

MOBILE COLUMN MILLING MACHINE SACHMAN MP 212 HS Year of manufacturing 2009



TECHNICAL DATA

CNC SIEMENS 840 D

WORKING AREA

| | |
|-----------------------------|--------------------|
| Longitudinal travel X axis: | mm 16.000 |
| Cross travel Z axis: | mm 1.600 |
| Vertical travel Y axis: | mm 4.000 |
| Rapid traverse rate: | m/min 30 |
| Axis acceleration: | m/s ² 2 |
| Maximum axis thrust: | N 16.000 |

WORKING TABLES

| | |
|--|------------------|
| No. 2 floor plates: | mm 7.792 x 3.190 |
| Rototranslating table: | mm 3.000 x 2.992 |
| Cross travel of rototranslating table: | mm 2.500 |
| Maximum load capacity at table center: | Ton 60 |

SPINDLE

| | |
|--------------------|-------------------|
| Tool taper: | ISO 50 DIN 69871 |
| Spindle speed: | Rpm 5.000 |
| Power S1: | kW 37 |
| Power S6: | kW 56 |
| Maximum torque S1: | Nm 1.295 |
| Maximum torque S6: | Nm 1.963 |
| Usable low range: | Rpm 0 – 1.145 |
| Usable high range: | Rpm 1.145 – 5.000 |

KOSMO 3 UNIVERSAL MILLING HEAD

| | |
|--------------------------------|------------------------|
| Positioning accuracy: | $\pm 0.002^\circ$ |
| Maximum torque on rear plane: | Nm 15.600 |
| Maximum torque on front plane: | Nm 11.000 |
| Lubrication and cooling: | Forced oil circulation |
| Weight: | kg 450 |

EQUIPMENT

- Rueckle rototranslating table, size 3,000 x 2,992 mm, cross travel 2,500 mm, maximum load capacity at table center 60 tons, equipped with double preloaded pinion system;
- Vertical axis designated as Y and cross axis designated as Z;
- Remote electronic handwheel;
- Automatic universal bi-rotary milling head “KOSMO 3 5000”, 5,000 rpm, ISO 50, indexing 0.02° on the front plane, continuous C-axis (hydraulic clamping) and 1° Hirth coupling on the rear plane, oil recirculation lubrication system;
- Horizontal extension, diameter 200 mm, length 600 mm, 4,000 rpm, ISO 50 taper, continuous C-axis (hydraulic clamping) and 1° Hirth coupling;
- Continuous platform (C-axis) prepared for future installation of a 2-axis continuous milling head;
- Automatic head changer for the above-mentioned heads (Kosmo head, horizontal extension and preparation for continuous head);
- Head storage magazine for 2 heads (Kosmo head + horizontal extension);
- Air conditioning unit for electrical cabinet;
- Belt-type chip conveyor along X-axis complete with transverse conveyor, coolant tank and coolant pump;
- High-pressure coolant system, 40 bar through spindle, complete with tank and paper filter system, DIN 69871 type B;
- Chain-type tool magazine with 80 positions “MAC80”, ISO 50, with tool change capability in both horizontal and vertical spindle positions (maximum tool length 400 mm, maximum tool weight 20 kg);
- Air blast through external spindle nozzle;
- Renishaw NC4 laser tool presetting system;
- Renishaw RMP60 workpiece probe;
- Mobile operator cabin moving along vertical and horizontal axes;
- Instruction manuals and CE Declaration of Conformity.

MACHINE TECHNICAL DESCRIPTION MP 212 HS

Description

The MP212 HS is a high-speed floor-type travelling column milling machine which, thanks to its innovative design and construction concepts, currently represents one of the most advanced products in this category.

The machine has been designed using structural finite element analysis (FEA) and features an "open structure" concept. The adopted technical solutions ensure high accuracy and rigidity together with outstanding dynamic performance, despite the large axis travels.

- Linear roller guideways and ram guideways fitted with hardened steel guide surfaces and roller bearing blocks provide an ideal combination of high speed, acceleration, and precision.
- The cast-iron double-column structure with centrally positioned ram ensures thermal symmetry and guarantees constant and symmetrical machining behavior. Furthermore, the column structure has been designed with a pyramidal shape, reducing mass in the upper section to decrease inertia without compromising rigidity.
- The powerful spindle motor, housed inside the rear section of the ram, provides excellent machining performance while significantly reducing thermal deformation.

This exceptional flexibility allows machining of a single workpiece over the entire longitudinal travel or the creation of two or more work areas for pendulum operation, minimizing downtime for workpiece loading and clamping.

The machine layout can also be customized, as the bed length is virtually unlimited and the machine can be equipped with rotary tables, Y-axis rototranslating tables of various sizes, and floor plates.

Using suitable fixtures, workpieces can also be machined in a vertical position, providing significant advantages in chip evacuation.

Various milling heads, both high-torque and high-speed versions, can be mounted on the horizontal ram.

High-speed machining technology fully demonstrates its advantages in semi-finishing and finishing operations on sculptured surfaces in cast iron and steel, as well as on light alloys, model-making materials, and composite materials for various applications.

X-Axis Unit – Travel 16,000 mm

The machine bed consists of a cast-iron base fixed to the floor by anchoring bolts, leveling points, and lateral adjustment devices.

It is equipped with roller linear guideways for the movement of the travelling column carriage.

The column carriage, also made of cast iron, moves along the bed guideways by means of roller bearing blocks (3 guideways size 65 and 12 roller blocks).

Movement of the travelling column (X-axis) is achieved through a rack-and-pinion system with automatic hydraulic backlash compensation and a single drive motor.

The machine is equipped with a main control panel located on the operator platform, which follows the column movement along the X-axis and can be disengaged and positioned at the front of the machine.

All machine controls are located on the main control panel.

In addition to the main control panel, a remote control station is provided, incorporating axis control pushbuttons and an electronic handwheel.

The remote control station is designed for easy transportation throughout the machine working area, simplifying workpiece setup and positioning operations.

The operator platform is mounted on the travelling unit and moves together with it along the X-axis. From this platform, the operator can easily monitor the machining process.

For safety reasons, the platform is equipped with protective railings and a transparent safety screen. The front access gate includes a safety interlock that limits X-axis travel speed whenever it is opened.

Cross Z-Axis Unit – Travel 1,600 mm

The ram carriage is a cast-iron box-type structure surrounding the ram and constraining it on all four sides through sixteen roller-bearing guide blocks (eight front and eight rear).

For the Z-axis section, six front roller blocks and two rear roller blocks have been incorporated to prevent ram overhang deflection.

The ram itself is manufactured from ribbed spheroidal cast iron and has been designed using structural calculations.

The four hardened and ground guideways form a square around the spindle drive axis, resulting in a perfectly symmetrical structure.

Ram Sag Compensation System

To compensate for moments generated by ram extension, a gantry-type compensation system is employed, consisting of:

- 2 motors
- 2 precision preloaded double-nut ball screws
- 2 optical scales

Compensation is achieved through the action of the rear motor, which corrects any difference between the front and rear Z-axis positions measured by the optical scales.

Vertical Y-Axis Unit – Travel 4,000 mm

The column is a double-column cast-iron structure, closed at both top and bottom, with a symmetrical design allowing the ram to move centrally.

Vertical movement of the ram carriage is guided by two preloaded roller linear guideways, one mounted on each column, plus a third rear guideway acting as a counter-support.

The vertical axis is driven by an AC brushless motor through a toothed belt reduction system connected to precision preloaded double-nut ball screws.

Position feedback is provided by an optical scale.

Vertical Axis Counterbalance System

The ram and ram carriage assembly is balanced by means of two telescopic hydraulic cylinders equipped with low-friction seals and connected through a closed hydraulic circuit to hydropneumatic accumulators.

The system compensates for the assembly weight, relieving the vertical axis ball screw.

An additional safety device consists of a brake acting directly on the vertical-axis screw.

This brake is automatically activated in the event of accidental pressure loss in the balancing system or power failure, preventing the ram assembly from descending.

KOSMO 3 Universal Head – 5,000 rpm

The KOSMO 3 is a newly designed universal milling head capable of positioning on both rotational planes with a resolution better than 0.02°.

Optional software is available to calculate the programming values required on both planes in order to obtain the desired spatial angles.

Spindle Drive System for KOSMO 3 Heads

Power transmission to the spindle of the various interchangeable heads is provided by an AC motor which, in the case of automatic heads, also controls the rotation and positioning of the head sections.

To optimize motor performance, a ZF gearbox with forced oil lubrication and cooling has been incorporated. The system features dual-flow lubrication (oil is extracted at the outlet) and automatically selects gear ratios to extend the constant-power operating range.

Speed ranges:

- 0 – 1,145 rpm
- 0 – 5,000 rpm

Spindle motor power:

- 37 kW (continuous)
- 56 kW (40% duty cycle)

Forced oil lubrication and cooling are provided.

The motor and gearbox assembly are mounted directly on the spindle transmission axis, ensuring smooth spindle rotation free from vibration.