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2. The main purpose and performance characteristics of the machine

The shearing machine is a product developed by our company, which has accumulated years of experience in the production of shearing machines and continuously draws on advanced foreign technologies. The hydraulic and electrical systems of this machine are designed with advanced, simple, practical, and high reliability, suitable for general machinery manufacturing, automotive, container manufacturing, switchgear, and light industry industries. It can be used for various metal materials (tensile strength of materials) σ Linear shear with b ≤ 450N/mm2 can reduce the shear thickness accordingly, and can also shear high tensile strength plates such as low alloy steel, stainless steel, spring steel, etc.

The shearing machine mainly has the following characteristics:

(1) Adopting an overall welded frame structure and undergoing vibration aging treatment, the machine tool has good rigidity, high accuracy, and good accuracy retention.

(2) The three-point support rolling guide rail is adopted, and the upper tool holder works without clearance on the rolling guide rail. The blade clearance can be adjusted by turning the handwheel, and

the blade clearance value is directly displayed on the clearance table.

(3) The movable blade holder and four blade long blade facilitate the adjustment of blade gap uniformity, improve cutting quality, and extend blade service life.

(4) A series oil cylinder synchronous system is adopted, and the machine tool is subjected to uniform force. By adjusting the oil quantity of the series oil cylinder, the shear angle can be easily adjusted to meet the needs of different shear plate thicknesses.

(5) Equipped with a motorized rear stopper device and electronic counter, it is convenient to adjust the position of the rear stopper.

(6) Equipped with a line lighting device, users can use the light to cut the line.

(7) The use of hydraulic presses for shearing is more reliable.

(8) Spherical ball support table, convenient for users to cut and feed.

(9) The front stopper with a ruler perpendicular to the lower blade is suitable for the user's front positioning operation requirements.

(10) The hydraulic system uses a leather bag type accumulator as auxiliary energy, while absorbing pressure impact, ensuring smooth machine operation and low noise.

3. Lifting and installation of machines

3.1 Lifting of the machine

After the machine tool is transported to your unit, it should be checked immediately according to the packing list to see if the model, accessories, spare parts, and relevant information of the machine tool match the packing list. If any errors are found, please contact our company promptly for resolution.

The upper part of this machine tool bed is equipped with lifting holes (lifting ears) for use during the lifting and installation of the machine tool (see the machine tool lifting diagram). When lifting and installing the machine tool, appropriate lifting equipment and steel wire ropes must be selected based on the weight of the machine tool. Improper lifting will cause unexpected personal and equipment accidents.

3.2 Installation

Before installing the machine tool, the foundation must be prepared according to the foundation diagram provided in this manual. The depth of the foundation depends on the soil conditions of the user, but should not be less than 500mm. The foundation pouring work is carried out in two stages. After the first pouring 10-15 days, the

machine tool is placed on the foundation, roughly leveled, and the foundation bolts are embedded. Then, the second pouring is carried out. After 48 hours, the level is corrected with a level gauge with an accuracy of 0.05/1000mm, and the foundation bolts are tightened. When leveling, place the level gauge on the lower blade support. The longitudinal horizontal tolerance of the machine tool is 0.2/1000mm.

Attention: After the machine tool is horizontally adjusted and fixed, please adjust the blade gap to the maximum state before using the machine tool, and correct the uniformity of the blade gap according to the steps described in 8.2.6.

3.3 Electrical wiring

This series of machine tools adopts a three-phase 50Hz 380V power supply. Electrical wiring should be carried out according to relevant standards and the power supply voltage should be regularly checked for normal operation.

4. Lubrication of the machine

4.1 Refueling the fuel tank

Before using the machine tool, be sure to clean the oil tank thoroughly, and there should be no impurities or dirt inside the oil tank. After cleaning the oil tank, inject hydraulic oil with a viscosity of 17-33 cm. The hydraulic oil used must be clean and filtered, and the amount of oil injected to the centerline of the oil mark is sufficient.

The hydraulic oil should be replaced regularly, and it is recommended not to work at low temperatures (below -5 ° C). When the temperature is low, the machine tool can be idle for a period of time, and if necessary, a heater can be installed in the hydraulic system. The normal operating oil temperature of the hydraulic system should not exceed 75 ° C. If the oil temperature is too high, a cooler should be installed.

4.2 Machine Tool Lubrication

Good lubrication is an important condition for ensuring the normal operation of the machine tool and extending its service life, and should be carried out within the range specified in the manual.

The main lubrication parts of this machine include:

a. The support point bearings of the front and rear rollers of the upper tool holder are replaced with calcium based lubricating grease every year during machine maintenance and upkeep.

b. The rolling fulcrum contacts the sliding surface of the guide rail plate and is replaced with calcium based lubricating grease once a week.

c. Replace the calcium based lubricating grease on the rear material transmission screw, chain, and guide slide surface once a week.

d. For exposed vulnerable parts, rolling bearings, etc., even if lubrication points are not set, they must be lubricated twice a week.

Lubrication points must be regularly inspected, maintained, and cleaned.

5. Adjustment and operation of the machine

5.1 Operating procedures

(1) Turn on the power and turn the cabinet switch to the "1" position.

(2) Press the motor start button to start the main motor and check if the rotation direction of the motor is consistent with the rotation direction on the oil pump nameplate (after pressing the start button, immediately press the stop button). If it does not match, it should be corrected. The correction method is to replace the connection sequence of any two phases in the three phase line of the main power supply of the machine tool (do not change the connection sequence of the main motor power supply input line). When there is air in the pipeline system, the method of alternately pressing the start button and stop button can be used, repeated several times, until the air is discharged before the oil pump enters normal operation.

(3) Adjust the blade gap according to the thickness of the cut plate. For ordinary low-carbon steel plates, the numbers shown in the table represent the thickness of the cut plate.

(4) Adjust the shear stroke as needed.

(5) Adjust the cutting angle according to the thickness of the cut

sheet material.

(6) Adjust the rear stopper position as needed.

When the machine tool malfunctions or needs to be stopped, please press the red emergency stop button!

5.2 Adjustment of shear angle

By adjusting the amount of oil in the upper chamber of the right oil cylinder, the shear angle can be changed. Start the main motor and press the "+" shear angle increase knob or the "-" shear angle decrease knob on the operation panel to drain or feed oil into the upper chamber of the right oil cylinder, and adjust the shear angle accordingly.

The value of the shear angle is indicated by an indicator light. The optimal cutting angle is determined based on the thickness and material of the board (or based on your work experience).

Attention: After adjusting the cutting angle each time, the machine tool must run idle at least once before proceeding with formal cutting!

5.3 Shear stroke adjustment (segmented shear)

By adjusting the shear stroke adjustment knob on the operation panel, the tool holder stroke can be adjusted steplessly. For some narrow sheet materials, smaller shear strokes can be selected. In order to shorten cutting time and improve cutting efficiency.

5.4 Adjustment of Blade Clearance

To obtain high-quality cutting sections, it is necessary to choose a reasonable blade gap based on the material being cut. This machine tool is equipped with a quick adjustment mechanism for blade clearance, which can conveniently adjust the blade clearance. It is recommended to adjust the blade gap using the following method.

Based on tensile strength σ B=370-400N/mm2, elongation δ= 35% low-carbon steel is used as the adjustment benchmark.

For tensile strength σ B=370-400N/mm2, elongation δ= For 35% low-carbon steel, the blade gap is selected based on 8% of the plate thickness, that is, the number in the blade gap table corresponds to the thickness of the cut plate material (in millimeters);

For medium and high carbon steels with lower elongation, the blade gap value should be larger than that of hanging carbon steels with equivalent plate thickness, and the specific value depends on the elongation of the plate and your experience;

When cutting stainless steel plates, the blade gap depends on its elongation, and it is recommended not to determine it based on tensile strength, as some stainless steels have higher elongation than high carbon steels of the same strength.

When shearing plastic materials, the blade gap should be smaller, while when shearing brittle materials, it should be larger.

Attention: After each adjustment, a trial shear must be performed, combined with shear angle adjustment, until you obtain a satisfactory shear section.

5.5 Blade Replacement and Grinding

The blade must be regularly sharpened. If not sharpened for a long time, it may seem effortless, but in reality, it can cause significant waste. If the blade continues to be sheared after being blunt, the outer grain structure of the blade will be damaged due to excessive pressure, which not only damages the equipment but also fails to achieve good shear quality. After grinding the blade, the damaged crystalline outer layer can be eliminated. Therefore, a complete blade grinding schedule should be developed based on the specific production situation, and it is best to have a set of sharpened blades as a backup to avoid affecting production.

We suggest using the following grinding schedule:

Blade changing (edge changing) after working for 80-100 hours

Blade grinding after 320-400 hours of operation

The upper and lower blades of this machine tool each have four cutting edges for use.

The above schedule is only applicable to normal use of shearing machines. If blade grinding can be arranged according to this schedule, the grinding amount will be the smallest and the service life

will be the longest. After grinding or replacing the blade, the blade clearance must be rechecked and adjusted.

5.5.1 Adjustment of blade clearance (after blade replacement or grinding)

The position of the upper tool holder has been adjusted before leaving the factory, it is best not to move it randomly. The tool holder is tilted on the vertical plane, meaning that it tilts backwards when viewed from top to bottom, with a tilt angle of 1 °.

The blade gap needs to be adjusted in the following situations:

(1) When the blade operates for 80-100 hours, after changing the blade.

(2) When reinstalling a sharpened blade.

(3) Adjust the blade gap to the minimum position, and then use the bolts on the workbench to adjust the blade gap to make the blades close and separate.

(4) Check the gap with a 0.05mm feeler gauge and ensure that it does not exceed this value.

(5) Restart the main motor and perform the accumulator charging operation.

Please refer to "Hydraulic System Analysis of Machine Tool No. 7" for the operation of charging the accumulator.

5.5.2 Rear stopper

The position of the rear stopper of this machine tool is adjusted by motorization.

The upper tool holder must stop at the top dead center in order to adjust the rear stopper.

The movement of the rear stopper is transmitted by the brake motor and worm gear reducer, and the stopper size counter and control button are installed on the operation panel on the left side of the front of the machine tool. This machine tool is equipped with three operation buttons: backward, forward, and jog forward. When adjusting the rear stopper, in order to eliminate errors caused by thread clearance, it should be moved from the back to the front, that is, the final positioning operation of the rear stopper must be completed by the rear stopper moving forward or jogging forward.

If the reading on the counter does not match the actual size, it is necessary to adjust the internal parameters of the counter. For specific methods and steps, please refer to the operating instructions for the counter (electronic digital display) later.

If there is a deviation in the parallelism between the retaining plate and the lower blade, the adjustment method is as follows:

(1) Coarse adjustment: Loosen the chain tensioner to detach the chain, rotate two screw rods separately until the stopper plate is parallel to the lower blade, and then reinstall the chain.

(2) Fine adjustment: Loosen the connecting screw between the nut seat and the retaining frame, adjust the nut on the screw rod behind the retaining frame to make the retaining plate parallel to the lower blade, and then tighten the screw.

6. Maintenance and troubleshooting of machines

6.1 Hydraulic circuit

(1) Regularly check the liquid level of the oil tank, and if it is below the centerline of the oil mark, immediately replenish the oil;

(2) After the first 500 hours of use, the oil must be changed for the first time, and then every 2000 hours of operation;

(3) The hydraulic oil used must meet the requirements, with a viscosity of 17-33 cm;

(4) Every time the oil is changed, the oil tank must be thoroughly cleaned.

6.2 Oil filter

(1) Regularly clean the oil filter located at the suction end of the oil pump with solvents such as gasoline and ethylene;

(2) After 8 days of initial use, the first cleaning should be performed, and thereafter, it should be cleaned once a month;

(3) If there is any damage, it must be replaced promptly.

6.3 Air Filter

(1) The air filter is installed on the fuel tank cover plate;

(2) Perform the first cleaning after 60 days of initial use, and clean every 120 working days thereafter;

(3) Be sure to wash with solvents such as gasoline and ethylene.

If leakage is found at the pipe joint, it must be tightened or replaced. If there is leakage in the high-pressure pipe, it must also be replaced. When replacing the high-pressure oil pipe joint, the following precautions must be taken:

(1) When sawing the pipe, the normal section should be kept perpendicular to the busbar, and burrs must be removed;

(2) The nut and clamp can slide on the pipe, and the clamp and nut are easy to tighten;

(3) Drop a few drops of engine oil onto the threads, sleeves, and nuts of the joint body for easy tightening;

(4) Tighten the nut until the ferrule cannot enter the connector body;

(5) Then, tighten the nut by an additional 1-1.25 turns.

6.4 Inspection of mechanical components

All mechanical components, such as transmission systems, guide rails, bolts, etc., must be inspected once a week.