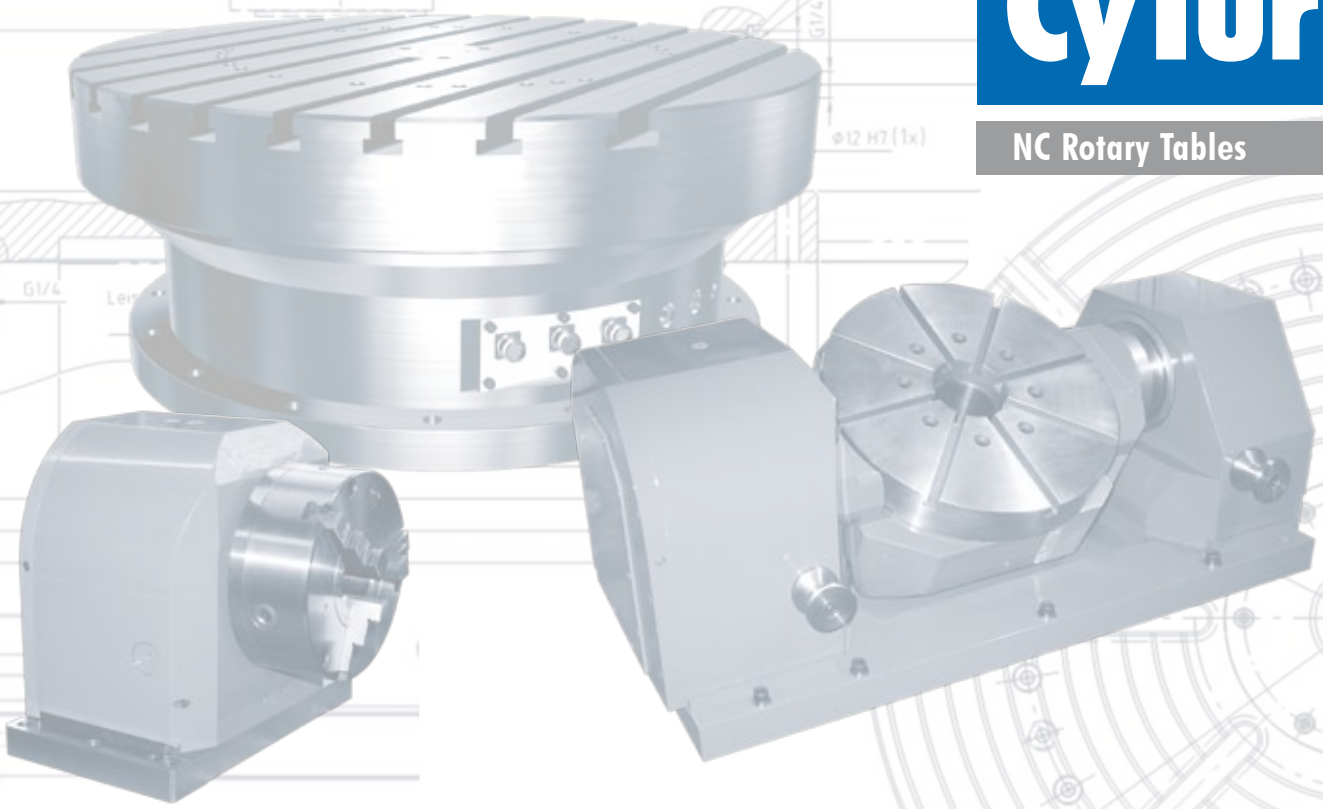
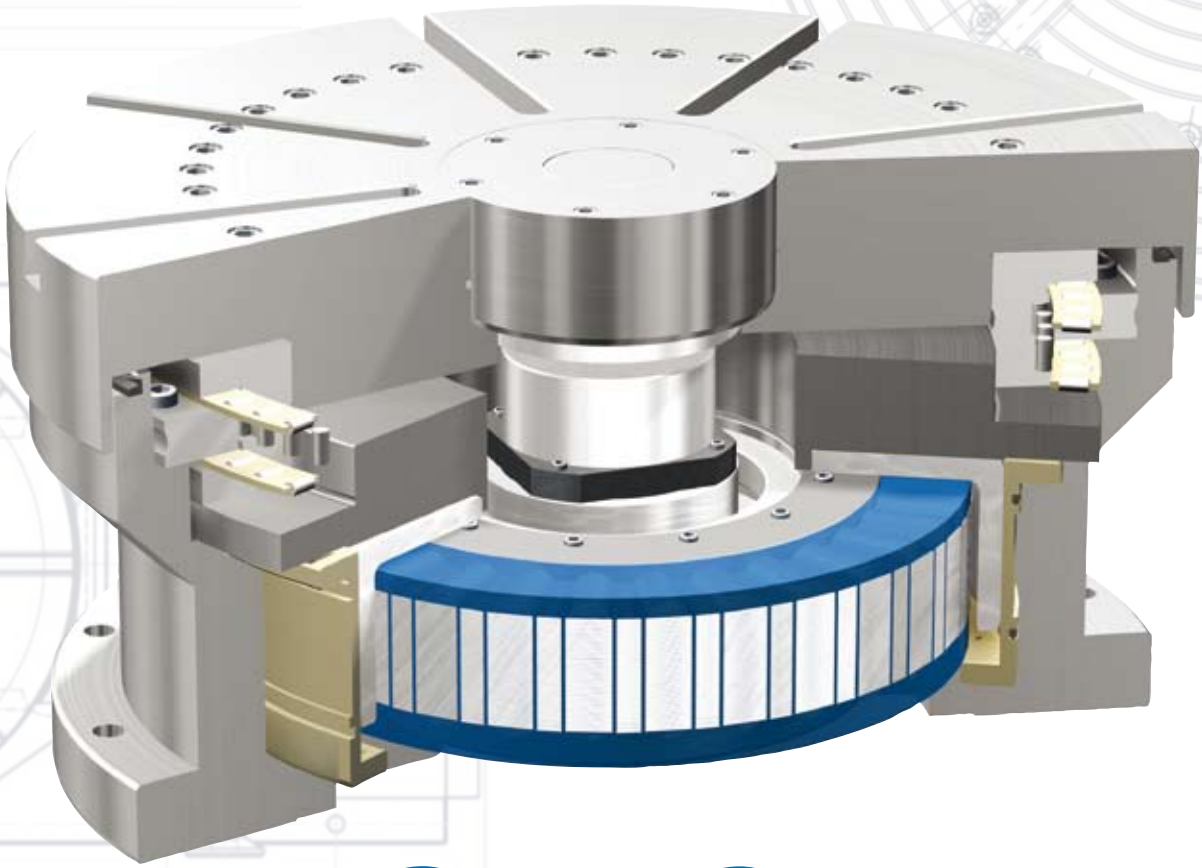
CyTurn

NC Rotary Tables





CYTEC SYSTEMS

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CyTurn

High dynamic Power Units...

The machining of workpieces on rotary tables requires high acceleration which can only be achieved by high torque from the very beginning, strong torque motors offer backlash-free direct drives for rotating axis.

...for Precision

This modern drive concept gives the rotary tables highest dynamic, precision and reliability which are increasingly in demanded with serial applications:

Engineering

- Centers with multiple axis machining
- High speed milling- and grinding machines
- Turning-milling machining
- Pick and place machines (also with fast pallet changing)

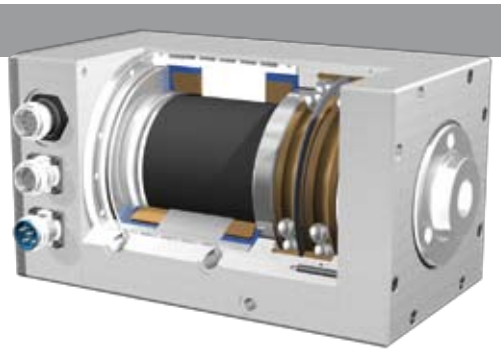
Contents

Rotary Tables horizontal

Rotary Tables vertical

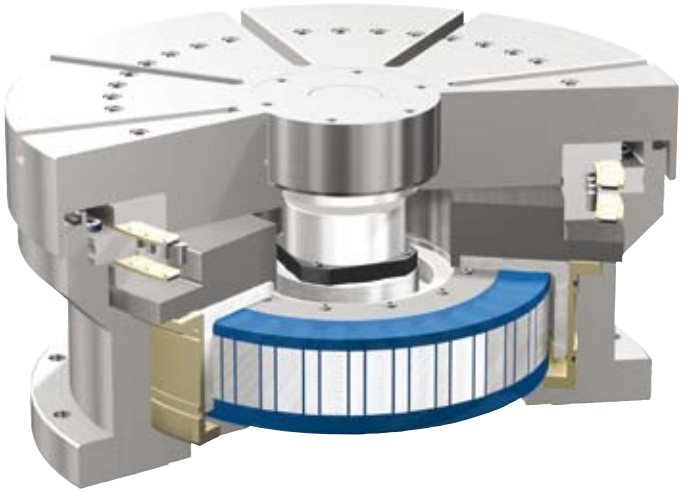
Rotary tilt Tables

Grinding Tables



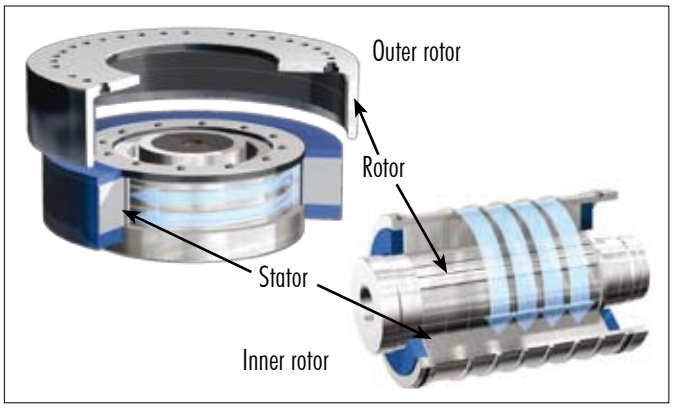
Characteristic Features:

- free of wear direct drive without gear
- high angular acceleration by means of high torque
- high rigidity of the table plate by means of backlash free preloaded axial-radial bearings
- extremely short positioning intervals
- high speed in continuous operation
- high precise angular measuring systems (absolute, incremental)
- smooth operation
- braking function by means of hydraulically operated non deforming clamping sleeve (option)
- thermal stability by means of liquid cooling
- secure sealing of bearings



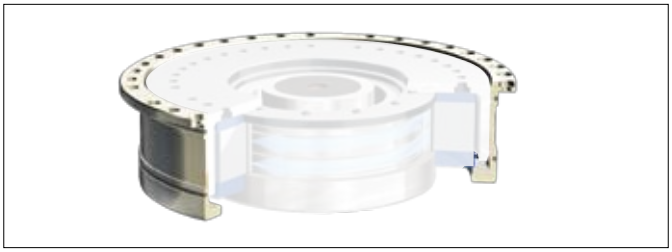
Drive

- For this, torque motors with high torque are used as a direct drive. They work almost free of wear without need for any further transmission elements as e. g. gears.

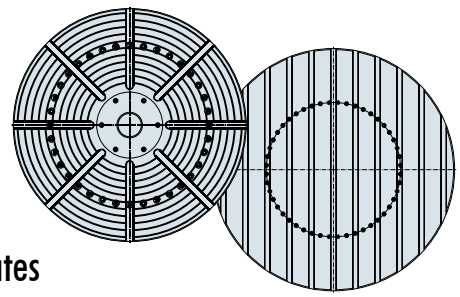


For positioning applications with low speed, drives with outer rotor are used, for continuous operation (up to 4000 r.p.m.) drives with inner rotors can be used.

- As standard liquid cooling is integrated in the motor design.



- Optionally the tables can be equipped with a hydraulically operated clamping bush to clamp the planar disc in any desired angular position if needed.



Face plates

- Depending on customer's demand different face plates are available: round, square, with parallel or radial slots, chucks, magnetic plates etc.

Bearing

- The series with an outer rotor are equipped with radial-axial bearings mounted in the rotor, which are characterised by high rigidity, load carrying capacity and precision.
- The series with an inner rotor are equipped with hybrid roller bearings that guarantee high rigidity and precision especially in high speed range.

Angular measuring systems

- Depending on execution angular encoders are used as standard, either as absolute encoders with a positioning precision of +/-2,5" or as incremental encoders with a positioning precision of +/-3,5" or +/-5".
- In executions for continuous operation or for higher speed, inductive systems are used for the detection of the angular position and speed value.

Adaptation to control systems

The rotary tables can be adapted easily to existing machine control systems. They are compatible with the most common manufacturers as e. g. Siemens, Heidenhain, Fanuc etc.

Cleaning (Option)

To protect the bearing against contamination from outside, the tables can be equipped with a sealing air device.

CyTurn Product Overview

Type:		Horizontal table CRT/200/H	Horizontal table CRT/400/H	Horizontal table CRT/500/H	Horizontal table CRT/660/H	Horizontal table CRT/750/H
Face plate diameter [mm]:		200	400	500	660	750
Load weight max. [kg]:		100	500	800	1.000	2.000
Speed max. [r.p.m.]:		2.000	350	300	80	110
Planar runout [mm]:		0,01	0,01	0,01	0,02	0,02
Swivel range:		continuous	continuous	continuous	continuous	continuous
Motor	Rated torque [Nm]:	106	193	230	740	580
	Peak torque [Nm]:	200	495	600	2.000	1.560
Clamping	Clamping torque [Nm]:	-	1.000	2.000	3.700	6.000
Rated power dissipation [kW]:		2,1 (6,0 l/min)	0,7 (2,2 l/min)	0,7 (2,2 l/min)	1,3 (3,6 l/min)	1,3 (3,6 l/min)
Weight approx. [kg]:		70	200	300	450	600
Catalogue page:		10	11	12	13	14

Type:		Rotary tilt table CRT/400/HV		Rotary tilt table CRT/525/HV	
		Rotary axis	Swivel axis	Rotary axis	Swivel axis
Face plate diameter [mm]:		400	-	525	-
Load weight max. [kg]:		400	-	500	-
Speed max. [r.p.m.]:		350	220	1410	20
Planar runout [mm]:		0,01		0,01	
Swivel range:		continuous	±95°	continuous	±95°
Motor	Rated torque [Nm]:	193	322	580	1.470
	Peak torque [Nm]:	495	830	1.560	3.940
Clamping	Clamping torque [Nm]:	1.000	2.000	3.000	8.000
Rated power dissipation [kW]:		2,1 (6,0 l/min)		3,5 (10,2 l/min)	
Weight approx. [kg]:		750		1.400	
Catalogue page:		24-25		26-27	

CyTurn



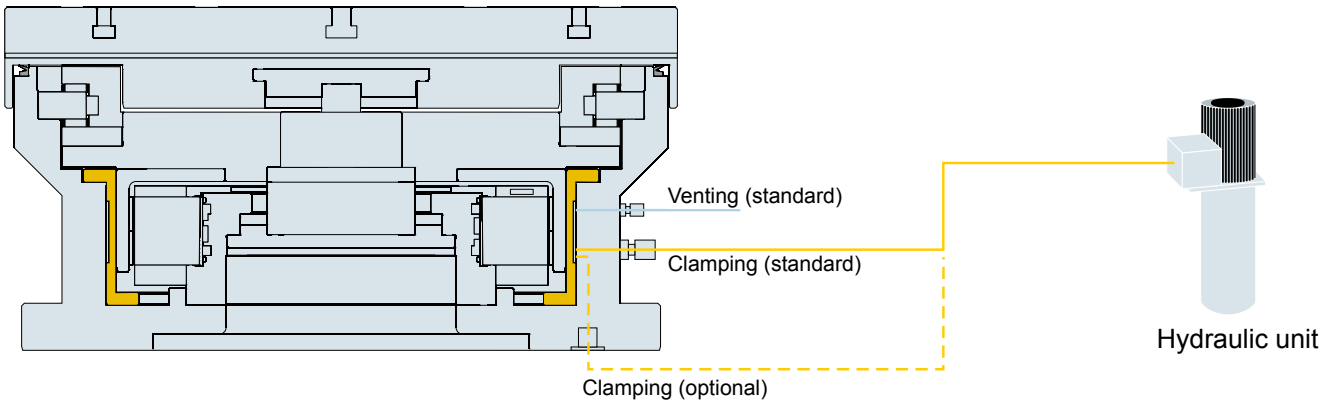



Horizontal table CRT/1000/H	Horizontal table CRT/1800/H	Table for pallet changer CRT/630/H	Table for pallet changer CRT/800/H	Spindle table CRT/090/V	Spindle table CRT/165/V	Vertical table CRT/350/V	Vertical table CRT/500/V
1.000	1.800	500 (630)	800	DIN 55 026-A3	DIN 55 026-A6	350	500
4.000	6.000	1.000	1.500	75	150	200	400
40	40	115	80	30	2.000	300	110
0,02	0,02	0,01	0,01	0,01	0,01	0,01	0,01
continuous	continuous	continuous	continuous	continuous	continuous	continuous	continuous
1.470	1.470	570	778	20	106	227	580
3.940	3.940	1.500	2.080	38	200	600	1.600
10.000	10.000	5.000	7.650	250	500	2.000	3.000
2,2 (6,4 l/min)	2,2 (6,4 l/min)	1,4 (4,0 l/min)	1,6 (4,7 l/min)	1,0 (3,0 l/min)	2,2 (6,4 l/min)	0,7 (2,2 l/min)	1,3 (3,6 l/min)
1.600	4.000	500	680	40	100	230	350
15	15	17	18	20	21	22	23

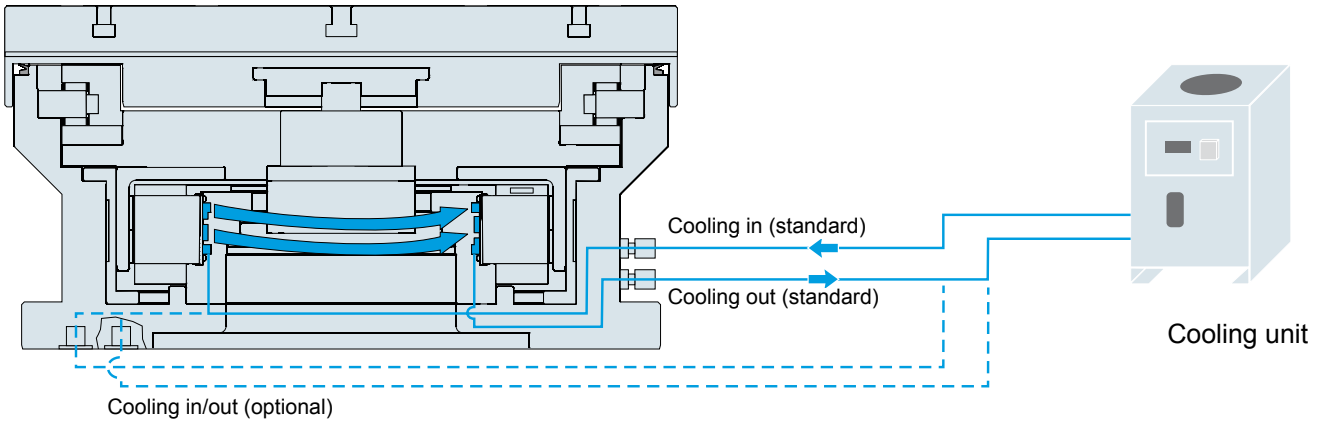


Rotary tilt table CRT/660/HV		Grinding table CRT/350/H	Grinding table CRT/570/H
Rotary axis	Swivel axis		
660	-	350	570
1.000	-	150	250
55	80	900	350
0,01		0,01	0,01
continuous	±95°	continuous	continuous
740	1.160	87	193
1.970	3.120	218	495
4.000	5.500	-	-
3,9 (11,5 l/min)		0,5 (1,5 l/min)	0,7 (2,2 l/min)
900		120	200
28-29		32	33

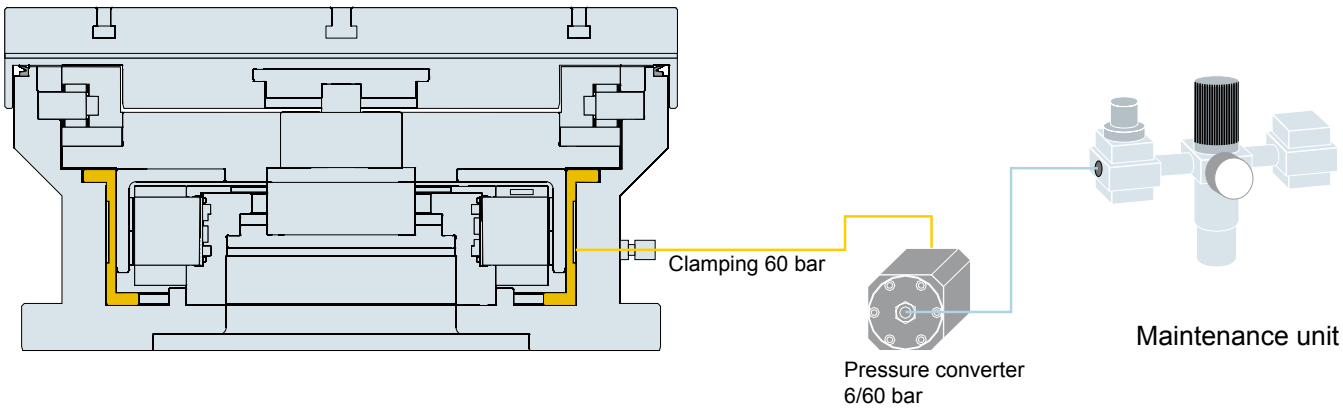
Interface hydraulics (clamping)



Interface cooling



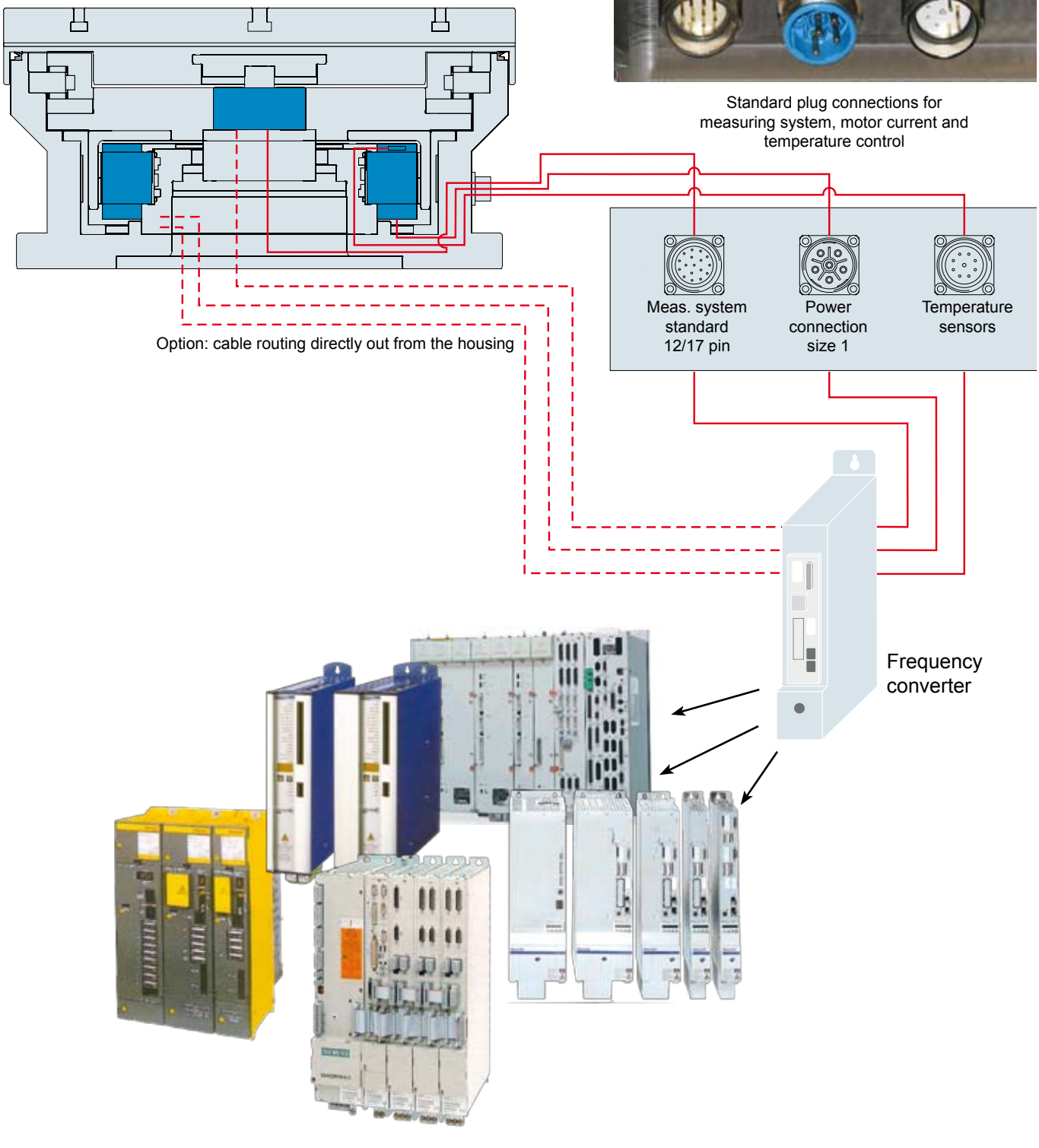
Interface pneumatics (option)



Electrical interface:

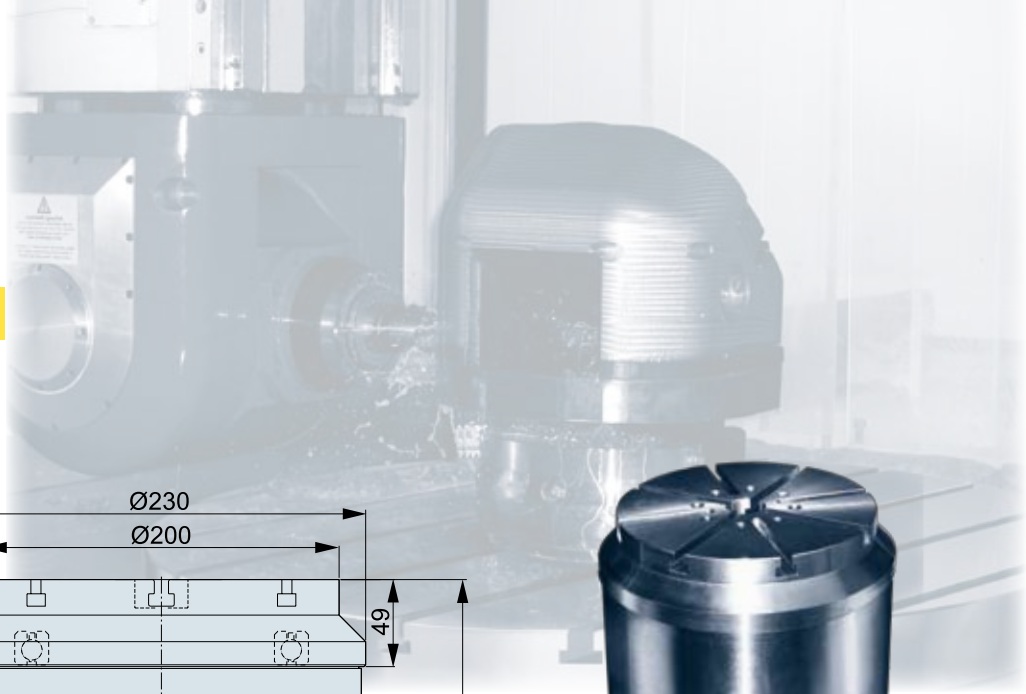
Motor current, measuring system, temperature control

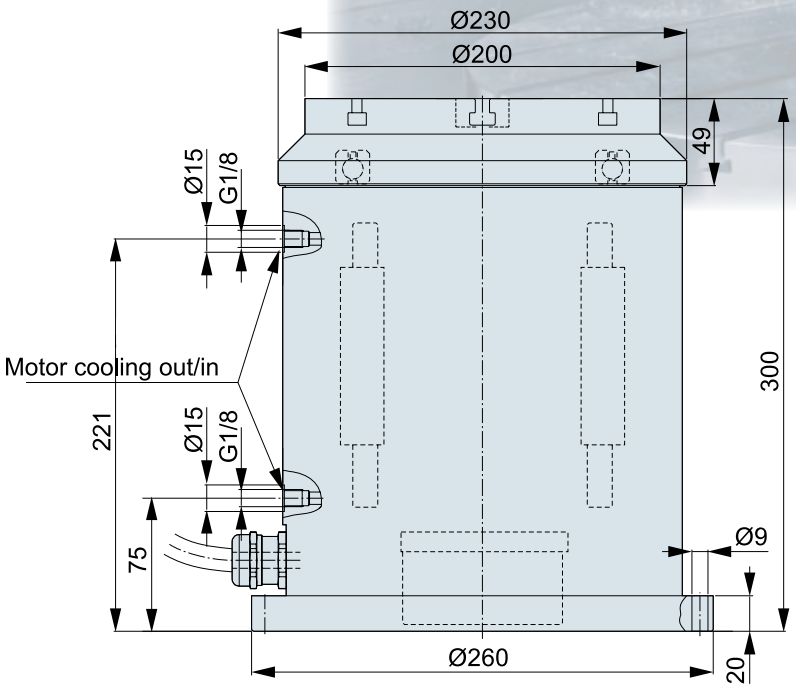
Standard plug connections for measuring system, motor current and temperature control

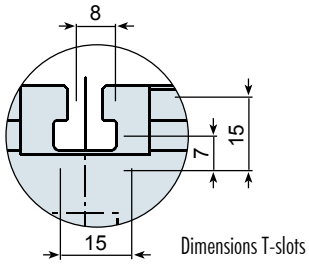


CyTurn

Rotary table CRT/200/H







Dimensions T-slots

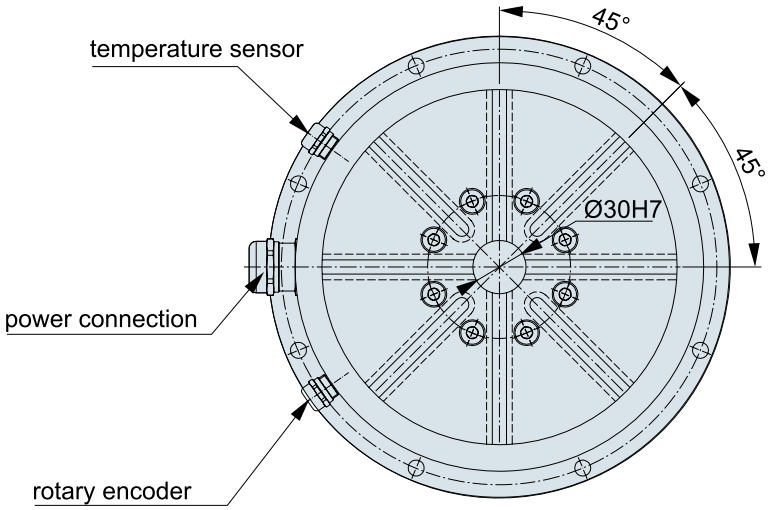


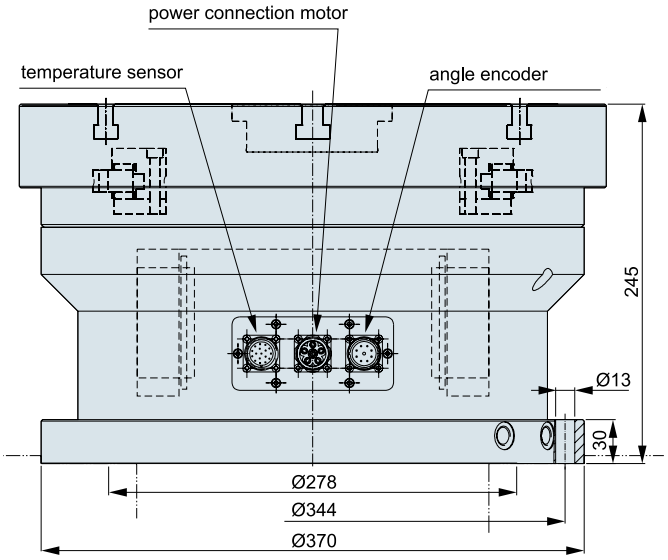
Table diameter:		200 mm
Load weight max.:		100 kg horizontal
Planar runout:		0,01 mm
Angular measuring system	Initial signal:	1Vss sin/cos
	Meas. principle:	incremental/absolute
	Precision:	± 5"
Weight approx.:		70 kg

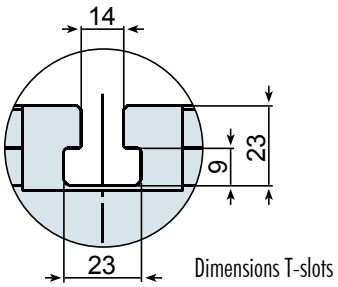
Motor IL 160-200	Peak torque:	200 Nm
	Rated torque:	106 Nm
	Rated power dissipation:	2,1 kW (6,0 l/min)
	Speed max. mech.:	2.000 r.p.m.
	Rated current:	25,0 A
	Nominal voltage:	400 V

Detailed motor data on page 36

CyTurn

Rotary table CRT/400/H





Dimensions T-slots

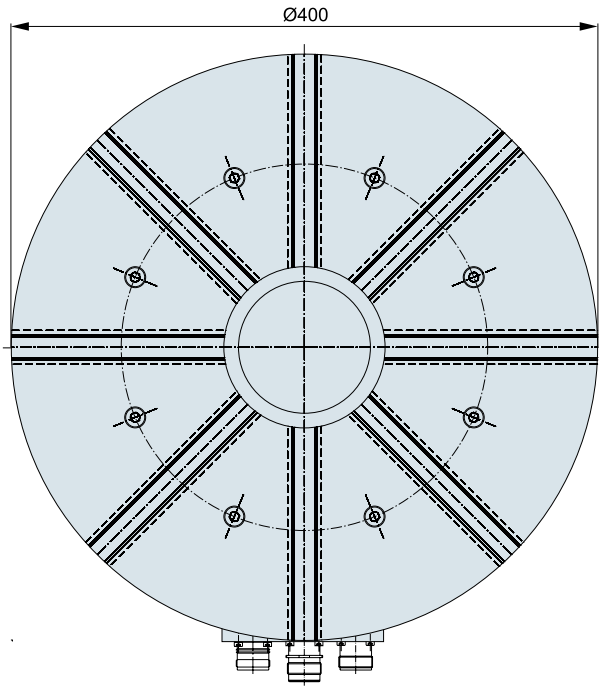


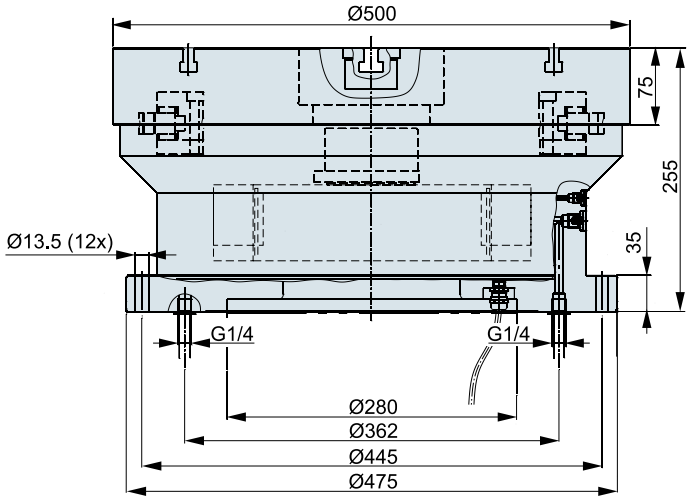
Table diameter:		400 mm
Load weight max.:		500 kg horizontal
Planar runout:		0,01 mm
Clamping	Clamping torque:	1.000 Nm
	Nominal pressure:	50 bar
Angular measuring system	Initial signal:	1Vss sin/cos
	Meas. principle:	absolute
	Precision:	± 5"
Weight approx.:		200 kg

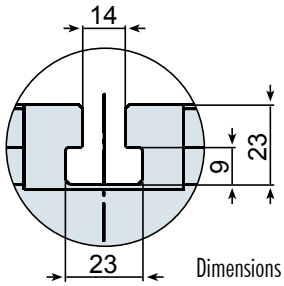
Motor RM 240-75	Peak torque:	495 Nm
	Rated torque:	193 Nm
	Rated power dissipation:	0,7 kW (2,2 l/min)
	Number of pole pairs:	25
	Speed max. mech.:	350 r.p.m.
	Rated current:	10,5 A
	Nominal voltage:	400 V

Detailed motor data on page 38

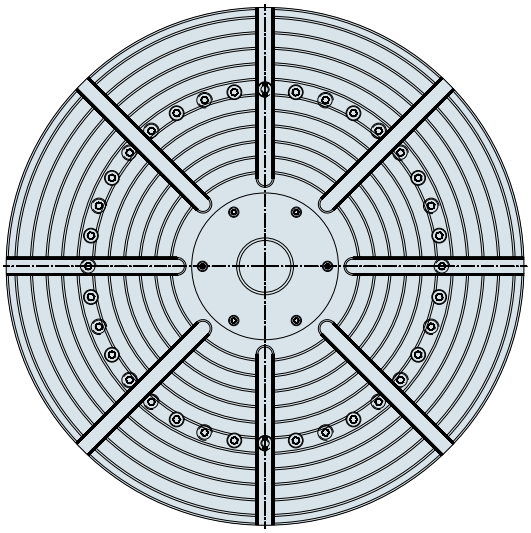
CyTurn

Rotary table CRT/500/H

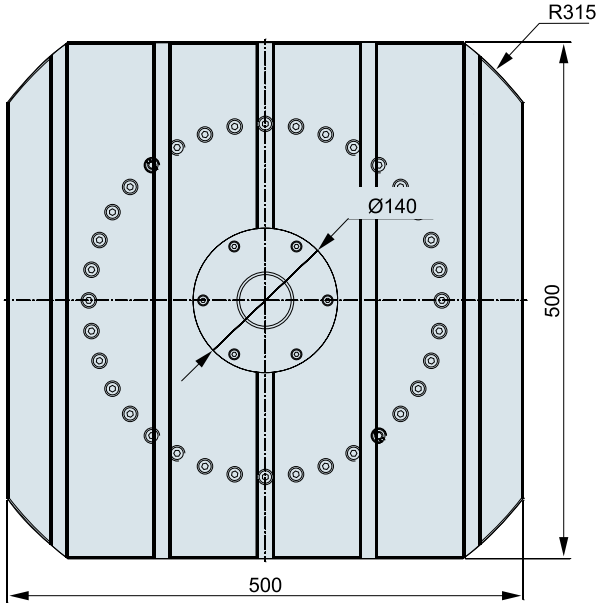




Dimensions T-slots



Standard with round face plate



Option with square face plate

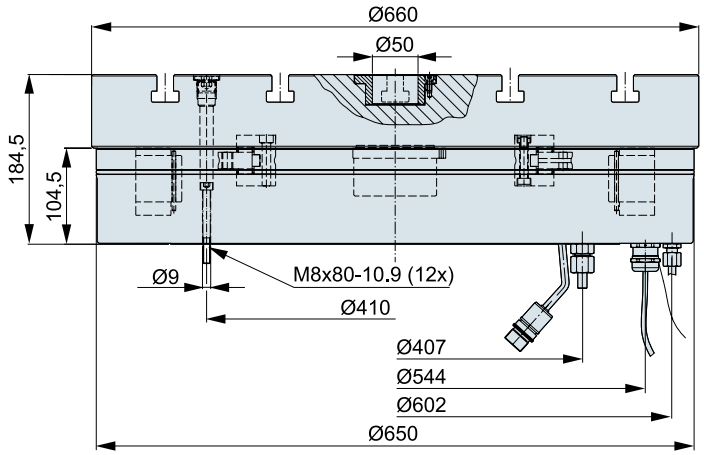
Table diameter:		500 mm
Load weight max.:		800 kg horizontal
Planar runout:		0,01 mm
Clamping	Clamping torque:	2.000 Nm
	Nominal pressure:	80 bar
Angular measuring system	Initial signal:	1Vss sin/cos
	Meas. principle:	incremental/absolute
	Precision:	± 2,5"
Weight approx.:		300 kg

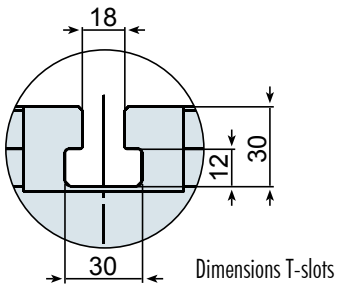
Motor RM 310-50	Peak torque:	600 Nm
	Rated torque:	230 Nm
	Rated power dissipation:	0,7 kW (2,2 l/min)
	Number of pole pairs:	30
	Speed max. mech.:	300 r.p.m.
	Rated current:	10,0 A
	Nominal voltage:	400 V

Detailed motor data on page 39

CyTurn

Rotary table CRT/660/H





Dimensions T-slots

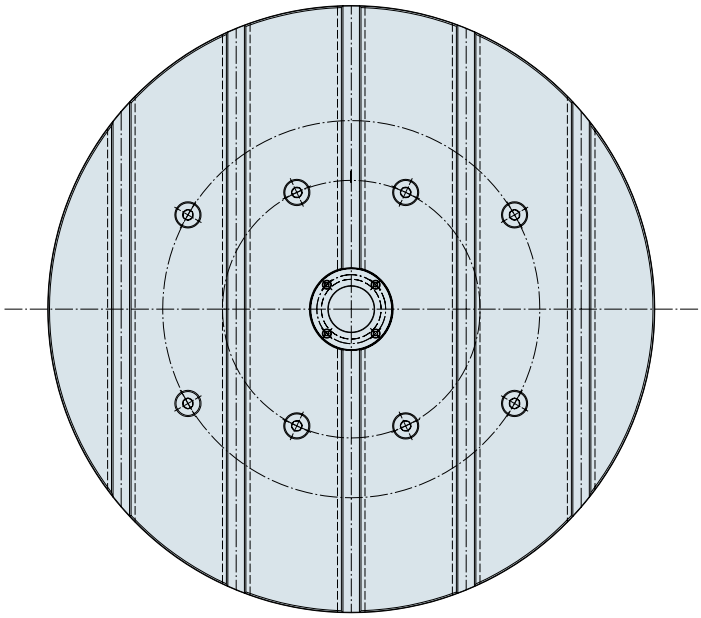


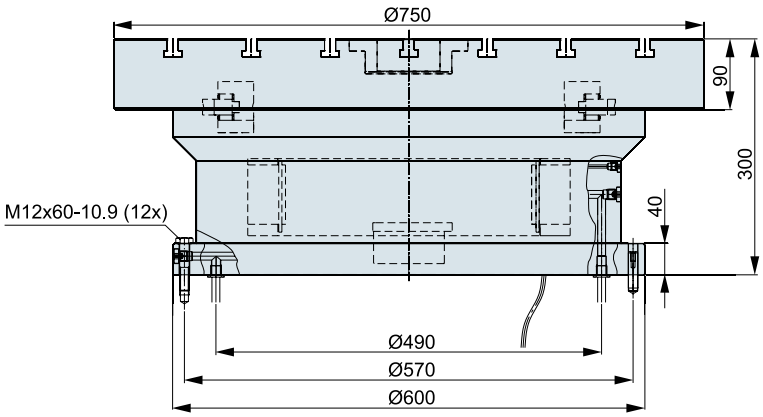
Table diameter:		660 mm
Load weight max.:		1.000 kg horizontal
Planar runout:		0,01 mm
Clamping	Clamping torque:	3.700 Nm
	Nominal pressure:	50 bar
Angular measuring system	Initial signal:	1Vss sin/cos
	Meas. principle:	absolute
	Precision:	±5"
Weight approx.:		450 kg

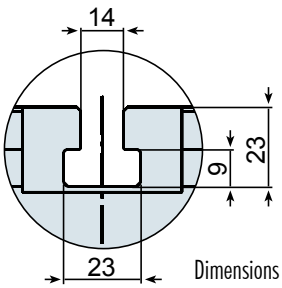
Motor RM 564-50	Peak torque:	2.000 Nm
	Rated torque:	740 Nm
	Rated power dissipation:	1,3 kW (3,6 l/min)
	Number of pole pairs:	55
	Speed max. mech.:	80 r.p.m.
	Rated current:	10,0 A
	Nominal voltage:	400 V

Detailed motor data on page 41

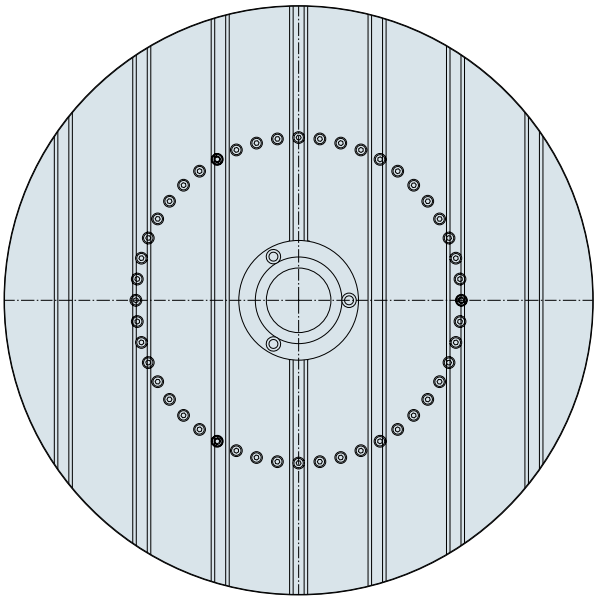
CyTurn

Rotary table CRT/750/H

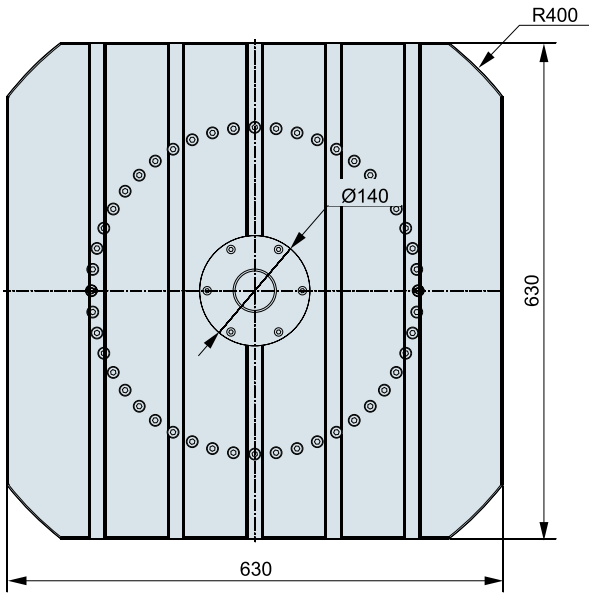




Dimensions T-slots



Standard with round face plate



Option with square face plate

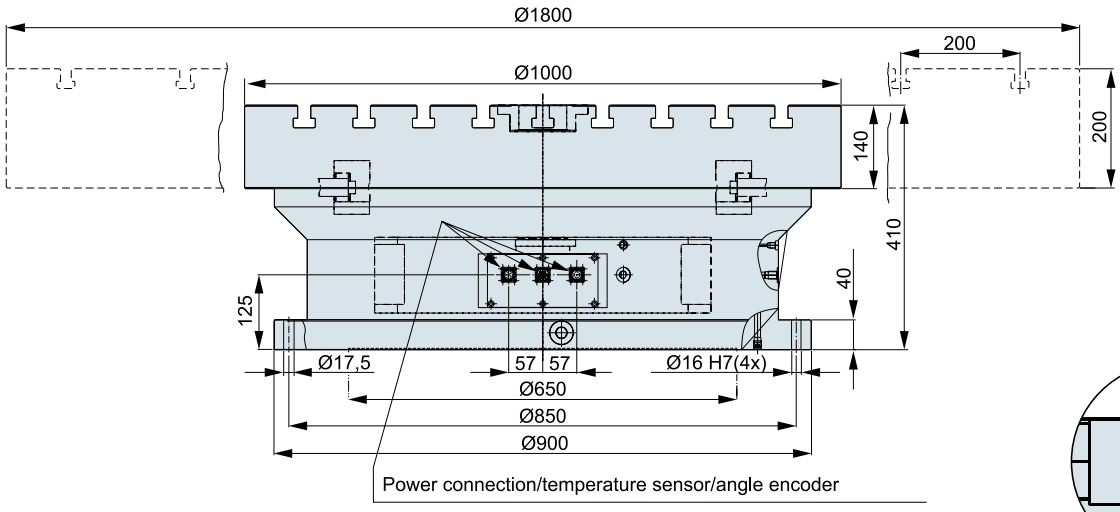
Table diameter:		750 mm
Load weight max.:		2.000 kg horizontal
Planar runout:		0,02 mm
Clamping	Clamping torque:	6.000 Nm
	Nominal pressure:	80 bar
Angular measuring system	Initial signal:	1Vss sin/cos
	Meas. principle:	incremental/absolute
	Precision:	± 2,5"
Weight approx.:		600 kg

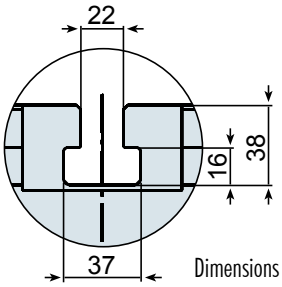
Motor RM 410-75	Peak torque:	1.560 Nm
	Rated torque:	580 Nm
	Rated power dissipation:	1,3 kW (3,6 l/min)
	Number of pole pairs:	40
	Speed max. mech.:	110 r.p.m.
	Rated current:	10,0 A
	Nominal voltage:	400 V

Detailed motor data on page 40

CyTurn

Rotary table CRT/1000/H; CRT/1800/H





Dimensions T-slots

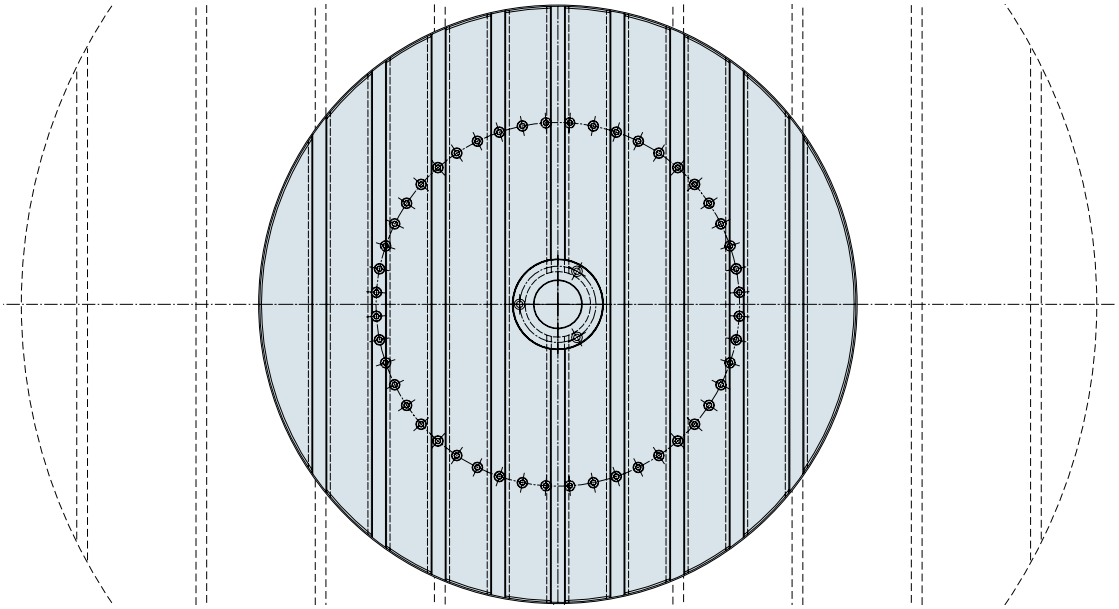


Table diameter:		1.000/1.800 mm
Load weight max.:		4.000/6.000 kg horizontal
Planar runout:		0,02 mm
Clamping	Clamping torque:	10.000 Nm
	Nominal pressure:	60 bar
Angular measuring system	Initial signal:	1Vss sin/cos
	Meas. principle:	incremental/absolute
	Precision:	± 2,5"
Weight approx.:		1.600/4.000 kg

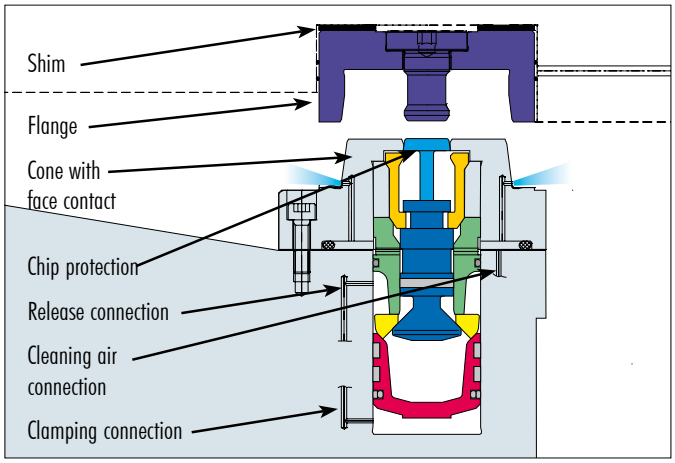
Motor RM 564-100	Peak torque:	3.940 Nm
	Rated torque:	1.470 Nm
	Rated power dissipation:	2,2 kW (6,4 l/min)
	Number of pole pairs:	55
	Speed max. mech.:	40 r.p.m.
	Rated current:	10,0 A
	Nominal voltage:	400 V

Detailed motor data on page 41

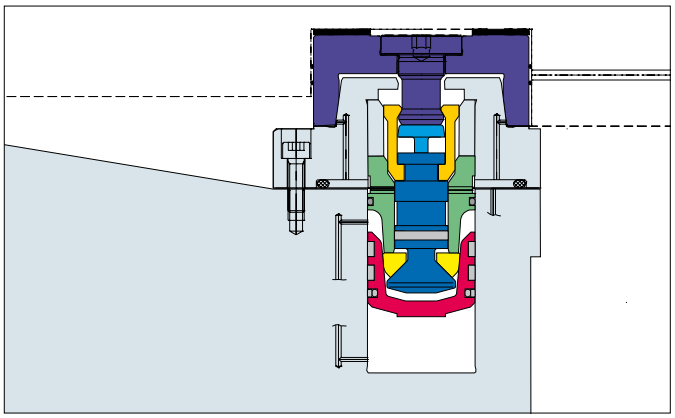
CyTurn Pallet change easy and fast...

Rotary tables with pallet changing system

Rotary tables with torque drives are well suited for applications in horizontal machining centres with fast pallet changing. The high initial acceleration enables ultra fast positioning. Also here the thermo symmetric design with high precision axial-radial bearings guarantees highest accuracy.
The rotary table is equipped with a rotary union for the hydraulic supply to the clamping systems. As an option also hydraulic for the workpiece clamping can be supplied.



Clamping system released



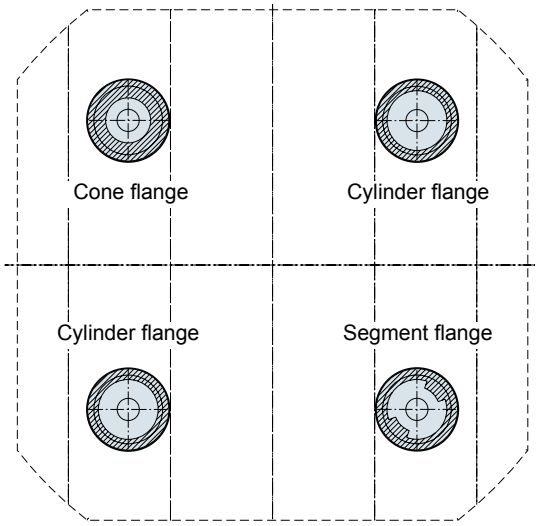
Clamping system clamped

Clamping system

For clamping the pallet, 4 hydromechanical clamping units series CyTab are integrated into the face plate. The clever part of this form is found in the holder flange. This has been conceived as a short taper with face contact (DIN 55026). During pallet indexing the contact surfaces are cleaned with compressed air. The high flow speed when the pallet is inserted in the holder piston ensures optimum cleaning. The combination of the initial stress generated by the clamping system with the special holder flange guarantees high repeatability and system accuracy.

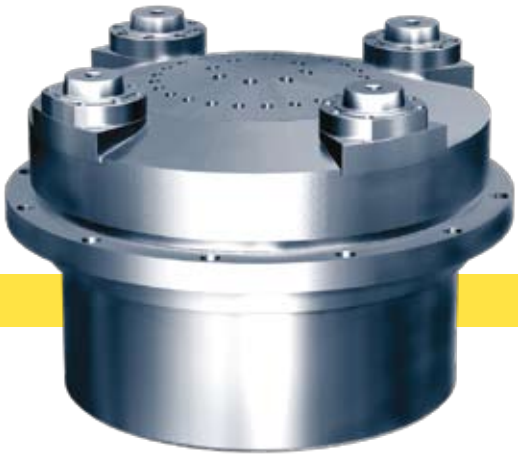
Pallet flanges

A 100% change precision is achieved by the design of the flanges. To avoid an over-adjustment in the X/Y-coordinates, the system consists of a fixed-point indexing with a round (cone) flange and an angular indexing with a segment flange. For the 4 point support 2 additional flanges are used which do not have any centring function.

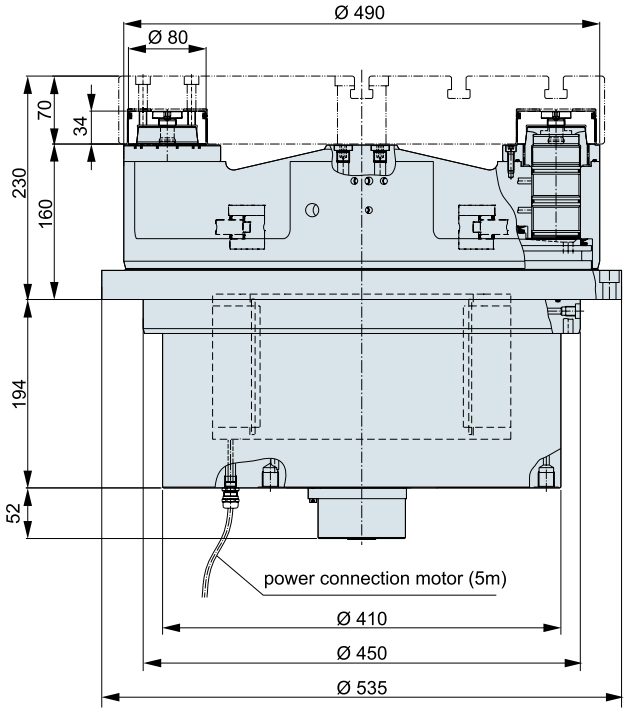


The flanges are clamped separately by the clamping system. Then the pallet is adjusted in vertical direction using the shims. Afterwards the flanges are screwed from above. So an exact indexing of pallet and rotary table is guaranteed. Optionally the flanges can be fixed positively in radial direction using casting compound.

CyTurn



Rotary table CRT/630/H for pallet change



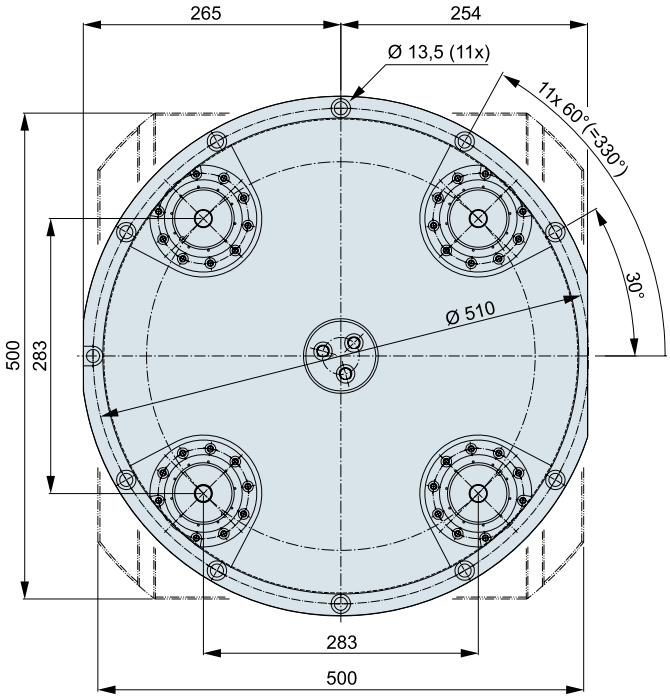


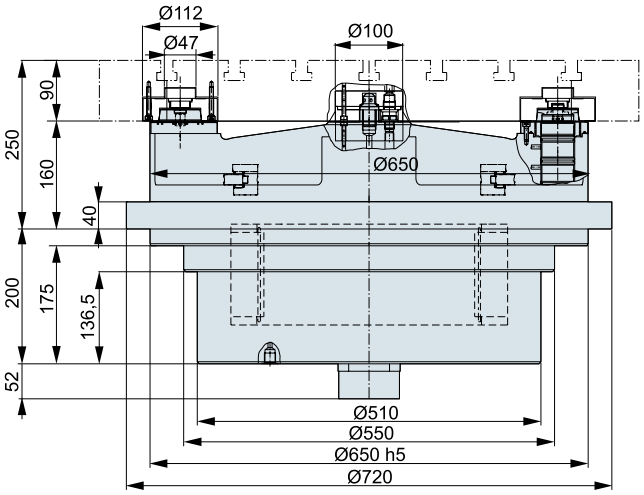
Table diameter:		535 mm
Pallet size:		500 (630) mm
Load weight max.:		1.000 kg horizontal
Admissible moment of tilt of rotary axis:		2.000 Nm
Planar runout:		0,01 mm
Clamping	Clamping torque:	5.000 Nm
	Nominal pressure:	80 bar
Angular measuring system	Initial signal:	1Vss sin/cos
	Meas. principle:	absolute
	Precision:	± 2,5"
Clamping system	Clamping force:	4x 20 kN = 80 kN
	Clamping pressure:	50-60 bar
Weight approx.:		500 kg

Motor RM 310-125	Peak torque:	1.500 Nm
	Rated torque:	570 Nm
	Rated power dissipation:	1,4 kW (4,0 l/min)
	Number of pole pairs:	30
	Speed max. mech.:	115 r.p.m.
	Rated current:	10,0 A
	Nominal voltage:	400 V

Detailed motor data on page 39

CyTurn

Rotary table CRT/800/H for pallet change



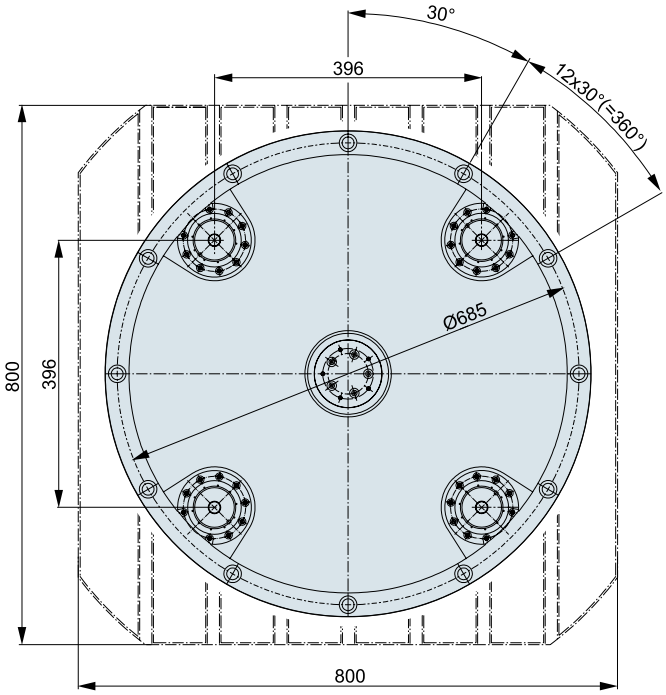


Table diameter:		720 mm
Pallet size:		800 mm
Load weight max.:		1.500 kg horizontal
Admissible moment of tilt of rotary axis:		2.500 Nm
Planar runout:		0,01 mm
Clamping	Clamping torque:	7.650 Nm
	Nominal pressure:	50 bar
Angular measuring system	Initial signal:	1Vss sin/cos
	Meas. principle:	absolute
	Precision:	± 2,5"
Clamping system	Clamping force:	4x 40 kN = 160 kN
	Clamping pressure:	50-60 bar
Weight approx.:		680 kg

Motor RM 410-100	Peak torque:	2.080 Nm
	Rated torque:	778 Nm
	Rated power dissipation:	1,6 kW (4,7 l/min)
	Number of pole pairs:	40
	Speed max. mech.:	80 r.p.m.
	Rated current:	10,0 A
	Nominal voltage:	400 V

Detailed motor data on page 40

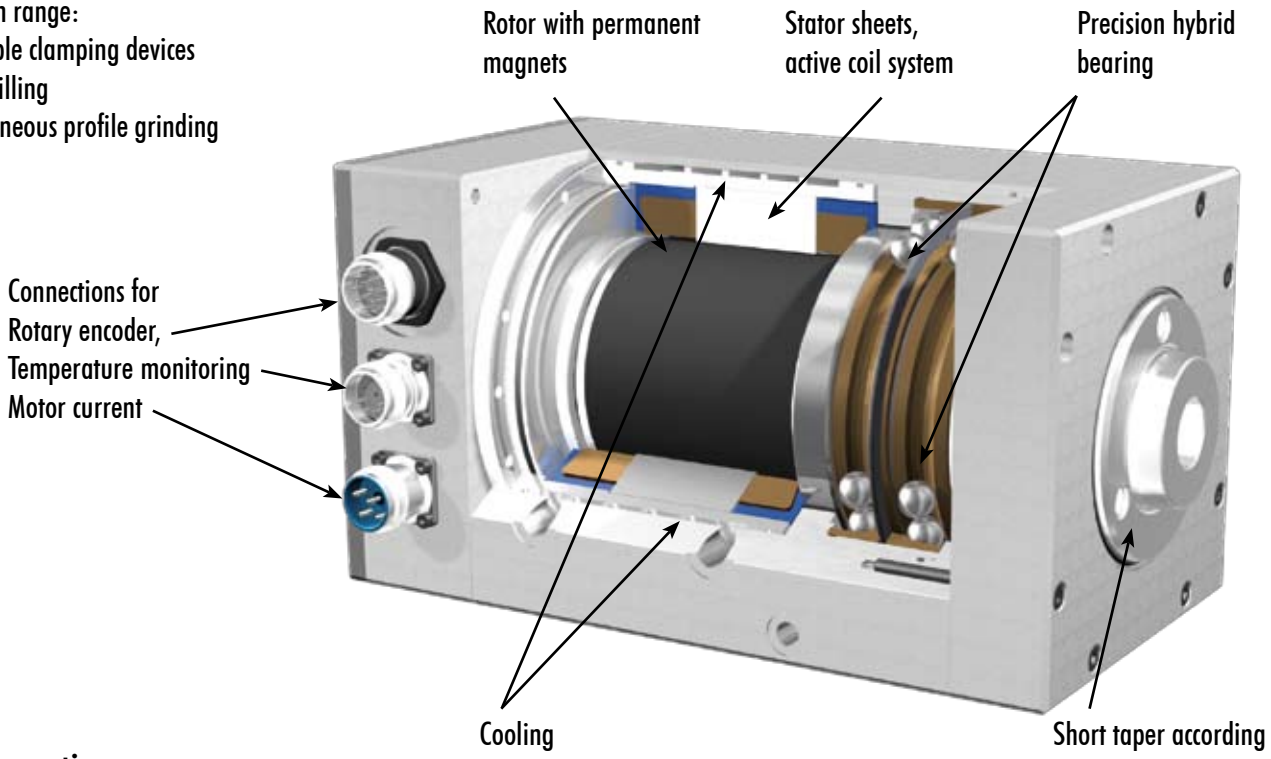
CyTurn

Turned into vertical...

Spindle table

Small, strong, fast...
These inner rotor rotary tables can be used as main spindle drive because of their high speed of 2.000 (optionally 4.000) r.p.m. e. g. for turn-milling purposes. Due to its backlash-free operation and its dynamic the rotary table can be used ideally for grinding purposes of gear tooth formings and curved discs as well as for processing turbine blades. Optionally a hydraulic clamping system can be integrated.

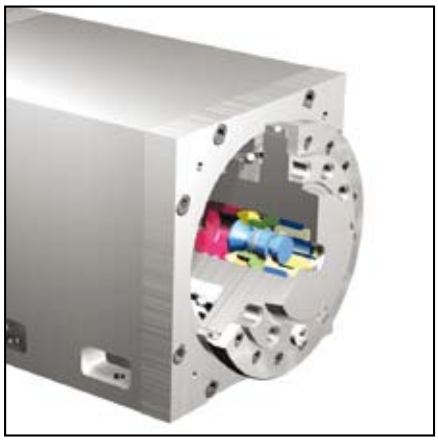
Application range:
- reversible clamping devices
- Turn-milling
- simultaneous profile grinding



Clamping options:

Chuck jaws (e. g. fast exchange chucks ROTA, Schunk)

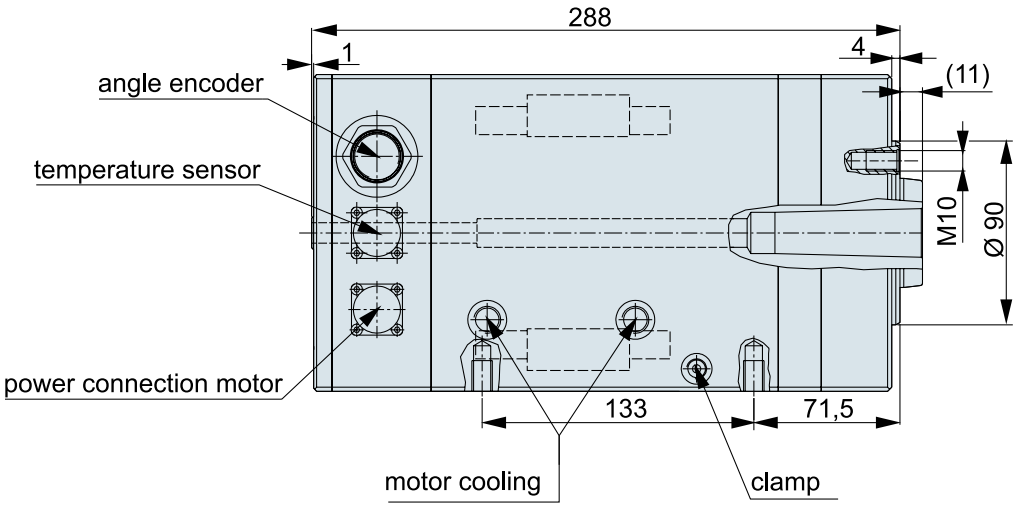
Planar plates

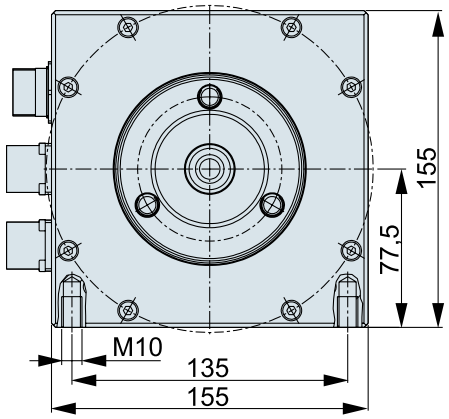


Short taper with integrated HSK-interface

CyTurn

Spindle table CRT/090/V





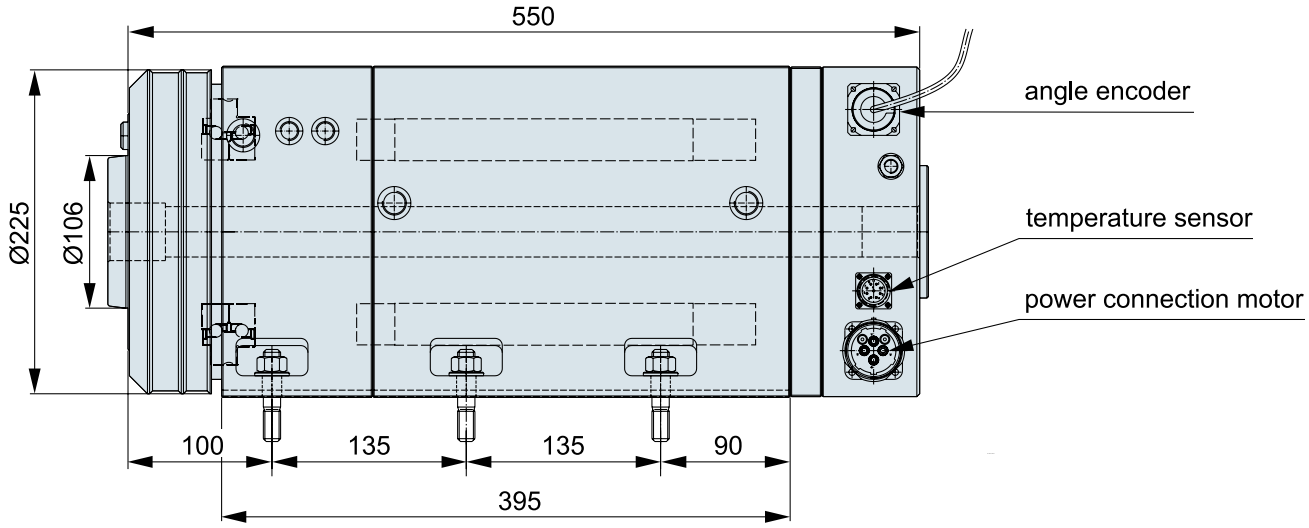
Chuck diameter:		DIN 55 026 - A3
Load weight max.:		75 kg
Planar runout:		0,01 mm
Clamping	Clamping torque:	250 Nm
	Nominal pressure:	35 bar
Angular measuring system	Initial signal:	1Vss sin/cos
	Meas. principle:	incremental/absolute
	Precision:	± 2,5"
Weight approx.:		40 kg

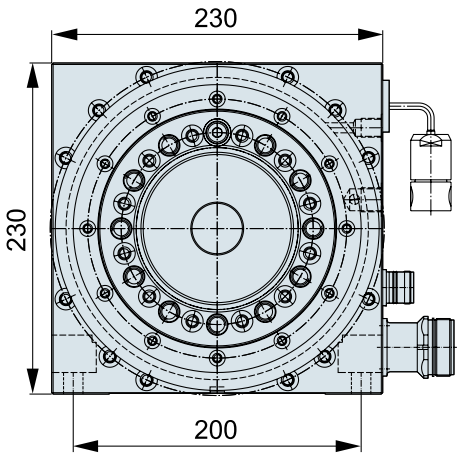
Motor IL 135-50	Peak torque:	38 Nm (20 A)
	Rated torque:	20 Nm (12 A)
	Rated power dissipation:	1,0 kW (3,0 l/min)
	Number of pole pairs:	5
	Speed max. mech.:	30 (2.000) r.p.m.
	Rated current:	11,0 A
	Nominal voltage:	400 V

Detailed motor data on page 35

CyTurn

Spindle table CRT/165/V





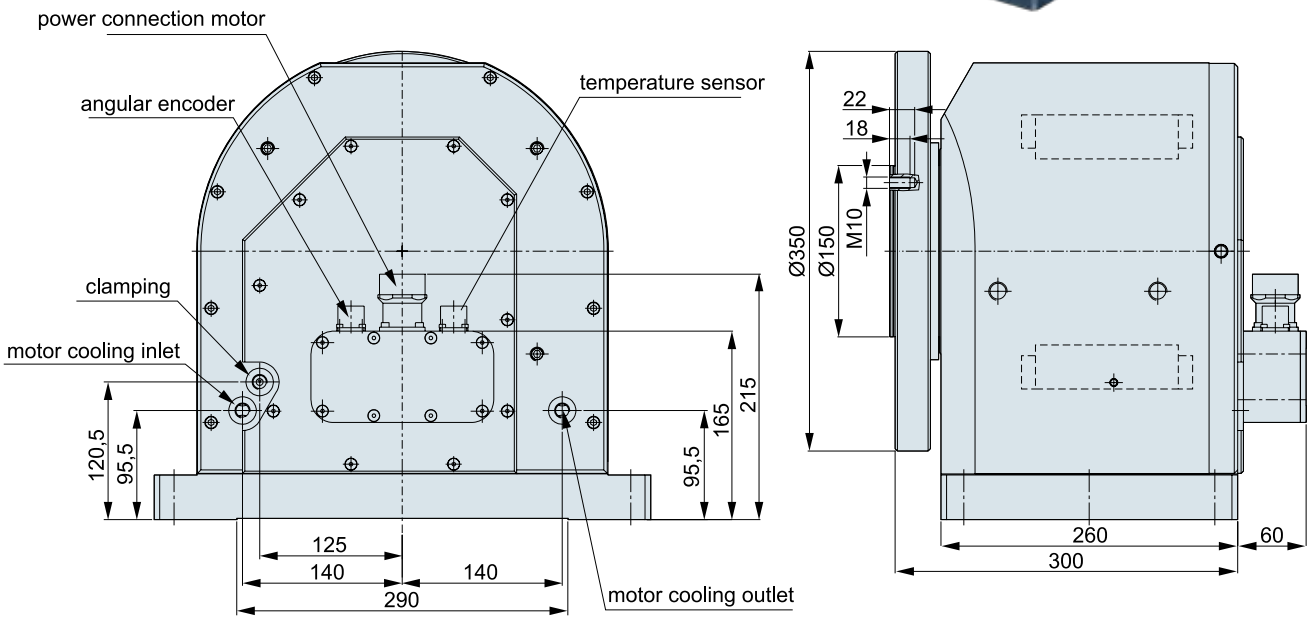
Chuck diameter:		DIN 55 026 - A6
Load weight max.:		150 kg
Planar runout:		0,01 mm
Clamping	Clamping torque:	500 Nm
	Nominal pressure:	50 bar
Angular measuring system	Initial signal:	1Vss sin/cos
	Meas. principle:	incremental/absolute
	Precision:	± 15" (± 7,5")
Weight approx.:		100 kg

Motor IL 160-200	Peak torque:	200 Nm
	Rated torque:	106 Nm
	Rated power dissipation:	2,2 kW (6,4 l/min)
	Number of pole pairs:	5
	Speed max. mech.:	2.000 r.p.m.
	Rated current:	25,0 A
	Nominal voltage:	400 V

Detailed motor data on page 36

CyTurn

Rotary table CRT/350/V



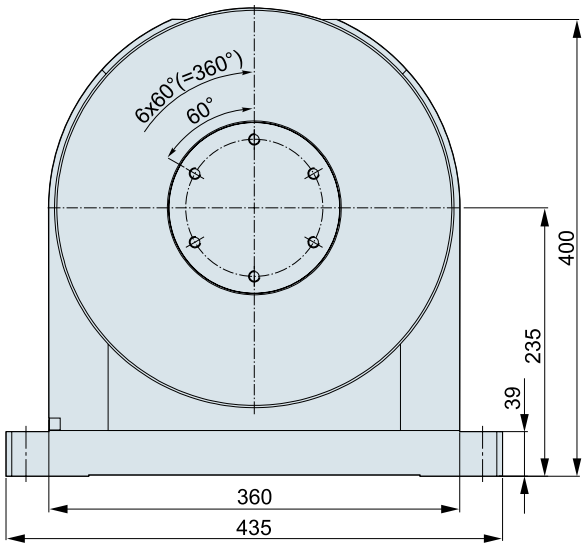


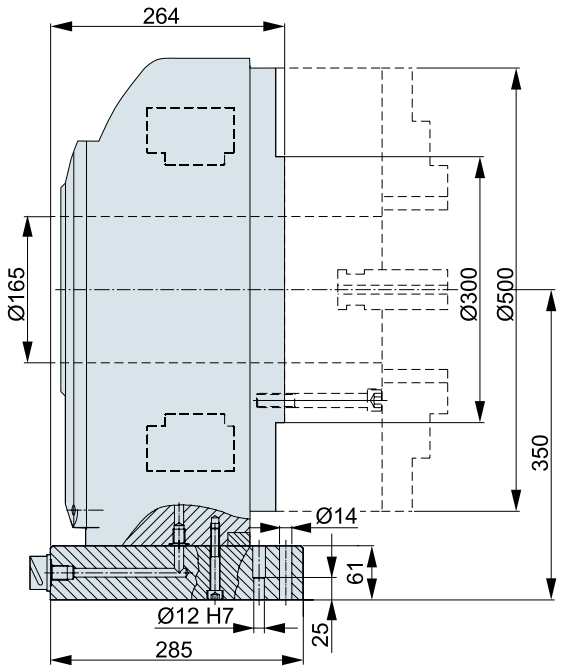
Table diameter:		350 mm
Load weight max.:		200 kg
Planar runout:		0,01 mm
Clamping	Clamping torque:	2.000 Nm
	Nominal pressure:	50 bar
Angular measuring system	Initial signal:	1Vss sin/cos
	Meas. principle:	incremental/absolute
	Precision:	± 3″
Weight approx.:		230 kg

Motor RM 310-50	Peak torque:	600 Nm
	Rated torque:	227 Nm
	Rated power dissipation:	0,7 kW (2,2 l/min)
	Number of pole pairs:	30
	Speed max. mech.:	300 r.p.m.
	Rated current:	10,0 A
	Nominal voltage:	400 V

Detailed motor data on page 39

CyTurn

Rotary table CRT/500/V



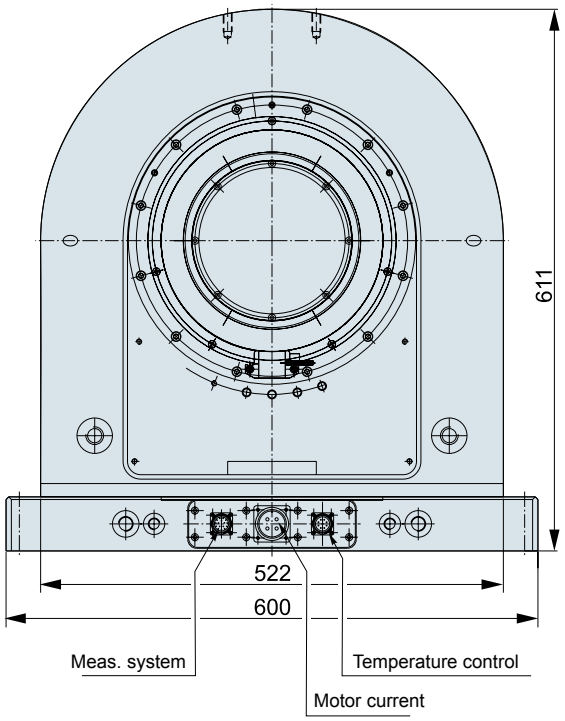


Table diameter:		500 mm
Load weight max.:		400 kg
Planar runout:		0,01 mm
Clamping	Clamping torque:	3.000 Nm
	Nominal pressure:	50 bar
Angular measuring system	Initial signal:	1Vss sin/cos
	Meas. principle:	incremental/absolute
	Precision:	± 3″
Weight approx.:		350 kg

Motor RM 410-75	Peak torque:	1.600 Nm
	Rated torque:	580 Nm
	Rated power dissipation:	1,3 kW (3,6 l/min)
	Number of pole pairs:	40
	Speed max. mech.:	110 r.p.m.
	Rated current:	10,0 A
	Nominal voltage:	400 V

Detailed motor data on page 40

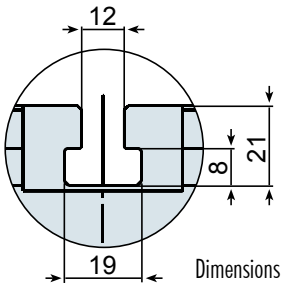
CyTurn Rotary tilt tables offer more...

Rotary tilt table CRT/400/HV

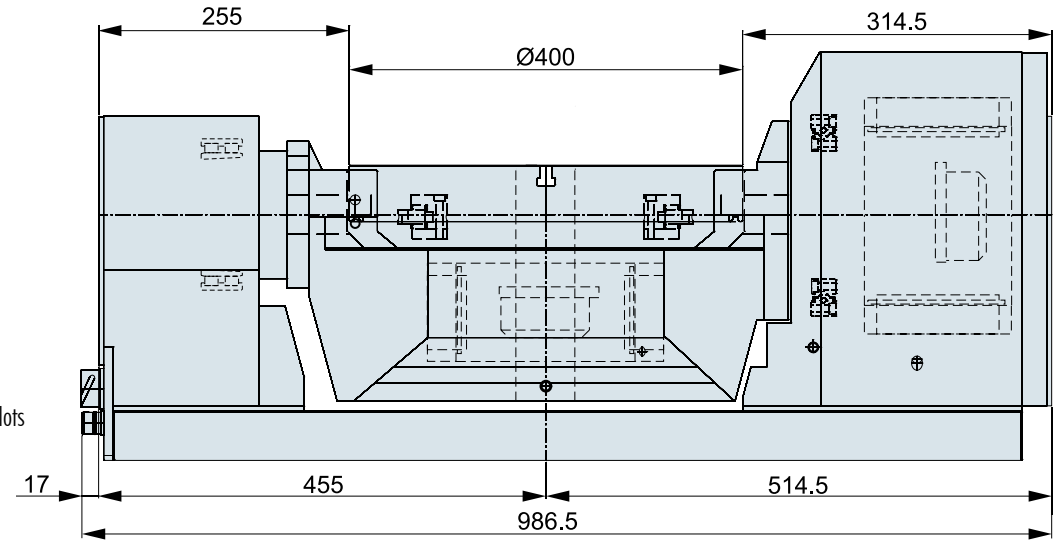
This series offers an additional swivel axis with a similar drive as the rotating axis (grease lubricated axial-radial bearings for high loads). The energy supply is enabled by means of a rotary distributor. For maximum rigidity the swivel axis is mounted to a massive base plate, but can be also combined with a linear guide system. All supply connections are located on one side of the housing. Options: increasing of speed up to 800 r.p.m.; centered bore of 100 mm diameter for processing rod stock.

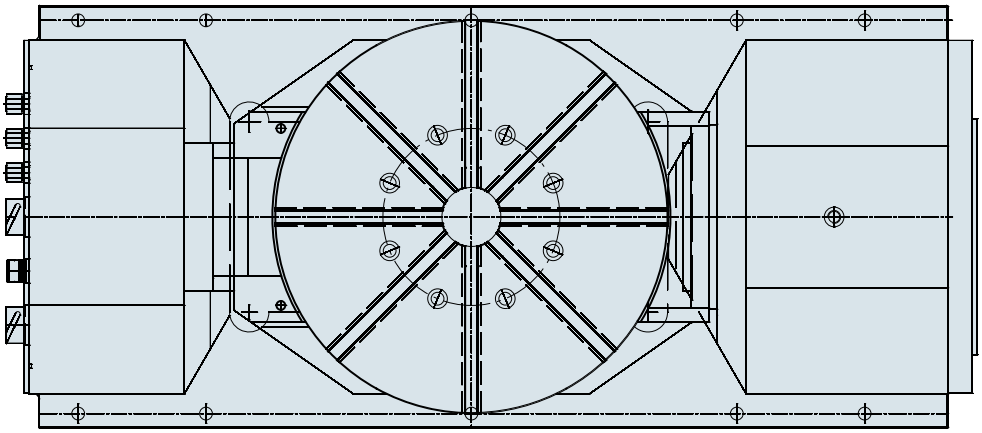
Application range:

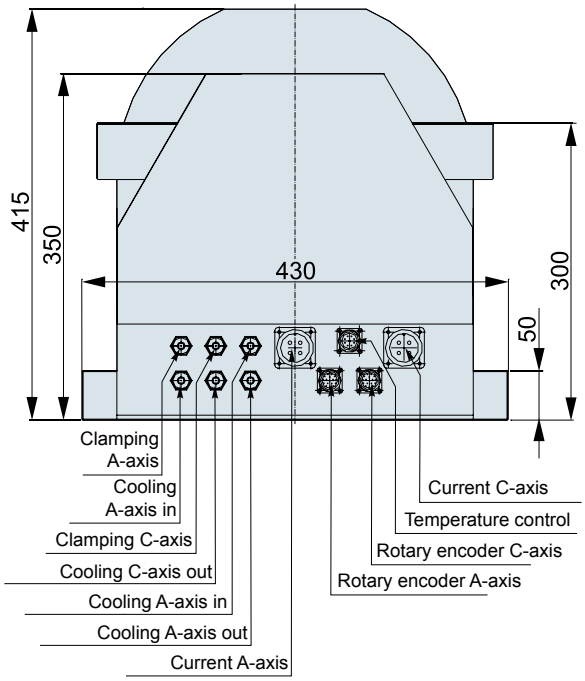
- profile grinding
- simultaneous turn-milling
- processing of free formed surfaces
- positioning

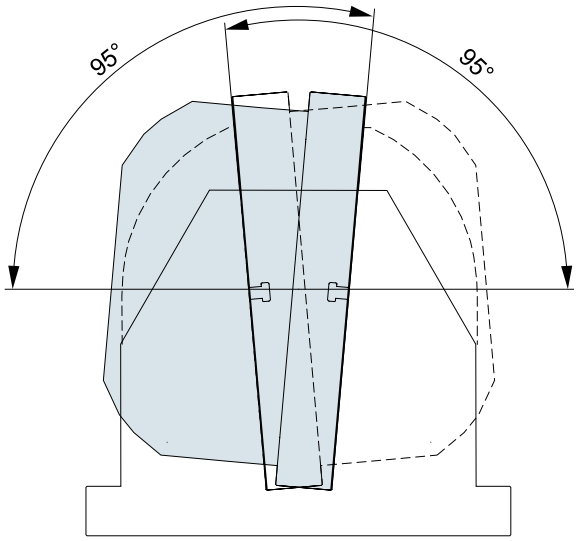


Dimensions T-slots









Swivel range

		Rotary axis	Swivel axis
Table diameter:		400 mm	-
Load weight max.:		600 kg	-
Planar runout:		0,01 mm	0,01 mm
Swivel range:		continuous	±95°
Clamping	Clamping torque:	1.000 Nm	2.000 Nm
	Nom. pressure (with integr. pressure converter, operation pneumatically with 6 bar):	60/6 bar	65/6 bar
Angular measuring system	Initial signal:	1 Vss sin/cos	1 Vss sin/cos
	Type:	incremental/absolute	incremental/absolute
	Positioning accuracy:	± 2,5“	± 2,5“
Motor	Type:	RM 240-75	RM 240-125
	Peak torque:	495 Nm	830 Nm
	Rated torque:	193 Nm	322 Nm
	Rated power dissipation (Cooling only necessary during 100% NC-operation):	2,1 kW (6,0 l/min)	
	Number of pole pairs:	25	25
	Speed max. mech.:	350 r.p.m.	220 r.p.m.
	Rated current:	10,5 A	10,5
	Nominal voltage:	400 V	400 V
Weight approx.:		750 kg	

Detailed motor data on page 38

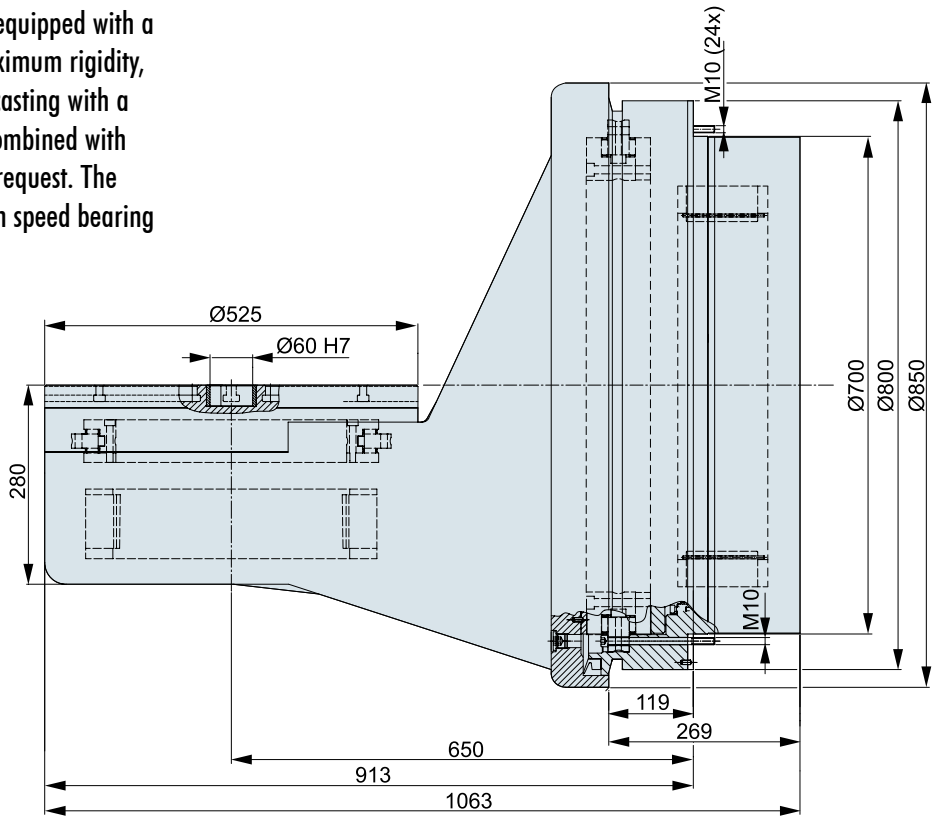
CyTurn

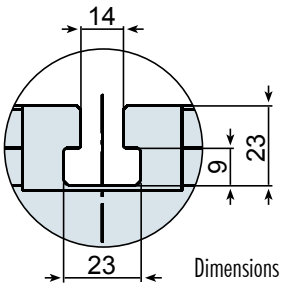
Rotary tilt table CRT/525/HV

For best accessibility this rotary tilt table is equipped with a single supported swivel axis. To achieve maximum rigidity, the swivel axis is made as a homogeneous casting with a bearing diameter of 580 mm. Other sizes combined with the other horizontal tables are possible on request. The rotary axis can be also equipped with a high speed bearing or with a central bore.

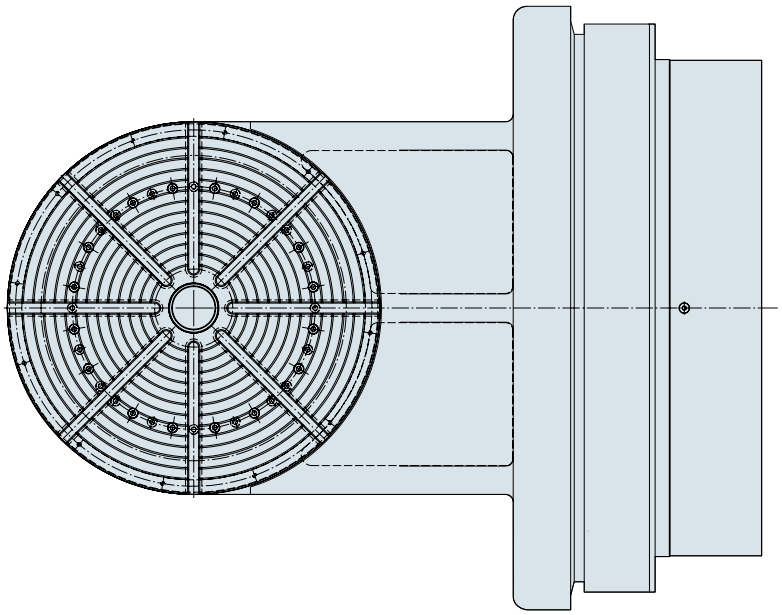
Application range:

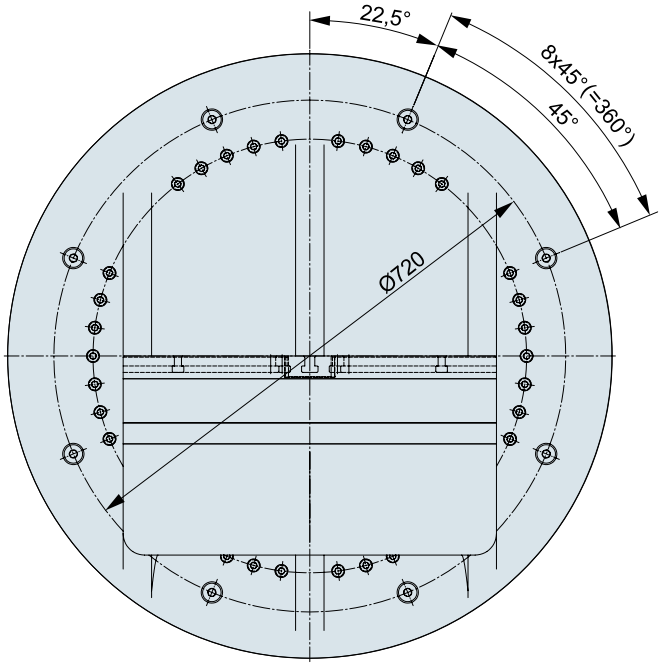
- processing of free formed surfaces
- simultaneous turn-milling
- machining of precision parts in aircraft industry





Dimensions T-slots



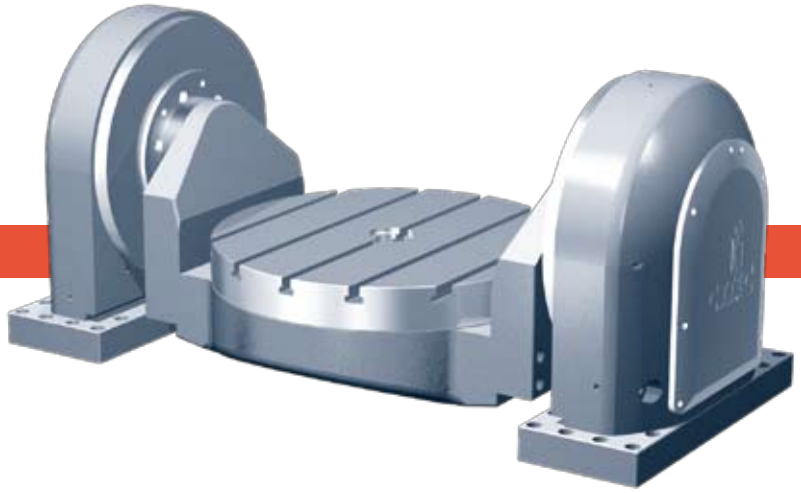


		Rotary axis	Swivel axis
Table diameter:		525 mm	-
Load weight max.:		500 kg	-
Planar runout:		0,01 mm	0,01 mm
Swivel range:		continuous	±95°
Clamping	Clamping torque:	3.000 Nm	8.000 Nm
	Nominal pressure:	50 bar	50 bar
Angular measuring system	Initial signal:	1 Vss sin/cos	1 Vss sin/cos
	Type:	incremental	incremental
	Positioning accuracy:	± 2,5"	± 3"
Motor	Type:	RM 410-75	RM 564-100
	Peak torque:	1.560 Nm	3.940 Nm
	Rated torque:	580 Nm	1.470 Nm
	Rated power dissipation (Cooling only necessary during 100% NC-operation):	3,5 kW (10,2 l/min)	
	Number of pole pairs:	40	55
	Speed max. mech.:	110 r.p.m.	20 r.p.m.
	Rated current:	10,0 A	10,0 A
	Nominal voltage:	400 V	400 V
Weight approx.:		1.400 kg	

Detailed motor data on page 40 and 41

CyTurn

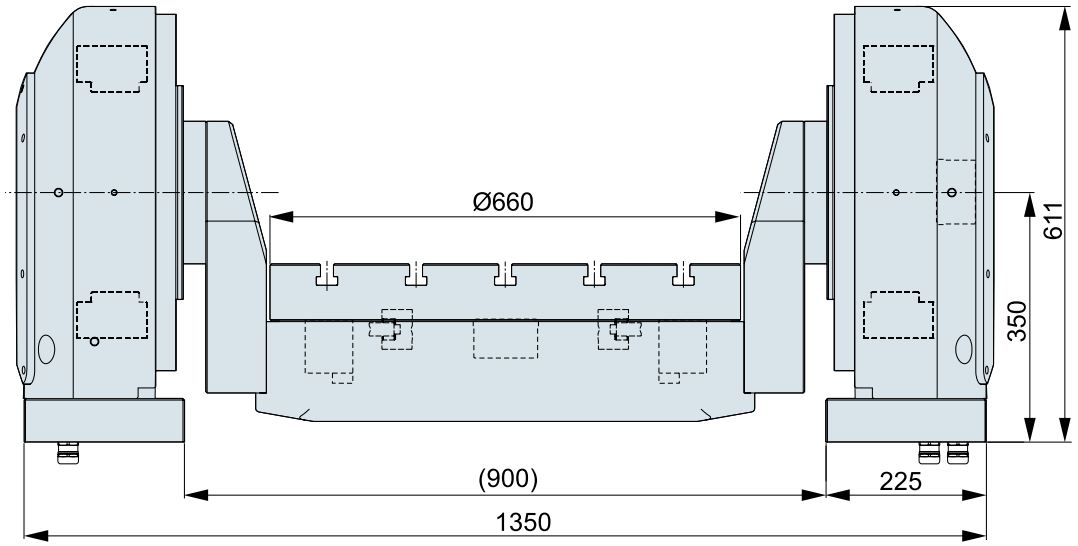
Rotary tilt table CRT/660/HV

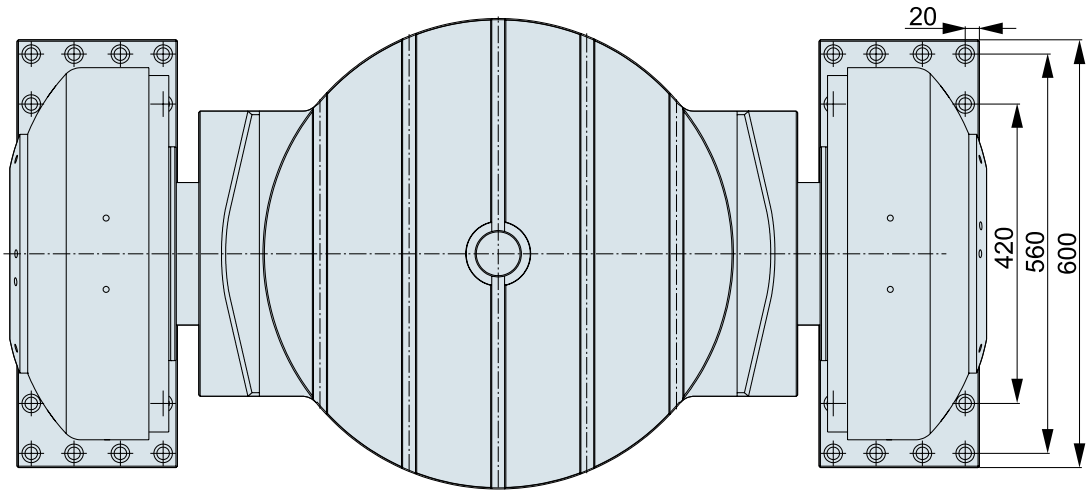


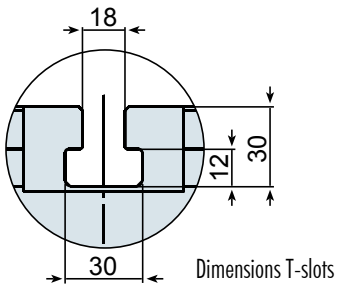
In this execution, a large swivel bridge with integrated NC rotary axis with high dynamic torque motor offers the possibility of complete 5 axis machining.

Application range:

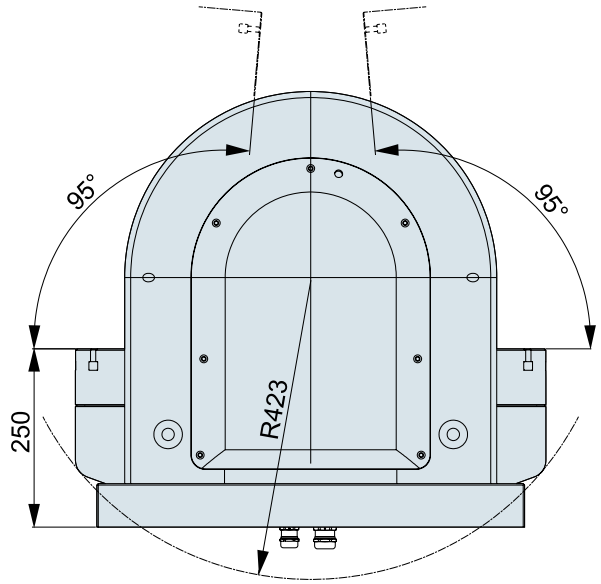
- 3D-mould manufacturing
- simultaneous heavy duty aluminium milling
- optional: high speed turning







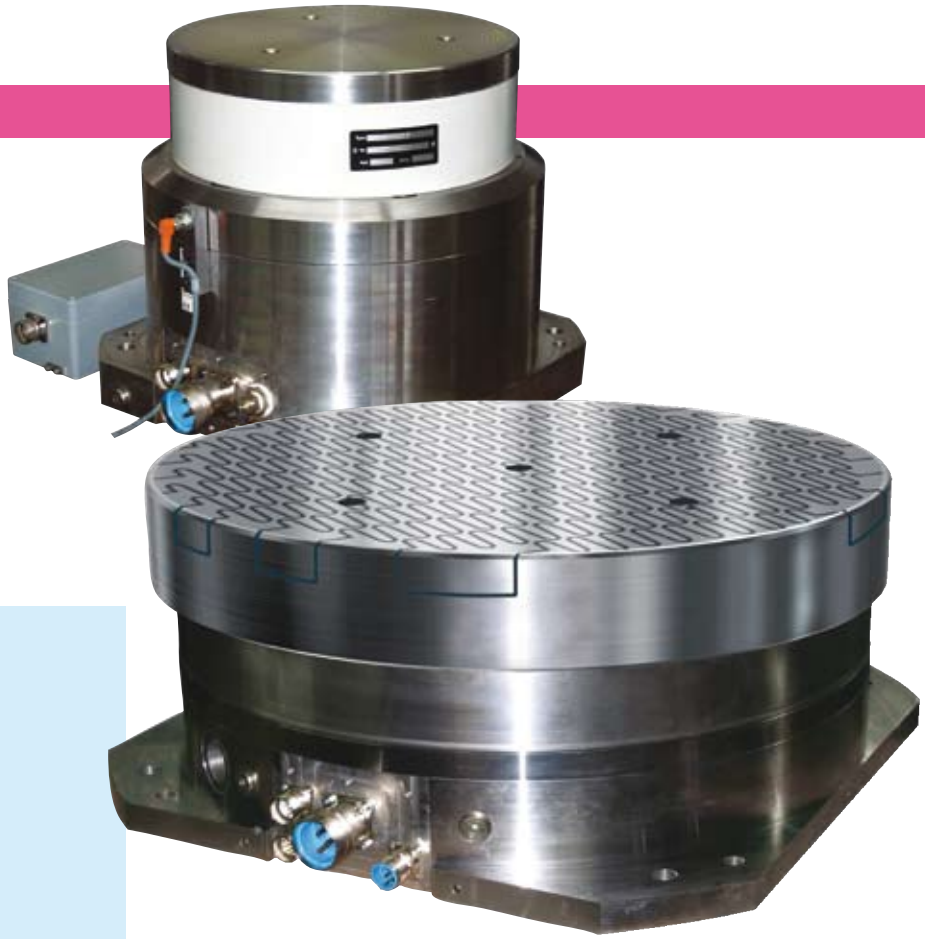
Dimensions T-slots



		Rotary axis	Swivel axis
Table diameter:		660 mm	-
Load weight max.:		1.000 kg	-
Planar runout:		0,01 mm	0,01 mm
Swivel range:		continuous	±95°
Clamping	Clamping torque:	4.000 Nm	5.500 Nm
	Nominal pressure:	50 bar	50 bar
Angular measuring system	Initial signal:	1 Vss sin/cos	1 Vss sin/cos
	Type:	absolute	absolute
	Positioning accuracy:	± 5"	± 5"
Motor	Type:	RM 564-50	RM 410-75 (2x)
	Peak torque:	1.970 Nm	3.120 Nm
	Rated torque:	740 Nm	1.160 Nm
	Rated power dissipation (Cooling only necessary during 100% NC-operation):	3,9 kW (11,5 l/min)	
	Number of pole pairs:	55	80
	Speed max. mech.:	80 r.p.m.	110 r.p.m.
	Rated current:	10,0 A	10,0 A
	Nominal voltage:	400 V	400 V
Weight approx.:		900 kg	

Detailed motor data on page 41 and 40

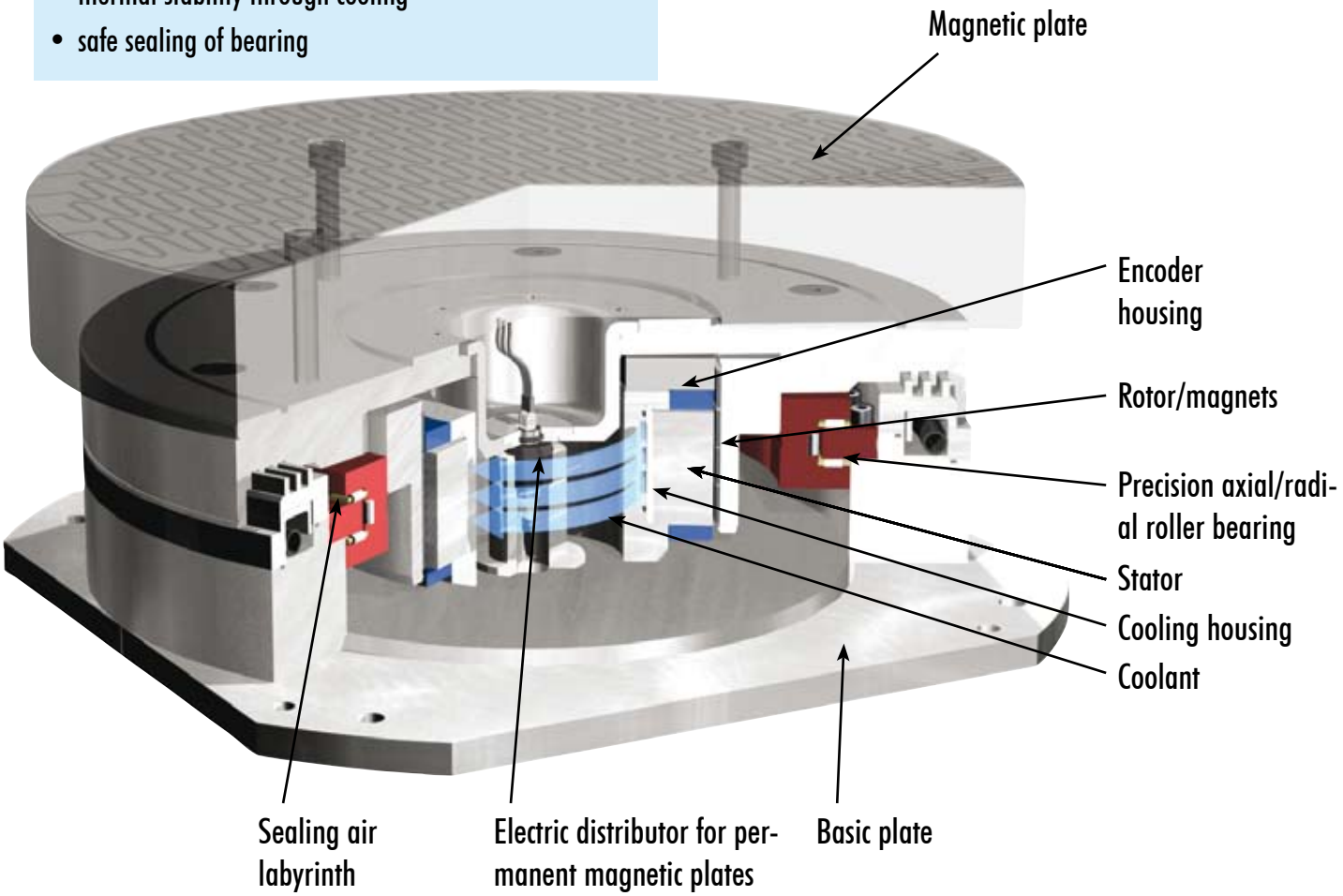
CyTurn Ideal for economic grinding...



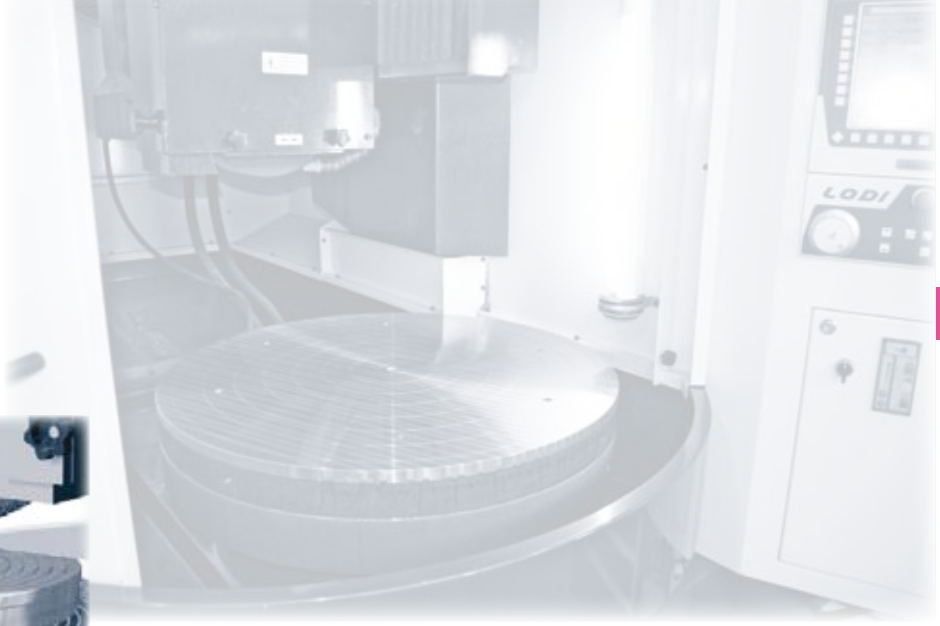
Direct driven NC rotary tables are ideally suited for planar grinding applications. The extreme smoothness enables high surface quality and precision in machining. The tables work very economically, idle strokes or reversal controlling e. g. on long table machines are eliminated. Different clamping options are available.

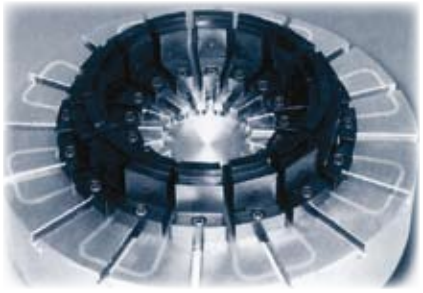
Essential advantages:

- reduced height, including planar disc
- free of wear direct drive without gear: long service life, high speed
- high bearing rigidity of the planar disc by means of axial-/radial bearing
- extreme smoothness
- thermal stability through cooling
- safe sealing of bearing



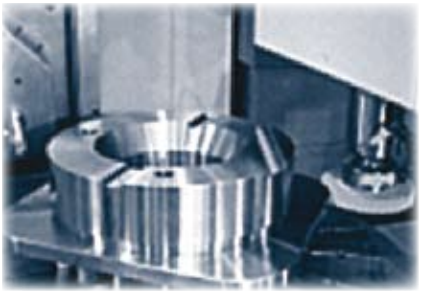
CyTurn



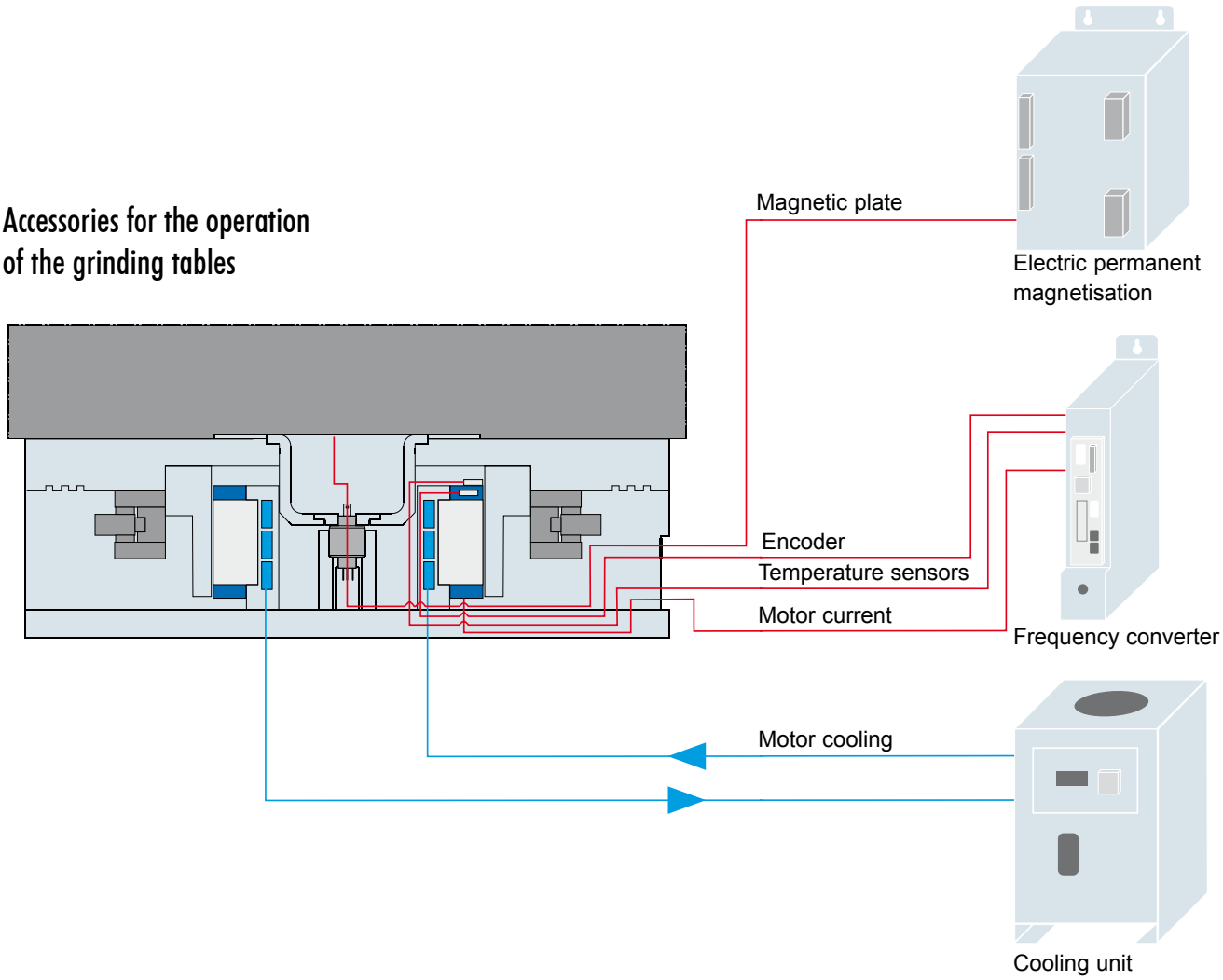


Optionally the face plate can be equipped with different clamping devices.

Even more complex serial parts such as pinions with shafts can be face ground economically.



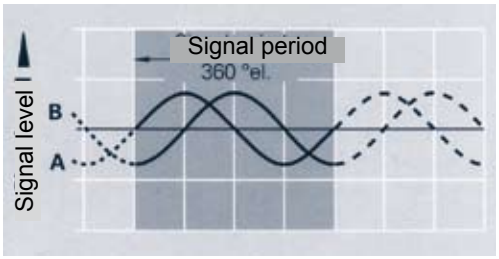
Accessories for the operation of the grinding tables

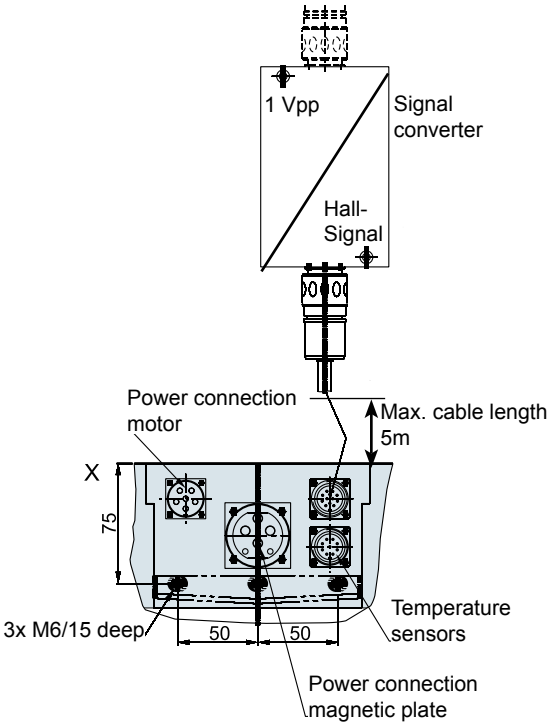


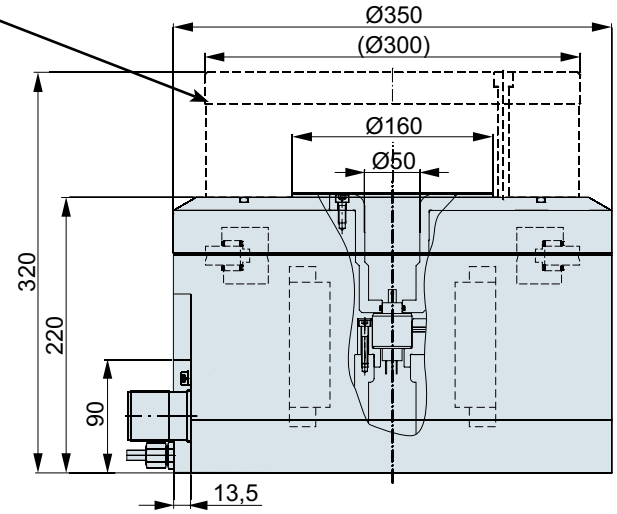
CyTurn

Grinding table CRT/350/H

Magnetic plate
(manufacturer e. g. SAV or similar)







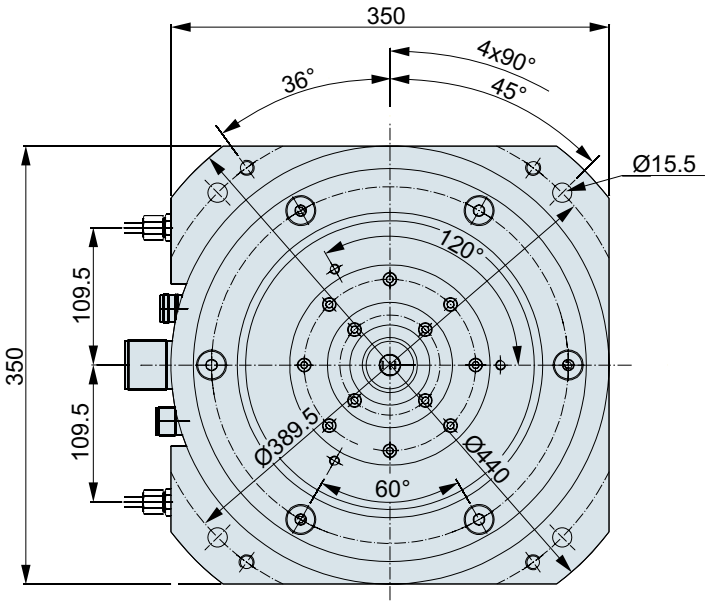


Table diameter:		350 mm
Load weight max.:		150 kg
Planar runout:		0,01 mm
Angular measuring system	Initial signal:	1Vss sin/cos
	Meas. principle:	Hall sensors
	Precision:	± 6'
Weight approx.:		120 kg

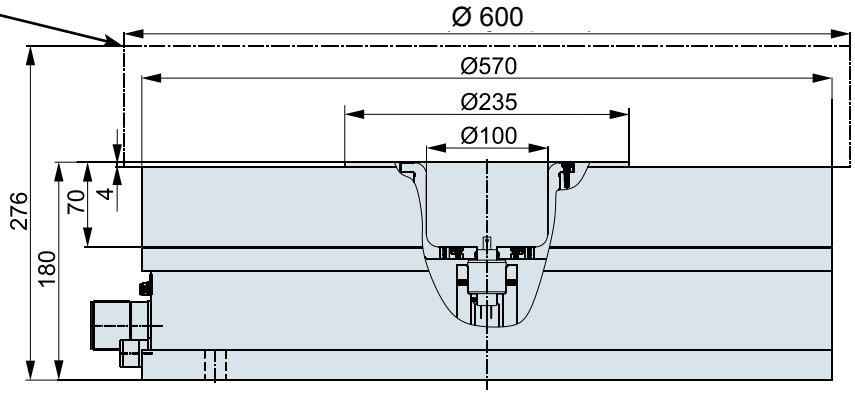
Motor RM 166-100	Peak torque:	218 Nm
	Rated torque:	87 Nm
	Rated power dissipation:	0,5 kW (1,5 l/min)
	Number of pole pairs:	15
	Speed max. mech.:	900 r.p.m.
	Rated current:	11,0 A
	Nominal voltage:	400 V

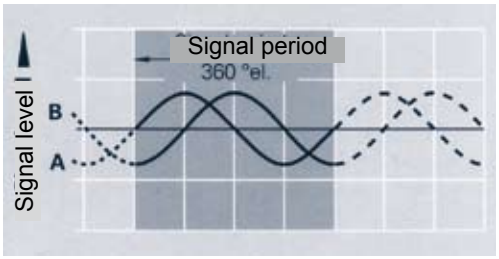
Detailed motor data on page 37

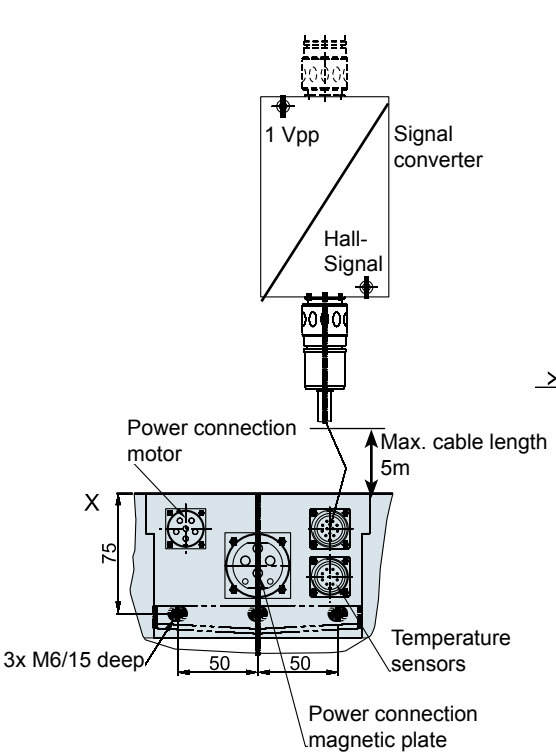
CyTurn

Grinding table CRT/570/H

Magnetic plate
(manuf. e. g. Wagner or similar)







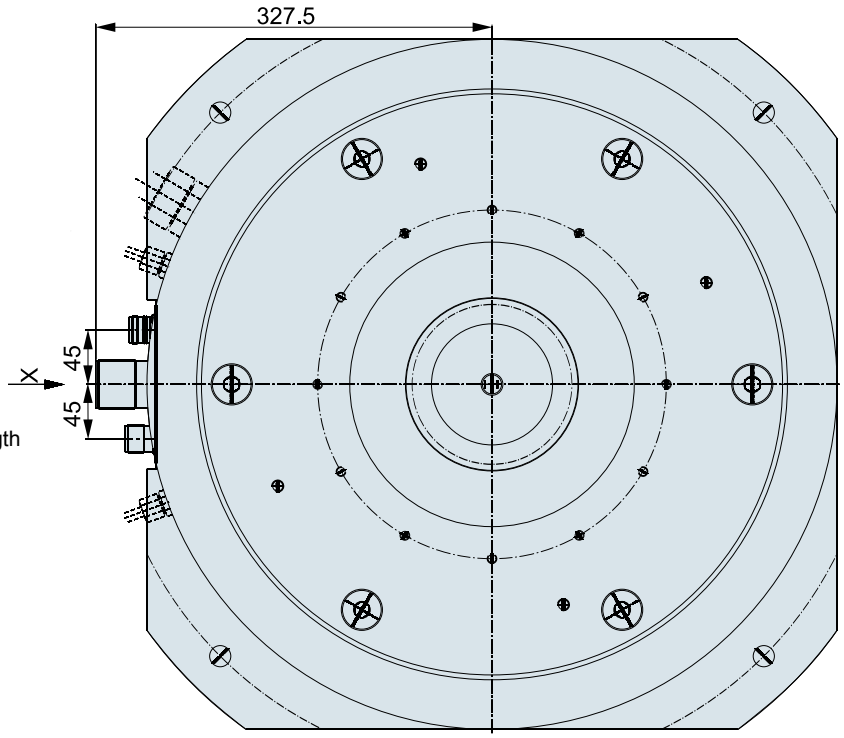


Table diameter:		570 mm
Load weight max.:		250 kg horizontal
Planar runout:		0,01 mm
Angular measuring system	Initial signal:	1Vss sin/cos
	Meas. principle:	Hall sensors
	Precision:	± 4‘
Weight approx.:		200 kg

Motor RM 240-75	Peak torque:	495 Nm
	Rated torque:	193 Nm
	Rated power dissipation:	0,7 kW (2,2 l/min)
	Number of pole pairs:	25
	Speed max. mech.:	350 r.p.m.
	Rated current:	10,5 A
	Nominal voltage:	400 V

Detailed motor data on page 38

Design

The torque motors consist of a primary part (stator with active coil system) and a secondary part (rotor with permanent magnet system). They are pivotably arranged to each other.

When the stator is supplied with current an electromagnetic force arises towards the rotor. This torque is generated in a pulse and is very high. It provides highest acceleration values in operation. Anyhow the motors are suitable for high speed up to 2.000 r.p.m.

With the motor systems the rotor can either be an internal armature (inner rotor) or an external ring (outer rotor).

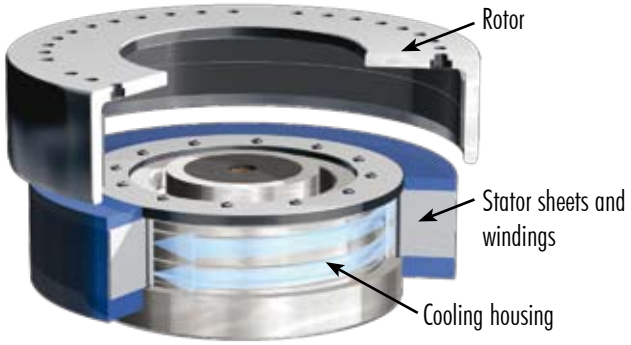
CyTec uses for the rotary tables outer rotor motors as standard to exploit the torque as efficiently as possible. For specific applications inner rotors are available.

Function

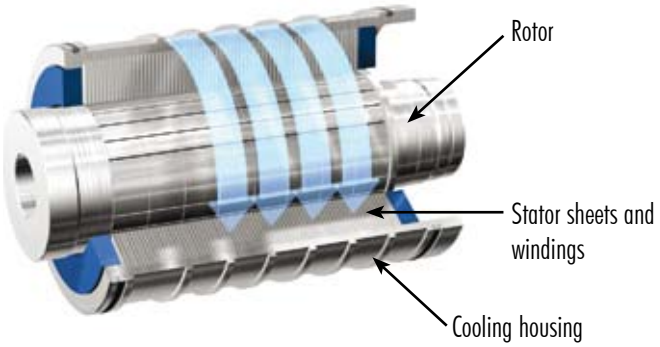
The torque motor works like a normal synchronous motor. With the outer rotor, the permanent magnets are fixed on the inner surface of the rotor ring, with the inner rotor they are fixed on the outer surface of the armature. The stator as primary part consists of a large number of magnetic coils which are star switched and provided with three-phase current. The required speed is dependant on the frequency. The dissipation heat of the stator is conducted by an integrated cooling system.

Because of the large number of poles high torque at very low speed is produced. The rotor is directly connected to the rotating machine part, any backlash is avoided.

In combination with suitable customer side guiding systems as pre-loaded roller bearings and adequate angular measuring systems for monitoring the rotor position, the motor is ready for operation in most varied applications.

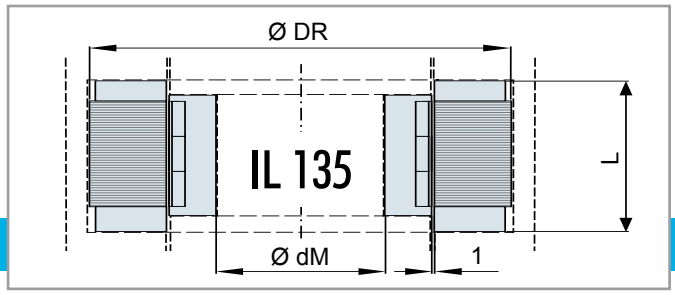


Outer rotor (cutaway)



Inner rotor (cutaway)

CyTurn



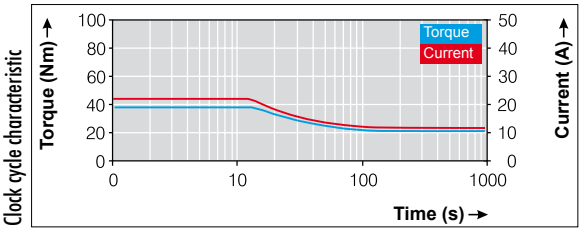
Technical data torque motor Type IL 135

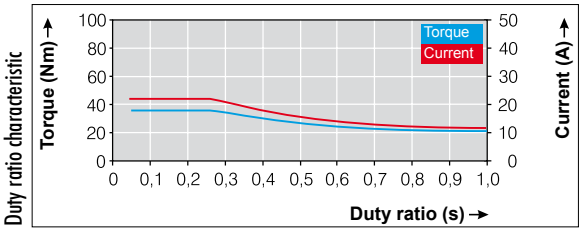
RM 135/	50	100
Forces and performance data		
Peak torque (Nm):	38	70
Rated torque (Nm):	20	43
Torque in swivel operation (Nm):	24	50
Stall torque (Nm):	13	24
Peak power dissipation/20°C (kW):	1,2	1,6
Rated power dissipation/100°C (kW):	1,0	1,7
Rated power (kW):	6,4	14,2
electr. time constant (ms):	7,0	9,0
thermal resistance w. water cooling (K/W):	0,2	0,1
Number of pole pairs:	5	5
Number of coils:	12	12
Speed max. mech. (r.p.m.):	4.500	4.500
Rated speed (r.p.m.):	3.200	3.100
Speed max. without field weakening (r.p.m.):	3.300	3.600

RM 135/	50	100
Dimensions		
Ø DR (mm):	135	135
Ø dM (mm):	55	55
L (mm):	101	151
Coil constants		
Torque constant (Nm/Arms):	1,9	1,9
Voltage constant (Vrms/1000/min)*:	118	111
Voltage constant (Vp/[rad/s])*:	1,6	1,5
Coil resistance/100°C (Ω)*:	2,2	0,9
Coil resistance/20°C (Ω)*:	1,4	0,6
Motor inductance (mH):	8,0	4,0
Peak motor current (A):	22,0	40,0
Rated current (A):	11,0	23,2
Current in swivel operation (A):	13,2	27,8
Stall current (A):	10,0	20,0

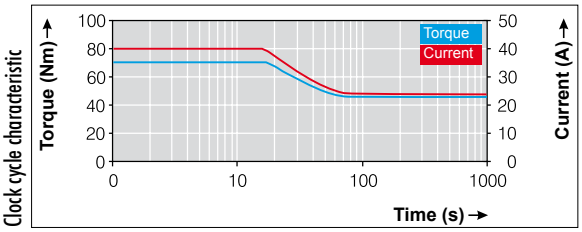
*Values measured between two connections, motor in star circuit

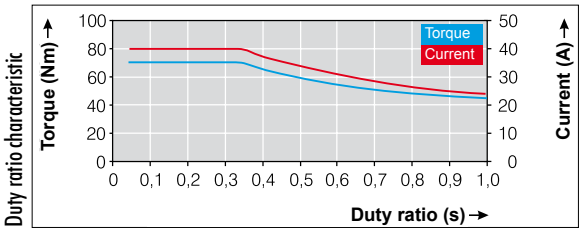
IL 135-50



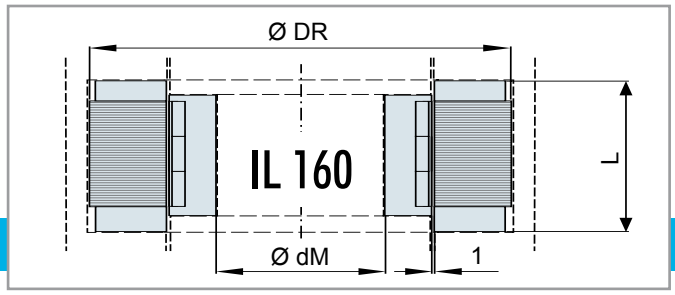


IL 135-100





CyTurn



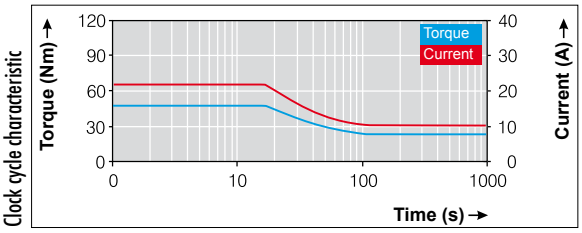
Technical data torque motor Type IL 160

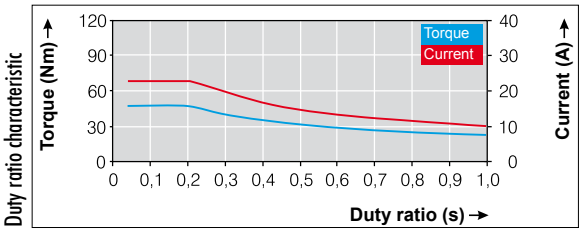
RM 160/	50	100	200
Forces and performance data			
Peak torque (Nm):	47	100	200
Rated torque (Nm):	23	50	106
Torque in swivel operation (Nm):	30	62	122
Stall torque (Nm):	13	28	60
Peak power dissipation/20°C (kW):	1,5	2,4	5,2
Rated power dissipation/100°C (kW):	0,6	1,8	2,1
Rated power (kW):	5,8	15,6	11,1
electr. time constant (ms):	9,7	12,5	15,3
thermal resistance w. water cooling (K/W):	0,2	0,1	0,05
Number of pole pairs:	5	5	5
Number of coils:	12	12	12
Speed max. mech. (r.p.m.):	3.500	6.000	2.000
Rated speed (r.p.m.):	2.400	3.000	1.000
Speed max. without field weakening (r.p.m.):	2.700	3.600	1.350

RM 160/	50	100	200
Dimensions			
Ø DR (mm):	160	160	160
Ø dM (mm):	65	65	65
L (mm):	110	160	260
Coil constants			
Torque constant (Nm/Arms):	2,4	1,8	4,8
Voltage constant (Vrms/1000/min)*:	148	111	296
Voltage constant (Vp/[rad/s])*:	2,0	1,5	4,0
Coil resistance/100°C (Ω)*:	2,9	0,6	1,8
Coil resistance/20°C (Ω)*:	2,2	0,5	1,4
Motor inductance (mH)*:	8,0	4,5	16,0
Peak motor current (A):	21,8	58,1	50,0
Rated current (A):	10,0	27,5	25,0
Current in swivel operation (A):	13,3	35,0	29,1
Stall current (A):	8,0	22,0	20,0

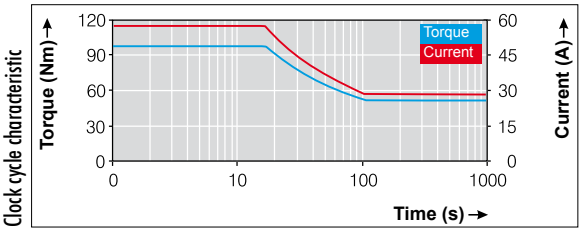
*Values measured between two connections, motor in star circuit

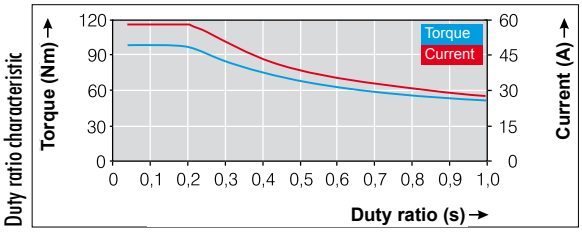
IL 160-50



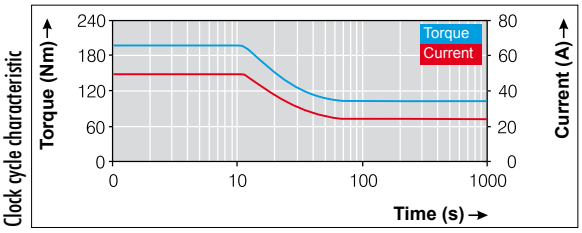


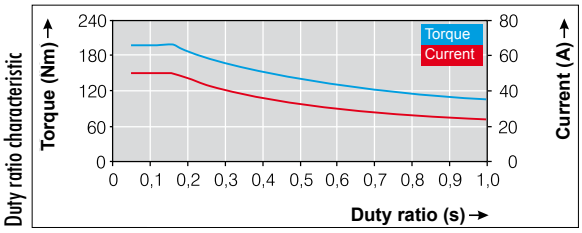
IL 160-100



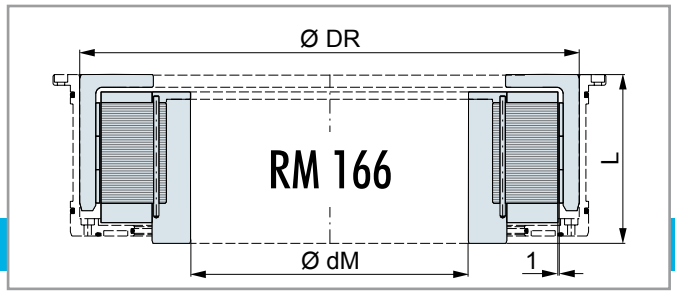


IL 160-200





CyTurn



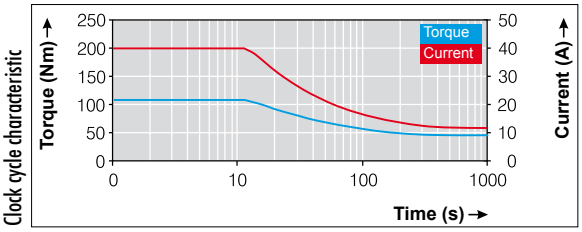
Technical data torque motor Type RM 166

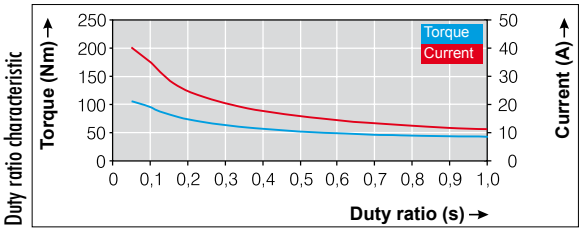
RM 166/	50	100
Forces and performance data		
Peak torque (Nm):	109	218
Rated torque (Nm):	44	87
Torque in swivel operation (Nm):	52	104
Stall torque (Nm):	31	62
Peak power dissipation/20°C (kW):	2,9	4,9
Rated power dissipation/100°C (kW):	0,3	0,48
Rated power (kW):	5,0	4,9
electr. time constant (ms):	11,4	13,6
thermal resistance w. water cooling (K/W):	0,27	0,16
Number of pole pairs:	15	15
Number of coils:	18	18
Speed max. mech. (r.p.m.):	1100	900
Rated speed (r.p.m.):	1100	530
Speed max. without field weakening (r.p.m.):	1100	695

RM 166/	50	100
Dimensions		
Ø DR (mm):	190	190
Ø dM (mm):	60	56
L (mm):	100	162,5
Coil constants		
Torque constant (Nm/Arms):	4,5	9,0
Voltage constant (Vrms/1000/min)*:	288	575
Voltage constant (Vp/[rad/s])*:	3,9	7,8
Coil resistance/100°C (Ω)*:	1,6	2,7
Coil resistance/20°C (Ω)*:	1,2	2,0
Motor inductance (mH)*:	13,9	27,7
Peak motor current (A):	40	40
Rated current (A):	11,0	11,0
Current in swivel operation (A):	14,0	14,0
Stall current (A):	11,0	11,0

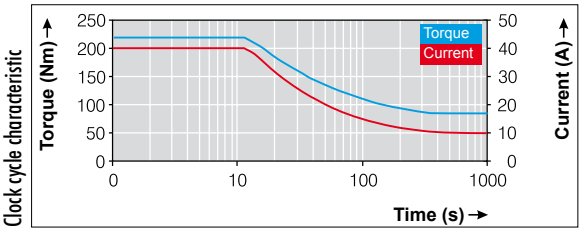
*Values measured between two connections, motor in star circuit

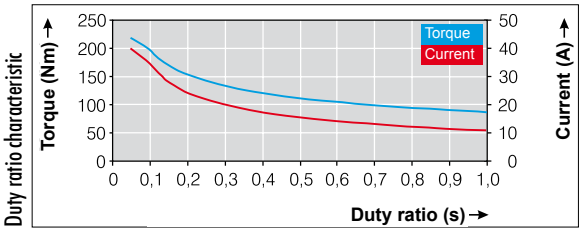
RM 166-50





RM 166-100





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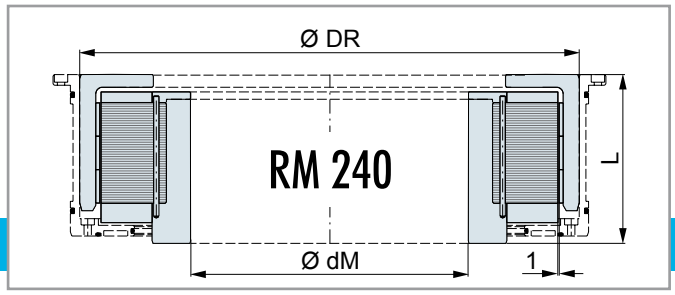


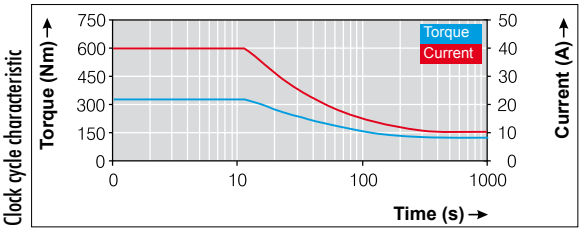
Technical data torque motor Type RM 240

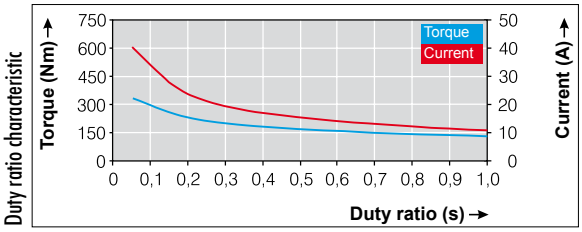
RM 240/	50	75	100	125
Forces and performance data				
Peak torque (Nm):	330	495	660	830
Rated torque (Nm):	129	193	257	322
Torque in swivel operation (Nm):	157	236	315	394
Stall torque (Nm):	91	136	182	230
Peak power dissipation/20°C (kW):	6,1	8,3	10,4	12,6
Rated power dissipation/100°C (kW):	0,6	0,7	0,9	1,4
Rated power (kW):	4,0	3,9	3,9	3,9
electr. time constant (ms):	14,8	16,5	17,5	18,2
thermal resistance w. water cooling (K/W):	0,14	0,10	0,08	0,07
Number of pole pairs:	25	25	25	25
Number of coils:	30	30	30	30
Speed max. mech. (r.p.m.):	450	350	250	220
Rated speed (r.p.m.):	300	195	145	115
Speed max. without field weakening(r.p.m.):	450	300	239	191

RM 240/	50	75	100	125
Dimensions				
Ø DR (mm):	286	286	286	286
Ø dM (mm):	133	133	133	133
L (mm):	110	135	160	?
Coil constants				
Torque constant (Nm/Arms):	14,0	22,0	26,0	32,5
Voltage constant (Vrms/1000/min)*:	890	1334	1675	2090
Voltage constant (Vp/[rad/s])*:	12,0	18,0	22,6	28,3
Coil resistance/100°C (Ω)*:	3,4	4,5	5,7	6,9
Coil resistance/20°C (Ω)*:	2,6	3,4	4,3	5,2
Motor inductance (mH)*:	38,0	57,0	76,0	95,0
Peak motor current (A):	40,0	40,0	40,0	40,0
Rated current (A):	10,5	10,5	10,5	10,5
Current in swivel operation (A):	14,0	14,0	14,0	14,0
Stall current (A):	10,5	10,5	10,5	10,5

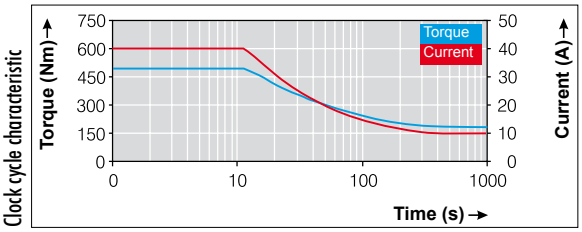
*Values measured between two connections, motor in star circuit

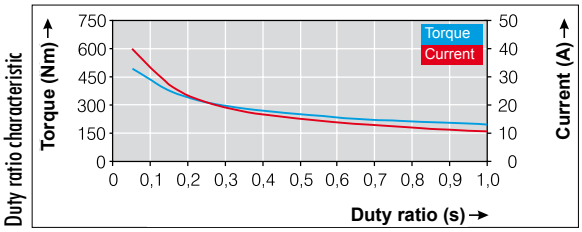
RM 240-50



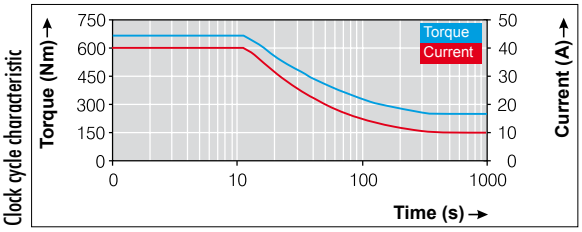


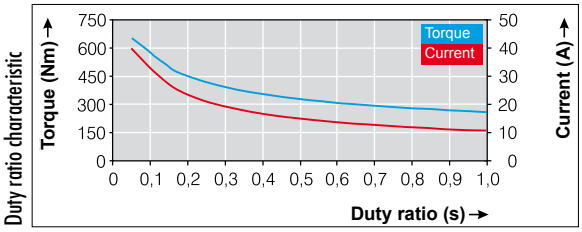
RM 240-75



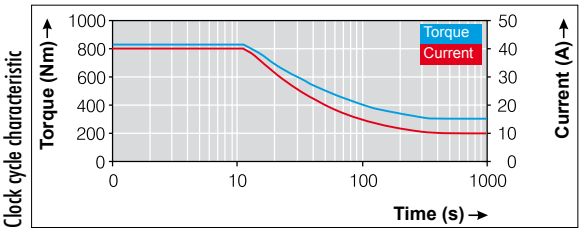


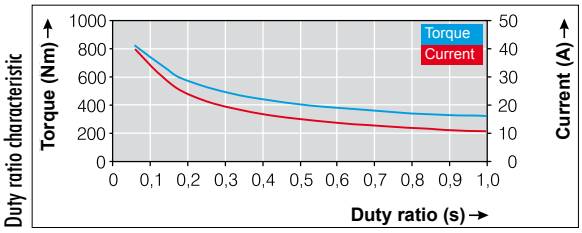
RM 240-100



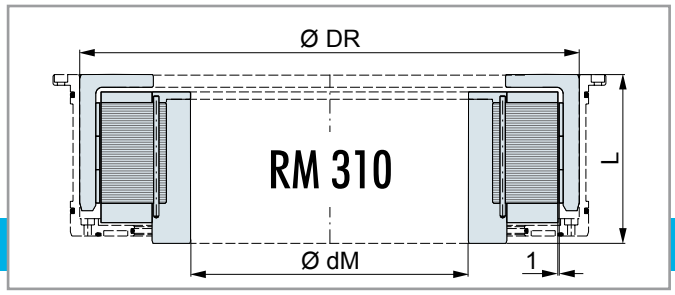


RM 240-125





CyTurn



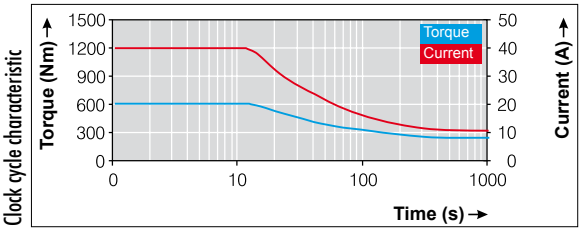
Technical data torque motor Type RM 310

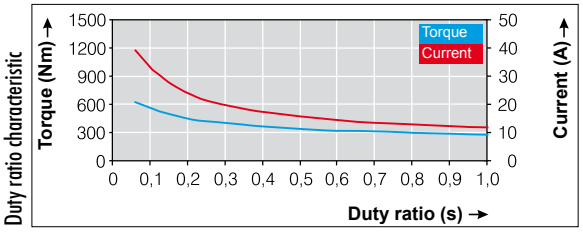
RM 310/	50	75	100	125
Forces and performance data				
Peak torque (Nm):	600	900	1200	1500
Rated torque (Nm):	227	340	453	567
Torque in swivel operation (Nm):	302	452	603	753
Stall torque (Nm):	161	240	320	401
Peak power dissipation/20°C (kW):	8,5	11,5	14,4	17,3
Rated power dissipation/100°C (kW):	0,7	0,9	1,2	1,4
Rated power (kW):	4,0	3,9	3,8	3,6
electr. time constant (ms):	16,9	18,9	20,0	20,8
thermal resistance w. water cooling (K/W):	0,11	0,08	0,07	0,06
Number of pole pairs:	30	30	30	30
Number of coils:	36	36	36	36
Speed max. mech. (r.p.m.):	300	200	160	115
Rated speed (r.p.m.):	170	110	80	60
Speed max. without field weakening (r.p.m.):	271	181	136	109

RM 310/	50	75	100	125
Dimensions				
Ø DR (mm):	335	342	342	342
Ø dM (mm):	173	160	160	160
L (mm):	101,5	135	160	185
Coil constants				
Torque constant (Nm/Arms):	24,0	36,0	48,0	60,0
Voltage constant (Vrms/1000/min)*:	1480	2200	2950	3690
Voltage constant (Vp/[rad/s])*:	19,9	29,9	39,8	49,8
Coil resistance/100°C (Ω)*:	4,7	6,3	7,9	9,5
Coil resistance/20°C (Ω)*:	3,5	4,8	6,0	7,2
Motor inductance (mH)*:	60,0	90,0	120,0	150,0
Peak motor current (A):	40	40	40	40
Rated current (A):	10,0	10,0	10,0	10,0
Current in swivel operation (A):	15,0	15,0	15,0	15,0
Stall current (A):	10,0	10,0	10,0	10,0

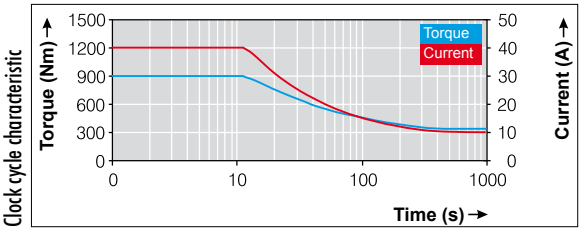
*Values measured between two connections, motor in star circuit

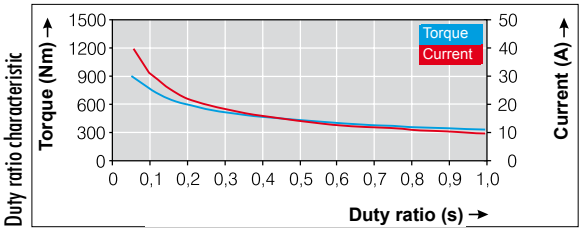
RM 310-50



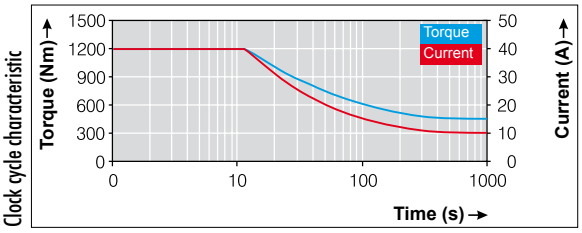


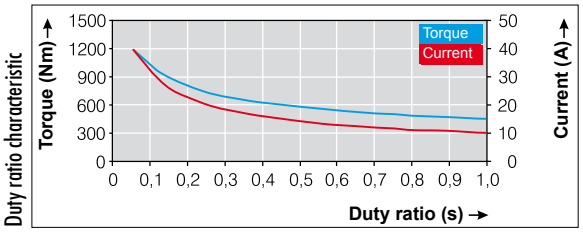
RM 310-75



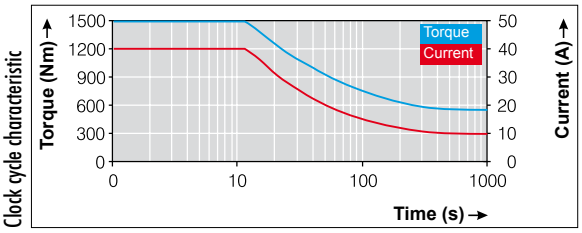


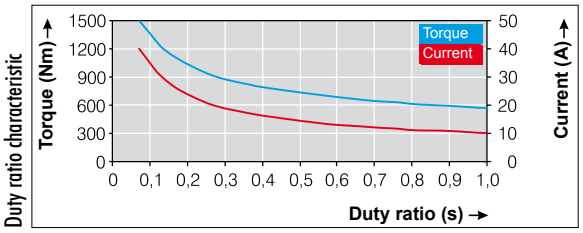
RM 310-100





RM 310-125





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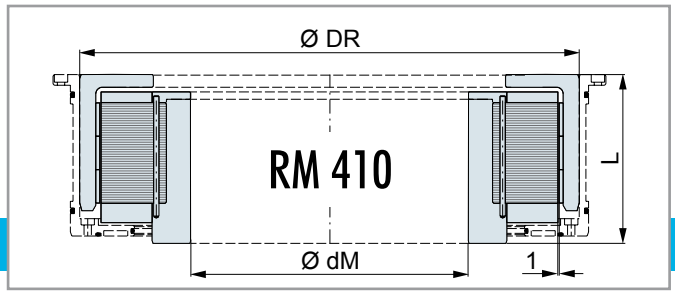


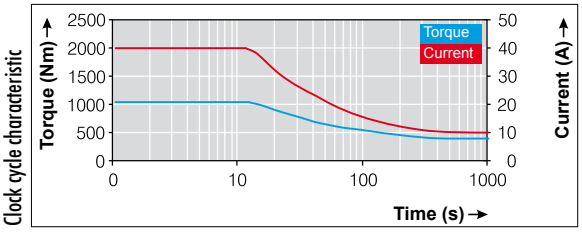
Technical data torque motor Type RM 410

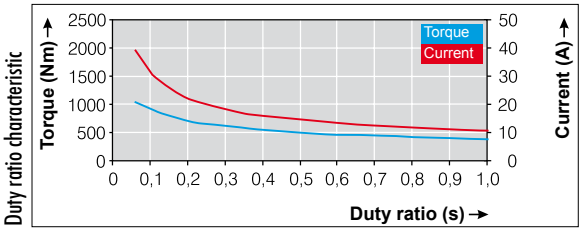
RM 410/	50	75	100
Forces and performance data			
Peak torque (Nm):	1.040	1.560	2.080
Rated torque (Nm):	390	580	780
Torque in swivel operation (Nm):	519	778	1.37
Stall torque (Nm):	275	412	550
Peak power dissipation/20°C (kW):	11,4	15,3	19,2
Rated power dissipation/100°C (kW):	0,9	1,3	1,6
Rated power (kW):	3,6	3,7	3,3
electr. time constant (ms):	16,9	18,9	20,0
thermal resistance w. water cooling (K/W):	0,09	0,06	0,05
Number of pole pairs:	40	40	40
Number of coils:	48	48	48
Speed max. mech. (r.p.m.):	160	110	80
Rated speed (r.p.m.):	90	60	40
Speed max. without field weakening (r.p.m.):	143	100	72

RM 410/	50	75	100
Dimensions			
Ø DR (mm):	442	442	442
Ø dM (mm):	279	279	279
L (mm):	101,5	126,5	151,5
Coil constants			
Torque constant (Nm/Arms):	44,0	65,0	90,0
Voltage constant (Vrms/1000/min)*:	2790	3990	5600
Voltage constant (Vp/[rad/s])*:	37,7	53,8	73,3
Coil resistance/100°C (Ω)*:	6,2	8,3	10,5
Coil resistance/20°C (Ω)*:	4,7	6,4	8,0
Motor inductance (mH)*:	80,0	120,0	160,0
Peak motor current (A):	40,0	40,0	40,0
Rated current (A):	10,0	10,0	10,0
Current in swivel operation (A):	15,0	15,0	15,0
Stall current (A):	10,0	10,0	10,0

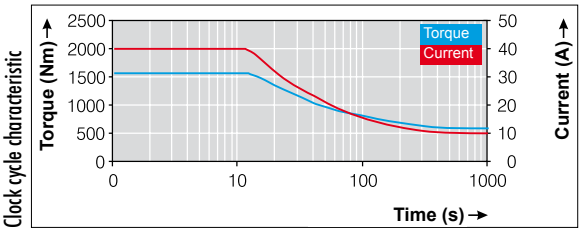
*Values measured between two connections, motor in star circuit

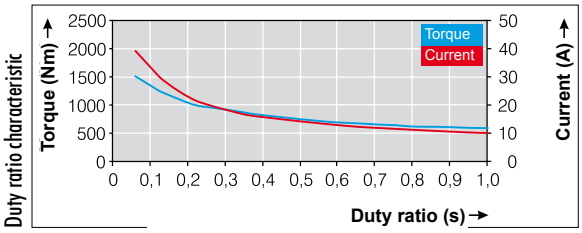
RM 410-50



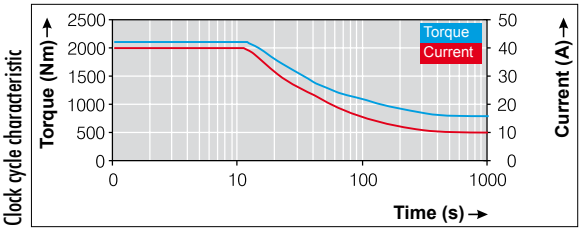


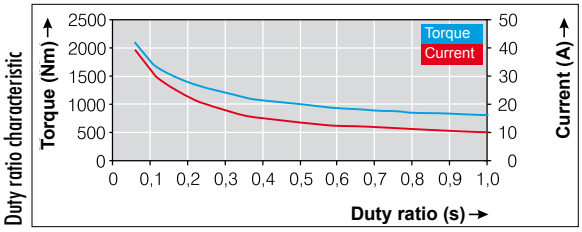
RM 410-75





RM 410-100





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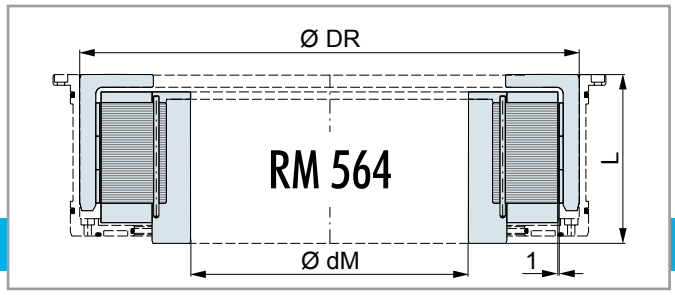


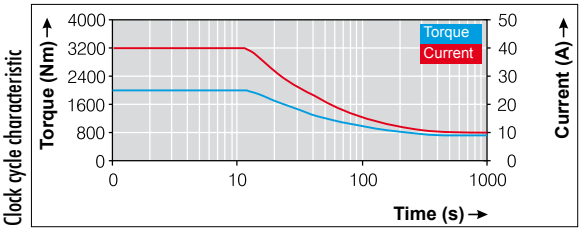
Technical data torque motor Type RM 564

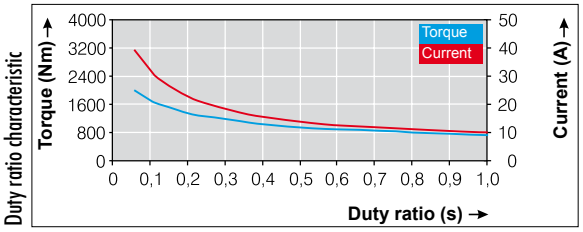
RM 564/	50	75	100
Forces and performance data			
Peak torque (Nm):	1.970	2.960	3.940
Rated torque (Nm):	740	1.105	1.470
Torque in swivel operation (Nm):	982	1.475	1.966
Stall torque (Nm):	520	780	1.040
Peak power dissipation/20°C (kW):	15,6	21,0	26,4
Rated power dissipation/100°C (kW):	1,3	1,7	2,2
Rated power (kW):	3,5	3,5	3,1
electr. time constant (ms):	16,9	18,9	20,0
thermal resistance w. water cooling (K/W):	0,06	0,05	0,04
Number of pole pairs:	55	55	55
Number of coils:	66	66	66
Speed max. mech. (r.p.m.):	80	50	40
Rated speed (r.p.m.):	45	30	20
Speed max. without field weakening (r.p.m.):	76	50	38

RM 564/	50	75	100
Dimensions			
Ø DR (mm):	596	596	596
Ø dM (mm):	430	430	430
L (mm):	111	136	161
Coil constants			
Torque constant (Nm/Arms):	87,0	130,0	174,0
Voltage constant (Vrms/1000/min)*:	5.280	7.900	10.600
Voltage constant (Vp/[rad/s])*:	71,2	106,9	142,5
Coil resistance/100°C (Ω)*:	8,5	11,5	14,4
Coil resistance/20°C (Ω)*:	6,5	8,7	11,0
Motor inductance (mH)*:	110,0	165,0	220,0
Peak motor current (A):	40,0	40,0	40,0
Rated current (A):	10,0	10,0	10,0
Current in swivel operation (A):	15,0	15,0	15,0
Stall current (A):	10,0	10,0	10,0

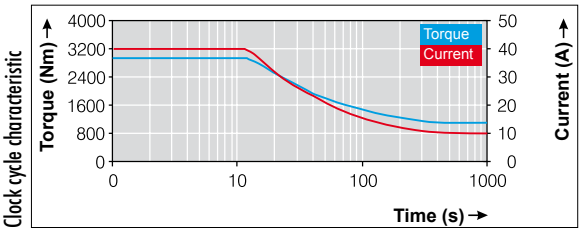
*Values measured between two connections, motor in star circuit

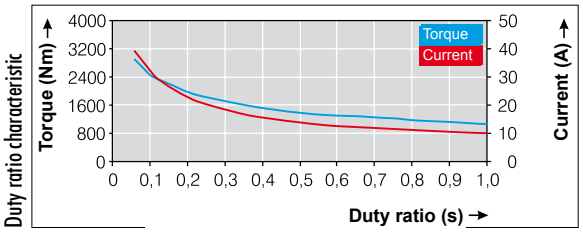
RM 564-50



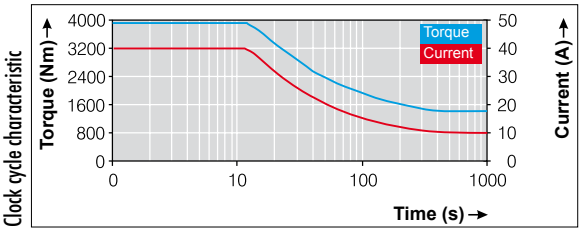


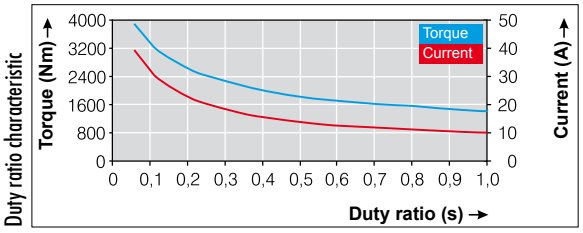
RM 564-75





RM 564-100





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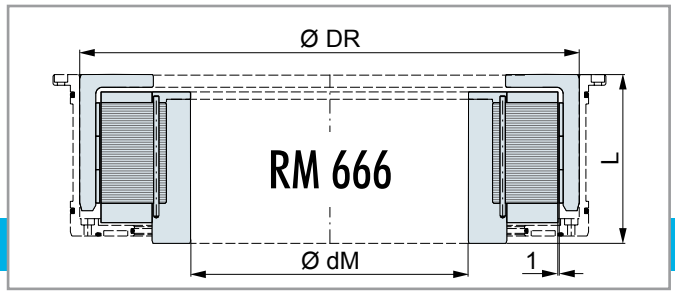


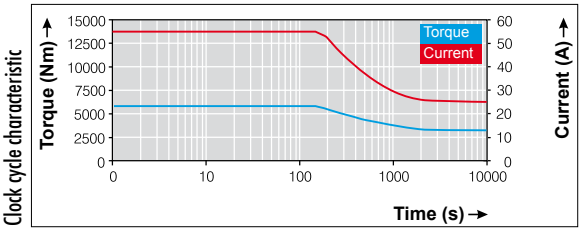
Technical data torque motor Type RM 666

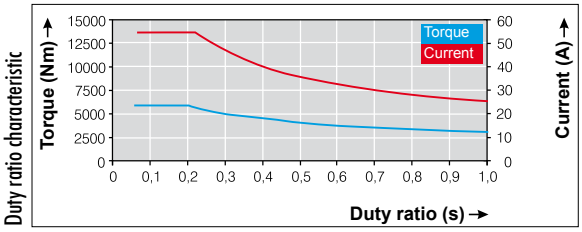
RM 666/	125	200	300
Forces and performance data			
Peak torque (Nm):	5.800	9.200	13.600
Rated torque (Nm):	3.160	5.010	7.400
Torque in swivel operation (Nm):	3.639	5.769	8.512
Stall torque (Nm):	2.240	3.550	5.230
Peak power dissipation/20°C (kW):	7,3	10,2	14,2
Rated power dissipation/100°C (kW):	2,0	2,8	3,8
Rated power (kW):	11,6	10,5	10,9
electr. time constant (ms):	67,8	77,3	83,8
thermal resistance w. water cooling (K/W):	0,04	0,03	0,02
Number of pole pairs:	25	25	25
Number of coils:	30	30	30
Speed max. mech. (r.p.m.):	45	32	22
Rated speed (r.p.m.):	35	20	14
Speed max. without field weakening (r.p.m.):	46	31	20

RM 666/	125	200	300
Dimensions			
Ø DR (mm):	715	715	715
Ø dM (mm):	456	456	456
L (mm):	225	300	400
Coil constants			
Torque constant (Nm/Arms):	135,0	210,0	320,0
Voltage constant (Vrms/1000/min)*:	8.170	13.100	19.600
Voltage constant (Vp/[rad/s])*:	110,3	176,5	264,7
Coil resistance/100°C (Ω)*:	2,1	3,0	4,1
Coil resistance/20°C (Ω)*:	1,6	2,3	3,1
Motor inductance (mH)*:	109,0	174,2	261,3
Peak motor current (A):	55,0	55,0	55,0
Rated current (A):	25,0	25,0	25,0
Current in swivel operation (A):	30,0	30,0	30,0
Stall current (A):	25,0	25,0	25,0

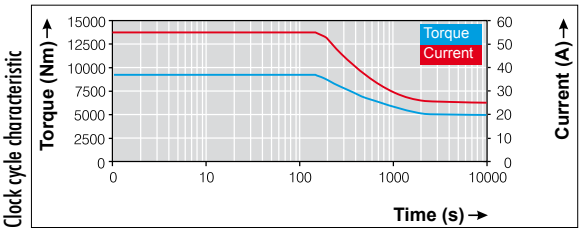
*Values measured between two connections, motor in star circuit

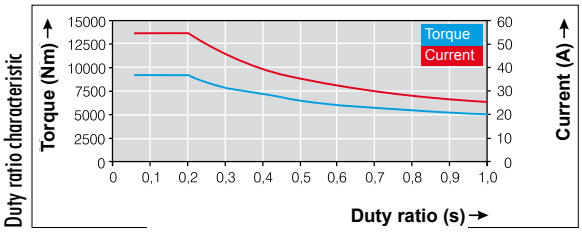
RM 666-125



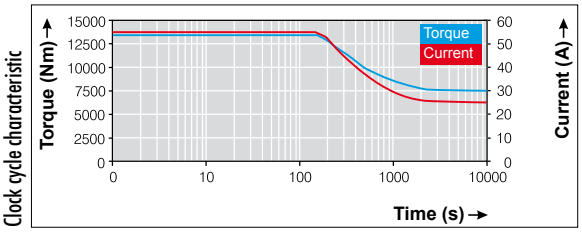


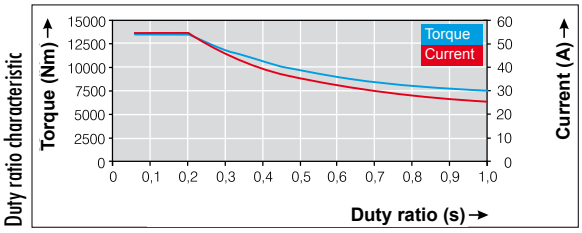
RM 666-200





RM 666-300





Glossary

Rating torque (water cooling, 100°C):
Continuously available torque with coolant temperature of 20°C and a coil temperature of 100°C. This torque is made available by the motor with a permanent strain on all three phases. This implies that the motor frequency based on a continuous revolution is at least 2 Hz. For a calculation of the speed, the motor frequency is divided by half the number of the magnetic poles.

Rated power dissipation:
Power dissipation of the motor with 100°C coil temperature and rating torque.

Motor constant:
The motor constant is represented by the relationship of continiuous torque with the square root of the power dissipation with the actual torque. This constant is related to a coil temperature of 20°C.

Thermal resistance:
The thermal resistance indicates the increase of temperature per power dissipation. The indicated value applies for a permanent strain on all phases and a coil temperature of 100°C.

Number of magnetic poles:
Number of magnetic poles of the rotor. The product of half the pole number and speed indicates the frequency of motor current.

Rated speed:
With rated speed, the induced countervoltage between two phases reaches an effective value of 400V. In doing so the motor is strained with rating torque, the rated current flows. Higher speeds are possible from a technical view, but demand higher motor voltage or a motor operation in the field weakening range. In field weakening range, the phasing is shifted related to the induced voltage so that a part of the induced voltage drops on the motor inductance. So the induced voltage can be higher than the externally supplied motor voltage. If in case of high speed the converter is switched off (e. g. in case of clearance blocking) no voltage will drop off on the motor inductance. The induced voltage is impressed on the motor terminals. If the converter doesn't have sufficient voltage stability it must be secured with an overvoltage protector.

Maximum speed:
With a motor voltage of 400 V, Maximum speed is only achievable with field weakening. The induced voltage is approx. 550 V with maximum speed. In case of maximum speed only a reduced torque is available (see characteristic curve continuous torque).

Torque constant:
The torque constant is depending on the lay out design of the magnetic system and the stator windings. As a result of saturation of the motor sheets, it is not a constant in the original meaning but decreases with increasing current. The indicated value applies for motor currents below the half of continuous current at 100°C.

Back EMF constant:
The Back EMF constant enables the calculation of the induced voltage depending on speed, indicated as effective value per 1000 r.p.m. The calculated voltage is measured between two motor terminals.

Winding resistance (20°C):
In the tables the winding resistance between two motor phases is indicated. It relates to the indicated temperature and a wiring line of 2 m length.

Motor inductance:
Inductance of stator winding, measured between two motor phases. Advice: most of the control systems need the value of the rotary field inductance which derives from the 1,5 fold value of the motor inductance.

Rated current (water cooling, 100°C):
With these currents and with water cooling at 20°C a winding temperature of 100°C is reached. Here a continuous strain of the three motor phases is assumed.

Characteristics clock cycle/duty ratio:
These curves show the maximum cycle of a torque pulse in dependance from the pulse duration. These curves only apply for the case that the motor frequency is higher than 2 Hz. Below this frequency the heating of the single motor phases is too different. You have the imminent danger of too high heating of single motor phases. When applying these curves, it must be regarded that the average rated power dissipation is not exceeded. This is ensured when the values indicated by the duty ratio characteristic are not exceeded also. The maximum torque value must not be exceeded too because otherwise a demagnetisation of the premanent magnets may occur.