3 AXIS HIGH SPEED BRIDGE TYPE MILLING CENTER

TECHNICAL DATA

Travels	**Longitudinal**	**column**	**Axis - X**	**mm**	**3.200**
	Cross	**ram**	**Axis - Y**	**mm**	**1.500**
	Vertical	**saddle**	**Axis - Z**	**mm**	**1.100**
Distance between bridge supports				**mm**	**1.650**
Table surface				**mm**	**3.100 x 1.150**
T-slots size					**18 mm**
Max load capacity					**5.000 kg**
Feedrates	rapids		X-Y-Z	mm/min.	60.000
Resolution	X, Y, Z			mm	0,001

Geometrical test norms	230-1 / ISO-10791
Axes accuracy according to	VDI / DGQ 3441
Positioning	0,010 mm
Repeatability	0,005 mm

Environmental conditions for accuracy

Range of environmental temperature	15 ÷ 30 °C
Gradient	Max. 0,5°C/h
Max temperature environmental change	2°C last 6 hours
Environmental temperature	0,3°C for each meter
Moisture	< 80 %

Technical Operational Data	Power supply	575V ±10%, 60 Hz. Net type " TN "	
		For different power net	
	Installed power	KVA	60
	Compressed air	Bars	7

Painting	White / black

Machine bed

The machine bed has been designed with a monolithic structure and is made in cast iron, in a proper size and strongly ribbed, in order to guarantee a strong self-supporting structure without special foundations. The structure is stabilized by a proper process. On the bed two linear guide ways are fixed where run their preloaded roller bearing pads of the piece holder table.

Bridge
Realized in electro-welded steel like the machine bed and it's stabilized with a proper double stress-release treatment. The structure is symmetric and guarantees constant behavior independently of heating and stress created during machining. On the bridge two linear guide ways are fixed where run the preloaded roller bearing pads of the saddle.

Saddle
The structure of this part is done in spheroidal cast iron where are fixed the roller bearing pads for the vertical sliding of the ram.

Ram
Realized in electro-welded steel where are fixed the 4 linear guides. The structure is stabilized by a proper process.

Guideways
With roller bearing pads and oil lubrication in order to reduce friction the reversal error with corresponding higher quality of finishing.

Longitudinal axis	X :	2 guideways size 55 mm with 6 pads
Cross axis	Y :	3 guideways size 55 mm with 6 pads
Vertical axis	Z :	4 guideways size 45 mm with 8 pads

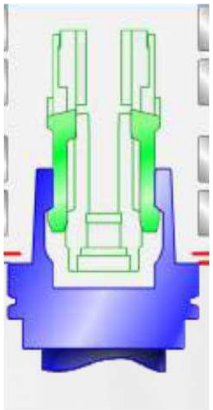
Telescopic steel protections for the longitudinal slide ways.

Welded bellow on the guides of the cross movement

MTS 29.92- Motorspindle integrated in the machine ram. HSK63A taper – max. speed 20.000 rpm – max power 29 kw (37 kw S6) – max torque 92 Nm (117 Nm S6), permanent pressurization, lubrication through air/oil mixture. Equipped with motor and bearings temperature control system, with accelerometer sensor for vibration control, tool unbalancing and collision monitoring. Rapid replacement of front bearings.
Bearings are oil-air lubricated and, in order to maintain a constant temperature inside the head, it is cooled through an automatic refrigerating system.

Tool taper	HSK 63A
Spindle speed	20.000 rpm
Spindle taper cleaning	by air – 6 Bar
Front seal	permanent pressurization – 1 Bar
Bearings	Ceramic hybrids
Lubrication	Air/oil – different following the rpm and the temperature.
Cooling system	coolant liquid

IMPROVEMENT – Spindles are equipped with a Fast-acting tool drawbar gripper. This device has a pre-hold system that allows the tool clamping to be finalize during spindle disengagement from tool change position.



Cooling system

Allows the cooling of linear motors, spindle and head orientation.

The system consists of a cooling unit, with a cooling power that allows the circulation of the cooling liquid with a constant temperature (temperature delta: 0,5° C).

Hydraulics compensation vertical axis
The vertical movement, is counter-balanced through hydraulic cylinders with low friction seals connected in a closed circuit to a nitrogen charged accumulator The system balances the weight of the saddle / ram group removing the load from the vertical travel ball screw. This counterbalance system is controlled by a pressure switch which, in case of pressure failure, stops the axis movement, creates an error message: EMERGENCY STOP and activates the security brake on the vertical axis ball screw.

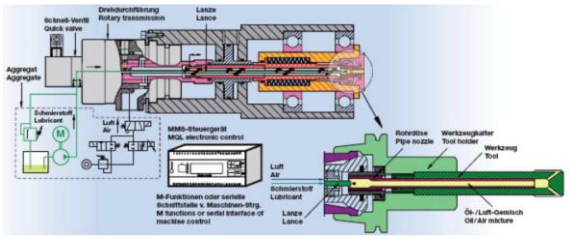
Axes movements
The axes movements allow a rapid feed up to 60 m/mins in the three axes. Equipped with linear motors that allows high accelerations and high speed, high positioning accuracy. The elimination of axes gears allows a repeatability and a positioning accuracy, that it is not possible if the machine is equipped with the traditional balls screws/rack and pinion system with heavy masses to move under continuous stress. By means of linear motors the machine performances are constantly increased and the wear is completely and definitely eliminated.
Axes movements can be manually operated by means of electronic handwheels on a pendant digital read out of positions on CNC screen.

Centralized automatic lubrication
All the scales are automatically lubricated through dedicated dispensers. Potential errors in the system are detected by a switch that immediately stop the machine.

Hydraulic system
The hydraulic system is made of an independent hydraulic unit with an electro-pump, accumulator, security valve, pressure switches, and additional control and distribution electro valves. All hydraulic components guarantee high manufacturing standards and are made by first class European companies. The hydraulic unit operates the automatic tool unclamping, tool changer, head release, etc.

Air around the spindle and trough the spindle

Spray Mist – MQL system through the spindle
IMPROVEMENTS – are equipped with a Two channel system MQL, the lubricant is transported via a pipeline to a quick valve. The exact quantity of oil will be supplied through the lance, which is located in the center of the spindle, into the pipe nozzle in the coolant pipe (tool holder). Compressed air is transported through a second channel to the mixing chamber. An oil-air mixture is produced and supplied to the tool.



Pneumatic system
Pneumatically controlled system with compressed air, consisting of: Pressure: 6 bar, air flow: 500 l/min. (air quality level according to 5.4.5/ISO 8573.1.) The compressed air is treated through a filter and an outlet for condensed water is mounted, with a ON/OFF valve on the air supply for stand-by mode or during a black out.

Electrical cabinet
The construction of the cabinet and the location of its components comply with the norms IEC/EN60204 and security rules CEI/EN1050. In the electrical cabinet, according to IP65 protection level, all electronic control equipment are installed: axes and spindle drives, transformers etc.. The electrical cabinet is equipped with an air-conditioning unit. All electrical and electronic components are of high quality and are made and supplied by the more important European manufacturers.

Centralized control board
Centralized control board for operator with 19" LCD video unit equipped with three electronically operated hand wheels for axes independent manual mode, installed on a pendant mounted an swinging supports for easy handling and best location for machine operators.

Measurement system with pressurized scales
Measuring optical scales are installed in a good location and protected against impurities and therefore can guarantee a maximum reliability and accuracy especially in cases of extreme operations. The system is Heidenhain both on the linear axes and on the rotary axes with resolutions of 0,001mm and 0,001°.

Thermal compensation and heat expansion
A CNC automatic system equipped with heat sensors allows the measurement and checking of the temperatures of those parts that are subject to heat expansion and that are exposed to. heat, relative to the environmental temperature. The remaining expansions are compensated. for electronically so that the highest accuracy under all working conditions can be attained.

Screws for chip removal on both sides and scrap chip conveyor with side discharge Chip evacuation
- by augers and dredging conveyor with side exit.
- for prevalent use (higher 80%) of transport and extraction of steel chips, in flakes form or short
curls, but not skein.
The chip is transported along a conveyor belt, and it is separated from the refrigerant flow and the minimum liquid is retained by the wet flakes.
Adjacent to the conveyor is placed a coolant collection tank, equipped with a decantation system. Suitable to retain any parts of chip leakage from the extraction system.

Automatic tool changer, chain type with automatic closure wall for tools protection during the milling. For the loading/unloading of the tools there is on the booth an appropriate opening.

Tool capacity	12 tools
Taper	HSK-63A
Max tool diam.	75 mm
Max tool length	220 mm
Max weight of tool	Kg 2.5

IMPROVEMENTS –Automatic Tool Changers are equipped with a fast acting CAM-BOX, this allows a faster rotation of the exchange arm. The tool magazine incorporates a tool brake detection system, this device "scans" the drilling and tapping tools inside the ATC magazine. With these improvements the tool brake detection is NO longer performed with the tool on the spindle so there is no impact on the machining cycle time. ATC cycle is optimized through PLC upgrade to reduce the tool change cycle to the essential.

PE172 - Part Probe
Electronical probe with radio waves transmission for compensation of the alignment, measuring and part centering with dedicated software complete with toolholder Probe M&H 38.41

ES500 – Air dryer unit for the pressure air.

Water gun system to clean the internal area of the enclosure.

Roll-up door 2800mm along one site of the machine tunnel for automatic load and unload electrical predisposition, software PLC predisposition, and hydraulic predisposition to receive customer pallet. The roll-up door track covers are improved to avoid chips build-up. A customized air blow is added to clean critical area.

Safety
The machine is delivered with a full metal booth and with a CE conformity certificate. The machine is complying with the European norms (89/392/CEE of 14.06.89 and 91/368/CEE of 20.06.91, 93/44/CEE of 14.06.93 and 93/68/CEE of 22.07.93). All machines are delivered with protections according to CE norms.

MIST COLLECTOR UNIT LOSMA

CNC SIEMENS 840 D Solution Line with 19" TFT screen in a wheel console
Digital numerical control on 5 axis expansible up to 31 axis included the spindle.
Digital drives and motors.
Remote controlled board with handwheel

Hardware:

- CNC Unit NCU 730.3B
- PC Unit PCU 50.5P 8Gbyte SDRAM, 2.4 GHz with OS Windows 7
- 40 GB hard disk
- 2 USB interfaces for external connections (printer, mass memory – one port is on the front panel).
- 2 Ethernet RJ45 10/100 MB/s ports.
- Operative panel OP019 with 19" TFT-VGA color screen, 19" CNC QUERTY keyboard.

Software:

- CNC software Sinumerik version 4.8.
- Operative software Sinumerik Operate version 4.8 in 6 languages (English, Chinese, Spanish,
- Italian, French, German), other languages available by option.
- Step7 software for PLC program display, version 5.5.

CNC Functions:

- Acceleration with soft variation.
- No-stop run with programmable fillet distance.
- 3D axis interpolation.
- Linear axis interpolators-
- Circle programmed with center and end point, radius and end point, with intermediate point.
- Operational modes and machine functions :
    - Automatic
    - Semi-automatic
    - MDI
    - Jog
    - Teach in
    - Program selection with directory
    - Multi-level recording.
- Spindle rotations from 0,1 up to 99000 rpm.
- Work feeds and rapids from 0,0001 up to 90000 mm/min. programmable.
- Zero shifting executable from the handwheel.
- Error compensation for quadrant change.
- Preset of the inputs.
- Block search with/without calculation.
- Tool compensation with design.
- Tool radius compensation :
    - with attach/detach strategies
    - with circle/ellipse attach on external corners.
- 3D tool radius compensation.
- Scale factors.
- Intermediate blocks with design in the tool radius compensation.

- Anticipated error recognition of the contour.
- Programmable origin offsets.
- Feed and spindle override.
- Positioning range of ± 9 decades.
- Orientated spindle stop.
- Spindle speed limit.
- Constant pitch thread.
- Tapping with/ without tool compensation.
- Programming language CNC DIN 66025 with advanced language.
- Text editor with program name up to 24 characters.
- Main program recall from main program and from sub-program :
    - 7 sub-program levels
    - 4 interrupt routines.
- Polar coordinates.
- Metric/Inches system.
- Programmable user variables.
- Pre-defined programmable user variables (calculation parameters).
- Calculation functions and trigonometric functions.
- Macro technique for extended parametric programming.
- Programmable software working limits.
- Alarms and messages selectable within the part-program (auto-diagnostic).
- Auto diagnostic.
- Contour checking.
- Temperature compensation.
- Look ahead function.
- RTCP function.
- Operation with tool management.
- NURBS interpolation.
- Options included with the PARPAS standard configuration:
- TRAORI and Remote Procedure Call (RPC) for Siemens 840 software functions

Hardware :

- Remote handwheel HT-2 with 3 mt. wire 6FC5303-0AA00-2AA0

Software :

- Milling technology package 6FC5800-0AS33-0YB0

Axes Drivers setting is upgraded and optimized in order to maximize axes acceleration, performance are:
X-axis = 3m/s$_2$
Z and Y = 6m/s$_2$

DCM Option DCM-Dynamic Collision Monitoring
dynamic anti-collision Monitoring with dynamic control of the work area to prevent accidental. collisions between the components of the machine tool. Requires WINDOWS option.

RKT - Automatic RETRACT
It detaches the tool from the part during machining in case of power failure in the plant where the milling machine is installed.