

MORBIDELLI

USER AND MAINTENANCE MANUAL

This manual must be kept for future reference and must always remain with the machine

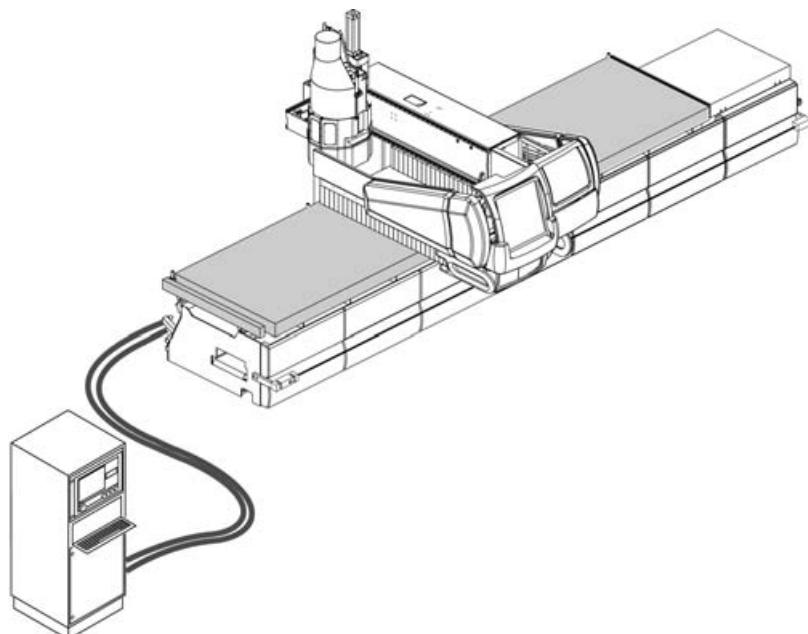
AUTHOR X5

USER AND MAINTENANCE MANUAL

Rel. 3.0 / 02-2004



CNC BORING AND ROUTING CENTRE



SCM GROUP S.p.A. - MORBIDELLI

Strada Montefeltro 81/3

61100 PESARO (Italy)

Tel. +39/0721/4451 - Fax +39/0721/ 445264



MANUFACTURER: **SCM GRUP S.p.A. - MORBIDELLI**

ADDRESS: **Strada Montefeltro 81/3 - 61100 - Pesaro (Italy)**

TYPE OF DOCUMENT: **USER AND MAINTENANCE MANUAL**

DOCUMENT CODE:

EDITION: **Rel. 3.0 / 02-2004**

PRODUCT: **CNC BORING AND ROUTING CENTRE**

MODEL: **AUTHOR X5**

SERIAL NO.:

CUSTOMER:

CUSTOMER SERIAL NO.: **CNC NUM - PC Office**

YEAR OF MANUFACTURE:

CONFORMITY: **STD**

INDEX

1 General and Safety information

2 Installing the Machine

3 Preparing the Machine

3.11 Boring head with 36 independent vertical spindles - Optional Author X5 - Rel. 2.0

3.43 Electro spindle 15Hp HSK63 plug with rear deposit with 12 room - for Author X5 - Rel. 2.0

4 Use and Programming

4.10 Shavings removal - Rel. 1.1

5 Maintenance

6 Troubleshooting

INDEX

1.1	General information.....	4
1.1.1	Aim of the manual	4
1.1.2	Machine Identification	5
1.1.3	Contact Address	6
1.1.4	Using the Machine	6
1.1.4.1	Materials Suitable for Machining	6
1.1.4.2	Materials not Suitable for Machining	6
1.2	Safety information	7
1.2.1	Operator safety	8
1.2.2	Machine safety	11
1.2.3	Tool safety	11
1.2.4	Maintenance safety	12
1.2.5	Residual risks.....	13
1.2.6	Terminology and Symbols.....	14
1.2.6.1	Terminology and Symbols in User Manual	14
1.2.6.2	Symbols on the machine	15
1.3	Machine Description.....	18
1.3.1	Description of the Electrical Cabinet.....	20
1.4	Emergency Devices	21
1.4.1	Emergency Devices on the Machine	22
1.4.2	Emergency Devices on the Electrical Cabinet.....	23
1.5	Safety Devices	24
1.5.1	Safety devices description.....	25
1.5.1.1	Machining unit cover	26
1.5.1.2	Bumpers	27

1.5.1.4	"SETTING" general protection mode.....	28
1.6	Technical Characteristics	29
1.6.1	General Technical Characteristics.....	29
1.7	Overall Dimensions	31
1.8	Working Dimensions	32
1.9	Axis Stroke.....	33



The documentations with the machine are composed of :

- User and maintenance manual in paper copy (this one)
- Electric and pneumatic circuit arrangements in paper copy .

Compact Disk contains:

- User and maintenance manual
- Electric and pneumatic circuit arrangements
- User and programming manual
- Spare parts catalogue
- Technical generic documentations of machine components is not necessarily included

1.1 General information



NOTE: In the manual the terms "Morbidelli" and "manufacturer" substitute the full name SCM GROUP S.p.A. - Morbidelli

- The aim of this manual is to prevent accidents to persons and damage to machinery. Please read it carefully, paying special attention to the text preceded by the words Warning, Caution, Important or Note and to text in underlined, bold type.

- Use of this manual is the sole responsibility of the user. Operations not described in it, or not performed according to instructions if they are described, are forbidden. Any operator who performs unauthorised operations or fails to follow instructions must accept full responsibility for the result of his/her actions.

- The machine is equipped with an electronic control device for programming all of the panel machining operations; the utilisation modes are described in the attached manual.



This manual must be kept for future reference.

1.1.1 Aim of the manual

Morbidelli has supplied this manual with the aim of providing all information and instructions necessary for full use of the AUTHOR model machining centre.

This manual is written for the machine operator, who must have an in-depth knowledge of operating modes, adjustments and routine maintenance operations.

The manual is divided into chapters, each split into sections and sub-sections. The order is not sequential, but follows a logical progression, starting with descriptions, then covering installation, adjustments, use, routine maintenance and ending with the chapter on troubleshooting.



Constant observance of the indications in this manual guarantees: personnel safety, machine safety, economical operation and extended machine life.



This manual must be kept for future reference and must always be kept with the machine.



Morbidelli declines all responsibility for damage deriving from use of the machine which is not described in this manual, or due to incorrect maintenance.

1.1.2 Machine Identification

Plate A is marked with the identification data for the machine. Please quote this data when making technical enquiries or ordering spare parts.

The plate is located on the frame (see fig. 1a) and shows the following data:

- Marca = Merchandise mark
- Tipo = Machine type
- Anno = Production year
- N° Serie = Serial number
- kg = Weight (kg)
- Un V = Rated voltage (volt)
- ~ = Phases number (alternate current)
- In A = Rated current (ampere)
- F Hz = Frequency (hertz)
- Icc. kA = Short circuit breaking capacity of the protective device (kA)
- w.d. = Wiring diagram number
- Mod. = Machine model
- Comp. = Machine version
- Ref. = Internal references

It is a good idea to write down the machine identification data on this page for ready reference.

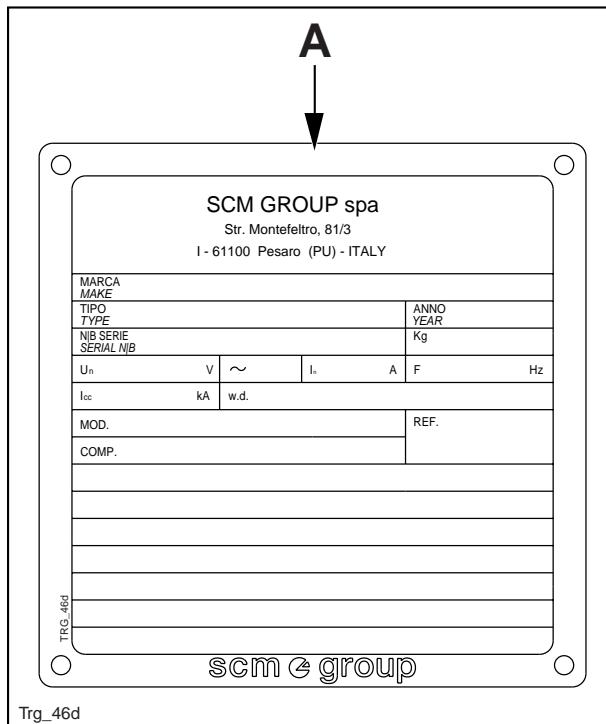


Fig. 1

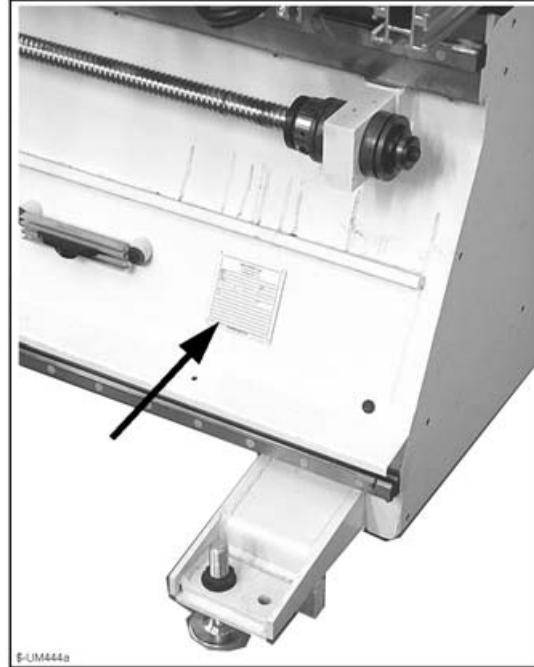


Fig. 1a

1.1.3 Contact Address

When writing to or calling the dealer or Morbidelli for any reason relative to the machine, always have the following information ready:

- Machine model
- Year of construction
- Serial number
- Voltage and frequency

For any request and/or information contact:

SCM GROUP S.p.A. - MORBIDELLI
Strada Montefeltro 81/3 - 61100 PESARO - Italy
Tel. 0721/4451 -- Telefax 0721/445264
E-mail: morbidelli@scmgroup.com

1.1.4 Using the Machine

AUTHOR is a CNC machining centre designed especially for boring and routing operations.

The machine was designed to use only tools which comply with "EN 847-1:1997 / EN847-2:2001 standards"

Morbidelli declines all responsibility for any damage arising as a result of use not described in this manual or incorrect maintenance.

Uses which are not allowed include the use of materials which are not specified by the manufacturer, or those which are outside machine technical specifications.

1.1.4.1 Materials Suitable for Machining

This machine must only be used for machining wood or similar materials.

"Similar materials" are those materials with technological and physical characteristics similar to those of wood, so that the machining and chipping removal mechanisms are the same.

Damage caused by machining materials other than those indicated is the responsibility of the user.

1.1.4.2 Materials not Suitable for Machining



IMPORTANT: AUTHOR must not, under any circumstances, be used to machine iron, aluminium or light alloys, or any materials other than those indicated by the manufacturer.

1.2 Safety information



Read this manual carefully before starting the machine, designed and built for maximum safety and top performance.

The machine must only be used by qualified operators

Persons using, adjusting, maintaining and repairing the machine must be familiar with and implement all instructions provided, especially in terms of safety.

The operator must never leave the machine unattended while it is operating.

The use of any machine tool involves certain risks. The operator is responsible for his/her safety and the safety of others.

Failure to observe safety standards always involves a serious risk of accident.

Never use the machine if under the influence of alcohol, drugs or medication.

The operator must be trained in the correct use of guards and safety devices. He/she must also be trained to carry out periodic inspections on these guards and safety devices.



The illustrations in the present manual may not correspond exactly with the actual configuration of your machine: this does not affect the validity of the information and instructions provided and does not, therefore, compromise operator safety.



WARNING: MAKING VARIATIONS TO THE MACHINE CONFIGURATION PARAMETERS IS STRICTLY PROHIBITED

THE MANUFACTURER DECLINES ALL RESPONSIBILITY FOR INJURY TO PERSONS OR DAMAGE OBJECTS AS A RESULT OF TAMPERING WITH THE MACHINE

WARNING: MAKING VARIATIONS TO THE MACHINE CONFIGURATION PARAMETERS IS STRICTLY PROHIBITED. NEVER MAKE ANY CHANGES ON THE MACHINE.

THE MANUFACTURER DECLINES ALL RESPONSIBILITY FOR INJURY TO PERSONS OR DAMAGE TO OBJECTS AS A RESULT OF TAMPERING WITH THE MACHINE



WARNING: BEFORE MACHINING, IT IS EXTREMELY IMPORTANT TO CHECK THE TOOLS ARE CORRECTLY INSTALLED (SEE CHAP. 3... / 4...)

1.2.1 Operator safety



- Always wear suitable work overalls, safety footwear and hats or hairnets.
- Keep all cuffs buttoned up or rolled up so that they cannot become trapped in moving machine parts.
- Remove all items of personal jewellery or clothing which could cause accidents (rings, watches, bracelets, chains, ties).
- Ensure that all guards, grills, covers and safety devices are efficient and in place at all times.
- Switch off the main power supply to the machine before commencing any cleaning or maintenance operations.
- Keep the machine, work surfaces and the working area clean and clear of obstructions at all times.
- Wear goggles or protective visors.
- Wear gloves.
- Use ear defenders or ear plugs.
- Use protective masks to reduce the risk of inhaling dust or other substances.
- Make sure that the working area is suitably lit, by the main or local lighting.
- A clear space all around the machine is essential to safety.

**WARNING:**

- Always work from the front of the machine (See Fig. 1.1).
- Only authorised personnel may enter the working area.
- Load and position the panels from the front of the machine.
- Do not perform checks or maintenance operations on any working area whatsoever of the machine when the machine is in operation. When the machine is running do not perform any checks or maintenance in a working area even though the machine might be operating in another area.
- Do not, under any circumstances, climb onto the machine for any reason while the power supply or the compressed air supply is on.

MAIN WORKING ZONES:

- 1 - Zone reserved for operators during machining
 2 - Zone for operator inserting panels (front of machine). Zone which is off limits during machining.
 3 - Zone which is always off limits during machining (work table and machine side and rear areas).

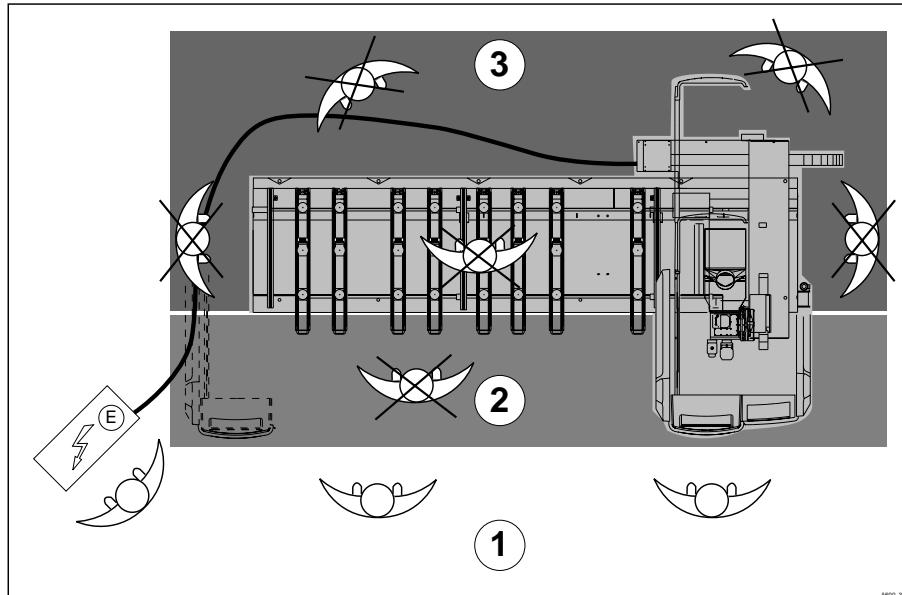


Fig.1.1



WARNING: Do not remove or disable safety protection or emergency devices for any reason.



ATTENTION: IT'S ABSOLUTELY FORBIDDEN TO ENTER, WITH TOOLS OR SOMETHINNG ELSE, INTO THE PROTECTIONS AND INTO SAFETY DEVICES OF THE GROUPS OPERATOR.



ATTENTION: IF THE OPERATOR HAS TO REMOVE WASTE MATERIALS HE MUST OPERATE AS DESCRIBED IN THE CHAPTER 4.10

OPERATOR'S POSITION FOR VISUAL MACHINING CHECKS

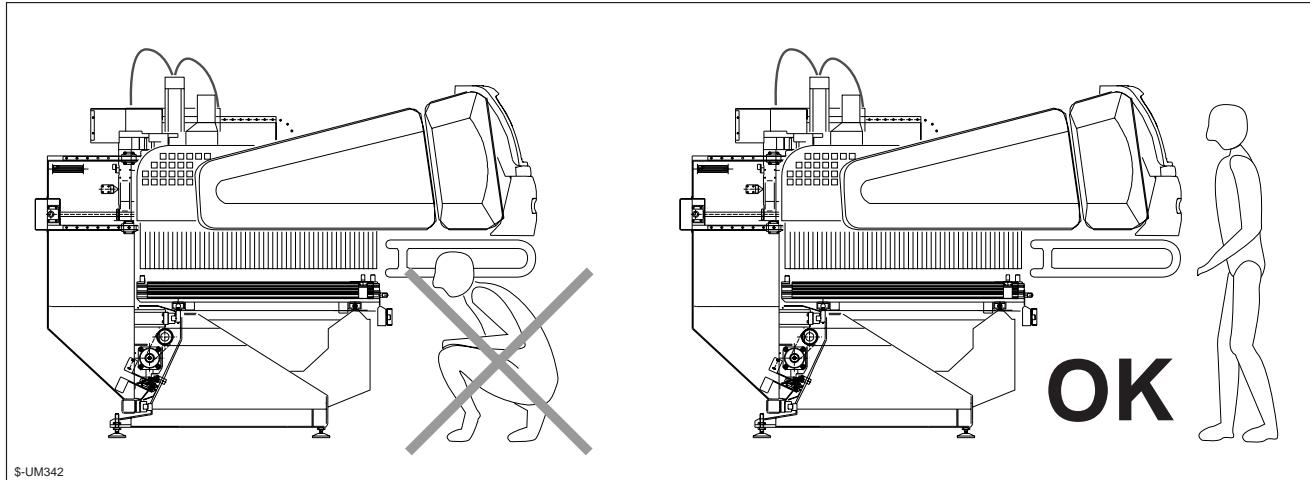


Fig. 1.1a

1.2.2 Machine safety



- Persons using the machine must concentrate before beginning work and must prevent other, inexpert or unauthorised persons, from using the machine.
- Never start the machine unless all safety and emergency devices are fitted. These must never be removed.
- Never carry out machining tests without the necessary guards.
- Never machine workpieces which are too small or too big for the machine.
- Avoid supporting panels by hand during machining. Use the purpose-designed supports.
- Observe all warnings on the machine, whether written or in the form of icons.
- The manufacturer declines all responsibility for unauthorised changes made to the machine and any damage which may arise as a result of said changes.
- Connect all dust extractor hoods to the vacuum system. Never operate the machine if the extractor system is off.
- Never remove waste or other parts of the workpiece from the machining area with the machine still operating (see chap. 4.10.1).
- Before starting the machine, check that there are no extraneous objects on the work table.

1.2.3 Tool safety



- Do not use cracked, bent or blunt tools: blunt tools not only reduce the quality of work, but increase the danger of ejection of workpieces or parts of them, tools or parts of them.
- Never use tools at a speed higher than that indicated by the tool manufacturer and never use tools that are larger in size than the maximum indicated in the appropriate chapters and paragraphs of this manual.
- Handle tools carefully. To avoid damaging the cutting edges, do not place them on metal surfaces. Use protective gloves to handle cutting edges.
- Store tools in an orderly manner and in a place where they are not accessible to unauthorised personnel.
- Before fitting any tool in its seat or shaft, check that the contact surfaces are clean, free of marks and perfectly flat.
- Ensure that all rotary tools are perfectly balanced, sharpened and carefully keyed and tightened.

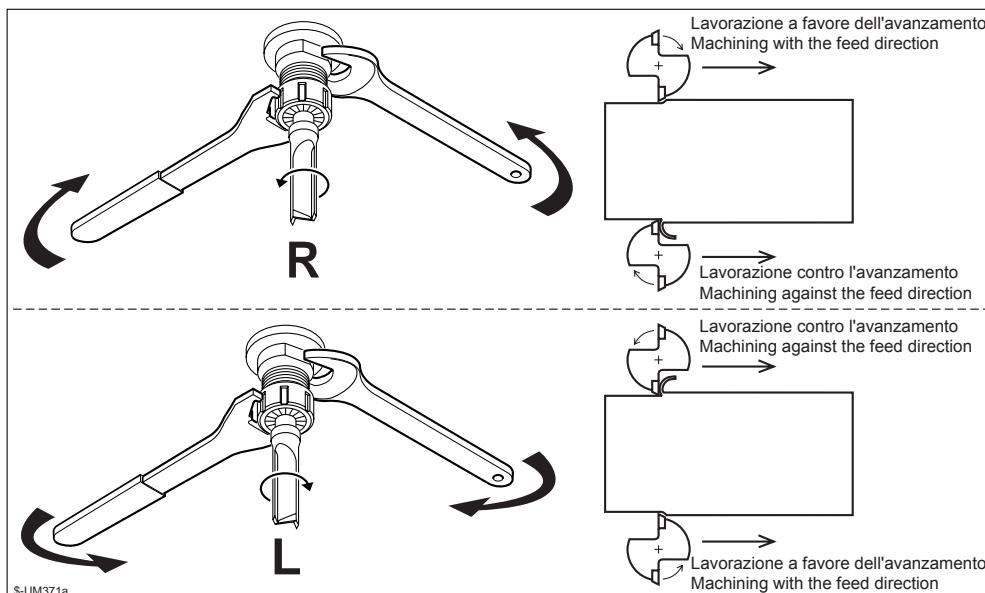


- Use tools which comply with "EN 847-1:1997 / EN 847-2:2001" standards.
- When fitting tools, check that the ring nuts or tightening screws do not come undone during machining (A tool that rotates to the right will have a fastening system with a right screw-thread, while a tool that rotates to the left will have a fastening system with a left screw-thread: figure 1.1b shows the correct way to shut a tool.); also check that the direction of machining matches the tool rotation (see fig. 1.1b).



WARNING: BEFORE MACHINING, IT IS EXTREMELY IMPORTANT TO CHECK THE TOOLS ARE CORRECTLY INSTALLED (SEE CHAP. 3...)

Figure shows how to correctly tighten a tool on the spindle and the correct direction of feed relative to tool rotation.



1.2.4 Maintenance safety



Before any maintenance operation, check that the main On/Off switch is padlocked in the 0 position and the main compressed air supply valve is padlocked in the closed position.



- Ensure that safety devices are always maintained in working order.
- Before removing any protective device for maintenance, adjustments or cleaning, stop the machine completely.
- Switch off the power using the main On/Off switch, then apply a sign to the machine indicating that work is being carried out.
- Clean the machine, the floor and the work tables carefully and at the proper intervals. Also keep decals and plates on the machine clean at all times.
- Regularly remove chippings and dust to prevent fire hazards.
- Do not use compressed air to clean the machine and the surrounding area, but use either industrial vacuum cleaners or a manual means of cleaning (e.g. brooms, rags, ecc.).
- Any machine fault or defect, including on guards or tools, must be reported as soon as it is discovered. The machine must be stopped and the necessary action taken.

1.2.5 Residual risks



IMPORTANT: Since you can gain access to the electrical panels in the electrical equipment without powering down, the key which opens the electrical equipment must be handed over to the maintenance manager.

Any work that has to be done in the electrical equipment without powering down must be carried out by specialised electricians.

This machine is equipped with safety devices which comply with the best available in the safety sector. These safety devices are effective if used correctly and maintained. Although all safety regulations have been observed use of the machine in accordance with the rules indicated in this manual may still involve the following residual risks:

- Contact with tools which are rotating or at a standstill.
- Contact with moving parts (belts, pulleys, etc.)
- Ejection of the workpiece or parts of it (e.g.: due to incorrect workpiece locking and/or machining waste)
- Ejection of tools or parts of them due to: programming errors (e.g.: retrieval of incorrect tools), tooling (association of incorrect parameters with a given tool code), loading incorrect tool when requested directly by the machine, incorrect tool loading in the tool magazine (if present on the machine), incorrect tool mounting.
- Electrocution due to contact with live parts.
- Tool collisions with the worktable and/or reference stops due to programming errors.

1.2.6 Terminology and Symbols



NOTE: The present manual applies to all versions of machines. Instructions and information applicable only to a particular version or versions are indicated with a Note or symbol. Unless otherwise specified with a Note or symbol, instructions and information apply to all versions.

1.2.6.1 Terminology and Symbols in User Manual



ATTENTION: indicates dangerous situations and/or conditions



PRECAUTION: indicates situations that might be dangerous if not carefully respected.



WARNING / NOTE: indicates situations and/or recommendations to pay attention to



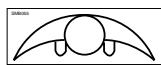
Specific for electro spindles with HSK63 fitting



Feature supplied only on request



Abbreviations for Numeric Control



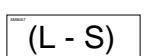
Machine operator



No-access area with on or operating machine



Right rotation (Clockwise)



Left rotation (Anti-clockwise)



Vertical routing unit

1.2.6.2 Symbols on the machine



Device for lifting by hook



DANGER: CRUSHING AREA



DANGER: CRUSHING AREA



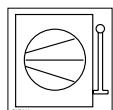
DANGER: CUTTING AREA



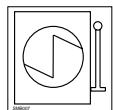
DANGER: ELECTRICAL CURRENT



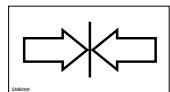
GENERAL DANGER



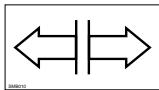
Pneumatic power switch



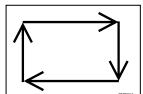
Electrical power switch



Lock



Release



Automatic cycle



Vacuum pump



Pneumatic power



r.p.m.(revolutions per minute)



Stop



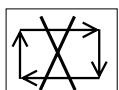
Start



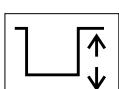
Rapid traverse



Feed



Hold



Raising the extractor hood



Manual control ("Setting" mode)



Automatic control



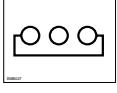
Machine functions enabled



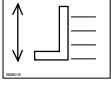
Machine functions disabled



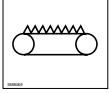
Editing block



Loading aid devices.



Workpiece alignment devices



Shavings conveyor

1.3 Machine Description

AUTHOR X5 is a numerically controlled boring and routing centre designed for the most specialised machining requirements.

The structure has two main elements:

- the load-bearing base A fig. 1.2)
- the single-piece upright B which moves along the X-axis

The operator group C is equipped with:

- a routing group C1 with independent displacement on two axes: axis C (Vector) , axis B (Tilting)

Machining unit C is mounted on a slide D which is moved on the upright B mobile along the Y-axis and includes movement along the Z-axis.

All movements involve sliding on prismatic guides with recirculating ball screws. The movements are made possible using top quality recirculating ball screws. On some models or optionals the X-axis movement can be created with a high quality rack and pinion.

The base is fitted with the worktables E and the reference stops for workpiece positioning.

The worktables consist of extruded aluminium alloy bars mounted on supports containing recirculating ball bushings and pneumatic locking devices. The worktables move along the X-axis on round, ground steel bars. At your request, the worktable movement system may be set up with prismatic guides and recirculating ball screws.

The suction cups F (fig. 1.3) are fitted in the worktables, to secure the workpieces by means of the vacuum. These suction cups are positioned by sliding them on the table along the Y-axis.

The machine control unit is installed on an electrical cabinet G connected to the machine by sheaths H long enough to allow free positioning (observing the machine minimum distances).

All the standard versions are equipped with:

- Electro spindle 15Hp HSK63 plug with rear deposit with 12 room

On request we have:

- one drilling unit with 12 vertical spindles C2 (8 in "X" direction, 5 in "Y" direction)
- 2+2 horizontal spindles in "X" direction
- 1+1 horizontal spindles in "Y" direction

In accordance with the specific requirements Author X5 is available in different lengths.

The working areas in "X" direction are:

- 3050 / 3200 / 3600 / 4400 / 5500 / 6700mm

The working area in "Y" direction is invariable: approx.1020mm for boring working and approx.1270mm for routing working.



NOTE. It is possible, on request, to have a single Nesting-type work table (optional): for information on this type of table see the relevant chapter.

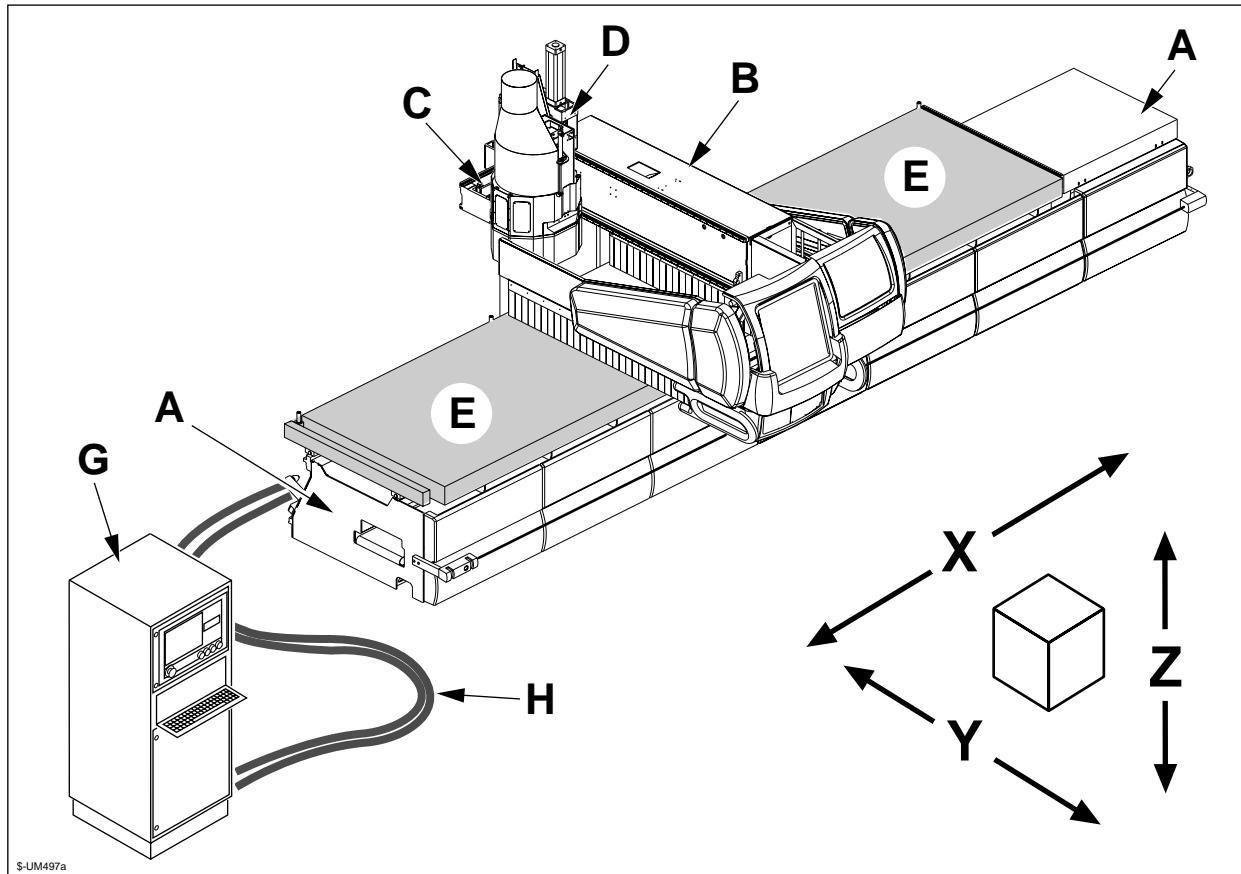


Fig. 1.2

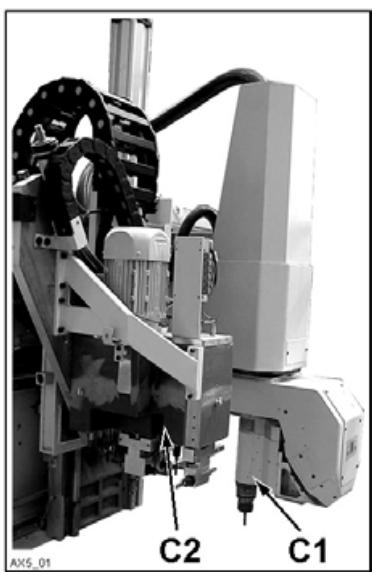


Fig. 1.3

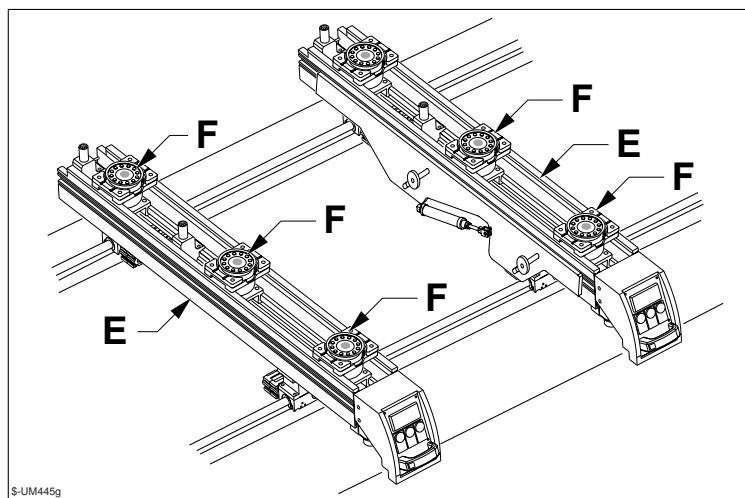


Fig. 1.3a

1.3.1 Description of the Electrical Cabinet

The electrical and electronic components are located in a stand-alone cabinet which may be placed in any desired location (at the minimum distance from the machine).

The machining cycle is controlled by a numeric control made to state-of-the-art technology so as to achieve high speeds, computing power and simultaneous performance of different functions.



NOTE: On the electrical cabinet there is a main switch (Fig.1.4) which operates on the power supply.



WARNING: BEFORE OPENING THE DOORS OF THE ELECTRICAL CABINET FOR ANY REASON, ALWAYS TURN THE MAIN SWITCH TO THE ZERO POSITION AND LOCK IT.
ALWAYS GIVE THE KEY TO THE ELECTRICAL CABINET TO THE HEAD OF MAINTENANCE.
ONLY SPECIALISED ELECTRICAL ENGINEERS MAY CARRY OUT WORK ON ELECTRICAL DEVICES.

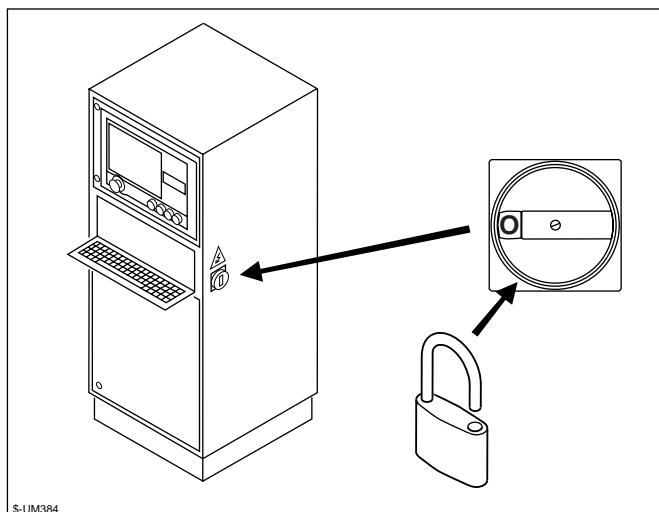


Fig. 1.4

1.4 Emergency Devices

The emergency devices allow you to bring the machine to an immediate stop when necessary and in the event of danger.



NOTE: Activating the emergency device will cut power (400V) to the machine, except for some devices powered at 24VDC, while the electrical equipment remains fully electrically powered.



WARNING: DO NOT REMOVE OR DISABLE SAFETY PROTECTION OR EMERGENCY DEVICES FOR ANY REASON.



PRECAUTION: IT IS EXTREMELY IMPORTANT TO REGULARLY CHECK THAT EMERGENCY DEVICES ARE WORKING PROPERLY ESPECIALLY IF THEY ARE NOT OFTEN ACTIVATED.

1.4.1 Emergency Devices on the Machine

The machine has an emergency cord-pull switch A1 (Fig.1.5):

- A pull of the cord is sufficient to activate the emergency switch.



WARNING: before restoring the machine and the CNC from emergency condition, verify that the cause for the emergency has been resolved.

To reset the machine after an emergency stop, proceed as follows:

- reset the microswitch by pulling push-button B1.
- reset the emergency condition by pressing push-button R for at least one second (until it comes on).



IMPORTANT: A CNC reset after an emergency immediately activates the machining unit return upstroke. Before resetting the CNC after an emergency, visually check that there are no tools inserted in the workpiece being machined or situations in which lifting the machining unit would lead to collisions with the workpiece or with machine parts.

To reset the CNC after an emergency stop, to press the function key F1 (Xilog) - F10 (Xilog Plus) (of keyboard).

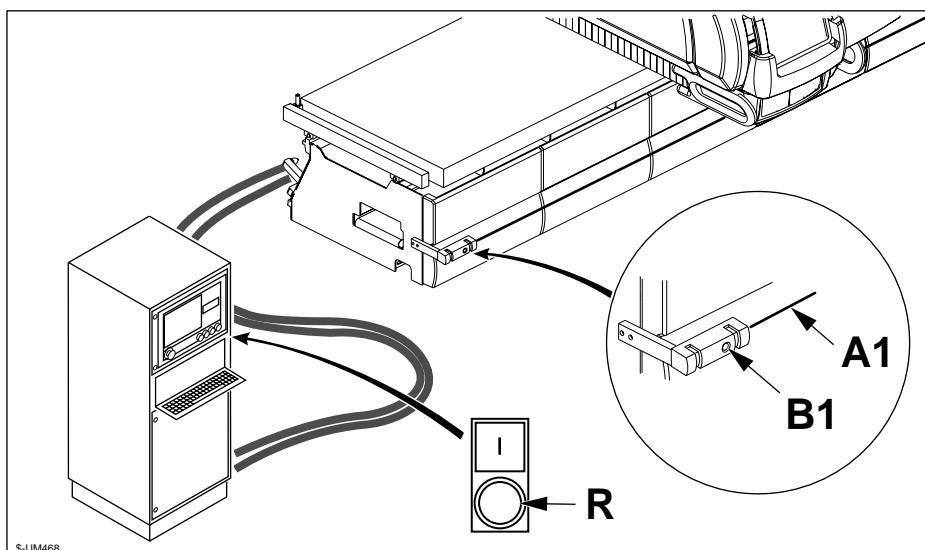


Fig. 1.5



CAUTION. With the single Nesting-type work table there is no emergency pull-cord. The emergency stop function is provided by mushroom-shaped pushbuttons fitted on the frontal section of the work table and/or on the control console. For further information on how the emergency pushbuttons work please see chapter 1.4.2.

1.4.2 Emergency Devices on the Electrical Cabinet

The electrical cabinet and mobile control panel have a mushroom-head emergency pushbutton V - V1 (Fig.1.8):

- To activate the emergency switch, press the pushbutton.



WARNING: When it is necessary to carry out checks or maintenance on the machine press the emergency pushbutton V or turn one selector S1 to .



WARNING: before restoring the machine and the CNC from emergency condition, verify that the cause for the emergency has been resolved.

To reset the machine after an emergency:

- reset push-button V by turning it and reset V1 by pulling it

- reset the emergency condition by pressing push-button R (Fig. 1.6) for at least one second (until it comes on).



IMPORTANT: A CNC reset after an emergency immediately activates the machining unit return upstroke. Before resetting the CNC after an emergency, visually check that there are no tools inserted in the workpiece being machined or situations in which lifting the machining unit would lead to collisions with the workpiece or with machine parts.

To reset the CNC after an emergency stop, to press the function key F1 (Xilog) - F10 (Xilog Plus) (of keyboard).

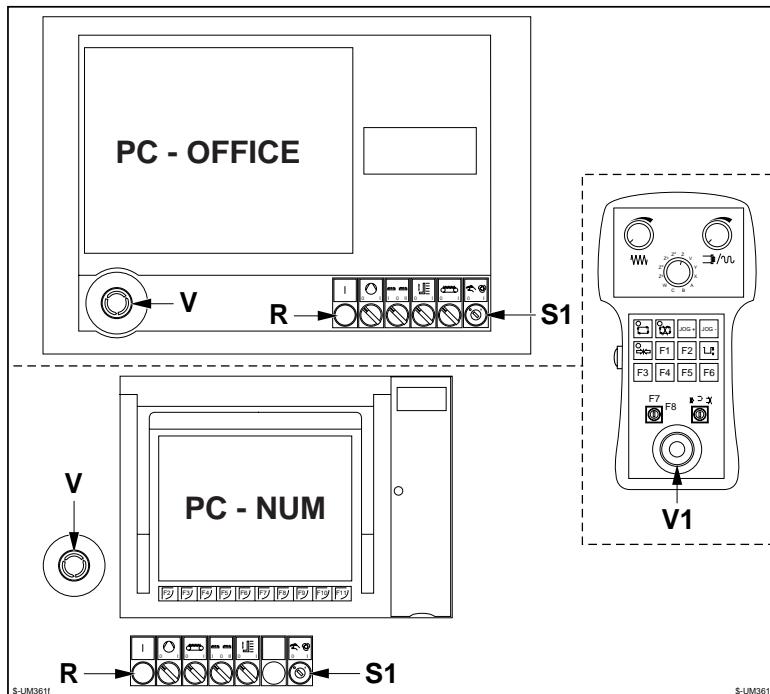


Fig. 1.8

1.5 Safety Devices

AUTHOR has been designed to offer the highest degree of safety.



WARNING: DO NOT REMOVE OR DISENABLE SAFETY PROTECTION OR EMERGENCY DEVICES FOR ANY REASON.



PRECAUTION: IT IS EXTREMELY IMPORTANT TO REGULARLY CHECK THAT SAFETY DEVICES ARE WORKING PROPERLY ESPECIALLY IF THEY ARE NOT OFTEN ACTIVATED.

1.5.1 Safety devices description

The machine is fitted with the following devices:

- Total guard A (fig.1.9) protecting the tool slide and the operating units so as to completely isolate the parts which move along the "Y" axis.
- High-absorption bumpers "B" mounted on the sides of the guard to guarantee the maximum safety in the event of a collision with an obstacle.
- Splinter containment barrier "C - D - H" to prevent the ejection of workpieces or tools, or parts of them.
- "S - S1" "setting" selector for operation under maximum safety conditions.



WARNING: DO NOT REMOVE OR DISABLE SAFETY PROTECTION OR EMERGENCY DEVICES FOR ANY REASON.



PRECAUTION: IT IS EXTREMELY IMPORTANT TO REGULARLY CHECK THAT SAFETY DEVICES ARE WORKING PROPERLY ESPECIALLY IF THEY ARE NOT OFTEN ACTIVATED.

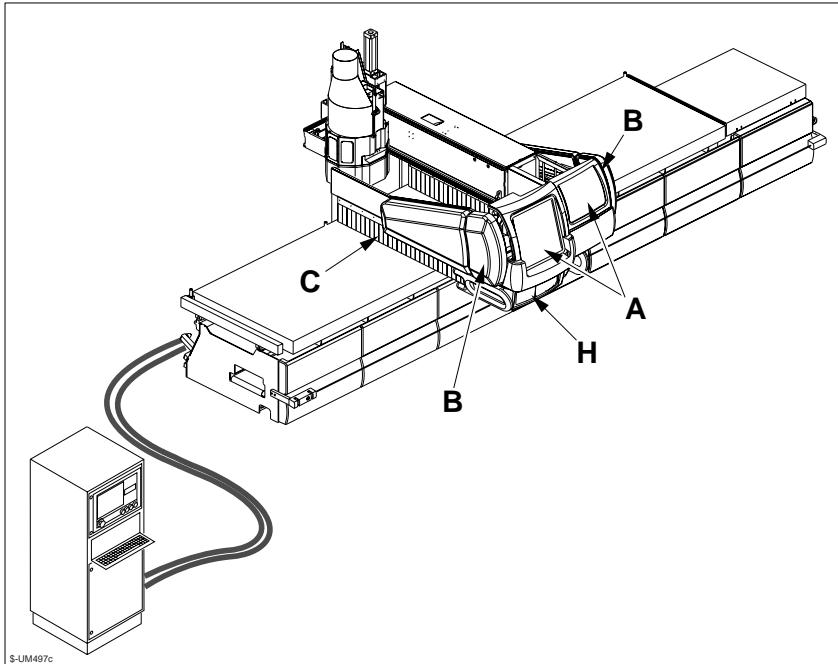


Fig. 1.9

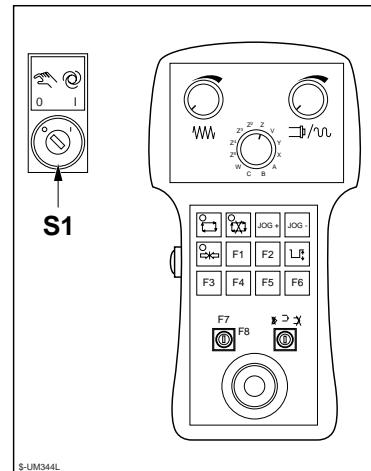


Fig. 1.9a

1.5.1.1 Machining unit cover

The cover A (Fig.1.10) protects the drilling head and all the other machining units.

On the front cover there is a door L, fitted with an inspection window, which can be opened to check the machining operations.

Behind the door is the protective device L1 which can be lowered using pin L2.

Under the cover there are oscillating barriers C in PVC which work alongside the panel being processed.



WARNING: Opening the door L activates the emergency state.

When one selector "S1" is set to position , opening door L and protective device L1 does not trigger the emergency alarm.

To reset the machine from the alarm condition you must:

- reset the microswitches by closing guard L1 and door L
- reset the emergency condition by pressing push-button R (Fig. 1.6) for at least one second (until it comes on).



IMPORTANT: A CNC reset after an emergency immediately activates the machining unit return upstroke. Before resetting the CNC after an emergency, visually check that there are no tools inserted in the workpiece being machined or situations in which lifting the machining unit would lead to collisions with the workpiece or with machine parts.

To reset the CNC after an emergency stop, to press the function key F1 (Xilog) - F10 (Xilog Plus) (of keyboard).

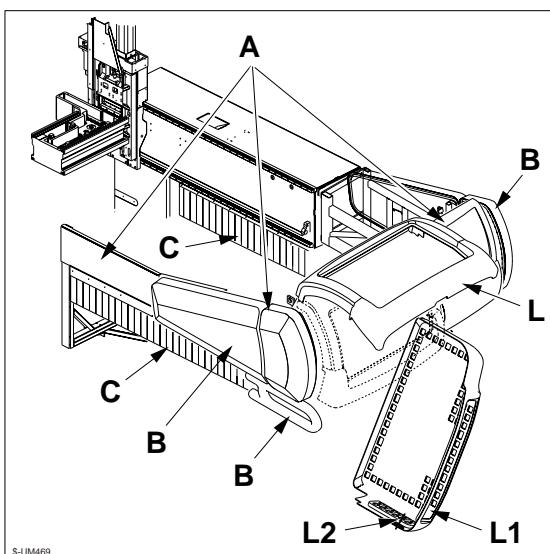


Fig. 1.10

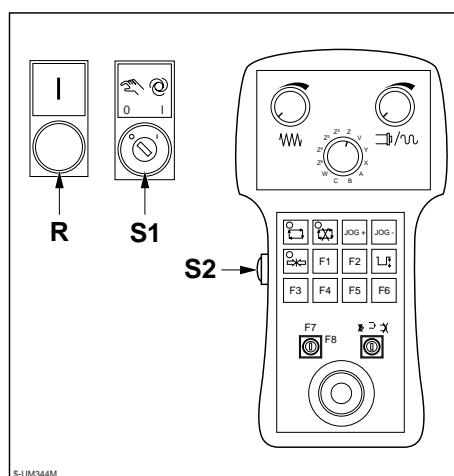


Fig. 1.10a

1.5.1.2 Bumpers

On the sides of the total guard there are safety bumpers B (Fig.1.10). When a person or object knocks the bumpers, the latter trigger an emergency condition which prevents accidents or damage caused by the collision.

To reset the machine after an emergency condition has been triggered, press pushbutton R .



IMPORTANT: A CNC reset after an emergency immediately activates the machining unit return upstroke. Before resetting the CNC after an emergency, visually check that there are no tools inserted in the workpiece being machined or situations in which lifting the machining unit would lead to collisions with the workpiece or with machine parts.

To reset the CNC after an emergency stop, to press the function key F1 (Xilog) - F10 (Xilog Plus) (of keyboard).



WARNING: DO NOT, UNDER ANY CIRCUMSTANCES ATTEMPT TO BYPASS THE EMERGENCY SAFETY DEVICES.

1.5.1.4 "SETTING" general protection mode

The electrical cabinet has a "mode" or "setting" switch S1 (Fig.1.13) which allows the user to operate in "adjust"  or "machining"  mode.



N.B.:

- In "adjustment" mode, tool rotation is off and axis movement is limited to 2m/min; more specifically:
 - To move the axes (in "manual" mode via the "+" and "-" keys or in MDI by confirming the command with the "cycle start" key) it is necessary to press and hold down key S2. If key S2 is released while an axis is moving the machine goes to emergency shutdown: to reset the emergency, press the white pushbutton R
 - In "adjustment" mode and with the CNC in the "automatic" state, at the start of machining the machine goes to the emergency state: press pushbutton R to reset the machine emergency and function key F1 of keyboard F1 (Xilog) - F10 (Xilog Plus) to reset the machining units and also the CNC
 - In "adjustment" mode and with the CNC in the "manual" state, all functions may be carried out except activation of all motors; if the operation is forced, attempting to start the motors from the MDI (Manual test) menu, the machine goes to the emergency state: to reset the emergency, press the white pushbutton R
 - In "adjustment" mode, opening the door on the operator unit does not activate an emergency.

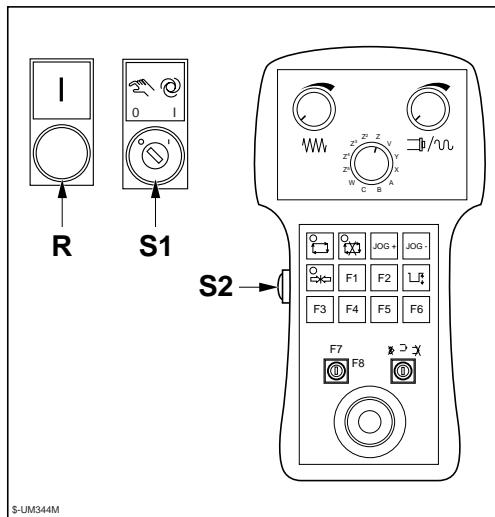


Fig. 1.13



WARNING: In case control operations, tool change, maintenance or other, should be performed in "SETTING" mode, it is compulsory to pull out the key (after turning the selector switch to ) so that nobody can inadvertently start the machine.

1.6 Technical Characteristics

1.6.1 General Technical Characteristics

GENERAL TECHNICAL SPECIFICATIONS – AUTHOR X5		
Work surface	mm	3050 x 1300
Work surface	mm	3200 x 1300
Work surface	mm	3600 x 1300
Work surface	mm	4400 x 1300
Work surface	mm	5500 x 1300
Work surface	mm	6700 x 1300
"X" – "Y" Axis stroke	mm	See chap. 1.8
"Z" Axis stroke	mm	400
Programmable speed in X-axis	m/min	40
Programmable speed in Y-axis	m/min	45
Programmable speed in Z-axis	m/min	22,5
Vector speed	m/min	60
Panel clearance (only routing)	mm	See chap. 1.9
Technical characteristics routing unit		See chap. 3.43.1
Technical characteristics boring unit (OPTIONAL)		See chap. 3.11.1
Total weight including electrical equipment (worktable 3050x1300)	Kg	3000
Total weight including electrical equipment (worktable 3200x1300)	Kg	3300
Total weight including electrical equipment (worktable 3600x1300)	Kg	3800
Total weight including electrical equipment (worktable 4400x1300)	Kg	5000
Total weight including electrical equipment (worktable 5500x1300)	Kg	5500
Total weight including electrical equipment (worktable 6700x1300)	Kg	6000
Sound power according to standards ISO / EN	DB	See table

AX5_161_3.0_GB

ELECTRIC TECHNICAL SPECIFICATIONS – AUTHOR X5		
Motor torque, X-axis	Nm	5,39
Motor torque, Y-axis	Nm	5,39
Motor torque, Z-axis	Nm	5,39
Motor power of 18 spindles drilling head	KW (Hp)	3 (4)
Electrospindle power	KW (Hp)	11 (15)
Standard power supply	V/Hz	400 / 50-60
Rated current in Amps	A	36

TECHNICAL SPECIFICATIONS air supply and extraction – AUTHOR X5		
Compressed air supply	Bar	7
Compressed air consumption	Nl/min	300
(A1) Diameter of electrospindle chip extraction hose	mm	250
Air consumption for suction (capacity - cubic meters/hour)	m ³ /h	5400
(A2) Diameter of boring head chip extraction hose (OPZIONALE)	mm	160
Air consumption for suction (capacity - cubic meters/hour)	m ³ /h	2200
Extraction air total consumption (rate – cubic metres / hour)	m ³ /h	7600
Air speed for suction	m/sec	30
Vacuum	Pascal	3000

CNC Boring and routing centre model: AUTHOR 600K		
Test report no. : CSR n. 98077 del 23/10/1998		
Operating conditions: BORING- ROUTING		
Reference standard: prEN 848-3E / UNI EN ISO 11202-97		
	Machining BORING	Machining ROUTING
Mean level of noise on measurement surface - dB (A)	83.4	89.7
Emitted noise level – dBw (A) [mW (A)]	101.2 [13.2]	107.5 [56.2]
Noise level at operator position - dB (A)	83	87.2

Tab_rum_A600K_gb

Fig.1.14

**NOTE:**

The noise values are emission levels and not necessarily safe working levels.

While there is a correlation between emission levels and exposure levels, this is not a reliable parameter for determining whether further precautions should be taken.

The factors which influence the real exposure of the operator include the duration of exposure, environmental features, other sources of emission, e.g. number of machines and other adjacent machining operations.

The exposure level regulations may vary from country to country.

This information should however make it possible for the machine user to make a better assessment of the hazards and risks involved.

Some factors which can reduce exposure to noise are:

- **correct choice of tool**
- **correct selection of speed**
- **tools and machine maintenance**
- **use of the enclosures and noise-proof guards provided**
- **correct use of hearing protection devices.**

1.7 Overall Dimensions

AUTHOR X5 - working table 3050x1300mm

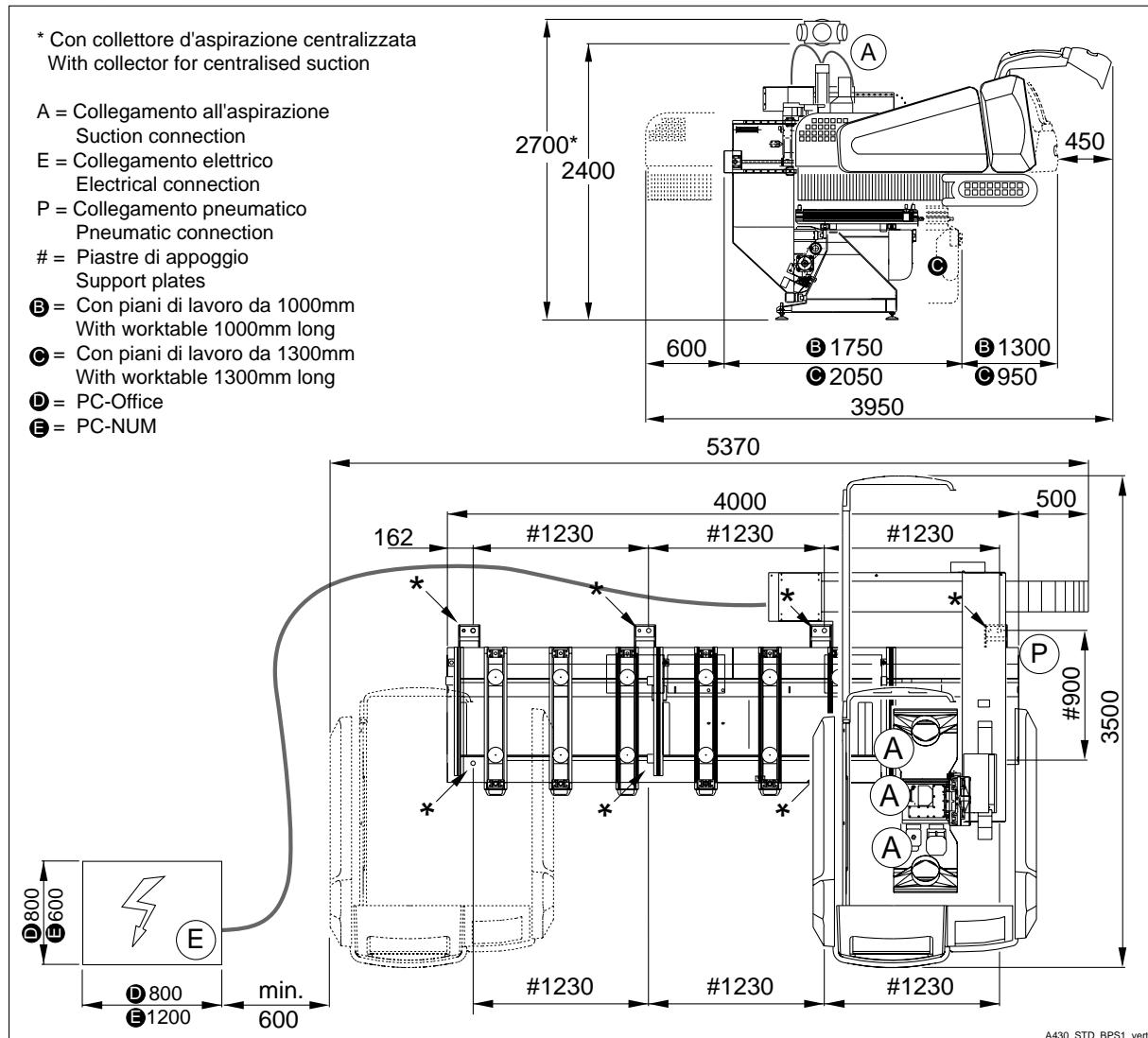


Fig. 1.15

1.8 Working Dimensions

The fig.1.16 shows the size of the work bench, sizes between the head chucks and minimum and maximum head positions with respect to the work bench.

AUTHOR X5

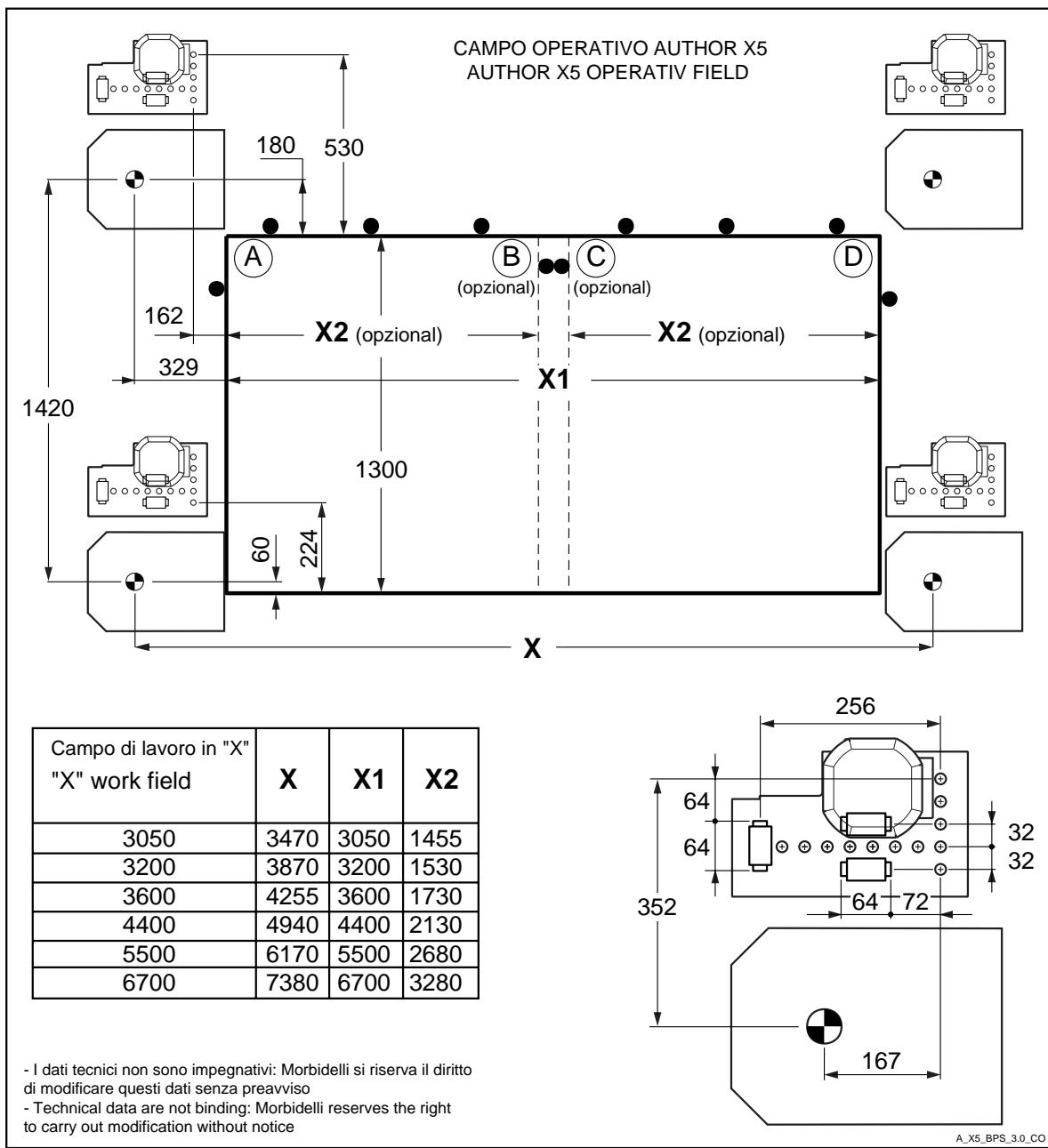


Fig. 1.16

1.9 Axis Stroke

Fig.1.17 shows the lengths of tool strokes and the distances between the main operator units and the standard work surface.

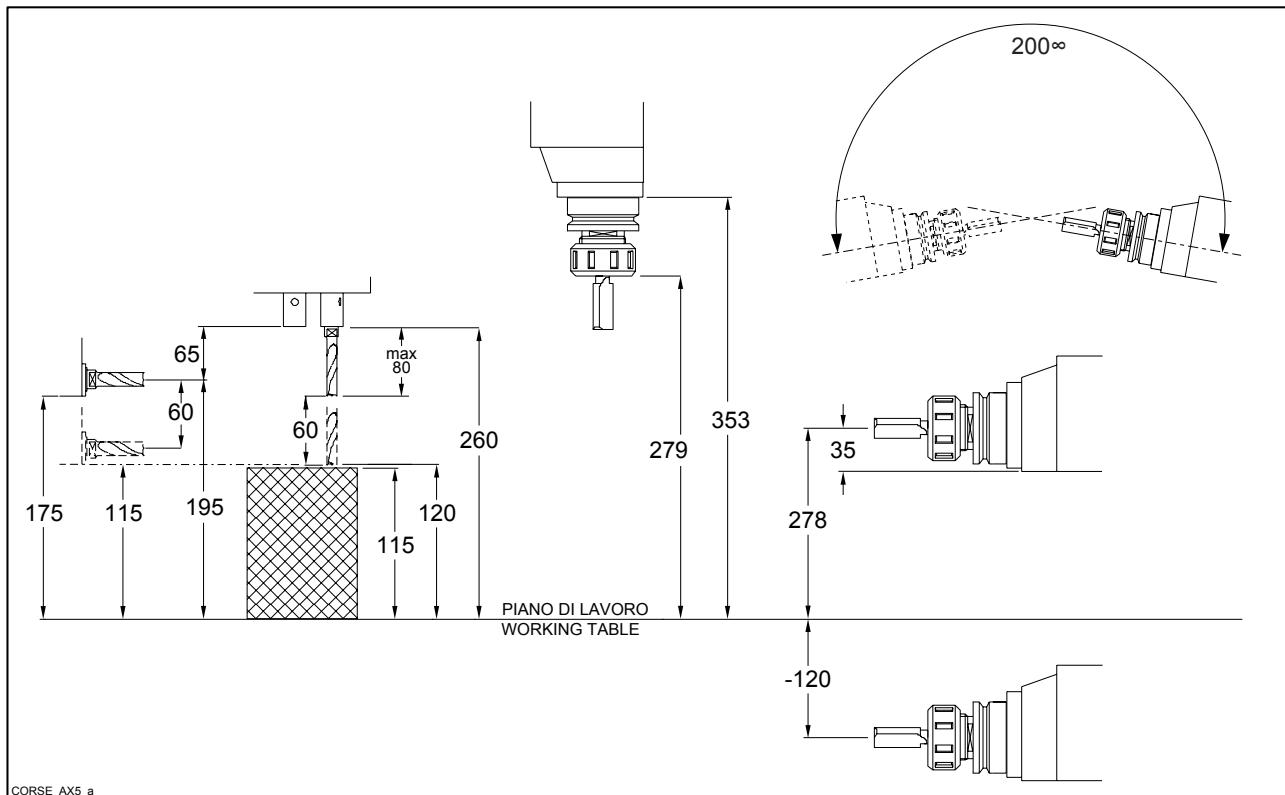


Fig. 1.17



NOTE: measures refer to fully uplifted "Z" axis

WARNING: for any possible risk of collision between the installed tools and the panel (during machining), see the notes in the specific chapters of tool installation (chap.3.)

Note

INDEX

2.1	Installing the Machine	2
2.2	Packing	3
2.2.1	Cleaning the machine on receipt.....	4
2.3	Handling.....	5
2.3.1	Moving the machine after installation	6
2.4	Positioning	7
2.5	Removing the securing blocks and brackets	8
2.6	Assembling the dismantled parts	11
2.6.2	Connecting up the Vacuum Pump.....	11
2.7	Levelling.....	12
2.7.1	Anchoring.....	13
2.8	Electrical Connections.....	14
2.9	Pneumatic Connections	16
2.10	Connections to the Chips Vacuum System	18
2.10.1	Connection to the centralised sawdust/shavings extractor (Optional).....	19

2.1 Installing the Machine



PRECAUTIONS

- Installation operations must be carried out by specialised Morbidelli technicians or personnel authorised by the manufacturer
- The machine must only be handled by qualified personnel



NOTE: Study the present use and maintenance manual before carrying out any operations on the machine



- Always check that the equipment to be used is in proper working order.
- Pay careful attention to adhesive labels (yellow=danger warning; blue=caution warning): they remind you how operations should be carried out, warn you of danger and prevent hazardous situations arising out of incorrect operations.



IMPORTANT: This machine must not operate in explosive environments.

The machine is designed for use indoors in industrial environments.

Operating conditions for the machine are as follows:

Humidity: 90% (max.)

Temperature: min. + 1°C (min) + 40°C (max.)

Altitude: 1500m asl (maximum; for higher altitudes, consult the manufacturer)

2.2 Packing

Foreword:

On MORBIDELLI machines all moving parts are locked and all dismantled parts are fixed to the machine body, to the pallet (if used) or packed separately (e.g.: perimeter fence).

The type of machine packaging depends on the model, the means of transport used and the destination:

- Heat-sealed covering canvas
- Pallet
- Crate

For instruction on cleaning off protective coatings, see section 2.2.1.

Unpacking:

- Support the cover A (Fig.2.1) as shown in detail A1
- Lift off the cover and then dismantle the sides (wooden cases and crates). Proceed gradually and carefully. Make sure the crate or case sides are adequately supported while you are removing the fixings which hold them together.
- Undo the four nuts C completely and release the base B.
- Lift the machine (refer to section 2.3) and remove the wooden base).
- Release all the parts to be assembled.

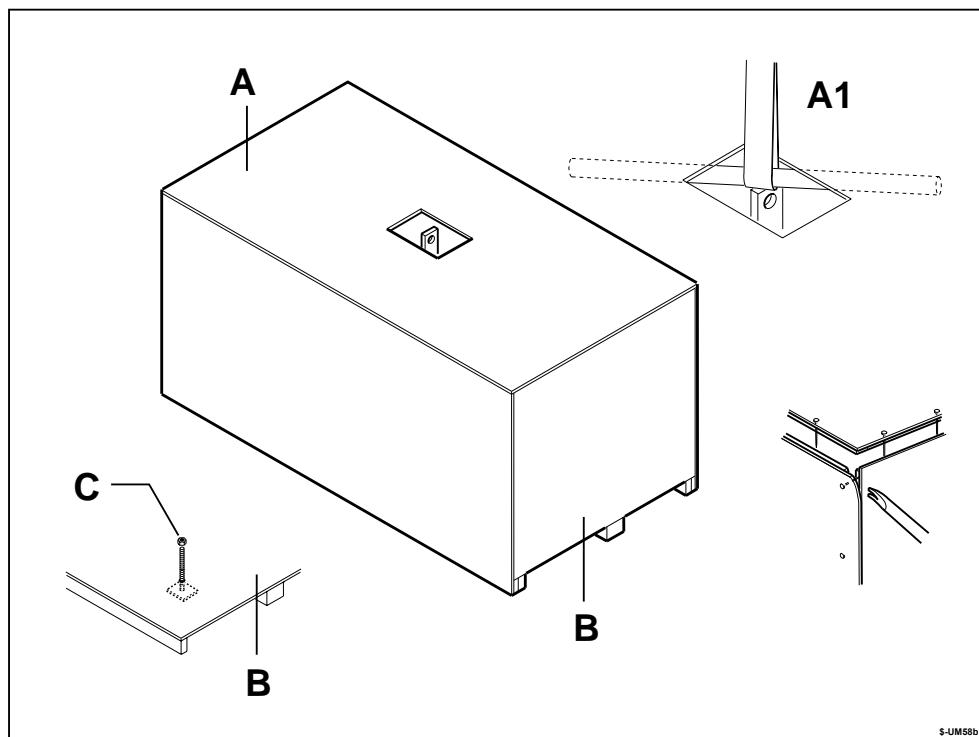


Fig. 2.1

2.2.1 Cleaning the machine on receipt

Before packaging, the machine is given a protective treatment using rust-proofing products. When the machine is unpacked, these products must be removed with the aid of suitable degreasers which do not damage metal and plastic parts on the machine. In particular, all sliding parts and machining units must be carefully cleaned.



Take special care to prevent liquids entering the motors.



*When you have completed cleaning, dry the parts with a clean cloth
a cloth dampened with neutral oil is suggested for the steel parts.*



IMPORTANT: Never use solvents, especially flammable types (benzene, diesel, kerosene, etc.).

2.3 Handling



The machine must only be handled by qualified personnel

Use a crane or gantry crane to handle the machine

To handle the machine, use a crane

ensuring that the capacity of the lifting means is greater than the weight of the machine.

The weight of the machine is indicated on the metal identification plate on the frame (see fig. 1a).

- Lift the machine only by the appropriate lifting brackets A (Fig.2.2) .

AUTHOR X5 - 3050/3200/3600/4400

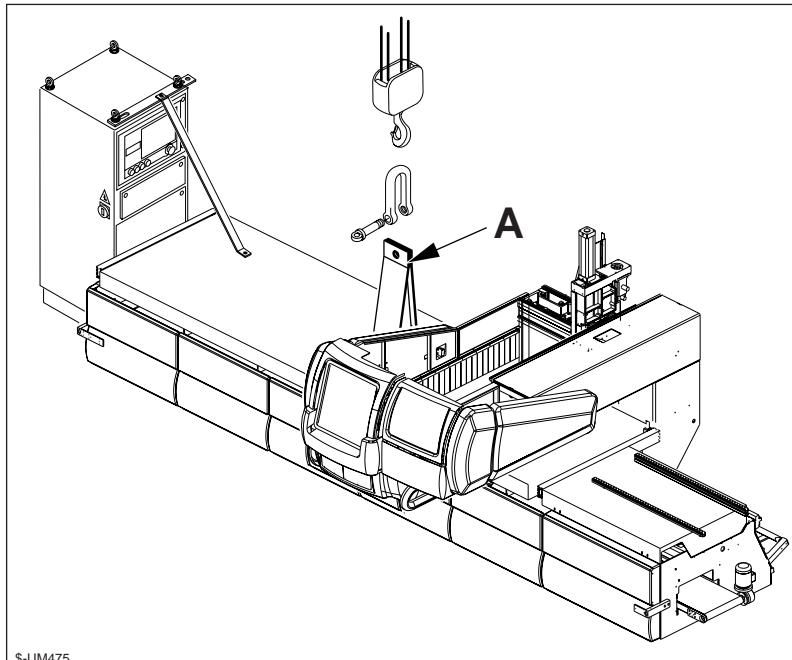


Fig. 2.2

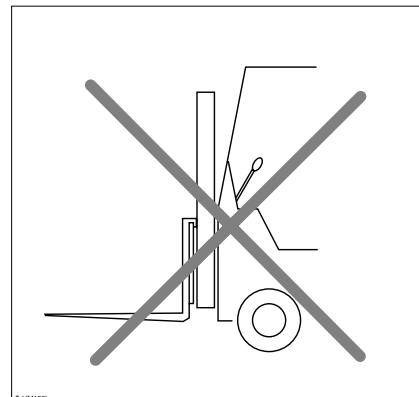


Fig. 2.2a



WARNING: It is forbidden to lift the machine with ropes, chains or forklift truck.

- When positioning the machine, avoid sudden, sharp movements.
- Check that the floor is solid, stable, flat and made of cement: other types of floors are not recommended



Ensure that the load-bearing capacity of the floor is greater than the weight of the machine



NOTE: For machines with a single Nesting-type work table please see the specific chapter.

AUTHOR X5 - 5500/6700

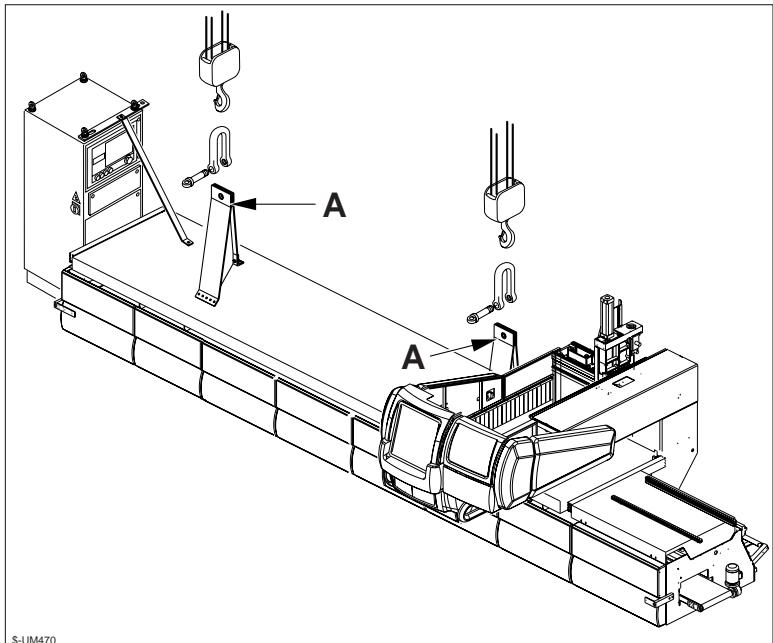


Fig. 2.2

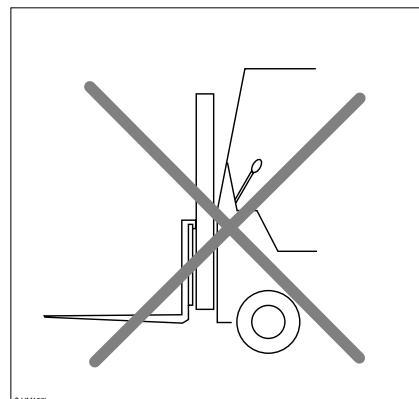


Fig. 2.2a

To move the machine without using hoisting equipment, position the special trolleys C (fig.2.3) at the points indicated in the diagram.

Check that lifting capacity of the trolleys is sufficient to take the weight of the machine.

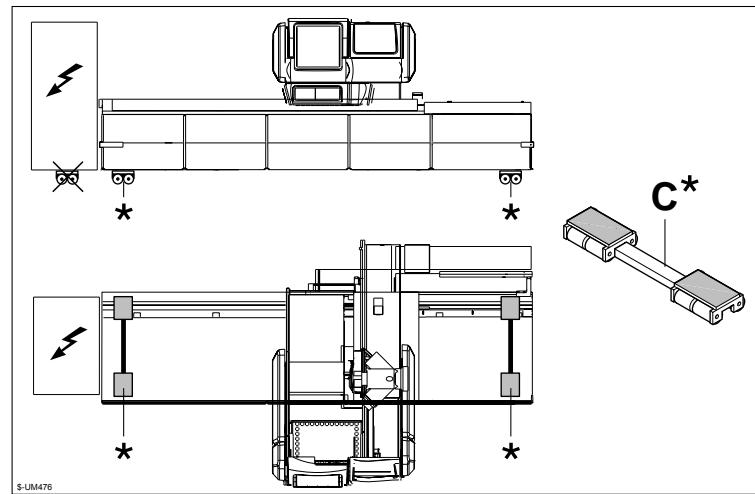


Fig. 2.3

2.3.1 Moving the machine after installation

To move the machine after it has been installed, follow the procedure described in section 2.4 in reverse. It is very important to secure the lifting bracket correctly.

2.4 Positioning

Place the machine in the best, well-aired and well-lit position (at least 300 Lux), which must be convenient for connection to the electrical, compressed air and chipping extraction systems. Leave enough space around the machine to allow easy maintenance.



PRECAUTIONS:

The ground has to be stable and must not transmit vibration of other machines.

The floor must support a load of 2500 kg/m² and an hardness of 250RBK. If this condition is not satisfied, a foundation must be prepared, see diagram in fig. 2.3.

Ensure that the weight of the machine is evenly distributed on the feet F (fig. 2.13).

INSTALLATION ON UPPER FLOORS ARE HIGHLY UNWARY: UPPER FLOORS ARE FLEXIBLE, THEY TRANSMIT AND AMPLIFY THE VIBRATION

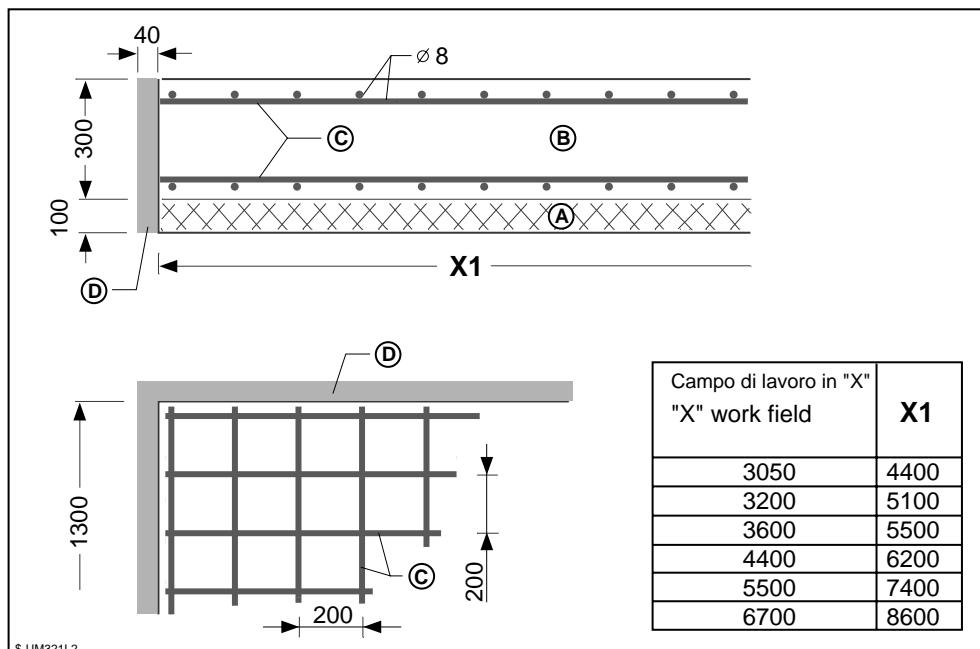


Fig. 2.3

A) Concrete 200 kg/m³

B) RBK250 concrete reinforced with FeB32K steel

C) Round for reinforced concrete FeB32K diameter 8mm or equivalent electric welding metal net

D) Polystyrene thickness 40mm or equivalent insulating material

To ensure maximum structural stability and stiffness, the machine must be anchored to the floor. Anchoring to the floor is also recommended to ensure that the machine remains level for a long time after installation. Next to the floor plates there are fixing holes for anchor bolts or expansion bolts.

2.5 Removing the securing blocks and brackets

For greater security during transport the electrical cabinet and the tool carriages are fastened to the machine body using blocks and brackets.

After positioning the machine on the work location, these blocks and brackets should be removed as follows:

- To support the electrical cabinet use rope or lifting chains connecting them to the eyebolts D (Fig.2.4).

- Remove the brackets B - C and position the electrical cabinet at the desired location.
- Remove the securing brackets A - E - F

AUTHOR X5 - 3050/3200/3600/4400

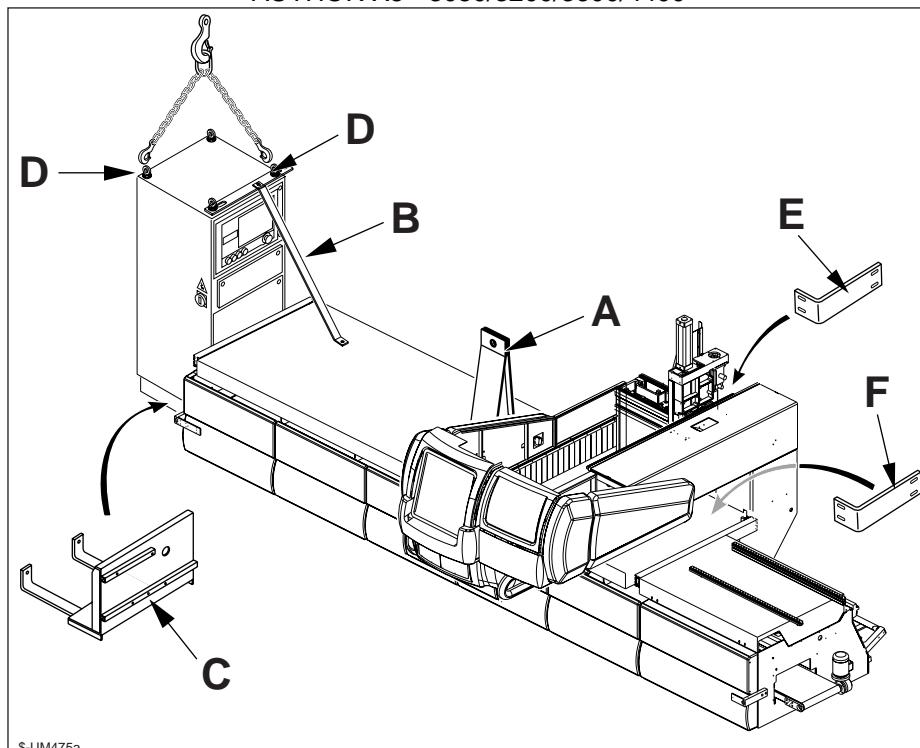


Fig. 2.4

AUTHOR X5 - 5500/6700

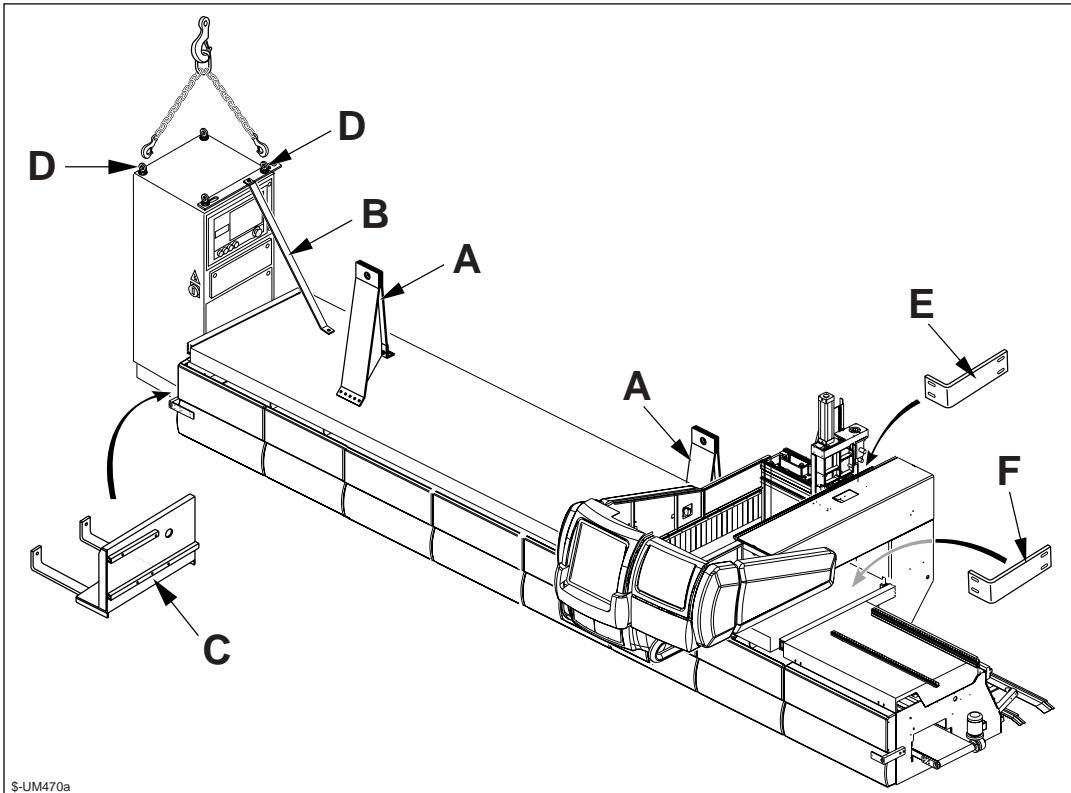


Fig. 2.4a



Check that all securing blocks, marked by the plate in figure 2.5, have been removed

Check that all securing blocks have been removed by pushing the bore unit by hand in the X and Y directions.

TOGLIERE PRIMA DI METTERE IN FUNZIONE LA MACCHINA TO TAKE OUT BEFORE PUT THE MACHINE INTO FUNCTION

Fig. 2.5



Do not start up the machine before carrying out this operation.

Note

2.6 Assembling the dismantled parts

2.6.2 Connecting up the Vacuum Pump

To prevent even the smallest vibrations on the machine, the vacuum pump is supplied separately. To connect up the vacuum pump, proceed as follows:

- Place the vacuum pump at the back of the machine (Fig.2.11e).
- Connect up the hose C and fix it in position with the clips provided.
- Connect the connector A and lock it in position with the clip B.

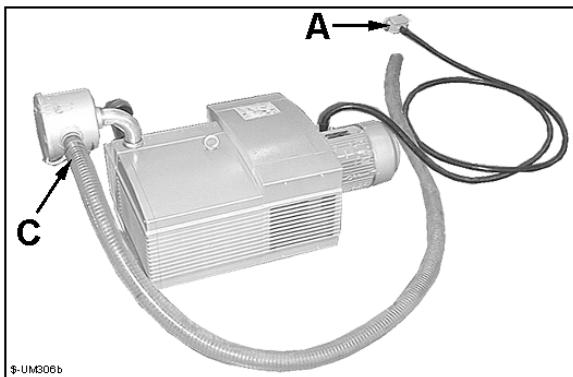


Fig. 2.11e

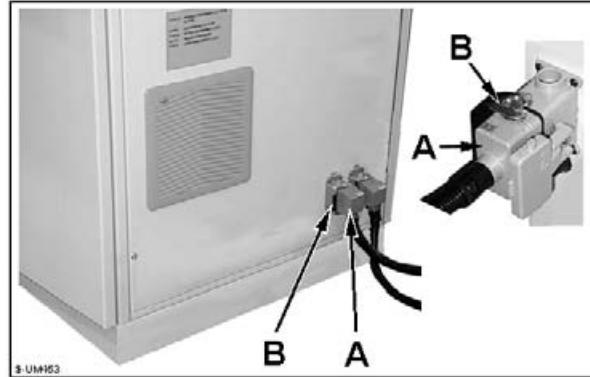


Fig. 2.11f

2.7 Levelling

For correct levelling, use:

- a precision level
- a perfectly straight and smooth levelling bar at least 700mm long
- a 16 mm open-ended spanner
- a 30 mm open-ended spanner

Place the bar B across the X-axis drive guides C and place level A (fig.2.12) on the bar B. To adjust the level, operate on the nuts D (fig.2.13) and, after adjusting tighten the nuts E.

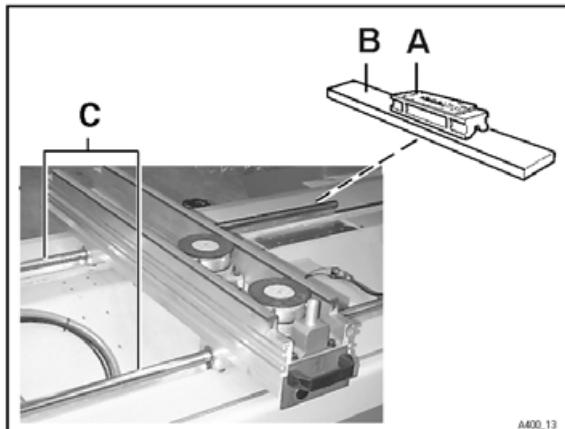


Fig. 2.12

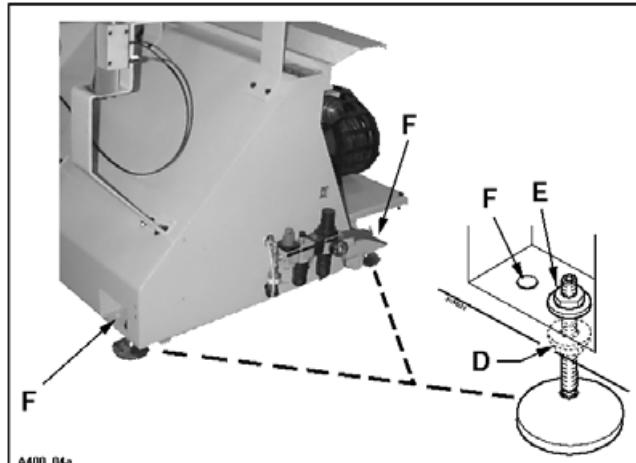
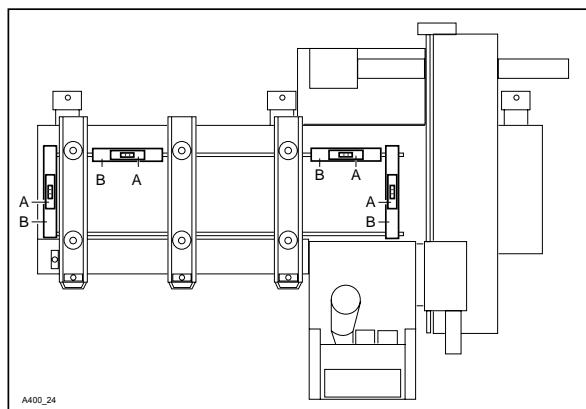


Fig. 2.13



NOTE: perfect levelling is obtained by trial and error, moving the levelling bar across and lengthways.



NOTE: The maximum difference in level along the X-axis is 0.1mm/m
The maximum difference in level along the Y-axis is 0.1mm/m

To maintain constant precision during machining, the manufacturer recommends that you carry out a periodic (at least annual) control of machine levelling and, if necessary, perform levelling again.

2.7.1 Anchoring

To ensure maximum structural stability and stiffness, the machine must be anchored to the floor. Anchoring to the floor is also recommended to ensure that the machine remains level for a long time after installation. Next to the floor plates there are fixing holes "F" for anchor bolts or expansion bolts.

2.8 Electrical Connections

IMPORTANT:

- **The machine must only be connected up by a qualified electrician.**
- **Check that the voltage of your mains power supply matches that of the machine +/-10% [V400 (V360 <-> V440) 50/60Hz]**
- **Check that your electrical line equipment is suitable for machine power supply requirements (refer to Table in Fig.2.14)**

AMPERE ASSORBITI ELECTRICAL INPUT (AMPERE) AMPERES ABSORBES STROMAUFNAHME (AMPERE) AMPERE ABSORBIDOS ΑΜΠΕΡΕ ΑΠΟΡΡΟΦΗΣΤΑ	SEZIONE CAVI CABLE SECTION SECTION CABLE KABELQUERSCHNITT SECCION CABLES ΙΑΤΟΜΗ ΚΑΛΩΔΙΩΝ	FUSIBILI AM AM FUSE FUSIBLE AM SICHERUNGEN FUSIBLES AM ΑΣΦΑΛΕΙΕΣ (ΕΥΘΚΤΑ) AM
A	mm ²	A AM
---> 10	2,5	12
10 ---> 14	4,0	16
14 ---> 18	6,0	20
18 ---> 22	6,0	25
22 ---> 28	10,0	32
28 ---> 36	10,0	40
36 ---> 46	16,0	50
46 ---> 54	16,0	63
54 ---> 76	25,0	80
76 ---> 92	35,0	100
92 ---> 110	50,0	125

S-UM202

Fig. 2.14

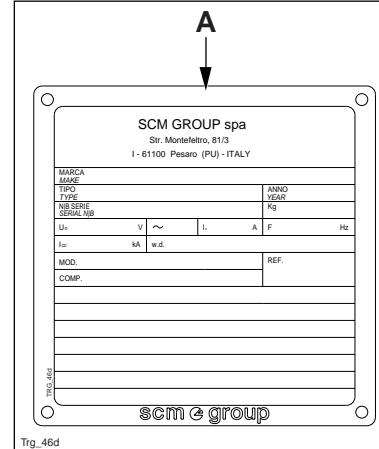


Fig. 2.15



NOTE: The table in Fig.2.14 applies to cables up to 100m long connecting the main line directly to the electrical cabinet.

Voltage (Volt) and current (I=ampere) are marked on the rating plate A (Fig.2.15)

If the power supply is connected through a transformer, refer to the rating plate of the transformer.



NOTE: Fit a safety device upstream of the machine in conformity with the wiring diagram specifications: a circuit breaker or delayed fuse, as indicated in the attached table.

Fit a cut-out switch upstream of the machine, in conformity with the laws and standards in force in the country in which the machine is used. The switch must be tripped at 300 mA, co-ordinating with the facility earth circuit.



NOTE: if the customer runs the electrical power down from above, do not pass the power leads close to the monitor and PC.

Do not use the electrical cabinet supply walls as a support for fixing power leads.

Connect the machine to your mains power supply as follows:

- Turn the main switch B (fig.2.16).
- Using the key supplied C, open the door of the electrical cabinet.
- Feed the power supply cable through the hole F.
- Connect the three wires of the power supply cable to the terminals D.
- Connect the neutral wire to terminal N
- Connect the yellow-green earth cable to the terminal E.
- Start the machine (see section 4.3.1) and check the direction of rotation of spindle no.1. The spindle must rotate in a clockwise direction. Alternatively check the direction of rotation of the vacuum pump (If already installed).
(The thread direction of the tool mounted on the machine defines the rotation direction of the spindle: right thread = right spindle rotation; left thread = left spindle rotation.)
- If the spindle or the pump do not rotate in the correct direction, invert two of the three wires on the terminals D.

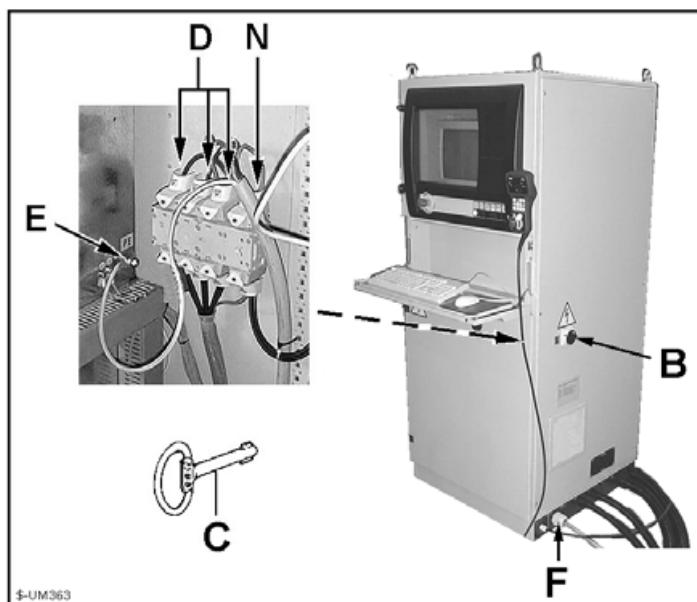


Fig. 2.16



NOTE: Check if the following electric connections have been made:

- **pedal control keyboards (cap. 2.6.2)**
- **vacuum pump (chap.2.6.3)**

2.9 Pneumatic Connections

**IMPORTANT:**

Make sure that:

- **the compressed air supply equipment is free from condensation and deposits (emulsified oil, scaling).**
- **the compressed air supply pressure is at least 6 bar.**
- **that the hoses and piping of the compressed air secondary distribution network have a diameter of 3/4" gas (approx. 27 mm).**

Pneumatic connections should be made as follows:

- Connect the air hose A (Fig.2.17) to the 14 mm diam. connector B of the filter unit.
- Fix the hose in place using a Jubilee clip C.
- To adjust the compressed air pressure, lift and rotate the knob D to obtain the setting required. Read off the air pressure on the pressure gauge E. The recommended working pressure for this machine is 6/7 bar.
- Press down the knob D to lock it in position.

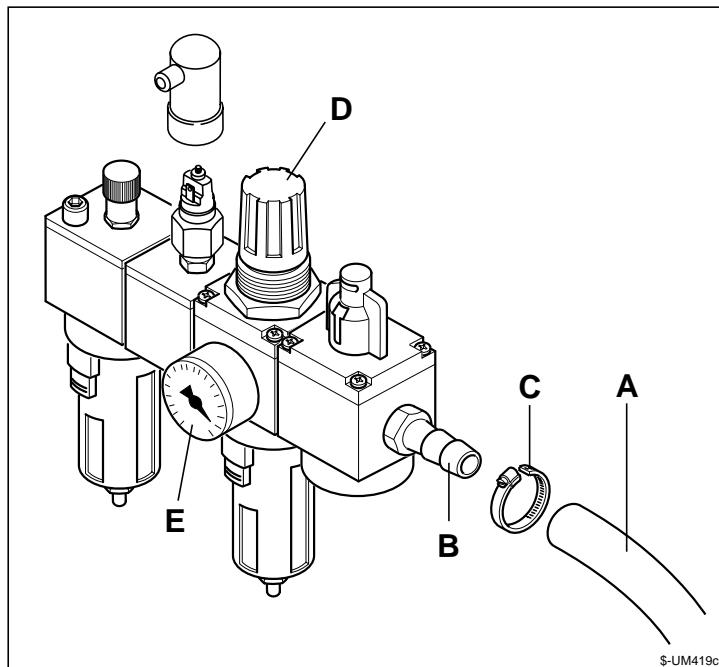


Fig. 2.17

To charge/discharge the compressed air circuit, proceed as follows:

METALWORK FILTER UNITS:

- Press the pushbutton F (fig.2.18) down fully to switch on the compressed air supply to the machine.
- Press the knob H to switch off the compressed air supply and to discharge the air from the machine circuit; the knob can be locked in this position using a padlock.

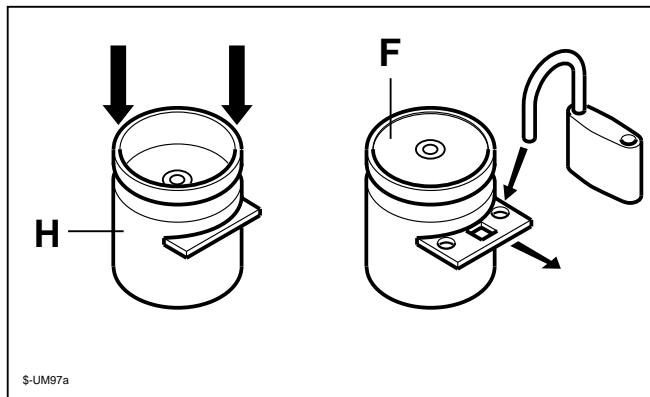


Fig. 2.18

PNEUMAX FILTER UNITS:

- Press the knob L (Fig.2.19) down fully and rotate to switch on the compressed air supply to the machine.
- To switch off the compressed air supply and discharge the air from the machine circuit, turn the knob L; the knob can be padlocked in this position.

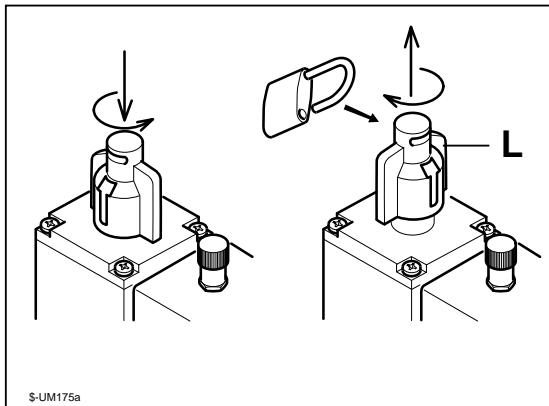


Fig. 2.19

2.10 Connections to the Chips Vacuum System



IMPORTANT:

Make sure that the vacuum system has the following characteristics:

- air speed for suction = 30m/s
- air consumption for suction (capacity - cubic meters/hour) = 5400m³/h
- vacuum = 3000Pa

Insert the flexible tubes of the suctions in the driving rings A (Fig 2.20) and link them to the operating groups:

- Electro spindle: connect a hose 250mm in diameter from the vacuum system to the manifold B (Fig.2.20) and fix it in place with a Jubilee clip.
- Boring head (Optional): connect a hose 160mm in diameter from the vacuum system to the manifold C (Fig.2.20a) and fix it in place with a Jubilee clip.

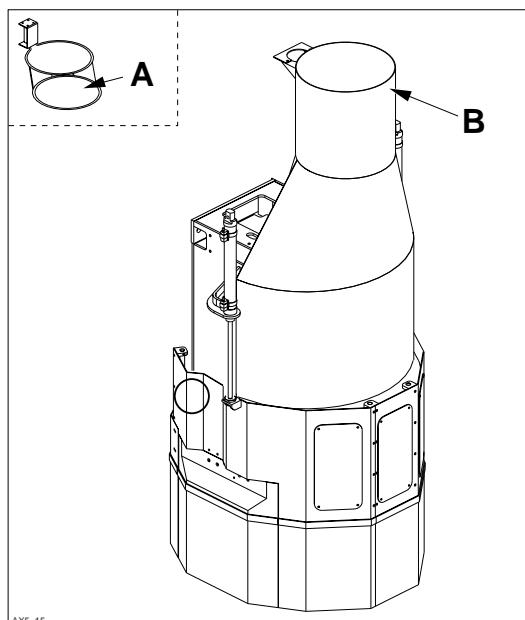


Fig. 2.20

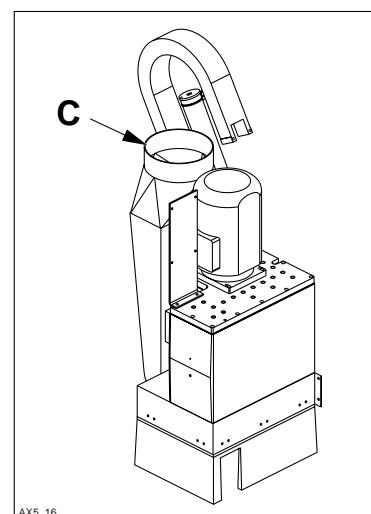


Fig. 2.20a



IMPORTANT: Ensure that there are no kinks or sharp bends in the extractor hose. Sharp bends will cause a build up of wood shavings in the bend and restrict the extraction flow (See Fig.2.21)

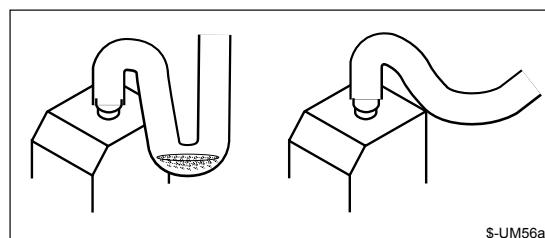


Fig. 2.21

2.10.1 Connection to the centralised sawdust/shavings extractor (Optional)

The centralised suction device requires a flexible tube of 250 mm diameter to connect it to the main waste extraction system.



IMPORTANT:

Make sure that the vacuum system has the following characteristics:

- air speed for suction = 30m/s
- air consumption for suction = 5400m³/h
- vacuum = 3000Pa

Connect a hose 250mm in diameter from the vacuum system to the manifold B (Fig.2.22) and fix it in place with a Jubilee clip.



IMPORTANT: *Ensure that there are no kinks or sharp bends in the extractor hose. Sharp bends will cause a build up of wood shavings in the bend and restrict the extraction flow (See Fig.2.21)*

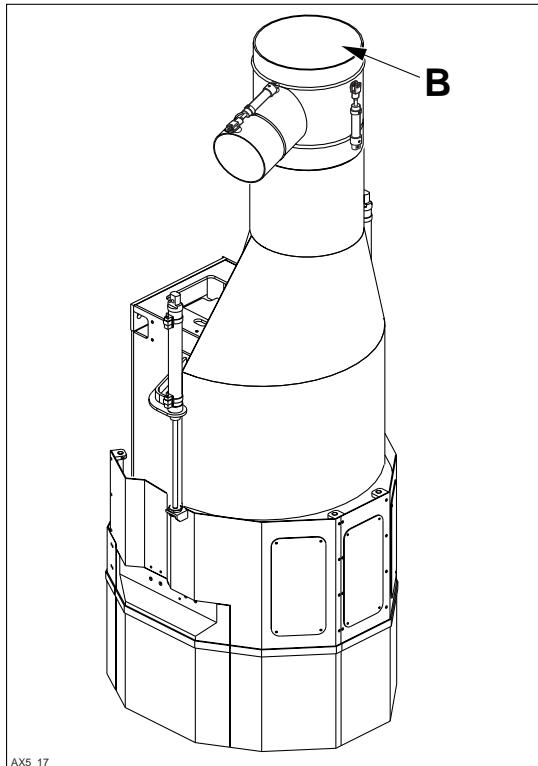


Fig. 2.20

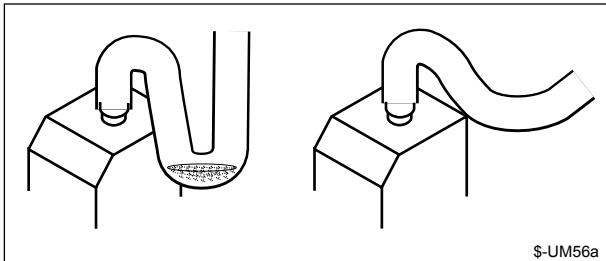


Fig. 2.21

INDEX

3.1	Preparing the Machine	2
3.2	Fitting the Tools	2
3.3	Panel Support Surfaces	3
3.3.1	Adjusting Panel Support Surfaces.....	3
3.3.1.1	Work table configurations	4
3.3.1.2	Positioning - removing the central stop bars.....	7
3.3.2	Adjusting the Work Surface Suction Heads	9
3.3.3	Loading aids.....	10
3.4	Workpiece Gripping Devices.....	11
3.4.1	Spacers for Profiling or for Working Small Pieces.....	11
3.4.2	Devices for holding small workpieces.....	12

3.1 Preparing the Machine

**WARNING:**

- During the machine adjustment and equipping phase, ensure that the machine is on emergency status (press the red mushroom-top button on the control panel) or in "setting" mode (rotate the setting selector on and pull out the key).
- All the operations described in this section must be performed by the machine operator.

3.2 Fitting the Tools

**WARNING:**

- During the machine adjustment and equipping phase, ensure that the machine is on emergency status (press the red mushroom-top button on the control panel) or in "setting" mode (rotate the setting selector on and pull out the key).
- All the operations described in this section must be performed by the machine operator.

**CAUTION!**

- Utilizzare solo utensili in accordo con le normative vigenti nello stato dove viene utilizzata la macchina



- Do not use cracked, bent or blunt tools.

- Do not use tools at speeds higher than the manufacturer's recommended limits.

- Handle tools carefully. To avoid damaging the cutting edges, do not place them on metal surfaces. Use protective gloves to handle cutting edges.

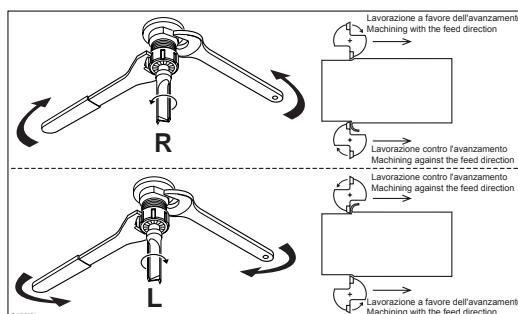
- Store tools in an ordered manner in purpose-designed drawers or cabinets. Tools must not accessible to unauthorised personnel.

- Before you fit a tool in its seat, check that all surfaces are clean and free from marks or dents.



Check that the tool direction of rotation/machining is compatible with the locking system (ring nuts or screws); a tool which rotates to the right requires a ring nut or screw with right-hand thread.

Figure shows how to correctly tighten a tool on the spindle and the correct direction of feed relative to tool rotation.



3.3 Panel Support Surfaces

You may adjust the panel support surface (surfaces A, Fig.3.9) and holding surfaces (suction heads B) according to the size of the panel to be worked.



The larger the surface operating on the panel, the more firmly the panel is held.

3.3.1 Adjusting Panel Support Surfaces

To move the support surfaces A (Fig.3.9), proceed as follows:

- Grip the handle, press pushbutton C and slide the surface A on its guides.
- Release the pushbutton to stop the surface in the desired position.

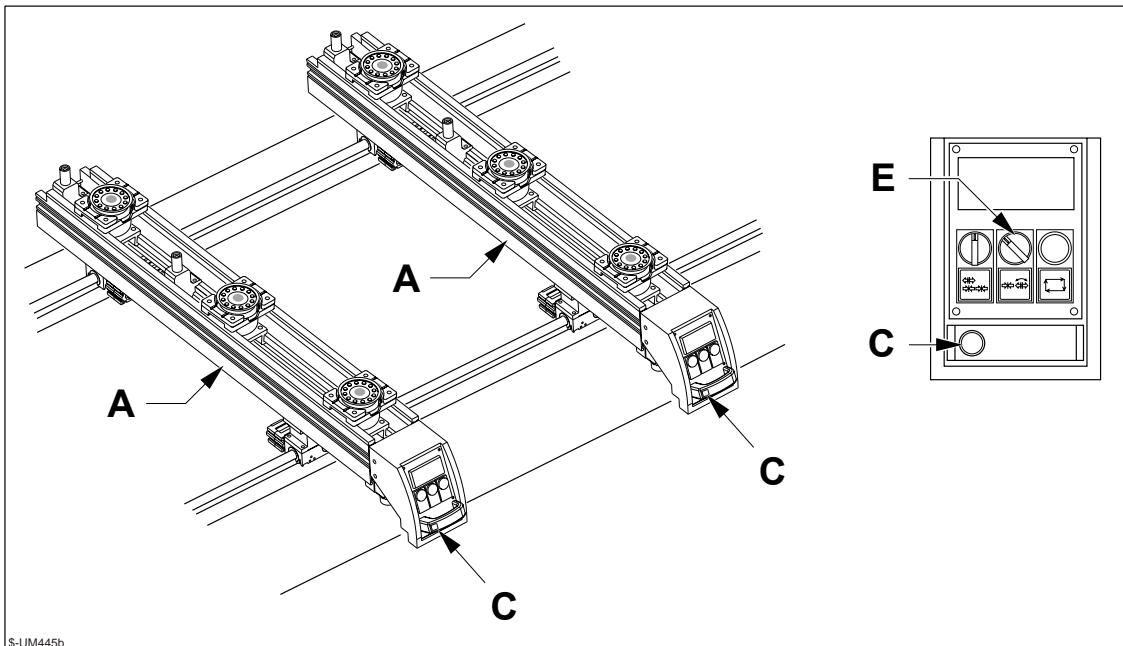


Fig. 3.9

3.3.1.1 Work table configurations

Thanks to the special blocking system for the centre stop holder bars, the work table can be configured to be optimised for machining needs.

There are three configuration possibilities based on the panel dimensions or on the machining method:

1) close double centre zero reference to use fields A - C or B - D to the maximum (fig. 3.8e)

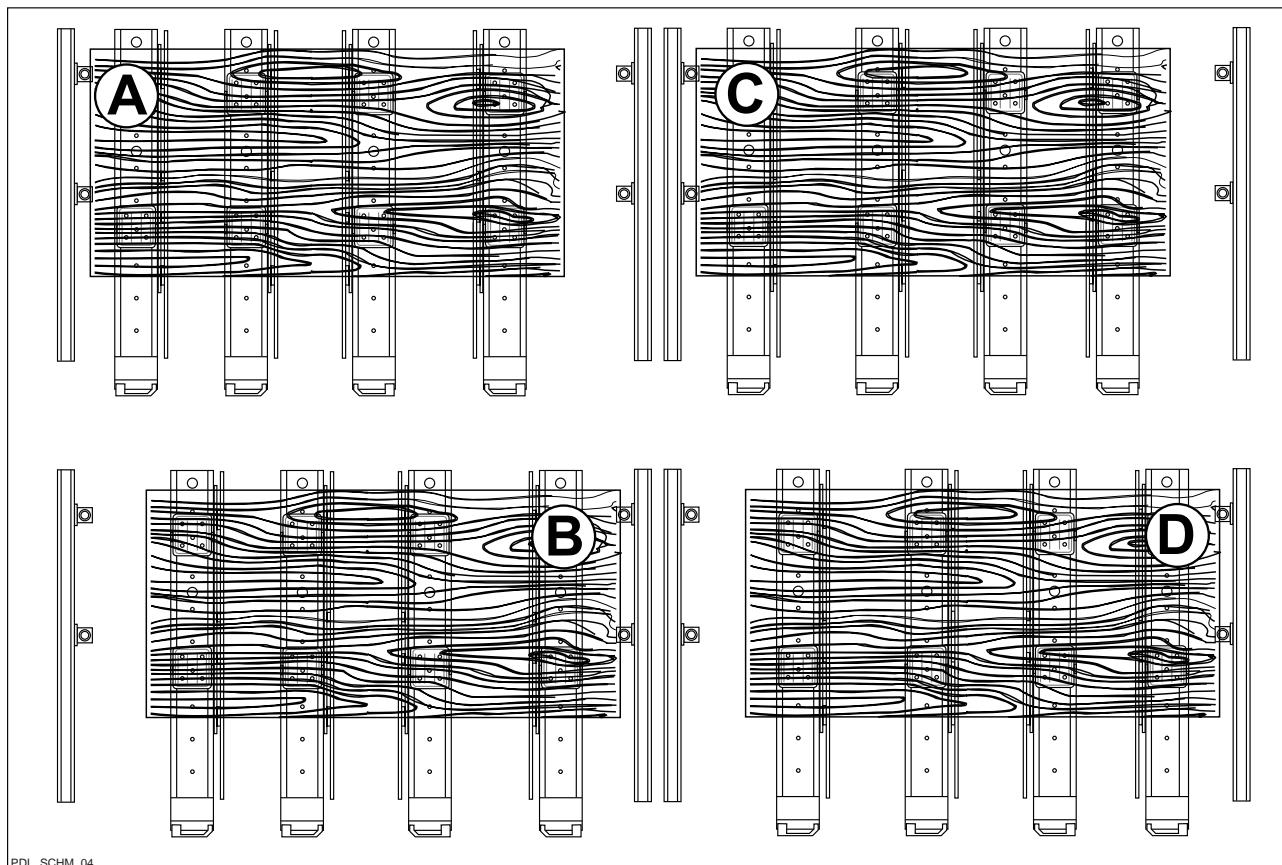
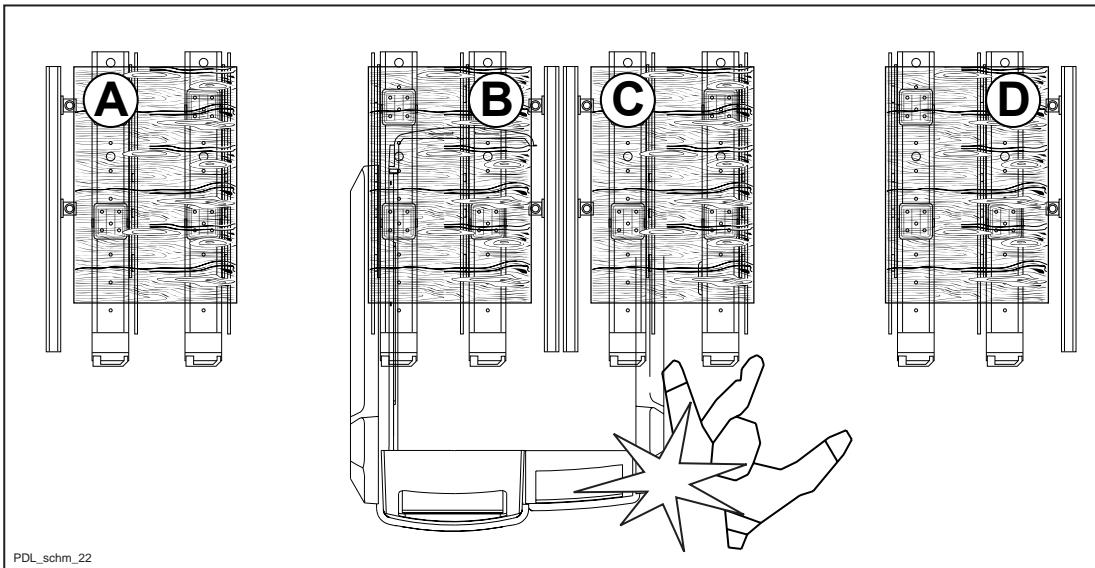


Fig. 3.8e



Proceed with caution when loading panels on fields B or C : if the machine is machining on the adjacent field it may enter the area where the panel is being loaded.



2) exclusion of the centre double zero reference to better use the work area (fig. 3.8f)

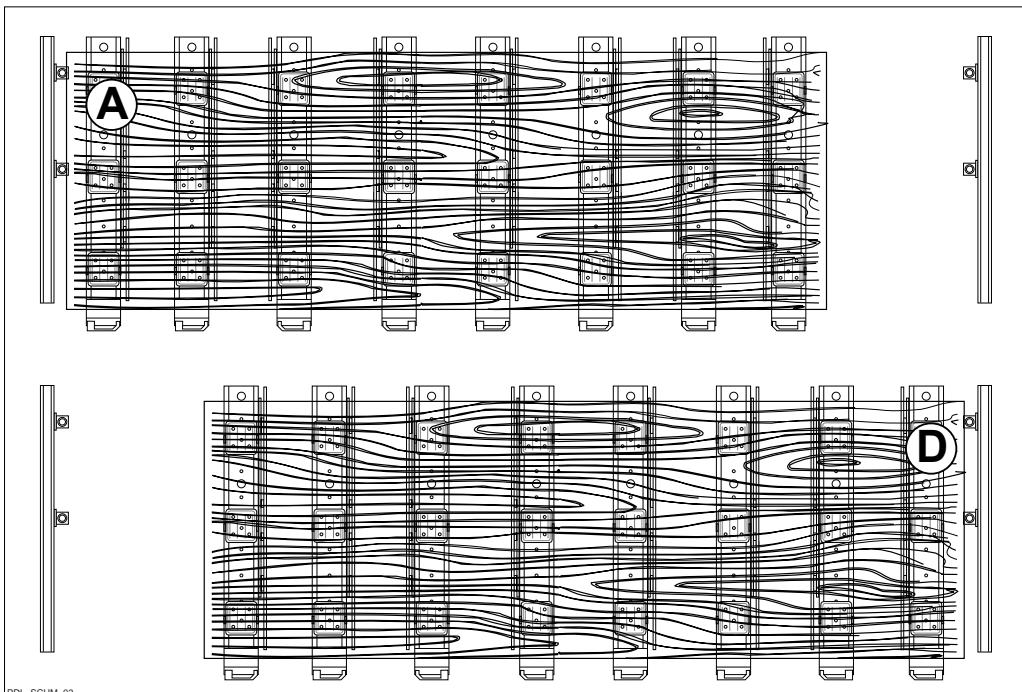


Fig. 3.8f

3) spaced double zero central reference so as to work on fields B (face 2) - C (face 3) with horizontal heads (fig. 3.8g)

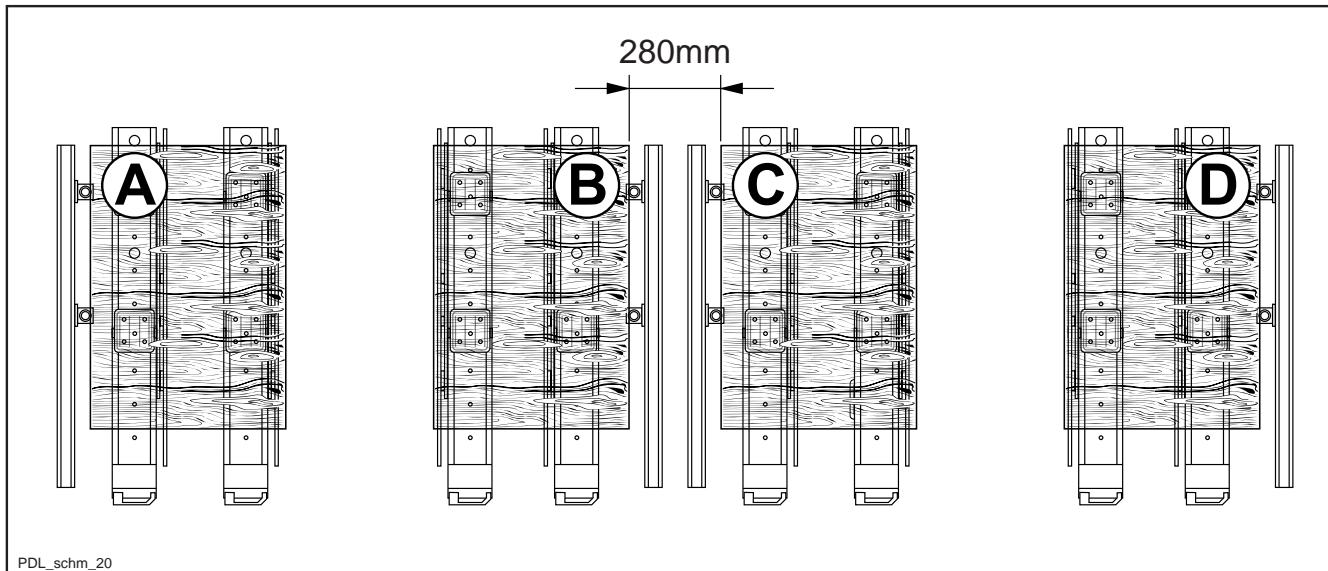


Fig. 3.8g

3.3.1.2 Positioning - removing the central stop bars

The device described below is of the mobile, removable* type (optional)



***NOTE: The removal option is impossible if the bars are mounted on prismatic guides**

To remove/position the centre stop bars:

- loosen knob B (Fig. 3.8h)
- to remove, simply extract the bars
- to position, remove the bars then loosen the screws with the washers C to free the positioning slots below
- tighten the screws with washers C in the threaded holes D to close the slots below and prevent positioning errors
- carry out positioning by inserting the dowels E in the slots and locking with the knobs B.

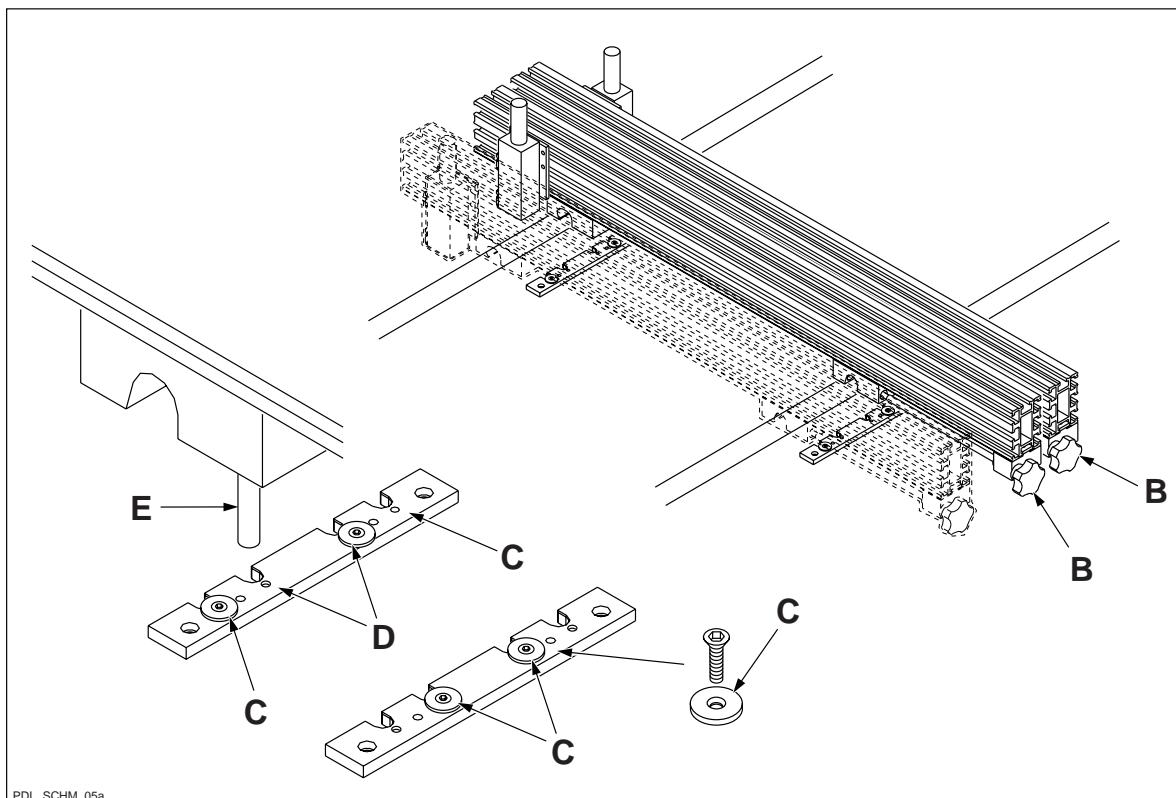


Fig. 3.8h



After this operation, in the program HEADER insert the value indicated on plate G (Fig. 3.8h) in field "BX" (fig. 3.8m)

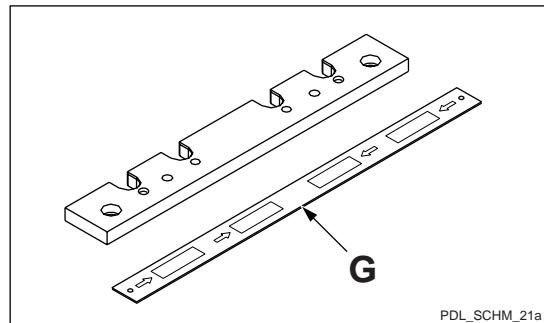


Fig. 3.8i

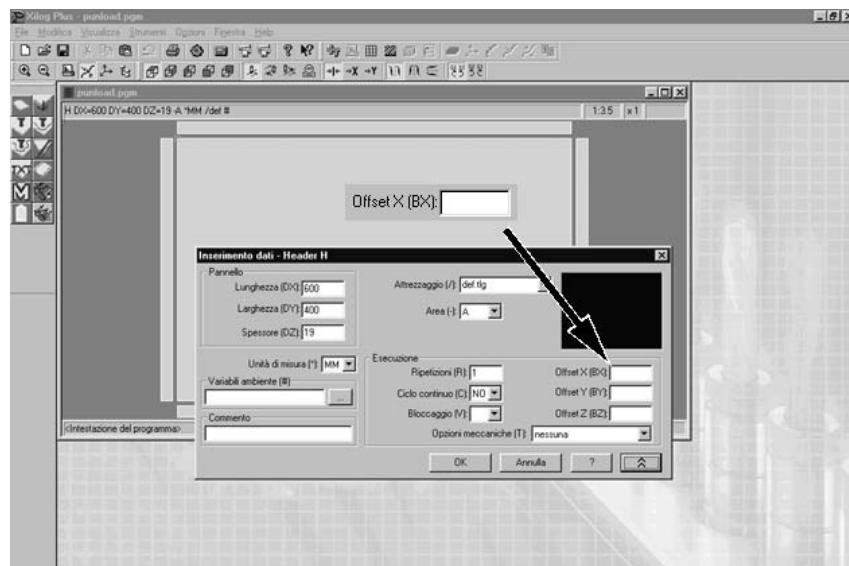


Fig. 3.8m

3.3.2 Adjusting the Work Surface Suction Heads

You may move the suction heads along the support surface according to the size of the panels to be worked. To do so, proceed as follows:

Liftable rectangular suction cup:

- Slide the suction cup along the table guides (fig.3.9b)
- Selector switch E can be used to raise the suction cup and turn it, to keep it higher above the work table, allowing trimming operations on the workpiece.



WARNING: In this case, remember to fit the extension F on the end stops and modify the program "HEADER" or panel offset (+25mm).

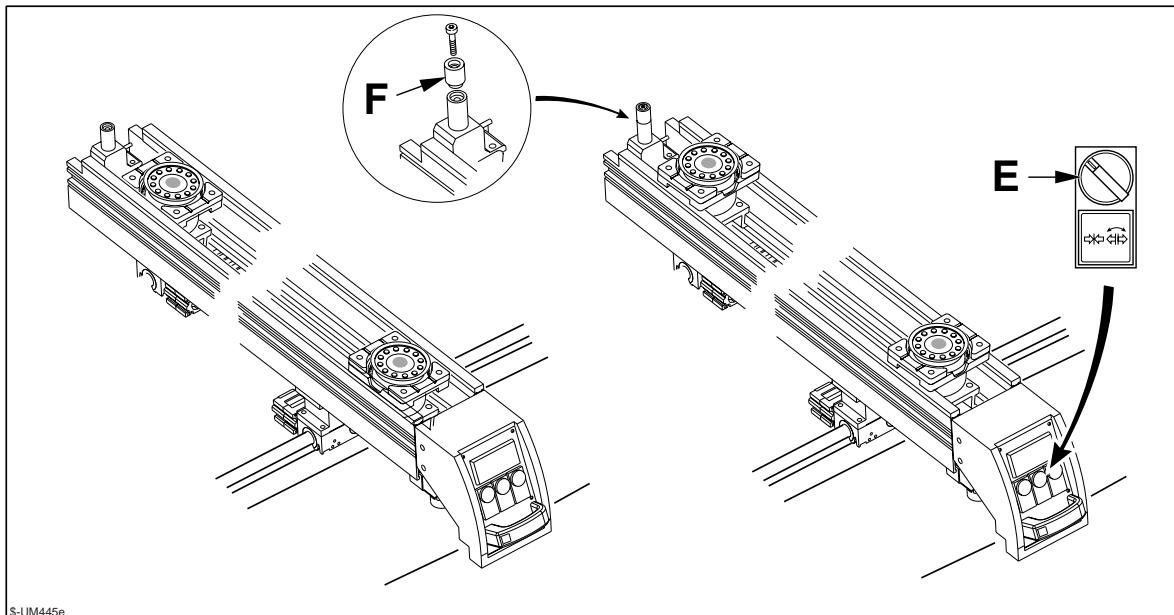


Fig. 3.9b

3.3.3 Loading aids

With the lifting suction cups (fig. 3.9b) or the trimming spacers (fig. 3.10) the loading aid bars A can be present on the work tables (fig. 3.9d).

With the selector in position "O" the loading bars are disabled.

To activate them, set selector B to position "I" or "II" (position "II" normally used if rectangular suction cups are fitted or if wooden ends are used for machining).

In position "I" the loading bars are raised:

- position the panel on the loading bars and rest it against the stops
- turn selector C to the unstable position and hold it there: the bars are lowered but the panel is still "free"
- release selector C to activate the suction cups and lock the panel in place
- to release the panel, turn and release selector C; the loading bars are raised after around one second

In position "II" the loading bars are raised:

- position the wooden end and the panel on the loading bars and rest it against the stops
- turn selector C to the stable position: the bars are lowered and you can adjust the position of the wooden end and panel
- turn selector C to the neutral position (vertical) to activate the suction cups and lock the panel in place
- to release the panel press and release selector C; the loading bars are raised after around one second



WARNING: To activate Selector B functions you must set "Automatic" mode on the CNC.

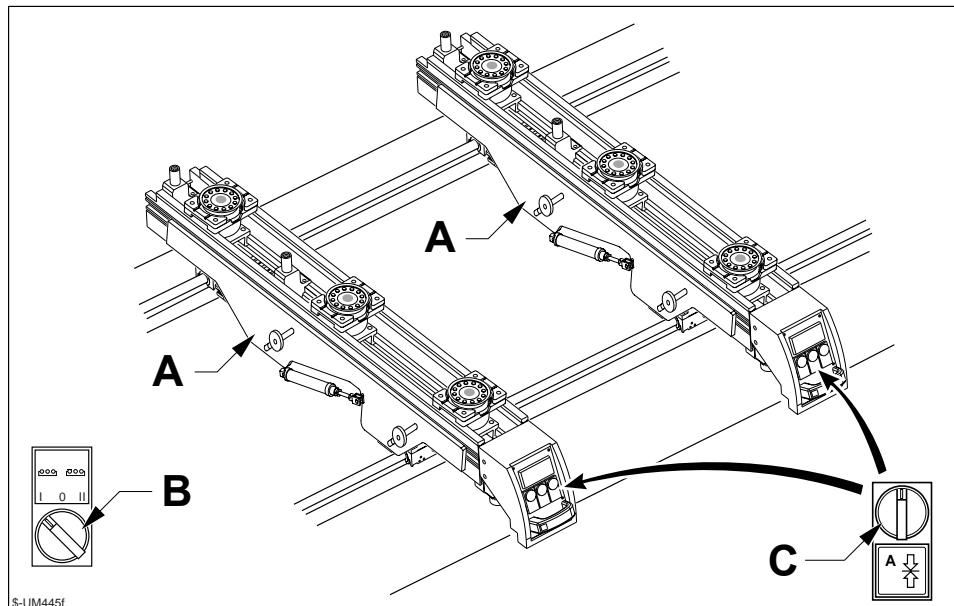


Fig. 3.9d

3.4 Workpiece Gripping Devices

On request, the manufacturer can supply a number of different workpiece gripping devices. The following are the ones most in demand:

- spacers for profiling operations;
- spacers for working small pieces;
- devices for holding small workpieces

3.4.1 Spacers for Profiling or for Working Small Pieces

**WARNING:**

- *During the machine adjustment and equipping phase, ensure that the machine is on emergency status (press the red mushroom-top button on the control panel) or in "setting" mode (rotate the setting selector on and pull out the key).*
- *All the operations described in this section must be performed by the machine operator.*

To fit, simply press the surface into place

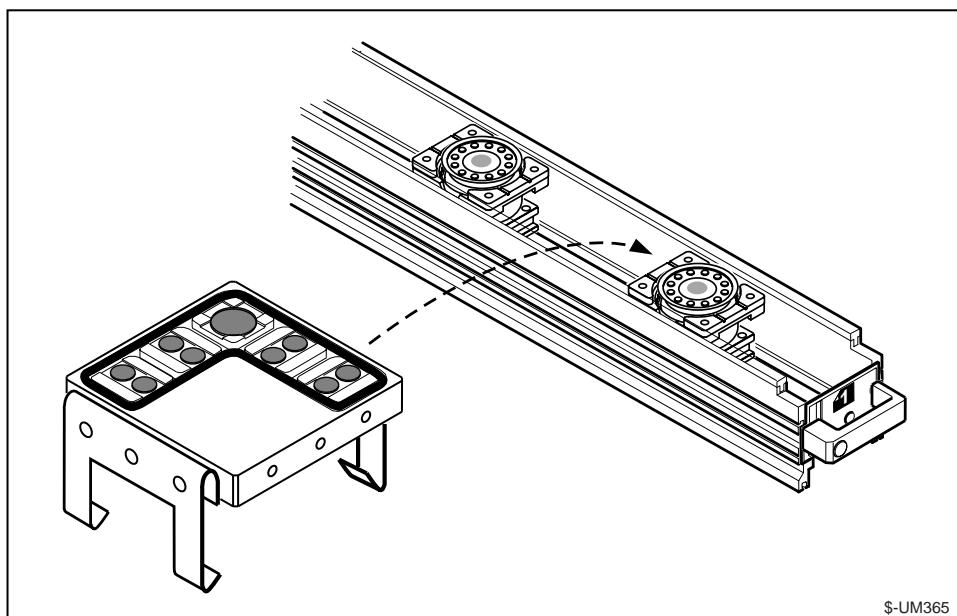


Fig. 3.10

3.4.2 Devices for holding small workpieces

**WARNING:**

- During the machine adjustment and equipping phase, ensure that the machine is on emergency status (press the red mushroom-top button on the control panel) or in "setting" mode (rotate the setting selector on and pull out the key).
- All the operations described in this section must be performed by the machine operator.

For fitting, set spacer A (fig.3.11) and locking plate B to the end stops, tightening them fully.

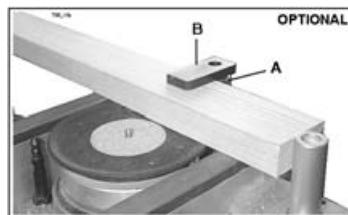


Fig. 3.11

**WARNING:**

with this type of device the blocking of the piece is limited to traction from the stops, therefore the machining operations must be "light" and the machining thrust must be in the direction of the stops : BEFORE EXECUTING MACHINING OPERATIONS, MANUALLY CHECK THAT THE PIECE IS BLOCKED.

To ensure correct use of these tools, the following procedure is advised:

- place a discard panel between the work table and the piece to be worked; for greater friction on the contact surface, glue a sheet of sand paper to the discard panel (the panel may be already prepared as a spacer and may be used several times - see fig. 3.11a)
- the panel must be sized so that it can be held by the suction cups: in this way there will be a maximum contact surface with a high friction coefficient under the piece being machined.



WARNING: MAKE SURE THAT THE MACHINING DEPTH IS NOT EXCESSIVE TO AVOID "BREAKING THROUGH" THE DISCARD PANEL AND CONSEQUENTLY RUIN THE WORK TABLE AND THE SUCTION CUPS.

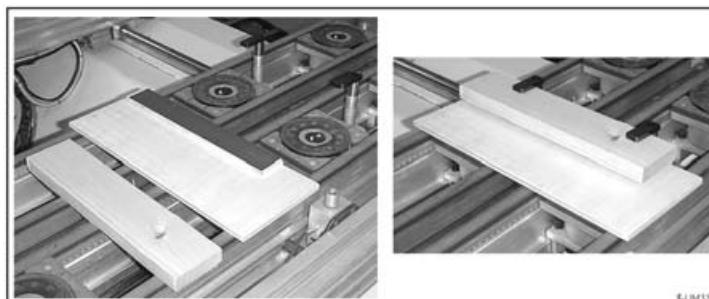


Fig. 3.11a

GB	3.11 - Boring head with 36 independent vertical spindles - Optional Author X5 - Rel. 2.0
----	---

INDEX

3.11	Boring head with 12 independent vertical spindles - Optional Author X5	3
3.11.1	Technical Characteristics	3
3.11.2	Tool Assembly	7
3.11.2.1	Tooling up	7
3.11.2.2	Fitting Drillling Bits on Vertical - Horizontal Spindles	8
3.11.3	Maintenance and lubrication.....	10

3.11 - Boring head with 36 independent vertical spindles - Optional Author X5 -
Rel. 2.0

GB

Note

3.11 Boring head with 12 independent vertical spindles - Optional Author X5

The boring head is used in machined to make vertical and horizontal holes in the panel.

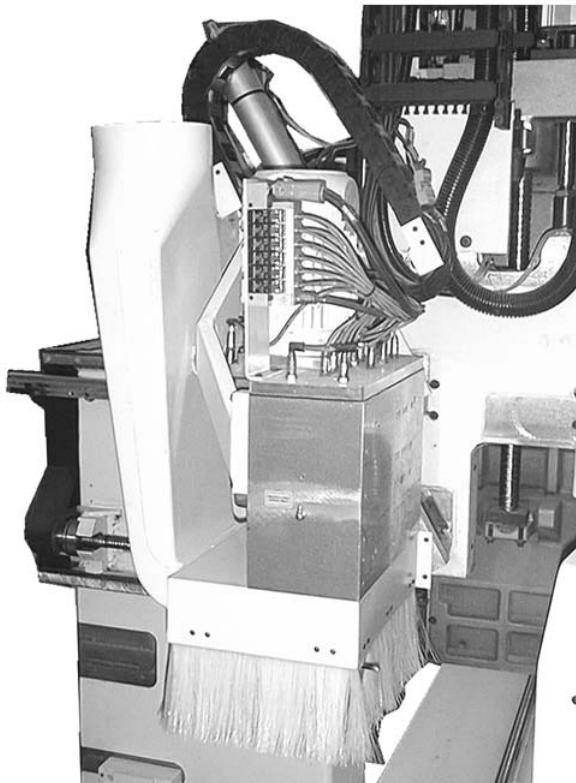


Fig. 1

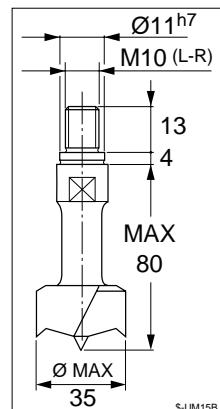
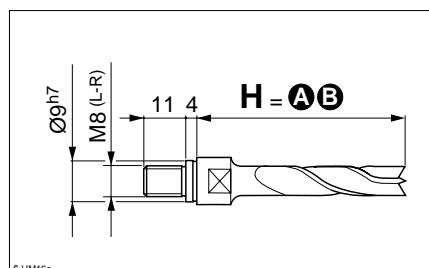
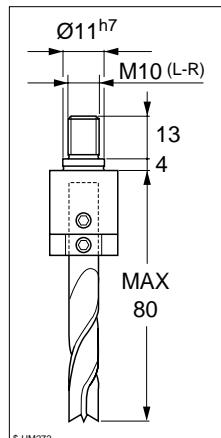
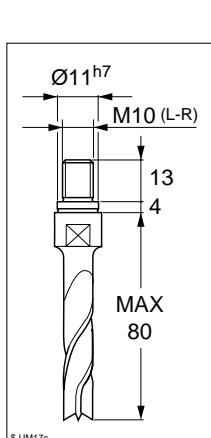
3.11.1 Technical Characteristics

Number of spindles	18 vertical (8 in X - 5 in Y) 6 horizontal (2+2 in X / 1+1 in Y)
Wheelbase	32mm
Spindle coupling	right and left M10 threaded hole
Spindle rotation speed	6000rpm
Motor power	3kW (4Hp)
Z axis vertical run at CN	400mm
Pneumatic vertical run for each spindle	60mm
Maximum length of boring head	see figure

3.11 - Boring head with 36 independent vertical spindles - Optional Author X5 - Rel. 2.0

GB

Maximum diameter of drill bits

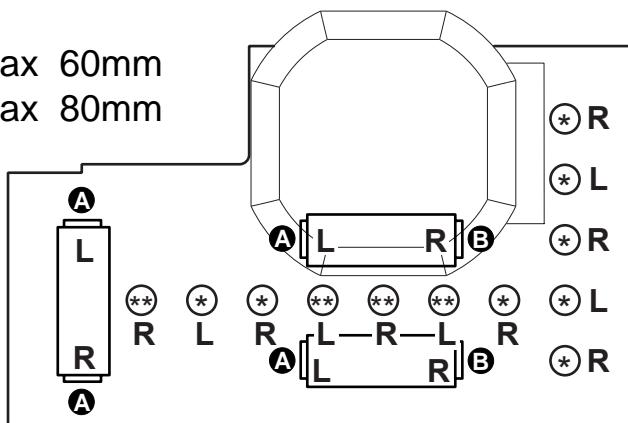


* = Ømax 35mm

** = Ømax 32mm

B = H max 60mm

A = H max 80mm



AX5_07a

Fig. 3



NOTE: The centre-to-centre distance between the spindles is 32 mm. This means that the total of the diameters of two bits mounted side by side must not exceed 64 mm.

Spindle numbering and sense of rotation

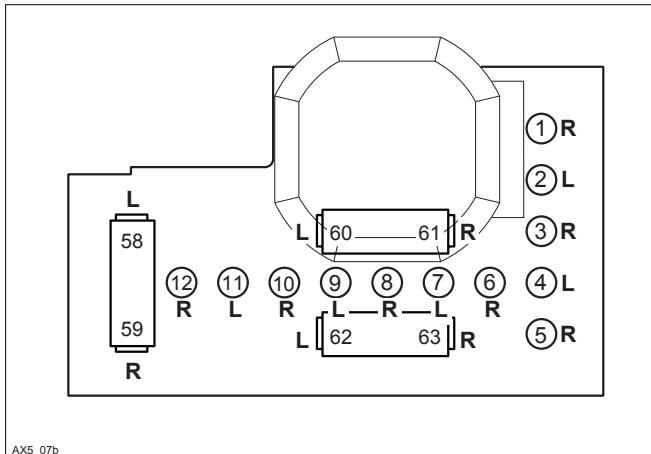


Fig. 4

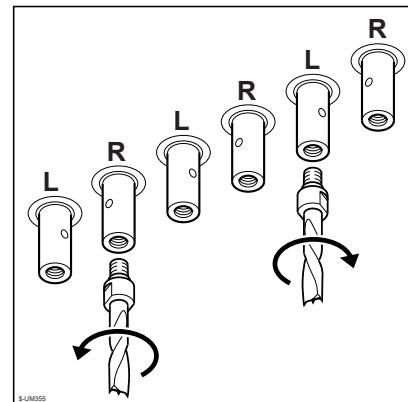


Fig. 4a

**3.11 - Boring head with 36 independent vertical spindles - Optional Author X5 -
Rel. 2.0**

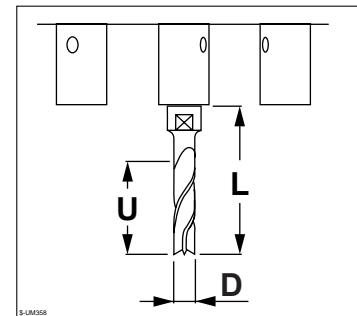
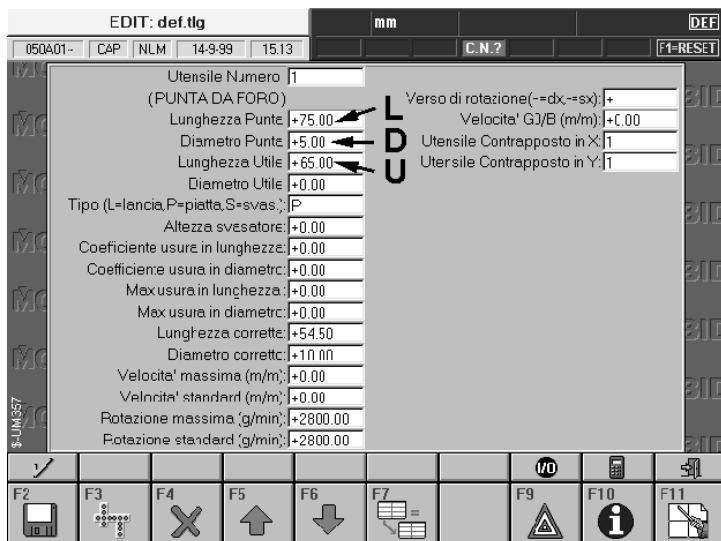
GB

Note

3.11.2 Tool Assembly

3.11.2.1 Tooling up

The tool configuration is set in the tooling up phase (see user's and programming manual). The principle identification parameters for the miller unit dimensions are shown in the figure.



3.11.2.2 Fitting Drilling Bits on Vertical - Horizontal Spindles

**WARNING:**

- During the machine adjustment and equipping phase, ensure that the machine is on emergency status (press the red mushroom-top button on the control panel) or in "setting" mode (rotate the setting selector on and pull out the key).
- All the operations described in this section must be performed by the machine operator.



WARNINGS: Each time you change a tool, take its measurements and enter them in the tooling parameters: see Xilog programming manual.

To fit the drilling bits, you need the following:

- 15*mm open-ended spanner
- spindle locking pin

* Spanner size depends on drilling bit design.

Fit the bits as follows:

- Insert the clockwise rotating bits into spindles R and the counterclockwise rotating bits in spindles L (See Fig.7)

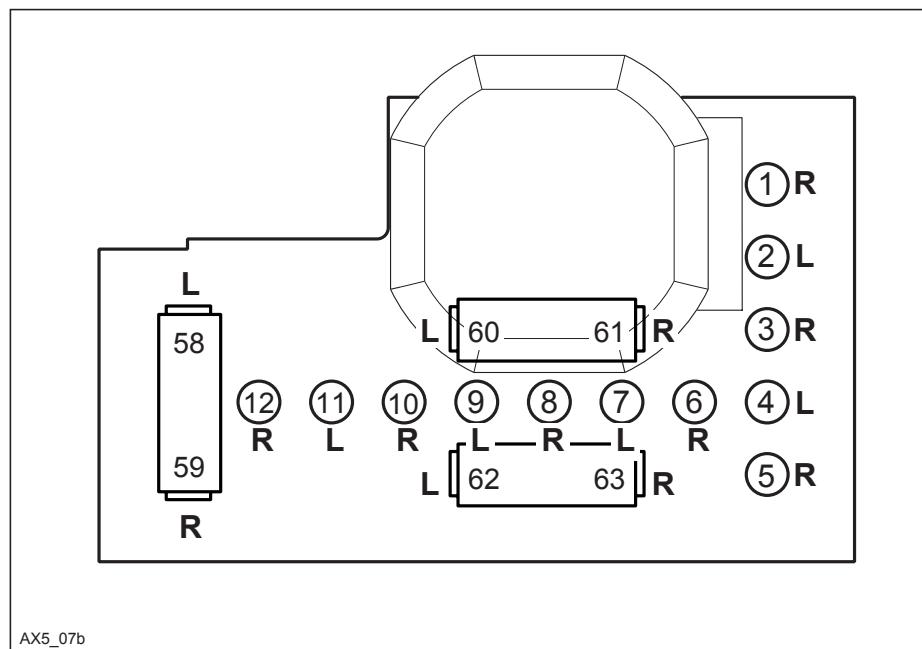


Fig. 7

- Tighten the bits with the open-ended spanner A (Fig. 8 - 9) and tighten the spindles with the pin supplied B.

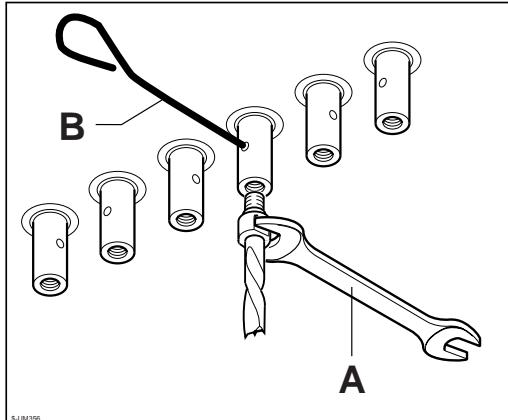


Fig. 8

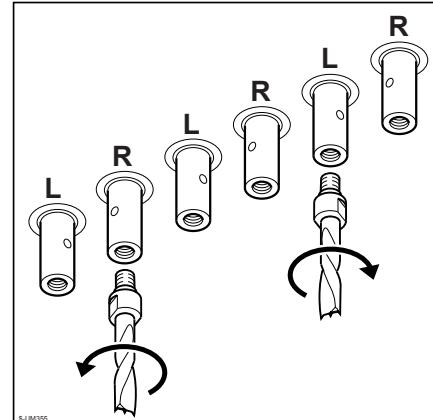


Fig. 8a

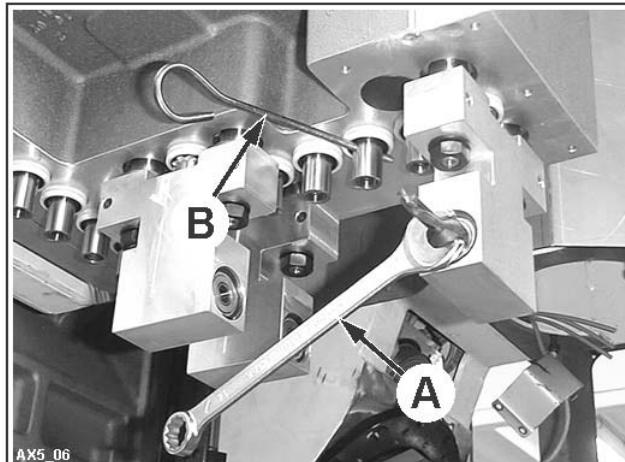


Fig. 9

3.11.3 Maintenance and lubrication



WARNING: All cleaning and maintenance operations must be performed by skilled personnel only. Before you start any cleaning or maintenance operations, switch off and lock out the main electrical and compressed air switches.

Do not attempt to perform repairs or other operations not described in this manual.

This machine must only be used and maintained by suitably qualified and authorised personnel. All operations requiring dismantling of machine components must only be performed by suitably skilled and authorised personnel.

When changing machine parts only use original MORBIDELLI spare parts. MORBIDELLI declines all responsibility for damage caused by the use of non-original MORBIDELLI spare parts.

Accident prevention regulations, safety precautions and occupational health and safety recommendations must be followed at all times.



CAUTION!: FAILURE TO CARRY OUT THIS MAINTENANCE OPERATION MAY EFFECT MACHINING QUALITY AND CAN INCREASE THE RISK OF TOOL BREAKAGE.



NOTE: The maintenance intervals given above are intended as a guide only. With particularly dusty operations (e.g. machining agglomerates) the maintenance operations must be performed more frequently to ensure continued machine efficiency.

An efficient extractor system will ensure efficient operation and prevent damage caused by overheating. Check the efficiency of the sawdust/shaving extractor system once a week.

Every machine is marked with an identification plate with all the information that needs to be communicated every time a service centre is contacted or spare parts are ordered.
For further details regarding the position of these plates consult each machine's specific user manual.



The identification plate referring to the entire line is situated on the line supervisor's electrical cabinet (if present) or on the electrical cabinet belonging to the first SCM GROUP - Morbidelli machine in the line.

- Inject approximately 1cm³ of grease (aprox. 2 pumping - Type "AGIP GRMU EP0") into each grease nipple F (Fig. 12). Clean away any excess grease.

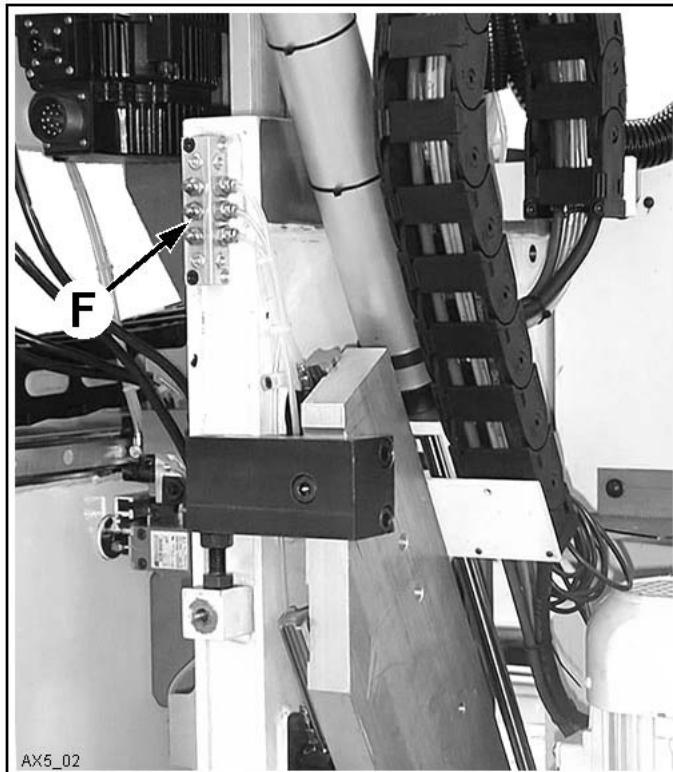


Fig. 12

3.11 - Boring head with 36 independent vertical spindles - Optional Author X5 -
Rel. 2.0

GB

Every 800-1000 hours (six-monthly maintenance):

Lubricate the 12 / 18 spindles on the main head:



IMPORTANT: activate the "setting" mode.

- Inject approximately 10cm³ of grease (aprox. 14 pumping - Type "KLUBER ISOFLEX NBU15") into each grease nipple T1 (Fig. 13)
- Re-start the machine (exit the "setting" mode) and switch on the boring head for several seconds; activate "setting" mode and repeat the greasing operation.



N.B.: The above-mentioned operations must be carried out 5 times in order to insert 50cm³ of grease in the head.

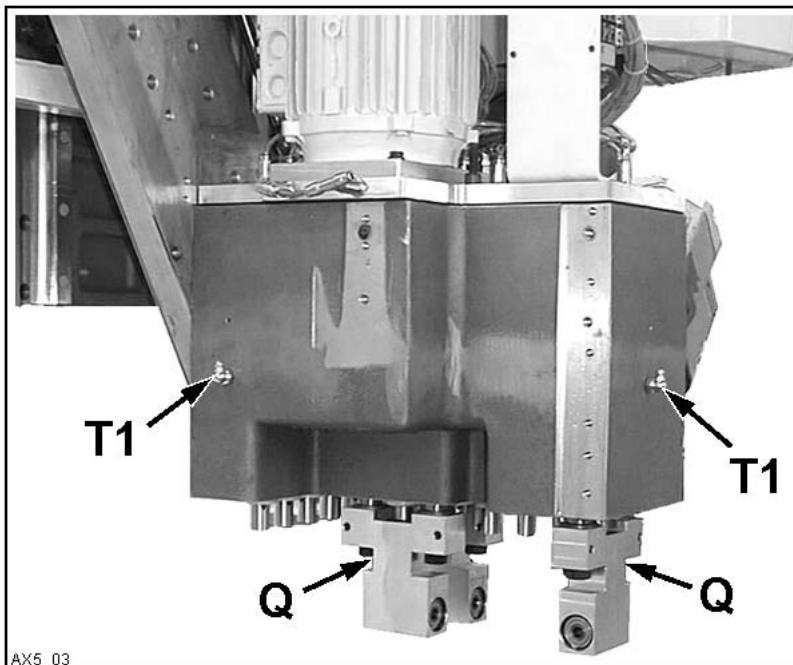


Fig. 13

Every 800-1000 hours (six-monthly maintenance):

Lubricate the horizontal heads:

- Inject approximately 1cm³ of grease (Type "KLUBER ISOFLEX NBU15") into each grease nipple Q (Fig. 13). Clean away any excess grease.

INDEX

3.43	Electro spindle 15Hp HSK 63 plug with rear deposit with 12 room	2
3.43.1	Electro spindle Technical Characteristics	4
3.43.2	Tool installation	6
3.43.2.1	Tooling up	7
3.43.2.2	Fitting Cutting Tools on Toolholder Spindles (Optional)	8
3.43.2.2.1	Fitting Cutting Tools on Toolholder Spindles with HSK63 fitting	9
3.43.3	Tool Magazine Technical Characteristics	10
3.43.4	Manual movements	11
3.43.5	Loading tools on the magazine	13
3.43.6	Maintenance and lubrication	16
.	Electrospindle and HSK63 taper maintenance	18

3.43 - Electro spindle 15Hp HSK63 plug with rear deposit with 12 room - for Author X5 - Rel. 2.0**GB**

3.43 Electro spindle 15Hp HSK 63 plug with rear deposit with 12 room

The machining head in question consists of an electrospindle for tools with HSK63 coupling and a tool magazine with 12 locations for automatic tool change-over.

The electrospindle has an independent mouvement on two axes: axis "C" (vector) , axis "B" (tilting).

The electro-spindle has a clamping system designed for DIN 69893 type tool tapers. A spring-loaded tie-rod inside the spindle ensures a perfect clamping fit between the tapers and guarantees full transmission of all motor power to the tool.

Microswitches are triggered to inform the CNC unit if the tool is clamped or released and if the electro-spindle is stopped or rotating. If the CNC does not receive this information or if it receives incorrect values for these parameters, it will stop the machining cycle.

An air jet inside the spindle shaft keeps the tool taper and the collet clean during the clamping.

The CNC unit is programmed so that the machine can only be started when the tool holder taper is correctly engaged. If the taper is not correctly engaged the machine will not start and a fault message for the operator will be displayed.

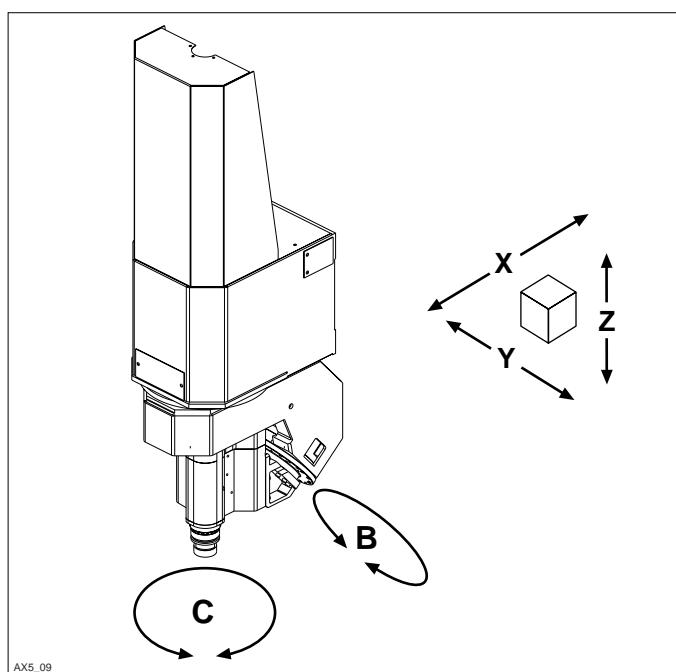


Fig. 1

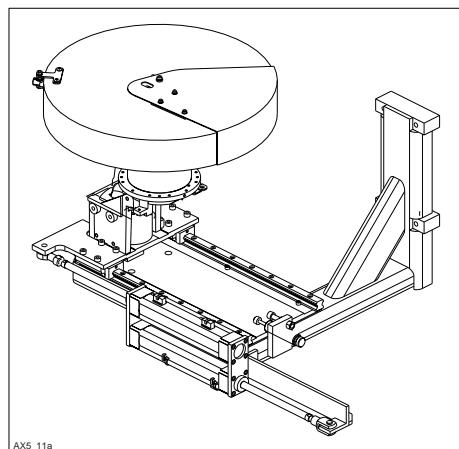


Fig. 1a

GB

GB	3.43 - Electro spindle 15Hp HSK63 plug with rear deposit with 12 room - for Author X5 - Rel. 2.0
-----------	---

**WARNING - RESIDUAL RISKS:**

- *Ejection of all or part of the workpiece (splinters)*
- *Ejection of all or part of the tool*
- *Danger caused by programming errors that could cause the tools to crash against the fixed parts.*
- *Danger caused by programming errors that could mean that wrong tools are called.*
- *Danger caused by errors in programming machine equipment (e.g. associating the wrong parameters to a certain tool code)*
- *Danger due to incorrect tool fitting*
- *Erroneous tool is loaded into the tool-holder store.*
- *Danger of tool locking screw or ring nut slackening.*

Generic programming errors, including:

- *always be sure that the tool rotation direction is correct!*
- *pay attention to the machining depth and the tool advance speed*



WARNING: *always check that the shavings extractor system is connected and switched on, in order to guarantee adequate electrospindle motor cooling.*



WARNING: *ENSURE THAT ELECTRO-SPINDLE IS FITTED WITH A TOOL TAPER AT ALL TIMES. LEAVING THE SPINDLE WITHOUT A TOOL TAPER:*

- *will allow the entry of shavings and sawdust into the spindle*
- *will cause damage when the spindle is rotated*

If the electro spindle is not used for various days, or it is always used with the same tool (and therefore there is no regular change cycle for the tool) a tool change cycle must be performed every 3-4 days in order to prevent the tool-holding cone to remain blocked inside the electro spindle.

IT IS VERY IMPORTANT THAT REGULAR CLEANING AND LUBRICATING OPERATIONS BE PERFORMED ON THE CONE AND THE ELECTRO SPINDLE AS INDICATED IN THE MAINTENANCE CHAPTER.

GB

3.43 - Electro spindle 15Hp HSK63 plug with rear deposit with 12 room - for Author X5 - Rel. 2.0

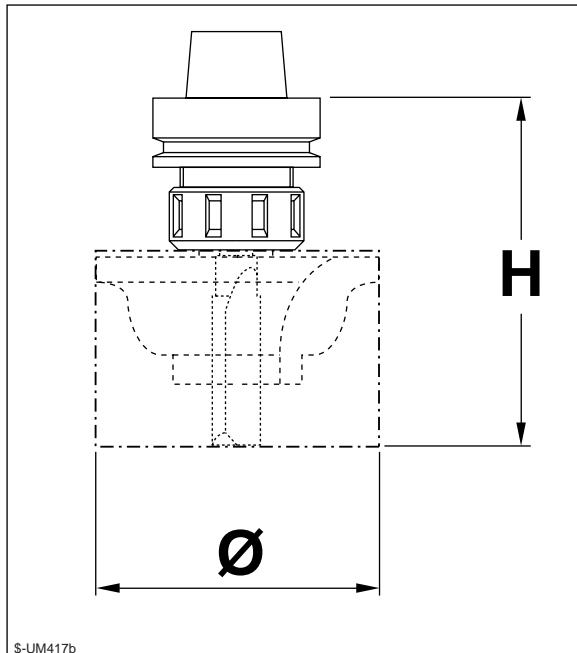


Fig. 2

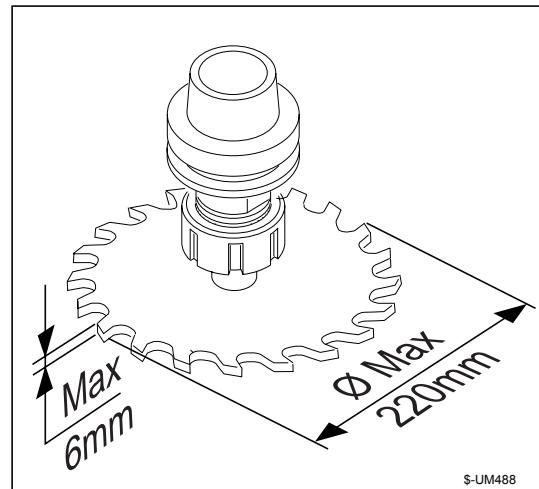


Fig. 2b

3.43.2 Tool installation

To ensure efficient operation and a long working life of the electro-spindle, observe the following basic precautions:

Only use tools according with the standard rules of the Countries where the machine is used.

Tools should be clearly marked with the maker's name and the permitted number of rpm for the tool.

Do not use non-standard tools.

These reduce electro-spindle life and may be dangerous for the operator.

- a) Only work with balanced tools (balance setting $Q < 1 \text{ mm/sec}$). Do no use unbalanced tools. Unbalanced tools will cause irregular running and vibrations and will damage the spindle bearings.
The toolholders used have to have a balancing degree of at least $G = 16$ at maximum speed (vertical cylindrical tool) (Referring to the standard rules pr EN 847-3 and ISO 1940-1)
- b) Before fitting a tool, thoroughly clean the contact surfaces between the tool and the spindle using a soft cloth. (DO NOT USE EMERY CLOTH!) Remove all traces of oil and ensure that the contact surfaces are not marked. This will ensure good tool centring and thus reduce imbalance and vibration to the minimum.
- c) Do not use force when fitting or removing a tool. Do not attempt to release the tool by knocking the spindle or the tool spanner with a hammer. This can break the tool and cause irreparable damage to the bearings.
- d) When you have finished using a tool, clean and oil the taper and threads and then store the tool in its container.
- e) Always use cutting speeds, feed speeds, tool lengths and diameters to match the machining operation.

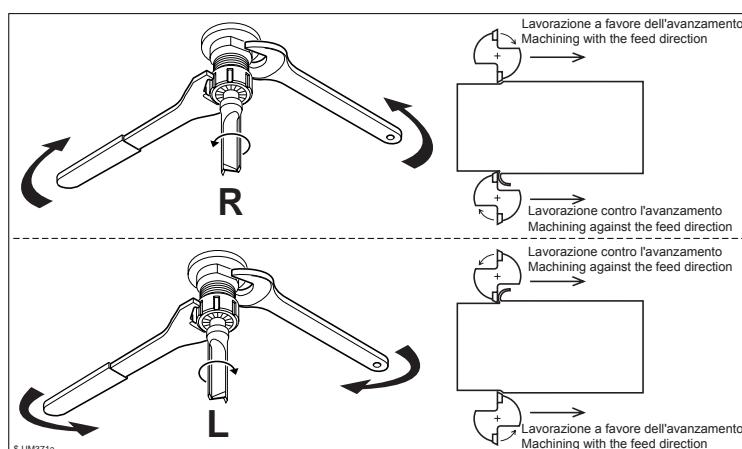


WARNING: Permitted operating speeds are marked on the tools. Do not exceed these limits.



Check that the tool direction of rotation/machining is compatible with the locking system (ring nuts or screws); a tool which rotates to the right requires a ring nut or screw with right-hand thread.

Figure shows how to correctly tighten a tool on the spindle and the correct direction of feed relative to tool rotation.



GB

GB	3.43 - Electro spindle 15Hp HSK63 plug with rear deposit with 12 room - for Author X5 - Rel. 2.0
-----------	---

3.43.2.1 Tooling up

The tool configuration is set in the tooling up phase (see user's and programming manual). The principle identification parameters for the miller unit dimensions are shown in the figure.



WARNING: In fields N do not enter speeds of rotation which are above the maximum speeds indicated by the tool manufacturer.

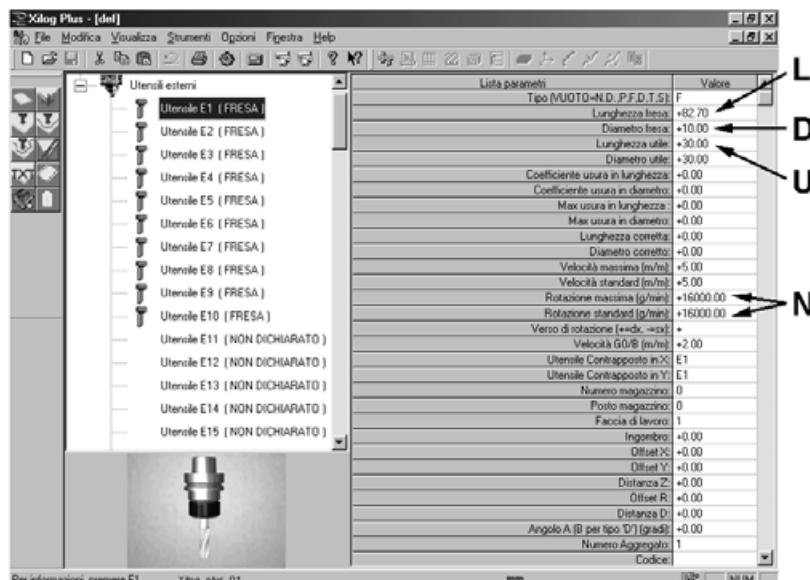


Fig. 3

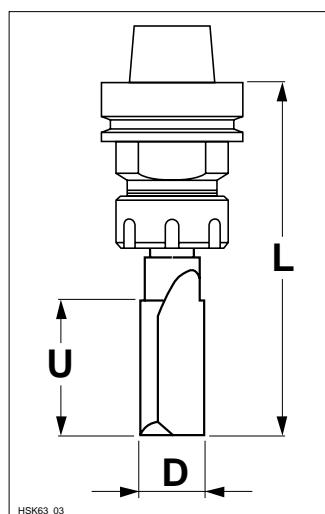


Fig. 4

3.43 - Electro spindle 15Hp HSK63 plug with rear deposit with 12 room - for Author X5 - Rel. 2.0

GB

3.43.2.2 Fitting Cutting Tools on Toolholder Spindles (Optional)



WARNING:

Fitting and removal of routers from toolholder spindles must not be performed on the machine.

The toolholder spindle must be removed from the operating unit and the cutting tools fitted or removed at the workbench.



WARNINGS: *Each time you change a tool, take its measurements and enter them in the tooling parameters: see Xilog programming manual.*



Check that the tool direction of rotation/machining is compatible with the locking system (ring nuts or screws); a tool which rotates to the right requires a ring nut or screw with right-hand thread.

Figure 3.0 shows how to correctly tighten a tool on the spindle and the correct direction of feed relative to tool rotation.

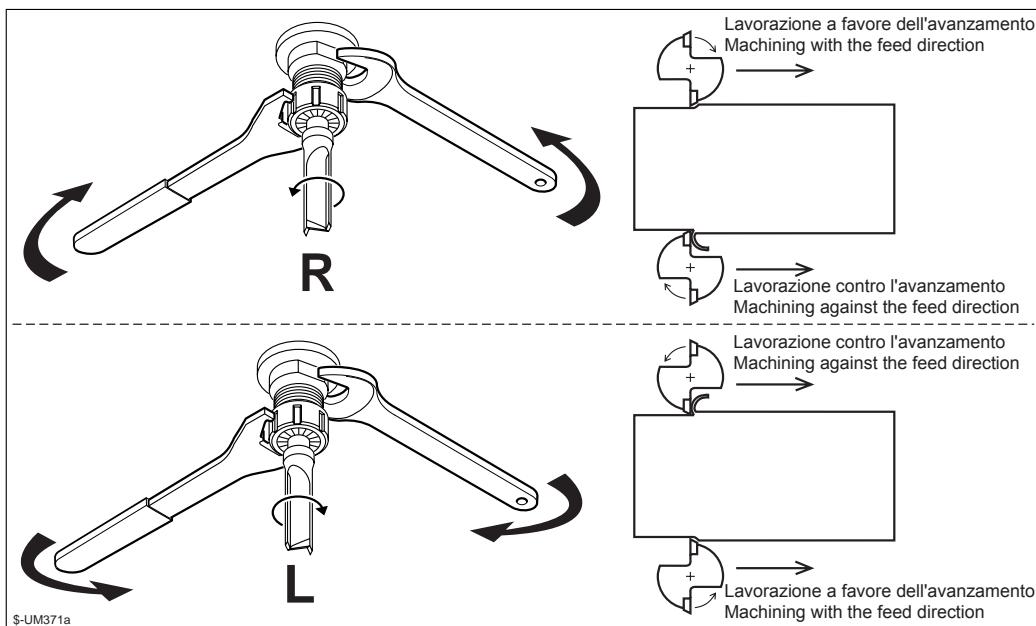


Fig.3.0

3.43.2.2.1 Fitting Cutting Tools on Toolholder Spindles with HSK63 fitting



WARNINGS: Each time you change a tool, take its measurements and enter them in the tooling parameters: see Xilog programming manual.

To fit the tools, you need the following:

- 45-50mm C-spanner
- 36mm open-ended spanner or clamp M (Fig. 5b)

To fit tools with cylindrical fitting on the tool holder spindles, proceed as follows:

- Undo the ring nut A (Fig. 5a) completely
- Select a gripper B with a bore diameter suitable for the tool fitting shank (Check the diameter marked on the collet. The collet diameter must be the same or slightly less than the diameter of the tool shank, e.g. tool shank 20, collet 19-20)
- Press gripper B into ring nut A
- Screw ring nut A on but without tightening
- Insert the tool C into the gripper.
- Hold the tool holder spindle still with the open-ended spanner or with the clamp M (Fig. 5b) and tighten the ring nut fully home with the C spanner



CAUTION: Check that grub screw D is always fitted in the tool-holder spindle: if it is not fitted dust can get into the electro-spindle and cause malfunctions and damage.

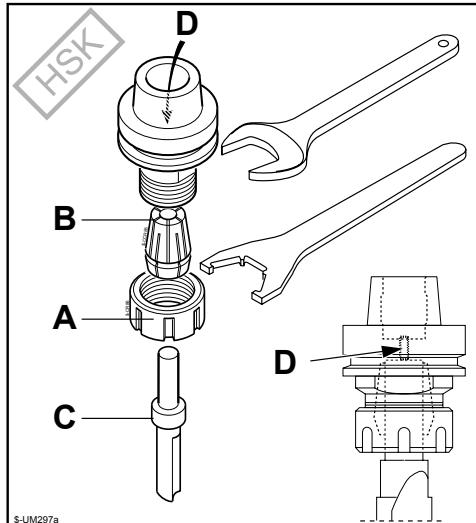


Fig. 5a

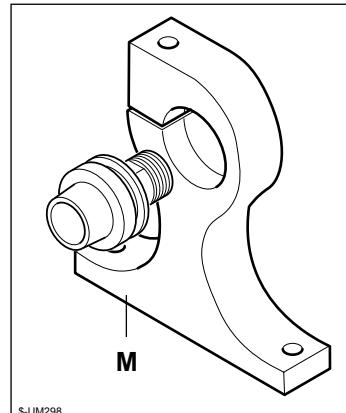


Fig. 5b



Check that the tool direction of rotation/machining is compatible with the locking system (ring nuts or screws); a tool which rotates to the right requires a ring nut or screw with right-hand thread.

3.43 - Electro spindle 15Hp HSK63 plug with rear deposit with 12 room - for Author X5 - Rel. 2.0

GB

3.43.3 Tool Magazine Technical Characteristics



WARNING: THIS CHAPTER INDICATES THE SIZE OF THE TOOLS THAT CAN BE MOUNTED ON THE DEPOSIT:



**WARNING: THE MAXIMUM WEIGHT SUPPORTED BY THE TOOL MAGAZINE IS: Kg 25
THE MAXIMUM WEIGHT SUPPORTED BY THE TOOL-HOLDING TONGS "A" (Fig. 6) IS: 4,5 Kg**

MAXIMUM DIMENSIONS OF TOOLS THAT CAN BE INSTALLED IN THIS MAGAZINE ARE:

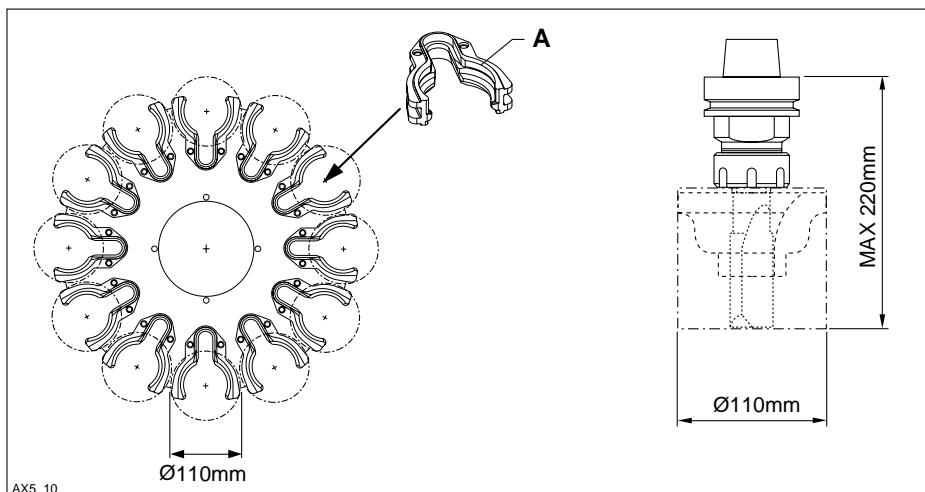


Fig. 6

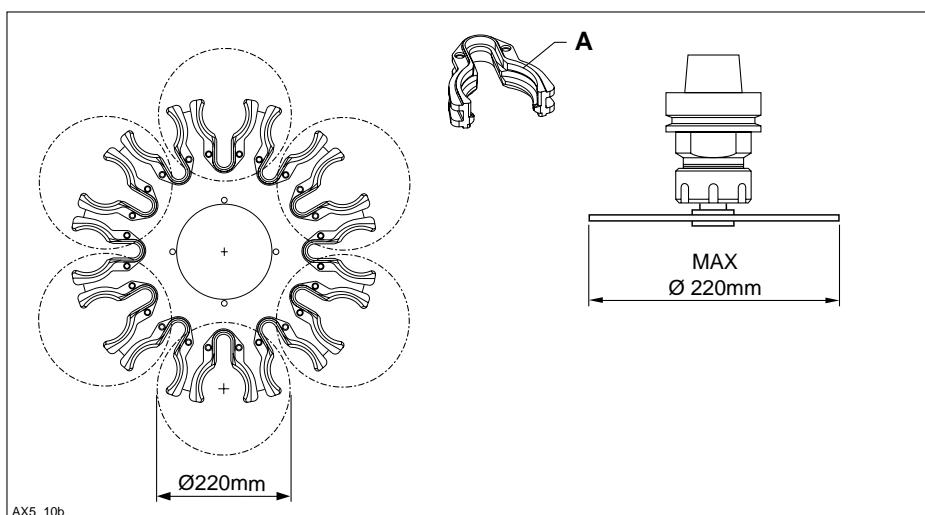


Fig. 6a

GB

GB	3.43 - Electro spindle 15H_p HSK63 plug with rear deposit with 12 room - for Author X5 - Rel. 2.0
-----------	--

3.43.4 Manual movements

From the video of the "Menù base" (Xilog) press the function key F6 (Fig. 7a) to activate the "MDI" modality, then press two times in sequence the function key F4 (Xilog) / shift +F12 (xilog Plus) (Fig. 7b): in this way the video of fig. 8 concerning the Tool-Room crib is activated.

The icons activate the following functions:

- Icon n° 1 = closing cover crib
- Icon n° 2 = opening cover crib
- Icon n° 3 = movement to front position (Y+)
- Icon n° 4 = movement to rear position (Y-)
- Icon n° 7 = select deposit calibration cycle
- Icon n° 5-6-8 = not used

To carry out the movements it is necessary to:

- position yourself over the icon and press enter (the frame of the icon will turn green)
- press the start (startcycle) key of the mobile push-button panel to carry out the selected function



NOTE: should an operation be requested that is incorrect or not possible, it will not be carried out: the LED in the start button will light up and inhibit manual movement.

To reset the system, exit the screen page using the Esc key on the keyboard (Xilog) or select another environment (Xilog Plus), or press the stop cycle [stop cycle] button on the mobile push-button control panel and function key F1 (Xilog) / F10 (Xilog Plus) on the keyboard in sequence.

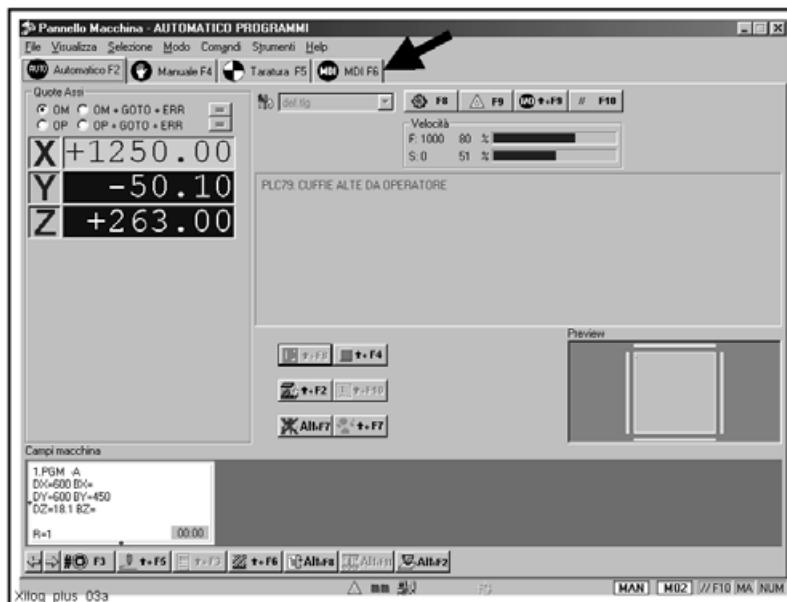


Fig. 7a

3.43 - Electro spindle 15Hp HSK63 plug with rear deposit with 12 room - for Author X5 - Rel. 2.0

GB

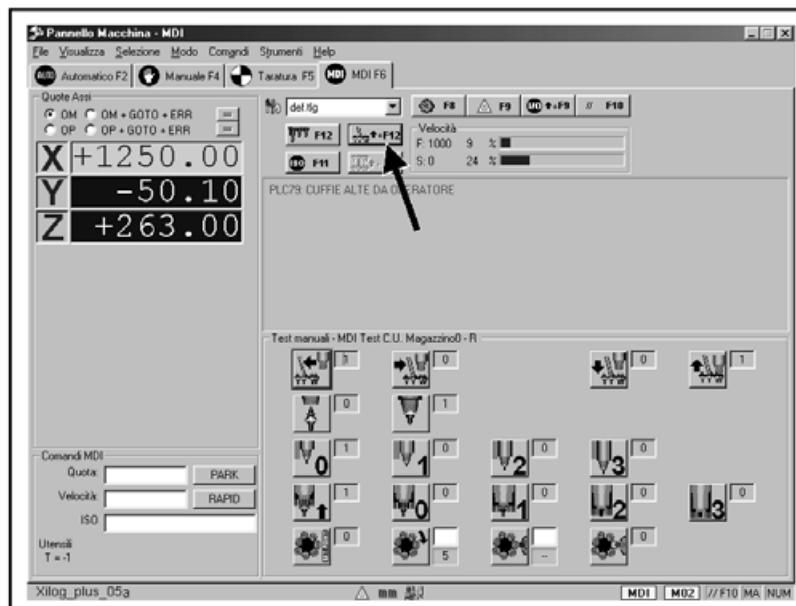


Fig. 7b

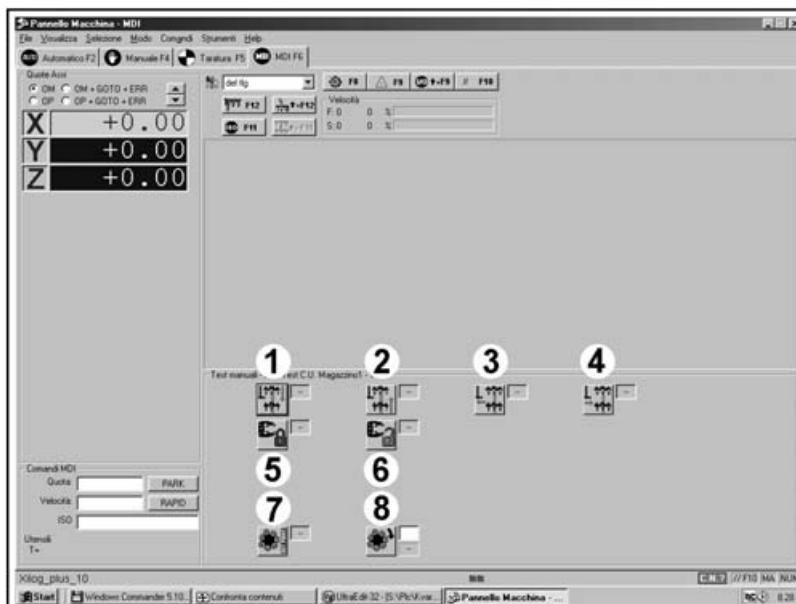


Fig. 8

3.43.5 Loading tools on the magazine

FOREWARD:

Before starting to work, the tools mounted in the deposit slots must be loaded into the deposit and the information stored in the CNC.

It is understood that in the CNC the tools must be stored by number and tool information (see the programming manual provided with the machine)



WARNING: Extreme care must be used when manually operating the tools: the machine is equipped with a device that detects the presence of a tool-holder on the electro spindle. BUT IT DOES NOT RECOGNIZE THE TYPE OF TOOL ACTUALLY MOUNTED.

The errors listed below can generate extremely dangerous situations:

- ***tool inserted in wrong room position***
- ***tool inserted in right room position but is not consistent with the tool recalled in the work program.***
- ***tool inserted in tool-holder with rotating direction that does not comply.***
- ***using tools that do not comply with regulations EN847-1:1997 and EN847-2:2001***
- ***using damaged tools: following a collision or such it is mandatory that the tools be overhauled by having them resharpened and balanced.***
- ***using tools at a speed greater than that indicated by the manufacturer.***
- ***using tools that are larger in size than those shown in this manual.***

THE ABOVE MENTIONED ERRORS MAY GENERATE THE FOLLOWING PROBLEMS:

- Rotating the tool at a speed greater than the limit established by the manufacturer may cause off-balancing, breaks and high speed ejection, with the risk of shooting through the protections installed on the machine and fatal effects on anyone that is hit.**
- Collision between the tool and parts of the machine may result in breaks in the tool and the machine, and serious consequences, as indicated in the previous point, or lesser ones up to a simple crack on machine parts.**

To load tools into the deposit it is necessary to proceed as follows:

- activate the "setting" mode by rotating selector S, on the electrical equipment, to position and remove the key
- activate MDI mode on the CNC
- go behind the machine
- press the key S2 and at the same time the key F6 of the keyboard to start up the rotation

3.43 - Electro spindle 15Hp HSK63 plug with rear deposit with 12 room - for Author X5 - Rel. 2.0

GB



WARNING:

The tools arranged in the deposits must correspond perfectly to the numbers displayed on the screen that appears when the menu in fig. 9 is activated.

The manufacturer suggests that an identification tag be placed on all tools showing reference "A", in order to prevent any errors (figure 10).

- enter the connection between the tool and its location in the magazine in magazine management:
- in "MDI" mode press key F5 (Xilog) / shift + F11 (Xilog Plus): the screen page in fig.9 appears

The table represents, in a circular manner, the fields relative to the magazine locations on the machine.

Deleting tools:

- use function key F4 (Xilog) / (Xilog Plus) then F6 (Xilog) / (Xilog Plus) (to confirm) to delete all tools in both magazines.

Loading tools:

- select fields
- use the "arrow" keys on the keyboard to view the tools present amongst the equipment loaded; to confirm press key F6 (Xilog) / (Xilog Plus).

The lower left hand corner (Ref. A - Fig. 9) displays the electrospindle enabled and the tool if loaded.

To delete the tools present on the electrospindles, you must run an unloading cycle first.

To write/change the characteristics of tools, the standard "tool editor" procedure (see the Xilog "Programming and Operations Manual") must be used, with the only difference that the fields relative to positioning into deposit space are deactivated (Ref B-C fig.10).



NOTE: after modifying the features of the tools in the Xilog Plus program (Editor), to make them immediately active in the Panel Mac program, exit the "MDI" environment (by selecting another: e.g.: manual) and reactivate the "MDI" environment.

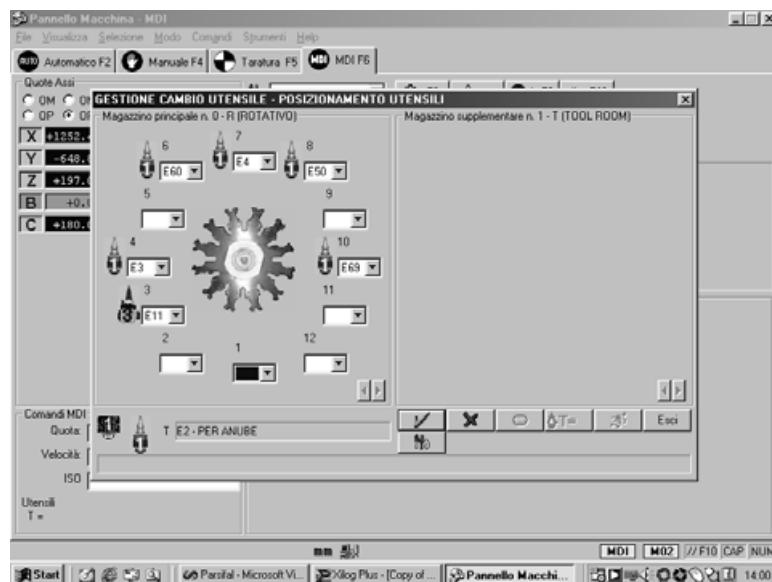


Fig. 9

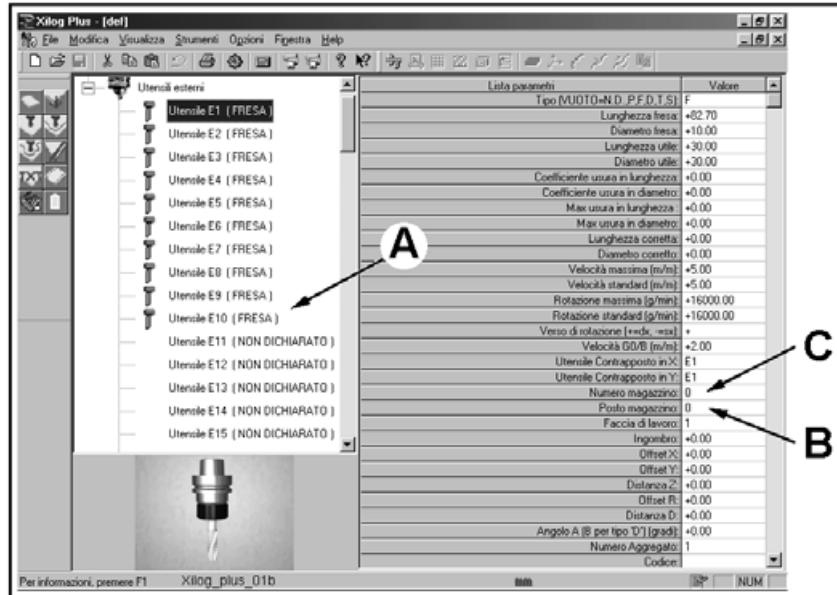


Fig. 10

During a cycle in "Automatic" mode, you have a dynamic view of the tool locations in the magazines and on the electrospindles.

Activate the display of the magazine locations from the "Automatic programs" menu using key combination shift+F5 (Xilog) / Alt+F11 (Xilog Plus).

Activate the display of tools fitted on the electrospindles from the "Display magazine locations" menu with key combination shift+F7 (Xilog) / (Xilog Plus) (command only active for machines in which two or more electrospindles can simultaneously use the rear magazine).

3.43 - Electro spindle 15Hp HSK63 plug with rear deposit with 12 room - for Author X5 - Rel. 2.0	GB
---	-----------

3.43.6 Maintenance and lubrication



WARNING: All cleaning and maintenance operations must be performed by skilled personnel only. Before you start any cleaning or maintenance operations, switch off and lock out the main electrical and compressed air switches.

Do not attempt to perform repairs or other operations not described in this manual.

This machine must only be used and maintained by suitably qualified and authorised personnel. All operations requiring dismantling of machine components must only be performed by suitably skilled and authorised personnel.

When changing machine parts only use original spare parts. The manufacturer declines all responsibility for damage caused by the use of non-original spare parts.

Accident prevention regulations, safety precautions and occupational health and safety recommendations must be followed at all times.



CAUTION!: FAILURE TO CARRY OUT THIS MAINTENANCE OPERATION MAY EFFECT MACHINING QUALITY AND CAN INCREASE THE RISK OF TOOL BREAKAGE.



NOTE: The maintenance intervals given above are intended as a guide only. With particularly dusty operations (e.g. machining agglomerates) the maintenance operations must be performed more frequently to ensure continued machine efficiency.

An efficient extractor system will ensure efficient operation and prevent damage caused by overheating. Check the efficiency of the sawdust/shaving extractor system once a week.

GB

GB	3.43 - Electro spindle 15Hp HSK63 plug with rear deposit with 12 room - for Author X5 - Rel. 2.0
-----------	---

Every 40 - 50 hours (weekly maintenance):

Lubricate recirculating ball shoes:



NOTE: the machining of medium density material creates very fine sawdust and shavings; in these cases the lubrication intervals specified must be halved.

- Inject approximately 2-3cm³ of grease (Type "AGIP - GR MU EP0") into each grease nipple F (Fig. 11). Clean away any excess grease.

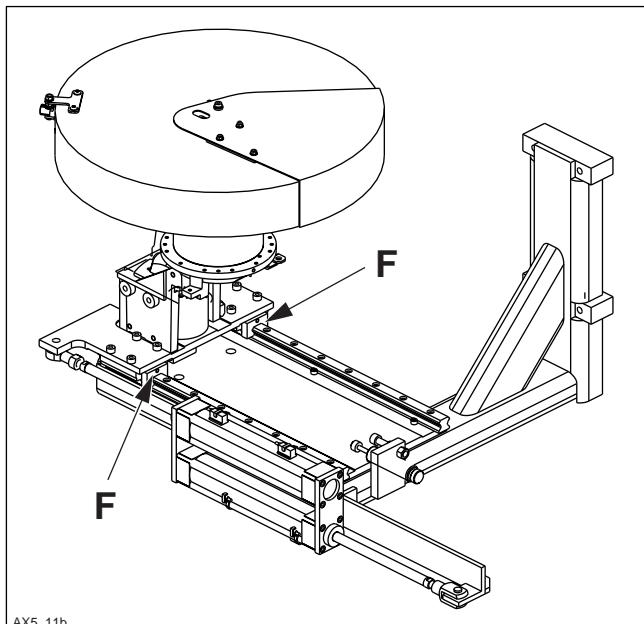


Fig. 11

GREASE FOR BEARINGS, SCREWS AND RECIRCULATING BALL SHOES (Type "B")	
---	--

AGIP	GR MU EP0
------	-----------

KLUBER	MICROLUBE GL261
--------	-----------------

Grasso_B-GB

3.43 - Electro spindle 15Hp HSK63 plug with rear deposit with 12 room - for Author X5 - Rel. 2.0

GB

Electrospindle and HSK63 taper maintenance

Every 50 hours: lubricate the tool taper clamping unit with the grease spray provide (code: 0002400035C).

Place the machine in "MANUAL" mode : selector S on 

Move the operator unit to an accessible position, remove the tool cone, then completely stop the machine. Insert the spray can tube in the gap between two of the collet sections (see the figure 21) and, holding the can in a vertical position, spray.
repeat the operation for the other gaps.

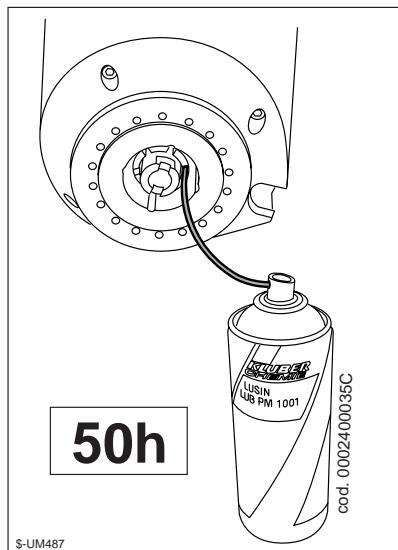


Fig. 21

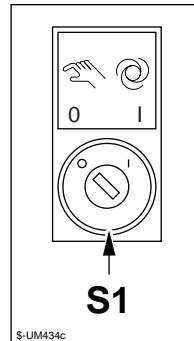


Fig. 21a

In order to uniformly distribute the grease between the "collets", put the machine back in "MANUAL" mode and perform 10-15 cone blocking and releasing actions (see fig. 22).



Fig. 22

GB

3.43 - Electro spindle 15Hp HSK63 plug with rear deposit with 12 room - for Author X5 - Rel. 2.0

Insert an empty cone and have the electric spindle rotate at 18000 rpm for about a minute (see fig. 23).



Fig. 23

At the end, stop the machine again, extract the tool cone and eliminate any grease deposited on the inside walls of the electric spindle shaft with a cloth and, if necessary, with acetone (WARNING: ACETONE IS A FLAMMABLE LIQUID!).

Also clean the hollow part of the tool cone (see fig. 25).



Fig. 24



Fig. 25

3.43 - Electro spindle 15Hp HSK63 plug with rear deposit with 12 room - for Author X5 - Rel. 2.0

GB

Clean the cone outside and inside with a dry and clean cloth every week.

Every month clean the contact surfaces (shown in grey in the figure 26) between the tool tapers and the chuck using acetone (CAUTION! FIRE HAZARD). Next, lubricate this area with the Teflub lubricant supplied (SCM: 0002400034A) Teflub is a dry, dustproof, waterproof lubricant which ensures correct clamping of the tool tapers.



NOTE: On tool holder tapers not supplied by manufacturer, perform this operation the first time the tapers are used.



IMPORTANT: AS WELL AS OBSERVING THE WARNINGS ON THE CANISTER:

- **DO NOT INHALE VAPOURS OR NEBULISED SUBSTANCES**
- **MAKE SURE THAT THE AREA USED IS WELL VENTILATED**
- **WEAR PROTECTIVE GLOVES IF CONTACT IS PROLONGED**
- **WEAR EYE PROTECTION**

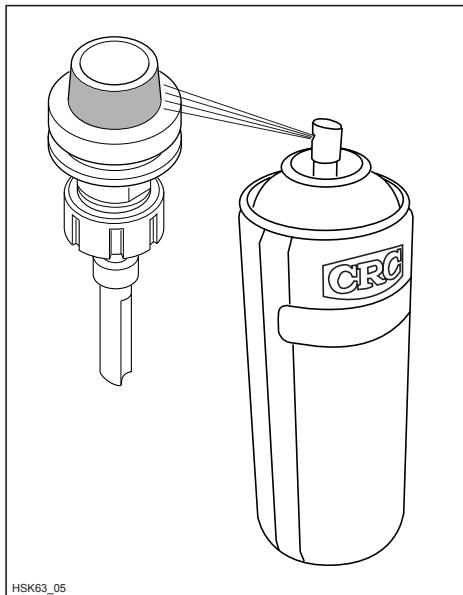


Fig. 26



WARNING: If the machine remains switched off for a long period of time (more than one week), the cone that stays mounted on the electro spindle must be carefully cleaned and lubricated.

INDEX

4.1	Use and Programming	3
4.2	Main Control Panel.....	4
4.2.1	Pushbutton Panels on the Machine.....	7
4.3	Starting and Stopping.....	8
4.3.1	Starting	8
4.3.2	Stopping.....	9
4.3.3	Machine emergency state reset procedure	10
4.3.3.1	Procedure for resetting an emergency during machining	10
4.3.3.2	Reset procedure after a cycle stop (Hold)	12
4.4	Setting up the Machine	13
4.5	Machining Procedures.....	14
4.6	Programming	16
4.6.1	Tool Numbering	16
4.6.2	Defining the work faces and the machining zones	17
4.6.3	Manual extractor hood movement	19
4.6.3.1	ISO commands	19
4.6.3.2	Hood reference cycle	20
4.7	Positioning a Panel	21
4.8	Use of additional stop (Optional)	23

Note

4.1 Use and Programming



IMPORTANT: The machine must be operated and programmed by trained personnel only.

- Always carry out simulated tests in manual mode to check that the machine is in perfect working order and ready to start machining.
- Before machining a batch of products, perform a single machining cycle and check the results with a gauge.
- Check that the extraction unit is connected up to the machine, in proper working order and suitable for the work required (refer to section 2.10).
- Check that the compressed air supply is on and check the oil level in the cup (refer to section 5.3).
- Keep the working area clean and tidy at all times.



WARNING: MAKING VARIATIONS TO THE MACHINE CONFIGURATION PARAMETERS IS STRICTLY PROHIBITED

THE MANUFACTURER DECLINES ALL RESPONSIBILITY FOR DAMAGE CAUSED TO PERSONS OR OBJECTS AS A RESULT OF TAMPERING WITH THE MACHINE

4.2 Main Control Panel

The electrical equipment has a set of fixed push-buttons and selectors and a mobile push-button panel also called the "mobile control panel" (Fig. 4.1 - 4.1a).

Depending on the type of electrical cabinet and the machine configuration the commands described here may not be present.

In the maximum configuration, the control panel is fitted with the following:

- A - "Axis" selector: for selecting the axes with the CNC in "manual" or "MDI" mode
- B - Potentiometer for adjusting speed of machining axes
- C - Potentiometer for adjusting speed of axes in manual mode
- D - (-) push-button for axis movement in manual mode: for moving axes in negative direction with CNC in "MDI" mode
- E - (+) push-button for axis movement in manual mode: for moving axes in positive direction with CNC in "MDI" mode
- F1 - Push-button (F1) for confirming tool loading/unloading: active in "Automatic" and "MDI" modes
- F3 - Push-button (F3) for lifting stops manually (not enabled on Author 427 - Author 500): active in all conditions except "Automatic" mode
- F6 - Push-button (F6) for revolving tool holder crib: active in "Manual" or "MDI" mode
- I - Push-button for ISO30 taper / HSK63 taper locking/release: active in "Automatic" and "MDI" modes
- L - "Stop cycle" push-button: temporarily stops (in hold state) the machining cycle, stopping the axes and electrospindle rotation. It is only active with the CNC in "Automatic" mode (press key P to restart the cycle)
- M - 2-position selector for enabling loading aid (Optional): for enabling/disabling loading aid devices if present on the machine
- P - "Start cycle" push-button: for restarting the machining cycle after a "hold" generated with push-button L. Only active with the CNC in "Automatic" mode. Also used to confirm instructions or commands entered using the software interface.
- Q - Push-button for lifting the RAPID 10 / 14 unit extractor hood manually: for manually lifting or lowering the extractor hood for the 10Hp electrospindles. Always active.
- R - White illuminated RESET push-button: when lit indicates that the machine is active and ready for machining. When not lit, indicates that machine is in the emergency state. After resetting the emergencies, use this push-button to reactivate the machine (press the push-button and it must light up).
- S1 - Two-position selector for activating "setting" mode: always active(see sec. 1.5.1.4)
- S2 - Key used for axes movement in "setting" mode: to move the axes in "setting" mode it is necessary to press and hold down key S2; if key S2 is released when an axis is moving the machine goes to emergency shutdown
- T - Two-position selector for activating the vacuum pump. For switching the vacuum pump ON/OFF.
- V - Mushroom-head emergency stop push-button: always active. For immediately stopping all machine functions, cancelling the machining cycle and stopping the axes and spindle rotation.
- W - 2-position selector for enabling the aligner (Optional)
- X - Three-position selector for "No edit" - "No mode": always active. In the "No edit" position (selector to the left) prevents editing on the CNC, i.e.: prevents data saves. In the "No mode" position (selector to the right) saves the machine functions previously enabled.
- Y - Selector for shavings conveyor. (Optional)



NOTE: the keys on the mobile push-button panel F2 - F4 - F5 - F7 - F8 are not enabled.

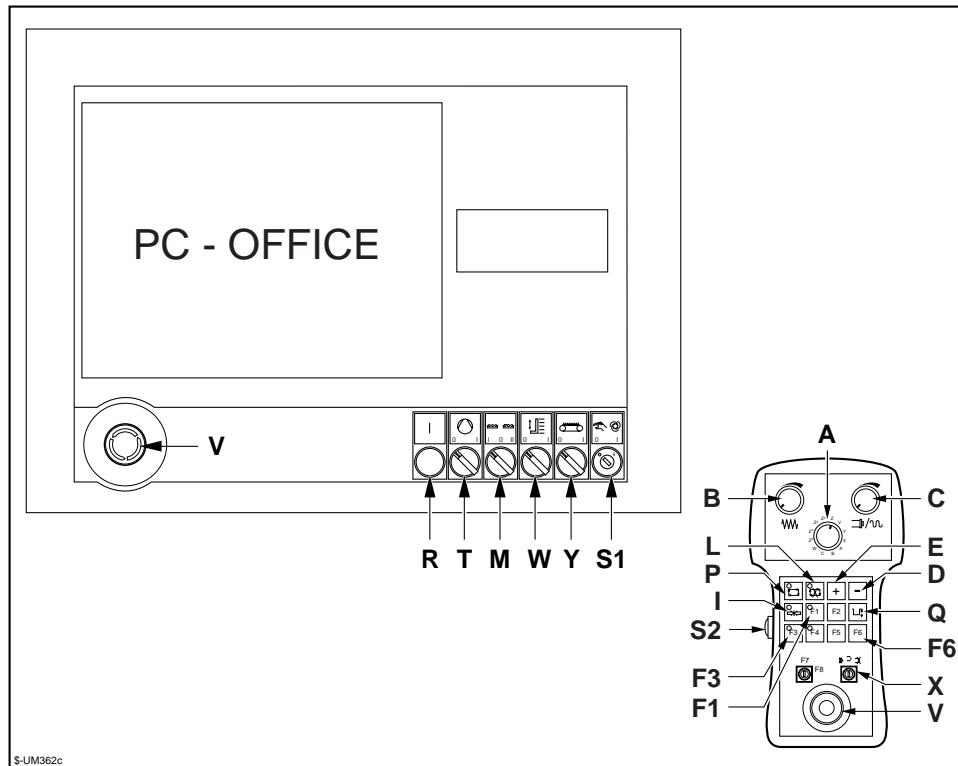


Fig. 4.1

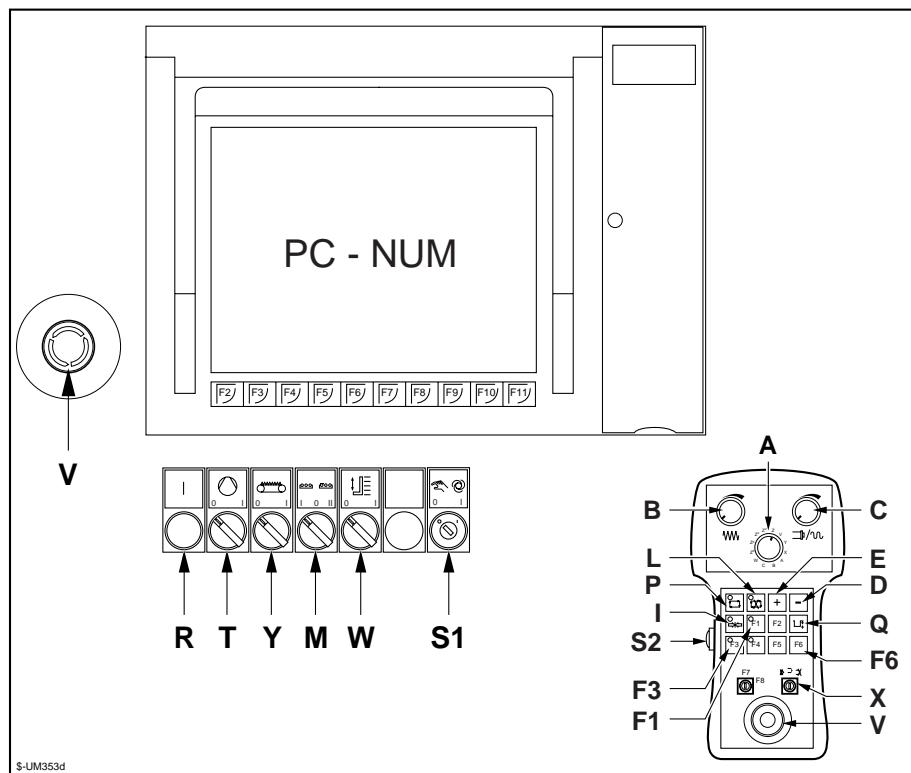


Fig. 4.1a

Note

4.2.1 Pushbutton Panels on the Machine

On the machines there is one pushbutton panel P (Fig.4.2):

- pushbuttons P1 are used to start the work cycle (one pushbutton for each working area);
- selector P2 is used to activate the suction cup.
- pushbutton P3 is used to release the work surface
- selector P4 is used to activate the liftable rectangular suction cup
- Selectors P5 are for selecting the machining areas for specular machining (optional)
- Mushroom-head button P7 (Optional) is used to activate the suction heads



NOTE: For machines with a single Nesting-type work table please see the specific chapter.

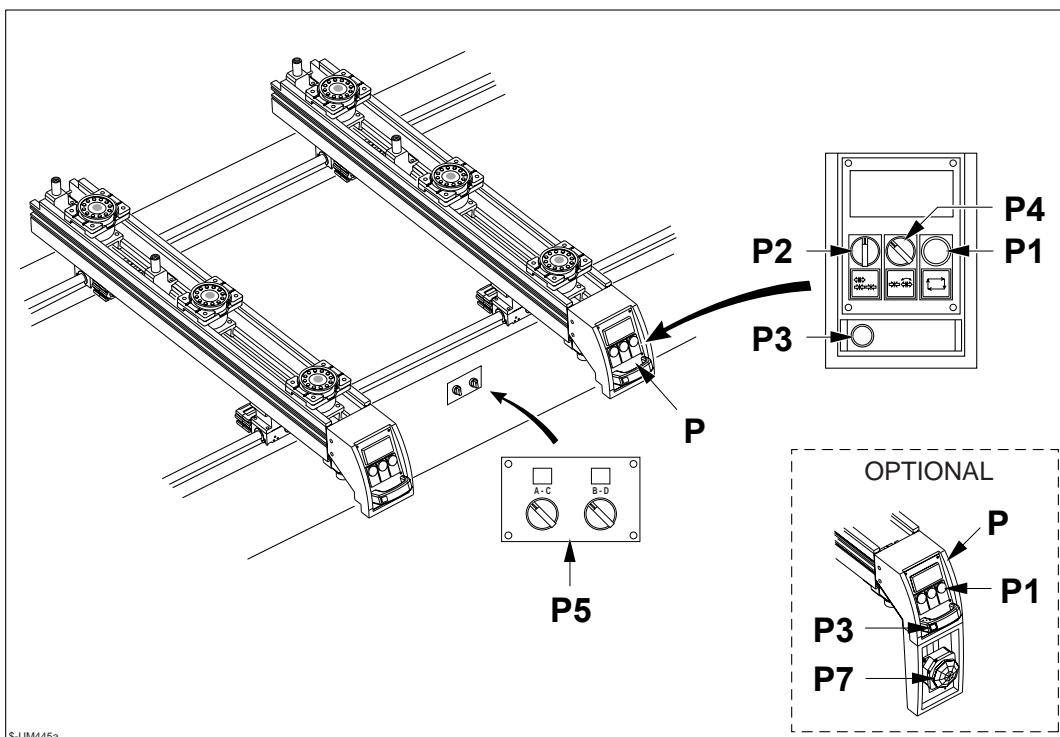


Fig. 4.2

4.3 Starting and Stopping

4.3.1 Starting



PRECAUTION: If the machine is being started for the first time, check that all securing brackets and blocks have been removed (see section 2.4).

To switch on the machine, proceed as follows:

- Check that the compressed air supply is on. The pressure gauge E (fig. 4.3a) should give a reading of at least 6 BAR.
- Using the key supplied, open the keyboard shelf B (fig. 4.3) and pull out the mouse table B1
- Turn the main On/Off switch A to position "I"
- Switch on the Computer: the Windows and Xilog operator interface start procedure begins
- when the screen page shown in fig. 4.4 appears, you can start the machine by pressing the white pushbutton R which lights up.



NOTE: if the white pushbutton R does not light up, check if any emergency or safety devices are activated.



IMPORTANT: before resetting the emergency and/or safety devices, check that the causes of their activation have been removed.



IMPORTANT: the white pushbutton R lights up to indicate that the machine is operating.

- The setting execute (see chapter 4.1 of the planning handbook Xilog3 / Panel Mac-Xilog Plus)
- When the message "sizing completed" appears on the display unit, the machine is ready to start machining.
- Turn on the chip extraction system (this is independent from the machine and optional).

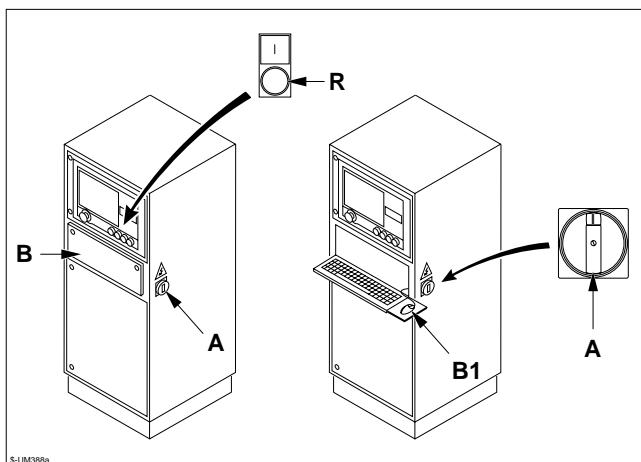


Fig. 4.3

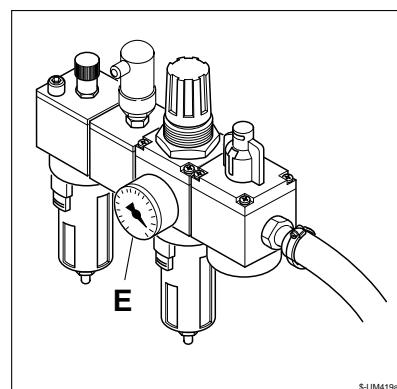


Fig. 4.3a

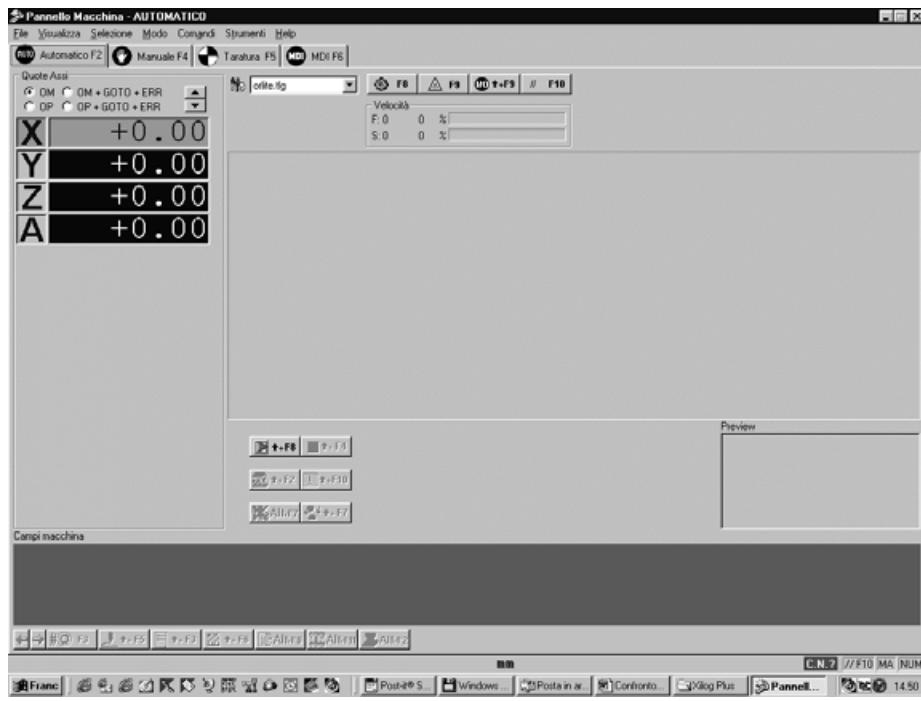


Fig. 4.4

4.3.2 Stopping

To switch on the machine, proceed as follows:

- Exit the operational mode on the NC
- Switch the machine to emergency stop condition.
- Close the Windows session (press Ctrl+ESC --> Close session --> Stop system)
- Turn off the continuity group (optional) if necessary
- Turn the main switch A to the 0 position.
- Clean and tidy up the working area.

4.3.3 Machine emergency state reset procedure

4.3.3.1 Procedure for resetting an emergency during machining

If a machine emergency is activated during machining, all of the axes and motors stop.

Under these conditions a tool may be trapped in the workpiece being machined. If you do not reset the emergency correctly you may damage the tool and the workpiece being machined.



NOTE: when an emergency is activated during machining, the cycle is interrupted and cannot be continued from the point at which it was interrupted.



WARNING: before restoring the machine and the CNC from emergency condition, verify that the cause for the emergency has been resolved.

There are two generic conditions which require different procedures for resetting the emergency:

- 1) stop with machining tools at a right angle to the standard machining faces (see sec. 4.6.2)
- 2) stop with machining tools at an angle to the machining faces

For the former, proceed as follows:

- Reset the machine emergency by pressing the white push-button R (fig. 4.1) for at least one second (until it comes on)
- Visually check the "trapped" conditions of the tool in the workpiece being machined
- Select the axis to be moved to extract the tool from the workpiece being machined with axis selector A (fig. 4.1) on the mobile push-button panel:
 - machining on face 1 = select Z-axis
 - machining on faces 2 - 3 = select X-axis
 - machining on faces 4 - 5 = select Y-axis
- Extract the tool from the workpiece being machined by moving the axis with the "+/-" keys on the mobile push-button panel (in this state the axes are moved up to a maximum speed of 2m/min.):
 - machining on face 1 = Z+
 - machining on face 2 = X+
 - machining on face 3 = X-
 - machining on face 4 = Y-
 - machining on face 5 = Y+
- Visually check that the tool is extracted from the workpiece
- When you have extracted the tool, press key F1 on the keyboard: the tool returns to the home position
- The machine is ready to continue normal operation

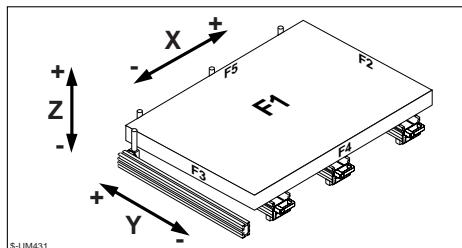


Fig. 4.4c

For the latter, proceed as follows:



NOTE: with the following instructions the integrity of the tool and/or workpiece are not guaranteed

- Reset the machine emergency by pressing the white push-button R (fig. 4.1) for at least one second (until it comes on)
- Turn a setting selector to
- Visually check the "trapped" conditions of the tool in the workpiece being machined
- To release the panel from the worktable turn selector P2 (fig. 4.2) to the stable position or press the multi-function push-button P7 (fig. 4.2a)
- Use the axis selector A (fig. 4.1) on the mobile push-button panel select one of the axes and move it extremely carefully to visually check tool extraction from the workpiece (in this state the axes are moved up to a maximum speed of 2m/min.)
- When you have extracted the tool, press key F1 on the keyboard: the tool returns to the home position and the reference stops are raised.



NOTE: If the above-mentioned operations were not sufficient to complete tool extraction from the workpiece, reactivate the machine emergency state and extract the tool manually.

4.3.3.2 Reset procedure after a cycle stop (Hold)

When you decide to perform checks during a machining cycle you can activate the "Hold" state with the "stop cycle"  key on the mobile push-button panel.

Under these conditions you can move the axes to extract the tool and move the mobile carriages.



NOTE: *The CNC saves the movement made after the stop with the "Stop cycle" command and, after the "Hold" state reset, only allows you to move the axes in the correct direction. They automatically stop at the initial dimension.*

To reset the initial conditions and continue the machining cycle from where it was interrupted, proceed as follows:

- press the "start cycle"  key on the mobile push-button panel
- select the axes previously moved one at a time (first the X - Y axes and lastly the Z-axis) and reposition them at the initial dimension where the cycle was interrupted.
- when all of the axes are at the initial position, press the "Start cycle"  key to restart machining.



IMPORTANT: *the axis can only move in the direction which takes it back to the starting dimension. It cannot move in the opposite direction. For this reason, the Z-axis must be moved last so as to avoid subsequent collisions between the tool and the workpiece being machined.*

4.4 Setting up the Machine

The term "machine setup" is used to indicate the sequence of operations required to make the machine ready to start machining panels.



WARNING:

- *During the machine adjustment and equipping phase, ensure that the machine is on emergency status (press the red mushroom-top button on the control panel) or in "setting" mode (rotate the setting selector on  and pull out the key).*
- *All the operations described in this section must be performed by the machine operator.*

MORBIDELLI recommends the following sequence of operations:

- Switch off the machine or switch it to emergency stop condition (sec.4.3.2 / sec.1.4.1 - 1.4.2)
- Clean the working area.
- Fit the tools (sec. 3.2.*)
- Adjust the panel support surfaces (sec. 3.3.*)
- Fit and adjust the panel gripping or clamping devices (sec. 3.4.*)
- If the machine is switched off, switch it on (sec. 4.3.1)and switch it to emergency stop condition (sec.1.4.1 - 1.4.2)
- Switch the N.C. to setting mode and enter the measurements of the tools fitted (see the CNC documentation enclosed).



WARNING: *The machine is equipped with a device that detects the presence of a tool on the electro spindle, BUT IT DOES NOT RECOGNIZE THE TYPE OF TOOL ACTUALLY MOUNTED.*

CHECK THAT THE TOOLS MOUNTED ARE CONSISTENT WITH THOSE RECALLED IN THE WORK PROGRAMS.

4.5 Machining Procedures

Machining procedures are the operations to be performed in sequence in order to run one or more complete machining cycles correctly.

We recommend the following sequence:

- Set up the machine: see sec. 4.4.

**WARNING:**

- *During the machine adjustment and equipping phase, ensure that the machine is on emergency status (press the red mushroom-top button on the control panel) or in "setting" mode (rotate the setting selector on and pull out the key).*
- *All the operations described in this section must be performed by the machine operator.*



- **BEFORE STARTING THE WORK, IT IS IMPORTANT TO VERIFY THAT THE TOOLS RECALLED IN THE WORK PROGRAM HAVE BEEN EQUIPPED IN A MANNER COMPATIBLE WITH THE WORK TO BE CARRIED OUT.**
- **ALSO CHECK THAT THE TOOLS MOUNTED ON THE STOREROOM ARE COMPATIBLE WITH THE EQUIPPING RECALLED IN THE WORK PROGRAM.**

- Switch on or reset the machine: see secs.4.3.1 / 1.4.1 / 1.4.2.
- Load N.C. program or lists run.
- Turn on the vacuum pump with the switch A (Fig.4.5).
- Position the panel to be machined (refer to sec. 4.7).

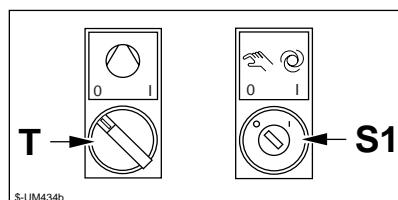


Fig. 4.5

At this stage, we recommend that you simulate machining operations. Then, before starting work on one or more product batches, it is a good idea to perform a single machining cycle and to check the results.
To do this, proceed as follows:

- With the N.C. in "Automatic" mode, press the horizontal function key "simulate" (key F7).
- Press start pushbutton P1 (Fig. 4.6).
- The N.C. simulates a programmed run, driving only the axes, and checking that there are no inconsistencies in the program.

A machining cycle may now be performed:

- Exit simulate mode by pressing the horizontal function key "simulate" (F7) on the NC
- Turn "setting" selector switch S1 to the position.
- Press start pushbutton P1 (fig. 4.6)
- When the machining is complete raise the suction cups with selector P2 and remove the panel
- Perform the check measurements.

You are now ready to produce programmed workpieces.

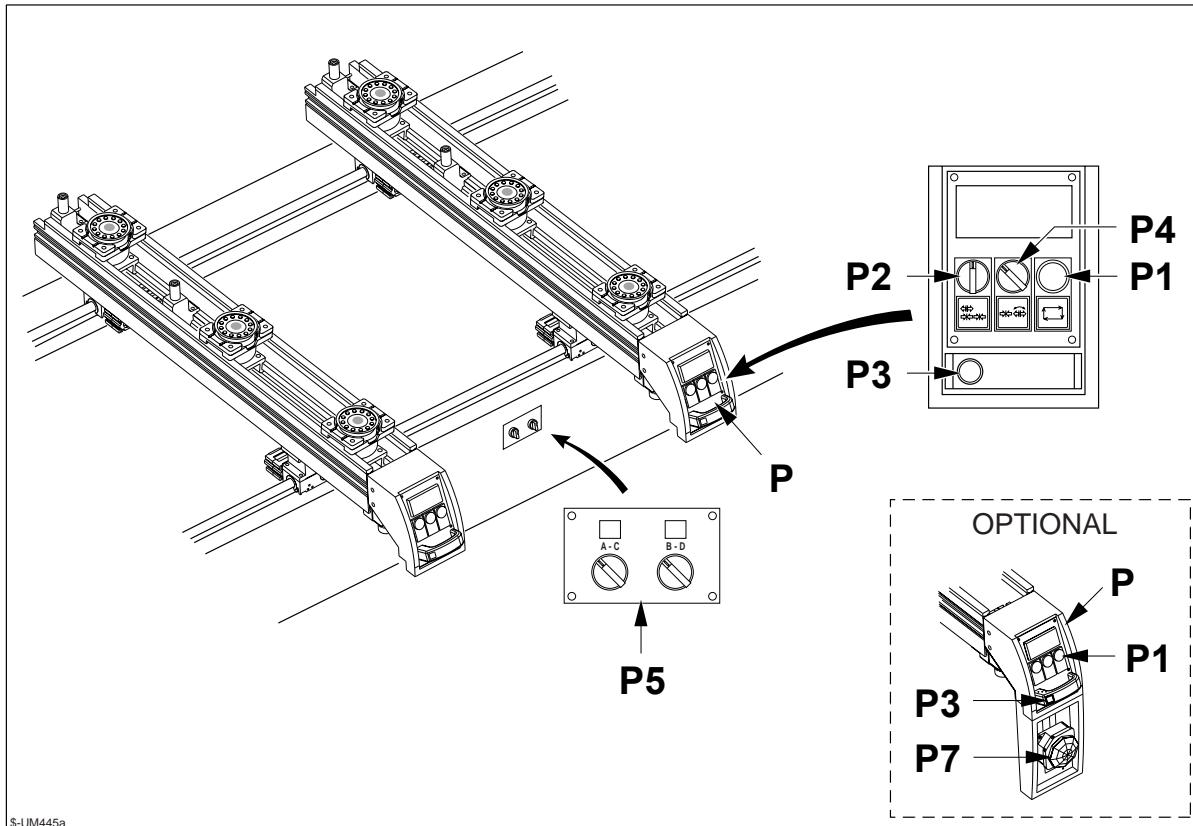


Fig. 4.6

4.6 Programming

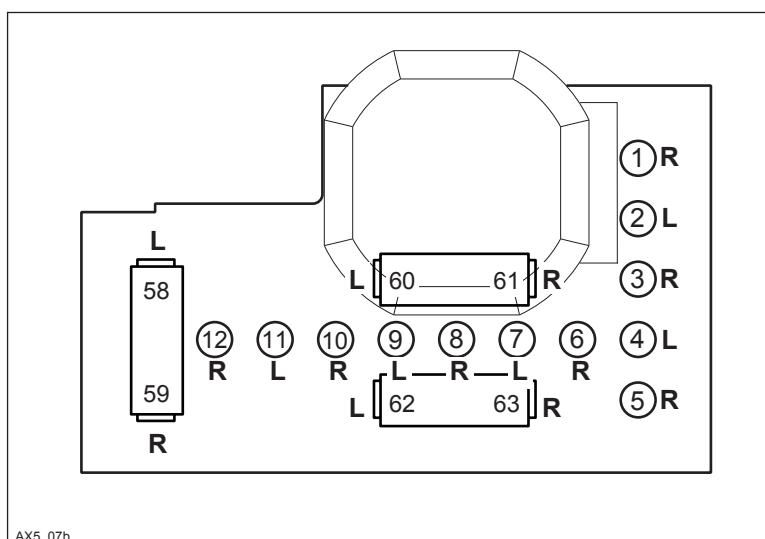
This section provides information to facilitate data entry during programming.
To program the NC refer to the specific manual enclosed.

4.6.1 Tool Numbering

On units installed by MORBIDELLI, the tools are defined during production and IT IS FORBIDDEN TO CHANGE THEM.

The illustrations show the standard numbering with which the tools are always defined.

Drilling unit with 12 vertical spindles



AX5_07b

4.6.2 Defining the work faces and the machining zones

Fig. 4.7a shows the panel work faces with the X and Y co-ordinates; the Z co-ordinate is used for the machining depth.

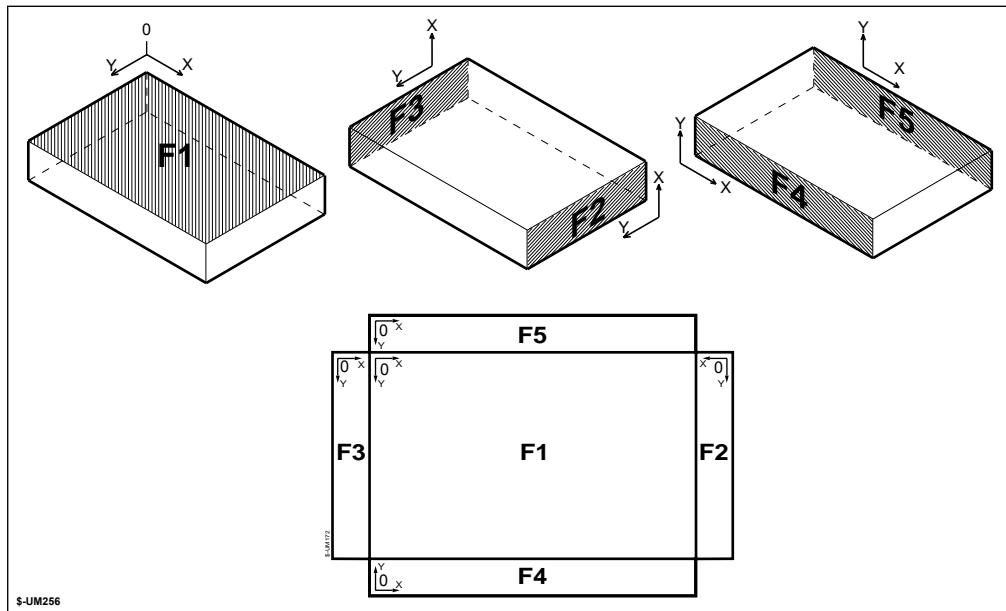


Fig. 4.7a

Figure 4.7ab indicates the carriage movement axes with the symbols showing increase (+) and reduce (-) movements.

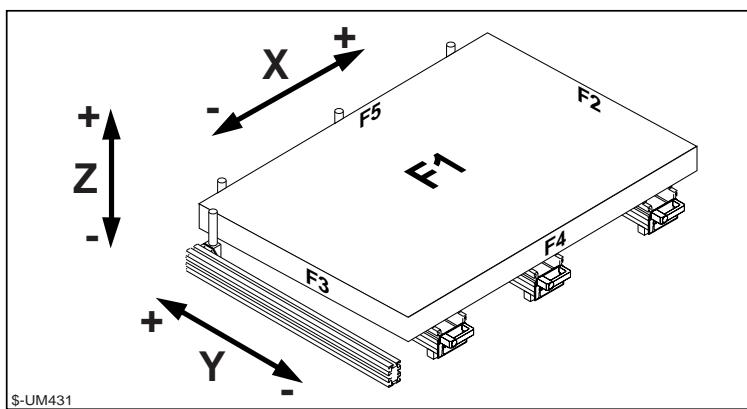


Fig. 4.7ab

AUTHOR shows two working fields : A - D (see fig. 4.7b)

For every working field, depending on the machine configuration, there is a start pedal button to A1 - D1, or a start button A2 on the machine (fig. 4.7d).

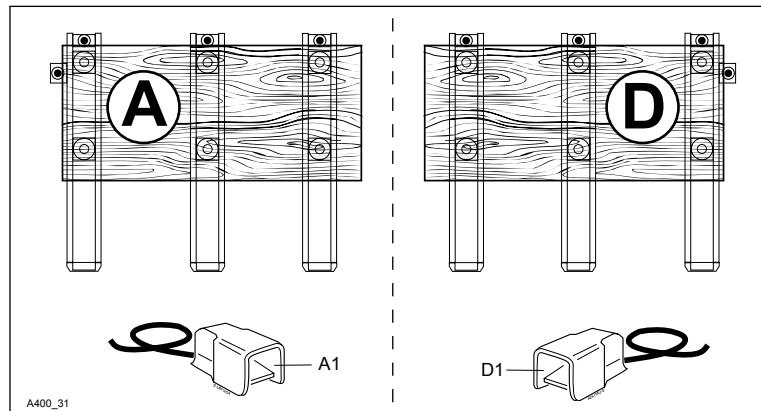


Fig. 4.7b

Where the centre stop is fitted (OPTIONAL) there are four working areas: A - B - C - D (see fig. 4.7c).

For every working field, depending on the machine configuration, there is a start pedal button to A1 - B1 - C1 - D1, or a start button A2 on the machine.

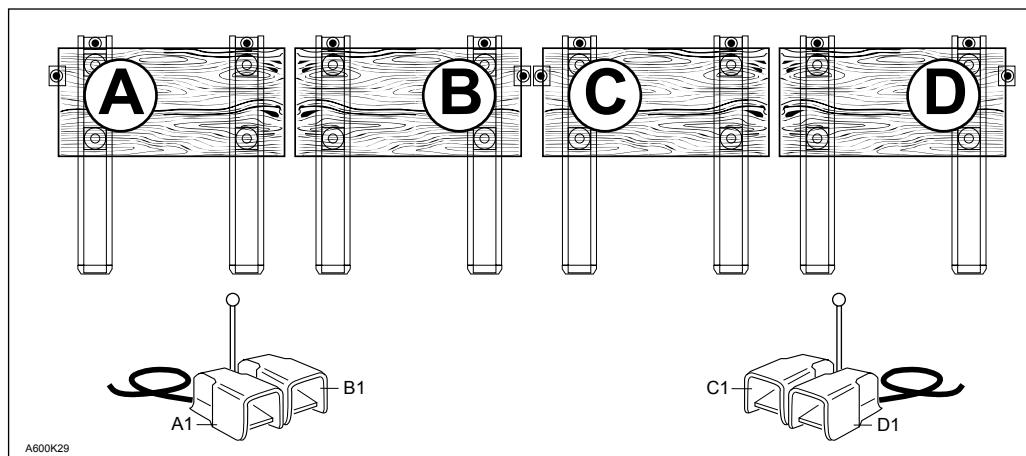


Fig. 4.7c

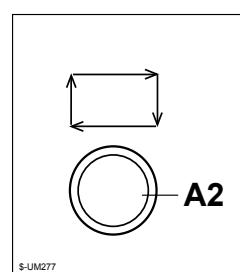


Fig. 4.7d

4.6.3 Manual extractor hood movement

4.6.3.1 ISO commands

If you need to position the extractor hood manually, use the ISO commands described below:

- from the basic menu press key "F6" to activate the "MDI" state (Fig. 4.7e)

- go to the "ISO" field

- enter the following codes to execute the relative commands:

- M23 = hood upstroke cycle
- M24 = hood lifting cylinder downstroke
- M26 = hood lifting cylinder upstroke
- M27 = 12-spindle boring head downstroke cycle
- M120 = hood downstroke cycle

- to confirm the code press ENTER ↵

- Press the "start cycle"  button on the mobile push-button panel to execute the command

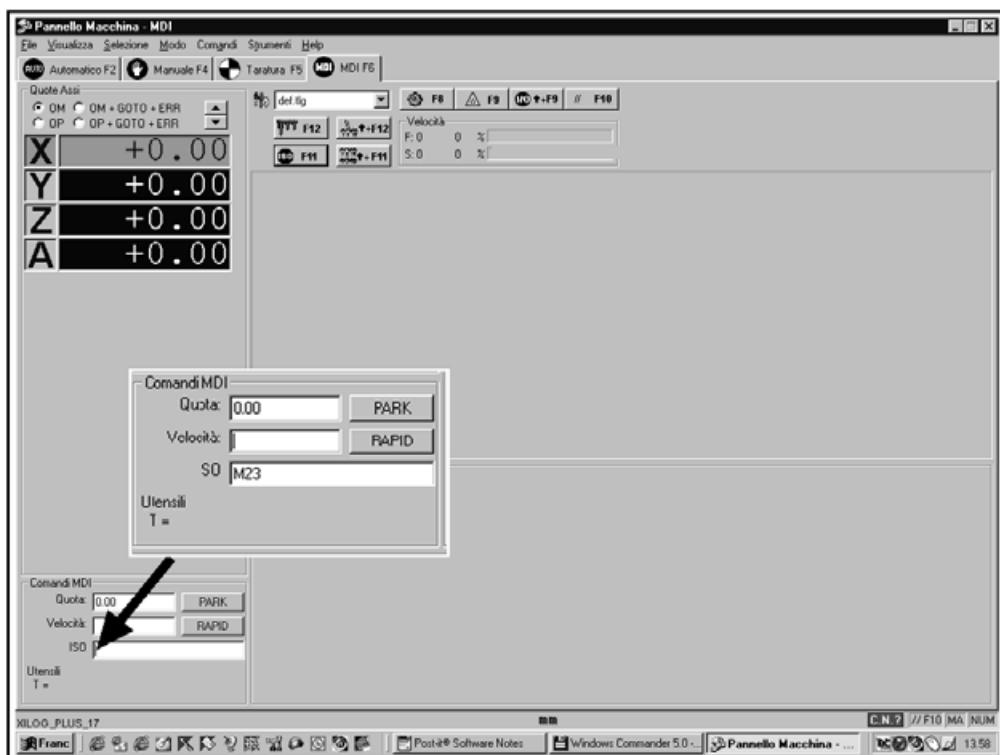


Fig. 4.7e

4.6.3.2 Hood reference cycle

When message "MSG167" - HOOD REFERENCE appears on the display, put the hood in the home position (hood down and cylinders up).

To do this, use ISO commands M24 and/or M26 (see previous section).



WARNINGS: Before raising the cylinders (M26) check that the bushing A (fig. 4.7f) of each rod is not in the relative seat B in the hood.

To release the bushings from the seats B, activate the Setting mode by turning selector S1 to (Fig. 4.7g), selecting axis "C" and holding down push-button S2. Turn the axis anti-clockwise approx. 5 - 7 degrees with the JOG + key.



NOTE: releasing push-button S2 during hood rotation generates a machine emergency condition

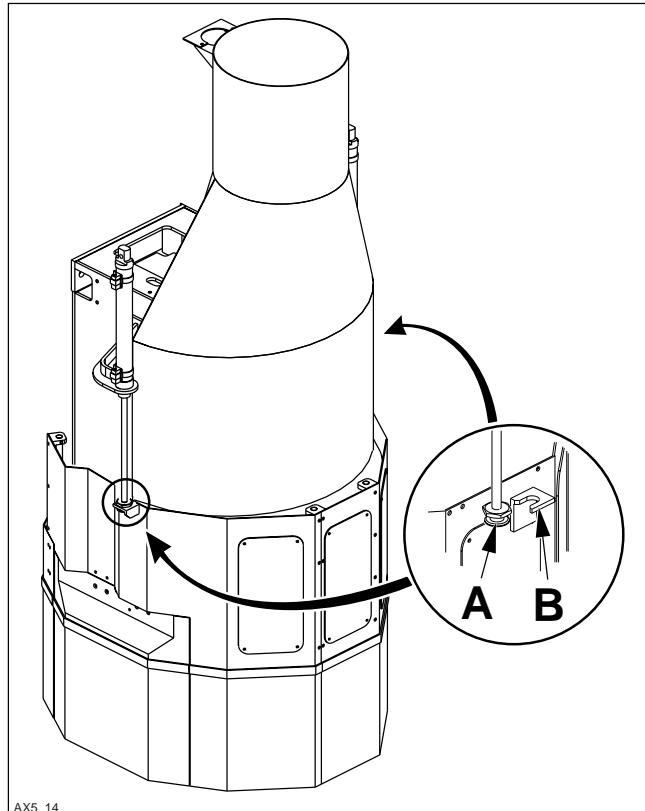


Fig. 4.7f

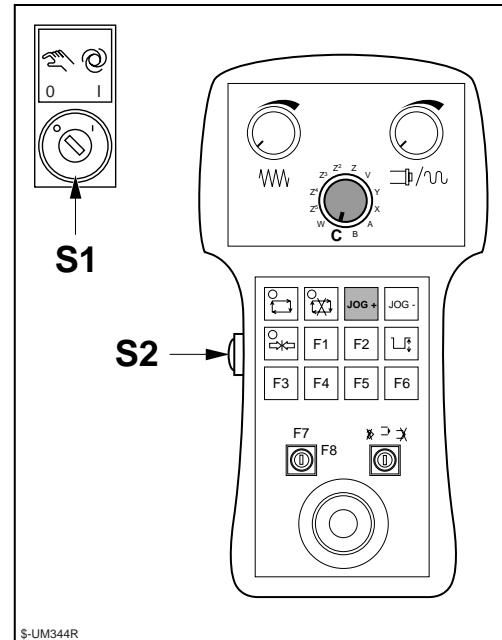


Fig. 4.7g

4.7 Positioning a Panel

To position a panel correctly on the work tables, proceed as follows:

- lift the reference stops (load a machining program in Automatic mode)
- check that the vacuum pump is ON
- slide the panel on the work tables, positioning it against the reference stops B (Fig. 4.8a)
- hold the panel so that it is resting firmly against the stops, then depending on the push-button panel mounted on the machine, switch the selector P2 or push-button P7 ON and OFF so that the suction cups hold the panel
- at this point the stops draw back and the panel is ready for machining. The program box D (Fig. 4.8b) on the NC turns dark blue if the field is immediately available for machining. It turns light blue if it is not immediately available for machining and a selection is generated (this occurs when the machine is machining on another field).



WARNING: BEFORE YOU START MACHINING, MAKE SURE THE PANEL IS SECURE ON THE WORK SURFACE.

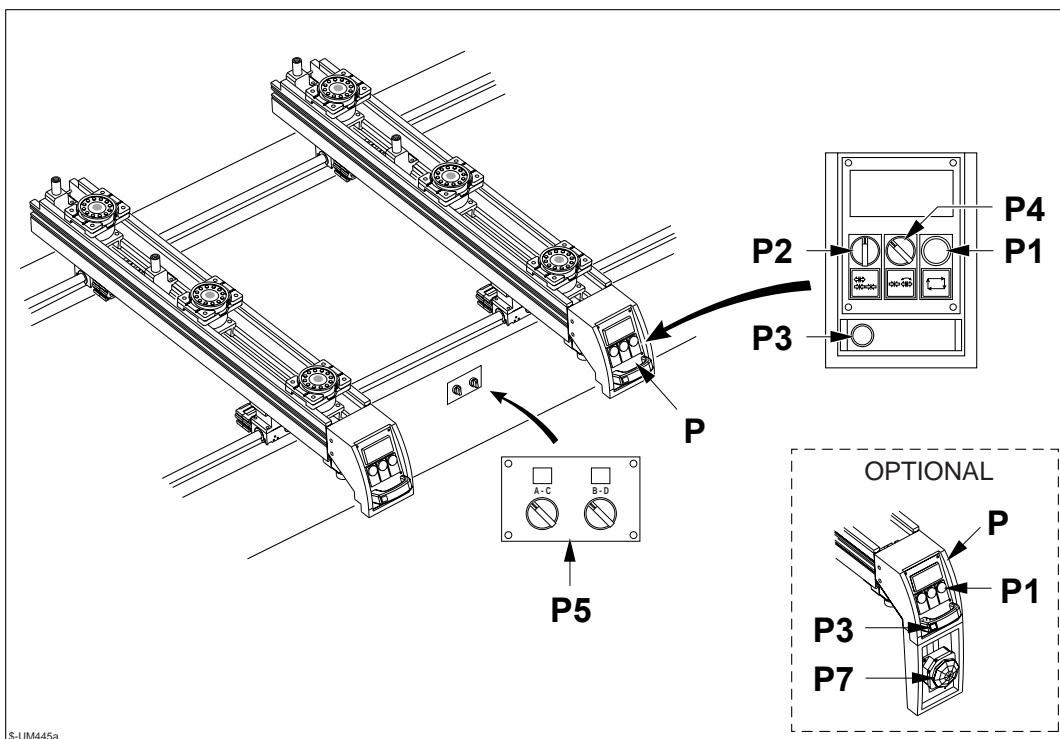


Fig. 4.8

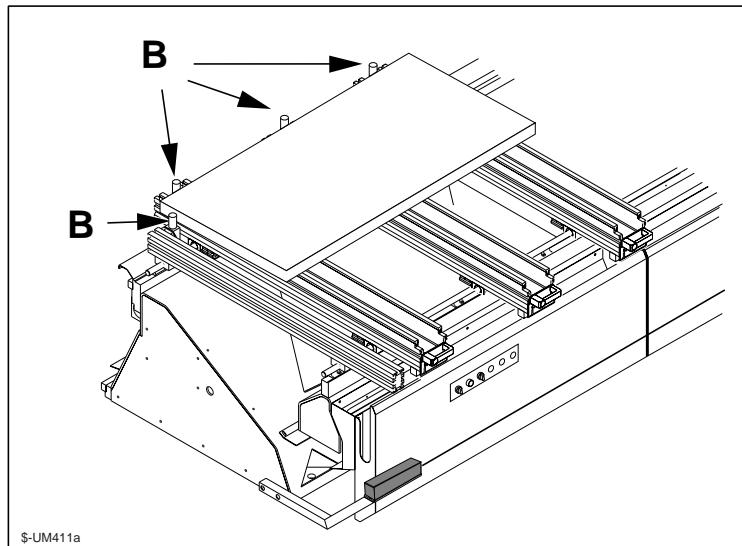


Fig. 4.8a

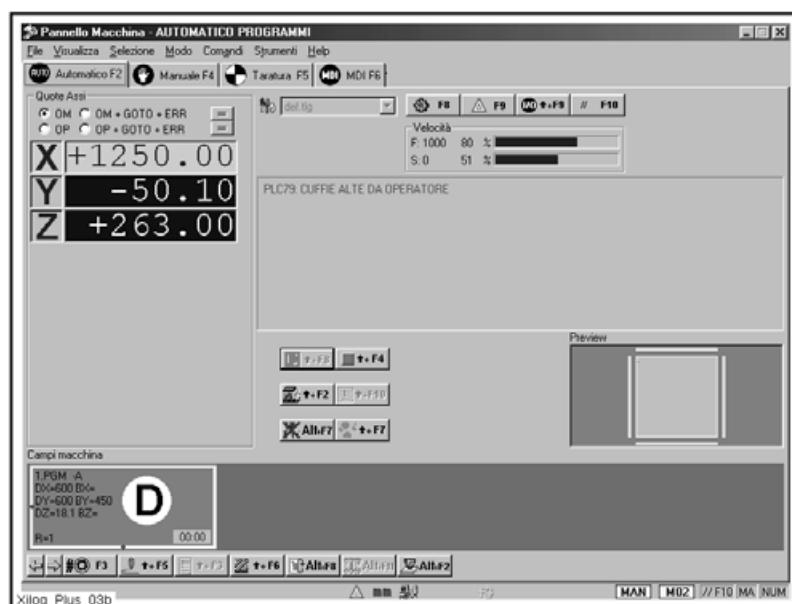


Fig. 4.8b

4.8 Use of additional stop (Optional)

An additional stop A may be installed on the machine on request (fig.4.9).

This stop is used to machine panels that are larger than the standard work bench (see chap. 1.8). Two rollers B are provided with the stop.



NOTE: when the vacuum cups positioned on the working table (see chap. 3.3.2) are used, it's necessary to install the tubular spacers C and the extension D.

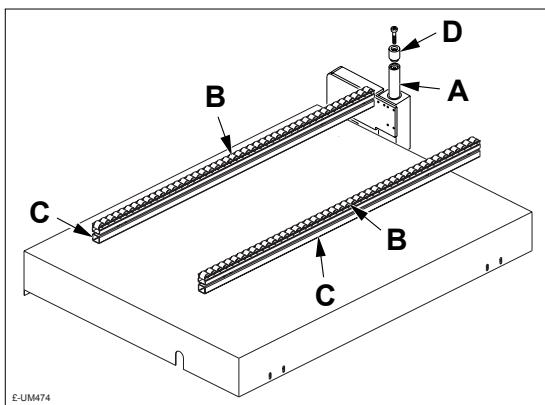


Fig. 4.9



PREMISE: As the panel to be machined is larger than the operators' unit working field, it is necessary to write a list with two programs in order to perform all the types of machining on the panel.

- write down the first program including the types of machining that can be performed on the field "D" (see fig.4.10)
- write down another program (still on the field "D") including the types of machining that could not be performed with the first program, but replacing its origin with a value equal to the distance "X" between the stop E and the stop A (see fig.4.11)
- write down a list to recall the previous programs.

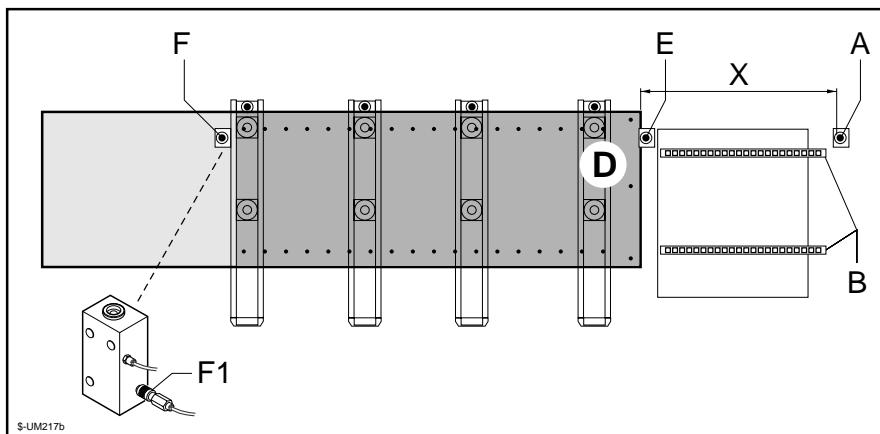


Fig. 4.10

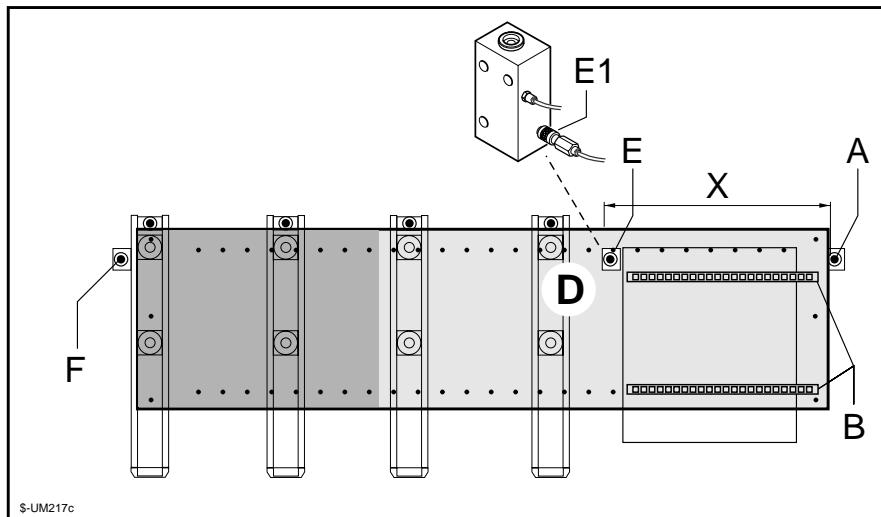


Fig. 4.11



NOTE: Before machining, it is advisable to position the SETTING selector switch on "I"; press start to start the cycle in "mock" mode. In this way, it can be checked if the operators' units movements correspond to the types of machining required to be performed on the panel.

The panels can now be machined:

- recall the program list on the CNC
- use the pneumatic cock F1 to disable the stop F (fig.4.10)
- place the panel against the ledges of field D
- start suckers and check the panel is firmly placed onto the work bench
- start the cycle and wait for the machine to complete the first program of the list
- position the SETTING selector switch on
- use the pneumatic cock E1 to disable the stop E (fig.4.11)
- release the panel
- place the panel against the stop A
- start suckers and check the panel is firmly placed onto the work bench
- position the SETTING selector switch on
- start the cycle again to perform the second machining program



PRECAUTION: When the supplementary right-hand stop is not used, it is advisable to disassemble the roller units B as there is a possibility of collision with them during machining on field D with horizontal heads on "face 2" of the panel.

INDEX

4.10.1	Shavings removal.....	2
--------	-----------------------	---

4.10.1 Shavings removal

When carrying out machining which produces shavings, follow the procedure described below to remove shavings from the worktable.

There are two different machining situations, which require different methods:

- "pendulum" machining
- "non-pendulum" machining, using a single worktable

PENDULUM MACHINING



IMPORTANT: Shavings may be produced during pendulum machining. Unless these are removed, they may be ejected by subsequent machining. To remove shavings, proceed as follows:

With pendulum machining (to be performed only in fields A and D) programme a "MIX" (see use and programming manual) with a sequence of programs to divide the machining which creates shavings from the other machining.



N.B.: to carry out the MIX on the same panel, you must enable a PLC function by writing the ISO command in the program editor : ISO - E10028=1 (for CNC - NUM) - ?%EDK[28]=1 (for CNC - ESA)

XILOG³MMI

```
EDIT: bugasusp.pgm
00001  H1 DX-520 DY-360 DZ-20 D-MM /DEF #
00002  ISO "E10028=1"
00003  G1 X-10 S-10 Z-10.5 E-1#V-5 S-9000#T-143
00004  SY -1 M-0
00005  G1 Y-80 V-
00006  SX -1 M-0
00007  G1 X-0 V-45
00008  SY -0 M-0
00009  G1 Y-0 V-4
00010  SX -0 M-0
00011  G1 X-70
00012  SY -1 M-0
00013  G1 Y-0 V-45
00014  SX -1 M-0
00015  G1 X-80 V-4
```

ISO
E10028=1

Integrazione ISO

GARANTITO

F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12

Fig. 1

XILOG PLUS

```
Xilog Plus [X0001.xls]
File Modulo Strumenti Guida Pianeta Help
00001 ISO "E10028=1"
00002 G1 X-10 S-10 Z-10.5 E-1#V-5 S-9000#T-143
00003 G1 Y-80 V-
00004 SX -1 M-0
00005 G1 X-0 V-45
00006 SY -0 M-0
00007 G1 Y-0 V-4
00008 SX -0 M-0
00009 G1 X-70
00010 SY -1 M-0
00011 G1 Y-0 V-45
00012 SX -1 M-0
00013 G1 X-80 V-4
00014 ISO "E10028=1"
```

ISO
E10028=1

Dimensione di messa in opera

File Edit Insert Modulo Strumenti Guida Pianeta Help
STATO: 00001.xls

Fig. 1



N.B.: the programming lines in the screen pages containing the figures are provided as an example

Load the panel in field A and press the relative START pushbutton (see Fig. 2), then you can load a second panel in field D (see fig. 3).

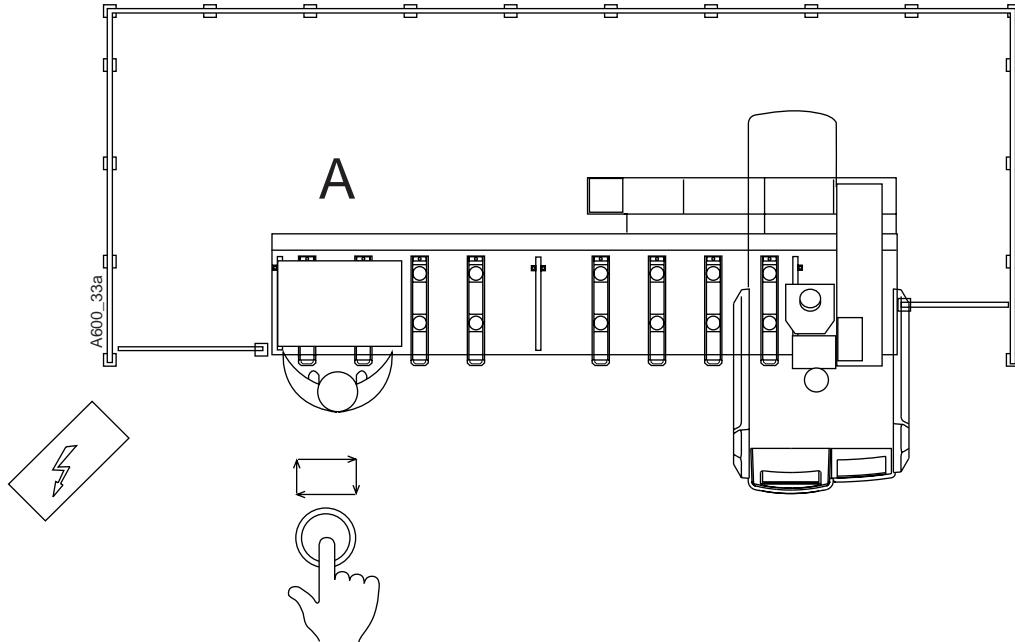


Fig. 2

4.10 - Shavings removal - Rel. 1.1

GB

Select machining in field D with the relative "start" pushbutton (Fig. 3). When the machine has completed the first machining in field A (which creates shavings), the machining unit moves to field D to carry out the first MIX machining, leaving field A so that you can remove the shavings from the worktable in field A (Fig. 4).



IMPORTANT: When removing shavings, always take care not to enter the machining field in which the machining unit is working.

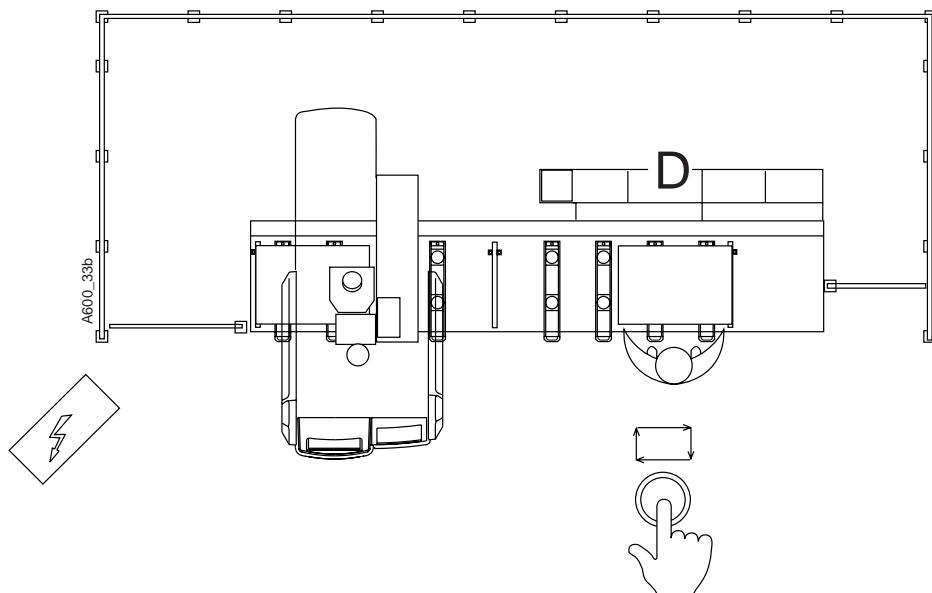


Fig. 3

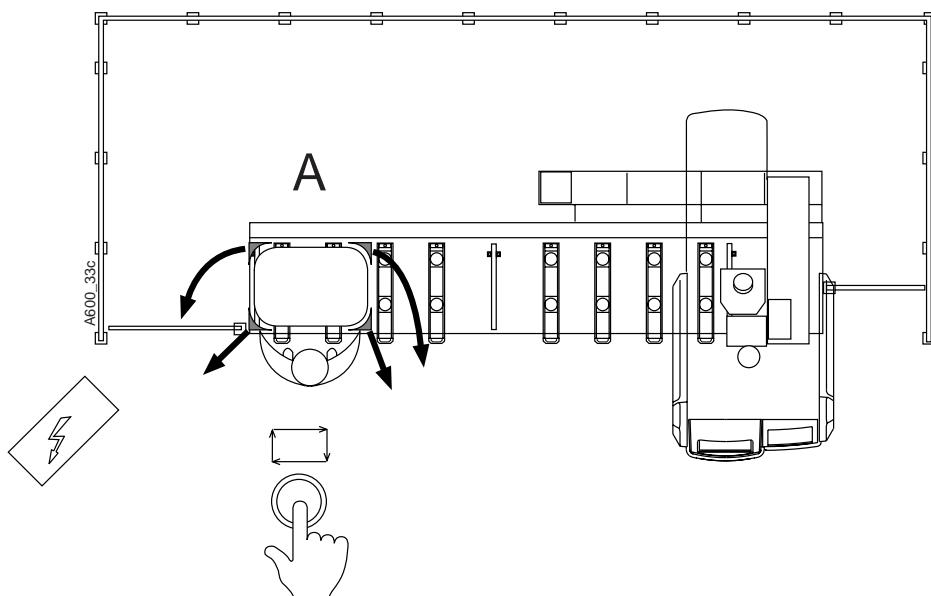


Fig. 4

Remove the shavings, then select machining in field A with the relative "start" pushbutton. When the machine has performed the machining in field D the machining unit moves to field A to perform the subsequent machining in the MIX, leaving field D so that you can remove any shavings from the worktable in field D (Fig. 5). After removing the shavings, select machining in field D with the relative "start" pushbutton.

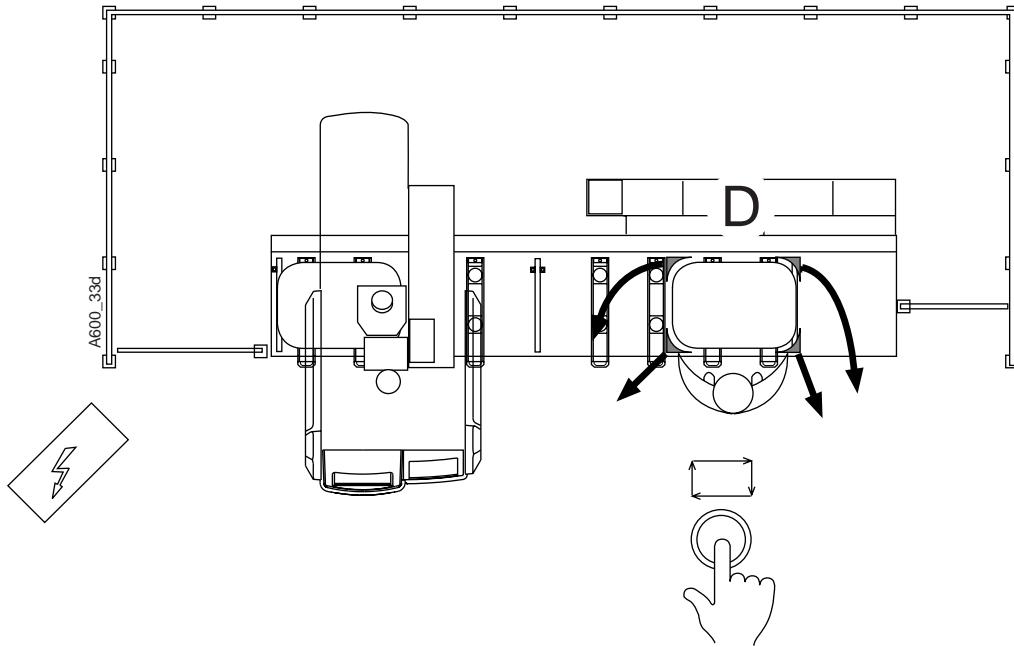


Fig. 5



IMPORTANT: Upon completion of the machining, if you want to reset the workpiece decrement system, return the CNC parameters to the original conditions, that is to say, write the ISO command in the program Editor: ISO - E10028=0 (for CNC - NUM) - ?%EDK[28]=0 (for CNC - ESA)



N.B.: Command ISO - E10028 (for CNC - NUM) - ?%EDK[28] (for CNC - ESA) manages workpiece decrements:

- if you enter the value = 0 the workpiece decrement occurs when the workpiece is physically released from the worktable
- if you enter the value = 1 the decrement occurs at the end of program execution



THE ISO E10028 COMMAND SET IN A PROGRAM REMAINS ON UNTIL YOU SWITCH OFF THE MACHINE

AT POWER UP THE ISO E10028 DEFAULT COMMAND IS ALWAYS = 0

NON-PENDULUM MACHINING - USING A SINGLE WORKTABLE

When machining on a single worktable, include the two commands described below in the machining program, so that when in the Hold state, the machining unit is parked in a zone which is far away from the operator, allowing you to remove the shavings in safety.

Insert command line N (null operation - see user and programming manual sec. 6.13.22), entering values which allow machining unit positioning in a safe parking zone, which does not obstruct shaving removal operations (see example in figures 7 - 8).

After command line N, insert the SET - STANDBY command, which enables the machine HOLD state

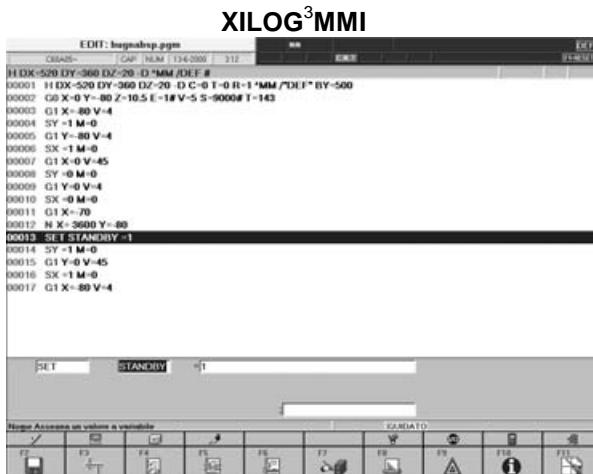


Fig. 6

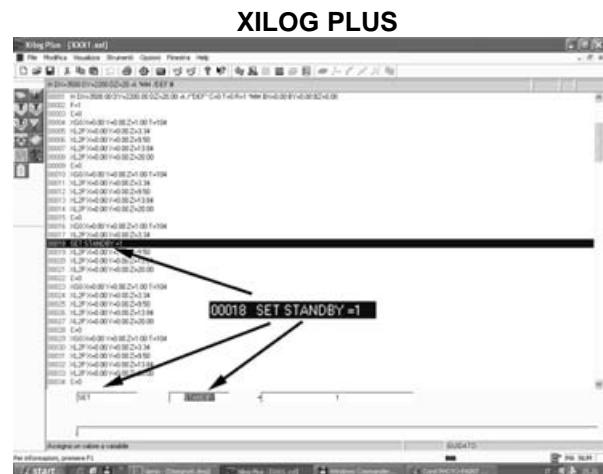


Fig. 6



N.B.: the programming lines in the screen pages containing the figures are provided as an example.

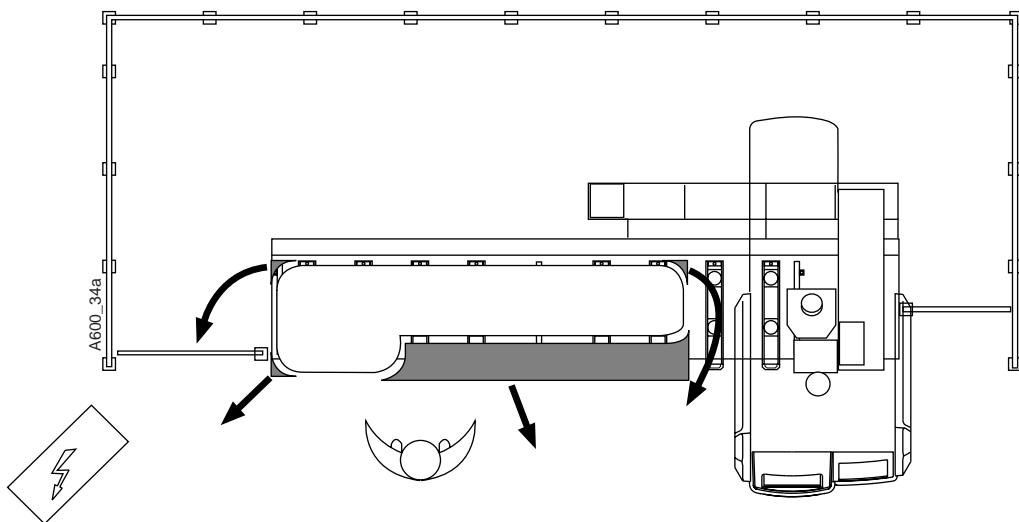


Fig. 7

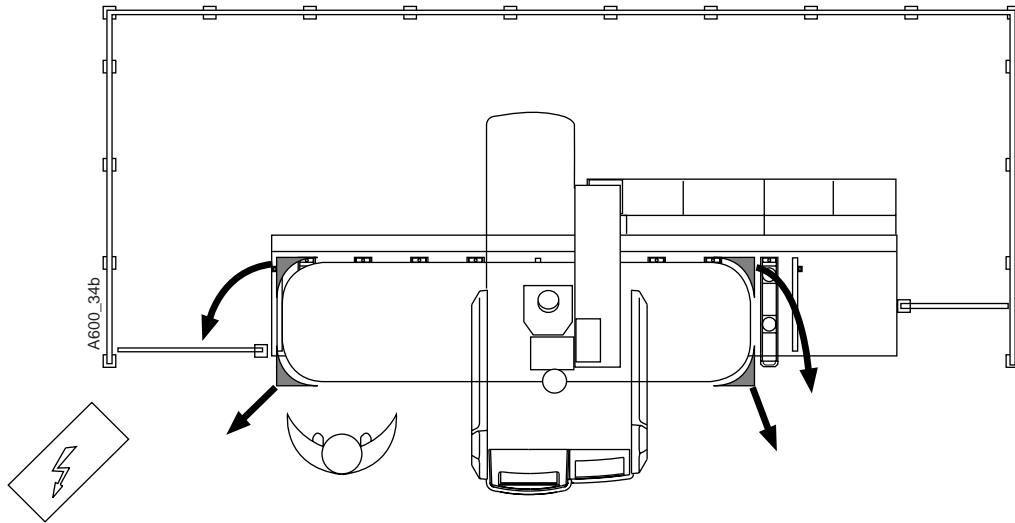


Fig. 8

After removing the shavings from the worktable, press the Start pushbutton on the CNC or the mobile control panel to restart the machining program.

Note

INDEX

5.1	Maintenance	2
5.2	Cleaning.....	4
5.3	Periodic Checks and Maintenance	4
5.4	Periodic Lubrication.....	9
.	Electrospindle and HSK63 taper maintenance	12
5.4.1	Centralised Lubrication Unit (OPTIONAL)	16
5.5	Table of greases and oils	18

5.1 Maintenance



WARNING: During maintenance, cleaning and lubrication operations, make sure that the power supply and compressed air are switched off and cannot be accidentally switched on.

To switch off the power supply, turn main switch A (fig.5.1) to the zero (0) position and lock it with a padlock

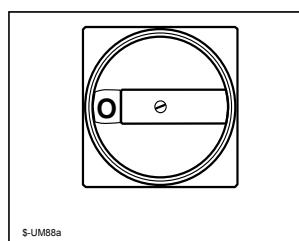


Fig. 5.1

To switch off the compressed air supply

- on Metalwork filter units, press down the knob H (fig.5.2) and padlock it.

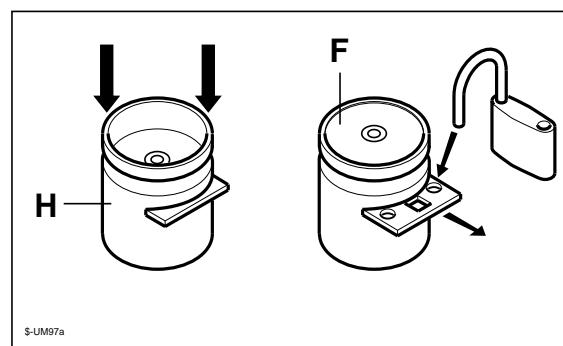


Fig. 5.2

- on Pneumax filter units, turn the knob L (fig.5.3) and padlock it.

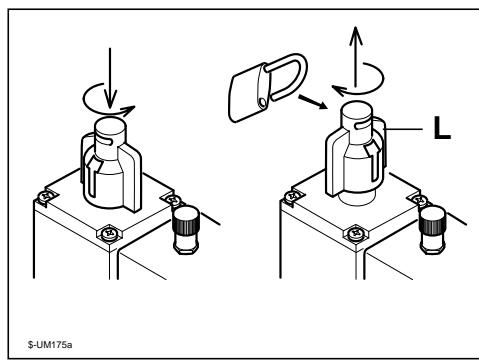


Fig. 5.3

**PRECAUTIONS:**

- The keys to padlocks must be given to the authorised personnel.
- All the operations described in this section must be performed by the machine operator or by qualified personnel.
- The intervals between maintenance operations are approximate and may vary according to the working environment of the machine and the type of material being machined:



NOTA: N.B.: Recommended maintenance intervals are calculated according to use of the machine for approx. 8 hours per day. If the machine is used more than this for example, several shifts each day) maintenance operations must be carried out more often.



IMPORTANT: The machining of medium density material creates very fine sawdust and shavings; in these cases the maintenance and lubrication operations must be performed more frequently

- To inject grease, use the grease gun P provided (Fig.5.4); each pump of the gun corresponds to 0.7 cm³ of grease (See table in Sec. 5.6).

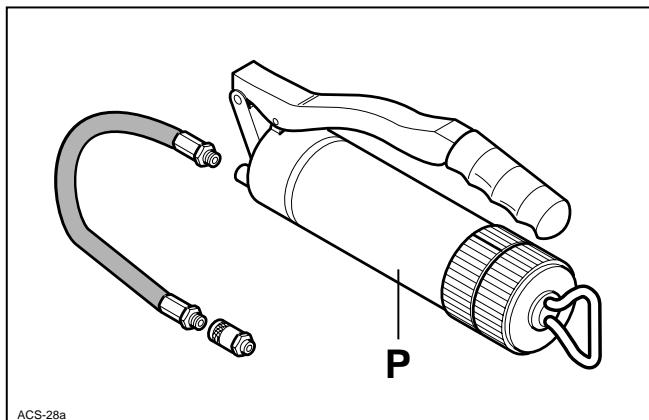


Fig. 5.4



CAUTION: The keys for padlocks for the main electricity On/Off switch and the filter unit compressed air quick discharge valves, and the tool for opening the electrical cabinet doors must be supplied to authorised personnel.

5.2 Cleaning



WARNING: During maintenance, cleaning and lubrication operations, make sure that the power supply and compressed air are switched off and cannot be accidentally switched on (See Sec. 5.1).

For correct cleaning of the machine, follow the instructions below:

- Remove sawdust and shavings with a vacuum cleaner. Do not use compressed air. Compressed air will only blow dirt into delicate machine parts leading to operating faults.
- Keep the axis guides and screw drives clean at all times.
- Keep the work surfaces and suction heads clean at all times.
- Keep the working zone around the machine clean.

5.3 Periodic Checks and Maintenance



WARNING: During maintenance, cleaning and lubrication operations, make sure that the power supply and compressed air are switched off and cannot be accidentally switched on (See Sec. 5.1).



PRECAUTIONS:

- All the operations described in this section must be performed by the machine operator or by qualified personnel.
- The intervals between maintenance operations are approximate and may vary according to the working environment of the machine and the type of material being machined:



NOTA: N.B.: Recommended maintenance intervals are calculated according to use of the machine for approx. 8 hours per day. If the machine is used more than this for example, several shifts each day) maintenance operations must be carried out more often.



IMPORTANT: The machining of medium density material creates very fine sawdust and shavings; in these cases the maintenance and lubrication operations must be performed more frequently



PRECAUTION: IT IS EXTREMELY IMPORTANT TO REGULARLY CHECK THAT EMERGENCY DEVICES ARE WORKING PROPERLY ESPECIALLY IF THEY ARE NOT OFTEN ACTIVATED (SEE CHAP. 1.6...).



PRECAUTION: IT IS EXTREMELY IMPORTANT TO REGULARLY CHECK THAT SAFETY DEVICES ARE WORKING PROPERLY ESPECIALLY IF THEY ARE NOT OFTEN ACTIVATED (SEE CHAP. 1.7...).

AT FREQUENT INTERVALS (daily maintenance):**Filter unit:**

- Check oil level in the bowl A (Fig.5.5) and top up, if necessary. The oil should always be over the half way mark. Use type C oil, as indicated in the table in Sec. 5.6.
- To top up, depending on the filter unit fitted, unscrew the filler cap G or unscrew the jar A .
- Check the oil drip rate through indicator B. The recommended drip rate is one drop every 10^{*}working cycles. To adjust the drip rate, turn screw C.
- Check the bowl D for signs of condensate and bleed out if necessary by opening the bleed valve E.



** N.B.: this value is provided by way of example, since a machine which carries out mainly boring operations consumes less air than a machine which carries out routing with automatic tool change-over. Always check the solenoid valve silencers: if they become dirty with oil, reduce its absorption in the filter unit lubricator (increase the number of cycles for each drop of oil absorbed).*

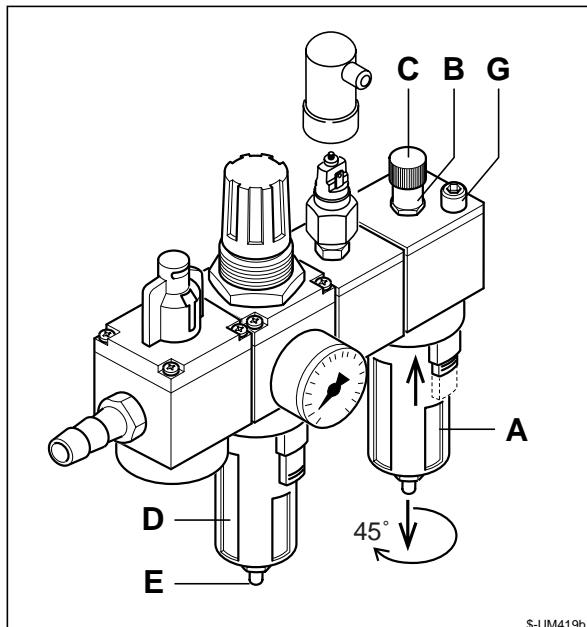


Fig. 5.5

PERIODICALLY (weekly maintenance):**Every 50 hours:****Vacuum pump precleaner:**

- Switch off the pump
- Undo the spring clips A (fig.5.6) and remove cover B.
- Take out the cartridge and clean it by blowing compressed through it from the inside.
- Refit the cartridge and the cover B and check that the sealing ring in the cover is correctly positioned.

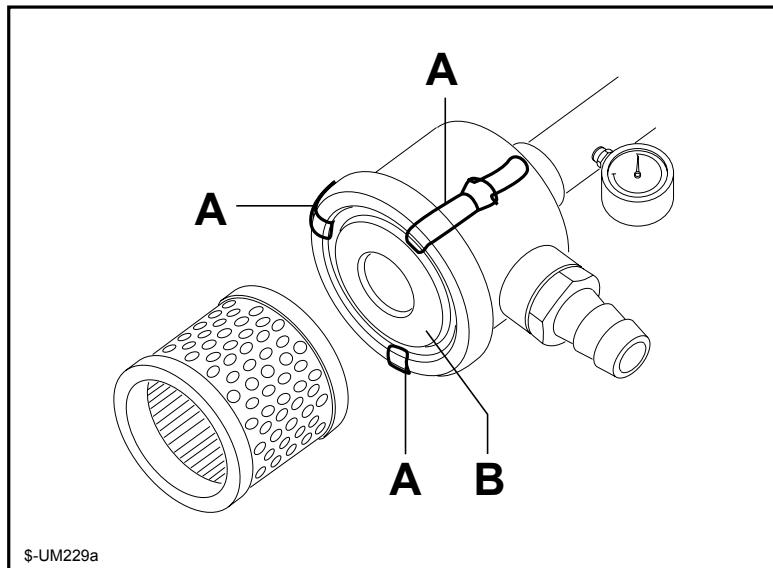


Fig. 5.6

Every 50 hours:**Cleaning the electrical cabinet air filters:**

WARNING: During cleaning operations, make sure that the power supply is switched off: turn main switch A (fig.5.1) to the zero (0) position and lock it with a padlock.

To clean filters it is necessary to proceed as follows:

- Remove the cover A (fig. 5.6a) levering with a screwdriver in the fissure B
- Take out the filters C and clean it with air compressed



NOTE: in case the filter is particularly dirty, it is necessary to replace it with one of similar filtering capacity.

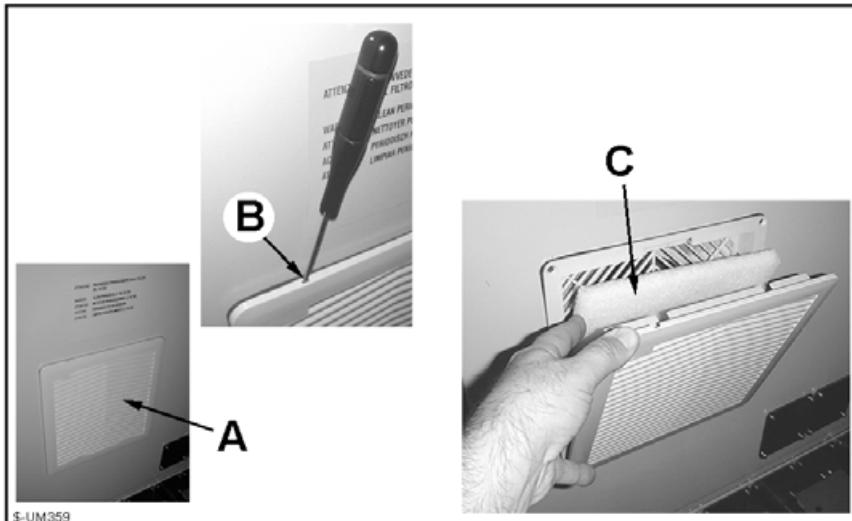


Fig. 5.6a

VACUUM PUMP MAINTENANCE

The pump maintenance schedules are shown below: the relative instructions are included in the documentation supplied with the machine.



NOTE: If the filters are oily or greasy, they must be replaced.



WARNING: FAILURE TO OBSERVE PUMP MAINTENANCE AND LUBRICATION INSTRUCTIONS MAY RESULT IN THE PUMP OVERHEATING AND BEING DAMAGED.

Maintenance for vacuum pump				
	Clean the filters	Replace the filters	1° Check the vanes	Check the vanes (after the first)
Brand / Model				
Rietschle / VLT 40	400/500 hours	1500/2000 hours	5000 hours	1000 hours
Rietschle / VTA 100	400/500 hours	1500/2000 hours	6000 hours	2000 hours
Rietschle / VTB 250	400/500 hours	1500/2000 hours	2000 hours	500 hours
Becker / VT 4.40	400/500 hours	1500/2000 hours	3000 hours or at least once a year	
Becker / KVT 3.100	400/500 hours	1500/2000 hours	3000 hours or at least once a year	
Becker / VTLF 250	400/500 hours	1500/2000 hours	3000 hours or at least once a year	

Manut_pompe_vuoto_gb

5.4 Periodic Lubrication



WARNING: During maintenance, cleaning and lubrication operations, make sure that the power supply and compressed air are switched off and cannot be accidentally switched on (See Sec. 5.1).



PRECAUTIONS:

- All the operations described in this section must be performed by the machine operator or by qualified personnel.
- The intervals between maintenance operations are approximate and may vary according to the working environment of the machine and the type of material being machined:



N.B.: Recommended maintenance intervals are calculated according to use of the machine for approx. 8 hours per day. If the machine is used more than this (for example, several shifts each day) maintenance operations must be carried out more often.



IMPORTANT: The machining of medium density material creates very fine sawdust and shavings; in these cases the maintenance and lubrication operations must be performed more frequently

To inject grease, use the grease gun P provided (Fig.5.4); each pump of the gun corresponds to 0.7 cm³ of grease.

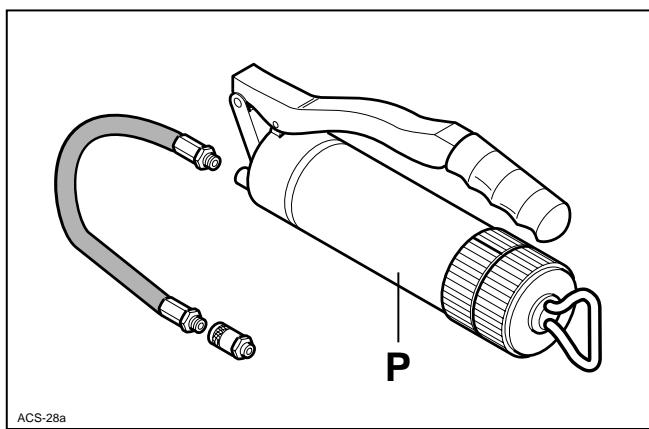


Fig. 5.4

Every 8 hours (daily maintenance):**Lubricating the recirculating ball screws and sliding blocks:****N.B.: For the distributors in fig. 5.9 - 5.10, this is not required if the centralised lubricating device described in section 5.4.1 is fitted.**

NOTE: the machining of medium density material creates very fine sawdust and shavings; in these cases the lubrication intervals specified must be halved.

- Inject approximately 1cm³ of grease (Type "B" - See table in Sec. 5.6) into each grease nipple F (Fig. 5.9 / 5.10 / 5.10a). Clean away any excess grease.

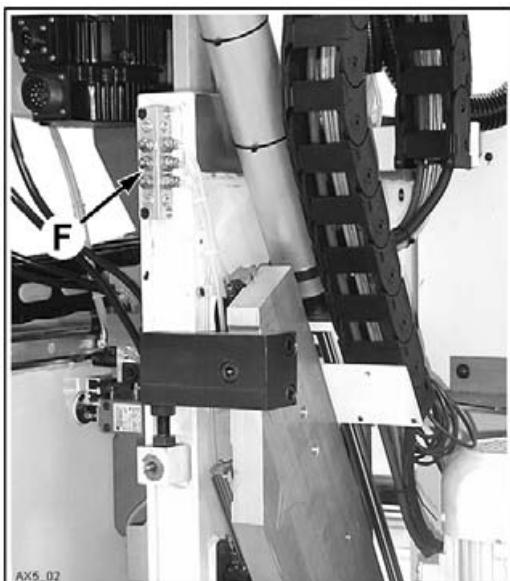


Fig. 5.9

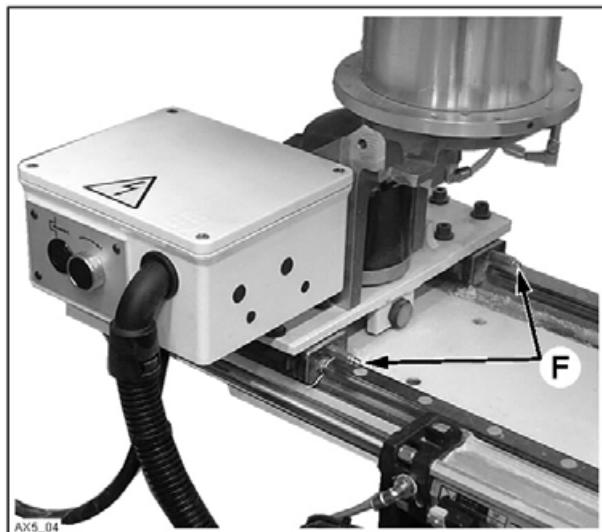


Fig. 5.10

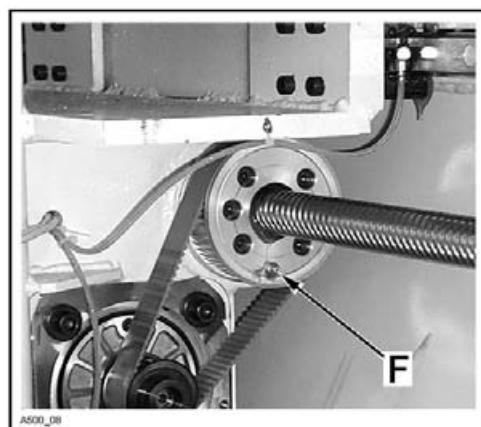


Fig. 5.10a

Every 800-1000 hours (six-monthly maintenance):

Lubricate the 12 / 18 spindles on the main head:



IMPORTANT: activate the "setting" mode.

- Inject approximately 10cm³ of grease (aprox. 14 pumping - Type "KLUBER ISOFLEX NBU15") into each grease nipple T1 (Fig. 13)
- Re-start the machine (exit the "setting" mode) and switch on the boring head for several seconds; activate "setting" mode and repeat the greasing operation.



N.B.: The above-mentioned operations must be carried out 5 times in order to insert 50cm³ of grease in the head.

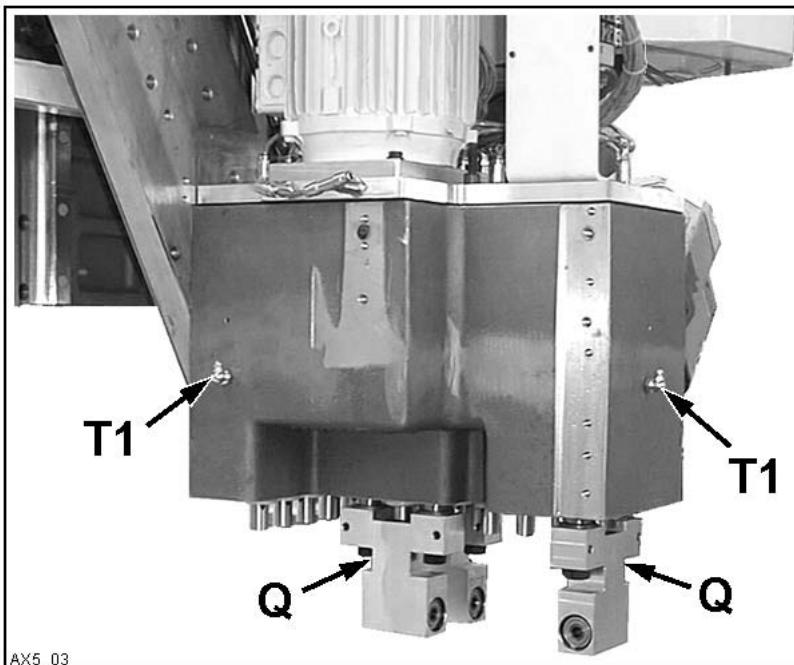


Fig. 13

Every 800-1000 hours (six-monthly maintenance):

Lubricate the horizontal heads:

- Inject approximately 1cm³ of grease (Type "KLUBER ISOFLEX NBU15") into each grease nipple Q (Fig. 13). Clean away any excess grease.

Electrospindle and HSK63 taper maintenance

Every 50 hours: lubricate the tool taper clamping unit with the grease spray provide (code: 0002400035C).

Place the machine in "MANUAL" mode : selector S on 

Move the operator unit to an accessible position, remove the tool cone, then completely stop the machine. Insert the spray can tube in the gap between two of the collet sections (see the figure 21) and, holding the can in a vertical position, spray. repeat the operation for the other gaps.

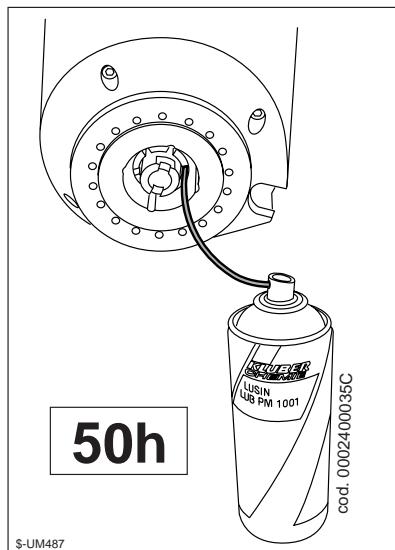


Fig. 21

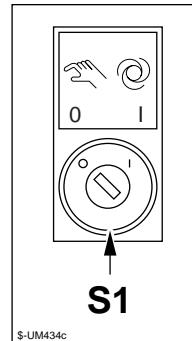


Fig. 21a

In order to uniformly distribute the grease between the "collets", put the machine back in "MANUAL" mode and perform 10-15 cone blocking and releasing actions (see fig. 22).



Fig. 22

Insert an empty cone and have the electric spindle rotate at 18000 rpm for about a minute (see fig. 23).



Fig. 23

At the end, stop the machine again, extract the tool cone and eliminate any grease deposited on the inside walls of the electric spindle shaft with a cloth and, if necessary, with acetone (WARNING: ACETONE IS A FLAMMABLE LIQUID!)

Also clean the hollow part of the tool cone (see fig. 25).



Fig. 24



Fig. 25

Clean the cone outside and inside with a dry and clean cloth every week.

Every month clean the contact surfaces (shown in grey in the figure 26) between the tool tapers and the chuck using acetone (CAUTION! FIRE HAZARD). Next, lubricate this area with the Teflub lubricant supplied (SCM: 0002400034A) Teflub is a dry, dustproof, waterproof lubricant which ensures correct clamping of the tool tapers.



NOTE: On tool holder tapers not supplied by manufacturer, perform this operation the first time the tapers are used.



IMPORTANT: AS WELL AS OBSERVING THE WARNINGS ON THE CANISTER:

- **DO NOT INHALE VAPOURS OR NEBULISED SUBSTANCES**
- **MAKE SURE THAT THE AREA USED IS WELL VENTILATED**
- **WEAR PROTECTIVE GLOVES IF CONTACT IS PROLONGED**
- **WEAR EYE PROTECTION**

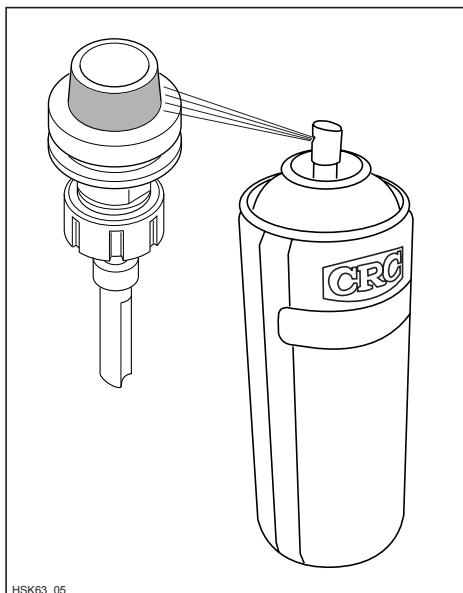


Fig. 26



WARNING: If the machine remains switched off for a long period of time (more than one week), the cone that stays mounted on the electro spindle must be carefully cleaned and lubricated.

VACUUM PUMP LUBRICATION



The pump lubrication schedules are shown below: the relative instructions are included in the documentation supplied with the machine.



WARNING: FAILURE TO OBSERVE PUMP MAINTENANCE AND LUBRICATION INSTRUCTIONS MAY RESULT IN THE PUMP OVERHEATING AND BEING DAMAGED.

Vacuum pump lubrication schedule		
	1 st lubrication	Periodic lubrication (after the first)
Brand / Model		
Rietschle / VLT 40		Lubricated for working life
Rietschle / VTA 100		10000 hours or at least once a year:
Rietschle / VTB 250		4500 hours or at least once a year:
Becker / VT 4.40		Lubricated for working life
Becker / KVT 3.100		Lubricated for working life
Becker / VTLF 250		3000 hours or at least once a year:

Lubrif_pompe_vuoto_gb

5.4.1 Centralised Lubrication Unit (OPTIONAL)

The centralised lubrication unit automatically lubricates the sliding devices on the X-Y-Z axes.

The unit consists of a grease tank A (Fig.5.16), a pneumatic pump B, and a level microswitch C which signals when the tank is empty to the distributors.

The distributor is fitted with a microswitch which checks that the lubrication cycle is operating correctly.

Automatic lubrication is controlled by the Numeric Control operating the pump and displaying the message N° PLC73 (Lubrication operating).

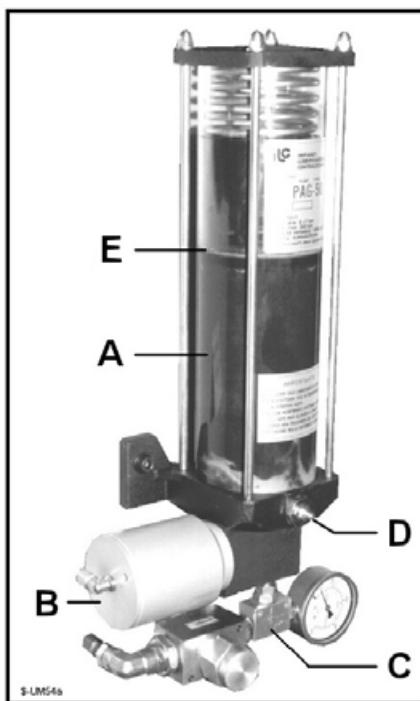


Fig. 5.16

The error message N° PLC74 (Lubrication error) is caused by:

- 1 - Empty grease pump
- 2 - Fault in lubrication equipment.

- In case 1, refill the grease tank by injecting grease through the nipple D.

When the tank is completely full surplus grease will begin to flow out of the hole E.

Do not fill the grease tank 100% full so as to avoid straining the seals.

- Case 2 occurs when the microswitch on the distributor no longer detects the presence of grease.

In this case:

- complete the current operating cycle;
- press the STOP pushbutton on the N.C. to clear the error message;
- check if the error message N° PLC74 occurs again on the next lubrication cycle;
- if the error message appears again on the next lubrication cycle, first check all the electrical connections of the microswitches, microswitch efficiency and then check for blockages in the lubrication equipment.

Centralised lubrication diagram

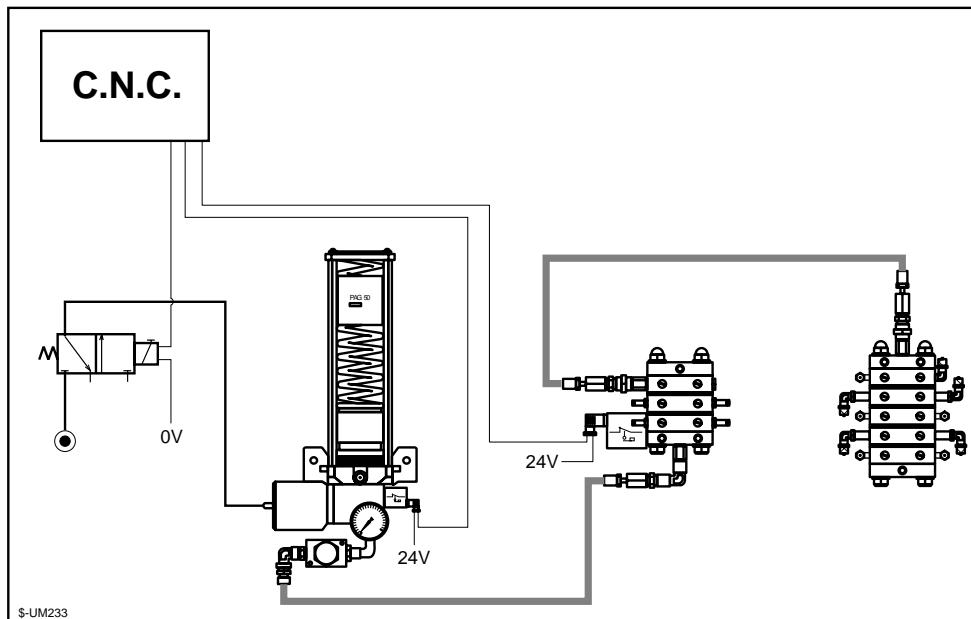


Fig. 5.16a

If the lubrication interval needs adjusting (set at 180 minutes during testing) proceed as follows:

- press key "F6" in the basic menu to activate the "MDI" state
- go to the "ISO" field (Fig. 5.16b)
- type the command E30023=xxx (for CNC NUM) or command %ETK[23]=xxx (for CNC KVARA), substituting xxx with the new lubrication interval: the unit of measurement is minutes
- press ↲ to confirm and press "start cycle" on the mobile control panel to acquire the new value.

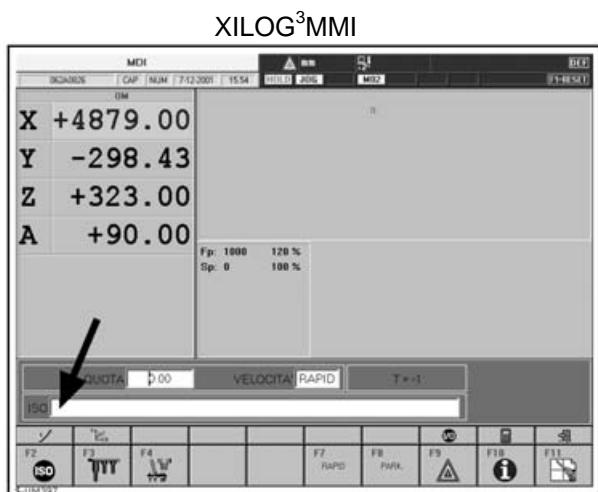


Fig. 5.16b



Fig. 5.16b

5.5 Table of greases and oils

GREASE FOR GEARS (Type "A") (BORING HEADS, ROUTING UNITS)	
KLUBER	ISOFLEX NBU 15

GREASE FOR BEARINGS, SCREWS AND RECIRCULATING BALL SHOES (Type "B")	
AGIP	GR MU EP0
KLUBER	MICROLUBE GL261

OIL FOR GEAR FILTER UNIT (Type "C")	
KLUBER	AIRPRESS 32
AGIP	ACER 22
SHELL	VITREA 25
MOBIL	DTE N 1
ESSO	NURAY 46

GREASE FOR CENTRALISED LUBRICATION UNIT (Type "D")	
AGIP	GR MU EP0
KLUBER	MICROLUBE GL261

AN55a -gb

NOTE: check the type of grease already present in the part you wish to lubricate; never mix different types of grease (sometime it is possible to see from the colour whether the original grease is of the same type as the new one you wish to add).



IMPORTANT! NEVER MIX DIFFERENT TYPES OF GREASE: mixing greases that have different basic components can cause a chemical reaction which may consequently alter their lubricating properties and, in some cases, may provoke solidification with subsequent seizure of the parts intended to be lubricated.

MORBIDELLI cannot be held responsible for any damage arising from lubricating operations carried out incorrectly or the use of lubricants different from those indicated.

INDEX

6.1	Inconvenients, causes and solutions (showing by NCC)	2
-----	--	---

6.1 Inconveniences, causes and solutions (showing by NCC)



IMPORTANT: ELECTRICAL EQUIPMENT MUST BE CHECKED ONLY BY SPECIALISED TECHNICIANS.

Any inconveniences that occur can be signaled directly by the CNC on the operator interface.

Error messages will appear next to each inconvenience.

The causes and the methods of intervention are described for each message as follows.

PLC1 = SET-UP AXES DRIVE FAULT

DESCRIPTION: There is a fault on one of the A, B, C axis drives

CAUSE: No DRIVE power. For other causes consult the DRIVE technical documentation

SOLUTION: Reset the overload switch. Consult the technical support service

PLC2 = MOTOR OVERLOAD

DESCRIPTION: Three-phase motor overload tripped

CAUSE: One or more overloads are tripped

SOLUTION: Check the status of the overloads in the electrical cabinet. To reset, press the relative push-button.

PLC3 = INSUFF. AIR PRESSURE

DESCRIPTION: Supply system air pressure is less than 4 Atm.

CAUSE: Mains compressed air supply is off or faulty

The main regulator adjustment is incorrect

SOLUTION: Check the facility's mains supply system

Increase the pressure by turning the regulator knob clockwise

PLC4 = MACHINE EMERGENCY

DESCRIPTION: The power supply to the power circuit is off

CAUSE: Emergency cord or overloads are activated

SOLUTION: Reset by pressing the "RESET EMERGENCY" push-button on the control panel

CAUSE: Accident prevention overload switches are disabled

SOLUTION: Re-enable the accident prevention overload switches, proceed as above

CAUSE: Machining unit overtravel (if present, also PLC10 - PLC15 , PLC17 - PLC18)

SOLUTION: Manually position the machining unit within the limits allowed

PLC5 = BRUSHLESS AXIS DRIVE FAULT

DESCRIPTION: There is a fault on one of the X, Y, Z axis drives

CAUSE: No DRIVE power. For other causes consult the DRIVE technical documentation.

SOLUTION: reset the overload switch. Consult the technical support service.

PLC6 = X AXIS DRIVE FAULT

DESCRIPTION: There is a fault on the X axis drive

CAUSE: No DRIVE power. For other causes consult the DRIVE technical documentation

SOLUTION: Reset the overload switch. Consult the technical support service

PLC7 = Y AXIS DRIVE FAULT**DESCRIPTION:** There is a fault on the y axis

CAUSE: No DRIVE power. For other causes consult the DRIVE technical documentation

SOLUTION: Reset the overload switch. Consult the technical support service

PLC8 = Z AXIS DRIVE FAULT**DESCRIPTION:** There is a fault on the z axis drive

CAUSE: No DRIVE power. For other causes consult the DRIVE technical documentation

SOLUTION: Reset the overload switch. Consult the technical support service

PLC9 = A AXIS DRIVE FAULT**DESCRIPTION:** There is a fault on the A axis drive

CAUSE: No DRIVE power. For other causes consult the DRIVE technical documentation

SOLUTION: Reset the overload switch. Consult the technical support service

PLC10 = X+ AXIS LIMIT SWITCH**DESCRIPTION:** The X axis is beyond the positive direction stroke limits

CAUSE: The axis is positioned at a dimension outside the limits allowed

SOLUTION: Manually position the axis within the limits allowed or carry out calibration

PLC11 = X- AXIS LIMIT SWITCH**DESCRIPTION:** The X axis is beyond the negative direction stroke limits

CAUSE: The axis is positioned at a dimension outside the limits allowed

SOLUTION: Manually position the axis within the limits allowed or carry out calibration

PLC12 = Y+ AXIS LIMIT SWITCH**DESCRIPTION:** The Y axis is beyond the positive direction stroke limits

CAUSE: The axis is positioned at a dimension outside the limits allowed

SOLUTION: Manually position the axis within the limits allowed or carry out calibration

PLC13 = Y- AXIS LIMIT SWITCH**DESCRIPTION:** The Y axis is beyond the negative direction stroke limits

CAUSE: The axis is positioned at a dimension outside the limits allowed

SOLUTION: Manually position the axis within the limits allowed or carry out calibration

PLC14 = Z+AXIS LIMIT SWITCH**DESCRIPTION:** The Z axis is beyond the positive direction stroke limits

CAUSE: The axis is positioned at a dimension outside the limits allowed

SOLUTION: Manually position the axis within the limits allowed or carry out calibration

PLC15 = Z- AXIS LIMIT SWITCH**DESCRIPTION:** The Z axis is beyond the negative direction stroke limits

CAUSE: The axis is positioned at a dimension outside the limits allowed

SOLUTION: Manually position the axis within the limits allowed or carry out calibration

PLC16 = C AXIS DRIVE FAULT**DESCRIPTION:** There is a fault on the C axis drive

CAUSE: No DRIVE power. For other causes consult the DRIVE technical documentation

SOLUTION: Reset the overload switch. Consult the technical support service

PLC17 = A- AXIS LIMIT SWITCH**DESCRIPTION:** The A axis is on the negative direction stroke limits

CAUSE: SW end of stroke parameter error

SOLUTION: Correct the SW end of stroke value in the "AXIS" parameters

CAUSE: The end of stroke contact microswitch is broken

SOLUTION: Substitute the contact microswitch

CAUSE: The contact microswitch connecting cable is broken

SOLUTION: Substitute the cable

PLC18 = A+ AXIS LIMIT SWITCH**DESCRIPTION:** The A axis is on the positive direction stroke limits

CAUSE: SW end of stroke parameter error

SOLUTION: Correct the SW end of stroke value in the "AXIS" parameters

CAUSE: The end of stroke contact microswitch is broken

SOLUTION: Substitute the contact microswitch

CAUSE: The contact microswitch connecting cable is broken

SOLUTION: Substitute the cable

PLC19 = AWAITING MAGAZINE OUT POSITION (rapid)**DESCRIPTION:** An error is activated during automatic or manual movement of the tool magazine

CAUSE: A microswitch is broken

SOLUTION: Substitute the microswitch

CAUSE: The magnetic limit switch connecting cable is broken

SOLUTION: Substitute the cable

PLC20 = AWAITING MAGAZINE IN POSITION (rapid)**DESCRIPTION:** An error is activated during automatic or manual movement of the tool magazine

CAUSE: A microswitch is broken

SOLUTION: Substitute the microswitch

CAUSE: The magnetic limit switch connecting cable is broken

SOLUTION: Substitute the cable

PLC21 = AWAITING MAGAZINE DOWN POSITION (rapid)

DESCRIPTION: An error is activated during automatic or manual movement of the tool magazine

CAUSE: A microswitch is broken

SOLUTION: Substitute the microswitch

CAUSE: The magnetic limit switch connecting cable is broken

SOLUTION: Substitute the cable

PLC22 = AWAITING TOOL MAGAZINE UP POSITION (rapid)

DESCRIPTION: An error is activated during automatic or manual movement of the tool magazine

CAUSE: A microswitch is broken

SOLUTION: Substitute the microswitch

CAUSE: The magnetic limit switch connecting cable is broken

SOLUTION: Substitute the cable

PLC23 = AWAITING TOOL RELEASE

DESCRIPTION: There was a tool change-over phase error during tool release

CAUSE: A microswitch is broken

SOLUTION: Substitute the microswitch

CAUSE: The proximity switch connecting cable is broken

SOLUTION: Substitute the cable

PLC24 = AWAITING TOOL LOCKING

DESCRIPTION: There was a tool change-over phase error during tool locking

CAUSE: A microswitch is broken

SOLUTION: Substitute the microswitch

CAUSE: The proximity switch connecting cable is broken

SOLUTION: Substitute the cable

PLC25 = AWAITING ELECTROSPINDLE TOOL CHANGE-OVER POSITION

DESCRIPTION: There was an error during the tool change-over. The NC waits for the electrospindle to reach the upper tool change-over position

CAUSE: A microswitch is broken

SOLUTION: Substitute the microswitch

CAUSE: The microswitch connecting cable is broken

SOLUTION: Substitute the cable

CAUSE: There is insufficient pressure for the electrospindle upstroke

SOLUTION: Adjust the pressure regulator

PLC26 = WAITING FOR ELECTROSPINDLE POSITION 1

DESCRIPTION: An error occurred during electrospindle positioning.

CAUSE: A microswitch is broken

SOLUTION: Substitute the microswitch

CAUSE: The magnetic limit switch connecting cable is broken

SOLUTION: Substitute the cable

PLC27 = WAITING FOR ELECTROSPINDLE POSITION 2

DESCRIPTION: An error occurred during electrospindle positioning.

CAUSE: A microswitch is broken

SOLUTION: Substitute the microswitch

CAUSE: The microswitch connecting cable is broken

SOLUTION: Substitute the cable

PLC28 = WAITING FOR ELECTROSPINDLE POSITION 3

DESCRIPTION: An error occurred during electrospindle positioning.

CAUSE: A microswitch is broken

SOLUTION: Substitute the microswitch

CAUSE: The microswitch connecting cable is broken

SOLUTION: Substitute the cable

PLC29 = WAITING FOR HOOD IN TOOL CHANGE-OVER POSITION

DESCRIPTION: The extractor hood did not reach the required position during a tool change-over

CAUSE: Jamming

SOLUTION: Check visually and eliminate any jamming

CAUSE: Faulty limit switches, or broken connecting cables

SOLUTION: Substitute any parts considered faulty

PLC30 = TOOL CHANGE-OVER CYCLE IN PROGRESS

DESCRIPTION: The machine is carrying out a tool change-over operation

PLC31 = MAGAZINE CALIBRATION CYCLE IN PROGRESS

DESCRIPTION: The machine is carrying out tool magazine calibration

PLC32 = AXIS CALIBRATION CYCLE IN PROGRESS

DESCRIPTION: The machine is calibrating the X - Y - Z - A axes

PLC33 = WAITING FOR START PUSH-BUTTON

DESCRIPTION: The CNC requests start to begin the calibration cycle

CAUSE: You have accessed the calibration page

SOLUTION: Press the "START" button to begin calibration

PLC34 = AXIS CALIBRATION COMPLETE

DESCRIPTION: This message appears on accessing the calibration page after calibration is completed

PLC35 = X AXIS CALIBRATION ERROR**DESCRIPTION:** Calibration was not carried out correctly on the X axis

CAUSE: A microswitch is broken

SOLUTION: Substitute the microswitch

CAUSE: The microswitch connecting cable is broken

SOLUTION: Substitute the cable

CAUSE: Motor driver fault

SOLUTION: Turn the machine off and then on again. If the problem persists contact the support service

PLC36 = Y AXIS CALIBRATION ERROR**DESCRIPTION:** Calibration was not carried out correctly on the Y axis

CAUSE: A microswitch is broken

SOLUTION: Substitute the microswitch

CAUSE: The microswitch connecting cable is broken

SOLUTION: Substitute the cable

CAUSE: Motor driver fault

SOLUTION: Turn the machine off and then on again. If the problem persists contact the support service

PLC37 = Z AXIS CALIBRATION ERROR**DESCRIPTION:** Calibration was not carried out correctly on the Z axis

CAUSE: A microswitch is broken

SOLUTION: Substitute the microswitch

CAUSE: The microswitch connecting cable is broken

SOLUTION: Substitute the cable

CAUSE: Motor driver fault

SOLUTION: Turn the machine off and then on again. If the problem persists contact the support service

PLC38 = A AXIS CALIBRATION ERROR**DESCRIPTION:** Calibration was not carried out correctly on the A axis

CAUSE: A microswitch is broken

SOLUTION: Substitute the microswitch

CAUSE: The microswitch connecting cable is broken

SOLUTION: Substitute the cable

CAUSE: Motor driver fault

SOLUTION: Turn the machine off and then on again. If the problem persists contact the support service

PLC39 = MAGAZINE CALIBRATION ERROR

DESCRIPTION: Tool magazine calibration was not carried out correctly

CAUSE: A microswitch is broken

SOLUTION: Substitute the microswitch

CAUSE: The microswitch connecting cable is broken

SOLUTION: Substitute the cable

CAUSE: Motor driver fault

SOLUTION: Turn the machine off and then on again. If the problem persists contact the support service

PLC40 = MACHINE IN STANDBY - PRESS START TO CONTINUE

DESCRIPTION: Suspension of the current machining has been requested by entering the instruction SET STANDBY in the program

CAUSE: You have requested suspension of the current machining cycle

SOLUTION: Press the START push-button to continue machining

PLC41 = BATTERY VOLTAGE INSUFFICIENT

DESCRIPTION: The NC indicates that the back-up battery which keeps the RAM memory powered up when there is no power supply has reached its minimum voltage level (is almost flat)

CAUSE: Flat battery

SOLUTION: Substitute the battery as soon as possible. In the meantime, do not turn off the CNC or data may be lost

PLC42 = ELECTROSPINDLE RECONNECTION IN PROGRESS

DESCRIPTION: The inverter was reset from the emergency state and the electrospindle is rotating without control

CAUSE: The inverter was reset from the emergency state

ACTION: Wait until the electrospindle has stopped

PLC43 = SELECT THE MACHINE EMERGENCY STATE

DESCRIPTION: The inverter is in the emergency state and the electrospindle is rotating without control

CAUSE: Inverter in emergency state

SOLUTION: Press the mushroom-head push-button to generate a machine emergency and reset the machine from the emergency state

PLC44 = WAITING FOR UNIT ROTATION

DESCRIPTION: When machining with the boring head or cutter disk, the unit descends but does not rotate

CAUSE: Power relay broken

ACTION: Substitute the power relay

PLC45 = WAITING FOR AREA AB PANEL LOCKING

DESCRIPTION: The machine waits until the suction cup vacuum sensor in the area in which the program is executed indicates that the workpiece has been locked in place

CAUSE: Vacuum presence pressure regulator faulty or incorrectly calibrated

SOLUTION: Substitute the pressure regulator, or calibrate the pressure regulator, consulting the technical support service

CAUSE: Suction cup filter blocked

SOLUTION: Clean the suction cup filter

CAUSE: The panel being machined does not close the suction cups

SOLUTION: Check panel porosity. Check that its surface is not curved

PLC46 = MOBILE CONTROL PANEL ENABLED

DESCRIPTION: If the machine has a mobile push-button panel, this indicates that it has been enabled

SOLUTION: Use the relative selector to disable the mobile push-button panel

PLC47 = SETTING MODE

DESCRIPTION: The machine is operating in SETTING mode (the spindles do not turn, and the axes work at a speed of 2m/min.)

CAUSE: The "SETTING" selector has been activated

SOLUTION: Turn the SETTING selector to "0"

PLC48 = INVERTER FREQUENCY ERROR

DESCRIPTION: The NC reads the inverter continuously in the acceleration or deceleration phase.

CAUSE: Inverter broken

SOLUTION: Substitute the inverter

CAUSE: Inverter parameters are incorrect

SOLUTION: Check the parameters against the print-out provided

CAUSE: Faulty 0 frequency relay or faulty frequency reached

SOLUTION: Substitute the faulty relay.

PLC49 = INVERTER 1 EMERGENCY

DESCRIPTION: The inverter which controls the electrospindles is in the emergency state

CAUSE: The acceleration and deceleration times are too short

SOLUTION: Increase the value in the inverter parameters, consulting the inverter technical manual

CAUSE: There is a fault in the electrical circuits

SOLUTION: Consult the inverter technical manual, and the technical support service

PLC50 = INVERTER 2 EMERGENCY

DESCRIPTION: The inverter which controls the electrospindles is in the emergency state

CAUSE: The acceleration and deceleration times are too short

SOLUTION: Increase the value in the inverter parameters, consulting the inverter technical manual

CAUSE: There is a fault in the electrical circuits

SOLUTION: Consult the inverter technical manual, and the technical support service

PLC51 = INVERTER 3 EMERGENCY

DESCRIPTION: The inverter which controls the electrospindles is in the emergency state

CAUSE: The acceleration and deceleration times are too short

SOLUTION: Increase the value in the inverter parameters, consulting the inverter technical manual

CAUSE: There is a fault in the electrical circuits

SOLUTION: Consult the inverter technical manual, and the technical support service

PLC52 = INVERTER 4 EMERGENCY

DESCRIPTION: The inverter which controls the electrospindles is in the emergency state

CAUSE: The acceleration and deceleration times are too short

SOLUTION: Increase the value in the inverter parameters, consulting the inverter technical manual

CAUSE: There is a fault in the electrical circuits

SOLUTION: Consult the inverter technical manual, and the technical support service

PLC53 = WAITING FOR AREA CD PANEL LOCKING

DESCRIPTION: The machine waits until the suction cup vacuum sensor in the area in which the program is executed indicates that the workpiece has been locked in place

CAUSE: Vacuum presence pressure regulator faulty or incorrectly calibrated

SOLUTION: Substitute the pressure regulator, or calibrate the pressure regulator, consulting the technical support service

CAUSE: Suction cup filter blocked

SOLUTION: Clean the suction cup filter

CAUSE: The panel being machined does not close the suction cups

SOLUTION: Check panel porosity. Check that its surface is not curved.

PLC54 = TWIN-PACK 5 ELECTROSPINDLE FAULT

DESCRIPTION: There is a fault on electrospindle 5

CAUSE: The electrospindle is overheated

SOLUTION: Check the extractor system

CAUSE: The electrospindle motor is faulty

SOLUTION: Call the support service

PLC55 = TWIN-PACK 6 ELECTROSPINDLE FAULT

DESCRIPTION: There is a fault on electrospindle 6

CAUSE: The electrospindle is overheated

SOLUTION: Check the extractor system

CAUSE: The electrospindle motor is faulty

SOLUTION: Call the support service

PLC56 = TOOL CHANGE-OVER ELECTROSPINDLE FAULT**DESCRIPTION:** There is a fault on the tool change-over electrospindle

CAUSE: The electrospindle is overheated

SOLUTION: Check the extractor system

CAUSE: The electrospindle motor is faulty

SOLUTION: Call the support service

PLC57 = TWIN-PACK 1 ELECTROSPINDLE FAULT**DESCRIPTION:** There is a fault on electrospindle 1

CAUSE: The electrospindle is overheated

SOLUTION: Check the extractor system

CAUSE: The electrospindle motor is faulty

SOLUTION: Call the support service

PLC58 = TWIN-PACK 2 ELECTROSPINDLE FAULT**DESCRIPTION:** There is a fault on electrospindle 2

CAUSE: The electrospindle is overheated

SOLUTION: Check the extractor system

CAUSE: The electrospindle motor is faulty

SOLUTION: Call the support service

PLC59 = TWIN-PACK 3 ELECTROSPINDLE FAULT**DESCRIPTION:** There is a fault on electrospindle 3

CAUSE: The electrospindle is overheated

SOLUTION: Check the extractor system

CAUSE: The electrospindle motor is faulty

SOLUTION: Call the support service

PLC60 = TWIN-PACK 4 ELECTROSPINDLE FAULT**DESCRIPTION:** There is a fault on electrospindle 4

CAUSE: The electrospindle is overheated

SOLUTION: Check the extractor system

CAUSE: The electrospindle motor is faulty

SOLUTION: Call the support service

PLC61 = WAITING FOR MAGAZINE TO OPEN**DESCRIPTION:** An error is activated during automatic or manual movement of the tool magazine

CAUSE: A microswitch is broken

SOLUTION: Substitute the microswitch

CAUSE: The magnetic limit switch connecting cable is broken

SOLUTION: Substitute the cable

PLC62 = WAITING FOR MAGAZINE OPEN PROTECTION

DESCRIPTION: An error is activated during automatic or manual movement of the tool magazine

CAUSE: A microswitch is broken

SOLUTION: Substitute the microswitch

CAUSE: The magnetic limit switch connecting cable is broken

SOLUTION: Substitute the cable

PLC63 = WAITING FOR MAGAZINE TO CLOSE

DESCRIPTION: An error is activated during automatic or manual movement of the tool magazine

CAUSE: A microswitch is broken

SOLUTION: Substitute the microswitch

CAUSE: The magnetic limit switch connecting cable is broken

SOLUTION: Substitute the cable

PLC64 = WAITING FOR MAGAZINE PROTECTION TO CLOSE

DESCRIPTION: An error is activated during automatic or manual movement of the tool magazine

CAUSE: A microswitch is broken

SOLUTION: Substitute the microswitch

CAUSE: The magnetic limit switch connecting cable is broken

SOLUTION: Substitute the cable

PLC65 = WAITING FOR ELECTROSPINDLE UP

DESCRIPTION: There is an error during the tool change-over. The NC waits for the electrospindle to reach the upper tool change-over position

CAUSE: A microswitch is broken

SOLUTION: Substitute the microswitch

CAUSE: The magnetic limit switch connecting cable is broken

SOLUTION: Substitute the cable

CAUSE: Insufficient pressure for electrospindle upstroke

SOLUTION: Adjust the pressure regulator

PLC66 = WAITING FOR ELECTROSPINDLE POS. 1

DESCRIPTION: An error occurred during electrospindle positioning.

CAUSE: A microswitch is broken

SOLUTION: Substitute the microswitch

CAUSE: The magnetic limit switch connecting cable is broken

SOLUTION: Substitute the cable

PLC67 = WAITING FOR ELECTROSPINDLE POS. 2

DESCRIPTION: An error occurred during electrospindle positioning.

CAUSE: A microswitch is broken

SOLUTION: Substitute the microswitch

CAUSE: The magnetic limit switch connecting cable is broken

SOLUTION: Substitute the cable

PLC68 = WAITING FOR ELECTROSPINDLE POS. 3

DESCRIPTION: An error occurred during electrospindle positioning.

CAUSE: A microswitch is broken

SOLUTION: Substitute the microswitch

CAUSE: The magnetic limit switch connecting cable is broken

SOLUTION: Substitute the cable

PLC69 = WAITING FOR SHUTTLE UP

DESCRIPTION: There is an error during the tool change-over. The NC waits for the shuttle to go up

CAUSE: A microswitch is broken

SOLUTION: Substitute the microswitch

CAUSE: The magnetic limit switch connecting cable is broken

SOLUTION: Substitute the cable

CAUSE: Jamming

SOLUTION: Check that the shuttle runs along the two guide rods correctly

PLC70 = WAITING FOR SHUTTLE DOWN

DESCRIPTION: There is an error during the tool change-over. The NC waits for the shuttle to come down

CAUSE: A microswitch is broken

SOLUTION: Substitute the microswitch

CAUSE: The magnetic limit switch connecting cable is broken

SOLUTION: Substitute the cable

CAUSE: Jamming

SOLUTION: Check that the shuttle runs along the two guide rods correctly

PLC71 = WAITING FOR LOCKED TOOL

DESCRIPTION: There is a tool locking error during the tool change-over

CAUSE: A microswitch is broken

SOLUTION: Substitute the microswitch

CAUSE: The proximity switch connecting cable is broken

SOLUTION: Substitute the cable

PLC72 = WAITING FOR TOOL RELEASED

DESCRIPTION: There is a tool release error during the tool change-over

CAUSE: A microswitch is broken

SOLUTION: Substitute the microswitch

CAUSE: The proximity switch connecting cable is broken

SOLUTION: Substitute the cable

PLC73 = LUBRICATION IN PROGRESS

DESCRIPTION: The machine is running the timed lubricating cycle

CAUSE: After a predetermined number of working hours, the CNC activates the lubricating cycle without interrupting the current processes

SOLUTION: wait for the message to disappear

PLC74 = LUBRICATION ERROR

DESCRIPTION: The timed lubricating device cannot carry out the lubricating cycle correctly

CAUSE: Grease tank empty

SOLUTION: Fill tank with grease (see section 5.4.1)

CAUSE: Circuit tube interruption

SOLUTION: Check the tubes and eliminate any bends or other causes which may prevent the grease from circulating correctly

CAUSE: Microswitch on pump

SOLUTION: Check that microswitch "C" on the pump is undamaged and is functioning correctly (see sec. 5.4.1)

CAUSE: Microswitch on distributor

SOLUTION: Check that the microswitch on the first grease distributor is undamaged and is functioning correctly (see sec. 5.4.1). NOTE: To clear the message on the display, press the "RESET ALARMS" push-button on the CNC keyboard

PLC75 = LUBRICATING PUMP EMPTY

DESCRIPTION: There is no grease on the pump

CAUSE: There is no grease on the pump

SOLUTION: Refill will grease to the level indicated through the filler cap

PLC76 = TOOL CHANGE-OVER FAULT

DESCRIPTION: An error occurred in the tool change-over electrospindle unit

CAUSE: The magazine is not in the OUT position

SOLUTION: Open the TEST I/O page and force the magazine into the correct position

CAUSE: Faulty sensor.

SOLUTION: Substitute the sensor

CAUSE: Faulty solenoid valve

SOLUTION: Substitute the solenoid valve

CAUSE: Tool released

SOLUTION: Check that the tool locking sensor is in good condition and functions correctly

CAUSE: Tool change-over electrospindle is not in the UP position

SOLUTION: Check that the electrospindle UP sensor is in good condition and functions correctly

PLC77 = NO TOOL IN ELECTROSPINDLE

DESCRIPTION: The NC awaits the load tool command

CAUSE: You have requested manual unloading of a tool that was not previously loaded

SOLUTION: To carry out this operation, load the tool

DESCRIPTION: There is no tool in the electrospindle programmed for machining

CAUSE: Faulty tie rod microswitch

SOLUTION: Adjust or substitute the microswitch

CAUSE: No tool in selected magazine location

SOLUTION: Place tool in magazine location

PLC79 = OPERATOR HOODS UP**DESCRIPTION:** Message indicates that the hoods have been forced up

CAUSE: You pressed the button which forces up the hoods on the electrospindle

SOLUTION: Press the button which lowers the hoods and clear the message

PLC80 = TOOL OUT OF POSITION**DESCRIPTION:** The tool to be used for machining (cutter disk 0 - 90) is not in the correct position

CAUSE: Faulty control limit switch

SOLUTION: Substitute the limit switch

CAUSE: The limit switch connecting cable is broken

SOLUTION: Substitute the cable

PLC81 = WAITING FOR PANEL ON AB SIDE BOTTOM STOPS**DESCRIPTION:** The machine is waiting for the panel to be brought into contact with the side stops in area AB

CAUSE: Faulty sensor

SOLUTION: Substitute the sensor

CAUSE: Insufficient pressure in the pneumatic cylinder

SOLUTION: Adjust the pressure with the relative regulator

PLC82 = MANUAL TOOL CHANGE-OVER ON ELECTROSPINDLE 1**DESCRIPTION:** The NC is waiting for you to manually load the tool on or unload it from the requested electrospindle

CAUSE: The machine has no tool magazine

SOLUTION: Manually load the tool, pressing the "lock/release" push-button on the mobile control panel then press "F1" to confirm.

CAUSE: You are using a tool which is catalogued in an external magazine

SOLUTION: See above

PLC83 = PHOTOCELL HOLD - PRESS START TO CONTINUE**DESCRIPTION:** Machining is suspended due to interference with the machining unit

CAUSE: The protection photocell was activated during the tool change-over

SOLUTION: Remove the object which activated the photocell, then press START

PLC84 = PHOTOCELL EMERGENCY**DESCRIPTION:** During an I/O test tool change-over the photocells generated an emergency on the CNC

CAUSE: There is an obstacle between the mobile unit and the tool magazine during the request for an I/O test tool change-over

SOLUTION: Remove the obstacle which has triggered the photocells and press the "RESET ALARMS" push-button on the CNC keyboard

CAUSE: You are using a tool which is catalogued in an external magazine

SOLUTION: See above

PLC85 = MANUAL TOOL CHANGE-OVER ON ELECTROSPINDLE 2

DESCRIPTION: The NC is waiting for you to manually load the tool on or unload it from the requested electrospindle

CAUSE: The machine has no tool magazine

SOLUTION: Manually load the tool, pressing the "lock/release" push-button on the mobile control panel then press "F1" to confirm.

CAUSE: You are using a tool which is catalogued in an external magazine

SOLUTION: See above

PLC86 = MANUAL TOOL CHANGE-OVER ON ELECTROSPINDLE 3

DESCRIPTION: The NC is waiting for you to manually load the tool on or unload it from the requested electrospindle

CAUSE: The machine has no tool magazine

SOLUTION: Manually load the tool, pressing the "lock/release" push-button on the mobile control panel then press "F1" to confirm.

CAUSE: You are using a tool which is catalogued in an external magazine

SOLUTION: See above

PLC87 = MANUAL TOOL CHANGE-OVER ON ELECTROSPINDLE 4

DESCRIPTION: The NC is waiting for you to manually load the tool on or unload it from the requested electrospindle

CAUSE: The machine has no tool magazine

SOLUTION: Manually load the tool, pressing the "lock/release" push-button on the mobile control panel then press "F1" to confirm.

CAUSE: You are using a tool which is catalogued in an external magazine

SOLUTION: See above

PLC88 = PRESS F1 TO CONFIRM TOOL UNLOADING

DESCRIPTION: A manual tool change-over is in progress. The machine requests confirmation that unloading is complete

SOLUTION: press F1 on the mobile push-button panel to confirm unloading.

PLC89 = WITHDRAW MAGAZINE

DESCRIPTION: The rear magazine cannot close

CAUSE: A tool has been unloaded, the magazine is full and cannot close

SOLUTION: Select the MANUAL TESTS page and free at least one magazine tool location

CAUSE: Calibration has begun with the magazine open

CAUSE: The automatic cycle has begun with the magazine open

SOLUTION: Select the MANUAL TESTS page and close the magazine

PLC90 = PRESS F1 TO CONFIRM TOOL LOADING

DESCRIPTION: A manual tool change-over is in progress. The machine requests confirmation that loading is complete

SOLUTION: press F1 on the mobile push-button panel to confirm loading.

PLC91 = WAITING FOR START PUSH-BUTTON TO BE PRESSED**DESCRIPTION:** The machine awaits your command to continue machining**CAUSE:** You have selected SINGLE MOVEMENT mode**SOLUTION:** Press the START push-button to carry out subsequent machining, or disable SINGLE MOVEMENT**PLC92 = NO EDIT****DESCRIPTION:** The keyswitch is set to the no edit position. In this mode you cannot edit programs and lists**CAUSE:** The keyswitch on the mobile control panel is in the no edit position.**SOLUTION:** Return the keyswitch to the central position to restore machine standard operation.**PLC93 = NO MODE****DESCRIPTION:** The keyswitch is in the no mode position. In this mode you cannot change the machine operating mode**CAUSE:** The keyswitch on the mobile control panel is in the no mode position.**SOLUTION:** Return the keyswitch to the central position to restore machine standard operation.**PLC94 = NO VACUUM****DESCRIPTION:** During or at the start of the machining program, the NC does not receive the workpiece locked indication**CAUSE:** Vacuum presence detection pressure regulator faulty or incorrectly calibrated**SOLUTION:** Substitute the pressure regulator and calibrate it, consulting the technical support service**CAUSE:** The suction cup filter is blocked**SOLUTION:** Clean the suction cup filter**CAUSE:** The panel being machined does not close the suction cups**SOLUTION:** Check the porosity of the panel. Check that the panel surface is not curved**PLC95 = PROG. DOES NOT EXIST ON FIELD REQUESTED****DESCRIPTION:** You have requested the program to start on a machining field without having enabled the NC for the machining**CAUSE:** The panel is mounted on a different field to that programmed on the NC**SOLUTION:** Move the panel to the enabled field. Change the machining field in the program HEADER**PLC96 = ZERO FEED RATE****DESCRIPTION:** The axis speed is zero**CAUSE:** The axis speed setting selector is set to zero**SOLUTION:** Turn the selector to set the desired speed (the axis in question starts automatically and the message disappears)

PLC97 = WAITING FOR TOOL PROTECTION UP

DESCRIPTION: The protection has not reached the UP position

CAUSE: Jamming

SOLUTION: Remove the cause of the jamming

CAUSE: Pneumatic cylinder

SOLUTION: Check that air is supplied to the cylinder

CAUSE: Positioning sensor

SOLUTION: Check that the sensor is undamaged and functions correctly

PLC98 = WAITING FOR TOOL PROTECTION DOWN

DESCRIPTION: The protection has not reached the down position

CAUSE: Jamming

SOLUTION: Remove the cause of the jamming

CAUSE: Pneumatic cylinder

SOLUTION: Check that air is supplied to the cylinder

CAUSE: Positioning sensor

SOLUTION: Check that the sensor is undamaged and functions correctly

PLC99 = PRESS F2 TO CONFIRM

DESCRIPTION: The machine requests confirmation of panel unloading due to the emergency in progress

SOLUTION: Press F2 to confirm unloading due to the emergency

PLC100 = WAITING FOR MAGAZINE TO POSITION 1

DESCRIPTION: An error occurred during magazine positioning

CAUSE: Faulty sensor

SOLUTION: Substitute the sensor

CAUSE: Sensor connecting cable broken

SOLUTION: Substitute the cable

CAUSE: Solenoid valve malfunction

SOLUTION: Check coil is working properly

PLC101 = WAITING FOR MAGAZINE TO POSITION 2

DESCRIPTION: An error occurred during magazine positioning

CAUSE: Faulty sensor

SOLUTION: Substitute the sensor

CAUSE: Sensor connecting cable broken

SOLUTION: Substitute the cable

CAUSE: Solenoid valve malfunction

SOLUTION: Check coil is working properly

PLC102 = WAITING FOR MAGAZINE TO POSITION 3**DESCRIPTION:** An error occurred during magazine positioning

CAUSE: Faulty sensor

SOLUTION: Substitute the sensor

CAUSE: Sensor connecting cable broken

SOLUTION: Substitute the cable

CAUSE: Solenoid valve malfunction

SOLUTION: Check coil is working properly

PLC103 = WAITING FOR MAGAZINE TO POSITION 4**DESCRIPTION:** An error occurred during magazine positioning

CAUSE: Faulty sensor

SOLUTION: Substitute the sensor

CAUSE: Sensor connecting cable broken

SOLUTION: Substitute the cable

CAUSE: Solenoid valve malfunction

SOLUTION: Check coil is working properly

PLC104 = WAITING FOR MAGAZINE UP**DESCRIPTION:** An error occurred during magazine positioning

CAUSE: Faulty sensor

SOLUTION: Substitute the sensor

CAUSE: Sensor connecting cable broken

SOLUTION: Substitute the cable

CAUSE: Solenoid valve malfunction

SOLUTION: Check coil is working properly

PLC105 = WAITING FOR MAGAZINE DOWN**DESCRIPTION:** An error occurred during magazine positioning

CAUSE: Faulty sensor

SOLUTION: Substitute the sensor

CAUSE: Sensor connecting cable broken

SOLUTION: Substitute the cable

CAUSE: Solenoid valve malfunction

SOLUTION: Check coil is working properly

PLC106 = WAITING FOR MAGAZINE TO MOVE LEFT**DESCRIPTION:** An error occurred during magazine positioning

CAUSE: Faulty sensor

SOLUTION: Substitute the sensor

CAUSE: Sensor connecting cable broken

SOLUTION: Substitute the cable

CAUSE: Solenoid valve malfunction

SOLUTION: Check coil is working properly

PLC107 = WAITING FOR MAGAZINE TO MOVE RIGHT

DESCRIPTION: An error occurred during magazine positioning

CAUSE: Faulty sensor

SOLUTION: Substitute the sensor

CAUSE: Sensor connecting cable broken

SOLUTION: Substitute the cable

CAUSE: Solenoid valve malfunction

SOLUTION: Check coil is working properly

PLC108 = WAITING FOR TOOL LOCK ON ELECTROSPINDLE 1

DESCRIPTION: Error during tool locking in electrospindle

CAUSE: Faulty sensor

SOLUTION: Substitute the sensor

CAUSE: Sensor connecting cable broken

SOLUTION: Substitute the cable

CAUSE: Solenoid valve malfunction

SOLUTION: Check coil is working properly

PLC109 = WAITING FOR TOOL LOCK ON ELECTROSPINDLE 2

DESCRIPTION: Error during tool locking in electrospindle

CAUSE: Faulty sensor

SOLUTION: Substitute the sensor

CAUSE: Sensor connecting cable broken

SOLUTION: Substitute the cable

CAUSE: Solenoid valve malfunction

SOLUTION: Check coil is working properly

PLC110 = WAITING FOR TOOL LOCK ON ELECTROSPINDLE 3

DESCRIPTION: Error during tool locking in electrospindle

CAUSE: Faulty sensor

SOLUTION: Substitute the sensor

CAUSE: Sensor connecting cable broken

SOLUTION: Substitute the cable

CAUSE: Solenoid valve malfunction

SOLUTION: Check coil is working properly

PLC111 = WAITING FOR TOOL LOCK ON ELECTROSPINDLE 4

DESCRIPTION: Error during tool locking in electrospindle

CAUSE: Faulty sensor

SOLUTION: Substitute the sensor

CAUSE: Sensor connecting cable broken

SOLUTION: Substitute the cable

CAUSE: Solenoid valve malfunction

SOLUTION: Check coil is working properly

PLC112 = WAITING FOR TOOL RELEASE ON ELECTROSPINDLE 1**DESCRIPTION:** Error during tool release from electrospindle

CAUSE: Faulty sensor

SOLUTION: Substitute the sensor

CAUSE: Sensor connecting cable broken

SOLUTION: Substitute the cable

CAUSE: Solenoid valve malfunction

SOLUTION: Check coil is working properly

PLC113 = WAITING FOR TOOL RELEASE ON ELECTROSPINDLE 2**DESCRIPTION:** Error during tool release from electrospindle

CAUSE: Faulty sensor

SOLUTION: Substitute the sensor

CAUSE: Sensor connecting cable broken

SOLUTION: Substitute the cable

CAUSE: Solenoid valve malfunction

SOLUTION: Check coil is working properly

PLC114 = WAITING FOR TOOL RELEASE ON ELECTROSPINDLE 3**DESCRIPTION:** Error during tool release from electrospindle

CAUSE: Faulty sensor

SOLUTION: Substitute the sensor

CAUSE: Sensor connecting cable broken

SOLUTION: Substitute the cable

CAUSE: Solenoid valve malfunction

SOLUTION: Check coil is working properly

PLC115 = WAITING FOR TOOL RELEASE ON ELECTROSPINDLE 4**DESCRIPTION:** Error during tool release from electrospindle

CAUSE: Faulty sensor

SOLUTION: Substitute the sensor

CAUSE: Sensor connecting cable broken

SOLUTION: Substitute the cable

CAUSE: Solenoid valve malfunction

SOLUTION: Check coil is working properly

PLC116 = SELECTED LOCATION NOT EMPTY**DESCRIPTION:** Error during tool change-over with "random" magazine management

CAUSE: Operator error in loading tools into magazine

SOLUTION: Check exact position of the tools in the magazine using the TEST I/O page

CAUSE: Faulty microswitch

SOLUTION: Substitute the microswitch

CAUSE: The proximity switch connecting cable is broken

SOLUTION: Substitute the cable

PLC117 = NO TOOL IN SELECTED LOCATION

DESCRIPTION: The machine has not performed tool unloading

CAUSE: The load tool command has been given for an empty magazine location

SOLUTION: Load the tool manually or load the magazine

PLC118 = WAITING FOR ELECTROSPINDLE 1 IN TOOL CHANGE-OVER POSITION

DESCRIPTION: There is an error during the tool change-over. The NC waits for the electrospindle to reach the upper tool change-over position

CAUSE: There is insufficient pressure for the electrospindle upstroke

SOLUTION: Adjust the pressure regulator

CAUSE: Faulty sensor

SOLUTION: Substitute the sensor

CAUSE: Sensor connecting cable broken

SOLUTION: Substitute the cable

CAUSE: Solenoid valve malfunction

SOLUTION: Check coil is working properly

PLC119 = WAITING FOR ELECTROSPINDLE 2 IN TOOL CHANGE-OVER POSITION

DESCRIPTION: There is an error during the tool change-over. The NC waits for the electrospindle to reach the upper tool change-over position

CAUSE: There is insufficient pressure for the electrospindle upstroke

SOLUTION: Adjust the pressure regulator

CAUSE: Faulty sensor

SOLUTION: Substitute the sensor

CAUSE: Sensor connecting cable broken

SOLUTION: Substitute the cable

CAUSE: Solenoid valve malfunction

SOLUTION: Check coil is working properly

PLC120 = WAITING FOR ELECTROSPINDLE 3 IN TOOL CHANGE-OVER POSITION

DESCRIPTION: There is an error during the tool change-over. The NC waits for the electrospindle to reach the upper tool change-over position

CAUSE: There is insufficient pressure for the electrospindle upstroke

SOLUTION: Adjust the pressure regulator

CAUSE: Faulty sensor

SOLUTION: Substitute the sensor

CAUSE: Sensor connecting cable broken

SOLUTION: Substitute the cable

CAUSE: Solenoid valve malfunction

SOLUTION: Check coil is working properly

PLC121 = WAITING FOR ELECTROSPINDLE 4 IN TOOL CHANGE-OVER POSITION

DESCRIPTION: There is an error during the tool change-over. The NC waits for the electrospindle to reach the upper tool change-over position

CAUSE: There is insufficient pressure for the electrospindle upstroke

SOLUTION: Adjust the pressure regulator

CAUSE: Faulty sensor

SOLUTION: Substitute the sensor

CAUSE: Sensor connecting cable broken

SOLUTION: Substitute the cable

CAUSE: Solenoid valve malfunction

SOLUTION: Check coil is working properly

PLC122 = WAITING FOR PANEL ON CD SIDE BOTTOM STOPS

DESCRIPTION: The machine is waiting for the panel to be brought into contact with the side stops in area CD

CAUSE: Faulty sensor

SOLUTION: Substitute the sensor

CAUSE: Insufficient pressure in the pneumatic cylinder

SOLUTION: Adjust the pressure with the relative regulator

PLC123 = CONFIRM CONVEYOR UNLOADING

DESCRIPTION: The machine requests confirmation of panel unloading due to the emergency in progress. The message appears with PLC 99: PRESS F2 TO CONFIRM

PLC124 = UNLOADING DUE TO EMERGENCY IN PROGRESS

DESCRIPTION: The message appears with PLC123 and PLC99. The machine indicates that panel unloading is in progress due to the emergency

PLC125 = AB UNLOADING INHIBITED

DESCRIPTION: The machine is waiting for unloading

CAUSE: The machining unit is above the panel

SOLUTION: Move the machining unit

PLC126 = CD UNLOADING INHIBITED

DESCRIPTION: The machine is waiting for unloading

CAUSE: The machining unit is above the panel

SOLUTION: Move the machining unit

PLC127 = MACHINING UNIT

DESCRIPTION: The machine is waiting for unloading

CAUSE: The machining unit is above the panel

SOLUTION: Move the machining unit

PLC128 = UNLOADER**DESCRIPTION:** ---**CAUSE:** ---**SOLUTION:** -----**PLC129 = CALIBRATE WORKTABLES AND SUCTION CUPS****DESCRIPTION:** The machine requests worktable and suction cup calibration before loading a panel**CAUSE:** You turned the selector to enable the worktables and suction cups on the NC**SOLUTION:** Calibrate the worktables and suction cups**PLC130 = CONNECTION NOT MADE****DESCRIPTION:** The worktable and suction cup positioning unit did not connect with the suction cup**CAUSE:** The suction cup was moved manually**SOLUTION:** Calibrate the worktables and suction cups**CAUSE:** The suction cup is dirty**SOLUTION:** Clean the suction cup**CAUSE:** Broken microswitch**SOLUTION:** Substitute the microswitch**PLC131 = WAITING FOR WORKTABLE AND SUCTION CUP POSITIONING UNIT DOWN****DESCRIPTION:** The positioning unit did not reach the DOWN position**CAUSE:** Broken microswitch**SOLUTION:** Substitute the microswitch**CAUSE:** Broken solenoid valve.**SOLUTION:** Substitute the solenoid valve**PLC132 = WAITING FOR WORKTABLE AND SUCTION CUP POSITIONING UNIT UP****DESCRIPTION:** The positioning unit did not reach the UP position**CAUSE:** Broken microswitch**SOLUTION:** Substitute the microswitch**CAUSE:** Broken solenoid valve.**SOLUTION:** Substitute the solenoid valve**PLC133 = AXIS B DRIVE FAULT****DESCRIPTION:** There is a fault on the axis B drive**CAUSE:** No DRIVE power. For other causes consult the DRIVE technical documentation**SOLUTION:** Reset the overload switch. Consult the technical support service

PLC134 = AXIS B CALIBRATION ERROR**DESCRIPTION:** Calibration was not carried out correctly on the B axis

CAUSE: Faulty sensor

SOLUTION: Substitute the sensor

CAUSE: Sensor connecting cable broken

SOLUTION: Substitute the cable

CAUSE: Motor driver fault

SOLUTION: Turn the machine off and then on again. If the problem persists contact the support service

PLC135 = LUBRICATE MACHINE**DESCRIPTION:** Lubrication request

CAUSE: The machine requests a lubricating cycle

SOLUTION: Open the Xilog MDI page (press push-button F6), then press F2 to open the set of ISO instructions and type the command M198. Press Enter and start NC.

PLC136 = TOOL WORN

SOLUTION: Check that the dimensions set in the tooling are still valid relative to the actual dimensions. If not, enter the tooling again with the correct values measured on the tool.

PLC137 = FEELING ERROR**DESCRIPTION:** The feeling function was not performed correctly

CAUSE: Programming error

SOLUTION: Check the program parameters again

CAUSE: Faulty feeler microswitch

SOLUTION: Substitute the microswitch

PLC138 = SERIAL TIME OUT**DESCRIPTION:** Communications problem between NC and driver

CAUSE: Connecting cable broken

SOLUTION: Check the connecting cable

PLC139 = SERIAL AXIS DRIVE FAULT**DESCRIPTION:** There is a fault on the serial axis drive

CAUSE: No DRIVE power. For other causes consult the DRIVE technical documentation

SOLUTION: Reset the overload switch. Consult the technical support service.

PLC140 = WORKTABLE AND SUCTION CUP GENERAL POSITIONING ERROR**DESCRIPTION:** The machine stopped during worktable and suction cup positioning

CAUSE: The driver of one of the worktables or suction cups is not communicating with the NC

SOLUTION: Calibrate the worktables and suction cups. If the error persists, substitute the driver

PLC141 = Rapid 1**DESCRIPTION:** This message (associated with other screen messages) indicates which electrospindle the messages on the screen refer to

PLC142 = Rapid 2

DESCRIPTION: This message (associated with other screen messages) indicates which electrospindle the messages on the screen refer to

PLC143 = BUSHINGS MISSING ERROR, PRESS START TO RESTART

DESCRIPTION: The bushing did not pass through the toroidal sensor at the start of the firing tube

CAUSE: Insufficient bushings in feeder.

SOLUTION: Add the quantity of bushings indicated in the technical specifications

CAUSE: A faulty bushing is jammed in the linear channel of the vibrating feeder or in the selector.

SOLUTION: Manually remove the bushing and press the start push-button on the mobile control panel

PLC144 = BUSHING INSERTER WASHING CYCLE IN PROGRESS

DESCRIPTION: Machine is emptying bushings from pipe

CAUSE: The machine is calibrating or is resetting after jamming

SOLUTION: Stop the machine procedures. The cycle eventually restarts automatically

PLC145 = WAIT FOR BUSHINGS ON INSERTER UNIT

DESCRIPTION: the bushing did not pass through the toroidal sensor at the end of the firing tube. The air jet continues until the transit signal is received

CAUSE: The firing tube is disconnected and the bushing is inside the tube.

SOLUTION: Reconnect the tube and the machine restarts automatically.

CAUSE: The firing tube is disconnected and the bushing is lost.

SOLUTION: Reconnect the tube and press the "Bushing inserter unit washing" pushbutton

CAUSE: The bushing was obstructed by a deformation in the nylon tube.

SOLUTION: Check whether or not the tube needs substituting, or if you can simply manually adjust the tube

PLC146 = WAIT FOR INSERTER UNIT LOWERING

DESCRIPTION: The inserter unit pneumatic selection cylinder lower sensor did not indicate completion of the stroke

CAUSE: A mechanical obstacle prevents unit movement

SOLUTION: Remove the obstacle

CAUSE: The sensor is damaged

SOLUTION: Substitute the sensor

CAUSE: The pneumatic solenoid valve is not working

SOLUTION: Substitute the solenoid valve

PLC147 = WAIT FOR INSERTER LOWERED

DESCRIPTION: The inserter sensor did not indicate the insertion punch stroke

CAUSE: Due to dust, a bushing obstructs the mechanical punch downstroke guide

SOLUTION: Remove the obstruction

CAUSE: The sensor is damaged

SOLUTION: Substitute the sensor

CAUSE: The pneumatic solenoid valve is not functioning

SOLUTION: Substitute the solenoid valve

PLC148 = WAIT FOR INSERTER UNIT RAISED

DESCRIPTION: The inserter unit cylinder sensor did not indicate the complete return stroke of the pneumatic selection piston

CAUSE: A mechanical obstruction prevents unit movement

SOLUTION: Remove the obstruction

PLC149 = SIMULATION NOT POSSIBLE

CAUSE: You selected simulated mode

SOLUTION: Deselect simulated mode

PLC150 = AREA AB MACHINING WITH CLAMPS

DESCRIPTION: The machine is machining with the clamps enabled in field AB

CAUSE: You enabled the area AB clamps selector

SOLUTION: Turn the area AB clamps selector to "0".

PLC151 = AREA CD MACHINING WITH CLAMPS

DESCRIPTION: The machine is machining with the clamps enabled in field CD

CAUSE: You enabled the area CD clamps selector

SOLUTION: Turn the area CD clamps selector to "0".

PLC152 = AREA AB CLAMPS RAISED PNEUMATICALLY

DESCRIPTION: The clamps in area AB are raised

CAUSE: You enabled the area AB clamps upstroke selector

SOLUTION: Turn the area AB clamps downstroke selector

PLC153 = AREA CD CLAMPS RAISED PNEUMATICALLY

DESCRIPTION: The clamps in area CD are raised

CAUSE: You enabled the area CD clamps upstroke selector

SOLUTION: Turn the area CD clamps downstroke selector

PLC154 = MAGAZINE NOT IN POSITION

DESCRIPTION: An error occurred in the tool change-over electrospindle unit

CAUSE: The magazine is not in the DOWN position

SOLUTION: Open the Test I/O page and force the magazine into the correct position

CAUSE: The magazine is not in the rear position

SOLUTION: Open the Test I/O page and force the magazine into the correct position

CAUSE: The rapid magazine is not in the UP position

SOLUTION: Open the Test I/O page and force the magazine into the correct position

CAUSE: The rapid magazine is not in the OUT position

SOLUTION: Open the Test I/O page and force the magazine into the correct position

CAUSE: The tool change-over electrospindle is not in the UP position

SOLUTION: Open the Test I/O page and force the electrospindle into the correct position

CAUSE: The tool change-over electrospindle is released

SOLUTION: Open the Test I/O page and force the electrospindle into the correct position

PLC155 = WAITING FOR MAGAZINE UP

DESCRIPTION: An error is activated during automatic or manual movement of the tool magazine

CAUSE: Faulty Magazine UP microswitch

SOLUTION: Substitute the microswitch

CAUSE: Microswitch connecting cable broken

SOLUTION: Substitute the cable

PLC156 = WAITING FOR MAGAZINE DOWN

DESCRIPTION: An error is activated during automatic or manual movement of the tool magazine

CAUSE: Faulty Magazine UP microswitch

SOLUTION: Substitute the microswitch

CAUSE: Faulty Magazine DOWN microswitch

SOLUTION: Substitute the microswitch

CAUSE: Microswitch connecting cable broken

SOLUTION: Substitute the cable

PLC157 = WAITING FOR MAGAZINE FORWARD (Y-)

DESCRIPTION: An error is activated during automatic or manual movement of the tool magazine

CAUSE: Faulty FORWARD position microswitch

SOLUTION: Substitute the microswitch

CAUSE: Faulty BACK position microswitch

SOLUTION: Substitute the microswitch

CAUSE: Microswitch connecting cable broken

SOLUTION: Substitute the cable

PLC158 = WAITING FOR MAGAZINE FORWARD (Y+)

DESCRIPTION: An error is activated during automatic or manual movement of the tool magazine

CAUSE: Faulty FORWARD position microswitch

SOLUTION: Substitute the microswitch

CAUSE: Faulty BACK position microswitch

SOLUTION: Substitute the microswitch

CAUSE: Microswitch connecting cable broken

SOLUTION: Substitute the cable

PLC159 = 10% INVERTER FAULT

DESCRIPTION: There is a fault in the electrospindle speed of rotation

CAUSE: The electrospindle is not rotating at the speed set

SOLUTION: Check the inverter.

PLC160 = EL. 1 REFRIGERATOR PRESSURE SWITCH

CAUSE: The mains supply is shut off or faulty. The main regulator calibration is insufficient

SOLUTION: Check the system

PLC161 = EL. 2 REFRIGERATOR PRESSURE SWITCH

CAUSE: The mains supply is shut off or faulty. The main regulator calibration is insufficient

SOLUTION: Check the system

PLC162 = SUCTION CUPS NOT LOCKED ON WORKTABLE AB

DESCRIPTION: The mains air pressure is too low

CAUSE: The mains supply is shut off or faulty. The main regulator calibration is insufficient

SOLUTION: Check the system which supplies the facility. Increase the pressure by turning the regulator knob clockwise

PLC163 = SUCTION CUPS NOT LOCKED ON WORKTABLE CD

DESCRIPTION: The mains air pressure is too low

CAUSE: The mains supply is shut off or faulty. The main regulator calibration is insufficient

SOLUTION: Check the system which supplies the facility. Increase the pressure by turning the regulator knob clockwise.

PLC164 = AREA AB CYCLE NOT OK

DESCRIPTION: The loading sequence is incorrect

CAUSE: The correct workpiece loading sequence was not followed

SOLUTION: Perform the cycle as indicated below:

- 1) Move the mobile bridge away from the loading zone
- 2) Check that the warning light on the worktable is OFF
- 3) Step onto the mat to load the panel
- 4) Step off the mat
- 5) Press the START cycle push-button

PLC165 = AREA CD CYCLE NOT OK

DESCRIPTION: The loading sequence is incorrect

CAUSE: The correct workpiece loading sequence was not followed

SOLUTION: Perform the cycle as indicated below:

- 1) Move the mobile bridge away from the loading zone
- 2) Check that the warning light on the worktable is OFF
- 3) Step onto the mat to load the panel
- 4) Step off the mat
- 5) Press the START cycle push-button

PLC204 = WAITING FOR ELECTROSPINDLE POSITION 0

DESCRIPTION: There was an error during the tool change-over. The NC waits for the electrospindle to reach the upper tool change-over position

CAUSE: Faulty microswitch

SOLUTION: Substitute the microswitch

CAUSE: Microswitch connecting cable broken

SOLUTION: Substitute the cable

CAUSE: Insufficient pressure for electrospindle upstroke

SOLUTION: Adjust the pressure regulator

PLC205 = WAITING FOR MAGAZINE POSITION 5

DESCRIPTION: There was an error during magazine positioning

CAUSE: Faulty sensor

SOLUTION: Substitute the sensor

CAUSE: Sensor connecting cable broken

SOLUTION: Substitute the cable

CAUSE: Solenoid valve malfunction

SOLUTION: Check coil is working properly

PLC206 = WAITING FOR MAGAZINE POSITION 6**DESCRIPTION:** There was an error during magazine positioning

CAUSE: Faulty sensor

SOLUTION: Substitute the sensor

CAUSE: Sensor connecting cable broken

SOLUTION: Substitute the cable

CAUSE: Solenoid valve malfunction

SOLUTION: Check coil is working properly

PLC207 = WAITING FOR MAGAZINE POSITION 7**DESCRIPTION:** There was an error during magazine positioning

CAUSE: Faulty sensor

SOLUTION: Substitute the sensor

CAUSE: Sensor connecting cable broken

SOLUTION: Substitute the cable

CAUSE: Solenoid valve malfunction

SOLUTION: Check coil is working properly

PLC208 = WAITING FOR MAGAZINE POSITION 8**DESCRIPTION:** There was an error during magazine positioning

CAUSE: Faulty sensor

SOLUTION: Substitute the sensor

CAUSE: Sensor connecting cable broken

SOLUTION: Substitute the cable

CAUSE: Solenoid valve malfunction

SOLUTION: Check coil is working properly

PLCxXX = XXXXXXXX**DESCRIPTION:** XXXXXXXX

CAUSE: XXXXXXXX

SOLUTION: XXXXXXX

Note
