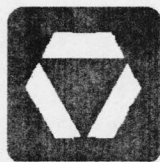


QY70K TRUCK CRANE

OPERATION MANUAL



XUZHOU HEAVY MACHINERY CO., LTD.

XUZHOU CONSTRUCTION MACHINERY GROUP CO., LTD. CHINA

QY70K TRUCK CRANE

OPERATION MANUAL

Total Pages: 1-123

VIN	
Date	

The operation manual is part of the crane!

Always keep on hand!

This equipment is designed and manufactured by complying with the standard of

Q/320301JAF16—2006 (XZJ5411JQZ70K Truck Crane)

Q/320301JAF99—2006 (XZJ5413JQZ70K Truck Crane)

Q/320301JAF123—2007 (XZJ5430JQZ70K Truck Crane)

Q/320301JAF124—2007 (XZJ5431JQZ 70K Truck Crane)

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QY70K Truck Crane Packing List

Serial number:

No.	Name	Qty	Package	Remark
1	QY70K Truck Crane	1	Naked package	With 20 L of fuel
2	QY70K Product Certificate	1		
3	QY70K Operation Manual	1		
4	QY70K Parts Catalogue	1		
5	QY70K Maintenance Manual	1		
6	Load Moment Indicator Instruction	1		
7	Supplied Tools	1	Metal case	
8	Supplied Spare Parts	1	Wood case	

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Preface

This manual describes the correct operation, inspection and adjustment for QY70K Truck Crane. In order to give full rein to the crane high performance, please read, understand and use the operating instructions in this manual to ensure safety and high efficiency work for a long time. And pay more attention to the contents of “Danger”, “Caution” and “Note” in this manual. For special application, please contact the technical department of our company.

Moreover, this manual contains the detailed description of all parts and control components as well as superstructure and chassis.

All regulations and guidelines applicable to the job site, such as accident prevention regulations and all guidelines and regulations stated in the manual must be strictly adhered to.

All cranes have been checked strictly in our factory and are supplied to Customers with all control components correctly set.

The machine has a 12-months warranty beginning from the date of the machine delivery to Customers. Warranty policy should be returned to manufacture after warranty period, items repaired and equipment situations should be recorded in the warranty policy.



Only the trained and qualified personnel can work on this crane.

Pay attention to periodic inspections of crane safety devices and don't use reluctantly the devices with any defects and abnormalities. What you should always keep in mind is **“Safety Is Top Priority ”**.

Please keep the supplied technical documents and operation manual carefully, and operate the machine according to instructions in them. Our warranty is voided if your machine is not operated and maintained in accordance with our directions.

We reserve the right to modify the design without notice for improvement.

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I . General Safe Operation Practices

1. Definition

- 1.1 Supervisor: person who possesses necessary theoretical and practical knowledge and has experience related in correctly operating cranes and lifting equipments.
- 1.2 Driver (operator): person who performs lifting operation or crane installation.
- 1.3 Employer: person or organization who employs employees to carry out lifting operation.
- 1.4 Rated load: the max. load which crane can lift in specified conditions.
- 1.5 Equipment conditions
 - 1.5.1 Working conditions: the conditions under permissible wind velocity in which crane can handle rated load and other conditions stipulated by standard and/or manufacturer.
 - 1.5.2 Non-working conditions: the conditions that crane is in downtime, no load applied, and other conditions stipulated by standard and/or manufacturer.
- 1.6 The center of gravity: the point in which all mass of a load is regarded to centralize, or the point on which all parts of an object is balanced.
- 1.7 Operation: any process of working using or operating crane, such as transporting, installing, disassembling, maintaining crane as well as handling load.
- 1.8 User(s): supervisor or organization who manages lifting operation.
- 1.9 Designated person: person who is authorized to manage crane operation and represent the organization that owns the load to be handled.

2. Crane Operation Management

2.1 System for Safe Working

System for safe working should be built, and it must be obeyed whenever one single operation or a group of cyclic work is performed, as well as operation in unfixed or fixed place (in a factory or dock). The system consists of:

2.1.1 Work planning

Working plan must be done for crane safe operation to ensure that all potential dangers at the jobsite are considered. It should be observed in operation;

- 2.1.2 Select, supply and operate cranes and lifting equipments properly;
- 2.1.3 Maintain, check and inspect cranes and lifting equipments;
- 2.1.4 Develop specialized training plan and designate supervisor and crew related to crane operation;
- 2.1.5 Entire supervision should be done by an authorized person who is specially trained and in possession of necessary limits of authority;
- 2.1.6 Obtain necessary certifies and other valid documents;
- 2.1.7 Using or operating cranes by an unqualified person is not allowed;
- 2.1.8 Watch out for the safety of person who is not related to crane operation; .
- 2.1.9 Cooperate with other organization to prevent harmful accident or for safety protection;
- 2.1.10 The communication which personnel including crane operator can understand should

be equipped. All system for safe working should be reported to all departments concerned.

2.2 Crane Operation Management

For fulfillment of the system for safe working, a person should be designated to supervise crane operation instead of the organization that owns the load to be handled. He should be trained and has practical experience.

2.3 Contract Conditions

2.3.1 Contract for crane operation

Employer may make contract with "user" who is to undertake crane operation. The contents of the contract is:

2.3.1.1 All works should be done according to the requirements explained in this section;

2.3.1.2 User should employ personnel who satisfies employer as explained in item 2.2;

2.3.1.3 Employer should inform user all information in written form;

User should observe all requirements stipulated in the section. User should be authorized to fulfill related duties, including the right to manage and direct personnel who belongs to employer. Before signing a contract, employer has a duty to satisfy the user's right for performing work according to the requirements explained in this section.

2.3.2 Lender's responsibility

When a user (or organization) rents crane and operator for lifting operation, the lender has the responsibility to designate qualified operator and lend a crane, which has been maintained, checked and inspected.

2.3.3 User's responsibility

User (or organization) has a duty to designate a supervisor according to the requirements explained in item 2.2. Although the owner of the crane has supplied some recommendation for crane selection and other items, user still has the right to ensure that the crane with proper type, dimension and lifting capacity is used and the working plan is performed.

3. Personnel Selection, Responsibilities and Basic Requirements

3.1 Basic Requirements

Safety of the machine depends on the selection of the supervisor.

3.2 Driver's Responsibility

Safety is the priority that operator must take into consideration and be on alert. He must refuse to operate when he knows it is unsafe, and consult his supervisor when safety is in doubt.

He must read and understand the 'Operator's Manual' and see that the machine is in proper order (especially the tightness of slings and rope sockets) before operating.

He must understand how to read the lifting load table and know that his machine can safely lift each load before attempting to lift it.

He must be alert, physically fit, and free from the influences of alcohol, drugs, or medications that might affect his eyesight, hearing, reactions and judgment.

He should check the job site in person before operation. He must see that unnecessary people, equipment, and material are kept out of the work area. The area around the machine should be

properly barricaded.

When an operator's vision is restricted or when operating in hazardous places such as near electrical power lines or around people, a signalman must be used. Because the operator is not always in the best position to judge distances and can not see all parts of the jobsite, a signalman may also be necessary at other times. Operators must understand standard crane signals and take signals only from designated signalmen.

Operators must respond to emergency stop signal whenever and whoever sent.

Operator must not leave the crane unattended during working.

3.3 Signalman's Responsibility

The primary duty of a signalman is to assist the operator in safe and efficient operation. Operators depend on designated signalmen to assist them in making movements without endangering people or property.

Signalmen must have a clear understanding of the work to be done so that they can safely coordinate each job with operators and crew.

Signalmen must place themselves where they can be clearly seen and where they can safely observe the entire operation. Standard crane signals must be used unless other methods of signaling such as two way radios or flags have been agreed upon.

3.4 Responsibility of All Crew

Inspect the tightness of slings and rope sockets.

Any unsafe condition or practice must be corrected or reported to the job supervisor.

Everyone who works around the crane, including riggers and maintenance personnel, must obey all warning signs and watch out for his own safety and the safety of others. Crew setting up machines or handling loads are expected to know proper machine erection and rigging procedures.

Watch out for hazards during operations and alert the operator and signalmen of dangers such as power lines, the unexpected presence of people, other equipment or unstable ground conditions.

3.5 Management's Responsibility

See that operators are trained, competent, physically fit and, if required, licensed. Good vision is required, as are good judgment, coordination and mental ability. Any person who lacks any of these qualities must not be allowed to operate a crane.

Signalmen must have good vision and sound judgment, know standard crane signals and be able to give signals clearly. They must have enough experience to be able to recognize hazards and signal the operator to avoid them.

Riggers must be trained to determine weights and distances and to select proper lifting tackle. It is management's responsibility to employ qualified riggers.

Crew must be given specific safety responsibilities and instructed to report any unsafe conditions to their supervisors.

3.6 Planning the Job

Most accidents can be avoided by careful job planning. The person in charge must have a clear understanding of the work to be done and equipment capabilities. He must consider all dangers at the jobsite, develop a plan to do the job safely, and then explain the plan to all concerned. Factors such as these should be considered:

- (1) What crew is needed and what responsibilities will they be given?
- (2) What is the weight and volume of load to be lifted, working radius, boom length and angle, and crane lifting performance?
- (3) How will the signalmen communicate with the operator?
- (4) What equipment is required to do the job safely? Is a crane the best equipment for the job?
- (5) How can the equipment be safely transported to the jobsite?
- (6) Are there gas lines, power lines or structures that must be moved or avoided?
- (7) Is the surface strong enough to support the machine and load?
- (8) How will loads be rigged? What special safety precautions must be taken if more than one crane is needed to lift a load?
- (9) What safety precautions must be taken when encounter unusual weather conditions such as winds, extreme cold, rain and snow?
- (10) What steps will be taken to keep unnecessary people and equipment safely away from the work area?
- (11) Try to use the shortest boom and radius possible.

3.7 Operator's Checklist

The operator must make a safety check before starting to work each day to see that the machine is in proper order. Checklist is as the following:

- (1) Do the checking of regular service.
- (2) Check the machine log to see that periodic maintenance and inspections have been performed and all necessary repairs made.
- (3) Check the operation of safety devices and indicators.
- (4) Carefully inspect load-bearing parts such as wire rope, boom, outriggers, hooks, and rigging.
- (5) Check the wear of slings and hooks.
- (6) Be sure no unauthorized field modifications have been made, such as counterweights increased or decreased and booms that have been improperly repaired.
- (7) Check for fuel and hydraulic oil leaks.
- (8) Test all controls for proper operation.
- (9) After starting the engine, check all gauges for proper readings.
- (10) Check the operation of brake and clutch.

3.8 Operation Precautions

Mistakes in calculating lifting capacity can cause accidents. So the following should be taken

into consideration:

- (1) Working radius is the horizontal distance from centerline of rotation to a vertical line through the center of gravity of the load. Note that the working radius will increase when the load is lifted.
- (2) Weight of the load, hooks and slings.
- (3) Boom length, jib, working radius and parts of line and operating area (side, rear).
- (4) Use the next lower rated capacity when working at boom lengths or radius between the figures on the rating chart. It is dangerous to guess the capacity for boom lengths or radius between those listed on the rating plate.
- (5) Trying to lift a load without knowing whether it is within the rated capacity while expecting the crane to start to tip to warn of an overload is very dangerous and should never be done. Cranes may suddenly tip over or collapse if the load is too heavy.
- (6) Safety protective equipments (safety belt, helmet) should be worn when work on structural parts.
- (7) The rated load is based on condition that the crane is set on firm ground horizontally. Cranes may tip over or collapse if the operating surface can't support their weight. Timber mats, steel plates may be needed under crane to distribute the load under it so that the bearing strength of the ground is not exceeded. Never place crane on sewer or underground pipeline or air-raid shelter.
- (8) Never slewing with a load when the crane is leveled more than 1 % of grade. No person and objects piled are permitted within slewing radius.
- (9) Avoid overloading, side loading and lifting load sideways. Trying to lift a load that is stuck, frozen or attached to something else may result in tipping, boom collapse or other damage. Be sure that loads are free before lifting.
- (10) Never use the crane as a lifter for transferring person.
- (11) Never operate the crane before extending jacks and outrigger beams fully.
- (12) It is not allowed to interrupt common operation by using emergency stop device.
- (13) When operate crane near power electrical lines, the safe clearances keeping any part of crane from the lines should comply with those shown in table 1-1, otherwise serious injury or death will occur, and then consequent power failure accidents such as civil electricity, electricity for hospital endangering patient, civil airport and traffic chaos and factory stopping work.

Minimum distance between boom, load and electrical overhead wires Table 1-1

Voltage of power lines (kV)	$V < 1$	$1 < V \leq 15$	$15 < V \leq 40$	$40 < V \leq 100$	$100 < V \leq 220$
Safety distance (m)	1.5	3	4	5	6

3.9 Emergency Methods When Electrical Accident Occurs

- (1) Notify the electrical power company immediately.
- (2) If any part of the crane or rigging contacts a high voltage line, the safest procedure for the operator is to stay at his post until the contact is cleared, or the power has been shut off. If the operator must leave the machine, he should jump off, rather than climb off.
- (3) In case someone gets electric shock, artificial respiration and heart massage must be carried out at once.
- (4) If the lines are broken, inform people around to keep out the lines and barricade this area.
- (5) After an accident, if reuse the crane, inspect all instruments.

3.10 Precautions Against Lightning and Earthquake

When lightning or earthquake occurs, immediately do the following:

- (1) Stop the work, and lower the load onto the ground. Retract the boom fully and position it on boom rest.
- (2) Engage the brakes, stop the engine, and turn off the electrical power of all electric circuits.
- (3) Advise all personnel to stay away from the surrounding area of the machine.

3.11 Influence of Wind

Influence of the wind on the machine becomes larger in proportion to the size of a lifted load, lifting height, and boom length. Especially, the following cases are very dangerous, so utmost care is necessary for operation.

- (1) When lifting a load of wide area, against which the wind blows hard, the wind could cause the overturn of the machine and damage to the boom. The wind could also blow the load against the boom, and could cause damage.
- (2) When the boom is fully raised without a load, the wind could blow the boom backward resulting in an overturn of the machine.

3.12 Cautions for Wind

When performing crane operation in strong wind, utmost cautions are required according to the wind velocity, machine condition and working environment. The wind velocity is different on the ground than in the high air. It is also different on flat ground and in city air. Always considering these conditions and taking proper measures to meet the situation. The wind velocity mentioned here means the instantaneous wind speed.

3.13 Method of Wind Velocity Measurement

The position where the wind works against the machine is the height above the ground that corresponds to 60% of the boom length at that time. Since the wind velocity of the weather report is the average wind speed for 10 minutes at a height of 10 meters above the ground, it is necessary to convert it into the instantaneous wind speed.

Conversion Table of wind velocity

Table 1-2

Wind velocity of weather report (m/s)	3				5				8				10			
	Flat area		City area		Flat area		City area		Flat area		City area		Flat area		City area	
	Av.	Inst.	Av.	Inst.	Av.	Inst.	Av.	Inst.	Av.	Inst.	Av.	Inst.	Av.	Inst.	Av.	Inst.
	Height above ground (m)															
5	2.7	9.8	2.5	10.0	4.5	11.7	4.2	11.4	7.1	14.5	6.7	14.0	8.9	16.3	8.4	15.8
10	3.0	10.2	3.0	10.2	5.0	12.3	5.0	12.3	8.0	15.4	8.0	15.4	10.0	17.5	10.0	17.5
15	3.2	10.4	3.3	10.5	5.4	12.7	5.6	12.9	8.6	16.0	8.9	16.3	10.7	18.2	11.1	18.7
20	3.4	10.5	3.6	10.8	5.6	12.9	6.0	13.3	9.0	16.5	9.5	17.0	11.2	18.8	11.9	19.5
25	3.5	10.7	3.8	11.0	5.9	13.2	6.3	13.6	9.4	16.9	10.1	17.6	11.7	19.3	12.6	20.2
30	3.6	10.8	4.0	11.2	6.0	13.3	6.6	13.9	9.6	17.1	10.6	18.1	12.0	19.6	13.2	20.9
40	3.8	11.0	4.2	11.5	6.3	13.6	7.1	14.5	10.1	17.6	11.3	18.9	12.6	20.2	14.1	21.8
50	3.9	11.1	4.5	11.7	6.6	13.9	7.5	14.9	10.5	18.0	12.0	19.6	13.1	20.8	15.0	22.8
75	4.2	11.4	5.0	12.2	7.0	14.4	8.3	15.7	11.2	18.8	13.2	20.9	14.0	21.7	16.5	24.8
100	4.4	11.6	5.3	12.6	7.4	14.8	8.9	16.3	11.8	19.4	14.2	21.9	14.7	22.4	17.8	26.7

If an instantaneous anemometer is provided in the machine, measure the wind velocity with the anemometer provided on the boom tip section. If an instantaneous anemometer is not provided in the machine, the wind velocity given by a weather report can be converted to the instantaneous wind speed. The instantaneous wind speed can be approximated by the table below.

Wind Speed Description

Table 1-3

Wind speed (m/s)	Name	Beaufort number	Effects observed on land
≤0.3	Calm	0	Calm; smoke rises vertically.
0.3~1.6	Light air	1	Smoke drift indicates wind direction.
1.6~3.4	Light breeze	2	Wind felt on face; leaves rustle.
3.4~5.5	Gentle breeze	3	Leaves, small twigs in constant motion, light flags extended.
5.5~8.0	Moderate breeze	4	Dust, leaves and loose paper rises up.
8.0~10.8	Fresh breeze	5	Small trees in leaf begin to sway, and there are waves on the surfaces of pool and natural pond.
10.8~13.9	Strong breeze	6	Larger branches of trees in motion, whistling heard in wires; umbrella uneasy to open.
13.9~17.2	Moderate gale	7	Whole trees in motion; resistance felt in walking against wind.
17.2~20.8	Fresh gale	8	Twigs and small branches broken off trees; progress generally impeded.
20.8~24.5	Strong gale	9	Slight structural damage occurs (chimney broken, slate blown from roofs).
24.5~28.5	Whole gale	10	Trees broken or uprooted; considerable structural damage occurs.
28.5~32.7	Storm	11	Very rarely experienced on land; usually accompanied by widespread damage.
≥32.7		12	

3.14 Precautions Against Wind

When the wind velocity exceeds 10m/sec. stop the work and lower the load onto the ground and release hook block. Retract the boom fully and position it on boom rest and stop engine.

3.15 Environment Influence to Cranes

Suitable working temperature for crane operation is $-25 \sim 40^{\circ}\text{C}$. Beyond the range, the working life of crane and operation safety will be reduced. When operating the crane out of this temperature range:

- (1) Viscosity of hydraulic oil, lubricant and grease will be changed, and consequently executive components are damaged mechanically;
- (2) Radiation of the crane, the starting of cooling system and engine will be influenced too. Stop operation if atmospheric temperature is beyond normal working temperature.

3.16 The Disaster Prevention Methods and the Self -Saving

Fire: when the fire occurs, the operator should stop crane operation and avoid dangerous accidents. Meanwhile, dial the fire alarm number and save yourself using the fire extinguisher on the condition that your life is not endangered before they come to rescue you

Accident: when the accidents occur and the door cannot be opened the persons inside the cab should smash the glass with the hammer equipped in the cabs and escape from the danger.

Thundering: when crane is caught in the thundering, the driver should be calm and stay in the driver's or the operator's cab and do not touch any metal in the cab.

3.17 The Crane Cleanness

After a period of usage, the whole crane should be cleaned. The outside of the crane should be cleaned with the cleaning agent and dry natural. The inside of the operator's and driver's cab should be cleaned with various cleaning agents. Excise care when cleaning the instrument panel and LMI with the cleaning agent otherwise short circuit may occur.

3.18 The Noise in the Working Operation

The noise level of the driver's cab inside should be 84 dB and noise level, 7.5m distance from driver's cab, should be 86 dB. The noise level operator's cab should be 118 dB.

II . Applications and Features

QY70K truck crane is suitable for lifting operation and installation work in plants, mines, oil field, ports, construction sites, etc.

The features of QY70K are as following:

1. The machine with high-tech, designed and developed by our company, has taken out many patents from China Patent Agency, and gained "Three C" certification. Main technical data and performance catch up with international advanced level;
2. The vehicle consists of chassis, lifting boom, turntable, jib, winch system, slewing system, telescoping system, elevating system, hydraulic system, electric system, counterweight and operator's cab;
3. Full dimension flat-head cab for chassis, all covered walking surface, double H-type outriggers, a fifth jack are available, as well as 360° operation of boom, power system with various options.
4. Five-section boom of oval cross-section extends from 10.7m to 40.1m. Special sliders, aligning device and high-tension steel plates contribute to smooth telescoping, reliable alignment, light boom weight and strong lifting capacity. Max. lifting moment is 1764kN.m.
5. Bi-part jib, comprising one lattice section and one box section can be attached at an angle of 0°, 15° of 30°.
6. Double cylinder plus ropes for boom telescoping.
7. Hydraulic transmission for both superstructure and chassis. Each mechanism speed can be changed step-less, so smooth movement and easy operation are gained.
8. Main and auxiliary winch systems of same model, equipped with integrated planetary reducers arranged in drum. can get oil supplied by single pump or double pump. The high efficiency motor of variable displacement has the features of lower speed with heavy load and higher speed with light load.
9. Slewing system with planetary reducer and constant closed-type brake has free-sliding function. Straight-tooth slewing bearing activated by a motor and a buffer valve fitted in the hydraulic system contribute to free sliding and reliable inching control.
10. Founding counterweight suspended highly in the rear of the machine makes more space for slewing operation.
11. Equipped with perfect safety devices: load moment indicator (LMI), hoist limit switch, outrigger pinning device and electric level gauge. And illuminators facilitate night operations.
12. All-round operator's cab with wide field of vision, equipped with air-conditioner, rolling sunshade curtain, vibration-proof adjustable seat, and soundproof and heat insulation.
13. The whole machine is lower center of gravity, good stability, high travel speed, and suit for fast job site transfer and flexible operation.

III. Technical Performance and Specifications

1. Truck Crane Outline and Specifications

- (1). Truck Crane Outline (Fig. 3-1, Fig. 3-1a, Fig. 3-1b)
- (2). Technical Specifications (Table 3-1, Table 3-1a, Table 3-2)

Table 3-1 (Model XZJ5411JQZ70K / XZJ5413JQZ70K)

Table 3-1a (Model XZJ5430JQZ70K / XZJ5431JQZ70K)

- (3). Total rated lifting load for boom (Table 3-3, Table 3-4, Table 3-5, Table 3-6,)
- (4). Total rated lifting load for jib (Table 3-7, Table 3-8,)
- (5). Lifting height curves (Fig. 3-2)
- (6). Crane working area (Fig. 3-3)

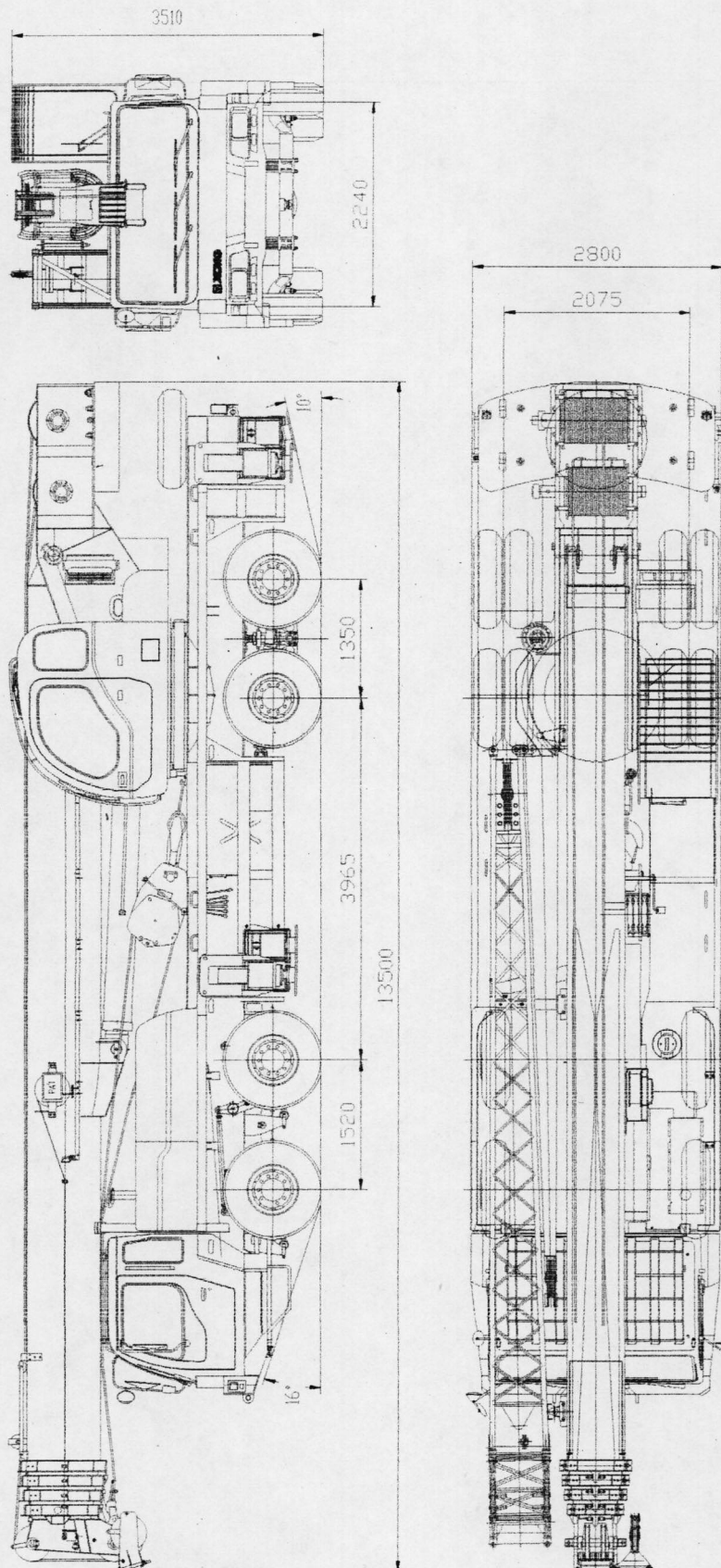


Fig. 3-1 QY70K Truck Crane Outline (XZJ5413JQZ70K)

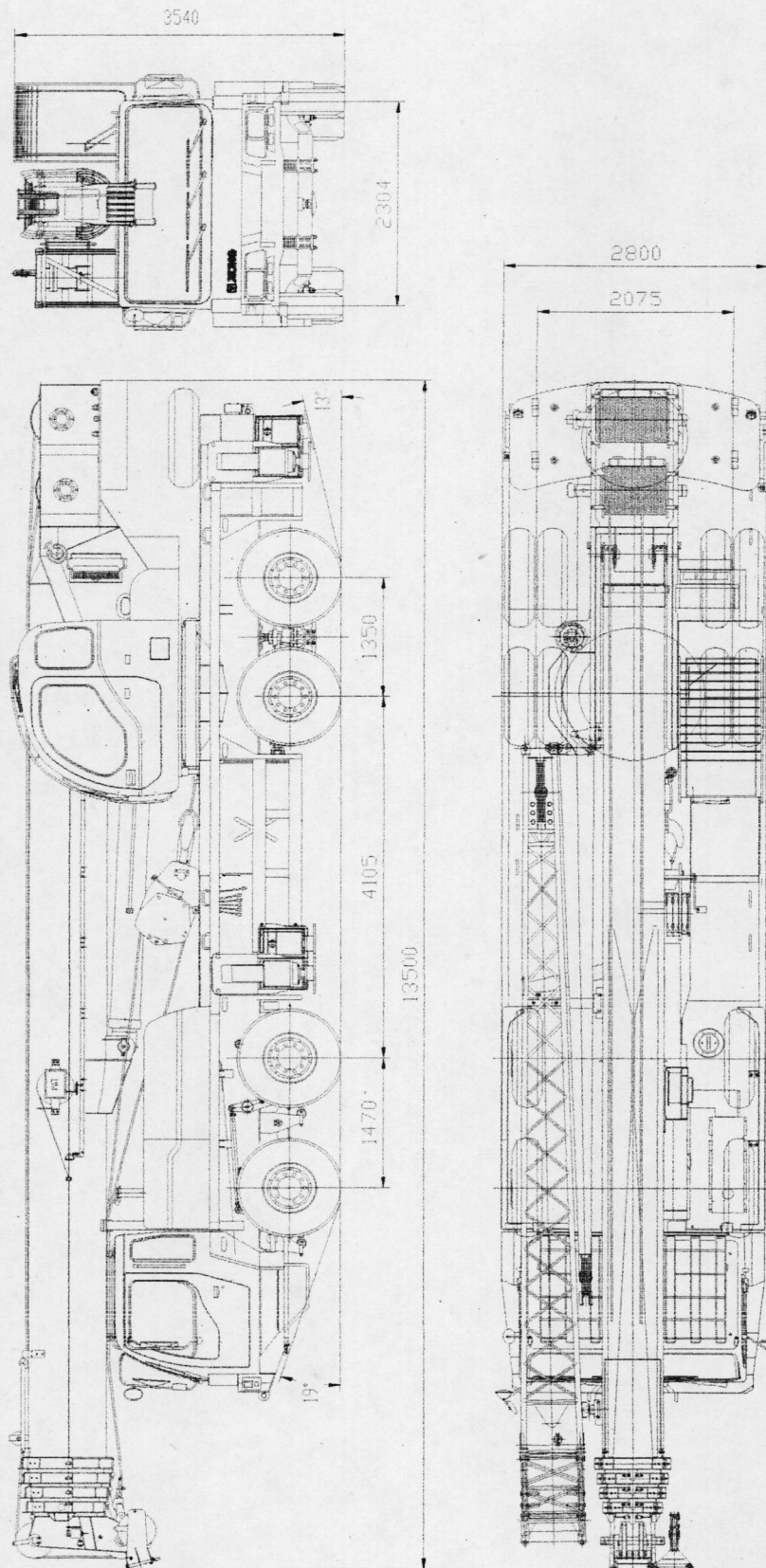


Fig. 3-1a QY70K Truck Crane Outline (XZJ5430JQZ70K / XZJ5431JQZ70K)

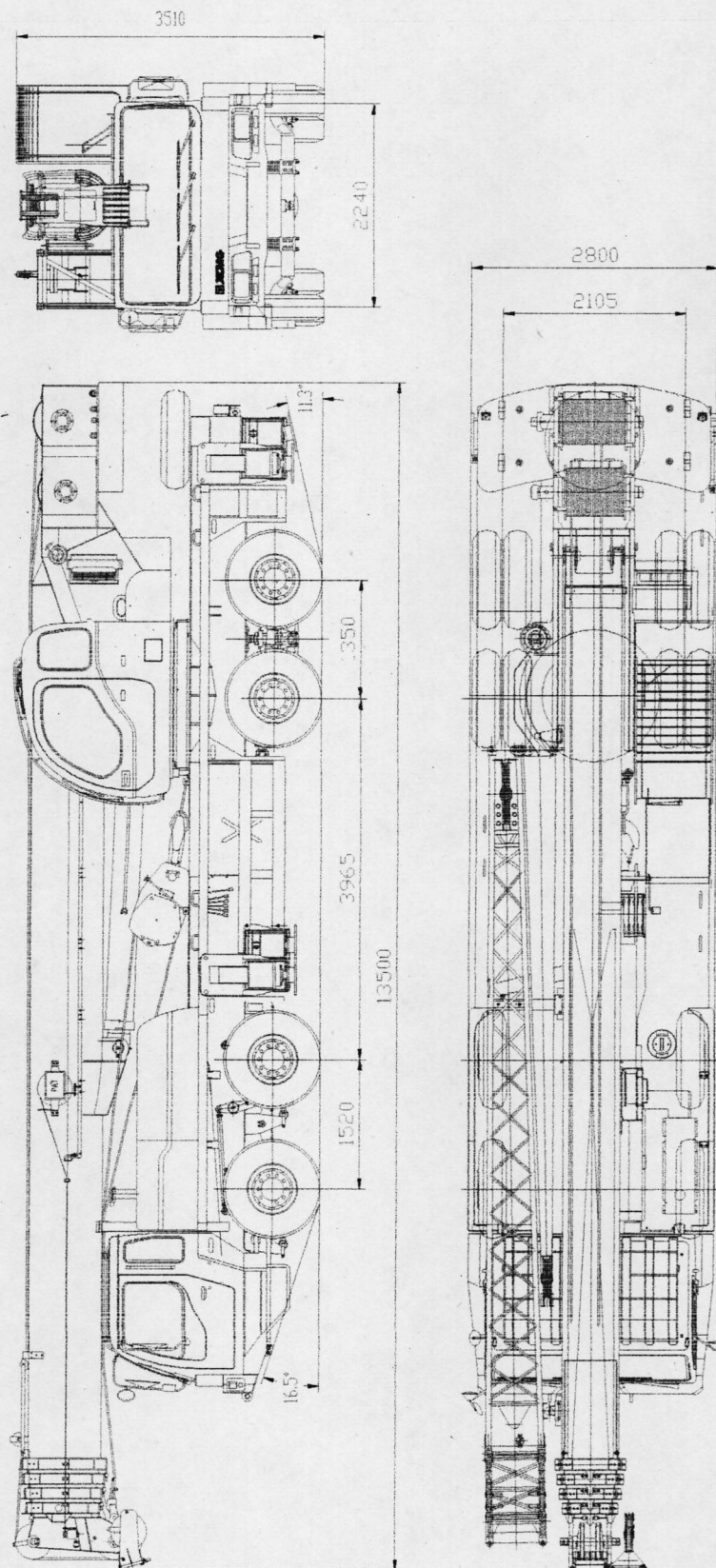


Fig. 3-1b QY70K Truck Crane Outline (XZJ5411JQZ70K)

(2). Technical Specifications

Main Technical Data in Travel configuration

Table 3-1

Category	Item		Unit	Parameter		
Outline	Overall length		mm	13500		
	Overall width		mm	2800		
	Overall height		mm	3510		
	Wheel base	1st and 2nd Axle	mm	1520		
		2nd and 3rd Axle	mm	39655		
		3rd and 4th Axle	mm	1350		
	Track	Front wheel	mm	2240		
		Rear wheel	mm	2105	2075	
Weight	Total vehicle dead weight in travel configuration		kg	41000		
	Axle load	1st and 2nd Axle	kg	15000		
		3rd and 4th Axle	kg	26000		
Power	Engine model			WD615. 44	WD615. 46	ISLE + 350
	Engine rated power		kW/ (r/min)	235/2200	266/2200	257/2100
	Engine rated torque		N.m (r/min)	1250/1500	1460/1400	1550/1400
	Engine rated speed		r/min.	2200	2200	2100
Travel	Travel speed	Max. travel speed	km/h	75		
		Min. travel speed	km/h	3		
	Turning diameter	Min. turning diameter	m	24.0		
		Turning diameter at boom tip	m	29.0		
	Min. ground clearance		mm	270		
	Approach angle		°	16.5	16	
	Departure angle		°	11.3	10	
	Braking distance (at 30 km/h)		m	≤10		
	Max. grade-ability		%	35	40	
	Fuel consumption of per 100 km		L	42		

Main Technical Data in Travel configuration

Table 3-1a

Category	Item		Unit	Parameter		
Outline	Overall length		mm	13500		
	Overall width		mm	2800		
	Overall height		mm	3540		
	Wheel base	1st and 2nd Axle	mm	1470		
		2nd and 3rd Axle	mm	4105		
		3rd and 4th Axle	mm	1350		
	Track	Front wheel	mm	2304		
		Rear wheel	mm	2075		
Weight	Total vehicle dead weight in travel configuration		kg	43000		
	Axle load	1st and 2nd Axle	kg	17000		
		3rd and 4th Axle	kg	26000		
Power	Engine model			QSI325	WD615. 46	WD615. 338
	Engine rated power		kW/ (r/min)	242/2100	266/2200	276/2200
	Engine rated torque		N.m (r/min)	1424/1400	1460/1400	1500/1400
	Engine rated speed		r/min.	2100	2200	2100
Travel	Travel speed	Max. travel speed	km/h	75		
		Min. travel speed	km/h	3		
	Turning diameter	Min. turning diameter	m	24.0		
		Turning diameter at boom tip	m	29.0		
	Min. ground clearance		mm	270		
	Approach angle		°	19		
	Departure angle		°	13		
	Braking distance (at 30 km/h)		m	≤10		
	Max. grade-ability		%	40		
	Fuel consumption of per 100 km		L	42		

Main Technical Data for Lifting Operation

Table 3-2

Category	Item			Unit	Parameter
Main Lifting Performance	Max. total rated lifting capacity			t	70
	Min. rated working radius			m	3
	Turning radius at turntable tail			mm	3550
	Max. load moment	Base boom		kN.m	2303
		Fully-extended boom		kN.m	1043
		Fully-extended boom + Jib		kN.m	492.8
	Outrigger span	Longitudinal		m	5.75
		Lateral		m	6.9
	Lifting height	Base boom		m	11.2
		Fully-extended boom		m	42
		Fully-extended boom + Jib		m	58
	Boom length	Base boom		m	11.2
		Fully-extended boom		m	42
		Fully-extended boom + Jib		m	57
Jib offset angle			°	0, 15, 30	
Working Speed	Elevating time	Boom raising		s	60
		Boom lowering		s	80
	Telescoping time	Boom full extending		s	150
		Boom full retracting		s	100
	Max. swing speed			r/min	2.0
	Hoisting speed (single line)	Main winch	Full load	m/min	75
			No load	m/min	130
		Auxiliary winch	Full load	m/min	98
			No load	m/min	108
	Outrigger extending and retracting time	Outrigger beam	Simultaneous extending	s	30
			Simultaneous retracting	s	20
		Outrigger jack	Simultaneous extending	s	35
			Simultaneous retracting	s	30
	Exterior noise level			db(A)	≤122

Table 3-3

(3). Total Rated Lifting Load for Boom (Outrigger fully extend 6.9m, Counterweight 5.5t)

With outrigger fully-extended 6.6m, without front jack, boom over side or over rear;; with front jack down, 360° swing operation																		
Radius (m)	Base boom 11.2m			Mid-extended boom 15.05m			Mid-extended boom 18.9m			Mid-extended boom 26.6m			Mid-extended boom 34.3m			Fully-extended boom 42m		
	Lifting load (kg)	Boom angle (°)	Lifting Height (m)	Lifting load (kg)	Boom angle (°)	Lifting height (m)	Lifting load (kg)	Boom angle (°)	Lifting height (m)	Lifting load (kg)	Boom angle (°)	Lifting height (m)	Lifting load (kg)	Boom angle (°)	Lifting height (m)	Lifting load (kg)	Boom angle (°)	Lifting height (m)
3	7000	70.1	11.2															
3.5	6350	67.3	11.1															
4	5450	64.4	11.0	46500	72.0	15.2	36500	79.36	19.2									
5	4700	58.3	10.7	40500	67.91	14.8	35500	73.38	19.0	22500	79.23	27.0						
6	3800	51.7	9.5	33500	63.58	14.2	33500	70.22	18.5	22500	77.31	26.7						
7	2800	44.3	8.5	26500	59.0	13.6	25500	66.75	18.0	21500	75.25	26.4	17000	80.0	34.5			
8	2000	35.5	7.1	19500	54.13	12.8	19500	63.14	17.5	19500	73.01	26.0	16000	78.52	34.1			
9	1600	23.9	5.0	15500	48.97	12.0	15500	59.47	16.9	16500	70.55	25.6	15000	76.91	33.8	9200	79.96	42.0
10				12800	43.37	10.8	12500	55.61	16.2	13700	68.05	25.2	13500	75.10	33.5	8900	78.82	41.6
12				9000	29.51	7.7	8500	47.43	14.4	10000	63.02	24.1	10700	71.44	32.7	8100	76.29	41.0
14							6000	37.95	11.9	7500	57.79	22.8	8000	67.51	31.7	7400	73.69	40.2
15							5000	32.30	10.3	6500	55.06	22.0	7000	65.52	31.1	7100	72.37	39.8
16										5500	52.26	21.1	6200	63.54	30.6	6500	70.85	39.3
18										4500	46.34	19.2	4800	59.47	29.3	5300	67.55	38.3
20										3200	39.60	16.8	3800	55.29	27.8	4200	64.31	37.2
22										2500	31.84	13.4	2900	50.85	26.0	3200	60.93	35.9
24													2200	45.90	23.9	2500	57.59	34.5
26													1700	41.08	21.5	2000	54.13	32.8
28													1200	35.37	18.5	1600	50.55	31.0
29													1000	32.2	16.6	1400	48.67	29.9
30																1200	46.72	28.8
32																850	42.6	26.2
34																600	38.2	23.2
Parts of line	12			10			8			5			4			3		
Telescopic g. %	2nd	0%		50%			100%			100%			100%			100%		
	3rd	0%		0%			0%			33%			66%			100%		
	4th	0%		0%			0%			33%			66%			100%		
	5th	0%		0%			0%			33%			66%			100%		
Boom angle	23.9~70.11			29.51~72.0°			32.3~79.36°			31.84~79.23°			32.2~80.0°			38.2~79.96		
Max. boom length at boom angle 0° :																		
34m																		
616 kg (Main hook block), 370 kg (Hook block for mid-extended boom)																		
Hook block weight																		

Table 3-4
Total Rated Lifting Load for Boom (Outrigger fully extend 5.6m, Counterweight 5.5t)

With outrigger fully-extended 5.6m, without front jack, boom over side or over rear;; with front jack down, 360° swing operation																		
Radius (m)	Base boom 11.2m			Mid-extended boom 15.05m			Mid-extended boom 18.9m			Mid-extended boom 26.6m			Mid-extended boom 34.3m			Fully-extended boom 42m		
	Lifting load (kg)	Boom angle (°)	Lifting height (m)	Lifting load (kg)	Boom angle (°)	Lifting height (m)	Lifting load (kg)	Boom angle (°)	Lifting height (m)	Lifting load (kg)	Boom angle (°)	Lifting height (m)	Lifting load (kg)	Boom angle (°)	Lifting height (m)	Lifting load (kg)	Boom angle (°)	Lifting height (m)
3	65000	70.11	11.2															
3.5	60000	67.31	11.1															
4	50000	64.40	11.0	46500	72.0	15.2	36500	79.36	19.2									
5	38000	58.35	10.7	37500	67.91	14.8	30500	73.38	19.0	22500	79.23	27.0						
6	26000	51.78	9.5	25500	63.58	14.2	25000	70.22	18.5	22000	77.31	26.7						
7	18500	44.36	8.5	18000	59.0	13.6	17500	66.75	18.0	18500	75.25	26.4	17000	80.0	34.5			
8	14200	35.59	7.1	13500	54.13	12.8	13500	63.14	17.5	14500	73.01	26.0	15000	78.52	34.1			
9	11000	23.90	5.0	10800	48.97	12.0	10500	59.47	16.9	11500	70.55	25.6	12500	76.91	33.8	9200	79.96	42.0
10				8500	43.37	10.8	8400	55.61	16.2	9500	68.05	25.2	10000	75.10	33.5	8500	78.82	41.6
12				5500	29.51	7.7	5500	47.43	14.4	6600	63.02	24.1	7300	71.44	32.7	7500	76.29	41.0
14							3600	37.95	11.9	4700	57.79	22.8	5300	67.51	31.7	5800	73.69	40.2
15							2800	32.30	10.3	4000	55.06	22.0	4600	65.52	31.1	5000	72.37	39.8
16										3400	52.26	21.1	4000	63.54	30.6	4400	70.85	39.3
18										2400	46.34	19.2	3000	59.47	29.3	3400	67.55	38.3
20										1600	39.60	16.8	2200	55.29	27.8	2600	64.31	37.2
22										1200	31.84	13.4	1600	50.85	26.0	2000	60.93	35.9
24													1100	45.90	23.9	1500	57.59	34.5
26													800	41.08	21.5	1100	54.13	32.8
28													500	35.37	18.5	800	50.55	31.0
29																500	48.67	29.9
Parts of line	12			10			8			5			4			3		
Telescoping %	2nd	0%		50%			100%			100%			100%			100%		
	3rd	0%		0%			0%			33%			66%			100%		
	4th	0%		0%			0%			33%			66%			100%		
	5th	0%		0%			0%			33%			66%			100%		
Boom angle	23.9~70.11			29.51~72.0°			32.3~79.36°			31.84~79.23°			35.37~80.0°			48.67~79.96		
Max. boom length at boom angle 0° :																		
Hook block weight																		
616 kg (Main hook block), 370 kg (Hook block for mid-extended boom)																		

Table 3-5

Total Rated Lifting Load for Boom (Outrigger fully extend 6.9m, Counterweight 7.5t)

With outrigger fully-extended, without front jack, boom over side or over rear;; with front jack down, 360° swing operation																		
Radius (m)	Base boom 11.2m			Mid-extended boom 15.05m			Mid-extended boom 18.9m			Mid-extended boom 26.6m			Mid-extended boom 34.3m			Fully-extended boom 42m		
	Lifting load (kg)	Boom angle (°)	Lifting height (m)	Lifting load (kg)	Boom angle (°)	Lifting height (m)	Lifting load (kg)	Boom angle (°)	Lifting height (m)	Lifting load (kg)	Boom angle (°)	Lifting height (m)	Lifting load (kg)	Boom angle (°)	Lifting height (m)	Lifting load (kg)	Boom angle (°)	Lifting height (m)
3	70000	70.11	11.2															
3.5	63500	67.31	11.1															
4	54500	64.40	11.0	46500	72.0	15.2	3650	79.36	19.2									
5	47000	58.35	10.7	40500	67.91	14.8	3550	73.38	19.0	22500	79.23	27.0						
6	38500	51.78	9.5	33500	63.58	14.2	3350	70.22	18.5	22500	77.31	26.7						
7	29500	44.36	8.5	26500	59.0	13.6	2550	66.75	18.0	21500	75.25	26.4	17000	80.0	34.5			
8	22500	35.59	7.1	21500	54.13	12.8	2130	63.14	17.5	19500	73.01	26.0	16000	78.52	34.1			
9	17500	23.90	5.0	17500	48.97	12.0	1700	59.47	16.9	17000	70.55	25.6	15000	76.91	33.8	9200	79.96	42.0
10				14000	43.37	10.8	1380	55.61	16.2	15200	68.05	25.2	13500	75.10	33.5	8900	78.82	41.6
12				9800	29.51	7.7	9500	47.43	14.4	10600	63.02	24.1	11600	71.44	32.7	8100	76.29	41.0
14							6600	37.95	11.9	8000	57.79	22.8	9300	67.51	31.7	7400	73.69	40.2
15							5600	32.30	10.3	7000	55.06	22.0	8000	65.52	31.1	7100	72.37	39.8
16							5000	23.65	8.2	6000	52.26	21.1	7000	63.54	30.6	6500	70.85	39.3
18										4800	46.34	19.2	5500	59.47	29.3	5500	67.55	38.3
20										3800	39.60	16.8	4200	55.29	27.8	4800	64.31	37.2
22										2850	31.84	13.4	3200	50.85	26.0	3800	60.93	35.9
24													2500	45.90	23.9	3000	57.59	34.5
26													1900	41.08	21.5	2300	54.13	32.8
28													1500	35.37	18.5	1900	50.55	31.0
29													1100	32.5	16.6	1600	48.67	29.9
30													850	24.11	14.6	1400	46.72	28.8
32																1100	42.6	26.2
34																850	38.2	23.2
36																600	27.45	20.0
Parts of fine	12			10			8			5			4			3		
Telescoping %	2nd	0%		50%			100%			100%			100%				100%	
	3rd	0%		0%			0%			33%			66%				100%	
	4th	0%		0%			0%			33%			66%				100%	
	5th	0%		0%			0%			33%			66%				100%	
Boom angle	23.9~70.11°			29.51~72.0°			32.3~79.36°			31.84~79.23°			24.11~80.0°			27.45~79.96		
Max. boom length at boom angle 0° :																		
Hook block weight																		
616 kg (Main hook block), 370 kg (Hook block for mid-extended boom)																		

Total Rated Lifting Load for Boom (Outrigger mid-extend 5.6m, Counterweight 7.5t)

Table 3-6

With outrigger mid-extended 5.6m, without front jack, boom over side or over rear;; with front jack down, 360° swing operation																			
Radius (m)	Base boom 11.2m			Mid-extended boom 15.05m			Mid-extended boom 18.9m			Mid-extended boom 26.6m			Mid-extended boom 34.3m			Fully-extended boom 42m			
	Lifting load (kg)	Boom angle (°)	Lifting height (m)	Lifting load (kg)	Boom angle (°)	Lifting height (m)	Lifting load (kg)	Boom angle (°)	Lifting height (m)	Lifting load (kg)	Boom angle (°)	Lifting height (m)	Lifting load (kg)	Boom angle (°)	Lifting height (m)	Lifting load (kg)	Boom angle (°)	Lifting height (m)	
3	70000	70.11	11.2																
3.5	62000	67.31	11.1																
4	51000	64.40	11.0	46500	72.0	15.2	3650	79.36	19.2										
5	43500	58.35	10.7	39500	67.91	14.8	3500	73.38	19.0	22500	79.23	27.0							
6	29500	51.78	9.5	29000	63.58	14.2	2850	70.22	18.5	22000	77.31	26.7							
7	21000	44.36	8.5	20500	59.0	13.6	2020	66.75	18.0	20500	75.25	26.4							
8	16000	35.59	7.1	15800	54.13	12.8	1500	63.14	17.5	17000	73.01	26.0	17000	80.0	34.5				
9	13000	23.90	5.0	12500	48.97	12.0	1200	59.47	16.9	13000	70.55	25.6	14000	76.91	33.8				
10				10000	43.37	10.8	9500	55.61	16.2	10500	68.05	25.2	11500	75.10	33.5	9200	79.96	42.0	
12				6800	29.51	7.7	6200	47.43	14.4	7500	63.02	24.1	8500	71.44	32.7	8900	78.82	41.6	
14							4500	37.95	11.9	5500	57.79	22.8	6200	67.51	31.7	8100	76.29	41.0	
15							3700	32.30	10.3	4500	55.06	22.0	5300	65.52	31.1	6600	73.69	40.2	
16										4000	52.26	21.1	4800	63.54	30.6	5800	72.37	39.8	
18										3100	46.34	19.2	3700	59.47	29.3	5200	70.85	39.3	
20										2200	39.60	16.8	2800	55.29	27.8	4100	67.55	38.3	
22										1500	31.84	13.4	2100	50.85	26.0	3200	64.31	37.2	
24													1600	45.90	23.9	2500	60.93	35.9	
26													1100	41.08	21.5	1900	57.59	34.5	
28													800	35.37	18.5	1400	54.13	32.8	
29																1000	50.55	31.0	
30																850	48.67	29.9	
																700	46.72	28.8	
Parts of line	12			10			8			5			4			3			
Telescoping %	2nd	0%		50%		100%		100%		100%		100%		100%		100%		100%	
	3rd	0%		0%		0%		0%		33%		33%		66%		66%		100%	
	4th	0%		0%		0%		0%		33%		33%		66%		66%		100%	
	5th	0%		0%		0%		0%		33%		33%		66%		66%		100%	
Boom angle	23.9~70.11			29.51~72.0°			32.3~79.36°			31.84~79.23°			35.37~80.0°			46.72~79.96			
Max. boom length at boom angle 0° : 31m																			
Hook block weight 616 kg (Main hook block), 370 kg (Hook block for mid-extended boom)																			

(4). Total Rated Lifting Load for Jib (Counterweight 5.5t) Table 3-7

With outrigger fully extended 6.9m, without front jack, boom over side or over rear;; with front jack down, 360° swing operation																		
42m																		
8.5m																		
15m																		
0°			15°			30°			0°			15°			30°			
Lifting load (kg)	Radius (m)	Lifting height (m)	Lifting load (kg)	Radius (m)	Lifting height (m)	Lifting load (kg)	Radius (m)	Lifting height (m)	Lifting load (kg)	Radius (m)	Lifting height (m)	Lifting load (kg)	Radius (m)	Lifting height (m)	Lifting load (kg)	Radius (m)	Lifting height (m)	
Boom angle																		
78°	4000	11.9	51.8	2700	13.7	50.9	2400	15.2	49.5	2500	14	57.9	1400	17.3	56.2	1100	20.1	53.7
75°	3600	14.4	51	2500	16.1	50	2300	17.6	48.5	2100	16.8	57	1250	20	55.2	1040	22.7	52.5
72°	3200	16.9	50.1	2300	18.5	49	2200	19.9	47.4	1800	19.6	56	1150	22.7	54	990	25.2	51.1
70°	2900	18.5	49.4	2200	20.1	48.2	2100	21.4	46.6	1700	21.4	55.2	1100	24.5	53.1	950	26.9	50.1
65°	2400	22.4	47.5	2000	23.9	46.2	1900	25.1	44.4	1400	25.8	53	950	28.7	50.6	880	30.9	47.4
60°	1850	26.1	45.2	1800	27.5	43.8	1700	28.6	41.9	1200	30	50.4	850	32.7	47.8	830	34.6	44.4
55°	1250	29.6	42.7	1200	30.9	41.1	1100	31.9	39.1	800	34	47.5	700	36.4	44.6	600	38	41.1
50°	700	32.9	39.8	650	34.1	38.1	600	34.9	36									
With outrigger mid-extended 5.6m, without front jack, boom over side or over rear; with front jack down, 360° swing operation																		
78°	4000	11.9	51.8	2700	13.7	50.9	2400	15.2	49.5	2500	14	57.9	1400	17.3	56.2	1100	20.1	53.7
75°	3600	14.4	51	2500	16.1	50	2300	17.6	48.5	2100	16.8	57	1250	20	55.2	1040	22.7	52.5
72°	3200	16.9	50.1	2300	18.5	49	2200	19.9	47.4	1800	19.6	56	1150	22.7	54	990	25.2	51.1
70°	2900	18.5	49.4	2200	20.1	48.2	2100	21.4	46.6	1700	21.4	55.2	1100	24.5	53.1	950	26.9	50.1
65°	1600	22.4	47.5	1500	23.9	46.2	1400	25.1	44.4	1400	25.8	53	950	28.7	50.6	880	30.9	47.4
60°	800	26.1	45.2	800	27.5	43.8	700	28.6	41.9	700	30	50.4	600	32.7	47.8	500	34.6	44.4
Hook block	100 kg (for 4t load)																	

Table 3-8

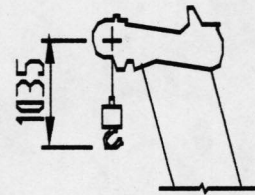
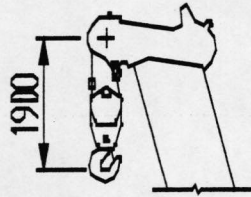
Total Rated Lifting Load for Jib (Counterweight 7.5t)

42m																		
With outrigger fully extended 6.9m, without front jack, boom over side or over rear;; with front jack down, 360° swing operation																		
Boom length	8.5m									15m								
Jib length	0°									30°								
Jib offset	15°									0°								
Boom angle	Lifting load (kg)	Radius (m)	Lifting height (m)	Lifting load (kg)	Radius (m)	Lifting height (m)	Lifting load (kg)	Radius (m)	Lifting height (m)	Lifting load (kg)	Radius (m)	Lifting height (m)	Lifting load (kg)	Radius (m)	Lifting height (m)	Lifting load (kg)	Radius (m)	Lifting height (m)
78°	4000	11.9	51.8	2700	13.7	50.9	2400	15.2	49.5	2500	14	57.9	1400	17.3	56.2	1100	20.1	53.7
75°	3600	14.4	51	2500	16.1	50	2300	17.6	48.5	2100	16.8	57	1250	20	55.2	1040	22.7	52.5
72°	3200	16.9	50.1	2300	18.5	49	2200	19.9	47.4	1800	19.6	56	1150	22.7	54	990	25.2	51.1
70°	2900	18.5	49.4	2200	20.1	48.2	2100	21.4	46.6	1700	21.4	55.2	1100	24.5	53.1	950	26.9	50.1
65°	2400	22.4	47.5	2000	23.9	46.2	1900	25.1	44.4	1400	25.8	53	950	28.7	50.6	880	30.9	47.4
60°	1850	26.1	45.2	1800	27.5	43.8	1700	28.6	41.9	1200	30	50.4	880	32.7	47.8	830	34.6	44.4
55°	1250	29.6	42.7	1200	30.9	41.1	1100	31.9	39.1	900	34	47.5	800	36.4	44.6	780	38	41.1
50°	850	32.9	39.8	800	34.1	38.1	700	34.9	36	610	37.6	44.3	550	39.8	41.2	500	41.2	37.5
With outrigger mid-extended 5.6m, without front jack, boom over side or over rear; with front jack down, 360° swing operation																		
78°	4000	11.9	51.8	2700	13.7	50.9	2400	15.2	49.5	2500	14	57.9	1400	17.3	56.2	1100	20.1	53.7
75°	3600	14.4	51	2500	16.1	50	2300	17.6	48.5	2100	16.8	57	1250	20	55.2	1040	22.7	52.5
72°	3200	16.9	50.1	2300	18.5	49	2200	19.9	47.4	1800	19.6	56	1150	22.7	54	990	25.2	51.1
70°	2900	18.5	49.4	2200	20.1	48.2	2100	21.4	46.6	1700	21.4	55.2	1100	24.5	53.1	950	26.9	50.1
65°	2400	22.4	47.5	2000	23.9	46.2	1900	25.1	44.4	1400	25.8	53	950	28.7	50.6	880	30.9	47.4
60°	1650	26.1	45.2	1450	27.5	43.8	1400	28.6	41.9	1050	30	50.4	850	32.7	47.8	750	34.6	44.4
55°	850	29.6	42.7	800	30.9	41.1	750	31.9	39.1	400	34	47.5	350	36.4	44.6	300	38	41.1
50°	400	32.9	39.8	350	34.1	38.1	300	34.9	36									
100 kg (for 4t load)																		
Hook block																		

Notes on Tables 3-3, 3-4, 3-5, 3-6, 3-7, 3-8:

- ✧ Total rated loads shown in the tables are the maximum lifting capacity when the crane is set up on firm and level ground, which do not exceed 75% of tipping load.
- ✧ Since the data in the tables is step type effective value, so, when the actual radius is between the two values, select the larger radius, which is the most approximate value to the corresponding lifting load.
- ✧ The boom telescoping method is synchronous and sequential telescoping, i.e., when extending, first extend fully the 2nd section, then the 3rd, 4th and 5th sections; when retracting, first retract the 3rd, 4th and 5th sections, then the 2nd section.
- ✧ The rated lifting load shown in tables includes the weight of hook block and slings. The working radius in the tables is the actual value including loaded boom deflection.
- ✧ The lifting height, boom angle and radius in the tables are the values for reference.
- ✧ Total rated loads shown in tables 3-3 and 3-4 are the values without jib attached. When a jib is attached on the boom head, reduce 2000 kg from the total rated lifting load.
- ✧ 75% of tipping load takes into account wind force 7, i.e. lifting operation is still permissible under the condition of wind pressure 125 N/m².
- ✧ Except base boom operation with fully extended outriggers, even if the crane is with no load, the boom angle should be not beyond the range given in the above tables.
- ✧ The lifting performance for single top is the same as that of main boom, but the maximum lifting load do not exceed 4t.

(5). Lifting height curves



Min. distance from main hook block center to sheave center

Min. distance from aux. hook block center to sheave center

Boom length + Jib length

Lifting height (m)

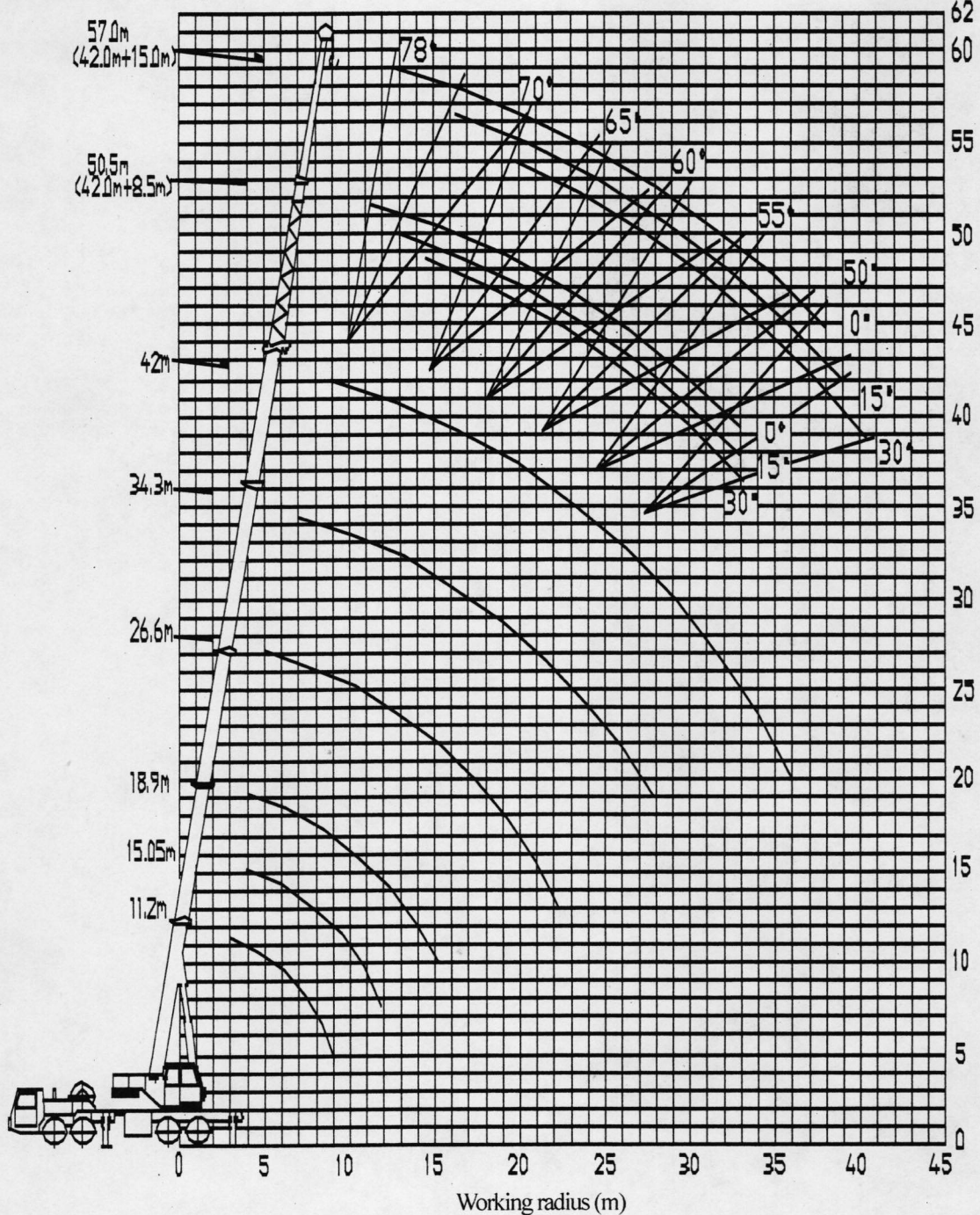


Fig. 3-2 Lifting height curves

(6). Crane working area

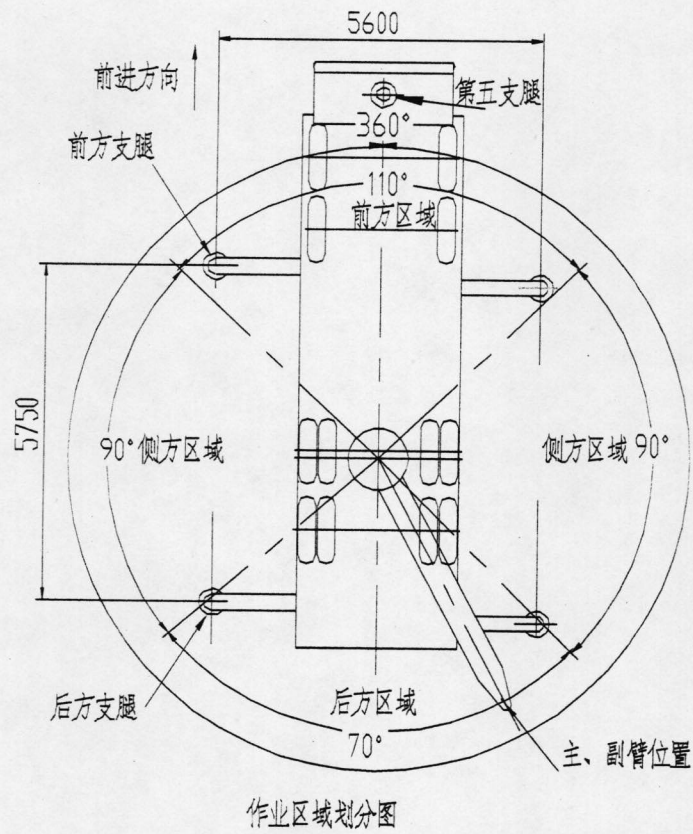
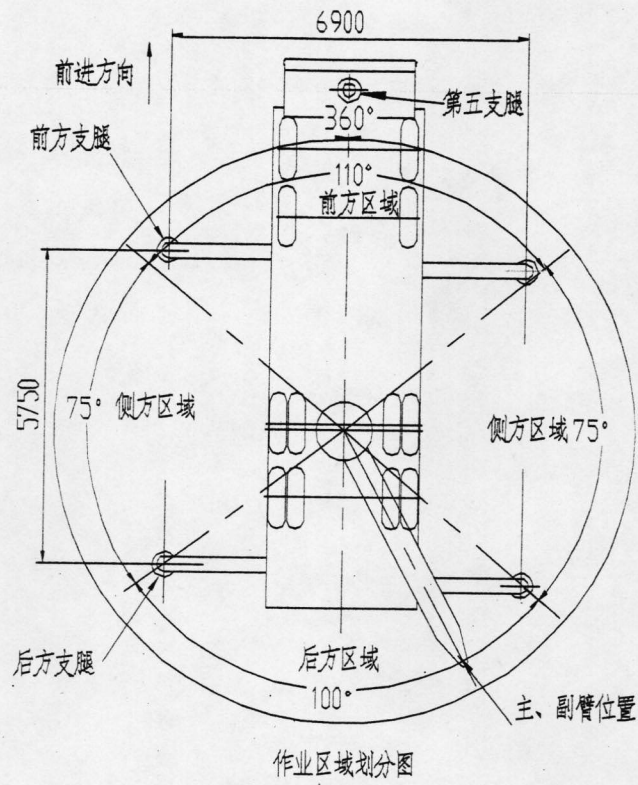


Fig. 3-3 Crane working area

2. Main Parts Structure and Specifications

(1). Slewing Ring

3-row roller type slewing ring for connection of crane superstructure and crane carrier, 360° swing operation permissible.

Model: 131.25.1480.320.04.03F.

(2). Oil Pump

Model: CBGJ2080EPA2080EPA1040EPA1010

Rated working pressure: 25 MPa

Peak pressure: 25 MPa

(3). Slewing Gear

Model: GJB17T3104-15 planetary reducer

Type: 3-stage planetary reducer

Reduction ratio: 104

Motor: A2F28W2Z6 axial plunger motor

(4). Winch (main and auxiliary)

Model: GJT23W2B51-02 (main winch) planetary reducer

GJT23W2B48-02 (auxiliary winch) planetary reducer

Reduction ratio: 50.5 (main winch); 48.2 (auxiliary winch)

Motor: A6V107EP2D/63W-VZB020B (main), A2FM80/61W-NAL020 (auxiliary).

Wire rope: 20NAT 4V×39S+5FC-1870 (main); 18NAT 4V×39S+5FC-1870 (auxiliary).

Wire rope length: 185m (main winch), 125m (auxiliary winch)

(5). Boom

Structure: 1 base boom and 4-section telescopic boom with oval boom profile.

Boom length: 11.2m (minimum); 42.0m (maximum).

Telescoping method: double cylinders plus wire ropes for synchronous and sequential telescoping.

(6). Jib

Structure: lattice type.

Jib length: two kinds of 8.5m and 15m.

(7). Elevating Cylinder

Type: single cylinder for front support elevation

Stroke: 2.78m.

(8). Telescoping Cylinder

Type: double cylinders plus wire ropes for synchronous and sequential telescoping.

Stroke: 7.7m (same stroke for 1st and 2nd stage cylinder).

(9). Operator's Cab

Type: integrated structure of glass reinforced plastics, equipped with safety glass, control instrument and air conditioner, with a wide field of vision.

(10). Crane Main Valve:

Model: LV22-1Y 310A.

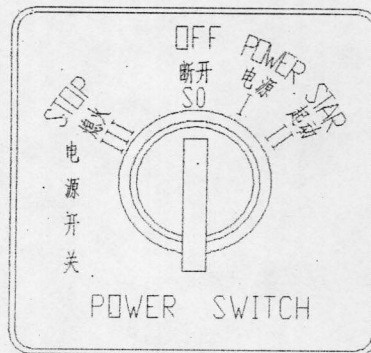
IV. Crane Operation

1. Starting and Stopping the Engine

1.1.1 Starting the engine

With hand brake handle engaged and transmission control lever in neutral, insert the starting key into the starter switch (SO), and turn it clockwise to I position to turn on power source. Depress accelerator pedal to proper position (about a quarter of its stroke) and further turn the key to II position, and then the engine will be started. Return the key to POWER position if the engine can not be started within 12 seconds. The engine starting time for once can't exceed 12 seconds and the interval for each engine starting is not less than 2 minutes.

Caution: If the engine can't be started for 3 times, stop starting and check the causes.

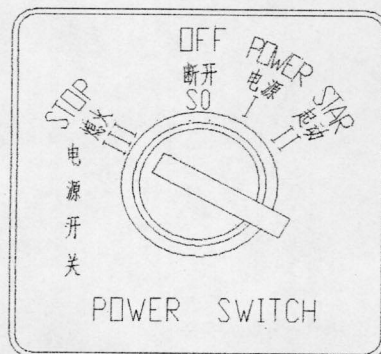


1.1.2 Preheating the engine

Preheating the engine should be performed after starting, and under idle speed. Only 60°C of water temperature is reached, can the engine run. In winter or cold area, the time of preheating the engine should be enlarged to increase cylinder temperature and make the surfaces to be lubricated sufficiently. Using the engine after starting without preheating will lead to serious wear and reduce the working life of engine.

1.1.3 Stopping the engine

Turn the starting key counterclockwise to III (STOP) position, after delaying for 1~2 seconds, the engine will stop, then release the key and the switch will reset to OFF position.



2. Operating PTO

2.1 Engaging PTO

Caution: Before engaging the PTO, make sure that the control levers in both superstructure and chassis are in neutral positions. Fully depress the clutch pedal with pressure above 0.45Mpa and then pull up PTO switch. After that, release the clutch pedal slowly. In winter run the hydraulic pump for 15~20 minutes to warm up hydraulic oil.

2.2 Disengaging the PTO

Fully depress the clutch pedal. Disengage the transmission PTO. Release the clutch pedal. Stop the engine. Turn off the engine starter switch.

Note: after engaging the PTO, start the engine with the starter switch in operator's cab and stop the engine with the engine stop switch.

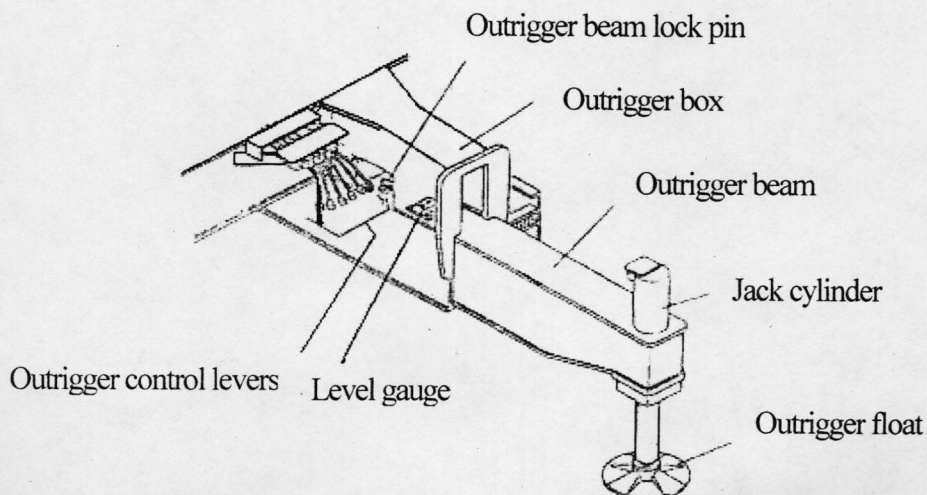
3. Operating Outriggers

3.1 Notes on operation

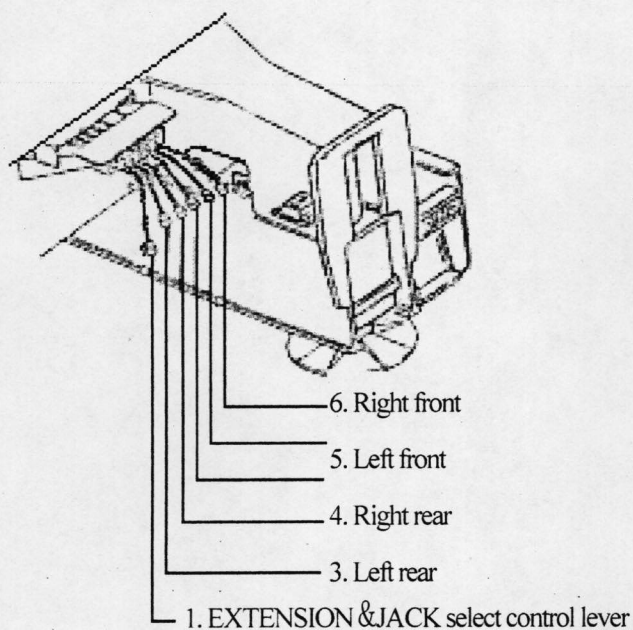
1. Pull out outrigger beam lock pins before extending the outrigger beams.
2. Set up the crane level by using wood blocks suited to the ground conditions.
3. Keep the tires off the ground.
4. Set up the crane on level and firm ground. In case of setting up the crane with outrigger on soft or slant ground, set up the crane level by using wood blocks suited to the ground conditions.
5. After setting up the crane, make sure that all the outrigger floats are in complete contact with the ground and no the risk of sinking.
6. Outrigger longitudinal span is 5.75m, lateral span is 6.9m for full extension and 5.6m for half extension. **Note:** Carry out operation by observing related rated load table.
7. **Caution:** Never operate the crane before outriggers extending into place.
8. Secure outriggers with outrigger beam lock pins after extending and retracting outriggers.
9. Never extend front jack before extending outrigger beams and jacks. Retract the front jack before retracting outrigger beams and jacks.

3.2 Outrigger operation

(1). Names of outrigger parts

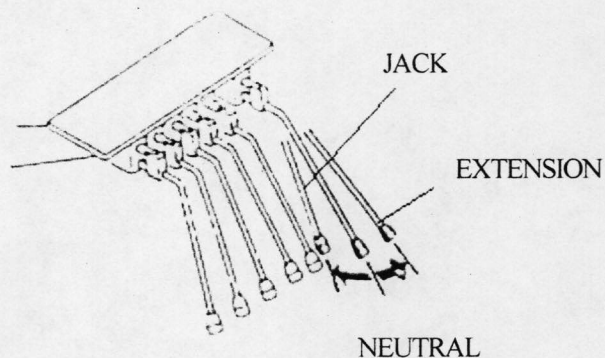


(2). Outrigger control levers



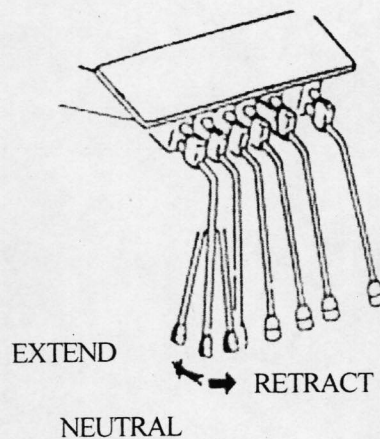
Note:

- a. The extension circuit or jack circuit is selected by the select levers.



Note: Return the select levers to NEUTRAL immediately after finishing operation. Before starting crane operation, make sure that the levers are in neutral.

- b. Outrigger beams or jacks will extend or retract when the EXTENSION & JACK control lever 1 is moved.



(3). Extending and retracting outrigger beams

Position the select levers 3, 4, 5 and 6 to EXTENSION, and then push the select lever 1 to EXTEND, the four outrigger beams extend synchronously. After the outrigger beams being extended fully, return all control levers to NEUTRAL. The outrigger beams extending has been finished. Preparations of retracting the outrigger beams are the same as above except pulling the select lever 1 to RETRACT.

(4). Extending and retracting outrigger jacks

Position the select levers 3, 4, 5 and 6 to JACK, and then push the select lever 1 to EXTEND, the four outrigger jacks extend synchronously. After the tires off the ground, return all control levers to NEUTRAL. Preparations of retracting the outrigger jacks are the same as above except pulling the select lever 1 to RETRACT.

(5). Front jack (5th outrigger)

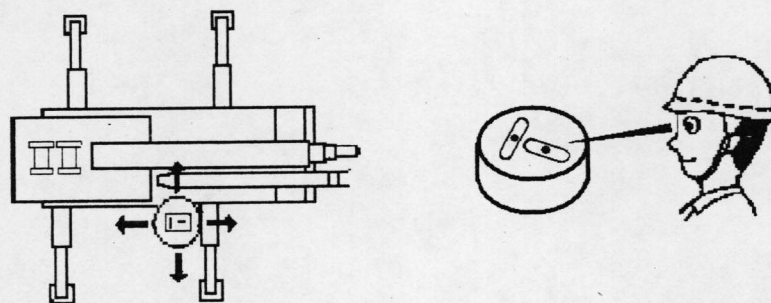
When use front jack, position lever 2 to JACK and push control lever 1 to EXTEND, the front jack will extend out, and then return all levers to NEUTRAL; preparations of retracting the front jack is the same as above except pulling the select lever 1 to RETRACT.

(6). How to level the crane

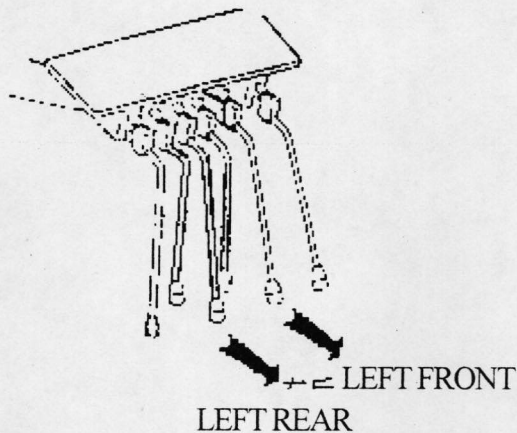
If the crane is not level with the jacks extended, level it as follows.

Example:

When the right side is higher.



- a. Return the LEFT FRONT and LEFT REAR select levers to NEUTRAL.



Note: be careful not to move the select levers over to EXTENSION.

b. While observing the level gauge, inch the EXTENSION & JACK control lever 1 to RETRACT.

c. After the crane is leveled, return the remaining select levers to NEUTRAL.

Note: make sure that all outrigger floats are in complete contact with the ground after crane tires off the ground.

4. Acceleration

Acceleration makes engine speed up and speed down by using hydrostatic oil. Depress the accelerator pedal, and the speed will be increased in engine, winch as well as in boom telescoping, boom elevation and swing operation. Remove your foot, the accelerator pedal will reset by spring force, and engine returns to idle.

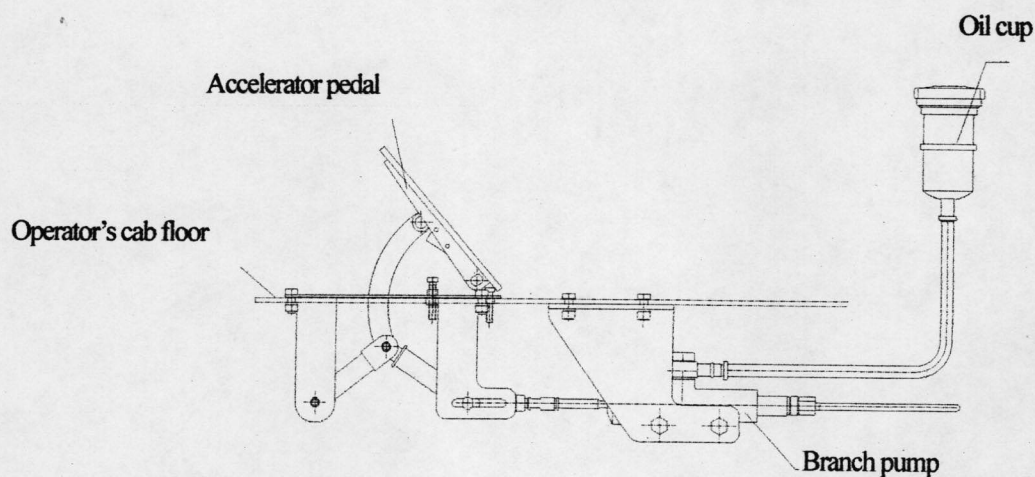
4.1 During crane operation, never depress the accelerator pedal abruptly in prevention of accident and damage.

4.2 Max. engine rotation torque is gained when it is running in 1400 r/min.

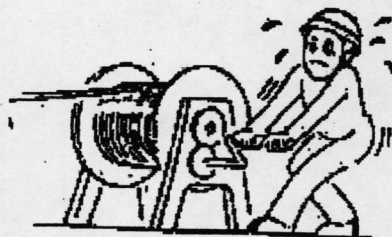
4.3 The accelerator has been set fully, and no necessary to reset. Reset it only when bad return of the accelerator pedal or lumpy movement of accelerator pedal is found. Adjust the accelerator wire at engine accelerator arm and pushrod of main cylinder below pedal. After resetting the free stroke should be 2-5mm, 800 r/min of idle speed be reached, and 2300 r/min should not be exceeded when the accelerator is depressed to the bottom.

4.4 Check oil cup level regularly. Refill in time if it is lower than the mid-mark. The brake liquid is KF-01 made by Xuzhou Automobile Chemicals Factory.

Note: Different brands of brake fluid should not be mixed.



5. Operating Winches



Notes on operation:

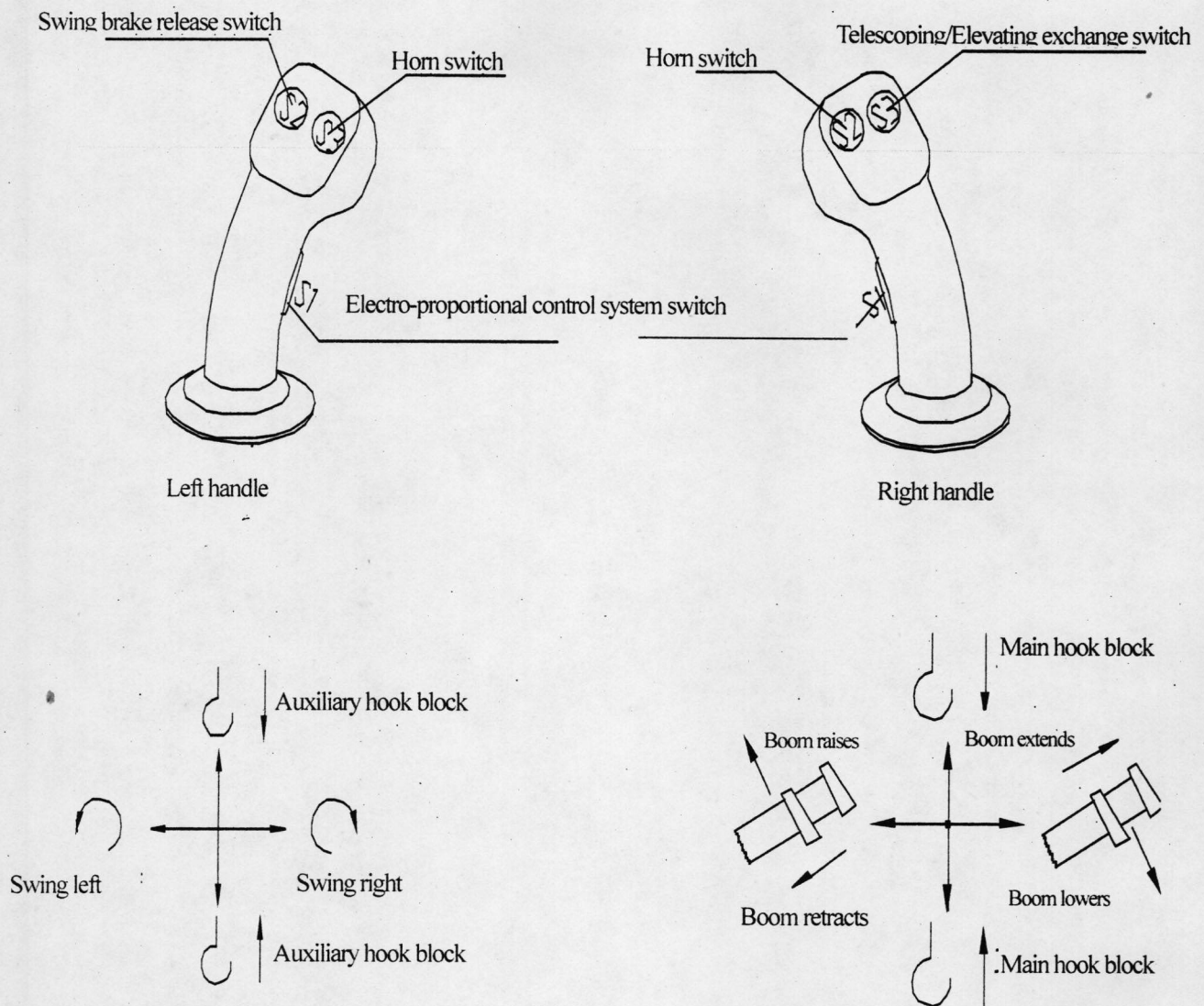
1. Lift up loads in the vertical direction only. Avoid side-loading or dragging loads on the ground.
2. Do not abruptly move the winch control lever.
3. Before operating, confirm that the winch brake is in proper order.

(1) Main winch control handle (right handle):

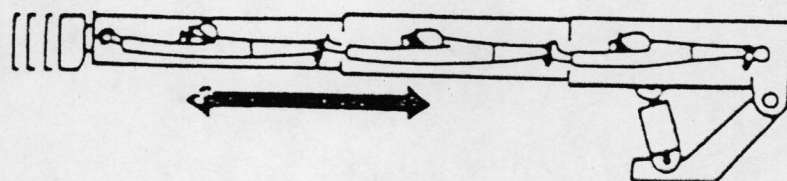
Push forward right handle, the hook block will lower; pull it backward, the hook block will rise up. The speeds of raising and lowering winch are adjusted by right handle and accelerator.

(2) Auxiliary winch control handle (left handle):

Push forward left handle, the hook block will lower; pull it backward, the hook block will rise up. The speeds of raising and lowering winch are adjusted by left handle and accelerator.



6. Boom Telescoping Operation



Notes on operation:

1. The hook block will rise or lower when the boom is telescoped. Compensate for this by simultaneously letting out or taking in the winch rope.
2. An extended boom can change its length as time passes. This is mainly because the volume of oil in the telescoping cylinder expands or contracts when temperature changes. If oil temperature lowers 10°C, for instance, a boom extended by 5m will retract approx.40mm. The extent of length change also depends on the boom length, elevation angle, lubrication condition, etc. To prevent boom retraction, observe the following:
 - ① Do not raise the oil temperature excessively.
 - ② Manipulate the telescoping control lever slightly to EXTEND to offset oil contraction.
3. When jib is in working condition and boom is extended fully, recommend telescoping with

big elevation angle.

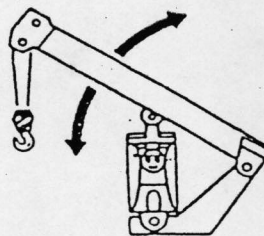
4. Telescoping under load is permissible only in special situation, but the load must not exceed 25 % of corresponding rated lifting capacity in the rated lifting load tables.

5. When telescoping boom, extend the 2nd boom section first, and then press 2nd-stage cylinder switch S10, last extend 3rd, 4th and 5th boom sections to specified length; when retracting boom, follow the reverse procedure. Otherwise, telescoping cylinder will be damaged and boom broken will occur.

Telescoping control handle (right handle)

With the selector switch of telescoping/elevating on control panel or on control handle depressed, move the control handle to the left, the boom will extend; move it to the right, the boom will retract. The speed will be adjusted by the control handle and accelerator.

7. Boom Elevating Operation:



Notes on operation

1. Lift up loads in vertical direction only. Avoid side-loading or dragging loads on the ground.
2. Observe the boom angle limit.
3. Move the elevating control lever slowly when starting and stopping boom motions.

(1) Boom elevating control handle (right handle)

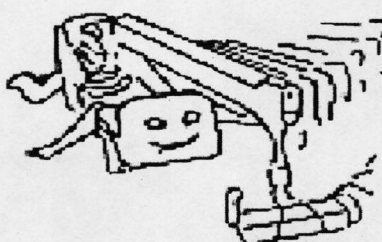
Before elevating operation, position telescoping/elevating selector switch to elevation. Move elevating control handle to the right, the boom will lower; move it to the left, the boom will rise. The elevating speed will be adjusted by control handle and accelerator.

(2) Relationship among boom angle, total rated load and working radius

When the boom is lowered, the working radius increases and the value of the total rated load decreases; when the boom is raised, the working radius decreases and the value of the total rated load increases.

Notes: Before lowering boom for erecting jib and re-reeving winch rope, boom should be retracted fully. After jib erection and re-reeving rope, raise the boom and extend to desired boom length.

8. Swing Operation



Notes on operation:

1. Do not pull loads sideways by swinging the boom.
2. Before swing operation, check outrigger extension width.
3. Make sure that the area in the swing path is clear of personnel and obstructions before starting to swing.
4. Move the swing control lever slowly when starting and stopping swing.
5. Apply the swing brake when the boom is not swung.
6. Unlock turntable lock device before starting to swing.

Swing control handle (left handle)

Before swing operation, first release turntable mechanical lock and depress slewing brake release switch. Move the control handle to the right, the turntable will turn right; move it to the left, the turntable will turn left.

9. Indication plates

(1) Nameplate

Nameplate is fixed on the outside of door of operator's cab. Refer to figure below.

There are crane name, model, the total rated load, date and manufacturer, etc on it.

(2) Indication plates of lifting performance

Indication plate of lifting performance is fixed on the inside of door of operator's cab. Refer to figure below. Please perform operation according to indication on the plate. Never overload.

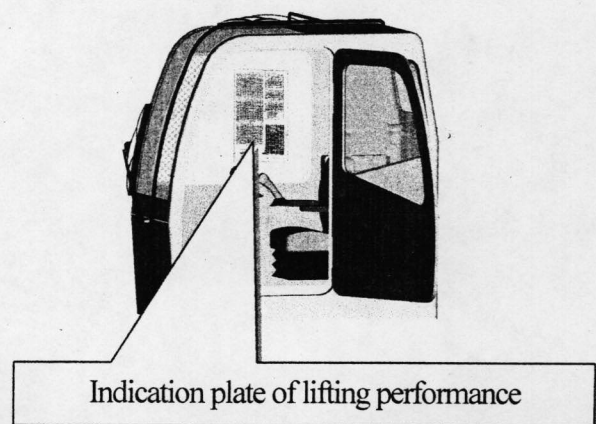
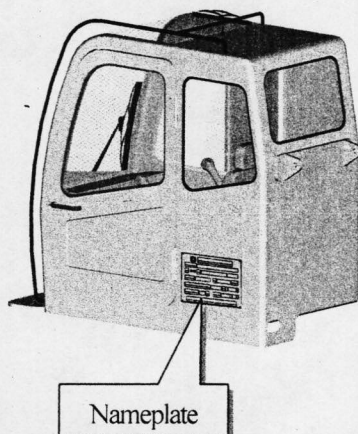
Indication plate of lifting performance consists of:

QY70K Truck Crane Rated Load Table

QY70K Truck Crane Lifting Height Chart

QY70K Truck Crane Working Range

In the total rated lifting load table, each working radius has a corresponding lifting load and a lifting height. Before lifting a load, operator must know the weight of the load and working area, then choose an appropriate working mode for crane operation, and do not exceed the total rated load in the table.



V. Accessories

1. Jib

Notes on operation:

1. Extend the outriggers fully, and set them.
2. When erecting and stowing the jib, make sure that there are no personnel and obstacles in its swing path.
3. Before using the jib, make sure connecting pin shafts and spring clamps in correct positions.
4. To erect and stow the jib, be sure to follow the procedure given in this manual. Observe the following, otherwise the jib or other parts can be damaged:
 - a) Do not lower the boom with the auxiliary hook block in contact with the jib head.
 - b) Do not operate the crane or drive the carrier with the jib stowing pin extracted.
 - c) To fold and unfold the jib, move it slowly.
5. To climb to a high position use a ladder for safety..

Jib erecting

The jib of quadrangular cross-section has features of simple structure, light weight and easy to erect and operate.

Notes about erecting jib:

(1) Operate the jib with outriggers fully extended.

(2) Installation of jib

a. Retract the boom fully, and stow it on the rear-side of the crane.

b. When only 1st jib section of 8.5m is used:

Unfold the extension of jib supporting stand, disconnect 1st and 2nd jib sections by removing pin shafts No. 1 and 4 on jib sections. Make alignment of the pin hole on 1st jib section and boom pin hole by turning 1st jib section around pin shaft 6, and then insert pin shaft A.

Remove pin shaft No. 6, and turn jib section around pin shaft A to align another 1st jib section pin hole with another main pin hole, and then insert another pin shaft A.

c. When two jib sections (15m) are used:

Disconnect jib and main boom by removing pins No. 2 and 4, 5 on jib sections, and then align jib pin hole with main boom pin hole by turning jib sections around pin shaft 6, last insert pin shaft A.

Remove pin shaft No. 6, and turn jib sections around pin shaft A to align another 1st jib section pin hole with another main pin hole, and then insert another pin shaft A.

Unfold 2nd jib section to align pin holes on 1st jib section with those on 2nd jib section, and then insert pin shaft No. 1.

d. Reeve rope around pulley holder and jib head pulley.

e. Turn on jib height limiter switch, and connect plug on jib and terminal board on jib head, install limiter weight.

f. Take out auxiliary hook block from auxiliary hook block support and install it to jib.

(3) Installation of jib with 15° or 30° offset:

Erecting the jib at 0° offset, and then lower boom until jib head touches the ground. Remove pin shaft B, and reinsert it into hole for 15° or 30° offset. The jib can be operated.

Note: before extending boom, confirm that boom angle should be over 55° .

the installation of 15 ° offset has been completed (Refer to Fig. 6-4).

(4) Stowing of jib

After use of the jib, stow the jib in reverse order of the installation, and then fix it at the right side of the base boom (refer to Figure for stowing of jib). Thus, the jib is in a stowing state.

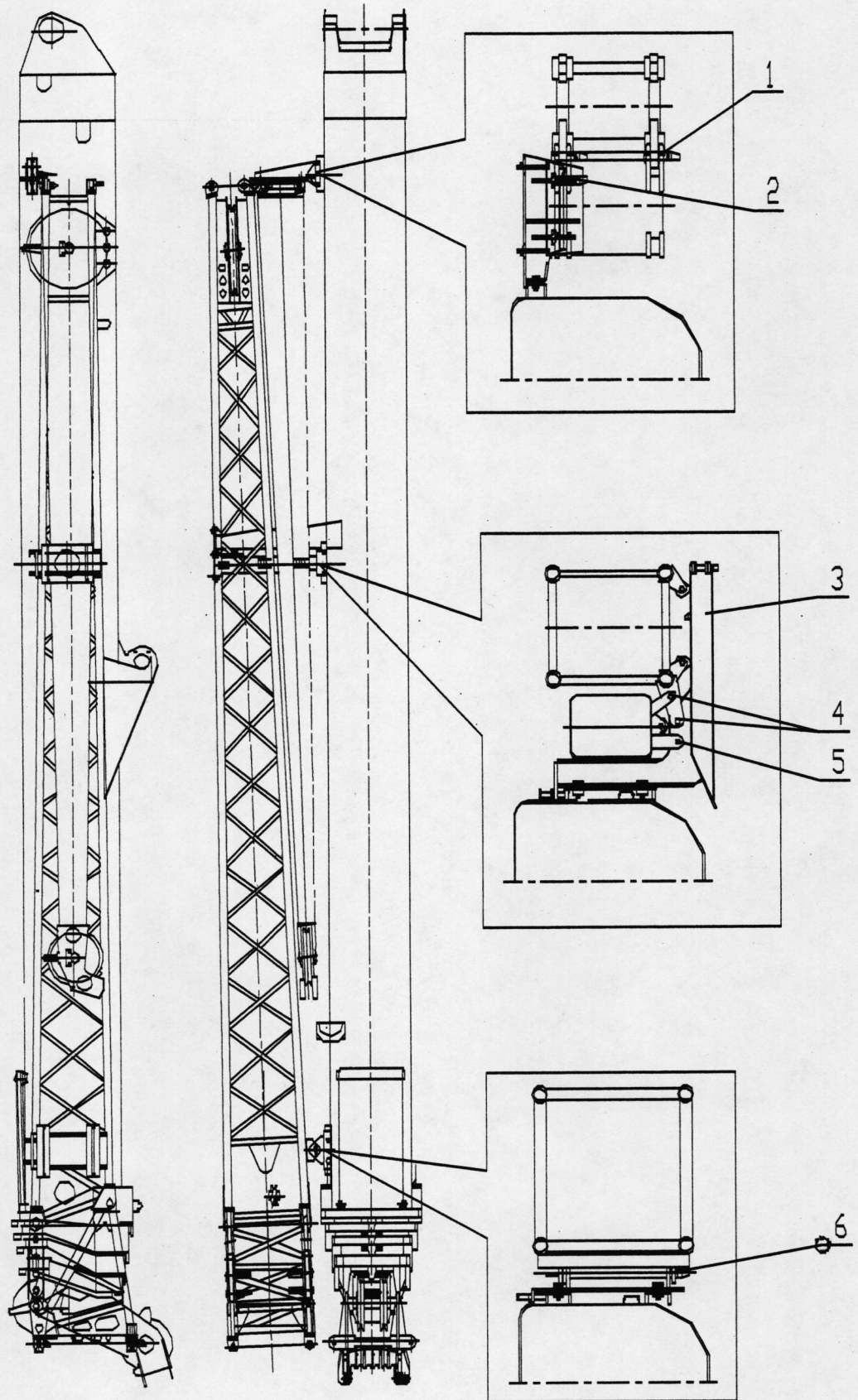


Fig. 6-1

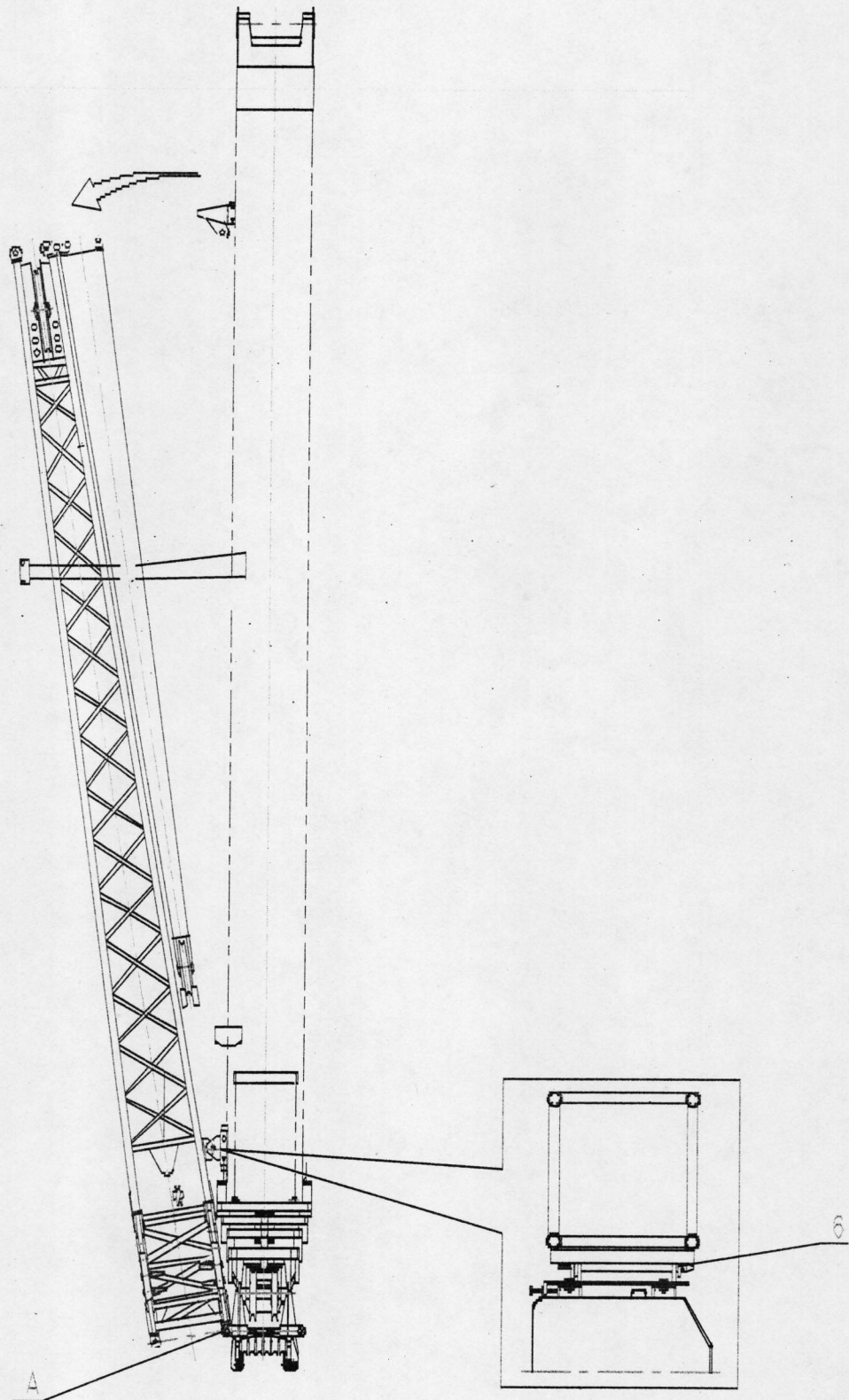
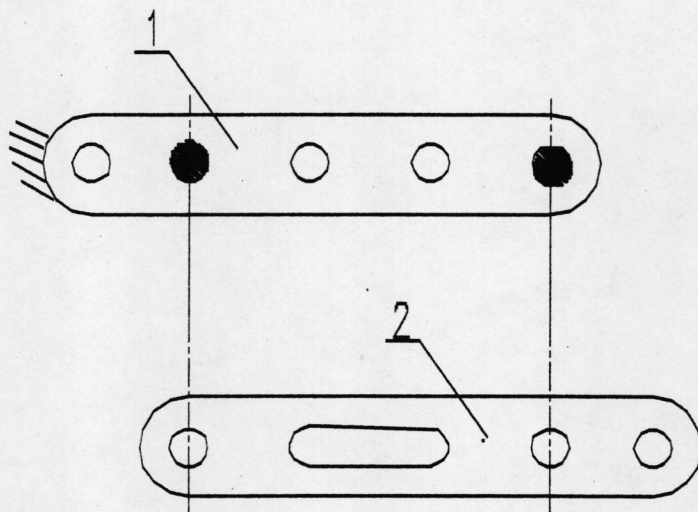
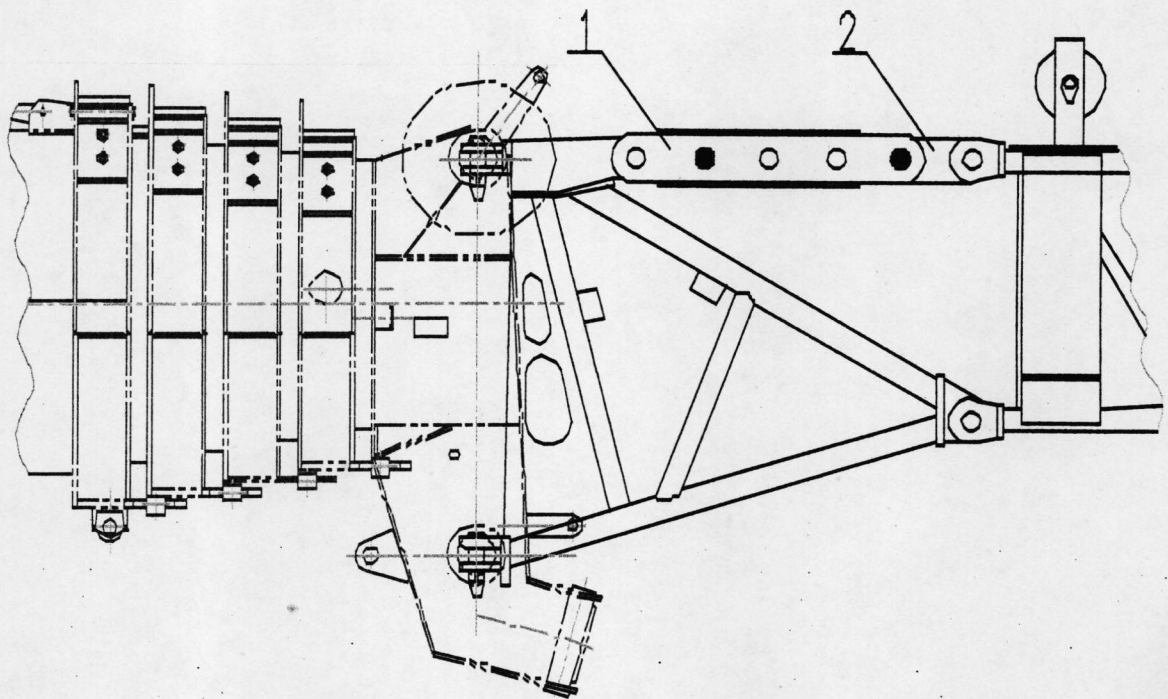
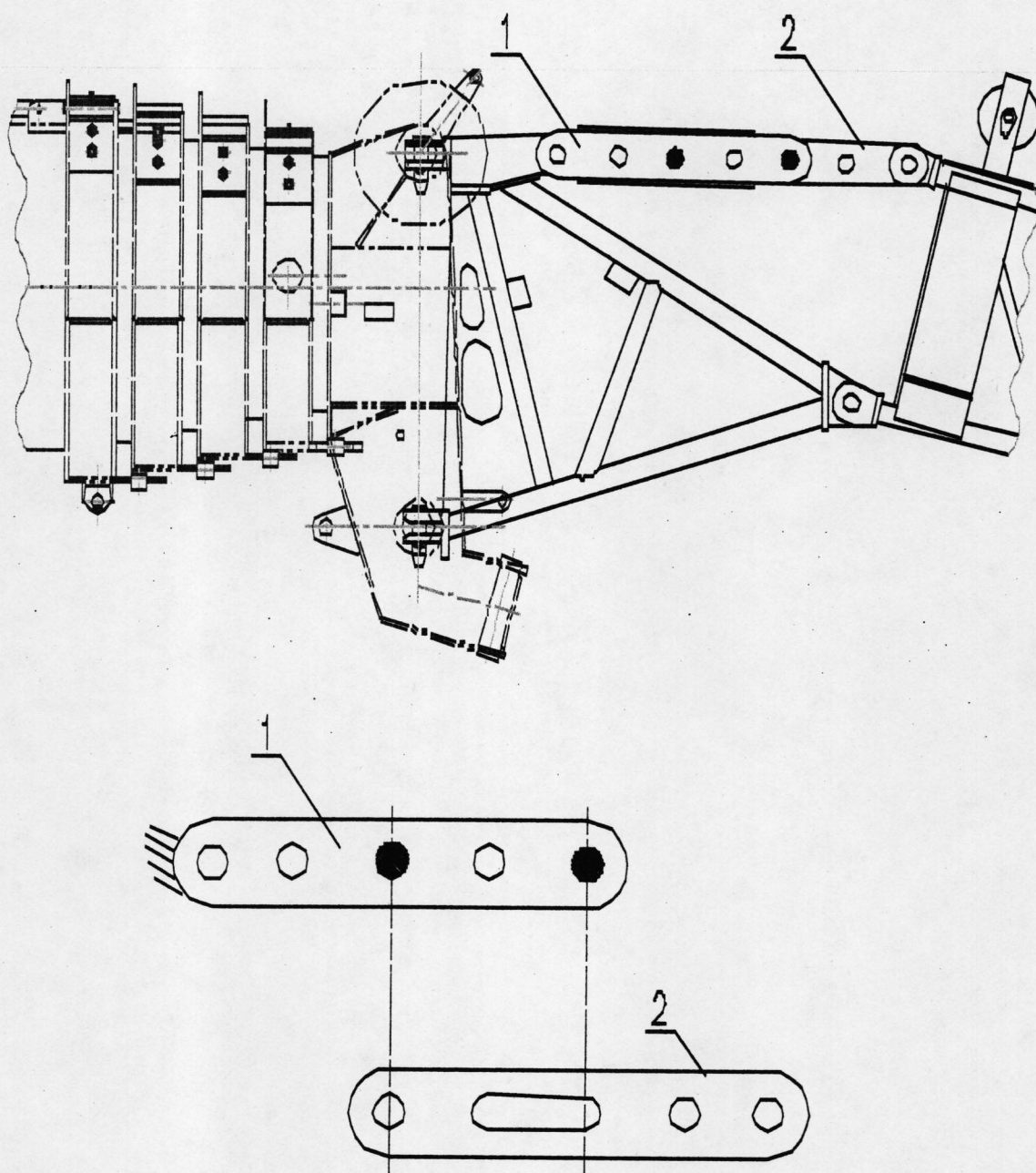


Fig. 6-2



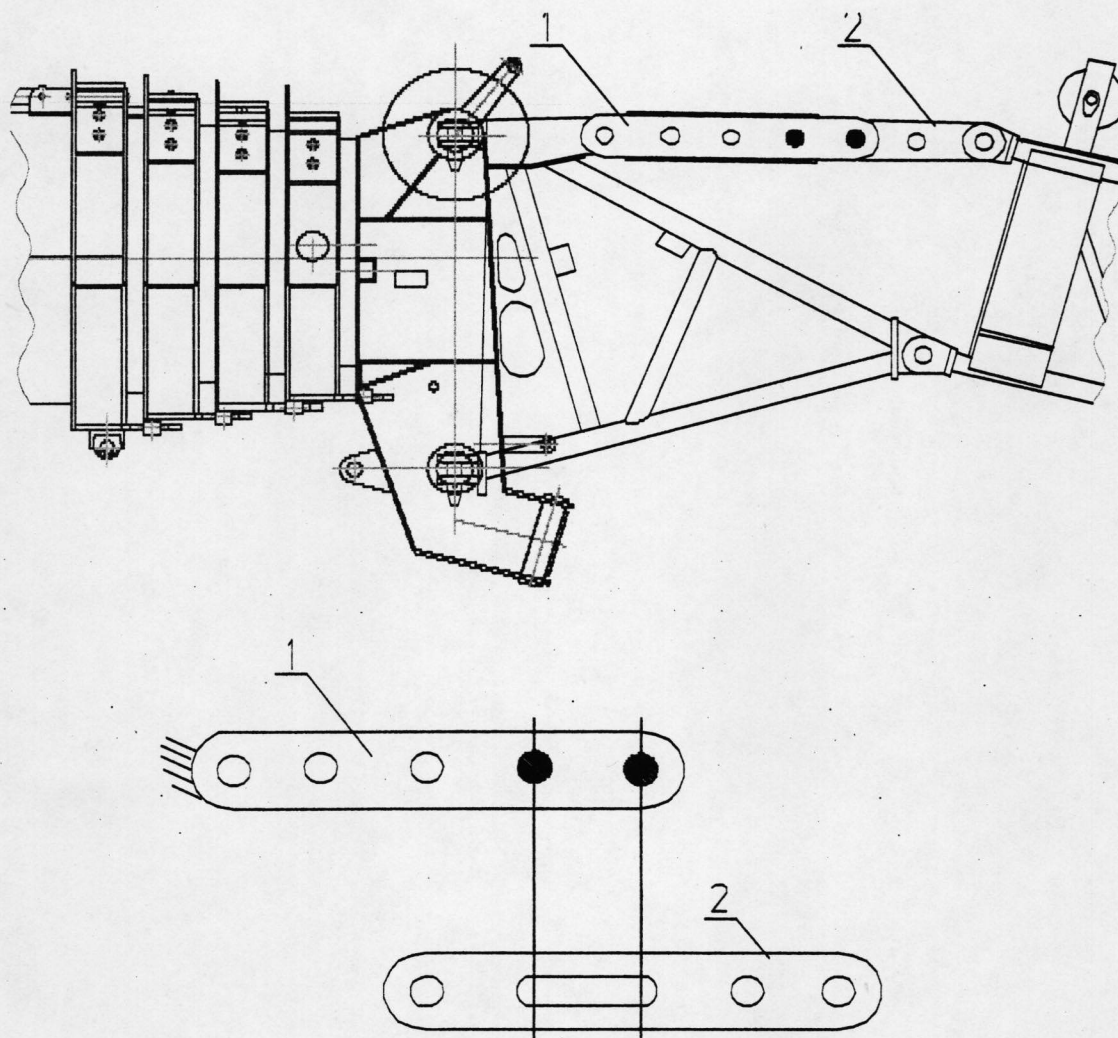
offset 0°

Fig. 6-3



offset 15°

Fig. 6-4



offset 30°

Fig. 6-5

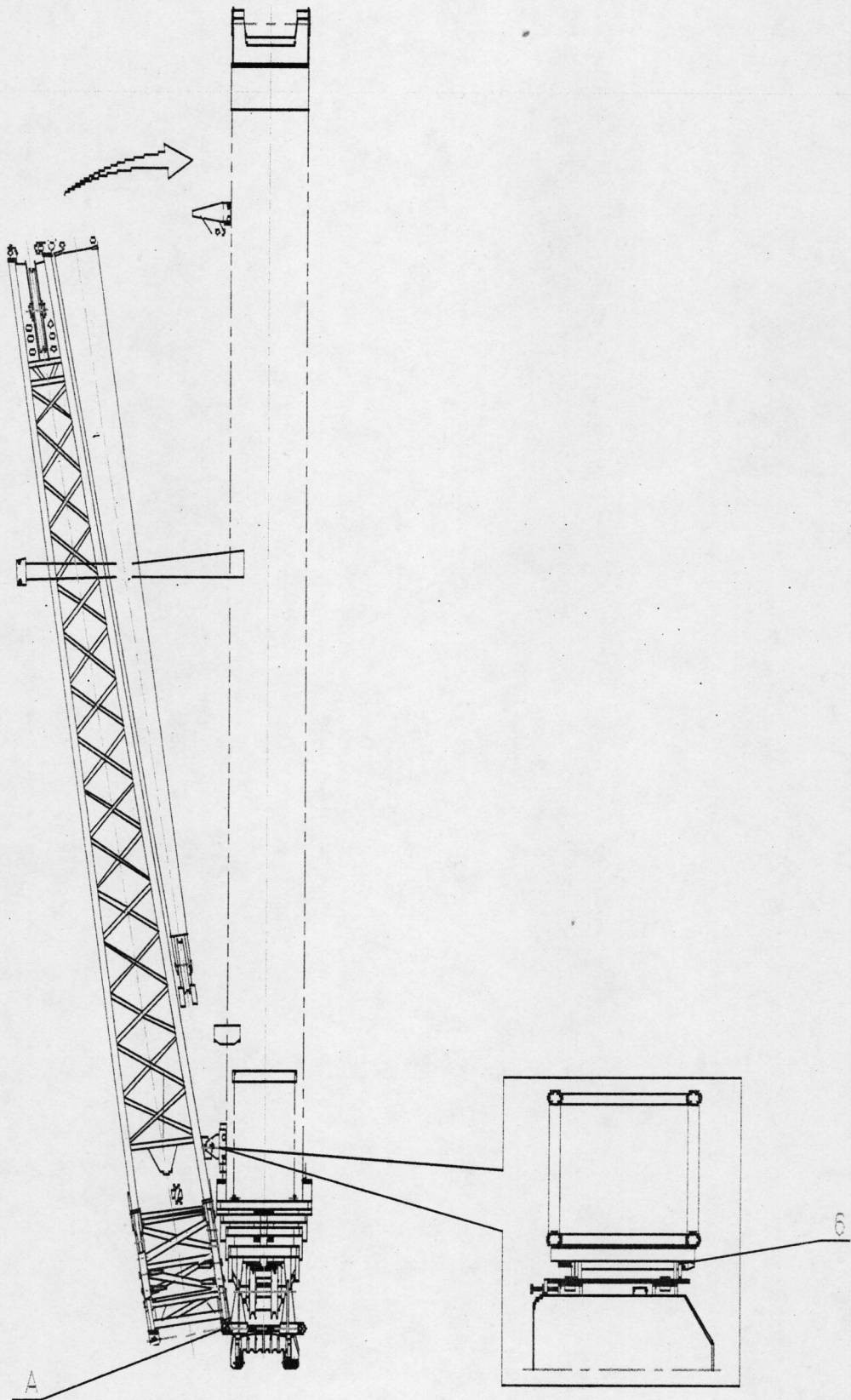


Fig. 6-6

2. Slewing Ring

(1) Basic structure

Structure of the slewing ring is shown as Figure below. It is not only the rotation part of the crane, but also the connection part of the crane superstructure and the crane carrier. The inner ring is fixed below the turntable of crane through 48 bolts 2 of M27 distributed on the same circle. The outer ring is fixed on the carrier frame through 48 bolts 1 of M27 distributed on the same circle.

(2) Notes on use of slewing ring

- The bolt used for connecting the slewing bearing is made of 42CrMo material through heat treatment and strength is class 12.9. Never replace it with common bolt.
- The pre-tighten moment of the bolt is 1606-2142 N.m. Check it after 100 working hours, afterwards check it completely every 500 working hours.
- In general, lubricate it once every 100 working hours. Refill Calcium base grease (ZG-3) from oil ports. Fill enough grease into it till the grease leak from the sealing ring.

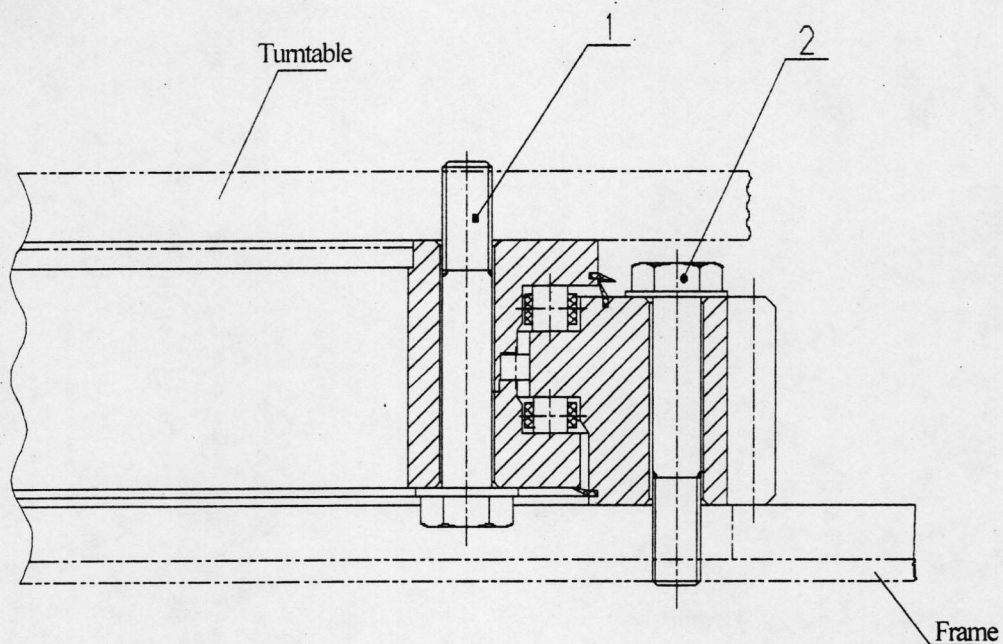


Fig. 6-7 Slewing ring

3. Hook Block

(1). Refer to Figure below for main and auxiliary hook block structures.

(2). Inspection:

The hook block must be discarded when one of the follows occurs (repair welding is not allowed on hook block).

- a. Cracks and damage on hook surface;
- b. The value of opening exceeds 10% of the nominal dimension (refer to the nameplates of main and auxiliary hook block);
- c. Critical section wore reaches 10% of the original dimension;
- d. Wear of rope touching surface exceeds 5% of the original height;
- e. Twisting deformation of hook exceeds 10° ;
- f. Plastic deformation on critical section of hook tail and threads and on hook.

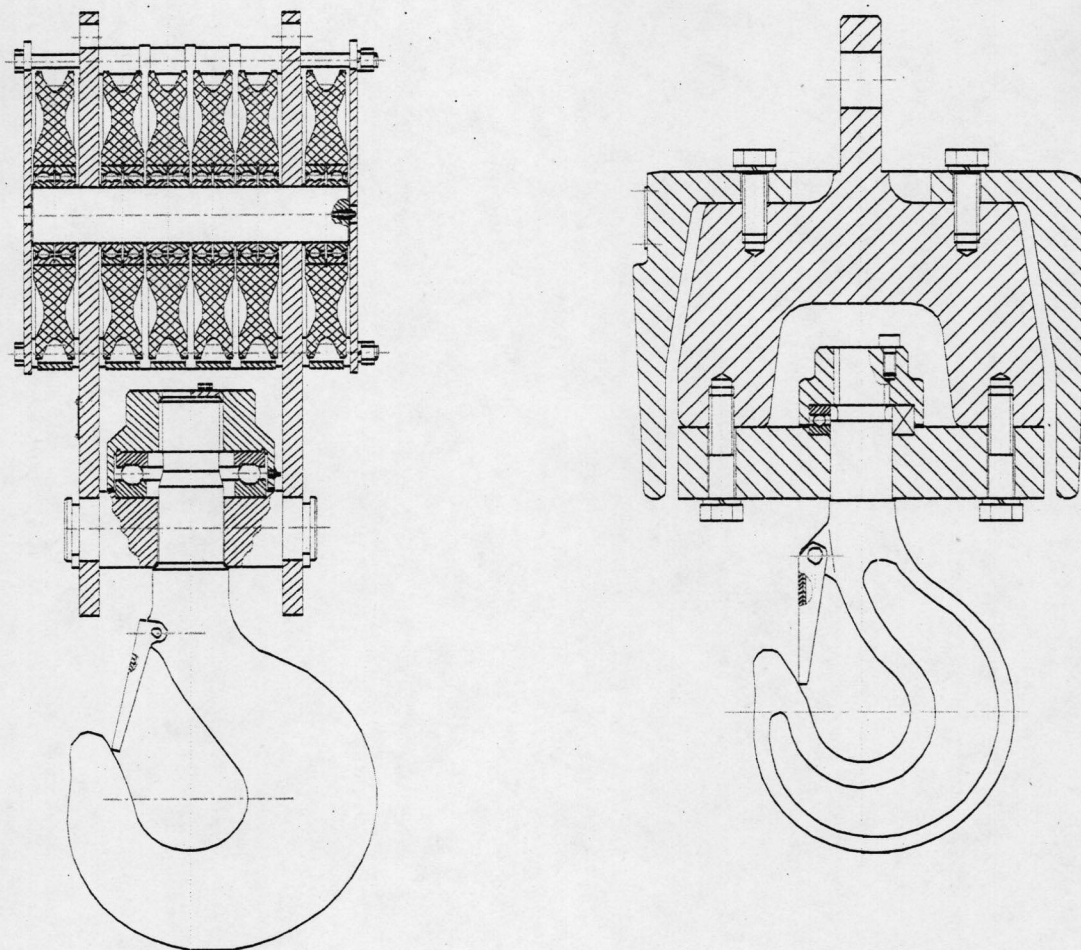


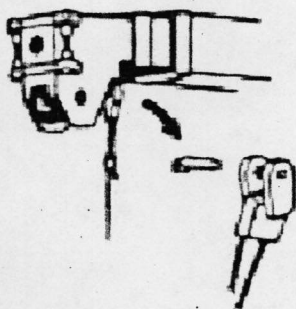
Fig. 6-8 Main and auxiliary hook block

4. Winch Rope

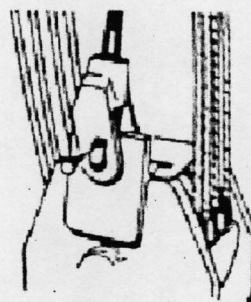
4.1 Working conditions

Extend and set the outriggers. Fully retract the boom and swing it over side or rear.

- a. Place the hook block on the ground by lowering the boom.
- b. Remove the rope guards.
- c. Remove the over-wind cutout device weight from the winch rope.
- d. Disconnect the rope socket.



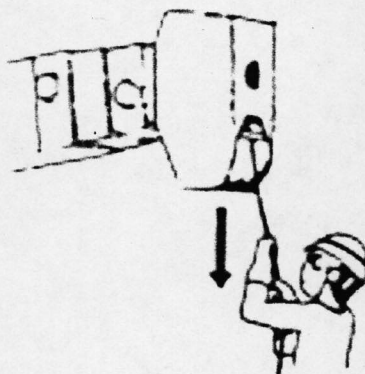
Rope socket anchored to boom



Rope socket anchored to hook block

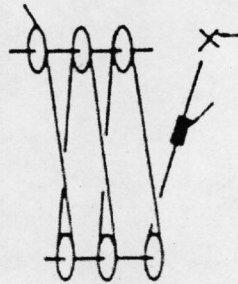
- e. Reeve the winch rope in the desired number of parts of line.

When pulling out the winch rope, run the winch and pull the rope by hand.

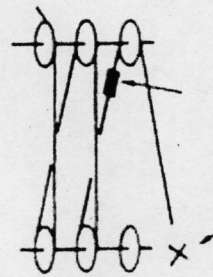


4.2 Notes

- a. The mounting position of the over-wind cutout device weight is determined by the position in which the rope socket is attached, the anchor on the boom or that on the hook block.

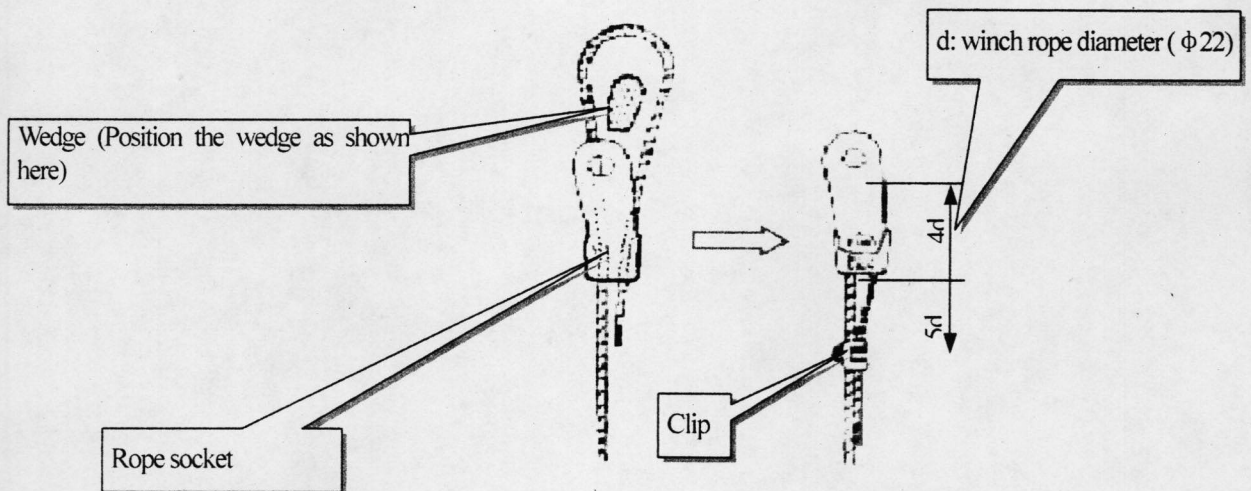


Rope socket anchored to boom
Mount the weight on the part of line with the rope socket.



Rope socket anchored to hook block
Mount the weight on the part of line that is next to the rope-socketed one.

- b. Mount the rope socket and clamp as shown below:

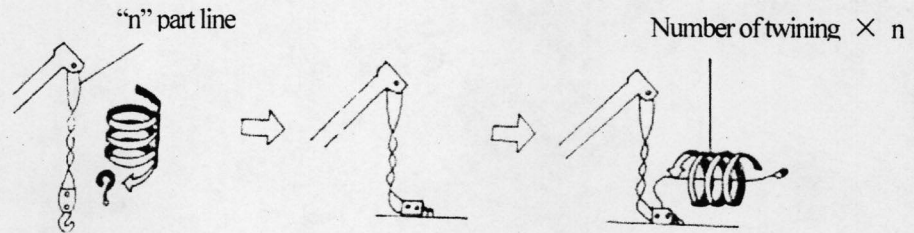


- c. During operation, apply proper tension to the rope. Do not further operate the winch when the hook block touches the ground and there is no load on the rope, otherwise rope disorder will occur.

- d. Select proper parts of line according to load and lifting performance table. If the number of parts of is too small, overload on single line will occur; if the number of parts of is too big, the hook block could not reach the ground, and only low hoist speed is gained.

4.3 Cautions in handling winch rope

- a. When winding a new wire rope on the winch drum, take care not to twist the rope.
- b. After installing a new wire rope on the winch drum, repeat hoist up and down a load of 10 % rated load several times.
- c. Inspection and discard of wire rope is according to GB5972-1986.
- d. When the winch rope becomes twined, correct it as follows.



- 1). Check the direction of the twining and count the number of twining turns.
- 2). Lower the hook block to the ground. (If the hook block cannot be hoisted down, lower the boom.)
- 3). Disconnect the rope socket from the hook block (or boom head). Turn the rope end in the twine direction "n" times the number of twines as counted in step 1) before attaching the rope socket to the hook block (or boom head).

Note: Do not turn the rope five turns or more at a time.

- 4). Fully extend the boom and raise it to the maximum angle. Repeat hoisting up and down the hook block several times.
- 5). Repeat the procedure above until no twining remains.

Note: if twining still remains after the above measures, replace the rope with a new one.

- e. Wind the first layer of wire rope on the winch drum uniformly and with proper tension applied to it.
- f. It is recommended that the hook end and the drum end of the winch rope should be periodically reversed to extend the rope life.
- g. Check the winch rope every working day for damage and deformation. Especially pay attention to fixing position of the winch rope. Inspected the following:

- 1). Common position

While you're required to inspect the entire rope length, we recommend you pay particular attention to the critical points of a wire rope:

Pick-up points;

Rope sections contacting the sheaves or on the drums.

- 2). Rope ends

Check broken wires and corrosion condition at the inside of wedge fittings and ends. Inspection of rope ends should also include the condition of the actual attachment.

VI. Crane Electric System

1. Devices in Operator's Cab

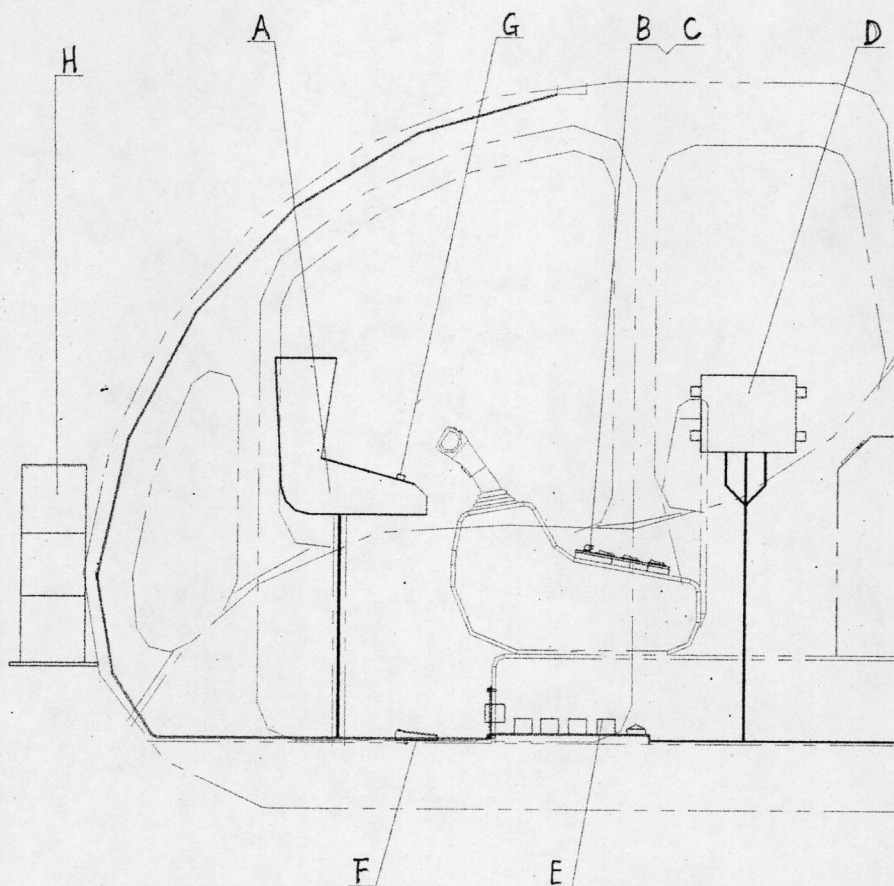


Fig. 6-1

- A — Instrument panel assembly: to display working and safety conditions
- B — Right controller: to control working conditions
- C — Left controller: to control safety conditions
- D — LMI main unit
- E — Control board assembly: logical control unit
- F — Switch: Auxiliary winch selection
- G — Switch: Emergent stop
- H — LMI triple-color warning lamp: Green: normal working
Yellow: pre-warning
Red: warning, unloading

2. LMI Display

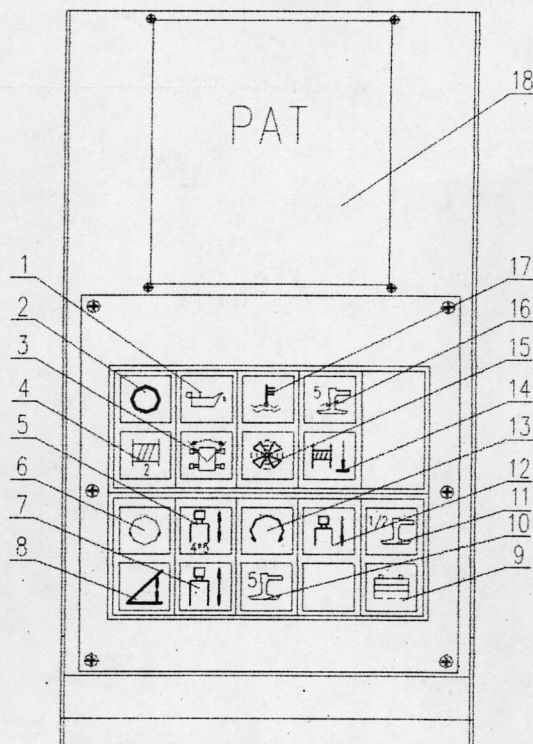


Fig. 6-2

1. Indicator lamp—Low oil pressure
2. Indicator lamp—Battery power
3. Indicator lamp—Front area indication
4. Indicator lamp—Auxiliary winch working
5. Indicator lamp—2nd-stage telescoping cylinder working
6. Indicator lamp—Electro-proportional system safety control
7. Indicator lamp—Boom extending
8. Indicator lamp—Boom elevating
9. Indicator lamp—Counterweight selection (optional)
10. Indicator lamp—5th outrigger working
11. Indicator lamp—Outrigger half-extending
12. Indicator lamp—Boom retracting
13. Indicator lamp—Swing brake releasing
14. Indicator lamp—Winch rope over-releasing
15. Indicator lamp—Hydraulic oil radiator
16. Indicator lamp—5th outrigger overload
17. Indicator lamp—High water temperature
18. Indicator lamp—LMI display

3. Right Controller

1. Starter switch
2. Switch — exchange selection of telescoping/elevating
ON: Boom telescoping
OFF: Boom elevating
3. Switch — 5th outrigger working
Note: Press the switch for operation with front jack. LMI will work acc. to performance table under this working condition.
4. Switch — 2nd-stage cylinder working
5. Switch — Mark lamps
6. Switch — Working lamps
7. Switch — Instrument panel illumination
8. Switch — Front windshield wiper
I Position: low speed
II Position: high speed
9. Switch — Roof window wiper
10. Switch — Wiper washer (Fig. 5-3)

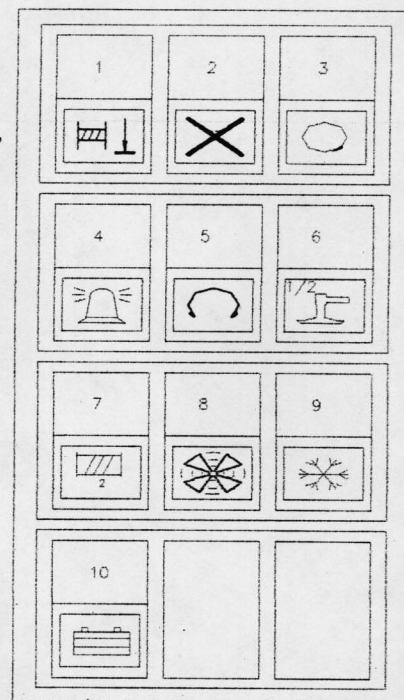


Fig. 6-3

4. Left Controller

1. Switch — Winch rope over-release relief switch

Note: when only 3 to 5 turns of winch rope left on the winch drum, the rope-end limiter will automatically activate to stop hoisting down. At this time, press the switch, hoisting down will continue.

2. Switch — Overload release

Note: when crane operation beyond the working range is detected by LMI, the movement of hoisting up, elevating down and boom extending will be stopped automatically. Press the switch, the above limits will be released.

3. Switch — Electro-proportional system safety control

Note: To avoid touching control handle by mistakes as access and egress operator's cab, press the switch before operation, the pressure in hydraulic system may emerge for operation. Otherwise the crane may not work normally. Turn off the switch before leaving the cab.

4. Switch — Warning lamp.

5. Switch — Swing brake releasing

Note: used to control the brake of swing reducer. When the switch is turned on, the swing brake opens, then swing operation can be carried out.

6. Switch — Half-extended outrigger selection

Note: For operation with half extended outriggers. Press the switch, LMI will work according to performance table under this working condition.

7. Switch — Auxiliary winch selection

8. Switch — Hydraulic oil radiator

9. Switch — Air conditioner-switch

10. Switch — counterweight selection (option)

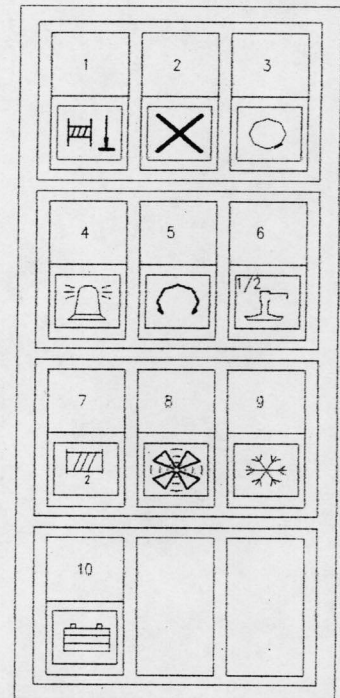


Fig. 6-4

5. Right Joystick Control Handle

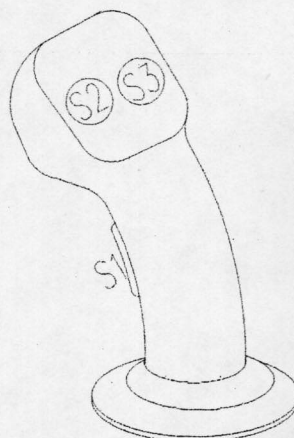


Fig. 6-5

- S1 Switch — Electro-hydraulic proportional system safety control
- S2 Switch — Horn
- S3 Switch — Exchange boom telescoping/elevating.

6. Left Joystick Control Handle

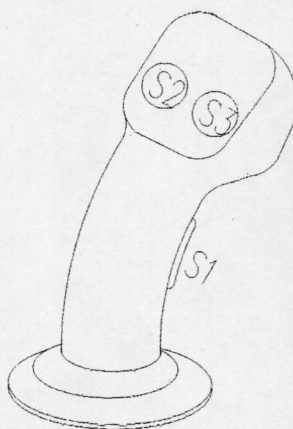


Fig. 6-6

- S1 Switch — Electro-hydraulic proportional system safety control
- S2 Switch — Swing brake releasing
- S3 Switch — Horn

7. Relay

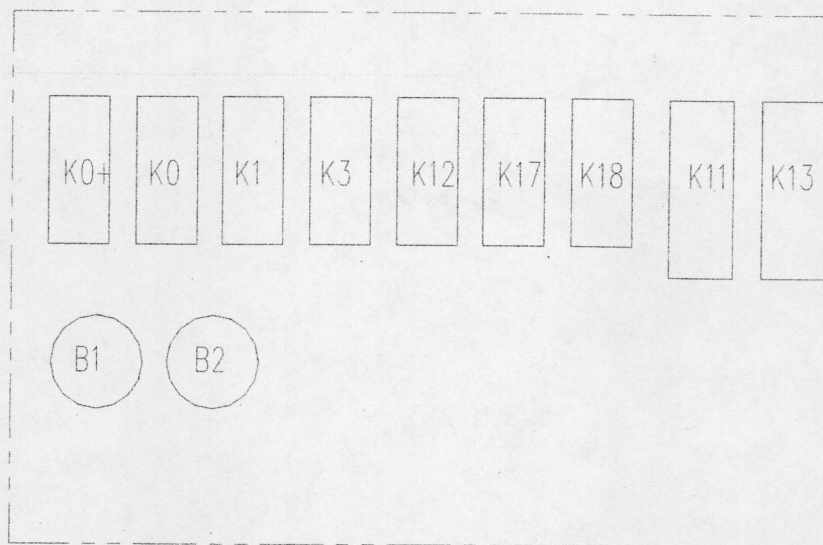


Fig. 6-7

K0+ Relay (model: JQ201S-FLO): Electrical control (China GB 3 engine).

K0 Relay (model: JQ201S-FLO): Electrical control

K1, K12 Relay (model: JQ202S-KLO): Front area control

K3 Relay (model: JQ202S-KLO): Horn control

K17 Relay (model: JQ202S-KLO): Air-conditioner heating control

K18 Relay (model: JQ202S-KLO): Air-conditioner cooling control

K11 Relay (model: SG251): Winch rope over-release warning control

K13 Relay (model: SG251): Front area warning control

B1 Buzzer (model: 37N-5010): Winch rope over-release warning

B2 Buzzer (model: 37N-5010): Front area warning

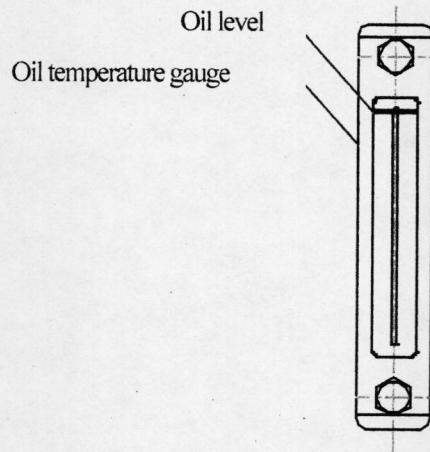
8. Notes on operation

- (1) Position all the control levers in neutral before turning on the main power.
- (2) An overload relief switch is fitted in the system. Use this switch carefully when the crane is in overload. In general, do not use this switch.
- (3) Read carefully “ Load Moment Indicator (LMI) Operation Instruction” before lifting operation.

VII. Hydraulic System

1. Check the Level of Hydraulic Oil Tank

Check the level of hydraulic oil tank prior to lifting operation. Add hydraulic oil when the oil level becomes below the level required.



2. Hydraulic System Description

In the electro hydraulic pilot control system of multi-way change valve, the main control valve is load sensitive proportional multi-way change valve. And anti-shock and anti-corrosion by gases valves are equipped in each valve block. The pilot valve uses an imported proportional relief valve. The moving angle of the pilot valve handle is directly proportional to the output pressure, so does the movement of the main control valve element. Thus fine inching control is available in the whole machine. Meanwhile, load sensitive valve makes the speed of actuator have no relationship with load, thus operation difficulty is reduced and labor saving is gained. Variable displacement motor in winch system makes a feature of high speed with light load and low speed with heavy load.

2.1 Main winch circuit

Max. Pump displacement: 130 ml/r, variable motor displacement: 107 ml/r.

The winch brake for winch circuit is constant-closed type. When operating the pilot control valve to control the main winch, the oil coming from the pilot control valve makes hydraulic control change valve change flow direction. Thus pressurized oil delivered by pilot pump activates winch brake through hydraulic control change valve, thus performing normal winding or unwinding operations.

When the pilot control valve in neutral, the pressurized oil in control circuit will return into oil tank. The hydraulic control change valve is reset by the action of return spring, causing the pressurized oil in winch brake to return into oil tank through the hydraulic control change valve, the brake is activated by the spring.

2.2 Auxiliary winch circuit

Max. Pump displacement: 130 ml/r, variable motor displacement: 80 ml/r.

The winch brake for winch circuit is constant-closed type. When operating the pilot control

valve to control the main winch, the oil coming from the pilot control valve makes hydraulic control change valve change flow direction. Thus pressurized oil delivered by pilot pump activates winch brake through hydraulic control change valve, thus performing normal winding or unwinding operations.

When the pilot control valve is neutral, the pressurized oil in control circuit will return into oil tank. The hydraulic control change valve is reset by the action of return spring, causing the pressurized oil in winch brake to return into oil tank through the hydraulic control change valve, the brake is activated by the spring.

2.3 Swing circuit

Max. pump displacement: 38 ml/r, constant plunger motor displacement: 28 ml/r.

The swing brake opening is controlled by a solenoid valve. In general, if the solenoid valve is not actuated, brake is engaged. If the solenoid valve is actuated, the brake opens by the action of pressure oil. So when operator swings the crane, the swing brake control switch S11 on the pilot valve control handle must be pressed.

The swing main circuit has free swing function. During lifting operation when the boom is under lateral pull, press any one switch of S13 and S17, the boom can align automatically, that is the boom center of gravity is in the same plane with the load center of gravity in prevention of boom deflection or damage due to lateral pull.

2.4 Elevating circuit

Max. pump displacement: 130 ml/r.

The system max. setting pressure is 30 MPa during boom lowering. In order to lower the boom smoothly or stop lowering reliably, a counterbalance valve is fitted in the circuit. Rod chamber pressure release circuit is designed in change valve to supply stable pressure signals for LMI. Boom lowering is performed by boom self-weight, so no need to accelerate engine.

2.5 Telescoping circuit

Max. pump displacement: 130 ml/r.

The crane's telescoping system consists of one base boom, four boom sections and two telescoping cylinders. When extending, firstly the 1st-stage cylinder drives the 2nd, 3rd, 4th and 5th boom sections out synchronously, then presses S10 boom cylinder exchange switch, the 2nd-stage cylinder extends the 3rd, 4th and 5th boom sections synchronously. When retracting, the 2nd-stage cylinder retracts the 3rd, 4th and 5th boom sections synchronously, and then repress S10 boom cylinder exchange switch, the 1st-stage cylinder retracts the 2nd, 3rd, 4th and 5th boom sections synchronously. In order to preventing piston rod from deflection due to high pressure during boom extending, the setting pressure of pressure limit valve is set 14MPa. A counterbalance valve is fitted in the telescoping circuit for boom stable retraction and reliable stopping.

2.6 Control circuit

A gear pump with 10ml/r of displacement supplies pressure for pilot control circuit, the setting pressure of relief valve in control circuit is 3MPa.

A solenoid valve for controlling oil source is fitted in the pilot control circuit. Only when the solenoid valve is actuated, all executive mechanisms in superstructure can work. Otherwise, there is no movement.

A safety unloading solenoid valve is fitted in the circuit. It is controlled by LMI. When load moment is or over rated value, the solenoid valve is actuated and all movements to increase moment are discontinued.

A rope-end limiter solenoid valve is fitted in the circuit. When only 3~5 wraps of rope left on main/auxiliary drum, the solenoid valve is actuated and the rope could not be released any further.

Swing and auxiliary winch share a pilot control valve (on left arm of chair). Push the handle forward, auxiliary hook block down; pull the handle backward, it up. Move the handle left, the turntable turn left; move the handle right, it turns right.

Telescoping (elevating) and main winch share a pilot control valve (on right arm of chair). Push the handle forward, main hook block down; pull the handle backward, it up. Move the handle left, telescoping (elevating) retracts (up); move the handle right, telescoping (elevating) extends (down).

2.7 Superstructure multiple-valve

It is for performing superstructure hydraulic circuit movements, for changing single pump and double-pump supply oil for operation of telescoping, elevating, main and auxiliary. It also can realize composite proportional hydraulic control of the direction, flow and pressure of hydraulic oil, and step-less regulation of executive mechanisms operated simultaneously under different loads. Its features are:

- (1) Energy saving: it may reduce the loss of flow and pressure, improve working efficiency of 25%~30% and reduce system heating.
- (2) Regulating function: it may regulate step-less the speed of single operation or simultaneous operation of four executive mechanisms, no interference. Even there is change in diesel engine speed, provided that it is in the range of max. displacement of supply oil pump, the valve outflow will not change, i.e. remains constant level.
- (3) Combined operation function: oil pump may automatically sense, transfer, select and copy max. load pressure through load sensitive information circuit integrated in the valve and respective pressure compensator so as to match pump output pressure to the pressure required by load irrespective of single operation or simultaneous operation. The sum of valve outflow matches to the flow required by load. For constant displacement pump, the surplus flow is by pass as hydraulic system pressure, but when executive mechanisms are out of use, double-pump discharges all displacement in form of low pressure so as to reduce hydraulic system heating. If the energy-saving system of variable displacement pump is needed, replace port valve block. When the spool of change valve is operated, load sensitive information circuit will transfer and copy information rapidly to the control valve of variable displacement pump, consequently, pump displacement will be changed for matching to the pressure and

flow required by load.

(4) There are damper and oscillation circuit equipped in the control circuit of each pressure compensator and load sensitive information circuit. They may improve the increasing and decreasing capacity of hydraulic system, so as to prevent pressure shock and abrupt flow change when sudden starting, stopping and operation without load applied on the hook occur.

(5) Main relief valve equipped on the port of double-pump serves to prevent overload and vent remotely. Secondary relief valves equipped on the ports A and B of executive mechanisms serve to prevent telescoping cylinder from bending and overload.

(6) The load suspended in the air is locked by a brake rather than a counterbalance valve due to internal leakage in hoist motor. When the load is lifted again, if the brake opens before or at the moment the pressure in hydraulic system is built, but the oil flow to motor is less than the leakage, second sliding will occur. Adapting a load sensitive valve may make the pressure in hydraulic system is built while the brake is disengaged, and the second sliding caused by motor leakage will be eliminated.

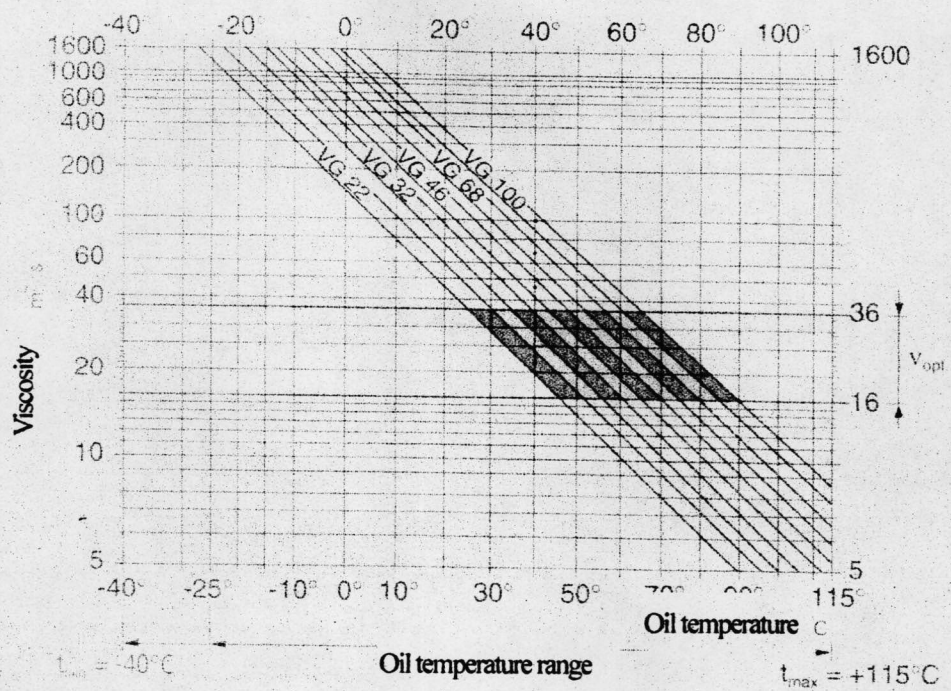
3. Specifications

Main circuit working pressure	31.5 MPa (refer to nominal value in "Hydraulic system diagram" for setting value of per relief valve)
Oil tank capacity	670L
Oil suction filter accuracy	180 μ
Oil return filter accuracy	10 μ
Hydraulic oil brand:	Ambient temperature
L-HM 46	above 5°C:
L-HM 32	-15°C~5°C:
L-HV 22	-30°C~ -15°C:
No. 10 aviation hydraulic oil	below -30°C:

4. Hydraulic Oil Description

The suitable temperature for hydraulic system working is about 60°C. When the temperature is more than 80°C, the volume efficiency of power parts and the sealing performance in hydraulic system will lower sharply, especially under idle engine. Consequently result in hydraulic system faulty; and when the temperature is lower than -20°C, hysteresis of hydraulic system will occur. In practical working, select open and close of hydraulic oil radiator as well as viscosity according to environmental temperature and working conditions. Refer to the diagram below for working temperature related to environmental temperature when select hydraulic oil.

Example: when environmental temperature is X°C, the working temperature in hydraulic system oil tank is 60°C, optimum viscosity range is in shadow, corresponding viscosity grade is VG46 or VG68, the should be selected.



VIII. Safety Devices

1. Load Moment Indicator (LMI)

(1) Working principle

According to the signals of boom length and boom angle input by related sensors, and the signal input by pressure sensor, the computer in moment limiter calculates the crane working radius and the load of elevating cylinder, then calculates the crane load moment. Comparing the value with the max. value of load capacity in the data base, finally displays the corresponding information for crane lifting operation.

(2) Safety function

When an overload occurs, the moment limiter automatically cut the crane motions that will increase the load moment (boom extending, boom lowering and hoist up) and only reserve those operations that will decrease the load moment (boom retracting, boom raising and hoist down).

(3) Hoist limit function

When hook block approaches boom head sheave (aprox.750mm), the hoist limit switch turns on to ground the 4.7k electric-resistance of boom length detector. After being processed by CPU of LMI, it stops boom extending and hook block winding. At the same time, the display warning lamp lights up.

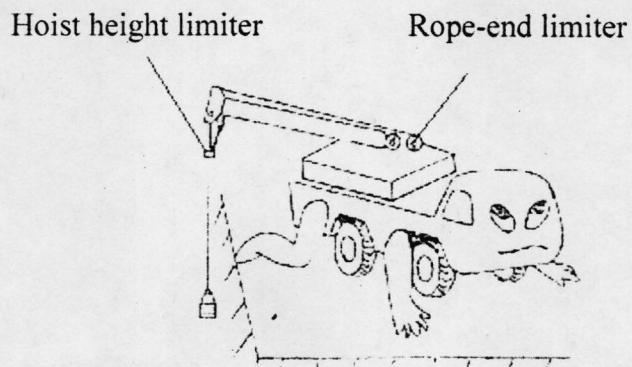
(4) Notes:

a. Please read LMI Instruction Manual carefully before lifting operation.

b. Although the crane is equipped with the load moment limiter, operator should take care for safety. Before lifting, operator should estimate the weight of the load to be lifted, and determine if the crane can lift the load or not in comparison with the total rated load chart. The LMI CPU is a very important safety device, so never carry out the impermissible operations with it switched off (such as extending the boom with a lifted load).

2. Rope-End Limiter

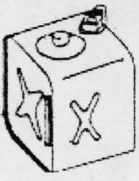
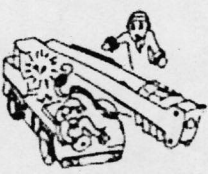
When lifting a load below the crane level and the wire rope unwinding until three to five turns remained on the winch drum, the rope-end limiter automatically activates to stop hook lowering, at this time, the buzzer sounds and warning lamp comes on.

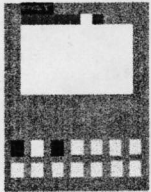


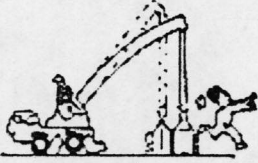
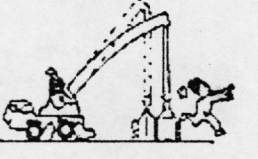
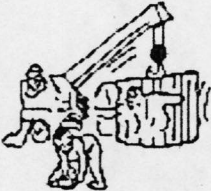
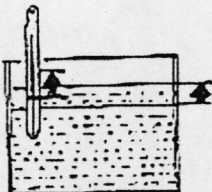
IX. General Cautions In Operation

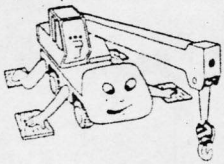
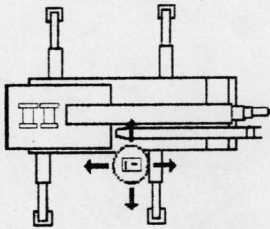
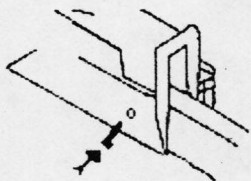
1. Cautions

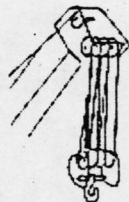
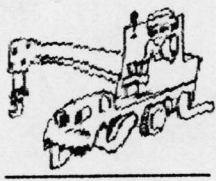
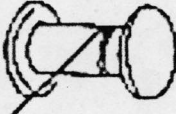
Cautions in operating the crane are summarized here. Before starting to operate your crane, carefully read and thoroughly understand them for safe operation.

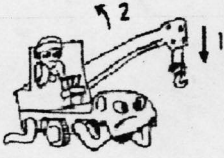
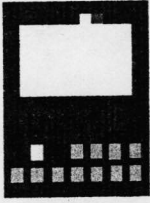
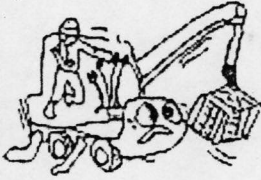
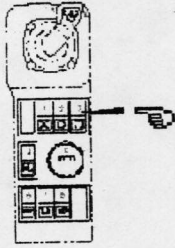
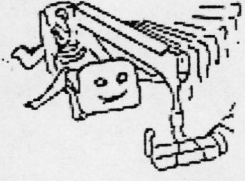
No.	Illustrations	Cautions	Remark
1.		Observe the "Starting and Stopping Engine" item in the carrier instruction manual.	Preoperational checks
2.		Check the hydraulic oil level with the crane in the traveling configuration, to make sure that the specified quantity is in the tank.	
3.		Check all the members for defects and abnormalities. If abnormalities occur, remove immediately.	
4.		Do not check and repair the crane when it is in lifting operation.	
5.		After starting the engine, run it at low speeds to warm it up sufficiently.	
6.		Before operating the engine, make sure that the various levers and switches are in their neutral or off positions.	

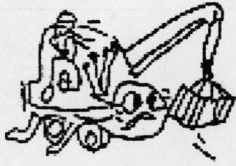
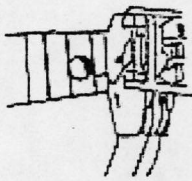
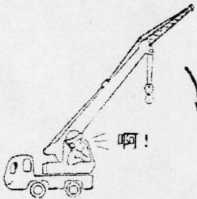
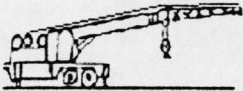
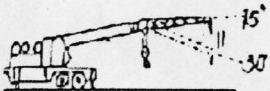
No.	Illustrations	Cautions	Remark
7.		Move the control levers and switches without load to check for correct crane functions. If any crane operation is faulty, repair immediately.	Preoperational checks
8.		Perform the specified preoperational checks of the Load moment indicator (LMI). (Refer to the Load moment indicator instructions.)	
9.		Check all other safety devices for proper function. (e.g. pressure gauge, etc.)	
10.		Turn on the power switch and starter switch in operator's cab before starting to operate the crane.	
11.		Do not lift loads in excess of the total rated loads. Do not overload the crane. Avoid side-loading or dragging loads on the ground. Do not try to take a load pressed by other loads or lift a load buried or stuck on the ground due to freezing.	During crane operation
12.		In general, lifting a load with two or more cranes at the same time is not permitted. If a load must be lifted with two or more cranes, carry out the lifting operation with straight wire ropes, synchronous movements of cranes and on condition that load on each crane must not exceed 80% of its rated load capacity.	

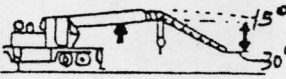
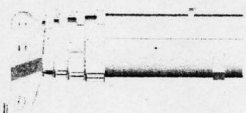
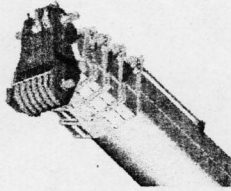
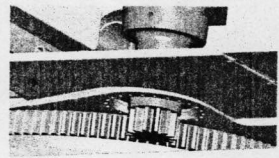
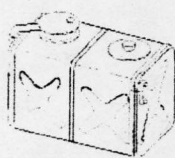
No.	Illustrations	Cautions	Remark
13.		The boom deflects under loads and the working radius increases. When calculating the total rated load, take this into consideration.	During crane operation
14.		Operate the crane slowly while you are familiarizing yourself with its operation	
15.		Do not look to the side when operating the crane. Operators must take signals only from designated signalmen. Operators must respond to emergency stop signal whenever and whoever sent.	
16.		Check safety conditions around the crane during operation. Operator should not leave the machine with a load suspended unattended.	
17.		Pay attention to the hydraulic oil temperature, and stop operation when the temperature rises above 80°C. Note that the amount of oil in the cylinders, tanks, etc. changes when the temperature changes. Therefore, when the boom is extended with the hydraulic oil at high temperatures, the boom retracts as the oil temperature drops. Compensate the boom retraction by extending the boom further.	

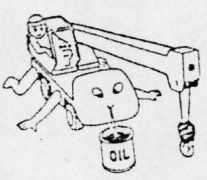
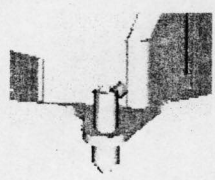
No.	Illustrations	Cautions	Remark
18.		Take note of weather report 1) Where the wind velocity is over 10m/sec. do not operate the crane. 2) If it is very windy or thundering, stop operating the crane and stow the boom.	During crane operation
19.		Avoid side loading or dragging loads on the ground.	
20.		Set up the crane level on a firm and even supporting surface (Where the ground is suspected to be soft, place strong wood blocks on the ground and set up the crane on them.)	Outrigger operation
21.		After setting up the crane, check that all the tires are clear of the ground and that the crane is level by monitoring the level gauge.	
22.		Extend the outriggers to the specified position, and lock them with the lock pins.	

No.	Illustrations	Cautions	Remark
23.		Do not abruptly move the winch control lever.	Winch operation
24.		During hoisting, lift the load off the ground 150~200mm, hold down for 10 minutes and check brake, and ascertain safety before further hoisting the load. Do not lift a load off the ground by raising the boom or extending the boom.	
25.		Reeve the winch rope in a proper number of parts of line according to the boom length in order to improve working speed and enlarge wire rope life.	
26.		If the winch rope twines and the hook block rotates, fully untwine the rope before lifting loads.	
27.		Do not lower the boom excessively even if no load to prevent crane tipping. Observe boom angle limit. When boom length is less than 30.4m, the min. boom angle may be reached.	
28.		When lowering the hook block, leave at least three turns of the winch rope on the winch drum.	

No.	Illustrations	Cautions	Remark
29.		Sufficiently lower the hook block before extending the boom.	Boom elevating
30.		With the boom fully retracted, check the length indication of the LMI. Extend the boom only after making sure that the indication is within the specified range.	
31.		Do not abruptly move the elevating control lever.	
32.		Before swinging the boom, make sure that area in the swing path is clear of personnel and obstructions.	Boo m swinging
33.		Before swinging the boom, check the preset position of swing brake release switch. Never move the switch during swinging.	
34.		While the SWING FREE/LOCK select switch is in FREE, take care to prevent the boom from drifting under tilt, wind pressure, or inertia.	

No.	Illustrations	Cautions	Remark
35.		Do not abruptly move the swing control lever. Reset the control lever smoothly, and release swing brake release switch on handle after the lever returning to neutral.	Boom swinging
36.		Keep the swing brake applied when the boom is not swung.	
37.		Pull out outrigger floats before setting up the outriggers.	Jib
38.		When folding and unfolding the jib, hold it by the auxiliary winch rope or the like, and swing it slowly.	
39.		When the jib is erected (stowed), connect (disconnect) the plug of jib height limiter to (from) the boom side.	
40.		Do not operate the crane or drive the carrier with the stowing pin extracted, otherwise the jib may drop off.	
41.		When stowing the jib, do not over-wind the auxiliary winch rope.	
42.		Do not lower the boom immediately after changing the offset to 30° or 15°.	

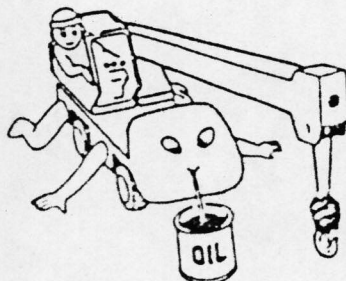
No.	Illustrations	Cautions	Remark
43.		Before changing the jib offset or extending, secure sufficient clearance above the ground by raising the boom.	Jib
44.		Once every month and every year, periodically inspect the crane	Maintenance and servicing
45.		Check and adjust boom cables regularly, at least every month. If cable looseness occurs, it may cause serious problem such as cable out of pulley groove, consequently retracting boom is impossible.	
46.		Lubricate boom telescoping chute regularly.	
47.		Check the condition of slewing bearing nuts tension regularly. If looseness is found, tighten in time.	
48.		Clean or replace the hydraulic oil at regular intervals to keep it always clean.	
49.		Replace the gear oil and other lubricants regularly.	

No.	Illustrations	Cautions	Remark
50.		Grease all the specified greasing points, and other rotating and sliding members regularly.	Maintenance and servicing
51.		Replace the filter element regularly.	
52.		Check the oil levels of the hydraulic oil, gear oil, and other lubricating oils for correct quantity, and refill as necessary.	
53.		Keep all parts properly adjusted (e.g. brakes). Keep them free from deformation, damage, loose mounting, etc.	
54.		Stow the hook block in the specified position and secure it.	Driving the vehicle
55.		Apply the turntable swing brake pin.	
56.		Retract outriggers fully and lock with pins.	

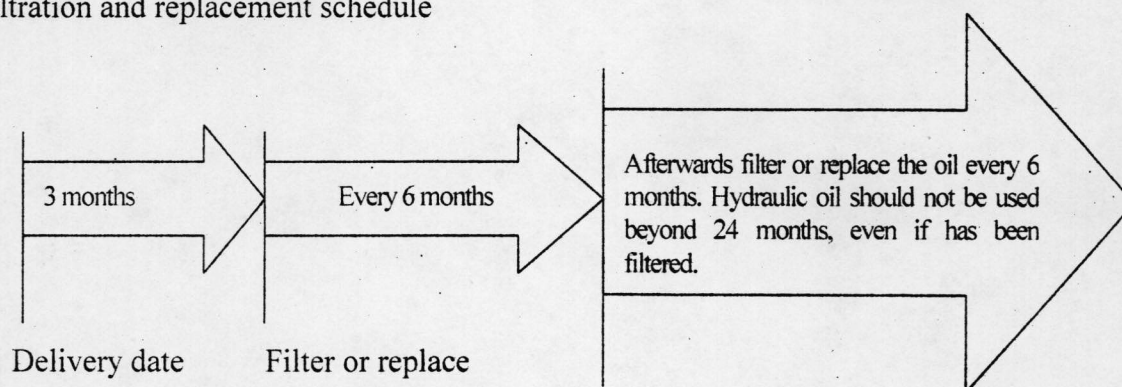
X. Oil

Different brands of hydraulic oil, gear oil and grease should not be mixed.

1. Hydraulic Oil



(1) Filtration and replacement schedule

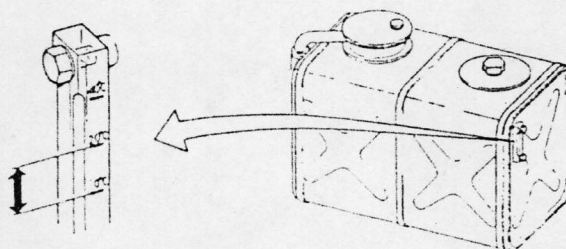


Notes:

- Whenever oil becomes excessively contaminated, filter or replace it even before the scheduled filtration or replacement time. Hydraulic oil is replaced according to JB/T9737.3-2000.
- Use suitable oil depending on the atmospheric temperature (refer to section 4.2).

(2) Hydraulic oil temperature

The oil temperature should always be below 80°C.



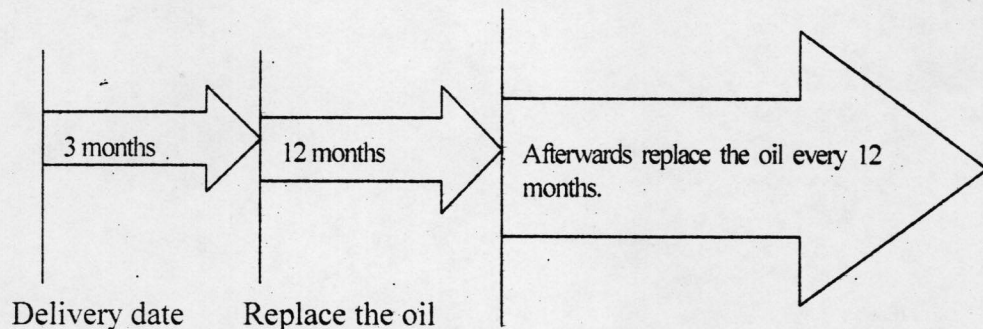
(3) Quantity of hydraulic oil

Required quantity of hydraulic oil is 600L.

Checking hydraulic oil level: check the oil level with the crane put in the road travel configuration; the oil level gauge not only can show the oil level, but also the hydraulic oil temperature; when checking the oil level, make sure that the oil level is above the middle mark of the level gauge. If the oil level is lower than the middle mark, add hydraulic oil.

2. Gear Oil

(1) Replacement schedule



Notes:

- Whenever oil becomes excessively contaminated, replace it even before the scheduled time of replacement.
- Frequently check the oil level, and refill if the level is lower than the specified level.

(2) Winch

Filling amount: about 2.5L.

Brand: Mobil SHC220 in winter; L-CKD220 ~320 EP gear oil in summer.

Remove wire rope to reveal drum bottom, and then remove the plug and refill enough oil.

(3) Swing system

Filling amount: about 1.2L.

Brand: Mobil SHC220 in winter; L-CKD220 ~320 EP gear oil in summer.

Remove the plug and refill enough oil.

3. Grease

No.	Greasing Position	Greasing interval	Methods
1.	Main hook block sheaves	Weekly	Grease pump
2.	Boom winch sheaves	Weekly	Grease pump
3.	Slide blocks between 2nd, 3rd, 4th, and 5th boom sections	Weekly	Coat, grease pump
4.	Sliding surfaces of slide block between 2nd, 3rd, 4th, and 5th boom sections	Weekly	Coat
5.	Elevating cylinder upper and lower pivot shafts	Weekly	Grease pump
6.	Jib sheaves	Before use	Grease pump
7.	Boom rear pivot shaft	Weekly	Coat, grease pump
8.	Slewing bearing	Acc. to section 5.2	Grease pump
9.	Pinions in swing system	Weekly	Coat
10.	Auxiliary hook block	Before use	Coat
11.	Winch rope	Weekly	Coat
12.	Telescoping wire rope	Weekly	Coat
13.	Outrigger jack floats	Weekly	Grease pump
14.	Winch bearing seat	Weekly	Grease pump

Notes:

- (1). Clean the grease cup and the surface to be coated with grease before greasing.
- (2). The sliding surfaces, which are not indicated in the list above, also require periodic greasing.
- (3). Monthly apply a thin coat of grease to the exposed portion of the elevating cylinder piston rod with the boom placed on the boom rest.

4. Hydrostatic Pressure Oil

The filling amount of hydrostatic pressurized oil is approx. 2.5 kg.

The crane is filled with the hydrostatic pressurized oil when it is delivered. If it is needed to replenish oil, refill with KF-01 brake fluid (made by Xuzhou Automobile Chemicals Factory).

Notes:

- (1). Different brands of brake fluid should not be mixed.
- (2). Use the brake fluid of the crane accelerator specified by our company. Do not replace it with other brands, otherwise the operating pump and the rotary joint sealing will be damaged.

XI. Common Troubles and Troubleshooting

1. Troubleshooting

SECTION	TROUBLE	CAUSE	REMEDY
Pump system	Noise	1. Insufficient oil. 2. Air entering through suction line. 3. Mounting bolt loose. 4. Contaminated hydraulic oil. 5. Propeller shaft vibration. 6. Universal joint worn. 7. Pump faulty.	Add oil. Repair and bleed air. Tighten. Replace or filter. Repair. Replace. Repair or replace.
Outrigger system	Outriggers inoperative.	1. Relief valve pressure setting faulty in carrier multi-valve. 2. Dirt blocks up relief valve element. 3. Control valve faulty.	Adjust. Disassembly and clean. Repair.
	Movement is sluggish.	1. Inner of control valve faulty. 2. Relief valve pressure setting too low.	Repair. Adjust.
	Jack automatically retracts or extends during operation or road travel.	1. Double-way hydraulic valve faulty. 2. Internal leakage in cylinder. 3. External leakage in cylinder.	Repair. Repair. Repair.
Swing system	Swing brake ineffective.	1. Brake lining worn or oil on brake lining. 2. Air entered brake oil circuit. 3. Brake cylinder faulty.	Repair or replace. Bleed air. Repair.
	Sluggish swing.	1. Relief valve in main valve pressure setting too low. 2. Hydraulic motor leakage. 3. Insufficient pressure in control circuit or pilot valve faulty. 4. Internal leakage in main valve or change faulty.	Adjust. Repair or replace. Check and repair. Check and replace sealing.

SECTION	TROUBLE	CAUSE	REMEDY
Swing system	Boom will not swing.	1. Relief valve pressure setting too low or leakage with sticking. 2. Main valve faulty. 3. Motor faulty. 4. Speed reducer faulty. 5. Pilot valve faulty. 6. Relief valve in pilot oil circuit faulty. 7. Blocked pilot oil circuit.	Repair and adjust. Repair. Repair or replace. Repair. Repair. Adjust after repair. Check oil circuit.
	Big starting shock	1. Pilot valve faulty. 2. Reservoir inflation pressure too high.	Check and repair. Adjust.
	Unsteady swing brake	1. Swing brake faulty. 2. Swing multi-valve faulty.	Check and repair. Check and repair.
	Free/lock change system inoperative.	1. Solenoid valve stuck or change faulty. 2. Brake pressure of inlet circuit too low. 3. Pressure of free-sliding relief valve too high.	Check and repair. Adjust pressure-relief valve and relief valve of pilot oil circuit. Adjust.
Elevating system	Boom elevation cylinder will not extend.	1. Relief valve pressure setting too low in crane multi-valve. 2. Internal leakage in control valve, control pressure too low. 3. Internal leakage in cylinder. 4. Master pump pressure too low. 5. No pressure in pilot oil circuit, solenoid valve faulty. 6. Pilot valve faulty. 7. Unloading solenoid valve faulty. 8. LMI faulty, unloading signal remains.	Adjust. Check, repair and adjust. Check and repair. Check and repair. Check, repair and adjust. Check and repair. Check and repair. Check and repair.

SECTION	TROUBLE	CAUSE	REMEDY
Elevating system	Boom elevation cylinder will not retract.	1. It is same as items 5, 6, 7 and 8 in Boom elevation cylinder will not extend. 2. Counterbalance valve faulty. 3. Back pressure of main return oil circuit too high. 4. Blocked control oil circuit of counterbalance valve.	Check and repair. Check and repair. Check and repair.
	Cylinder retracts during operation.	1. Internal leakage in cylinder. 2. Counterbalance valve faulty.	Repair or replace. Repair or replace.
Telescoping system	Boom will not extend.	1. Too low pressure setting of relief-valve in telescoping control valve of crane multi-valve. 2. It is the same as items 2, 3, 4, 5, 6, 7 and 8 in Boom elevation cylinder will not extend.	Adjust. Check, repair and adjust.
	Boom will not retract.	1. Relief valve pressure setting too low in crane multi-valve. 2. Counterbalance valve faulty. 3. It is the same as items 2, 4, 5 and 6 in Boom elevation cylinder will not extend.	Adjust. Check and repair or replace. Check, repair and adjust.
	Boom retracts during operation.	1. Counterbalance valve faulty. 2. Internal leakage in cylinder. 3. External leakage in cylinder, valve or piping joints.	Repair. Repair. Repair.
Winch system	Brake is ineffective.	1. Oil on brake friction disc. 2. Friction disc worn. 3. Air entered. 4. Master cylinder faulty.	Clean. Adjust or replace. Trouble-shooting. Repair

SECTION	TROUBLE	CAUSE	REMEDY
Winch system	Winch will not hoist up loads.	1. Too low pressure setting of relief valve in crane multi-valve. 2. Hydraulic motor faulty. 3. Internal leakage in main valve. 4. Main pump pressure too low. 5. No pressure in pilot oil circuit. 6. Pilot handle faulty. 7. Unloading solenoid valve faulty, in unloading state. 8. ALM faulty, unloading signal continuous. 9. Winch brake faulty.	Adjust. Check and repair. Check and repair. Check and repair. Check and repair. Check and repair. Check and repair. Check and repair.
	Winch will not let out rope in power hoist-down mode.	1. Counterbalance valve faulty. 2. Control oil circuit of counterbalance valve blocked. 3. Winch brake faulty. 4. No pressure in brake inlet circuit. 10. No pressure in pilot oil circuit. 11. Pilot valve faulty. 12. Leakage in winch motor.	Check and repair. Check and repair. Check and repair. Check change valve. Check and repair. Repair or replace. Repair.
Functional parts	Fine control, controllable and proportional function insensitive	1. Pressure in control oil circuit too low. 2. Pilot relief valve faulty. 3. Main valve faulty.	Adjust. Check and repair. Check and repair.
Hydraulic system	Overheat hydraulic oil, low speed of functional parts.	1. Internal leakage in main pump. 2. Relief-valve in multi-valve faulty. 3. Counterbalance valve opening pressure too high. 4. Leakage in winch motor. 5. Relief-valve pressure setting in main pump too low	Check and repair. Check and repair. Check and repair. Check and repair. Check, and repair.

SECTION	TROUBLE	CAUSE	REMEDY
Electrical system	1. Work lamps will not light 2. Boom lamp will not light. 3. Room lamp will not light.	1. Bulb burned out. 2. Fuse blown. 3. Earthing faulty. 4. Wire broken. 5. Switch faulty.	Replace. Replace. Repair. Repair. Repair or replace.
	Wipers inoperative.	1. Fuse blown. 2. Switch faulty. 3. Motor faulty. 4. Earthing faulty. 5. Wire broken.	Replace. Replace. Replace. Repair. Repair.
	Buzzer will not sound	1. Earthing faulty. 2. Switch faulty. 3. Relay faulty. 4. Wire broken. 5. Buzzer faulty. 6. LMI faulty.	Repair Replace. Replace. Repair Repair or replace. Contact our service station.
	Starter will not be operated from crane operator's cab	1. Main fuse blown or loose. 2. Wire broken, switch faulty.	Repair or replace. Repair or replace.
	Load moment indicator faulty	1. Fuse blown. 2. Relay faulty. 3. Solenoid faulty. 4. Solenoid valve earthing faulty. 5. Others.	Replace. Replace. Replace. Replace. Contact our service station.
	Height limiter inoperative.	1. Fuse blown. 2. Cord reel faulty. 3. Wire broken. 4. Limit switch faulty. 5. Weight rope broken. 6. Solenoid valve faulty. 7. Solenoid valve earthing faulty. 8. Limit switch earthing faulty. 9. LMI faulty.	Replace. Repair or replace. Repair. Replace. Replace Repair or replace. Repair. Repair. Contact our service station.

2. Replacing Wire Ropes

(1) Wire rope replacement standard

Wire ropes are fatigued with use, and to continue to use them without paying attention to fatigue is very dangerous. Inspection and replace wire rope according to GB5972-1986

《Cranes Wire Rope Code of Practice for Examination and Discard》, and replace any wire ropes which fall into one or more of the categories below.

- (1) Steel wires of more than 10 % of wires (excluding filler wires) in the most external strand in one lay are broken.
- (2) Reduction of wire rope diameter exceeds 7 % of nominal diameter.
- (3) Evidence of kinking.
- (4) Excessively deformed (indented strand, protrusion of wires, bird-caging) or corrode wire ropes.
- (5) Wire ropes with an abnormal rope end.

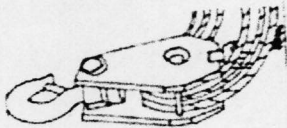
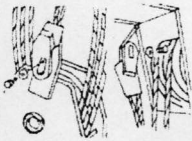
(2) Requirements of replacement wire rope

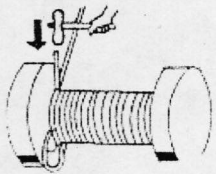
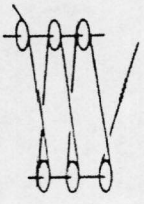
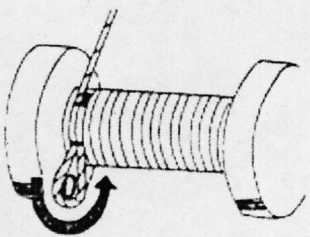
- (1) In general, replace wire rope with the same type and size as the original one. If the rope is not the same type, the rope performance not less than the original one's should be ensured, and fit grooves on drum and sheaves.
- (2) If the rope is cut from a long one, the rope ends should be bound with a wire or vinyl tape to prevent rope loosening.

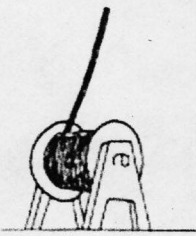
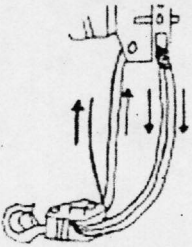
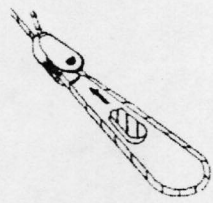
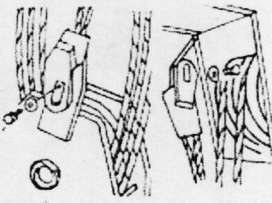
(3) Working conditions of replacing main winch rope

Take main winch wire rope for example:

- (1) Set up the crane on firm, level ground.
- (2) Fully retract the boom.

No.	Procedure	Note	Tools
1	Place the main hook block on the ground. 	Avoid disorderly rope winding on the drum.	
2	Disconnect the rope socket from the boom head or main hook block. 	Keep the parts carefully so as not to lose them.	Wrench

No.	Procedure	Note	Tools
3	Remove the rope from the rope socket. 	Keep the parts carefully so as not to lose them.	Bar Hammer Wrench
4	Let out the rope by turning the winch under power. 	Pull the rope.	
5	Remove the rope end from the winch drum. 	Keep the wedge. 	Bar Hammer
6	Reeve the new rope over all the sheaves. 	Through the correct route. Bind the rope end with a wire or vinyl tape. 	Wire or vinyl tape
7	Install the rope end to the winch drum. 	1. Put the wedge in the correct orientation. 2. The rope end must not protrude from the external periphery of the drum. 	Hammer

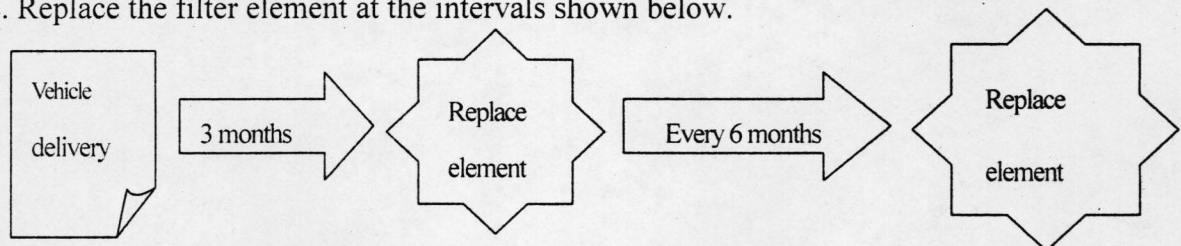
No.	Procedure	Note	Tools
8	Wind the rope on the drum. 	1. Avoid disorderly rope winding on the drum. 2. Bind the rope end with a wire or vinyl tape. 	Wire or vinyl tape
9	Reeve the rope over the sheaves at the boom head and the hook block. 	Exercise care to route the rope correctly.	Bar Hammer
10	Attach the rope socket and rope clamp to the rope. 	Put the wedge in the correct orientation.	Hammer Wrench
11	Attach the rope socket to the boom head or the hook block depending on the number of parts of line. 		Wrench

No.	Procedure	Note	Tools
12	Raise and extend the boom, then lower the hook block until no turn of the rope remains on the winch drum.	Exercise care not to excessively lower the hook block. Otherwise the rope may be damaged.	Bar Hammer
13	Wind the rope on the drum while hoisting a weight which applies aprox.30 % of the "maximum permissible load for winch rope" to the rope.	Do not exceed the total rated load. The load limit for winch rope: 27180N.	Hammer Wrench
14	Remove the weight from the hook.		

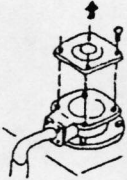
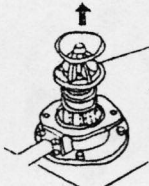
3. Return Filter

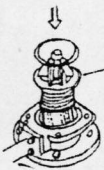
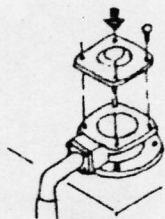
(1). Notes on operation

- Stow the boom.
- Stop the pump.
- Replace the filter element at the intervals shown below.



(2). Replacement of the filter element

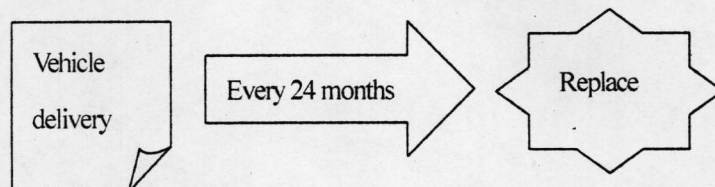
No.	Procedure	Note	Tools
1	Remove the cover. 		Wrench
2	Remove the filter assembly.  Filter assembly		

No.	Procedure	Note	Tools
3	Remove the snap pin, loosen the nut and remove the filter element. 		Wrench
4	Replace the filter element and assemble the filter. 	Tighten the nut gradually. After the sealing surface makes contact with the element evenly, further tighten the nut within one turn and insert the snap pin. 	
5	Install the filter assembly.  Filter assembly		Wrench
6	Install the cover. 		Wrench

4. Line Filters (replace the element)

(1). Notes on operation:

- a. Stow the boom.
- b. Stop the pump.
- c. Replace the filter element at intervals shown below.



XII. Periodic Inspections

The crane should be kept in such a condition as will assure the full performance of each crane function. This is essential for both the assurance of safety and high work efficiency.

Inspection items are described below.

Make repairs immediately when unusual conditions are found during periodic inspections.

Be sure to perform the preoperational inspections of:

- (1) Outriggers.
- (2) Crane mechanisms: boom swinging, elevation and telescoping and rope winding.
- (3) Brake systems.
- (4) Electrical system.
- (5) Safety devices.

Inspection items	
Pump drive system	Control levers and switches 1. Operating condition.
	PTO (power take off) 1. Loose installation and leakage. 2. Abnormal noise and heating.
Hydraulic system	Hydraulic oil tank 1. Loose installation and damage. 2. Cracks and leakage. 3. Oil level, contamination and viscosity.
	Hydraulic pump 1. Loose installation and damage. 2. Abnormal noise vibration and heating. 3. Leakage. 4. Suction line condition (air entry). 5. Delivery pressure. 6. Loose and leaking piping joints.

Inspection items	
Boom swing system	Brake 1. Braking performance. 2. Deformation and wear of links. 3. Lubrication.
	Rotary joint 1. Leakage. 2. Turning condition, noise, vibration and heating. 3. Electrical conductivity between carbon brush and slip ring.
	Speed reducer and swing bearing. 1. Oil level and contamination. 2. Cracks, deformations of gearbox and oil leakage from it. 3. Abnormal noise and vibration. 4. Loose installation. 5. Hydraulic motor operating pressure. 6. Loose and leaking piping joints.
Boom elevating system	Elevating cylinder 1. Wear and damage of pivot pins. 2. Tightness of bolts for pivot pin retaining plate. 3. Leakage. 4. Vibration and noise. 5. Erratic cylinder retraction during load lifting. 6. Deterioration, twisting and deformation of hoses.
	Counterbalance valve 1. Leakage. 2. Pulsation. 3. Loose and leaking piping joints.

Inspection items	
Boom telescoping system	Boom 1. Cracks, damage and deformation. 2. Tightness of bolts for boom pivot pin retaining plate. 3. Scratches on sliding surfaces. 4. Wear and damage of pivot pin bosses. 5. Lubrication of sliding surfaces. 6. Deformations and cracks of boom rest.
	Telescoping cylinders 1. Pulsation, and noise. 2. Operational sequence. 3. Leakage. 4. Function of counterbalance valve. 5. Loose piping joints.
	Jib 1. Cracks and deformations. 2. Lubrication of connecting pins and bosses.
	Winch rope 1. Diameter. 2. Wire breakage. 3. Kinks. 4. Deformation. 5. Corrosion. 6. Lubrication. 7. Tightness.

Inspection items	
Winch system	Speed reducer 1. Tightness of mounting bolts. 2. Noise. 3. Crack and deformation of gearbox. 4. Wear of bearings. 5. Lubrication. 6. Leakage.
	Brakes 1. Wear of brake disc and lining. 2. Loose and leaking piping joints. 3. Deformations of spring.
	Counterbalance valve 1. Leakage. 2. Loose and leaking piping joints. 3. Pulsation.
	Drums 1. Cracks. 2. Disorderly rope winding.
	Hooks and sheaves 1. Rotation of hook. 2. Deformation. 3. Movement of trunnion. 4. Connections between trunnion and hook. 5. Deformation of rope guard. 6. Rotation of sheave (abnormal noise). 7. Cracks and wear of sheaves. 8. Deformation and damage of sheave support and protecting pieces. 9. Lubrication.

Inspection items	
Winch system	Jib 1. Cracks and deformations. 2. Lubrication of connecting pins and bosses.
	Winch rope 1. Diameter. 2. Wire breakage. 3. Kinks. 4. Deformation. 5. Corrosion. 6. Is the rope socket wedge in place? 7. Connection of the rope and rope socket. 8. Wear and cracks of rope socket boss and pin. 9. Reeved through correct sheaves.
Hydraulic devices	Relief valves 1. Pressure setting.
	Control valves 1. Operating conditions. 2. Leakage. 3. Tightness of mounting bolts.
	Master cylinder 1. Operating conditions. 2. Leakage. 3. Brake fluid level. 4. Deterioration, twisting and damage of hoses.
Crane controls instruments safety devices	Starter switch 1. Function. 2. Installation. 3. Lighting of pilot lamp.
	Wipers (Windshield, roof window) 1. Function. 2. Wear and damage of blade.

Inspection items	
Crane controls instruments safety devices	Room lamp 1. Lighting.
	Buzzer 1. Function.
	Load moment indicator 1. Operation. 2. Accuracy.
	Over-wind cutout device (hoist limit switch) 1. Function. 2. Damage of wire rope for weight. 3. Installation. 4. Operation of solenoid valve.
	Cab 1. Tightness of nuts and bolts. 2. Function of window and door locks.
	Pressure gauges 1. Smooth movement of needle. 2. Tightness of connections.
	Control levers and pedals 1. Function. 2. Play.
	Work lamps 1. Lighting. 2. Damage. 3. Installation
	Lamp on boom head 1. Lighting. 2. Installation

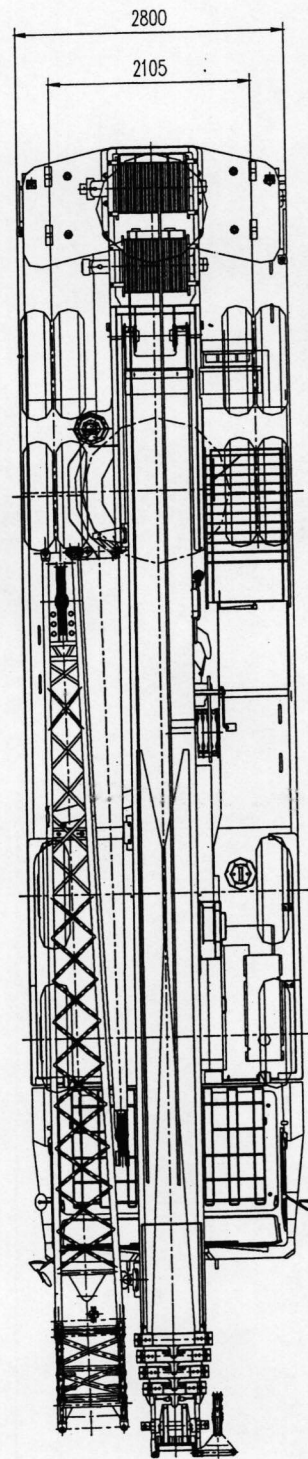
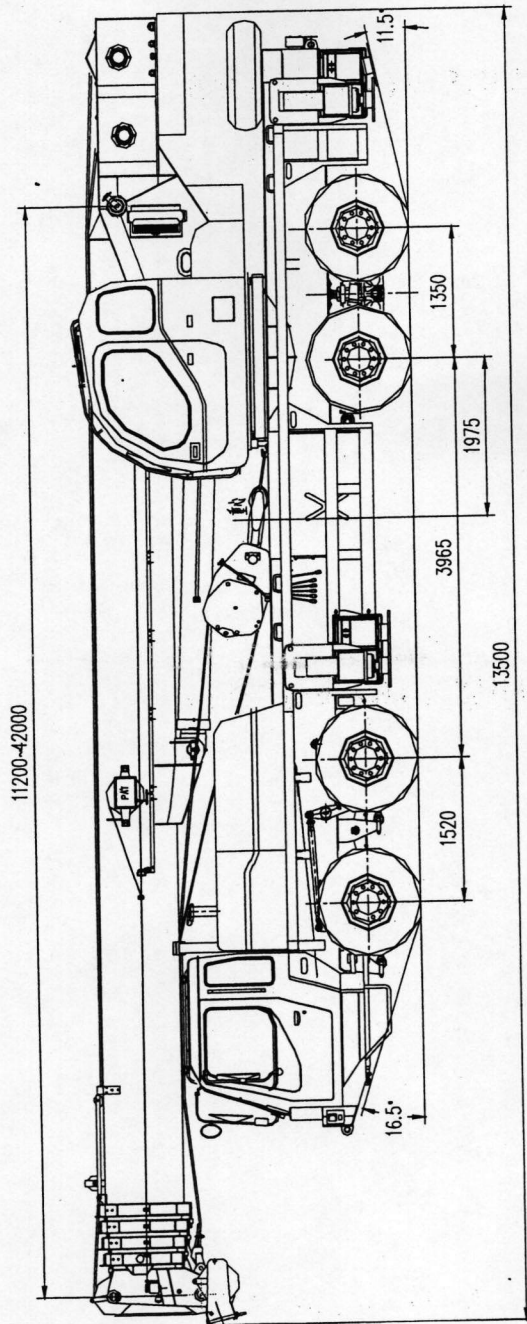
Inspection items	
Outrigger system	Jack 1. Retraction during load lifting. 2. Extension during road travel. 3. Leakage. 4. Function of pilot check valve. 5. Tightness of piping joints. 6. Noise and vibration. 7. Deformation and damage of outrigger floats.
	Outrigger box, outrigger beam, extension cylinder 1. Deformation and damage. 2. Tightness of beam lock pins and bosses. 3. Deformation and cracks of bracket. 4. Noise and vibration. 5. Loose piping and loose connections, and deteriorated hose. 6. Leakage.
	Control valve 1. Operating conditions. 2. Tightness of piping joints. 3. Tightness of mounting bolts. 4. Leakage.
	Level gauge 1. Scratches and deformation. 2. Installation. 3. Bubble conditions.
Miscellaneous	Accessories 1. Damaged or missing.

Inspection items	
Hydraulic device	Hydraulic circuit 1. Loose connections. 2. Leakage. 3. Loose and cracks of supports. 4. Deterioration, twisting and damage of hoses.
Note	Re-tightening of slewing ring mounting bolts: during monthly periodic inspection, when looseness of slewing ring mounting bolts are found, the bolts should be re-tightened in service station. Moreover, it is recommended that carry out inspection once a year and re-tight slewing ring mounting bolts conforming to the specified tightening torque. The tightening torque for the mounting bolts is 1150~1350 N.m.

- ◇ The inspection interval for regular inspection should be based on working condition and working environment, but not less than monthly once.
- ◇ The inspection interval for periodic inspection should be based on working condition and working environment, but not less than annual once.
- ◇ The following cranes should be carried out inspection and testing according to the relevant standards:
 - The crane in normal operation, once every two years;
 - The crane of overhaul, newly assembled and modified, before delivery;
 - The crane being laid idle over one year, before reusing;
 - The crane that its structural parts and mechanisms are damaged in strength, rigid and stability due to storm, earthquake and accident, before reusing.

X III. Railroad Transportation

1. The crane can be transported on railway flat-car.
2. Block the crane wheels with wood wedges or cement blocks.
3. Tie the crane and the flat-car with ropes tightly.
4. The gravity center of the vehicle lies in the front of the rear axle. The distance between the gravity center and the center of rear axle is 1658mm, refer to the diagram below.
5. All control levers and switches of the crane must be in neutral and off positions.
6. After loading the crane, lock all the doors and windows to prevent opening during transportation.



X IV. Appendix

1. Main Parts

Main Parts List

No.	Name	Model	Qty	Position
1.	Crane carrier	XZ65K	1	
2.	Slewing ring	131.25.1480.302.04.03F	1	Turntable-frame
3.	Swing reducer	GJT17T3B104-01	1	Swing system
4.	Motor	A2F28W2Z6	1	Swing system
5.	Winch reducer	GJT26W2B51-10	1	Main winch
		GJT23W2B48-02	1	Auxiliary winch
6.	Motor	A6V107	1	Main winch
		A2FM80	1	Auxiliary winch
7.	Wire rope	20NAT 4VX39S+5FC-1870	185m	Main winch
		18NAT 4VX39S+5FC-1870	125m	Auxiliary winch

2. Easy Wear Parts**Easy Wear Parts List**

No.	Drawing No.	Name	Material	Qty	Assembled Position
1	QY70K.02.1-4	Slider	804 Plastics	6	1st, 2nd, 3rd section head (upper)
2	QY60K.02.1-10	Slider	804 Plastics	75	1st, 2nd, 3rd section head (lower)
3	QY60K.02.1-11	Slider	804 Plastics	6	1st, 2nd, 3rd section head (lower)
4	QY60K.02.1-12	Slider	804 Plastics	6	1st, 2nd, 3rd section head (lower)
5	QY60K.02.1-13	Slider	804 Plastics	6	1st, 2nd, 3rd section head (lower)
6	QY70K.02.2-2	Slider	804 Plastics	2	2nd section tail (upper)
7	QY70K.02.3-2	Slider	804 Plastics	2	3rd section tail (upper)
8	QY70K.02.4-7	Slider	804 Plastics	2	4th section tail (upper)
9	QY60K.02.4-6	Slider	804 Plastics	2	4th section head (lower)
10	QY60K.02.4-7	Slider	804 Plastics	1	4th section head (lower)
11	QY60K.02.4-8	Slider	804 Plastics	1	4th section head (lower)
12	QY60K.02.4-9	Slider	804 Plastics	1	4th section tail (upper)
13	QY60K.02.4-10	Slider	804 Plastics	1	4th section head (lower)
14	QY60K.02.4-11	Slider	804 Plastics	1	4th section head (lower)
15	QY60K.02.4-12	Slider	804 Plastics	1	4th section head (lower)
16	QY60K.02.4-13	Slider	804 Plastics	1	4th section head (lower)
17	QY60K.02.4-14	Slider	804 Plastics	1	4th section head (lower)
18	QY60K.02.4-15	Slider	804 Plastics	2	4th section head (lower)
19	QY60K.02.4-16	Slider	804 Plastics	1	4th section head (lower)
20	QY70K.02.5-2	Slider	804 Plastics	2	5th section tail (upper)

3. Supplied Spare Parts and Tools

(1) QY70K Supplied Tools accord with XZ65K Supplied Tools

(2) Supplied Spare Parts

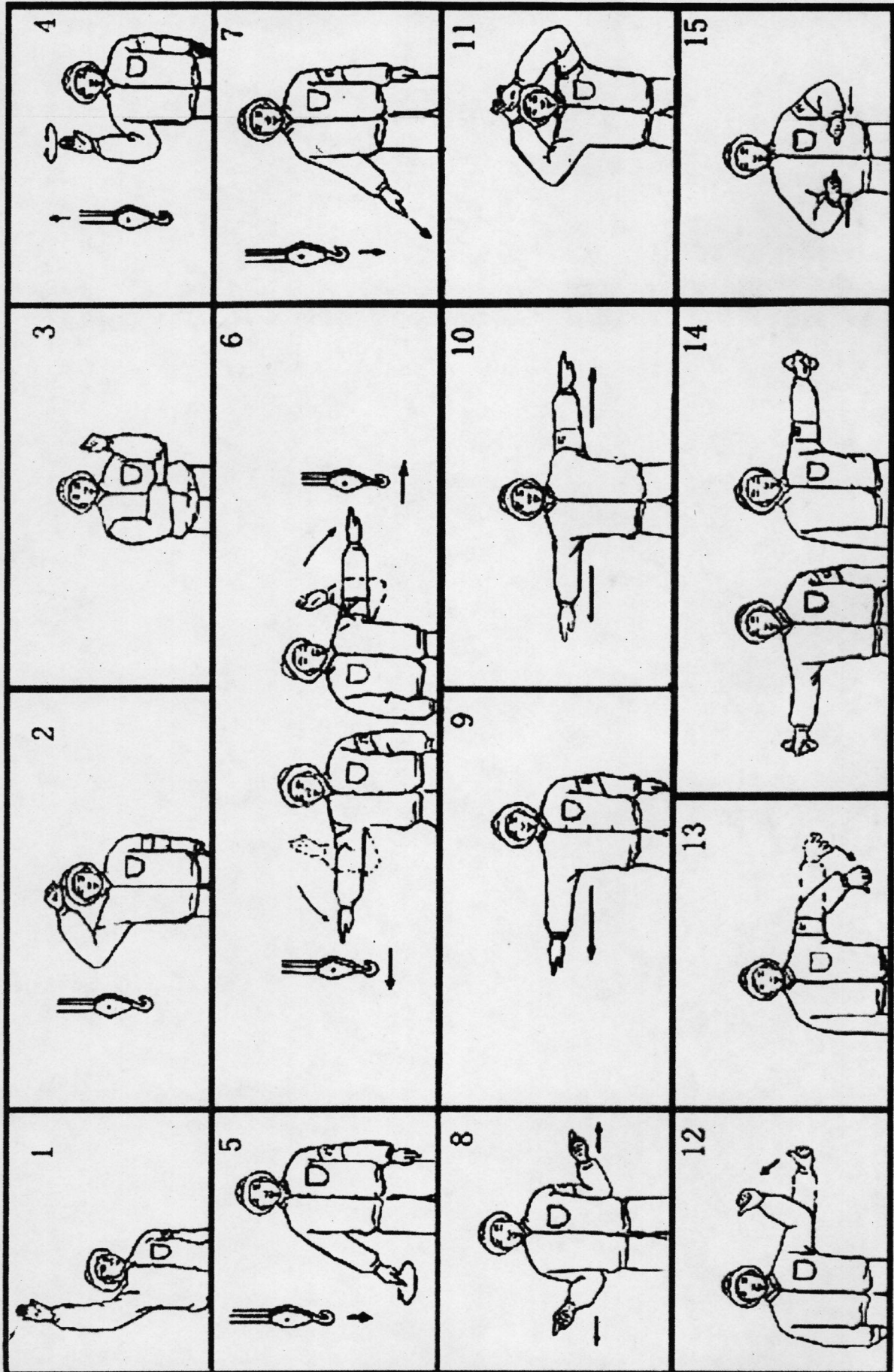
Supplied Spare Parts List

No.	Model	Name	Qty
1	PGB.0631.060	Pressure testing device	1
2	PGB.0631.400-1000	Pressure testing device	1
3	JB982-77	Washer 14	12
4	JB982-77	Washer 33	12
5	GB3452.1-92	"O" ring 7×1.8G	12
6	GB3452.1-92	"O" ring 9.5×1.8G	16
7	GB3452.1-92	"O" ring 16×2.65G	16
8	GB3452.1-92	"O" ring 22.4×2.65G	16
9	GB3452.1-92	"O" ring 26.5×2.65G	16
10	DJ7011-6.3-10	Single-core combined socket	12
11	DJ7011-6.3-20	Single-core combined socket	12
12	JQ202S-KLO(24V)	Relay	4
13	KF-01	Brake fluid (made by Xuzhou Automobile Chemicals Factory)	2 kg

X V. Hand Signs

Explanation of hand signs

1. Ready (Attention)
2. Main hook block
3. Auxiliary hook block
4. Hoist up
5. Hoist down
6. Hook block moves this way
7. Load lowering this way
8. Extend boom
9. Stop!
10. Stop immediately
11. Finish
12. Raise boom
13. Lower boom
14. Slewing this way
15. Retract boom



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