

I. TECHNICAL CHARACTERISTIC

1.1. Technical Specification

FR series knee type milling machines are designed for light and medium milling works at work-piece bulk up to 450 kg.

They have the compact construction and heavy stiffness. The heavy stiffness combined with magnitude of installed power of the spindle drive gives the machine tools adopted to machine many different type of materials and makes possible to select the economical cutting parameters.

These milling machines are equipped with TNC 124 type Heidenhain's CNC system.

Capabilities these milling machines comprise:

- operation as standard milling machine, equipped with a numerical distant readout,
- programming by machining the first work-piece, based on so called „teach-in” method,
- entering the previously prepared programme data from diskette with the disk station or by personal computer (PC),
- automatic machining with feeds along controlled axes of X, Y and Z in accordance with the program have been entered to the system,
- programming and machining by utilisation the following fixed cycles:
 - drilling of bores distributed in one line or on certain circle,
 - drilling with a tool retraction for scrape removal,
 - optional machining with utilisation a time delay for smoothing the surface to be under processing,
 - threading,
 - rectangular pockets milling.

Memory capacity of the control system is 2000 program blocks, they are containing no more than 20 programs.

Optoelectronic rules are used for positional measurement.

The vertical and horizontal spindles of the milling machines are equipped with a system for quick tool exchange.

The longitudinal of the table, lateral of the slide, and vertical of the console feeds are conducted by means of rolling screws driven by AC type motors.

The milling machine poses a central lubrication system provides optimal lubrication conditions of the ways and rolling screws, and hydraulic system which task is the vertical feed drive relief and tool disclamping.

I.2. Characteristic Data.

Designation of quantity	Measure in mm
1	2
Working table surface	400 x 1400
Number of grooves in the table	6
Groove width in the table	18
Groove spacing in the table	63
Horizontal spindle cone Vertical spindle cone	ISO 50 ISO 40
Maximal table shifts: - longitudinal, - lateral , - vertical.	1030 320 465
Maximal distance between the table and horizontal spindle central line	465
Longest distance from the vertical way to the front rest surface	515
Maximal distance from front of the horizontal spindle to front rest surface	532
Distance between the central line of the horizontal spindle to beam's way.	152
Shortest distance between the table edge and vertical way.	17
Horizontal spindle diameter in the front bearing.	90

1	2
Vertical spindle quill travel.	75
Distances from the front of the vertical spindle in vertical position to the table surface: - maximal, - minimal.	540 0
Minimal distance from the central line of the vertical spindle in his vertical position to vertical ways of the milling machine.	145
Turning angle of the vertical spindle (head).	$\pm 45^{\circ}$
Number of horizontal spindle velocity steps. Number of vertical spindle velocity steps.	16 16
Range of horizontal spindle rotational speed (f=50 and 60 Hz)	56-1800 rpm
Range of vertical spindle rotational speed (f=50 and 60 Hz)	56-1800 rpm
Ranges of feeds: - longitudinal, - lateral, - vertical.	1-2000 mm/min 1-2000 mm/min 1-2000 mm/min
Magnitudes of feeds: - longitudinal feed, - lateral feed, - vertical feed	10000 mm/min 10000 mm/min 5000 mm/min

MOTORS

No	Assignment	Description	Power [kW]	Torque [Nm]	Rotational Speed [rpm]	
					f=50Hz	f=60Hz
1	Drive motors of the horizontal spindle	Totally enclosed flanged, asynchronous motor, mechanical size of 132 to IEC, voltages and frequencies as ordered	7.5	-	1455	1750
2	Drive motor of the vertical spindle	Totally enclosed flanged, asynchronous motor, mechanical size of 132 to IEC, voltages and frequencies as ordered	5.5	-	1450	1735
3	Feed motor	AC motor	axis X	-	8	4100
			axis Y	-	8	4100
			axis Z	-	12	2700
4	Cooling agent, electrical small pump	Asynchronous motor of special construction. Voltage as ordered.	0.09	-	2800	3350

NOTE: 60 Hz motors can be performed to NEMA standards .

