	36.6	8.6	71	41.5	8.8	73.3	46.3
16	5.9	60.6	30.6	6.3	64.8	35.7	6.6	68.1	40.6	6.8	70.7	45.5
18	4.5	56.6	29.2	4.8	61.4	34.5	5.1	65.1	39.6	5.3	68	44.6
20	3.4	52.3	27.6	3.7	57.8	33.2	4	62	38.5	4.2	65.3	43.3
22	2.5	47.7	25.7	2.8	54.1	31.6	3.1	58.9	37.1	3.3	62.5	42.4
24	1.8	42.7	23.5	2.1	50.1	29.9	2.3	55.6	35.7	2.5	59.7	41.1
26	1.2	37.1	20.8	1.5	45.9	27.8	1.7	52.1	34	1.9	56.7	39.7
28				1	41.3	25.5	1.2	48.4	32.1	1.4	53.6	38.1
30										1	50.4	36.3
Multiplying power		5			4			3			2	



Continued Table 5-3 Main arm lifting performance of XCT80 truck crane

Note: unit of weight lifting: t, elevation angle unit: ° Height unit: m, amplitude unit: m.

Outrigger half extension 5.6m, counterweight 11.5t																
Length		12.4			16.79			21.17			25.56			29.95		
Working amplitude	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	
3	80	67.8	12.8	65	74.4	17.5										
3.5	75	65.2	12.5	63	72.6	17.3	45	77	22							
4	68	62.5	12.2	61	70.7	17.1	45	75.3	21.8							
5	58	56.9	11.5	54	67	16.7	43	72.5	21.5	38	76.1	26.1	32	78.7	30.7	
6	43.5	50.8	10.7	42.6	63.1	16.1	38	69.5	21	35	73.7	25.8	30	76.7	30.4	
7	31.7	44.1	9.6	31	59	15.5	30.6	66.6	20.6	31.9	71.3	25.4	28	74.7	30.1	
8	24.5	36.2	8.2	23.8	54.8	14.7	23.5	63.5	20	24.6	68.9	25	25.4	72.6	29.7	
9	19.6	25.9	6.2	19	50.2	13.9	18.7	60.3	19.4	19.7	66.4	24.5	20.5	70.6	29.3	
10				15.5	45.3	12.8	15.2	57	18.7	16.2	63.9	23.9	16.9	68.5	28.9	
12				10.7	33.7	10	10.5	50	17	11.4	58.6	22.7	12	64.2	27.9	
14							7.4	42	14.9	8.3	52.9	21.1	8.9	59.7	26.6	
16							5.3	32.2	11.9	6.2	46.7	19.33	6.8	55	25.2	
18										4.6	39.8	16.9	5.2	49.9	23.5	
20													3.9	44.4	32.4	
22													3	38.2	18.8	
24																
26																
28																
30																
32																
34																
Multiplying power		12			10			8			6			6		

Continued Table 5-3 Main arm lifting performance of XCT80 truck crane

Note: unit of weight lifting: t, elevation angle unit: ° Height unit: m, amplitude unit: m.

Outrigger half extension 5.6m, counterweight 11.5t												
Length Working amplitude	34.34			38.72			43.11			47.5		
	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height	Lifting weight	Elevation angle	Height
3												
3.5												
4												
5												
6	24.5	78.9	35									
7	22.5	77.2	34.7									
8	20	75.4	34.4	17.9	77.6	39						
9	18.9	73.7	34	16.9	76.1	38.7						
10	17.4	71.9	33.7	15.7	74.5	38.3	13.4	76.6	43	12.5	78.3	47.5
12	12.5	68.2	32.8	12.9	71.4	37.2	12.3	73.8	42.3	11	75.8	47
14	9.4	64.5	31.8	9.7	68.1	36.6	10	71	41.5	10	73.3	46.3
16	7.2	60.6	30.6	7.5	64.8	35.7	7.8	68.1	40.6	8	70.7	45.5
18	5.6	56.6	29.2	5.9	61.4	34.5	6.2	65.1	39.6	6.4	68	44.6
20	4.3	52.3	27.6	4.7	57.8	33.2	4.9	62	38.5	5.1	65.3	43.3
22	3.4	47.7	25.7	3.7	54.1	31.6	3.9	58.9	37.1	4.1	62.5	42.4
24	2.6	42.7	23.5	2.9	50.1	29.9	3.1	55.6	35.7	3.3	59.7	41.1
26	1.9	37.1	20.8	2.2	45.9	27.8	2.5	52.1	34	2.7	56.7	39.7
28	1.4	30.5	17.3	1.7	41.3	25.5	1.9	48.4	32.1	2.1	53.6	38.1
30				1.2	36.2	22.6	1.4	44.5	30	1.6	50.4	36.3
32							1	40.3	27.5	1.2	47	34.3
34										0.8	43.4	32
Multiplying power	5			4			3			2		



Table 5-4 Auxiliary arm lifting performance of XCT80 truck crane

Note: unit of weight lifting: t, elevation angle unit: ° Height unit: m, amplitude unit: m.

Outrigger full extension 7.9m, counterweight 2.2t																		
Boom angle	10.5						17.5											
	0°			15°			30°			0°			15°			30°		
	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height
78	6.3	13.3	57.4	4.4	15.6	56.6	4.2	17.6	55.2	3.7	15.7	64	2	19.7	62.4	1.6	23.1	59.8
75	5.8	16.2	56.3	4	18.5	55.4	3.7	20.4	53.9	3.2	19	62.8	1.6	22.8	61	1.4	26.1	58.3
72	5.1	19.1	55.1	3.7	21.3	54.1	3.5	23.1	52.5	2.7	22.2	61.5	1.4	25.9	59.5	1.3	29	56.6
70	4.7	20.9	54.3	3.5	23.1	53.1	3.4	24.9	51.5	2.5	24.2	60.5	1.3	27.9	58.3	1.3	31	55.3
65	3.4	25.5	51.8	3	27.5	50.5	2.8	29.2	48.7	1.9	29.3	57.7	1.2	32.8	55.2	1.1	35.6	52
60	2.1	29.8	49	1.9	31.7	47.5	1.8	33.2	45.5	1.5	34.1	54.5	1.1	37.4	51.7	1	39.8	48.3
55	1.2	33.9	45.8	1.1	35.7	44.1	1	37	42	0.8	38.7	50.9	0.7	41.7	47.9	0.6	43.8	44.2
Outrigger full extension 7.9m, counterweight 3.5t																		
Boom angle	10.5						17.5											
	0°			15°			30°			0°			15°			30°		
	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height
78	6.3	13.3	57.4	4.4	15.6	56.6	4.2	17.6	55.2	3.7	15.7	64	2	19.7	62.4	1.6	23.1	59.8
75	5.8	16.2	56.3	4	18.5	55.4	3.7	20.4	53.9	3.2	19	62.8	1.6	22.8	61	1.4	26.1	58.3
72	5.1	19.1	55.1	3.7	21.3	54.1	3.5	23.1	52.5	2.7	22.2	61.5	1.4	25.9	59.5	1.3	29	56.6
70	4.7	20.9	54.3	3.5	23.1	53.1	3.4	24.9	51.5	2.5	24.2	60.5	1.3	27.9	58.3	1.3	31	55.3
65	3.6	25.5	51.8	3.2	27.5	50.5	3	29.2	48.7	1.9	29.3	57.7	1.2	32.8	55.2	1.1	35.6	52
60	2.2	29.8	49	2.1	31.7	47.5	1.9	33.2	45.5	1.6	34.1	54.5	1.1	37.4	51.7	1	39.8	48.3
55	1.3	33.9	45.8	1.3	35.7	44.1	1.2	37	42	0.9	38.7	50.9	0.8	41.7	47.9	0.7	43.8	44.2
50	0.7	37.7	42.2	0.7	39.3	40.4	0.6	40.4	38.3									

Table 5-4 Auxiliary arm lifting performance of XCT80 truck crane

Note: unit of weight lifting: t, elevation angle unit: ° Height unit: m, amplitude unit: m.

Outrigger full extension 7.9m, counterweight 8t																		
10.5										17.5								
Boom angle	0°			15°			30°			0°			15°			30°		
	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height
78	6.3	13.3	57.4	4.4	15.6	56.6	4.2	17.6	55.2	3.7	15.7	64	2	19.7	62.4	1.6	23.1	59.8
75	5.8	16.2	56.3	4	18.5	55.4	3.7	20.4	53.9	3.2	19	62.8	1.6	22.8	61	1.4	26.1	58.3
72	5.1	19.1	55.1	3.7	21.3	54.1	3.5	23.1	52.5	2.7	22.2	61.5	1.4	25.9	59.5	1.3	29	56.6
70	4.7	20.9	54.3	3.5	23.1	53.1	3.4	24.9	51.5	2.5	24.2	60.5	1.3	27.9	58.3	1.3	31	55.3
65	3.9	25.5	51.8	3.2	27.5	50.5	3	29.2	48.7	1.9	29.3	57.7	1.2	32.8	55.2	1.1	35.6	52
60	2.8	29.8	49	2.6	31.7	47.5	2.5	33.2	45.5	1.6	34.1	54.5	1.1	37.4	51.7	1	39.8	48.3
55	2.1	33.9	45.8	2	35.7	44.1	1.8	37	42	1.4	38.7	50.9	1	41.7	47.9	0.9	43.8	44.2
50	1.2	37.7	42.2	1.4	39.3	40.4	1.1	40.4	38.3	1	42.9	46.9						



Table 5-4 Auxiliary arm lifting performance of XCT80 truck crane

Note: unit of weight lifting: t, elevation angle unit: ° Height unit: m, amplitude unit: m.

Outrigger full extension 7.9m, counterweight 11.5t														
Boom angle	10.5						17.5							
	0°			15°			0°			15°			30°	
	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude
78	6.3	13.3	57.4	4.4	15.6	56.6	3.7	15.7	64	2	19.7	62.4	1.6	23.1
75	5.8	16.2	56.3	4	18.5	55.4	3.2	19	62.8	1.6	22.8	61	1.4	26.1
72	5.1	19.1	55.1	3.7	21.3	54.1	2.7	22.2	61.5	1.4	25.9	59.5	1.3	29
70	4.7	20.9	54.3	3.5	23.1	53.1	2.5	24.2	60.5	1.3	27.9	58.3	1.3	31
65	3.9	25.5	51.8	3.2	27.5	50.5	1.9	29.3	57.7	1.2	32.8	55.2	1.1	35.6
60	2.8	29.8	49	2.6	31.7	47.5	1.7	34.1	54.5	1.1	37.4	51.7	1.1	39.8
55	2.1	33.9	45.8	1.9	35.7	44.1	1.4	38.7	50.9	1	41.7	47.9	0.9	43.8
50	1.2	37.7	42.2	1.1	39.3	40.4	1.1	42.9	46.9					

Table 5-4 Auxiliary arm lifting performance of XCT80 truck crane

Note: unit of weight lifting: t, elevation angle unit: ° Height unit: m, amplitude unit: m.°

Outrigger half extension 5.6m, counterweight 2.2t																		
10.5									17.5									
Boom angle	0°			15°			30°			0°			15°			30°		
	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height
78	6.3	13.3	57.4	4.4	15.6	56.6	4.2	17.6	55.2	3.7	15.7	64	2	19.7	62.4	1.6	23.1	59.8
75	5.5	16.2	56.3	4	18.5	55.4	3.7	20.4	53.9	3.2	19	62.8	1.6	22.8	61	1.4	26.1	58.3
72	3.7	19.1	55.1	3.2	21.3	54.1	2.8	23.1	52.5	2.7	22.2	61.5	1.4	25.9	59.5	1.3	29	56.6
70	2.8	20.9	54.3	2.5	23.1	53.1	2.2	24.9	51.5	2.2	24.2	60.5	1.3	27.9	58.3	1.3	31	55.3
65	1.4	25.5	51.8	1.2	27.5	50.5	1.1	29.2	48.7	0.9	29.3	57.7	0.7	32.8	55.2	0.6	35.6	52
60	0.4	29.8	49	0.4	31.7	47.5	0.3	33.2	45.5									
55																		

Outrigger half extension 5.6m, counterweight 3.5t																		
10.5									17.5									
Boom angle	0°			15°			30°			0°			15°			30°		
	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height
78	6.3	13.3	57.4	4.4	15.6	56.6	4.2	17.6	55.2	3.7	15.7	64	2	19.7	62.4	1.6	23.1	59.8
75	5.8	16.2	56.3	4	18.5	55.4	3.7	20.4	53.9	3.2	19	62.8	1.6	22.8	61	1.4	26.1	58.3
72	4.1	19.1	55.1	3.5	21.3	54.1	3.2	23.1	52.5	2.7	22.2	61.5	1.4	25.9	59.5	1.3	29	56.6
70	3.2	20.9	54.3	2.8	23.1	53.1	2.5	24.9	51.5	2.5	24.2	60.5	1.3	27.9	58.3	1.3	31	55.3
65	1.6	25.5	51.8	1.5	27.5	50.5	1.3	29.2	48.7	1.2	29.3	57.7	1	32.8	55.2	0.8	35.6	52
60	0.7	29.8	49	0.6	31.7	47.5	0.5	33.2	45.5									
55																		



Table 5-4 Auxiliary arm lifting performance of XCT80 truck crane

Note: unit of weight lifting: t, elevation angle unit: ° Height unit: m, amplitude unit: m.

Outrigger half extension 5.6m, counterweight 8t														
Boom angle	10.5						17.5							
	0°			15°			0°			15°			30°	
	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude
78	6.3	13.3	57.4	4.4	15.6	56.6	3.7	15.7	64	2	19.7	62.4	1.6	23.1
75	5.8	16.2	56.3	4	18.5	55.4	3.2	19	62.8	1.6	22.8	61	1.4	26.1
72	5.1	19.1	55.1	3.7	21.3	54.1	2.7	22.2	61.5	1.4	25.9	59.5	1.3	29
70	4.4	20.9	54.3	3.5	23.1	53.1	2.5	24.2	60.5	1.3	27.9	58.3	1.3	31
65	2.6	25.5	51.8	2.3	27.5	50.5	1.9	29.3	57.7	1.2	32.8	55.2	1.1	35.6
60	1.4	29.8	49	1.3	31.7	47.5	1	34.1	54.5	0.9	37.4	51.7	0.8	39.8
55	0.7	33.9	45.8	0.6	35.7	44.1								
50														



Continued Table 5-4 Auxiliary arm lifting performance of XCT80 truck crane

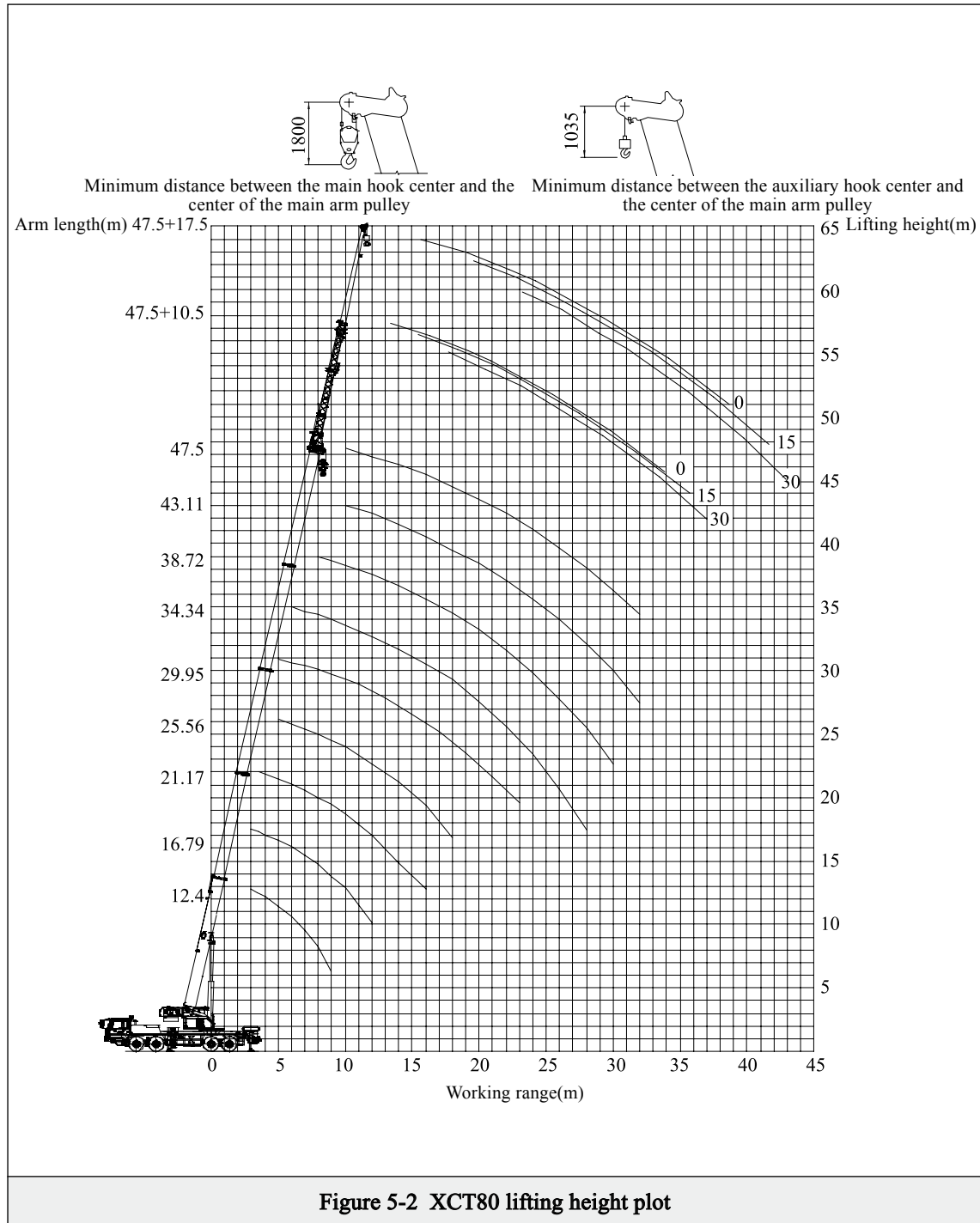
Note: unit of weight lifting: t, elevation angle unit: ° Height unit: m, amplitude unit: m.

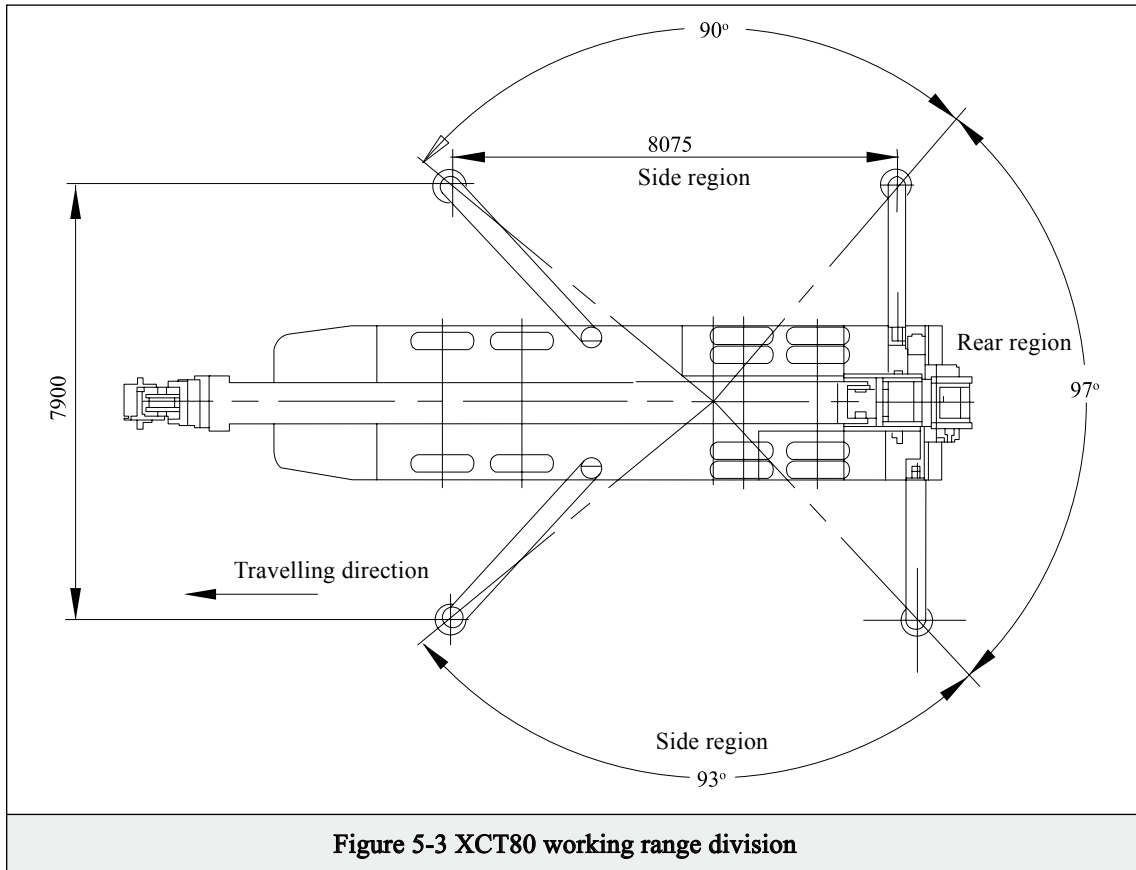
Outrigger half extension 5.6m, counterweight 8t																		
Boom angle	10.5									17.5								
	0°			15°			30°			0°			15°			30°		
	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height	Lifting weight	Working amplitude	Lifting height
78	6.3	13.3	57.4	4.4	15.6	56.6	4.2	17.6	55.2	3.7	15.7	64	2	19.7	62.4	1.6	23.1	59.8
75	5.8	16.2	56.3	4	18.5	55.4	3.7	20.4	53.9	3.2	19	62.8	1.6	22.8	61	1.4	26.1	58.3
72	5.1	19.1	55.1	3.7	21.3	54.1	3.5	23.1	52.5	2.7	22.2	61.5	1.4	25.9	59.5	1.3	29	56.6
70	4.7	20.9	54.3	3.5	23.1	53.1	3.4	24.9	51.5	2.5	24.2	60.5	1.3	27.9	58.3	1.3	31	55.3
65	3.3	25.5	51.8	3	27.5	50.5	2.8	29.2	48.7	1.9	29.3	57.7	1.2	32.8	55.2	1.1	35.6	52
60	2.1	29.8	49	1.9	31.7	47.5	1.8	33.2	45.5	1.5	34.1	54.5	1.1	37.4	51.7	1.1	39.8	48.3
55	1.2	33.9	45.8	1.1	35.7	44.1	1.1	37	42	0.8	38.7	50.9	0.6	41.7	47.9	0.6	43.8	44.2
50	0.6	37.7	42.2	0.5	39.3	40.4	0.5	40.4	38.3									



Description of tables 5-3 and 5-4:

1. The weight listed in the table is the maximum lifting weight that the machine on a flat and firm ground can guarantee. Working over the weight is prohibited strictly;
2. The total rated lifting weight in table includes the weight of the hook and spreader.
3. The standard elevation and lifting height for main arm are the reference values, the working amplitude should be taken as the base;
4. The lifting performance of arm end single pulley is the same as the main arm lifting performance, but the maximum weight shall not exceed 6300Kg;
5. When the auxiliary arm is in the operating state and the main boom is hoisting, the main boom rated lifting weight should be reduced by at least 2000kg.
6. Before working, the third, fourth and fifth arms should be fully extended after full extension of second arm, and retraction is in the opposite order;
7. Operation is only allowable under wind below grade 5 (wind speed of 14.1m/s).
8. The main arm elevation range should be used, even if no-load, the boom elevation angle should within the range given in the tables above, and beware of the crane overturning.





5-4 Crane main structure performance parameters

1. Cab

The new composite structure of the full width cab features good sealing and anti-corrosion, as well as front and rear shock-proof plastic block. The cab is fully enclosed, with luxurious equipment, security glass, 3 wipers, rearview mirrors with large vision, electronic control window washer, electronic door and window lifter, indoor air heater with defrosting, single cold air conditioning, and radio and player. Driver and front passenger air seats are adjustable to a variety of locations. The left steering wheel height and angle are adjustable.

2. Suspension

The front axle adopts leaf spring suspension, and the rear axle adopts rubber suspension plus V-shaped thrust rod structure, which is able to increase the horizontal positioning of the axle, completely solve the dislocation of the medium and rear axle.

3. Traveling brake

Dual-circuit pneumatic brake is operated by pedal. The first circuit acts on the wheels of first and



second axes, and the second circuit acts on the wheels of third and fourth axes.

4. Parking brake

Deflation brake acts on the rear two axles, playing the role through the spring energy storage gas chamber on the axles.

5. Auxiliary brake

Engine exhaust brake

6. Steering form

8×4 wheel steering, and mechanical steering mechanism, with hydraulic power assisted.

7. Slewing bearing

Type: Three-row roller external tooth

Model: 131.25.1600.101.04.03F4

8. Oil pump

Type: The main pump is variable displacement piston pump,

And auxiliary pump is triple gear pump.

Rated working pressure: 32/23/23/23MPa

Maximum input speed: 2300r/min

Displacement: 145/50/23/08ml/r

9. Slewing mechanism

Model: HS120C-00

Type: Three-grade planetary gear deceleration

Rated output torque: 11000 Nm

Brake type: Wet braking

Braking torque: 200 Nm

Speed ratio: 101.8

Motor: A2F45W2Z1 axial piston motor

10. Main lifting mechanism

Type: QBL400D1 planetary reducer

Speed ratio: 59.37

Model of wire rope: NOTOR HP

φ 20-2160

Rope diameter: 20mm

Length of wire rope: 235m

Main winch motor: H2V108SL2R/

PI+PE/1/100/80/108MNBR Variable motor

11. Auxiliary lifting mechanism

Type : QBL260E1 planetary gear deceleration

Speed ratio: 62

Model of wire rope: NOTOR HP

φ 20-2160

Rope diameter: 20mm

Length of wire rope: 145m

Auxiliary winch motor: SH11C M 075

ME OD SAO LM2 RV constant displacement motor

12. Main boom

Type: one section of base boom and four sections telescopic arms, U-shaped cross-section

Length: 12.4m~47.5m

Telescopic type: two-cylinder and rope row, in sequence and simultaneous telescoping

13. Auxiliary arm

Type: two-section truss plus box-shaped structure

Length: 10.5m~17.5m

14. Balance weight

The combined self-handling balance weight has the combined weight of 2.2t, 3.5t, 8t



and 11.5t. It can carry 3.5t balance weight (2.2t fixed balance weight, balance weight bracket 1.3t balance weight) in traveling state.

15. Turntable

Type: Single vertical plate plus local box-shaped structure, the mechanical locking pins are set.

16. Luffing cylinder

Type: single-cylinder front outrigger luffing

Stroke: 2.885m

17. Telescopic cylinder

Type: Double-acting cylinder with double-core tube

Telescopic cylinders I: Diameter: $\phi 200\text{mm}$
stroke: 8775mm

Telescopic cylinders II: Diameter:
 $\phi 200\text{mm}$ stroke: 8775mm

18. Operating room

Steel sliding door structure type is equipped with safety glass, air conditioning and control instrumentation, with broad vision. It is externally equipped with a push-pull pedal, to ensure the security for in and out the cab.

19. Main valve of upper crane portion

Model: SBLV22-H proportional sensing multi-way valve

20. Torque limiter

Model: HC4900



LOG



Chapter 6 The components and functions of lower crane portion

6-1 General overview

XCT80 truck crane lower crane portion is mainly composed of nine major components, including power system, transmission system, travelling system, operating system, cab, covering parts, hydraulic system, air conditioning system, electrical system and auxiliary system.

6-1-1 Power system

The power system is composed of the engine, the cooling system, an air filter, a muffler and other components.

6-1-2 Transmission system

The transmission system consists of the clutch, gearbox, and the drive shaft.

6-1-3 Driving system

The traveling system consists of the suspension system, axles, and tires.

6-1-4 Operating system

The operating system consists of the steering system, the steering hydraulic system, the clutch operating system, the variable speed control system, and the brake system.

6-1-5 Cab and covering parts

The cab and covering parts mainly consists of the cab, walk of platen and hoardings, and the hood parts.

6-1-6 Hydraulic system

The hydraulic system consists of the hydraulic pump, the hydraulic valve, the cylinder and piping components.

6-1-7 Air conditioning system

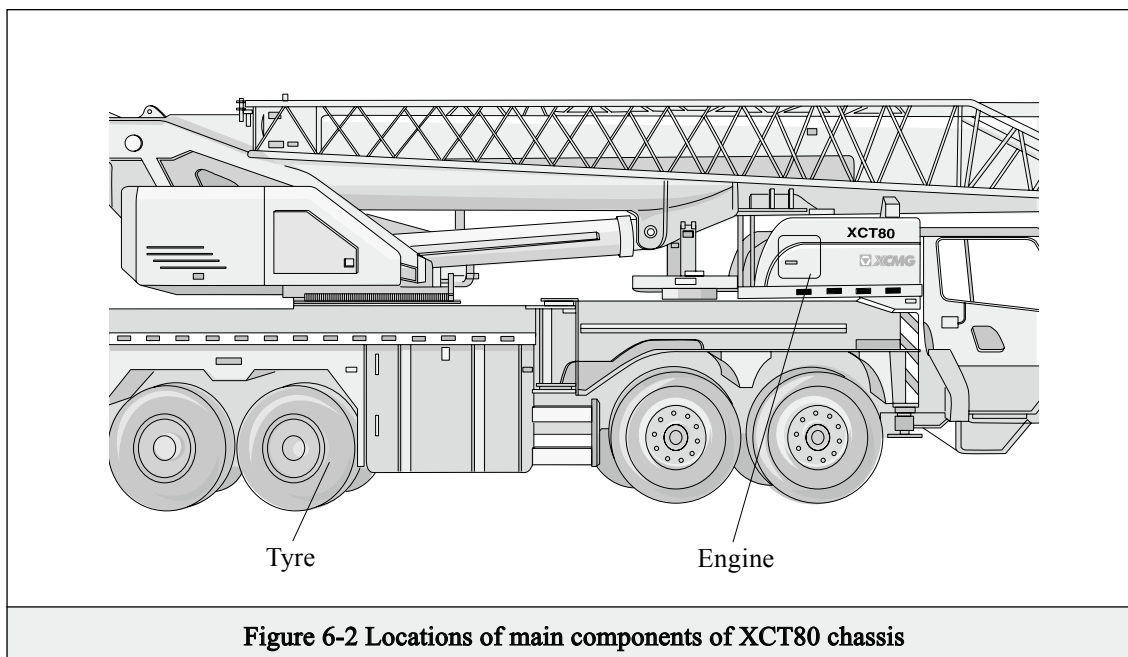
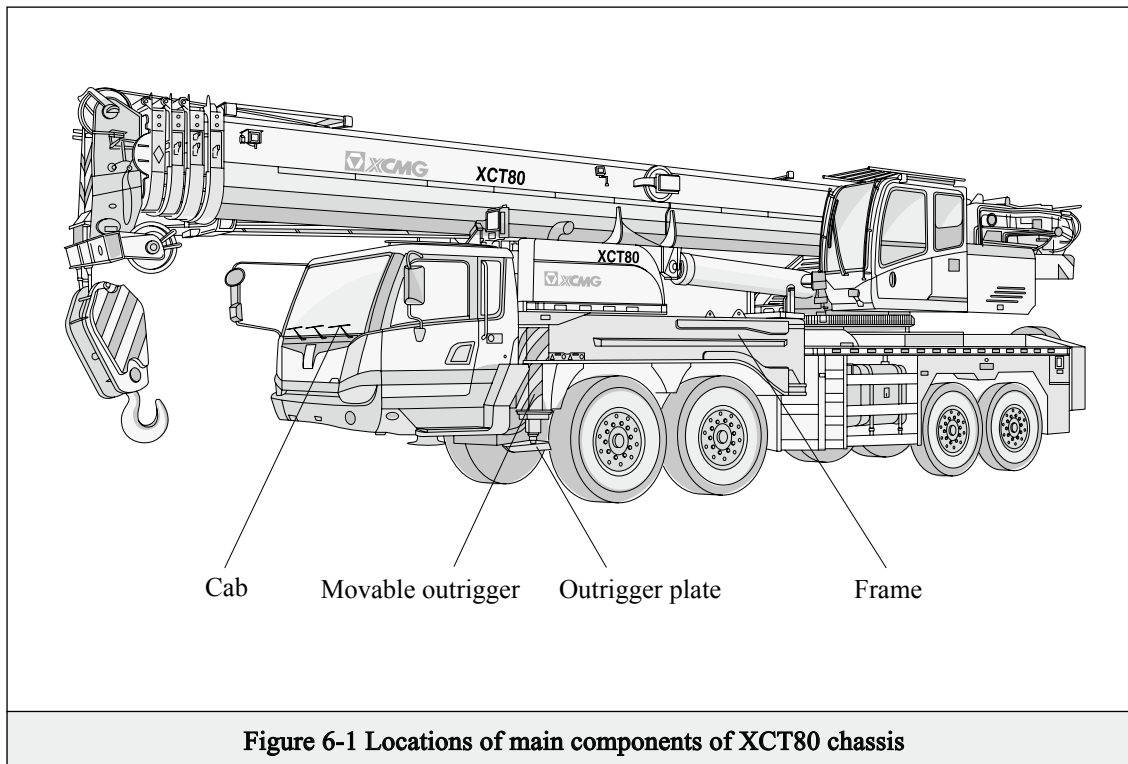
The air conditioning system is mainly composed by the heating system, and the cooling system.

6-1-8 Electrical system

The electrical system is mainly composed by the power supply, the lighting system, and the control circuits.

6-1-9 Auxiliary system

The auxiliary system mainly consists of the boom frame, lower crane portion signs, vehicle tools and other components.





6-2 Main components introduction

1. Cab:

The cab is of a full width integral type cab, and elastically connects to frame with four rubber cushions. The driver seat is used with before and after, and backrest angle adjustable hydraulic shock absorber backrest seat, the front windshield is a large area of laminated safety glass, an electric wiper is installed at the lower part of window, and each rear window is installed on the left and the right side of rear wall. Cab assembly the all-covering softening interior is assembled in cab, the sun visor, lamps and radio equipment are mounted, and the rearview mirror assembly is mounted on the two sides. All the electrical control and instruments are on the dashboard, the door opening angle can be 85 degrees, and an electric type structure of the door glass is used. The rubber sealing strip with good sealing performance is used on periphery of the door frame, which has good sealing performance.

2. Support:

690/700 high-strength steel and large cross-section sheet frame cross-section structure are adopted, increasing the carrying capacity of the frame and refining the local structure;

3. Transmission system

Dual countershaft gearbox and end-face tooth drive shaft transmission form is adopted, ensuring smooth and reliable transmission;

4. Braking system

The steering form is 8×4 (the first and second axles for steering), with mechanical + hydraulic power.

5. Braking system:

Dual-circuit pneumatic brake, front-plate and rear-drum brake, together with the engine-assisted braking, with high braking stability, more safe and reliable driving.

6-3 Cab and protective device

6-3-1 The cab interior equipments

The cab interior equipments comprise a dashboard, a control switch, an operating mechanism and seats. (Figure 6-3).

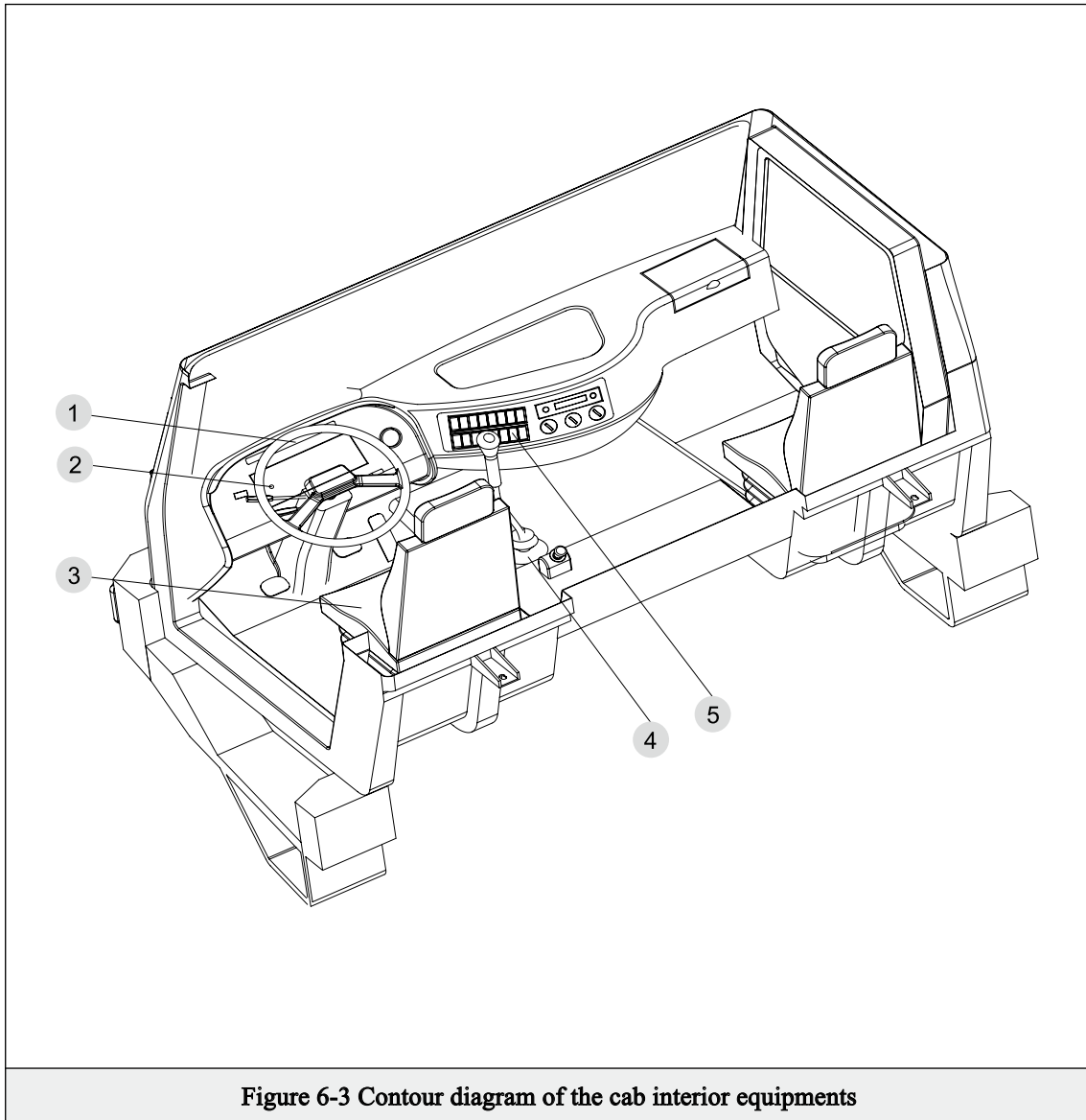


Figure 6-3 Contour diagram of the cab interior equipments

No	Name	No	Name	No	Name
1	Lamb	2	Dashboard	3	Seats
4	Operating mechanism	5	Control switch		



6-3-1-1 Dashboard

The instrument panel consists of the combination instrument, switches, and indicator lights, as shown in Figure 6-4.

a. Combination instruments

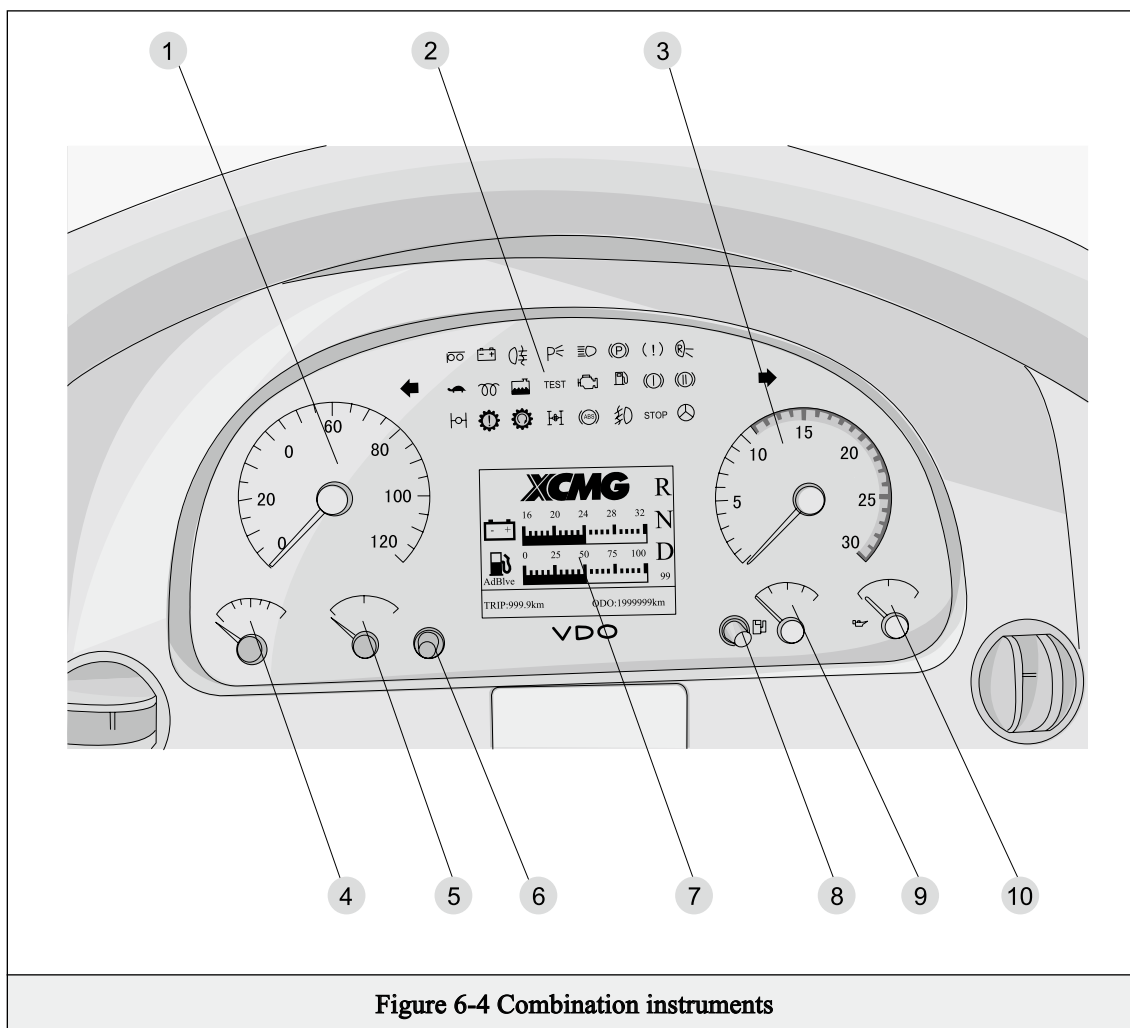
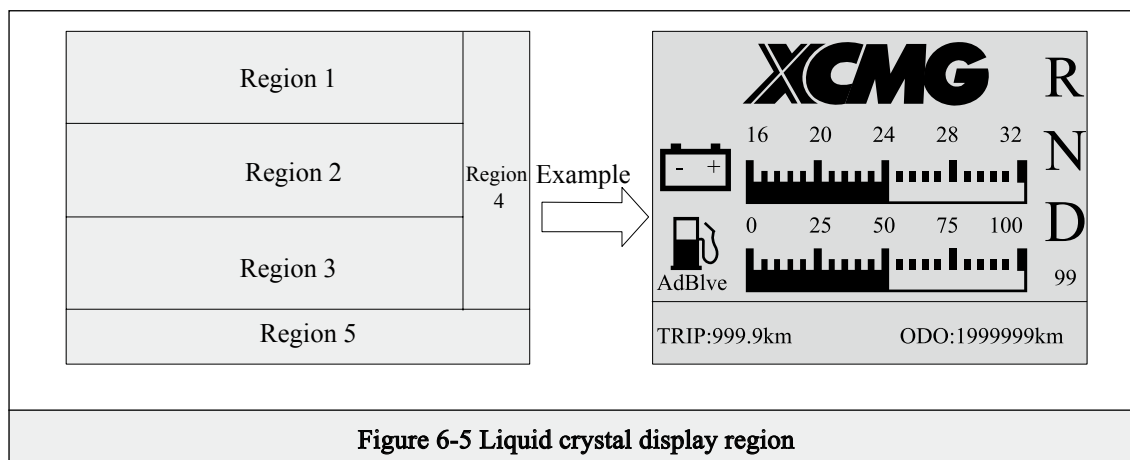


Figure 6-4 Combination instruments

No.	Name	No.	Name	No.	Name
1	Speedometer	2	Sign indication region	3	Engine speed gauge
4	Engine water temperature	5	Barometer	6	Adjustment button I
7	Liquid crystal display	8	Adjustment button II	9	Fuel gauge
10	Engine oil pressure gauge				

The liquid crystal display region

The liquid crystal display region division:



Display contents for each region

1)Region 1 shows the current alarm signs, such as: after the instruments are powered on, when the body gas line pressure is low, it will display low air pressure alarm, and if the conditions are met, the XCMG trademarks will be displayed in region 1.

2)Region 2 displays the following contents: the voltage information, the accelerator opening degree, the engine torque, engine running time, and fuel economy. It is noteworthy that when the instrument is in the CAN mode and non-CAN mode, the contents displayed in the region II are different.

3)Region 3 displays the current voltage information or urea level information.

4)Region 4 displays the information of the current gear when the vehicle is equipped with the automatic gearbox.

5)Region 5 displays the accumulated vehicle mileage and single mileage information.

Instrument operation instructions

1)Pressure switch display

After instruments are powered on, the barometer shows pressure value of a gas line (5 in Figure 6-4), and when pressing the adjustment button I (6 in Figure 6-4), the barometer displays the pressure value of another gas line.

2)Instrument brightness adjustment

Press adjustment button I (6 in Figure 6-4) and adjustment button II (8 in Figure 6-4) for over 3s, the instruments enter into the setup mode, as shown in Figure 6-7, the customers can design instrument background lighting settings, and set the Chinese and English display, but cannot change the parameter settings.

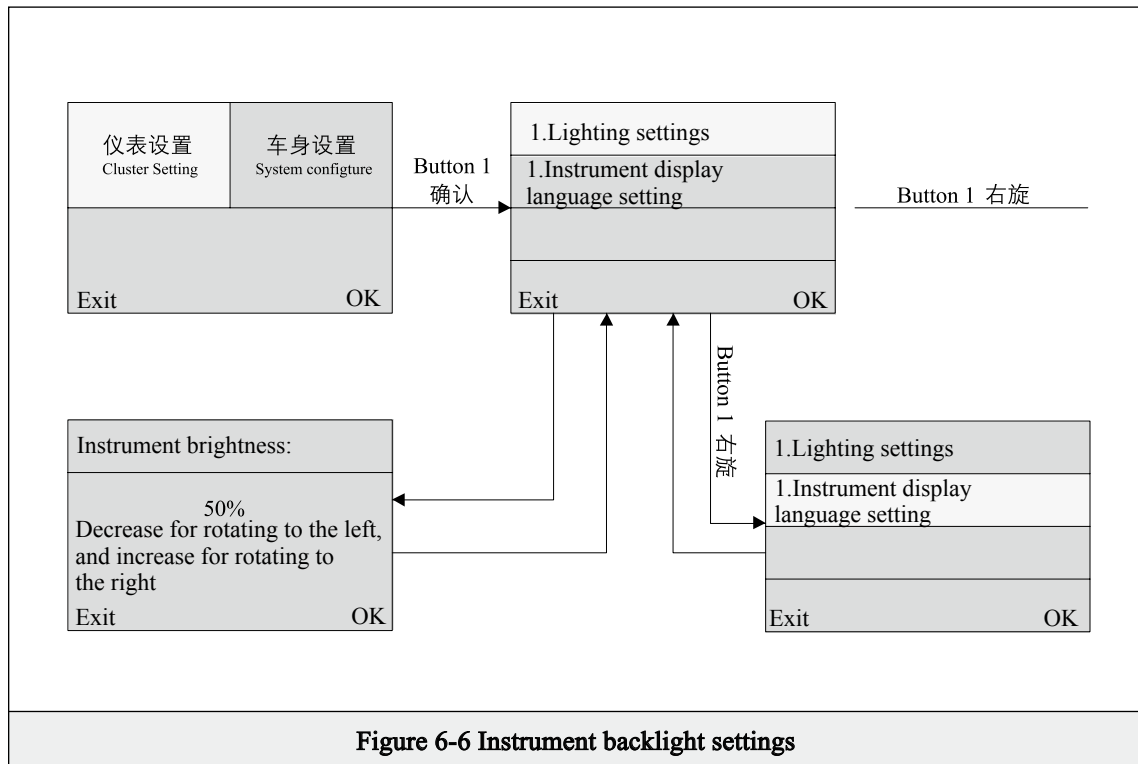


Figure 6-6 Instrument backlight settings

Instrument buzzer alarm

1) Low oil pressure alarm

When the engine speed is over 300 rpm/min, the instrument will send continuous alarm at the frequency of 625Hz (0.5s) and 488Hz (0.5s).

2) Air pressure 1 & 2 alarm

When the air pressure is low and engine speed is greater than 350 rpm/min, the instrument will send continuous alarm at the frequency of 1250Hz (0.5s) and 976 Hz (0.5s).

3) Engine coolant level

The instrument will alarm send continuous alarm at the frequency of 2048Hz

4) Low Urea level (National IV engine)

The instrument will send continuous alarm at the frequency of 1250Hz.

b. Indicator lights assembly

Sign instructions are as follows:

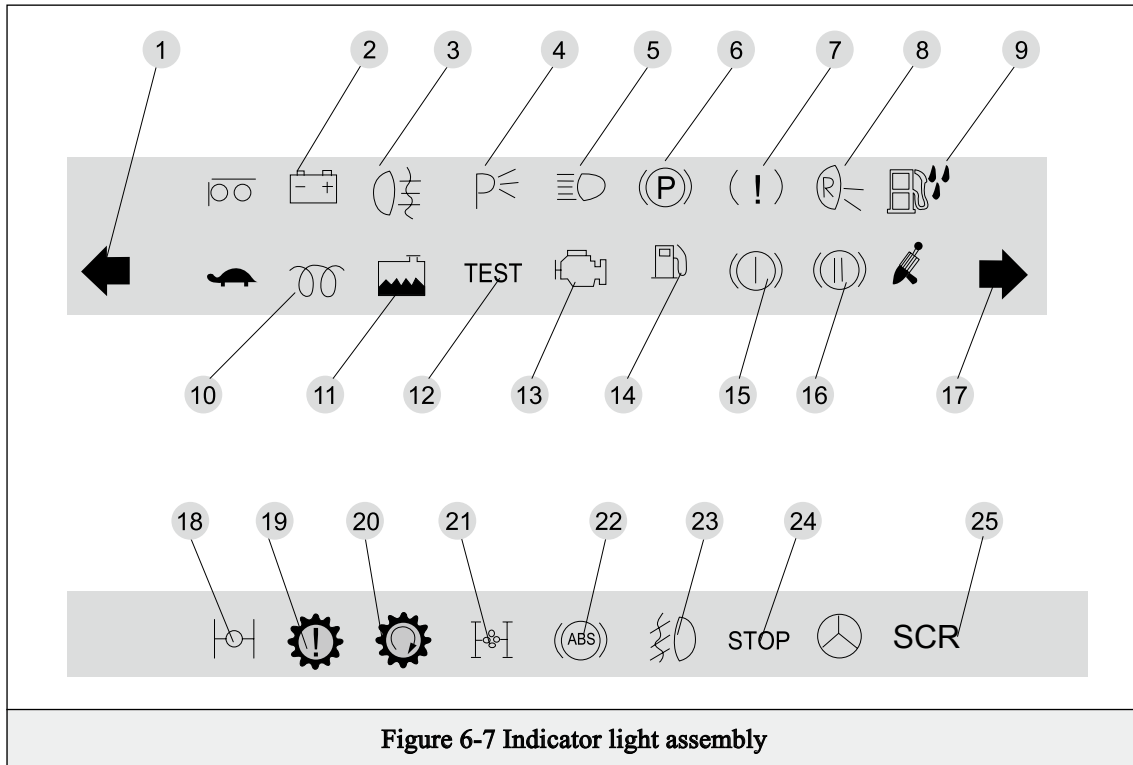
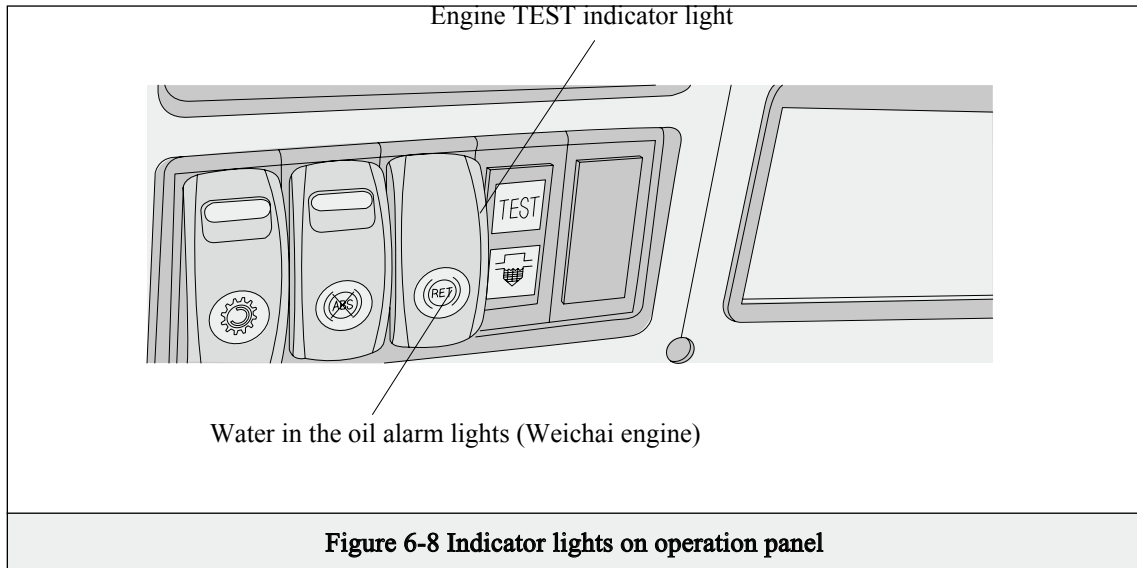


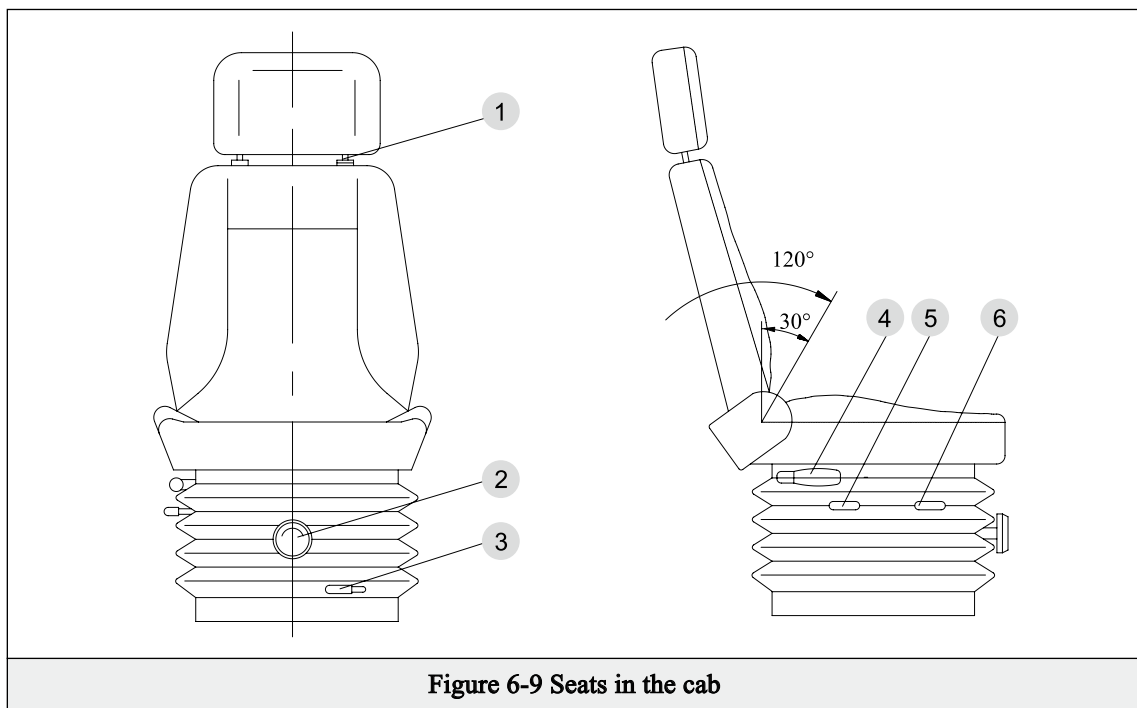
Figure 6-7 Indicator light assembly

No.	Name	No.	Name	No.	Name
1	Left steering indicator light	2	Charging indicator light	3	Rear fog lamp indicator light
4	Brake indicator light	5	Distance light indicator light	6	Parking brake light
7	Braking fault indicator light	8	Reversing indicator light	9	Water-in-oil indicator light
10	Preheating indicator light	11	Water level indicator light	12	Engine diagnostic indicator light
13	Post-processing emission malfunction indicator light (National IV engine)	14	Urea liquid level indicator light	15	Low pressure I alarm indicator light
16	Low pressure II alarm indicator light	17	Right steering indicator light	18	Inter-gear differential speed indicator light
19	Gearbox fault indicator light(Automatic gearbox)	20	Power take-off indicator light	21	Inter-axis differential speed indicator light
22	ABS fault indicator light (Optional)	23	Front foglight	24	Front fog indicator light
25	SCR indicator light (National IV engine)				

Others are standby indicator lights.



6-3-1-2 Seats



No.	Name	No.	Name	No.	Name
1	Headrest height lock switch	2	Damping stiffness adjustment handle	3	Seat front and back adjustment handle
4	Backrest angle adjustment handle	5	Cushion rear height adjustment handle	6	Cushion front height adjustment handle



Two seats are equipped in the cab in the left and right sides, and the manipulation pieces for the seats are mounted symmetrically. The seat height adjustment amount is 60mm, front and back adjustment distance is 170mm, and backrest angle adjustment range is 120° (specifically determined according to actual situation of the cab). Stroke of the seat damping device can be steplessly adjusted according to body weight (40~130kg), with the maximum stroke of 50mm. Headrest height adjustment amount is 40mm.

The seat adjustment methods are as follows:

1)Headrest height lock: open headrest height locking switch, pull out or insert the headrest to the appropriate location by hand, and release the lock switch to complete the adjustment.

2)Front and back adjustment: gently upward lift the seat front and back adjustment handle 3, push the seat front and back to the ideal position, and put down the handle to lock automatically.

3)Backrest angle adjustment: pull the backrest angle adjustment handle 4 to turn the backrest forward and backward. When the handle is released, you can lock the backrest in the specified location.

4)Stiffness adjustment: rotate damping stiffness adjustment handle 2 according to

the driver's own body weight until you feel comfortable. Clockwise rotation of the load handle is for carrying weight increase, otherwise decrease.

5)Height adjustment: Pull up cushions front height adjustment handle 6, the front part of the seat cushion automatically pops up, and pull up cushions rear height adjustment handle 5, the rear part of the seat cushion automatically pops up. When pressed down, either separately or simultaneously pull up handle 5 and 6, press down forcibly, and then release the front and rear handles to fix the seat cushion position.



In front and back adjustment and backrest angle adjustment, you should pull up the handle to the place, and lock after adjustment. After adjustment, the handles should return in place to ensure that the lock of the various parts is reliable.



6-3-1-3 Cab operation panel

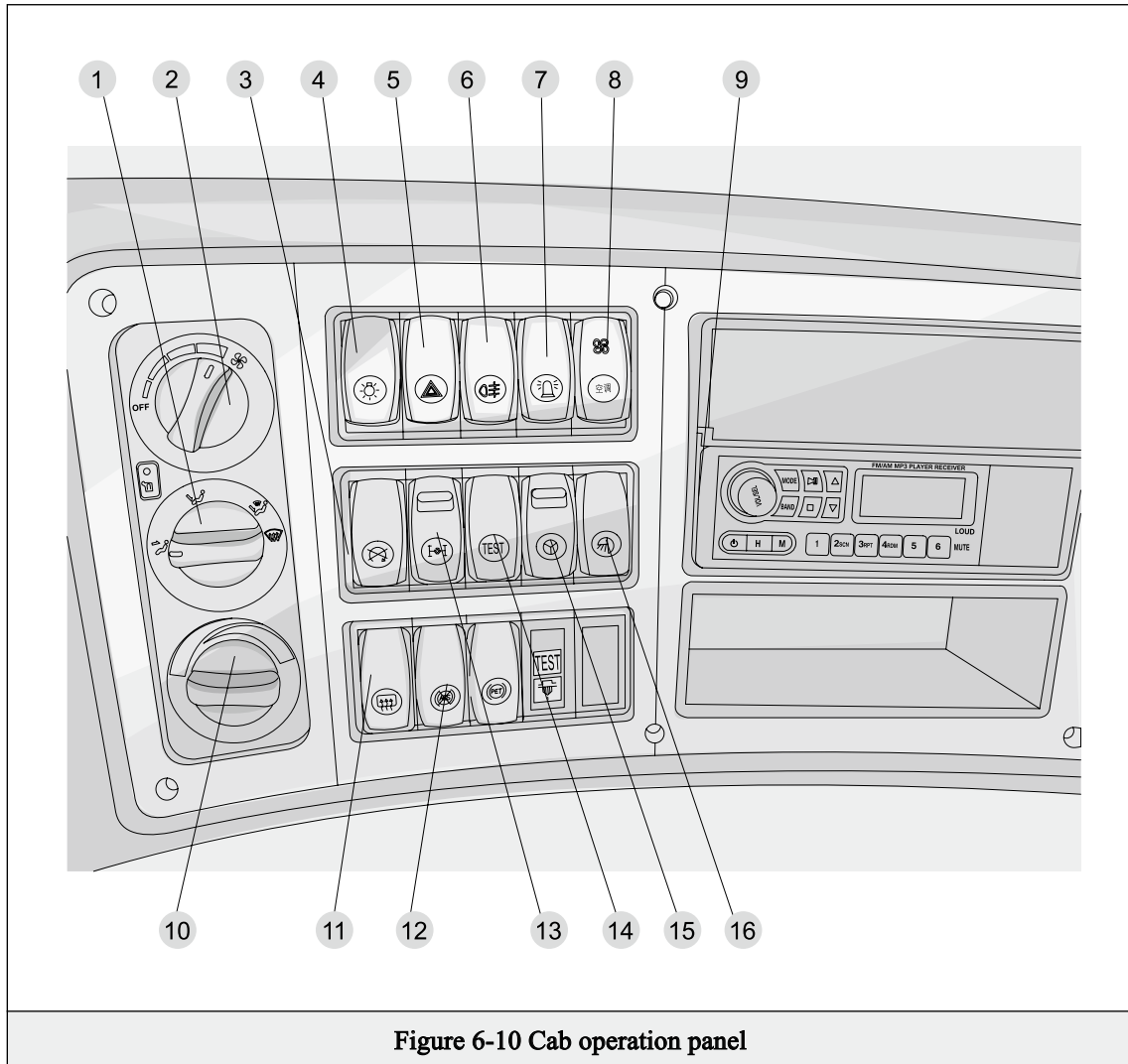


Figure 6-10 Cab operation panel

No.	Name	No.	Name	No.	Name
1	Wind direction adjustment switch	2	Wind speed adjustment switch	3	Flameout switch
4	Lighting switch	5	Emergency signal switch	6	Fog lamp switch
7	Warning light switch (optional)	8	Air-conditioning switch	9	Radio cassette
10	Cold and warm selection switch	11	Power take-off switch	12	ABS failure switch (optional)
13	Shaft speed differential switch	14	Outrigger light switch	15	Diagnostic switch
16	Rearview mirror heating				

Others are standby switches.

6-3-1-4 Operation parts in cab

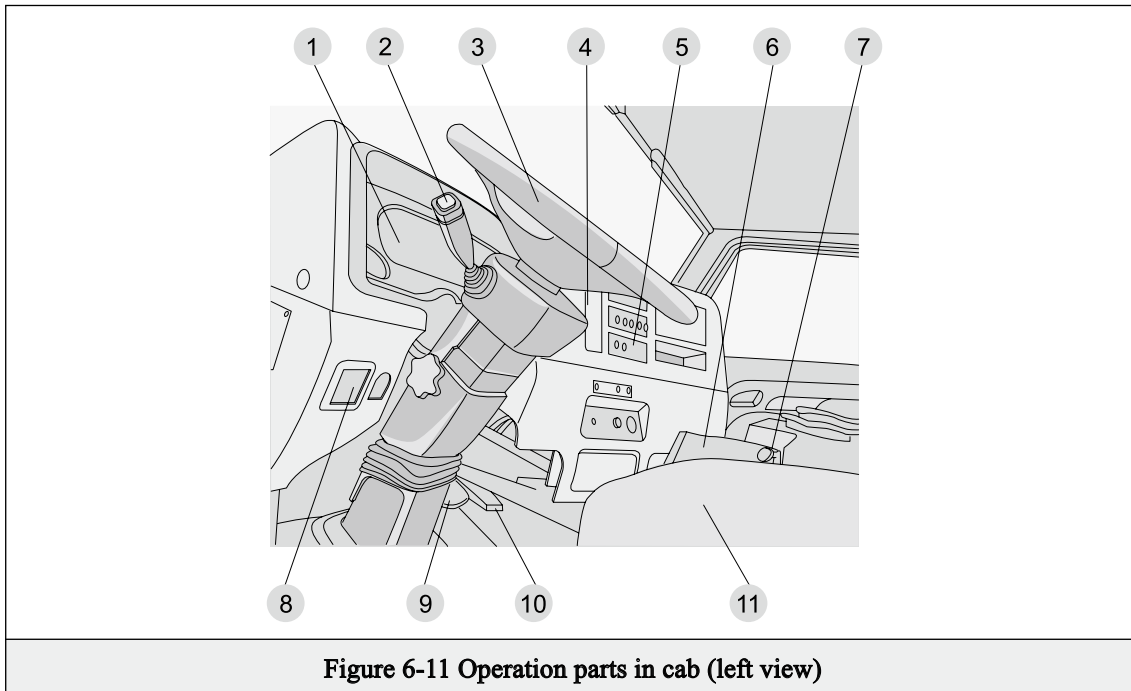


Figure 6-11 Operation parts in cab (left view)

No.	Name	No.	Name	No.	Name
1	Combination meter	2	Lighting master switch	3	Steering wheel
4	Exhaust brake, wiper switch	5	Operation panel assembly	6	Gearbox lever
7	Hand brake lever	8	Electric rearview mirror	9	Foot brake pedal
10	Foot accelerator pedal	11	Seat		

The combination switch assembly (No. 2 and No. 4 in Figure 6-12, the lighting switch, exhaust brake, wiper switch) is introduced as follows:

1) Lighting control switch: 2 in Figure 6-12 is lighting switch, push switch forward to turn on the right turning light, and the switch backward to turn on the left turning light, then the left turning light and driving right steering light on the instrument panel flash. Rotating forward 30° is for low beam, and rotating forward another 30° is for the high beam, and the high beam indicator light goes on. The small and large lights are as follows: OFF, small light, and headlight. Uplift the switch to realize light changing, as shown in A view.

2) Exhaust brake, wiper motor and washing switch: 4 in Figure 6-12 is the exhaust, wiper and washing switch, press the button at the top of the switch to start washing, which automatically resets after release. Rotating operation can realize intermittent, low-speed and high-speed wiping of the wiper motor, as shown in the B view. Pull back the switch to turn on the engine exhaust brake.

3) Exhaust brake switch: When the vehicle travels down a long slope, pull back the switch to realize exhaust brake, which not only can prevent accelerating to the degree of danger due to the gravity of the vehicle itself, but also reduce the use of the brake, so as that the temperature of the brakes during going down long slope is not too high. This switch should be reset When it is not in use.

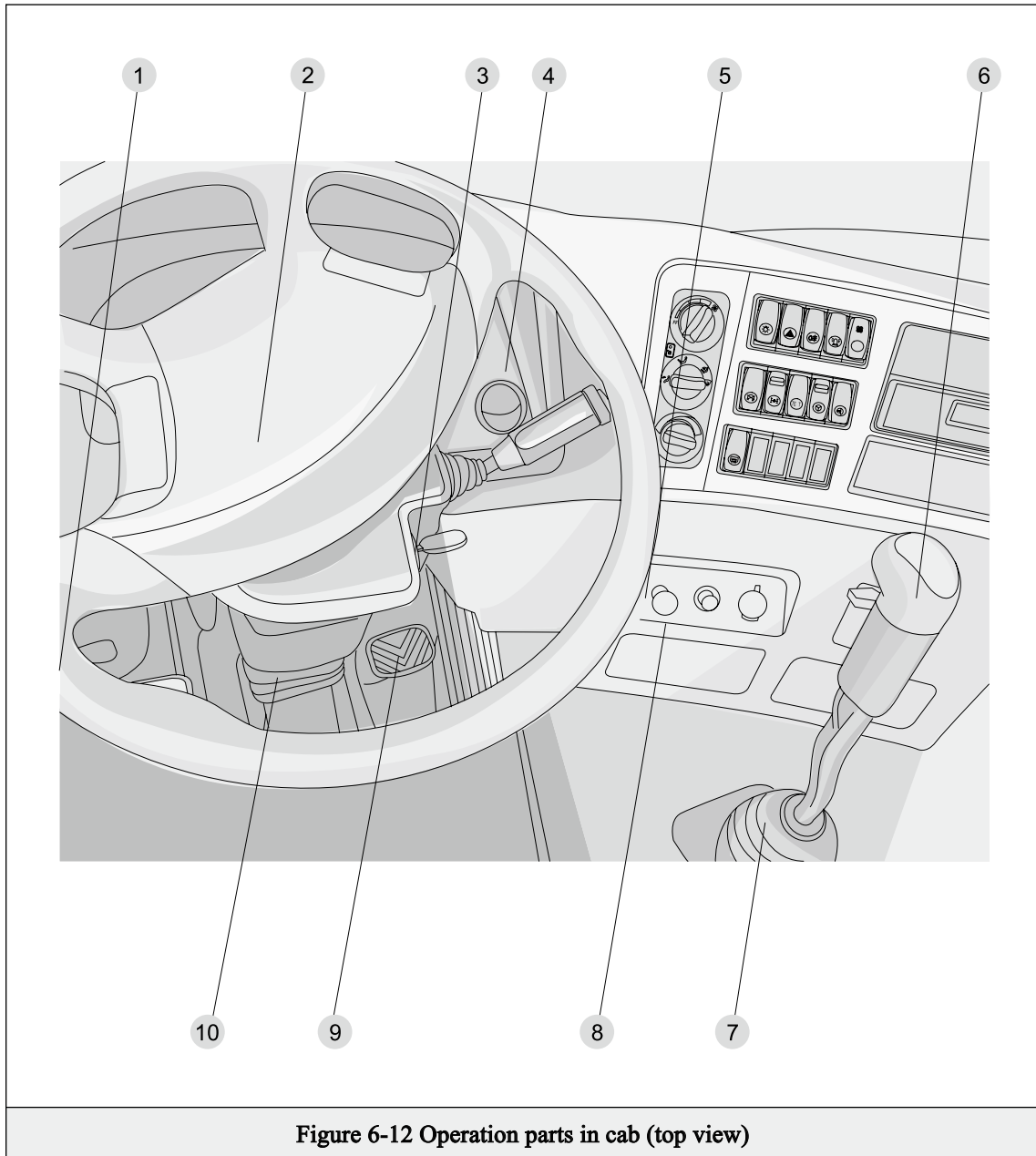


Figure 6-12 Operation parts in cab (top view)

No.	Name	No.	Name	No.	Name
1	Clutch pedal	2	Steering wheel	3	Start switch
4	Combination switch assembly	5	Power connector	6	Gearbox lever
7	Hand brake lever	8	Cigarette lighter	9	Accelerator pedal
10	Foot brake pedal				

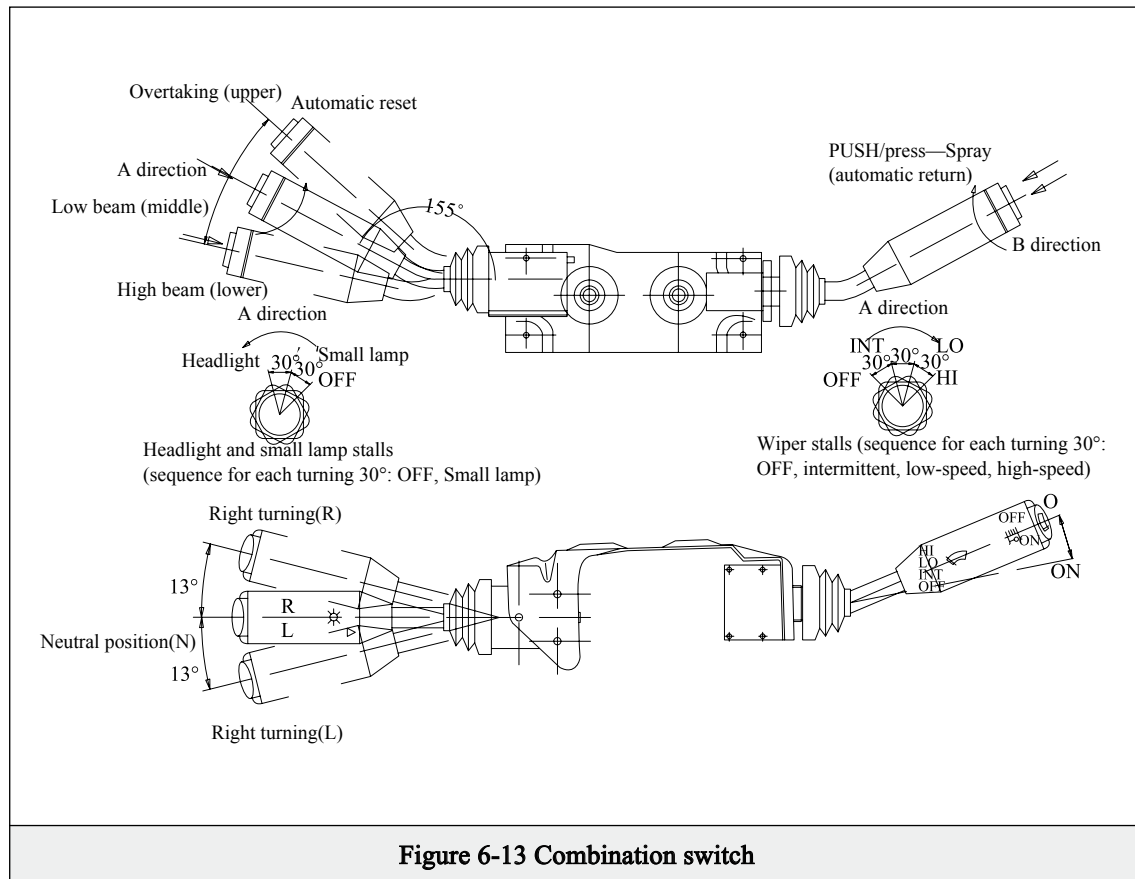


Figure 6-13 Combination switch



When using this switch down a long slope, you should pay attention to:

- 1、 The engine should not be shut down, and the clutch should not be in separation state, otherwise it will cause the exhaust brake system failure;
- 2、 Reasonably select stalls, the engine speed shall not be more than 2100 rpm.



6-3-2 Main function introduction of meters, switches and lights in the cab

1. Start switch (Figure 6-14)

When the key is inserted into the start switch, four locations can be selected, (KEY position does not work) as shown in the figure and their functions are:

OFF: all power off, then the key can be pulled out.

ACC: when the engine does not start, and devices such as CD player are used, you can rotate the key to this position.

ON: power on state, rotate the key to this position when the engine is working.

START: engine start position.

2. Fuel gauge (9 in Figure 6-4)

When the start switch key is in the ON position, the fuel gauge shows approximately the storage capacity of the fuel tank, when the vehicle is accelerating, braking or the upward and downward state, the fuel gauge pointer will change, and generally indicate a lower value than the actual oil level. When the vehicle needs refueling, the icon at the bottom right of the fuel gauge is on to prompt the driver to refuel.

3. Power take-off switch (11 in Figure 6-10) and indicator light (20 in Figure 6-7)

The rear of transmission is equipped with a power take-off, the power take-off indicator light goes on when the power take-off works, which can drive the hydraulic pump to work and

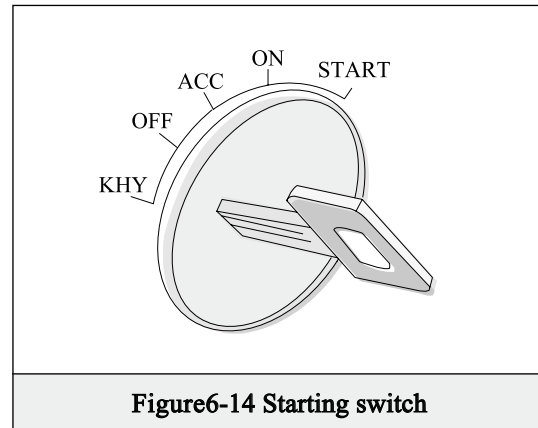


Figure6-14 Starting switch



When you start the engine using the starter switch in the cab, the gearbox must be in neutral position.



is used for the hydraulic system of the vehicle and the lifting operation.

Power take-off manipulation methods:

When the vehicle is parked in the operating position, pull the hand brake, make the engine idling, step on the clutch pedal to separate the clutch, and then manipulate the shift lever to make the transmission in gear 4 state, press the power take-off switch (11 in Figure 6-11), release the clutch pedal, then the power take-off gear and transmission gear mesh smoothly, the power take-off works. On the contrary, step on the clutch pedal to separate the clutch, the power take-off switch reset, manipulate the shift lever to make the gearbox in neutral position, release the clutch pedal, then the power take-off gear smoothly disengages with the transmission gear.

4. Barometer (5 in Figure 6-4), and the low pressure alarm indicator light (15 and 16 in Figure 6-7)

The double-needle barometer indicates the pressure of the service brake of the two-circuit system, with the normal operating pressure of 0.45~0.8MPa. If air pressure of any circuit reduces down to 0.45MPa, you should stop and check the gas system. In this case, the brake system malfunction indicator light (7 in Figure 6-7) is on.

When the hand brake circuit pressure of the gas system is below 0.45MPa, the parking brake indicator light (Figure 6-7 in sequence 6) goes



a. When using the power take-off switch, the air pressure should be greater than 0.45MPa. (Low pressure alarm LED is off.)

b. When driving, the power take off switch must be placed in the OFF position.



on, indicating that the vehicle cannot be started or the power take-off cannot be operated.

5. Engine speed hour meter (3 in Figure 6-4)

The engine speed hour meter consists of the engine tachometer and hour meter. The engine tachometer shows engine speed for the driver to adjust the engine speed, to provide a guarantee for the rational use of the engine. The hour meter records the total operation time of the engine, which will be displayed in the liquid crystal display area.

6. Engine oil pressure gauge (10 in Figure 6-4) and engine oil pressure warning indicator light

The engine oil pressure gauge indicates the oil pressure value of the engine lubrication system. The oil pressure values of the engine at idling speed and under normal working speed are different.

In idling, Weichai WP12 engine oil pressure ≥ 150 kPa;

In idling, the Hangzhou Engine MC11 engine oil pressure ≥ 100 kPa.

When engine oil pressure is too low, the oil pressure warning indicator light at bottom right of the engine oil pressure gauge goes on, indicating the engine lubrication system failure. You should stop and check for troubleshoot, to avoid aggravating the mechanical wear of the engine, the details can be found in the engine manual.

7. Engine water temperature gauge (4 in Figure 6-4)

The engine water temperature gauge indicates the temperature of the coolant. In the case of normal driving, the pointer is approximately in the half position, i.e. the normal working temperature of the engine is 80 to 95° C. When driving at high speed or climbing steep slopes in high temperature areas, the pointer moves towards the red sector. If the engine water temperature is too high, the water temperature alarm indicator light at the bottom right of the water temperature gauge will go on, you should immediately stop the vehicle in a safe place, and let the engine idle, so that the water temperature return to the normal state.

8. Indicator light assembly (Figure 6-7)

The indicator lights indicating vehicle operation conditions.

9. Speed odometer (1 in Figure 6-4)

The speed odometer consists of the speed meter and odometer, in which the speed meter indicates the traveling speed, and the odometer records the total mileage.

10. Lighting master switch (4 in Figure 6-10) (2 in Figure 6-11)

When lacking of light within the field of view, the lighting master switch should be turned on, and reset it when not using.

11. Fog lamp switch (6 in Figure 6-10) and fog lamp indicator light (3 and 23 in Figure 6-7)



This switch must be used when driving in the fog, then the fog lamp indicator light and front and rear fog lamps go on.

12. Warning light switch (optional) (7 in Figure 6-10)

When this switch is pressed, the warning lights begin flashing, and reset it when not using.

13. Air conditioning switch (8 in Figure 6-10)

Press this switch, the air conditioning begins to work, and reset when not using.

14. Emergency signal switch (5 in Figure 6-10)

When the vehicle must be parked in a dangerous place, this switch should be pressed to turn on the danger warning lights, then all turning signal lights flash. When the danger warning needs to be released, you should reset it. Even if the key is in the OFF position, the danger warning lights also play a role.

15. Differential locking switch (13 in Figure 6-10) and differential indicator (18 and 21 in Figure 6-7)

During driving, when the rear wheels fall in the pit and cannot drive, press this switch, the differential locking indicator light goes on, open the differential gas path through the solenoid valve control, so that drive axle can be as rigid coupling, so improve the passing ability of the vehicle.



When using the differential locking switch, you must note the following:

- a. Before turning on or release the differential lock, the power output of the engine must be cut off, while the vehicle should be in a stationary state;
- b. When using this switch, the vehicle must be kept straight driving, otherwise it will damage the drive axle;
- c. Once entering the good road, you must immediately lift the differential lock. Continuous use of this switch will cause damage to the drive train and increase fuel consumption.

16. Heater adjustment switch (1,2 and 10 in Figure 6-10)

It can adjust the amount of wind, wind direction and temperature according to the demand.

17. Hand brake handle (7 in Figure 6-11 in the sequencer) and hand brake indicator light (6 in Figure 6-7)

When the vehicle stops or the driver leaves the vehicle, pull back the hand brake lever to the locking position range of $55^{\circ} \sim 77^{\circ}$, and then the hand brake indicator light goes on, indicating that the vehicle has been parked. When the vehicle starts, you should release the



parking brake, first pull up the locking sleeve on the lever, and then pull the lever forward, so that the lever is in the range of $0^{\circ} \sim 10^{\circ}$, and then the hand brake light goes off.

When the vehicle is traveling in danger and emergency braking is required, if the foot brake has failure, the hand brake switch can be used to stop the vehicle.

When the vehicle must be dragged but the vehicle service brake is damaged, the hand brake can be used instead of the service brake.



a. Using the parking brake and service brake at the same time is prohibited, to prevent damage to the brake system.

b. The hand brake lever must be pulled up when the driver leaves the vehicle.

c. During the operation of the power take-off, you need to pull up the hand brake lever, observe hand brake indicator light, to confirm the vehicle is in the parking state before the power take-off operation.

18. Combination switch (Figure 6-12)

Its method of operation is described in Section 6.3.1.4, not repeat them here.

19. Flameout switch (3 in Figure 6-10)

When you need to stop the engine, you must operate this switch, and should not stop the engine directly turning off the key.

20. Rearview mirror heating switch (16 Figure 6-10)

In the summer and winter, the water, frost or thin ice on the rear-view mirror will affect the driver's view to observe the rear vehicle and the surrounding environment, easily leading to accidents. By press the rearview mirror heating switch, it will automatically remove the frost on the mirror, providing the convenience of driving.

21. ABS failure switch (optional) (12 in Figure 6-11)

When the vehicle is equipped with ABS anti-lock braking system (optional), the ABS braking system will be released by pressing this switch, to restore regular brake.

22. Outrigger working lights switch (14 in Figure 6-10)

During the lifting operation in poor light conditions, when this switch is pressed, the outrigger lights on left and right sides go on, illuminating the outrigger working area for easy operation.

23. Electric mirror switch (8 in Figure 6-11)



You can only release switch after flameout of the engine.



A small DC motor is installed in the rearview mirror, when the rearview mirror needs to adjust slightly, in accordance with the direction shown by arrow on the button, the rearview mirror can be driven by the motor to convert the angle and direction, until to the appropriate position.

24.Engine diagnostic switch (15 in Figure 6-10 in sequence) and engine diagnostic indicator light (27 in Figure 6-7)

When the engine diagnostic indicator light is on during vehicle operation, press this switch, If the "TEST" indicator light is flashing evenly, indicating the engine is working properly. If light is not uniformly flashing, indicating the engine failure. Determine the fault code and judge engine failure type according to the number of flashes indicator light "TEST" and referring to the product diesel engine manual.

25. Charge indicator light (2 in Figure 6-7)

When the start switch is in ON position, this light is on, indicating the power is turned on, you can start the engine. After the engine is working properly, the light goes off, indicating the generator starts to work. If this light does not go off, you can increase the throttle to the middle engine speed, if the light is still on, indicating the generator does not work, you should stop to check.

26. Brake indicator light (4 in Figure 6-7)

When the foot brake pedal is stepped on, the brake indicator light goes on.

27.Reversing indicator light (8 in Figure 6-7)

When the shift lever is in the reverse position, the reverse indicator light goes on.

6-3-3 Other device

1. Lock

Screw the key 90° in clockwise and rebound, the door lock is locked;

Screw the key 90° in counterclockwise and rebound, the door lock is unlocked.

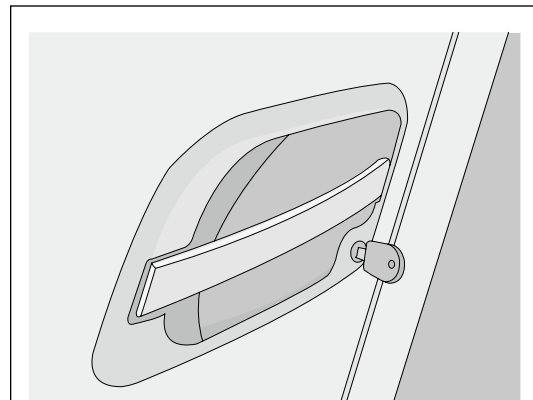


Figure 6-15 Lock



2. Quartering hammer

When encountering emergencies, one can use the quartering hammer to break down the vehicle window for life surviving.

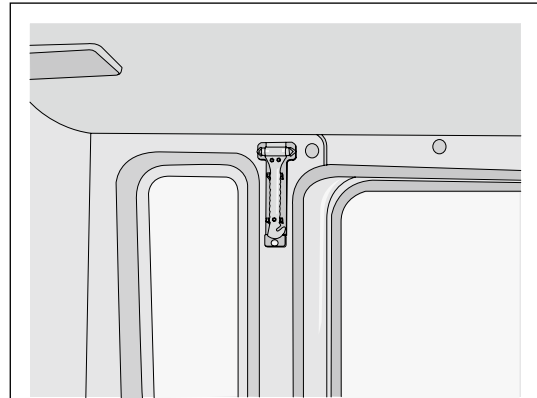


Figure 6-16 Quartering hammer

3. Fire extinguisher

Dry powder fire extinguisher, the operating temperature is $-20^{\circ}\text{C} \sim 55^{\circ}\text{C}$, the do's and don'ts in details see the fire extinguisher instruction.

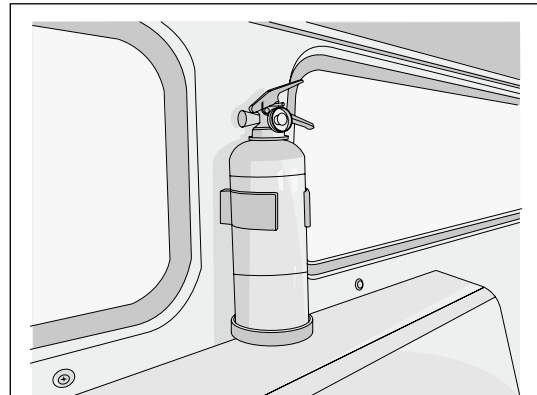


Figure 6-17 Fire extinguisher

4. Towing hook

Adopting a binaural plate bolt type front towing device, it is convenient and flexible in operation, and used for fixing the hook and towing the vehicle.

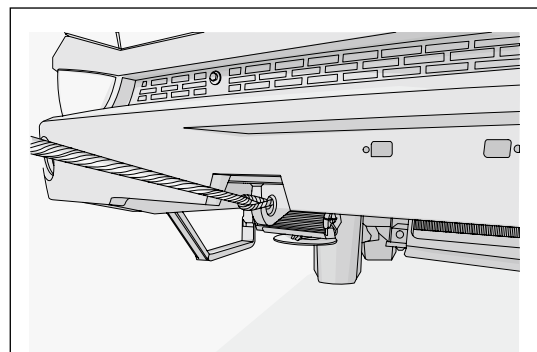


Figure 6-18 Towing hook

5. Front panel control switch

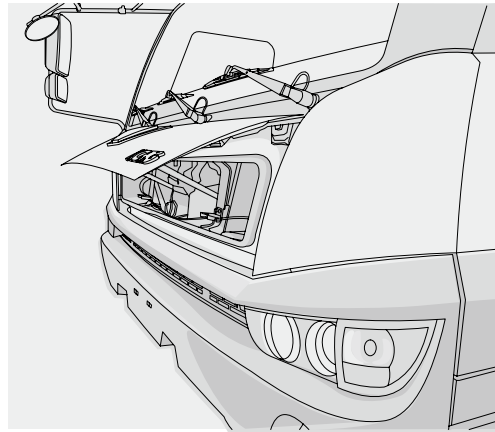


Figure 6-19 Front panel

The cab front panel control switch is located in the left side of the driver near the floor (see Figure 6-20). You can open the front panel in the cab by pulling up this switch, to facilitate the inspection and repair of the interior pipe line in the cab.

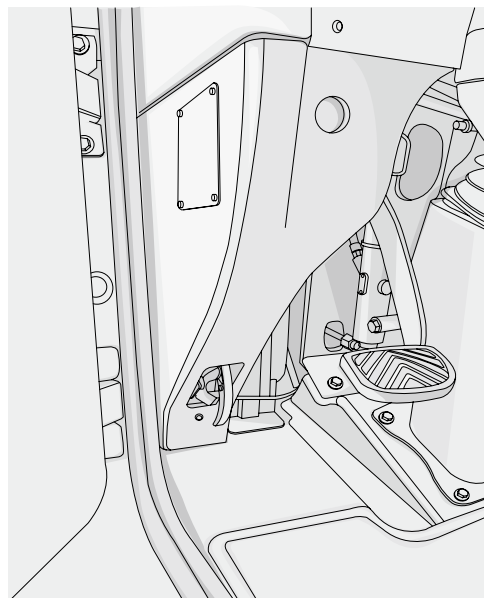


Figure 6-20 Front panel control switch

6-3-4 Protective devices

Material: Q235;

Structure: Frame-covering structures;

Joints and form: a. rear shield is connected with frame by welding;

b. side shield is connected with platen by bolts;

Dimensions see XCT80 the protective devices schematic diagram (Figure 6-21) of the lower crane portion.

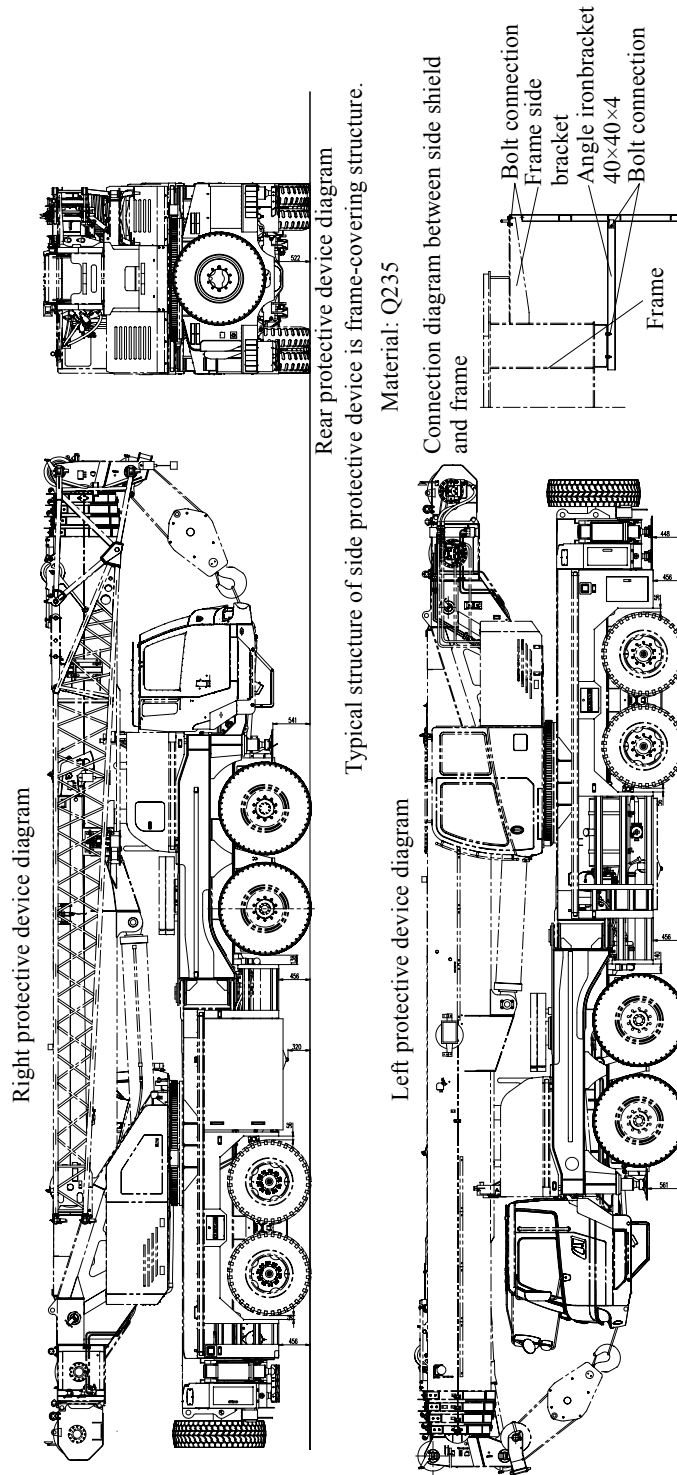


Figure 6-21 Protective devices schematic diagram of the lower crane portion



LOG



Chapter 7 Traveling Status on Highway

7-1 Preparations before traveling

7-1-1 Crane traveling mode on highway

Travelling on highway should be consistent with the relevant national road traffic regulations, the maximum weight of the vehicle on the People's Republic of China national road shall not be more than 50t.

7-1-2 Inspection of vehicle condition

1. Check the coolant level

The vehicle adopts translucent PVC material expansion tank located in the left side of the boom bracket behind the cab. There MAX and MIN two marks on the expansion tank, representing the highest water level limit and lowest water level limit. You can see coolant level through the expansion tank. You should ensure that the coolant level is located between two marks under normal circumstances. When there is insufficient coolant, you should replenish the coolant with the method as follows:

In the cold state, open the pressure cap of the expansion tank, replenish coolant to the position about 1cm below the highest limit, cover the pressure cap, and then start the engine and make it run at about 1000r/min, pay attention to observe the water level dropping



The 3.5t balance weight for travelling state should not all mounted on the end of the turntable, 1.3t of balance weight balance must be placed and fixed firmly on the frame bracket, otherwise there is a risk of damages to axle and turning over!



● In the normal operation of the vehicle, the coolant liquid level should be checked until the system cools down in order to prevent injury to people due to high-temperature liquid and vapor.。

● The coolant must not be filled when the engine is in high temperature state. Otherwise it may cause the engine to explode.



situations. If the water level drops to below the lowest limit, you should shut down the engine to continue filling the coolant until the engine works more than 20 minutes and the liquid level is stable between the highest limit and lowest limit.

2. Check fuel level

When the starter switch key (Figure 7-7) is placed in the "ACC" or "ON" position, the fuel quantity can be checked from oil gauge, and add fuel to the specified level depending on the specific circumstances.

3. Check the engine oil level

In the engine cooling state, or the engine stopping working for more than half an hour, pull out the oil dipstick to check the oil level scale on the dipstick. The liquid level should be within the required scale line. Engine oil with the specified model should be added when the level is below the scale line.

4. Check gearbox oil level

Remove the oil level observation plug to observe the oil level, which should be kept at the lower edge of the observation hole.

5. Remove the water in braking system air reservoir

Open the manual release valve at the lower part of the reservoir pump, eliminate the condensed water in the cylinder body.

6. Check the oil-water separator

Check whether there is water at the bottom of the oil-water separator, and the water should be discharged in time.



When the oil level indicator pointer is in the red zone, indicating lack of fuel, it must be refueled, do not wait until the fuel tank is empty before refueling, and otherwise you need to exhaust the air before refueling.



Check the gearbox oil level after the vehicle stops for more than half an hour.



7. Check tire

a. Check the tread depth of tires (including the spare tire) should not be less than 3.2mm;

b. Tire pressure should reach the required pressure, Pressure of tyres on the first and second shafts is (0.9 ± 0.05) MPa, and that of tyres on the third and fourth shafts is (0.84 ± 0.05) MPa;

c. Check whether the tire fixation is reliable, with bolt tightening torque of (600 to 660) Nm;

d. You should be sure that there will be no spatter damages to the human body in charging, to ensure that there is no person in the danger zone.

8. Check the electronic system

Check whether the combination meter indicator light is normal, and the buzzer can alarm.

9. Check the oil, gas and coolant piping

Confirm there is no piping leakage, if any it should be repaired in time and added the corresponding oil.

10. Check the air filter

In dusty environmental conditions, the dust cup should be emptied daily and cleaned. When it is used under normal conditions, the filter should be cleaned when the red in the air filter negative pressure indicator (behind the machine shed on the right side) appears.

11. Check the water tank of windshield cleaning system

The water tank for windshield washer system is located in the right front maintenance window. Open the maintenance window to observe the remaining amount of the cleaning agent in the

tank, and to ensure the cleaning agent is sufficient.

12. Check the air compression system

Fill compressed air source in the neutral position until the pressure reaches to 0.8MPa.

The warning light of brake pressure supply circuit I and II is not on until the pressure reaches 0.5MPa (brake pressure supply circuit I and II status display).

When the pressure of pressure loop III is insufficient to contact handbrake parking brake, the vehicle can not be driven. Release pressure is 0.5MPa. The parking brake indicator light will not go out the wheel gates had been lifted.

13. Check differential lock

Check the axis differential indicator light and wheel differential indicator light on chassis status display is off, the normal state is off, which is on only when the differential lock is turned on.

7-1-3 The use of air conditioning

The cool-warm air conditioning is adopted, the engine circulating hot water is used for warm air, and cool air is provided by the air conditioning system refrigerant cycle.

When warm air is used in winter, the hot water valve on warm air piping must be opened (see Figure 7-1), and then set the temperature of warm air and wind direction by various keys (see Figure 7-2)

When cool air is used in summer, the hot water valve on warm air piping must be closed, and then set the temperature of warm air and wind direction by various keys in Figure 7-2.

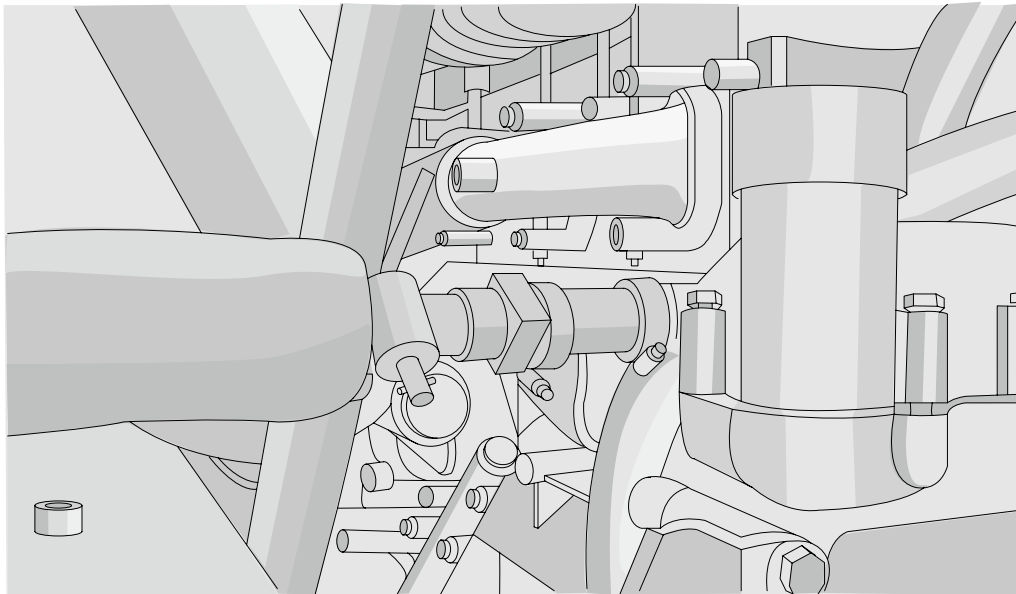


Figure7-1

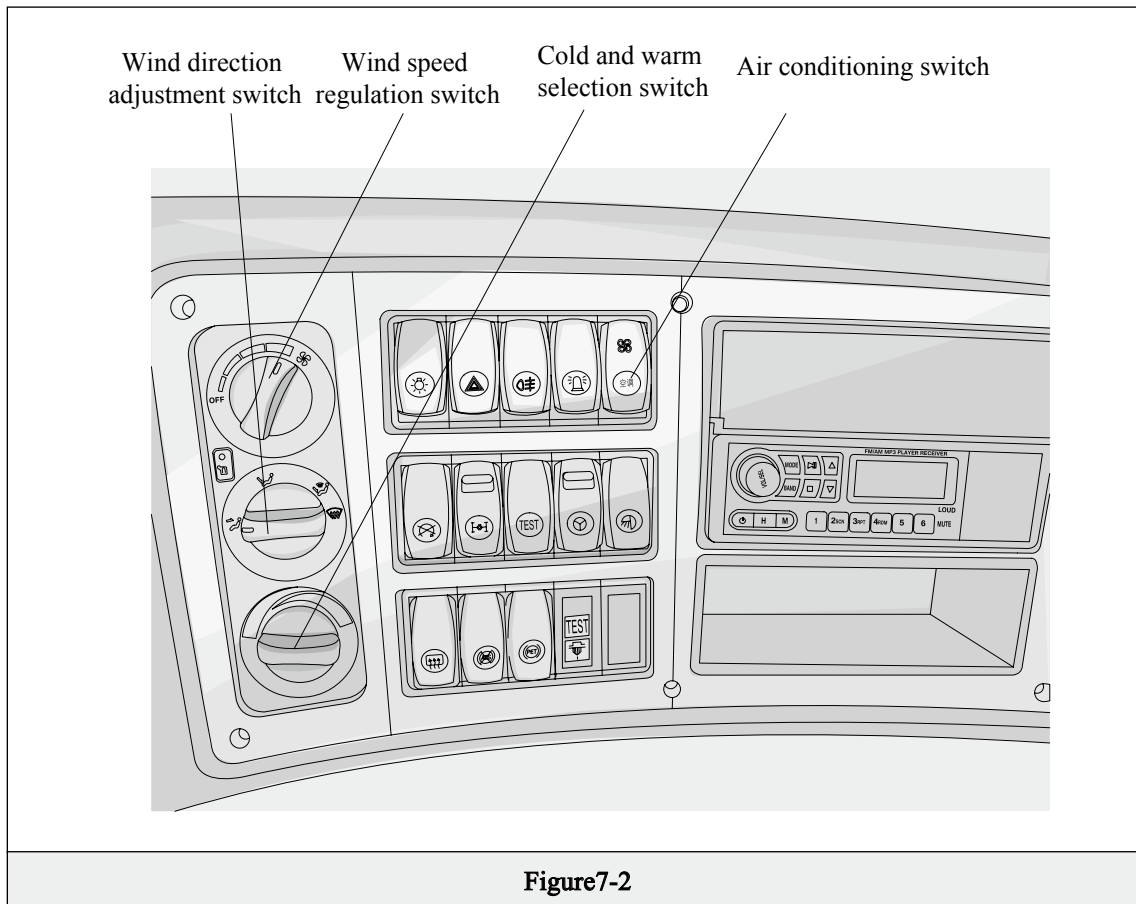


Figure7-2

CAUTION

- Ensure to close the hot water valve in the refrigeration, and open it in heating.
- When the water in the engine cooling system needs to be discharged in winter, the water in warm air piping must also be released.

7-2 Operation of lower crane portion engine

7-2-1 Check before starting the engine

1. Check hydraulic system stop valve

The stop valve is located in the right side of the hydraulic tank, and must be opened before engine start. When the lever is parallel to the pipeline, it indicates the valve is open.

2. Turn on the main power switch

The power supply main switch is located on the vehicle shed in the right side and hood middle position, turning to the right to turn on the power supply main switch, and to the left to turn off the power supply main switch.

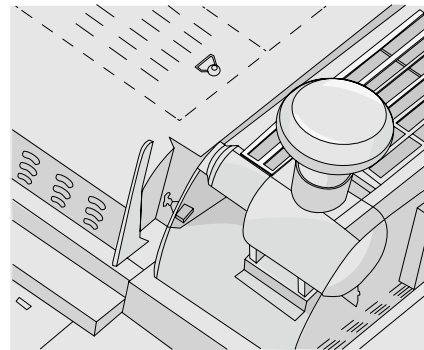


Figure 7-3 the main power switch

3. Check coolant

Coolant tank is located in the rear left of the lower crane portion cab., in Figure 7-4.



● There is danger of getting burned in the engine overheating.

● The coolant is sealed. Pay attention to the steam from the port which may cause burns if the cooler is opened when the engine is very hot. .

Please wear suitable protective gloves before opening the lid. Screw slowly the lid to the first notch to let steam release.



Unscrew (Do not open it!) the lid of hole 1 at the operating temperature lower limit to release pressure. Open the lid. The coolant level should at least reach the minimum position. If the oil level is too low, add coolant in accordance with the “Engine Manual” . Finally, tighten the lid of the coolant.

4. Check engine oil

Check lower crane portion engine oil level every day before starting work, and the vehicle should be placed horizontally in check.

a. Start the engine, observe the lower crane portion engine oil pressure warning lights, if the alarm lights do not go out after 10 seconds, turn off the engine and find out the reasons.

b. The engine idles for about 2-3 minutes.

c. Turn off the engine.

d. Check the oil level after 2 minutes.

Engine oil dipstick is located in the left side of the vehicle in front of the main boom. The oil level should be between the min and max position. If necessary, add oil, and for engine oil specifications you can refer to the “Engine Manual” .

Lower crane portion engine oil refueling nozzle is located next to the dipstick in the left rear of the cab. (see Figure 7-5)

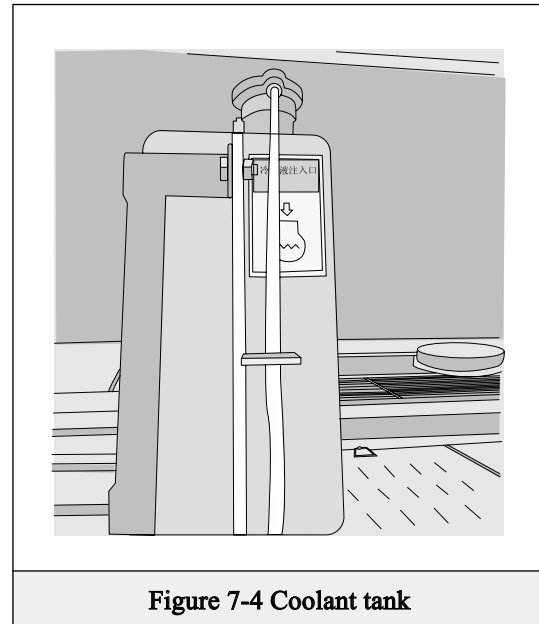
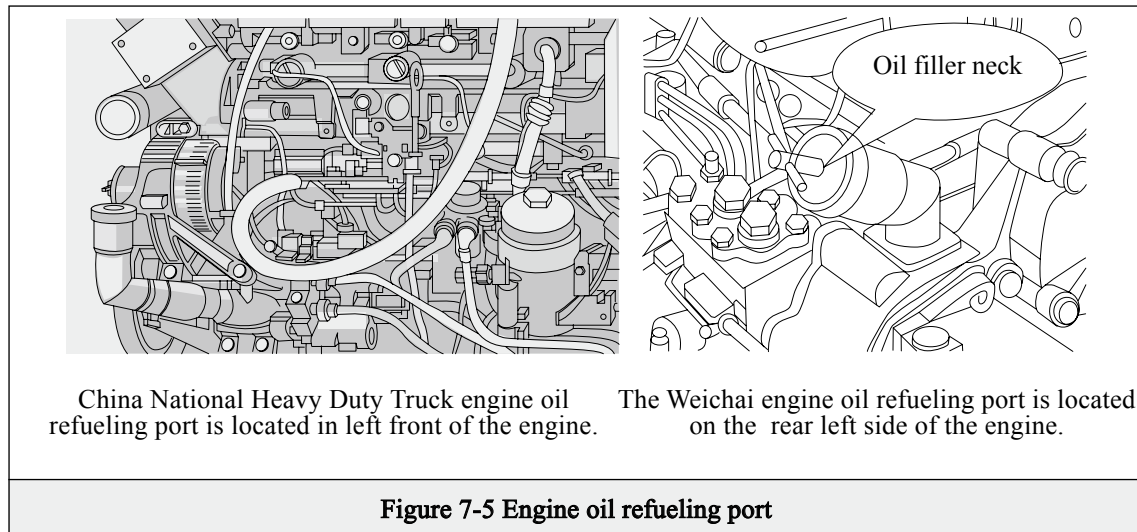


Figure 7-4 Coolant tank



Do not fill excessively, and the oil level shall not exceed the highest mark position of the dipstick. Too much oil can damage the engine.

5. Add fuel

Observe the fuel gauge, and add fuel if necessary. The fuel tank is located on the right side of the operating room. Fuel can be added at the fueling mouth. The fuel tank capacity is 350L. The fuel models added are specified in the “Engine Manual” .



- The engine must be turned off prior to adding fuel. Otherwise there is a danger of fire.
- Tighten and lock the fuel tank cap after each refueling, to prevent fuel tank cap falling off and fuel volatilization.



7-2-2 Start lower crane portion engine

1. Start ignition switch

Check the gearbox in neutral, turn on the ignition switch, insert the key and turn to the "START".

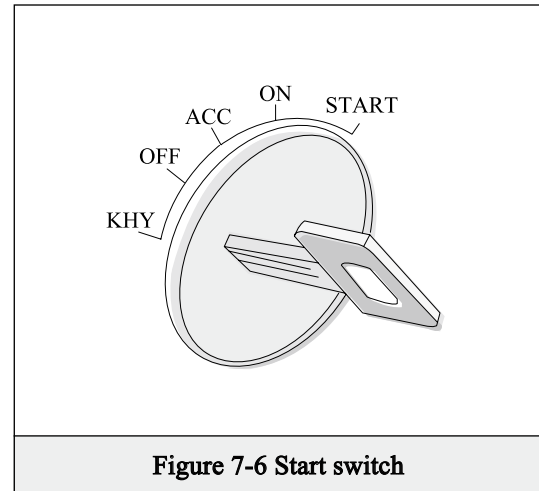


Figure 7-6 Start switch



When starting the engine or ignition switch, the indicator light is used as the alarm light in system detection. Timely replace the faulty lights.

In the following situations the indicator lights and warning lights should be on:

- a. Engine oil pressure alarm light;
- b. Charging indicator light;
- c. Handbrake light;
- d. If the brake circuit pressure is less than 0.5MPa, the pressure warning lights of the brake circuits I and II are on;

e. Engine power indicator light.

2. Start lower crane portion engine

The specific use of the engine is shown in the "Engine Manual" .



Check the position of the handbrake. It indicates the handbrake is locked when the shift joystick is backward.

7-2-3 Inspection after the engine startup

1. Check the instrument

The following indicator lights and warning lights should be extinguished when the engine is running:

- a. Engine oil pressure indicator light;
- b. Charging indicator light;
- c. Engine power system;

When traveling, observe the following indicator lights:

Engine coolant;

If the above indicator lights are on, it indicates there is vehicle failure.

7-2-4 Flameout of engine

The engine shuts down when pressing the engine flameout switch.



● This engine is equipped with flame preheating cold start device, start by start fluid is prohibited.

● Do not step down the throttle pedal;

● Turn the switch to 3 within 30 seconds after the ignition start system indicator light goes off;

● Release the ignition switch after engine starts operation;

● If the engine does not start, the start-up procedure is stopped in about 15 seconds, and which should be tried again in 1 minute.

● If the engine still does not start after several attempts, it indicates there is system failure, which needs repair.



In order to ensure safe and reliable vehicle running, you must shut down the engine with the ignition switch.



7-3 General operation

7-3-1 Starting and gear shift

1. Starting

Release the handbrake handle. The spring brake can only be completely released when air reservoir pressure in the brake system reaches 0.45MPa and after the handbrake indicator light and low pressure warning light goes out. The vehicle is prohibited to start after the hand brake indicator light goes out. The gas booster system can only be operated after the hand brake indicator light goes out.

2. Transmission control method

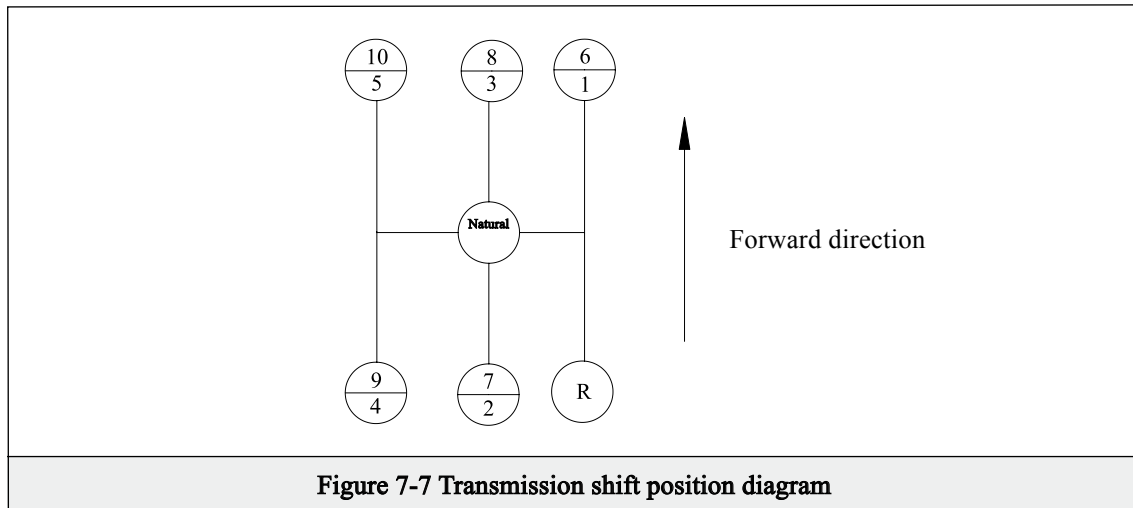
Before driving, first step on the clutch pedal to completely separate it, and then shift the shifting lever to the required gear, release the clutch pedal to start the vehicle.

Upshift:

- a. Place the shift lever in neutral position to start the engine.
- b. Shift to gear 1 to start the vehicle.
- c. In shifting, the shift lever is shifted from gear 1 to gear 2, 3, and 4 sequentially and finally to the maximum gear.

Downshift: when shift downward the gear, and the shift lever can be continuously operated from the maximum gear to gear 1.

Figure 7-7 shows the transmission shift position



- In gear shift, the clutch must be completely separated and the shift lever should be shifted in place, otherwise it will cause the gear off or tooth impact.
- When moving forward the vehicle, gear 1-3 can be used based on the current intersection.
- Observe at any time the engine oil pressure gauge, engine tachometer, engine water temperature gauge working conditions in the process of traveling.
- To ensure traffic safety, glide in the neutral gear and engine off is not allowed.
- When using engine exhaust to brake, stepping on the clutch and shift to neutral is also not allowed, or there will be exhaust brake failure.
- Select different gear based on a variety of road conditions, to meet the needs of traveling.
- Accelerator pedal is not allowed to step on when shifting gear.
- When you are driving the crane to shift from gear 5 to gear 6 (or gear 6 to gear 5), you should wait 1-2 seconds, in order to facilitate the conversion of the high and low gear intervals of the auxiliary transmission.

3. Parking and halt

No matter which gear the shift lever is in, you can use the foot brake or hand brake to stop the vehicle. After the car is stopped, regardless of the temporary parking or long-term parking, the shift lever shall be in the neutral position. When the vehicle is needed to halt, you must use the hand brake.



7-3-2 Trail operation

a. When the vehicle needs to be moved but its driveline has failure, the towed vehicle speed can not exceed 10 km/h, and the emergency signal switch should be turned on. The steering indicator lights should also be on.

b. When the vehicle is dragged because of damages to the engine and transmission, the drive shaft in front of axle 3 must be disengaged.

c. When the vehicle is tailored due to steering failure and damaged front axle, the front part of the vehicle must be lifted.

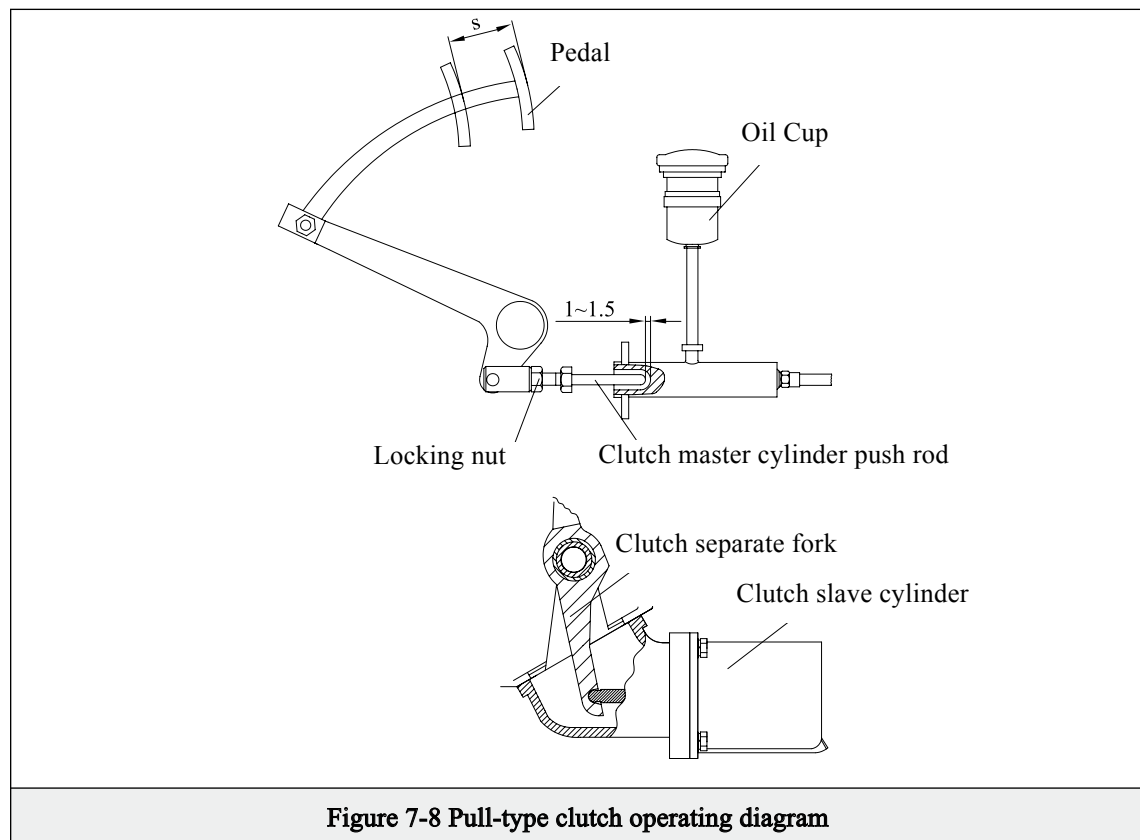
d. When the service brake is damaged, the hand brake can be used to drag the vehicle.

7-3-3 Clutch operating

The pull-type diaphragm spring clutch is adopted for the truck crane chassis.

The clutch manipulation (see Figure 7-8) is realized by static pressure oil and gas booster. Depress the clutch pedal to completely separate the clutch friction plates with the engine flywheel, playing a role in cutting power.

In the case of clutch slave cylinder push rod does not move, the free stroke S of the clutch pedal should be in the range of 40~60mm. If it does not meet the requirements, the gap of the master cylinder push rod should be checked for requirements conformity. Check whether there is air in the static pressure oil pipes.



In the case of the clutch pedal to the end, the clutch should be able to completely separate, if the clutch can not be completely separated, the clutch operating system should be checked.

The clutch operating system is realized by static pressure oil, so you should first add static pressure oil to the system and eliminate the air in the system. The adjustment method of the clutch operating system is as follows:

a. Open the oil cup lid in the cab, and then add the brake oil to the oil cup, so that the oil level height reaches 3/4 to 4/5 of the height of oil cup.

b. Open the rubber cover of deflation cap on the clutch slave cylinder according to the following steps:

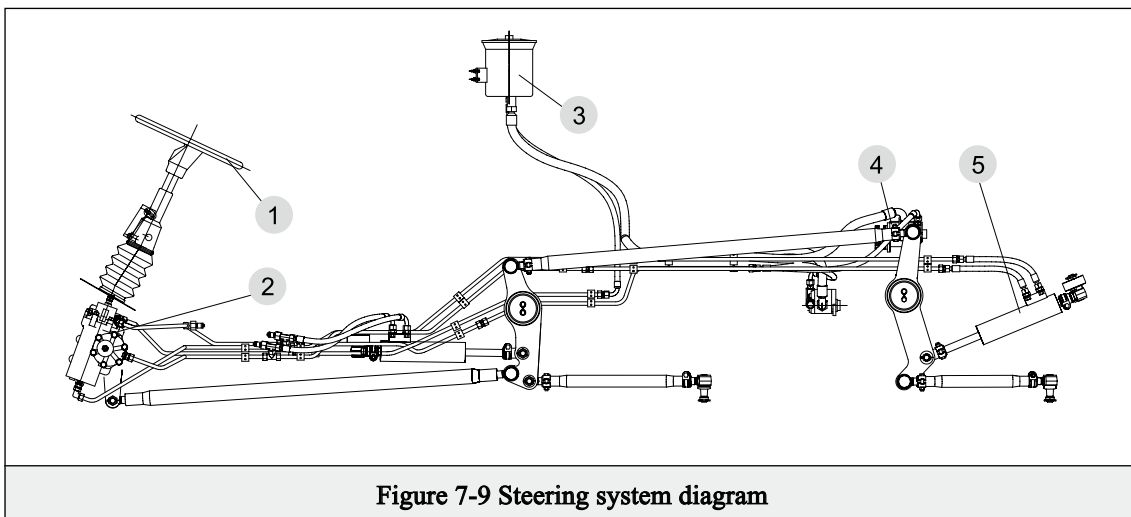
1) Continuously step on clutch pedal to the maximum stroke, until you feel heavy pedal force, and then keep the clutch pedal static in the maximum stroke position.

2) Slightly unscrew the deflation cap on the clutch slave cylinder, the air bubbles spurt out from the system, and then immediately screw tightly the deflation cap and release the clutch pedal.

Repeat the above steps until no air bubbles come from the brake fluid. Pay attention to the height of oil level in the oil cup, and all oil as required in a timely manner.

7-3-4 Steering system

Steering form (see Figure 7-9) is mechanical and hydraulic power assisted steering. The driver controls the vehicle through the steering wheel.



No.	Name	No.	Name	No.	Name
1	Steering wheel	2	Steering box	3	Steering tank
4	Steering pump	5	Steering cylinder		



Steering process::

a. Intermediate position: when the vehicle travels in straight, the steering wheel will not rotate is if no steering force is applied to the steering wheel.。

b. Steering process: When the vehicle needs steering, the driver turns the steering wheel to achieve steering, the vehicle will turn left by turning the steering wheel to the left, and the vehicle turns right by turning the steering wheel to the right.

c. Return process: after steering, if you no longer rotate the steering wheel, the wheel will turn to straight traveling position under the rotary moment, until the vehicle travels in straight.

d. Return process: after steering, if you no longer rotate the steering wheel, the wheel will turn to straight traveling position under the rotary moment, until the vehicle travels in straight.



● Power steering gear works relying on engine-driven steering pump. The vehicle shall not glide after the engine is shut down. Otherwise the steering will be heavy, which may result in an accident.

● When the steering system has as a failure due to the oil pump or oil line, the steering gear can be used as a mechanical steering gear, to force steering to the repair place. Forced steering for a long time can damage the steering gear.

When steering, you should try to avoid turn the steering wheel to the limit position.



7-3-5 Braking system

The brake system consists of the service brake (foot brake), the parking brake (hand brake) and auxiliary brake (engine exhaust brake and engine retarder brake).

1. Service brake

The service brake, dual-circuit pneumatic brake, is operated by pedal, with the maximum working pressure of 0.8MPa. The first circuit acts on the wheels of axle 1, and the second circuit acts on the wheels of axle 2 and 3. Once the air reservoir pressure of one of the two circuits drops below 0.45MPa, the vehicle should be immediately stopped in a safe place and find out the reasons for the pressure reduction. Several brakes performed continuously in a short time may also cause the pressure to drop below 0.45MPa.

2. Parking brake

Parking brake, acting on axle 3 and 4 through the spring two storage gas chamber on the axles, is the deflation spring brake. After stopping, the driver pulls the hand brake to stop state to keep the vehicle stop in place. Only when the hand brake switch is in the releasing state, the pressure of brake system circuit 23 is greater than 0.45MPa (low pressure alarm lamp is off). When the hand brake indicator light goes out, the compressed gas pushes the spring back into the original position, the brake can be released. The hand brake can also be used as emergency braking, when the vehicle is traveling in danger and emergency braking is required, if foot brake fails at this time, the hand brake switch can stop the vehicle. When the vehicle must be dragged but the vehicle service



When using engine exhaust brake, you should pay attention to:

1. The engine should not be shut down, the clutch should not be in separated state, and the transmission must not be in neutral;

2. Reasonably select the transmission range and the engine speed should not exceed 2100rpm.



brake is damaged, the hand brake can be used in place of the service brake to drag the vehicle.

3. Auxiliary brake

Auxiliary brake is the engine exhaust brake. When the vehicle travels down a long slope in the mountains, in order to prolong the service life of the brake, the exhaust brake switch can be operated to realize the engine exhaust brake by closing the butterfly valve on the exhaust pipe through an electromagnetic valve control cylinder.

4. Precautions for braking system operation

When self-braking is caused by the pipe connecting the spring brake chamber due to leakage, the release process of the brake is as follows (see Figure 7-10a): a. Open blanking cap at the end of the brake chamber; b. Unscrew the nut on the screw, and remove the screw; c. (see Figure 7-10b) Put the screw in from the end of the brake chamber and lock it; d. Tighten the nut so that the screw rotates out, then the brake can be released. When parking on a sloping road, the wheels must be plugged with wedge to prevent slide of the vehicle before lifting the spring brake.

7-4 Driving cranes in winter

7-4-1 Cooling system

In order to ensure the normal use of the vehicle in the winter, we recommend the use of long-lasting antifreeze, and the antifreeze model should be selected based on the local ambient temperature. See antifreeze in section 11.6.

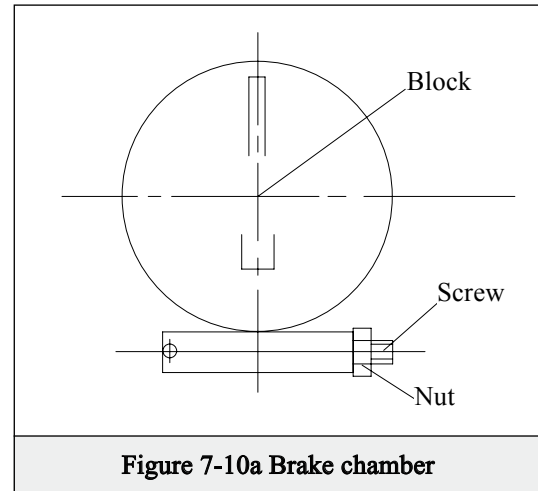


Figure 7-10a Brake chamber

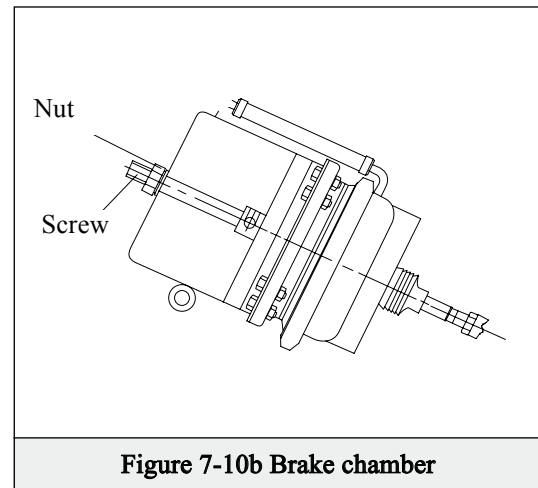


Figure 7-10b Brake chamber



● Seawater is strictly prohibited to directly fill in the cooling system.

● Replacement of the antifreeze should be carried out in accordance with use requirements of the engine. The freezing point of antifreeze should be 5°C lower than the minimum low temperature.

7-4-2 Braking device

Before driving, the condensed water in the air reservoir must be released.

7-4-3 Battery

This model adopts a maintenance-free battery. The middle of the battery is equipped with a status indicator light, as shown below:

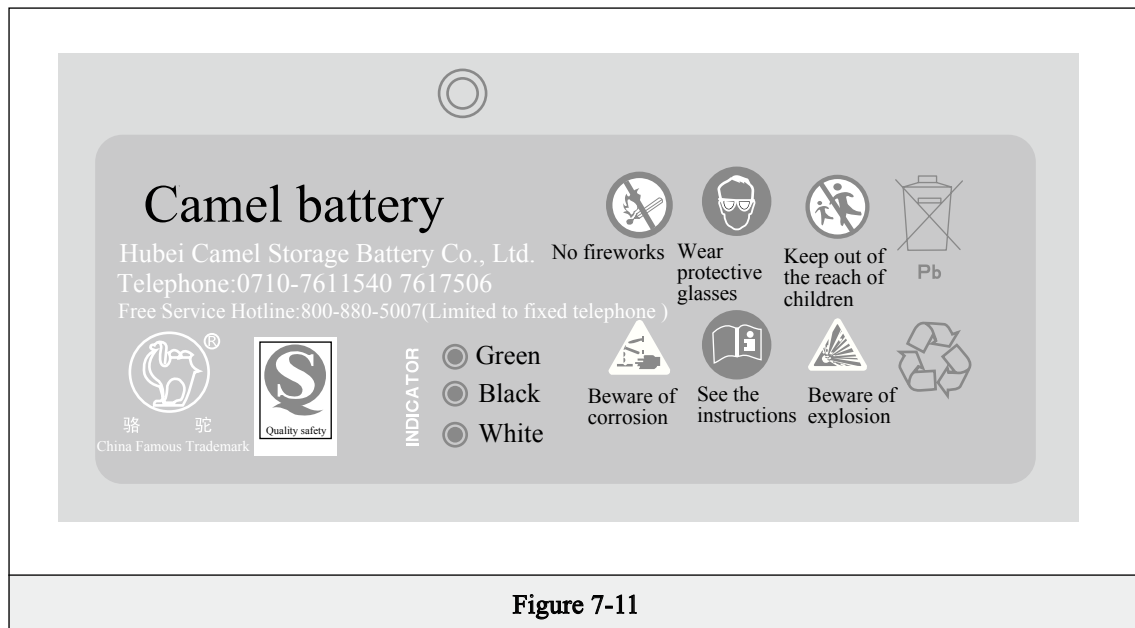


Figure 7-11

Indicator light has three colors, which represent the following meanings:

Green: normal

Black: need recharge

White: replace battery

If the vehicle is not used for a long time and the temperature is low, you had better remove the battery and place it in a warm indoor.



1. When checking the battery, you should pay attention to following matters:

- a. The battery should be kept clean and dry. If the terminal is polluted, it should be released and cleaned, and then lubricated with clean, acid-free and acid-resistant grease;
- b. Tools should not be placed on the battery;
- c. The battery cables are prohibited to be removed during the engine running;
- d. When disassembling the battery cables, you should pay attention to firstly dismantle the battery negative cable, and then dismantle the battery positive cable.



When removing the battery cables, you should avoid battery positive cable connects to the ground!

2. Battery charging

The battery after storage for three months or with a single battery terminal voltage lower than 12.3V must be charged. In the cold season, you should in particular pay attention to the charging of the battery.

The battery can only be charged with DC, and the strength should not exceed 1/10 of the battery capacity. For example, when charging a battery of 165Ah, the charging current should not be greater than 16.5A.

The battery charging state is shown on the use guide of the battery.



A series of horizontal dashed lines for recording information, spanning the width of the page.

LOG



Chapter 8 The components and functions of upper crane portion

8-1 General overview

XCT80 truck crane mainly consists of five major components including a lifting device, a safety device, an upper crane portion control room, and slewing bearing system, hydraulic system and electric system.

8-1-1 Lifting device

The lifting device is composed of a Main boom, a Main boom telescopic mechanism, an auxiliary arm, a luffing mechanism, a main lifting mechanism, an auxiliary lifting mechanism, a main hook, an auxiliary hook, a balance weight and other components.

8-1-2 Safety device

The safety device includes an over winding protection mechanism, a three-coil over releasing protection mechanism, a force limiter, a turntable lock, a balance valve, a hydraulic lock, a level instrument and other parts.

8-1-3 Upper crane portion control room and rotary bearing system

The Upper crane portion control room and rotary bearing system are composed of an upper crane portion control room, a slewing bearing, turntable, a rotary motor, a reducer and other components.

8-1-4 Upper crane hydraulic system

The upper crane portion hydraulic system is composed of an upper crane portion multi-way valve and slewing, stretching, luffing, lifting and other oil circuits.

8-1-5 Upper crane portion electric system

The electrical system of the upper crane portion is mainly composed by the engine, the lighting electrical systems, and a variety of intelligent control devices.

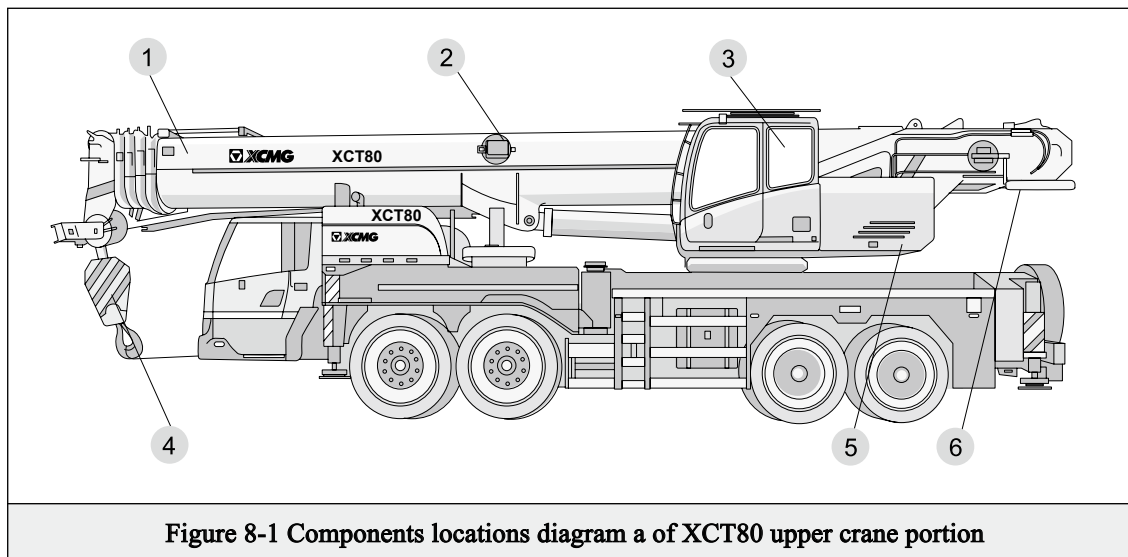


Figure 8-1 Components locations diagram a of XCT80 upper crane portion

No.	Name	No.	Name	No.	Name
1	Main boom	2	Safety device	3	Control cab
4	Lifting hook	5	Shield	6	Fixed balance weight

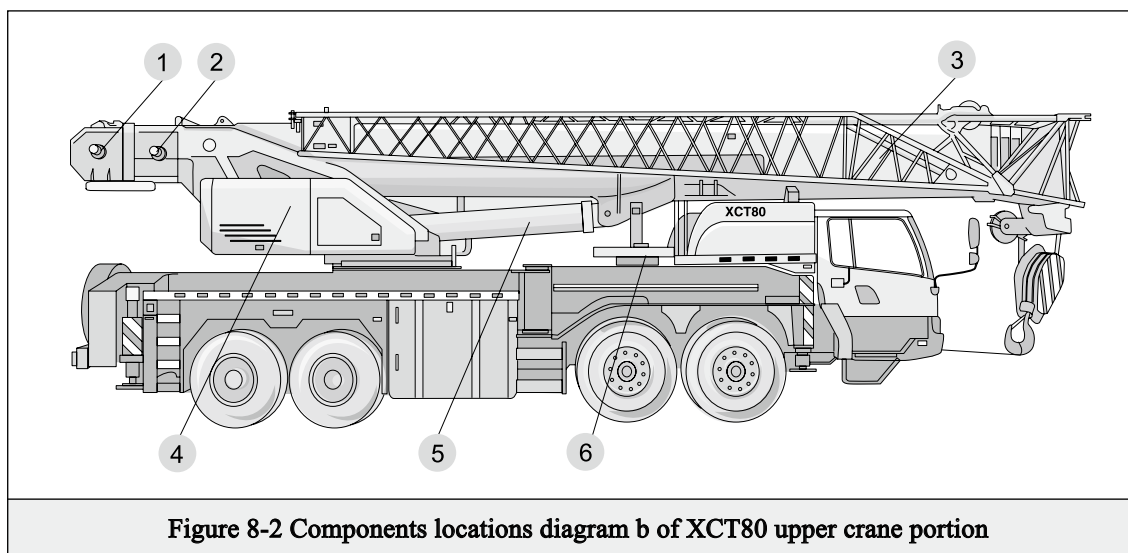


Figure 8-2 Components locations diagram b of XCT80 upper crane portion

No.	Name	No.	Name	No.	Name
1	Auxiliary hoisting	2	Main hoisting	3	Auxiliary arm
4	Turntable	5	Derricking cylinder	6	Activity balance weight



8-2 Main component introduction

1. Main boom

Five-section main suspension boom with U-shaped cross section is designed with special slider and centering device and has high strength steel plate which makes the suspension boom weight light, rigidity good, stretch stably, centering reliably, and be of the powerful lifting capacity; The Main boom length is the value between 12.4m and 47.5m. The maximum lifting force moment is 3060kN.m.

2. Main boom stretching mechanism

Adopt the double cylinder adding rope row stretching mode .

3. Auxiliary arm

The auxiliary arm is of two sections, the first section of Auxiliary arm adopts a quilting frame, The second section of auxiliary arm uses a box structure, with the first section arm length of 10.5m, and the second combination arm length of 17.5m, with three variable established angles of 0° , 15° and 30° ;

4. Main and auxiliary lifting mechanism:

The drum built-in planetary gear reducer is adopted for both the main and auxiliary hoisting mechanisms, which can achieve single pump or double pumps oil supply. The main drum adopts the variable motor to realize various speeds such as heavy low-speed and light-load high-speed, with high efficiency;

5. Hook

The hook totally has three kinds, and one should use different hooks accordance to the requirements of lifting performance table and different use conditions in order to exert effective lifting capacity much better.

Name	Lifting weight(t)	Maximum magnification	Weight(kg)	Remark
Main lifting hook	80	12	1000	Double hook
Mid-length boom hook	40	6	560	Single hook
Auxiliary hook	7	1	250	Single hook

6. Balance weight:

Vehicle combination balance weight is adopted, with 2.2t of fixed balance weight for the turntable in travelling state, balance weight of 1.3t for balance weight bracket, and 3.5t, 4.5t of combination balance weight should be transported with the vehicle. 11.5t of balance weight is the fully equipped state. The movable balance weight is hitched by hydraulic cylinder and operated by the remote control



box to provide faster and more convenient balance weight hitching.

7. Upper crane portion operating room

The new steel control room has good sealing and corrosion protection, providing safety and comfort. The fully enclosed front view window is equipped without vision dead corner and adopts safety glass and a scroll sunshade. The push-pull slide door is added the sliding pedal below the door, with more humanized layout, providing safe and convenient personnel access. The operator seat backrest can be positioned, with a lever mounted on the armrest on both sides of the seat. The standard control member and indicator are distributed according to the ergonomics.

8. Swing mechanism:

It is provided with the realizable free trackslip swing mechanism. The swing mechanism adopts a planetary gear speed reducer and a normally closed brake, drives the straight tooth type slewing bearing through a motor and the hydraulic system is collocated with a buffer valve, which can achieve a free rotary and stationary fretting;

9. Safety device:

This machine is equipped with torque limiter system, a height limiter device, a outrigger latch device and an electronic level meter, allocated with a lighting device for the nighttime operation; it is provided with an international first-class technology self-fault diagnosis function automatic moment limiter, a wire rope over-release and over-volume, a height limiter, a outrigger latch device , an optional anemometer and a level, as well as various working conditions of operation indication and alarm device so that the operation is safe and reliable.

10. Hydraulic system:

The machine adopts an open type hydraulic transmission, the main pump is variable pump supplemented by fixed displacement pump, to meet different needs. The upper crane portion hydraulic system adopts the pilot hydraulic proportional control mode, the main hoisting motor system uses the variable pump and variable motor system, with constant power control, also can realize heavy-load low speed and light-load high speed. The system is controlled by hydraulic proportional load feedback multi-channel reversing valve, and the main operating valve is the load sensing multi-channel proportional reversing valve. When the pressure difference changes between the pump outlet and load, the oil distribution disk inclination of the variable pump is changed by changing the load feedback port, and change the pump discharge amount. Constant power variable pump control is adopted, the pressure and flow of the pump is automatically adjusted to the optimum size by the load of the pump, so that greatly enhance the control performance and energy efficiency.



8-3 Operating cab

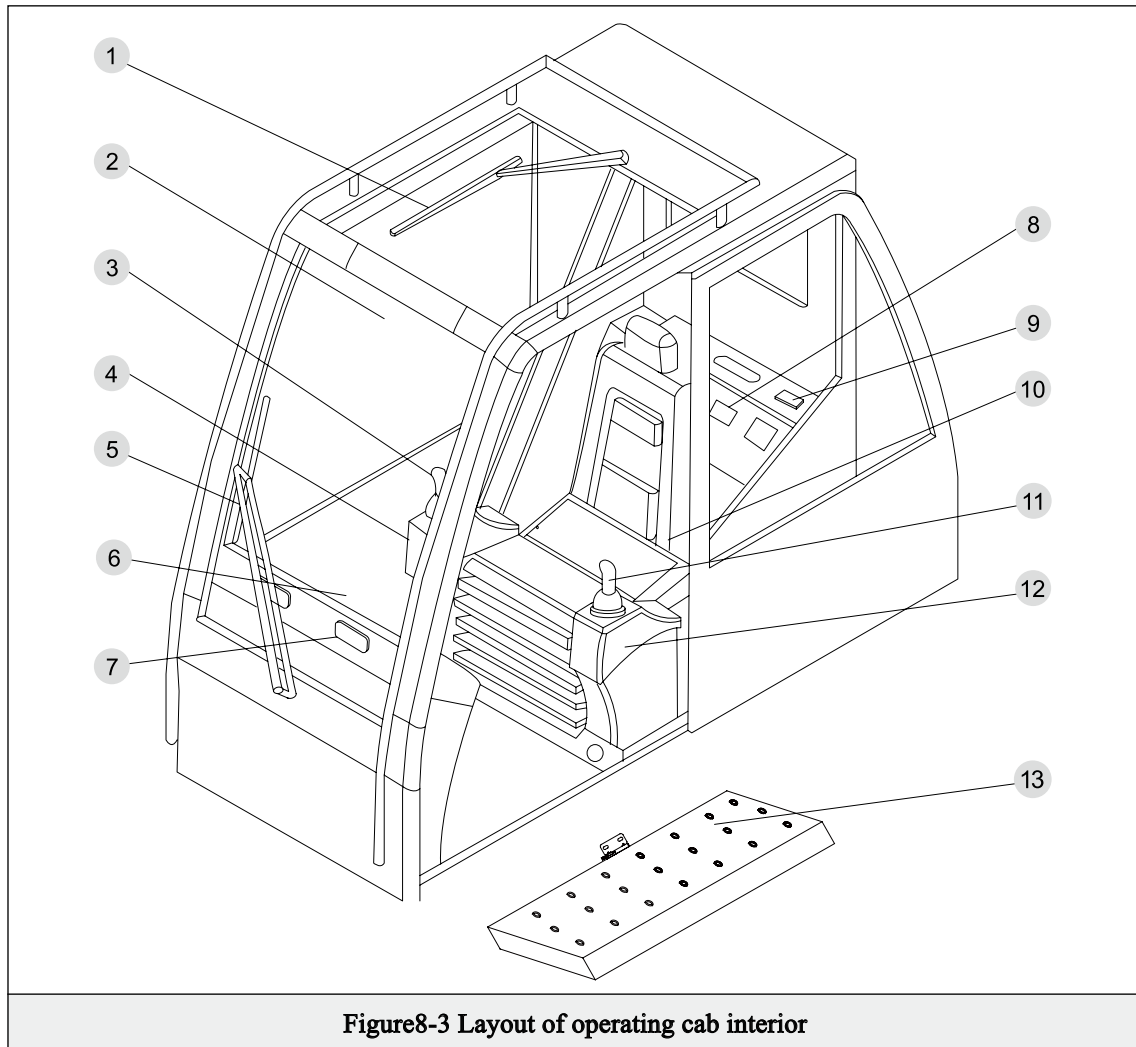


Figure8-3 Layout of operating cab interior

No.	Name	No.	Name	No.	Name
1	Top window wiper	2	Lifting performance table	3	Right operating handle
4	Right electric control box	5	Front window wiper	6	Instruments desk panel
7	Front air outlet	8	Air conditioning and heating dashboard	9	Rear air outlet
10	Chair let	11	Left operating handle	12	Left electric control box
13	Push-pull pedal				



Forbidden to standing on the operating room top.

8-3-1 Electric device

The electric device in operating room comprises a dashboard (a rocker switch, an indicator lamp and display), a combination switch, a start key switch, an air conditioning control switch, control mechanism (an accelerator pedal, a left handle, a right handle, etc.), and so on(Figure 8-4).

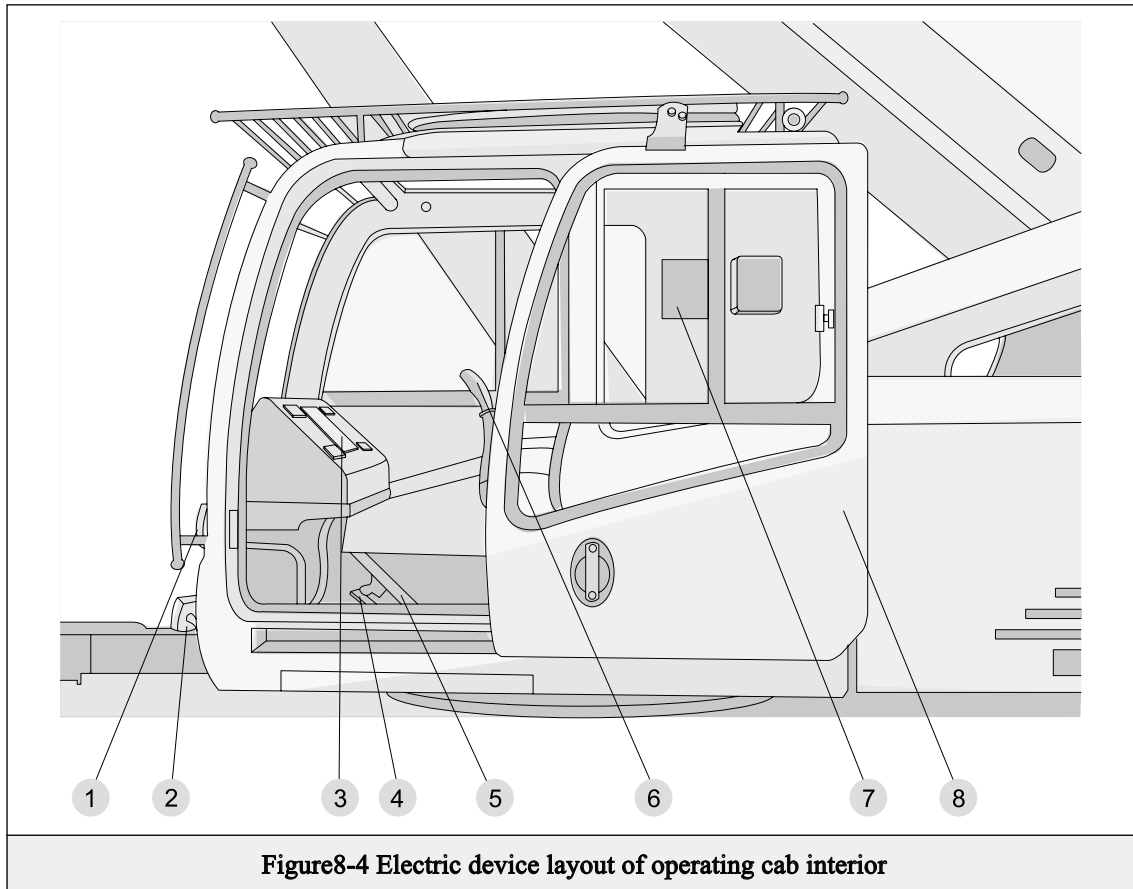


Figure8-4 Electric device layout of operating cab interior

1. Torque limit tricolor alarm lamps(optional): Green: normal working state

Yellow: pre-alarm working state

Red: alarm and unloading working state

2. Working lamp

3. Instrument panel assembly: Centralized display operation and safety condition

4. Telescopic and auxiliary hoisting footswitch

5. Electric accelerator pedal

6. Hydraulic control handle: To control the crane main and auxiliary hoisting lifting, luffing, retraction, rotary, and electric horn.

7. Torque limiter host

8. Control box assembly (below the machine shed outside of the control room): logic control unit



8-3-2 Instrument panel

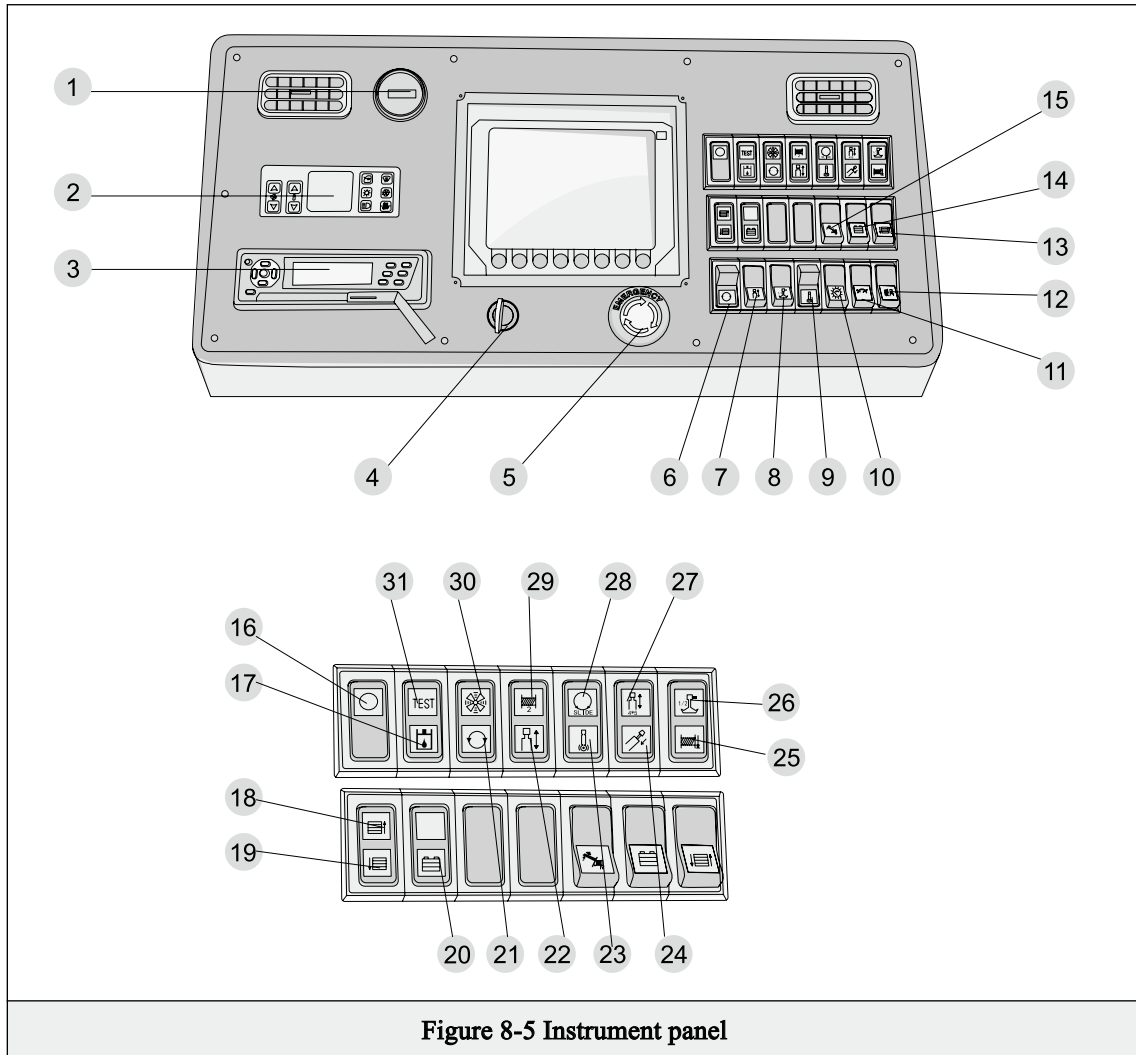


Figure 8-5 Instrument panel

1. Hour meter
2. Air conditioning control panel
3. Radio
4. Start lock
5. Emergency stop switch button



Press the button switch, to shut down the engine. The switch must be reset in time.



6. Switch – for pilot pressure control



You should prevent dangerous movements of the crane caused by operator mistakenly touching handles when getting in and out of the control room. The switch must be turned off before proceeding with the formal operation, in order to establish a normal working pressure of the hydraulic system. Otherwise, the crane does not work properly. The switch must be turned off after the operation is completed.

7. Switch – two-level cylinder selection

8. Switch - semi-stretched outrigger work selection



When the crane is in the semi-stretched outrigger working state, the torque limiter system will limit according to the condition performance table when pressing the switch.

9. Switch - rotary braking release



It is used to control the brake of the rotation reducer. After the switch is closed, the rotary brake is opened, and then rotation operation can be carried out.

10. Switch - dashboard lighting

11. Switch - engine flameout

12. Switch - heater

13. Switch - balance weight lifting

14. Switch - balance weight selection



15. Switch - balance weight selection



In normal state, the left handle manipulate the telescopic movement of the crane forward and backward. When pressing the switch, the crane auxiliary hoisting carries out up and down action.

16. Indicator light - power

17. Indicator light - oil filter clogging alarm

18. Indicator light – balance weight cylinder lifting

19. Indicator light – balance weight cylinder lowering

20. Indicator light – balance weight selection

21. Indicator light - system pressure

22. Indicator light - telescoping work

23. Indicator light - rotary brake release

24. Indicator light - boom retraction

25. Indicator light - over release

26. Indicator light - semi-stretched outrigger

27. Indicator light – two-level cylinder work

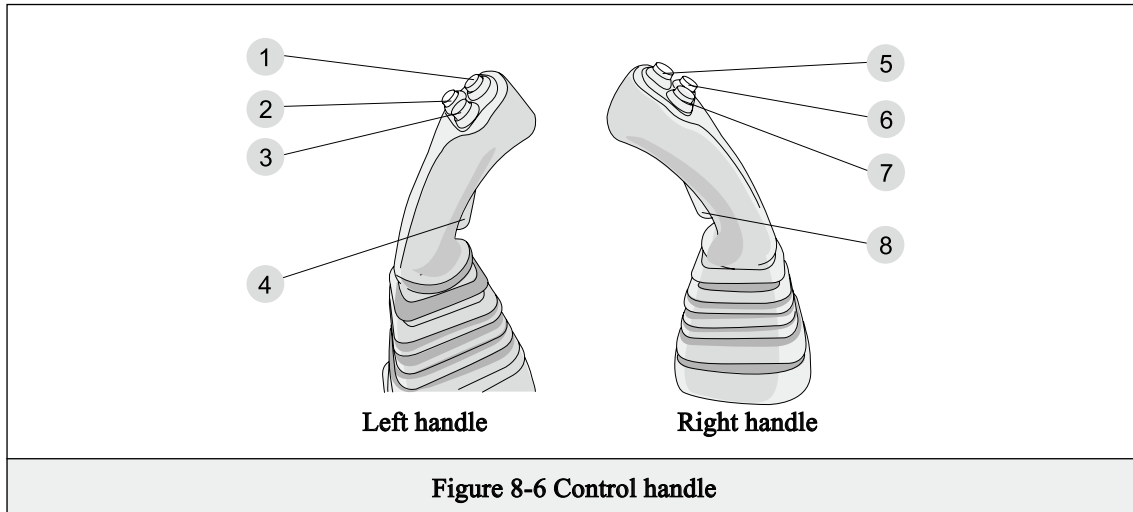
28. Indicator light - free slip and turning

29. Indicator light – auxiliary hoisting work

30. Indicator light - cooling fan

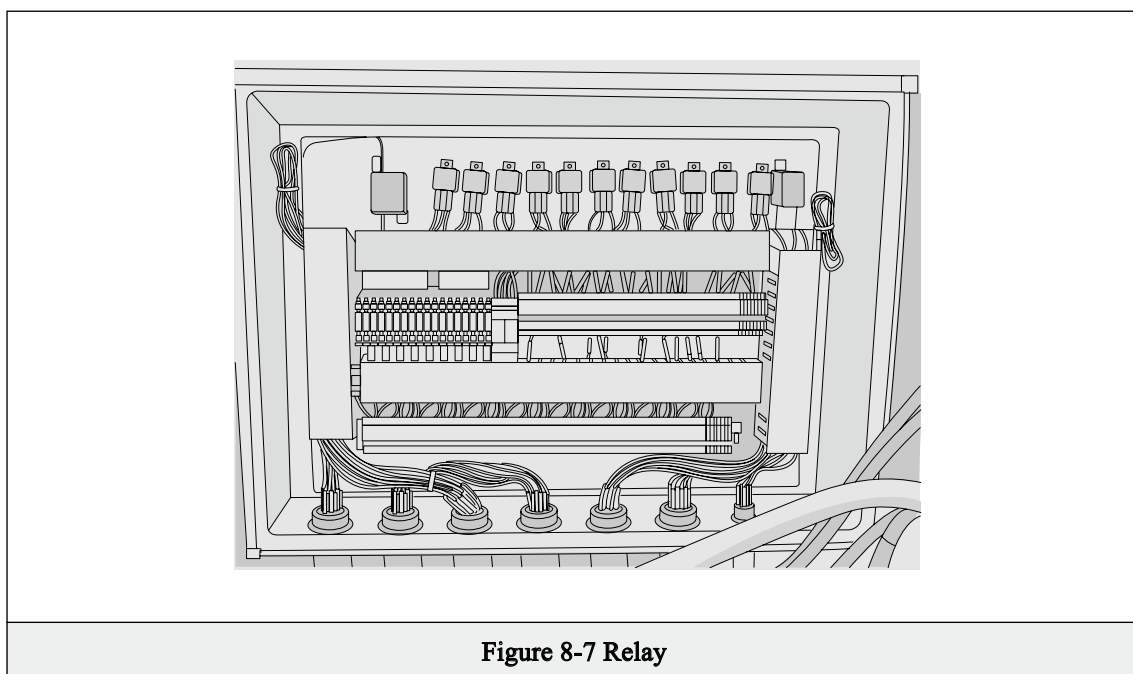
31. Indicator light - engine fault diagnosis

8-3-3 Control handle



No.	Name	No.	Name	No.	Name
1	Horn	2	Rotary brake release	3	Free slip and turning
4	Pilot pressure	5	Horn	6	Telescopic/auxiliary hoisting switch
7	Free slip and turning	8	Pilot pressure		

8-3-4 Relay





K0+ relay (model: JQ202S-FLO): control power supply of lower crane portion

K0 relay (model: JQ202S-FLO): control power supply of upper crane portion

K2 relay (model: JQ202S- FLO): Control hydraulic oil cooling

K3 relay (model: JQ202S- FLO): horn control

K7 relay (model: PLC-RSC-24DC): Control free slip and turning

K11 relay (model: SG253): over release of hoisting

K12 relay (model: JQ202S- FLO): auxiliary hoisting work selection

K13 relay (model: JQ202S- FLO): Low-speed rotary control

K4 relay (model: 05.LY-2): Control system pressure

K5 relay (model: JQ202S- FLO): Rotary brake release

K6 relay (model: JQ202S- FLO): Control rotary brake release

K8 relay (model: PLC-RSC-24DC): Telescopic auxiliary hoisting switch

K9 relay (model: JQ202S- FLO): system unloading

K10 relay (model: JQ202S- FLO): balance weight cylinder work selection and rotary low speed control

8-3-5 Electric system manual

1. Before close the main power, place all the control handles in media and reset all switches.

2. Reading carefully Torque limiter manual before the operation.



8-4 Safety device

8-4-1 Lifting torque limiter

1. Working principle

Lifting torque limiter calculates the crane operating radius according to suspension boom length and angle signals inputted into each sensor. According to the input signal of pressure sensor, the luffing cylinder force is calculated, and then the lifting torque is calculated. Finally comparing with the maximum stress value stored in the database, the corresponding information is issued through display.

2. Safety function

When the lifting torque limiter overloads, the force limiter will cut off all action working condition that can continuously increase torque(stretching boom, downward luffing and lifting); only action working condition that decreases the torque is retained (retracting boom, upward luffing, off hook).

3. lifting height limit function

Open the switch when the hook goes closer to the lifting boom pulley head (Specific height see Figure 5-2 Lifting height graph in Chapter 5), and after the processing of the lifting torque limiter, the lifting boom stretching and the hook lifting are stopped at once. At the same time, the lifting torque limiter display alarm lamp is brightly on.

4. The Do's and Don'ts

a. Before the lifting operation, please carefully read “torque limiter manual”.

b. Although the crane is equipped with torque limiter, this device is not as a substitute as the judgment of a crane operator. Practical experience and operation according to the crane safety operation specification are still not be replaced by the torque limiter, and the operator still has the responsibility for safety operation.

c. Before the operation, the driver should know about the weight of hanging things and compare with the lifting performance table to select the appropriate working condition. The torque limiter is one of the most important safety devices of the machine, and not closed for forbidden during the lifting operation and in not allowed lifting working condition (e.g. stretching boom bearing weight etc.).

8-4-2 Three-coil protector (counter)

The counter is also called three-coil protector. When the crane operating plane is higher, the hoisting mechanism steel wire rope might over release. When the steel wire rope on the reel remains at least three to five laps, the protector actives, the buzzer alarms and the over releasing alarm indicator lamp lights.



8-4-3 Length and angle sensor

The sensor mounted on the lifting boom side is composed of a case, a spiral spring a spring chamber and a length measuring cable. The case interior is provided with a length sensor, an angle sensor and electronic slip ring mechanism. The length measuring cable after 3/4 over winding plate is fixed on the distal boom head part of lifting boom. The reel rotates synchronously while the lifting boom stretching. The cable stretching length can be determined by the rotation number and the reel radius so that the stretching length of lifting boom is obtained. The luffing angle relative to the horizontal is measured through a damped pendulum angle sensor. Length measuring circuit is also used to transport height limit switch of other sensor signals.

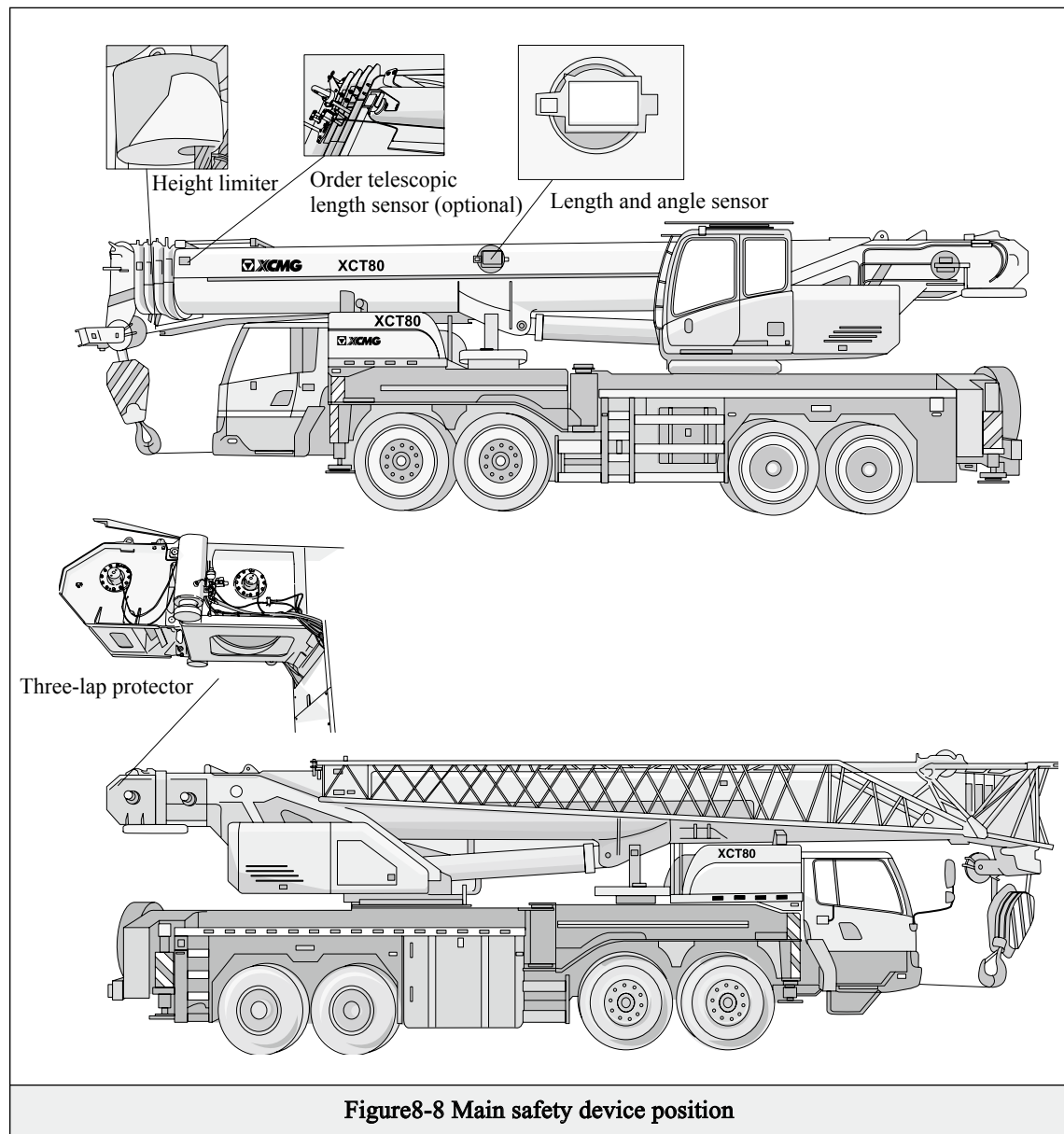


Figure8-8 Main safety device position



8-4-4 Groove jumping device (rope block)

The pulley group on lifting boom head and lifting hook pulley group both have rope block. Rope block plays a key role in preventing the steel wire rope slipping off from pulley groove and sliding track. For installation, the steel wire rope should be firstly installed and then the rope block; before the removal of steel wire rope, the rope block shall be removed at first.

8-4-5 Level

By observing if the position of the show ball within the level is in median position to determine whether the crane levels or not. The display ball in median position indicates it levels, otherwise it is not.

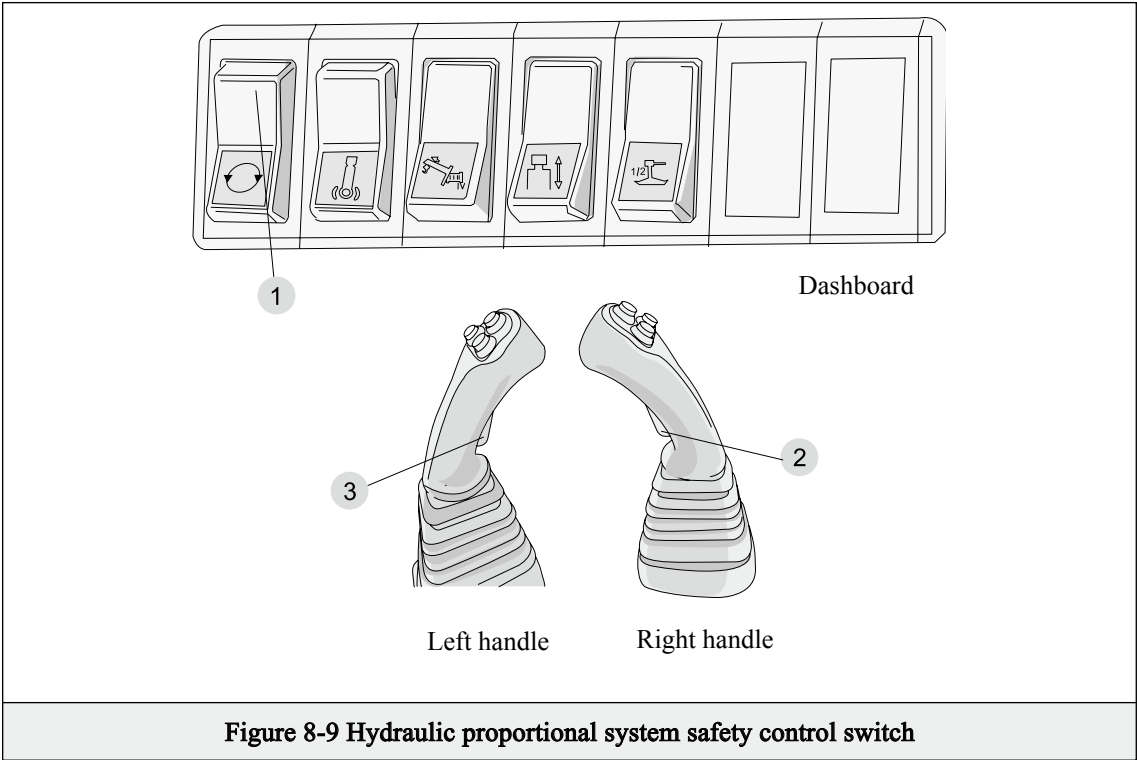
8-4-6 Horn

For protecting the safety of people or things around the crane, when the crane is ready to work, open the horn switch on the dashboard or handle to remind the people or things to keep away.

8-4-7 Safety control switch

1. Hydraulic proportional system safety control switch (also known as hydraulic pilot switch)

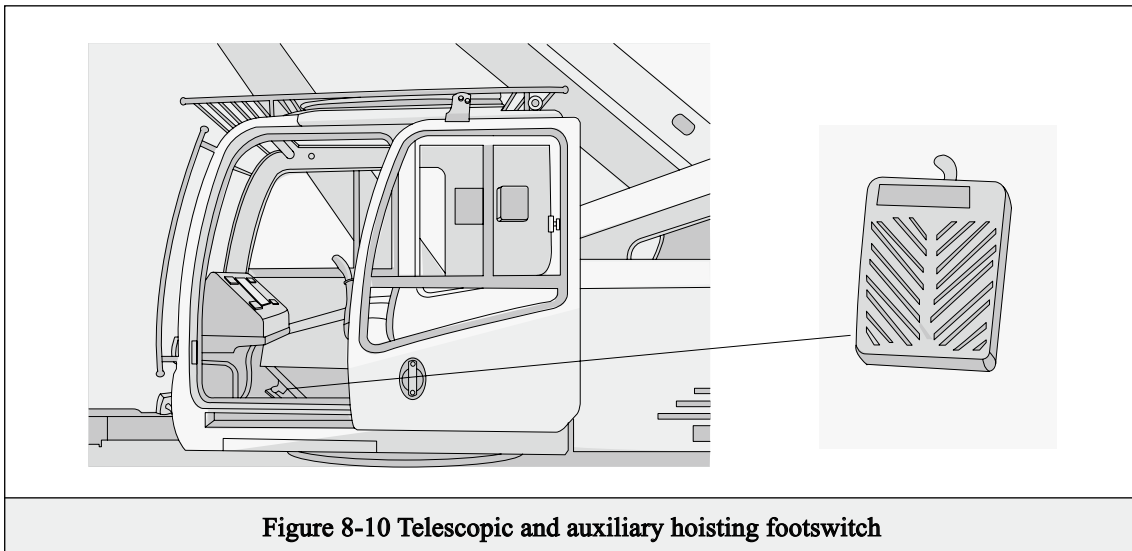
The safety device is used to prevent accidental touch of handle lever. When the switch is turned off, the system can only work under control of liquid proportion.



No.	Name	No.	Name	No.	Name
1	Pilot switch S16	2	Pilot switch S32	3	Pilot switch S42

2. Telescopic and auxiliary hoisting footswitch

The safety device is used to prevent the dangers due to the misoperation of telescopic and auxiliary hoisting. If arm stretching and auxiliary hoisting movement is needed, you must first step on the footswitch, and then operating the corresponding handles.

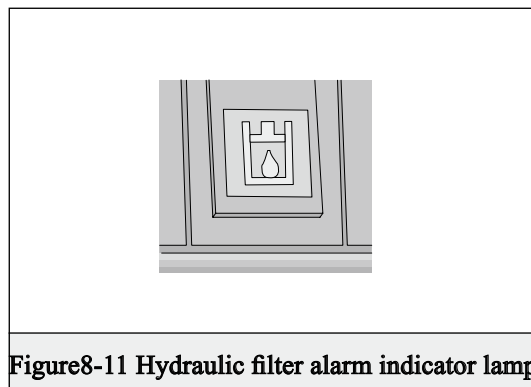


8-4-8 Hydraulic unloading valve

Unloading device is used for preventing danger due to overload. The valve can prevent the working condition of continuously increasing torque (downward luffing and lifting); only the operating condition (upward luffing and off hook) decreasing torque is allowed.

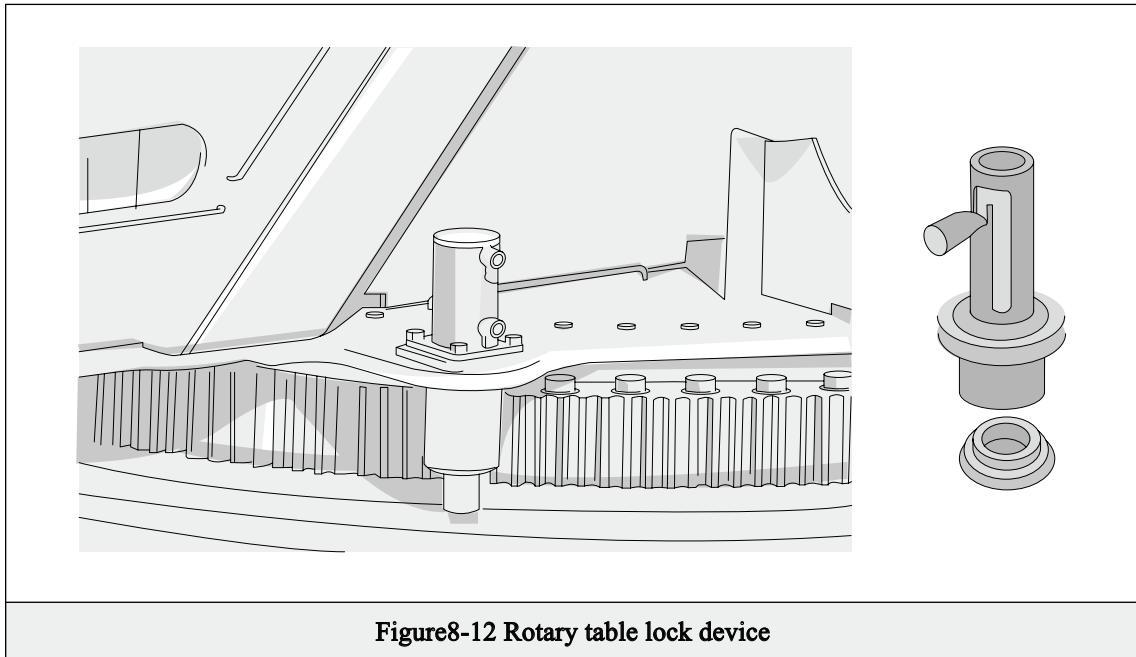
8-4-9 Hydraulic oil filter blocking alarm lamp

When the system hydraulic oil filter is blocked, the suction oil filter alarm indicator lamp or the return oil filter alarm indicator lamp light (see Figure 8-11), stop the operation and do replacement.





8-4-10 Rotary table lock device



This device is composed of a locking pin and a rotary table, when on 0° position in the operating room (facing the vehicle heading direction), the safety device of upper crane portion structure is fixed through a locking pin. When operating the rotary table locking device, operate at slow speed, and preferably the engine is idle. When driving, one should use the rotary table locking device to lock the turntable and the frame.



- For lifting and falling of balance weight, the rotary table locking pins must extend out, and the rotary table and the frame are at the lock state;
- Before the slewing operation, the rotary table locking device must be removed (lifting the rotary table mechanical lock).



A series of horizontal dashed lines for recording information.

LOG



Chapter 9 Crane accessory

9-1 Crane accessory selection

Some risks exist in process of assembly, installation, operation, disassembly and transportation of crane. The producers do not responsible for accidents caused by the operation of crane not in accordance with the laws and regulations and the crane operating conditions and procedures. Please take a note that the accident may result in casualties and also will bring losses of mounts of goods and materials. Please be sure to obey laws and regulations and the operation guide. In this way, you not only ensure your own safety, but also ensure the surrounding personnel security.

9-2 Mounting and dismounting of auxiliary lifting mechanism

9-2-1 Operating Precautions

a. In the installation and removal of fast plug connector of auxiliary winch, you should pay attention to the protection of the O-ring.

b. In the installation and removal of auxiliary winch, you should pay attention to the lifting position, and try to ensure that the spreader is just above the lifting point of the auxiliary winch, to avoid inclined pulling.

c. The vehicle performance table is given in the case of configuration with auxiliary winch. When the auxiliary winch is dismantled,

it is equivalent balance weight decrease of approximately 0.6t.

d. In installation of the auxiliary winch, you should pay attention to the installation sequence of the pin, the lower 2 pin axles should be firstly installed, and then install the top pin. The sequence is opposite when dismantling.



Aiming at stability conditions below the dividing line in the performance table, the lifting weight of the auxiliary winch is prohibited to remove.

9-2-2 Mounting auxiliary lifting mechanism

The auxiliary lifting mechanism is mounted on the rear side of main lifting mechanism, which can be transported together with the balance weight when it is not in use.

1. Insert the auxiliary lifting mechanism junction plate into the junction bracket plug on the rotary table end (Figure 9-1).

2. Mount the pin shaft A (four places).

3. Connect the auxiliary hoisting motor B and auxiliary lifting winch with the main oil line by quick coupling. As shown in Figure 9-2, the male connector A connects with female connector A, male connector T connects with female T, the male connector and the female connector of the brake oil pipe are connected together, the male connector and the female connector of the motor leaking oil pipe are connected together. The connections should be right, without oil leakages.

4. Plug wire connector of the auxiliary winch counter (three ring protection).

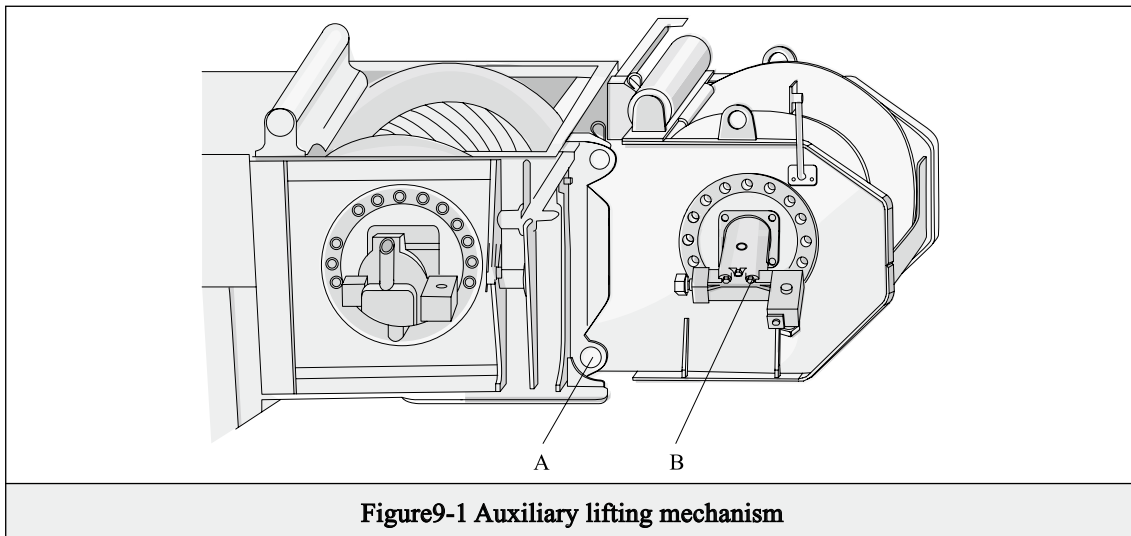


Figure9-1 Auxiliary lifting mechanism

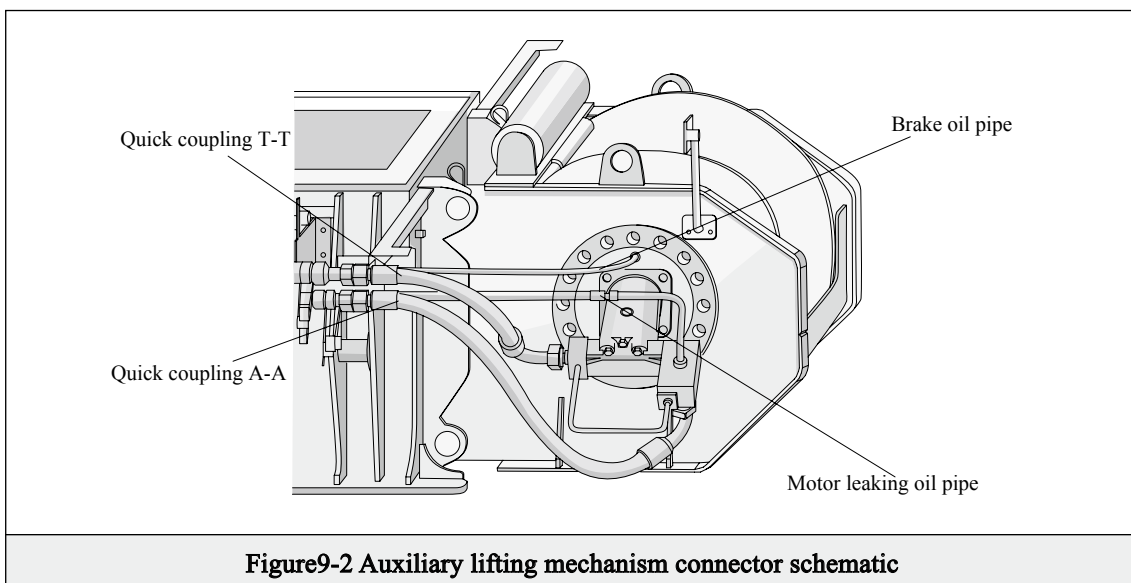


Figure9-2 Auxiliary lifting mechanism connector schematic



9-2-3 Dismounting auxiliary lifting mechanism

1. Disconnect the quick coupling between the auxiliary hoisting mechanism and main oil line (see Figure 9-2), and cover the protective cap.
2. Remove wire connectors of the auxiliary volume counter (three ring protection).
3. Lift the auxiliary winch lifting point with the lifting auxiliary device, first to an appropriate height (pull the hoisting rigging by hand, just tension is the suitable height.)
4. Unplug R pin of the pin axle A, remove four pin axles A, and you should note that the upper two should be dismantled first, and then the lower two.
5. Slowly lower the auxiliary winch mechanism to place it to the specified location.

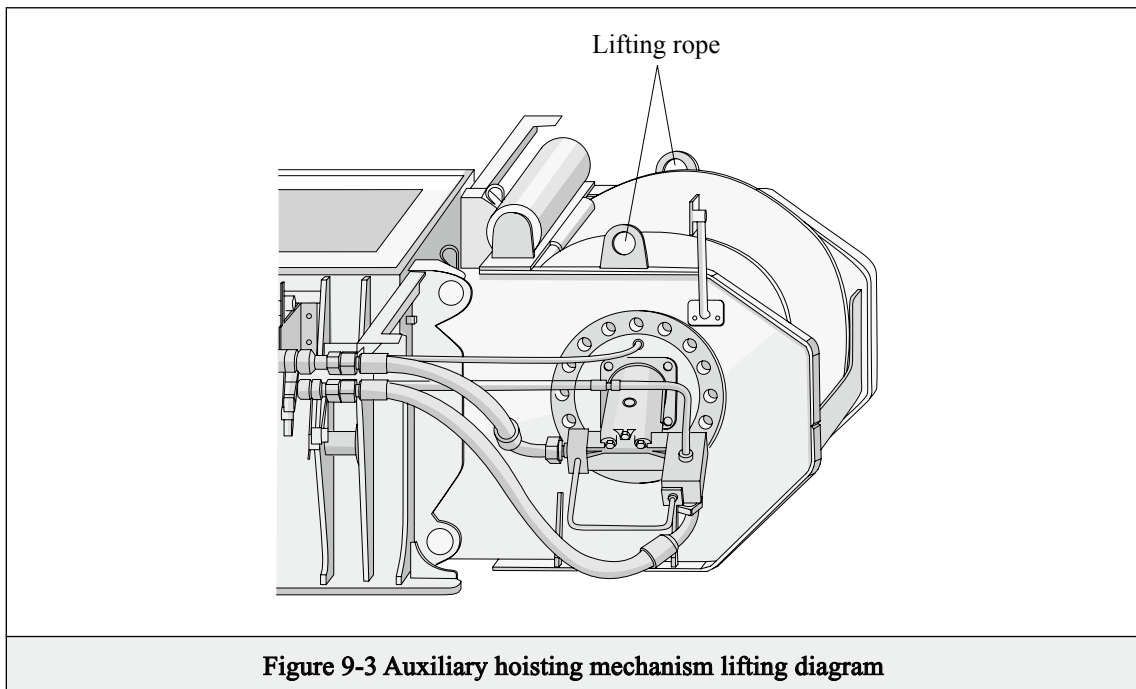


Figure 9-3 Auxiliary hoisting mechanism lifting diagram



9-3 Mounting and dismounting of auxiliary crane arm

9-3-1 Operating Precautions

- a. Confirm the outrigger extends to the working position specified in a rated lifting weight
- b. Before mount and retract the auxiliary crane arm, should ensure that there is enough operation space on the operating site.
- c. When mounting and retracting the auxiliary crane arm, the mounting angle of auxiliary crane arm must be 0°
- d. When mounting and retracting the auxiliary crane arm, the rotation range of auxiliary crane arm is forbidden for people standing.
- e. When mount and retract the auxiliary crane arm necessarily at a high place, should use the ladder and wear the safety belt properly.



Strictly forbidden for the following operation, otherwise the auxiliary crane arm is damaged and accidents happen:

- Strictly forbidden for the operations of stretching arm and falling arm at the state of contact between the auxiliary hook and the auxiliary crane arm top end.
- Strictly forbidden for the operations of crane and crane moving after pulling out the auxiliary crane arm fixed pin located on lateral side of main crane boom.
- Strictly forbidden for fast actions of swing forward and retracting backward the auxiliary crane arm when mounting and retracting the auxiliary crane arm.



9-3-2 Component name of auxiliary crane arm

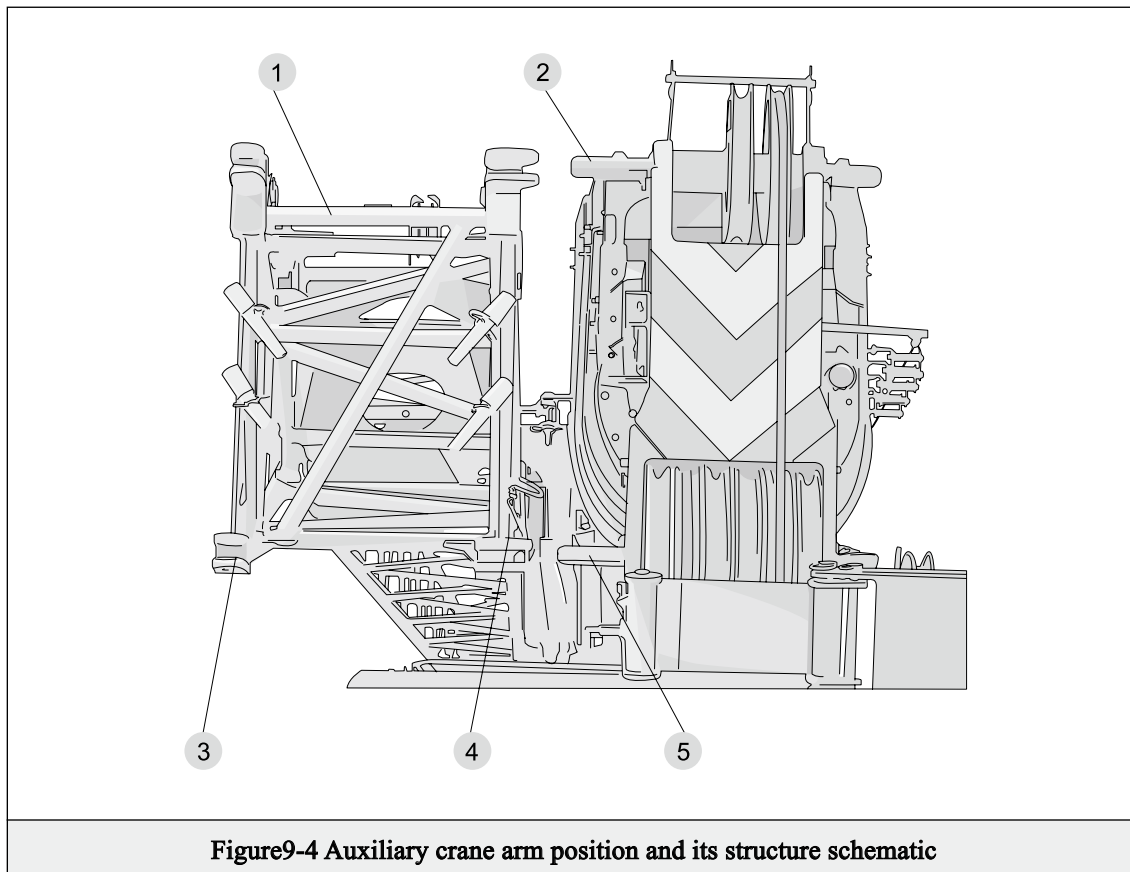


Figure9-4 Auxiliary crane arm position and its structure schematic

No.	Name	No.	Name	No.	Name
1	Auxiliary arm	2	Main boom	3	Auxiliary arm installation hole(four places)
4	Auxiliary arm installation pin (four places)	5	Main arm installation hole ((four places))	6	

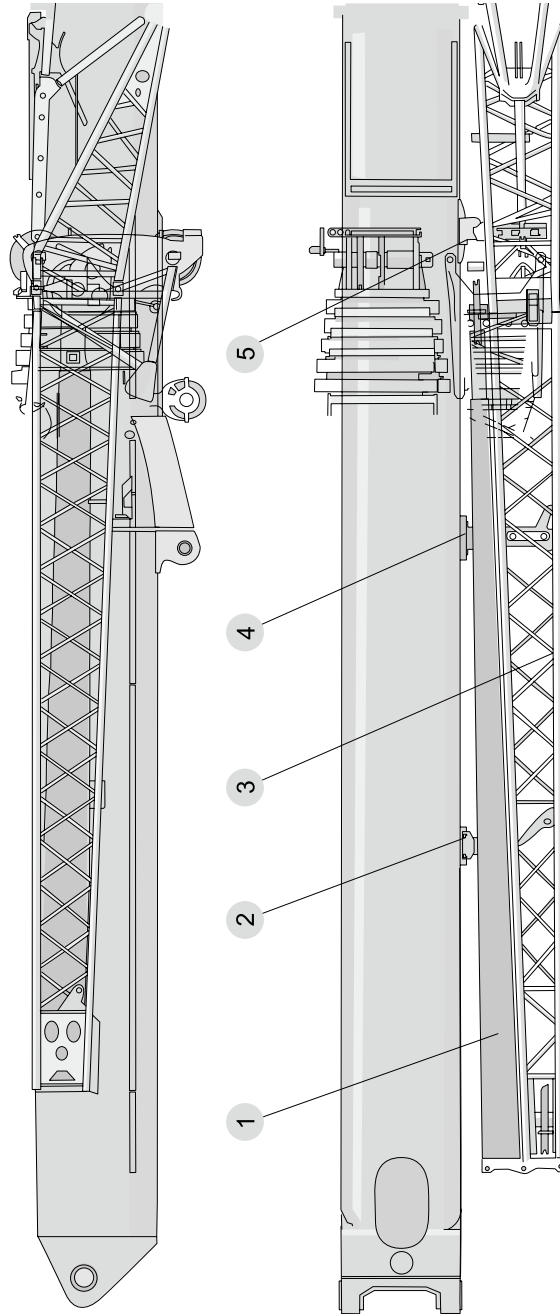


Figure9-5 Auxiliary crane arm position and its structure schematic

No.	Name	No.	Name	No.	Name
1	Second section auxiliary arm	2	Rear bracket	3	First section auxiliary arm
4	Middle bracket	5	Front bracket		



9-3-3 Mounting auxiliary crane arm

The first installation process:

In accordance with the requirements to mount the crane, after the main crane boom fully retracting, it is slewing to the lateral rear side of the completed crane and falling down to the lowest point.

The second installation process:

Unplug the clip A on the middle bracket, and pull the handle B down, so that the bracket 1 rotates with pin axle C as the rotational axis. When it rotates to the position that pin axle D of bracket 1 is aligned with the pin axle hole E of bracket 2, release handle B, insert the pin axle D into the pin axle hole E, and then insert clip A (Figure 9-6).

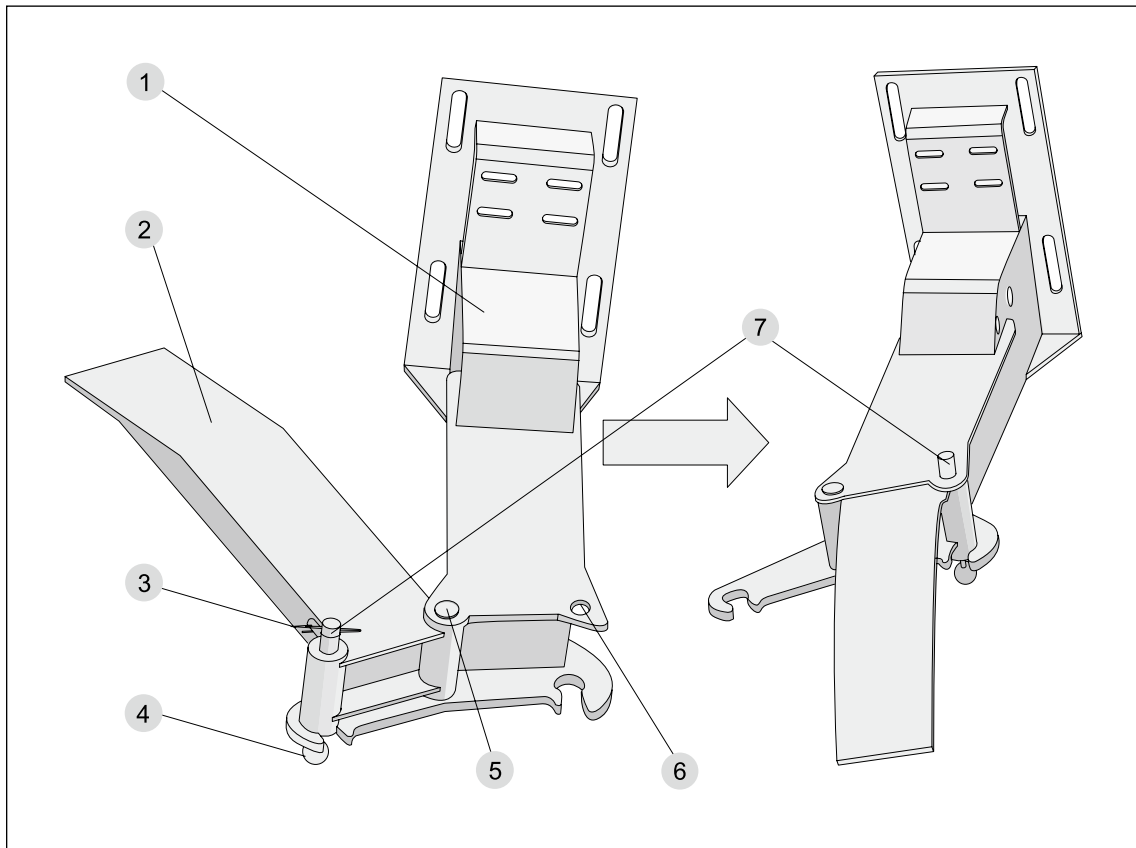


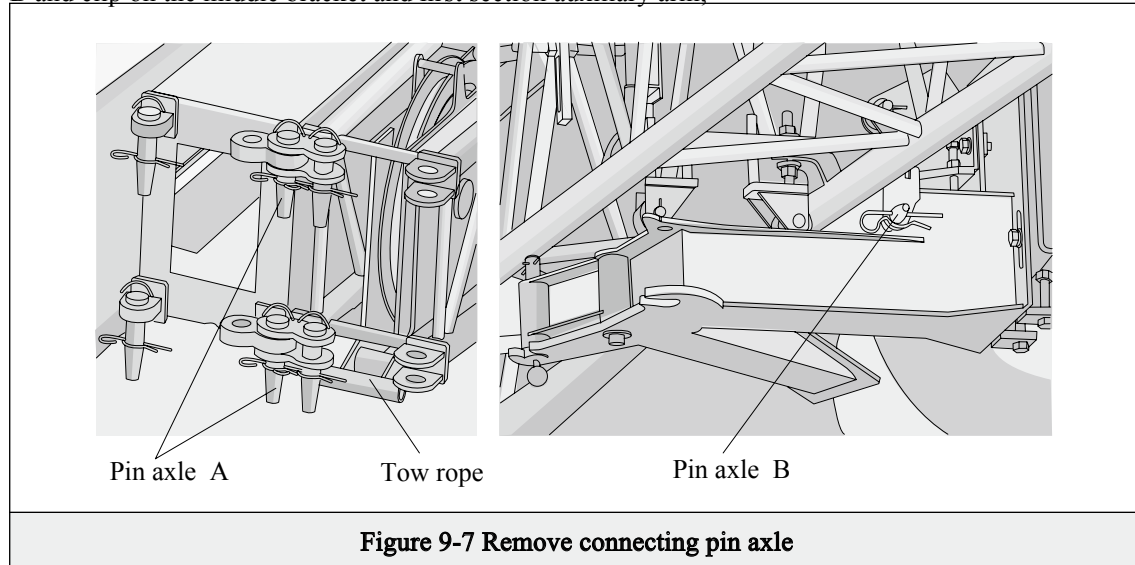
Figure 9-6 Deployment diagram of middle bracket

No.	Name	No.	Name	No.	Name
1	Bracket 2	2	Bracket 1	3	Clip A
4	Handle B	5	Pin axle C	6	Pin axle hole E
7	Pin axle D				

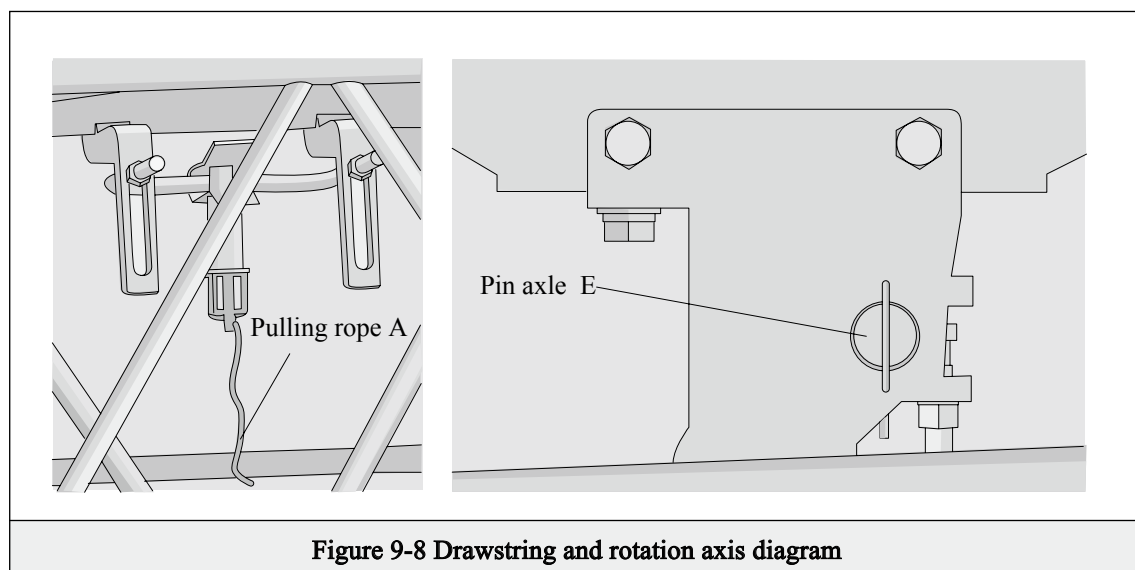
The third installation process:

1.If only one section auxiliary arm is used, the total length of the auxiliary arm is 10.5m:

- a. Fasten a tow rope at the end of the first section auxiliary arm, remove the connecting pin axle A and clip on the first and second section auxiliary arms (each of 2), and remove the connecting pin axle B and clip on the middle bracket and first section auxiliary arm;



- b. Pull the nylon drawstring A on the first section auxiliary arm, so that the second auxiliary arm disengages with the first section auxiliary arm. Pull the tow rope, so that the first section auxiliary arm rotates with the pin axle E on front bracket as rotation axis;

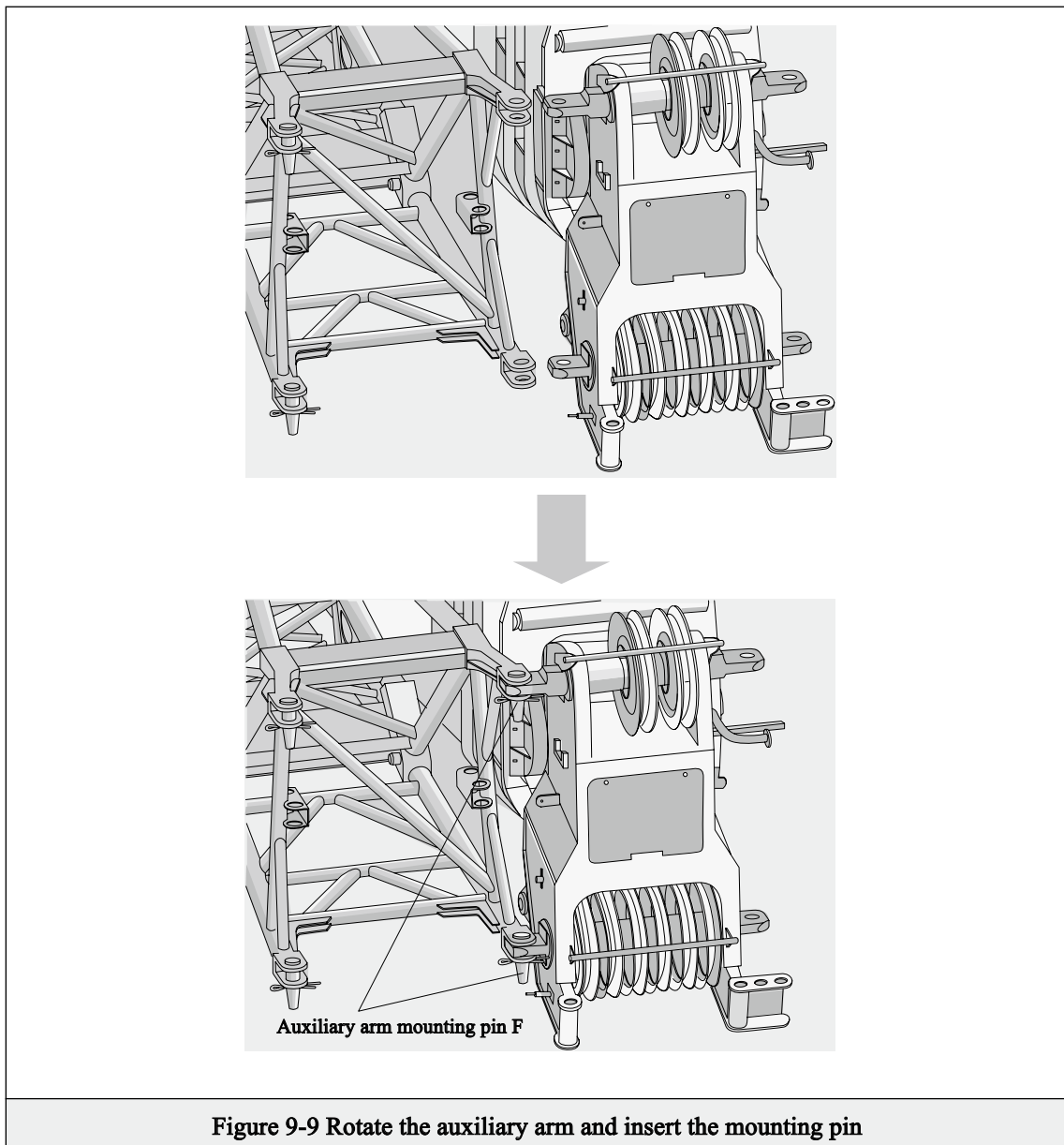




c. When it rotates to the position that the right mounting hole of the main arm is aligned with the left mounting hole auxiliary arm, insert the auxiliary arm mounting pin F and clip (each of upper and lower 2);



Only the mounting pin of auxiliary arm is confirmed to be reliably inserted and fixed with clamp, the next step of operation can be carried out. Otherwise it will cause the auxiliary arm falls off, causing dangers



d. Remove the pin axle E and clip on the front bracket, and continue to pull the tow rope, so that the auxiliary arm rotates with the auxiliary arm mounting pin F as rotation axis. When rotating to the position that the auxiliary arm right side mounting hole is aligned with the mounting holes on the left side of the main arm, insert another two auxiliary arm mounting pins F and clip (each one in the upper and lower).

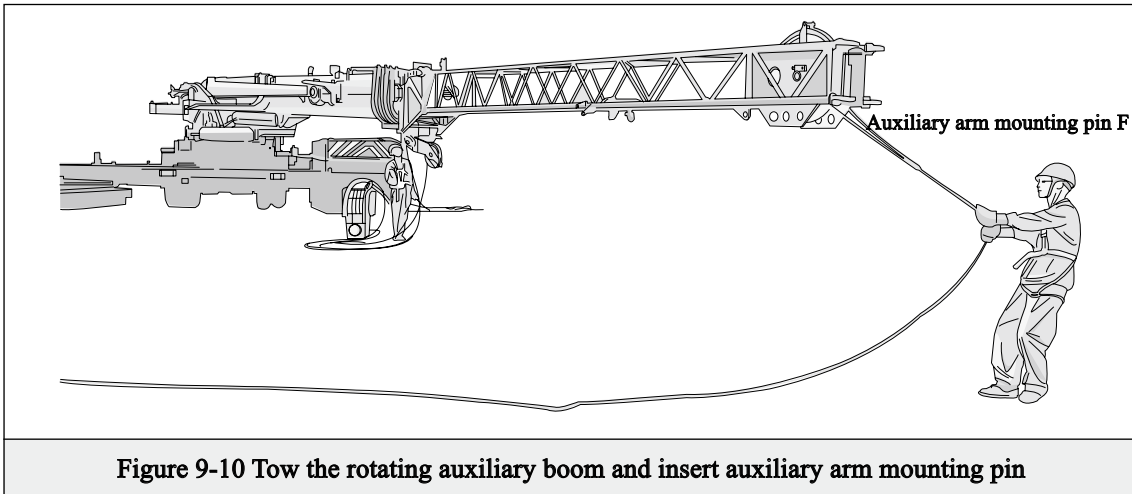


Figure 9-10 Tow the rotating auxiliary boom and insert auxiliary arm mounting pin

2.If the first section auxiliary arm and second section auxiliary arm are used, the total length of the auxiliary arms is 17.5m:

a. Fasten the tow rope at the end of the first section auxiliary arm, and remove the connecting pin axle B and clip on the middle bracket and the first section auxiliary arm, the connecting pin axle G and clip on the middle bracket and second section auxiliary arm, connecting pin axle H and clip on the rear bracket and the second section auxiliary arm (each of two);

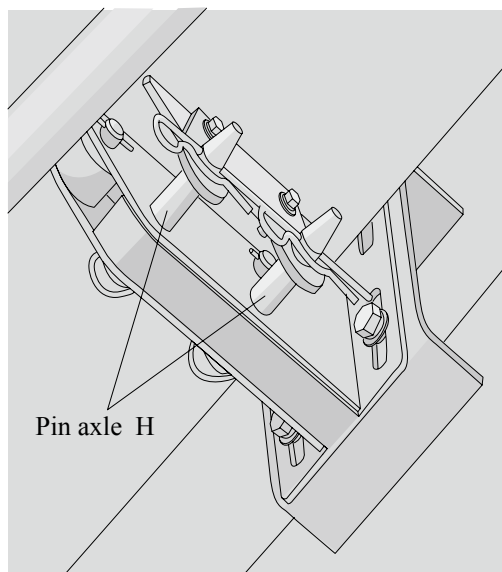
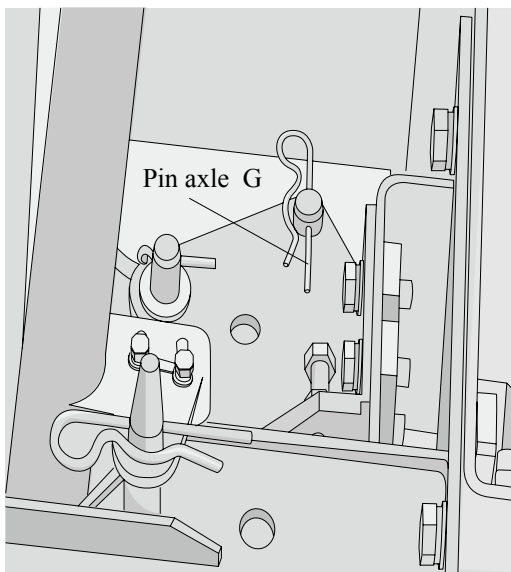


Figure 9-11 Remove the connecting pin between auxiliary arm and bracket



b. Pull the tow rope, so that the auxiliary arm rotates with pin axle E on the front bracket as the rotation axis (as step 2 in 1);

c. When it rotates to the position that the right mounting hole of the main arm aligns with the left mounting hole of the auxiliary arm, insert the auxiliary arm mounting pin F and clip (each of two in the upper and lower) (as step 3 in 1);



Only the mounting pin of auxiliary arm is confirmed to be reliably inserted and fixed with clamp, the next step of operation can be carried out. Otherwise it will cause the auxiliary arm falls off, causing dangers.

d. Remove the pin E and clip on the front bracket, and continue to pull the tow rope, so that the auxiliary arm rotates with the auxiliary arm mounting pin F as the rotation axis. When rotating to the position that the right side mounting hole of the auxiliary arm aligns with the left mounting hole of the main arm, insert another two auxiliary arm mounting pins F and clip (each one in the upper and lower). (as step 4 in 1)

e. Pull the nylon drawstring A, so that the first section auxiliary arm disengages with second section auxiliary arm, rotate the second section auxiliary arm with the connecting pin axle A on the first and second section arms as rotation axis. Insert another four pin A and clips when the pin axle hole on the second section auxiliary arm aligns with the pin axle hole on the first section auxiliary arm.

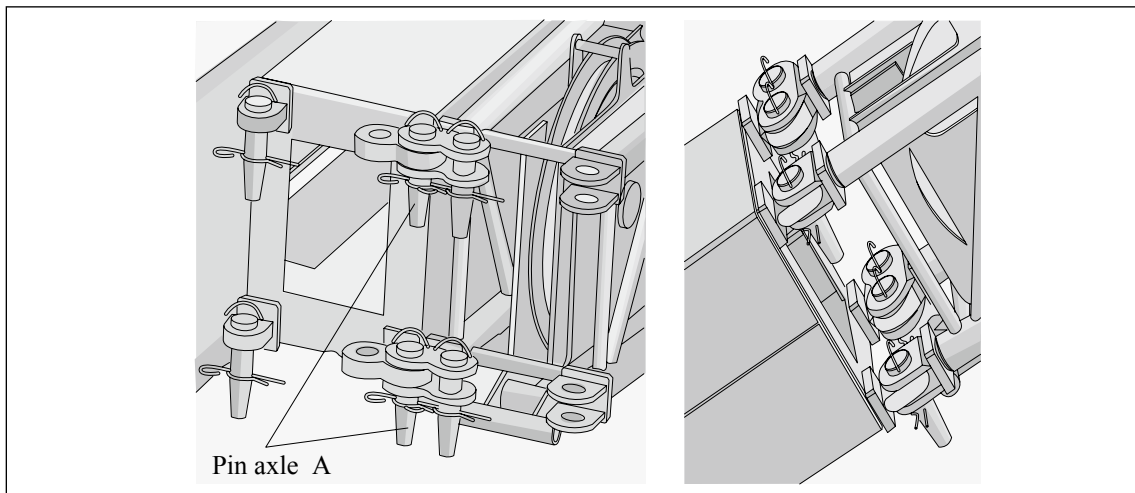


Figure 9-12 Rotate second section auxiliary arm and insert the connecting pin axle

The fourth installation process:

When using the auxiliary arm, you need to support the pulley bracket. When using the first section auxiliary arm condition, make the rope pass through the pulley guide on the pulley bracket and the pulley at the head of the first section auxiliary arm. When using the first section auxiliary arm and second section auxiliary arm conditions, make the rope pass through the guide pulley on the pulley bracket and the pulley at the head of the second section auxiliary arm, and no longer need to pass through the pulley at the head of the auxiliary arm. When supporting the pulley bracket, first pull out the pin axle I and clips, rotate the pulley bracket with pin axle J as rotating axis, and insert the pin axle I and clip when the pin hole K of the pulley bracket aligns with pin hole L of the auxiliary arm, as shown in Figure 9-13.

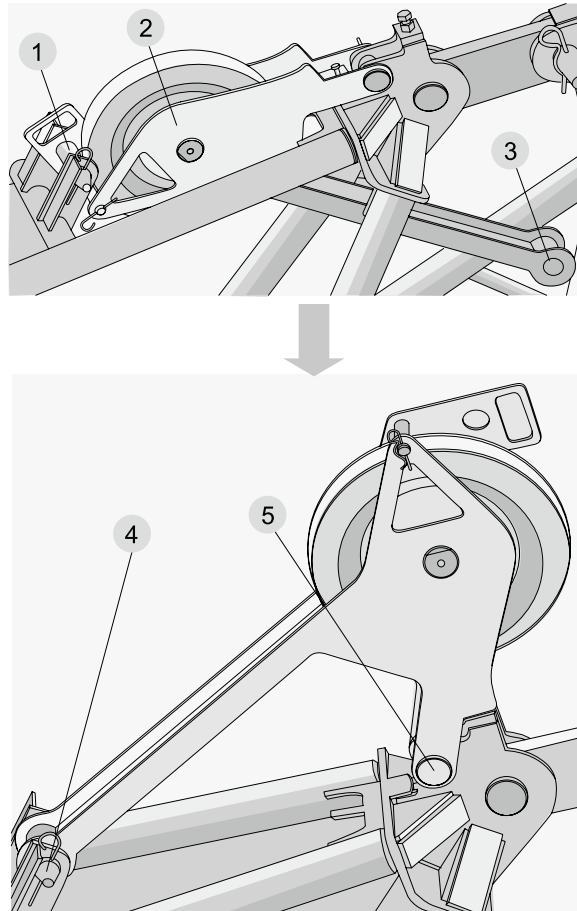


Figure 9-13 Support pulley bracket

No.	Name	No.	Name	No.	Name
1	Pin axle I	2	Pulley bracket	3	Pin axle hole K
4	Pin axle hole L	5	Pin axle J		

The fifth installation process:

Support the pulley bracket on the auxiliary boom, take out the wire rope from the auxiliary boom head pulley, and make it pass through the pulley bracket and auxiliary boom head pulley.

The sixth installation process:

Connect the connector on the auxiliary boom and junction box on the main boom head, and install lifting height limiting block.

The seventh installation process:

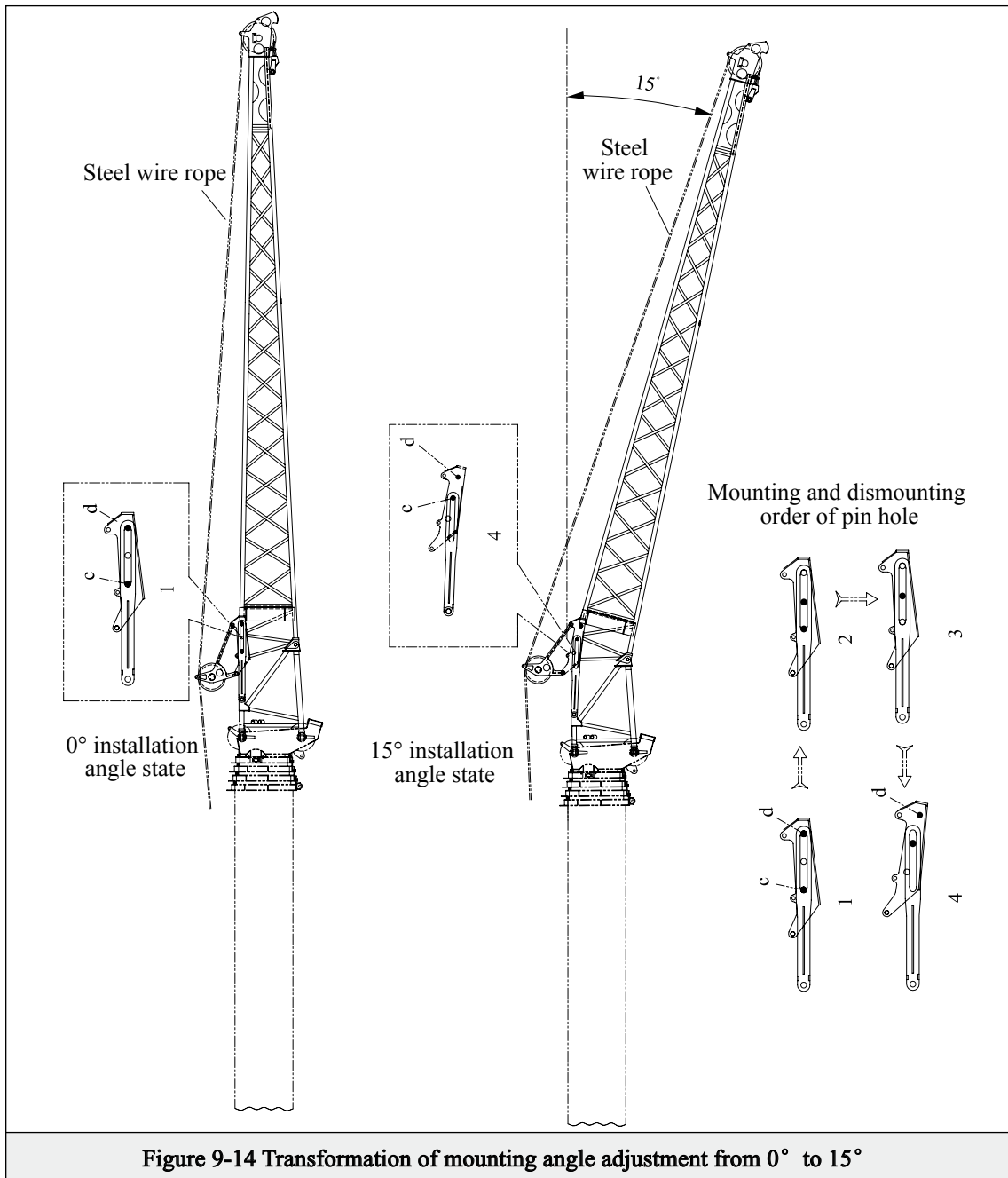
Mount the wire rope and rigging on the auxiliary hook.



9-3-4 Mounting angle adjustment of auxiliary crane arm

1. Transformation from 0° to 15° (as shown in figure9-14)

Remove the lifting wire rope rigging of the auxiliary winch from the auxiliary hook, tie the auxiliary hook rigging and the auxiliary arm head with the discoloration cotton lifting rope in the spares and confirm it is firm. Then slowly lift the auxiliary winch, make the auxiliary winch lifting rope in tension state, pull out the pin axle of the 0° mounting hole on the luffing pulling plate, and then slowly lower the auxiliary winch wire rope to 15° installation angle state. Install the mounting pin axle, remove the rigging from the auxiliary lifting arm, and install it on the hook, you can enter the working condition of 15° installation angle.



2. Transformation from 0° to 30° (as shown in figure9-15)

Remove the lifting wire rope rigging of the auxiliary winch from the auxiliary hook, tie the auxiliary hook rigging and the auxiliary arm head with the discoloration cotton lifting rope in the spares and confirm it is firm. Then slowly lift the auxiliary winch, make the auxiliary winch lifting rope in tension state, pull out the pin axle of the 15° mounting hole on the luffing pulling plate, and then slowly lower the auxiliary winch wire rope to 30° installation angle state. Install the mounting pin axle, remove the rigging from the auxiliary lifting arm, and install it on the hook, you can enter the working condition of 30° installation angle.

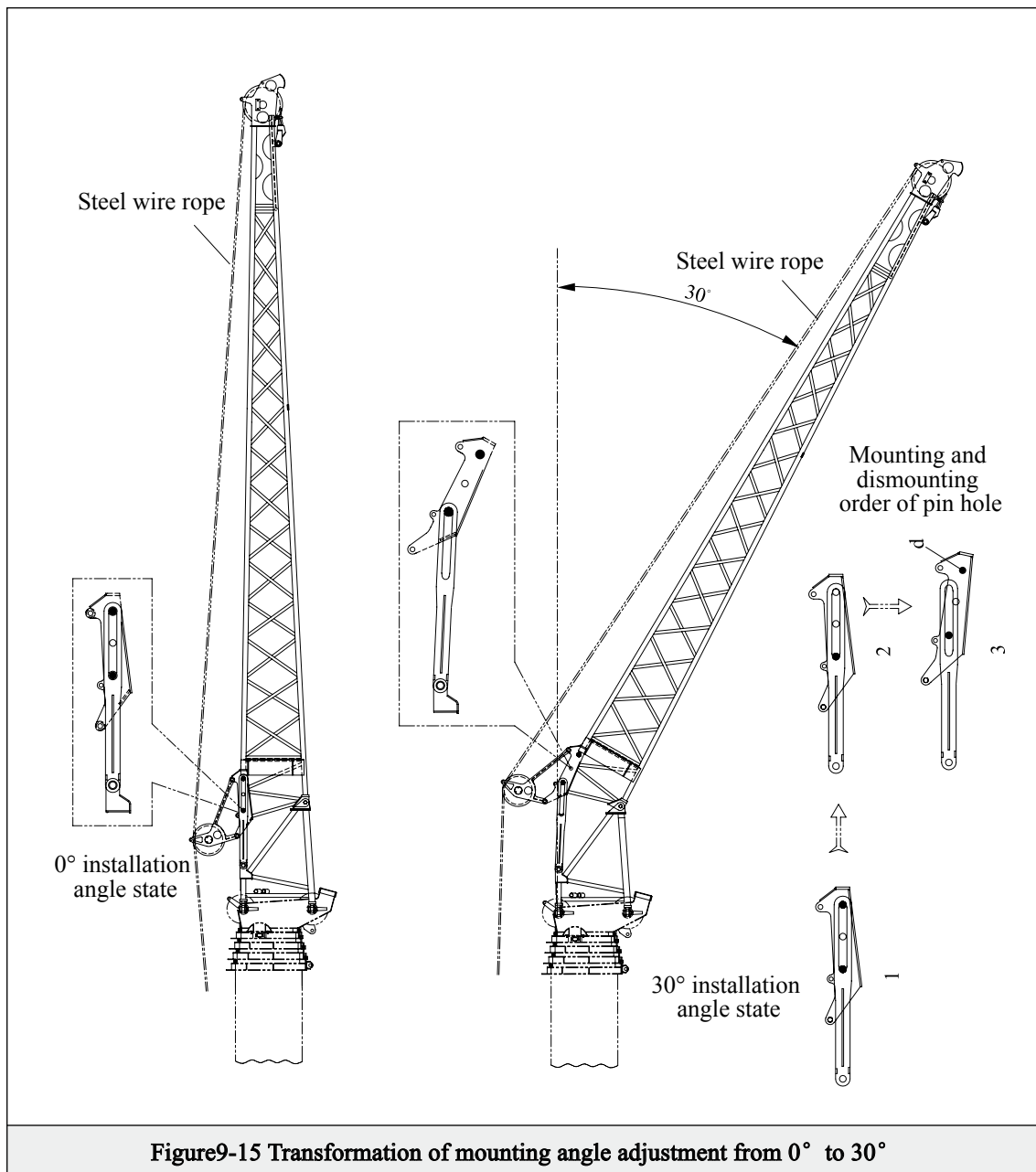


Figure9-15 Transformation of mounting angle adjustment from 0° to 30°



3. Auxiliary crane arm transformation with 0° mounting angle

Dismount the rigging of auxiliary rolling lifting steel wire rope from the auxiliary hook, mount the auxiliary crane arm head (as mentioned before), remove idle pin shaft d from auxiliary crane arm, then slowly lift the auxiliary winding so that the included angle is close to 0° between the auxiliary crane arm and the main crane boom, then mount pins C and D on according to the 0° installation state diagram so that the auxiliary crane arm retracts back to 0° installation angle.

9-3-5 Auxiliary crane arm storage

After the use of auxiliary crane arm working condition, one should timely retract the auxiliary crane arm back to the right side of main crane boom (as the main crane boom head for the front orientation), and the retracting method follows the opposite order as in 9.3.3, that is, firstly remove the pin axle on the left side of main crane boom head, rotate the auxiliary arm around the pin axle on the right side of main crane boom head to a certain angle, mount E pin axle in Figure 9-8, remove the pin axle on the right side of main crane boom head, then rotate again around the pin axle E to a certain angle and mount the pin axle in Figure 9-7,9-11, and at last retract and store the flip frame.



When retract the auxiliary arm, if the angle is not 0° , you must first change it from 15° or 30° back to 0° .



When the auxiliary arm angle is 0° , you must fully retract the main arm and set it into the horizontal state.



● The following operations are strictly prohibited. Otherwise it would cause damages to the auxiliary arm and accidents:

● Any person is strictly prohibited to stand on the passing way of or under the auxiliary arm.

● The pin axle E on the front bracket is strictly prohibited to insert the corresponding connection hole on the auxiliary arm. You should guarantee the reliable connection between the front bracket and auxiliary arm. Remove the auxiliary arm mounting pin F in the right mounting hole of the main arm and the left mounting hole on the auxiliary arm.

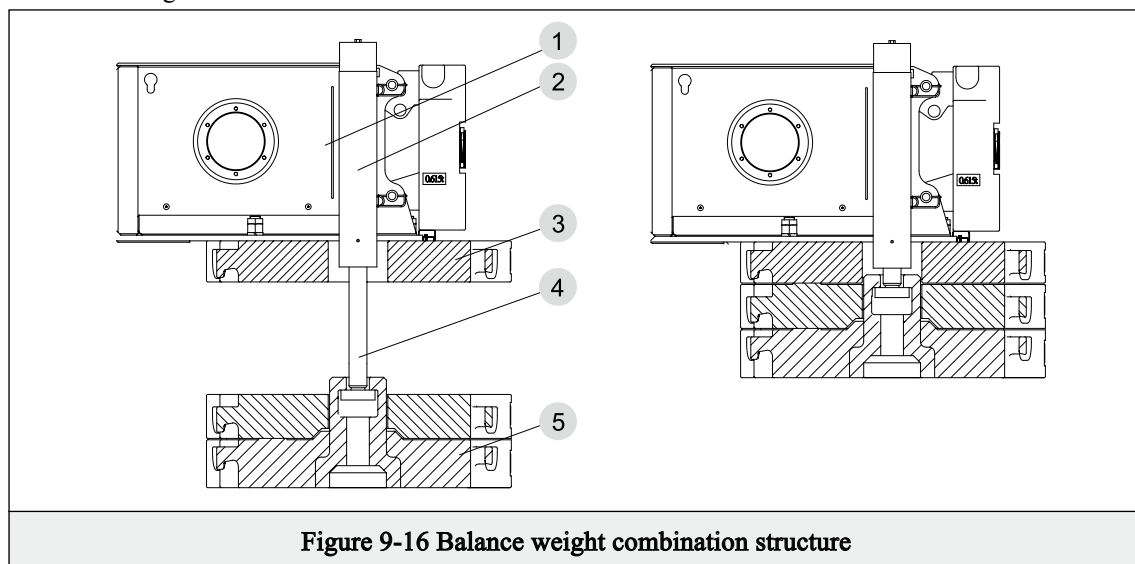
9-4 Mounting and dismounting of balance weight

9-4-1 Operating Precautions

- Recommend basic arm length lifting balance weight.
- Before the assembly, balance weight cylinder fully retracts to avoid collision between the balance weight cylinder and the rotary table when they rotating.
- There must be adequate slewing space; otherwise the balance weight may fall off to damage the important component of crane.
- The reference range of balance weight be fallen in the frame positioning position is 3660mm.
- Before operating the slewing motion, one should loose the rotary table slewing pin locking pin, press the slewing brake removing switch on dashboard to release the slewing brake.
- Before using the remote control box and operating counter weight lifting in operating room, the balance weight working selection switch must be firstly pressed down.
- Any outrigger is required to extend to the position specified in the crane performance table.
- Any outrigger is required to extend to the position specified in the crane performance table.

9-4-2 Balance weight combination

XCT80 truck crane is equipped with the up lifting combined balance weight, and the vertical movement of the balance weight is mainly driven by the balance weight cylinder rod. In different combinations of balance weights, the positioning and fixing of the balance weight can be realized by adjusting the downwardly extending length of the cylinder rod. The combined balance weight structure is shown in Figure 9-16.



No.	Name	No.	Name	No.	Name
1	Turntable	2	Hydraulic cylinder	3	Fixed balance weight
4	Cylinder rod	5	Combination balance weight		



Balance weight assembly includes:

Fixed counter weight D: 2.2t,

Movable counter weight A: 1.3t; B: 4.5t ; C: 3.5t. A total of three blocks.

They can be assembled into the following several combinations.

Table 9-1 Balance weight combination mode

Combination ways	Fixed balance weight D	Flexible balance weight A	Flexible balance weight C	Flexible balance weight B	Combined weight/t
Combination 1	✓				2.2
Combination 2	✓	✓			3.5
Combination 3	✓	✓		✓	8.0
Combination 4	✓	✓	✓	✓	11.5



XCT80 truck crane balance weight combinations are shown in the above table, "✓" represents choosing, no "✓" means not choosing. In combination 4, the stacking sequence of the flexible balance weight is A, C, B sequentially from top to bottom. The cylinder is fixed below the fixed balance weight D, the stacking sequence of the rest combinations is the same with combination 4.

9-4-3 Mounting balance weight

1. Start engine.
2. Set force limiter working condition: full or half stretching lifting performance working condition when balance weight is 2.2t.
3. Hang the mounted balance weight block on crane frame.



Stack according to the combination sequence in Table 9-1 (the one in front is put above, and then in turn stack).

4. Press the " Balance weight working condition selection switch " lower end (Figure9-17) on instrument panel, at this time the "Balance weight work condition selection " indicator lamp is brightly on(Figure9-17), and the handle can not control slewing;

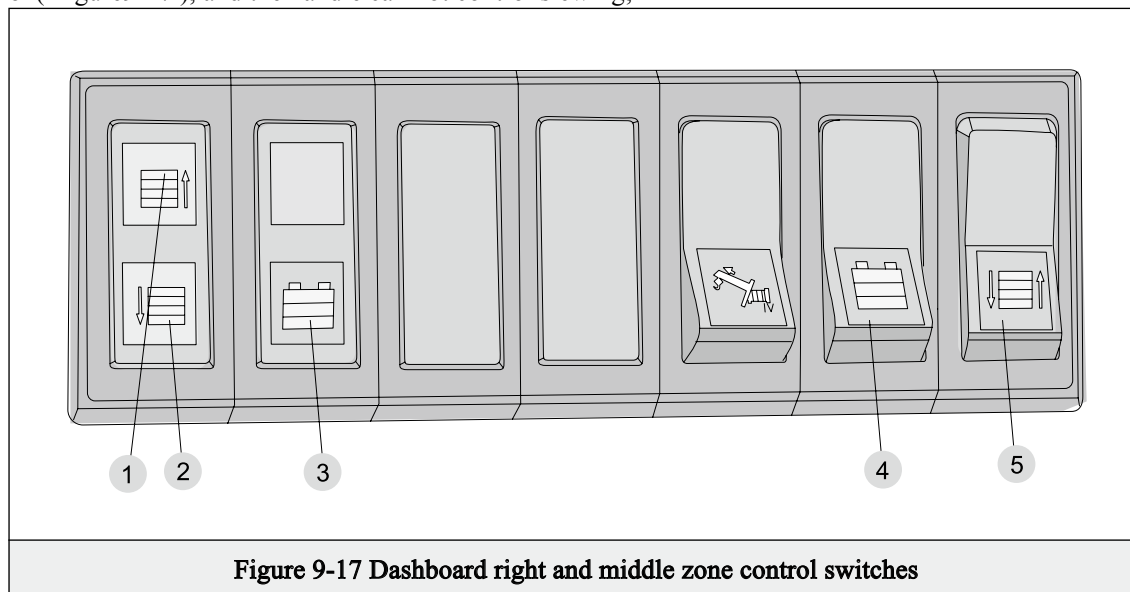


Figure 9-17 Dashboard right and middle zone control switches

No.	Name	No.	Name	No.	Name
1	Balance weight lifting limit indicator lamp	2	Balance weight lowering limit indicator light	3	Balance weight work selection indicator lamp
4	Balance weight work selection switch	5	Balance weight lifting and lowering switch		

5. Operate the "slewing switch" on remote control box (Figure9-18), and slewing runs at low speed, so that the balance weight cylinder is aligned at the "Balance weight cylinder counter weight cylinder extending position" in Figure9-19; adjust slightly the telescopic cylinder stretching length, and align with balance weight mounting pedestal opening (Figure 9-19)

6. Continue to manipulate the "rotary switch" on the remote control box, to realize counterclockwise rotation (turning left), so that the balance weight cylinder aligns with the "balance weight cylinder lift position" in Figure 9-19.



7. Manipulate the "balance weight cylinder lift switch" on the remote control box, so that the balance weight cylinder is fully retracted, the lifting balance weight disengages with the frame. Confirm the plane of the suspension flexible balance weight mates firmly with the fixed balance weight lower surface, and lift the balance weight to the highest position, then the balance lifting limit indicator light goes on (Figure 9-17).

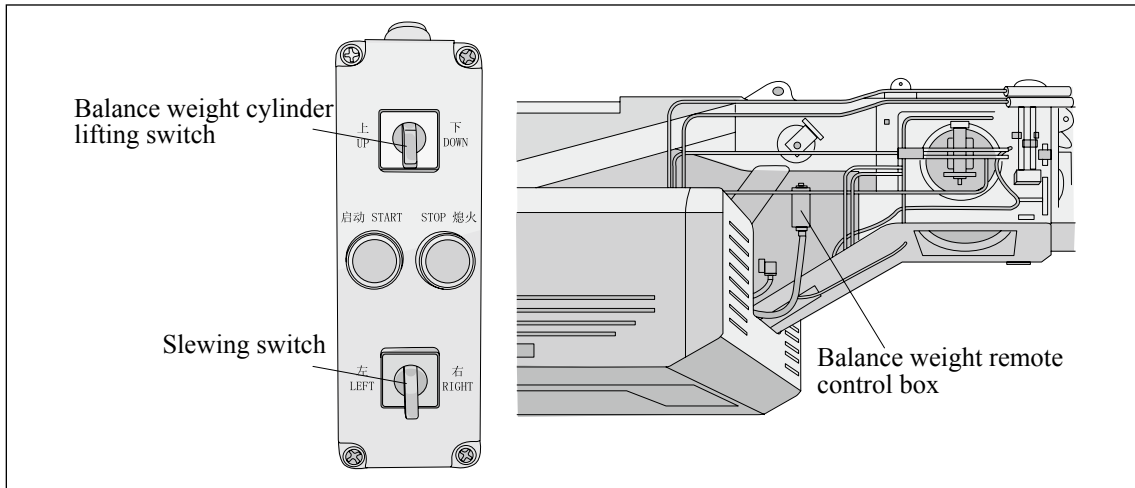


Figure 9-18 Balance weight remote control box (fixed below the turntable left boom hinge rear point)

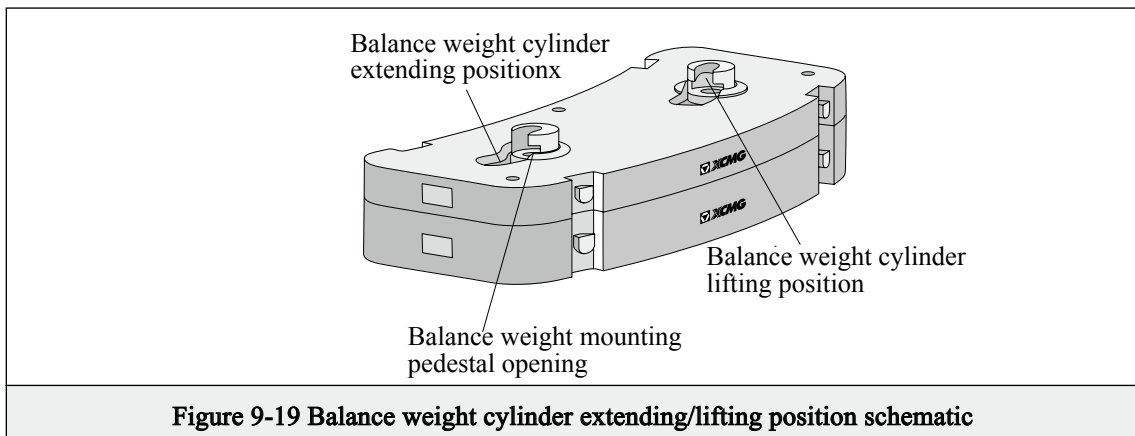


Figure 9-19 Balance weight cylinder extending/lifting position schematic



When adjusting for hanging balance weight, one must operate using the operating remote control box



9-4-4 Dismounting balance weight

1. Operate crane slewing so that the main crane boom head is located on the right rear side of the crane;
2. Press the lower end of the "balance weight cylinder lift switch" on the dashboard, so that the balance cylinder is fully extended, and place the balance weight on the bracket;
3. Repeat balance weight installation step 4, slowly rotate (rightward) with the "rotary switch" on the balance weight remote control box, and observe that the balance weight cylinder is aligned to the extending position (Figure 9-19);
4. Manipulate the "balance cylinder lift switch" on the balance weight remote control box, so that the balance weight cylinder is fully retracted;

9-5 Mounting and dismounting of arm end single pulley

Arm end single pulley consists of the pulley bracket, pulley shaft, pulley, coupling pin and fixed pin, which is installed in the left side of the head of the end section arm in traveling or when it is not used.

When using arm end single pulley, you can speed up the lifting speed in case of lifting lighter loads, to improve operating efficiency.

9-5-1 Operating precautions

1. Rotate the arm end single pulley to the left side of the head of the end section arm, so as not to affect the driver's sight.



Driving crane on the operating state of arm end single pulley, the view is not wide and the danger is liable to happen.

2. When operating, turn on the arm end single pulley lifting height limit switch (use the height limit switch of auxiliary arm), insert the cable plug into the control box socket on main crane boom head, and mount the lifting limit switch touch block.



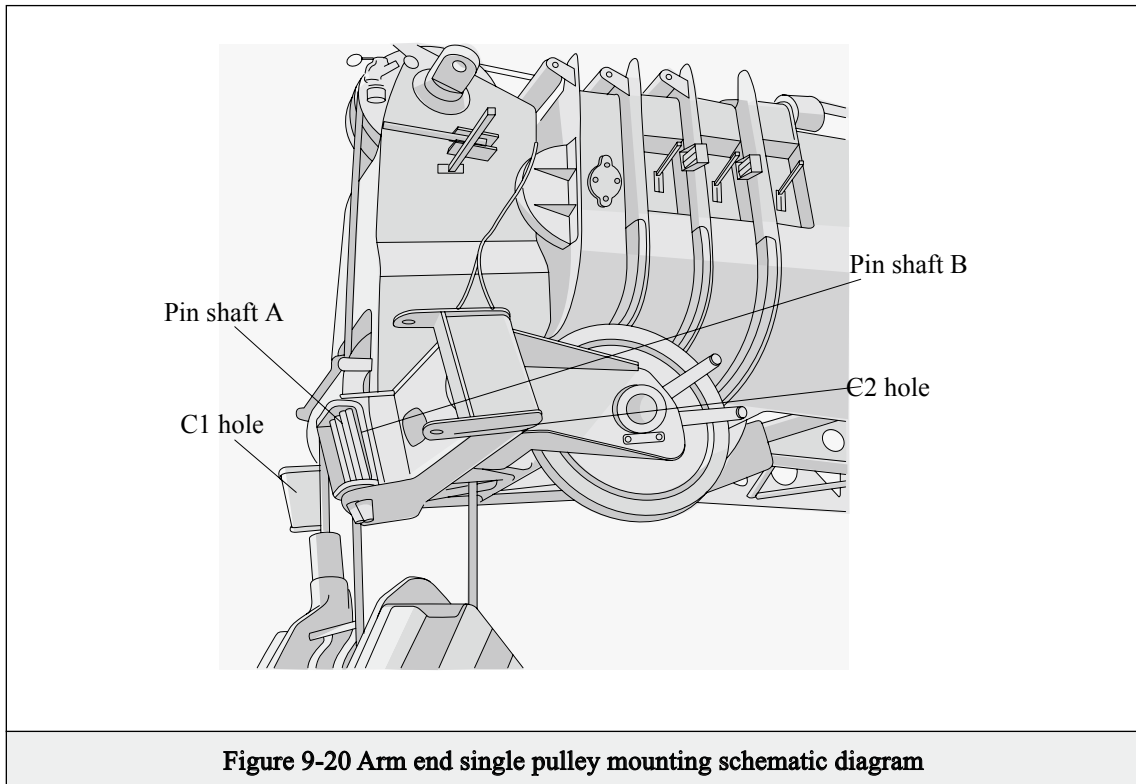
The height limit switch must be connected correctly, and its function is ensured at normal.

3. Make the auxiliary lifting steel wire rope go through the arm end single pulley and operate using the auxiliary lifting mechanism.
4. After mounting the arm end single pulley, connect the over rolling stop device wire.
5. Before operating the arm end single pulley, one must store the auxiliary arm.



9-5-2 Mounting arm end single pulley

When driving, the arm end single pulley is arranged on the left side of main crane boom and fixed using pins A and B, as shown in the Figure9-20.



1. The arm end single pulley installation methods are as follows:

- a. Remove pin shaft A, rotate as rotation axis of pin shaft B, make the arm end single pulley C2 hole to align at the main crane boom C1 hole, plug pin shaft C as shown in the Figure9-21, and steer the auxiliary lifting steel wire rope by pulley.
- b. Turn on the arm end single pulley lifting height limit switch, insert the cable plug into the control box socket of main crane boom head, and mount the lifting limit switch touch block.

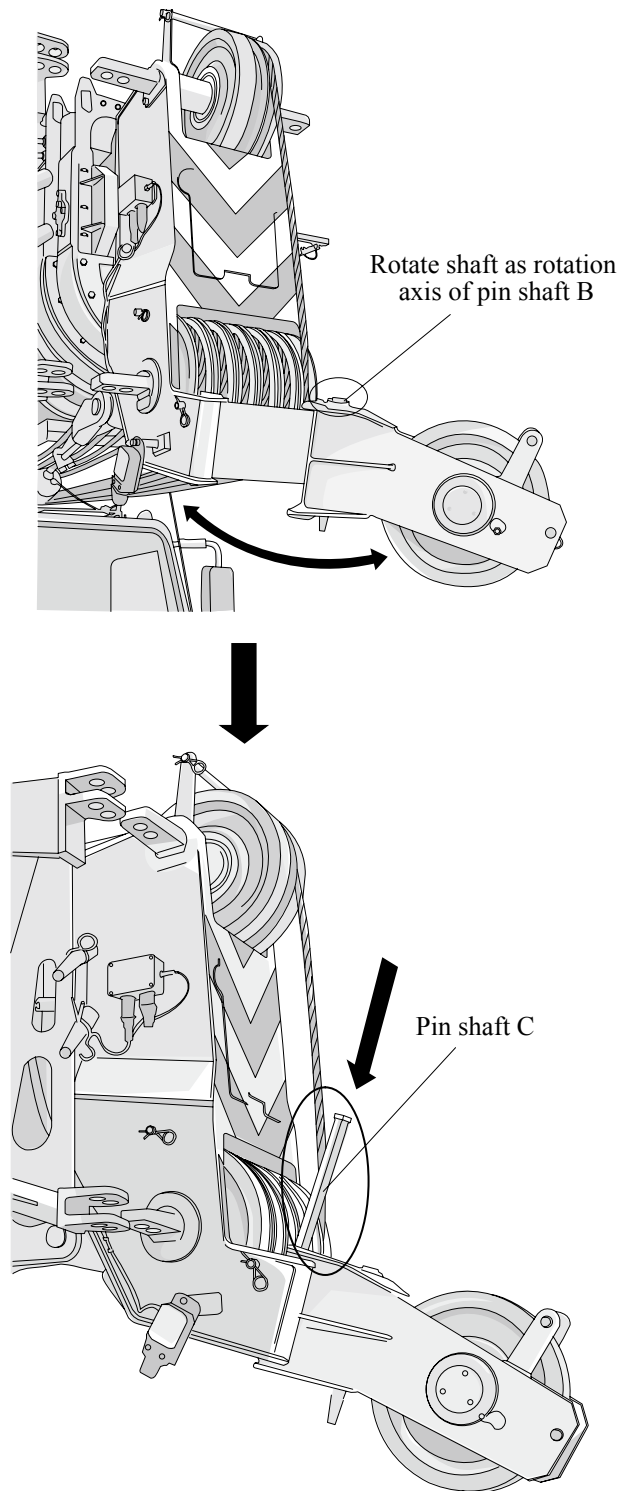


Figure 9-21



c. Mounting auxiliary crane hook

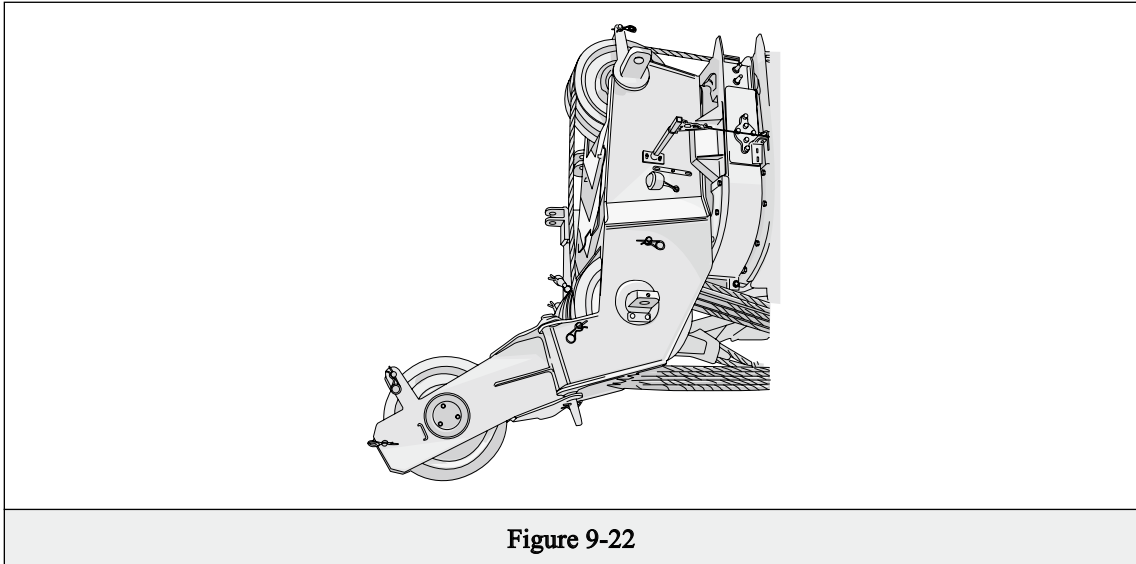


Figure 9-22

Arm end single pulley installation finish (figure 9-22)

9-5-3 Storing arm end single pulley

After the use of arm end single pulley working condition, one should timely retract the auxiliary crane arm back to the left side of main crane boom (as the main crane boom head for the front orientation), and the retracting method follows the opposite order as in 9.5.2.

9-5-4 Crane performance of arm end single pulley

The crane performance of arm end single pulley is the same as that of the corresponding main arm working condition, but the maximum lifting weight must not exceed 6.3 tons



No single performance table of are end single pulley

2. Force limiter working condition settings must be correct.



Uncorrected settings may leading to danger.

3. The weight, 70kg, of the arm end single pulley should be subtracted from lifting weight.

9-6 Hook and steel wire rope

9-6-1 Hook selection

XCT80 truck crane is equipped with 3 hooks, which are main hook (80t hook), middle hook (40t hook) and auxiliary hook (7t hook) respectively, with the maximum ratio for main hook, middle hook and auxiliary hook of 12, 6 and 1 respectively. The selection of hook shall comply with the lifting weight and ratio from Table 5-3 and 5-4 (main and Auxiliary Boom Performance Table) in Chapter 5 of Operation Manual.

The auxiliary hook is mainly used for auxiliary operations. When requirement of lifting speed is relatively high and the lifting weight is lighter, auxiliary hook is recommended to be used. The auxiliary hook generally cooperates with the auxiliary arm for hoisting, or is used simultaneously with the main hook.

9-6-2 Hook basic structure

The structures of main hook, middle hook, and auxiliary hook are shown in Figure 9-23, 9-24 and 9-25.

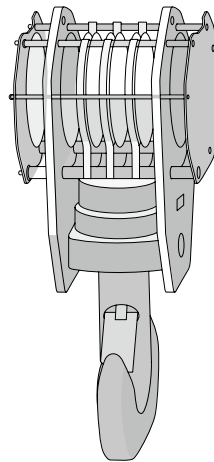


Figure 9-23 Main hook

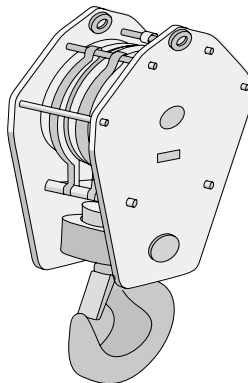


Figure 9-24 Middle hook

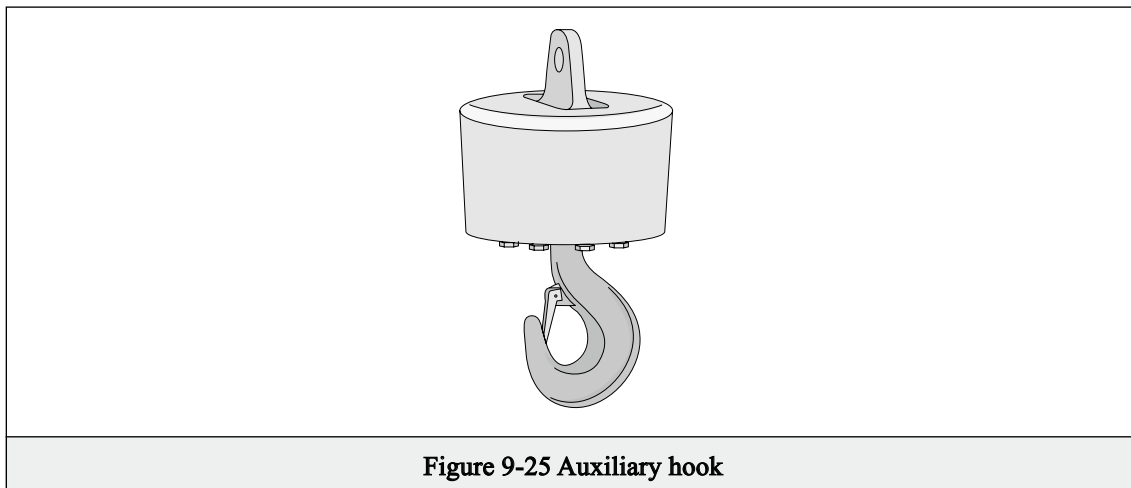


Figure 9-25 Auxiliary hook

9-6-3 Steel wire rope magnification conversion

1. Operating condition

Mount the outrigger well, and the crane arm is fully retracted and rotates to the lateral or rear area:

- a. After falling down the arm, the hook is fallen down to the ground.
- b. Dismount the arm boom head rope block (Figure9-26) .

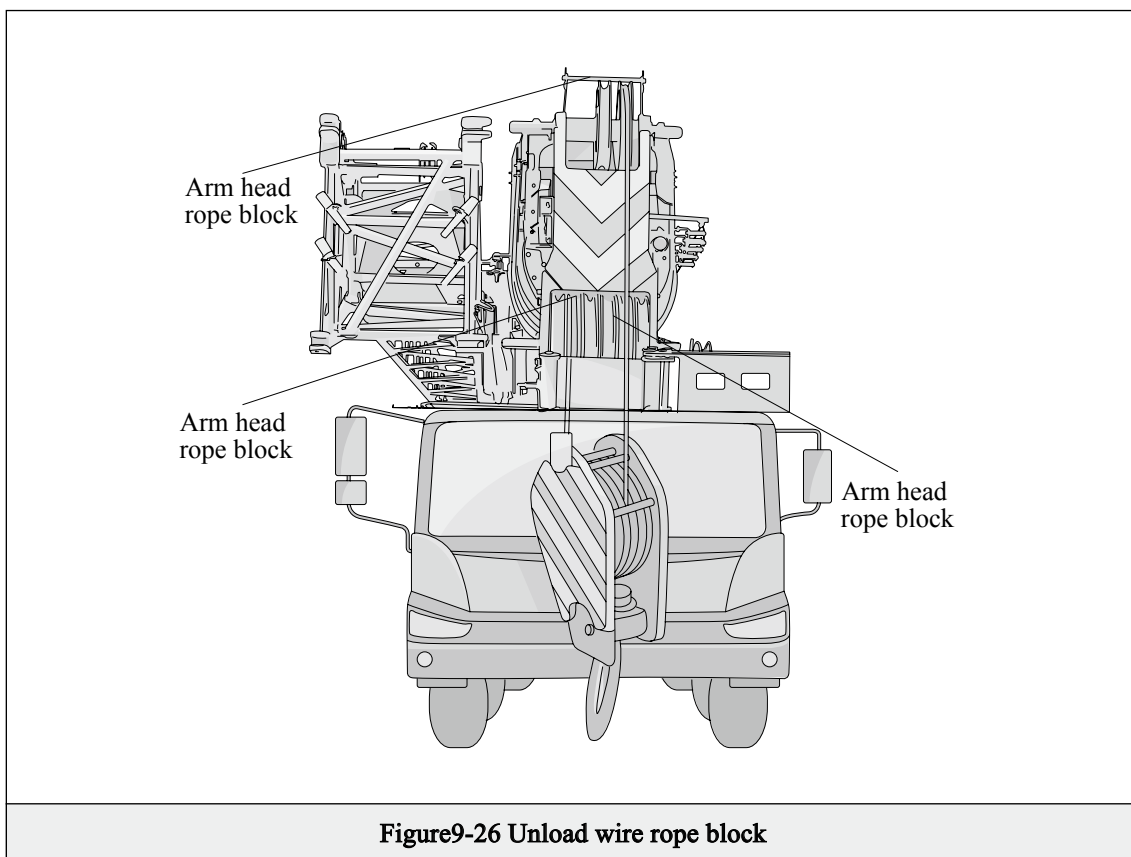
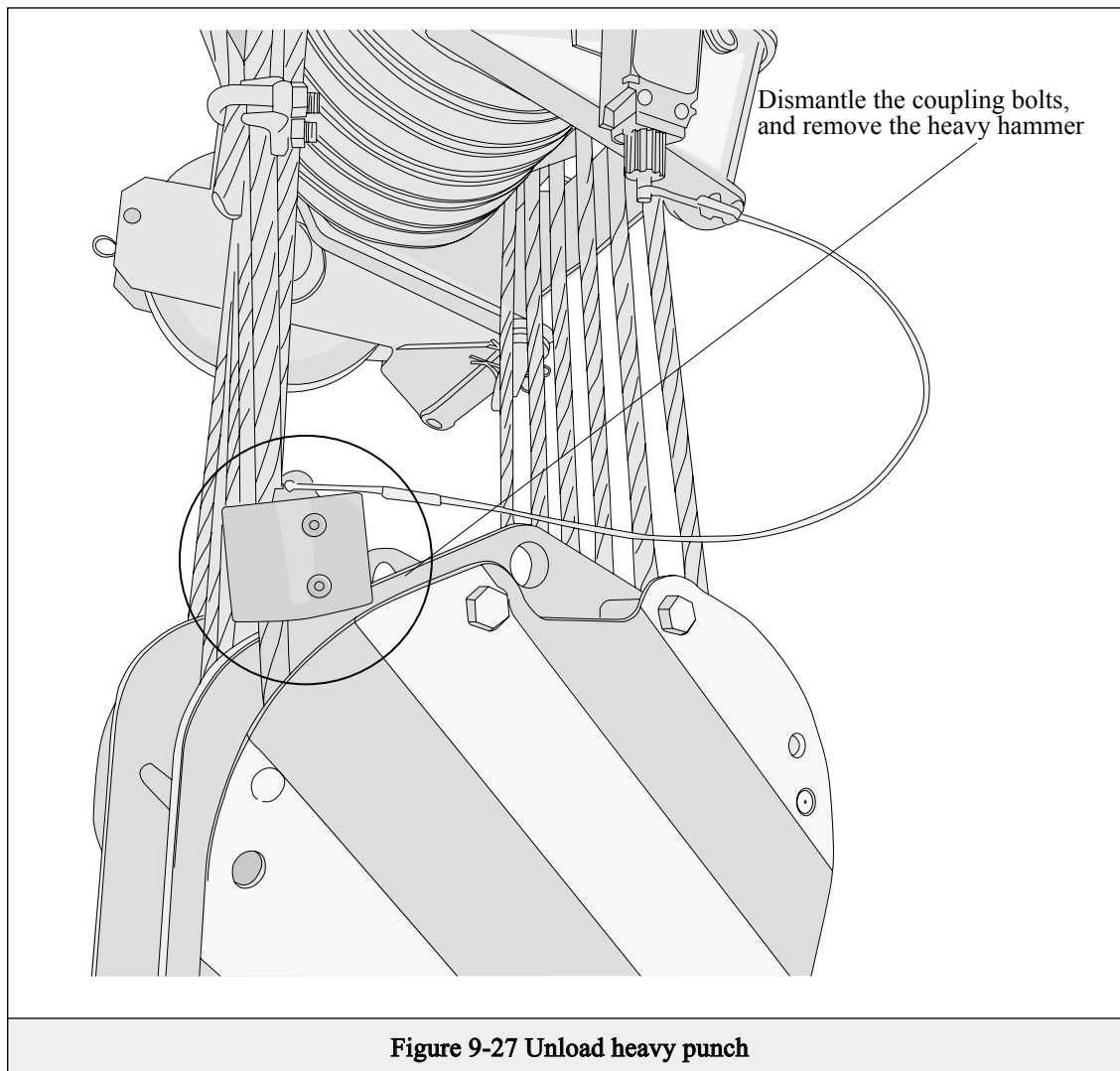


Figure9-26 Unload wire rope block

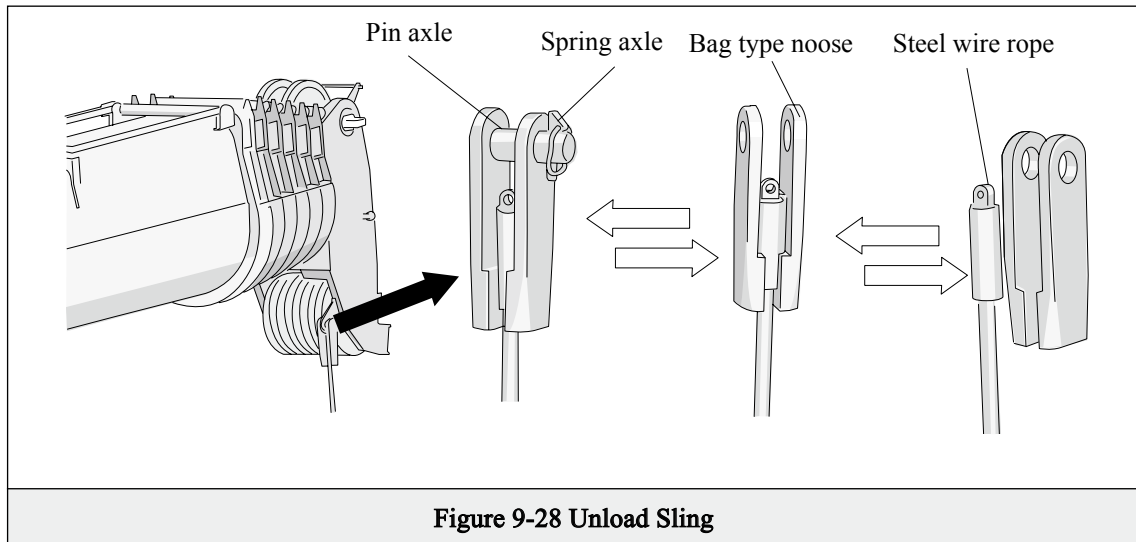


c. Unload heavy punch from steel wire rope (Figure9-27).



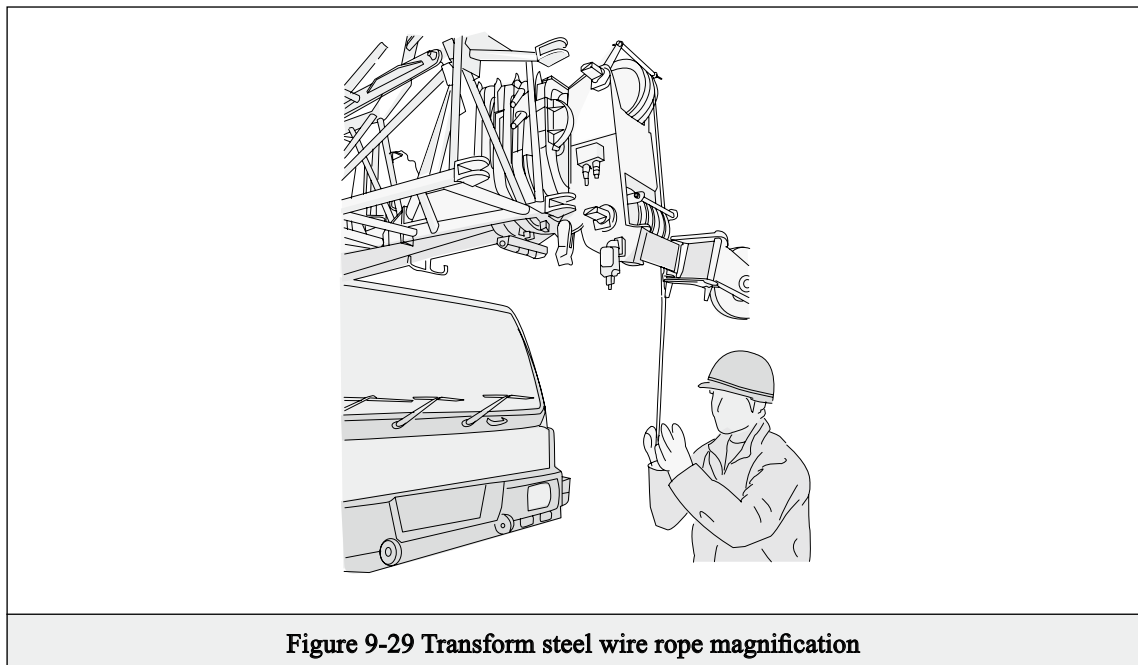


d. Dismount sling (Figure 9-28) .



e. Transform steel wire rope magnification

While falling the hook, one should pull the steel wire rope outside (Figure9-29), and the Crossing and winding method of steel wire rope see 9.6.4.



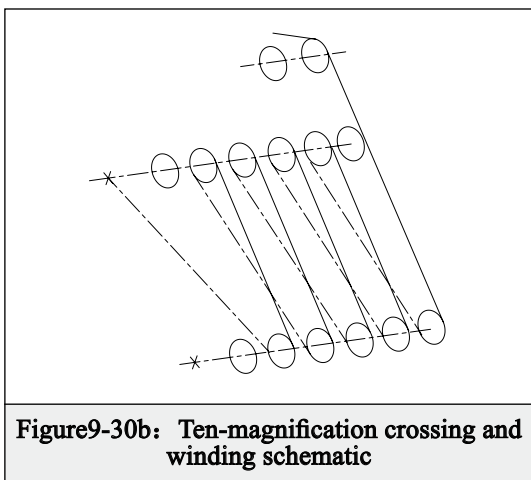
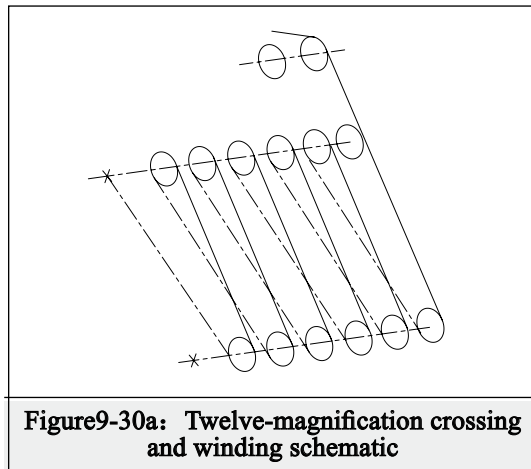
Protective gloves should be properly worn during the operation to avoid scratches.

9-6-4 Crossing and winding method of steel wire rope

According to the different requirements of the load, select the appropriate steel wire rope magnification in accordance with the rated crane weight table. Choosing much smaller magnification may lead to single rope tension overload and much bigger magnification may lead to the hook hardly falling down to the ground, at the same time obtaining a lower weight lifting speed.

1. When lift weight with a twelve magnification, cross and wind steel wire rope according to the method as shown in Figure9-30a.

2. When lift weight with a ten magnification, cross and wind steel wire rope according to the method as shown in Figure9-30b.





3. When lift weight with a eight magnification, cross and wind steel wire rope according to the method as shown in Figure9-30c.

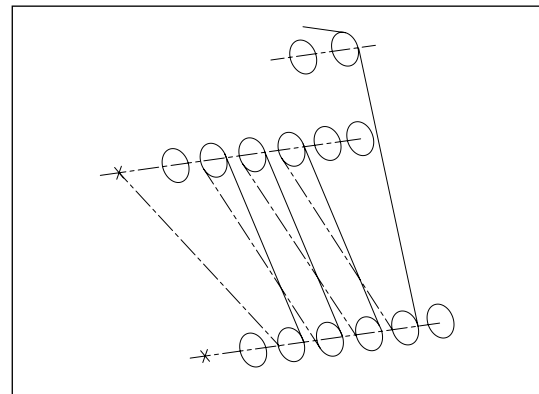


Figure9-30c: Eight-magnification crossing and winding schematic

4. When lift weight with a six magnification, cross and wind steel wire rope according to the method as shown in Figure9-30d.

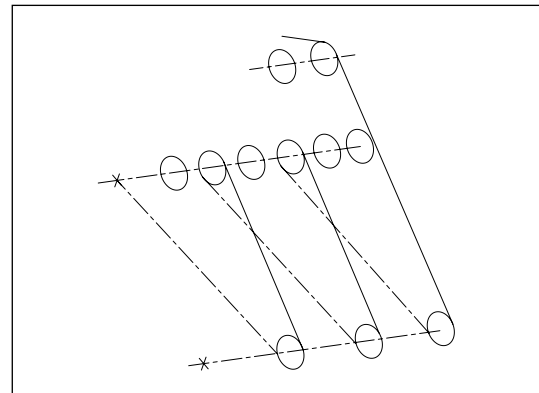


Figure9-30d: Six-magnification crossing and winding schematic

5. When lift weight with a five magnification, cross and wind steel wire rope according to the method as shown in Figure9-30e.

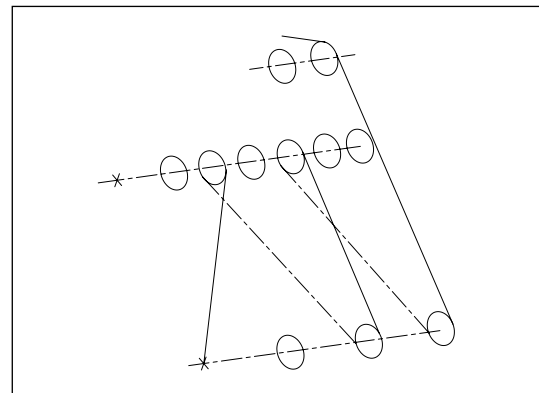


Figure9-30e: Five-magnification crossing and winding schematic

6. When lift weight with a four magnification, cross and wind steel wire rope according to the method as shown in Figure9-30f.

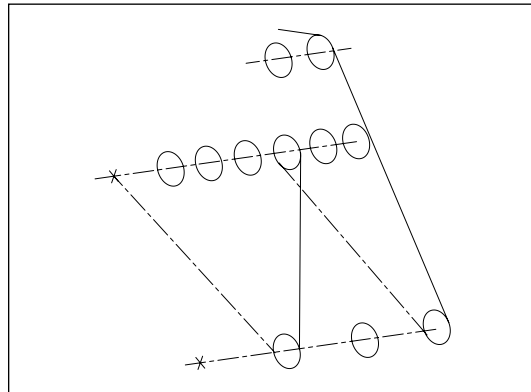


Figure9-30f: Four-magnification crossing and winding schematic

7. When lift weight with a three magnification, cross and wind steel wire rope according to the method as shown in Figure9-30g.

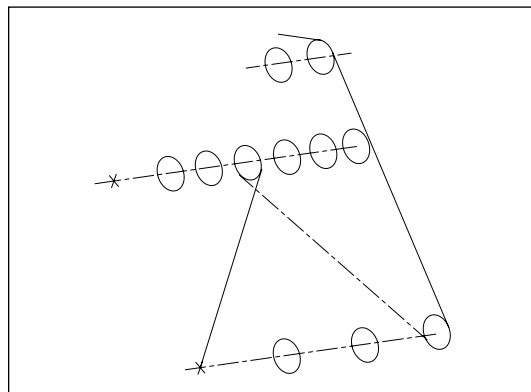


Figure9-30g: Three-magnification crossing and winding schematic

8. When lift weight with a two magnification, cross and wind steel wire rope according to the method as shown in Figure9-30h.

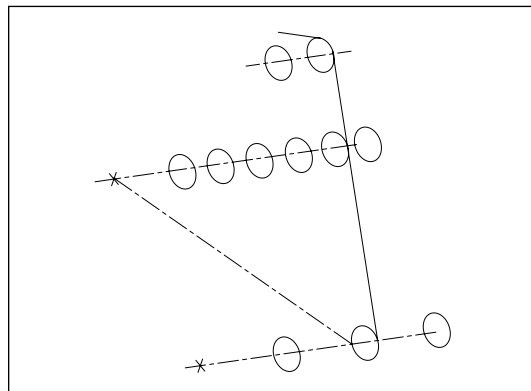
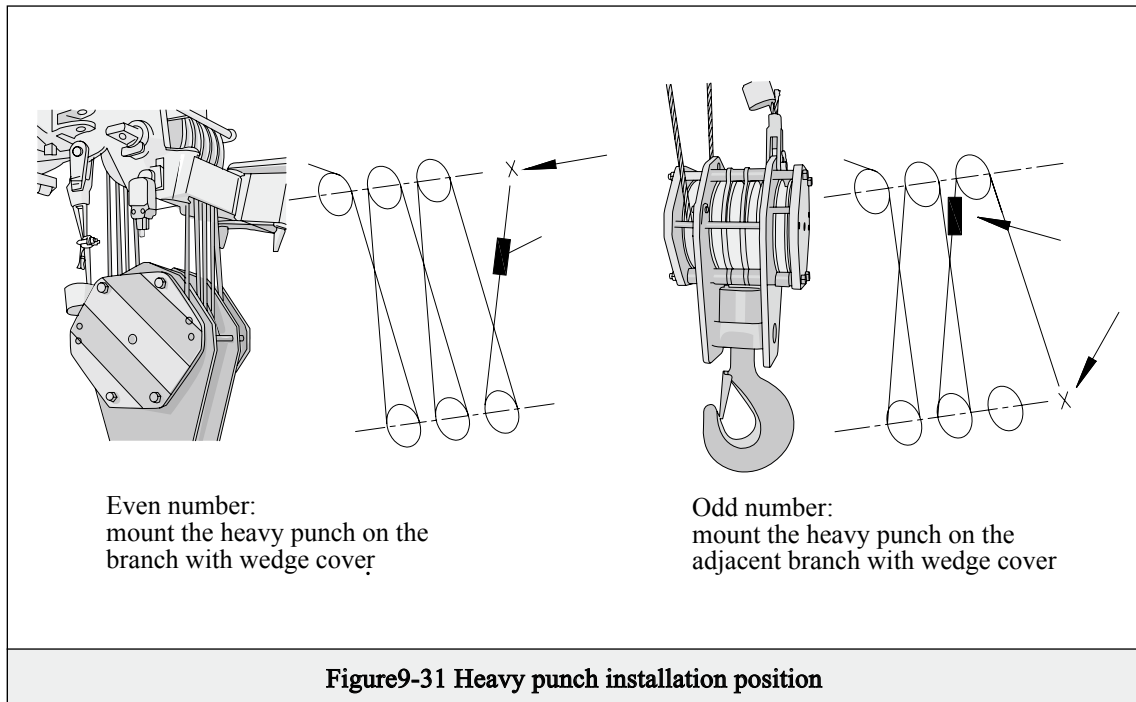


Figure9-30h: Two-magnification crossing and winding schematic



9-6-5 Crossing and winding of steer wire rope precautions

1. The over winding stop device heavy punch installation position varies in accordance with odd or even number of magnification (see heavy punch installation position in Figure9-31)



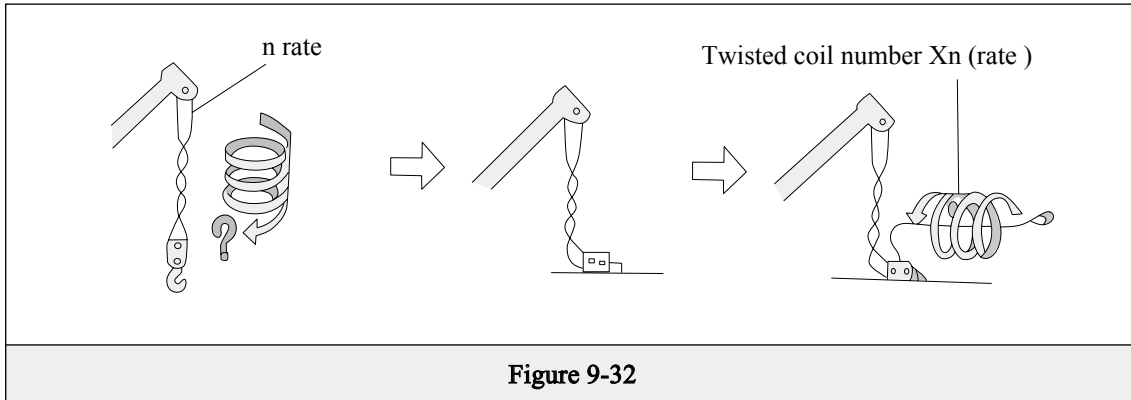
2. In the operation process one should make the steel wire rope to keep certain tension. When the hook is lowered to the ground and the steel wire rope has no longer load, one should not do the winding lifting operation again, otherwise that easily leads to the rope disorder.

3. When crossing and winding new steel wire rope wear onto the winding drum, care should be taken not to make it twist, because the steel wire rope twisting may generate conditions of looping, kinking or bending in the rope.

4. After winding the new steel wire rope, one should carry out some operations to the crane with approximately 10% of rated load.

5. Steel wire rope inspection and scrap is executed according to GB/T 5972 "crane steel wire rope maintenance, installation, inspection and scrap".

6. The crane uses imported anti-rotation high-quality steel wire rope, so in general no rotation would happen. In case steel wire ropes are twisted together, please correct that as the following steps(Figure9-32).



- a. Check the steel wire rope twisted direction and record the twisted coil number.
- b. Fall the hook down to the ground (if the hook can fall, drop the crane arm).
- c. Remove the sling from the hook (or crane arm), rotate it with n times of twisted coil number(from step①) along the steel wire rope twisted direction, and then fix the rope end onto the hook (or crane arm).



Rotate one time but no more than five coils (including five coils) n : magnification.

- d. Fully extend the crane arm out with the maximum elevation angle, and repeatedly operate lifting and falling of the hook several times.
- e. Repeatedly operate the steps above until the twisted phenomenon disappears.



In case after adopting these steps, there is still having twisted phenomenon, so the replacement of new steel wire ropes is needed.

7. When wind the first layer onto the winding drum, one should apply appropriate tension to the steel wire rope.

8. Regularly exchange the steel wire rope of the hook end and the winding drum end to avoid the steel wire rope bears various loads, which can significantly improve the steel wire rope utilization rate and service life.



9. On each working day, one should observe all visible parts of any steel wire rope as far as possible to find the general damage and deformation. Special attention should be paid on the steel wire rope connection parts onto crane. Any suspicious changes of steel wire rope state should be reported, and the personnel in charge implement inspections according to the regulations. The parts for regular inspection by the personnel in charge are as follows:

a. General portion:

1) Although the whole steel wire rope is taken for full inspection, special attention should be paid to the following location;

2) The start and end parts of the movable and fixed steel wire rope

3) The rope section going through the pulley group and bypassing the pulley.

b. Rope end portion:

Check the broken wires and corrosion within the bag type rope and rope end.



LOG



Chapter 10 Crane operation

10-1 Crane operation preparations

Two conditions of the safe use of the crane: good state equipments and well trained operators.

10-1-1 Check before crane runing

1. Detailed reading the engine specification relating to its start and stop section.
2. Check the hydraulic oil level of crane and ensure that the hydraulic oil quantity reaches a prescribed value.
3. Check any components state, confirm no abnormal phenomenon and strictly forbidden for operating under abnormal conditions.
4. After starting the engine, it runs with slow speed and idling to make the engine full preheating.
5. Before switch on the power take-off device, one must confirm that any operation handles and switches are located in the "medium" or "off" position.
6. When the operation without load, ensure that any control handles and switches have no abnormal phenomenon, and strictly forbidden for operating under abnormal conditions.
7. Before operating the torque limiter, it should be pre-checked (see "torque limiter manual").
8. Check all safety devices (such as alarm indicator lamp) with or without abnormal phenomenon.

9. Before the crane operation, the power switch should be turned off in operating room of lower crane portion.

10-1-2 Crane operation conditions check

The crane operators must obtain or trying to investigate the following conditions before driving the crane to the construction site:

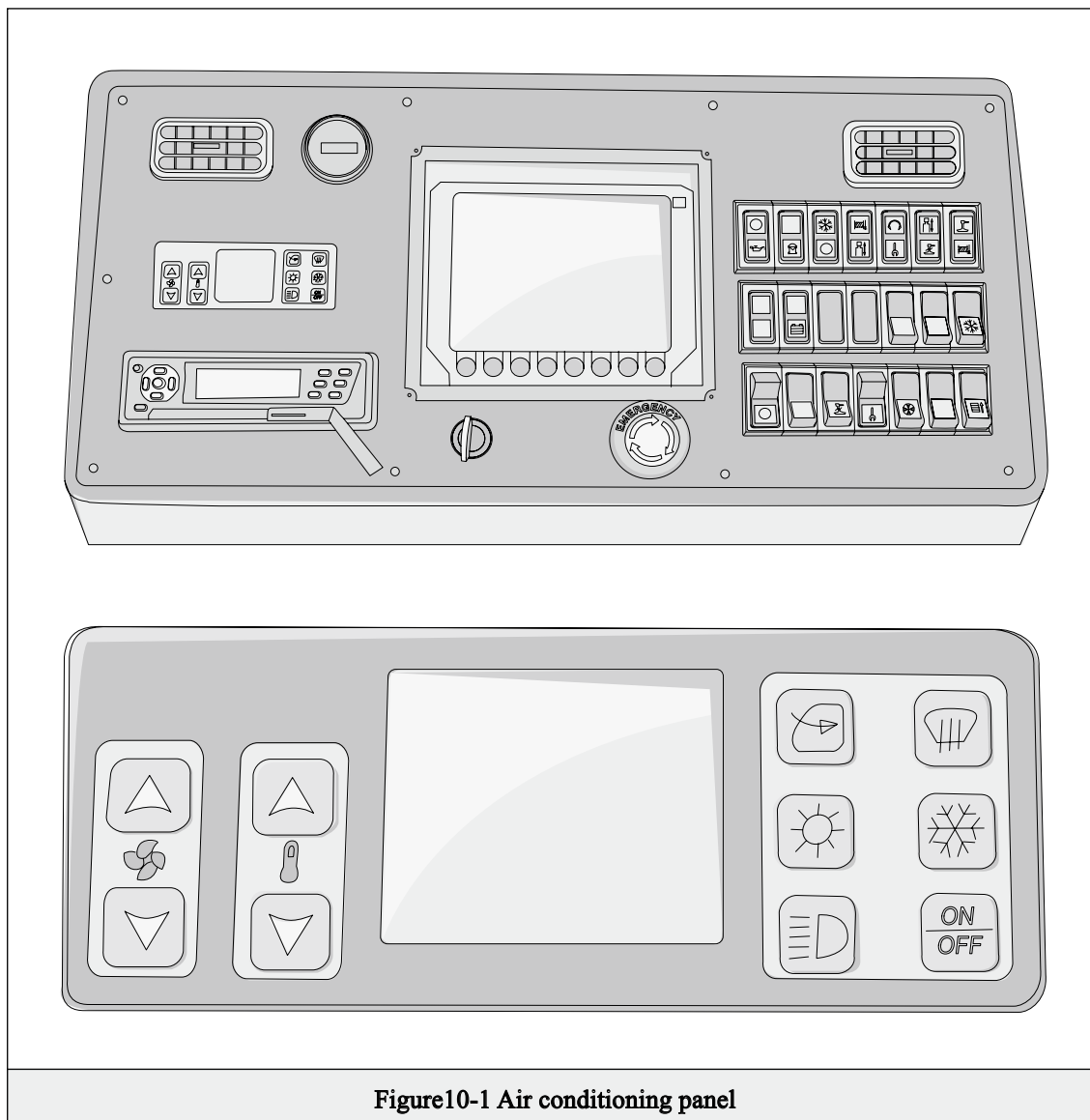
1. Operation type;
2. Construction site(distance);
3. Passing height and road width along the way;
4. Wire case overhead the operation ;
5. Operating conditions limit due to surrounding buildings;
6. Weight and shape size of the lifting heavy;
7. Lifting and falling height;
8. Foundation bearing capacity, etc.

After obtaining these details, the crane operator can determine to mount the necessary lifting device and master the lifting working conditions: such as the lifting hook; the auxiliary boom; the support pad; the operating route selection; approval of driving the crane.

If the driver does not master the necessary lifting working conditions, it is difficult to finish the task successfully. Therefore, before the operation, the operator should do well all kinds of preparation work to prevent accidents.

10-1-3 Air conditioning equipment use

The control room air conditioning control device is located in the left side of the instrument panel. Please select the appropriate temperature range depending on the operating environment temperature.





The display panel consists of a LCD display and 10 keys, which is used for setting room temperature and wind direction in operating room to when using cooling and warming air conditioning, see figure10-1.

1. Display panel and symbol instructions

Setting symbol: SET

Inner loop symbol:

Temperature display symbol:

Outer loop symbol:

First gear wind speed symbol:

Auto symbol: AUTO

2. Button instruction

a. Temperature regulation key:



1) Temperature increasing key:



On the crane inner temperature display state, press this key to display a setting temperature, at this time press the key each time again, the setting temperature increases 1 °C, press the key continuously, the setting temperature continuously increases, and the set temperature is higher than 29 °C then displaying HI. The set temperature display is a flashing display, and after 5 seconds the inner temperature display is automatically recovered.

2) Temperature decreasing key:



As to the second to the sixth gear speed symbols, the gear increases by one gear in turn based on the first gear wind speed symbol.

On the crane inner temperature display state, press this key to display a setting temperature, at this time press the key each time again, the setting temperature decreases 1 °C, press the key continuously, the setting temperature continuously decreases, and the set temperature is lower than 17 °C then displaying LO. The set temperature display is a flashing display, and after 5 seconds the inner temperature display is automatically recovered.

b. Wind speed regulation key:



1) Wind speed increasing key:



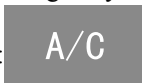
On no wind state, press the key, the wind speed changes to the first gear. On wind speed state, press the key, the wind speed increases one gear. When the wind speed rises to the top and then press the key, the wind speed does not change any more.

2) Wind speed decreasing key:



On no wind state, press the key, the wind speed changes to the first gear. On wind speed state, press the key, the wind speed decreases one gear. When the wind speed rises to the lowest gear and then press the key, the wind speed does not change any more.

c. A/C key:



Press this key under conditions that allow compressor opening, the compressor is turned on. Press the button once again, the compressor is turned off.

d. Defrosting key:



Press this key, and the system enters into defrosting mode.

e. Mode key:



Press the key, switching between face blowing, foot blowing and defrost.

f. Cycle key:



Press the key, switching between the inner and outer cycles.

g. AUTO key:



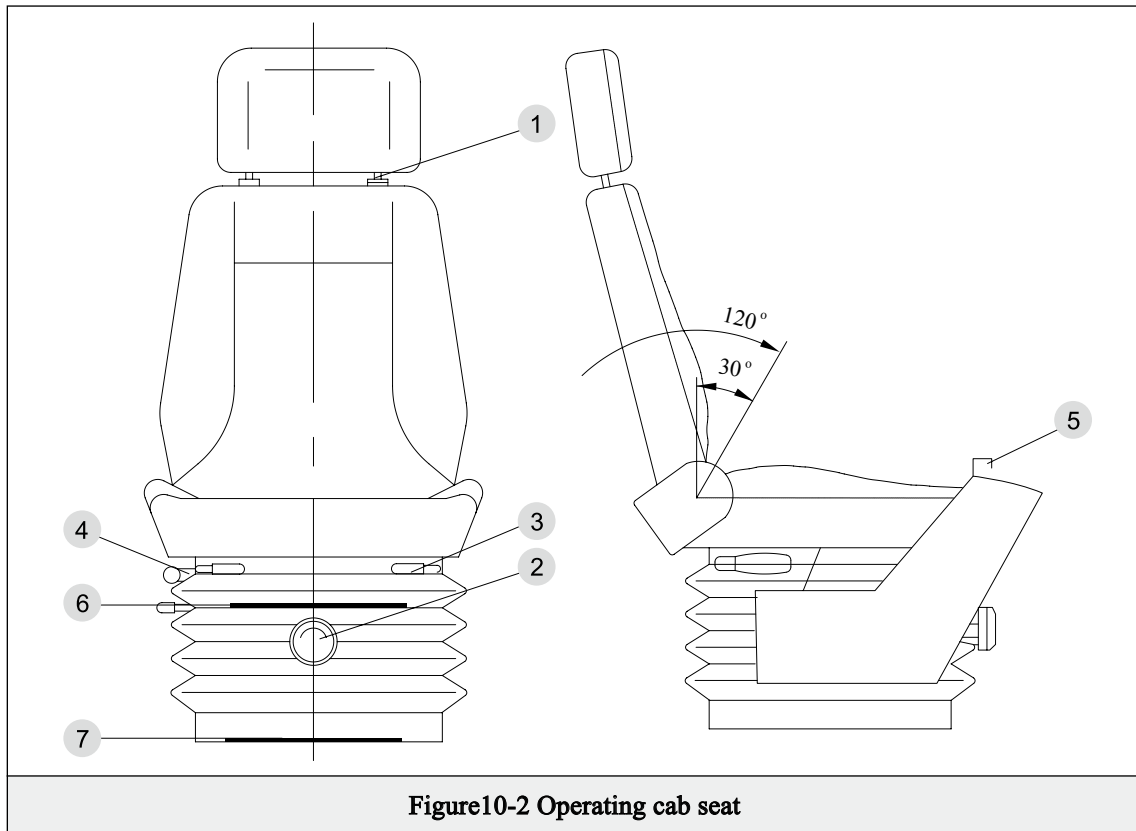
Press the key to enter the auto-run mode. Press the key once again or the A/C key and defrost key, you can exit this mode.

h. OFF key:



On the crane running state, press this key, the system stops running and enters into shutdown state.

10-1-4 Operating cab seat adjustment



No.	Name	No.	Name	No.	Name
1	Headrest height lock switch	2	Damping stiffness adjustment knob	3	Seat height adjustment switch
4	Backrest angle adjustment switch	5	Armrest box uplift switch	6	Upper seat portion back and forth adjustment handle
7	Seat base back and forth adjustment handle				

A driver seat is equipped in operating room (Figure 10-2), the seat height adjustment quantity is 60mm, the front and rear adjustment distance is 170mm, and the backrest angle adjustment range is 120°. The working range of seat damping device can be stepless adjusted according to the human body weight (between 40 and 130kg), and the maximum adjustment range is 50mm. Headrest height adjustment quantity is 40mm.

The methods of seat adjustment are as follows:

1) Headrest height lock: open the headrest height lock switch, pull out or insert the headrest to a proper position by hand, and loose the lock switch to complete the regulation.

2) Stiffness adjustment: According to the driver's own weight, rotate the damping stiffness adjustment knob until you feel comfortable. Clockwise rotation of the load handle is for load weight



increase, and vice versa.

3)Height adjustment: upward pull the height adjustment switch in the front of the seat, you can release seat height locking, and lower seat height by its own weight. Release the switch to lock the position. Pull up the switch, which the body leaves the seat at the same time, the seat can automatically rise. When the switch is released, the seat height is automatically locked.

4)The backrest angle adjustment: pull the backrest angle adjustment switch to release the seat back angle locking. Adjust the body elevation angle to the right position, and release the adjustment switch to complete the backrest angle adjustment.

5)Armrest box uplift switch: pull the switch upward to remove the armrest box lock; the armrest box can automatically lift up depending on the gas spring pushing.

6)Upper seat front and back adjustment: pull up the front and back adjustment handle for the upper seat to release the seat cushion position locking. Move front and back the cushion to the right position and release the handle to complete the front and back adjustment of the upper seat.

7)Seat base front and back adjustment: pull up the seat base front and back adjustment handle to release the seat base position locking. Move front and back to the appropriate location, and release the handle to complete the front and back adjustment of the seat base.



When doing the back and forth adjustment and the backrest angle adjustment, pull the handle upward in place, and after the adjustment, operate the lock. After finishing the adjustment, the handle returns back in place to ensure the reliability of any part locking.



10-1-5 Check the winch steel wire rope position

1. Slowly rotate the winch winding reel to at least release a ring of steel wire rope. At the same time check the released steel wire rope.
2. The steel wire rope must be uniformly rolled on the winding reel.
3. The clearance among steel wire ropes must equal about 0 to 2mm.
4. The intersection angle between steel wire ropes each other is 180° (the upper layer and the lower steel wire rope repeat at cross point).



- When checking, adjust winch monitoring mirror to a proper angle and keep it clean.
- The check in this section is implemented when the crane engine is working.



- When rotating the winch winding reel, there is an accident risk.
- Ensure that you and other personnel are far away from the winding reel. If you hold the winding reel, your finger and arm may be squeezed between the winding reel and winch bracket or be involved by the winding steel.

10-1-6 Check safety device



- When operating the crane, must use the safety device and strictly prohibit the bypass security device.
- The defective safety device must be repaired by Xuzhong customer service professionals.

1. Check crane torque limiter

After the test program is running, check if:

- a. Display error messages
- b. The early stage alarming and the closing alarm lamps light
- c. Continuous alarm sound

If none of the above circumstances occur, the lifting torque limiter is normal.

2. Check height limit switch

- a. Lift up the main boom.
- b. Slowly lift the hook until the hook closes to the height limit switch heavy punch place.
- c. Check whether the height limit switch off alarm lamp lights or not.
- d. Check whether the crane action of increasing crane torque is effective or not. Check all crane actions of increasing crane torque. (Lifting load/uplift main boom/stretching main boom).

If the height limit switch off alarming lamp lights and the action of increasing crane torque stops, then the height limit switch is normal.

3. Check the crane control emergency stop switch

- a. Put the load down and loose two control handles.
- b. Press the crane control emergency stop switch down.

If the crane engine stops, the crane control emergency stop switch starts working normally.

4. Check rotary table lock device

Before the slewing operation, must remove the rotary table lock device (lift up rotary table mechanical lock).Detailed instructions see 8.4.10.

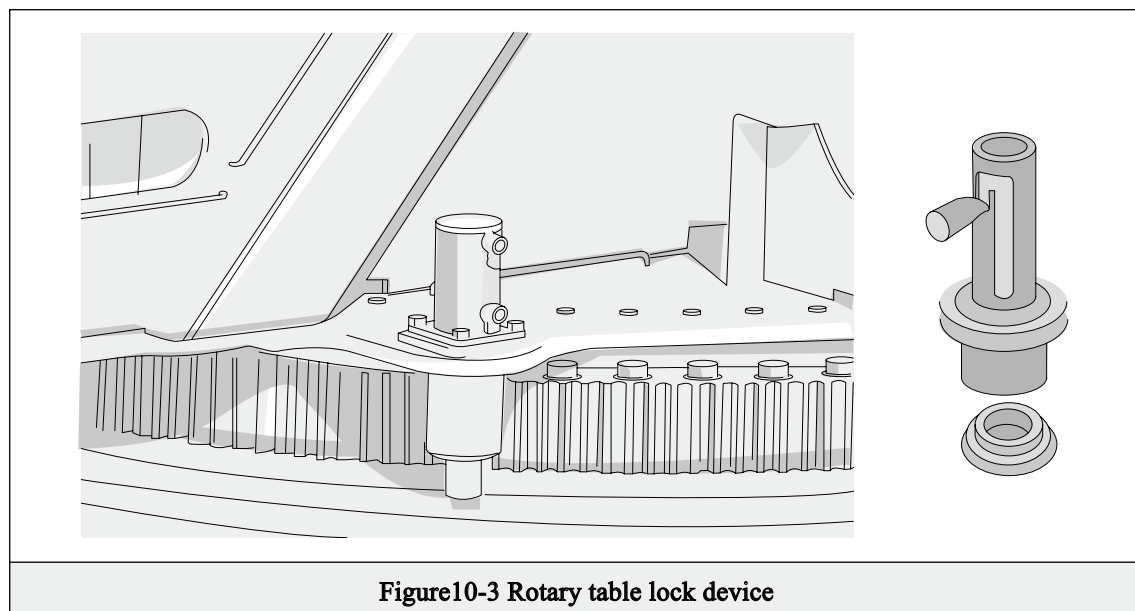


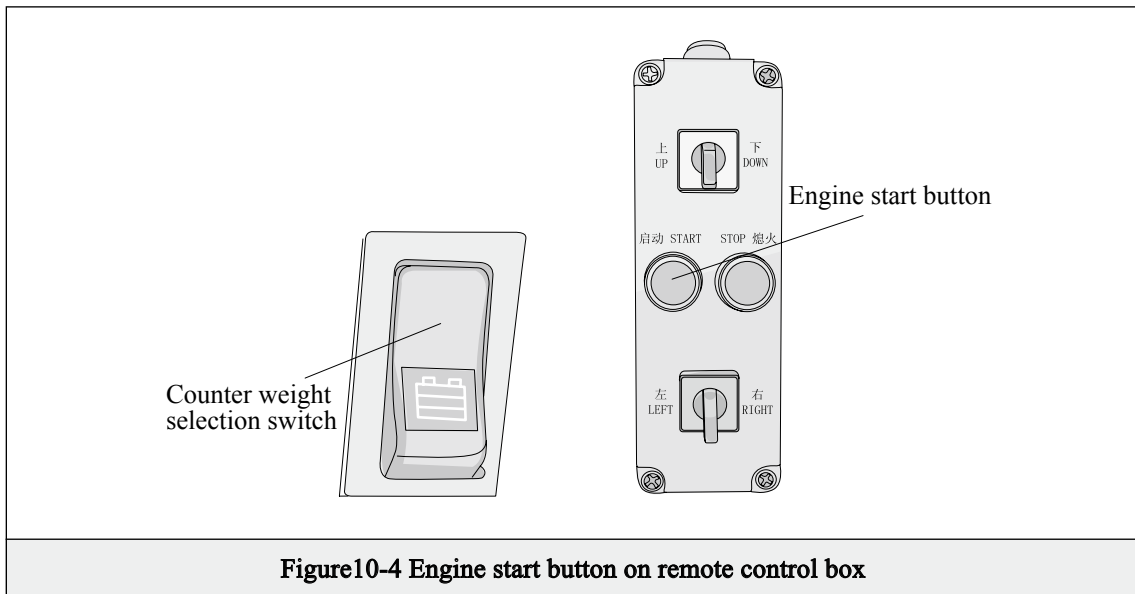
Figure10-3 Rotary table lock device



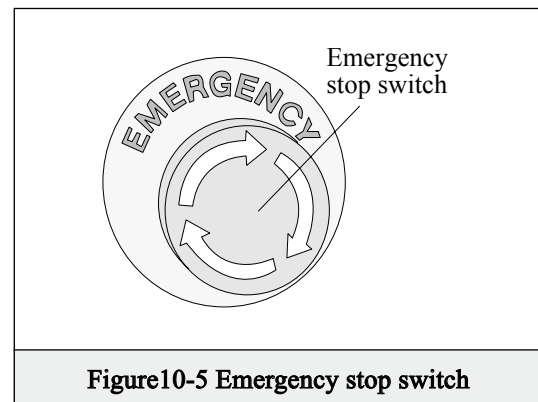
10-2 Engine operation

The engine operation method please refers to the content 7.2. In addition to 7.2 of the described engine operation, the following several situations can also start the engine.

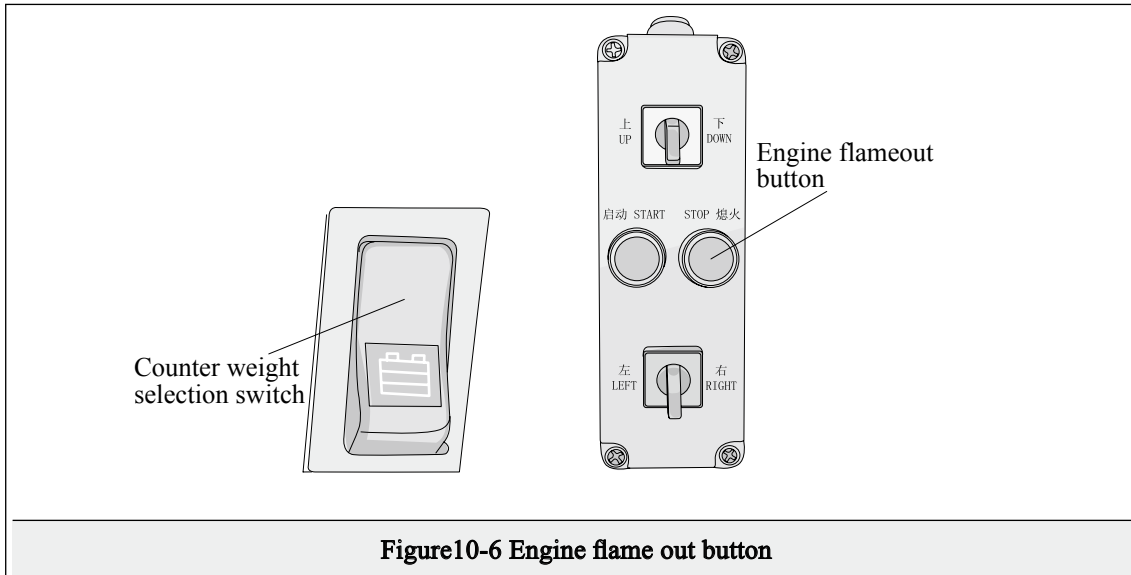
1. Press "weight selection switch" down in operating room, then use the engine start button in remote control box to start the engine.



2. In case of emergency, press the emergency stop switch on the dashboard and the engine can be of flameout. After the flameout, should reset the switch timely.



3. Press the counter weight selection switch in operating room, and then use the engine flameout button on remote control box to shut it down.



10-3 Power take-off operation

Power switch is located in the chassis cab. When the crane needs to open outrigger and does the upper crane portion operations, firstly park the crane in a safe position.

When the engine is at an idling state, place the gear control lever in the neutral position, stamp the clutch pedal to completely separate the clutch, put the shift lever in the 4th gear position, turn on the power take-off switch, release the clutch pedal, at the moment the power take-off gear and transmission gear are smoothly meshed, and the power take-off starts working.

Conversely, stamp the clutch pedal to separate the clutch, turn off the power take-off switch, and then place the shift lever into the neutral position, release the clutch pedal, at the moment the power take-off gear and transmission gear are smoothly separated.



- Before pulling out the power take-off switch, the air pressure should be greater than 0.45MPa, (low pressure alarm indicator lamp is off).
- When driving, the power take-off switch must be placed in the off position.
- When operating the power take-off switch, the clutch must be completely separated.

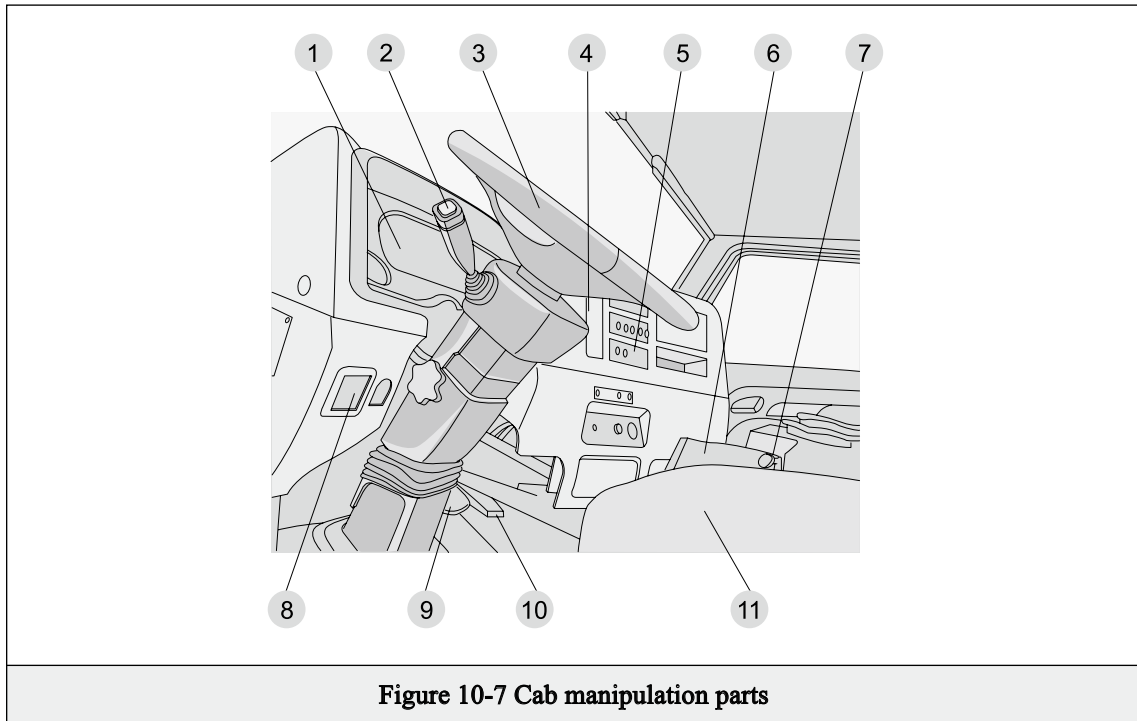


Figure 10-7 Cab manipulation parts

No.	Name	No.	Name	No.	Name
1	Combination instrument	2	Lighting master switch	3	Steering wheel
4	Exhaust brake, wiper switch	5	Control panel assembly	6	Gearbox lever
7	Hand brake lever	8	Electric rearview mirrors	9	Foot brake pedal
10	Foot accelerator pedal	11	Seat		

Cab operating panel and rocker switches are shown below:

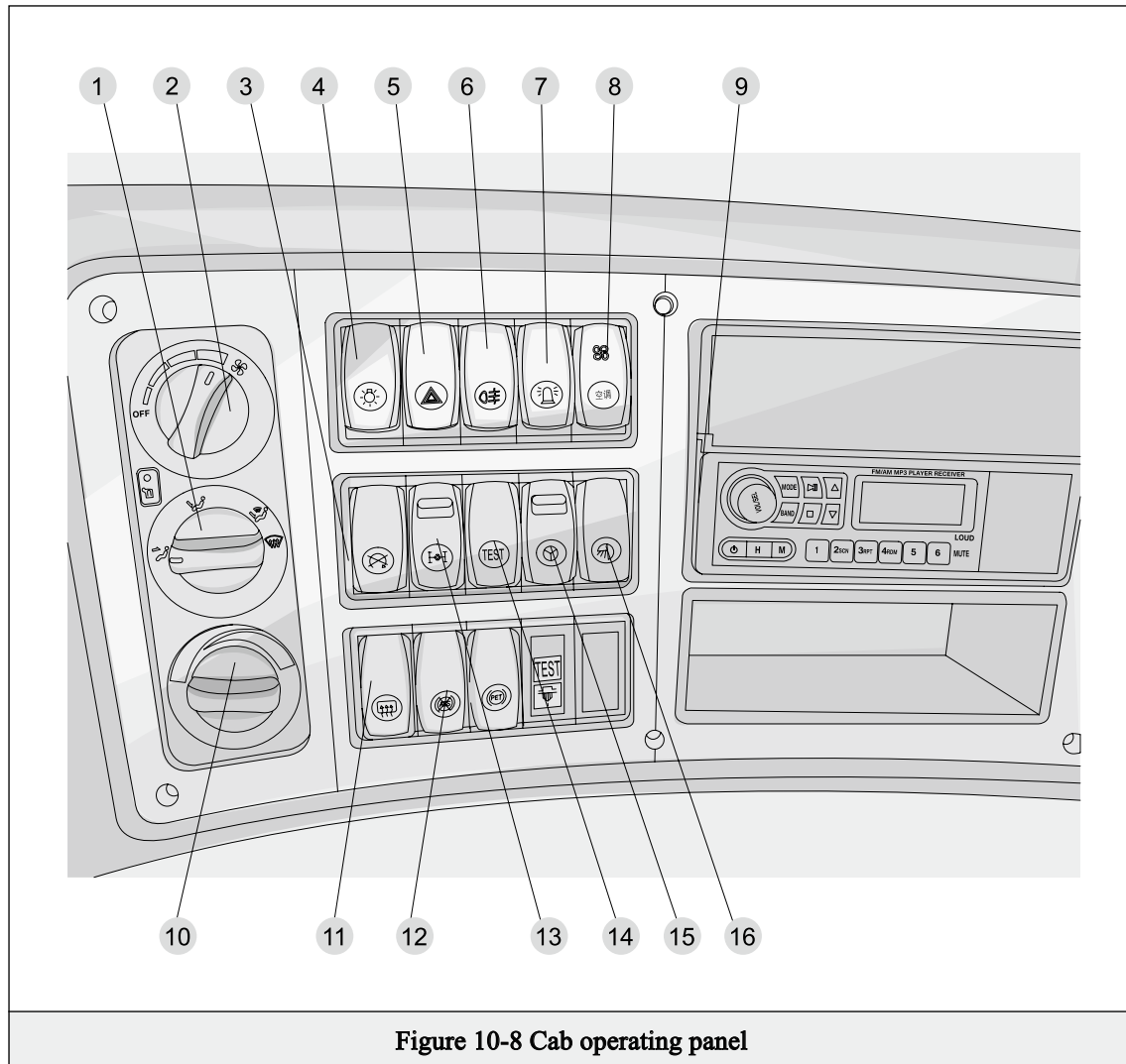


Figure 10-8 Cab operating panel

No.	Name	No.	Name	No.	Name
1	Wind direction adjustment switch	2	Wind speed adjustment switch	3	Flameout switch
4	Lighting switch	5	Emergency switch	6	Fog lamp switch
7	Warning light switch (optional)	8	Air-conditioning switch	9	Radio cassette
10	Cold and warm selection switch	11	Power take-off switch	12	ABS failure switch (optional)
13	Inter-axle differential switch	14	Outrigger lamp switch	15	Diagnosis switch
16	Rearview mirror heating				



10-4 Outrigger system operation

10-4-1 Operating precautions

1. Ensure that there is enough space for completely unfolding the crane outrigger

Automobile crane in work should be placed in a much wider place, prevent the outrigger touching the barrier when outrigger unfolding or moving, and after the outrigger fully unfolding, will the upper crane operations do so as to be able to successfully complete the heavy lifting work. The outrigger longitudinal span is 8.075m, and the outrigger lateral span with full stretching is 7.9m. When operating, must use the corresponding crane performance table;

2. Supporting ground selection

a. The crane should in principle be with a horizontal state located on the flat and solid ground, and when in case the outrigger must be mounted on a soft or sloping ground, it must level no matter what supporting ground conditions; The whole machine inclination should be in the range of $\leq 1\%$, or you must pad steel plate or stow-wood into the bottom of the outrigger plate, otherwise there is the danger of turning over.

b. When factors of reducing the ground stability appear, must immediately put down the weight and retract the crane boom, and after removing factors, support the crane again out according to request. Factors of reducing stability include: rain, snow or other water sources leading to the ground conditions change; the ground of supporting outrigger side sinks; supporting outrigger oil cylinder leaks.



Prohibit supporting blocks placed on the cave; prohibit supporting block deformation (not flat); select the appropriate supporting mode, prohibit supporting on the slope, and prohibit mounting the crane on the condition of the horizontal outrigger not fully extending.

3. Outrigger supporting on special ground

When the crane working position located at the riverside and the road shoulder edge place, one need pay special attention. Due to the loose soil of the riverside and the road shoulder edge, it is most dangerous for the crane outrigger. When operating in these situations, firstly lay several supporting reinforcement stakes near the foundation of the crane outrigger, then properly backfill rough stones or rubbles to enlarge the supporting area, if necessary, can pave sleepers.

4. Load of supporting ground

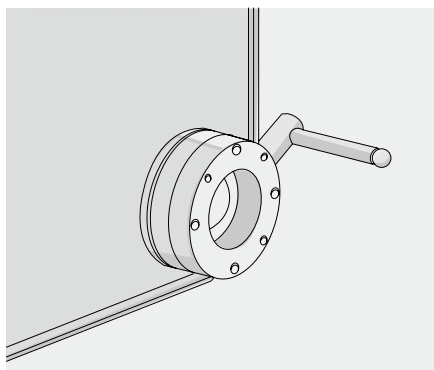
The crane must be supported on solid ground, and the supporting ground loading capacity should be checked before the crane operating.

5. Check hydraulic cylinder oil level

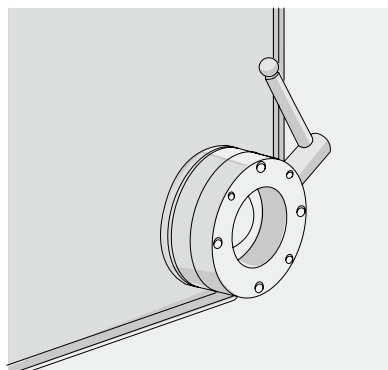
Before preparing for the crane operation, firstly check the hydraulic oil level, if the oil level is below the required level, one should in time supplement oil to the specified level. Oil supplement method: open plane air cleaner cover on cylinder, add hydraulic oil of same brands through the air cleaner.

6. Check the cut-off valve status

Check the cut-off ball valve on the suction line between the fuel tank and the pump is in the OFF or the through-flow state. The cut-off ball valve must be in through-flow state before the hydraulic system works, through-flow state is shown in Figure 10-9a, and OFF state in Figure 10-9b.



A Through-flow state



B OFF state

Figure 10-9 Cut-off ball valve state diagram

10-4-2 Outrigger operation composition

1. Outrigger structure as shown in figure 10-10.

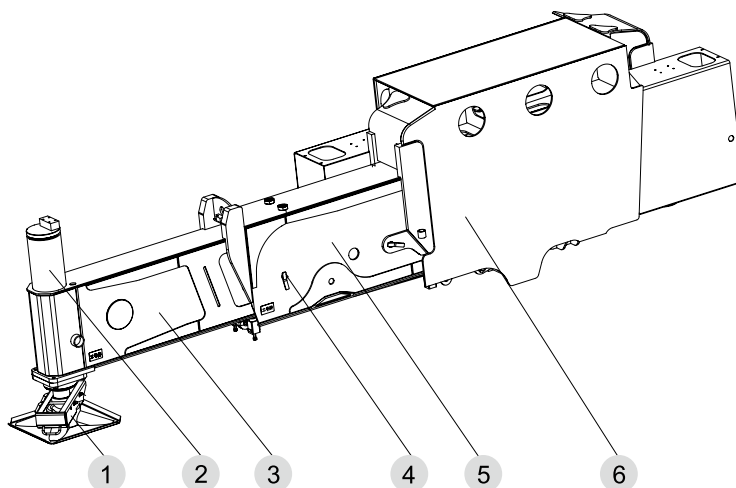


Figure10-10 Outrigger structure sketch

No.	Name	No.	Name	No.	Name
1	Foot plate	2	Outrigger vertical cylinder	3	Movable outrigger grade I
4	Outrigger locating pin	5	Movable outrigger grade II	6	Fixed outrigger



2. Constitute of front outrigger manipulation

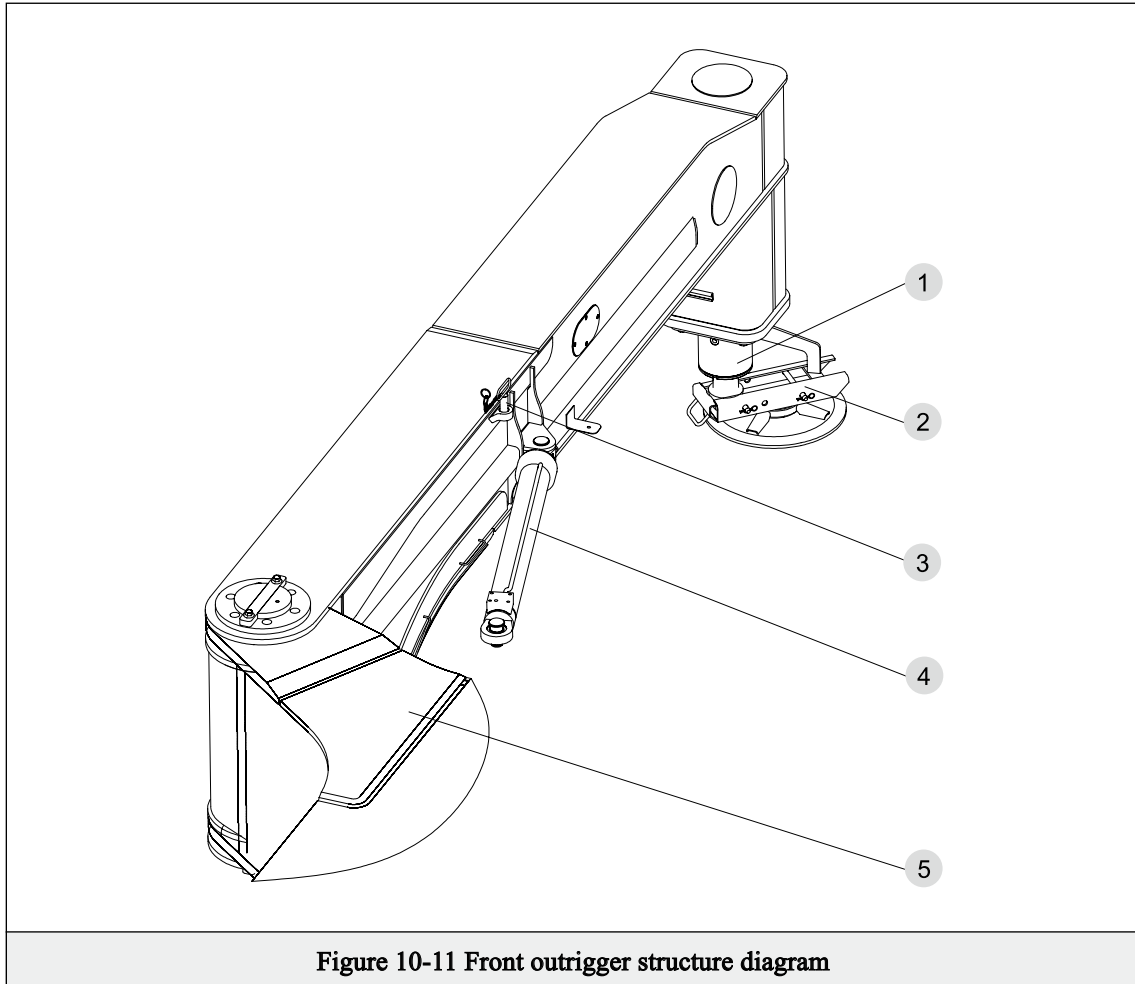


Figure 10-11 Front outrigger structure diagram

No.	Name	No.	Name	No.	Name
1	Outrigger vertical cylinder	2	Stabilizer plate	3	Outrigger positioning pin
4	Outrigger swing cylinder	5	Frame		



In Figure 10-11, when outriggers stretch out, the outrigger positioning pins (3 in Figure 10-11) must be pulled out, and when the outriggers retract, the outrigger positioning pins must be placed in the position shown in Figure 10-11.

3. Outrigger operation

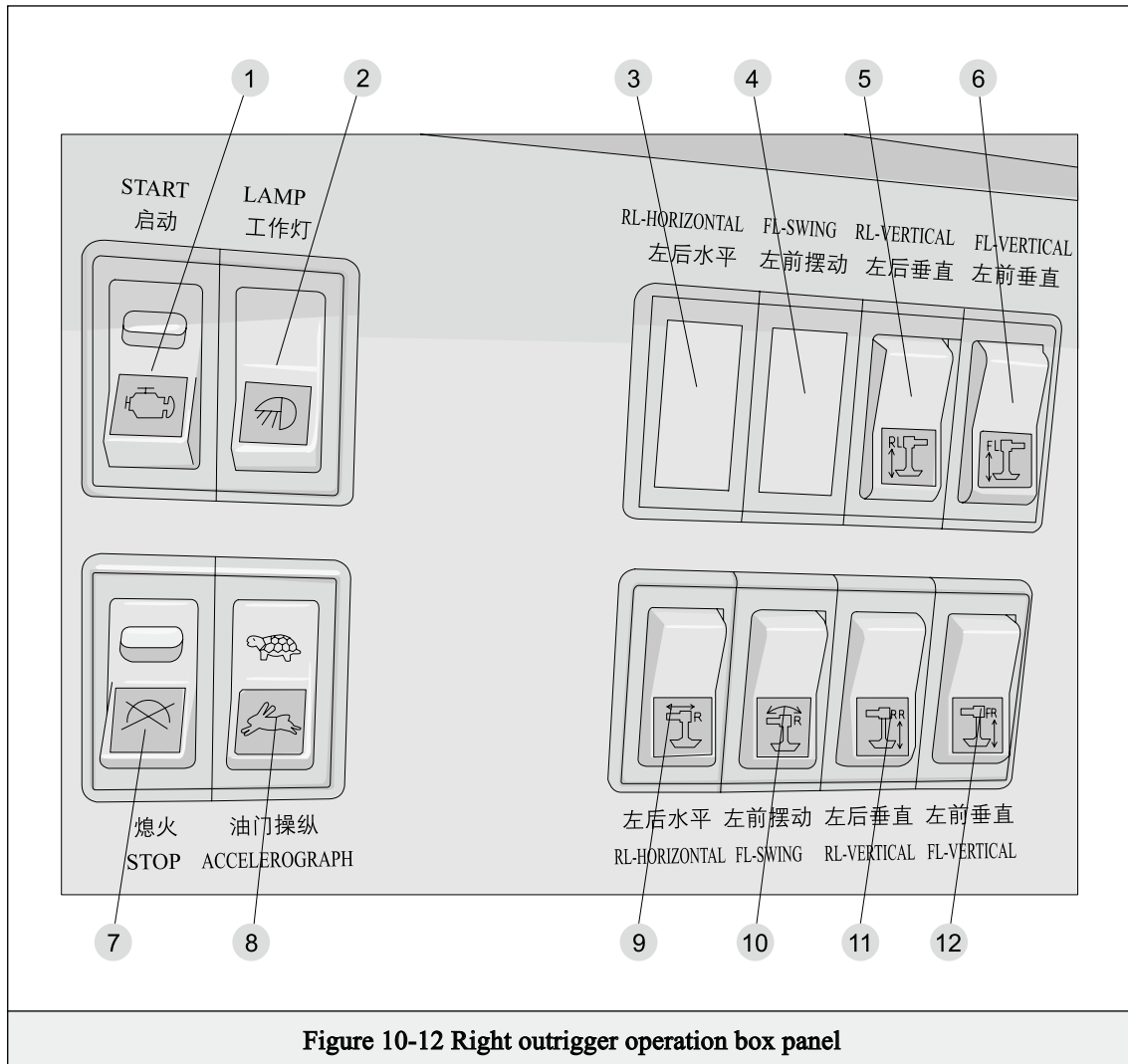


Figure 10-12 Right outrigger operation box panel

No.	Name	No.	Name	No.	Name
1	Engine ignition switch	2	Outrigger light switch	3	Blank panel
4	Empty panel	5	Left rear outrigger vertical cylinder switch	6	Left front outrigger vertical cylinder switch
7	Flameout switch	8	Engine throttle switch	9	Right rear outrigger horizontal cylinder switch
10	Right front outrigger swing cylinder switch	11	Right rear outrigger vertical cylinder switch	12	Right front outrigger vertical cylinder switch

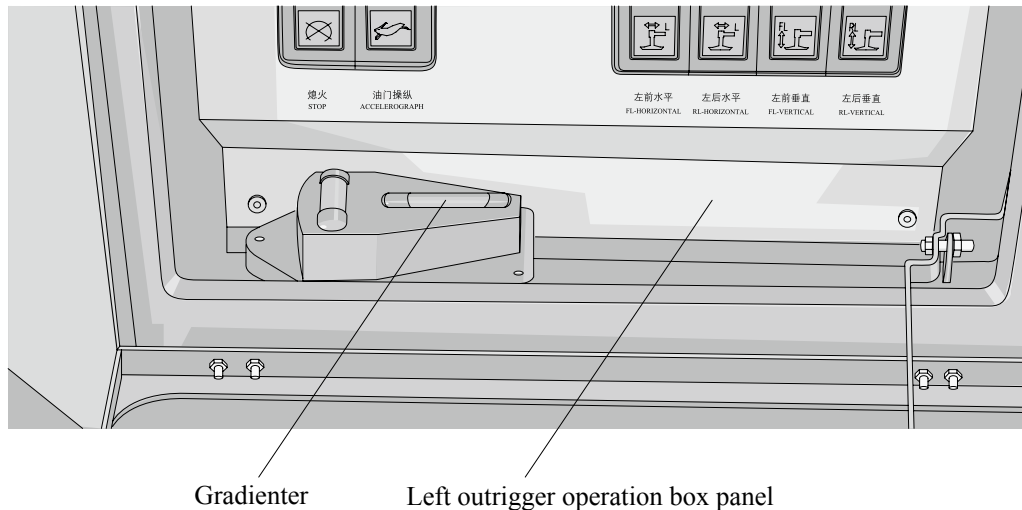


Figure 10-13 Left outrigger operation box

The outrigger operation box is around the third and fourth axis, each one on the right and left side. The right outrigger operation panel is shown in Figure 10-12, 1 is engine ignition switch; 2 is outrigger light switch, which is used for lighting of outriggers during night work. 7 is the flameout switch; 8 is the engine throttle switch, which can be pressed to increase the engine speed. When the engine throttle switch is reset, the engine returns to the idle state.

The left outrigger operation box is shown in Figure 10-13. The function of left operation panel is basically the same with the right operation panel, with the difference as follows: on the left panel, No. 5 in Figure 10-12 is changed into the right front outriggers vertical cylinder switch, No. 6 is changed into the right rear outrigger vertical cylinder switch, No. 9 is changed into the left front outrigger swing cylinder switch, No. 10 is changed into the left rear outrigger horizontal cylinder switch, No. 11 is changed into the left front outriggers vertical cylinder switch, and No. 12 is changed into the left rear outriggers vertical cylinder switch.

Press the power take-off switch in the cab, the power take off indicator light goes on, and then you can operate the outriggers.

No. 1 in Figure 10-13 is a gradienter. When the level bubble of the gradienter is in the center graticule line, it indicates that it has been leveling. Otherwise, you should continue to adjust the outrigger control button until the vehicle is in the horizontal position, and then begin lifting operation after inserting movable outriggers positioning pin. The swing, horizontal and vertical outrigger switches can be separately operated, press the appropriate button up, outriggers retract, and press the button down, the outriggers stretch out.

10-4-3 Fold and unfold foot plate

Before extending out outrigger, the foot plate should be pulled out from the driving state (A in Figure10-14). Firstly, pull out the locating pin (B in Figure10-14), pull the foot plate out (C in Figure10-14), and then insert the fixed pin been pulled out into the inside pin hole (D in Figure10-14) and the outrigger can be just extended. When the crane is driving, the foot plate should be stored, and the storage method is opposite to the pull out method.

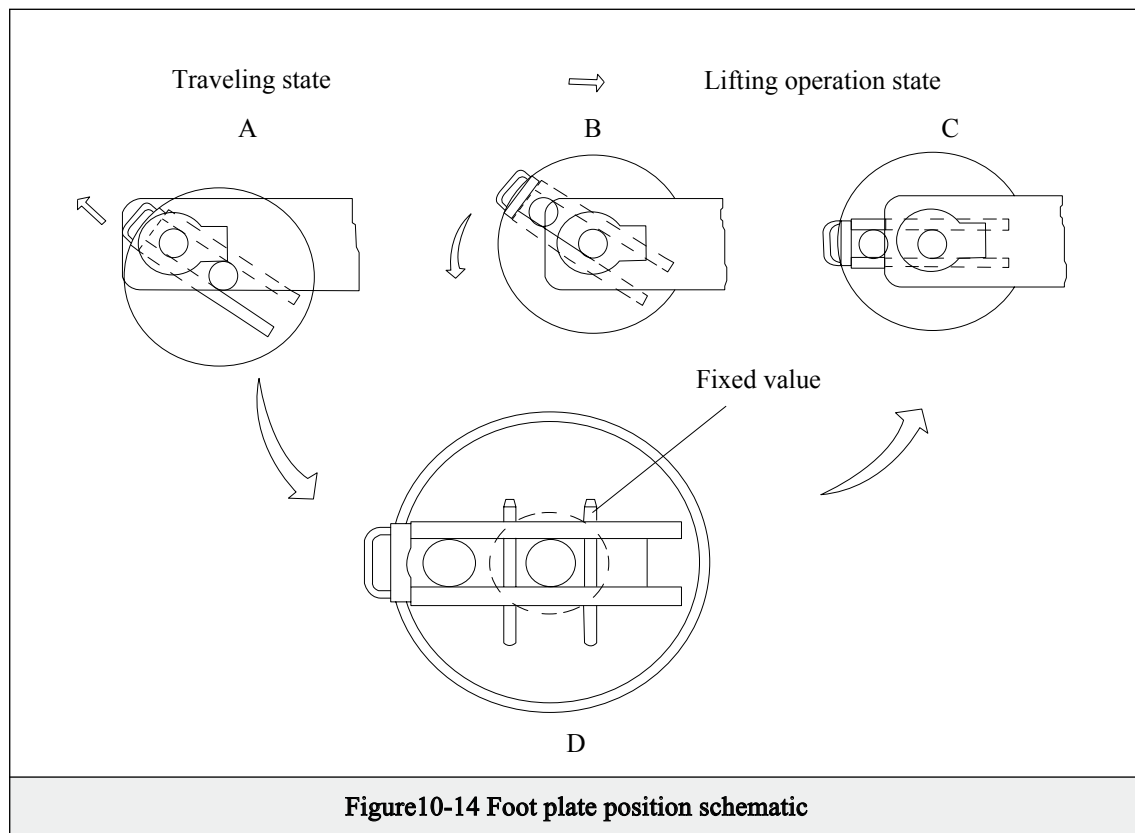


Figure10-14 Foot plate position schematic

10-4-4 Fold and unfold horizontal outrigger

The horizontal outrigger and swing outrigger are unilaterally operated, that is, the left outrigger control box can only control the stretching and retraction of the left front swing outrigger and the left rear horizontal outrigger, and the right outrigger control box can only control the stretching and retraction of the right front swing outrigger and the right rear horizontal outrigger.

10-4-5 Fold and unfold vertical outrigger

Separately press or simultaneously press the four outrigger vertical oil cylinder control switches to control stretching of the four vertical outrigger.



10-4-6 Leveling crane

If the crane has not yet been supported level after stretching the vertical cylinder, its leveling can be realized in accordance with the following steps:

1. Making the level bubble in the middle position by separately adjusting the stretching of each vertical cylinder, it indicates the leveling is OK.
2. Once the level is leveling, immediately loose the adjustment button.



When operating with supporting outrigger, ensure all crane tires must leave the ground, and each foot plate are really all contacting with the ground, if necessary pad the pad tray wooden or the steel under the foot plate.

10-5 Throttle operation

10-5-1 Operating precautions

a. The throttle operation should be smooth, do not stamp too hard on the throttle pedal during the operation in order to avoid danger and damage of the crane, smoothly stamping on the increasing or reducing throttle can make the operation safe and stable, also is effective methods of prolonging the service life of the engine and reducing fuel consumption.

b. The engine reaches the maximum torque at (1000~1400) rpm. The moving of the handle matching with the accelerator pedal can obtain the desired speed.

c. The throttle is an electric control throttle and has been adjusted well when leaving the factory, so generally do not need to adjust again. When if found the phenomena of the throttle pedal returns badly and speeds up poorly so that the throttle should be adjusted, its adjustment requires the professional training personnel. Engine idle speed after the adjustment is 700-800 r/pm, and the highest speed is no more than 2100 r/pm when stamping the throttle pedal to the bottom.

10-5-2 Operating method

Engine throttle operation is performed by electronic pedal output signals to realize the engine acceleration and deceleration (see Figure 10-15). Stamping on the throttle pedal in upper crane portion control room can improve the rotation speed of the engine, so that the action speeds of the slewing, the crane boom luffing, the crane boom stretching and each mechanism lifting is increased; release the throttle pedal, the throttle can return under the action of the spring force, and the engine returns to the idle state.

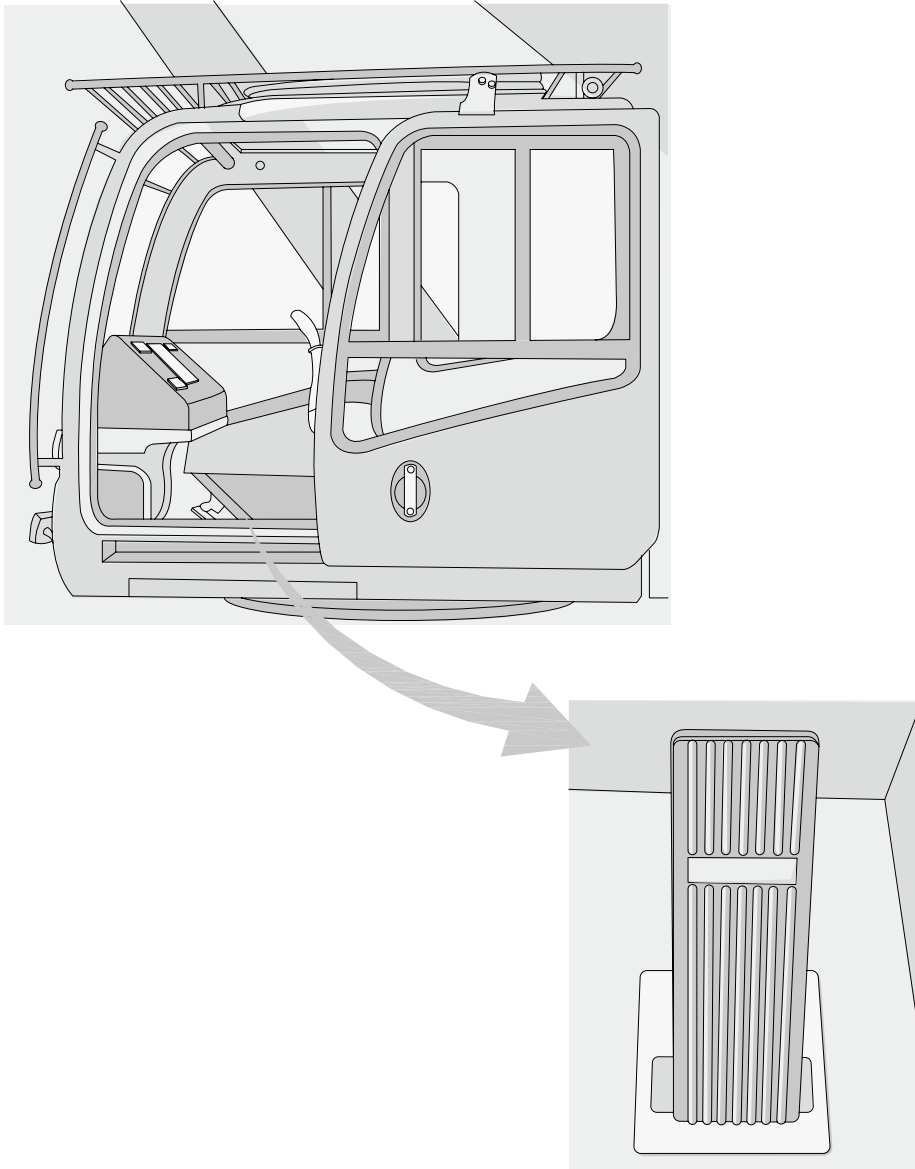


Figure10-15 Throttle operation electric pedal



10-6 Lifting mechanism operation

10-6-1 Operating precautions

- Make the weight lifting or falling smoothly, not sharply pull the operating of the lifting mechanism
- Before doing the crane operation, one should check the brake to confirm its normal and then perform lifting. Before the lifting load still not leaves the ground, do not use the lifting boom and the extending boom to hang it off the ground, can only do the hook operation.
- Choose the appropriate steel wire rope magnification according to the crane boom length and the crane performance table.
- When the hook rotating due to the winding of steel wire rope, one should loose the steel wire rope completely and can just do the lifting operation.
- When the hook falling, the steel wire rope must be left on the winding drum at least more than 3 coils.
- The vertical load lifting is only allowed, not allowed to drag the load without leaving the ground, and avoid the side load as possible as you can

10-6-2 Main lifting mechanism operation (right control handle)

Push the right control handle forward to fall the hook down and backward to lift the hook up; the lifting and falling speed is adjusted through the angle of control handle and the throttle size(see Figure 10-16).

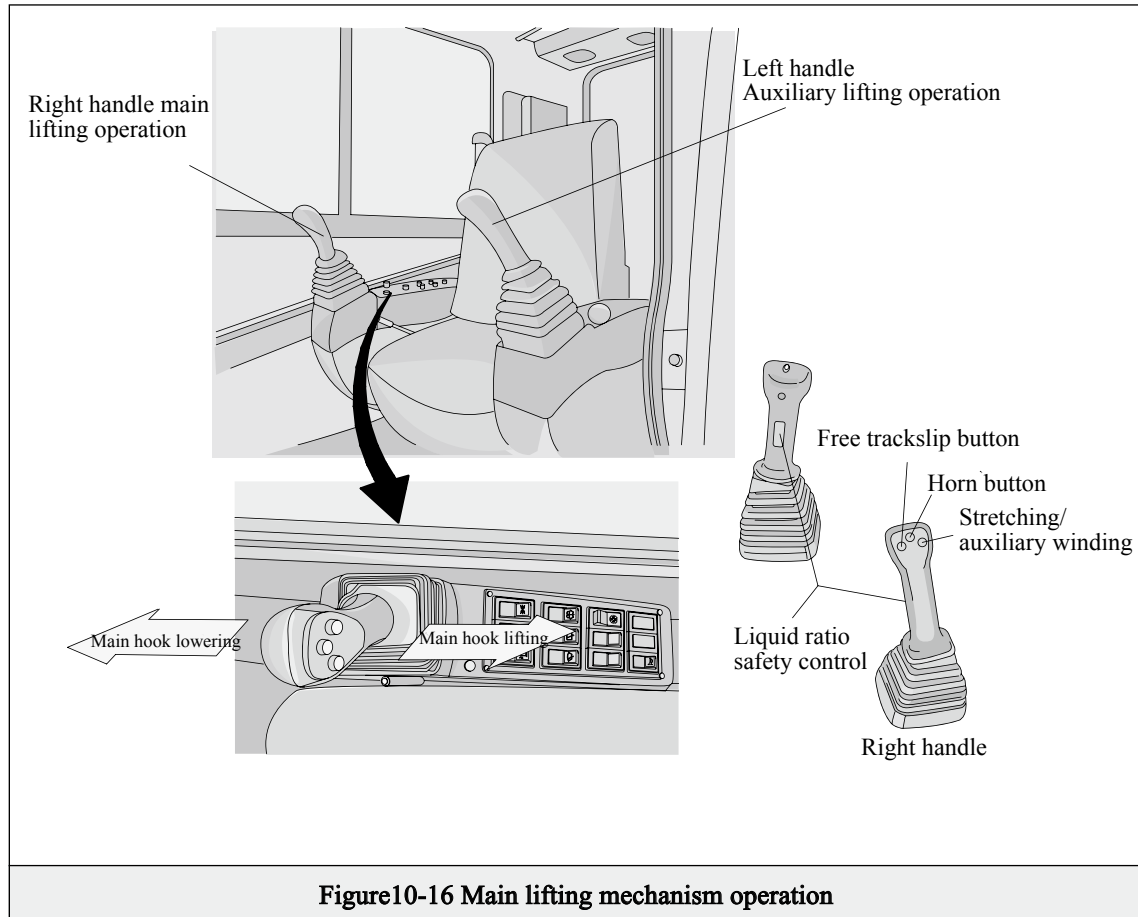
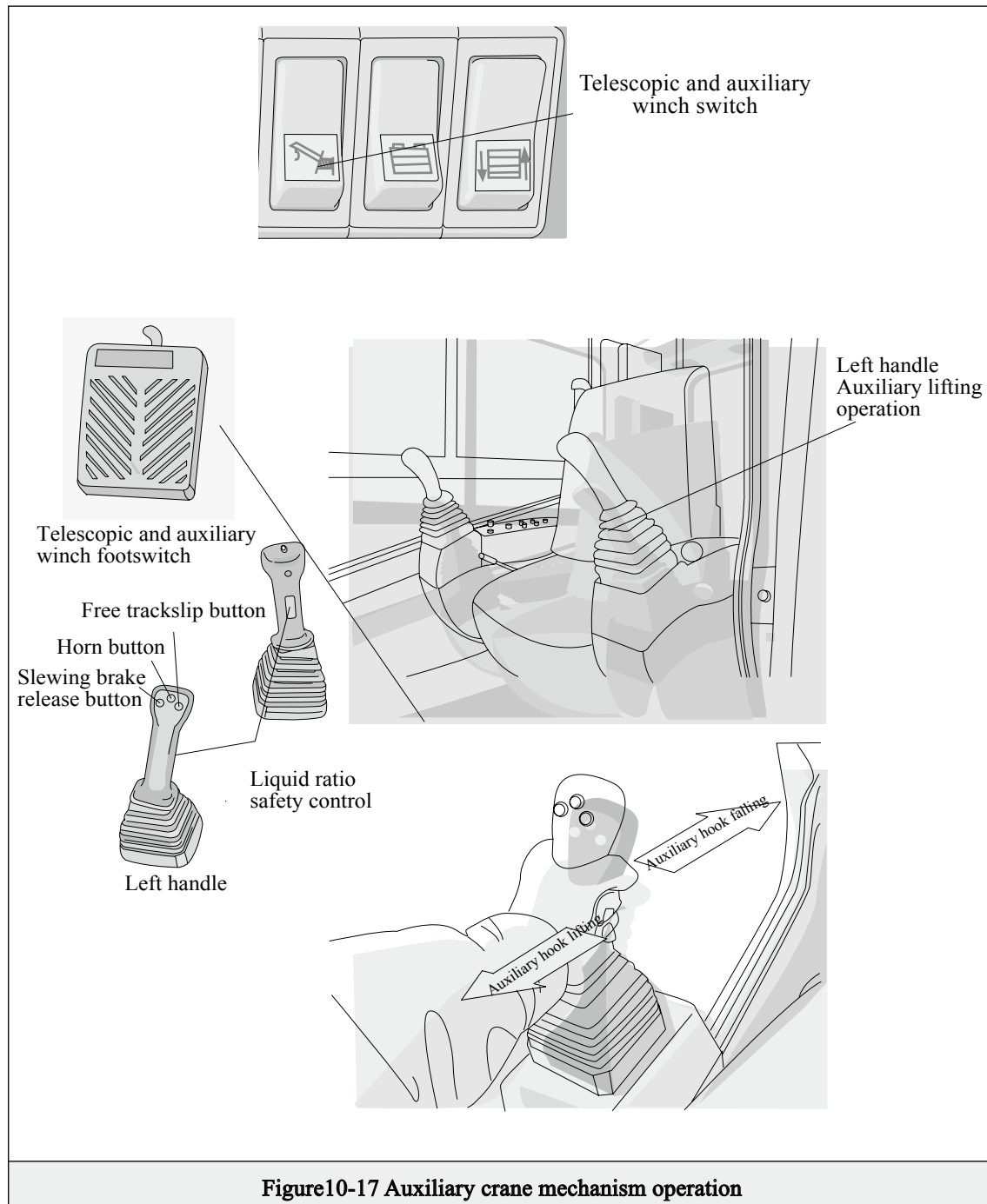


Figure10-16 Main lifting mechanism operation

10-6-3 Auxiliary lifting mechanism operation (left control handle)

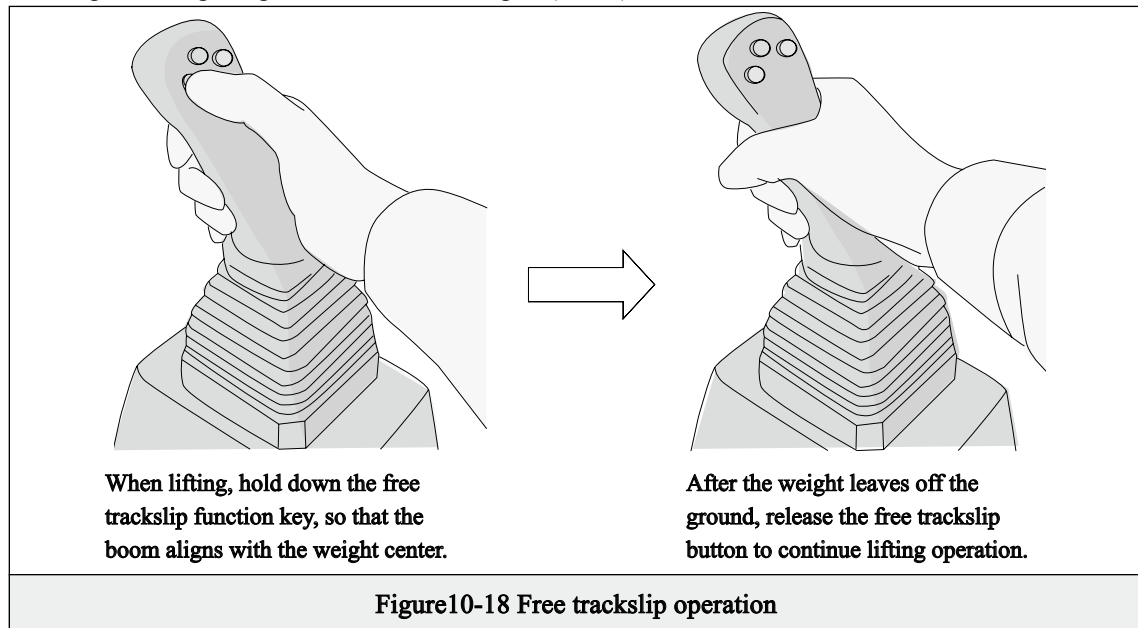
Press the telescopic and auxiliary winch switch S17 to the ON position, or press the right handle telescopic and auxiliary winch button (the function of the button is telescopic in bouncing state), while stepping on the telescopic and auxiliary winch footswitch in the cab by foot. The hook lowers by pushing the left handle forward, and the hook goes up by pulling backward the left handle. The speed is controlled by the handle and accelerator pedal(see Figure 10-17).





10-6-4 Free trackslip operation

In order to prevent the side load when lifting the weight, while doing the lifting operation, hold on press the free trackslip button on handle to open the free trackslip function, the crane boom free trackslip is aligned at the center of gravity of the weight, and then release the free trackslip button after the weight leaving the ground, as shown in figure(10-18).



10-7 Main crane boom stretching operation

10-7-1 Operating precautions

- Before extending the boom, confirm the fully retracted length of the main crane boom displayed on the torque limiter within the prescribed scope.
- When stretching the crane boom, the hook will lift along with it. Thus while doing the crane boom stretching operation, adjust the hook height using the right control handle (lifting mechanism control).
- After the crane boom extending, the crane boom will slightly retract due to the hydraulic oil temperature change for a certain time. For example: when the crane boom extending length is 5 meters and the hydraulic oil temperature decreases 10 °C, the retraction is about 40 mm. In addition to the hydraulic oil temperature change, this natural stretching changes some also due to factors of the crane boom stretching state, main crane boom elevation angle and lubrication conditions. When the crane boom natural retraction happens, one should do the proper stretching operation to restore the required length.



Don't make the hydraulic oil temperature too high.



10-7-2 Operating method

Press the telescopic auxiliary winch switch S17 to the OFF position and maintain the telescopic and auxiliary winch switch button on the right handle is in the bouncing up state, while stepping on the telescopic and auxiliary winch footswitch in cab.

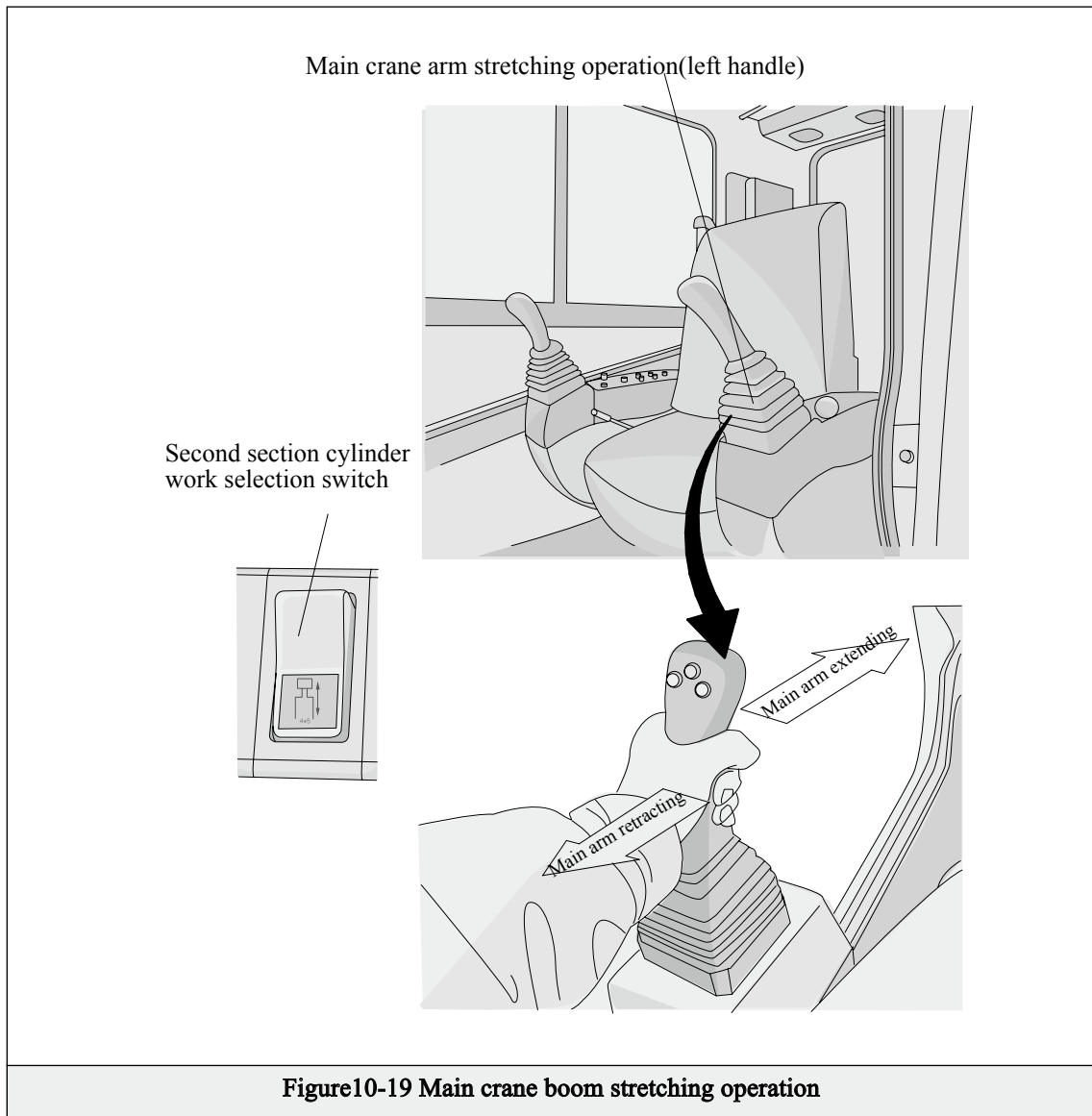
The boom retracts by pulling backward the left handle, and stretches out by pushing the left handle forward (see Figure 10-19). The telescopic speed is adjusted by the operation handle and the accelerator pedal.



Do not allow stretching with load, the stretching action is only performed in no load condition.



When stretching the crane boom, one must firstly extend the second section boom in place, press the boom swithover switch, then extend the three, fourth and fivth boom to the prescribed boom length, and when retracting the boom, do the operation in opposite order. Otherwise, when doing the crane operation, can damage the stretching cylinder, and a broken boom risk. The rated crane capacity table of this crane is provided based on the stretching order above mentioned.



10-8 Main crane boom luffing operation

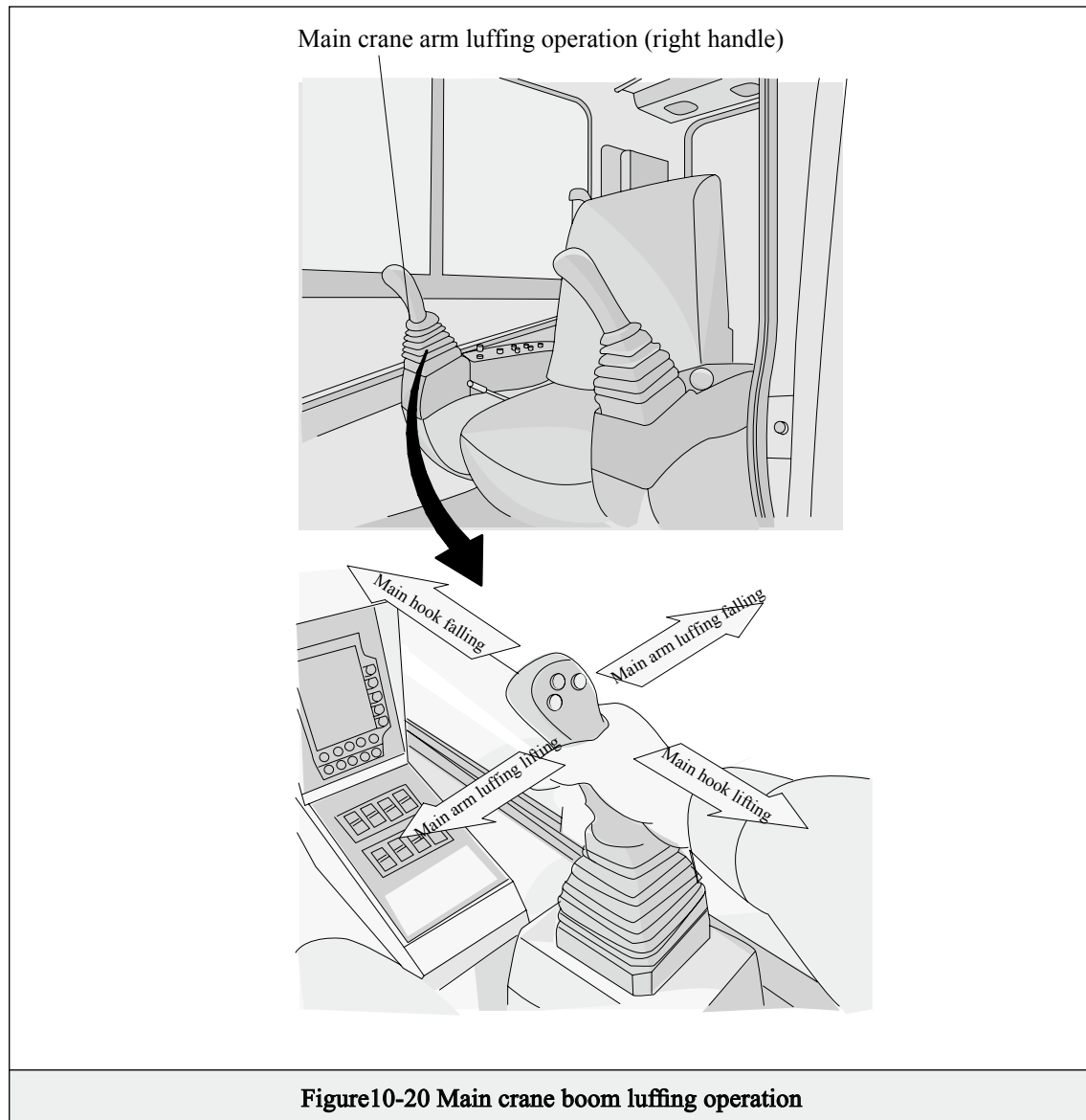
10-8-1 Operating precautions

- The vertical load lifting is only allowed, not allowed to drag the load without leaving the ground to avoid the side load.
- The luffing elevation angle is prohibited beyond the main crane elevation angle limit in the rated crane capacity table.
- When starting and stopping the luffing operation, slowly pull the right control handle to do the main crane boom luffing operation.

10-8-2 Main crane boom luffing operation (right control handle)

Pull the right control handle rightward, the boom falls; pull the right control handle leftward, the boom lifts (see Figure10-20);

Luffing boom lifting speed is controlled by the control handle and the throttle; the boom falling speed is controlled by the control handle, the engine is idle, and nothing to do with the throttle size.





10-8-3 Relations between main crane boom elevation angle and total crane weight and working radius

When doing the auxiliary boom installation and magnification transformation operation needed to lower the crane boom, one should extend outriggers, retract the crane boom retracted to a fully retraction state, fall the crane boom down, after finishing the required installation, lift the crane boom up, and then extend the boom to a desired length.

The working radius increases when fall the boom, while the rated total crane capacity reduces; the working radius decreases when lift the boom, while the rated total crane capacity increases.

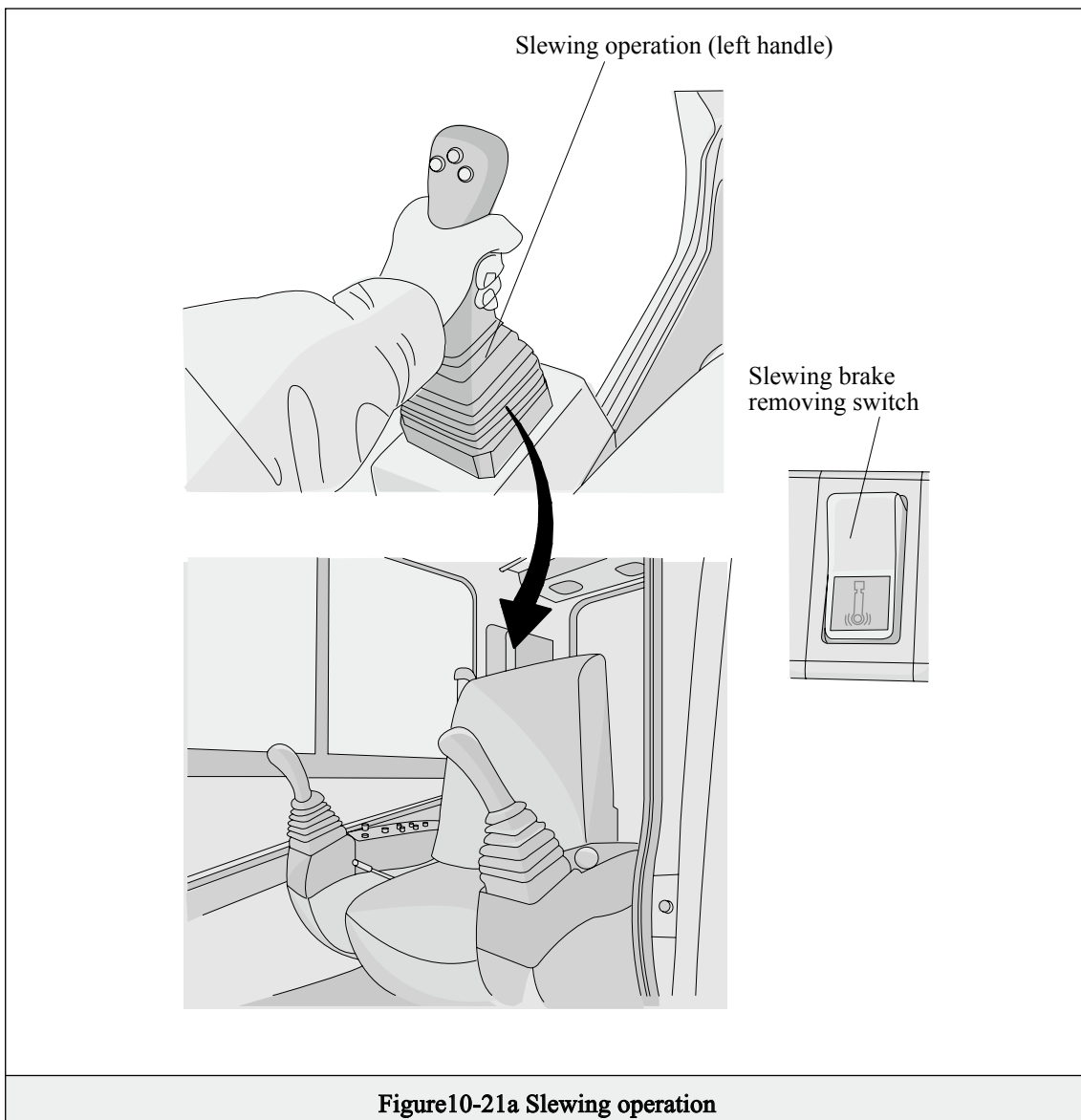
10-9 Slewing operation

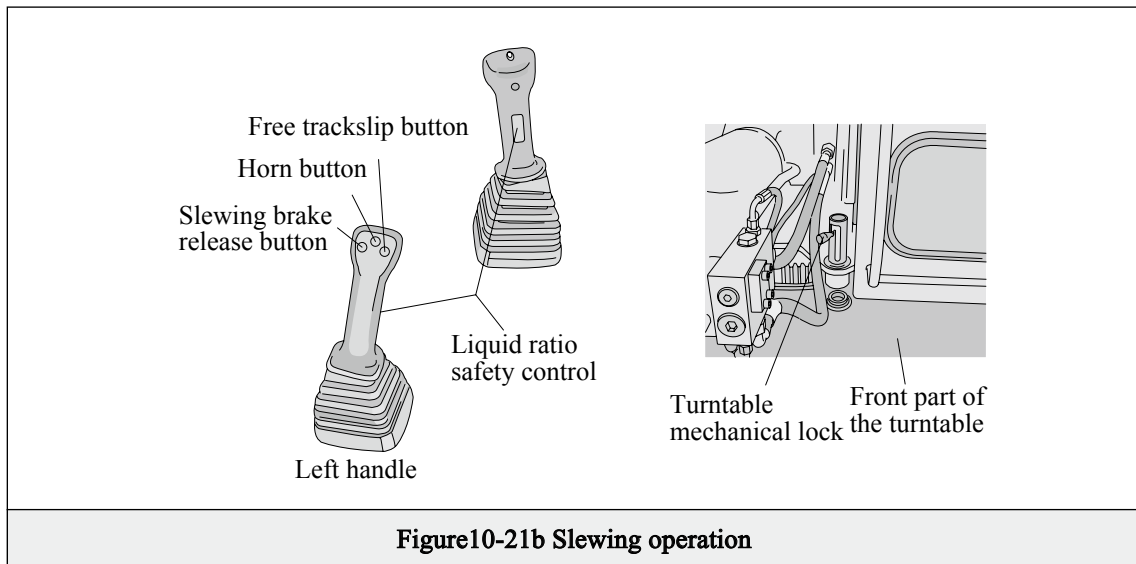
10-9-1 Operating precautions

- a. Before starting the slewing operation, one should check the outrigger lateral span if it fits the specified value in the rated crane capacity table.
- b. Must ensure sufficient slewing working space.
- c. Before doing the slewing operation, one must remove the rotary table lock device (lift the rotary table mechanical lock).
- d. When starting and stopping the slewing operation, one should slowly pull the left control handle.
- e. When no slewing operation, the slewing brake removing switch S12 must be closed.

10-9-2 Slewing operation (left control handle)

Before slewing operation, you should first lift the turntable mechanical lock, and press the slewing brake release switch on the control panel or press the slewing brake release button on the left handle (Figure 10-21b). Pulling the left handle to the right is for right turn of the turntable, and to the left is for left turn of the turntable (Figure 10-21a)





10-10 Combined action instructions

In lifting operations, certain principles should be followed for different combinations of actions. You must operate the crane within an allowable range. The specific principles are as follows:

1. Telescopic generally acts separately, should not be operated simultaneously with other actions.
2. Slewing should not act together with the auxiliary winch.
3. The main winch should not act together with luffing action.
4. The slewing can be combined with the action of the main winch, slewing with luffing, auxiliary winch with luffing, and main winch with auxiliary winch.



The operation of the crane should be smooth as far as possible, try to slow the operation.



LOG



Chapter 11 Oil and Grease

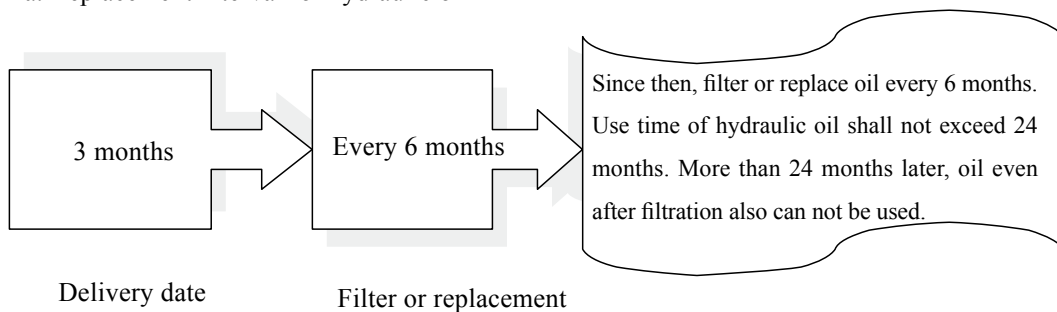
11-1 Fuel and engine oil

a. Type, amount and time for engine oil filling of engine is shown in “Users’ manual for engine” . For the machine leaving factory, the oil filling type is CH – 4, and quantity of about 30-33 liters, for type CF-4 quantity of about 20 liters

b. Engine refueling type is shown in “Users’ Manual for Engine” , and fuel tank volume is 350 liters.

11-2 Hydraulic oil

a. Replacement interval for hydraulic oil



The product is of full hydraulic drive type, so the hydraulic oil quality, viscosity and clearness is very important to the normal work of the crane. If you ignore the hydraulic oil replacement, it will be extremely easy to lead to the various kinds of machine faults, and seriously shorten their working life. Our company will not assume all consequences caused by replacement and filtration of hydraulic oil not abiding by this manual.



● Hydraulic oil should be timely filtered or replaced whenever you find the serious hydraulic oil pollution.

● Appropriate hydraulic oil should be chosen according to environment temperature.

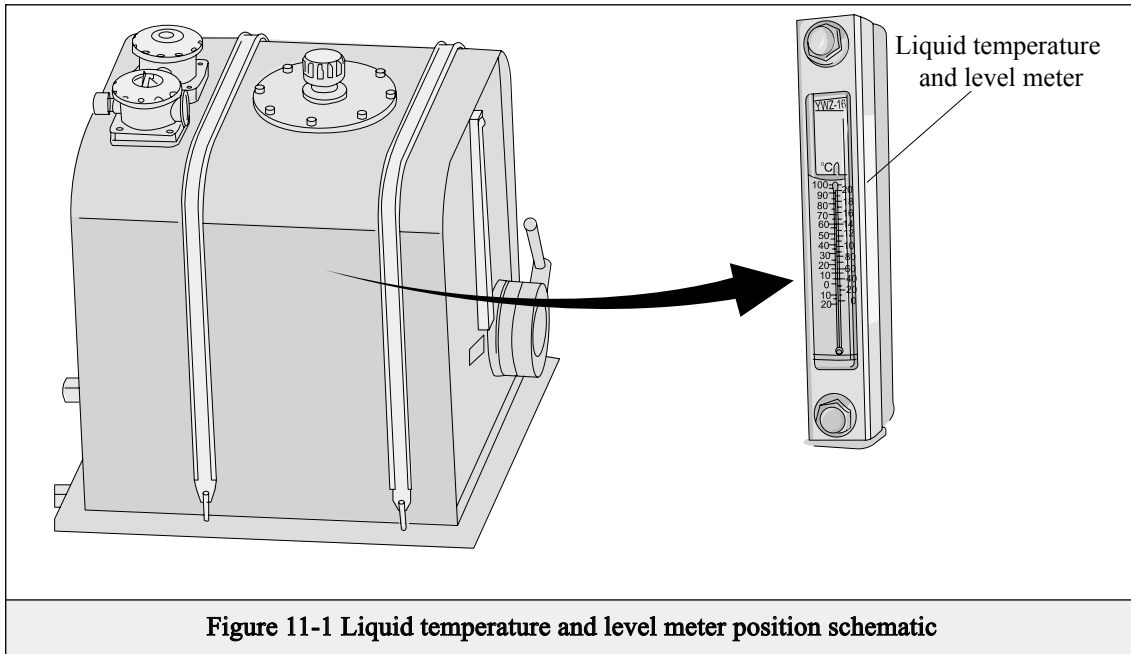
b. Hydraulic oil temperature

The highest working temperature of hydraulic oil is 80°C.

c. Hydraulic oil quantity

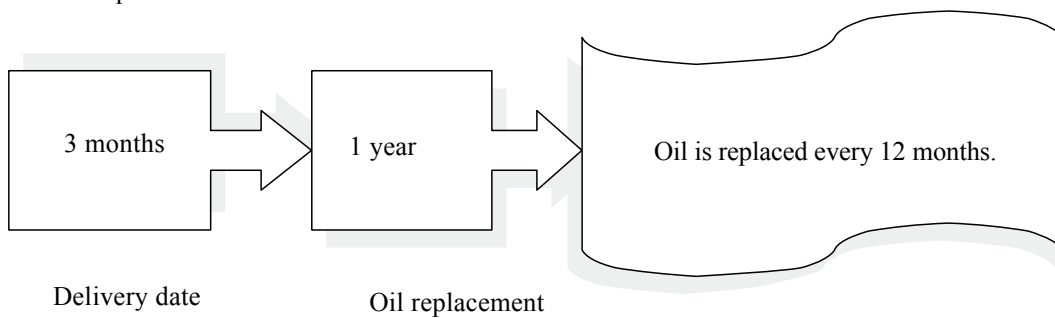
Hydraulic oil demanded quantity is about 900 liters, and kunlun brand hydraulic oil is recommended.

Check the oil quantity: oil quantity check should be carried out when the crane is in driving preparation condition. The liquid temperature and level meter can not only display oil level scale, but also shows the temperature of hydraulic oil. When checking the oil, be sure to keep oil level liquid level above gauge central line, hydraulic oil should be added if it is lower than the minimum oil level line.



11-3 Gear oil

a. Oil replacement interval



● Gear oil also should be replaced if serious gear oil pollution is found, even if oil replacement interval has not reached.

● Regularly check oil pressure, gear oil should be added if oil level is below the specified value.



b. Lifting mechanism

Main winch and auxiliary winch: idling for 10 to 15 minutes before refueling, screw down the oil drain cock, and discharge completely all the used oil. Screw up the oil drain cock, screw off oil scale plug, and add lubricating oil until there is oil overflow at oil scale hole. Tighten the oil adding cock and oil scale plug.

Oil quantity is about 6.5 litres (Primary winch: 3.5L, auxiliary winch: 3L), in winter: Mobil SHC220 or L-CKD220; in summer: Mobil SHC320 or L-CKD320 gear oil.

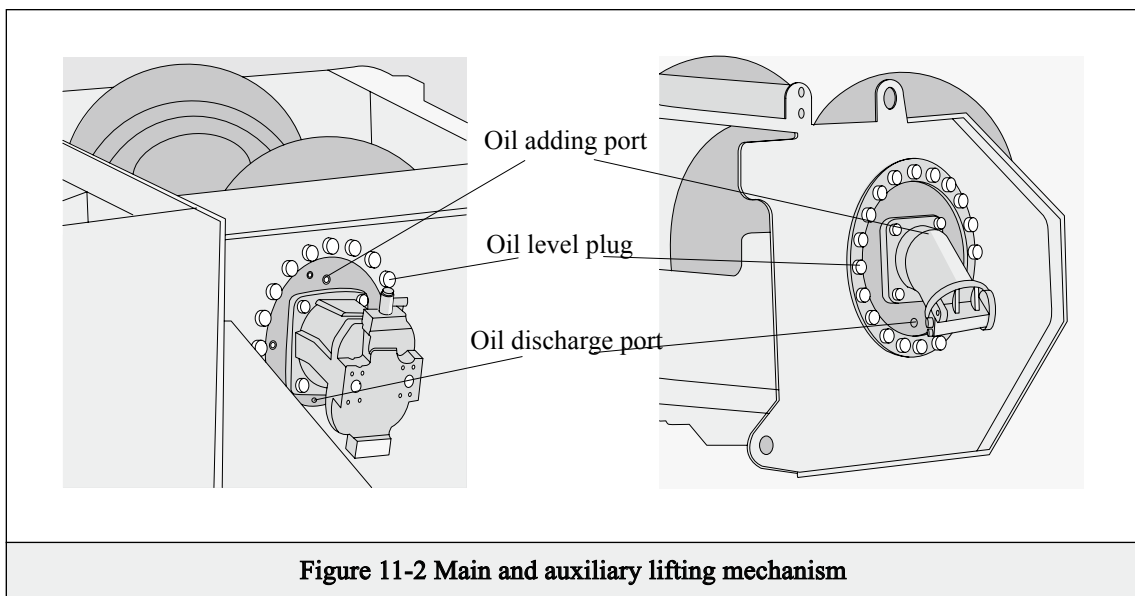


Figure 11-2 Main and auxiliary lifting mechanism

c. Slewing mechanism

Oil quantity is about 3 litres, in winter: Mobil SHC220 or L - CKT220; in summer: Mobil SHC320 or L - CKD320 gear oil.

Idling for 10 to 15 minutes before refueling, screw down the oil drain cock at the bottom of the reducer, discharge completely all the used oil, and screw up the oil drain cock. Screw off oil adding plug, add lubricating oil to oil scale middle position, and tighten the oil adding cock.

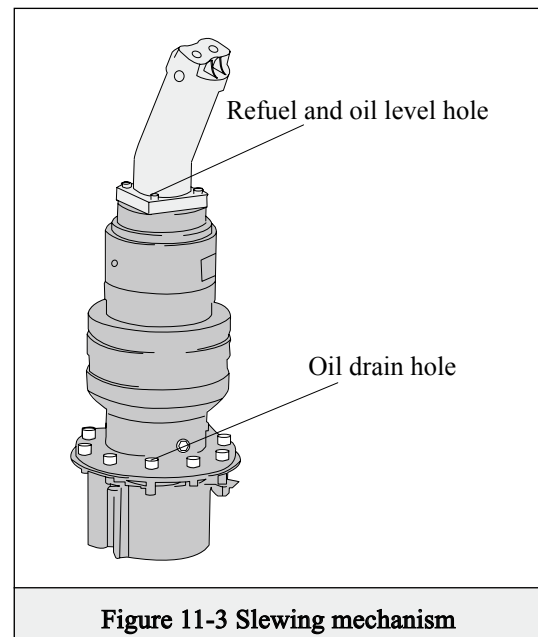


Figure 11-3 Slewing mechanism



11-4 Grease

a. Lubricating position

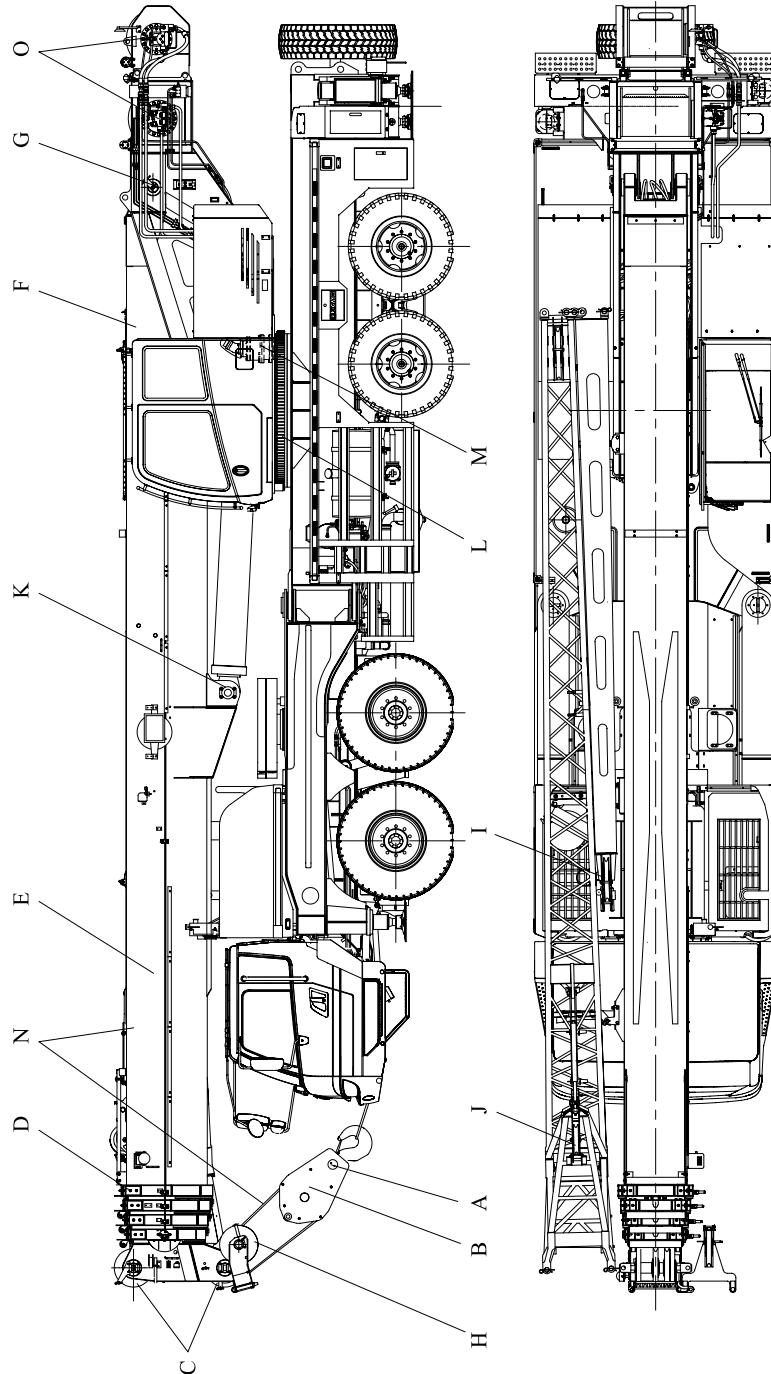


Figure 11-4 XCT80 truck crane lubricating position schematic diagram



b. Lubricating position table

Table 11-1 Lubricating position table

No.	Name	Interval	Oil	Means
A	Main hook beam	Every week of before use	Lithium base grease ZL45-2	Oil by oil gun
	Lifting hook upper transverse beam	Every week of before use	Lithium base grease ZL45-2	Oil by oil gun
	Auxiliary hook beam	Every week of before use	Lithium base grease ZL45-2	Oil by oil gun
B	Main hook pulley	—	—	Self-lubricating bearing
	Lifting hook pulley block	—	—	Self-lubricating bearing
C	Boom head pulley	—	—	Self-lubricating bearing
D	Boom head slide block	Every week	Molybdenum disulfide heavy machine ointment	Apply
E	External surface passed by slide blocks of the second, third, fourth, and fifth-section arms	Every week	Molybdenum disulfide heavy machine ointment	Apply
F	Boom end slide block	Every week	Molybdenum disulfide heavy machine ointment	Oil by oil gun
G	Boom rear hinged point	Every week	Molybdenum disulfide heavy machine ointment	Oil by oil gun
H	Arm end single pulley	—	—	Self-lubricating bearing
I	Auxiliary arm pulley	—	—	Self-lubricating bearing
J	Auxiliary arm guide wheel	Before use	2# Lithium base grease	Oil by oil gun
K	Luffing cylinder upper and lower hinged points	Every week	2# Lithium base grease	Oil by oil gun
L	Slewing bearing	100hours	ZG-3 Albany grease	Oil by oil gun
M	Slewing mechanism small gear tooth surface	Every week	2# Lithium base grease	Apply
N	Wire rope	Every week	2# Lithium base grease	Apply
	Wire rope (for boom extension and retraction)	Every week	2# Lithium base grease	Apply
O	Main and auxiliary lifting bearing base	Every week	2# Lithium base grease	Oil by oil gun



Table11-2 Components requiring lubrication of the lower crane portion

Name	Interval	Oil	Means
Clutch separation fork shaft	100hours	2# Lithium base grease	Oil by oil gun
Clutch separation bearings	100hours	2# Lithium base grease	Oil by oil gun
Transmission shaft front bearing	100hours	2# Lithium base grease	Oil by oil gun
Transmission control seat	Every week	2# Lithium base grease	Oil by oil gun
Drive shaft intermediate support	Every week	2# Lithium base grease	Oil by oil gun
Drive shaft universal joint	Every week	2# Lithium base grease	Oil by oil gun
Drive shaft telescoping spline	Every week	2# Lithium base grease	Oil by oil gun
Front leaf spring pin	Every week	2# Lithium base grease	Oil by oil gun
Front leaf spring	Every week	2# Lithium base grease	Oil by oil gun
Thrust rod ball head	100hours	2# Lithium base grease	Oil by oil gun
Knuckle king pin and bearings	100hours	2# Lithium base grease	Oil by oil gun
Steering arm bearing	100hours	2# Lithium base grease	Oil by oil gun
Steering rod ball head	100hours	2# Lithium base grease	Oil by oil gun
Front and rear axle wheel hub bearings	100hours	2# Lithium base grease	Oil by oil gun
Front and rear brake camshafts	100hours	2# Lithium base grease	Oil by oil gun
accelerator and brake pedal shaft	100hours	2# Lithium base grease	Oil by oil gun
Cab door hinge	100hours	2# Lithium base grease	Oil by oil gun



- Before adding oil, wipe clean the oil cup and surfaces to be applied with grease.
- Sliding surfaces not listed in the table should also be regularly added lubricating oil.
- In the state the boom retracted on the boom support, if part of the boom luffing oil cylinder piston rod is exposed, the part should be monthly applied a grease.
- When applying grease to the surfaces passing by the sliders of the head and end of the second, third, fourth and fifth section arms, the boom grease applying operation must be carried out with full balance weight, with maximum weight of the hook of 1000Kg, and allowable maximum arm length of 38.72m. The second-section arm should be firstly fully stretched for grease applying, and fully retracted, and then the same should be carried out for the third, fourth and fifth-section arm. Applying grease to the boom is prohibited in other working conditions.



11-5 Domestic and foreign grease comparison

Table 11-3 Domestic and foreign grease comparison

Classification	Hydraulic system	Winching speed reducer, slewing reducer	Bearing, slide block, slewing bearing, wire rope, boom hinged point, luffing hinged point
Name	Anti-wear hydraulic oil	Heavy duty industrial gear oil	Extreme pressure lithium grease
CNPC Sinopec	L-HV22, L-HM 32, L-HM 46	L-CKD220, L-CKD320	No. 2
MOBIL	Mobil DTE 11M, 13M, 15M	Mobilger630, Mobilger632	No. 2
SHELL	Tellus 22, 32, 46	Omala220, Omala320	No. 2
CALTEX	Rando oil HD 32, 46	Meropa220, Meropa320	No. 2
CASTROL	Hyspin AWS 15, 32, 46; Hyspin AWH 15, 32, 46	Alpha Max220, Alpha Max320	No. 2
TOTAL	AZOLLAZS 32, 46	Carter EP220, Carter EP320	No. 2
BP	Bartran HV 22, Energol HLP-HM 32, 46	Energol GR-XF220, Energol GR-XF320	No. 2



11-6 Coolant

The vehicle requires the use of special antifreeze as the engine coolant. You should replace with different antifreeze models according to the lowest temperature of the environment. The use of purified water, tap water or sea water as coolant is never allowed even if the ambient temperature is above 0°C. The reason is that the water lacks the necessary preservatives and antirust additives, which may cause the blocked engine and cooling system due to corrosion, affecting the use.

Coolant used in the vehicle cooling system is the antifreeze (JFL-318), with an amount of about 30L, which can be used at the ambient temperature above -10°C.

Limit temperature of antifreeze freezing (°C)	Antifreeze model
-10	JFL-318
-26	JF-L336
-35	JFL-345



- The "alcohol - water" mixture of antifreeze is not appropriate for engine.
- Sea water is strictly prohibited to directly cool the engine.
- Antifreeze can be added in accordance with requirements off "users' manual for engine", and also can be made by you according to the proposed formula in this manual. In the use of antifreeze, the freezing point of antifreeze should be 5°C lower than the minimum temperature in the region.

11-7Waste oil, antifreeze processing

All kinds of lubricating oil, grease, fuel, and antifreeze used by the crane will cause certain direct or indirect pollution to the environment. Antifreeze and lubricating oil is toxic, which should be processed according to the local environmental laws and regulations if can't continue to use. Using allowed waste processing equipment (including city maintenance station and the special facilities provided by garage) to reclaim the used antifreeze liquid and lubricating oil. If you have any questions, please contact with the local environmental protection department to get help, in order to process conveniently and properly the used antifreeze liquid and lubricating oil.



LOG



LOG



Chapter 12 Crane inspection and maintenance

12-1 Overview

The crane has been tested and checked according to relevant standards prior to delivery, but deviation may occur in the use process due to the main reasons that wear, corrosion and environmental changes, external force damages and changes in use conditions. Therefore, the crane should be at least annually checked by experienced professional and technical personnel based on the using condition changes and work environment changes since crane delivery date. Specific references are GB/T 3811, GB/T 6068 standards. If the products are exported to other countries or regions, it should comply with the local related standards.

The experienced professional and technical personnel, with rich experience and professional knowledge in the hoisting equipment maintenance, should pass professional training and have been engaged in the crane professional work for a long time, they should be familiar with the relevant standards and regulations, and can make the right judgment to the use of crane.

Professional engineers are experienced personnel engaged in the crane design, manufacturing and maintenance aspects, and they should be familiar with relevant standards and regulations. For the inspection of the crane, they are able to judge whether the crane is working in a safe state, so as to ensure the safety operation of crane for a long time.

Crane reinspection is usually visual inspection by professional engineer/professional and technical personnel to inspect the use condition of the crane and parts. This kind of inspection can timely find out crane safe hidden trouble, so as to avoid accidents.



If the crane has undergone significant transformation, or after maintenance of the part bearing dynamic load, it must be approved by company professional before delivery, otherwise the caused accident liability by this shall be borne by you.

12-2 Inspection items

Here's a list of some important check items, which must be carried out by professional engineers/professional technical personnel.

Please pay special attention to the inspection to following various parts:

- a. Outrigger structure;
- b. Lifting mechanism: slewing, boom luffing, boom telescoping, as well as lifting mechanisms;
- c. Brake mechanisms;
- d. Electrical system;
- e. Safety device.



Inspection items	
Driving device Slewing	Operating lever and switch:
	1. Operating status.
	Power take-off device:
	1. For looseness and oil leakage.
	2. For abnormal noise and heating.
Mechanism	Brake:
	1. The braking performance.
	2. Deformation and wear of connecting rod.
	3. Lubrication is normal or not.
	Slewing joint:
	1. Oil leakage.
	2. Slewing status with or without abnormal noise, vibration and heating.
	3. Conducting state between carbon brush and slip ring.
	Reducer and slewing mechanism:
	1. Oil quantity and oil pollution.
	2. Crack, deformation and oil leakage of gear box.
	3. Abnormal noise and vibration.
	4. Loose parts in installation.
	5. Hydraulic motor working pressure is normal or not.
	6. Oil pipe joint is loose and oil leakage or not.
Boom luffing mechanism	Boom derricking cylinder:
	1. The pivot pin has wear and damages or not.
	2. Pivot pin lock bolt is loose or not.
	3. For oil leakage.
	4. For vibration and noise.
	5. In lifting operations whether oil cylinder is naturally retracted.
	6. Hose for aging and deformation.
	Balancing valve:
	1. For oil leakage.
	2. For pulsating.
	3. Pipe joint is loose and has oil leakage or not.
Telescopic mechanism	Main arm:
	1. Crack, bending and damage.
	2. Boom bottom pivot pin lock switch bolt is loose or not.
	3. Sliding surface with or without scratches.
	4. Pivot pin sets have wear and damages or not.
	5. Sliding surface lubrication state.
	6. Boom support has deformation and crack or not.



Inspection items	
Telescopic mechanism	Boom telescopic cylinder:
	1. Action state (with or without pulsation and noise).
	2. Action sequence is normal or not.
	3. For oil leakage phenomenon.
	4. The function of balancing valve.
	5. Pipe joint is loose or not.
	Auxiliary arm:
	1. Crack, bending and damage.
	2. Connecting pin and pin sets lubricating state.
	Wire rope:
	1. Diameter.
	2. Broken wire.
	3. Kink.
	4. Deformation.
	5. Corrosion situation.
	6. Lubrication situation.
	7. Tension situation.
Lifting mechanism	Reducer:
	1. Installation parts for looseness and crack.
	2. With or without noise.
	3. Gear box for crack, deformation and oil leakage.
	4. Bearing wear.
	5. Lubrication situation.
	6. For oil leakage.
	Brakes:
	1. Brake disc and liner wear.
	2. Pipe joint is loose and has oil leakage or not.
	3. Spring is deformation.
	Balancing valve:
	1. For oil leakage.
	2. Pipe joint is loose and has oil leakage.
	3. With or without pulsation.



Inspection items	
Lifting mechanism	Drum:
	1. Crack.
	2. Wire rope disorder.
	Auxiliary arm:
	1. Crack, bending and damage.
	2. Connecting pin and pin sets lubrication state.
	Hook and pulley:
	1. The hook rotary situation.
	2. Deformation.
	3. Beam swing is normal or not.
	4. Beam and hook connecting condition.
	5. Deformation of trip preventer.
	6. Pulley rotary (with or without abnormal noise).
	7. Pulley for crack and wear.
	8. Pulley bracket and shield for bending and damage.
	9. Lubrication situation.
	Wire rope:
	1. Diameter.
	2. Broken wire.
	3. Kink.
	4. Deformation.
	5. Corrosion situation.
	6. Leashes, wedges position is correct or not.
	7. Wire rope and leashes connection conditions.
	8. Leashes shaft pin and bushing for wear and crack.
	9. Wire rope rounding the pulley is normal or not.
Hydraulic system	Hydraulic tank:
	1. For looseness and damage.
	2. Crack and leakage.
	3. The oil, pollution degree and viscosity.
	Hydraulic pump:
	1. For looseness and damage.
	2. Abnormal noise, vibration and fever.
	3. For oil leakage.
	4. Inlet line whether sucking air or not.
	5. Oil supply pressure is normal or not.
	6. Pipe joint is loose and has oil leakage.



Inspection items	
Hydraulic system	Overflow valve:
	1. Setting pressure.
	Control valve:
	1. Action situation.
	2. Oil leakage.
	3. Bolt is loose or not.
	Main valve:
	1. Action situation.
	2. Oil leakage.
	3. Brake oil quantity.
	4. Hose for aging, distortion and damage.
	Starting switch:
	1. Starting switch function.
	2. Installation condition.
	3. Light action situation.
Crane operating mechanism	Wiper:
	1. Action situation.
	2. Brush tablet for wear and tear.
	Indoor light:
	1. On or not.
	Buzzer:
	1. Buzzer function.
	Automatic force limit device:
	1. Action situation.
	2. Accuracy.
	Overwinding stop device (height limiter) :
	1. Action situation.
	2. Heavy hammer sling is damaged or not.
	3. Installation condition.
	4. Electromagnetic valve action situation.
	Upper crane potion control room:
	1. Nut and bolt is loose or not.
	2. Window, door lock switch function.



Inspection items	
Crane operating mechanism	Pressure gauge:
	1. Pointer movement is translation or not.
	2. The connection is loose or not.
	Operating handle and pedal:
	1. The function.
	2. Clearance.
	Working light:
	1. On or not.
	2. Whether there is any break.
	3. Installation condition.
	Arm end light:
	1. On or not.
	2. Installation condition.
Outrigger mechanism	Outrigger lifting cylinder:
	1. Natural retraction in lifting operation.
	2. Natural decline in the course of driving.
	3. For oil leakage.
	4. Function of fluid operated check valve.
	5. Pipe joint is loose or not.
	6. Noise and loose.
	7. Outrigger plate for deformation and damage.
	Fixed outrigger, movable outrigger box, outrigger horizontal cylinder:
	1. For deformation and damage.
	2. Movable outrigger box fixing pin and pin sets are loose or not.
	3. Bracket for deformation and crack.
	4. Noise and vibration.
	5. Hose and hose connection is loose or not.
	6. For oil leakage.
	Control valve:
	1. Action situation.
	2. Pipe joint is loose or not.
	3. Bolt is loose.
	4. For oil leakage.



Inspection items	
Outrigger mechanism	Main oil cylinder:
	1. Action situation.
	2. Oil leakage.
	3. Brake oil quantity.
	4. Hose for aging, distortion and damage.
	Auxiliary parts:
	1. Damage and loss.
Others	Pipe line:
	1. The connection positions have loose.
	2. Oil leakage.
	3. Pipe clamp is loose and has crack.
	4. Hose for aging, distortion and damage.
	Fastening once again of slewing bearing installation bolt:
	In routine regular inspection each month, if the slewing bearing installation bolt looseness is found, bolt fastening should be carried out at the maintenance station. In addition, it is recommended that the annual inspection and verification of slewing bearing installation bolt fastening state in accordance with the specified torques should be carried out, with bolt tightening torque of (700~900) N.m.

12-2-1 Inspection of steel structure bearing weight

Steel structures bearing weight such as boom, turntable, frame, outrigger, rim, etc must be checked at least once every year. The welding line even not bearing heavy weight also should be paid special attention during inspection.

If the crane bears overload external force, such as abnormal vibration and impact in operation process, the dynamic load at parts bearing shock or impact should immediately be inspected. If any crack is found on the steel structure, the crack damage degree must be determined by professional and technical personnel through the material analysis, such as magnetic particle testing, ultrasonic testing or X ray detection, then repair welding or other methods to repair to damaged parts are implemented by the professional and technical personnel.



Crane inspection personnel have an unshirkable responsibility for crane internal and external inspection.



12-2-2 Daily inspection

In every shift or the beginning of each working day, daily inspection is carried out to crane according to the following contents:

1. Check the winding of all wire rope on the pulley and the drum is normal, without dislocation;
2. Check the appearance of the electrical equipment, oil, grease, water or dirt is not allowed;
3. The table board and parts subjecting to the visual inspection should be free of lubricant and coolant liquid spills.
4. Check all the limiting device or insurance device as well as operating handle operation state, which must be carried out in non-working status of crane;
5. Check whether the moment limiter functions are normal;
6. Overload limiter with the amplitude indicating function should be checked the conformity between indicating amplitude value and actual amplitude;
7. Check whether the air pressure is in normal state in the pneumatic control system, such as the pressure in the brake;
8. Check whether light, wind screen wiper and cleaning device can be normally used;
9. Appearance inspection of crane wheel and tire safety condition;
10. Check all control systems of the crane with no load are in normal state,
11. Check all alarm devices can be normally

operated;

12. For safety and fireproof consideration, check whether the crane is in a clean and tidy environment, and stay away from oil tank, waste, tools or materials. Check the inlet and outlet of the crane, which should be barrier-free and corresponding fire extinguishing facilities should be complete;

13. Before starting the crane, check whether the brake and clutch function is normal;

14. Check whether the hydraulic and air pressure system hose in normal working conditions have abnormal bending and wear;

15. Before operation, you should ensure there is no cable joint or wiring device on the equipment or control device.

12-2-3 Weekly inspection

Normally inspection is carried out once a week, and the following contents should be checked in addition to daily inspection:

1. Check all wire rope appearance for broken wire, extrusion deformation, cage-shaped distortion or other signs of damages, as well as transition wear and surface corrosion situation.
2. Check the connecting situations of all wire rope end node, rotary joint, pin shaft and fixing device. Check the pulley and drum crack and wear, as well as whether all the pulleys are damaged and rope blocking situation.
3. Check whether the crane structure is damaged, such as suspension arm for defect, bending, upward arch, buckling and telescopic



boom for excess wear trace, welding crack, bolts and other fasteners for loose phenomenon.

4. Check hook and other lifting for damage, abnormal action or wear. Check hook handle thread and insurance nut for excessive rotation likely due to wear or corrosion.

5. Regular calibration of moment limiter according to the specification requirements.

6. Check the hydraulic system for leakage.

7. Check the brake and clutch function.

8. Check the tire pressure and damages, turntable and external surface wear. Check the bolt fastening situation of the wheel.

12-2-4 Inspection for unusual use

If hoisting machinery is stopped not using for more than one month but no more than one year, it should be checked according to daily inspection before use. If hoisting machinery is stopped not using for more than one year, it should be checked according to weekly inspection before use.

12-2-5 Test requirements

In the first use of the crane after overhaul as well as after a serious accident, load lifting ability test should be carried out. The above overhaul refers to maintenance by removing or updating the main structure parts, also including the overall repair to mechanism or control system, but after overhaul crane performance parameters and technical index should not be changed. Before test, visual inspection and no load test should be firstly carried out. In the no load test, the operating and control devices should be flexible and reliable. Movement of all mechanism should be steady and accurate, crawl, vibration and impact and other abnormal phenomenon are not allowed. The action of limiting and protective devices should be accurate and reliable.

Visual inspection and load lifting ability test content should be carried out according to GB/T5905 provisions. Test shall be conducted by qualified personnel.

After test, crane torque limiter device should be calibrated again to meet the prescribed requirements.



12-3 Wire rope inspection

1. Daily visual inspection

Every working day all the visible parts of wire rope should be observed as far as possible, with the purpose to find the general damage and deformation. Special attention should be paid to the connection positions of wire rope on the crane, any suspicious changes in wire rope state should be reported, and checked by the competent personnel according to the provisions of the "inspection positions".

2. Regular inspection

Regular inspection should be carried out by the competent personnel according to the provisions of the "inspection positions". In order to determine the interval for regular inspection, the following points should be considered:

- a. National regulations requirement to the application of wire rope;
- b. Working environment;
- c. Crane working level;
- d. Early test results;
- e. Wire rope used time.

3. Special inspection

Special inspection should be carried out according to "test position" provisions.

In the situation that accidents happened due to wire rope and/or its fixed end damages, or putting into use again after disassembly of wire rope, the wire rope should be check once.

If crane is stopped not working up to 3 months or above, the wire rope should be checked first before use.

4. Test position

Wire rope should be made full length check (nondestructive testing is recommended for full length check), you still should pay special attention to the following parts:

- a. Both ends of movable rope and fixed rope;
- b. Wire rope segment through the pulley block or bypass the pulley;
- c. In repeated working of the crane, any part of wire rope bypass pulley when the crane is in load condition, such as the inspection on wire rope end on the drum, check broken wire and wear, etc. round the pulley parts;



According to the use situation of wire rope, the competent personnel should inspect once or more every month.



- d. Wire rope section in balance pulley;
- e. Any section with wear due to external factors;
- f. Wire rope internal part with corrosion and fatigue, such as wire rope internal lubrication state, corrosion degree, wear signs and broken wire due to the extrusion or wear etc.;
- g. Wire rope section in thermal environment

5. Scrap standard

The wire rope safety use is determined by following factors::

- a. Nature and quantity of broken wire;
- b. Broken wire at the end;
- c. Broken wire local accumulation;
- d. Broken wire increasing rate;
- e. Strand fracture;
- f. Rope diameter decrease, including conditions due to rope core damages;
- g. Elasticity reduction;
- h. External and internal wear;
- i. External and internal corrosion;
- j. Deformation;
- k. Damages due to the effect of heating or electric arc;
- l. Permanent elongation.

All inspections shall take into account the above various factors as recognized specific standards. But the wire rope damage is usually by a variety of comprehensive factors, governors should judge the reason and make decision whether the steel wire rope is scrapped or continuously used according to the



Internal damages are the leading cause of many wire rope failures, which are mainly due to corrosion and normal fatigue. The routine external inspection may not be able to find the extent of the internal damages, which is still so even if fracture risk is coming.



cumulative effect, specific rejection standard see the provisions of article 3.5 in GB/T5972-2009 "crane wire rope care, maintenance, installation, test and scrap" .

6. Replacement requirements and steps

The new replaced wire rope should be of the same type and specification with the original wire rope. If wire rope with different types and specifications is used, it must be approved by our company crane design personnel or steel wire rope manufacturer, and compatible with the slot shape on drum and pulley.

Based on the using condition, if a section is needed to cut from a long rope, both ends should be dealt with, to prevent the wire rope loose with appropriate methods.

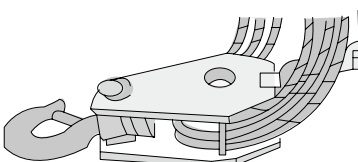
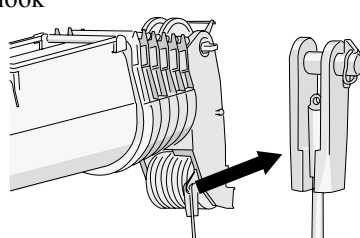
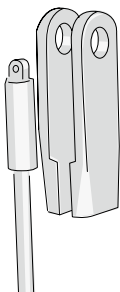
Wire rope should not be placed randomly in installation, wire rope should always bend in the same direction, that is, they should be in the same direction from the reel top to the drum top, or from reel bottom to drum bottom. You should be especially careful to the ends fixation to ensure safety and reliability.



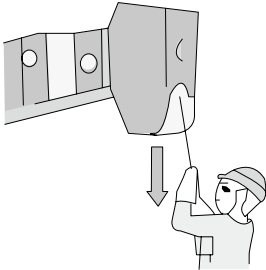
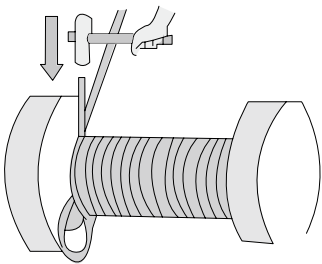
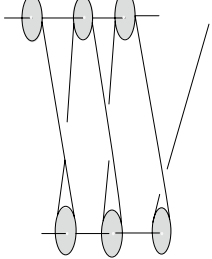
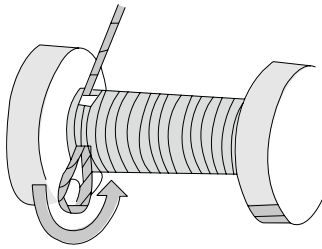
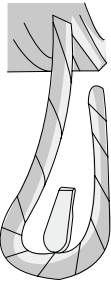
If any part of the crane has friction with wire rope products during installation, effective protective measures should be taken to the contacting parts.



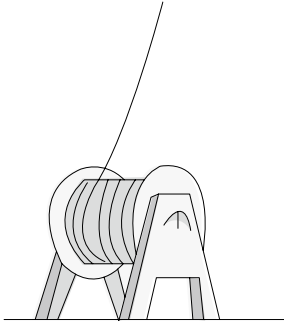
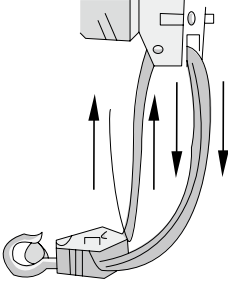
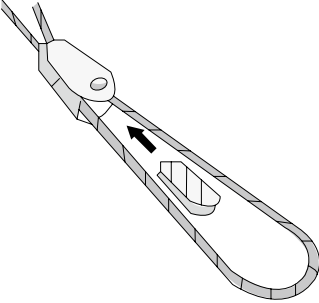
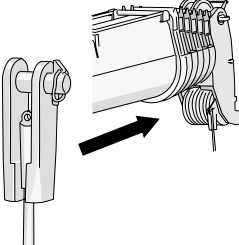
Take replacement of master winch wire rope as an example, firstly place the crane on solid and flat ground, completely retract the boom, and then replace according to the following steps:

No.	Steps	Precautions	Tools
1	Lower the main arm to the ground 	Be careful to avoid disorder winding of steel wire rope on drum.	
2	Dismantle the wire rope on the top-section of main boom of the main hook 	Carefully keep parts, and don't lose.	Hand hammer
3	Remove the wire rope in the wire knot 	Carefully keep parts, and don't lose.	



No.	Steps	Precautions	Tools
4	Carry out hook decline operation, and pull out wire rope from the drum 	Wire rope should be pulled out at the same time by hand.	Protective gloves
5	Remove the wire rope from the main drum 	Keep well the wedge 	Steel bar, hammer
6	Make new wire rope round all pulleys 	CAUTION Be careful not to round the wrong pulley, wire rope end should be winded tightly with wire or vinyl plastic tape	Wire or vinyl plastic tape
7	Fix the wire rope end on the main drum 	1. Properly install the wedges. 2. Wire end should not be exposed from the drum cylindrical external face. 	Hand hammer



No.	Steps	Precautions	Tools
8	Wind the wire rope 	1.Be careful not to wind disorderly wire rope on drum. 2.Wire rope end should be winded tightly with wire or vinyl plastic tape. 	Wire or vinyl plastic tape
9	Wind wire rope on the top main pulley and main hook pulley according to the corresponding ratio 	Pay attention not to make a mistake in the order.	
10	Install the rope knot and rope clamp on the wire rope 	Properly install wedges.	Hammer, wrench
11	Install wire rope knot on the top main pulley and main hook pulley according to the corresponding ratio 		Hand hammer



No.	Steps	Precautions	Tools
12	Lift the boom to certain high elevation and stretch out, and then lower the hook until the wire rope on the drum is remained 3-5 rings.	Not excessively lower the hook, otherwise it will damage the wire rope	Steel bar, hammer
13	Lift a load making the wire rope tension reach about 30% of maximum allowable load value of wire rope single strand, and then wind the wire rope around the drum.	It shall not exceed rated total lifting weight. Maximum allowable load of wire rope single strands is 6300 kg.	Hammer, wrench
14	Remove the load from the main hook		

The new replaced wire rope in crane should be carried out trial use before putting into use, and you shall ensure that all devices relating to wire rope operation (such as winding drum, pulley, etc.) should be in normal operation. In order to adjust the wire rope and its accessories to adapt to the actual working condition, partial loading, alternating loading, and unloading should be carried out in low speed and at about 10% of rated working load condition, as well as a few lifting motion.

7. Maintenance

Regular care and maintenance on wire rope can improve the safety of crane operation and effectively increase the service life of the wire rope. Wire rope should not only be applied with grease or oil when installing, but also later should be lubricated and cleaned periodically, especially the wire rope within the scope of winding around pulley shall be kept the good lubrication state before showing dry or corrosion signs.

For wire rope used lubricating oil (grease) model, see chapter 11 of the “XCT80 truck crane operation manual”.

Shorter service life of wire rope results from the lack of maintenance, especially the crane is used in corrosive environment, as well as the various reasons relating to operation, for example, the use in special situations where wire rope lubricant is strictly prohibited. In view of this situation, the wire rope inspection interval should be reduced.



12-4 Hook inspection

1. Use inspection

Hook should be regularly checked by professional. Through the inspection, the problem can be found as early as possible, thus can avoid the accidents, the problem should be handled in time after discovery. Hook inspection is mainly carried out from the following several aspects:

a. Surface crack

Check hook surface for crack, which should be scrapped if there is a crack,

b. Deformation

1)The hook should be checked the measuring length y value (as shown in figure 12-1), the hook should be scrapped when the value is more than 10% of the size before use.

2)Check hook the torsional deformation, the hook should be scrapped when the torsion angle α (as shown in figure 12-1) is more than 10° .

3)The hook handle should not have plastic deformation, or it should be scrapped.

c. Wear

Hook wear ΔS (as shown in figure 12-1) shall not exceed 5% of the basic size, and otherwise the hook should be scrapped.

d. Corrosion

1)Corrosion size of the hook shank diameter d_1 (as shown in figure 12-1) should not be more than 5% of the basic size, otherwise the hook should be scrapped.

2)The hook thread should not have corrosion.

e. Welding is not allowed to repair the hook defects.

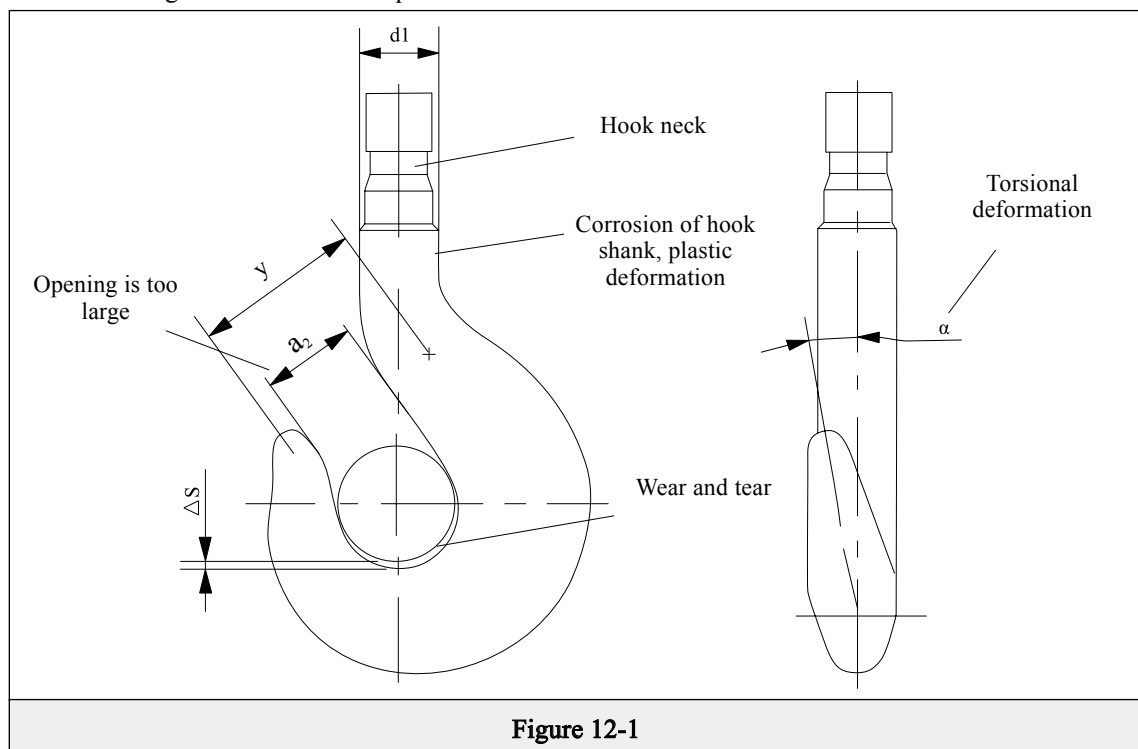


Figure 12-1



2. Scrap

Hook should be scrapped when the following circumstances occur:

- a. When some cracks are found by 20X magnifier on the surface of the hook;
- b. Degree of opening a_2 (see the main, auxiliary hook plate) increased by 15% than the original size;
- c. The other hooks should be checked the values of measuring length y (as shown in Figure 12-1), when the values exceed 10% of the nominal dimensions before use, the hooks should be scrapped:
- d. Dangerous section wears up to 5% of the original dimension;
- e. Torsional deformation is more than 10° ;
- f. Section wear at the hanging rope is more than 5% of the original height;
- g. Dangerous section or hook neck has plastic deformation.

12-5 Drum, pulley and brake inspection

12-5-1 Drum

Drum should be scrapped when the following circumstances occur:

- a. Surface defects (such as crack, etc.) affecting performance;
- b. Wear of drum wall is up to 20% of the original wall thickness.

12-5-2 Pulley

The pulley should be scrapped when one of the following conditions appears:

- a. Surface defects (such as crack, etc.) affecting performance;
- b. Wheel groove uneven wear is up to 3 mm;
- c. Wheel groove wall wear thickness is up to 20% of the original wall thickness,
- d. Wheel groove bottom diameter reduction due to wear reaches of 50% of the wire rope diameter.

12-5-3 Brake

Lifting reducer and slewing reducer are equipped with brakes, but other mechanisms are not equipped. When the brake parts are in one of the following conditions, the parts should be replaced or the brake should be scrapped:

1. The input end has oil leakage phenomenon, oil seal damages, and the brake oil seal needs to be replaced.
2. Insufficient braking torque
 - a. Friction plate wear is serious and the braking torque decreases, the friction plates should be replaced.;
 - b. Friction plate should be replaced due to deformation.



LOG



LOG



Chapter 13 Crane Transportation and Storage

Different means of transportation should be selected for XCT80 truck crane according to the actual situation. The center of gravity of the vehicle is 1204mm away from the rotation center (the front direction), with a height of 1950mm.

13-1 Crane transportation mode

The crane can travel on the highway, and can also be transported by other modes of transportation for long distance. In loading of the crane, the crane operating room, all joysticks of outrigger and the power switch must be in the neutral position and the off position, and doors and windows are in locking to prevent the open in the transportation.

13-1-1 Highway transportation

a. Crane road transportation can be self-transportation. Vehicle dimensions in driving state (L × W × H): 14770mm x 2790mm × 3890mm, vehicle weight in driving state: 50t [without the main hook, auxiliary hook, and 8t balance weight].

b. Traveling on the highway should be consistent with the requirements of the relevant national and local road traffic laws and regulations.

c. The middle hook must be fixed to the fixing hole in front of the frame with a soft rope, to prevent swinging and causing accidents.

13-1-2 Rail transportation

a. In rail transportation, the crane can be mounted on a flatbed truck;

b. The wheels of the crane must be stuck with a piece of wood or cement blocks;

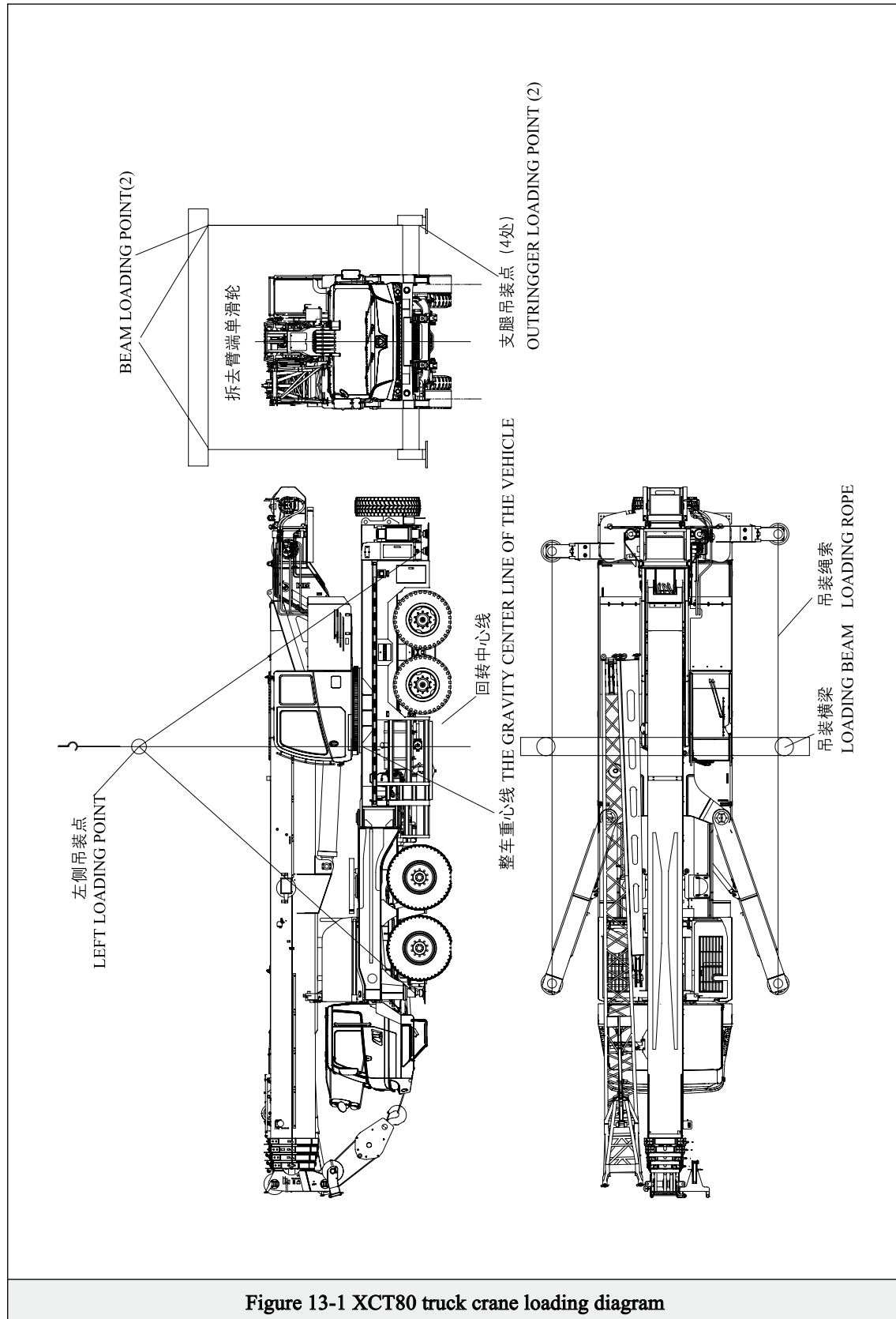
c. The crane should be tied tightly to the flatbed with rope to prevent loose.

13-1-3 Shipping transportation

a. If the crane is transported by shipping, Ro Ro ship is recommended. Ro-Ro transportation is convenient and can save a lot of assembly time, and the crane just need to drive to the specified location of the Ro Ro ship and fixed.

b. When lifting (a dedicated spreader is recommended) is needed, four horizontal outriggers should extend to about 4900mm, the wire rope round the legs, and the hook is located above the center of gravity position of the vehicle.

c. If containers decomposition transportation is adopted, you should contact with our company, our company will provide users with the size and weight of the corresponding parts according to the actual situation to facilitate transportation.





13-2 Lorry shipping parts

Part		Dimension(L×W×H)(mm)	Weight(t)
Balance weight (2)	Balance weight B	2700×1143×352	4.5
	Balance weight C	2700×1143×233	3.5
Hook	Main hook	710×603×1784	1.0
	Auxiliary hook	427×427×748	0.25

13-2-1 Balance weight transportation

XCT80 truck crane is fully equipped with balance weight of 11.5t, and 3.5t for traveling state, its combination is: 2.2t fixed + 1.3t movable, for long-distance driving 1.3t of balance weight is required to be fixed firmly on the balance mounting bracket on the frame. In addition, 8t of balance weight should be transported by truck.



Traveling with more than 3.5t of balance weight is prohibited, and 1.3t of balance weight is prohibited for long distance transition, or there will be danger to damage the axle and turning over.

13-2-2 Hook transport

For long distance transition, the main hook and auxiliary hook require trucking. When the main hook is in the working state, it can be fixed to the front of the frame in short distance transition with soft rope.



13-3 Crane storage

The following measures should be taken if the crane is stopped not using in a longer period:

- a. Lock the doors and windows of the operating room and the cab, ensure all the joysticks and switches are in the neutral or off position, and cut off the power;
- b. Wipe away the dust and grease on the body to keep the body clean;
- c. Retract all the cylinder piston rods (except vertical cylinder) fully to the extreme positions;
- d. Extend the vertical cylinder so that the tire is completely off the ground;
- e. Charge the tire to the specified air pressure, fill moisture-proof wood below the tire;
- f. All exposed machined surfaces should be applied with grease to prevent corrosion;
- g. Clear the dust on the wire rope, and apply grease;
- h. The crane is better parked in the storeroom, if it is placed in the open air, the rain, lightning, freezing preventing measures should be taken;
- i. Start the engine and idling bodies once every three months, the operation time should not be less than 1 hour;
- j. The crane stored for more than one year and a half should be cleaned and maintained prior to use, in addition overall inspection and maintenance for the whole machine should be conducted. Based on the actual situation, decide whether to replace the engine diesel filter element, air filter cartridge, diesel mechanism, clean the cooling system and replace coolant.
- k. Special personnel should be responsible for the integrity of the crane, which should be able to put into use at any time once needed.



A series of horizontal dashed lines for recording information, with the word "LOG" centered in the lower half of the page.



Chapter 14 Appendix

14-1 Terms

1. Lifting weight Q

It is the mass of lifting heavy objects by the crane in rated lifting weight. Rated lifting weight is the maximum allowable lifting weight for heavy crane safety operations. The weight includes the wire rope from the spreader, slings, and arm head to the hook.

2. Magnitude R

It is the horizontal distance from the centerline of rotation of the rotary platform to the vertical centerline of the hook (no load) when the crane is placed on flat ground, also known as working amplitude.

3. Lifting height H

It is the vertical distance between the crane supporting surfaces to the highest working position of the hook.

4. Lifting moment M

It is the product of crane working amplitude R and the corresponding weight load Q .

5. Outrigger span

It is the distance between the two outrigger plates, the transverse span b and longitudinal span a as shown in the Figure.

Transverse span b : the distance measured in the direction between the vertical axes of the outriggers longitudinally along the perpendicular direction to the crane.

Longitudinal span a : the distance measured in the direction between the vertical axes of the outriggers longitudinally along the parallel direction to the crane.

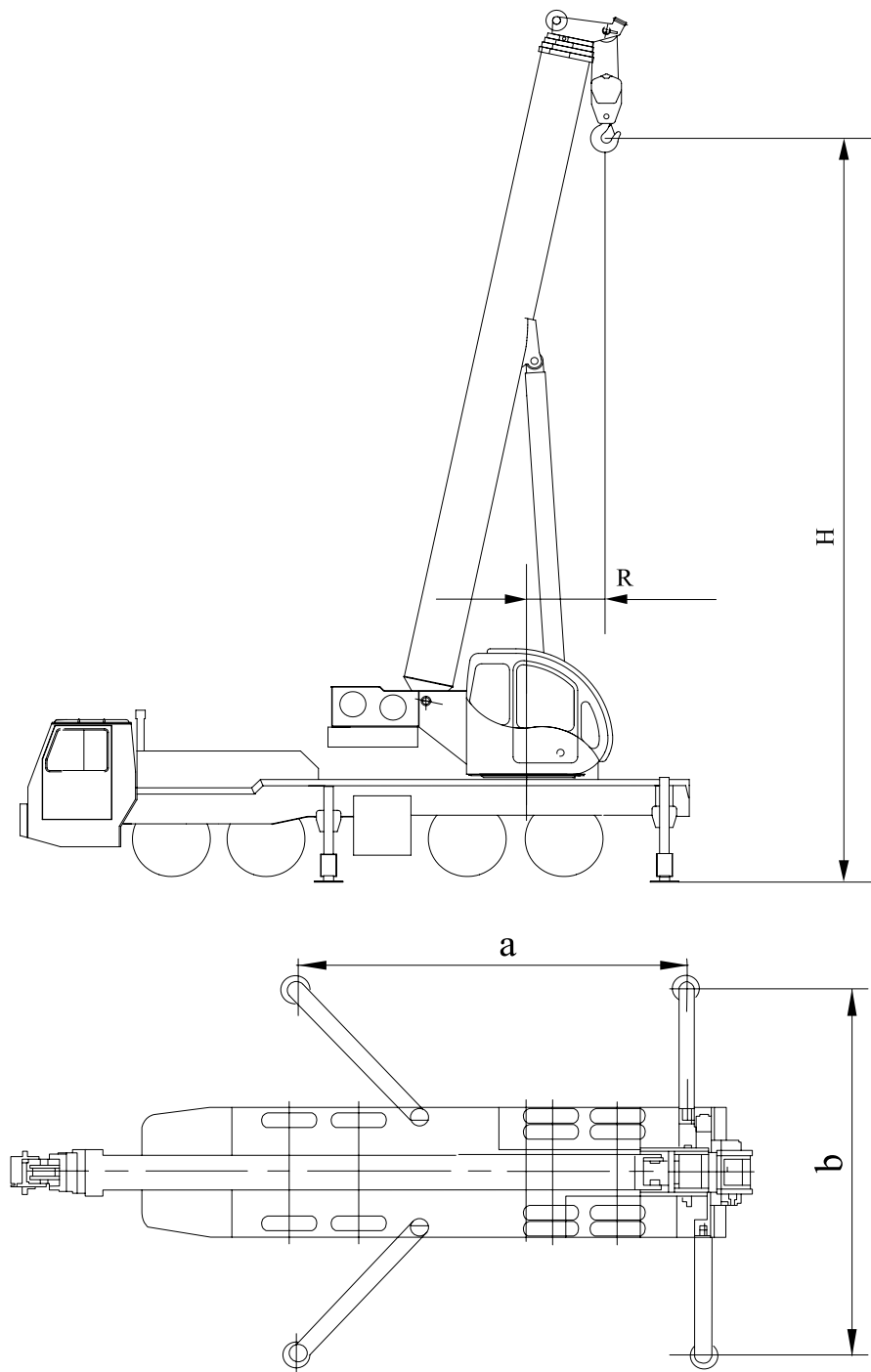


图14-1



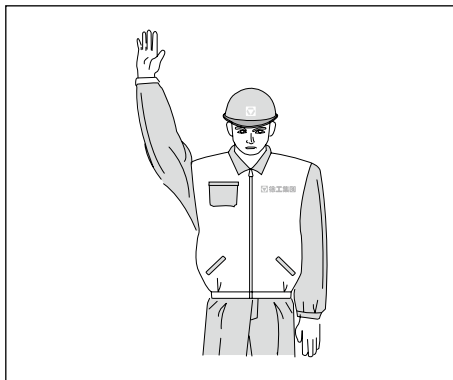
14-2 Lifting commanding gestures diagram

The personnel must be familiar with standard lifting operation command signal and gesture, which should be kept consistent between members. The recommended standard gestures are as follows:

14-2-1 Universal gesture signal

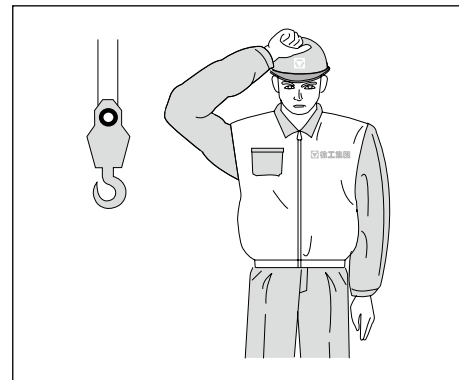
1. "Preparation" (Note)

Keep arms straight, place above the head, with fingers naturally separated and palms forward remain intact.



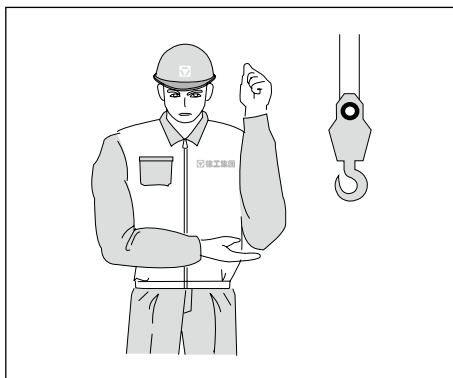
2. "Ask for main hook."

Naturally fist with one hand, place above the head to touch the top of the head slightly.



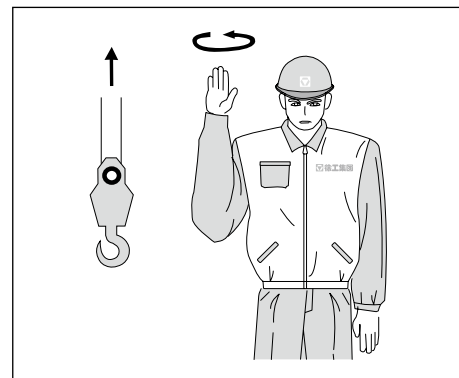
3. "Ask for auxiliary hook"

Naturally fist with one hand, forearm fixed upward, and the other hand stretches out, with the palm touching the elbow of the first hand.



4. "Hook up"

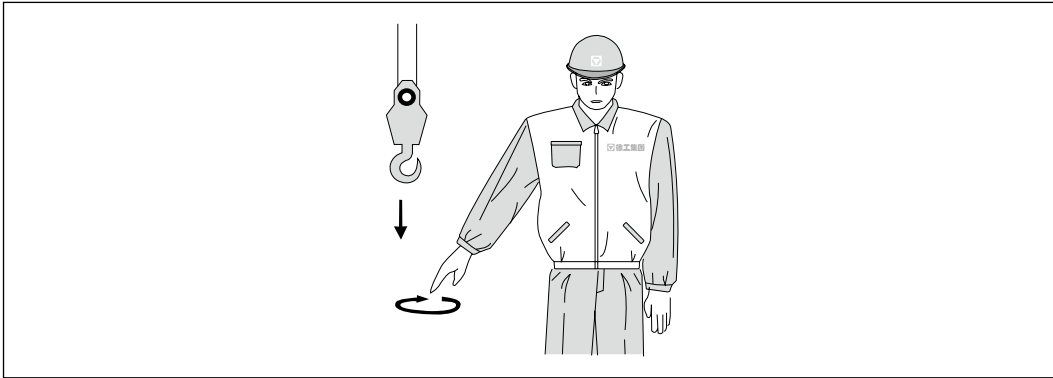
Forearm stretches laterally upward, with fingers outstretched naturally, higher than the shoulder, rotates around the wrist.





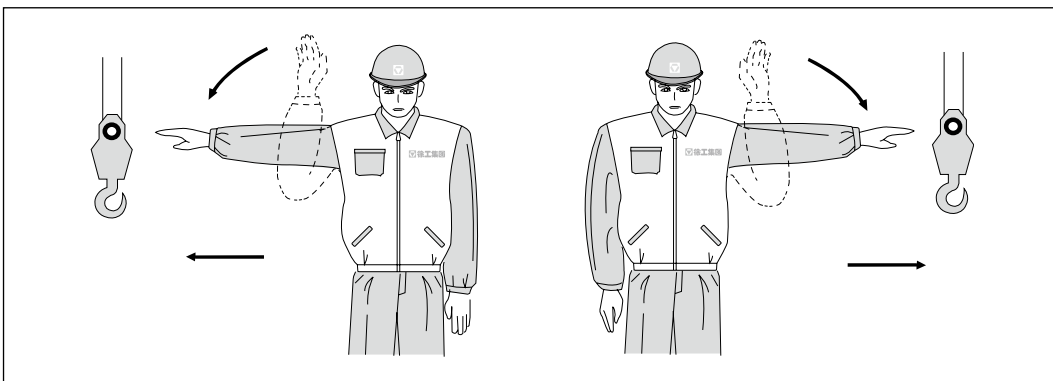
5 "Hook down"

Arm stretches toward in the front, with angle of about 30 degrees, with the fingers naturally separated, and rotates around the wrist.



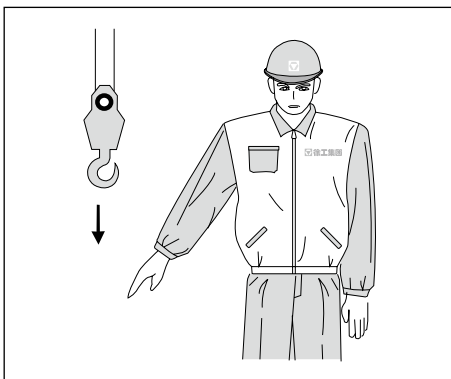
6 "Hook horizontal movement"

Arm stretches straight laterally upward, with fingers kept together and palms facing down, waves to the shoulder level position toward the load movement direction.



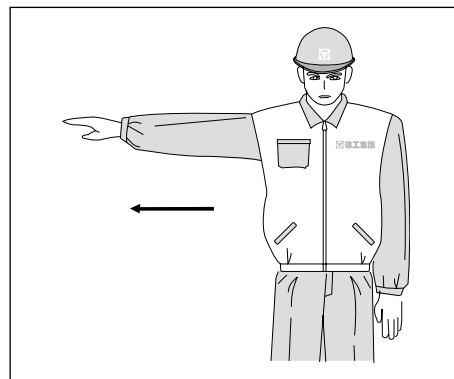
7 "Indicating decline azimuth"

Fingers stretch straight, pointing the position of the load should be landed.



8. "Stop"

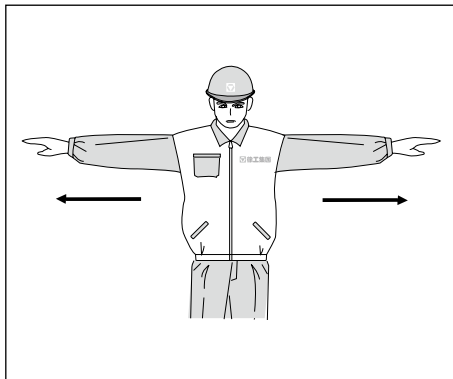
Place the forearm on the chest in level, with fingers outstretched and palms down, wave to one side in the level.





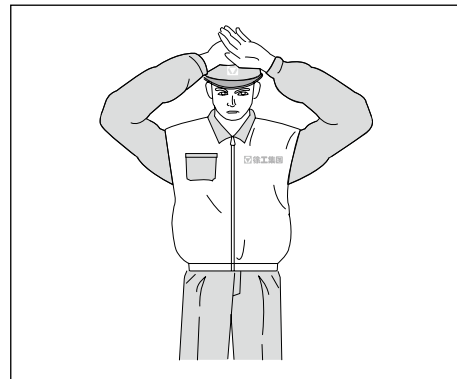
9. "Emergency stop"

Place the two forearms on the chest, with fingers outstretched and palms down, and at the same time wave to both sides in the level.



10. "End of working"

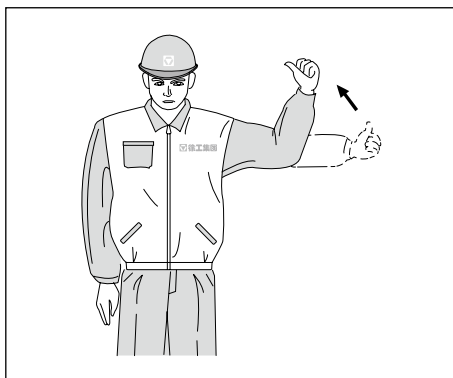
Fingers of both hands outstretched across in front of the forehead.



14-2-2 Special gesture signal

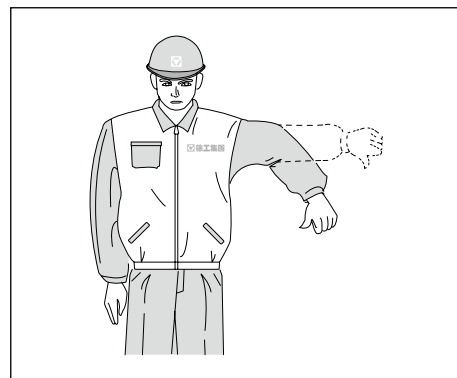
1. "Extending arm"

Stretch the arm straightly to the side, with thumb up and other fingers fist, and swing forearm upward.



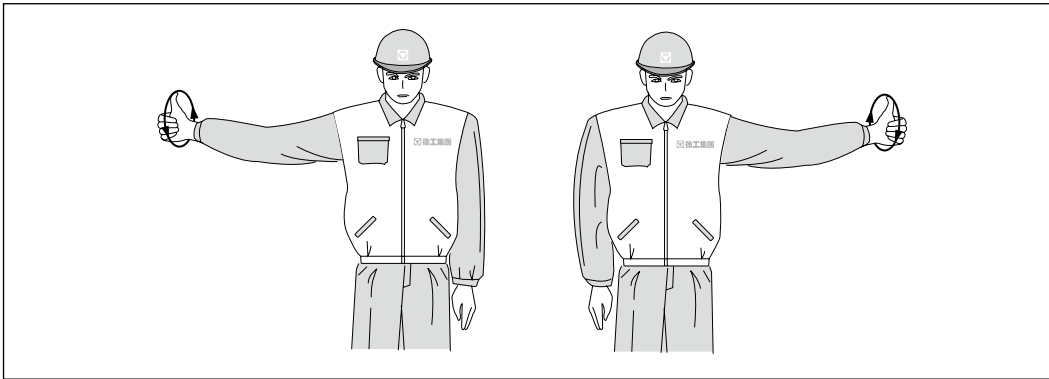
2 "Lowering arm"

Stretch the arm straightly to the side, with thumb up and other fingers fist, and swing forearm downward.



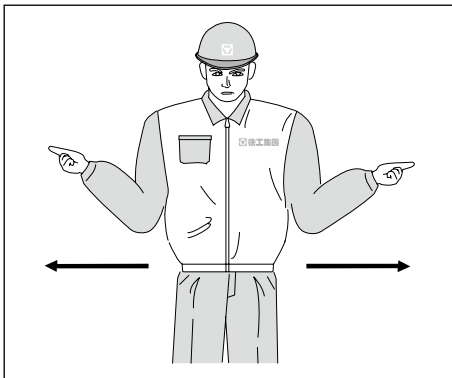
3 “Rotating arm”

Stretch the arm horizontally straight, pointing the direction of arm turning, with thumb extended and other fingers fist, and rotate around the wrist.



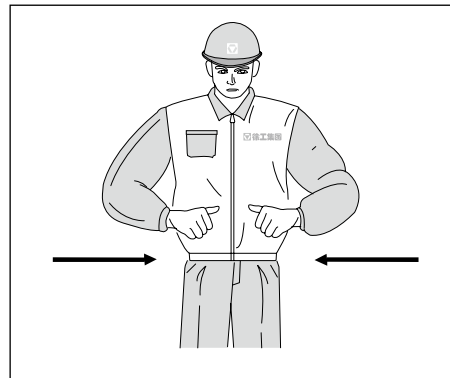
4. "Extending arm"

Both hands were fist, with fist upward, and both thumbs move to both sides outward.



5. “Retracting arm”

Both hands were fist, with fist upward, and both thumbs move to the side inward.





LOG



XUZHOU HEAVY MACHINERY CO.,LTD.
XUZHOU CONSTRUCTION MACHINERY GROUP CO., LTD., CHINA

Add : No. 165, Tongshan Road, Xuzhou City, Jiangsu Province, China

Tel : +86-516-83462242 83462350

Fax : +86-516-83461669

Post Code : 221004

Service Tel : +86-516-83461183

Service Fax : +86-516-83461180

Quality Inquiry Tel : +86-516-87888268

Spare Parts Tel : +86-516-83461542

All rights reserved