
Supplier **FERMAT Group, a.s.**

name (contact person) Jan Ferenc

Address Zitavskeho 496

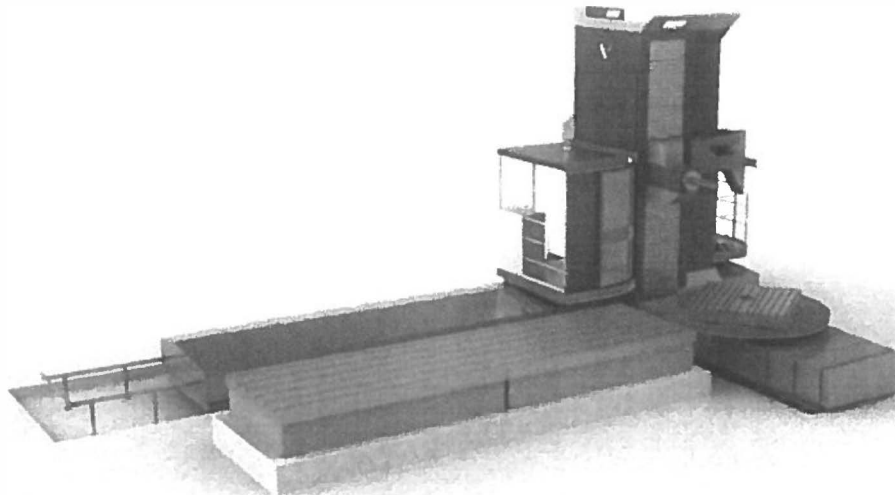
Town 156 00 Praha 5 - Zbraslav

Country Czech Republic (VAT CZ26688930)

Email jan.ferenc@fermatmachinery.com

Phone Direct Phone: FAX: +420 277 009 626 | Mobile: +420 777 339 601

Technical specification and machine order

Floor type horizontal boring machine WRF 160 CNC

X axis [mm] - column travel	13 500
Y axis [mm] - headstock travel	4 100
Z axis [mm] - ram travel	1100
W axis [mm] - spindle out travel	1000
CNC rotary table size [mm]	2500 x 3500
CNC rotary table load capacity [kg]	40 000
V axis [mm] - table travel	2400

General Technical Specification

FERMAT's **Horizontal Boring Mill WRF 160** represents the newest technology and concept of floor-type horizontal boring mills that are currently on the global marketplace. Its powerful headstock consists of a movable slide ram (Z-axis) and a moveable live spindle (W-axis). **WRF 160** has excellent accuracy of circular interpolation and high precision of the additional CNC Rotary Table.

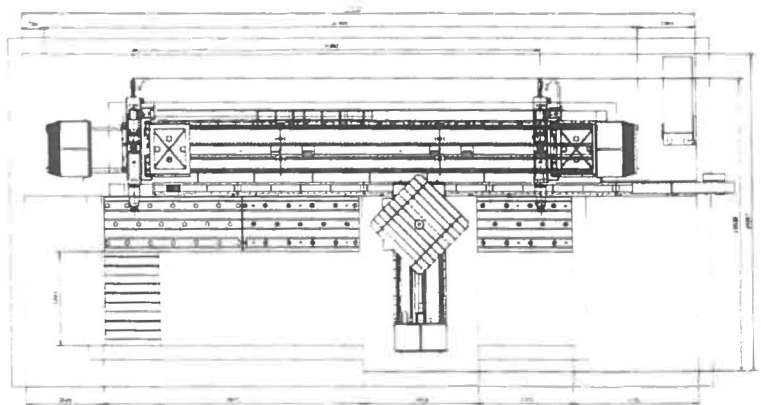
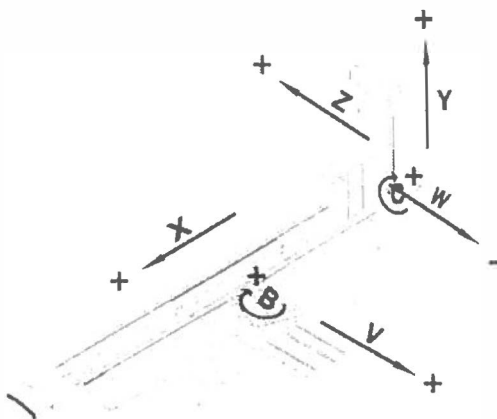
Because of its modern design, **WRF 160** is a universal boring and milling machine that allows efficient processing of large and heavy workpieces while conserving high precision and quality of the operation.

The machine column adopts a crosswise movement (along the X-axis) while rotary table moves longitudinally (V-axis/B-axis).

Fully integrated modular design lets our customers configure their machine to their requirements, including X-travel from 2 400 mm to 28 100 mm, Y-axis travel from 2 000 mm to 6 000 mm, with a variety of headstocks, tables and floor plates.

The CNC Rotary Tables T15/T20/T25/ T40/T50, with table sizes from 1600x1800 to 3 500 x 3 500 mm, can hold heavy work pieces of up to 15 000kg/20 000 kg/25 000 kg/ 40 000 kg/50 000 kg. Even heavier work pieces can be clamped on floor plates or specially designed tables.

All components of the machine are from renowned manufacturers.



Example of a layout and axis system of WRF160 CNC

Headstock		
Spindle Diameter	Ø160	mm
Spindle Taper	DIN 69871, ISO 50	
Pull Studs	DIN 69872	
Spindle RPM	10 – 2500	RPM
Spindle Motor Power for Heidenhain /Siemens(S1 Continuous/ S6-40%)	60 / 80	kW
Maximum Spindle Torque for Heidenhain/Siemens (S1 Continuous/S6-40%)	2 655 / 4 008	Nm
Headstock Dimension	460x500	Mm
Working Ranges		
Column Travel (X-axis)	2 400 – 28 100	Mm
Headstock Travel (Y-axis)	2 000 – 6 000	mm
Ram Travel (Z-axis)	1000 (1100,1200 optional)	mm
Spindle Travel (W-axis)	1000	mm
Operation Travel All Axis	1 – 10 000	mm/min
Rapid Travel X-axis	20 000	mm/min
Rapid Travel Y-axis	15 000	mm/min
Rapid Travel Z-axis, W-axis	8 000	mm/min
Max. Axial Force X-axis, Y-axis	40	kN
Max. Axial Force Z-axis, W-axis	40	kN
Positioning Accuracy X, Y, Z, W	0.01	mm
Repeatable Positioning Accuracy X, Y, Z, W	0.005	mm
Positioning of X, Y, Z	Linear electro-optical	
Positioning of W	From the Encoder	
Hydraulic And Pneumatic System		
Tool Unclamping Pressure	10 – 15	MPa
Ancillary Circuit Pressure	8	MPa
Tool Clamping Force	24	kN
Tool Clamping	Hydro-mechanic	
Incoming Air Pressure	0,6	MPa
Volume Of Incoming Air (Tool Cooling)	400	l/min
Electricity (According to Local Requirements)		
Power Requirement	To be specified	kVA
Operation Voltage	3 x 400	V
Operation Voltage Allowance	5 %	
Operation And Control Voltage	24	V
Operation Voltage Frequency	50	Hz
Maximal Noise Level At Operator's Location	72	dB
Other Specifications		
Hydraulic Unit Volume	15	l
Lubrication Unit Volume	2	l

Machine Specification

- Spindle Diameter 160 mm, Spindle Taper ISO 50
- Heidenhain iTNC 530 Control System
- Siemens Spindle Motor Power 60 kW, Hand Wheel HR 520, Separate Control Panel with 15" LCD Screen
- CNC Rotary Table on Cross Roller Taper Bearing with 2 Pinions and 2 Servomotors. Maximum Table Load 40 Tons, 2500x3500 mm, V axis travel 2400 mm with Rotary Scale and Encoder Heidenhain for B-Axis. Table will be equipped by additional hydraulic brakes for table rotation – B axis.
- Heidenhain Scales for X, Y, Z, V Axes
- Automatic Lubrication System
- Hydraulic System with Bosch Rexroth valves.
- Headstock Oil Chiller
- Outside coolant system 4 bars
- Coolant through spindle 30 bars (CTS)
- ATC 60, ISO50
- Pick up station with 3 positions (for 2 angular heads)
- PHA 37, automatic right angular head with 2.5° steps.
- Connection of UHM mi (head will be supplied by Nordmark to Fermat in Brno facility)
- Chip conveyor belt type
- Air condition of the distribution box
- Work Lamp on the Column, operator's cabin
- Remote Diagnostics (WiFi ready, connection to be done by the customer; service must)
- Moveable Operator's cabin
- Leveling Bolts & Seal Pads, X axis and table will be anchored every 305 mm.
- CE Standard with TÜV Certificate (Safety Fence is Option), EC Declaration of Conformity, Electro Revision Certificate
- Documentation (operator and Service Manuals; machine Documentation: Control System Programming, Service and Operator Manuals; geometric Measuring Documentation)
- Installation (geometry accuracy gauging as per the valid international standards ISO 230-1:1996: ISO 3070-3.4:19)
- One day training (operation and maintenance)
- Packing
- Transport to Nordmark in Denmark
- 12 months guarantee
- Connection of Demmeler tilting table including separate cabinet, cables, drives, control system, profi bus. Demmeler supplies servomotors. Delivery time of Demmeler table is not known. Because of that, delivery time of the machine is without connection of this table.

WRF 160 CNC (X=13 500, Y=4100, Z=1100, W=1000, V=2400)

Documentation Performance

Documentation in English

- Operator and Service Manuals
- Machine Documentation
- Control System Programming, Service and Operator Manuals
- Geometric Measuring Documentation

Subject of the Performance Is Not

- Machine Foundation (informational plans only)
- Anchoring material
- Any Building Conversion Necessary for Installation of the Machine
- Covering and Equipping of the Supply Channels
- Power Supply Lines to the Machine
- Lifting Equipment Necessary for the Installation of the Machine
- Handling Equipment at the Place of the Installation
- Technological Tools
- Training of the Programmers in Programming of the Machine Control System
- Cooling Liquid Necessary for Cooling Systems
- Hydraulic Fillings
- Any machining test, technology

Machine Acceptance

Machine pre-acceptance in Fermat

The Pre-Acceptance will be carried out at FERMAT's premises in Brno, Czech Republic before shipment considering the local conditions at the assembly hall. The customer may participate at this inspection.

- Duration: 1 day of the Pre-Acceptance (mechanical and functional) testing of the machine)
- Language: English

Scope of pre-acceptance

- **Inspection and Presentation of the Machine**
 - Check of machine completeness according to the order
 - Check of documentation completeness
- **Functional Tests of the Machine**
 - Test of all functions of the machine including all options
 - Partial geometrical test

Machine acceptance at Customer's Premises

Acceptance will be carried out immediately after termination of the installation at the customer's premises.

Scope of acceptance

- **Inspection and Presentation of the Machine**
 - Check of machine completeness according to the order
 - Check of documentation completeness

- **Functional Tests of the Machine**
 - Test of all functions of the machine including all options
 - Geometrical test

Installation, Training

Installation at Customer's Premises

- The installation will take place at the customer's premises after the delivery of the machine.
- Customer's Responsibility before and during Installation
- Preparation of the machine base, including pre-cast holes for the foundation bolts, and power supply lines for construction of the machine according to the foundation plan
- Confirmation of delivery of the machine
- Securing the machine or its parts and protect it or its parts from loss, destruction or damage
- Providing any possible assistance during the period of the installation, namely electric power, compressed air etc.
- Training
- Training shall be carried out at the customer's premises during or after the installation of the machine. The customer will choose the relevant technicians (operators, maintenance staff) for the training.
- Training range: mechanical and electrical part, maintenance and operation of the machine
- Duration: 1 working days
- Language: English

Validity, Delivery, Packing, Warranty, Payment Conditions

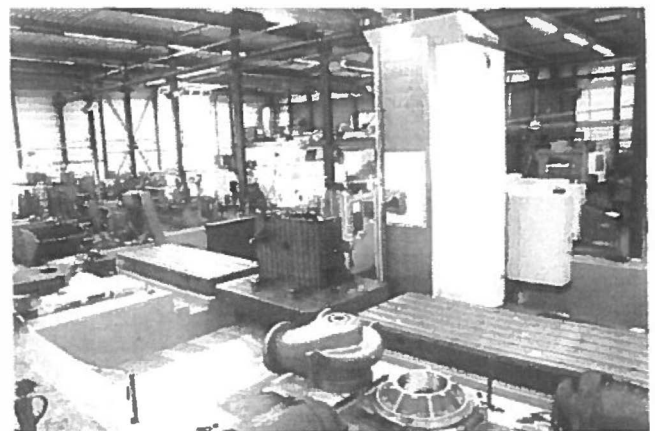
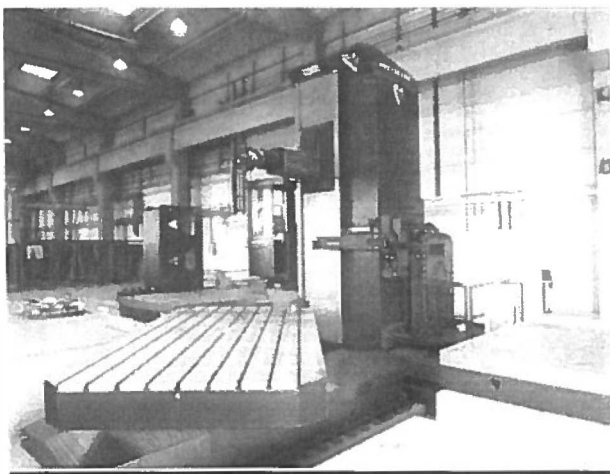
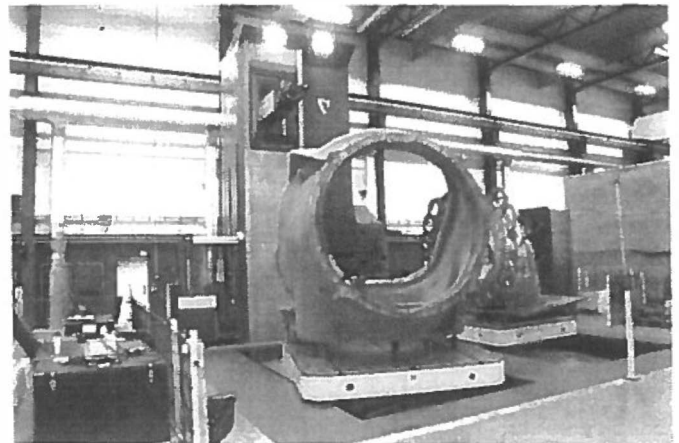
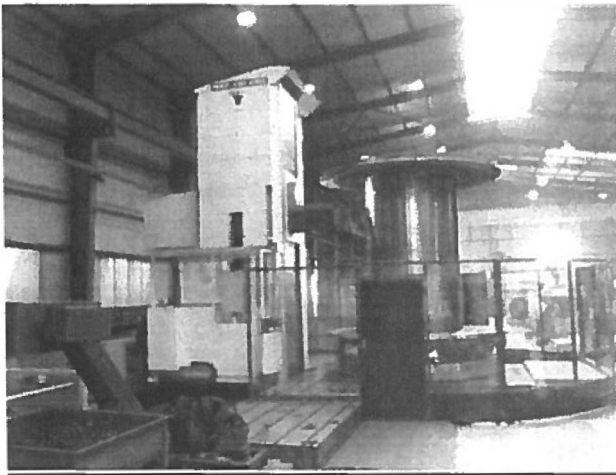
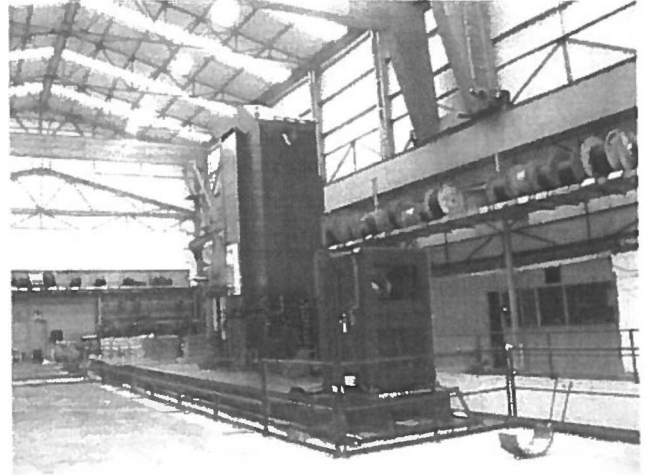
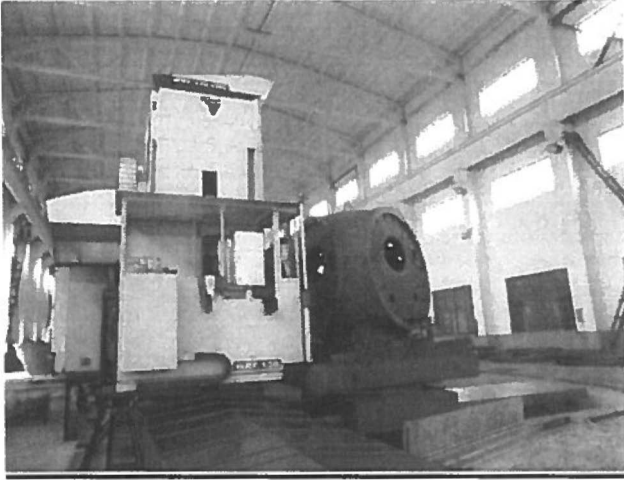
Delivery:	2,5 months from down payment EXW Brno, Czech Republic,
Packing:	waterproof, Inland
Installation:	Included in the price
Warranty:	12 months
Retention of title:	The delivered goods is until full payment owned by FERMAT and are free to act accordingly if necessary.
Terms of the offer:	<p>The offer is non-binding and is subject to confirmation, and is subject to prior sale. In case of order placement, our confirmation of the order constitutes the final sales contract. Dependent on further development of our products, we reserve the right to change technical details.</p> <p>Please note, that we do not accept any penalty in case of delay in deliveries due to delayed incoming payments.</p>

On behalf of FERMAT Group,

a.s.

Jan Ferenc, General Manager
Jiří Ferenc, owner

WRF 160 CNC



Amendment #1 to the PO

Following modifications have been agreed some for extra cost, some for free:

WRF 160 CNC	Nordmark Maskinefabrik - remarks	comment	Info needed deadline	availability within 2,5M EXW delivery	Nordmark confirmation (selection to be ordered)
1	machine foundation	we should have our first proposal by tomorrow, after the weekend we need your feedback			ongoing
2	UHAmi microindexing head	we need the head ASAP to manage withing the delivery	2 5 2012	yes	sent
3	MH probe	we need the head ASAP to manage withing the delivery, must be delivered with its cable	2 5 2012	yes	sent
4	preparation for connection to the exhaust system	we can supply as per the previous machines, will you require that?	2 5 2012	yes	OK as previous machine
5	ATC switch on/off by M function	we can supply as per the previous machines, will you require that?	2 5 2012	yes	OK as previous machine
6	ATC functionality with a waiting tool, using Tool del	we can supply as per the previous machines, will you require that?	2 5 2012	yes	OK as previous machine
7	additional button for a tool release	100 EUR	2.5.2012	yes	100 €
8	manual loading into ATC	the machine will not stop while loading into ATC tools manually, automatic exchange will be blocked at that time	2 5 2012	yes	OK as previous machine
9	air in the cabin and ATC platform	200 EUR for the ATC	2.5.2012	yes	200 €
10	220 V in the cabin	we can supply as per the previous machines, will you require that?	2 5.2012	yes	OK as previous machine
11	regulation of CTS	200 EUR using proportional valve, we can supply as per the previous machines; will you require that?	2.5.2012	yes	200 €
12	sensor of CTS on the spindle	800 EUR	2.5.2012	yes	800 €
13	overloading for the spindle	to be set at 56, we can supply as per the previous machines, will you require that?	2 5 2012	yes	OK as previous machine
14	ATC cover	standard	2 5 2012	yes	OK as previous machine
15	cabin top	standard	2 5 2012	yes	OK as previous machine
16	electrocabinet extra top cover		2 5 2012	yes	OK as previous machine
17	Gear change	M function for the gear change, we can supply as per the previous	2 5 2012	yes	OK as previous machine
18	safety fence by FERMAT	yes or no, if yes then the standard fence will be offered based on the foundation drawing/layout. The delivery for the fence is 6-7 weeks after we order it	14.5.2012	yes	2 100 €
19	light safety bars (safety)	Nordmark will send, 500 EUR for the safety relay we must get	sent	no	
20	el.locks for the doors of safety fence	800 EUR a pair x 2 doors	ASAP	no	
21	chip conveyor	standard	7 5 2012	yes	OK
22	chip conveyor height (end part)	the end part of the chip conveyor should be again 1600 mm above the floor, we can supply as per the previous machines, will you require	7 5 2012	yes	will be on the drawing limited in connection with dept and space available
23	FERMAT rotary table location	looking from the operator's cabin by the machine, will on left or right side?	ASAP	yes	OK
24	Demmeler table	foundation drawing integrated	info	info	OK

total due 3 400 €

The price for above mentioned stock machine modification

3 400 EUR

Account No.: CZ7860000000002013400010

Bank code: PMBPCZPP

Issuing Bank: PPF banka a.s., Evropská 2690/17, Praha 6, 160 41

On behalf of FERMAT Group, a.s.



Jan Kropacek**FERMAT GROUP, a.s.**
Žitavského 496
156 00 Praha 5 - Zbraslav
DIČ: CZ226688930