QUY80B
Hydraulic Crawler Crane

Operation Manual

Fushun Excavator Corporation. Ltd

Foreword

Thank you for choosing QUY80B hydraulic crawler crane manufactured by Fushun Excavator Corp. LTD, which is developed and designed through accumulating and absorbing many experience of foreign advanced technology. Please go over this instruction book carefully before operation and make it exert special function in order to guarantee safe use and the improvement of working performance

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⚠ Warning

- Please apply for it if this instruction is lost or shattered.
- Please convey this instruction together when the crane is being.
- Please refer to" spare parts book" when the component is ordered
- Please pay attention to observe local regulation when the crane is used.
- Please operate, inspect and repair crane carefully, safety is always first.。
- Any damage is not in the realm of quality guarantee if don't comply with the regulation of instruction.
- Please still observe the routine machinery operation except regulation of safety operation in this instruction.
- Please don't change any part at random. Contact us in advance if the equipment needs being changed.

■ Quality Guarantee

The crane's quality is regulated in the realm of guarantee. The flaw and damage is authorized by FUWA without any fees in the guarantee period.

■ Repairing components

Due to crane's safety depends on some safe parts, please change some parts periodically according to specific regulation in order to avoid something is happened.

Due to product's ceaseless improvement, maybe a little difference between the instruction's contents and the crane, please contact appointed site offered by our company if you have any questions.

Contents

Chapter One Safety

Warning

- To ensure safe operation and working efficiency, please read and understand all the contents of this manual before any machine operation.
- DO NOT operate or repair the machine before fully understand all the contents of this manual.
- Improper operation or maintenance will result in material loss and personnel injury. To avoid accidents from happening please strictly follow all the requirements of this safety operation regulations and other instructions about machine operation.
- The residential country laws and regulations about safety operation of machine may be different from contents in this manual, so besides follow instructions of this manual, all the safety regulations of the residential country of the user should also be satisfied.

Important Notice

Please read this manual carefully and carry out proper operation procedures.

In order to understand safe operation procedures, this crane or instruction would mark some safe warning symbols to be indicated as follow"danger, warning and caution", which to be implied below:

DANGER ……Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING ……Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION ……Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

1.1 General Safety Notices

1.1.1 Work overalls and safety harness

All crew members should wear work overalls and safety harness, including helmet, safety boots and gloves. And follow the instructions as below:

- Do not wear loose and slack clothes, scarves, and keep free ends of shirts and coats

fastened.

- Don’t wear bracelet, finger rings, ear rings or other jewelry during machine operation and repair.
- Do not wear clothes with grease on it, to prevent it from catching fire.
- Put on all safety harness before starting the work.
- Do cleaning and maintenance work periodically fit to operate crane.
- Replace damaged safety harness immediately.

1.1.2 Health requirements for the operators：

- Physicality and mentality must be healthy.
- The person who operate machine must be alert, physically fit, and free from the influences of alcohol, drugs, or medications that might affect his eyesight, hearing, reactions, and judgments.
- He should know first aid procedures and can operate fire extinguisher.

1.1.3 Skill requirement：

- Be able to read and thoroughly understand all the contents of this Manual.
- Must be trained and endowed with operator’s license before operating the machine.

1.2 Responsibilities and Duties

1.2.1 Operator’s responsibility

The operator is the best safety feature in any crane. Safety must always be the operator’s most important concern. He must refuse to operate when he knows it is unsafe and consult his supervisor when safety is in doubt.

- For any working direction that is against the regulations stipulated in the Manual, the operator must refuse to carry them out.
- During operation the operator should focus on the work and keep careful watch of the signal man, don’t chat during work.
- The operator should fully master the working principle of working attachment and familiar with its structure and the function and usage of safety devices. He should also master the operation, maintenance and repair skills.
- He must understand how to use the Load Chart of the crane and know that his machine can safely lift each load before attempting to lift it.
- He must never lift a load without knowing the length of the boom, the weight of the

load, and the load radius or boom angle.

- Never attempt to operate the crane at conditions exceeding those shown on the Load Chart. Such operation can cause tipping or structural failure of crane which can result in damage, injury and even death.
- He must be sure that there are no unnecessary people, equipment and material stay within the work area. The work area should be properly barricaded.
- He should not leave the driver's cabin with the load being hung in the air.
- When an operator's vision is restricted or when operating in hazardous places such as near electrical power lines or around people, such operation must be done under the directions of a signal man. Because the operator is not always in the best position to judge distances and can not see all parts of the jobsite. A signal man must be used at all times. Operators must understand standard crane signals and take signals only from designated signalman.

1.2.2 Signalman's responsibility

- Assists the operator to work safely and efficiently.
- He must understand clearly each hoisting work so that he can safely coordinate each job with operator and other crew members.
- Signal man must stand at a position where he can be clearly seen and where he can safely observe the entire operation.
- Standard crane signals must be used unless other methods of signaling such as radio.

1.2.3 Responsibilities of All Crew Members

- Any unsafe condition or practice must be corrected or reported to the job supervisor.
- Everyone who works around the crane, including riggers, must obey all warning signs and watch out for his own safety and the safety of others.
- Crew members setting up machines or handling loads are expected t know proper machine erection and rigging procedures.

Watch 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.

1.3 Important Notices before Operation.

1.3.1 Planning the Job

Warning
● Most accidents can be avoided by careful job planning.

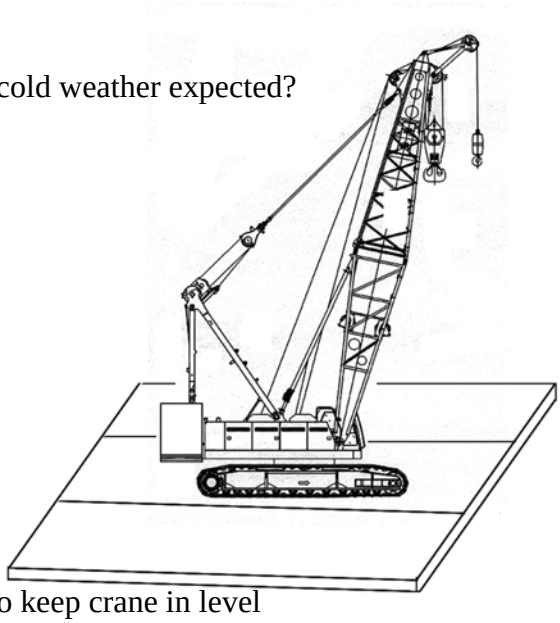
The operator must clearly understand the work to be done and equipment capabilities. He must consider all the potential dangers at the jobsite, and develop a plan to do the job safely, and then explain the plan to all concerned people. Factors, including but not limit to, the following should be fully considered while preparing the job plan:

- What crew members are needed and what responsibilities will they be given?
- What is the weight of the load to be lifted, the lift radius, boom angle, and the rated capacity of the crane?
- How will the signalmen communicate with the operator?
- What equipment is required to do the job safely?
- How can the equipment be safely transported to the jobsite?
- Are there any gas lines, electrical power lines or structures to be moved or avoided?
- Is the surface strong enough to support the machine and load?
- How will loads be rigged?
- What special safety precautions must be taken if a crane must travel with a suspended load or if more than one crane is needed to lift a load?
- Are unusual weather conditions such as winds or extreme cold weather expected?

1.3.2 Ground Condition Required for Crane Operation

Safety Notice

Cranes may tip over or collapse if the operating Surface cannot support their weight. Timber mats, steel plates or concrete rafts may be used under crawlers to distribute the load under the crane so that the bearing strength of the ground is not exceeded.



- Matting plate may be used based on the ground condition to keep crane in level position during operation.
- Avoid soft or unstable ground, sand, and areas with high water contents or partially frozen ground.
- When machine are working near trenches, the trenches should be shored or sloped to prevent cave-ins and slides.

1.3.3 Inspection before Crane Operation

Check the crane carefully and thoroughly and repair any abnormal parts, failing to do this may result in serious machine damage or body injury. The daily check procedures should include, but not limit to, the following:

- Check the machine log book to see that periodic maintenance and inspections have been performed and all necessary repairs made.
- Check the operation of the boom angle limiter, moment limiter, boom stoppers, all brakes and locks as well as emergency stop button functioning normally.
- Carefully inspect load bearing parts such as wire rope, (load hoist ropes, boom hoist ropes, pendant ropes), boom stoppers, hooks and rigging.
- Inspect the crane for any missing bolts, nuts or pins and any cracked or broken components.
- Be sure no unauthorized field modifications have been made, such as counterweights increased or decreased and booms that have been improperly repaired.
- Check for fuel and hydraulic oil leaks.
- After starting the engine, check all gauges for proper readings.
- Test all controls for proper operation.
- Check brakes and clutches. Test load brakes by lifting a load a few inches off the ground and holding it.
- Keep the driver's cabin and wind shield clean. Keep car floor clean.
- If safety operation is in doubt, stop the machine immediately.

Safety notice Never grab or hold wire ropes with bare hands.

1.3.4 Operating precautions

Serious damage and injury and even death may happen if miscalculating the lifting capacity.

- Note that the radius will increase when the load is lifted.
- The rated load capacity of a crane means the sum of load, hook weight and rigging weight.
- When working at boom lengths or radii between the figures on the Load Chart, use

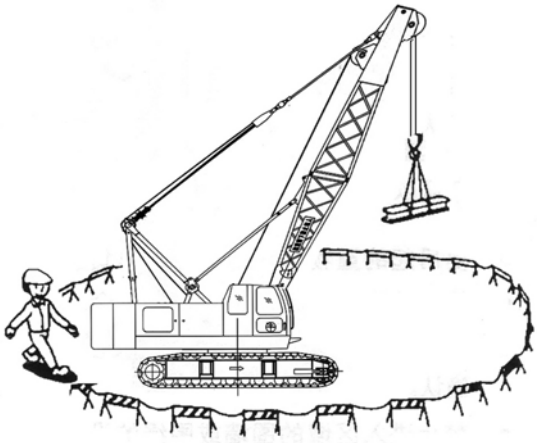
the lower rated load only.

Important Notice

In case the load is unknown, and the operator tries to lift it up only relying on the safe load indicator, this will be very dangerous! Cranes may suddenly tip over or collapse if the load is too heavy. Always operate within the rated capacity. The operator must reduce the load under adverse field conditions until, he judgment, the machine can safely handle the lift.

1.3.5 Work area requirements

People other than the crew members should not stay in the work area. To prevent people from unexpectedly entering in the work area, first barricade this area and then set up warning signs before operation. Ensure only the necessary people and equipment is in the work area.



Safety Note!

People can be crushed by the rear (counterweight) of the machine if there is not enough room for it to swing.

1.3.6 Do not bypass safe load indicator and any other safety devices

- Removing or bypassing the safety devices may cause serious damage and injury.

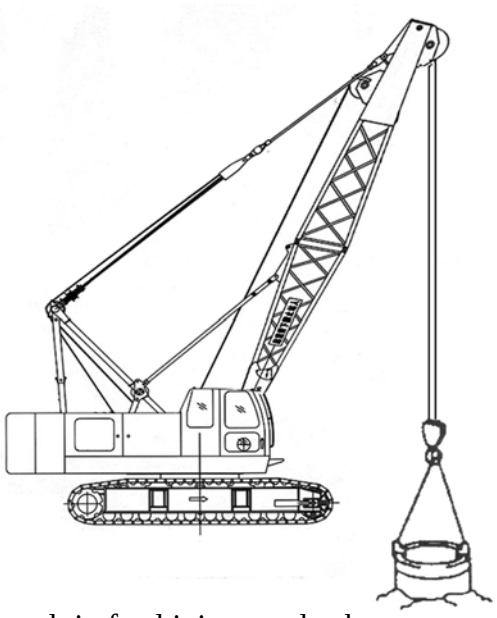
1.3.7 Working conditions

- Keep driver’s cabin and foot steps clean.
- Do not put sundries, such as magazines and newspapers, on the control panel.
- Do not keep any tools in the driver’s cabin.
- Do not keep clothes or other personal things in the cabin in a way that his view field or attention might be influenced.
- Keep the cabin’s doorway free from blocking and ice, snow.
- Keep the wind shield and rear view mirror of the cabin clean.

1.3.8 Precautions during hoisting operation

Trying to lift a load which is stuck, frozen or attached to something else may result in tipping, boom collapse or other damage.

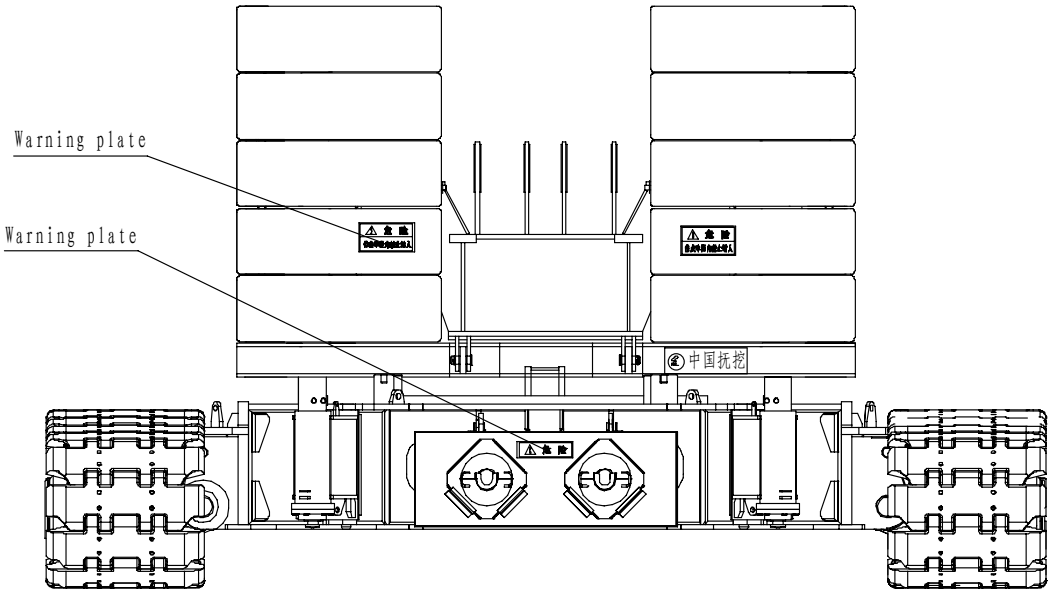
- Be sure that loads are free before lifting.



1.3.9 Keep safety signs clean

Neglecting the safety signs on the crane may result in fatal injury or death.

- Make sure that you can read all safety signs. Clean or replace these if you cannot read the words or see the pictures. When cleaning the labels use a cloth, water and soap. Do not use solvent, gasoline, etc.. You must replace the label if it is damaged, missing or cannot be read. If you replace a part where there is a safety label, make sure a new label is put on the replaced part.



1.4 Important Notices during Crane Operation

⚠ Danger!

- During operation, among hoisting, slewing and derricking actions only two of these actions (combined actions) which is listed in this manual is permitted,
- With main, aux two lifting device, which shouldn't be started.
- Do not adjust the brakes of hoist winch and derricking winch while a load is holding on the hook.

1.4.1 Hooks' requirement

The operator and other crew members should keep a close watch on the following points when working:

- Rigging should be in good order and free of damage, and the load should stay in balance position during hoisting.
- Riggings should safely stay on the hook.
- The hoist wire rope should be kept upright.
- Check the hook is equipped with hook latch/lock.

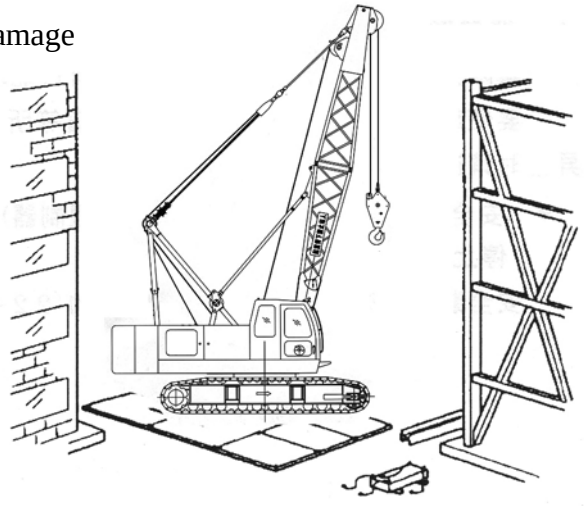
1.4.2 Braking's requirement

During operation the operator should test the brake by lifting the load a few inches above the ground and hold it in the air by brake to insure good working condition.

1.4.3 Jobsite operation requirements

During hoisting operation keep the hook and load a safe distance from the surrounding buildings and constructions to avoid damage of material and the machine.

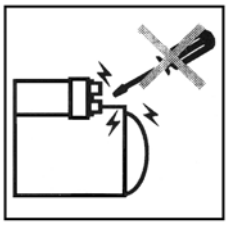
Keep loads stay away from other building and ground.



1.4.4 Always operate the engine from the cabin

No not start the engine in a position other than the driver's cabin. This may result in accidents. **Danger!**

- Be sure always start and run the engine from driver's seat.



Safety Notice Always start the engine from driver's seat!

1.4.5 Precautions before boom hoisting.

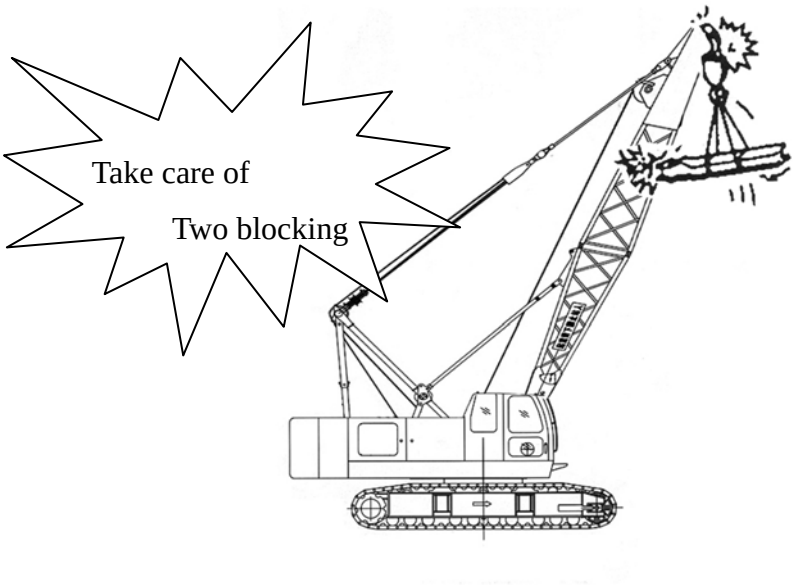
Check that no tools or other materials are left on the boom before hoist up the boom, otherwise these things will fall down and result in damage and injury.

1.4.6 Two blocking

The hoist rope can break if the hook block contacts the end of the boom. This is called "two blocking". Two blocking, for example, can be caused by lowering the boom without paying out load line or by hoisting the hook into the end of the boom tip. Two blocking can pull jibs and lattice booms over backwards or cause structural damage at boom or jib points.

Safety Notice Do not forget to lower down the hook while lowing the boom.

Always keep a safe space between the hook block and boom tip



1.4.7 Carelessness in getting on and off crane.

- Please wait till the crane has stopped. Do not jump on or off. Always use both hands and make sure you have good footing.
- When get on or off the crane use handrail and foot steps, do not jump on or off.

Safety Notice Sometimes it's very slippery, so take care when getting on or off the crane.

1.4.8 People other than operators are not allowed to embark the crane during operation.

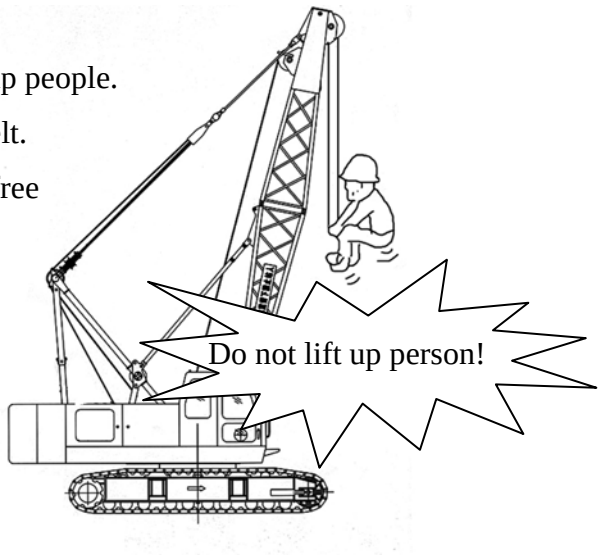
- If other people stay on the crane he may block the view field and cause personnel injury.

Safety Notice No other people should stay on the machine during operation!

1.4.9 Do not use this crane to lift up person.

It is not allowed to lift up people with hook. If you have to do this, then strictly follow below instructions:

- Mount on the hook a special device for lifting up people.
- The person to be carried should fasten safety belt.
- Positively lower down the hook and never use free falling function to lower a person.



1.4.10 Keep smooth slewing

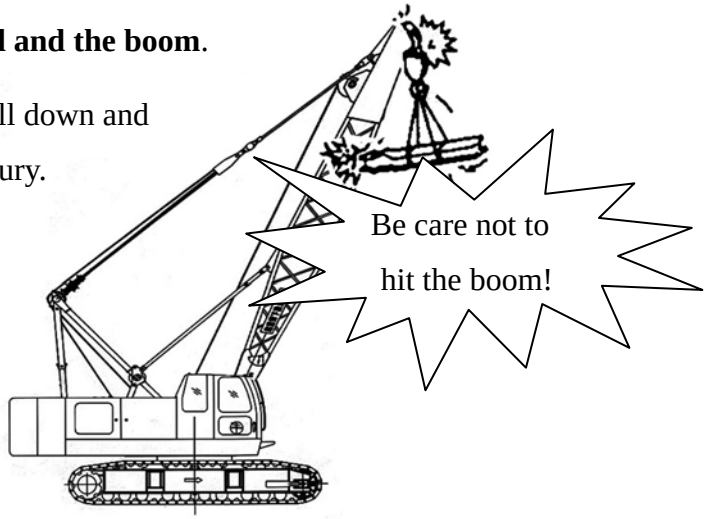
Jerk slewing actions will break the balance of load and then you will lose control of slewing actions.

- Keep smooth slewing actions.

1.4.11 Keep a safe distance between the load and the boom.

If the load knocks on the boom it may fall down and cause material damage and personnel injury.

- Any knocks between load and boom will lower the original strength of main chord and weld seams.



Important Notice The main boom and jib is made of high tensile steel, so if needs repair please turn to our company for technical supports.

1.4.12 Sideway hoist safety precautions

The rated load chart is based on level and sound ground and correct operation. Normally the dynamic load does not increase total load received by the machine. But with long boom or traveling with load, side hoisting operation may increase potential danger and more easily to cause turnover and boom damage.

- Sideway load usually caused by sudden stop of slewing or not upright hoist of load, wind load and hoisting while crane standing on sloped surface can also cause sideway load.

Safety Notice Do not create excessive sideway load.

1.4.13 Hooks and load relative position

If the load is not right under the hook, when hoisted up it will cause swing of load and even lose balance control, it may even cause turnover of machine and boom damage. So ensure the load is directly under the hook and keep all surrounding material and people at enough safe distance.

1.4.14 Precautions for traveling

During traveling care should be taken to avoid people, power line, underground service on the project and narrow paths and bridge maximum load capacity. For narrow

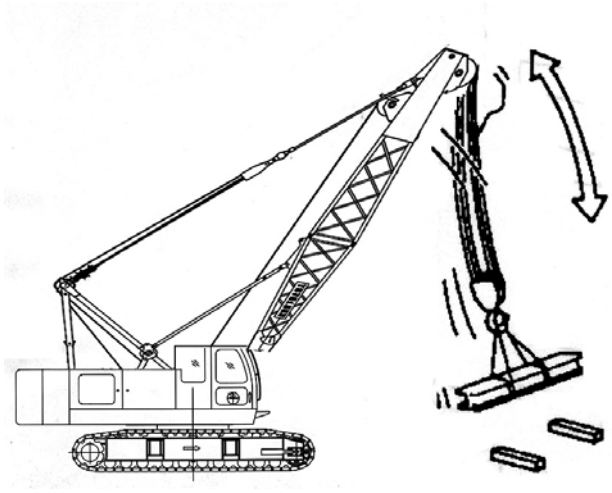
paths and slopes must have signal man for supervision. The slewing pin lock must be engaged during traveling.

- When the crane travels with load on the main hook the load should not exceeds 70% of its maximum rated load, and the boom should move toward in direction as shown by the arrow on the track frame, and that the load should be about 50cm off the ground.

1.4.15 Shocks during slewing operation

Sudden start or sudden stop of slewing and high speed slewing may cause excessive load on the machine which may cause overturning of the crane.

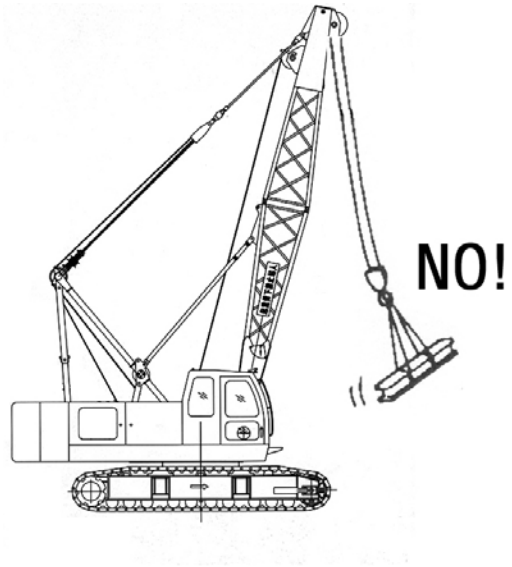
- So smooth start and stop and slow slewing operation is necessary.



1.4.16 Unexpected slewing

Due to tilting of machine or wind force, the crane may slew unexpectedly if not locked up, which may result in injury and death.

- Apply slewing brake if not doing slewing operation.



1.4.17 Do not operate the crane savagely

Savage operation of the crane may cause crane and material damage.

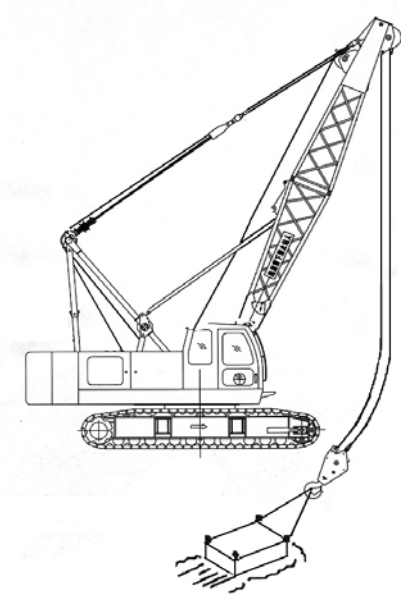
- Do not operate in a sudden and jerking way.

1.4.18 Keep boom length as short as is acceptable

To meet working requirements, the boom length should be as short as possible. This will increase the safety of the operation.

1.4.19 Do not drag the load sideway

Do not drag the load by slewing action, fail to follow this may result in tilting accident. Boom danger.

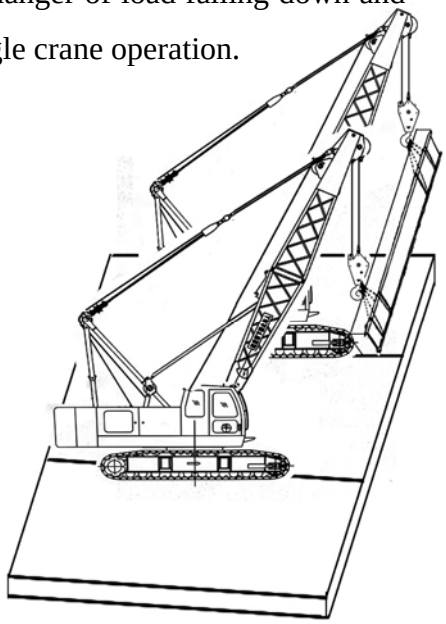


NO!

- Firstmove the load and then hoist it up rightly.

1.4.20 Two crane working together

When two cranes work together to lift up a load, the danger of load falling down and crane turnover increases. So it's more dangerous than single crane operation.



Following instructions must be followed for cooperative work of two cranes:

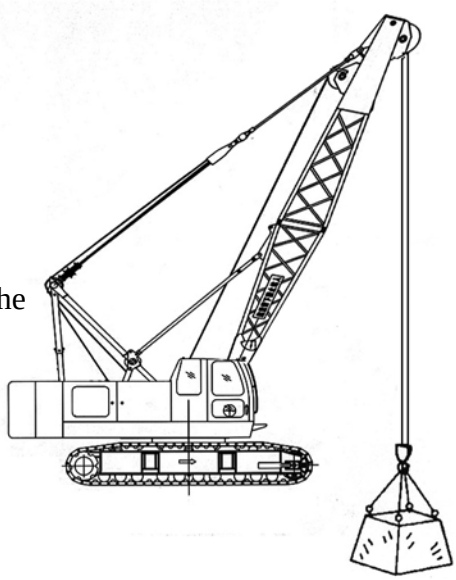
- Side the two cranes on solid and hard ground
- These two crane should have same or similar capacity.
- Operate at low speed.
- Hoist the load uprightly.
- Keep the load level and stable.
- For such work both cranes should be supervised by one signal man and the load should not exceed 75% of the total load capacity of two cranes.

  And the load applied on each crane should not exceed 80% of their rated load respectively.
- The operator should review the job planning together with the signal man and supervisor before such operation.
- During the whole course of operation be sure the cranes' movements match perfectly.

Important Notice Never do hoist work with more than two cranes working together!

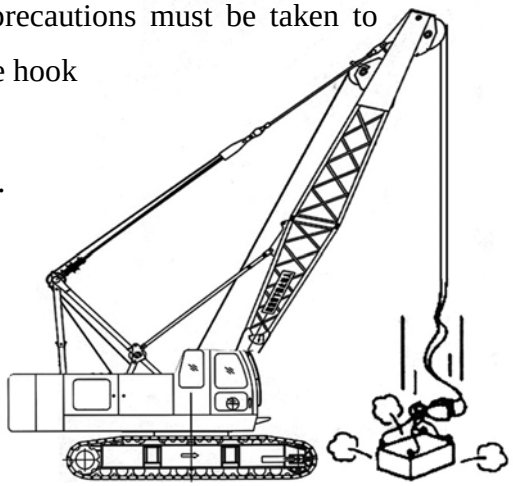
1.4.21 Overload

Overload will result in machine turnover and injury. Moreover, when hoist up load from under the water, do not drag the load out of water suddenly or drag it sideway. The load increasing when it brake from the water. Due to suction on load.



1.4.22 Precautions for remove loads

During hoisting of load, the wire rope will be stretch, while remove the load, the wire rope will restore its original length. If the boom angle is too large, this may cause backward swing and even damage the boom stopper. So precautions must be taken to lower the boom to safe angle before remove the load from the hook



1.4.23 Take care the slippery pedal of brakes and clutches.

Due to snow and rains, the pedals of brake and clutch may become slippery, which may cause damage and injury during lowering of load.

- Before operation checks that the pedals are not slippery.

Safety Note If the pedals are slippery, dry them on clean them.

1.4.24 Prevent the wire rope from disordered and knotting

If crossing or knotting occurs in the wire rope, it may cut the wire rope and drop the load. This may result in serious damage of machine and personnel injury.

- If crossing of wire rope occurs, rewind the wire rope onto the drum.
- If there is any knotting, unknot it before any operation. Inspect for damage to road.

1.4.25 Precautions during start and shut down of engine

- If shut down the engine during operation, it may cause the load to drop down and cause serious accidents.
- When shut down the engine be sure to engage the brake and locks, and switch of all the control rod of winches to neutral position.

1.5 Precaution of Injury Hazard during Operation

⚠ Warning!

1.5.1 Look out for the overhead load

- Stand off the load and never stay under the load.
- Never pass loads over people.

1.5.2 Keep away from working radius

- Do not stand within the working area when the crane is traveling.

1.5.3 Safe running of machine

- During machine running never reach in the rotation parts in case of injury.

1.5.4 Precaution of falling down

The following instructions should be followed before climbing up the superstructure.

- For installation, maintenance or inspection work only.
- Wear anti-slippery boots and taken some security measures. Harness.

Safety Notice Do not walk on the roof of driver's cabin.

1.5.5 Hand precautions

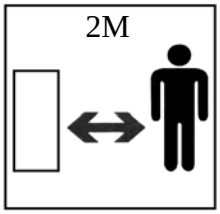
- Fix the open door, wind shield or engine housing after open it, in case they flap back and hurt your hands.

Safety Notice Take care not to hurt your fingers.

1.5.6 Keep fingers and other things away from the engine fan.

- In case of hurting of fingers

1.5.7 Keep a safe distance from the machine



- To protect personal safety, always keep a safe distance from the machine during its operation.。

1.5.8 Precautions in Handling Hydraulic Oil

Hydraulic oil may penetrate through clothes and reach your skin and damage the cell. Below precautions should be followed to protect you from harm.

- Only qualified and skilled personnel are allowed to inspect and repair hydraulic parts.
- Before repair, release the pressure from the system and all the hoses.
  During inspection of leakage, do not use naked hand to check leakage points.
  Periodically check all the hoses, hose joints and tube joints for any leakage and damage.
- Replace immediately the damaged hose and hose joints with the spare parts denoted by the manufacturer.

Safety Notice In case any physical harm occurs, band the injury with anti-bacteria bandage and seek medical treatment immediately.

1.5.9 Scalding hazard

The machine surface can be as a high temperature as above 65°, which may harm skin. In case hand is scalded, band the injury with anti-bacteria bandit and seek medical treatment immediately.

Follow the precautions listed below will protect you from scald injury:

- Wear gloves when work on hot parts.
- The hot steam comes out of the engine cooling system may cause harm, so wait till the cover of the cooling water tank cools down before check the cooling system.
- Try not to touch below listed parts:
  - Parts containing coolant or hydraulic oil, and containing hot hydraulic oil or engine machine oil.
  - Containing hot exhausted gas.

Safety Notice Wait till the machine thoroughly cool down before carry out any cleaning or repair work.

1.5.10 Chemical burning hazard

The accumulator liquids may cause burnings as follows:

- When enters eyes may cause blindness.
- If spilt on the skin may burn the skin.
- Can damage clothes when spilt on the clothes.

Below first aid measures should be taken:

- Once the liquids spilt into the eyes or on the skin, flush with clean water and use eye washer.
- Cover the injured parts with anti-bacteria bandage and seek medical treatment.
- Neutralize the spilt acid accumulator liquid with soda solution. First solve the soda into water, and then pour the solution onto the spilt acid liquid till no more bubble generated.
- Do not smoke or approach with any open flame to the accumulator liquid.

- Wear gloves when work nearby accumulators.
- Do not short circuit an accumulator.
- Never put any tools on the accumulator.
- During storage of an accumulator

- Keep it in level position.
- Never store an accumulator near any hot parts (such as radiator).
- Never expose it directly under the sun.
- Periodically check the power of accumulator.

1.5.11 Fire hazard

When refilling fuel or hydraulic oil tanks, the spilt oil may catch fire when touching the hot surface of some parts.

In case a fire occurs following measures should be taken:

- Shut down the engine.
- Switch the engine start-up key to OFF position and leave the driver's cabin and try danger to extinguish the fire. Do not put yourself in.
- For the burning hydraulic oil, fire extinguisher can be used at the beginning of fire.

Follow below procedures for filling in fuel and hydraulic oil:

- Shut down the engine.
- Do not smoke or use open flames when refilling tanks.
- Do not allow any people to stay in the driver's cabin (they may accidentally start the engine).
- If any spilling occurs during filling fuel, remove it immediately from the machine.

After filling in fuel, carry out below procedures before restart the engine:

- Replace the fuel tank.
- Remove the filling device.
- Start the engine by the procedures stated in the Manual.

Fire Precautions and Safety Regulations:

- Refilling the machine with fuel in a place with good ventilation.
- Never bring any flammable liquid onto the machine. And only small volume of fuel should be kept at working site for refilling of fuel.
- Never use any flammable material for cleaning of the machine.
- Periodically check the shields, cable, hose fixers for any defects or looseness.
- Periodically check the tubes, hoses and joints for leakage or damages. Replace should be done for damaged parts.
- Periodically check the electrical system for any loose connectors or burnt parts.

1.5.12 Precaution of toxic smog and gas

The exhausted gas from the engine contains CO gas and other toxic gas, which are harmful for health.

When working around toxic waste material below protection measures should be taken:

- Wear gas mask and change filtration parts periodically.
- Keep the working environment in good ventilation condition.
- Do not use any other auxiliary heater in such area.

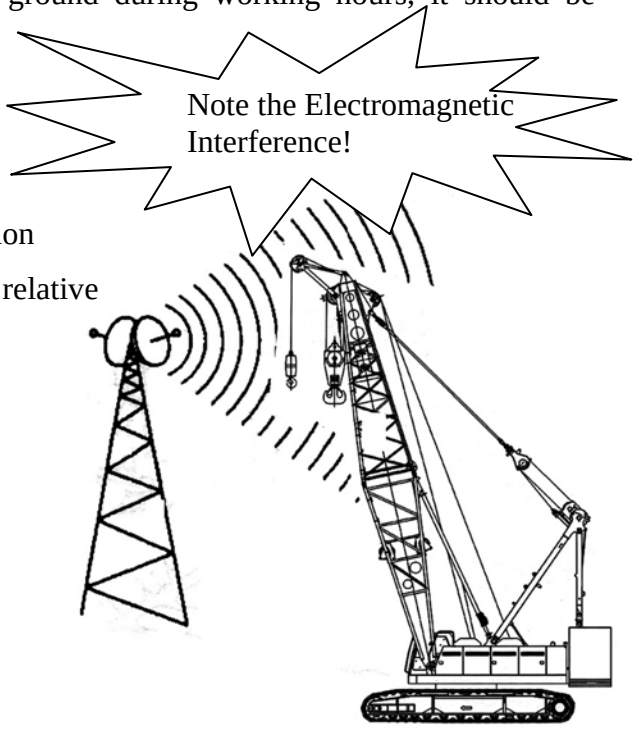
1.5.13 Hazard of electromagnetic interference.

When working near electromagnetic signal launching station, power transformer substation or radar station, this machine is liable to be damaged by the electromagnetic interference. And the wire rope and hook may generate induction voltage and the driver may suffer electrical shock.

Precaution Measures:

- If the machine is separated from the ground during working hours, it should be grounded.

  Note: To ground machine at night hands chains from hook block to ground.



- Learn about the frequency of the operation station and working hour and then take relative shielding measures.

1.5.14 Precautions when work on windy days.

⚠ Danger!
● This crane should be operated under maximum wind speed limit, otherwise will result in turnover of crane.

The wind speeds referred to are instant wind speed. If operate in strong wind will result in such dangers as listed below:

- The wind load may cause machine to turnover.
- Wind may cause the load to hit with the boom and further cause boom damages.
- Wind load will increase with the increase of boom length, load height and load facing wind surface.
- When the boom lift up to the maximum angle and the hook is empty, then if there is strong wind from front, the boom is liable to tilt backward and cause damage.

Wind Precaution Measures:

Before operation, the operator must know that day's weather forecast and the actual wind speed. If the wind exceeds the safety limits then stop operation to avoid serious damage.

During work, for boom length less than 50m, the maximum allowable wind speed is 13.8m/s (equal to Grade 6), for boom length over 50m, the maximum allowable wind speed is 9.8m/s (equal to Grade 5).

- Even the operation is within the wind speed limits, precautions should be taken for the existence of temporary strong wind currents which is very dangerous.

For lifting big surface the rated load should be decreased relatively to lower the risks due to wind load, and move the load slowly and carefully.

Safety Notice

The wind speed may vary widely based on different terrain and altitudes, and in rural area and suburbs the winds are also different. So different precautions should be taken. In case the actual wind speed exceeds the maximum allowable wind speed then stop the machine and lower the load onto the ground.

Inspections after strong wind:

- Check that there is no abnormal condition before running the machine.

1.5.15 Measurement methods of wind speed

Wind force and speed estimation methods

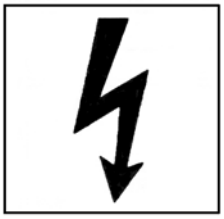
Wind force		Approx. speed of wind 10m above the ground.	Explanation (on land)
Grade	Description	（m/s）	
0	No Wind	0-0.2	No wind, smoke rise upright to the sky.
1	Slight wind	0.3-1.5	Wind vane stands still and smoke shifts slightly..
2	Gentle wind	1.6-3.3	Can sense it when facing the wind, leaves sounds and wind vane start to move.
3	Light wind	3.4-5.5	Leaves and small sticks swing and flag extended.
4	Soft wind	5.5—7.8	Dust and leaves is blown in to the air.
5	Medium wind	8.0-10.7	Wind vane and small branches start to move
6	Strong wind	10.8-13.8	Big branches swing and power line sounds sharp and it’s hard to walk facing the wind with umbrella
7	Very strong wind	13.9-17.1	Tree stems swing and it’s hard to walk facing the wind.
8	Big wind	17.2-20.7	Branches broken and impossible to walk facing the wind.
9	Very big wind	20.8-24.4	Weak constructions broken and chimney collapsed, tiles blown off the roof.
10	Gale	24.5-28.4	Rare in land, trees blown out of the ground and serious damages of constructions.
11	Strong gale	28.5-32.6	Seldom occurs, and will cause big damages.
12	Hurricane	32.7 and above	Will surely cause a ruin.

1.5.16 Thunder and lighting hazard

Thunder may result in machine damage and even personnel death.

Precaution Measures:

- Stop working and lower the load onto the ground and lower the boom near ground.
- Brake and lock the hoist and slewing system and shut down the engine.
- Shut off the power supply of moment limiter and other limiters.
- Evacuate all crew from the working area.
- If it is suspected that the crane has been hit by thunders or lighting, execute inspection procedures before start the machine as below:
  - Check if there is any damaged part and ropes.
  - Check the electrical system the moment limiter.
  - Check every running parts works properly.



1.5.17 Precautions for earthquake

If earth quick happens during machine operation, stop the machine and carry out the following procedures:

- Lower the load on the ground and lower the boom as near to the ground as possible.
- Brake and lock the hoist and slewing systems, shut down the engine and moment limiter and limiting devices.
- Evacuate all people from the site.
- After earthquake check all parts before start operation for:
  - Any part damages.
  - All actions ok.
  - Functioning well.
  - Ground condition.

1.5.18 Power lines

Electrical shocks may occur when the hoist load contact with a live power line in the air, so the following precautions should be taken:

- Keep a safe distance according to the local safety regulations.
- In case the required safe distance cannot be secured, then needs to contact with power administration bureau before starting the work.
- Keep the crew a safe distance away from the machine and hoist load.

- All crew people should wear insulated rubber shoes.
- Use only a professional signal man for such work.

During operation below listed minimum safety distance should be satisfied:
Note: Damp on wet weather can cause electric to jump to earth.

Minimum Safety Distance for Machine Working near High Voltage

Voltage (V)	Min. Safety Distance (m)
0-50000	≥3m
50000-200000	≥4.5m
200000-350000	≥6m
350000-500000	≥7.5m
500000-750000	≥10.5m
750000-1000000	≥13.5m

In case electrical shocks happen, take following procedures:

- Contact immediately with local power admin. Bureau.
- The crane off the accident site.
- Keep people off the crane and load.
- Keep the operator in the cabin, if necessary then use a wooden ladder and be sure not to touch the machine on the ground at same time.
- If use metal ladder, mat the ground with dry wood plank, first the operator move from the metal ladder onto the wood plank without any contact before walk onto the ground.

Check after Electrical Shocks

Check all machine parts before operation, if any abnormal performance found please contact us for repair.

1.5.19 Environment protection

Fuel oils and detergent may enter the earth, water and cause pollution. The following environmental protection measures should be taken:

- If found any leakage should stop the leakage immediately.
- Use oil neutralizer to remove the oil or fuel.
- Follow local environmental protection regulations and treatment procedures for oil leakage.
- Any changed waste fuel and oil should be separately stored in a close and oil-resistant container.

1.6 Procedures for After Operation Treatment

⚠ Caution!

1.6.1Important notice after operation

It will be dangerous if the operator leaves the driver's cabin without taking following measures:

- Stop the crane on solid ground, never leave it by water or bank that is liable to flood and earth falling.
- Lower the load onto the ground, and lower the boom if necessary.
- Engage the slewing brake and pin lock.
- Engage all winch pawls.
- Engage parking brake.
- Shut off power.
- Remove the key from engine start switch.
- Lock all the doors and windows.

Safety Notice

In windy weathers take suitable procedures to secure the machine from being damaged by strong wind if possible lower boom.

1.7 Important Notices for Assembly, Disassembly and Transportation.

⚠ Caution!

1.7.1 Stand away before giving signals

During assembly and disassembly process jamming incidents may happen, so precautions must be taken:

- Signal man should wait till all crew men stand away from the machine and then give signals.

1.7.2 Follow the correct procedures.

Strictly follow the correct procedures for assembly and disassembly work, otherwise may result in machine damages or even personnel injury.

1.7.3 Do not enter inside or under the boom when assembly and disassembly.

The falling boom may cause serious injury during assembly/disassembly work.

While removing boom or insert/draw out the pins, never stand under or on top boom sections.

- Don’t use finger for seeking the pin holes, use tool.
- Wear eye glass in case the hardened metal surface cracks and hurt eyes.

1.7.4 Notice during assembly/disassembly counterweights

Serious injury will occur if fails to follow below precaution measures:

- Locate the machine on level and solid ground and lock the slew bearing with pin lock.
- Fully extend out the crawlers before installing counterweights.

1.7.5 Important Notice for Embark the machine onto a trailer

If the machine is not properly secured and fixed on the trailer, it may result in turnover of the trailer and machine damage. So following precautions shall be taken:

- Carry out securing and fixing work on level and solid ground.
- When ship by railway or trailers, the bridge slope should not exceed 15°.
- Select suitable trailer according to machine weight and height.
- During loading the trailer it should be locked with parking brake.

- The crane should be load on the truck in lengthwise direction and no slewing action is allowed when the crane is on the trailer.
- Counterweights should be removed before loading on the trailer.
- Remove or retract the protruding parts as much as possible.
- Engage all brakes and locks.
- Lock up all doors and windows.
- Secure the machine on the trailer.
- Protect all the corners of machine in case being damaged during transportation.

1.7.6 The trailer for carrying crane must not be overloaded.

Select proper trailer for crane transportation. Check weight it can carry.

1.7.7 Traffic limits.

Before inland shipment survey the traffic limits such as narrow channels and low bridges which may block the trailer from passing through.

1.7.8 When pass through narrow or dark area

When pass through narrow or dark area, more precautions should be taken in case injury happens.

1.7.9 Pressure release

The pressure in hydraulic system may remain for a long time after system shut down. So before check and repair the hydraulic system, release the pressure in case the high pressure oil jet out.

1.7.10 Remove the pins

Before remove the pins linking boom sections or jib sections, secure the sections on a solid surface, otherwise the boom sections will fall to the ground and be damage.

- Secure both end of the boom section and fully loosen the pendant rope before remove the pins.
- During assembly or disassembly do not stand on top of, inside or below the boom in case of injury.

1.8 Spare Parts Selection

1.8.1 Parts selection

Use only the parts denoted by the manufacturer, fail to follow this will result in machine damage.

1.8.2 Periodical replacement of spare parts

For safety consideration, fail to replace spare parts as per the requirements of Maintenance Manual will cause serious safety hazard.

- Replace parts as per the requirement.

1.8.3 Periodically check key components

Fail to carry out timely inspection and maintenance procedures will cause unexpected accidents and failing of parts.

Prepare monthly and annual inspection and overhaul planning. Periodically carry out inspection procedures and replace parts whenever necessary:

- Check safety devices, alarming units, brakes and clutches for any abnormal condition.
- Check the control system.
- Mechanical parts, electrical parts, wire ropes and riggings should be periodically checked for any abnormal problems. And repair and replace immediately once any defects are found.
- The manufacturer shall not be responsible for any accidents caused by using unconfirmed alien spare parts that are not offered by the manufacturer.

Chapter Two General Specifications and Technical Data

2.1 General specifications

Model: QUY80B

Max. rated capacity: 80t

Max. Hoist Torque: 80t×4m=320tm

Descriptions			UOM	Data
Main boom length			m	13～58
Fly jib length.			m	9～18
Max. length of main boom and fly jib			m	49+18
Boom angle			º	30～80
Operating speed	Line speed	Hoist	m/min	High70 Low35
		Lower	m/min	High 70 Low 35
		Boom hoist	m/min	※54
		Boom lower	m/min	54
	Swing		r/min	High3/ Low 1.8
	Propel		km/h	※ 1.3
Parts of line of main hoist		10	Single line pull	8t
Grade ability (with basic boom only and cab on rear side)			%	30
Rated power output/rotation speed of diesel engine			KW/rpm	Cummins USA QSL-9 209KW @ 2000rpm
Mass of crane			t	80.6
Ground pressure (with basic boom）			MPa	0.0804
Ground pressure (with max. main boom)			MPa	0.0864
Ground pressure (with max. main boom + jib)			MPa	0.0863
Counterweight			t	24.6

Note: ※ Speed may vary with loads

2.2 Overall Dimensions

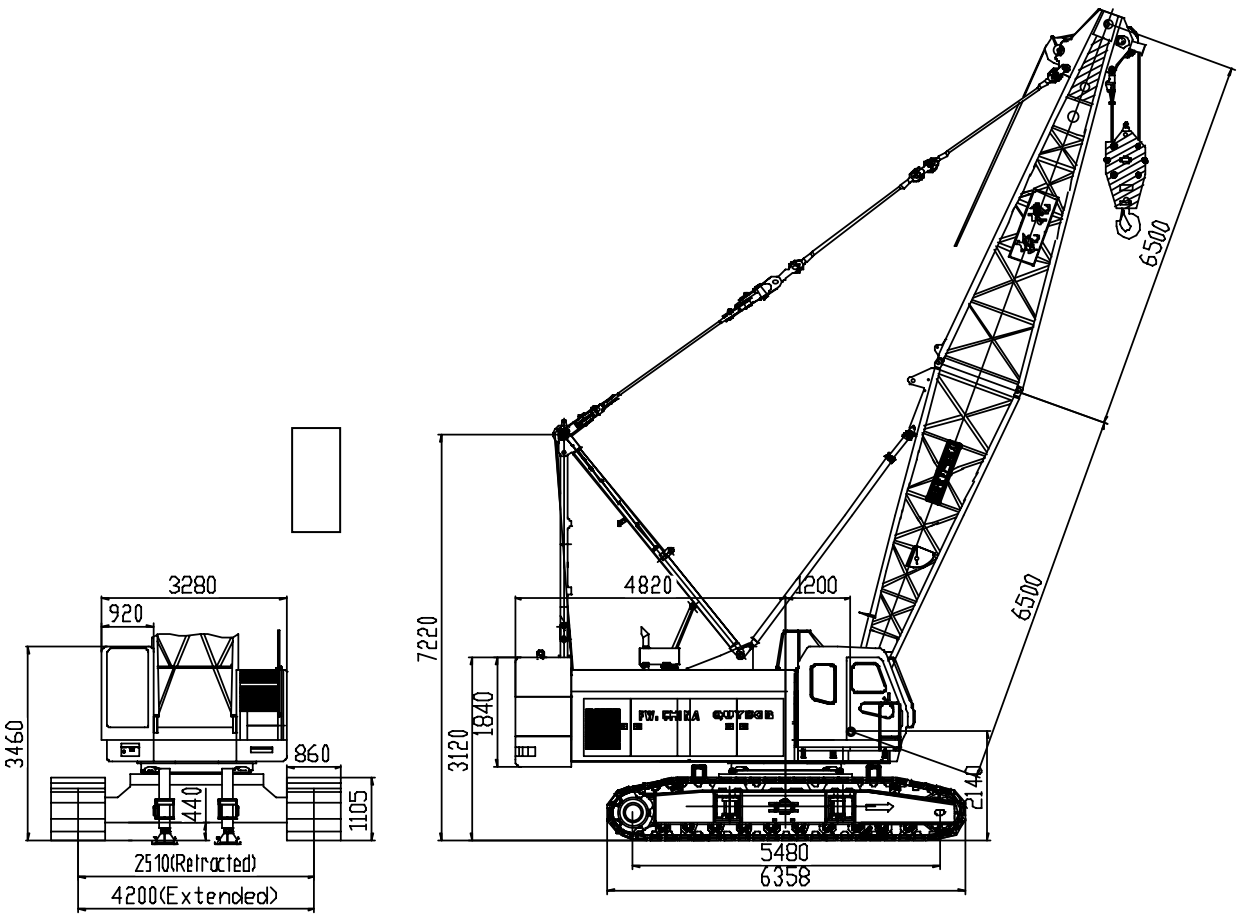


Figure 2.1 Overall dimension of QUY80B

2.3 Rated Lifting Capacity

1. Load Chart(Boom) Tipping load：75% Unit：t

Length(m) / Radius(m)	13	16	19	22	25	28	31	34	37	40	43	46	49	52	55	58	
4.0	80.00																
4.5	75.11	75.00	(5.15m)														4.5
5.0	65.47	65.36	61.92	(5.77m)													5.0
5.5	55.98	55.76	55.69	54.79	(6.40m)												5.5
6.0	47.72	47.59	47.51	47.44	47.31												6.0
6.5	42.72	42.58	42.50	42.42	42.28												6.5
7.0	38.18	38.04	37.95	37.87	37.73	37.65	(7.65m)										7.0
7.5	34.49	34.35	34.26	34.18	34.03	33.95	32.89	(8.27m)									7.5
8.0	31.44	31.29	31.20	31.12	30.97	30.88	30.80	29.21	(8.89m)								8.0
8.5	28.87	28.72	28.63	28.54	28.40	28.31	28.22	28.07	26.23	(9.52m)							8.5
9.0	26.68	26.53	26.44	26.35	26.20	26.11	26.02	25.87	25.78	23.71	(10.14m)	(10.76m)					9.0
10.0	23.13	22.89	22.89	22.80	22.64	22.55	22.46	22.31	22.21	22.12	21.54	19.72	(11.38m)				10.0
11.0	20.39	20.24	20.14	20.05	19.90	19.80	19.71	19.55	19.46	19.37	19.21	19.11	18.13		(12.64m)		11.0
12.0	18.21	18.05	17.96	17.86	17.71	17.61	17.52	17.36	17.26	17.17	17.01	16.92	16.82	16.67	15.38	(13.26m)	12.0
13.0	16.43	16.27	16.18	16.08	15.92	15.82	15.73	15.57	15.47	15.38	15.22	15.12	15.03	14.87	14.77	14.20	13.0
14.0	(12.46m)	14.79	14.69	14.60	14.44	14.34	14.25	14.09	13.99	13.89	13.73	13.64	13.54	13.38	13.28	13.12	14.0
15.0		13.34	13.25	13.15	12.99	12.89	12.80	12.64	12.54	12.45	12.29	12.19	12.10	11.94	11.84	11.68	15.0
16.0			12.19	12.10	11.90	11.84	11.75	11.59	11.49	11.39	11.23	11.13	11.04	10.88	10.78	10.62	16.0
18.0			10.75	10.39	10.23	10.13	10.04	9.87	9.78	9.68	9.52	9.42	9.32	9.16	9.06	8.90	18.0
20.0			(17.65m)	8.93	8.77	8.67	8.58	8.42	8.32	8.22	8.06	7.97	7.87	7.71	7.60	7.45	20.0
22.0				8.79	7.73	7.63	7.54	7.37	7.27	7.18	7.02	6.92	6.83	6.66	6.56	6.40	22.0
24.0				(20.25m)	7.35	6.78	6.68	6.52	6.42	6.33	6.16	6.07	5.97	5.81	5.71	5.55	24.0
26.0					(22.85m)	6.06	5.79	5.63	5.54	5.44	5.28	5.19	5.10	4.94	4.84	4.68	26.0
28.0						(25.45m)	5.21	5.05	4.96	4.86	4.70	4.61	4.51	4.36	4.26	4.10	28.0
30.0								4.56	4.46	4.37	4.20	4.11	4.02	3.86	3.76	3.60	30.0
32.0								4.20	3.84	3.75	3.59	3.50	3.41	3.26	3.17	3.02	32.0
34.0								(30.64m)	3.61	3.39	3.23	3.14	3.05	2.90	2.81	2.66	34.0
36.0									(33.24m)	2.99	2.82	2.73	2.65	2.50	2.41	2.26	36.0
38.0										(35.84m)	2.55	2.46	2.37	2.23	2.14	1.99	38.0

2. Load Chart (Runner)

Tipping load：75% Unit：t

Length (m) / Radius (m)	13	16	19	22	25	28	31	34	37	40	43	46	49	52	55	58	
4.0	8.00																
4.5	8.00	8.00	(5.15m)														4.5
5.0	8.00	8.00	8.00	(5.77m)													5.0
5.5	8.00	8.00	8.00	8.00	(6.40m)												5.5
6.0	8.00	8.00	8.00	8.00	8.00												6.0
6.5	8.00	8.00	8.00	8.00	8.00												6.5
7.0	8.00	8.00	8.00	8.00	8.00	8.00	(7.65m)										7.0
7.5	8.00	8.00	8.00	8.00	8.00	8.00	8.00	(8.27m)									7.5
8.0	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	(8.89m)								8.0
8.5	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	(9.52m)							8.5
9.0	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	(10.14m)	(10.76m)					9.0
10.0	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	(11.38m)				10.0
11.0	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00		(12.64m)		11.0
12.0	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	(13.26m)	12.0
13.0	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	13.0
14.0	(12.46m)	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	14.0
15.0		8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	15.0
16.0			8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	16.0
18.0			8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	18.0
20.0			(17.65m)	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	20.0
22.0				8.00	8.00	8.00	8.00	8.00	8.00	8.00	7.90	7.78	7.67	7.48	7.36	7.17	22.0
24.0				(20.25m)	8.00	7.73	7.59	7.38	7.25	7.13	6.93	6.82	6.70	6.51	6.39	6.20	24.0
26.0					(22.85m)	7.14	6.79	6.58	6.45	6.32	6.12	6.00	5.89	5.69	5.57	5.38	26.0
28.0						(25.45m)	6.11	5.89	5.76	5.64	5.43	5.31	5.20	5.00	4.88	4.68	28.0
30.0								5.31	5.17	5.05	4.84	4.72	4.60	4.40	4.28	4.09	30.0
32.0								5.13	4.66	4.53	4.32	4.20	4.08	3.88	3.76	3.57	32.0
34.0								(30.64m)	4.37	4.08	3.87	3.75	3.63	3.43	3.31	3.11	34.0
36.0									(33.24m)	3.71	3.47	3.35	3.23	3.02	2.90	2.70	36.0
38.0										(35.84m)	3.11	2.99	2.87	2.66	2.54	2.34	38.0

3. Load Chart (Fixed jib)

Tipping load：75% Unit：t

Boom （m）	37						40						43						46						49						52	
Jib （m）	9		13.5		18		9		13.5		18		9		13.5		18		9		13.5		18		9		13.5		18		13.5	
Jib angle ° / Boom angle°	15°	30°	15°	30°	15°	30°	15°	30°	15°	30°	15°	30°	15°	30°	15°	30°	15°	30°	15°	30°	15°	30°	15°	30°	15°	30°	15°	30°	15°	30°	15°	30°
58	5.50	5.21	4.77	4.00	4.19	3.20	4.94	4.69	4.30	4.00	3.79	3.20	4.37	4.16	3.82	3.58	3.37	3.11	3.90	3.72	3.42	3.21	3.02	2.80	3.47	3.32	3.05	2.87	2.69	2.50	2.65	2.49
59	5.71	5.39	4.95	4.00	4.34	3.20	5.13	4.87	4.48	4.00	3.94	3.20	4.56	4.33	3.99	3.72	3.52	3.20	4.08	3.88	3.58	3.35	3.16	2.92	3.64	3.47	3.20	3.00	2.83	2.62	2.79	2.63
60	5.93	5.50	5.14	4.00	4.51	3.20	5.35	5.05	4.66	4.00	4.10	3.20	4.76	4.51	4.16	3.87	3.67	3.20	4.27	4.06	3.75	3.50	3.31	3.04	3.82	3.64	3.36	3.15	2.98	2.74	2.95	2.77
61	6.17	5.50	5.35	4.00	4.69	3.20	5.57	5.25	4.85	4.00	4.27	3.20	4.97	4.70	4.35	4.00	3.84	3.20	4.48	4.24	3.93	3.65	3.47	3.18	4.02	3.82	3.54	3.30	3.13	2.87	3.12	2.91
62	6.43	5.50	5.57	4.00	4.88	3.20	5.82	5.47	5.06	4.00	4.46	3.20	5.21	4.91	4.55	4.00	4.02	3.20	4.70	4.44	4.12	3.82	3.65	3.20	4.23	4.01	3.72	3.46	3.30	3.01	3.30	3.07
63	6.70	5.50	5.80	4.00	5.00	3.20	6.08	5.50	5.29	4.00	4.65	3.20	5.45	5.13	4.77	4.00	4.21	3.20	4.93	4.65	4.33	4.00	3.83	3.20	4.45	4.21	3.92	3.63	3.47	3.16	3.49	3.24
64	7.00	5.50	6.05	4.00	5.00	3.20	6.36	5.50	5.53	4.00	4.86	3.20	5.72	5.36	5.00	4.00	4.41	3.20	5.19	4.88	4.55	4.00	4.03	3.20	4.70	4.43	4.13	3.81	3.66	3.20	3.69	3.42
65	7.32	5.50	6.32	4.00	5.00	3.20	6.66	5.50	5.79	4.00	5.00	3.20	6.01	5.50	5.25	4.00	4.63	3.20	5.46	5.12	4.79	4.00	4.24	3.20	4.96	4.66	4.36	4.00	3.87	3.20	3.92	3.61
66	7.66	5.50	6.61	4.00	5.00	3.20	6.99	5.50	6.06	4.00	5.00	3.20	6.32	5.50	5.51	4.00	4.86	3.20	5.76	5.38	5.05	4.00	4.46	3.20	5.24	4.91	4.61	4.00	4.09	3.20	4.16	3.82
67	8.00	5.50	6.93	4.00	5.00	3.20	7.34	5.50	6.37	4.00	5.00	3.20	6.66	5.50	5.80	4.00	5.00	3.20	6.08	5.50	5.32	4.00	4.71	3.20	5.55	5.18	4.88	4.00	4.33	3.20	4.42	4.00
68	8.00	5.50	7.00	4.00	5.00	3.20	7.73	5.50	6.69	4.00	5.00	3.20	7.03	5.50	6.12	4.00	5.00	3.20	6.43	5.50	5.63	4.00	4.97	3.20	5.89	5.47	5.17	4.00	4.58	3.20	4.70	4.00
69	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	7.43	5.50	6.46	4.00	5.00	3.20	6.82	5.50	5.96	4.00	5.00	3.20	6.25	5.50	5.49	4.00	4.86	3.20	5.00	4.00
70	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	7.87	5.50	6.83	4.00	5.00	3.20	7.24	5.50	6.32	4.00	5.00	3.20	6.66	5.50	5.83	4.00	5.00	3.20	5.34	4.00
71	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	7.70	5.50	6.71	4.00	5.00	3.20	7.10	5.50	6.21	4.00	5.00	3.20	5.71	4.00
72	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	7.59	5.50	6.63	4.00	5.00	3.20	6.11	4.00
73	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	6.56	4.00
74	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	7.00	4.00
75	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	7.00	4.00
76	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	7.00	4.00
77	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	7.00	4.00
78	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	8.00	5.50	7.00	4.00	5.00	3.20	7.00	4.00

NOTE:

1. The maximum allowed hoist load should be the rated load deducting the weight of hooks and wire rope and other riggings if applicable.
2. When mounted with jib, the maximum allowed hoist load of main hook should be, besides deduction of all hooks and jib weight as well as other riggings, deducted the following mass in response of the relative jib length:

Jib length（m）	9	13.5	18
Deduct mass(kg)	750	1000	1300

3. When mounted with jib, main boom length scope is 37～52m.
4. Mass of counterweight is 24.6 tons.
5. When mounted with extended boom, the main hook hoist load should be the rated load deducting the mass of extended boom (0.42t) and main and auxiliary hooks.

Mass of hooks, relationship between rope falls and max. rated load capacity :

Hooks	Rope Falls / Mass（t）	Max. rated load capacity (t)									
		10	9	8	7	6	5	4	3	2	1
80t	1.030	80	72	64	56	48	40	32	24	16	8
50t	0.667					48	40	32	24	16	8
25t	0.438								24	16	8
8t	0.246										8

2.4 Working Range

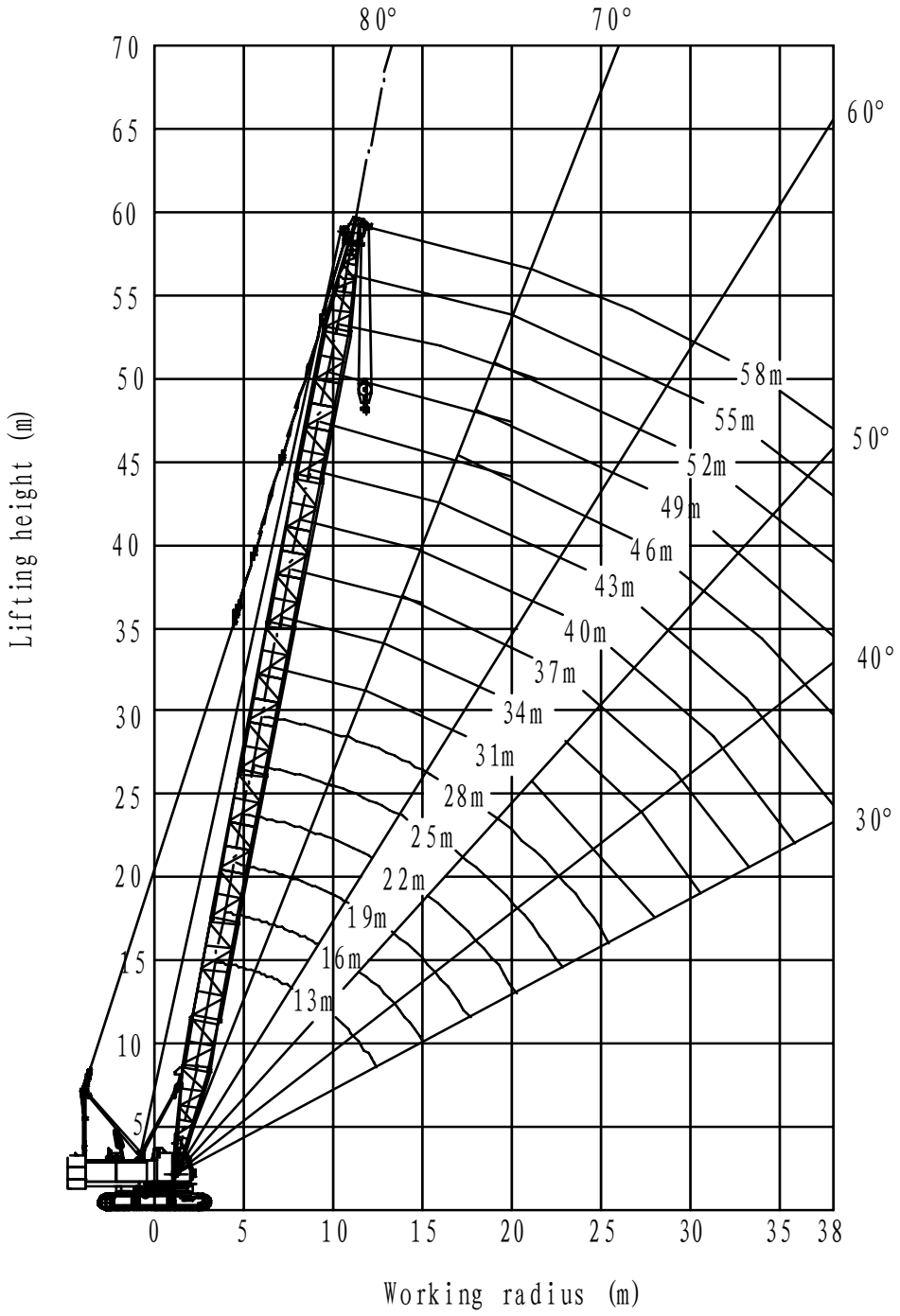


Figure 2-2

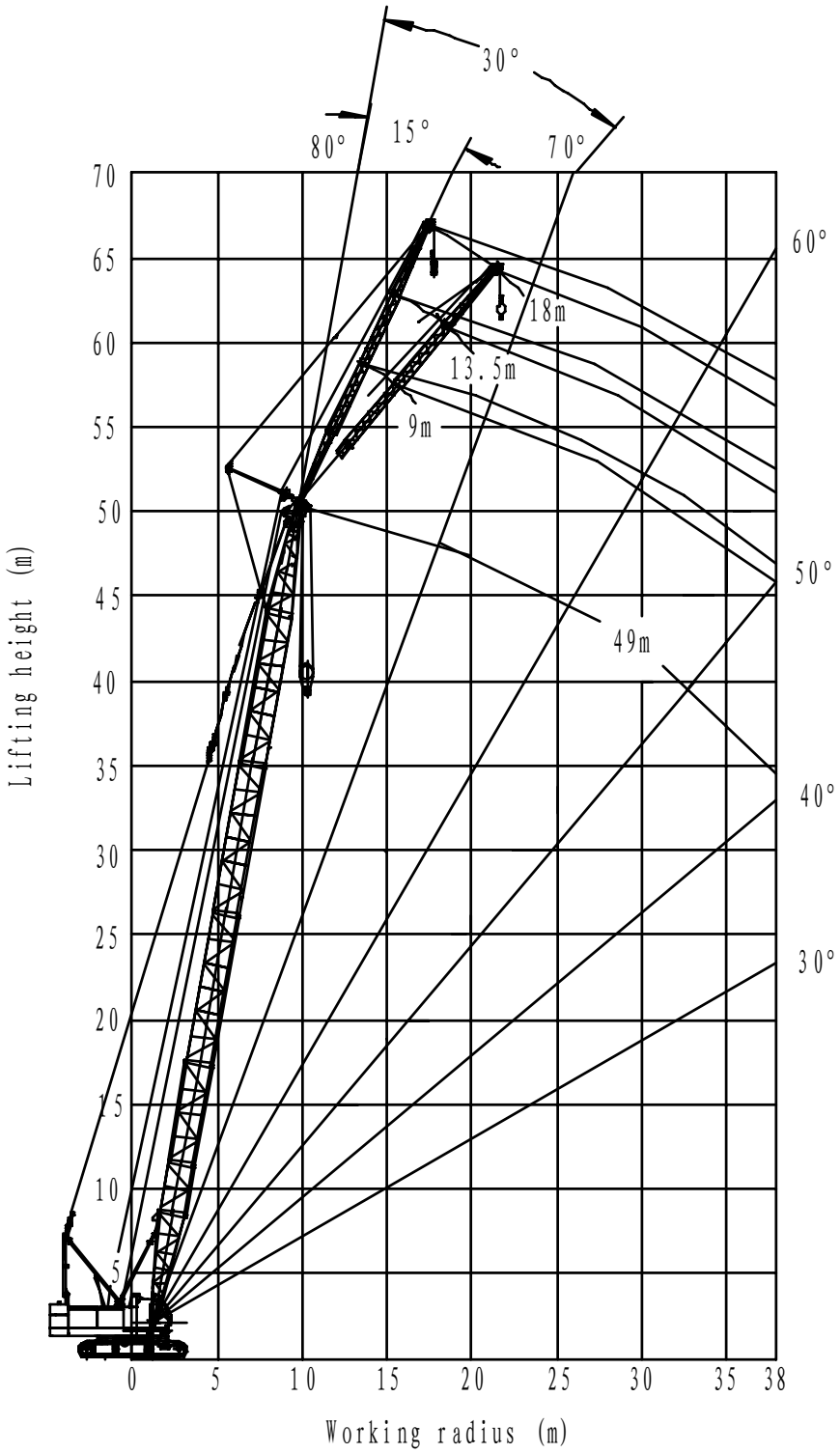


Figure 2-3

Chapter Three Construction, Hydraulic and Electrical system

3.1 Power Transmitting Mechanism

3.1.1 General configuration of the machine

The crane components consist of working attachment, super structure, carrier, diesel engine and hydraulic system. See Fig. 3-1.

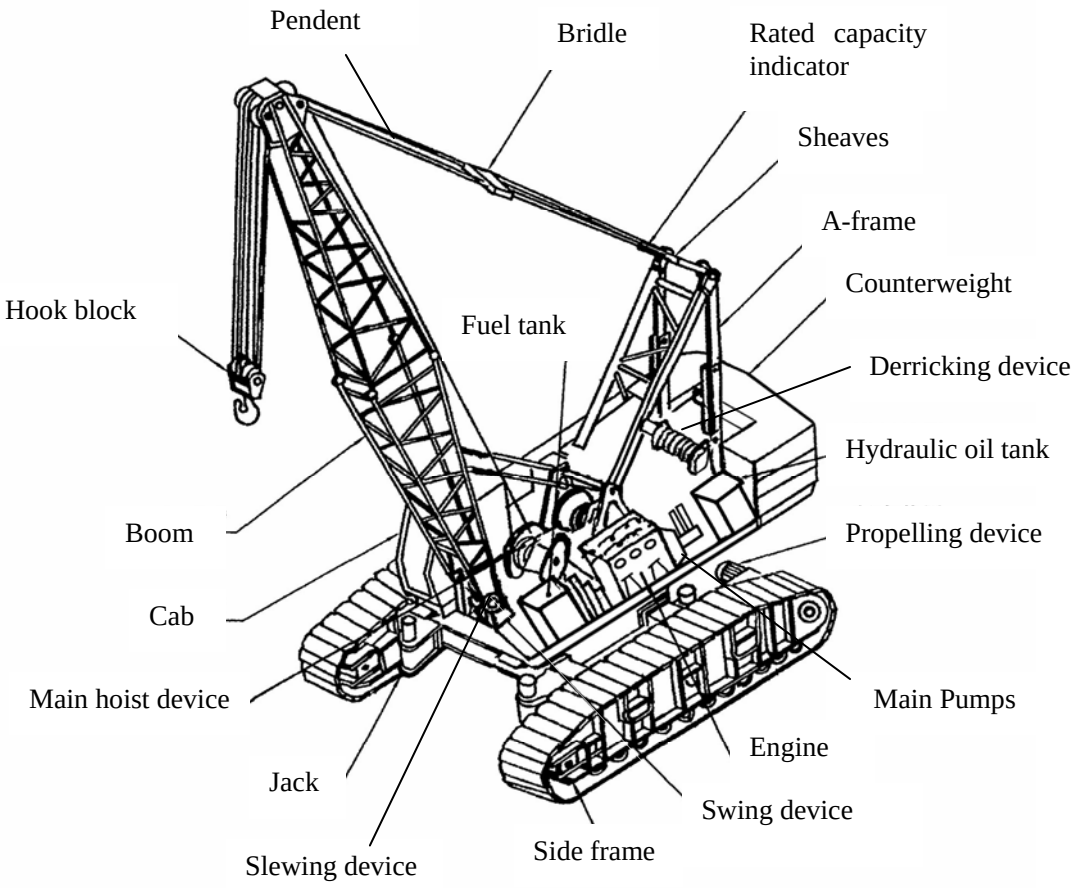


Fig. 3-1 General Configuration of QUY80B

3.1.2 Transmission system

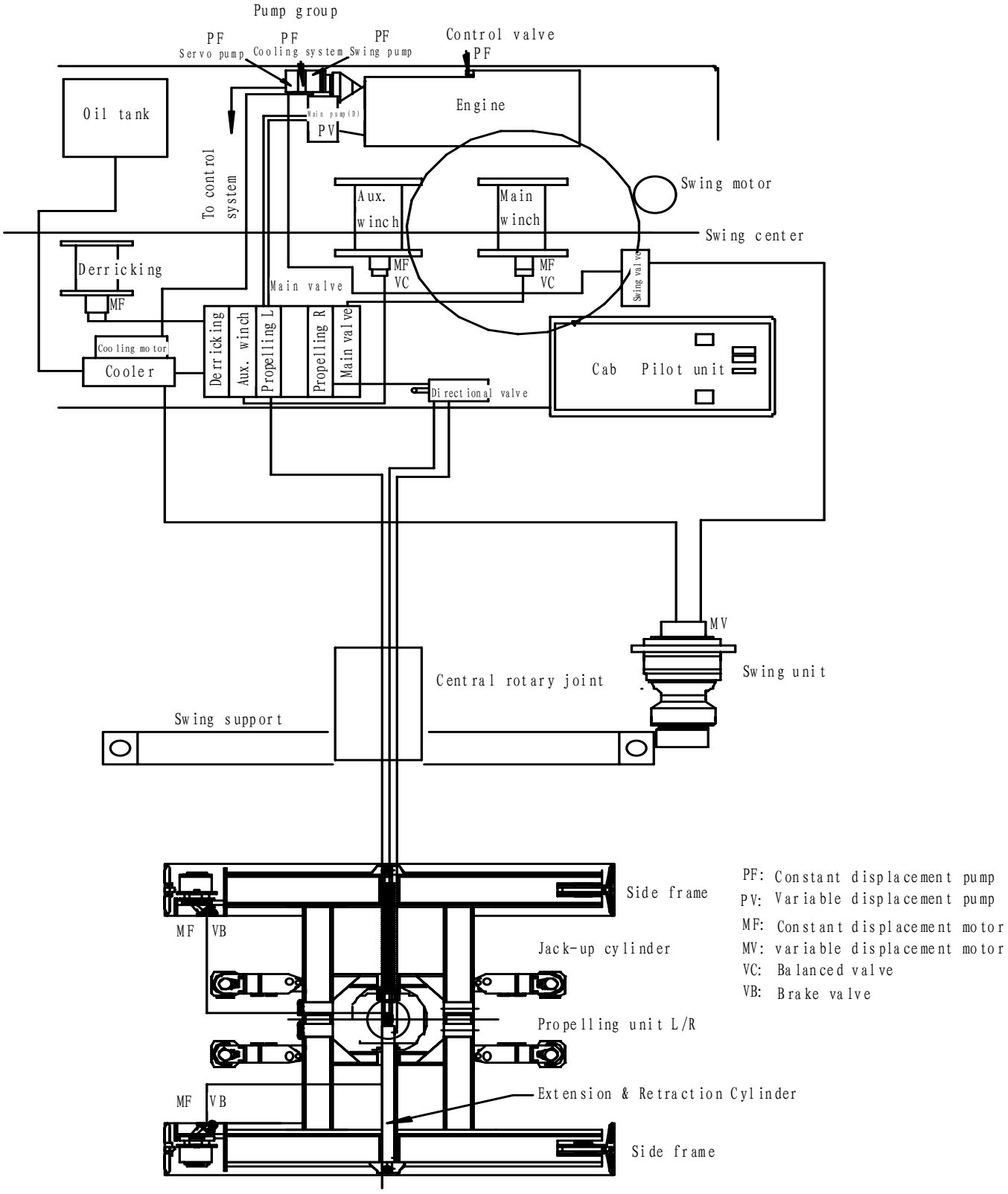


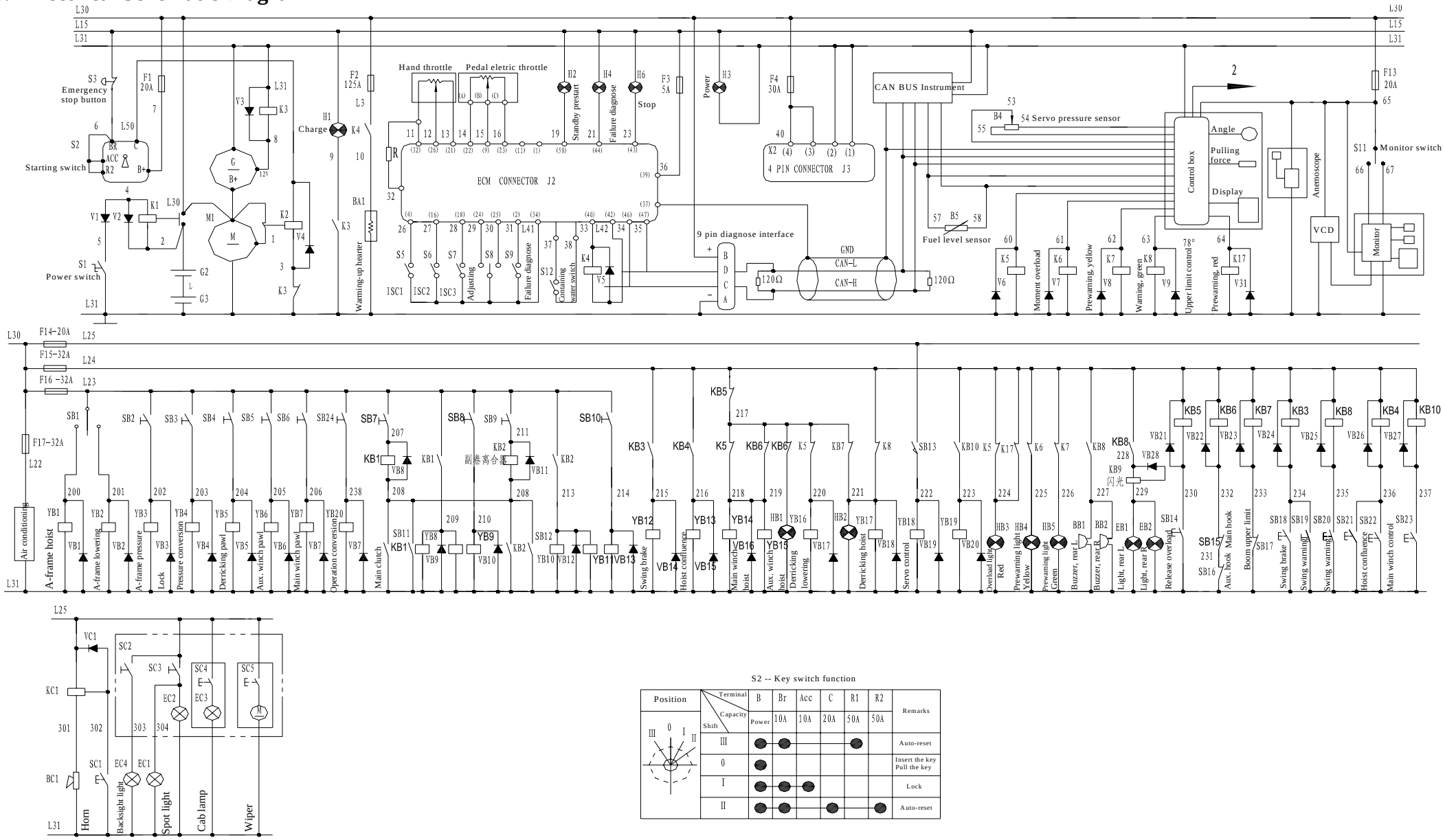
Fig. 3-2 Transmission System

Note:

The engine drives the pump group, which in turn supply pressure to hydraulic oil through the control valves to various working devices. Control valves are controlled by pilot system.

Relief valves are provided in the hydraulic system serves as safety valves protecting the system from being over pressured. Adjustment had been made to these valves before the machine was dispatched. They are preset to be in conformity to the system pressure. So, unauthorized alternation of these settings could cause severe machine damage and even personnel insults.

3.2 Electrical Schematic Diagram



S2 -- Key switch function

Position	Terminal / Capacity / Shift	B Power	Br 10A	Acc 10A	C 20A	R1 50A	R2 50A	Remarks
III 0 I II	III	●	●			●		Auto-reset
	0	●						Insert the key Pull the key
	I	●	●	●				Lock
	II	●	●		●		●	Auto-reset

3.3 Hydraulic System Schematic Diagram of Hydraulic System Is Shown in Fig.3-4

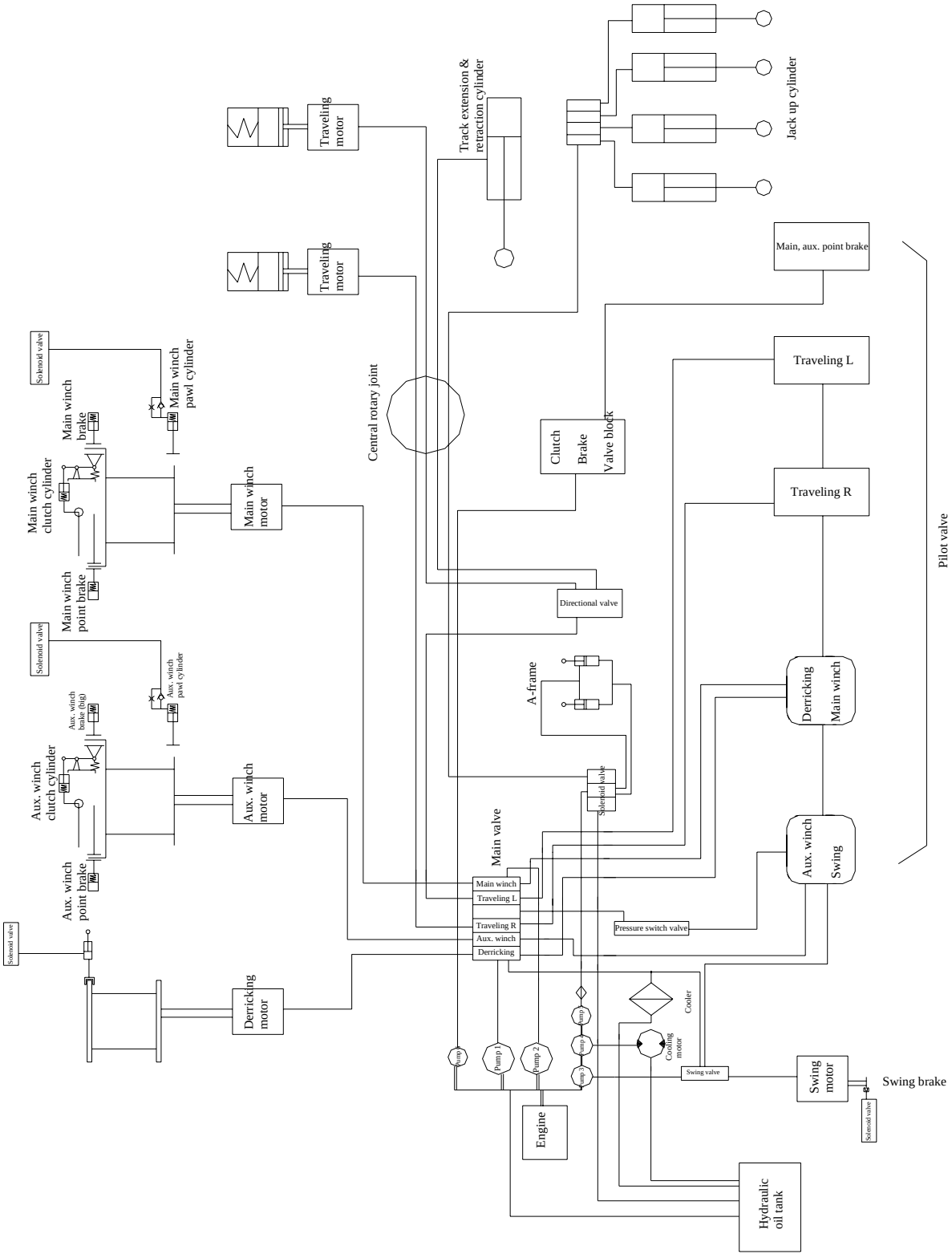


Fig. 3-4

Chapter Four Safety Devices

This machine is equipped with all the safety devices listed below:

1. Safe Load Indicator (SLI).
2. Hook over hoist limiter and boom angle limiter.
3. Anemometer.
4. Level gauge
5. Brakes and locks (Refer to Chapter 4).

With safety devices, such as Safe Load Indicator and Over-hoist Limiters, the machine can automatically stop hoisting or derricking operations and at the same time give a warning alarm when the machine is in danger, so as to avoid any potential damages or even personnel casualties.

⚠Warning
● **It is strictly prohibited to equip this machine with pile drivers or rams for dynamic solid foundation work.**

4.1 Safe load indicator

The functions of safe load indicator are shown as below:

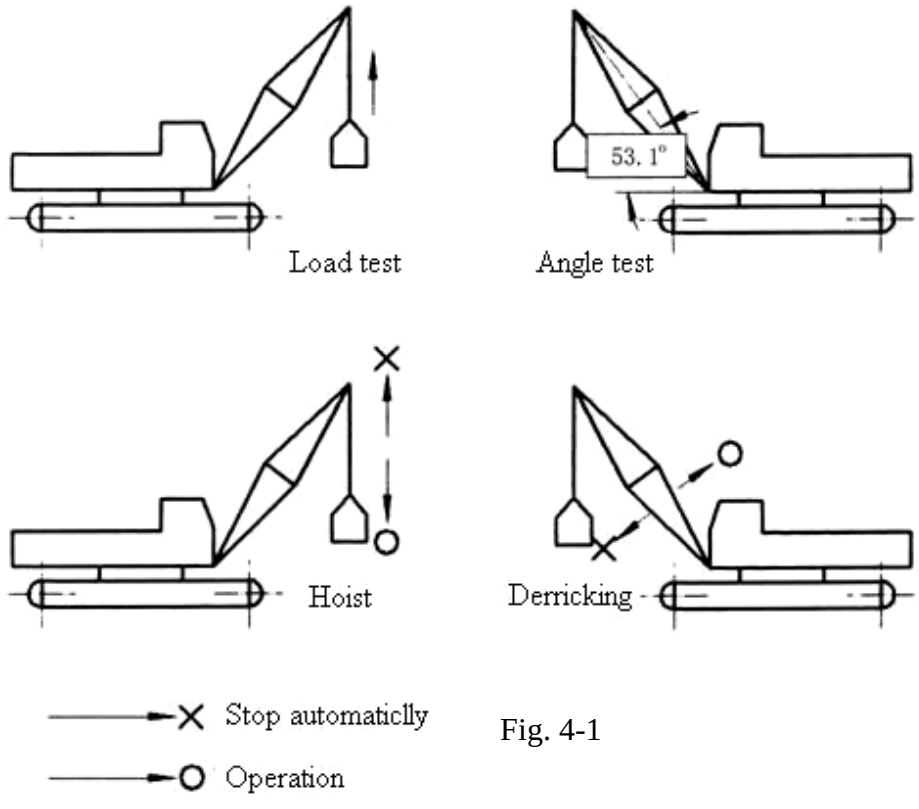


Fig. 4-1

Safe Load Indicator is an important safety device for safe operation of crane. In normal operation, it monitors and shows actual hoist load and boom angle, working radius and shows rated load also for reference.

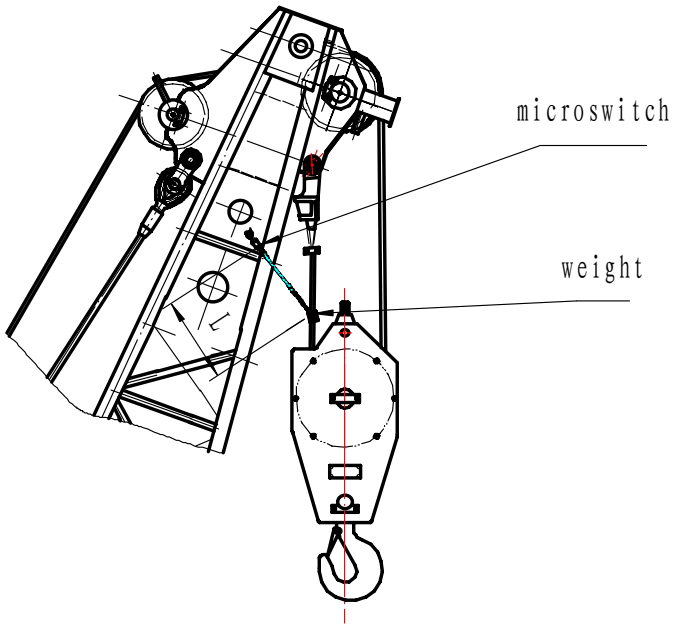
When the actual load is below 90% of rated max. load, the green safe load signal on the computer screen light up. When the actual load falls between 90% and 100% of rated max. load, the yellow monitor signal on the computer screen and working signal light outside the cabin light up and the buzz in the driver's cabin alarms intermittently at the same time. When the actual load reaches 105% of max. rated load the red warning signal on the screen and outside the cabin light up and the warning buzz alarms continuously, at the same time the safety system automatically cut off actions which may bring the machine beyond safe working scope (see Fig. 4-1)

In case the boom lifts up and over 78 degree the boom angle limiter triggering switch will be engaged and safety system will automatically cut off boom up action.

CAUTION: When the machine post on uneven or soft ground, slewing operation is strictly prohibited with 90% of rated load or above. Otherwise severe machine damage or personnel casualties may happen.

For detailed instructions about Safe Load Indicator please see "Operating Manual of Safe Load Indicator".

4.2 Hook Anti-over Hoist Limiter



In normal working status the plumb keeps limit switch in engaged position and the control electrical circuit is in closed status and works normally. When the hook hoists up to certain heights and touches the plumb of the limit switch shall be disengaged by the reposition spring, then the switch cuts off the control circuit which control the hook hoist up action. In this case the hook lowering action is still available. By pressing down safety device release button, the hook anti-over hoist limiter can be by-passed. The distance between trigger switch and plumb is L=1.70-2.00m.

4.3 Boom limit devices

There are two boom limit devices: limit switch and safe load indicator

4.3.1 Limit switch

As shown in Fig. 4-3, when the boom is within 78 degree the trigger switch at the boom foot stays engaged and all boom actions available. When the boom lifts up to 78 degree and touches the trigger switch, the trigger switch shall be disengaged and cut off boom hoist action, at the same time buzz and warning signal lights up. At this status the boom lowering action is still available.

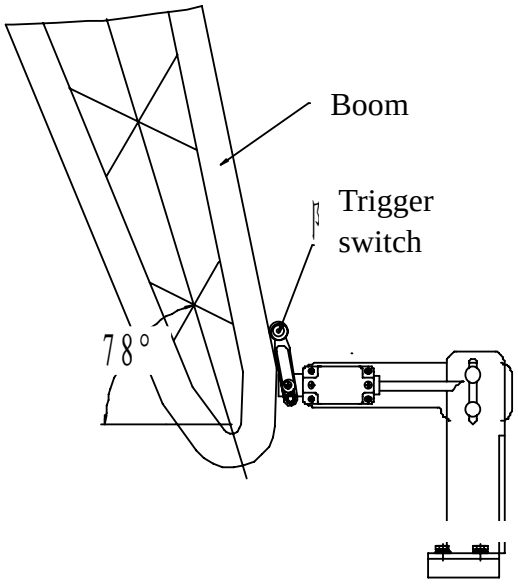


Fig. 4-3 Boom upper limit device

Note that the boom upper limit device is adjustable so that the engaging angle is changeable.

You can by-pass the safety device by pressing down the Safety Release Button, but this will bypass the moment limiter and hook anti-over hoist limiter at the same time, so NEVER KEEP SAFETY DEVICES BYPASSED FOR LONG TIME!

CAUTION: Before starting the operation, make sure that all of the above safety devices function normally. When assemble the crane, keep the release button pressed down. Don't press down the release button during normal working time.

4.3.2 Boom Upper Position Controlled by Safe Load Indicator

The Safe Load Indicator can also control the upper position of boom. When the boom lifts up over 78 degree the Safe Load Indicator will give a warning alarm and signal lights up and the boom up action will be automatically cut off. But this lock status cannot be released by pressuring down the safety release button.

Note: Limit switch and moment limiter mutually protect the machine from damage.

4.4 Boom Lower Limit device

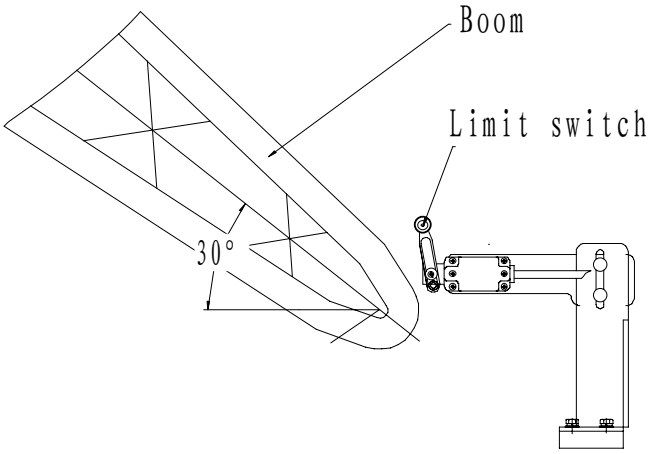


Fig. 4-3 Boom lower limit device

The lower position is limited by Safe Load Indicator. The Safe Load Indicator automatically scans and shows the actual boom angle and actual load, and in case the actual load exceeds 105% of the maximum rated load, or when the boom angle is less than 30 degree, boom lowering action shall be cut off by the Safe Load Indicator automatically.

Chapter Five Operation

5.1 Inspection before operation

5.1.1 Precautions to be taken before operate the machine.

The life time of crane is influenced deeply by the initial use of it. So careful precautions should be followed as below:

1. The initial 50-100 hours is match-up period, and during this period try to take all the possible measures to prevent machine from big load shocks.

2. Daily inspection should include engine, hydraulic system, working attachments and other running parts besides general inspection.

5.1.2 Inspect the machine before operation

1. Check list for daily maintenance

Item	Descriptions
Visual inspection	Any damages and parts missing or loosing caused during transportation
Hydraulic system	Check if there is any oil line leakage or surface scratches of the hoses.
Cooling system	Fill up cooling water whenever is needed and check if there is any leakage.
Fuel system	Fill the fuel tank with diesel fuel that has been deposited for over 24 hours.
Electrical system	Check that any loosing or abnormal wire connections.

2. Inspection before operation

Execute daily inspection for all the points shown below before use of the crane:
See Fig. 5-1.

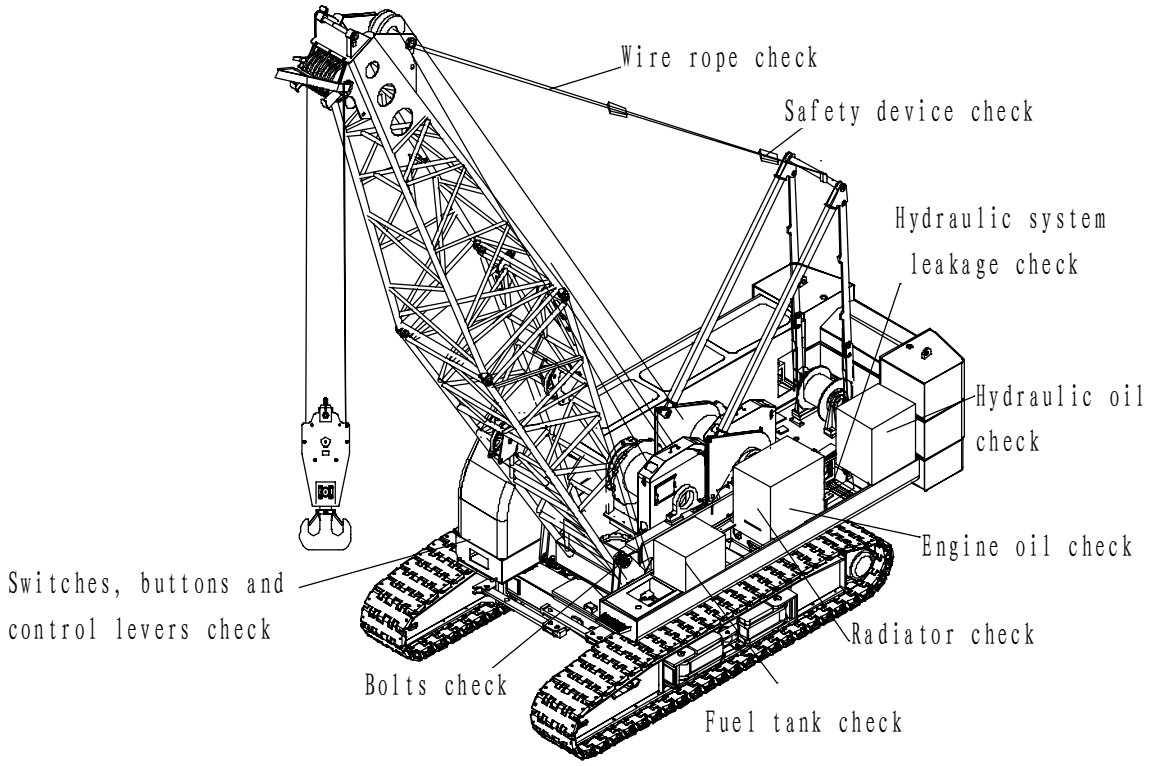


Fig. 5-1

5.2 Layout of control system

5.2.1 Layout of control system

See Fig. 5-2.

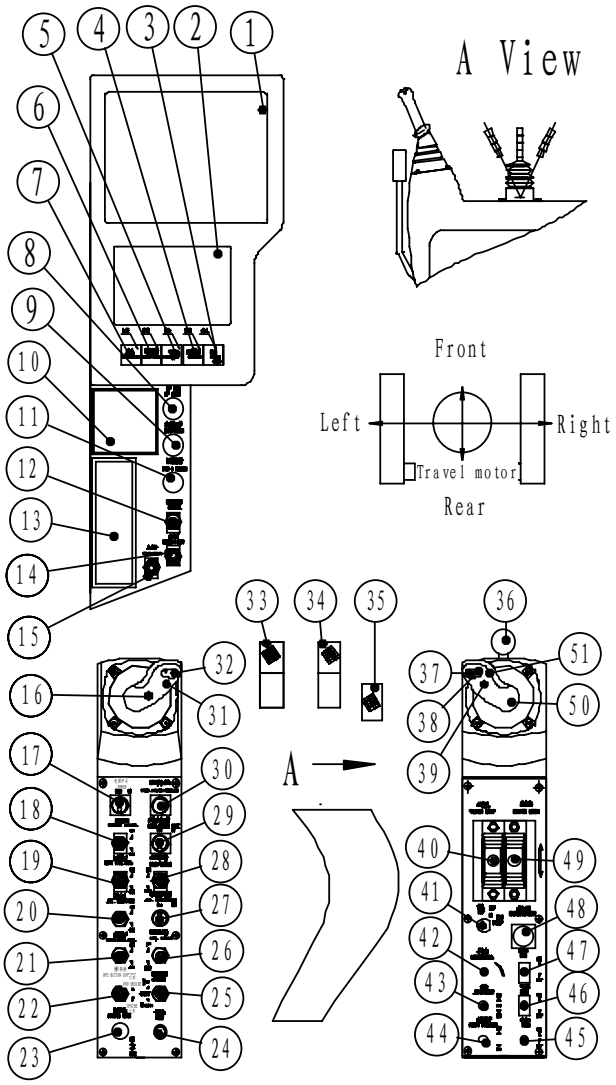


Fig. 5-2

5.2.2 Names of above index

1. Safe load indicator

2. VCD display

3. Charging indicator

The indicator lights up (green) – charge; the indicator goes out – no charge.

4. Waiting for start indicator

When the environmental temperature is below minimum start–up temperature of engine, the preheat system automatically starts to heat up, and the green indicator lights up. After the green indicator goes out it means the machine has finished preheat and the engine is ready for start up.

5. Power indicator

This indicator lights up when the starting switch turns on.

6. Troubleshooting indicator (Yellow)

The yellow indicator lights up to show there is trouble in the engine and the engine should be stopped to check and repair.

7. Engine stop indicator (Red)

When any error occurs in the engine, this red indicator will light up and shows an error code simultaneously.

8. 78º limit buzzer indicator

The indicator lights up and the buzzer sounds to show that boom exceed 78º.

9. Hook limit indicator

The indicator lights up and the buzzer sound to show hook over-hoist.

10. Display of anemometer

11. Oil return filter element alarm indicator

The oil tank is equipped with signal generator. When the filter element is plugged, the indicator will light up and become red.

12. Monitor switch

13. VCD player

14. Spotlight

15. Rear view light

16. Joystick of pilot valve （Swing，Aux. winch）

17. Power switch

18. Swing control switch

19. Main winch pawl switch

20. Aux. winch pawl switch

21. Derricking pawl switch

22. Pressure changeover switch

23. Swing lock switch

24. Fuse

25. A-frame rise/lower switch

26. Aux. hook clutch

27. Lock, aux. hook clutch

28. Main hook clutch

29. Lock, main hook clutch

30. Control system release switch

31. Swing control switch

32. Control joystick for aux. winch flow addition

33. Pedal for aux. winch brake

34. pedal for main winch brake

35. Pedal accelerator

36. Pressure control switch

37. Switch for swing indicator

38. Horn

39. Main winch lower switch

40. Pilot valve for travel left

41. Engine start switch

42. Hand throttle

43. Adjusting switch

44. Troubleshooting switch

Used for finding engine error

45. ISC 3 1400rpm

46. ISC 2 1600rpm

47. ISC 1 1800rpm

48. Emergency stop switch

49. Pilot valve for travel right

50. Joystick for pilot valve (Derricking, main winch)

5.3 Operation of servo system

Layout of control levers and switches for servo system is shown in Fig.5-3.

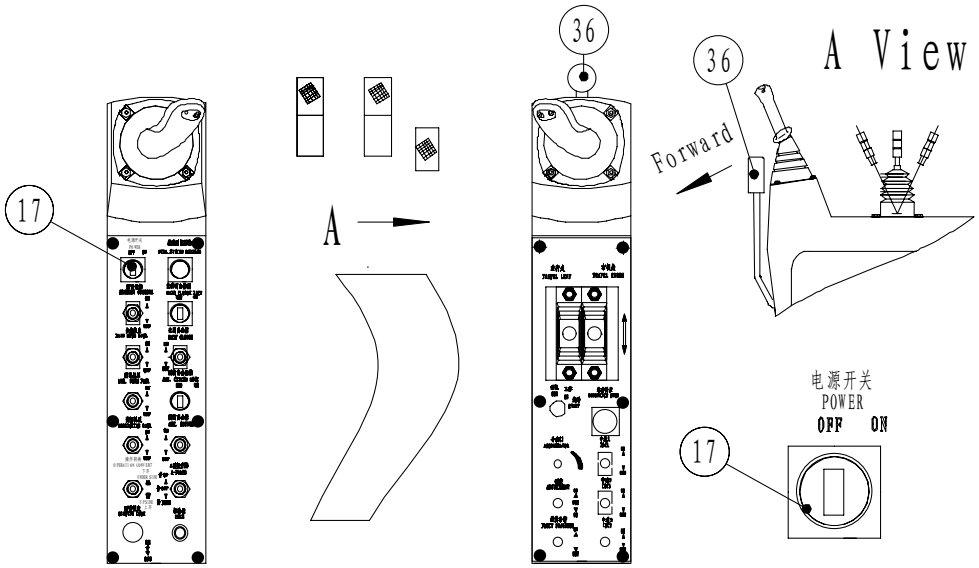


Fig. 5—3

Operation：

Place power switch 17 in ON position. Then start the engine. (For more details about operation of the engine, see following descriptions.)

Push lever 36 forward, this lever is main switch of servo system. Then servo system is supplied with oil. The servo pressure is 4Mpa.

5.4 Operation of A-frame

Layout of switches for operation of A-frame is shown in Fig.5-4.

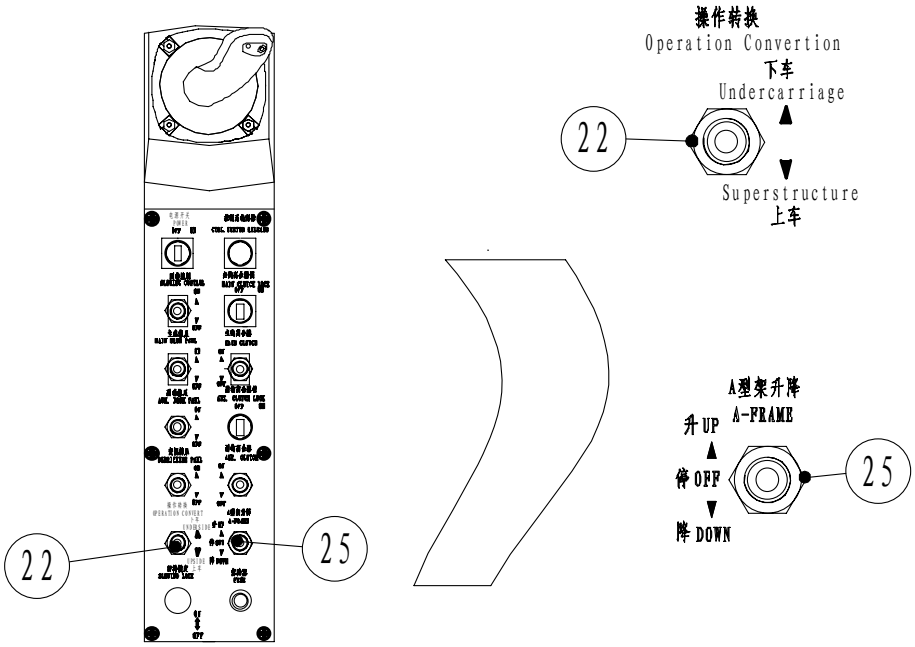


Fig. 5-4

Operation：

Before A-frame rising and lowering, place pressure changeover switch 22 in Superstructure position. Operate A-frame rise/lower switch 25. A-frame raises when switch 25 is in UP position; A-frame lowers when switch 25 is in DOWN position. A-frame stops when switch 25 is in OFF position.

Note：After operation, switches 22, 25 are in the neutral position. Insert the fixing pin.

5.5 Operation of the engine

Layout of switches and control levers for the engine is shown in Fig. 5-5.

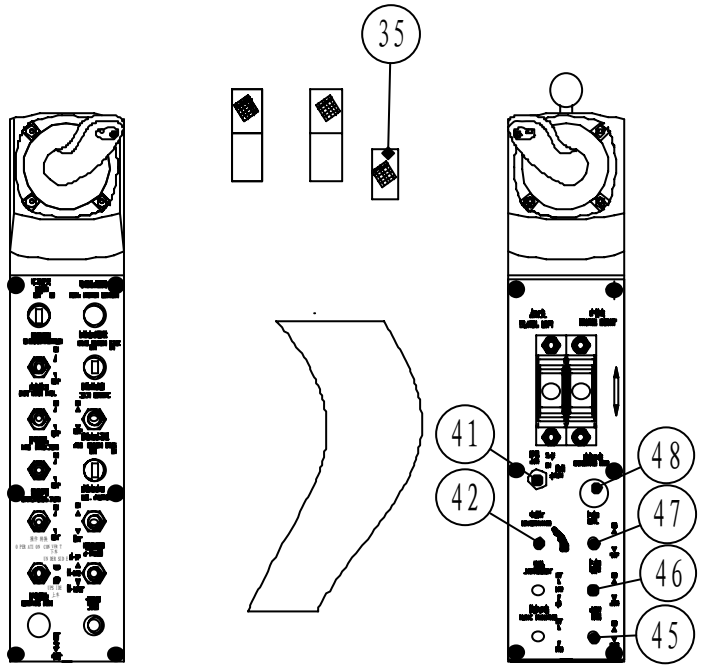


Fig. 5—5

5.5.1 Start the engine

1. Before starting the engine, switches, joysticks of pilot valve should be in neutral position. Accelerator pedal should be in up position and hand throttle should in neutral position.

2. See Fig. 5-6, insert key into switch 41 and turn the key to Position I, then the starter is powered on and all indicators of electrical system flash and go out one by one. Turn the key to Position II to start up the engine. NEVER keep the key at Position II for more than 15 seconds to avoid damage of the starter. If start-up fails, release the key and wait for no less than 30 seconds and start it again. Do not remove the hand from the key because the start switch is a type of auto-reset.

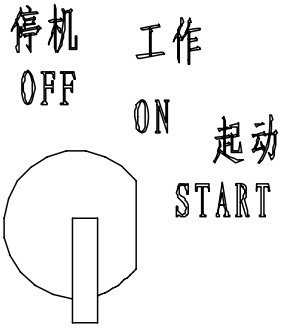


Fig. 5-6

3. After engine start release the key and it will automatically return to Position I.

4. After start up, switch the engine to idle speed to warm up, this is good for long life use of engine.

A. The preferable cooling water temperature of engine is 80-95℃, if running below 60℃, it will cause extra consumption of fuel and abnormal wear of engine.

B. The preferable working temperature of hydraulic oil is 30-80℃. If working under 20℃, any jerk actions may cause damages of motors, valves or pipe lines. Before operation, please warm up the engine to let cooling water and hydraulic oil reach suitable temperature.

First keeps the engine idling for 5 minutes. Above steps are not necessary if the temperature is over 20℃. In winter and cold area, above steps should be performed twice or more to make the temperature of cooling water over 60℃ and working oil over 20℃, and keep engine speed at 1000rpm, servo pressure at 5Mpa.

5.5.2 Stop the engine

1. Before stop the engine, keep the engine at idling status for 5 minutes, and then turn the starter switch 41 from Position II to OFF position to cut off the power and the engine stops. Never leave key in machine.

2. When starter switch is at Ⅱ position, to stop the engine by pressing emergency stop switch 48 in case of emergency, but it is not under idling position when the engine stops. Once the emergency stop button is pushed down, it will be locked. To unlock the button by turning it clockwise for next time use. (Under engine idling status, you can also press the emergency stop button to stop the engine.)

5.5.3 Engine speed adjustment

The engine speed can be controlled via hand throttle, pedal accelerator and speed switches, and details as follows:

1. Hand throttle control: by turning the hand throttle switch 42 to realize engine variable speed control.
2. Pedal accelerator control: by stepping on accelerator pedal 35 to realize engine variable speed control.
3. Fixed speed selection button:

   Speed 1: 1800rpm (switch 47 engages solely)

   Speed 2: 1600rpm (switch 46 engages solely)

   Speed 3: 1400rpm (switch 45 engages solely)

Three fixed speed can be got by operating switches 45, 46, 47 separately.

The fixed speed function has priority over the hand throttle and pedal throttle control. For further information about engine operation please refer to *Operation Manual of Engine*.

5.6 Hoisting operation

Layout of switches for hoisting operation is shown in Fig. 5-7.

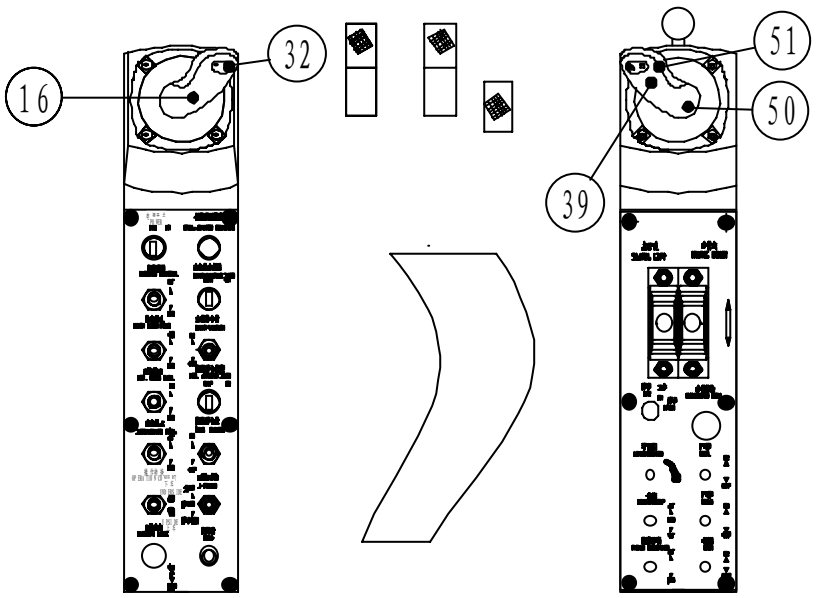


Fig. 5-7

5.6.1 Main hoisting operation

Joystick 50 is for derricking and main hoisting operation. By pressing down or releasing main winch flow addition switch 51; there are two ranges of stepless speeds available:

1. Low speed (0-35m/min) hook lowering operation: hold down Button 39 and push the joystick 50 forward.
2. Low speed (0-35m/min) hook hoisting up operation: pull joy stick 50 backward.
3. High speed (35-70m/min) hook lowering operation: press and hold Button 39 and Button 51 and push forward joy stick 50.
4. High speed (35-70m/min) hook hoisting up operation: press and hold Buttons 51, 39 and pull backward the joystick 50.

Note: It is strictly forbidden to do high speed slewing action during hook hoisting up or lowering down.

5.6.2 Aux. hoisting operation

Joystick 16 is for slewing and aux. hoist operation. By pressing down flow addition switch 32, there are two ranges of stepless speeds available:

1. Low speed (0-35m/min) aux. hook lowering operation: push the joystick 16 forward.
2. Low speed (0-35m/min) aux. hook hoisting up operation: pull joystick 16 backward.
3. High speed (35-70m/min) aux. hook lowering operation: press and hold flow addition switch 32 push forward joystick 16.
4. High speed (35-70m/min) aux. hook hoisting up operation: press and hold flow addition switch 32and pull backward the joystick 16.

Note: It is strictly forbidden to do high speed slewing action during auxiliary hook hoisting up or lowering down.

5.7 Derricking operation

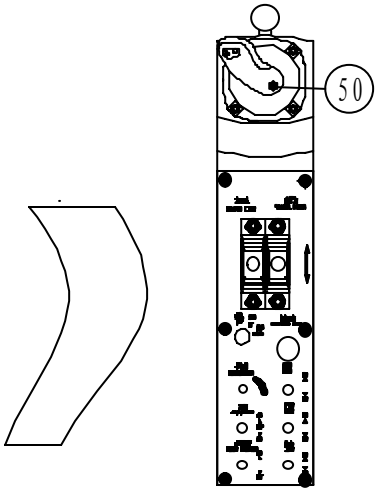


Fig. 5-8

Push pilot valve joystick 50 right, boom raises.

Push pilot valve joy stick 50 left, boom lowers.

Pilot valve joy stick 50 is at neutral position, boom brake is engaged.

Note: Before boom lowering operation, first lift up the boom a little then lower down the boom, this can prevent the derricking winch pawl from being deadlocked.

5.8 Brakes and locks for main hoist, aux. hoist and derricking

For safety consideration, this machine is equipped with normally closed band-type brake for its main and aux. hoist winches. When control joysticks of winches are in neutral position, the control oil line is cut off and brake cylinder is disengaged, and the band type brake is engaged by the spring force. So does the derricking winch brake.

See Fig. 5-9 below:

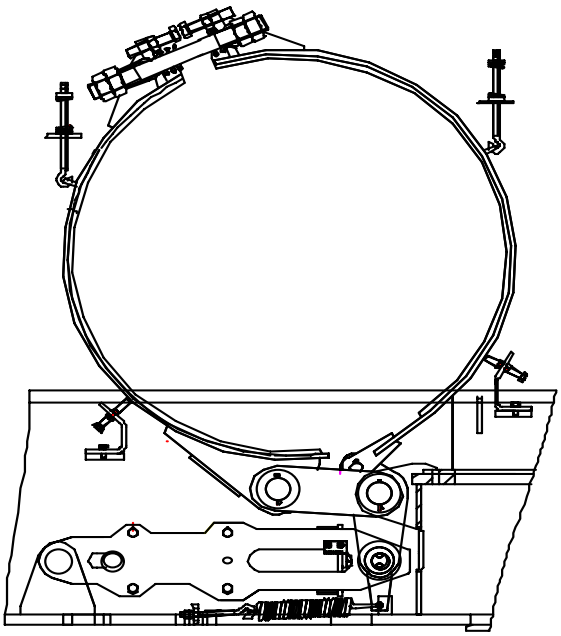


Fig. 5-9 Brake of winches

On the drums of main/aux. and derricking winches there are pawls to lock them up during transportation and repair.

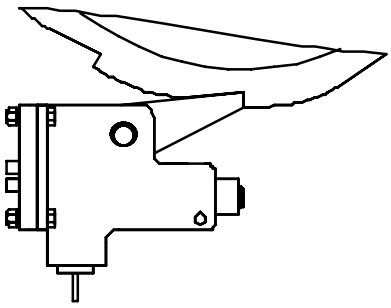


Fig. 5-10 Pawl of winches

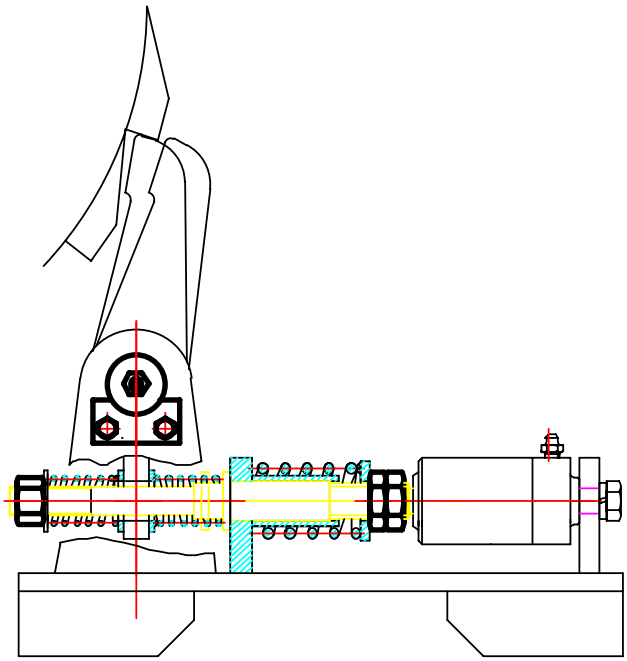


Fig. 5－11 Derricking pawl

The control buttons are on left control panel shown in Fig. 5-12.

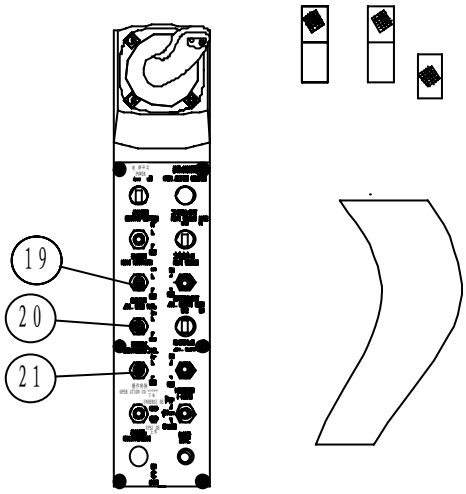


Fig. 5-12

Before the operation of main, aux. winch or derricking winch, keep the switch 19, 20, or 21 to ON position to disengage pawl from the drum, then the winch can work for hoisting. When the system stops, keep the switch 19, 20 and 21 to OFF position to lock the drums with pawls.

5.9 Swing operation

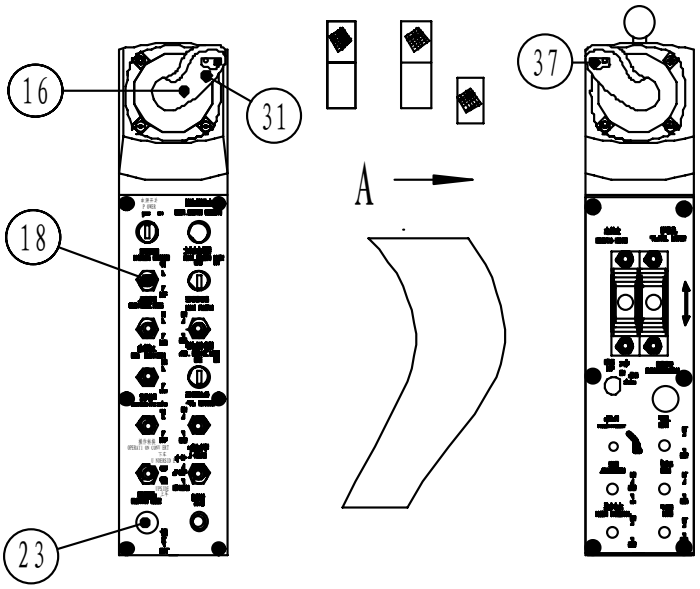


Fig. 5—13

Note: Release swing brake first before swinging.

Swing brake is normal open brake. Press swing control switch 31 which on left joy stick to engage the brake; Swing brake engages continuously when swing control switch 18 which on the right control panel is at ON position. Set swing control switch 18 in OFF position to release the brake.

Push pilot valve (joy stick) 16 left, press light/buzzer switch 37 at the same time, swing the superstructure left and buzzer buzzes.

Push pilot valve (joy stick) 16 right, press light/buzzer switch 37 at the same time, swing the superstructure right and buzzer buzzes.

The swing speed can be proportionally controlled by the offset degree of joy stick.

Cautions for swing operation:

① Only low speed swing operation is allowed when perform main and aux. hoist or lower operation.

② Swing should be smooth and keep the load moving steadily without jerking actions.

③ To stop swinging by operating the joy stick reverse, the operation should be done slowly.

④ Hydraulic swing brake is only for temporary stop of swing operation.

⑤ Swing lock must be applied during transportation or stop the swing operation

continuously.

After finishing work or during transportation, and in case of the crane parks on a slope, swing lock pins should be engaged to fix the superstructure. There are 4 locking positions applicable and controlled by swing lock switch 23 switch on the left control panel.

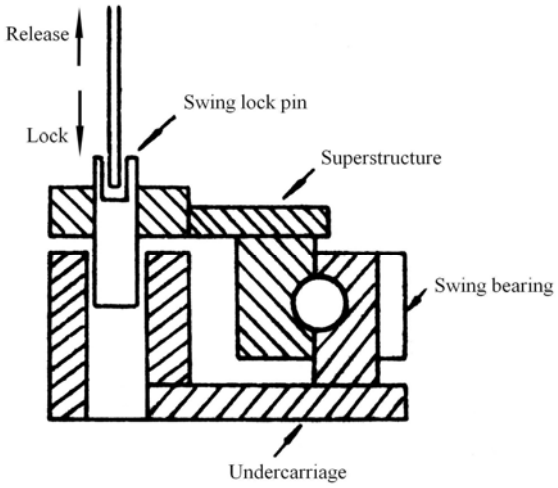


Fig. 5-14

5.10 Travel operation

When traveling operation is performed, switch the transfer valve lever which on the right catwalk to traveling position. See Fig. 5－15.

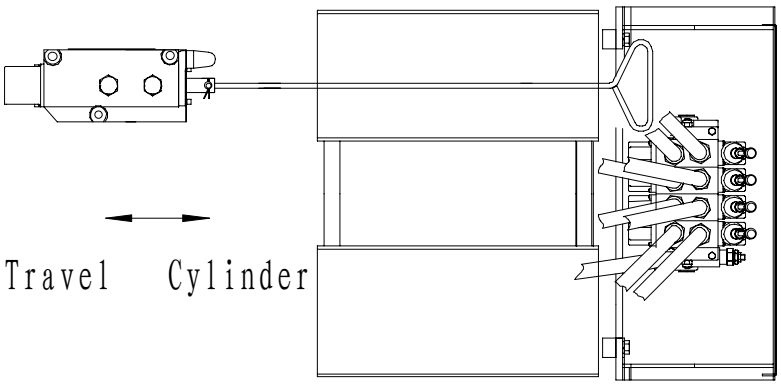


Fig. 5－15

Layout of control levers and switches for travel operation is shown in Fig.5-16.

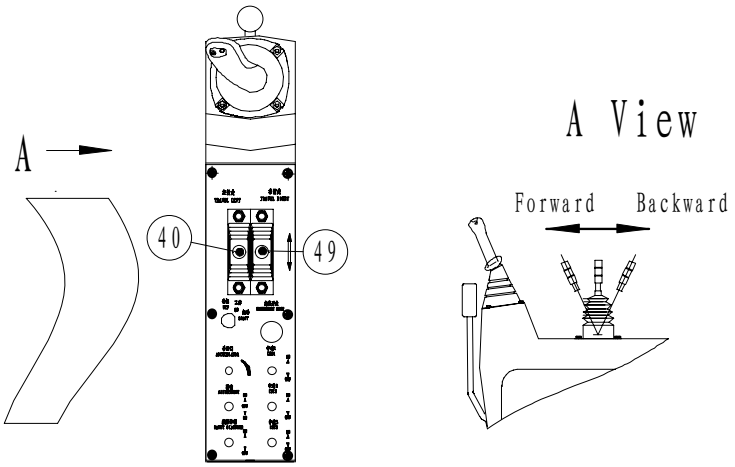


Fig. 5－16

No. 40, 49 are for left and right traveling.

Step the pedal forwards for going forward. Step the pedal backwards for back traveling. Operate left or right traveling pedal (lever) separately for turning, but jerk operation should be avoided.

Note:

① For long distance traveling, set the traveling motor at rear and travel forwards as per the direction of the arrows which are on the side frames.

② The best rotation speed of the engine is 1700rpm for long distance traveling.

Traveling brake:

Traveling brake is normal close brake. When the control lever is at neutral position, the pressure oil circuit is cut; the brake is engaged by the spring force. When the engine stops, even the pedal (lever) is at other position, the brake keeps at the brake status.

When the machine parks on a slope, put wedges under the tracks once the operator leaves the cabin.

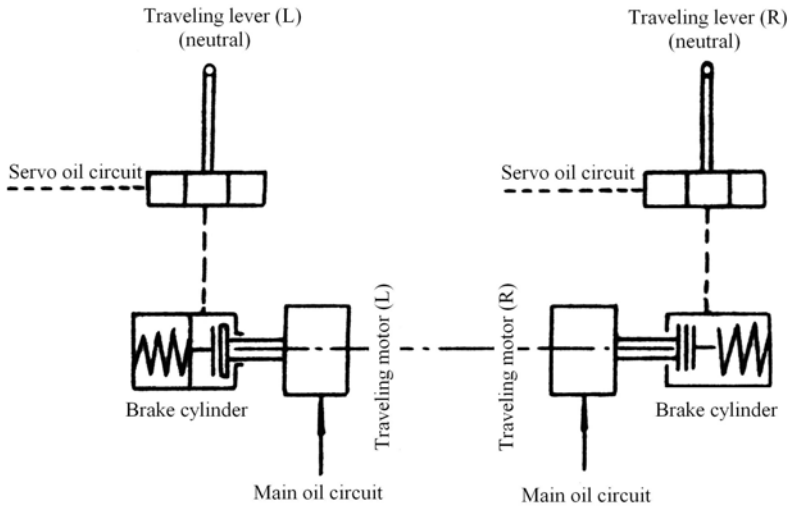


Fig. 5—17

Note: When the machine parks on a slope, put wedges under the tracks once the operator leaves the cabin.

5.11 Undercarriage cylinder operation

Before operation of undercarriage cylinders the conversion switch bar on the right platform should be shifted to “Cylinder” position. See Fig. 5-18 below:

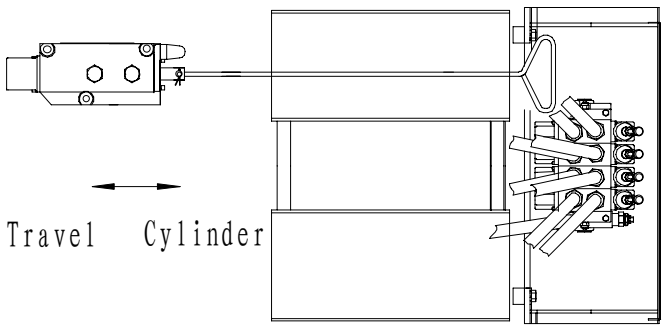


Fig. 5-18

:

Layout of control switch for undercarriage cylinder operation is shown in Fig. 5-19.

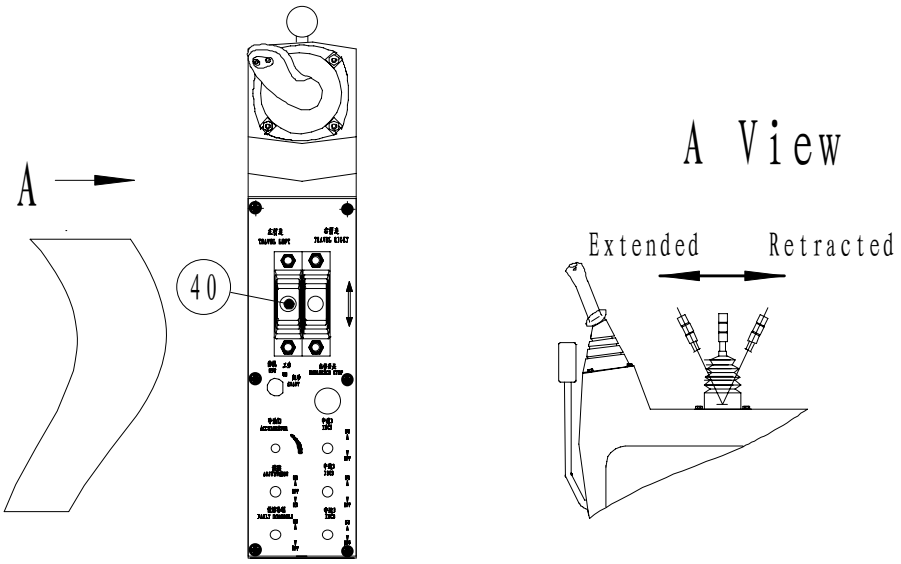


Fig. 5-19

Pilot valve (pedal) 40 is for extension and retraction cylinder

Step the pedal forwards – cylinder and tracks extension;

Step the pedal backwards – cylinder and tracks retraction

Undercarriage extension and retraction:

1. Under transportation condition, pull out the left fixed pins (at the side of bigger size cylinder).

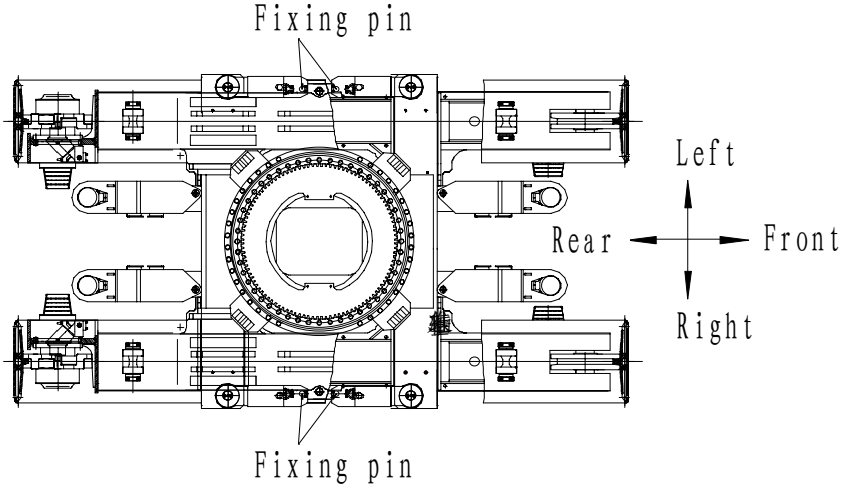


Fig. 5-20

2. Rotate extended bracket on left side as shown in Fig. 5-21.

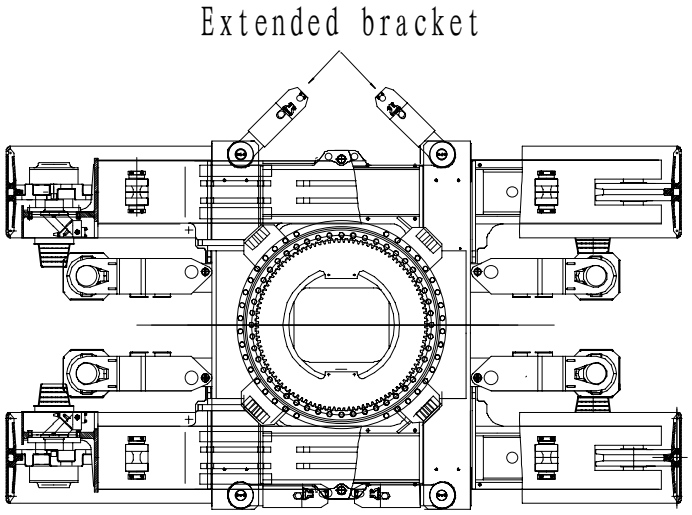


Fig. 5-21

3. Turn extended bracket till it is vertical to the carbody, insert the jacket as shown in Fig. 5-22

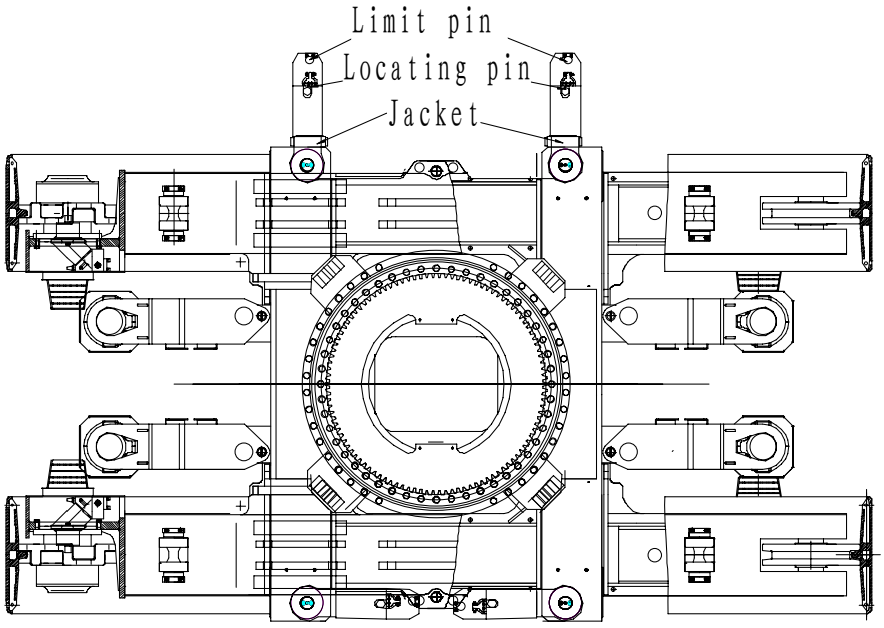


Fig. 5-22

4. Step the pilot valve(pedal) 40 forward slowly to make the cylinder extend. After cylinder extending, fix the limit pins and dowels. Adjust the stoppers and fix them.

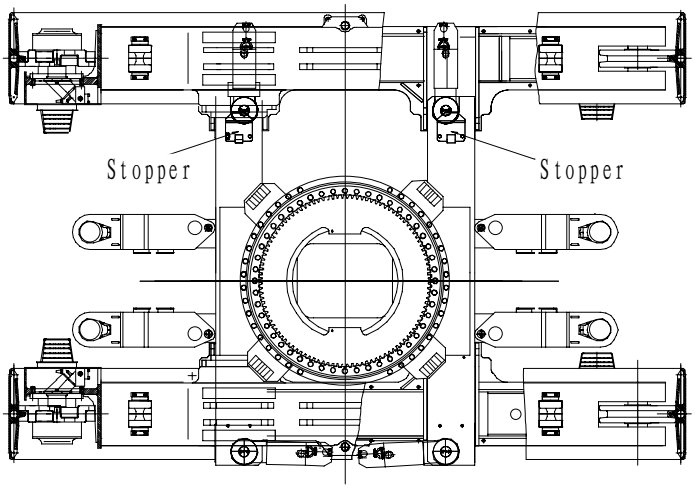


Fig. 5-23

5. Repeat above steps to extend another track. Adjust the adjusting screw to make it contact against the side frame tightly.

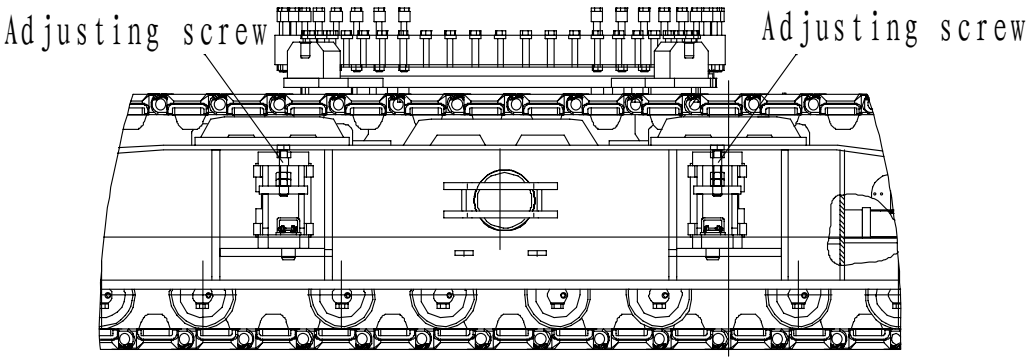


Fig 5-24

6. Reverse above steps to retract the tracks.

5.12 Free fall

This crane is equipped with free fall system which can greatly increase productivity.

5.12.1 Structural sketch of normally closed band type brake and clutch.

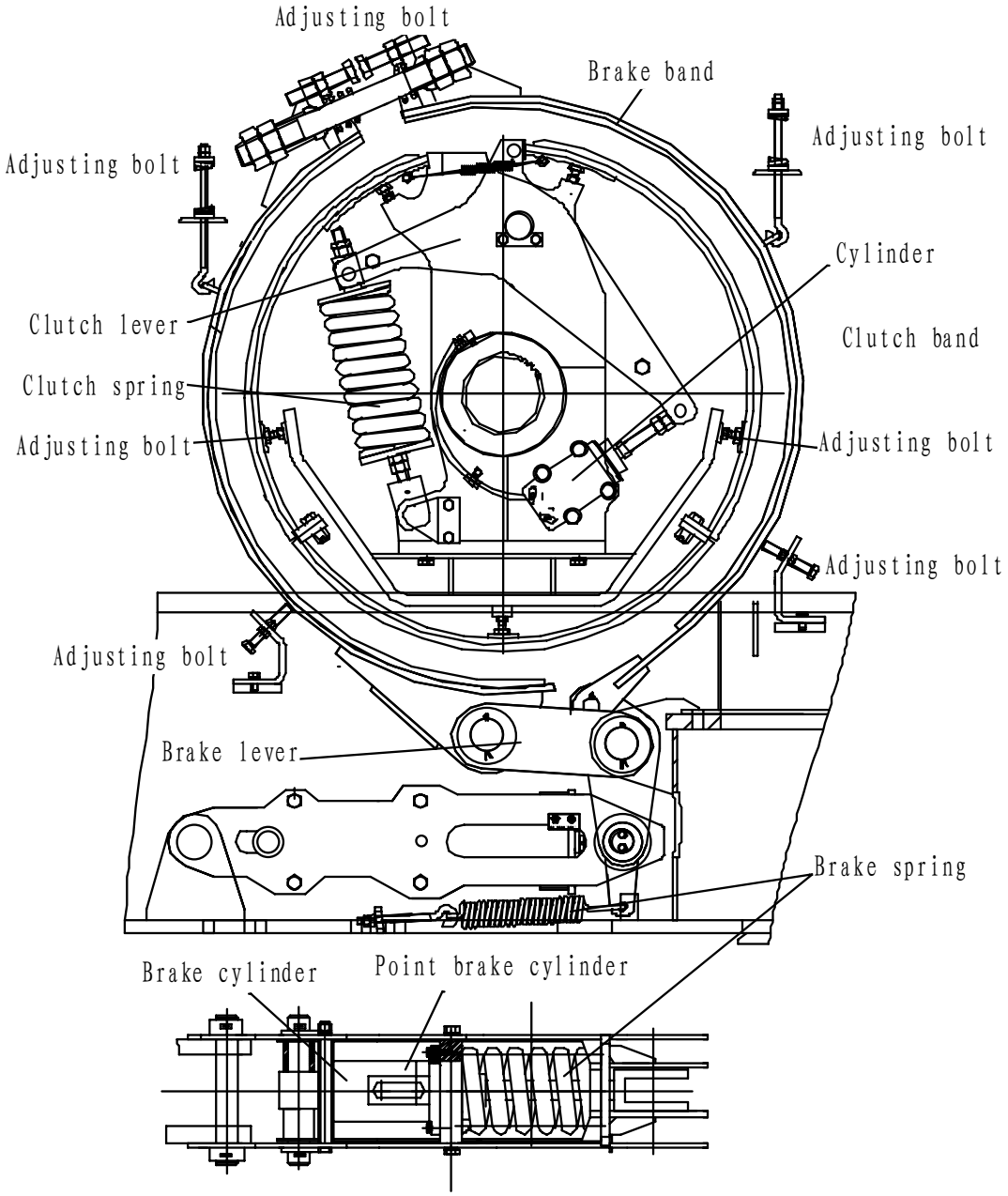


Fig. 5-25

5.12.2 Working principles

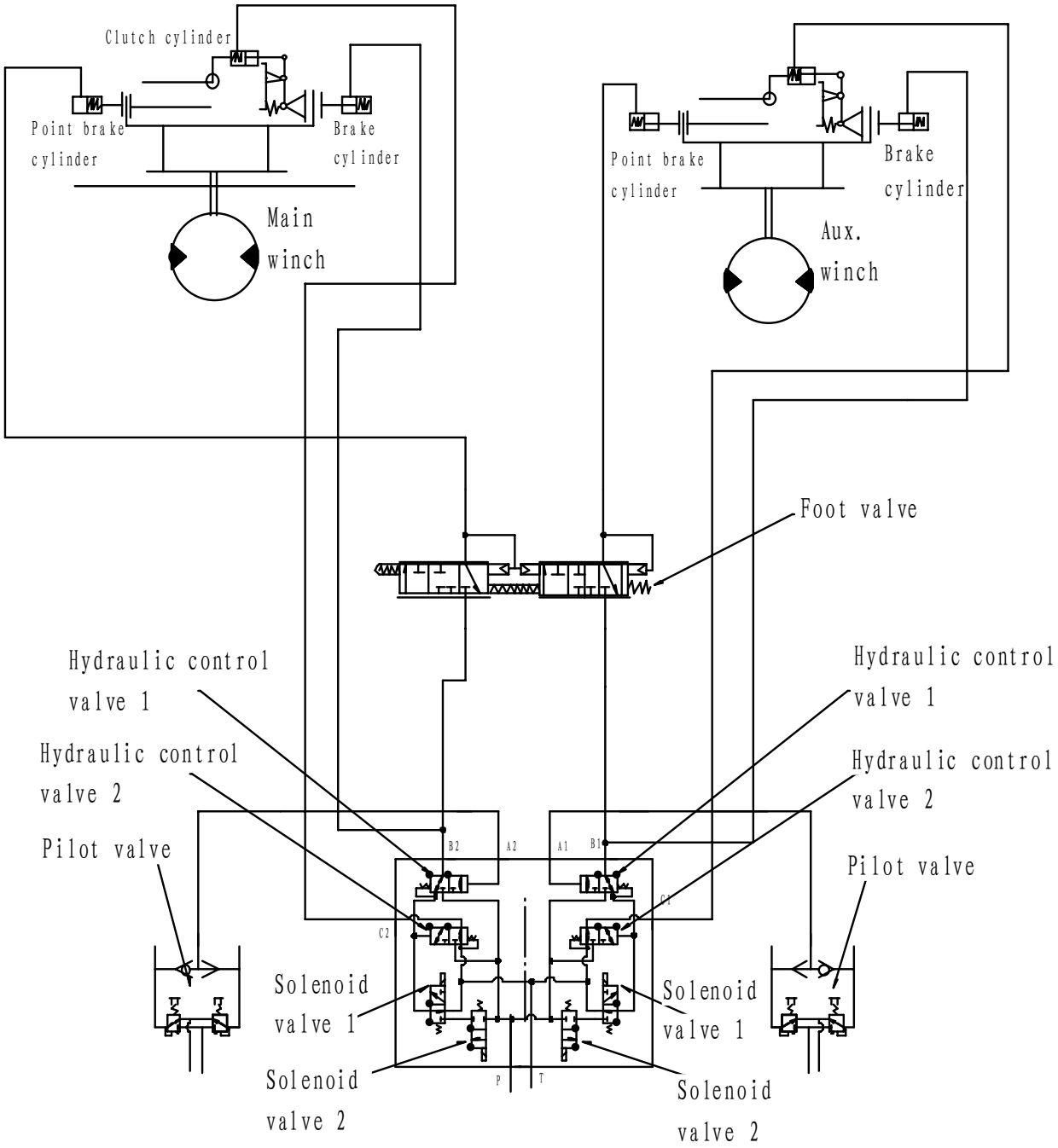


Fig. 5-2

This crane has two working modes: normal working mode and free falling mode.

The normal working mode is a kind of active mode, when there is no action the winch brake is in engaged status. When running the winch, the control valve control oil pressure to engage the brake cylinder and the brake is disengaged, and the winch is rotated by the friction force

between the inner surface of the winch and the clutch (the clutch is driven by the reduction gear linked with the hydraulic motor. In short, in normal working mode the winch control bar control the winch brake (disengage it) and winch clutch (engage it) to work simultaneously. So under this mode the operator doesn't need to take care of the winch pedal brake by pushing down on the pedal.

In free falling working mode, the winch control valve is in neutral position. Switch solenoid and step down pedal brake to disengage winch clutch from the winch drum, then the winch is in loose and free rotation condition and the winch brake is in standby condition. Now lift up the pedal brake to free fall the load, and you can control the falling speed by using the winch pedal brake.

5.12.3 Operation of free fall

Layout of control switches and pedals for operation of free fall is shown in Fig.5-27

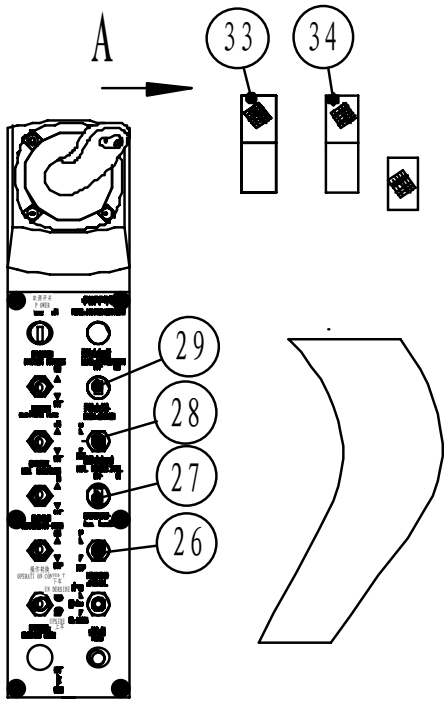


Fig. 5-27

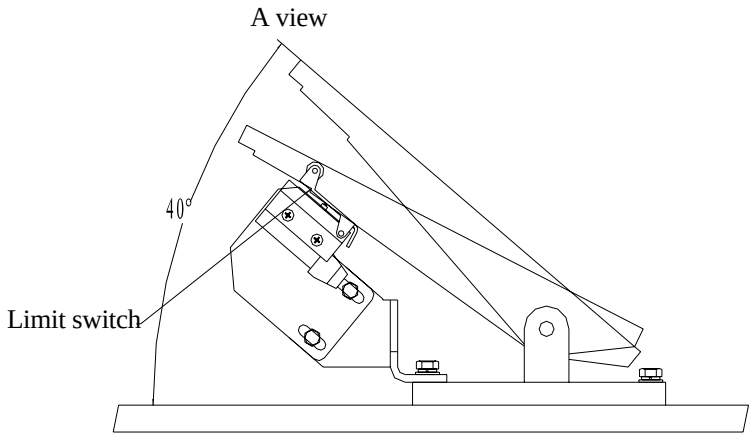


Fig. 5-28

Free fall operation of main hook:

1. First turn the main winch clutch lock Switch 29 to ON position.
2. Step down Pedal 34 to trigger on the limiter switch.
3. Switch the main winch clutch Switch 28 to ON position
4. Lift up the Pedal 34, the limiter is disengaged, now free falling operation begins. The falling speed can be adjusted
5. After free fall operation, switch the Switch 28, 29 to OFF position.

Free fall operation of aux. hook:

1. First turn the aux. winch clutch lock Switch 27 to ON position.
2. Step down Pedal 33 to trigger on the limiter switch
3. Switch the auxiliary winch clutch Switch 26 to ON position
4. Lift up the Pedal 33, the limiter is disengaged, now free falling operation begins. The falling speed can be adjusted.
5. After finish free fall operation, switch the Switch 26, 27 to OFF position.

5.13 Simultaneous operations

This machine is able to perform simultaneous operation as follows:

① Simultaneous operation of main winch and swing

② Simultaneous operation of derricking and swing

③ Simultaneous operation of travel and swing

5.14 Precautions for crane operation

Crane operation includes hoist, lower, derricking, swing and traveling. There are three lengths of boom sections available, i.e. 3m, 6m and 9m, and there are various combinations of boom lengths between 13m and 58m. Jib length is 9m to 18m.

This crane has 80t, 50t, 25t and 8t capacity hooks available, where the 8t capacity ball hook is for auxiliary winch. And there are various line parts available for 80t, 50t and 25t capacity hook, such as 10~1, 6~1 and 3~1. .

1. Prior to crane work inspection should be made as follows:

① Ensure that the winding of wire rope is correct and no break strand found.

② The boom is in good condition.

③ Moment limiter features normally.

④ Hoist preventive device functions properly.

⑤ Boom over hoist preventive device functions properly.

2. The operator should be aware that when hoist up load the derricking wire rope would be extended and thus the working radius shall be increased, this is obvious especially with long boom configuration.

3. Keep slow and smooth swing and derricking to prevent the load from big swing and shock.

4. When work with 58m boom, there will be subject with maximum tensile force on the derricking wire rope, so make sure to keep smooth movement of boom hoisting to prevent it from damage.

5. In case the wind reaches Grade 6 or above, any operation of crane should be stopped.

6. When level derricking with long boom and jib, the boom should be toward front side (same direction as shown by the arrow on track frame); lower the boom to 30 degree. The hook should touch the ground.

7. When operating with auxiliary hook, the empty hook (especially the auxiliary hook) tends to swing during machine swing. So the empty hook should be hoisted up to the boom tip.

8. In case the boom is damaged, it should be replaced or repaired before use. The boom material is high tensile steel so only professional repair works can be done such repair or turn to us for assistance.

9. Keep the boom angle within 30-70 degree during traveling. If the boom angle is over 70 degree, the machine may turn over due to the uneven road.

10. Never perform overload work.

11. Be sure to put the load on to the ground and apply brake and lock before operator leaving the driver's cabin.

12. Do not operate the main and auxiliary hooks simultaneously.

13. The machine should be parked on solid and level ground. For soft ground, it must be enhanced to keep level of the machine.

14. In case of two cranes work together to hoist one load, it is strongly recommended that the two cranes should have the same capacity. And keep slow operation speed to keep the load stable, it is also required to have professional supervisor to monitor such work.

15. When attached with jib, the actual allowable load of main hook is the rated load of main hook deducting weight of main and auxiliary hooks and the respective mass shown on below table:

Jib Length(m)	9	13.5	18
Mass deducted (kg)	750	1000	1300

16. Operate the machine near the live lines is dangerous, and following precautions should be strictly followed:

Voltage	Low	High	Supper high
Distance between boom and line	1.0m	1.2m	2m. Increase 0.2m per 10Kv more when it is above 60Kv

Note:

Wind speed refers to the average value of wind speed at 10m/sec. above ground level within 10 minutes.

1. When the wind speed is less than 10m/sec. which is equal to Grade 5.

① The wind speed will increase with the height, so extra attentions should be paid for long boom hoist and especially when the load is hoist up high in the air.

② For hoisting load with big surface, wind comes from backward may cause severe damage.

③ When with empty hook, wind coming from front is more dangerous.

2. When the wind speed is more than 10m/sec. which is equal to grade 6, no operation is allowed and does the following procedures to secure safety of the crane:

① Stop the machine along with the tracks direction and keep the counterweight facing the wind.

② Engage all brakes and locks. Put the load on the ground and loosen the hoist rope slightly.

③ Stop the engine.

3. When the wind speed is over 15m/sec. which is equal to Grade 7. Lower the boom to the ground. Apply swing pin lock.

Chapter Six Inspection, Maintenance and Adjustment

6.1 Inspection and Maintenance Procedures

The servicing life of the machine will be prolonged if the proper maintenance and adjustment is carried out correctly. Inspection, maintenance and adjustment are very important work especially when the machine is operating in critical conditions.

When performing the periodic maintenance services, the following procedures must be observed.

1. Maintenance services should be performed in fine weather and the machine is placed on firm and level surface.

2. Hydraulic system inspection and maintenance services should be performed in area free from dust.

3. Shut down the engine and ensure no load on the hook before inspection of the engine. Hang on the driver's cabin door a hanger marked "Machine under Repair". For engine inspection see "Engine Operational Manual". Remove key.

Class	Inspection and maintenance	Items
A	Daily	Check engine fuel level Check oil level in hydraulic oil tank Check engine visually Check for leakages of pipes, hoses and loose joints Check for leakage on cylinders of main and aux. winch pawls Check for leakage of cylinder of derrick winch pawl Check A-frame and sheaves Check wire ropes and hooks Check switch levers, pedals and monitors Fill lubricant into rotation parts

B	Monthly	Repeat inspection procedures in Catalogue A. Replace machine oil and filter of the engine Check tension of engine belt Check voltage of battery Clean surface of engine and hyd. oil radiator Check and adjust track tension Check oil level of reduction gears for hoist, slew, derrick and travel.
C	Yearly	Repeat inspection procedures in Catalogue B. Fill or change lubricant periodically Replace filter covers of hydraulic oil filters and make chemical analysis on oil quality. Replace lubricant for reduction gear of hoist, derrick, slew and travel. Replace leaking or damaged high pressure hoses

6.2 Important Notices for Inspection and Maintenance

1. Replacement of the machine oil, gear oil and hydraulic oil should be carried out when the system is still hot.

2. Place the machine on level ground before inspecting the oil level or filling lubricant.

3. Clean the nozzle before and after filling lubricant.

4. Clean up the tank, oil pool and filter covers before change oils with different brands.

5. Before filling into the tank the hydraulic oil must be filtered with filtration precision 30μm.

6. The lubrication points, oil filling ports and drainage ports are shown in Fig. 6-1.

7. Fill all bearings with lubricants and reduction gears with gear oil.

8. The grease points, oil filling ports and drainage ports are shown in Fig. 6-2.

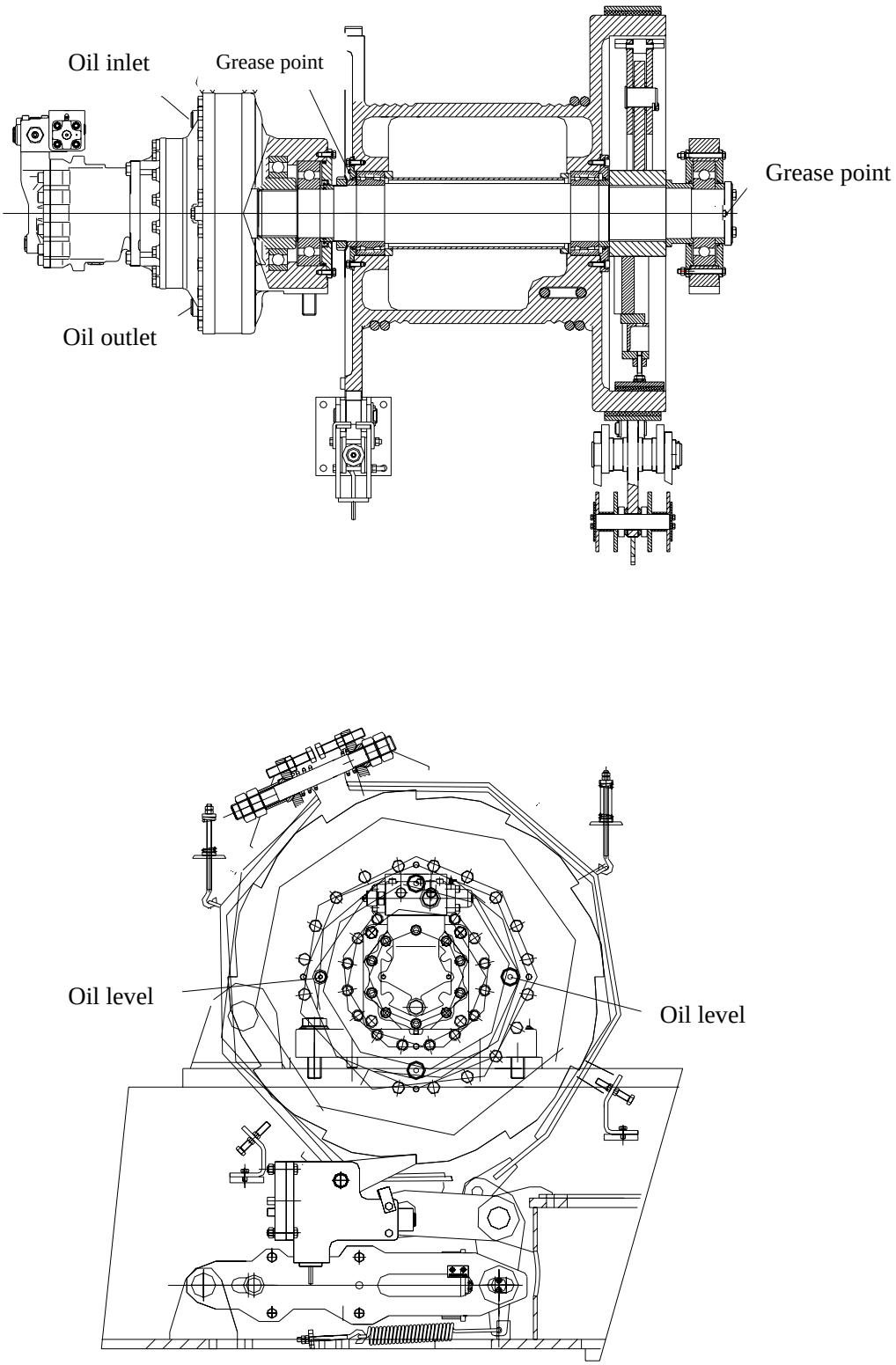


Fig. 6-1 Main, aux. winches

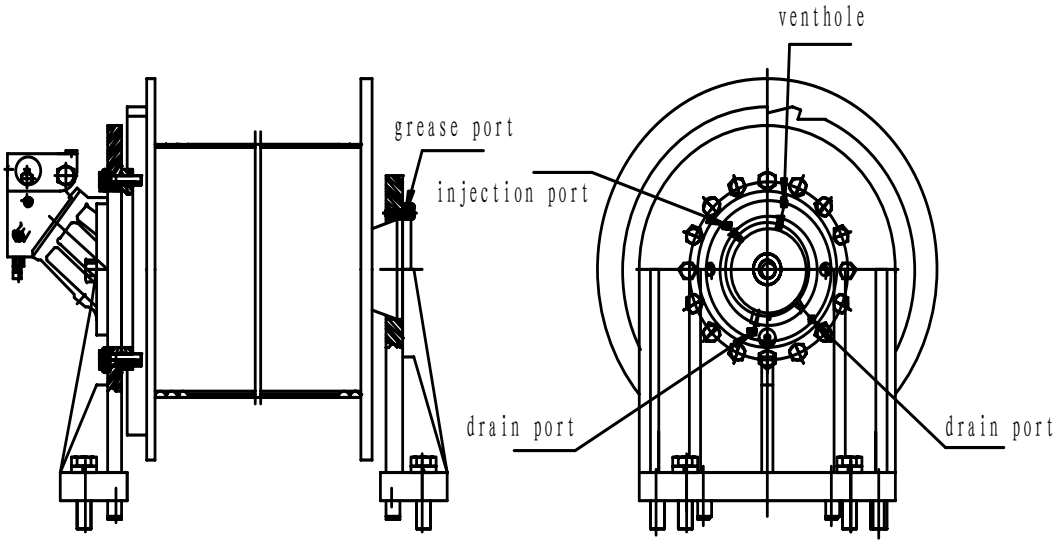


Fig. 6-2 Derricking winch

6.3 Adjustments of Pawls on Main/Aux. Hoisting Winches and Derricking Winch

6.3.1 Adjustment of pawls on main and aux. hoisting winches

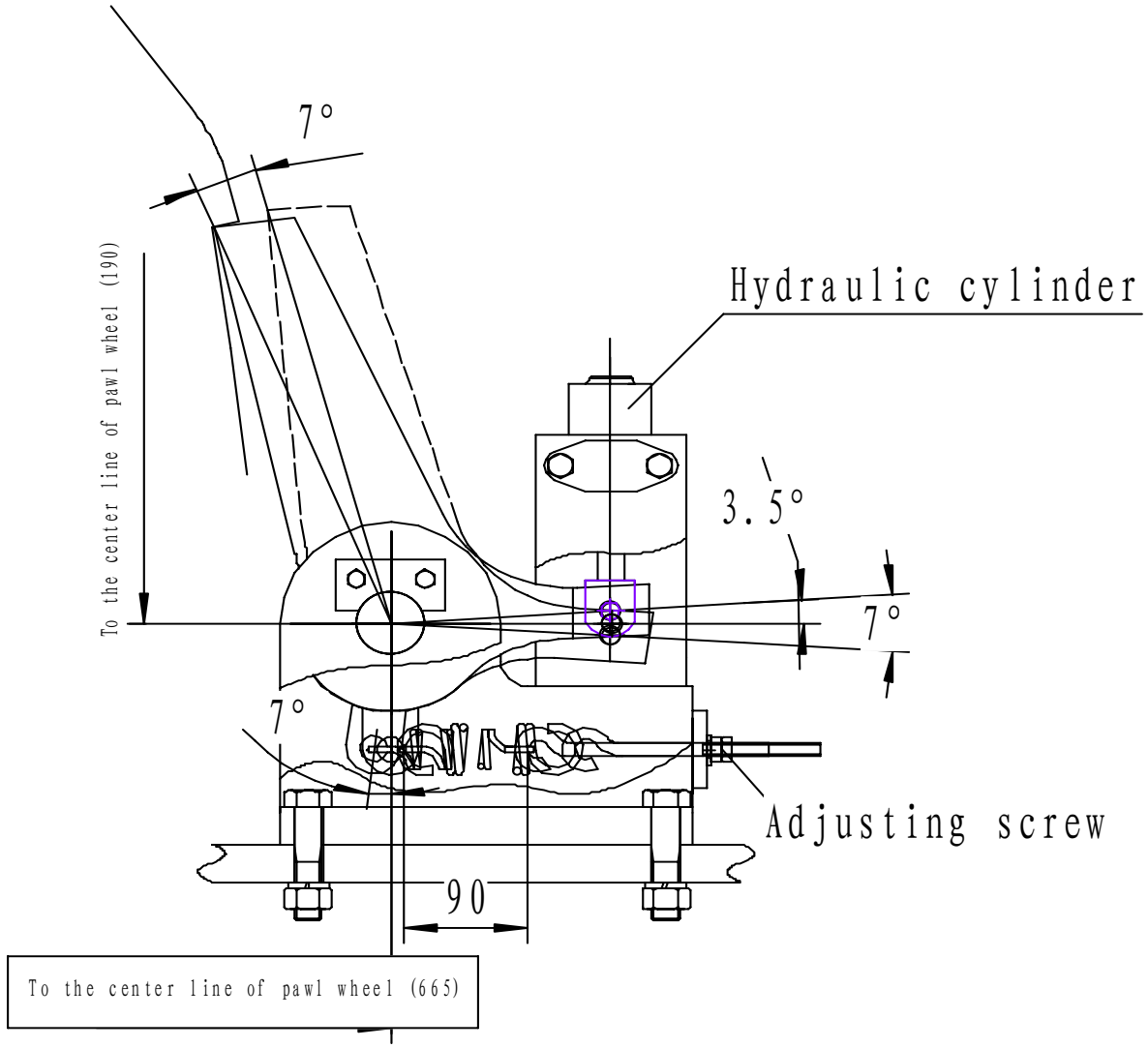


Fig. 6-3

As shown in Fig. 6-3, the swing angle of pawl is 7 degree, and the cylinder stroke is 11.1mm. During installation the pawl spring should be adjusted to the dimensions shown in Fig. 6-3 (90mm) by adjusting screw. The minimum installation dimension is 115mm.

6.3.2 Adjustment of pawl on derricking winch

As shown in Fig. 6-4. Spring 3 and Spring 4 are to keep pawl in position, and Spring 5 is to restore cylinder piston back to position. In open position the distance between top of pawl and top of ratchet wheel is 5mm.

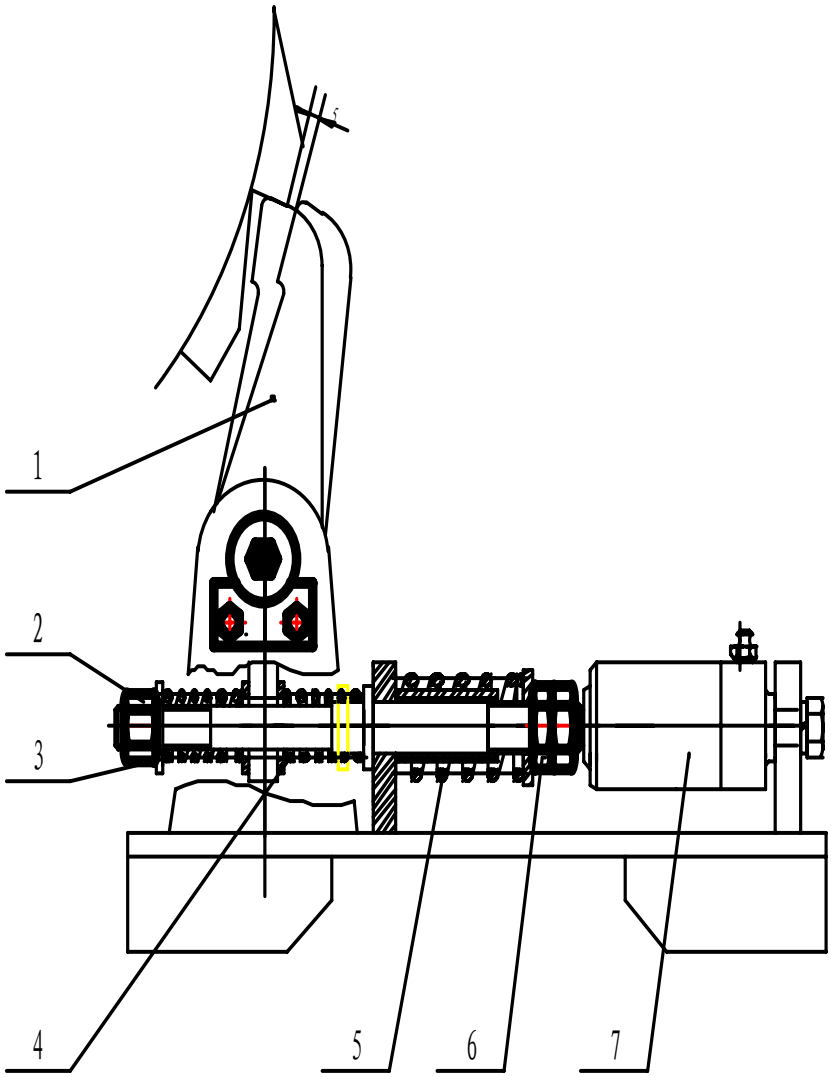


Fig. 6-4 Ratchet Wheel

1. Pawl 2. Adjustment nut 3. Adjust spring 4. Compressive spring 5. Back spring 6. Adjust nut 7. Hydraulic cylinder

Spring 3 and 4 is used to maintain the pawl position. Spring 5 is cylinder piston back spring. When the pawl opens, the distance to the teeth of pawl wheel is 5mm.

6.4 Adjustment of Brakes

6.4.1 Structure of brakes for main and auxiliary winches as shown in Fig. 6-5 below:

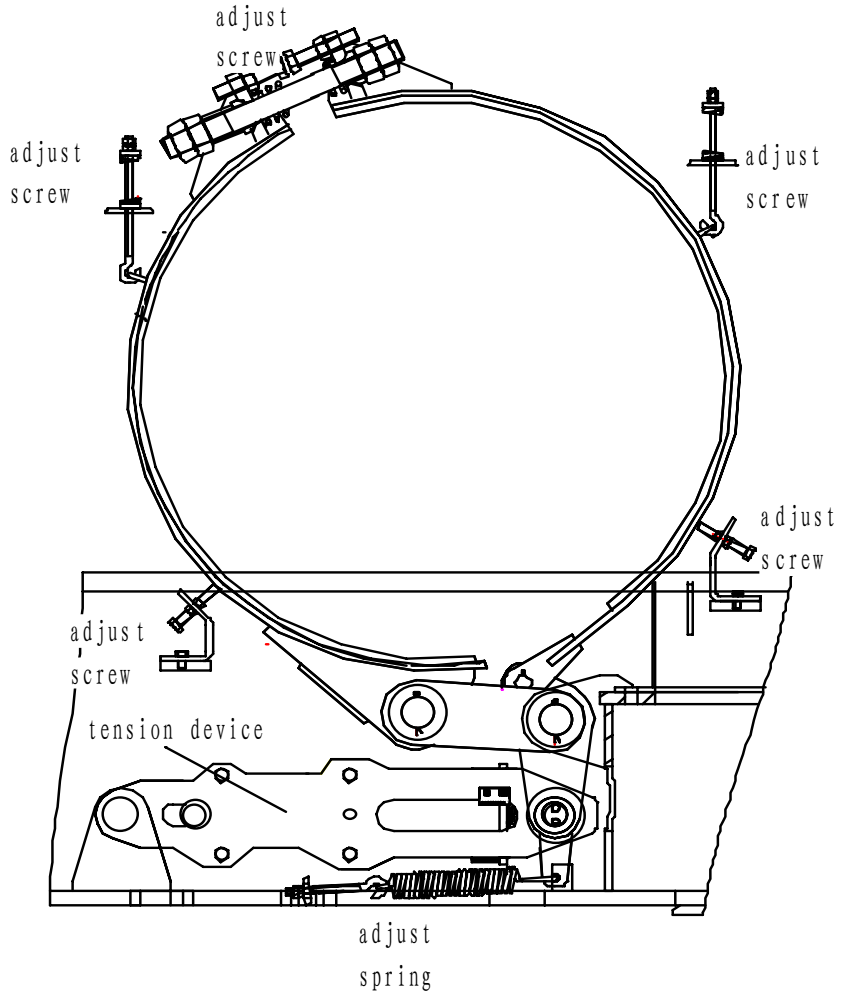


Fig. 6-5

The roundness of brake band can be adjusted by adjusting the 5 screw nuts and the spring.

1. When the brake is disengaged, the gap between brake band and the winch drum should be 0.8-1mm.
2. When engaged, the touching surface of brake bank and drum should be more than 75%of total surface.

6.4.2 Adjustment of brake spring, see Fig. 6-6 below:

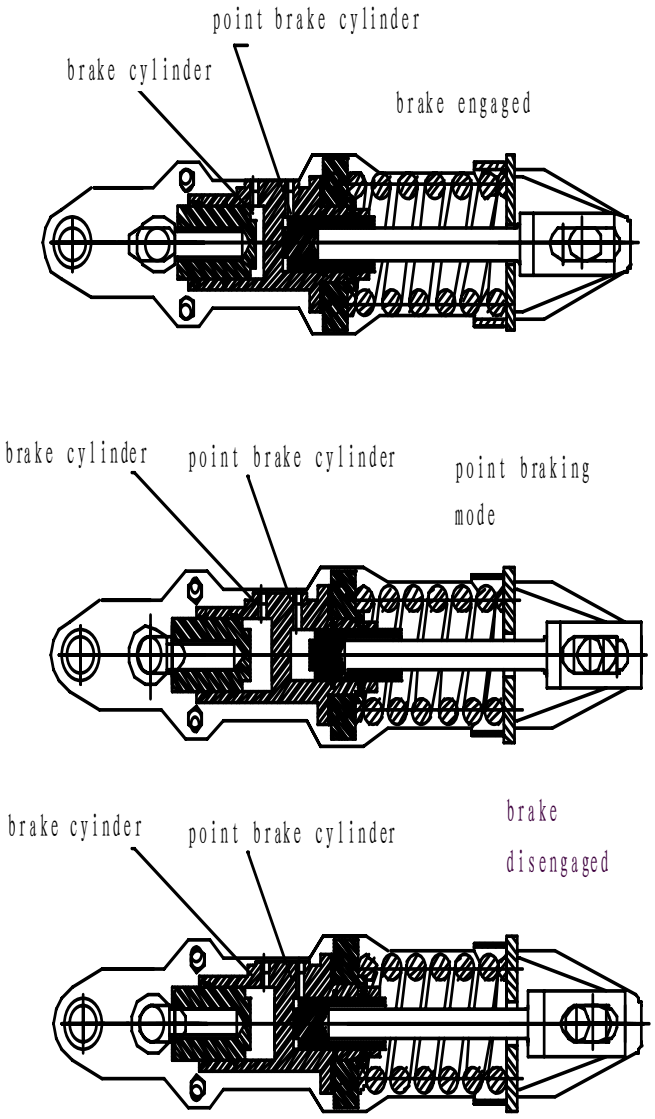


Fig. 6-6

1. Engaged status: the brake cylinder is cut off and the brake is engaged by spring force.
2. Touch braking status: brake cylinder is power on and the spring is pressed and brake is disengaged. Then by touch brake to control free falling speed.
3. Disengaged status: brake cylinder is power on and touch brake cylinder is cut off, the brake is disengaged.

Note:

After adjustment of brakes or clutches a test using a load must be carried out to

insure good working operation.

6.5 Adjustment of clutch, see Fig. 6-7:

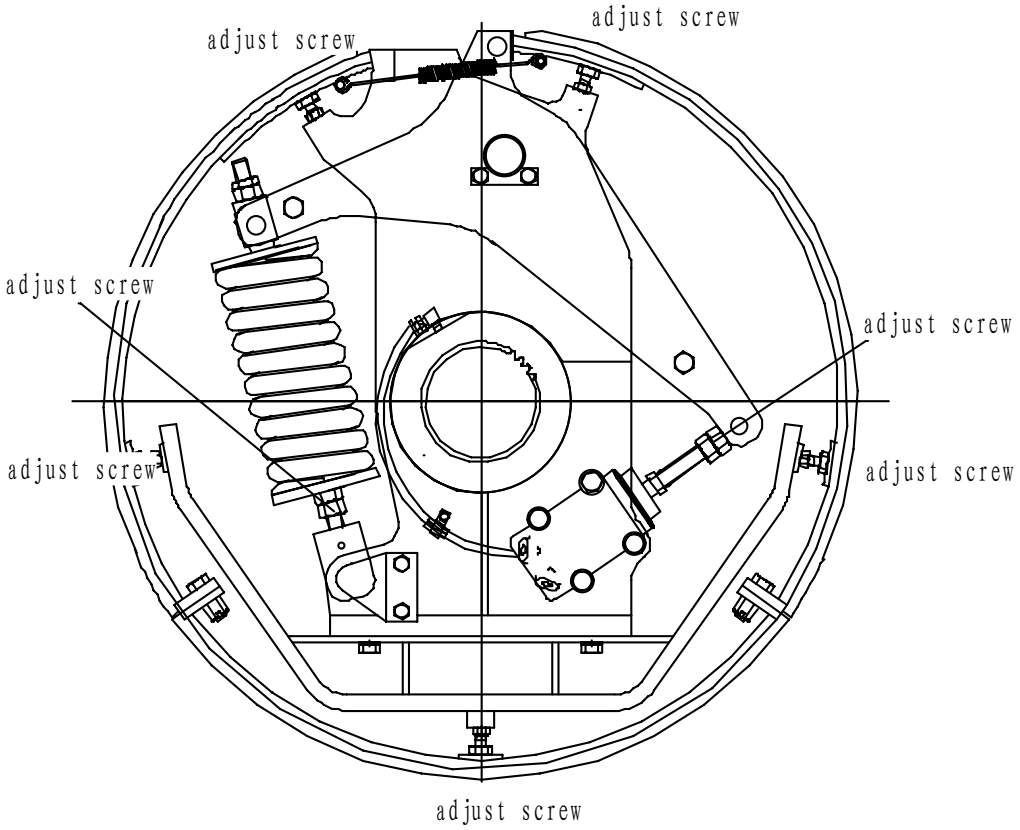


Fig. 6-7

1. Adjust the roundness of the brake band by adjusting the adjustment screw nut to required standard.
2. When the clutch is disengaged the gap between the band and the drum should be about 0.5mm.
3. When engaged, the touching surface between clutch lining and drum should be more than 75% of total surface.

6.6 Track tension adjustment

The sinking of the shoe between the pilot wheel and upper roller is not more than 20mm.

Chapter Seven Boom Disassembly and Assembly

For boom disassemble and assemble. Refer to Fig. 7-1.

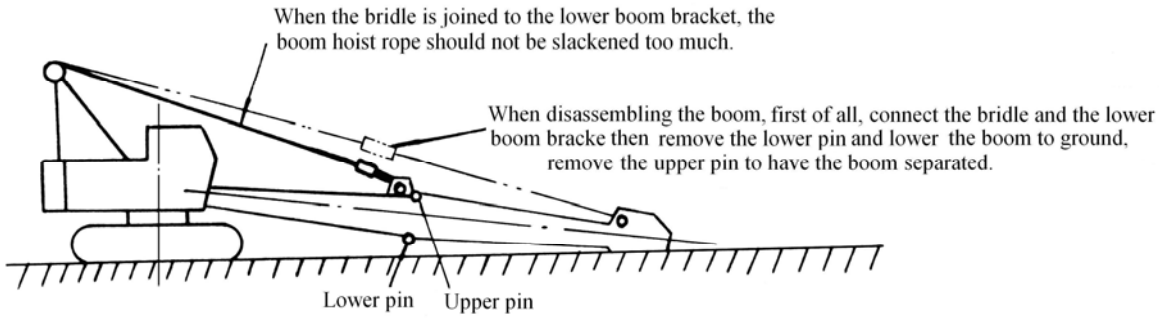


Fig. 7-1

Note: Never enter under or on top of boom when remove boom pins.

1. Boom replacement, disassembly and reassembly work should be carried out in open and wide space
2. It is recommended to use another crane to assist the assembly or disassembly work to make it easy.
3. Any strained installation must be avoided.
4. Check the working attachment for damages before disassembling or assembling.
5. Check and make sure the wire rope reeving is correct.
6. Special attention must be paid for safety in installing or disassembling of booms.
7. Adjust the Safe Load Indicator to be corresponding to the boom configuration.
8. Check all pin and clip are in place before lifting the boom.

7.1 Boom Combinations

The crane boom set consists of 13m basic boom (boom foot 6.5m, boom tip 6.5m) and boom sections of 3m, 6m, and 9m in length. The combinations are shown in Fig. 7-2.

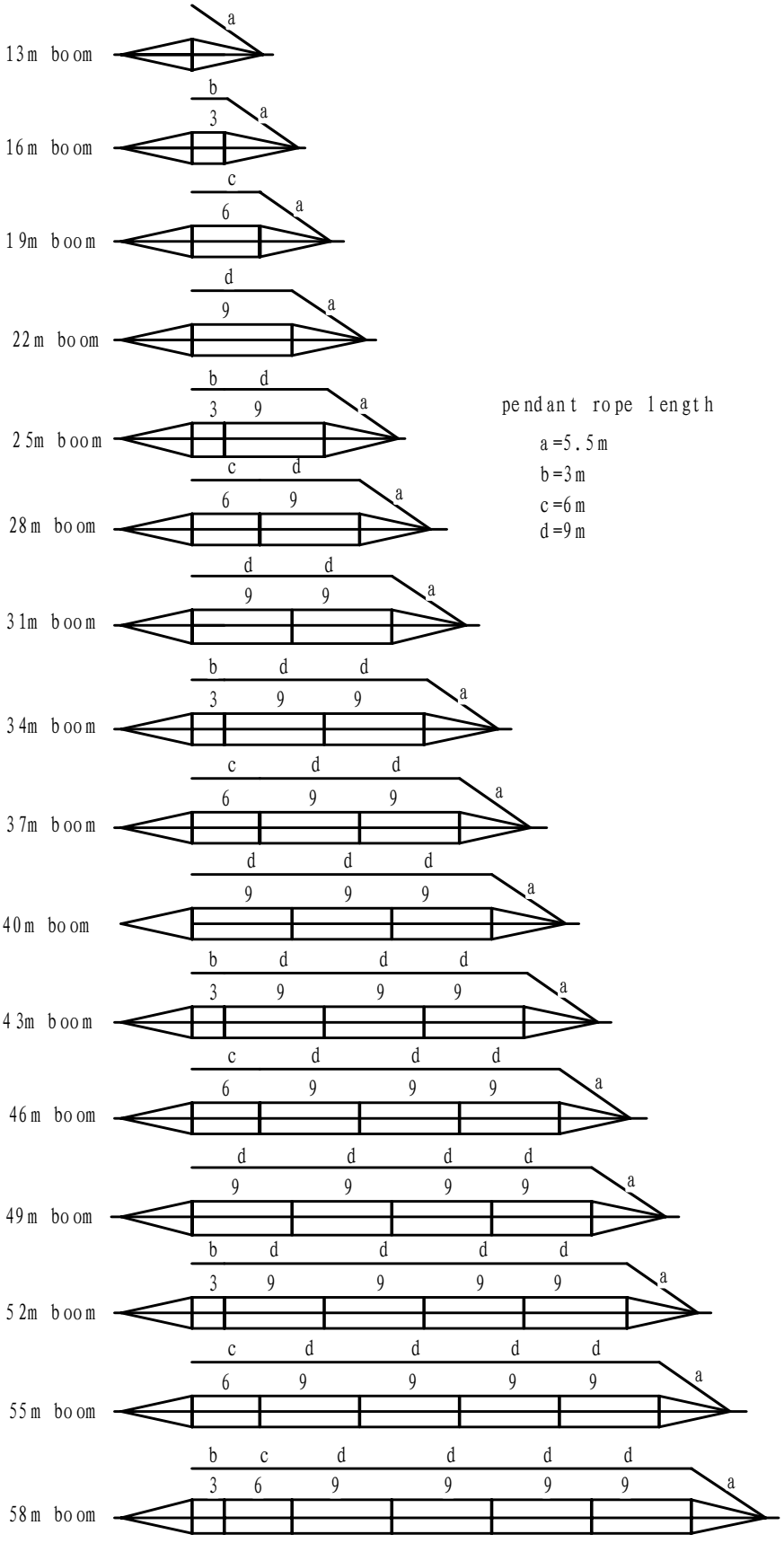


Fig. 7-2 Boom Combinations

7.2 Boom Assembly and Disassembly

7.2.1 Basic boom assembly

Boom assembly procedures are as follows:

1. Prepare the following parts and components:

6.5m boom foot, 6.5m boom tip, pendant wire rope, hoist derricking wire rope, bridle, boom joint pins, pin locks, boom stoppers and electrical cables.

2. Joint the boom foot and boom tip on level ground using boom joint pins, as shown in Fig. 7-3.

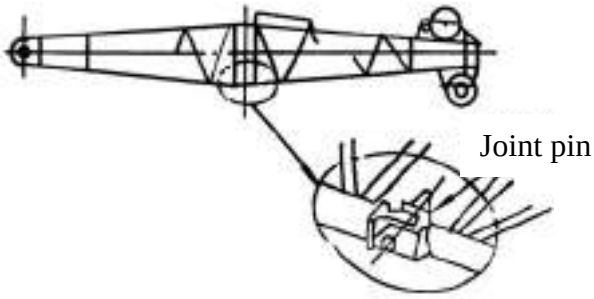


Fig. 7-3

3. Lift up the boom foot using an auxiliary crane, as shown in Fig. 7-4.

4. Center boom foot pin hole by moving machine. Lightly hammer boom foot pin to insert. Fit to insert. Fit in stopper, as shown in Fig. 7-4.

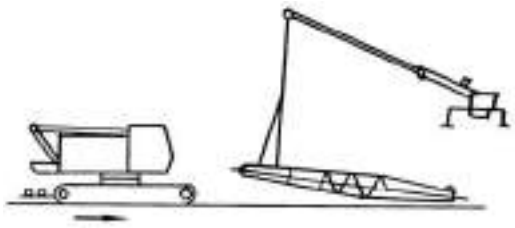


Fig. 7-4

5. Refer to Chapter Seven “Wire rope reeving” for reeving of derricking rope between bridle and pulley block.

6. Install boom stopper, as shown in Fig. 7-5.

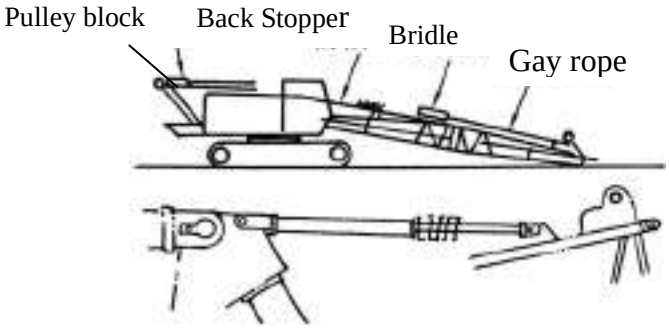


Fig. 7-5

7. Joint boom tip and bridle with pendant rope.

8. Wiring electric devices (hook anti-over hoist limiter, boom angle indicator and moment limiter) after completing jib assembly.

9. Lift up A-frame and mount on the counterweights, as shown in Fig. 7-6.

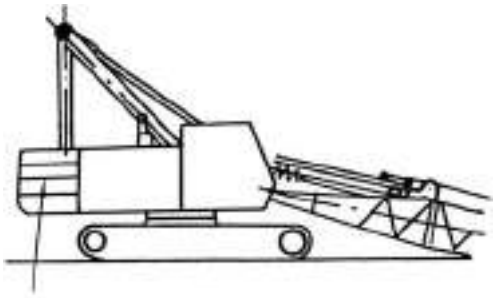


Fig. 7-6

10. Gently wind in the derricking wire rope to lift up the boom. Precaution should be taken to prevent wire rope from being disordered.

11. For disassembling the boom, carry out the above procedures reverse.

7.2.2 Assembly procedures for Boom Sections

1. Select suitable boom sections according to the boom combination guideline (see Fig. 7-2). Prepare pendant ropes and boom joint pins accordingly.

2. Put basic boom on the ground as shown in Fig. 7-7.

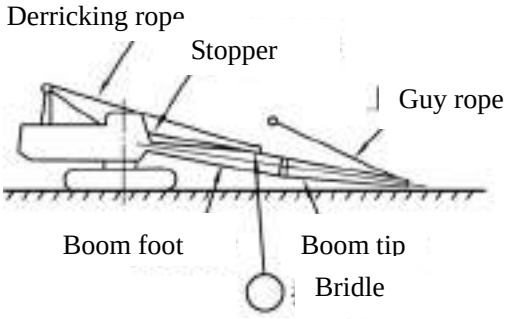


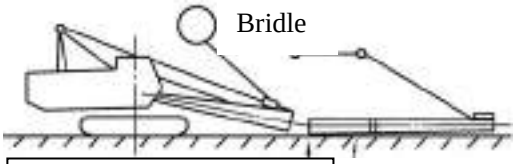
Fig. 7-7

3. Loosen the derricking wire rope.

4. Directly connect self-assembling bridle and the connecting link in stalled on boom foot using pin. Then disconnect gay rope from bridle.

5. Remove boom joint pin for separation of boom foot and boom tip as shown in Fig. 7-8.

6. Move basic machine backward a distance where boom section can be put in between after lifting boom foot., as shown in Fig. 7-8.



Never enter under boom when drawing out boom pins

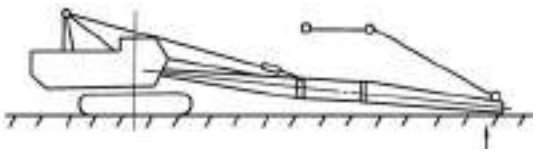
Boom section

Fig. 7-8

7. Joint the boom tip, boom sections and pendant rope together with pins.

8. Move the machine slowly to align the holes of boom foot and boom section. Then insert the pin.

9. Wind up derricking rope until underside pin holes of boom foot match with boom section. Insert the pin as shown in Fig. 7-9.



Do not take end of boom off ground or boom may bend.

Fig. 7-9

10. Disconnect the bridle and the link of boom foot. Connect the bridle with pendant rope.

11. Install hoist rope, hook and wire electric devices.

12. Wind up derricking rope for working posture.

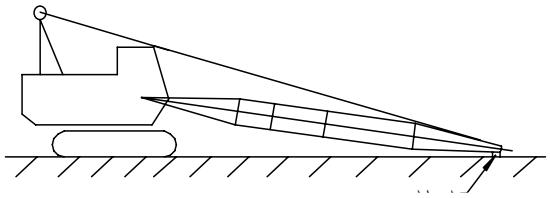
13. Gradually wind up the boom. Check the functions of boom over hoist preventive device

and hook over hoist preventive device when the boom angle is 80°.

14. Check derricking rope has row on to winch drum properly.

7.3 Disassembly of Boom

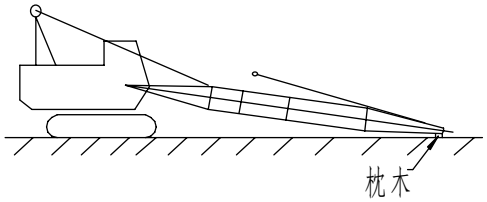
1. Lower the boom slowly onto the ground. Put timber sleeper under the tip of the boom to protect it from damage or dirt.



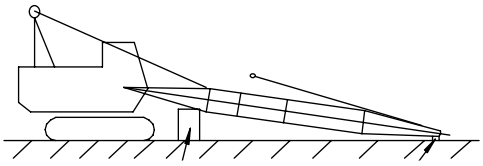
Wooden block

2. Slack the derricking rope and remove the gay rope from the bridle.

3. Mount the bracket for self-assembling of the bridle on the basic boom with pins.



4. Support the basic boom with wood block.



Support block Wooden block

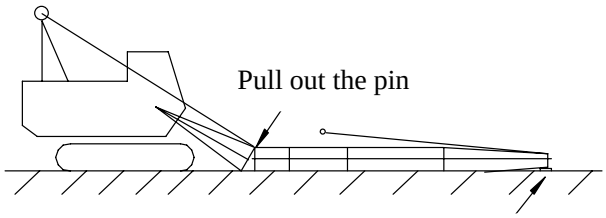
5. Wind and tension the derricking rope.

Caution: Tension the derricking rope. The boom top should not be away from the ground.

6. Adjust the position of support block to make no gap between basic boom and the wooden block.

7. Remove the underside joint pins of the boom. Wind the derricking rope a little and take out the block.

8. Lower the boom a little until whole boom is on the ground completely. Remove the spring pin on the upside pin.



Caution: The boom will fall off if it is supported with no blocks even though the bridle is connected with the boom foot. The boom will also fall off if disassembling it without tensioning the derricking rope.

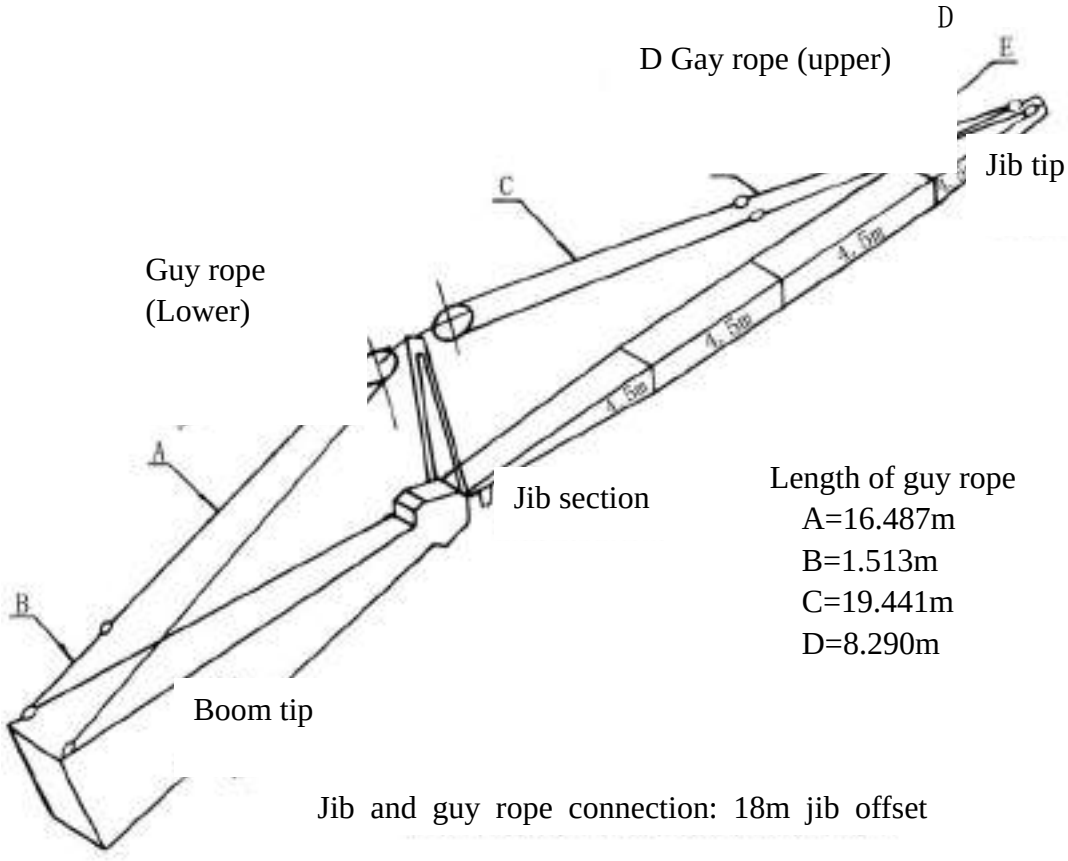
Danger：It is absolutely forbidden to enter under the boom to pull out the connecting pins.

7.4 Jib Assembling

1. Before jib assembling, prepare the following component: pins for jib, cotter pin, hoisting rope, hook, supporting mast and pendant rope.

2. Put the boom onto the ground and install the jib and support mast.

3. Connect the upper gay rope to jib through the balance pulleys mounted on the supporting mast. Connect the lower guy rope to the bracket of the boom through the balance pulleys as follows.



Guy rope reeving with jib

Boom length（m）			37～49	37～49	37～49	52
Jib length（m）			9	13.5	18	13.5
Jib combination（m）			4.5 Up+4.5 Down	4.5+4.5+4.5 Down	4.5Up+2×4.5+4.5 Down	4.5Up+4.5 Down+4.5
Guy rope (lower)	Angle	15°	A			
		30°	A+B			
Guy rope (upper)			C	C+D	C+2D	C+D

CAUTION:

1. If the connection of the guy rope is not correct, the jib angle will be wrong and cause serious accidents.

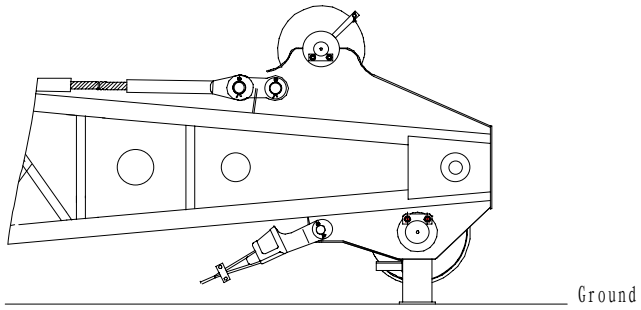
2. Install the weight of hook anti-over hoist limiter when install the hoisting rope.

3. Adjust the Safe Load Indicator in accordance with the boom and jib combination and angle.

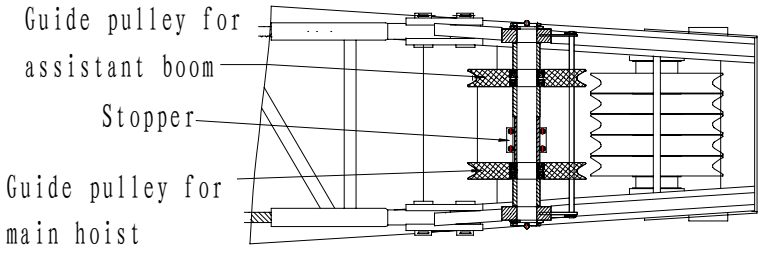
7.5 Assembly of the assistant boom

1． Prepare the parts for assistant boom and tools, such as hammer and spanner.

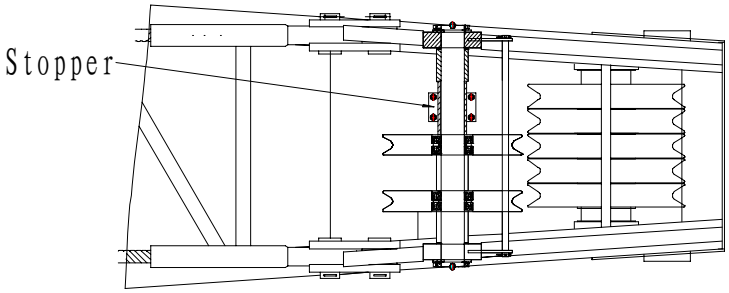
2．Lower the boom on the ground.



The position of stopper is shown as follows.



3．Adjust the stopper to move the assistant guide wheel to the center.

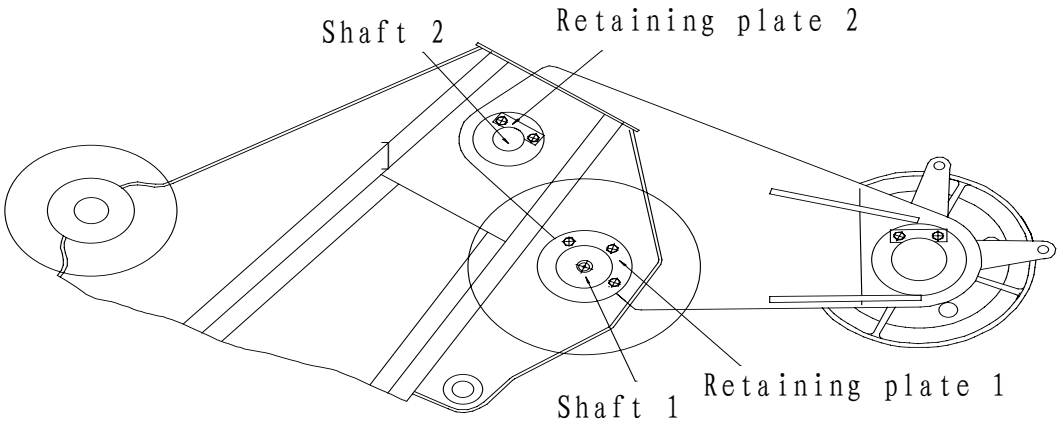


4. Installation of the assistant boom

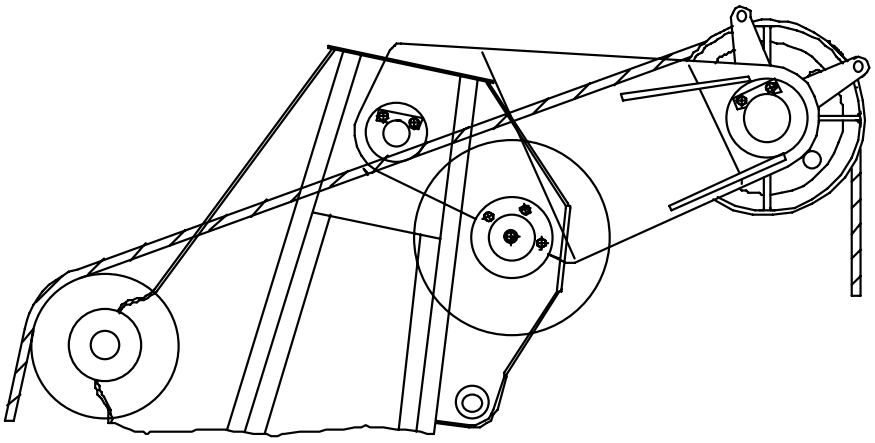
a. Lift the assistant boom. Push the assistant boom towards the boom head to make the holes on the assistant boom align the holes on the boom tip. Insert Shaft 2.

b. Turn the assistant boom to make the recesses which on the assistant boom fit the grooves on both sides of the boom tip.

c. Install retaining plate 1 and 2 with bolts.



5. Wind the wire rope on the assistant boom as follows.



Chapter Eight Wire Rope

8.1 Usage of Wire Ropes

Most of actions of the machine are done by wire ropes. The quality and the maintenance of the wire ropes effect on the efficiency of operation. Please use the ropes which appointed by the manufactory correctly.

8.1.1 Unwind the rope from reel.

When install rope to the machine by unwinding a rope reel, correct procedure must be applied, as shown in Fig. 8-1.

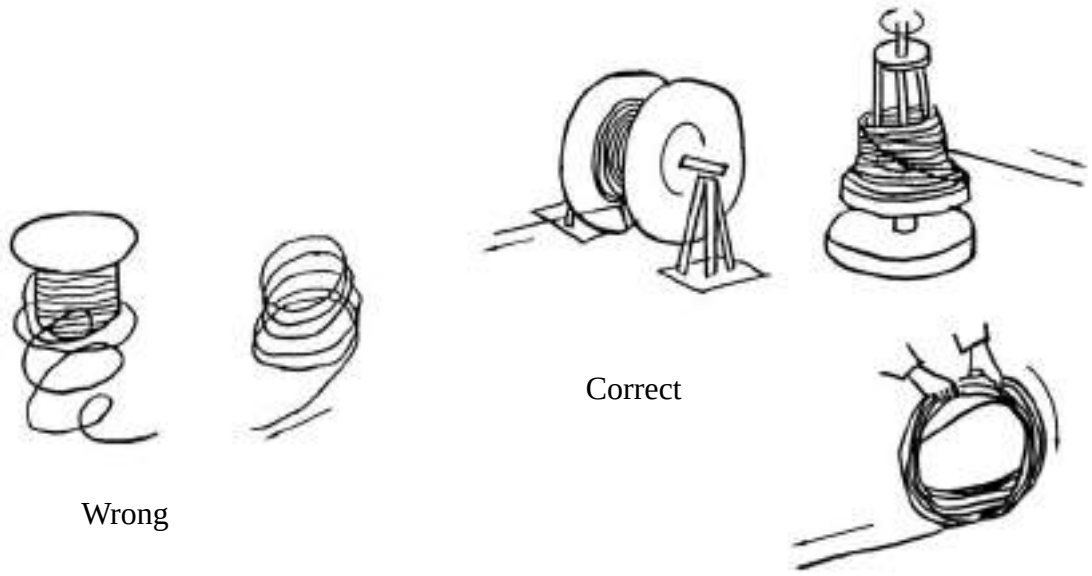
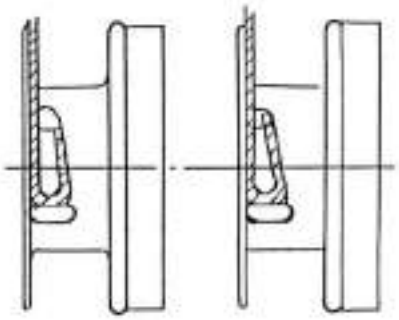


Fig. 8-1

8.2 Wire rope unwinds around drum

Unwinding a wire rope reel incorrectly will disturb the construction of the rope and cause loosening, kinking or twist which may seriously affect the servicing of the rope.

Wind up new ropes onto the drum as shown in Fig. 8-2 and 8-3.



Correct Wrong

Fig. 8-2 Anchor Wire Rope onto Drum

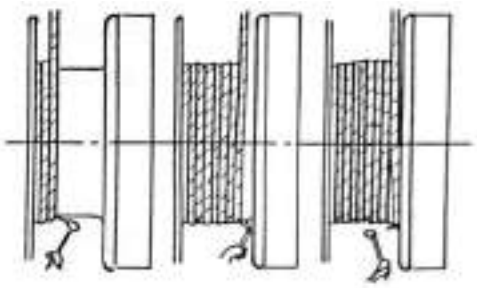


Fig. 8-3 Correct Method of Reeling Rope

Comply with the following procedures when reel the ropes.

1. Lock the rope to the drum. Do not protrude the end of the rope beyond outer drum surface.

2. When reel the rope on a drum, use care to guide the rope in line with each other from one end of the drum.

3. When the first layer is finished, the rope should be tapped or pushed into place with a wooden hammer or pry bar to ensure an even winding surface.

4. Keep the gap as smaller as possible between the drum and the first coil of the rope when winding continuous.

5. Always keep sufficient tension when winding.

6. Winding in poor should be absolutely avoided, which is one of the reasons causes the premature break.

7. As a usual practice that the rope rewinding is necessary after a period of use, or it will run in poor occasionally.

8. Use rope clip to fix the end when handling wire rope with a rope socket as shown in Fig. 8-4.

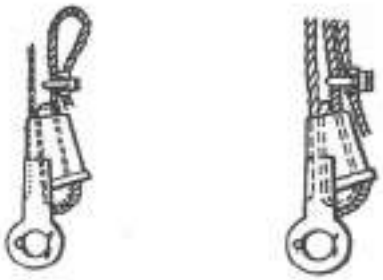


Fig. 8-4 Dead ending rope in a socket

8.3 Replace the Wire Rope

Servicing life of the wire ropes is greatly different depending on their separate working conditions. It is therefore very important that the wire ropes be inspected at regular intervals. Use defective rope is not allowed. All ropes including the hoisting ropes and pendant ropes must be inspected in regular intervals. Severe accident will be brought without inspecting the wire ropes strictly.

Replacement intervals of wire ropes are evaluated with their broken wires, wear and corrosive conditions.

Replace the wire ropes when:

1. Ten percent of the wires consisting of the entire strand are broken.
2. The diameter is reduced by more than 7% of its normal size.
3. Twisted or kinked.
4. The rope is deformed or rusted excessively.

In addition, such as the pendant ropes are subjected to shock and heavy loads, care must be paid for failure due to fatigue of materials. The replacement of a rope can be considered according to above conditions but inside conditions can not be estimated due to different working conditions. All in all, ropes should be replaced every 2000 servicing hours even if the above defects are not found.

8.4 Wire Rope Reeving

8.4.1 Derricking rope reeving

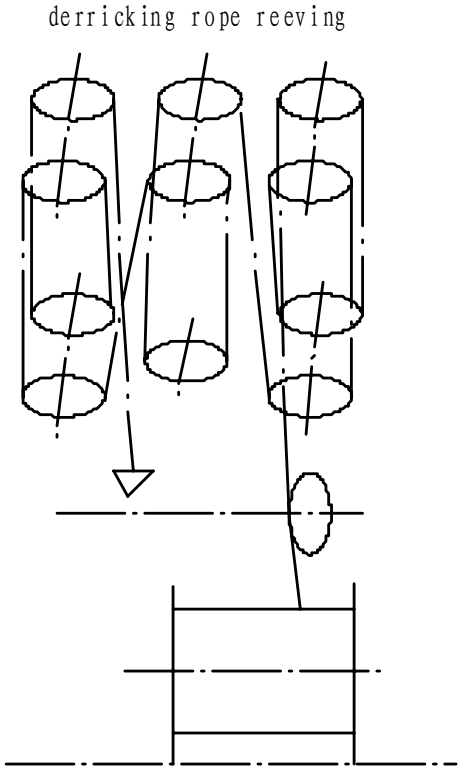


Fig. 8-5

8.4.2 Main hoist wire rope reeving

Caution: The maximum number of part lines of main hook is 10. The direction of socket is shown in Fig. 8-6. The method of the rope reeving is shown in Fig. 8-7.

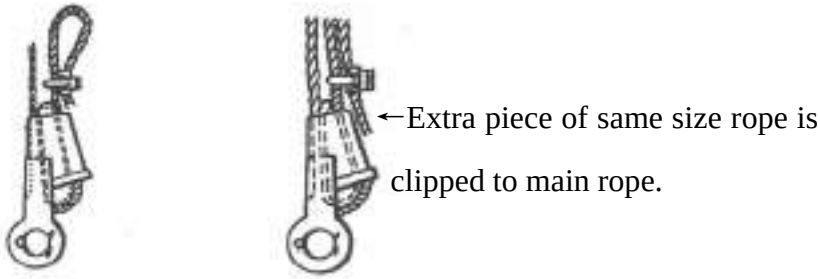


Fig. 8-6

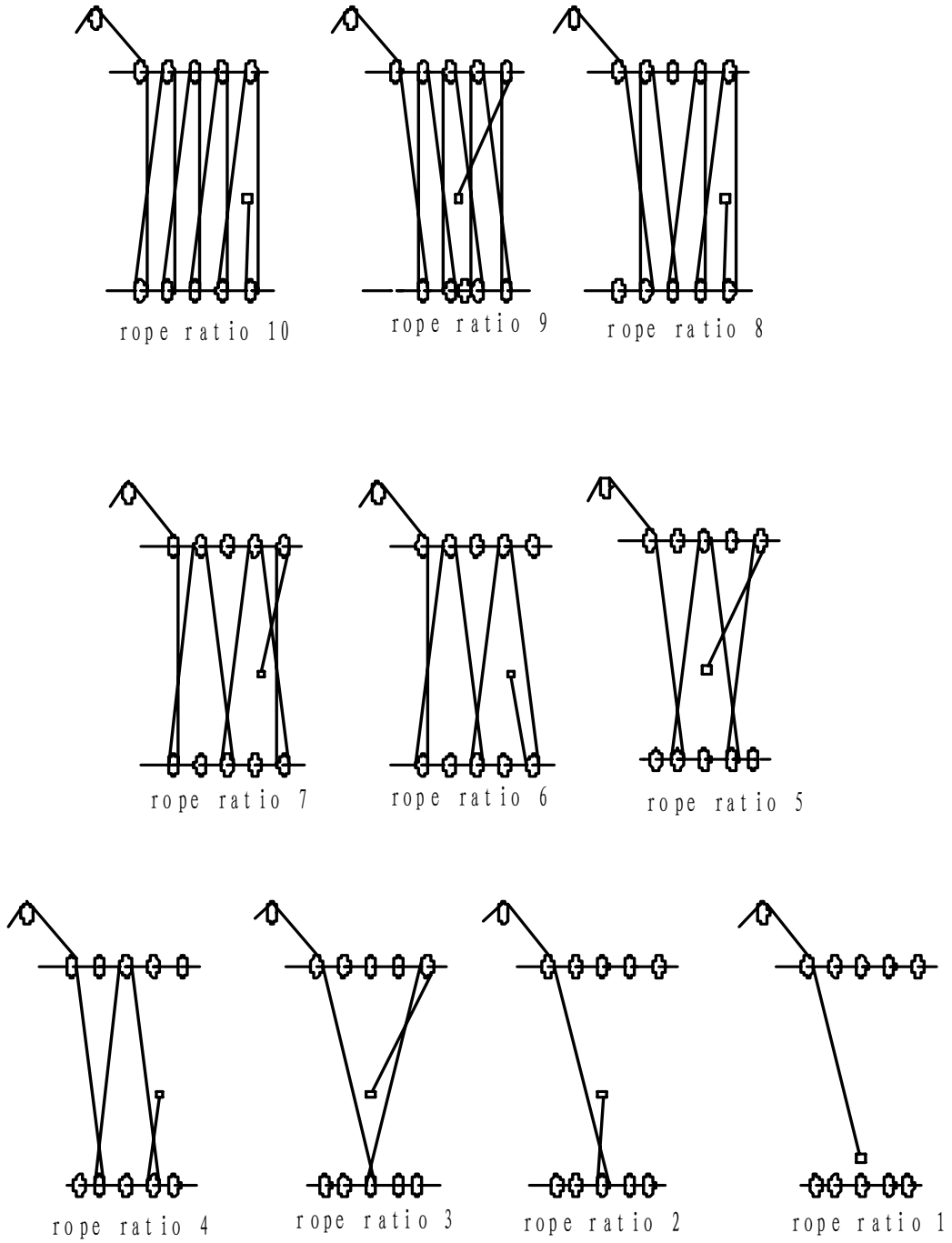


Fig. 8-7 Main hoist rope reeving

8.4.3 Aux. hoist rope reeving.

See Fig. 8-8

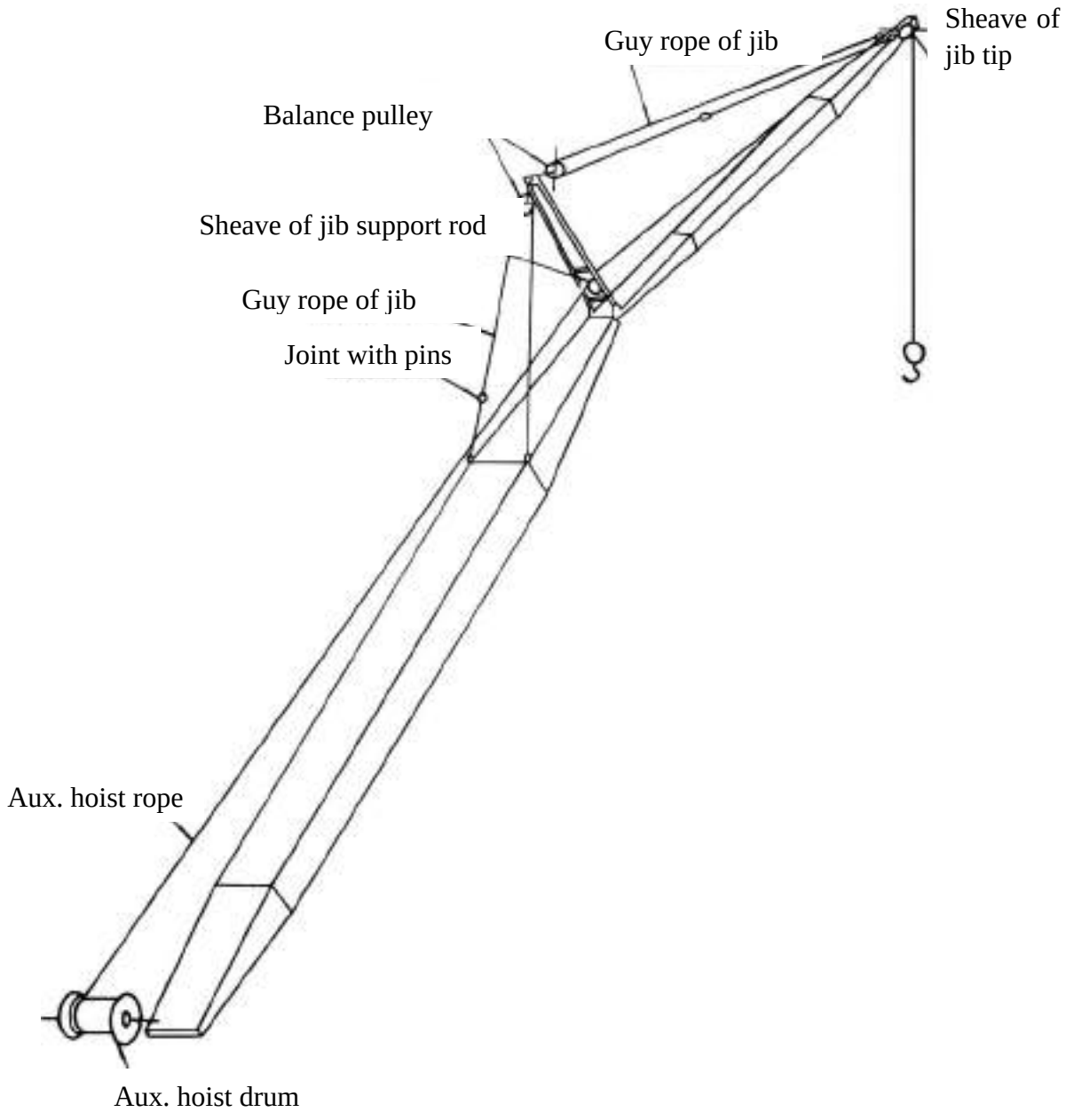


Fig. 8-8 Aux. hoist rope reeving

8.4.4 Reeve the wire ropes of main and aux. hoist at the same time.

See Fig. 8-9

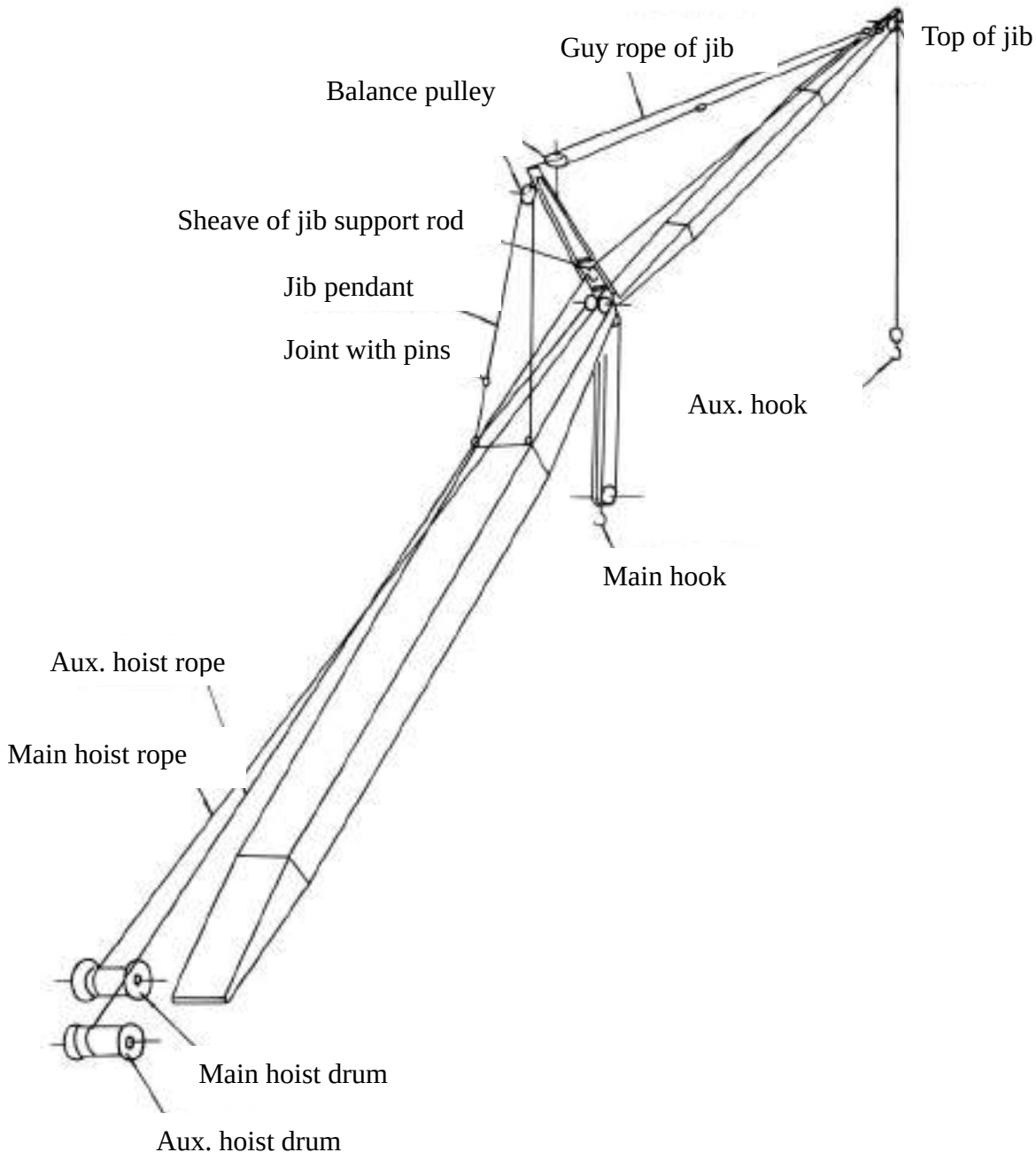


Fig. 8-9 Main and aux. hoist wire ropes reeving

8.5 Standard of Wire Rope

Specification for crane wire rope

Application	Specification	Rope dia.	Qty	Length (m)	Breaking load
Main winch	6Fi(29)-φ26-B	φ26mm	1	220	46t
Aux. winch	6Fi(29)-φ26-B	φ26mm	1	180	46t
Derricking	6Fi(29)-φ20-C	φ20mm	1	200	27t

Chapter nine Transportation

When the work is finished and machine is to be transported to other site, disassemble the attachment, counterweight and both tracks for transport.

9.1 Disassembly of Crane

There are two schemes of transport available.

9.1.1 Transport with crawlers on the machine

1. Place the machine on solid and level ground. Turn the boom in the lengthwise of the crawlers.
2. Lower the boom onto the ground.

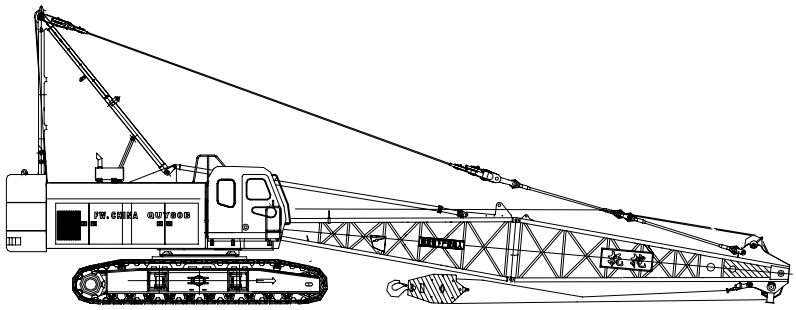


Fig. 9-1

3. Remove all counterweights.

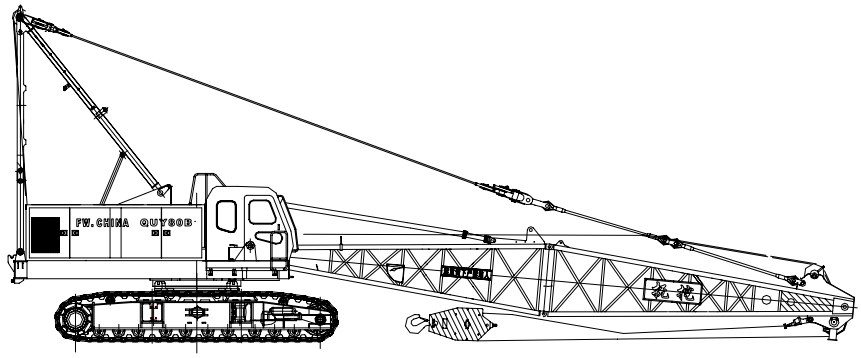


Fig. 9-2

4. Fully lower down the A-frame and keep the derricking pulley block on the A-Frame and then disconnect the pendants.

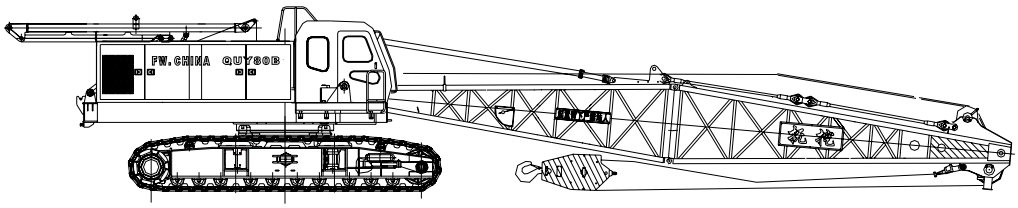


Fig. 9-3

5. Remove the main and auxiliary hooks and reeling the wire ropes onto the main and auxiliary winches.

6. Remove the boom section one by one.

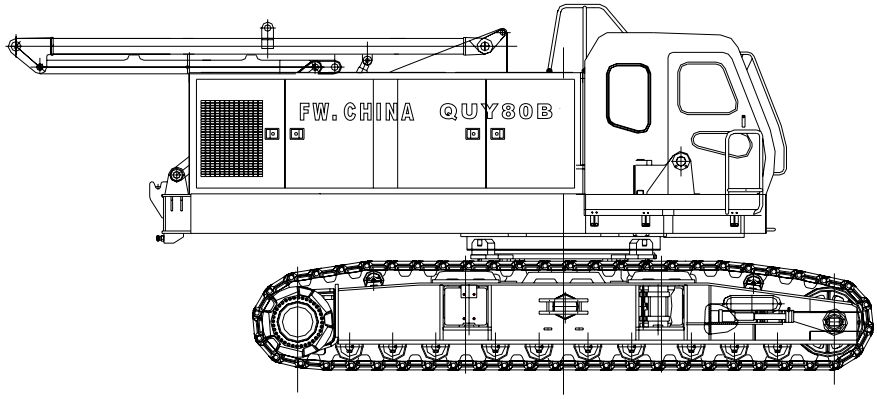


Fig. 9-4

7. Retract the crawlers to transport condition. (Refer to Chapter Four)

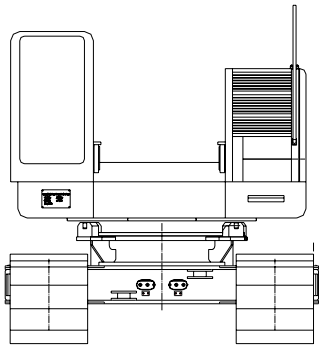
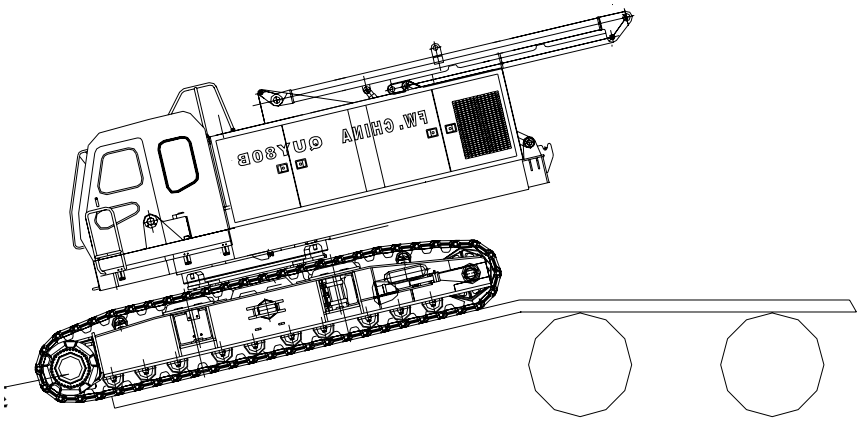


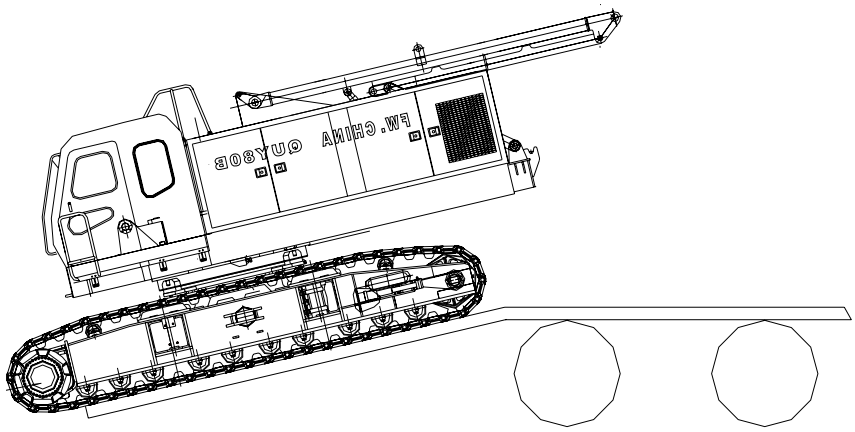
Fig. 9-5

Note: This operation must be done without boom and counterweights on the machine. And cab lock in engaged.

8. Drive the machine slowly onto the trailer, and shut down the engine.



Climb up the trailer



Climb down the trailer

Fig. 9-6

9.2 Transportation with crawlers removed.

In case the vehicle capacity limits, you can remove the crawlers from the car body after finishing step 1.2.3.4.5. 6 of Article 9.1, details as follows:

1. Turn the jack-up cylinders to working position and mount on the jack-up shoes.

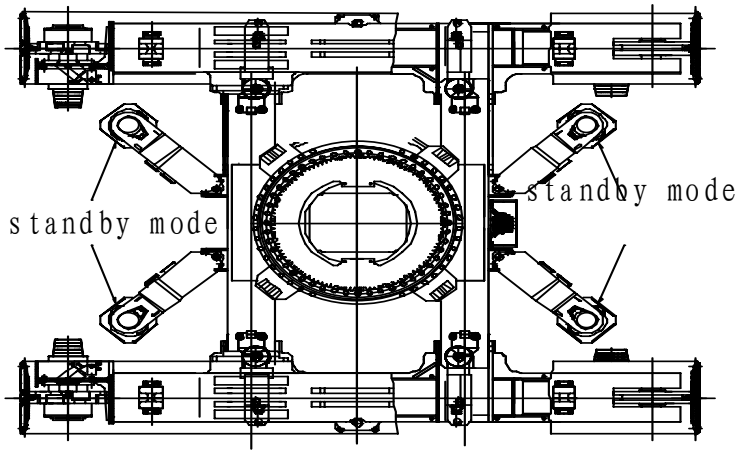


Fig. 9-7

2. Remove the fixing parts (which are for fix-up during transport), see Chapter Four for detailed information.
3. Remove the hoses from the travel motors and disconnect the shift joints.
4. Run the engine at low speed.
5. Switch the pressure conversion switch 21 to ON position, turn the A-Frame pressure lock switch 24 to ON position, and the A-Frame hoist switch to OFF position, also turn the switch 51 to “car body operation” position.

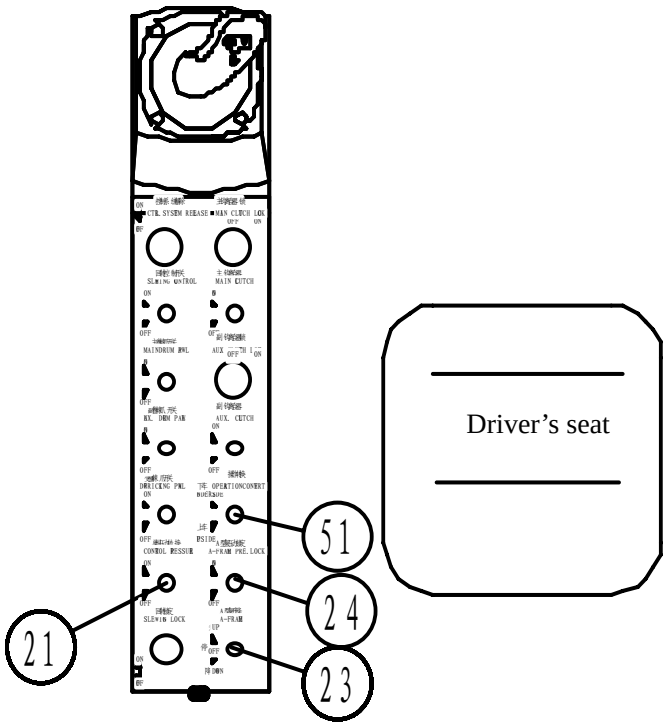
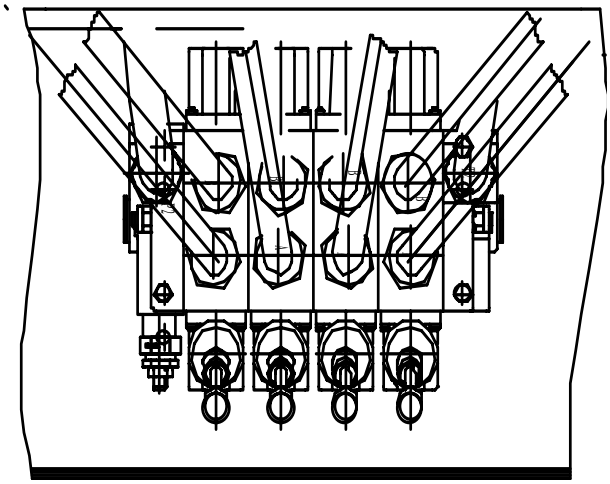


Fig. 9-8

6. Operate the control bar to jack up the car body.



Track jack controls mounted on car body

Fig. 9-9

7. Remove the crawlers one by one using another crane.
8. Retract the crawler retraction cylinder and remove the crawler mounting racks.
9. Operate the controls to lift up car body and drive the truck in under the car body,

see Fig. 9-10.

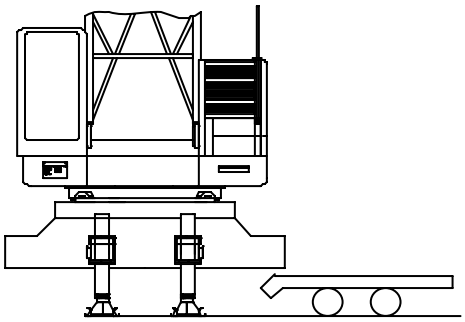
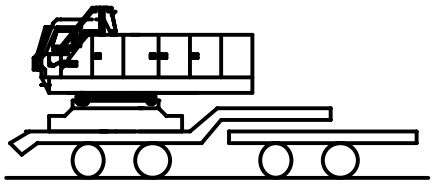


Fig. 9-10

10. Operate the controls to lower down the car body onto the trailer, and then retract jack up cylinders and remove them and pack for transport.



CAUTIONS:

1. Remove the counterweights and booms before make above operation.

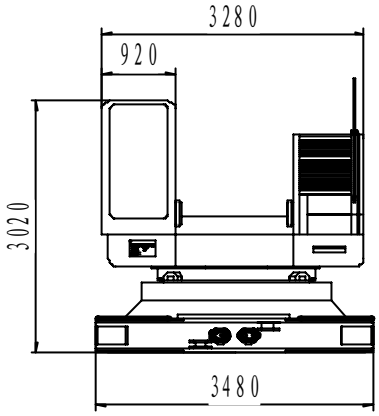
2. Before removing the boom, first remove the counterweights to avoid tipping over of crane.

3. Stop the engine first before disconnect the quick joints and hoses, otherwise it will cause accidents. The hoses should be secured to the bracket with tape after removal.

4. Relative transportation laws should be followed during transportation.

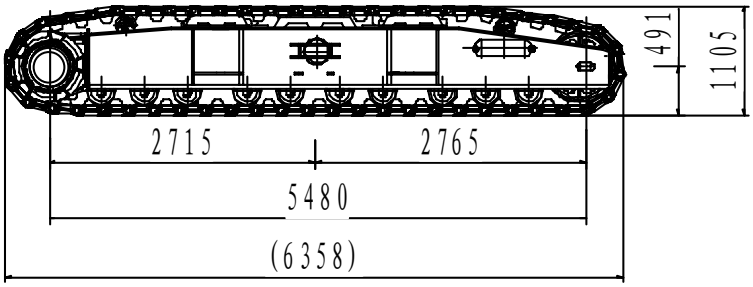
9.3 Transporting Dimensions of All Parts after Disassembly

1. Main Body



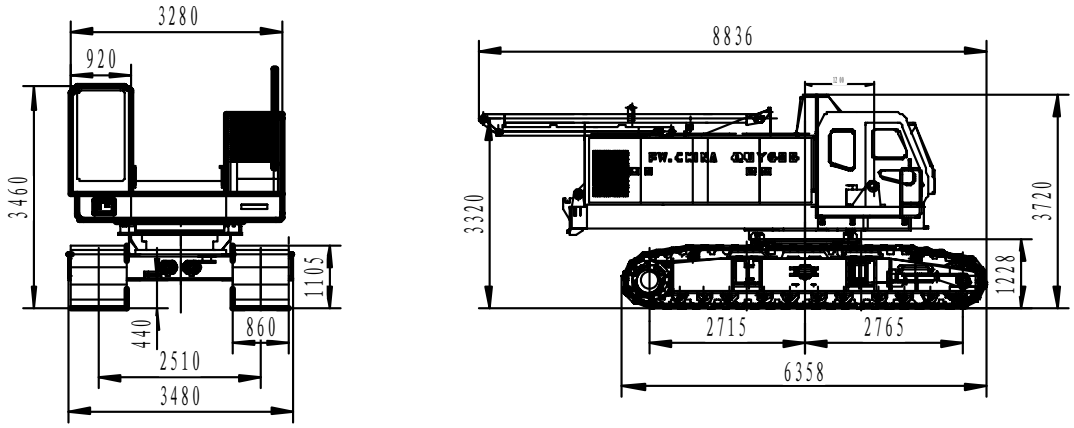
Wt. ----------k g----------29000

2．Crawler



Wt. ----------k g----------12000

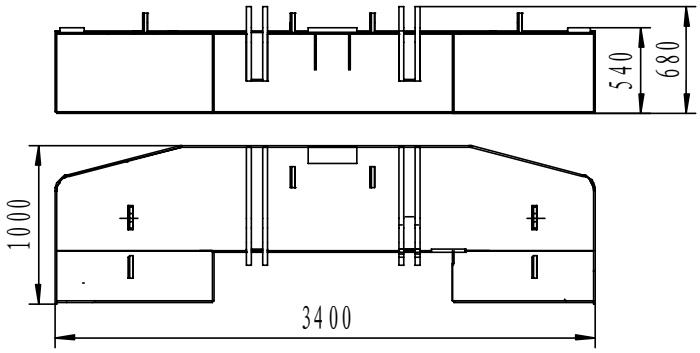
3．Main Body with Crawlers



Wt. ----------k g----------53000

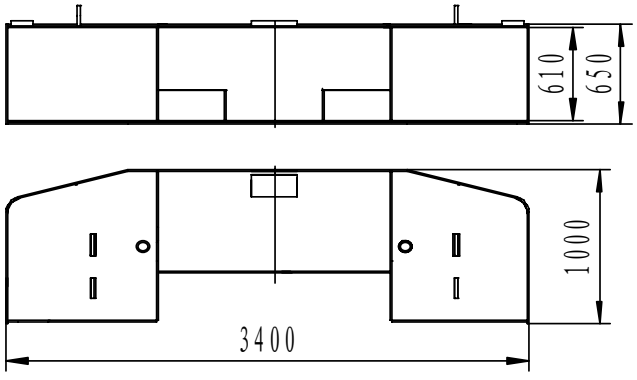
4．Fabricated Counterweight

Counterweight A



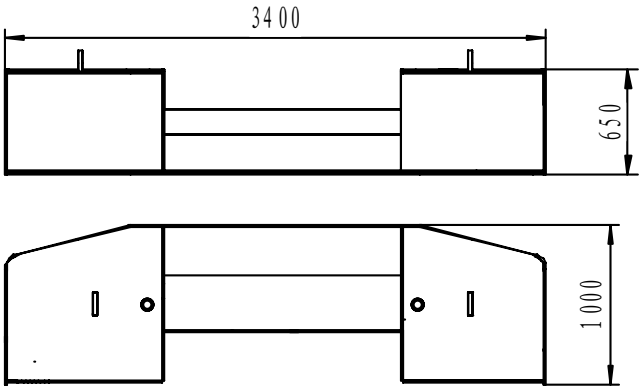
Wt. ----------k g----------7810

Counterweight B



Wt. ----------k g----------9276

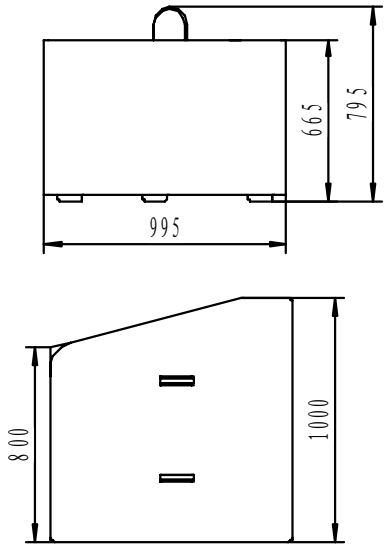
Counterweight C



Wt. ----------k g----------7530

5. Casting Counterweight

Counterweight A

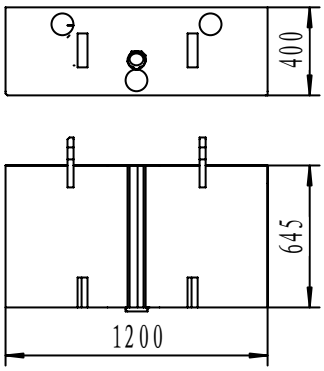


Wt. ----------k g----------4067

Counterweight B

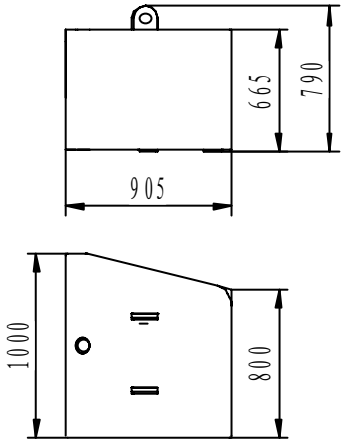
Wt. ----------k g----------4055

Counterweight C



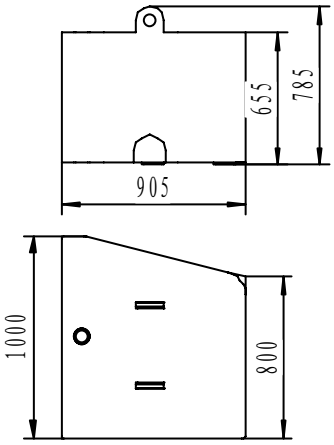
Wt. ----------k g----------2111

Counterweight D



Wt. ----------k g----------3656

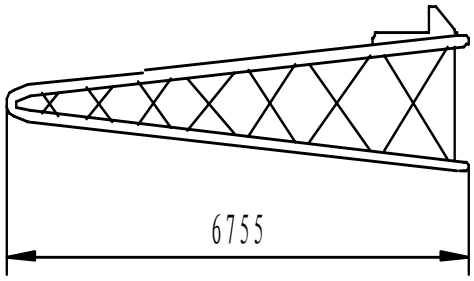
Counterweight E



Wt. ----------k g----------3654

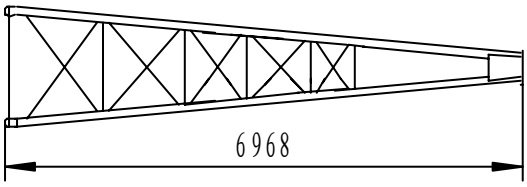
6．Working Attachment

Boom Foot



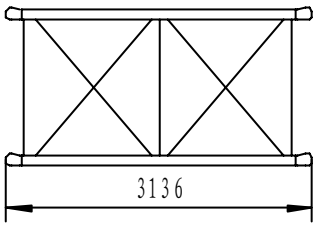
Sectional Dimension----------mm----------1602X1602
Wt. ----------k g----------1800

Boom Tip



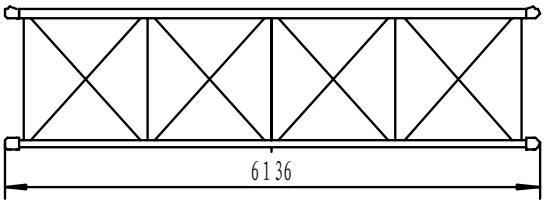
Sectional Dimension----------mm----------1602X1602
Wt. ----------k g----------1680

3M Boom Section



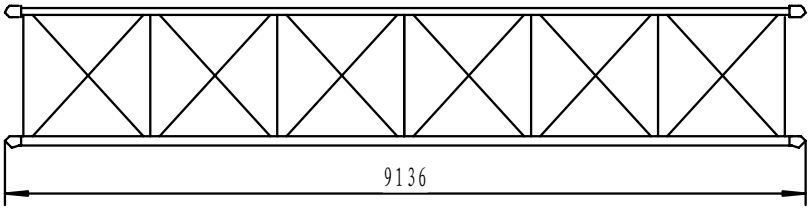
Sectional Dimension----------mm----------1602X1602
Wt. ----------k g----------523

6M boom section



Sectional Dimension----------mm----------1602X1602
Wt. ----------k g----------844

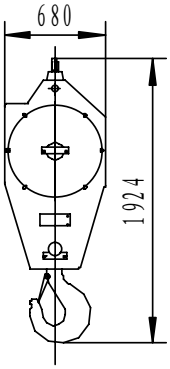
9M boom section



Sectional Dimension----------mm----------1602X1602
Wt. ----------k g----------1150

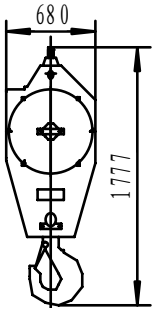
7．Hooks

80T Capacity Hook Block



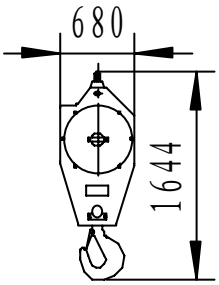
Wt. ----------k g----------1030

50T Hook Block



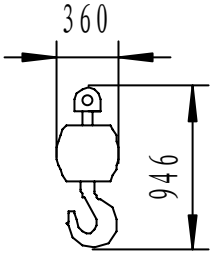
Wt.----------k g----------667

25T Hook Block



Wt. ----------k g----------438

8T Ball Hook



Wt. ----------k g----------246