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TECHNICAL SALES OFFER № 22_10_18_01

Horizontal milling machine tool "MECMILL PLUS HPC3" with floor-type moving column equipped with CNC SIEMENS 840DE Solution Line



General description

Mecmill Plus is a milling machine with floor-type moving column.

The three independent axes of the machine have the following travel lengths:

- longitudinal X-axis: 10000 mm
- cross Y-axis: 1850 mm
- vertical Z-axis: 4000 mm

On the ram of the machine is mounted a rotary platform, that is managed by the numerical control and on which the milling head is fixed.

It is equipped with SIEMENS 840DE SL Numerical Control.

The machine tool can be equipped with automatic tool changer.

*(Two pieces of the machine tools are available on stock for immediate shipment.
Optionally, the machine tools can be operated simultaneously within one working area if mounted together on the common foundation.)*

Description of base machine

▪ MACHINE BED

The machine has been designed through the structural calculation software assuring very good distribution and reduction of weight which allow to achieve high rigidity and dynamic performances.

It consists of a bed in fabricated steel, cellular-type heat-treated structure. The machine bed is anchored to the foundation by means of devices for fixing, levelling and lateral setting.

It is equipped with two guideways having high rigidity roller recirculating pads, accuracy class G1.

The guideways are protected by telescopic covers housing the chain holding cables so as to allow them to be preserved against wearing due to chips and debris.

The column slides on the guideways together with the telescopic covers.



▪ COLUMN

It consists of a double pillar electrowelded heat-treated structure having a symmetric structure.

The two guideways for the vertical sliding of the ram-saddle are recirculating roller linear guideways, high rigidity, accuracy class G1 and allow the sliding of the ram saddle in a central position. The symmetric structure allows to achieve high stiffness as well as high thermal stability with high accuracy during the machining.

The vertical axis control screw and the balancing hydraulic cylinders of the ram group are housed in the ram-saddle.

An operator work lamp is located on top of the column.



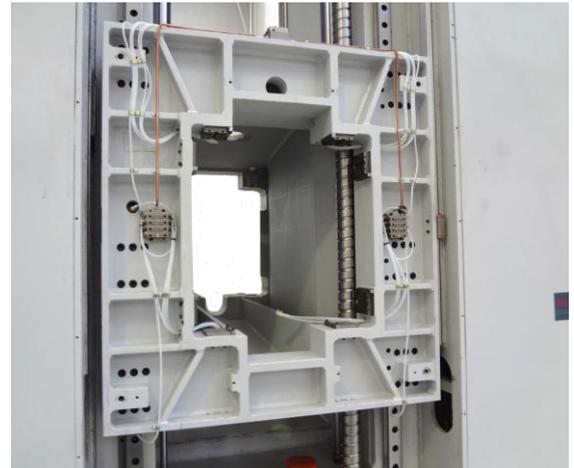
- RAM-SADDLE

It consists of an electrowelded heat-treated steel structure which contains the ram, constraining it on the four sides.

The saddle is linked up with the column by means of the pads of the recirculating roller linear guideways.

The ram slides inside the saddle through 16 pads on the front side and 8 pads on the rear side.

Guideways roller recirculation bearings are pre-loaded and slide on the flat guideways of the ram.



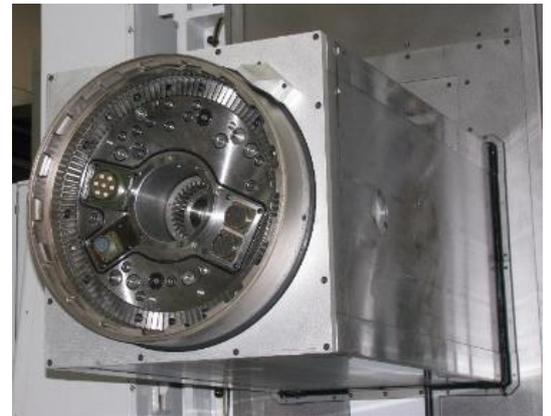
- RAM

It consists of a double-tubular electrowelded steel structure with 4 ground and hardened (hardness 60 ± 2 HRC) sliding guideways, that make a square in the middle of which is situated the spindle shaft

The Siemens spindle motor is located inside the ram and directly controls the milling heads. It is fluid cooled. The front side of the ram incorporates a rotary platform prearranged to receive one of the possible milling heads.

Characteristics:

- ram dimensions: 550 x 600 mm
- spindle motor: 50 kW and 1500 Nm



- “WONDER B.R.A.” - BALANCING RAM ASSET PATENTED SYSTEM

In order to assure high accuracies, an automatic electromechanical device has been provided. It counterbalances the ram drop according to the travel and head mounted.

The “WonderB.R.A. Balancing Ram Asset” patented system avoids the modification of the internal ram draw force without acting on the vertical and cross guideways. It also allows to maintain the correct geometric trim irrespective of the axis position.



▪ HPC3 ROTARY PLATFORM WITH AUTOMATIC MILLESIMAL POSITIONING (PC3)

On the front side of the ram a rotary platform is built-in.

The platform is managed by the numerical control and can assume any position. The rotation is by a separate motor.

The platform rotates on bearings suitably designed to grant very high rigidity and accuracy. Once the position is achieved, a big-size hydraulic brake is activated and the platform is clamped.

The platform is equipped with a bayonet-type front coupling device which allows the milling heads to be hooked by angular rotation. The subsequent clamping is assured by an annular cylinder.

Thanks to a proper hydraulic system, the clamping device does not move if not hydraulically controlled.

This system guarantees a passive security that also in case of pressure drop or in case of wrong working prevents the head drop.

The platform is prearranged to receive milling heads with gears lubricated by an innovative air/oil system.

Characteristics:

- number of positions: any position
- rotation amplitude: $\pm 180^\circ$
- external diameter: 380 mm
- brake clamping torque: 17000 Nm



▪ AXES FEED

The feed of the column (longitudinal axis) is by rack and pinions, with two AC Brushless digital motors and by means of an electronic system which enables to avoid mechanical backlash in the positioning of the axis. The electronic antibacklash system consists of two separate kinematic chains, two motors and two drives. Thanks to an appropriate steering of the motors, the system always executes the passage through the zero speed point at different moments for the two motors (thus avoiding backlash).

The feed of the cross axis and of the vertical axis is by AC Brushless digital motors which activate, via toothed belt reduction gears, the respective recirculating precision ball screws with double preloaded nut. The positional transducers of the axes consist of Heidenhain optical scales.



Characteristics:

-feed speed 0 ÷ 25000 mm/min

<i>Axes travels [mm]</i>	<i>Linear accuracy positioning P [μm]</i>	<i>Repeatability accuracy Ps [μm]</i>
X=10000	25	13
Y=1850	9	4
Z=4000	13	8

Note: values calculated according to VDI DGQ 3441 norms.

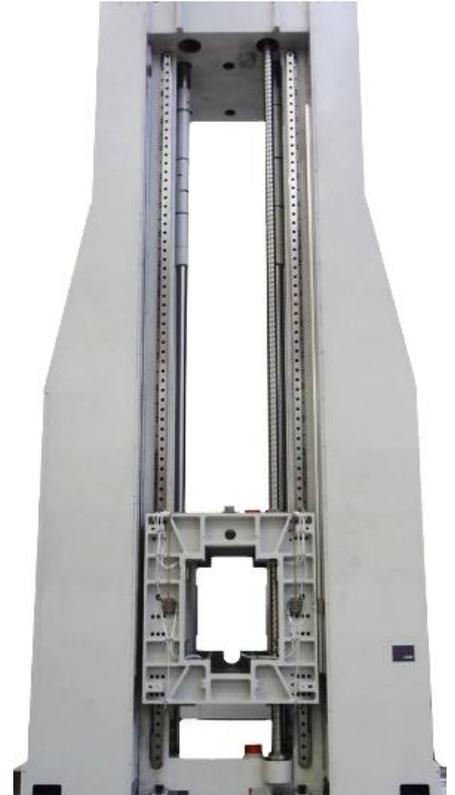
- BALANCING SYSTEM OF THE VERTICAL Z-AXIS

The balancing of the ram/ram saddle group is by hydraulic cylinders, equipped with low-friction seals, which are connected, via a closed circuit, to hydro-pneumatic accumulators.

The weight of the group is compensated by discharging it from the drive screw of the vertical axis.

A safety device consisting of an electromagnetic brake acting on the screw of the vertical axis, is also provided. It is automatically activated in case of a sudden pressure drop on the balancing piston, and thus prevents the descent of the ram/ram saddle group.

In case of power loss, the group remains balanced, thanks to the action of the accumulators and the brake of the vertical screw is activated.



- GUARDING AND COVERS

All the sliding and moving parts of the machine are efficiently protected against the infiltrations of chips or debris.

The guideways of the machine bed and of the column are guarded by sliding telescopic metal sheets.

The ram guideways are hardened (hardness 58÷62 HRC) and sheltered by oil-wipers; in the rear side we have also provided concertina covers.



- LUBRICATION

The reduction gears of the longitudinal axis feed are oil lubricated; the roller pads and the screws are automatically grease lubricated. The screw supports are permanently grease lubricated.



- HYDRAULIC SYSTEM

It consists of an independent central unit located on the floor. It includes a gear-electropump, a pressure accumulator, an overpressure valve with the corresponding pressure switches and a row of manifolds. This unit supplies the tool unclamping device on the spindle, the clamping and unclamping of the platform, the clamping and unclamping of the spindle-carrying body and the movements of the tool change arm. It is also used for the preloading of the vertical axis balancing circuit.



- THERMAL CONDITIONING SYSTEM

On the machine we have foreseen two separate conditioning circuits having the following functions:

- 1) control of the temperature of the milling head semibodies;
- 2) control of the temperature of the spindle drive motor .

The temperature of the refrigeration liquid is maintained at a constant value with respect to the environmental temperature by means of a thermostat detecting the temperature of the machine structure.



▪ PUSHBUTTON PANEL

The machine is equipped with a main pushbutton panel placed on the operator platform, thus following the column in the longitudinal movement. On the pushbutton panel all the control buttons of the machine, the video screen, the keyboard of the numerical control are assembled.

In addition to the main pushbutton panel, a remote hand portable panel is foreseen containing the pushbuttons to control the axes and No.1 electronic handwheel supplied by CNC manufacturer.

It can be connected to the main pushbutton panel via cable. The remote pushbutton panel can be moved by the operator to any position of the work area of the machine and therefore can simplify workpiece set-up and checking.



▪ MOTORIZED OPERATOR PLATFORM

The platform is fixed to the traversing group and slides together with the column along the longitudinal axis. From the platform the operator has access to the pushbutton panel and can easily follow the machining. The platform can be moved in vertical direction up to 2.500 mm. For safety reasons, the platform is equipped with transparent protection screens (front side) so that the operator is completely guarded against chips and coolant sprays.

The operator access is protected by a gate which, if opened, stops the machine. An interlocked door located in the front side allows the operator to have access to the machine working area and to use the remote pushbutton panel for workpiece set-up.

A portable pushbutton panel for tool clamping/unclamping and a shelf have also been provided.



▪ ELECTRICAL EQUIPMENT

The electrical installations, both on the machine and in the switch cabinets on the floor, are in conformity with the EN60204/1 norms.

The servodrives of the axes and of the spindle are compact and modular.

The switch cabinet on the floor contains the main devices for switch-off, power supply, transformation and control of servo mechanisms. An automatic work lamp is also provided.



The switch cabinet is equipped with thermal conditioning system.
The standard protection degree is IP54.

- POWER SUPPLY

400V ($\pm 10\%$), 50 Hz ($\pm 1\%$).

- PAINT

A high quality, two component polyurethane paint is used, providing optimal long-term resistance. The standard colors are White RAL 9003, Blue RAL 5013, Red RAL 3020 and Grey RAL 7024, slightly hammered surface.

- ANCHORAGE DEVICES

Levelling devices and lateral registers for machine structure, floor plate and accessories that require foundation.

- SAFETY NORMS ON THE MACHINE

The machine has the CE mark. The machine has been designed and will be manufactured according to the current safety regulations in force in Europe and in the main industrialized countries, including North America.

On the European market the regulations used are "CE" (machinery directive 2006/42/CE, low voltage directive 2014/35/UE, electromagnetic compatibility directive 2014/30/UE).

MECOF supplies the protection of the working area (made of grid panels with a max. height of ca. 1400 mm and, in the front side of the machine, with steel framing panels with lexan windows with a max. height of 2.200 mm, according to the machine layout); this solution guarantees the respect of the above norms. It will be necessary to agree with the customer the solution for the complete protection of both the working area and the operative area so that the user can make the workshop area safe for the machine installation.

- CMTN-S: TELESERVICE

The machine is equipped with TELESERVICE which is activated at the end of the machine installation at the customer's premises; the standard solution foresees that the connection to the machine can be carried out by Mecof at any time; it is the customer's right to request that the connection can be made only against specific authorization. This request must be made by the customer in the final acceptance phase, from which the warranty period starts. The Mecof remote assistance system uses a connection system called "eWON Talk2m" whose security is certified. The data exchanged with the machine are encrypted with SSL/TLS security protocol.

This option is used to improve the technical service assistance since it allows to:

- search for the cause of failure and, as a consequence, carry out the intervention in reduced time;
- search for the cause of default and eliminate the error without performing the intervention;
- program the machine PLC in the distance;
- transmit data to CNC.

This option includes:

- software on the machine (CNC options and connection programs);
- machine connection to M.T.N. (MECOF Teleservice Network).

The customer shall pay for:

- *the internet connection of at least 1MB/sec*
- *the net connection in the customer's plant.*

The service will be available in the following days: from Mondays to Fridays from 7:30 a.m. to 18:30 p.m. (Italian time)

▪ ENVIRONMENTAL CONDITIONS

The milling centre has been designed for high dynamic and precision performances and can be installed in an industrial environment class 3K4 (reference norm EN60721-3-3) where the salient characteristics are the following:

- Air temperature from +10 to +40° C
- Relative humidity from < 80%

Note: the environmental conditions to be met during the installation and final acceptance test of the machine are indicated in detail in the MECOF test certificate.

▪ SIEMENS 840 DE SOLUTION LINE NUMERICAL CONTROL

CNC model: SINUMERIK 840DE SL software CNC 31-3 Export, supplied in a version that does not require an export license.

Characteristics:

- Numerical Control card Ncu 730.3B software latest version
- Drive system Siemens S120 in constructive form booksize
- IPC427 latest version with Operative System Windows 10 IOT
- Software HMI Sinumerik Operate (latest version)
- Diagnostic software PLC Step 7 installed on the IPC427
- Display Multi-Touch 22" IPF V2
- Pushbutton panel MCP customized
- Manual remote pushbutton panel HT2 with display and handwheel
- CNC keyboard QWERTY
- Ethernet 10/100 Mbyte connection
- Optimization of the parameters of the control and drives in order to achieve the best performances in high speed machining
- SINUMERIK Safety Integrated: personnel and equipment protection and safety
- CYCLE800
- Linear axes for simultaneous contouring control: 3 (X-axis, Y-axis, Z-axis)
- Additional CNC controlled rotary axes, indexed: 2 (A-axis, C-axis)

- emcoCONNECT for SIEMENS 840DE-SL

emcoCONNECT - Connected Machine as a control center for the entire production process. emcoCONNECT control panel for optimized machine operation incl. 22" multi-touch display, industrial PC and keyboard incl. HMI hotkeys. emcoCONNECT provides the necessary connectivity for networking the production environment and thus the prerequisite for the Industry 4.0 era. The SIEMENS user interface is supplemented with functionalities that are useful for operation, such as:

- Dashboard with clear presentation of the current machine status
- MDE / BDE function for the user
- Documentation app with machine documentation, spare parts lists, programming instructions, etc. on board
- Remote support for remote diagnostics and remote maintenance
- Remote Desktop for connection to an external workstation, e.g. for CAD / CAM, etc.
- Web browser enables connection to browser-based IT systems, etc.
- OPC UA interface for integration into the operating environment (optional)
- Platform for future extensions and special applications



The control hardware for emcoCONNECT consists in a 22" Panel Industrial PC (IPC427: Intel Core i3-6102E / 3x Gigabit Ethernet (IE / PN) / 4GB Memory and HMI Operating System Windows 10 IoT Enterprise Ultimate / 180GB Solid-State Drive SATA) and a customized Premium PC keyboard and machine control panel.

Networkable with CAD / CAM products. Open for forward-looking emcoCONNECT APP extensions. Uniform surface for all new high-tech machines from EMCO.

Description of options:

- **PL15/II: FLOOR PLATE (CLASS II ACCORDING TO DIN 876)**

Floor plate holding workpiece manufactured by modules (cast iron) with anchorage devices, levelling elements and lateral setting.



Specifications of the floor plate:

- width of the reference T-slot: 22 mm
- distance between the T-slots: 250 mm
- width: 1500 mm
- total length: 10000 mm
- max. load capacity: 15000 Kg per m²

- **DCB6-E: UNIVERSAL MILLING HEAD WITH AUT. MILLESIMAL POSITIONING, 50 kW**

The head consists of two cast iron bodies:

- the main body (semibody C) is mounted to the platform and rotates together with it;
- the second body, which carries the spindle (semibody A), rotates around an axis with a 45° inclination to the platform axis and can assume any position automatically.

These positions are obtained by the rotation of these two components:

- Hirth frontal serration, 120 positions (one every 3 degrees) and hydraulic brake for the unlocking of one of the Hirth rings to reach the remaining positions.

The Hirth ring is controlled by a gearmotor and the position is indicated by a transducer that reads directly.

The spindle rotation is obtained by means of two couples of conical spiral bevel gears, which are case-hardened and run in. The lubrication is minimal by air/oil and the oil recovery is carried out thanks to a patented system. The head is maintained at constant temperature by the fluid circulation (mix of water and glycol) thanks to a conditioning group. This head is prearranged to receive a double coolant system: one through the spindle and the other one around it, with different working pressures. This head is prearranged to carry out automatic tool change operations. The head is equipped with an interface flange including a bayonet that assures the necessary precision and repeatability.



Characteristics of the milling head 50 kW:

- spindle rotation speed: 15 ÷ 5000 rpm
- torque: 1500 Nm (S1) - 1800 Nm (S6)
- power: 50 kW (S1) - 61 kW (S6)
- A axis clamping torque with continuous positioning: 10000 Nm
- tool taper: 50 ISO 7388/1 (DIN 69871-A)
- tool clamping system: automatic
- tool clamping force: 20000 N
- axial clamping force of the "A" body: 100000 N
- lubrication: air/oil
- cooling: water/glycol
- rotation resolution: 0,001 degree

▪ DCB6-E: UNIVERSAL MILLING HEAD WITH AUT. MILLESIMAL POSITIONING, 38 kW

The head consists of two cast iron bodies:

- the main body (semibody C) is mounted to the platform and rotates together with it;
- the second body, which carries the spindle (semibody A), rotates around an axis with a 45° inclination to the platform axis and can assume any position automatically.

These positions are obtained by the rotation of these two components:

- Hirth frontal serration, 120 positions (one every 3 degrees) and hydraulic brake for the unlocking of one of the Hirth rings to reach the remaining positions.

The Hirth ring is controlled by a gearmotor and the position is indicated by a transducer that reads directly.

The spindle rotation is obtained by means of two couples of conical spiral bevel gears, which are case-hardened and run in. The lubrication is minimal by air/oil and the oil recovery is carried out thank to a patented system. The head is maintained at constant temperature by the fluid circulation (mix of water and glycol) thanks to a conditioning group. This head is prearranged to receive a double coolant system: one through the spindle and the other one around it, with different working pressures. This head is prearranged to carry out automatic tool change operations. The head is equipped with an interface flange including a bayonet that assures the necessary precision and repeatability.

Characteristics of the milling head 38 kW:

- spindle rotation speed: 15 ÷ 6000 rpm
- torque: 1000 Nm
- power: 38 kW
- A axis clamping torque with continuous positioning: 10000 Nm
- tool taper: HSK 100
- tool clamping system: automatic
- tool clamping force: 20000 N
- axial clamping force of the "A" body: 100000 N
- lubrication: air/oil
- cooling: water/glycol
- rotation resolution: 0,001 degree

- MTCM: COLUMN-TYPE HEAD MAGAZINE

To locate the heads when they are not machining, a two-pocket magazine is positioned at the end of the positive travel of X axis.

The column holding heads is completely closed and is automatically opened when the change takes place (it will be opened only the side reached by the machine).

Once the change operations are completed, the column is automatically closed.

The milling heads are supported by 2 floating devices which make easier the deposit and pick-up of the heads, even if there are high thermal variations.

The axial position of the heads is assured by a device which centers the spindle of the head automatically.

A safety device assures the correct position of the head during the deposit/collect operation, signalling any possible positioning errors.

This option configuration reduces the X-axis travel of 1000 mm.



- CU100-I/H: 100-POCKET TOOL CHANGER (1 PIECE FOR EACH MACHINE TOOL)

This consists of a chain magazine designed for 100 tools, which is attached to the side of the column. The exchanging arm slides on a guideway, which is also fixed to the column. The tool exchange is carried out in fixed positions of vertical and cross axes and in any position of the longitudinal axis.

The automatic cycle of tool change carries out in a quick sequence:

- the axis positioning and orientation of the head bodies with the spindle in horizontal position;
- the movement of approaching and entering the machining field of the carriage holding the exchange arm (which has carried out the tool search in hidden time);
- the cycle for the collection and substitution of the tool and the return of the carriage to the rest position.

The digital drives of the chain and of the exchange arm guarantee precision and reliability during the time for the function of the tool change.



Characteristics:

- number of tools: 100
- attachment for tools: 50 ISO 7388/1 (DIN 69871-A)
- max. diameter of the tool, all positions used: 115 mm
- max. diameter of the tool, with adjacent pockets free: 320 mm
- max. length of the tool: 500 mm
- max. weight of the tool: 35 Kg
- total max. weight of tools: 1200 Kg
- management of the magazine: at codified stations, with fixed pockets

- CUAP: PLATFORM FOR MANUAL LOADING / UNLOADING OF TOOLS

- CUA: INCREASED TOOL CHANGER CAPABILITY (APPLIED TO EACH MACHINE TOOL)

- max. diameter of the tool up to 320 mm;
- increase max. length up to 500 mm;
- increase max. tool weight up to 35 kg

- CAPR: PROGRAMMABLE ADAPTIVE CONTROL

This allows the power absorbed by the spindle to be limited: the power value limit is set by the program, and is specified as a percentage of the maximum possible spindle power. The adaptive control comes into operation when the absorbed power reaches the limit value.

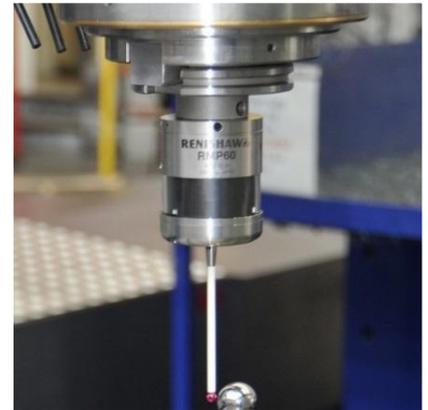
The feed is then reduced and regulated in such a way so as to maintain the value of the absorbed power within the programmed limit. If the feed falls below 50% of the programmed value, the machining operation is stopped. The adaptive control can, however, be switched off by the program. The programmed power limit must not be less than 30% of the maximum possible power.

▪ TASR: MEASURING PROBE (1 PIECE FOR EACH MACHINING TOOL)

This digital measuring probe is wireless connected to the machine control (via radio).

It permits the execution of point-by-point measurements on the workpiece. The option includes an extension of the control functions, which will allow the use of the recorded measurements, for example for:

- calculation of distances between the axes;
- dimensional measurements along the X, Y and Z-axes;
- measurements of four points of circular elements (calculation of the diameter and of the center).



▪ TT10M: CHIP CONVEYOR

The conveyor consists of a hinged band made of steel. It is embedded into the floor, along the longitudinal axis of the machine on the front side of the bed.

The band length corresponds to the X-axis travel of the machine.

The end part is raised in order to allow the discharge of chips into appropriate containers.

Characteristics:

- band speed: 3,4 m/min
- width: 370 mm
- useful band width: 235 mm
- capacity: 160 dm³ /min (approximate capacity, because of extreme variability of the chip type)



▪ 9ATROLLEY: TILTING TROLLEY

Tilting trolley for chips and machining debris. It is positioned at the end of the ramp of the chip conveyor, outside the working area.

Capacity: 300 l.



- PLAL: WASHING GUN

Washing gun with hose reel and 5000 mm pipe.

- IRDS: TOOL COOLANT SYSTEM WITH OUTPUT BOTH THROUGH THE SPINDLE NOSE AND AROUND THE SPINDLE (1 PIECE FOR EACH MACHINE TOOL)

Two coolant outputs are provided:

1) Output around the spindle

With this system, the coolant liquid flows through channels to the spindle; the coolant exits through 4 nozzles which can be oriented.

The system ensures that the coolant liquid is delivered near to the tool, irrespective of the orientation of the spindle.



Characteristics:

- pump head: 70 m
- pump capacity: 80 l/min.
- operating pressure: 0.5 ÷ 6 bar
- operating capacity: 15 ÷ 28 l/min.
- pump type: centrifugal

NOTE:

- *The capacity and pressure values change depending on the number and dimensions of the nozzles.*
- *An auxiliary "M" function allows the selection of compressed air in lieu of coolant liquid.*

2) Output through a hole coaxial the spindle allowing the use of tool holders with central hole according to DIN 69871/A.

Characteristics:

- pump pressure: 20 bar
- pump capacity: 20 l/min.
- max. working pressure: 20 bar
- working capacity: 10 ÷ 20 l/min.
- type of pump: volumetric



NOTE:

- *the values will change according to the diameter and length of the coolant holes in the tools.*
- *An auxiliary "M" function allows the selection of compressed air in lieu of coolant liquid, according to the cycle use.*

Both systems are fed by a single unit including a recovery tank, a filtering tank and a feeding pump of the filtering system.

Specifications:

- capacity of recovery tank (base machine): 1000 l
- capacity of filtering tank: 1000 l
- filtering: by cartridge (with automatic obstruction detector)
- filtering grade delivery 6 bar: 60 µm
- filtering grade delivery 20 bar: 30 µm

The selection between the two outputs is by M code.

- VF20: FILTERING TANK (CAPACITY 2000 LITERS) (1 PIECE FOR EACH MACHINE TOOL)

Filtering tank (capacity 2000 liters). It is suggested for machines with X axis travel (longitudinal) longer than 10000 mm.

- VR20: RECOVERY TANK (CAPACITY 2000 LITERS) (1 PIECE FOR EACH MACHINE TOOL)

Recovery tank (capacity 2000 liters). It is suggested for machines with X axis travel (longitudinal) longer than 10000 mm.

- RRDS: DEVICE FOR THE REGULATION OF COOLANT DELIVERY (1 PIECE FOR EACH MACHINE TOOL)

The regulation of the coolant delivery can take place automatically or manually. The automatic regulation is carried out by the programming of an M function, while the manual regulation is performed by special Softkeys.

It can be applied to IRDS coolant system.

▪ GA7FF: AIR COMPRESSOR «ATLAS COPCO»

Atlas Copco air compressor model GA 7 FF - 8,5 bar with air cooling and integrated dryer, air tank 270 l.

Technical specifications:

- Operational pressure: 4 - 8,5 bar
- Air volume supply at 8,5 bar: 18.6 l/sec
- Mex.power 7,5 kW
- Insulation protection class: IP 55/F
- Level of noise: 62 dB (A)
- Length x Width x Hight: 1158 x 600 x 1179 mm
- Weight: 367 kg



▪ SOPL-S: ADDITIONAL SIEMENS CNC REMOTE

The operator platform of the MASTER machine will have a common control panel to control 2 machines. The SLAVE machine will have one control panel which uses the SIEMENS 840DE Solution Line operator panel. Each machine is equipped with its own electrical cabinet and its own CNC. Both machines are independent.

▪ SANT: ANTICOLLISION DEVICE

The need of fully machining a workpiece at one set-up could generate interference risks between the two crossbeam and the two milling heads. In order to avoid this condition, the machine adopts a hardware and software anti-collision device.

By the software control the two numerical controls share the length of the machine axes travels. The hardware control consists of two sensors that detect the distance of both crossbeams along the total length of the axis travel.

By both systems, in case the distance between the two crossbeams is lower than a pre-set tolerance, all the axis travel movements are suddenly stopped.

CONTENTS OF THE MACHINE TOOLS

Art.	Milling Machine No. 1
>	<p>HORIZONTAL MILLING MACHINE series "MECMILL PLUS HPC3" WITH Siemens SINUMERIK 840DE SL software CNC 31-3 Export</p> <p>Basic configuration</p> <ul style="list-style-type: none"> • X travel (longitudinal): 10000 mm • Y travel (cross): 1850 mm • Z travel (vertical): 4000 mm • Brushless spindle motor Siemens , 50 kW - 1500 Nm. • Ram, 550x600 mm, equipped with continuous turning face plate PC3 with endless automatic millesimal positioning, in any position, controlled by CNC. • Bayonet coupling for automatic head change. • Patented system "WonderB.R.A. Balancing Ram Asset" • Main control panel and remote control panel. Motorization of the operator's platform, vertical travel 2500 mm. Digital axis motors by Siemens • Electrical cabinet with conditioning system (protection degree is IP54) • protection of the working area made of grid panels with a height of c 1400 mm and, in the front side of the machine, with steel framing panels with lexan windows • Power 400 V ($\pm 10\%$), 50 HZ ($\pm 1\%$) • Hardware and software for the machine connection to M.T.N. (Mecof Teleservice Network) with help of Internet connection, min. 1 Mb / sec. • Standard color: white RAL 9003, Blue RAL 5013, Red RAL 3020 and Grey RAL 7035, slightly hammered surface. • CE marking • CNC Siemens SINUMERIK 840DE SL SOLUTION LINE SOFTWARE 31-3 EXPORT <p style="text-align: right;">Quantity: 1 piece</p>
	INCLUDED OPTIONS:
<u>PL15/II</u>	<p>Floor plate (class II according to DIN 876); Load capacity 15000 kg/m²; Dimensions 10000x1500 mm</p> <p style="text-align: right;">Quantity: 1 piece</p>
DCB6-E	<p>Universal milling head with aut. millesimal positioning 50 kW, 1500 Nm, 5000 rpm, ISO 50 is equipped with gears, lubricated by the air/oil system. Intended for automatic head change operations.</p> <p style="text-align: right;">Quantity: 2 pcs</p>
DCB6-E	<p>Universal milling head with aut. millesimal positioning 38 kW, 1000 Nm, 6000 rpm, HSK 100 is equipped with gears, lubricated by the air/oil system.</p> <p style="text-align: right;">Quantity: 2 pcs</p>
MTCM	<p>Column type two-pocket head magazine for automatic stacking of 2 milling heads "DCB6-E", completely closed, which guarantees maximum protection of the heads. This option reduces the X-axis travel of 1000 mm.</p> <p style="text-align: right;">Quantity: 1 piece</p>

CU100-H	100 pocket tool changer (chain magazine) with the exchanging arm slides, which is fixed to the column (tool holder ISO 50). It allows tool changes with the spindle in a horizontal position.	Quantity: 1 piece
CUAP	Platform for manual loading / unloading of tools	Quantity: 1 piece
CUA	Extra option to increase tool changer capability <ul style="list-style-type: none"> - max. diameter of the tool up to 320 mm; - max. length up to 500 mm; - max. tool weight up to 35 kg - max. total tool weight up to 1200 kg 	Quantity: 1 piece
CAPR	Programmable adaptive control	Quantity: 1 piece
TASR	Measuring probe (via radio)	Quantity: 1 piece
TT10M	Chip belt conveyor with unloading ramp, for machine with X-axis = 10.000 mm, width 370 mm.	Quantity: 1 piece
TROLLEY	Trolley for chips and debris.	Quantity: 1 piece
PLAL	Washing gun with hose reel and pipe (5000 mm).	Quantity: 1 piece
IRDS	Cooling system with two coolant outputs: 1) Output around the spindle (pressure 6 bar operating capacity 28 l/min') with help of collectors with 4 fixed nozzles 2) Supply through spindle (pressure 20 bar, flow rate 20 l/min') through hole coaxial with spindle for holders with central hole (tools as per DIN 69871/A) This system is serviced by a receiving tank and filtration tank, 2000 liters each. Filtration rate: 1) 60 microns and 2) 30 microns, with help of cartridge type filters, mounted on tanks	Quantity: 1 piece
VF20	Filtering tank (capacity 2000 liters).	Quantity: 1 piece
VR20	Recovery tank (capacity 2000 liters)	Quantity: 1 piece
RRDS	Device for the regulation of coolant delivery	Quantity: 1 piece
	Warranty extension up to 24 months	
	Set of spare parts	
PACK	Marine packaging for the machine tool in wooden boxes	
GA7FF	Air compressor GA7FF-8,5 Atlas Copco	Quantity: 1 piece
	Additional services: - <i>Loading, Documentation</i>	

Art.	Milling Machine No.2
>	<p>HORIZONTAL MILLING MACHINE series "MECMILL PLUS HPC3" WITH Siemens SINUMERIK 840DE SL software CNC 31-3 Export</p> <p>Basic configuration</p> <ul style="list-style-type: none"> • X travel (longitudinal): 10000 mm • Y travel (cross): 1850 mm • Z travel (vertical): 4000 mm • Brushless spindle motor Siemens , 50 kW - 1500 Nm. • Ram, 550x600 mm, equipped with continuous turning face plate PC3 with endless automatic millesimal positioning, in any position, controlled by CNC. • Bayonet coupling for automatic head change. • Patented system "WonderB.R.A. Balancing Ram Asset" • Main control panel and remote control panel. Motorization of the operator's platform, vertical travel 2500 mm. Digital axis motors by Siemens • Electrical cabinet with conditioning system (protection degree is IP54) • Protection of the working area made of grid panels with a height of c 1400 mm and, in the front side of the machine, with steel framing panels with lexan windows • Power 400 V ($\pm 10\%$), 50 HZ ($\pm 1\%$) • Hardware and software for the machine connection to M.T.N. (Mecof Teleservice Network) with help of Internet connection, min. 1 Mb / sec. • Standard color: white RAL 9003, Blue RAL 5013, Red RAL 3020 and Grey RAL 7035, slightly hammered surface. • CE marking • CNC Siemens SINUMERIK 840DE SL SOLUTION LINE SOFTWARE 31-3 EXPORT <p style="text-align: right;">Quantity: 1 piece</p>
	INCLUDED OPTIONS:
<u>PL15/II</u>	<p>Floor plate (class II according to DIN 876); Load capacity 15000 kg/m²; Dimensions 10000x1500 mm</p> <p style="text-align: right;">Quantity: 1 piece</p>
DCB6-E	<p>Universal milling head with aut. millesimal positioning 50 kW, 1500 Nm, 5000 rpm, ISO 50 is equipped with gears, lubricated by the air/oil system. Intended for automatic head change operations.</p> <p style="text-align: right;">Quantity: 2 pcs</p>
MTCM	<p>Column type two-pocket head magazine for automatic stacking of 2 milling heads "DCB6-E", completely closed, which guarantees maximum protection of the heads. This option reduces the X-axis travel of 1000 mm.</p> <p style="text-align: right;">Quantity: 1 piece</p>
CU100-H	<p>100 pocket tool changer (chain magazine) with the exchanging arm slides, which is fixed to the column (tool holder ISO 50). It allows tool changes with the spindle in a horizontal position.</p> <p style="text-align: right;">Quantity: 1 piece</p>

CUAP	Platform for manual loading / unloading of tools	Quantity: 1 piece
CUA	Extra option to increase tool changer capability <ul style="list-style-type: none"> - max. diameter of the tool up to 320 mm; - max. length up to 500 mm; - max. tool weight up to 35 kg - max. total tool weight up to 1200 kg 	Quantity: 1 piece
CAPR	Programmable adaptive control	Quantity: 1 piece
TASR	Measuring probe (via radio)	Quantity: 1 piece
TT10M	Chip belt conveyor with unloading ramp, for machine with X-axis = 10.000 mm, width 370 mm.	Quantity: 1 piece
TROLLEY	Trolley for chips and debris.	Quantity: 1 piece
PLAL	Washing gun with hose reel and pipe (5.000 mm).	Quantity: 1 piece
IRDS	Cooling system with two coolant outputs: <ol style="list-style-type: none"> 1) Output around the spindle (pressure 6 bar operating capacity 28 l/min') with help of collectors with 4 fixed nozzles. 2) Supply through spindle (pressure 20 bar, flow rate 20 l/min') through hole coaxial with spindle for holders with central hole (tools as per DIN 69871/A). This system is serviced by a receiving tank and filtration tank, 2000 liters each. Filtration rate: 1) 60 microns and 2) 30 microns, with help of cartridge type filters, mounted on tanks	Quantity: 1 piece
VF20	Filtering tank (capacity 2000 liters).	Quantity: 1 piece
VR20	Recovery tank (capacity 2000 liters)	Quantity: 1 piece
RRDS	Device for the regulation of coolant delivery	Quantity: 1 piece
	Warranty extension up to 24 months	
	Set of spare parts	
PACK	Marine packaging for the machine tool in wooden boxes	
GA7FF	Air compressor GA7FF-8,5 Atlas Copco	Quantity: 1 piece
	Additional services: - <i>Loading, Documentation</i>	

GENERAL SALES CONDITIONS

The machine tools passed the preliminary tests at the manufacturer and are stored at the manufacturer at Belforte Monferrato, Italy, packed into wooden boxes ready for transportation.

SHIPEMENT

Shipment time begins after conclusion of a Contract and the advance payment: within 30 business days. Specific shipment terms may be agreed during negotiations about the Contract conditions.

OBLIGATION TO ACCEPT DELIVERY OF THE MACHINE

The buyer is always obliged to accept delivery of the equipment, even if delivery is delayed. In the event that the buyer does not accept the equipment, for reasons beyond the control of the seller (for example, delay in the completion of the foundation), the buyer will have to pay all related costs.

FORCE MAJEURE

Both parties shall not be liable for any failure to perform or delay in contractual obligations in the event of failure to perform due to force majeure circumstances such as fires, natural disasters, war strikes or other circumstances beyond the control of both parties. In this case, the deadlines for fulfilling contractual obligations will be extended for a time equal to the time of force majeure circumstances.

The right to force majeure is not valid if one of the parties, which is unable to comply with contractual obligations for the reasons set out above and does not inform the other party in writing of the impossibility.

PACKAGE

The equipment is packed in marine packaging.

Preliminary acceptance was carried out at the manufacturer's premises at MEKOF Srl, Italy, according to MEKOF's test methods.

The final acceptance will be carried out after delivery of the equipment to the premises of the end-user and mounting of the equipment on the foundation.

WARRNATY

The warranty period for the equipment is 24 months from the date of commissioning of equipment at the premises of the end-user or 27 months from the date of shipment of the equipment from Italy. In order to carry out maintenance, a set of spare parts must be included in the delivery.

The Seller is not responsible for failures caused by non-compliance with safety standards, as indicated in the instruction manual, and due to improper use of the machine, as well as in case of modifications and / or repairs made without the written permission of the Seller.

In addition, the warranty does not cover parts due to normal wear and tear and technical intervention to replace them. The right to request compensation and/or damages due to

machine downtime caused by malfunctions and during repairs, and more precisely, due to repair of malfunctions during the warranty period, is excluded.

LAYOUT

After receiving the order and accepting the order confirmation, the Seller will send the layout of the machine, which must be approved according to the terms specified in the contract. In the event that this does not happen due to the fault of the Buyer / End User, the delivery date is delayed by the same period.

FOUNDATION

The machine must be mounted on a suitable foundation. Analysis of the soil where the machine is installed, as-built foundation drawings and the technical data are the responsibility of the buyer. The supplier will send the buyer the necessary information and technical data necessary for the design and construction of the foundation to meet the requested installation requirements. The supplier recommends that the buyer contact the specialized design services to design the foundation structure, taking into account the soil conditions and the specific needs specified by the supplier, according to the weight of the machine, the cutting force and the allowable deformations in the foundation area. Professional design and proper manufacture of the foundation is the responsibility of the buyer.

INSTALLATION

Leveling fixtures will be supplied with the machines. The purchaser will furnish, for all the time necessary, at his own expense, all necessary and suitable facilities for raising the mill and the necessary manpower. In addition, sufficient "parking" areas must be allocated to ensure the free movement and placement of machine components during the assembly phases.

PROPERTY TRANSFER

The equipment becomes the property of the buyer at the time of its delivery at the agreed place, subject to full payment of the cost of the equipment.

DELIVERY DOES NOT INCLUDE

- Executive foundation drawings and foundation manufacturing;
- MasterFlow 928;
- Analysis of soil characteristics in the machine installation area;
- Supply line and air line (prepare according to MEKOF instructions);
- Coating of through channels of cable and pipes;
- Latticed coverings for the chip conveyor;
- Transportation.

CONFIDENTIALITY

Drawings, technical drawings and other similar documentation that one party transfers to the other party for the design of the project and / or after the signing of the contract belongs to the copyright holder of the party that provided them. Without the prior

permission of the copyright holder, it is prohibited to use, copy, duplicate or transfer to third parties. The parties have the right to use any information only to achieve the purpose that was established with the provision of documentation and the contract.

TECHNICAL DOCUMENTATION

The machine will be supplied with the following documentation:

CD ROM WITH PDF FILES:

- MECOF - manual
- MECOF - electrical circuits
- MECOF - hydraulic and pneumatic schemes
- CNC manufacturer - manuals
- Other suppliers - manuals (in supplier's language)

COPY ON PAPER:

- MECOF - manual
- MECOF - electrical circuits
- MECOF - hydraulic and pneumatic schemes
- CNC manufacturer - manuals
- Other suppliers - manuals (in supplier's language)
- CE declaration for accumulators and safety valves
- CE declaration of MECOF

Notes: Design drawings of the machine, milling heads and electrospindles are not supplied. Only circuits required for maintenance are supplied.

OTHER TECHNICAL DOCUMENTATION

Any technical data given in manufacturer's promotional, illustrative and printed documents are approximate guidelines.

THIS TECHNICAL OFFER VALIDITY: 90 DAYS