OPERATION MANUAL

Hydraulic Finger Joint Shaper

WINTER MX 3518

WARNING!

The operator must thoroughly read this manual before operation.
Keep this manual for future reference.

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I. Purposes and Features

1. Main purposes: This machine is designed for use with a finger joint clamp. For better utilization of lumber, particularly lumber of inferior quality, the machine can finger joint and splice wood battens, and reduce waste of resource. Spliced planking by finger joint features less deformation in consequential processing and higher performance than ordinary planking.

2. Features: High level of automation and high spindle speed. The worktable adopts a reliable hydraulic reciprocation. The processed finger joint ends are more precise and smoother than those processed with manual or pneumatic systems. The better finger joint quality helps improve productive efficiency and save labors. The rails adopted are the most precise, stable and reliable straight slide rails supplied by professional manufacturers. They are made of high-hardness wear-proof steel and feature small deformation and wear resistance.

This machine is compact, rational in structure and handsome in appearance. It produces products of better quality than other equipment, and is an ideal choice for wood furniture manufacturers.

II. Technical Parameters

No.	Parameters	Values	Memo.
1	Available working area on worktable	490mm×600mm	
2	Max. working width	400mm	
3	Max. working height	120mm-180mm	
4	Finger joint height	12mm-18mm	
5	Saw blade diameter	300mm	
6	Cutter bit diameter	160mm	
7	Cylinder pressure	0.6-0.8Mpa	

8	Hydraulic cylinder stroke	50×1100 (heavy duty)	
9	Max. operating pressure	70bar	
10	Motor power rating	17.2kw	
11	Spindle speed	7000r/min	
12	Machine dimensions	(1710×1450× 1330)mm	
13	Hydraulic oil		Equivalent to ISOVG 32-46 petroleum base, wear resistant

III. Schematic Diagram

IV. Main Structure

This machine is composed of the machine base, slide carriage, worktable, spindle, high-power motor and cutting saw. The automatic reciprocation of the worktable is achieved through the hydraulic system and electrical system.

1. The machine base is a welded steel structure of 6-20mm steel plate and bears the static load of the machinery.

2. The finger joint shaper spindle is the heart and main structure of the machine and is directly exposed to the cutting force. Therefore, superior quality raw materials are used for such parts. The spindle is made of #45 steel, forged, quenched and wrought to achieve excellent strength, rigidity, toughness and resistance to deformation. Imported high-speed light-duty bearings (6208, 6011) and high-quality high-speed lubricant are used. The front and rear glands adopt a labyrinth-type sealing device. The spindle rotates at a speed above 7000r/min, stable, high in machining precision, and generating no heat or vibration. The elevation range is around 60mm.

3. Cutting saw. The motor is mounted level on the carriage of the dovetail groove guide rail. The saw blade is directly installed on the flange of the motor axle. The saw blade is 300mm in diameter.

4. Worktable and guide rail base. The worktable is made of cast iron and the guide rail base is of ordinary 8-30mm steel plates, welded and quenched. High-precision straight slide rails supplied by professional manufacturers are adopted for worktable guide rails. Such products feature stable and reliable performance, smooth, easy and accurate operation and resistance to twist, wear and pressure, and are the most advanced guide rails available on the market. High in cost and excellent in quality, the worktable adopts a hydraulic reciprocation and the whole process is subject to the control of a full automatic synchronous circuit for coordinated and synchronous operation. The crushing, pressing and delivery of workpieces are accomplished through a pneumatic device, synchronous to the hydraulic reciprocation.

5. Principles on hydraulic operation and electrical control. In the hydraulic device, a 2.2kw-4 motor drives a bi-directional hydraulic pump to reciprocate clockwise. For more information about the operation, refer to the usage and operation of this machine. The hydraulic stroke and pressure are adjustable. The electrical control is synchronous to the hydraulic operation. Refer to the electrical control and the circuit diagram.

Bought-in Parts List

No.	Parts	Model	Quantity	Memo.
1	Cylinder	QUA63×200 QGA80×150 10Y-2SD40N150S	1 for each model	
2	Bearing	6208	1 for each model	
3	Bearing	6011	2 for each model	
4	Flat belt		1	

V. Installation and Debugging

The machine can be firmly placed on a concrete floor with all legs on the ground and the machine surface in level. Rubber blocks can be placed on the parts touching the ground to absorb vibration.

1. Adjustment of finger joint cutter bit

Clean the inner hole of the cutter and the cutter shaft. The cutter shall be installed in such a manner that it rotates opposite to the feeding direction of the workpiece. Press on the spacer and the copper sheathing (to prevent the locknut from being removed), release the lock handle on the side, turn the elevation handwheel till the lower edge of the cutter bit is a couple of millimeters below the workpiece surface, lock again the side handle, and turn the cutter shaft with hand to restore the belt to its normal position.

2. Adjustment of baffle plate and cutting saw

Adjust the distance between the baffle plate and the cutting saw blade (around 5mm), cut finger joint end of the workpiece, and adjust the distance between the cutting saw blade and the cutter according to the workpiece. Generally speaking, the end face the cutting saw produces shall allow a gap of 0.5mm after the finger joints are manually connected. Lock the side handle after adjustment. If the front end face of the cutting saw blade is too much higher above the teeth base of the cutter, the length of the wrought finger joints will be insufficient, leaving too much space in the middle after connection, and harming the strength of the connected workpiece. If the front end face of the cutting saw blade is too much lower below the teeth base of the cutter, the wrought finger joints will be too long, leaving too much space at the side after connection, and harming the finger joint strength of the workpiece.

3. Adjustment of Worktable Slide Carriage

When the machine has been used for some time, the slide carriage below the worktable may get loose, affecting the finger joint quality. Loosen the fastening bolt below the slide carriage, wrench tight the adjustment bolt on the side, and lock the fastening bolt after adjustment.

4. Hydraulic Reciprocation of Worktable

Prior to work, the hydraulic pressure shall be adjusted according to the height and depth of the workpiece to process. Start the hydraulic switch, the worktable returns to reciprocation touching device, the suitable device on both end sides of the guide rail base. The whole process shall be synchronous to the air pressure.

VI. Electrical Control System

This machine is highly automatic and the main operations are accomplished through the electrical control system.

1. Prior to the use of this machine, the worker shall be familiar with the electrical control system and the hydraulic principle, from the connection of the power

supply to the use of the electric buttons. The general operating steps are as follows: make sure the mechanical, hydraulic and pneumatic systems are OK and start in turn the cutter bit axle, cutting saw, pneumatic system and hydraulic control system. The worktable brings the workpiece to reciprocate on the rail. In case of emergency, cut the mains, turn off all stop buttons and close the mains switch after the trouble is removed.

2. The worker must read the circuit diagram and the control box instructions carefully.

VII. Usage

1. Prior to starting the machine, check whether the power is turned on, the pneumatic and hydraulic systems are OK, and all the machine parts are locked, and then, check whether the finger joint cutter bit and cutting saw blade are securely clamped and the clamp nut and lock bolt are firmly pressed.

2. Oil the machine prior to start.

3. Prior to start, check the power supply and the electrical system, and check whether the barometer and hydromanometer readings have attained the working pressures. In case of under or over pressure, adjust according to the required values. Check the pneumatic and hydraulic junction, connector, air and oil pipes for leakage and check whether the valves are normal.

4. Adjust the height of the finger joint cutter bit and the spindle to the worktable according to the working height of the workpiece. There is an elevation adjustment bolt on the spindle case base. For adjustment, loosen the outer case fastening bolt first, wrench the elevation adjustment bolt to the desired position, and lock the same and the case base bolt.

5. Calibration of cutting saw blade. Generally speaking, the front extremity of the cutting saw blade is 0.5mm behind the teeth base of the cutter, reducing the force the cutter is exposed to.

6. Calibration of baffle plate. The surface of the baffle plate shall be 10mm behind

the front extremity of the cutting saw.

7. Place the planking (the finger joint side) against the baffle plate of the worktable, turn on the pneumatic valve so that the top board of the cylinder presses tight the workpiece (a bed piece can be used if the workpiece is too thin). The workpiece shall be properly arranged. The side cylinder presses vertically and the cylinder presses later. For the first operation of the machine, pull the planking with hands to check whether the planking is firmly pressed.
8. Hydraulic and pneumatic adjustment. Prior to starting the machine, adjust the synchronization of the hydraulic and pneumatic systems and coordinate the working steps.
9. Process the workpiece now. The whole process is subject to the control of the electrical control system. See the instructions on the operation of electric buttons.

VIII. Safety Rules

1. Prior to using this machine, read the User Manual carefully and learn the performance and usage.
2. This machine shall be properly grounded to avoid creepage.
3. To ensure normal operation of the machine, check machine parts for any damages and replace the damaged parts immediately.
4. Prior to use, take away tools and wrenches.
5. To replace cutters, disconnect the power supply.
6. Keep the workplace clean and tidy. Untidiness may lead to accidents.
7. Workers on duty shall be properly dressed in coveralls.
8. The workplace is liable to accidents. Turn off the mains when the machine is not in use.
9. Use suitable cutters only. Do not use parts unsuitable to the designed functions of the machine.

10. To leave the machine, the worker shall wait till the machine completely stops.

11. Do not stand on the machine. Any touch of the cutter will result in serious injuries.

12. The workpiece shall be fed opposite to the direction of the cutter revolution.

13. Clean and service the machine prior to and after use.

IX. Maintenance and Service

1. Clean the machine of rubbish and saw dust before checking off each day.

2. Oil the spindle sleeve with high-speed lubricant.

X. Attentions

1. When the machine is delivered, the worktable surface is covered with protective paper and the power supply is set with overload protection.

2. Prior to using the machine, check whether the cutter bit is clamped and the cutter blade clamp screw secured.

XI. Additional Instructions

As the Factory pursues the improvement of the product quality to meet the customer’s requirements, it reserves the right to change the technical specifications without notice.

Appendix: 3518 Circuit Diagram

SQ1: Worktable limit for moving forward

SQ2: Feeding limit

SQ3: Feeding return

SQ4: Worktable limit for moving backward

SQ5: Pressing cylinder releasing workpiece

YE1: Worktable moving forward

YE2: Worktable moving backward

MX3518 Hydraulic Finger Joint Shaper

Pressing rack	Cutter bit protective cover
Cutter body	Cutter bit clamp nut
Fixing pole	Cutter spindle clamp sleeve
Baffle plate	Cutter spindle motor
Pressing plate	Cutter spindle feeding flange
Worktable	Bushing
Worktable backing block	Spindle motor fine adjustment base
Worktable slide rail	Spindle motor fixing plate
Worktable hydraulic driving cylinder	Spindle motor belt pulley
Rail base	Spindle bearing gland
Elevation worm	Spindle bearing clamp nut
Worm wheel case	Spindle flat belt pulley
Elevation worm wheel	Spindle
End cap	Machine body
Elevation screw bolt	
Spindle sleeve base	
Elevation screw nut	
Elevation carrier	
Spindle sleeve	
Spindle bearing	

Packing List

MX3518 Hydraulic Finger Joint Shaper

Serial No.	Name	Quantity	Remark
1	Main frame	1	
2	Operational manual instituti	1	
3	Qualified certificate	1	
4	Packing list	1	
5			
6			
7			
8			
9			

Packing check by: Date:

Certificate of Quality

Product Name: Hydraulic Finger Joint Shaper Product Model: MX3518

Ex-factory No._____ Ex-factory Date: _____

This is to certify that this product, by quality inspection, is in conformity with the requirements of technical conditions and technical standards. Thus it is allowed to leave the factory.

Inspector: No.3 inspector (seal)