

WATTSAN M3 1313/1325/1616/2030/2040
CNC ROUTER MACHINE MANUAL



Wattsan

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SPECIFICATIONS

Model		1313	1325	1616	2030	2040
Working field, mm	X	1300	1300	1600	2100	2100
	Y	1300	2500	1600	3000	4000
	Z	300	300	300	300	300
Length, mm		2240	3440	2540	4040	5040
Width, mm		2070	2070	2370	2870	2866
Height, mm		1895	1895	1895	1895	1895
Bed		Welded, steel profile				
Motors		Syntec 750W				
Guides		Hiwin 25mm				
Reducer		Planetary Nidec 1:10				
Rack		Helical rack M1.5 20x20				
Maximum feed speed, mm/min X		45000				
Maximum feed rate, mm/min Y		45000				
Maximum feed speed, mm/min Z		8000				
Positioning accuracy, mm.		0,05				
Working temperature/ambient temperature, °C		15-30				
Power supply, V		AC 380±10% V、 50/60Hz				
Power consumption excluding spindle and peripherals, W		~4000				
Vacuum Table		Optional				
Coolant System		Optional				
Lubrication System		Automatic				

EQUIPMENT

Name	Quantity
Machine	1 pc
Control cabinet	1 pc
Fuse Kit	1 pc
Milling bits set	1 pc
Set of collet chucks (tool holders)	1 pc
Clamp Set	1 pc
Wrench Set	1 pc
Key Set	1 pc

Information about signs and symbols

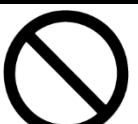
In this instruction manual, the following designations, signs and symbols are used to convey particularly important information:

	This indicates a hazardous situation that could result in serious injury or death if the specified instructions are not strictly followed.
	Indicates a potential hazard that could result in minor injury or damage to the product.
	It contains important information about the safe and correct handling of the product.
	This component is energized by an electric current. In these places, strictly follow the safety rules when working with electricity.

Read the instructions carefully before starting.

Note!

The equipment you directly purchased may differ from the equipment shown in the figures.

	Untrained personnel should not be allowed to work with this equipment and install it.
 MUST-DO	The location of the equipment must be equipped with fire extinguishing equipment. It is forbidden to store flammable and explosive substances near the device.
 MUST-DO	The user must ensure that the material to be processed is suitable for processing on the machine in order to avoid risks to the life and operation of the equipment.
 FORBIDDER	The operator must not leave the equipment unattended while it is in operation. The equipment must be turned off at the end of operation.
 FORBIDDER	During the operation of the machine, it is forbidden to be in the area of movement of moving parts of the machine.
	The equipment must be located in a dry, uncontaminated place. The temperature inside the room should be 15-30 Co. Humidity should be in the range of 5-70% (provided there is no condensation).
	The equipment operates from an AC voltage of 380 V with a frequency of 50 / 60 Hz. It is forbidden to use the equipment without a voltage stabilizer.

Attention!

The seller is not responsible for the improper use of the equipment and if the user fails to take precautions.

1. INTRODUCTION

1.1 EQUIPMENT DESCRIPTION

WATTSAN M3 CNC router is designed for high-precision machining of various materials such as wood, aluminum, plastic, composites, acrylic, and soft metals. This machine is ideal for use in industries such as furniture manufacturing, advertising, decorative work, as well as mold making and other products that require precision machining. With its rugged design and automatic tool change system, the WATTSAN M3 can work at high speed without losing accuracy.

1.2 KEY FEATURES AND BENEFITS

- **Powerful Spindle:** Provides high power, which allows you to process hard materials such as aluminum and dense wood.
- **Automatic Tool Changer (ATC):** Speeds up the work process with automatic tool changes. This feature reduces downtime and increases productivity.
- **Syntec Control System:** Powerful and intuitive USB and networked controller that provides control stability and easy programming for complex tasks.
- **Vacuum table (optional):** A powerful vacuum system allows the material to be securely fixed on the work surface without the need for mechanical clamps, which minimizes movement and vibration of the workpiece.
- **Rugged Design:** The housing is made of high-quality materials to reduce vibrations and improve stability, even during long-term operation at high speeds.
- **Spindle cooling system (air or water):** Ensures stable spindle operation, preventing it from overheating during long operations.

1.3 PURPOSE OF THE EQUIPMENT

WATTSAN M3 is designed to perform the following types of processing:

- **Milling:** Suitable for both simple and complex products, and can handle materials of different densities.
- **Engraving:** Provides high detail and accuracy when engraving on acrylic, wood, and other materials.
- **Profiling and contour cutting:** Ideal for creating complex contours and shapes.

1.4 APPLICATIONS

WATTSAN M3 CNC router is used in various industries:

- **Furniture and décor production:** Creation of interior elements, furniture facades, decoration of furniture items.
- **Advertising Industry:** Production of advertising signs, letters, logos and other advertising structures.
- **Mold Making:** Used to create molds and other complex components.
- **Souvenir & Art:** Suitable for the production of decorative products, souvenirs and art products made of wood and plastic.
- **Plastic and acrylic processing:** Allows you to quickly and accurately cut and engrave acrylic sheets, which is important for creating light boxes, plaques and other products.

1.5 BASIC OPERATING REQUIREMENTS

Before you begin, make sure that all the requirements are met:

- Connected ground: Ground resistance $<4\ \Omega$.
- It is necessary to install a mains voltage stabilizer to stabilize the voltage of the machine.
- Good ventilation is required to prevent the accumulation of dust and combustion products.
- To cool the spindle, it is necessary to properly configure and control the operation of the chiller. It is a specialized equipment that cools and circulates water and requires the use of distilled water only.
- Operation of the equipment is allowed only with a connected compressed air or auxiliary gas supply system.
- To prevent fire, the workplace must be equipped with a suitable fire extinguisher.
- There should be a free area around the machine of about 1 m on each side.

CHAPTER 2. SAFETY ENGINEERING

2.1. OVERVIEW

Proper safety precautions when operating the milling machine are essential to prevent accidents, protect the operator and ensure the safe operation of the equipment. Failure to follow these guidelines may result in personal injury, damage to the machine, or disruption of the production process.

Before operating the machine and performing daily maintenance, the operator should read this chapter carefully, learn the safety precautions and requirements of the machine, and follow the appropriate precautions.

2.2 GENERAL SAFETY REQUIREMENTS

- Personnel working with this equipment must know and remember all the safety requirements for working with milling equipment and obey the safety requirements adopted at the enterprise, and the requirements for the management of the corresponding equipment.
- The operator is not allowed to leave the workplace while the equipment is in operation.
- The user must ensure that the material to be machined is suitable for milling in order to avoid risks to the life and operation of the equipment
- Keep the work area clean and provide adequate lighting.
- Do not wear loose-fitting clothing, gloves, bracelets, necklaces, or jewelry.

	It is forbidden to work on faulty equipment. If a fault is detected, turn off the equipment and unplug it. Inform the specialists. Do not repair the equipment yourself.
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2.3 PRECAUTIONS FOR MACHINE OPERATION

- Familiarize yourself with the location of the emergency "STOP" button and make sure it is available for immediate use in the event of an emergency.
- Make sure that the selected tool is securely locked in the spindle. Unreliable fixation can lead to tool ejection and damage to the workpiece.
- When working, keep a safe distance from the cutting area and do not touch the spindle. To replace the tool, wait for it to stop completely.
- Use only the tools and accessories that are provided for installation with this equipment. Never use unsuitable or damaged tools.

2.4. ELECTRICAL SAFETY

- Make sure the machine is securely grounded to prevent static electricity and reduce the risk of electric shock.
- Make sure the correct AC supply voltage is used before applying power to the unit. Using the wrong voltage may damage the installation.
- Never use the device in a humid or wet environment. Do not touch electrical contacts and switches with wet hands to avoid electric shock.
- Do not open the electrical cabinet or change the machine parameters without consulting the manual. If you need to change something, then these changes must be approved with the equipment supplier. Before modifying, record the original values so that the machine can be restored to its original parameters if necessary.
- Always turn off the device when not in use. Never leave the machine running unattended.
- Before performing any maintenance or repair work on the machine, make sure that the equipment is completely disconnected from the power supply.

	After turning off the power to the machine, you must wait at least 5 minutes, and only then you can touch the electrical circuit of the machine. For a period of time after the power is turned off, there may be a high voltage in the machine's electrical system, which can cause harm to people and equipment.
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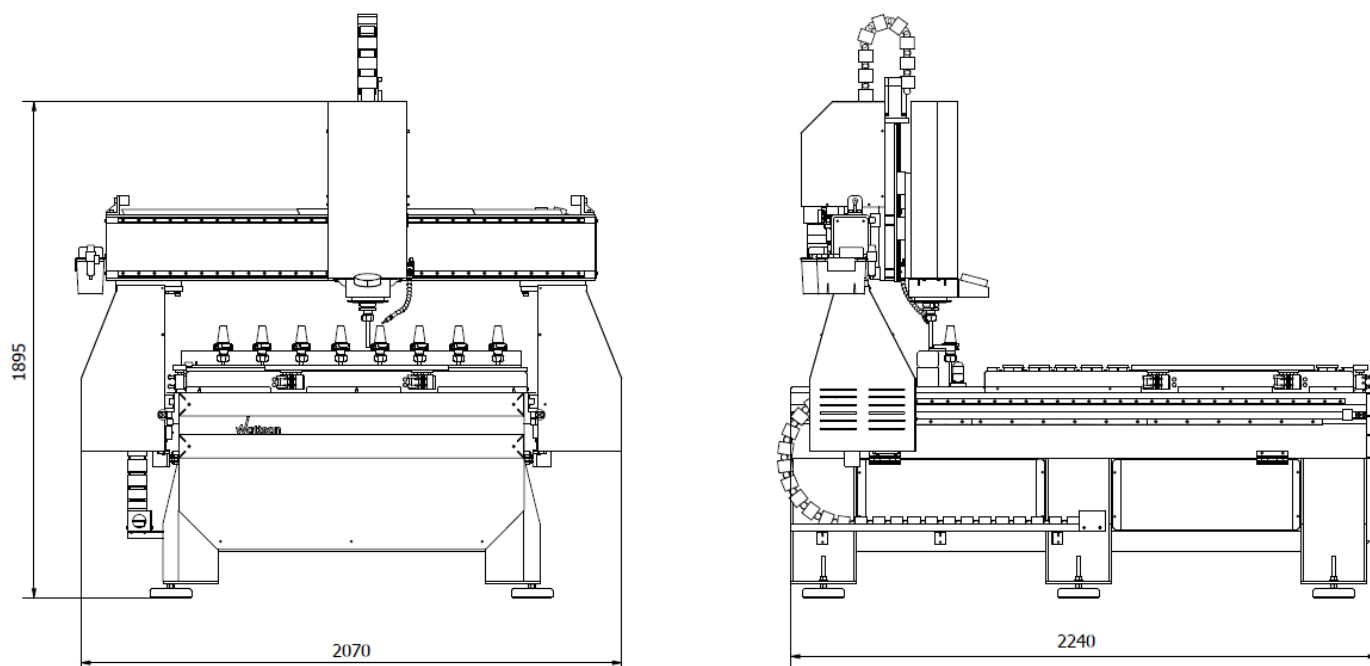
2.5. OBLIGATIONS OF THE OPERATOR

- The operator must undergo special training in order to start working on the machine.
- Follow the instructions for regular maintenance of the appliance to keep it operational and prevent accidents.
- After completing each work shift, remove chips and dust from the surface of the table and moving parts of the machine to avoid the accumulation of waste.

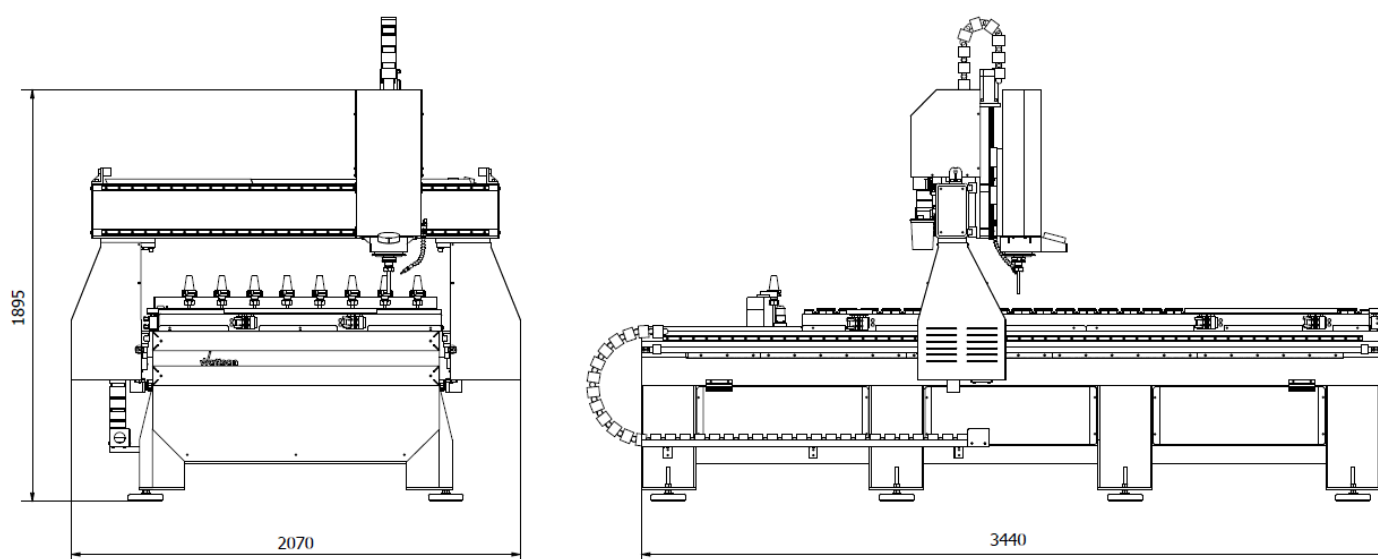
CHAPTER 3. APPEARANCE OF THE MACHINES

3.1 MACHINE DIMENSIONS

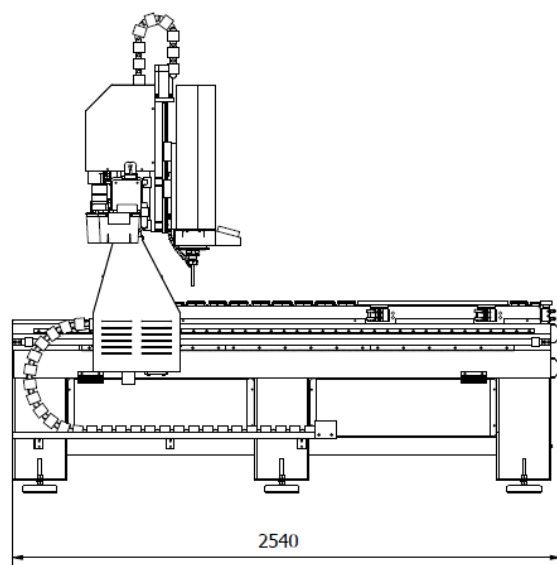
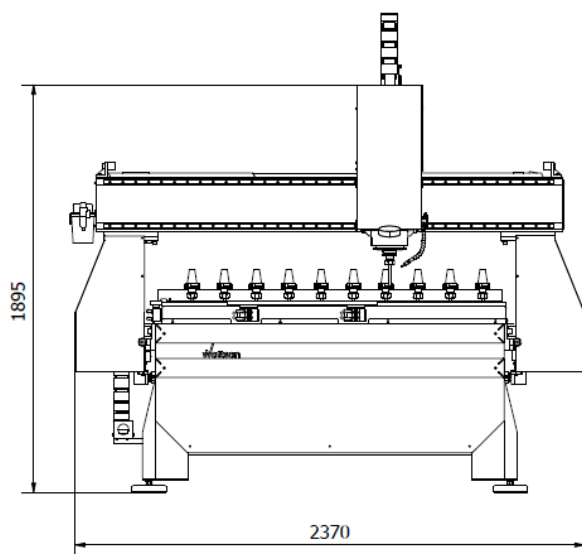
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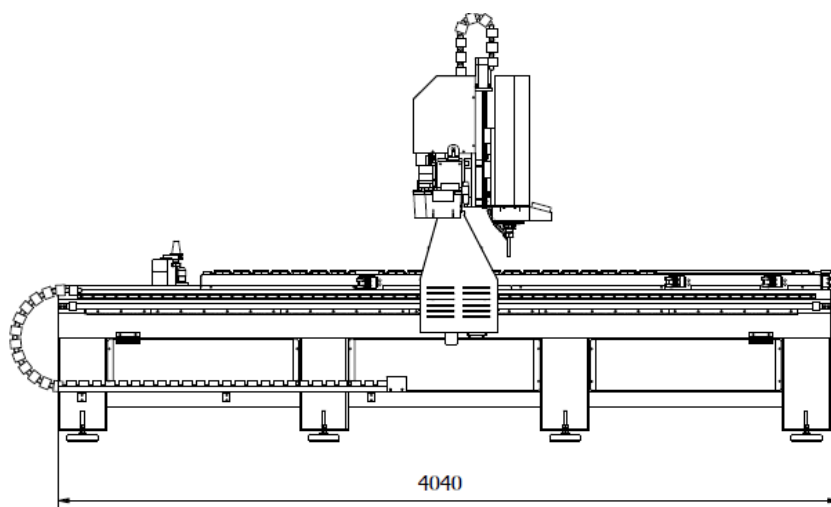
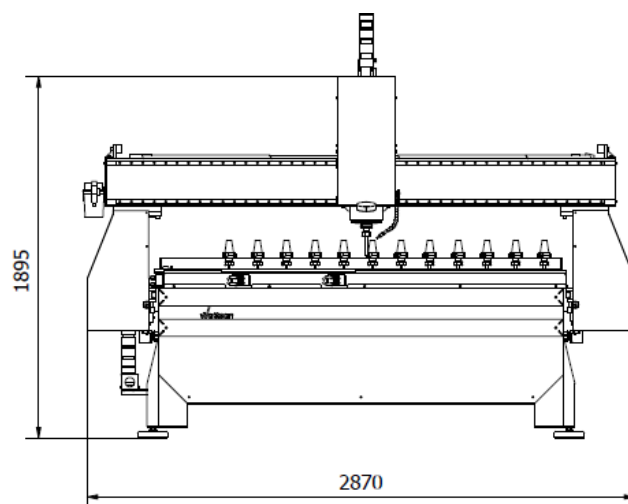
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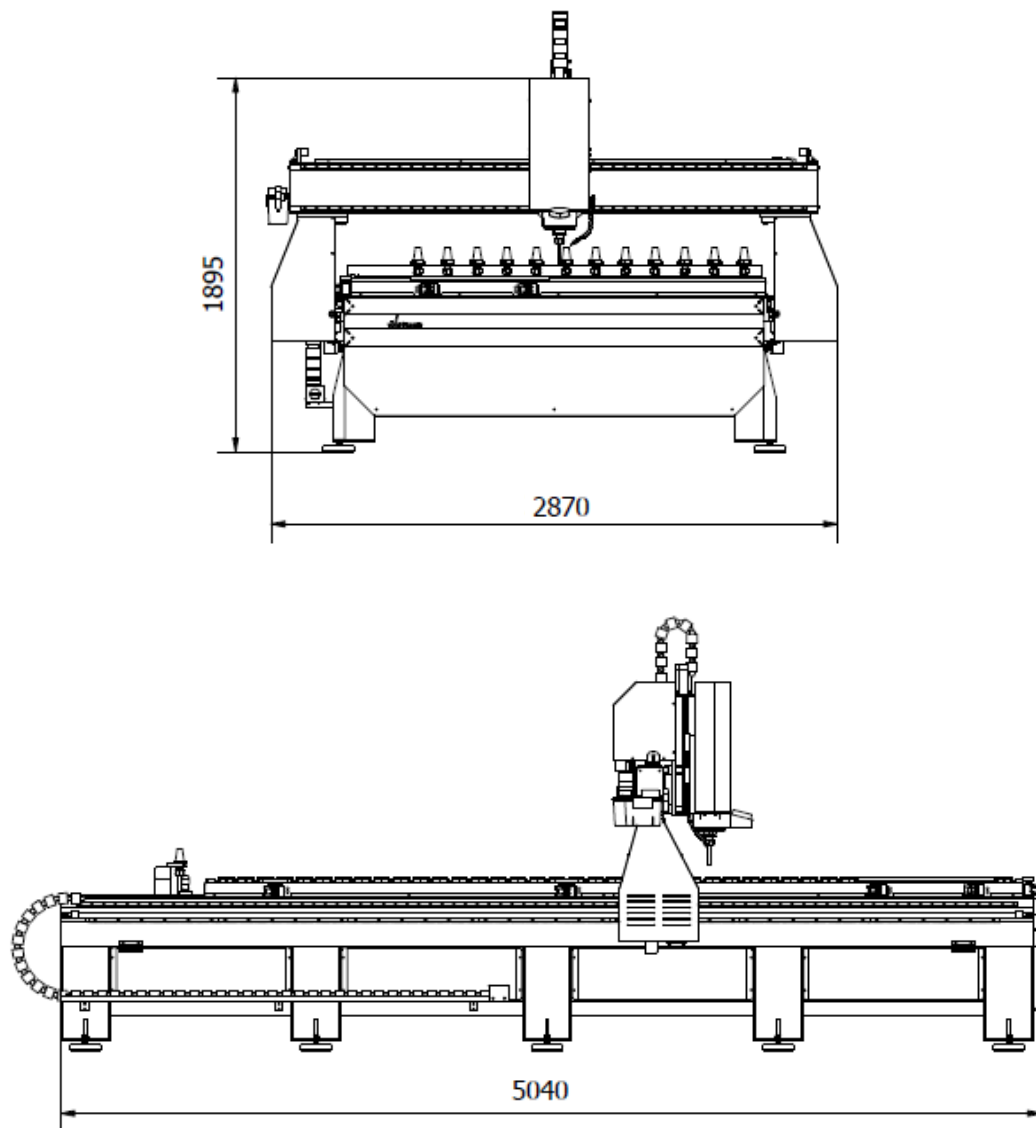
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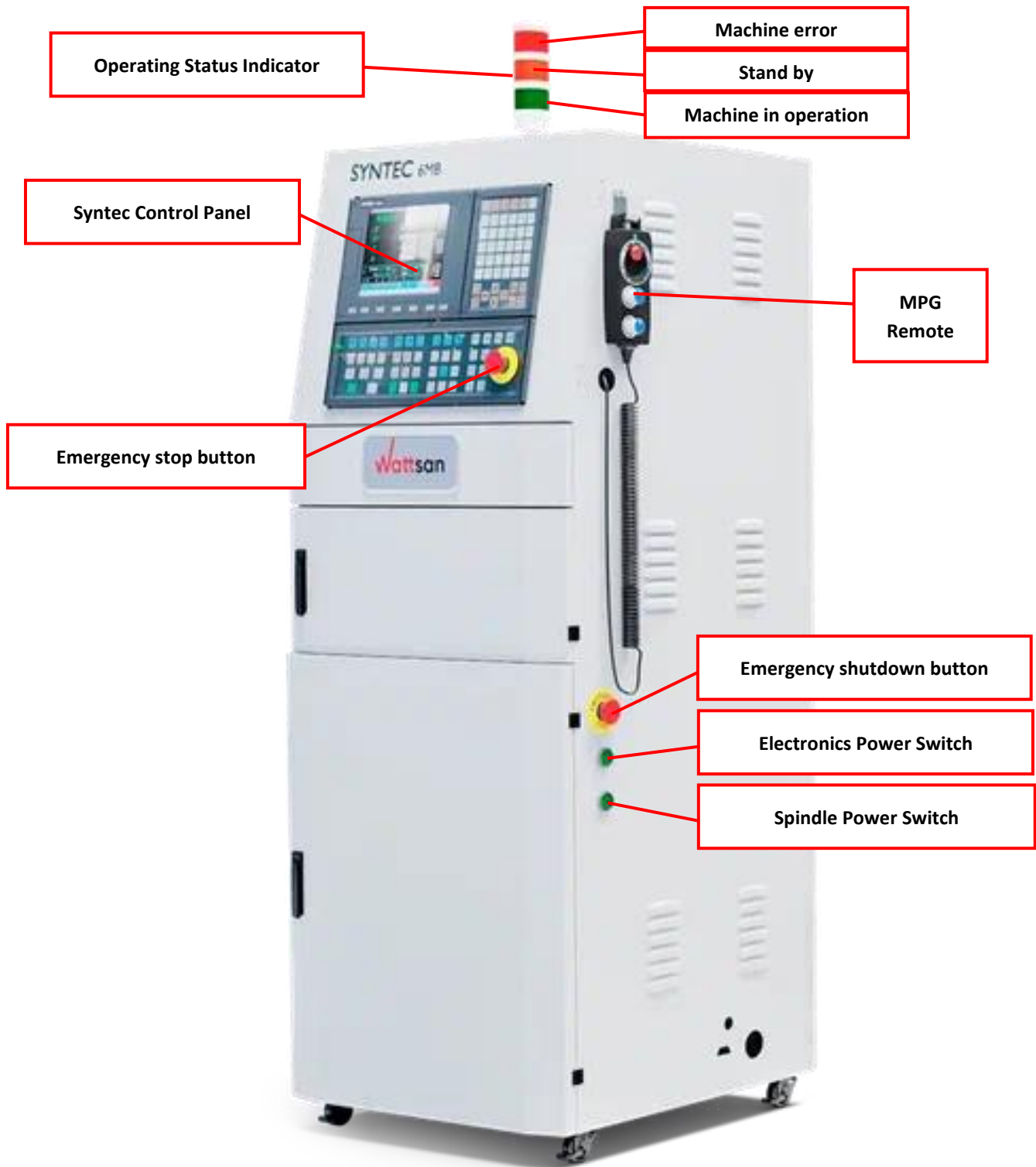
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3.2 CONTROL CABINET WITH CONTROL UNIT



CHAPTER 4. ACCEPTANCE AND UNPACKING

4.1 GENERAL INFORMATION

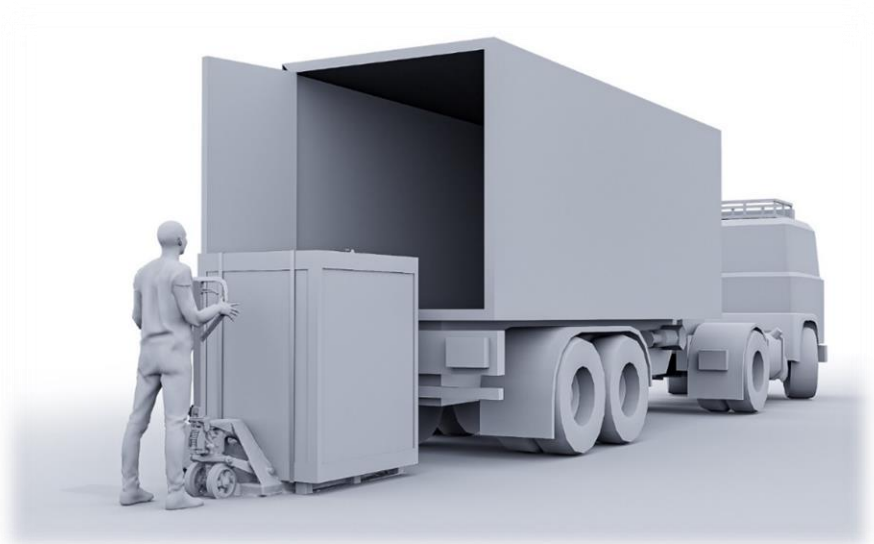
We strongly recommend that only specially trained personnel unload the machine.

Before unloading the equipment, carefully inspect the cargo and packaging for damage, check the number of pieces declared in the bill of lading. In the presence of damage and/or the absence of cargo packages, we recommend that you draw up a commercial act, since without this document, the insurance company has the right to refuse to pay compensation.

4.2 UNLOADING EQUIPMENT BY FORKLIFT OR STACKER

When unloading equipment using this type of equipment, pay attention to the lifting capacity and length of the forks. Make sure the forks are the right length by referring to the dimensions of the equipment. If you unload from the side, focus on the width of the base of the box/bed. If unloading is carried out through the rear gate - by the length of the box/bed.





ATTENTION!

1. Do not stand under a lifted and moving load. Be sure to use a hard hat.
2. Avoid sudden movements and jolts when raising and lowering equipment.
3. Do not tilt the equipment until the original packaging is removed.

4.3 UNBOXING

Check the machine and all accessories for external damage when accepting the equipment from the carrier. If possible, unpack the equipment together with a representative of the carrier.

CHAPTER 5. INSTALLATION

5.1 PREPARING THE INSTALLATION SITE

Before installing the machine, make sure that the working area meets all technical requirements:

- **Size and Location:** Make sure that the mounting area is sufficient to accommodate the machine and allows access from all sides for maintenance. At least 1000 mm of free space around the machine on each side is required.
- **Flat surface:** The floor should be level and stable, preferably concrete, to avoid vibrations and distortions during the operation of the machine.
- **Lighting:** The work area should be well lit so that the operator can easily control the processing process.
- **Temperature and humidity:** The recommended temperature for the operation of the equipment is between +10°C and +35°C, with a humidity of no more than 70%. Avoid installation in places with high humidity or near heat sources.



Do not use the equipment at temperatures below the dew point.

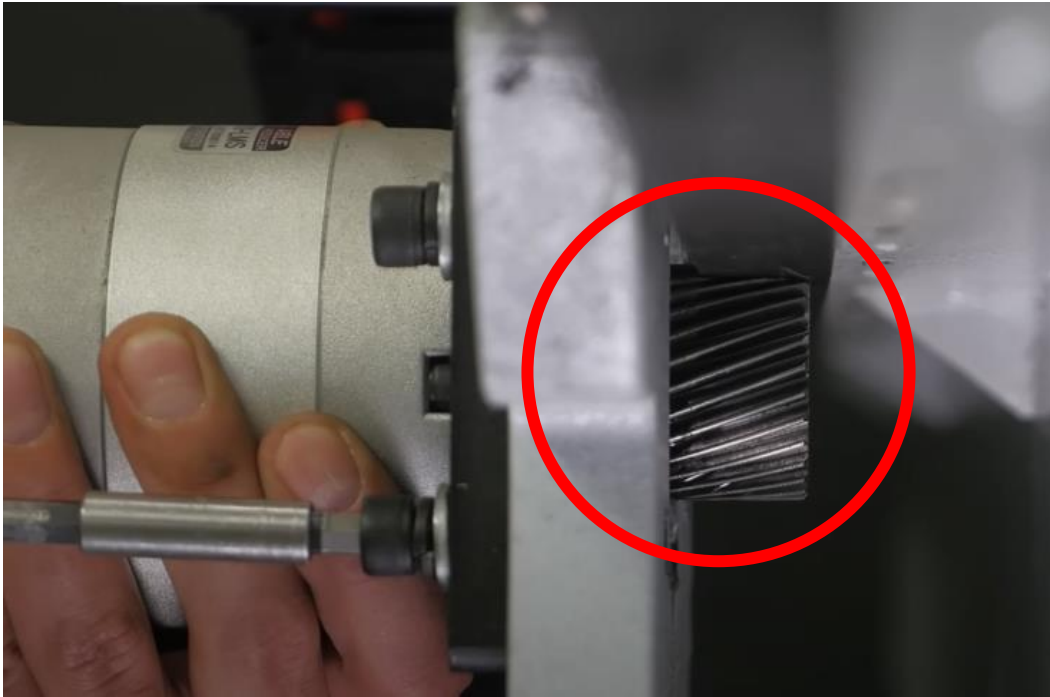
Temperature	Humidity															
	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%
16°C				0	2	4	5	7	8	9	10	11	12	13	14	15
18°C			1	3	4	6	8	9	11	12	13	14	15	16	17	18
21°C		1	3	5	7	9	11	12	13	14	16	17	18	18	19	21
27°C	2	5	8	10	12	13	16	17	18	19	21	22	23	24	25	26
29°C	4	7	10	12	14	16	18	19	21	22	23	24	26	27	28	28
32°C	7	10	12	15	17	19	21	22	23	25	26	27	28	29	31	31
35°C	9	12	15	17	19	21	23	24	26	27	29	30	31	32	33	34
38°C	11	14	17	20	22	24	26	27	29	30	31	33	34	35	36	37

5.2 INSTALLING STEPPER MOTORS

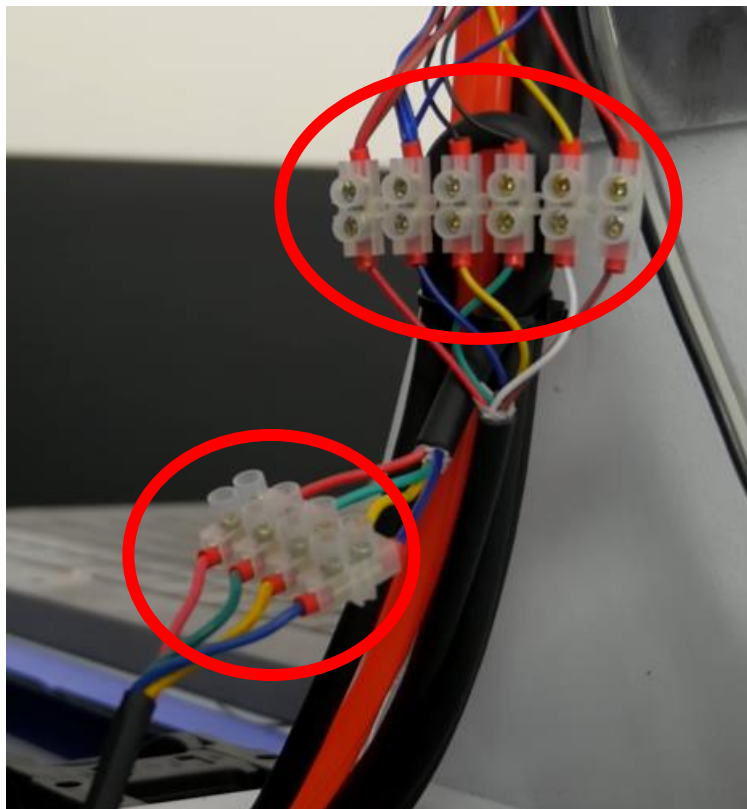
1. Secure the motors without stringing the screws



2. Lift the motor so that the motor drive rests firmly on the helical rack and tighten the screws.



3. Connect the motor wires to the terminal according to the color coding of the wires



5.3 CONNECTING THE MACHINE TO THE CONTROL UNIT

5.3.1 WIRING CONNECTION

1. Take the cable channel and slide the wires through the hole in the control unit.

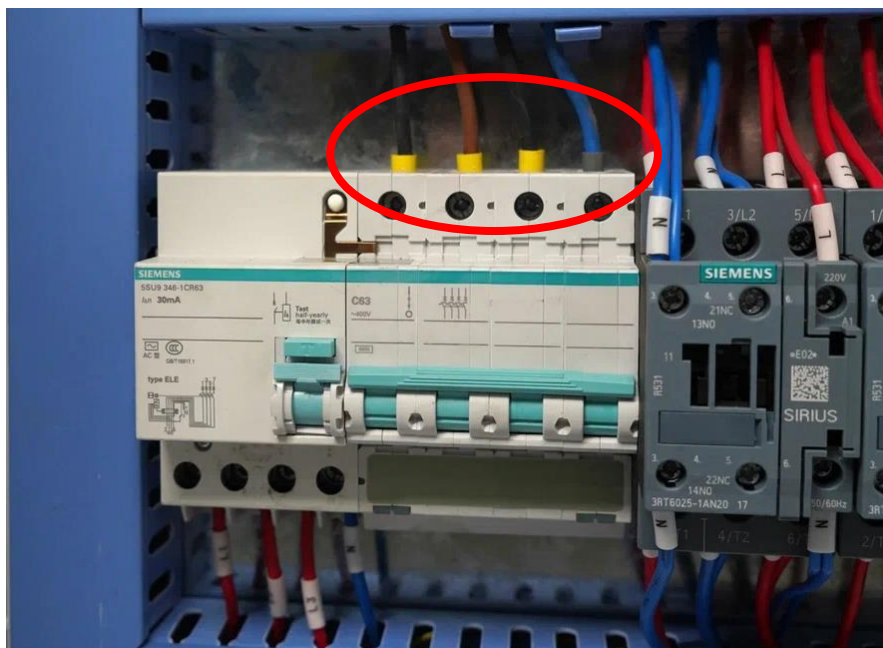


2. Connect the wires to the terminal according to the wire markings

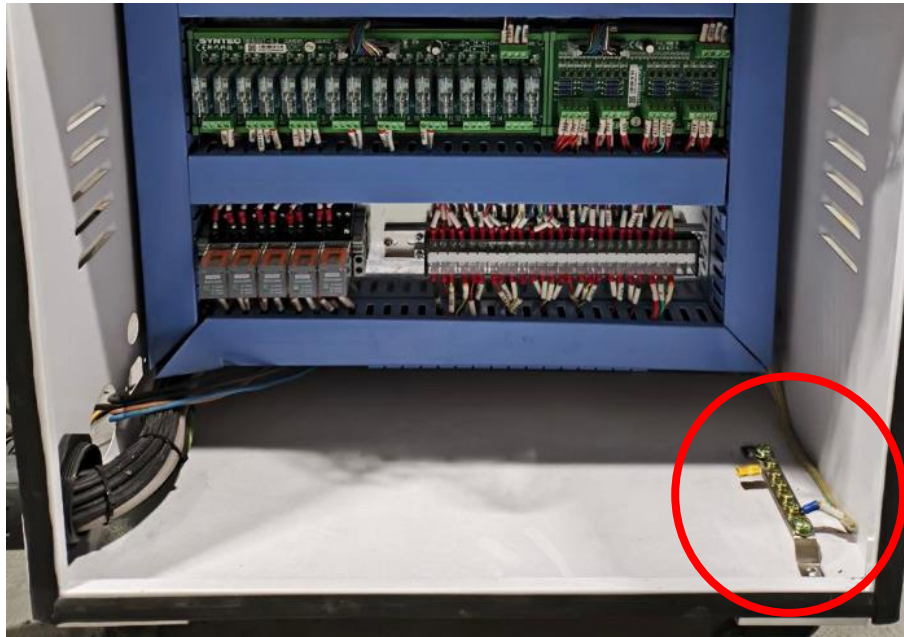


5.3.2 CONNECTING THE POWER SUPPLY

1. Locate the main switch in the control cabinet and connect the power supply to the switch:



2. Connect the ground cable to the machine's ground bus.



It is important to connect equipment through a voltage stabilizer! If the voltage fluctuates, the equipment will not work properly. If the voltage is too high, the electronic components of the machine may be damaged!

5.4 INSTALLING VIBRATION MOUNTS

Vibration mounts are not included as standard, but we strongly recommend installing them.

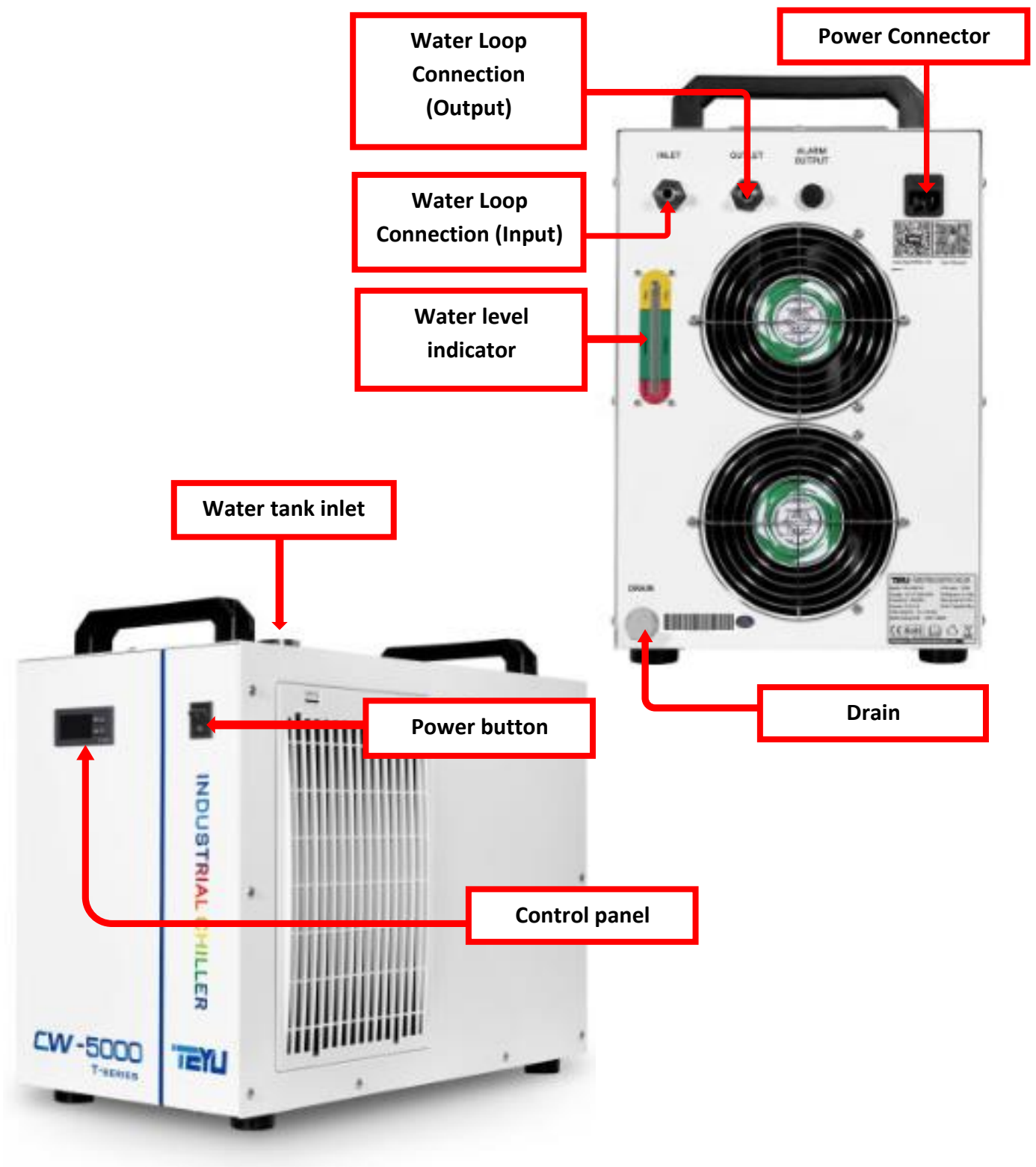
The frame posts have holes for anchor bolts.



1. It is necessary to raise the machine to ensure the possibility of supplying a vibration support under the support of the machine, for convenience you can use pads.
2. Using the lifting mechanism, set the bed to the desired height, and then, rotating the screw, fix the vibration support. Perform similar actions for each vibration support.
3. Check the evenness of the machine installation with a laser or bubble level.
4. After reaching the desired height, it is necessary to fix the vibration support by screwing the nut with the washer from the kit onto the screw and performing the desired tightening torque.
5. Remove the lifting mechanisms.

5.5 CONNECTING THE CHILLER

5.5.1 CONNECTION PROCEDURE



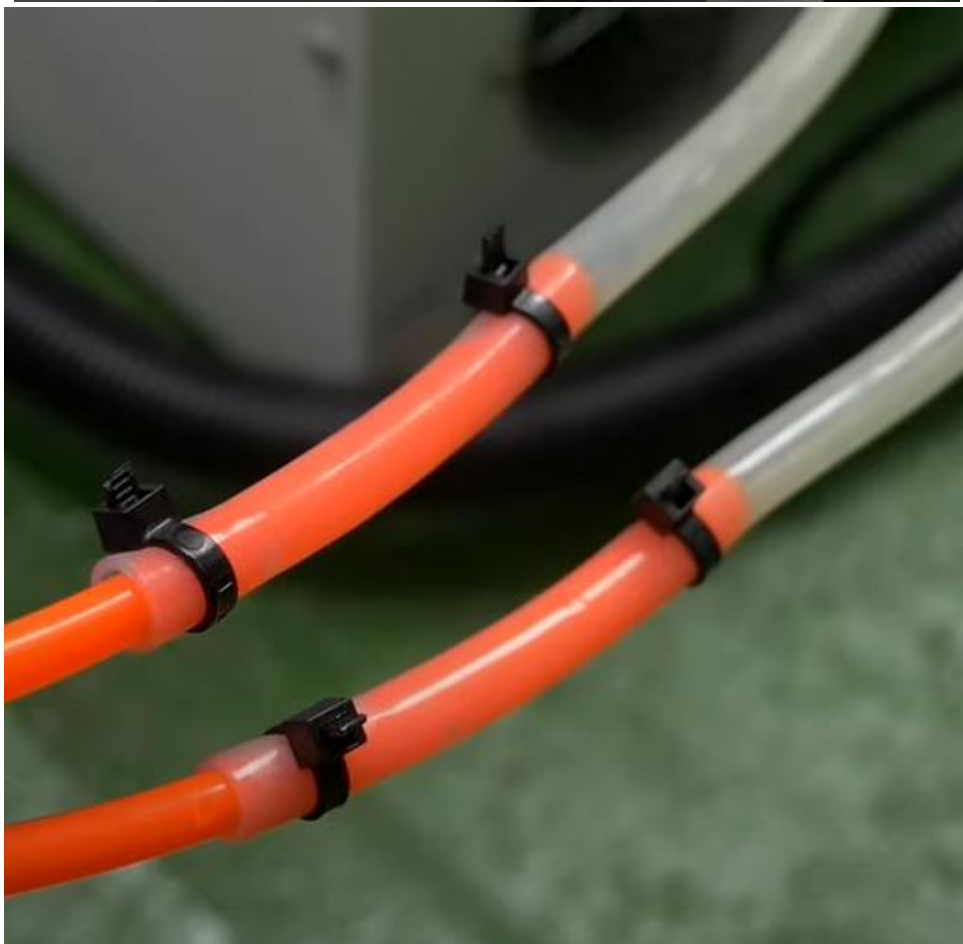
1. Take the two silicone hoses that come with the kit and connect them to the Inlet and Outlet fittings of your chiller:



2. Insert the machine cooling system hoses into the chiller silicone hoses:



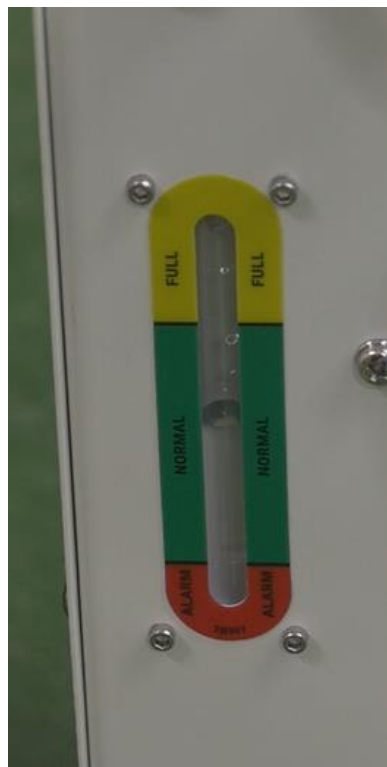
3. Tighten the hose connections with clamps:



4. Tighten the chiller drain plug until it stops.



5. Unscrew the filler plug of the chiller and pour distilled water into the chiller in the amount according to the chiller manual. Check at the back of the chiller that the water level is within the green zone. If the water level is below the green zone, add water, if it is higher, drain the excess water by unscrewing the chiller drain plug. And screw on the chiller fill plug.



6. Plug the chiller power cable into the chiller. Be sure to connect the power supply to the chiller through a voltage stabilizer.



Hoses should not be twisted or pinched for normal water inflow and should be tightly connected to avoid water leakage!

5.5.2 CHILLER SETUP

After installing the chiller, it is necessary to configure it if a configurable controller is installed on the chiller

Please set up the chiller according to the instructions attached to it. The water temperature should be set at 25°C.

5.6 MATERIAL INSTALLATION

5.6.1 FASTENING WITH PRESSURE PLATES

This method of fastening can only be used if the outer edges are not processed. To protect the machine bed, place a film under the material to be processed.



1. Insert the screw into the plate and tighten the nut:



2. Screw in the bolt:



3. Level the plate with a bolt and tighten the nut:



5.6.2 VACUUM TABLE (IF EQUIPPED)

Vacuum tables are used to quickly fix sheet material on the surface of the table. Due to the strong thrust, the vacuum table not only fixes, but also aligns the processed materials. For a high-quality work result, it is very important that the surface of the processed material is even.



The vacuum table is divided into zones, each of which is activated separately by a ball valve.



These areas are connected to the pump using reinforced PVC tubing

To isolate the zone, you need to use a special rubber gasket, which is inserted into the grooves on the desktop. It is important that the rubber gasket is laid only along the grooves of the vacuum zone that you are going to insulate.



For through-cutting on a vacuum table, the most commonly used substrate is the so-called spoilboard or sacrificial table. It is designed to protect the table itself from damage and comes in two types: perforated and solid.

Perforated is usually two PVC sheets with holes through which air holds the material or part.

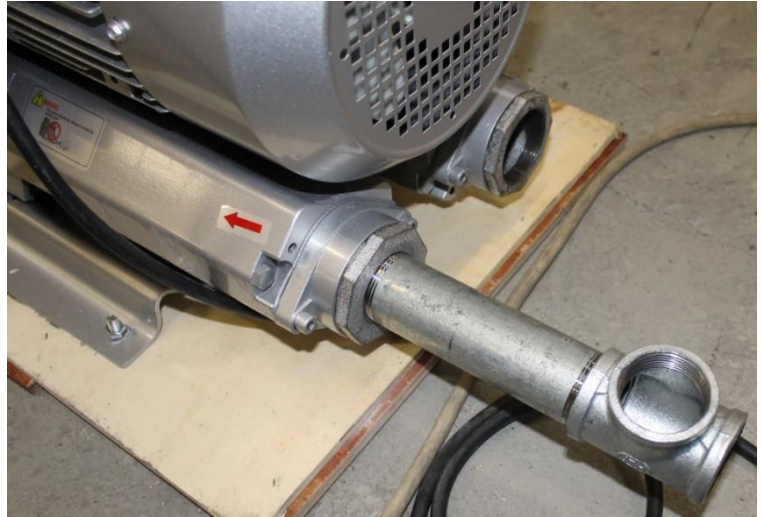
Solid is used with pumps that are capable of creating a vacuum close to 1 atm. Usually, a porous material such as MDF is used - the workpiece is pressed due to the fact that air passes through the pores in the material.

5.6.3 CONNECTING THE VACUUM PUMP

1. Unpack the vacuum pump



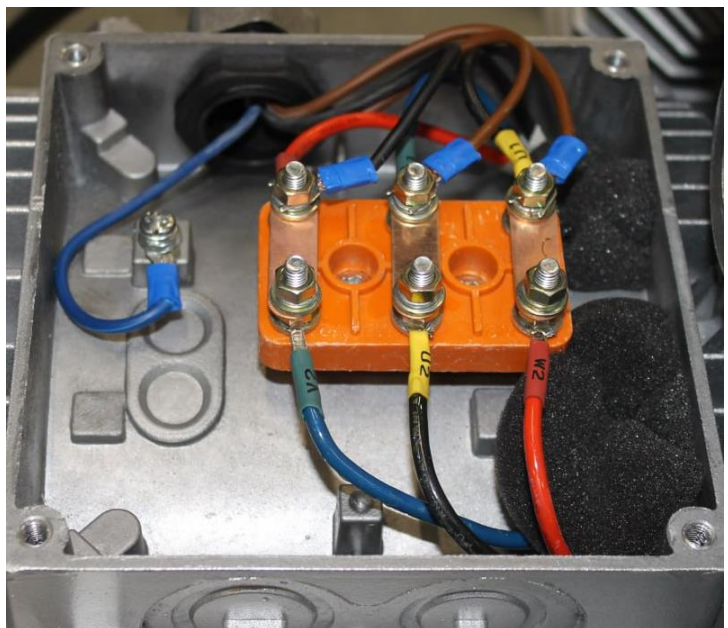
2. Install the vacuum adapters



3. Install the air filter and safety valve to the adapter, connect the hose from the machine to the filter outlet



4. Open the cap, which is located on top of the pump, and connect the 380 volt power. It is necessary to connect according to the diagram located under the cover.





5. Remove the caps from the holes on the vacuum table. Turn on the pump, put the ball valves on the machine in the open position, and check if air is being sucked in. If, instead of suction, the pump, on the contrary, blows air, then swap any 2 of the three power wires.

5.7 CENTRALIZED LUBRICATION SYSTEM

A centralized lubrication system makes the machine much easier to maintain. Before starting the machine, you need to adjust the lubrication system.



Using a screwdriver, tighten and unscrew the screws of the lubrication distributors so that all bearings are supplied with the same amount of lubricant. You also need to set a sufficient tightening of the screws so that the grease does not flow back into the barrel.

For lubrication, it is recommended to use a high-quality oil with a viscosity of SAE 30

5.8 CONNECTING THE COMPRESSOR

For the Auto Tool Changer (ATC) system to function, a compressed air source (air compressor) must be connected to the machine.



- Take the hose coming from the compressor and connect it to the machine's filter system. Fix the connection with a clamp. Turning the screw, set the pressure in the range of 6-8 bar.



For the system to work, the pressure value must be at least **6 bar** (0.6 MPa). The recommended range is 6-8 bar.

- Set the pressure gauge at the back of the spindle body to 2 bar.



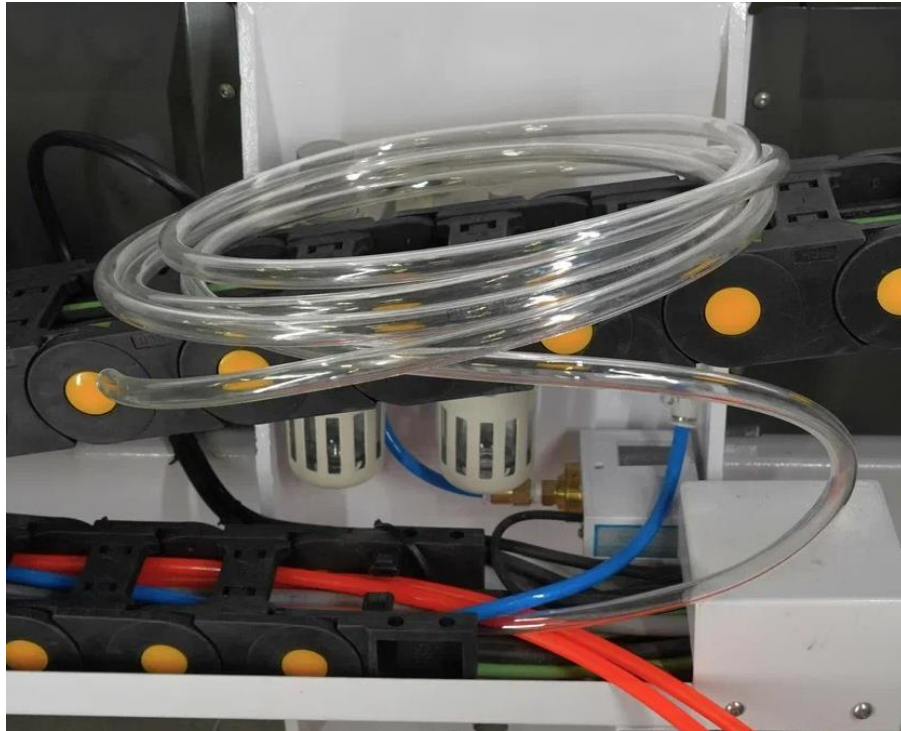
5.9 CONNECTING THE COOLANT SYSTEM

The coolant system is used to cool and lubricate the tool and the material being processed.

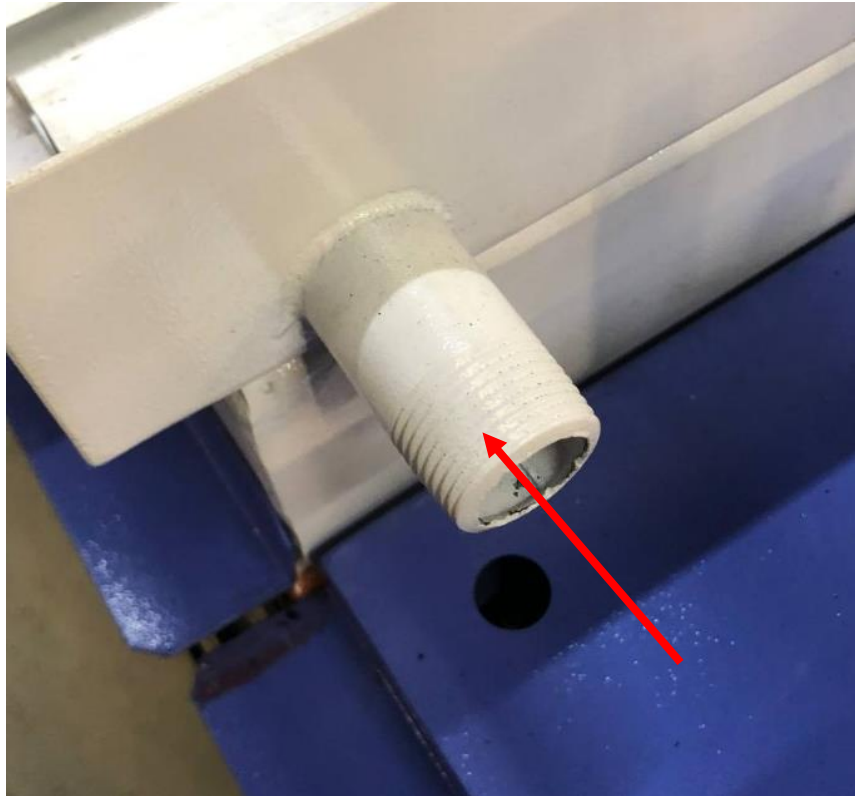
Coolant is an option on these machines.

Connection:

1. Locate the clear hose on the side of the machine. Connect it to the pump.



2. Slide one end of the hose into the machine drain and the other end into the pump reservoir



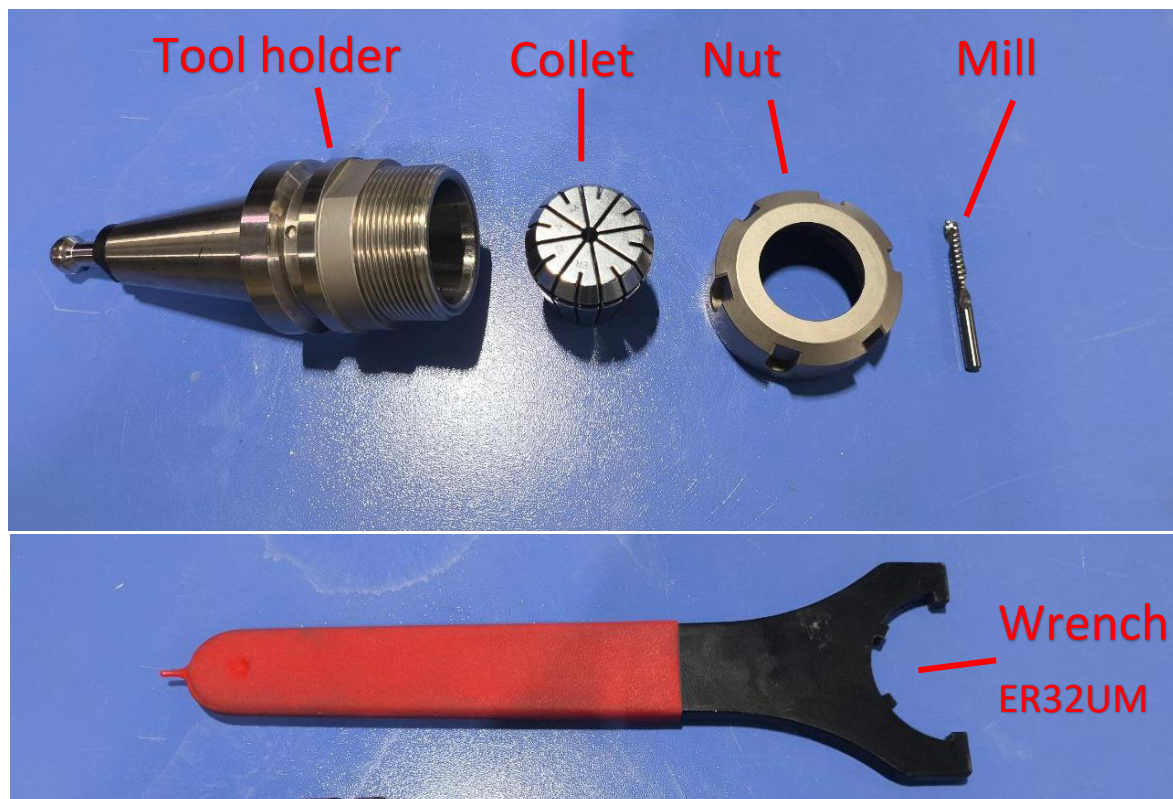
3. Plug the pump into the connector at the back of the machine



To manually activate the coolant system, use the F4 key.

5.10 TOOL INSTALLATION

The auto-changing spindles are adapted to work with collet chucks with a BT/ISO taper.

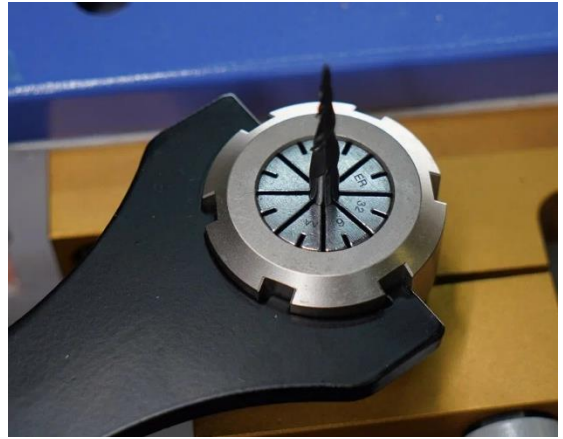


5.10.1 PROCEDURE FOR INSTALLING THE TOOL IN THE COLLET CHUCK.

1. Insert the collet into the nut until it clicks into place.
2. Take a tool with a shank diameter that fits the collet seat.
3. Insert the tool into the collet.
4. Place the chuck in the chuck vice on the machine and fasten.



5. Insert the collet with the tool into the chuck and tighten the nut with your hand for several turns. Then tighten the nut with a wrench.



First, you need to insert the collet into the nut, and only then the cutter into the collet.
To pull out the collet, you must first move it sideways until it clicks, then it will jump out of the nut groove.

5.10.2 INSTALLING THE TOOL IN THE AUTO SHIFT SLOT

There are special cells on the machine for installing collet chucks with tools in them. Each socket has its own serial number in the control system.



When working with the automatic tool changer, the following rules must be observed:

- The tool slot must be emptied if the machine is working with a tool with the same number



The management system always involves working with one of the tools. Before changing the tool for the first time, make sure that the socket attached to the previous tool is clear.

- If the tool is replaced, then in the socket with the number of the tool for which the replacement is carried out must be the chuck

CHAPTER 6. CONTROL PANEL



6.1 Control Buttons

Depending on the machine configuration, some buttons on the control panel may not be used, or the function associated with the button may differ from the icon.

6.1.1 BASIC FUNCTION BUTTONS

- **Single Block**



Block mode. The device executes one block, then stops. Each time you click the Cycle Start button, the next block will be processed. It is usually used to test the control program.

- **Home mode**



In Home mode, when the Cycle Start button is pressed, the machine will automatically find zero in all 3 axes

- **MPG Simulation**



When this function is enabled in AUTO or MDI mode, the speed of the machine will depend on the rotational speed of the handheld pulse generator flywheel. The flywheel rotates faster – the machine moves faster, the flywheel does not rotate – the machine does not move. It is usually used to test the control program.

- **Auto**



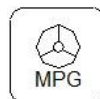
Automatic control program execution mode

- **MDI**



Machine mode used for manual input of small control programs, as well as for changing parameters.

- **MPG Mode**



The mode of control of the movement of the machine using a pulse generator.

- **JOG**



A mode in which the movement of the machine is controlled using the X+/X-/Y+/Y-/Z+/Z- buttons on the panel

- **Cycle Start**



Cycle start button, starts the control program in AUTO and MDI modes

- **Feed Hold**



Stop feed button in AUTO and MDI modes.

- **Locate**



Push button to raise the air stop

- **Tool Set**



Tool Length Measurement Button

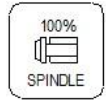
Spindle Rotation Control:



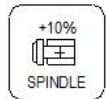
- Spindle start-up



- 10% reduction in spindle speed



- Spindle speed will be 100%



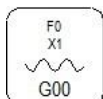
- 10% increase in spindle speed

Machine Motion Control

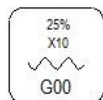
- The direction of movement of the machine along the X +/X-/Y+/Y-/Z+/Z- axes and the direction of rotation of the rotary mechanism (4+ and 4-). Rapid Jog - Rapid Machine Feed Mode. When the Rapid Jog button is pressed together with one of the movement buttons, the machine will move at a speed of G00.

- **G00 Accelerated Motion Control Buttons**

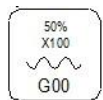
They are used to regulate the idle speed of the machine. To reduce the feed rate of the G00, you need to press 50%, 25% or F0



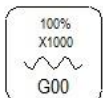
Movement Speed 5-10%



25% Movement Speed



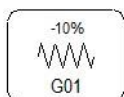
50% Movement Speed



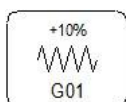
100% Movement Speed

- **G01 Linear Interpolation Feed Control Buttons**

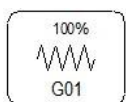
Used to regulate the speed of the machine during material processing



Reduce G01 Speed by 10%



Increase G01 Speed by 10%



Set G01 Speed to 100%

Function buttons



On these buttons, the operator can program the execution of any program or function.



External equipment control buttons. Can be programmed by the operator to control external equipment through the output ports.

Text Buttons



26 English letters.

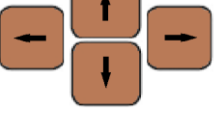


10 digits

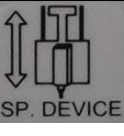
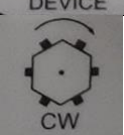
("(", ")", "[", "]", "|", "!", "&", "\$", "#", "<", ">", "=", "%", "@", "*", ".", ",", "+", "-")

Characters

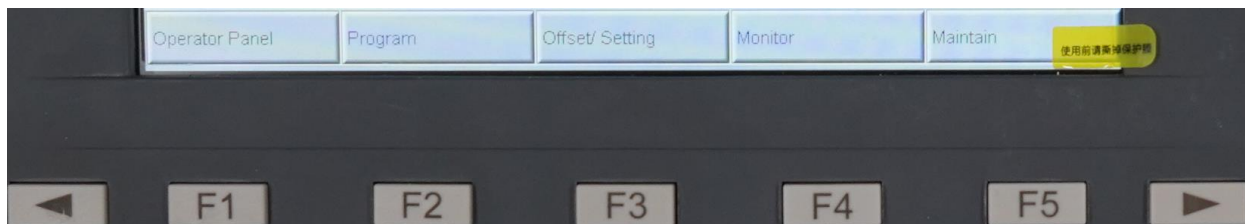
	Displaying the home page
	Put a space in the text
	Delete text to the left of the cursor
	Reset Program Settings
	Saving and Entering a Text Program

	When clicked along with another text button, a subscript character will be entered
	Display of a menu displaying information about the current positions of the machine axes
	When clicked, the 'Monitor' tab will open
	When clicked, the "Program" tab will open
	Open the manual on the screen
	When clicked, the Offset/Setting tab will open
	Go to the top/bottom of pages
	Cursor movement

6.1.2 ADVANCED FUNCTION BUTTONS

		Not Used
		
		
		

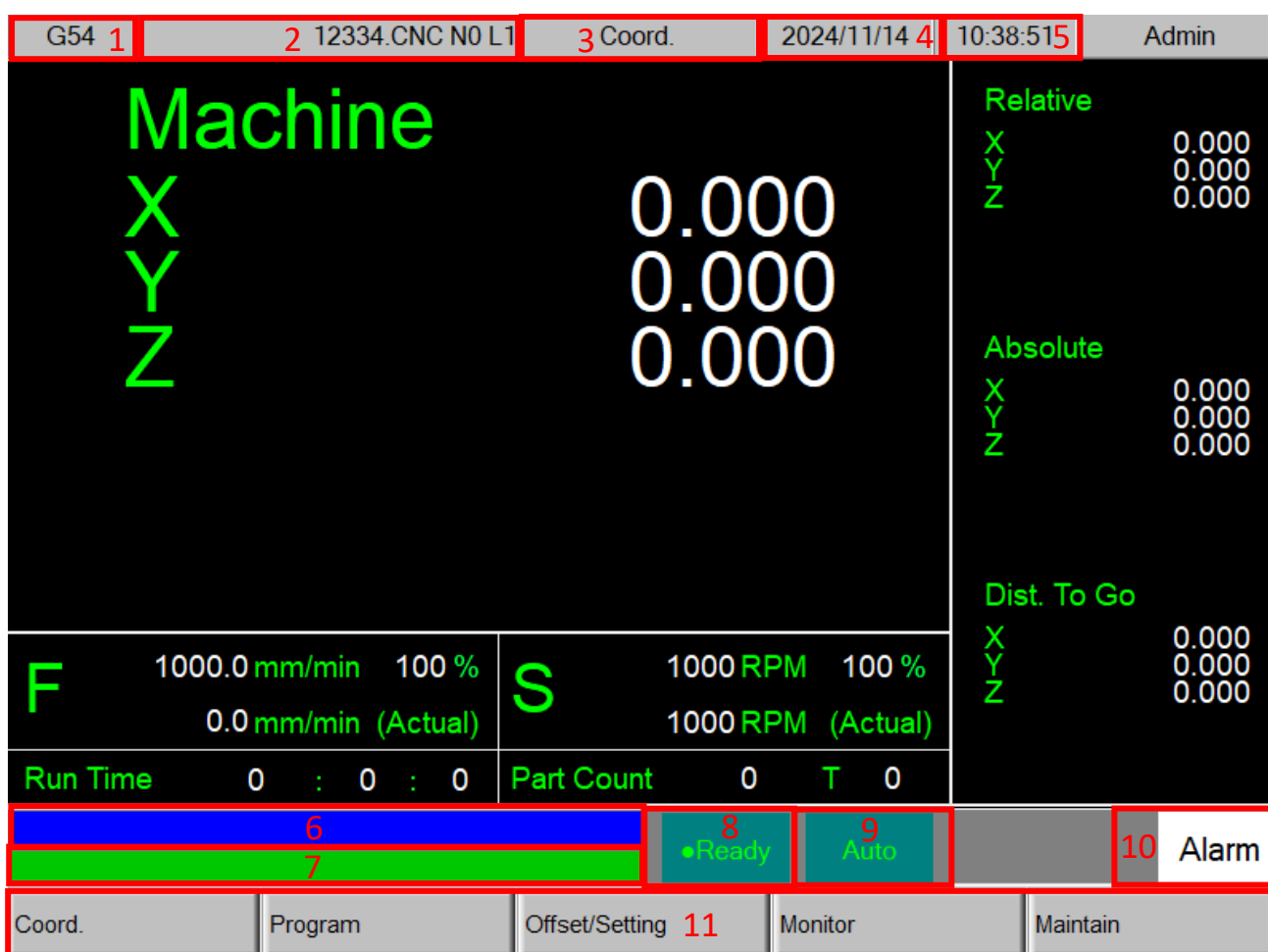
Corresponding navigation buttons in the menu



The F1, F2, F3, F4, F5 buttons are used to move to the appropriate level in the screen menu. For example, pressing F1 will take you to the Operator Panel, F2-Program, and so on.

The left/right arrows are used to go to the previous/next level menu.

6.1.3 INTERFACE DESCRIPTION



Features of the interface:

- | | |
|--|----------------------------------|
| 1. Selected coordinate system | 6. Data entry string |
| 2. The name of the selected file and the string to be executed | 7. Annotated String |
| 3. Open menu window | 8. Status |
| 4. Date | 9. Regime |
| 5. It's time | 10. Errors |
| | 11. Interface tab navigation bar |

6.2 MANUAL PULSE GENERATOR



CHAPTER 7. GET STARTED

7.1 STARTING THE MACHINE

Before starting the machine, it is necessary:

- ✓ Check that there are no forgotten tools or other foreign objects in the mechanisms of the machine.
- ✓ Check the tightening of the joints on the machine and its parts that need to be tightened.
- ✓ Check all electrical connections, make sure all cables are connected correctly and connectors are secured.
- ✓ Check the power supply parameters and their compliance with the characteristics of the machine and the connected load.
- ✓ Check the proper functioning of protective devices
- ✓ Ground the machine, the console and the control unit by connecting to the general workshop grounding system.
- ✓ After each turn on the machine, it is mandatory to perform the "Leaving for the house" procedure.



Every day, before starting work, it is recommended to warm up the spindle (Start the spindle for 5 minutes at a rotation speed of 10-12 thousand revolutions)

Machine Start-Up Procedure:

- In the control unit, turn on the main switch



- Open the emergency shutdown button by turning it clockwise.
- Press both green buttons alternately.



- Turn on the chiller (if equipped)



- Open the emergency stop button by turning it clockwise.



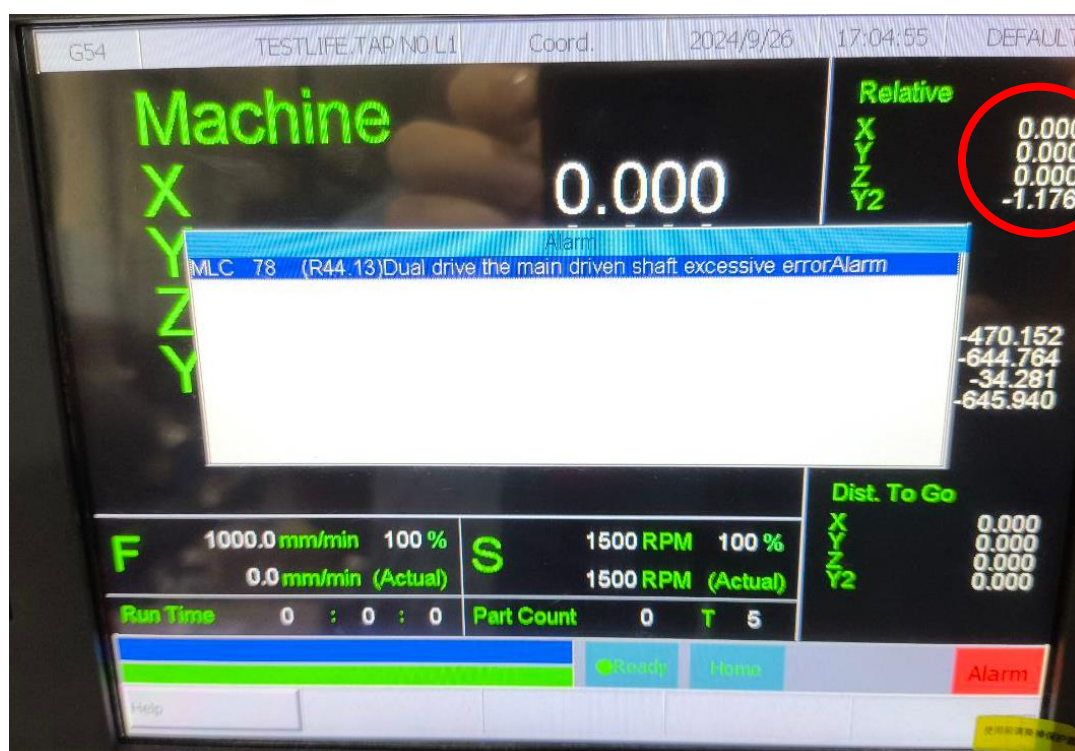
7.2 PROCEDURE "LEAVING FOR THE HOUSE"

After turning on the machine, it is mandatory to perform the procedure "Going home" ("Return to zero point", "Return to the point of origin", "Return to machine zero"). This is necessary for it to correctly determine its position relative to the desktop.

To do this, after starting the machine, press the Home button on the control panel, followed by the **Cycle Start** button.



After the procedure of leaving for the house, error 78 may appear

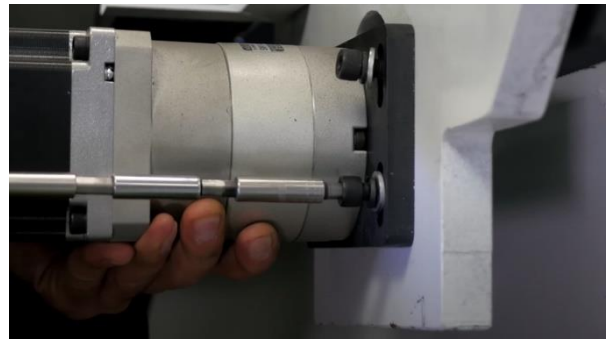


This error is a consequence of the fact that the motors Y and Y2 are not coaxial (the difference in the coordinates of Y and Y2 is more than 1 mm). To correct the error, you need to:

- Disable the movement of the machine by activating the emergency stop button



- Slightly loosen the mount of one of the motors



- Move the gantry so that the difference between the Y and Y2 coordinates is less than 0.5mm



The machine corrects an error of less than 0.5 mm automatically

- Tighten the motor mount
- Disable Emergency Stop Mode
- Repeat the procedure "Leaving for the house"

7.3 AUTOMATIC TOOL CHANGE SYSTEM

In order for the machine to work with the tool, it is necessary to measure the overhang length of each tool using the tool sensor.

At the first start-up, all procedures are carried out in the mode of manual generation of MPG pulses.

7.3.1. CHECKING THE POSITION OF THE TOOL PROBE.

It is performed after the procedure of "leaving for the house" and the absence of errors.

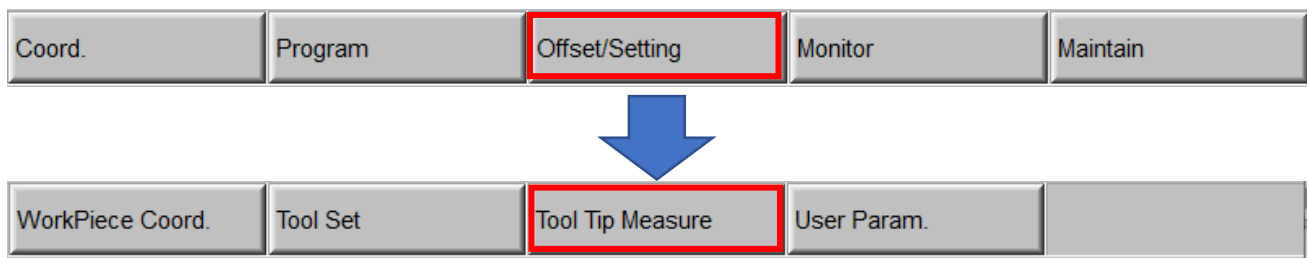
- Switch to manual motion control with the **MPG** button.



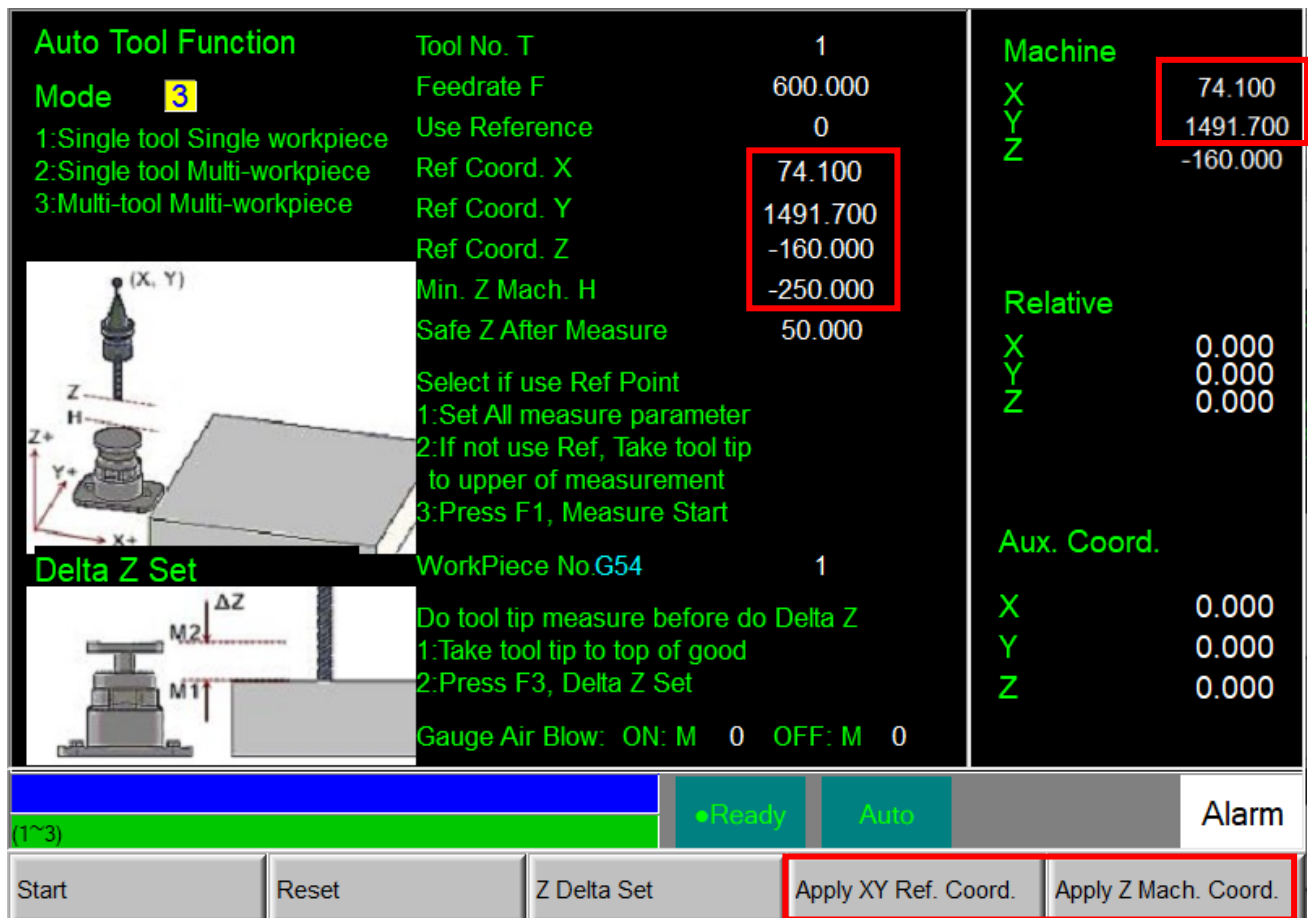
- Next, use the MPG remote to move the spindle so that it is above the tool probe.



- Go to the Offset/Setting (F3) tool measurement menu, then Tool Tip Measure (F3).



- Compare the coordinates of the tool probe with the current machine coordinates



- Change the coordinates of the sensor in case of discrepancy with the machine coordinates using the **Apply XY Ref. Coord buttons.(F4)/**.
- To configure the sensor on the Z axis, fill in 2 fields: **Ref Coord. Z** and **Min. Z Mach H**.
Ref Coord. Z is the coordinate of the start of the machine movement at the Feedrate F speed before contact with the sensor.
Min. Z Mach H. – The coordinate sets the maximum allowable value by which the spindle can descend. When it is reached, the machine will give an error.
Coordinates can be recorded manually or using the **Apply Z Mach button. Coord. (F5)**, bringing the machine to the required point.



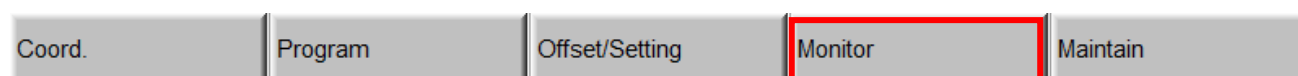
On this screen, you can see the number of the instrument that is currently installed. (String **Tool №. T**)

7.3.2 CHECKING THE POSITION OF THE TOOL CELL.

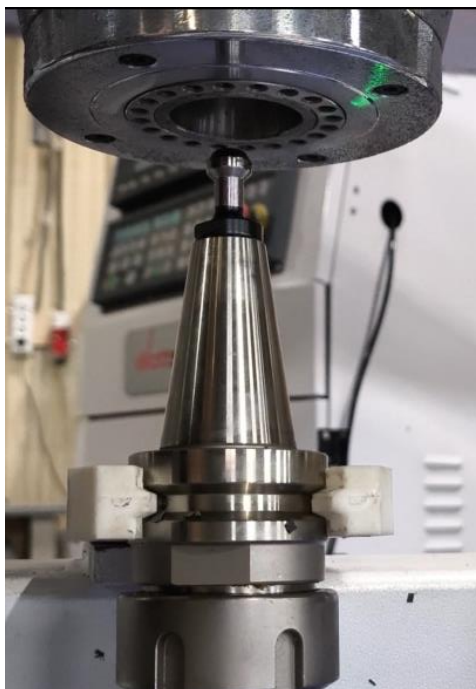
At the first start-up, make sure that the mesh positions for the tool and tool probe are correctly set. To do this, it is necessary to manually replace the tool in all cells.

To do this, you need:

- Enable **MDI**  **mode**. Go to the **Monitor (F4)** menu.



- Enter the **MDI Input (F3)** menu and enter the command "TX" into the empty field using the keyboard (the command consists of the letter T-stands for tool selection and X for tool number from 1 to 8). Press **OK (F1)**.
- Enable **MPG SIM**  **mode**. Press **Cycle Start** . With the help of a flywheel on the control panel, it is necessary to control the movement of the machine.
- First of all, the machine will go to the socket with the tool that is currently installed. **It is important that this socket is not occupied by another tool.** Check that the machine correctly determines the position of the socket.
- After the machine has removed the tool, the machine will go to the slot number that was specified in the command to install another tool.
- Smoothly move the spindle over the tool, making sure that the spindle and tool position match.



- Replace the tool if there are no deviations.
- Repeat this procedure for all tool numbers in the machine. (T1, T2, T3, T4, T5, T6, T7, T8).



In the event that the machine movement tool change program does not match the position of the tool cells, you must correct the coordinates of the cells in the control system.

7.3.3 ADJUSTING TOOL CELL COORDINATES

- Go to the **ATC Set** menu: while on the home screen, press the right arrow , then **ATC Set (F5)**, enter the password "520" and press **Enter**.
- The table shows the coordinate values for all 8 instruments.
- Switching to **MPG** manual mode, slide the tool spindle into an empty slot. Make sure that the chuck in the cell is level and that the cell is not deformed.
- To edit the parameters in the table, press **ATC Set pass (F5)** and enter the password "520"
- Use the arrows to navigate to the row with the tool number corresponding to the cell. Enter a machine coordinate value in the tool position coordinate cells.
- Y and Z coordinates can be duplicated for all cells if the cells are set on the same line.
- For the remaining X coordinates, repeat the procedure above.

After the adjustment, re-check the position of the tool cells.

7.3.4 CHANGING TOOLS IN MANUAL MODE

The tool holder can be installed in the spindle in manual mode.

To do this, hold F1 on the control panel, while the pneumatic chuck clamp is disengaged. **Be careful, if you do not hold the tool installed in the spindle at this moment, it will fall on the table.**



After removing the previous tool, set the next tool and release the **F1** button.

7.4 STARTING PROCESSING

Before starting processing, specify the coordinates of the origin of the working coordinate system and measure the selected tool.

7.4.1 MEASURING THE TOOL

Before the program can be executed, the instrument to be processed must be measured with a sensor. This can be done in two ways: Manual and Auto mode.

In the second option, it is enough to activate the **Tool Set function** . After that, the machine will automatically measure it every time you change the tool.

To measure in manual mode, follow these steps:

- Go to the **Offset /Setting (F3)** menu, then **Tool Tip Measure (F3)**.
- Under **Tool No. T**, enter the number of the tool you want to measure and press **Start (F1)**.

Tool No. T

1

- Next, the machine will automatically replace the tool, and take measurements using the tool sensor.
- Repeat the procedure for each tool.

7.4.2 WORKING COORDINATE SYSTEM (G54)

Place the workpiece on the work surface

- In manual **JOG mode** , move the tool to the point where the origin of the coordinate system is supposed to be, according to the program (for more accurate positioning, use **MPG mode**).
- Go to the **Offset/Setting (F3)** menu. In the G54 coordinate column, enter the value of the current machine X and Y coordinates.
- To set the value for the Z-axis, go to the **Tool Tip Measure (F3)** menu.
- Make sure that the tool touches the surface of the workpiece and press **Z Delta Set (F3)**.

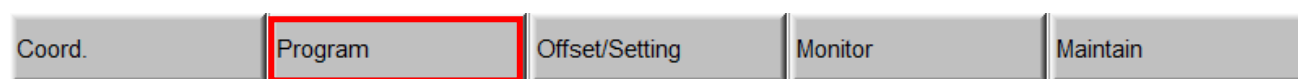
Setting the working coordinate system (G54) values is complete.

7.4.3 TRANSFERRING THE PROGRAM TO THE MACHINE

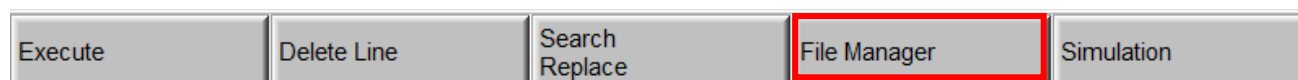
To perform tasks on the machine, you must select and run the appropriate machining program. You can use a USB drive or a network connection to transfer the program file.

Let's consider the option with a USB flash drive:

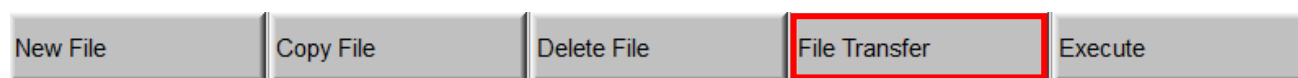
- On the home screen, press **Program (F2)**.



- Select **File Manager (F4)**.



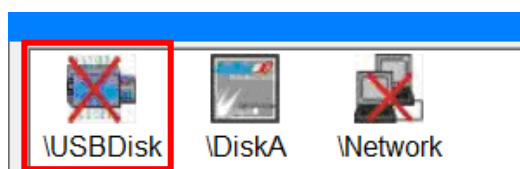
- To transfer from an external drive, insert the USB drive into the slot on the machine and press **File Transfer (F4)**.



- Select **File Import**.



- Next, select the **USB Disk device**, select the desired files and press **Copy (F1)** to copy the file to the machine's memory.



- Return to the **File Manager (F4)** screen. This screen lists the files located in the machine's memory. You can select the appropriate file and press **Execute (F5)**, after which the program will load for execution.

Name	Size	Modified	Comment
1	2	2024/11/12 11:48...	
12334.cnc	2527	2024/11/11 10:17...	(Program Name-12334)

Ready

Auto

Alarm

New File

Copy File

Delete File

File Transfer

Execute

The machine is ready to execute the program by pressing **Cycle Start**.

Before starting the processing, you can select **Simulation (F5)** on the **Program** screen. In this mode, you can follow the operations in the simulation mode.

Execute	Delete Line	Search Replace	File Manager	Simulation
---------	-------------	----------------	--------------	------------



It is recommended to start a new program in manual **MPG SIM mode**.

CHAPTER 8. MACHINE MAINTENANCE

Interval	Maintenance
Daily	At the end of each shift, clean the work surface of chips, dust and material residue using an industrial vacuum cleaner or brush.
	Inspect the cutting edges and the condition of the tool. If it shows signs of wear or damage, replace it with a new one.
	Check the coolant level in the system and add it to the correct level if necessary.
Monthly	Inspect guides, ball screws, and gear racks for wear. If necessary, clean and apply a fresh coat of lubricant.
	Check the oil level. Add if necessary.
3 months	Replace the water in the chiller.
6 months	Check the condition of the screw connections.
Perforce	Carry out external cleaning of the machine with a soft and clean cloth.

All moving parts of the milling and engraving machine require external condition monitoring and replacement in case of significant wear.

CHAPTER 9. TROUBLESHOOTING



The Syntec 6W-E control panel displays codes and error messages. Study them and check the documentation to determine possible causes.

Symptoms	Reason	What to do
The machine does not turn on.	- An emergency shutdown has been activated. - Lack of power supply. - Faulty main switch. - Problems with cables or the power grid.	- Open the emergency shutdown button pins by turning the button clockwise. - Check your network connection and cables. - Make sure the main switch is working. - Check the circuit breakers and fuses.
Reduced machining accuracy.	- Wear of guides or ball screws. - Backlash in joints and fasteners.	- Check the condition of the rails and replace the worn parts. - Tighten the fasteners and check the backlash in the ball screws. All work with the mechanics of the machine should be carried out with the power supply turned off!
Jerks when moving.	- Lack of lubrication on the guides. - Engine breakdown or bearing problems.	- Apply lubricant to the guides. - Check the motor and bearings. Replace faulty components if necessary.
Spindle overheating	- Low coolant level. - Breakdown of the cooling system pump. - Blockage in the hoses of the water circuit.	- Check the coolant level. - Check the operation of the pump and replace it if it malfunctions. - Clean the cooling hoses.

CHAPTER 10. WARRANTY

In case of equipment breakdown during its warranty period due to a defect caused by the manufacturer, repair is carried out by the supplier's company free of charge.

However, consumable parts such as optical parts (tools, hoses, fittings, etc.) are not eligible for warranty service.

For free repair or replacement of accessories, the buyer bears the cost of delivering new components from the place of their storage to the buyer's address, and, if necessary, the buyer bears the cost of the specialist's visit to the place of work.

If the equipment failure is caused by a defective part or assembly of the equipment, this part or assembly is repaired or replaced free of charge.

Defective components and parts must be returned to the supplier.

If the malfunction is not caused by the quality of parts or components of the equipment, the buyer will have to pay the cost of repair as well.

Warranty service is also not subject to malfunctions due to improper use of equipment, non-compliance with maintenance rules, operating conditions, as well as warnings specified in manuals and on warning plates that have arisen during the warranty period.

Also, a prerequisite is that your equipment and peripherals are grounded and operated through a voltage stabilizer.