

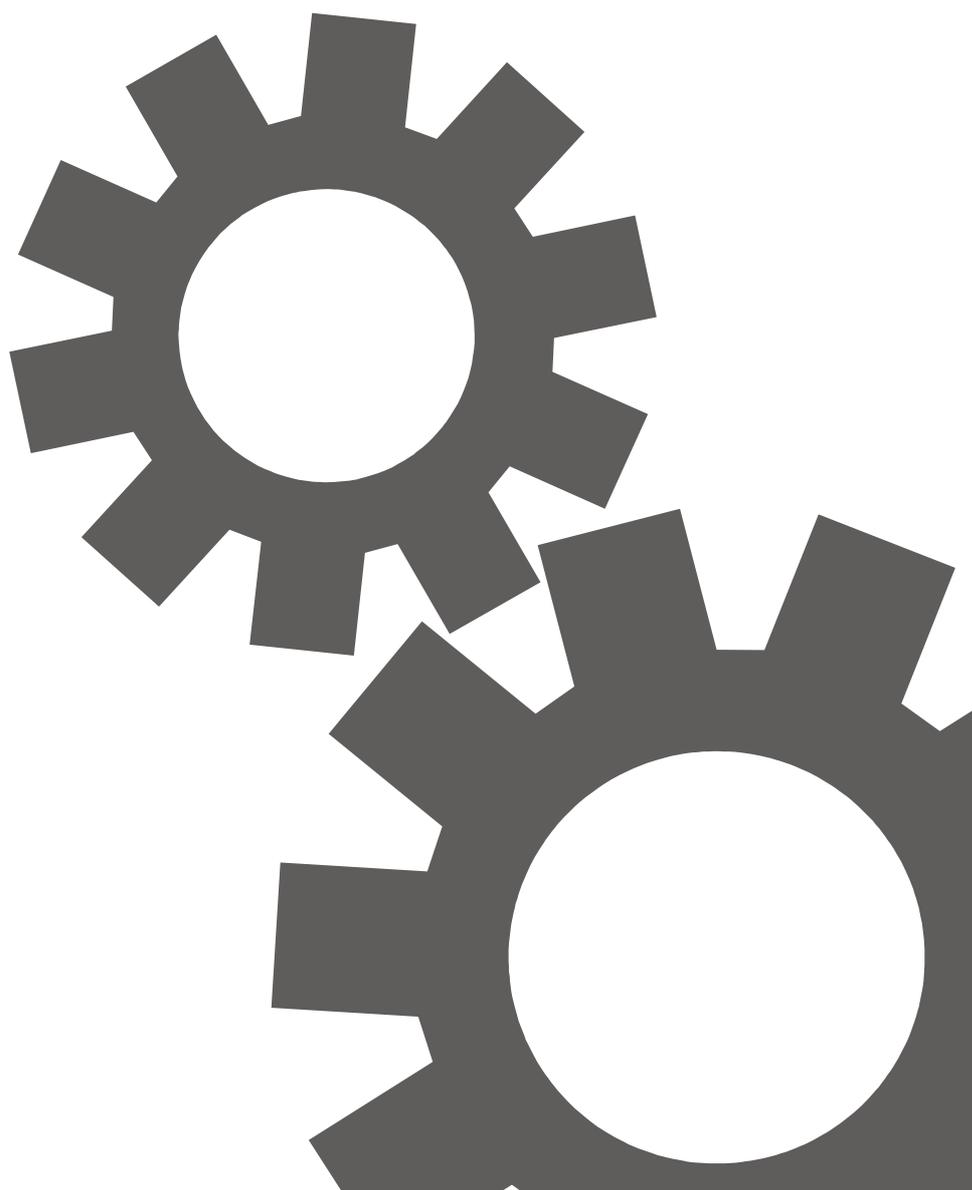
Translation of the original instructions

# Skill

1224 G FT, 1536 G FT, 1836 G FT

Processing centre

## User Manual



2.2

5801A0456 ENGLISH

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# Introduction

This document, together with the interface instruction manual and any attachments, provide the information required for proper use of the machine. The procedures indicated must only be carried out by staff with adequate training.

In order to avoid incorrect manoeuvres that might result in injury to persons it is important to read and fully understand all the documents supplied with the machine. The manufacturer cannot be held responsible or legally liable for any damage resulting from incorrect use of the documentation.

The description or illustration of certain devices may differ slightly from the actual ones without in any way compromising their comprehension. Some devices indicated and described in this manual may not be present on your machine.

This document complies with the indications in Machine Directive 2006/42/CE.

## Conventions

The text sections that must not be overlooked are highlighted and preceded by the symbols described and illustrated below.



**Paragraphs marked with this symbol indicate an imminent danger, and the contents must therefore be taken into careful account in order to prevent a serious accident.**



**Paragraphs marked with this symbol indicate procedures to be used and actions to be taken to avoid any damage to goods and property.**



This symbol is used to indicate points of particular importance that must not be overlooked.

## Documents supplied with the machine

The documents supplied with the machine must be kept safely throughout the machine's working life, and must be passed on to third parties on sale. They must be stored in a suitable place within easy access of and known to the persons using the machine.

Based on the model or configuration of the machine, some of the following might not be present.

The following is a list of the documents supplied with the machine:

- **User Manual.** Contains information on use of the machine. Given the complexity of the subjects dealt with, this information may be divided into a number of sections.
- **User interface instruction manual.** Contains the information on use of the machine's user interface. Given the complexity of the subjects dealt with, this information may be divided into a number of sections.
- **Spare parts catalogue.** Used to identify and order components to be replaced, following the instructions provided. It is not necessarily translated into the language of the country to which the machine is being sent.
- **Pneumatic diagrams.** These describe the machine's pneumatic systems and are for the sole use of the trained technicians authorised by the manufacturer. They are not necessarily translated into the language of the country to which the machine is being sent.
- **Wiring diagrams.** These describe the machine's electrical systems and are for the sole use of the trained technicians authorised by the manufacturer. They are not necessarily translated into the language of the country to which the machine is being sent.
- **CE declaration of conformity.** This certifies that the machine complies with the directives indicated. It is only issued for machines sold in EEC countries and those where Machine Directive 2006/42/EC is applied.
- **Attachments.** These contain additional information that completes and/or replaces the information in the document with which they are enclosed.
- **Interactive digital support.** Contains the main documents supplied with the machine.



Some documents might be integrated in the user interface or in the interactive digital support.

## **CE declaration of conformity**

The following are the contents of the CE Declaration of conformity:

- The name and address of the manufacturer.
- The name, model and serial number of the machine.
- Compliance with directives 2006/42/CE - Machinery Directive, 2004/108/CE - Electromagnetic Compatibility Directive, 2006/95/CE - Low Voltage Electrical Materials Directive.
- The person authorised to prepare the technical folder and their address.
- The place and date of issue of the declaration.
- The signature of the authorised person.
- The name and surname of the person authorised to sign.
- The position of the person authorised to sign.



# Preliminaries



# 1 Safety information

This chapter contains the main information relating to the safety of machine users.

## 1.1 Main safety warnings

- The machine has been designed to be used exclusively by one person. To avoid accidents, the presence of two or more people on a single machine is absolutely forbidden.
- Before carrying out any type of operation, carefully check there is nobody near the machine.
- It is absolutely forbidden to climb onto any part of the machine.
- The machine is only sufficiently safe if:
  - all the safety standards governing health and safety at work are respected;
  - all the information on machine use contained in the respective manuals and applied directly to the machine is respected;
  - the operators have been suitably trained in the use of the machine;
  - the residual risks (see page 20) are taken into due account.
- Do not modify the machine's electrical system and do not tamper with, elude, eliminate or bypass the safety devices fitted on the machine. Non-compliance with this warning could result in serious risks to the health and safety of persons.
- The machine must be only used for the purpose for which it has been designed.
- Wear clothing with an adequate level of protection for the operations to be carried out (goggles, gloves, safety helmet, shoes, etc.).
- Woodworking operations create dust. It is recommended, at the customer's discretion, that you wear a mask with a suitable protection level.
- Wear earmuffs or earplugs to protect hearing.
- Before starting the machine, check there is nobody inside the danger areas.
- Make sure that nothing will obstruct normal movement of the mobile parts of the machine and that all the casings, doors and protective covers are in their proper places and securely fixed.
- Before starting work, check to make sure that the tools installed in the machine have not been tampered with in any way.
- Always keep the working area clean and tidy.
- Before approaching the tools, always check they have stopped, also in case of sudden interruption of the machining operation or to eliminate chips.
- The machine must never be left unattended during operation.

- When handling chemical substances such as lubricants, glues etc., comply with the safety standards for the products in question and consult the relevant safety cards supplied by the respective manufacturers.
- In the case of an accidental interruption in the electricity supply, in order to prevent damage to the electronic equipment, rotate the main switch of the machine to the “0-off” position immediately.

### Tools

- 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 the speed limit, which is stamped on the surface of the tool or indicated by the manufacturer. If used at rotation speeds higher than those foreseen, certain tools might break, causing pieces to fly out of the machine.
- Before installing any tool in its seat make sure that the guide and centring surfaces have no dents and are perfectly clean.
- In each tool apply only the prescribed torque to screws, bolts, nuts and ring nuts.
- Always make sure the tool rotation direction is the same as that of the spindle in which it is mounted.
- Tools must always comply with the specifications reported in the instructions for the machine on which they are to be used.

### Tooling, maintenance and repairs

- The machine must be set up by one person only. Ensure that nobody else approaches the machine during setting up operations.
- Never leave tools on the machine when setting up has been completed.
- Never use petrol, solvents or flammable fluids to clean the parts, use commercially available type-approved detergents that are non-toxic and non-flammable.
- When the need arises to carry out repairs or maintenance in areas not accessible from the ground, use a ladder or a platform with steps complying with local and national standards.
- In the case of repairs, contact the BIESSE Service Centre.
- Comply with local standards when disposing of substances and/or parts of the machine.
- Do not work under or near any kinematic systems that have not been appropriately supported and locked in position.
- Do not replace or tamper with any laser projectors that may be fitted on the machine.
- When replacing tools manually, always check they have stopped before you touch them.
- In the case of remote servicing, the operations performed in remote must be authorised by the client.

## Installation

- Before starting any installation work, check that the various parts of the machine are free from any physical damage caused by bumping, tearing or abrasion. Damage to electrical cables or sheathing will compromise the safety of the machine's electrical system.

## 1.2 Safety devices

The machine is equipped with various devices that increase the level of safety. For information on the operation and use of these devices, refer to the relevant chapter.

## 1.3 Danger signs

The following describes and illustrates the danger signs present on the machine.



**DANGER - Live components!** Before carrying out any operations on the electrical system, make sure that the power supply has been turned off.



**DANGER - Hot surfaces!** Wear suitable protective clothing.



**DANGER - Shearing!**



**The safety signs affixed to the machine must be kept undamaged and clean.**

## 1.4 Residual risks

The machine has been manufactured in compliance with Directive 2006/42/EC, which sets down the requirements necessary to safeguard the safety and health of operators. In spite of this, and in spite of following all the instructions for use contained in the respective manuals and affixed directly to the machine, the following risks still persist:

- Accidents caused by incorrect commands given by the operator; always pay great attention when entering data in the numerical control software and when operating the machine.
- Injuries or burns caused by tools; handle tools with great care, and always use suitable gloves.
- Ejection of cut-offs; to restrict the risk it is recommended that, wherever possible, the cut piece be suitably fixed.
- Detachment of pieces, as the efficiency of the vacuum locking system depends on the porosity, thickness and size of the piece, as well as the type of tools being used for the machining operation (see cautionary notice in the chapter "Intended Uses").

## 2 Main parts

This chapter provides information on the type of machine, its main and optional parts, and the configuration of the various models available.

 Some devices indicated and described in this manual may be optional features and therefore not present on your machine.

### 2.1 General description of the machine

This machine is a numerical control processing centre designed for "Nesting". The term "Nesting" refers to the optimised machining operation of a large piece, in order to extract various profiles of different shapes, reducing waste to a minimum.

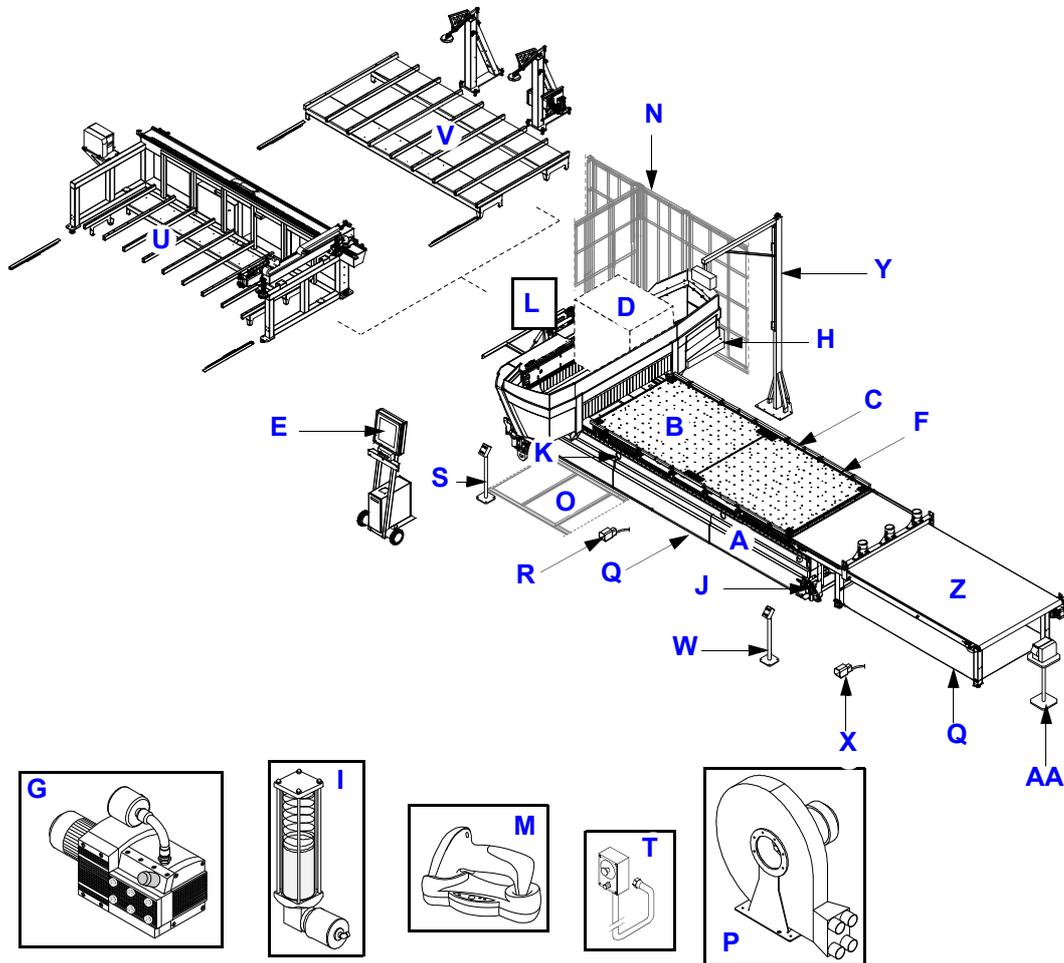
For further information on the machining operations that are possible, on the loading methods and on the panel characteristics, please see chapter 4 "[Intended use](#)".

The machine comprises a base, a group of devices that allow the positioning and locking of the piece/pieces to be machined (work table), and a series of units used to machine the piece (operating section). The operating section can be configured so as to satisfy the various machining needs.

More detailed information about the parts that make up the machine is given in paragraph 2.2 "[General overview and main parts](#)" on page 22.

The machine is manufactured with safety systems that meet the regulations in force in the various countries. Machines destined for use in Europe and those countries where Directive 2006/42/EC is applied also bear the CE mark.

## 2.2 General overview and main parts

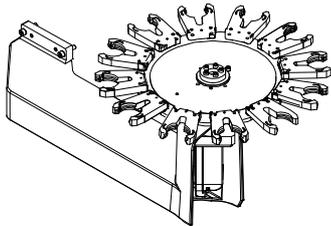


- A Base**; this is the load-bearing structure of the machine.
- B Work table**: for the description, see page 26.
- C Electrical cabinet**: contains the main electronic equipment for machine functioning.
- D Operating section**: for the description, see page 29.
- E Console**; contains the main commands that are used to manage machine operation (see chapter 5).
- F Main switch**; for the description, see paragraph 7.2, page 70.
- G Vacuum pump**; supplies the level of vacuum required to lock the piece to be machined on the work table. The machine may be fitted with a number of pumps of various types, according to the piece locking needs.
- 250m<sup>3</sup>/h Becker Picchio VTLF2250 vacuum pump.
  - 300m<sup>3</sup>/h Busch type Mink MM 1322 AVM vacuum pump.

**H Revolver tool magazine:** contains the tools required for machining, which are picked up and set down automatically by the operating section.

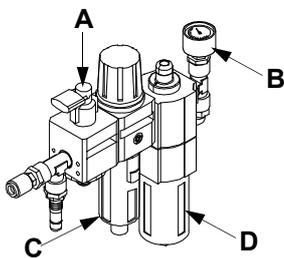
This magazine can be fitted with a tool/aggregate identification system (Balluff), which enables the main tool data (length, diameter, rotation speed, etc.) to be read or recorded, using a chip located inside the collet spindles or in the coupling of the aggregates.

12 places



**I Lubrication pump :** automatically lubricates certain devices (slide blocks, lead nuts, racks, etc.) used to drive the main machine axis carriages. The frequency with which lubrication is performed is set on the numerical control.

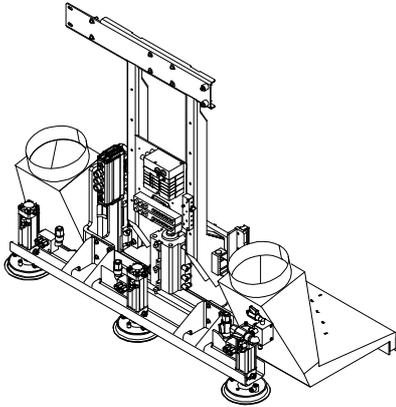
**J FR unit (filter, regulator);** filters the compressed air used by the machine and keeps its pressure constant. It is fitted with a cut-out valve **A** (see paragraph 7.8, page 77), a pressure gauge **B** to check the pressure (see paragraph 14.6, page 123) and two filters: the air filter **C** and the oil separator filter **D**.



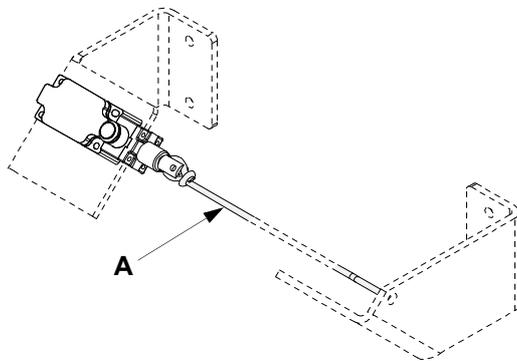
**K Pressure gauge:** allows you to check the pressure of the vacuum system. For further information, please consult paragraph 14.6 "Pressure check" on page 123.

## 2 Main parts

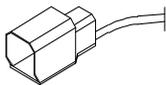
- L loader/unloader**; used to transfer the pieces to be machined from the loading pallet to the FT table, and also used to transfer the machined pieces from the FT table to the unloading belt.



- M Bar code reader**: for the description, see page 32.
- N Safety fence**: for the description, see paragraph 7.7, page 76.
- O Contact mat**: for the description, see paragraph 7.5, page 73.
- P Electric fan**: generates an air flow directed to the air cushion surface, to facilitate material loading and unloading operations.
- Q Emergency cord**: (ref.A) for the description, see paragraph 7.3, page 71.



- R Piece locking pedal**; commands the locking of the piece on the work table. Each working area is equipped with one pedal.



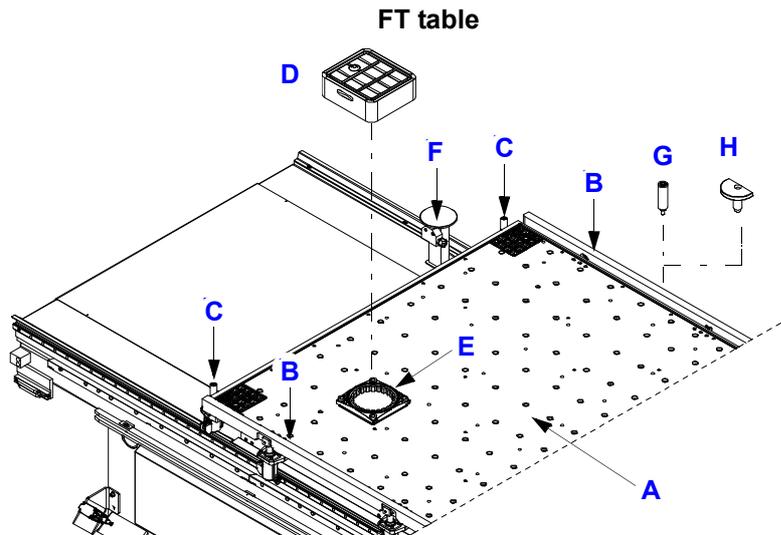
- S Working area button pad**; for the description, see paragraph 5.2, page 54.
- T Machine axis control button pad**; for the description, see chapter 5.
- U Loading pallet (with labelling unit)**; for a description, please see paragraph “Loading/unloading unit”, page 27.

- V Loading pallet (without labelling unit);** for a description, please see paragraph [“Loading/unloading unit”](#), page [27](#).
- W Unloading belt button pad;** for the description, see paragraph [Unloading belt button pad](#), page [56](#).
- X Unloading belt pedal;** for the description, see paragraph [Unloading belt button pad](#), page [56](#).
- Y Laser geometry projector;** can project any geometric element onto the work table (for example the trajectory of the tool during machining operations), to help during tooling operations.
- Z Unloading belt;** contains the machined pieces unloaded from the unloader.
- AA Labelling unit;** prints out labels.

## 2.3 Work table

The work table is the group of parts that are used to position and fix the piece to be machined.

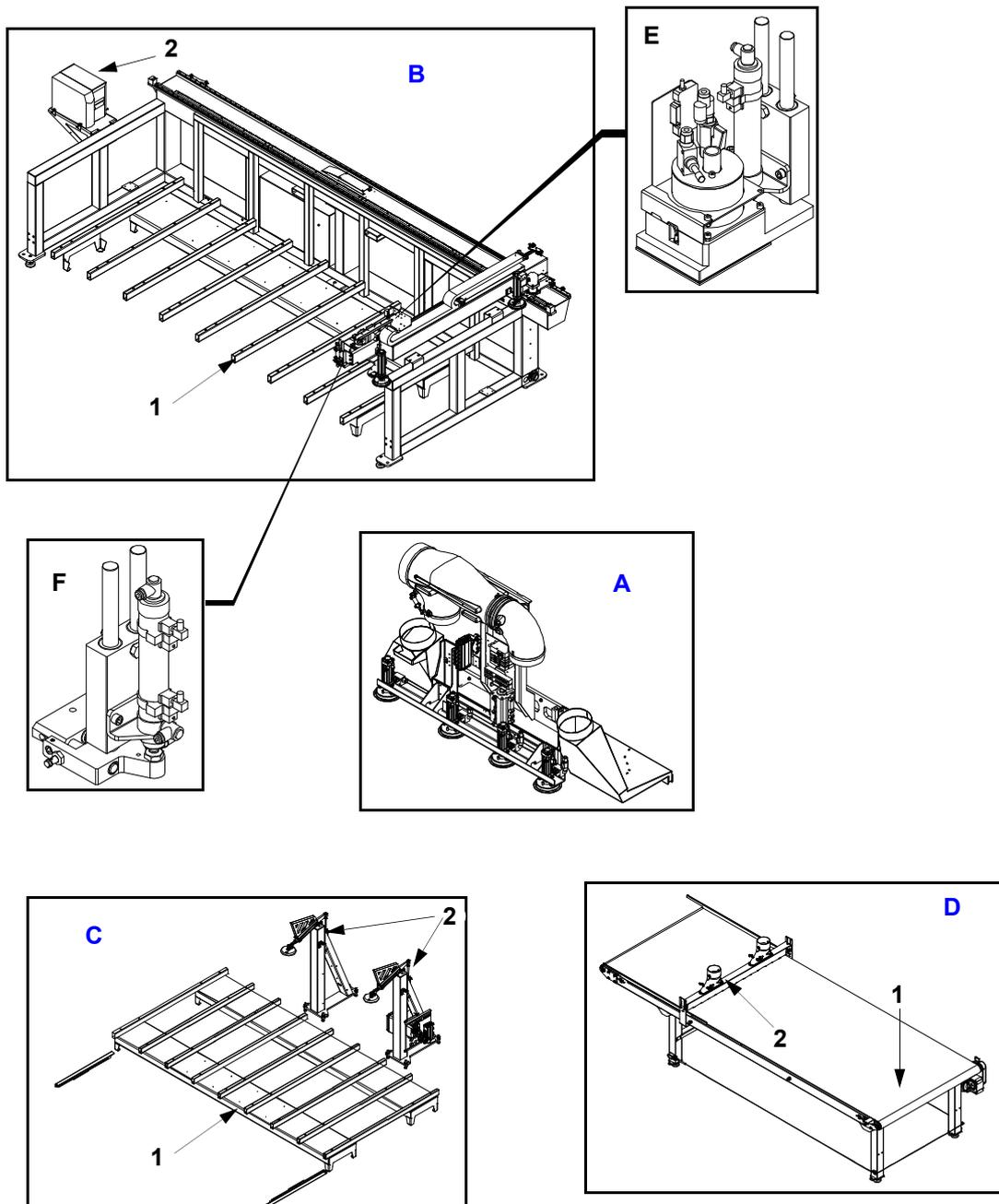
### Description of the work table elements



- A Table;** supports the piece to be machined blocking it with the help of the appropriate positioning and locking devices.
- B Front stop;** used as a reference when positioning the front or rear side of the piece (according to the stop line used).
- C Side stop;** used as a reference when positioning the right or left side of the piece (according to the working area being used).
- D Shapeable suction cup (piece locking device);** supports and locks the piece by means of a vacuum pump. Locking takes place by means of channels formed on the surface of the suction cup, allowing the definition of the area to be de-pressurised via a special rubber seal, so that the piece will adhere to the suction cups. There are different types of shapeable suction cups available that allow, under certain working conditions, locking the pieces more firmly (see appendix [A.6](#), page [147](#)).
- E Suction cup support;** holds the shapeable suction cups, allowing them to be changed quickly, to be positioned in the direction of the Cartesian X/Y axes and to be turned to 24 different positions.
- F Presetter:** allows you to measure the length of the tool (digital measuring device). For further information, please consult the paragraph “[Using the Presetter device](#)” on page [66](#).
- G Extension for stop:** installed on the stops (in the event of locking on the FT work table with the shapeable suction cup, to increase their length).
- H Clamp stop plate;** installed when required on the stop rods, to allow the locking of the piece. It is normally used when locking small pieces or when it is not possible to use the suction cups.

## 2.4 Loading/unloading unit

The loading/unloading unit allows the pieces to be moved onto the work table, and removed from the work table after machining.



**A Loader/unloader;** thanks to the help of special suction cups, this device picks the piece up from the **loading pallet** and moves it, at the end of machining, to the **unloading belt**.

**B Loading pallet (with labelling unit);** part of the machine that comprises the stack loading surface (1), containing the pieces to be machined, and the following devices:

- label applicator (E);
- front pusher (F), that automatically pushes the piece against the stops;  
The loading pallet also includes a labelling unit (2).

**i** The information concerning the labelling machine is given in the appropriate User Manual. Labelling machine parameters must be adjusted only if the label applicator does not lift the label and if TEARING and PRINT MODE parameters are not equal to the value pre-set in table 11 of page 127.

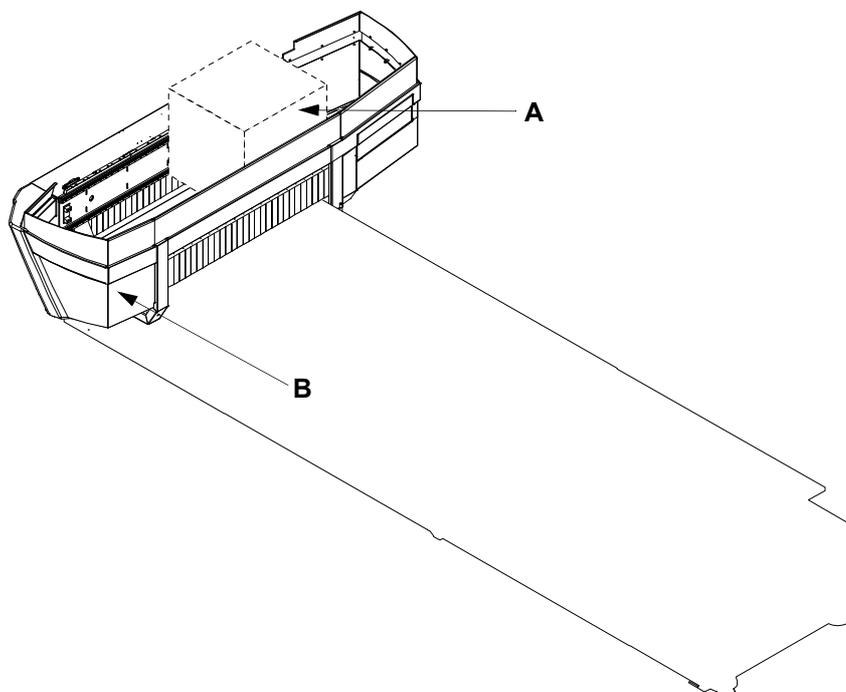
**C Loading pallet (without labelling unit);** part of the machine that comprises the stack loading surface (1), containing the pieces to be machined, and the front pushers (2) that push the piece to be loaded up against the Y axis.

**D Unloading belt:** contains the machined pieces taken from the loader/unloader. It consists of:

- an unloading surface (1)
- a suction unit (2), to clean the piece during automatic unloading

## 2.5 Operating section

The operating section is the totality of the working units and the supplementary devices (ref. **A**). Each working unit is fixed in a pre-set position on the machine Z axis carriage.



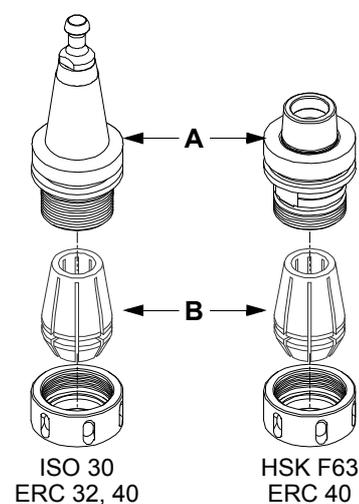
**A** “Working units” (see page 30).

**B** “Operating section guards” (see page 75).

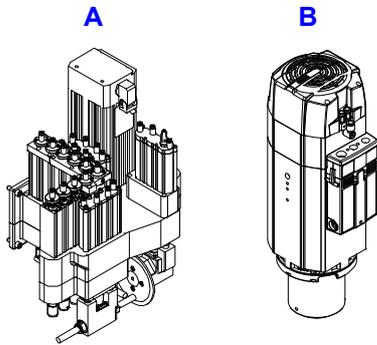
### Collet spindles

The collet spindles are used in determined working units to quickly change the tool during the machining operation cycle (see the technical data of the collet spindles, appendix **A** “Technical characteristics”). The machine is equipped with collet spindles with ISO 30 coupling (ref. **A**), to be used with ERC 32 or ERC 40 (ref. **B**) type collets.

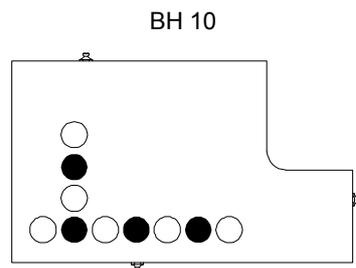
There are collet spindles designed for left or right-hand rotation (see paragraph 3.7 “Information on the rotation direction of the spindles”, page 43).



### Working units

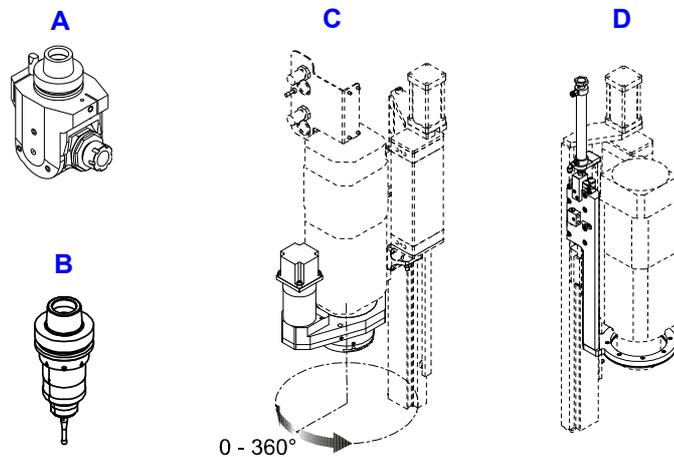


- A Boring unit;** used mainly to perform series and/or single boring operations. The boring unit is fitted with vertical spindles and chucks with horizontal spindles, and can be fitted with a circular blade chuck to make grooves or sectioning.



- B Milling unit;** used to perform every type of machining operation with the use of milling tools and aggregates. It is fitted with an electrospindle for rapid tool change during the machining operation cycle, using special collet spindles (see page 29). For the list of the electrospindles available, consult appendix A “[Technical characteristics](#)” (page 143).

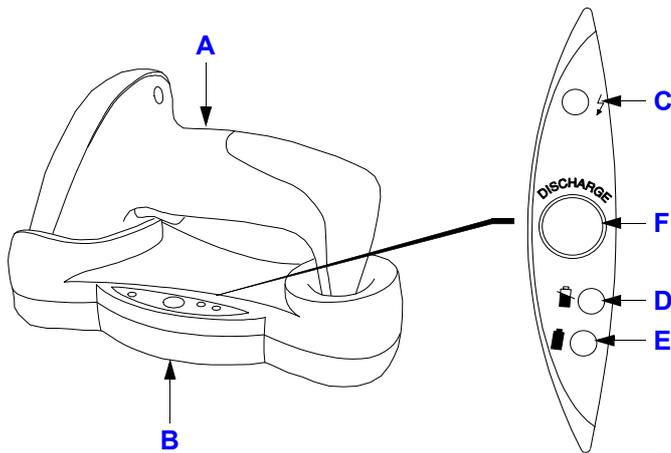
## Supplementary devices for working units



- A Aggregates:** supplementary devices equipped with tools (boring, milling, etc.) to be installed in the milling units, to carry out various types of machining operation. For further details see the relevant instruction manuals.
- B Thickness tracer:** device to obtain the co-ordinates of a reference point to be used during the machining operation programming.
- C C-axis:** device that can be installed on the electrospindle, allowing the aggregate spindle axis to be rotated by 360°.
- D Presser:** device that can be installed on the electrospindle to allow a pressure to be applied to the piece being machined. This is used in particular when machining stacked pieces to prevent them from moving.  
For information on how to use this device, see the Software User Manual.

## 2.6 Bar code reader

The bar code reader permits rapid transmission to the numerical control of data relating to the program to be carried out.



**A - Reader**

**B - Base**

**C - Yellow LED:** indicates that the reader is ready for use (on) and that data is being transmitted (flashing).

**D - Red LED:** indicates that the batteries are recharging.

**E - Green LED:** indicates that the batteries have finished recharging.

**F - Restore batteries key:** used to restore the battery duration.

## 2.7 Identification of the manufacturer and the machine

The name and address of the manufacturer are:

- BIESSE S.p.A., Via Della Meccanica 16 - 61122 Pesaro ITALY

- Biesse Manufacturing Co. Pvt Ltd. - Survey No. 32, No. 469, Jakkasandra Village, Sondekoppa rd. Nelamangala Taluk, Bangalore Rural District 562 123 - India

The manufacturer and the machine are identified by means of the plates provided. The labels report the data listed below and, where applicable, the EC mark.

- A - device
- B - EC mark
- C - company name and address
- D - model - type
- E - serial number
- F - year of construction
- G - pneumatic supply
- H - suction air speed
- J - machine mass
- K - wiring diagram number
- L - electrical cabinet mass
- M - supply voltage
- N - rated current
- O - number of supply phases
- P - power
- Q - frequency
- R - supply voltage short-circuit cut-out power.

electric system rating plate

BIESSEARTECH made in Italy	
WOOD DIVISION	
BIESSE S.p.A. - Via della Meccanica, 16 - 61122 Pesaro, PU ITALIA - Tel. 0721/439100	
Modello - Tipo Model - Type	
Matricola Serial number	
N° Schema elettrico Wiring diagram number	
Massa Weight	kg
Tensione di alimentazione Power supply voltage	VAC
Corrente nominale Rated current	A
Numero fasi alimentazione Number of power supply phases	
Potenza Power	kW
Frequenza Frequency	Hz
Potere di interruzione del corto circuito alla tensione di alimentazione Suitable for use on a circuit capable of delivering not more than	kA RMS Sym 21 power supply voltage

BIESSEARTECH made in Italy	
WOOD DIVISION	
BIESSE S.p.A. - Via della Meccanica, 16 - 61122 Pesaro, PU ITALIA - Tel. 0721/439100	
Modello - Tipo Model - Type	
Matricola Serial number	
Anno di costruzione Year of construction	
Alimentazione pneumatica Air supply	Bar
Velocità aria di aspirazione Suction flow rate	m/sec
Massa Weight	kg

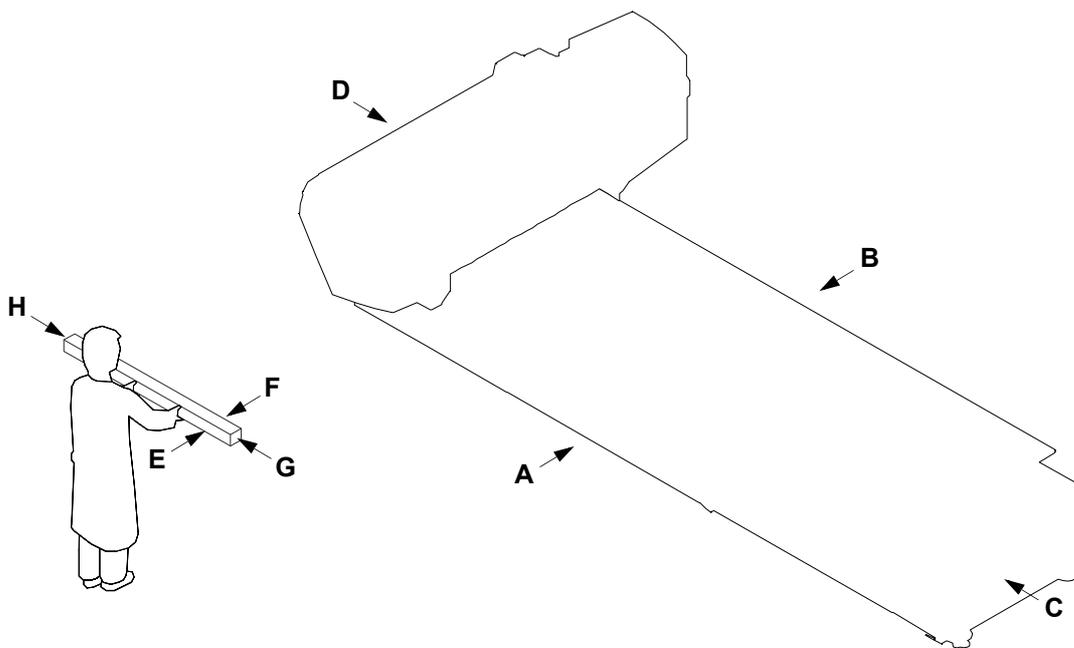


## 3 Basic information

This chapter deals with various subjects, that give a clearer understanding of how the machine works.

### 3.1 Guideline indications

The following figure contains useful guideline indications.

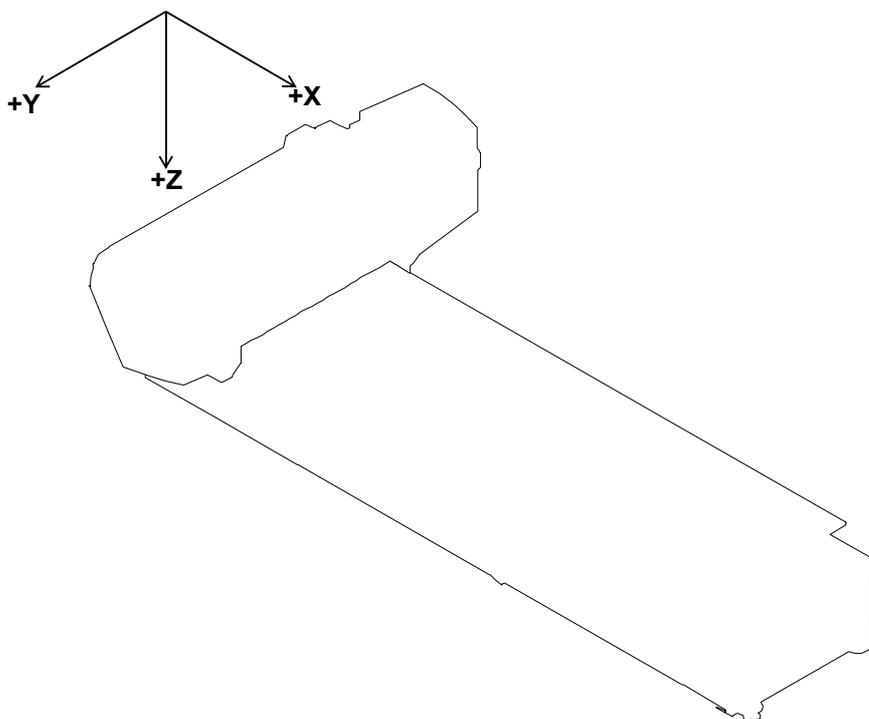


- A** Front side or front of the machine, on which the pieces are loaded and unloaded.
- B** Rear side of the machine.
- C** Right hand side or right of the machine.
- D** Left hand side or left of the machine.
- E** Front side or front of the piece.
- F** Rear side of the piece.
- G** Right hand side of the piece.
- H** Left hand side of the piece.

## 3.2 Cartesian axes and co-ordinates

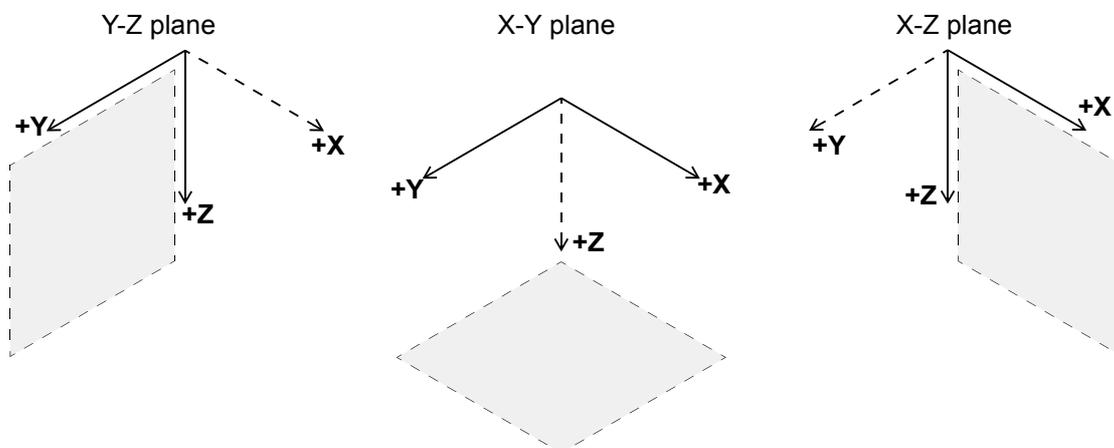
The position and movement of certain parts of the machine are indicated using the Cartesian axes and co-ordinates system. This system is used in geometry to describe the position of a point on a plane or in space using the X, Y and Z axes.

The positions of the Cartesian axes with respect to the machine are illustrated below.



### Planes of the Cartesian axes

In some cases, a pair of axes in the Cartesian system is used to refer to a particular plane. An example of each plane is shown in the figure below.



## 3.3 Machine axes

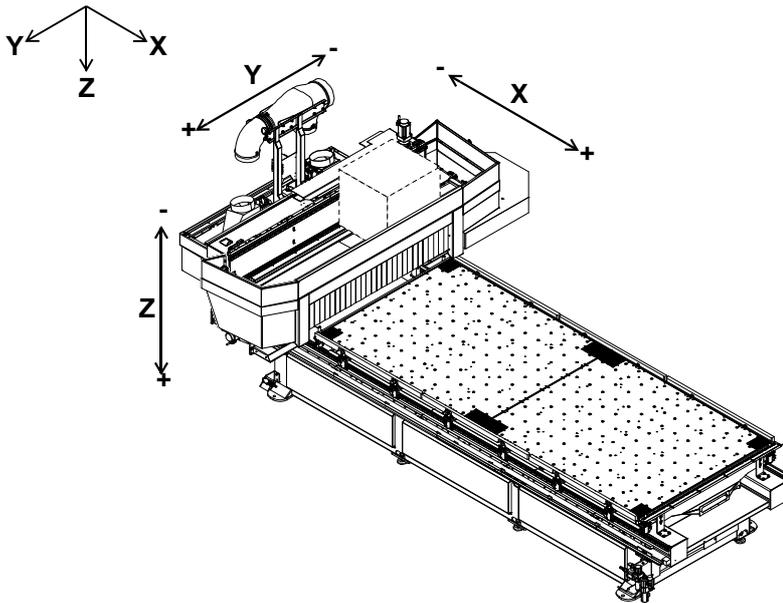
The machine axes are electronically controlled elements that allow the movement of parts or units of the machine.

The position of the machine axes can be displayed at any time on the numerical control, on the page that normally opens when the software is launched.

### Machine co-ordinate axes

The co-ordinated machine axes drive the machine units that are directly involved in machining the piece (e.g. the operating section), and they can be interpolated.

- **X**; group of parts that move the operating section in the direction of the Cartesian X-axis.
- **Y**; group of parts that move the operating section in the direction of the Cartesian Y-axis.
- **Z1**; group of parts that drives the milling unit electrospindle vertically. Refer to the machine Z-axis for the positive and negative directions of movement.
- **Z2**; group of parts that drives the boring unit vertically. Refer to the machine Z-axis for the positive and negative directions of movement.

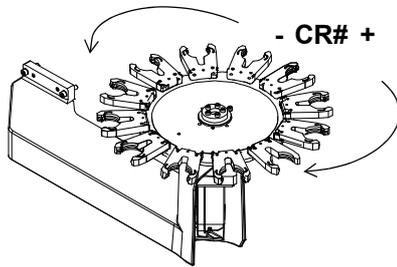


### Auxiliary machine axes

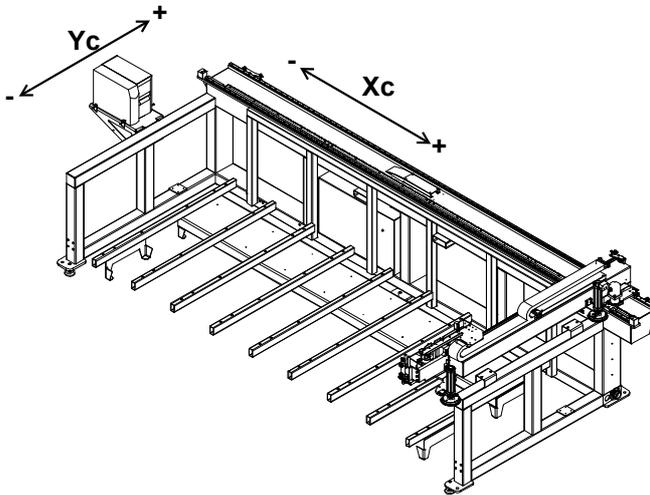
The auxiliary machine axes drive the machine units that are not directly involved in machining the piece (e.g. the tool magazines), and they cannot be interpolated.

### 3 Basic information

- **CR#**; group of parts that rotate the tool-holder plate of the Revolver tool magazine.



- **Yc**: group of parts that moves the loading pallet devices along the Y-axis.
- **Xc**: group of parts that move the loading pallet devices along the X axis.



## 3.4 Origins

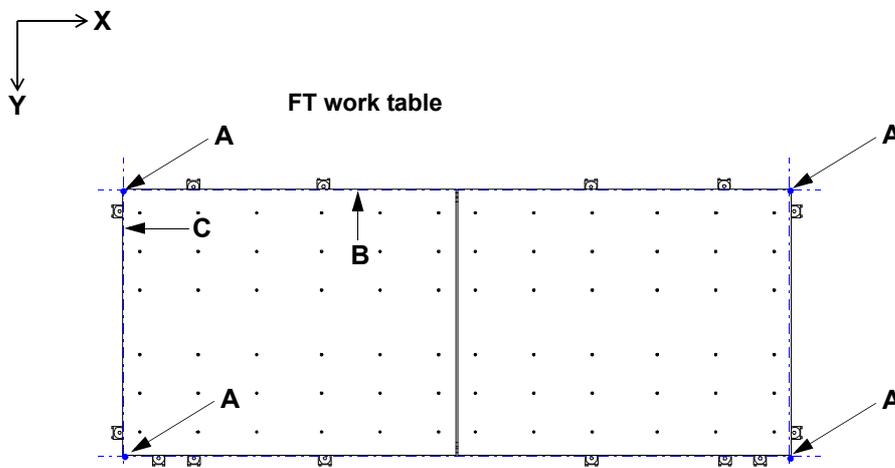
The origin is a pre-set point used as a reference when establishing the position of an element on the machine. The machine has a number of origins: the absolute origin (or machine origin) and the work table origins.

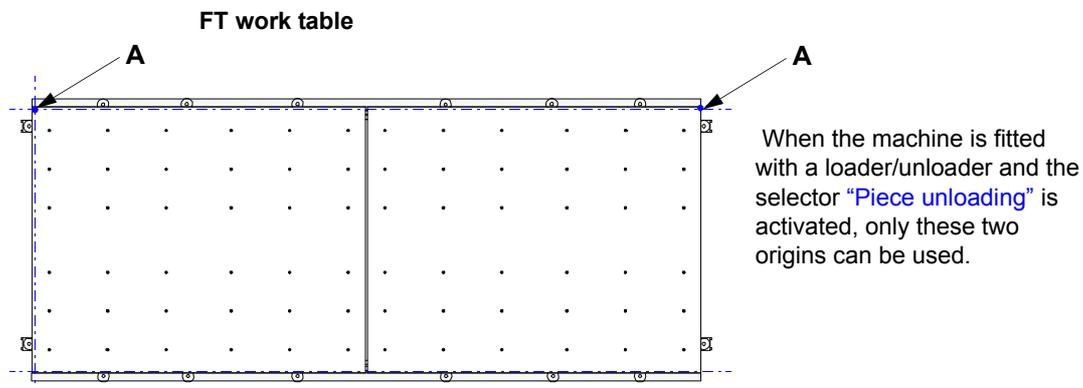
### Absolute origin

The absolute origin (or machine origin) is an imaginary point located on the axis of the milling unit, when the latter is reset, at the height of the bottom end (nose). It corresponds to the 0 (zero) point in the system of Cartesian axes and co-ordinates and the main machine axes, and represents the point from which to start when establishing the position of the other origins. It is set by the manufacturer when the machine is first tested, using suitably arranged cams and limit switches.

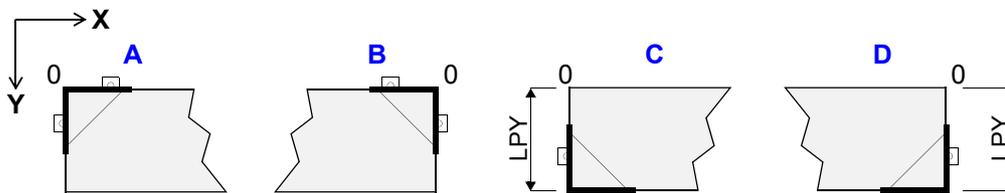
### Work table origins

The work table origins are reference points (ref. **A**) for the program positions. In the direction of the Cartesian axes X and Y these are the intersection point between two imaginary lines, one that is tangent to the front stop **B** (called "stop line") and the other tangent to the side stop **C**, while in the direction of the Cartesian Z-axis they represent the resting surface of the piece on the work table.



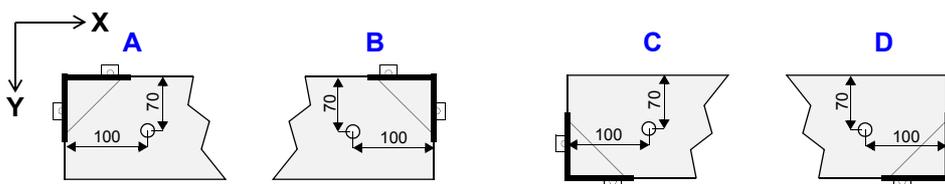


The work table origins may be of various types:



- A Straight origins:** these use the top left hand corner of the piece as a reference point when the rear side of the piece is pushed up against the front stops.
- B Mirror (or symmetrical) origins:** these use the top right hand corner of the piece as a reference point when the rear side of the piece is pushed up against the front stops.
- C Translated straight origins:** these use the top left hand corner of the piece as a reference point, when the front side of the piece is pressed up against the front stops. In this case, to make the necessary calculations, the machine uses the dimensions of the piece along the Cartesian Y-axis (LPY), as entered in the program.
- D Translated mirror origins:** these use the top right hand corner of the piece as a reference point, when the front side of the piece is pressed up against the front stops. In this case, to make the necessary calculations, the machine uses the dimensions of the piece along the Cartesian Y-axis (LPY), as entered in the program.

The following example illustrates a program containing the instructions required to carry out a vertical bore at  $X = +100$  and  $Y = +70$  and the result obtained on the various origins.



The straight and mirror origins are normally used to create the left and right hand parts of a furniture unit (sides, doors, etc.) with a single program.

To carry out a machining operation it is necessary to select at least one work table origin, as described on page 87.

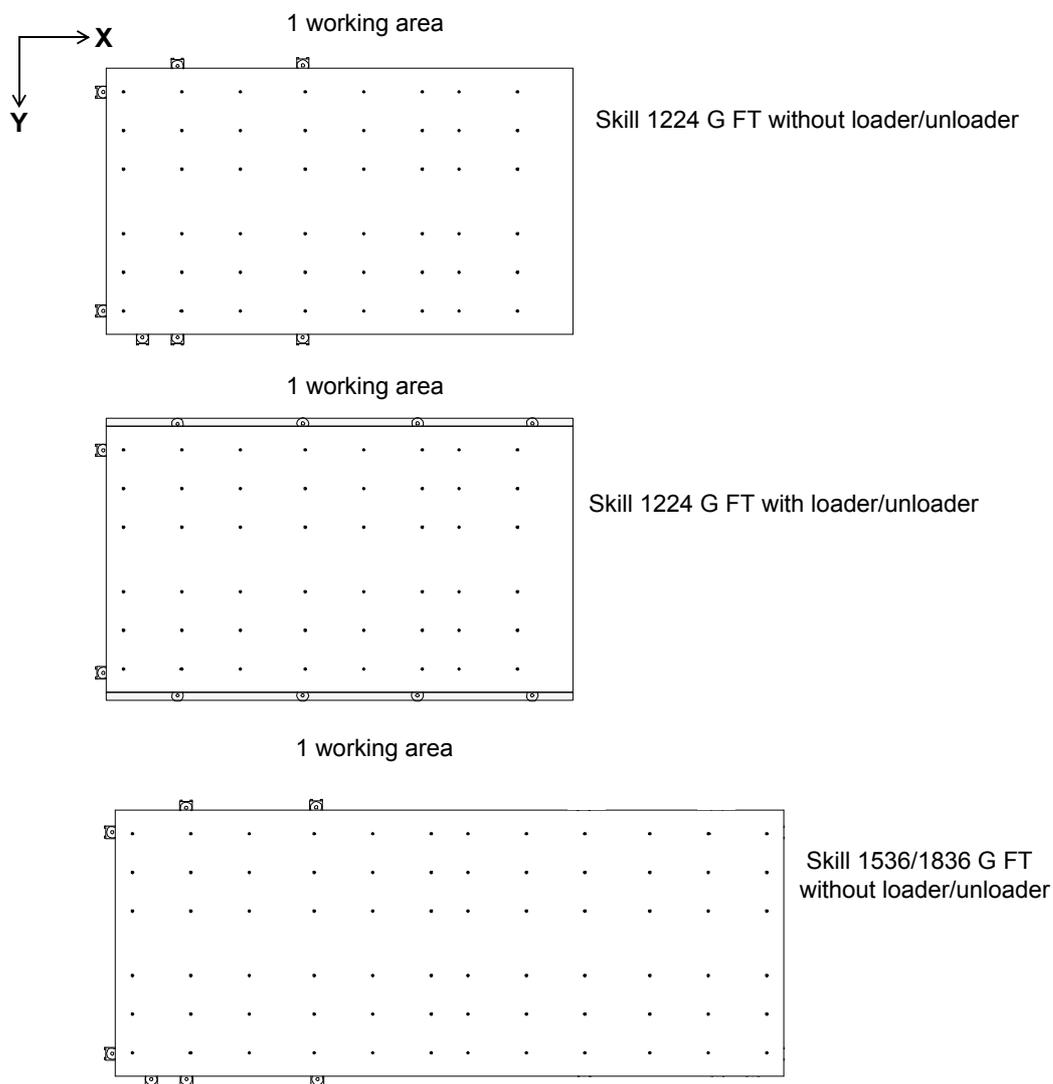
## 3.5 Working areas

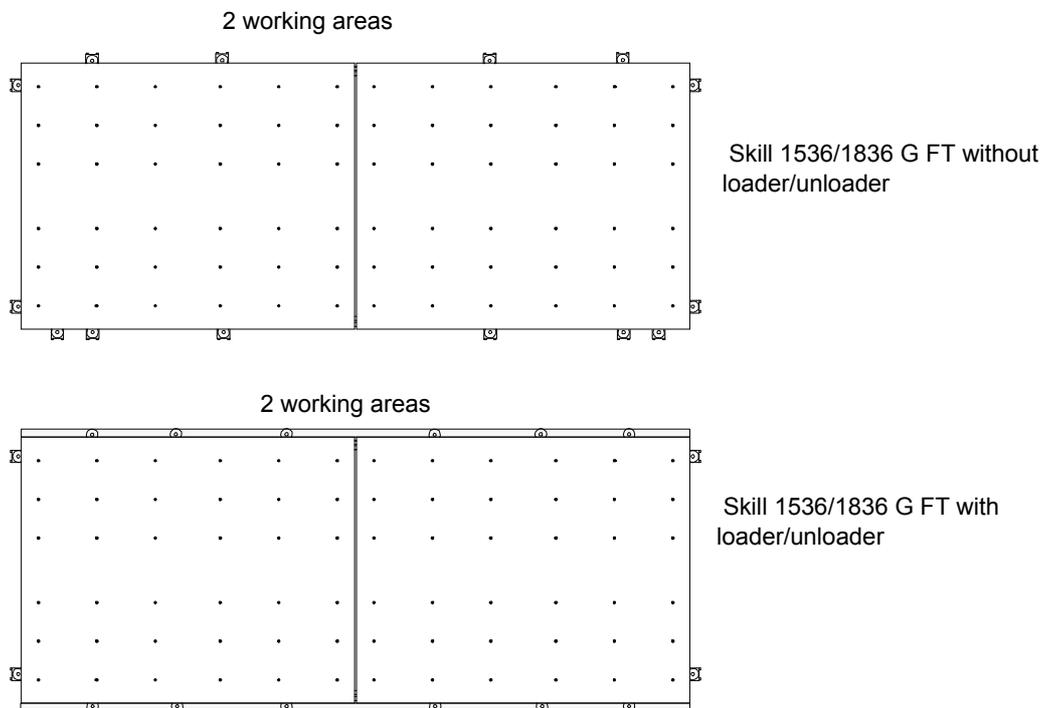
The working areas are divisions in the table of the work table. It is possible to position and lock a piece to be machined in each of the working areas.

The work table is formed of two working areas (see figure) that are activated by means of the blocking pedal: one for each area.

Each working area can be divided into a number of locking zones. The locking zones can be activated depending on the size of the piece

### Areas of the FT work table



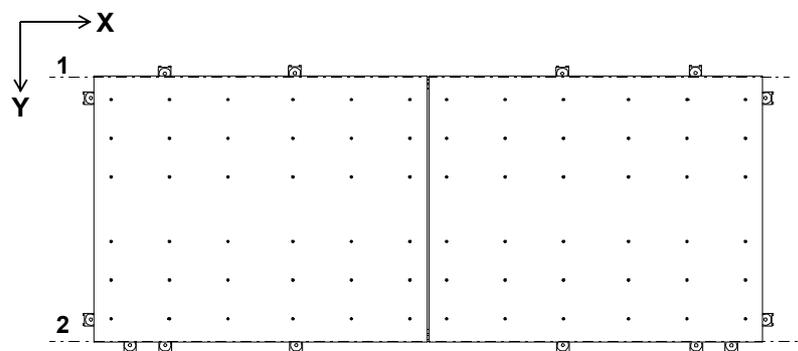


## 3.6 Stop lines

The “stop lines” are imaginary lines tangent to the front stops or to the clamps. The intersection between a stop line and an imaginary line tangent to the side stops allows an origin of the work table to be defined (see page 39).

To carry out a machining operation it is necessary to enable a stop line, as described on page 86.

### *FT work table*



- 1 = first stop line
- 2 = second stop line

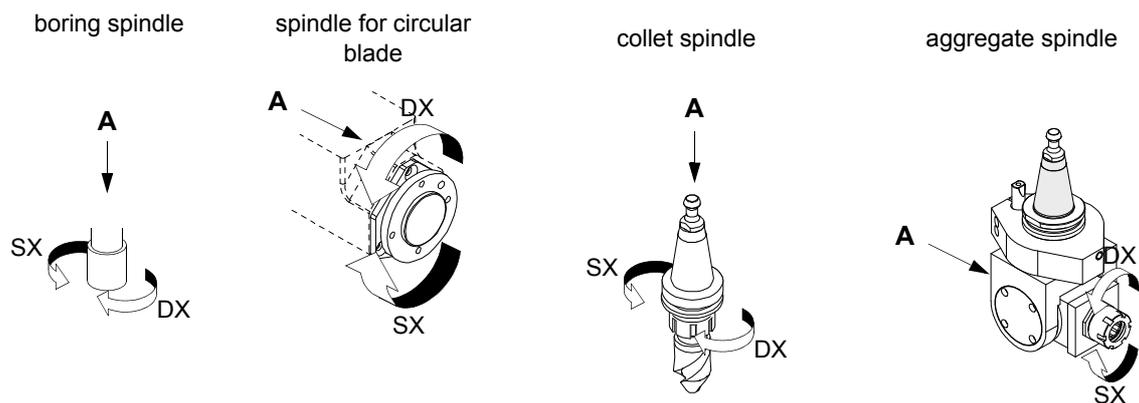
## 3.7 Information on the rotation direction of the spindles

The machine is equipped with various spindles, and it is extremely important, in order to avoid the risks connected with installation of an unsuitable tool, to understand the definition of right or left spindle and be able to determine the rotation direction of each spindle with certainty.

### Definition of a right or left spindle

The definition of “right” spindle (DX) is given to a spindle that rotates clockwise, while “left” (SX) is used for a spindle that rotates anticlockwise.

To define the rotation direction of a spindle, you must look at it from direction **A**, as indicated in the figure below.

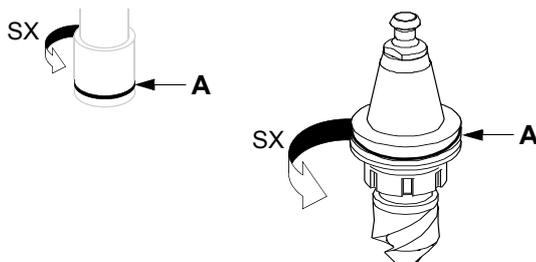


### Determining the spindle rotation direction

Information on the rotation direction of the various spindles is given in appendix A “[Technical characteristics](#)”.

There are, however, conventions that enable the quick determination of spindle rotation direction:

- A groove on the outside of the spindle (see examples in figure ref. **A**) indicates that it is a left spindle.



- The screwing direction of the ring nut or flange that locks the tool is always the opposite of the spindle rotation direction.

## 3.8 Slot, Tp

The term “slot” defines the areas where the various working units are installed.

In the numerical control software the slots are identified by the abbreviation “Tp”, followed by the number of the corresponding slot (e.g. for a milling unit located in slot 1 the abbreviation Tp1 will be used). The same abbreviation - TP - is also used to identify the circular blade tool chuck, located on the boring unit. The number used for this chuck varies according to the configuration of the operating section.

## 4 Intended use

This chapter contains information defining the safe and proper uses for which the machine has been built.

### 4.1 How to load and unload the piece

The machine is not designed to be used in line with other machines. The material to be machined must be loaded and unloaded manually or using suitable devices.

In order to reduce machining times (pendular mode), loading and unloading of the piece can be carried out in one part of the work table while the operating section is machining in the opposite part, as long as the dimensions of the piece in the X-axis permit it (see paragraph 4.2, page 45).

### 4.2 Characteristics and dimensions of workable materials

The following materials can be worked:

- Wood (solid wood, plywood, fibre panels, stripboard, multiply plywood, veneered sheets).
- Wood derivatives (chipboard, MDF, OSB).
- The materials listed above, coated with plastic laminates or banding materials.



**Under no circumstances must the machine be used to work plasterboard, ferrous materials or materials not mentioned above.**

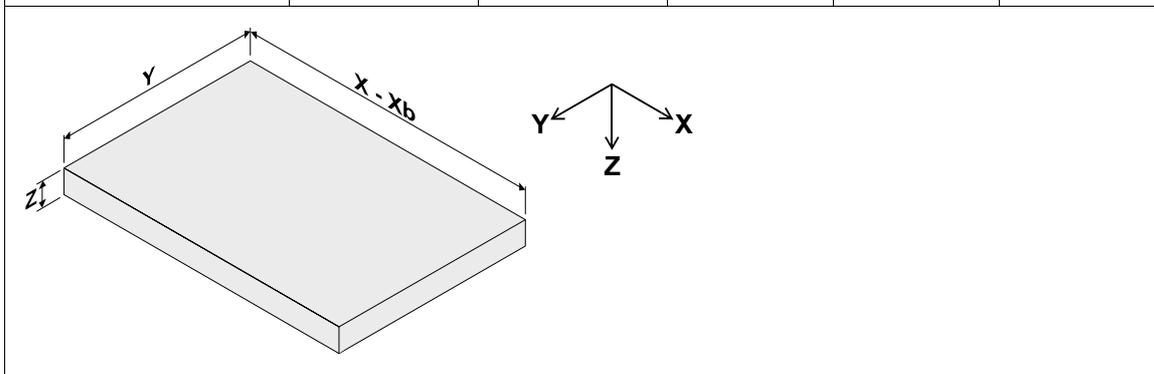
Table shows the maximum dimensions of the workable materials. Values **X** and **Y** correspond to the surface of the piece that rests on the work table, along the respective Cartesian axes X and Y; **Xb** corresponds to the surface available along the Cartesian X-axis when loading in pendular mode (see paragraph 4.1 “How to load and unload the piece”, page 45). The Z value corresponds to the maximum workable thickness of the piece.

Maximum dimensions of machinable materials.

Machine model	X (mm)	Y (mm)	Xb (mm)		Z (mm)
			CE	non-EC	
Skill 1224 G FT	2465	1260	-	-	170 105*
Skill 1536 G FT	3765	1560	1340	1470	170 105*

#### 4 Intended use

Machine model	X (mm)	Y (mm)	Xb (mm)		Z (mm)
			CE	non-EC	
Skill 1836 G FT	3765	1875	1340	1470	170 105*



\* value if the loading/unloading unit is used (see page 149).

**!** The minimum dimensions of the pieces to allow proper locking using the vacuum locking system are not easy to define, as the efficiency of the locking depends on the porosity, thickness and dimensions of the piece, as well as on the type of tool used for the machining operation. Should there be any doubts regarding the efficiency of the standard locking system, it is recommended that auxiliary locking systems (clamp stops, front pushers, etc.) be used. In any case, BIESSE is available for any necessary clarification.

Piece workability data vary according to the working field of the working unit involved in the machining operation (see pages 150 and 153), as well as the piece's position on the work table, the tool and piece size, and the size of the other working units.

Minimum/maximum values for the pieces that can be loaded on the loading pallets.

Machine model	Minimum values (mm)			Maximum values (mm)			maximum weight
	X	Y	Z	X	Y	Z	kg
Skill 1224 G FT	2200	800	9,8	2460	1260	80	150
Skill 1536 G FT	2200	800	9,8	3770	1560	80	150
Skill 1836 G FT	2200	800	9,8	3770	1870	80	200

**!** The position of the two loading pallet pushers must be adjusted during installation according to the panels to be machined.

**!** The maximum height of the stack that can be loaded is 620 mm.

## 4.3 Executable machining operations

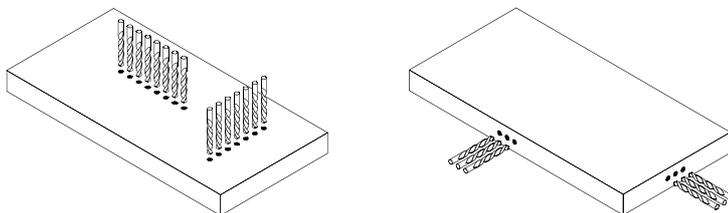
All the machining operations that can be carried out by the machine are described and illustrated below. Some of them can only be carried out using optional units.

For information on the characteristics of the tools required to carry out the machining operations foreseen, see page 98.

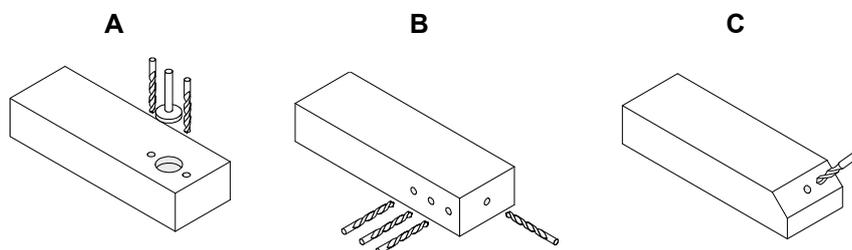
 **Grinding operations are not allowed on the machine.**

### Boring operations

- Vertical and horizontal series boring (system boring).

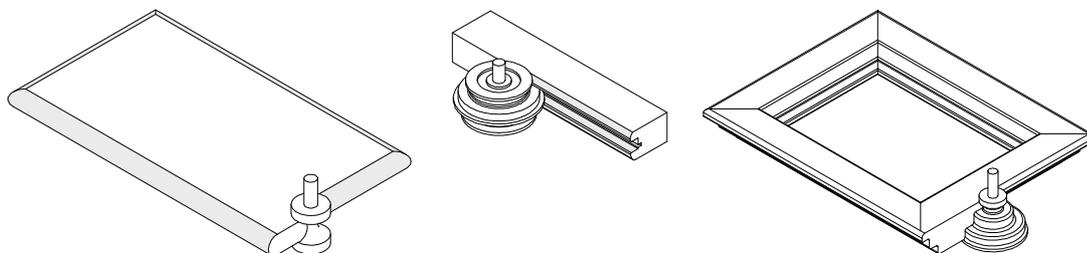


- Vertical **A**, horizontal **B** and tilting tool boring operations **C**, for example to make housings for dowels or hardware materials.

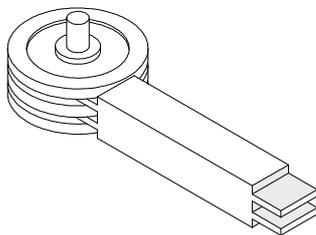


### Milling operations

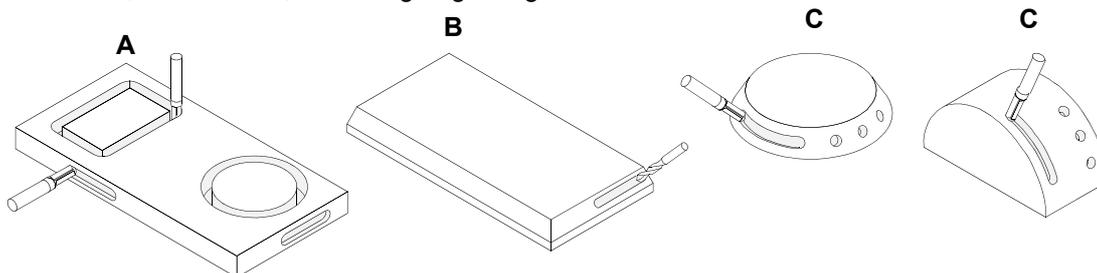
- Creating any type of profile on the edge of the pieces, using special shaped mills (profiling or rebating in the case of pre-assembled doors).



- Creating joints for door and window frame elements (tenoning).

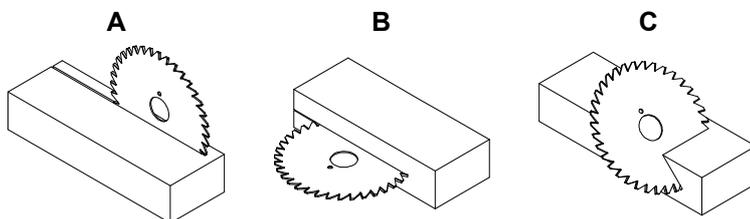


- Vertical **A**, horizontal **B**, and tilting engraving **C**.



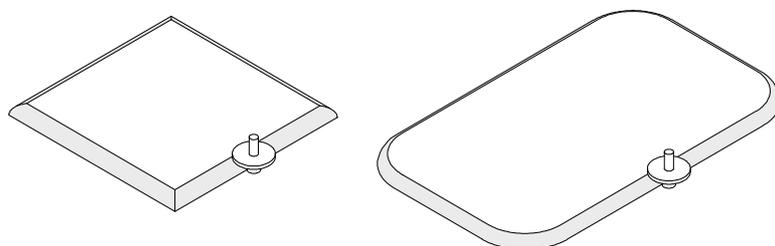
## Cuts

- Vertical **A**, horizontal **B**, and tilting cuts **C**.



## Smoothing operations

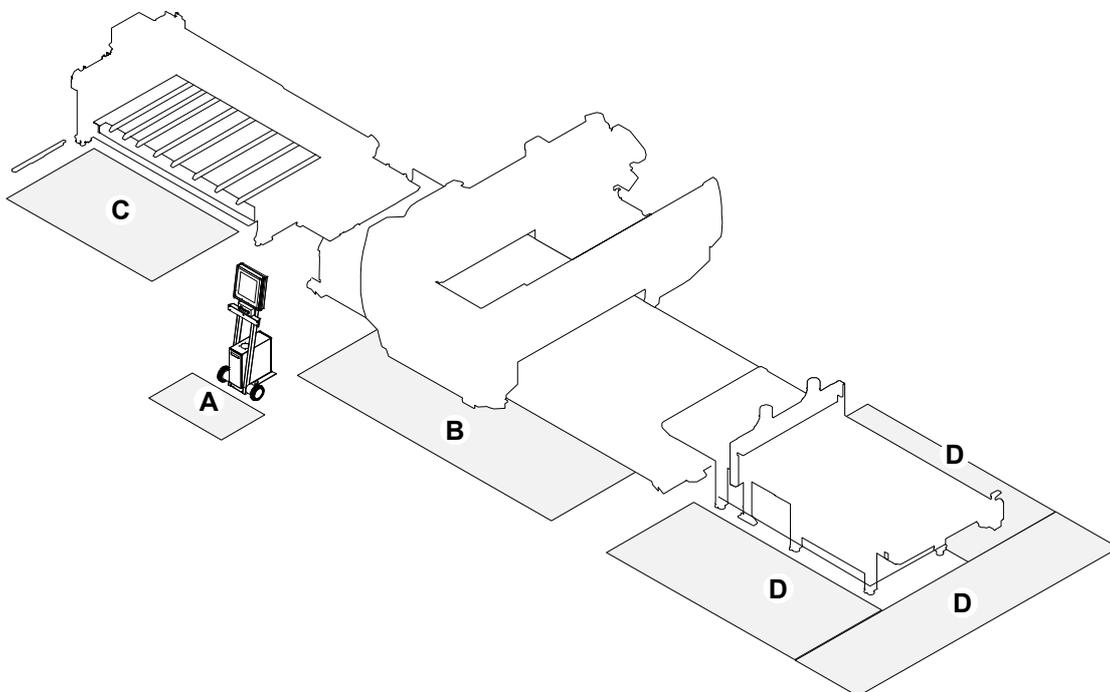
- Smoothing the edges of pieces with squared or curved profiles.



## 4.4 Work area

"Work area" means the area where it is possible to stand while the machine is working, in order to activate and control the command devices.

- **Area A:** in front of the control panel to use the NC, to activate commands and to oversee the correct functioning of the machine.
- **Area B:** in front of the work table, for the manual blocking of the pieces and the lifting of the pieces at the end of the machining operation.
- **Area C:** in front of the loading pallet, to put down the stack of pieces to be worked.
- **Area D:** in front of the unloading belt to pick up the machined pieces.



## 4.5 Danger area

The danger area is the whole of the area occupied by moving parts during the machining operation. This area is suitably marked off by the safety fence and the contact mat (see pages [76](#) and [73](#)).



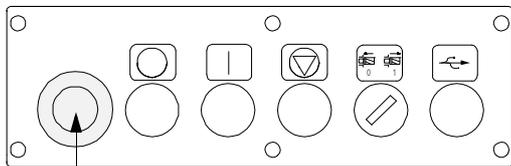
# 5 Controls and indicator devices

This chapter contains the description of the commands and indicator devices on the push-button panels, the terminals, the control panel and the software interface:

- 5.1 “Control panel” (page 51)
- 5.2 “Working area button pad” (page 54)
- 5.3 “Machine axis control button pad” (page 54)
- 5.4 “Loading pallet button pad” (page 55)
- 5.5 “Unloading belt button pad” (page 56)

## 5.1 Control panel

The control panel is used to control the main functions of the machine .

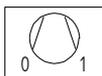
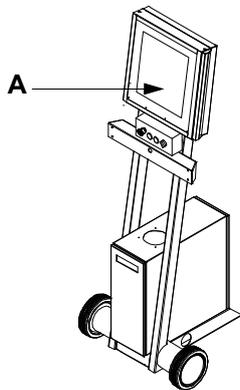


Emergency stop button

	<b>STOP;</b> (black button) used for stopping the machine.
	<b>Machine power;</b> (luminous white button) used to prepare the moving parts to receive the electric power supply. <ul style="list-style-type: none"> <li>• <i>On</i> = function activated.</li> </ul>
	<b>Tooling;</b> (key selector) activates the tooling mode for machine set-up. When this function is enabled, only the voltage (24V) required to operate the solenoid valves is available, so that operations can be carried out in safety. When the key is removed the selector will not turn. <ul style="list-style-type: none"> <li>• <i>Right</i> = function activated.</li> </ul>
	; USB pen drive.

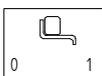
## Soft Console

The commands of the Soft console (**A**) allow you to manage the machine's secondary functions and those relating to certain optional devices.



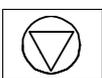
### Prevent piece unlocking

prevents the piece from unlocking (vacuum locking only) in the event of an emergency stop. This function is normally activated when performing milling operations, so that there is no risk that the piece will have to be discarded in the event of a sudden emergency.



### Unloader enabling (key selector);

activates the use of the unloader to unload the piece.



**Stop:** allows you to interrupt an operation.



### Deactivation of tool rotation;

disables the rotation of the spindle of each unit of the operating section. This function is especially useful during program tests to check machine movements, as the curtain guards are not lowered.



**Activation of stop lines:** allow you to activate a stop line. Each key is associated with two stop lines:

- 1st; activates the first stop line (LED on).
- 2nd; activates the second stop line (LED on).



**Enabling clamp stops** used to enable the clamp stops locking function when running the program. This control also makes it possible to select whether or not this function is to be enabled alongside the suction cup locking function.

- *On* = function activated together with suction cup locking.
- *Flashing* = function activated without suction cup locking.



**Activation of piece movement devices** used to activate any devices that facilitate the movement of the piece during loading/unloading phases (bar supports, electric fan, etc.).

- *On* = function activated.



**Reset electrospindle:** used to lift the electrospindle that has remained down due to a sudden machine stoppage.

- *Flashing* = indicates that the electrospindle has to be reset.



**TEST:** used to start a test cycle from the position of the tools in the magazine.



**Martyr panel:** allows you to visualise, on the software interface of the numerical control, the data field to modify the thickness of the support panel (see paragraph 8.12, page 88).



**Lubrication cycle:** carries out a lubrication cycle on certain devices that allow movement of the main machine axes carriages (slide blocks, lead nuts, racks, etc.).



**Piece unloading:** allows to manually unload the machined piece, only if this function has been enabled through the selector “[Unloader enabling](#)”.



**Unloader movement:** used to lift or lower the unloader (only on machines with FT work table ).



**Open tool magazine:** allows you to open any covers of the tool magazines.

- On = function activated.



**Presetter management:** allows the management of the digital Presetter device. For the detailed description, refer to paragraph 6.10 “[Using the Presetter device](#)” on page 66.

- On = Presetter management functions activated.



**Levelling:** used to enable support panel levelling mode.



**Parking mode;** used to manage the operating section parking mode. For the description of the status of the red LED, see paragraph 8.14 “[Managing the operating section parking mode](#)” on page 89.



**labelling machine configuration;** sets labelling machine data at the software level (see instructions for software use).



**Jog+ :** commands the movement of the machine axes in the positive direction.



**Vel:** allows you to increase the speed of the axes during the movement in manual mode. The JOG+ or JOG- key must be pressed at the same time.



**Jog- :** commands the movement of the machine axes in the negative direction.



**Stop:** allows you to interrupt an operation.



**Start:** allows you to run an operation.



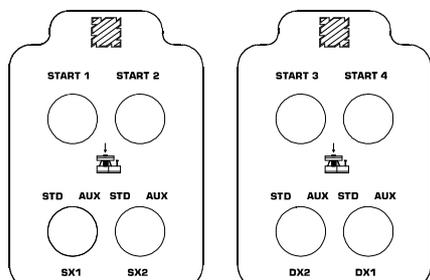
**Reset:** restores the numerical control after an emergency.



**Clear:** updates the error log visualised in the numerical control software window.

## 5.2 Working area button pad

This button pad is used to manage certain functions relating to the working area.



**START (1, 2, 3, 4);** (luminous green button)

used to select the origin and start the machining operation. The various states of the button indicate the following conditions:

*Off* = origin cannot be selected for the machining operation;

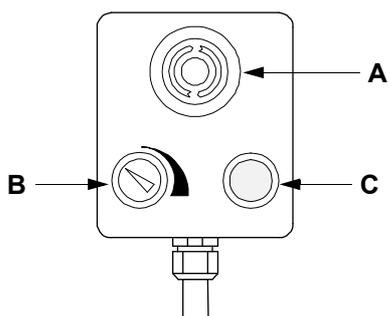
*On* = origin can be selected for the machining operation;

*Flashing (slowly)* = the origin contains a locked piece; press the button to confirm the machining operation.

*Flashing (quickly)* = the origin contains a locked piece that has been partially machined; press the button once to move the operating section to the parked position, press it again to start the machining operation.

## 5.3 Machine axis control button pad

The machine axis control button pad is used to control the speed of advance of the machine axes.



**A Emergency stop button;** for the description, see paragraph 7.1, page 69.

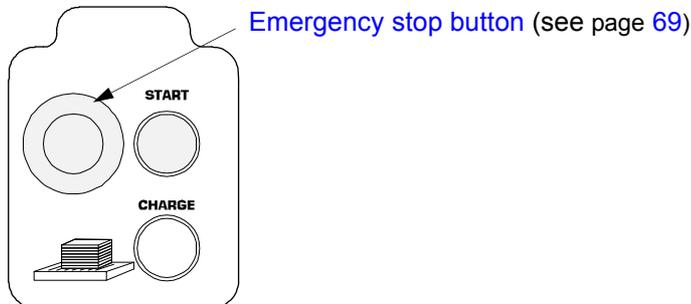
**B Remote override (axes);** varies the speed of movement of the machine axes.

**C Multifunction**(blue button); the function of this button depends on the type of operation being carried out:

- if the machine tooling mode (see selector “Tooling” on page 51) has been activated, by pressing the button you can command the opening of the electrospindle blocking collet, thus releasing the tool. When the button is released, the collet closes, blocking the tool;

## 5.4 Loading pallet button pad

This button pad manages the loading pallet



**START** (green indicator light button);

by pressing this button you can reset the photocell barrier. Its light indicates the status of the loading pallet.

- Off = pallet deactivated ; use of pallet not allowed.
- On (fixed) = loading pallet activated. In this case, by crossing the photocell barrier, the button switches off, deactivating the pallet.
- Flashing = loading pallet activated. In this case, crossing the photocell barrier, the machine stops immediately, and the button switches off, deactivating the loading pallet.

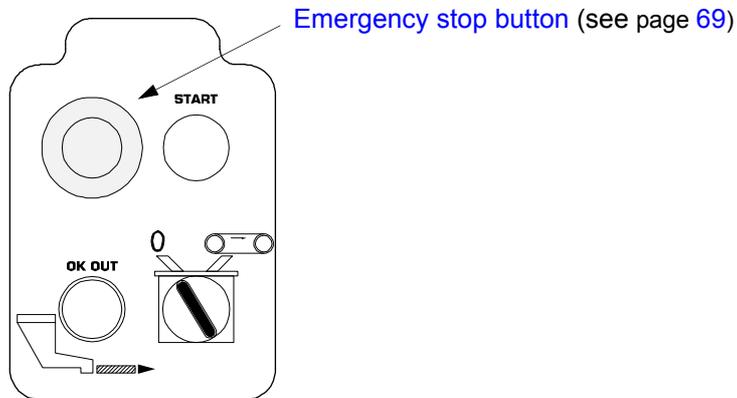
**CHARGE** (white indicator light button):

it commands the loading of the piece stack onto the loading surface of the loading pallet stack.

- Off = function deactivated.
- On (fixed) = function activated. To carry out the loading, press the button; the button begins to flash. Wait for the button to stop flashing, then proceed with the loading.
- Flashing = it indicates that the loading surface stack is moving to prepare for loading of the pile of pieces. Loading is only possible when the button stops flashing.

## 5.5 Unloading belt button pad

This button pad manages the unloading belt.



**OK OUT**(white indicator light button):

used to request the automatic unloading of the worked pieces onto the unloading belt.

- Off = function deactivated.
- On (fixed) = function activated. To run the automatic unloading at the end of the machining operation, press the button; the light will begin flashing.
- Flashing = indicates that the piece unloading function has been booked. When machining is over the pieces are unloaded automatically onto the unloading belt.

**START**(green light);

- On: the unloader is not working and the contact mat is restored.
- Flashing: the unloader is working and the contact mat is restored.
- Off: the contact mat must be restored or the machine is in emergency mode.

**Belt movement**(black selector);

to move the belt, turn the selector to the right or press the pedal of the unloading belt.

Use



# 6 Using the machine

This chapter explains the procedures for using the machine: starting up, stopping, switching off, etc.



**Do not install any type of software on the PC of the machine without permission of the manufacturer.**

## 6.1 Switching the machine on

1. Check the doors in the safety fence are closed.
2. Rotate the main switch of the machine to the “1-on” position (see paragraph 7.2, page 70).
3. Disconnect the cut-out valve (see paragraph 7.8, page 77).
4. Start the chip suction system to which the machine is connected, making sure that the connection pipe knife valve is open.
5. Check the software interface of the numerical control for possible error messages. To remedy the errors, refer to the Software User Manual and the relevant annexes for the error code, read the description of the fault, and carry out the corrective action indicated.
6. Check that the following safety devices are working correctly (see page 69)
7. Press the button “Machine power” (“Control panel”, page 51). The button must light up.
8. Activate the “Reset” icon (page 53).
9. Activate the “Clear” icon (page 53).
10. Perform a global zero-setting of the machine axes (see page 60).
11. Carry out the warm-up cycles for the units on the operating section (see page 61). Once the warm-up cycles have been completed, the machine is ready for use.

## 6.2 Zero-setting the machine axes

Zero-setting is a procedure via which the machine axes move to a pre-set position known to the NC. Axes reset may be “global”, when all the axes are zero set together, or “single” when the axes are zero set one at a time on different occasions.

### Global zero-setting

To carry out a zero-setting of all the machine axes, follow the instructions given below:

1. On the software interface of the NC, activate the global zero-setting mode for the machine axes.
2. Activate the “Start” icon to start the reset procedure. The first axes to be zero-set are the Z-axes of the working units, followed by the remaining axes.

### Single zero-setting

To carry out the zero-setting of a single machine axis, follow the instructions given below:

1. On the interface software, enable single machine axes zero-set mode and select the axis you wish to zero-set.
2. Check that nothing can impede the regular movement of the axes, then command the start of the zero-setting by activating the “Start” icon (page 53).



The single reset must follow the order given above for the global reset.

## 6.3 Moving the machine axes

On certain occasions (for example during tooling) it may be necessary to move the machine axes manually. To move the machine axes manually, use the numerical control (see the Software User Manual).

## 6.4 Operating section warm-up cycles

When starting up the machine for the first time each day, it is necessary that the units in the operating section perform a short warm-up cycle, as indicated below.

### Warming up the milling unit

Each electrospindle must be made to perform a short warm-up cycle to allow the bearings to reach an even working temperature gradually.

For this purpose, it is necessary to create a program in which each electrospindle is used as follows:

- 50% of max. rated speed for 2 minutes.
- 75% of max. rated speed for 2 minutes.
- 100% of max. rated speed for 1 minute.



It is recommended that this cycle be repeated every time the machine remains unused for a period of time sufficient to allow the electrospindle to return to room temperature.

### Warming up the boring unit

To obtain precise machining operations, it is very important to make the boring unit carry out a warm-up cycle for about 15 minutes. Since there is no switch-on command as such, follow the instructions given below

- Create a simple program in which the boring and milling units are used, and run it.
- When the boring and milling unit motors start up, turn the remote override to the left (until it reaches zero) and wait for the length of time indicated above.

## 6.5 Machine stop

The machine stops (it stops working) if the electrical power supply is interrupted (see the paragraph [“Stop due to interruption of the electricity supply”](#)), or following the deliberate or accidental use of one of the safety devices: emergency cord or button (see the paragraph [“Emergency stop”](#)).

 **If the machine stops, or the machining operation suddenly stops, always check the tools are not moving before going near the operating section.**

### Emergency stop

The “emergency” stop is used when it is necessary to stop operation of the machine immediately due to a dangerous situation or unforeseen circumstances.

To make this type of stop, press the nearest emergency button (see paragraph [7.1](#), page [69](#)) or activate the emergency cord (see paragraph [7.3](#), page [71](#)); the program under way will stop immediately and the machine will stop.

To restart the machine, proceed as described on page [63](#).

 **When the function that prevents tool rotation is deactivated (see the icon [Deactivation of tool rotation](#) on page [52](#)), the working units lift up, even in the event of an emergency stop. If necessary, perform a machine reset (see page [63](#)) before disabling this function.**

### Stop due to interruption of the electricity supply

If there is an interruption in the electricity supply, the machine will switch off. For the switch-on and reset operations, see paragraph [6.6 “Machine reset”](#).

## 6.6 Machine reset

If there is a sudden stop of the machine functions (see paragraph 6.5), to reset them you must proceed as indicated below.



**Before moving the machine axes, the tool magazines and the electrospindles, remove any obstructions to ensure there is no risk of danger.**

### Resetting in the event of an emergency stop

1. Eliminate the cause of the sudden machine stoppage, resetting any commands or safety devices activated (see chapter 7).
2. Press the white button “Machine power” (“Control panel” page 51).
3. Activate the “Stop” icon (page 53).
4. Activate the “Reset” icon (page 53).  
In certain cases, if stoppage has occurred during automatic tool change operations, it may be necessary to run a reset cycle for the operating section and magazine involved.
5. Check the condition of the red LED relating to the key “Reset electrospindle” (“Control panel”, page 52). If the LED is flashing, this means the electrospindle must be reset; in this case, check there are no obstacles to its movement then activate the icon “Reset electrospindle”.
6. Restart the machining operation (see paragraph 6.8, page 64).

### Resetting after an interruption of the electricity supply

1. Rotate the main switch of the machine to the “0 off” position and, when the electricity supply has been restored, repeat the machine switch-on procedure (see page 59).
2. Lift the piece from the work table if the electricity supply interruption happened when the program was running.
3. Carry out the machining operation procedure again (see chapter 8 “Carrying out machining operations”).

## 6.7 Interrupting the program

This type of stop is used when it is necessary to stop the program being run without stopping the machine altogether (the spindles continue to turn).

- To temporarily suspend the machining operation, press the “**Stop**” key (page 53). By activating the “**Start**” icon (page 53) once again, you can continue the machining operation from the point at which it was interrupted.
- To stop the machining operation completely, activate the “**Stop**” icon and the “**Reset**” icon. In this case it is not possible to continue the machining operation from the point at which it was interrupted.

## 6.8 Restarting the program after an emergency stop

If the piece blocks after the emergency stop, it is necessary to reset the machine functions (see paragraph 6.6, page 63) and restart the machining program execution (see paragraph 8.5, page 85).

If the function to prevent the piece unlocking is activated (see the selector “**Prevent piece unlocking**” on page 52), the piece being machined will remain blocked, allowing you to resume the machining operation from the beginning or from the point in which it was interrupted (see the following paragraphs).

### ***Resuming the machining operation from the start***

1. Restore the working of the machine, as indicated in paragraph 6.6 “**Machine reset**” (see page 63).
2. Activate the “**Start**” icon (page 53) to run the machining program.
3. Press the flashing button “**START (1, 2, 3, 4)**” (“**Working area button pad**”, page 54); the operating section moves to its resting position.
4. Press the button “**START (1, 2, 3, 4)**” again; the machining operation restarts from the beginning.

### ***Resuming the machining operation from the point at which it was interrupted***

1. Press the button “**Machine power**” (“**Control panel**”, page 51).
2. Press the flashing button “**START (1, 2, 3, 4)**” (“**Working area button pad**”, page 54); the machining operation resumes from the point at which it was interrupted.

## 6.9 Switching the machine off

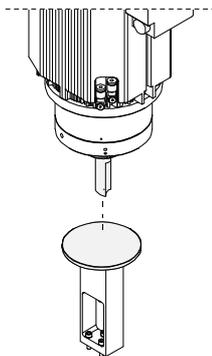
1. Move the operating section into the park area, on the left-hand side, to prevent any tools that may be fitted on the units from jolting the elements on the work table.
2. Remove the tools from the electrospindles and protect the coupling area from dust and/or impurities by applying a plug or a clean collet spindle.
3. Stop the machine at the end of its working cycle by pressing the black button "STOP" ("Control panel", page 51).
4. Prepare the PC for switching off.
5. Rotate the main switch of the machine to the 0-off position (see paragraph 7.2, page 70).
6. Shut off the compressed air system by actuating the cut-out valve (see paragraph 7.8, page 77).



**One of the pistons moving the electrospindle vertically remains under pressure even when the cut-out valve has been triggered. To avoid a sudden descent of the electrospindle, do not tamper with the respective pneumatic pipes.**

## 6.10 Using the Presetter device

The digital Presetter device allows you to measure the length of the tool in the electrospindle (measuring precision +/- 0.025 mm), and to register it in the tool table of the NC (see also paragraph 14.4 “Adjusting the Presetter”, page 152).



To carry out this operation, observe the following procedure:

1. Check that the machine has been set to receive electrical energy (“Machine power” button and “Stop” and “Start” keys pressed).
2. In the numerical control software, activate the environment AUTOMATIC (see the Software User Manual).
3. Activate the “Presetter management” icon, a new dialogue box will be displayed in the numerical control software.
4. In the appropriate fields, choose the option relating to tool measurement (see the Software User Manual).

To avoid the operating section jolting against the work table, the use of this device is only allowed when the data of table are respected.

**L2Min** = minimum tool length.

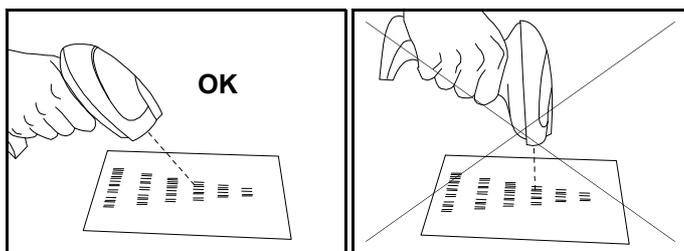
Type of collet spindle		L2Min
Coupling	Collet	
ISO 30	ERC 32	55
ISO 30	ERC 40	45
HSK F63	ERC 40	30

Type of collet spindle		L2Min
Coupling	Collet	

## 6.11 Using the bar code reader

Optimum reading conditions are obtained when the reader is inclined with respect to the surface on which the code is located, so as to avoid the risk of direct reflection, which might have a negative effect on the reading.

Successful reading is signalled by a beep and a green spot which lights up the code.

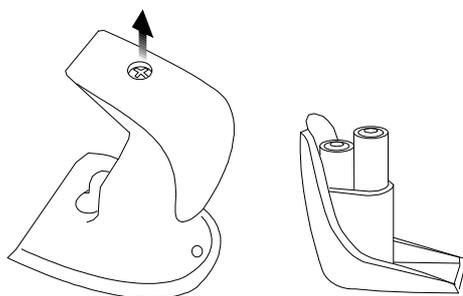


## Recharging the batteries

When the reader is placed on its base unit the batteries are recharged, and this is signalled by a red LED. When the batteries are fully recharged, the green LED will light up.

After a number of recharge cycles, the duration of the batteries may decrease. To restore a good level of battery duration, position the reader on its base and press the restore batteries key (see page 32).

**Replacing the batteries**



# 7 Using the safety devices

This chapter provides important information for the correct use of the safety devices present on the machine.

**!** Should these safety devices fail to operate correctly, inform the maintenance technician or the BIESSE service department. Under no circumstances must the machine be used if the safety devices are not working.

## 7.1 Emergency stop button

The emergency button (red mushroom-head) is used to stop the machine in the event of a potential danger or unexpected event, and it is located in various points on the machine:

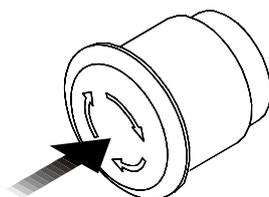
- [Control panel](#)
- [Machine axis control button pad](#)
- [Loading pallet button pad](#)
- [Unloading belt button pad](#)

**!** Activating the button does not electrically isolate all the parts of the machine.

**!** To avoid wear in the button mechanisms, only use it for emergency stops (see [paragraph 6.5](#), page [62](#)).

### Checking proper operation

1. With the machine switched on, press any one of the available emergency buttons and check the machine power button is switched off.



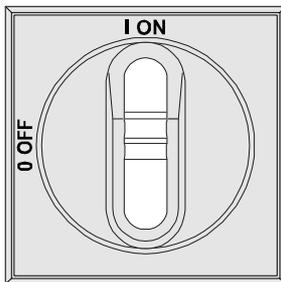
2. To reset the device and restore the machine functions, rotate the button in the direction indicated by the arrows on the button itself.



## 7.2 Main switch

The main switch isolates the machine from the electricity supply in order to enable maintenance or repair work to be carried out in safety.

Rotating the switch to the “0-off” position interrupts the flow of electricity from the power supply network.



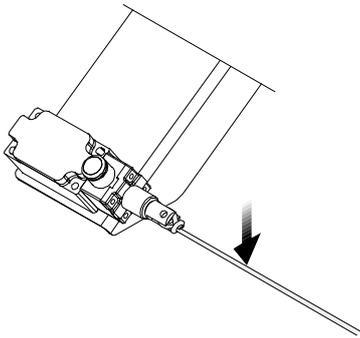
-  **When the switch is in the 0-off position, the terminals to which the power supply cables are attached are still live.**
-  **After the switch has been rotated to the 0-off position, the condensers will remain charged and live for a few minutes.**
-  **To prevent the machine from being accidentally switched on during maintenance or repair work, padlock the switch in the off position.**

## 7.3 Emergency cord

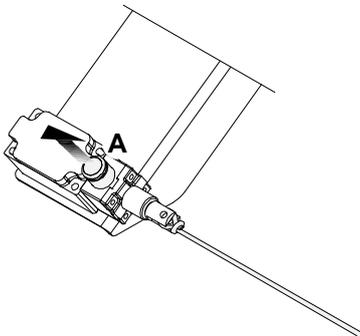
The emergency cord allows the machine to be stopped immediately if there is any danger. To restore the working of the machine, see paragraph 6.6, page 63.

### Checking proper operation

1. With the machine turned on, activate the emergency cord and make sure that the machine power button is turned off.

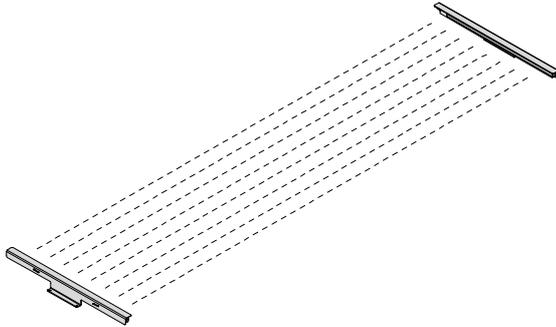


2. To deactivate the device and allow the machine to function normally, pull the knob (ref. **A**) on the switch connected to the cord.



## 7.4 Photocell barrier

The photocell barrier (ref.A) offers protection against the risk of interference with the moving parts of the loading pallet.



- If you go beyond the photocell barrier during the automatic operations to move the piece from the stack loading surface to the work table, the automatic piece loading operations will be deactivated and the machine will go into emergency mode. To restore the working of the machine, see paragraph “[Machine reset](#)”, page 63.
- If you go beyond the photocell barrier when the machine is performing a machining operation at an X position higher than a set value (which guarantees the safety of the operator), the power supply to the loading pallet only will be cut, disabling all loading operations; to restore it, press the “[START](#)” button ([Loading pallet button pad](#), page 55) or the “[Machine Power](#)” button ([Control panel](#), page 51). If the operating section is at an X position lower than the set value, the power supply to the machine will also be cut. To restore the working of the machine, see paragraph “[Machine reset](#)”, page 63.

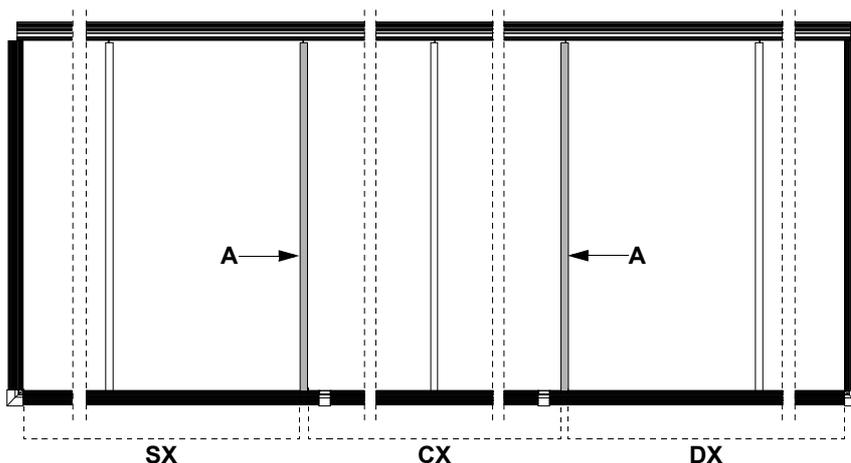
### Checking proper operation

1. Move the loader/unloader to the down position using manual movements, after activating the “[Unloader movement](#)” icon.
2. Cross the photocell barrier; the machine power button and the “[START](#)” button on the loading pallet button pad must switch off.
3. Restore machine functioning.

## 7.5 Contact mat

The contact mat detects the presence of those who stand on it, and stops the machine immediately in the event of danger.

It is made up of individual parts that are joined together to form one or more areas for detection of persons, separated by special yellow stripes (ref. **A**).



**A** = yellow separator lines;

**SX** = left-hand area;

**DX** = right-hand area;

**CX** = central area, only if the contact mats are divided into three areas.



**The contact mat will not detect the presence of persons weighing less than 35kg (e.g. children). The minimum pressure required to operate it is 300 N with a disk 80 mm in diameter, and between 300 and 600 N with a disk 200 mm in diameter (see UNI EN 1760-1).**

When the contact mat is triggered, if the machine goes into emergency mode it is necessary to reset the machine functions (see paragraph 6.6, page 63), otherwise it is only necessary to reset the mat function by pressing the button “**START (1, 2, 3, 4)**” (“**Working area button pad**”, page 54) or the button “**Machine power**” (“**Control panel**”, page 51).

You are only allowed to pass across the contact mat in the following cases:

- at the end of the machining operation, when the operating section is in the resting position.
- during the pendular machining operation, to load or unload the piece, when the buttons “**START (1, 2, 3, 4)**” (see page 54) are lit up or slowly flashing. In this case it is only possible to pass across the right or left area, but not the central area (if present).

In all other cases, walking across the mat will cause the machine to stop.



When the button “**START (1, 2, 3, 4)**” flashes quickly, this means that a particular reset procedure is under way, during which the machine may stop if the mats are trodden on.

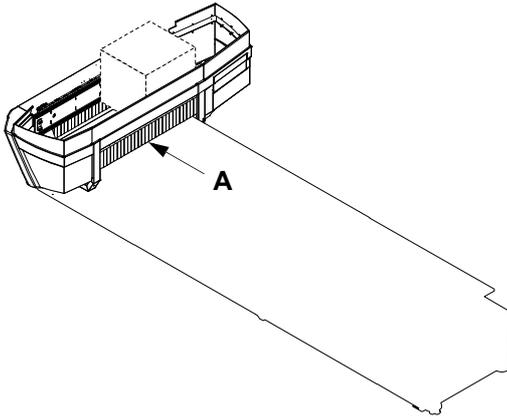
## Checking proper operation

- In the case of a machine with a single-area contact mat, observe the following procedure:
  1. Along Cartesian axis Y, position the operating section towards the rear part of the machine.
  2. Move the X-carriage to about halfway along the contact mat.
  3. Tread on the contact mat; the button “Machine power” (see page 51) must switch off.
  4. Reset the working of the machine (see paragraph 6.6, page 63).
- In the case of a machine with a contact mat divided into more than one area (2 or 3 areas), observe the following procedure:
  1. Along Cartesian axis Y, position the operating section towards the rear part of the machine.
  2. Move the X-carriage to about halfway along the right-hand area of the contact mat.
  3. Tread on the right or central area, in the case of mats with three areas; the button “Machine power” (see page 51) must switch off.
  4. Reset the working of the machine (see paragraph 6.6, page 63).
  5. In the direction of the Cartesian X-axis, position the operating section about halfway along the left-hand area.
  6. Tread on the left or central area; the button “Machine power” (see page 51) must switch off.
  7. Reset the working of the machine (see paragraph 6.6, page 63).

## 7.6 Operating section guards

The operating section is fitted with a guard that isolates the working units when they are moving, hence avoiding any contact with the external areas, limiting the noise emission and the risk of flying chips or tool parts.

It is fitted with reinforced, transparent panels and curtain guards made of flexible material (ref. **A**).



-  **before starting machining operations, check that the curtain guards are not damaged.**
-  **Never insert your hands or other objects into the upper part of the operating section guard panels.**

## 7.7 Safety fence

The safety fence prevents access to the danger zones while the machine is in operation.

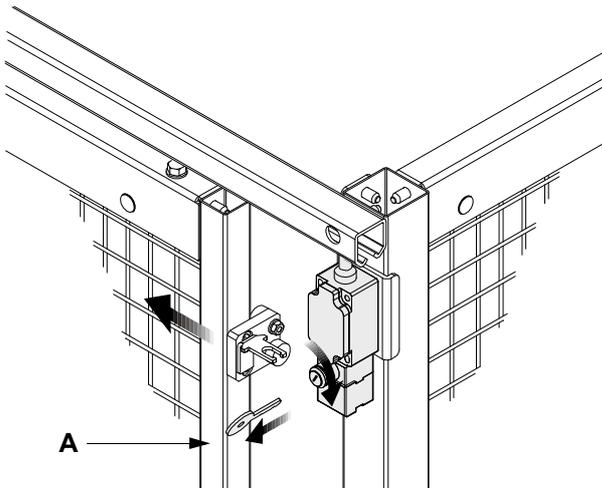
**!** **Never insert your hands or other objects into the upper part of the safety fence guard panels.**

The safety fence is also equipped with doors to allow access for interventions on the machine. When the doors are opened, the machine stops immediately thanks to the presence of a limit switch.

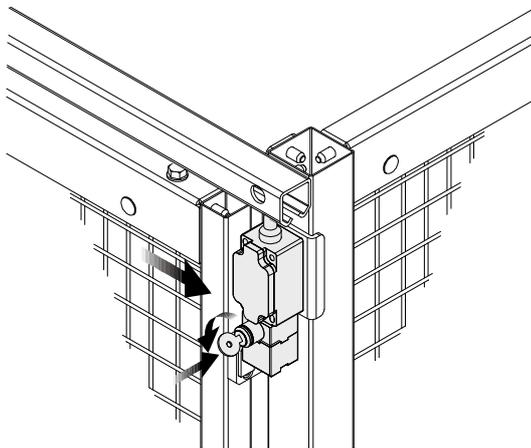
**!** **To prevent anyone from accidentally restarting the machine, remove the key from the limit switch lock before entering the area protected by the safety fence, and keep the key with you.**

### Checking proper operation

1. With the machine turned on, open the safety fence door (see figure) and make sure that the machine power button turns off.



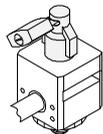
2. To allow the machine functions to be reset, close the doors, insert the key in the lock and block the limit switch by rotating the key to the left (the reset operations are described on page 63, paragraph 6.6).



## 7.8 Compressed air cut-out valve

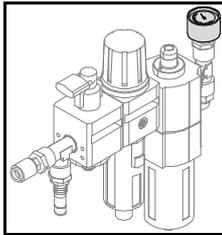
The cut-out valve in the FR unit allows the compressed air system of the machine to be isolated in order to enable maintenance and/or repair work to be carried out safely. When the cut-out valve is activated, the air present in the machine system is discharged and the flow of air from the external supply network is shut off.

- ⚠ **When the cut-out valve is activated, some of the units might drop down due to gravity. You should therefore stand well away from the moving parts of the machine.**
- ⚠ **Some parts of the machine may still be under pressure even after the cut-out valve has been activated. If necessary, fix all parts that may be subject to the force of gravity.**
- ⚠ **To prevent the compressed air from being accidentally turned on during maintenance or repair work, padlock the cut-out valve.**

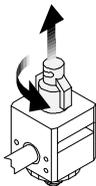


## Checking proper operation

1. Press the machine power button.
2. Bring the machine to the emergency stop condition.
3. Go to the pressure gauge indicating the supply pressure.



4. Set the cut-out valve to OFF.



5. Check that the pressure gauge shows a pressure of 0 bar.
6. Go to the electrical cabinet.
7. press the machine power button and check that:
  - the machine remains in a state of emergency stop
  - the monitor displays the insufficient pressure message
8. To deactivate the device and allow the machine to be restarted, press the cut-off valve and turn it clockwise.



## Check the pressure in the vacuum system

1. Press the machine power button.
2. Bring the machine to the emergency stop condition.
3. Make sure that there is no residual vacuum in the shapeable suction cups (press the vacuum valve on the shapeable suction cup and check that no air comes out)
4. Unfasten the connector that connects the electrical cabinet to the vacuum pump.
5. Quit emergency stop mode by powering up the machine and pressing the [Reset](#) button on the NC keyboard.
6. Select a program and press [Start](#).
7. Carry out the locking procedure:
  - select the origin
  - press the Piece locking pedal
  - press START on the working area button pad
8. Check that:
  - the machine does not move from the parked position reached when the locking origin was selected
  - the NC is set to STOP
  - the LED on the NC keyboard START button is flashing, indicating that the machine is in suspended mode
  - the PC monitor displays the "insufficient depression" message

## 7.9 Key-activated commands

Some machine commands can only be activated by inserting a key in the respective lock, to prevent someone from accidentally activating the devices when operations are being carried out inside the danger zones of the machine.



# 8 Carrying out machining operations

The information concerning the methods and procedures for performing machining operations given below presuppose the preparation and start-up of the machine as well as a thorough knowledge of the software (see the Software User Manual).

## 8.1 Warnings for correct machining operations

The following is a list of the warnings to be observed before, during and after the machining operation.

Failure to observe the following indications could cause injury to people or damage to things.

### Before the machining operation

- Check that the conical coupling of the collet spindles and the conical surfaces and stop surfaces of the electrospindle are thoroughly clean, to allow safe blocking (see chapter 14 “Maintenance”, paragraph 128).
- Protect the coupling area of the unused electrospindles from dust by applying a plug or a collet spindle.
- Carry out warm-up cycles on the milling and boring units (see page 61).
- Protect unused carriages with the special cover, to prevent them from filling with dust, as this would result in excessive blockage of the filter and might cause the piece to fall off.
- Never use tools beyond the speed limit, which is stamped on the surface of the tool or indicated by the manufacturer. Certain tools, if rotated at speeds greater than those intended, could break, projecting splinters.

The values given in the table refer to the maximum rotation speed to be set for the electrospindle, in relation to the weight and diameter of the tool used.

Tool diameter (mm)		Tool weight (kg)		Max. speed (rpm)*	
ISO 30	HSK F63	ISO 30	HSK F63	ISO 30	HSK F63
150	160	4	6	5000 ÷ 9000	5000 ÷ 9000
130	150	4	6	9000 ÷ 12000	9000 ÷ 12000
100	110	2.5	5	12000 ÷ 14000	12000 ÷ 14000
80	80	2.5	4	14000 ÷ 18000	14000 ÷ 18000
50	50	2	3	18000 ÷ 24000	18000 ÷ 24000

\* The values refer to tools with balance quality G. 2.5, according to ISO 1940 standards.

## 8 Carrying out machining operations

- Set the correct acceleration and deceleration ramp times according to the diameter and mass of the tools to be used on the electrospindles. These values are expressed in seconds and refer to a speed of 24000 rpm, even if the tool is unable to reach this speed.

The values for the same tool must be the same.

If incorrect values are entered, the tool may continue to rotate under inertia for several minutes, even after an emergency stop or when the machine is switched off, creating a hazardous situation for anyone coming near the operating section. To check that the data entered are correct, perform a few start and stop cycles of the electrospindle, checking that the tool stops correctly and that the NC has not produced any error messages.

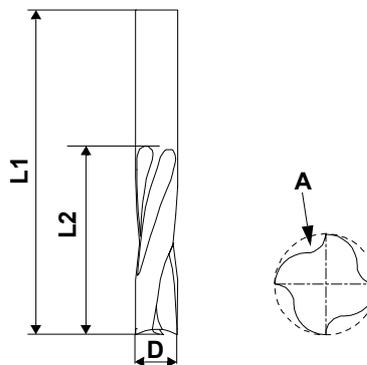
A few reference values that must always be checked on the machine are shown below:

Tool diameter (mm)	Tool weight (kg)	Maximum speed (rpm)	Ramp time (s)
20	0.4	24000	2
140	3	12000	4
230	6	5000	9

- For Nesting projects on chipboard pieces (only with FT tables), with high speed machining, a 50 m/min tool speed limit must be observed. A good machining operation, with well-defined pieces, is only achieved through the use of appropriate tools, which in turn prevents the electrospindle from being damaged.

The following list is an example of the characteristics a tool should have in order to carry out this kind of machining operation:

- diameter (**D**): 12 or 14mm;
- tool length (**L2**): 70/80mm;
- cutting edge length (**L2**): 25/30mm;
- four cutting edges with wide root grooves (**A**);
- rotation speed: 20000/24000 rpm.



- When the aggregate with copier is used, the aggregate in-and-out speed should not be too high so as to prevent it from hitting the piece. The speed to be set should not exceed 6/8m/min.

- When using an aggregate with copier, bear in mind the maximum and minimum depth it can reach:

Device type	Minimum depth (mm)	Maximum depth (mm)
Setting axis	1	10

 **Failure to comply with the above-mentioned indications may cause irreversible damage to both the electrospindle and the aggregate.**

 **Before performing a machining program, perform a simulation to check that there is no interference during movement of the machine (see page.86).**

## During the machining operation

- Avoid, at all costs, any contact between the rotating, non-cutting parts and the piece being machined.
- During the loading and unloading of the piece, the operator must never lean on the work table and/or climb onto the machine, as the contact mat might not detect his presence.
- When the machine is used in pendular mode (see page 45), take into account the safety limits set in the numerical control to avoid damaging the piece. If the operating section reaches this limit while a piece is being loaded or unloaded in the working area opposite the one in which machining operations are being carried out, the machining operations will be paused. To find this limit, consult the machine working field information in the appendix to this manual, or the Software User Manual.
- If the axis speed slows down (this is visible in the software interface from the reduction of the axis speed - axis override bar), this means the electrospindle is absorbing too much current. In this case, check that the machining operation parameters are correct (speed, etc. ...) and/or that the tool is not worn; otherwise, change it.
- When using an aggregate, consider the machining operation suspension times that are necessary in order not to overheat it (see the Aggregate User Manual).

 **If the machine stops (see paragraph 6.5, page 62) or the machining operation suddenly stops, always check that the tools are not moving before going near the operating section.**

## After the machining operation

- If the machine remains unused for a long time (e.g. during the night or on non-working days), remove the tools from the electrospindles and replace them with a plug or a clean collet spindle.
- At the end of the machining operation, to avoid problems of sticking, always remove the collet spindle from the electrospindle and replace it with a clean one at room temperature. Warning! Wear gloves to avoid burns.

## 8.2 Changing the machine axis transfer speed

The machine axes transfer speed is usually changed when testing a program, in order to select the speed best suited to the material to be machined, or to allow closer observation of movements in particularly critical points of the program.

The speed is changed manually by turning the remote override knob (see page 54). The percentage variation is visualised in a special data field on the NC software interface.

## 8.3 Changing the spindle rotation speed

The variation of the rotation speed for the working unit spindles is normally carried out when testing a program, in order to select the most suitable speed for the material being processed.

The speed is changed manually by turning the remote override knob (see page 56), located on the [Machine axis control button pad](#). The spindle rotation speed can be reduced to a minimum of 50% of the programmed speed. When the spindle rotation speed is reduced, the numerical control software displays a warning message. The percentage variation is visualised in a special data field on the NC software interface.

## 8.4 Procedure to carry out the machining operation with the loading/unloading unit

To carry out a machining operation using the loading/unloading unit in its automatic function for transporting the pieces onto the work table and unloading the machined pieces, observe the following procedure:

1. Create a machining program (see the Software User Manual).
2. Equip the machine, if necessary (for information see [“Tooling”](#)).
3. Activate the [Unloader enabling](#) icon (see page 52)
4. Wait for the CHARGE button (loading pallet button pad) to light up if you need to position the stack of pieces on the stack loading surface of the loading pallet.  
To carry out the loading, press the CHARGE button; the button will flash until the stack loading surface movements are completed. Wait for the button to stop flashing, then proceed with depositing the pieces.

 In this case, before carrying out this operation, check the axes have been reset, the machine is in MANUAL MOVEMENTS mode (see the Software User Manual), and there is no operation under way.

5. Activate the “Support panel” icon (control panel) and, in the appropriate software interface dialogue box, complete the requested data fields (see the Software User Manual).
6. From the software interface, run the machining program previously created (see the Software User Manual), then activate the [“Start”](#) icon.
7. Prepare the machine for the automatic movement of the machined pieces from the work table to the unloading belt, and pick up the single pieces from the surface manually.

## 8.5 Procedure to carry out a machining operation without the loading/unloading unit

To carry out the machining operation, loading and unloading the pieces manually (without using the loading/unloading unit), observe the following procedure:

1. Equip the machine, if necessary (for information see [“Tooling”](#)). If the support panel is used, see paragraph [8.12](#), page [88](#) to modify its dimensions.
2. Activate the stop line that you wish to use for the machining operation (see paragraph [8.7 “Activate stop line”](#) on page [86](#)).
3. From the software interface, launch the machining program previously created (see the Software User Manual), then activate the [“Start”](#) icon (page [53](#)). The machining program could contain instructions that allow you to suspend the machining operation (see the Software User Manual).
4. Select a work table origin (see paragraph [8.8 “Selecting the origin”](#) on page [87](#)).
5. Load and lock the piece on the work table.
6. Press the flashing [“START \(1, 2, 3, 4\)”](#) button (page [54](#)) to run machining operation. In the case of pendular machining, the machine will only start the next machining operation after it has completed the current one.  
Once the machining operation is under way, if you tread on the contact mat it will be necessary to reset the functions (see paragraph [7.5 “Contact mat”](#), page [73](#)).
7. Unload the piece (see paragraph [8.11 “Piece unlocking and unloading”](#) on page [88](#)).

To execute another working cycle using the same program, repeat the above procedure from step [2](#) to step [7](#).

### Suspending the program

In a program, it is possible to insert instructions suspending the machining operation to allow certain operations to be carried out on the piece being machined (for example to turn it, clean it or move it to another origin). Please consult the Software User Manual on how to insert these suspensions in the program.

To resume the machining operation, proceed as described in point [6](#), after (if necessary) locking the piece again.

## 8.6 Program simulation

Before running the machining program, it is possible to simulate it in order to check the correctness of the operations that the machine will carry out.

These operations can be simulated via video (i.e. visualised in the PC software interface) with the machine not running, or they can be simulated directly on the machine.

### Simulation on video

To simulate the machining program in the PC interface software, proceed as described in the Software User Manual.

### Simulation on the machine

To simulate the program directly on the machine, activate the “[Deactivation of tool rotation](#)” icon (see page [52](#) ) on the control panel, and proceed as if you were carrying out a normal machining operation, but without locking the piece on the work table.

When the machining operation is started with this function activated, the spindles do not turn and the curtain guards protecting the operating section are not lowered, thus allowing better observation of the movements of working units.



**When the function that prevents tool rotation is deactivated (see the “[Deactivation of tool rotation](#)” icon on page [52](#)), the working units lift up, even if an emergency stop has been triggered. If necessary, perform a machine reset (see page [63](#)) before disabling this function.**

## 8.7 Activate stop line

To carry out a machining operation it is first necessary to activate a stop line (see page [42](#)).

Before activating it, consider the work table origin you intend to select (see page [87](#)), as each origin is located on a specific stop line.

The stop line can be activated in different ways:

- using the “[Activation of stop lines](#)” icon (see page [52](#))
- via the insertion of a special instruction in the program (see the Software User Manual).

## 8.8 Selecting the origin

The origin of the work table is selected by pressing the “START (1, 2, 3, 4)” button (see page 54).

Table of the origins that can be selected with the START buttons.

button	selected origin	stop line active
START 1	1	first
START 2	2	second

According to the dimensions of the piece along the Cartesian X-axis, as defined in the program being run, the machine will automatically enable the origins on which it is possible to carry out the machining operation, lighting up the relative “START (1, 2, 3, 4)” button.

The origin to be selected may also be specified in the program, by entering a specific instruction (see the Software User Manual). In this case the machine will only light up the “START (1, 2, 3, 4)” button that corresponds to the origin specified in the program.

If the operating section is close to the selected origin, before approaching the work table wait until it has moved and then stopped.

## 8.9 Locking the piece on the FT work table

According to the characteristics of the piece its is possible to select various locking methods:

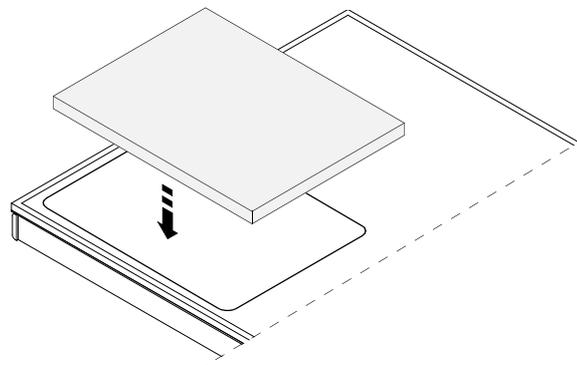
- [Standard locking](#) (see page 87).
- [Locking with the help of the support panel](#) (see page 88).

### Standard locking

Standard locking is performed using the vacuum system, positioning the pieces directly on the table in question. The area in which the pieces are positioned must be limited by sealing gaskets. If necessary, clean the surface of the table before locking.

To lock the piece, proceed as follows:

1. Set the piece on the table and position it, if necessary, against the stops.
2. Press on the piece for it to attach properly to the work table and lock it by pushing the pedal. After locking, make sure that the piece is perfectly sealed.



To release the piece briefly in order to correct its position, keep the respective pedal pressed.

### Locking with the help of the support panel

This type of locking is made with the help of the vacuum system, positioning the pieces on the support panel fixed to the table. If necessary, clean the surface of the panel before locking.

To lock the piece, proceed as follows:

1. Set the piece on the panel and position it, if necessary, against the stops.
2. Press the piece so that it adheres well to the martyr panel, then lock it by pushing the relative pedal. After locking, make sure that the piece is perfectly sealed.

To release the piece briefly in order to correct its position, keep the respective pedal pressed.

## 8.10 Activation of piece movement devices

The machine is fitted with certain devices (bar supports, etc.) that facilitate movement of the piece during the loading/unloading phases. To activate them, use the [“Activation of piece movement devices”](#) icon (page 52).

## 8.11 Piece unlocking and unloading

The piece is generally released automatically at the end of the machining operation. If it does not release, you must press the locking pedal for the working area concerned.

## 8.12 Support panel thickness management

By default, the management of the support panel thickness is made by filling in the appropriate fields in the machining program (see the Software User Manual).

To quickly modify the data relating to the thickness of the support panel without changing the machining program, observe the following procedure:

1. In the numerical control software, activate the MANUAL MOVEMENTS environment (see the Software User Manual).
2. Activate the [“Martyr panel”](#) icon ([“Soft Console”](#), page 52); the numerical control software will display a new dialogue box.
3. Define the thickness of the support panel in the appropriate data field (see the Software User Manual).

## 8.13 Support panel levelling

To level the support panel, observe the following procedure:

1. Carry out the machining program by activating the support panel levelling cycle within the piece parameters. Enter a value of not more than 10mm as the machining depth (see the Software User Manual). When creating the program, the Z dimension of the piece must not be greater than 20mm, while the X/Y dimensions must be more than 1000mm.
2. Activate the “[Levelling](#)” icon (see page [53](#)) and run the program.

## 8.14 Managing the operating section parking mode

Before or at the end of the machining operation, the operating section automatically positions itself in one of the pre-set parking areas. The machine can be fitted with two or three parking areas, depending on the quantity of working areas it has:

- two parking areas in the case of one working area;

The machine chooses the parking area according to a specific procedure that can be selected using the “[Parking mode](#)” icon (page [53](#)).

- If the LED on the icon is switched off and the piece being worked is of short or medium length\*, and the machine has two working areas, the operating section is parked in the following way:
  - in the right hand lateral area, if the origins selected are the central left ones;
  - in the left hand lateral area, if the origins selected are the central right ones
- If the LED of the icon is switched off and the piece being worked is of short or medium length\*, and the machine has only one working area, the operating section is parked on the side opposite the selected origin.
- If the LED of the icon is off and the piece being machined is long\*, parking is performed on the side opposite that of the selected origin.
- If the LED of the icon is on, the operating section is always parked in the side area opposite the loading area.
- If the LED on the icon is flashing, the operating section is always parked in the central area (function active only on machines with two working areas).

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\* For clarification on the definition of short, medium or long piece, please consult the Software User Manual.



# 9 Problem-solving

This chapter describes how to solve any problems that may arise during use of the machine.

## 9.1 Problems, causes and solutions

Should a problem occur, first check for any messages on the numerical control screen; if there is no message, deal with the problem by consulting the table provided in this chapter or, should no indications be provided, contact the BIESSE Service Centre.

Problem	Cause	Solution
The numerical control does not switch on.	Lack of power supply.	Check the machine's main power switch is turned to 1 (ON).
	A thermal switch of the electric panel has blown	Reset the switch.
The start button on the main control panel does not light up.	There are emergency devices activated.	Check the emergency button.
		Check the emergency cords.
		Check the doors of the safety fence.
	Check the position of the cut-out valve located in the FR unit.	
	The bulb is broken.	Substitute the bulb.
The piece does not remain blocked.	The filters on the vacuum system or the vacuum pump are dirty.	Clean the filters.
	The electric valves are faulty.	Check the electric valves.
	The tubes connected to the vacuum system are damaged.	If bent, straighten them manually and check sealing capacity. If broken, replace with new tubes. Do not repair them with adhesive tape or glue.
	The vacuum pump motor rotates in the wrong direction.	Do not use the machine, and report the problem at once to BIESSE Service Centre.

<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
The machine axes do not move and no errors are visualised.	The remote override knob is set to minimum.	Turn the knob slowly until it is in the correct position.
The machining operation does not start.	The functions of the contact mat have not been reset.	Reset the functions of the mat (see the chapter regarding the use of the safety devices).
During a work cycle, some of the spindles in the boring unit do not descend when invoked by the program.	The spindle shaft is dirty or oxidised. This can happen when the spindles are not often used.	Clean the spindle shaft.
	There may be problems in the electric or pneumatic system.	Consult the circuit layouts or contact the BIESSE Service Centre.
During the work cycle the stops do not move into position or do not descend.	There are deposits on the rods.	Remove the deposits with a clean dry cloth or a bronze wire brush.
	The piece has been pressed too hard against the stops.	Unlock the piece and repeat the positioning operation.
	There may be problems in the electric or pneumatic system.	Consult the circuit layouts or contact the BIESSE Service Centre.
The spindles on the boring unit rotate in the wrong direction.	The live wires in the power supply terminals, inside the electrical cabinet, are inserted in the wrong order.	Switch off the machine and contact the BIESSE Service Centre.
The machining operation quality is poor.	The tool is not suitable for the type of work being carried out, or the tool is worn.	Replace the tool.
	The speed of the tool movement and/or rotation is not suitable for the type of material being machined.	Adjust the parameters of the tool movement and/or tool rotation speed.
The axis has reached the end of its stroke and has come into contact with the mechanical stop.	Wrong manoeuvres have been carried out.	Reset the machine.
	Axis drive system malfunction.	Contact BIESSE Service Centre.

<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
The electrospindle vibrates	The collet spindle is not balanced.	Choose a collet spindle on the basis of the indications given in the appendix, in the chapter relating to the technical characteristics of the collet spindles.
	The tool is not balanced.	Choose a tool on the basis of the indications given in the chapter relating to the preparation of the operating section.
	Dirt in the spindle coupling area and/or on the conical couplings of the collet spindles.	Remove any impurities as described in the chapter relating to the maintenance of the electrospindles and the collet spindles.
	The bearings are damaged.	Do not use the machine, and report the problem at once to the BIESSE Service Centre.
The bearings of the electrospindle are noisy	The bearings are damaged.	Do not use the machine, and report the problem at once to the BIESSE Service Centre.



**Tooling**



# 10 Preparing the operating section

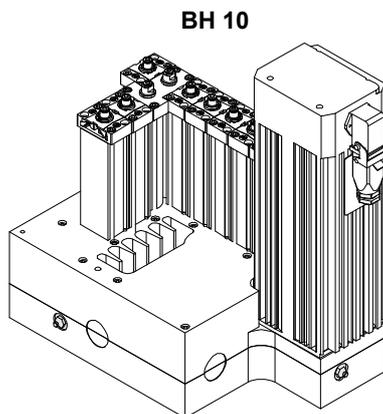
This chapter contains all the information required to prepare the operating section to carry out machining.

## 10.1 Installing the tools

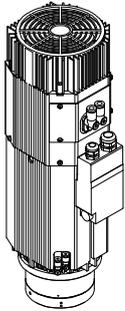
To install the tools in the operating section, position the section at a point allowing the best possible access to the spindle in question and, if necessary, lower the unit or the spindle.

On page 98 you can see the main characteristics that the tools must possess in order to be installed in the working units.

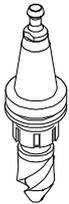
- i** Certain additional information on tools, that might be of use when tooling up the units, such as the spindle/s direction of rotation, the size of wrenches to be used and, if foreseen, the type of collet used, is given in the appendix (see [“Technical characteristics”](#)).
- To install the tools in the boring unit, see the paragraph [“Installing the tools in the boring unit”](#) on page 102.



- To install the tools in the electrospindle, consult the following paragraphs:  
“Installing the tools in the electrospindle” on page 103;  
“Installing the aggregates in the electrospindle” on page 104.



- To install the tools in the collet spindles, see the paragraph “Installing the tools in the collet spindle” on page 105.



When tooling has been completed, the data must be entered in the numerical control software (see the Software User Manual).

### Characteristics of the installable tools

A vast range of tools with special characteristics can be used on the working units:

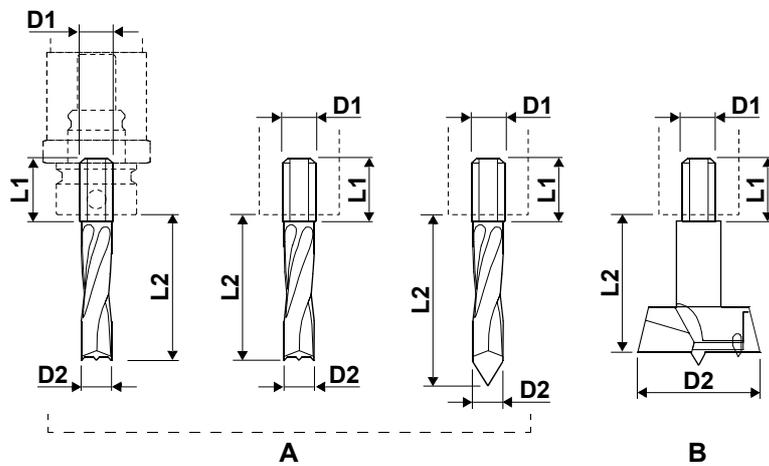
- Boring tools: bits of various types for boring operations (see page 99).
- Milling tools: cylindrical shank milling cutters (see page 100) or with ISO 30 coupling for milling operations.
- Cutting tools: circular blade tools (see page 101) for grooves or sectioning cutting.

For information on the tools to be used with the aggregates, refer to this paragraph. The missing data is provided in the Aggregate User Manual.

 **Only use tools that comply with EN 847-1 and EN 847-2 specifications on the machine, and always comply with the specifications for use indicated by the manufacturer.**

 **Grinding wheels cannot be used on the machine.**

**Bits**



Bit dimensions (mm) according to the type of spindle used.

Spindles	Tool data (mm)			
	D1 max	D2 max	L1 min	L2 max
vertical spindles of the boring units	10	20*	20	57**
horizontal spindles <b>M1</b> of the boring unit BH10	10	20	20	40
horizontal spindles <b>M2</b> of the boring unit BH10	10	20	20	57
aggregate spindle	(see the Aggregate User Manual)			

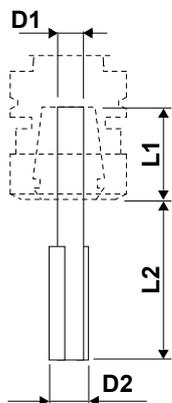
BH 10

**A** = spindles in which it is not possible to install bits with a diameter (D2) greater than 30mm.

\* Tools of type **B** can have a maximum diameter of 35mm.

\*\* For some machine configurations, this datum may not be correct, so you are advised to always check the layouts of the working fields (see paragraphs [A.9](#) and [A.10](#)).

### Milling cutters with cylindrical shanks

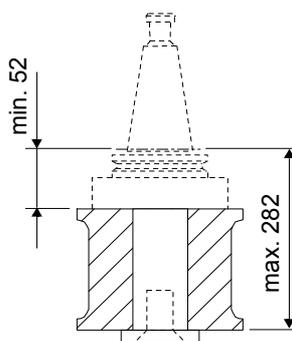


Dimensions of milling cutters with cylindrical shank (mm) according to the type of spindle used.

Spindles	D1 (max. mm)	D2 (max. mm)	L1 (min. mm)	L2 (max. mm)
- electrospindle with ISO 30 coupling and ERC 32 collet	20	120	40	110
- electrospindle with ISO 30 coupling and ERC 40 collet	25	160	46	130

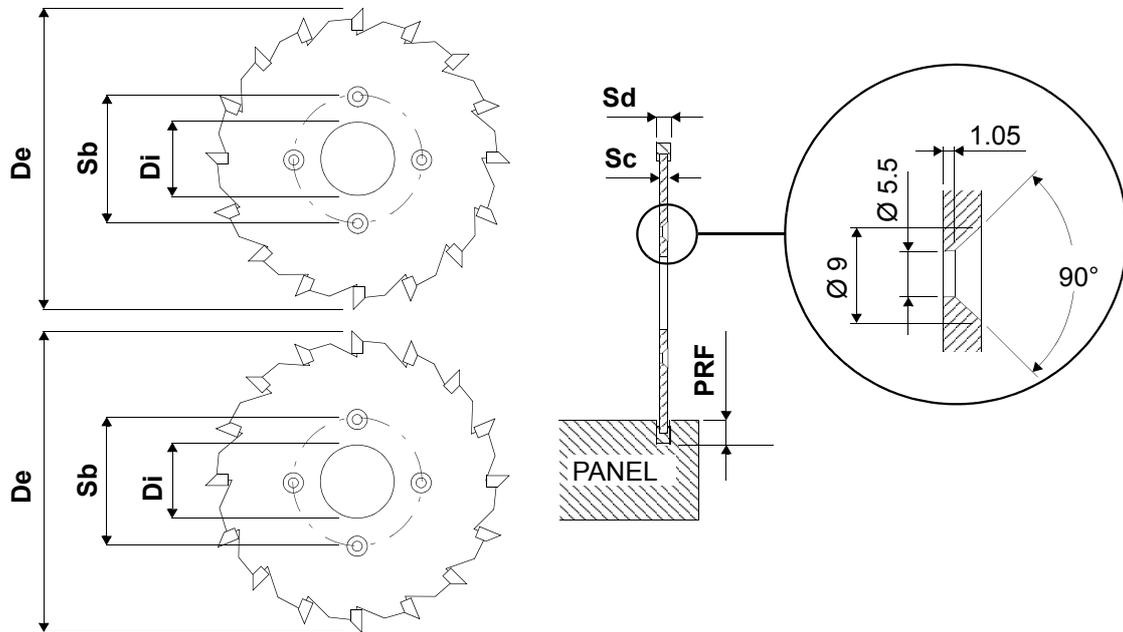
### Milling cutters with ISO 30 coupling

ISO 30\*



\* These data concern the maximum dimensions of the tools that can be installed in the electrospindles. For the maximum dimensions of the tools that can be installed in the magazines, refer to the technical data given in the magazine layouts (see appendix A).

### Circular blade tools



Blade dimensions (mm) according to the type of spindle used; **De** = maximum diameter; **Sd** = maximum bit thickness; **PRF** = maximum depth.

Spindles	Tool data (mm)					
	De	Di	Sb	Sc	Sd	PRF*
boring unit spindle	120	35	50	2.8	4	26
aggregate spindle	(see the Aggregate User Manual)					

\* These values can be applied to a machining operation carried out in a number of stages, to avoid damaging the chuck or aggregate.

## Installing the tools in the boring unit

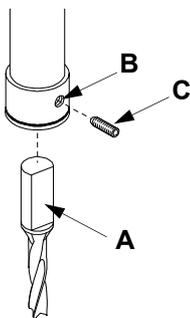
1. Stop the machine.
2. Pick up the tools and approach the unit required.
3. Install the tools as described below.

### ***Boring tools***

The boring tools can be fixed in various ways.

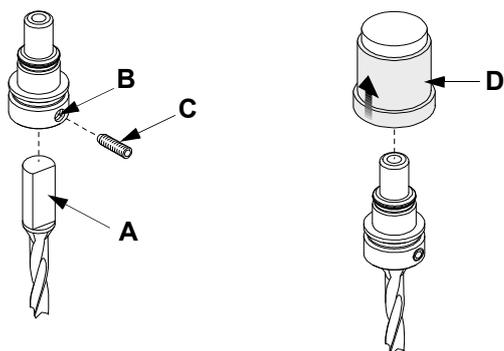
#### **Fixing with lockscrew:**

1. Insert the tool in the spindle, turning the fixing surface **A** towards the bore **B**.
2. Fix the tool using the lockscrew **C** provided.



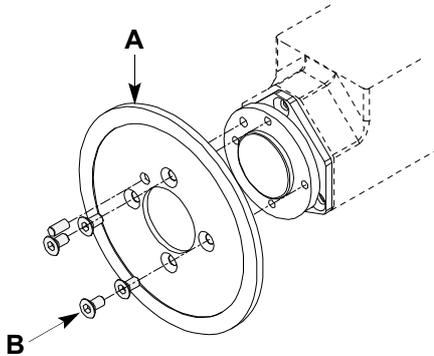
#### **Fixing with bush for snap-on coupling:**

1. Insert the tool in the bush opening, turning the fixing surface **A** turned towards the bore **B**.
2. Fix the tool using the lockscrew **C** provided.
3. Slide the cylinder **D** upwards, insert the bush with the tool and release the cylinder **D**.



## Cutting tools

Insert the blade **A** in the spindle and lock it with the appropriate screws **B**.



## Installing the tools in the electrospindle

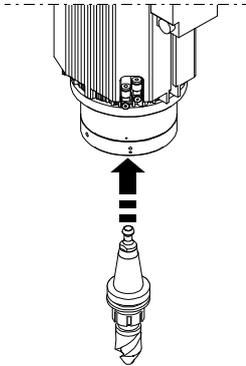
In general, the installation of tools in the electrospindle is managed automatically during machining operations, using the tool magazine (see page 107).

If you want to install a tool manually, observe the following procedure:

1. Turn the selector "Tooling" (see page 51) on the control panel to the right, and remove the key to prevent anyone from restoring the machine to normal operation.
2. Take the tool and move near the milling unit.
3. Command the opening of the electrospindle blocking collet, pressing the button "Multifunction" ("Machine axis control button pad", page 54). If there is already a tool in the electrospindle, this is immediately released. In this case, before pressing the above-mentioned button, be ready to catch it so it doesn't fall.

**⚠ Given that a number of electrospindles are present, take the following precautions when carrying out this operation: check that the collet to be opened is the right one; do not stand under the milling unit.**

4. Insert the tool in the electrospindle and block it by releasing the button **"Multifunction"** (**"Machine axis control button pad"**, page 54).

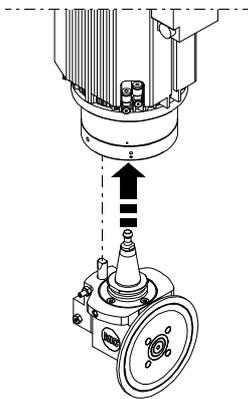


**i** The electrospindle can only house tools fitted with the appropriate collet spindle (see **"Installing the tools in the collet spindle"** on page 105).

## Installing the aggregates in the electrospindle

In general, the installation of aggregates in the electrospindle is managed automatically during machining operations, using the tool magazine (see page 107).

For the procedures regarding the manual installation of the aggregates, consult the Aggregate User Manual.



**i** The electrospindle can only house aggregates with an ISO 30, HSK F 63 or HSK E63 coupling.

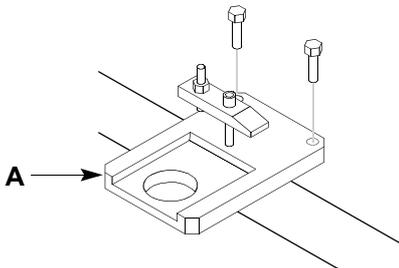
## Installing the tools in the collet spindle

 For safety reasons, the collet spindles used on the machine must only be supplied by BIESSE.

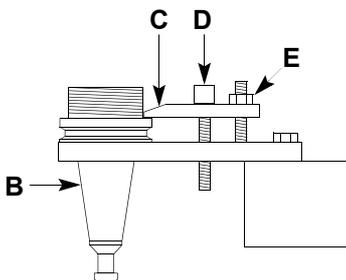
Follow the instructions provided below, according to the type of collet spindle.

### ISO 30 collet spindle

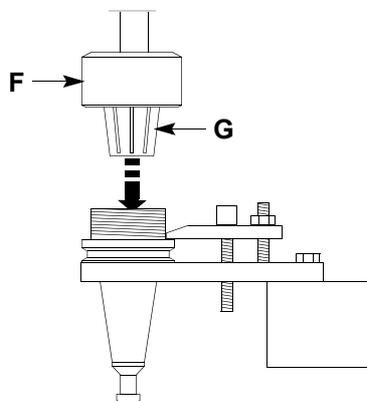
1. To facilitate assembly operations, a special piece of equipment is provided (ref. **A**) which must be anchored to a fixed support (e.g. a tool bench) using the bores provided.



2. Position the spindle coupling **B** in the equipment. Turn the bracket **C** until it is positioned on the spindle and adjust the screws **D** and **E** to lock it.



3. Remove the ring nut **F**, turning it clockwise if the spindle is a left hand one or in the opposite direction in the case of a right hand spindle.
4. Insert the collet **G** in the housing provided on the ring nut **F**.
5. Insert the tool shank in the collet and refit the ring nut **F**.





# 11 Preparing the magazines

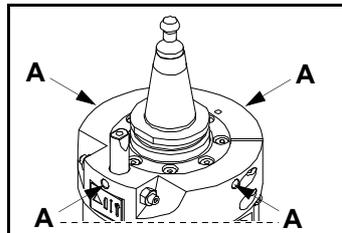
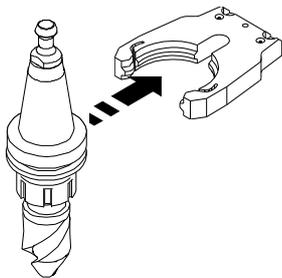
This chapter explains the procedures to prepare the tool magazine.

- i** The Revolver tool magazine houses the tools fitted with the appropriate collet spindle (see page 29) and/or the aggregates fitted with the appropriate coupling (see the Aggregate User Manual).

## 11.1 Preparing the Revolver tool magazine

For the housing procedures, observe the following indications:

6. Turn the selector “Tooling” (see page 51) on the main control panel to the right, and remove the key to prevent anyone from restoring the machine to normal operation.
7. Pick up the tools/aggregates and approach the magazine required.
8. Position the tools/aggregates in the tool-holder, as shown below. To orientate the aggregates accurately use the correct lockpin housings (ref.A) .



- i** In the case of aggregates, check the lockpin has already been adjusted as explained in the User Manual.

9. Enter the data in the numerical control software (see the Software User Manual).

For a list of the tools/aggregates that can be used on this type of magazine, see paragraph 11.2 on page 108.

## 11.2 Tools and aggregates that can be used, and their direction

The tools and aggregates that can be housed in the magazines are listed in the layouts given in the appendix.

To house the tools/aggregates, you must observe the following rules:

- Respect the orientation shown in the layouts, which refers to the aggregate in the pick-up position.
- The tools/aggregates must not exceed the maximum dimensions position shown in the various layouts, to avoid any collisions with the machine parts when the magazine is rotating.
- Respect the positions indicated in the layouts because, during the installation of large aggregates or tools, it may be impossible to house other tools or aggregates in the adjacent, previous or subsequent positions.

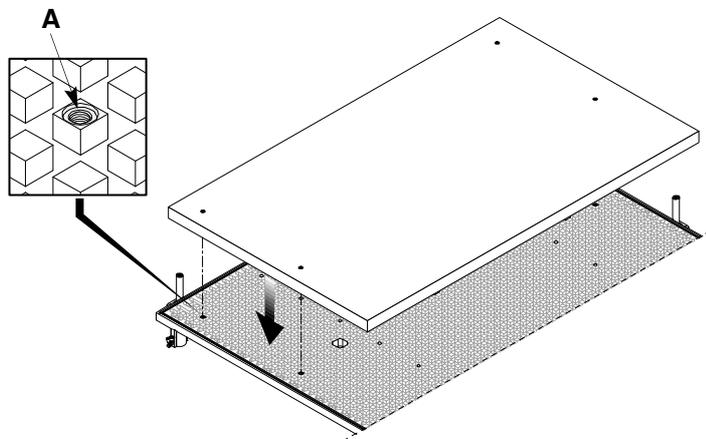
# 12 Preparing the FT work table

This chapter explains the procedures for tooling the FT work table.

## 12.1 Preparing the support panel

When using the support panel, observe the following indications:

1. Create the machining program to generate the borings to be applied to the support panel in order to fix it to the table (see paragraph 8.5 “[Procedure to carry out a machining operation without the loading/unloading unit](#)”).
2. Run a levelling cycle for the support panel (see paragraph 8.13, page 89).
3. Fix the support panel **A** to the table, using the screws supplied.





# Operations



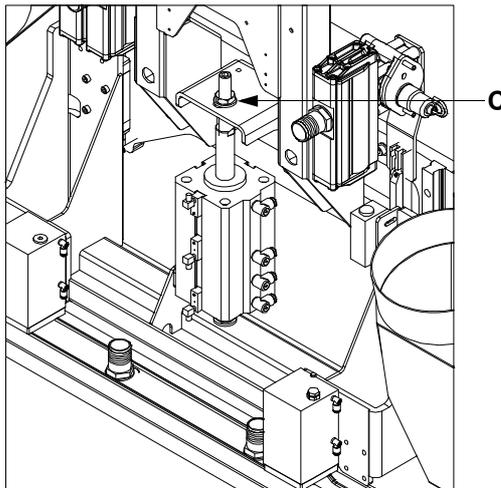
# 13 Adjustments

This chapter describes the procedures for adjusting certain parts of the machine.

## 13.1 Unloader adjustment

When using the support panel, in order to correctly unload the pieces you must adjust the unloader.

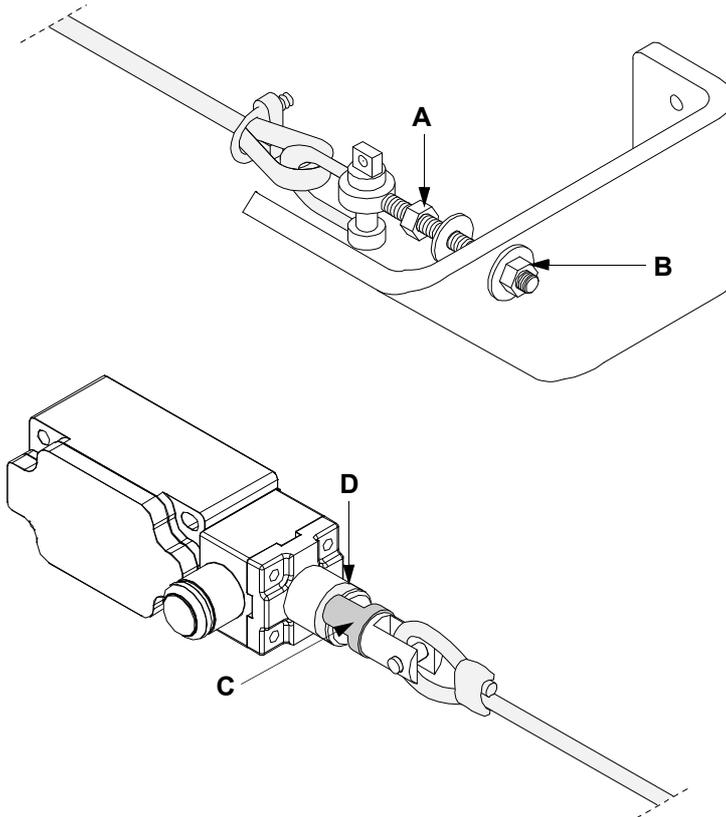
The adjustment varies depending on the thickness of the panel used, and is carried out via the screw **C** (see layout paragraph [Layout to adjust the loader/unloader](#), page 148).



## 13.2 Tightening the emergency cord

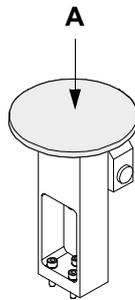
To tighten the emergency cord when it has come loose, observe the following procedure:

1. Loosen the nut **A**.
2. Tighten the nut **B** until you reach the required tension. The cord is tight when the black stop **C** is halfway along the green stripe **D**.



## 13.3 Adjusting the Presetter

In order to work correctly, the Presetter device requires the periodical adjustment of the washer **A**.

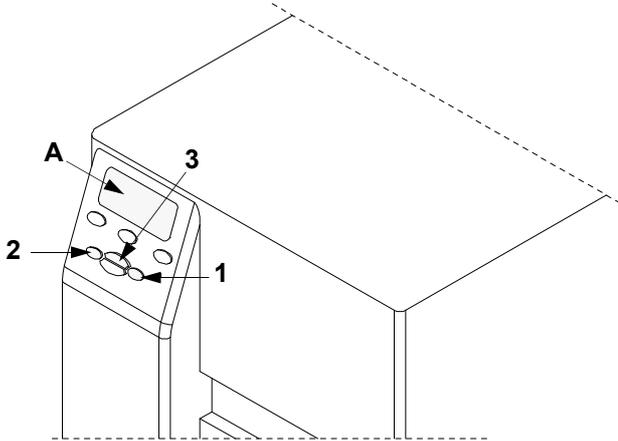


To carry out this operation, observe the following procedure:

1. Check the machine has been set to receive electrical energy (“[Machine power](#)” button and “[Stop](#)” and “[Reset](#)” keys pressed).
2. In the numerical control software, activate the environment AUTOMATIC (see the Software User Manual).
3. Press the “[Presetter management](#)” button, a new dialogue box will be displayed in the numerical control software.
4. Select the options relating to the alignment and/or the calibration of the Presetter device (see the Software User Manual).  
Alignment relates to adjustment of the washer A, which must be aligned between + 0.01 - 0.01mm, along the X and Y axes.

## 13.4 Adjusting the labelling machine parameters

In order to work correctly, some parameters of the labelling machine must be adjusted. Use the display **A** of the labelling machine control panel to visualise and adjust the printer settings.



### Visualising or modifying the parameters

While visualising the parameters, press PLUS (1) to move on to the next parameter, or MINUS (2) to go back to the previous one. If you want to modify a parameter or visualise the relative options, press SELECT (3). When a parameter is modified, an asterisk (\*) appears in the upper left-hand corner of the label printer display, to indicate that the value is different from the one currently set in the printer.

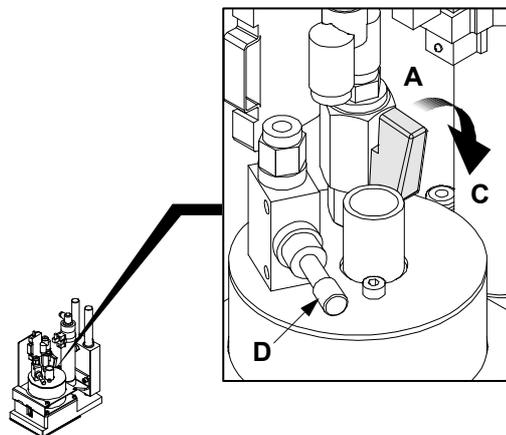
The table below shows the parameters that must be adjusted.

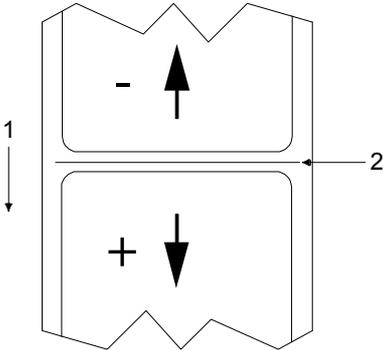
## 13.5 Adjusting the label applicator

The depression of the label applicator must be adjusted according to the type of label used.

Valve in position **A**: to manage small labels (2" X 2" and similar).

Valve in position **C**: to manage medium/large labels (2" X 4" up to 4" X 4"). This management also allows fine adjustment (if necessary) by means of the capacity regulator **D**.



Parameter	Action/Description
<b>STRAPPARE</b> +052 	<p>Adjustment of the tear position</p> <p>This parameter defines the position of the support on the tear/peel bar after printing.</p> <p>A higher number allows you to move the support forwards (consequently bringing the tear line nearer the starting edge of the next label), while a lower number allows you to move the support backwards (consequently bringing the tear line nearer the edge of the newly printed label).</p>
	<div style="text-align: center;">  </div> <p>1 = direction of the support  2 = Predefined factory setting of the tear line in position +52</p> <p>Predefined value: +52</p> <p>To modify the value shown:</p> <ol style="list-style-type: none"> <li>1. Press SELECT (SELECTION) to select the parameter</li> <li>2. Press PLUS (+) to increase the value.</li> <li>3. Press MINUS (-) to decrease the value.</li> <li>4. Press SELECT (SELECTION) to accept any modification and to deselect the parameter.</li> </ol>
	<p>Selecting the print mode</p> <p>This parameter tells the printer how to remove the printed labels.</p>
<b>MODO DI STAMPA</b>  <b>- STACCARE</b> +	<p><i>Predefined value:</i> REMOVE</p> <p>To modify the value shown:</p> <ol style="list-style-type: none"> <li>1. Press SELECT (SELECTION) to select the parameter.</li> </ol>
	<ol style="list-style-type: none"> <li>2. Press PLUS (+) or MINUS (-) to scroll through the options.</li> <li>3. Press SELECT (SELECTION) to accept.</li> </ol>



# 14 Maintenance

This chapter contains information that is essential to maintain the machine in perfect working order.

## 14.1 Warnings relating to machine maintenance

Unless otherwise indicated, all maintenance operations must be carried out with the machine turned off.

In particular, make sure that the main switch is set to the “0 off” position (see page 70) and that all the air has been drained out of the compressed air system by opening the cut-out valve (see paragraph 7.8, page 77).

Both the main switch and the cut-out valve must be blocked with a padlock to prevent the machine from being turned on again.



**One of the pistons moving the electrospindle vertically remains under pressure even when the cut-out valve has been triggered. This might cause the electrospindle to lower in two cases:**

- in the case of tampering with the respective pneumatic pipes;
- in the case of air leaks from the pistons, when the machine is not used for a long period of time.

## 14.2 Forced lubrication

It is possible at any moment to run a lubrication cycle for the parts connected to the lubrication pump; press the key “[Lubrication cycle](#)” (see , page 53). When the lubrication cycle starts up, the timer indicating the time passed since the last lubrication cycle is set at zero.

## 14.3 List of the maintenance operations to be carried out on the machine

The following table lists the foreseen maintenance operations (Intervention column), indicating the frequency with which each intervention is to be carried out (Frequency column) and, for the interventions that require it, the page on which the operations to be carried out are quoted.

Frequency	Part involved	Intervention
<b>Daily</b>	General machine	<ul style="list-style-type: none"> <li>• <a href="#">General cleaning of the machine</a> - page 122</li> </ul>
	Safety devices	<ul style="list-style-type: none"> <li>• Inspection of the condition of the cams and their safety switches. If necessary, replace them.</li> </ul>
	Work table	<ul style="list-style-type: none"> <li>• Inspection of the condition of the table gaskets, the suction cups and the jigs. If necessary, replace them.</li> </ul>
	Operating section	<ul style="list-style-type: none"> <li>• Inspection of the condition of the curtain guards. If necessary, replace them.</li> <li>• <a href="#">Checking the electrospindle tool locking</a> - page 127</li> <li>• <a href="#">Checking and cleaning the collet spindles</a> - page 127</li> <li>• <a href="#">Checking and cleaning the electrospindle</a> - page 128</li> </ul>
	Becker VTLF2.250 vacuum pump	<ul style="list-style-type: none"> <li>• <a href="#">Cleaning the cooling ducts</a> - page 136</li> </ul>
<b>Weekly</b>	General machine	<ul style="list-style-type: none"> <li>• <a href="#">Cleaning the machine guides and racks</a> - page 122</li> <li>• <a href="#">Pressure check</a> - page 123</li> </ul>
	FR unit	<ul style="list-style-type: none"> <li>• <a href="#">Cleaning the filter</a> - page 132</li> </ul>
	Busch Mink vacuum pump	<ul style="list-style-type: none"> <li>• <a href="#">Cleaning and replacing the air filters</a></li> </ul>
	Becker VTLF2.250 vacuum pump	<ul style="list-style-type: none"> <li>• <a href="#">Cleaning the filters</a> - page 136</li> </ul>
<b>Every 2 weeks</b>	Operating section	<ul style="list-style-type: none"> <li>• <a href="#">Lubrication and cleaning of the boring spindle gears</a> - page 131</li> </ul>
	General machine	<ul style="list-style-type: none"> <li>• <a href="#">Lubrication of the X-drive devices (slide blocks and racks)*</a> - page 124</li> <li>• <a href="#">Lubrication of the Y and Z drive devices (slide blocks and lead nuts)*</a> - page 125</li> <li>• <a href="#">Loading pallet lubrication</a> - page 126</li> </ul>
<b>Each month</b>	Operating section	<ul style="list-style-type: none"> <li>• <a href="#">Checking the connections of the electrospindles</a> - page 129</li> </ul>
	Operating system on the machine PC	<ul style="list-style-type: none"> <li>• <a href="#">Updating the antivirus system</a> - page 121</li> </ul>
<b>Every 3 months</b>	Busch Mink vacuum pump	<ul style="list-style-type: none"> <li>• Check there is no dirt or dust in the pump; if necessary, clean it.</li> </ul>
<b>Every 6 months</b>	Busch Mink vacuum pump	<ul style="list-style-type: none"> <li>• <a href="#">Cleaning the fans and the cooling tubes</a></li> </ul>

Frequency	Part involved	Intervention
Every 3000 hours	Becker VTLF2.250 vacuum pump	• <a href="#">Lubricating the bearings</a> - page 137
Every 3000 hours or every year	Becker VTLF2.250 vacuum pump	• <a href="#">Blade wear check</a> - page 137
Every 3000 hours or every year	Busch Mink vacuum pump	• <a href="#">Cleaning the net filter</a>
**	FR unit	• <a href="#">Replacing the oil separator filter cartridge</a> - page 133
***	Lubrication pump	• <a href="#">Topping up the lubrication pump</a> - page 126

\* Operation to be carried out only if the machine does not have its own automatic lubrication system.

\*\* See the specific paragraph.

\*\*\* The pump is fitted with a sensor that checks the lubricant level. When the minimum level is reached, a message is visualised on the numerical control screen, indicating that this operation must be carried out.

## Updating the antivirus system

The update of the antivirus system is not automatic. It must be done manually for the entire period of the duration of the license.

Proceed as follows:

From the PC of the machine connect to the site <http://www2.biesse.it/home/antivirus.asp>.

Click on "Download antivir update" and download the file.

Launch the application Avira AntiVir Professional, click on "Update" and "Manual Update".

Open the file previously downloaded. The update will start automatically.



The antivirus system correctly installed and maintained as described does not guarantee total protection anyway. The manufacturer assumes no responsibility for any inefficiencies in the system.

## 14.4 General cleaning of the machine

Proper cleaning of the machine and the surrounding area will make the working environment healthier and safer, allowing controls and indicators to be identified with ease and without mistakes.

Use a vacuum cleaner to remove any wood chips, and if necessary use a compressor to remove fine dust, making sure you stand at a sufficient distance. To prevent the floor from becoming slippery, waste chips must be removed using a vacuum cleaner or brush.



**Never use compressed air to clean the electrical cabinet; use a vacuum cleaner or soft cloth, as the dust removed might deposit on the electrical contacts and cause damage.**



**To avoid damaging the various operating section covers, clean them using soap and water only; under no circumstance should thinners, degreasing agents, alcohol, benzene or other chemical products be used.**

## 14.5 Cleaning the machine guides and racks

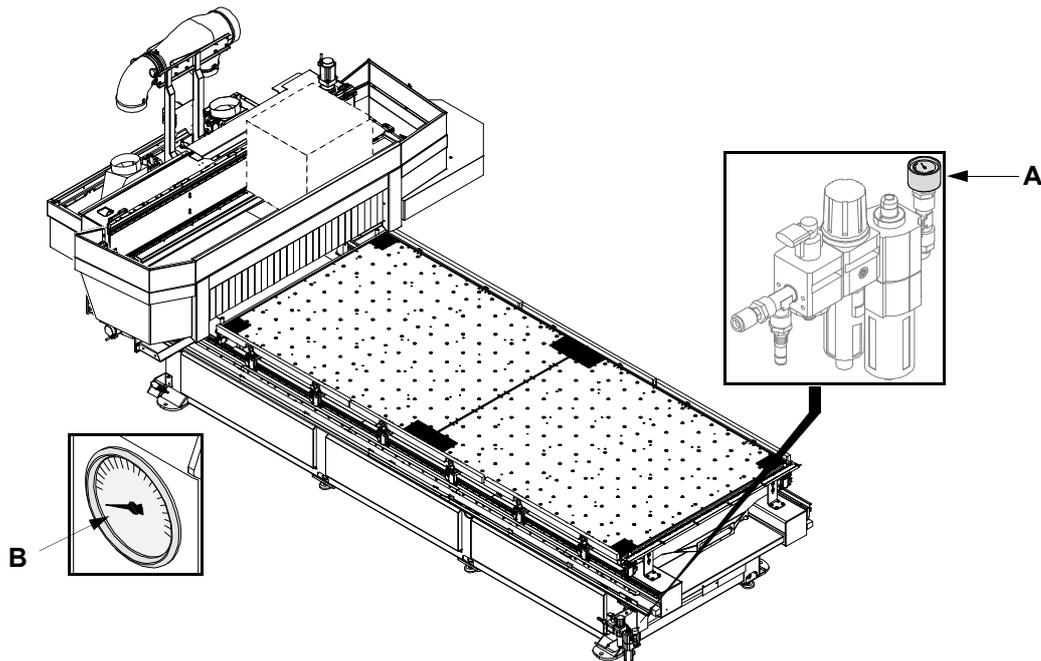
Clean any deposits on the guides and racks using a cloth or a bronze wire brush.

Using a brush, spread a thin layer of [MOBILUX EP 0](#) lubricant on each rack.

## 14.6 Pressure check

The following illustrates and describes the pressure gauges on which the pressure must be checked at regular intervals.

 **If the pressure value is found to be incorrect, do not make any adjustments, but call the BIESSE Service Centre.**

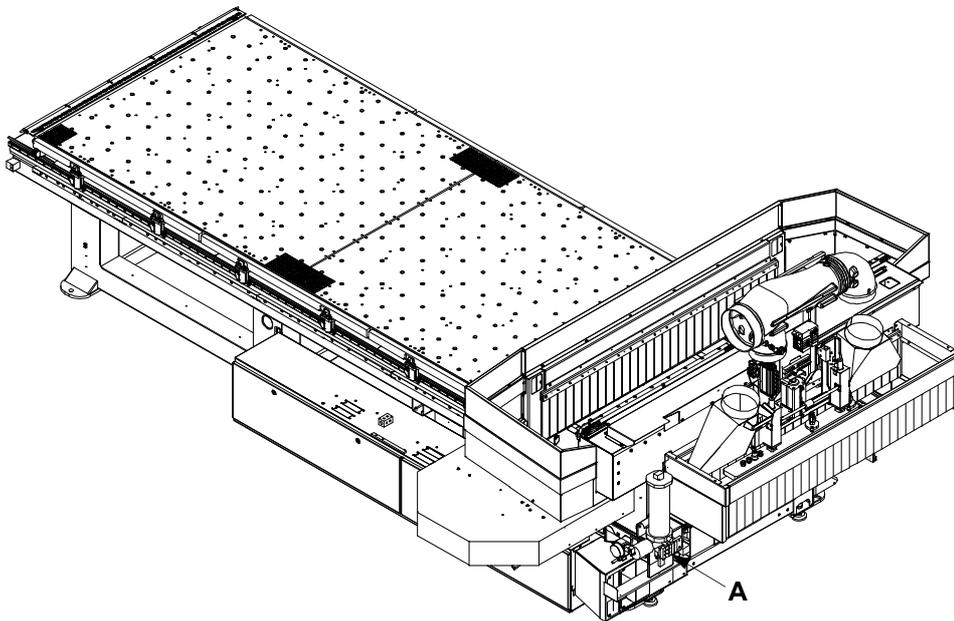


- A** Pressure gauge indicating the supply pressure = 6.5 - 7.5 bar.  
The supply pressure must be checked with the machine in emergency stop mode, without having activated the cut-out valve.
- B** Pressure gauge that shows the vacuum system pressure = about - 0.85 bar (- 12.5 psi, - 65 cm Hg, - 85000 Pa).  
The checking of the vacuum system pressure must be made by simulating a blocking without a piece.

## 14.7 Lubrication of the X-drive devices (slide blocks and racks)

**i** Operation to be carried out only if the machine does not have its own automatic lubrication system.

1. Fill the pump provided with **MOBILUX EP 0** lubricant.
2. Insert the pump into any one of the greasing nipples on the distributor **A** and pump in approximately 3 grammes of lubricant (4 strokes of the pump).

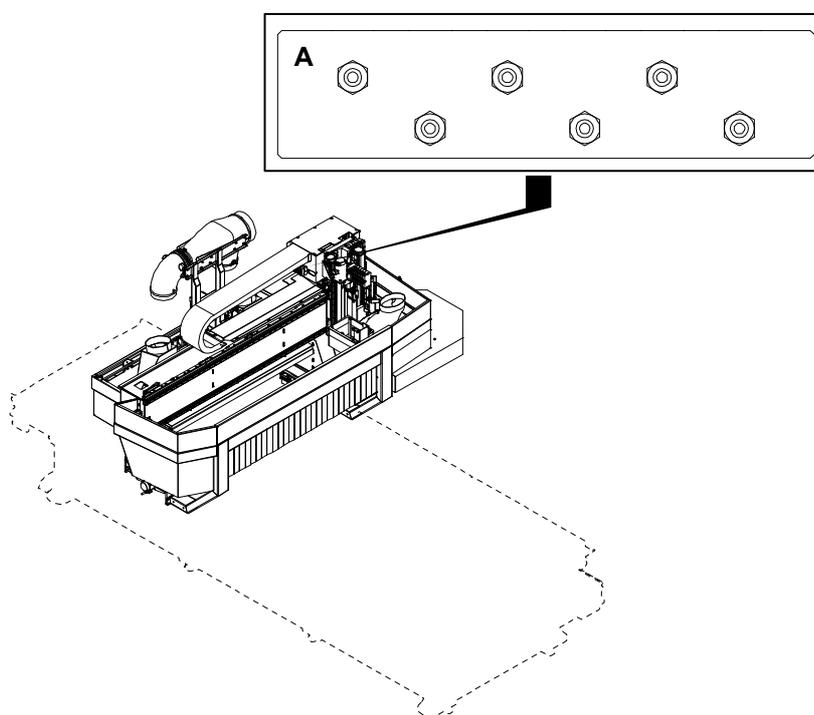


3. Repeat this operation for each of the greasing nipples on the distributor **A**.

## 14.8 Lubrication of the Y and Z drive devices (slide blocks and lead nuts)

**i** Operation to be carried out only if the machine does not have its own automatic lubrication system.

1. Fill the pump provided with **MOBILUX EP 0** lubricant.
2. Insert the pump into any one of the greasing nipples on the distributor **A** and pump in approximately 3 grammes of lubricant (4 strokes of the pump).

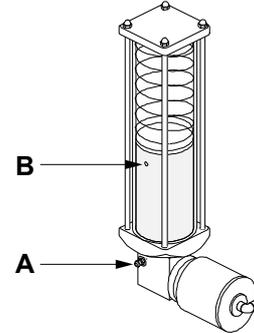


3. Repeat this operation for each of the greasing nipples on the distributors **A**.

## 14.9 Topping up the lubrication pump

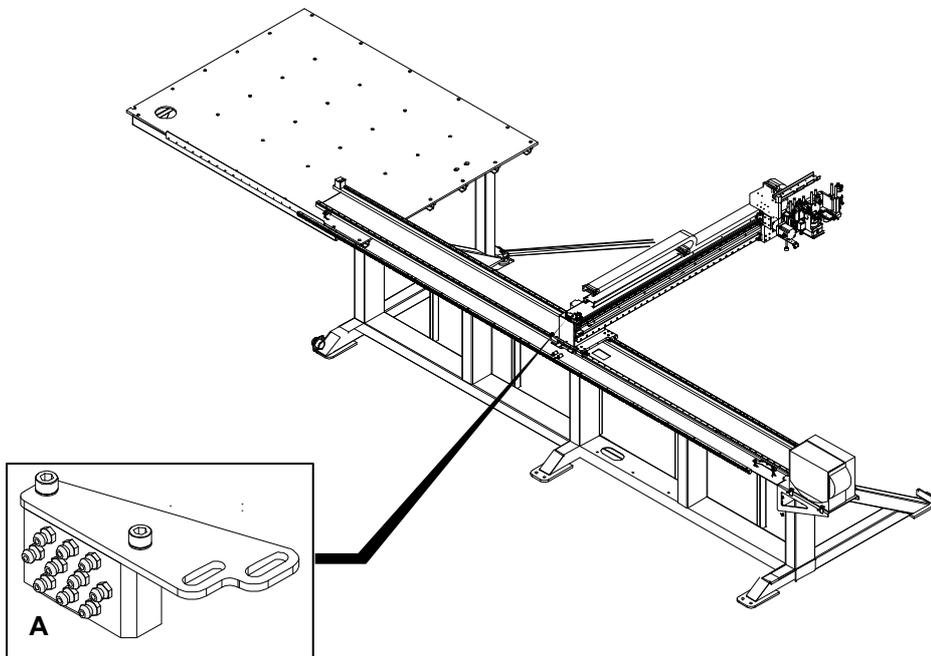
If the lubricant level in the pump has reached minimum, a message will appear on the numerical control. In this case, top up as described below.

1. Fill the pump provided with **MOBILUX EP 0** lubricant.
2. Insert the pump into the greasing nipple **A** and pump in lubricant until it seeps out through the bleed hole **B**, indicating that maximum level has been reached.



## 14.10 Loading pallet lubrication

1. Fill the pump provided with MOBILUX EP O lubricant.
2. Insert the pump in the greasing nipples **A** and pump in one gramme of lubricant (roughly one stroke of the pump).



## 14.11 Interventions on the operating section

The following paragraph lists the scheduled maintenance operations for the operating section parts.

- [Checking the electrospindle tool locking](#), page 127.
- [Checking and cleaning the collet spindles](#), page 127.
- [Checking and cleaning the electrospindle](#), page 128.
- [Checking the connections of the electrospindles](#), page 129.
- “Cleaning the C-axis”
- “Lubricating the HSK F63 electrospindle unlocking device”
- [Lubrication and cleaning of the boring spindle gears](#), page 131.

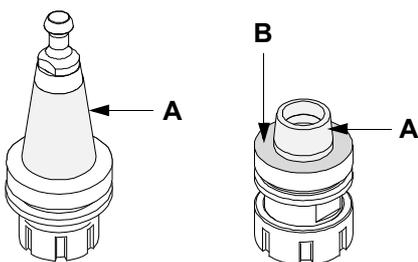
### Checking the electrospindle tool locking

To carry out this check, fit a tool on each of the electrospindles present and, after stopping the machine, check manually to ensure they are perfectly locked. Also check that air is coming out of the electrospindle coupling area.

### Checking and cleaning the collet spindles

Before using the collet spindles, make sure that the conical coupling **A** is thoroughly clean, without dust, grease, coolant, oil, metallic particles, scale, or traces of oxidising substances.

Carefully clean the conical coupling **A** and the stop surface **B** with a clean and soft cloth. It is forbidden to use aggressive products like acids or similar products, and abrasive elements like wire wool, wire brushes, emery cloth, etc.



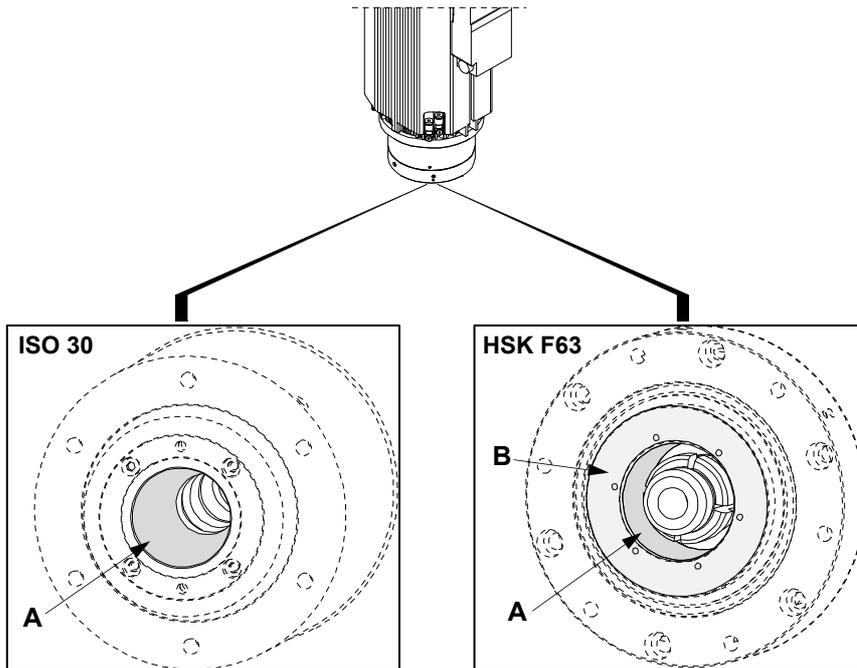
 **For safety reasons, in order to guarantee accurate machining operations and to minimise collet spindle wear, keep these areas as clean as possible.**

 **At the end of the machining operation, to avoid problems of sticking, always remove the collet spindle from the electrospindle and replace it with a clean one at room temperature. Warning! Wear gloves to avoid burns.**

## Checking and cleaning the electrospindle

Before using the collet spindle, make sure that the conical surfaces **A** and the stop surfaces **B** are thoroughly clean, without dust, grease, coolant, oil, metallic particles, scale, or traces of oxidising substances.

Clean the surfaces **A** and **B** carefully with a soft, clean cloth. It is forbidden to use aggressive products like acids or similar products, and abrasive elements like wire wool, wire brushes, emery cloth, etc.



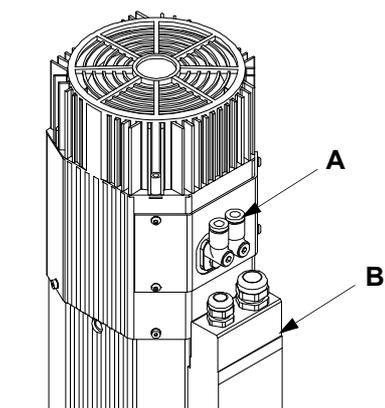
- ⚠ For safety reasons, in order to guarantee accurate machining operations and to minimise electrospindle wear, keep these areas as clean as possible.
- ⚠ The electrospindle may be damaged if any dirt gets into the coupling area. If, therefore, you want to use compressed air to clean the outer surface of the electrospindle, protect this area with a plug or a clean collet spindle.
- ⚠ Do not direct jets of compressed air into the shaft of the electrospindle without the collect spindle fitted.



## Checking the connections of the electrospindles

Inspect the following:

- Check that electrical cables are not damaged.
- Check the connectors are firmly fixed (see figure).



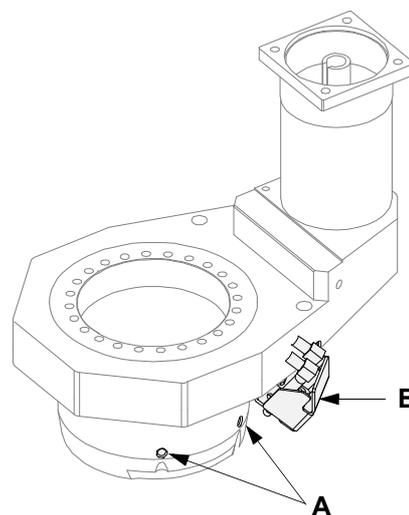
**A** = pneumatic connections.

**B** = electrical connections.

- Check the seal of the pipes of the pneumatic system and the cooling circuit connections.
- Check the seal of the pipes of the pneumatic system and the cooling circuit connections.

## Cleaning the C-axis

- Thoroughly clean the seats **A**.
- Clean the detection sensor **B** with a cloth or brush to allow its correct functioning.



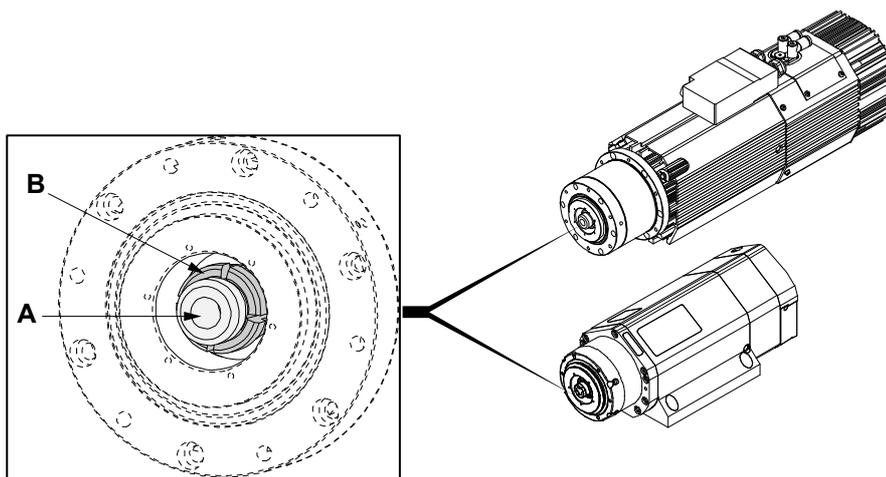
## Lubricating the HSK F63 electrospindle unlocking device

To avoid problems during tool changing operations, periodically apply METAFLUX Fett-Paste 70-8508 grease for metals on the electrospindle unlocking device.

**⚠ Use only the above-mentioned grease. Other products are not compatible with the ones used by Biesse S.p.A. at first greasing. If different types of incompatible greases are mixed or subsequently used, they can cause deposits of substances detrimental to the unlocking device operation, thus impairing safety.**

Observe the following procedure:

1. Apply grease in the expeller **A** and in the gap between the locking collet segments **B**, with the help of a thin clean plastic implement.
2. Spread the grease evenly, using a collet spindle which should be inserted in the unlocking device and disconnected a dozen times.
3. Remove the collet spindle and wipe off any excess grease with a clean cloth.



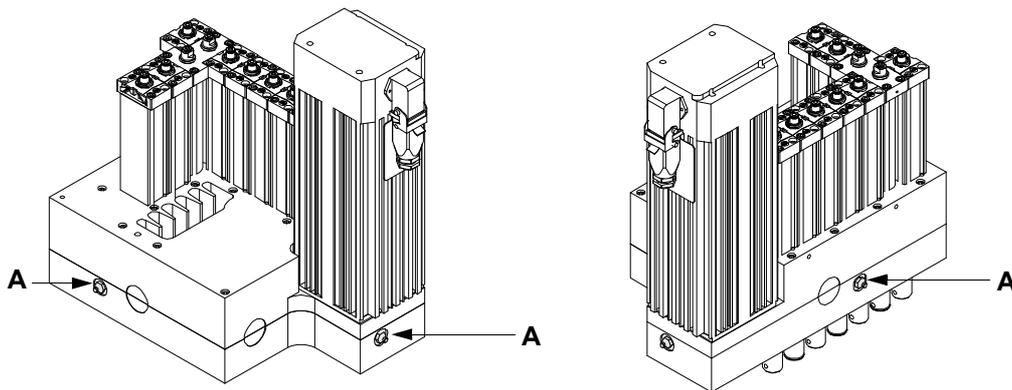
**⚠ Excess grease is harmful since chips or other material may form deposits, which in turn may dirty the locking collet, the conical surfaces and the stop surfaces. For safety reasons, in order to guarantee accurate machining operations and to minimise wear of the unlocking device and the collet spindle, keep these areas as clean as possible.**

## Lubrication and cleaning of the boring spindle gears

To lubricate the boring spindle gears, proceed as follows:

1. Fill the pump provided with **ALPHASPEED GYS 4-128 HD** lubricant.
2. Insert the pump in the greasing nipple **A** and pump in 8 grammes of lubricant (approximately 10 strokes of the pump).

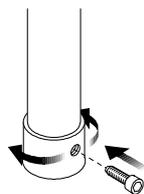
BH 10



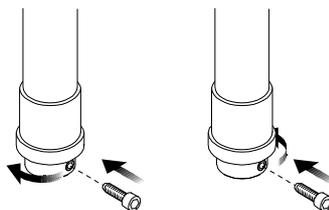
Every 5 strokes of the pump, turn the spindles manually to distribute the lubricant evenly. To carry out this operation, proceed as follows:

- Lower a spindle (preferably one that is not fitted with a tool). For the boring unit with snap-on coupling spindles it is necessary to lower 2 spindles, one right and one left.
- Insert the screw into the tool fixing bore, so that it can be used to turn the spindles easily.
- Turn the spindles, turning 5 times in one direction and 5 in the opposite direction.

standard spindle



spindles with snap-on coupling



Spindles not frequently used can become rusty and go down with difficulty or get blocked. After lubricating the boring unit it is therefore advisable to clean the outside of rusty spindles and apply a Teflon spray.

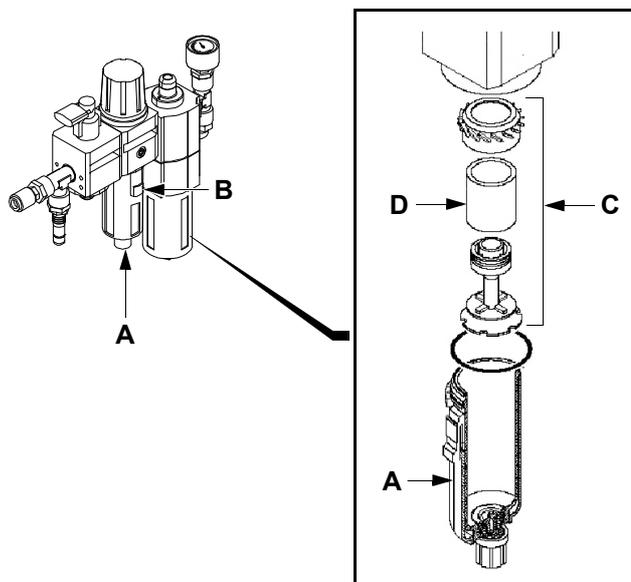
## 14.12 Interventions on the FR unit

The following paragraph lists the scheduled maintenance operations for the FR unit.

### Cleaning the filter

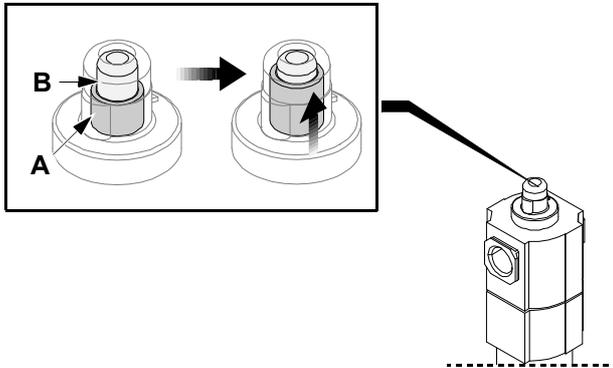
To clean the filter, proceed as follows:

1. Make sure there is no pressure in the system; the supply pressure gauge (see page 123) must indicate 0 bar.
2. Remove the filter cup **A**. To do this, lower the lever **B** and turn the cup by 45° (either to the right or the left).
3. Unscrew the baffle unit (ref.**C**).
4. Extract the cartridge **D** and clean it with soap, water and compressed air.



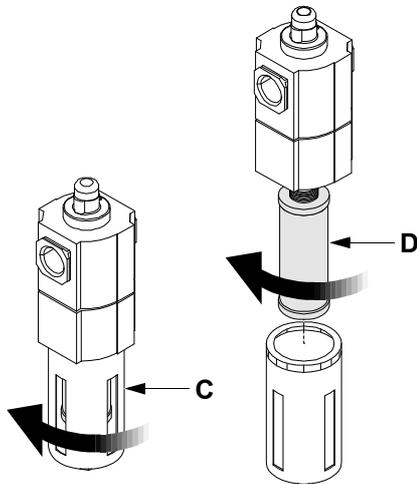
## Replacing the oil separator filter cartridge

The oil separator filter cartridge should be replaced when the red indicator light **A** rises, arriving halfway up the green indicator light **B**.



To change the cartridge, proceed as follows:

1. Make sure there is no pressure in the system; the supply pressure gauge (see page [123](#)) must indicate 0 bar.
2. Remove the cup **C** by turning it anticlockwise.
3. Unscrew the cartridge **D** and replace it.



## 14.13 Interventions on the Busch Mink vacuum pump

The following paragraph lists the maintenance interventions scheduled for the 300m<sup>3</sup>/h Mink-type MM 1322 AVM Busch vacuum pump.

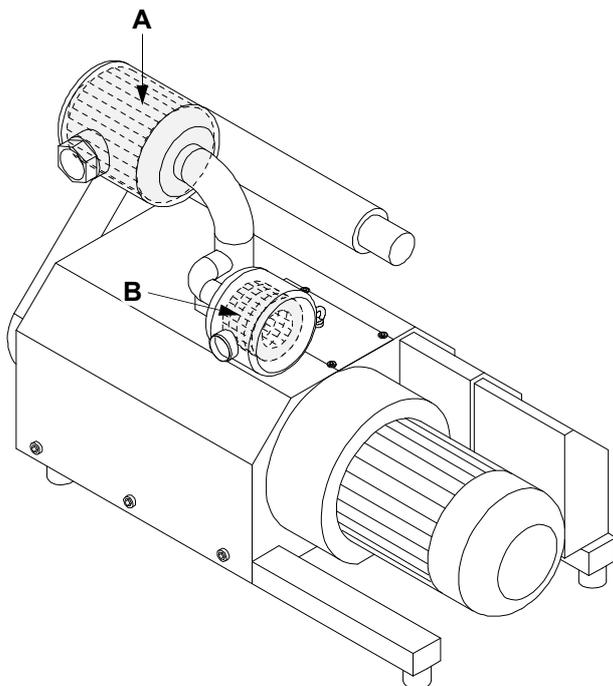
Before carrying out maintenance operations, switch off the vacuum pump.

### Cleaning the net filter

Check the net filter and clean it (see the instructions supplied with the vacuum pump).

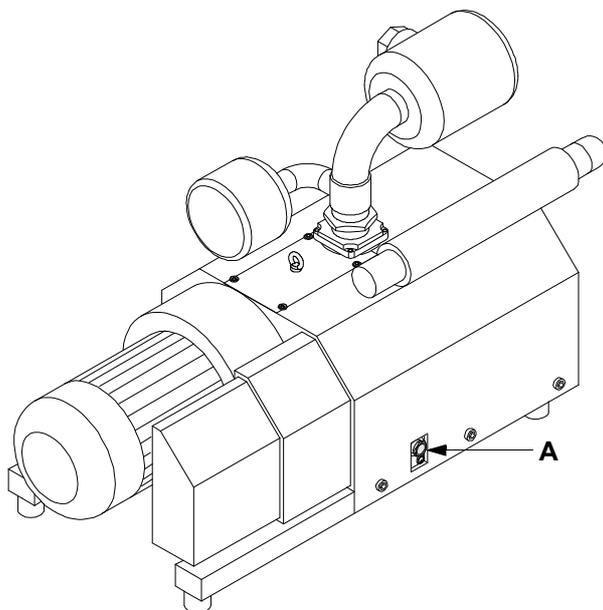
### Cleaning and replacing the air filters

Remove the air filters **A/B** and clean them by blowing compressed air from the inside to the outside; if the filters are clogged, replace them.



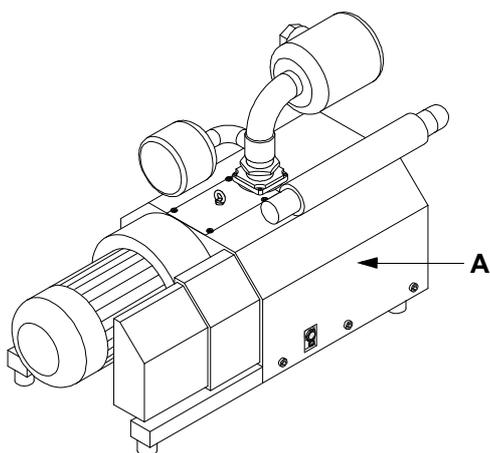
## Checking the oil level

The oil level in the gear box can be checked with the indicator **A**.  
If the oil level is below the minimum notch, this means there is a leakage. Contact the Biesse Service Centre.



## Cleaning the fans and the cooling tubes

1. Remove the soundproof casing **A**.



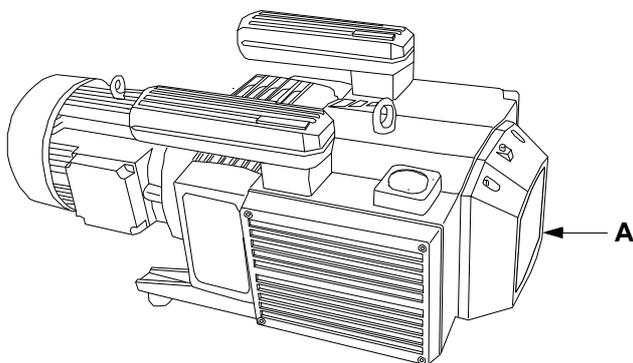
2. Clean the fans, the cooling tubes, the grilles and the cooling louvres (see the instructions supplied with the vacuum pump).
3. Replace the soundproof casing .

## 14.14 Operations on the Becker VTLF2.250 vacuum pump

The following section lists the maintenance operations planned for the 250m<sup>3</sup>/h Becker VTLF2.250 vacuum pump.

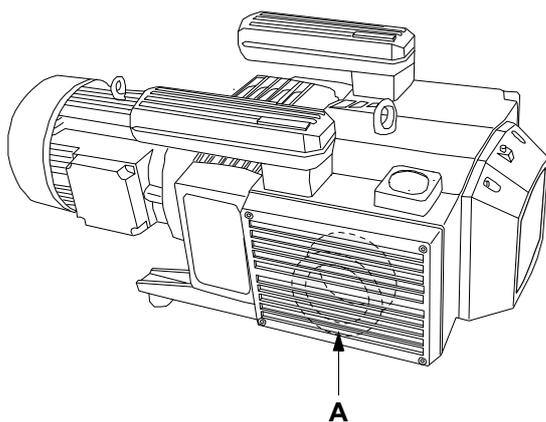
### Cleaning the cooling ducts

To guarantee adequate ventilation, clean the cooling ducts **A** by blowing with compressed air.



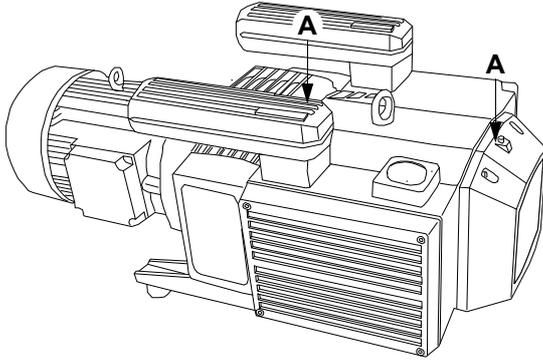
### Cleaning the filters

Remove the air filters **A** and clean them using a jet of compressed air and blowing from the inside out. Replace blocked or greasy filters.



## Lubricating the bearings

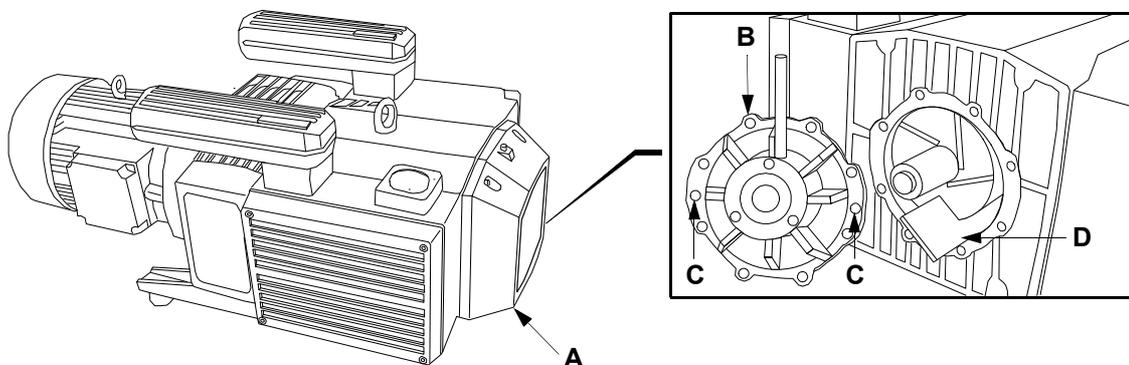
The vacuum pump bearings must be lubricated through the greasing nipples **A** with the pump operating, using the syringe provided filled with KLÜBER AMBLYGON TA 15/2 type grease (pump in 10 grammes of grease).



## Blade wear check

***Make sure everything is kept as clean as possible during this operation.***

1. Remove the cover **A**.
2. Remove the cover **B**. To carry out this operation, after unscrewing the bolts that fasten the cover, screw two bolts evenly into the holes **C**, making sure the cover is not tilted to the side.
3. Remove the blades **D** and check they do not exceed the minimum limit of 41 mm. If necessary, replace them. Make sure you assemble the blades the right way round.
4. When performing this operation, also check the gaskets and bearing for wear.
5. Replace the cover **B**, centring it perfectly on the rotor and on the pins, and screwing up the relative fixing bolts evenly. On completing the operation, check the rotor turns easily.
6. Replace the cover **A**.



## 14.15 Lubricants

Use the lubricants recommended by the manufacturer (see the column **Recommended lubricants**) but, if these are not readily available, use the equivalents (see the column **Equivalents**).

Should it be necessary to replace the recommended lubricant with an equivalent one of another brand, clean the parts in question thoroughly to remove any residual traces of the previous product, to ensure that there will be no chemical reactions that might damage the machine.

Recommended lubricants			Equivalent
Name	characteristics	Use	
<b>KLÜBER AMBLYGON TA 15/2</b>	<ul style="list-style-type: none"> <li>• Physical state at room temperature (20°C): pasty</li> <li>• Colour: beige</li> <li>• Odour: characteristic</li> <li>• Dropping point DIN ISO 2176: &gt;220°C</li> <li>• Flame point ASTM D 92: not applicable</li> <li>• Explosiveness limit (lower - higher): the product has no explosion risk</li> <li>• Density at 20°C (g/cm<sup>3</sup>) DIN 51757: Ca.0.93</li> <li>• Solubility in water: insoluble</li> <li>• pH: not applicable</li> <li>• Boiling point/interval °C: not applicable</li> <li>• Explosive properties: not applicable</li> <li>• Combustive properties: not applicable</li> <li>• Vapour pressure: not applicable</li> <li>• Division coefficients (n-octanol/ water): not applicable</li> <li>• Base oil viscosity DIN 51562: at 40°C 220 at 100°C 17</li> <li>• Penetration worked at 25°C DIN ISO 2137 0.1mm: 285-315</li> <li>• Consistency Class NLGI DIN 51818: not applicable</li> <li>• Resistance to water DIN 51807 T 1 3h/90°C: 0 at 90</li> <li>• Pour pressure at -30°C DIN 51805 mbar: not applicable</li> <li>• Vapour density: not applicable</li> <li>• Evaporation speed: not applicable</li> </ul>	bearings and articulations	product with no equivalent

Recommended lubricants			Equivalent
Name	characteristics	Use	
<b>KLÜBER LUSING PROTECT G31</b>	<ul style="list-style-type: none"> <li>Physical state at room temperature (20°C): aerosol</li> <li>Colour: not applicable</li> <li>Odour: perceptible, characteristic</li> <li>Density at 20°C ASTM D-4052(g/cm<sup>3</sup>): approx. 0.6</li> <li>Flammability COC ASTM D-92 (°C): inflammable in the presence of live flames</li> <li>Solubility in water: insoluble</li> <li>Drip point DIN 51801/1 (°C): 3.2 (7.5 at 50×C)</li> </ul>	Protection for HSK F63 couplings	product with no equivalent
<b>KLÜBER Polilub GA 352 P</b>	<ul style="list-style-type: none"> <li>Form: pasty</li> <li>Colour: amber</li> <li>Odour: specific for the product</li> <li>Dropping point, DIN ISO 2176: &gt;220°C</li> <li>Flammability point: not applicable</li> <li>Explosion risk: product not explosive</li> <li>Density at 20°C: approx. 0.92g/cm<sup>3</sup></li> <li>Penetration worked at 25°C DIN ISO 2137 0.1mm: 280-310</li> <li>Solubility in/miscibility with water: insoluble</li> <li>Organic solvents: 0.5%</li> </ul>	general assembly grease for pneumatic devices	product with no equivalent
<b>METAFLUX Fett-Paste 70-8508</b>	<ul style="list-style-type: none"> <li>Physical state: pasty</li> <li>Odour: characteristic</li> <li>Colour: grey</li> <li>Flammability (°C): &gt;150</li> <li>Density: approx. 1.09 (g/cm<sup>3</sup>), 20°C</li> <li>Solubility in water: insoluble</li> </ul>	Tool unlocking devices on electrospindles with HSK F63 couplings	product with no equivalent
<b>MOBILTEMP SHC 100</b>	<ul style="list-style-type: none"> <li>Category: GREASE</li> <li>volume mass: 1.0 kg/dmc at 15°C</li> <li>vapour pressure: &lt;0.1mm Hg, at 20°C</li> <li>viscosity: 87 cSt, at 40°C 13 cSt, at 100°C</li> <li>drip point: &gt;260°C</li> <li>Boiling point: &gt;315°C</li> </ul>	Gears	<ul style="list-style-type: none"> <li>AGIP ROCOL SAPPHIRE LO TEMP 2</li> <li>AGIP ROCOL SAPPHIRE HI-PRESSURE</li> <li>MOBILTEMP SHC 32</li> </ul>

Recommended lubricants			Equivalent
Name	characteristics	Use	
<b>MOBILUX EP 0</b>	<ul style="list-style-type: none"> <li>• Physical state: grease</li> <li>• Colour: light</li> <li>• Odour: weak</li> <li>• Limit odour: not determined</li> <li>• pH: not applicable</li> <li>• Boiling temperature C(F): &gt; 316 (600)</li> <li>• Dropping point C(F): &gt; 180 (356)</li> <li>• Flammability temperature C(F): &gt; 204 (400) (ASTM D-93)</li> <li>• Flammability: not determined</li> <li>• Self-flammability: not determined</li> <li>• Explosive properties: not applicable</li> <li>• Vapour tension-mm Hg 20 C: not determined</li> <li>• Relative density, 15/4 C: 1</li> <li>• Stability in water: negligible</li> <li>• Division coefficient: &gt; 3.5</li> <li>• Viscosity At 40 C, cSt: 150.0</li> <li>• Viscosity At 100 C, cSt: &gt; 16.0</li> <li>• Pour point C(F): not applicable</li> <li>• Freezing point C(F): not determined</li> </ul>	Slide blocks, guides and racks	<ul style="list-style-type: none"> <li>• ESSO BEACON EP 0</li> <li>• KLÜBER TRIBOSTAR 0 EP*</li> <li>• KLÜBER CENTOPLEX 0 EP**</li> </ul>
<b>ALPHASPEED GYS 4-128 HD</b>		Gears	-

\* Italian market only.

\*\* International market.

# Appendices



# A Technical characteristics

## A.1 Main machine axes X, Y, and Z

	X	Y	Z
maximum programmed speed (m/min)	60	60	20
acceleration programmed (m/s <sup>2</sup> )	3	3	3

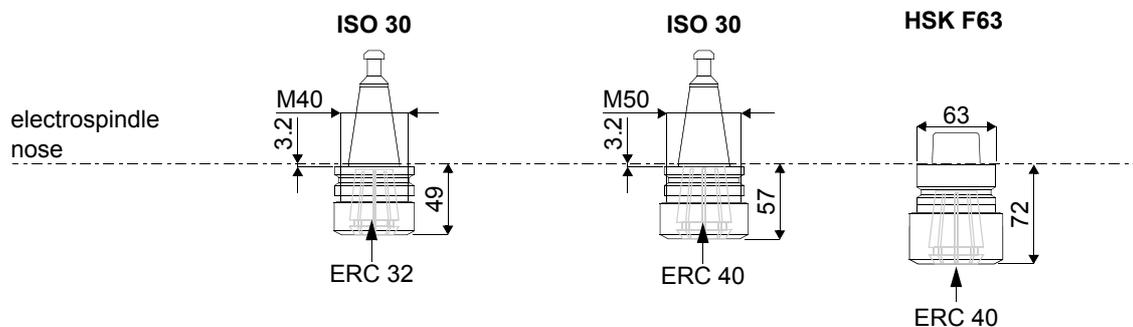
## A.2 Types of electrospindles

	maximum power (service type S6) at 12000 rpm	Maximum rotation speed (rpm)
ES959 - ISO 30 (air-cooled)	12kW	24000
ES959 - HSK F63 (air-cooled)	12kW	24000

## A.3 Collet spindles

collet type*	ISO 30	
	ERC 32	ERC 40
maximum rotation speed (rpm)	24000	24000

\* Different collets are available to fit tools with shanks with a maximum diameter of 25mm. Each collet is designed to take a specific diameter of shank.



## A.4 Boring unit

	<b>BH 10</b>
engine power at 6000 rpm (kW)	3
rotation speed of vertical spindles (rpm)	6,000
rotation speed of horizontal spindles (rpm)	4737
distance between spindle centres (mm)	32*
spindle rotation direction for boring tools	see figure 1
spindle data for boring tools	see figure 2
maximum spindle rotation speed for circular blade (rpm)	7500
circular blade spindle data	see figure 3

\* The value indicated is only reached after a proper warm-up (see 6.4 "Operating section warm-up cycles" on page 61).

Figure 1

□ ⊙ : right spindle

■ ● : left spindle

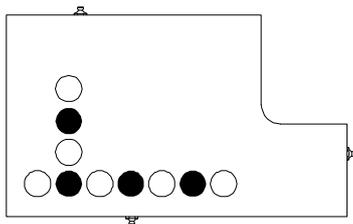


Figure 2

A: spindle with standard coupling

B: spindle with snap-on coupling

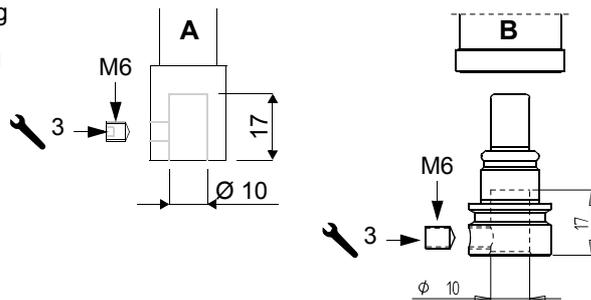
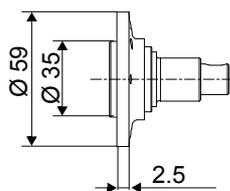


Figure 3



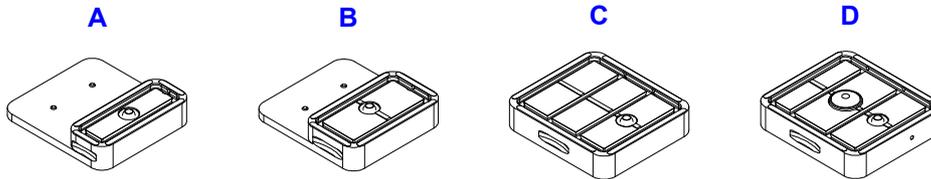
## A.5 Revolver tool magazine

	<b>with 12 places</b>
maximum weight of a tool complete with collet spindle or aggregate (kg)	7.5
maximum overall weight of tools complete with collet spindles or aggregates (kg)	45
maximum height of the spindle nose for tools with ISO 30; HSK F63 coupling (mm)	273; 280

**List of dimension and orientation layouts for tools/aggregates in the**

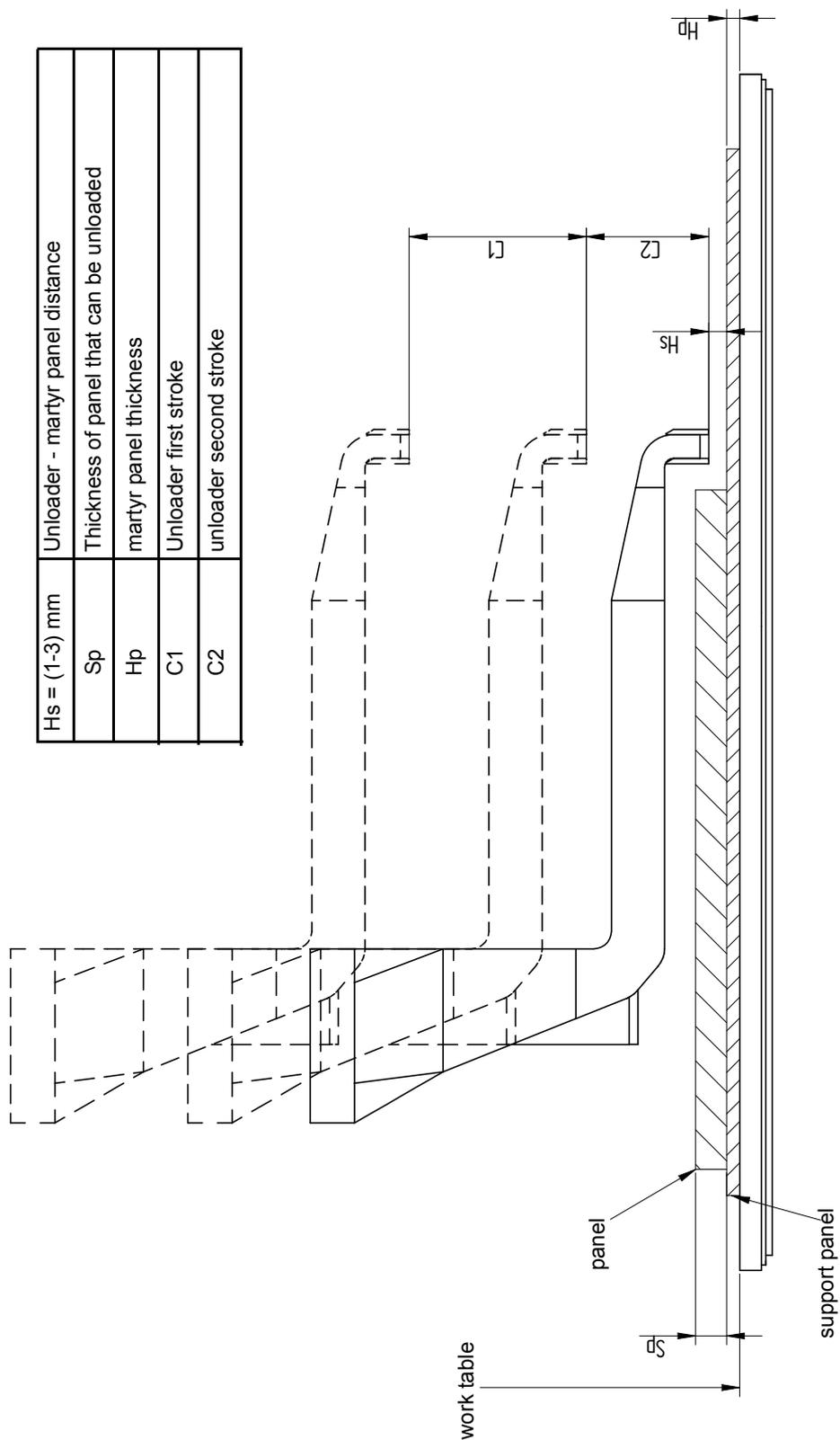


## A.6 Dimensions of the shapeable suction cups



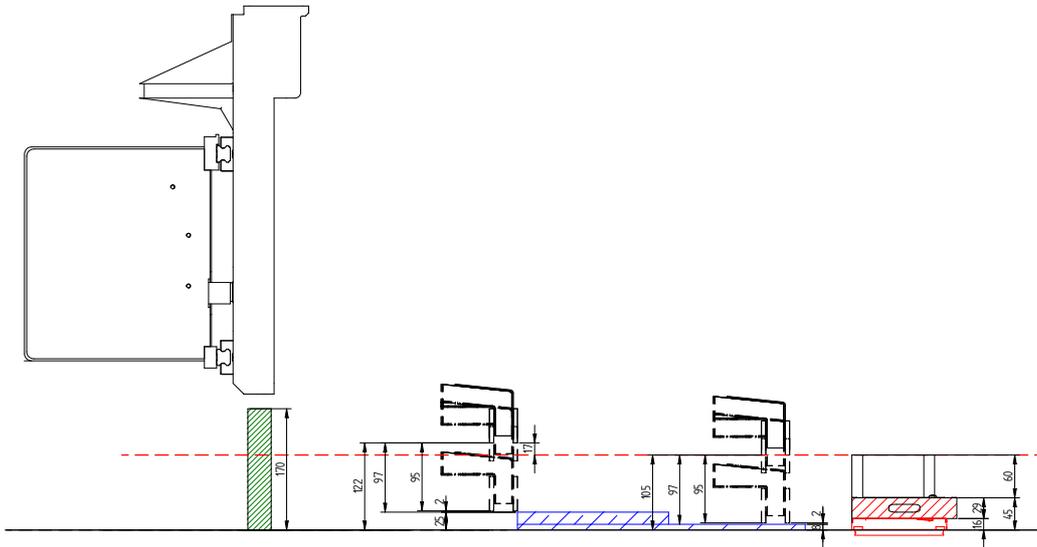
- A** shapeable suction cup size 132 x 54 x 29mm;
- B** shapeable suction cup size 132 x 75 x 29mm;
- C** shapeable suction cup size 132 x 146 x 29mm;
- D** shapeable suction cup size 132 x 146 x 29mm, with device to help loading;.

## A.7 Layout to adjust the loader/unloader



It is possible to mill the support panel for a value of  $F \leq (Spmin-6)$  until it reaches a limit value of  $Hpmin \geq 6$

## A.8 Martyr panel/piece dimensions for loader/unloader



unloader information	mm
Piece passage without unloader	170
Unloader stroke	95
Unloader adjustment field	17
Maximum height of martyr panel	25
Minimum height of martyr panel	8
Martyr panel passage with panel H = 25	97
Martyr panel passage with panel H = 8	97
Piece passage with unloader on shapeable suction cup	60

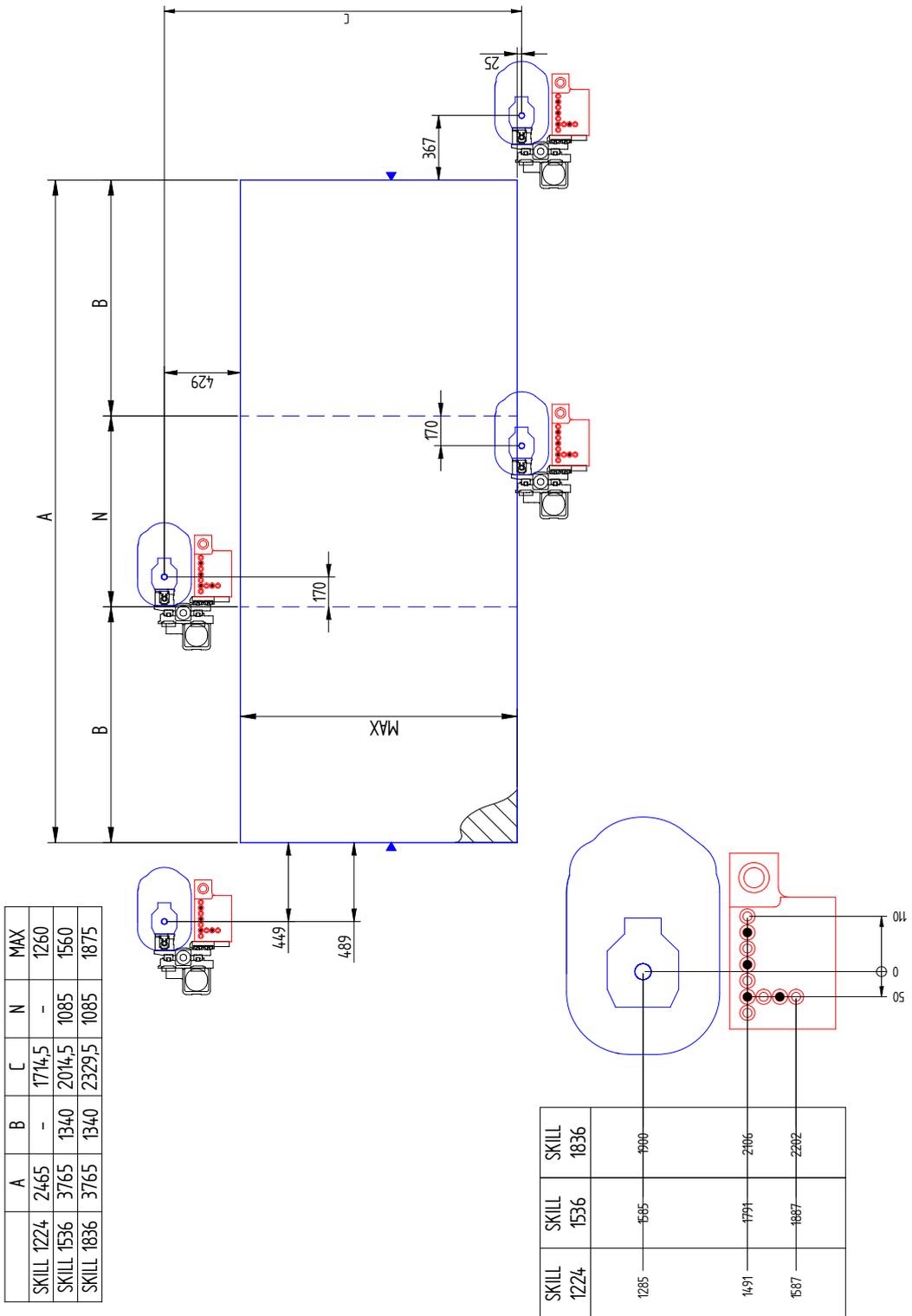
## A.9 Working field in X-Y

The layouts listed in the following section show the position of the operating section with respect to the work table origins and the maximum stroke that the operating section can perform along the Cartesian X-Y axes.

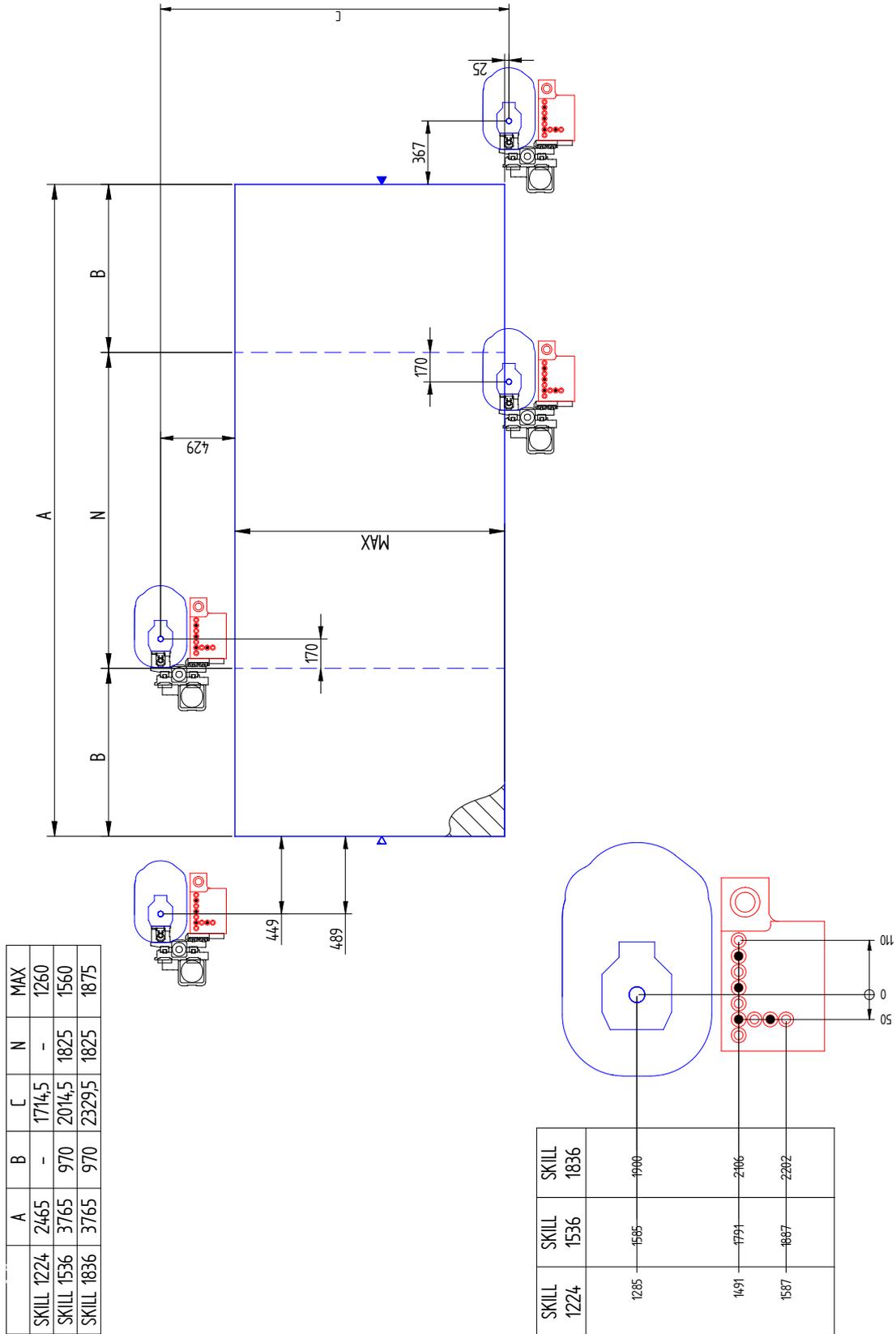
### List of layouts for EC and non-EC machine versions

1. ["Skill G FT CE version"](#), page 151.
2. ["Skill G FT non CE version"](#), page 152.

1. Skill G FT CE version



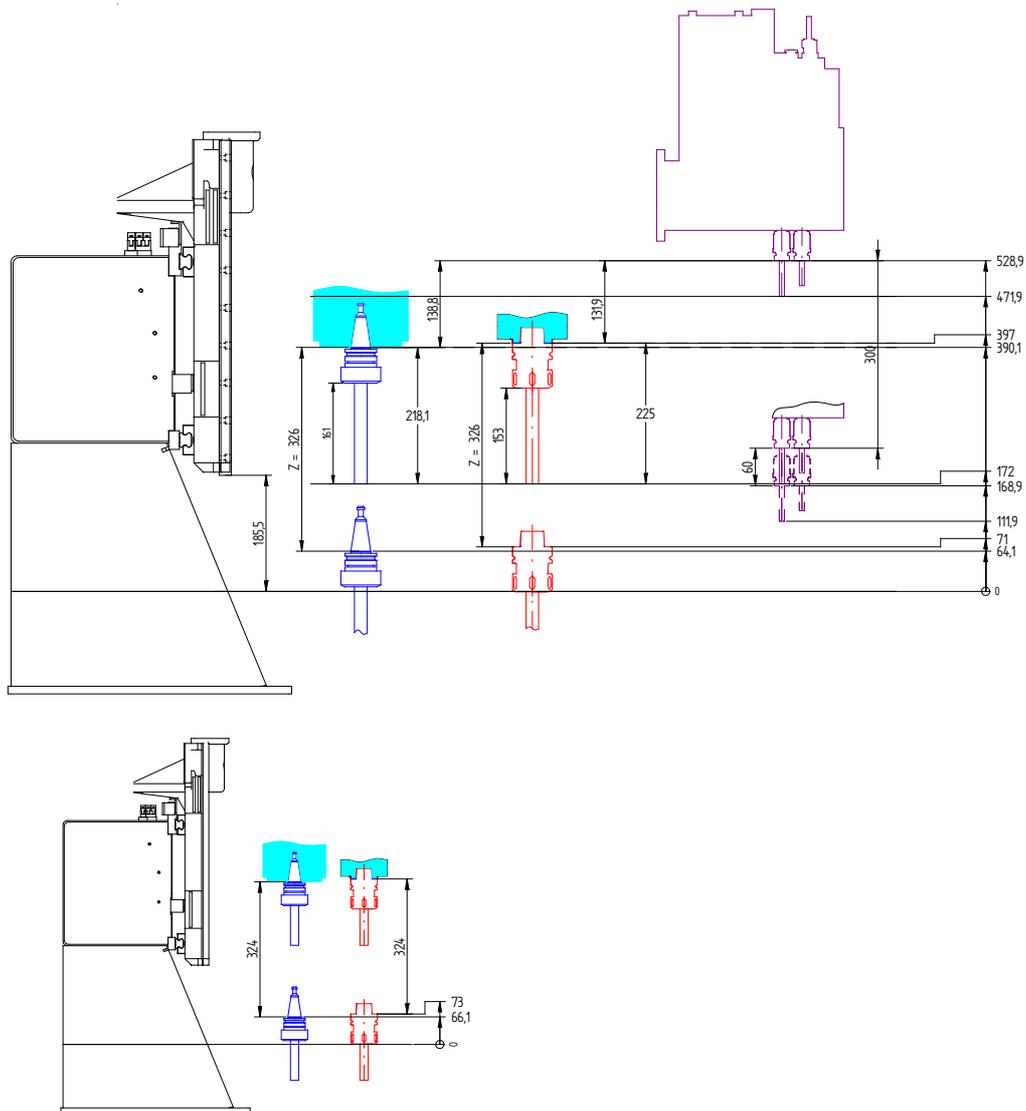
2. Skill G FT non CE version



## A.10 Working field in Z

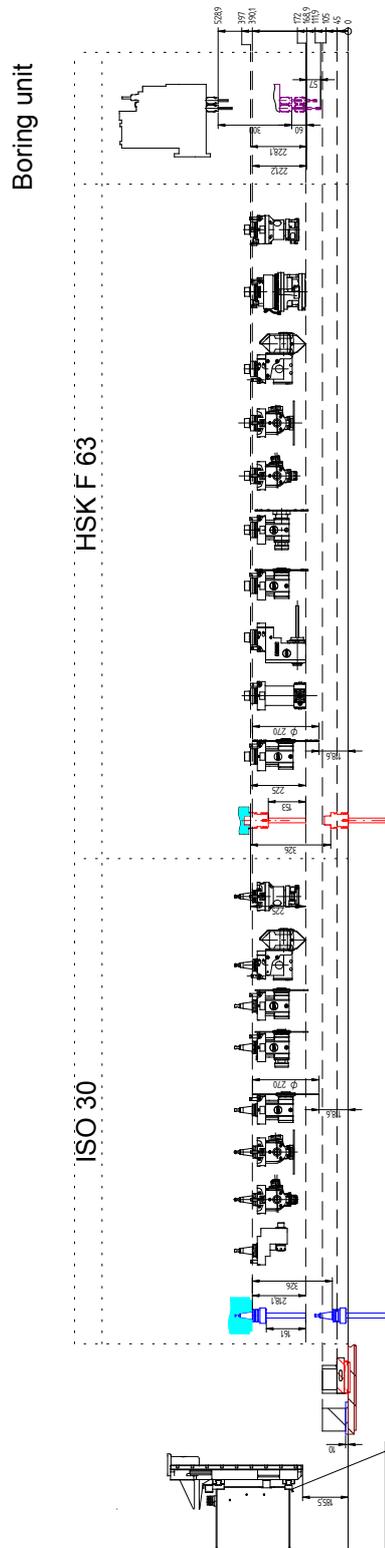
The layout listed below shows the tool strokes along the Z axis.

Tool stroke layout



	Milling unit	Boring unit
Strokes (mm)	326	
Pneumatic release (mm)		300

Tool stroke layout and overall dimensions



## A.11 Noise level

The correct noise pressure level, measured from the operator's workstation, is:

- LP = 78 dB (A), during boring
- LP = 78.5 dB (A), during milling

The noise power level is:

- LWA = 93.5 dB, during boring
- LWA = 95.5 dB, during milling

Uncertainty factor K = 4 dB

Reference standards: EN ISO 3746 - EN ISO 11202.



**The noise levels indicated are emission levels and do not necessarily represent safe working levels.**

Even though there is a relation between emission levels and exposure levels, this cannot be used reliably to establish whether or not further precautions are necessary.

The factors determining the noise levels to which the operative personnel are 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 risks involved.



The noise level depends on:

- the wear condition of the tool
- forward speed
- the rotation speed
- material being machined



# B Transport

The machine can be dispatched using various forms of transport (road, rail, sea, air), and the method is usually agreed with the customer at the time of purchase. The machine is divided into a number of parts for transport purposes, and this appendix contains a list of the parts to be dispatched, and their relative weights.

## B.1 Parts to be transported

For transport, the machine has to be disassembled into the parts indicated below.

## B.2 Unloading the machine

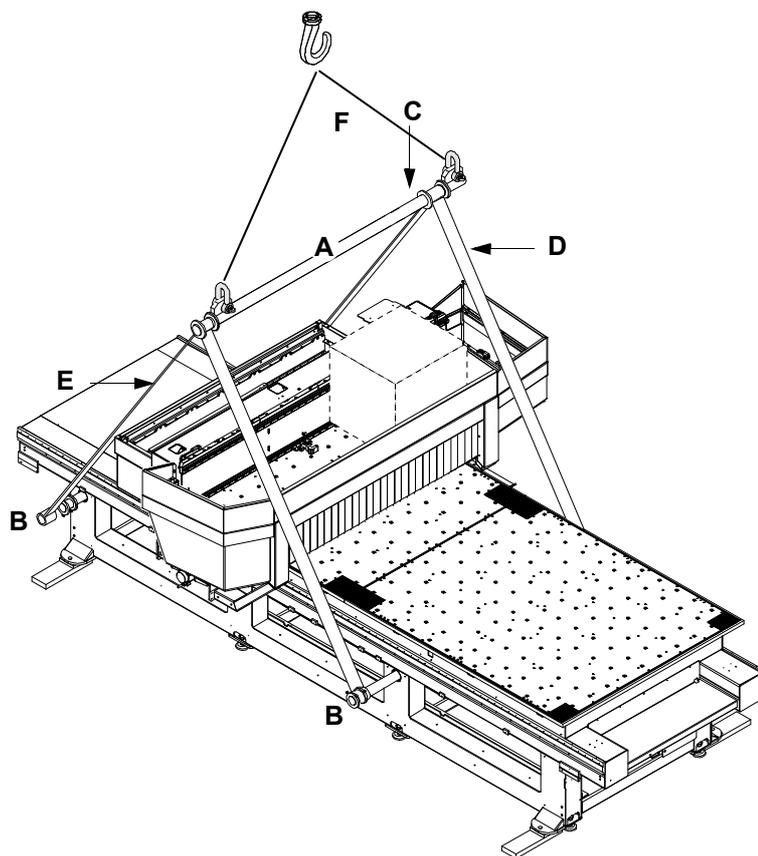
 **Lifting and transfer operations necessary to position the machine in its final location must be carried out by personnel with the necessary technical training, according to the indications given below.**

 **Employ means and equipment (bars, ropes, etc.) of adequate load-bearing capacity when carrying out lifting operations. Before lifting up each component, remove the fastening materials (nails, ropes, etc.) set on the machine.**

After unloading the main structure, remove the tables and vibration damper plates located under the base, as described on page [161](#).

## Lifting the machine

To lift the main structure of the machine use the method illustrated below. No particular procedures are necessary to lift the remaining parts

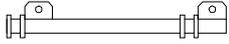
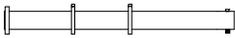
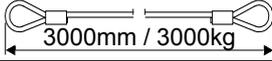
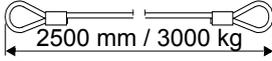
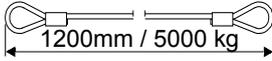


### SKILL 1224 G FT

Material	Quantity	Supplied
A	1	yes
B	4	yes
C	2	no
D	4	yes*
E	2	no

\* only in the case of transportation in a container.

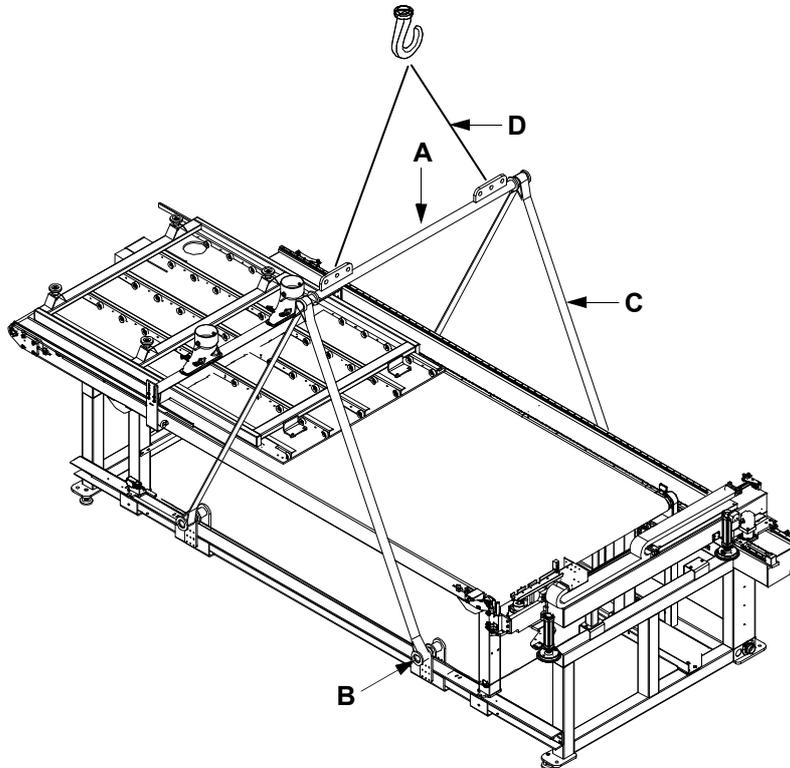
**SKILL 1536 G FT; 1836 G FT**

Material	Quantity	Supplied
<b>A</b> 	1	yes
<b>B</b> 	4	yes
<b>C</b> 	2	no
<b>D</b> 	2	yes*
<b>E</b> 	2	yes
<b>F</b> 	2	no

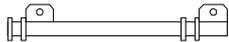
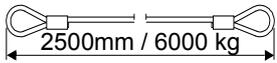
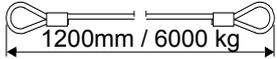
\* only in the case of transportation in a container.

 **The equipment supplied must not be used for other machines or other purposes.**

### Loading pallet and unloading belt lifting

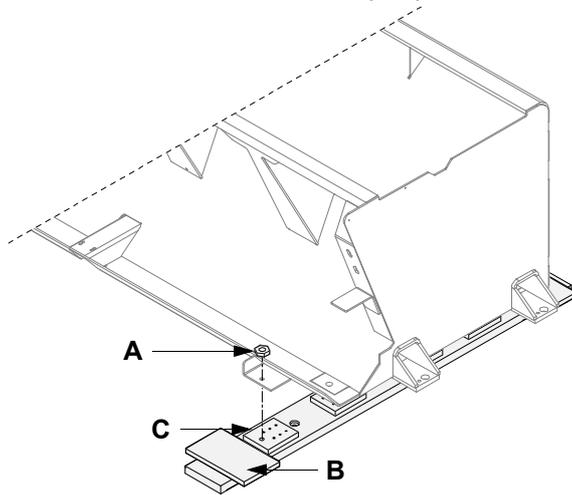


### Loading pallet and unloading belt

Material	Quantity	Supplied
A 	1	yes
B 	2	no
C 	4	yes
D 	2	no

## Removal of the boards and vibration damper plates

Before resting the main structure on the ground, unscrew all the screws **A** and remove the wooden boards **B** and the vibration damper plates **C** from under the base.





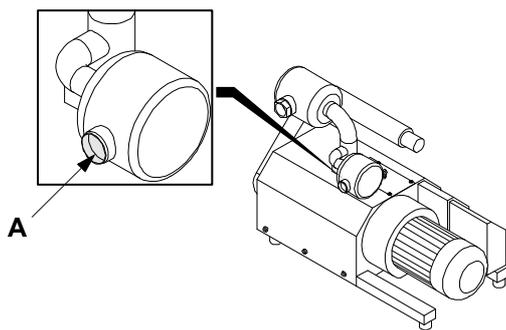
# C Installation

This appendix contains indications for the installation of the machine.

## C.1 Warnings regarding machine installation

Before proceeding, please read the following warnings carefully:

- The area in which the machine is installed must be properly illuminated, ventilated, of adequate size and fitted with connections to the various supply systems (electricity, compressed air, etc.). In this regard, see the paragraph “[Machine layout, connection points and working dimensions](#)” on page 164. The systems to which the machine is to be connected and the environment in which it is to be installed must comply with the requirements indicated on page 204.
- The machine cannot be installed in explosive environments.
- The machine assembly, levelling and connection operations are the responsibility of BIESSE assistance service personnel. Do not remove the packing, open any cases of material, or above all turn the machine on without the consent of trained, experienced staff. Should the safety seals on the boxes of accessories be tampered with, BIESSE will not be liable for any missing objects.
- Check the plug **A** of the Busch Mink pump air filter has been removed; if not, remove it immediately.



## C.2 Machine layout, connection points and working dimensions

The following illustrates the machine layout with the connection points to the power supply networks and the working dimensions.

The data relevant to the dimensions and to the positioning of the various items supplied separately from the machine (electrical cabinet, vacuum pump, projectors, etc.) are shown in the sections following the layout of the machine.

### Machine layout

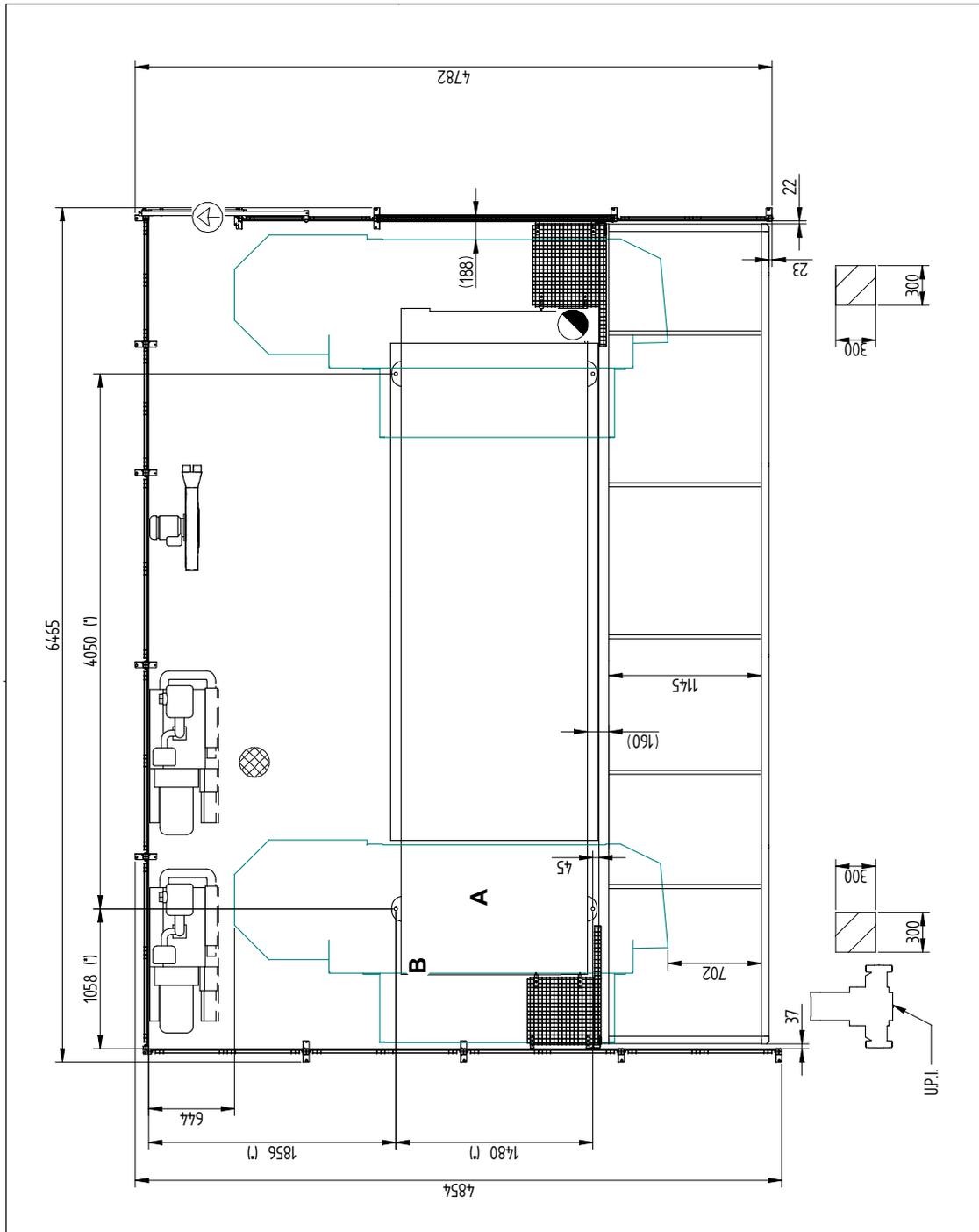
- [Layout for Skill 1536 G FT CE setup](#)
- [Layout for Skill 1224 G FT CE setup](#)
- [Layout for Skill 1536 G FT non CE setup \(safety fence h=2000 mm\)](#)
- [Layout for Skill 1224 G FT non CE setup \(safety fence h=2000 mm\)](#)
- [Layout for Skill 1536 G FT non CE setup](#)
- [Layout for Skill 1224 G FT non CE setup](#)
- [Layout for Skill 1224 G FT setup with CE unloading belt](#)
- [Layout for Skill 1224 G FT setup with loading pallet \(with labelling unit\) and CE unloading belt](#)
- [Layout for Skill 1224 G FT setup with loading pallet \(without labelling unit, with pushers\) and CE unloading belt](#)
- [Layout for Skill 1536 G FT setup with CE unloading belt](#)
- [Layout for Skill 1536 G FT setup with loading pallet \(with labelling unit\) and CE unloading belt](#)
- [Layout for Skill 1536 G FT setup with loading pallet \(without labelling unit, with pushers\) and CE unloading belt](#)
- [Layout for Skill 1224 G FT setup with non CE unloading belt](#)
- [Layout for Skill 1224 G FT setup with loading pallet \(with labelling unit\) and non CE unloading belt](#)
- [Layout for Skill 1224 G FT setup with loading pallet \(without labelling unit, with pushers\) and non CE unloading belt](#)
- [Layout for Skill 1536 G FT setup with non CE unloading belt](#)
- [Layout for Skill 1536 G FT setup with loading pallet \(with labelling unit\) and non CE unloading belt](#)
- [Layout for Skill 1536 G FT setup with loading pallet \(without labelling unit, with pushers\) and non CE unloading belt](#)
- [Layout for Skill 1224 G FT setup with non CE unloading belt](#)
- [Layout for Skill 1224 G FT setup with loading pallet \(with labelling unit\) and non CE unloading belt](#)
- [Layout for Skill 1224 G FT setup with loading pallet \(without labelling unit, with pushers\) and non CE unloading belt](#)

- Layout for Skill 1536 G FT setup with non CE unloading belt
- Layout for Skill 1536 G FT setup with loading pallet (with labelling unit) and non CE unloading belt
- Layout for Skill 1536 G FT setup with loading pallet (without labelling unit, with pushers) and non CE unloading belt
- Layout for Skill 1836 G FT CE setup
- Layout for Skill 1836 G FT non CE setup (safety fence h=2000 mm)
- Layout for Skill 1836 G FT non CE setup
- Layout for Skill 1836 G FT setup with CE unloading belt
- Layout for Skill 1836 G FT setup with loading pallet (with labelling unit) and CE unloading belt
- Layout for Skill 1836 G FT setup with loading pallet (without labelling unit, with pushers) and CE unloading belt
- Layout for Skill 1836 G FT setup with non-CE unloading belt (safety fence h=2000 mm)
- Layout for Skill 1836 G FT setup with loading pallet (with labelling unit) and non-CE unloading belt (safety fence h=2000)
- Layout for Skill 1836 G FT setup with loading pallet (without labelling unit with pusher) and non-CE unloading belt (safety fence h=2000)
- Layout for Skill 1836 G FT setup with non CE unloading belt
- Layout for Skill 1836 G FT setup with loading pallet (with labelling unit) and non CE unloading belt
- Layout for Skill 1836 G FT setup with loading pallet (without labelling unit, with pushers) and non CE unloading belt

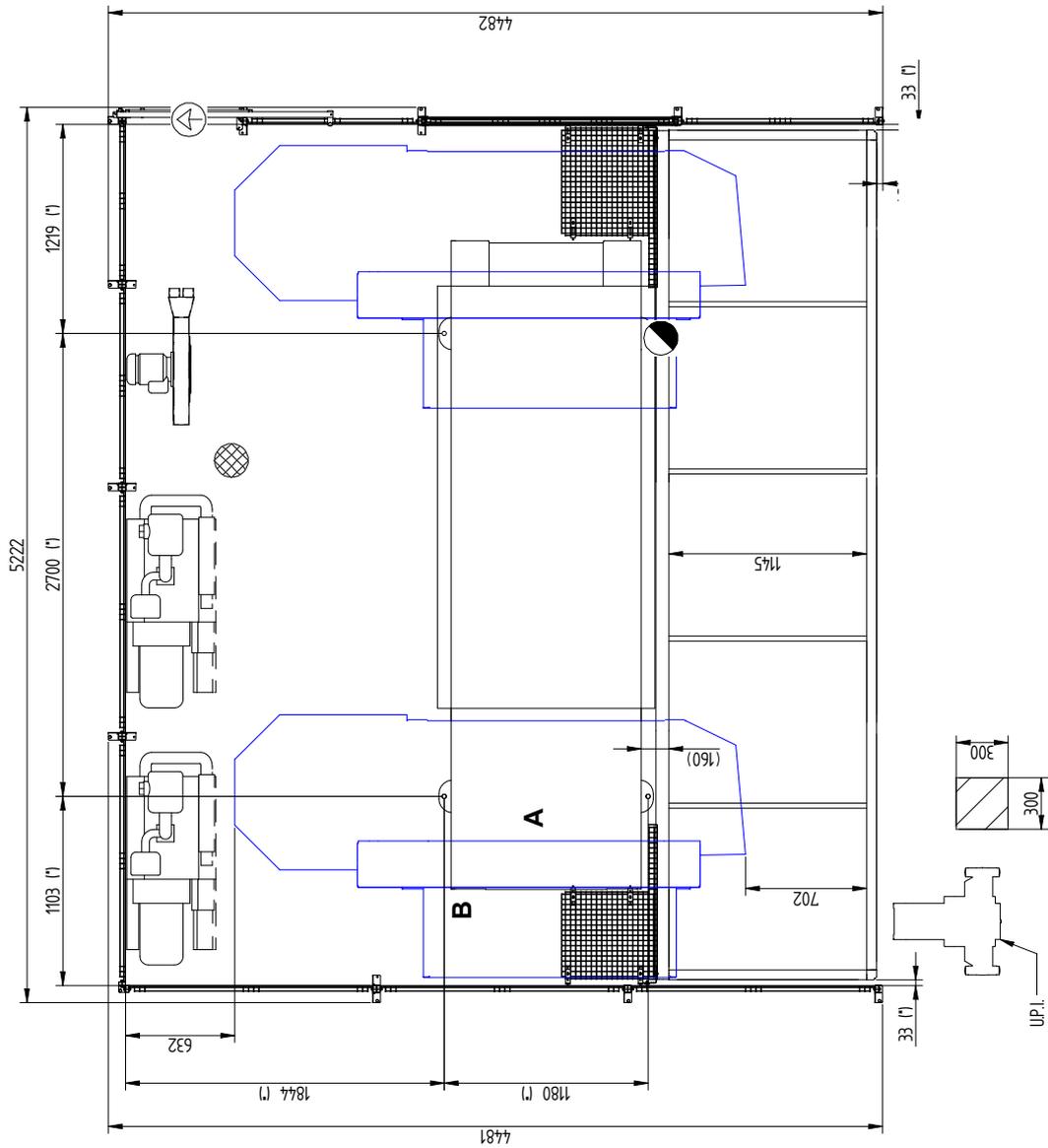
**Key**

(*)	Position of bores anchoring the machine to the floor.
	Connection point to the compressed air system: 3/8"; pipe with min. internal diameter.15 mm; minimum pressure 7.5 bar; height from the ground 370 mm.
	Connection point to the compressed air system: 3/8"; pipe with min. internal diameter. 15mm; minimum pressure 7.5 bar; height from the ground 550mm.
	Connection point for suction system. <ul style="list-style-type: none"> <li>• <b>A</b> = main manifold: diameter = 200 mm; height from the ground = 2400 mm;</li> <li>• <b>B</b> = unloader manifold: diameter = 250 mm; height from the ground = 2400 mm;</li> <li>• <b>C</b> = unloading belt manifold: diameter = 150 mm; height from the ground = 1550 mm;</li> <li>• <b>D</b> = lower work table manifold: diameter = 150 mm; height from the ground = 750 mm;</li> </ul>
	Entrance gate.
	Location of the vacuum pump.

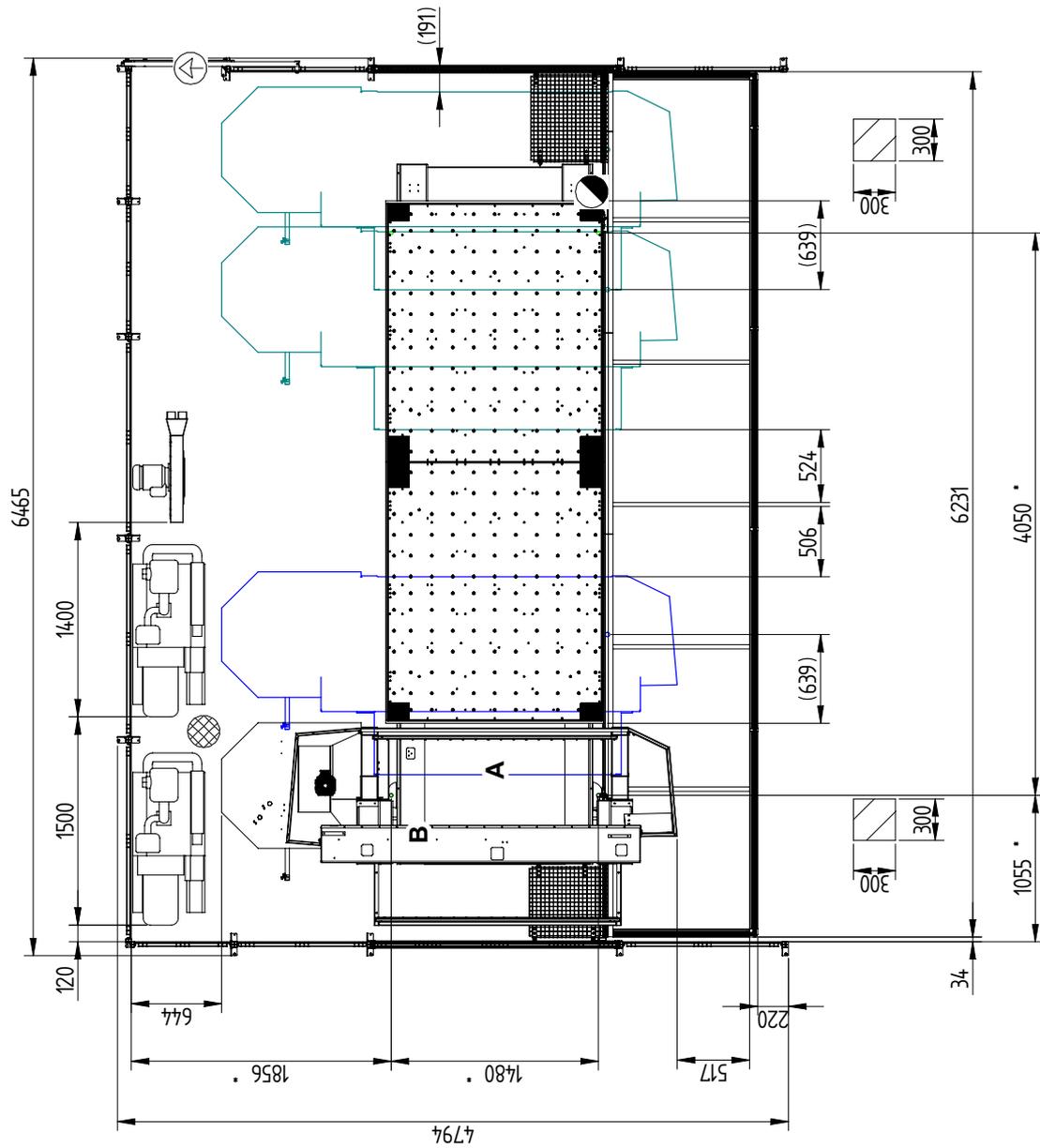
### Layout for Skill 1536 G FT CE setup



## Layout for Skill 1224 G FT CE setup

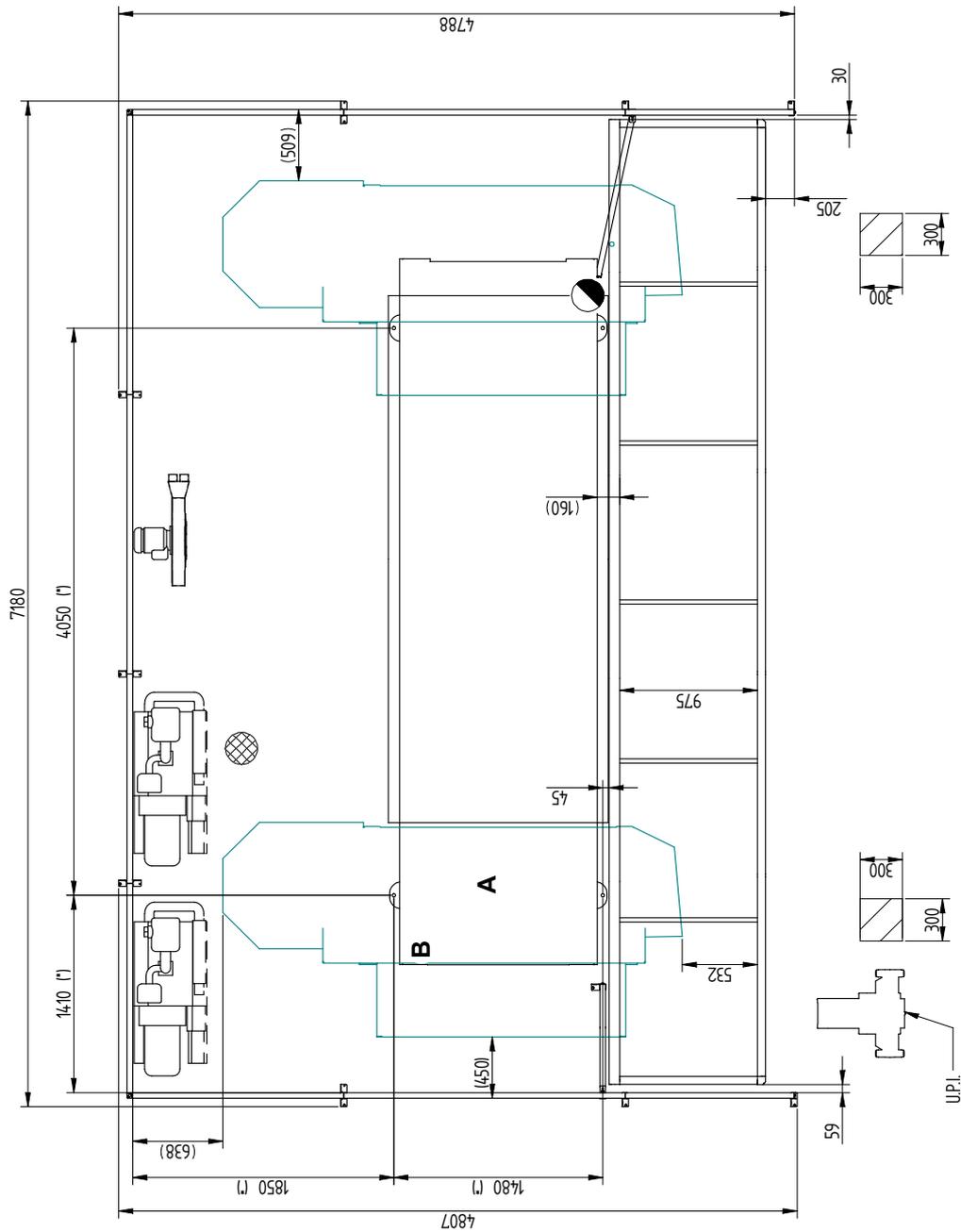


Layout for Skill 1536 G FT non CE setup (safety fence h=2000 mm)

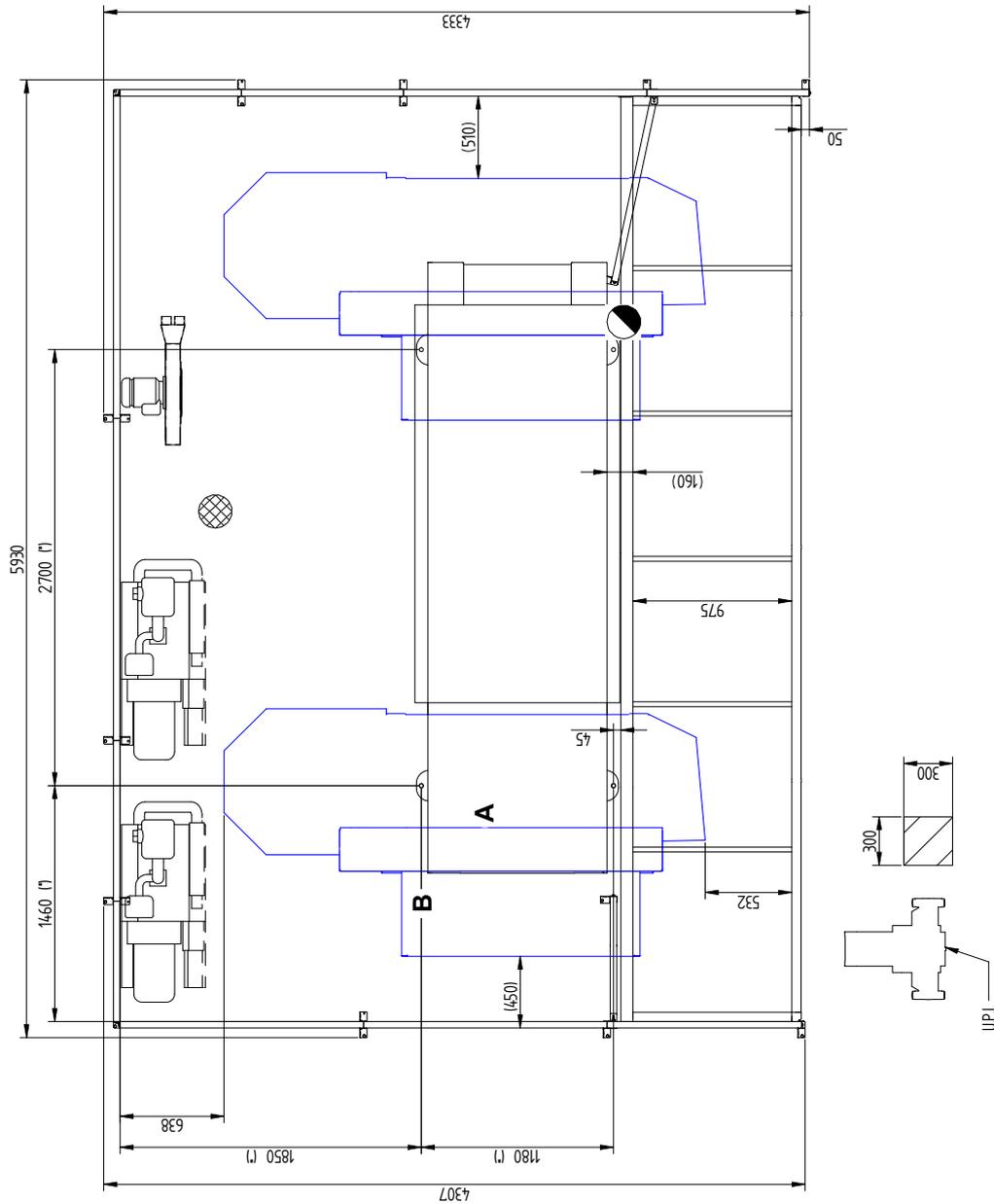




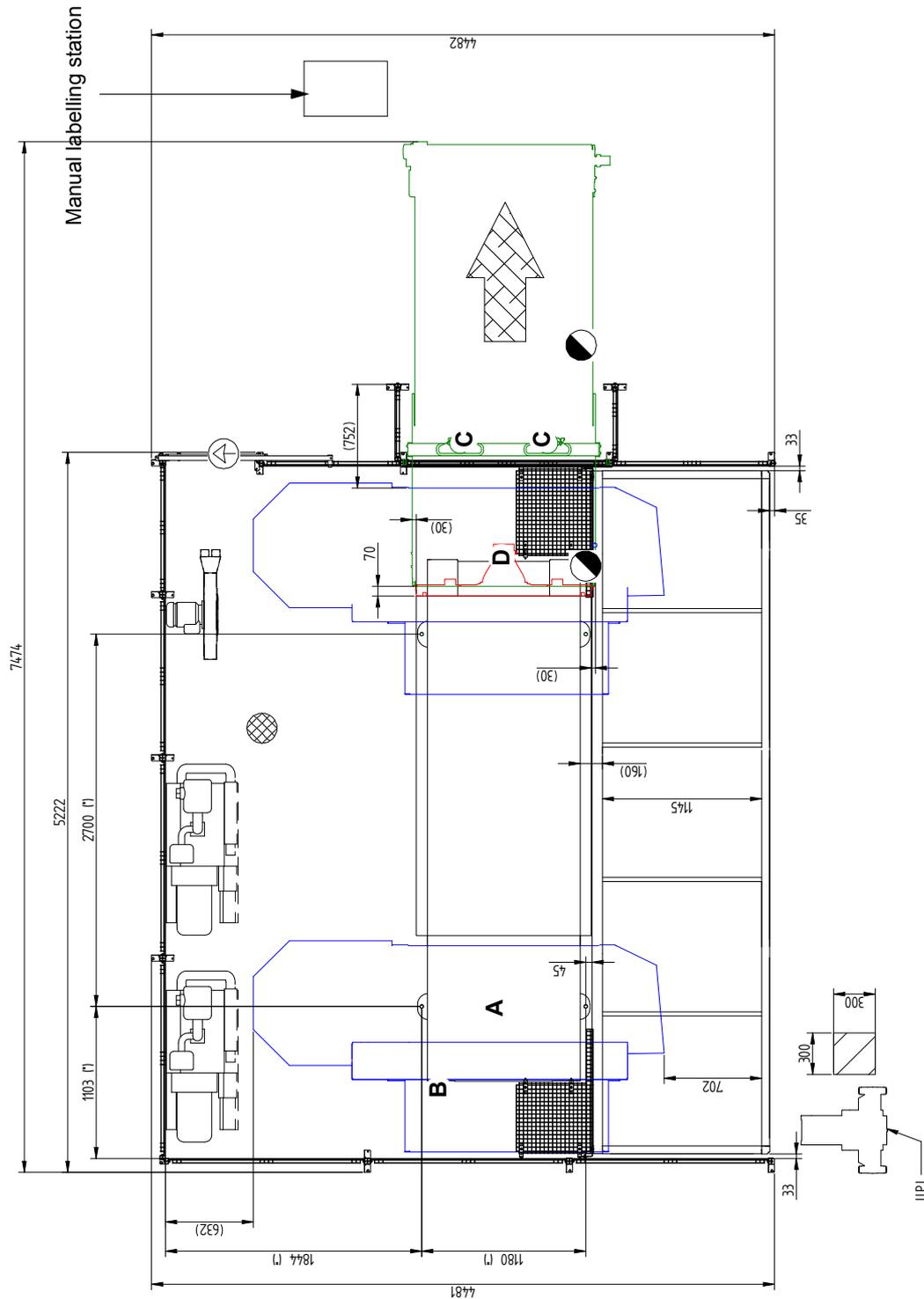
### Layout for Skill 1536 G FT non CE setup



## Layout for Skill 1224 G FT non CE setup

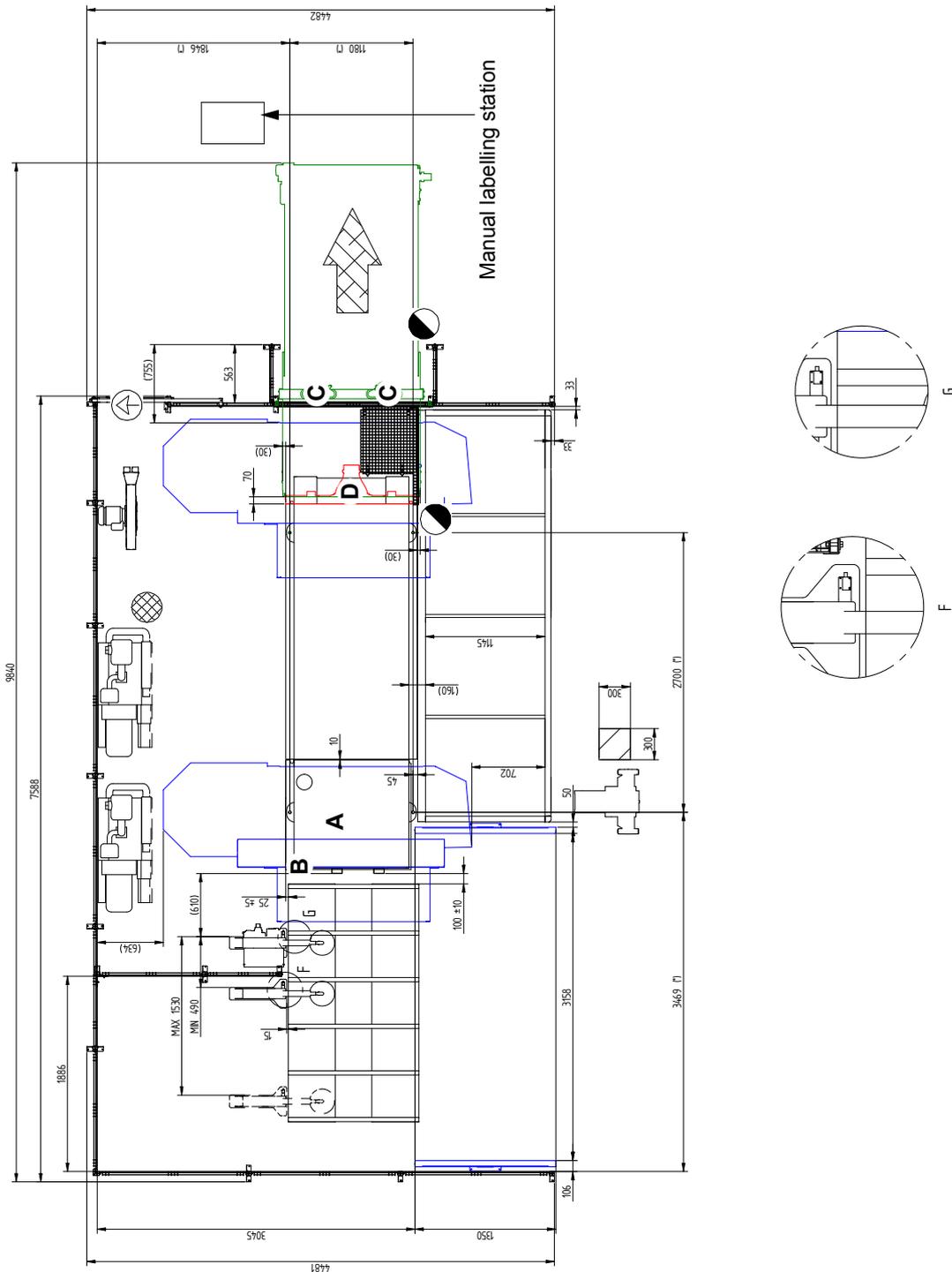


### Layout for Skill 1224 G FT setup with CE unloading belt

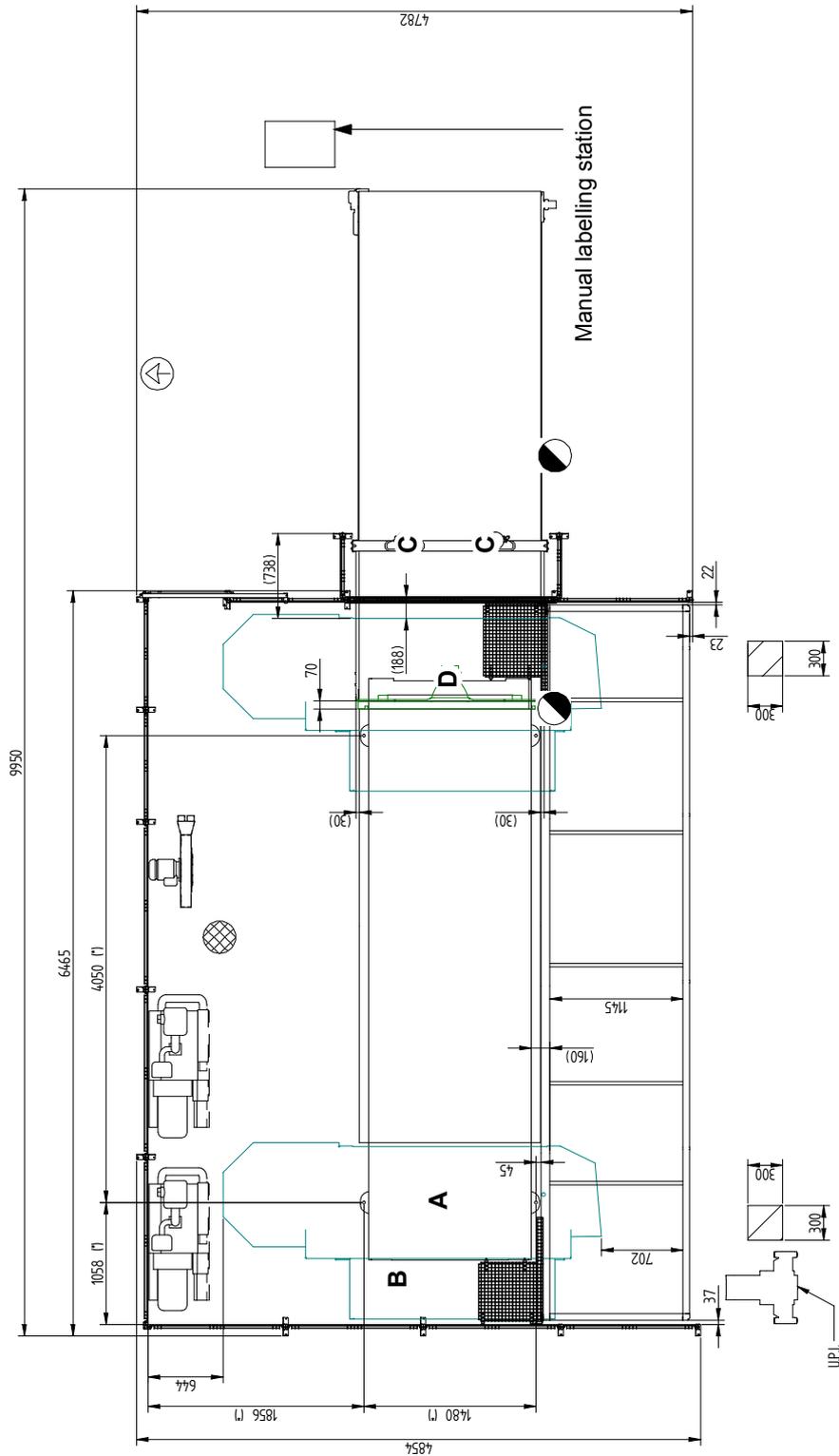




### Layout for Skill 1224 G FT setup with loading pallet (without labelling unit, with pushers) and CE unloading belt

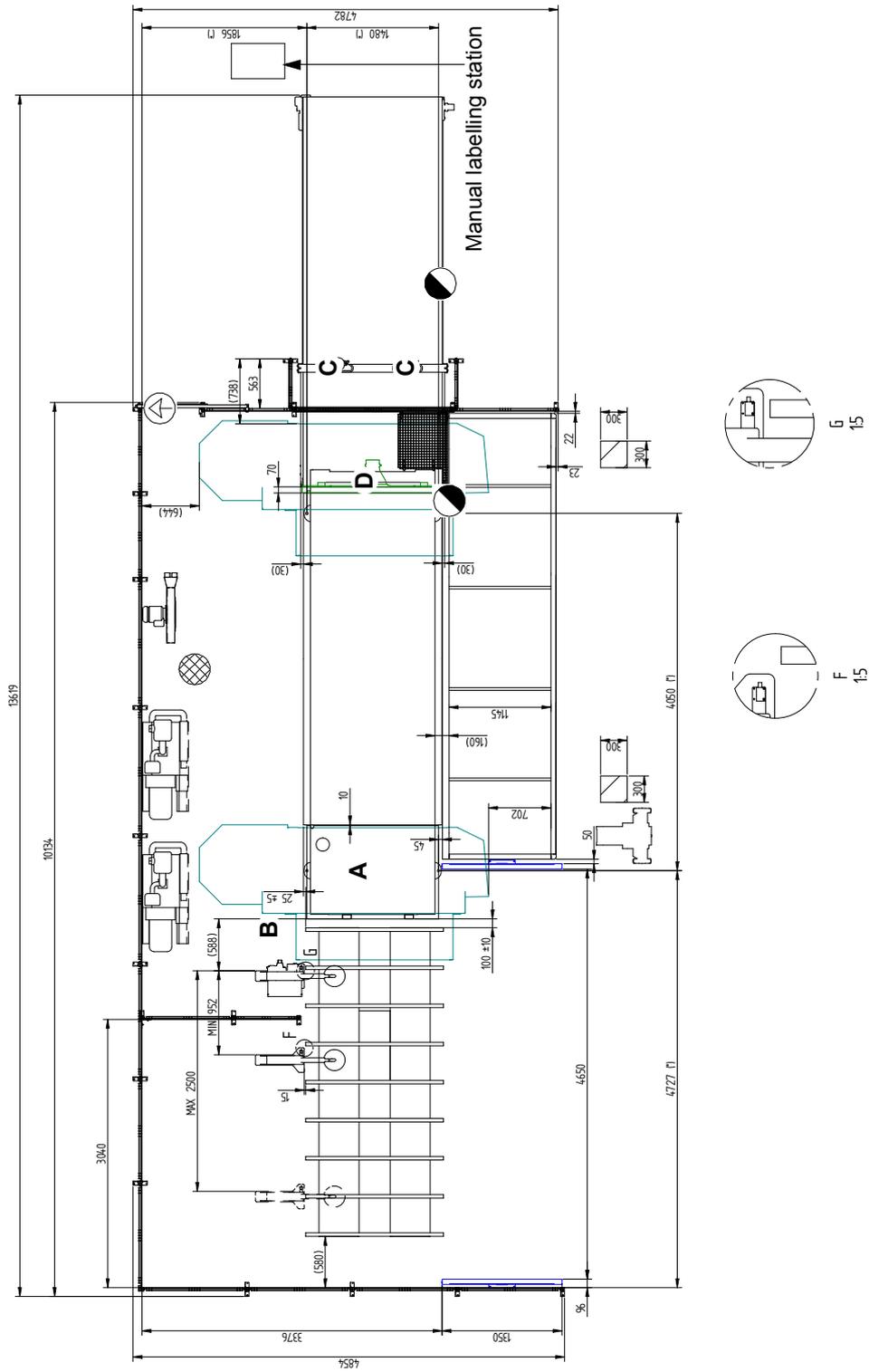


### Layout for Skill 1536 G FT setup with CE unloading belt

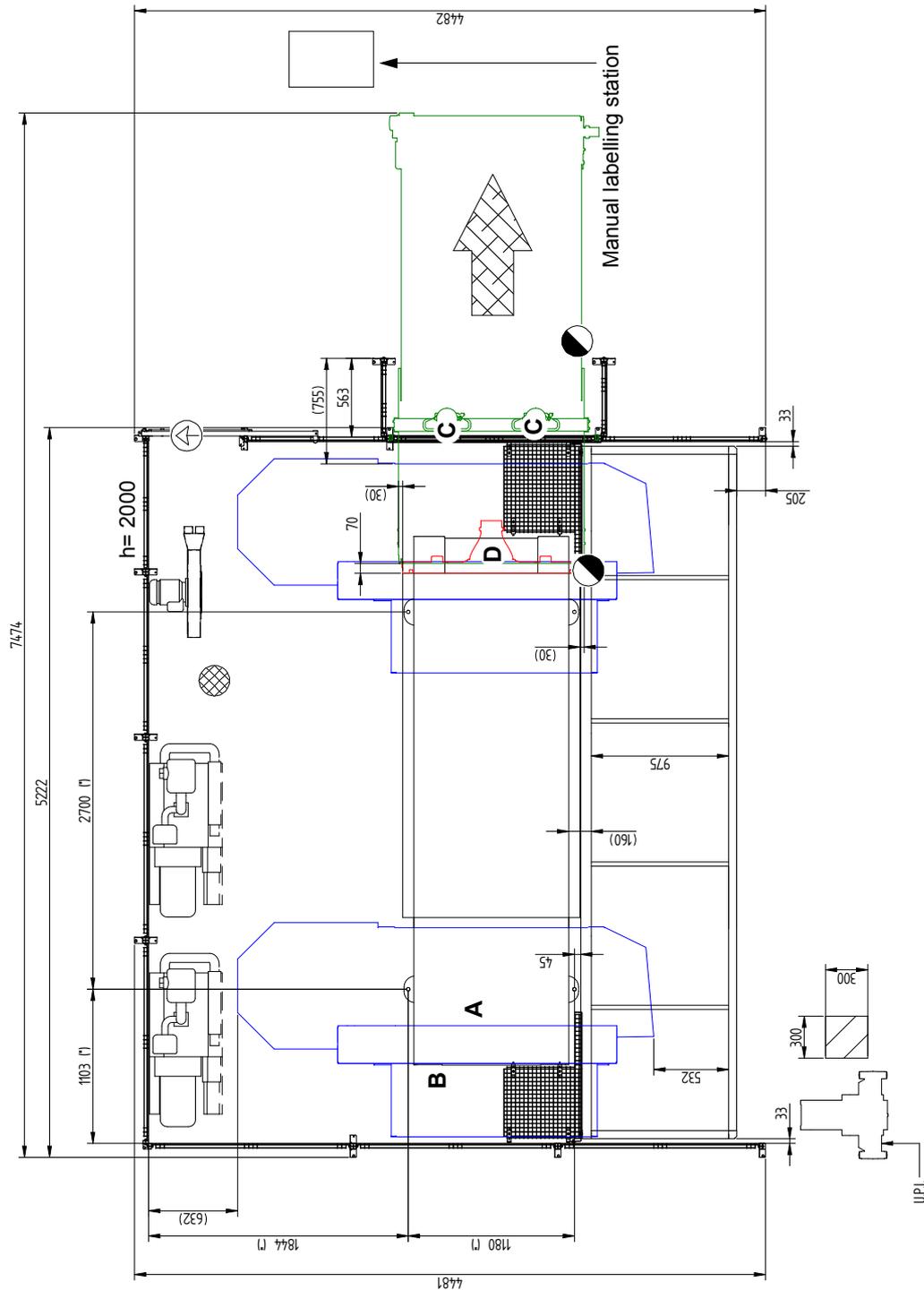




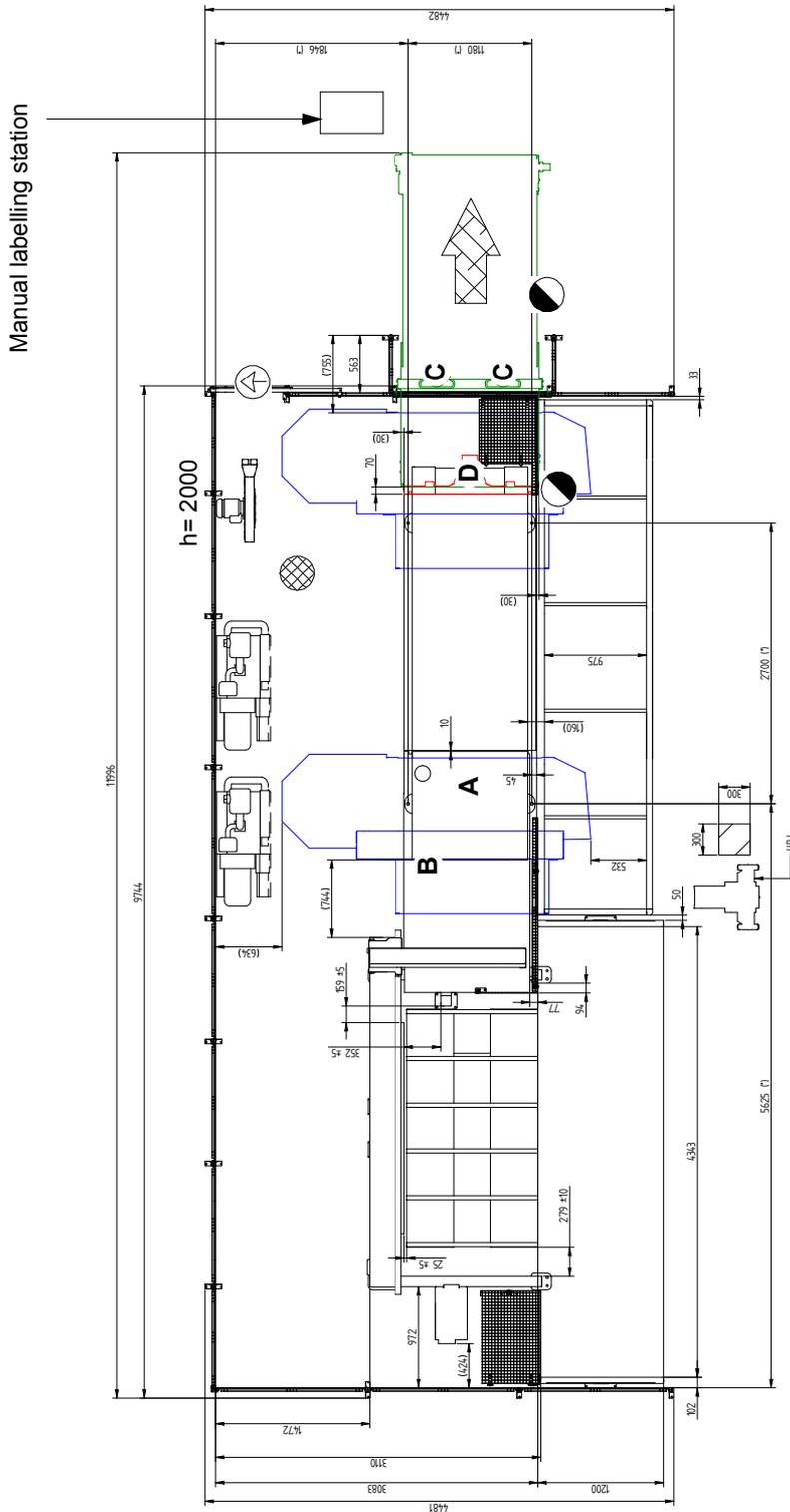
**Layout for Skill 1536 G FT setup with loading pallet (without labelling unit, with pushers) and CE unloading belt**



### Layout for Skill 1224 G FT setup with non CE unloading belt

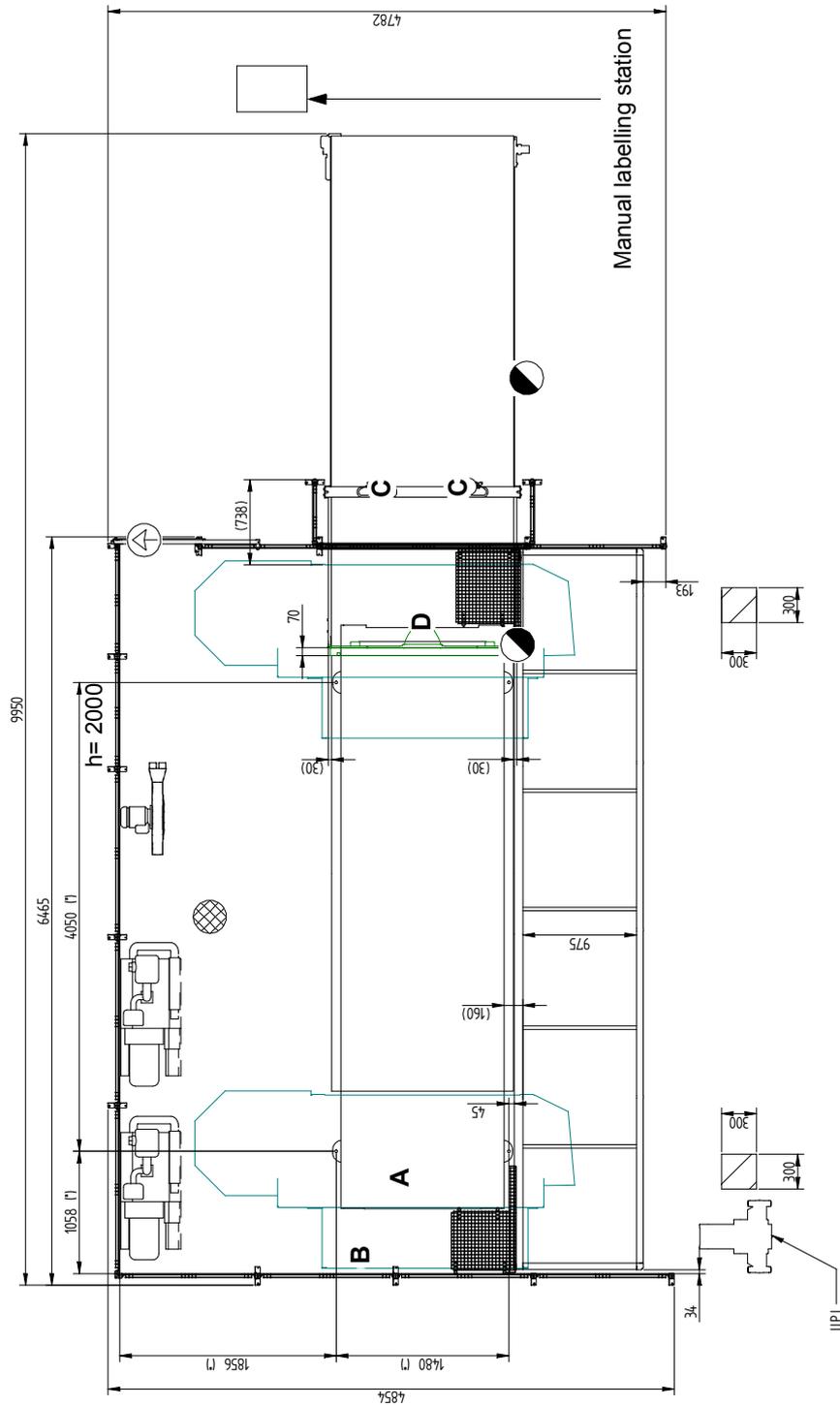


### Layout for Skill 1224 G FT setup with loading pallet (with labelling unit) and non CE unloading belt



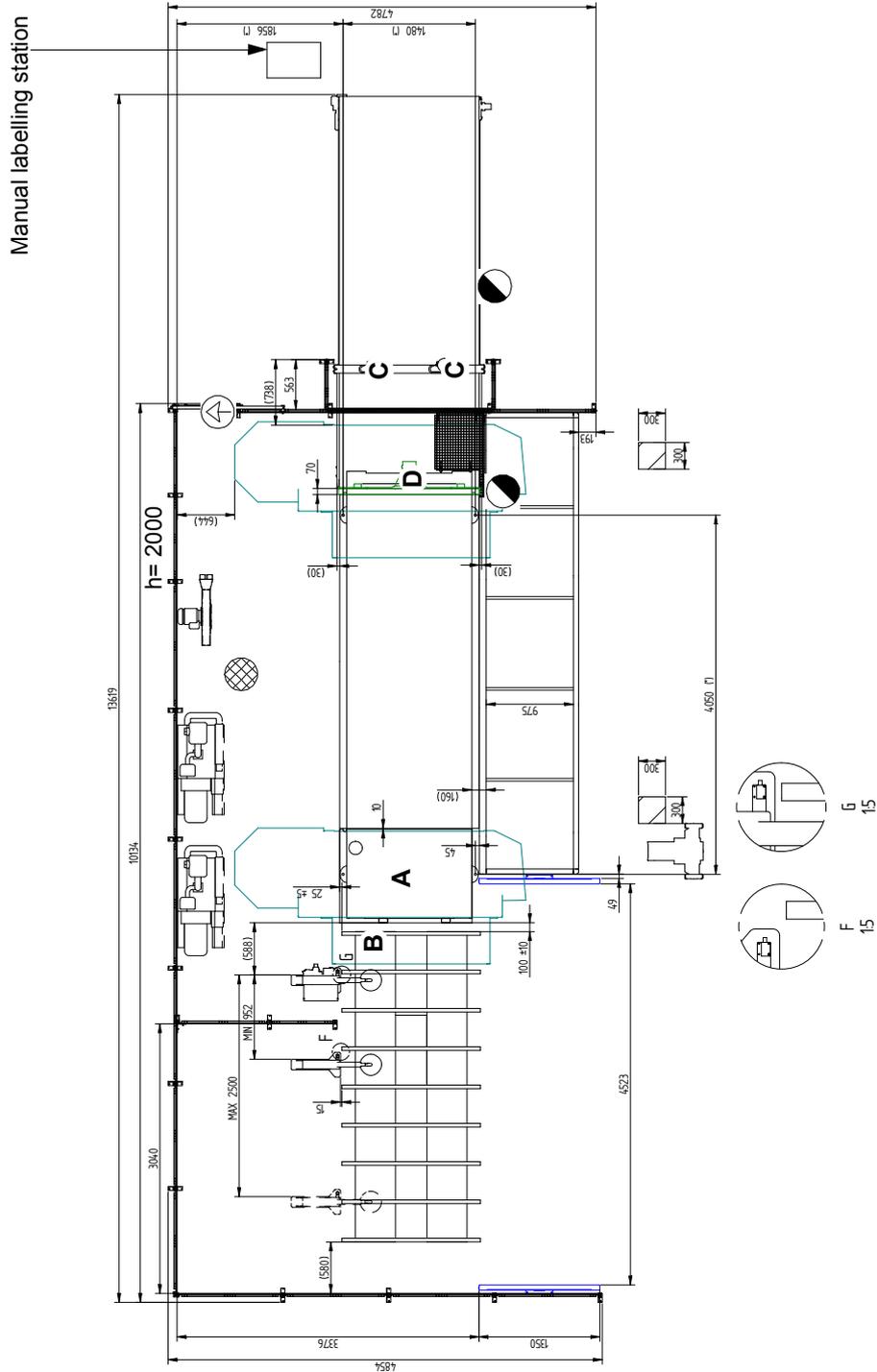


### Layout for Skill 1536 G FT setup with non CE unloading belt



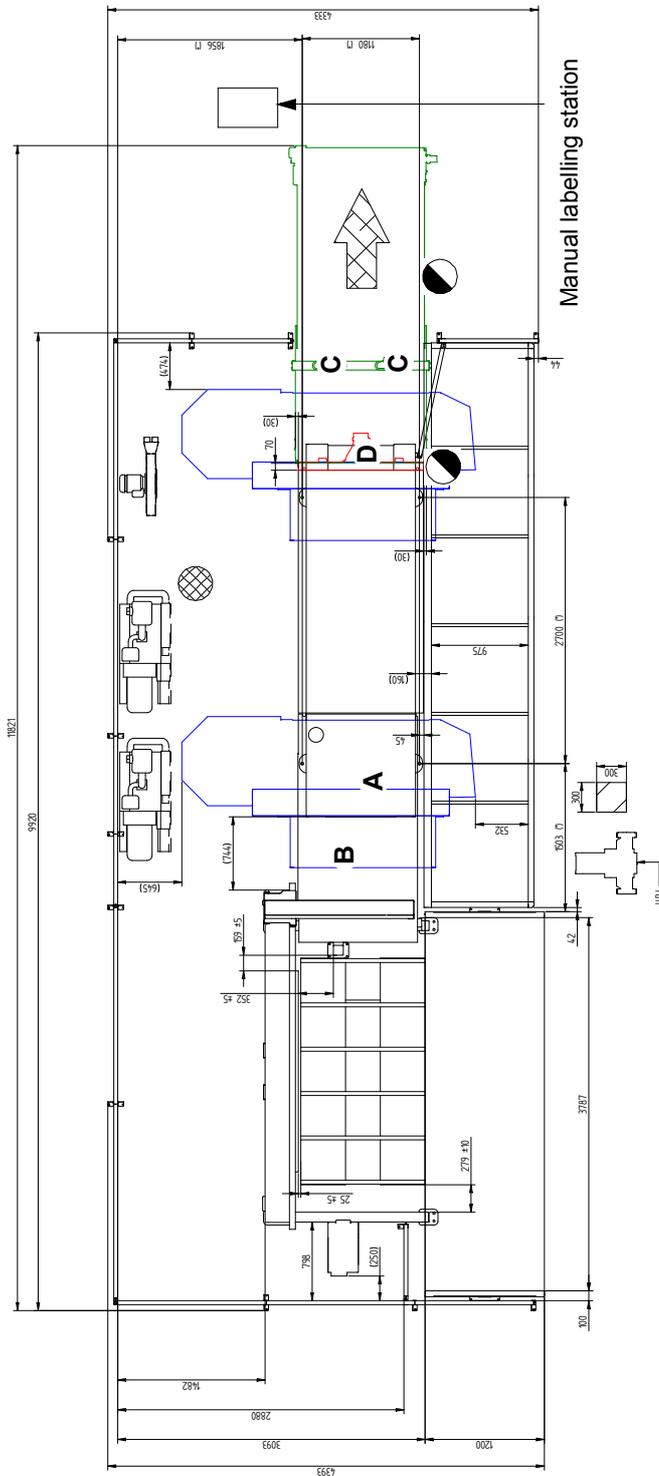


**Layout for Skill 1536 G FT setup with loading pallet (without labelling unit, with pushers) and non CE unloading belt**



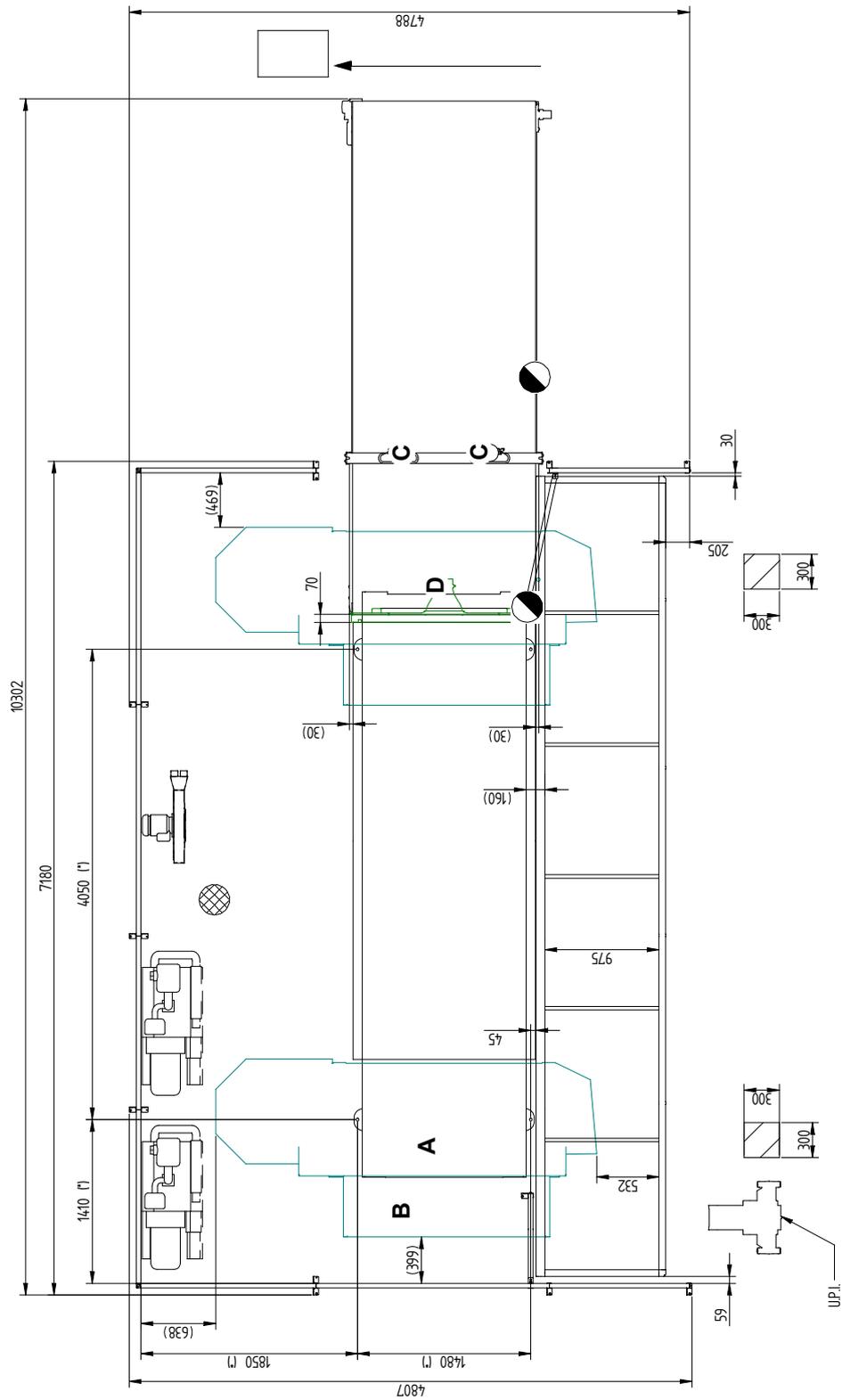


**Layout for Skill 1224 G FT setup with loading pallet (with labelling unit) and non CE unloading belt**

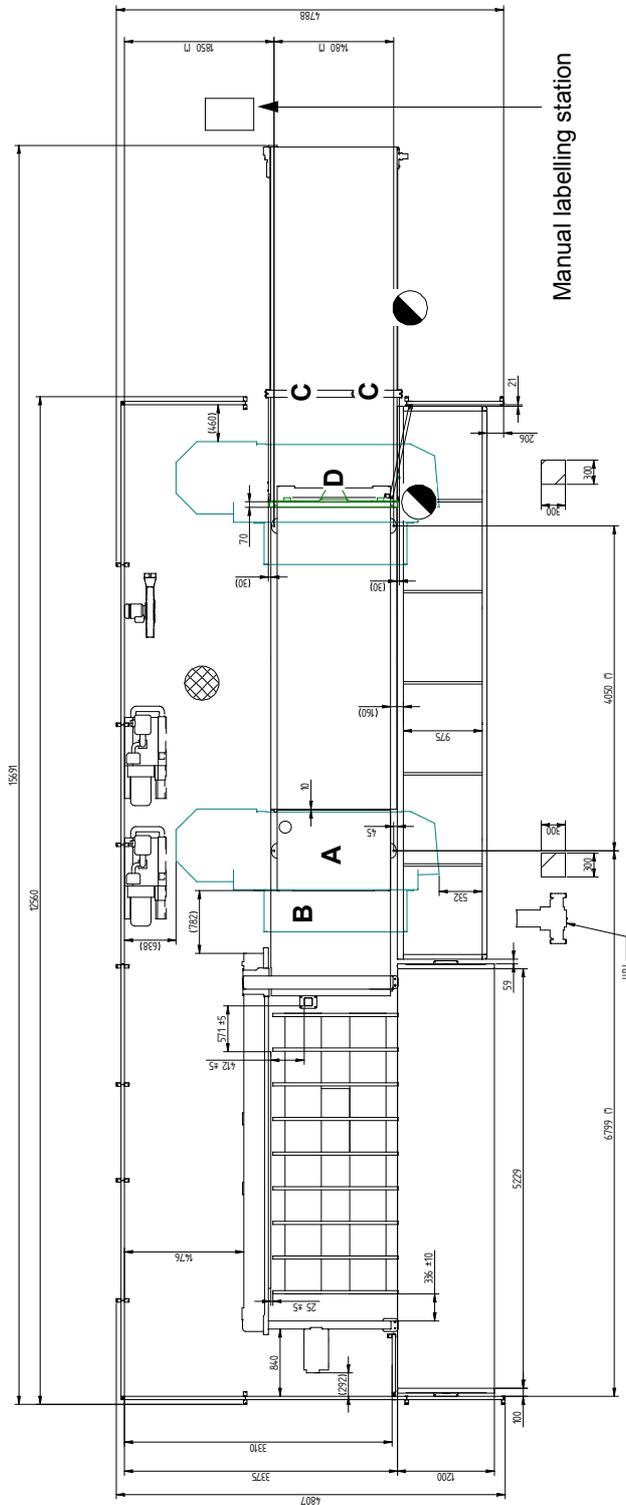




### Layout for Skill 1536 G FT setup with non CE unloading belt

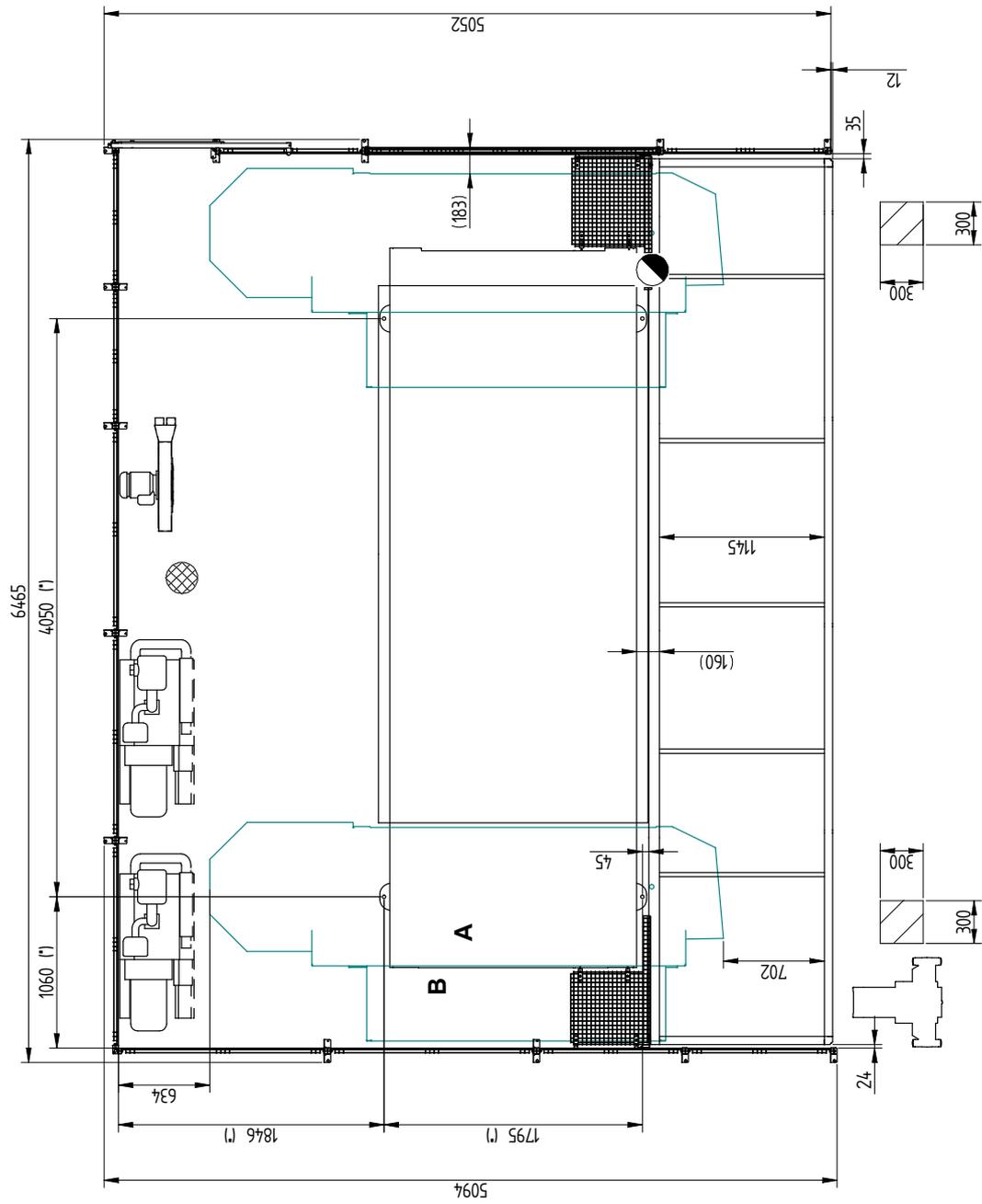


### Layout for Skill 1536 G FT setup with loading pallet (with labelling unit) and non CE unloading belt





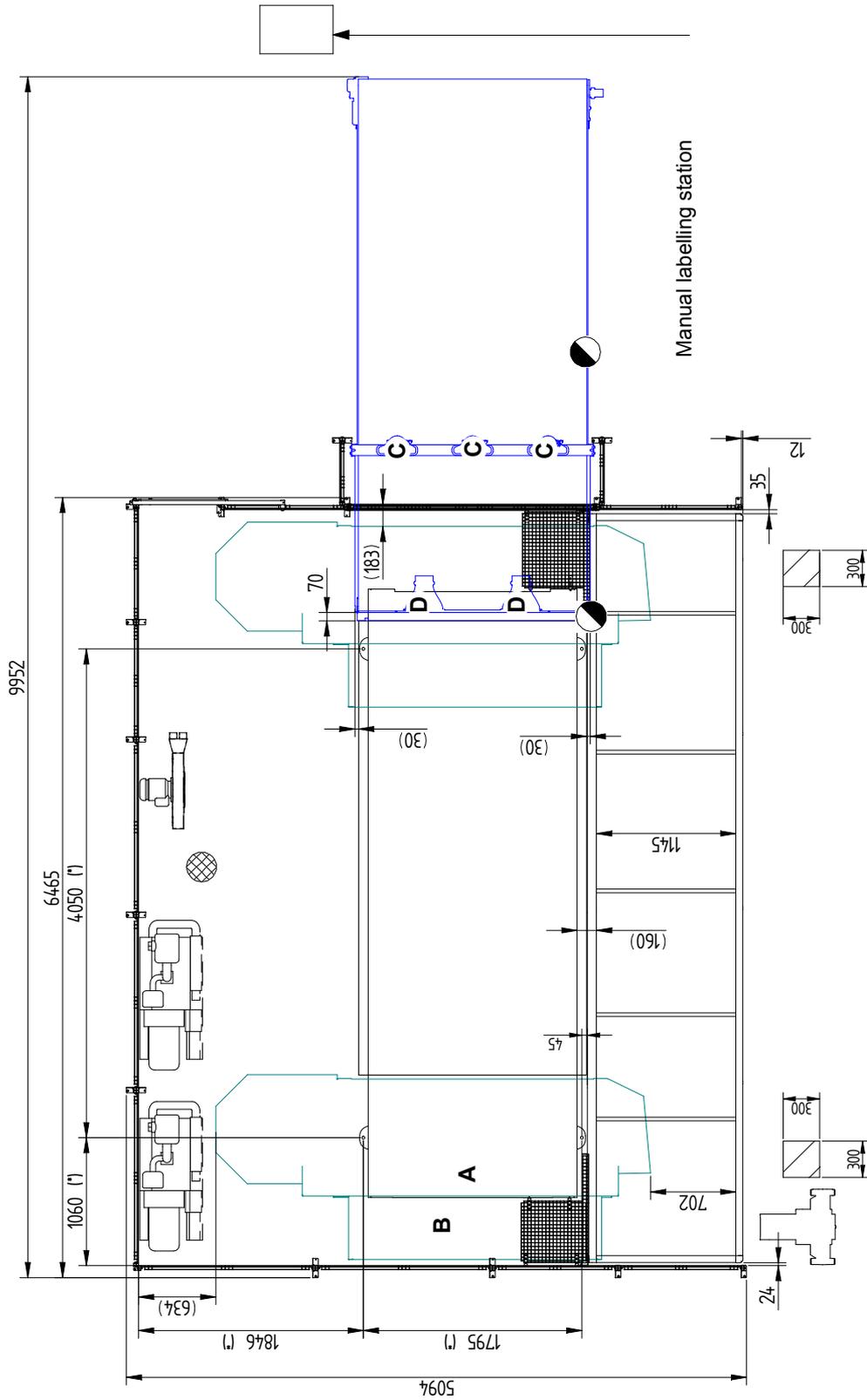
### Layout for Skill 1836 G FT CE setup



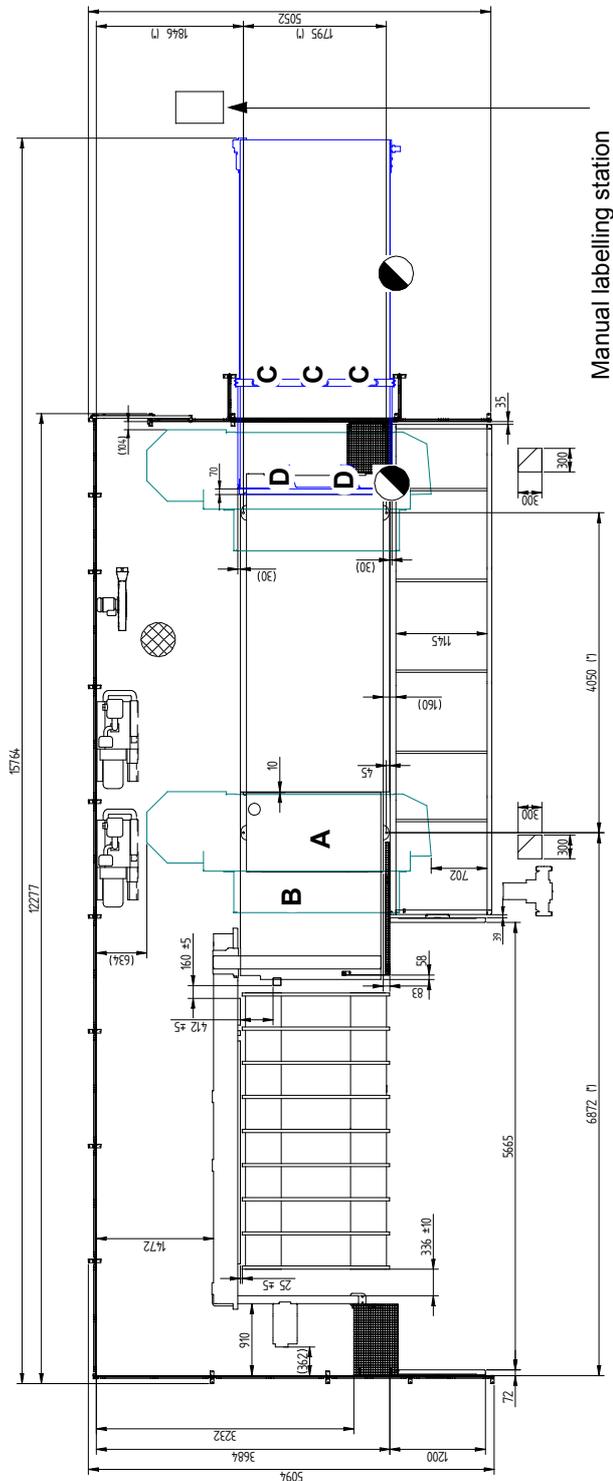




### Layout for Skill 1836 G FT setup with CE unloading belt

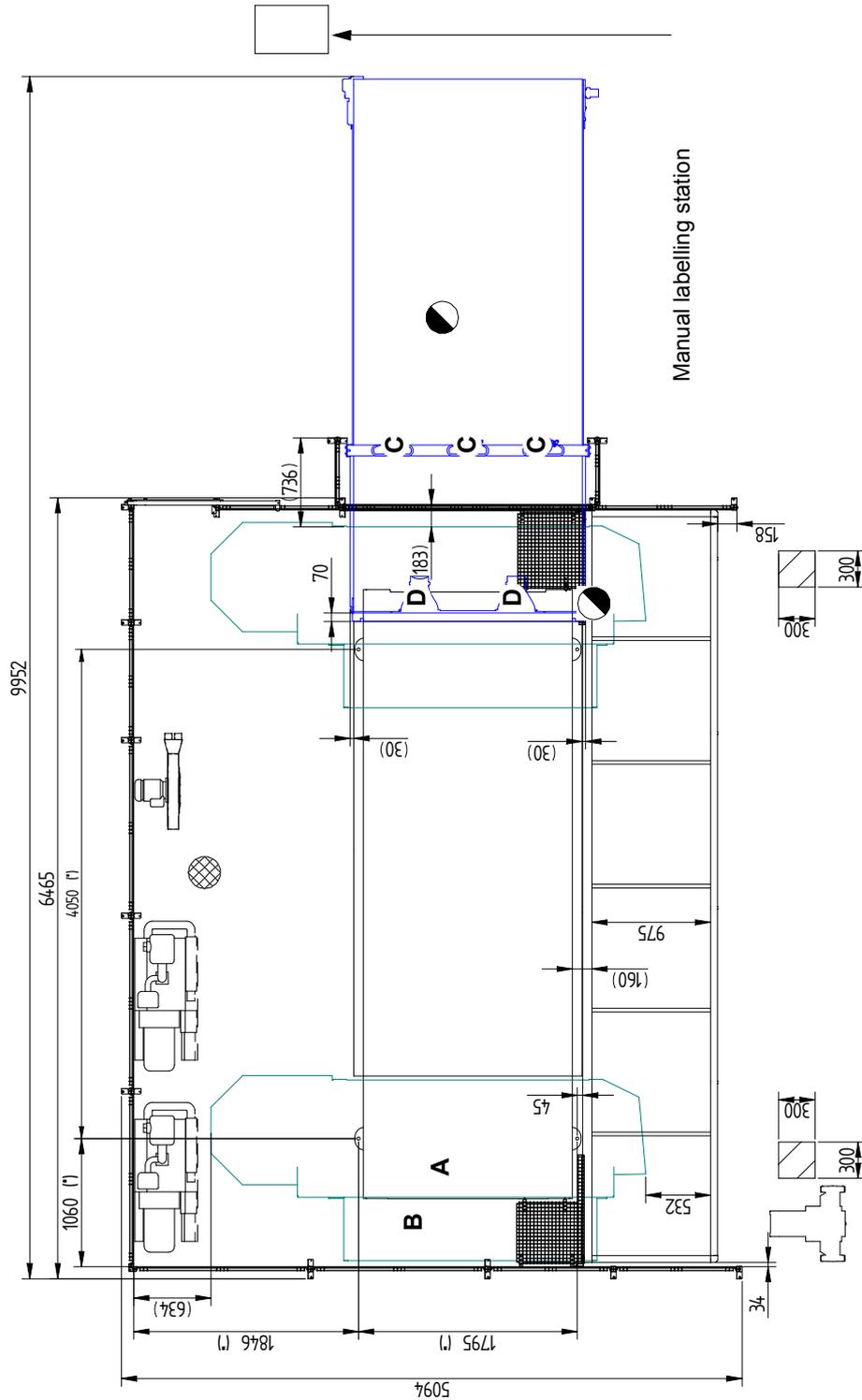


### Layout for Skill 1836 G FT setup with loading pallet (with labelling unit) and CE unloading belt





Layout for Skill 1836 G FT setup with non-CE unloading belt (safety fence h=2000 mm)





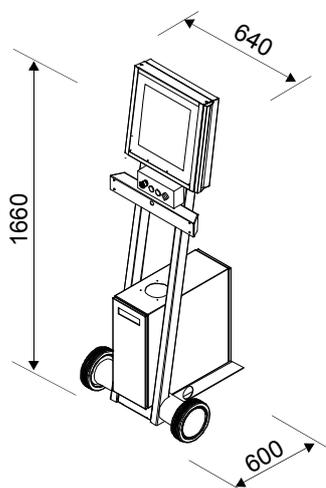






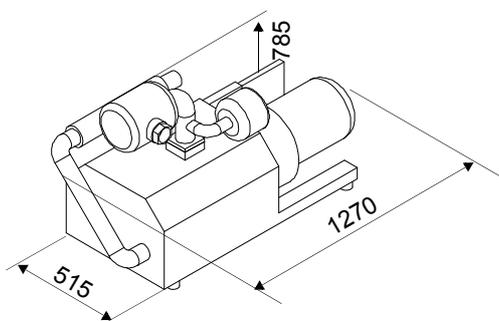


### Overall dimensions of the console

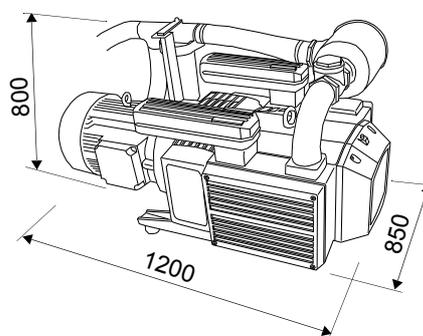


### Vacuum pump dimensions

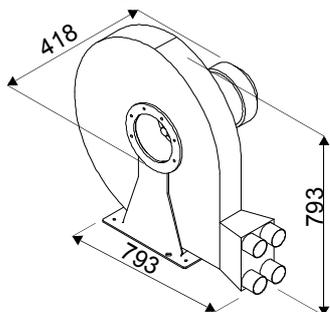
Busch Mink



Becker VTLF2.250



### Working dimensions of the electric fan



## C.3 Installation area requisites

The essential requisites for the various systems which the machine will be connected to are described below, along with those for the room in which it will be set up.

### Electric system requisites

The quality of the electric system must guarantee the essential requirements indicated in CEI 60204-1, IEC 204-1, unless otherwise agreed with the customer.

- Supply voltage: (see rating plate) with tolerance  $\pm 10\%$
- Supply voltage frequency: (see rating plate) with tolerance  $\pm 2\%$
- Maximum absorbed power: (see rating plate)
- Harmonic distortion: from second to fifth  $< 10\%$  + from sixth to thirtieth  $< 2\%$
- Three-phase supply voltage imbalance:  $< 2\%$
- Voltage peaks: duration less than 1.5 ms and  $< 200\%$  of supply voltage
- Voltage gaps: duration  $< 3$  ms; period  $> 1$  second
- Voltage drops: value  $< 20\%$  of peak supply voltage; period  $> 1$  second
- System to comply with standards: IEC 64-8, IEC 364

For mains voltages up to 400V, the machine's electrical cabinet can be connected to a point in the system with a short-circuit current of less than 10 kA R.M.S.(or 17 kA peak). For mains voltages greater than 415V the short circuit current at the connection point must be lower than 5 kA R.M.S. If the presumed short circuit current at the power supply point is greater, it must be restricted.

The machine's electrical equipment is not protected against atmospheric power surges.

The machine is not fitted with phase advancing capacitors.

### **Differential protection**

No differential type protection is foreseen for the machine's electric system. The choice of differential protection must not contrast with current legal requirement, local regulations or the characteristics of the factory and machine electrical system.

Bear in mind the following machine characteristics to ensure you make the correct choice:

1. Electromagnetic disturbance protection devices (mains filter and screening) may produce high frequency leakage current and pulse leakage currents exceeding 30 mA.  
The 30 mA differential switches may not guarantee continuous operation under all conditions.
2. The machine may be subject to earth faults even with direct current (IEC 755).  
If this is not in contrast with local laws or the characteristics of the system, you are advised to fit differential switches with adjustable currents and trip times, of the type that are not influenced by high frequencies.

It is advisable to use differential switches that are highly resistant to pulse overvoltage caused by atmospheric conditions and manoeuvres (EN 61008-1), and wave tested 8/20  $\mu$ s >1000A (VDE 0432 T2).

### **Power supply from local electricity generator**

If the electricity is supplied by a local generator rather than mains supply, the generator must guarantee the above indicated requisites for the electrical system, while taking also into account that the starting current for the vacuum pumps is 8 to 10 times the machine's specification plate current.

### **Electrical data of the machine with inverter for connection to the mains with autotransformer**

Pot. Inst. = total installed power; Cons. = consumption; Fus. = fuses; Sec. = minimum section.

Vacuum pump m <sup>3</sup> /h	Inst.Power kW	200V mains supply		220V mains supply	
		Cons. A	Fus. A	Cons. A	Fus. A
1 x 250/300	25,9	88	100	80	100
2 x 250/300	34.2	116	125	105,5	125

Vacuum pump m <sup>3</sup> /h	Inst.Power kW	380-400-415V mains supply		440-460-480V mains supply		575-600V mains supply	
		Cons. A	Fus. A	Cons. A	Fus. A	Cons. A	Fus. A
2 x 300	25,9	44	63	40	63	29	35
2 x 250	34.2	58	80	52,7	80	25.3	25

### Installed electrical power

The power output depends on the number and capacity of vacuum pumps as shown in the table. The minimum installed power indicated on the machine rating plate always comprises the power required for 2 vacuum pumps, 90m<sup>3</sup>/h (or one 250m<sup>3</sup>/h), even if they are not present in the machine. The power factor taken into account is 0.85.

### Fuses

At the mains electricity connection point there must be safety protection in the form of fuses for the connection cable, for the cut-off switch and any autotransformer present. Uses GI/Gg type fuses for IEC regulations, or J type for UL and CSA (or equivalent) regulations. Fuse sizes are given in the table above.

The power supply cable, the electrical cabinet cut-out and any autotransformers can be protected by automatic switches. When selecting the type of automatic switch to be used, bear in mind the following conditions:

- The automatic switch thermal current must be calibrated to the same value as that of the cut-out
- the magnetic current must be set to between 7 and 12 times the rated thermal current
- the automatic switch must have a cut-out power exceeding the short circuit current at the point of installation
- the current limited by the switch must be less than 10 kA (5 kA for voltages >415V) with a short circuit current equal to that at the installation point (see the switch limiting characteristics).

### Connection cable

The mains connection cable must have a cross-section chosen according to the size of fuses, or automatic switches, and the length of the connection itself. Minimum and maximum cross section areas are given in the table above.

It is advisable for the cable to be shielded or fed through a metal conduit so as to reduce possible electromagnetic interference. The screening or metal raceway must be earthed.

## Requisites for the compressed air system

- The compressed air system must guarantee a supply pressure of at least 7 -7.5 bar.
- The machine consumes an average of approximately 300 NL/min of compressed air.
- According to standard ISO 8573-1, the compressed air admitted to the machine must satisfy the following cleanliness requirements:
  - Solids particles Class 7: Dimension < 40 micron; Concentration < 10mg/m<sup>3</sup>;
  - Humidity Class 4: Dew point temperature < 3°C;
  - Oil Class 4: Concentration < 5 mg/m<sup>3</sup>.

## Suction system requisites

- The suction system must be permanently connected to the machine, it must operate with the machine and must be capable of supplying a constant minimum flow rate of 30 m/sec.
- The static pressure in the point of connection to the operating section (main manifold) is 3000 Pa.

- The air consumption for aspiration is 3400 m<sup>3</sup>/h.
- A guillotine valve type device must be provided on the pipe connecting the suction system to the machine, so that the machine can be cut off when necessary from the main system. This valve must be in an easily accessible position and in full view of the operator.

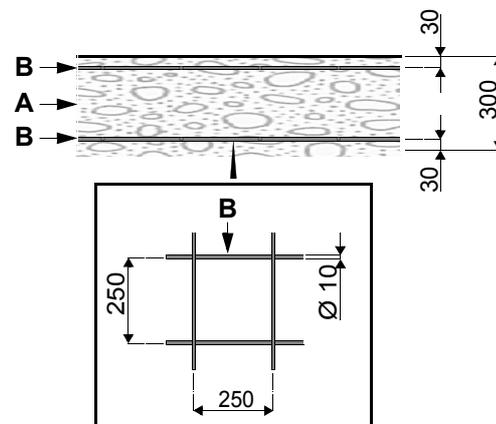
 **Insufficient system performance may damage health.**

## Requirements when anchoring the machine to the floor

### Cross-section of flooring

A - Concrete.

B - Grille.



### Vertical forces

- Maximum static load on each side support foot: 2000kg.
- Maximum unitary static load on each side support foot: 6.5 N/mm<sup>2</sup>
- Maximum static load on each internal support foot: 1200kg.
- Maximum unitary static load on each internal support foot: 4 N/mm<sup>2</sup>
- Maximum dynamic load on each support foot: 150kg.
- Maximum unitary dynamic load on each support foot: 0.5 N/mm<sup>2</sup>
- Maximum static load created by tie rod on each side support foot: 2200kg.
- Maximum unitary static load created by tie rod on each side support foot: 7.2 N/mm<sup>2</sup>
- Maximum unitary load on each internal support foot: (6.5 + 0.5) = 7 N/mm<sup>2</sup>
- Maximum unitary load on each side support foot: (4 + 0.5 + 7.2) = 11.7 N/mm<sup>2</sup>

### Horizontal forces

- Tangential dynamic load on each support foot: 240kg

### Levelling

- Maximum planar error of flooring: 25mm/m (not accumulable).
- Maximum inclination of the floor in all directions: 0.4%.

## **Environmental requisites**

- Temperature: from 0 to +40 °C
- Maximum relative humidity: 90% (without condensation)
- Maximum altitude: 1000m (unless agreed otherwise with the customer)

# D Decommissioning - Demolition

## D.1 Decommissioning

During the machine's life cycle it may be necessary to transfer it to another location. In this case, contact the BIESSE Service Centre.

## D.2 Demolition

When the machine reaches the end of its technical working life it must be totally decommissioned so that it can no longer be used for the purposes for which it was designed and built. If any parts are used again it must be for purposes other than those for which the individual part and the machine as a whole was originally designed and constructed.

Contact specialised companies for demolition of the machine.



**Certain parts of the machine might be under pressure. Fix all parts capable of moving by gravity.**

The machine uses lubricating oil and grease. To neutralise the lubricant fluids which remain attached to parts of the machine and cannot be reused, use degradable solvents of an approved type. For evacuation of recoverable lubricant fluids empty the tanks and deliver the fluids to the local authority in charge of disposal. Any batteries, accumulators, buffer batteries for electronic cards and conditioners that may be found in the machine must also be disposed of in a suitable manner.

BIESSE declines all liability for damage to persons or things that may derive from any secondary use of single parts of the machine for functions or assemblies other than those originally contemplated. BIESSE recognises 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.



# E Guarantee and customer service

## E.1 Guarantee

For information on the guarantee, please refer to the documentation issued on purchase of the machine.

## E.2 Customer service

BIESSE S.p.A. has service points throughout the world. The whole structure forms a highly efficient integrated network, which customers can contact for any problem, information, advice or news.

The service department employs technicians with a high level of knowledge and experience on the models manufactured, gained through special training in our factory, who are able to service machines on site.

BIESSE Authorised Service Centres are listed in the InDocs CD-ROM.



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