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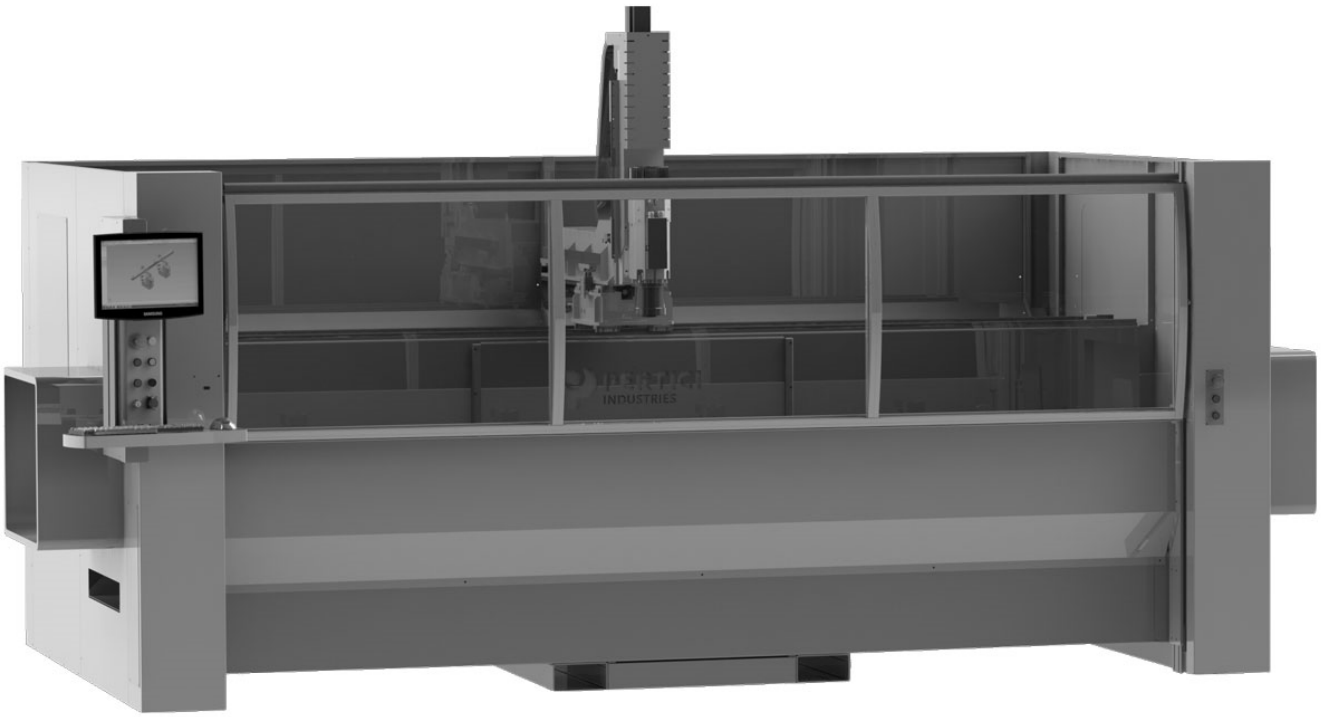
MACHINING CENTRE
MC 400 – MC 250

USER MANUAL



Contents

1. GENERAL INSTRUCTIONS

1.1. MANUFACTURER

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1.2. PRELIMINARY REMARKS

This manual is intended for the operator and, above all, for the personnel responsible for proper machine use for safety purposes.

It is therefore recommended to read it carefully, especially the paragraphs pertaining to the warnings and the operating methods, and to always keep it in its original case, if possible together with the machine so as to always make it available for future reference too.

1.3. STRUCTURE OF THE MANUAL

1.3.1. AIM AND CONTENT

This manual aims to provide the customer with all the necessary information so that, in addition to proper machine use, the customer may be able to manage it in the safest and most independent way possible. The manual contains information pertaining to safety, technical aspect, operation, machine stoppage, maintenance, disposal and spare parts. Prior to carrying out any operation on the machine, the operators and qualified personnel are required to carefully read the instructions contained in this publication. In case of doubt on the proper interpretation of said instructions, please contact PERTICI INDUSTRIES S.r.l. to obtain the necessary explanations or additional information.

1.3.2. RECIPIENTS

The manual in question is aimed at both the operator and the technicians authorized to carry out maintenance on the machine. Operators are not allowed to carry out operations reserved to maintenance or qualified personnel. PERTICI INDUSTRIES S.r.l. shall not be liable for damages resulting from failure to comply with this ban.

- OPERATOR: personnel assigned the task of operating, adjusting, cleaning and carrying out ordinary maintenance on the machine.
- QUALIFIED PERSONNEL and QUALIFIED OPERATOR: individuals who have attended specialization and training courses and who have experience with regards to the installation, commissioning and maintenance, repair and transport of the machine.

The machine is intended for industrial and thus professional and non-generalized purposes, consequently its use must be entrusted to qualified workers. The personnel assigned to work on the machine have to possess, or otherwise acquire through suitable education and training, the requirements listed here below:

- Be 18 years of age or older;
- Be physically and psychologically fit to perform jobs entailing specific technical difficulty;
- Be duly trained on machine use and maintenance;
- Be considered fit by the employer to carry out the assigned task;
- Possess enough general and technical knowledge to be able to understand the contents of the manual and to properly interpret the drawings and diagrams contained in it;
- Knowledge of main hygienic, accident-prevention and technological regulations;
- Overall knowledge of the line and of the plant where the machine is installed;
- Specific experience in the processing technologies associated with the use of numerical control machines;
- Knowledge of what to do in case of an emergency, where to find personal protection equipment and how to use it correctly;
- Be able to understand and interpret all indications contained in the manual as well as all safety-related prescriptions.

In addition to the characteristics mentioned above, maintenance personnel must also be adequately trained from a technical standpoint.

1.3.3. KEEPING AND USING THE MANUAL

The instructions manual must be kept in the immediate vicinity of the machine, inside a suitable container and, most importantly, protected against liquids and anything else that may make it illegible.

In case the machine is sold, the customer is kindly invited to provide PERTICI INDUSTRIES S.r.l. with the address of the new owner in order to facilitate the sending of any additions to the manual to the new user.

1.3.4. WARNINGS

- The manual reflects the state of technology at the time the machine is sold, and cannot be considered inadequate if it is subsequently updated on the basis of new knowledge.
- The manual forms integral part of the machine; it must be read carefully prior to carrying out any operations, and it must be kept for future reference.
- Any use other than the one indicated in this manual is considered incorrect or improper.
- PERTICI INDUSTRIES S.r.l. is relieved of any responsibility in the following cases:
  - Improper machine use;
  - use by untrained personnel;
  - incorrect installation;
  - unsuitable power supply;
  - serious shortcomings in the scheduled maintenance;
  - unauthorized changes or operations;
  - use of spare parts which are not original or specific for the machine model.

1.3.5. GLOSSARY

HAZARD: a potential source of injury or damage to health.

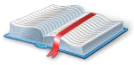
DANGER ZONE: any zone within and/or around a machine in which a person is subject to a risk to his health or safety.

EXPOSED PERSON: any person wholly or partially in a danger zone.

OPERATOR: the person or persons installing, operating, adjusting, cleaning, repairing or moving the machine or carrying out maintenance on it.

RISK: a combination of the probability and the degree of an injury or damage to health that can arise in a hazardous situation.

1.3.6. SYMBOLS USED

SYMBOL	MEANING	DESCRIPTION
	DANGER	Indicates a dangerous situation (including a risk of death) for the user
	CAUTION	Indicates a caution or a remark related to key functions or useful information
	REMARK	The system asks to take a measurement, to check a warning message, etc.
	REFER TO MANUAL	Reference must be made to the user manual prior to carrying out a specific operation

2. MACHINE DESCRIPTION

The MC made by PERTICI INDUSTRIES S.r.l. is a four-axis numerical control machining centre for milling, drilling and tapping operations on profiles made of aluminium, PVC, light alloy in general and steel up to 3 mm thick.

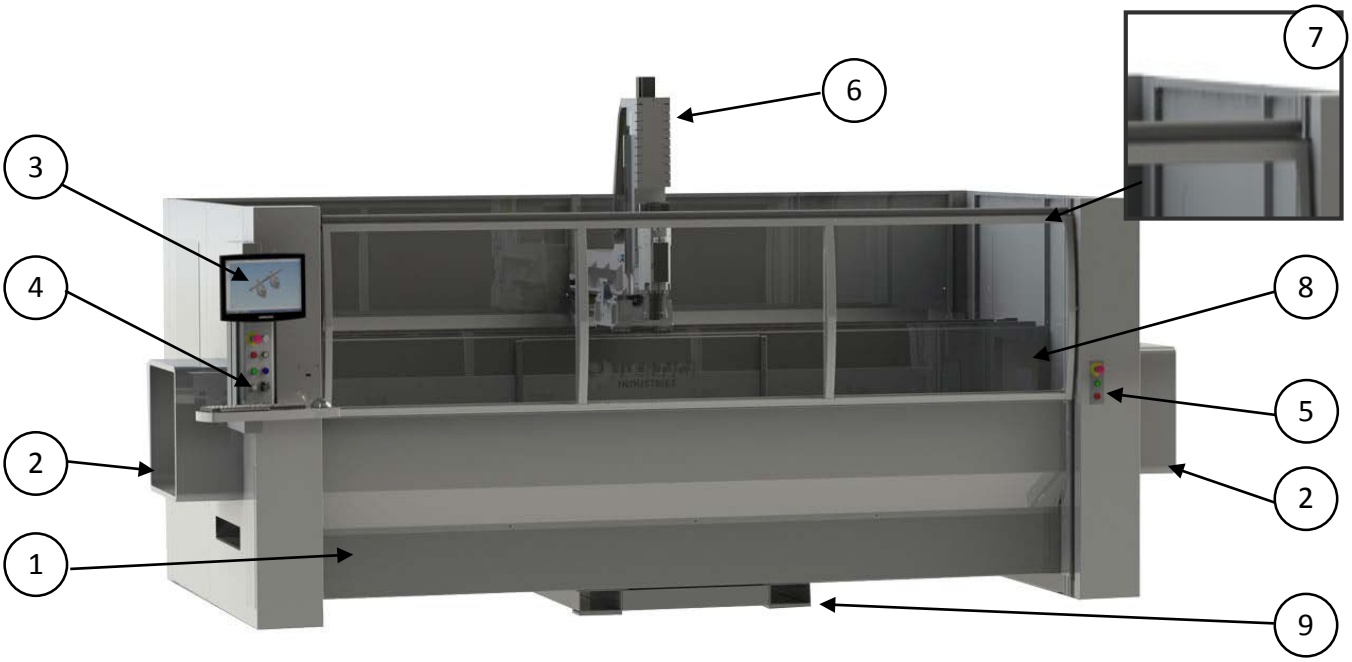


Fig. 1

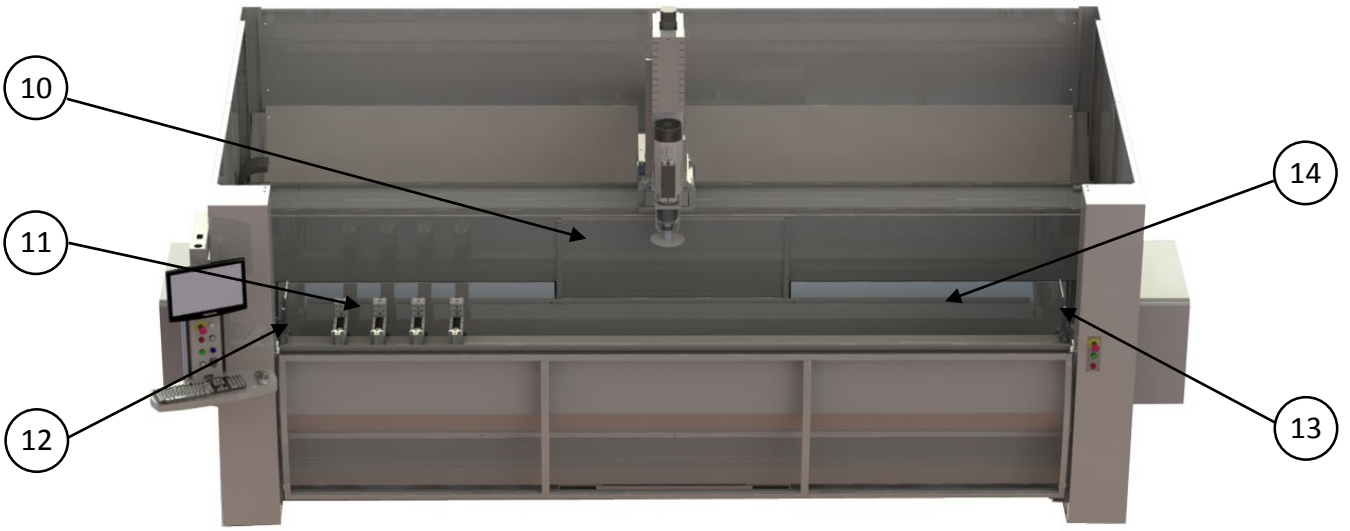


Fig. 2

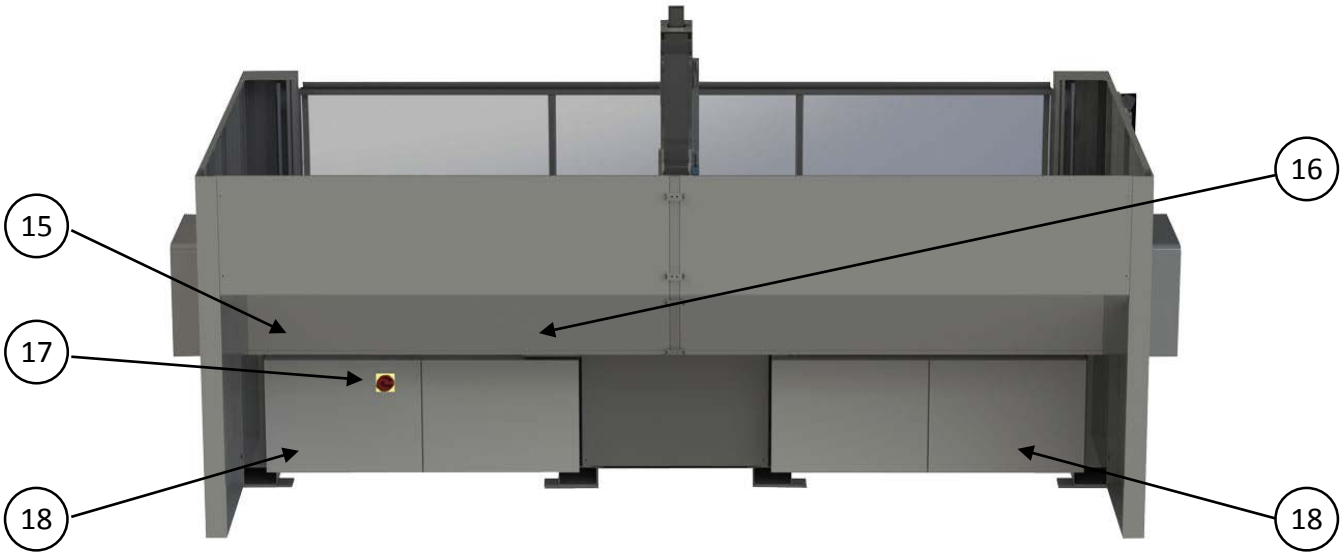


Fig. 3

Key

1. Bed
2. Side tunnel
3. Operator interface
4. Main pushbutton panel
5. Secondary pushbutton panel
6. Machining head
7. Safety sensor (bumper)
8. Hidden guard
9. Insertion of forklift truck forks during handling
10. Tool storage
11. Clamps
12. Left end stop
13. Right end stop
14. Table
15. Minimal lubricating-cooling unit
16. Compressed air treatment unit
17. Main switch
18. Electrical equipment

2.1. AXIS MOVEMENT

AXIS	MOVEMENT
X	Ball runner blocks with precision guides and gear motors coupled through pinion-rack system
Y	Ball runner blocks with precision guides and direct motor on ball screw
Z	Ball runner blocks with precision guides and direct motor on ball screw
Table	Supported with high-resistance roller bearings and direct gear motor
Clamps	Ball runner blocks with precision guides and gear motors coupled through pinion-rack system

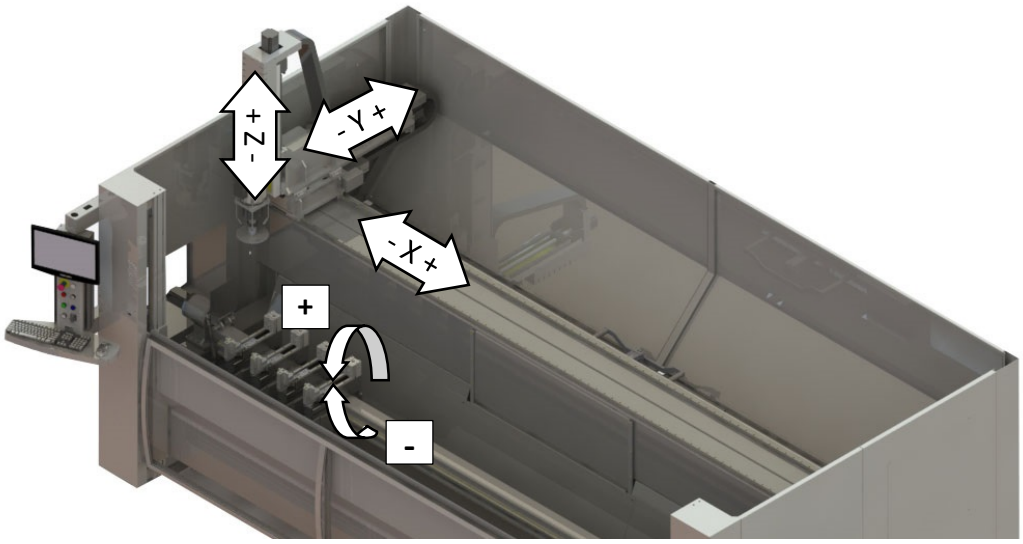


Fig. 4

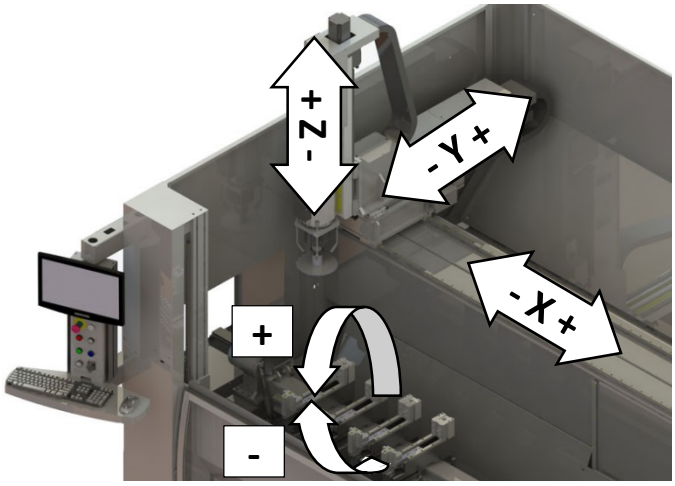


Fig. 5

2.2. SAFETY PROTECTION

The operator's safety is guaranteed thanks to the presence of:

- *a hidden guard* positioned on the front for the entire length of the machine;
- *a perimeter guard* for the lateral and rear areas.

2.2.1. HIDDEN GUARD

The hidden guard, made with an aluminium frame and clear, anti-collision cladding in polycarbonate, is automatically closed before each work cycle and stays closed during the entire machining process or in case of emergency conditions, thus preventing access to danger zones and/or moving components.

This guard is moved under conditions of total safety, in terms of the operator, through one of the following solutions:

- *Automatic*: The closing is an integral part of the work cycle, and it is carried out by giving the cycle start command. Safety is guaranteed by the contact safety sensor (bumper), located at the top of the guard and in the direction of movement which, in case the normal travel is hindered for any reason, interrupts its closing.
- *Supervised*: The closing operation precedes the work cycle and is controlled by the operator, for its entire travel, through the START pushbutton. The closing operation stops once this pushbutton is released.

2.2.2. PERIMETER GUARD

The perimeter guard consists of a system of panels made of metal sheet, and protects the sides and rear of the machine up to a height of 1845 mm, thus preventing any access to the danger zones.

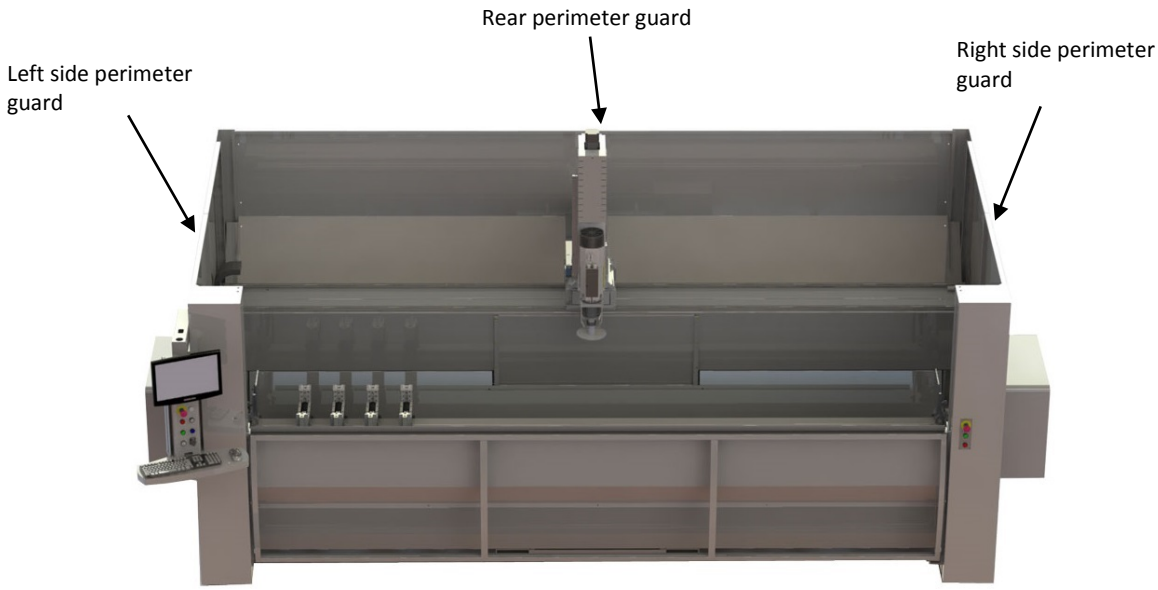


Fig. 6

2.3. CONTROL STATIONS

The MC machining centre is totally controlled from the main pushbutton panel located at the left front end of the machine (at the operator interface).

The duplication of the main controls (START/STOP/EMERGENCY), on the secondary pushbutton panel, provides the operator with an additional control station needed to ensure greater manoeuvring flexibility both during the machining phase and under emergency conditions.

2.3.1. MAIN PUSHBUTTON PANEL

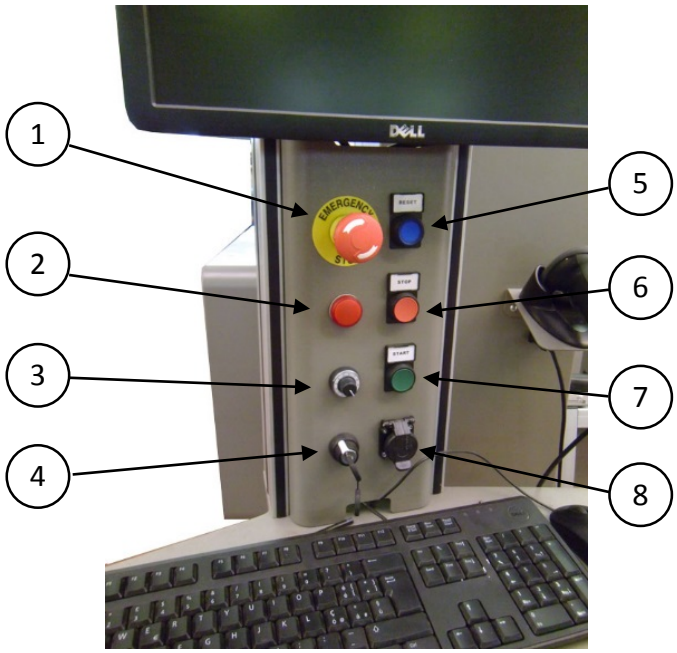


Fig. 7

1. EMERGENCY pushbutton
2. EMERGENCY warning light
3. Speed adjustment knob
4. ON/OFF maintenance selector
5. RESET pushbutton
6. STOP pushbutton
7. START pushbutton
8. USB port

2.3.2. SECONDARY PUSHBUTTON PANEL

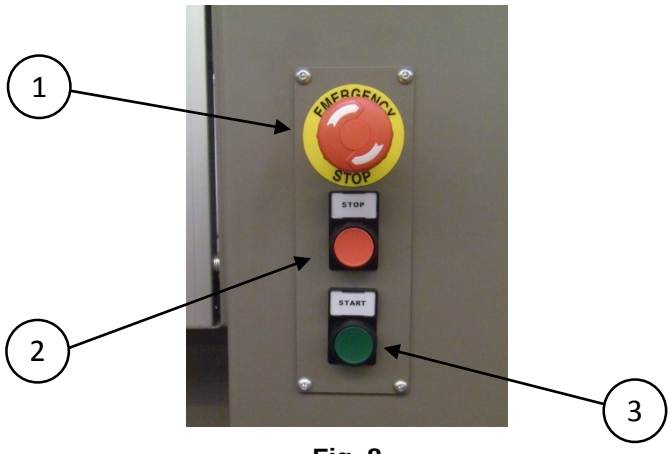


Fig. 8

1. EMERGENCY pushbutton
2. STOP pushbutton
3. START pushbutton

2.4. MACHINING HEAD

The rotation of the electro-spindle is frequency-controlled, through inverter and numerical control, in a range from 100Hz up to a maximum of 800Hz. The quick coupling system used to clamp the tool holder cone is the mechanical type, while its release takes place pneumatically.

The tool release operation can be carried out by operating the tool change pushbutton (Fig. 9) with the machine in manual mode (see technical manual for the machine software), or in automatic mode, completely managed by the software.

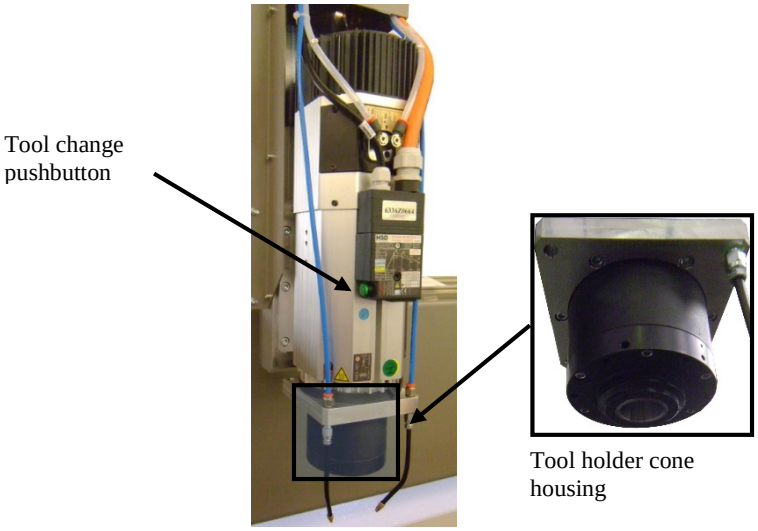


Fig. 9

2.5. TOOL STORAGE

The tool storage is located on the front of the machine bed. Access to said storage is allowed only after the door is opened (operation managed by the machine software supplied as standard equipment).

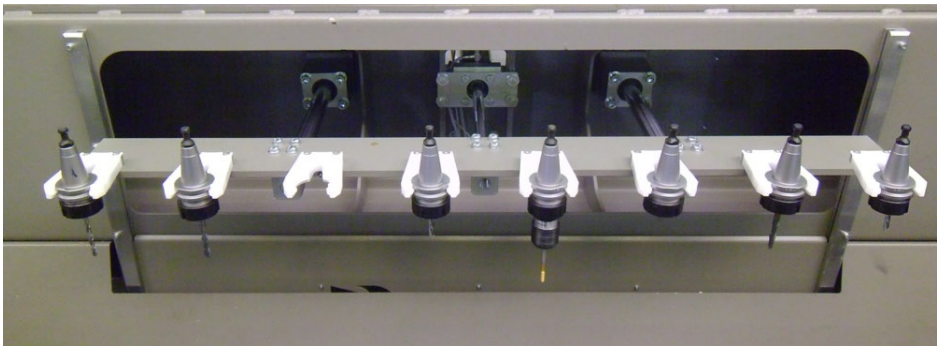


Fig. 10

2.6. CLAMPS

The profile to be machined is clamped in position using the special pneumatic-type clamping units (clamps). Each clamp consists of one fixed unit, one mobile unit and two jigs. This makes it possible to adjust, for each clamp, the useful opening (6 fixed positions from A to B) as well as the height of the jig in order to best adapt to the shape and dimensions of the profile, thus ensuring the utmost efficacy during the grabbing.

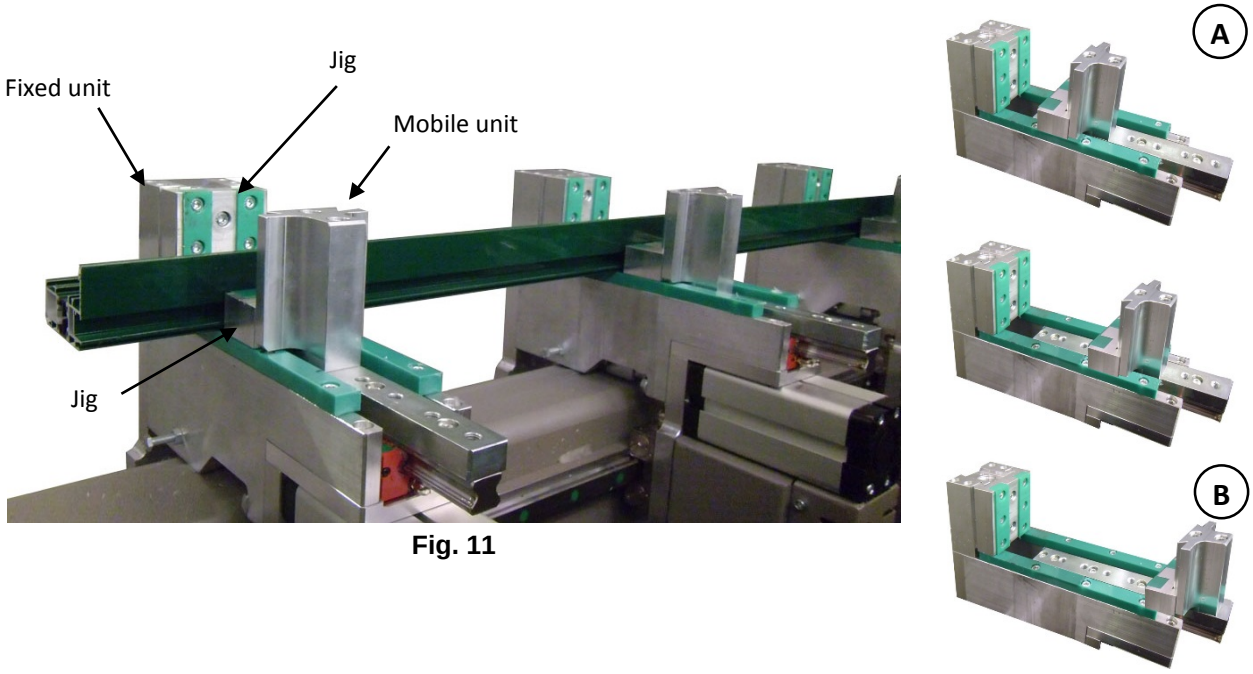


Fig. 11

Clamping of the piece (with low pressure) is carried out by operating one of the two profile clamp/release pushbuttons located on the side clamps.

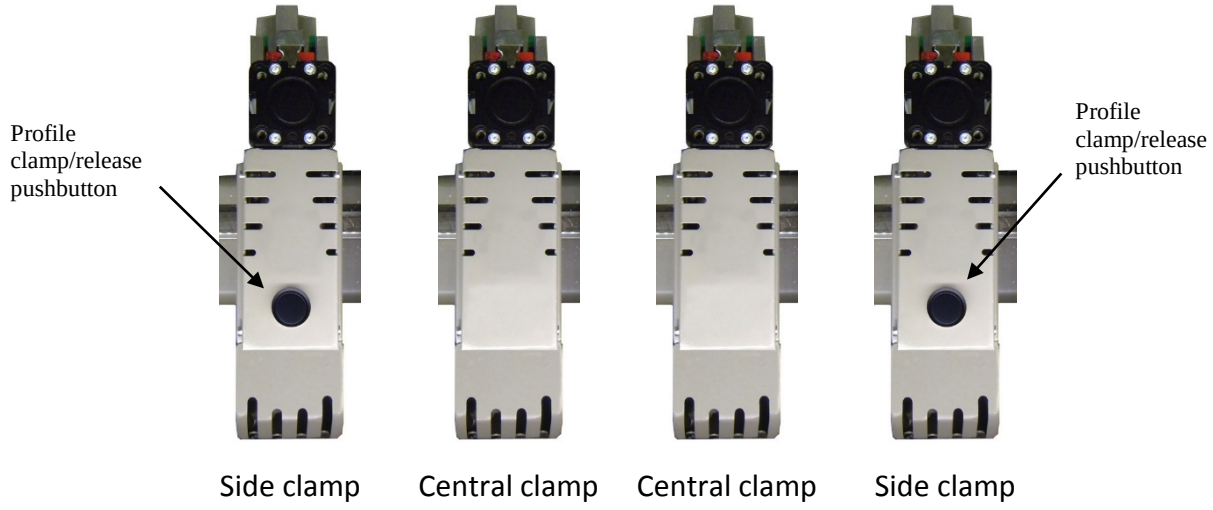


Fig. 12 – Clamps for automatic positioning

2.6.1. POSITIONING OF THE CLAMPS

⚠	**With the machine not supplied or in a state of emergency, the clamps, in automatic positioning mode, must not be moved manually in order to prevent damages to the drives.**

The positioning is managed in one of the following ways, depending on the machine model:

- ***automatic***: each clamp, equipped with motor, is operated and positioned automatically by the numerical control.
- ***from machining head***: clamps positioned through the movement of the machining head.
- ***manual recommended***: clamps positioned by the operator.

In the case of machining centre with manual recommended positioning, in addition to the clamp/release profile pushbutton on the side clamps, all the clamps are equipped with a clamp brake release pushbutton (to move the clamp along the table in the X direction) and with a proper positioning LED.

- LED on → Clamp not positioned
- LED off → Clamp correctly positioned

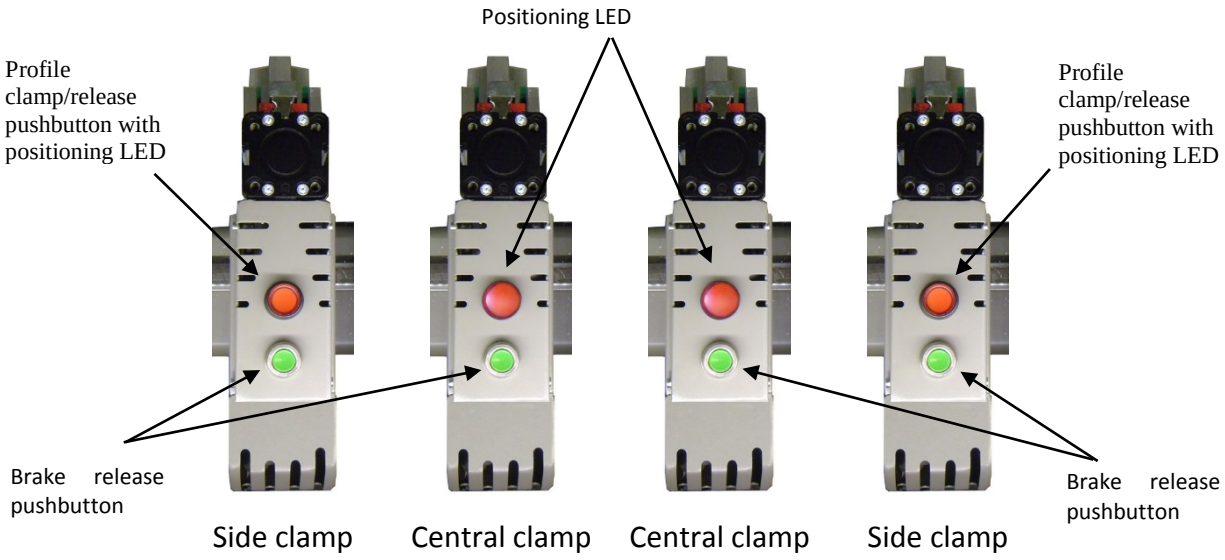


Fig. 13 – Clamps for manual positioning

2.7. MINIMAL COOLING LUBRICANT UNIT

The machining centre is equipped with a tool cooling and lubrication system during the work cycle. The cooling lubricant fluid is sprayed directly on the material removal area through 2 or 4 nozzles.

The unit, located on the rear of the machine, consists of:

- oil tank with level sensor for oil level management by means of software;
- 2 or 4 pumps with oil and air adjustment system;
- 2 or 4 spraying nozzles located on the spindle-nose.

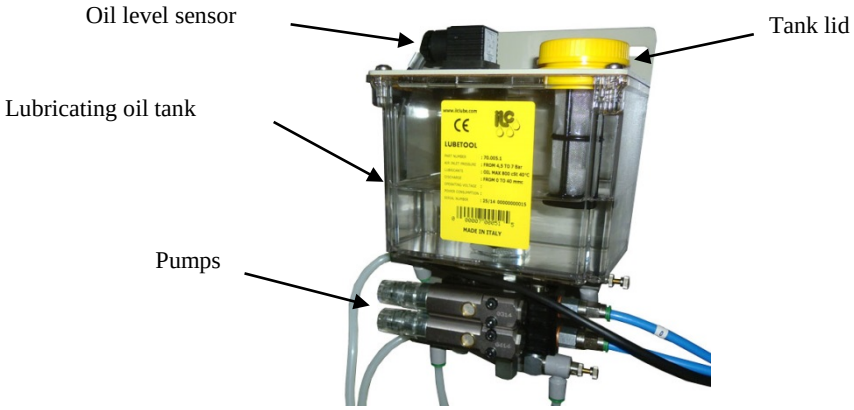


Fig. 14 – Cooling lubricant unit with 2 spraying nozzles

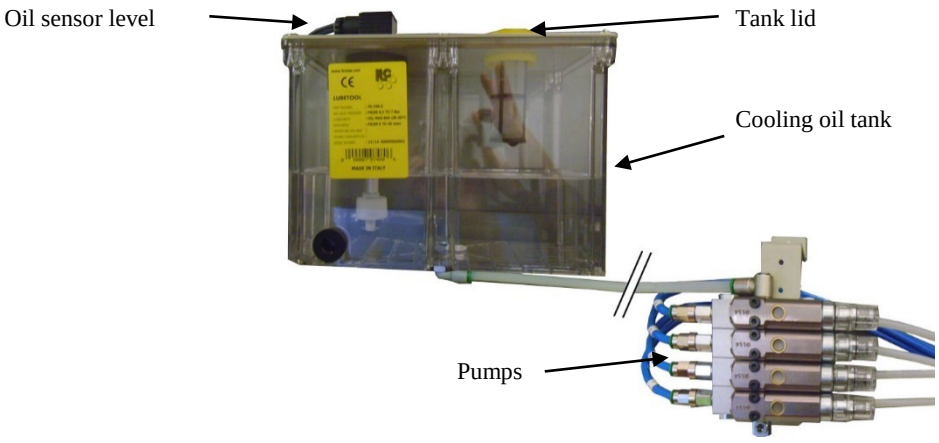


Fig. 15 – Cooling lubricant unit with 4 spraying nozzles

2.7.1. PHYSICAL PROPERTIES OF THE COOLING LUBRICANT OIL

The oil used has the following properties:

- It is made entirely of synthetic esters obtained from raw materials of natural origin;
- odourless;
- light colour;
- completely biodegradable and absolutely non-toxic.

Moreover, it is an integral fluid with complex additivation, featuring a great ability to prevent the sticking of shavings and chips and a significant resistance to extreme pressures, completely free of chlorine and its by-products.

Specific weight at 15°C Kg/l	Viscosity at 40°C cSt	Flash point °C
0.928	68	290

Table 1

2.8. BARCODE READER

The machine can be equipped with a barcode reader.

The operator reads the part no. pertaining to the piece to be machined, and the management and control system of the machine automatically calls up the previously stored machining cycle.

Fig. 16

2.9. COMPRESSED AIR TREATMENT UNIT

The machining centre is equipped with a compressed air treatment unit featuring the following components:

- Shut-off valve
- Pressure regulator with filter
- Pressure switch
- Circuit bleed valve
- Gradual starter

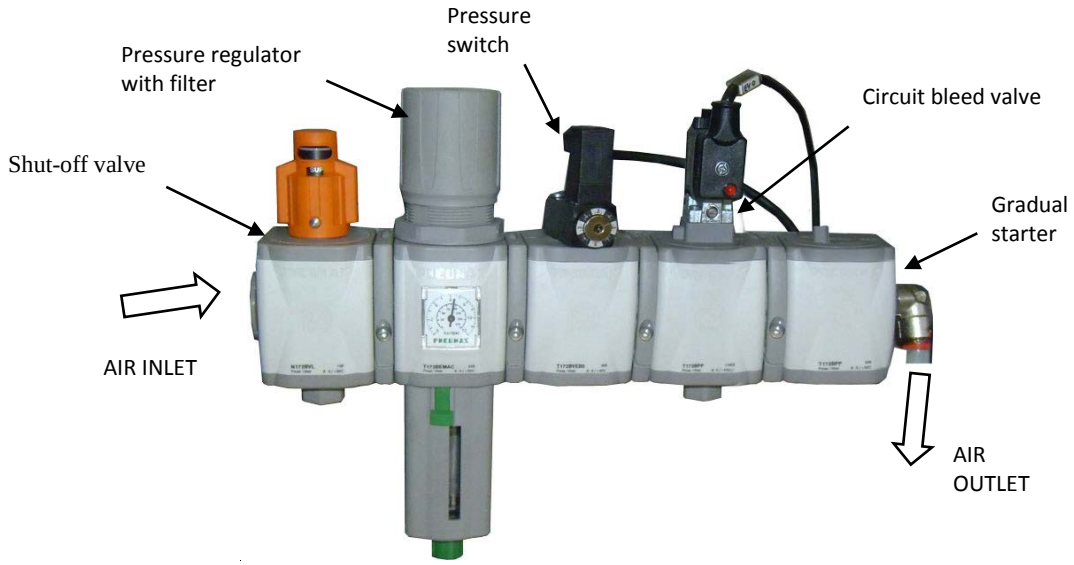


Fig. 17

2.10. ELECTRICAL EQUIPMENT

The electrical system is installed inside two electrical cabinets fully integrated in the machine bed and which provide connections for the supply and control of powered devices.

The main switch is located on the door of one of the two cabinets.

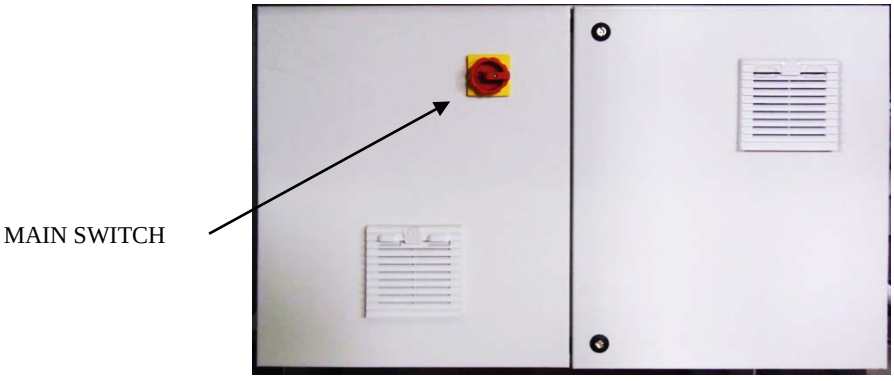


Fig. 18

3. TECHNICAL CHARACTERISTICS

3.1. MODELS AND VERSIONS

The MC machining centre is available in models MC400 and MC250, with useful machining length of 4000 mm and 2500 mm, respectively. Each one is in turn subdivided into various versions, featuring different configurations, in order to better adapt to the final user's operational needs.

MODEL	VERSIONS	CNC-CONTROLLED AXIS	TABLE	CLAMP POSITIONING	TOOL CHANGE[1]	TOOL STORAGE	SOFTWARE
MC400	MC400A	4	ROTARY, CNC-CONTROLLED	AUTOMATIC	AUTOMATIC	AVAILABLE	ADVANCED 3D
	MC400B	4	ROTARY, CNC-CONTROLLED	FROM MACHINING HEAD	AUTOMATIC	AVAILABLE	ADVANCED 3D
	MC400BE	4	ROTARY, CNC-CONTROLLED	FROM MACHINING HEAD	AUTOMATIC	AVAILABLE	BASIC 3D
	MC400C	4	ROTARY, CNC-CONTROLLED	MANUAL RECOMMENDED	MANUAL	NOT AVAILABLE	ADVANCED 3D
	MC400CE	4	ROTARY, CNC-CONTROLLED	MANUAL RECOMMENDED	MANUAL	NOT AVAILABLE	BASIC 3D
	MC400E	3 (X-Y-Z)	FIXED	MANUAL RECOMMENDED	MANUAL	NOT AVAILABLE	ADVANCED 3D
	MC400EE	3 (X-Y-Z)	FIXED	MANUAL RECOMMENDED	MANUAL	NOT AVAILABLE	BASIC 3D
MC250	MC250CE	4	ROTARY, CNC-CONTROLLED	MANUAL RECOMMENDED	MANUAL	NOT AVAILABLE	BASIC 3D
	MC250EE	3 (X-Y-Z)	FIXED	MANUAL RECOMMENDED	MANUAL	NOT AVAILABLE	BASIC 3D

Table 2

[1] The tool storage is available only on the versions with automatic tool change

3.2. TECHNICAL CHARACTERISTICS

TECHNICAL CHARACTERISTICS	U. of M.	MC250	MC400
X axis maximum travel (longitudinal)	mm	2710	4175
Y axis maximum travel (transversal)	mm	550	550
Z axis maximum travel (vertical)	mm	490	490
A axis maximum travel (table rotation)		-90° ÷ +90°	-90° ÷ +90°
X axis maximum speed	m/min	90	90
Y, Z axis maximum speed	m/min	60	60
A axis maximum speed	°/s	90	90
X, Y, Z axis acceleration	m/s^2	6	6
A axis acceleration	rad/s^2	13.5	13.5
Tool storage capacity		-	8[2]
Maximum diameter of milling tool	mm	20	20
Maximum diameter of tapping tool		M10 through-hole on 5-mm thickness	M10 through-hole on 5-mm thickness
Blade maximum diameter	mm	180	180
Tool coupling cone		ISO 30 DIN69871	ISO 30 DIN69871
Number of standard clamps (optional)		4 (up to 6)	4 (up to 6)
Number of end stops		2	2
Electro-spindle power (optional)	kW	5.5 (7.5)	5.5 (7.5)
Electro-spindle maximum speed	rev/min	18000[3] (24000[4])	18000[3] (24000[4])
Overall dimensions (LxDxH)	mm	3770x2830x2417	5240x2830x2417
Weight	Kg	2100	2500

Table 3

CONSUMPTIONS	U. of M.	MC250	MC400
Compressed air consumption during machining	Nl/min	150	150
Compressed air consumption when idle	Nl/min	60	60
Supply voltage (R-S-T-N-GRD)	V	400	400
Work frequency	Hz	50/60	50/60
Installed electrical power	kW	8.5[3] (12[4])	8.53 (12[4])
Max. absorption at 400V	A	153 (22[4])	153 (22[4])

Table 4

ENVIRONMENTAL REQUIREMENTS	
Ambient air temperature	min= -10°C max= +40°C
Maximum unpressurised altitude	1000 m a.s.l.
Relative humidity	30 ÷ 90%

Table 5

[2] Only on some versions of the machining centre MC400.
[3] With $P_{electro\text{-}spindle}$ = 5.5kW
[4] With $P_{electro\text{-}spindle}$ =7.5kW

3.3. LAYOUT

3.3.1. LAYOUT OF THE MC250

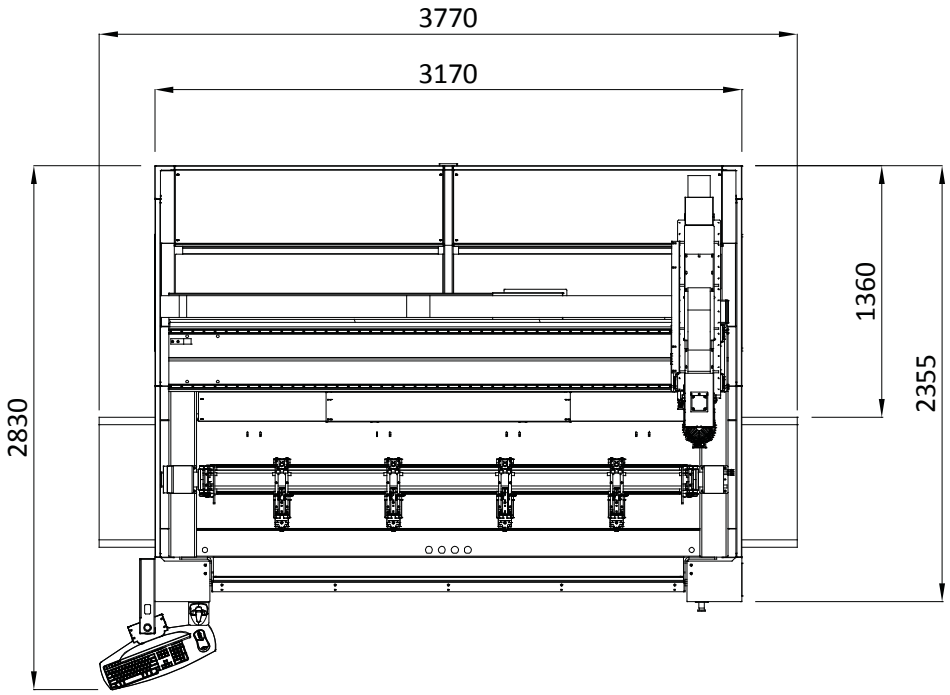


Fig. 19 – View from above

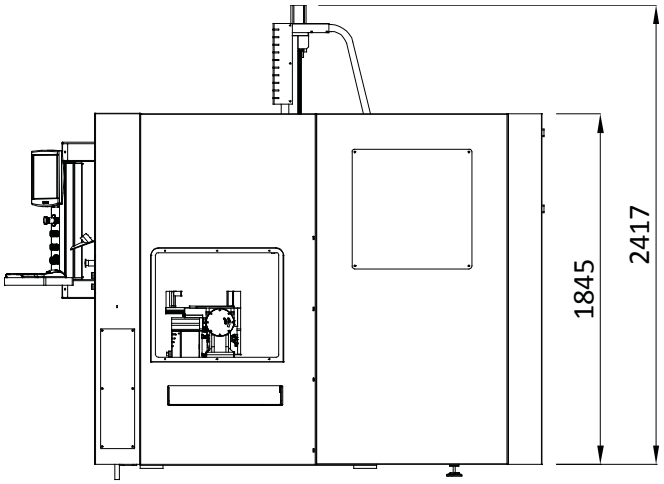


Fig. 20 – View from the side

All measurements in [mm]

3.3.2. LAYOUT OF THE MC400

Fig. 21 – View from above

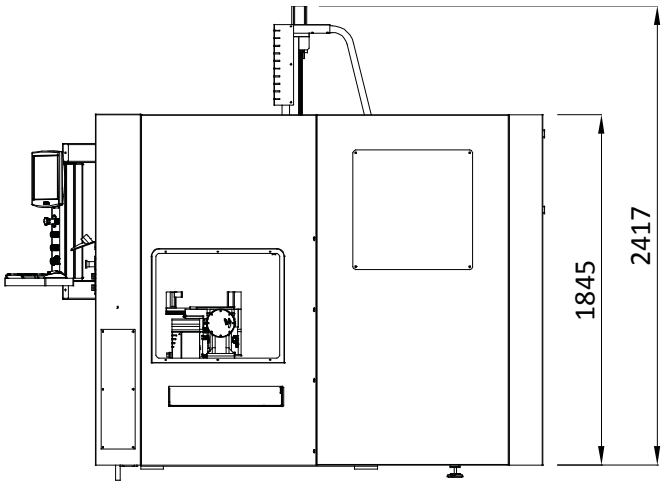


Fig. 22 – View from the side

All measurements in [mm]

3.4. DIMENSION OF TOOL AND TOOL-HOLDER

3.4.1. CYLINDRICAL MILLING CUTTER/BORING BIT

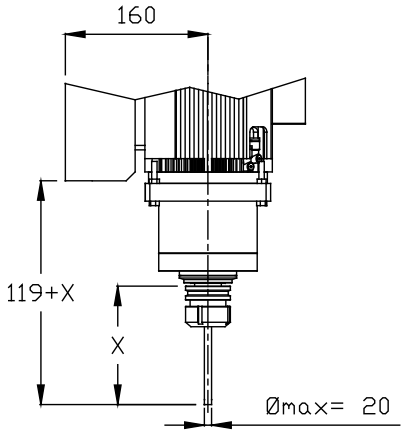


Fig. 23

3.4.2. DISC MILLING CUTTER

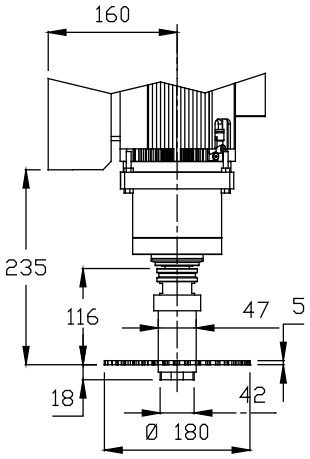


Fig. 24

All measurements in [mm]

3.5. Y-Z TOP WORK AREA

3.5.1. MAXIMUM TRAVEL WITH CYLINDRICAL MILLING CUTTER/BORING BIT

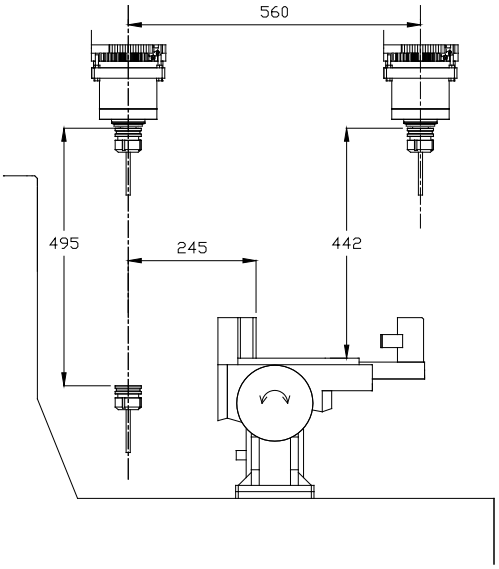


Fig. 25 – Table 0°

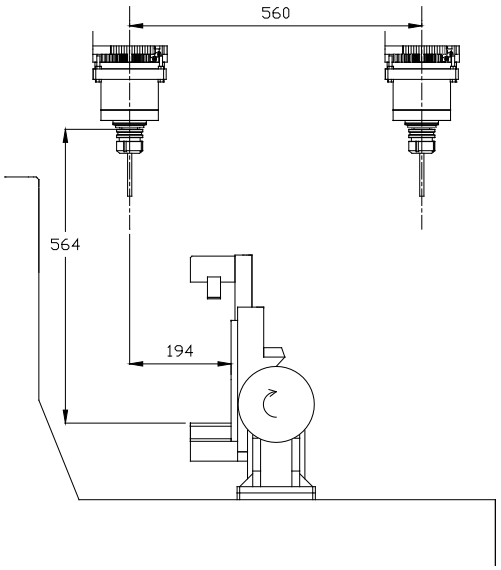


Fig. 26 – Table -90°

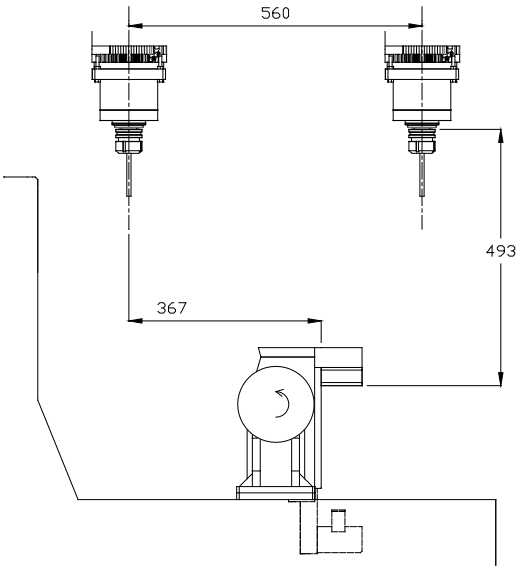


Fig. 27 – Table +90°

All measurements in [mm]

3.5.2. USEFUL TRAVEL WITH CYLINDRICAL MILLING CUTTER /BORING BIT

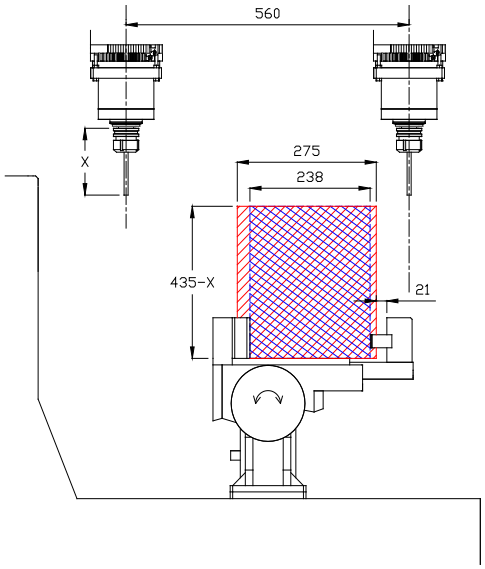


Fig. 28 – Table 0°

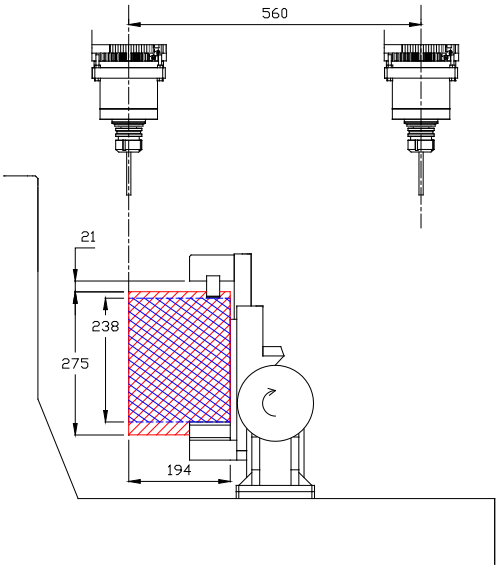


Fig. 29 – Table -90°

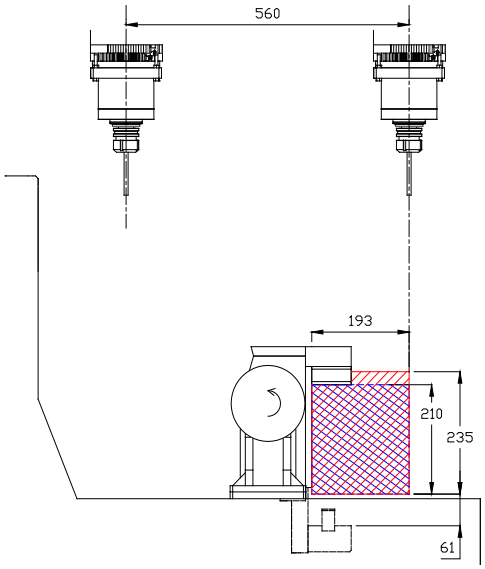


Fig. 30[5] – Table +90°

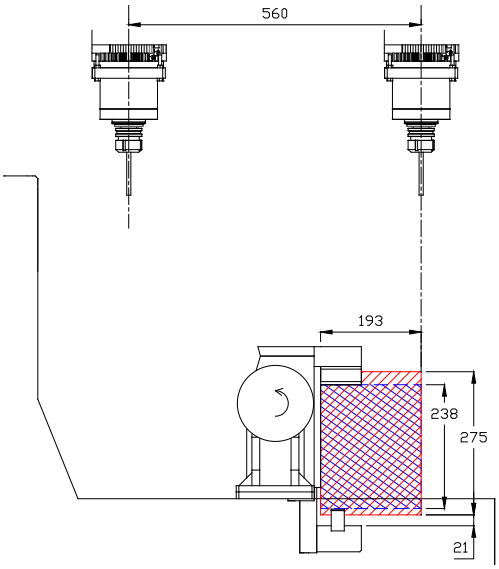


Fig. 31[6] – Table +90°

Max profile footprint without jigs

Max profile footprint with jigs

All measurements in [mm]

[5] Profile length greater than the maximum distance between the lateral end stops
[6] Profile length less than the maximum distance between the lateral end stops

3.5.3. MAXIMUM TRAVEL WITH DISC MILLING CUTTER

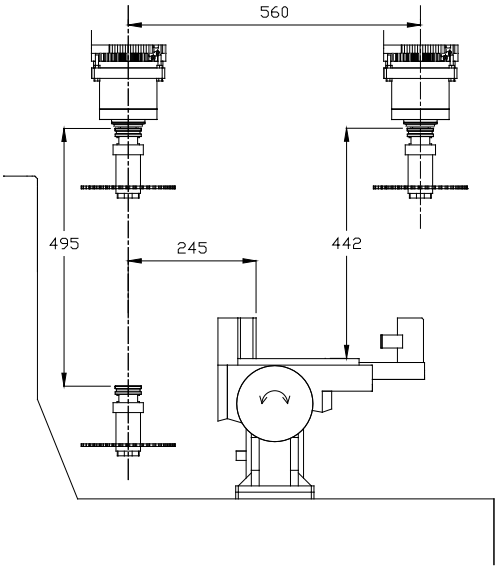


Fig. 32 – Table 0°

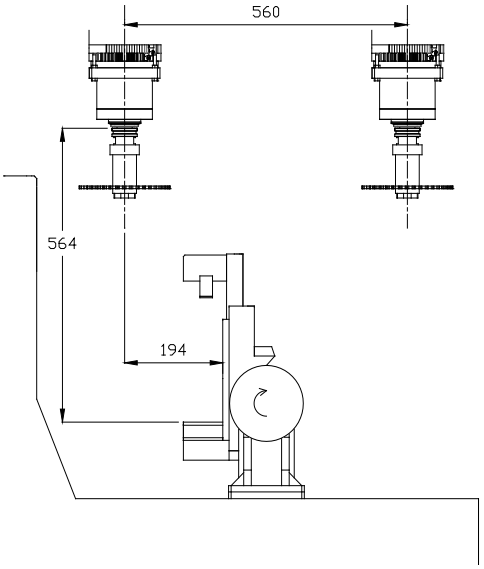


Fig. 33 – Table -90°

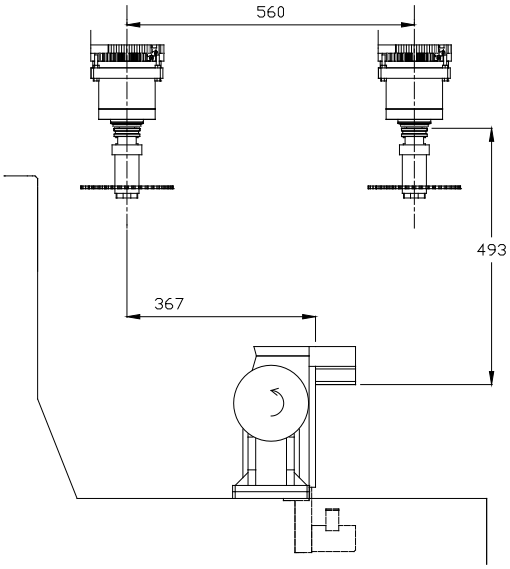


Fig. 34 – Table +90°

All measurements in [mm]

3.5.4. USEFUL TRAVEL WITH DISC MILLING CUTTER

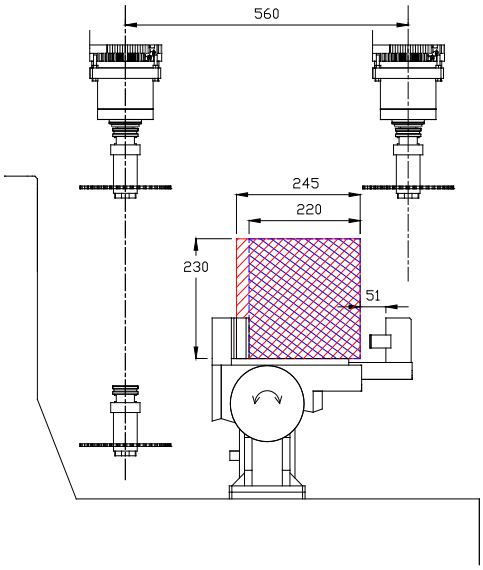


Fig. 35 – Table 0°

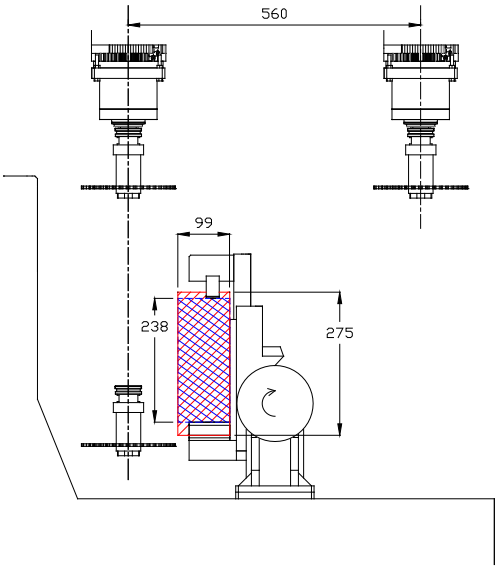


Fig. 36 – Table -90°

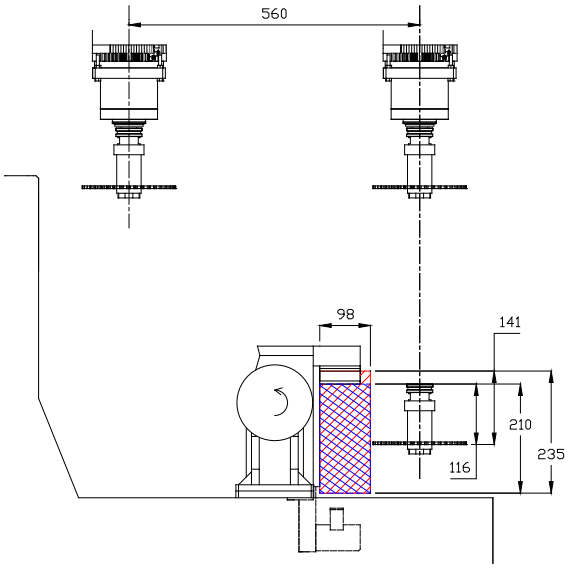


Fig. 37[7] – Table +90°

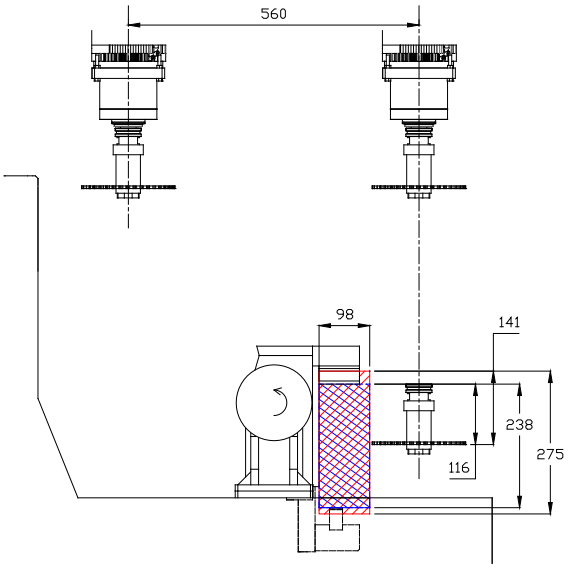


Fig. 38[8] – Table +90°

Max profile footprint without jigs

Max profile footprint with jigs

All measurements in [mm]

[7] Profile length greater than the maximum distance between the lateral end stops
[8] Profile length less than the maximum distance between the lateral end stops

3.6. X-Z TOP WORK AREA

3.6.1. MAXIMUM AND USEFUL TRAVEL OF THE MC250

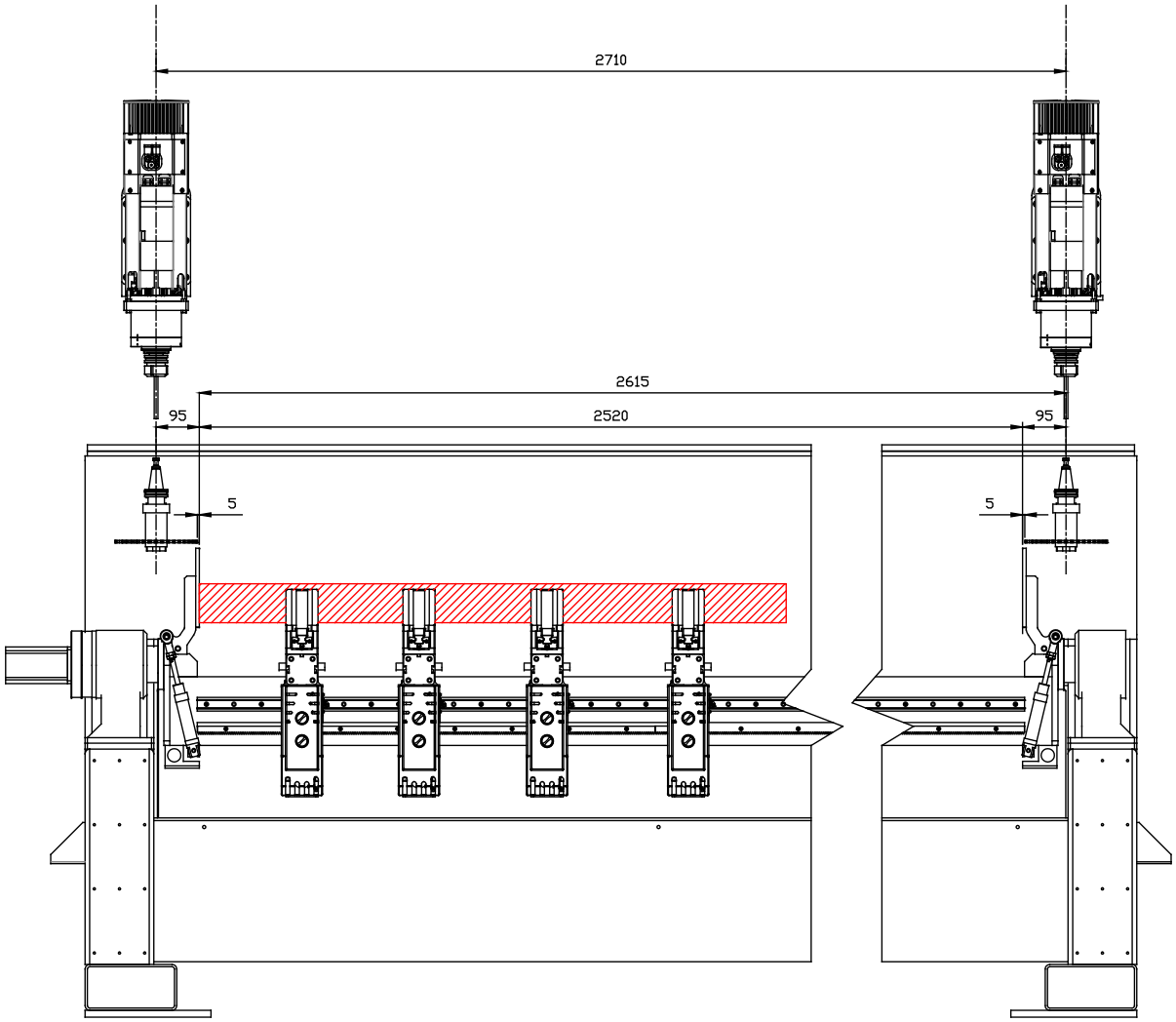


Fig. 39

Profile footprint

All measurements in [mm]

3.6.2. MAXIMUM AND USEFUL TRAVEL OF THE MC400

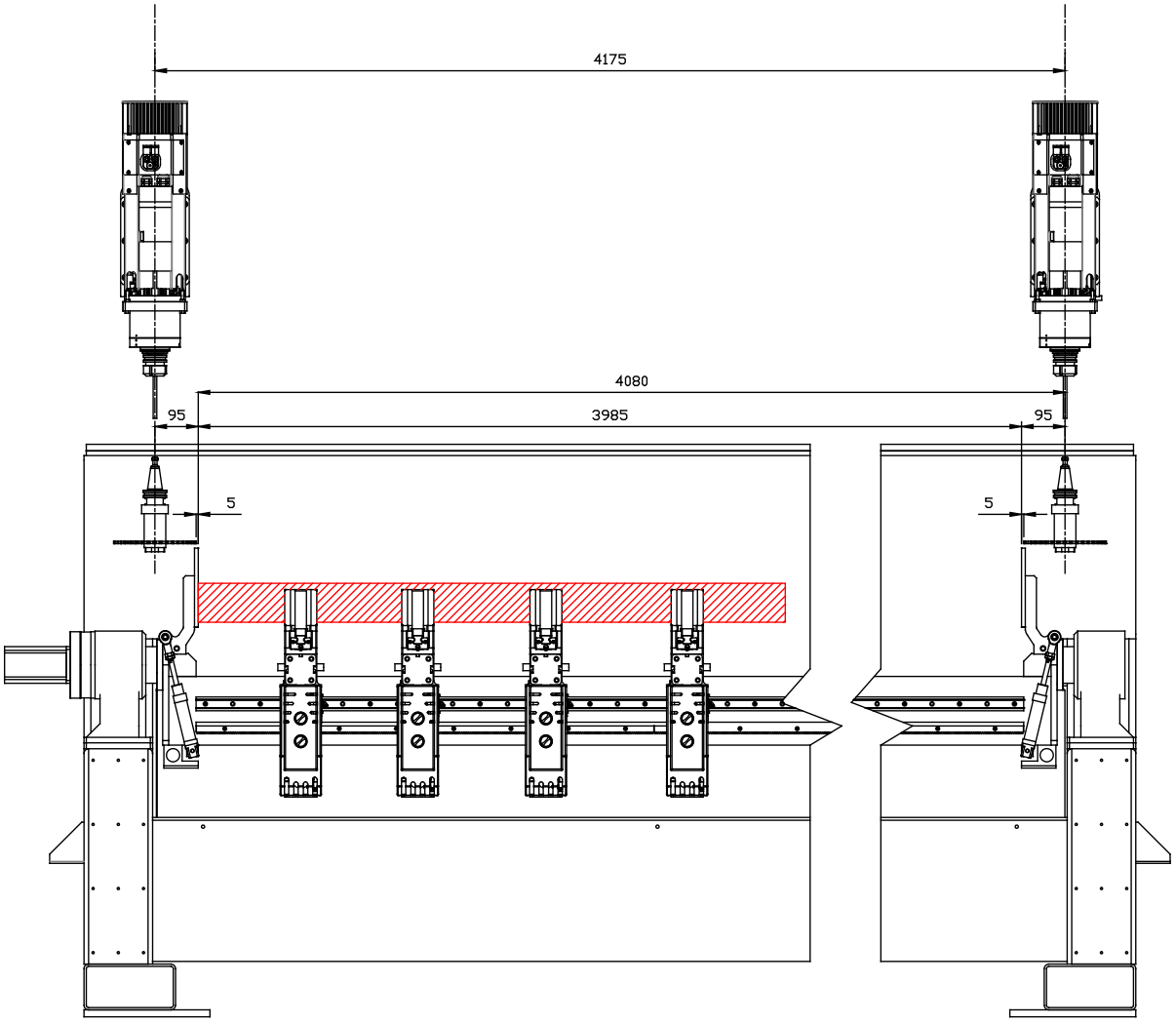


Fig. 40

Profile footprint

All measurements in [mm]

4. INSTALLATION

	Machine installation is handled by PERTICI INDUSTRIES S.r.l. or by personnel authorized by PERTICI INDUSTRIES S.r.l. Please contact PERTICI INDUSTRIES S.r.l. if the machine will be installed elsewhere in the future.

4.1. MACHINE UNLOADING PROCEDURE

The necessary equipment is:

- 2 forklift trucks having at least 4000kg of capability with forks length of 2 meters.

1. Connect the straps to the forklift truck **A** and pull the machine outside, till it is possible to insert the forks, of the forklift truck **A** ,under the wooden platform (on the short side)
2. Slightly lift by the forklift **A** (on the short side) the machine with its wooden platform and continue to pull the machine until the middle lift points are available.

3. Place the forklift truck **B** in correspondence of the middle lift points, slightly lift the machine and remove the machine by moving the truck forward.
4. When the machine is completely free, remove the forklift truck **A** paying attention to remove the straps.
5. Now it is possible to place the machine on the floor.

4.2. TRANSPORT AND HANDLING

Transport operations must be carried out by professionally qualified personnel.

The machine must be transported so as to prevent any damages to its components:

- all protections, guards and doors must be properly closed and secured;
- the machine must be transported in the same position as for the installation;
- prior to the transport, the unpainted parts need to be greased in order to prevent their deterioration;
- in connection with the type of transport, the machine must be protected against all possible collisions and/or stress.

	**Be extremely careful during the machine lifting, handling and transport operations. The equipment employed to lift-move-transport the machine must be able to carry out the requested task without endangering people.** **No one must be standing within at least a 5-metre radius around the machine during the lifting and transport operations.**

	Damages caused to the machine during transport and handling ARE NOT covered by WARRANTY. **Any repairs or replacement of damaged parts shall be charged to the customer.** **Make sure the packing is intact the moment the machine is delivered.**
	During handling operations, be careful to avoid collisions, jolts and sudden oscillations. Prevent the machine from tilting too much and/or turning over.
	Take all necessary precautions during the handling and transport operations; avoid danger to people and damages to the machine and to property.

The machine is shipped completely greased and wrapped in heat-shrink nylon. The solidity of the machine and its shape are such as to ensure its transportability and storage in a safe manner and with no damage. Remove all packing material from the machine and make sure that no damages were caused during the transport.

Once it is taken out of its packing, the machine can be lifted (***exclusively from the front***) using a FORKLIFT TRUCK[9]. The forks must be inserted in the bottom part of the bed, as indicated below.

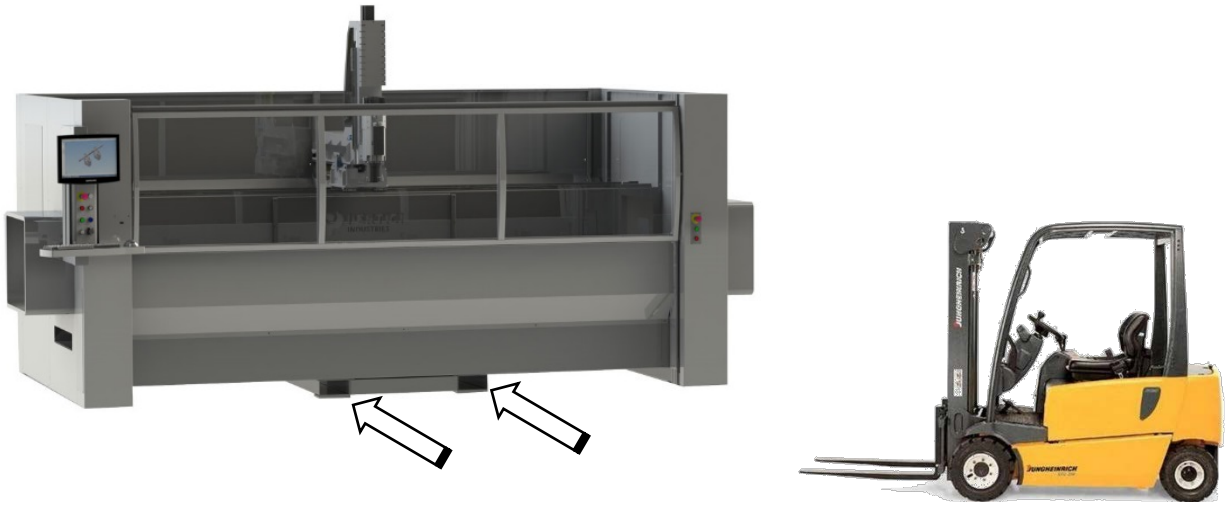


Fig. 41 – Lifting using a forklift truck

	For transport purposes, the machine is shipped with its head mechanically secured to the middle of the pallet.
	Prior to handling the machine, you need to make sure that the head is indicatively in the centre of the machine.

[9] Lifting capacity higher than the one indicated in Table 3 (based on the model)

4.3. STORAGE

In case of a long period of inactivity, the machine must be stored by taking the proper precautions concerning the storage place and times:

- store the machine in a closed place;
- grease any unpainted parts;
- protect the machine against collisions and stress;
- protect the machine from humidity and from high temperature changes;
- make sure the machine does not come in contact with corrosive substances.

4.4. PRELIMINARY OPERATIONS

For the installation, you need to set up a manoeuvring area that is suited to the dimensions of the machine and of the selected lifting equipment. To satisfy the precision and stability requirements, the machine must be positioned on solid foundations made of reinforced concrete. It is important to make sure that the foundation is duly consolidated in order to prevent any sagging while the machine is being positioned in place.

4.5. PLACING THE MACHINE

When the machine is received, and before it is unloaded from the shipping means, you need to carry out the **following checks**:

- **CHECK** the lifting capacity of the forklift truck (or other piece of equipment used to lift the machine), taking into account the total mass of the machine and the height of the truck;
- **DO NOT PLACE** your hands on the machine until it is stable on the ground;
- **DO NOT STAND** underneath the machine during the handling operations;
- If the machine is handled by means of rollers, always keep in mind the **MOVEMENT TRAJECTORY** in order to avoid any risk of crushing, entanglement or shearing.

	**Do not position the machine in proximity to areas where flammable substances or gases are present as the generation of sparks or the projection of incandescent fragments may cause explosions or fire.**

Place the machine in a position that is suited to the activity to be carried out, so as to make it easier to hook up the machine to the user's electrical and pneumatic system. Once the machine is transported to its final position and after unpacking it, proceed with its installation.

The machine must be positioned at a distance of at least 600 mm from walls, and in any event in an area that is sufficiently large to ensure the personnel's transit for regular processing operations as well as for purposes of inspection and routine and extraordinary maintenance.

	The spaces surrounding the machine must have free passages such as to avoid creating risks and hazards for the operator and for the material being processed
	The clearance zone defines an area that has to be kept free of objects that may create an obstacle or a hazard during job performance.
	Make sure that the entire area where the machine has been placed has proper and sufficient lighting.

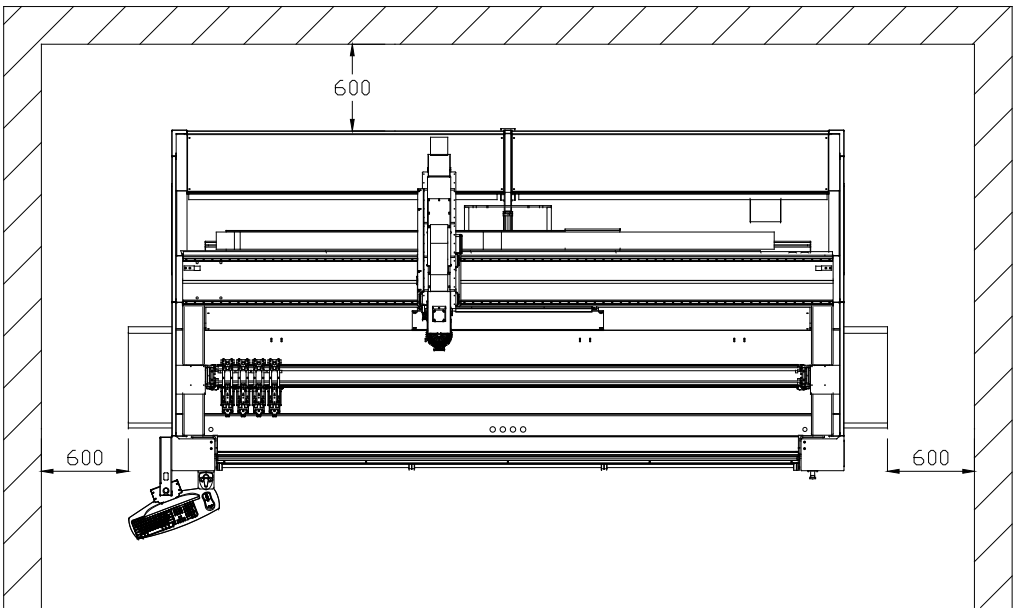


Fig. 42 – Clearance areas

4.6. REMOVAL OF MACHINING HEAD STOPS

The machining centre is shipped with the machining head blocked by means of stops (Fig. 43) in the three directions (X-Y-Z), in order to avoid damages during shipping and/or the positioning.

Remove the stops prior to the commissioning phase.

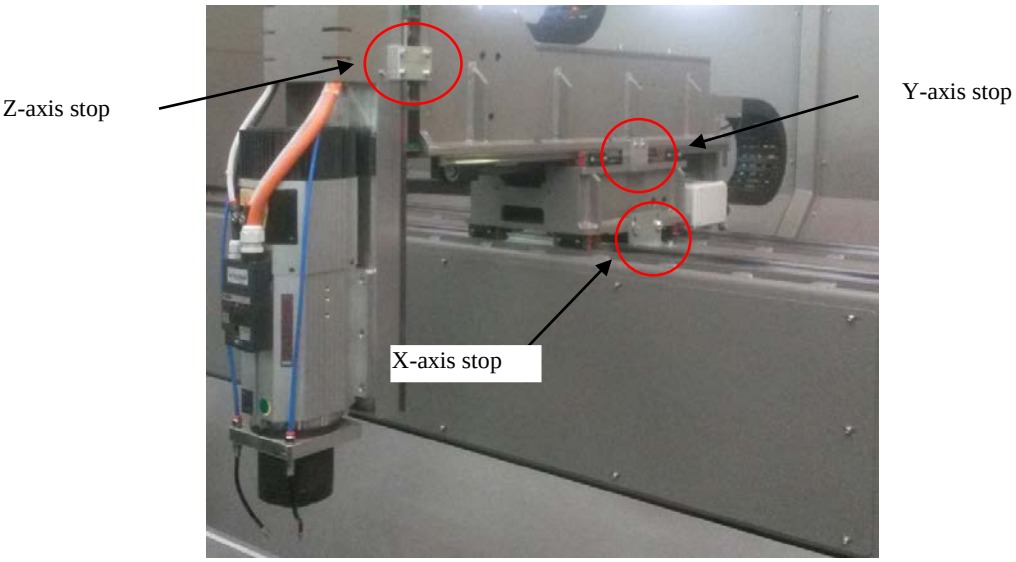


Fig. 43

4.7. SETTING UP THE MACHINE

4.7.1. LEVELLING THE MACHINE

	The machine must be assembled and levelled by PERTICI INDUSTRIES S.r.l. or by personnel authorized by PERTICI INDUSTRIES S.r.l. Please contact PERTICI INDUSTRIES S.r.l. if the machine will be installed elsewhere in the future.

This operation is extremely important as it ensures that the machine will comply with the level of accuracy with which it was tested.

On the bottom part of the bed, the machining centre is equipped with 8 resting plates (4 lateral ones and 4 central ones) which are crucial for the positioning and securing to the floor, if any, of the machine.

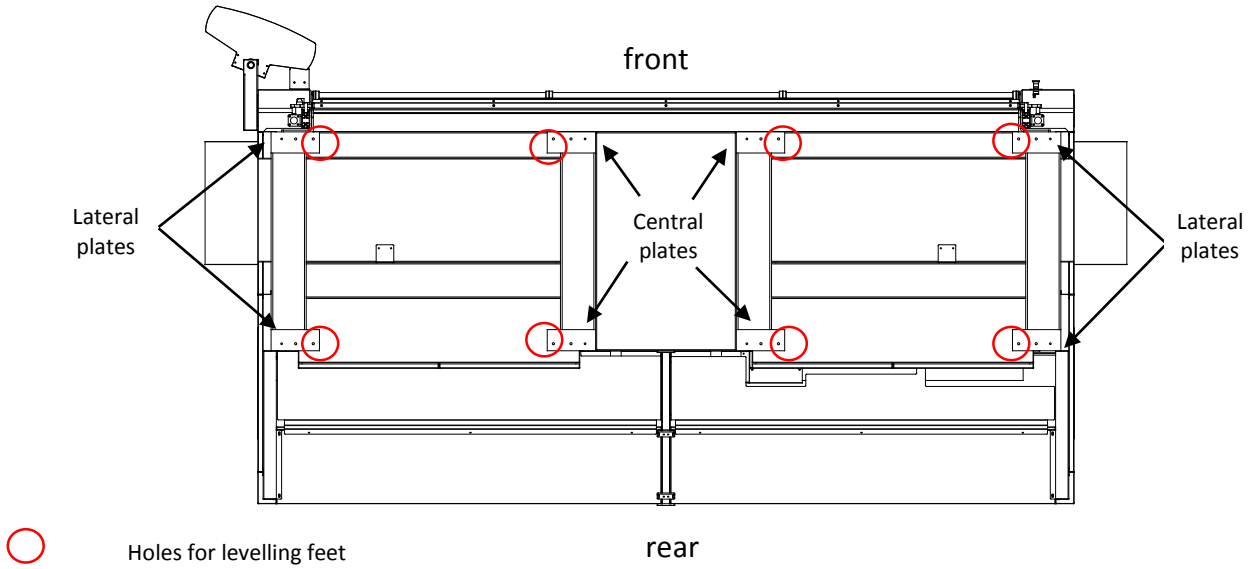


Fig. 44 – MC400 view from below

For each resting plate, assemble a levelling foot as shown in Fig. 45 and according to the procedure described below.

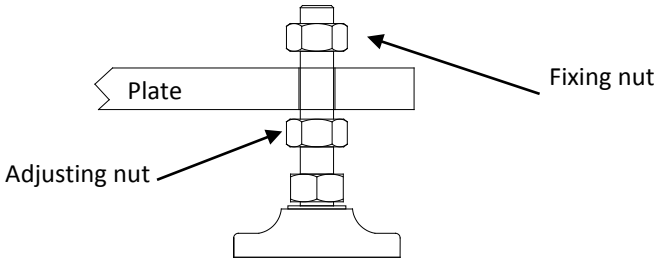


Fig. 45

- With the machine slightly raised, insert the stem of the foot, previously equipped with nut M12 (adjusting nut), in the hole drilled in the plate indicated in Fig. 44.
- Screw a second bolt (fixing bolt) on the stem, without tightening it.
- Position the machine on the floor and proceed with the adjustment.
- With the help of a mechanical bubble level, level the machine through the adjustment nut, using a 19-mm wrench, first on the 4 lateral feet and subsequently on the central ones.
- Once you have made sure that the machine is perfectly levelled, block it in place by tightening the fixing nut of the feet.

Fig. 46

4.7.2. CONNECTING THE PNEUMATIC SYSTEM

The connection to the line can be carried out using a rubber or Rilsan hose (Din 74324), with internal diameter **of at least 8 mm.**

	The operating pressure of the user's network, with the machine working at full load, must be included between 6 and 6.5 bar/atm

- Connect the line to the shut-off valve of the air treatment unit using a 3/8" female fitting.

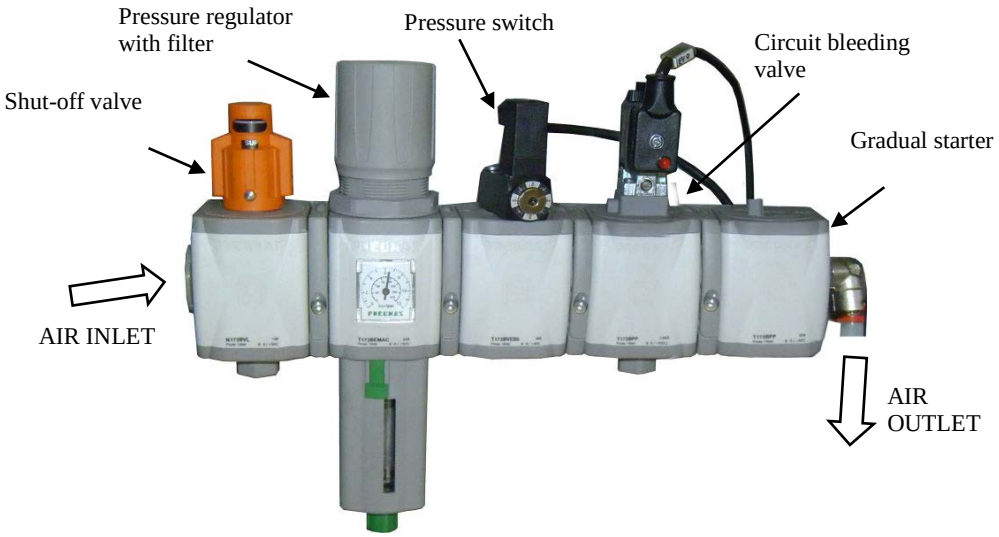


Fig. 47

- Supply the Machining Centre by opening the shut-off valve (press and rotate the knob in a clockwise direction).

Fig. 48

- Adjust the supply pressure to a value included between 6 and 6.5 bar/atm, working on the pressure regulator:
  - pull the knob upward
  - rotate in a clockwise direction to increase the pressure, or in a counter clockwise direction to decrease it; check the pressure value on the pressure gauge
  - push the knob downward to set the adjustment just carried out.

Fig. 49 – Supply pressure adjustment

The purpose of the filter is to purify the air from dust and humidity that may damage the valves and the pneumatic cylinders.

	During the first processing jobs, make sure that the pressure displayed on the pressure gauge does not drop below 6 bar/atm
	Periodically check the level of condensate and impurities accumulated in the air treatment unit.
	Do not change the pneumatic circuit in any way or carry out any adjustment without the prior authorization of PERTICI INDUSTRIES S.r.l. or of personnel authorized by PERTICI INDUSTRIES S.r.l.
	Prior to carrying out any sort of maintenance on the unit, cut off the machine from the power sources and make sure that all residual energy has dissipated
	Bleed the condensate and impurities from the air treatment unit before they reach the maximum level
	Contact PERTICI INDUSTRIES S.r.l. in case of need

4.7.3. CONNECTING THE ELECTRICAL SYSTEM

- Do not hook up the machine to the mains until it has been completely positioned and assembled.
- The supply voltage has to meet the following condition :

  Va = Vt +/- 10% Vt

  Va = actual supply voltage
  Vt = machine rated voltage
- Prior to hooking up the machine to the mains, verify the voltage on the plate affixed to the machine and make sure that the socket voltage matches the one requested by the machine.
- We recommend the connection by means of plug and interlocked socket in compliance with EC standards, with overload fuses with capacity suited to the machine absorption (see rating plate).
- It is recommended to use the type of fuses suited to starter motors.
- Make sure that the power cable is intact and properly positioned.
- The user's electrical system has to comply with the regulations in force in the country of installation. Specifically, the electrical system has to be equipped with:
  - an equipotential earthing system;
  - a protection device installed upstream the machine and coordinated such as to guarantee automatic power cut out, in compliance with the provisions of the aforementioned regulations.

	**Prior to carrying out any sort of maintenance on the unit, cut off the machine from the power sources and make sure that all residual energy has dissipated.**
	**Do not tamper with the electrical system.** **Make sure that the machine has been properly connected to the earthing system of the location where it is used, in order to protect the operator against possible indirect contacts.** **Size the system with an ample tolerance margin based on the machine rating plate data in terms of electrical power and absorbed current.**
	**The connection of the machine electrical system is carried out by PERTICI INDUSTRIES S.r.l. or by personnel authorized by PERTICI INDUSTRIES S.r.l.** **Please contact PERTICI INDUSTRIES S.r.l. if the machine will be installed elsewhere in the future.**

	**PERTICI INDUSTRIES S.r.l. shall in no way be responsible for any damages incurred by the equipment which were caused by changes in the mains voltage and a temperature that exceeds the maximum allowed values.**
	**PERTICI INDUSTRIES S.r.l. declines any and all responsibility if the machine has not been properly connected to an equipotential earthing system and if no protection devices have been installed upstream the machine to guarantee automatic power cut out, in compliance with the provisions of the aforementioned regulations.**
	**Please contact PERTICI INDUSTRIES S.r.l. in case of need.**
	**Refer to the electrical diagrams enclosed with this manual for additional information.**

5. SAFETY

The risk analysis and the relevant observations, referred to in this chapter, are based on:

- knowledge of regular conditions and of the intended use of the machine, which are specified in this manual;
- the assumption that the machine is meant to be used in indoor industrial environments in order to carry out cutting operations of profiles made of plastic and light alloys.
- the assumption that the workers have been suitably trained and informed on the specific risks which exist in the workplace, in compliance with, among other things, laws and standards in force;
- the assumption that access to the workplace is prohibited to unauthorized personnel, inexperienced workers and children.

5.1. GENERAL WARNINGS

- The operator must be an adult individual trained in the use of the machine and with sufficient work experience; moreover, the operator is required to read very carefully the information provided in this manual, with special reference to the suitable safety precautions listed in this chapter.
- Safe machine use is guaranteed only for the functions and materials listed in these operating instructions.

	PERTICI INDUSTRIES S.r.l. shall in no way be responsible in case the machine is used for unfit purposes and not in compliance with the operating instructions
	PERTICI INDUSTRIES S.r.l. does not consider itself responsible in terms of the safety, reliability and performance of the machine in the event that the warnings and suggestions provided in this manual are not complied with, with special reference to the following activities: assembly, use, routine and extraordinary maintenance, repairs
	This type of machine can be dangerous if it is not used in the proper manner We strongly recommend that the operator thoroughly follow all safety-related indications
	All safety measures envisaged in this manual are only and exclusively in relation to proper machine uses and uses authorized by PERTICI INDUSTRIES S.r.l. Said uses are referred to the methods for preparing, running and carrying out maintenance on the machine. It is forbidden to use the machine for processing operations not allowed by PERTICI INDUSTRIES S.r.l. It is forbidden to modify the machine and/or its parts without the prior consent of PERTICI INDUSTRIES S.r.l.
	Do not remove or change the protections Never tamper with the safety devices
	**All operations on the machine must be carried out with the power and pneumatic supply cut out, unless specified otherwise.**

Prior to using the machine, make sure you have read and fully understood the manual supplied by the manufacturer. Wear the required personal protection equipment (PPE):

- safety goggles;
- gloves (when handling the material and during maintenance operations);
- anti-noise earmuffs or plugs (always);
- safety shoes (when moving heavy pieces or pieces with sharp edges);
- tight-fitting clothes with the cuffs buttoned up (always);
- hair nets or caps (in case of long hair).

				
Safety goggles mandatory	Protective gloves mandatory	Earmuffs mandatory	Safety shoes mandatory	Tight-fitting clothes mandatory

Table 6 – Pictograms pertaining to personal protection equipment

Moreover, it is crucial that the operator comply with the following warnings:

- keep the machine and the work area tidy and clean;
- arrange for suitable containers and/or marked off areas where to store both the pieces to be machined and the ones already machined;
- do not use the machine if not under normal psychological and/or physical conditions;
- wear suitable clothing in order to avoid any impediment and/or dangerous entanglements that may pull you towards the machine;
- wear the personal protection equipment prescribed by this manual, depending on the operations to be carried out;
- do not remove or alter the plates affixed to the machine by its manufacturer;
- do not remove or bypass the safety systems installed on the machine.

5.2. SAFETY DEVICES

The machine is equipped with three types of stop devices:

1. Stop during normal operation (category 2 - EN 60204-1), represented by the STOP pushbutton located on the control panel.
2. End-of-work shift stop (category 0 - EN 60204-1), represented by the power disconnector switch.
3. Emergency stop which immediately cuts off power to the actuators; the machine is equipped with two emergency pushbuttons.

The normal stop automatically takes place at the end of the cycle.

	**The use of control devices in a way other than the one described in chapter 5, or their replacement with non-original components or components that do not comply with regulatory provisions shall relieve the Company PERTICI INDUSTRIES S.r.l. from any and all responsibility as regards their operation.**
	**The addition of new control devices must be preliminarily authorized by PERTICI INDUSTRIES S.r.l., in order to make sure that they do not give rise to dangerous situations for the operator or the user.**

5.3. SAFE WORK PRACTICES

It is crucial that all operators be:

- suitably trained on the use, adjustment and functioning of the machine;
- informed on factors that affect exposure to noise, for example:
  - proper choice of tools,
  - proper choice of speed,
  - machine maintenance;

It is important that:

- the floor of the work area around the machine be flat, well-kept and free of loose materials, for example shavings and scrap pieces;
- the workplace be provided with suitable general or localized lighting;
- the raw materials and the finished pieces be placed near the operator's regular work position;
- suitable lifting equipment be used for raw materials, semi-finished and finished products;
- the area surrounding the machine be kept clean, arranging for defining areas for the transit, for the machining and for material storage.

It is crucial for the operator:

- to wear, when necessary, the personal protection equipment; this may include:
  - hearing protection devices in order to reduce the risk of deafness,
  - respiratory protection in order to reduce the risk of inhaling dangerous dust and fumes,
  - gloves when handling the pieces,
- stop the machine when it is left unattended;
- report any machine defect or failure as soon as it is discovered;
- adopt safe procedures for cleaning and maintenance operations;
- refrain from removing scraps or other parts of the piece from the work area while the machine is working;
- make sure that all guards and other safety devices needed for machine operation are in place, in good conditions and subjected to regular maintenance.

5.4. INFORMATION ON RESIDUAL RISKS

The machine was designed and built according to the provisions of European Directives, taking as reference the harmonized standards on the subject of safety. Where possible, hazards were eliminated during the design phase. For those that were not eliminated, we proceeded to fit fixed and/or interlocked protections and guards that comply with regulatory provisions.

This paragraph aims to highlight the residual risks associated with the activities described in this manual, pertaining to machine running and maintenance. The following situations present residual risks for the operator:

There is the risk of profiles falling during the loading and unloading operations, possibly crushing the operator's lower limbs.

There is the risk of cuts and abrasions during the blade replacement phase (mandatory use of safety gloves).

There is the risk of the upper limbs being crushed when accessing with removed side protections for the processing of long profiles.

There is the risk of hands colliding with moving organs when giving commands for individual movements with the front door lowered and leaning completely towards the inside of the machine.

There is the risk of upper limbs being severed due to contact with the moving blade, during maintenance operations.

	**For this reason, the fixed protections installed at the lateral openings must always be in place, unless their removal is strictly necessary in order to process "long" products; in this case, they must be immediately reassembled at the end of the jobs. The improper use of these protections may be very dangerous for the operator.**

There is the risk resulting from prolonged exposure to noise (mandatory use of hearing protection devices).

	**In the event that situations arise pertaining to unexpected and/or unforeseeable uses, it is recommended to contact the PERTICI INDUSTRIES S.r.l. Customer Service prior to proceeding with any other activity.**
	**Always make sure that the machine is disconnected from all energy sources prior to carrying out any cleaning, lubrication, maintenance, repair and adjustment operation or replacement of parts.**
	**Under no circumstances is the operator allowed to leave the machine unattended when in operation.** **After having stopped the machine, the operator has to make sure that all moving organs have actually stopped before moving away from the machine.**

5.5. RESIDUAL RISKS ASSOCIATED WITH THE PROCESSED MATERIAL

As a consequence of the material being processed, the following residual risks are present:

- **Sharp edges:** after being processed, the material may have sharp edges, consequently the pieces need to be handled while wearing safety gloves.

5.6. PROTECTION DEVICES

The machine is equipped with guards suited to protect individuals exposed to risks caused by the mobile transmission elements and by the moving parts that contribute to carrying out the machining.

Subject these protection devices, as well as the entire machine, to routine and extraordinary maintenance procedures at the required intervals.

5.7. RISK DUE TO NOISE EMISSION

The test conditions and the obtained values are listed in **Errore. L'origine riferimento non è stata trovata.**.

	**It is recommended that the operator be equipped with suitable protection devices, such as good-quality soundproof earmuffs.**
	**In order to avoid increasing the level of exposure over time compared to the measured level, the quality of the blade needs to be checked constantly and the routine and extraordinary maintenance operations must be carried out as planned.**

The work cycle, in other words loading the profile, processing and unloading it, takes a very short time to be completed. This is why the processing cycle requires the operator's constant presence in the area where noise is emitted. Moreover, the type of material being processed, i.e. profiles obtained through drawing and thus characterized by empty chambers, amplifies the acoustic emission values compared to those obtained during no-load operation.

In connection with the machine use, it is not possible to guarantee that the personal exposure level is less than 85 dB(A).

Hence, internal tests need to be conducted, directly at the place where the machine operates, as regards noise emission in connection with the exposure time, as this limit value may be exceeded.

N.B.

The indicated noise levels are emission levels and do not necessary represent safe operational levels. Although there is a relationship between the emission levels and the exposure levels, this relationship cannot be used in a reliable manner in order to determine whether additional precautions are needed. The factors that determine the level of exposure to which the operator is subjected include the duration of the exposure, the characteristics of the workplace as well as other sources of noise (number of machines, nearby processes, etc.). Moreover, the allowed

exposure levels may also change from country to country. In any event, the information provided in this manual will allow the users of the machine to conduct a better assessment of the hazard and of the risk to which they are subjected.

5.8. RISK DUE TO VIBRATIONS

Under conditions of use that comply with the indications for proper use, the vibrations produced by the machine are not such as to lead to dangerous situations.

POWER RESTORAL AND REPOSITIONING CYCLE

In the event that any one of the emergency devices is operated, the movements of all the actuators are instantly inhibited, and the following procedure needs to be followed, with reference to the control panel:

- re-establish the original condition of the emergency device, if possible removing the reason that caused said device to be used;
- press the power switch on pushbutton.

5.9. PLATES

The plate illustrated here below is positioned on the side of the machine and indicates its serial number.

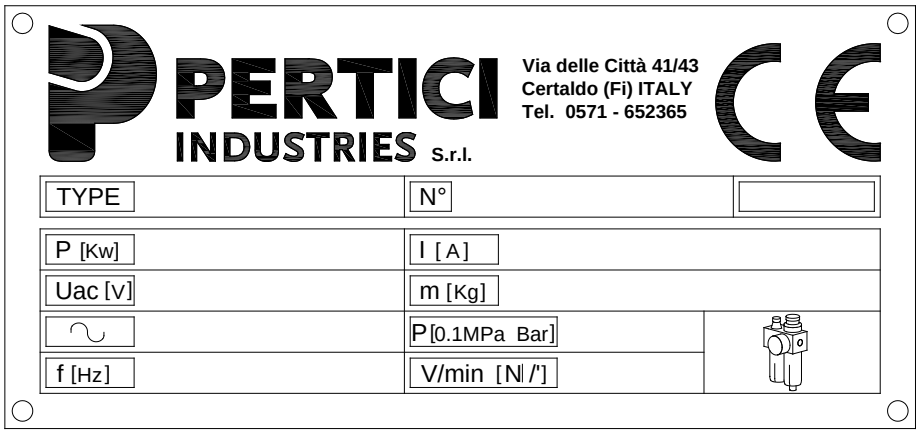


Fig. 50 – CE marking

	Check the perfect preservation of images, colours and texts of the warning plates. At the least sign of wear, the warning plates need to be replaced immediately, promptly notifying the person in charge and/or a top manager, who will arrange for undertaking the necessary measures.

6. COMMISSIONING AND USE

	All machine preparation, running and maintenance operations must be carried out by qualified personnel and/or personnel expressly authorized by PERTICI INDUSTRIES S.r.l. only.

6.1. PRELIMINARY CHECKS

- Make sure that the work area of the machine is free of pieces or objects that might hinder its regular operation.
- Make sure that the work tops of the clamps are clean and free of shavings or scraps of material.
- Make sure that the electrical connection of the plug into the interlocked socket has been properly carried out.
- Make sure that connection of the pneumatic system has been properly carried out. Otherwise, arrange for a proper connection (4.6.2 Connecting the pneumatic system).
- Check that the pressure with no load displayed on the pressure gauge is included between 6 and 6.5 bar/atm. Otherwise, arrange for adjusting it (4.6.2 Connecting the pneumatic system).

6.2. TURNING THE MACHINE ON AND OFF

6.2.1. TURNING ON THE MACHINE

- Rotate the main switch located on the electrical cabinet of the machine in a clockwise direction (Fig. 51).

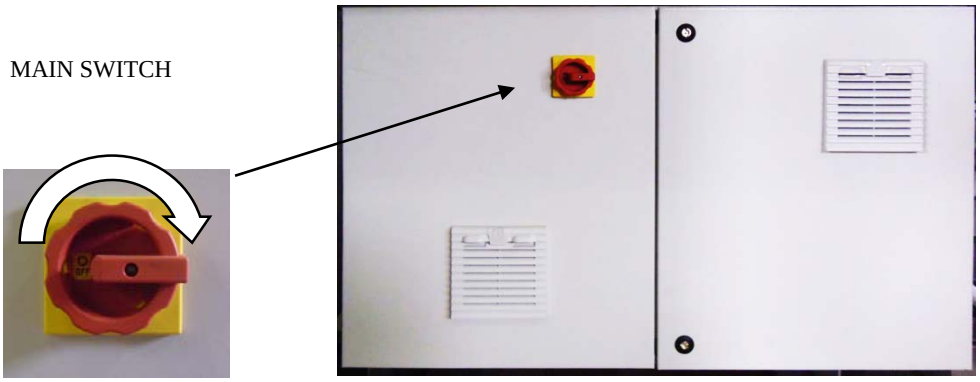


Fig. 51

- Wait for the industrial PC to start and to upload the machine program (the RESET pushbutton/lamp on the main pushbutton panel will be lit up).

- Press the RESET pushbutton/lamp for at least 0.5 seconds. As a consequence:
  - the lamp turns off,
  - the auxiliary circuits are supplied,
  - the cylinders are pressurized.

(Make sure the machine is not in a state of emergency)

Fig. 52

- Proceed with resetting the axes and the clamps (see the technical manual of the machine software).

6.2.2. TURNING OFF THE MACHINE

- Close the machine program *FILE → EXIT*
- Close the Windows operating system: *START → END SESSION → STOP THE SYSTEM → OK*
- Wait and make sure that everything closes properly and that the screen shows the turning off consent message
- Turn off the machine by rotating the main switch located on the electrical cabinet of the machine in a counter clockwise direction (Fig. 53)

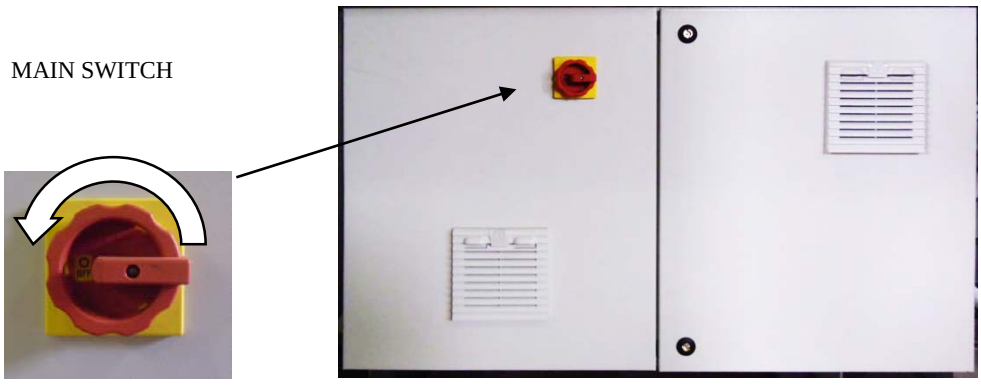


Fig. 53

6.3. PRESETTING THE TOOL, LOADING THE STORAGE AND INITIAL ADJUSTMENTS

6.3.1. PRESETTING THE TOOL

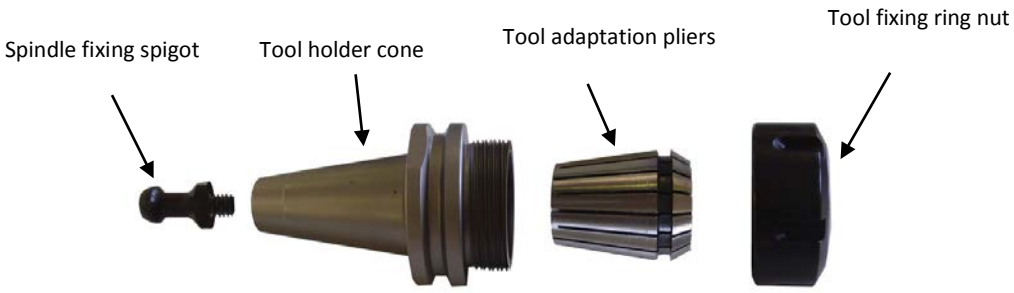


Fig. 54

- Check that the *spindle fixing spigot* is screwed in all the way and properly blocked.
- Remove the *tool fixing ring nut* from the cone using an adjustable hook wrench.
- Apply pressure to insert the *tool adaptation pliers* in the *tool fixing ring nut* (Fig. 55).
- Screw the *tool fixing ring nut* on the cone without tightening it.
- Insert the tool in the *tool adaptation pliers*.
- Holding the *tool holder cone* with a bench clamp, tighten the ring nut by means of an adjustable hook wrench until the tool is perfectly tightened in its seat.
- Measure the length of the tool from the reference, as shown in Fig. 56.
- ***(Only with versions with tool holder storage supplied as standard equipment)*** Insert the tool holder in the storage with the conical side facing upward.
- Enter the tool data as requested by the machine software (see the technical manual of the machine software).

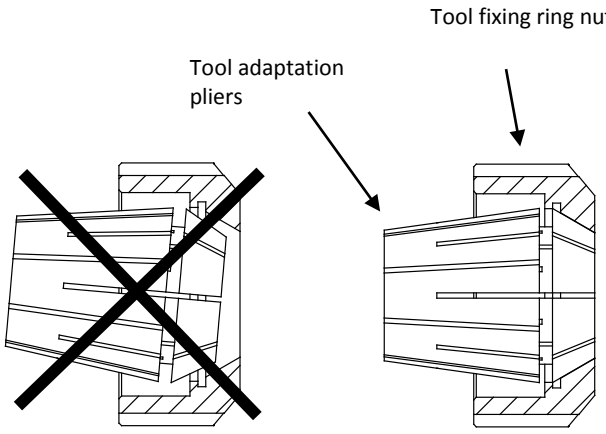


Fig. 55

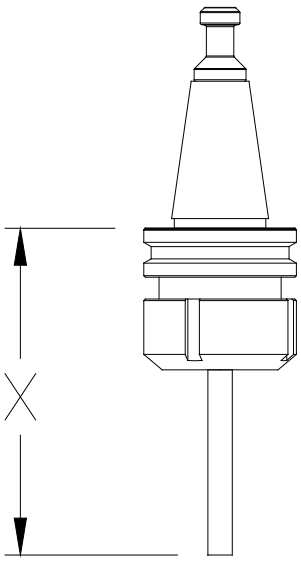


Fig. 56

6.3.2. LOADING THE STORAGE[10]

Load the storage with the tools needed to carry out the work cycle. Access to the storage is allowed through the operator interface (see the software technical manual).

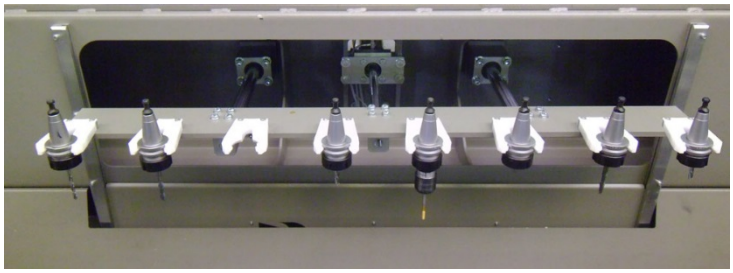


Fig. 57

6.3.3. ADJUSTING THE COOLING LUBRICANT OIL DISPENSING PUMP

In case of need, the cooling lubricant oil dispensing pump can be adjusted so that it properly lubricates all the tools used during the work cycle. The amount of dispensed oil during each spraying cycle is controlled through the knob located on the individual pump. The spraying frequency, on the other hand, is managed through special machine parameters that can be accessed from the operator interface (see the software manual).

Turn the knob in a clockwise direction to reduce the oil quantity and in a counter clockwise direction to increase it.

Adjusting knob

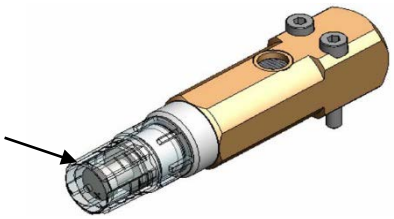


Fig. 58

CLICKS	OIL FLOW RATE
CLICK 0	39.00
CLICK 1	37.23
CLICK 2	35.47
CLICK 3	33.70
CLICK 4	31.93
CLICK 5	30.16
CLICK 6	28.40
CLICK 7	26.63
CLICK 8	24.86
CLICK 9	23.10

CLICKS	OIL FLOW RATE
CLICK 10	21.33
CLICK 11	19.56
CLICK 12	17.79
CLICK 13	16.03
CLICK 14	14.26
CLICK 15	12.49
CLICK 16	10.73
CLICK 17	8.96
CLICK 18	7.19
CLICK 19	5.42

CLICKS	OIL FLOW RATE
CLICK 20	3.66
CLICK 21	1.89
CLICK 22	0.12
CLICK 23	0.00
CLICK 24	0.00
CLICK 25	0.00
CLICK 26	0.00
CLICK 27	0.00

Table 7

[10] Storage available on some versions only

6.3.4. ADJUSTING THE SPRAYING NOZZLES

This means adjusting the trajectory of the spraying nozzles so that they do not interfere with the tool change operations, at the same time guaranteeing proper spraying of the cooling lubricant fluid.

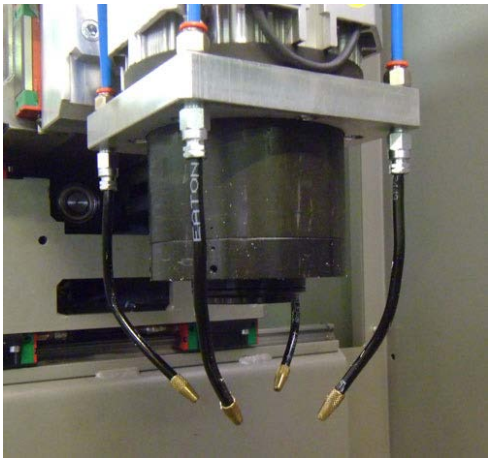


Fig. 59

6.3.5. ADJUSTING THE CLAMPS

In order to obtain accurate machining, it is necessary to adjust the useful opening of the clamps, in order to welcome the profile to be processed, and the height of the jig, to ensure a more effective grip.

ADJUSTING THE USEFUL OPENING

1. Remove the two socket head cap screws using a 6-mm Allen wrench in order to free the mobile unit of the clamp.
2. Position the mobile unit in the new position in order to guarantee the desired useful opening (there are 6 fixed positions available).
3. Block the mobile unit by tightening the screws that were previously removed.

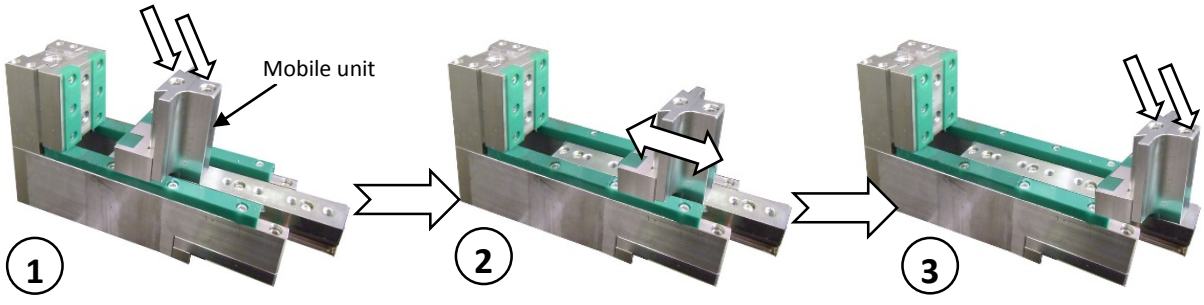


Fig. 60

In the event that, despite the previous adjustment, the useful opening of the clamps is still not compatible with the size of the profile to be machined, an additional adjustment is possible by removing:

- jig of the mobile unit, by unscrewing the socket head cap screw using a 5-mm Allen wrench
- jig of the fixed unit, by unscrewing the two socket head cap screws using a 6-mm Allen wrench.

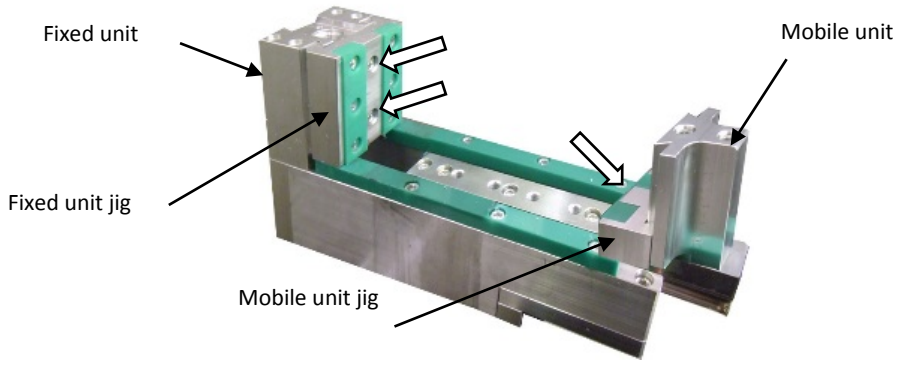


Fig. 61

	The maximum dimensions of the profile that can be machined with/without jigs are illustrated in § *3.5 Y-Z.*

ADJUSTING THE FIXED UNIT JIG HEIGHT

1. Loosen the socket head cap screws using a 5-mm Allen wrench in order to free the jig of the fixed unit.
2. Slide the jig along the track of the fixed unit until reaching the desired height.
3. Block the jig by tightening the screw that was previously loosened.

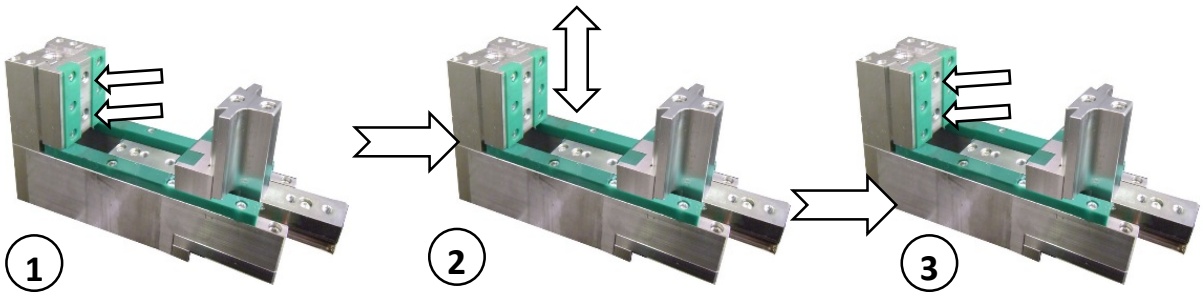


Fig. 62

ADJUSTING THE MOBILE UNIT JIG HEIGHT

1. Loosen the socket head cap screw using a 5-mm Allen wrench in order to free the jig of the mobile unit.
2. Slide the jig along the track of the mobile unit until reaching the desired height.
3. Block the jig by tightening the screw that was previously loosened.

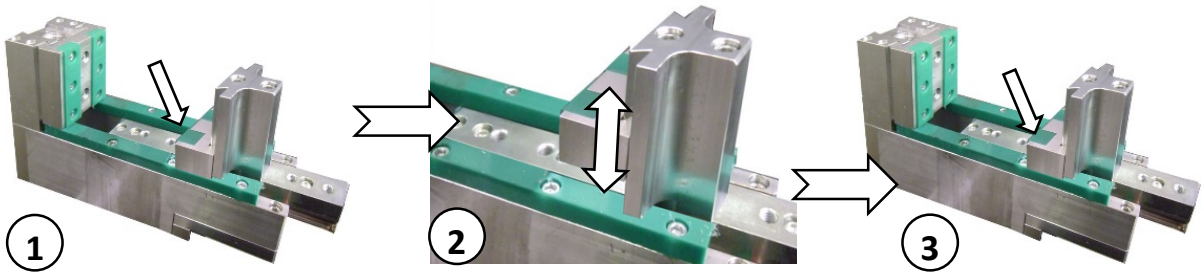


Fig. 63

6.4. USING THE MACHINE

At the first daily start-up, carry out the cycle described below with tool holder inserted and without carrying out any machining (see the technical manual of the machine software):

Time [1 min]	Rotation speed [rev/min]
2	50% of the max speed*
2	75% of the max speed*
1	100% of the max speed*

*maximum rated speed

6.4.1. MANUAL MODE

The manual mode is used to load the tool storage (if available), carry out routine maintenance or check the individual functions of the machine.

- Turn on the machine (§6.2.1)
- Select the desired manual function (see the technical software manual)
- Turn the potentiometer to zero before each movement.
- Press START to start the movement.
- Adjust the movement speed through the potentiometer.

The movements of the manual functions are not checked by a verification of the overall dimensions of the machine parts or of the piece.

Make sure the movements take place without any collisions between the various machine parts or between part of the machine and the pieces to be processed.

6.4.2. AUTOMATIC MODE

The machine allows a work cycle programmed beforehand by means of the software supplied as standard equipment to be carried out (for information about the programming, see the technical manual of the machine software).

- Turn on the machine (§6.2.1).
- Load the work cycle programmed beforehand and follow the instructions displayed on the screen (see the technical manual of the machine software).
- Press START to begin the positioning procedure of clamps and profile (Fig. 7 or Fig. 8 on page 14).

Only for versions with recommended manual clamps positioning

During this phase, all clamps, if not properly positioned, have their positioning LED lit up.

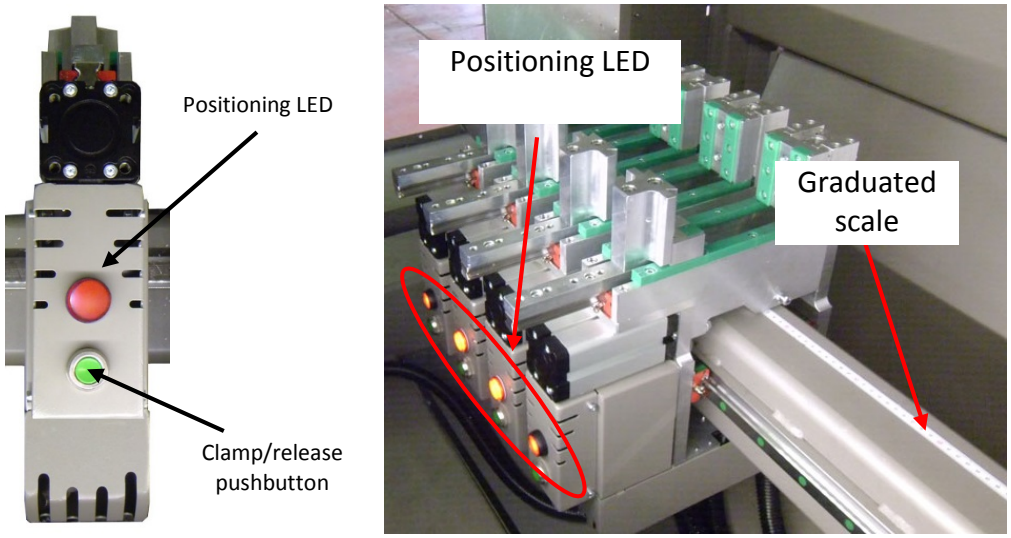


Fig. 64

Starting from the outermost clamp, press the release pushbutton and drag the clamp along the table so that the value displayed on the screen (Fig. 65) matches the one indicated on the graduated scale. The proper positioning is confirmed by the turning off of the positioning LED.

Fig. 65

Repeat the same operation for the other clamps.

- Position the profile on the clamps top, making sure that it is against the end stop.
- Block the profile by pressing the *profile clamp/release* pushbutton located on the end clamps (Fig. 12 or Fig. 13 on page 16).

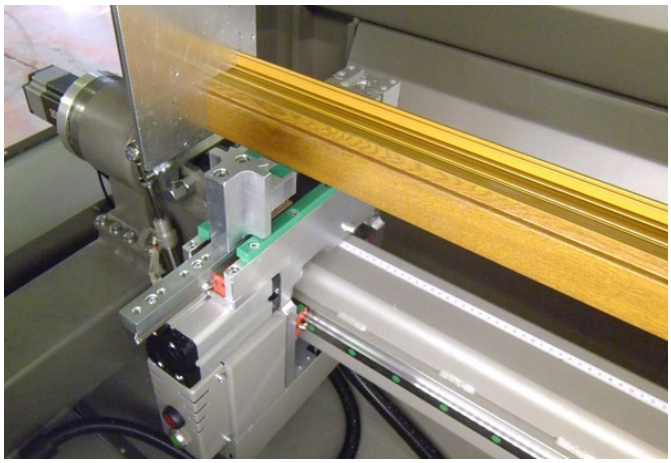


Fig. 66

- Press START to begin the work cycle (see the technical manual of the machine software).

7. MAINTENANCE

WARNING!!!!!!
PRIOR TO CARRYING OUT ANY MAINTENANCE OPERATION
- **PRESS the emergency pushbutton on the control panel**
- **DO NOT DISCONNECT the machine from the pneumatic supply network, unless indicated otherwise**

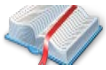
The machine requires no special maintenance operations.

The technical solutions, the materials used and the protective paints were specifically chosen to cut down on maintenance operations. Nevertheless, it is recommended to carry out a set of operations, subdivided into *Routine Maintenance* and *Extraordinary Maintenance,* aimed at ensuring the safety, reliability and efficiency of the machine over time.

	**Use original spare parts only** **The user shall be solely responsible for the perfect operation of the machine in case the latter is not repaired and kept in proper working order by skilled and authorized personnel**
	**Contact the technical assistance service indicated by the company that supplied the machinery for repair operations**

MAINTENANCE OF THE ELECTRICAL EQUIPMENT must be carried out only after having CUT OFF power to the machine.

Any maintenance operation of the electrical equipment must be carried out by skilled or authorized personnel, using original parts.



It is recommended to carry out maintenance according to the frequencies and methods listed below.

Failure to comply with said requests relieves PERTICI INDUSTRIES S.r.l. from any and all responsibility in respect of the warranty.

Contact PERTICI INDUSTRIES S.r.l. in case of need.

7.1. LUBRICATION

Proper and regular lubrication represents a basic element for a long service life and optimal performance of the machine.

	Lubricants are highly polluting substances: for their disposal, it is mandatory to turn to a waste disposal company in compliance with the laws in force on the subject.
	Pertici Industries S.r.l. shall not be responsible for damages caused by the use of lubricants that do not comply with the specifications listed below.

APPLICATION	TYPE	ACRONYM AND NOTES
RUNNER BLOCKS, GUIDES AND RACKS	GREASE	KLUBER microlube GL261
TOOL	OIL	Biodegradable vegetal oil Specific weight at 15°C = 0.928 kg/l viscosity at 40°C = 68 cSt flash point = 290°C

Table 8

7.1.1. LUBRICATION OF RUNNER BLOCKS AND GUIDES

Lubrication must be carried out only after having placed the spindle in the reset position (see technical manual of the machine software) and the machine in the EMERGENCY condition (press the mushroom EMERGENCY pushbutton).

1. Remove the left side protection panel by unscrewing the socket head cap screws using a 4-mm Allen wrench (Fig. 67),
2. Lubricate the runner blocks and the guides through two lubrication points (Fig. 68),
3. Reposition the left side protection panel and tighten the screws that were previously removed,
4. From the front of the machine, lubricate the ball runner blocks located on the right edge of each clamp (Fig. 69).

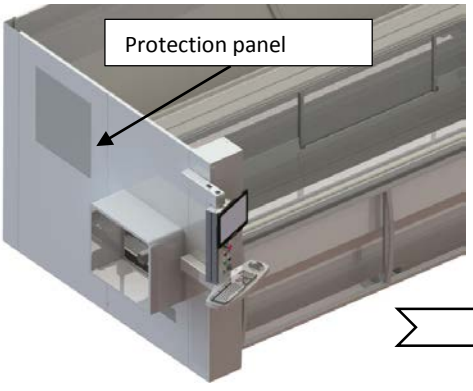


Fig. 67

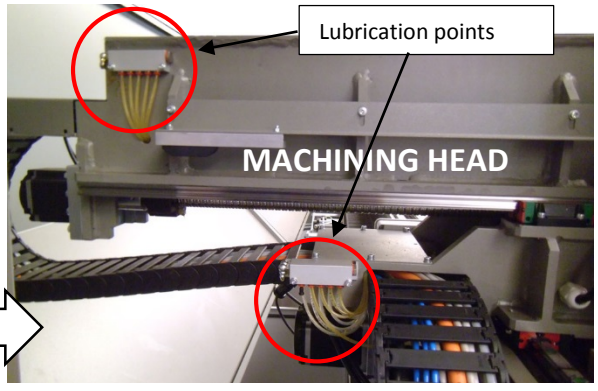


Fig. 68

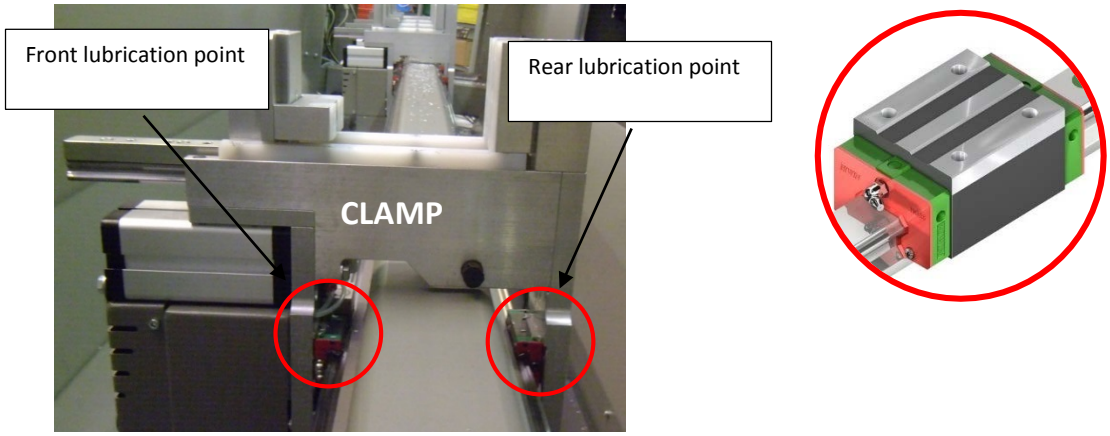


Fig. 69

7.1.2. TOPPING UP OF TOOL COOLING LUBRICANT TANK

Lubrication must be carried out only after having placed the spindle in the reset position (see technical manual of the machine software) and the machine in the EMERGENCY condition (press the mushroom EMERGENCY pushbutton).

Tool lubrication is carried out by means of the minimal cooling lubricant unit described in § 2.7. In case of low oil level, signalled by the user interface or discovered after a visual inspection, proceed to top up the tank according to the procedure indicated below:

1. Remove the right side protection panel by unscrewing the socket head cap screws using a 4-mm Allen wrench (Fig. 70),
2. Unscrew the oil tank cover and top up with cooling lubricant oil of the type indicated in § 2.7.1 (Fig. 71),
3. Close the oil tank and reposition the right side protection panel, tighten the screws that were previously removed.

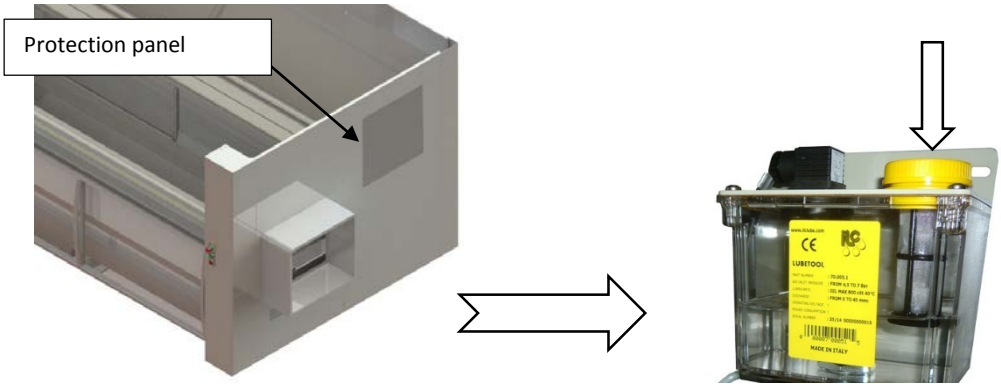


Fig. 70 **Fig. 71**

7.1.3. RACK LUBRICATION

Lubrication must be carried out only after having placed the spindle in the reset position (see technical manual of the machine software) and the machine in the EMERGENCY condition (press the mushroom EMERGENCY pushbutton).

X-AXIS RACK

- With the help of a brush, apply lubricant of the type indicated in Table 8 along the entire accessible length of the area shown in Fig. 72.
- Operate the machining head in direction X, for the entire useful travel, at least twice, so as to evenly distribute the applied lubricant.

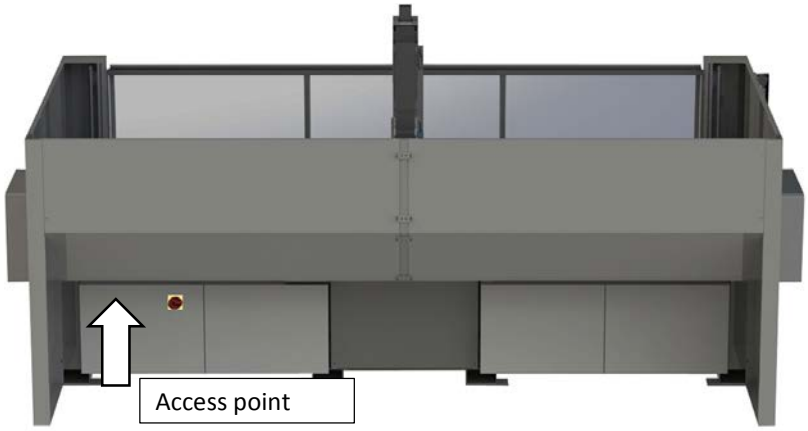


Fig. 72

CLAMPS RACK *(Installed only on versions with automatic clamps positioning)*

- Clean the rack of any processing residue using a compressed air gun (do not point the jet of air directly at the clamps).
- With the help of a brush, apply lubricant of the type indicated in Table 8 along the entire length of the rack.
- Operate the outermost clamp in direction X, for the entire useful travel, at least twice, so as to evenly distribute the applied lubricant.
- Remove any excess lubricant.

Fig. 73

7.2. ROUTINE MAINTENANCE

7.2.1. DAILY MAINTENANCE

The use of a compressed air gun is not recommended in order to avoid pushing any processing residue in areas that may then be difficult to reach.

ITEM	ACTION
Scrap collection tank	Remove any shavings or other processing material using the hose of a vacuum cleaner.
Clamps	
End stops	
Power cord	Make sure it is intact: it must not have any cuts or abrasions
Air treatment unit	Check the condensate level; if necessary, drain the container by means of the special valve located underneath the container itself
Container of the cooling lubricant solution	Check the level and top up if necessary (§ 7.1.2)

Table 9

7.2.2. WEEKLY MAINTENANCE

ITEM	ACTION
Spindle	Remove any shavings or other processing material using the hose of a vacuum cleaner.
Cones	
Electrical system	Check: - the insulation safety of the cables, - the proper operation of the differential protection device, - continuity of the protective conductor (earth).
Blockings of the various mechanical components	Check their condition and proper operation
Articulations subject to jamming	Grease and oil periodically

Table 10

7.2.3. MONTHLY MAINTENANCE

ITEM	ACTION
Lubrication of runner blocks and guides	Lubricate according to the procedure indicated in § 7.1.1.

Table 11

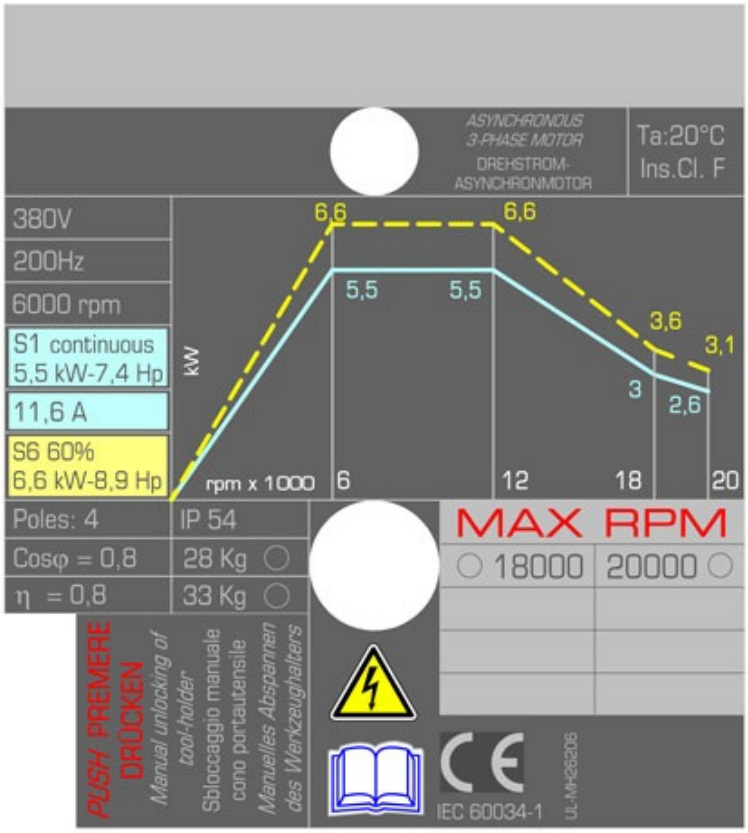
7.2.4. MAINTENANCE EVERY 2 MONTHS

ITEM	ACTION
Lubrication of racks	Lubricate according to the procedure indicated in § 7.1.3.

Table 12

ANNEX 1 DOCUMENTATION PERTAINING TO COMPONENTS

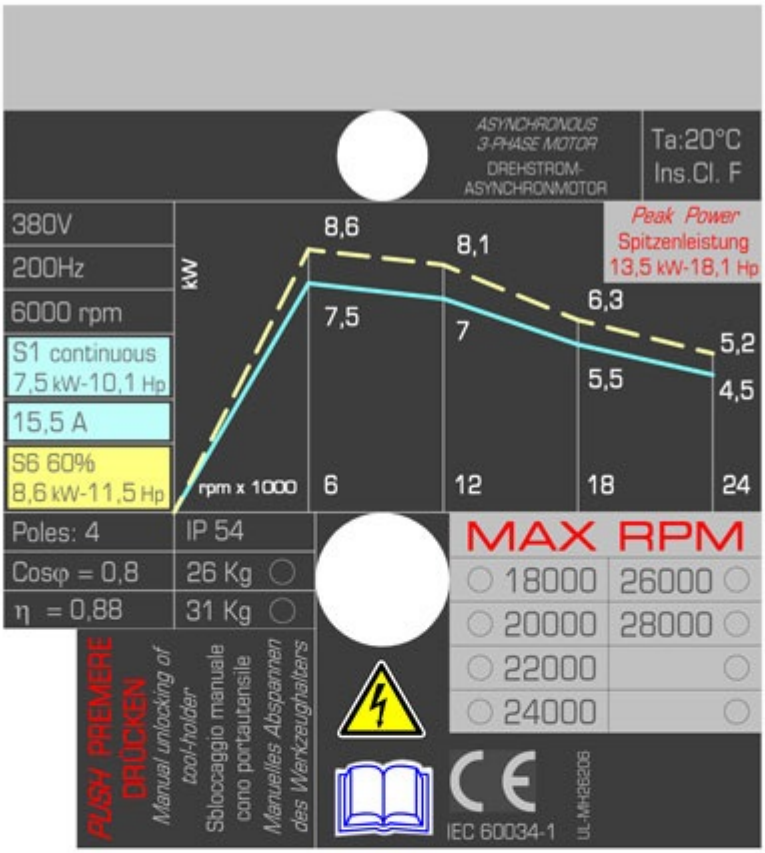
ANNEX 1.1 ELECTRO-SPINDLE P=5.5KW



Tensione nominale (*)	Nennspannung (*)	*Rated voltage (*)*	V	380		380		380		380							
Frequenza nominale	Nennfrequenz	*Rated frequency*	Hz	200		400		600		667							
Velocità nominale	Nominale Geschwindigkeit	*Rated speed*	rpm	6000		12000		18000		20000							
Tipo di servizio	Betriebsart	*Duty type*		S1 cont	***S6 60%***	S1 cont	***S6 60%***	S1 cont	***S6 60%***	S1 cont	***S6 60%***						
Potenza nominale	Nennleistung	*Rated power*	kW	5,5	***6,6***	5,5	***6,6***	3	***3,6***	2,6	***3,1***						
Coppia nominale	Nenndrehmoment	*Rated torque*	Nm	8,7	***10,5***	4,4	***5,2***	1,6	***1,9***	1,2	***1,5***						
Corrente nominale	Nennstrom	*Rated current*	A	11,6	***13,9***	11,6	***13,9***	7,2	***8,4***	6	***7,4***						
Rendimento nominale η	Nennwirkungsgrad η	*Rated efficiency η*		0,8													
Fattore di potenza cos φ	Leistungsfaktor cos φ	*Power factor cos φ*		0,8													
Numero di poli	Polzahl	*Number of poles*		4													
Classe di isolamento	Isolierklasse	*Insulation class*		F													
Tipo di raffreddamento	Kühlungstyp	*Type of cooling*		*Elettroventola* / Elektrolüfter / *Cooling fan*													
Peso versione NASO CORTO	Gewicht Version KURZE NASE	*Weight of SHORT NOSE variant*	kg	~ 28													
Peso versione NASO LUNGO	Gewicht Version LANGE NASE	*Weight of LONG NOSE variant*	kg	~ 33													

[(*) fornita da inverter] [(*) von Inverter geliefert] *[(*) from inverter]*

ANNEX 1.2 ELECTRO-SPINDLE P=7.5kW



Tensione nominale (*)	Nennspannung (*)	*Rated voltage (*)*	V	380		380		380		380	
Frequenza nominale	Nennfrequenz	*Rated frequency*	Hz	200		400		600		800	
Velocità nominale	Nominale Geschwindigkeit	*Rated speed*	rpm	6000		12000		18000		24000	
Tipo di servizio	Betriebsart	*Duty type*		S1 cont	***S6 60%***	S1 cont	***S6 60%***	S1 cont	***S6 60%***	S1 cont	***S6 60%***
Potenza nominale	Nennleistung	*Rated power*	kW	7,5	***8,6***	7,0	***8,1***	5,5	***6,3***	4,5	***5,2***
Coppia nominale	Nenndrehmoment	*Rated torque*	Nm	11,9	***13,7***	5,6	***6,4***	2,9	***3,3***	1,8	***2,1***
Corrente nominale	Nennstrom	*Rated current*	A	15,5	***17,8***	15,0	***19,3***	11,5	***13,2***	10,0	***11,5***
Rendimento nominale η	Nennwirkungsgrad η	*Rated efficiency η*		0,88		0,86		0,80		0,75	
Fattore di potenza cos φ	Leistungsfaktor cos φ	*Power factor cos φ*		0,8							
Numero di poli	Polzahl	*Number of poles*		4							
Classe di isolamento	Isolierklasse	*Insulation class*		F							
Tipo di raffreddamento	Kühlungstyp	*Type of cooling*		*Elettroventola* / Elektrolüfter / *Cooling fan*							
Peso versione NASO CORTO	Gewicht Version KURZE NASE	*Weight of SHORT NOSE variant*	kg	~ 26							
Peso versione NASO LUNGO	Gewicht Version LANGE NASE	*Weight of LONG NOSE variant*	kg	~ 31							

[(*) fornita da inverter] [(*) von Inverter geliefert] *[(*) from inverter]*

ANNEX 2 EXPLODED DRAWINGS OF MECHANICAL PARTS

- Documentation being prepared –

ANNEX 3 ELECTRICAL SYSTEM

- See ANNEX Electrical System –

ANNEX 4 PNEUMATIC SYSTEM

- See ANNEX Pneumatic System -

ANNEX 5 ELECTRICAL TESTS

- Documentation being prepared -

ANNEX 6 NOISE TESTS

- Documentation being prepared -