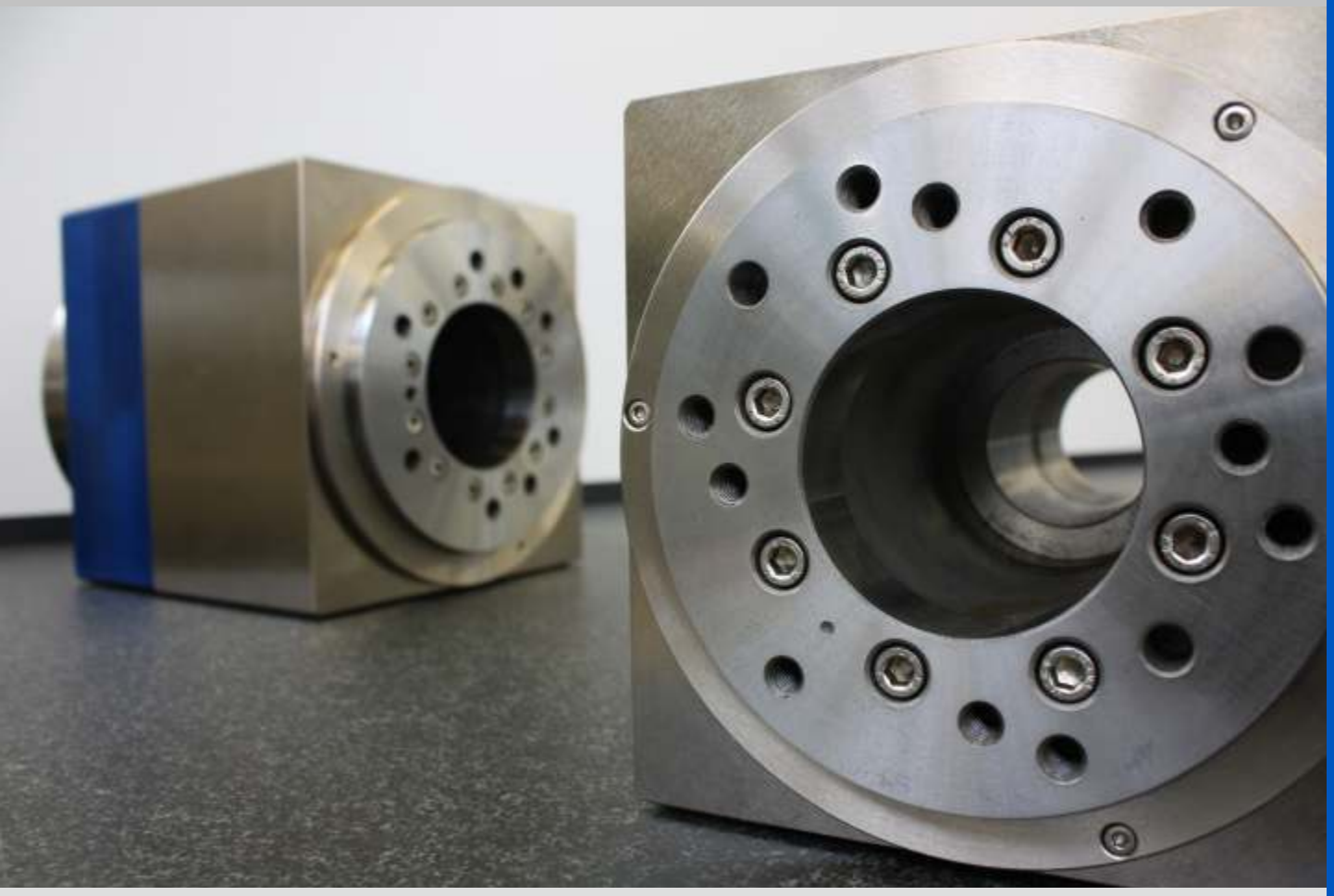
DETLEV HOFMANN GmbH
PRÄZISIONS-MASCHINENBAU

We are certified to DIN EN ISO 9001:2008

CNC Dividing Heads • CNC Rotary Axes



Detlev Hofmann GmbH

CNC Dividing Heads / CNC Rotary Axes

As a design and development supplier of CNC-dividing heads and rotary axes with more than 25 years of experience we know, that precision, flexibility and performance are the key factors to the success and progress of our customers. Whether in the subcontracting business, tool and die manufacturing, jewellery industry, aerospace industry or in medical and dental techniques, our dividing heads help you to achieve high precision and even higher productivity.

Detlef Michael Hofmann
shareholder and
Managing Director

Detlev Hofmann GmbH
Präzisions-Maschinenbau

- About us ...
- multi-face machining

HOWIMAT gear-type units
With patented recirculating ball gear system

Gear-type series

TMI Torque series (with torque motor)

- TMI built-in type
- TMI-FL built-in type flange version

TMI series

Peripheral devices / additional equipment

- fixtures
- base plates / counter bearings
- tailstocks
- electrical controls

Equipment

Applications / branches

- sample applications
- references

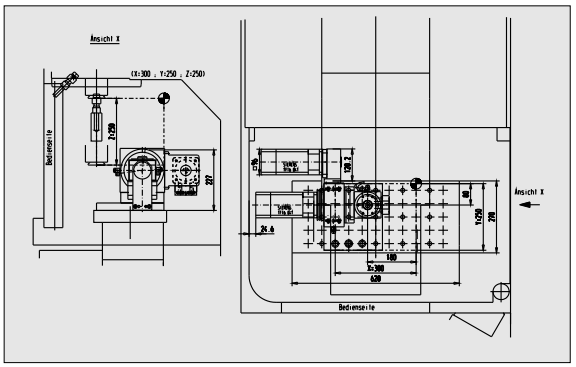
Examples

About us...

We are a successful supplier of our products for more than 50 years

Customer satisfaction is our main target

The Detlev Hofmann GmbH, with the head office in Pforzheim, is a company that specialises on the development, manufacturing and the assembly of CNC controlled dividing heads and their corresponding accessories. In existence for more than 50 years, the company has always been known as a medium-sized, flexible company with the main target of delivering sustainable and innovative products e.g. customised solutions for the machine-tool industry based around our standard units. Due to our long standing experience and the build up of know-how, which shows in our products, we are in a position to supply sophisticated and up-to-date products to our customers. Customer requirements are paramount and we make sure are established and satisfied in each step of the order process. This creates solutions that are tailored exactly to the needs of the client. We see ourselves as development suppliers with the aim of establishing a long term cooperative and trusting relationship between ourselves and our customers. This is the corporate policy and innovative energy of Detlev Hofmann GmbH. To engage in the complex requirements and find a clear, individual and precise solution that fulfils the customers exacting specifications is our aim - from development and manufacturing to service and support.



The conception of a dividing head in the working area of a machine-tool, according to our customers exacting specifications

What else sets us apart?

A flat hierarchy, quick decision making and big in-house production strength in depth gives us the big advantage of being able to react quickly and flexibly to customer demands. Specialised and well trained employees develop, produce and assemble premium dividing heads and the appropriate peripheral devices. With the required skill and feeling each of our employees engages in his duties, providing dependable quality. We set a high value in the active co-operation of all our employees and also in a faithful and fair working atmosphere.

Due to the highly skilled workforce and their pool of experience and knowledge and the use of the most modern CNC machine-tools in our production, we have the ability to manufacture all of the required components in our own workshop. With constant quality and dimensional tests on modern measuring machines throughout the production and assembly process, we can guarantee the constant quality level of our products

You can also benefit from the knowledge and skill of our technical team and the structured head office and realise, that with the Detlev Hofmann GmbH you have the right partner in every case.

Insights









Multi-face machining

Your advantages - overview

Using CNC dividing heads and rotary axes on required applications will put you in a position to increase your machining capabilities with an additional 4th or 4th/5th axis. We offer you the possibility to achieve your specific machining task in an efficient, productive and cost-effective way, by using our up-to date range of equipment.

Advantages of multi-face machining

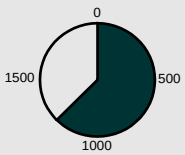
- reduced number of settings guarantees reliable geometrical accuracies between each machining step
- positioning inaccuracies due to multi setting are not applicable
- better progressing sequences e.g. with cross over (e.g. cross holes ...)
- increased productivity due to shorter cycle times, setting times and work-piece handling
- increased efficiency and reliability because of a lack of uncontrolled handling-time
- less clamping positions reduces the cost of the required fixtures

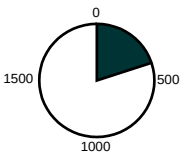
Advantages of our dividing heads and rotary axes

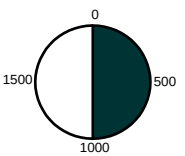
- significant reduction of non-production time
- high cutting efficiency due to rigid and at the same time compact design
- no hydraulic components and service requirements (gear driven units only)
- no additional clamping system required (gear driven units only)
- our CNC dividing heads and rotary axes are easy to interface mechanically and electronically in existing systems

Comparison of non-productive times for positioning cycle of 90°

	Conventional screw drive	Hofmann-Gear-type unit	Hofmann-Torque series
1) clamping OPEN *	400 ms	0 ms	400 ms
2) acceleration	150 ms	100 ms	100 ms
3) linear speed	150 ms	200 ms	0 ms
4) deceleration	150 ms	100 ms	100 ms
5) clamping CLOSE *	400 ms	0 ms	400 ms
TOTAL	**1250 ms**	**400 ms**	**1000 ms**
	process time **450** ms	process time **400** ms	process time **200** ms







Times shown are approximate

* times for clamping system “open” and “close” result in the sum of enabling time set in the control system, times for the switching of the valves and time consumption until the required hydraulic pressure is achieved, etc.

Approximate 90% of all HOWIMAT CNC dividing heads are manufactured and delivered without an additional clamping system, because the patented recirculating ball gear offer exceptionally high torsion stiffness.

Only approxinately 10% of all HOWIMAT CNC dividing heads require an additional hydraulic clamping system, normally only for the following applications:
- clamping of the counter bearing on tilting axis (depending an the application, rotary axis requires no additional clamping)
- clamping of the counter bearing when using swivelling ridges or applying extreme tangential forces during machining

HOWIMAT gear-type units

... with patented recirculating ball system

Technical features:

- highest precision due to patented recirculating ball gear system
- no additional clamping of the dividing head spindle required
- high positioning speed
- optimal torsion stiffness
- very compact design
- 5 sizes available
- big spindle bore
- wide range of additional equipment available
- suitable for diversified applications

Our axes consist of:

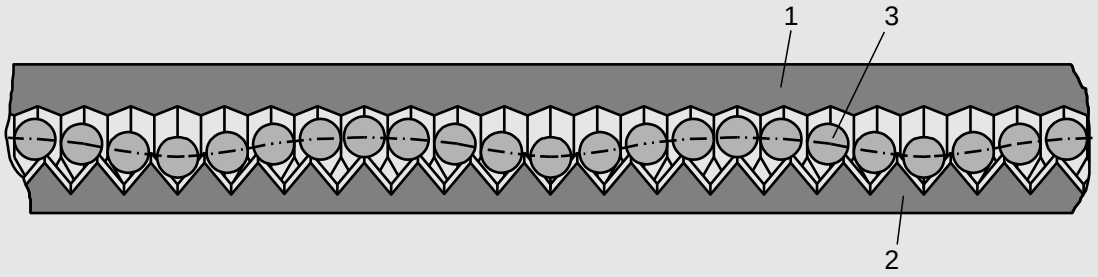
- heavy duty, high precision axial-radial roller bearings
- patented recirculating ball gear system
- auxiliary transmission (bevel gear drive or belt-drive system)
- completely sealed and precision-ground housing

The patented recirculating ball gear system is the heart of the rotary table and is implemented in each CNC dividing head of our gear drive series.

The gear drive:

- enables precise positioning of the spindle
- can accept high torque forces
- has easy backlash adjustment

Functional description of the recirculating ball gear drive system



How it works?

The balls (5) are actuated by a circular cam to lift them up and back down into a fixed tooth disc (4). The second tooth disc (3) accepts the balls, but has a different number of teeth.

In contrast to contemporary gear drives, torque and overload are generally transmitted by two gear teeth, the HOWIMAT precision recirculating ball drive system has a large number of balls engaged in the transmission.

Nearly 40% of the balls on the gear circumference are supporting the transmission. This generates a very high stiffness in torsion of the gear, which is irreversible. Therefore most applications don't require any additional clamping system, assuming the proper sized unit is selected.

The entire gearing area is used for transmission even for small angular pitches and therefore the precision of the recirculating ball gear is ensured for an extended period of time, even if a load is concentrated in the same point for an extended period of time.

Our system provides a major benefit over conventional gear systems in production environments, as conventional systems will wear locally on certain position areas of the gear, something which is unavoidable.

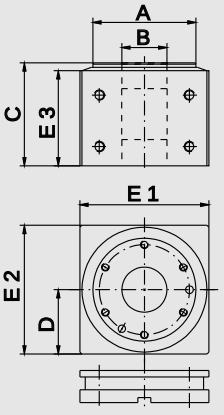
Using our system we completely remove this problem which has been the major flaw of existing systems since their inception.

HOWIMAT gear-type units

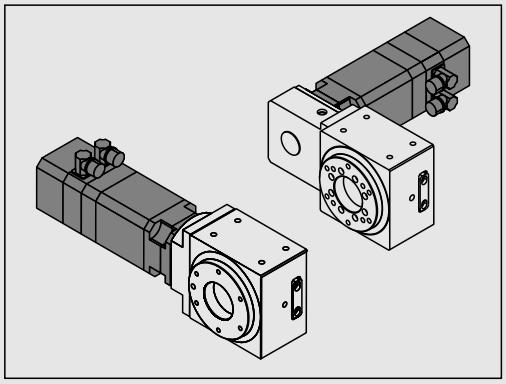
Main dimensions

size	A spindle-ø	B spindle bore	C length of spindle	D centre height (mm)	E1 x E2 x E3 housing outside dimensions
80.2	80	35 H6	80	from 50	100x 100x 74
125.2	125	60 H6	110	from 75	150x 150x 95
160.2	160	80 H6	135	from 95	190x 190x 120
220.2	220	120 H6	155	from 125	250x 250x 140
320.2	320	200 H6	160	from 182,5	365x 365x 145

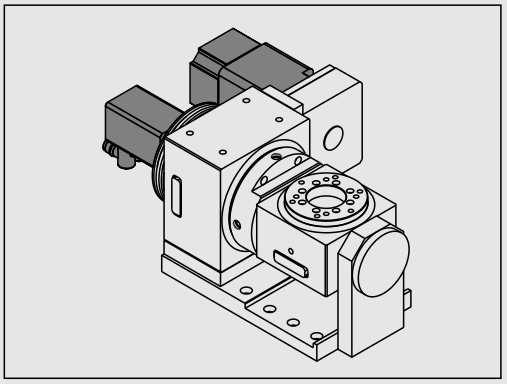
Subject to change without prior notice!



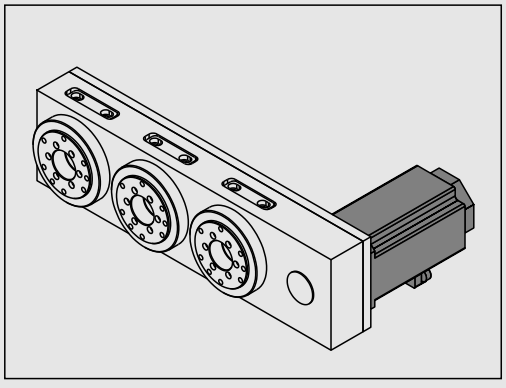
Design variations



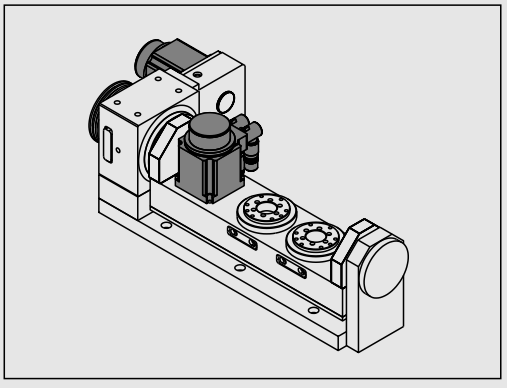
CNC .../K (motor cross - left or right side)
CNC .../Z (motor axially parallel - left or right side)
1-axis version



CNC .../A2
2-axis version



CNC .../Z... (2 to 5 spindles)
multi-spindle 1-axis version



CNC .../Z... (2 to 5 spindles)
multi-spindle 2-axis version

HOWIMAT gear-type units

weight, speed .....

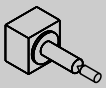
size		weight in kg (approx, w/o motor)	pitch circle of gearing in mm	required motor torque in Nm in Nm	cycle time * 90° (approx.) in sec.	reduction ratio ** (Version K)	speed *** (version K) in rpm
80.2	Standard Option	5 kg	74 mm	1,0 - 2,0 Nm	0,35 s -	60 : 1 higher rpm´s upon request !!	50 min-1
125.2	Standard Option	15 kg	117 mm	2,0 - 3,0 Nm	0,55 s 0,45 s	120 : 1 60 : 1	25 min-1 50 min-1
160.2	Standard Option	25 kg	152 mm	3,5 - 6,0 Nm	0,55 s 0,45 s	120 : 1 60 : 1	25 min-1 50 min-1
220.2	Standard Option	44 kg	210 mm	6,0 - 10,0 Nm	0,80 s 0,65 s	120 : 1 60 : 1	25 min-1 40 min-1
320.2	Standard Option	90 kg	310 mm	12,0 - 20,0 Nm	1,00 s -	180 : 1 -	16,6 min-1 -

* With HOWIMAT CNC-dividing heads no additional clamping is required.
If an increased mass moment of inertia could be created, due to fixture or work-piece design, please contact us.

** reduction ratio may vary for Z-version (additional tooth-belt drive)

*** higher rpm in Z-version

Subject to change without prior notice!

Size	maximum load * vertical	horizontal	with tailstock	maximum forces vertical	horizontal (tilting moment)	rated torque dynamic **	max. tangential moment static *** (unclamped)
							
80.2	30 kg	15 kg	30 kg	1800 N	60 Nm	max. 30 Nm	max. 60 Nm
125.2	125 kg	70 kg	150 kg	24000 N	300 Nm	max. 160 Nm	max. 280 Nm
160.2	350 kg	160 kg	350 kg	35000 N	600 Nm	max. 250 Nm	max. 500 Nm
220.2	1000 kg	400 kg	1000 kg	50000 N	2000 Nm	max. 600 Nm	max. 1200 Nm
320.2	1800 kg	800 kg	1800 kg	80000 N	3500 Nm	max. 1400 Nm	max. 2500 Nm

* during simultaneous machining, the load should not be bigger than 50% of the maximum, due to the regulating performance of the motor.

** the shown driving torque is the maximum load. The possible driving torque depends on the chosen motor (if motor type is known, figures can be given upon request)

*** the shown tangential moment is the maximum permissible load with the corresponding elastic deformation (when machining at the load limits, please contact us. Additional clamping systems upon request)

Load details and accuracies

size		radial and axial run out	indirect measuring system indexing accuracy *	repeatability *	direct measuring system in arc sec. **
80.2	Standard	+/- 0,0030 mm	+/- 0,006 degr.	+/- 0,002 degr.	+/- 10,0”
	Option	+/- 0,0015 mm			+/- 5,0”
125.2	Standard	+/- 0,0030 mm	+/- 0,004 degr.	+/- 0,002 degr.	+/- 2,5”
	Option	+/- 0,0015 mm			
160.2	Standard	+/- 0,0030 mm	+/- 0,004 degr.	+/- 0,002 degr.	+/- 10,0”
	Option	+/- 0,0015 mm			+/- 5,0”
220.2	Standard	+/- 0,0030 mm	+/- 0,004 degr.	+/- 0,002 degr.	+/- 2,5”
	Option	+/- 0,0015 mm			+/- 2,0”
320.2	Standard	+/- 0,0050 mm	+/- 0,003 degr.	+/- 0,0015 degr.	+/- 1,0”
	Option	+/- 0,0020 mm			

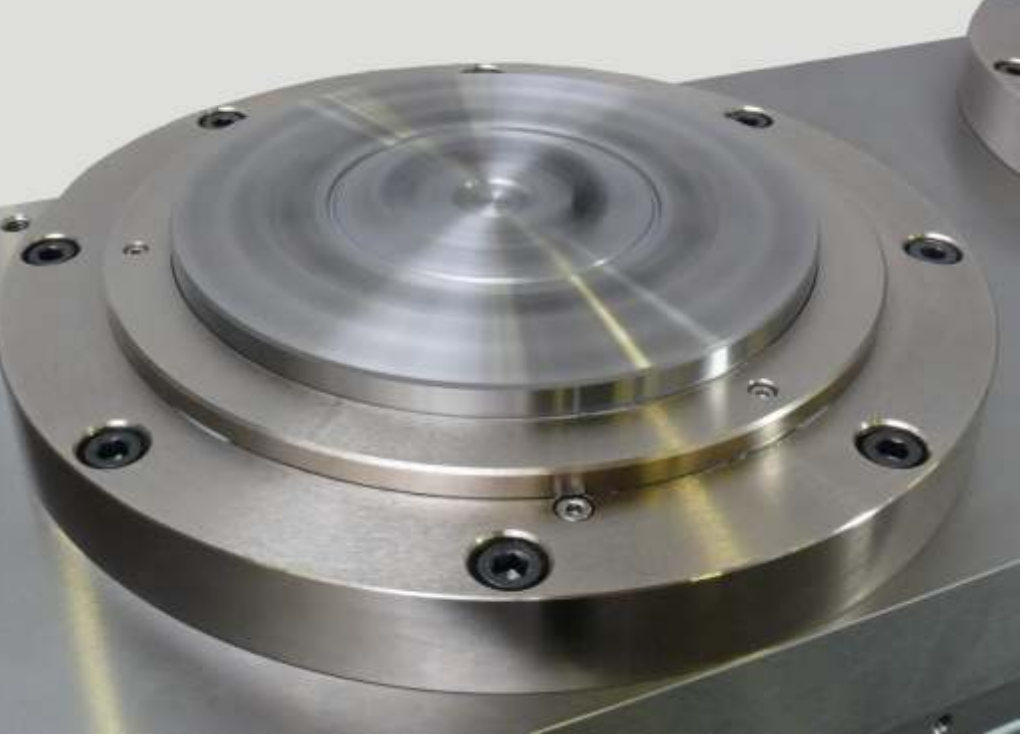
* when positioned from one side 0,001 degr. = 3,6”

** for higher accuracies direct measuring systems are available:
e.g. Heidenhain ECN 225 (+/- 10”); RCN 226 (+/- 5”); RON 285 (+/- 5”); RCN 729 (+/- 2”) etc.

- other built-in measuring systems upon request

- increased bearing accuracy available as an option!

Subject to change without prior notice!



TMI Torque series

... with torque-motor (sleeve-shaft motor)

Technical characteristics:

- direct-drive technology with high dynamic torque-motors
- highest dynamic (up to 0,1 sec. for 90°)
- very high speeds and therefore new manufacturing possibilities
- high precision due to direct measuring systems
- backlash free
- extremely compact dimensions
- 6 sizes available
- big centre bore
- extensive range of accessories available
- suitable for a great variety of applications

Our axes consist of:

- heavy-duty / high-precision axial-radial bearings
- integrated spindle-brake (emergency stop option available)
- high dynamic and wear-free torque-motor
- direct measuring system
- completely sealed and precision-ground housing (square housing only) or flange type housing

Employing our TMI series rotary axes with torque-motor offers you new manufacturing possibilities, due to the high speed and dynamic movement. The power transmission with this technology is free of wear and gives you constant quality of your produced parts for several years.

Functional description of a torque-motor

Arranged around the spindle, the torque-motor (sleeve-shaft motor) is designed for the highest possible torque. Optionally these motors can be water-cooled for maximum performance.
.
As this system works without any gear drive, expensive transmission repairs after a collision are now a thing of the past

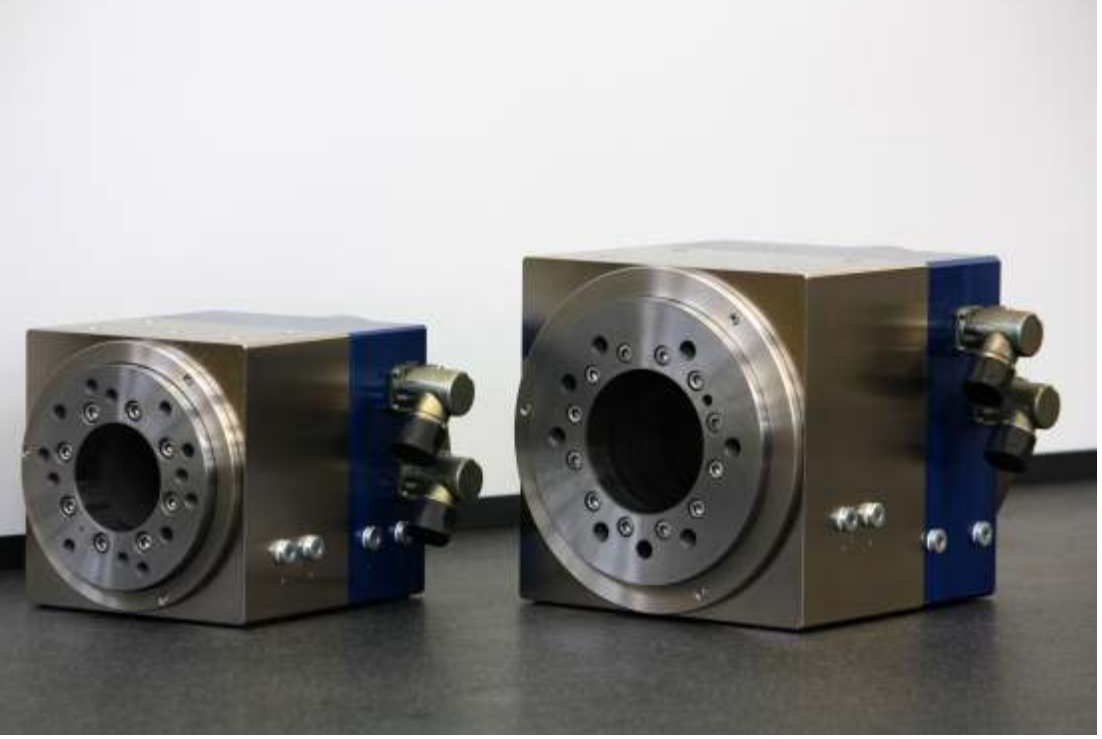
A superior performance in rotation speed and dynamics, compared to the gear-driven dividing heads, offers a much bigger scale of manufacturing possibilities e.g. turning processes or circular grinding.

The measuring system is linked directly with the spindle of the rotary axis and gives the highest positioning accuracy. Furthermore, there is now NO backlash!

The main bearing is a very rigid, compact and high-precision design. All units have an integrated spindle clamping system, which enables the unit to take very high manufacturing forces.

The sophisticated overall design gives the units a very compact dimension. A wide range of additional equipment offers you a modern and integrated concept. Individual solutions for specific requirements are always possible and realisable.

The rotary axes of the TMI series can be used with almost all modern CNC controls.



TMI torque series / built-in type

Main dimensions

TMI series with torque-motor and square housing

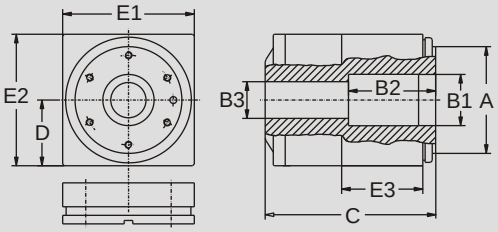
size		A spindle-ø	B1 spindle bore	B2 depth of bore	B3 through bore	C length of spindle	D centre high (min.)	E1 x E2 x E3 housing outside dimensions
CNC 080.2	*TMI 28*	80 h6	35 H6	through bore	35 mm	126 mm	from 50 mm	150 x128 x 100
	TMI 55	80 h6	35 H6	72 mm	28 mm	153 mm	from 50 mm	100 x100 x 74
CNC 100.2	*TMI 28*	100 h6	50 H6	108 mm	30 mm	145 mm	from 65 mm	130 x 130 x 95
	TMI 55	100 h6	50 H6	143 mm	40 mm *	230 mm	from 65 mm	130 x 130 x 95
CNC 125.2	*TMI 25*	125 h6	60 H6	90 mm	40 mm *	149 mm	from 77 mm	154x 154 x 95
	TMI 55	125 h6	60 H6	105 mm	40 mm *	215 mm	from 77 mm	154 x 154 x 95
	TMI 110	125 h6	60 H6	160 mm	40 mm *	270 mm	from 77 mm	154 x 154 x 95
CNC 160.2	*TMI 55*	160 h6	80 H6	125 mm	40 mm *	235 mm	from 97,5 mm	195 x 195 x 120
	TMI 110	160 h6	80 H6	180 mm	40 mm *	290 mm	from 97,5 mm	195 x 195 x 120
CNC 220.2	*TMI 50*	220 h6	120 H6	105 mm	40 mm *	215 mm	from 125 mm	250 x 250 x 140
	TMI 70	220 h6	120 H6	125 mm	40 mm *	235 mm	from 125 mm	250 x 250 x 140
	TMI 100	220 h6	120 H6	155 mm	40 mm *	265 mm	from 125 mm	250 x 250 x 140
	TMI 150	220 h6	120 H6	155 mm	40 mm *	315 mm	from 125 mm	250 x 250 x 140
CNC 320.2	*TMI 50*	320 h6	200 H6	127 mm	40 mm *	225 mm	from 182,5 mm	365 x 365 x 145
	TMI 70	320 h6	200 H6	147 mm	40 mm *	245 mm	from 182,5 mm	365 x 365 x 145
	TMI 100	320 h6	200 H6	177 mm	40 mm *	275 mm	from 182,5 mm	365 x 365 x 145
	TMI 150	320 h6	200 H6	227 mm	40 mm *	325 mm	from 182,5 mm	365 x 365 x 145

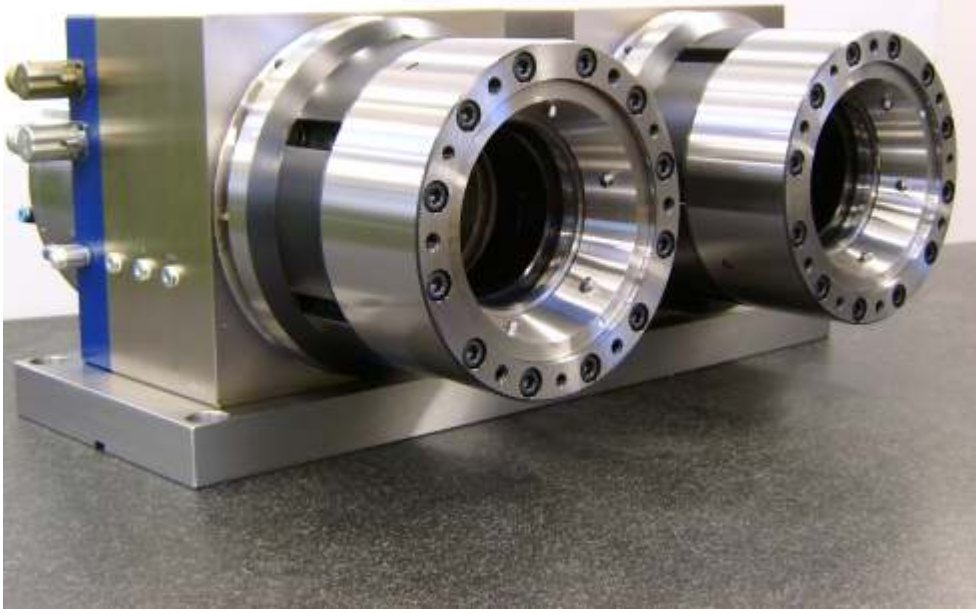
* dimension B3 only valid with standard measuring system Heidenhain (Absolute encoder, accuracy +/- 10")

dimension B3 alternatively 16mm
(with option "increased accuracy" e.g. +/- 5" or +/- 2,5")

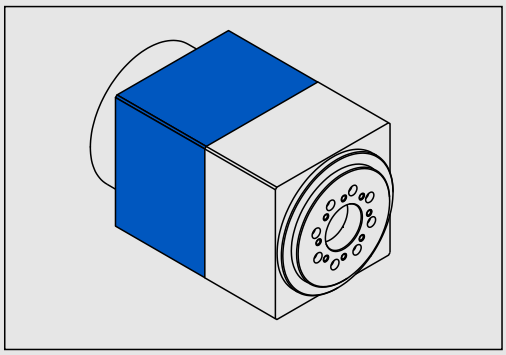
dimension B3 alternatively complete through bore, equivalent to B1
(Only with option "built-in measuring device", upon request only, dimension C may vary)

Subject to change without prior notice!

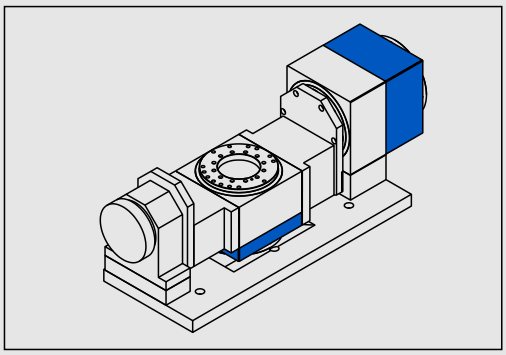




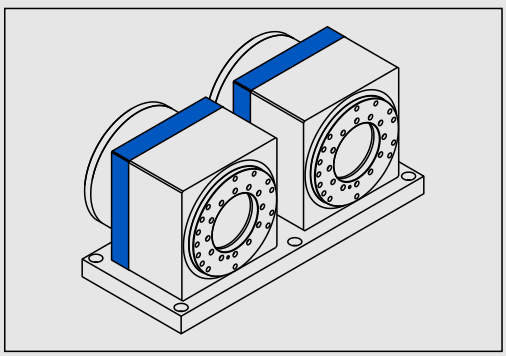
Design variations



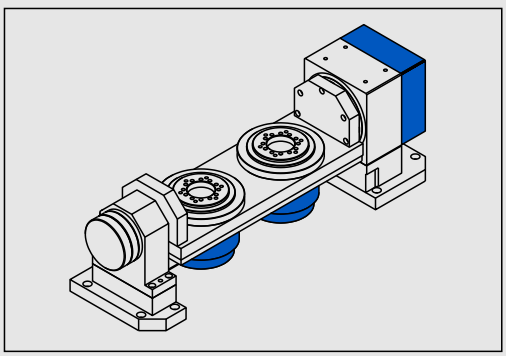
CNC ... / TMI
1-axis version



CNC ... / TMI / A2
2-axis version



CNC ... / TMI / 2 to 4 spindles
multi-spindle 1-axis version



CNC ... / TMI / 2 to 4 spindles / A2
multi-spindle 2-axis version

TMI-FL torque series - flange type

... built-in axes with torque-motor (sleeve-shaft motor)

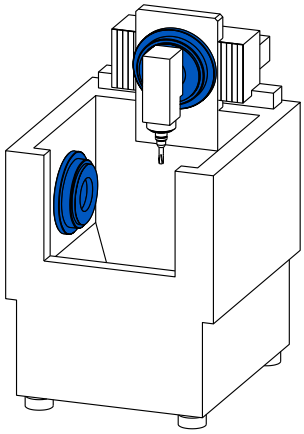
Description

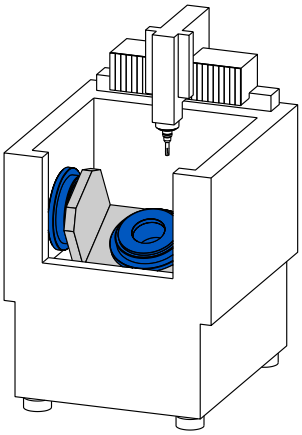
The rotary axis-flange-integral modules type TMI-FL have been designed to easily fit a dividing head into a machine system. Compared to the standard TMI axes, the only difference is the flange-type, round housing. All internal parts and therefore also all technical details are completely identical with the standard TMI series.

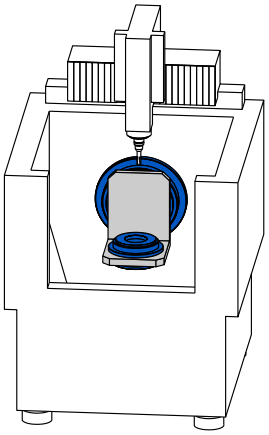
The housings of the units are made of high grade case-hardened steel or high-tensile aluminium and offer maximum stability with a very compact design. The housing is precision ground and completely sealed against coolant and chips. Due to a centring ring and counter bores attached to the housing, the unit can easily be integrated and mounted into a machine system. The cable outlets and various other connections for example, the coolant supply are arranged in a way that there will be no interference to the circumference of the unit. This gives you the possibility to mount the units vertically or axially into the machine system. Multiple units can also be placed next to each other for multi-spindle machining.

The universal use together with the compact design, the defined interface for the connections in the machine as well as the exchangeability of the units for service or repair, guarantees the maximum production benefits from these axes.

Mounting examples for rotary tables: TMI-FL torque series - flange type / built-in axes







Main dimensions

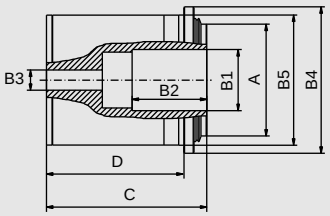
TMI-FL Torque series with torque-motor / flange type / built-in axes

size		A spindle-ø	B1 spindle-bore	B2 depth of bore	B3* through bore	C length of spindle	D length of housing	B4 housing outside ø	B5 ø of centring device
CNC 125.2	*TMI 55-FL*	125 h6	60 H6	105 mm	40 mm *	215 mm	185 mm	ø 196 mm	ø 165 g6
	TMI 110-FL	125 h6	60 H6	160 mm	40 mm *	270 mm	240 mm	ø 196 mm	ø 165 g6
CNC 160.2	*TMI 55-FL*	160 h6	80 H6	125 mm	40 mm *	235 mm	180 mm	ø 248 mm	ø 217 g6
	TMI 110-FL	160 h6	80 H6	180 mm	40 mm *	290 mm	235 mm	ø 248 mm	ø 217 g6
CNC 220.2	*TMI 50-FL*	220 h6	120 H6	105 mm	40 mm *	215 mm	170 mm	ø 288 mm	ø 256 g6
	TMI 70-FL	220 h6	120 H6	125 mm	40 mm *	235 mm	190 mm	ø 288 mm	ø 256 g6
	TMI 100-FL	220 h6	120 H6	155 mm	40 mm *	265 mm	220 mm	ø 288 mm	ø 256 g6
	TMI 150-FL	220 h6	120 H6	155 mm	40 mm *	315 mm	270 mm	ø 288 mm	ø 256 g6
CNC 320.2	*TMI 50-FL*	320 h6	200 H6	127 mm	40 mm *	225 mm	148 mm	ø 410 mm	ø 365 g6
	TMI 70-FL	320 h6	200 H6	147 mm	40 mm *	245 mm	168 mm	ø 410 mm	ø 365 g6
	TMI 100-FL	320 h6	200 H6	177 mm	40 mm *	275 mm	198 mm	ø 410 mm	ø 365 g6
	TMI 150-FL	320 h6	200 H6	227 mm	40 mm *	325 mm	248 mm	ø 410 mm	ø 365 g6

* dimension B3 only valid with standard measuring system Heidenhain
(Absolute encoder, accuracy +/- 10")

dimension B3 alternatively 16mm
(with option "increased accuracy" ; e.g. +/- 5" or +/- 2,5")

dimension B3 alternatively complete through bore, equivalent to B1
(only with option "built-in measuring device", upon request only, dimension C may vary)



Subject to change without prior notice!

TMI torque series

Speed, clamping force .....

Technical details are valid for TMI built-up and built-in versions (flange version) !

size		nominal torque (if InK is cooled)	peak torque (saturation region)	nominal / peak current (Aeff)	max. rpm *	clamping force ** (clamping system)	tilting moment (main bearing)
CNC 080.2	*TMI 28*	4 Nm	12 Nm	1,3 / 4,8 Aeff	1200 min-1 *	ca. 30 Nm	60 Nm
	TMI 55	8 Nm	24 Nm	2,6 / 8,1 Aeff	1200 min-1 *	ca. 30 Nm	60 Nm
CNC 100.2	*TMI 28*	8 Nm	16 Nm	2,1 / 4,5 Aeff	1200 min-1 *	ca. 150 Nm	140 Nm
	TMI 28-HS	8 Nm	24 Nm	6,5 / 24 Aeff	2000...4000 min-1 *	ca. 150 Nm	140 Nm
	TMI 55	16 Nm	37 Nm	4,3 / 11 Aeff	1200 min-1 *	ca. 150 Nm	140 Nm
	TMI 55-HS	16 Nm	37 Nm	15 / 37 Aeff	2000...4000 min-1 *	ca. 150 Nm	140 Nm
CNC 125.2	*TMI 55*	24 Nm	43 Nm	11 / 17 Aeff	800 min-1 *	ca. 250 Nm	400 Nm
	TMI 110	50 Nm	86 Nm	11 / 17 Aeff	800 min-1 *	ca. 250 Nm	400 Nm
CNC 160.2	*TMI 55*	48 Nm	74 Nm	9 / 15 Aeff	600 min-1 *	ca. 500 Nm	800 Nm
	TMI 110	103 Nm	148 Nm	9 / 12 Aeff	430 min-1 *	ca. 500 Nm	800 Nm
CNC 220.2	*TMI 50*	113 Nm	179 Nm	5,6 / 9,5 Aeff	140 min-1 *	ca. 1200 Nm	2000 Nm
	TMI 70	142 Nm	251 Nm	13 / 26 Aeff	430 min-1 *	ca. 1200 Nm	2000 Nm
	TMI 100	231 Nm	358 Nm	8 / 13 Aeff	82 min-1 *	ca. 1200 Nm	2000 Nm
	TMI 150	338 Nm	537 Nm	15 / 26 Aeff	150 min-1 *	ca. 1200 Nm	2000 Nm
CNC 320.2	*TMI 50*	241 Nm	439 Nm	9 / 18 Aeff	130 min-1 *	ca. 3500 Nm	3500 Nm
	TMI 70	344 Nm	614 Nm	10 / 20 Aeff	96 min-1 *	ca. 3500 Nm	3500 Nm
	TMI 100	484 Nm	878 Nm	16 / 32 Aeff	120 min-1 *	ca. 3500 Nm	3500 Nm
	TMI 150	744 Nm	1320 Nm	18 / 36 Aeff	78 min-1 *	ca. 3500 Nm	3500 Nm

* higher rpm upon request

** pneumatic emergency stop clamping system upon request

Subject to change without prior notice!

Accuracies

Technical details are valid for TMI built-up and built-in versions (flange version)!

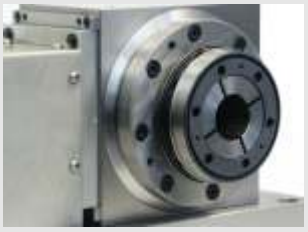
size		radial run out	axial run out	indexing accuracy * in arc sec.
CNC 080.2	Standard	+/- 0,0030 mm	+/- 0,0030 mm	upon request
	Option 1	+/- 0,0015 mm	+/- 0,0015 mm	
	Option 2	+/- 0,0010 mm	+/- 0,0010 mm	
CNC 100.2	Standard	+/- 0,0030 mm	+/- 0,0030 mm	+/- 10,0”
	Option 1	+/- 0,0015 mm	+/- 0,0015 mm	+/- 5,0”
	Option 2	+/- 0,0010 mm	+/- 0,0010 mm	
CNC 125.2	Standard	+/- 0,0030 mm	+/- 0,0030 mm	+/- 2,5”
	Option 1	+/- 0,0015 mm	+/- 0,0015 mm	
	Option 2	+/- 0,0010 mm	+/- 0,0010 mm	
CNC 160.2	Standard	+/- 0,0030 mm	+/- 0,0030 mm	upon request
	Option 1	+/- 0,0015 mm	+/- 0,0015 mm	
	Option 2	+/- 0,0010 mm	+/- 0,0010 mm	
CNC 220.2	Standard	+/- 0,0030 mm	+/- 0,0030 mm	+/- 10,0”
	Option 1	+/- 0,0015 mm	+/- 0,0015 mm	+/- 5,0”
	Option 2	+/- 0,0010 mm	+/- 0,0010 mm	+/- 2,5”
CNC 320.2	Standard	+/- 0,0030 mm	+/- 0,0030 mm	+/- 2,0”
	Option 1	+/- 0,0015 mm	+/- 0,0015 mm	+/- 1,0”
	Option 2	+/- 0,0010 mm	+/- 0,0010 mm	

* the given accuracies are only valid with the respective measuring device (encoder) !

Subject to change without prior notice!

Peripheral devices / additional equipment

work-holding devices and systems - overview



Collets (manual or automatic):

collet types:	EX 16, EX 32, EX 40 ER 16, ER 32, ER 40
deadlength collets:	F30, 162 E, 173 E, 185 E, 386 E
draw-back collets:	W20, W25, B32, Hainbuch Spanntop etc.

Jaw-chucks (manual or automatic):

Röhm
Schunk
Forkardt
Schrenk
SoMatec

SK-taper (manual or automatic):

SK 30, SK 40 (also with KK5 centring), SK 50 (also with KK6 centring)
=> according to DIN 2080 or DIN 69871

MK-taper (manual or automatic):

MK 1 ... MK 6

Pallet clamping-systems (manual or automatic):
EROWA
System 3R
MECATOOL
Hirschmann etc.

HSK (manual or automatic):
HSK 32
HSK 50
HSK 63
HSK 100
=> according to DIN 69893

Zero-point work-holding systems (manual or automatic):
Schunk NSE
Lang Quick-Point
Vischer & Bolli

Faceplates with T-slots (according to customer´s requirements):
with 4, 6 or 8 slots are available
from min. ø100mm to max. ø630mm are available

Hydraulic expansion chucks (manual):
ø 35 H6
ø 60 H6
with radial application of force
true-runout better than 0,003 mm at the inner ø of the chuck

Direct measuring systems

Type Heidenhain
RON 2xx, RON 7xx, RON 8xx
RCN 2xx, RCN5xx, RCN7xx, RCN 8xx
ERN 1xx, ECN 1xx
ERA 4xx etc.

Rotary feed-through

- for hydraulic or pneumatic connections
- for dividing head or counter bearing
- for 2 to 9 leads

Peripheral devices / additional equipment

... around the dividing head

Base-plates

- also in connection with intermediate plates / blocks for the required centre height
- for horizontal and vertical use
- centre height and design according to customers requirements
  (also adapted for special machines)

Counter bearings

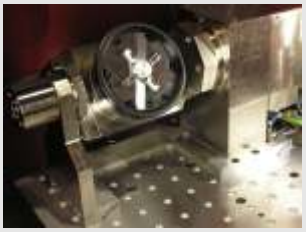
- with or without hydraulic clamping device
- also available in connection with multi-lead rotary feed-through for various medias
- centre height according to customers requirements

Tailstocks

- manual, hydraulic or pneumatic operated
- with centres MT 2 or MT 3
- travel 25, 40 or 60mm
- centre height according to customers requirements

Specials

for special requirements



Corrosion protected dividing heads and rotary axes (chemical nickel plated)

- all outside parts are corrosion protected by a 5 micron thick nickel coating

Non-corroding dividing heads and rotary axes (INOX)

- all outside parts are made from stainless steel
- primary seals are made from hard-wearing VITON material

Completely sealed dividing heads and rotary axes (IP 68)

- all outside parts are made from stainless steel
- primary seals are made from hard-wearing VITON material
- for use on EDM machines etc.

... much more on request - according to customers requirement!

Control systems and electrics

operation with a separate dividing head control system and M-function

Our control system type HOWIPOS 1/AC is a modern Microprocessor CNC-positioning control. Positioning controller, control system and operating panel are all mounted in a compact console. The control is easy and comfortable to use with and easy, menu-guided programming system. The illuminated LCD-display shows all input data and indicators in clear text. A special program has been developed for the use of the HOWIPOS control with rotary-tables and dividing heads. The control system is mounted in a table-top housing and connected with the dividing head - ready to use. The activation of the control system, by means of an M-signal from the machine is already prepared.

Technical details

HOWIPOS	1-axis controller	2-axes controller
type	CPS 20	CPS 300
display	2-lines	4-lines
keyboard	plastic-foil keyboard	plastic-foil keyboard
number of programs to be stored	90	90
number of inputs	8	16
number of outputs	6	16
Input resolution	0,001 °	0,001 °
number of amplifiers	1	2
number of motors	1	2
cable length (standard)	5 m	5 m

Control by means of the machine tool controller e.g. 4th or 4th / 5th axis of a machine tool control system

Servomotor according to customer requirements, to suit customers own control system

(Not valid for TMI type units!)

The motor of all popular motor-manufacturers are suitable to be built on to our units e.g.

- Siemens FT and FK series
- Fanuc alpha and beta series
- Heidenhain QSY series
- Infranor BLS and HDD series
- Bosch MAC, MDD, MKD, MSK, SE, SF and SG series
- Yaskawa SGM series etc.

and others (please specify)

Appropriate drive packages to suit machine control system

- required servo motor
  (as shown above - not for TMI series)

- plug-in cable-set up to the defined interface
  (Cable length approx. 5 m including protective tube, PG 29)

- mating connector (alternatively flying leads)

- including motor cover (stainless steel)

Sample applications

HOWIMAT gear type series

machine type: CHIRON FZ 15 high-speed
(vertical machining centre with separate loading and machining area)

process: 5-face machining of various components

dividing head: CNC 160/160.2/A2 (4th and 5th axis)
- including Vischer & Bolli Dock Lock system 3to for different fixtures
- including rotary-distributor with 2 outlets for rotary axis
- including clamping system for the counter bearing (750 Nm)

machine type: DECKEL-MAHO DMP 60V
(vertical machining centre with separate loading and machining area)

process: 5-face machining of various components
(serial parts, 2 pieces in one setting)

dividing head: CNC 160/160.2/A2 (4th and 5th axis)
- including rotary-distributor with 2 outlets for rotary and tilting axis
- including clamping system for the counter bearing (750 Nm)

machine type: HELLER MC 25
(horizontal machining centre with X = 800mm)

process: drilling and milling application on cylinder heads

dividing head: CNC 220.2/K (4th axis)
- centre height 250mm, with base plate 290mm
- including rotary distributor with 4 outlets
- including swivelling-bridge, clearance 570mm
- including clamping system for the counter bearing (900 Nm)
- including direct measuring system

machine type: HELLER MC 25
(horizontal machining centre with X = 800mm)

process: drilling and milling application on steering Box including 3-dimensional drilling appl.

dividing head: CNC 160.2/Z2-A400 (4th axis)
- 2-spindle dividing head with spindle distance 400mm
- including 2 swivelling-bridges, clearance 760mm
- including clamping system for the counter bearing
- including 2 quick-change clamping systems
- including automatic loading

machine type: HELLER MC 16
(horizontal machining centre X = 630mm)

process: drilling and milling application on cylinder housing

dividing head: CNC 220.2/Z (4th axis)
- centre height 210mm, with base plate 250mm
- including rotary distributor with 3 outlets
- including swivelling-bridge, clearance 350mm
- including clamping system for the counter bearing (900 Nm)
- including direct measuring system

machine type: CHIRON FZ 08 KS Magnum
(compact vertical machining centre with X=450mm and Y=270mm)

process: 5-face machining (2 work-pieces with approx. 200x 40x 100mm)

dividing head: CNC 160/2Sp125.2-A230 (4th and 5th axis)
- twin-spindle tiltable dividing head
- lowered rotary axis
- spindle distance 230mm
- fixture diameter 229mm
- including 2 rotary distributors with 2 outlets for rotating and tilting axis
- without spindle clamping system

Sample applications

HOWIMAT gear type series

machine type: CHIRON FZ 08 KS
(compact vertical machining centre with X=300mm and Y=250mm)

process: 5-face machining including 3-dimensional drilling application
Milling and turning operations!

dividing head: CNC 160/80.2/A2/HS (4th and 5th axis)
- gear reduction switchable from I = 30 for milling operation to I = 1,5 for turning operations
- including automatic collet-chuck for W20 collets
- including direct measuring system for rotating

machine type: CHIRON DL 18 KL
(twin-spindle vertical machining centre)

process: 5-face machining for various parts up to diameter 180mm

dividing head: CNC 220/4Sp160.2-A200 (4th and 5th axis)
- 4-spindle tiltable dividing head
- spindle distance 200mm
- spindle bare 80mm
- lowered rotating axis
- including counter bearing clamping system 1.250 Nm

machine type: CHIRON FZ 18 L 2000
(vertical machining centre for twin-table machining)

process: drilling and milling operations with multi-piece fixtures

dividing head: CNC 160.2/Z (4th axis)
- centre height 215mm
- including fixture plate 700x 350x 50mm
- swivelling base plate with clearance 640mm
- including hydraulic rotary distributor for 2 outlets
- 1 unit left hand and 1 unit right hand design

machine type: FANUC 0iC (wire-cut EDM machine with robot loading system)

process: EDM machining of PKD-tools up to 300mm length

dividing head: CNC 125.2/K-NIRO (4th axis)
- non-corroding dividing head
- sealing according to IP 68
- automatic HSK-63 clamping system
- suitable for robot loading
- true surface runout < 0,001mm
- including direct measuring system

machine type: SODICK MC 430 L
(compact HSC-machining centre)

process: 5-axis machining of various components (mould and die production)

dividing head: CNC 125.2/K-80.2/K/A2 (4th and 5th axis)
- tiltable 2 axes dividing head
- including face plate 45mm
- with lowered rotating axis
- rotating distributor with 2 outlets for automatic chuck EROWA IST 100
- all connections of the rotary axis are lead through the tilting axis

machine type: SPINNER VC 1460
(vertical machining centre with cross table)

process: machining en the circumference of a embossing roller

dividing head: CNC 220.2/TMI100 (4th axis)
- direct drive technology
- centre height 220mm
- including sensor-module-external box (SME 125) for torque motor EnDat and DRIVE CLiQ interface
- including pressure booster
- including stainless steel cover and plug-in wiring

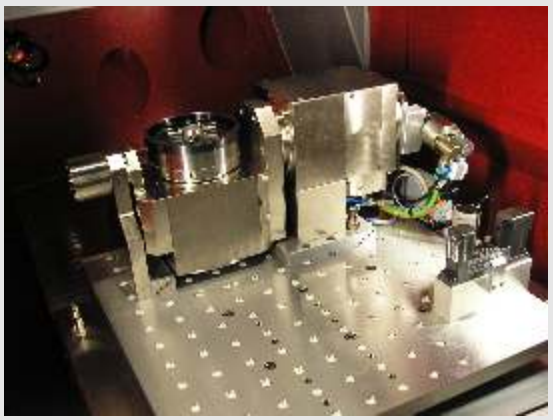
Sample applications

TMI torque series

machine type: SAUER LASERTEC DML 80
(laser machining centre)

process: 5-face laser machining (laser drilling) of Cooling holes in turbine blades

dividing head: CNC 320.2/TMI50-160.2/TMI55/A2
(4th and 5th axis)
- direct drive technology
- rotary axis 78mm below centre height (375mm)
- including rotary distributor with 2 outlets on rotating axis
- including pallet system for MECATOOL GPS 240



machine type: KERN Pyramid Nano
(high accuracy CNC milling centre)

process: 5-face manufacturing (milling and drilling) of various work-pieces

dividing head: CNC 125.2/TMI110-125.2/TMI55/A2
(4th and 5th axis)
- direct drive technology
- rotary axis 15mm below centre height (200mm)
- increased axial / radial runout +/- 0,0010mm
- including rotary distributor with 2 outlets on rotary axis

machine type: MÄGERLE MFP 50

process: grinding of turbine blades

dividing head: CNC 220.2/TMI150-220.2/TMI150/A2-160.2/TMI55
(4^{th}, 5^{th} and additional 6^{th} axis)
- direct drive technology on all axes
- complete energy supply feed through both rotating and the tilting axis
- including clamping system EROWA 029436
- including hydraulic clamping system and emergency stop clamping system
- hydraulic clamping system on the counter bearing

machine type: EWAG EWAMATIC LINE

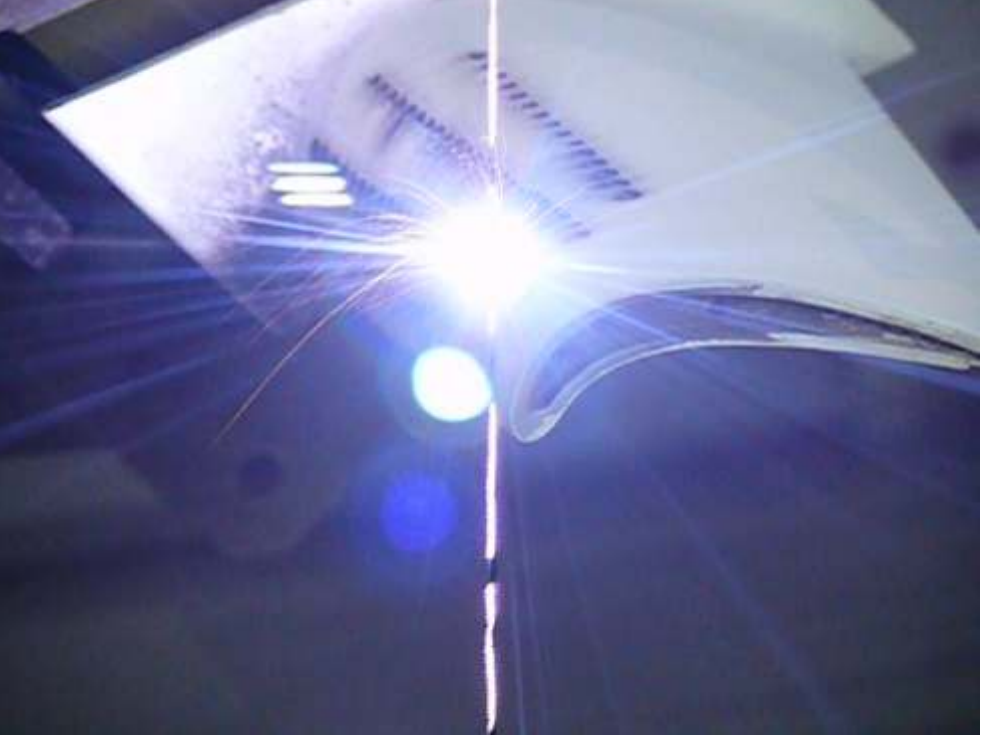
process: grinding and eroding of PKD-tools up to 300mm length

dividing head: CNC 125.2/TMI55 (4^{th} axis)
- direct drive technology
- speed up to 800 rpm
- 90° in 0,1 second
- including automatic HSK 63 clamping system
- true surface runout < 0,0005mm
- suitable for robot loading

machine type: CINCINNATI CFVi 550 - 30 Tools (vertical machining centre)

process: 5-face machining of various components up to dia. 350 mm

dividing head: CNC 220.2/TMI150-220.2/TMI50/A2
(4^{th} and 5^{th} axis)
- direct drive technology
- 90° in 0,15 seconds
- spindle bore of rotating axis dia. 120mm / 43mm
- tilting axis range +93° to -3°
- counter bearing clamping system 1.250 Nm



Our references

Certificate of competence and success

Profit from our range of services

The reputation we have established with our high-class products commits us to the best possible service towards our customers. We offer you a reliable and high precision system component for your machine with the best possible material characteristics. The combination of excellent engineering and constant improvement of the technologies gives Detlev Hofmann GmbH the leading position in the manufacturing of CNC dividing heads and rotary axes. Even with difficult, customer-individual solutions we constantly prove our competence in this field.

Our excellent understanding of the developments and requirements in the market enables us to develop new exciting markets, in addition those already in existence. The big variety of applications for our units makes us unique in the market. Due to our long-standing experience in a wide scope of applications such as milling, turning, drilling, grinding, eroding, engraving, measuring and testing as well as laser techniques, means we can offer you the widest variety of products and services. This includes the clarification of all technical details and requirements, the development, manufacturing an assembly of our units and if requested, also the initial installation and start-up operation of our axes, which can include training of the operators. We guarantee a reliable and fast after-sales service and support.

Therefore our references are a testimonial of competence and success and are also a confirmation of the trust that our customers show towards us and our range of products.

Our references

For more than 25 years we have been a supplier to the machine tool and tool-making industry, the mould and die sector as well as the automotive and aerospace industries. In addition we supply the jewellery and dental industry with our reliable and innovative products.

Together with our strong partners within the machine-tool sector we set new standards in the area of 5-face manufacturing which offers higher efficiency and productivity within the manufacturing process. We will work with all our clients to find the optimum solution to meet all their needs.

DETLEV HOFMANN GmbH
Präzisions- Maschinenbau

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