



CNC Rotary Tables – Edition 5

PGD
Series

Preloaded
Gear Drive

2025

**Main
catalog**

1/2025 | EN



Backlash-free, high-speed, with sensors –
ready for real Industry 4.0 thanks to **pl-smartBox**

Swiss Rotary Table Technology

Since 1974

pL LEHMANN is a medium-sized business that has specialized in rotary tables for over 40 years:

- 1960 Founding – Contract manufacturing
- 1973 Conversion into a stock corporation
- 1974 Introduction of numerically controlled rotary tables (HUST)
- 1980 Construction of new factory building
- 1986 Development of the 400 series
- 1988 2nd generation joins management
- 1997 Construction of new assembly building
- 2000 Development of the 800 series (DD up to 10,000 rpm)
- 2002 2nd generation assumes management responsibility
- 2003 Development of the 700 series (DD up to 800 rpm)
- 2008 Addition of office building
- 2010 Development of the 500 series
- 2011 Start of internationalization / lean production
- 2013 Development of the high-speed version of the 500 series
- 2016 Expansion of factory building
- 2019 Introduction of AM-LOCK and the 900 DD series
- 2021 New MQ series for measurement technology
- 2022 New P-Line for simple positioning tasks

Today, pL LEHMANN is still an owner-managed family-owned company present in over 20 countries (see the back of this catalog or www.lehmann-rotary-tables.com).

The company is committed to typical Swiss values

- Product quality
- Superior technology
- Innovation and flexibility
- Long-term, sound business policies

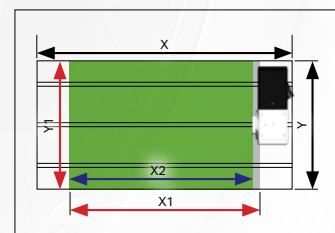
For more, see www.lehmann-rotary-tables.com.



* Sales and service partners trained and equipped by pL
(VAR – value added resellers or VAP – value added partners)

Selection Guides

pL LEHMANN offers detailed Selection Guides for over 30 machine brands (see **pp. 6+7**)



Additional pL products



DD Series



AM-LOCK



ROTOMATION



Measurement technology



Skiving

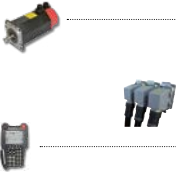
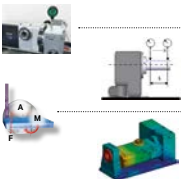


Scroll for «rotomilling»



Grinding

«Whoever wishes to invest in tomorrow's way of production must consider the needs and opportunities available today.»

	Applications	4	Overview Applications
	Overview and facts	6	
	Modular system combiFlex®	8	
	Typical applications	16	
	Benchmark and facts	18	System & Facts, smartBox
	Technology	22	
	smartBox & documentation	26	
	pL service	30	
	E-Series and P-Line	34	Rotary tables
	rotoFIX / longFLEX	42	
	T-Series	44	
	Rotary tables, multi-spindle	60	
	MTS – Modular Tooling System	68	SPZ, DDF, WMS
	Clamping cylinder	70	
	Rotary union	72	
	Indexing accuracy, angular position measuring system	74	
	Motors and servos	78	MOT, KAB, WDF, CNC
	Implemented integrations	80	
	Cables, connectors and wall penetrations	82	
	CNC control system FANUC 35iB	86	
	Clamping, aligning	90	Aligning, GLA, RST, LOZ
	Counter bearing / hydraulic unit, tailstocks	91	
	Small parts	94	
	Commissioning, training	98	Service & Technology
	Geometry accuracies, spindle loads	110	
	Machining forces, permissible feed torques	116	
	Behavior of the rotary table, tech. explanations	124	
	Content of workpiece clamping systems	139	Tooling
	ROTOMATION transferBox	184	

CNC rotary tables for economical manufacturing:
pL LEHMANN has suitable and rational solutions
for nearly every industry



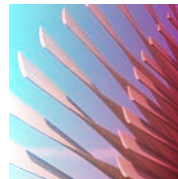
Automotive



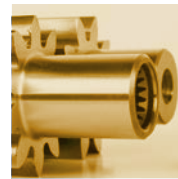
Medical/Dental



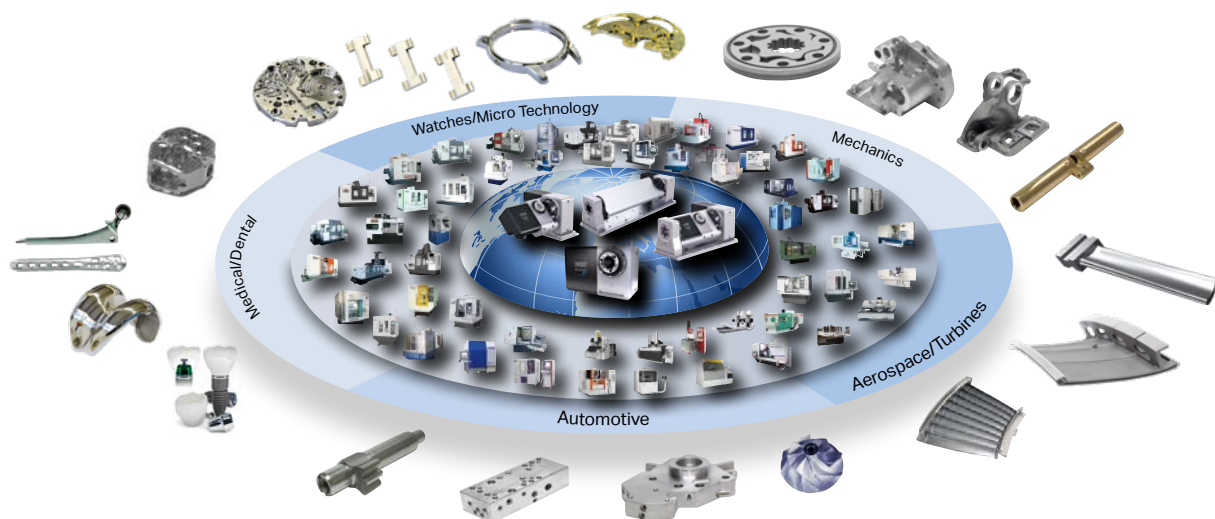
Watches /
Micro Technology



Aerospace/Turbines



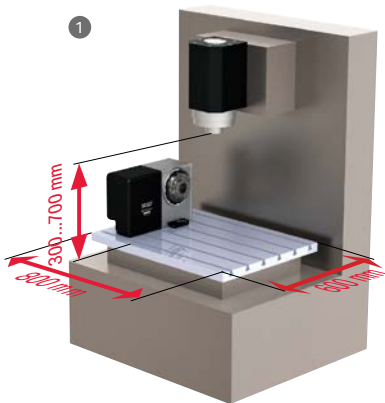
Mechanics



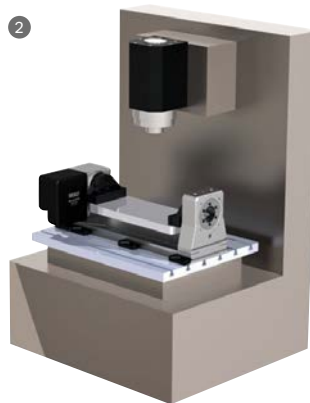
pL rotary tables in use on over **200** different machine brands and
over **1,000** different machine models.

pL competence: Integration in **all known** CNC control systems
(Fanuc, Siemens, Heidenhain, Haas, Winmax, Mitsubishi, Brother,
Mazatrol ...), for new machines as well as for retrofits

Highly productive solutions even on compact machines
– for almost every requirement: 4-axis or 5-axis



Base machine can be used in 3-axis mode at all times, e.g. for bulky workpieces



4th axis with swivel yoke, on base plate



4th axis with swivel yoke, directly on machine table



4th axis, 3-spindle, X-mounting (lengthwise)



4th axis, 3-spindle, Y-mounting (crosswise)



4th + 5th axis, 1-spindle, X-mounting (lengthwise)



4th + 5th axis, 2-spindle, Y-mounting (crosswise)



4th + 5th axis, 2-spindle, X-mounting (lengthwise)



4th axis for tilting the grinding spindle. 5th axis (vertical) for workpiece rotation

Overview
Applications

System &
Facts, smartBox

Rotary
tables

SPZ,
DDF, WMS

MOT, KAB,
WDF, CNC

Aligning,
GLA, RST, LOZ

Service
& Technology

Tooling

Up to 210 rpm
up to 0.21 sec / 90°

High-speed GD

Extended travel in
Z- and X-direction

More space

High spindle load,
heavy-duty bearing

Heavy duty

E-Series



EA-50x light only 12 kg



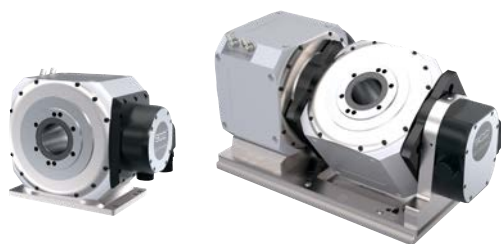
Selection of suitable machines

Vertical machining centers

(Selection Guides available)

- AKRIA
- Almac
- AMS
- AWEA
- BFW
- Brother Speedio
- Chiron
- Cincinnati
- DMG MORI
- DN Solutions
- EMCO
- Fanuc Robodrill
- Fehlmann
- GF Mikron
- Haas CNC
- Hardinge
- Bridgeport
- Hasegawa
- Hurco
- Hwacheon
- Hyundai/Wia
- Kaast
- Komatech
- Leadwell
- Litz
- Makino
- Map
- MAPLE
- MAS
- Mazak
- MT EVO
- PreMill
- Priminer
- Quaser
- Schaublin
- Takumi
- Tongtai
- Toyoda
- Wele
- XYZ
- YCM

DD Series



Request our special catalog

High-speed DD

up to max. 3,300 rpm

Adaptability

Multifunctional
spindle HSK

Precision

On the workpiece, as
precise as 2 µm / 100 mm

Pneum. Clamping
up to 7,000 Nm

High clamp

Large parts up to
ø 500

Big size

PGD backlash-free
long-life gear unit

No backlash

Other

- Finepart (waterjet cutting)
- Hexagon (measuring)
- LT Ultra (ultra precision)
- OGP Quality vision (measuring)
- ...

Grinding

- Blohm Jung
- Chevalier
- Elb-Schliff
- Hauser
- Lapmaster Wolters
- Mägerle
- Moore
- ...

Laser

- DMG MORI Sauer
- GF Mikron
- Litz
- Microlution
- ...

T-Series



All base plates made of steel

with integrated hole pattern for
slot spacing of 100 and 125 mm,
integrated alignment system
lineFIX for lengthwise or cross-
wise clamping.

M-Series



Connectivity

Monitoring for
operation & service

No adjust

Load change without
parameter adjustment

Less cost

No cooling system,
no hydraulics

High value retention: can be modified at any time,
only 4 sizes ø100 – 500 mm – over 290 standard
configurations

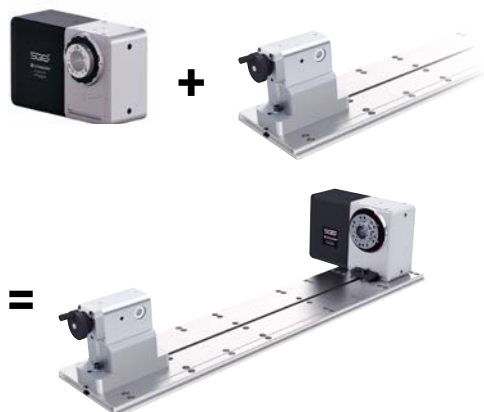
EA → TF TIP



EA → EA with rotoFIX



EA → EA with longFLEX



Diversity of products

unique

- Wide range of applications for each size
- Lower storage costs, also in service (spare parts)
- Increased sales and service productivity



Attention! Due to export control regulations,
the conversion will only be carried out at headquarters.

Standard machine in stock, available at short notice,
equipped with matching rotary table

Highest level of flexibility

unique

- Rotary table is available quickly and can be converted at any time
- If the needs change, the investment is not lost
- Pay in installments: First, the machine later the rotary table - can be retrofitted at any time



TF TIP → T1 TAP



TF TIP → T1 TOP



T1 TAP → T1 TOP



Overview
Applications

System &
Facts, smartBox

Rotary
tables

SPZ,
DDF, WMS

MOT, KAB,
WDF, CNC

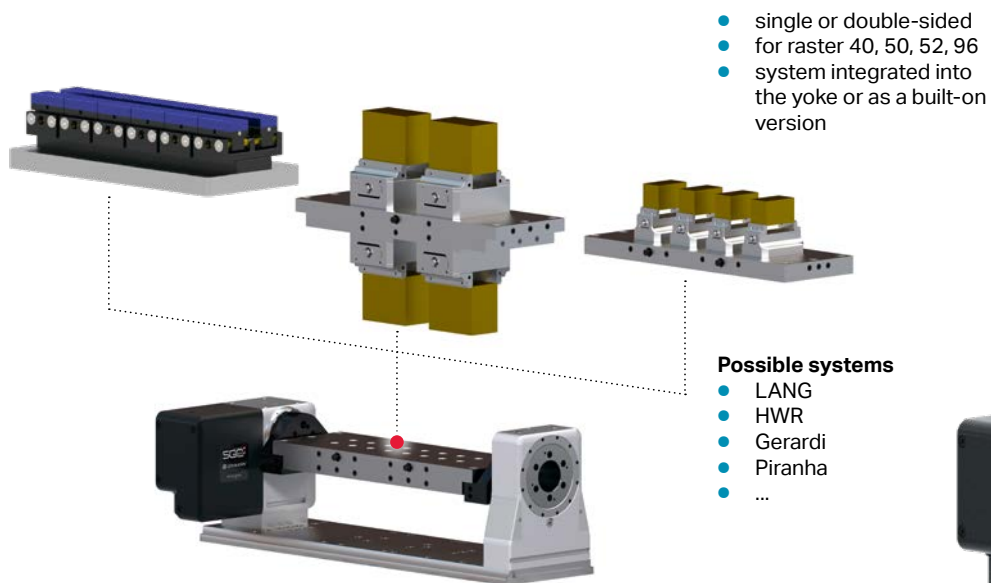
Aligning,
GLA, RST, LOZ

Service
& Technology

Tooling

Potentials of clamping yokes with integrated or built-on zero point clamping system

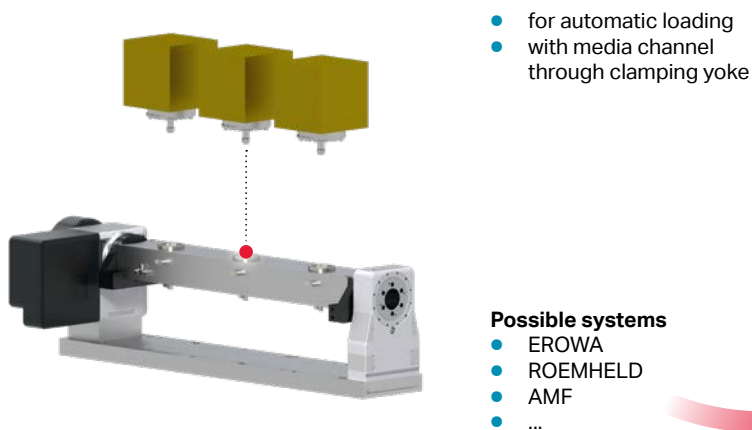
Yoke with manual zero point clamping system



Manual version



Yoke with automatic zero point clamping system

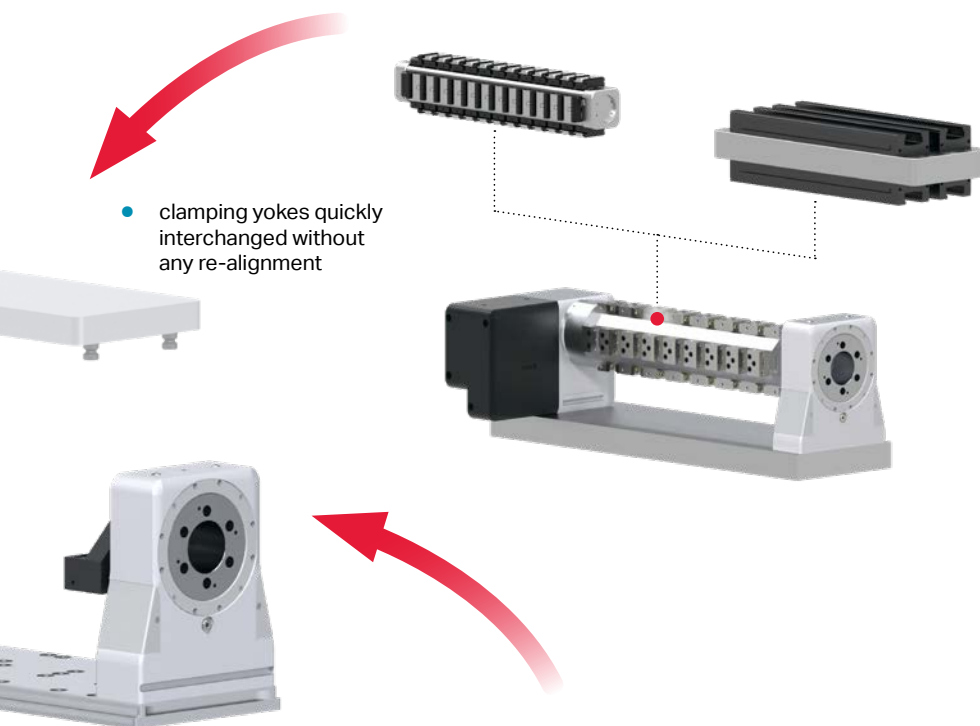


Automatic version



Clamping yokes with hole pattern for individual mounting of clamping tools or with a flexibly adjustable rail system

Yoke with rail system



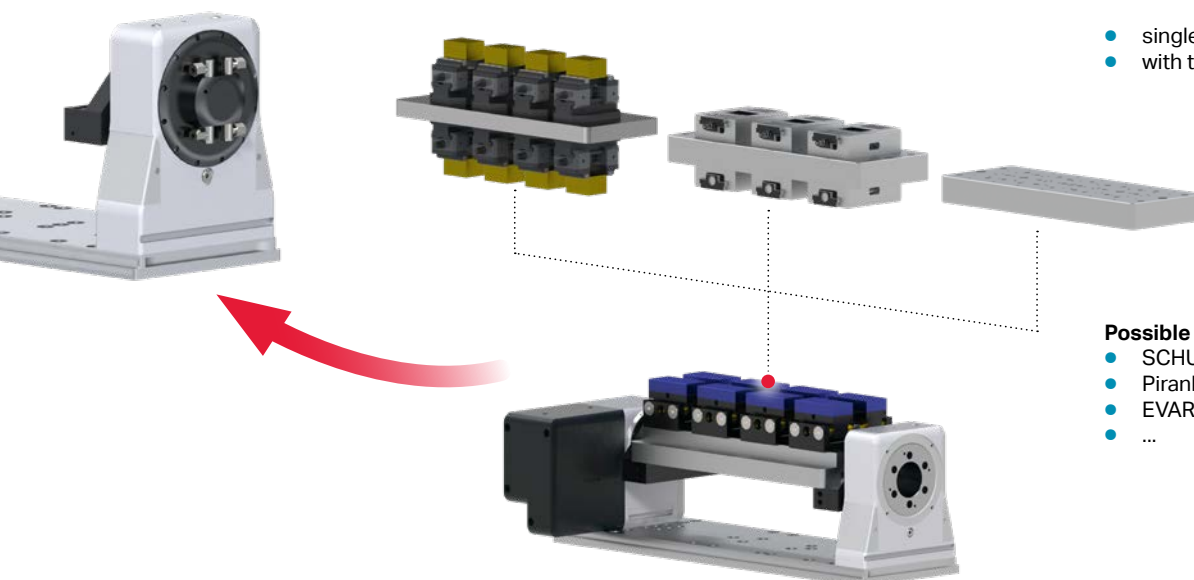
- clamping yokes quickly interchanged without any re-alignment

- vises moved without any re-alignment
- easily adaptable to suit part size

Possible systems

- SCHUNK
- TRIAG
- EVARD
- ...

Yoke with bolted on clamping tools (manual or automatic)



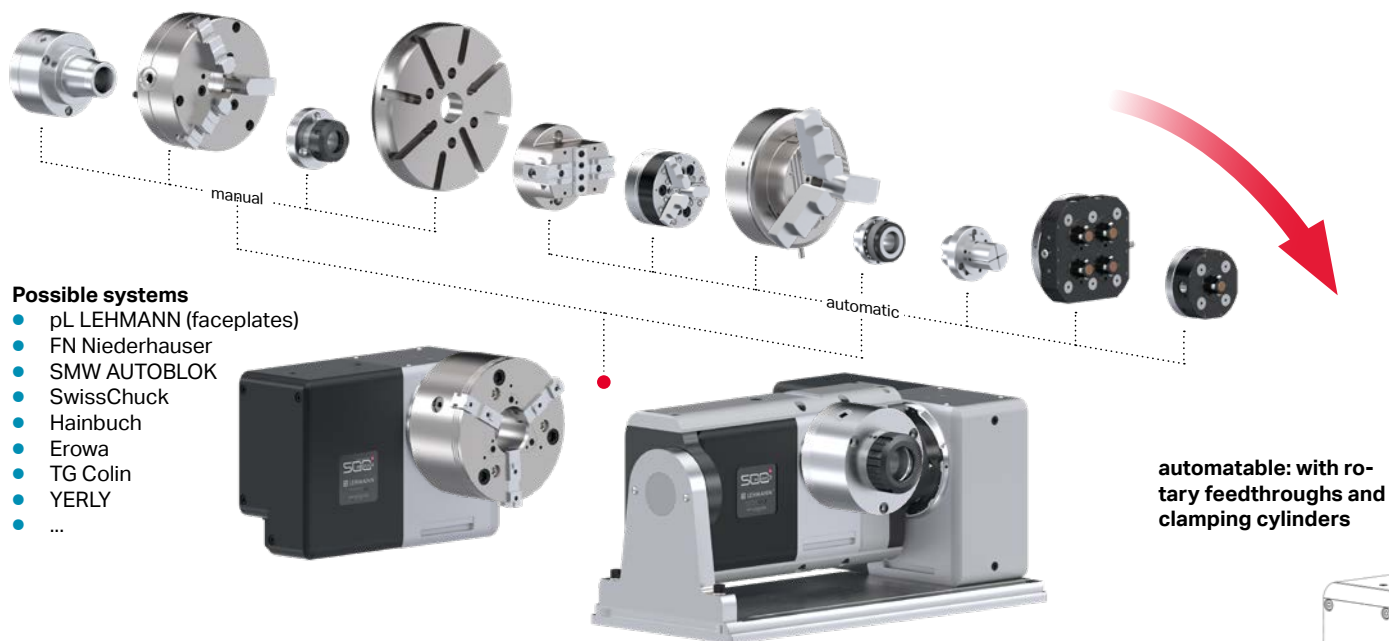
- single or double-sided
- with tapped hole pattern

Possible systems

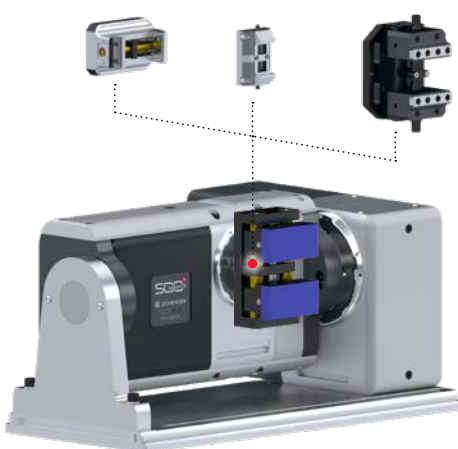
- SCHUNK
- Piranha
- EVARD
- ...

From manual clamping tools for single item production through to fully automated systems

Faceplates, force clamp and jaw chucks, collet chucks

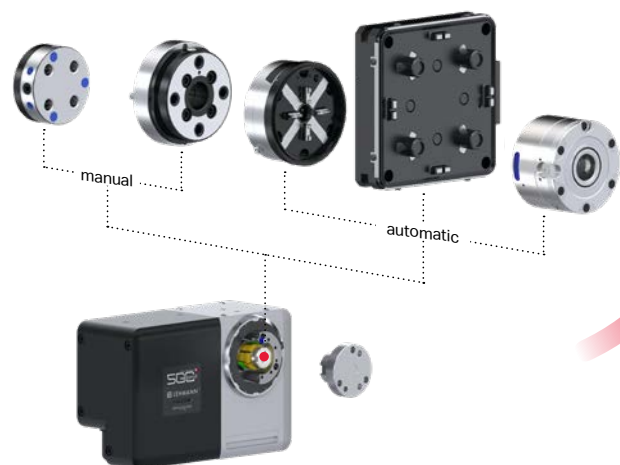


Centric clamping unit



- Possible systems**
- SCHUNK
 - LANG
 - Gressel
 - Piranha Clamp
 - EVARD
 - TRIAG
 - ...

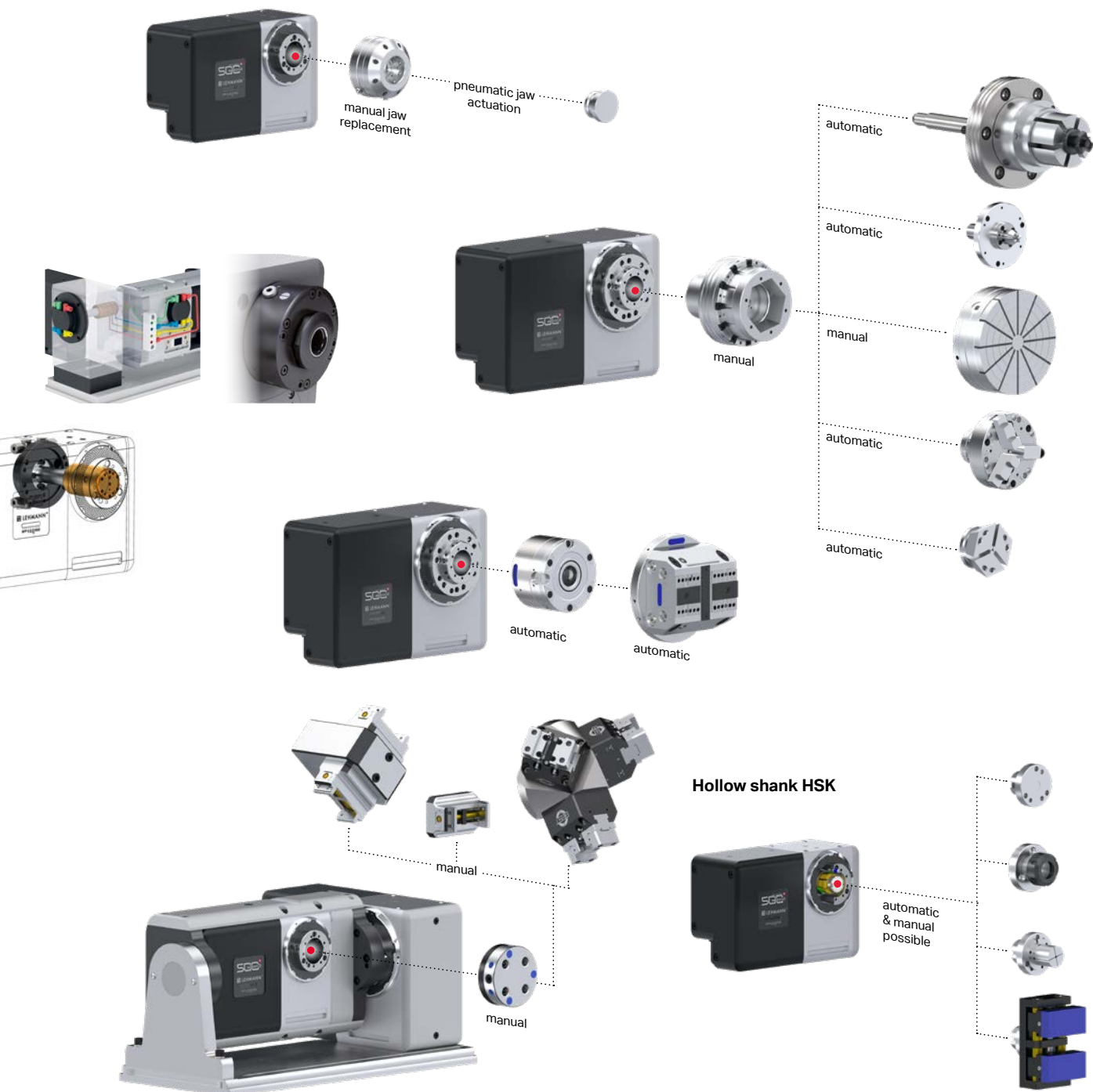
Zero point clamping systems



- Possible systems**
- pL LEHMANN (ripas & CAPTO)
 - Erowa
 - System 3R
 - Parotec
 - Roemheld
 - AMF
 - SCHUNK
 - LANG
 - GRESSEL
 - ...

Centering clamping unit for workpiece handling,
built-on zero point clamping system for quick vise
interchange

Possible combinations



Overview
Applications

System &
Facts, smartBox

Rotary
tables

SPZ,
DDF, WMS

MOT, KAB,
WDF, CNC

Aligning,
GLA, RST, LOZ

Service
& Technology

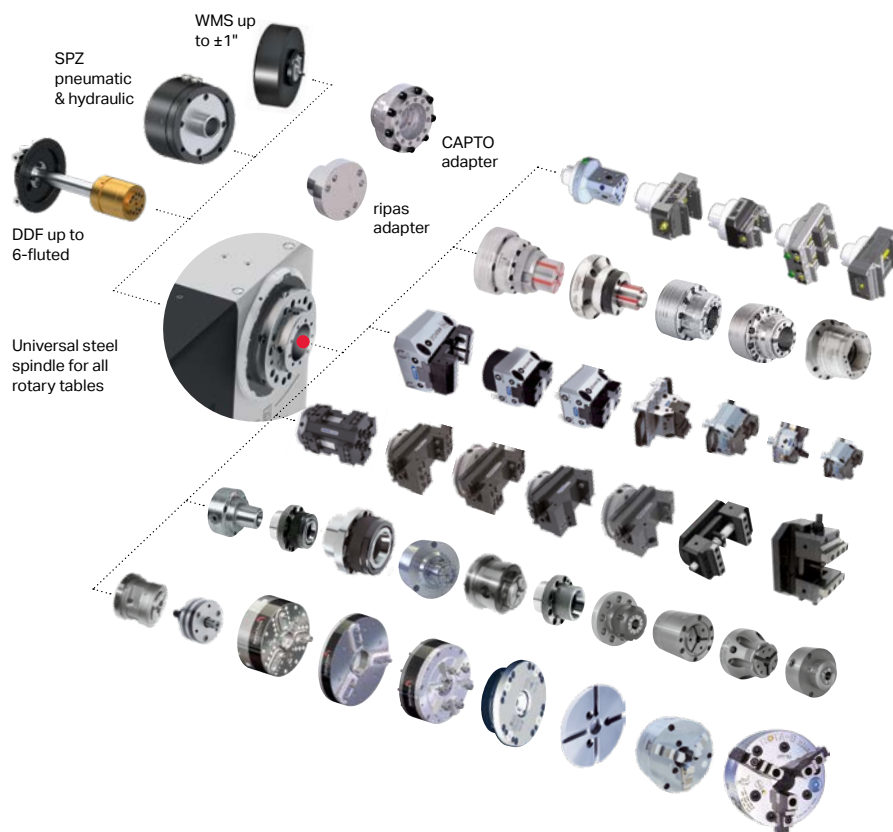
Tooling

Extremely wide assortment for workpiece clamping.
Standardized interface in front and rear:
maximum universality

For all variants and possibilities, see p. 139

Spindle accessories, rear (see p. 70)

- Rotary unions **up to 250 bar**
- Hydraulic clamping cylinder **23 kN at 120 bar**
- Pneumatic clamping cylinder **11 kN at 10 bar**
- Angular position measuring systems **as precise as ± 1 arcsec**



Spindle accessories, front (see p. 139)



unique

Tailstocks and counter bearings (see pp. 91–93)



ripas zero point clamping system (see pp. 144/145)



EA-507 with ripas auto and ripas adapter

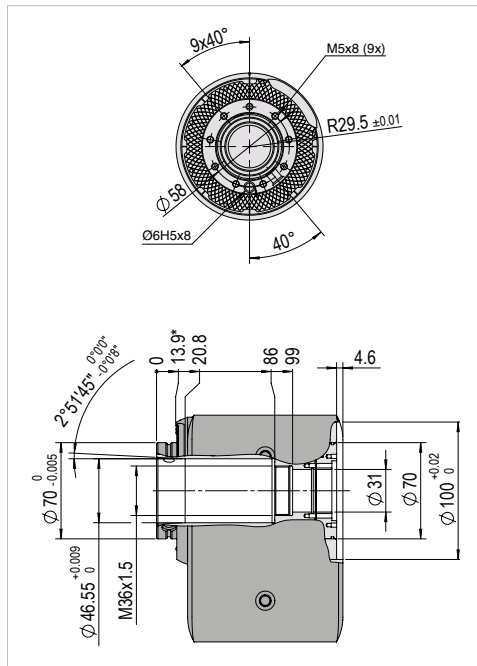
CAPTO clamping



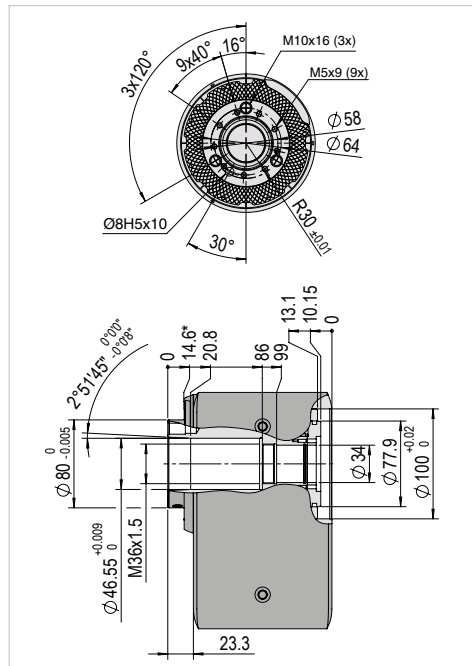
EA-507 with CAPTO retrofit kit (see p. 145)

All spindle connection dimensions front and back for building your fixture. Applies to all versions, whether EA-, M- or T-type rotary table

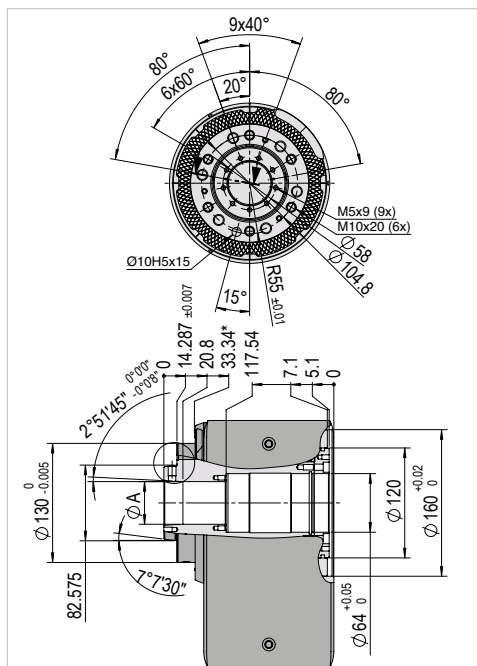
Module size
507 HSK-A63/ø70



Module size
510 HSK-A63/ø80

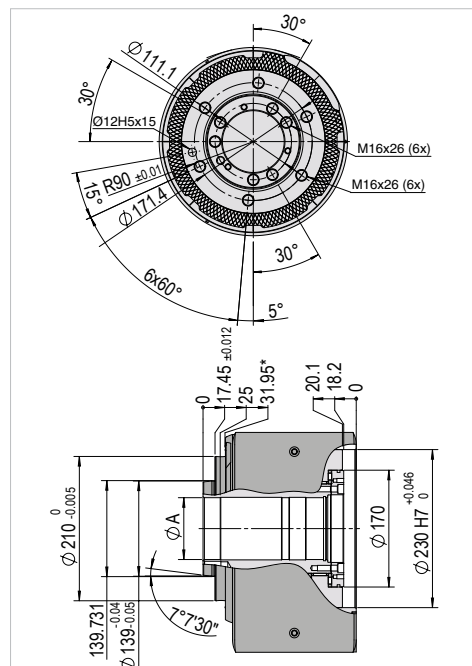


Module size
520 HSK-A63/KK5



Dimension A **Standard:** Ø46.55 +0.009/0 **SPI.520-d64:** Ø64

Module size
530 ø90/KK8



Dimension A **Standard:** Ø90 +0.015/0 **SPI.530-d102:** Ø102

HSK = Hollow shank taper in acc. with DIN 69063-1 (spindle) or DIN 69893 (adapter), KK... = Short taper size ... in acc. with DIN 55026

* with SPI.5xx-Lab:
507 = 1.25
510 = 4.95
520 = 20.15
530 = 21.75
(see S. 34-67)

Interesting applications for increasing productivity

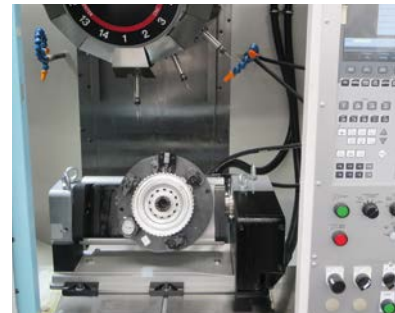
Provided on GF+ Machining Solutions, Akira Seiki, Almac, Amada Machine, AMS, AWEA, BFW, Blohm Jung, Bridgeport (Hardinge), Brother Milling, Chevalier, Chiron, DMG MORI, DN Solutions, Emco Famup, Fanuc Robodrive, Finepart, Feeler, Haas Automation, Hartford, Hasegawa, Hedelius, Hurco, Huron, Hwacheon, Hyundai WIA, ICON, Kitamura, Kondia, Leadwell, Makino, MAS, Mazak, Microlution, Mikron, Moore Tool, MT EVO, POSmill (Microcut), Quaser, Sauer (DMG MORI), Spinner, Stama, TongTai, Toyoda, Unitech, Willemin-Macodel, XYZ, YCM



TF-510520 – Milling/boring – Mechanics



T1-520520 – Milling/boring – Mechanics



T1-507510 – Milling/boring – Automotive



EA-510 rotoFIX – Milling/boring – Automotive



T2-507510 – Milling/boring – Automotive



T1-520520 – Milling/boring – Mechanics



EA-510 – Grinding – built-in – several industries



T1-520520 – Grinding – Aerospace/Turbines



EA-510 – Grinding – Mechanics



TF-507510 – Milling/boring – Medical technology

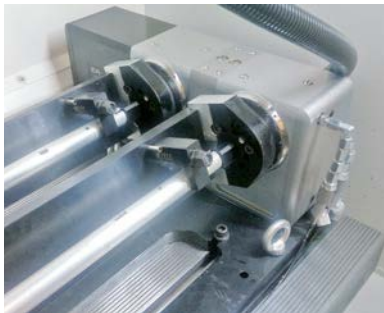


TF-507510 – Milling/boring – Watches/Micro Technology



TF-507510 – Milling/boring – Dental Technology

Additional interesting examples of applications can be found on our website www.lehmann-rotary-tables.com in the Download / Applications area



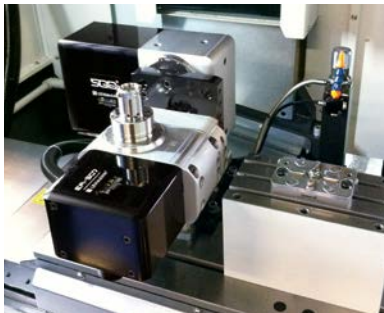
M2-510 – Milling/boring – Automotive



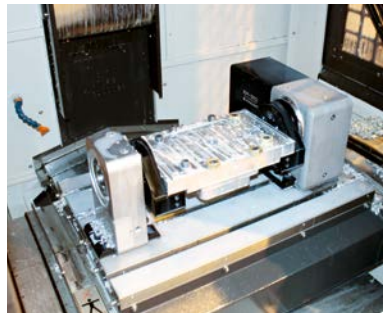
EA-510 – Milling/boring – Automotive



TF-507507 – Milling/boring – Dental Technology



TF-507510 – Milling/boring – Watches/Micro Technology



EA-510 rotoFIX – Milling/boring – Mechanics



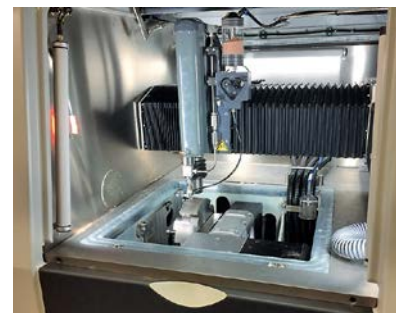
EA-510 rotoFIX – Milling/boring – Mechanics



T1-510520 – Milling/boring – Mechanics



T3-510520 – Milling/boring – Automotive



T1-507510 – Waterjet drilling – Aerospace/Turbines



EA-510 longFLEX – Milling/boring on horizontal center – Mechanics



EA-520 – Milling/boring – Mechanics



T1-510520 – Grinding – Aerospace/Turbines

Overview
Applications

System &
Facts, smartBox

Rotary
tables

SPZ,
DDF, WMS

MOT, KAB,
WDF, CNC

Aligning,
GLA, RST, LOZ

Service
& Technology

Tooling

Whether 5-axis machining or complete 6-sided machining – the choice is yours



5 Axis Processing

- Simultaneous or positioning mode
- For CNC control systems from Siemens, Fanuc, Heidenhain, Brother, Haas, Mitsubishi, Hurco, Mazak
- Can be used worldwide in pure positioning mode without restrictions due to the export control

Multi-part machining

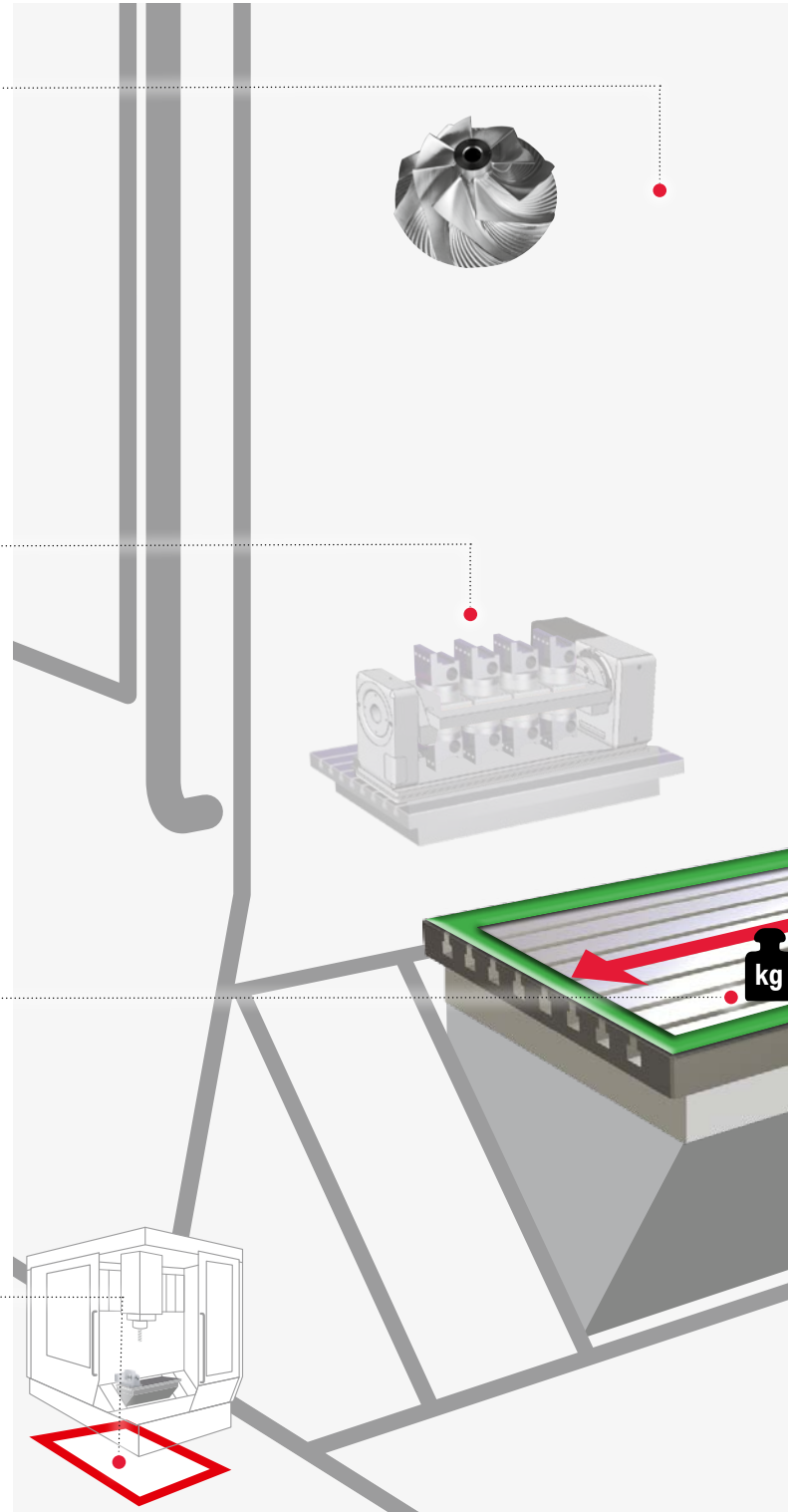
- Highly productive parts manufacturing with clamping yokes and counter bearing
- Manual or automatic workpiece change
- On both 4th axes as well as 4th/5th axes
- Easy to retrofit

Table load

- More reserves for heavy devices and additional clamping devices, without overloading the machine

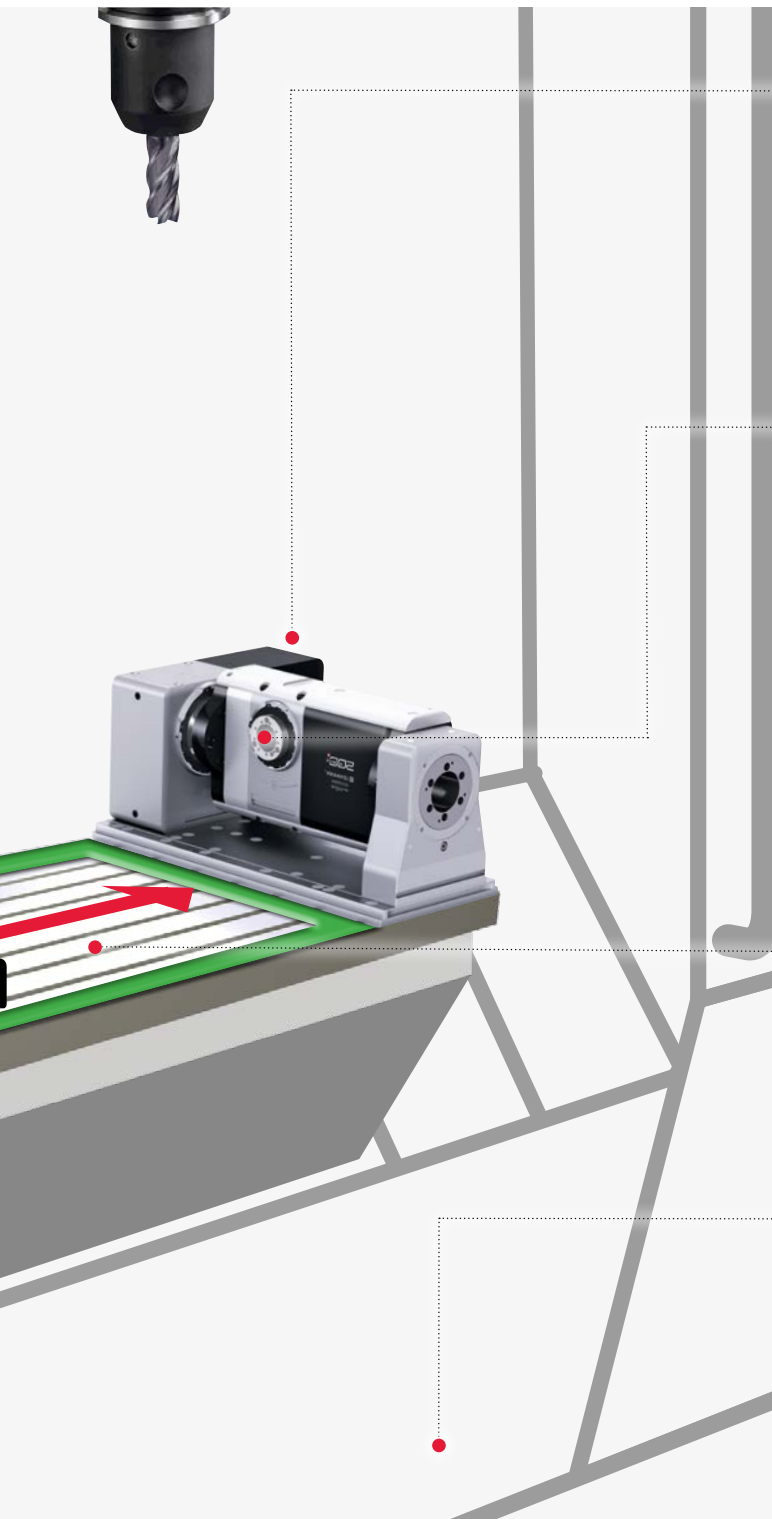
Machine floor space

- 5 machines on a floor space for 3
- 67% higher productivity per m²



Market studies show major productivity gain in various industries with 3 + 2 concepts – at significantly lower costs

Efficient manufacturing of workpieces ... to ø350 mm/150 kg (positioning) or ø150 mm/34 kg (simultaneous) with workpiece accuracies of 0.01...0.002 mm per 100 mm spatial diagonal (For more information and our conditions, see **pp. 132/133**)



Low projecting edge

- Good accessibility across the C-axis (from above)
- Cutting tools preloaded very quickly: Maximum service life, best milling performance and surface quality

C-axis perm. load

- Suited for medium to small parts – the corresponding 5-axis machine is available for large parts

Work table surface

- 2 machines in one: as 3-axis machine for large workpieces, for instance, and parallel to this a genuine 5-axis for the machining of impellers, for example
- Particularly interesting for the flexible contract manufacturer
- Work space for vise or chuck work (pre or post-processing of the 6th side)

Floor load

- Can also be installed in more lightweight production halls without additional foundations
- Lower risk when used in multi-story buildings
- Lower transport costs

Overview,
Applications

System &
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Rotary
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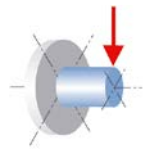
Service
& Technology

Tooling

Powerhouse in a small space. Keeping the workpiece immobile and in position determines performance and precision.

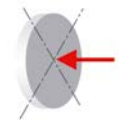
Pull-out torque

- Withstands high machining forces (e.g. during drilling)



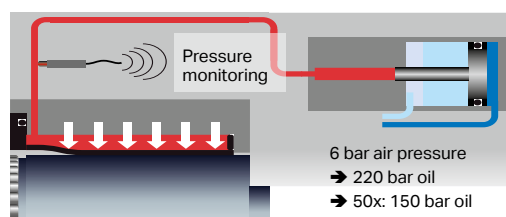
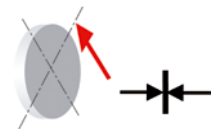
Axial force

- Withstands very high compressive and tensile forces



Clamping torque

- Ultra-fast, monitored, strong, only 6 bar air pressure



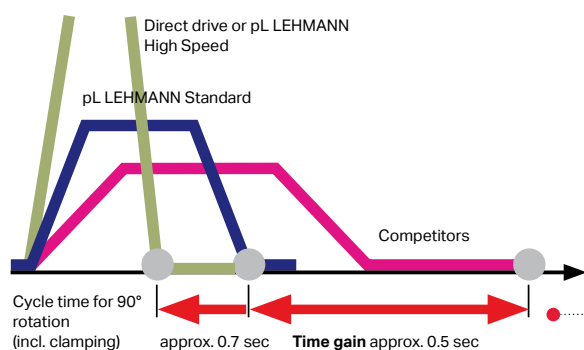
Fully integrated BRAKY pressure intensifier



PGD*-Advantages as Compared to Direct Drives (DD) at a glance

- Only one rotary table for everything: Standard or high speed, for CNCs from Siemens, Heidenhain, Fanuc...
- No cooling unit needed
- No safety brake
- Smaller drive enhancements
- Lower electrical power consumption
- Simpler commissioning and drive tuning

*For more information, please refer to p. 22



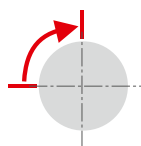
Speed

- High speeds



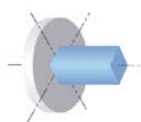
Cycle time

- Short cycle times (with clamping)



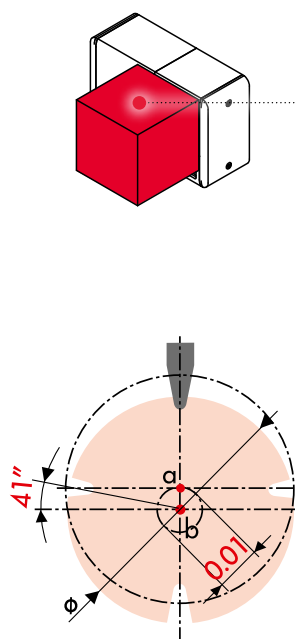
Spindle load

- Large and heavy loads despite its compact external dimensions



Radial/axial run-out

- Low radial and axial run-out for optimum work-piece precision



Overview,
Applications

System &
Facts, smartBox

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Service
& Technology

Tooling

PGD – The preloaded gear unit, permanently backlash-free, wear-resistant: requirements for simultaneous machining and maintenance-free use in production

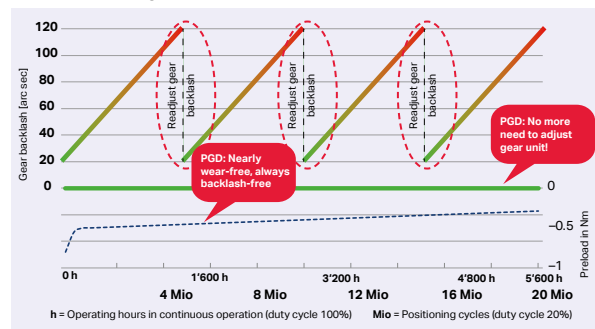
PGD gear unit (Preloaded Gear Drive)

- Strong gear teeth
- Wheel and worm gear made of steel, surface hardened and ground, runs in an oil bath
- Worm gear with 4-way backlash-free mounting
- Permanently backlash-free preloaded
- High long-term precision, virtually wear-free
- High impact resistance
- Up to 20,000 h or 20 million* 90° positionings
- Easy to adjust, if ever necessary
- For smaller machining tasks** no clamping necessary (time savings)
- 5,000 h highly dynamic simultaneous processing*

* Based on long-term tests of more than 20,000 h with over 23 million 90° cycles; valid under appropriate use; the limit reached first is valid

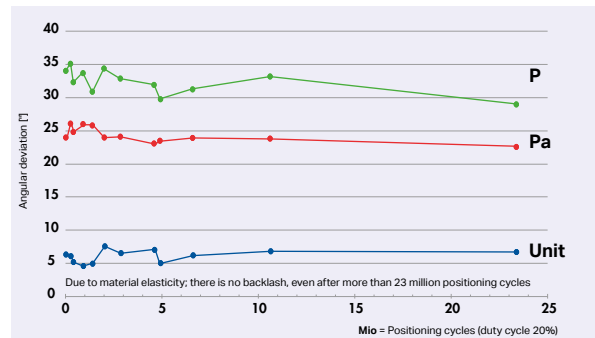
** For possible torque per characteristic curve for 100% duty cycle at 1 rpm; please refer to pp. 118 – 123

Maintenance free gear unit – permanently preloaded



All values based on internal testing using standard load and catalog values (speed, cycle time). Duty cycle as defined on p. 136

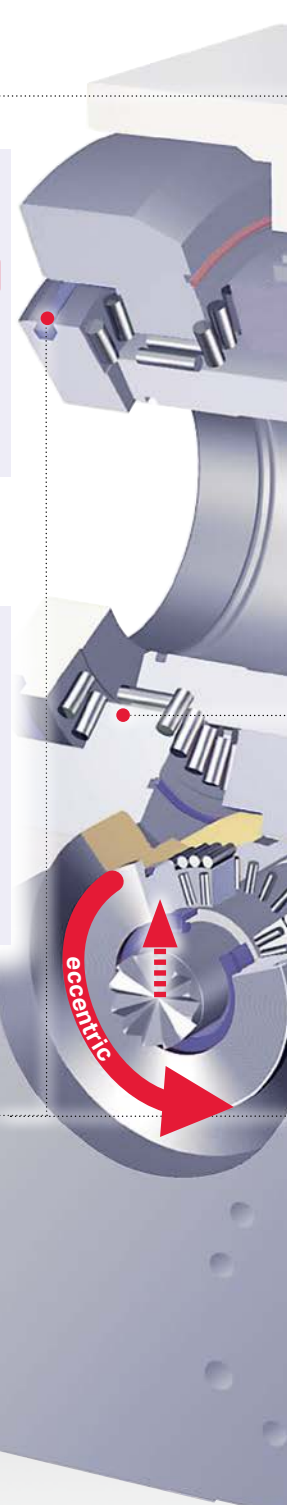
Consistent accuracy – even after more than 23 million positioning cycles



Real values measured according to VDI/DGQ 3441 or ISO 230-2: Changes in the context of measurement uncertainty.

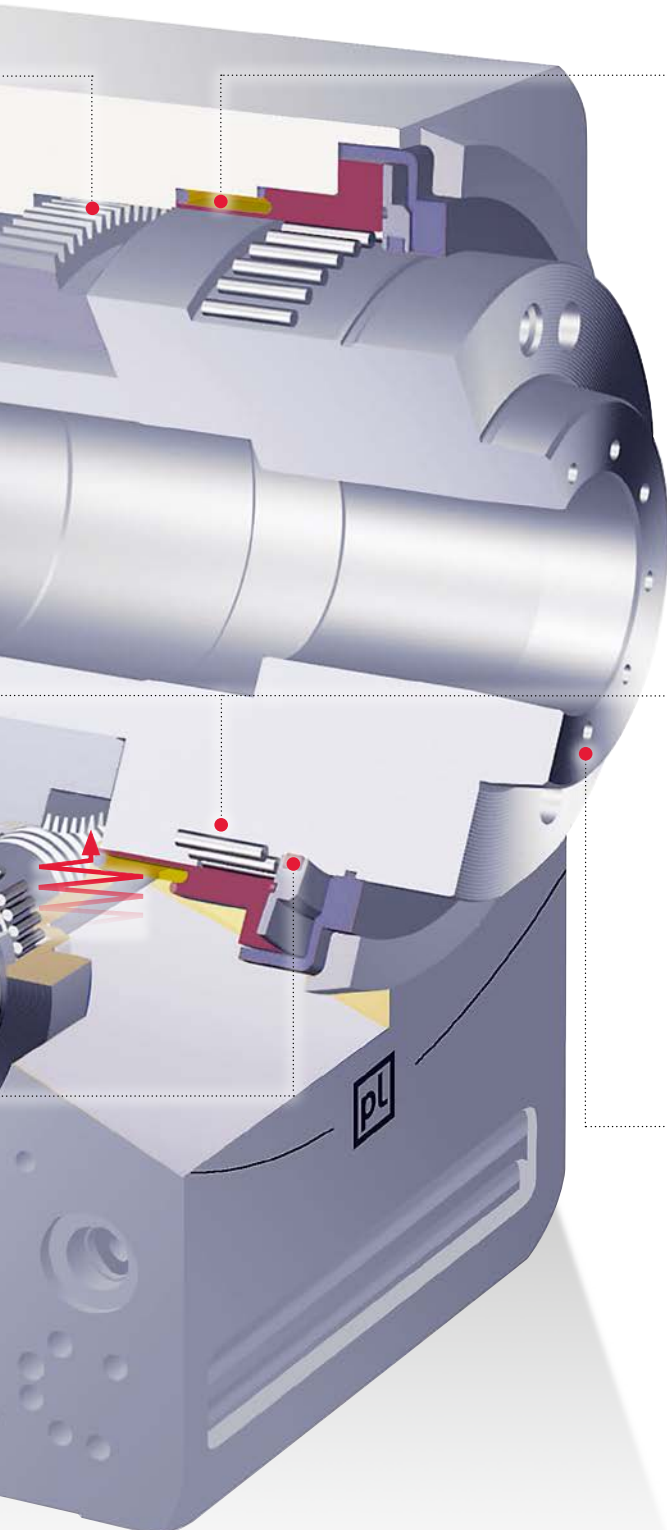
Tightness IP 67 (IP 68)

- All models are fully sealed
- Spindle housing with pressurized oil lubrication system
- Additional spindle labyrinth seal (optional) for use with high-pressure coolant (e.g., production grinding) and aggressive materials such as glass, graphite, ceramic, etc.



PGD*-Advantages as Compared to Direct Drives (DD) at a glance

- Only one rotary table for everything: Standard or high speed, for CNCs from Siemens, Heidenhain, Fanuc...
- No cooling unit needed
- No safety brake
- Smaller drive enhancements
- Lower electrical power consumption
- Simpler commissioning and drive tuning



Spindle clamping

- Expansion chuck principle
- 6 bar air pressure, integrated pressure intensifier
- Clamping with largest spindle diameter and close to the workpiece
- Very fast acting, 360° simultaneously
- Integrated pressure sensors for optimum monitoring (microprocessor-controlled)
- Long service life
- Consistent clamping force throughout the entire service life

Spindle bearing

- 4x play-free fitted, large precision roller bearings
- Long distance between the radial bearings provides for high spindle rigidity
- All bearing points run in oil baths
- Good gear unit efficiency ratio (up to 60 %)

Spindle

- Steel, hardened and ground
- Radial and axial run-out 6 µm (optional to 2 µm)
- Universal interface with HSK cone and / or short cone KK (both to DIN)
- Accessories for manual or automatic HSK/ISO clamping, various collet systems, faceplates and jaw chucks, palletizing systems, rotary unions and clamping cylinders...

Overview,
ApplicationsSystem &
Facts, smartBoxRotary
tablesSPZ,
DDF, WMSMOT, KAB,
WDF, CNCAligning,
GLA, RST, LOZService
& Technology

Tooling

Functional design, good chip and coolant flow, service-friendly

Transport and bleeding holes

- Bolt holes for transport
- Easily accessible bleeding holes for oil bath and spindle clamping system

Drive motor

- Single housing (2 lengths) for all motors: Fanuc, Mavilor (Siemens, Heidenhain), Yaskawa, Sanyo, Melder/Mitsubishi
- Motors are easy to replace

USB slot

- Fast, simple data output for evaluation on a PC in case of malfunction
- Licensing possibility with registration code via USB stick (OEM feature)
- Fully sealed, placed in well protected location
- PC connection for remote diagnostics

Wire guide

- Wire guide up to 150° (in different directions) swiveling and can be fixed
- Circlip for quick change in the event of a malfunction
- All wires and hoses plugged into the motor housing

Connector interfaces

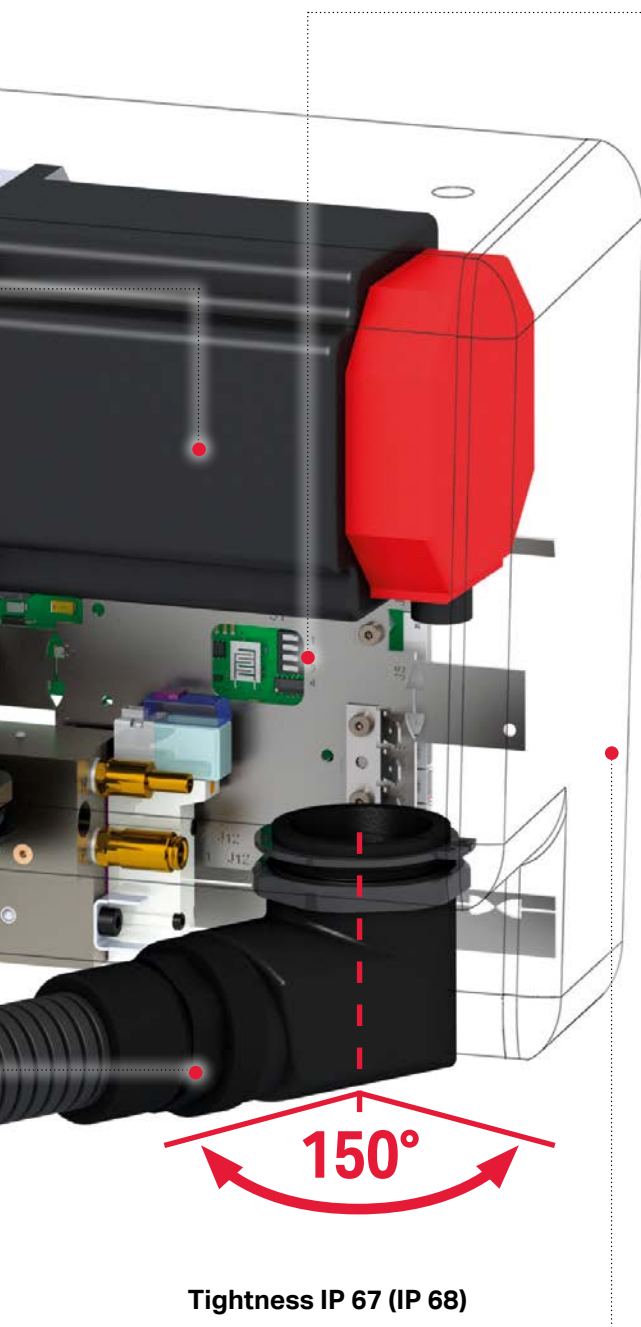
- Standardized, fully wired, available for many different machines
- Wide range of lengths and connectors



unique



Productivity and availability increase,
downtime and maintenance costs decrease



Tightness IP 67 (IP 68)

- Fully sealed motor compartment IP67 (optional IP 68)
- Prevents damage to motor, wiring, connectors, etc.

unique

pL-smartBox – for real industry 4.0

Helps to increase productivity and availability, lower downtime and maintenance costs and permits quick troubleshooting and preventive maintenance.

Sensors for ...

- Speed
- Internal pressure
- Temperature
- Humidity
- Shock / impact
- Limit value exceeded with real-time stamp

Components

- Microprocessor
- 3D acceleration sensor – shock sensor

Monitoring

- Duty cycle limit – overload protection, prevents motor and gear unit damage

Compatibility

- 100% backwards-compatible with blackBOX (starting at Edition 2)

Prepared for interfaces

- Wi-Fi
- Web server with Ethernet and RJ45 port – display state/error on CNC

For details, please refer to pp. 26/27

Overview,
Applications

System &
Facts: smartBox

Rotary
tables

SPZ,
DDF, WMS

MOT, KAB,
WDF, CNC

Aligning,
GLA, RST, LOZ

Service
& Technology

Tooling

Increase availability and decrease maintenance costs!

Every pL rotary table is equipped with a sealed (watertight) USB port. When a common USB flash drive is inserted, the data is automatically read out as a file. This file can be easily sent to pL or to the representative in your country by e-mail for an error analysis.

Technical information for «pL-smartBox» – the rotary table electronics

The electronics unit controls and monitors the system. It is housed in a black box.

Voltage:	24V DC
Current:	0.1A max standard, 0.3A max with servo valve
1 input:	«clamp», optionally +24 V DC approx. 5 mA or 110 VAC approx. 25 mA without hardware measures. With AC actuation, the software parameter «Input Clamp» must be set to «AC». Otherwise the pneumatic valve chatters.
8 outputs:	Ready, Error, Unclamped, Clamped, Reference, Limit1, Limit2, Service. Current: Each output individually, max. 50 mA NPN/PNP; can be combined, rewired.
Buffer:	The real-time clock is battery-buffered.
Interface:	USB interface



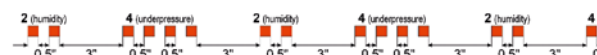
Malfunction display by means of pL-smartBox, flashing LED «ERROR»

Meaning of the red LED, «ERROR» ■

- In the event of an error, the red LED «ERROR» flashes continuously until the error is rectified.
- When there are several errors, the flashing code for the next error follows after a pause of 3 s, etc.
- The errors do not appear in order of importance, but in ascending order.
- It is possible to continue working with some errors; with others, the «READY» signal goes to 0 V, disabling the rotary table. See the following table.

Measure: Call technician for maintenance.

Example of flashing code for «ERROR» LED (red): flashing code for «Rel.humidity» (2) AND «Negative pressure, housing» (4):



Meaning of the yellow LED, «SERVICE» ■

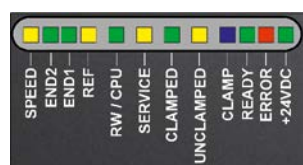
- Meaning of the yellow LED, «SERVICE»
- When «SERVICE» is necessary, the corresponding code flashes continuously.
- For additional instructions, see «Maintenance recommendation» and «Maintenance log», document DOK-0301 included in the packaging. It is also provided on the USB stick for the pL rotary table.
- The continuously updated document must be saved in the course of machine maintenance.

Example of yellow «SERVICE» LED: flashing code for «revolutions of the worm»:



Displays and operating elements

LEDs on the motor cover indicate the operating status.



Remote maintenance – a highlight in the event of an emergency



Meaning of the LEDs

LED	Color	Function	Comment
SPEED	yellow	Worm speed	Flashes 1x per worm revolution
END2	green	Limit switch 2 (-) UZ	Extinguishes when end position «-» is reached. (Only for tilting axes with connected limit switches.)
END1	green	Limit switch 1 (+) GUZ	Extinguishes when end position «+» is reached. (Only for tilting axes with connected limit switches.)
REF	yellow	Spindle reference	Illuminates/extinguishes on the edge of the cam / slot
RW/CPU	green	EPROM / USB stick	– Flashes in idle state at 2-second intervals if OK. – Flickers during read in/out on USB stick or EPROM. – Illuminates permanently/does not illuminate if system is not ready
SERVICE	yellow	Service	Flashing sequence. For code key, see below.
CLAMPED	green	Spindle clamping «clamped»	Illuminates when spindle clamping is clamped
UNCLAMPED	yellow	Spindle clamping «unclamped»	Illuminates when spindle clamp is unclamped
CLAMP	blue	«clamp» spindle clamping	Illuminates when «clamping» signal is present
READY	green	System OK.	Illuminates permanently when system is ready. NOTE: If error messages are displayed and the LED «READY» is nevertheless illuminated, only warnings are involved.
ERROR	red	Error	Flashing sequence. For code key, see below.
+24VDC	green	Power System OK.	Illuminated continuously when the power supply is OK.

Flashing code ERROR ■

No. of flashes	Meaning	Brief explanation	E/B*	Opt.	Actua. thresh. (example)	Signal «READY»**
1	Temperature level	Internal temperature exceeded	E		85 [C°]	0
2	Relative humidity	Relative humidity exceeded	E		50 [%]	0
3	Housing pressure	Housing pressure exceeded	E		1000 [mbar]	0
4	Gauge pressure too low	Below minimum pressure for motor add-on	B		100 [mbar]	0
5	Excess. current, prop. valve	Excessive current at proportional valve	E	x	0.100 [A]	1
10	Max. impact X	Impact / acceleration X exceeded	E		15 [g] 1 [ms]	0
11	Max. impact Y	Impact / acceleration Y exceeded	E		15 [g] 1 [ms]	0
12	«Clamped» time exceeded	«Clamp» time exceeded	E		1 000 [ms]	1
13	«Unclamped» time exceeded	«Unclamp» time exceeded	E		1 000 [ms]	1
17	License expired	License expired				0
18	License key incorrect	License key incorrect				1
19	System time wrong	System time wrong				0
20	Max. rpm exceeded	Max. rpm exceeded	E		(6 000 [rpm])	
21	Interruption request	Acc. sensor defective or not calibrated				
22	Max. duty cycle exceeded	Motor duty cycle exceeded	E		5 [min] / 40 %	0
25	No serial no. parameterized	No serial number parameterized				0
26	Initializ. clamping sensor incompl.	Initializ. of sensor for clamping - calibration not correct				0
27	Initializ. operating pressure sensor incompl.	Initializ. of sensor initialization for operating pressure calibration not correct (e.g. 6 bar)				0
28	Initializ. sealing air sensors not correct	Initializ. of sensor for sealing air calibration not correct				0
29	Initializ. acceleration sensors not correct	Initializ. of sensor for acceleration - calibration not correct				0
30	Max. impact Z	Impact / acceleration Z exceeded	E		15 [g] 1 [ms]	0
31	Internal group error	Various errors – bit breakdown by means of software				0

* Error occurs in the case of: E = exceeding, B = falling below the switching threshold

** «READY» = Signal high = i.O, low = Fehler/Error

Flashing code SERVICE ■ When flashing, see instructions in «Maintenance recommendation» and «Maintenance log»

No. of flashes	Meaning	Brief explanation
1	Clamping cycles	Maximum number of clamping cycles reached. A clamping cycle consists of unclamping, clamping and signal output.
2	Rotary table «ON»	Maximum operating hours reached. The hour counter starts as soon as the blackBOX receives power.
3	Worm rotating	Maximum working hours reached. The hour counter starts running as soon as clamping is released.
4	Rev. worm	Maximum worm gear rotations reached. Sensor on the large toothed belt pulley.
5	Std clamping released	Maximum value for rotary table exceeded during active use. The counter starts running as soon as clamping is released.

Never search for documents again – everything at hand at all times
No Internet connection necessary!

The everyday life of a commissioning technician

The information needed is missing: electrical schematics, drive data, parameter lists, commissioning instructions ... Commissioning must be interrupted, the search for data begins: paper? Internet? Passwords?. Time is passing. The deadline is approaching. The urgency of the situation means do the best possible with existing knowledge.

Result: It rotates, but functions only halfway, pL specifications cannot be met (rotational speed, cycle time, accuracy...)

pL finding: Investigations have shown that 70% of optimization cases can be attributed to poor or incorrect commissioning.



smart doc on the USB stick

- IA mini USB stick is plugged into a USB slot (in the swiveling/tilting axis on T-type rotary tables)
- The following files are stored on this flash drive:
 - 1 ADAT drive setup data for each system
 - 2 Appropriate parameter list for the provided CNC control system
 - 3 General operating manual / user's manual in German and English
 - 4 General commissioning manual in German and English with all diagrams
 - 5 If necessary, machine-specific commissioning manual in German and English (e.g. for Brother)
 - 6 Indexing accuracy report(s) to VDI/DGQ 3441
 - 7 Geometry report
 - 8 Main catalog
 - 9 If necessary, special drawings from the customer
- The files are also available online in the pL-ERP (for Help-liner) as well as in the «full documentation»
- All files at the current revision level – version check not needed, risk of errors minimized

Product documentation saved securely:
The USB stick remains on the product

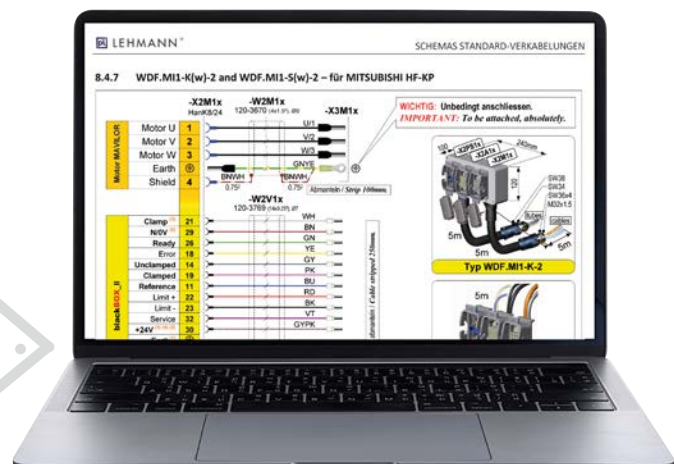


Your benefit

- Download no longer necessary – extra work eliminated
- Password no longer necessary – waiting for registration eliminated
- Internet no longer necessary – problems with poor or no network connection eliminated
- No lost documents, no missing USB stick – stick is always inserted, «loaded» and safely protected under the USB slot cover
- Everything needed is immediately available (appropriate for each rotary table) – tedious searching eliminated
- Emergency solution by technician no longer necessary – existing, often wrong (because out-of-date) data are no longer used



If the USB stick is lost, everything is still available on the website.



ROTOLUTION – customer-specific turn-key solutions «ontop», largely with proven standard elements, from CAD to commissioning.

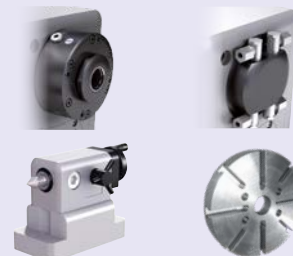
ROTOMATION – The ideal expansion with standardized automation. Economical. Professional. Simple.

Standard

Rotary tables see pp. 34–67

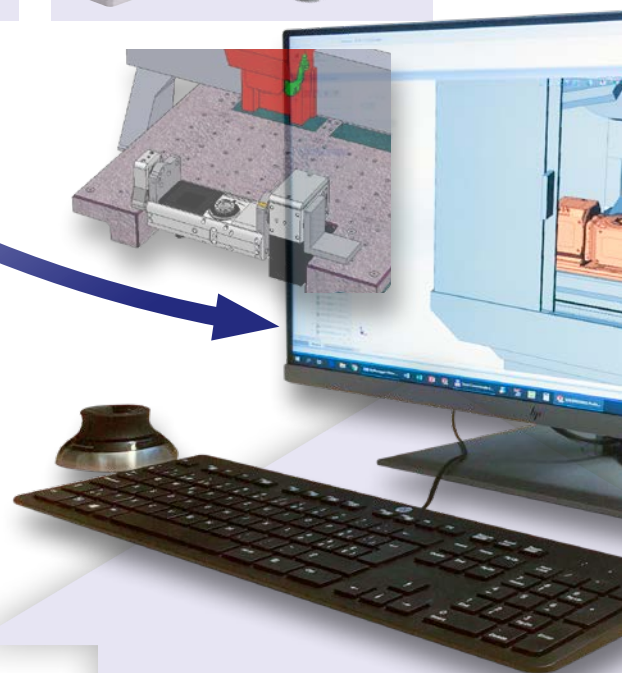


Accessories see pp. 70–73, 91–93, 144–147

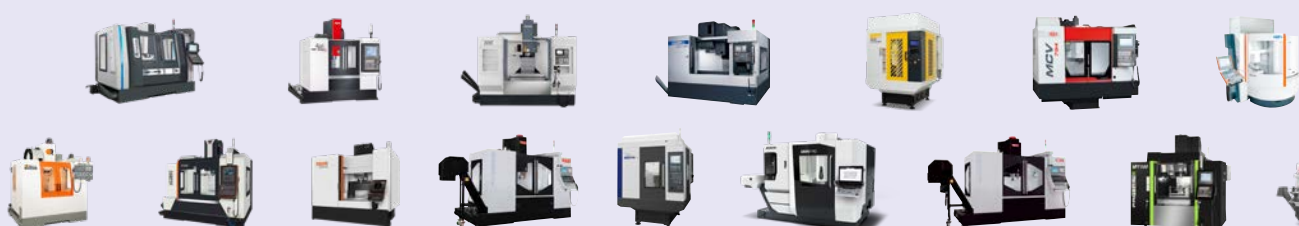


Customer

Problem situation
«help me» –
don't know,
have no time,
no experience!



Vertical machining centers and grinding machines (a Selection Guide is available for all of these machines at our website)



*Examples

5thAXIS.

GRESSEL

HWR

PAROTEC
spanntechnik - robotik - engineering

RÖHM
driven by technology

ITG COLIN

AMF

HAINBUCH

LANG
TECHNIK
einfach. zukunft. greifen.

ERANHA-CLAMP

SCHUNK

TRIAG
INTERNATIONAL

EROWA

hemo

MicroLoc

ripas

SwissChuck
Precision Workholding

YERLY

EVARD
PRECISION S.A.

HOFFER
technics

NIEDERHAUSER
SPANNTECHNIK UND SYSTEME

ROEMHELD
HILMA ■ STARK

system 3R

ROTOLUTION

CAD & adaptation

- Installation check
- Adjustment to standard parts
- Special parts

CAD & clamping means

- Workpiece clamping
- Standard/special

see pp. 148–183

*Examples

ROTOMATION

CAD & automation

- Workpiece handling
- Partnerships (GU with partners)

see pp. 184/185

Project management and execution, direct if needed

Plug-&-work package

Problem solution «on top» –

Standard and ROTOLUTION from a single source, ROTOMATION and machine in partnership

Customer

Overview, Applications

System & Facts, smartBox

Rotary tables

SPZ, DDF, WMS

MOT, KAB, WDF, CNC

Aligning, GLA, RST, LOZ

Service & Technology

Tooling

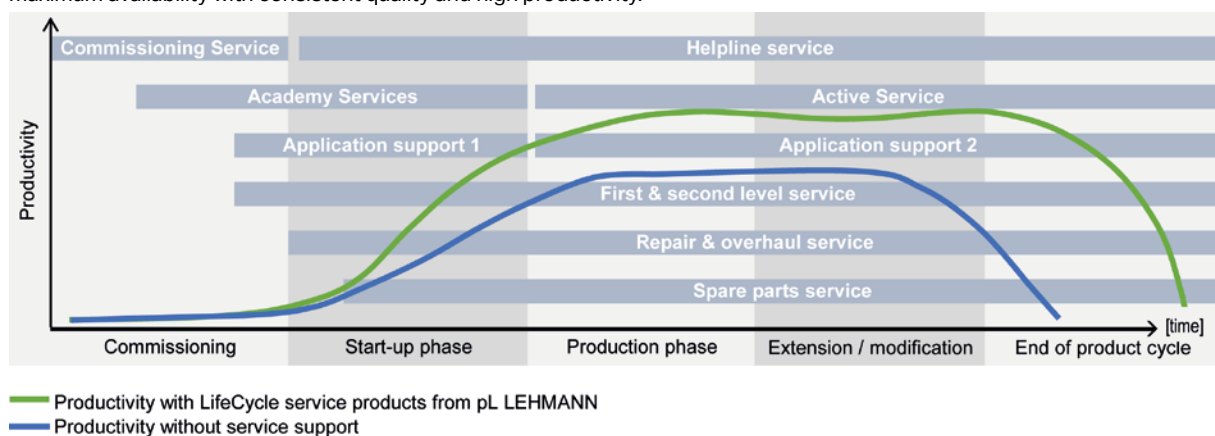
Present in over 30 countries:
from sales consultation to the final service

SERVICE
CONSULTATION



Increase productivity – Extend life cycle

Comprehensive and professional services throughout the product life cycle – maximum availability with consistent quality and high productivity.



A look in our production: High manufacturing depth provides for flexibility and quality

Production



With workpiece pool for unmanned production



High precision circular and flat grinding



Material flow



Assembly area with Kanban System

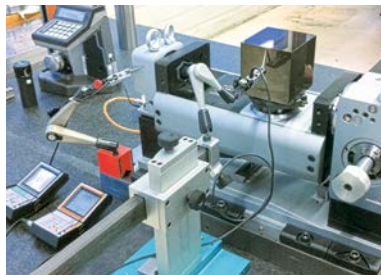


Rational equipping of spare parts packages

Quality control



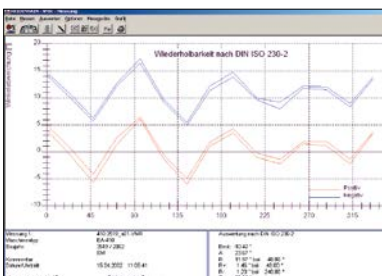
Measuring a housing on a 3D measuring unit



Measuring a T-type rotary table with a cube

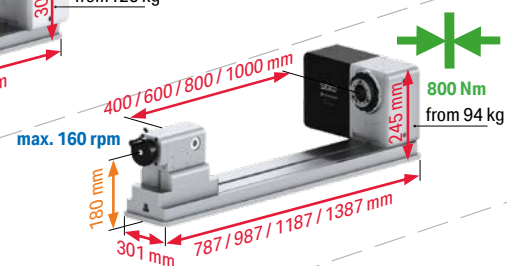
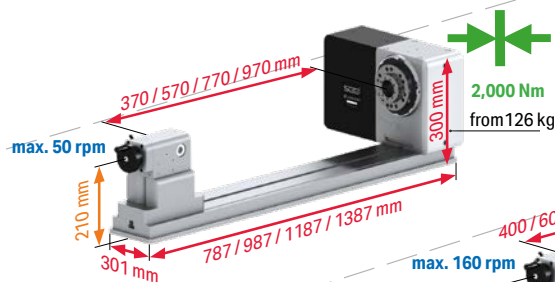
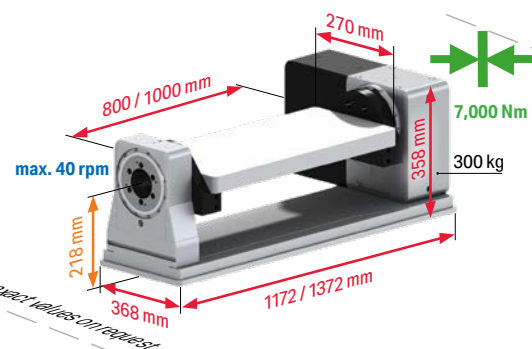


Measuring the indexing accuracy – fully automatically



Recording the indexing accuracy according to ISO 230-2 and VDI/DGQ 3441

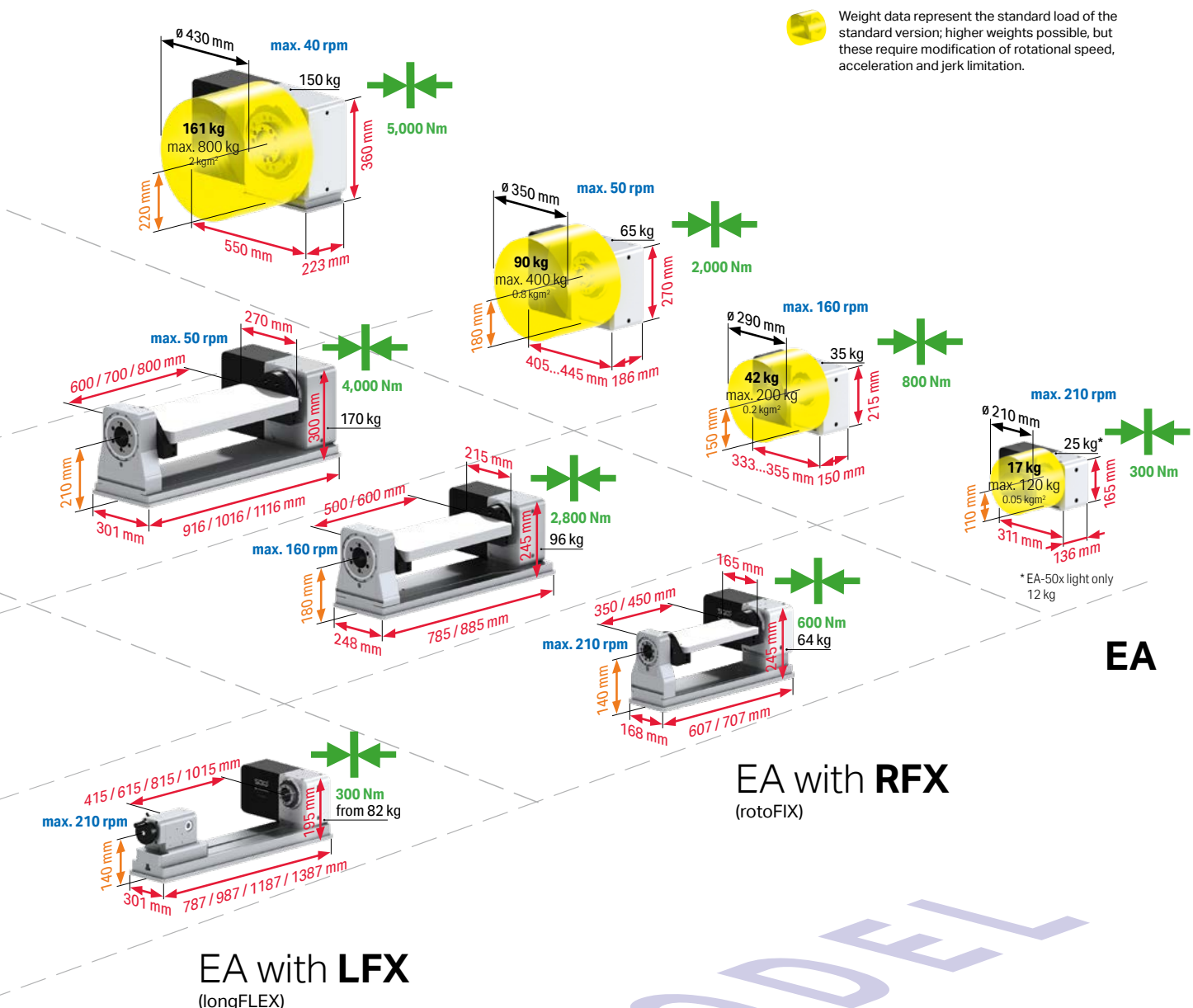
Interested? Contact us or visit our website at
www.lehmann-rotary-tables.com



SIZE

Facts

- High speed up to 210 rpm
- Steel base plates with hole pattern (matches a slot spacing of 100 mm and 125 mm)
- Cycle time for 90° as fast as 0.21 sec.



50x	507 (standard) or 508 (high speed)
51x	510 (standard) or 511 (high speed)
52x	520 (standard) or 521 (high speed)
EA	single-axis, single-spindle CNC rotary table
rotoFIX	modular clamping yoke system
longFLEX	modular shaft clamping system



				EA-507	EA-508	EA-510	EA-511	EA-520	EA-521	EA-530
Dimensions	Swivel ø		mm	160		240		350		430
	Center height		mm	110		150		180		220
	Total weight	with motor	kg	25		35		65		150
	Center bore ²⁾		mm	31		34		46 / 64		90 / 102
Bearing / Clamping	Max. clamping torque		Nm	300	250	800	600	2,000	1,800	5,000
	Max. spindle load	with tailstock	kg	240		400		800		1600
		without tailstock	kg	120		200		400		800
	Standard load ¹⁾		kg	17	12	42	22	90	61	161
Gear unit	Max. axial force		kN	44		46		100		210
	Max. pull-out torque		Nm	1,200		2,000		3,900		10,400
	Max. moment of inertia	Standard load ¹⁾	kgm ²	0.05	0.025	0.2	0.07	0.8	0.4	2
		J max	kgm ²	0.5	0.25	2	0.7	8	4	20
Precision	Max. feed torque ³⁾		Nm	120	70	250	150	440	230	650 opt. 850
	Limited torques due to eccentric loads ⁴⁾		Nm	25	9 ⁵⁾	40	30 ⁵⁾	110	45 ⁵⁾	280
	Indexing accuracy Pa ²⁾		± arc sec	20/15		17/10		12/8		10/6
	Repeat accuracy Ps average		± arc sec			2				
Max speed	Max speed	with standard load ¹⁾	rpm	111	210	80	160	50	100	40
	Radial run-out ²⁾	on spindle ø	µm			6 / 3				
	Axial run-out ²⁾	at spindle end face	µm			6 / 3				
	Parallelism ²⁾	Dividing axis to base	µm/100 mm			10 / 5				

¹⁾ Mutually dependent; for individual drive motor data, see right side

²⁾ Standard / increased (optional); for measuring method and validity of the values, please refer to p. 74, for optional angular position measuring system please refer to p. 76/77

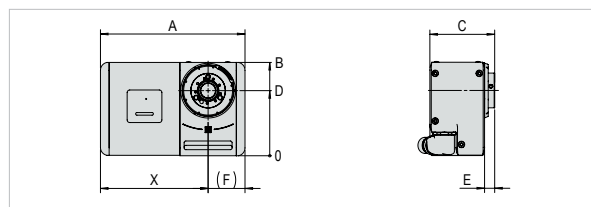
³⁾ Limit value for gear unit, at 1 rpm

⁴⁾ For torque calculation, see p. 114

⁵⁾ Limit value for self-locking, gear unit 508/511/521

EA-520 = High Series (high speed, high resistance)

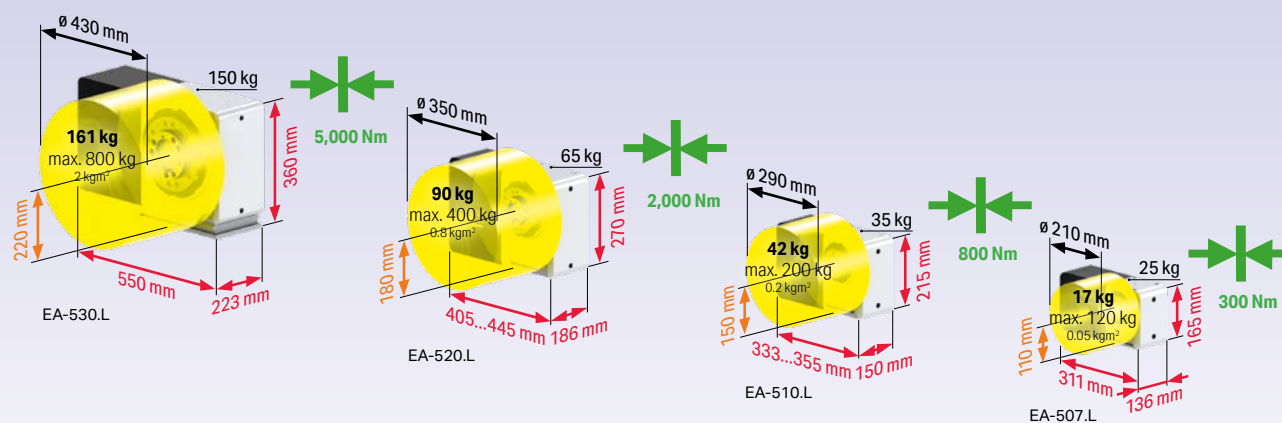
Dimensions



	A	B	C	D	E	F	X
EA-507	311	165	136	110	23	75	236
EA-508	311	165	136	110	23	75	236
EA-510	333	215	150	150	23	85	248
EA-511	333	215	150	150	23	85	248
EA-520	405	270	186	180	44	110	295
EA-521	405	270	186	180	44	110	295
EA-530	550	360	223	220	43	160	390

Item no.

EA-510.L-F1	
Motor	BE=Beckhoff, F1=Fanuc (200 V), F2=Fanuc HVis (400 V), M1=Movinor/Mavilor ERN, M2=Movinor/Mavilor EQN 1125, M3=Movinor/Mavilor EQN 1135, M13=Mitsubishi 200V, M14=Mitsubishi 400V, S2=Sanyo, Y2=Yaskawa SGMJV/SGMEV, Y4=Yaskawa SGM7J
Dividing axis motor position	L=left, R=right
Dividing axis size	507, 508, 510, 511, 520, 521, 530
Rotary table model	



Drive data

(based on standard load cube shown on pp. 112/113)

		Motors	Feed* [Nm]	Speed [rpm]	Cycle time*** [sec]	90°	180°
MAVILOR / MOVINOR **	EA-507	BLS-072	120	111	0.26	0.39	
	EA-508	BLS-072	70	210	0.23	0.29	
	EA-510	BLS-072	250	80	0.30	0.49	
	EA-511	BLS-072	150	160	0.23	0.31	
	EA-520	BLS-073	440	50	0.41	0.71	
	EA-520	LN-098	440	45	0.43	0.77	
	EA-521	LN-098	230	90	0.27	0.43	
FANUC	EA-530	LN-098	650	40	0.52	0.89	
	EA-507	β1 is	80	66.7	0.30	0.53	
	EA-508	β1 is	55	130	0.25	0.36	
	EA-510	α2 (HV)is	120	55	0.36	0.63	
	EA-511	α2 (HV)is	85	100	0.24	0.39	
	EA-520	α2 (HV)is	210	33	0.54	0.99	
	EA-520	α4 (HV)is	355	33	0.56	1.01	
YASKAWA SGMJ	EA-521	α4 (HV)is	230	60	0.37	0.62	
	EA-530	α4 (HV)is	420	27	0.69	1.25	
	EA-530	α8 (HV)is****	650	26.7	0.64	1.20	
YASKAWA SGMJV	EA-507	SGM7J 06	120	66	0.30	0.53	
	EA-508	SGM7J 06	70	133	0.22	0.33	
	EA-510	SGM7J 08	195	66.6	0.32	0.55	
	EA-511	SGM7J 08	135	133	0.22	0.33	
	EA-520	SGM7J 08	335	40	0.46	0.84	
	EA-521	SGM7J 08	230	80	0.28	0.46	
	EA-530	SGM7A-25	650	40	0.52	0.89	
YASKAWA SGMJV	EA-507	SGMJV 04	115	66.7	0.30	0.53	
	EA-508	SGMJV 04	70	130	0.22	0.33	
	EA-510	SGMJV 08	195	66.7	0.32	0.55	
	EA-511	SGMJV 08	140	133	0.21	0.32	
	EA-520	SGMJV 08	335	40	0.46	0.84	
	EA-521	SGMJV 08	230	80	0.28	0.46	
	EA-530	SGMEV 15	650	27	0.65	1.21	
MITSUBISHI	EA-507	HG56	120	60	0.32	0.57	
	EA-508	HG56	70	110	0.22	0.36	
	EA-510	HG-(H)75	185	50	0.37	0.67	
	EA-511	HG-(H)75	130	100	0.24	0.39	
	EA-520	HG-(H)105	440	32	0.54	1.01	
	EA-521	HG-(H)105	230	60	0.34	0.59	
	EA-530	HG-(H)104	650	24	0.70	1.32	
SANYO	EA-507	R2Ax 06040	120	66.7	0.30	0.52	
	EA-508	R2Ax 06040	70	130	0.22	0.33	
	EA-510	R2Ax 08075	210	66.7	0.32	0.55	
	EA-511	R2Ax 08075	145	130	0.22	0.34	
	EA-520	R2Ax 08075	270	45	0.43	0.77	
	EA-521	R2Ax 08075	175	95	0.28	0.43	
	EA-507	1FK2203	85	80	0.28	0.46	
SIEMENS	EA-508	1FK2203	60	140	0.22	0.32	
	EA-510	1FK2204	150	65	0.33	0.56	
	EA-511	1FK2204	105	130	0.22	0.33	
	EA-520	1FK2205	425	33	0.53	0.98	
	EA-520	1FK7042	435	50	0.44	0.74	
	EA-521	1FK2205	230	65	0.30	0.53	
	EA-521	1FK7042	230	90	0.27	0.43	
	EA-530	1FK2206	650	35	0.56	0.98	
	EA-530	1FK7062	650	40	0.52	0.89	

* At 1 rpm; for more, please refer to p. 118

** for Siemens / Heidenhain

*** Without clamping; for times, please refer to p. 132

**** not with 35iB

For calculation of load, forces and torques, please see p. 114

Important information

- The limit values as set out in the corresponding parameter list take precedence over the data and information provided in the main catalog (due to motor, drive enhancement and the respective machine CNC)
- Motor-independent data are optimum values at operating temperature
- Further details are available at www.lehmann-rotary-tables.com, under Down-load / Commissioning



Labyrinth seal
(cutaway view)

- Recommended for:
- grinding operations
 - high coolant pressures
 - Glass and ceramics machining
 - extremely fine abrasive particles

Accessories

Base plates pp. 38/39, Motor, cable, angular position measuring system and pL-CNC starting at p. 76. Accessories starting at p. 68

Options

Item no.	Description
GET.5xx-GEN	Increased gear precision ¹⁾
GEO.5xx-GEN	Incr. geometric precision, 1/2 standard tolerance
SPI.5xx-Lab ²⁾	Spindle seal with labyrinth, integrated sealing air pressure control

¹⁾ incl. lower radial and axial run-out of 0.003 mm

²⁾ for 507/510: HSK and ripas clamping not possible manually, GET.5xx-GEN and GEO.5xx-GEN only partly possible (lower radial and axial run-out cannot always be achieved)

Suitable alignment elements

Item no.	Designation	Slot width	Weight [kg]
AUR.St-12		12h6	0.07
AUR.St-14		14h6	0.07
AUR.St-16	Alignment block, 1 pair	16h6	0.07
AUR.St-18		18h6	0.07

The EA clamped in another way ...



Center height increase

	Item no.	Designation	Increase / center height D	Weight [kg]
EA-507 (508)	GPL.507-150	Base plate for center height increase	40 mm / 150 mm	4.67
EA-510 (511)	GPL.510-180		30 mm / 180 mm	
EA-520 (521)	GPL.520-220		40 mm / 220mm	12.15
EA-530	GPL.530-280		60 mm / 280 mm	



Vertical clamping

	Item no.	DDF	SPZ	WMS 2	WMS 7	WMS C	Height [mm]	Weight [kg]
EA-510 (511)	GPL.510ver-180	•				•	180	7.93
EA-510 (511)	GPL.510ver-240*	•	•	•		•	240	20.37
EA-520 (521)	GPL.520ver-215	•				•	215	21.16
EA-520 (521)	GPL.520ver-275*	•	•	•		•	275	
EA-530	GPL.530ver-255	•				•	255	
EA-530	GPL.530ver-310*	•	•	•	•	•	310	

* only 1 accessory possible (e.g. DDF), cannot be combined (e.g. DDF+SPZ)

WMS = for angular position measuring systems (WMS 2 small, WMS 7 large); for more, please refer to **p. 76/77**

SPZ = for clamping cylinder; for more, please refer to **p. 70/71**

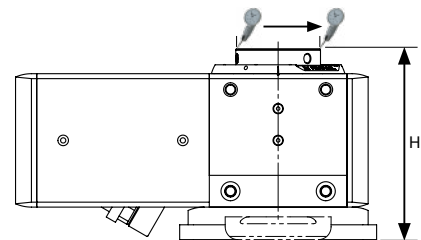
DDF = for rotary union; for more, please refer to **p. 72**



Add-on housing for vertical clamping. Shown with rotary union.



Add-on housing for vertical clamping. Shown with angular position measuring system "compact".



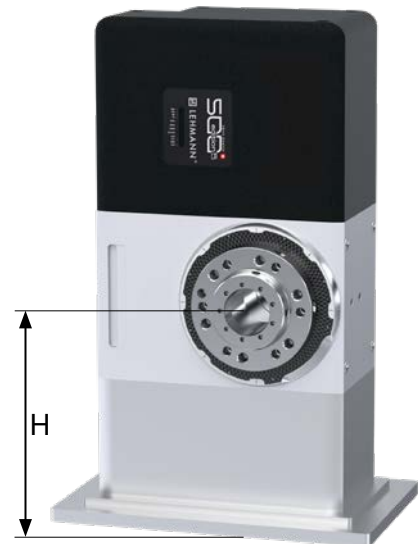
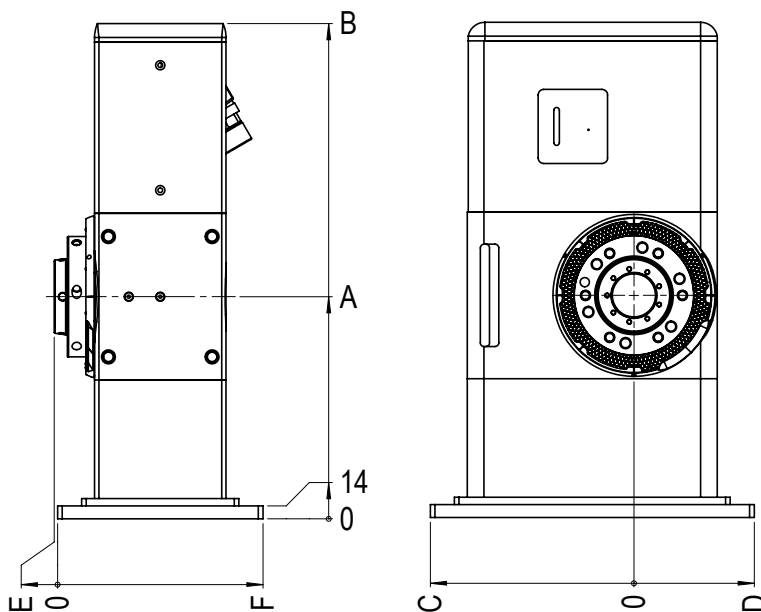
0.01/100 mm (increased: 0.005/100 mm)
H = ±0.1

... the solution for horizontal machining centers



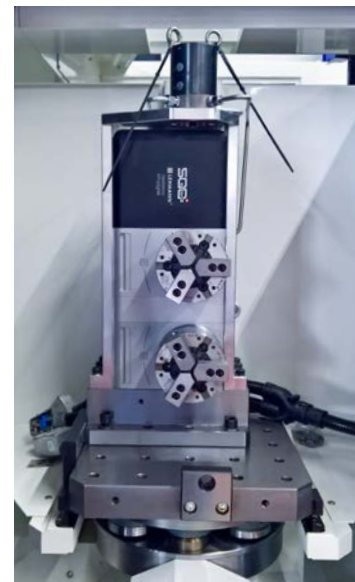
Lateral clamping

	Item no.	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	H [mm]	Weight [kg]
EA-510 (511)					on request				
EA-520 (521)	GPL.520hor-240	240	575	220	130	4	222	240	
EA-530					on request				



Options

Item no.	Description
GEO.5xx-GEN	Incr. geometric precision, 1/2 standard tolerance



Overview,
Applications

System &
Facts, smartBox

Rotary
tables

SPZ,
DDF, WMS

MOT, KAB,
WDF, CNC

Aligning,
GLA, RST, LOZ

Service
& Technology

Tooling

Solution well suited to simple and efficient applications such as prototyping, special machines, training workshops, on flat grinding machines, etc.



Application

For manufacturing individual parts and small series, and for reworking, in applications that demand exceptional flexibility and ultra-fast retooling



QuickConnect

- Connection cable to machine CNC
- «Start» input signal
- «Reset» input signal
- «In Position» output signal
- 24V emergency stop link

Version

- Rotary table with stepper motor and control
- QuickControl software including tablet for angle positioning, with pitch calculator, endless function, absolute or incremental movement, direct or TEACH-IN programming, program memory, M-function
- QuickData: external position specification (programming on machine CNC only!)

Extremely simple production solution with ControlTablet and QuickControl software – manual or automatic, with program memory, TEACH-IN, and other options

Ready
within
minutes



Connect
power
and air



Connect
to tablet
or PC



Start
QuickControl
software



*On request

				EA-P07.L/R NA*	EA-P08.L/R NA
Dimension	Swivel ø		mm	160	
	Center height		mm	110	
	Total weight	with motor	kg	25	
	Center bore	throughout	mm	31	
Bearing / clamping	Max. clamping torque	Compressed air 6 bar	Nm	300	250
	Max. spindle load	with tailstock	kg	200	
		without tailstock	kg	100	
		Standard load ¹⁾	kg	17	12
	Max. axial force		kN	44	
Gear unit	Max. pull-out torque		Nm	1,200	
	Max. feed torque ³⁾		Nm	60	35
	Torque limit values from eccentric loads ⁴⁾		Nm	25	9 ⁵⁾
	Indexing accuracy Pa ²⁾		± arcsec	20	
	Repeatability Ps average		± arcsec	2	
Precision	Max speed	with standard load ¹⁾	rpm	10	16
	Radial run-out ²⁾	on spindle ø	µm	6 / 3	
	Axial run-out ²⁾	at spindle end face	µm	6 / 3	
	Parallelism ²⁾	Rotary axis to footprint	µm/100mm	10 / 5 ²⁾	

¹⁾ Mutually dependent; drive data for NANOTEC stepper motor ST6018L3008-B at 20% duty cycle

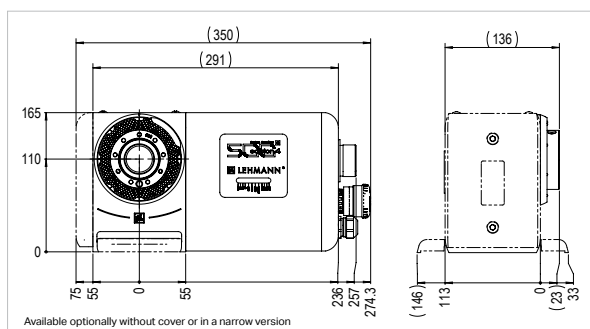
²⁾ Standard / increased (optional); for measuring method and validity of the values, refer to p. 74

³⁾ Limit value for gear unit, at 1 rpm

⁴⁾ For torque calculation, see p. 114

⁵⁾ Limit value for self-locking, gear unit

= High Series
(high speed, high resistance)



Options

Item No.	Description
GET.5xx-GEN	Increased gear unit precision ¹⁾
GEO.5xx-GEN	Incr. geometric precision, ½ standard tolerance
SPI.5xx-Lab ²⁾	Spindle seal with labyrinth, integrated sealing air pressure control

¹⁾ incl. increased radial and axial run-out 0.003 mm

²⁾ for 507/510: HSK and ripas clamping not possible manually, GET.5xx-GEN and GEO.5xx-GEN only partly possible (increased radial and axial run-out cannot always be reached)

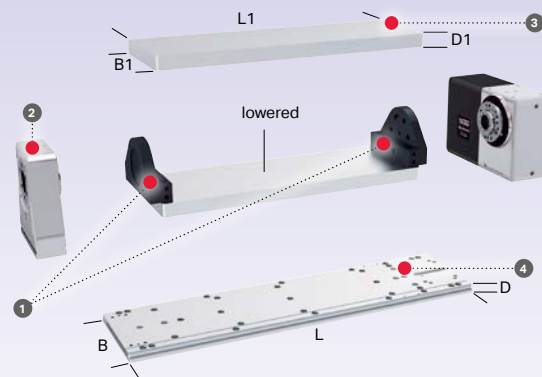
Suitable alignment elements

Item No.	Designation	Slot width	Weight [kg]
AUR.St-12	Alignment nut, 1 pair	12h6	0.07
AUR.St-14		14h6	0.07
AUR.St-16		16h6	0.07
AUR.St-18		18h6	0.07

rotoFIX Clamping Yoke System



Hole pattern system for table slot spacings of 100 and 125



In order to meet more demanding accuracy requirements, we recommend using a direct angular position measuring system (pp. 76/77)

			EA-507 (EA-508)		EA-510 (EA-511)		EA-520 (EA-521)			EA-530	
1 Bore sets	Sph	[mm]	140		180		210			218	
	Aluminum	Item no.	RFX.507-ASa		RFX.510-ASa-TOP		RFX.520-ASa-TOP			RFX.530-ASa-TOP	
	Weight	[kg]	2.86		4.09		6.88				
	DT	Prep. DDF 4-fluted*	Item no. DDF.507-RFX-04		Item no. DDF.510-RFX-04		Item no. DDF.520-RFX-04			Item no. DDF.530-RFX-04	
		Prep. DDF 6-fluted*	Item no. -		Item no. -		Item no. DDF.520-RFX-06			Item no. DDF.530-RFX-06	
	GLA	Prep. DDF 4-fluted*	Item no. DDF.507-RFX-04		Item no. DDG.510-RFX-04-TOP		Item no. DDG.520-RFX-04-TOP			Item no. DDG.520-RFX-04-TOP	
		Prep. DDF 6-fluted*	Item no. -		Item no. DDG.510-RFX-06-TOP		Item no. DDG.520-RFX-06-TOP			Item no. DDG.520-RFX-06-TOP	
2 Counter bearing (GLA)		Item no.	GLA.TOP1-110		GLA.TOP2-150		GLA.TOP2-180			GLA.TOP2-180	
3 Clamping yokes	Length L1	[mm]	350 450		500** 600**		600** 700** 800**			800 1000	
	Width B1	[mm]	165		215		270			270	
	Thickness D1	[mm]	20		35		40			40	
	Aluminum	Item no.	RFX.507-SB350a	RFX.507-SB450a	RFX.510-SB500a	RFX.510-SB600a	RFX.520-SB600a	RFX.520-SB700a	RFX.520-SB800a	RFX.520-SB800a	RFX.520-SB1000a
	Weight	[kg]	3.11	4.00	10.14	12.17	17.47	20.38	23.30	23.30	29.13
	Steel	Item no.	RFX.507-SB350s	RFX.507-SB450s	RFX.510-SB500s	RFX.510-SB600s	RFX.520-SB600s	RFX.520-SB700s	RFX.520-SB800s	RFX.520-SB800s	RFX.520-SB1000s
4 Base plates	Weight	[kg]	9.04	11.63	29.48	35.38	50.78	59.26	67.74	67.74	84.70
	Length L	[mm]	622	722	785	885	916	1016	1116	1172	1372
	Width B	[mm]	168		248		301			368	
	Thickness D	[mm]	30		30		30			38	
	Steel	Item no.	RFX.507-GP350s-TOP	RFX.507-GP450s-TOP	RFX.510-GP500s-TOP	RFX.510-GP600s-TOP	RFX.520-GP600s-TOP	RFX.520-GP700s-TOP	RFX.520-GP800s-TOP	RFX.530-GP800s-TOP	RFX.530-GP1000s-TOP
	Weight	[kg]	31.01	36.14	46.26	52.10	64.72	71.81	78.90	128.55	150.50
Moments of inertia (without rotary table, without counter bearing)	Mom. inert. (Al)	[kgm ²]	0.02	0.02	0.06	0.07	0.16	0.17	0.21	on request	
	Mom. inert. (steel)	[kgm ²]	0.04	0.05	0.17	0.21	0.46	0.50	0.60		

fix = Clamping is permanently attached to rotary table; adjustable = Clamping with flexible conduit, assembled by customer
Moments of inertia only for centered placement; eccentric on request

* For suitable rotary union, please refer to p. 72/73

** When the clamping yoke is mounted eccentrically, the zentriX alignment system cannot be used (risk of collision)

Important information

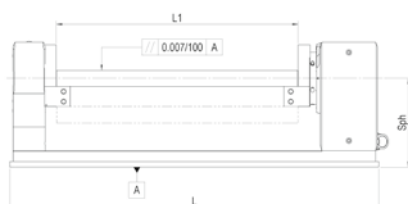
When retrofitting, it may be necessary to reduce the rotational speed, acceleration and gear backlash. The rotary table, rotoFIX and the counter bearing must be installed coaxially to one another <0.05 mm.

Standard load from steel

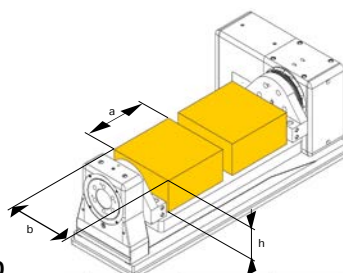
Type	Standard load a × b × h [mm]	Weight [kg]	Moment of inertia J with sls* clamping yoke (Alu) below [kgm ²]	Moment of inertia J with sls* clamping yoke (Alu) centric [kgm ²]
507	2 × 130 × 130 × 65	17	0.07	0.08
510	2 × 173 × 173 × 83	42	0.28	0.35
520	2 × 228 × 228 × 114	90	0.92	1.26
530	2 × 273 × 273 × 136	161	on request	

*sls = Standard load, cube pp. 112/113

Can be moved with standard drive data for EA-type rotary tables (see p. 37); larger loads require a reduction in rotational speed, acceleration and jolt.



For alignment and clamping, please refer to p. 90



Also available adjustable

Support of longer workpieces with adjustable
tailstock or counter bearing



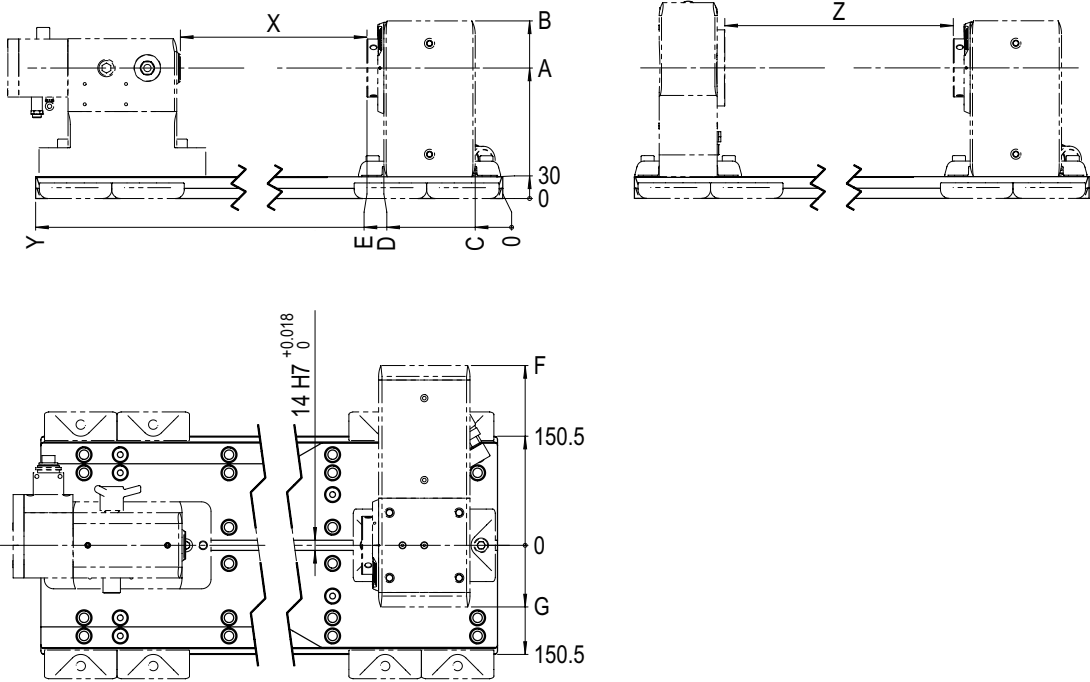
longFLEX base plate kit

Item no.		A	B	C	D	E	F	X	Y	Z	Weight*
		[mm]									[kg]
507	LFX.5xx-400s-2	140	195	38	151	174	236	415	787	512	82
	LFX.5xx-600s-2							615	987	712	93
	LFX.5xx-800s-2							815	1187	912	102
	LFX.5xx-1000s-2							1015	1387	1112	113
510	LFX.5xx-400s-2	180	245	38	164	187	248 (270)	400	787	475	94
	LFX.5xx-600s-2							600	987	675	105
	LFX.5xx-800s-2							800	1187	875	114
	LFX.5xx-1000s-2							1000	1387	1075	125
520	LFX.5xx-400s-2	210	300	38	180	209	295 (320)	370	787	452	126
	LFX.5xx-600s-2							570	987	652	137
	LFX.5xx-800s-2							770	1187	852	146
	LFX.5xx-1000s-2							970	1387	1052	157

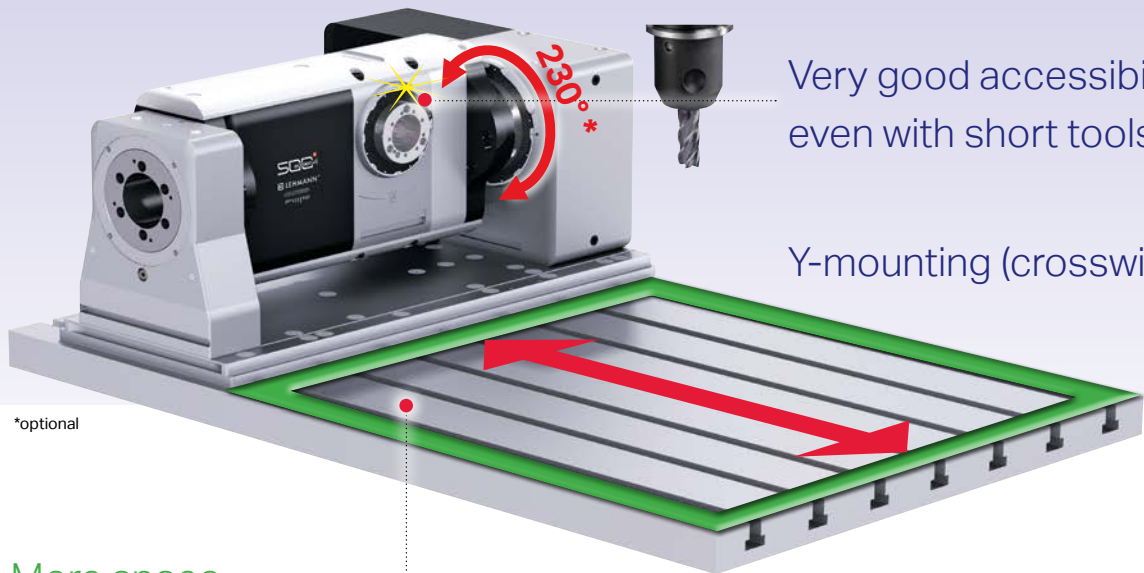
* Complete, including rotary table and tailstock, base plate (steel)

Fastening material

Item no.	Designation
LFX.GLA-Bef	for counter bearing
LFX.RST-Bef	for tailstock



For alignment and clamping, please refer to **p. 90**

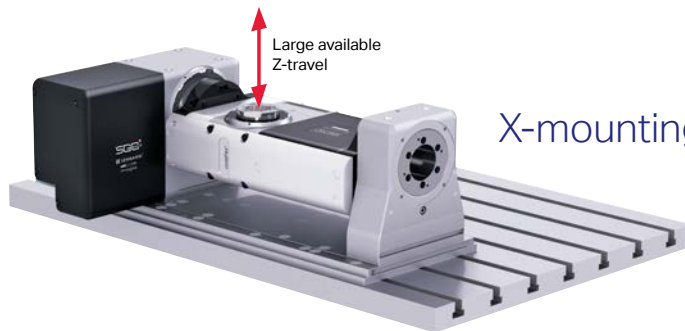


Very good accessibility,
even with short tools

Y-mounting (crosswise)

*optional

More space
for workpiece and fixtures



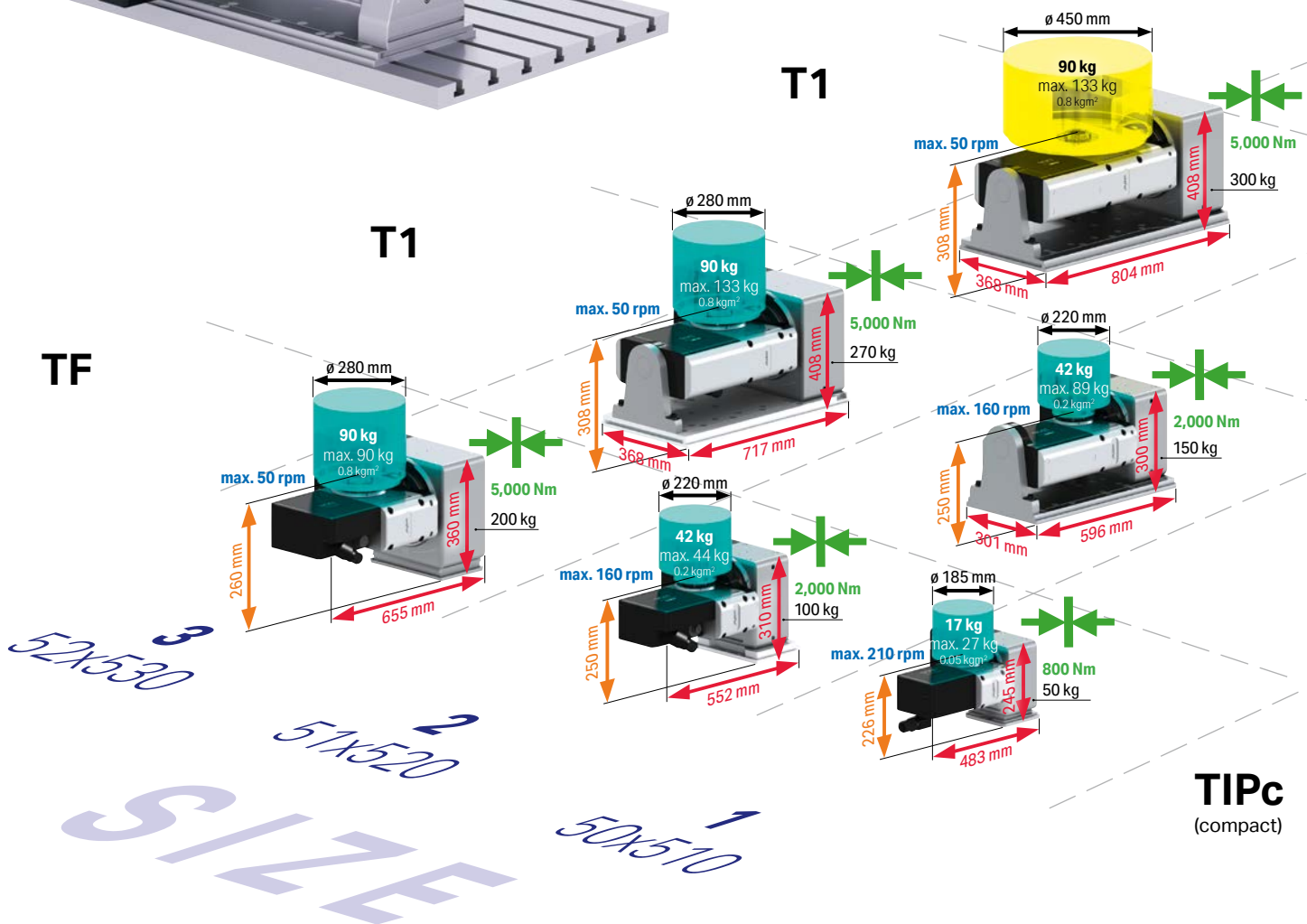
X-mounting (lengthwise)

T1

T1

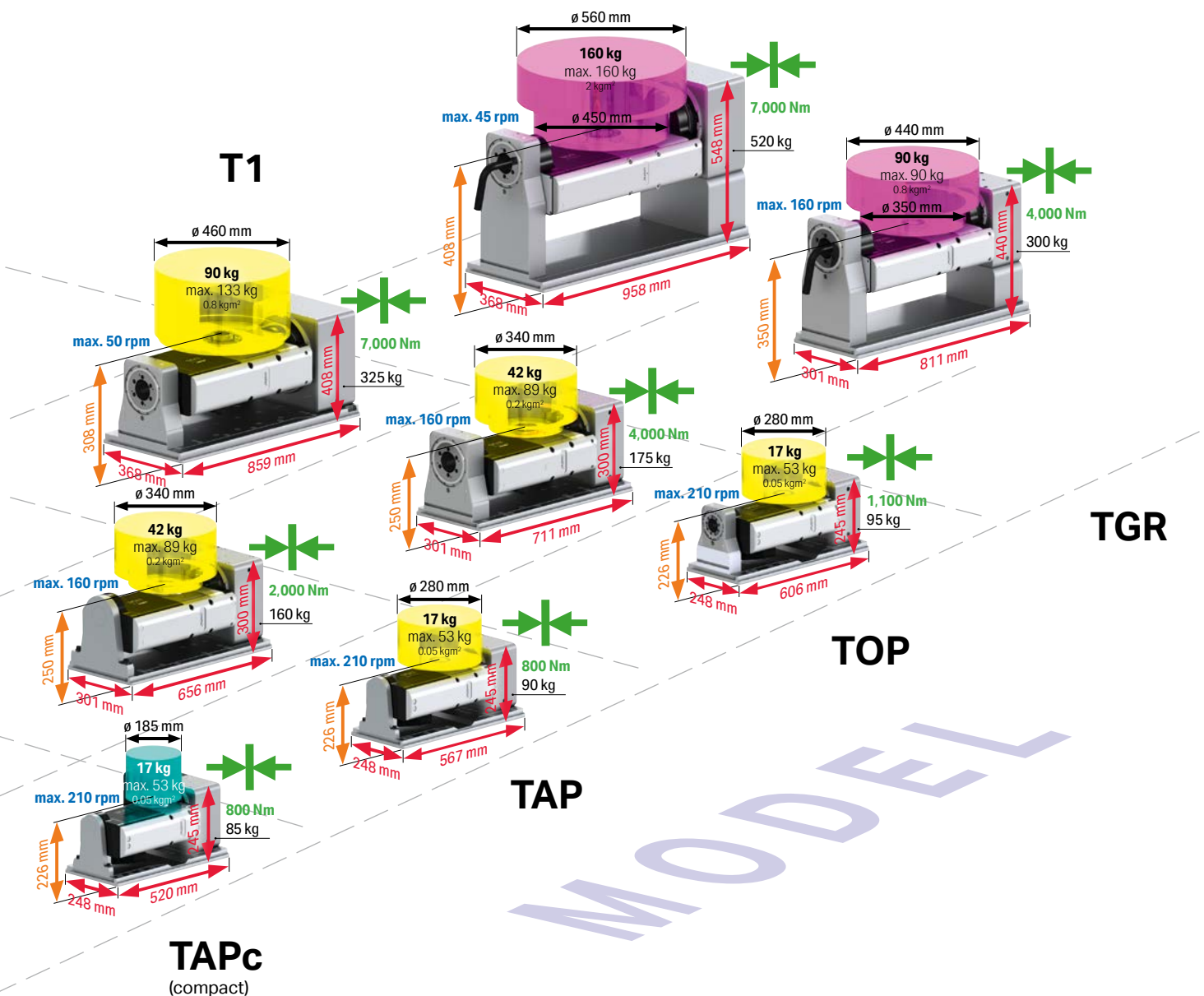
T1

TF



Facts

- Up to 150 % higher clamping torque in tilting axis
- Fewer variants – more solutions
- Larger workpiece $\varnothing$ possible
- Spatially optimized arrangement of the dividing axis



50x510	507510 (standard) or 508510 (high speed)
51x520	510520 (standard) or 511520 (high speed)
52x530	520530 (standard) or 521530 (high speed)
TIPc	Two-axis rotary table, no counter bearing, compact
TAPc	Two-axis rotary table, with supporting bearing, compact
TAP	Two-axis rotary table, with supporting bearing
TOP	Two-axis rotary table, with clamped counter bearing
TGR	Two-axis rotary table, with clamped counter bearing specifically for grinding applications



*optional

 = Dividing axis for High Series (high speed, high resistance)

				TF-507510 TIP1c	TF-508510 TIP1cs	TF-510520 TIP2c	TF-511520 TIP2cs	TF-520530 TIP3c	TF-521530 TIP3cs
Dimensions	Swivel ø	mm		180		220		195	
	Swiveling range	degrees		90° +5°/-25° (optional 180° ±25°)					
	Center height	mm		180		210		220	
	Total weight	kg	with motor	65		110		220	
	Center bore	mm	Standard / increased	30		34		46 / 64	
Bearing / Clamping	Max. clamping torque	Nm	4 th axis	300	250	800	600	2,000	1,800
		Nm	5 th axis	800		2,000		5,000	
	Max. spindle load	kg	0°–30°	40		66		135	
		kg	30°–90°	27		44		90	
		kg	Standard load ¹⁾	17	12	42	21	90	61
	Max. axial force	kN	4 th axis	6		10		40	
	Max. pull-out torque	Nm	4 th axis	1,200		2,000		3,900	
		Nm	5 th axis	2,000		3,900		10,400	
Gear unit	Max. moment of inertia	kgm ²	Standard load ¹⁾	0.05	0.025	0.2	0.07	0.8	0.4
		kgm ²	J max	0.5	0.25	2	0.7	8	4
	Feed torque max ³⁾	Nm	4 th axis	120	70	250	150	440	220
		Nm	5 th axis	230		440		650	
	Limited torques due to eccentric loads (acting on the tilting axis) ⁵⁾	Nm		40		110		280	
	Gear unit loading	Nm	without load	-12		-22		-44	
		Nm	with standard load	15	10	30	5	100	45
		Nm	M max	250		440		650	
Precision	Indexing accuracy Pa	± arc sec	4 th axis ²⁾	20/15		17/10		12/8	
		± arc sec	5 th axis (90°) ⁴⁾	35/20	35/22	21/22	21/13	11/38	11/20
	Repeat accuracy Ps average	± arc sec	4 th axis	2					
		± arc sec	5 th axis	2					
	Max speed at standard load	min ⁻¹	4 th axis ¹⁾	111	210	80	160	50	100
		min ⁻¹	5 th axis ¹⁾	70		40		25	
	Radial run-out ²⁾	µm	on spindle ø	6 / 3					
	Axial run-out ²⁾	µm	at spindle end face	6 / 3					
Parallelism ²⁾	Spindle to base	µm/100 mm		10 / 5					

¹⁾ Mutually dependent; for individual drive motor data, see right side

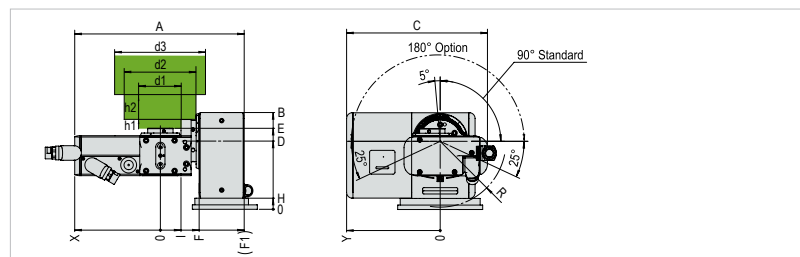
²⁾ Standard / increased; for measuring method and validity of the values, please refer to p. 74, for optional angular position measuring systems, please refer to p. 76/77

³⁾ Limit value for gear unit, at 1 rpm

⁴⁾ Without load / with standard load 0°–90°

⁵⁾ For torque calculation, see p. 114

Dimensions



	A	A*	B	C	C*	D	E	F	F1	H	I	R	X	Y	Y*	d1	d2	d3	h1	h2
TIP1c	466		245	382	404	180	226	104	230	30	55	147	236	248	270		186	350		55
TIP2c	512	534	310	444	469	220	260	122	264	40	65	173	248	295	320	128	220	226	30	95
TIP3c	630	655	360	554		220	260	155	335	40	90	195	295	390		178	282	326	66	166

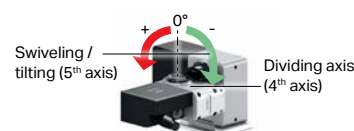
Dimensions with 508, 511 or 521 identical to 507510, 510520 and 520530.

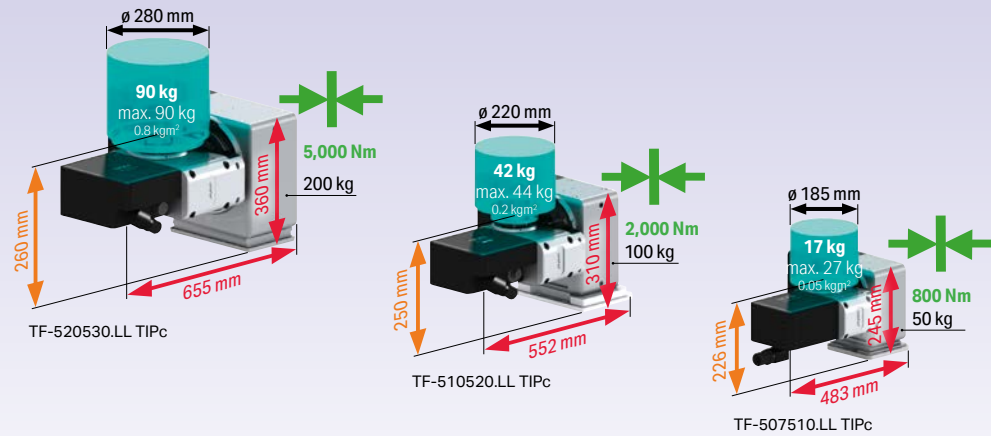
*With large motor (option)

Important information

Center height increase (option)

Depending on the accessories involved (clamping cylinder, rotary union, angular position measuring system...), a center height increase (dimension D) is required. (See page for respective accessory)





Drive data

(based on standard load cube shown on pp. 112/113)

		Motors 4 th /5 th	Feed* [Nm]		Speed [rpm]		Cycle time*** [sec]				
			4 th	5 th	4 th	5 th	4 th	5 th	4 th	5 th	5 th
MAVILOR / MOVINOR**	TF-507510 TIP1c	BLS-072/BLS-072	120	230	111	70	0.26	0.43	0.39	0.64	
	TF-508510 TIP1c	BLS-072/BLS-072	70	230	210	70	0.23	0.43	0.29	0.64	
	TF-510520 TIP2c	BLS-072/BLS-073	250	425	80	45	0.30	0.50	0.49	0.83	
	TF-510520 TIP2c	BLS-072/LN-098	250	440	80	40	0.30	0.50	0.49	0.87	
	TF-511520 TIP2c	BLS-072/BLS-073	150	425	160	45	0.23	0.50	0.31	0.83	
	TF-511520 TIP2c	BLS-072/LN-098	150	440	160	40	0.23	0.50	0.31	0.87	
FANUC	TF-520530 TIP3c	BLS-073/LN-098	440	650	50	25	0.41	0.89	0.71	1.49	
	TF-521530 TIP3c	LN-098/LN-098	220	650	90	25	0.27	0.74	0.43	1.34	
	TF-507510 TIP1c	β1 is/α2 (HV)is	80	110	66.7	45	0.30	0.49	0.53	0.83	
	TF-508510 TIP1c	β1 is/α2 (HV)is	55	110	130	45	0.25	0.49	0.36	0.83	
	TF-510520 TIP2c	α2 (HV)is/α2 (HV)is	120	195	55	29	0.36	0.66	0.63	1.18	
	TF-510520 TIP2c	α2 (HV)is/α4 (HV)is	120	335	55	30	0.36	0.64	0.63	1.14	
YASKAWA SGM7J	TF-511520 TIP2c	α2 (HV)is/α2 (HV)is	85	195	100	29	0.24	0.66	0.39	1.18	
	TF-511520 TIP2c	α2 (HV)is/α4 (HV)is	85	335	100	30	0.24	0.64	0.39	1.14	
	TF-520530 TIP3c	α2 (HV)is/α4 (HV)is	210	395	33	20	0.54	0.94	0.99	1.69	
	TF-520530 TIP3c	α4 (HV)is/α8 (HV)is****	355	650	33	25	0.56	0.89	1.01	1.49	
	TF-521530 TIP3c	α4 (HV)is/ α4 (HV)is	220	355	60	22	0.37	0.84	0.62	1.52	
	TF-507510 TIP1c	SGM7J 06/08	120	180	66	60	0.30	0.44	0.53	0.69	
YASKAWA SGMJV	TF-508510 TIP1c	SGM7J 06/08	70	180	133	60	0.22	0.44	0.33	0.69	
	TF-510520 TIP2c	SGM7J 08/08	195	315	66.6	38	0.32	0.54	0.55	0.94	
	TF-511520 TIP2c	SGM7J 08/08	135	315	133	38	0.22	0.54	0.33	0.94	
	TF-507510 TIP1c	SGMJV 04/08	115	180	66.7	60	0.30	0.44	0.53	0.69	
	TF-508510 TIP1c	SGMJV 04/08	70	180	130	60	0.22	0.44	0.33	0.69	
	TF-510520 TIP2c	SGMJV 08/08	195	315	66.7	38	0.32	0.54	0.55	0.94	
MITSUBISHI	TF-511520 TIP2c	SGMJV 08/08	140	315	133	38	0.21	0.54	0.32	0.94	
	TF-520530 TIP3c	SGMJV/EV 08/15	335	650	40	25	0.46	0.89	0.84	1.49	
	TF-521530 TIP3c	SGMJV/EV 08/15	220	650	80	25	0.28	0.74	0.46	1.34	
	TF-507510 TIP1c	HG56/75	120	170	60	45	0.32	0.49	0.57	0.83	
	TF-508510 TIP1c	HG56/75	70	170	110	45	0.22	0.49	0.36	0.83	
	TF-510520 TIP2c	HG-(H)75/(H)105	185	430	50	30	0.37	0.59	0.67	1.09	
SANYO	TF-511520 TIP2c	HG-(H)75/(H)105	130	430	100	30	0.24	0.59	0.39	1.09	
	TF-520530 TIP3c	HG-(H)105/(H)104	440	650	32	20	0.54	0.94	1.01	1.69	
	TF-521530 TIP3c	HG-(H)105/(H)104	220	650	60	22	0.34	0.82	0.59	1.50	
	TF-507510 TIP1c	R2Ax 06040/08075	120	185	66.7	60	0.30	0.44	0.52	0.69	
	TF-508510 TIP1c	R2Ax 06040/08075	70	185	130	60	0.22	0.44	0.33	0.69	
	TF-510520 TIP2c	R2Ax 08075/08075	210	245	66.7	40	0.32	0.54	0.55	0.92	
SIEMENS	TF-511520 TIP2c	R2Ax 08075/08075	145	245	130	40	0.22	0.54	0.34	0.92	
	TF-507510 TIP1c	1FK2203/1FK2204	85	150	80	55	0.28	0.45	0.46	0.73	
	TF-508510 TIP1c	1FK2203/1FK2204	60	150	140	55	0.22	0.45	0.32	0.73	
	TF-510520 TIP2c	1FK2204/1FK2205	150	425	65	30	0.33	0.59	0.56	1.09	
	TF-511520 TIP2c	1FK2204/1FK2205	105	425	130	30	0.22	0.59	0.33	1.09	
	TF-520530 TIP3c	1FK2205/1FK2206	425	650	33	25	0.53	0.74	0.98	1.34	
	TF-520530 TIP3c	1FK7042/1FK7062	435	650	50	25	0.44	0.77	0.74	1.37	
	TF-521530 TIP3c	1FK2205/1FK2206	220	650	65	25	0.30	0.74	0.53	1.34	
	TF-521530 TIP3c	1FK7042/1FK7062	220	650	90	25	0.27	0.74	0.43	1.34	

* At 1 rpm; for more, please refer to p. 118

*** Without clamping; for times, please refer to p. 132

** for Siemens / Heidenhain

**** not with 35iB

Item no.

TF-510520.LL TIP-F1	
Motor	BE=Beckhoff, F1=Fanuc is (200 V), F2=Fanuc HV is (400 V), M1=Movinor/Mavilor ERN, M2=Movinor/Mavilor EQN 1125, M3=Movinor/Mavilor EQN 1135, M3=Mitsubishi 200V, M4=Mitsubishi 400V, S2=Sanyo, Y2=Yaskawa SGMJV/SGMEV, Y4=Yaskawa SGM7J
Divider add-on version	
Swiveling axis motor position	L=left, R=right
Dividing axis motor position	L=left, R=right
Swiveling axis size	510, 520
Dividing axis size	507, 510, 520
Rotary table model	

For calculation of load, forces and torques, please see p. 114

Important information

- The limit values as set out in the corresponding parameter list take precedence over the data and information provided in the main catalog (due to motor, drive enhancement and the respective machine CNC)
- Motor-independent data are optimum values at operating temperature
- Further details are available at www.lehmann-rotary-tables.com, under Download / Commissioning



Labyrinth seal (cutaway view)

Recommended for:

- Grinding operations
- High coolant pressures
- Extremely fine abrasive particles

Accessories

Motor, cable, angular position measuring system and pL CNC starting at p. 76. Accessories starting at p. 68

Options

Item no.	Description
GET.5xx-GEN	Increased gear precision ¹⁾
GEO.5xx-GEN	Incr. geometric precision, 1/2 standard tolerance
SPI.5xx-Lab ²⁾	Spindle seal with labyrinth, integrated sealing air pressure control
SWB.510-180	Tilting range increase from 90° to 180° (with overshoot to max. 230°)
SWB.520-180	
SWB.530-180	

¹⁾ incl. lower radial and axial run-out of 0.003 mm

²⁾ for 507/510: HSK and ripas clamping not possible manually, GET.5xx-GEN and GEO.5xx-GEN only partly possible (lower radial and axial run-out cannot always be achieved)

Suitable alignment elements

Item no.	Designation	Slot width	Weight [kg]
AUR.St-12		12g6	0.07
AUR.St-14	Alignment	14g6	0.07
AUR.St-16	T-slot nuts, 1 pair	16g6	0.07
AUR.St-18		18g6	0.07



*optional

 = High Series
(high speed, high resistance)

				TF-508511 TIP1cs	TF-511521 TIP2cs
Dimensions	Swivel ø	mm		180	220
	Swiveling range	degrees		90° +5°/-25° (optional 180° ±25°)	
	Center height	mm		180	210
	Total weight	with motor	kg	65	110
	Center bore	Standard / increased	mm	30	34
Bearing / Clamping	Max. clamping torque	4 th axis	Nm	250	600
		5 th axis	Nm	600	1,800
	Max. spindle load	0°–30°	kg	40	66
		30°–90°	kg	27	44
		Standard load ¹⁾	kg	12	21
	Max. axial force	4 th axis	kN	6	10
	Max. pull-out torque	4 th axis	Nm	1,200	2,000
		5 th axis	Nm	2,000	3,900
Gear unit	Max. moment of inertia	Standard load ¹⁾	kgm ²	0.025	0.07
		J max	kgm ²	0.25	0.7
	Feed torque max ³⁾	4 th axis	Nm	70	150
		5 th axis	Nm	130	210
	Limited torques due to eccentric loads (acting on the tilting axis) ⁵⁾		Nm	30	45
	Gear unit loading	without load	Nm	-12	-22
		with standard load	Nm	10	5
		M max	Nm	150	230
	Indexing accuracy Pa	4 th axis ²⁾	± arc sec	20/15	17/10
		5 th axis (90°) ⁴⁾	± arc sec	35/22	21/13
Precision	Repeat accuracy Ps average	4 th axis	± arc sec		2
		5 th axis	± arc sec		2
	Max speed at standard load	4 th axis ¹⁾	min ⁻¹	210	160
		5 th axis ¹⁾	min ⁻¹	80	50
	Radial run-out ²⁾	on spindle ø	µm		6 / 3
	Axial run-out ²⁾	at spindle end face	µm		6 / 3
	Parallelism ²⁾	Spindle to base	µm/100 mm		10 / 5

¹⁾ Mutually dependent; for individual drive motor data, see right side

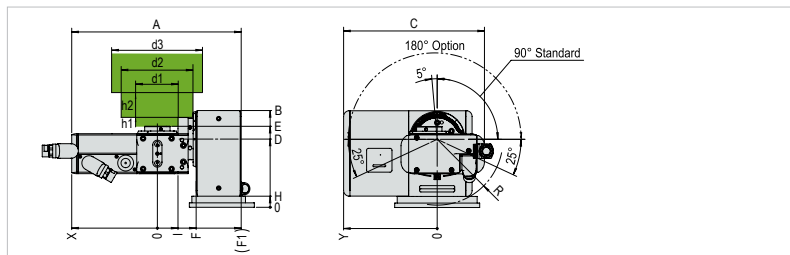
²⁾ Standard / increased; for measuring method and validity of the values, please refer to **p. 74**, for optional angular position measuring systems, please refer to **p. 76/77**

³⁾ Limit value for gear unit, at 1 rpm

⁴⁾ Without load / with standard load 0°–90°

⁵⁾ For torque calculation, see **p. 114**

Dimensions



	A	A*	B	C	C*	D	E	F	F1	H	I	R	X	Y	Y*	d1	d2	d3	h1	h2
TIP1c	466		245	382	404	180	226	104	230	30	55	147	236	248	270		186	350		55
TIP2c	512	534	310	444	469	220	260	122	264	40	65	173	248	295	320	128	220	226	30	95

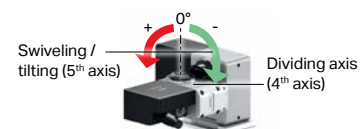
Dimensions with 508, 511 or. 521 identical to 507510, 510520 and 520530.

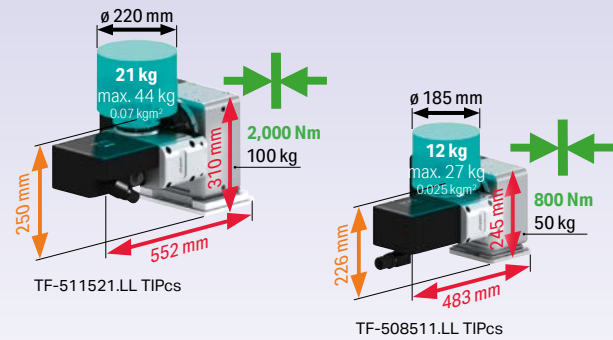
*With large motor (option)

Important information

Center height increase (option)

Depending on the accessories involved (clamping cylinder, rotary union, angular position measuring system...), a center height increase (dimension D) is required. (See page for respective accessory)





Drive data

(based on standard load cube shown on pp. 112/113)

		Motors 4 th /5 th	Feed* [Nm]		Speed [rpm]		Cycle time*** [sec]		
			4 th	5 th	4 th	5 th	4 th	5 th	5 th
MAVILOR / MOVINOR**	TF-507511 TIP1c	BLS-072/BLS-072	120	130	111	80	0.26	0.38	0.37
	TF-508511 TIP1c	BLS-072/BLS-072	70	130	210	80	0.23	0.38	0.29
	TF-510521 TIP2c	BLS-072/BLS-073	250	210	80	50	0.30	0.44	0.49
	TF-511521 TIP2c	BLS-072/LN-098	250	210	80	50	0.30	0.44	0.49
	TF-511521 TIP2c	BLS-072/BLS-073	150	210	160	50	0.23	0.44	0.31
FANUC	TF-507511 TIP1c	BLS-072/LN-098	150	210	160	50	0.23	0.44	0.31
	TF-508511 TIP1c	β1 is/α2 (HV)is	80	75	66.7	60	0.30	0.49	0.53
	TF-510521 TIP2c	α2 (HV)is/α2 (HV)is	120	120	55	45	0.36	0.34	0.63
	TF-510521 TIP2c	α2 (HV)is/α2 (HV)is	120	210	55	50	0.36	0.44	0.63
	TF-511521 TIP2c	α2 (HV)is/α2 (HV)is	85	120	100	45	0.24	0.54	0.39
YASKAWA SGM7J	TF-507511 TIP1c	α2 (HV)is/α2 (HV)is	85	210	100	50	0.24	0.44	0.39
	TF-508511 TIP1c	SGM7J 06/08	120	120	66	70	0.30	0.30	0.53
	TF-510521 TIP2c	SGM7J 06/08	70	120	133	70	0.22	0.30	0.33
	TF-510521 TIP2c	SGM7J 08/08	195	205	66.6	50	0.32	0.44	0.55
	TF-511521 TIP2c	SGM7J 08/08	135	205	133	50	0.22	0.44	0.33
YASKAWA SGMJV	TF-507511 TIP1c	SGMJV 04/08	115	120	66.7	70	0.30	0.39	0.53
	TF-508511 TIP1c	SGMJV 04/08	70	120	130	70	0.22	0.39	0.33
	TF-510521 TIP2c	SGMJV 08/08	195	205	66.7	50	0.32	0.44	0.55
	TF-511521 TIP2c	SGMJV 08/08	140	205	133	50	0.21	0.44	0.32
MITSUBISHI	TF-507511 TIP1c	HG56/75	120	115	60	60	0.32	0.41	0.57
	TF-508511 TIP1c	HG56/75	70	115	110	60	0.22	0.41	0.36
	TF-510521 TIP2c	HG-(H)75/(H)105	185	210	50	50	0.37	0.44	0.67
	TF-511521 TIP2c	HG-(H)75/(H)105	130	210	100	50	0.24	0.44	0.39
	TF-507511 TIP1c	R2Ax 06040/08075	120	125	66.7	80	0.30	0.38	0.52
SANYO	TF-508511 TIP1c	R2Ax 06040/08075	70	125	130	80	0.22	0.38	0.33
	TF-510521 TIP2c	R2Ax 08075/08075	210	155	66.7	50	0.32	0.46	0.55
	TF-511521 TIP2c	R2Ax 08075/08075	145	155	130	50	0.22	0.46	0.34
SIEMENS	TF-507511 TIP1c	1FK2203/1FK2204	85	105	80	65	0.28	0.45	0.46
	TF-508511 TIP1c	1FK2203/1FK2204	60	105	140	65	0.22	0.45	0.32
	TF-510521 TIP2c	1FK2204/1FK2205	150	210	65	50	0.33	0.44	0.56
	TF-511521 TIP2c	1FK2204/1FK2205	105	210	130	50	0.22	0.44	0.33

* At 1 rpm; for more, please refer to p. 118

*** Without clamping; for times, please refer to p. 132

** for Siemens / Heidenhain

For calculation of load, forces and torques, please see p. 114

Important information

- The limit values as set out in the corresponding parameter list take precedence over the data and information provided in the main catalog (due to motor, drive enhancement and the respective machine CNC)
- Motor-independent data are optimum values at operating temperature
- Further details are available at www.lehmann-rotary-tables.com, under Download / Commissioning



Labyrinth seal (cutaway view)

Recommended for:

- Grinding operations
- High coolant pressures
- Extremely fine abrasive particles

Accessories

Motor, cable, angular position measuring system and pL CNC starting at p. 76.
Accessories starting at p. 68

Options

Item no.	Description
GET.5xx-GEN	Increased gear precision ¹⁾
GEO.5xx-GEN	Incr. geometric precision, 1/2 standard tolerance
SPL.5xx-Lab ²⁾	Spindle seal with labyrinth, integrated sealing air pressure control
SWB.510-180	Tilting range increase from 90° to 180° (with overshoot to max. 230°)
SWB.520-180	
SWB.530-180	

¹⁾ incl. lower radial and axial run-out of 0.003 mm

²⁾ for 507/510: HSK and ripas clamping not possible manually, GET.5xx-GEN and GEO.5xx-GEN only partly possible (lower radial and axial run-out cannot always be achieved)

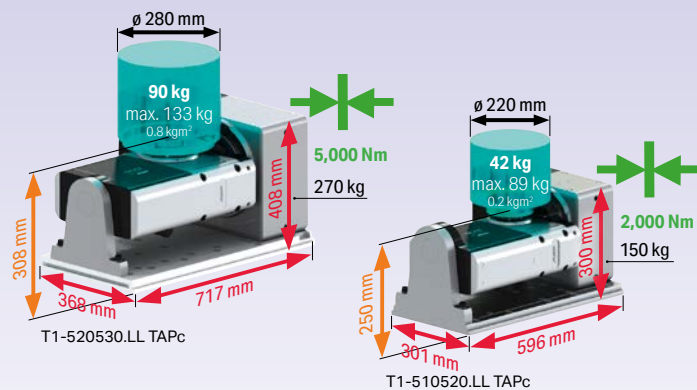
Item no.

TF-510520.LL TIP-F1	
Motor	BE=Beckhoff, F1=Fanuc is (200 V), F2=Fanuc HV is (400 V), M1=Movinor/Mavilor ERN, M2=Movinor/Mavilor EQN 1125, M3=Movinor/Mavilor EQN 1135, M3=Mitsubishi 200V, M4=Mitsubishi 400V, S2=Sanyo, Y2=Yaskawa SGMJV/SGMEV, Y4=Yaskawa SGM7J
Divider add-on version	
Swiveling axis motor position	L=left, R=right
Dividing axis motor position	L=left, R=right
Swiveling axis size	510, 520
Dividing axis size	507, 510, 520
Rotary table model	

Suitable alignment elements

Item no.	Designation	Slot width	Weight [kg]
AUR.St-12		12g6	0.07
AUR.St-14	Alignment	14g6	0.07
AUR.St-16	T-slot nuts, 1 pair	16g6	0.07
AUR.St-18		18g6	0.07

T1-Type Rotary Tables TAP (unclamped supporting bearing)



*optional

■ = Dividing axis for High Series (high speed, high resistance)

				T1-507510 TAP1(c)	T1-508510 TAP1(c)s	T1-510520 TAP2(c)	T1-511520 TAP2(c)s	T1-520530 TAP3(c)	T1-521530 TAP3(c)s		
Dimensions	Swivel ø		mm	180		220		195			
	Swiveling range		degrees	90° +5°/-25° (optional 180° ±25°)							
	Center height		mm	180		210 (235 ³⁾)		268 / 308			
	Total weight	with motor	kg	90 (85)		160 (150)		300 (270)			
	Center bore	Standard / increased	mm	30		34		46 / 64			
Bearing / Clamping	Max. clamping torque	4 th axis		Nm	300	250	800	600	2,000	1,800	
		5 th axis		Nm	800		2,000		5,000		
	Max. spindle load	0°-30°		kg	79		133		200		
		30°-90°		kg	53		89		133		
		Standard load ¹⁾		kg	17	12	42	21	90	61	
	Max. axial force	4 th axis		kN	6		10		40		
	Max. pull-out torque	4 th axis		Nm	1,200		2,000		3,900		
		5 th axis		Nm	2,000		3,900		10,400		
	Gear unit	Max. moment of inertia	Standard load ¹⁾		kgm ²	0.05	0.025	0.2	0.07	0.8	0.4
			J max		kgm ²	0.5	0.25	2	0.7	8	4
Feed torque		4 th axis		Nm	120	70	250	150	440	220	
max ⁴⁾		5 th axis		Nm	250		440		650		
Limited torques due to eccentric loads ⁶⁾			Nm	40		110		280			
Gear unit loading		without load		Nm	-12		-22		-44		
5 th Axis		with standard load		Nm	15	10	30	5	100	45	
		M max		Nm	250		440		650		
Indexing accuracy Pa		4 th axis ²⁾		± arc sec	20/15		17/10		12/8		
		5 th axis (90°) ⁵⁾		± arc sec	35/20	35/22	21/22	21/13	11/38	11/20	
Precision	Repeat accuracy Ps average	4 th axis		± arc sec	2						
		5 th axis		± arc sec	2						
	Max speed at standard load	4 th axis ¹⁾		min ⁻¹	111	210	80	160	50	100	
		5 th axis ¹⁾		min ⁻¹	60		40		25		
	Radial run-out ²⁾	on spindle ø		µm	6 / 3						
	Axial run-out ²⁾	at spindle end face		µm	6 / 3						
	Parallelism ²⁾	Spindle to base		µm/100 mm	10 / 5						

¹⁾ Mutually dependent; for individual drive motor data, see right side

²⁾ Standard / increased; for measuring method and validity of the values, please refer to p. 74, for optional angular position measuring systems, please refer to p. 76/77

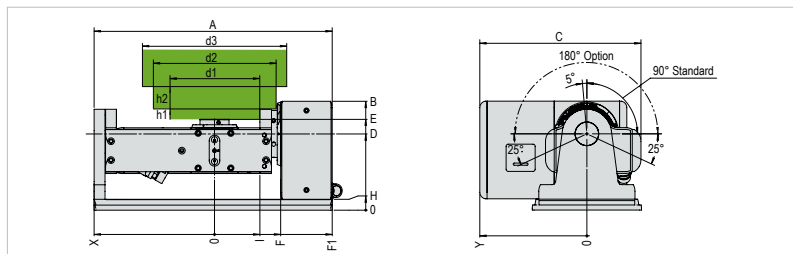
³⁾ In relation to dividing axis when in the horizontal position

⁴⁾ Limit value for gear unit, at 1 rpm

⁵⁾ Without load / with standard load 0°-90°

⁶⁾ For torque calculation, see p. 114

Dimensions



	A	B	C	C*	D	E	F	F1	H	I	R	X	Y	Y*	d1	d2	d3	h1	h2
TAP1	567	245	382	404	180	226	151	277	30	102	149	290	248	270		280	350	55	
TAP1c	520	245	382	404	180	226	104	230	30	55	149	290	248	270		186	350	55	
TAP2	656	300	444	469	210	250	182	324	30	125	173	332	295	320	248	340	400	30	95
TAP2c	596	300	444	469	210	250	122	264	30	65	173	332	295	320	128	220	400	30	95
TAP3	804	408	554		268	308	242	422	38	177	195	382	390		352	456	500	66	166
TAP3c	717	408	554		268	308	155	335	38	90	195	382	390		178	182	500	66	166

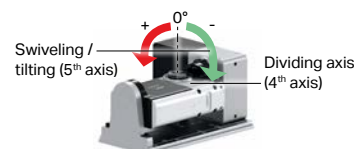
Dimensions with 508, 511 or 521 identical to 507510, 510520 and 520530.

*With large motor (option)

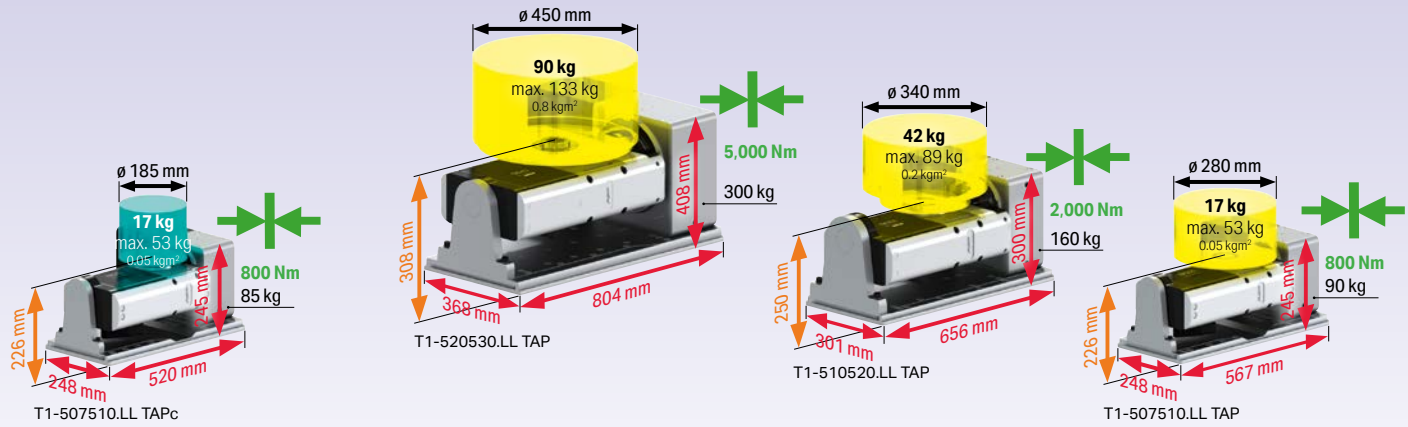
Important information

Center height increase (option)

Depending on the accessories involved (clamping cylinder, rotary union, angular position measuring system...), a center height increase (dimension D) is required. (See page for respective accessory)



T1-Type Rotary Tables TAP (unclamped supporting bearing)



Drive data

(based on standard load cube shown on pp. 112/113)

		Motors 4 th /5 th	Feed* [Nm]		Speed [rpm]		Cycle time*** [sec]		
			4 th	5 th	4 th	5 th	4 th	5 th	4 th
MAVILOR/ MOVINOR **	T1-507510 TAP1	BLS-072/BLS-072	120	230	111	70	0.26	0.43	0.39
	T1-508510 TAP1	BLS-072/BLS-072	70	230	210	70	0.23	0.43	0.29
	T1-510520 TAP2	BLS-072/LN-098	250	425	80	45	0.30	0.50	0.49
	T1-511520 TAP2	BLS-072/BLS-073	150	425	160	45	0.23	0.50	0.31
	T1-511520 TAP2	BLS-072/LN-098	150	440	160	40	0.23	0.50	0.31
	T1-520530 TAP3	BLS-073/LN-098	440	650	50	25	0.41	0.89	0.71
FANUC	T1-521530 TAP3	LN-098/ LN-098	220	650	90	25	0.27	0.74	0.43
	T1-507510 TAP1	β1 is/α2 (HV)is	80	110	66.7	45	0.30	0.49	0.53
	T1-508510 TAP1	β1 is/α2 (HV)is	55	110	130	45	0.25	0.49	0.36
	T1-510520 TAP2	α2 (HV)is/α2 (HV)is	120	195	55	29	0.36	0.66	0.63
	T1-510520 TAP2	α2 (HV)is/α4 (HV)is	120	335	55	30	0.36	0.64	0.63
	T1-511520 TAP2	α2 (HV)is/α2 (HV)is	85	195	100	29	0.24	0.66	0.39
YASKAWA SGM7J	T1-511520 TAP2	α2 (HV)is/α4 (HV)is	85	335	100	30	0.24	0.64	0.39
	T1-520530 TAP3	α2 (HV)is/α4 (HV)is	210	395	33	20	0.54	0.94	0.99
	T1-520530 TAP3	α4 (HV)is/α8 (HV)is****	355	650	33	25	0.56	0.89	1.01
	T1-521530 TAP3	α4 (HV)is/ α4 (HV)is	220	355	60	22	0.37	0.84	0.62
	T1-507510 TAP1	SGM7J 06/08	120	180	66	60	0.30	0.44	0.53
	T1-508510 TAP1	SGM7J 06/08	70	180	133	60	0.22	0.44	0.33
YASKAWA SGMJV	T1-510520 TAP2	SGM7J 08/08	195	315	66.6	38	0.32	0.54	0.55
	T1-511520 TAP2	SGM7J 08/08	135	315	133	38	0.22	0.54	0.33
	T1-507510 TAP1	SGMJV 04/08	115	180	66.7	60	0.30	0.44	0.53
	T1-508510 TAP1	SGMJV 04/08	70	180	130	60	0.22	0.44	0.33
	T1-510520 TAP2	SGMJV 08/08	195	315	66.7	38	0.32	0.54	0.55
	T1-511520 TAP2	SGMJV 08/08	140	315	133	38	0.21	0.54	0.32
MITSUBISHI	T1-520530 TAP3	SGMJV/EV 08/15	335	650	40	25	0.46	0.89	0.84
	T1-521530 TAP3	SGMJV/EV 08/15	220	650	80	25	0.28	0.74	0.46
	T1-507510 TAP1	HG56/75	120	170	60	45	0.32	0.49	0.57
	T1-508510 TAP1	HG56/75	70	170	110	45	0.22	0.49	0.36
	T1-510520 TAP2	HG-(H)75/(H)105	185	430	50	30	0.37	0.59	0.67
	T1-511520 TAP2	HG-(H)75/(H)105	130	430	100	30	0.24	0.59	0.39
SANYO	T1-520530 TAP3	HG-(H)105/(H)104	440	650	32	20	0.54	0.94	1.01
	T1-521530 TAP3	HG-(H)105/(H)104	220	650	60	22	0.34	0.82	0.59
	T1-507510 TAP1	R2Ax 06040/08075	120	185	66.7	60	0.30	0.44	0.52
	T1-508510 TAP1	R2Ax 06040/08075	70	185	130	60	0.22	0.44	0.33
	T1-510520 TAP2	R2Ax 08075/08075	210	245	66.7	40	0.32	0.54	0.55
	T1-511520 TAP2	R2Ax 08075/08075	145	245	130	40	0.22	0.54	0.34
SIEMENS	T1-510520 TAP2	1FK2204/1FK2205	150	425	65	30	0.33	0.59	0.56
	T1-511520 TAP2	1FK2204/1FK2205	105	425	130	30	0.22	0.59	0.33
	T1-520530 TAP3	1FK2205/1FK2206	425	650	33	25	0.53	0.74	0.98
	T1-520530 TAP3	1FK7042/1FK7062	435	650	50	25	0.44	0.77	0.74
	T1-521530 TAP3	1FK2205/1FK2206	220	650	65	25	0.30	0.74	0.53
	T1-521530 TAP3	1FK7042/1FK7062	220	650	90	25	0.27	0.74	0.43

* At 1 rpm; for more, please refer to p. 118

*** Without clamping; for times, please refer to p. 132

** for Siemens / Heidenhain

**** not with 35iB

Item no.

T1-510520.LL TAP-F1	
Motor	BE=Beckhoff, F1=Fanuc is (200 V), F2=Fanuc HV is (400 V), M1=Movinor/Mavilor ERN, M2=Movinor/Mavilor EQN 1125, M3=Movinor/Mavilor EQN 1135, M3=Mitsubishi 200V, M4=Mitsubishi 400V, S2=Sanyo, Y2=Yaskawa SGMJV/SGMEV, Y4=Yaskawa SGM7J
Divider add-on version	
Swiveling axis motor position	L=left, R=right
Dividing axis motor position	L=left, R=right
Swiveling axis size	510, 520
Dividing axis size	507, 510, 520
Rotary table model	

For calculation of load, forces and torques, please see p. 114

Important information

- The limit values as set out in the corresponding parameter list take precedence over the data and information provided in the main catalog (due to motor, drive enhancement and the respective machine CNC)
- Motor-independent data are optimum values at operating temperature
- Further details are available at www.lehmann-rotary-tables.com, under Download / Commissioning



Labyrinth seal (cutaway view)

- Recommended for:
- Grinding operations
 - High coolant pressures
 - Extremely fine abrasive particles

Accessories

Motor, cable, angular position measuring system and pL CNC starting at p. 76.
Accessories starting at p. 68

Options

Item no.	Description
GET.5xx-GEN	Increased gear precision ¹⁾
GEO.5xx-GEN	Incr. geometric precision, ½ standard tolerance
SPI.5xx-Lab ²⁾	Spindle seal with labyrinth, integrated sealing air pressure control
SWB.510-180	Tilting range increase from 90° to 180° (with overshoot to max. 230°)
SWB.520-180	
SWB.530-180	

¹⁾ incl. lower radial and axial run-out of 0.003 mm

²⁾ for 507/510: HSK and ripas clamping not possible manually, GET.5xx-GEN and GEO.5xx-GEN only partly possible (lower radial and axial run-out cannot always be achieved)

Suitable alignment elements

Item no.	Designation	Slot width	Weight [kg]
AUR.iX-12	lineFIX alignment pin, 1 pair	12g6	
AUR.iX-14		14g6	0.03
AUR.iX-16		16g6	0.03
AUR.iX-18		18g6	0.03

Included in the standard scope of delivery.
For lineFIX, refer to p. 90

T1-Type Rotary Tables TAP (unclamped supporting bearing)



*optional

 = High Series
(high speed, high resistance)

				T1-508511 TAP1(c)s	T1-511521 TAP2(c)s
Dimensions	Swivel ø	mm		180	220
	Swiveling range	degrees		90° +5°/-25° (optional 180° ±25°)	
	Center height	mm		180	210
	Total weight	with motor	kg	90 (85)	160 (150)
	Center bore	Standard / increased	mm	30	34
Bearing / Clamping	Max. clamping torque	4 th axis	Nm	250	600
		5 th axis	Nm	600	1'800
	Max. spindle load	0°-30°	kg	40	66
		30°-90°	kg	27	44
		Standard load ¹⁾	kg	12	21
	Max. axial force	4 th axis	kN	6	10
	Max. pull-out torque	4 th axis	Nm	1,200	2,000
Gear unit		5 th axis	Nm	2,000	3,900
	Max. moment of inertia	Standard load ¹⁾	kgm ²	0.025	0.07
		J max	kgm ²	0.25	0.7
	Feed torque max ⁴⁾	4 th axis	Nm	70	150
		5 th axis	Nm	130	210
	Limited torques due to eccentric loads ⁶⁾		Nm	30	45
	Gear unit loading	without load	Nm	-12	-22
Precision		with standard load	Nm	10	5
		M max	Nm	150	230
	Indexing accuracy Pa	4 th axis ²⁾	± arc sec	20/15	17/10
		5 th axis (90°) ³⁾	± arc sec	35/22	21/13
	Repeat accuracy Ps average	4 th axis	± arc sec		2
		5 th axis	± arc sec		2
	Max speed at standard load	4 th axis ¹⁾	min ⁻¹	210	160
		5 th axis ¹⁾	min ⁻¹	80	50
	Radial run-out ²⁾	on spindle ø	µm		6 / 3
	Axial run-out ²⁾	at spindle end face	µm		6 / 3
	Parallelism ²⁾	Spindle to base	µm/100 mm		10 / 5

¹⁾ Mutually dependent; for individual drive motor data, see right side

²⁾ Standard / increased; for measuring method and validity of the values, please refer to p. 74, for optional angular position measuring systems, please refer to p. 76/77

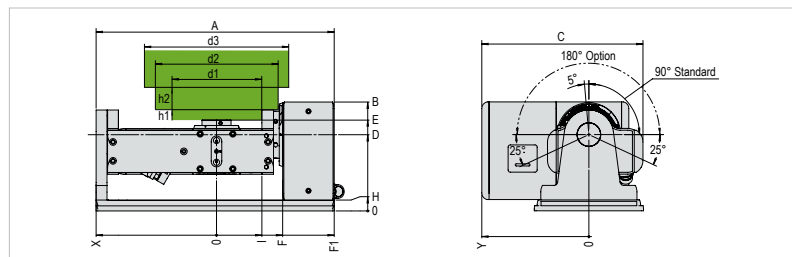
³⁾ In relation to dividing axis when in the horizontal position

⁴⁾ Limit value for gear unit, at 1 rpm

⁵⁾ Without load / with standard load 0°-90°

⁶⁾ For torque calculation, see p. 114

Dimensions



	A	B	C	C*	D	E	F	F1	H	I	R	X	Y	Y*	d1	d2	d3	h1	h2
TAP1	567	245	382	404	180	226	151	277	30	102	149	290	248	270	280	350		55	
TAP1c	520	245	382	404	180	226	104	230	30	55	149	290	248	270	186	350		55	
TAP2	656	300	444	469	210	250	182	324	30	125	173	332	295	320	248	340	400	95	
TAP2c	596	300	444	469	210	250	122	264	30	65	173	332	295	320	128	220	400	95	

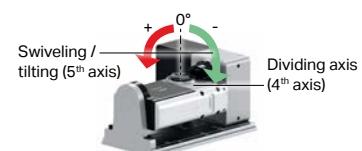
Dimensions with 508, 511 or. 521 identical to 507510, 510520 and 520530.

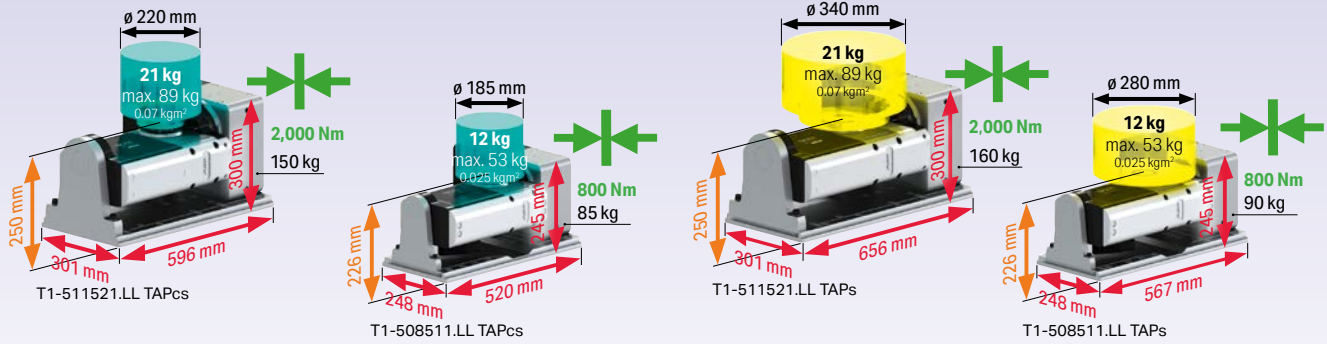
*With large motor (option)

Important information

Center height increase (option)

Depending on the accessories involved (clamping cylinder, rotary union, angular position measuring system...), a center height increase (dimension D) is required. (See page for respective accessory)





Drive data

(based on standard load cube shown on pp. 112/113)

		Motors 4 th /5 th	Feed* [Nm]		Speed [rpm]		Cycle time*** [sec]		
			4 th	5 th	4 th	5 th	4 th	5 th	4 th
MAVILOR / MOVINOR **	T1-507511 TAP1	BLS-072/BLS-072	120	130	111	80	0.26	0.38	0.39
	T1-508511 TAP1	BLS-072/BLS-072	70	130	210	80	0.23	0.38	0.29
	T1-510521 TAP2	BLS-072/BLS-073	250	210	80	50	0.30	0.44	0.49
	T1-511521 TAP2	BLS-072/BLS-073	150	210	160	50	0.23	0.44	0.31
	T1-511521 TAP2	BLS-072/LN-098	150	210	160	50	0.23	0.44	0.31
FANUC	T1-507511 TAP1	β1 is/α2 (HV)is	80	75	66.7	60	0.30	0.49	0.53
	T1-508511 TAP1	β1 is/α2 (HV)is	55	75	130	60	0.25	0.49	0.36
	T1-510521 TAP2	α2 (HV)is/α2 (HV)is	120	120	55	45	0.36	0.34	0.63
	T1-510521 TAP2	α2 (HV)is/α2 (HV)is	120	210	55	50	0.36	0.44	0.63
	T1-511521 TAP2	α2 (HV)is/α2 (HV)is	85	120	100	45	0.24	0.54	0.39
YASKAWA SGM7J	T1-507511 TAP1	SGM7J 06/08	120	120	66	70	0.30	0.30	0.53
	T1-508511 TAP1	SGM7J 06/08	70	120	133	70	0.22	0.30	0.33
	T1-510521 TAP2	SGM7J 08/08	195	205	66.6	50	0.32	0.44	0.55
	T1-511521 TAP2	SGM7J 08/08	135	205	133	50	0.22	0.44	0.33
	T1-511521 TAP2	SGM7J 08/08	135	205	133	50	0.22	0.44	0.33
YASKAWA SGMJV	T1-507511 TAP1	SGMJV 04/08	115	120	66.7	70	0.30	0.39	0.53
	T1-508511 TAP1	SGMJV 04/08	70	120	130	70	0.22	0.39	0.33
	T1-510521 TAP2	SGMJV 08/08	195	205	66.7	50	0.32	0.44	0.55
	T1-511521 TAP2	SGMJV 08/08	140	205	133	50	0.21	0.44	0.32
	T1-511521 TAP2	SGMJV 08/08	140	205	133	50	0.21	0.44	0.32
MITSUBISHI	T1-507511 TAP1	HG56/75	120	115	60	60	0.32	0.41	0.57
	T1-508511 TAP1	HG56/75	70	115	110	60	0.22	0.41	0.36
	T1-510521 TAP2	HG-(H)75/(H)105	185	210	50	50	0.37	0.44	0.67
	T1-511521 TAP2	HG-(H)75/(H)105	130	210	100	50	0.24	0.44	0.39
	T1-511521 TAP2	HG-(H)75/(H)105	130	210	100	50	0.24	0.44	0.39
SANYO	T1-507511 TAP1	R2Ax 06040/08075	120	125	66.7	80	0.30	0.38	0.52
	T1-508511 TAP1	R2Ax 06040/08075	70	125	130	80	0.22	0.38	0.33
	T1-510521 TAP2	R2Ax 08075/08075	210	155	66.7	50	0.32	0.46	0.55
	T1-511521 TAP2	R2Ax 08075/08075	145	155	130	50	0.22	0.46	0.34
	T1-511521 TAP2	R2Ax 08075/08075	145	155	130	50	0.22	0.46	0.34
SIEMENS	T1-510521 TAP2	1FK2204/1FK2205	150	210	65	50	0.33	0.44	0.56
	T1-511521 TAP2	1FK2204/1FK2205	105	210	130	50	0.22	0.44	0.33

* At 1 rpm; for more, please refer to p. 118

*** Without clamping; for times, please refer to p. 132

** for Siemens / Heidenhain

For calculation of load, forces and torques, please see p. 114

Important information

- The limit values as set out in the corresponding parameter list take precedence over the data and information provided in the main catalog (due to motor, drive enhancement and the respective machine CNC)
- Motor-independent data are optimum values at operating temperature
- Further details are available at www.lehmann-rotary-tables.com, under Download / Commissioning



Labyrinth seal (cutaway view)

- Recommended for:
- Grinding operations
 - High coolant pressures
 - Extremely fine abrasive particles

Accessories

Motor, cable, angular position measuring system and pL CNC starting at p. 76. Accessories starting at p. 68

Options

Item no.	Description
GET.5xx-GEN	Increased gear precision ¹⁾
GEO.5xx-GEN	Incr. geometric precision, 1/2 standard tolerance
SPI.5xx-Lab ²⁾	Spindle seal with labyrinth, integrated sealing air pressure control
SWB.510-180	Tilting range increase from 90° to 180° (with overshoot to max. 230°)
SWB.520-180	
SWB.530-180	

¹⁾ incl. lower radial and axial run-out of 0.003 mm

²⁾ for 507/510: HSK and ripas clamping not possible manually, GET.5xx-GEN and GEO.5xx-GEN only partly possible (lower radial and axial run-out cannot always be achieved)

Item no.

T1-510520.LL TAP-F1	
Motor	BE=Beckhoff, F1=Fanuc is (200 V), F2=Fanuc HV is (400 V), M1=Movinor/Mavilor ERN, M2=Movinor/Mavilor EQN 1125, M3=Movinor/Mavilor EQN 1135, M3=Mitsubishi 200V, M4=Mitsubishi 400V, S2=Sanyo, Y2=Yaskawa SGMJV/SGMEV, Y4=Yaskawa SGM7J
Divider add-on version	
Swiveling axis motor position	L=left, R=right
Dividing axis motor position	L=left, R=right
Swiveling axis size	510, 520
Dividing axis size	507, 510, 520
Rotary table model	

Suitable alignment elements

Item no.	Designation	Slot width	Weight [kg]
AUR.iX-12	lineFIX alignment pin, 1 pair	12g6	
AUR.iX-14		14g6	0.03
AUR.iX-16		16g6	0.03
AUR.iX-18		18g6	0.03

Included in the standard scope of delivery. For lineFIX, refer to p. 90

T1-Type Rotary Tables TOP (clamped counter bearing)



*optional

 = Dividing axis for High Series (high speed, high resistance)

				T1-507510 TOP1	T1-508510 TOP1s	T1-510520 TOP2	T1-511520 TOP2s	T1-520530 TOP3	T1-521530 TOP3s
Dimensions	Swivel ø	mm		180		220		195	
	Swiveling range	degrees		90° +5°/-25° (optional 180° ±25°)					
	Center height	mm		180		210 (235 ³⁾)		268 / 308	
	Total weight	kg	with motor	95		175		325	
	Center bore	mm	Standard / increased	30		34		46 / 64	
Bearing / Clamping	Max. clamping torque	Nm	4 th axis	300	250	800	600	2,000	1,800
		Nm	5 th axis	1,100		4,000		7,000	
	Max. spindle load	kg	0°-30°	79		133		200	
		kg	30°-90°	53		89		133	
		kg	Standard load ¹⁾	17	12	42	21	90	61
	Max. axial force	kN	4 th axis	6		10		40	
	Max. pull-out torque	Nm	4 th axis	1,200		2,000		3,900	
		Nm	5 th axis	2,000		3,900		10,400	
	Max. moment of inertia	kgm ²	Standard load ¹⁾	0.05	0.025	0.2	0.07	0.8	0.4
	J max	kgm ²		0.5	0.25	2	0.7	8	4
Gear unit	Feed torque max ⁴⁾	Nm	4 th axis	120	70	250	150	440	220
		Nm	5 th axis	250		440		650	
	Limited torques due to eccentric loads ⁶⁾	Nm		40		110		280	
	Gear unit loading	Nm	without load	-12		-22		-44	
		Nm	with standard load	15	10	30	5	100	45
	M max	Nm		250		440		650	
	Indexing accuracy Pa	± arc sec	4 th axis ²⁾	20/15		17/10		12/8	
		± arc sec	5 th axis (90°) ⁵⁾	35/20	35/22	21/22	21/13	11/38	11/20
	Repeat accuracy Ps average	± arc sec	4 th axis			2			
		± arc sec	5 th axis			2			
Precision	Max speed at standard load	min ⁻¹	4 th axis ¹⁾	111	210	80	160	50	100
		min ⁻¹	5 th axis ¹⁾	60		40		25	
	Radial run-out ²⁾	µm	on spindle ø			6 / 3			
	Axial run-out ²⁾	µm	at spindle end face			6 / 3			
	Parallelism ²⁾	µm/100 mm	Spindle to base			10 / 5			

¹⁾ Mutually dependent; for individual drive motor data, see right side

²⁾ Standard / increased; for measuring method and validity of the values, please refer to p. 74, for optional angular position measuring systems, please refer to p. 76/77

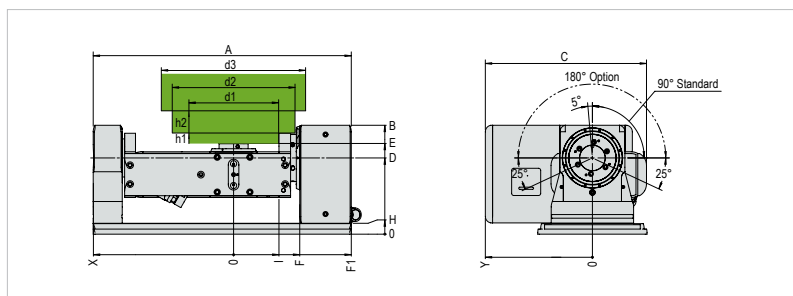
³⁾ In relation to dividing axis when in the horizontal position

⁴⁾ Limit value for gear unit, at 1 rpm

⁵⁾ Without load / with standard load 0°-90°

⁶⁾ For torque calculation, see p. 114

Dimensions



	A	B	C	C*	D	E	F	F1	H	I	R	X	Y	Y*	d1	d2	d3	h1	h2
TOP1	606	245	382	404	180	226	151	277	30	102	149	328	248	270	280	350	55		
TOP2	711	300	444	469	210	250	182	324	30	125	173	387	295	320	248	340	400	30	95
TOP3	859	408	554		268	308	242	422	38	177	195	437	390		352	456	500	66	166

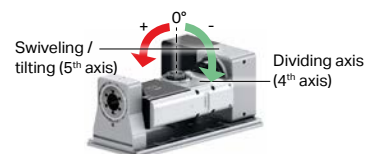
Dimensions with 508, 511 or 521 identical to 507510, 510520 and 520530.

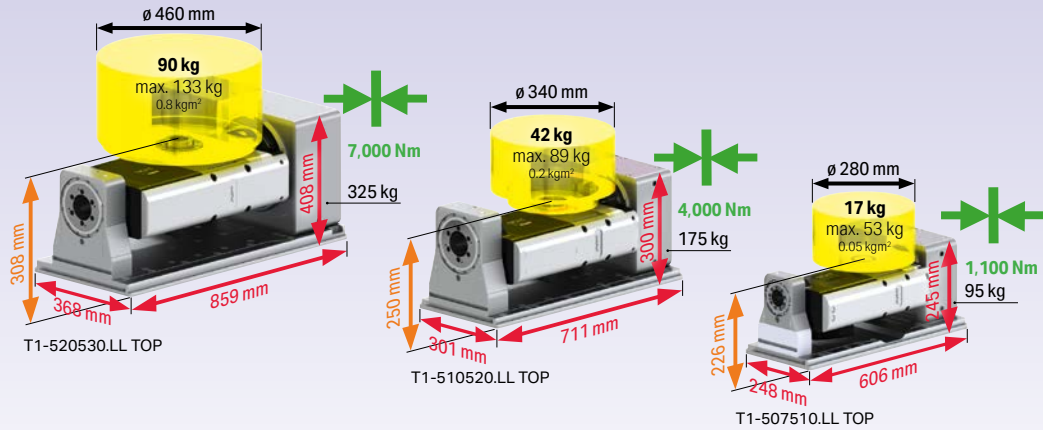
*With large motor (option)

Important information

Center height increase (option)

Depending on the accessories involved (clamping cylinder, rotary union, angular position measuring system...), a center height increase (dimension D) is required. (See page for respective accessory)





Drive data

(based on standard load cube shown on pp. 112/113)

		Motors 4 th /5 th	Feed* [N/m]		Speed [rpm]		Cycle time*** [sec]		
			4 th	5 th	4 th	5 th	4 th	5 th	5 th
MAVILOR/ MOVINOR **	T1-507510 TOP1	BLS-072/BLS-072	120	230	111	70	0.26	0.43	0.64
	T1-508510 TOP1	BLS-072/BLS-072	70	230	210	70	0.23	0.43	0.64
	T1-510520 TOP2	BLS-072/BLS-073	250	425	80	45	0.30	0.50	0.83
	T1-510520 TOP2	BLS-072/LN-098	250	440	80	40	0.30	0.50	0.87
	T1-511520 TOP2	BLS-072/BLS-073	150	425	160	45	0.23	0.50	0.83
	T1-511520 TOP2	BLS-072/LN-098	150	440	160	40	0.23	0.50	0.87
FANUC	T1-520530 TOP3	BLS-073/LN-098	440	650	50	25	0.41	0.89	1.49
	T1-521530 TOP3	LN-098/ LN-098	220	650	90	25	0.27	0.74	1.34
	T1-507510 TOP1	β1 is/α2 (HV)is	80	110	66.7	45	0.30	0.49	0.53
	T1-508510 TOP1	β1 is/α2 (HV)is	55	110	130	45	0.25	0.49	0.36
	T1-510520 TOP2	α2 (HV)is/α2 (HV)is	120	195	55	29	0.36	0.66	1.18
	T1-510520 TOP2	α2 (HV)is/α4 (HV)is	120	335	55	30	0.36	0.64	1.14
YASKAWA SGM7J	T1-511520 TOP2	α2 (HV)is/α2 (HV)is	85	195	100	29	0.24	0.66	1.18
	T1-511520 TOP2	α2 (HV)is/α4 (HV)is	85	335	100	30	0.24	0.64	1.14
	T1-520530 TOP3	α2 (HV)is/α4 (HV)is	210	395	33	20	0.54	0.94	1.69
	T1-520530 TOP3	α4 (HV)is/α8 (HV)is****	355	650	33	25	0.56	0.89	1.01
	T1-521530 TOP3	α4 (HV)is/ α4 (HV)is	220	355	60	22	0.37	0.84	1.52
	T1-507510 TOP1	SGM7J 06/08	120	180	66	60	0.30	0.44	0.53
YASKAWA SGMJV	T1-508510 TOP1	SGM7J 06/08	70	180	133	60	0.22	0.44	0.33
	T1-510520 TOP2	SGM7J 08/08	195	315	66.6	38	0.32	0.54	0.55
	T1-511520 TOP2	SGM7J 08/08	135	315	133	38	0.22	0.54	0.33
	T1-507510 TOP1	SGMJV 04/08	115	180	66.7	60	0.30	0.44	0.53
	T1-508510 TOP1	SGMJV 04/08	70	180	130	60	0.22	0.44	0.33
	T1-510520 TOP2	SGMJV 08/08	195	315	66.7	38	0.32	0.54	0.55
MITSUBISHI	T1-511520 TOP2	SGMJV 08/08	140	315	133	38	0.21	0.54	0.32
	T1-520530 TOP3	SGMJV/EV 08/15	335	650	40	25	0.46	0.89	0.84
	T1-521530 TOP3	SGMJV/EV 08/15	220	650	80	25	0.28	0.74	0.46
	T1-507510 TOP1	HG56/75	120	170	60	45	0.32	0.49	0.57
	T1-508510 TOP1	HG56/75	70	170	110	45	0.22	0.49	0.36
	T1-510520 TOP2	HG-(H)75/(H)105	185	430	50	30	0.37	0.59	0.67
SANYO	T1-511520 TOP2	HG-(H)75/(H)105	130	430	100	30	0.24	0.59	0.39
	T1-520530 TOP3	HG-(H)105/(H)104	440	650	32	20	0.54	0.94	1.01
	T1-521530 TOP3	HG-(H)105/(H)104	220	650	60	22	0.34	0.82	0.59
	T1-507510 TOP1	R2Ax 06040/08075	120	185	66.7	60	0.30	0.44	0.52
	T1-508510 TOP1	R2Ax 06040/08075	70	185	130	60	0.22	0.44	0.33
	T1-510520 TOP2	R2Ax 08075/08075	210	245	66.7	40	0.32	0.54	0.55
SIEMENS	T1-511520 TOP2	R2Ax 08075/08075	145	245	130	40	0.22	0.54	0.34
	T1-510520 TOP2	1FK2204/1FK2205	150	425	65	30	0.33	0.59	0.56
	T1-511520 TOP2	1FK2204/1FK2205	105	425	130	30	0.22	0.59	0.33
	T1-520530 TOP3	1FK2205/1FK2206	425	650	33	25	0.53	0.74	0.98
	T1-520530 TOP3	1FK7042/1FK7062	435	650	50	25	0.44	0.77	0.74
	T1-521530 TOP3	1FK2205/1FK2206	220	650	65	25	0.30	0.74	0.53
	T1-521530 TOP3	1FK7042/1FK7062	220	650	90	25	0.27	0.74	0.43

* At 1 rpm; for more, please refer to p. 118

** for Siemens / Heidenhain

*** Without clamping; for times, please refer to p. 132

**** not with 35iB

Item no.

T1-510520.LL TOP-F1	
Motor	BE=Beckhoff, F1=Fanuc is (200 V), F2=Fanuc HV is (400 V), M1=Movinor/Mavilor ERN, M2=Movinor/Mavilor EQN 1125, M3=Movinor/Mavilor EQN 1135, M3=Mitsubishi 200V, M4=Mitsubishi 400V, S2=Sanyo, Y2=Yaskawa SGMJV/SGMEV, Y4=Yaskawa SGM7J
Divider add-on version	
Swiveling axis motor position	L=left, R=right
Dividing axis motor position	L=left, R=right
Swiveling axis size	510, 520
Dividing axis size	507, 510, 520
Rotary table model	

For calculation of load, forces and torques, please see p. 114

Important information

- The limit values as set out in the corresponding parameter list take precedence over the data and information provided in the main catalog (due to motor, drive enhancement and the respective machine CNC)
- Motor-independent data are optimum values at operating temperature
- Further details are available at www.lehmann-rotary-tables.com, under Download / Commissioning



Labyrinth seal (cutaway view)

- Recommended for:
- Grinding operations
 - High coolant pressures
 - Extremely fine abrasive particles

Accessories

Motor, cable, angular position measuring system and pL CNC starting at p. 76.
Accessories starting at p. 68

Options

Item no.	Description
GET.5xx-GEN	Increased gear precision ¹⁾
GEO.5xx-GEN	Incr. geometric precision, ½ standard tolerance
SPI.5xx-Lab ²⁾	Spindle seal with labyrinth, integrated sealing air pressure control
SWB.510-180	Tilting range increase from 90° to 180° (with overshoot to max. 230°)
SWB.520-180	
SWB.530-180	

¹⁾ incl. lower radial and axial run-out of 0.003 mm

²⁾ for 507/510: HSK and ripas clamping not possible manually, GET.5xx-GEN and GEO.5xx-GEN only partly possible (lower radial and axial run-out cannot always be achieved)

Suitable alignment elements

Item no.	Designation	Slot width	Weight [kg]
AUR.iX-12	lineFIX alignment pin, 1 pair	12g6	
AUR.iX-14		14g6	0.03
AUR.iX-16		16g6	0.03
AUR.iX-18		18g6	0.03

Included in the standard scope of delivery.
For **lineFIX**, refer to p. 90

T1-Type Rotary Tables TOP (clamped counter bearing)



*optional

 = High Series
(high speed, high resistance)

				T1-508511 TOP1s	T1-511521 TOP2s
Dimensions	Swivel ø		mm	180	220
	Swiveling range		degrees	90° +5°/-25° (optional 180° ±25°)	
	Center height		mm	180	210
	Total weight	with motor	kg	95	175
	Center bore	Standard / increased	mm	30	34
Bearing / Clamping	Max. clamping torque	4 th axis	Nm	250	600
		5 th axis	Nm	900	3,800
	Max. spindle load	0°-30°	kg	40	66
		30°-90°	kg	27	44
		Standard load ¹⁾	kg	12	21
	Max. axial force	4 th axis	kN	6	10
	Max. pull-out torque	4 th axis	Nm	1,200	2,000
		5 th axis	Nm	2,000	3,900
	Max. moment of inertia	Standard load ¹⁾	kgm ²	0.025	0.07
		J max	kgm ²	0.25	0.7
Gear unit	Feed torque max ⁴⁾	4 th axis	Nm	70	150
		5 th axis	Nm	130	210
	Limited torques due to eccentric loads ⁶⁾		Nm	30	45
	Gear unit loading	without load	Nm	-12	-22
		with standard load	Nm	10	5
		M max	Nm	150	230
	Indexing accuracy Pa	4 th axis ²⁾	± arc sec	20/15	17/10
		5 th axis (90°) ⁵⁾	± arc sec	35/22	21/13
	Repeat accuracy Ps average	4 th axis	± arc sec		2
		5 th axis	± arc sec		2
Precision	Max speed at standard load	4 th axis ¹⁾	min ⁻¹	210	160
		5 th axis ¹⁾	min ⁻¹	80	50
	Radial run-out ²⁾	on spindle ø	µm		6 / 3
	Axial run-out ²⁾	at spindle end face	µm		6 / 3
	Parallelism ²⁾	Spindle to base	µm/100 mm		10 / 5

¹⁾ Mutually dependent; for individual drive motor data, see right side

²⁾ Standard / increased; for measuring method and validity of the values, please refer to p. 74, for optional angular position measuring systems, please refer to p. 76/77

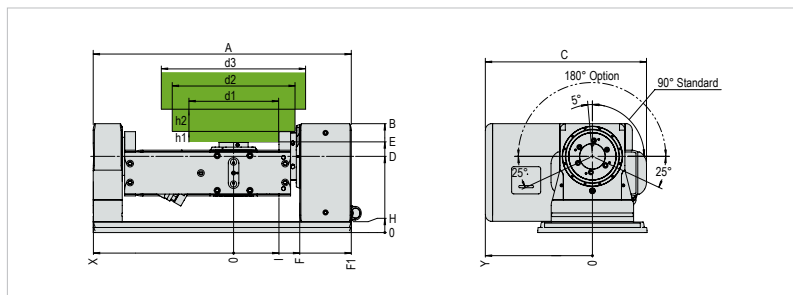
³⁾ In relation to dividing axis when in the horizontal position

⁴⁾ Limit value for gear unit, at 1 rpm

⁵⁾ Without load / with standard load 0°-90°

⁶⁾ For torque calculation, see p. 114

Dimensions



	A	B	C	C*	D	E	F	F1	H	I	R	X	Y	Y*	d1	d2	d3	h1	h2
TOP1	606	245	382	404	180	226	151	277	30	102	149	328	248	270	280	350		55	
TOP2	711	300	444	469	210	250	182	324	30	125	173	387	295	320	248	340	400	30	95

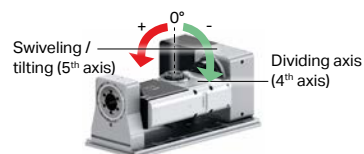
Dimensions with 508, 511 or. 521 identical to 507510, 510520 and 520530.

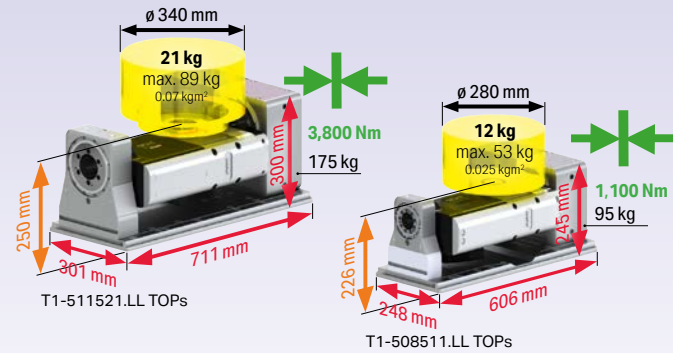
*With large motor (option)

Important information

Center height increase (option)

Depending on the accessories involved (clamping cylinder, rotary union, angular position measuring system...), a center height increase (dimension D) is required. (See page for respective accessory)





Drive data

(based on standard load cube shown on pp. 112/113)

		Motors 4 th /5 th	Feed* [Nm]		Speed [rpm]		Cycle time*** [sec]				
			4 th	5 th	4 th	5 th	4 th	5 th	4 th	5 th	180°
MAVILOR / MOVINOR**	T1-507511 TOP1	BLS-072/BLS-072	120	130	111	80	0.26	0.38	0.39	0.37	
	T1-508511 TOP1	BLS-072/BLS-072	70	130	210	80	0.23	0.38	0.29	0.57	
	T1-510521 TOP2	BLS-072/BLS-073	250	210	80	50	0.30	0.44	0.49	0.74	
	T1-510521 TOP2	BLS-072/LN-098	250	210	80	50	0.30	0.44	0.49	0.74	
	T1-511521 TOP2	BLS-072/BLS-073	150	210	160	50	0.23	0.44	0.31	0.74	
FANUC	T1-511521 TOP2	BLS-072/LN-098	150	210	160	50	0.23	0.44	0.31	0.74	
	T1-507511 TOP1	β1 is/α2 (HV)is	80	75	66.7	60	0.30	0.49	0.53	0.74	
	T1-508511 TOP1	β1 is/α2 (HV)is	55	75	130	60	0.25	0.49	0.36	0.74	
	T1-510521 TOP2	α2 (HV)is/α4 (HV)is	120	120	55	45	0.36	0.34	0.63	0.87	
	T1-510521 TOP2	α2 (HV)is/α4 (HV)is	120	210	55	50	0.36	0.44	0.63	0.74	
YASKAWA SGM7J	T1-511521 TOP2	α2 (HV)is/α4 (HV)is	85	120	100	45	0.24	0.54	0.39	0.87	
	T1-511521 TOP2	α2 (HV)is/α4 (HV)is	85	210	100	50	0.24	0.44	0.39	0.74	
	T1-507511 TOP1	SGM7J 06/08	120	120	66	70	0.30	0.30	0.53	0.61	
	T1-508511 TOP1	SGM7J 06/08	70	120	133	70	0.22	0.30	0.33	0.61	
	T1-510521 TOP2	SGM7J 08/08	195	205	66.6	50	0.32	0.44	0.55	0.74	
YASKAWA SGMJV	T1-511521 TOP2	SGM7J 08/08	135	205	133	50	0.22	0.44	0.33	0.74	
	T1-507511 TOP1	SGMJV 04/08	115	120	66.7	70	0.30	0.39	0.53	0.61	
	T1-508511 TOP1	SGMJV 04/08	70	120	130	70	0.22	0.39	0.33	0.61	
	T1-510521 TOP2	SGMJV 08/08	195	205	66.7	50	0.32	0.44	0.55	0.76	
	T1-511521 TOP2	SGMJV 08/08	140	205	133	50	0.21	0.44	0.32	0.76	
MITSUBISHI	T1-507511 TOP1	HG56/75	120	115	60	60	0.32	0.41	0.57	0.66	
	T1-508511 TOP1	HG56/75	70	115	110	60	0.22	0.41	0.36	0.66	
	T1-510521 TOP2	HG-(H)75/(H)105	185	210	50	50	0.37	0.44	0.67	0.74	
	T1-511521 TOP2	HG-(H)75/(H)105	130	210	100	50	0.24	0.44	0.39	0.74	
	T1-507511 TOP1	R2Ax 06040/08075	120	125	66.7	80	0.30	0.38	0.52	0.57	
SANYO	T1-508511 TOP1	R2Ax 06040/08075	70	125	130	80	0.22	0.38	0.33	0.57	
	T1-510521 TOP2	R2Ax 08075/08075	210	155	66.7	50	0.32	0.46	0.55	0.76	
	T1-511521 TOP2	R2Ax 08075/08075	145	155	130	50	0.22	0.46	0.34	0.76	
SIEMENS	T1-510521 TOP2	1FK2204/1FK2205	150	210	65	50	0.33	0.44	0.56	0.76	
	T1-511521 TOP2	1FK2204/1FK2205	105	210	130	50	0.22	0.44	0.33	0.76	

* At 1 rpm; for more, please refer to p. 118

** for Siemens / Heidenhain

*** Without clamping; for times, please refer to p. 132

For calculation of load, forces and torques, please see p. 114

Important information

- The limit values as set out in the corresponding parameter list take precedence over the data and information provided in the main catalog (due to motor, drive enhancement and the respective machine CNC)
- Motor-independent data are optimum values at operating temperature
- Further details are available at www.lehmann-rotary-tables.com, under Download / Commissioning



Labyrinth seal (cutaway view)

- Recommended for:
- Grinding operations
 - High coolant pressures
 - Extremely fine abrasive particles

Accessories

Motor, cable, angular position measuring system and pL CNC starting at p. 76.
Accessories starting at p. 68

Options

Item no.	Description
GET.5xx-GEN	Increased gear precision ¹⁾
GEO.5xx-GEN	Incr. geometric precision, ½ standard tolerance
SPI.5xx-Lab ²⁾	Spindle seal with labyrinth, integrated sealing air pressure control
SWB.510-180	Tilting range increase from 90° to 180° (with overshoot to max. 230°)
SWB.520-180	
SWB.530-180	

¹⁾ incl. lower radial and axial run-out of 0.003 mm

²⁾ for 507/510: HSK and ripas clamping not possible manually, GET.5xx-GEN and GEO.5xx-GEN only partly possible (lower radial and axial run-out cannot always be achieved)

Item no.

T1-510520.LL TOP-F1	
Motor	BE=Beckhoff, F1=Fanuc is (200 V), F2=Fanuc HV is (400 V), M1=Movinor/Mavilor ERN, M2=Movinor/Mavilor EQN 1125, M3=Movinor/Mavilor EQN 1135, M3=Mitsubishi 200V, M4=Mitsubishi 400V, S2=Sanyo, Y2=Yaskawa SGMJV/SGMEV, Y4=Yaskawa SGM7J
Divider add-on version	
Swiveling axis motor position	L=left, R=right
Dividing axis motor position	L=left, R=right
Swiveling axis size	510, 520
Dividing axis size	507, 510, 520
Rotary table model	

Suitable alignment elements

Item no.	Designation	Slot width	Weight [kg]
AUR.iX-12	lineFIX alignment pin, 1 pair	12g6	
AUR.iX-14		14g6	0.03
AUR.iX-16		16g6	0.03
AUR.iX-18		18g6	0.03

Included in the standard scope of delivery.
For lineFIX, refer to p. 90

T1-Type Rotary Tables TGR (clamped counter bearing)



*optional

 = Dividing axis for High Series (high speed, high resistance)

				T1-510520 TGR2	T1-511520 TGR2s (on request)	T1-520530 TGR3	T1-521530 TGR3s
Dimensions	Swivel ø		mm	305		335	
	Swiveling range		degrees	90° +5°/-25° (optional 180° ±25°)			
	Center height		mm	348		408	
	Total weight	with motor	kg	300		520	
Center bore	Standard / increased	mm	34		46 / 64		
Bearing / Clamping	Max. clamping torque	4 th axis	 Nm	800	600	2,000	1,800
		5 th axis	 Nm	4,000		7,000	
	Max. spindle load	0°–30°	 kg	135		200	
		30°–90°	 kg	90		160	
		Standard load ¹⁾	 kg	90	22	160	61
	Max. axial force	4 th axis	 kN	10		40	
	Max. pull-out torque	4 th axis	 Nm	2,000		3,900	
		5 th axis	 Nm	3,900		10,400	
	Max. moment of inertia	Standard load ¹⁾	 kgm ²	0.8	0.07	2.0	0.4
		J max	 kgm ²	2	0.7	8	4
Gear unit	Feed torque max ³⁾	4 th axis	 Nm	250	150	440	220
		5 th axis	 Nm	440		650	
	Limited torques due to eccentric loads ⁵⁾		Nm	110		280	
	Gear unit loading	without load	Nm	-105		-160	
	5 th axis	with standard load	Nm	-86	-15	100	-60
		M max	Nm	440		650	
	Indexing accuracy Pa	4 th axis ²⁾	 ± arc sec	17/10		12/8	
		5 th axis (90°) ⁴⁾	 ± arc sec	49/18	49/42	31/25	31/22
	Repeat accuracy Ps average	4 th axis	 ± arc sec			2	
		5 th axis	 ± arc sec			2	
Precision	Max speed at standard load	4 th axis ¹⁾	 min ⁻¹	80	160	50	100
		5 th axis ¹⁾	 min ⁻¹	35		25	
	Radial run-out ²⁾	on spindle ø	µm	6 / 3			
	Axial run-out ²⁾	at spindle end face	µm	6 / 3			
	Parallelism ²⁾	Spindle to base	µm/100 mm	10 / 5			

¹⁾ Mutually dependent; for individual drive motor data, see right side

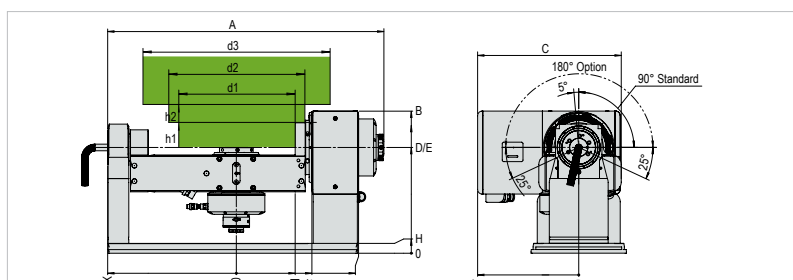
²⁾ Standard / increased; for measuring method and validity of the values, please refer to p. 74, for optional angular position measuring systems, please refer to p. 76/77

³⁾ Limit value for gear unit, at 1 rpm

⁴⁾ Without load / with standard load 0°-90°

⁵⁾ For torque calculation, see p. 114

Dimensions



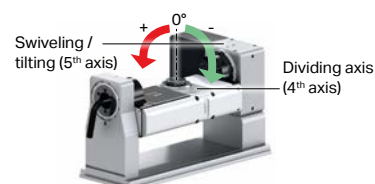
	A	B	C	D	E	F	F1	H	I	R	X	Y	d1	d2	d3	h1	h2
TGR2	928	440	469	350	350	232	374	38	175	196	437	320	352	456	680	56	206
with WMS7:	458																
TGR3	1056	548	554	408	408	292	472	38	227	226	487	390	452	556	800	96	206

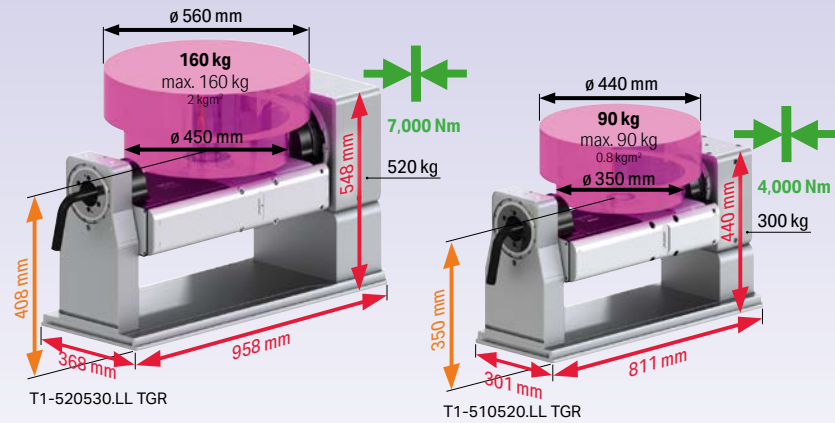
Dimensions with 511 or 521 identical to 510520 and 520530.

Important information

Center height increase (option)

Depending on the accessories involved (clamping cylinder, rotary union, angular position measuring system...), a center height increase (dimension D) is required. (See page for respective accessory)





Drive data

(based on standard load cube shown on pp. 112/113)

		Motors 4 th /5 th	Feed* [Nm]		Speed [rpm]		Cycle time*** [sec]		90°	180°
			4 th	5 th	4 th	5 th	4 th	5 th		
MAVILOR MOVINOR**	T1-510520 TGR2	BLS-072/LN-098	250	440	65	35	0.45	0.71	0.68	1.14
	T1-511520 TGR2	BLS-072/LN-098	150	440	160	35	0.23	0.71	0.31	1.14
	T1-520530 TGR3	BLS-073/LN-098	425	650	45	25	0.50	0.89	0.83	1.49
	T1-520530 TGR3	BLS-098/LN-098	440	650	40	25	0.53	0.89	0.91	1.49
FANUC	T1-521530 TGR3	LN-098/ LN-098	220	650	90	25	0.27	0.89	0.43	1.49
	T1-510520 TGR2	α2 (HV)is/α4 (HV)is	120	335	45	27	0.51	0.86	0.84	1.41
	T1-511520 TGR2	α2 (HV)is/α4 (HV)is	85	335	100	27	0.24	0.86	0.39	1.41
	T1-520530 TGR3	α2 (HV)is/α4 (HV)is	210	395	28	22	0.66	0.97	1.19	1.65
YASKAWA SGM7J	T1-520530 TGR3	α4 (HV)is/α8 (HV)is****	355	650	30	25	0.64	0.89	1.14	1.49
	T1-521530 TGR3	α4 (HV)is/α4 (HV)is	220	395	60	22	0.37	0.97	0.62	1.65
	T1-510520 TGR2	SGM7J 08/08	195	315	60	30	0.46	0.81	0.71	1.31
	T1-511520 TGR2	SGM7J 08/08	135	315	133	30	0.22	0.81	0.33	1.31
YASKAWA SGMJV	T1-510520 TGR2	SGMJV 08/08	195	315	60	30	0.46	0.81	0.71	1.31
	T1-511520 TGR2	SGMJV 08/08	140	315	133	30	0.21	0.81	0.32	1.31
	T1-520530 TGR3	SGMJV/EV 08/15	315	650	40	25	0.53	0.89	0.91	1.49
	T1-521530 TGR3	SGMJV/EV 08/15	220	650	80	25	0.28	0.89	0.46	1.49
MITSUBISHI	T1-510520 TGR2	HG-(H)75/(H)105	185	430	50	28	0.48	0.74	0.78	1.28
	T1-511520 TGR2	HG-(H)75/(H)105	130	430	100	28	0.24	0.74	0.39	1.28
	T1-520530 TGR3	HG-(H)105/(H)104	430	650	30	22	0.63	0.94	1.13	1.62
	T1-521530 TGR3	HG-(H)105/(H)104	220	650	60	22	0.43	0.94	0.59	1.62
SA- NYO	T1-510520 TGR2	R2Ax 08075/08075	210	245	60	25	0.46	0.97	0.71	1.57
	T1-511520 TGR2	R2Ax 08075/08075	145	245	130	25	0.22	0.97	0.34	1.57
	T1-510520 TGR2	1FK2204/1FK2205	150	425	60	25	0.46	0.79	0.71	1.39
	T1-511520 TGR2	1FK2204/1FK2205	105	425	90	25	0.44	0.79	0.61	1.39
SIEMENS	T1-520530 TGR3	1FK2205/FK2206	425	650	33	25	0.60	0.88	1.05	1.48
	T1-520530 TGR3	1FK7042/1FK7062	410	650	45	25	0.50	0.89	0.83	1.49
	T1-521530 TGR3	1FK2205/1FK2206	220	650	65	25	0.44	0.88	0.67	1.48
	T1-521530 TGR3	1FK7042/1FK7062	220	650	90	25	0.27	0.89	0.43	1.49

* At 1 rpm; for more, please refer to p. 118

*** Without clamping; for times, please refer to p. 132

** for Siemens / Heidenhain

**** not with 35iB

For calculation of load, forces and torques, please see p. 114

Important information

- The limit values as set out in the corresponding parameter list take precedence over the data and information provided in the main catalog (due to motor, drive enhancement and the respective machine CNC)
- Motor-independent data are optimum values at operating temperature
- Further details are available at www.lehmann-rotary-tables.com, under Download / Commissioning



Labyrinth seal (cutaway view)

Recommended for:

- Grinding operations
- High coolant pressures
- Extremely fine abrasive particles

Accessories

Motor, cable, angular position measuring system and pL CNC starting at p. 76. Accessories starting at p. 68

Options

Item no.	Description
GET.5xx-GEN	Increased gear precision ¹⁾
GEO.5xx-GEN	Incr. geometric precision, ½ standard tolerance
SPI.5xx-Lab ²⁾	Spindle seal with labyrinth, integrated sealing air pressure control
SWB.520-180	Tilting range increase from 90° to 180° (with overshoot to max. 230°)
SWB.530-180	

¹⁾ incl. lower radial and axial run-out of 0.003 mm

²⁾ for 507/510: HSK and ripas clamping not possible manually, GET.5xx-GEN and GEO.5xx-GEN only partly possible (lower radial and axial run-out cannot always be achieved)

Item no.

T1-510520.LL TGR-F1	
Motor	BE=Beckhoff, F1=Fanuc is (200 V), F2=Fanuc HV is (400 V), M1=Movinor/Mavilor ERN, M2=Movinor/Mavilor EQN 1125, M3=Movinor/Mavilor EQN 1135, M3=Mitsubishi 200V, M4=Mitsubishi 400V, S2=Sanyo, Y2=Yaskawa SGMJV/SGMEV, Y4=Yaskawa SGM7J
Divider add-on version	
Swiveling axis motor position	L=left, R=right
Dividing axis motor position	L=left, R=right
Swiveling axis size	510, 520
Dividing axis size	507, 510, 520
Rotary table model	

Suitable alignment elements

Item no.	Designation	Slot width	Weight [kg]
AUR.iX-12	lineFIX alignment pin, 1 pair	12g6	
AUR.iX-14		14g6	0.03
AUR.iX-16		16g6	0.03
AUR.iX-18		18g6	0.03

Included in the standard scope of delivery.

For lineFIX, refer to p. 90



More space for workpiece and fixtures



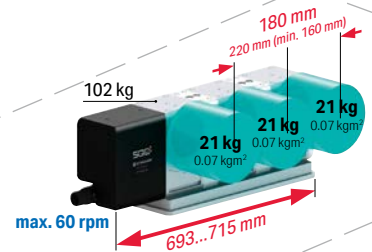
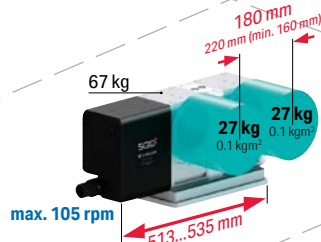
M2

M3

51x

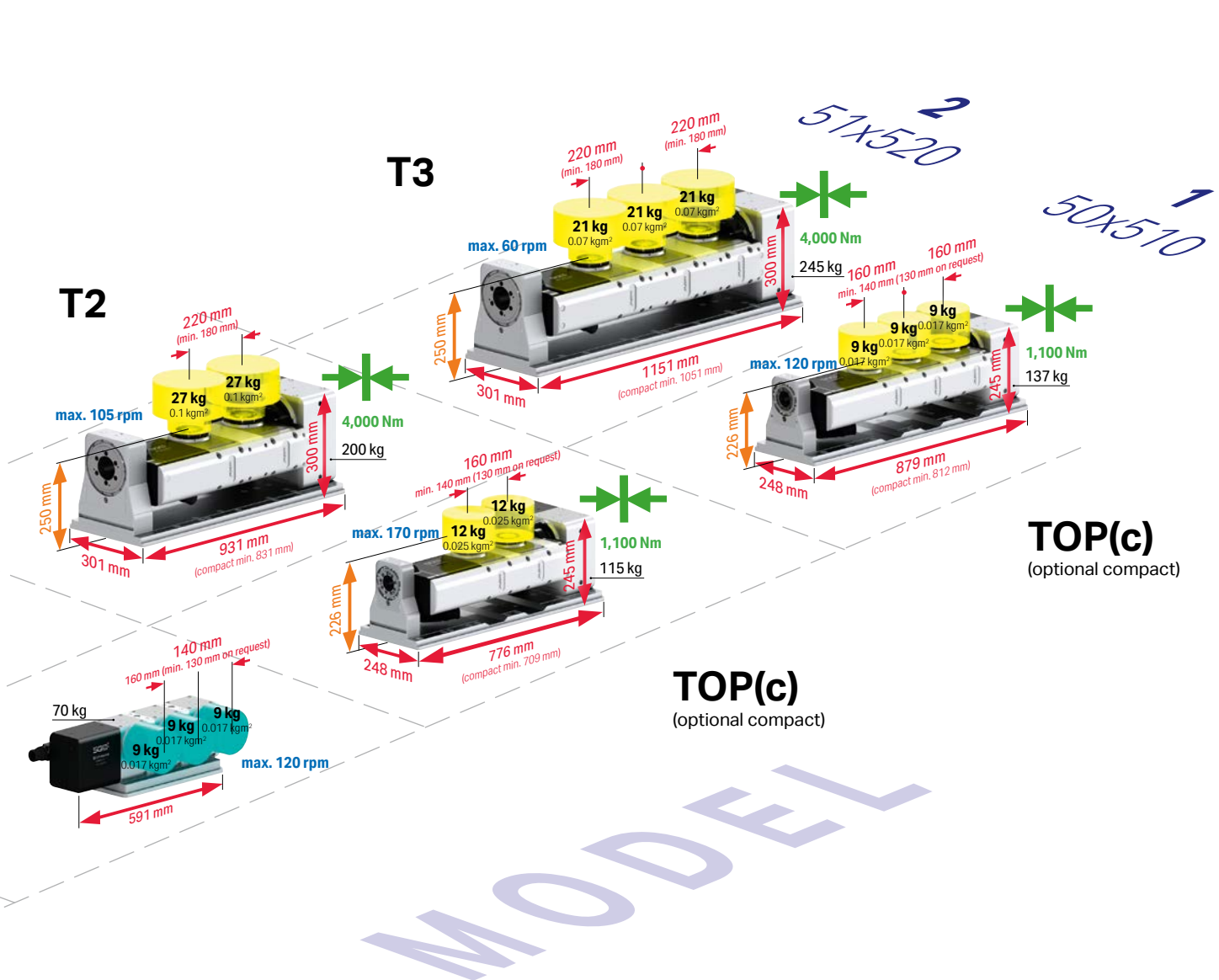
SIZE

50x



Facts

- Up to 54 % higher clamping torque in tilting axis
- Fewer variants – more solutions
- Spindle distance min. 130 mm
- Spatially optimized arrangement of the dividing axis



Weight data represent the standard load of the standard version; higher weights possible, but these require modification of rotational speed, acceleration and jerk limitation.

- 50x 507 (standard) or 508 (high speed)
 51x 510 (standard) or 511 (high speed)
 M2 Single-axis, multi-spindle rotary table, 2-position
 M3 Single-axis, multi-spindle rotary table, 3-position
 T2 Two-axis multi-spindle rotary table, 2-position
 T3 Two-axis multi-spindle rotary table, 3-position

M-type rotary tables



M2



M3

 = High Series
(high speed, high resistance)

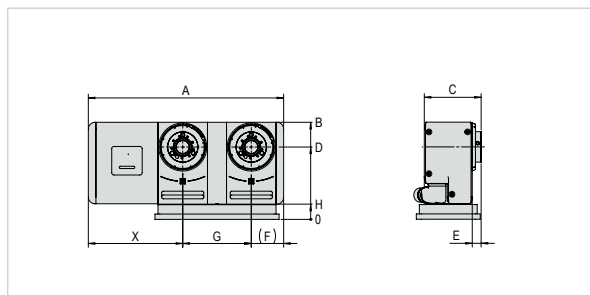
				M2-507	M2-508	M2-510	M2-511	M3-507	M3-508	M3-510	M3-511	
Dimensions	Swivel ø		mm	140		180		140		180		
	Spindle distance		mm	140		180		140		180		
	Center height		mm	150		190		150		190		
	Total weight	with motor	kg	46		67		70		102		
	Center bore		mm	31		34		31		34		
Bearing / Clamping	Max. clamping torque		Nm	300	250	800	600	300	250	800	600	
	Max spindle load per spindle	with tailstock		kg	2x120	2x60	2x200	2x100	3x80	3x40	3x133	3x67
		without tailstock		kg	2x60	2x30	2x100	2x50	3x40	3x20	3x67	3x33
		Standard load*		kg	2x12	2x7.5	2x27	2x14	3x9	3x6	3x21	3x11
	Max. axial force	per spindle		kN	44		46		44		46	
Max. pull-out torque	per spindle		Nm	1200		2000		1200		2000		
Gear unit	Max. moment of inertia	Standard load*		kgm²	0.05	0.025	0.2	0.07	0.05	0.025	0.21	0.07
		J max	kgm²	0.5	0.25	2	0.7	0.5	0.25	2	0.7	
	Max. feed torque		Nm	120	70	190	140	120	70	150	120	
	Limited torques due to eccentric loads (per spindle)***			Nm	20	9	25	20	10	9	13	10
	Indexing accuracy Pa **		± arc sec	20		17		20		17		
Repeat accuracy Ps average		± arc sec	2									
Max speed	with standard load*		rpm	90	170	70	105	70	120	40	50	
Precision	Radial run-out **	on spindle ø, outside & inside	µm	6 / 3								
	Axial run-out **	at spindle end face	µm	6 / 3								
	Parallelism **	Dividing axis to base	µm/100 mm	10 / 5								

* Maximum values possible mechanically, mutually dependent; for individual drive motor data, see right side

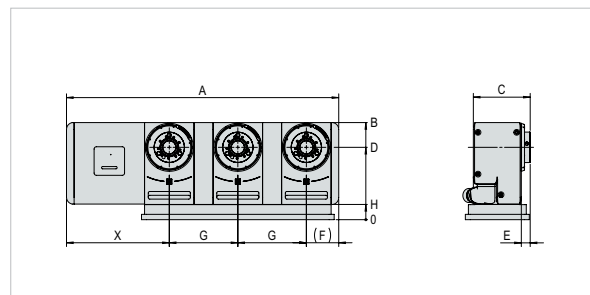
** Standard / increased; for measuring method and validity of the values, please refer to **p. 74**, for optional angular position measuring systems, please refer to **p. 76/77**

*** For torque calculation, please see **p. 114**

Dimensions

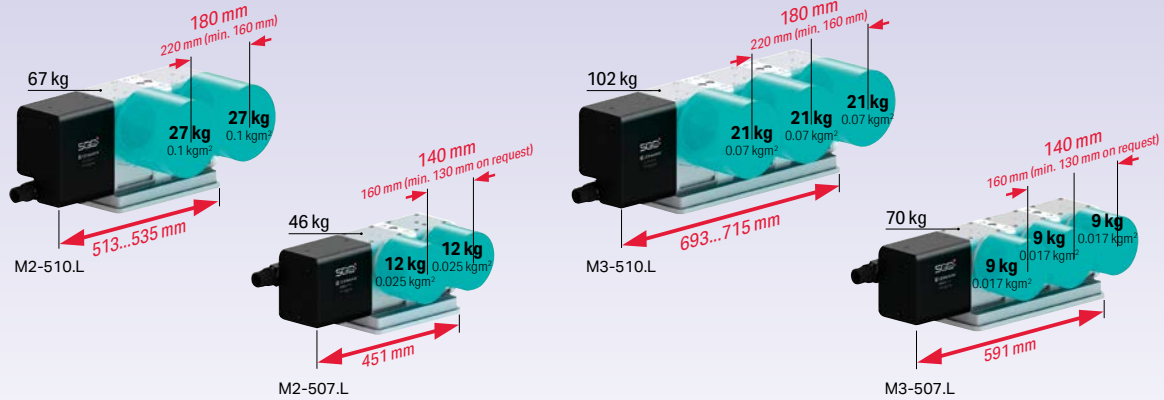


	A	B	C	D	E	F	G	G min.	H	X
M2-207	451	205	136	150	23	75	140	130	40	236
M2-510	513	255	150	190	23	85	180	160	40	248



	A	B	C	D	E	F	G	G min.	H	X
M3-507	591	205	136	150	23	75	140	130	40	236
M3-510	693	255	150	190	23	85	180	160	40	248

Dimensions with 508 or 511 identical to 507 and 510.



Drive data

(based on standard load cube shown on pp. 112/113)

		Motors	Feed*	Speed	Cycle time***	
			[Nm]	[rpm]	[sec]	
MAVILOR / MOVINOR **	M2-507	BLS-072	120	90	0.32	0.48
	M2-508	BLS-072	70	170	0.27	0.35
	M2-510	BLS-072	190	70	0.32	0.54
	M2-511	BLS-072	140	105	0.25	0.40
	M3-507	BLS-072	120	70	0.34	0.55
	M3-508	BLS-072	70	120	0.27	0.39
	M3-510	BLS-072	150	40	0.48	0.85
	M3-511	BLS-072	120	50	0.36	0.66
FANUC	M2-507	β1 is	65	60	0.37	0.62
	M2-508	β1 is	40	90	0.34	0.50
	M2-510	α2 (HV)is	95	45	0.45	0.78
	M2-511	α2 (HV)is	80	70	0.33	0.55
	M3-507	β1 is	30	30	0.57	1.07
	M3-508	β1 is	30	40	0.48	0.86
	M3-510	α2 (HV)is	65	30	0.66	1.16
	M3-511	α2 (HV)is	65	35	0.52	0.95
YASKAWA SGM7J	M2-507	SGM7J 06	120	65	0.35	0.58
	M2-508	SGM7J 06	70	120	0.23	0.36
	M2-510	SGM7J 08	145	50	0.40	0.70
	M2-511	SGM7J 08	110	90	0.28	0.45
	M3-507	SGM7J 06	120	50	0.39	0.69
	M3-508	SGM7J 06	70	95	0.28	0.43
	M3-510	SGM7J 08	105	35	0.54	0.97
	M3-511	SGM7J 08	85	60	0.38	0.63
YASKAWA SGMJV	M2-507	SGMJV 04	85	50	0.41	0.71
	M2-508	SGMJV 04	65	85	0.31	0.49
	M2-510	SGMJV 08	145	50	0.40	0.70
	M2-511	SGMJV 08	110	90	0.28	0.45
	M3-507	SGMJV 04	60	35	0.54	0.97
	M3-508	SGMJV 04	50	55	0.39	0.66
	M3-510	SGMJV 08	105	35	0.54	0.97
	M3-511	SGMJV 08	85	60	0.38	0.63
MITSUBISHI	M2-507	HG56	100	40	0.43	0.81
	M2-508	HG56	70	80	0.29	0.48
	M2-510	HG-(H)75	135	45	0.40	0.73
	M2-511	HG-(H)75	100	80	0.30	0.49
	M3-507	HG56	75	35	0.48	0.91
	M3-508	HG56	65	65	0.37	0.60
	M3-510	HG-(H)75	95	25	0.64	1.24
	M3-511	HG-(H)75	80	35	0.48	0.91
SANYO	M2-507	R2Ax 06040	95	55	0.37	0.64
	M2-508	R2Ax 06040	70	100	0.30	0.45
	M2-510	R2Ax 08075	145	50	0.39	0.69
	M2-511	R2Ax 08075	135	90	0.28	0.45
	M3-507	R2Ax 06040	70	40	0.48	0.85
	M3-508	R2Ax 06040	60	65	0.35	0.58
	M3-510	R2Ax 08075	110	35	0.54	0.97
	M3-511	R2Ax 08075	120	60	0.35	0.60
SIEMENS	M2-507	1FK2203	60	45	0.43	0.77
	M2-508	1FK2203	50	80	0.34	0.53
	M2-510	1FK2204	110	50	0.42	0.72
	M2-511	1FK2204	85	90	0.28	0.45
	M3-507	1FK2203	40	30	0.62	1.12
	M3-508	1FK2203	40	50	0.48	0.78
	M3-510	1FK2204	70	35	0.57	1.00
	M3-511	1FK2204	65	55	0.41	0.68

* at 1 rpm; for more, please refer to p. 118

** for Siemens / Heidenhain

*** without clamping; for times, please refer to p. 132

For calculation of load, forces and torques, please see p. 114

Important information

- The limit values as set out in the corresponding parameter list take precedence over the data and information provided in the main catalog (due to motor, drive enhancement and the respective machine CNC)
- Motor-independent data are optimum values at operating temperature
- Further details are available at www.lehmann-rotary-tables.com, under Download / Commissioning



Labyrinth seal (cutaway view)

- Recommended for:
- Grinding operations
 - High coolant pressures
 - Extremely fine abrasive particles

Accessories

Motor, cable, angular position measuring system and pL CNC starting at p. 76. Accessories starting at p. 68

Options

Item no.	Description
GEO.5xx-GEN	Incr. geometric precision, ½ standard tolerance
SPI.5xx-Lab-x2 ¹⁾	Spindle seal with labyrinth, integrated sealing air pressure control
SPI.5xx-Lab-x3 ¹⁾	Spindle seal with labyrinth, integrated sealing air pressure control

¹⁾ for 507/510: HSK and ripas clamping not possible manually, GET.5xx-GEN and GEO.5xx-GEN only partly possible (lower radial and axial run-out cannot always be achieved)

Item no.

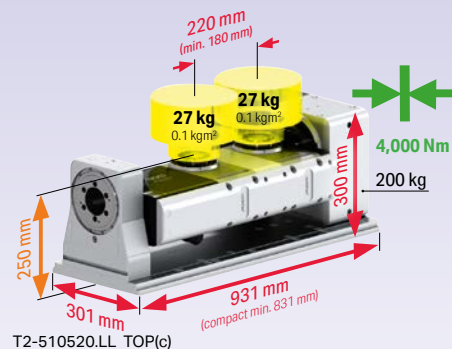
M2-510.L-F1	
Motor	BE=Beckhoff, F1=Fanuc is (200 V), F2=Fanuc HVis (400 V), M1=Movinor/Mavilor ERN, M2=Movinor/Mavilor EQN 1125, M3=Movinor/Mavilor EQN 1135, M4=Mitsubishi 200V, M5=Mitsubishi 400V, S2=Sanyo, Y2=Yaskawa SGMJV/SGMEV, Y4=Yaskawa SGM7J
Dividing axis motor position	L=left, R=right
Dividing axis size	507, 508, 510, 511
Rotary table model	



T2



T3



T2-510520.LL TOP(c)

 = Dividing axis for High Series (high speed, high resistance)

				T2-507510 (508510) TOP1.2(s)	T2-510520 (511520) TOP2.2(s)	T3-507510 (508510) TOP1.3(s)	T3-510520 (511520) TOP2.3(s)
Dimensions	Swivel ø		mm	160	220	160	220
	Spindle distance		mm	160	220	160	220
	Center height		mm	190	220	190	220
	Total weight	with motor	kg	115	200	137	245
	Center bore		mm	31	34	31	34
Bearing / Clamping	Max. clamping torque	4 th axis	Nm	300 (250)	800 (600)	300 (250)	800 (600)
		5 th axis	Nm	1,100	4,000	1,100	4,000
	Max spindle load per spindle	0°–30°	kg	2x40	2x67	3x27	3x44
		30°–90°	kg	2x27	2x45	3x18	3x30
		Standard load ¹⁾	kg	2x12 (2x7.5)	2x27 (2x14)	3x9 (3x6)	3x21 (3x11)
	Max. axial force	4 th axis per spindle	kN	12	20	12	20
	Max. pull-out torque	4 th axis	Nm	1,200	2,000	1,200	2,000
Gear unit		5 th axis	Nm	2,000	3,900	2,000	3,900
	Max. moment of inertia	Standard load ¹⁾	kgm²	0.05 (0.025)	0.2 (0.07)	0.05 (0.025)	0.21 (0.07)
		J max	kgm²	0.5 (0.25)	2 (0.7)	0.5 (0.25)	2 (0.7)
	Feed torque max ³⁾	4 th axis	Nm	120 (70)	190 (140)	120 (70)	150 (120)
		5 th axis	Nm	230	440	230	440
	Limited torques due to eccentric loads (acting on the tilting axis) ⁵⁾		Nm	40	110	40	110
	Gear unit loading 5 th Axis	without load	Nm	-20	-33	-22	-45
		with standard load	Nm	18 (16)	30 (8)	22 (20)	25 (13)
		M max	Nm	250	440	250	440
	Indexing accuracy Pa	4 th axis ²⁾	± arc sec	20	17	20	17
Precision		5 th axis (90°) ⁴⁾	± arc sec	45/20 (45/29)	26/22 (26/15)	56/28 (56/30)	30/20 (30/18)
	Repeat accuracy Ps average	4 th axis	± arc sec	2			
		5 th axis	± arc sec	2			
	Max speed at standard load	4 th axis ¹⁾	min ⁻¹	90 (170)	70 (105)	70 (120)	40 (50)
		5 th axis ¹⁾	min ⁻¹	60	40	60	40
	Radial run-out ²⁾	on spindle ø	µm	6 / 3			
	Axial run-out ²⁾	at spindle end face	µm	6 / 3			
	Parallelism ²⁾	Spindle to base	µm/100 mm	10 / 5			

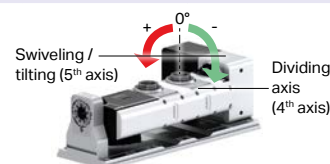
¹⁾ Mutually dependent; for individual drive motor data, see right side

²⁾ Standard / increased; for measuring method and validity of the values, please refer to **p. 74**, for optional angular position measuring systems, please refer to **p. 76/77**

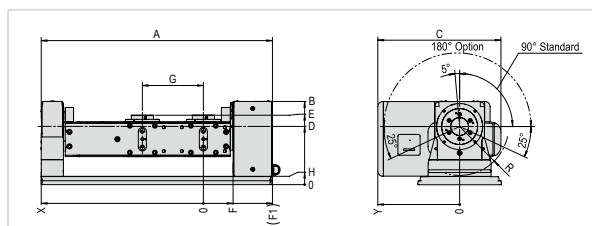
³⁾ Limit value for gear unit, at 1 rpm

⁴⁾ Without load / with standard load 0°–90°

⁵⁾ For torque calculation, see **p. 114**



Dimensions



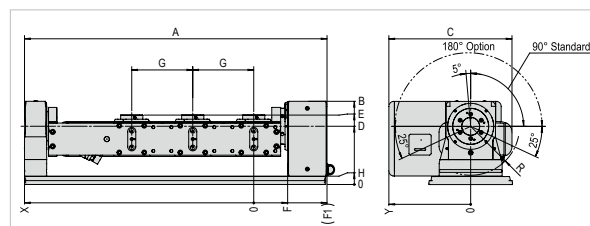
	A	B	C	D	E	F	F1	G	G2*	H	R	X	Y
T2-507510	766	245	382	180	226	151	230	160	130	30	136	489	248
T2-510520	931	300	469	210	250	182	264	220	180	30	177	571	295

Dimensions with 508 or 511 identical to 507510 and 510520.

* Minimum possible spindle distance (option)

Compact Versions: Dimension A, F and X

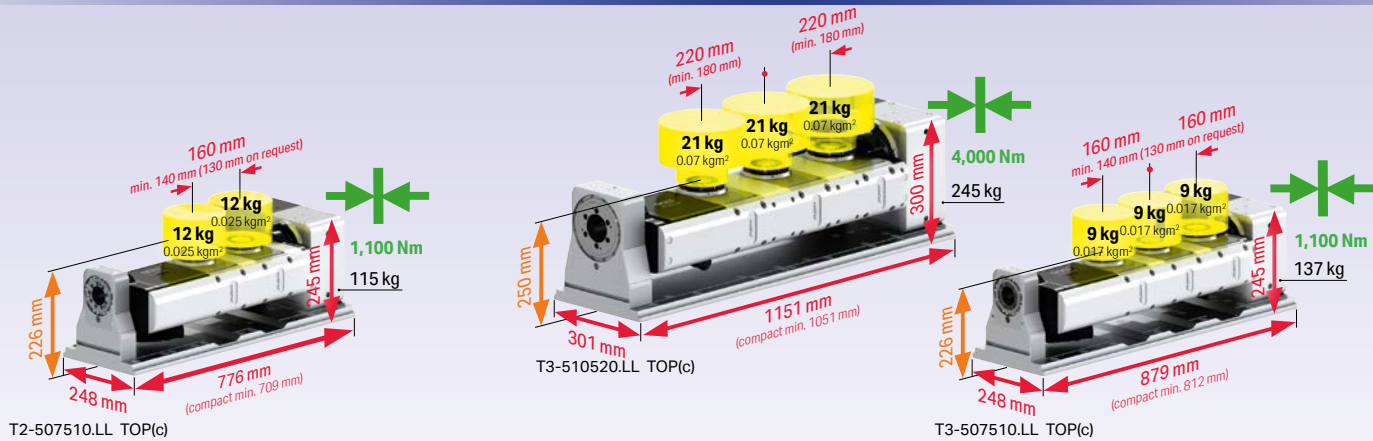
507510: 47 mm shorter, 510520: 60 mm shorter



	A	B	C	D	E	F	F1	G	G2*	H	R	X	Y
T3-507510	896	245	382	180	226	151	230	160	130	30	136	658	248
T3-510520	1111	300	469	210	250	182	264	220	180	30	177	791	295

Raised center height (option): Depending on the accessories involved (clamping cylinder, rotary union, angular position measuring system...), a center height increase (dimension D) is required. (See page for respective accessory)

Item no. as on TOP. Instead of «T1», however, «T2» or «T3».



Drive data

(based on standard load cube shown on pp. 112/113)

		Motors 4 th /5 th	Feed* [Nm]		Speed [rpm]		Cycle time*** [sec]			
			4 th	5 th	4 th	5 th	4 th	5 th	4 th	5 th
MAVILOR / MOVINOR **	T2-507510 TOP1.2	BLS-072/BLS-072	120	230	90	60	0.32	0.44	0.48	0.69
	T2-508510 TOP1.2(s)	BLS-072/BLS-072	70	230	170	60	0.27	0.44	0.35	0.69
	T2-510520 TOP2.2	BLS-072/BLS-073	190	425	80	45	0.32	0.54	0.54	0.87
	T2-510520 TOP2.2	BLS-072/LN-098	190	440	80	40	0.32	0.52	0.54	0.89
	T2-511520 TOP2.2(s)	BLS-072/BLS-073	140	425	105	45	0.25	0.54	0.40	0.87
	T2-511520 TOP2.2(s)	BLS-072/LN-098	140	440	105	40	0.25	0.52	0.40	0.89
	T3-507510 TOP1.3	BLS-072/BLS-072	120	230	70	60	0.34	0.50	0.55	0.75
	T3-508510 TOP1.3(s)	BLS-072/BLS-072	70	230	120	60	0.27	0.50	0.39	0.75
	T3-510520 TOP2.3	BLS-072/BLS-073	150	425	40	40	0.48	0.57	0.85	0.94
	T3-510520 TOP2.3	BLS-072/LN-098	150	440	40	40	0.48	0.54	0.85	0.92
FANUC	T3-511520 TOP2.3(s)	BLS-072/BLS-073	120	425	50	40	0.36	0.57	0.66	0.94
	T3-511520 TOP2.3(s)	BLS-072/LN-098	120	440	50	40	0.36	0.54	0.66	0.92
	T2-507510 TOP1.2	β1 is/α2 (HV)is	65	110	60	40	0.37	0.61	0.62	0.98
	T2-508510 TOP1.2(s)	β1 is/α2 (HV)is	40	110	90	40	0.34	0.61	0.50	0.98
	T2-510520 TOP2.2	α2 (HV)is/α2 (HV)is	95	195	45	28	0.45	0.69	0.78	1.23
	T2-510520 TOP2.2	α2 (HV)is/α4 (HV)is	95	335	45	30	0.45	0.66	0.78	1.16
	T2-511520 TOP2.2(s)	α2 (HV)is/α2 (HV)is	80	195	70	28	0.33	0.69	0.55	1.23
	T2-511520 TOP2.2(s)	α2 (HV)is/α4 (HV)is	80	335	70	30	0.33	0.66	0.55	1.16
	T3-507510 TOP1.3	β1 is/α2 (HV)is	30	110	30	40	0.57	0.69	1.07	1.06
	T3-510520 TOP2.3	α2 (HV)is/α2 (HV)is	65	195	30	27	0.66	0.74	1.16	1.29
YASKAWA SGM7J	T3-510520 TOP2.3	α2 (HV)is/α4 (HV)is	65	335	30	29	0.66	0.68	1.16	1.19
	T2-507510 TOP1.2	SGM7J 06/08	120	180	65	55	0.35	0.48	0.58	0.75
	T2-508510 TOP1.2(s)	SGM7J 06/08	70	180	120	55	0.23	0.48	0.36	0.75
	T2-510520 TOP2.2	SGM7J 08/08	145	315	50	38	0.40	0.56	0.70	0.95
	T2-511520 TOP2.2(s)	SGM7J 08/08	110	315	90	38	0.28	0.56	0.45	0.95
	T3-507510 TOP1.3	SGM7J 06/08	120	180	50	50	0.39	0.52	0.69	0.82
	T3-508510 TOP1.3(s)	SGM7J 06/08	70	180	95	50	0.28	0.52	0.43	0.82
	T3-510520 TOP2.3	SGM7J 08/08	105	315	35	35	0.54	0.61	0.97	1.03
	T3-511520 TOP2.3(s)	SGM7J 08/08	85	315	60	35	0.38	0.61	0.63	1.03
	T2-507510 TOP1.2	SGMJV 04/08	85	180	50	55	0.41	0.48	0.71	0.75
YASKAWA SGMJV	T2-508510 TOP1.2(s)	SGMJV 04/08	65	180	85	55	0.31	0.48	0.49	0.75
	T2-510520 TOP2.2	SGMJV 08/08	145	315	50	38	0.40	0.56	0.70	0.95
	T2-511520 TOP2.2(s)	SGMJV 08/08	110	315	90	38	0.28	0.56	0.45	0.95
	T3-507510 TOP1.3	SGMJV 04/08	60	50	35	50	0.54	0.52	0.97	0.82
	T3-508510 TOP1.3(s)	SGMJV 04/08	50	180	55	50	0.39	0.52	0.66	0.82
	T3-510520 TOP2.3	SGMJV 08/08	105	315	35	35	0.54	0.61	0.97	1.03
	T3-511520 TOP2.3(s)	SGMJV 08/08	85	315	60	35	0.38	0.61	0.63	1.03
MITSUBISHI	T2-507510 TOP1.2	HG56/75	100	170	40	45	0.43	0.51	0.81	0.85
	T2-508510 TOP1.2(s)	HG56/75	70	170	80	45	0.29	0.51	0.48	0.85
	T2-510520 TOP2.2	HG-(H)75/(H)105	135	430	45	30	0.40	0.63	0.73	1.13
	T2-511520 TOP2.2(s)	HG-(H)75/(H)105	100	430	80	30	0.30	0.63	0.49	1.13
	T3-507510 TOP1.3	HG56/75	75	170	35	40	0.48	0.57	0.91	0.94
	T3-508510 TOP1.3(s)	HG56/75	65	170	65	40	0.37	0.57	0.60	0.94
	T3-510520 TOP2.3	HG-(H)75/(H)105	95	430	25	30	0.64	0.64	1.24	1.14
	T3-511520 TOP2.3(s)	HG-(H)75/(H)105	80	430	35	30	0.48	0.64	0.91	1.14
SANYO	T2-507510 TOP1.2	R2Ax 06040/08075	95	185	55	55	0.37	0.48	0.64	0.75
	T2-508510 TOP1.2(s)	R2Ax 06040/08075	70	185	100	55	0.30	0.48	0.45	0.75
	T2-510520 TOP2.2	R2Ax 08075/08075	145	245	50	40	0.39	0.57	0.69	0.94
	T2-511520 TOP2.2(s)	R2Ax 08075/08075	135	245	90	40	0.28	0.57	0.45	0.94
	T3-507510 TOP1.3	R2Ax 06040/08075	70	185	40	50	0.48	0.52	0.85	0.82
	T3-508510 TOP1.3(s)	R2Ax 06040/08075	60	185	65	50	0.35	0.52	0.58	0.85
	T3-510520 TOP2.3	R2Ax 08075/08075	110	245	35	35	0.54	0.61	0.97	1.03
	T3-511520 TOP2.3(s)	R2Ax 08075/08075	120	245	60	35	0.35	0.61	0.60	1.03
SIEMENS	T2-507510 TOP1.2	1FK2203/1FK2204	60	150	45	45	0.43	0.51	0.77	0.85
	T2-508510 TOP1.2(s)	1FK2203/1FK2204	50	150	80	45	0.34	0.51	0.53	0.85
	T2-510520 TOP2.2	1FK2204/1FK2205	110	425	50	30	0.42	0.61	0.72	1.11
	T2-511520 TOP2.2(s)	1FK2204/1FK2205	85	425	90	30	0.28	0.61	0.45	1.11
	T3-507510 TOP1.3	1FK2203/1FK2204	40	150	30	40	0.62	0.61	1.12	0.98
	T3-508510 TOP1.3(s)	1FK2203/1FK2204	40	150	50	40	0.48	0.61	0.78	0.98
	T3-510520 TOP2.3	1FK2204/1FK2205	70	425	35	30	0.57	0.64	1.00	1.14
	T3-511520 TOP2.3(s)	1FK2204/1FK2205	65	425	55	30	0.41	0.64	0.68	1.14

* At 1 rpm; for more, please refer to p. 118

** For Siemens / Heidenhain

*** Without clamping; for times, please refer to p. 132

For calculation of load, forces and torques, please see p. 114

Important information

- The limit values as set out in the corresponding parameter list take precedence over the data and information provided in the main catalog (due to motor, drive enhancement and the respective machine CNC)
- Motor-independent data are optimum values at operating temperature
- Further details are available at www.lehmann-rotary-tables.com, under Download / Commissioning



Labyrinth seal (cutaway view)

- Recommended for:
- Grinding operations
 - High coolant pressures
 - Extremely fine abrasive particles

Accessories

Motor, cable, angular position measuring system and pL CNC starting at p. 76. Accessories starting at p. 68

Options

Item no.	Description
GEO.5xx-GEN	Incr. geometric precision, 1/2 standard tolerance
SPI.5xx-Lab 1) (for 5 th axis)	Spindle seal with labyrinth, integrated sealing air pressure control
SPI.5xx-Lab-x2 1) (for 4 th axis)	Spindle seal with labyrinth, integrated sealing air pressure control, for 2 spindles
SPI.5xx-Lab-x3 1) (for 4 th axis)	Spindle seal with labyrinth, integrated sealing air pressure control, for 3 spindles
SWB.510-180	Tilting range increase from 90° to 180° (with overshoot to max. 230°)
SWB.520-180	

1) for 507/510: HSK and ripas clamping not possible manually, GET.5xx-GEN and GEO.5xx-GEN only partly possible (increased radial and axial run-out cannot always be achieved)

Suitable alignment elements

Item no.	Designation	Slot width	Weight [kg]
AUR.iX-12		12g6	
AUR.iX-14	lineFIX	14g6	0.03
AUR.iX-16	alignment pin, 1 pair	16g6	0.03
AUR.iX-18		18g6	0.03

For lineFIX, refer to p. 90



 = High Series
(high speed, high resistance)

				T2-508511 TOP1.2s	T2-511521 TOP2.2s
Dimensions	Swivel ø		mm	160	220
	Spindle distance		mm	160	220
	Center height		mm	190	220
	Total weight	with motor	kg	115	200
	Center bore		mm	31	34
Bearing / Clamping	Max. clamping torque	4 th axis	Nm	250	600
		5 th axis	Nm	900	3,080
	Max spindle load per spindle	0°–30°	kg	2x40	2x67
		30°–90°	kg	2x27	2x45
		Standard load ¹⁾	kg	2x7.5	2x14
	Max. axial force	4 th axis per spindle	kN	12	20
	Max. pull-out torque	4 th axis	Nm	1,200	2,000
Gear unit		5 th axis	Nm	2,000	3,900
	Max. moment of inertia	Standard load ¹⁾	kgm ²	0.025	0.07
		J max	kgm ²	0.25	0.7
	Feed torque max ³⁾	4 th axis	Nm	70	140
		5 th axis	Nm	130	210
	Limited torques due to eccentric loads (acting on the tilting axis) ⁵⁾		Nm	30	45
	Gear unit loading	without load	Nm	-20	-33
Precision		5 th Axis	Nm	16	8
		M max	Nm	150	230
	Indexing accuracy Pa	4 th axis ²⁾	± arc sec	20	17
		5 th axis (90°) ⁴⁾	± arc sec	45/29	26/15
	Repeat accuracy Ps average	4 th axis	± arc sec		2
		5 th axis	± arc sec		2
	Max speed at standard load	4 th axis ¹⁾	min ⁻¹	170	105
Precision		5 th axis ¹⁾	min ⁻¹	70	45
	Radial run-out ²⁾	on spindle ø	µm		6 / 3
	Axial run-out ²⁾	at spindle end face	µm		6 / 3
Precision	Parallelism ²⁾	Spindle to base	µm/100 mm		10 / 5

¹⁾ Mutually dependent; for individual drive motor data, see right side

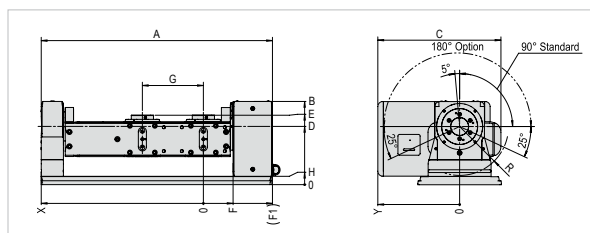
²⁾ Standard / increased; for measuring method and validity of the values, please refer to **p. 74**, for optional angular position measuring systems, please refer to **p. 76/77**

³⁾ Limit value for gear unit, at 1 rpm

⁴⁾ Without load / with standard load 0°–90°

⁵⁾ For torque calculation, see **p. 114**

Dimensions



	A	B	C	D	E	F	F1	G	G2*	H	R	X	Y
T2-507510	766	245	382	180	226	151	230	160	130	30	136	489	248
T2-510520	931	300	469	210	250	182	264	220	180	30	177	571	295

Dimensions with 508 or 511 identical to 507510 and 510520.

* Minimum possible spindle distance (option)

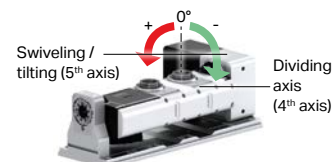
Compact Versions: Dimension A, F and X

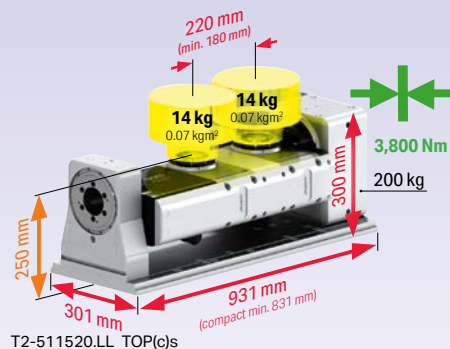
507510: 47 mm shorter, 510520: 60 mm shorter

Important information

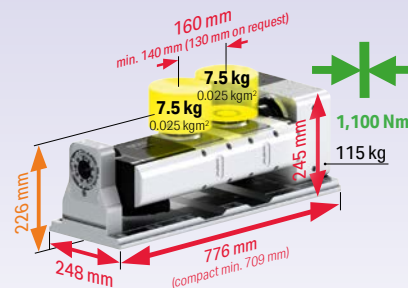
Raised center height (option): Depending on the accessories involved (clamping cylinder, rotary union, angular position measuring system...), a center height increase (dimension D) is required. (See page for respective accessory)

Item no. as on TOP. Instead of «T1», however, «T2».





T2-511520.LL TOP(c)s



T2-508510.LL TOP(c)s

Drive data

(based on standard load cube shown on pp. 112/113)

		Motors 4 th /5 th	Feed* [Nm]		Speed [rpm]		Cycle time*** [sec]			
			4 th	5 th	4 th	5 th	4 th	5 th	4 th	5 th
MAVILOR/ MOVINOR**	T2-508511 TOP1.2(s)	BLS-072/BLS-072	70	130	170	70	0.27	0.43	0.35	0.65
	T2-511521 TOP2.2(s)	BLS-072/BLS-073	140	210	105	45	0.25	0.50	0.40	0.83
	T2-511521 TOP2.2(s)	BLS-072/LN-098	140	210	105	50	0.25	0.47	0.40	0.77
FANUC	T2-508511 TOP1.2(s)	β1 is/α2 (HV)is	40	60	90	45	0.34	0.64	0.50	0.97
	T2-511521 TOP2.2(s)	α2 (HV)is/α2 (HV)is	80	120	70	45	0.33	0.57	0.55	0.77
	T2-511521 TOP2.2(s)	α2 (HV)is/α4 (HV)is	80	210	70	50	0.33	0.47	0.55	0.77
YASKAWA SGM7J	T2-508511 TOP1.2(s)	SGM7J 06/08	70	110	120	65	0.23	0.46	0.36	0.69
	T2-511521 TOP2.2(s)	SGM7J 08/08	110	205	90	50	0.28	0.47	0.45	0.77
YASKAWA SGMJV	T2-508511 TOP1.2(s)	SGMJV 04/08	65	110	85	65	0.31	0.46	0.49	0.69
	T2-511521 TOP2.2(s)	SGMJV 08/08	110	205	90	50	0.28	0.47	0.45	0.77
MITSUBISHI	T2-508511 TOP1.2(s)	HG56/75	70	100	80	60	0.29	0.48	0.48	0.73
	T2-511521 TOP2.2(s)	HG-(H)75/(H)105	100	210	80	50	0.30	0.47	0.49	0.77
SANYO	T2-508511 TOP1.2(s)	R2Ax 06040/08075	70	110	100	65	0.30	0.46	0.45	0.69
	T2-511521 TOP2.2(s)	R2Ax 08075/08075	135	155	90	50	0.28	0.49	0.45	0.79
SIEMENS	T2-507511 TOP1.2(s)	1FK2203/1FK2204	60	105	45	55	0.43	0.55	0.77	0.82
	T2-508511 TOP1.2(s)	1FK2203/1FK2204	50	105	80	55	0.34	0.55	0.53	0.82
	T2-511521 TOP2.2(s)	1FK2204/1FK2205	85	210	90	50	0.28	0.47	0.45	0.77

* At 1 rpm; for more, please refer to p. 118

** for Siemens / Heidenhain

*** Without clamping; for times, please refer to p. 132

For calculation of load, forces and torques, please see p. 114

Important information

- The limit values as set out in the corresponding parameter list take precedence over the data and information provided in the main catalog (due to motor, drive enhancement and the respective machine CNC)
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- Further details are available at www.lehmann-rotary-tables.com, under Download / Commissioning



Labyrinth seal (cutaway view)

- Recommended for:
- Grinding operations
 - High coolant pressures
 - Extremely fine abrasive particles

Accessories

Motor, cable, angular position measuring system and pL CNC starting at p. 76. Accessories starting at p. 68

Options

Item no.	Description
GEO.5xx-GEN	Incr. geometric precision, 1/2 standard tolerance
SPI.5xx-Lab 1) (for 5 th axis)	Spindle seal with labyrinth, integrated sealing air pressure control
SPI.5xx-Lab-x2 1) (for 4 th axis)	Spindle seal with labyrinth, integrated sealing air pressure control, for 2 spindles
SPI.5xx-Lab-x3 1) (for 4 th axis)	Spindle seal with labyrinth, integrated sealing air pressure control, for 3 spindles
SWB.510-180 SWB.520-180	Tilting range increase from 90° to 180° (with overshoot to max. 230°)

1) for 507/510: HSK and ripas clamping not possible manually, GET.5xx-GEN and GEO.5xx-GEN only partly possible (increased radial and axial run-out cannot always be achieved)

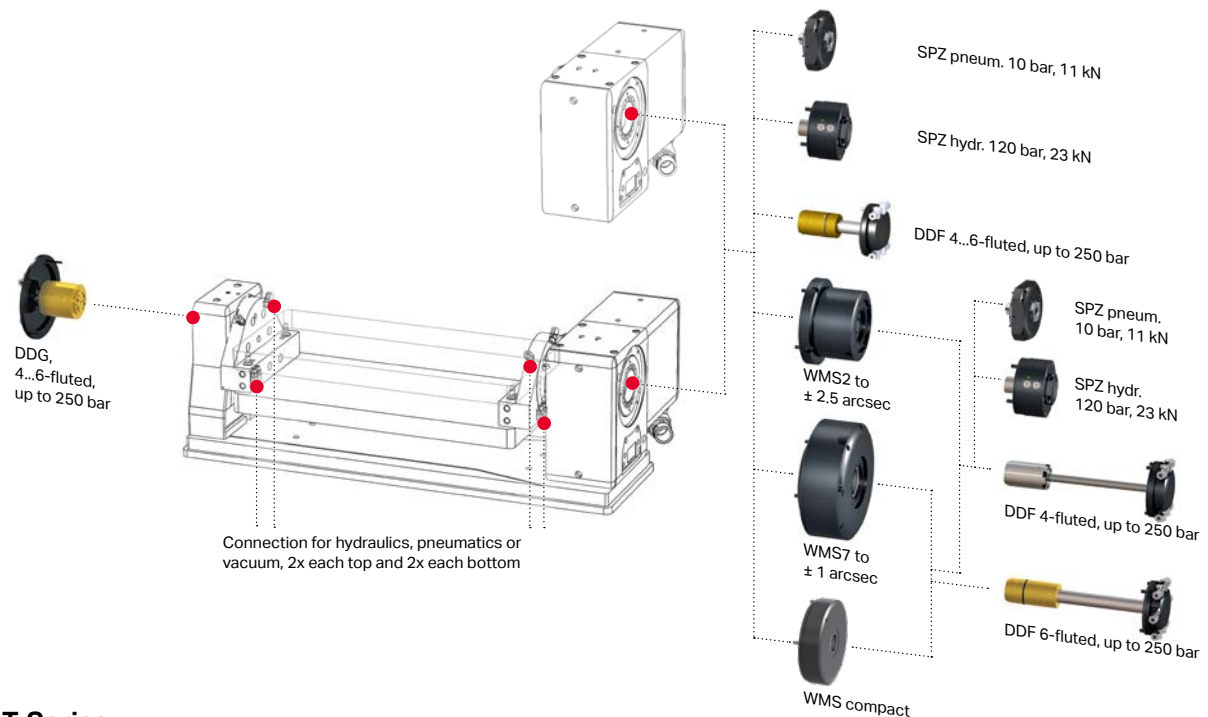
Suitable alignment elements

Item no.	Designation	Slot width	Weight [kg]
AUR.iX-12	lineFIX alignment pin, 1 pair	12g6	
AUR.iX-14		14g6	0.03
AUR.iX-16		16g6	0.03
AUR.iX-18		18g6	0.03

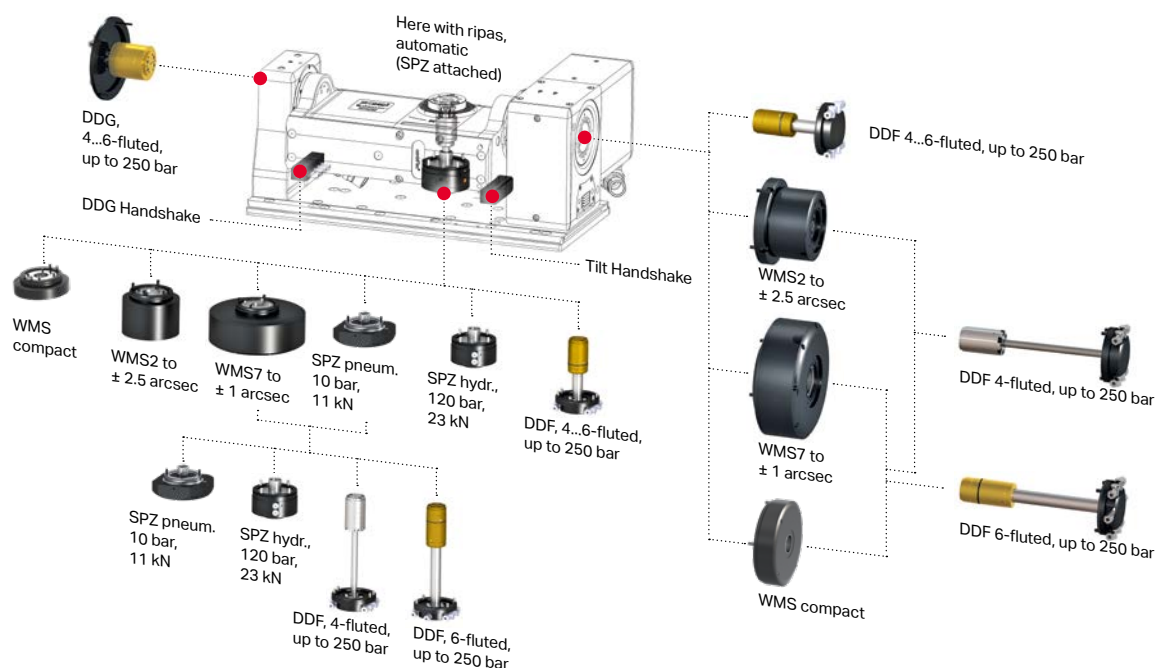
For lineFIX, refer to p. 90

- Positioning accuracy to **± 1 arcsec**
- Up to **12 channels** on dividing axis or clamping yoke
- Medium: Oil, air or vacuum, up to **250 bar**
- Many standard combinations

E-Series



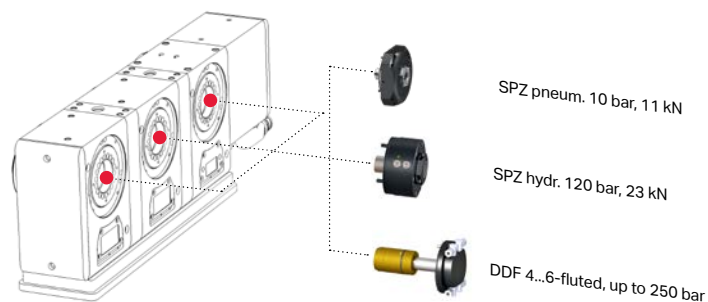
T-Series



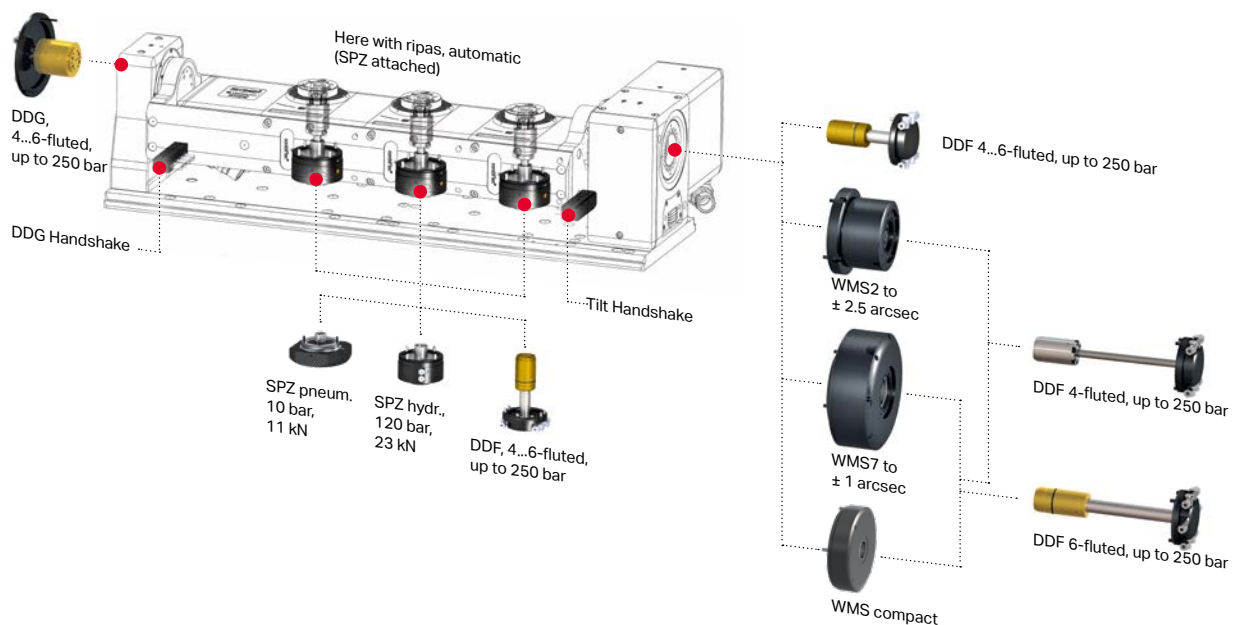
- Rotary union in combination with direct measuring systems small and large
- Can be retrofitted anytime **with ease**
- Clamping cylinder up to **23 kN**

– DDF up to 2x6 channels
– SPZ on WMS2

M-Series



T2...T3-Series



Note

1. DDF 6-fluted not possible on
 - 507 and 508
 - Small counter bearing (TOP1)
 - 510 with rotoFIX
2. WMS7 not possible on 507 and 508
3. SPZ (stroke = 15 mm) not possible in combination with WMS2

WMS Angular position measuring system
2 = Size 2000, Heidenhain, Magnescale
7 = Size 8000, Heidenhain

DDF Rotary union on rotary table

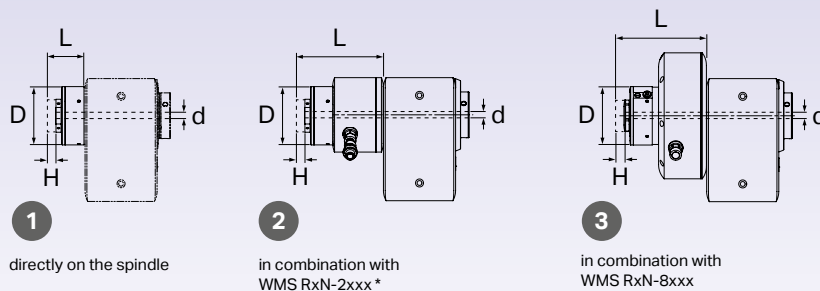
DDG Rotary union for counter bearing
4 = 4 channels
6 = 6 channels

SPZ Clamping cylinders

MTS Modular tooling system

For any center height increases due to the respective spindle accessories, see **S. 71**.

Hydraulic clamping cylinder standard



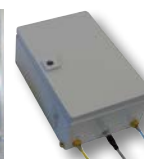
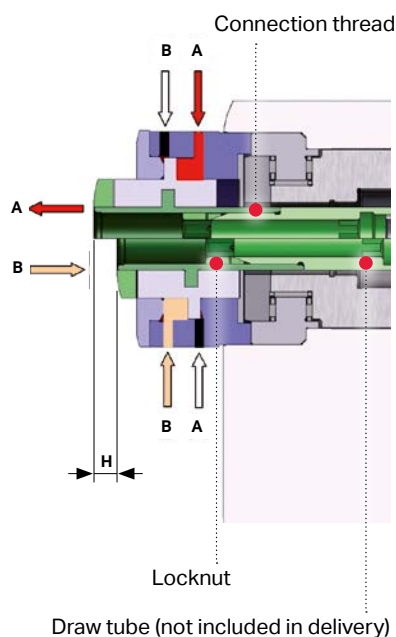
Pulling force max. 23 kN at max. permissible pressure of 120 bar

Item no.	Effective direction Designation	H [mm]	Oil [cm ³]	D [mm]	d [mm]	Connection thread	L [mm]			Weight [kg]
							1	2 *	3	
507	SPZ.5xx-d2.5	2.5	5.2	102	22	M24x1.5	60	149		2.90
	SPZ.5xx-9	9	18.8				72	161		2.85
	SPZ.5xx-15	15								3.44
	SPZ.507-WMS2**							•		
510	SPZ.5xx-d2.5	2.5	5.2				52	141	136	2.90
	SPZ.5xx-9	9	18.8				64	153	148	2.85
	SPZ.5xx-15	15								3.44
	SPZ.510-WMS2**							•		
520	SPZ.510-WMS7								•	0.21
	SPZ.520-d2.5	2.5	5.2				73	165	160	3.60
	SPZ.520-9	9	18.8				85	177	172	3.55
	SPZ.520-15	15								4.14
530	SPZ.520-WMS2**							•		
	SPZ.520-WMS7								•	
	SPZ.530-d2.5	2.5	5.2				65	144	133	5.09
	SPZ.530-9	9	18.8				77	156	145	5.04
all types	SPZ.530-15	15								5.63
	SPZ.530-WMS2**							•		
	SPZ.530-WMS7								•	
	SPZ.Awk-Vor									
all types	SPZ.Awk									
	SPZ.Awk									

* If in combination with pL accessories, only on request (only possible for stroke of 2.5 mm and 9 mm)

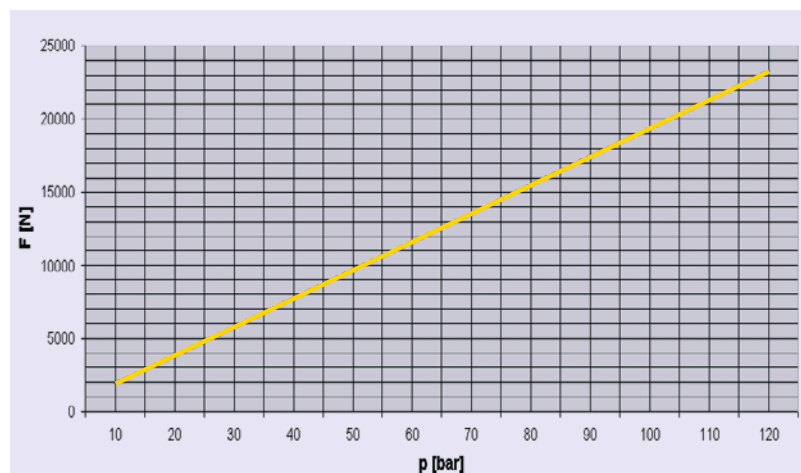
** May be used only for pulling

Principle of operation



Control box for presence detection (SPZ.Awk)

Hydraulically actuated: Forec diagram 10...120 bar (compression or tension; for suitable hydraulic unit, please refer to p. 91)

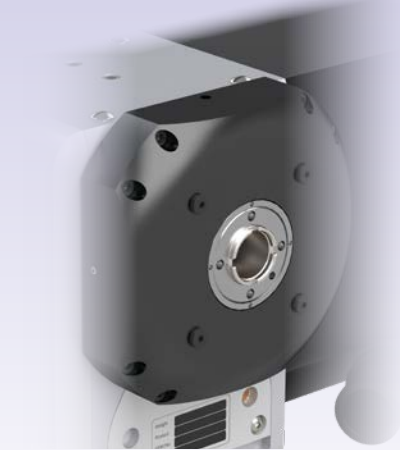


Pneumatic clamping cylinder with adjustable stroke

NEW

1

More information about clamping cylinder **p. 70**, rotary union **p. 72**, angular position measuring system **p. 76/77**

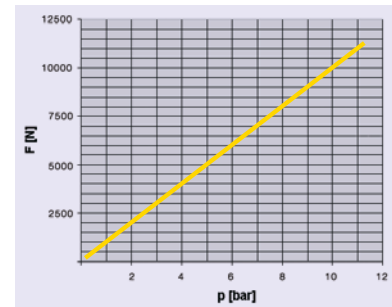


Pulling force max. 11 kN at max. permissible pressure of 10 bar

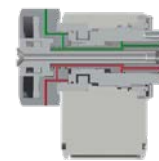
pL LEHMANN Item no.	Designation	H min* [mm]	Air [cm ²]	D [mm]	d [mm]	Connec- tion thread	L [mm]	Weight [kg]
507	SPZ.507-3p	3	28	169 / 143x143	22	M24x1.5	57.2	4.5
	SPZ.507-9p	9	100				63.7	4.5
	SPZ.507-15p	15	167				69.7	4.5
510	SPZ.510-3p	3	28				48.7	4.5
	SPZ.510-9p	9	100				55.2	4.5
	SPZ.510-15p	15	167				61.2	4.5
520	SPZ.520-3p	3	28				69.7	4.5
	SPZ.520-9p	9	100				76.2	4.5
	SPZ.520-15p	15	167				82.2	4.5
530	SPZ.530-3p	3	28				61.7	4.5
	SPZ.530-9p	9	100				68.2	4.5
	SPZ.530-15p	15	167				74.2	4.5
	SPZ.510-15p-DDF2**	15	167		6	M10x1	81.2	
	SPZ.Valve	Valve set						
	SPZ.Booster	Pressure booster, 1:2, up to 10 bar						

* Stroke of 3, 9 and 15 mm can be achieved with the same clamping cylinder

** Max. pressure at DDF up to 120 bar (250 bar on request)



SPZ without DDF



SPZ with DDF

Raised center height on T-type rotary tables

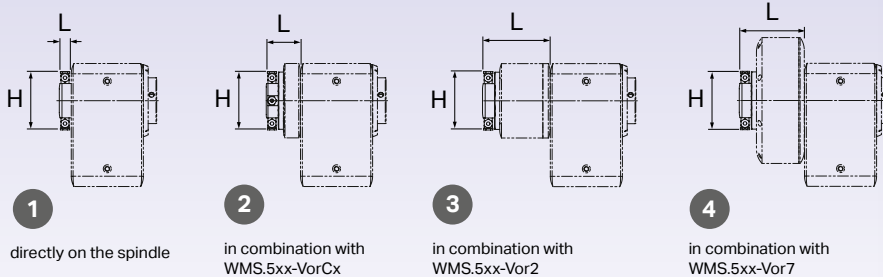
For all combinations of possible spindle accessories.

					Hydraulic & pneumatic				Hydraulic										Pneumatic
	Item no.	In-crease	4 3 1 WMS2	2 WMS7	WMSC	1 DDF	2 WMS2 + DDF	2 WMS7 + DDF	WMSC + DDF	1 SPZ2.5	1 SPZ9	1 SPZ15	2 WMS2 + SPZ2.5	3 WMS7 + SPZ2.5	2 WMS2 + SPZ9	3 WMS7 + SPZ9	3 WMS7 + SPZ15	SPZ-P*	
TIP1	SPH.TIP1-40	without	•		•	•	•		•	•	•	•						•	
	SPH.TIP1-80	80mm	•		•	•	•		•	•	•	•	•		•			•	
TIP2	SPH.TIP2-40	without	•		•	•			•	•	•	•						•	
	SPH.TIP2-80	40mm	•	•	•	•	•	•	•	•	•	•						•	
TIP3	SPH.TIP3-50	80mm	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	SPH.TIP3-100	without	•		•	•			•	•	•	•						•	
TAP1	SPH.TAP1-40	50mm	•	•	•	•	•	•	•	•	•	•						•	
		100mm	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
TAP2	SPH.TAP2-30	without	•		•	•			•	•	•	•						•	
	SPH.TAP2-60	40mm	•		•	•			•	•	•	•						•	
TAP3	SPH.TAP3-50	30mm	•	•	•	•	•	•	•	•	•	•						•	
		60mm	•		•	•	•	•	•	•	•	•						•	
TOP1	SPH.TOP1-40	without	•		•	•			•	•	•	•						•	
	SPH.TOP1-70	50mm	•		•	•			•	•	•	•						•	
TOP2	SPH.TOP2-30	70mm	•		•	•	•	•	•	•	•	•	•		•			•	
	SPH.TOP2-60	100mm	•		•	•	•	•	•	•	•	•	•	•				•	
TOP3	SPH.TOP3-50	without	•		•	•			•	•	•	•						•	
	SPH.TOP3-100	30mm	•		•	•			•	•	•	•						•	

WMS = Angular position measuring system, SPZ = clamping cylinder, DDF = rotary union

* pneumatic clamping cylinder with 3, 9 and 15 mm stroke

Ultra-compact, for air and oil



Rotary unions for rotary table

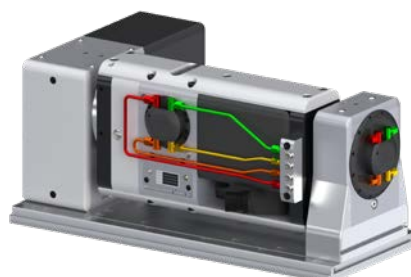
Item no.	Flutes	Oil	Air	H [mm]	1	2	3	4	Weight [kg]
DDF.507-04	4	•	•	102	30				2.56
DDF.507-04C	4	•	•	102		66			2.69
DDF.507-04-2	4	•	•	102			117		2.43
DDF.510-04	4	•	•	102	21				2.58
DDF.510-06	6	•	•	122					2.80
DDF.510-06C	6	•	•	122		60			2.93
DDF.510-04-2	4	•	•	102			119		2.44
DDF.510-04-7	4	•	•	102				114	2.89
DDF.510-06-7	6	•	•	122					3.10
DDF.520-04	4	•	•	102	42				3.43
DDF.520-06	6	•	•	122					3.63
DDF.520-06C	6	•	•	122		74			3.05
DDF.520-04-2	4	•	•	102			121		2.47
DDF.520-04-7	4	•	•	102				117	3.03
DDF.520-06-7	6	•	•	122					3.18
DDF.530-04	4	•	•	102	34				5.82
DDF.530-06	6	•	•	122		75			5.97
DDF.530-06C	6	•	•	122					3.87
DDF.530-04-2	4	•	•	102			109		3.19
DDF.530-04-7	4	•	•	102					3.79
DDF.530-06-7	6	•	•	122				98	3.95

All rotary unions can be used on all T-type rotary tables without increasing the center height so long as no angular position measuring system is used.

Rotary unions (DDF) for counter bearing (GLA)

Item no.	Flutes	Oil	Air	H [mm]	L [mm]	Weight [kg]
DDG.507-04-TOP	4	•	•	102	30	2.48
DDG.520-04-TOP	4	•	•	102	44	3.66
DDG.520-06-TOP	6	•	•	122	44	4.11

DDG on GLA for T-type rotary table



4 connections, at rear

DDG on GLA for rotoFIX



2 connections facing down

2 connections facing up

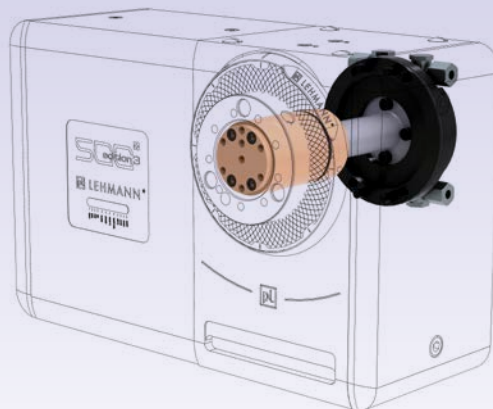
For raised center height on T-type rotary tables, see p. 71

The center height changes only if the rotary union is used on an angular position measurement system.

All rotary unions: Channel size $\varnothing 3.5$ mm,
permissible pressure 250 bar

DDF.TxP1.Lx-04(p)

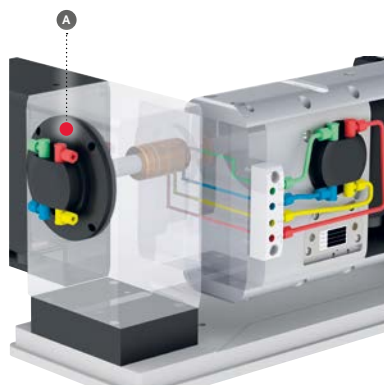
p = pneumatic clamping cylinder
without = DDF and hydraulic clamping cylinder



Handshake for T-type rotary tables

The following options (adapter plate and tubing) are required in order to feed the rotary unions on the dividing axis via the tilting axis:

Item no.	Left	Right	A	B	Remarks
TxP					
DDF.TxP1.Lx-04(p)	•	•	•	•	not possible for version TxP1c
DDF.TxP1.Rx-04(p)	•	•	•	•	not possible for version TxP1c
DDF.TxP2.Lx-04-2(p)	•	•	•	•	not possible for versions TxP2c and Oxx
DDF.TxP2.Lx-06-2(p)	•	•	•	•	not possible for versions TxP2c and Oxx
DDF.TxP2.Rx-04-2(p)	•	•	•	•	not possible for versions TxP2c and Oxx
DDF.TxP2.Rx-06-2(p)	•	•	•	•	not possible for versions TxP2c and Oxx
DDF.TxP3.Lx-04-2(p)	•	•	•	•	
DDF.TxP3.Lx-06-2(p)	•	•	•	•	
DDF.TxP3.Rx-04-2(p)	•	•	•	•	
DDF.TxP3.Rx-06-2(p)	•	•	•	•	
TOP					
DDG.TOP1-04(p)	•	•	•	•	
DDG.TOP2-04-2(p)	•	•	•	•	If Oxx in addition, DDFWMS-7-TxP needed
DDG.TOP2-06-2(p)	•	•	•	•	
DDG.TOP3-04-2(p)	•	•	•	•	
DDG.TOP3-06-2(p)	•	•	•	•	
TGR					
DDF.TGR2.Lx-04(p)	•	•	•	•	
DDF.TGR2.Lx-06(p)	•	•	•	•	
DDF.TGR2.Rx-04(p)	•	•	•	•	
DDF.TGR2.Rx-06(p)	•	•	•	•	
DDF.TGR3.Lx-04(p)	•	•	•	•	
DDF.TGR3.Lx-06(p)	•	•	•	•	
DDF.TGR3.Rx-04(p)	•	•	•	•	
DDF.TGR3.Rx-06(p)	•	•	•	•	



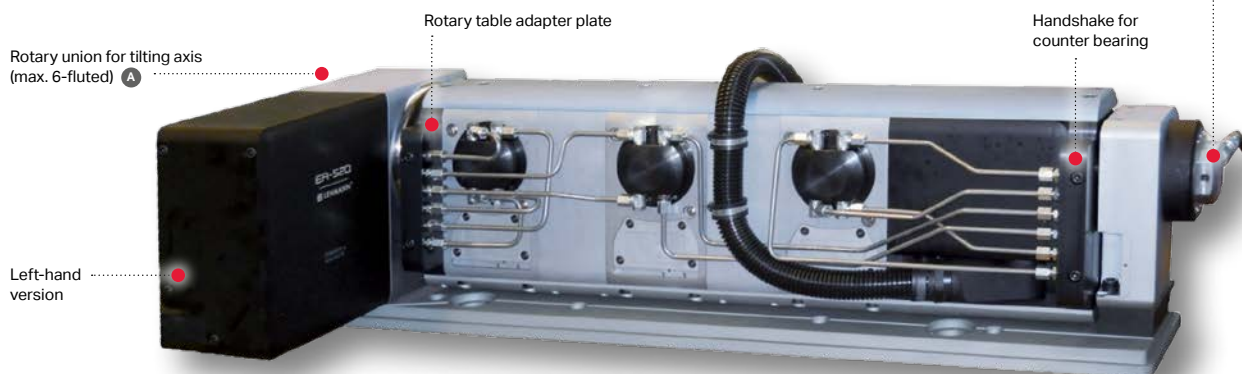
Handshake
Medium transfer from
tilting axis to dividing
axis (rear)



Handshake
Medium transfer from
tilting axis to dividing
axis (front)

Essential for handshake with WMS.5xx-Vor7

Item no.	Left	Right	Remarks
DDFWMS-04-7	•	•	Adjustment strip, rotary table adapter plate
DDFWMS-06-7	•	•	



Overview,
Applications

System &
Facts, smartBox

Rotary
tables

SPZ,
DDF, WMS

MOT, KAB,
WDF, CNC

Aligning,
GLA, RST, LOZ

Service
& Technology

Tooling

«What you measure is what you get» –
how to produce more accurately with 3+2 than
with many 5-axis machining centers

Attainable workpiece accuracies

Reference values for T-type rotary tables

In order to achieve the best possible spatial accuracies (volumetric accuracy), a few points must be observed. For more information, please refer to **p. 133**.

Reference values	Positioning	Simultaneous
Size	350 mm cube	150mm cube
Weight	150 kg	34 kg
Accuracy ¹⁾	± 10 µm/100 mm	
Accuracy ²⁾	± 5 µm/100 mm	not possible
Accuracy direct measuring system ¹⁾	± 3 µm/100 mm	
Accuracy direct measuring system ²⁾	± 2 µm/100 mm	not possible

¹⁾ only ONE workpiece zero point

²⁾ multiple workpiece zero points

WMS = Direct measuring system ± 2.5"; both axes



Elasticity of tilting axes (reference values for pitch error)

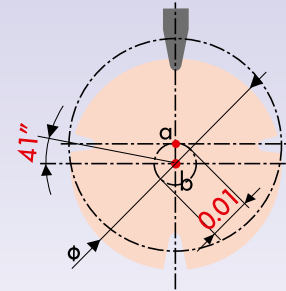
0° to 90° [arcsec]	Unloaded		Standard load sls [*]	
	TxP	TGR	TxP	TGR
TF...T1-507510 (508510)	-35 (-35)	–	6 (-9)	–
TF...T1-510520 (511510)	-18 (-18)	-73 (on request)	20 (1)	12 (on request)
TF...T1-520530 (521530)	-2	-42	56	29
T2-507510 (508510)	-56 (-56)	–	-5 (-23)	–
T2-510520 (511510)	-28 (-28)	–	20 (-5)	–
T3-507510 (508510)	-78 (-78)	–	-21 (-40)	–
T3-510520 (511510)	-37 (-37)	–	16 (-11)	–

^{*} see **p. 113**

Explanation: The pitch error corrects the positioning error resulting from elasticity caused by the eccentric load of the rotary axis on the tilting axis.

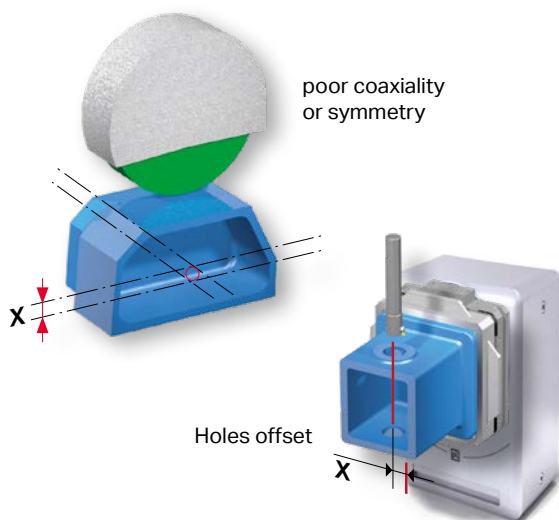
Recommendation: In order to achieve the best possible accuracies, we always recommend compensating for the gear backlash and the pitch error (5th axis) with the CNC control unit and/or by using a direct measuring system (option, **p. 76/77**). A tilting range of 180° results in other compensation values; please contact the factory if necessary.

Quality at pL LEHMANN «The right processes automatically yield the desired results»



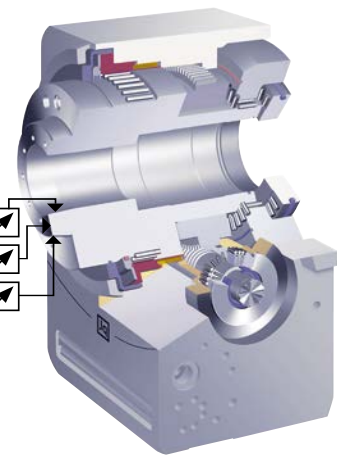
a) effective center of rotation
b) center of spindle / workpiece

Result on workpiece from concentricity error

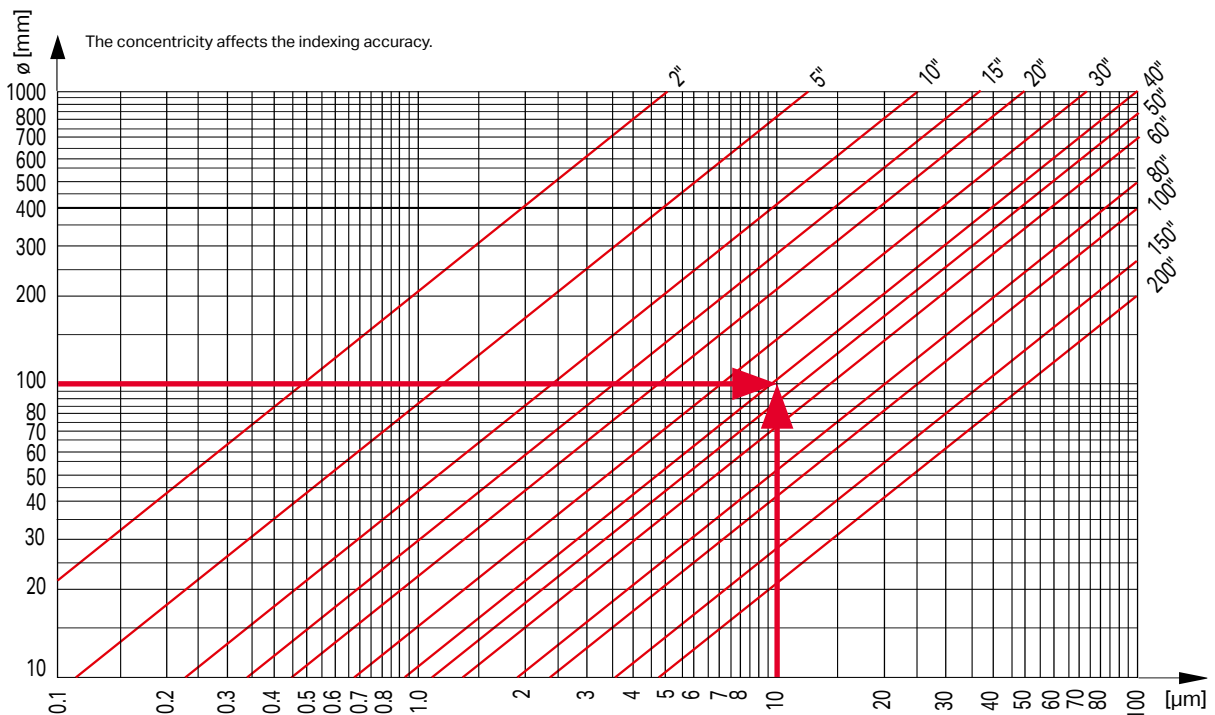


	Standard *	Optional **
X =	0.006	0.003 (0.002)
	0.006/Ø100	0.003 / Ø100
X =	0.006	0.003 (0.002)

Other rotary tables:
* usually 0.01 +67%
** not available



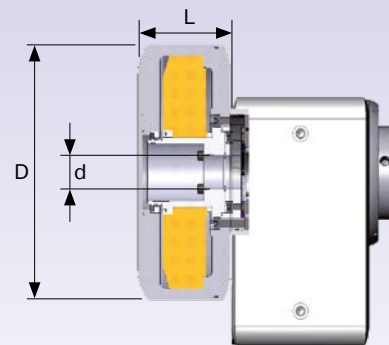
Angular seconds and radian compared



Example: Workpiece-Ø 100 mm, concentricity error 0.01mm = additional error on workpiece up to approx. 41''

Concentricity error μ

For the highest indexing accuracy:
Fully encapsulated, leak-proof,
protected against impact, adjusted
with high precision



	L	D [mm]	d
WMS.507-VorCX	35.5	130	34
WMS.510-VorCX	29.9	130	34
WMS.520-VorCX	35.9	165	46
WMS.530-VorCX	38		
WMS.520-VorCH	34.5	180	50
WMS.507-Vor2	88.2	130	15
WMS.510-Vor2	88.5		
WMS.520-Vor2	91.6		
WMS.530-Vor2	79		
WMS.510-Vor7	84	220	30
WMS.520-Vor7	87		46
WMS.530-Vor7	68		50
WMS.TOP2-Vor2	102	130	15

Alternative to direct measuring system

Optional increased mechanical gear accuracy

GET.5xx-GEN Only possible on EA-, TF- and T1-type rotary tables (for data, see respective rotary table on pp. 34–59)

Option: Additional cable for retrofitting direct measuring system

KAB.WMS-14.0-o

Cable run in flexible tubing, 14 m long, without connector

For center height increase on T-type rotary tables, see p. 71

The center height of the T-type rotary table is increased in accordance with the angular position measuring system (additional charge)

Important information

On T1-507510 with direct measuring system, the tilting range option for 180° is not possible

Measuring method used to determine the gear unit's accuracy according to VDI/DGQ 3441 or ISO 230-2

- Measured at operating temperature of the unit after 5 warm-up cycles
- 5 measuring cycles
- 24 measuring points (15° increments)
- Acceleration 500°/s²
- All measured values apply in unloaded condition at room temperature approx. 22 °C
- The values WITHOUT load apply

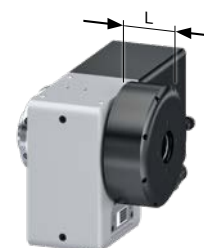
Attention: Due to the influence of environmental factors during the measurement (temperature, vibration, etc.), the recorded measurement error may exceed the catalog limit value by up to 10%.

Attachment variants of the direct measuring system

Applicable depending on the selected direct measuring system (see p. 77)



WMS.5xx-Vor2



WMS.5xx-Vor7

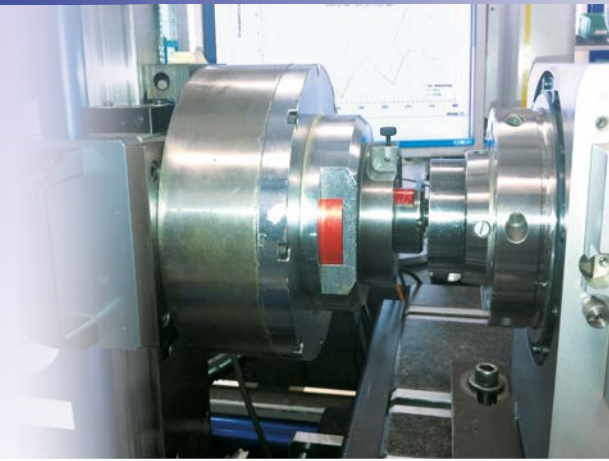


WMScompact
(WMS.5xx-VorCX)



Example WMS with DDF
* see p. 72/73

Size and accuracy: wide range for different controls and interfaces



Fully automated measuring system for indexing accuracy measurement

WMS.TXM-75.1T

T = tilting axis, only with incremental measuring system
without = only 1 measuring head available, .1 = 1 measuring head, .2 = 2 measuring heads
M = Incremental, A = Absolute
X = REX
T = Tonic / 1Vss, V = Vionic / TTL, S = Siemens, F = Fanuc, M = Mitsubishi

Selecting the direct measuring system

5 in the case of 507/508 with TTL (2 measuring heads) and Siemens only possible without spindle clamping

	Encoder kit Item no.	Preparation Item no.	Incremental	Absolute	1Vss	TTL	EnDat02	Siemens driveClik	Fanuc	Mitsubishi	System	Indexing accuracy		Type	Read head	
												normal	comp.*			
Rotary table	WMS.xXM-75	WMS.5xx-VorCX	x	x							Renishaw Line	± 10"	± 3"	REX	1	5
	WMS.xXM-75.1	WMS.5xx-VorCX	x			x					count 11840, or	± 10"	± 3"	REX	1	5
	WMS.xXM-75.2	WMS.5xx-VorCX	x			x					20 µm pitch	± 2.5"	± 1"	REX	2	5
	WMS.xXA-75	WMS.5xx-VorCX		x					x	x	Renishaw Line	± 10"	± 3"	REX	1	5
	WMS.xXA-75.1	WMS.5xx-VorCX		x			x				count 11840, or	± 10"	± 3"	REX	1	5
	WMS.xXA-75.2	WMS.5xx-VorCX		x			x				20 µm pitch	± 2.5"	± 1"	REX	2	5
	WMS.RU97A	WMS.5xx-Vor2	x				x				Magnescale	± 2.5"		RU97A	built-in	3
	WMS.RU77F	WMS.5xx-Vor2	x						x			± 2.5"		RU77	built-in	4
	WMS.RU77M	WMS.5xx-Vor2	x							x		± 2.5"		RU77	built-in	4
	WMS.91x-HH	WMS.520-VorCH	x				x					± 12"		ECA 4410	1	5
	WMS.91x-HH+	WMS.520-VorCH	x				x					± 8"		ECA 4410	1	5
	WMS.285	WMS.5xx-Vor2		x	x							± 5"		RON 285	built-in	1
	WMS.287	WMS.5xx-Vor2		x	x							± 2.5"		RON 287	built-in	1
	WMS.2381	WMS.5xx-Vor2		x			x					± 4"		RCN 2381	built-in	1
	WMS.2581	WMS.5xx-Vor2		x			x					± 2"		RCN 2581	built-in	1
	WMS.275	WMS.5xx-Vor2	x			x					Heidenhain	± 5"		RON 275	built-in	1
	WMS.8391F**	WMS.5xx-Vor7		x					x			± 2"		RCN 8391F	built-in	2
	WMS.8391M**	WMS.5xx-Vor7		x						x		± 2"		RCN 8391M	built-in	2
Counterbearing	WMS.8381**	WMS.5xx-Vor7		x			x					± 2"		RCN 8381	built-in	2
	WMS.8591F**	WMS.5xx-Vor7		x					x			± 1"		RCN 8591F	built-in	2
	WMS.8591M**	WMS.5xx-Vor7		x						x		± 1"		RCN 8591M	built-in	2
	WMS.8581**	WMS.5xx-Vor7		x			x					± 1"		RCN 8581	built-in	2
	WMS.2381	WMS.TOP2-Vor2		x							Heidenhain	± 4"		RCN 2381	built-in	1
	WMS.2581	WMS.TOP2-Vor2		x								± 2"		RCN 2581	built-in	1
	WMS.RU97A	WMS.TOP2-Vor2		x								± 2.5"		RU97A	built-in	3
	WMS.RU77F	WMS.TOP2-Vor2		x							Magnescale	± 2.5"		RU77	built-in	4
	WMS.RU77M	WMS.TOP2-Vor2		x								± 2.5"		RU77	built-in	4

* Sine error compensated for individually by customer**

** not available for 507/508

HEIDENHAIN



Magnescale



RENISHAW



Suitable motors for drive systems from
FANUC, SIEMENS, HEIDENHAIN, YASKAWA,
MITSUBISHI, SANYO...



Order items

The correct motor is defined in the order code for the respective rotary table by specifying the motor abbreviation from the applicable order number key.

Item no.	Designation
MOT.dCliq	Siemens sensor module for drive Click for installation in control cabinet

Integration on Siemens Solution Line

pL LEHMANN has developed appropriate solutions together with SIEMENS. Request our special documentation. Our specialists will assist you during commissioning.

Important information

Servo drive design: Rated current at least 75% of motor's peak current! (Otherwise, only reduced drive performance is possible)

Dimension X = Dimension from spindle axis to end of motor housing (see pp. 34–67).

Motor flange, max

507/508 = 70x70mm, 510/511 = 90x90mm
520/521 = 105x105mm, 530 = 144x144mm

Motor table

		pL LEHMANN Item no.	Motor manufacturer Item no.	Voltage [VAC]	s = Standard o = Option					Motor pos. L/R					Overall gear ratio i_{tot}						
					507 / 508	510 / 511	520 / 521	530		507 / 508	510 / 511	520 / 521	530		507	508	510	511	520	521	530
SPZ, DDF, WMS	MOVINOR / MAVILOR (Siemens, Heidenhain)	BLS 072 ERN 1185	MOT.MA-072ERN	BLS 072 ERN 1185	400	s	s			236	248				90:1	45:1	120:1	60:1			
		BLS 072 EQN 1125	MOT.MA-072EQN25	BLS 072 EQN 1125	400	o	o			236	248				90:1	45:1	120:1	60:1			
		BLS 072 EQN 1135	MOT.MA-072EQN35	BLS 072 EQN 1135	400	o	o			236	248				90:1	45:1	120:1	60:1			
		BLS 073 ERN 1185*	MOT.MA-073ERN	BLS 073 ERN 1185	400			s				295							150:1	75:1	
		BLS 073 EQN 1125*	MOT.MA-073EQN25	BLS 073 EQN 1125	400			o				295							150:1	75:1	
		BLS 073 EQN 1135*	MOT.MA-073EQN35	BLS 073 EQN 1135	400			o				295							150:1	75:1	
MOT, KAB, WDF, CNC	FANUC	LN098 ERN 1185	MOT.MO-098ERN	LN098 ERN 1185	400			s				320	390						150:1	75:1	150:1
		LN098 EQN 1125	MOT.MO-098EQN25	LN098 EQN 1125	400			o				320	390						150:1	75:1	150:1
		LN098 EQN 1135	MOT.MO-098EQN35	LN098 EQN 1135	400			o				320	390						150:1	75:1	150:1
		β 1/6000is	MOT.FA-1/6is	A06B-0116-B103	200	s	o			236	248				90:1	45:1	90:1	45:1			
		b1.5/6000HVis-B	MOT.FA-1.5/6HVisB	A06B-2020-B103	400	s	o			236	248				90:1	45:1	90:1	45:1			
		α 2/5000is*	MOT.FA-2/5is	A06B-0212-B100	200		s	s			248	295					90:1	45:1	150:1	75:1	
Aligning, GLA, RST, LOZ	YASKAWA	α 2/5000HVis*	MOT.FA-2/5HVis	A06B-0213-B100	400		s	s			248	295					90:1	45:1	150:1	75:1	
		α 4/5000is	MOT.FA-4/5is	A06B-0215-B100	200			s				320	390						150:1	75:1	180:1
		α 4/5000HVis	MOT.FA-4/5HVis	A06B-0216-B100	400			s				320	390						150:1	75:1	180:1
		SGMJV-04	MOT.YA-SGMJV04	SGMJV-04ADA61	200	s	o			236	248				90:1	45:1	120:1	60:1			
		SGMJV-08	MOT.YA-SGMJV08	SGMJV-08ADA61	200		s	s			248	295					90:1	45:1	150:1	75:1	
		SGMEV-15	MOT.YA-SGMEV15	SGMEV-15ADA61	200			s					390								180:1
Service & Technology	MITSUBISHI	SGM7A-25	MOT.YA-SGM7A25	SGM7A-25A7A61	200			s					390								150:1
		SGM7J-06	MOT.YA-SGM7J06	SGM7J-06A7A61	200	s	o			236	248				90:1	45:1	120:1	60:1	150:1	75:1	
		SGM7J-08	MOT.YA-SGM7J08	SGM7J-08A7A61	200		s	s			248	295					90:1	45:1			
		HG56	MOT.MI-HG-56S	HG-56S-D47	200	s	o			236					90:1	45:1					
		HG75	MOT.MI-HG-75S	HG-75S-D48	200		s				270						90:1	45:1			
		HG-H75	MOT.MI-HG-H75S	HG-H75S-D48	400		s				270						90:1	45:1			
Tooling	BECK-HOFF	HG104	MOT.MI-HG-104S	HG-104S-D48	200			s					390								150:1
		HG-H104	MOT.MI-HG-H104S	HG-H104S-D48	400			s					390								150:1
		HG105	MOT.MI-HG-105S	HG-105S-D48	200			s				320							150:1	75:1	
		HG-H105	MOT.MI-HG-H105S	HG-H105S-D48	400			s				320							150:1	75:1	
		R2Ax06040	MOT.SA-R2Ax060-2	R2AA06040FXR00M	200	s	o			236	248				90:1	45:1	90:1	45:1			
		R2Ax08075	MOT.SA-R2Ax080-2	R2AA08075FXR5TM6	200		s	s			248	295					90:1	45:1	120:1	60:1	
SPZ, DDF, WMS	SIEMENS	1FK2203		1FK2203-4AK00-2MB0	400	s	o			236	248				90:1	45:1	90:1	45:1			
		1FK2204	MOT.SI-1FK2204-5A	1FK2204-5AF01-0MB0	400		s				248						90:1	45:1			
		1FK2205	MOT.SI-1FK2205-2A	1FK2205-2AF01-0MB0	400			s				295							150:1	75:1	
		1FK2206	MOT.SI-1FK2206-4A	1FK2206-4AF01-0MB0	400				s				390								150:1
		1FK7042	MOT.SI-1FK7042-2A	1FK7042-2AK71-1RG0	400			s				320							150:1	75:1	
		1FK7062	MOT.SI-1FK7062-2A	1FK7062-2AH71-1RG0	400				s				390								150:1

* on T1-510520 TGR2, the standard motor used in the tilt axis is Movinor LN-098 or Fanuc alpha 4/5000(HV)is

Specific amplifier for the respective motor

- Including required connection material
- Wall bushing (WDF) p. 82/83, Loose accessories (LOZ) p. 94-97 and commissioning (INB.1AX-SP or INB.2AX-SP) recommended



● = Ideal amplifier ● = Amplifier with power limit reached. You may need to reduce the drive data. ● = Amplifier oversized. But function is guaranteed

*** On request if order no. missing		Number of axes	Motor									
Order no.***	Amplifier version											
Fancuc 200V	SER.F1-aiSV20-B-EA	SVM 1 aiSV 20	1	●	●	●						
		SVM 1 aiSV 80	1									
	SER.F1-biSV20-B-EA	SVM 1 biSV 20	1	●	●	●						
	SER.F1-biSV40-B-EA	SVM 1 biSV 40	1									
		SVM 1 biSV 80	1									
		SVM 2 aiSV 4/20	1	●	●	●						
	SER.F1-aiSV20/20-B-Tx	SVM 2 aiSV 20/20	2	●	●	●	●	●	●			
		SVM 2 aiSV 20/40	2	●	●	●	●	●	●			
		SVM 2 aiSV 40/80	2	●	●	●	●	●	●			
		SVM 2 aiSV 80/80	2	●	●	●	●	●	●			
		SVM 2 aiSV 80/160	2	●	●	●	●	●	●			
Fancuc 400V	SER.F1-biSV20/20-B-Tx	SVM 2 biSV 20/20	2	●	●	●	●	●	●			
		SVM 3 aiSV 20/20/20	3	●	●	●	●	●	●			
		SVM 3 aiSV 20/20/40	3	●	●	●	●	●	●			
		SVM 1 aiSV 10HV	1	●	●	●	●	●	●			
		SVM 1 aiSV 40HV	1	●	●	●	●	●	●			
		SVM 1 biSV 10HV	1	●	●	●	●	●	●			
		SVM 1 biSV 40HV	1	●	●	●	●	●	●			
		SVM 2 aiSV 10/10HV	2	●	●	●	●	●	●			
		SVM 2 aiSV 20/40HV	2	●	●	●	●	●	●			
		SVM 2 aiSV 40/40HV	2	●	●	●	●	●	●			
		SVM 2 aiSV 40/80HV	2	●	●	●	●	●	●			
Heidenhain		UE 212B	5	●	●	●	●	●	●			
		UE 242B	5	●	●	●	●	●	●			
	SER.Mx-UM111D-EA	UM 111 / UM 111D	1	●	●	●	●	●	●			
		UM 111B / UM 111BD	1	●	●	●	●	●	●			
	SER.Mx-UM121D-Tx	UM 121 / UM 121D	2	●	●	●	●	●	●			
		UM 121B / UM 121BD	2	●	●	●	●	●	●			
	SER.Mx-UM310-EA	UM310D	1	●	●	●	●	●	●			
	SER.Mx-UM320-Tx	UM320D	2	●	●	●	●	●	●			
	SER.MI3-E-20A-EA	MDS-E-V1-20	1	●	●	●	●	●	●			
		MDS-E-V1-40	1	●	●	●	●	●	●			
		MDS-E-V2-20	2	●	●	●	●	●	●			
		MDS-E-V2-40	2	●	●	●	●	●	●			
Mitsubishi 200V		MDS-E-V2-80	2	●	●	●	●	●	●			
		MDS-E-V3-20	3	●	●	●	●	●	●			
		MDS-E-V3-40	3	●	●	●	●	●	●			
	SER.MI4-EJH-15A-EA	MDS-EJH-V1-15	1	●	●	●	●	●	●			
	SER.MI4-EJH-20A-EA	MDS-EJH-V1-20	1	●	●	●	●	●	●			
	SER.MI4-EH-10A-EA	MDS-EH-V1-10	1	●	●	●	●	●	●			
	SER.MI4-EH-20A-EA	MDS-EH-V1-20	1	●	●	●	●	●	●			
	SER.MI4-EH-10A-Tx	MDS-EH-V2-10	2	●	●	●	●	●	●			
	SER.MI4-EH-20A-Tx	MDS-EH-V2-20	2	●	●	●	●	●	●			
		MDS-EH-V2-40	2	●	●	●	●	●	●			
		6SL3120-1TE13-0ADx*	1	●	●	●	●	●	●			
		6SL3420-1TE13-0AAx	1	●	●	●	●	●	●			
Mitsubishi 400V	SER.Mx-6SL3120-5A-EA**	6SL3120-1TE15-0ADx*	1	●	●	●	●	●	●			
		6SL3420-1TE15-0AAx	1	●	●	●	●	●	●			
	SER.Six-6SL3120-9A-EA	6SL3120-1TE21-0ADx*	1	●	●	●	●	●	●			
		6SL3420-1TE21-0AAx	1	●	●	●	●	●	●			
	SER.Mx-6SL3120-18A-EA**	6SL3120-1TE21-8ADx*	1	●	●	●	●	●	●			
		6SL3420-1TE21-8AAx	1	●	●	●	●	●	●			
		6SL3120-1TE23-0AAx*	1	●	●	●	●	●	●			
		6SL3420-2TE11-0AAx	2	●	●	●	●	●	●			
		6SL3120-2TE13-0ADx*	2	●	●	●	●	●	●			
		6SL3420-2TE13-0AAx	2	●	●	●	●	●	●			
	SER.Mx-6SL3120-5A-Tx**	6SL3120-2TE15-0ADx*	2	●	●	●	●	●	●			
		6SL3420-2TE15-0ADx	2	●	●	●	●	●	●			
Siemens Sinamics S120 (Solutioonline)		6SL3120-2TE21-0ADx*	2	●	●	●	●	●	●			
		6SL3120-2TE21-8AAx*	2	●	●	●	●	●	●			
		6SL3121-2TE15-0AAx	2	●	●	●	●	●	●			
		6SL3121-2TE15-0AAx	2	●	●	●	●	●	●			
		6SL3121-2TE15-0AAx	2	●	●	●	●	●	●			
		6SL3121-2TE15-0AAx	2	●	●	●	●	●	●			
		6SL3121-2TE15-0AAx	2	●	●	●	●	●	●			
		6SL3121-2TE15-0AAx	2	●	●	●	●	●	●			
		6SL3121-2TE15-0AAx	2	●	●	●	●	●	●			
		6SL3121-2TE15-0AAx	2	●	●	●	●	●	●			
		6SL3121-2TE15-0AAx	2	●	●	●	●	●	●			
		6SL3121-2TE15-0AAx	2	●	●	●	●	●	●			

* Not compatible with Combi Power Motor Module XYZ Axis

** Including SMC20 sensor module

Complete list available at: [www.lehmann-rotary-tables.com/Helpdesk/Downloads/Servo motor](http://www.lehmann-rotary-tables.com/Helpdesk/Downloads/Servo%20motor)

A few implemented and known machine/rotary table combinations (incomplete list)



Haas



Brother



Chevalier



DMG MORI



DN Solutions



Fanuc



	Machine Type	CNC System	CNC Type	Input Voltage	EA-507 (508)	EA-510 (511)	EA-520 (521)	EA-530	Mx-507	Mx-510	Tx-50x510	Tx-51x510	Tx-51x520	Tx-520520
Akira Seiki	Vx Series	Mitsubishi	M700	200VAC	●	●	●	●	●	●	●	●	●	●
Alzmetall	BAZ35	Heidenhain	TNC426	400VAC	○	○	○	●	○	○	○	○	○	○
AMS	MVC400	Fanuc	0iMD	200VAC	●	●	●	○	●	●	○	○	○	○
Awea	AF-1000	Fanuc	18iMB	200VAC	●	●	●	●	●	●	●	●	●	●
	AF-1060	Heidenhain	iTNC530	400VAC	●	●	●	○	●	●	●	●	●	●
	AF-1250	Heidenhain	iTNC530	400VAC	●	●	●	○	●	●	●	●	●	●
Axa	DBZ	Heidenhain	iTNC530	400VAC	○	○	○	○	○	○	○	○	○	○
BFW	Dhruva 4070HE	Fanuc	0iMD	200VAC	●	○	●	●	●	○	○	○	○	○
	Dhruva	Siemens	828D	?	○	○	○	○	○	○	○	○	○	○
	Dhruva	Mitsubishi	MV70BV	?	○	○	○	○	○	○	○	○	○	○
Bridgeport	XV2290	Siemens	828D	400VAC	●	●	●	●	●	●	○	○	○	○
Brother	R450X1	Sanyo	C00	200VAC	●	○	●	●	●	○	●	●	●	●
	Sx00X1	Sanyo	C00	200VAC	●	●	●	○	●	●	●	●	●	●
	TC-22Bn	Yaskawa	B00	200VAC	●	○	●	●	○	○	●	●	●	●
	TC-32Bn/FT/QT	Yaskawa	B00	200VAC	●	○	●	●	○	○	●	●	●	●
	TC-R2B	Sanyo	B00	200VAC	●	○	●	●	○	○	●	●	●	●
	TC-S2Dn	Sanyo	B00	200VAC	●	○	●	●	○	○	●	●	●	●
Chevalier	SMART III Series	Syntec	21MA	200VAC	●	●	●	○	●	●	●	●	●	●
	FMG 1632CNC-HD	Siemens	840Dsl	400VAC	●	●	●	○	●	●	●	●	●	●
Chiron	FZ 12W	Fanuc	31iB5	400VAC	●	●	●	●	●	●	○	○	○	○
	Mill2000	Siemens	840Dsl	400VAC	○	●	●	○	○	●	●	●	●	●
DMG MORI	DMU 50, 70, 100			400VAC	○	○	○	○	○	○	○	○	○	○
	Milltap 700	Siemens	840Dsl	400VAC	●	●	●	●	●	●	●	●	●	●
	DMC xx35V			400VAC	○	○	○	○	○	○	○	○	○	○
	DMC xx50V	Siemens	840Dsl	400VAC	○	○	○	○	○	○	○	○	○	○
	DMF			400VAC	○	○	○	○	○	○	○	○	○	○
	CMX xx35V	Siemens	840Dsl	400VAC	●	●	●	○	●	●	●	●	●	●
	CMX xx50V	Siemens	840Dsl	400VAC	●	●	●	○	●	●	●	●	●	●
	CMX xx50V	Fanuc	?	?	○	○	○	○	○	○	○	○	○	○
	NVX5x Series	Mitsubishi	M730BM	200VAC	●	●	●	●	●	●	●	●	●	●
DN Solutions	DNM400-650	Siemens	828Dsl	400VAC	●	●	●	●	●	●	●	●	●	●
	DNM400-650	Fanuc	0iMD	200VAC	●	●	●	●	●	●	○	○	○	○
	DNM500 II, 650 II	Fanuc	0iMD	200VAC	●	●	●	●	●	●	○	○	○	○
	DNM400-650HS	Fanuc	30/31/32i-A	200VAC	○	○	○	○	○	○	○	○	○	○
	DT360D	Fanuc	0iMD	200VAC	○	○	○	○	○	○	○	○	○	○
	DT400	Fanuc	0iMD	200VAC	○	○	○	○	○	○	●	●	●	●
	Mynx7500/50	Fanuc	0iMD	200VAC	●	●	●	●	●	●	○	○	○	○
	VC430 / VC510	Fanuc	0iMD	200VAC	●	●	●	○	●	●	○	○	○	○
	VM5400, 6400	Fanuc	30/31/32i-A	200VAC	○	○	○	○	○	○	○	○	○	○
Fanuc Robodrill	a-T14iFx	Fanuc	31i-A5/B5	200VAC	○	○	○	○	○	○	○	○	○	○
	a-T21iFx	Fanuc	31i-A5/B5	200VAC	○	○	○	○	○	○	●	●	●	●
	a-D14xiA(5)	Fanuc	31i-B5	200VAC	●	●	●	○	●	●	●	●	●	●
	a-D21xiA(5)	Fanuc	31i-B5	200VAC	●	●	●	○	●	●	○	○	○	○
	a-D21xiB(5)	Fanuc	31i-B5	200VAC	○	○	○	○	○	○	●	●	●	●

● All technical information available at pL, partially listed by machine manufacturer

○ Known, completed integrations, technical information only partially available, or to be carried out by machine manufacturer; inquire about feasibility at the factory.

Specific commissioning documentation available for
over 40 different machines (incl. parameter lists)



Hurco



Hyundai WIA



Priminer



Makino



Mazak



Hardinge



	Machine Type	CNC System	CNC Type	Input Voltage	EA-507 (508)	EA-510 (511)	EA-520 (521)	EA-530	Mx-507	Mx-510	Tx-50x510	Tx-51x510	Tx-51x520	Tx-520x520
GF Mikron	Mills400	Heidenhain	iTNC530	400VAC	●	●	●	○	○	●	○	○	○	○
	VCE			400VAC	○	○	○	○	○	○	○	○	○	○
	VCP			400VAC	○	○	○	○	○	○	○	○	○	○
Haas	Minimill, VF-x, DT-1	HAAS	> M18.7	200VAC	●	●	●	○	●	●	●	●	●	●
	OM-2A	HAAS	> M18.7	200VAC	●	●	●	○	●	●	●	●	●	●
	VF-x	HAAS NGC	100.16, 000.1021	200VAC	●	●	●	○	●	●	●	●	●	○
Hasegawa	PM250	Fanuc	31i-B5	200VAC	●	●	●	○	●	●	○	○	○	○
Hermle	C800U	Siemens	840Dpl	400VAC	○	○	○	○	○	○	○	○	○	○
Hurco	VMX10(i)	HURCO	WinMax V9.x	200VAC	●	●	●	○	●	●	○	○	○	○
	VMX24(i), 30(i)	HURCO	WinMax V9.x	200VAC	●	●	●	○	●	●	○	○	○	○
	VMX24, 30	HURCO	WinMax V8.x	200VAC	●	●	●	○	●	●	○	○	○	○
	VMX42	HURCO	WinMax V8.x	200VAC	●	●	●	○	●	●	○	○	○	○
	VMX42(i)	HURCO	WinMax V9.x	200VAC	●	●	●	○	●	●	○	○	○	○
Hyundai WIA	F400	Fanuc	0iMD	200VAC	●	●	●	○	●	●	○	○	○	○
Jyoti	VMC640	Siemens	810D	400VAC	○	○	○	○	○	○	○	○	○	○
KAASST	KAASST	Fanuc			○	○	○	○	○	○	○	○	○	○
Lapmaster	Micron Macro-S/SK	Siemens	840Dpl	400VAC	●	●	○	○	●	●	○	○	○	○
Leadwell	LCV760	Fanuc	0iMF	200VAC	●	●	●	○	●	●	○	○	○	○
Makino	Slim3N	Fanuc	0iMD	400VAC	●	●	●	○	●	●	○	○	○	○
	PS95	Fanuc	?	?	○	○	○	○	○	○	○	○	○	○
Mazak	VCS430	Mazak (Mitsubishi)	SMART or MATRIX NEXUS 2	200VAC	○	●	●	○	○	●	○	○	○	○
	VCS530CSL	Mazak (Mitsubishi)	SMART	200VAC	○	●	●	○	○	●	○	○	○	○
	VTC800	Mazak (Mitsubishi)	Mazatrol	400VAC	○	●	●	○	○	●	○	○	○	○
POSmill	B800	FANUC	0iMD	200VAC	●	●	●	○	●	●	○	○	○	○
	C1050	Heidenhain	iTNC530 HSCI	400VAC	●	●	●	○	●	●	○	○	○	○
	C1050	Heidenhain	TNC620	400VAC	●	●	●	○	●	●	○	○	○	○
	C800	Heidenhain	iTNC530 HSCI	400VAC	●	●	●	○	●	●	○	○	○	○
Quaser	MV154	Fanuc	?	200VAC	○	○	○	○	○	○	○	○	○	○
	MV184	Fanuc	0iMF	200VAC	●	●	●	○	●	●	○	○	○	○
	MV184	Heidenhain	TNC620	400VAC	●	●	●	○	●	●	○	○	○	○
	MV184	Siemens	828D	400VAC	●	●	●	○	●	●	○	○	○	○
	MV234	Fanuc	31iB	200VAC	●	●	●	○	●	●	○	○	○	○
	MV235	Fanuc	31iB	200VAC	●	●	●	○	●	●	○	○	○	○
Reckermann	Kombi 1300	Heidenhain	TNC320	400VAC	●	●	●	○	●	●	○	○	○	○
Republic Lagun	VGC5028	Fanuc	31i-B5	200VAC	○	○	○	○	○	○	○	○	○	○
Sauer	Lasertech 45	Siemens	840Dsl	400VAC	●	●	●	○	●	●	○	○	○	○
Spinner	MVC610	Siemens	840Dsl	400VAC	●	●	●	○	●	●	○	○	○	○
Tongtai	VU5	Siemens	840Dsl	400VAC	○	○	○	○	○	○	○	○	○	○
Wagner	WMC1100B	Siemens	828D	400VAC	○	○	○	○	○	○	○	○	○	○

● All technical information available at pL, partially listed by machine manufacturer

○ Known, completed integrations, technical information only partially available, or to be carried out by machine manufacturer; inquire about feasibility at the factory.

The right connector solution for every need:
for the motor, machine and servo

Customer-provided additional cover on cabin wall penetration WDF.xx-K

Mazak: Plug-in connection of top of cabin

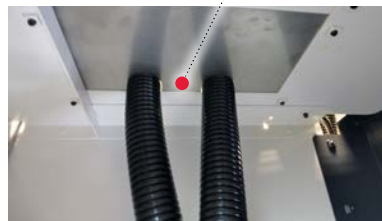


**Connectors suitable for
Standard preparation for
Kitagawa (Plug and Play):** Pull
original cable and connectors
into top of cabin and connect
to pL LEHMANN connectors.

Connectorless installation, performed through hole in cabin

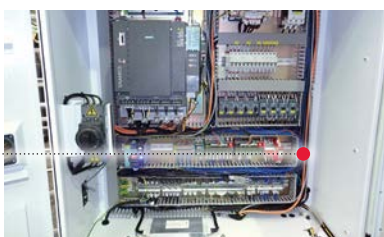


View of outside



View of inside

Control cabinet wall penetration, Harting



Control cabinet wall penetration, Clipper



WDF.M2-S-2

Depending on the preparation of the machine, loose mating connectors or fully wired wall penetrations for cabin and control cabinet are available

Wall mounting of WDF.xx-MIL



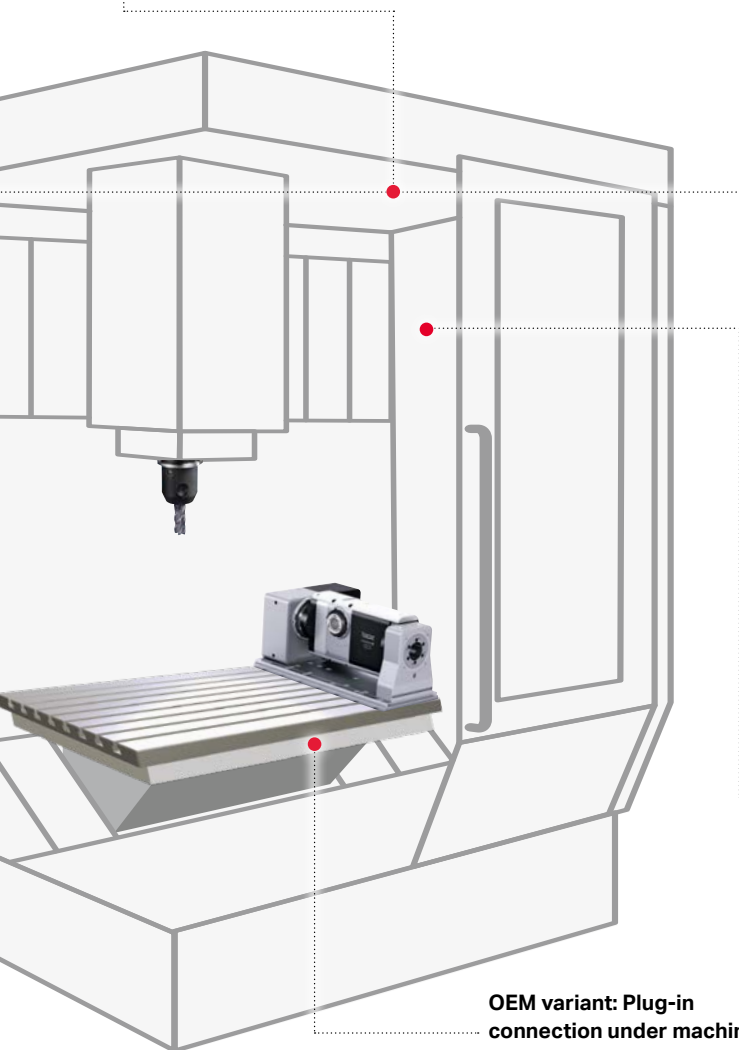
Machine wall bushing, round connector (MIL), WDF.xx-R1(z)-S...



WDF.Fx-R1



View of outside



Harting machine wall bushing



Harting wall bushing M4 inner



Harting wall bushing K8 inner



Harting wall bushing K8 outer

Cabin wall bushing with connector box, Harting K8



OEM variant: Plug-in connection under machine table (cannot be retrofitted)

Overview,
Applications

System &
Facts, smartBox

Rotary
tables

SPZ,
DDF, WMS

MOT, KAB,
WDF, CNC

Aligning,
GLA, RST, LOZ

Service
& Technology

Tooling

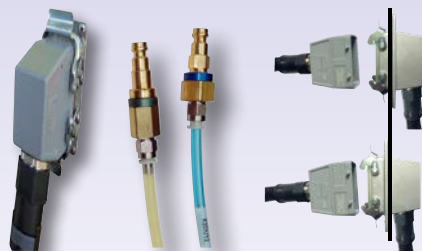
HARTING K8



all in tight connector housings

A cable set is an essential accessory to guarantee imperviousness.

HARTING M4



(pL-Standard)

Standard cabling HARTING

- High availability
- Connector is easy to disassemble when servicing is required
- Interface coding makes it impossible to mix up the connectors
- High degree of imperviousness (IP 65)
- Secure connection thanks to crimping
- Cables and hoses are relieved from strain
- Outflow on rotary table in just one flexible tube

Item no.

Please put together order number using the code key below.

KAB.F3-4.0w-K8w

Connector	
o = without connector (free cable ends)	
K8g = Harting HanK8/24, straight	
K8w = Harting HanK8/24, angled	
M4g = Harting M4, straight	
R1 = MIL round connector 28-11N/20-29W (4th axis)	
R1z = MIL round connector 28-11Z/20-29Z (5th axis)	
FNC = Fanuc CNC 35iB	
needed only if rotary table is equipped with angular position measuring system	
Cable lengths	
Standard = 1m, 2m, 3m, 4m, 5m, 6m	
Special = 9m, 14m (additional charge)	
Motor	
BE = Beckhoff	
F3 = Fanuc α	
F4 = Fanuc β	
M1 = Movinor / Mavilor ERN	
M2 = Movinor / Mavilor EQN	
M12 = Mitsubishi HF/HG(-H)	
SA = Sanyo	
Y2 = Yaskawa SGMJV / SGMEV, SGM7J	

Flexible tubing with splitter

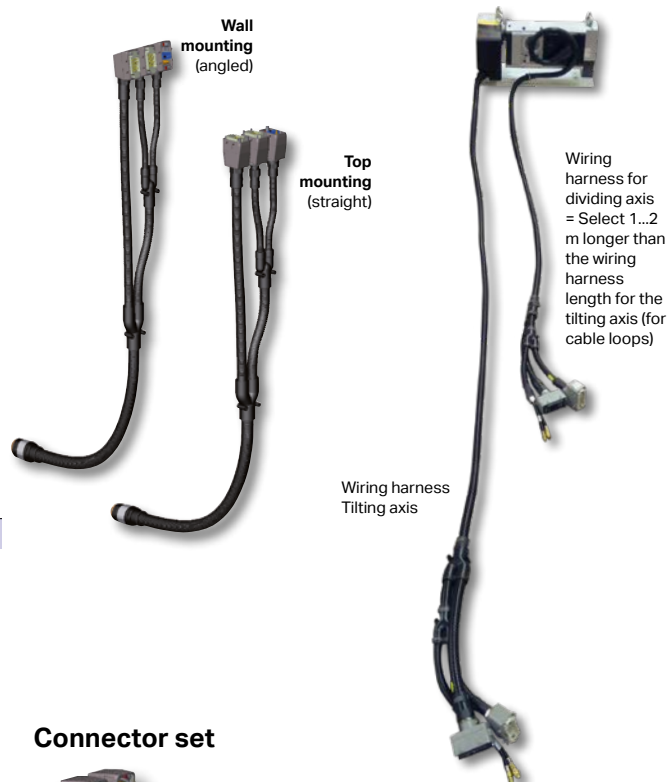
Required when a cable set with free cable ends and connector set STE.xxx is used.

Item no.	Designation
KAB.1H-2	1 Splitter
KAB.1H-M4-2	1 Hose piece with reducer and flexible tubing
KAB.1Hw	1 Splitter with WMS
KAB.2H-2	2 Splitter



Outgoing cable on side

Item no.	Designation
KAB.507.L-Seite	
KAB.507.R-Seite	Outgoing cable on side

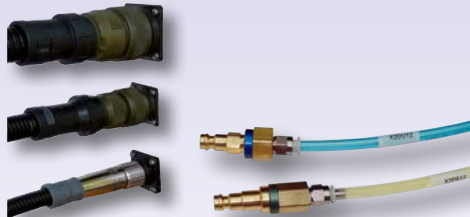


Connector set



Item no.	For machine...	Required	Weight [kg]
STE.BRa-2	Brother		0.38
STE.DMa	Deckel DMC xx3V, DMC xx4V, DMC xx35V (eco), DMC xx50V, Milltap 700 (only when 4th axis)	KAB.2H-2, when WMS in add. to STE.DMaw	0.72
STE.DMaw	WMS, Deckel DMC xx3V, DMC xx4V, DMC xx35V (eco), DMC xx50V, Milltap 700 (only when 4th axis)		0.33
STE.DMb-2	Deckel DMU 50/70	When WMS in add. to STE.DMbaw	0.76
STE.DMbaw-2	WMS, Deckel DMU 50/70		
STE.FAa-2	Fanuc Robodrill (Europe)		0.25
STE.FAb	Fanuc Robodrill (USA); 4th axis	KAB.1H-2	0.27
STE.FAbz	Fanuc Robodrill (USA); 5th axis	KAB.1H-2	0.27
STE.FNC	Fanuc-control system 35iB	KAB.2H-2	0.72
STE.HUb	Hurco VMX	KAB.1H-2	0.48
STE.K8g	Harting K8, straight	KAB.2H-2	1.10
STE.K8w	Harting K8, angled	KAB.2H-2	1.11
STE.M4g	Harting M4, straight	KAB.1H-M4-2	
STE.M4w	Harting M4, angled	KAB.1H-M4-2	
STE.MIb	Mikron VCE	KAB.2H-2	0.98
STE.R1	MIL round connector 28-11N/20-29W	KAB.2H-2, when WMS in add. to KAB.1Hw	0.42
STE.R1z	MIL round connector 28-11Z/20-29Z	KAB.2H-2, when WMS in add. to KAB.1Hw	0.42

MIL

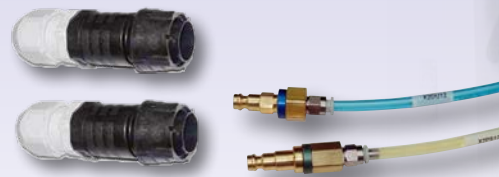


Electric

Air/oil

Clipper

(FANUC Robodrill Europe)



Electric

Air/oil

Mating plugs / wall penetrations

Item no.	Designation	Weight [kg]	
LOZ.lo	Air/oil		
WDF.M4-5xx	Harting M4		①
WDF.K8	Harting Hank8/24	1.37	①
WDF.R1	MIL round connector 28-11N/20-29W		①
WDF.R1z	MIL round connector 28-11Z/20-29Z		①
WDF.WMS	M23, 17-pole		
WDF.WMS-Fx-PCR	M23, 17-pole, Fanuc		
WDF.WMS-Mlx-10P	M23, 17-pole, Mitsubishi		
WDF.M1-DOa	Encoder plug for DN Solutions	0.46	②
WDF.Fx-S-2	Control cabinet, per axis for Fanuc		②
WDF.Fx-Sw-2	WMS, control cabinet, per axis for Fanuc		②
WDF.Fx-R1(z)-S-2	Control cabinet, per axis for Fanuc		②
WDF.Mx-S-2	Control cabinet, per axis for Mavilor	2.81	②
WDF.Mx-Sw-2	WMS, control cabinet, per axis for Mavilor		②
WDF.M2-R1(z)-S-2	Control cabinet, per axis for Mavilor		②
WDF.Mlx-S-2	Control cabinet, per axis for Mitsubishi HF-KP, Hx-(H)		②
WDF.Fx-K-2	Cabinet wall, per axis for Fanuc		③
WDF.Fx-Kw-2	WMS, cabinet wall, per axis for Fanuc		③
WDF.Fx-M4-2	Cabinet wall, per axis for Fanuc		②
WDF.M1-M4-2	Cabinet wall, per axis for Mavilor ERN		②
WDF.M2-M4-2	Cabinet wall, per axis for Mavilor EQN		②
WDF.M2-M4w-2	Cabinet wall, per axis for Mavilor EQN, WMS Endat		②
WDF.Mx-K-2	Cabinet wall, per axis for Mavilor	6.88	③
WDF.Mx-Kw-2	WMS, Cabinet wall, per axis for Mavilor		③
WDF.Mx-M4-2	Cabinet wall, per axis for Mavilor		②
WDF.Mlx-K-2	Cabinet wall, per axis for Mitsubishi HF-KP, Hx-(H)		③
WDF.Mlx-M4-2	Cabinet wall, per axis for Mitsubishi HF-/HG-(H)		②
WDF.Slx-M4-2	Cabinet wall, per axis for Siemens DriveCliQ BR500		②
WDF.lo	Air/oil	0.09	
WDF.h	Hydraulics (2 fluted)		

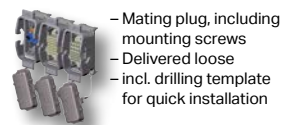
WMS = Angular position measuring system

Machine-specific wiring

Specific wiring is available for different machine brands and types. For more information, refer to the machine-specific commissioning instructions.

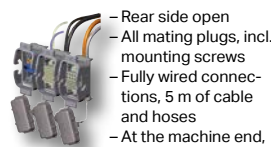
- Brother
- Chevalier
- Chiron
- DMG MORI
- DN Solutions
- Fanuc Robodrill
- Haas
- Hardinge
- Hurco
- Hyundai
- Kellenberger
- Makino
- Matsura
- Mazak
- Mikron
- Stama
- YCM

① Loose mating plugs



- Mating plug, including mounting screws
- Delivered loose
- incl. drilling template for quick installation

② Control cabinet wall penetration



- Rear side open
- All mating plugs, incl. mounting screws
- Fully wired connections, 5 m of cable and hoses
- At the machine end, with servo mating plug
- incl. drilling template

③ Cabinet wall penetration



- Rear side closed
- Fully wired connections, 10 m of cable and hoses, 5 m of flexible tubing
- At the machine end, with servo mating plug
- incl. drilling template for quick installation

Option: Additional cable for retrofitting WMS

Item no.
KAB.WMS-14.0-o



Cable run in flexible tubing, 14 m long, without connector

Overview,
Applications

System &
Facts, smartBox

Rotary
tables

SPZ,
DDF, WMS

MOT, KAB,
WDF, CNC

Aligning,
GLA, RST, LOZ

Service
& Technology

Tooling

CNC control system FANUC 35iB: Manual control pendant

Multi-functional manual operating device which can be used for both this CNC control system as well as for machines equipped with FANUC CNC.



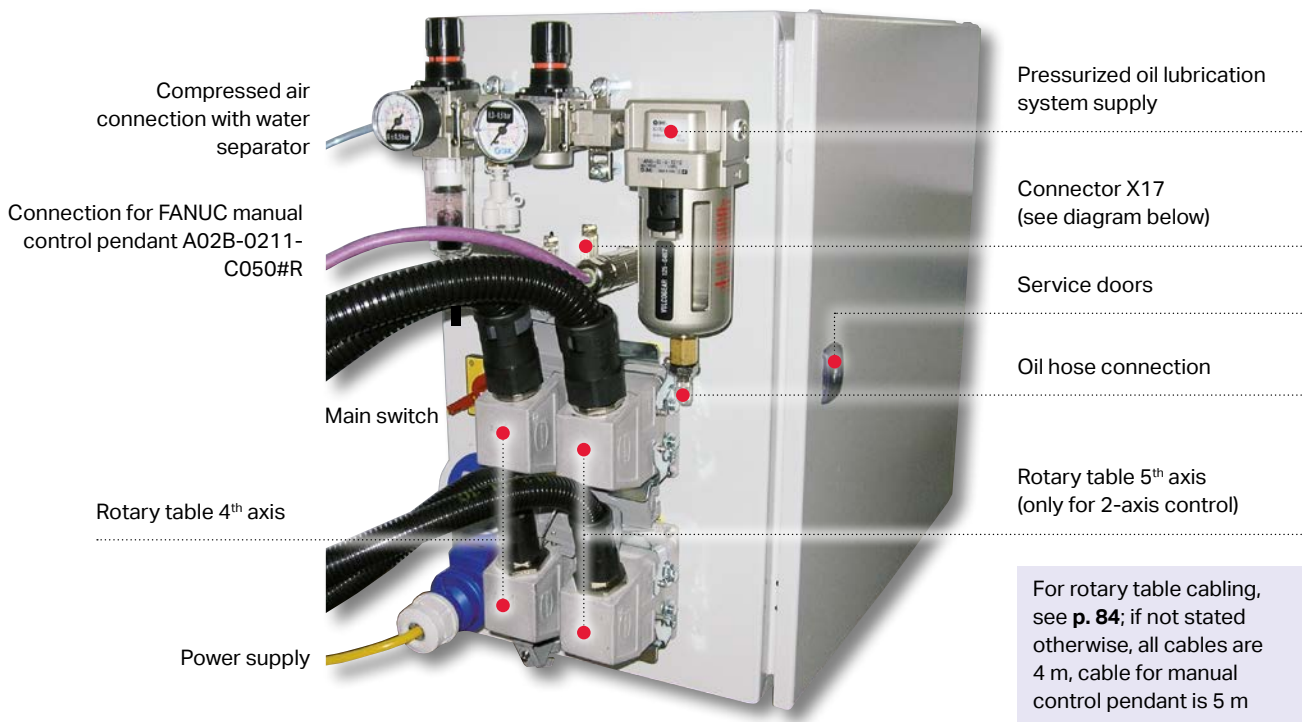
CNC control system for 1 or 2 axes

Original FANUC components –
worldwide on-site service guaranteed!

Control cabinet

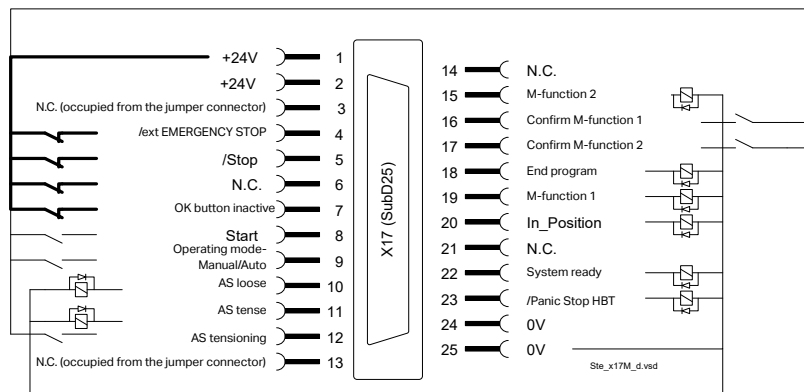
All connections and operating elements on the side wall on the left. Control cabinet doors for easy access to components. Control cabinet suitable for one- or two-axis models.

Control cabinet dimensions (without connectors):
230 V version: H = 500, B = 500, T = 300 mm

Connector X17 for connecting the 4th and 5th axis

The jumper connectors supplied with the product enable the control system to be operated without these axes connected.

Connections necessary for operation are shown in bold.



Wide range of functions



EA-530 with Fanuc 35iB: Drive data reduced by approx. 30%

Order items

Item no.	Designation	Weight [kg]	Dimensions / remarks
CNC.1AX-FA	CNC control system Fanuc 35iB, 1-axis		see pp. 86/87
CNC.2AX-FA	CNC control system Fanuc 35iB, 2-axis		see pp. 86/87
CNC.MFK	M-function cable	1.05	only in conjunction with CNC.1AX-FA or CNC.2AX-FA
CNC.HaKab-10m	Handycable	1.29	10 m
CNC.WMS-1	Option for angular position measuring system		Only in conjunction with CNC.1AX-FA
CNC.WMS-2	Option for angular position measuring system		Only in conjunction with CNC.2AX-FA
CNC.BAT	Backup battery option	0.05	Only in conjunction with CNC.1AX-FA or CNC.2AX-FA
CNC.Trafo	Transformer	15.11	For Fanuc-CNC (400 V to 200 V)
CNC.TRE	Option: Indexing calculator		

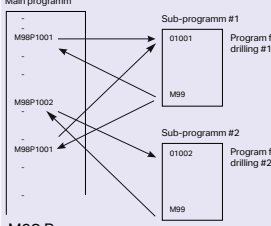
Technical data

Features	Specifications	Remarks
1. Programmable angle	0.001 ... 9999.999°	freely programmable
2. Sub-programs	Yes	can be nested in 4 ways
3. Total storage capacity	4000 characters (bytes)	Optional 128 kBytes
4. Number of programs, incl. macros	63	Optional 400
5. Program storage buffering	via battery	
6. Programming options	Absolute, incremental	can be combined in any way you wish
7. Reference point approach	Yes, by means of reference cam and measuring system	optional absolute
8. Reference point shift	Yes	via parameters
9. Manual feed	creep, rapid traverse, gradual	
10. Feed programming	Yes	
11. Repeat function	programmable loop	
12. Software range limit switch	Yes	adjustable via parameters
13. Hardware range limit switch	Yes	
14. Spindle clamping	automatic	can be switched on / off
15. Monitoring of spindle clamping	Yes	
16. «Rotary table in position» output	Yes	
17. External «Manual/Automatic» input	Yes	
18. «Ready for operation / fault detection» output	Yes	
19. External «Enable turning» input	Yes	
20. Free M-function outputs	5x	e.g. to activate an automatic tailstock
21. «External cycle start» input	Yes	
22. «External cycle stop» input	Yes	
23. «External EMERGENCY STOP» input	Yes	1-channel
24. OK button	single stage	
25. Fault message system on manual control pendant	Clear text	
26. Motor output	AC servomotor	1 or 2 axes
27. Motor measuring system input	FANUC serial	
28. Position measuring system input	FANUC serial	Optional with SDU box
29. Power supply	200...240 VAC 50/60 Hz	1-phase
30. Interface	USB slot, PC card	Ethernet (option)
31. Minimum required signals from the machine	acknowledgeable M-function EMERGENCY STOP connection	if connection to machine CNC required
32. External single block position specification	via RS232 option	not provided
33. Program skips	by using GoTo command	must be done with block numbers (Nxxxx)
34. Continuous turning	Yes	e.g. for grinding work
35. Sub-programs	Yes	can be nested in 4 ways
36. External «EMERGENCY STOP» output	Yes, from manual operating device	1-channel

Easy to program

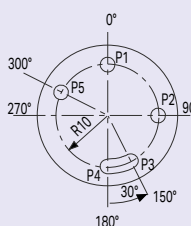
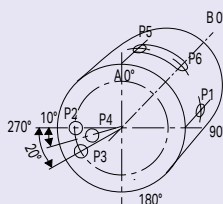


Program functions

Angular positioning 	G91 G00 A45	G91 = Incremental G00 = Rapid traverse A45 = 45° with A-axis	Incremental / absolute divisions 	G91 G00 A45; M00 (cycle stop); A181.567; M00 (cycle stop); A90.987; M00 (cycle stop); G90 A0;	Subprogram call 
Circle milling 	G91 G01 A45 F100	G01 = Feed F = °/min	Workpiece zero point offset 	G53 = Delete zero point offset G54 = Set zero point offset	
Unequal divisions 	G91 G00 A45; M00 (cycle stop); A35.12; M00 (cycle stop); A61.876; M00 (cycle stop); A93; M00 (cycle stop); A67.34; M00 (cycle stop); A57.3;		Continuous turning 	M04 S0.5; G04 X30000; M05 30 seconds continuous turning in counterclockwise direction at 0.5 [1/min] (only 4th axis)	Delay time 
Auto reference 	G28 A00	Moves to reference position	M-function M110 M111 M112 M113 M114	Acknowledgeable M-functions, parameterizable	Cycle stop M00 After each motion, an M00 must be programmed so that the program cycle can be stopped.
					Program end M30 M30 = Jump to program start.

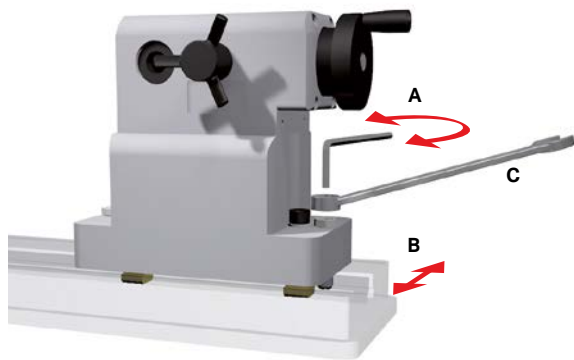
Programming

Programming uses the internationally known ISO code.

Programming example 1 – axis:	Programming example 2 – axis:	Example of M-functions	
%; O0001(test program 1); N10 G90 G00 A0 (P1); N20 M00 (cycle stop); N30 G90 G00 A90 (P2); N40 M00 (cycle stop); N50 G90 G00 A150 (P3); N60 M00 (cycle stop); N70 G91 G01 A30 F40 (P4); N80 M00 (cycle stop); N90 G90 G00 A300 (P5); N100 M30 (PG end) 	%; O0001(test program 2); N10 G90 G00 A90 B0 (P1); N20 M00 (cycle stop); N30 G90 G00 A270 B90 (P2); N40 M00 (cycle stop); N50 G91 G00 A-20 B0 (P3); N60 M00 (cycle stop); N70 G91 G00 A10B0 (P4); N80 M00 (cycle stop); N90 G90 G00 A0 B0 (P5); N100 M00 (cycle stop); N110 G91 G01 A45 B0 (P5); N120 M30 (PG end); 	CNC machine program N... N1030 G90 G00 X4 Y14 Z40; N1040 M?? N1050 G90 G00 X8 Y4 Z30; N1060 M?? N1070 G90 G00 X16 Y2 Z33; N1080 M?? N1090 G90 G00 X16 Y2 Z33; N1100 M30	Fanuc CNC 35iB program %; O1001(FanucNC PG); N10 G90 G00 A90; N20 M00 (cycle stop); N30 G90 G00 A45; N40 M00 (cycle stop); N50 G90 G00 A00; N60 M30 (PG end)
		M?? = M-function according to CNC machine	

Align and secure correctly on the machine table: **lineFIX** and **zentriX**

zentriX alignment system (example: tailstock on longFLEX)



Item no.	Designation	Slot width	Weight [kg]
AUR.zX-12	zentriX alignment pin, 1 pair	12g6	0.10
AUR.zX-14		14g6	0.10
AUR.zX-16		16g6	0.11
AUR.zX-18		18g6	0.12

Rotating the Allen wrench (A) pushes the tailstock against the base plate (B) by means of an eccentric screw (C). Once the desired position is reached, the eccentric screw is secured with a hexagon nut (C). Finished. For additional information, please refer to the installation and commissioning instructions at: www.lehmann-rotary-tables.com

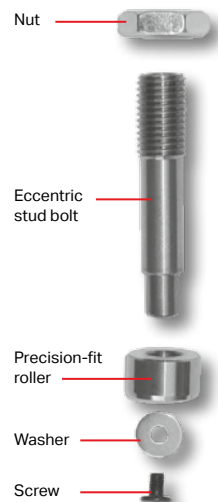
available for ...



All longFLEX versions



All tailstocks

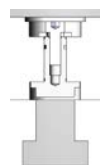


lineFIX alignment system for T-type rotary tables (not for TIP)



Y-mounting (crosswise)

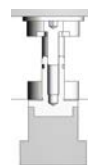
Principle of operation



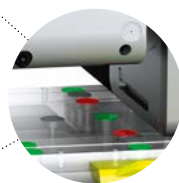
retracted, not used



Alignment element in slot 1 (e.g. 14 mm)



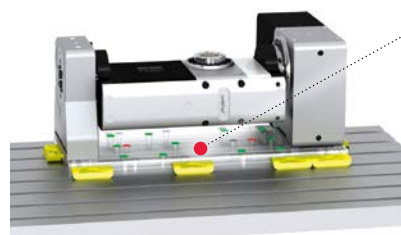
Alignment element in slot 2 (e.g. 18 mm)



Position of the lineFIX pins.

Hole pattern for 100 and 125 mm.

Clamping claws (if necessary)



X-mounting (lengthwise)

As a standard feature, every T-type rotary tables has two **lineFIX** pins (for a slot width of 14 or 18 mm). Depending on the arrangement, four different precision-fit holes are available. Every base plate has a hole pattern that matches a T-slot spacing of 100 mm and 125 mm. After being set up initially with **lineFIX** pins, the rotary table undergoes final adjustment and is then secured in position using these holes.

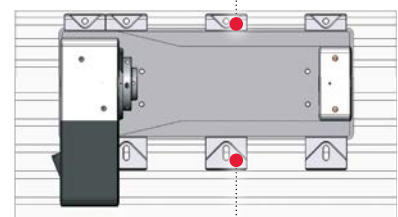
Item no.	Designation	Slot width	Weight [kg]
AUR.iX-12-16	Option (1 pair)	12/16	
AUR.iX-14-18	Standard (1 pair)	14/18	0.03
LOZ.Bride-L	Long clamps, for 63/125 grid pattern*		0.93

* When installed properly as described in the operating manual, the hold-down force per clamping claw (short or long) is 20 kN.

Version with clamping claws

If no hole pattern matches the slots, the rotary table can be secured by means of clamping claws.

Short clamping claws (standard scope of delivery)



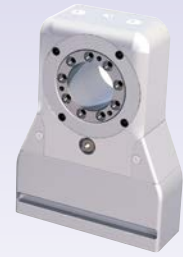
Long clamping claws (Item no.: **LOZ.Bride-L**): for use when mounting at intermediate positions.



GLA.520hd



GLA.TOP2 with 2,000 Nm



GLA.TOP1 with 300 Nm

Counter bearing, incl. bearing pin

- Compact and stable counter bearing with large roller bearing
- Prepared for automatic clamping, oil connection from below and from side
- Max. allowed hydraulic pressure 220 bar (GLA.TOP2) or max. 150 bar (GLA.TOP1)
- Center height 0 +0.04 mm
- Delivered with bearing pin

	Item no.	Clamping torque* [Nm]	Max. pull-out torque [Nm]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	d [mm]	e [mm]	Weight [kg]
507	GLA.TOP1-110	300	not available	155	170	55	110	30	110	70	46.55	7
	GLA.TOP1-150	300		155	210	55	150	70	110	70	46.55	9
510, 520, 530	GLA.TOP2-150-2	2,000	on request	227	240	80	150	30	179	105	64	21
	GLA.TOP2-180-2	2,000		227	270	80	180	60	179	105	64	24
	GLA.TOP2-220-2	2,000		227	310	80	220	100	179	105	64	29
	GLA.TOP2-280-2	2,000		227	370	80	280	160	179	105	64	36
all sizes	GLA.HYD-fix	Hydraulic kit fix										
	GLA.HYD-vario-2	Hydraulic kit vario**										

* at hydraulic pressure = 220 bar or 150 bar

** in combination with EA-520 or EA-530 and suitable counter bearing, the pull-out torque is reduced by approx. 30% (applies to rotary table and counter bearing)

GLA.510hd-150, GLA.520hd-180

- 2x radial and axial bearings (as on rotary table)
- Prepared for automatic clamping, oil connection from below and from side
- Max. allowed hydraulic pressure 220 bar
- Center height 0 +0.04 mm

Item no.	Clamping torque* [Nm]	Max. pull-out torque [Nm]	A [mm]	B [mm]	C [mm]	D [mm]	d [mm]	e [mm]	Weight [kg]
GLA.510hd	800	2000	170	215	150	150	80	34	
GLA.520hd	2000	3900	220	270	171	180	130	46	

* at hydraulic pressure = 220 bar

CYMAX hydraulic unit

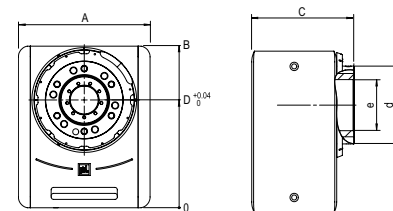
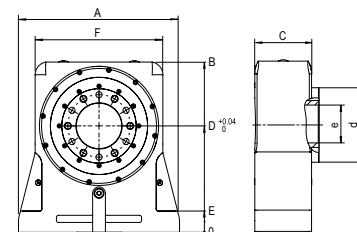
Item no.	Designation	Technical data	Weight [kg]
AGG.CY1-2*	Cymax hydraulic unit	1 clamping circuit, 400 V (can be converted to 200 V)	
AGG.CY2-2*	Cymax hydraulic unit	2 clamping circuits, 400 V (can be converted to 200 V)	
AGG.LEIT-05-2	Hydraulic line with threaded fitting (supplied loose)	1 pair (2 pieces), 5 m	
AGG.CY-Basis	Basic kit	for CYMAX hydraulic unit	
AGG.CY-Fuss	Foot switch	for CYMAX hydraulic unit	
AGG.CY-Hand	Hand switch	for CYMAX hydraulic unit	

* Preparing the machine for connection of the unit is the customer's responsibility

- 3x400 VAC (380–480 V, 50–60 Hz) can be converted to 3x200 VAC (200–280 V, 50–60 Hz)
- Control voltage U = 24 V DC
- Main pressure 10–125 bar

Suitable alignment elements

	Item no.	Designation	Slot width	Weight [kg]
GLATOP1	AUR.IX-12-16	Option (1 pair)	12/16	
	AUR.IX-14-18	Standard (1 pair)	14/18	0.03
GLATOP2	AUR.St-12	Alignment T-slot nuts, 1 pair	12g6	0.07
	AUR.St-14		14g6	0.07
	AUR.St-16		16g6	0.07
	AUR.St-18		18g6	0.07



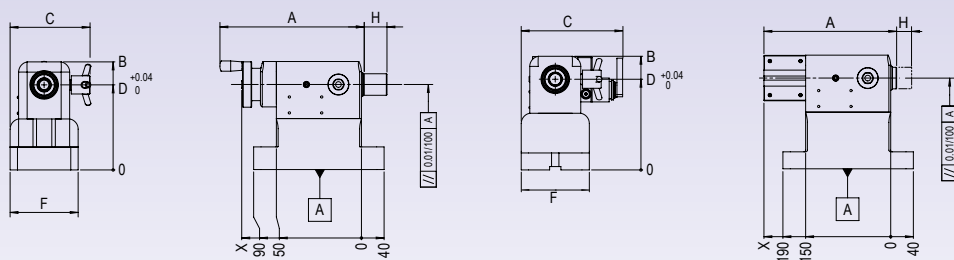
AGG.CYx-2



AGG.CY-Fuss



AGG.CY-Hand



measured without load, quill extended halfway

Standard design for all types = right-handed version (as shown)

	Item no.	Designation	A [mm]	B [mm]	C [mm]	F [mm]	H [mm]	manual	pneu- matic ²⁾	hydraulic ³⁾	Weight [kg]	✗	✓
Center height D [mm]	110	RST.COM-110m ⁴⁾	COMPACT tailstock	222	128	130	100	30	•		11		•
		RST.LIG-110m	LIGHT tailstock	255		142		40	•		20		•
		RST.LIG-110p ¹⁾	LIGHT tailstock	225	150	184	120	40		•	20		•
		RST.LIG-110h ¹⁾	LIGHT tailstock	229		168		40			24		•
	150	RST.COM-150m ⁴⁾	COMPACT tailstock	222	168	130	100	30	•		16		•
		RST.LIG-150m	LIGHT tailstock	255		142		40	•		25		•
		RST.LIG-150p ¹⁾	LIGHT tailstock	238	190	184	120	40		•	25		•
		RST.LIG-150h ¹⁾	LIGHT tailstock	238		168		40		•	29		•
	180	RST.LIG-180m	LIGHT tailstock	255		142		40	•		30		•
		RST.LIG-180p ¹⁾	LIGHT tailstock	238	220	184	120	40		•	30		•
		RST.LIG-180h ¹⁾	LIGHT tailstock	238		168		40		•	34		•
	220	RST.LIG-220m	LIGHT tailstock	255		142		40	•		35		•
		RST.LIG-220p ¹⁾	LIGHT tailstock	238	260	184	120	40		•	35		•
		RST.LIG-220h ¹⁾	LIGHT tailstock	238		168		40		•	40		•
	235	RST.LIG-235m	LIGHT tailstock	255	275	142	120	40	•			•	
		RST.LIG-280m	LIGHT tailstock	255		142		40	•		42		•
		RST.LIG-280p ¹⁾	LIGHT tailstock	238	310	184	120	40		•	42		•
		RST.LIG-280h ¹⁾	LIGHT tailstock	238		168		40		•	47		•
Tailstock Option / Accessories	RST.L-m	Left-hand version, manual									0.00		•
	RST.L-p	Left-hand version, pneumatic									0.00	•	
	RST.R-pmh	pneumatic, with manual lever valve									0.09	•	
	RST.L-pmh	Left-hand version, pneumatic, with manual lever									0.09	•	
	RST.L-h	Left-hand version, hydraulic										•	
	RST.Hub-p	Stroke monitoring for tailstock (pneumatic), free cable ends 5 m of which 4.5 m in flexible tubing; stroke 5 mm shorter									0.73	•	
	RST.Hub-h	Stroke monitoring for tailstock (hydraulic), free cable ends 5 m of which 4.5 m in flexible tubing; stroke 5 mm shorter									0.82	•	
	RST.SPI-MK2s	Fixed center, hardened steel					MK2				0.37		•
	RST.SPI-MK3s	Fixed center, hardened steel					MK3						•
	RST.SPI-MK2hm	Fixed center, HM use					MK2						•
	RST.SPI-MK3hm	Fixed center, HM use					MK3				0.37		•

All LIGHT tailstocks: Parallelism of quill axis to alignment groove adjustable thanks to zentriX system (see operating manual)

¹⁾ Delivered as standard without manual lever valve. Can be ordered as option.

²⁾ Impact force approx. 660...2,000 N at 2...6 bar air pressure

³⁾ Impact force approx. 3,800 N at max. 24 bar oil pressure

⁴⁾ Delivered with center height +/-0.01 mm

Morse taper size (DIN 228)

– COMPACT = MK 2

– LIGHT = MK 3

✗ CANNOT be retrofitted

✓ can be retrofitted

Suitable alignment elements

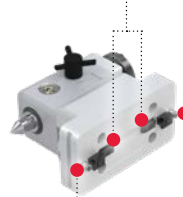
Item no.	Designation	Slot width	Weight [kg]
AUR.zX-12	zentriX alignment pin, 1 pair	12g6	0.10
AUR.zX-14		14g6	0.10
AUR.zX-16		16g6	0.11
AUR.zX-18		18g6	0.12
AUR.St-12	Alignment T-slot nuts, 1 pair	12g6	0.07
AUR.St-14		14g6	0.07
AUR.St-16		16g6	0.07
AUR.St-18		18g6	0.07

Is included in corresponding LOZ. RST. See p. 95

Possible alignment elements

Alignment T-slot nuts

Revolving centers see p. 183



zentriX alignment pins





Manual version (right-hand)

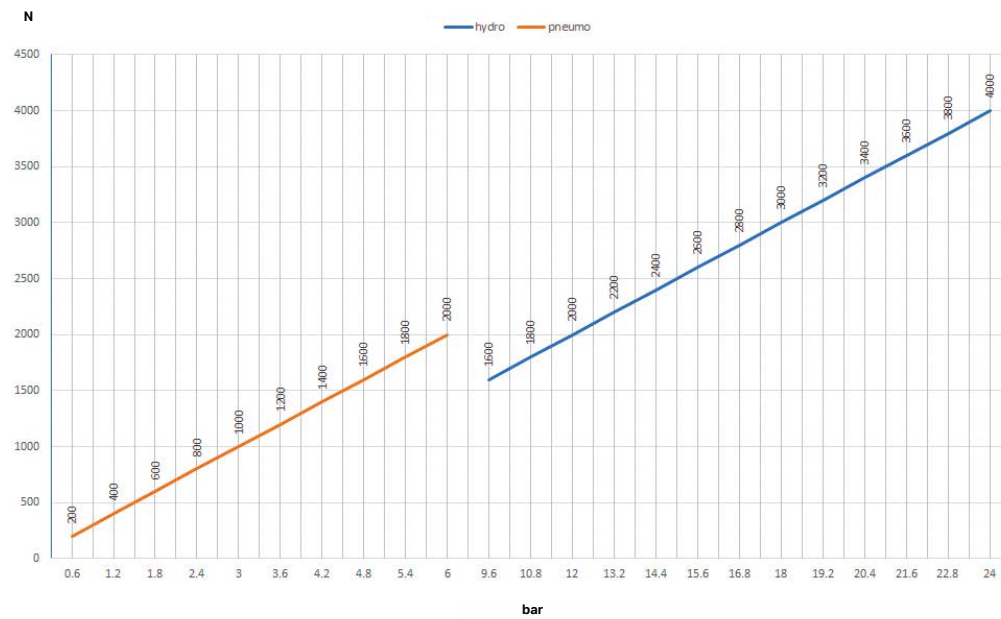


Pneumatic version (right-hand)

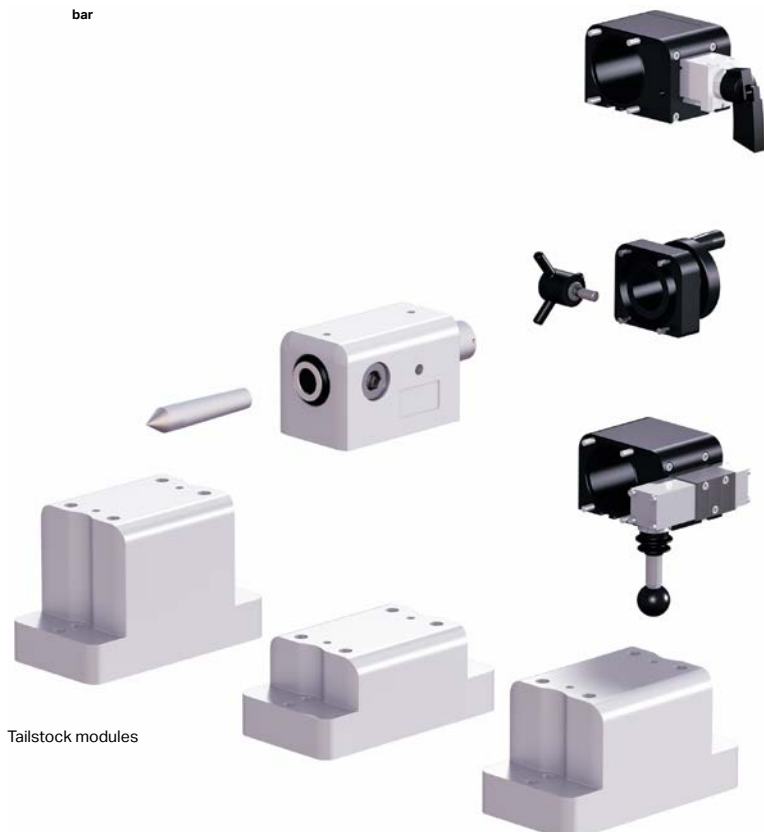


Pneumatic version (right-hand) with manual lever valve (option)

Pressure-force diagram



Left-hand model.



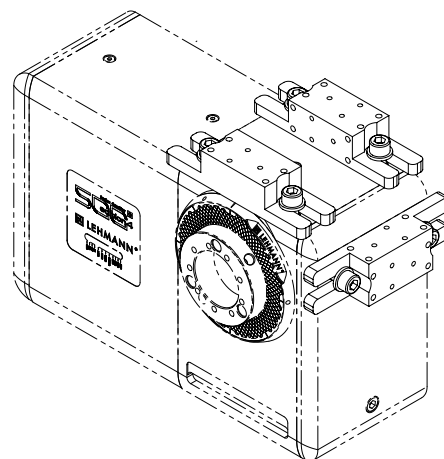
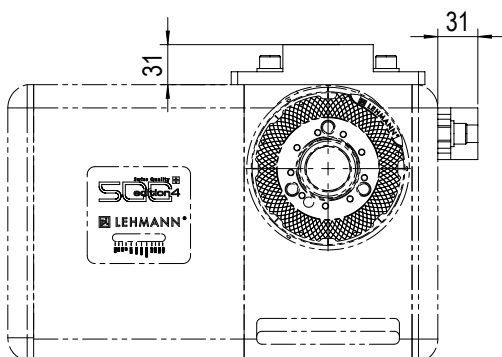
Tailstock modules

Support for mounting various buttons for tool breakage monitoring

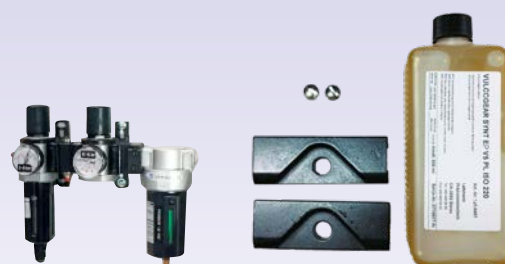
Item no.	Designation	For product	Weight [kg]
LOZ.5xx-WZB	Tool breakage sensor fastening	EA-510, EA-520	

Compatible with

- Marposs (ML75)
- Blum (Micro Compact NT)
- Renishaw (NC4+)



Mounting and accessories packages for standard rotary tables



LOZ.5xx-EA

	Item no.	For machine	For product	Weight [kg]					
50x	LOZ.507-EA		EA-507	2.87	x	x			
	LOZ.507-LFX		longFlex	7.03	x	x			
51x	LOZ.USB-EA		EA-508 light			x*			
	LOZ.510-EA		EA-510	3.16	x	x			
52x	LOZ.510-LFX		longFlex	7.41	x	x			
	LOZ.520-EA		EA-520	3.16	x	x			
530	LOZ.520-LFX		longFlex	7.41	x	x			
	LOZ.530-EA		EA-530	4.01	x	x			
all sizes	LOZ.5x0-EA _o		EA-510/520.0x		x	x			
	LOZ.5xx5xx-T1+2		T1/T2-5xx5xx		x	x			
	LOZ.5xx5xx-T3+4		T3/T4-5xx5xx		x	x			
	LOZ.5xx5xx-TF		TF-5xx5xx		x	x			
	LOZ.5xx-GLA		GLA.5xx			x*			
	LOZ.5xx-M2		M2-5xx	4.02	x	x			
	LOZ.5xx-M3+4		M3/M4-5xx	5.74	x	x			
	LOZ.5xx-RFX		rotoFIX	5.73	x	x			
	LOZ.GLA-TOP		Counter bearing	0.87		x*			
	LOZ.Nute12-EA		EA, 12 mm				x		
	LOZ.Nute14-EA		EA, 14mm				x		
	LOZ.Nute14-Tx		Mx-/Tx, 12 mm				x		
	LOZ.Nute16-EA		EA, 16mm				x		
	LOZ.Nute16-Tx		Mx-/Tx, 16mm				x		
	LOZ.Nute18-EA		EA, 18mm				x		
	LOZ.Nute18-Tx		Mx-/Tx, 18mm				x		
	LOZ.RST-14**		LIGHT tailstock, 14 mm				x		
	LOZ.RST-14St***		LIGHT tailstock, 14 mm				x	x	
	LOZ.RST-18**		LIGHT tailstock, 18 mm				x		
	LOZ.RST-18St***		LIGHT tailstock, 18 mm				x	x	

* without gear oil

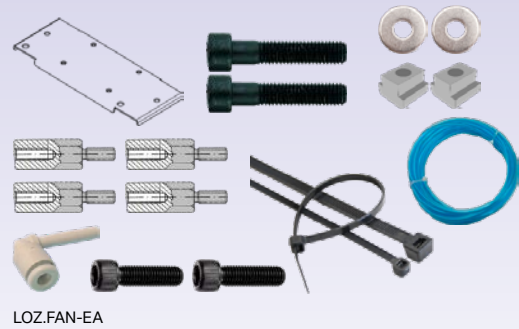
** with zentriX alignment system (instead of alignment slot nut) and with a fixed center MK3

*** with fixed tip MK3

Overview,
ApplicationsSystem &
Facts, smartBoxRotary
tablesSPZ,
DDF, WMSMOT, KAB,
WDF, CNCAligning
GLA, RST, LOZService
& Technology

Tooling

Fastener and accessory packets for machine-specified rotary tables



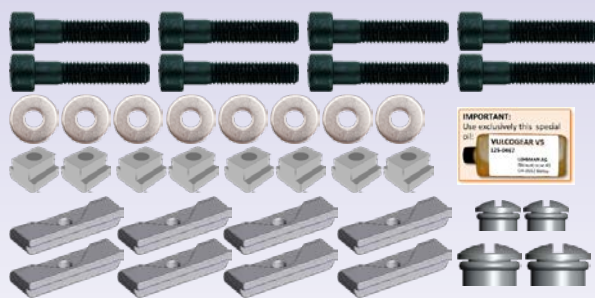
LOZ.FAN-EA

* Including LOZ.Bride-L

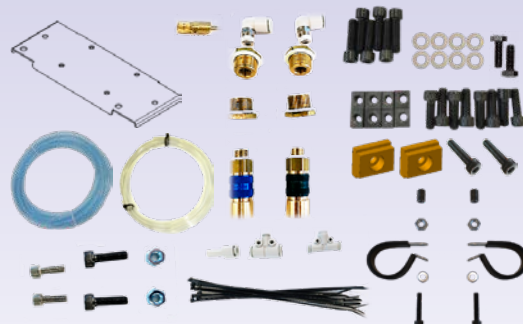
** Without gear oil

*** Sometimes no clamps are included in the delivery because they are not needed

	Item No.	for machine	for product	Weight [kg]	Maintenance unit	Gear oil, clamps***, screw plugs	Fastening materials on machine table (screws, T-slot nuts)	Alignment slot nut (1 pair)	Mating connector air / oil
Overview, Applications	LOZ.AKI-Vx-EA-2	Akira Seiki Vx	EA		x	x	x	x	x
	LOZ.AKI-Vx-RFX-2	Akira Seiki Vx	RFX		x	x	x		x
	LOZ.AKI-Vx-Tx-2	Akira Seiki Vx	Tx		x	x	x		x
	LOZ.AWE-EA-2	AWEA AF/BM	EA		x	x	x	x	x
	LOZ.AWE-RFX-2	AWEA AF/BM	RFX		x	x	x		x
	LOZ.AWE-Tx-2	AWEA AF/BM	Tx		x	x	x		x
	LOZ.BFW-EA-2	BFW Dhruva HSTC	EA		x	x	x		
	LOZ.BFW-Tx-2	BFW Dhruva HSTC	Tx		x	x	x		
	LOZ.BRO-R4Xd-1Tx	BROTHER RX4dx	Tx		x	x	x		
	LOZ.BRO-R4Xd-2EA50x	BROTHER RX4dx	EA		x	x	x	x	
System & Facts, smartBox	LOZ.BRO-R4Xd-2EA51x	BROTHER RX4dx	EA		x	x	x	x	
	LOZ.BRO-R4Xd-2RFX	BROTHER RX4dx	RFX		x	x	x		
	LOZ.BRO-R4Xd-2Tx	BROTHER RX4dx	Tx		x	x	x		
	LOZ.BRO-R6Xd-1Tx	BROTHER RX6dx	Tx		x	x	x		
	LOZ.BRO-R6Xd-2EA	BROTHER RX6dx	EA		x	x	x	x	
	LOZ.BRO-R6Xd-2RFX	BROTHER RX6dx	RFX		x	x	x		
	LOZ.BRO-R6Xd-2Tx	BROTHER RX6dx	Tx		x	x	x		
	LOZ.BRO-S2D-EA	BROTHER S2Dx	EA						
	LOZ.BRO-SWXx-EA50x	BROTHER SxX, SxXd, WxXd	EA		x	x	x	x	x
	LOZ.BRO-SWXx-EA510-521	BROTHER SxX, SxXd, WxXd	EA		x	x	x	x	x
Rotary tables	LOZ.BRO-SWXx-RFX	BROTHER SxX, SxXd, WxXd	RFX		x	x	x		x
	LOZ.BRO-SWXx-Tx	BROTHER SxX, SxXd, WxXd	Tx		x	x	x		x
	LOZ.CHE-EA-2	Chevalier SMART III	EA	0.56	x	x	x	x	x
	LOZ.CHI-xZ-Tx-2	CHIRON DZ, FZ	Tx		x	x			
	LOZ.DAT	Datron			x	x			
	LOZ.DMG-xxxV	DMC xxxV cover	EA	1.74			x	x	
	LOZ.DMG-CMX-EA	DMG CMX xx00V	EA	1.84		x	x	x	
	LOZ.DMG-CMX-Tx	DMG CMX xx00V	Tx	5.48		x	x		
	LOZ.DMG-DMF	DMF cover				x	x	x	
	LOZ.DMG-DMF-530	DMF cover	EA	1.96 (3.24)		x	x	x	
SPZ, DDF, WMS	LOZ.DMG-DMU	DMU cover				x	x	x	
	LOZ.DMG-JP-EA-2	DMG Mori CMX xx00V+NVX (JP made)	EA		x	x	x	x	
	LOZ.DMG-JP-RFX-2	DMG Mori CMX xx00V+NVX (JP made)	RFX		x	x	x		
	LOZ.DMG-JP-Tx-2	DMG Mori CMX xx00V+NVX (JP made)	EA		x	x	x		
	LOZ.DMG-TAP9	DMG Mori DMP Series	TAP9			x	x		
	LOZ.DOO-DT-EA-2	Doosan DT400/DT360D (110VAC)	EA	1.42	x	x	x	x	x
	LOZ.DOO-DT-Tx-2	Doosan DT400/DT360D (110VAC)	Tx		x	x	x		x
	LOZ.DOO-EA510-521	Doosan DVM/DNM/Mynx xx00 (24V)	EA		x	x	x	x	x
	LOZ.DOO-EA530	Doosan DVM/DNM/Mynx xx00 (24V)	EA		x	x	x	x	x
	LOZ.DOO-RFX	Doosan DVM/DNM/Mynx xx00 (24V)	RFX		x	x	x		x
MOT, KAB, WDF, CNC	LOZ.DOO-Tx-2	Doosan DVM/DNM/Mynx xx00 (24V)	Tx		x	x	x		x
	LOZ.DOO-VC-1EA-2	Doosan VC430/ VC510 (24V)	EA		x	x	x		x
	LOZ.DOO-VC-2EA-2	Doosan VC430/ VC510 (24V)	EA		x	x	x		x
	LOZ.DOO-VC3600-2EA-2	Doosan VC3600 (24V)	EA		x	x	x		x
	LOZ.FAN-EA50x	Fanuc Robodrill	EA		x	x	x		
	LOZ.FAN-EA51x-52x	Fanuc Robodrill	EA		x	x	x		
	LOZ.FAN-RFX	Fanuc Robodrill	RFX		x	x	x		
	LOZ.FAN-Tx-2	Fanuc Robodrill	Tx	1.65	x	x	x		
	LOZ.HAA-EA50x	Haas	EA		x	x	x	x	
	LOZ.HAA-EA510-521	Haas	EA		x	x	x	x	
Aligning GLA, RST, LOZ	LOZ.HAA-EA530	Haas	RFX		x	x	x	x	
	LOZ.HAA-OM-EA50x	Haas	EA		x	x	x		
	LOZ.HAA-RFX	Haas	RFX		x	x	x		
	LOZ.HAA-Tx-2	Haas	Tx/Mx		x	x	x		
	LOZ.HAR-APC-2EA	Hardinge V480 APC	EA		x	x	x		x
	LOZ.HAR-EA-2	Hardinge V480/710	EA		x	x	x	x	x
	LOZ.HAR-Tx-2	Hardinge V480/710	Tx		x	x	x		x
	LOZ.HAR-GX-EA510-521	Hardinge GX series and V1000	EA		x	x	x	x	x
	LOZ.HAR-GX-EA530	Hardinge GX series and V1000	EA		x	x	x	x	x
	LOZ.HAR-GX-RFX	Hardinge GX series and V1000	RFX		x	x	x		x
Service & Technology	LOZ.HAR-GX-Tx-2	GX series and Hardinge V1000	Tx		x	x	x		x
	LOZ.HUR-VMX.1a-2	HURCO VMX24/30			x	x			
	LOZ.HUR-VMX.1b-2	HURCO VMX42			x	x	x		
	LOZ.HUR-VMX.1c-2	HURCO VMX10			x	x	x		
Tooling									



LOZ.DMG-CMX-Tx



LOZ.DOO-EA

* Including LOZ.Bride-L

** Without gear oil

*** Sometimes no clamps are included in the delivery because they are not needed

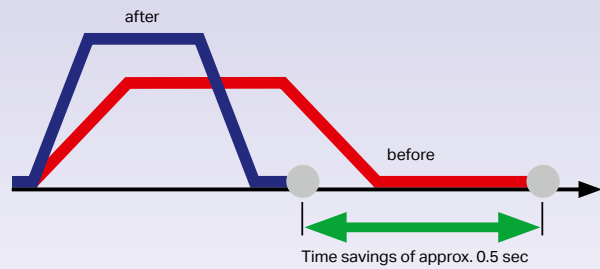
Item No.	for machine	for product	Weight [kg]	Maintenance unit	Gear oil, clamps***, screw plugs	Fastening materials on machine table (screws, T-slot nuts)	Alignment slot nut (1 pair)	Mating connector air / oil
LOZ.HUR-VMX.2a-2	HURCO VMX24/30			x	x	x		
LOZ.HUR-VMX.2b-2	HURCO VMX42			x	x	x		
LOZ.HUR-VMX.2c-2	HURCO VMX10			x	x	x		
LOZ.HWA-HIT-EA-2	HWACHEON HIT400	EA		x	x	x	x	x
LOZ.HWA-HIT-Tx-2	HWACHEON HIT400	Tx		x	x	x		x
LOZ.HWA-V-EA-2	HWACHEON VESTA	EA		x	x	x	x	x
LOZ.HWA-V-RFX	HWACHEON VESTA	RFX		x	x	x		x
LOZ.HYU-EA510-521	Hyundai WIA F	EA		x	x	x	x	x
LOZ.HYU-EA530	Hyundai WIA F	EA		x	x	x	x	x
LOZ.HYU-IC-APC-2EA-2	Hyundai WIA iCUT series APC	EA		x	x	x		x
LOZ.HYU-IC-EA-2	Hyundai WIA iCUT	EA		x	x	x		x
LOZ.HYU-IC-Tx-2	Hyundai WIA iCUT	Tx		x	x	x		x
LOZ.HYU-KF-EA-2	Hyundai WIA KF	EA		x	x	x	x	x
LOZ.HYU-KF-Tx-2	Hyundai WIA KF	Tx		x	x	x		x
LOZ.HYU-RFX	Hyundai WIA F	RFX		x	x	x		x
LOZ.HYU-Tx-2	Hyundai WIA F	Tx		x	x	x		x
LOZ.LEA-EA	Leadwell V	EA				x		x
LOZ.LIT-EA-2	Litz TV	EA		x	x	x	x	x
LOZ.LIT-Tx-2	Litz TV	Tx		x	x	x		x
LOZ.MAK-PS-EA-2	Makino PS95/105	EA		x	x	x	x	x
LOZ.MAK-PS-RFX	Makino PS95/105	RFX		x	x	x		x
LOZ.MAK-PS-Tx-2	Makino PS95/105	Tx		x	x	x		x
LOZ.MAK-SLI-EA-2	Makino Slim3n	EA		x	x	x		
LOZ.MAK-SLI-Tx-2	Makino Slim3n	Tx	0.66	x	x	x		
LOZ.MAZ-VCP-EA-2	Mazak VCP (without APC)	EA		x	x	x	x	x
LOZ.MAZ-VCP-2EA-2	Mazak VCP (with APC)	2 x EA or 2 x M		x	x	x		x
LOZ.MAZ-VCx-EA510-521	Mazak VCS/VCN	EA		x	x	x	x	x
LOZ.MAZ-VCx-EA530	Mazak VCS/VCN	EA		x	x	x	x	x
LOZ.MAZ-VCx-RFX	Mazak VCS/VCN	RFX		x	x	x		x
LOZ.MAZ-VCx-Tx-2	Mazak VCS/VCN	Tx		x	x	x		x
LOZ.MAZ-VTC-EA510-521	Mazak VTC	EA		x	x	x	x	x
LOZ.MAZ-VTC-EA530	Mazak VTC	EA		x	x	x	x	x
LOZ.MAZ-VTC-RFX	Mazak VTC	RFX		x	x	x		x
LOZ.MAZ-VTC-Tx-2	Mazak VTC	Tx		x	x	x		x
LOZ.MIC-Tx-2	Microlution ML10	Tx		x	x			
LOZ.MIK-E-2	Mikron Mill E			x	x	x		
LOZ.MIK-HxM	Mikron HSM/HPM	EA	1.74		x	x	x	
LOZ.MIK-VCE	Mikron VCE			x	x	x	x	
LOZ.MIK-VCE-530	Mikron VCE	EA		x	x	x	x	
LOZ.MIK-VCE-Tx	Mikron VCE	Tx		x	x	x		
LOZ.MOR-NVX-EA-2	MoriSeiki NVXxxxx	EA		x	x	x	x	x
LOZ.MOR-NVX-Tx-2	MoriSeiki NVXxxxx	Tx		x	x	x		x
LOZ.MTE-EA-2	MT EVO V	EA		x	x	x	x	
LOZ.MTE-Tx-2	MT EVO V	Tx		x	x	x		
LOZ.PRI-EA-2	Priminer (Kaast) VxL	EA		x	x	x	x	x
LOZ.PRI-RFX	Priminer (KAASST) VxL	RFX		x	x	x		x
LOZ.PRI-Tx-2	Priminer (Kaast) VxL	Tx	1.94	x	x	x		x
LOZ.PRI-V6-EA-2	Priminer (Kaast) V6L	EA		x	x	x	x	x
LOZ.PRI-V6-Tx-2	Priminer (Kaast) V6L							
LOZ.QUA-EA-2	Quaser MV	EA	0.49	x	x	x	x	
LOZ.QUA-RFX	Quaser MV	RFX						
LOZ.QUA-Tx-2	Quaser MV	Tx	1.70	x	x	x		
LOZ.ROK-EA-2	RokuRoku CEGA	EA		x	x	x	x	x
LOZ.SAE-EA-2	SAEILO M	EA		x	x	x	x	
LOZ.SAE-RFX	SAEILO M	RFX		x	x	x		
LOZ.SAE-Tx-2	SAEILO M	Tx		x	x	x		
LOZ.TON-EA-2	Tongtai VU-5	EA		x	x	x		
LOZ.TON-Tx-2	Tongtai VU-5	Tx		x	x	x*		
LOZ.WEL-EA-2	Wele AQ	EA		x	x	x	x	x
LOZ.WEL-Tx-2	Wele AQ	Tx		x	x	x		x
LOZ.WER-EA-2	WERTH Messtechnik (51x-52x)	EA		x	x**			
LOZ.WER-T1-2	WERTH Messtechnik	T1		x	x**			
LOZ.WER-TF-2	WERTH Messtechnik	TF		x	x**			

Machine-specific installation kits

Overview,
ApplicationsSystem &
Facts, smartBoxRotary
tablesSPZ,
DDF, WMSMOT, KAB,
WDF, CNCAligning
GLA, RST, LOZService
& Technology

Tooling

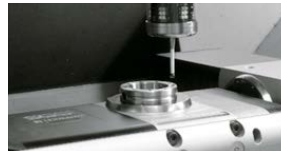
From commissioning to optimization



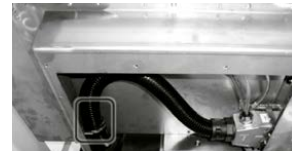
Optimization of the cycle time

Commissioning service

Commissioning on new machines with control systems from Siemens, Heidenhain, Fanuc, Brother, Hurco, Mitsubishi, Haas, Mazak. In addition to **commissioning**, upon request we also optimize for positioning or simultaneous operation with our application support.



3D measurement



Mech.+electr. installation



Basic commissioning

INB.xAX-CMS

Goal

Rotary table connected, aligned and parameterized, ready for production.

Tasks

- Mechanical installation of the rotary table on the machine table
- Alignment of the rotary axes with the main axes of the machine
- Kinematics setting / checking (in case of multi-spindle rotary tables, 1 spindle each)
- Electrical connection of the rotary table to the machine
- Basic parameterization based on pL parameter lists at least with the usual values, but preferably in accordance with customer requirements
- Brief customer training

Prerequisite

- Machine must be prepared accordingly (amplifier, control cabinet wiring, plugs, PLC, CNC with 4th and/or 5th axis available; or can be ordered from pL LEHMANN)
- Passwords must be available for setting parameters (including password for safety parameters)
- During commissioning, a suitable technician from the machine supplier may need to be present (to adjust parameters, possibly to adjust the PLC etc.); arranged and paid for by the customer; ask us about this.

Work productively and without problems
starting from day 1:
Proper commissioning is critical



Additional package for wall bushing

INB.xAX-WDF

Goal

In addition to commissioning the CMS, pL installs the machine-side cabling.

Tasks

- Installation of cabling from control cabinet to cabinet wall

Prerequisite

- CMS commissioning by pL must also be purchased



Additional package for amplifier and connection material

INB.xAX-SER

Goal

In addition to commissioning the CMS, pL integrates the amplifier(s) with the control cabinet wiring.

Tasks

- ServoPack installation with wiring in the control cabinet

Prerequisite

- CMS commissioning by pL must also be purchased



Additional package for PLC adjustments

INB.xAX-PLC

Goal

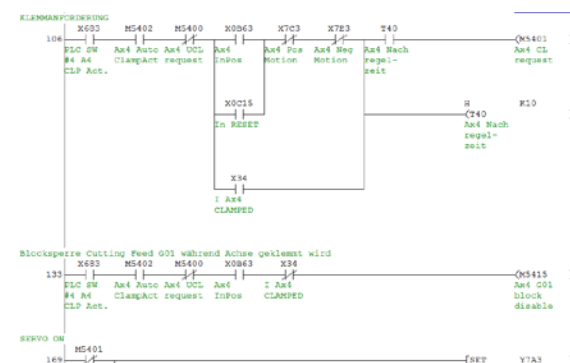
Optimal adjustment of the PLC by pL for the 4th or 4th/5th axis.

Tasks

- Basic programming or optimization of an existing PLC
- Checking whether the clamping control functions correctly and is not active before the target position has been cleanly reached

Prerequisite

- CMS commissioning by pL must also be purchased



Overview,
Applications

System &
Facts, smartBox

Rotary
tables

SPZ,
DDF, WMS

MOT, KAB,
WDF, CNC

Aligning,
GLA, RST, LOZ

Service
& Technology

Tooling

More efficiency with
the right setup



Additional package for macro programming

INB.Makro

e.g. for the following requirements

- Parameter switching if multiple rotary tables are used on the same machine
- Kinematics shifting for multi-spindle systems from spindle 1 to others
- Changing parameter settings for different workpiece weights
- Changing pitch error compensations for different eccentric loads

```
(-----)
(Prufung ob Werkstück in Spindelgreifer)
IF [#709EQ0]GOTO2(ohne Prüfung)
G54.1P44(Nullpunkt Werkzeugtaster)
G90
#2200=0(Verschleisswerte von T200 auf null setzen)
G0X0Y0
M19S90(Spindelpositionierung fuer Renishaw)
G0G90G41#710Z[#714+#[#727*3]](Rohteilhoehe-Sicherheitsabstand Teil greifen)
M108(Abbblasluft ein)
G01Y-75F5000(Bewegung zum Abblasen)
Y30(Bewegung zum Abblasen)
V0(Bewegung zum Abblasen)
M18(Abbblasluft aus)
(-----)

(Renishaw Zyklus)
#2400=#[#2200+#[710]+#[#714-#722]](WZ-Laenge T200 = aktuelles WZ + Rohteil - ueberfahr-laenge Rohteil)
G65P9858H-#721M1Q[#733+#[14]R#729T200(WZ-Bruchkontrolle mit Durchmesser von Werkstück und T200)
#731=#148(uebergabe Resultat Renishaw)
(-----)

(Auswertung)
IF [#731EQ1]GOTO1(kein Werkstück vorhanden = nochmals von vorne)
#720=0
(-----)
```

Additional package for building zero-point clamping system on machine

INB.NPSMaschine

Goal

Build and align zero-point clamping system on machine table.

Tasks

- Build and align zero-point clamping system on machine table
- Align rotary table appropriately for this

Prerequisite

- CMS commissioning by pL must also be purchased



Additional package for commissioning the foot / hand switch

INB.AGG

Goal

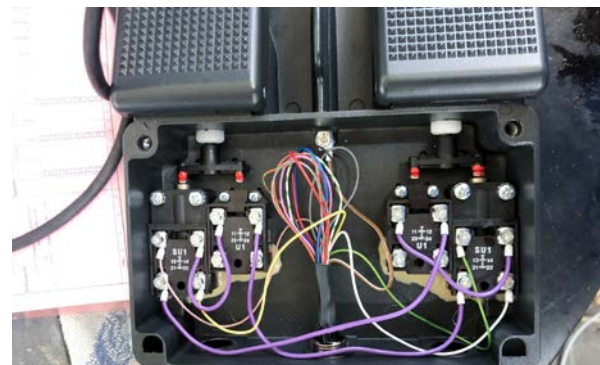
Integrate the foot or hand switch for activating, e.g., the clamping cylinder or tailstock (for each clamping circuit).

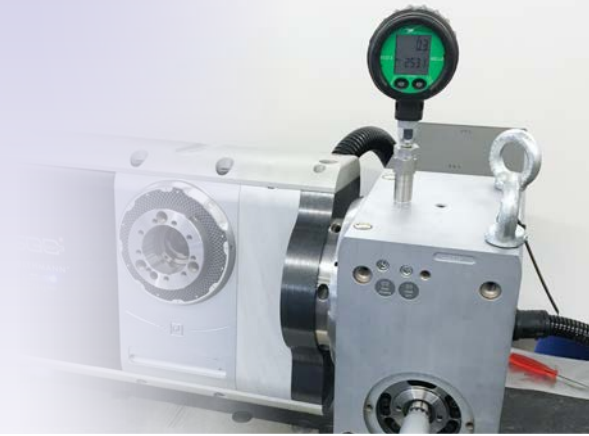
Tasks

- Mechanical connection and hose routing
- Integration into the safety circuit of the machine

Prerequisite

- Only foot or hand switch, NO control for M-function (latter is also available on request)
- Wiring diagram for machine must be available





Commissioning the M-function

INB.MF

Goal

FANUC 35i links with the machine CNC via the M-function

Tasks

- Mechanical installation of the rotary table on the machine table
- Alignment of the rotary axes with the main axes of the machine
- Wiring the FANUC 35i to the interface of the machine CNC
- Function test and brief training of the operator
- EMERGENCY Stop link if possible

Prerequisite

- Machine or CNC must be prepared accordingly (M-function available)

Note

We offer training in our Academy for operation of the Fanuc 35iB control system.

Support for OEM initial commissioning (Partner Kit)

INB.PartnerKit

Goal

The standard pL scope of delivery is defined (plugs, cable lengths, installation kit, etc.) and the OEM technical documentation is adjusted. Machine can be ordered prepared for pL.

Tasks

- Support for setting up and commissioning a pL rotary table
- Adaptation of PLC to pL rotary table
- Optimum parameterization as standard

- Recording of all points to be documented as well as subsequent monitoring of implementation
- Training in how to operate and maintain the rotary table

Prerequisite

- The presence of a technician from the machine manufacturer is mandatory, and if necessary also from the control system supplier

Overview,
ApplicationsSystem &
Facts, smartBoxRotary
tablesSPZ,
DDF, WMSMOT, KAB,
WDF, CNCAligning,
GLA, RST, LOZService
& Technology

Tooling

Maximum productivity
necessitates taking into account your
application – we help you



Optimally clamped? Here too, we provide you with on-site support.

Application support

INB.xAX-APS

Goal

Optimize rotary table settings to customer's application (time optimization and/or accuracy improvement).

Tasks

- Calculation based on rotary table and workpiece (what is possible)
- Checking the geometry, making corrections as far as possible
- Checking whether the clamping control functions correctly and is not active before the target position has been cleanly reached
- Checking pitch errors (0–90° relatively easy, with portable measuring device where appropriate)
- Checking the stress/load buildup (eccentric loads,

stresses must not be too large), the machining sequence and the control characteristics (adjusts cleanly)

- Adjustment of gear backlash and pitch error
- Optimizing for a specific workpiece including clamping device and machining strategy (simultaneous machining may require considerably more effort; charged for separately)
- Kinematics setting / checking
- Expenses such as travel time, travel expenses, hotel and meals are charged at cost

Prerequisite

- Programming system must be prepared accordingly (e.g. for simultaneous operation)

Real-world examples:

A. Maximizing productivity

1. Clamping deactivated if necessary
 - Reason: Production of small parts
 - Result: Productivity substantially increased
2. Speed increased from 12 to 58 rpm
 - Reason: Commissioning by OEM not optimal
 - Result: Cycle time considerably shortened
3. Parameters adjusted to pL calculations, idle times reduced from 100 ms to 10 ms, clamping partially deactivated
 - Reason: Maximum possible optimization of production time per unit
 - Result: Production time per unit was 60 s before, 40 s after, productivity increased 33%
4. Parameters for interpolated operation optimized, clamping idle times reduced from 500 ms to 10 ms or from 1000 ms to 300 ms
 - Reason: Implement impeller machining with a 3+2 machine concept
 - Result: ED 100% and impeller production possible, cycle time considerably shortened

B. Prevention of future damage/hazards

1. 'Release clamping' decreased from 300 ms to 100 ms
 - Reason: Unnoticed pL product defect
 - Result: Cycle time considerably shortened
2. Assignment of B/C axes to clamp/release macros corrected
 - Reason: Faulty commissioning by OEM
 - Result: Future production failures prevented
3. OFF control placed after 'clamped' spindle
 - Reason: Faulty commissioning by OEM
 - Result: Future production failures prevented

C. Optimization of the workpiece accuracy

1. Positioning accuracy optimized from 100 to 10 increments
 - Reason: Faulty commissioning by OEM
 - Result: Considerably more accurate workpieces
2. Alignment and zero-point correction of the rotary table
 - Reason: Careless installation by OEM
 - Result: Volumetric accuracy substantially improved

We test before the investment –
afterwards we help if questions arise



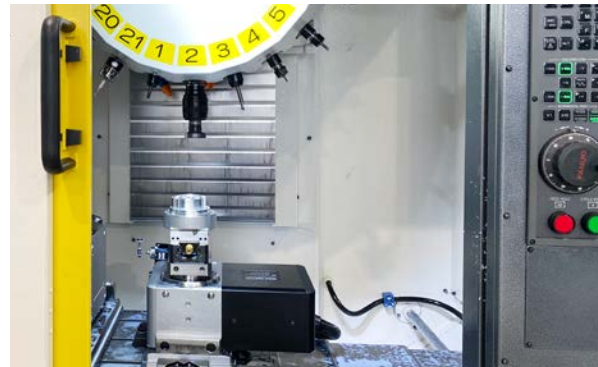
Test machining

Preparation

- Checking feasibility
- Determining tool and machining data with tool supplier where applicable
- Creating schedule

Implementation – at the factory with the customer present

- Explaining solution of the application
- Machining and inspecting workpieces
- Measuring equipment provided by the customer – or customer takes workpieces along for the measurement



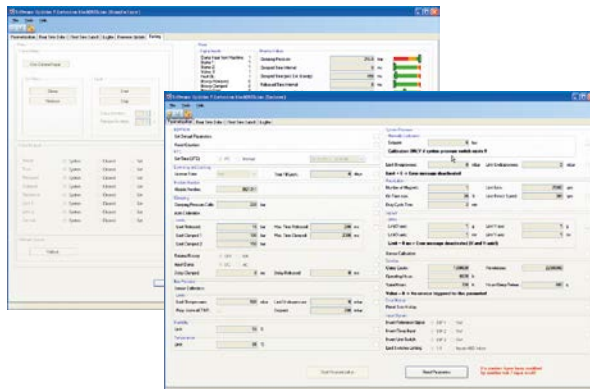
Helpline service

Phone service from 7:30 a.m. – 12:00 p.m. and 2:00 p.m. – 5:00 p.m. as well as emergency phone service for all pL service centers 24 hours a day, 5 days a week

- Technical support
- Diagnostic support
- Organizing factory and field service
- Taking spare parts orders

Goal

Be able to help quickly, competently and without red tape



blackBOXcom



Overview,
Applications

System &
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Rotary
tables

SPZ,
DDF, WMS

MOT, KAB,
WDF, CNC

Aligning,
GLA, RST, LOZ

Service
& Technology

Tooling

We also support you after the purchase to ensure high availability of your equipment

Software Updater P.Lehmann blackBOX.com (Enduser)

Tools Help

Real Time Data I Real Time Data II Logfile

System Time (UTC): 21.02.2014 11:11:09

Power Fail Date (UTC): 19.02.2014 17:43:43

Sw Version: 005k

PCB Serial Number:

PCB Lot Number:

Last Revision (UTC): 28.01.2014 16:30:57

Operating Hours: 35 h

Operating Hours Last Revision: 35 h

Control & Monitoring Spindle Clamping

Max. Clamping Pressure Total: 0.6 bar

Max. Clamping Pressure Last Revision: 0.6 bar

Clamp Cycles Total: 121

Clamp Cycles Last Revision: 121

activeService¹⁾

¹⁾ an excerpt from our Active Services; please contact us for additional options

Easy Check

- Visual inspection
- Hose check
- Oil check/maintenance unit
- Bleed if necessary
- Read and evaluate blackBOX data
- Status report with recommendation

Benefits

- Prevention helps to minimize expensive downtime
- Travel costs are prorated
- The customer does not need to think about it
- No contract, you are free to decide annually
- Based on the worldwide practical experience of pL

Facts

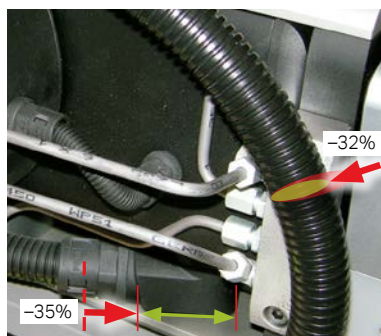
- Without maintenance contract
- We schedule the region on our own
- Then notify the intended customers of the pending visit
- Customers can decide yes or no

Goal

Prevent downtime, eliminate stress and costs, extend the service life → Prevention instead of reaction

Technischer Kundendienst			R-Nr.	R14-1220
Erfüllungsort: (western)	Peter Lehmann AG Bäraustrasse 43 CH-3602 Bärau		A-Nr. M-Nr.	044789-001
dir. Telefon Nr.	Mamer: 002 900 83 16		Masch.	
R-Adresse	COMADUR SA, Le Locle		CNC	
Arbeiten				
T = Teiler, S = Schleifer, TS = Teiler/MTD Schleifer				
Code	Strom Anfuhr	Element	X	Tätigkeit
10		Anlage		reinigen
11		Anlagendokumentation		kongieren
12		Anlagenscheibe		kontrollieren
13		Bereichsbesicherung		erschaffen
45		blackBOX		testen
46		Guardy		testen
47		Brakey		testen
15		Drehdurchführung		kontrollieren
48		Drucksensor		testen
36		SPZ/MA / Macrotol		kontrollieren

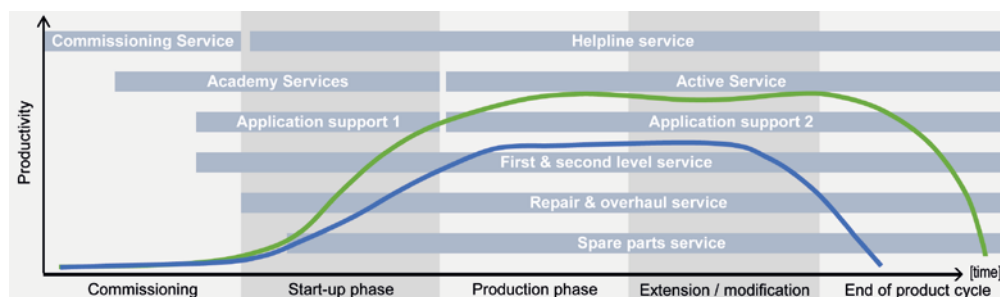
Status report with recommendation



Retrofitting of further developments on request (shorter outgoing cable, smaller diameter).



LifeCycle Services: Increased productivity over the life of your machine ...



— Productivity with LifeCycle service products from pL LEHMANN
— Productivity without service support

Only well-trained technical personnel
can assure optimal performance.
This applies to us as well as our customers.
Don't hesitate to make use of our service
offerings.



Example of a course confirmation

Customer Academy

Professional training sessions at the pL factory (at the customer on request) with extensive documentation for reference as well as a corresponding training certificate.

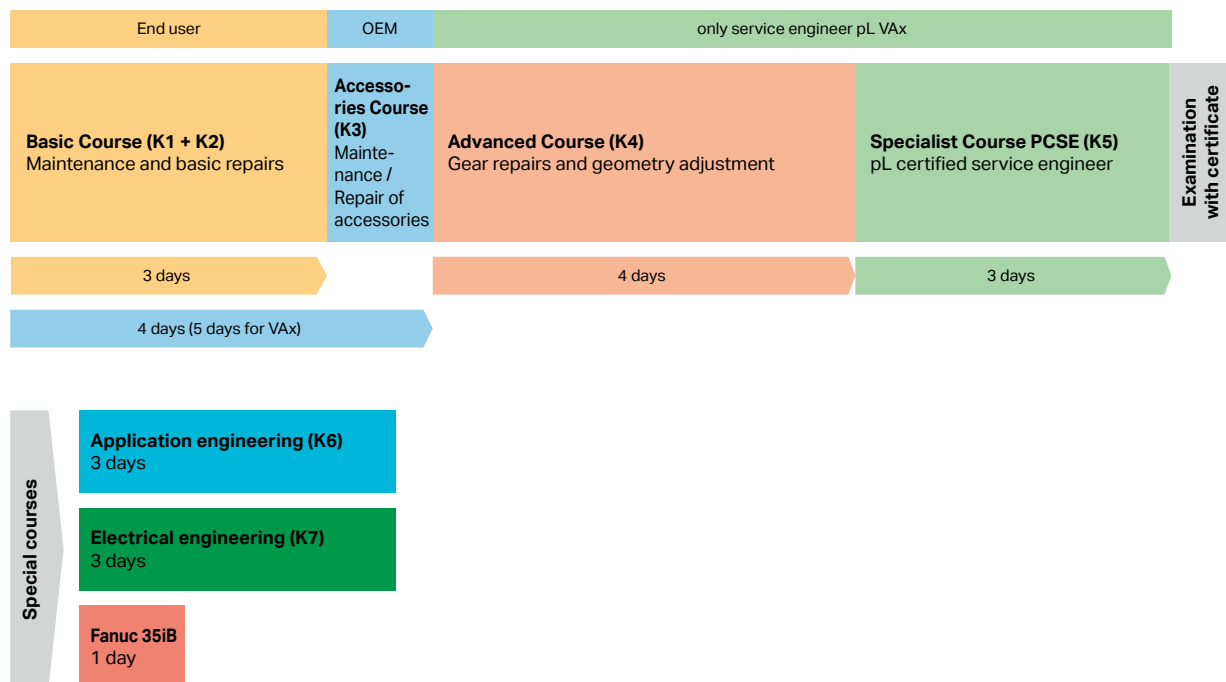
Goal

To make pL service centers and customers more independent, increase the availability of pL products

Your benefit

- Independence from third parties – maximum productivity
- Shortest possible interruptions
- Economical and competent
- Prevention of expensive operator errors
- Prevention of time-consuming fault diagnosis
- Correct spare parts ordering
- 1 year of Helpline service free of charge worldwide

Courses at a glance



Additional information

- Detailed documentation as references
- 1 year of Helpline service free of charge worldwide
- At least 2 participants, max. 4 participants per group
- Course contents matched to the individual when necessary
- Practical exercises, supplemented with theory

Registration prerequisites

- Completion of technical training in mechanics, machining and assembly
- CNC knowledge
- Experience in maintenance or service (preferably with/on machine tools)
- Basic knowledge of electrical engineering, pneumatics and hydraulics

Overview,
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Facts, smartBox

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Service
& Technology

Tooling

We hold refresher courses to ensure that the knowledge of our technicians is updated continuously. These are also available for you.

Seal change on Braky

The courses in detail (course language in German or English only)

For end customers and machine dealers

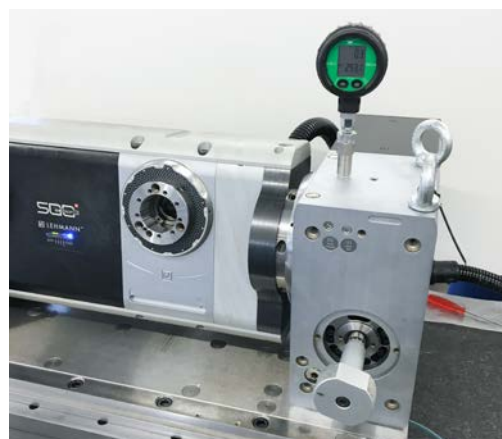
Basic Course – for Helpline and maintenance technicians (K1 + K2)

Prerequisite: Practical experience in maintenance of machine tools

Course goals:

- Basic knowledge of pL LEHMANN rotary tables
- Diagnosing faults (e.g. via blackBOX)
- Knowledge of spare parts packages
- Learning about specific tools
- blackBOX software and analysis
- Small repairs such as Braky replacement, for instance
- Motor and wiring harness replacement on dividing and tilting axis
- Checking and adjusting the gear unit
- Adjusting and cleaning the scale dial

The better your knowledge of pL rotary table, the shorter are your downtimes and the higher is your productivity!



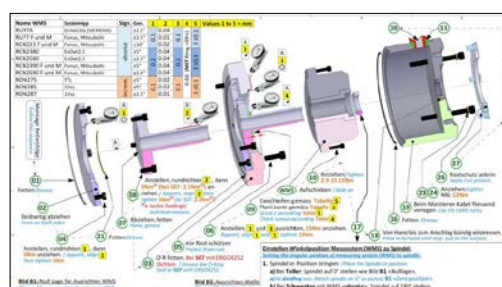
Checking the clamping pressure correctly

Accessories Course – for OEM service / commissioning technicians (K3)

Prerequisite: Basic Level Course

Course goals:

- Correct setting and operation of accessories such as rotary union, clamping cylinder, tailstock, counter bearing...
- Understanding and handling the angular position measuring system
- Handling the ripas system correctly
- Working correctly with CYMAX hydraulic units



Installation instructions for WMS

Courses for our service partners and large and customers who wish to be completely self-sufficient

Advanced Course – for the knowledgeable service technician as a freelancer (K4)

Prerequisite: Accessories Level Course (contractual cooperation with pL service location)

Course goals:

- Repair of gear unit, spindle seals and spindle clamping
- Measuring and adjusting the geometry correctly
- Machine-specific wiring



Remeasuring and aligning

severe oil loss

Specialist Course PCSE – for the knowledgeable pL service technician – for pL service location only (K5)

Prerequisite: Advanced Level Course (contractual cooperation with pL service location)

Course goals:

- In-depth knowledge of current and older products, incl. accessories
- Good knowledge of the service structure and organization of pL
- Performance of damage analyses
- Parameterization of the blackBOX

Special courses

Application engineering – for application technicians and product managers/sellers of pL LEHMANN rotary tables (K6)

Prerequisite: Knowledge of CNC machining and basic knowledge of rotary tables

Course goals:

- Knowledge of the behavior of pL rotary tables in various applications
- Optimization options for applications
- Detailed troubleshooting for demanding customer requirements
- Selection of the correct rotary table based on customer requirements

Electrical engineering – for knowledgeable service technicians (K7)

Prerequisite: Practical experience in maintenance of machine tools

Course goals:

- Analytical approach for electrical problems
- Measurement technology
- Interpretation and understanding of electrical diagrams
- Shutdown measures in case of electrical problems

Fanuc 35iB

Prerequisite: Practical experience in operating and programming machine tools

Course goal:

- Operation of our Fanuc 35iB control

Product line 900

Coming soon after market introduction



Massive crash – a case for the pL professional



Measuring correctly



Application of a 4th axis on a 3-axis machining center



Fanuc 35iB manual control pendant

Overview,
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Service
& Technology

Tooling

Knowledge is a prerequisite.
Professional implementation, however,
requires replacement parts and ...

Gear unit (for trained technicians only)



Seal sets



Bearing set



BOOSTY spare parts packages



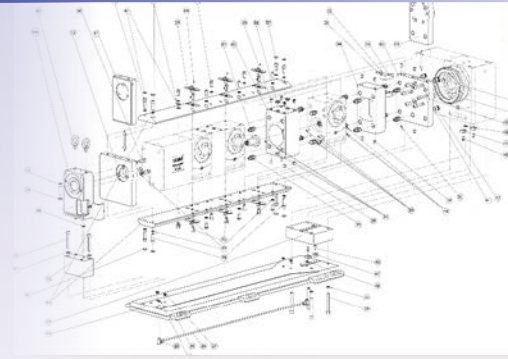
Cable sets



Spare parts packages in a carrying case



... Tools Our service partners have both.
That is why they maintain a web shop with
availability data that is updated daily.



Web shop example

Modell	Position	Bezeichnung	Bemerkung	Bestand	Preis in CHF	Menge
120-0963	03	Rohrschelle	MW2, schwarz	91 Stück	3,00	2 + -
120-1102	58	Verschlusszapfen	M16x1,5	877 Stück	3,00	4 + -



WZP.BASIS.BR5xx



WZP.CARD



WZP.HARA.x07



WZP.RIP



WZP.BRAKY.DMO



3x 135-0042b



WZP.HARA.xx0



WZP.RIP.SKP


WZP.BRAKY.KTR507
WZP.BRAKY.KTR5x0


WZP.DDF



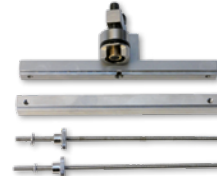
WZP.MANO.30



WZP.WMS



WZP.ZRSP



... and others

New Digital Age for Your 3-Axis Machining Center



CNC.Tablet

- Digitally monitored with remote access
- Prevention of downtime through preventive service monitoring
- Useful tool for servicing

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& Technology

Tooling

High geometric accuracies as standard,
combined with a high level of rigidity and stability

() values = increased accuracy. Item no. GEO.5xx-GEN

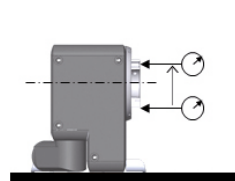
The tolerances given below apply under the following conditions:

1. The rotary table is mounted as specified in the commissioning instructions
2. The measurement is carried out on a calibrated granite plate (all machine errors are excluded)
3. The rotary table is not subjected to any outside thermal influences (sun, fans, heaters...)
4. Prior to the measurement, the rotary table and the measuring and test equipment have been in the same environment for at least 24 h
5. All measured values are determined for an unloaded rotary table

Geometry of EA rotary tables

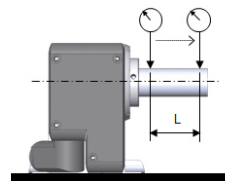


Perpendicularity
Spindle surface to support surface



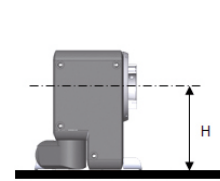
0.01/100 mm (0.005/100 mm)

Parallelism
Spindle axis with support surface



0.01/100 mm (0.005/100 mm)

Center height

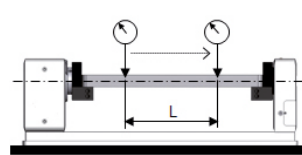


0...0.04 mm

Geometry of EA rotary tables with rotoFIX

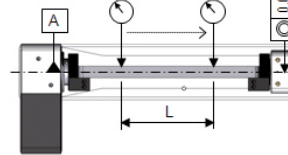


Parallelism with support surface



0.007/100 mm (0.0035/100 mm)

Parallelism with tilting axis



0.007/100 mm (0.0035/100 mm)

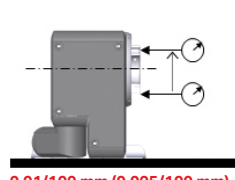
For EA vertical see p. 38

Geometry of M-type rotary tables



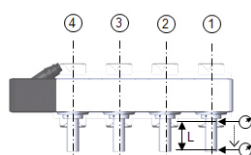
on request

Perpendicularity
Spindle surface to support surface



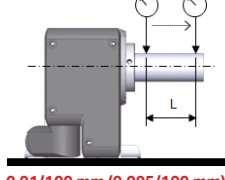
0.01/100 mm (0.005/100 mm)

Axis parallelism
Spindle 2, 3 and 4 to spindle 1



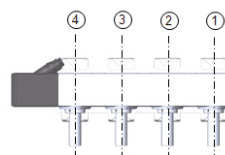
0.01/100 mm (0.005/100 mm)

Parallelism
Spindle axis with support surface



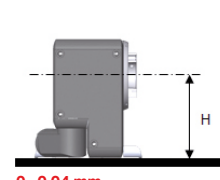
0.01/100 mm (0.005/100 mm)

Axis distance
X1, X2 and X3



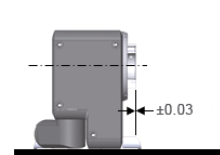
± 0.02 mm (± 0.01 mm)

Center height



0...0.04 mm

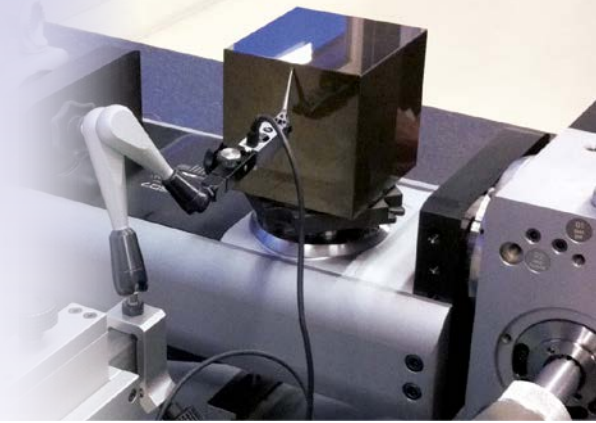
Depth difference of the spindles



± 0.03

And for the most demanding requirements:
1/2 tolerance as an option

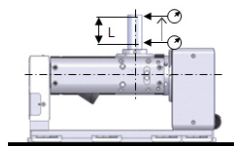
() values = increased accuracy. Item no.. GEO.5xx-GEN



Geometry of TF and T1 rotary tables

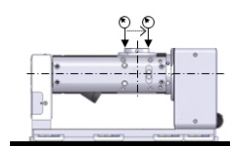


Perpendicularity
Dividing/indexing axis to swiveling/tilting axis



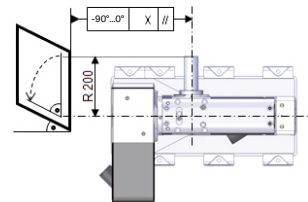
0.01/100 mm (0.005/100 mm)

Parallelism
Spindle surface to support surface



0.01/100 mm (0.005/100 mm)

Tilt drift
Change in the angle between the dividing / indexing axis and tilting axis during the tilting movement from -90° to 0°

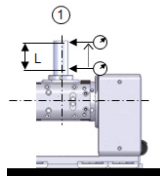


0.01/R150 mm (0.005/R150 mm; applies only to T1)

Geometry of T2...3 rotary tables

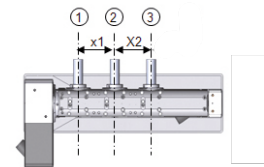


Perpendicularity
Dividing/indexing axis to tilting axis of spindle 1



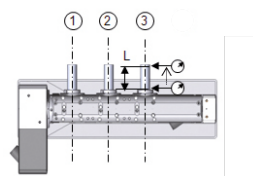
0.01/100 mm (0.005/100 mm)

Axis distance
X1, X2 and X3



± 0.02 mm (± 0.01 mm)

Axis parallelism
Spindle 2 and 3 to spindle 1



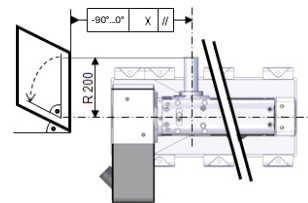
0.01/100 mm (0.005/100 mm)

Parallelism
Spindle surface to support surface



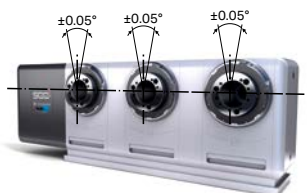
0.01/100 mm (0.005/100 mm)

Tilt drift
Change in the angle between the dividing / indexing axis and tilting axis during the tilting movement from -90° to 0°



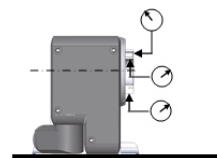
0.01/R150 mm (0.01/R150 mm)

For M- and T-type rotary tables



For all rotary tables

Radial and axial run-out for all rotary table versions
– measured at spindle nose
– Axial run-out on largest diameter
– Radial run-out of the inner bore as well as centering Ø



0.006 mm (0.003 mm)

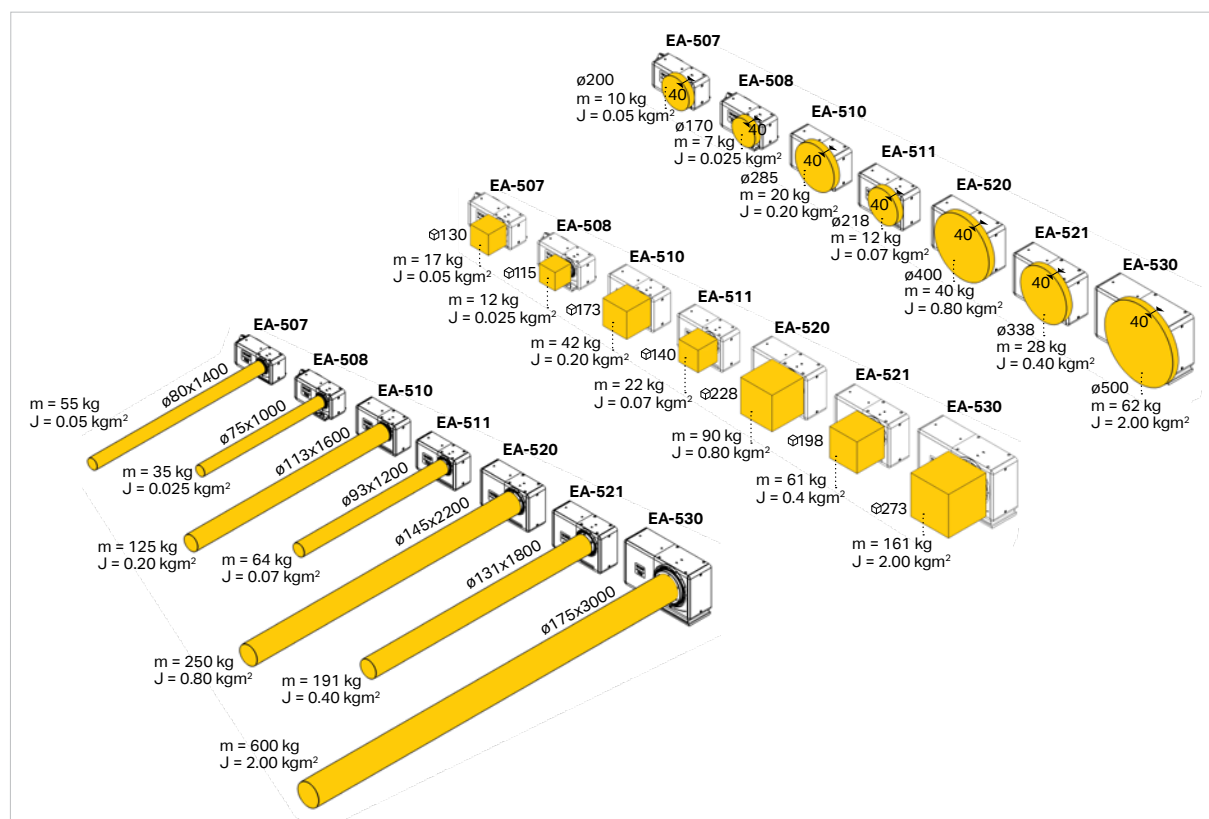
Basics of the drive data

All drive data of pL LEHMANN rotary tables (pp. 34–67) have been designed for the following standard spindle loads in accordance with DIN/VDE 0530 as follows:

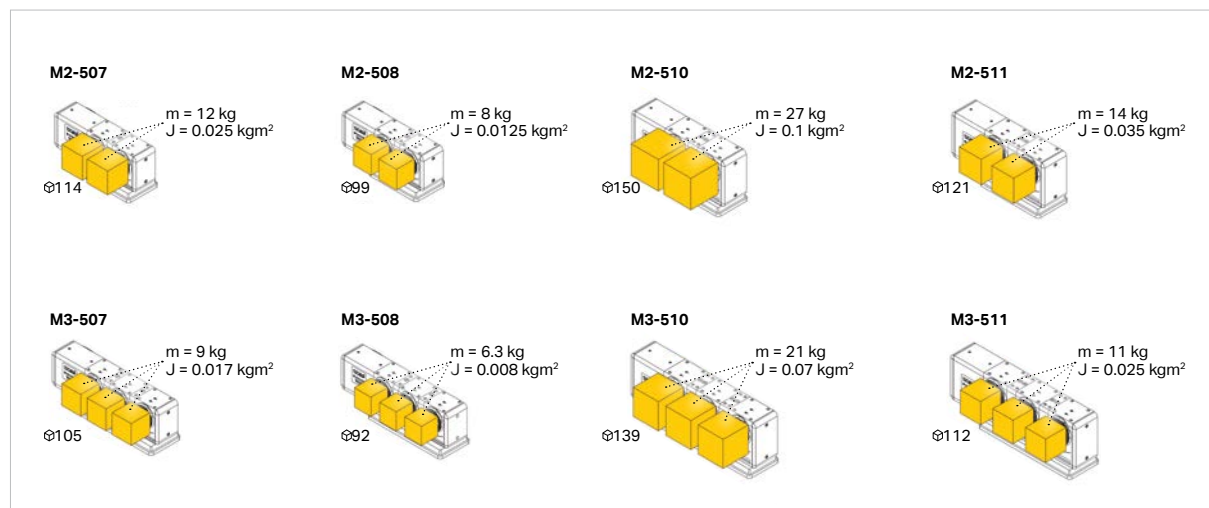
- For intermittent service S3 duty cycle 20%
- Cycle duration 1 minute

Any other conditions require the adjustment of the drive data (acceleration, jerk limitation, rotational speed).

EA-type rotary table



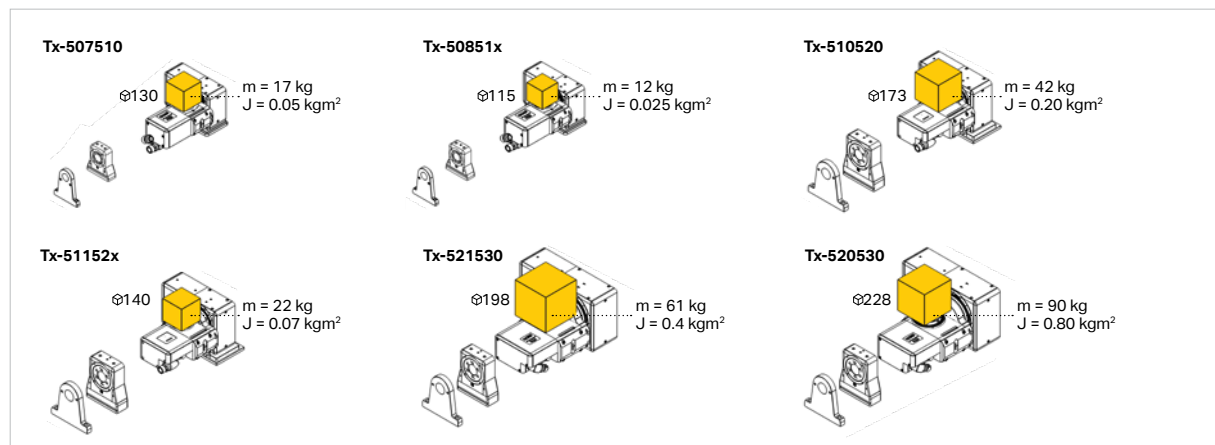
Mx-type rotary tables



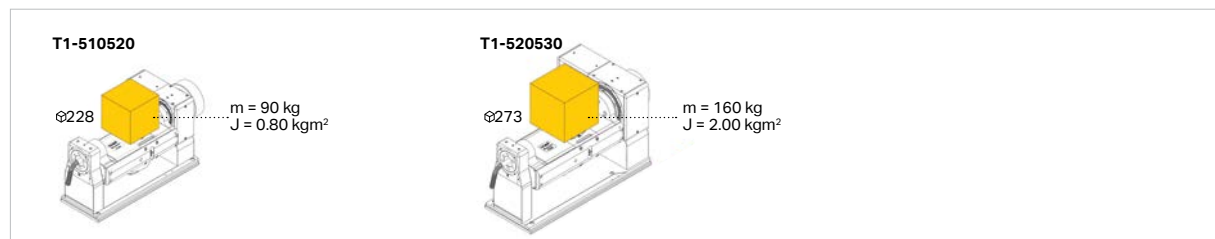
Reference values for duty cycle (ED)

- For normal rotary table work such as milling / boring (mainly positioning) approx. 20 %.
- For milling / boring in intensive mixed operation (positioning / feed machining): approx. duty cycle 40 %
- For profile and depth grinding approx. ED 60% / simultaneous machining, 5-axis
- For engraving: approx. duty cycle 80–100 %.

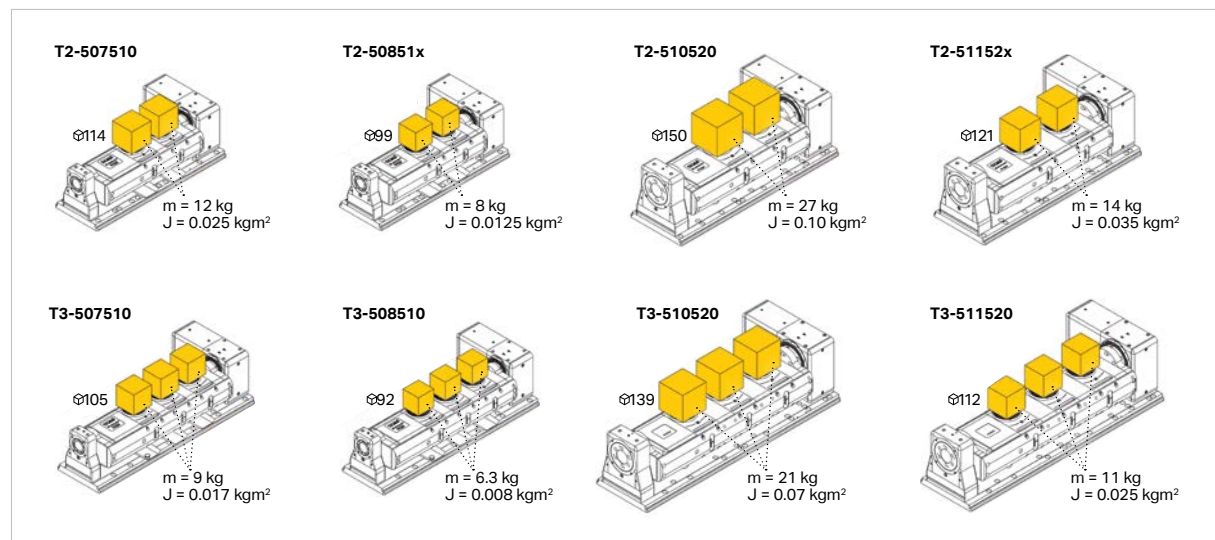
Tx-type rotary tables (TIP, TAP, TOP)



T1-type rotary tables (TGR)



T2...3-type rotary tables (TOP.x)



Calculating loads, forces and moments of inertia, avoiding risks and damage

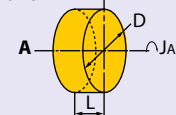
It is not only the weight which counts; shape and position are also often decisive factors

We are here to help

Request a proposal and we will gladly prepare you an offer for your individual calculation up to and with a specific list of parameters. Contact your closest pL LEHMANN representative. We are here to help.

Calculation of the load on the dividing/indexing axis (using Steiner's theorem)

Center of gravity in rotary axis

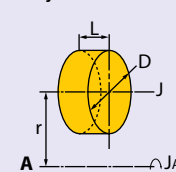


D: Outside diameter of the round bar [m]
L: Length of the round bar [m]
p: Density [kg/m³]
m: Mass of the round bar [kg]
J_A: Moment of inertia [kgm²]

$$m = \frac{D^2 \cdot \pi}{4} \cdot L \cdot p$$

$$J_A = \frac{m \cdot D^2}{8}$$

Center of gravity outside rotary axis



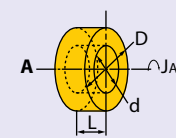
D: Outside diameter of the round bar [m]
L: Length of the round bar [m]
r: Turning radius [m]
p: Density [kg/m³]
m: Mass of the round bar [kg]
J_A: Moment of inertia of the round bar at center A [kgm²]
J: Moment of inertia [kgm²]

$$m = \frac{D^2 \cdot \pi}{4} \cdot L \cdot p$$

$$J = \frac{m \cdot D^2}{8}$$

$$J_A = J + m \cdot r^2$$

Center of gravity in rotary axis

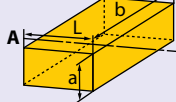


D: Outside diameter of the cylinder [m]
d: Bore diameter of the cylinder [m]
L: Length of the round bar [m]
p: Density [kg/m³]
m: Mass of the cylinder [kg]
J_A: Moment of inertia [kgm²]

$$m = \left(\frac{D^2 \cdot \pi}{4} \cdot L \cdot p \right) - \left(\frac{d^2 \cdot \pi}{4} \cdot L \cdot p \right)$$

$$J_A = \frac{1}{8} m (D^2 + d^2)$$

Center of gravity in rotary axis

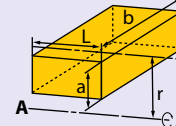


a: Side length [m]
b: Side length [m]
L: Side length [m]
p: Density [kg/m³]
J_A: Moment of inertia [kgm²]

$$m = a \cdot b \cdot L \cdot p$$

$$J_A = \frac{1}{12} m (a^2 + b^2)$$

Center of gravity outside rotary axis



a: Side length [m]
b: Side length [m]
L: Side length [m]
p: Density [kg/m³]
r: Turning radius [m]
J_A: Moment of inertia [kgm²]

$$m = a \cdot b \cdot L \cdot p$$

$$J_A = \frac{1}{12} m (a^2 + b^2 + 12r^2)$$

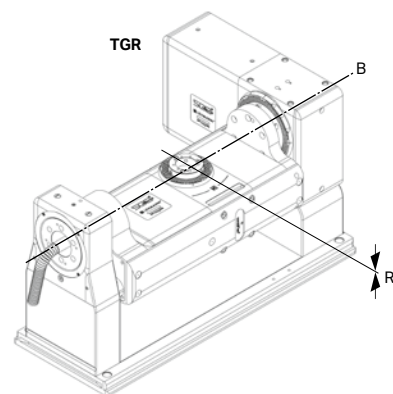
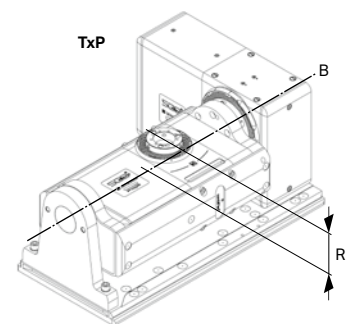
Key

A = Dividing/indexing axis
 B = Swiveling/tilting axis
 R = Radius between swiveling/tilting axis and spindle nose of dividing/indexing axis [m]
 Rs = Center distance [m]
 m = Mass [kg]
 M = Torque calculated from $m \times g \times Rs$ [Nm]
 Me = Torque acting on the tilting axis caused by the dead weight of the tilting axis [Nm]
 g = Acceleration due to gravity 9.81 [m/s²]

Densities of different materials x dynamic speed (p)

Steel 7.85 x 10³ kg/m³
 Cast iron 7.85 x 10³ kg/m³
 Aluminum 2.7 x 10³ kg/m³
 Copper 8.94 x 10³ kg/m³
 Brass 8.5 x 10³ kg/m³

Calculation of the load on the swiveling/tilting axis



Distance R

Rotary table	TxP [mm]	TGR [mm]	Limited torques [Nm]
TF...Tx-50x51x	46	-	see p. 46-58 and 64-66
TF...Tx-51x52x	40	0	
TF...T1-52x530	40	0	

Calculation of the torque in the tilting direction (without intrinsic torque of the dividing axis):

$$Rs = R + L/2$$

$$M = m \times Rs \times g$$

Calculation of the total torque in the tilting direction (with intrinsic torque of the dividing/indexing axis):

Me is the gear unit loading without load; see respective T-type rotary table see p. 46-58 and 64-66)

Empirical values from intensive machining tests as an aid for proper selection of your T-type rotary table



Starting point

Machine:	DMC 1150V
Spindle power:	14.5 kW
Spindle torque:	110 Nm
Clamping:	8 clamping claws
Workpiece:	C45E, 130x130x130 mm



Test workpiece

Cutting data

No.	Tool	Ø mm	vc Cutting speed m/min	n Speed rpm	fz Feed mm/rev	z No of teeth	vf Feed speed mm/min
1	Angular milling cutter	40	260	2069	0.25	5	2578
2	End milling cutter	12	260	6898	0.18	4	4967
3	End milling cutter	12	180	4776	0.09	4	1719
4	Twist drill VHM	17	240	4495	0.35	1	1573



Optimal real-world cutting data or manufacturer's recommendation

General finding

Because of physical laws, the -90° tilt position (dividing axis horizontal) is always more stable than the 0° position (dividing axis vertical). For comparison with near-real-world conditions, only the results for the **0° position** are listed in

the following. Despite the absence of clamping in the counter bearing, the TAP-type rotary table achieved amazingly good results.

Comparison in detail

* The trials were conducted with the predecessor version fixX or varioX.

No.	radial depth of cut ap mm				axial depth of cut ae mm				Mat'l. removal rate Q cm³/min			
	T1-507510 TAP1	T1-507510 TOP1	T1-510520 TAP2	T1-510520 TOP2	T1-507510 TAP1	T1-507510 TOP1	T1-510520 TAP2	T1-510520 TOP2	T1-507510 TAP1	T1-507510 TOP1	T1-510520 TAP2	T1-510520 TOP2
1	2	2.5	2.5	3	32	32	32	32	166	207	207	248
2	20	20	20	20	3	3	3	3	298	298	298	298
3	5	5	5	5	10	10	10	10	86	86	86	86
4									357	357	357	357

T1-507510 TAP1



Conclusion

- The limit is reached with tool no. 1, vibrations on the rotary table are quite audible. Reduction of cutting data required for long-term machining
- Tool no. 3 is also at the limit for severe vibrations
- The remaining machining is possible without major problems

T1-507510 TOP1 (fixX*)



Conclusion

- Vibrations with tool no. 1 audible, but still in acceptable range
- Tool no. 3 also generates some, but not critical, vibrations on the rotary table
- Noticeably greater stability than TAP version, thanks to clamping of the counter bearing

T1-510520 TAP2



Conclusion

- Except for minor vibrations with tool no. 1, good machining performance was achieved
- Except for tool no. 1, the machine and tools are the limiting factors. For this reason, the evaluation is identical to that for T1
- Noticeable stability improvement compared to T1-507510 fixX and TAP1

T1-510520 TOP2 (varioX*)



Conclusion

- With the available tools and this machine, the rotary table cannot be pushed to its performance limit. Only tool no. 1 is able to generate minor vibrations
- Compared to TAP2, the stability improvement is not significant, but exists and is noticeable

Overview, Applications

System & Facts, smartBox

Rotary tables

SPZ, DDF, WMS

MOT, KAB, WDF, CNC

Aligning, GLA, RST, LOZ

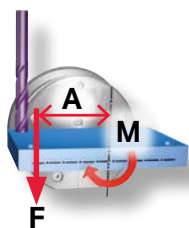
Service & Technology

Tooling

Reference values for configuring and selecting the correct rotary table

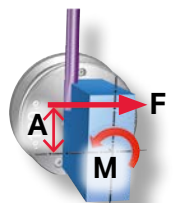
F = Feed force, **A** = Distance [m] from rotary table axis to feed force (F) during machining, **M** = Resulting torque ($F \times A$)
Resulting torque M = $F \times A \rightarrow$ must not exceed the max. clamping torque [Nm] or max. feed torque [Nm] of the rotary table!

V = Rough machining, WP = indexable inserts, VHM = Solid hard metal



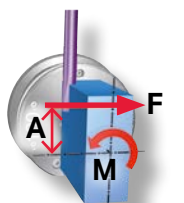
Boring / drilling

Tool type	Wz ø [mm]	Cutting speed [m/min]	Feed F [mm]	Feed force F [N]		
				CK45	X5CrNi18-10	AlMg4.5Mn0.7
Twist drill VHM	5	220	0.12	920		
		120	0.10		1120	
		350	0.15			315
Twist drill VHM	10	220	0.27	1,450		
		120	0.18		1,900	
		350	0.2			650
Twist drill VHM	17	220	0.35	2,850		
		120	0.25		3,980	
		350	0.3			1,250
WP drill	38	140	0.09	4,350		
		100	0.08		6,550	
		180	0.16			2,800



End milling and slot milling

Tool type	Wz ø [mm]	Cutting speed [m/min]	Feed F [mm]	Depth of cut [mm]	Cutting width [mm]	Feed force F [N]		
						CK45	X5CrNi18-10	AlMg4.5Mn0.7
End milling cutter V	8	180	0.09 x 4	4	8	840		
		70	0.06 x 4	4	8		410	
		570	0.15 x 4	4	8			360
End milling cutter V	12	180	0.11 x 4	6	12	1,100		
		70	0.07 x 4	6	12		700	
		570	0.17 x 4	6	12			550
End milling cutter V	20	180	0.095 x 4	10	20	1,550		
		70	0.08 x 4	10	20		1,400	
		570	0.17 x 4	10	20			950



Hobbing

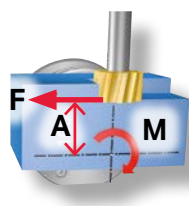
Tool type	Wz ø [mm]	Cutting speed [m/min]	Feed F [mm]	Depth of cut [mm]	Cutting width [mm]	Feed force F [N]		
						CK45	X5CrNi18-10	AlMg4.5Mn0.7
End milling cutter V	8	200	0.09 x 4	8	4	510		
		77	0.06 x 4	8	4		420	
		627	0.15 x 4	8	4			360
End milling cutter V	12	200	0.11 x 4	12	6	1,050		
		77	0.07 x 4	12	6		700	
		627	0.17 x 4	12	6			550
End milling cutter V	20	200	0.15 x 4	20	10	2,700		
		77	0.08 x 4	20	10		1,350	
		627	0.17 x 4	20	10			950



Turning

Tool type	Turning ø [mm]	Cutting speed [m/min]	Feed F [mm]	Depth of cut [mm]	Cutting force [N]		
					CK45	X5CrNi18-10	AlMg4.5Mn0.7
Corner lathe tool WP	40	250	0.3	2	541		
		140	0.25	2		286	
		500	0.4	3			65.6

Factory information from well-known tool manufacturers
(applies to new tool cutting edges)



Corner milling (slab milling or plane milling)

Tool type	Wz ø [mm]	Cutting speed [m/min]	Feed F [mm]	Depth of cut [mm]	Cutting width [mm]	Feed force F [N]		
						CK45	X5CrNi18-10	AlMg4.5Mn0.7
Angular milling cutter WP	40	160	0.12 x 6	2	40	1,750		
		160	0.12 x 6	2.5	25	1,250		
		85	0.12 x 6	2	40		1,550	
		85	0.12 x 6	2.5	25		1,150	
		500	0.15 x 6	3	40			1,250
Angular milling cutter WP	80	210	0.15 x 10	3.5	80	4,900		
		240	0.15 x 10	7	40	4,900		
		160	0.08 x 10	3.5	80		3,450	
		176	0.08 x 10	7	40		3,450	
		450	0.2 x 10	3.5	80			3,100
		495	0.2 x 10	7	40			3,100

Overview,
Applications

System &
Facts, smartBox

Rotary
tables

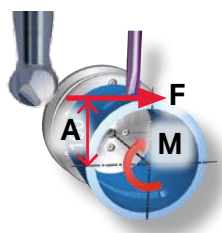
SPZ,
DDF, WMS

MOT, KAB,
WDF, CNC

Aligning,
GLA, RST, LOZ

Service
& Technology

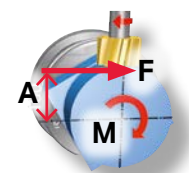
Tooling



Ball end milling

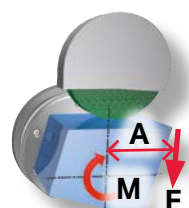
Tool type	Wz ø [mm]	Cutting speed [m/min]	Feed F [mm]	Depth of cut [mm]	Cutting width [mm]	Feed force F [N]		
						CK45	X5CrNi18-10	AlMg4.5Mn0.7
Ball end milling cutter	6	220	0.1 x 2	1.0	1.0	60		
		100	0.08 x 2	0.8	0.8		35	
		530	0.15 x 2	2.0	2.0			50
Ball end milling cutter	12	220	0.14 x 2	1.3	1.3	100		
		100	0.11 x 2	1.0	1.0		65	
		530	0.16 x 2	3.0	3.0			85

Mill turning



Tool type	Wz ø [mm]	Cutting speed [m/min]	Feed F [mm]	Depth of cut [mm]	Cutting width [mm]	Feed force F [N]		
						CK45	X5CrNi18-10	AlMg4.5Mn0.7
Angular milling cutter	40	130	0.12 x 6	5	1 mm / 360°	435		
		85	0.12 x 6	5	1 mm / 360°		390	
		500	0.12 x 6	5	1 mm / 360°			193

Grinding



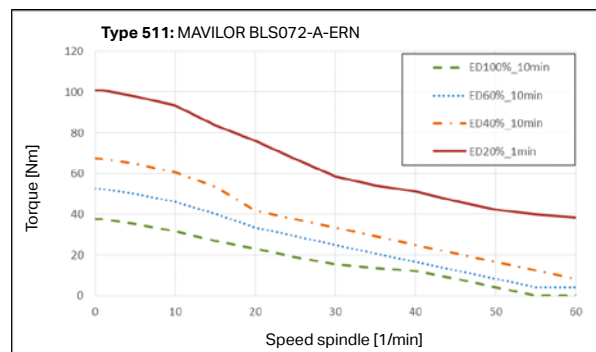
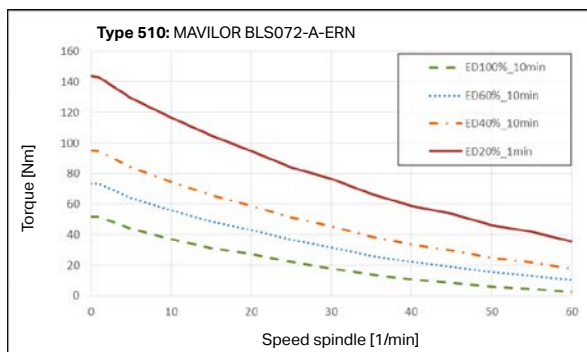
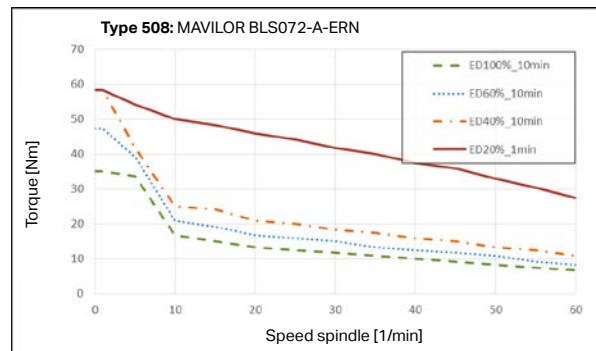
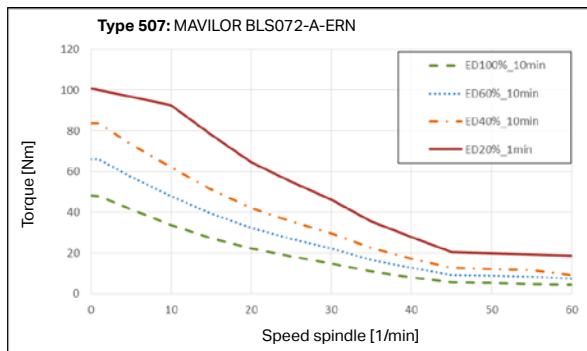
Tool type	Grinding capacity [kW]	Feed force F [N]		
		CK45	X5CrNi18-10	AlMg4.5Mn0.7
Ceramic grinding wheel	40	2200		
	75	4130		
CBN grind- ing wheel				

Permissible feed torque during machining under various conditions for **EA**-type rotary tables and dividing axes of **T**-type rotary tables



All diagram values with 20 % safety

For Siemens and Heidenhain CNCs



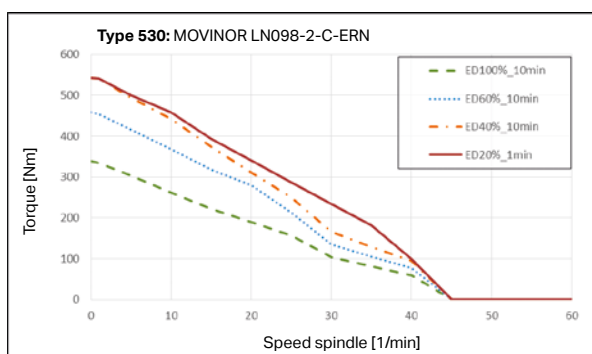
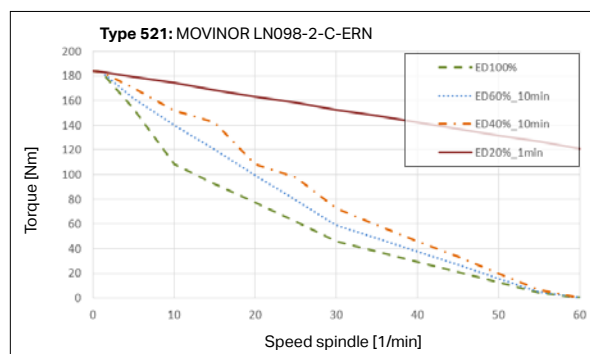
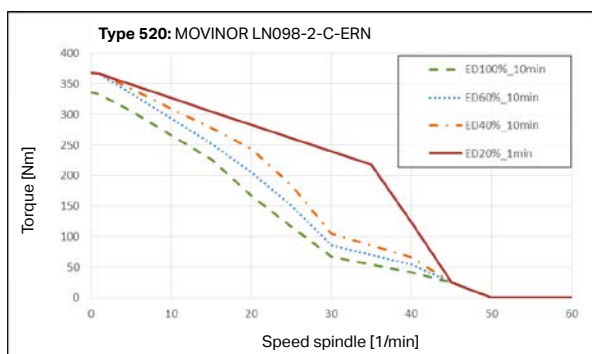
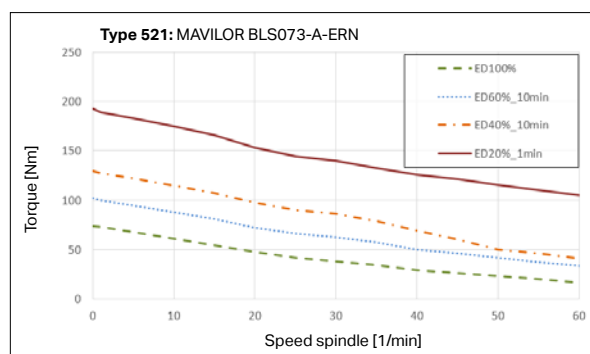
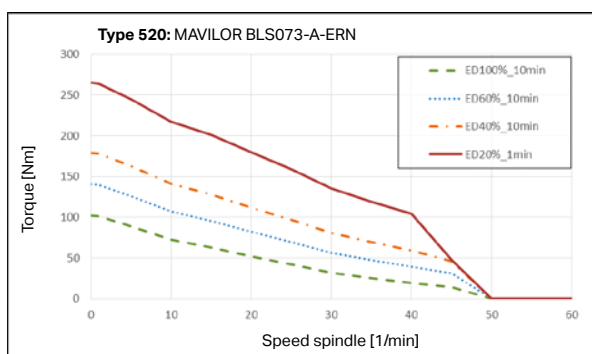
Reference values for duty cycle (ED)

- Duty cycle 20 % → Normal rotary table work of milling / boring for positioning mode
- Duty cycle 40 % → For milling / boring in intensive mixed operation (positioning / feed machining)
- Duty cycle 60 % → Profile and depth grinding, temporary simultaneous machining, 5-axis
- Duty cycle 80–100 % → Engraving, impeller machining, tool and die making

All diagram values with 20 % safety



For Siemens and Heidenhain CNCs



Overview,
Applications

System &
Facts, smartBox

Rotary
tables

SPZ,
DDF, WMS

MOT, KAB,
WDF, CNC

Aligning,
GLA, RST, LOZ

Service
& Technology

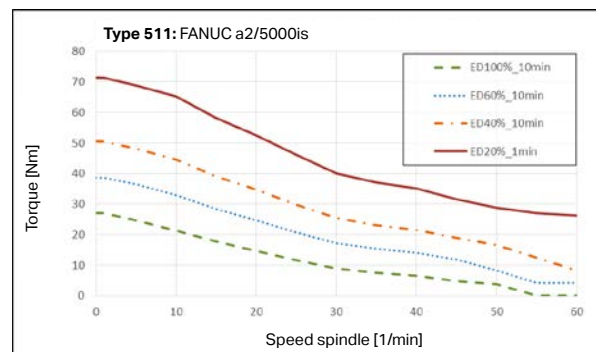
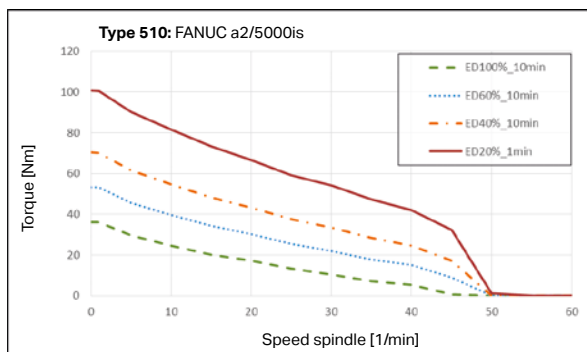
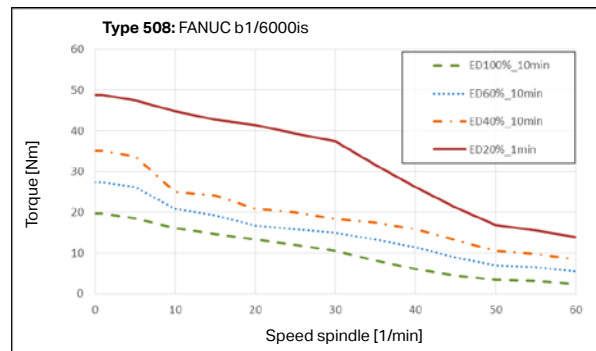
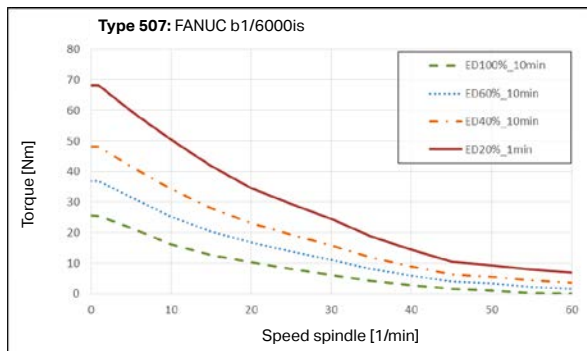
Tooling

Permissible feed torque during machining under various conditions for **EA**-type rotary tables and dividing axes of **T**-type rotary tables



All diagram values with 20 % safety

For Fanuc CNC



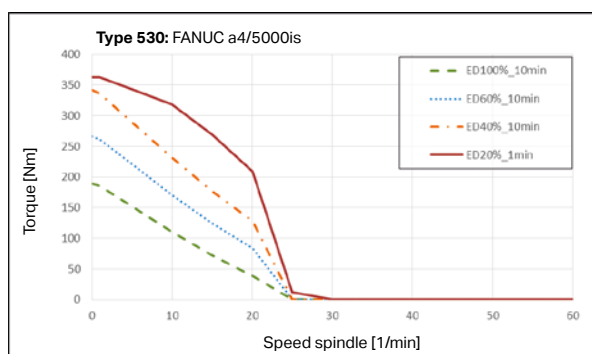
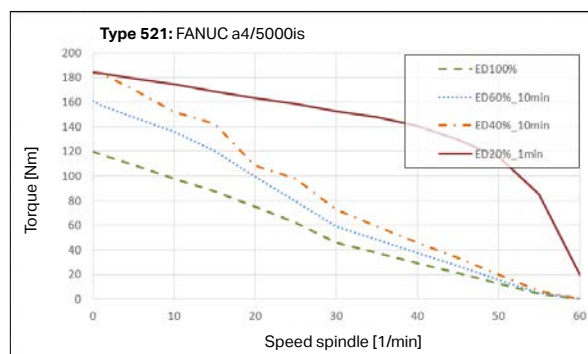
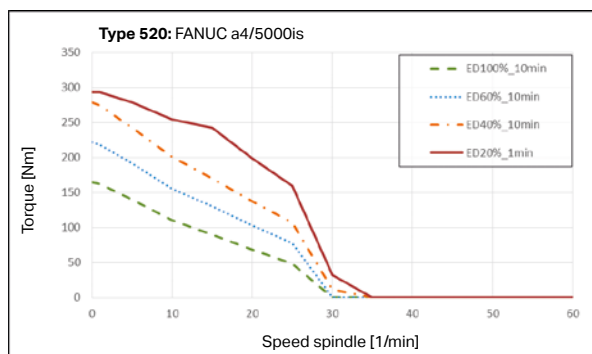
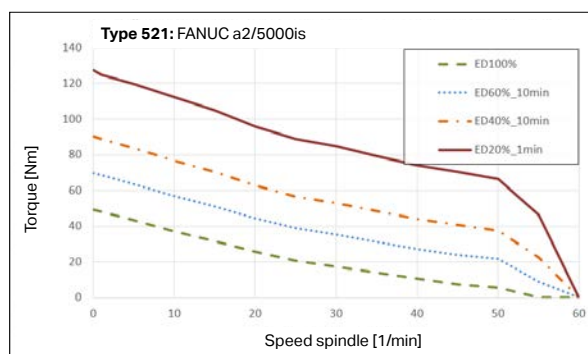
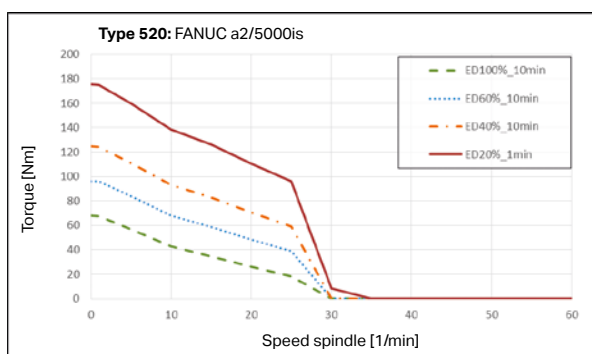
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All diagram values with 20 % safety



For Fanuc CNC



Overview,
Applications

System &
Facts, smartBox

Rotary
tables

SPZ,
DDF, WMS

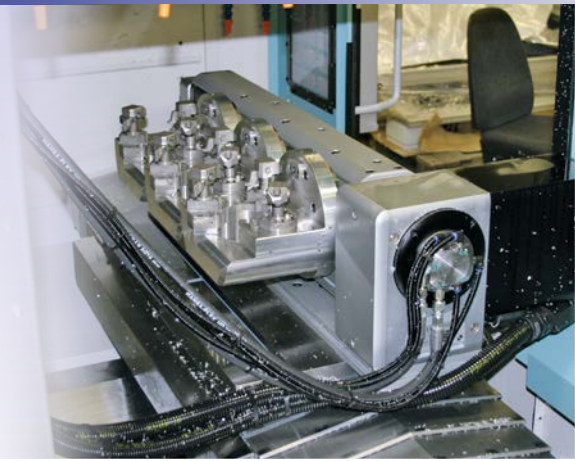
MOT, KAB,
WDF, CNC

Aligning,
GLA, RST, LOZ

Service
& Technology

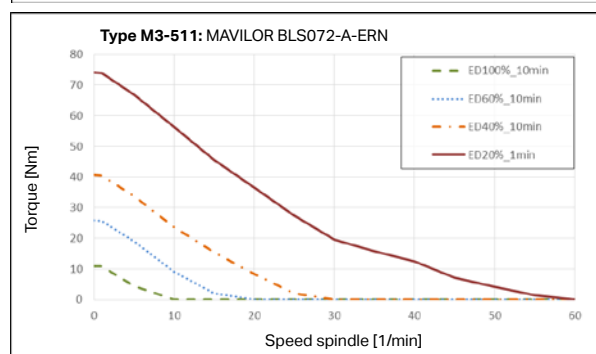
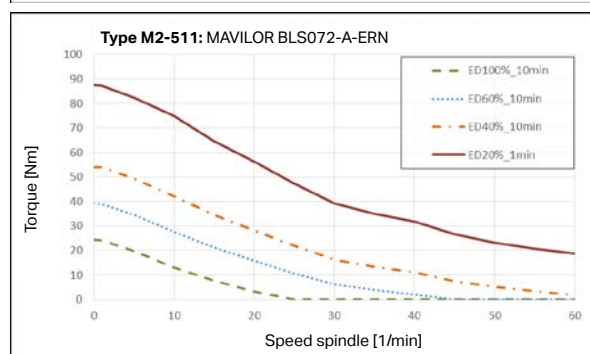
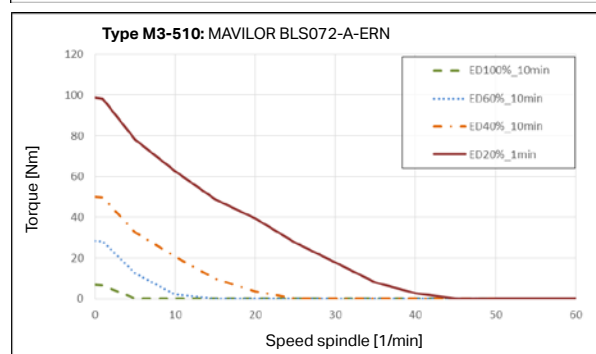
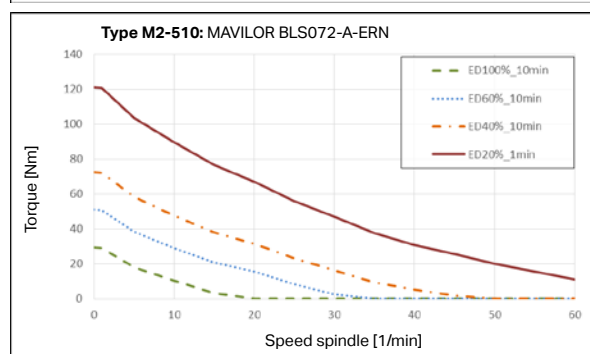
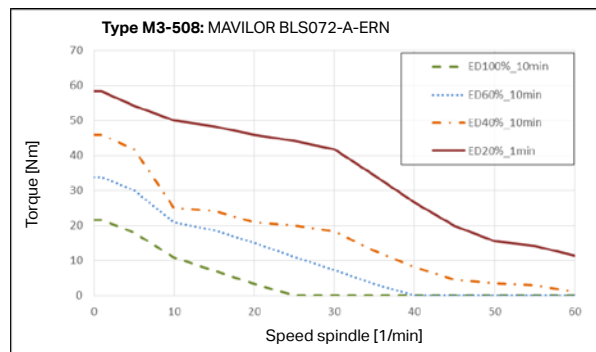
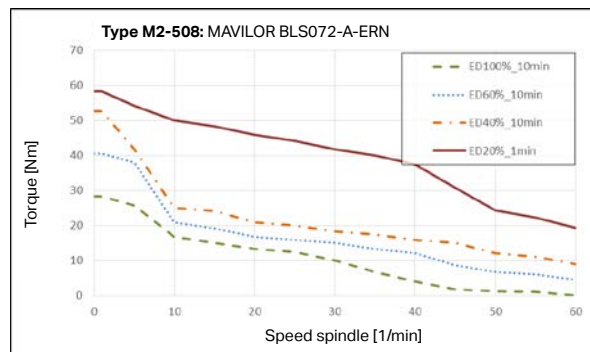
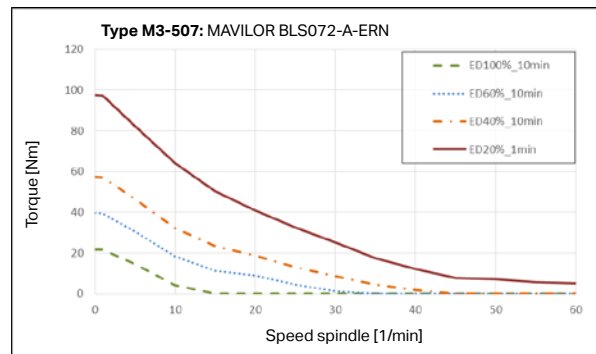
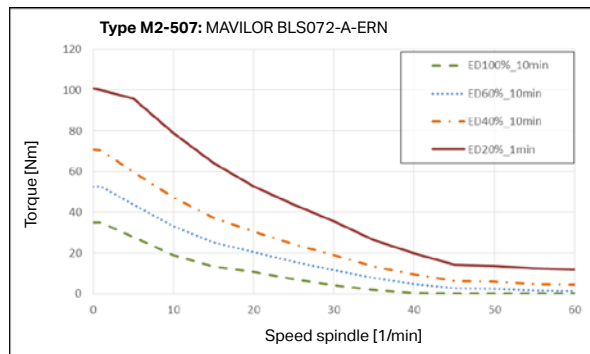
Tooling

Permissible feed torque during machining under various conditions for **M**-type rotary tables and dividing axes of **T2...3**-type rotary tables



All diagram values with 20 % safety

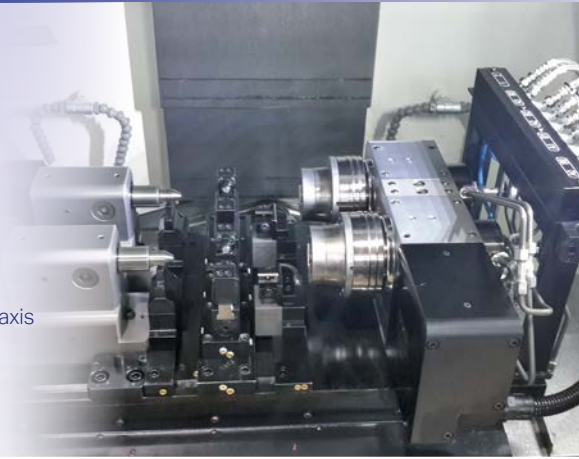
For Siemens and Heidenhain CNCs



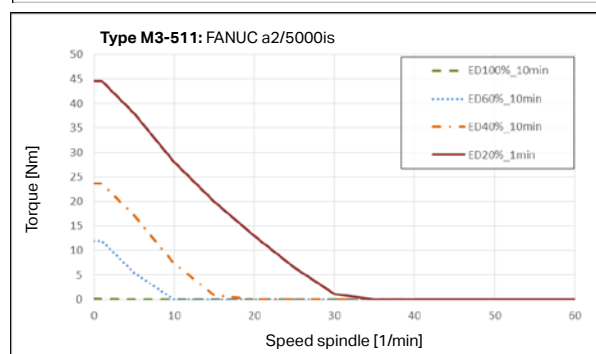
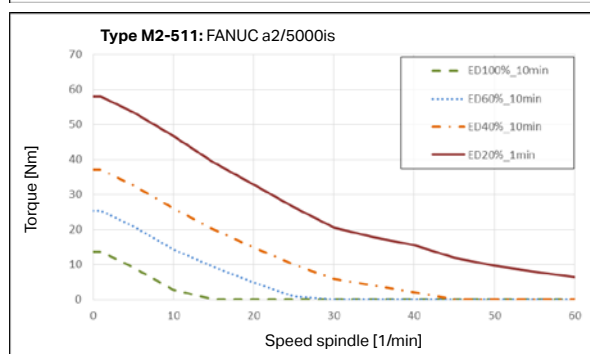
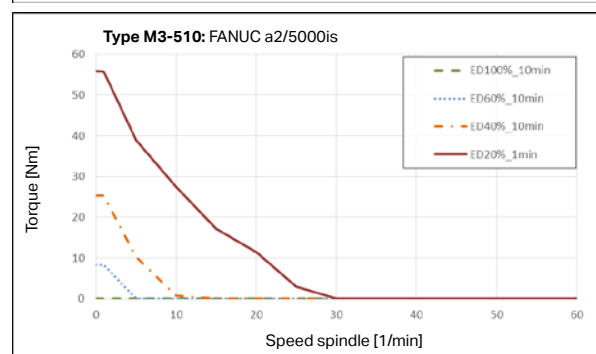
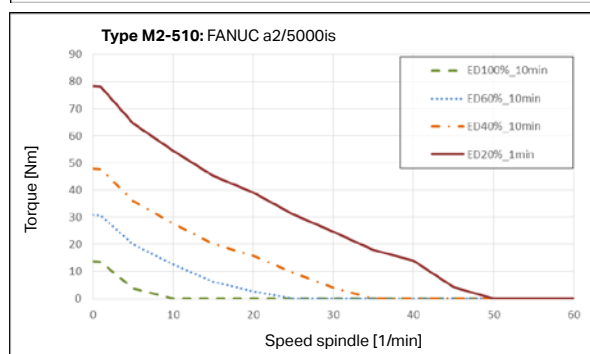
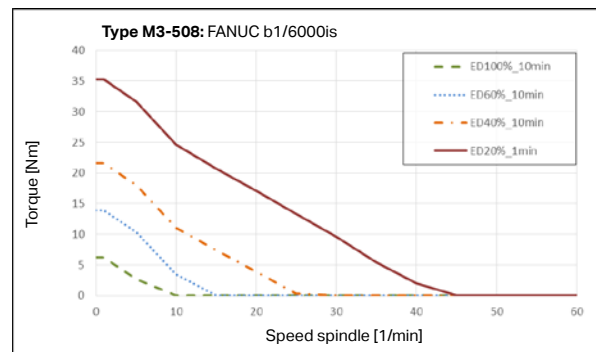
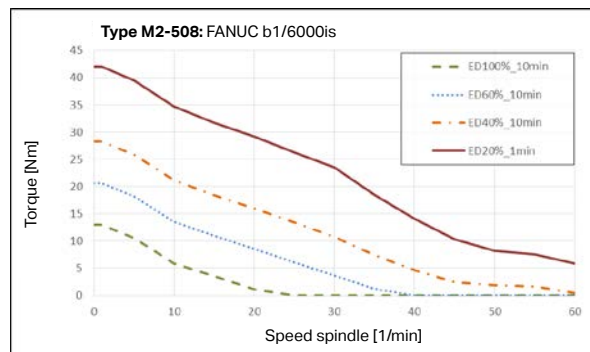
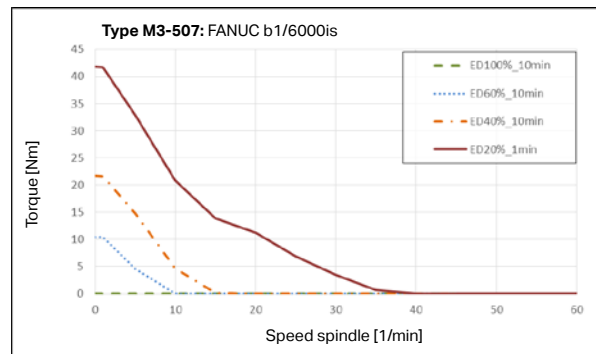
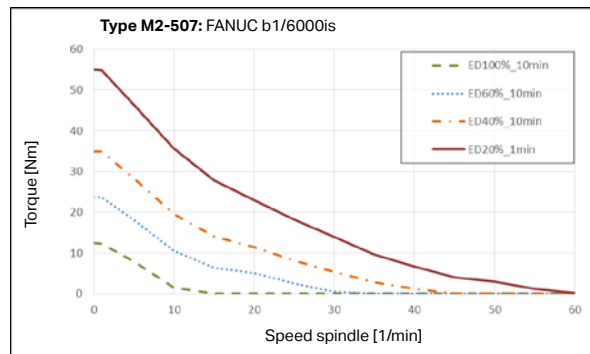
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All diagram values with 20 % safety



For Fanuc CNC



Overview,
Applications

System &
Facts, smartBox

Rotary
tables

SPZ,
DDF, WMS

MOT, KAB,
WDF, CNC

Aligning,
GLA, RST, LOZ

Service
& Technology

Tooling

Material elasticities and their effect on workpiece accuracy: Understand them correctly and know how to respond in real-world practice



P8 on EA- and M-type rotary tables

Background

Every material has a certain elasticity. Depending on the orientation and load, these affect the accuracy of machining in different ways. The figures and data shown here provide information on the values to be expected.

Optimization options

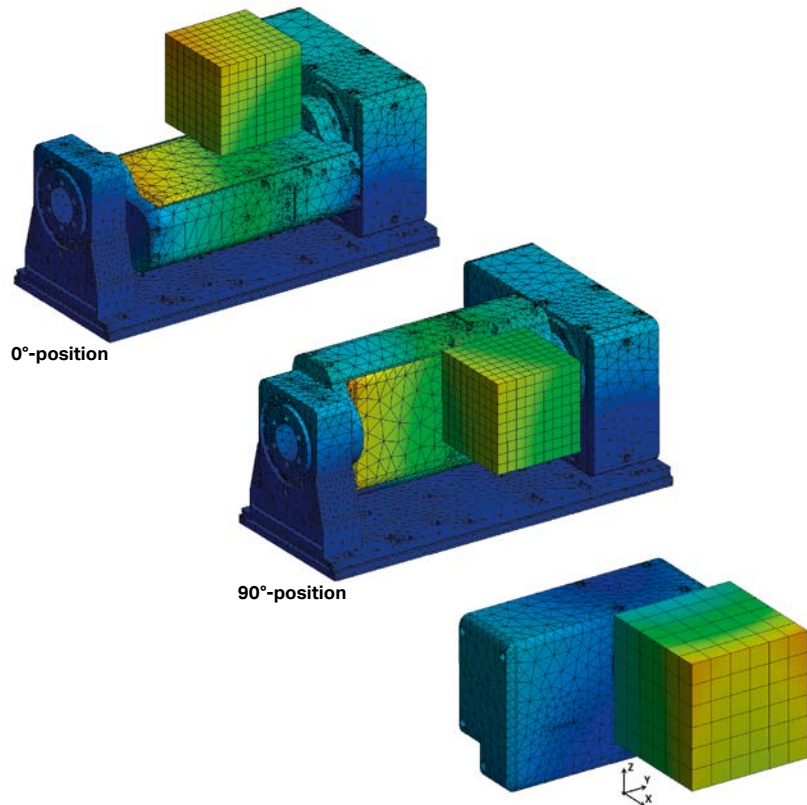
If the static stiffness is insufficient, the following may help:

- Error compensation in the axis direction affected
- Use of lighter clamping means
- On a TF-type rotary table (TIP), retrofitting a counter bearing, if necessary
- Changing the machining strategy

Static mechanical analysis

Using FEM analyses, the compliance in P8 (see figure at right) was calculated in the respective configuration for all T-type rotary tables listed below. The deflections in the X- and Y-directions are usually negligible. The table below shows the deflection in the Z-direction. Depending on the workpiece weight, this information can be used to determine the approximate displacement.

Results of static-mechanical FEM analysis

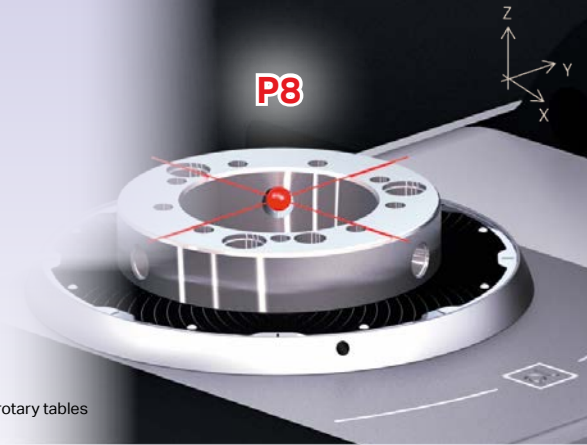


Condition: Rotary table is mounted in the specified manner and both axes are clamped with 6 bar compressed air.

Compliance of EA- and M-type rotary tables in P8 in the Z-direction (approximate values)

$\mu\text{m/kg}$	
EA-50x	-0.020
EA-51x	-0.015
EA-52x	-0.015
EA-530	-0.006





P8 with T-type rotary tables

Compliance of TF-type rotary tables in P8 in the Z-direction (approximate values)

$\mu\text{m/kg}$	0°	90°
	TIPc	TIPc
TF-50x51x	-0.110	-0.142
TF-51x52x	-0.064	-0.076
TF-52x530	-0.046	-0.056



Compliance of T1-type rotary tables in P8 in the Z-direction (approximate values)

$\mu\text{m/kg}$	0°				90°			
	TAPc	TAP	TOP	TGR	TAPc	TAP	TOP	TGR
T1-50x51x	-0.032	-0.039	-0.039		-0.074	-0.132	-0.132	
T1-51x52x	-0.024	-0.041	-0.041	-0.030	-0.051	-0.082	-0.082	-0.069
T1-52x530	-0.026	-0.046	-0.041	-0.041	-0.055	-0.110	-0.097	-0.101



Compliance of T2-type rotary tables in P8 in the Z-direction (approximate values)

$\mu\text{m/kg}$	Spindle distance	0°		90°	
		Spindle 1	Spindle 2	Spindle 1	Spindle 2
T2-50x51x TOP1.2	160 mm	-0.054	-0.099	-0.117	-0.219
T2-51x52x TOP2.2	220 mm	-0.038	-0.098	-0.069	-0.234
T2-51x52x TOP2.2	300 mm	-0.038	-0.117	-0.065	-0.292



Overview,
Applications

System &
Facts, smartBox

Rotary
tables

SPZ,
DDF, WMS

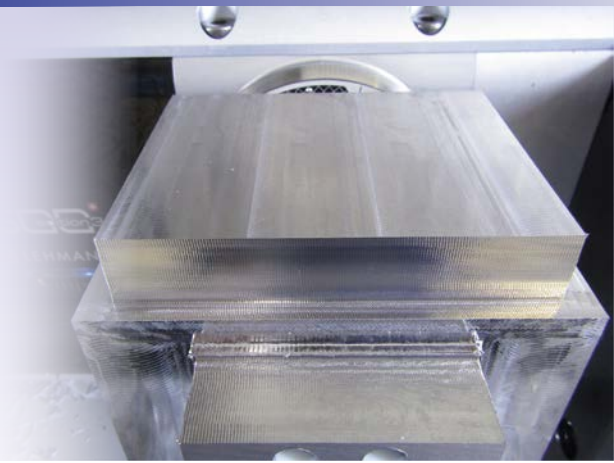
MOT, KAB,
WDF, CNC

Aligning,
GLA, RST, LOZ

Service
& Technology

Tooling

Optimizing vibration, tool wear,
surface quality and machining capacity



Dynamic analysis

The eigenfrequencies were determined using FEM modal analyses. The compliance frequency response curves at the right show the result of the harmonic analysis. The first 9 vibration modes and eigenfrequencies of all rotary tables listed below were determined. Experience has shown the mode 1 and mode 2 are the most important in actual practice. These values can be found in the table below.

Optimization options

If the frequency of the machining process starts to increase, change the following:

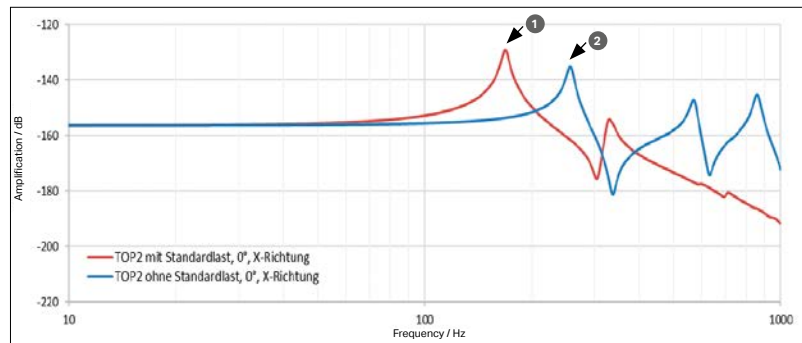
- Tool speed
- Number of teeth on tool
- Machining strategy
- Workpiece orientation

Important notice: : Shape, weight and the way the workpieces are assembled as well as the clamping devices used can significantly affect eigenfrequencies.

Condition: Rotary table is mounted in the specified manner and both axes are clamped with 6 bar compressed air.

With / without standard load

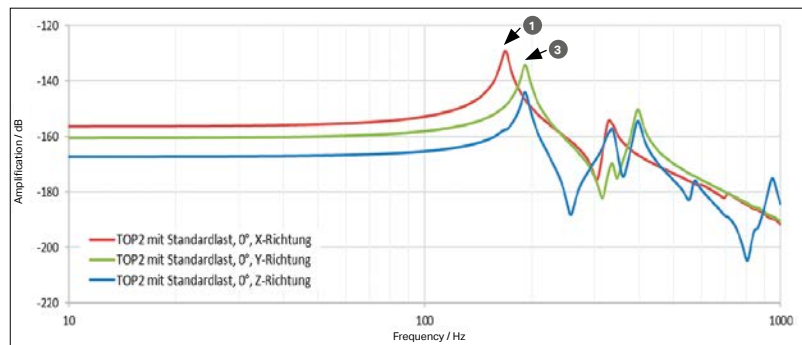
Example: T1-510520 TOP2, excitation in the in X-direction



The above peak values 1-2 can be found in the table below. This example shows clearly how a change in the standard load can shift the eigenfrequencies. This shift also occurs during machining, of course, since the weight of the workpiece is changing.

Operating directions X, Y and Z

Example: T1-510520 TOP2



The lowest eigenfrequency is usually the most critical one. The above illustration shows clearly that this frequency is excited in the X-direction. For this reason, machining that could cause vibration should be performed in the Y- or Z-direction. The first two eigenfrequencies are given in the table below.

Example of machining frequency calculation

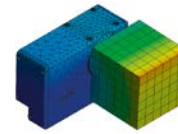
Angular milling cutter $\varnothing 40$ mm, number of teeth 4, speed 1900 rpm = $\frac{4 \times 1900}{60} = 127$ Hz

Every object has several natural frequencies (so-called eigenfrequencies) that depend on the object's shape, mass and material. If the machining frequency matches an eigenfrequency, e.g. that of a rotary table, the result is chattering or whistling noises. A vertical machining center has the first eigenfrequency in the range of approximately 100 Hz. It is important that the machining frequency does not match the eigenfrequency.

The illustrations below always show mode 1

Eigenfrequency of EA- and M-type rotary table, mode 1 and 2 (approximate values)

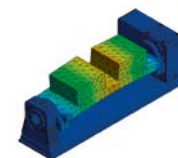
Hz	Rotary table fastened by means of bolted connection from below, without consideration of the compliance of the intermediate plate								Rotary table fastened by means of clamping claws							
	without standard load				with standard load				without standard load				with standard load			
	507	510	520	530	507	510	520	530	507	510	520	530	507	510	520	530
Mode 1	859	760	669	602	352	229	160	201	780	716	627	564	339	222	155	194
Mode 2	913	797	681	634	371	249	163	211	857	731	638	596	364	245	160	203



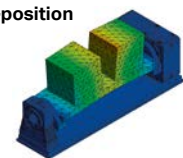
Eigenfrequency of rotoFIX-type rotary tables, mode 1 and 2 (approximate values)

Hz	without standard load				with standard load				with twice the standard load			
	507	510	520	530	507	510	520	530	507	510	520	530
Mode 1	332	254	166	60	224	194	120	46	165	149	90	35
Mode 2	575	364	306	179	325	249	176	108	193	157	104	62

- For the 90° position, a lower first eigenfrequency and a higher second eigenfrequency can be expected (+/- 10-20%).
- With an eccentric clamping yoke assembly, the first eigenfrequency is slightly lower and the second is 20-30% higher.
- The aluminum clamping yoke results in a slightly lower first eigenfrequency for larger loads. For small loads, on the other hand, it is slightly higher.



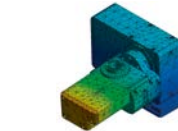
with standard load listed on p. 42



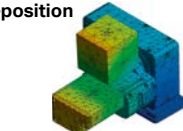
twice the standard load listed on p. 42

Eigenfrequency of TF-type rotary tables, mode 1 and 2 (approximate values)

Hz		without standard load		with standard load	
		TIPc		TIPc	
		0°	90°	0°	90°
Mode 1	50x51x	180	185	129	134
	51x52x	187	194	110	126
	52x530	221	222	107	123
Mode 2	50x51x	192	201	141	157
	51x52x	206	215	132	143
	52x530	226	243	133	137



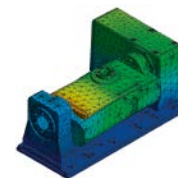
without standard load listed on p. 46



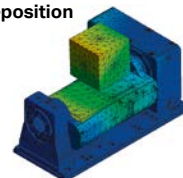
with standard load listed on p. 46

Eigenfrequency of T1-type rotary tables, mode 1 and 2 (approximate values)

Hz	without standard load								with standard load							
	TAPc		TAP		TOP		TGR		TAPc		TAP		TOP		TGR	
	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°
Mode 1																
50x51x	270	283	230	231	241	245			187	201	181	190	183	195		
51x52x	249	233	215	194	257	214	212	196	152	156	143	142	169	154	155	154
52x530	243	211	184	172	195	181	144	122	133	131	107	105	113	112	107	94
Mode 2																
50x51x	318	315	283	265	312	295			229	238	218	218	244	238		
51x52x	261	296	233	249	294	321	232	247	162	187	158	175	192	210	181	196
52x530	260	314	238	259	259	264	157	196	139	156	134	142	143	145	122	143



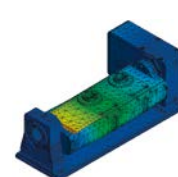
without standard load listed on pp. 50-58



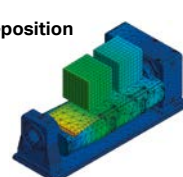
with standard load listed on pp. 50-58

Eigenfrequency of T2-type rotary tables, mode 1 and 2 (approximate values)

Hz		Spindle distance	without standard load		with standard load	
			0°	90°	0°	90°
Mode 1	T2-50x51x TOP1.2	160 mm	185	188	150	155
	T2-51x52x TOP2.2	220 mm	154	142	101	96
	T2-51x52x TOP2.2	300 mm	138	129	93	89
Mode 2	T2-50x51x TOP1.2	160 mm	272	259	218	211
	T2-51x52x TOP2.2	220 mm	221	220	142	146
	T2-51x52x TOP2.2	300 mm	206	204	137	139



without standard load listed on p. 64

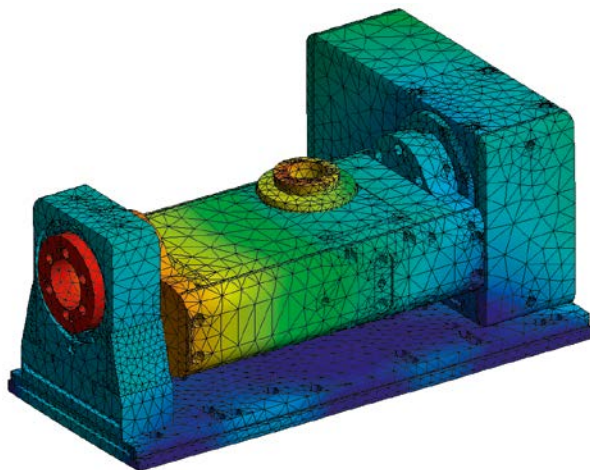


with standard load listed on p. 64

Thermal deformation from the process and operation

Basics

Heat is generated by friction and electrical losses. The more intense and the longer a motion lasts, the more the temperature rises. Depending on the particular heat sources (motor, gear unit, seals, etc.) the effects on dimensions differ greatly. At point P8 (see figure to the right), the relevant differences for the workpiece have been determined and are presented in the adjacent tables. The determination was made experimentally and with the aid of simulations.



Thermally induced deformations under steady-state conditions from the FEM simulation of the T1-510520 TOP2, duty cycle 20% in acc. with catalog, without coolant, deformation shown magnified 80x.

Approximate values for estimating the deformations

Approximate values for estimating the thermally induced deformations are listed in the tables on the following pages. All values apply to L-versions; on the R-version, it must be kept in mind that the signs for the directions of rotation are reversed.

Cooling plate

The cooling plate is an option for improving heat removal from the gear unit, bearings, etc. in demanding applications, e.g. simultaneous machining over an extended period of time (HSC, grinding, engraving). The values listed in the adjacent tables are based on the use of such cooling plates on EA-type rotary tables or tilting axes on T-type rotary tables.



Influencing factors

The thermally induced deformations occur in response to external (coolant, ambient air, etc.) and internal (gear unit, bearings, motor, etc.) thermal factors. The following factors require particular attention:

- Operating mode of the table (duty cycle, performance, etc.)
- Idle time between the work cycles
- Optional cooling plate (on request) for removing internal heat from the gear unit, bearings, etc.
- Machine table (thickness, size, material) and how the rotary table is mounted on it

Example of reading the tables

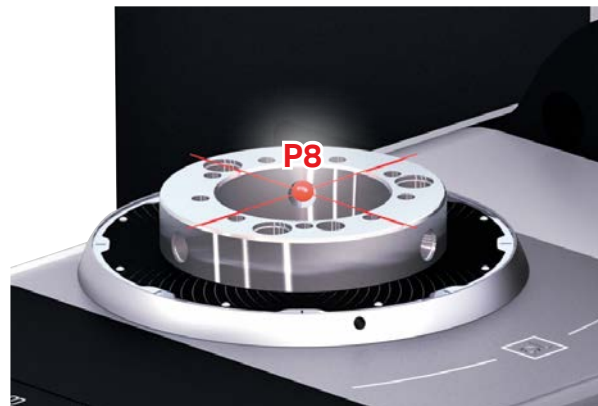
For dry machining with the T1-510520 TOP2, without a cooling plate, the table indicates a displacement at point P8 of 16 μm in the X-direction 60 s after a cold start. This displacement increases in the following minutes and then decreases later. Explanation for this behavior: When starting cold, there are very large temperature differences that cause corresponding displacements. The subsequent equalization of temperatures results in a reduction of the displacements. Tip: The Y-direction does not exhibit this behavior (see Table). It is thus better to perform precision machining shortly after a cold start in the Y-direction than in the X-direction.

The best cooling is not a substitute for the briefest possible workpiece clamping ...



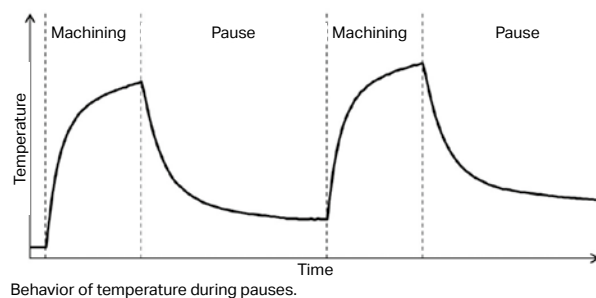
Measuring point P8

The displacements and rotations are evaluated at point P8, at the center of the spindle surface.

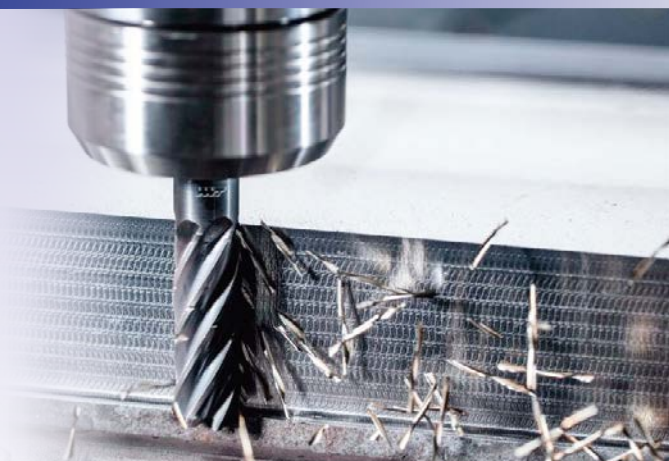


Important for precision machining

Maximum precision is achieved through use of coolant (KSS). Constant and uniform wetting of the rotary table is recommended. Interruptions in the use of coolant can result in accuracy fluctuations. The most effective heat removal is achieved with water-based coolants that are kept at a constant temperature and distributed uniformly. In addition, pauses and interruptions in machining between individual cycles should be avoided. Relevant cooling and thus deformations can occur even from pauses of one minute.

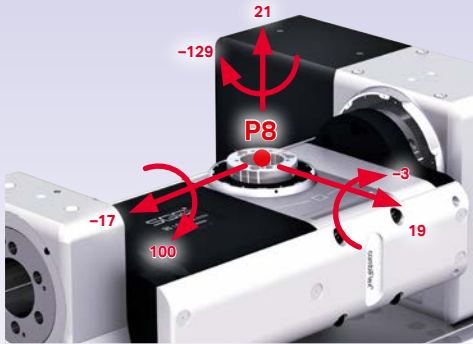


The following values in both tables apply with the rotary table mounted and resting over its entire surface on a solid machine table (steel/cast metal).



Dry machining

		μm															arcsec														
		X-displacement					Y-displacement					Z-displacement					U-rotation					V-rotation					W-rotation				
Time after start, duty cycle 20%		60°	90°	180°	1h	10h	60°	90°	180°	1h	10h	60°	90°	180°	1h	10h	60°	90°	180°	1h	10h	60°	90°	180°	1h	10h	60°	90°	180°	1h	10h
without cooling plate	EA-507	2	2	3	21	35	0	0	0	-2	-4	2	2	4	20	37	-105	-121	-132	-53	-42	-3	-4	-6	-1	2	0	0	0	0	0
	EA-510	2	2	3	23	38	0	0	0	-3	-5	2	3	6	27	50	-105	-121	-132	-53	-42	-4	-5	-8	-1	3	0	0	0	0	0
	EA-520	2	3	5	31	50	0	0	0	-4	-7	3	4	7	32	60	-88	-101	-111	-44	-35	-5	-6	-10	-2	4	0	0	0	0	0
	EA-530	3	4	5	35	57	0	0	0	-6	-10	3	5	8	40	74	-108	-125	-136	-55	-43	-6	-8	-12	-2	5	0	0	0	0	0
	TF-507510 TIP1c	16	19	20	7	5	-1	-1	-3	-45	-70	9	13	20	54	83	-4	-5	-8	0	4	105	120	128	50	40	-135	-147	-141	-54	-47
	TF-510520 TIP2c	16	19	20	7	5	-1	-2	-3	-52	-81	11	15	23	63	97	-5	-7	-11	-1	6	88	100	107	42	34	-135	-147	-141	-54	-47
	TF-520530 TIP3c	57	66	68	26	18	-6	-8	-10	-71	-107	11	19	26	79	120	-6	-9	-13	-1	8	-108	-125	-136	-55	-43	-112	-123	-118	-45	-39
	T1-507510 TAP1c	16	19	20	6	3	-3	-4	-7	-47	-70	8	10	15	47	75	-1	-2	-2	6	10	107	122	130	52	43	-149	-161	-156	-73	-67
	T1-510520 TAP2c	16	19	20	6	3	-3	-5	-9	-54	-81	9	12	18	55	87	-1	-2	-3	8	13	89	102	109	44	36	-149	-161	-156	-73	-67
	T1-520530 TAP3c	57	66	68	21	11	-6	-8	-10	-71	-107	9	15	21	69	107	-1	-3	-4	8	16	-108	-125	-136	-55	-43	-124	-135	-130	-61	-56
	T1-507510 TAP1	16	19	20	6	3	-4	-6	-10	-65	-97	8	10	15	47	75	-1	-2	-2	6	10	107	122	130	52	43	-149	-161	-156	-73	-67
	T1-510520 TAP2	16	19	20	6	3	-4	-7	-13	-77	-116	9	12	18	55	87	-1	-2	-3	8	13	89	102	109	44	36	-149	-161	-156	-73	-67
	T1-520530 TAP3	57	66	68	21	11	-9	-12	-15	-105	-158	9	15	21	69	107	-1	-3	-4	8	16	-108	-125	-136	-55	-43	-124	-135	-130	-61	-56
	T1-507510 TOP1	16	19	20	6	3	-4	-6	-10	-65	-97	8	10	15	47	75	-1	-2	-2	6	10	107	122	130	52	43	-149	-161	-156	-73	-67
	T1-510520 TOP2	16	19	20	6	3	-4	-7	-13	-77	-116	9	12	18	55	87	-1	-2	-3	8	13	89	102	109	44	36	-149	-161	-156	-73	-67
	T1-520530 TOP3	57	66	68	21	11	-9	-12	-15	-105	-158	9	15	21	69	107	-1	-3	-4	8	16	-108	-125	-136	-55	-43	-124	-135	-130	-61	-56
	T1-510520 TGR2	0	0	1	2	4	-4	-7	-13	-76	-114	14	18	27	83	132	-1	-2	-3	8	13	89	102	109	44	36	-149	-161	-156	-73	-67
	T1-520530 TGR3	0	0	1	4	7	-8	-11	-14	-98	-148	14	23	31	104	163	-1	-3	-4	8	16	-108	-125	-136	-55	-43	-124	-135	-130	-61	-56
	T2-507510, 160, 2	16	19	20	6	3	-6	-10	-16	-105	-156	5	7	10	31	50	-1	-2	-2	6	10	107	122	130	52	43	-149	-161	-156	-73	-67
	T2-507510, 160, 1	16	19	20	6	3	-4	-6	-10	-65	-97	8	10	15	47	75	-1	-2	-2	6	10	107	122	130	52	43	-149	-161	-156	-73	-67
	T2-510520, 220, 2	16	19	20	6	3	-7	-12	-23	-135	-204	6	7	11	34	54	-1	-2	-3	8	13	89	102	109	44	36	-149	-161	-156	-73	-67
	T2-510520, 220, 1	16	19	20	6	3	-4	-7	-13	-77	-116	9	12	18	55	87	-1	-2	-3	8	13	89	102	109	44	36	-149	-161	-156	-73	-67
	T2-510520, 300, 2	16	19	20	6	3	-9	-15	-28	-166	-250	5	7	10	30	48	-1	-2	-3	8	13	89	102	109	44	36	-149	-161	-156	-73	-67
	T2-510520, 300, 1	16	19	20	6	3	-4	-7	-13	-77	-116	9	12	18	55	87	-1	-2	-3	8	13	89	102	109	44	36	-149	-161	-156	-73	-67
	with cooling plate* (optional)	EA-507	2	2	3	16	20	0	-1	-1	-4	-5	2	2	4	14	17	-105	-122	-135	-64	-60	-3	-4	-6	-4	-4	0	0	-1	-1
EA-510		2	2	3	17	21	0	-1	-2	-5	-5	2	3	6	19	23	-105	-122	-135	-64	-60	-4	-6	-8	-6	-5	0	-1	-1	-1	-2
EA-520		2	3	4	23	28	-1	-1	-2	-7	-8	3	4	7	22	27	-88	-102	-112	-54	-50	-5	-7	-10	-7	-6	-1	-1	-1	-2	-2
EA-530		3	3	5	27	33	-1	-2	-3	-11	-12	4	5	9	27	33	-108	-125	-139	-66	-62	-6	-8	-12	-8	-8	-1	-1	-2	-3	-4
TF-507510 TIP1c		16	18	19	7	6	-1	-1	-3	-36	-45	9	13	20	47	55	-4	-6	-9	-4	-4	105	120	130	61	57	-136	-148	-143	-57	-50
TF-510520 TIP2c		16	18	19	7	7	-1	-2	-3	-42	-52	11	15	23	55	64	-5	-8	-12	-6	-5	88	101	108	51	48	-136	-148	-143	-57	-50
TF-520530 TIP3c		56	64	66	23	23	-6	-6	-13	-61	-72	15	19	30	68	78	-6	-9	-14	-7	-7	-108	-125	-139	-66	-62	-113	-123	-119	-48	-42
T1-507510 TAP1c		16	18	19	7	6	-3	-4	-7	-38	-45	7	10	15	40	48	-1	-2	-2	2	2	104	119	127	54	50	-137	-149	-144	-61	-55
T1-510520 TAP2c		16	18	20	7	6	-3	-5	-8	-44	-52	8	11	17	47	55	-2	-2	-3	3	2	87	99	106	45	41	-137	-149	-144	-61	-55
T1-520530 TAP3c		56	64	68	23	22	-6	-6	-13	-61	-72	11	14	22	58	67	-2	-2	-4	3	3	-108	-125	-139	-66	-62	-114	-124	-120	-51	-46
T1-507510 TAP1		16	18	19	7	6	-4	-6	-10	-57	-67	7	10	15	40	48	-1	-2	-2	2	2	104	119	127	54	50	-137	-149	-144	-61	-55
T1-510520 TAP2		16	18	20	7	6	-5	-8	-12	-67	-79	8	11	17	47	55	-2	-2	-3	3	2	87	99	106	45	41	-137	-149	-144	-61	-55
T1-520530 TAP3		56	64	68	23	22	-9	-9	-19	-94	-111	11	14	22	58	67	-2	-2	-4	3	3	-108	-125	-139	-66	-62	-114	-124	-120	-51	-46
T1-507510 TOP1		16	18	19	7	6	-4	-6	-10	-57	-67	7	10	15	40	48	-1	-2	-2	2	2	104	119	127	54	50	-137	-149	-144	-61	-55
T1-510520 TOP2		16	18	20	7	6	-5	-8	-12	-67	-79	8	11	17	47	55	-2	-2	-3	3	2	87	99	106	45	41	-137	-149	-144	-61	-55
T1-520530 TOP3		56	64	68	23	22	-9	-9	-19	-94	-111	11	14	22	58	67	-2	-2	-4	3	3	-108	-125	-139	-66	-62	-114	-124	-120	-51	-46
T1-510520 TGR2		0	0	1	2	2	-5	-8	-12	-66	-78	8	11	17	47	55	-2	-2	-3	3	2	87	99	106	45	41	-137	-149	-144	-61	-55
T1-520530 TGR3		0	0	1	2	3	-9	-9	-18	-89	-105	11	14	22	58	67	-2	-2	-4	3	3	-108	-125	-139	-66	-62	-114	-124	-120	-51	-46
T2-507510, 160, 2		16	18	19	7	6	-7	-10	-17	-97	-114	5	7	10	26	32	-1	-2	-2	2	2	104	119	127	54	50	-137	-149	-144	-64	-55
T2-507510, 160, 1		16	18	19	7	6	-4	-6	-10	-57	-67	7	10	15	40	48	-1	-2	-2	2	2	104	119	127	54	50	-137	-149	-144	-64	-55
T2-510520, 220, 2		16	18	20	7	6	-9	-15	-23	-126	-149	5	7	11	29	34	-2	-2	-3	3	2	87	99	106	45	41	-137	-149	-144	-61	-55
T2-510520, 220, 1		16	18	20	7	6	-5	-8	-12	-67	-79	8	11	17	47	55	-2	-2	-3	3	2	87	99	106	45	41	-137	-149	-144	-61	-55
T2-510520, 300, 2		16	18	20	7	6	-12	-19	-28	-158	-186	4	6	9	26	30	-2	-2	-3	3	2	87	99	106	45	41	-137	-149	-144	-61	-55
T2-510520, 300, 1		16	18	20	7	6	-5	-8	-12	-67	-79	8	11	17	47	55	-2	-2	-3	3	2	87	99	106	45	41	-137	-149	-144	-61	-55



Example T1-510520 TOP2



Wet machining (water-based coolant)

Values apply for coolant temperature equal to the ambient temperature

		µm															arcsec															
		X-displacement					Y-displacement					Z-displacement					U-rotation					V-rotation					W-rotation					
Time after start, duty cycle 20%		60"	90"	180"	1h	10h	60"	90"	180"	1h	10h	60"	90"	180"	1h	10h	60"	90"	180"	1h	10h	60"	90"	180"	1h	10h	60"	90"	180"	1h	10h	
without cooling plate	EA-507	2	3	4	6	6	0	0	0	1	1	3	4	6	7	7	-125	-138	-126	-115	-111	-4	-6	-7	-7	-7	0	0	0	0	0	
	EA-510	2	3	5	6	7	0	0	0	1	1	3	6	8	9	9	-125	-138	-126	-115	-111	-6	-8	-10	-10	-9	0	0	0	0	0	
	EA-520	3	5	6	8	9	0	0	0	1	1	2	4	7	9	11	11	-104	-115	-105	-96	-93	-7	-10	-12	-12	-11	0	0	0	0	1
	EA-530	4	5	7	9	10	0	0	1	2	2	5	8	11	13	14	-129	-142	-130	-119	-115	-8	-12	-14	-14	-14	0	0	0	0	1	
	TF-507510 TIP1c	19	21	19	18	17	-2	-3	-5	-7	-8	13	19	24	25	25	-5	-8	-9	-9	-9	124	133	120	110	107	-157	-145	-126	-112	-105	
	TF-510520 TIP2c	19	21	19	18	18	-2	-3	-6	-9	-10	15	22	28	29	30	-7	-11	-13	-12	-12	103	111	100	92	89	-157	-145	-126	-112	-105	
	TF-520530 TIP3c	67	73	67	63	62	-8	-10	-16	-19	-20	19	25	34	34	38	-8	-13	-15	-14	-15	-129	-142	-130	-119	-115	-131	-121	-105	-93	-88	
	T1-507510 TAP1c	19	20	19	17	17	-4	-7	-10	-13	-14	10	15	18	19	19	-2	-2	-2	-2	-2	123	132	120	109	106	-159	-147	-129	-116	-109	
	T1-510520 TAP2c	19	21	19	17	17	-5	-8	-12	-15	-16	12	17	21	23	23	-2	-3	-3	-3	-3	102	110	100	91	88	-159	-147	-129	-116	-109	
	T1-520530 TAP3c	67	71	66	60	59	-8	-10	-16	-19	-20	15	19	26	27	29	-2	-4	-4	-4	-4	-129	-142	-130	-119	-115	-133	-123	-108	-96	-91	
	T1-507510 TAP1	19	20	19	17	17	-5	-10	-14	-18	-19	10	15	18	19	19	-2	-2	-2	-2	-2	123	132	120	109	106	-159	-147	-129	-116	-109	
	T1-510520 TAP2	19	21	19	17	17	-7	-12	-17	-22	-23	12	17	21	23	23	-2	-3	-3	-3	-3	102	110	100	91	88	-159	-147	-129	-116	-109	
	T1-520530 TAP3	67	71	66	60	59	-12	-15	-25	-29	-30	15	19	26	27	29	-2	-4	-4	-4	-4	-129	-142	-130	-119	-115	-133	-123	-108	-96	-91	
	T1-507510 TOP1	19	20	19	17	17	-5	-10	-14	-18	-19	10	15	18	19	19	-2	-2	-2	-2	-2	123	132	120	109	106	-159	-147	-129	-116	-109	
	T1-510520 TOP2	19	21	19	17	17	-7	-12	-17	-22	-23	12	17	21	23	23	-2	-3	-3	-3	-3	102	110	100	91	88	-159	-147	-129	-116	-109	
	T1-520530 TOP3	67	71	66	60	59	-12	-15	-25	-29	-30	15	19	26	27	29	-2	-4	-4	-4	-4	-129	-142	-130	-119	-115	-133	-123	-108	-96	-91	
	T1-510520 TGR2	0	1	1	1	1	-7	-12	-17	-22	-23	20	28	35	38	38	-2	-3	-3	-3	-3	102	110	100	91	88	-159	-147	-129	-116	-109	
	T1-520530 TGR3	0	1	1	1	1	-12	-15	-24	-28	-29	25	32	42	45	48	-2	-4	-4	-4	-4	-129	-142	-130	-119	-115	-133	-123	-108	-96	-91	
	T2-507510, 160, 2	19	20	19	17	17	-8	-16	-23	-29	-31	7	10	12	13	13	-2	-2	-2	-2	-2	123	132	120	109	106	-159	-147	-129	-116	-109	
	T2-507510, 160, 1	19	20	19	17	17	-5	-10	-14	-18	-19	10	15	18	19	19	-2	-2	-2	-2	-2	123	132	120	109	106	-159	-147	-129	-116	-109	
	T2-510520, 220, 2	19	21	19	17	17	-12	-21	-30	-39	-41	7	11	13	14	14	-2	-3	-3	-3	-3	102	110	100	91	88	-159	-147	-129	-116	-109	
	T2-510520, 220, 1	19	21	19	17	17	-7	-12	-17	-22	-23	12	17	21	23	23	-2	-3	-3	-3	-3	102	110	100	91	88	-159	-147	-129	-116	-109	
	T2-510520, 300, 2	19	21	19	17	17	-15	-26	-37	-48	-50	7	9	12	13	13	-2	-3	-3	-3	-3	102	110	100	91	88	-159	-147	-129	-116	-109	
	T2-510520, 300, 1	19	21	19	17	17	-7	-12	-17	-22	-23	12	17	21	23	23	-2	-3	-3	-3	-3	102	110	100	91	88	-159	-147	-129	-116	-109	
with cooling plate* (optional)	EA-507	2	3	4	5	5	-1	-1	-2	-2	-1	3	4	6	6	7	-126	-139	-129	-119	-114	-4	-6	-8	-8	-8	0	-1	-1	-1	-1	
	EA-510	2	3	4	5	6	-1	-1	-2	-2	-2	3	6	8	9	9	-126	-139	-129	-119	-114	-6	-9	-10	-11	-10	-1	-1	-1	-1	-1	
	EA-520	3	4	6	7	8	-1	-2	-3	-3	-2	4	7	9	10	11	-105	-116	-108	-99	-96	-7	-10	-12	-13	-12	-1	-1	-2	-2	-2	
	EA-530	4	5	7	8	9	-2	-3	-4	-4	-3	5	8	11	13	13	-129	-143	-133	-122	-118	-9	-13	-15	-15	-15	-1	-2	-3	-3	-2	
	TF-507510 TIP1c	19	20	18	16	16	-1	-3	-5	-6	-7	13	20	24	25	25	-7	-8	-8	-10	-10	124	134	122	115	110	-159	-147	-129	-114	-108	
	TF-510520 TIP2c	19	20	18	17	16	-2	-3	-5	-7	-9	15	23	28	29	29	-9	-11	-11	-14	-13	103	112	102	96	92	-159	-147	-129	-114	-108	
	TF-520530 TIP3c	65	69	62	60	56	-8	-13	-16	-18	-19	19	26	34	38	34	-12	-14	-14	-16	-16	-129	-143	-133	-122	-118	-133	-122	-107	-95	-90	
	T1-507510 TAP1c	19	20	19	17	16	-4	-7	-10	-12	-13	10	15	18	19	19	-2	-3	-3	-3	-3	122	131	120	108	104	-159	-148	-130	-116	-109	
	T1-510520 TAP2c	19	21	19	17	17	-5	-8	-12	-14	-15	12	17	21	22	22	-3	-3	-4	-4	-4	102	110	100	90	87	-159	-148	-130	-116	-109	
	T1-520530 TAP3c	66	71	64	60	57	-8	-13	-16	-18	-19	15	19	26	29	26	-4	-4	-5	-5	-5	-129	-143	-133	-122	-118	-133	-123	-108	-97	-91	
	T1-507510 TAP1	19	20	19	17	16	-6	-10	-14	-17	-18	10	15	18	19	19	-2	-3	-3	-3	-3	122	131	120	108	104	-159	-148	-130	-116	-109	
	T1-510520 TAP2	19	21	19	17	17	-7	-12	-18	-21	-22	12	17	21	22	22	-3	-3	-4	-4	-4	102	110	100	90	87	-159	-148	-130	-116	-109	
	T1-520530 TAP3	66	71	64	60	57	-12	-19	-25	-28	-29	15	19	26	29	26	-4	-4	-5	-5	-5	-129	-143	-133	-122	-118	-133	-123	-108	-97	-91	
	T1-507510 TOP1	19	20	19	17	16	-6	-10	-14	-17	-18	10	15	18	19	19	-2	-3	-3	-3	-3	122	131	120	108	104	-159	-148	-130	-116	-109	
	T1-510520 TOP2	19	21	19	17	17	-7	-12	-18	-21	-22	12	17	21	22	22	-3	-3	-4	-4	-4	102	110	100	90	87	-159	-148	-130	-116	-109	
	T1-520530 TOP3	66	71	64	60	57	-12	-19	-25	-28	-29	15	19	26	29	26	-4	-4	-5	-5	-5	-129	-143	-133	-122	-118	-133	-123	-108	-97	-91	
	T1-510520 TGR2	0	1	1	1	1	-7	-12	-18	-21	-22	12	17	21	22	22	-3	-3	-4	-4	-4	102	110	100	90	87	-159	-148	-130	-116	-109	
	T1-520530 TGR3	0	1	1	1	1	-12	-18	-24	-27	-28	15	19	26	29	26	-4	-4	-5	-5	-5	-129	-143	-133	-122	-118	-133	-123	-108	-97	-91	
	T2-507510, 160, 2	19	20	19	17	16	-10	-17	-23	-28	-30	7	10	12	13	13	-2	-3	-3	-3	-3	122	131	120	108	104	-159	-148	-130	-116	-109	
	T2-507510, 160, 1	19	20	19	17	16	-6	-10	-14	-17	-18	10	15	18	19	19	-2	-3	-3	-3	-3	122	131	120	108	104	-159	-148	-130	-116	-109	
	T2-510520, 220, 2	19	21	19	17	17	-13	-22	-33	-38	-40	7	11	13	14	14	-3	-3	-4	-4	-4	102	110	100	90	87	-159	-148	-130	-116	-109	
	T2-510520, 220, 1	19	21	19	17	17	-7	-12	-18	-21	-22	12	17	21	22	22	-3	-3	-4	-4	-4	102	110	100	90	87	-159	-148	-130	-116	-109	
	T2-510520, 300, 2	19	21	19	17	17	-16	-27	-40	-47	-49	7	9	12	12	12	-3	-3	-4	-4	-4	102	110	100	90	87	-159	-148	-130	-116	-109	
	T2-510520, 300, 1	19	21	19	17	17	-7	-12	-18	-21	-22	12	17	21	22	22	-3	-3	-4	-4	-4	102	110	100	90	87	-159	-148	-130	-116	-109	

Information regarding questions about cycle time,
PLC, commissioning and application
(spec. simultaneous operation)

Cycle time calculation

pL has specific calculation tools at its disposal. Where necessary, we can provide assistance when calculating the piece part time. Based on your information, we will prepare a detailed cycle time calculation. See the table to the right for reference values for the clamping cycle.

	unclamp	clamp *
EA-50x	60 ms	90 ms
EA-51x	110 ms	140 ms
EA-52x	120 ms	150 ms
EA-530	160 ms	260 ms

* can be eliminated with PLC optimization

PLC models

Spindle clamping is a pL LEHMANN exclusive and has great potential for savings. At www.lehmann-rotary-tables.com, you can find appropriate PLC templates.

Parameter lists*

A variety of parameter lists for various machines and three typical applications for each are available (Download).

Automatic parameter setting via CNC program. For example, available for FANUC ROBODRILL.

Lasttyp	Massentrage- beimoment	Kriterien (wenn Massentragebeimoment nicht bekannt)	
		Last	Dimension
Catalog (Max.Speed)			
		< 0.8kgm*2	< 90kg
Usual			
		< 1.2kgm*2	< 120kg
Max.Load			
		< 8kgm*2	< 800kg

* Tool for determining the permissible limit values for each rotary table; please contact us.

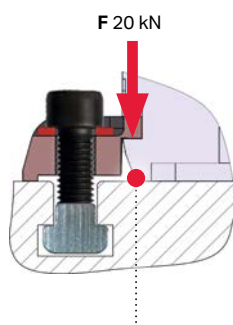
Pull-out torque

Permissible loads as a function of the individual rotary table mounting:

Reference values	Unit	507 / 508	510 / 511	520 / 521	530	Remarks
max. permissible depending on bearing	Nm	1200	2000	3900	10400	Pull-out load, spindle
EA and TF tilter with claw clamps	Nm	700	1000	1000	2000	with max. tensile load on claw clamp, without noteworthy lifting of the housing ¹⁾
EA and TF tilter with base plate*	Nm	1200	2000	3900	10400	Securely bolted from below ²⁾ ; base plate is at least twice as wide as housing in the axis direction* and is bolted to machine table in optimal manner
*Base plate width	mm	226	254	284	360	Thickness: min. 40 mm (steel)

All data measured at face of spindle, across axis of rotation

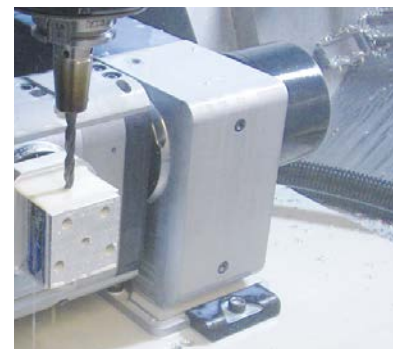
Bolt torque as specified in operating manual:



¹⁾ Lifting point on housing



²⁾ Individual base plate securely bolted to housing from below through all 4 holes



Properly tightened is a prerequisite for the best possible utilization of the permissible loading.

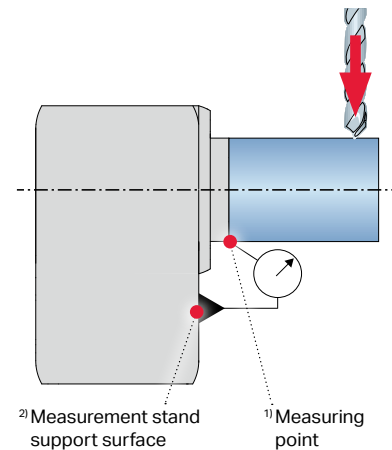
Specific reference values for individual applications and how to use them

Stiffness

Expected response (elasticity) to corresponding load:

Reference values	Unit	507 (508)	510 (511)	520 (521)	530	Remarks
Torsion, gear unit	Nm/°	1440 (1,000)	1800 (1,800)	5400 (5,400)	14000	in conjunction with feed torque
Spindle, axial*	kN/mm	1400	1800	2400	4600	in conjunction with axial force
Spindle, deflection*	kNm/mm	21	26	52	135	in conjunction with pull-out torque

*All data measured at face of spindle¹⁾, relative to rotary table housing²⁾; spindle clamping active (inactive approx. -10%)



Achievable workpiece accuracies in three dimensions

The reference values are based on detailed experiments where, among other things, such sample parts were produced on a DMU 65: with different T-type rotary tables (TF and T1), with and without WMS, with and without compensation. Depending on the machine's accuracy and the conditions listed below, the following workpiece accuracies are possible:

Reference values	Positioning	Simultaneous
Size	Cube 350mm	Cube 150mm
Weight	150 kg	34 kg
Accuracy ¹⁾	$\pm 10 \mu\text{m}/100 \text{ mm}$	
Accuracy ²⁾	$\pm 5 \mu\text{m}/100 \text{ mm}$	not possible
Accuracy WMS ¹⁾	$\pm 3 \mu\text{m}/100 \text{ mm}$	
Accuracy WMS ²⁾	$\pm 2 \mu\text{m}/100 \text{ mm}$	not possible

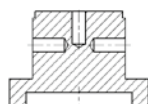
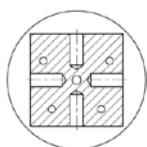
¹⁾ only ONE workpiece zero point

²⁾ multiple workpiece zero points

WMS = Angular position measuring system $\pm 2.5''$; both axes

Conditions

1. Perfect alignment to machine axes
2. Highly accurate zero point
3. Best possible error compensation in all axes
4. Increased geometry accuracy of the rotary table (option: GEO.5xx-GEN)



Test workpiece



Definition of the terms used in this catalog

1 Drive data

The term «drive data» always refers to rotational speed, acceleration as well as jerk limitation.

2 Gear unit

Gear unit load ($M_{\text{gear max.}}$)

[Nm]

...refers to the maximum permissible mechanical torque at a spindle rotational speed of 1 rpm.

Feed torque (M_{feed})

[Nm]

...refers to the available torque at a rotational speed of 1 rpm, corresponding to the maximum permissible gear unit load. Depending on the motor used and/or duty cycle, however, it can be correspondingly lower.

Eccentric spindle load ($sl_{\text{eccentric}}$)

[Nm]

The eccentric load catalog* corresponds to

- 0 Nm (standard load always centric) for EA- and M-type rotary tables as well as dividing/indexing axes of T-type rotary tables
- the maximum torque for T-type rotary tables, which affects the swiveling/tilting axis in the form of the intrinsic load of the dividing/indexing axis as well as that of the cubic standard load. Please refer to the respective parameter list, catalog values.

For T-type rotary tables, the eccentric load usual* is identical to the gear load with sls. For an EA rotary table, this torque is equal to the value resulting from the maximum eccentric load when using a rotoFIX Alu with a standard load. Please refer to the respective parameter list for usual values.

The eccentric load max load* corresponds to the maximum mechanical torque which can still be transmitted without any damage using the gear unit at a minimum rotational speed of approx. 10 rpm. Please refer to the respective parameter list, max load values.

* For definitions please refer to «Geometry / Integration» p. 135



Center of gravity shift without and with load. The greater the red center of gravity, the greater is the gear unit loading in the tilting axis. The blue arrow shows the direction in which the center of gravity moves from «without load» to «with load».

pL standard spindle load ($sls = sl_{\text{standard}}$) pp. 34–67 and 112/113

[kg]

...refers to the pL spindle load defined as standard, derived from practice, covering approximately 90% of all applications. All drive data and parameter lists are designed for the cubic pL standard load. All masses moving within this volume (workpiece including device) and clamped coaxially to the rotary axis can be moved using the standard drive data. Eccentrically arranged standard pL spindle loads may require a reduction of the drive data.

Standard moment of inertia (J_{standard}) pp. 34–67 and 112/113

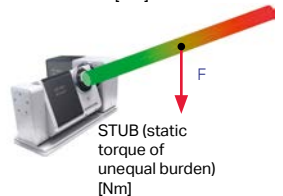
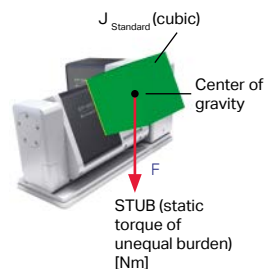
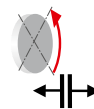
[kgm²]

...refers to the resulting moment of inertia due to the defined pL standard load and its shape, if the load is clamped coaxially to the rotary axis. The usual J ratio between load and motor is generally 1:1 or less (e.g. 0.5:1).

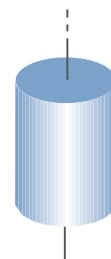
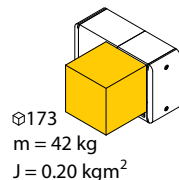
Max. perm. moment of inertia (J_{max})

[kgm²]

...corresponds to 10x the standard moment of inertia (J_{standard}). In most applications, this moment of inertia is not exceeded even with large workpieces. It should also be noted that the J ratio of 10:1 is NOT exceeded with any motorized model. Large J values can be moved, of course, but required appropriate adjustments (on request).



EA-510



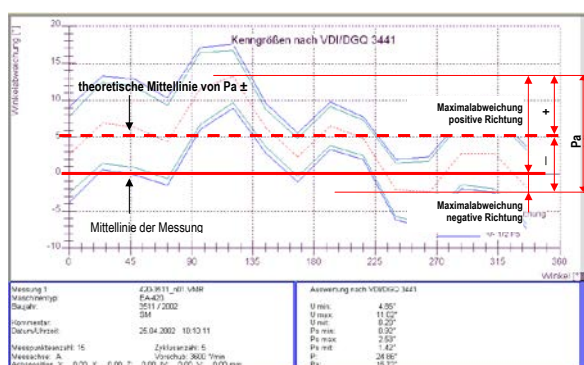
Function explanations, limit values and conditions minimize your risks

3 Gear accuracies

All accuracy data apply to an unloaded rotary table

Measuring process

- 5 warm-up cycles
- 5 measuring cycles
- 24 measuring points (15°)
- Acceleration 500°/s²
- Heidenhain ROD 800 measuring and test equipment with K15 coupling
- Unloaded rotary table as individual module – room temperature approx. 22°C



Explanation of indexing accuracy Pa ±:

Indexing accuracy (Pa ±) [arc sec]

...refers to the sum of maximum positive and negative deviations between the ACTUAL position and the TARGET position of all angular positions over 360° measured in a direction of rotation, stated as ± value. This is equal to the position deviation Pa according to VDI/DGQ 3441, but accumulated (example: TG ± 15" corresponds to Pa 30") and:

- without consideration of the reversal error
- without consideration of the radial and axial run-out error of the spindle

Repeat accuracy (Ps_{with}) [arc sec]

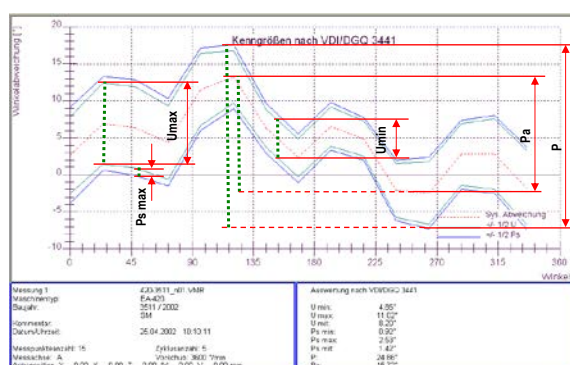
...refers to the maximum deviation within the results of the repeatedly measured angular positions, approached from the same side. This corresponds to the position variation Ps max according to VDI/DGQ 3441, i.e.:

- without consideration of the reversal error

Positioning accuracy (P) [arc sec]

...refers to the maximum deviation between the TARGET position and the ACTUAL position when the direction of rotation changes. This corresponds to the positioning uncertainty P according to VDI/DGQ, i.e.:

- without consideration of the radial and axial run-out error of the spindle.



Explanation of various parameters according to VDI/DGQ 3441:

Reversal backlash (U gear) [arc sec]

...refers to the maximum mechanical backlash when the direction of rotation changes within a specific number of repeatedly measured angular positions.

- This does not correspond to a measurement parameter listed in VDI/DGQ 3441
- The elasticity of all parts connected in the drive train is NOT taken into account

Reversal error (U average*) [arc sec]

...refers to the average reversal error, including elasticity, backlash and/or overshoot of all parts connected in the drive train when the direction of rotation changes within a specific number of repeatedly measured angular positions.

This corresponds to the reversal error U average according to VDI/DGQ 3441. The average value is calculated on the basis of all measured values.

* For compensation and definition of backlash, please refer to «Geometry / Integration, 6.4»

Definition of the terms used in this catalog

4 Speed

Duty cycle (ED)

[%]

...refers to the duration of the movement per unit of time according to the DIN/VDE 0530 Standard. pL rotary tables are designed for intermittent duty (positioning operation) S3 at a duty cycle of 20%, but with a cycle duration of 1 minute. If these conditions are exceeded by the respective application, the drive data must be reduced accordingly.

Spindle speed (n_{sp})

[rpm]

...always refers to the maximum possible rotational speed of the spindle

- while complying with the duty cycle
- with the corresponding motor
- with the pL standard spindle load (cubic)

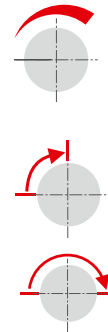
Cycle time 90° / 180° ($t_{90^\circ} / t_{180^\circ}$)

[sec]

...refers to the time required for the entire dividing / indexing operation for a 90°/180° movement

- Dividing/indexing operation STANDARD pL = unclamping and clamping monitored using a pressure sensor. During clamping, the clamped signal is sent as soon as a value of 100 bar has been reached. Thus, the machine can already move before the full clamping pressure is applied. If the full clamping pressure has not been reached after 2 sec, the clamped signal is canceled. Everything is controlled by the pL-smartBox.
- Dividing/indexing operation OPTIMIZED = as standard, but the clamped signal is queried only prior to the feed movement. This operation requires adjustment of the respective machine PLC and is not included in the pL scope of delivery.

**DIN / VDE 0530
S3, duty
cycle 20%**



5 Spindle bearing

Axial force (F_{axial})

[N]

...refers to the maximum permissible axial load on the spindle. It includes the workpiece, devices, machining forces and other forces resulting from the rotational and tilting movement.

Pull-out torque (M_{tilt})

[Nm]

...refers to the maximum permissible tilting load on the spindle, measured from the spindle face. It includes the workpiece, devices, machining forces and torques resulting from the rotational and tilting movement.

Transport load (sl_{max})

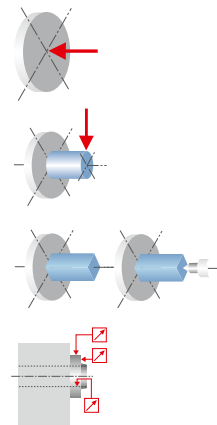
[kg]

...refers to the total, maximum permissible load which is installed starting from the spindle nose and performs a rotational movement together with the spindle (device and workpiece). This load does not correspond to the pL standard spindle load.

Radial and axial run-out ($ro_{rad/ax}$)

[mm]

...refers to the maximum deviation occurring in the axial (axial run-out) or radial (radial run-out) direction when measured over 360°. Measured in each case on the maximum possible diameter of the spindle nose.



6 Clamping

Clamping torque (M_{clamp})

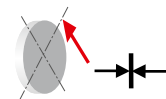
[Nm]

...refers to the maximum permissible torque load on the spindle nose during active clamping (6 bar air pressure). The pL clamping is extremely rigid. Depending on the load, there is also a setting behavior in addition to a usual elasticity. We distinguish between three phases when progressing from zero load to maximum load. The setting behavior results in an irreversible torsion after unloading as follows:

- Phase 1 «normal» (approx. 1/3 to 1/2 of the permissible clamping torque) up to approx. 0.0015 mm*
- Phase 2 «increased» (approx. 2/3 of the permissible clamping torque) up to approx. 0.005 - 0.01 mm*
- Phase 3 «maximum» (up to 100% of the permissible clamping torque) up to approx. 0.035 mm*

The clamping torque is so high that the divider package of the 2-axis rotary tables can already exhibit considerable torsional movement before the clamp relaxes. As a result, the maximum clamping torque cannot be used in all cases.

* For unilateral load, in relation to the spindle outside Ø of the respective rotary table. The indexing and repeat accuracy is not impaired by another positioning.



Function explanations, limit values and conditions minimize your risks

7 Leak tightness (acc. to EN 60529)

...refers to the leak tightness in terms of protection against accidental contact, protection against the ingress of foreign matter and protection against the ingress of water:

IP 65: Protection against accidental contact, no ingress of dust, protection against the ingress of water jets

IP 66: Same protection as IP 65, but protection against the ingress of powerful water jets

IP 67 (standard at pL): Same protection as IP 66, but protection against the ingress of water from temporary immersion

IP 68 (optional at pL): Same protection as IP 67, but protection against the ingress of water from permanent immersion



8 Geometry and integration

All accuracy data apply to an unloaded rotary table

Tilting drift (sd₂₀₀)

...refers to the deviation of the perpendicularity between the dividing/indexing axis and the swiveling/tilting axis over a specific tilting range. pL always measures three points: -90° (horizontal), -45° and 0° (vertical), always related to the position of the dividing/indexing axis and on a radius starting from the center of the swiveling/tilting axis of 200 mm.

Offset values (offset)

...refer to the deviation from any theoretical NOMINAL values in order to ensure easier alignment of the rotary table on the machine and faster commissioning.

Pitch error (pe)

...refers to the effective NOMINAL-ACTUAL deviation over a specific rotation angle ("pitch error") for axis error compensation on the CNC machine. For rotary tables, this occurs typically with the movement of eccentrically arranged loads such as clamping yokes, tilting axes etc.

Backlash (bl)

...refers to the mechanical and electronic reversal error* (gear unit, angular position measuring system, positioning control...) for the loose backlash compensation on the CNC machine.

* For definition, see «Gear unit» p. 134

Parameter lists

To minimize commissioning time and make maximum use of the pL rotary table, you can find parameter lists for various controls at www.lehmann-rotary-tables.com. In the case of load-relevant parameters, we distinguish between...

usual

...refers to the practice-oriented drive values for pL standard spindle loads, which should usually be set (pL recommendation) in order to still provide certain reserves to integrate deviations occurring in practice and to allow an easier control comparison. Normally, no warm-up is required here.

catalog

...refers to the maximum achievable catalog drive values for pL standard spindle loads, for which more demanding requirements are imposed both on the commissioning engineer and on the material in order to achieve these values. Depending on the respective application, they must be reduced (empirically). A warm-up cycle for the gear unit is frequently recommended here.

max load

...refers to the maximum achievable drive values for J max. and eccentric loading.

**3D
precision**

offset 1: [mm]

0.013

pitch error: [°]

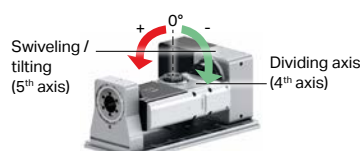
0.005

FANUC	
a2/5000is	
Fanuc	
a1000A	
HEIDENHAIN	
RCN x2xF	
i 90:1	
Value	Value
Catalog: 19800	
Usual: 16200	
Max. load: 5400	

9 Axis definition

Swiveling axis = tilting axis

Dividing axis = rotary axis



Workpiece clamping systems

	Palletizing system ripas	144
	HSK / ripas clamping systems, Morse taper , CAPTO	145
	AM-LOCK	146
	Manual 3-jaw chucks / face plates	147
	Automatic jaw chucks	148
	Collet clamping Type B, SCHAUUBLIN	150
	Collect clamping Type W, SCHAUUBLIN	151
	Collet clamping Type F and ER, SCHAUUBLIN	152
	Collet clamping OTTET	153
	HAINBUCH	154
	Multiple clamping systems SCHUNK	158
	TANDEM power clamping blocks SCHUNK	160
	VERO-S zero-point clamping system SCHUNK	162
	Zero-point clamping system HWR	163
	gredoc + gre4doc clamping devices GRESSEL	164
	Zero-point clamping system LANG	166
	Palletizing systems EROWA	167
	Palletizing systems System 3R	168
	Palletizing systems PAROTEC	169
	Polymut multiple clamping system Evard	170
	Centering vise Evard	171
	Clamping systems TRIAG	172
	Other clamping systems / clamping system MicroLoc	175
	Clamping systems TG Colin/ YERLY	176
	Chuck SwissChuck / HOFER	177
	Clamping technology hemo / PiranhaClamp	178
	Palletizing systems STARK / AMF	179
	Zero-point clamping plates	180
	Face driver RÖHM	182
	Revolving centers RÖHM	183
	transferBox ROTOMATION	184

Overview,
Applications

System &
Facts, smartBox

Rotary
tables

SPZ,
DDF, WMS

MOT, KAB,
WDF, CNC

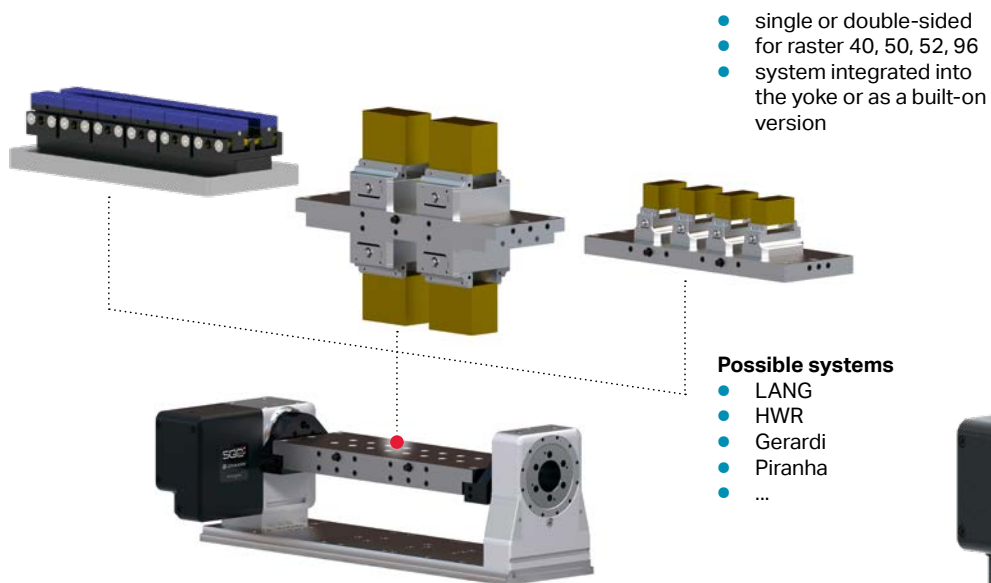
Aligning,
GLA, RST, LOZ

Service
& Technology

Tooling

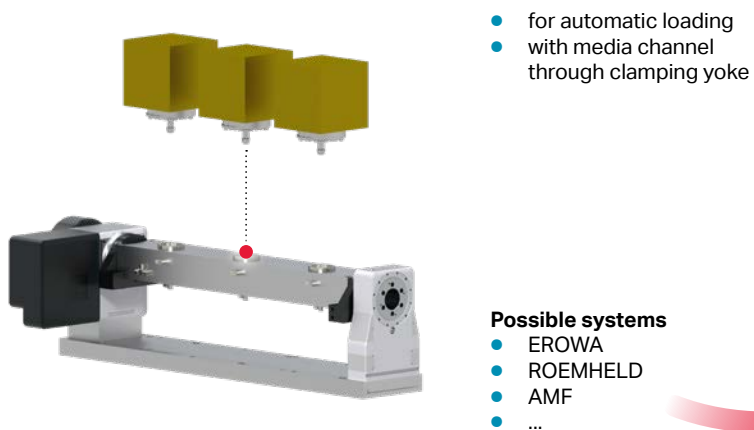
Potentials of clamping yokes with integrated or built-on zero point clamping system

Yoke with manual zero point clamping system



Manual version

Yoke with automatic zero point clamping system

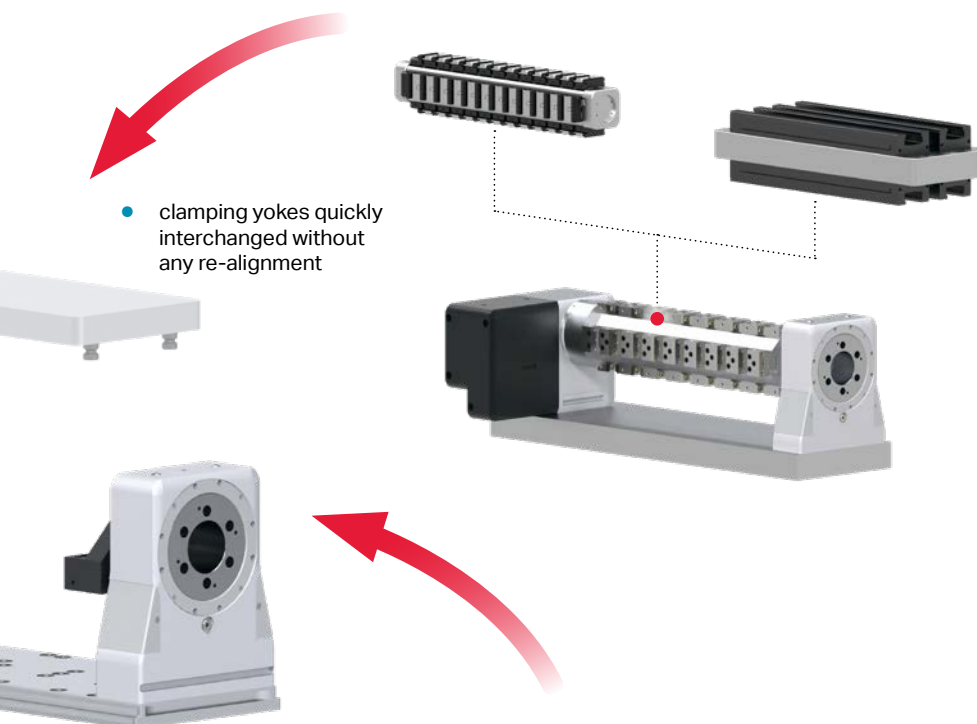


Automatic version

- with quick couplers for transfer of media

Clamping yokes with hole pattern for individual mounting of clamping tools or with a flexibly adjustable rail system

Yoke with rail system



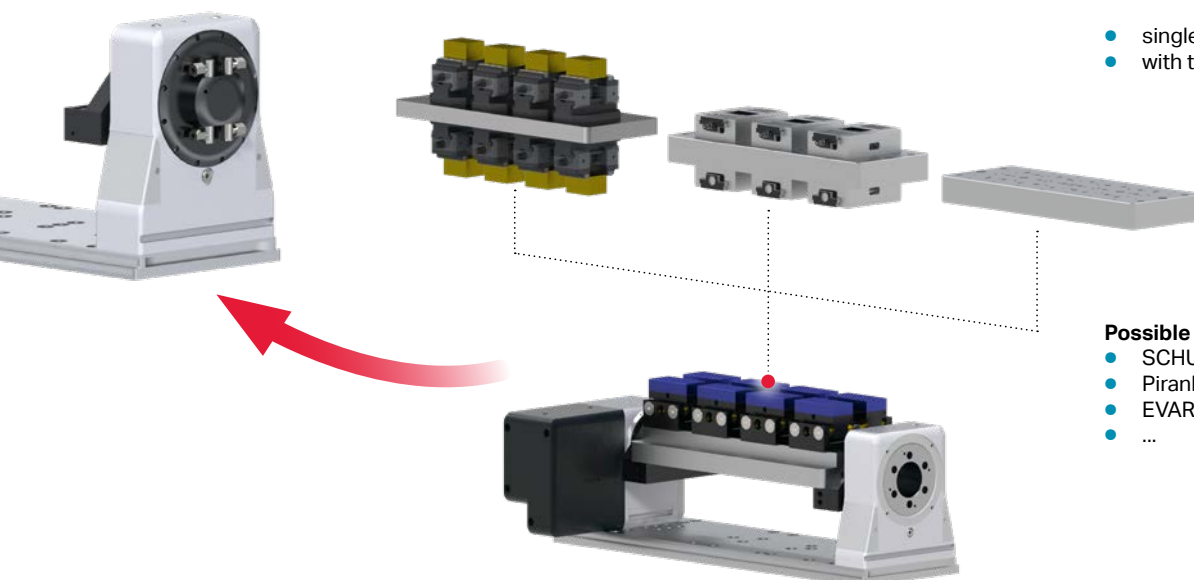
- clamping yokes quickly interchanged without any re-alignment

- vises moved without any re-alignment
- easily adaptable to suit part size

Possible systems

- SCHUNK
- TRIAG
- EVARD
- ...

Yoke with bolted on clamping tools (manual or automatic)



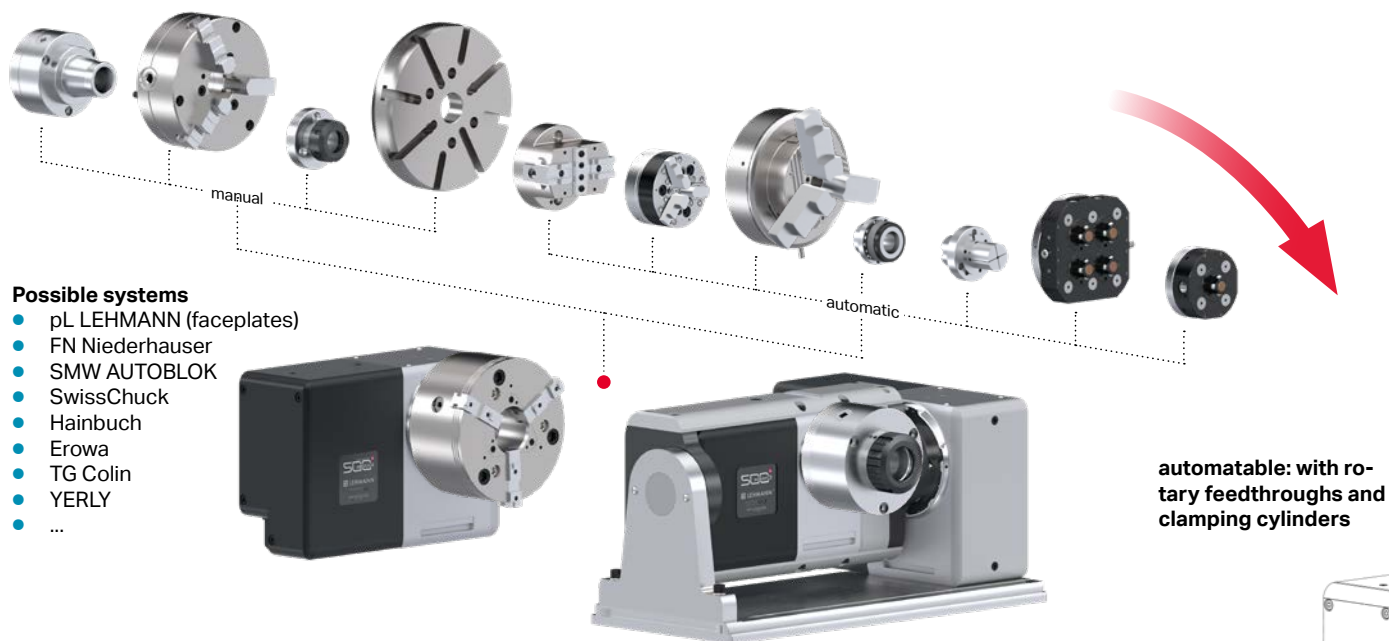
- single or double-sided
- with tapped hole pattern

Possible systems

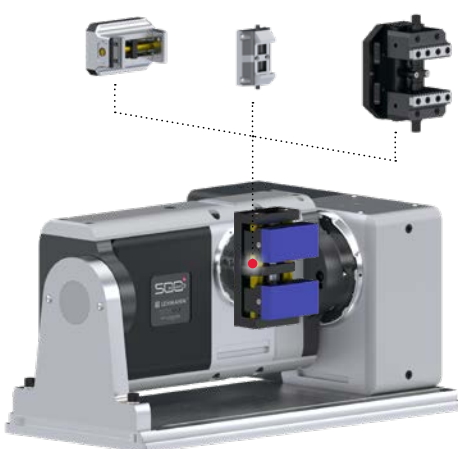
- SCHUNK
- Piranha
- EVARD
- ...

From manual clamping tools for single item production through to fully automated systems

Faceplates, force clamp and jaw chucks, collet chucks



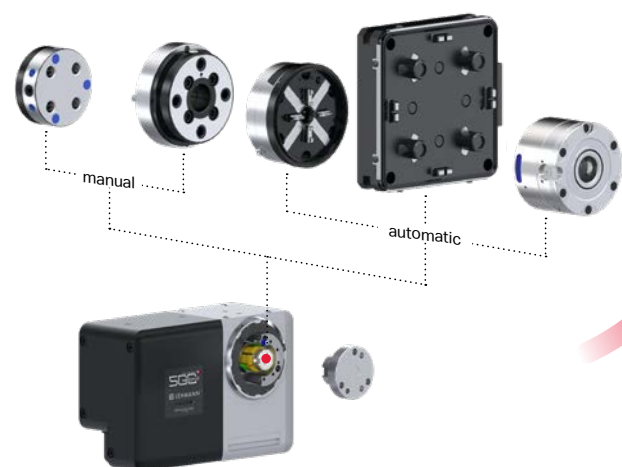
Centric clamping unit



Possible systems

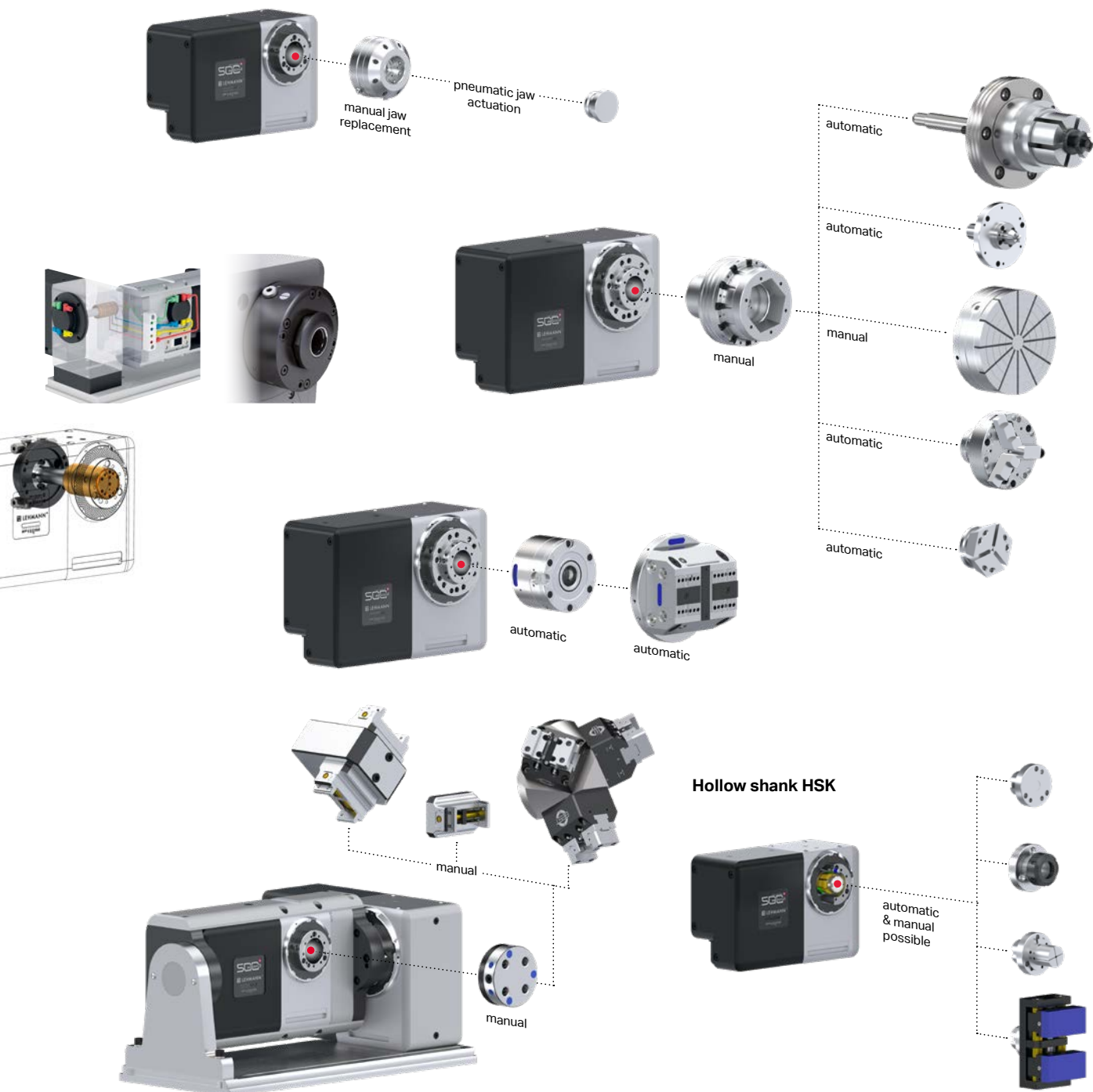
- SCHUNK
- LANG
- Gressel
- Piranha Clamp
- EVARD
- TRIAG
- ...

Zero point clamping systems



Centering clamping unit for workpiece handling,
built-on zero point clamping system for quick vise
interchange

Possible combinations



Overview,
Applications

System &
Facts, smartBox

Rotary
tables

SPZ,
DDF, WMS

MOT, KAB,
WDF, CNC

Aligning,
GLA, RST, LOZ

Service
& Technology

Tooling

HSK clamping with precise angular positioning = compact palletizing system manually and automatically



newChuck: ideal table chuck for machining of the 5th or 6th side, for example, with Integrated ripas

All clamping means installed by pL LEHMANN (if ordered together with a rotary table)

The main advantages of ripas

- Very space-saving, as integrated completely in the spindle
- Easy to retrofit
- Very rigid torsionally
- High precision
- Standard interface proven in thousands of applications
- When required, standard adapter can also be used (no rough positioning possible)

The principle

The basis is the standardized HSK clamping with conventional clamping sets. However, the carrier cams are precisely ground and can deflect axially. The counterpart (HSK adapter) has a precise groove as well as a positioning bore for the guide pin.

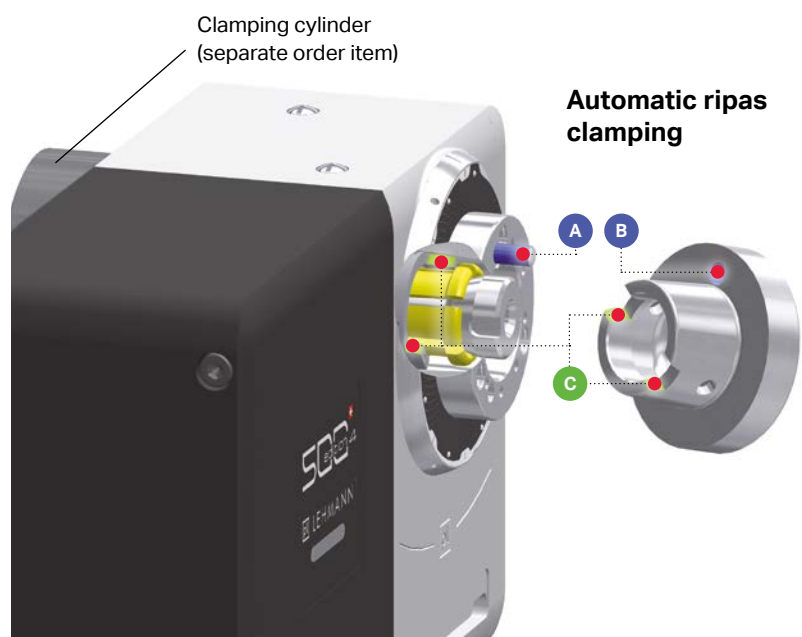
The function

ripas has 3 functions:

- A Anti-twist protection
- B Rough positioning
- C Precision positioning

Process

During changes (manually or automatic), the guide pin A ensures proper orientation while providing rough positioning at the same time B. Shortly before the face is reached, the inner precision cams perform the precision positioning C.



Flexible, precise, compact and can be automated –
the ripas / zero point clamping system from
pL LEHMANN

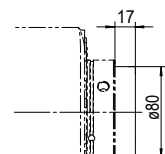
SPZ.5xx = Item number for combined clamping cylinder for types 507 and 510

	Item no.	Designation	Weight [kg]	Manual (MAPAL)	automatic (Ortlieb)	Required clamping cylinder *
507	RIP.507-63m**	ripas clamping, manual, A63	0.97	●		
	RIP.507-63m-OT	ripas clamping, manual, A63, for Ottet system		●		
	RIP.507-63k	ripas clamping, automatic, A63	1.12		●	SPZ.5xx-9 / -9p
	RIP.507-63k-OT	ripas clamping, automatic, A63, for Ottet system			●	SPZ.5xx-9 / -9p
510	RIP.510-63m**	ripas clamping, manual, A63	0.97	●		
	RIP.510-63m-OT	ripas clamping, manual, A63, for Ottet system		●		
	RIP.510-63k	ripas clamping, automatic, A63	1.12		●	SPZ.5xx-9 / -9p
	RIP.510-63k-OT	ripas clamping, automatic, A63, for Ottet system			●	SPZ.5xx-9 / -9p
520	RIP.510-63k-WMS2	ripas clamping, automatic, HSK-A63, for WMS.510-Vor2			●	SPZ.5xx-9 / -9p
	RIP.520-63m	ripas clamping, manual, A63	1.45	●		
all sizes	RIP.520-63k	ripas clamping, automatic, A63	1.66		●	SPZ.520-9 / -9p
	MKx.5xx-MK4-1	Adapter MK4	1.60			
	RIP.63ada	ripas adapter - Standard	0.70			
	RIP.63ada-B	ripas adapter with face coating for major improvement of the slip-free torque transmitted (please refer to technical data)	0.70			
	RIP.63-KD-1	ripas/HSK alignment pin	2.63			
	RIP.FUTm	ripas table chuck	23.10	●		

HSK = Hollow shank taper to DIN 69063-1 (spindle) or DIN 69893 (adapters)

* For T-type rotary tables it may be necessary to increase the center height, see p. 71

** Not possible in combination with the «Labyrinth» spindle seal (see p. 37)



Above dimensions apply with ripas adapter inserted. Without adapter, the collet chuck projects approx. 10.5 mm.

Technical data for ripas / HSK

	Unit	HSK-A63 manual		HSK-A63 automatic	
		Standard	ripasGrip (option)	Standard	ripasGrip (option)
Perm. tension, max.	kN		–	10 for hydr. 50 / pneum. 9 bar ¹⁾	
Resulting insertion force on adapter, max.	kN		30 at 20 Nm ²⁾	30	
Perm. pull-out torque (before losing face contact)	kN		approx. 600	approx. 600	
Transport load	kg		approx. 60	approx. 60	
Perm. torque ³⁾ (slip ⁴⁾ max. ± 0.003°) A	Nm	–	approx. +50%	approx. 150	approx. 300
Perm. torque ³⁾ (slip ⁴⁾ max. ± 0.01°) B	Nm	–	approx. +50%	approx. 250	approx. 450
Repeat accuracy, XYZ	mm		< 0.005	< 0.005	
Repeat accuracy, angular	± arc sec		8	4	

¹⁾ With SPZ.5xx-9 / -9p

³⁾ Values apply under static conditions, without any vibrations, with no load, dry, grease-free, clean

²⁾ Radial screw

⁴⁾ Returns to original position after unclamping/clamping

Options for all sizes

SPZ.Awk-Vor	Preparation for presence check only possible for automatic clamping (only with adapter from pL)
SPZ.Awk	Control box for presence check (see p. 70)

CAPTO clamping

	Item no.	Designation	Weight [kg]	Manual	auto- matic	Required clamp- ing cylinder *
507	CAP.507-C3k	Capto C3			●	SPZ.5xx-9
	CAP.507-C3k-WMS2	Capto C3, for WMS.507-Vor2			●	
	CAP.507-C4m	Capto C4		●		
	CAP.507-C4k	Capto C4			●	SPZ.5xx-9
	CAP.507-C4k-WMS2	Capto C4, for WMS.507-Vor2			●	
510	CAP.510-C4m	Capto C4		●		
	CAP.510-C4k	Capto C4			●	SPZ.5xx-9



* For T-type rotary tables it may be necessary to increase the center height, see p. 71

Tooling for individual finish machining / finishing



Jumbo pallet (300 x 300 mm) on centric AM-LOCK chuck QUATTRO for light machining



Jumbo pallet (300 x 300 mm) on 4x AMLOCK-QUATTRO chucks for higher machining forces

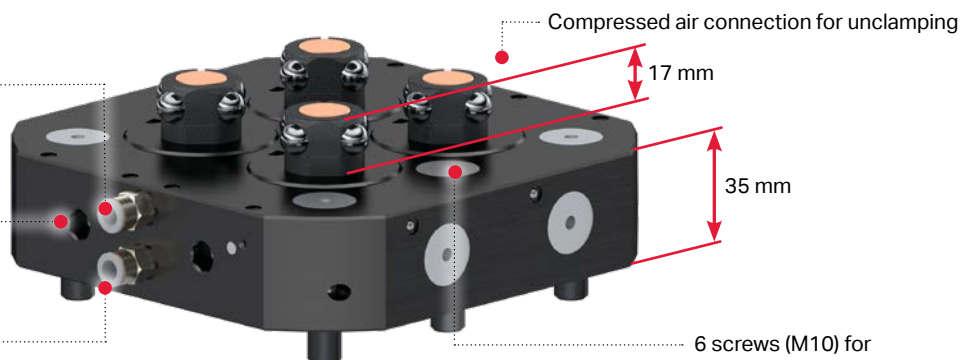


QUATTRO chuck

Connection for contact check/cleaning

Manual clamping: 180° turn suffices

Compressed air connection for clamping



Dimensions: 150 x 150 x 35 (53) mm (L x W x H)

UNO chuck



Dimensions: 100 x 100 mm 35 mm high

6 benefits (applies to QUATTRO and UNO)

- Only 35 mm high
- Manual and pneumatic in one
- Easy to clean
- With pulse voltage
- Easy mounting
- Minimal maintenance

Technical data

		UNO	QUATTRO
Repeat accuracy X/Y/Z		approx. ± 0.005 mm	
Retention force, clamped	manual	approx. 6 kN	approx. 24 kN
	pneumatic at 6 bar	approx. 10 kN	approx. 40 kN

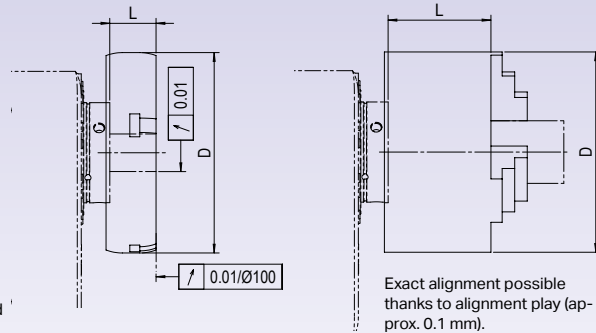
Item no.

Item no.	Designation	Dimensions	Weight [kg]	max. speed [rpm]
AML.SPF-U	UNO chuck	Ø50x34 mm, 1 pin	1.18	
AML.SPF-Q	QUATTRO chuck	150x150x34 mm, 4 pins	4.70	



for more information, see AM-LOCK brochure

Clamped quickly and easily
Quickly converted for small series
and express work



All clamping means supplied loose, except TPL.mon or if increased accuracy ordered
Further information about jaw chucks at: www.niederhauser.ch
Request installation and operating instructions directly from manufacturer

Faceplates (axial discs)

Item no.	Designation	Diameter D [mm]	Thickness [mm]	Passage [mm]	L from spindle [mm]	Weight [kg]	max. speed [rpm]	Moment of inertia J [kgm²]	Niederhauser item no.
507*	TPL.507-160	Faceplate, 4 T-slots 12 mm	160	30	30	6		0.02	
510***	TPL.510-160	Faceplate, 4 T-slots 12 mm	160	40	30	6		0.02	
	TPL.510-200	Faceplate, 4 T-slots 12 mm	200	40	30	10		0.05	
	TPL.510-240	Faceplate, 4 T-slots 12 mm	240	45	30	16		0.12	
520***	TPL.520-250	Faceplate, 8 T-slots 14 mm	250	45	45	17		0.14	
	TPL.520-300	Faceplate, 8 T-slots 14 mm	300	50	45	27		0.31	
	TPL.520-350	Faceplate, 8 T-slots 14 mm	350	50	45	37		0.58	
530	TPL.530-300	Faceplate, 8 T-slots 18mm	300	51	45	27		0.31	
	TPL.530-400	Faceplate, 8 T-slots 18mm	400	51	45	49		0.99	
	TPL.530-500**	Faceplate, 8 T-slots 18 mm	500	56	45	84		2.65	
	TPL.5xx-GEN	Increased accuracy = ½ tolerance values							
	TPL.mon	Faceplate assembled and measured							

* Not possible in combination with spindle seal with labyrinth SPL.507-Lab
** Increased center height required (see p. 71)
*** Not possible for TxPc models



Scroll chucks (manual)

incl. matching adapter flange, 1 set each of hard boring and turning jaws as well as clamping wrench and fastening screw

507*	BFU.507-100ps	Scroll chuck	100		20	62.5	4	6300	0.005	507-100ps
	BFU.507-125ps**	Scroll chuck	125		35	74	7	5500	0.01	507-125ps
	BFU.507-160ps**	Scroll chuck	160		42	82.5	13	4600	0.04	507-160ps
510	BFU.510-125ps	Scroll chuck	125		35	74	7	5500	0.01	510-125ps
	BFU.510-160ps**	Scroll chuck	160		42	82	13	4600	0.04	510-160ps
	BFU.510-200ps**	Scroll chuck	200		44	92	22	4000	0.07	510-200ps
520	BFU.520-160ps	Scroll chuck	160		42	85	13	4600	0.04	520-160ps
	BFU.520-200ps**	Scroll chuck	200		55	95	23	4000	0.12	520-200ps
	BFU.520-250ps**	Scroll chuck	250		76	106	39	3500	0.31	520-250ps
530	BFU.530-250ps	Scroll chuck	250		76	104	32	3500	0.25	530-250ps
	BFU.530-315ps	Scroll chuck	315		80	116	56	2800	0.69	530-315ps
	BFU.530-400ps	Scroll chuck	400		136	123	97	2000	1.88	530-400ps
	BFU.5xx-GEN	Increased accuracy = ½ tolerance values								



- Limited clamping force
- Limited range of jaws (no claw and segment jaws)
- Cheaper than wedge bar chuck

Wedge bar chuck SMW type HG-F (manual, modular helical gear jaw system)

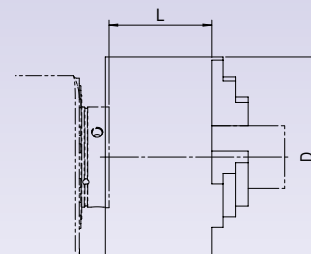
incl. matching adapter flange, 1 set of hard, reversible ground stepped jaws in the chuck as well as clamping wrench and fastening screw

507*	BFU.507-160ks**	Wedge bar chuck	160		42	81	11	5500	0.04	507-160ks
510	BFU.510-160ks**	Wedge bar chuck	160		42	81	11	5500	0.04	510-160ks
	BFU.510-200ks**	Wedge bar chuck	200		42	102.5	22	4800	0.11	510-200ks
	BFU.510-250ks**	Wedge bar chuck	250		42	102.5	22	4800	0.11	510-250ks
520	BFU.520-160ks	Wedge bar chuck	160		46	70	11	5500	0.04	520-160ks
	BFU.520-200ks**	Wedge bar chuck	210		60	92	22	4800	0.11	520-200ks
	BFU.520-250ks**	Wedge bar chuck	260		81	110	38	4200	0.30	520-250ks
530	BFU.530-250ks	Wedge bar chuck	260		81	112	38	4200	0.30	520-250ks
	BFU.530-315ks	Wedge bar chuck	315		102	135	58	3500	0.89	520-315ks
	BFU.530-400ks	Wedge bar chuck	400		128	153	112	2700	2.58	520-400ks
	BFU.5xx-GEN	Increased accuracy = ½ tolerance values								



- Higher clamping force
- Faster conversions (with quick jaw change system)
- More jaw accessories
- More expensive than scroll chuck

* Not possible in combination with spindle seal with labyrinth SPL.507-Lab
** Not possible for TxPc models



Exact alignment possible thanks to alignment play (approx. 0.1 mm).

Clamping means installed and aligned by pL LEHMANN (if ordered together with a rotary table)

Further information: www.niederhauser.ch
Request installation and operating instructions directly from manufacturer

Precision power chucks, 2-jaw (cylinder-actuated)

	pL LEHMANN Item no.	Designation	D [mm]	Passage [mm]	L from spindle [mm]	Weight [kg]	max. speed [rpm]	Moment of inertia [kg ²]	Required clamping cylinder	Niederhauser item no., incl. adapter flange
507	BFU.507-100ksa-2	2-CL-C 100 Z92	100	-	68	5	6000		SPZ.5xx-15 / -15p	507-CLC100
	BFU.507-125ksa-2	2-CL-C 125 Z115	125	-	90	8	5000		SPZ.5xx-15 / -15p	507-CLC125
	BFU.507-160ksa-2	2-CL-C 160 Z140	160	-	105	14	4100		SPZ.5xx-15 / -15p	507-CLC160
510	BFU.510-125ksa-2	2-CL-C 125 Z115	125	-	92	8	5000		SPZ.5xx-15 / -15p	510-CLC125
	BFU.510-160ksa-2	2-CL-C 160 Z140	160	-	107	14	4100		SPZ.5xx-15 / -15p	510-CLC160
	BFU.510-200ksa-2	2-CL-D 200 Z170	200	-	118	20	3300		SPZ.5xx-15 / -15p	510-CLD200
520	BFU.520-160ksa-2	2-CL-C 160 Z140	160	-	109	15	4100		SPZ.520-15 / -15p	520-CLC160
	BFU.520-200ksa-2	2-CL-D 200 Z170	200	-	120	20	3300		SPZ.520-15 / -15p	520-CLD200
530	BFU.530-200ksa-2	2-CL-D 200 Z170	200	-	123	22	3300		SPZ.530-15 / -15p	530-CLD200

- Can be used as centric clamping unit (if clamping cylinder is present)
- Up to size 160 with tongue and groove base jaws



Precision power chucks, 3-jaw (cylinder-actuated)

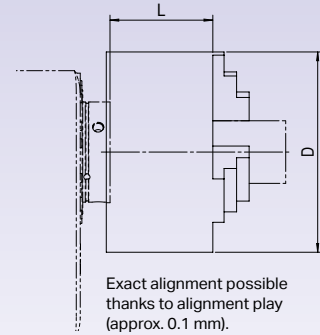
	pL LEHMANN Item no.	Designation	D [mm]	Passage [mm]	L from spindle [mm]	Weight [kg]	max. speed [rpm]	Moment of inertia [kg ²]	Required clamping cylinder	Niederhauser item no., incl. adapter flange
507	BFU.507-130ksa	BHD-130-32-3-Z	130	32	85	7	7000		SPZ.5xx-15 / -15p	507-BHD130
	BFU.507-165ksa	BHD-165-46-3-Z	165	46	95	13	6000		SPZ.5xx-15 / -15p	507-BHD165
510	BFU.510-165ksa	BHD-165-46-3-Z	165	46	97	13	6000		SPZ.5xx-15 / -15p	510-BHD165
	BFU.510-210ksa	BHD-210-52-3-Z	210	52	112	24	5000		SPZ.5xx-15 / -15p	510-BHD210
520	BFU.520-165ksa	BHD-165-46-3-Z	165	46	87	13	6000		SPZ.520-15 / -15p	520-BHD165
	BFU.520-210ksa	BHD-210-52-3-Z	210	52	114	24	5000		SPZ.520-15 / -15p	520-BHD210
530	BFU.530-210ksa	BHD-210-52-3-Z	210	52	117	27	5000		SPZ.530-15 / -15p	530-BHD210

- Radial run-out approx. 0.02 mm
- Repeatability approx. 0.02 mm
- Fine serration on base jaws
- BHD version is with inch jaws



Clamping means installed and aligned by pL LEHMANN
(if ordered together with a rotary table)

Further information: www.niederhauser.ch
Request installation and operating instructions directly from manufacturer

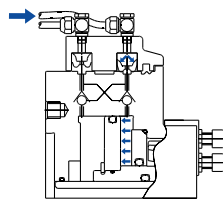


Front-end power chuck, 3-jaw

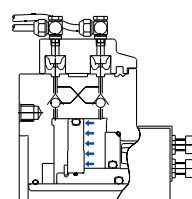
pL LEHMANN Item no.	Designation	D [mm]	Passage [mm]	L from spindle [mm]	Weight [kg]	max. speed [rpm]	Moment of inertia [kg·m ²]	Niederhauser item no., incl. adapter flange
507	BFU.507-125vsa	SP 125-26	204	26	135	21	4000	507-SP125
510	BFU.510-160vsa	SP 160-38	255	38	163	33	3500	510-SP160
520	BFU.520-160vsa	SP 160-38	255	38	163	33	3500	520-SP160



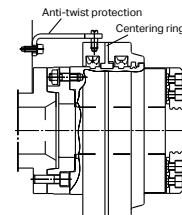
- With finely serrated base jaws



Clamp/open (only possible at standstill). Profile seal is applied to the chuck outer diameter by compressed air and the cylinder chamber is filled. After the clamping pressure has been built up, the compressed air is switched off and the respective cylinder chamber is closed by a pilot-operated check valve in the chuck.



SMW profile seal has lifted off due to inherent elasticity. Clamping pressure is maintained permanently in the cylinder and chuck can rotate.



Distributor mounted on chuck outer diameter with centering ring (wear part). An anti-rotation device is required on the machine headstock.

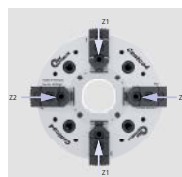
Precision power chucks, 4-jaw (cylinder-actuated)

pL LEHMANN Item no.	Designation	D [mm]	Passage [mm]	L from spindle [mm]	Weight [kg]	max. speed [rpm]	Moment of inertia [kg·m ²]	Required clamping cylinder	Niederhauser item no., incl. adapter flange
510	BFU.510-210ksa-4	Centco4-210-52	210	52	129	29	5000	SPZ.5xx-15 / -15p	510-Centco4
520	BFU.520-210ksa-4	Centco4-210-52	210	52	131	30	5000	SPZ.520-15 / -15p	520-Centco4
530	BFU.530-210ksa-4	Centco4-210-52	210	52	134	32	5000	SPZ.530-15 / -15p	530-Centco4



- Good radial and axial concentricity
- Centric clamping of various component shapes

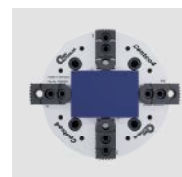
Initially, only the force required for workpiece centering acts on the two pairs of jaws Z1 and Z2. The force required for machining is built up only after both pairs of jaws Z1 and Z2 are in contact with the workpiece.



2+2 centric compensating clamping



2+2 centric compensating clamping for round or thin-walled workpieces

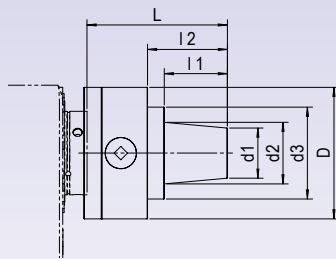


2+2 centric compensating clamping for rectangular or square workpieces

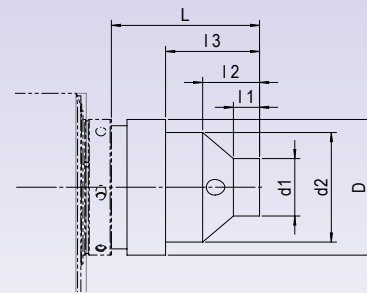


2+2 centric compensating clamping for workpieces with awkward geometric shape

Manual flange-mounted chuck supplied loose,
power-operated, set up and aligned by pL LEHMANN
(if ordered together with a rotary table)



Mounting chuck, manual
Radial run-out with collet approx. 15µ (Schaublin)



Mounting chuck, automatic Type B axfix

Further information at: www.niederhauser.ch

Request installation and operating instructions directly from manufacturer

SPZ.5xx = Item number for combined clamping cylinder for types 507 and 510 (see p. 70)

	pL LEHMANN Item no.	Designation	System	axfix	Manual	Power-actuated	L [mm]	I1 [mm]	I2 [mm]	I3 [mm]	D [mm]	d1 [mm]	d2 [mm]	d3 [mm]	Weight [kg]	Max. speed [rpm]	Required clamping cylinder ** (Option)	Niederhauser item no., incl. adapter flange
507	ZSP.507-B32Am	Mounting chuck	B32	•	•	•	133	59	75	–	126	53	62	88	8.5	6000		507-B32
	ZSP.507-B32Aka	Mounting chuck	B32	•	•	•					130				7.2	8000	SPZ.5xx-d2.5d25	507-B32KA
510	ZSP.510-B32Am	Mounting chuck	B32	•	•	•	133	59	75	–	126	53	62	88	8.7	6000		510-B32
	ZSP.510-B32Aka	Mounting chuck	B32	•	•	•					130				7.2	8000	SPZ.5xx-d2.5d25	510-B32KA
520	ZSP.520-B32Am	Mounting chuck	B32	•	•	•	149	59	75	–	130	53	62	88	9.7	6000		520-B32
	ZSP.520-B32Aka	Mounting chuck	B32	•	•	•	135	25	54.5	90	130	55	105		8.4	8000	SPZ.5xx-d2.5d25	520-B32KA
	ZSP.520-B45Am	Mounting chuck	B45	•	•	•	180	76	–	–	160	65	96	–				520-B45
	ZSP.520-B45Aka	Mounting chuck	B45	•	•	•	142	25	55.5		130	68	105				SPZ.520-d2.5 / -3p	520-B45KA

** For T-type rotary tables it may be necessary to increase the center height, see p. 71

Clamping capacity and passage

System	Clamping capacity [mm]	Collet passage [mm]
B32	0.3...32	28
B45	1...45	36

Mounting chuck



B32, manual



B32, automatic



B45, manual

Collet holder B32



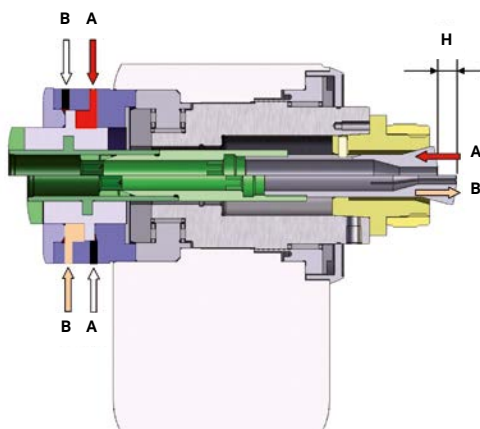
with pointed B32 collet



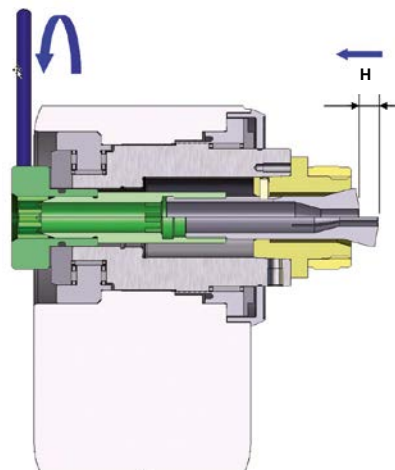
with standard B32 collet

For more, please see p. 151

Principle of collet clamping with HSK application

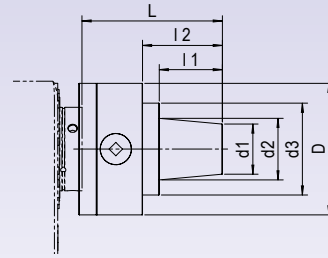


Automatic collet clamping

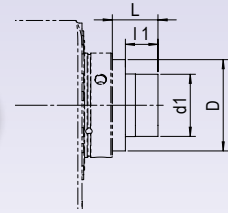


Manual collet clamping

Manual flange-mounted chuck supplied loose,
power-operated, set up and aligned by pL LEHMANN
(if ordered together with a rotary table)



Mounting chuck, manual



Collet adapter, installed by pL
LEHMANN (if ordered together
with a rotary table)

Further information at: www.niederhauser.ch

Request installation and operating instructions directly from manufacturer

SPZ.5xx = Item number for combined clamping cylinder for types 507 and 510 (see p. 70)

pL LEHMANN Item no.	Designation	System	Manual Power-actuated	L [mm]	L1 [mm]	L2 [mm]	D [mm]	d1 [mm] * without/ with threaded protective ring	d2 [mm]	d3 [mm]	Weight [kg]	Max. speed [rpm]	Required clamping cylinder ** (Option)	Niederhauser item no., incl. adapter flange
507	ZSP.507-W20m with HSK adapter	W20	•	50	35	-	70	38/54*	-	-	-	-	-	-
	ZSP.507-W20Am Mounting chuck	W20	•	111	36	53	126	40	54	88	7.5	6000	-	507-W20
	ZSP.507-W20k with HSK adapter	W20	•	50	35	-	70	38/54*	-	-	-	-	SPZ.5xx-d2.5 / -3p	-
	ZSP.507-W25m with HSK adapter	W25	•	50	35	-	70	48/60*	-	-	-	-	-	-
	ZSP.507-W25Am Mounting chuck	W25	•	135	60	76	126	48	59	88	8.5	6000	-	507-W25
	ZSP.507-W25k with HSK adapter	W25	•	50	35	-	70	48/60*	-	-	-	-	SPZ.5xx-d2.5 / -3p	-
	ZSP.507-W31m with HSK adapter	W31.75	•	50	35	-	70	46	-	-	-	-	-	-
	ZSP.507-W31Am Mounting chuck	W31.75	•	122	48	64	126	53	62	88	7.5	6000	-	507-W31.75
	ZSP.507-W31k with HSK adapter	W31.75	•	50	35	-	70	46	-	-	-	-	SPZ.5xx-d2.5 / -3p	-
	ZSP.507-W31kND with HSK adapter, effective passage increased ø25 mm	W31.75	•	50	35	-	70	46	-	-	-	-	SPZ.5xx-d2.5d25	-
510	ZSP.510-W20m with HSK adapter	W20	•	50	35	-	70	38/54*	-	-	-	-	-	-
	ZSP.510-W20Am Mounting chuck	W20	•	111	36	53	126	40	54	88	7.5	6000	-	510-W20
	ZSP.510-W20k with HSK adapter	W20	•	50	35	-	70	38/54*	-	-	-	-	SPZ.5xx-d2.5 / -3p	-
	ZSP.510-W25m with HSK adapter	W25	•	50	35	-	70	48/60*	-	-	-	-	-	-
	ZSP.510-W25Am Mounting chuck	W25	•	135	60	76	126	48	59	88	8.5	6000	-	510-W25
	ZSP.510-W25k with HSK adapter	W25	•	50	35	-	70	48/60*	-	-	-	-	SPZ.5xx-d2.5 / -3p	-
	ZSP.510-W31m with HSK adapter	W31.75	•	50	35	-	70	46	-	-	-	-	-	-
	ZSP.510-W31Am Mounting chuck	W31.75	•	122	48	64	126	53	62	88	7.5	6000	-	510-W31.75
	ZSP.510-W31k with HSK adapter	W31.75	•	50	35	-	70	46	-	-	-	-	SPZ.5xx-d2.5 / -3p	-
	ZSP.510-W31kND with HSK adapter, effective passage increased ø25 mm	W31.75	•	50	35	-	70	46	-	-	-	-	SPZ.5xx-d2.5d25	-
520	ZSP.520-W20Am Mounting chuck	W20	•	127	36	53	130	40	54	88	8.7	6000	-	520-W20
	ZSP.520-W25Am Mounting chuck	W25	•	151	60	76	130	48	59	88	9.7	6000	-	520-W25
	ZSP.520-W31Am Mounting chuck	W31.75	•	138	48	64	130	53	62	88	8.7	6000	-	520-W31.75

** For T-type rotary tables it may be necessary to increase the center height, see p. 71

Collet adapters (Type W) pL LEHMANN®



W20



W25



W31.75 (5C)

Collet holder W25



with standard W25 collet



ki-mech gmbh

Further information at:
www.ki-mech.ch
Request installation and op-
erating instructions directly
from manufacturer

- Rugged and slim design for better accessibility
- Radial run-out < 0.005mm

Clamping capacity and (effective) passage

System	Clamping capacity [mm]	Collet passage [mm]	Standard effective passage [mm]
W20	0.3...23	14.5	14
W25	0.3...29	21	17
W31.75 (5C)	0.5...31	27	17
W31.75 (5C), increased passage*	0.5...31	27	25

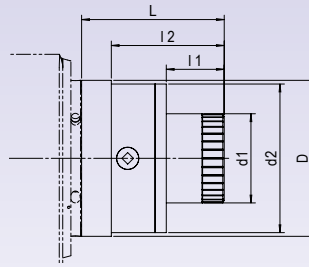
* applies to kND versions in table above

Collet clamping Type F and ER, SCHAUBLIN



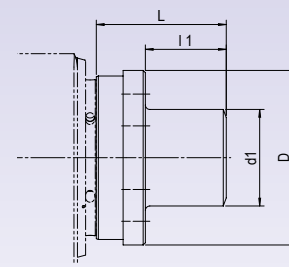
Manual flange-mounted chuck supplied loose, power-operated, set up and aligned by pL LEHMANN (if ordered together with a rotary table)

for sizes 507 to 530



Mounting chuck, manual Type F

for sizes 507 to 530



Mounting chuck, hydraulic Type F

Further information at: www.niederhauser.ch

Request installation and operating instructions directly from manufacturer

Collet clamping Type F

Achievable accuracy with collet 30–40µ

	pL LEHMANN Item no.	Designation	Manual	Pneumatic	Hydraulic	System	Clamp- ing capacity [mm]	L [mm]	I1 [mm]	D [mm]	d1 [mm]	Weight [kg]	Max. speed [rpm]	Required clamp- ing cylinder *	Niederhauser item no., incl. adapter flange
507	ZSP.507-F35Am	Mounting chuck	•			F35	1...30	129	40	160	90	12.7	4500		507-F35
	ZSP.507-F35Ak	Mount. chuck, power- actuated		•		F35	1...30	117.4	73.4	112	85	8.8	6000	SPZ.5xx-9 / -9p	507-F35K
510	ZSP.510-F35Am	Mounting chuck	•			F35	1...30	129	40	160	90	12.7	4500		510-F35
	ZSP.510-F35Ak	Mount. chuck, power- actuated		•		F35	1...30	114.4	73.4	112	85	8.8	6000	SPZ.5xx-9 / -9p	510-F35K
520	ZSP.520-F48Am	Mounting chuck	•			F48	1...42	145	40	160	90	12.7	4500		520-F48
	ZSP.520-F48Ak	Mount. chuck, power- actuated		•		F48	1...42	137.9	90.9	155	102	8.8	6000	SPZ.520-9 / -9p	520-F48K
530	ZSP.530-F66Am	Mounting chuck	•			F66	4...60	192	78	210	120	24	4000		530-F66
	ZSP.530-F66Ak	Mount. chuck, power- actuated		•		F66	4...60	174.9	108.9	235	130	18.7	5000	SPZ.530-9 / -9p	530-F66K

SPZ.5xx = Item number for combined clamping cylinder for types 507 and 510 (see p. 70)

* For T-type rotary tables it may be necessary to increase the center height, see p. 71



Manual



Automatic

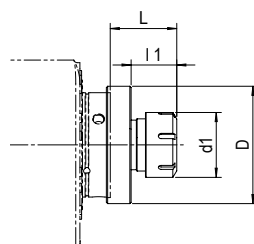
Collect clamping Type ER

	pL LEHMANN Item no.	Designation	Manual	System	Clamping capacity [mm]	L [mm]	I1 [mm]	I2 [mm]	D [mm]	d1 [mm]	d2 [mm]	Weight [kg]	Max. speed [rpm]	Niederhauser item no., incl. adapter flange
507	ZSP.507-E25Am	Mounting chuck	•	ER-25	0.5...17	62	30	–	90	42	–	2.7	6000	507-ER25
	ZSP.507-E32Am	Mounting chuck	•	ER-32	1...22	70	38	–	90	50	–	3.0	6000	507-ER32
	ZSP.507-E40Am	Mounting chuck	•	ER-40	2...30	72	40	–	90	63	–	3.7	6000	507-ER40
510	ZSP.510-E25Am	Mounting chuck	•	ER-25	0.5...17	46	30	–	90	42	–	1.5	6000	510-ER25
	ZSP.510-E32Am	Mounting chuck	•	ER-32	1...22	54	38	–	90	50	–	1.8	6000	510-ER32
	ZSP.510-E40Am	Mounting chuck	•	ER-40	2...30	56	40	–	90	63	–	2.5	6000	510-ER40
520	ZSP.520-E25Am	Mounting chuck	•	ER-25	0.5...17	80	30	50	130	42	90	4.2	6000	520-ER25
	ZSP.520-E32Am	Mounting chuck	•	ER-32	1...22	88	38	50	130	50	90	4.5	6000	520-ER32
	ZSP.520-E40Am	Mounting chuck	•	ER-40	2...30	90	40	50	130	63	90	5.2	6000	520-ER40



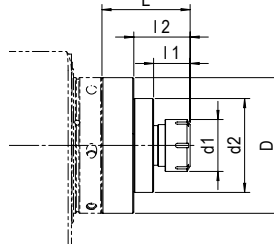
Manual

for sizes 507 and 510



Mounting chuck, manual Type ER

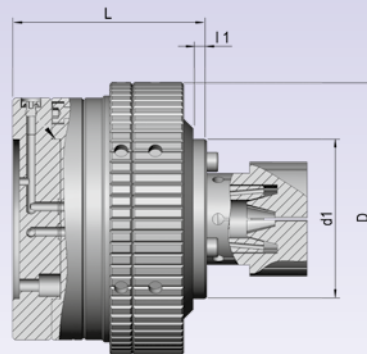
for size 520



Mounting chuck, manual Type ER

Clamping devices assembled and aligned by pL LEHMANN
(if ordered together with a rotary table)

Further information at: www.niederhauser.ch
Request installation and operating instructions directly from manufacturer



OTTET collet chuck

pL LEHMANN Item no.	Designation	D [mm]	d 1 [mm]	L [mm]	l 1 [mm]	Weight [kg]	Max. speed [rpm]	Power- actuated	Required rotary union or clamping cylinder*	Niederhauser item no. incl. adapter flange
507	ZSP.507-OTp	130	–	85	–	12.7	7,000	•	DDF.507-04	507-FNO-1
	ZSP.507-OTph**	120	70	85	–	9.2	7,000	•	DDF.507-04	507-FNO-PH
	ZSP.507-OTkh**	120	70	96	20	9.2	7,000	•	SPZ.5xx-9 / -9p	507-FNO-K
510	ZSP.510-OTp	130	–	85	–	12.7	7,000	•	DDF.510-04	510-FNO-1
	ZSP.510-OTph**	120	70	85	–	9.2	7,000	•	DDF.510-04	510-FNO-PH
	ZSP.510-OTkh**	120	70	99	20	9.2	7,000	•	SPZ.5xx-9 / -9p	510-FNO-K
520	ZSP.520-OTp	130	–	101	–	12.7	7,000	•	DDF.520-04	520-FNO-1
	ZSP.520-OTph**	130	70	98	–	9.2	7,000	•	DDF.520-04	520-FNO-PH
	ZSP.520-OTkh**	130	70	102	20	9.2	7,000	•	SPZ.520-9 / -9p	520-FNO-K

* see pp. 70–73

** h = with stroke limitation

The collet chuck with clamping piston inside is suitable for internal and external clamping, pneumatically actuated.



without stroke
limitation



with stroke
limitation

OTTET collet clamping with ripas

pL LEHMANN®

pL LEHMANN Item no.	Designation	Max. speed [rpm]	Required ripas palletizing system and clamping cylinder*
507	ZSP.507-OTk		RIP.507-63m-OT and SPZ.5xx-2.5 / -3p required
	ZSP.507-OTm		RIP.507-63k-OT and SPZ.5xx-2.5 / -3p required
510	ZSP.510-OTk		RIP.510-63m-OT and SPZ.5xx-2.5 / -3p required
	ZSP.510-OTm		RIP.510-63k-OT and SPZ.5xx-2.5 / -3p required

* see p. 70/71/145

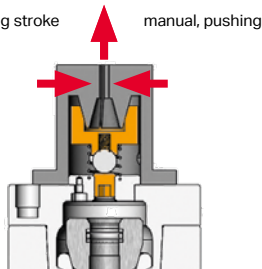
The collet chuck with clamping piston inside is suitable for internal and external clamping, pneumatically actuated.



ripas pallet with
OTTET collet

External clamping example

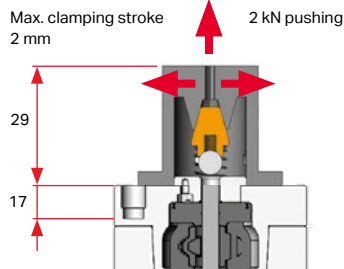
Max. clamping stroke
2 mm



ripas automatic (or manual), OTTET manual

Internal clamping example

Max. clamping stroke
2 mm



ripas manual (automatic not possible), OTTET automatic

- Machining depth 8–13 mm
- Collet min. Ø30 (only internal clamping possible)
- Collet max. Ø80mm



The clamping device serves as the starting point on the Lehmann CNC rotary table and can be set up easily for your workpieces through use of a wide variety of clamping elements and adapters. Regardless of whether the clamping requires a round or profiled contour, whether unmachined or finish-machined parts are involved, whether soft or hard machining, or external or internal clamping – the HAINBUCH System offers a multitude of clamping options – without major expense or effort for setup.

Clamping means installed and aligned by pL LEHMANN
(if ordered together with a rotary table)

Further information: www.hainbuch.com

Request installation and operating instructions directly from manufacturer

Advantages of Axzug

- More accurate
- More stable
- Cheaper
- Smaller

Advantages of Axfix

- Fewer clamping marks
- No loss of clamping length
- Defined axial positioning
(e.g., for work with counter spindle)
- Hainbuch system not possible

Rotating clamping means



TOPlus
Chuck



TOPlus mini
Chuck



SPANNTOP
Chuck



SPANNTOP mini
Chuck



TOROK hand chuck (only Axzug available)



Stationary clamping means



MANOK plus manual vise



HYDROK hydraulic vise

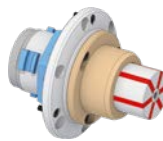


Clamping element



Clamping head – external clamping

Clamping adapters



MANDO Adapt mandrel –
Internal clamping



Jaw module size 145 or 215 –
jaw clamping (2 jaws also available)



Face driver
adaptation

Morse taper
adapter



Magnet module

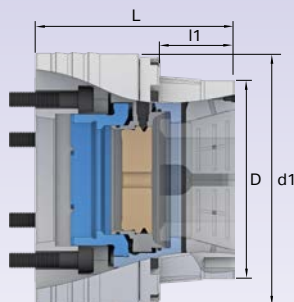
- All-round clamping
- 3 different versions: for tubular material, fine machining or boring out yourself
- Multitude of profile clamping options
- Coolant-resistant rubber-metal connection, keeps swarf out of the clamping means
- Clamping capacity SE $\varnothing$ 3 – 65 mm
Clamping capacity RD $\varnothing$ 3 – 65 mm
- Fast conversion from external to internal clamping without alignment thanks to CENTREX interface
- Radial run-out < 0.005 mm between chuck taper and mandrel taper
- Clamping capacity $\varnothing$ 8 – 100 mm
- axfixe 3-jaw clamping
- Can be used in rotating (moving) and stationary applications
- Convert from chuck head to mandrel or jaw clamping in less than 2 minutes
- Jaw stroke with size 65: 2.2 mm
- Enormous flexibility
- Self-centering of adapter in the chuck $\leq$ 0.003 mm
- Extremely fast conversion without disassembling the chuck [1 min.]
- End face axial clamping via neo-dymium magnet
- High axial run-out changeover accuracy
- High retention force of 140 N/cm²
- Assembly in 30 sec. without aligning
- Low maintenance, since resistant to contamination
- 1 size $\varnothing$ 200 available



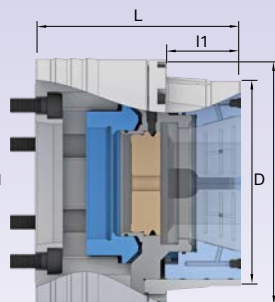
Clamping means installed and aligned by pL LEHMANN
(if ordered together with a rotary table)

Further information: www.hainbuch.com

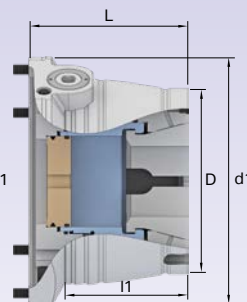
Request installation and operating instructions directly from manufacturer



TOPlus mini Axzug
SPANNTOP mini Axzug



TOPlus mini Axfix
SPANNTOP mini Axfix



TOROK SE Axzug
TOROK RD Axzug

HAINBUCH chucks TOPlus mini | TOROK SE

* For T-type rotary tables it may be necessary
to increase the center height, see p. 71

	pL LEHMANN Item no.	Designation	Manual Hydraulic	Size	Clamping capacity [mm]	L [mm]	l1 [mm]	D [mm]	d1 [mm]	Weight [kg]	Max. speed [rpm]	Required clamping cylinder *	HAINBUCH SYSTEM compatible	HAINBUCH item no., incl. adapter flange
507	HAI.507-tp-axz	TOPlus mini Axzug	•	26	3...26	84.5	31	67 f7	129	5.3	10000	SPZ.5xx-9 / -9p	•	10001281
	HAI.507-tp-axf	TOPlus mini Axfix	•	26	3...26	86	33	74 f7	129	5.8	10000	SPZ.5xx-9 / -9p	•	10001285
510	HAI.510-tp-axz	TOPlus mini Axzug	•	52	3...52	103.5	42	119 f7	150	10.9	7000	SPZ.5xx-9 / -9p	•	10001282
	HAI.510-tp-axf	TOPlus mini Axfix	•	52	3...52	104.5	44	119 f7	150	10.6	7000	SPZ.5xx-9 / -9p	•	10001286
	HAI.510-tp-to	TOROK SE Axzug	•	52	3...52	137	92	125 f7	174	14.6	7000		•	10001300
	HAI.510-tp-axz	TOPlus mini Axzug	•	52	3...52	107	42	119 f7	150	10.4	7000	SPZ.520-9 / -9p	•	10001283
520	HAI.520-tp-axf	TOPlus mini Axfix	•	52	3...52	109	44	119 f7	150	10.1	7000	SPZ.520-9 / -9p	•	10001287
	HAI.520-tp-to	TOROK SE Axzug	•	52	3...52	140	91.5	125 f7	174	14.4	7000		•	10001301
	HAI.530-tp-axz	TOPlus mini Axzug	•	65	3...65	112	49	129 f7	205	14.9	6000	SPZ.530-9 / -9p	•	10001284
	HAI.530-tp-axf	TOPlus mini Axfix	•	65	3...65	105.5	50	137 f7	203	14.7	6000	SPZ.530-9 / -9p	•	10001288
530	HAI.530-tp-to	TOROK SE Axzug	•	65	3...65	151.5	97	145 f7	210	18.8	6000		•	10001302



TOPlus mini

TOPlus mini

- 25 % higher retention force than SPANNTOP
- Outstanding rigidity thanks to large contact surface of the clamping segments
- Insensitive to dirt thanks to clamping head geometry
- Lower centrifugal force losses compared to jaw chucks
- Optimal lubrication thanks to lubrication grooves in the clamping element holder
- Workpiece stabilized through axial pulling against workpiece stop
- Radial run-out < 0.01 mm
- Minimal interference contour and easy changing of the clamping heads

HAINBUCH chucks SPANNTOP mini | TOROK RD

* For T-type rotary tables it may be necessary
to increase the center height, see p. 71

	pL LEHMANN Item no.	Designation	Manual Hydraulic	Size	Clamp- ing capacity [mm]	L [mm]	l1 [mm]	D [mm]	d1 [mm]	Weight [kg]	Max. speed [rpm]	Required clamping cylinder *	HAINBUCH SYSTEM compatible	HAINBUCH item no., incl. adapter flange
507	HAI.507-st-axz	SPANNTOP mini Axzug	•	32	3...32	101	43	66 f7	133	6.7	8000	SPZ.5xx-9 / -9p	•	10001289
	HAI.507-st-axf	SPANNTOP mini Axfix	•	32	3...32	96	44	74 f7	129	6.2	8000	SPZ.5xx-9 / -9p	•	10001293
510	HAI.510-st-axz	SPANNTOP mini Axzug	•	52	3...52	103.5	45	90 f7	150	9.0	7000	SPZ.5xx-9 / -9p	•	10001290
	HAI.510-st-axf	SPANNTOP mini Axfix	•	52	3...52	104.5	44	98 f7	150	9.2	7000	SPZ.5xx-9 / -9p	•	10001294
	HAI.510-st-to	TOROK RD Axzug	•	52	3...52	137	92	125 f7	174	14.7	7000		•	10001297
	HAI.510-st-axz	SPANNTOP mini Axzug	•	52	3...52	107	45	90 f7	150	9.1	7000	SPZ.520-9 / -9p	•	10001291
520	HAI.520-st-axf	SPANNTOP mini Axfix	•	52	3...52	109	44	98 f7	150	9.4	7000	SPZ.520-9 / -9p	•	10001295
	HAI.520-st-to	TOROK RD Axzug	•	52	3...52	140	91.5	125 f7	174	14.4	7000		•	10001298
	HAI.530-st-axz	SPANNTOP mini Axzug	•	65	3...65	112	47	111 f7	205	13.9	6000	SPZ.530-9 / -9p	•	10001292
	HAI.530-st-axf	SPANNTOP mini Axfix	•	65	3...65	105.5	50	119 f7	203	13.3	6000	SPZ.530-9 / -9p	•	10001296
530	HAI.530-st-to	TOROK RD Axzug	•	65	3...65	151.5	97	145 f7	210	18.5	6000		•	10001299



SPANNTOP mini

Adapter flange required in order to use
Hainbuch system.

SPANNTOP mini

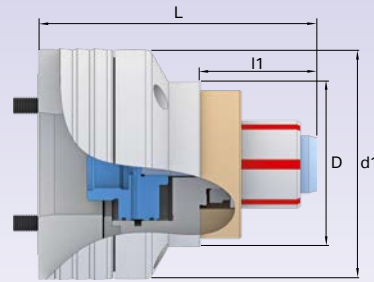
- Classical benefits of all HAINBUCH power chucks, e.g. high retention force, all-around clamping with high accuracy and exceptional ease of setup
- Lower centrifugal force losses compared to jaw chucks
- Workpiece stabilized through axial pulling against workpiece stop
- Radial run-out < 0.01 mm
- Minimal interference contour and easy changing of the clamping heads



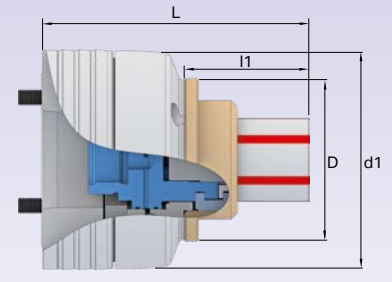
Clamping means installed and aligned by pL LEHMANN
(if ordered together with a rotary table)

Further information: www.hainbuch.com

Request installation and operating instructions directly from manufacturer



MANDO T211 Axzug



MANDO T212 Axzug
MANDO T812 Axfix

HAINBUCH clamping mandrels MANDO

* For T-type rotary tables it may be necessary to increase the center height, see p. 71

	pL LEHMANN Item no.	Designation	Hydraulic	Size	Clamping capacity [mm]	L [mm]	l1 [mm]	D [mm]	d 1 [mm]	Weight [kg]	max. speed [rpm]	Required clamp- ing cylinder *	HAINBUCH item no., incl. adapter flange
507	HAI.507-ma-axz1	MANDO T212 Axzug	●	xxs	8...13	121.5	45.5	65	141	8.30	7000	SPZ.5xx-9 / -9p	10001308
	HAI.507-ma-axf1	MANDO T812 Axfix	●	xxs	8...13	116.75	44.0	65	141	8.20	7000	SPZ.5xx-9 / -9p	10001316
	HAI.507-ma-axz2	MANDO T212 Axzug	●	xs	13...19	116	45.5	65	141	8.00	7000	SPZ.5xx-9 / -9p	10001309
	HAI.507-ma-axf2	MANDO T812 Axfix	●	xs	13...19	120	47.5	65	141	8.20	7000	SPZ.5xx-9 / -9p	10001317
510	HAI.510-ma-axz1	MANDO T212 Axzug	●	s	16...21	112.5	47.5	70	141	7.50	7000	SPZ.5xx-9 / -9p	10001310
	HAI.510-ma-axf1	MANDO T812 Axfix	●	s	16...21	117.5	49.5	70	141	7.80	7000	SPZ.5xx-9 / -9p	10001318
	HAI.510-ma-axz2	MANDO T211 Axzug	●	0	20...28	115.5	40.0	75	141	7.20	7000	SPZ.5xx-9 / -9p	10001303
	HAI.510-ma-axz3	MANDO T212 Axzug	●	0	20...28	123.5	58.5	90	141	8.00	7000	SPZ.5xx-9 / -9p	10001311
520	HAI.510-ma-axf2	MANDO T812 Axfix	●	0	20...28	129.5	60.5	90	141	8.40	7000	SPZ.5xx-9 / -9p	10001319
	HAI.520-ma-axz1	MANDO T211 Axzug	●	1	26...38	130	51.0	75	141	7.50	7000	SPZ.520-9 / -9p	10001304
	HAI.520-ma-axz2	MANDO T212 Axzug	●	1	26...38	134	64.5	90	141	8.40	7000	SPZ.520-9 / -9p	10001312
	HAI.520-ma-axf1	MANDO T812 Axfix	●	1	26...38	137.5	66.5	90	141	8.60	7000	SPZ.520-9 / -9p	10001320
530	HAI.520-ma-axz3	MANDO T211 Axzug	●	2	36...54	150	71.0	100	141	8.10	7000	SPZ.520-9 / -9p	10001305
	HAI.520-ma-axz4	MANDO T212 Axzug	●	2	36...54	152	80.5	104	141	9.30	7000	SPZ.520-9 / -9p	10001313
	HAI.520-ma-axf2	MANDO T812 Axfix	●	2	36...54	153.5	82.5	104	141	9.30	7000	SPZ.520-9 / -9p	10001321
	HAI.530-ma-axz1	MANDO T211 Axzug	●	3	50...80	172	78.0	100	211	14.1	6000	SPZ.530-9 / -9p	10001306
530	HAI.530-ma-axz2	MANDO T212 Axzug	●	3	50...80	172	87.5	120	211	15.5	6000	SPZ.530-9 / -9p	10001314
	HAI.530-ma-axf1	MANDO T812 Axfix	●	3	50...80	173.5	90.0	120	211	15.8	6000	SPZ.530-9 / -9p	10001322
	HAI.530-ma-axz3	MANDO T211 Axzug	●	4	69...100	187	95.0	100	211	15.3	6000	SPZ.530-9 / -9p	10001307
	HAI.530-ma-axz4	MANDO T212 Axzug	●	4	69...100	180.5	97.5	138	211	16.6	6000	SPZ.530-9 / -9p	10001315
	HAI.530-ma-axf2	MANDO T812 Axfix	●	4	69...100	183.5	100.0	138	211	17.3	6000	SPZ.530-9 / -9p	10001323



MANDO T211

For components with through
holes Ø20–200 mm
(due to tension bolts)

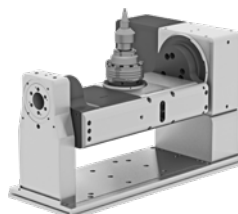


MANDO T212
MANDO T812

For components with blind
holes from Ø8–200 mm

MANDO

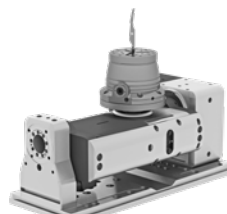
- Typical HAINBUCH features such as ease of setup, parallel clamping, optimal force transmission, high rigidity and retention force as well as low wear
- Workpiece stabilized through axial pulling against workpiece stop
- Radial run-out < 0.01 mm, version T812 < 0.025 mm
(with adaptation +0.003 mm)
- Large adaptation range through use of vulcanized clamping elements
- Prepared for air system check at workpiece stop



SPANNTOP mini Axzug size 52 on T1-520530 TAP3



MANDO T211 size 0 on T1-510520 TAP2



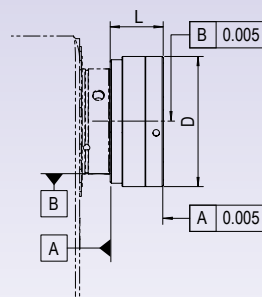
TOROK SE size 52 on T1-507510 TOP1



TOPlus mini Axfix size 52 on EA-520

Clamping devices installed and aligned by pL LEHMANN
(if ordered together with a rotary table)

Further information at: www.hainbuch.com
Request installation and operating instructions directly from manufacturer



Tolerances apply to all HAINBUCH
clamping devices

Safe and airline zero-point clamping systems

	pL LEHMANN Item No.	Designation	open, pneumatic 6 bar	unclamping, hydraulic 65 bar	D1 [mm]	D2 [mm]	L from spindle [mm]	Weight [kg]	Max. speed [rpm]	Clamping force [kN]	Retention force [kN]	Required rotary union*	HAINBUCH item no., incl. adapter flange
507	HAI.507-al	DockLock airline 20	•		120	130	52	5.8		>9	40	DDF.507-04	10023382
	HAI.507-SA	DockLock safe 20		•	120	130	50	5.8		>9	40	DDF.507-04	10023383
510	HAI.510-al	DockLock airline 20	•		120	130	52	4.9		>9	40	DDF.510-04	10023385
	HAI.510-SA	DockLock safe 20		•	120	130	50	4.9		>9	40	DDF.510-04	10023388
520	HAI.520-al	DockLock airline 20	•		120	140	52	6.0		>9	40	DDF.520-04	10023390
	HAI.520-SA	DockLock safe 20		•	120	140	50	6.0		>9	40	DDF.520-04	10023391
530	HAI.530-al	DockLock airline 20	•		120	220	57	10.7		>9	40	DDF.530-04	10023393
	HAI.530-SA	DockLock safe 20		•	120	220	55	10.7		>9	40	DDF.530-04	10023394

* see pp. 72/73

Clamping devices for safe and airline zero-point clamping systems

	pL LEHMANN Item No.	Designation	Interference circle ø [mm]	L from support [mm]	Dimensions LxWxH [mm]	Weight [kg]	Max. speed [rpm]	HAINBUCH item no.
Empty pallets	HAI.al-PalQ	DockLock airline 20 pallet	206	35	150x150x35			10023464
	HAI.al-PalR	DockLock airline 20 pallet, round	160	35	Ø160x35			10023465
	HAI.sa-PalQ	DockLock safe 20 pallet	206	35	150x150x35			10023466
	HAI.sa-PalQ	DockLock safe 20 pallet, round	160	35	Ø160x35			10023467



airline (opening, pneumatic)



safe (unclamping, hydraulic)



Further information: www.schunk.com

Request installation and operating instructions directly from manufacturer

Hole grid plate assembled by pL LEHMANN
(if ordered together with a rotary table)



KSC mini
1 side, 1 row



KSC mini
1 side, 2 rows

Hole grid plates

	pL LEHMANN Item no.	L (mm)	SCHUNK Item no. Hole grid plate
510	SCH.510-LRP500	500	1505511
	SCH.510-LRP600	600	1505512
520	SCH.520-LRP600	600	1505513
	SCH.520-LRP800	800	1505514



Clamping elements

pL LEHMANN Item no.	Clamping system	SCHUNK Item no. Clamping elements
SCH.KSCmini	KSC mini	1505515
SCH.KSC125	KSC 125	1505518
SCH.KSM400	KSM2 400	1505521
SCH.KSM500	KSM2 500	1505522



KSC mini

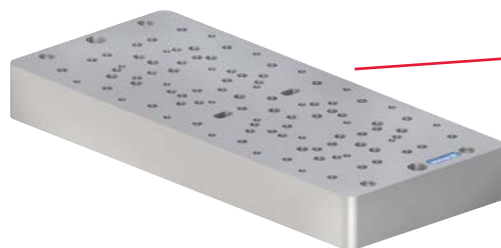


KSM400

Ordering information

Always order together with pL

- Counter bearing GLA.TOP2-xx0 (p. 42)
- Mounting kit RFX.5x0-ASa-TOP (p. 42)
- Base plate RFX.5x0-GPxxxs-TOP (p. 42) or hydraulic kit GLA.HYD-xxx (p. 91)



Hole grid plate SCHUNK 40105326, 40105355, 40105356,
40105357



Instead of the standard clamping yoke shown on
p. 42, the SCHUNK hole grid plate is used here.



Further information: www.schunk.com

Request installation and operating instructions directly from manufacturer

Hole grid plate assembled by pL LEHMANN
(if ordered together with a rotary table)



KSC mini
2 sides, 1 row



KSC mini
2 sides, 2 rows

Combination possibilities

	pL LEHMANN Item no. Hole grid plate	L [mm]	Clamping system	Description	Number of clamping elements
510	SCH.510-LRP500	500	KSC mini	1 side, 2 rows	10
		500	KSC mini	2 sides, 2 rows	20
		500	KSC 125	1 side, 1 row	3
		500	KSC 125	2-sides 1-row	6
		500	KSM2 400	1 side, 1 row	max. 5
		500	KSM2 400	1 side, 2 rows	max. 10
		500	KSM2 400	2 sides, 1 row	max. 10
	SCH.510-LRP600	500	KSM2 400	2 sides, 2 rows	max. 20
		600	KSC mini	1 side, 2 rows	14
		600	KSC mini	2 sides, 2 rows	28
		600	KSC 125	1 side, 1 row	3
		600	KSC 125	2-sides 1-row	6
		600	KSM2 500	1 side, 1 row	max. 6
		600	KSM2 500	1 side, 2 rows	max. 12
520	SCH.520-LRP600	600	KSM2 500	2 sides, 1 row	max. 12
		600	KSM2 500	2 sides, 2 rows	max. 24
		600	KSC mini	1 side, 2 rows	14
		600	KSC mini	2 sides, 2 rows	28
		600	KSC 125	1 side, 1 row	3
		600	KSC 125	2-sides 1-row	6
		600	KSM2 500	1 side, 1 row	max. 6
	SCH.520-LRP800	600	KSM2 500	1 side, 2 rows	max. 12
		600	KSM2 500	2 sides, 1 row	max. 12
		600	KSM2 500	2 sides, 2 rows	max. 24
		800	KSC mini	1 side, 2 rows	18
		800	KSC mini	2 sides, 2 rows	36
		800	KSC 125	1 side, 1 row	5
		800	KSC 125	2-sides 1-row	10
		800	KSM2 500	1 side, 1 row	max. 6
		800	KSM2 500	1 side, 2 rows	max. 12
		800	KSM2 500	2 sides, 1 row	max. 12
		800	KSM2 500	2 sides, 2 rows	max. 24



KSC 125
1 side, 1 row



KSC 125
2 sides, 1 row



KSCM2 400
1 side, 1 row



KSM2 400
2 sides, 1 row



KSM2 400
1 side, 2 rows



KSM2 400
2 sides, 2 rows

Overview,
Applications

System &
Facts, smartBox

Rotary
tables

SPZ,
DDF, WMS

MOT, KAB,
WDF, CNC

Aligning,
GLA, RST, LOZ

Service
& Technology

Tooling



Clamping devices assembled by pL LEHMANN, final adjustment by customer (if ordered together with a rotary table)

Further information: www.schunk.com
Request installation and operating instructions directly from manufacturer

Adapter flange

	pL LEHMANN Item no.		Fits power clamping blocks	L from spindle [mm]	Weight [kg]	SCHUNK Item no.
507/ 510	SCH.5xx-Ada64	①	TANDEM3 64	15	0.7	1504986
	SCH.5xx-Ada100	②	TANDEM3 100	20	2.4	1504987
	SCH.5xx-Ada140	③	TANDEM3 140	20	3.9	1536156
510	SCH.510-Ada160	④	TANDEM3 160	15	4.8	1504112
520	SCH.520-Ada250	⑤	TANDEM3 250	22	18	1504988
530	SCH.530-Ada250	⑥	TANDEM3 250	on request	on request	on request

ROTA-S plus 2.0 adapter flanges

	pL LEHMANN Item no.	matching the manual chuck	L from spindle [mm]	Weight [kg]	SCHUNK Item no.
510	SCH.510-ROTA160	ROTA-S plus 160	20	4.5	1546433
520	SCH.520-ROTA160	ROTA-S plus 160	27	4.5	1546435
	SCH.520-ROTA200	ROTA-S plus 200	20	4.5	1539279



KSPZ plus 250 on EA-520



SCHUNK clamping unit on SCHUNK VERO-S (p. 162)



Clamping devices assembled by pL LEHMANN, final adjustment by customer (if ordered together with a rotary table)

Further information: www.schunk.com

Request installation and operating instructions directly from manufacturer

Power clamping blocks

pL LEHMANN Item no.	Designation	Size [mm]	L from spindle (with adapter flange, without jaws) [mm]	Hydraulic	Pneumatic	Centered	Fixed jaw	Stroke per jaw [mm]	Clamping force [kN] *	Max. pressure (bar)	Max. range with standard jaws ** [mm]	Weight (with adapter flange) [kg]	Max. speed *** [rpm]	Required adapter flange	Additionally required pL LEHMANN rotary union ***	SCHUNK catalog reference	
SCH.KRH100	KRH3 100-Z	100 x 100	94.2	●	●	●	●	2	18	60	-	6.9	100	2	507/510	DDF.5xx-04	1518364
SCH.KRH100LH	KRH3-LH 100-Z	100 x 100	94.2	●	●	●	●	6	16	120	-	7.0	100	2	507/510	DDF.5xx-04	1518368
SCH.KRH160	KRH3 160-Z	160 x 160	102.2	●	●	●	●	3	45	60	-	19.2	100	3	510	DDF.5xx-04	1518382
SCH.KRH160LH	KRH3-LH 160-Z	160 x 160	102.2	●	●	●	●	8	40	120	-	19.2	100	3	510	DDF.5xx-04	1518386
SCH.KRP100	KRP3 100-Z	100 x 100	89.2	●	●	●	●	2	18	9	-	6.4	100	2	507/510	DDF.5xx-04	1475575
SCH.KRP100LH	KRP3-LH 100-Z	100 x 100	89.2	●	●	●	●	6	8	9	-	6.4	100	2	507/510	DDF.5xx-04	1475586
SCH.KRP160	KRP3 160-Z	160 x 160	97.2	●	●	●	●	3	45	9	-	15.8	100	3	510	DDF.5xx-04	1499466
SCH.KRP160LH	KRP3-LH 160-Z	160 x 160	97.2	●	●	●	●	8	20	9	-	15.8	100	3	510	DDF.5xx-04	1499475
SCH.KSP64	KSP3 64-Z	64 x 64	65.7	●	●	●	●	2	4.5	9	40	1.9	100	1	507/510	DDF.5xx-04	1409255
SCH.KSP64F	KSP3-F 64-Z	64 x 64	65.7	●	●	●	●	4	4.5	9	40	1.9	100	1	507/510	DDF.5xx-04	1409335
SCH.KSP100	KSP3 100-Z	100 x 100	89.2	●	●	●	●	2	18	9	70	6.2	100	2	507/510	DDF.5xx-04	1409263
SCH.KSP100LH	KSP3-LH 100-Z	100 x 100	89.2	●	●	●	●	6	8	9	70	6.2	100	2	507/510	DDF.5xx-04	1409301
SCH.KSP100F	KSP3-F 100-Z	100 x 100	89.2	●	●	●	●	4	18	9	70	6.2	100	2	507/510	DDF.5xx-04	1409343
SCH.KSP140	KSP3 140-Z	140 x 140	92.7	●	●	●	●	3	30	9	90	11	100	6	507/510	DDF.5xx-04	1409268
SCH.KSP140LH	KSP3-LH 140-Z	140 x 140	92.7	●	●	●	●	7	15	9	90	11.1	100	6	507/510	DDF.5xx-04	1409308
SCH.KSP140F	KSP3-F 140-Z	140 x 140	92.7	●	●	●	●	6	30	9	90	11.1	100	6	507/510	DDF.5xx-04	1409347
SCH.KSP160	KSP3 160-Z	160 x 160	97.2	●	●	●	●	3	45	9	120	15.80	100	3	510	DDF.5xx-04	1409272
SCH.KSP160LH	KSP3-LH 160-Z	160 x 160	97.2	●	●	●	●	8	20	9	120	16.00	100	3	510	DDF.5xx-04	1409312
SCH.KSP160F	KSP3-F 160-Z	160 x 160	97.2	●	●	●	●	6	45	9	120	15.80	100	3	510	DDF.5xx-04	1409351
SCH.KSP250	KSP3 250-Z	250 x 250	128.2	●	●	●	●	5	55	6	170	50.00	100	4 / 5	520/530	DDF.5xx-04	1409282
SCH.KSP250LH	KSP3-LH 250-Z	250 x 250	128.2	●	●	●	●	15	20	6	170	50.00	100	4 / 5	520/530	DDF.5xx-04	1409322
SCH.KSP250F	KSP3-F 250-Z	250 x 250	128.2	●	●	●	●	10	55	6	170	50.00	100	4 / 5	520/530	DDF.5xx-04	1409359
SCH.KSH100	KSH3 100-Z	100 x 100	94.2	●	●	●	●	2	18	60	70	7	100	2	507/510	DDF.5xx-04	1463173
SCH.KSH100LH	KSH3-LH 100-Z	100 x 100	94.2	●	●	●	●	6	16	120	70	7	100	2	507/510	DDF.5xx-04	1463180
SCH.KSH100F	KSH3-F 100-Z	100 x 100	94.2	●	●	●	●	4	18	60	70	7	100	2	507/510	DDF.5xx-04	1463178
SCH.KSH140	KSH3 140-Z	140 x 140	97.7	●	●	●	●	3	30	60	90	13	100	6	507/510	DDF.5xx-04	1463182
SCH.KSH140LH	KSH3-LH 140-Z	140 x 140	97.7	●	●	●	●	7	30	120	90	13	100	6	507/510	DDF.5xx-04	1463185
SCH.KSH140F	KSH3-F 140-Z	140 x 140	97.7	●	●	●	●	6	30	60	90	13	100	6	507/510	DDF.5xx-04	1463188
SCH.KSH160	KSH3 160-Z	160 x 160	102.2	●	●	●	●	3	45	60	120	18.8	100	3	510	DDF.5xx-04	1463202
SCH.KSH160LH	KSH3-LH 160-Z	160 x 160	102.2	●	●	●	●	8	20	120	120	19	100	3	510	DDF.5xx-04	1463224
SCH.KSH160F	KSH3-F 160-Z	160 x 160	102.2	●	●	●	●	6	45	60	120	18.8	100	3	510	DDF.5xx-04	1463207

* at max. pressure and / or max. torque

** with standard jaws KTR 64 / 100 / 160 / 250 (processing must be carried out by the customer)

*** see pp. 72/73

**** only indexing allowed

LH version = long stroke

F version = 1 fixed jaw

Overview,
Applications

System &
Facts, smartBox

Rotary
tables

SPZ,
DDF, WMS

MOT, KAB,
WDF, CNC

Aligning,
GLA, RST, LOZ

Service
& Technology

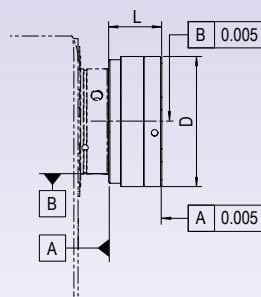
Tooling



Clamping devices assembled by pL LEHMANN, final adjustment by customer (if ordered together with a rotary table)

Further information: www.schunk.com

Request installation and operating instructions directly from manufacturer



NSE3 138-P with two medium interfaces

Adapter flange

	pL LEHMANN Item no.		Compatible with zero-point clamping systems	L from spindle [mm]	Weight [kg]	SCHUNK Item no.
507/510	SCH.5xx-Ada90	1	NSE mini 90	15	1	1505504
	SCH.5xx-Ada138	2	NSE3 138	35.7	3.7	1505506
	SCH.5xx-Ada138P	3	NSE3 138 P	35.7	3.7	1505507
520	SCH.520-Ada138	4	NSE3 138	40	2.4	1505508
	SCH.520-Ada176	5	NSE3 176	40	6.6	1505509
530	SCH.530-Ada176	6	NSE3 176	50	8.5	1505510

Important technical data

	Unit	NSE3 138	NSE +176
Pneumatic system	[mm]	Yes	Yes
Repeat accuracy	[mm]	< 0.005	< 0.005
Actuating pressure	[bar]	6	6
Draw-in force	[kN]	28	40
Retention force M16	[kN]	75	75



Zero point clamping systems

pL LEHMANN Item no.	Designation non-rusting	Pneumatic 6 bar	Turbo function	non-rusting	D [mm]	L from spindle (with adapter flange) [mm]	Draw-in force [kN]	Increased draw-in force with turbo function [kN]	Max. retention force [kN]	Weight (with adapter flange) [kg]	Max. speed ** [rpm]	Open	Anti-twist protection	Required adapter flange	Required rotary union*	SCHUNK catalog reference
SCH.90ix	VERO-S NSE mini 90-V1	•	•	•	ø90	35	0.5	1.5	25	1.8	100	•	•	1	DDF.5xx-04	0435105
SCH.138ix	VERO-S NSE3 138-V1	•	•	•	ø138	74.7	8	28	75	8.20	100	•	•	2 / 4	DDF.5xx-04	1313723
SCH.138ix-P	VERO-S NSE3 138-V1-P	•	•	•	ø138	74.7	8	28	75	6.7	100	•	•	3	DDF.5xx-04	1359500
SCH.176ix	VERO-S NSE plus 176-V1	•	•	•	ø176	74.7	9	40	75	12.00	100	•	•	5 / 6	DDF.5xx-04	0471096

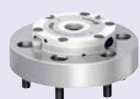
* see pp. 72/73

** only indexing allowed

P = with media passage

Increased accuracy = ½ tolerance values; Item no. NPS.5xx-GEN

NSE plus 90-V1



Empty chuck



Centric clamping unit KSA plus 100

NSE3 138-V1-P

Version -P has 2x media passage



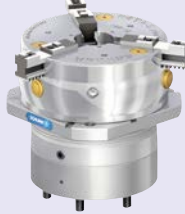
Empty chuck



Diaphragm chuck



Centric clamping unit KSC 125



ROTA-S plus 2.0

NSE plus 176-V1



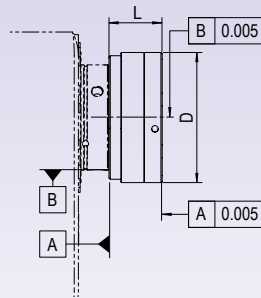
Empty chuck

HWR

Clamping devices assembled by pL LEHMANN, final adjustment by customer
(if ordered together with a rotary table)

Further information at: www.hwr.de

Request installation and operating instructions directly from manufacturer



HWR zero-point clamping system

pL LEHMANN Item no.	Designation	Manual	Dimensions D x L [mm]	Weight [kg]	Max. speed [rpm]	suitable for LEHMANN SPI	suitable for HWR 5-axis vises*
HWR.5xx-SP52m	SOLIDPoint® 52 incl. adapter plate	•	116x37	3.4	400	507 / 510	691065-46, 691105-46, 691145, 683085-46, 683120-46, 683085-77, 683120-77, 683160-77
HWR.520-SP52m		•	116x43*	3.6	400	520	
HWR.5xx-SP52 +96m	SOLIDPoint® 96/52 incl. adapter plate	•	196x37	7.6	400	507 / 510	691065-46, 691105-46, 691145, 683085-46, 683120-46, 683085-77, 683120-77, 683160-77, 683155-77, 683155-125
HWR.520-SP52 +96m		•	196x43*	7.6	400	520	
HWR.5xx-SP96m	SOLIDPoint® 96 incl. adapter plate	•	196x43	7.6	400	507 / 510	683155-77, 683155-125
HWR.520-SP96m		•	196x43*	7.6	400	520	

* Length dimensioned from screw-on surface behind taper

Clamping yoke

pL LEHMANN Item No.	Description	Manual	Dimensions L x W x H [mm]	Weight [kg]	Spacing [mm]	Number of clamping elements	HWR Item No.
510 HWR.510-500	SOLIDPoint clamping yoke	•	500 x 156 x 54 mm	29.5	96 / 52	4	698001



Vises suitable for the HWR zero-point clamping system

pL LEHMANN Item no.	Designation	Clamping capacity [mm]	Weight [kg]	Max. speed [rpm]	HWR Item No.	Base body required
HWR.SG46-S65	SOLIDGrip 46, length 77 mm, jaw width 46 mm	0 – 65	1.7	400	691065-46	pL LEHMANN Item No. HWR.5xx-SP52m / HWR.520-SP52m
HWR.SG46-S105	SOLIDGrip 46, length 117 mm, jaw width 46 mm	0 - 105	2.5	400	691105-46	
HWR.SG46-S145	SOLIDGrip 46, length 157 mm, jaw width 46 mm	0 - 145	3.2	400	691145-46	
HWR.SG77-S85	SOLIDGrip 77, length 102 mm, jaw width 77 mm	0 – 85	2.3	400	683085-77	
HWR.SG77-S120	SOLIDGrip 77, length 130 mm, jaw width 77 mm	0 – 120	2.9	400	683120-77	
HWR.SG77-S160	SOLIDGrip 77, length 170 mm, jaw width 77 mm	0 – 160	3.5	400	683160-77	
HWR.SG125-S155-125	SOLIDGrip 125, length 160 mm, jaw width 125 mm	0 – 155	8.4	400	683155-125	pL LEHMANN Item No. HWR.5xx-SP96m / HWR.520-SP96m



Overview,
Applications

System &
Facts, smartBox

Rotary
tables

SPZ,
DDF, WMS

MOT, KAB,
WDF, CNC

Aligning,
GLA, RST, LOZ

Service
& Technology

Tooling



* Clamping devices assembled and aligned by pL LEHMANN
(if ordered together with a rotary table)

Further information: www.gressel.ch

Request installation and operating instructions directly from manufacturer

GRESSEL gredoc pallet system

pL LEHMANN Item no.	Designation	Manual	D1 [mm]	D2 [mm]	L1 [mm]	L2 [mm]	Weight [kg]	Max. Speed [rpm]	GRESSEL Item no. incl. adapter flange
507	GRE.507-GRU*	•	ø135	148	30	–	3.0		NGS.010.015.01
510	GRE.510-GRU*			148		–	3.0		NGS.010.016.01
520	GRE.520-GRU*			154		30	6.4		NGS.010.007.01

Technical data	Unit	Dimensions
Mechanical system		Yes
Repeat accuracy	(mm)	< 0.01
Draw-in force	(kN)	20
Height tolerance	(mm)	± 0.005

Clamping devices for above GRESSEL gredoc pallet system

pL LEHMANN Item no.	Designation	Manual	D [mm]	L from spindle [mm]	Pallet sizes [mm]	Weight [kg]	Max. speed * [rpm]	GRESSEL catalog reference	Base body required
GRE.C280-grip	C2.0 80 L-130 with reversible jaw grip	•	157 x 80 x 78	128		4	100	CNM.080.001.01	GRE.5xx-GRU
GRE.C2125-grip	C2.0 125 L-160 with reversible jaw grip	•	208 x 125 x 83	133		8.7	100	CNM.125.001.01	
GRE.NGZ-p	Pyramid 3-way 30° for C3 L-80	•	ø190 x 54 / 30°		ø190	2.6	100	NGZ.010.135.11	GRE.DOC-x
GRE.C3	C3 L-80 without system jaws	•	70 x 80 x 42			0.9	100	CGM.070.002.01	
GRE.SWB-grip	SWB grip 3mm width 45 (1 piece)	•	45 x 22 x 22			0.1	100	CGA.070.001.01	
GRE.AB	Mounting pin, incl. fastening screw	•	ø40			0.1	100	NGA.000.001.01	

All items must be ordered separately! (Example of Lehmann EA-507: NGS.010.015.01 + CGM.080.001.01 + NGA.000.001.01)

* only indexing allowed



C2.0 125



C3



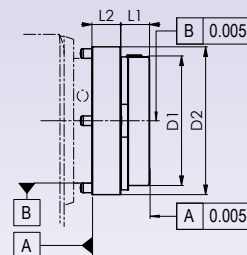
SWB grip 3 mm



Pyramid 3-way 30°
with C3 L-80 grip



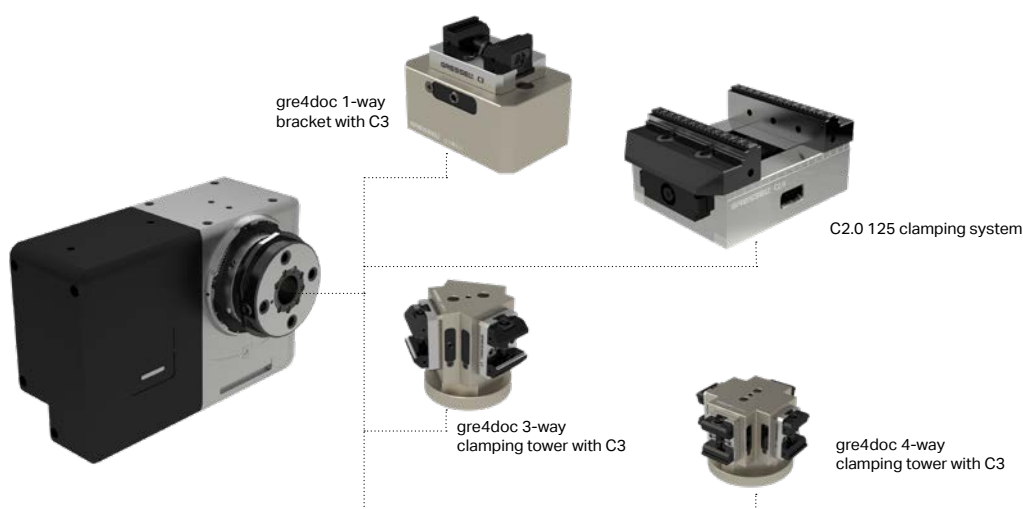
EA application



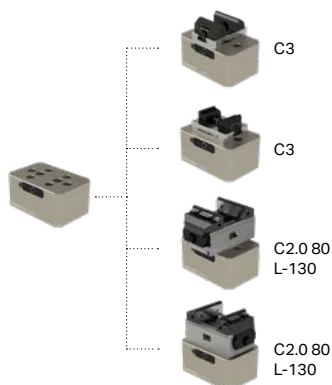
Clamping tools installed and aligned by pL LEHMANN
(if ordered together with a rotary table)

Further information at: www.gressel.ch
Request installation and operating instructions directly from manufacturer

gredoc + gre4doc modular zero-point clamping system



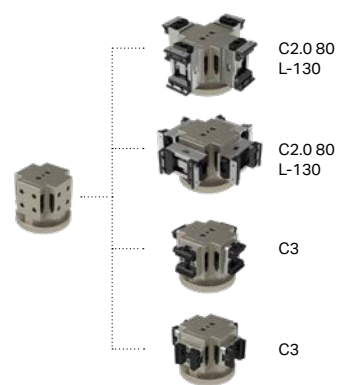
gre4doc 1-way bracket



gre4doc 3-way clamping tower



gre4doc 4-way clamping tower



Clamping towers

pL LEHMANN Item No.	Designation	Manual	D [mm]	L from spindle [mm]	Pallet sizes [mm]	Weight [kg]	Max. speed * [rpm]	GRESSEL catalog reference	Base body required
GRE.DOC-1	gre4doc 1-way bracket	•	150 x 100 x 70		ø148	2.9	100	NGS.040.000.01	
GRE.DOC-3	gre4doc 3-way pyramid	•	ø148 x 171		ø148	6.3	100	NGS.040.200.01	GRE.5xx-GRU
GRE.DOC-4	gre4doc 4-way pyramid	•	ø197 x 171		ø148	11.9	100	NGS.040.210.01	

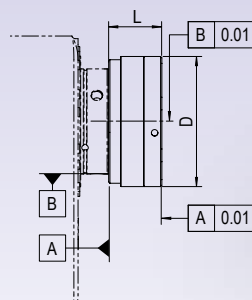
* only indexing allowed



einfach. zukunfft. greifen.

Clamping devices assembled by pL LEHMANN,
final adjustment by customer (if ordered together with a rotary table)

Further information at: www.lang-technik.de
Request installation and operating instructions directly from manufacturer



LANG zero-point clamping system

pL LEHMANN Item no.	Designation	Manual	Power-actuated**	Dimensions D x L (mm)	Weight [kg]	Max. speed [rpm]	suitable for LEHMANN SPI	suitable for LANG 5-axis vices*
LAN.5xx-QP52m	Quick-Point® 52, incl. adapter flange	•	•	Ø 116 x 43	3.60	400	507 / 510 / 520	48085-46 / 48085-77 / 48120-46 / 48120-77 / 48160-77
LAN.5xx-QP52k		•	•	Ø 196 x 37	on request			
LAN.5xx-QP52 +96m	Quick-Point® 52/96, incl. adapter flange	•	•	Ø 196 x 37	on request	400	507 / 510	48085-46 / 48085-77 / 48120-46 / 48120-77 / 48160-77 / 48155-77 / 48155-125
LAN.5xx-QP96m		•	•	Ø 196 x 27	7.60			
LAN.5xx-QP96m-D***	Quick-Point® 96, incl. adapter flange	•	•	Ø 196 x 37	on request	400	507 / 510	48155-77 / 48155-125
LAN.5xx-QP96k		•	•	Ø 196 x 37	on request	on request		
LAN.520-QP96m		•	•	Ø 196 x 41.5	7.50	400	520	48155-77 / 48155-125
LAN.520-QP96k		•	•		on request	on request		

* The maximum length of the vise base body depends on the rotary axis type. Longer vise variants may be possible. Please inquire.

**Required clamping cylinder: SPZ.5xx-9 / -9p or SPZ.520-9 / -9p

*** with through hole Ø 46.55 mm



LAN.5xx-QP52m



LAN.5xx-QP96m



LAN.520-QP96m



LAN.5xx-QP52 +96m



LAN.5xx-QP96m-D

Vises suitable for the LANG zero-point clamping system



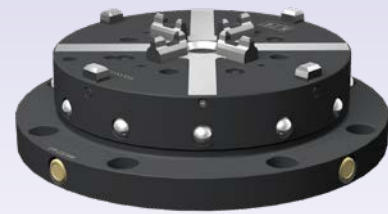
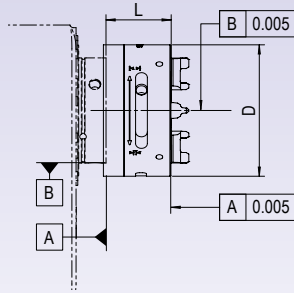
Example of application
Makro-Grip® 125 with Quick-Point® 96, manual on LEHMANN EA-510



Example of application
Makro-Grip® 77 with Quick-Point® 52, power-actuated on LEHMANN EA-510

pL LEHMANN Item no.	Designation	Clamping capacity [mm]	Weight [kg]	Max. speed [rpm]	LANG Item No.	Base body required
LAN.MG46-S85	Makro-Grip® 46, length 102 mm Jaw width 46 mm	0 – 85			48085-46	pL LEHMANN Item No. LAN.5xx-QP52x
LAN.MG46-S120	Makro-Grip® 46, length 130 mm Jaw width 46 mm	0 – 120			48120-46	
LAN.MG77-S85	Makro-Grip® 77, length 102 mm Jaw width 77 mm	0 – 85	2.30	400	48085-77	
LAN.MG77-S120	Makro-Grip® 77, length 130 mm Jaw width 77 mm	0 – 120	2.90	400	48120-77	
LAN.MG77-S160	Makro-Grip® 77, length 170 mm Jaw width 77 mm	0 – 160	3.50	400	48160-77	
LAN.MG77-S155	Makro-Grip® 77, length 160 mm Jaw width 77 mm	0 – 155			48155-77	
LAN.MG125-S155	Makro-Grip® 125, length 160 mm Jaw width 125 mm	0 – 155	8.40	400	48155-125	pL LEHMANN Item No. LAN.5xx-QP96x / LAN.520-QP96x

All LANG vices can also be attached to other zero-point clamping systems (Erowa, Schunk, 3R, etc.) after being adjusted slightly. For further information, please contact your local LANG Technik representative.



Clamping means installed and aligned by pL LEHMANN
(if ordered together with a rotary table)

Further information: www.erowa.com
Request installation and operating instructions directly from manufacturer

ProductionChuck 210 Combi ER-032388

ERO.5xx = Item number for combined clamping chuck for types 507 and 510

	pL LEHMANN Item no.	Designation (incl. flange)	Manual Pneumatic	D [mm]	L from spindle [mm]	Pallet sizes [mm]	Workpiece weight (perm.) [kg]	Max. speed [rpm]	Open Clean Z-support	Rotary union	Chuck weight, (incl. Adapter flange) [kg]	EROWA cata- log reference	EROWA Item no., incl. adapter flange
507	ERO.507-CTSix	CTS Chuck Dual Rotation (Inox)	•	ø112	45.3	ø60	4	8000	•	1)	4.3	ER-050316	on request
	ERO.5xx-FTSix	FTS Chuck (Inox)	•	ø74	46.5	ø72	4	4000	•	1)	1.5	ER-057335	ER-073469
	ERO.5xx-Qcix	QuickChuck 100 P (Inox)	•	ø100	50	□50/ø148	35	3000	•	•	2.6	ER-036345	ER-073351
	ERO.5xx-ITS100ix	ITS Chuck 100 P (Inox)	•	ø100	50	□50/ø148	35	5000	•	•	2.5	ER-043123	ER-073433
	ERO.5xx-PC	PowerChuck P	•	ø150	64.5	□50/ø148	50	5000	•	•	7.5	ER-115254	ER-073046
510	ERO.5xx-MTS	MTS IntegralChuck S-P/A	•	ø130	62	ø148	50	4500	•	•	4	ER-131210	ER-073457
	ERO.510-CTSix	CTS Chuck Dual Rotation (Inox)	•	ø112	45.3	ø60	4	8000	•	2)	4.3	ER-050316	on request
	ERO.5xx-FTSix	FTS Chuck (Inox)	•	ø74	46.5	ø72	4	4000	•	•	1.5	ER-057335	ER-073469
	ERO.5xx-QCix	QuickChuck 100 P (Inox)	•	ø100	50	□50/ø148	35	3000	•	•	2.6	ER-036345	ER-073351
	ERO.5xx-ITS100ix	ITS Chuck 100 P (Inox)	•	ø100	50	□50/ø148	35	5000	•	•	2.5	ER-043123	ER-073433
520	ERO.5xx-PC	PowerChuck P	•	ø150	64.5	□50/ø148	50	5000	•	•	7.5	ER-115254	ER-073046
	ERO.5xx-MTS	MTS IntegralChuck S-P/A	•	ø130	62	ø148	50	4500	•	•	4	ER-131210	ER-073457
	ERO.520-PC	PowerChuck P	•	ø150	75	□50/ø148	50	5000	•	•	8.7	ER-115254	ER-073460
	ERO.520-P210	ProductionChuck 210	•	ø81/ø210	98	ø210	120	4500	•	•	16.6	ER-032964	ER-073461
	ERO.520-P210c	Product.Chuck 210 Combi	•	ø210	98	□50/ø210	120	4500	•	•	18	ER-032388	ER-073462
530	ERO.530-PC	PowerChuck P	•	ø150	75	□50/ø148	50	5000	•	•	7.5	ER-115254	on request
	ERO.530-P210	ProductionChuck 210	•	ø81/ø210	98	ø210	120	4500	•	•	16.6	ER-032964	on request
	ERO.530-P210c	Product.Chuck 210 Combi	•	ø210	98	□50/ø210	120	4500	•	•	18	ER-032388	on request
	ERO.530-UPCP	UPC P Chuck	•	320x300	95	□320	250	1000	•	•	51	ER-016841	ER-077382
	ERO.530-UPCC	UPC Chuck Combi	•	280x280	90	□50/□320	200	1000	•	•	48	ER-070649	on request

Increased accuracy = ½ tolerance values; Item no. NPS.5xx-GEN

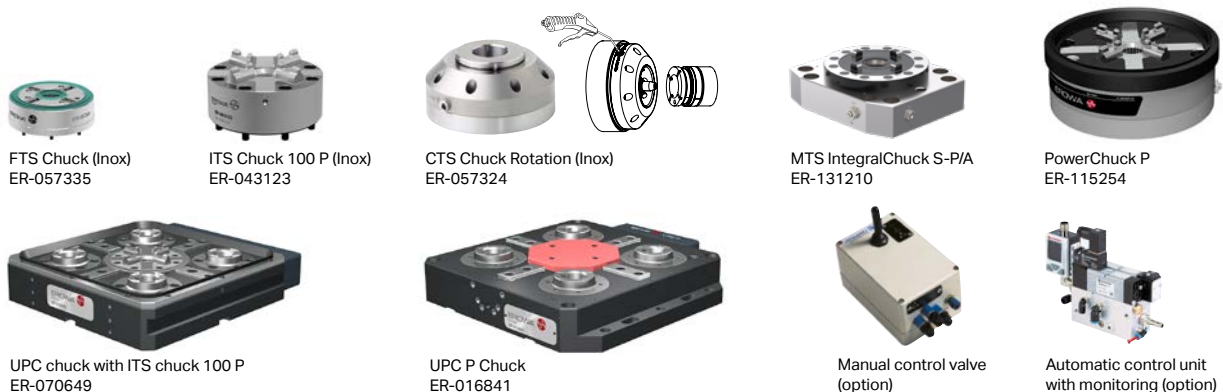
for all automatic chucks

ERO.HSV	Manual control valve	supplied loose with all necessary cables and hoses, ready to connect
ERO.ASV-2	Automatic control valve	supplied loose, for installation in the control cabinet, with all necessary cables/hoses

Additionally required rotary union (see **pp. 72/73**):
1) = DDF.507-04, 2) = DDF.510-04, 3) = DDF.520-04, 4) = DDF.530-04

When standard pallets with open holes are used, water, metal chips etc. can get into the pallet chuck, air lines and control valve. To prevent this, seal kits are available from the respective chuck manufacturers.

The speed values are theoretical, application-specific maximum values. The user is responsible for the optimum radial run-out of the pallets (incl. clamping device and workpiece) as well as sufficient workpiece fastening.



FTS Chuck (Inox)
ER-057335

ITS Chuck 100 P (Inox)
ER-043123

CTS Chuck Rotation (Inox)
ER-057324

MTS IntegralChuck S-P/A
ER-131210

PowerChuck P
ER-115254

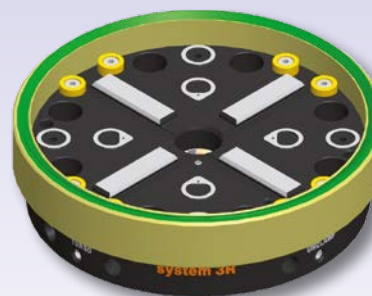
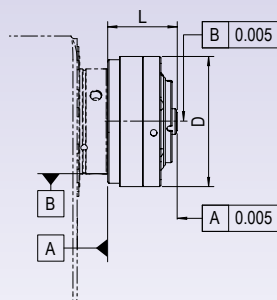
UPC chuck with ITS chuck 100 P
ER-070649

UPC P Chuck
ER-016841

Manual control valve
(option)

Automatic control unit
with monitoring (option)

system 3R



Clamping devices installed and aligned by pL LEHMANN
(if ordered together with a rotary table)

Further information at: www.system3r.com

Request installation and operating instructions directly from manufacturer

S3R.5xx = Item number for combined chuck for types 507 and 510

	pL LEHMANN Item No.	Designation (incl. flange)	Pneumatic	D [mm]	L from spindle [mm]	Pallet sizes [mm]	Number of media transfers	Workpiece weight (perm.) [kg]	Weight [kg]	Max. speed [rpm]	Permitted pull-out torque [Nm]	Opening	Clean Z-support	Clean cams	incr. clamping force/venting	Rotary union	SYSTEM 3R Catalog reference	SYSTEM 3R item no. incl. adapter flange
507	S3R.5xx-G70	3R GPS 70	●	ø99	56	ø70	-	10	2.70	5,450		●	●			1)	C188720	X663000
	S3R.5xx-G70C	3R GPS 70 COCN	●	ø99	76	ø70	-	10	3.65	5,450		●	●				X663070	X697640
	S3R.5xx-G70	3R GPS 70	●	ø99	56	ø70	-	10	2.70	5,450		●	●			2)	C188720	X663000
	S3R.5xx-G70C	3R GPS 70 COCN	●	ø99	76	ø70	-	10	3.65	5,450		●	●				X663070	X697640
510	S3R.510-G120	3R GPS 120	●	ø118	56	ø120	-	20	3.60	5,450		●	●			2)	C188770	X663010
	S3R.510-G120-P	3R GPS 120	●	ø118	64	ø120	4	20	3.95	5,450		●	●				C190120	X663080
	S3R.510-MGC*	3R Magnum Chuck	●	ø162	46	ø156, w/index pin	-	100	6.70	5,450		●	●	●		2)	3R-SP26712	90940.02
	S3R.510-MGC-P*	3R Magnum Chuck		ø162	48	ø156, w/index pin	2		6.10	5,450		●	●			90948	X697650	
520	S3R.510-MCC	3R Macro Chuck	●	ø100	49	54x54, 70x70	-	10	2.60	5,450		●	●	●		2)	3R-600.14-30	90940.01
	S3R.520-G120	3R GPS 120	●	ø118	70	ø120	-	20	5.00	5,450		●	●			3)	C188770	X663020
	S3R.520-G120-P	3R GPS 120	●	ø118	71	ø120	4	20	5.00	5,450		●	●				C190120	X663090
	S3R.520-G240	3R GPS 240	●	240x240	84	240x240	-	150	20.70	3,000		●	●	●	●	3)	C219200	X663030
	S3R.520-G240-P	3R GPS 240	●	240x240	84	240x240	2	150	20.70	3,000		●	●				X633700	X697600
	S3R.520-G240ix	3R GPS 240, rust-resistant	●	240x240	84	240x240	-	150	21.00	3,000		●	●	●	●	3)	X607620	X663040
	S3R.520-G240ix-P	3R GPS 240, rust-resistant	●	240x240	84	240x240	2	150	21.00	3,000		●	●				X691630	X697610
	S3R.520-MGC*	3R Magnum Chuck	●	ø162	60	ø156, w/index pin	-	100	7.70	5,450		●	●	●		3)	3R-SP26712	90940.12
	S3R.520-MGC-P*	3R Magnum Chuck	●	ø162	60	ø156, w/index pin	2	100	7.20	5,450		●	●				90948	X697660
	S3R.520-MCC	3R Macro Chuck	●	ø100	63	54x54, 70x70	-	10	3.50	5,450		●	●	●		3)	3R-600.14-30	90940.11
	S3R.520-DYN	3R Dynafix	●	277x277	83		-	250				●	●				3R-770-5	90940.30
	S3R.520-DYN-P	3R Dynafix	●	277x277	83		2	250	30			●	●				3R-770-5A	X697670
530	S3R.530-G240	3R GPS 240	●	240x240	84	240x240		150				●	●	●	●	4)	C219200	on request
	S3R.530-G240ix	3R GPS 240, rust-resistant	●	240x240	84	240x240		150				●	●	●	●	4)	X607620	
Ref. pallet	S3R.RP-GPS240	Reference pallet GPS 240															C846600	
	S3R.RP-GPS70120	Reference pallet GPS 70															C846360	
	S3R.RP-Macro	Reference pallet Macro															36-606.1	
	S3R.RP-Magnum	Reference pallet Magnum															3R-686.1-HD	

Additionally required rotary union (see pp. 72/73):

1) = DDF.507-04, 2) = DDF.510-04, 3) = DDF.520-04, 4) = DDF.530-04

* For Magnum pallets only.
Macro pallets may not be clamped

When standard pallets with open holes are used, water, metal chips etc. can get into the pallet chuck, air lines and control valve. To prevent this, seal kits are available from the respective chuck manufacturers.

Increased accuracy = ½ tolerance values; Item no. NPS.5xx-GEN

- Repeatability 2 µ
- Angular position accuracy 0.005 mm

GPS 70/120/240

- Cast aluminum design at very good price-performance ratio
- Compact in overall height
- No clamping spigots
- Complete coverage for sink erosion and milling applications
- Ideal for automation
- High-precision repeatability

Macro

- High stability and precision
- Especially for milling applications

Macro Magnum

- Solid construction
- High stability and precision
- Complete tightness
- Especially for milling applications in the high-precision range

Dynafix

- High holding and clamping forces
- Extremely precise steel ground O-point supports
- Mainly milling and sink erosion applications



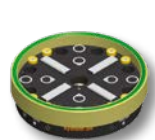
GPS 70



GPS 120



Macro



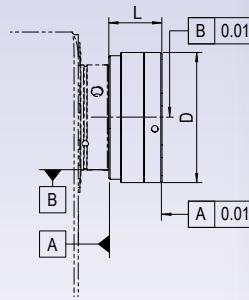
Macro Magnum



GPS 240



Dynafix



Clamping device assembled by pL LEHMANN,
final adjustment by customer (if ordered together with a rotary table)

Further information: www.parotec.ch
Request installation and operating instructions directly from manufacturer



	pL LEHMANN Item no.	Designation	Manual	Pneumatic	Hydraulic	D [mm]	L from spindle (mm) (up to Z-support)	Pallet sizes [mm]	Number of media interfaces**	Max. workpiece weight [kg]	Weight [kg]	Max. speed [rpm]	Open system [bar]	Clean Z-support	With re-tightening	Required rotary union*	PAROTEC Item no. incl. adapter flange
507	PAR.507-PG162p	POWER GRIP 160, 1er		•		Ø162	69	□158/ Ø148	0	250	9.6	6,000	6	•	•	DDF.507-04	XT2160142007
	PAR.507-PG162mp	POWER GRIP 160, 1er (LPA)	•			Ø162	69	□158/ Ø148	0	250	9.9	6,000	6	•	•	DDF.507-04	XT2160142008
	PAR.507-PG162h	POWER GRIP 160, 1er			•	Ø162	69	□158/ Ø148	0	750	9.9	6,000	30	•	•	DDF.507-04	XT2160142707
	PAR.507-PY162p	POLY GRIP, 1er		•		Ø162	69/76.5	Ø70-Ø148	0	50	5.0	6,000	6	•	•	DDF.507-04	XT9911420707
	PAR.507-PY162mp	POLY GRIP, 1er (LPA)	•			Ø162	69/76.5	Ø70-Ø148	0	50	5.1	6,000	6	•	•	DDF.507-04	XT9911420708
510	PAR.510-PG162p	POWER GRIP 160, 1er		•		Ø162	69	□158/ Ø148	0	250	9.5	6,000	6	•	•	DDF.510-04	XT2160162010
	PAR.510-PG162mp	POWER GRIP 160, 1er (LPA)	•			Ø162	69	□158/ Ø148	0	250	9.5	6,000	6	•	•	DDF.510-04	XT2160162011
	PAR.510-PG162p-P	POWER GRIP 160, 1er		•		Ø162	69	□158/ Ø148	3	250	9.6	6,000	6	•	•	DDF.510-06	XT2160162013
	PAR.510-PG162h	POWER GRIP 160, 1er			•	Ø162	69	□158/ Ø148	0	750	9.5	6,000	30	•	•	DDF.510-04	XT2160162710
	PAR.510-PG162h-P	POWER GRIP 160, 1er			•	Ø162	69	□158/ Ø148	3	750	9.6	6,000	30	•	•	DDF.510-06	XT2160162713
520	PAR.510-PY162p	POLY GRIP, 1er		•		Ø162	69/76.5	Ø70-Ø148	0	50	5.0	6,000	6	•	•	DDF.510-04	XT9911420710
	PAR.510-PY162mp	POLY GRIP, 1er (LPA)	•			Ø162	69/76.5	Ø70-Ø148	0	50	5.1	6,000	6	•	•	DDF.510-04	XT9911420711
	PAR.520-PG162p	POWER GRIP 160, 1er		•		Ø162	69	□158/ Ø148	0	250	10.4	6,000	6	•	•	DDF.520-04	XT2160162020
	PAR.520-PG162mp	POWER GRIP 160, 1er (LPA)	•			Ø162	69	□158/ Ø148	0	250	10.4	6,000	6	•	•	DDF.520-04	XT2160162021
	PAR.520-PG162p-P	POWER GRIP 160, 1er		•		Ø162	69	□158/ Ø148	3	250	10.4	6,000	6	•	•	DDF.520-06	XT2160162023
530	PAR.520-PG162h	POWER GRIP 160, 1er			•	Ø162	69	□158/ Ø148	0	750	10.4	6,000	30	•	•	DDF.520-04	XT2160162720
	PAR.520-PG162h-P	POWER GRIP 160, 1er			•	Ø162	69	□158/ Ø148	3	750	10.4	6,000	30	•	•	DDF.520-06	XT2160162723
	PAR.520-PY162p	POLY GRIP, 1er		•		Ø162	69/76.5	Ø70-Ø148	0	50	5.0	6,000	6	•	•	DDF.520-04	XT9911420720
	PAR.520-PY162mp	POLY GRIP, 1er (LPA)	•			Ø162	69/76.5	Ø70-Ø148	0	50	5.1	6,000	6	•	•	DDF.520-04	XT9911420721
	PAR.530-PG350p	POWER GRIP 160, 1er		•		Ø350	89	□158/ Ø148	0	250	9.9	6,000	6	•	•	DDF.530-04	XT2160162030
530	PAR.530-PG350mp	POWER GRIP 160, 1er (LPA)	•			Ø350	89	□158/ Ø148	0	250	9.9	6,000	6	•	•	DDF.530-04	XT2160162031
	PAR.530-PG350p-P	POWER GRIP 160, 1er		•		Ø350	89	□158/ Ø148	3	250	9.9	6,000	6	•	•	DDF.530-06	XT2160162033
	PAR.530-PG350h	POWER GRIP 160, 1er			•	Ø350	89	□158/ Ø148	0	750	9.9	6,000	30	•	•	DDF.530-04	XT2160162730
	PAR.530-PG350h-P	POWER GRIP 160, 1er			•	Ø350	89	□158/ Ø148	3	750	9.9	6,000	30	•	•	DDF.530-06	XT2160162733
	PAR.530-PG376p-P	POWER GRIP 160, 4er		•		Ø376	85	□398/ Ø400	4	1000	57	6,000	6	•	•	DDF.530-06	XT2160462034
530	PAR.530-PG376h-P	POWER GRIP 160, 4er			•	Ø376	85	□398/ Ø400	4	3000	57	6,000	30	•	•	DDF.530-06	XT2160462734
	PAR.530-GG376h-P	GENIUS GRIP 160, 4er			•	Ø376	85	□398/ Ø400	4	3000	70	6,000	30	•	•	DDF.530-06	GX2160462734
	PAR.530-PY350p	POLY GRIP, 1er		•		Ø350	69/76.5	Ø70-Ø148	0	50	5.0	6,000	6	•	•	DDF.530-04	XT9911420730
	PAR.530-PY350mp	POLY GRIP, 1er (LPA)	•			Ø350	69/76.5	Ø70-Ø148	0	50	5.1	6,000	6	•	•	DDF.530-04	XT9911420731

* see pp. 72/73

** up to 200 bar

LPA = air gun connection

Technical data	Unit	POWER GRIP	GENIUS GRIP	POLY GRIP
Repeatability	mm	±0.002	±0.002	±0.002
Clamping force without re-tightening PNEU	kN	17		7
Clamping force with re-tightening PNEU	kN	28		12
Clamping force without re-tightening HYDR	kN	35	50	
Clamping force with re-tightening HYDR	kN	45	90	
Permissible pull-out torque without re-tightening PNEU 6 bar	Nm	429	700	160 / 210*
Permissible pull-out torque without re-tightening HYDR 30 bar	Nm	890	1'050	

* 2 possible Z-supports. More details on request.



POWER GRIP 160, 1er on EA-507



POWER GRIP 160, 1er on EA-510



POWER GRIP 160, 1er on EA-520



POWER GRIP 160, 4er on EA-530



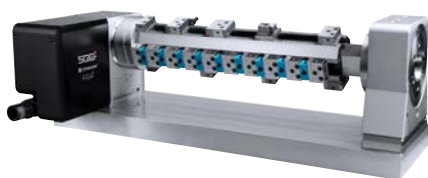
Clamping device assembled by pL LEHMANN,
final adjustment by customer (if ordered together with a rotary table)

Further information at: www.evard-precision.ch
Request installation and operating instructions directly from manufacturer



Polymut Monoblock towers

pL LEHMANN Item no.	Designation	Size [mm]	Total length [mm]	Length Toothling [mm]	Weight [kg]	Evard item no. incl. adapter flange
507	EVA.507-350-T50	50	368	318	16	T50350507
	EVA.507-450-T50	50	468	418	19	T50450507
	EVA.510-500-T50	50	503	453	24	T50500510
510	EVA.510-600-T50	50	603	553	28	T50600510
	EVA.510-500-T80	80	503	423	45	T80500510
	EVA.510-600-T80	80	603	523	53	T80600510



Rotary table EA-510.L with Polymut 50/500
Compatible with pL LEHMANN rotoFIX base plate.

Simultaneously produce up to 32 workpieces 25 mm wide with
a precision and repeat accuracy of +/- 0.01 mm. The modular
Polymut system will meet all of your requirements regarding
workpiece clamping.

- Accuracy ± 0.01 over all clamps
- Tight and protected guides
- Very stiff, because guide is directly integrated into jaw
- Narrower jaws, thus more workpieces per 100 mm compared to other manufacturers

Fixed and clamping jaws

pL LEHMANN Item no.	Designation	Size [mm]	Width [mm]	Weight [kg]	Required accessories	Evard Item no.
Polymut 50	EVA.50160	50	20	0.310	–	50160
	EVA.50161	50	20	0.360	–	50161
	EVA.4101	50	49	0.226	–	4101
	EVA.4121	50	49	0.230	–	4121
	EVA.50105	50	49	0.340	–	50105
	EVA.4102	50	49	0.373	–	4102
	EVA.4109	50	49	0.373	–	4109
	EVA.50101	50	49	0.373	–	50101
	EVA.4111	80	78	0.880	–	4111
	EVA.4120	80	78	0.900	–	4120
Polymut 80	EVA.80107	80	78	1.330	–	80107
	EVA.4110	80	78	1.446	–	4110
	EVA.4119	80	78	1.430	–	4119
	EVA.80101	80	78	1.475	–	80101
	EVA.105001	80	105	2.050	–	105001
	EVA.105005	80	105	2.070	–	105005
	EVA.105007	80	105	2.100	–	105007
	EVA.105002	80	105	2.650	–	105002
	EVA.105006	80	105	2.575	–	105006
	EVA.105008	80	105	2.540	–	105008
EVA.120000	EVA.120001	80	120	2.300	–	120001
	EVA.120005	80	120	2.200	–	120005
	EVA.120007	80	120	2.400	–	120007
	EVA.120002	80	120	2.980	–	120002
	EVA.120006	80	120	2.890	–	120006
	EVA.120008	80	120	2.830	–	120008



Clamping device assembled by pL LEHMANN,
final adjustment by customer (if ordered together with a rotary table)

Further information at: www.evard-precision.ch
Request installation and operating instructions directly from manufacturer



Centering vise – Type CM

	pL LEHMANN Item no.	Designation	manual pneumatic	Size [mm]	Clamping capacity [mm]	Weight [kg]	Evard Catalog Reference	Evard Item no. incl. adapter flange
507/510	EVA.5xx-2020	CM centering vise	•	20	25	0.22	2020	2020507
	EVA.5xx-2021	CM stainless steel centering vise	•	20	25	0.22	2021	2021507
	EVA.5xx-3000	CM centering vise	•	30	56	0.66	3000	3000507
	EVA.5xx-7050	Azimet centering vise	•	50	50	1.20	7050	7050507
	EVA.5xx-3001	CM stainless steel centering vise	•	30	56	0.66	3001	3001507
	EVA.5xx-5000	CM centering vise	•	50	89	2.30	5000	5000510
	EVA.5xx-7070	Azimet centering vise	•	70	70	4.00	7070	7070510
	EVA.5xx-8000	CM centering vise	•	80	137	6.45	8000	8000510



Combine the EA-507 rotary table with the
CM 20 centering vise and split the μ's.

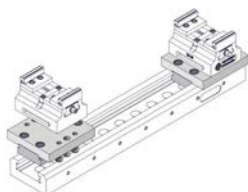


Jaws

	pL LEHMANN Item no.	Designation	Size [mm]	Weight [kg]	Required accessories	Evard Item no.
CM 50	EVA.500053	Standard jaw	50	Included in the weight of the vise	–	500053
	EVA.500051	Stepped jaw	50	Included in the weight of the vise	–	500051
	EVA.500052	Claw jaw	50	Included in the weight of the vise	–	500052
	EVA.500055	Special claw jaw	50	Included in the weight of the vise	–	500055
CM 80	EVA.800053	Standard jaw	80	Included in the weight of the vise	–	800053
	EVA.800051	Stepped jaw	80	Included in the weight of the vise	–	800051
	EVA.800052	Claw jaw	80	Included in the weight of the vise	–	800052
	EVA.800055	Special claw jaw	80	Included in the weight of the vise	–	800055
CM 105	EVA.105053	Standard jaw	105	Included in the weight of the vise	–	105053
	EVA.105051	Stepped jaw	105	Included in the weight of the vise	–	105051
	EVA.105052	Claw jaw	105	Included in the weight of the vise	–	105052
	EVA.105055	Special claw jaw	105	Included in the weight of the vise	–	105055

Adapter plate for CM 50 on Polymut

pL LEHMANN Item no.	Designation	Size of the CM [mm]	Size of the Polymut [mm]	Required accessories	Evard Item no.
EVA.500054	Adapter plate for CM 50 on Polymut 80	50	80	See Monoblock tower	500054
EVA.500057	Adapter plate for CM 50 on Polymut 50	50	50	See Monoblock tower	500057



Clamping devices installed and aligned by pL LEHMANN
(if ordered together with a rotary table)

Further information at: www.triag-int.ch

Request installation and operating instructions directly from manufacturer

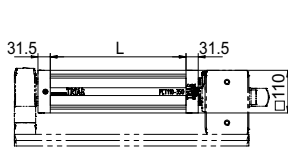
Clamping bars

	pL LEHMANN Item No.	Usable length L [mm]	Cube [mm]	Interference circle* Ø [mm]	Weight [kg]	Max. speed [rpm]	Counterbear- ing **	Base plate	TRIAG Item no.
507	TRI.507-350	350	110x110	156	34		GLA.TOP1-110	RFX.507-GP350s-TOP	PCT110-350-507-PL
	TRI.507-450	450	110x110	156	43		GLA.TOP1-110	RFX.507-GP450s-TOP	PCT110-450-507-PL
510	TRI.510-500	500	110x110	156	45		GLA.TOP2-150	RFX.510-GP500s-TOP	PCT110-500-510-PL
	TRI.510-600	600	110x110	156	54		GLA.TOP2-150	RFX.510-GP600s-TOP	PCT110-600-510-PL
520	TRI.520-600	600	110x110	198	54		GLA.TOP2-180	RFX.520-GP600s-TOP	PCT110-600-520-PL
	TRI.520-700	700	110x110	198	63		GLA.TOP2-180	RFX.520-GP700s-TOP	PCT110-700-520-PL

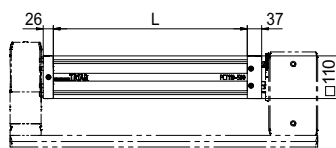
* without jaws

** must always be ordered from pL

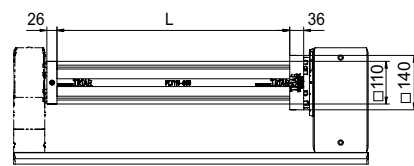
- Weight for clamping bar and adapter flanges only (without rotary table, counterbearing and common base plate).
- For more information about base plates, see **p. 43** and for counter bearings, see **p. 91**



EA-507 for GLA.TOP1-110 and
RFX.507-GPxxxs-TOP



EA-510 for GLA.TOP2-150 and
RFX.510-GPxxxs-TOP



EA-520 for GLA.TOP2-180 and
RFX.520-GPxxxs-TOP



EA-510 with pneuma-
tic centric clamping unit



EA-510 rotoFIX
with TRIAG clamping tower 4-sided

Clamping yokes

	pL LEHMANN Item No.	Usable length L [mm]	Dimensions L x W x H [mm]	Weight [kg]	Max. speed [rpm]	Mounting set	Counterbearing *	Base plate
507	TRI.507-SB350	350	350 x 165 x 20			RFX.507-ASa	GLA.TOP1-110	RFX.507-GP350s-TOP
	TRI.510-SB500	500	500 x 215 x 35			RFX.510-ASa	GLA.TOP2-150	RFX.510-GP500s-TOP
510	TRI.510-SB600	600	600 x 215 x 35			RFX.510-ASa	GLA.TOP2-150	RFX.510-GP600s-TOP
	TRI.520-SB600	600	600 x 270 x 40			RFX.520-ASa	GLA.TOP2-180	RFX.520-GP600s-TOP
520	TRI.520-SB700	700	700 x 270 x 40			RFX.520-ASa	GLA.TOP2-180	RFX.520-GP700s-TOP
	TRI.520-SB800	800	800 x 270 x 40			RFX.520-ASa	GLA.TOP2-180	RFX.520-GP800s-TOP
530	TRI.520-SB1000	1000	1000 x 270 x 40			RFX.520-ASa	GLA.TOP2-180	RFX.520-GP1000s-TOP
	TRI.520-SB800	800	800 x 270 x 40			RFX.530-ASa	GLA.TOP2-180	RFX.530-GP800s-TOP
530	TRI.520-SB1000	1000	1000 x 270 x 40			RFX.530-ASa	GLA.TOP2-180	RFX.530-GP1000s-TOP

* must always be ordered from pL

- Weight for clamping bar and adapter flanges only (without rotary table, counterbearing and common base plate).
- For more information about base plates, see **p. 43** and for counter bearings, see **p. 91**



EA-510 rotoFIX with clamping yoke pL 500
mm and mounted TRIAG rails



EA-520 rotoFIX with clamping yoke
pL 1000 mm and mounted TRIAG rails

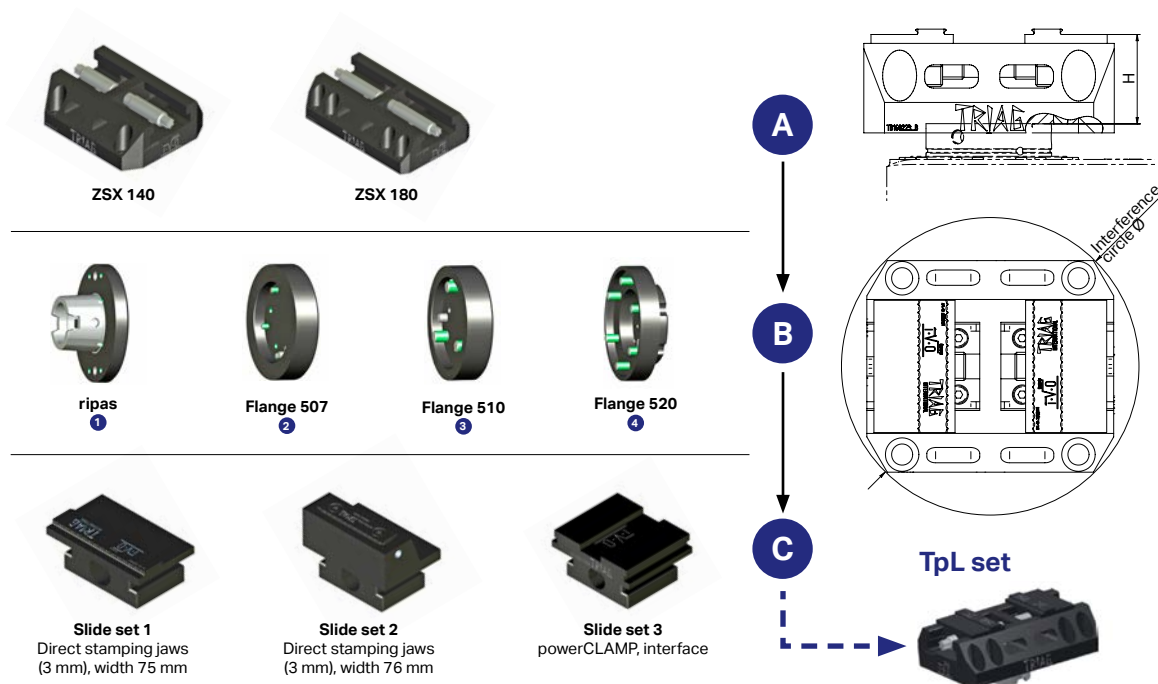


Ultra-compact
self-centering vise –
only 50 mm above spindle



Clamping devices assembled by pL LEHMANN,
final adjustment by customer (if ordered together with a rotary table)

Manufacturer for adaptation to pL rotary table: www.ivo-oesterle.de
Manufacturer for all other add-on elements: www.triag-int.ch



A Centric clamping unit

pL LEHMANN Item No.	Designation	L from flange [mm]	Interference circle Ø [mm]	Weight, approx. (without adapter flange) [kg]	Max. speed [rpm]	Required adapter flange	TRIAG item no.
TRI.ZSX-140	ZSX 140 (140 x 120 x 50)	32.5	184	3	400	1 / 2 / 3 / 4	ZSX140L50-PL
TRI.ZSX-180	ZSX 180 (180 x 120 x 50)		216	4.2			ZSX180L50-PL

B Hollow shank taper adapter and flange

HSK	pL LEHMANN Item no.	Compatible with centric clamping units	L from spindle [mm]	Weight [kg]	Required*	TRIAG item no.
507	TRI.HSK	ZSX 140 / ZSX 180	12.5	0.9	RIP.5xx-63x	FLZSX-HSK63-PL
510	TRI.507		12.5	1		FLZSX-507-PL
520	TRI.510		15	1.2		FLZSX-510-PL
	TRI.520		17.7	2.2		FLZSX-520-PL

* see p. 145

C Suitable jaw set

ZSX 140/180	pL LEHMANN Item No.	Designation	Weight [kg]	TRIAG item no.
	TRI.ZB5X	Slide set 1 direct stamping jaws (3 mm), width 75 mm	1	ZB5XPRG
	TRI.ZB5U	Slide set 2 direct stamping jaws (3 mm), width 76 mm	2	ZB5UPRG
	TRI.ZBM	Slide set 3 powerCLAMP, interface	1.8	ZBM



Clamping devices assembled by pL LEHMANN,
final adjustment by customer (if ordered together with a rotary table)

Further information at: www.triag-int.ch

Request installation and operating instructions directly from manufacturer

Pneumatic centric clamping unit

	pL LEHMANN Item No.	Designation	Size [mm]	L from spindle (with adapter flange, without jaws) [mm]	Pneumatic	Jaw stroke [mm]	Clamping force [kN] *	Max. pressure (bar)	Max. range with standard jaws ** [mm]	Weight (with adapter flange) [kg]	Max. speed *** [rpm]	Additionally required pL LEHMANN rotary union **	TRIAG Item no.
507/510/520	TRI.5xx-ZSP150	Centric clamping unit	150 x 150	105	•	6	24	12	124.5	13.5	400	DDF.5xx-04	ZSP150L100- 510/520-PL

* at max. pressure and / or max. torque

** see p. 72/73

*** only indexing allowed

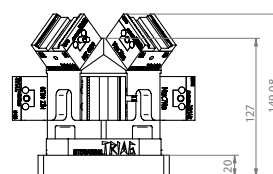
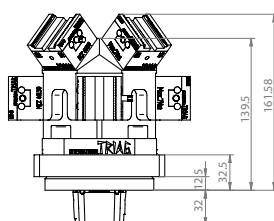
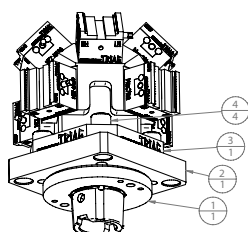


5-axis centric clamping block

	pL LEHMANN Item No.	Designation	Size [mm]	L from spindle (with adapter flange and clamp, without jaws) [mm]	Manual	Weight (with adapter flange) [kg]	Max. speed* [rpm]	Additionally required pL LEHMANN accessories **	TRIAG Item no.
HSK	TRI.5xx-CENHSK	5-axis centric clamping block	120 x 120	162	•	7.7	0	RIP.5xx-63x	FLZSX-HSK63-PL UB5AXMCZ40-45-4 ZF230540
QuickPoint	TRI.5xx-CENQP			149		7	0	LAN.5xx-QP96x	UB5AXMCZ40-45-4 ZF230540

* only indexing allowed

** see p. 145



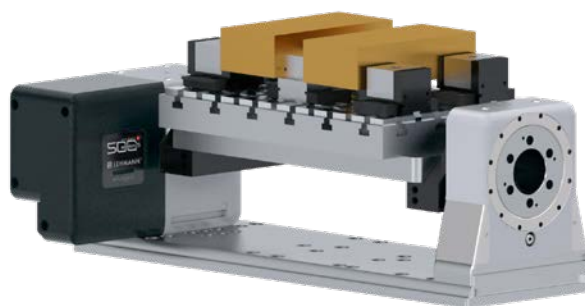
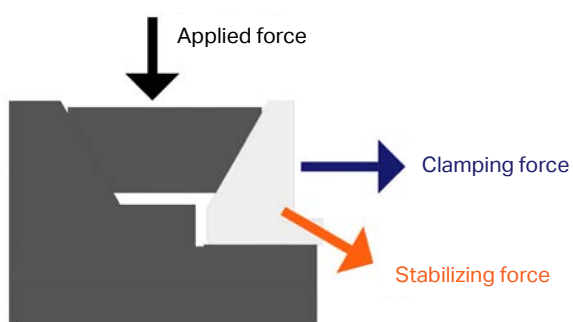
There are even more possibilities ...

Further information on the following
clamping systems on request



Further information at: www.microloc.com

MicroLoc



Overview,
Applications

System &
Facts, smartBox

Rotary
tables

SPZ,
DDF, WMS

MOT, KAB,
WDF, CNC

Aligning,
GLA, RST, LOZ

Service
& Technology

Tooling

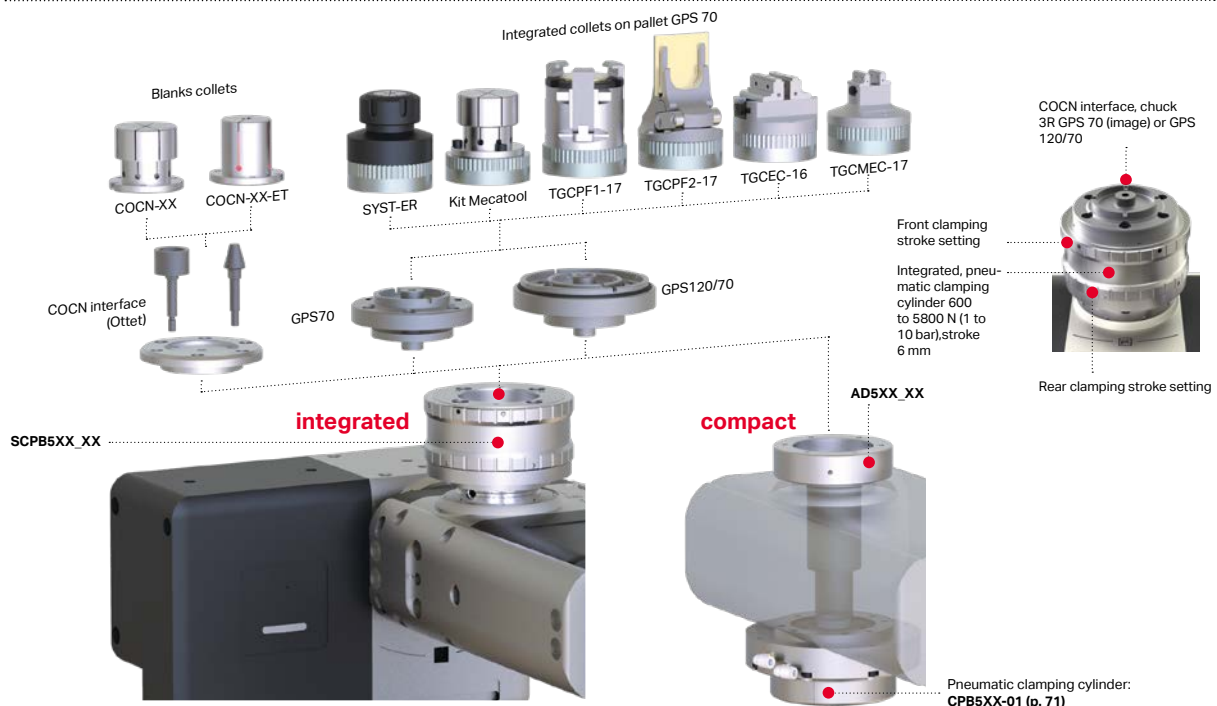


Further information at: www.tgcolin.ch



Further information at: www.yerly.net

TG Colin



YERLY



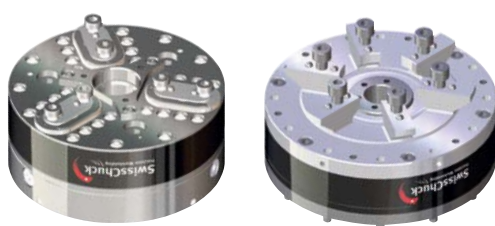


Further information at: www.SwissChuck.com



Further information at: www.hofer-maschinentechnik.ch

SwissChuck



Precision power chucks (cylinder-actuated)

Precision diaphragm chuck (pneumatically actuated)

- Sealed and oil filled
- High-precision
- Precision interface for fast changeovers

HOFER



LINEAR multiple clamping system



TITAN 100 zero-point clamping system



REX-M center clamp

Overview,
Applications

System &
Facts, smartBox

Rotary
tables

SPZ,
DDF, WMS

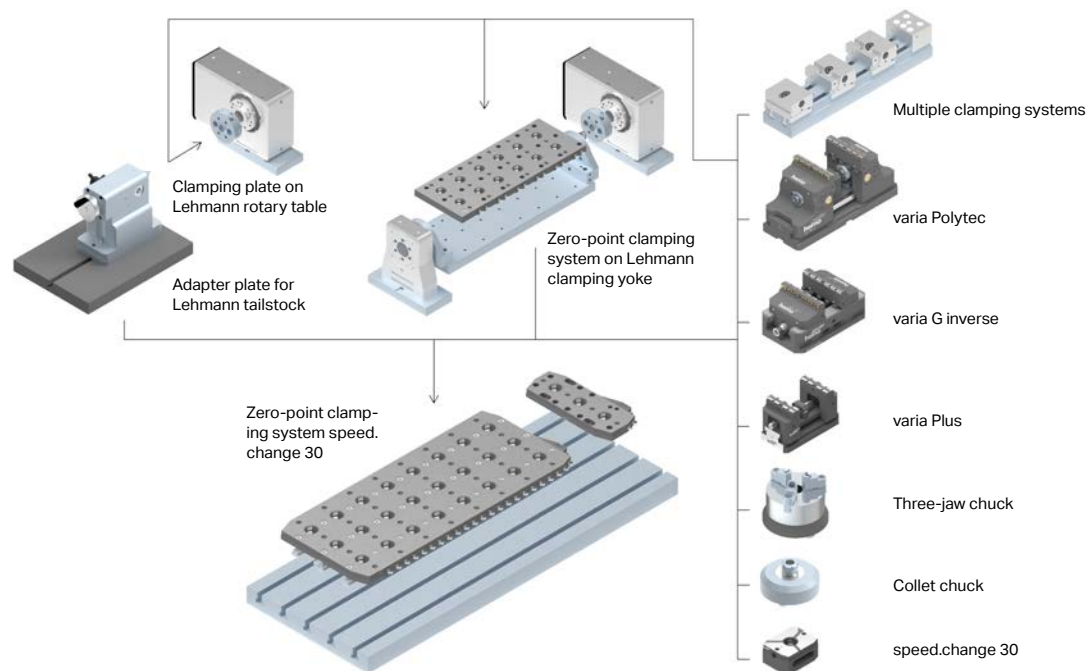
MOT, KAB,
WDF, CNC

Aligning,
GLA, RST, LOZ

Service
& Technology

Tooling

hemo



PiranhaClamp

Zero-point clamping plates



510 with NSP

Ripas

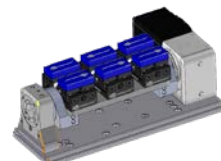
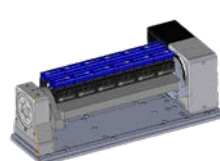


PV 75 Ripas

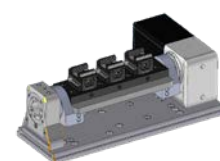


Snapper 300 Ripas

Clamping yoke


507-350 mm x 165 mm
3 Gepard direct

520-600 mm x 270 mm
NSP 6 Gepard


520-800 mm NSP 8x PV75


507-350 mm x 165 mm
NSP 3 PV75



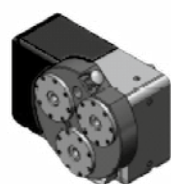
ROEMHELD
HILMA ■ STARK

Further information at: www.stark-inc.com

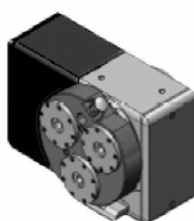


Further information at: www.amf.de

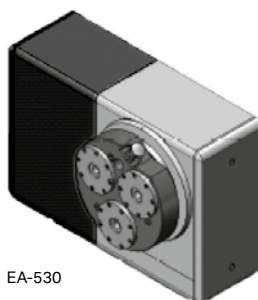
STARK



EA-510



EA-520



EA-530

AMF



AMF zero-point clamping system



EA-type rotary table with
swing arm and AMF chuck



EA-type rotary table with cube
and AMF chuck

Overview,
Applications

System &
Facts, smartBox

Rotary
tables

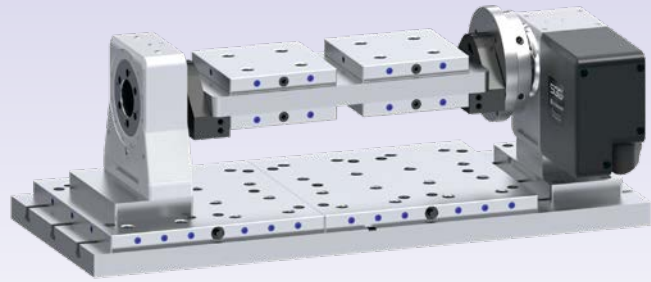
SPZ,
DDF, WMS

MOT, KAB,
WDF, CNC

Aligning,
GLA, RST, LOZ

Service
& Technology

Tooling



HWR

pL LEHMANN item No.	Description	Manual	Dimensions L x W x H [mm]	Weight [kg]	Spacing	Positioning accuracy [mm]	Retention force 4 pins [kN]	Number of clamping nests	HWR Item No.
HWR.SP52+96m-1	SOLIDPoint® 96/52: zero-point plate	•	192 x 192 x 27	7.2	96 / 52	0.005	60	1	660005 + 662101 + 662111
HWR.SP96m-1	SOLIDPoint® 96: zero-point plate	•	192 x 192 x 27	7.2	96	0.005	60	1	660205 + 662101 + 662111
HWR.SP96m-2	SOLIDPoint® 96: multiple zero-point plate	•	384 x 192 x 27	15	96	0.005	60	2	660025 + 677102 + 677112
HWR.SP52+96m-2	SOLIDPoint® 96/52: multiple zero-point plate	•	384 x 192 x 27	15	52 / 96	0.005	60	2	660225 + 677102 + 677112
HWR.SP96m-4	SOLIDPoint® 96: multiple zero-point plate	•	384 x 384 x 27	28	96	0.005	60	4	660045 + 677104 + 677114



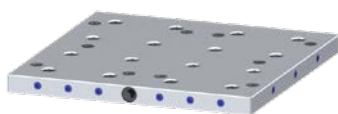
HWR.SP96m-2



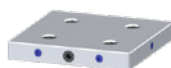
HWR.SP96m-4

LANG

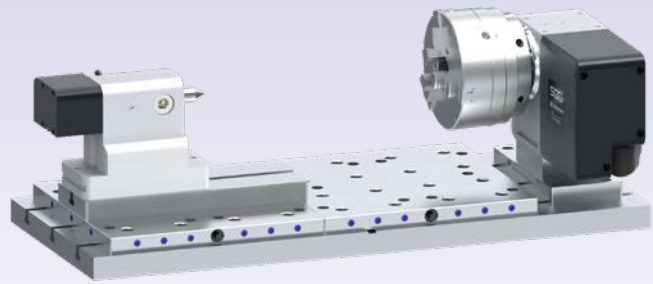
pL LEHMANN item No.	Description	Manual	Dimensions L x W x H [mm]	Weight [kg]	Spacing	Repeatability [mm]	Retention force 4 pins [kN]	Number of clamping nests	LANG Item No.
LAN.QP96m-1	QuickPoint® 96: zero-point plate	•	192 x 192 x 27	7.76	96	0.005	6	1	45710
LAN.QP52+96m-1	QuickPoint® 96/52: zero-point plate	•	192 x 192 x 27	7.45	52 / 96	0.005	6	1	45748
LAN.QP96m-2	QuickPoint® 96: multiple zero-point plate	•	384 x 192 x 27	16.48	96	0.005	6	2	45720
LAN.QP96m-4	QuickPoint® 96: multiple zero-point plate	•	384 x 384 x 27	31.48	96	0.005	6	4	45740



LAN.QP96m-4



LAN.QP96m-1



GRESSEL

pL LEHMANN item No.	Description	Manual	Dimensions L x W x H [mm]	Weight [kg]	Spacing	Positioning accuracy [mm]	Retention force 4 pins [kN]	Number of clamping nests	GRESSEL Item No.
GRE.GEC-2	2-way angular	•	400 x 130 x 30	11	200	< 0.01	2 x 20	2	NGS.020.022.01
GRE.GEC-3	3-way angular	•	600 x 130 x 30	18	100	< 0.01	3 x 20	3	NGS.020.023.01



GRE.GEC-2



GRE.GEC-3

Preparations for base plate at rotary table, counterbearing and tailstock

Rotary table and counterbearing

For adaptation of the rotary table and the counterbearing, a base plate with corresponding adaptation to the zero-point clamping system is required. The design is project-specific and is offered as an engineering service.

	Item No. Base plate	Item No. Adaptation	Item No. Engineering	Increase of center height
EA-507 (508)	GPL.507-150	SPEZ.GPL-m	SPEZ.ENG-k	40mm
EA-510 (511)	GPL.510-180			30mm
EA-520 (521)	GPL.520-220			40mm
EA-530	GPL.530-280			60mm
GLA.TOP1	GPL.TOP1-150			40mm
GLA.TOP2	GPL.TOP2-180			30mm



Tailstock

For adaptation of the tailstock, the standard base plate can be adapted to the zero-point clamping system. If this is not possible due to the positioning on the zero-point clamping plate (e.g. break-through of the holes), an adaptation base plate is required.

	Item No. Adaptation base plate	Item No. Adaptation	Item No. Engineering
RST.LIG-xxxx	without	SPEZ.GPL-m	SPEZ.ENG-k
	GPL.RST-30		





Installed by pL LEHMANN
(if ordered together with a rotary table)

Further information at: www.roehm.biz
Request installation and operating instructions directly from manufacturer

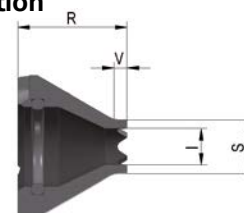


Face driver, play-free version with hydraulic compensation for clockwise and counterclockwise rotation

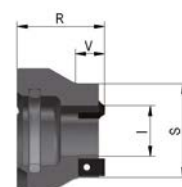
pL LEHMANN Item no.	Designation	Overhang [mm]	Max. workpiece weight [kg]	Max. axial load [kN]	Weight [kg]	Max. speed [rpm]	RÖHM Item no., incl. adapter flange
507	RÖH.507-SM Face driver	65	100	20			1340449
510	RÖH.510-SM Face driver	65	100	20			1340450
520	RÖH.520-SM Face driver	65	100	20			1340451
530	RÖH.530-SM Face driver	65	100	20			1340452

Accessories: Driver plates / play-free / clockwise and counterclockwise rotation

pL LEHMANN Item no.	Designation	S Clamping circle Ø	Associated center Ø	R Overhang [mm]	I [mm]	V [mm]	Weight [kg]	RÖHM item no.
directly geared	RÖH.MS-DV08 Driver plate	8	4	38	4.5	4		1341603
	RÖH.MS-DV10 Driver plate	10	4	38	4.5	4		1341604
	RÖH.MS-DV12 Driver plate	12	6	36	7	4		1341605
	RÖH.MS-DV16 Driver plate	16	10	33	11	4		1341606
	RÖH.MS-DV20 Driver plate	20	12	30	13	4		1341607
	RÖH.MS-DV25 Driver plate	25	16	30	17	8		1341608
3x select. HM plates 6 x 3.2	RÖH.MS-DV32 Driver plate	32	16	30	22	10		1341609
	RÖH.MS-HM20 Driver plate	20	6	30	7	8		1341624
	RÖH.MS-HM25 Driver plate	25	10	30	11	8		1341625
	RÖH.MS-HM32 Driver plate	32	16	30	17.5	10		1341626
	RÖH.MS-HM40 Driver plate	40	16	30	27	16		1341627
	RÖH.MS-HM50 Driver plate	50	16	30	36			1341635
	RÖH.MS-HM63 Driver plate	63	16	30	49			1341636
	RÖH.MS-HM80 Driver plate	80	16	30	66			1341637



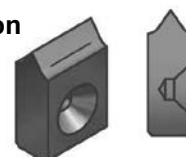
Driver plate directly geared
1209000



Driver plate
3x select. HM plates 6 x 3.2
1209007

Accessories: Metal carbide driver plates, clockwise and counterclockwise rotation

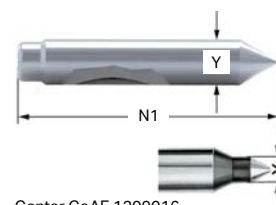
pL LEHMANN Item no.	Designation	Clamping circle Ø	Size	Weight [kg]	RÖHM Item no.
RÖH.HMP-20	Metal carbide plate	20-32	6 x 3.2		88970
RÖH.HMP-40	Metal carbide plate	40-80	9.5 x 3.2		87931



Metal carbide driver plates 088970

Accessories: Center

pL LEHMANN Item no.	Designation	Clamping circle Ø	Y Center Ø	N1 [mm]	Weight [kg]	RÖHM Item no.
RÖH.ZS-08	Center	8-10	4	90		1341941
RÖH.ZS-12	Center	12	6	90		1341942
RÖH.ZS-16	Center	16	10	90		1341943
RÖH.ZS-20	Center	20	12	90		1341944
RÖH.ZS-25	Center	25-80	16	90		1341945



Center CoAE 1209016



Supplied loose by pL LEHMANN

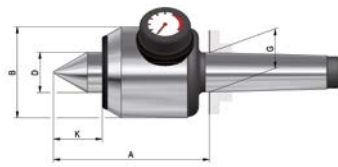
Further information at: www.roehm.biz

Request installation and operating instructions directly from manufacturer

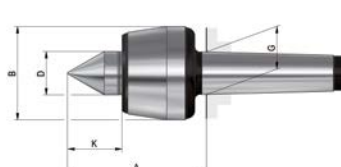


Revolving centers

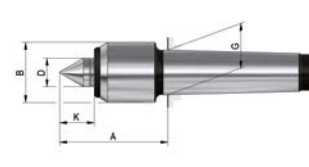
	pL LEHMANN Item no.	Designation	Mount MK	Max. run-out deviation [mm]	Max. workpiece weight [kg]	Max. radial load [daN]	Max. speed [rpm]	D Moving-tip Ø [mm]	B Housing Ø [mm]	A [mm]	G [mm]	K [mm]	Weight [kg]	RÖHM item no.
Tailstock options / accessories	RÖH.ZS-DAMK3	with pressure display and length compensation; spring-loaded tip - spring travel max. 1.6 mm at axial clamping force of 550 daN; body hardened and ground – tip angle 60°	3	0.01	400	200	4000	25	64	105	23.8	31		60798
	RÖH.ZS-SAMK2	Standard version; body hardened and ground; tip angle 60°	2	0.005	200	100	7000	20	43	65	17.8	24		43115
	RÖH.ZS-SAMK3		3	0.005	400	200	6300	22	48.5	70.5	23.8	27		42315
	RÖH.ZS-GDMK2	with small housing diameter, body hardened and ground; tip angle 60°	2	0.005	200	100	7000	15	32	62	17.8	19.5		5336
	RÖH.ZS-GDMK3		3	0.005	400	200	7000	15	34	62	23.8	19.5		5429



Mikó 60798



Mikó 43115 / 42315



Mikó 5336 / 5429

Overview,
Applications

System &
Facts, smartBox

Rotary
tables

SPZ,
DDF, WMS

MOT, KAB,
WDF, CNC

Aligning,
GLA, RST, LOZ

Service
& Technology

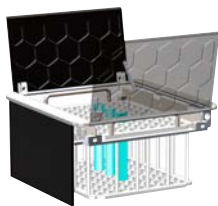
Tooling

ROTOMATION *transferBox*

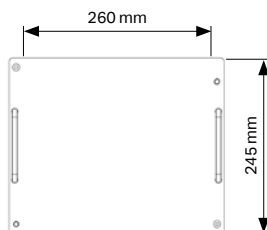
- Plug & play indoor automation
- For unmanned 6-side machining with integrated part changer
- Workpiece storage with quick-change system
- Installed/uninstalled on machine within minutes (with zero-point clamping)

Blow off finished workpiece

TOP



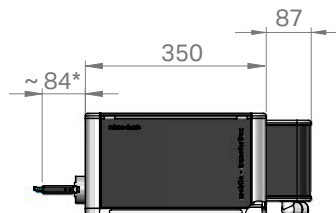
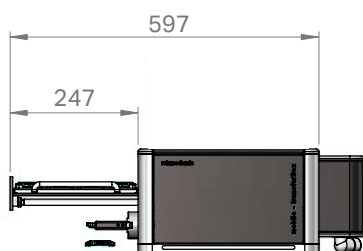
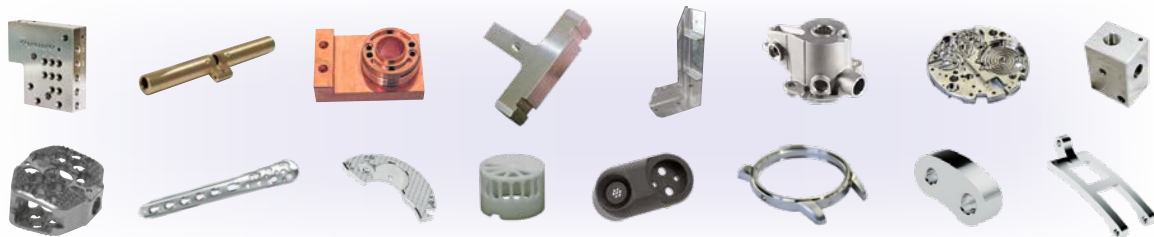
Vertical rod holder



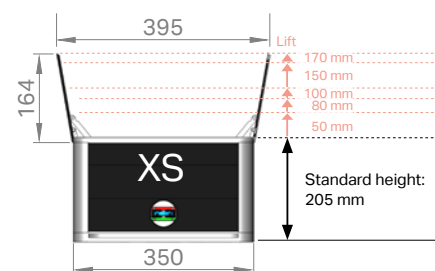
TOP workpiece carrier
Useful depth with standard height*: 94 mm
* Height increase, see below



Part reverser for rear side machining

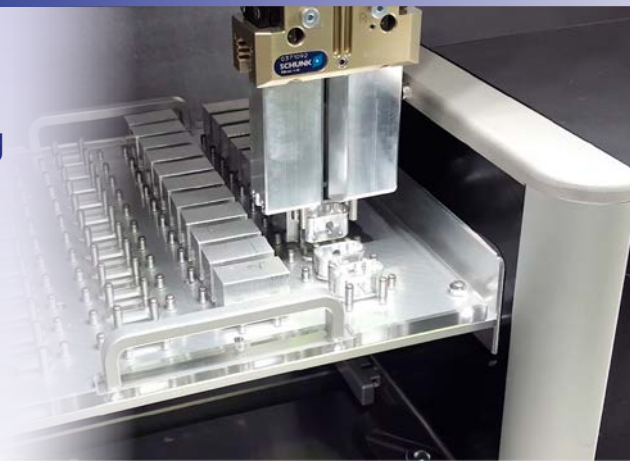


* Example



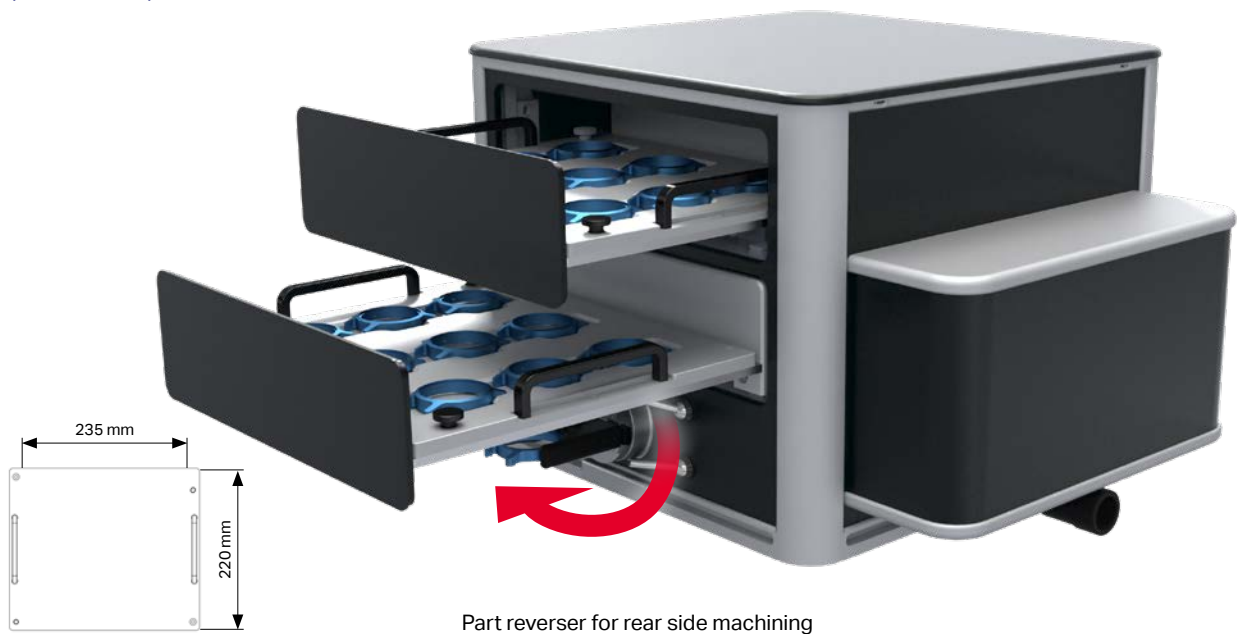
Ideal for existing and new vertical machining centers. Turn nighttime into production time
«From real-world applications – for real-world applications»

Deposit finished workpiece



SLIDE

(here, SLIDE-2)



Workpiece carrier SLIDE
Usable height: max. 49 mm

Part reverser for rear side machining

After just a few minutes ... produce!

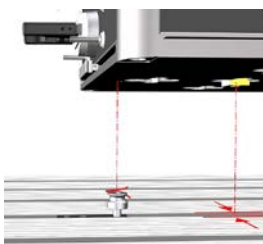
Position box and plug it in

Load workpieces

Start program



Zero-point positioning



Interesting expansion



4th axis, one spindle



4th/5th axis



ROTARY SOLUTIONS > MACHINE TOOLS & METROLOGY

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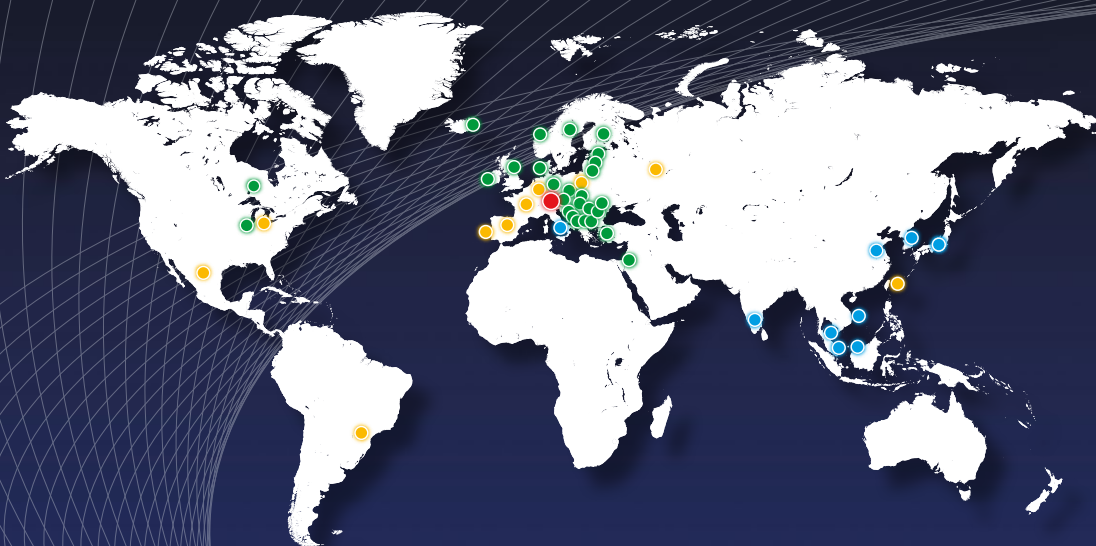
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