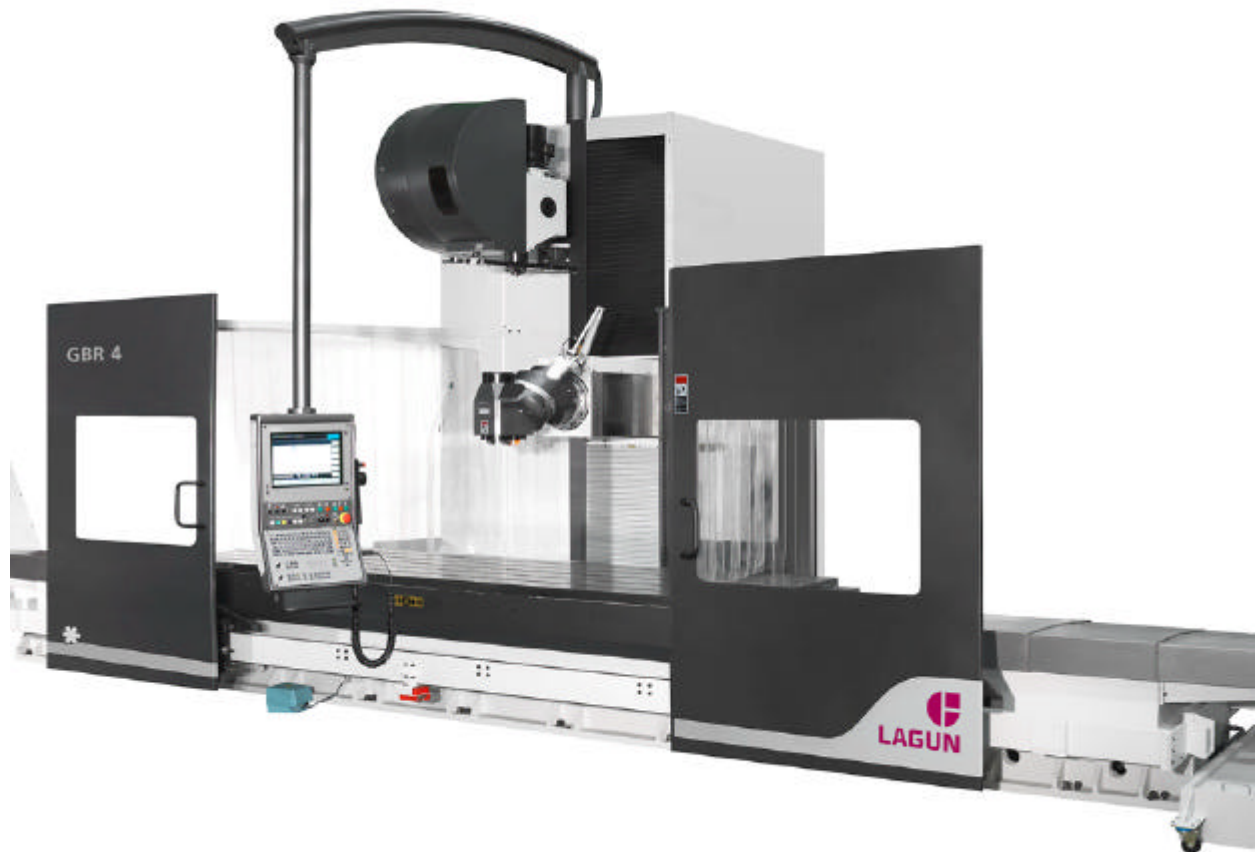


BED TYPE MILLING MACHINE



GBR 3
GBR 4



GORATU'S great experience in the machine tool sector, together with the remarkable competence of the R&D department of its Integral Technological Centre have resulted in a new generation of BED-TYPE MILLING MACHINE of excellent quality, great performance, accuracy, flexibility and high output.

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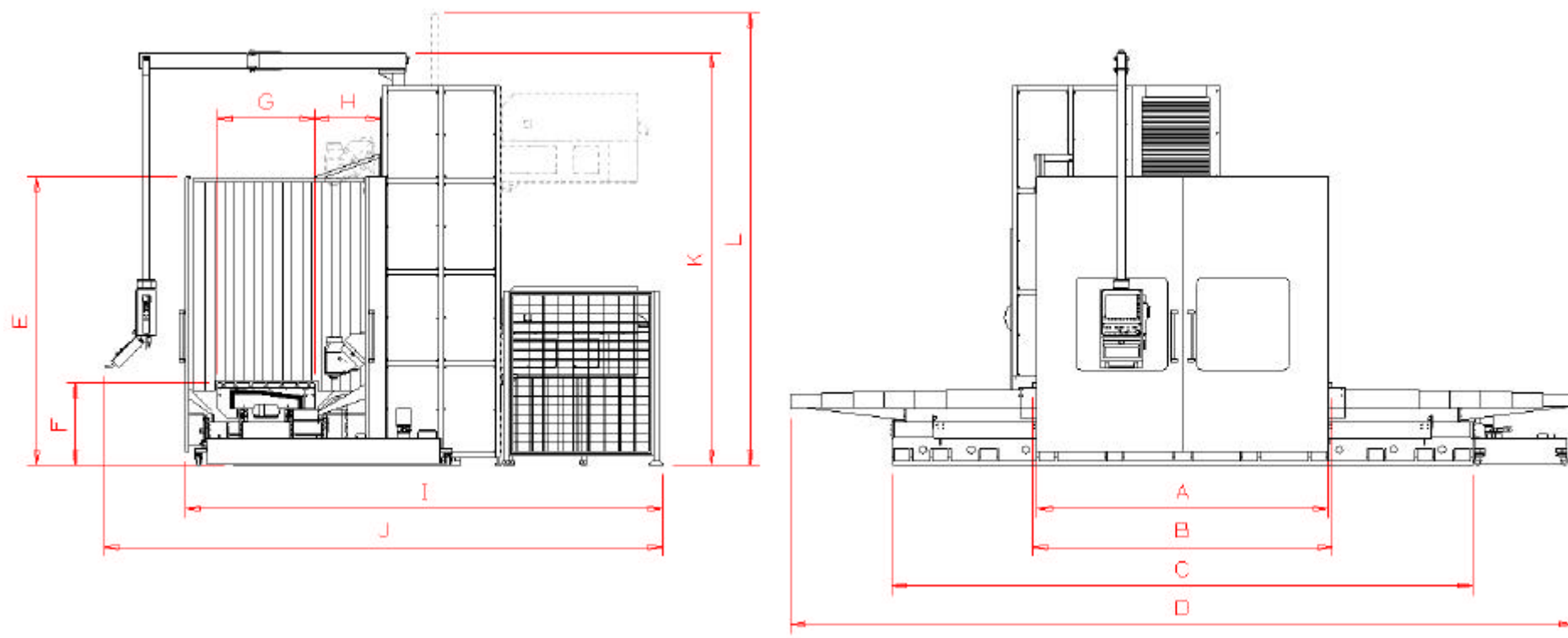
1. TECHNICAL FEATURES

1.1. MACHINE DESCRIPTION:

BED TYPE MILLING MACHINE LAGUN	GBR 3	GBR 4
TABLE		
WORKING SURFACE (mm)	3100x1000	4100x1000
T SLOTS, NUMBER AND WIDTH (mm)	7x22	
DISTANCE BETWEEN SLOTS (mm)	160 - 125	
MAXIMUM WEIGHT ON TABLE (Kgs)	6000	7000
TRAVERSE		
LONGITUDINAL – X AXIS (mm)	3000	4000
CROSS– Y AXIS (mm)	1200	
VERTICAL – Z AXIS (mm)	1500/2000*	
RAPID FEEDS		
LONGITUDINAL – X AXIS (mm/min)	20000	
CROSS – Y AXIS (mm/min)	20000	
VERTICAL – Z AXIS (mm/min)	20000	
SPINDLE (MAIN SPINDLE)		
SPINDLE TAPER	ISO 50 DIN 69871/A	
SPEED RANGE (min ⁻¹)	3000/4000*	
MAIN MOTOR		
MAIN MOTOR POWER (kW)	28/34,5	
SERVOMOTOR POWER (kW)	5,37	
COOLING MOTOR PUMP (kW)	1,1	
CENTRAL LUBRICATION PUMP(kW)	0.15	
CENTRAL HYDRAULIC UNIT (kW)	0.75	
MACHINE ACCURACY		
POSITIONING (mm)	A: 0,015	
REPEATABILITY (mm)	R: 0,008	
MEASUREMENTS		
PLANT LAY-OUT (mm)	8090x5770	10090x5770
MACHINE HEIGHT (mm)	3770/4681,5*	
WEIGHTS		
NET WEIGHT (Kgs)	18300	21600
GROSS WEIGHT WITH SEA PACKING (Kgs)	19500	22900
TOTAL INSTALLED POWER (kW)	49	

(*) Optional

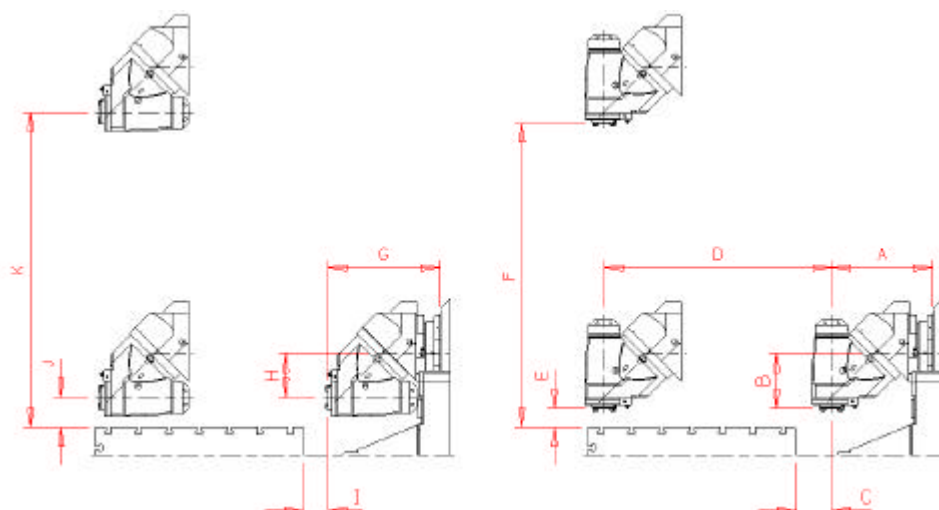
1.2. MACHINE LAY-OUT:



LAGUN	A	B	C	D	E	F	G	H	I	J	K	L
GBR 3	3000	3100	6000	8090	2485	850	1000	690	4928	5770	3770	-----
GBR 4		4100	8000	10090	2985*						4270*	4681,5*

(*) Optional

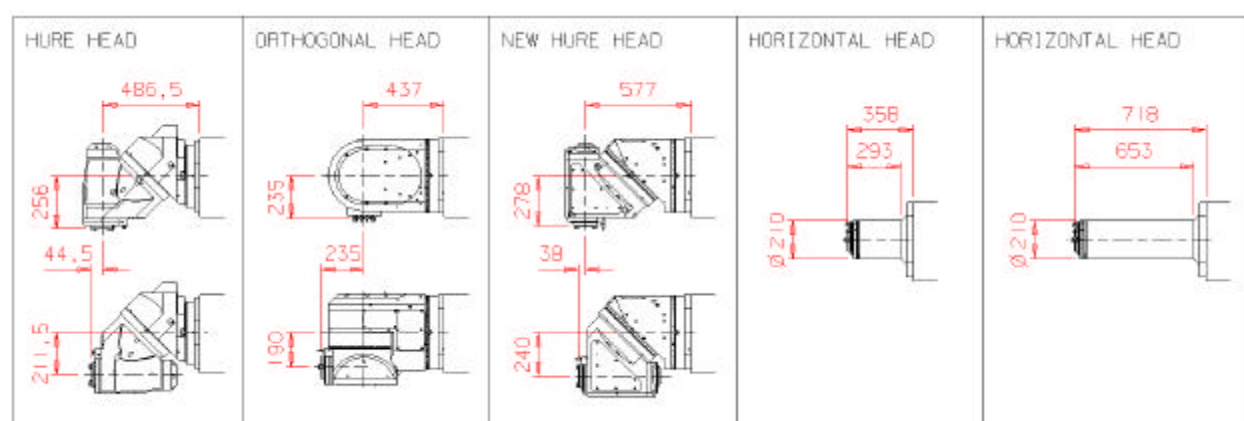
1.3. SPINDLE TRAVEL LENGTH



LAGUN	A	B	C	D	E	F	G	H	I	J	K
TRAVERSE Z 1500	486,5	256	200	1200	62,5	1562,5	531	211,5	155,5	107	1607
TRAVERSE Z 2000						2062,5*					2107*

(*) Optional

1.4. MILLING HEAD'S DIMENSIONS



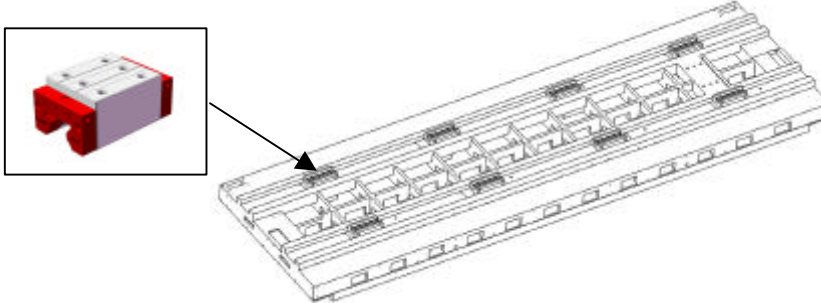
2. BED

- The table slides on this part. The bed is anchored to the floor by means of anchoring and levelling holes of the machine, and is laterally attached to the column. It is made of pearlitic grey cast iron, quality EN-GJL-300 (UNE-EN 1561 standard), with a hardness of 190-220 HB, reinforced by means of ribs at the bottom and subjected to finite element calculation.
- It is fitted with a tray integrated in the cast iron piece itself along the side to collect liquids and chips.
- The table slides on two, size-45, rolling linear guide ways. The displacement of the table is by means of ball screw.

3. TABLE

- The table is made of pearlitic grey cast iron, quality EN-GJL-300 (UNE-EN 1561 standard), and has a hardness of 190-220 HB, robustly reinforced with ribs at the bottom and subjected to finite element calculation.

- The upper part is provided with 7 T slots of 22 mm; the central one serves as reference with 22 H7, with 160mm between slots (except both of extremes, which are to 125mm).
- Guidance of the table is carried out using size-45 long type roller shoes, 8 units for the GBR 3 and 10 units for the GBR 4. This guide rail system provides the machine with high dynamics and rigidity due to the rollers and thus insignificant friction in rails.

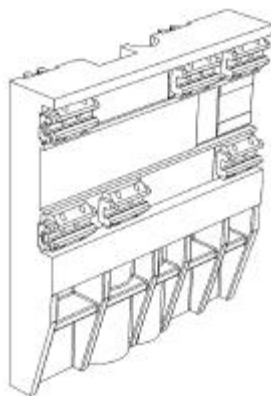


4. COLUMN

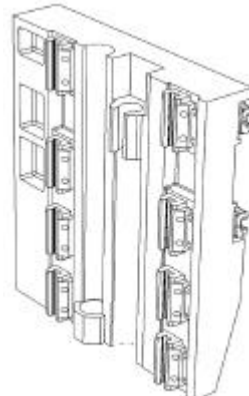
- The column is rigidly attached to the bed, and is made of pearlitic grey cast iron, quality EN-GJL-300 (UNE-EN 1561 standard), with a hardness of 190-220 HB, and is dimensioned and robustly reinforced with inner ribs to absorb the cutting and weight forces and studied by finite elements.
- The union between the bed and column provides the machine with a great rigidity, which allows it to work under any circumstances. They are separated by an adequate distance, which enables machining of large volume parts with a width greater than the table.
- In the bottom part of the base, holes are located for machine anchoring to the floor, with threaded supports for levelling.
- For vertical slide displacement the column has two size-45 rolling type linear guide ways.

5. VERTICAL SLIDE

- The vertical slide is made of pearlitic grey cast iron, quality EN-GJL-300 (UNE-EN 1561 standard), and has a hardness of 190-220HB, robustly reinforced with ribs at the bottom and subjected to finite elements.
- The 8 long type guide carriages for Z movement and another 6 for the Y movement are located on this part.



Y AXIS MOVEMENT



Z AXIS MOVEMENT

6. RAM

- The ram is made of pearlitic grey cast iron, quality EN-GJL-300 (UNE-EN 1561 standard), with a hardness of 190-220 HB, and is dimensioned and robustly reinforced with inner ribs to absorb the cutting and weight forces, and studied by finite elements.
- The ram has two size-45 rolling linear guide ways with recirculation rolls carriages, closed and protected against contamination.

7. SPINDLE HEAD

- Both bodies of spindle head are made of spheroidal graphite cast iron, quality EN-GJS-HB155 (UNE-EN 1563 standard), with a hardness of 130-180 HB.
- The Spindle head is made up of two parts joined at 45°, which rotates around each other and are joined to the front part of the ram.

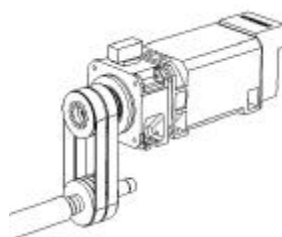


- The head fitted on the machine can be "HURE" type, "ORTHOGONAL" type, "HORIZONTAL L 290mm" and "HORIZONTAL L 650mm". The standard head fitted on the machine is a "HURE" type with the following main features:
 - o Hardened and ground Klingerlberg-type epicyclical taper gears.
 - o Hardened and ground spindle shaft DIN 5480 (gear type).
 - o Main spindle bearing diameter 85 x 130 mm.
 - o Super-precision angular-contact ball bearings on the entire head.
 - o Hydro-mechanic type tool clamping system (clamping force 12 / 14 kN).
 - o Adapted to the machine and commanded by the CNC.
 - o Complete installation with safety interface.
 - o Rigid tapping.
 - o Spindle taper and pull stud options:
 - Spindle taper DIN 69871 A/50 and pull stud DIN 69872 A (STANDARD)
 - Spindle taper DIN 69871 A/50 and pull stud ANSI B5.50
 - Spindle taper MAS 403 BT/50 and pull stud MAS 403 BT (45°)
 - Spindle taper DIN 2080/50 and pull stud DIN 69872 A

8. DIGITAL DRIVE OF MAIN SPINDLE

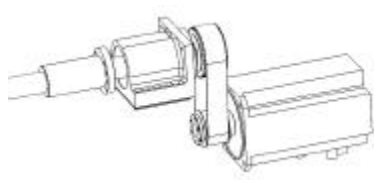
- The main motor is equipped on the upper part of the ram, and has a two-speed reducer box fitted that transmits the power to the main spindle to the machine through pulleys and belts.
- The change of the "Speed range" is performed by means of a two-speed box for the motors.
- The main advantages of use this element is as follows:
 - o Separated lubrication systems for the gear box (oil) and the main shaft (grease).
 - o Avoids noise emission.

- o No heat transmission from main spindle (insignificant thermal expansion for this reason).
- o No vibration transmission from gears of main spindle, and therefore machining quality is not affected.
- o High tangential forces can be withstood thanks to the robustness of the bearings of the box output shaft.
- o High efficiency degree (greater than 95%).
- o Change of range through an electroiman.



9. DIGITAL FEED DRIVE OF X, Y AND Z AXIS

- The diameter of the ball screws of X axis is $\varnothing 63 \times 30$ mm pitch, Y axes is $\varnothing 50 \times 16$ mm, and Z axis $\varnothing 50 \times 12$ mm pitch, hardened and ground, ISO 5 quality in accordance with DIN 69051, guided on one end with combined axial-radial bearings (drive side) and preloaded angular contact bearings on the other end.
- The brushless servomotors are driven by regulators. Transmission of movement of the motors to the relevant shaft is done by means of pulleys and notched belt drives with rounded teeth with a transmission relation of $i=2$ in X axis and $i=1,5$ in Y-Z axis.



- The brushless servomotors are driven by regulators.
- RAPID FEEDS OF X – Y – Z AXIS (mm/min)20.000

10. MEASURING SYSTEM

- The measuring system uses direct reading linear encoder with an incremental system with a resolution of 0,001mm.
- These encoders are provided with a codification system with several reference sources, which allows a rapid start of the jobs without the need for long displacements of the axes for reference searches.

11. THERMAL COMPENSATION

- Thermal expansion compensation on the X / Y / Z -axis, governed by the CNC with two temperature probes, one on the headstock and the other one on the rear part of the machine to check environmental temperature.

12. PROTECTION OF SLIDES AND SLIDEWAYS

- The bed is protected at either end by means of metal telescopic guards. Metal telescopic guard protects guides, direct reading linear encoder... of the X-axis.
- The rear part of the cross slide is protected by means of bellows and the front part by a metal shutter with a thickness of 5,5 mm. the bellows protects guide ways, ball screw, of the Z-axis.
- Ball screw of the Y-axis is protected by a metal telescopic guard.

13. TOOL CLAMPING SYSTEM

- The tool releasing system operates by means of a hydraulic piston integrated in the head itself, and driven by a hydraulic unit, which releases and clamps the tool by means of track tension spring washers.
- Tool clamping/releasing can be performed by means of an electric pedal so as to be able to handle the tool more comfortably.
- These operations can either be performed manually or automatically provided that the machine is equipped with a tool magazine.

14. COUNTERWEIGHT FOR COMPENSATION OF VERTICAL Z AXIS

- The Z-axis (vertical slide and ram) is balanced by means of a counterweight system, made up of a hydraulic cylinder and its rod attached to the vertical slide, and connected to a nitrogen accumulator, which together form a closed circuit, so that there is no need for an additional hydraulic unit during operation.
- If for any reason, a discharge of the circuit takes place and the pressure drops below the established limits for a correct operation of the system, a device manually charges the system again. The instructions to charge manually are detailed in machine maintenance manual.
- Nevertheless, the machine is equipped with a safety system, which blocks the operation of the entire system in case of an emergency.

14.1. SAFETY BRAKE OF THE VERTICAL Z AXIS

- o An electromagnetic brake is fitted on the upper end of the ball screw of the vertical axis, which acts as a security in case of a power cut and avoids the vertical slide falling down.
- o This safety system is equipped in case of a failure in operation of the counterweight for the vertical slide compensation.

15. COOLANT SYSTEM

- A reservoir has been fitted on the outer end of the bed with a tank, which holds 500 litres of coolant and a motor pump.
- Within the tank there is an electrical coolant level switch for coolant vigilante.
- The coolant is pumped from the tank with a flow rate of 30 liter/min and pressure of 4 bars to the end of the main shaft. The nozzles can be adjusted towards the tool point, and the flow can be set by means of a shut-off valve.

16. LUBRICATION

- The lubrication system consists of a central unit which by means of a time delayed signal given by the CNC automatically distributes the oil to several points such as ball screws, to the MR type roller shoes in three axis. In order to have smooth running of the machine, all rolling elements are lubricated.
- The lubrication may also be set into operation manually by means of an electric push button on the control panel.
- This unit has been provided with safety systems and circuit control so that any abnormality, low oil level in tank, clogging up of piping, etc. is immediately detected, triggering off the corresponding alarm displayed on the screen.

17. SAFETY GUARDS

- Two sliding doors, which move in either direction, have been fitted onto the front part of the machine. A third door has been fitted at the rear which slides outwards.
- All doors have been fitted with safety interlocking and locking micro switches which make it impossible to start up the machine when the doors are open or prevent the doors from being opened while the machine is performing a machining cycle
- The door of operator cabinet is equipped with a window to allow visibility of the work area. This door-window is part of safety measures of the machine and it is designed to resist impacts according to health and safety standards.
- The sides have been provided with safety curtains.
- On the rear part of the machine it is fitted a metallic guarding fence to make a rigid and stable structure, isolating the ram of the machine and avoiding possible accidents for the persons located in work area. Metallic guarding fence allow visualizing the protected area.
- Low-voltage lamp for illumination of work area.
- For machine control is located an illumination indicator.

18. INSTALLATION DATA

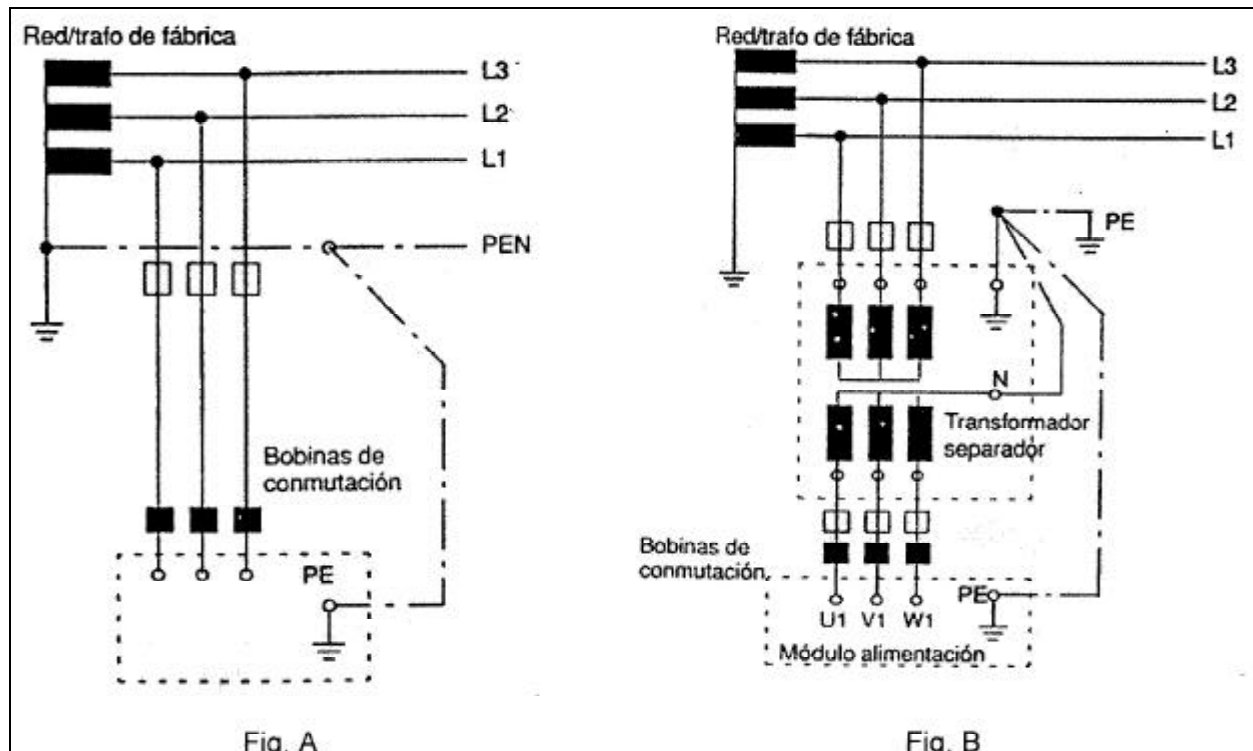
18.1. SITTING OF MACHINE

- o In order to get the most out of your machine, we recommend the following sitting:
 - A place with a firm floor.
 - Environmental temperature of $22^{\circ} \pm 3$
 - Maximum relative humidity of air 75%
- o Avoid the following locations:
 - Where machine is exposed to direct sunlight and/or any other heat source.
 - Places with nearby vibration sources. If he above location can not be avoided, provide the machine base with an anti-vibrating system.
 - Upper floors. If there is no other alternative, make sure it is placed near a pillar or reinforce the floor with an extra layer of concrete.
- o Provide sufficient free space around the machine to fit accessories, machine supplements, to carry out repairs, to ensure operator mobility, etc.

18.2. ELECTRICAL DATA

- o In order to connect our regulation equipment for energy return to the net, bear in mind the following requirements:
 - This equipment may be connected directly in case the factory network is of the TN type. This concerns a symmetric three-phase AC network with 4 or 5 wires with the star connection connected to ground (see fig. A).
 - With another type of network, use a separator transformer with the star connection of the secondary connected to ground (see fig. B).

VOLTAGE..... 400 V $\pm$ 10 %; 50 Hz $\pm$ 1 %
 SERVICE VOLTAGE 110 V AC / 24 V DC
 LAMP Protection IP 67; 220 V
 ELECTRIC CABINET Protection IP 55
 COOLANT OF ELECTRIC CABINET.....Protection int. IP 34/ext. IP 54



19. STARTING UP AND COMMISSIONING

- Customer request:
 - o Machine sitting following GORATU's foundation instructions.
 - o Electrical connection following GORATU's instructions.
 - o Air connection following GORATU's instructions.
- Machine visual inspection, in order to check any damage that may occur during transport.
- Check properly power supply and air connections (phase order and pressure).

- Check properly good performance of machine:
 - o Movement of all axis.
 - o Spindle rotation / Orientation.
 - o Accessories / Auxiliary equipments.
 - o Gears / Refrigeration
- Geometrical verification as per UNE standard specified for each type of machine.
- Operation training:
 - o 1 Day (8 hours) for basic numerical control operation for standard machine without options. Training course with following contents:
 1. Control panel / CNC.
 2. Axis movement / Reference setting.
 3. Offsets calculation / work piece reference.
 4. Edition / program selection.
 5. Tool offset
 6. Program transmission (PC – CNC).
 - o Options:
 1. Tool measuring probe. (2 hours).
 2. Work piece measuring probe. (3 hours).
 3. Digitalising probe. (6 hours).
 4. Electronic dividing table. (1 hour).
 5. Tool magazine. (1,5 hours).

20. VERIFICATIONS

- The machine is geometrically verified in accordance with Geometrical verification standard of GORATU, adaptation of Spanish standard UNE 15-302/90, from ISO 1984-1982, and compendium of DIN 8615, part 3 and 4 relative to “verification conditions of fixed bed height milling machines and mandrino in horizontal position and/or mandrino in vertical”
 - Axis positioning verification is made by laser according to ISO 230-2 standard.
 - POSITIONING ACCURACY (mm)..... A: 0,015 mm
 - REPEATABILITY (mm)..... R: 0,008 mm
- (*) For X>3000 mm traverse, increase 0,005 mm. For each additional 1000 mm.*

21. SAFETY STANDARDS

- The machine has been designed and constructed in accordance with:
 - o Machinery directive 2006/42/CE
 - o Electromagnetic Compatibility Directive 2004/108/CE
 - o Low tension Electrical Facilities Directive 2006/95/CE
 - o Safety standards on machining centres EN 12417+A2

22. PAINTWORK

- Machine and splashguard light dark texturized RAL 7466 and light grey.
- Doors, headstock, CNC desk, dark grey texturized RAL 7466.
- Accessories in dark grey texturized RAL 7466.

23. DOCUMENTATION

- 1 Complete machine manual, with assembly drawings and part lists.
- 1 set of CNC manuals.
- Machine parameters.
- Verification record.

24. TOOLS FOR MACHINE OPERATION

- Sling pack.
- Draw bars for tools according to machine taper.
- Double-end spanner 27-29 to perform manual headstock.
- Double-end spanner 30-32 to perform machine levelling.
- 17 mm. Allen key for the levelling.
- Samoa lubrication pump to lubricate headstock gears.

25. NUMERICAL CONTROL

❖ SEE ANNEX 1

26. OPTIONS AND ACCESSORIES

❖ SEE ANNEX 2

27. COMMON OPTIONS AND ACCESSORIES

❖ SEE ANNEX 3

28. LAY-OUTS

❖ SEE ANNEX 4

29. MACHINE WARRANTY

- This warranty is valid for a maximum period of 12 months or 2000 operating hours (whichever first) based upon an 8 hour a day shift.
- The manufacturer will supply defective pieces without any charge in EX WORKS conditions; repair carried out during the warranty period and will not serve to extent this period. Renovated pieces will remain warranted in original conditions of machine. Any defective parts replaced will remain at the seller's disposal. Defective parts will be send by the customer to the manufacturer, once the customer have received his spare parts. On the contrary, if the customers don't send spare parts, the invoice will be charged to the customer.
- If the customer require of manufacture technician, labour cost, displacements cost and accommodation cost will be charged to the customer, in AFM established conditions. Machine warranty doesn't cover damages and operation failures of incorrect machine utilization and their accessories.
- Machine assembly will be done according to the instructions and foundation drawing supplied by GORATU. Not accomplishing these instructions can be the origin of geometrical tolerances deviations.
- The machine warranty doesn't cover damages and operation failure of incorrect machine utilization and their accessories.
- We recommend read the instructions Manual carefully, in particular the section on SAFETY. GORATU MAQUINAS HERRAMIENTA S.A. is under no obligation to pay any compensation for accidents, material damage to goods other than the object of the contract or loss of profit.
- With regard to the regulation of that specified in this warranty, the parties should refer to the general conditions for machinery supply outlined by CECIMO, with which the parties are familiar.

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