

## Truck Crane Quick Operation Guide



Shenli

Machinery



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## Truck Crane Basic Operations

### 一、 Choose Lifting Location

It is very important to choose a right, appropriate location for truck crane. There are some rules to follow when choosing the location: (1) Ground should be solid and unsinkable. (2) It's better for the lifting boom to cover the whole working area as much as possible. (3) There are no such things as power lines, etc. in the lifting area to avoid hidden safety issue. (4) The area should be bright and wide open.

### 二、 Turn On the Power Takeoff

Once a good location is chosen, set the crane to lifting-ready status. When the pressure reaches 6Mpa, turn on the Power Takeoff (PTO) button and begin outrigger operation.

### 三、 Outrigger Operation

The crane has a total of 5 outriggers including 4 body outriggers in H-shape and one rear leg to enhance the stability of the crane working in the rear part.

Generally, the order of extending outriggers is extending the 4 front outriggers first, then the rear outrigger. Use the opposite order for retracting the outriggers. The 4 body outriggers can be extended at the same time or two of them on both sides extended at the same time. When the 4 outriggers are operated at the same time, it will be slower. The outrigger operation method is as follows: First, push the two or four outrigger joystick to the lower gear, then push the telescopic lever to the lower position to extend the outriggers horizontally; After the horizontal hydraulic cylinder is extended, push the telescopic lever back to neutral position, push the two or four outrigger joystick to the upper gear, then push the telescopic lever to the lower position to extend the outriggers vertically. The operation method for the rear outrigger extension is the same. (The operation method for retracting the outriggers is opposite to the extension.)

Each outrigger can be adjusted individually with the above method until it's horizontally even. In addition, it is necessary to put supporting wood blocks under the outriggers to increase the pressure area and enhance stability.

### 四、 Slewing Operation

After the outrigger extensions are completed, the crane's lifting, slewing, luffing, and telescoping operation can be done in the operation cab located in the upper part of the truck. Shenli Crane's slewing operation is done by the rotary joystick in the operation cab. The operation method is as follows: Push the rotary joystick to the lower position for counterclockwise rotation; Otherwise, push the rotary joystick to the upper position for clockwise rotation.

### 五、 Telescoping Boom

Push the telescopic boom joystick to upper position for extending the boom; Push the joystick to lower position for retracting the boom. The boom has 5 sections which are telescoped at the same time.

### 六、 Luffing Operation

Push the luffing joystick to upper position for extending the luffing hydraulic cylinder and increasing the luffing angle; Push the joystick to lower position for retracting the luffing

hydraulic cylinder and decrease the luffing angle. The screen in the operation cab clearly displays the luffing angle. On the right side of the operation cab, there is a display on the boom showing the luffing angle for checking the operation angle.

## 七、 **Weight lifting Operation**

There are two other operation joysticks. One of them is for controlling the lifting or lowering of the small hook. The other is for controlling the lifting or lowering of the big hook. The operation methods for the two hooks are the same. Push the joystick to the lower position for lifting the hook; Push the joystick to the upper position for lower the hook.

## **Truck Crane Safe Operating Practices**

1. The truck crane must be operated by a certified operator who is familiar with the crane's performance, operation, safety requirement, and received the national driver license.
2. Preparations and Inspections before operating the truck crane.
  - 2.1. Check the tires' pressures to make sure they meet the requirement. Check if any tire is damaged.
  - 2.2. Remove the accumulated water in the air tank
  - 2.3. Check if the battery connector was secured.
  - 2.4. Check the integrity of the vehicle shape; Check if there are enough of oil and water; Check if there is any leakage at the connectors of oil pipes, air pipes, and water pipes.
  - 2.5. Check all the meters, switches, lights, signals, window shield wipers to make sure they work normally.
  - 2.6. Check steering wheel and each part of brake system to make sure they are flexible, safe, and reliable.
  - 2.7. Check if drive shaft bolts, leaf spring bolts, wheel bolts, wheel helical fastening are reliable, check if any of them are damaged or broken.
  - 2.8. Check if each operating handle is positioned correctly, flexible, and reliable.
3. Precautions when turning on the engine:
  - 3.1. Before the engine was turning on, it is required to check if the water level of the water tank is normal and if there is enough gas in the gas tank. The engine can be turned on after the requirements are satisfied. After warming up 5 minutes and make sure all meters can be turned on and off well, then start to work.
  - 3.2. The engine's cooling liquid is anti-frozen and anti-rusty (PH value is 7.5 – 9). It is strictly forbidden to replace the anti-frozen and anti-rusty cooling liquid with water.
  - 3.3. When warming up, the oil level must be between the minimal and maximal marks on the dipstick. If the oil level is below the minimal mark, it is necessary to add oil unconditionally.
4. Precautions when operating the crane
  - 4.1. Preparations before operating the crane
    - 4.1.1. Check the working ground condition. The ground should be solid and even. If the ground is soft or uneven, one can't start working until appropriate wood block was padded and safety was ensured.

- 4.1.2. Add lubricant oil to each lubrication location according to the lubrication chart. Check if the lubricant oil in the hydraulic cylinder is between the marked levels as required.
- 4.1.3. Check the tension and wear of the wire rope for telescopic boom.
- 4.1.4. Check if the lifting brakes are reliable and tighten each part; secure the rigging and lifting parts.
- 4.1.5. It's strictly forbidden to operate the crane without using the outrigger, or move the crane when lifting heavy objects. It's necessary to extend the outrigger and ensure the levelness of the machine's body using a level before operating the crane,
- 4.1.6. If there are overhead power lines near the working site, the distance between the crane's boom and the power lines should follow the provisions of the relevant departments.
- 4.1.7. When turning on the hydraulic pump, keep it running at low speed to achieve a sufficient warm-up effect and running without load for a few minutes to check if there is any oil leakage or anomalies.

#### 4.2. Precautions during lifting operation

- 4.2.1. It's strictly forbidden to stand under the lifting boom.
- 4.2.2. The entire machine's inclination cannot be greater than  $10^{\circ}$ .
- 4.2.3. Stop working if wind force is greater than level 6,
- 4.2.4. When the crane is lifting, if the horizontal outrigger was found retracting and it is necessary to adjust the outrigger, it is required to unload the heavy object onto the ground, retract the boom and put it on the outrigger, then readjust the outrigger.
- 4.2.5. If the heavy object needs to stay in the air for a long period, the operator is not allowed to leave the operating cab.
- 4.2.6. The operation should be steady, smooth, and slow. It is strictly forbidden to yank, thrust, or any sudden fierce operation. Oblique lifting or oblique pulling is strictly forbidden.
- 4.2.7. Don't lift the underground objects or frozen objects. It's forbidden to drive while lifting objects.
- 4.2.8. The number of turns of the wire rope on the hoisting winch drum should not be less than 3 turns.
- 4.2.9. When the main boom is fully extended, the elevation angle should not be less than  $30^{\circ}$  under any conditions.

#### 4.3. Operations of lifting and lowering heavy objects

- 4.3.1. When the main wench lifts up or lowers down, press the button on the corresponding handle and move the handle forward or backward at the same time to achieve high speed. Release the button after moving the handle. To stop the high speed, release the handle to let it return to central position.
- 4.3.2. When the auxiliary wench lifts up or lowers down, the operation is similar to the operation of the main wench.
- 4.3.3. The operator should frequently check the pressure displayed on the oil-pressure gauge.
- 4.3.4. Overload lift, lateral dragging or pulling, front lift, and sharp switching operations can cause severe dangers, which should be strictly forbidden.

#### 4.4. Operations of telescoping boom

- 4.4.1. When telescoping the boom, the hook will be lifted accordingly. Therefore, when telescoping the boom, it's necessary to adjust the hook's height by operating the lifting handle. It's strictly forbidden to telescope the boom with load.
- 4.4.2. There is no high speed when retracting the boom. After retracting the boom, it's forbidden to telescoping the boom immediately. Only after approximately 2 seconds will it be allowed to telescope the boom.

#### 4.5. Slewing operations

- 4.5.1. Toggle the rotary brake button at the rear of the left armrest, the brake cylinder opens. Push the left handle to rotate.
- 4.5.2. Before slewing operation, the operator must confirm that there is no obstacle in the slewing scope.
- 4.5.3. The slewing operation should be steady and smooth. Sharp stopping rotation or switching directions is very dangerous, which must be avoided.

#### 5. Normal stopping procedure

- 5.1. When stopping the truck, disconnect the main power switch circuit.
- 5.2. Before turning off the engine, running it at slow speed for a few minutes. After the machine parts cool down evenly, then shut down the exhaust brake.
- 5.3. Try hard to avoid parking on a slope. If it's necessary to stop the truck, find an appropriate place to avoid slippery.
- 5.4. When stopping the truck, Release the acceleration pedal first, and then step on the brake pedal. After the truck slows down, step down the clutch pedal and shift the transmission to neutral position. After the truck stops completely, release the clutch and pull out the emergency brake handle, i.e. the hand brake.

#### 6. Post – operation inspection

- 6.1. Check if any part leaks oil and make necessary preparations in the upper part of the truck.
- 6.2. Check if there is any loose nuts and bolts. If any anomaly occurs that day, it's necessary to make timely repairs. It is strictly forbidden to run the machine with any malfunction.
- 6.3. After the work is done, make necessary cleaning, such as each movable part, the exposed parts of the cylinder piston rod, etc.
- 6.4. Count the tools and accessories to avoid missing any tools or accessories.

#### 7. The truck crane should be cleaned and maintained frequently. Every operation joystick/lever should be put in a non-working position after a day's work is over. Pay attention to change lubrication grease and lubrication oil in winter and summer. If there is no antifreeze added into cooling water, the cooling water must be emptied to avoid the engine cracking from frozen when the truck stops running.

## Common Troubles and Troubleshooting

1. Base boom steel cable replacing method: unlock the two ends of the steel cable, there is a round wheel inside, weld one end of the used rope to an end of the new rope and ensure the smoothness of the joint, lead out the new rope by pulling out the used rope, and lock the ends of the new rope to their individual positions.
2. Straight through valve channeling oil: When running the diesel engine, the motor following it to turn indicates there are problems with straight through valve. Washing it clean it or replacing it will work.
3. Luffing cylinder falls: Lift a part of luffing cylinder, and then remove the two oil pipes from the balance valve. If the entrance port keeps leaking, it indicates the balance valve has problems and it is necessary to wash clean or replace the balance valve. If the return oil port keeps leaking, it indicates the cylinder has internal leaking and it is necessary to check and replace the cylinder oil seal.
4. Joint oil leakage: The crane's oil line joints are sealed with O-ring. If there is leakage at a joint, it is necessary to replace the O-ring seal immediately.
5. Crane's hydraulic oil replacing method: The truck crane uses L-HM46<sup>#</sup> or 68<sup>#</sup> anti-wear hydraulic oil. Generally, use 68# hydraulic oil in summer and 46# hydraulic oil in winter. According to the different locations and temperatures, choose corresponding type of hydraulic oil. Use low-numbered hydraulic oil in the place with average low temperature. The higher the number, the denser the hydraulic oil.

After being used for a while, the hydraulic oil will deteriorate. It is necessary to replace the hydraulic oil regularly. After a new truck crane being put into use for three months, the hydraulic oil needs to be replaced with the same type of hydraulic oil once. When replacing the hydraulic oil, put the crane in the parking state, discharge the hydraulic oil from the hydraulic oil tank completely first, then remove the outlet flange from the oil tank and wash it clean, clean the oil tank with cleaners, replace oil filter and reinstall the flange.

Fill the tank with the same type of hydraulic oil and begin to empty the used oil in each oil pipe. First, empty each oil cylinder in the lower part of the crane. Disconnect the return oil pipe between the crane's lower part valve and the tank (Note: the pipe connecting the lower part valve to the tank), put it in a waste oil drum, then start the engine to make the oil pump work through the PTO, followed by operating the lower part valve to extend horizontal legs, then the waste oil flows out from the return oil pipe; After finishing extension of horizontal outriggers, start operating the vertical cylinder to let the waste oil flow out from the return oil pipe. The waste oil won't be discharged completely until all the cylinders finish extension. Reconnect the return oil pipe and leveling the lower part of the crane. Now, start to discharge the waste oil from the oil cylinders of the crane's upper part. Remove the return oil pipe of the luffing cylinder, then operating the luffing cylinder to lift the base boom. The waste oil now flows out from the return port of the oil cylinder. When the cylinder is empty, reconnect the oil pipe. Then, start to discharge the telescopic cylinder. Similarly, remove the return oil pipe from the telescopic cylinder and start to extend the boom. The waste oil is discharged completely when the boom extends completely. After the oil pipe is

reinstalled, check the oil level in the tank and add the oil to the corresponding level as needed. Then, the overall oil replacement is completed.

6. Troubleshooting of the entire machine slowing down

First, check if the powered chassis is placed at low speed; then, check if entrance-pipe to the oil pump is leaky (bubbles observable in the pipe from the rubber pipe). If the oil pipe sucks in too much air, there will be a large amount of bubbles generated in the oil tank, which cause the hydraulic oil returning to the tank. Check, clean, and adjust the pressure of the pressure valve: disconnect the return oil pipe of the crane's lower part valve and check if the pressure-valve has excessive internal-discharge.



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