

5801A0080
English

User's manual

NC processing centre
ROVER 13S

Series nr.

Construction year

 **BIESSE**

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BIESSE reserves the right to make any modifications or improvements without prior notice in this technical document and in any machine produced at its plants. This right shall also apply to any machines traded with the same reference code as that to which this manual refers but with a different serial number. In particular, the information contained in this manual refers to the machine specified in the chapter "[GENERAL INFORMATION](#)".

In addition, this document may include an "[Appendix](#)", containing information on the specific configuration of the machine.

Updating

Minor modifications: minor changes, additions or corrections relating to this edition shall be supplied to clients by the BIESSE technical department in the form of separate sheets, which the customer can insert in the manual.

Major modifications: when major modifications become necessary, a completely new issue may be released with an updated code reference.

Errata corrigé: if any errors are found in this manual, BIESSE will supply the original purchaser with an indication of corrections for a reasonable period of time after the date of purchase.

The clauses specified in the paragraph "[Warning regarding restricted information](#)" shall also apply to any updated technical manuals or documents (see introduction of this manual).

Printing history and changes made to new versions of the manual

Code	Issue	Eprom	Date of printing	Additions	Deletions	Changes	Drafted by	Approval
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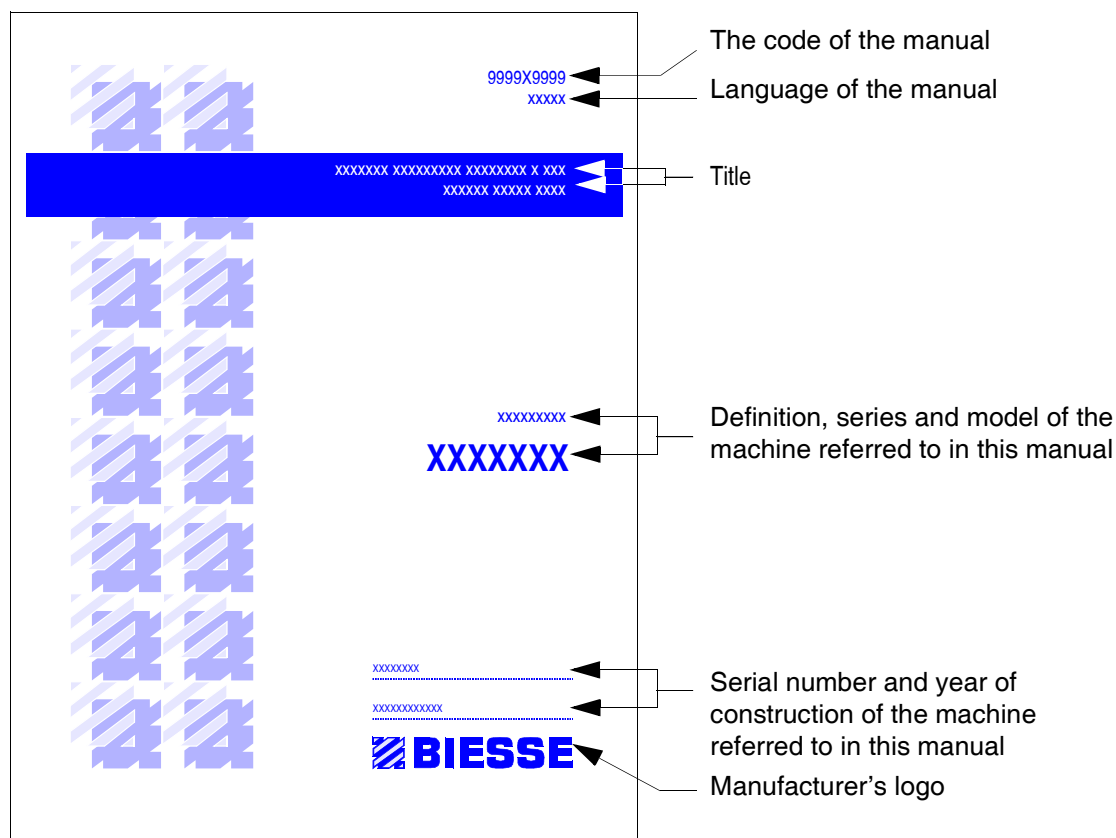
USE OF THE MANUAL

1.1 **DOCUMENTATION**

BIESSE shall not recognize as valid any documents that have not been produced, issued and distributed by BIESSE unless they are accompanied by a specific written declaration issued by BIESSE itself or an approved representative.

1.1.1 **Manual reference data**

To find the data which refers to this particular manual turn to the front cover and check the following diagram:



1.1.2 **Restrictions on the use of the manual**

This manual has been prepared for personnel requested to carry out installation and for operators and also provides information on demolition procedure. The manual is to be used during the entire working life of the machine after it has been manufactured and sold.

The information contained in this manual however is not intended and cannot be referred to as a substitute for the knowledge and experience of the client who uses the machine and who shall be solely responsible for the work carried out on the machine

1.1.3 Available documents

The manuals and documents that accompany the machine are listed in the table below:.

Type of document:	Produced by:
MANUAL: "USE"	BIESSE S.p.A.
MANUAL: "MAINTENANCE"	BIESSE S.p.A.
MANUAL: NUMERICAL CONTROL	BIESSE S.p.A. and C.N.I. S.r.l.
CIRCUIT DIAGRAMS	BIESSE S.p.A.
SPARE PARTS CATALOGUE	I.D.M. Grafica S.n.c.

These documents are contained in a single package and are delivered with the machine. Other documents, not issued by Biesse S.p.a., relating to particular components are considered and supplied as "enclosed documents" and are placed inside the electric cabinet or delivered in a separate package together with the rest of the technical manuals.

By specific request the documentation can be extended to include the parts relating to the [Rover-CAD Applications](#), produced by CNI S.r.l. in collaboration with BIESSE S.p.a. and considered as "enclosed documents".



INFORMATION

All documents must be kept with the machine as they may be required for consultation from time to time. If the machine is transferred or sold, make sure all the documents are kept with the machine.

1.1.4 How to use the documents:

<u>Consult:</u>	<u>for:</u>
User's Manual	General information and safety, learning about technical data and possible uses, unloading and installation, tooling-up, controls and operation procedure, solving main problems.
Maintenance Manual	Planning and carrying out maintenance, replacing parts, details regarding the BIESSE Technical Support Service.
Numerical Control Manual	Learning to program, tooling-up, machine work methods, solving problems.
Spare parts Catalogue	Ordering spare parts (please follow instructions given).
Wiring Diagrams	Checking for correct operation of various systems e.g. electric, pneumatic etc.

1.1.5 Conventions

All references made to directions and positions (left, right, rear, front) refer as seen by a person standing and looking at the machine from the location shown in the general view of the machine at “*chapter 3*” of this manual.

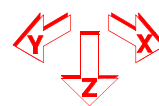
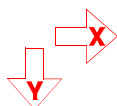
Abbreviations:

N.C. = numerical control;
R-H = right;
Fig. = figure;
FRL = main compressed air unit (filter, regulator, lubricator);
M-T-CH assy = motor - transmission - boring chuck assembly;
RH. H. U. = right-hand horizontal unit;
LH. H. U. = left-hand horizontal unit;
IG = main switch;
Max = maximum;
Min. = minimum;
MSW = microswitches;
W.T. = working table;
P.L.C. = programmable controller;
Rg. = origin;
Tab. = table;
H.B.H. = horizontal boring head;
V.H. = vertical head.

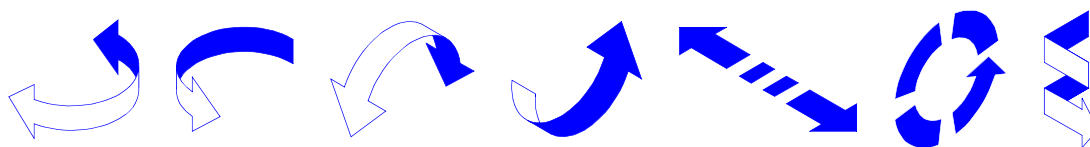
Directional references

These references allow for correct interpretation of the figures. The point of observation is given with respect to the origin of the machine axes.

Examples of references used in the representations of two-dimensional and three-dimensional figures.



Examples of references used to indicate directions of rotation, movements etc.



1.1.5.1 Conventional warning signs



INFORMATION

Special notes and useful advice on various topics

The most important information concerning safety is indicated as follows:



DANGER

Information referring to procedure or operations, which, if not performed correctly, can cause injury, death or long-term risks for health and the environment.



CAUTION

Information referring to procedure or operations, which, if not performed correctly, can cause damage to the product.

GENERAL INFORMATION

2.1 IDENTIFICATION DATA

2.1.1 Identification of the manufacturer



BIESSE S.p.A. Woodworking Machinery

Via Toscana, 75 - 61100 Pesaro ITALY

Telephone (0721)4391

Fax (0721) 453248

Italian fisc.code and VAT 00113220412

2.1.2 Identification of the machine

To identify [model](#), [serial number](#) and [year of manufacture](#), please refer to the machine identification plate affixed to the machine base frame. See "[chapter 3](#)".

The "CE" version of the machine carries the CE Mark as per section 1.7.3 of Annex I and Annex III of EC Directive 89/392, and subsequent modifications.

2.2 BIESSE OFFICES

To contact BIESSE S.p.A. [fax messages may be sent](#) to the following departments:

Tab. 2 - 1

<u>Office</u>	<u>Fax Number</u>
Sales Department	0721 - 453248
Service Department	0721 - 451820

2.3 GENERAL INFORMATION ON SAFETY

BIESSE warns all users that the instructions, procedures and advice contained in this manual and currently applicable safety regulations must be followed carefully. The same applies to the use of protection devices installed on the machine and to personal safety measures.



INFORMATION

BIESSE declines all responsibility for any damage to persons or things resulting from a failure to observe safety regulations and these warnings

2.3.1 Passive safety devices

Definition

Passive safety devices are those devices or measures which eliminate or decrease risks without any necessity for intervention by the operator.

The machine is protected by the following devices.

“Standard” version

- ☐ Photoelectric cells in the front area of the machine.
- ☐ Posts with protection chains in the rear area of the machine.

“CE” version

- ☐ Rear and side metallic mesh guard, with an access door to the rear part of the machine. Opening of the door causes the emergency stop of the machine. Every time that it is necessary to access the area delimited by the protection mesh guard, pull out the key from the safety microswitch located on the door to prevent unintentional reset of normal operation of the machine by another operator.
- ☐ Protective PVC bands mounted around the operating section to limit the risk caused by airborne chips or tool fragments.
- ☐ Contact mats located in the front area of the machine. The mats are controlled by three control centers and are arranged as to implement areas with different safety levels. The areas protected by the outermost contact mats can be accessed only if the corresponding work area has been enabled (START on machine turned ON). An immediate emergency stop will take place on the machine if these mat-protected areas are accessed at any other time. An immediate emergency stop will also be caused by the safety microswitches located on carriage X if the operating section should attempt to invade the area in which the operator is standing. Again, an immediate emergency stop of the machine will be triggered if an attempt is made to access the area protected by the centre contact mat at any time.
- ☐ Limit switches on carriages X and Y which cut off the electricity supply in hardware mode in case of danger.

For more information, please refer to chapters “3” and “6” of this manual.

2.3.2 Active safety devices

Definition

Active safety devices are those type devices or measures which eliminate risks by means of active and conscious intervention on the part of the operator.

The machine is protected by the following devices:

- ❑ A red, manually-activated, mushroom-type EMERGENCY-STOP push-button, located in the electric cabinet. By activating this push-button the machine will be shut down completely.
- ❑ A foot-operated emergency cord located in the front part of the machine base frame. The operator can use the emergency cord to stop the machine completely.
- ❑ A mode selection switch with key-lock located in the electric cabinet. Activation of this selector means that only the voltages required to execute tooling-up operations will be enabled.

For more information, please refer to chapters “3” and “6” of this manual.

2.3.3 Maintenance and other procedures

Before intervening in any way in any part of the machine in all situations in which a residual risk may be present operators must make sure that there are persons close at hand who would be able to assist and provide first aid if the need were to arise.



DANGER

When carrying out all the operations in this manual make sure you follow the procedure indicated and observe all warnings.

2.3.4 Use by qualified personnel

The machine will operate under safe conditions if it is used by ‘qualified’ personnel as described in this manual. All installation, use and maintenance operations must be performed by qualified and authorized persons only.



INFORMATION

BIESSE declines all responsibility for damage to persons or things resulting from use by non-qualified operators.

2.3.5 Danger area

Definition

Any area in which the presence of an exposed person represents a risk to the health and safety of that person.

The dangerous areas of the machine are:

“Standard” version

- ☐ inside the electric cabinet,
- ☐ in the front part of the machine monitored with the photocells.
- ☐ in the rear part of the machine inside the area delimited by the posts with chains.

“CE” version

- ☐ inside the electric cabinet,
- ☐ the area inside the surrounding protection guard,
- ☐ in the front part of the machine above the contact mat,
- ☐ in the side zones of the surrounding mesh guard close to the slots.

2.3.6 Operator

Definition

Any qualified person (see paragraph 2.3.4, page 2 - 5) requested to carry out transportation, installation, testing, adjustment, tooling-up, use, cleaning, maintenance, repair work or demolition of the machine.

2.3.7 Exposed person

Definition

Any person present, whether completely or partially, in a dangerous area (see paragraph 2.3.5, page 2 - 6).

2.3.8 Control area

Definition

The areas where the operator must stand during operation of the machine. From this point the operator can operate and control the control devices on the machine and carry out all procedure necessary for normal production.

The working positions of the machine are the following:

- ☐ In front of the NC control module of the electric cabinet for use and control of the instruments used to govern machine operation,
- ☐ In front of the machine to load and unload the panel and to monitor the normal operation of the machine.

2.3.9 Residual risk

Definition

These are the risks which cannot be eliminated completely on account of certain technical reasons.

The manual mentions the residual risks existing during use, tooling up and maintenance of the machine. All residual risks will be highlighted and noted by a “**DANGER**” symbol. Further explanation can be found in the paragraph: “*Conventions used for notices*”.

2.3.10 Precaution on the part of operators

The machine is supplied by BIESSE with all necessary safety devices installed for the foreseen type of use. However, to further improve the level of safety during operation operators are advised to be very careful. In particular:

- ☐ wear protective clothing of the approved type i.e. glasses, gloves, helmet and footwear.
- ☐ do not wear garments or accessories that can get caught in machinery e.g. ties, bracelets, necklaces.
- ☐ never operate the machine while under the influence of any medicine, drugs or drink that may reduce levels of vigilance and reflexes.
- ☐ keep the working area clean and tidy at all times.
- ☐ do not lean against the machine or attempt to climb onto it.
- ☐ handle the tools with care and always use protective gloves.

2.4 CONDITIONS OF THE GUARANTEE

BIESSE S.p.a. guarantees that the machine was tested at its own premises and that a positive result was obtained.

The guarantee shall remain valid for a period of 6 months starting from the date of delivery unless there is an agreement between BIESSE S.p.a. and the purchaser to define the commissioning of the machine at the latter's premises. When, however, it is agreed between both parties that commissioning shall be performed at the purchaser's premises, the guarantee shall be valid for a period of 6 months starting from the date of commissioning of the machine at the purchaser's premises and, in any case, for a period of no longer than 9 months following the date of delivery. Working hours over 48 hrs./week shall result in corresponding reductions in the period of validity of this guarantee.

BIESSE S.p.a. shall be also considered liable for defects in electric and electronic parts of the machine. The guarantee shall not cover defects caused by normal wear and consumption of those parts which, by their very nature, are subject to rapid and continuous consumption e.g. gaskets, belts, brushes, fuses etc. The guarantee for replaced or repaired components shall expire on the same as expiry of the guarantee of the machine itself.

Furthermore BIESSE S.p.a. shall not be liable for any lack of conformity of the machine deriving from a failure to observe regulations indicated in the instructions manuals and in any case due to inappropriate use or treatment of the machine. The purchaser may thus demand that any parts found to be faulty be replaced provided that such faults are not attributed to mis-handling and, in the case of modification, provided that BIESSE S.p.a. has issued prior written consent.

The purchaser shall lose any right to this guarantee if he or she does not provide BIESSE S.p.a. with a detailed written account of the nature of any defects of conformity found in the machine within 15 days following discovery of the fact. Moreover, the purchaser shall lose his or her right to this guarantee if he or she does not allow the vendor to perform all checks required or if, the vendor having requested the return of a faulty component at its own expense, the purchaser fails to return the component as soon as possible after such a request.

The technical documents which accompany the machine are prepared with close reference to the content of the corresponding Directives and current safety regulations. It is therefore of the utmost importance that the user read completely all volumes of the same in order to obtain from the machine the best possible performance and to ensure the maximum lifetime to its component parts.

The configuration of some parts or devices described or illustrated in the documents may differ from the configuration actually present in the machine in a specific version designed and prepared for particular requirements or safety standards. In this case, certain descriptions, references or advised procedure may be of a generic nature although their effectiveness shall remain valid. The supply of tools or special equipment with the machine is conditioned by the specific characteristics and safety regulations in force in each country. The drawings and photographs are supplied with the sole aim of providing examples as a point of reference for a more complete understanding of the text.

BIESSE products are constantly developed and updated and therefore the firm reserves the right to modify functional or aesthetic characteristics of its machinery, to make variations in drawings of any functional part or accessory or suspend production and supply without giving prior notice

to anyone and without incurring any obligation. BIESSE S.p.a. furthermore reserves the right to make any structural or functional modification besides modifying the supply of spare parts and accessories without any obligation on its part to inform anyone for any reason whatsoever of such changes.

2.5 CONDITIONS REGARDING ASSISTANCE

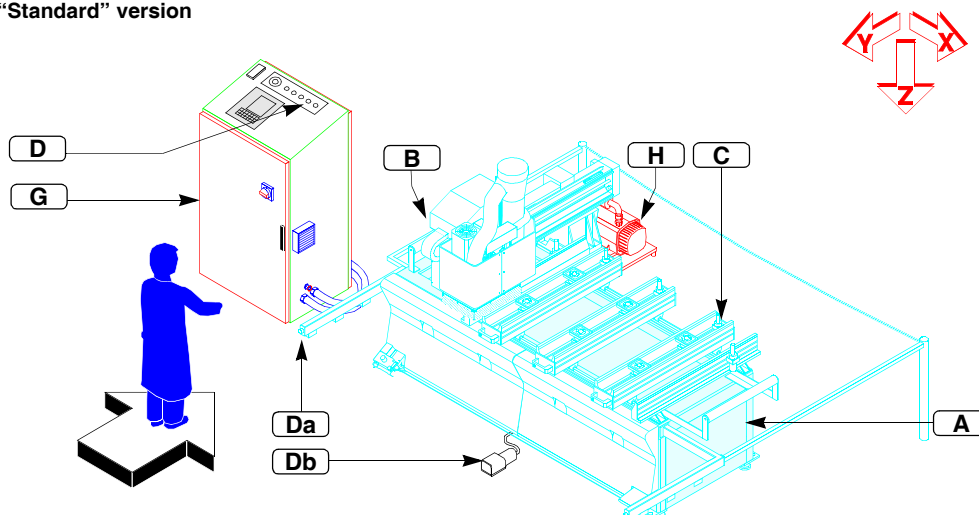
For information on this topic please consult the “[Maintenance Manual](#)” supplied for this machine.

DESCRIPTION OF THE MACHINE

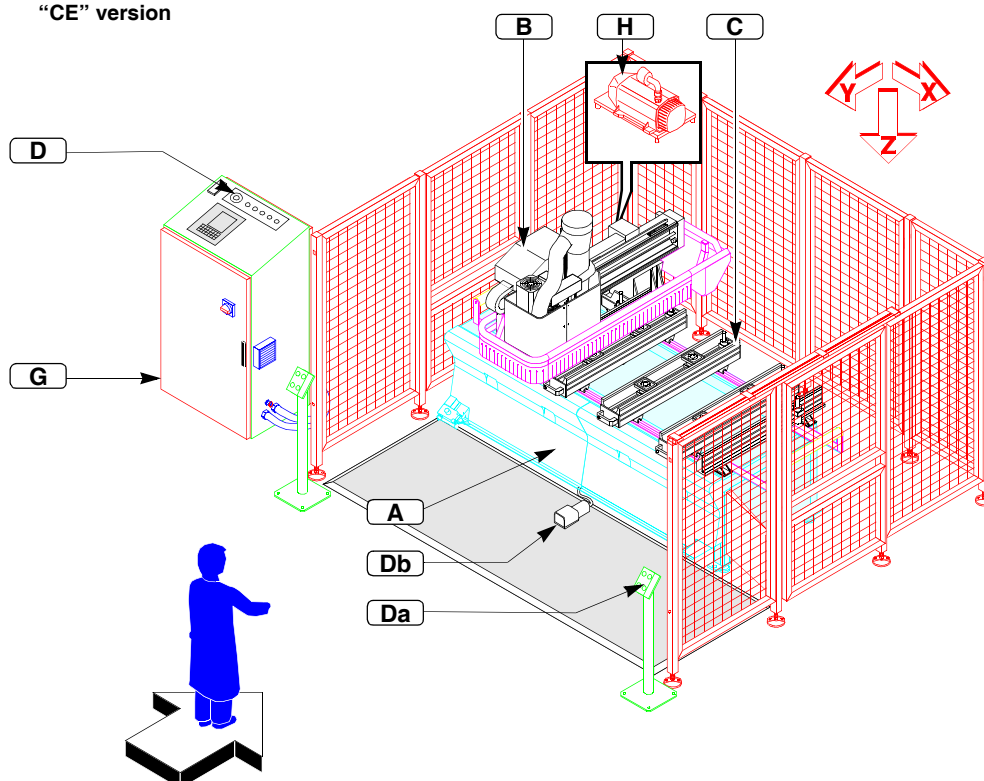
3.1 MAIN PARTS OF THE MACHINE

Fig. 3 - 1 Main parts of the machine

“Standard” version



“CE” version



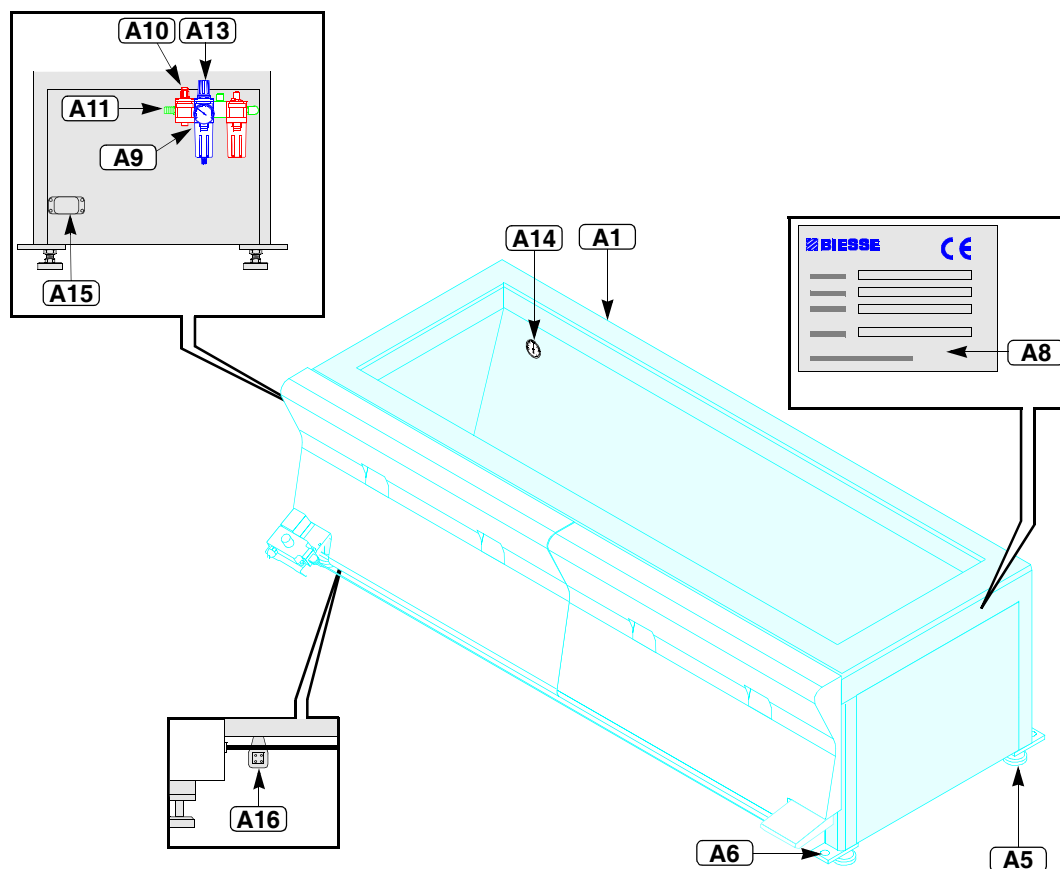
- A** *SUPPORT STRUCTURE* (see paragraph 3.2, page 3 - 4);
- B** *OPERATING SECTION* (see paragraph 3.3, page 3 - 5)
- C** *WORKING TABLE* (see paragraph 3.4, page 3 - 7)
- D** *CONTROLS* (see paragraph 3.5, page 3 - 8)
 - Da** *Front control boxes* (see paragraph 3.5.5, page 3 - 12);
 - Db** *Pedal* (see paragraph 3.5.6, page 3 - 12);
- G** *ELECTRIC CABINET* (see paragraph 3.7, page 3 - 14)
- H** *VACUUM PUMP* (see paragraph 3.8, page 3 - 15)
- SAFETY DEVICES* (see paragraph 3.9, page 3 - 16);
- OPTIONAL DEVICES* (see paragraph 3.10, page 3 - 18).

3.1.1 Overall dimensions and weight

Overall dimensions	See chapter " <i>INSTALLATION</i> "
Weight (kg)	gross weight of the machine as set-up for transportation 2000 Kg (approx.)

3.2 SUPPORT STRUCTURE

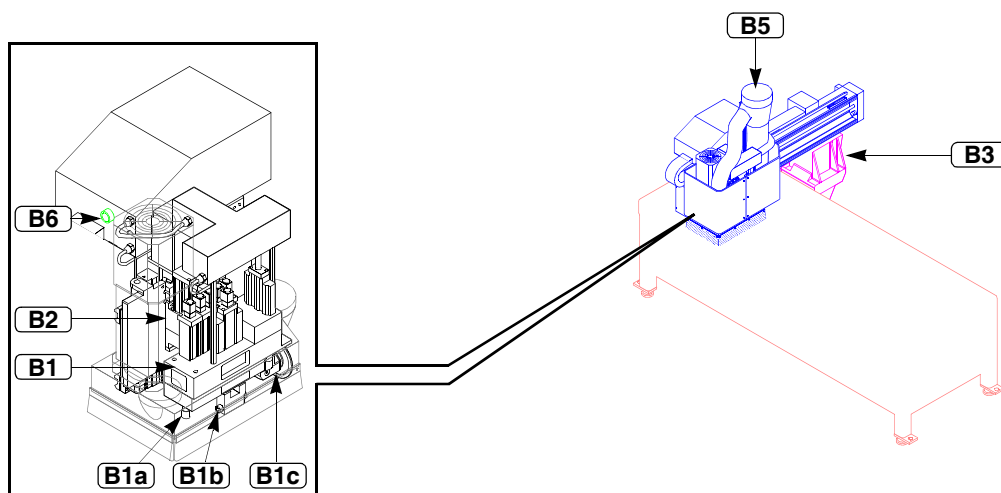
Fig. 3 - 2 Support structure



- A1** base;
- A5** support feet;
- A6** anchor holes;
- A8** machine identification plate;
- A9** “FRL”group;
- A10** Cut-off valve for FRL unit (only for “CE” version);
- A11** pneumatic system connection;
- A13** general pneumatic system pressure gauge;
- A14** vacuum pressure gauge;
- A15** vacuum pump connection socket;
- A16** contact mat connection socket (only for “CE” version).

3.3 OPERATING SECTION

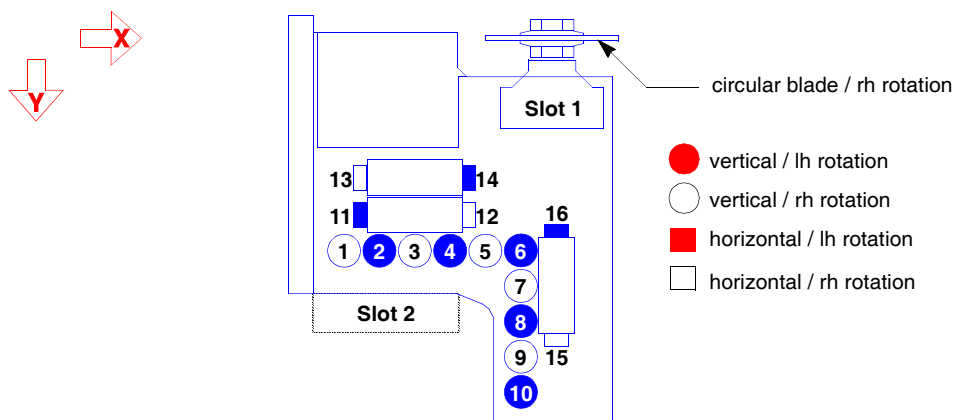
Fig. 3 - 3 Operating section



- B1** boring head
 - B1a** vertical spindles
 - B1b** horizontal spindles
 - B1c** chuck with circular saw tool;
- B2** Slots (*allowing for installation of power units or working units*);
- B3** Movement carriage for axis X;
- B5** suction manifold;
- B6** Lock/unlock push-button for adapter of vertical electros spindle with ISO30 cone adapter

3.3.1 Identification of boring and milling head spindles

Fig. 3 - 4 Identification of Spindles of Boring Head and Slots



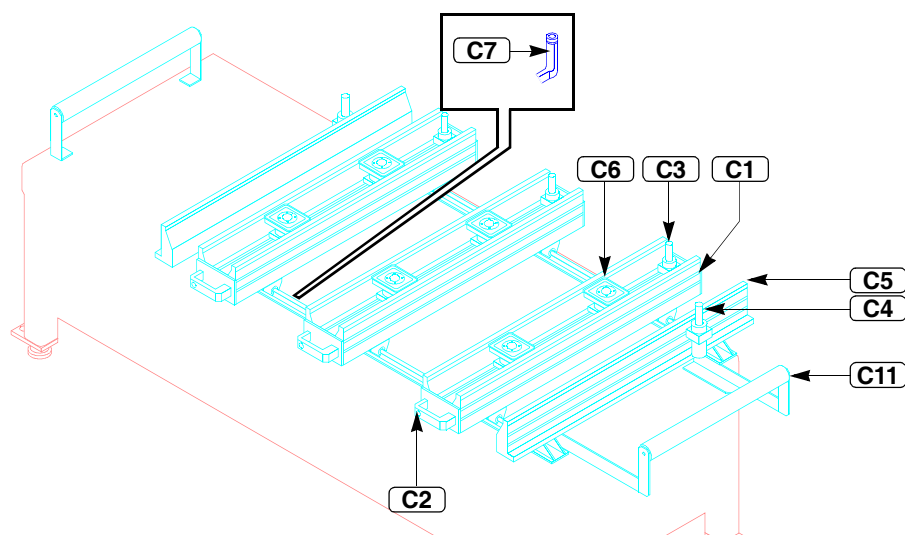
Main technical characteristics

Tab. 3 - 1

number of boring heads	1
n° vertical spindles for each boring head	10
n° horizontal spindles for each boring head	6
diameter of tool coupling for boring head spindles(mm)	10
n° and power of each spindle-drive motor for boring head spindles (kW)	1 x 1,32
rotation speed of boring head spindles (revs/1')	4000
Max. RPM motor axis X (revs/1')	3000
Max. RPM motor axis Y (revs/1')	3000
Max. RPM motor axis Z (revs/1')	3000
Rated torque motor axis X (Nm)	8,34
Rated torque motor axis Y (Nm)	5,39
Rated torque motor axis Z (Nm)	2,84
Suction nozzle diameter (mm)	200

3.4 WORKING TABLE

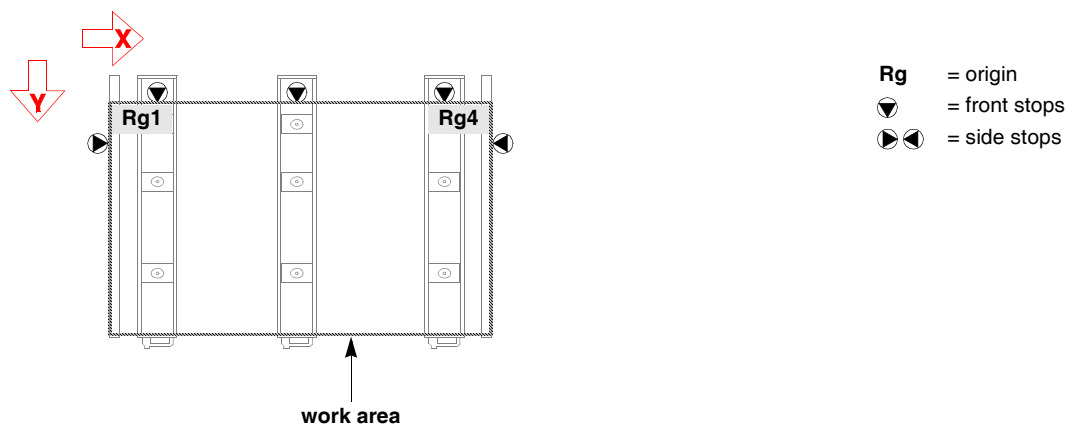
Fig. 3 - 5 Working table



- C1** panel support;
- C2** panel support release/block button;
- C3** front stop;
- C4** side stop;
- C5** side stops support;
- C6** suction cup;
- C7** automatic connection for (optional) auxiliary vacuum system
- C11** roller for supporting and handling large panels.

3.4.1 Identification of origins and work areas

Fig. 3 - 6 Identification of origins and work areas

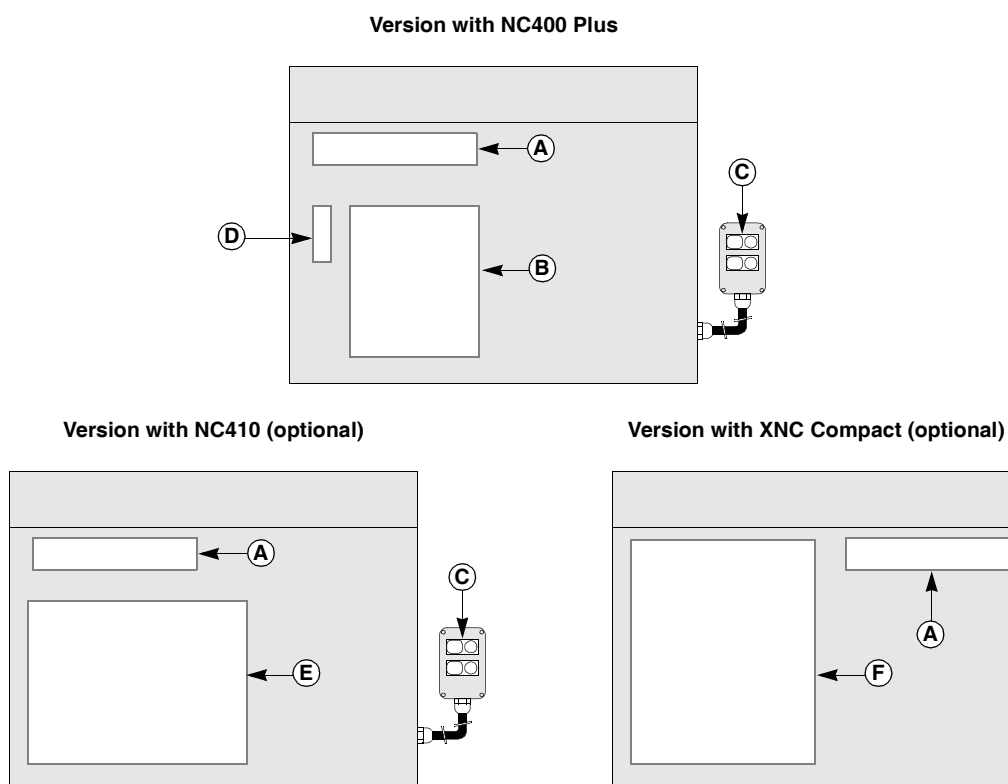


3.5 CONTROLS

The main controls are located on the electrical cabinet and are subdivided as follows:

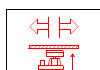
- Ⓐ main control panel (see paragraph 3.5.1, page 3 - 9);
- Ⓑ control module of the NC400 Plus numerical control (see paragraph 3.5.2, page 3 - 10);
- Ⓒ override: keys which allow percentage variation of the programmed feed speed;
- Ⓓ floppy disk drive;
- Ⓔ control module of the NC410 numerical control (see paragraph 3.5.4, page 3 - 11)
- Ⓕ control module of the XNC Compact numerical control (see paragraph 3.5.4, page 3 - 11);

Fig. 3 - 7 Positions of the controls on the electrical cabinet

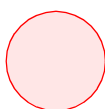


3.5.1 Main control panel

D2 Red VACUUM light



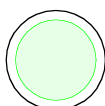
This light illuminates to indicate a reduction in the level of vacuum.



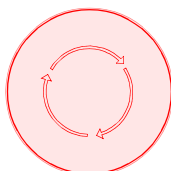
D3 START button



Used to start the machine.

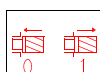


D4 EMERGENCY button



Used to stop the machine immediately.

D15 TOOLING switch

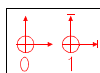


Used to activate the operating mode for tooling of the operating section.

Right = tooling mode active.



D16 2 MOVEMENT STOPS switch

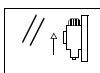


Used to activate use of the two movement stops during performance of the program.

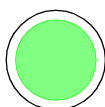
Right = function active.



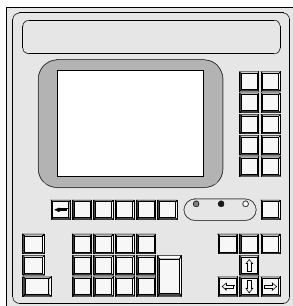
D22 INVERTER RESET button



Used to reset an axis which has moved over the limit position. When this button is pressed all the limit stop microswitches are disabled; check carefully that the axis moves in the correct direction.

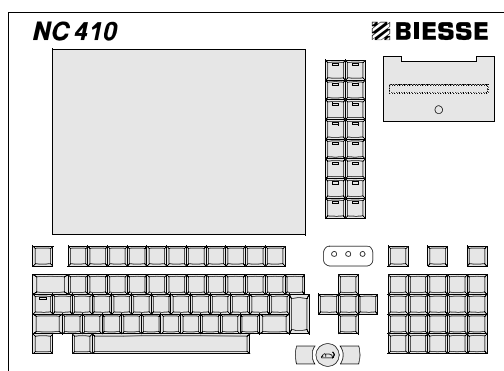


3.5.2 Control module of the NC400 Plus numerical control



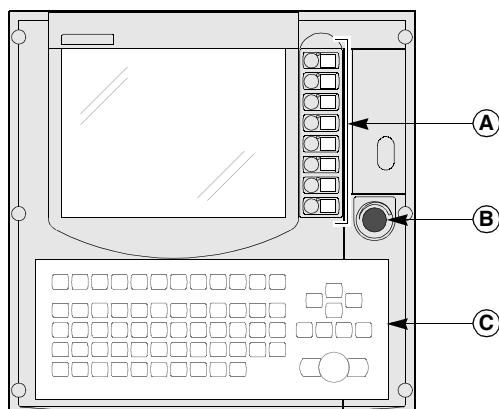
For information, consult the "Programming Manual".

3.5.3 Control module of the NC410 Plus numerical control (optional)



For information, consult the "Programming Manual".

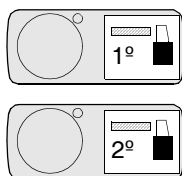
3.5.4 Control module of the XNC Compact numerical control (optional)



- Ⓐ PLC keyboard; see description below.
- Ⓑ Override: knob which allows percentage variation of the programmed feed speed.
- Ⓒ Programming keyboard: for information, consult the "Programming Manual".

Description of the controls on the PLC keyboard

D51 FRONT STOPS keys



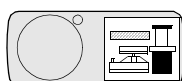
Used to select the row of front stops to be used for execution of the program.
Illuminated = row of stops selected.



INFORMATION

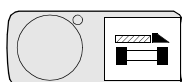
Only the keys relating to the rows of stops present on the machine are active.

D52 CLAMP STOPS key



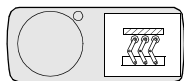
Used to utilize the clamp stops during execution of the program.
Illuminated = function active.
Flashing = function active; vacuum clamping not active.

D53 PUSHERS key



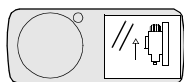
Used to utilize the front pushers during execution of the program.
Illuminated = function active

D54 BAR SUPPORTS key



Used to utilize the bar or ball supports during execution of the program.
Illuminated = function active.

D57 RESET SLOT key



Used to obtain upward return of the electric spindle if it has remained lowered due to a sudden emergency or after the STOP and RESET keys have been pressed.

3.5.5 Front control boxes

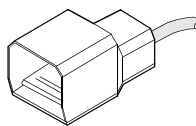
D1a START AREA buttons



Used to select the corresponding working area and to start machining.

3.5.6 Pedal

D1b Pedal

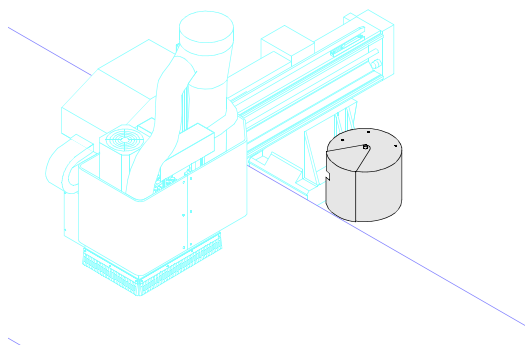


Controls fixing of the panel on the working table.

3.6 TOOL MAGAZINES

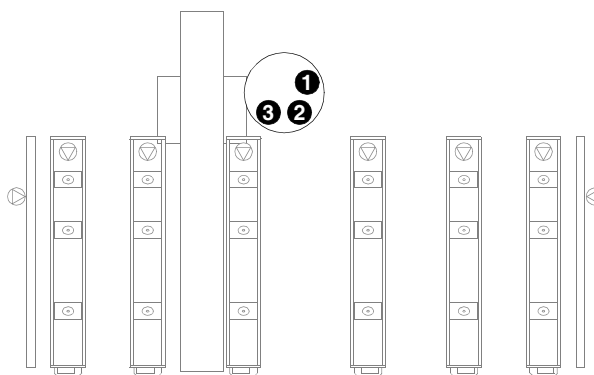
The magazine allows automatic tool change. It can hold tools fitted with an ISO 30 cone adapter.

Fig. 3 - 8 Tool magazines



3.6.1 Tool magazines identification

Fig. 3 - 9 Tool magazines identification

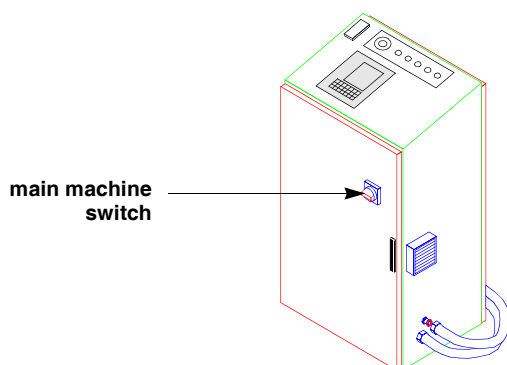


Main technical characteristics

Max no. of tools	3
Max diameter of tools (mm)	Ø 60

3.7 ELECTRIC CABINET

Fig. 3 - 10 Electric cabinet



Tab. 3 - 2

protection	IP 54
regulation reference for electric cables	CEI EN 60204-1
regulation reference for housing	NEMA 12 - DIN 40050 IEC 529
overall dimensions (mm)	see paragraph 3.1.1, page 3 - 3
overall weight (kg)	250 (approx.)

3.7.1 Technical characteristics of the main electric equipment

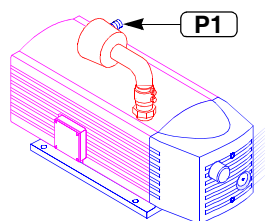
Tab. 3 - 3

Transformers	frequency of power supplied (Hz)	50/60
	insulation class	E
	electric rigidity (KV per 1')	4
	protection	open construction
Protection sheaths	material	P.V.C. / Polyamid
	protection	IP 67
Power cables and auxiliaries between on board- machine and electric cabinet	conductor	flexible copper
	insulation	P.V.C. CEI 20-20

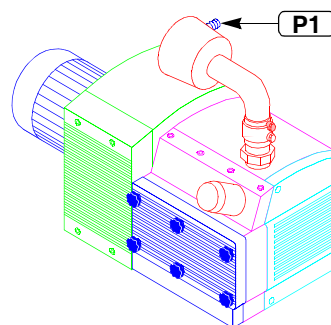
3.8 VACUUM PUMP

Fig. 3 - 11 Vacuum pump

Becker VT 4.40



Becker KVT 3.100 (optional)



P1 vacuum system connection.

Main technical characteristics

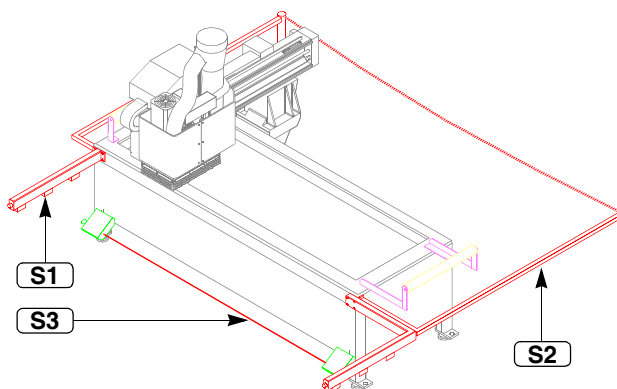
	Becker VT 4.40	Becker KVT 3.100
length (mm)	530	800
width (mm)	330	470
height (mm)	480	720

3.9 SAFETY DEVICES

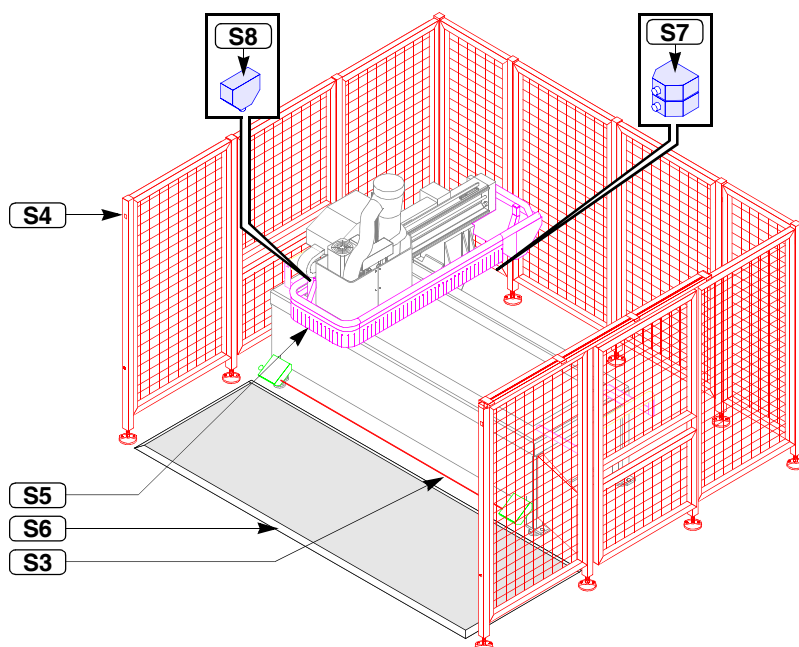
This section lists the safety devices installed on the machine and on the operating section. More information on the emergency controls can be found at paragraph 3.5, page 3 - 8 and in the section dealing with *GENERAL SAFETY INFORMATION*, Chapter 2.

Fig. 3 - 12 Safety devices

“standard” version



“CE” version



- S1** photoelectric cells;
- S2** posts with safety chain;
- S3** foot-operated front emergency cord, to stop the machine in emergencies;
- S4** safety mesh guard, can be used also in the “standard” version instead of posts and chain;
- S5** PVC bands;
- S6** contact mats;
- S7** limit switch on axis X;
- S8** limit switch on axis Y.

3.10 DESCRIPTION OF MAIN OPTIONALS



INFORMATION

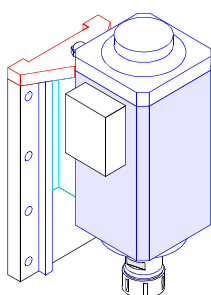
For any information not contained here, or for further details on the optional devices that can be installed on the machine, please contact the COMMERCIAL - SALES office of BIESSE S.p.A.

3.10.1 Working units

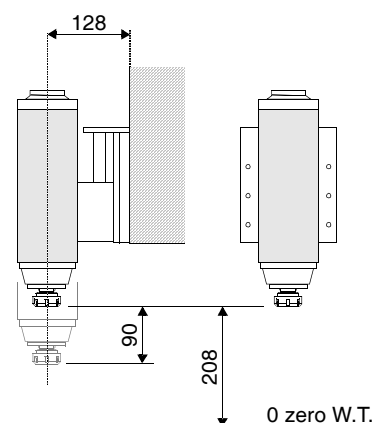
Definition given to units complete with slide and motor. These units can be positioned directly on the slots of the operating section. The working units available on the machine are:

3.10.1.1 Vertical electrospindle with connection for ERC32 pincer

Fig. 3 - 13 Vertical electrospindle with connection for ERC32 pincer

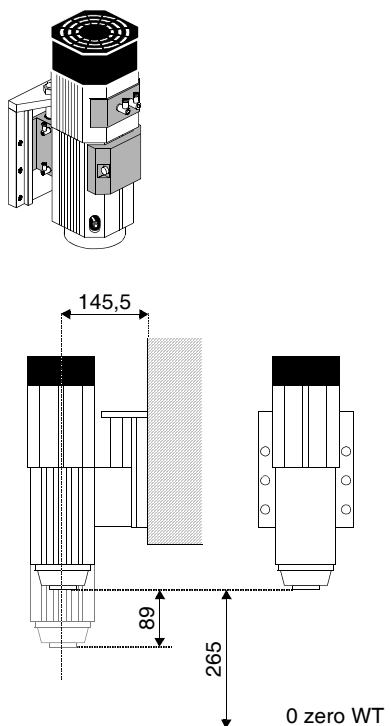


power at 12000 rpm (kW)	2,2
operation range (revs/1')	6000÷18000
connection type	ERC 32 pincer
rotation direction	right-hand
max length of tool shank (mm)	40
min - max diameter of tool shank (mm)	6 - 20



3.10.1.2 Vertical electrospindle with coupling for ISO 30 cone

Fig. 3 - 14 Vertical electrospindle with coupling for ISO 30 cone

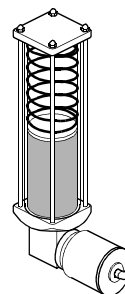


power - 12000 revs/1' (kW)	3,6
operation range (revs/1')	1000÷24000

3.10.2 Centralized lubrication system

Fig. 3 - 15 Lubrication unit

This device automatically greases the recirculating ball rollers which drive the axes.

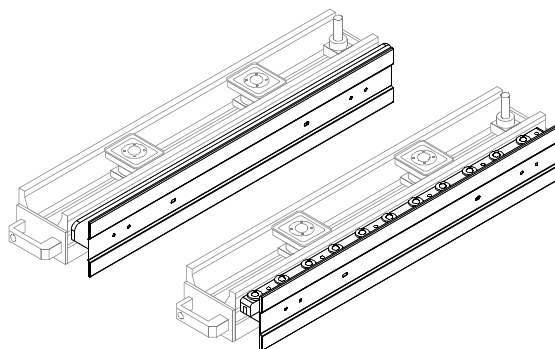


3.10.3 Ball or bar supports

Fig. 3 - 16 Ball or bar supports

These devices are used for easier loading and unloading of large-size panels. They are installed on the side of each panel support.

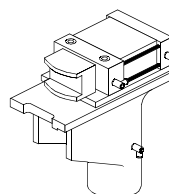
When these devices are used, the maximum weight of the panel must not exceed 40 kg.



3.10.4 Double movement stop

Fig. 3 - 17 Double movement stop

This type of stops is used for panels with overhanging edges.

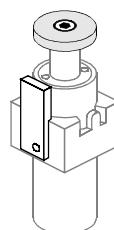


3.10.5 Auxiliary clamping devices

These devices are used for clamping small size panels on which the standard clamping method with suction cups may not be sufficiently secure.

Fig. 3 - 18 Stop clamp

This device is secured to the upper part of the stops and used as a clamp.



3.10.6 Jigs

These devices are used to retain the panel at a distance from the working table for operations on the edges.

Fig. 3 - 19 Manual locking/unlocking jig

This type of jig can only be used with the standard suction cups of the working table.

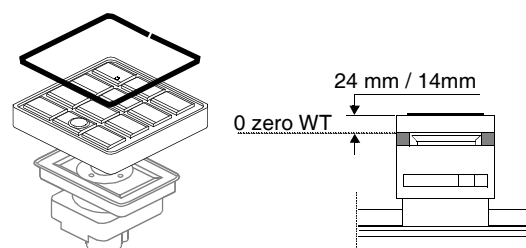
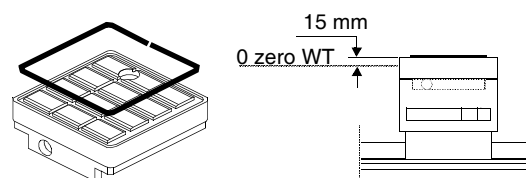


Fig. 3 - 20 Automatic locking/unlocking jig

This type of jig replaces the standard suction cups on the working table and features a lock/unlock button for the positioning of the jig.



3.10.7 Adapters and pincers

Devices, the interposition of which allows for connection between power units and tools.

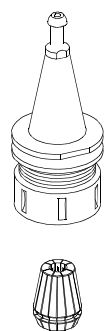


CAUTION

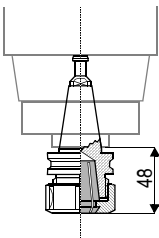
Each specific adapter is pre-set for right-hand or left-hand rotation (as requested by the client). Check the direction of rotation of the power unit on which it is to be installed.

3.10.7.1 ISO 30 cone adapter for ERC32 pincers

Fig. 3 - 21 ISO 30 cone adapter for ERC32 pincers

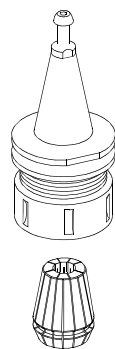


max length of tool shank (mm)	40
min - max diameter of tool shank (mm)	6 - 20

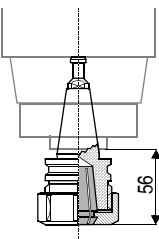


3.10.7.2 ISO 30 cone adapter for ERC40 pincers

Fig. 3 - 22 ISO 30 cone adapter for ERC40 pincers



max length of tool shank (mm)	46
min - max diameter of tool shank (mm)	3 - 30



INSTALLATION

4.1 **WARNING**



DANGER

Installation operations must be performed by personnel with the necessary preparation and technical know-how.



CAUTION

Make sure you follow the instructions, thus avoiding any operations that may damage the machine.



INFORMATION

Keep all equipment used to transport the machine e.g. the NC cabinet supports, clamping brackets for the operating section etc. These will have to be used again if the machine is ever moved.

4.1.1 **Checking for the presence of any damage before installation procedure**



CAUTION

Check that the various parts of the machine are not damaged in any way through impact, tearing or abrasion.

4.1.2 **Procedure for reporting damage**



INFORMATION

If physical damage has been found, interrupt the installation procedure and report the type of damage incurred to the person responsible for the machine.

If necessary, please contact:

[BIESSE ASSISTANCE SERVICE](#) (Fax 0721/ 451820)

4.2 STORAGE

The instructions contained in this section must be followed during the periods of temporary storage of the machine, which may become necessary in the following situations:

- ☐ when the machine is not installed immediately after delivery.
- ☐ when the machine is decommissioned and stored until a new location is ready.

If these instructions are not observed, BIESSE shall not be considered liable for any damage to the machine or incurred in subsequent performance, which does not conform with the technical specifications supplied.

4.2.1 Physical characteristics of the storage area

If the machine is stored, the machine must be located in an area which has the following characteristics:

Dimensions

The machine will require sufficient space for its own overall dimensions and extra space for movement of operators and maneuvering so that the slinging and hoisting operations can be carried out properly and safely without hindrance;

Protection from atmospheric agents

If the machine is housed in a container, the storage area must be covered and protected against direct atmospheric agents such as rain, snow, hail and must be accessible only to authorized personnel;

Floor surface

The floor upon which the machine is brought to rest must be flat, with a maximum planar error of 25 mm (also when obtained with spacers) and with a maximum inclination of 0.4% in any direction. The floor must also ensure an overall load 13 kN with reference to the entire storage surface and a minimum unitary load of 3,4 MPa.



CAUTION

In order to avoid unnecessary strain on the frame of the machine operators are advised to adjust the height of the levelling pads so that the pads are equally loaded.

4.2.2 Environmental characteristics of the storage area

Tab. 4 - 1

Temperature	from -20 C to +50 C
Humidity	max. 90% not condensed

4.3 UNLOADING AND MOVING THE MACHINE



DANGER

Do not stand in the field of action of the crane during unloading operations. Use the unloading method described in this paragraph. Do not use any other method.



DANGER

To raise the machine or any part of the machine, use equipment and means of raising of suitable capacity.



DANGER

Free the machine from any clamping materials used to avoid movement during transportation.



DANGER

Before proceeding with movement of the machine remove any packing material that may have been used.



CAUTION

During movement of the machine avoid any movement that may damage it. If necessary, anchor the load effectively to the fork-lift truck.



CAUTION

Protect painted parts by placing clean soft rags or undulated carton sheets over the machine.

4.3.1 Unloading and moving the machine



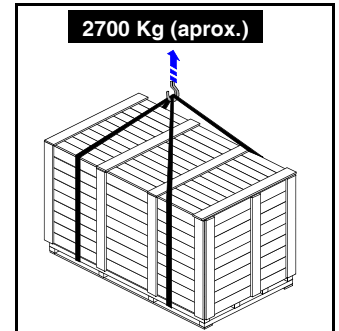
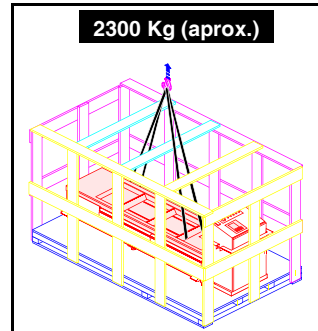
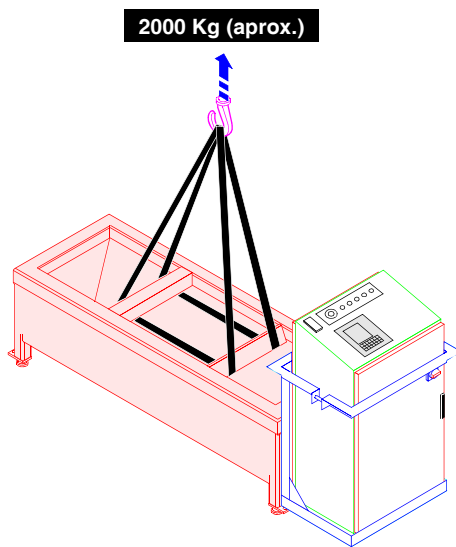
DANGER

Before proceeding with operations read very carefully the warnings given in paragraph 4.3, page 4 - 4.

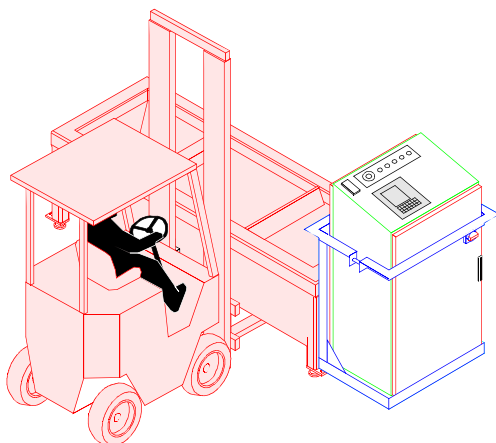
1. To unload the machine, position the slings as shown in the diagram and lift slowly.
2. To transport the machine use a fork-lift truck as described in the figure.
3. Before placing the machine on the ground in its definitive position, remove all the sheets of vibration-damping material (B) and replace all the support pads (C).

Fig. 4 - 1 Unloading and moving the machine

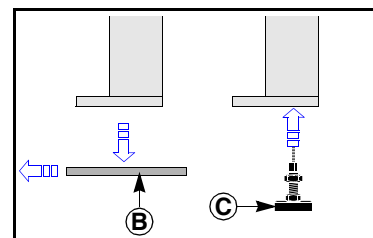
1



2



3



4.3.2 Unloading and moving the vacuum pump

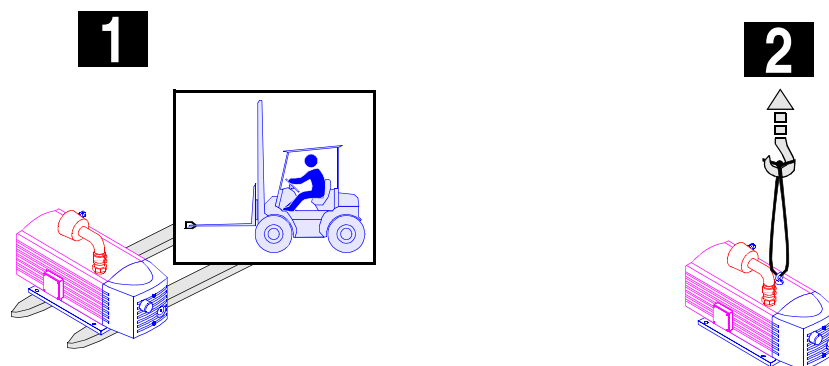


DANGER

Before proceeding with operations read very carefully the warnings given in paragraph 4.3, page 4 - 4.

1. Unload and move all vacuum pumps, using a fork-lift truck as shown in the figure.
2. If it is not possible to carry out the unloading operation directly with the fork-lift truck, unload each vacuum pump, using a crane with hoist straps, and then move the pumps with the fork-lift truck.

Fig. 4 - 2 Unloading and moving the vacuum pump



4.3.3 Unloading and moving the surrounding guards

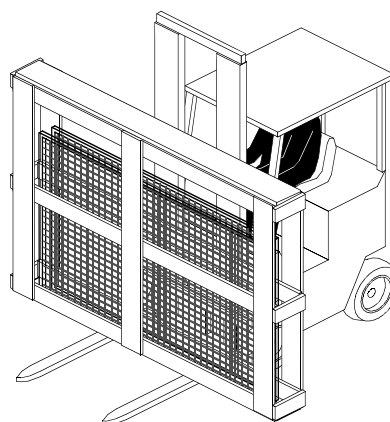


DANGER

Before proceeding with operations read very carefully the warnings given in paragraph 4.3, page 4 - 4.

1. Unload and move the surrounding protection guards with a fork-lift truck as shown in the figure.

Fig. 4 - 3 Unloading and moving the surrounding guards



4.4 REMOVING AND POSITIONING THE ELECTRICAL CONTROL CABINET

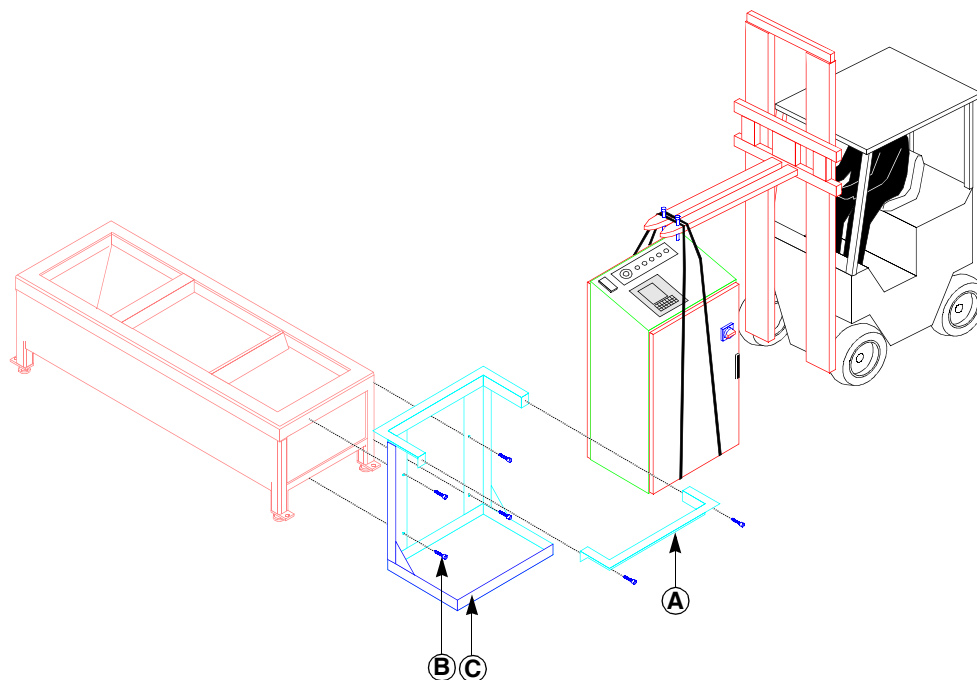


INFORMATION

To position the electrical control cabinet, refer to *Fig. 4 - 5*, page 4 - 8.

1. Remove the bracket (A).
2. Use a fork-lift truck to lift the electrical control panel and place it in its definitive position.
3. Unscrew the screws (B) and remove the support (C).

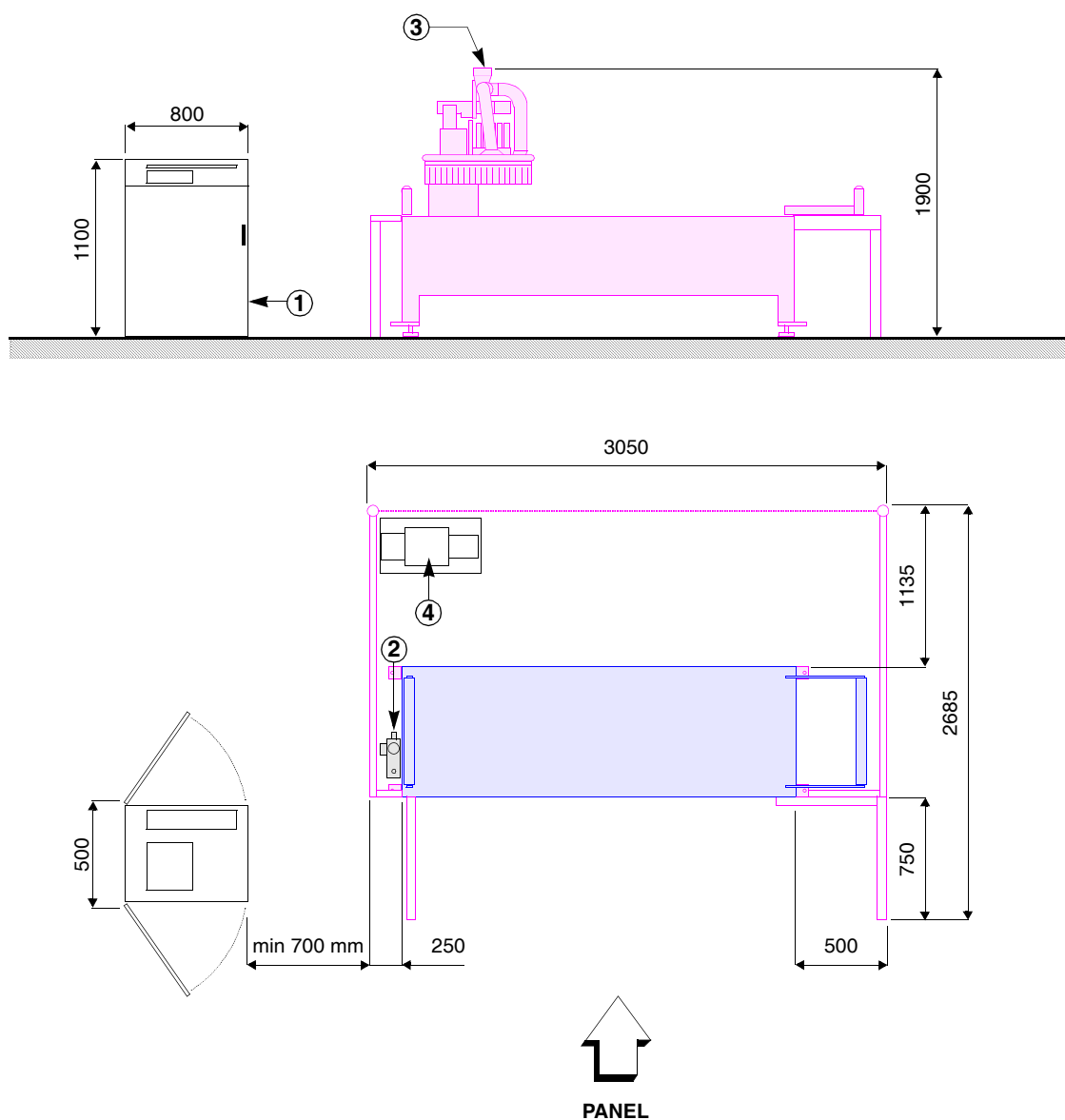
Fig. 4 - 4 Removing and positioning the electrical control cabinet



4.5 POSITIONING THE MACHINE

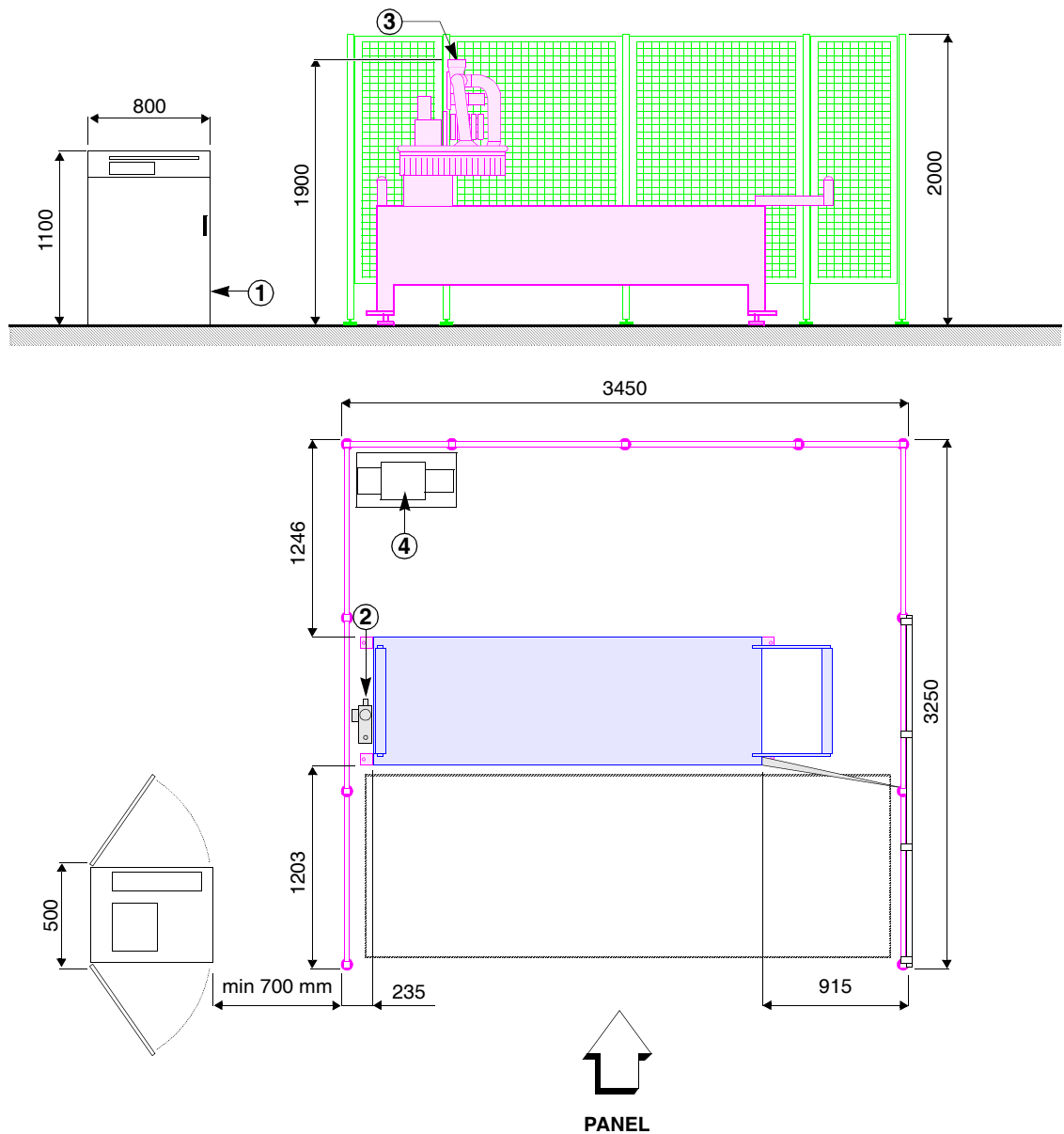
- ① connection point of electrical system; ② connection point of pneumatic system;
③ connection point of suction system; ④ vacuum pump.

Fig. 4 - 5 Machine positioning layout



- ① connection point of electrical system;
- ② connection point of pneumatic system;
- ③ connection point of suction system;
- ④ vacuum pump.

Fig. 4 - 6 Machine positioning layout - "CE" version



4.5.1 General information

Make sure the machine is not installed in areas where there is a potential source of distraction which will disturb the operator.

The working area must be fully illuminated and must be close to a take-off point for compressed air and electrical power, the latter being in a protected position and fitted with a lockable section switch. The working area must also be fitted with an extraction system for the removal of dust and chips.

Preferably, the machine must be located in an area with free space available all around it, through an angle of 360°. If this is not completely possible, it must be positioned at least 700 mm away from walls, other machinery, equipment and other large objects. The overall volume of the machine and the position of the NC cabinet must be taken into careful consideration to make sure installation is carried out rationally.

To position all the disassembled parts e.g. electric cabinet, vacuum pump etc., refer to [Fig. 4 - 5](#), page [4 - 8](#)).

4.5.2 Type of flooring and load conditions

The place where the machine is installed must be able to withstand the following conditions:

- ☐ Total static load: 12000 N;
- ☐ Static load on each support pad: 3000 N;
- ☐ Max vertical dynamic load on each pad: 90 N
- ☐ Max unitary load on each pad: 3,41 MPa
- ☐ Max horizontal dynamic load in the X axis direction for each pad: 290 N
- ☐ Max horizontal dynamic load in the Y axis direction for each pad: 240 N

Levelling:

- ☐ Maximum planar error of flooring: 25 mm
- ☐ Maximum inclination of the floor in all directions: 0,4%.

4.5.3 Noise level

The noise levels indicated are output levels and do not necessarily represent safe operational levels. Although there is a relationship between output levels and exposure levels, the output levels cannot be reliably used to determine whether additional precautions are necessary or not. The factors determining the noise levels to which the operative personnel is exposed, include the length of exposure, the characteristics of the work area, as well as other sources of dust and noise, etc. i.e. the number of machines and processes concurrently operating in the vicinity. In any case, the information supplied will help the user of the machine to better assess the danger and the risks involved.

Noise level tests were conducted as described in: EN 31202 - ISO 7960 - prEN 848.

Materials worked: chipboard covered with melamine, thickness 18 mm.

Instruments: phonometer BK 2230

K_1 = Background noise correction factor lower than 4 dB (A)

K_3 = Background environment correction factor lower than 4 dB (A)

Tab. 4 - 2

	a	b	c	LR
Boring head				
1. 10 boring drill-bits diam 8 mm	4000	1	10	82
Vertical electrospindle with coupling for cone ISO 30				
1. tool w/ cut diam 25 mm	18000	6	5	83
2. 2 cutting edges				
3. length of cutting edges 40 mm				

a = tool rotation speed (rpm)

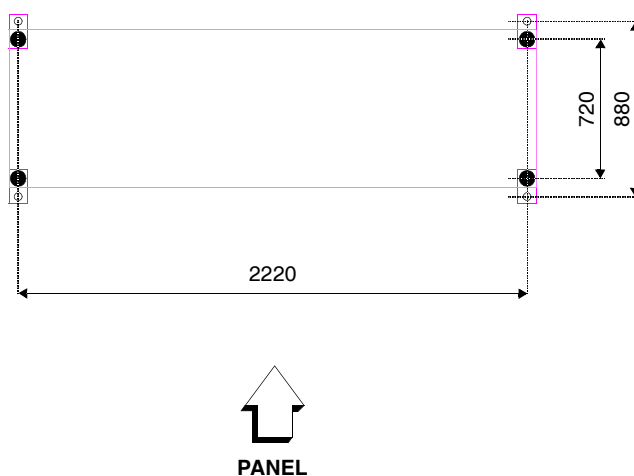
b = forward movement speed (m/min)

c = depth of operation (mm)

LR = corrected acoustic radiation pressure in the operator position, in dB (A)

4.5.4 Layout of support feet and anchor holes

Fig. 4 - 7 Layout of support feet and anchor holes



4.5.5 Environmental conditions for correct operation of the machine

Users are advised to observe the following specifications:

Temperature

- ☐ When the machine is operating: from 0° C to +50° C (with air conditioner from 0°C to +50°C)
- ☐ When the machine is not operating: from -20°C to +50°C.
- ☐ During storage and before installation: from -20°C to +50°C.

Relative humidity

- ☐ Max. 90% not condensed

Height

- ☐ Max. 1000 m

4.6 ASSEMBLING THE MACHINE



DANGER

Machine assembly operations must be carried out by skilled personnel authorized by BIESSE.

The following paragraphs indicate all the assembly procedures required by both versions of the machine. The operations required for the “standard” version are;

1. remove the protection material (page 4-13);
2. securing rollers for panel support (page 4-14)
3. remove the clamping brackets used during transportation (page 4-15);
4. level the machine (page 4-15);
5. install and secure supports for photoelectric cells and reflectors (page 4-15);
6. install and secure safety chain posts (page 4-16);
7. fasten machine to the floor (page 4-16);
8. assemble safety mesh, if provided (page 4-18).

The operations required for the “CE” version are;

1. remove the protection material (page 4-13);
2. securing rollers for panel support (page 4-14)
3. remove the clamping brackets used during transportation (page 4-15);
4. level the machine (page 4-15);
5. install and secure supports for photoelectric cells and reflectors (page 4-15);
6. assemble safety mesh, (page 4-18).
7. install and secure contact mats (page 4-24);
8. install and secure supports for control box on machine (page 4-25).

4.6.1 Removing the protective material



CAUTION

Remove the protective layer from the guides before moving the machine axes.



CAUTION

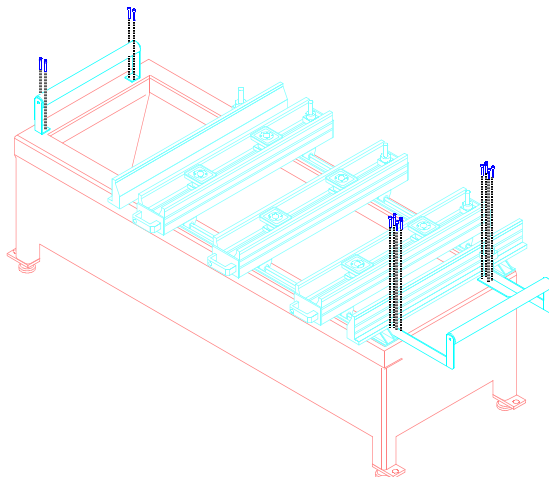
Never use petroleum spirit, nitro perchloride solvent, dry-cleaning fluid or other solvents which would damage the paint, synthetic materials, etc.

Remove the protective material using a soft, clean cloth dipped in kerosene, cleaning and drying all the travel guides carefully.

4.6.2 Securing rollers for panel support

1. Secure rollers for panel support as shown in figure.

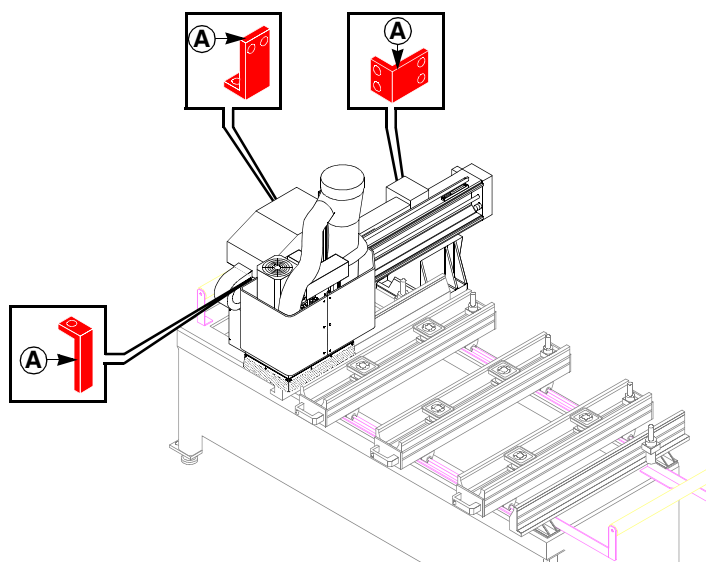
Fig. 4 - 8 securing rollers for panel support



4.6.3 Removing the transport clamping brackets

1. Remove all the clamping brackets **(A)** (3 brackets to be removed).

Fig. 4 - 9 Removing the transport clamping brackets

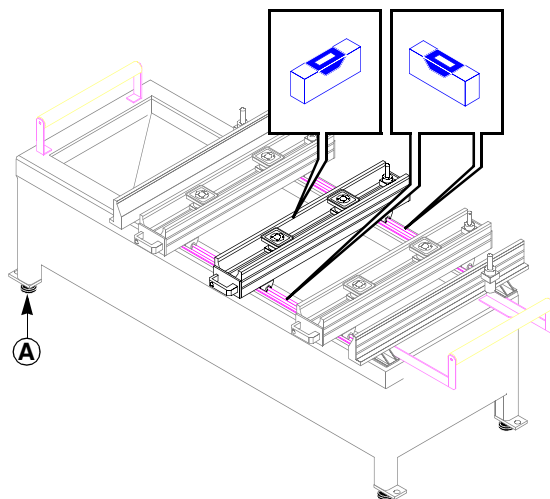


4.6.4 Levelling the machine

Before levelling the machine, place the operating section in the central zone of the machine by hand. The spirit-level must have a sensitivity of at least 0.05 mm per metre.

1. Back off all the jam nuts of the pads.
2. Level the machine by adjusting all the feet **(A)**, placing the spirit-level in the points shown in the figure.
3. When levelling is complete, place the support pads **(B)** on the ground and fully tighten all the jam nuts.

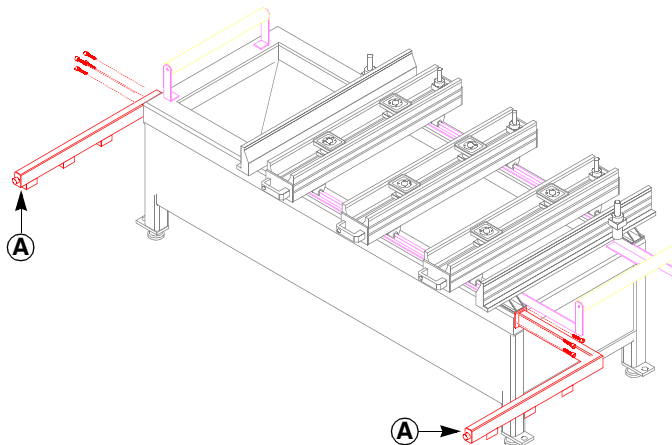
Fig. 4 - 10 Levelling the machine



4.6.5 Installing supports for photoelectric cells and reflectors

1. Install and secure supports **(A)** as shown in the figure.

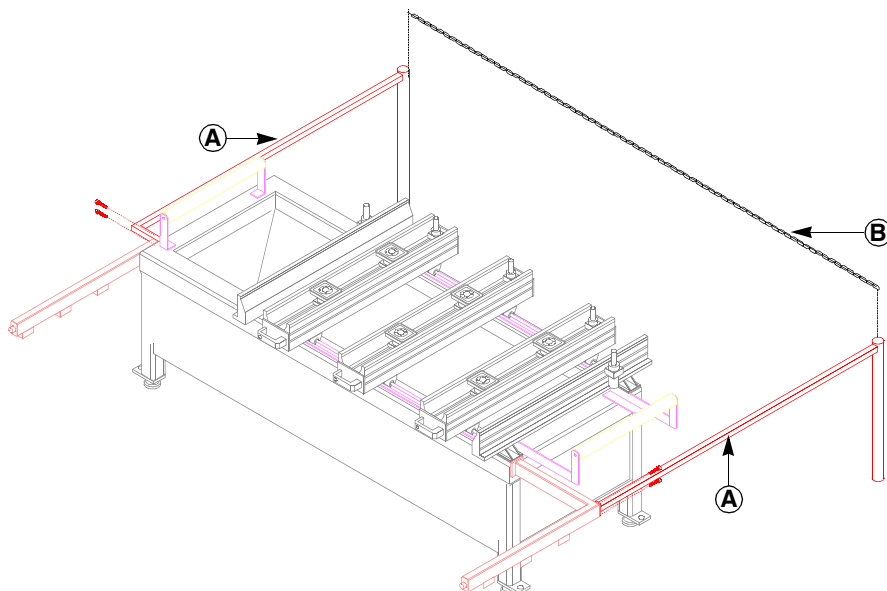
Fig. 4 - 11 Installing supports for photoelectric cells and reflectors



4.6.6 Installing posts for safety chain

1. Install and secure posts ① and safety chain ② as shown in the figure.

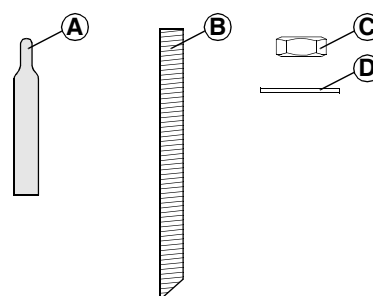
Fig. 4 - 12 Installing posts for safety chain



4.6.7 Fixing the machine to the floor

Material supplied for fixing the machine to the ground

Ref.	Description	Quantity
①	chemical phial	4
②	threaded rod M16 x 250	4
③	M16 nut	4
④	washer	4



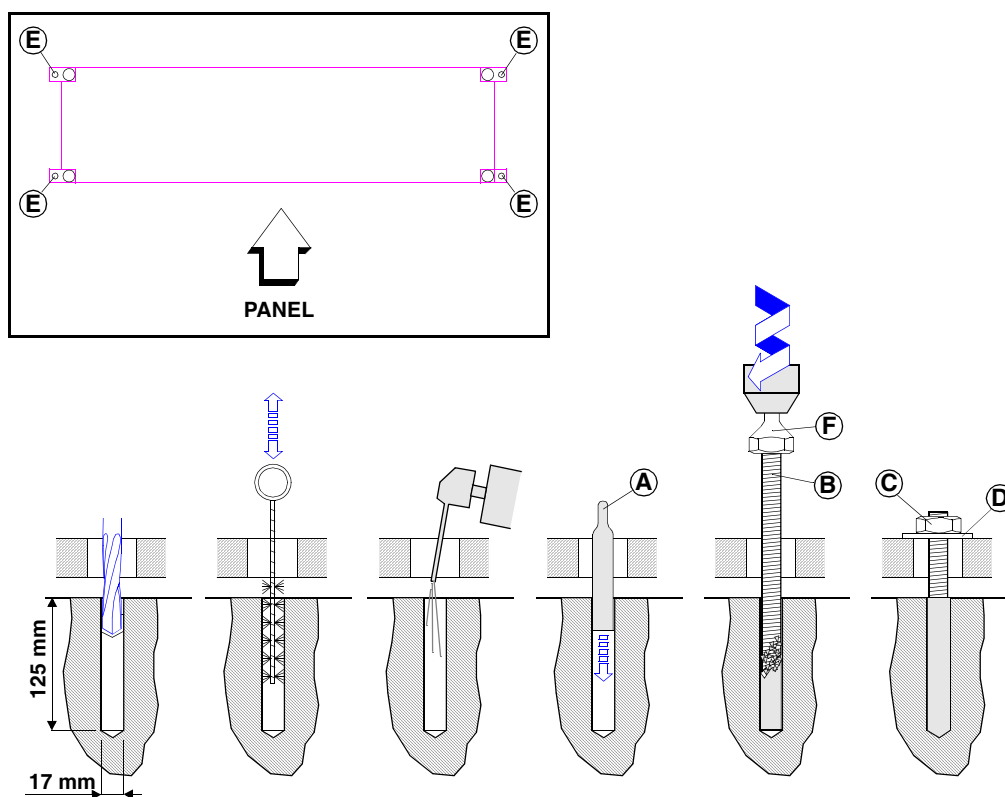
1. Make a hole, of the diameter and depth indicated, in line with each of the fixing holes ⑤ (see Fig. 4 - 13, page 4 - 17) provided on the base.
2. Remove dust and dirt from the holes by brushing and blowing with compressed air; pressurized water can also be used.
3. Insert the chemical phial ① in the hole.
4. Fit the adaptor ⑥ onto a drill with rotary percussion function.
5. Screw the threaded rod ② onto the adaptor ⑥.

6. Insert the threaded rod (B) in the hole and operate the drill to drive the rod down to the specified depth; stop for a few seconds if the contents of the phial come out of the hole.
7. Wait for the chemical to set; during this time, no load must be applied.

SETTING TIME	with dry concrete	with damp concrete
$\geq +20\text{ C}$	20 min.	40 min.
$+10\text{ C} / +20\text{ C}$	30 min.	60 min.
$0\text{ C} / +10\text{ C}$	1 h	2 h
$-5\text{ C} / 0\text{ C}$	5 h	10 h

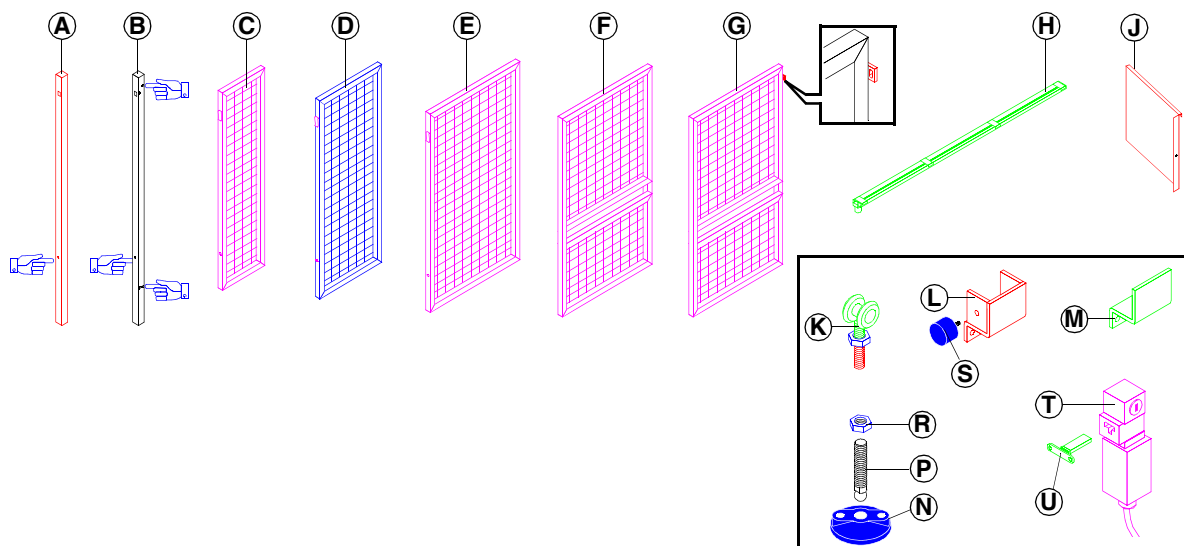
8. After the setting time, fit the washer (D) and screw down the nut (C).

Fig. 4 - 13 Fixing the machine to the floor



4.6.8 Assembling the mesh guard

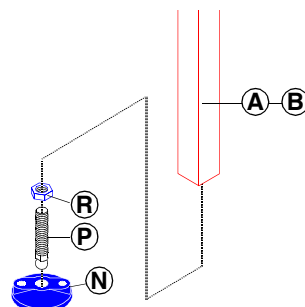
List of components



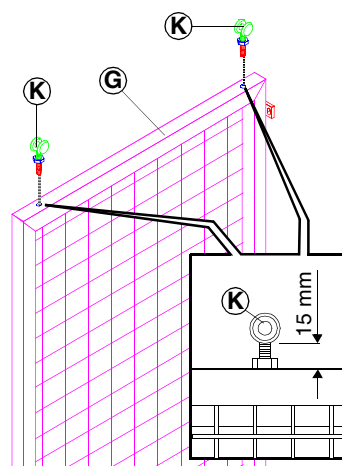
Ref.	Description	Quantity	Code
Ⓐ	support for protection panel	6	-
Ⓑ	support for protection panel and for safety micro	2	-
Ⓒ	protection panel L= 500	1	-
Ⓓ	protection panel L= 650	1	-
Ⓔ	protection panel L= 1000	6	-
Ⓕ	protection panel L= 1000 (with opening)	1	-
Ⓖ	protection panel for door L=1000 (with opening)	1	-
Ⓕ	support for door	1	-
Ⓖ	guard closing casing	1	-
Ⓚ	carriage for door	2	-
Ⓛ	buffer support for door	1	-
Ⓜ	door guide	1	-
Ⓝ	support plates	11	1414A0023
Ⓟ	levelling screw	11	0804A0032
Ⓡ	nut M16 x 1,5	11	301620500
Ⓢ	buffer	1	201800300
Ⓣ	safety microswitch	1	-
Ⓤ	key for safety microswitch	1	-
❶	screw M6 x 35 TCEI	18	300205100
❷	washer	32	301900600
❸	screw M5 x 14 TCEI	6	300203000

Ref.	Description	Quantity	Code
④	screw M5 x 50 TCEI	2	300203900
⑤	nut M5	2	301604400
⑥	brass plug	11	201300600
⑦	screw M8 x 40 TE	11	300207100
⑧	screw M6 x 10 TCEI	3	300204500

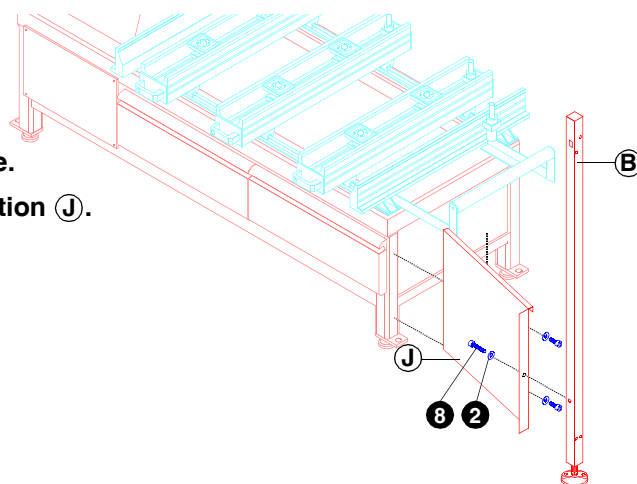
1. Fit the supporting pad using the plates (N), the levelling screw (P) and the nut (R).
2. Fit the supporting pad under each support (A) and (B).



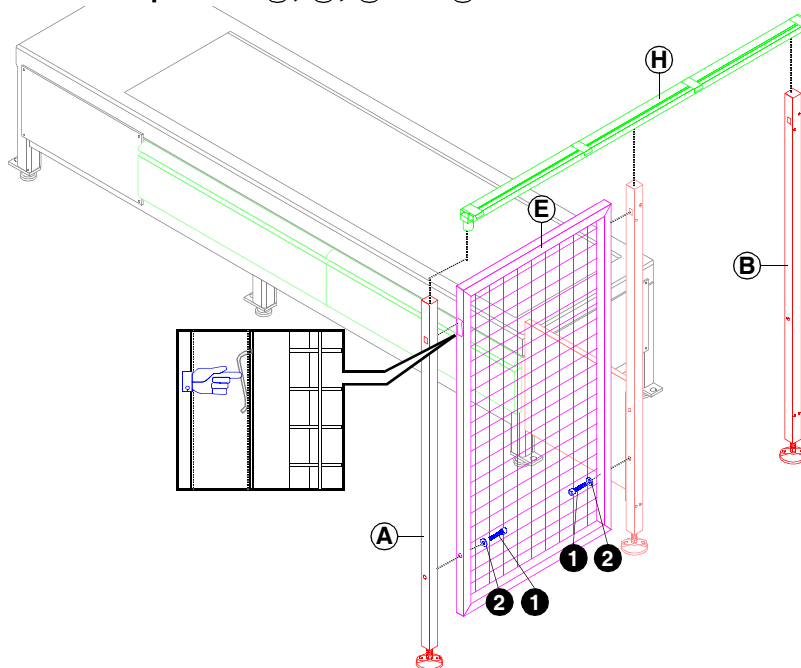
3. Screw the carriages (K) onto the door guard panel (G) down to the depth shown in the figure.



4. Fix the protection **(J)** onto the base.
5. Fix the support **(B)** onto the protection **(J)**.

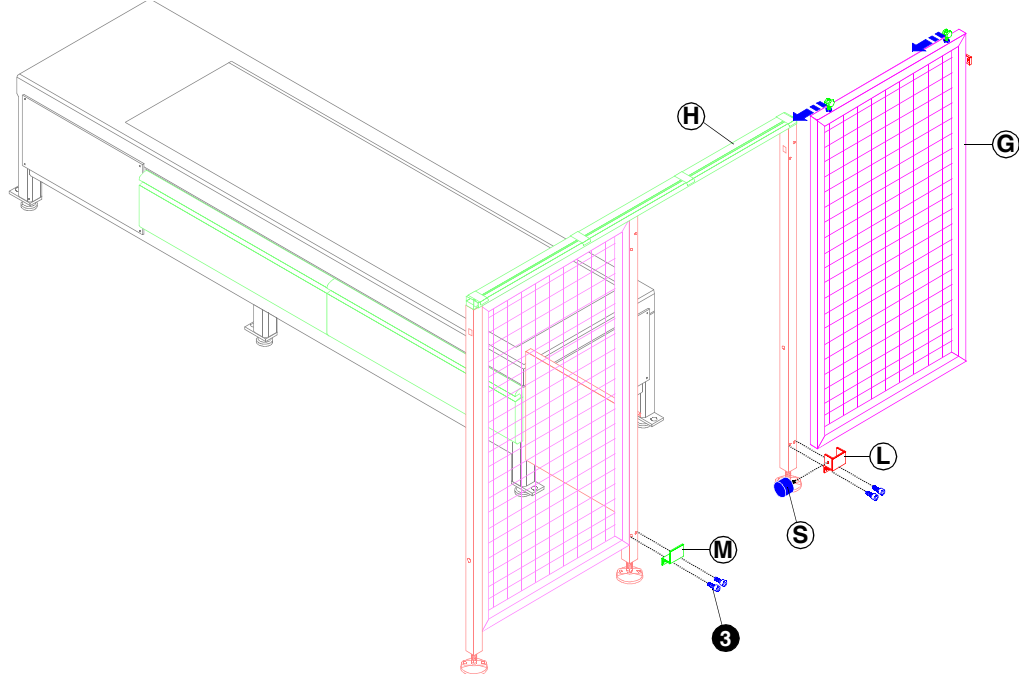


6. Fit the components **(E)**, **(A)**, **(H)** and **(B)**.



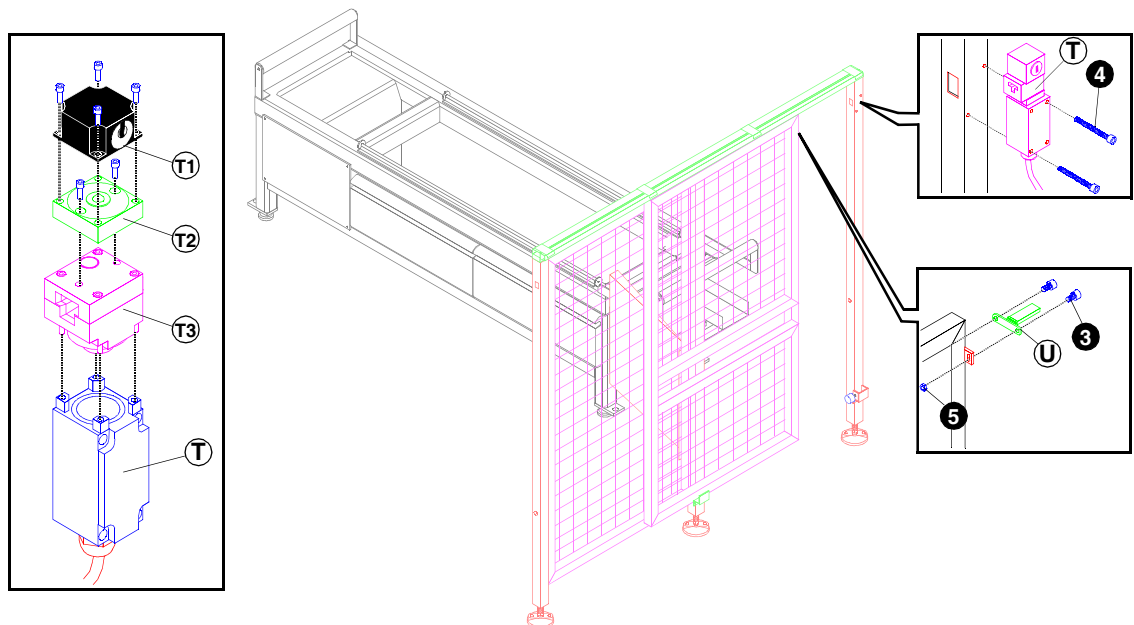
7. Fit the door carriages **(G)** into the guides on the support **(H)**.
8. Fix the buffer support **(L)** and the guide **(M)**.

9. Screw the buffer **(S)** onto the support **(L)**.

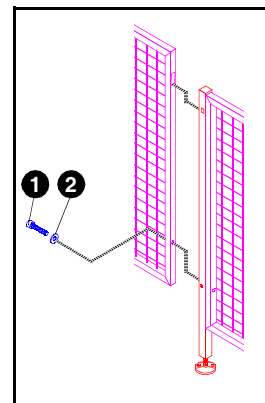
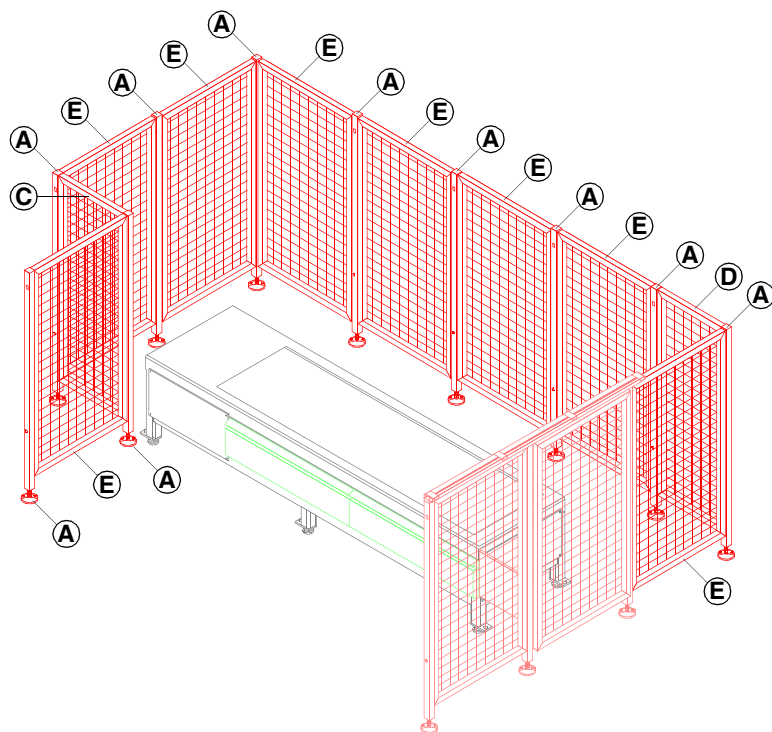


10. Dismantle the parts **(T1)**, **(T2)** and **(T3)** of the safety microswitch **(T)** and reassemble them as indicated in figure.

11. Fix the safety microswitch **(T)** and the screw **(U)**.



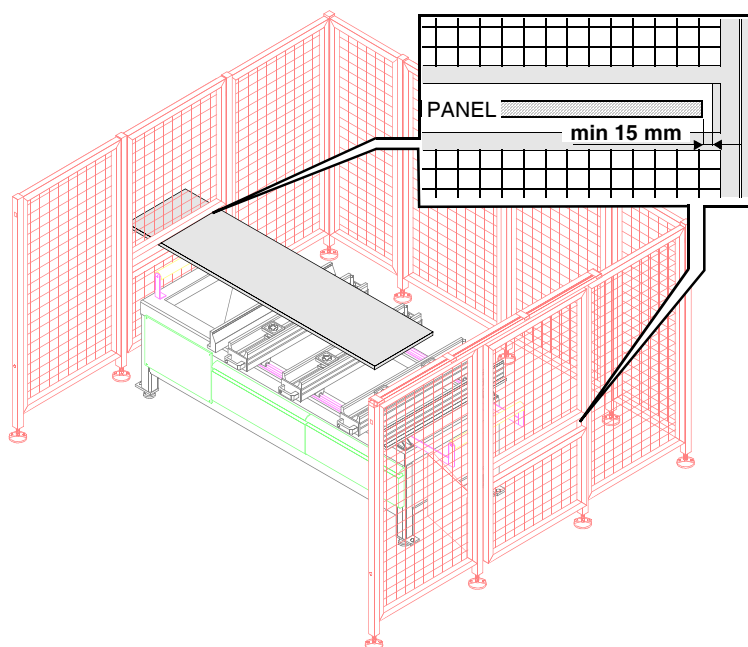
12. Assemble the remaining components as shown in the figure which follows



Proceed as described below to check that the side slots on the guard are in exactly the right position.

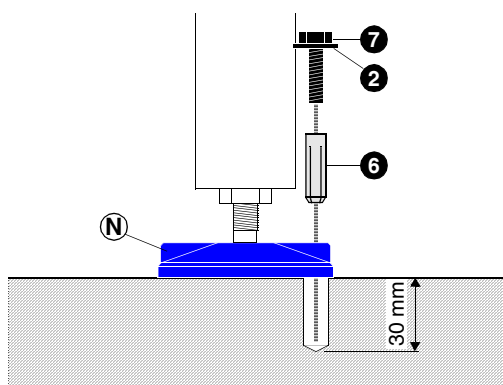
13. Position a panel as shown in the figure and align it on the front stops.

14. Check that in the points shown in the figure the edge of the panel is at least 15 mm from the guard.



After all the components have been assembled and levelled properly, secure the mesh guard to the floor.

15. Make a hole about 30 mm deep in the floor in line with **just one** of the two holes on each supporting plate (N).
16. Fix the guard using the material provided.



4.6.9 Fixing the contact mats

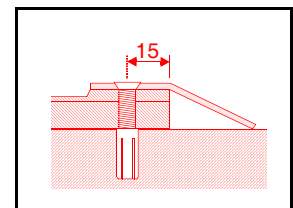
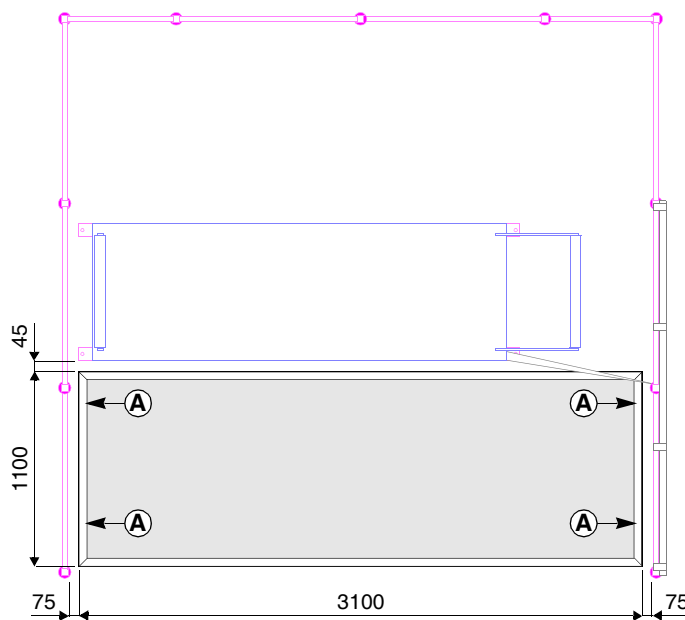


CAUTION

When handling the mats, follow the constructor's instructions.

1. Position the contact mat using the reference values shown in the figure.
2. Make holes in the contact mat in the points (A) shown in the figure.
3. Fix the contact mat using the material provided.

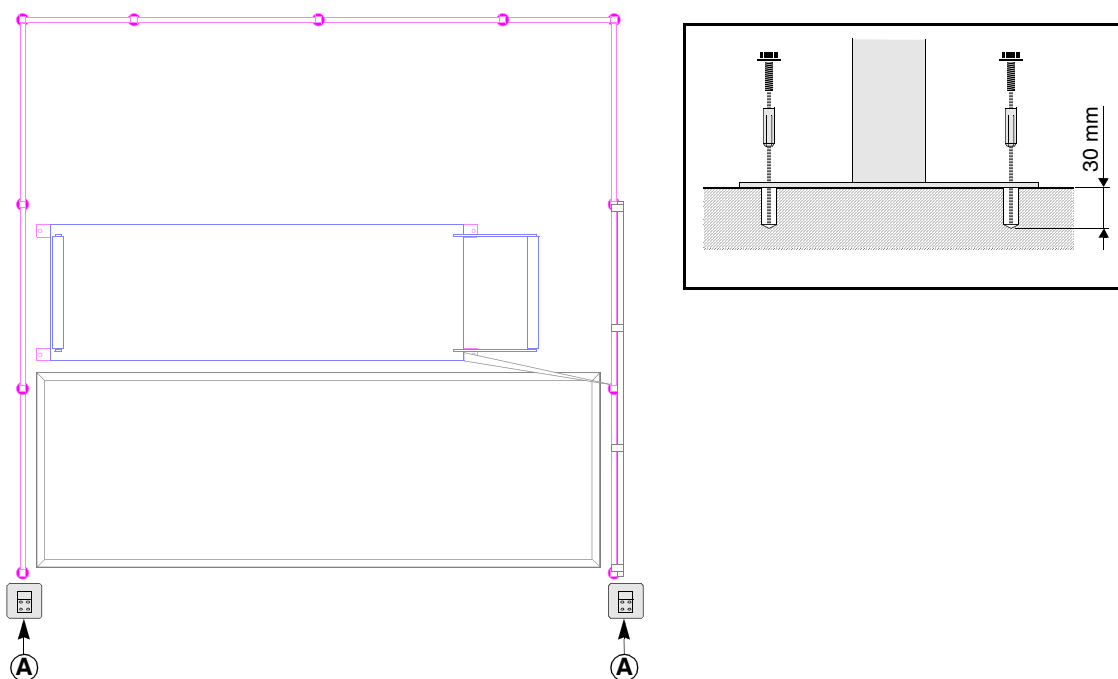
Fig. 4 - 14 Fixing the contact mats



4.6.10 Fixing the control box supports on the machine

1. Position the control box supports on the machine in the points **Ⓐ** shown in the figure.
2. Make a hole about 30 mm deep in the hole in line with each of the holes in the supporting plates.
3. Fix the supports to the ground using the material provided.

Fig. 4 - 15 Fixing the control box supports on the machine



4.7 CONNECTION TO POWER OUTLETS



DANGER

The connection operations must be carried out by specialized technical staff.

4.7.1 Energy requirement for power networks

Tab. 4 - 3

Electric energy	max power installed in the machine(KVA)	(see data plate)
	absorbed current	(see data plate)
	voltage	(see data plate)
	tolerance for voltage supplied (%)	±10
	voltage frequency (Hz)	(see data plate)
	auxiliary voltages for control circuits (V CC)	24
	auxiliary voltages for control circuits (V CA)	110
	gauge of cables between mains and machine for 220 V (Ø mm ²)	16
	gauge of cables between mains and machine for 380 V (Ø mm ²)	10
	gauge of cables between mains and machine for 500 V (Ø mm ²)	6
Pneumatic energy	min pressure (bar)	7
	working pressure (bar)	6,5
	socket for connection to network (inch)	1/2
	average consumption (NL/min)	40
Air for extraction	min flow speed (m/sec)	30
	n° of connection ports	1
	operating section connection opening diameter (mm)	Ø 200
	min capacity / hour (m ³ /h)	3392

4.7.2 Electrical system connection



DANGER

Connection of the machine earth line is strictly compulsory. The connection must be made before the live wires are connected.



CAUTION

Check that the line voltage and the machine presetting are the same.

The protection against indirect contacts is designed for **TN** type power supply networks. In case of connections to systems of other types (**TT, IT**), users must adapt to their own systems.

The machine **IS NOT EQUIPPED WITH DIFFERENTIAL SECURITY BREAKERS**. Differential safety systems must be provided as appropriate to the characteristics of the system, complying with the local laws and regulations in force. The presence of electronic power equipment produces leakage currents on the earth wire of value much higher than 30 mA, due to the measures taken to reduce electromagnetic interference. DC earth faults may also occur. Use of a SIEMENS 5SZ6466-OK600 differential security breaker, installed in accordance with the manufacturer's instructions, is recommended.

For connection voltages up to 415V, the machine is equipped with protection against **SHORT-CIRCUIT** currents up to 10 KA. If the presumed short-circuit current in the power supply point is higher than this value, it must be limited to 15 KA.

For connection voltages above to 415V, the machine is equipped with protection against **SHORT-CIRCUIT** currents up to 4 KA. If the presumed short-circuit current in the power supply point is higher than this value, it must be limited to 4 KA.

The cable used to connect the machine to the mains power supply must be screened or pass through a metal raceway to reduce electromagnetic interference. The screening or the metal raceway must be connected to earth.

1. Turn the workshop cut-out switch to which the machine is to be connected, and the machine master switch, to 0 (zero) OFF position.
2. Open the front and rear doors.
3. Insert the power supply cable through the brass cable clamp on the right-hand side of the electrical cabinet and connect it to its respective terminals.

Checking the connection

Check the spindle rotation direction by pressing the remote control marked KM1 or K14211. If the spindles turn in the opposite direction, switch off the machine and exchange two of the three live wires on the power supply terminals.

4.7.3 Connecting the pneumatic system

1. Connect the supply hose to the connection **A11** (see chapter 3).
2. Take hold of the knob on the “FRL” unit **A9** , pull it up until it is released (about 5 mm) and screw down until the pointer of the pressure gauge **A13** reaches the 6.5 bar mark.
3. After making the adjustment, press the knob to lock it and prevent further turning.

4.7.4 Suction air connection

The suction system must be permanently connected to the machine and operate with it. It must be capable of providing the specified performance constantly and be maintained in good working order. Inadequate system performance may lead to poor processing quality and damage to the machine and the health of the operator.

Every pipe connecting the suction system to the machine must be fitted with a cut-off gate valve, to allow the machine to be disconnected from the main system. These valves must be in an easily accessible position visible to the operator.

1. Connect the extraction lines to the manifold **B5** (see chapter 3).

4.7.5 Connecting the vacuum pump

1. Back off the tube clamp on the end of the suction system connection hose and connect it to point **P1** (see chapter 3).

**DANGER**

Make sure the machine is switched off before connecting the vacuum pump electricity supply cable.

2. Connect the electricity supply cable to the connection socket **A15** .

4.7.6 Connecting the contact mats

1. Wire the power supply cables to the corresponding connectors **A16** (see chapter 3).

FIELD OF APPLICATION AND LIMITATIONS IN USE

5.1 WHAT THE MACHINE IS DESIGNED TO DO

The machine was designed, constructed and protected with safety measures exclusively for the uses corresponding with the specifications and data indicated in this manual or otherwise supplied by BIESSE to the client.

5.1.1 Types of material

It is possible to work panels in solid wood, fibre panels, chipboard panels and medium-density plywood (MDF) with the following characteristics:

Maximum sizes

- ❑ Length (X axis): 2200 mm (1600 workable);
- ❑ Width (Y axis): 900 mm
- ❑ Thickness (Z axis): 65 mm

Minimum sizes

Minimum sizes cannot be easily defined since the intensity of the vacuum clamping system depends on porosity, thickness and dimensions of the panel. In addition, the minimum clamping intensity differs for each type of tool used.

Whenever questions arise concerning the effectiveness of the vacuum clamping system, the use of “*Auxiliary clamping systems*” is recommended. In any case, BIESSE remain available to supply all further clarifications required.

5.1.2 Types of operation

The operations that can be carried out are the following:

- ❑ multiple vertical boring through the X-Y axes,
- ❑ multiple horizontal boring through the Y-Z and X-Z axes.
- ❑ linear milling with circular tools in the X-direction,

If the machine is also equipped with working units, in addition to the operations described previously, it is also possible to perform the following operations:

- ❑ shaping with cylindrical tools with simultaneous X, Y and Z interpolation,
- ❑ smoothing with the special tool fitted on the working unit.

5.1.3 Mode of operation

The processes described in the above point may be carried out with the aid of an operator who loads and/or unloads the panel.

5.2 What the machine is not designed to do

The machine cannot be used for the following:

- The working of panels in materials different from those specified in paragraph 5.1.1, page 5 - 2.
- The working of panels with different dimensions than those specified in paragraph 5.1.1, page 5 - 2.
- Types of operation different from those specified in paragraph 5.1.2, page 5 - 2.
- Modes of operation different from those specified in paragraph 5.1.3, page 5 - 3 and in particular all those test operations performed with disconnected protection devices, with consequent possibility for the operator to access the danger area during the working of panels.

5.2.1 Risks derived from inappropriate use

The machine has built-in mechanical and electronic safeguards that stop the operator from using the machine for purposes it was not designed for.



DANGER

If the user tampers with and alters in any way the protection devices in order to carry out operations the machine was not designed to perform, the risk of injury will be very high.

5.2.2 Responsibility deriving from inappropriate use.



INFORMATION

BIESSE declines all responsibility for damage to persons or things deriving from inappropriate use of the machine.

5.2.3 Risks deriving from erroneous use

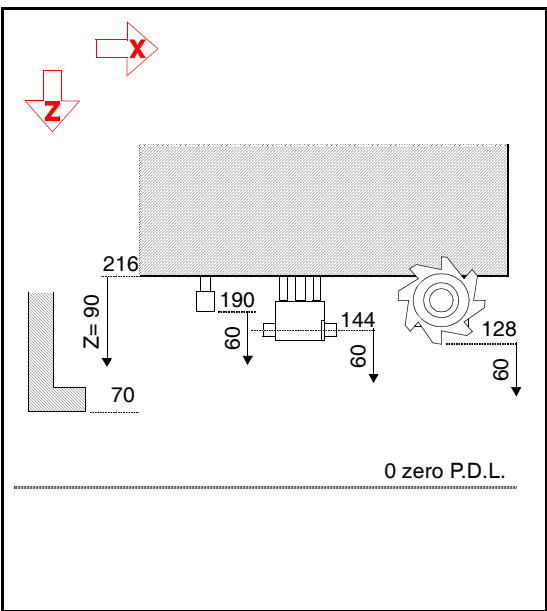
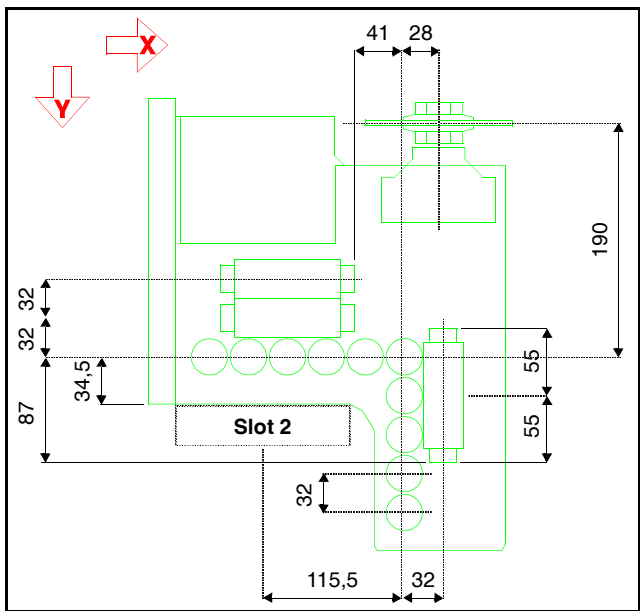
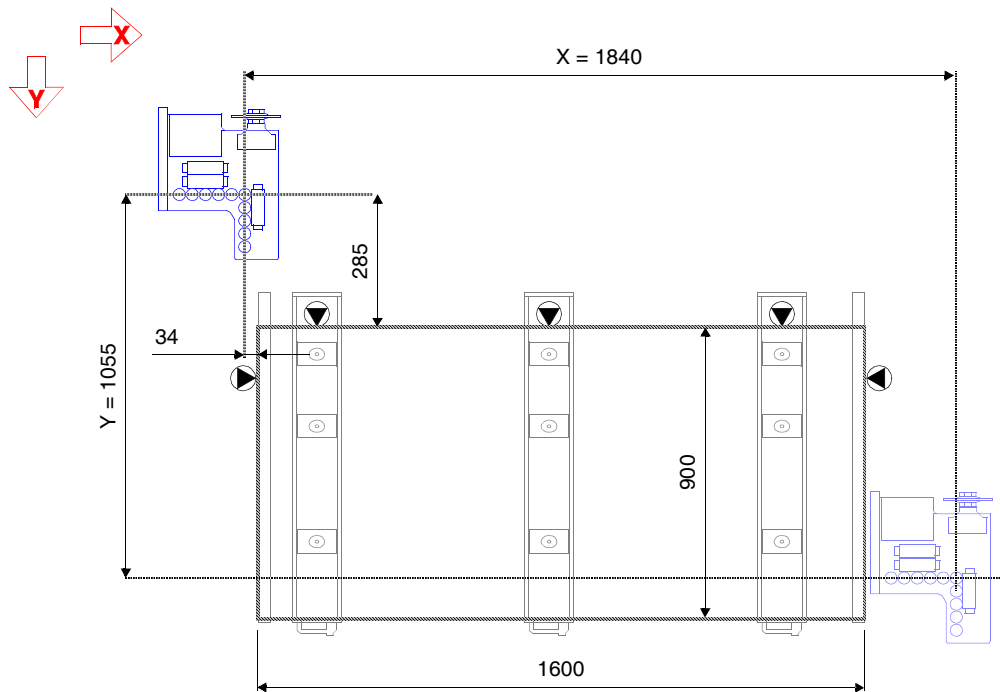


INFORMATION

BIESSE declines all responsibility for damage to persons or things deriving from deliberately erroneous use of the machine.

5.3 WORKING FIELD

Fig. 5 - 1 Working field



USE

6.1 TYPES OF OPERATION

The level of safety of the machine varies according to which procedure is carried out.

6.1.1 Normal operation

Normal operation procedures are all those procedures which provide full protection for the operator by means of 'passive' safety devices. All procedures in this category are described in the paragraph entitled "Procedures for Normal Operation".

6.1.2 Special operation

Special operation procedures are all those which provide full protection to the operator by means of 'active' safety devices. These procedures are fully described in the paragraph entitled "Special operation Procedures. All those operations performed for maintenance procedure, as described in the "Manual for Maintenance" are also included in this category.

6.1.3 Levels of safety

Operators trained to work with this machine must be placed in a maximum safety level. This means that the persons using the machine will have received adequate technical training and shall be authorized to perform tasks within the limits of the two levels of operation mentioned above. Operators entrusted with normal operation can carry out tasks only within the limits indicated in the paragraph "Procedures for Normal Operation", while other operators will be allowed to work at the levels indicated in the paragraphs on "Procedures for Normal Operation" and "Procedures for Special Operation".



DANGER

Special operation implies greater residual risk. This kind of work requires specific training.

6.2 NORMAL OPERATING PROCEDURE



DANGER

Never wear garments or accessories that could get caught up in parts of the machine.



DANGER

Dust is produced during operation on the panels. Avoid inhaling dust particles by wearing a mask.



DANGER

Do not attempt to change the programs controlling the safety systems. BIESSE S.p.A. cannot be held liable for damages to persons or things caused by unauthorized changes.



DANGER

Access to the electrical cabinet is permitted to qualified and authorized service personnel only.



DANGER

After operation, the temperature of the working tools is dangerously high. Wait a few minutes before changing the tools manually and wear protection gloves.



DANGER

In case of sudden electrical power failure during a machining operation, wait a few minutes before approaching the electrospindle and ensure always that the tool has stopped completely.



DANGER

Every time that it is necessary to access the area delimited by the protection mesh guard, pull out the key from the safety microswitch located on the door to prevent unintentional reset of normal operation of the machine by another operator.

6.2.1 Switching on the machine

Before starting the machine it is necessary to execute the following operations:

1. **Generate the appropriate degree of pressure in the workshop/factory general pneumatic system.**
2. **Switch on the general workshop/factory chip-extraction system.**
 - ☐ Make sure the connection tube sectioning guillotine is open.

At this point it is possible to switch on the machine.

1. **Turn the workshop mains section switch to position 1 (ON).**
2. **Turn the main switch of the machine to position 1 (ON).**

6.2.1.1 Resetting the axes

Zero resetting is an operation used to move the axes to a preset position, where the machine is able to determine their exact position with respect to the working table. The axes must always be reset before any machining operation. It is not instead necessary to reset the axes to enter programming data.

Further information on resetting operation may be found in the *“Numerical Control Manual”*.

6.2.1.2 Heating cycle for electrospindles with ISO 30 cone adapter

During each daily initial starting phase users are advised to allow the unit to run a brief warming-up cycle so as to allow the bearings to gradually reach a uniform working temperature. Proceed as follows.

1. **Prepare a program in which each power unit (electrospindle for ISO 30 cone) is used in the following manner:**

50% of rated max speed for 2 minutes

75% of rated max speed for 2 minutes

100% of rated max speed for 1 minute

6.2.2 Work cycle

Before starting the work cycle, check the following:

- ☐ Ensure that nothing can obstruct the normal movement of the machine along its axes and that all covers, doors, protection panels etc. are installed correctly and safely.
- ☐ Check that the tools installed are suitable for the programs to be executed.
- ☐ Check that the panel supports are located in the correct position for the operations to be performed.

Preliminary operations

1. **Program the required operation with the Numerical Control.**
 - ☐ Refer to the documentation concerning the programming of the *“Numerical Control”*.
2. **Tool-up the machine.**
 - ☐ The tooling-up procedures are described at paragraph 6.3, page 6 - 7.
3. **Check that all the emergency devices are properly reset.**
4. **Press the start push-button D3 (see chapter 3, “*CONTROLS*” paragraph)**

Loading the panel and starting work

5. **Select the work area to be used for the required operation by pressing the corresponding *START* push-button D1a .**

6. Lean the panel on the working table, placing it first against the front stops and then against the side stops.
7. Clamp the panel by pressing pedal **D1b** .
 - Ensure that the panel is securely clamped by using a sufficient number of suction cups properly positioned for the panel to be worked. Keep the pedal pressed to release the panel momentarily, if necessary to adjust positioning.
8. To confirm the beginning of the work cycle, press the **START** push-button **D1a** again.

6.2.2.1 Work cycle using clamp stops

Clamp stops can be useful when working on narrow panels, that would otherwise not be safely held in place by the suction cups only.



DANGER

Keep your hands clear of the operation area of the clamp stops.

Preliminary operations

See paragraph 6.2.2, page 6 - 4.

1. Select this type of machining using the CLAMP STOPS key on the PLC keyboard (see *"Programming Manual"* for machine with NC400 Plus or NC410, or see chapter 3, *"CONTROLS"* paragraph, key **D52** , for machine with XNC Compact).

Loading the panel and starting work

1. Select the work area to be used by the required operation by pressing the corresponding **START** push-button **D1a** .
2. Lean the panel on the working table, placing it first against the front stops and then against the side stops.
3. Raise the stops by pressing pedal **D1b** .
4. To lower the stops and clamp the panel release pedal **D1b** .
 - Ensure that the panel is securely clamped. If necessary to correct the position, keep the pedal pressed to release the panel momentarily.
5. To confirm the beginning of the work cycle, press the **START** push-button **D1a** again.
6. At the end of the work cycle, press pedal **D1b** to release and unload the panel.

6.2.2.2 Starting the working cycle with front pushers

Use of the front pushers may be useful when machining narrow panels, with dimensions which do not allow secure clamping using the suction cups only. To enable the machine for this type of operation, press the key provided on the PLC keyboard (see *"Programming Manual"* for machine with NC410, or see chapter 3, *"CONTROLS"* paragraph, key **D53** , for machine with XNC Compact) before loading the panel.

To start the working cycle, follow the instructions given in paragraph 6.2.2, page 6 - 4.

**DANGER**

Never place your hands close to the front pusher clamping zone.

6.2.2.3 Starting a work cycle with ball-type or bar-type supports

Ball or bar-type supports can be useful when loading or unloading heavy panels. To enable the machine for this type of operation, press the key provided on the PLC keyboard (see *“Programming Manual”* for machine with NC410, or see chapter 3, *“CONTROLS”* paragraph, key **D54** , for machine with XNC Compact) before loading the panel

To start the work cycle, follow the instructions detailed at paragraph 6.2.2, page 6 - 4.

6.2.2.4 Starting a work cycle with the auxiliary vacuum system

The auxiliary vacuum system is used to block special jigs, for routing along the edges of the panels. Set-up the machine for this type of operation as described in paragraph 6.2.2.4, page 6 - 6.

To start the work cycle, follow the instructions detailed at paragraph 6.2.2, page 6 - 4.

6.2.3 Powering off the machine

1. Always wait for the end of the work cycle.
2. Free a wide space on the working table area by moving the panel supports away.
3. Using the NC manual movement option, jog the operating section immediately above this clear space.
4. Set the Numerical Control to power off.
5. Press the EMERGENCY push-button **D4** (see chapter 3).
6. Turn to 0 (OFF) the main machine switch, and then turn off the workshop mains section switch.
7. Turn off the pneumatic circuit at the connection with the workshop line.
8. Close the pneumatic circuit at the cut-off valve.

6.3 SPECIAL OPERATION PROCEDURE



DANGER

Never wear garments or accessories that could get caught up in parts of the machine.



DANGER

After operation, the temperature of the working tools is dangerously high. Wait a few minutes before changing the tools manually and wear protection gloves.



DANGER

Access to the electrical cabinet is permitted to qualified and authorized service personnel only.



DANGER

In case of sudden electrical power failure during a machining operation, wait a few minutes before approaching the electrospindle and ensure always that the tool has stopped completely.



DANGER

Every time that it is necessary to access the area delimited by the protection mesh guard, pull out the key from the safety microswitch located on the door to prevent unintentional reset of normal operation of the machine by another operator.



DANGER

Tooling-up operations must be performed by ONE PERSON only. Make sure no other person can come near the machine during these operations.



CAUTION

Never leave any tools in or on the machine after any operation.

BIESSE supplies some of the tools to be used for tooling-up operations.

Special operation procedures require the use of the NC, in addition to the instructions supplied in this manual. It is necessary therefore that the operator refers also to the *"Numerical Control Manual"*.

6.3.1 Emergency stop

If a situation arises in which the machine must be shut down without delay, proceed as follows:

Emergency Stop on the Main Control Panel

1. Press the **EMERGENCY - STOP** button **D4** (see chapter 3).

To restore normal operation, turn the same push-button clockwise and press the machine Start push-button **D3**.

Emergency Stop from the machine

1. Operate the *front emergency cord* **S3** (see chapter 3).

To restore normal operation, press the yellow push-button located on the microswitch on the cord, and press the machine Start push-button **D3**.

6.3.2 Tooling-up the operating section

6.3.2.1 Warnings regarding tool selection

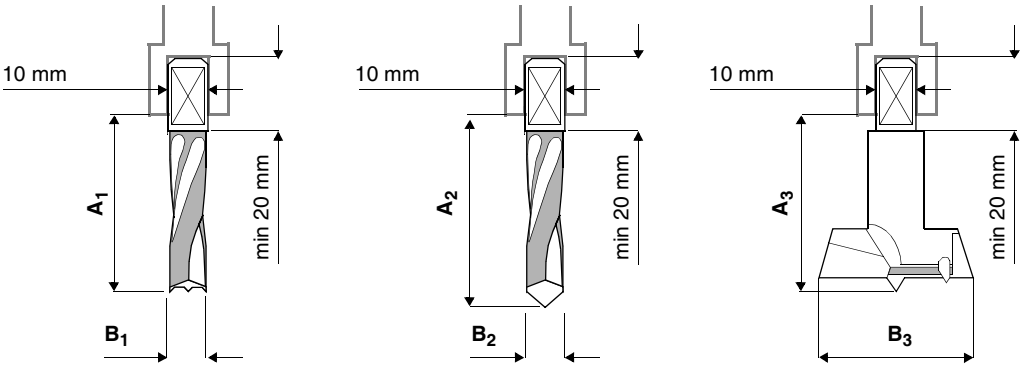
When choosing tools to be installed in the machine, the operator is advised to follow the rules given below.

- ☐ Never use deformed or cracked rotating tools.
- ☐ Check for perfect balance of rotating tools and make sure they are perfectly sharp and suitable for the work to be performed.
- ☐ Never use tools beyond their speed limit, which is generally impressed on the tool surface or in some way indicated by the manufacturer.
- ☐ Before installing any tool in its seating make sure that the guide and centering surfaces have no dents and are perfectly clean.
- ☐ In each tool apply only the prescribed torque to screws, bolts, nuts and rings.
- ☐ Always make sure that the direction of rotation of the tool is the same as that of the spindle in which it is mounted.
- ☐ Users must also make sure the following characteristics are respected.

Drawings of the tools have been given as examples only and to facilitate comprehension of the technical characteristics.

6.3.2.2 Characteristics of tools for horizontal and vertical boring

Fig. 6 - 1 Characteristics of tools for horizontal and vertical boring

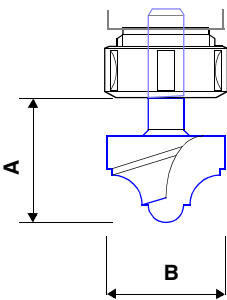


Tab. 6 - 1

		A ₁	A ₂	A ₃	B ₁	B ₂	B ₃
Boring head (vertical spindles)	max (mm)	70	70	70	42	42	50
Boring head (horizontal spindles)	max (mm)	40	-	-	42	-	-

6.3.2.3 Characteristics of tools for shaping

Fig. 6 - 2 Characteristics of tools for shaping

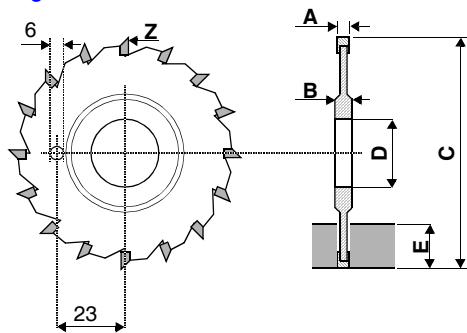


Tab. 6 - 2

		A	B
Working units	max (mm)	50	30

6.3.2.4 Characteristics of tools for linear milling

Fig. 6 - 3 Characteristics of tools for linear milling



Tab. 6 - 3

		A	B	C	D	E	Z ^(a)
Milling head	min (mm)	4	2,8	-	35	-	30
	max (mm)	10	6	120		25	

^(a)- Number of teeth.

6.3.2.5 Inserting tools in the boring head



DANGER

Before proceeding with this operation read very carefully the warnings given in paragraph 6.3, page 6 - 7.

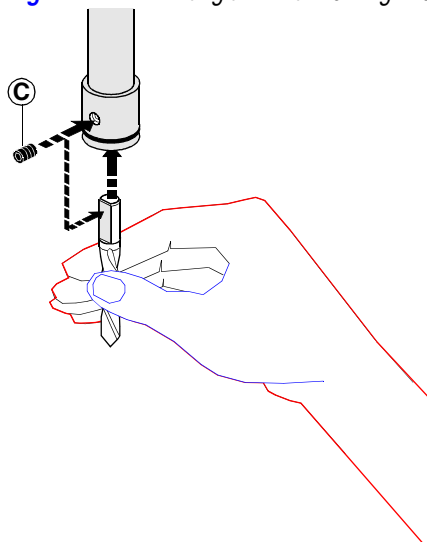


CAUTION

The tools used must conform to the characteristics described in paragraph 6.3.2.2, page 6 - 9

1. Position the operating section at a point in the machine where access to the boring head will be best.
2. Turn the selector to the right **D15** (see chapter 3, “**CONTROLS**” paragraph) and take out the key to avoid it being accidentally turned on.
3. Force descent of the spindles involved in the tooling-up procedure.
4. For easier operation, some of the covers can be removed, by unscrewing the knobs securing them.
5. Insert the tools in the spindles, orienting the attachment plane close to the lock screw **C**.
6. Lock the tools with the lock screw **C**.

Fig. 6 - 4 Inserting tool in the boring head



6.3.2.6 Inserting tools on vertical electrospindle with connection for ERC32 pincer



DANGER

Before proceeding with this operation read very carefully the warnings in paragraph 6.3, page 6 - 7.

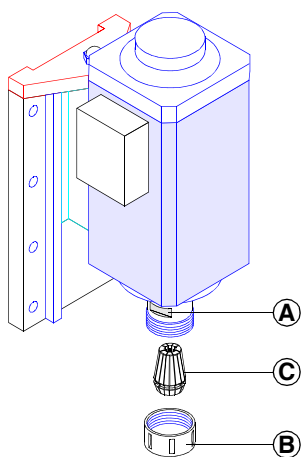


CAUTION

The tools used must conform to the characteristics described in paragraph 6.3.2.2, page 6 - 9

1. Position the operation section at a point of the machine where access to the power unit is best.
2. Switch the machine off.
3. For easier operation, some of the covers can be removed, by unscrewing the knobs securing them.
4. Position the pincer (C) in the seat on the ring-nut (B) and screw it onto the electric spindle without fully tightening.
5. Fit the tool
 - Make sure that the dimensions of the pincer are compatible with the size of the shank of the tool to be fitted
6. Completely tighten the ring-nut (B) and secure the shaft of the electric spindle in the spanner slot (A).

Fig. 6 - 5 Inserting tools on vertical electrospindle with connection for ERC32 pincer



6.3.2.7 Loading tools on vertical electrospindle with ISO 30 cone tool adapter



DANGER

Before proceeding with this operation read very carefully the warnings in paragraph 6.3, page 6 - 7.



CAUTION

For safety reasons the adapters used in this type of electrospindle must be supplied exclusively by BIESSE S.p.a. or an authorized dealer.



CAUTION

So as to protect the internal part from any dust infiltration this electrospindle must be always fitted with a tool-holder cone.

To tool this type of electrospindle, use cone adapters ISO 30, already fitted with a tool as described in paragraph 6.3.2.8, page 6 - 13.

1. Position the operation section at a point of the machine where access to the power unit is best.
2. Turn the selector to the right **D15** (see chapter 3, “**CONTROLS**” paragraph) and take out the key to avoid it being accidentally turned on.
3. Press the green push-button **B6** .
4. Insert the adapter cone completely in the electrospindle seating.
5. To lock the adapter release the green push-button **B6** .

6.3.2.8 Insertion of tools in ISO 30 cone adapters

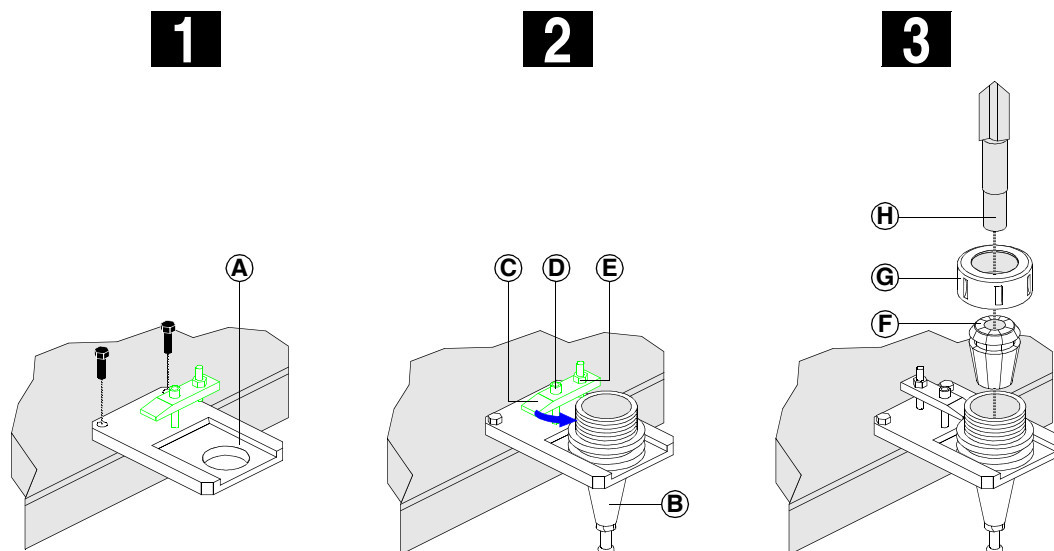


CAUTION

The tools used must conform with the characteristics described in paragraph 6.3.2.3, page 6 - 9.

1. Anchor the device **A** to a solid structure (e.g. a work bench), using the holes already prepared (see *Fig. 6 - 6*, page 6 - 14).
2. Position the adapter **B** in the device **A** as shown in the figure.
3. Position the bracket **C** on the adapter described in the figure.
4. Lock the adapter by turning screws **D** and **E**.
5. Position the pincer **F** in the seating on the ring **G** and screw onto the adapter.
 - Make sure the dimensions of the pincer are compatible with the dimensions of the tool shank to be installed.
6. Insert the tool shank **H** in the pincer and tighten the ring fully.

Fig. 6 - 6 Insertion of tools in ISO 30 cone adapters



6.3.3 Setting the working table



DANGER

Before continuing with this operation, please read carefully the warnings contained in paragraph 6.3, page 6 - 7.

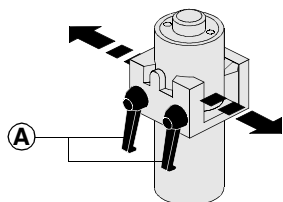
6.3.3.1 Positioning panel supports and suction cups

1. Press the **EMERGENCY** push button **D4** (see chapter 3, “**CONTROLS**” paragraph).
2. To position the panel supports, press the green button **C2**. When the push-button is released, the support will be blocked.
3. The suction cups must be positioned manually, by sliding them in the panel support.

6.3.3.2 Side stops

1. Press the **EMERGENCY** push button **D4** (see chapter 3, “**CONTROLS**” paragraph).
2. The handles **A** can be used to position the stops. Turn them to the right to release and to the left to block.

Fig. 6 - 7 Positioning and blocking the side stops



6.3.3.3 Manually-blocked jigs

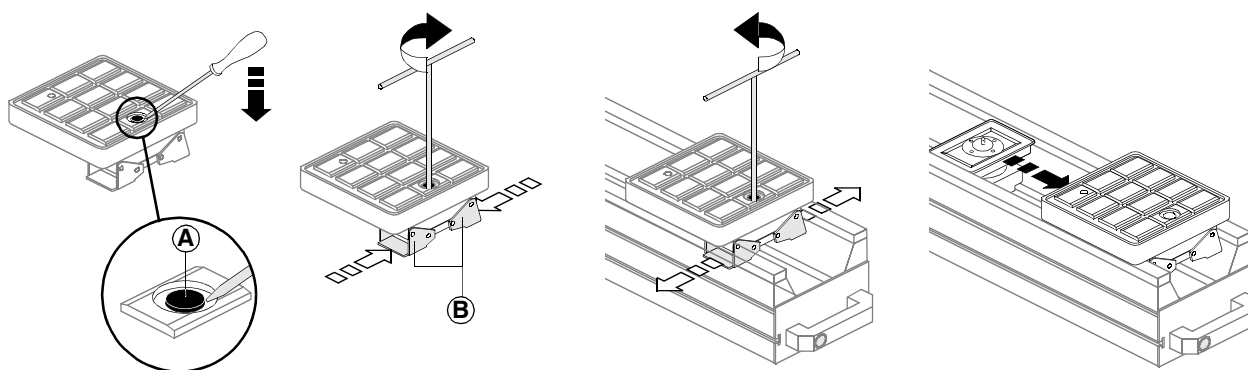


DANGER

These jigs must be installed on the panel support and positioned in correspondence with the suction cups.

1. Press the **EMERGENCY** push button **D4** (see chapter 3, “**CONTROLS**” paragraph).
2. Use a screwdriver to remove plastic cover **A**.
3. Turn the screw in the hole to release lock levers **B**.
4. To block the jig on the panel support, unscrew the screw completely.
☐ When finished, replace plastic cover **A**.
5. Position suction cups under every jig to connect the suction cups to the vacuum system.

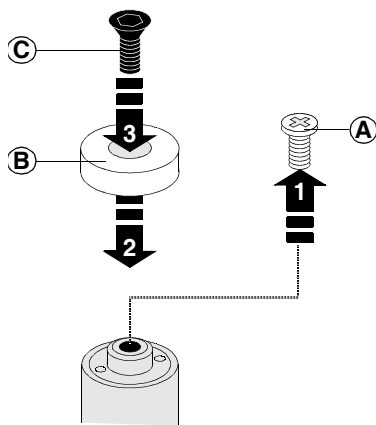
Fig. 6 - 8 Positioning and blocking the manually-blocked jigs



6.3.3.4 Outfitting the stops for clamping

1. Press the **EMERGENCY** push button **D4** (see chapter 3, “**CONTROLS**” paragraph).
2. Use a screwdriver to unscrew screw **A**.
3. Position flange **B** on the stop.
4. Secure the flange by screwing screw **C** on the stop.

Fig. 6 - 9 Outfitting the stops for clamping



6.3.3.5 Outfitting the working table to operate with special jigs

1. Press the **EMERGENCY** push button **D4** (see chapter 3, “**CONTROLS**” paragraph).
2. Insert the pipe provided onto its automatic connection **C7** or **C10**, and connect it to the connection on the jig.
3. Lean the jig onto the working table.
4. Move the selector **D2a** switch of the selected area, to ON.
 - Ensure that the jig is firmly secured using a sufficient number of suction cups.

DECOMMISSIONING

7.1 WARNINGS



DANGER

Before proceeding with these operations consult the Biesse Technical Support Service.



DANGER

All operations described in this chapter must be carried out by qualified personnel.



DANGER

Before accessing electrical equipment wait for 1 minute to allow the capacitors to discharge residual energy.



DANGER

Pressurized air contained in the tanks. Eliminate residual pressure.



DANGER

If flammable products are used, smoking is forbidden.



DANGER

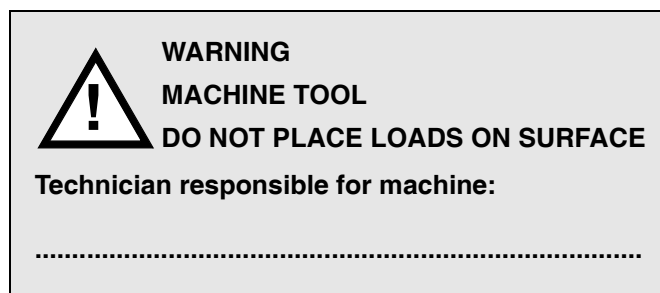
If products which are potentially harmful are used, use suitable plasticized gloves and a protective mask.



CAUTION

Never place any load or object on the machine. Attach to the machine one or more clearly visible notices with a message similar to that shown in the figure.

Fig. 7 - 1 Attachment of a notice to machines that are not in use



7.2 PROTECTION OF PARTS SUBJECT TO CORROSION

The machine requires cleaning and those parts subject to corrosion have to be protected.



DANGER

Before proceeding with operations read very carefully the warnings given in paragraph 7.1, page 7 - 2.

1. Obtain permission from the person responsible for the machine to proceed with dismantling.
2. Turn the main machine switch and the workshop or factory section switch to the OFF position.
3. Disconnect the machine from the mains circuit.
4. Clear a space around the machine to allow for free movement.
5. Remove and put away any tools still in the machine.
6. Lock the operating section.
7. Discharge residual pressure from the pneumatic system.
8. Use compressed air to clean the machine and remove dust and chips.
9. Use kerosene to spray-wash all parts of the machine.
10. Dry afterwards using clean rags.
11. Cover all visible parts with a permanent protection (in a 50% solution with kerosene) offering high degree of protection against humidity and rust. Use a suitable spray-gun to apply the product.



INFORMATION

BIESSE S.p.A. recommends: OVER-COAT 7442 produced by [CERTIFIED LABORATOIRES - ILM ITALIA S.r.l.](#) Via Edison, 20090 Cusago (MI) ITALIA.



CAUTION

The product must dry completely. Wait before beginning packing.

7.3 **PACKING AND LOADING**

During the life cycle of the machine it may become necessary to dismantle its parts (with packing and loading procedure) for transfer to another site.



DANGER

Before proceeding with operations read very carefully the warnings given in paragraph 7.1, page 7 - 2.



DANGER

Before moving the machine fasten all moving parts in the most appropriate manner.

1. To pack and load the machine refer to the INSTALLATION chapter in this manual.



CAUTION

The characteristics of the storage area must conform with the specifications given in the INSTALLATION chapter in this manual.

DEMOLITION

8.1 WARNINGS



DANGER

All operations described in this chapter must be carried out by qualified personnel.



DANGER

Before accessing electrical equipment wait for 1 minute to allow the capacitors to discharge residual energy.



DANGER

Pressurized air contained in the tanks. Eliminate residual pressure.



DANGER

If flammable products are used, smoking is forbidden.



DANGER

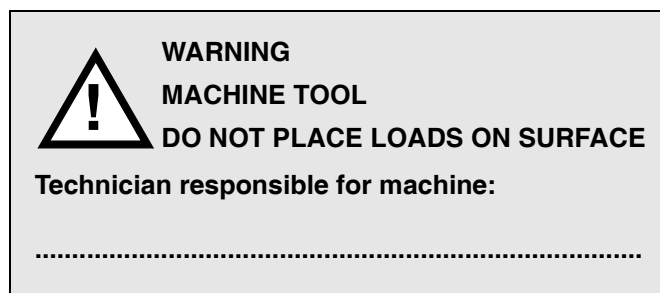
If products which are potentially harmful are used, use suitable plasticized gloves and a protective mask.



CAUTION

Never place any load or object on the machine. Attach to the machine one or more clearly visible notices with a message similar to that shown in the figure.

Fig. 8 - 1 Attachment of a notice to machines that are not in use



8.2 DEMOLITION OF THE MACHINE

When the machine reaches the end of its 'technical' or working life it must be totally decommissioned so that it can no longer be used for the purposes it was designed and constructed. This procedure allows for re-use of its parts and the raw materials contained in it. If any parts are utilized again, it shall be for uses or purposes different from those for which the machine was originally constructed.

8.2.1 Responsibility

BIESSE declines all liability for damage to persons or things as may derive from any secondary use of single parts of the machine for functions or assembly different from those originally contemplated. BIESSE recognizes no implicit or explicit suitability for specific purposes of any parts of the machine, which are used again after final decommissioning in view of demolition.

8.2.2 Decommissioning



DANGER

Before proceeding with operations read very carefully the warnings given in paragraph 8.1, page 8 - 2.

To decommission the machine permanently proceed as follows:

- 2. Turn the main machine switch and the workshop or factory section switch to the OFF position.**
- 3. Disconnect the machine from the mains circuit.**
- 4. Clear a space around the machine to allow for free movement.**
- 5. Remove and put away any tools still in the machine.**
- 6. Lock the operating section.**
- 7. Discharge residual pressure from the pneumatic system.**
- 8. To pack and load the machine refer to the INSTALLATION chapter in this manual.**

8.3 RESIDUAL RISKS.

Following correct execution of the procedure for final decommissioning and demolition no particular risks remain and the machine can be discarded, left in storage or dismantled completely. However, attention should be drawn to the residual risks that exist in the period of time between the last time the machine was used normally and the time it is demolished.

8.3.1 Direct risks

**DANGER**

Pressurized air in the tanks. Eliminate pressure.

**DANGER**

Capacitors contain residual voltage. Discharge capacitors. Before accessing electrical equipment wait for 1 minute to allow the capacitors to discharge residual energy.

**DANGER**

Mobile parts move under force of gravity. Secure all moving parts.

8.3.2 Risks to the environment

**DANGER**

The machine uses lubricating oil and grease. To neutralize the lubricant fluids which remain attached to parts of the machine and cannot be re-used use degradable solvents of the approved type. For evacuation of recoverable lubricant fluids empty the tanks and, if possible, request local authorities or appropriate service to remove and dispose of them.

TROUBLE-SHOOTING



INFORMATION

If a problem occurs, check to see if error codes have appeared on the video screen of the NC system and then refer to the “[error-code list](#)” to find out how to eliminate the cause. (see the “Numerical Control Manual”). Otherwise, refer to the table below. If the problem is not mentioned, contact BIESSE Service.

PROBLEM	CAUSE	SOLUTION
The panel does not remain locked on the panel supports	The suction cup tubes (connected to the vacuum system) are damaged	<ul style="list-style-type: none"> If bent, straighten them manually and check sealing capacity. If broken, replace with new tubes. Do not repair with adhesive tape or glue.
	The inner surfaces of the suction cups are dirty	<ul style="list-style-type: none"> Dismantle and clean the suction cups.
	The vacuum pump motor turns backwards	<ul style="list-style-type: none"> Do not use the machine and report the problem immediately to BIESSE's Service Dept.
	The auxiliary vacuum system is not enabled	<ul style="list-style-type: none"> Turn the selector of the required function on the auxiliary vacuum control box.
During a work cycle, some of the spindles in the boring head do not descend when invoked by the program.	The spindles have become oxidized. This can happen when they are not used very much	<ul style="list-style-type: none"> Clean the spindles to remove the oxide and apply over the area a Teflon spray of the TRI-FLOW type or equivalent product.
	There may be problems in the electric or pneumatic systems	<ul style="list-style-type: none"> Refer to the “circuit diagrams”.
During a work cycle, the stops do not position or do not descend	Deposits have formed on the stems of the stops involved	<ul style="list-style-type: none"> Remove the deposits with a clean, dry rag or bronze wire brush.
	The panel was pressed too hard against the stops	<ul style="list-style-type: none"> Release the panel and reposition it.
	There may be problems in the electric or pneumatic systems	<ul style="list-style-type: none"> Refer to the “circuit diagrams”.
During a work cycle, chips are not extracted	The machine has been shut off from the main extraction system by the sectioning guillotine.	<ul style="list-style-type: none"> Open the sectioning guillotine.
	The pistons in the operating section, which regulate automatic exclusion of tools from the extraction system, have become blocked.	<ul style="list-style-type: none"> Contact Biesse S.p.a. Assistance Service.
The panel support cannot be positioned or cannot be locked	Deposits have formed along the slide bars	<ul style="list-style-type: none"> Remove the deposits with a clean, dry rag or bronze wire brush.
	Problems with the locking piston	<ul style="list-style-type: none"> Contact Biesse S.p.a. Assistance Service

PROBLEM	CAUSE	SOLUTION
The spindles on the boring head rotate in the wrong direction	Wrong sequence of phases in electric power terminals in the electric cabinet	<ul style="list-style-type: none"> Go through the procedure to switch off the machine and then invert at least two of the leads of the three phases of the power supply.
During emergency shut-down of the machine, the operating section descends through the Z axis	Insufficient pressure for the compensation cylinder of the Z axis	<ul style="list-style-type: none"> Check the pressure indicated on the pressure gauge. Refer to the <i>"Maintenance manual"</i>.
	There may be problems in the pneumatic circuit	<ul style="list-style-type: none"> Contact Biesse S.p.a. Assistance Service
The quality of results obtained on the machine is poor	The tool is not suitable for the type of work being carried out or is worn	<ul style="list-style-type: none"> Replace with new tool.
	Speed of movement and/or rotation speed of the tool not suitable for the type of material being worked	<ul style="list-style-type: none"> Adjust the parameters of the speed of movement and/or tool rotation speed. Refer to the documentation of the <i>"Numerical Control"</i>.



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