REIDEN SWISS
HIGH PERFORMANCE MACHINE TOOLS

e

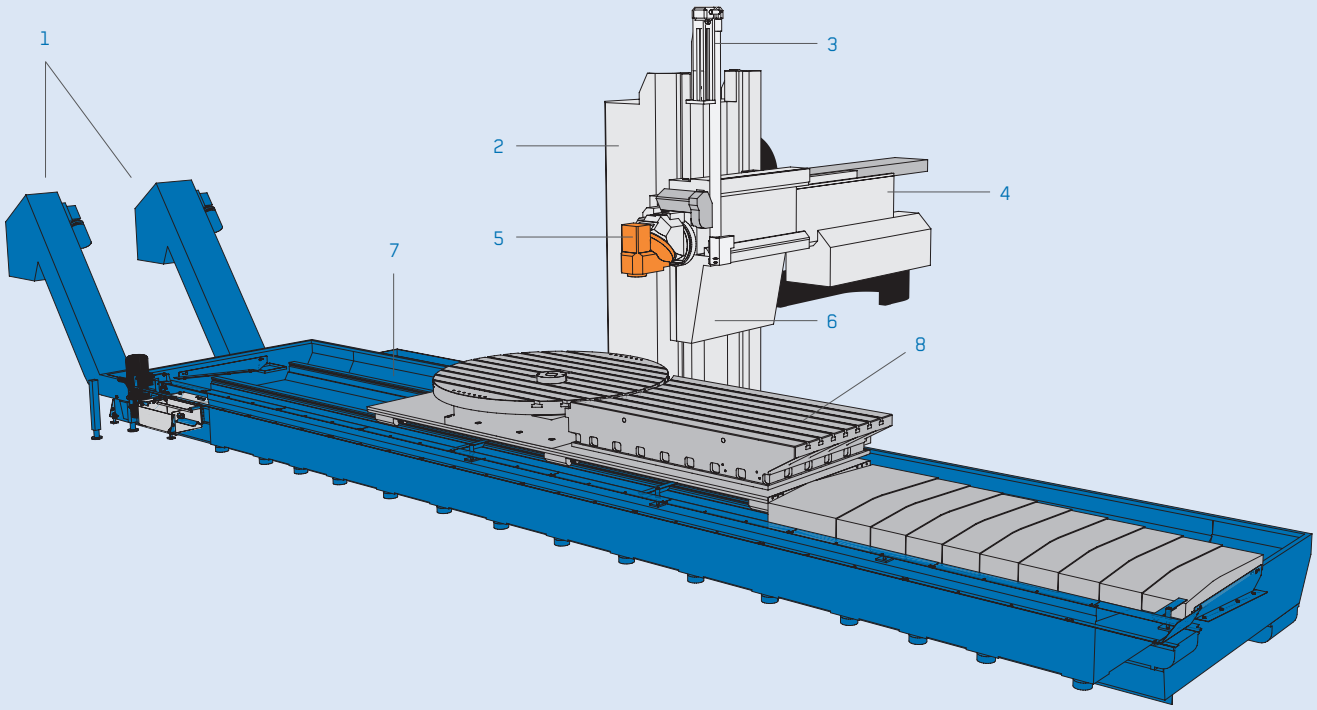
BFR2

5-axis machining center
a system developed for high performance

MACHINE TOOL MANUFACTURER

Cross slide

The high stability of the cross slide is characterised by the minimal distance between the cross and vertical guides. This consequently ensures that the gear beam travels as close as possible on the base. The plastic-coated box type guide ways in the cross- and vertical axis are handscraped to the grinded and hardened opposing guide ways to the highest precision.



1 Chip conveyors left and right of the machine bed

2 Cast iron machine column with grouted square brackets of polymer concrete

3 Hydraulic weight compensation for the complete vertical unit

4 Electrically-/hydraulically-compensated gear beam with hardened, grinded and deep hole drilled guide ways which are attached to the water cooling circuit

5 Automatic milling head

6 Cross slide

7 Ribbed cast iron machine bed

8 Rigid-, rotary-, or combination table

RIGID BASIC CONCEPT
FOR DEALING WITH HIGH MACHINING FORCES

This generously dimensioned machine design with box type guide ways guarantees stability and smooth running even with extreme cutting forces.

5-axis machining centers are exposed to more complex loads than other machines due to their substantially greater technology range. All the forces occurring in multi-axis simultaneous machining have therefore already been taken into account when dimensioning the machine cross-section. The machine design is modular and expandable. The mechanical components vary only in the X axis, i.e. as a function of the travel and the table version.

The centerpiece – the automatic milling head

Continuously developed since 1982 and proven in hundreds of uses, it counters in its compact design even the most powerful cutting forces.

Horizontal - vertical

Automatically pivoted and held and positioned over a hirth gear.

B-axis, continuous programmable

The B-axis pivots continuous +/- 180° by means of a pre-stressed, backlash-free worm drive. The NC axis is designed for positioning and simultaneous operation.

A axis, programmable at every 1°/ 15°

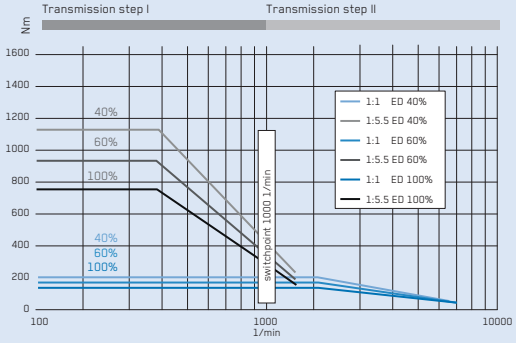
On the horizontal-vertical pivotal plane the A axis can be programmed at every 1°/15°. Programming is carried out directly at the machine controls via a user friendly dialogue.

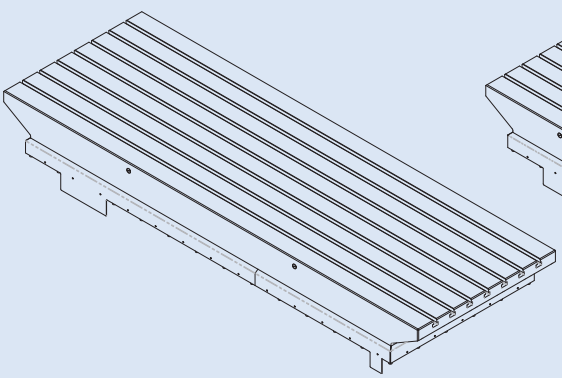
INTEGRATED PIVOT DESIGN
FOR MAXIMUM FLEXIBILITY

By optimal arrangement of the pivot axes machining can be carried out in almost any corner.
Changing the workpiece setup is a thing of the past.

Torque diagram

Spindle 6'000 / 7'000 rpm





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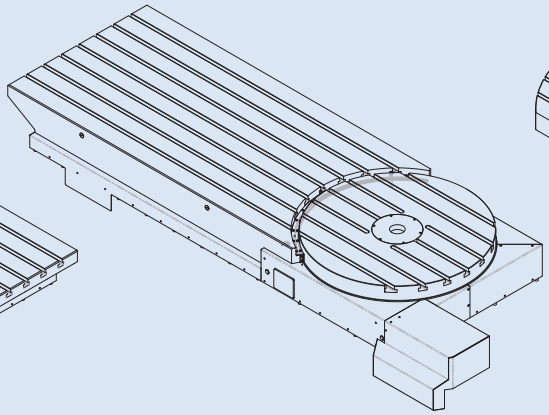

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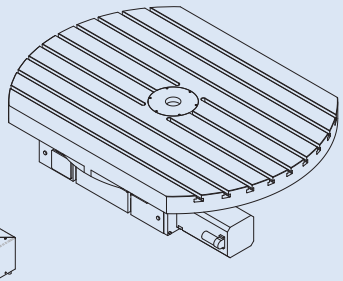

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Table versions

The following table versions are available with all machine types:

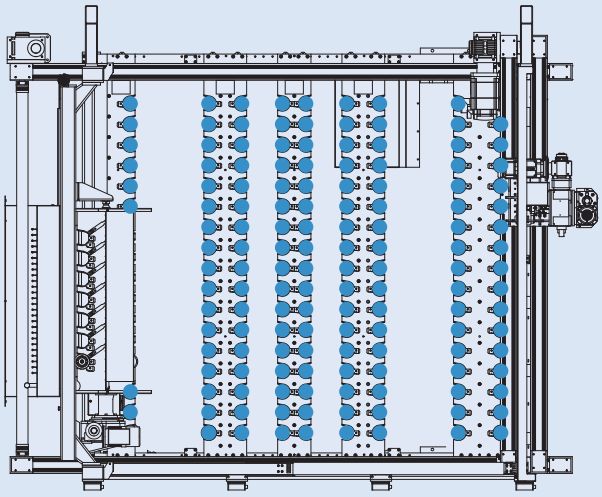
1 Rigid tables

2 Combination tables, rigid table and rotary table on a plane

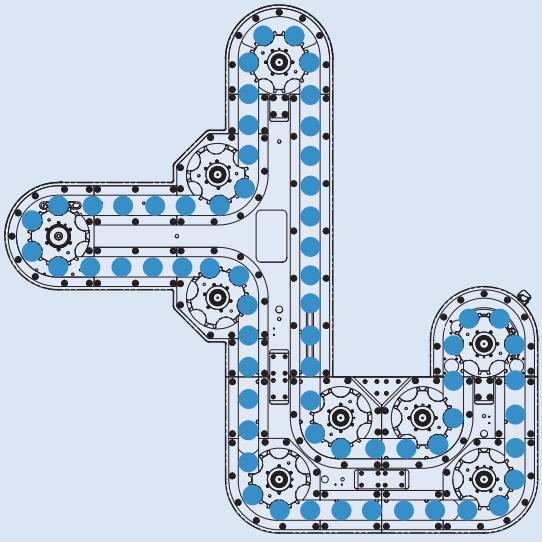
3 Rotary tables from ø 1'000 to ø 1'700 mm

Table surfaces

Along with the standard T-slots the table surfaces can also be supplied with hole matrix or zero point clamping systems.



Shelf magazine
151 / 321 places

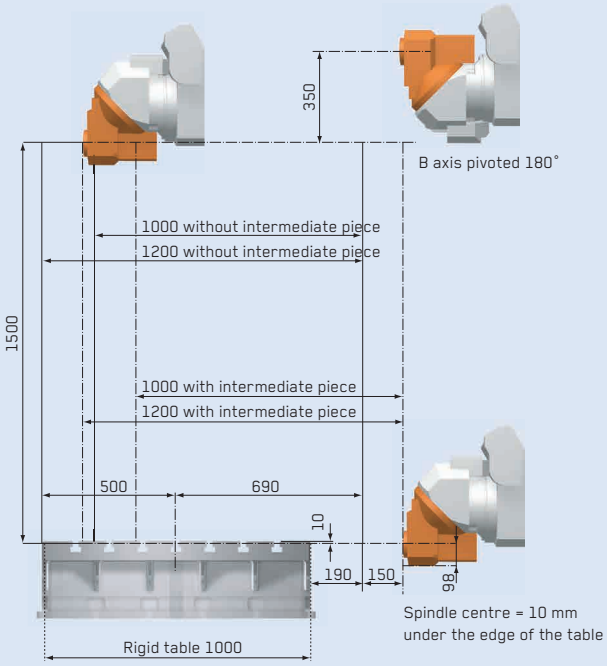


Chain magazine
64 / 80 / 120 places

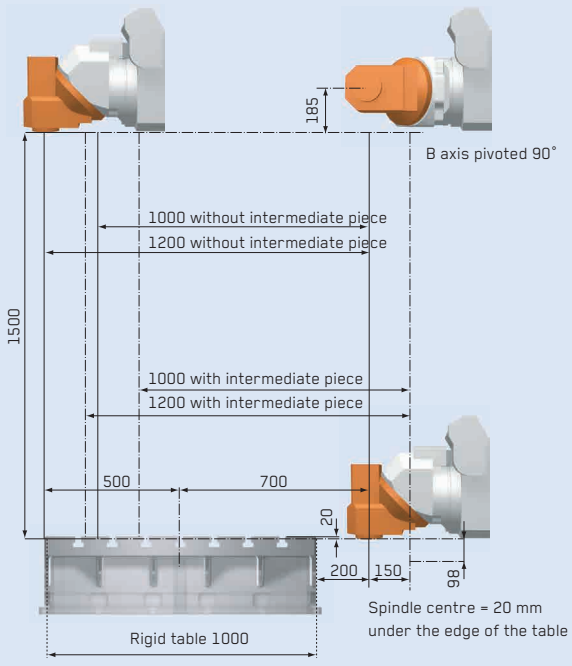
Tool changer

The tool changer arranged to the side of the lateral work space is fitted as either a chain magazine or optionally as a shelf magazine. Time-concurrent loading of tools is possible in both versions.

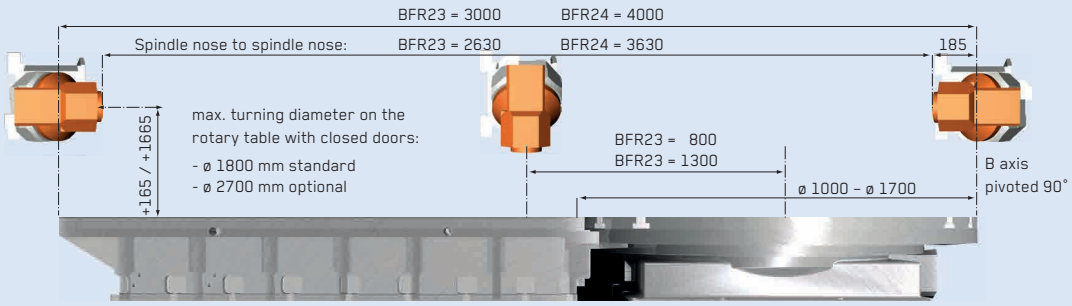
Movement diagrams



Horizontal



Vertical



Front

INDIVIDUALLY
CUSTOMIZED

A multitude of options guarantees the customer a customized machine. Individual customer desires and requirements can be met quickly and easily thanks to our own mechanical and electrical engineering department.

Good view and accessibility

The optimal arrangement of the controls, good and large windows always guarantee the operator an optimal view of the tool and work piece.

Full-space protection casing

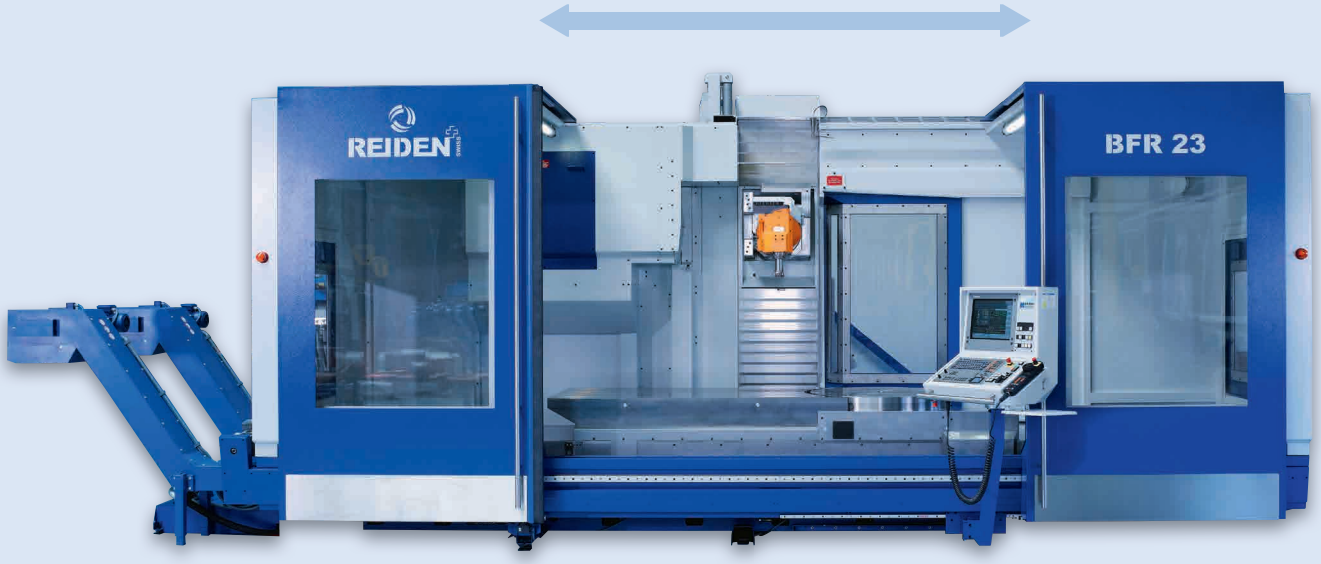
All machines in the BFR2 series have full space protection casing as standard with two angled doors and a sliding door at the rear for good accessibility during horizontal machining.

Chip conveyors

Both slat-band chip conveyor front and back along the machine bed allow effective and rapid removal of chips and prevent thermal impact on the machine.

Door opening

BFR 23: 3'100 mm
BFR 24: 4'100 mm



OPTIMUM ERGONOMICS
IN TERMS OF THE OPERATOR

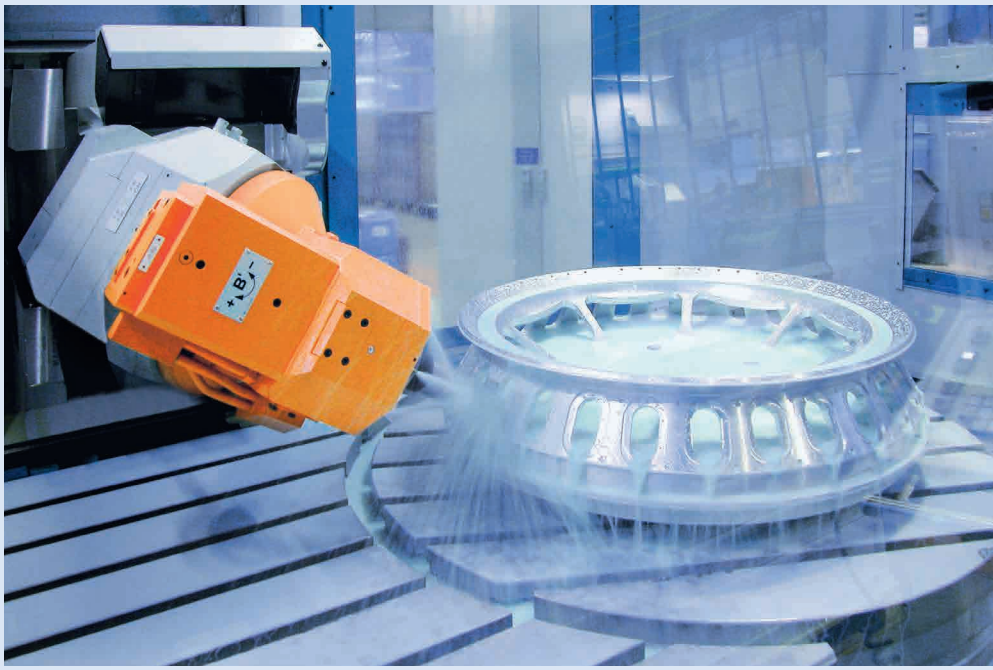
Ergonomics coordinated on the operator of the machine allow an optimal view of the work piece and tool on every machining.
Maximum accessibility for loading and unloading work pieces or fixtures. Full accessibility for economic loading and unloading with crane.

Control panel, rear

A second control panel at the rear is optionally available. This allows the operator an optimal overview even when machining in the horizontal position.

Ball screws, guide ways

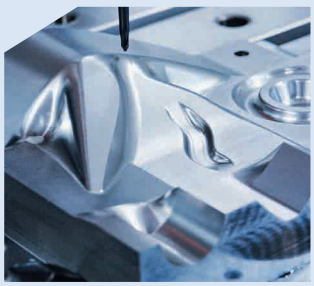
The generously sized ball screws and guide ways guarantee a high capacity for years without losing accuracy in the process. Assembled with expertise you can make a significant contribution to the high precision of the machine.



HIGHEST PRECISION
VIA PROVEN TECHNOLOGIES

To meet the high demands of our customers we use qualitatively high end components from established suppliers.

The REIDEN BFR2 series has been developed and constructed for the manufacture of single component- and small batch run production in general machine-, tool and die making up to the aerospace level or for productive quantity manufacture.



Die making

Cooled guides and generously sized drive motors, precision ball screws and high mechanical basic accuracy provide for the best results in surface- and shape accuracy during die making.

Simultaneous machinings

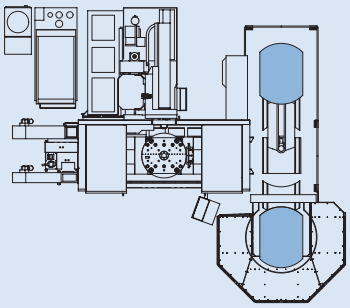
Thanks to the compact milling head and universal B-axis even difficult to access machinings can be carried out. The backlash-free worm drive guarantees the highest precision when simultaneously machining.

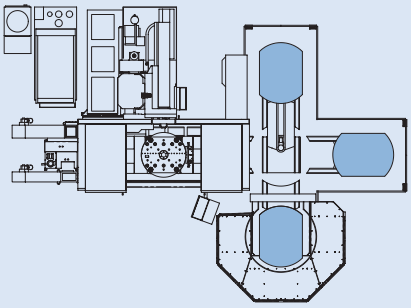
Machine construction

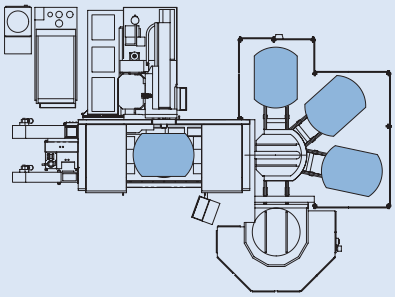
Hydraulically clamped rotation axes guarantee stability during heavy roughing in machine construction. Laser calibrated linear and rotary axes provide for the highest accuracy on the work piece to be machined.

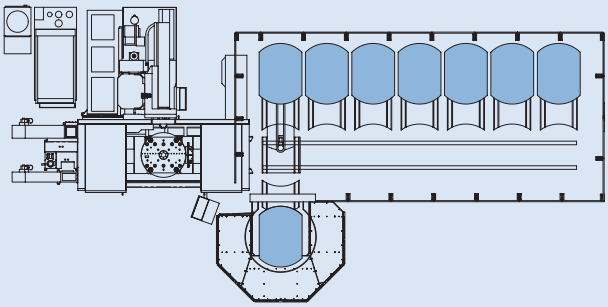
Pallet base table

The pallet is pushed over bearing rollers with a gap of 0.5mm on to the base table. The pallets are then clamped over 4 zero-point clamping systems. Repeat accuracy is +/-0.01 mm.









Modular design

Via its modular construction the machine can be extended from the standard range with 2 pallets to a linear storage unit. User friendliness and machine handling are not affected by this.

REIDEN BFR2, 5 axis machining center with REIDEN PCS (Pallet Changing System)

Pallet size	mm	ø 1'400 × 1'200 / ø 1'700 × 1'200
Max. transfer weight	kg	4'000
Number of pallets, standard		2
Optional		up to linear storage unit

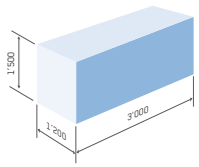
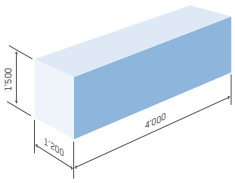
MINIMUM NONPRODUCTIVE TIME
THANKS TO AUTOMATION DESIGN

The automation design allows flexible automation of work pieces and time-concurrent setup of pallets. Solutions coordinated to meet the customer's requirements guarantee a minimal required space for the pallet exchanger.

The flexible automation design allows the machining of large and complex individual components during the manned shift and small- and medium-series runs during the unmanned shift.

The REIDEN BFR2 series is equipped even in the basic model with innovative technology for commercial complete machining.

	Basic features	Additional features
Control and operation:		
Control	Heidenhain TNC 640	Siemens 840 D SL
Additional control at rear		●
Portable electronic hand wheel	front	rear
2 sets of operating and programming instructions (including wiring diagram)	●	
Automatic opening and closing of front angle doors	●	
Drive and spindle		
Spindle speed range	20–6'000 min^{-1}	20–7'000 min^{-1}
Dual gear ZF transmission	●	
Transmission cooling system	●	
Spindle taper	ISO 50 (BIG PLUS) DIN 69871 / 72	HSK100 Form A DIN 69893
Automatic pivoting head horizontal / vertical	●	
Milling head cooling system	●	
Airshield system in milling head	●	
B axis +/- 180° (continuous)		●
A axis 0–90° (indexable every 1° or 15°)		●
Minimal quantity lubrication system		●
Work space and travelling distances		
Full space protection casing	●	
Machine interior lighting	●	
2 angled doors for loading by crane	●	
Access door, rear	●	
Rigid table	●	
Combination table		●
Rotary table		●
Increased rotary table accuracy		●
Lateral extension from 1'000 to 1'200 mm		●
Intermediate unit between bed and column of 150 mm		●
Peripherals		
Tool changer, places, chain magazine	64	80 / 120
Tool changer, places, shelf magazine		151 / 321
2 chip conveyors front and rear, along machine bed	●	
Rinsing jet with separate coolant pump	●	
Internal coolant supply, form A	30 bar	50 / 80 bar
Pressure regulation of internal coolant supply		●
Coolant recooling		●
Paper band filter	●	
Endless band filter		●
Rotating inspection glass		●
Smoke and coolant mist extractor		●
Oil skimmer		●
Touch probe (radio)		●
Laser tool setting and monitoring		●
Pallet exchange system		●
Colouring	Light grey RAL7035 / Violet blue RAL5000	upon request

Specifications		BFR23	BFR24
			
Cutting area			
X axis (longitudinal axis)	mm	3'000	4'000
Y axis (transverse axis)	mm	1'000 / (1'200)*	
Z axis (vertical axis)	mm	1'500	
Rotary table versions*	ø	1'000 / 1'250 / 1'700	
Combination table versions*	ø	1'000 / 1'250 / 1'700	
Max. rotary diameter	mm	1'800 (2'700)*	
Max. table load	kg	6'000 / (9'000)**	7'500 / (11'000)**
Main drive			
Spindle power 6'000 / 7'000 rpm	kW	30 kW at 100% duty ratio / 45 kW at 40% duty ratio	
Max. spindle torque 6'000 / 7'000 rpm	Nm	1'135	
Feed motor			
Rapid feed X axis	m / min	30	
Rapid feed Y and Z axis	m / min	20	
Tool changer			
Max. tool length	mm	600	
Max. tool diameter	mm	125 / 250	
Machine specifications			
Machine weight (400 mm base required)	kg	30'000	34'000
Dimensions length × width × height	mm	8'738 × 5'035 × 3'503	10'778 × 5'035 × 3'503

* Optional, ** At adjusted speed

Subject to technical alterations. Base in accordance with manufacturer information

Guaranteed accuracies DIN VDI / DGQ 3441

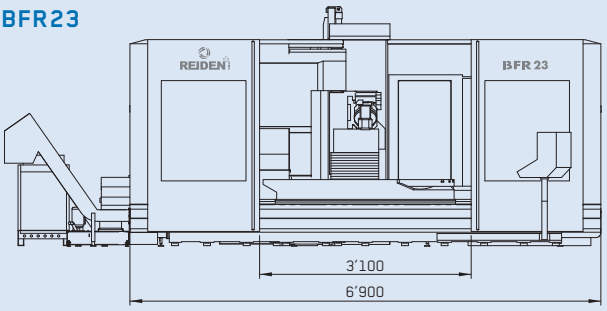
Accuracy depends heavily on external thermal influences. The values given are reached in the temperature region of 20° +/- 2° during factory approval.

Linear axes X, Y, Z	
Position error P	8 µm
Position deviation Pa	4 µm
Repeatability Ps_{mid}	4 µm
Repeatability Ps_{max}	5 µm
Reversal error Ps_{mid}	2 µm
Reversal error U_{max}	3 µm

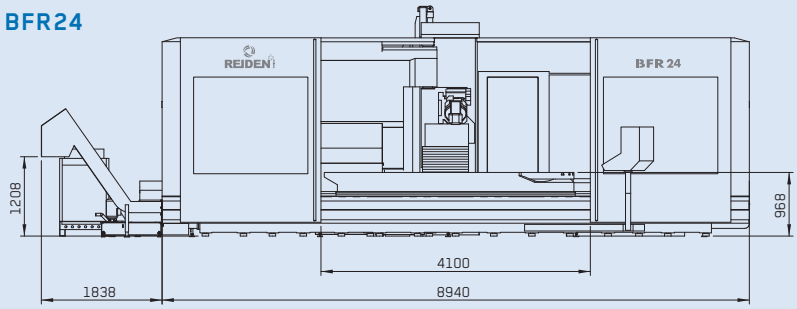
Rotary table C axis	
Positioning error P	5 ws
Position deviation Pa	2 ws
Repeatability Ps_{mid}	2 ws
Repeatability Ps_{max}	3 ws
Reversal error U_{mid}	2 ws
Reversal error U_{max}	2 ws

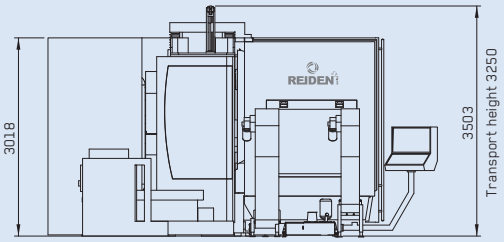
BFR2 dimensions

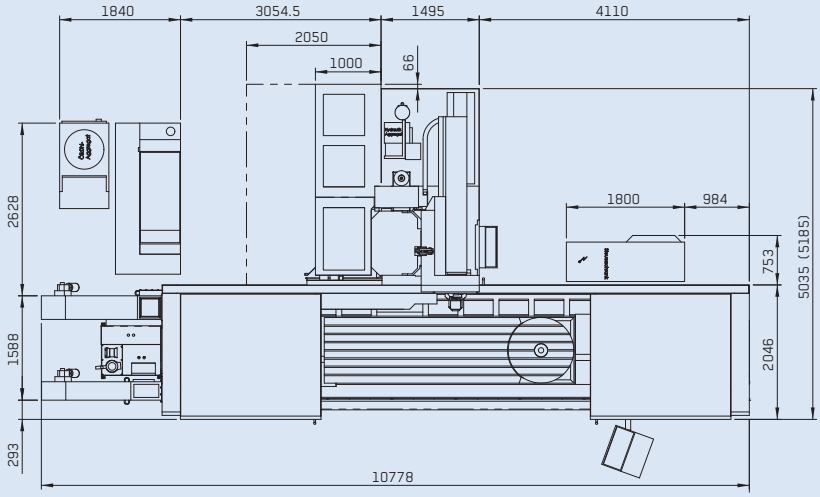
BFR23

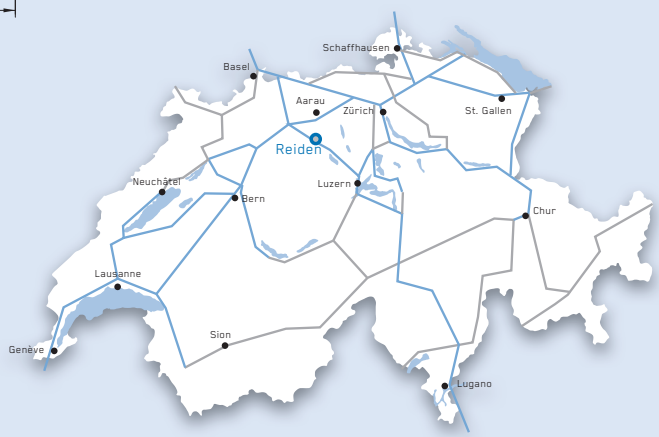


BFR24









Reiden Technik AG
Machine tool manufacturer
Werkstrasse 2
CH-6260 Reiden

Tel. +41 62 749 20 20
Fax +41 62 749 20 21
info@reiden.com

www.reiden.com