

# SDO<sup>+</sup>

## CNC Rotary Tables – Edition 4

**PGD**  
Series

Preloaded  
Gear Drive

2022

**Main  
catalog**

1/2022 | EN



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

**pl** LEHMANN<sup>®</sup>

# 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 the first 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 (direct drive up to 10,000 rpm)
- 2002 2nd generation assumes management responsibility
- 2003 Development of the 700 series (direct drive 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
- 2017 Introduction of the 600 series
- 2019 Introduction of AM-LOCK and the 900 DD Series up to 5,450 rpm

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

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](http://www.lehmann-rotary-tables.com).

## Additional pL products



DD Series



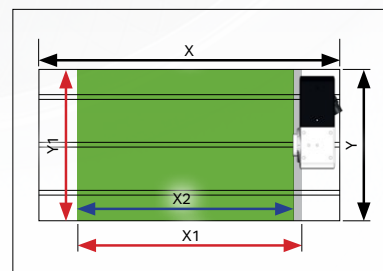
AM-LOCK





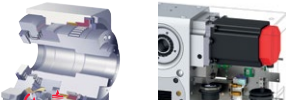

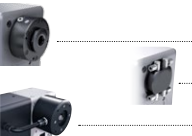
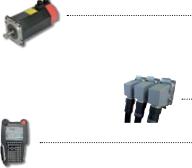
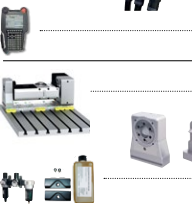

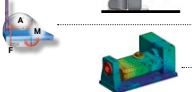

\* Sales and service partners trained and equipped by pL (VAR – value added resellers or VAP - value added partners)

## Selection Guides

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

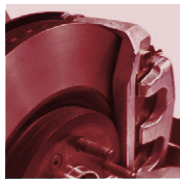


Whoever wishes to invest in tomorrow's way of production must consider the needs and opportunities available today

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The entire catalog is subject to technical changes without notice

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



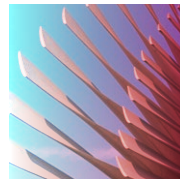
Automotive



Medical/Dental



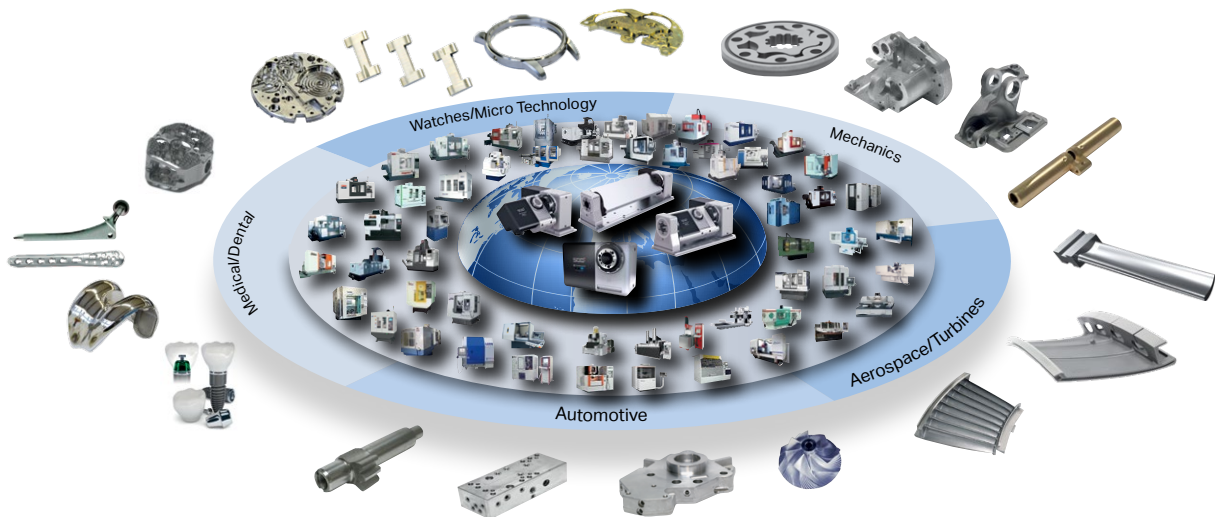
Watches /  
Micro Technology



Aerospace/Turbines



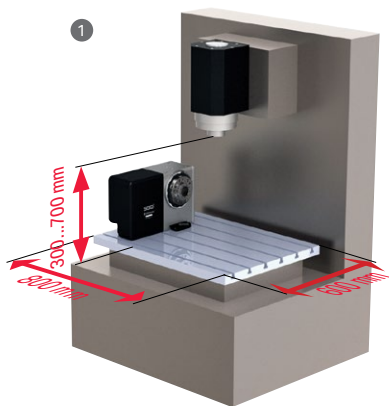
Mechanics



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



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



2 4<sup>th</sup> axis with swivel yoke, on base plate



3 4<sup>th</sup> axis with swivel yoke, directly on machine table



4 4<sup>th</sup> axis, 3-spindle, X-mounting (lengthwise)



5 4<sup>th</sup> axis, 3-spindle, Y-mounting (crosswise)



6 4<sup>th</sup> + 5<sup>th</sup> axis, 1-spindle, X-mounting (lengthwise)



7 4<sup>th</sup> + 5<sup>th</sup> axis, 2-spindle, Y-mounting (crosswise)



8 4<sup>th</sup> + 5<sup>th</sup> axis, 2-spindle, X-mounting (lengthwise)



9 4<sup>th</sup> axis for tilting the grinding spindle. 5<sup>th</sup> axis (vertical) for workpiece rotation

- Overview Applications
- System & Facts, IBox
- 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

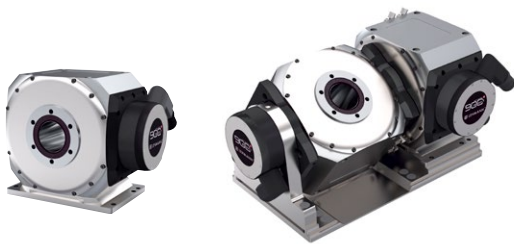
### Vertical machining centers

(Selection Guides available)

- Almac
- AMS
- BFW
- Brother Speedio
- Cincinnati
- DMG MORI
- Doosan
- EMCO
- Fancu Robodrill
- Fehlmann
- GF Mikron
- Haas CNC
- Hardinge
- Bridgeport
- Hasegawa
- Hurco
- Hwacheon
- Hyundai/Wia
- Kaast
- Komatech
- Map
- MAPLE
- MAS
- Mazak
- MTRent
- Okuma
- PreMill
- Priminer
- Quaser
- Schaublin
- Takumi
- Tongtai
- Toyoda
- Wele
- YCM

## DD Series

**NEW**



Request our special catalog

**High-speed DD**

up to 5,450 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
- Hauser
- Kellenberger
- 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**

Wireless monitoring,  
for operation & service

**No adjust**

Load change without  
parameter adjustment

**Less cost**

No cooling system,  
no hydraulics

Overview  
Applications

System &  
Facts, IBox

Rotary  
tables

SPZ,  
DDF, WMS

MOT, KAB,  
WDF, CNC

Aligning,  
GLA, RST, LOZ

Service  
& Technology

Tooling

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

## EA → TF TIP



## Diversity of products

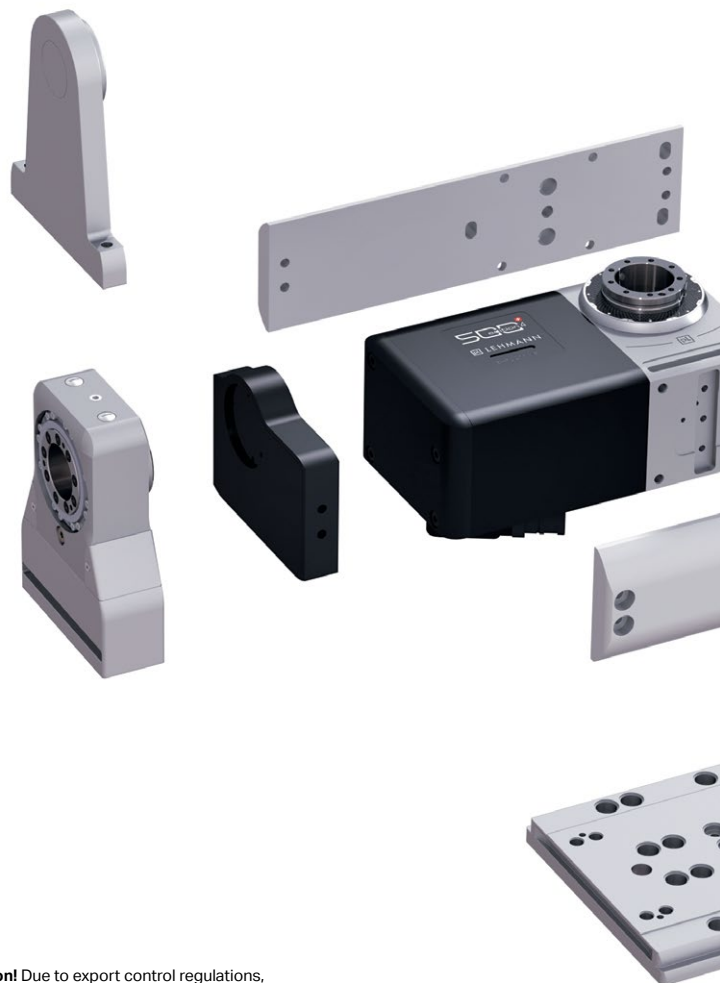
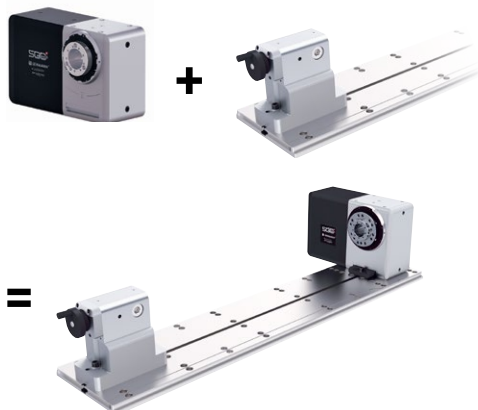
unique

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

## EA → EA with rotoFIX



## EA → EA with longFLEX



**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**

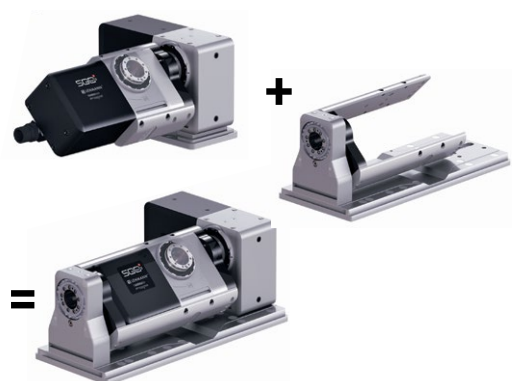
- Rotary table is available quickly and can be converted at any time
- If the needs change, the investment is not lost
- Pay in installments: First, the machine later the rotary table - can be retrofitted at any time



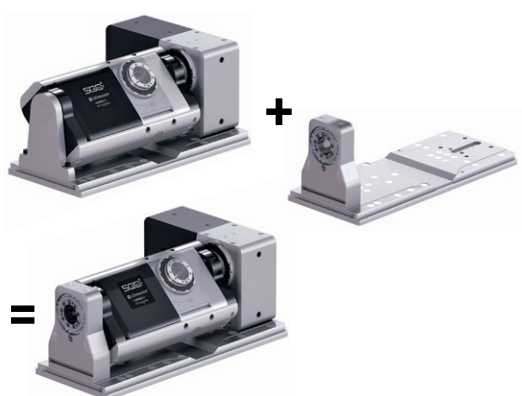
**TF TIP → T1 TAP**



**TF TIP → T1 TOP**



**T1 TAP → T1 TOP**



Overview  
Applications

System &  
Facts, IBox

Rotary  
tables

SPZ,  
DDF, WMS

MOT, KAB,  
WDF, CNC

Aligning,  
GLA, RST, LOZ

Service  
& Technology

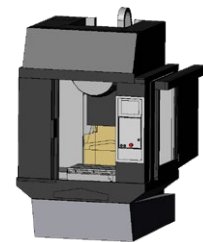
Tooling

Productivity, flexibility, price:  
many things speak for «on-top»

3-axis VMC + rotary table



3-axis VMC (TC) + rotary table



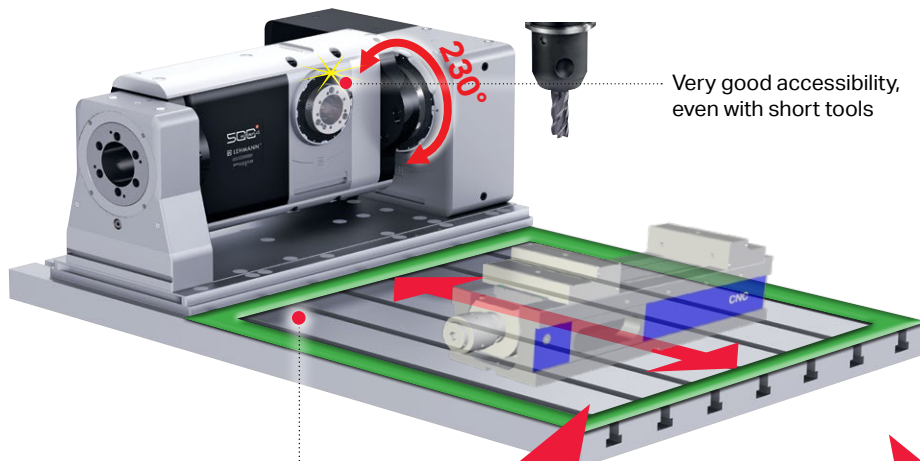
**Plus points for 3+ versus horizontal**

- Low initial investment
- Expandable & scalable
- Short amortization time

**Plus points for 3+ versus 5 axes**

- Maximum universality & efficiency
- Shaft machining
- Complete machining, incl. 6th side
- Clamping yoke & tower machining

**3+2**

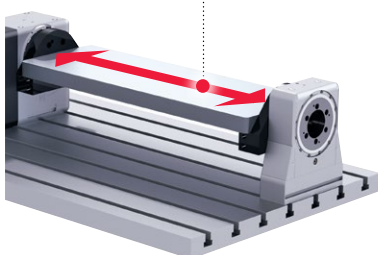


Very good accessibility, even with short tools

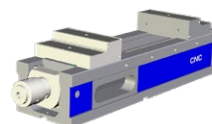
More space for workpieces and fixtures

If necessary, vise, indoor automation, or Clamping yoke

**3+1**



Vises of all kinds



**Indoor automation**

Intelligent automation for small parts or bar stock



Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, WMS

MOT, KAB, WDF, CNC

Aligning, GLA, RST, LOZ

Service & Technology

Tooling

## 4<sup>th</sup> axes, with modular system, single-/multi-spindle

**4 Sizes**

**Center height / Clamping torque**

- EA-507: 110 mm / 300 Nm
- EA-510: 150 mm / 800 Nm
- EA-520: 180 mm / 2,000 Nm
- EA-530: 220 mm / 5,000 Nm

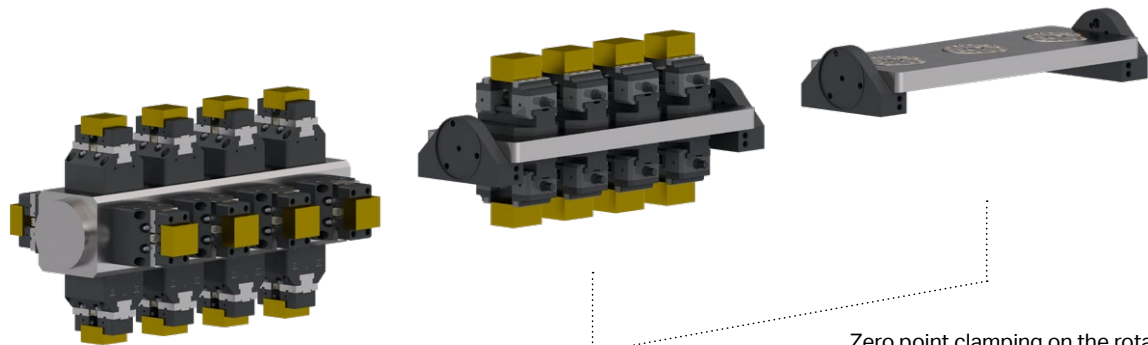
**Workpiece weights, incl. fixture / max. speed**

- EA-507: 240 kg / 111 rpm
- EA-510: 400 kg / 80 rpm
- EA-520: 800 kg / 50 rpm
- EA-530: 1,600 kg / 40 rpm

For simultaneous machining of up to 4 workpieces: the M-type rotary tables from the modular system for efficient series production.

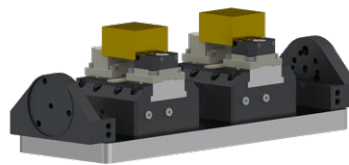
- Overview Applications
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## 4<sup>th</sup> axes, with modular clamping yoke system



Zero point clamping on the rotary table spindle further increases productivity

Modular quick change system for multiple clamping



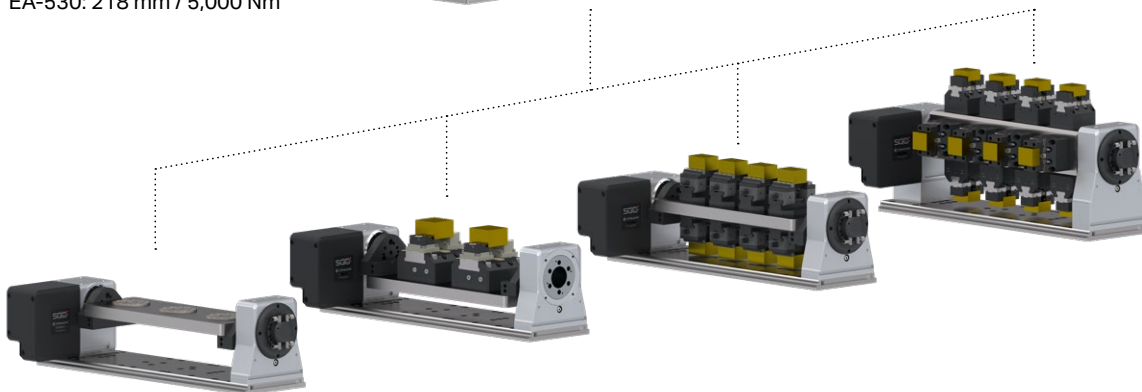
### Workpiece weights, incl. fixture / max. speed

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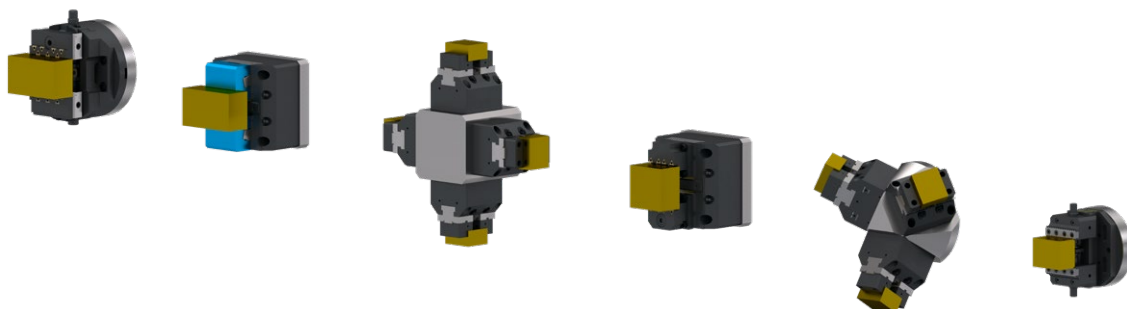
### 4 Sizes

#### Center height / Clamping torque

- EA-507: 140 mm / 300 Nm
- EA-510: 180 mm / 800 Nm
- EA-520: 210 mm / 2,000 Nm
- EA-530: 218 mm / 5,000 Nm



## 4<sup>th</sup>/5<sup>th</sup> axes, with modular system, single-spindle

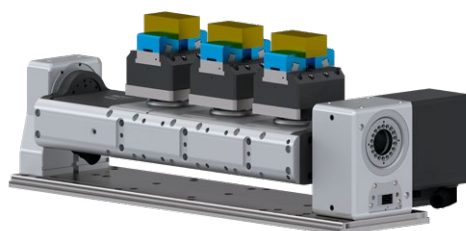


Whatever is possible on the 4th axes is also available for the rotating-tilting rotary tables from the modular system – standardized. Almost all variants also fit on multi-spindle rotating-tilting rotary tables – **extends machine runtime, increases productivity, reduces costs in series production.**



### 3 Sizes

- Tx-507510
- Tx-510520
- Tx-520530



### Center heights

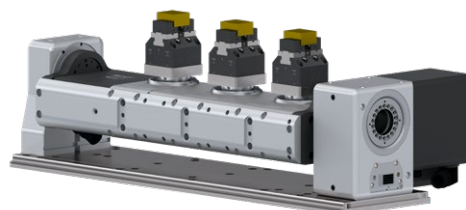
- 180 mm
- 210 mm
- 220 mm



T1-91x915 up to 5,400 rpm possible, here with TOPlus mini 40

### Workpiece weights incl. fixture and max. workpiece Ø

- 53 kg / 280 mm
- 89 kg / 340 mm
- 133 kg / 450 mm



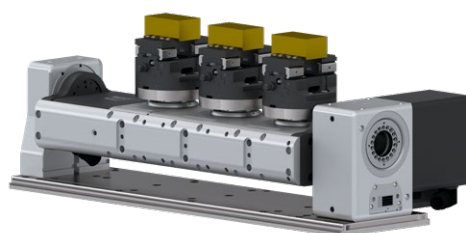
### max. speed 4<sup>th</sup> / 5<sup>th</sup> axis

- 111 rpm / 60 rpm
- 80 rpm / 40 rpm
- 50 rpm / 30 rpm



### Clamping torques 4<sup>th</sup>/5<sup>th</sup>

- 300 Nm / 1,100 Nm
- 800 Nm / 4,000 Nm
- 2,000 Nm / 7,000 Nm



Overview  
Applications

System &  
Facts, IBox

Rotary  
tables

SPZ,  
DDF, WMS

MOT, KAB,  
WDF, CNC

Aligning,  
GLA, RST, LOZ

Service  
& Technology

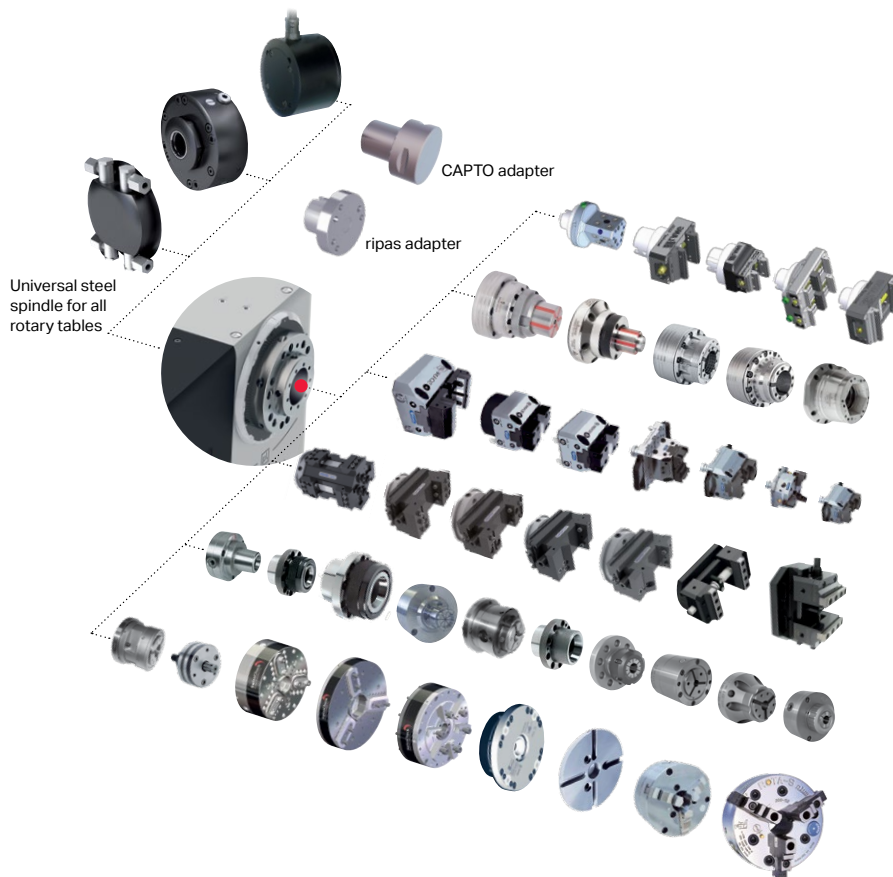
Tooling

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

For all variants and possibilities, see p. 117

## Spindle accessories, rear (see p. 56)

- Rotary unions **up to 250 bar**
- Clamping cylinder **23 kN at 120 bar**
- Angular position measuring systems **as precise as  $\pm 1$  arcsec**



## Spindle accessories, front (see p. 117)



## Tailstocks and counter bearings (see pp. 75–77)



## ripas zero point clamping system (see pp. 122/123)



EA-507 with ripas auto and ripas adapter

## CAPTO clamping

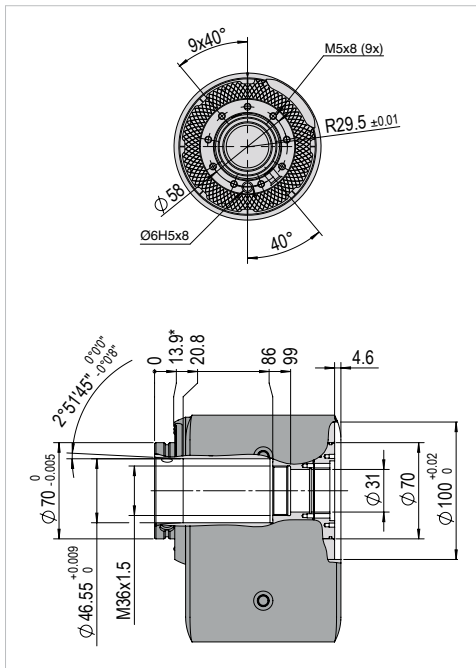
**NEW**



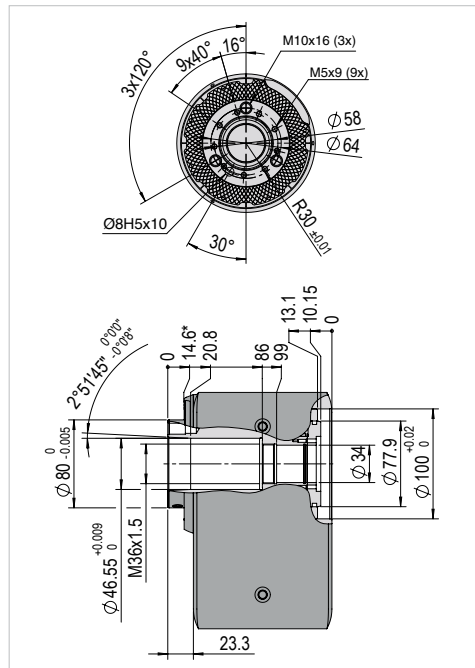
EA-507 with CAPTO retrofit kit (see p. 123)

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

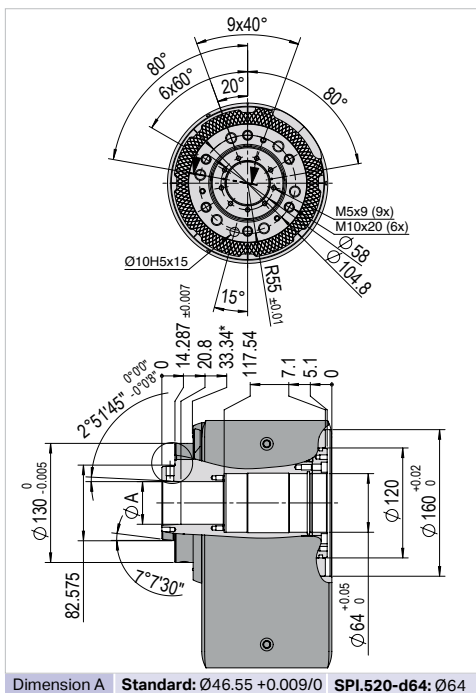
**Module size 507** HSK-A63/ø70



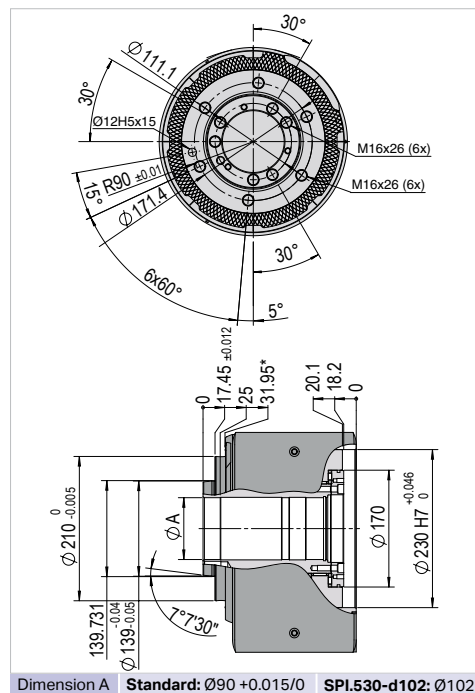
**Module size 510** HSK-A63/ø80



**Module size 520** HSK-A63/KK5



**Module size 530** ø90/KK8



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. 30-53)

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

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

## Interesting applications for increasing productivity

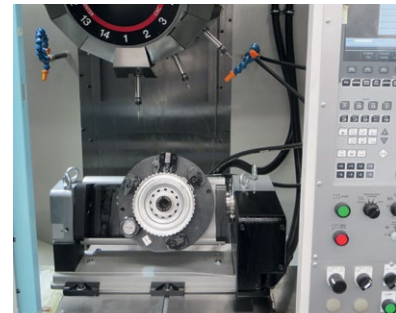
Provided on GF+ Machining Solutions, Akira Seiki, Almac, Amada Machine, AMS, AWEA, BFW, Blohm Jung, Bridgeport (Hardinge), Brother Milling, Chevalier, Chiron, DMG MORI, Doosan, Emco Famup, Fanuc Robotdrill, Finepart, Feeler, Haas Automation, Hartford, Hasegawa, Hedelius, Hurco, Huron, Hwacheon, Hyundai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



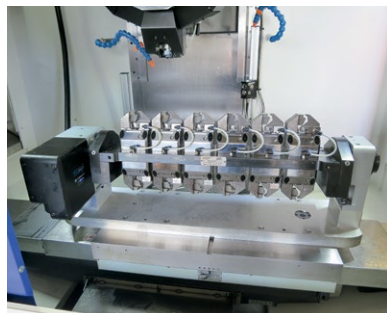
TF-510520 – Milling/boring – Mechanics



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



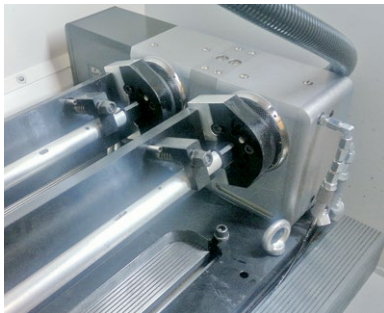
TF-507510 – Milling/boring – Watches/Micro Technology



TF-507510 – Milling/boring – Dental Technology



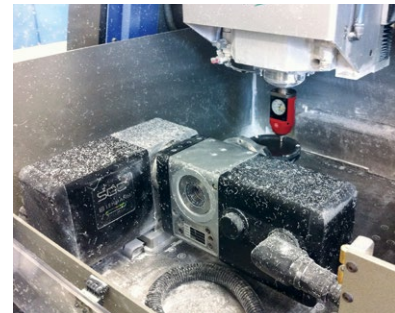
Additional interesting examples of applications can be found on our website [www.lehmann-rotary-tables.com](http://www.lehmann-rotary-tables.com) in the Download / Applications area



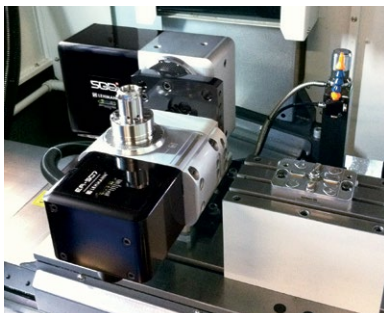
M2-510 – Milling/boring – Automotive



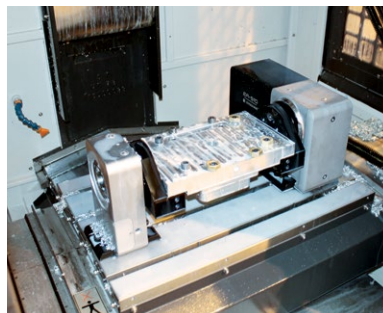
EA-510 – Milling/boring – Automotive



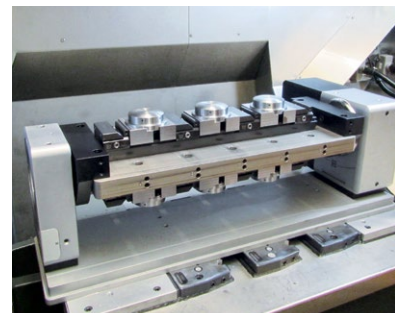
TF-507507 – Milling/boring – Dental Technology



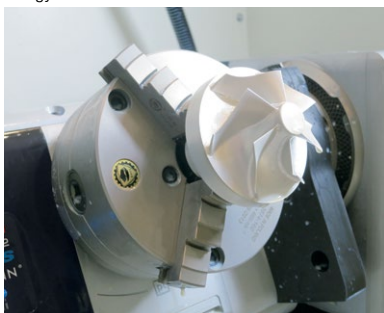
TF-507510 – Milling/boring – Watches/Micro Technology



EA-510 rotoFIX – Milling/boring – Mechanics



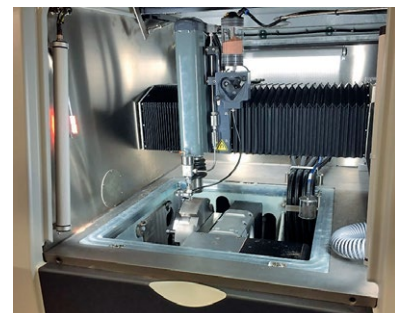
EA-510 rotoFIX – Milling/boring – Mechanics



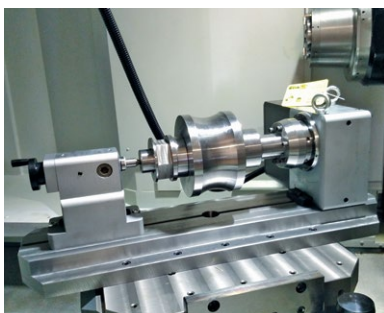
T1-510520 – Milling/boring – Mechanics



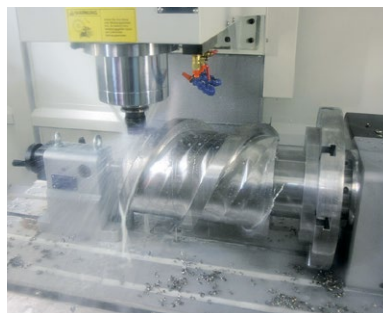
T3-510520 – Milling/boring – Automotive



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, IBox

Rotary  
tables

SPZ,  
DDF, WMS

MOT, KAB,  
WDF, CNC

Aligning,  
GLA, RST, LOZ

Service  
& Technology

Tooling

Benefits for the...

**OEM** ...OEMs themselves (manufacturer, importer)

**USE** ...Users and OEM application technicians

best of

Benchmark features (average values) in relation to ...

**5** ... 5 axis machines

**GD** ... Other gear-driven rotary tables up to ø400 mm

best of

**DD** ... Direct Drives up to ø250 mm

best of

... Not applicable

All % values and color notes are according to pL-Benchmark 2015 with a total of 16 machines



**OEM** **USE** | **GD** **DD** **5**

## 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

**OEM** **USE** | **GD** **DD** **5**

## Multi-part machining

not possible

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

**OEM** **USE** | **GD** **DD** **5**

## Table load

+257 %

best of

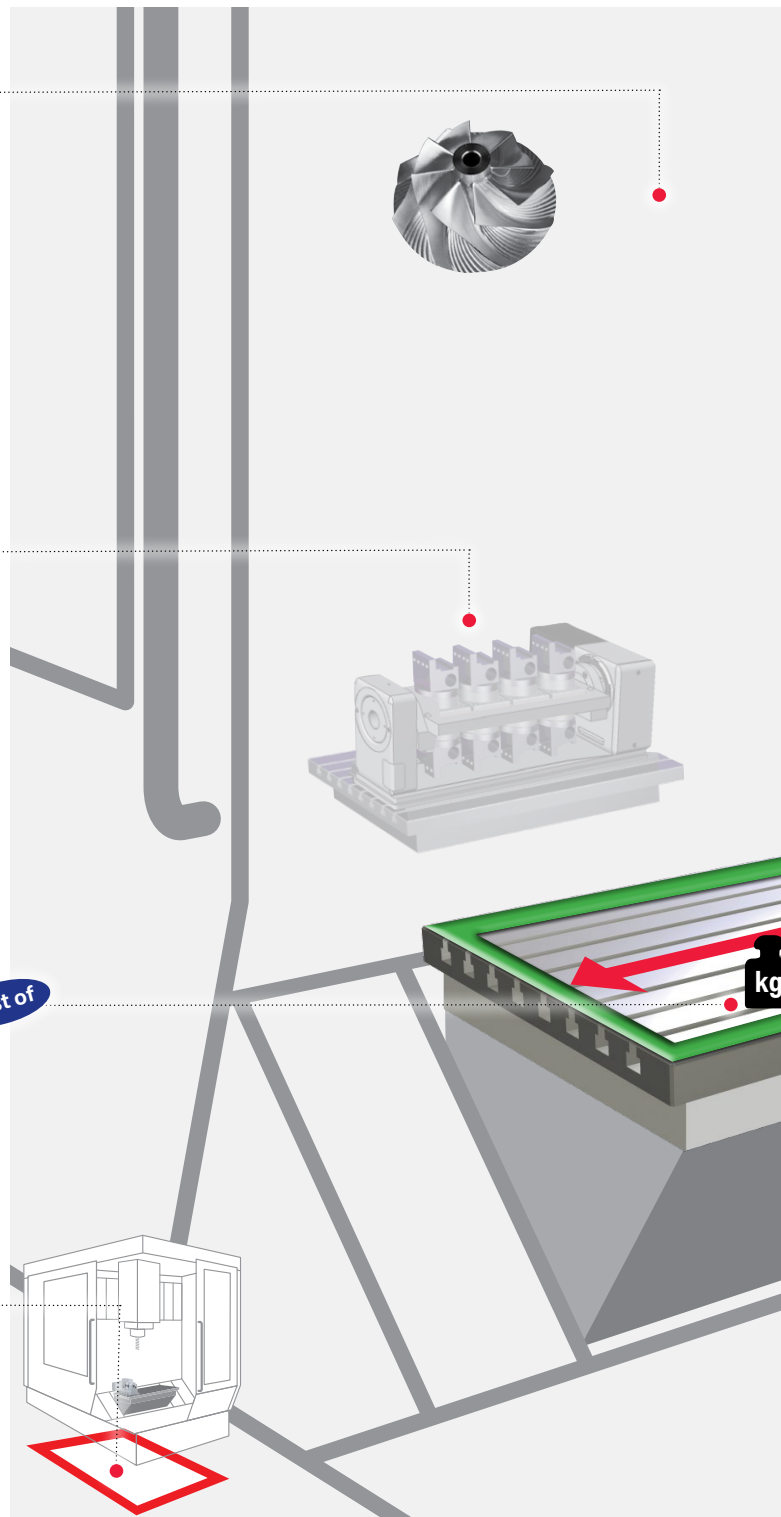
- More reserves for heavy devices and additional clamping devices, without overloading the machine

**OEM** **USE** | **GD** **DD** **5**

## Machine floor space

-40 %

- 5 machines on a floor space for 3
- 67% higher productivity per m<sup>2</sup>



Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, WIMS

MOT, KAB, WDF, CNC

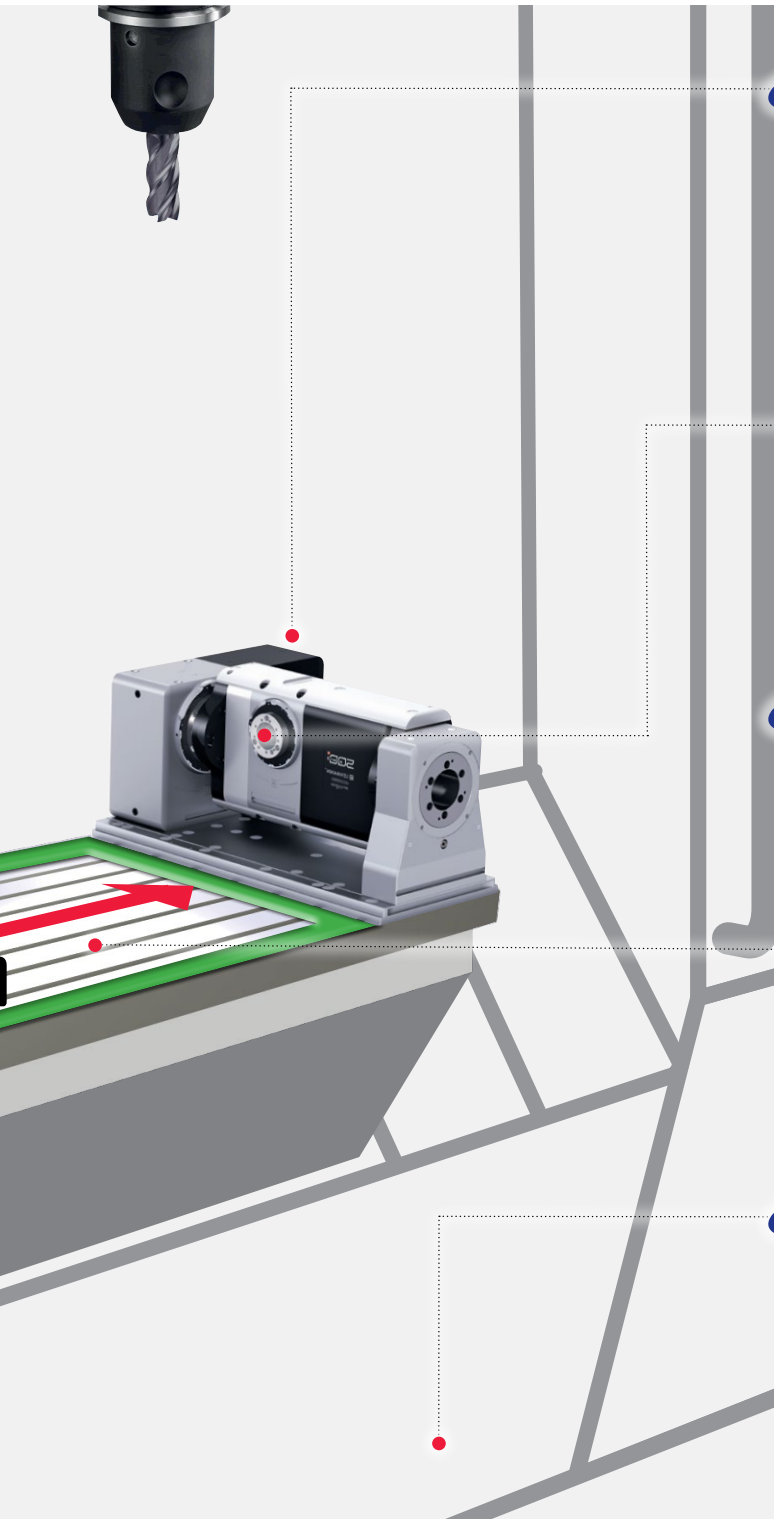
Aligning, GLA, KST, LOZ

Service & Technology

Tooling

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. 110/111)



OEM USE | GD DD **5**  
**Low projecting edge** **- 52 %**

best of

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

OEM USE | GD DD **5**  
**C-axis perm. load** **- 12 %**

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

OEM USE | GD DD **5**  
**Work table surface** **+94 %**

best of

- 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)

OEM USE | GD DD **5**  
**Floor load** **- 30 %**

best of

- 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 & Facts, IBox

Rotary tables

SPZ, DDF, WMS

MOT, KAB, WDF, CNC

Aligning, GLA, RST, LOZ

Service & Technology

Tooling

# Rotary Table in Use

Benefits for the...

**OEM** ...OEMs themselves (manufacturer, importer)

**USE** ...Users and OEM application technicians

best of

Benchmark features (average values) in relation to ...

**5** ... 5 axis machines

**GD** ... Other gear-driven rotary tables up to ø400 mm

best of

**DD** ... Direct Drives up to ø250 mm

best of

... Not applicable

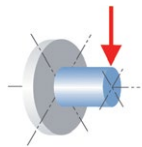
All % values and color notes are according to pL-Benchmark 2015 with a total of 129 rotary tables from renowned manufacturers. All criteria is based on the max. achievable limits

OEM USE | 5

GD DD  
+ 147 % + 233 %

## Pull-out torque

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



best of

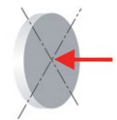


OEM USE | 5

GD DD  
+ 324 % not available

## Axial force

- Withstands very high compressive and tensile forces



best of

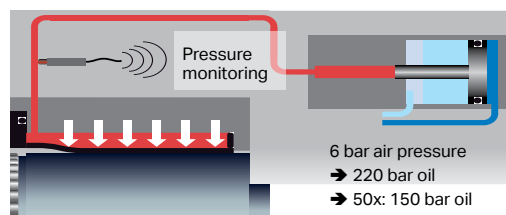
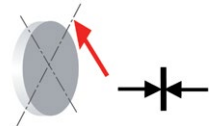


OEM USE | 5

GD DD  
+ 115 % + 236 %

## Clamping torque

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

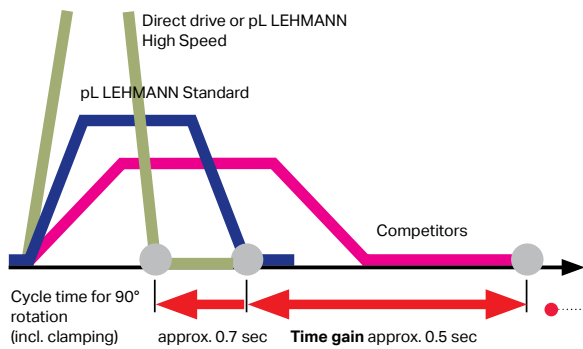


Fully integrated BRAKY pressure intensifier

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

1. Only **one** rotary table for every-thing: Standard or high speed, for CNCs from Siemens, Heidenhain, Fanuc...
2. **No** cooling unit needed
3. **No** safety brake
4. **Smaller** drive enhancements
5. **Lower** electrical power consumption
6. **Simpler** commissioning and drive tuning

\*For more information, please refer to p. 22



best of

OEM USE | 5

GD DD  
+ 78 % - 11 %

### Speed

- High speeds



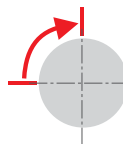
best of

OEM USE | 5

GD DD  
- 67 % + 4 %

### Cycle time

- Short cycle times (with clamping)



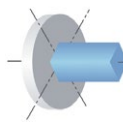
best of

OEM USE | 5

GD DD  
+ 123 % + 427 %

### Spindle load

- Large and heavy loads despite its compact external dimensions



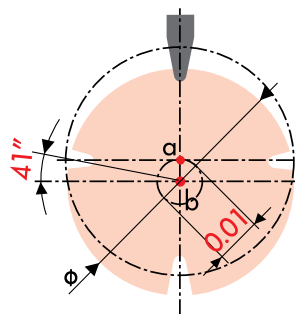
best of

OEM USE | 5

GD DD  
- 34 % - 31 %

### Radial/axial run-out

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



- Overview, Applications
- System & Facts, IBox
- Rotary tables
- SPZ, DDF, WMS
- MOT, KAB, WDF, CNC
- Aligning, GLA, RST, LOZ
- Service & Technology
- Tooling

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

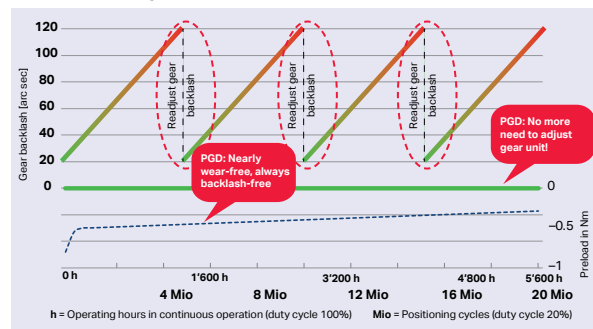
## PGD gear unit (Preloaded Gear Drive)

- 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

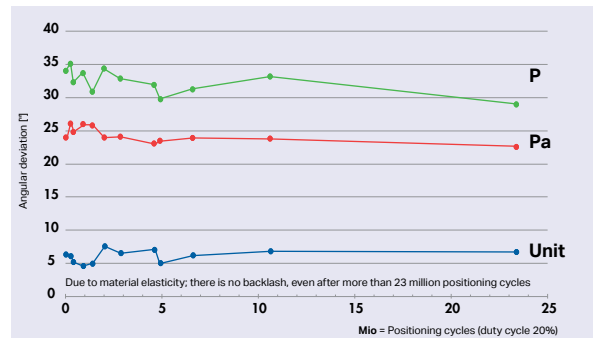
\*\* For possible torque per characteristic curve for 100% duty cycle at 1 rpm; please refer to pp. 98 – 101

### 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. 114

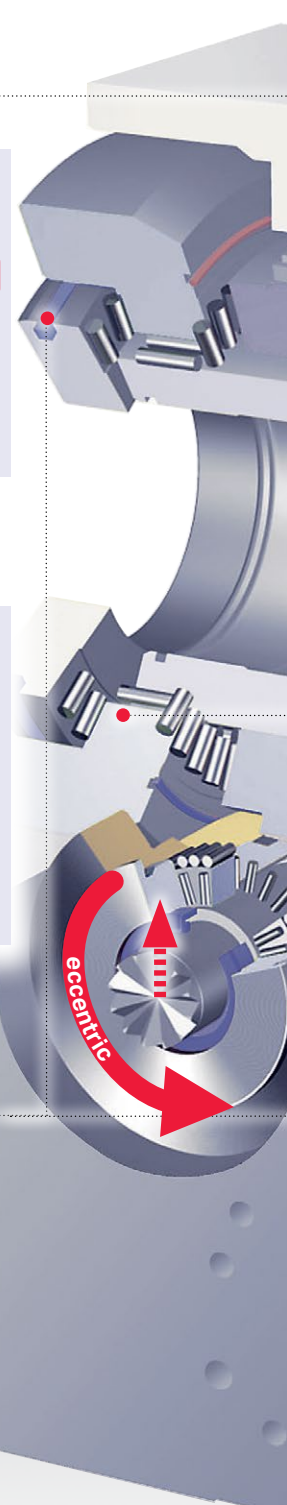
### Consistent accuracy – even after more than 23 million positioning cycles



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

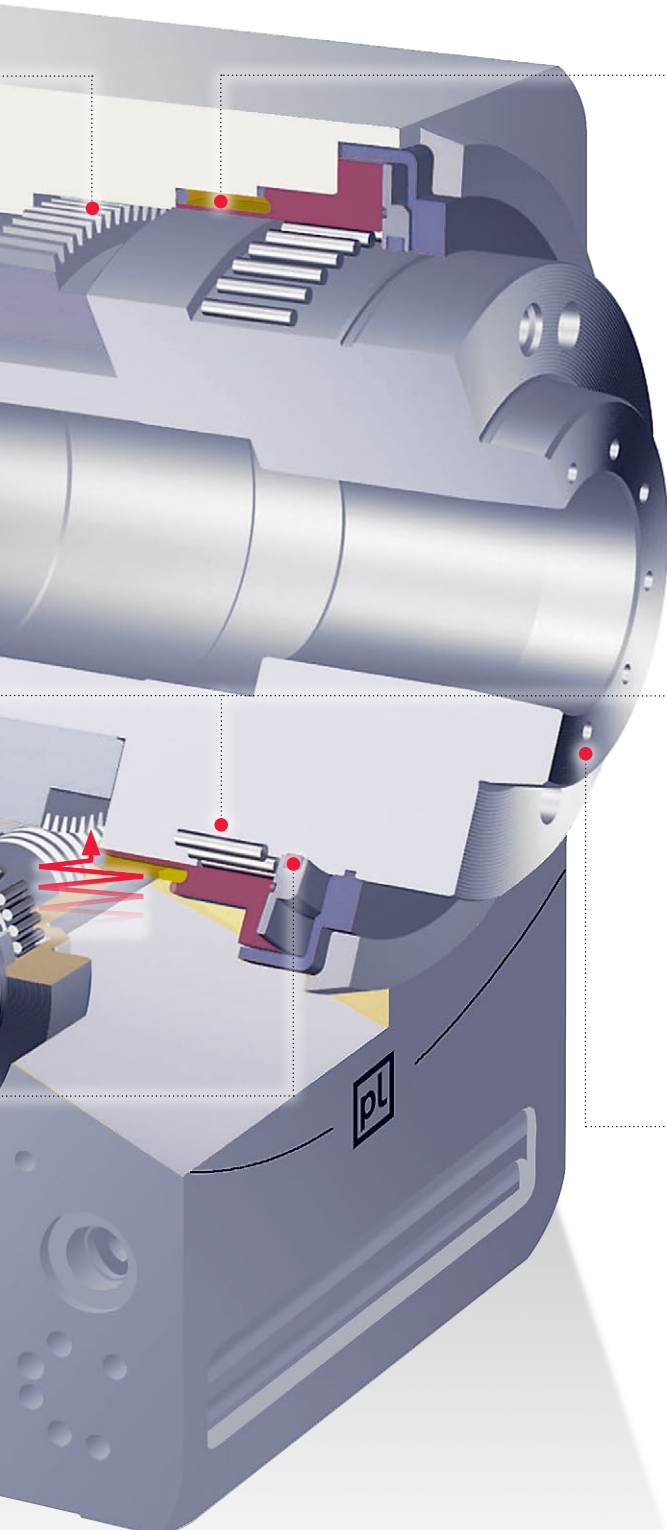
## Tightness IP 67 (IP 68)

- 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

- 1 Only **one** rotary table for everything: Standard or high speed, for CNCs from Siemens, Heidenhain, Fanuc...
- 2 **No** cooling unit needed
- 3 **No** safety brake
- 4 **Smaller** drive enhancements
- 5 **Lower** electrical power consumption
- 6 **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: BoxRotary  
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

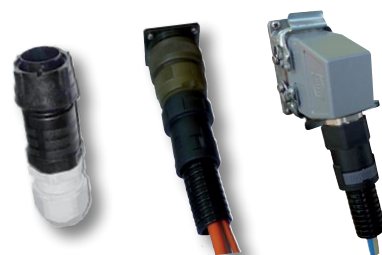
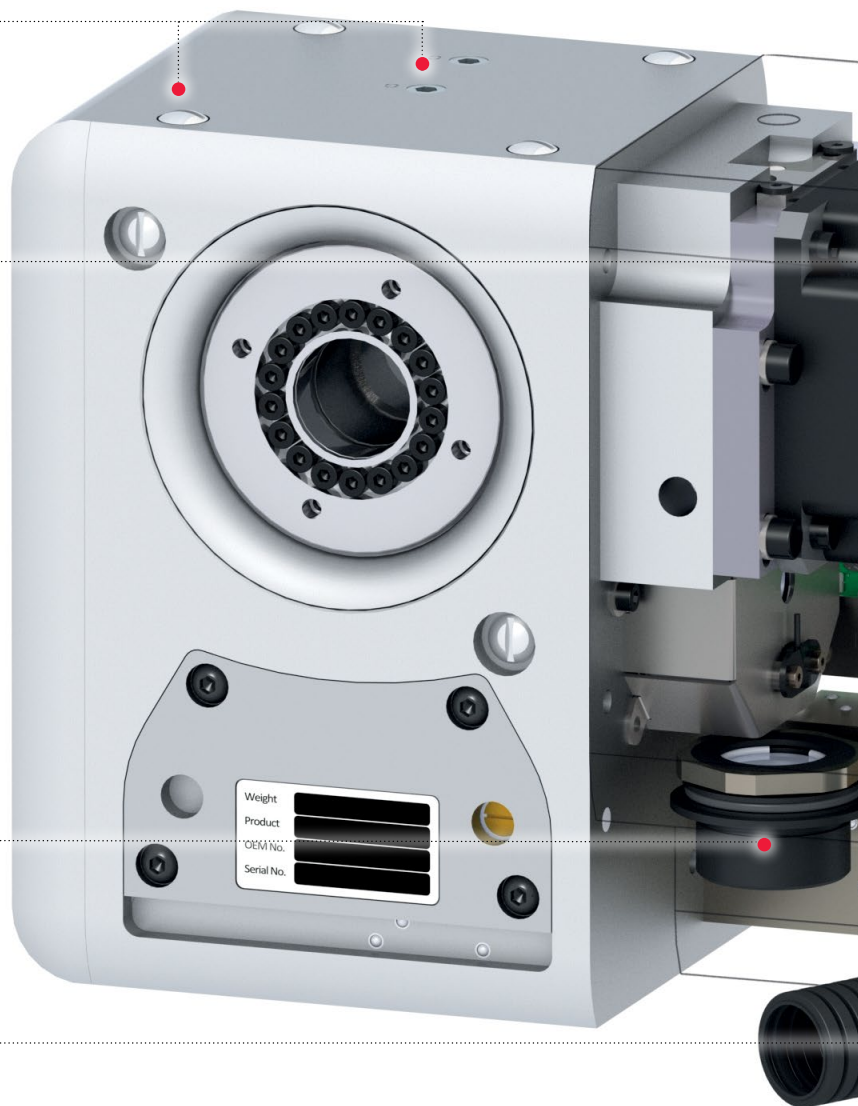
unique

## 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

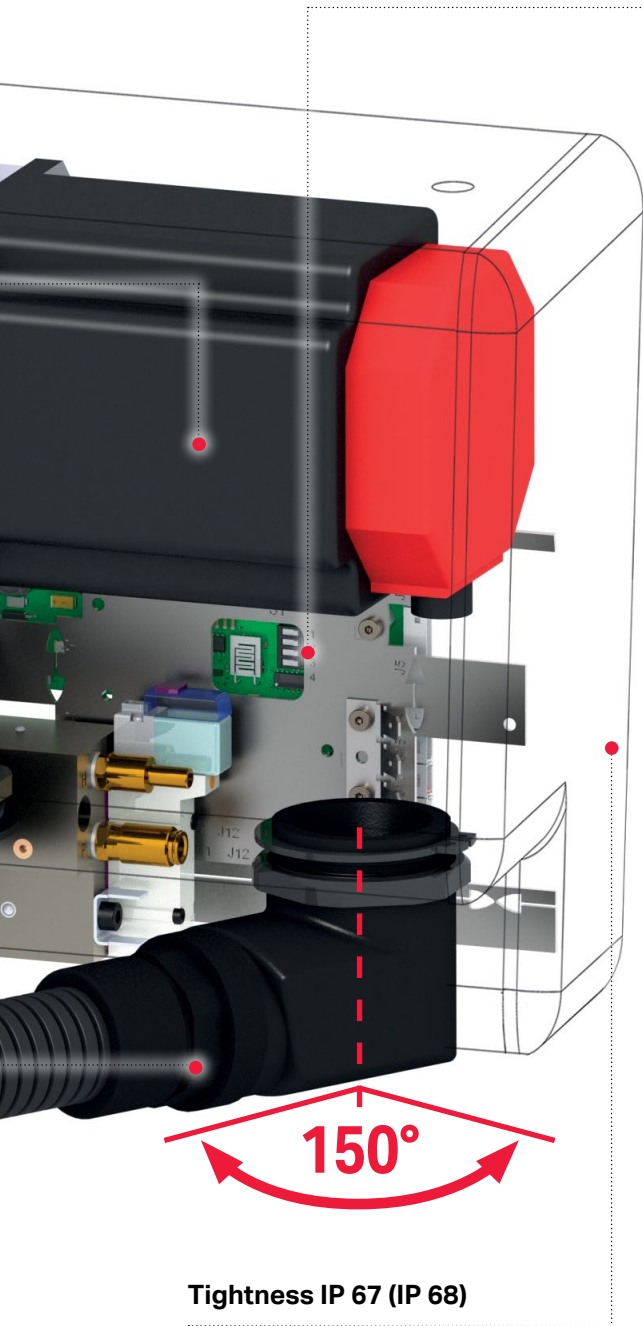
- Standardized, fully wired, available for many different machines
- Wide range of lengths and connectors





Productivity and availability increase,  
downtime and maintenance costs decrease

Bluetooth®,  
Ethernet, web server



**Tightness IP 67 (IP 68)**

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

unique

**iBox – 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

**New features with version 4.3**

**Components**

- Faster microprocessor
- 3D acceleration sensor (previously 2D) – shock sensor

**Monitoring**

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

**Interfaces**

- Bluetooth – set parameters and read out data via smartphone and app
- Web server with Ethernet and RJ45 connector – display state/error on CNC
- Input for current sensor

**Compatibility**

- 100% backwards-compatible – starting at Edition 2

**Prepared for options**

- External WLAN or GSM module
- External, enhanced vibration sensor with additional DSP
- E-mail notification, e.g. of error messages

For details, please refer to pp. 26/27

- Overview, Applications
- System & Facts, iBox
- 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-iBox» – the rotary table electronics

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

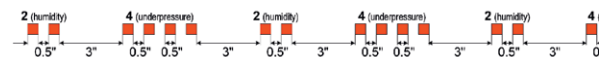
- Voltage:** 24V DC
- Current:** 0.1A max standard, 0.3A max with servo valve
- 1 input:** «clamp», optionally +24 V DC approx. 5 mA or 110 VAC approx. 25 mA without hardware measures. With AC actuation, the software parameter «Input Clamp» must be set to «AC». Otherwise the pneumatic valve chatter.
- 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, Bluetooth, Ethernet

#### 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):

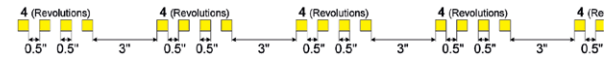


**Malfunction display by means of pL-iBox, flashing LED «ERROR»**

#### Meaning of the yellow LED, «SERVICE» ■

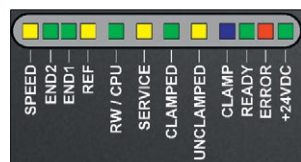
- Meaning of the yellow LED, «SERVICE»
- When «SERVICE» is necessary, the corresponding code flashes continuously.
- For additional instructions, see «Maintenance recommendation» and «Maintenance log», document DOK-0301 included in the packaging. It is also provided on the USB stick for the pL rotary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

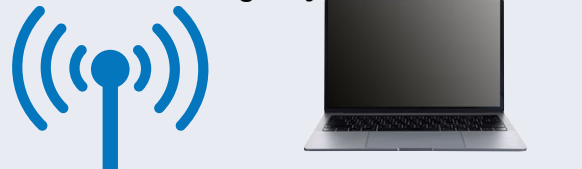


### Displays and operating elements

LEDs on the motor cover indicate the operating status.



### Remote maintenance – a highlight in the event of an emergency



Bluetooth®, Ethernet, web server



### Meaning of the LEDs

LED	Color	Function	Comment
SPEED	yellow	Worm speed	Flashes 1x per worm revolution END2
END2	green	Limit switch 2 (-) UZ	Extinguishes when end position «-» is reached. (Only for tilting axes with connected limit switches.) END1
END1	green	Limit switch 1 (+) GUZ	Extinguishes when end position «+» is reached. (Only for tilting axes with connected limit switches.) REF
REF	yellow	Spindle reference	Illuminates/extinguishes on the edge of the cam / slot RW/CPU
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
SERVICE	yellow	Service	Flashing sequence. For code key, see below. CLAMPED
CLAMPED	green	Spindle clamping «clamped»	Illuminates when spindle clamping is clamped UNCLAMPED
UNCLAMPED	yellow	Spindle clamping «unclamped»	Illuminates when spindle clamp is unclamped CLAMP
CLAMP	blue	«clamp» spindle clamping	Illuminates when «clamping» signal is present READY
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
ERROR	red	Error	Flashing sequence. For code key, see below. +24VDC
+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
6	Oil level check	Oil level is too low (for BR600 only)	B	x		0
7	Air pressure too high	Air pressure too high	E	x	7.0 [bar]	0
8	Air pressure too low	Air pressure too low	B	x	4.0 [bar]	0
9	Overcurrent at motor	This function is not programmed	E	x		
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
14	Speed difference worm vs motor	If toothed belt is broken, this error is triggered	E	x	selectable	0
15	Insuff. current at clamping valve	Insufficient current at clamping valve (broken wire?)	B		1 [mA]	0
16	External pressure intensifier	Error at external pressure intensifier		x		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

\* E = Exceed, B = Below

\*\* «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	1 clamping cycle is made of «unclamp+clamp» and the signal control.
2	Rotary table «ON»	Set number of «operating hours» exceeded. The counter starts when the pL-iBox is «on».
3	Worm rotating	Set number of «partial operation» hours exceeded. The counter starts running as soon as clamping is released.
4	Rev. worm	Set number of «worm revolutions» exceeded. Sensor at the belt pulley.



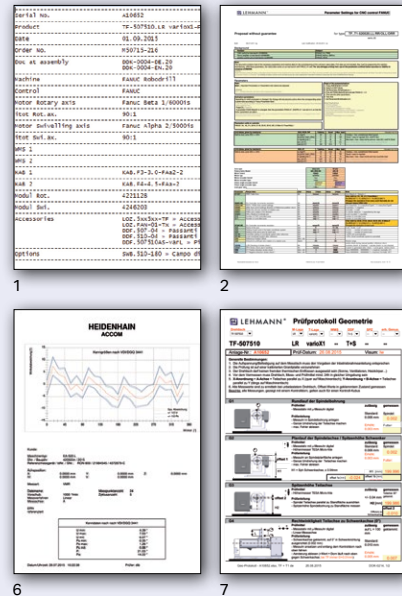
Never search for documents again – everything at hand at all times  
 No Internet connection necessary!

### 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 have been saved on this USB stick:
  - 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 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

Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, WMS

MOT, KAB, WDF, CNC

Aligning, GLA, RST, LOZ

Service & Technology

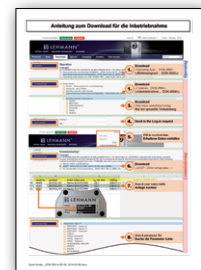
Tooling

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

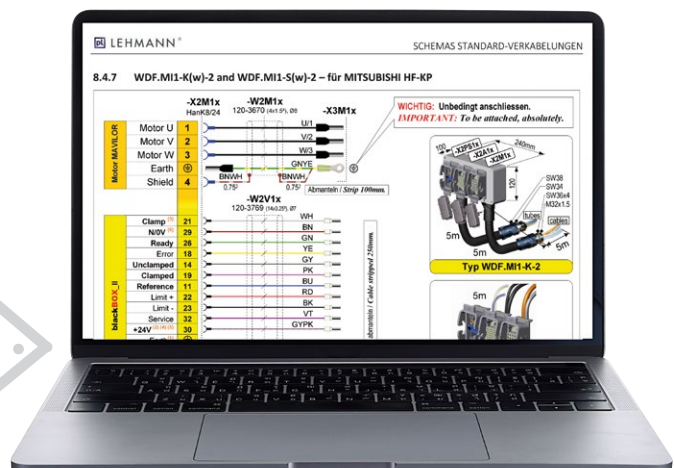


## Your benefit

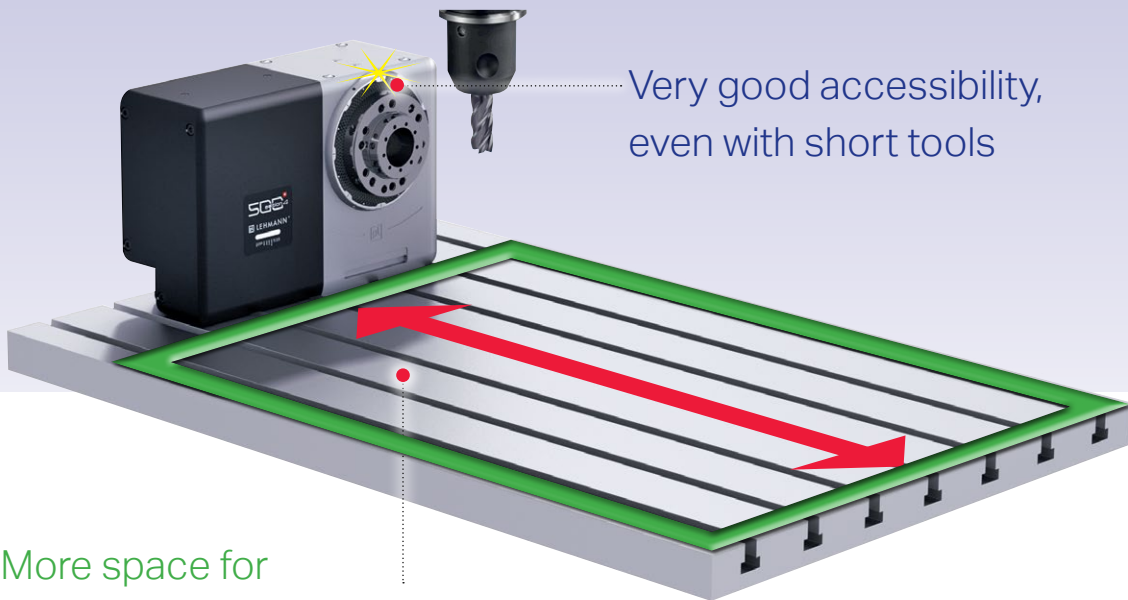
- Download no longer necessary – extra work eliminated
- Password no longer necessary – waiting for registration eliminated
- Internet no longer necessary – problems with poor or no network connection eliminated
- No lost documents, no missing USB stick – stick is always inserted, «loaded» and safely 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.

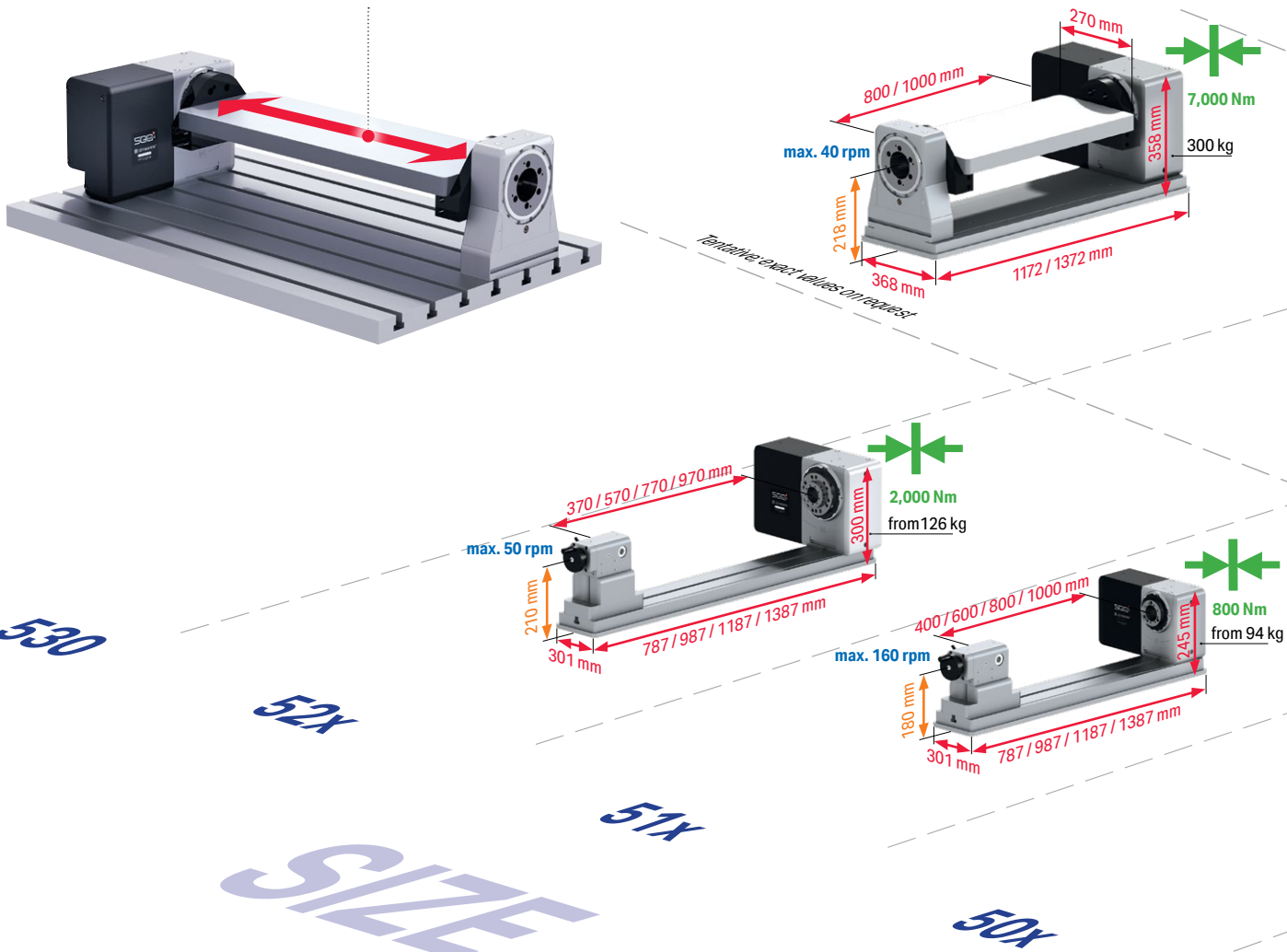


Overview, Applications  
System & Facts, IBox  
Rotary tables  
SPZ, DDF, WMS  
MOT, KAB, WDF, CNC  
Aligning, GLA, RST, LOZ  
Service & Technology  
Tooling



Very good accessibility, even with short tools

More space for workpieces and fixtures



Overview, Applications

System & Facts, IBox

Rotary Tables

SPZ, DDF, WMS

MOT, KAB, WDF, CNC


Aligning, GLA, RST, LOZ

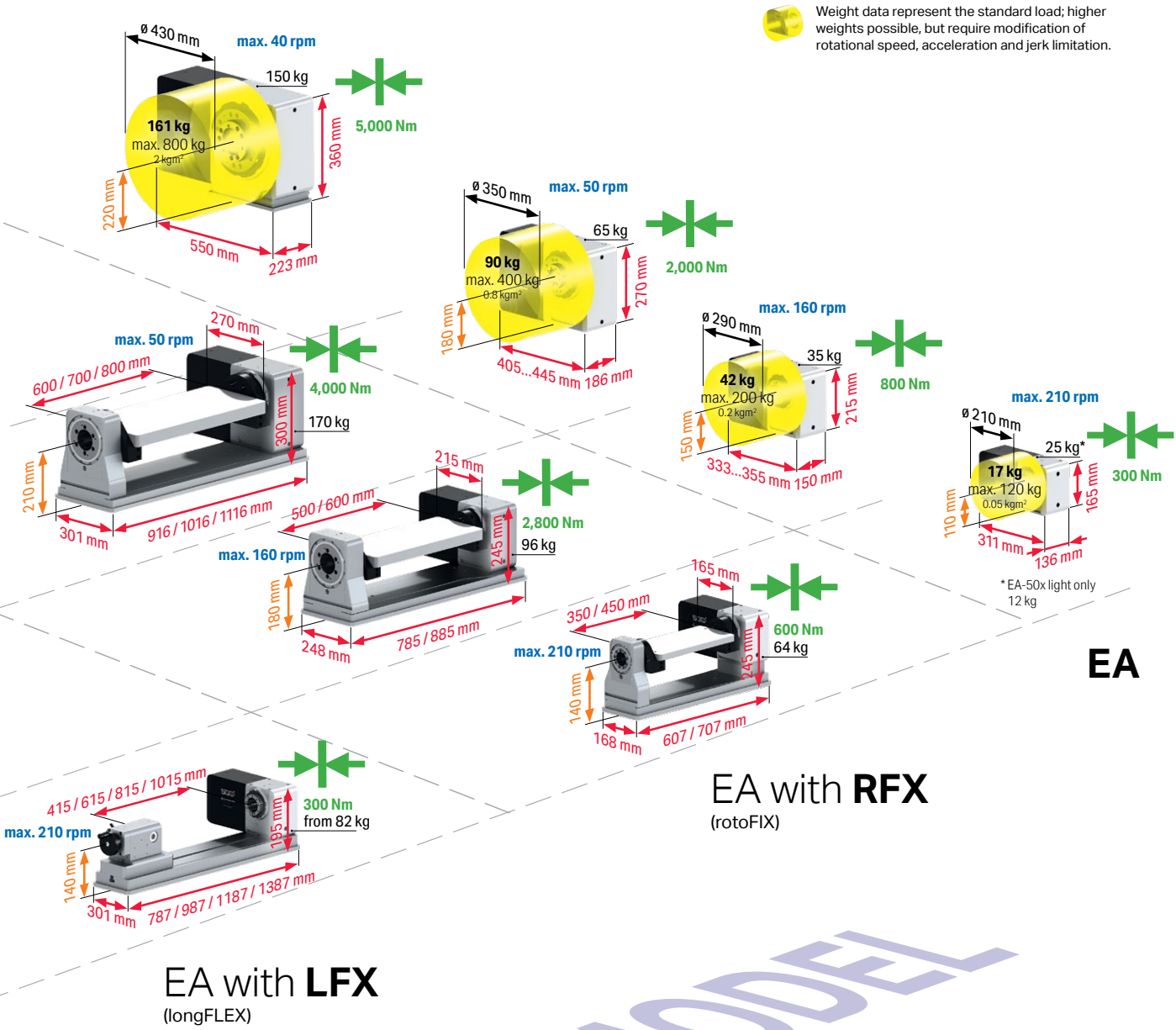
Service & Technology

Tooling

## Facts

- 1 High speed up to 210 rpm
- 2 Feed torque up to 850 Nm (tentative)
- 3 Steel base plates with hole pattern (matches a slot spacing of 100 mm and 125 mm)
- 4 Cycle time for 90° as fast as 0.21 sec.

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



MODEL

- 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

- Overview, Applications
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- Aligning, GLA, RST, LOZ
- Service & Technology
- Tooling



				EA-507	EA-508	EA-510	EA-511	EA-520	EA-521	EA-530	
<b>Dimensions</b>	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 <sup>2)</sup>		mm	31		34		46 / 64		90 / 102	
<b>Bearing / Clamping</b>	Max. clamping torque		Nm	300	250	800	600	2000		5000	
	Max. spindle load	with tailstock		kg	240		400		800		1600
		without tailstock		kg	120		200		400		800
	Standard load <sup>1)</sup>		kg	17	12	42	22	90	61	161	
Max. axial force		kN	44		46		100		210		
Max. pull-out torque		Nm	1200		2000		3900		10400		
<b>Gear unit</b>	Max. moment of inertia	Standard load <sup>1)</sup>		kgm <sup>2</sup>	0.05	0.025	0.2	0.07	0.8	0.4	2
		J max		kgm <sup>2</sup>	0.5	0.25	2	0.7	8	4	20
	Max. feed torque <sup>3)</sup>		Nm	120	70	250	150	440	220	650 opt. 850	
	Limited torques due to eccentric loads <sup>4)</sup>		Nm	25	9 <sup>5)</sup>	40	30 <sup>5)</sup>	110	45 <sup>5)</sup>	280	
Indexing accuracy Pa <sup>2)</sup>		± arc sec	20/15		17/10		12/8		10/6		
Repeat accuracy Ps average		± arc sec	2								
Max speed	with standard load <sup>1)</sup>		rpm	111	210	80	160	50	100	40	
<b>Precision</b>	Radial run-out <sup>2)</sup>	on spindle ø	µm	6 / 3							
	Axial run-out <sup>2)</sup>	at spindle end face	µm	6 / 3							
	Parallelism <sup>2)</sup>	Dividing axis to base	µm/100 mm	10 / 5							

<sup>1)</sup> Mutually dependent; for individual drive motor data, see right side

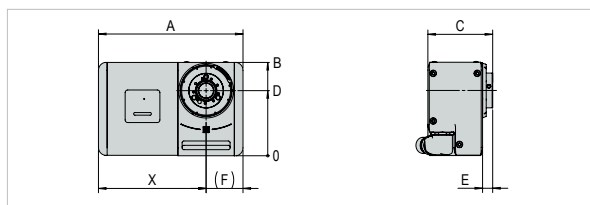
<sup>2)</sup> Standard / increased; for measuring method and validity of the values, please refer to p. 60, for optional angular position measuring system please refer to p. 61

<sup>3)</sup> Limit value for gear unit, at 1 rpm

<sup>4)</sup> For torque calculation, see p. 94

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

## Dimensions



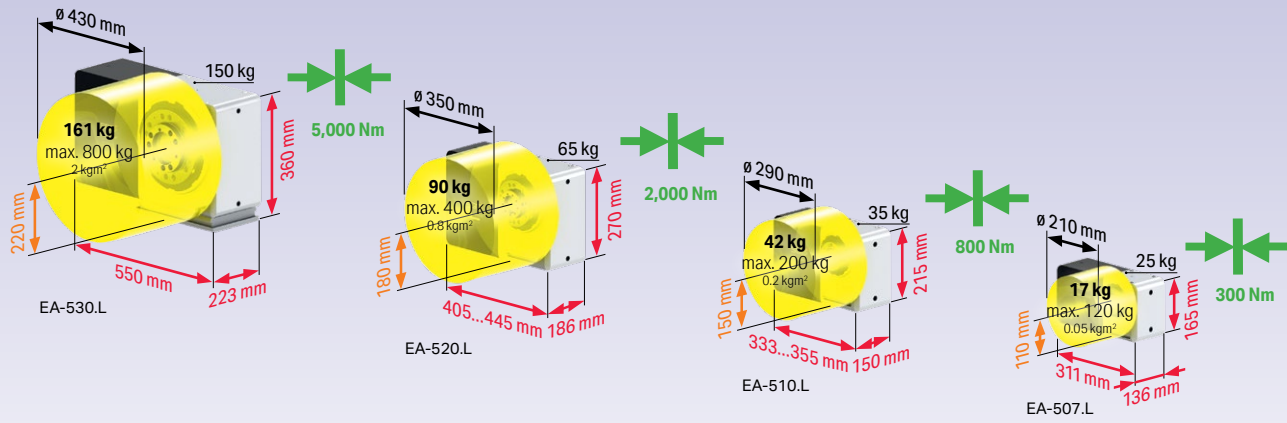
	A	B	C	D	E	F	X
EA-507	311	165	136	110	23	75	236
EA-508	311	165	136	110	23	75	236
EA-510	333	215	150	150	23	85	248
EA-511	333	215	150	150	23	85	248
EA-520	405	270	186	180	44	110	295
EA-521	405	270	186	180	44	110	295
EA-530	550	360	223	220	43	160	390

## Item no.

EA-510.L-F1







**Drive data**

(based on standard load cube shown on pp. 92/93)

		Motors				
			Feed* [Nm]	Speed [rpm]	Cycle time*** [sec]	
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	220	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
	EA-521	α4 (HV)is	220	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 SGM7J	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	220	80	0.28	0.46
YASKAWA SGMJV	EA-530	on request				
	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
MITSUBISHI	EA-521	SGMJV 08	220	80	0.28	0.46
	EA-530	SGMEV 15	650	27	0.65	1.21
	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
SANYO	EA-520	HG-(H)105	440	32	0.54	1.01
	EA-521	HG-(H)105	220	60	0.34	0.59
	EA-530	HG-(H)104	650	24	0.70	1.32
	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
OKUMA	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-520	BL-ME24J-50SN	300	27.5	0.61	1.15
SIEMENS	EA-521	BL-ME24J-50SN	200	55	0.34	0.61
	EA-530	BL-ME80J-40SN	650	25	0.69	1.29
	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	220	65	0.30	0.53
	EA-521	1FK7042	220	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. 98      \*\* for Siemens / Heidenhain  
 \*\*\* Without clamping; for times, please refer to p. 110      \*\*\*\* not with 35iB

For calculation of load, forces and torques, please see p. 94

**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](http://www.lehmann-rotary-tables.com), under Download / Commissioning



Labyrinth seal (cutaway view)

Recommended for:  
 + grinding operations  
 + high coolant pressures  
 + extremely fine abrasive particles

**Accessories**

Base plates pp. 34 & 35, Motor, cable, angular position measuring system and pL-CNC starting at p. 62. Accessories starting at p. 54

**Options**

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

<sup>1)</sup> incl. lower radial and axial run-out of 0.003 mm  
<sup>2)</sup> 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]
<b>AUR.St-12</b>		12h6	0.07
<b>AUR.St-14</b>	Alignment block, 1 pair	14h6	0.07
<b>AUR.St-16</b>		16h6	0.07
<b>AUR.St-18</b>		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	
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. 61

SPZ = for clamping cylinder; for more, please refer to p. 56/57

DDF = for rotary union; for more, please refer to p. 58



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



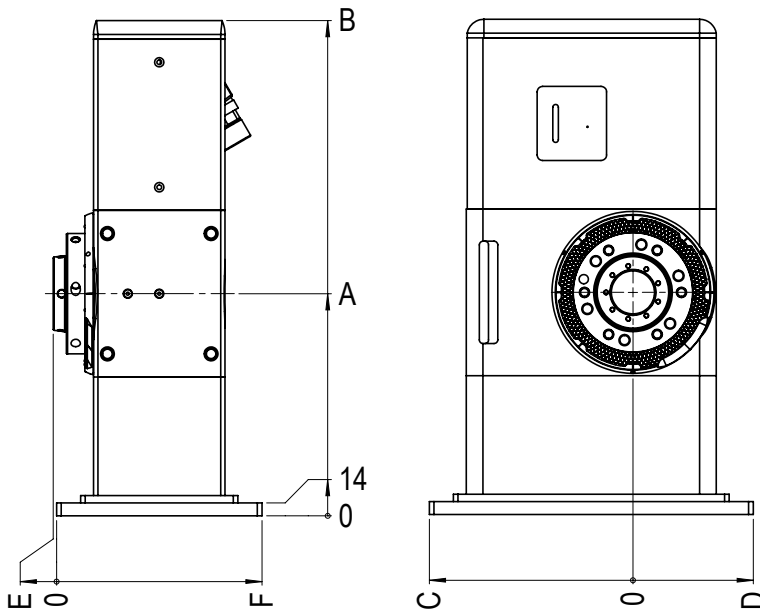
Add-on housing for vertical clamping. Shown with angular position measuring system "compact".

... the solution for horizontal machining centers



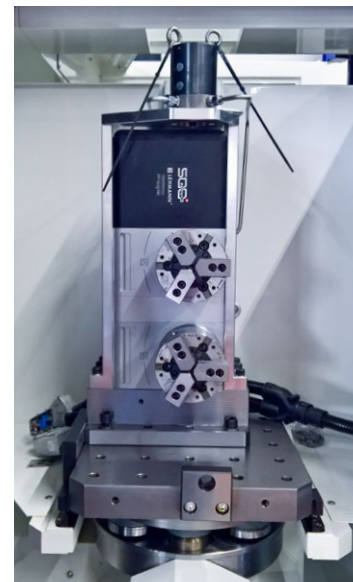
## Lateral clamping

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



## Options

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



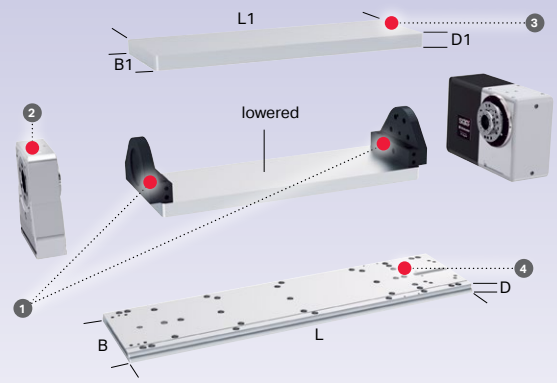
- Overview, Applications
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- SPZ, DDF, WMS
- MOT, KAB, WDF, CNC
- Aligning, GLA, RST, LOZ
- Service & Technology
- Tooling

# rotoFIX Clamping Yoke System



**NEW**

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. 60-61)

		EA-507		EA-510		EA-520			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		DDF.510-RFX-04		DDF.520-RFX-04			DDF.530-RFX-04	
		Prep. DDF 6-fluted*	Item no.	-		-		DDF.520-RFX-06			DDF.530-RFX-06	
GLA	Prep. DDF 4-fluted*	Item no.	DDF.507-RFX-04		DDG.510-RFX-04-TOP		DDG.520-RFX-04-TOP			DDG.520-RFX-04-TOP		
	Prep. DDF 6-fluted*	Item no.	-		DDG.510-RFX-06-TOP		DDG.520-RFX-06-TOP			DDG.520-RFX-06-TOP		
2 Counter bearing (GLA)	fix	Item no.	GLA.TOP1-110		GLA.TOP2-150		GLA.TOP2-180			GLA.TOP2-180		
	adjustable	Item no.	Option: GLA.HYD-vario									
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	
	Weight	[kg]	9.04	11.63	29.48	35.38	50.78	59.26	67.74	67.74	84.70	
4 Base plates	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 <sup>2</sup> ]	0.02	0.02	0.06	0.07	0.16	0.17	0.21	on request		
	Mom. inert. (steel)	[kgm <sup>2</sup> ]	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. 58

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

## Important information

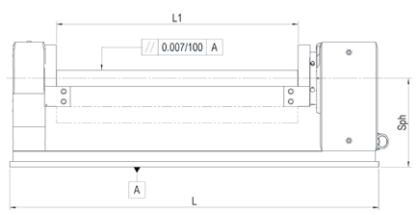
When retrofitting, it may be necessary to reduce the rotational speed, acceleration and gear backlash. The rotary table, rotoFIX and the counter bearing must be installed coaxially to one another <0.05 mm.

## Standard load from steel

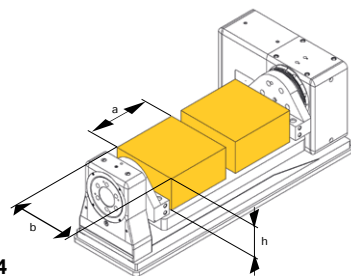
Type	Standard load a × b × h	Weight	Moment of inertia J with sls* clamping yoke (Alu) below [kgm <sup>2</sup> ]	Moment of inertia J with sls* clamping yoke (Alu) centric [kgm <sup>2</sup> ]
	[mm]	[kg]		
507	2 × 130 × 130 × 65	17	0.07	0.08
510	2 × 173 × 173 × 83	42	0.28	0.35
520	2 × 228 × 228 × 114	90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

\*sls = Standard load, cube pp. 92/93

Can be moved with standard drive data for EA-type rotary tables (see p. 33); larger loads require a reduction in rotational speed, acceleration and jolt.

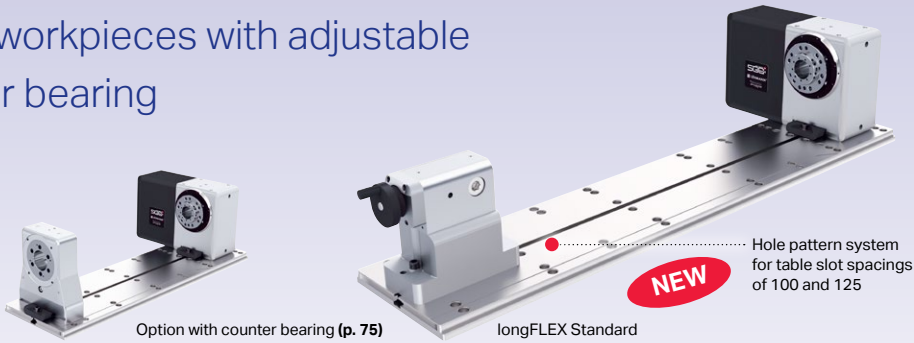


For alignment and clamping, please refer to p. 74



Also available adjustable

Support of longer workpieces with adjustable tailstock or counter bearing



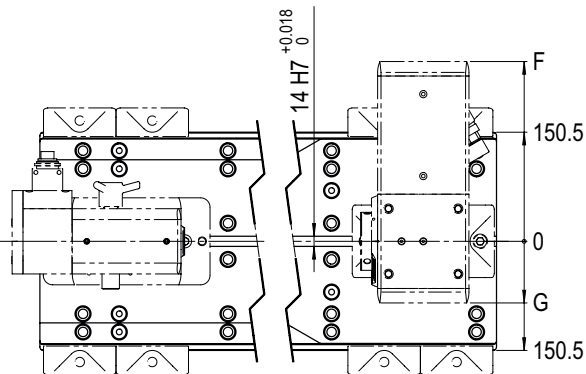
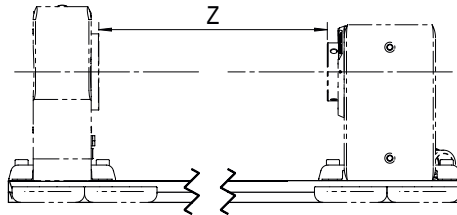
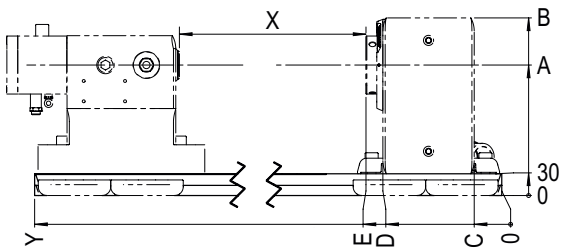
longFLEX base plate kit

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. 74

Overview, Applications

System & Facts, IBox

Rotary Tables

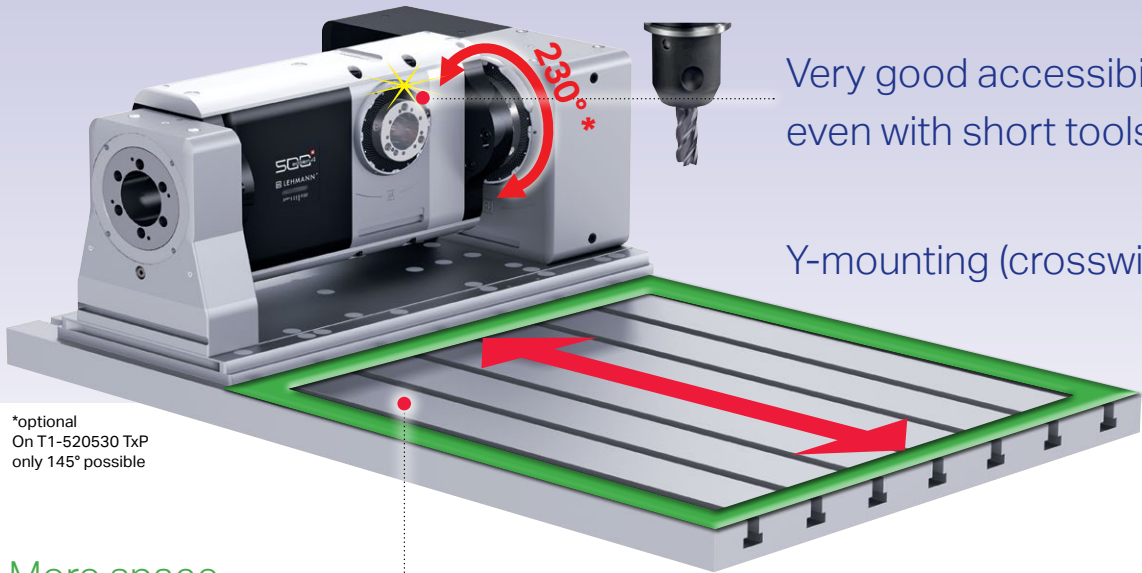
SPZ, DDF, WMS

MOT, KAB, WDF, CNC

Aligning, GLA, RST, LOZ

Service & Technology

Tooling

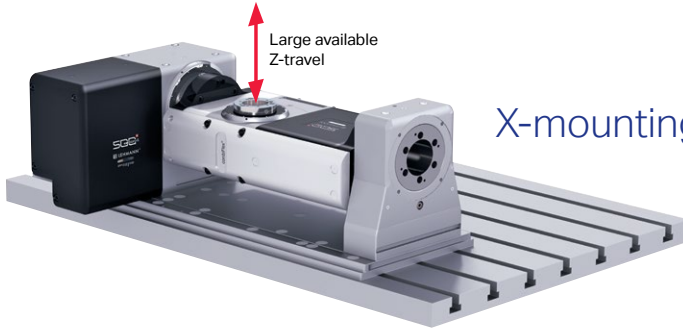


Very good accessibility, even with short tools

Y-mounting (crosswise)

\*optional  
On T1-520530 TxP  
only 145° possible

More space for workpiece and fixtures



Large available Z-travel

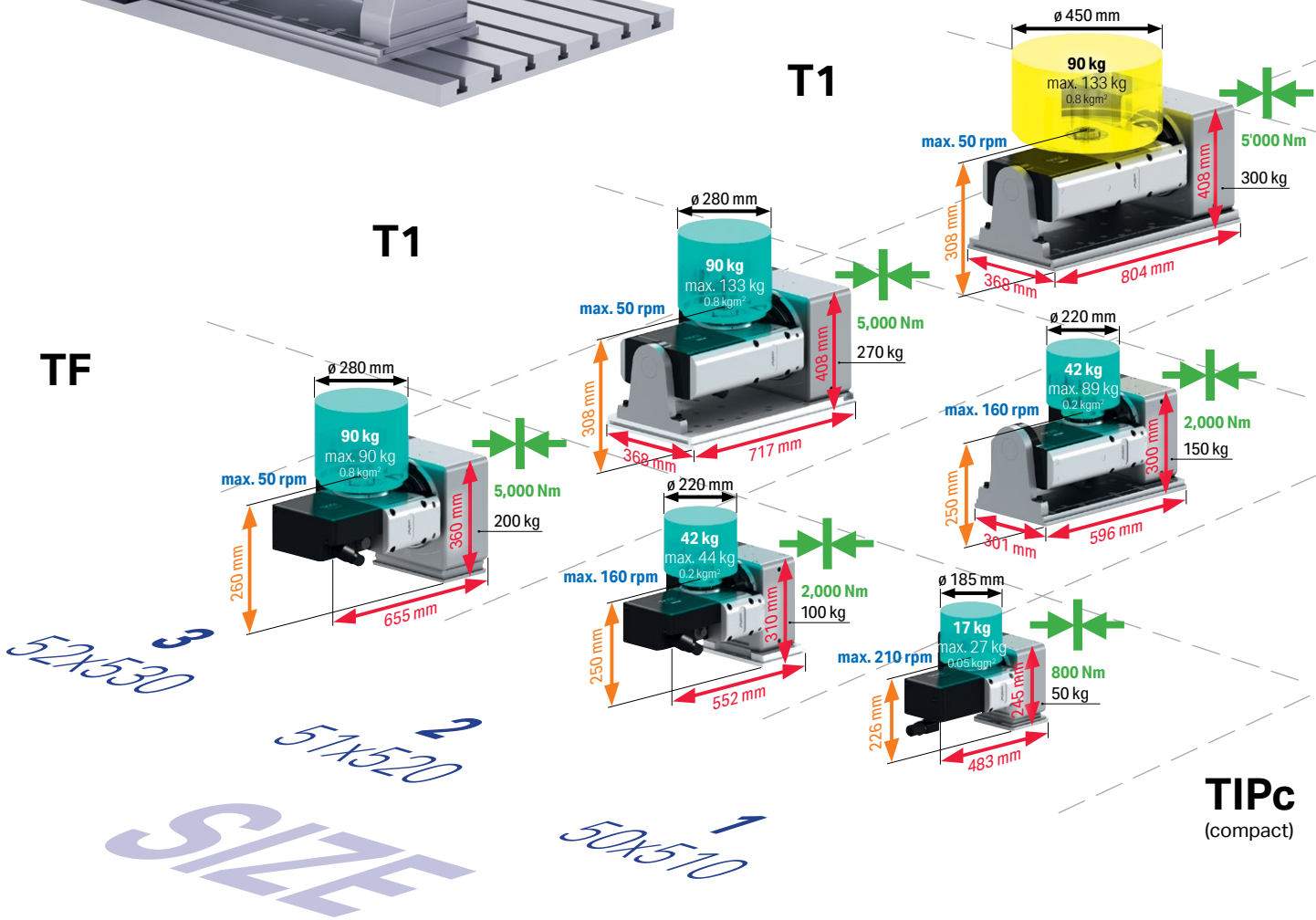
X-mounting (lengthwise)

T1

T1

T1

TF

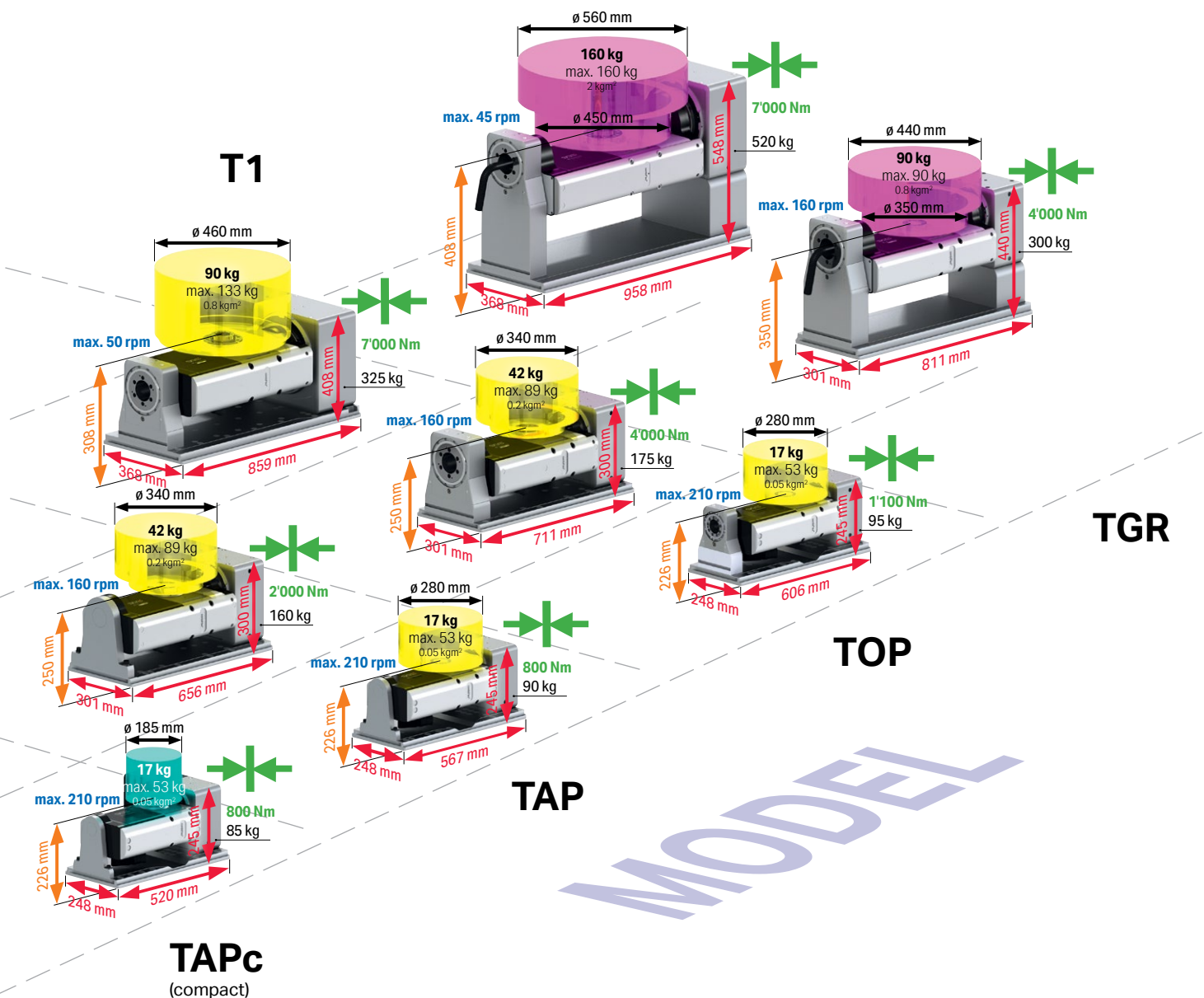


TIPc  
(compact)

- Overview, Applications
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- Aligning, GLA, RST, LOZ
- Service & Technology
- Tooling

### Facts

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



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

50x510	508510 (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

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\*optional

			TF-507510 TIP1c	TF-508510 TIP1cs	TF-510520 TIP2c	TF-511520 TIP2cs	TF-520530 TIP3c	TF-521530 TIP3cs
<b>Dimensions</b>	Swivel ø	mm	180		220		195	
	Swiveling range	degrees	90° +5°/-25° (optional 180° ±25°)					
	Center height	mm	180		210		220	
	Total weight	with motor kg	50		100		200	
	Center bore	Standard / increased mm	30		34		46 / 64	
<b>Bearing / Clamping</b>	Max. clamping torque	4 <sup>th</sup> axis 5 <sup>th</sup> axis Nm	300	250	800	600	2000	
	Max. spindle load	0°-30° kg	40		66		135	
		30°-90° kg	27		44		90	
		Standard load <sup>1)</sup> kg	17	12	42	21	90	61
	Max. axial force	4 <sup>th</sup> axis kN	6		10		40	
Max. pull-out torque	4 <sup>th</sup> axis Nm	1200		2000		3900		
	5 <sup>th</sup> axis Nm	2000		3900		10400		
<b>Gear unit</b>	Max. moment of inertia	Standard load <sup>1)</sup> kgm <sup>2</sup>	0.05	0.025	0.2	0.07	0.8	0.4
		J max kgm <sup>2</sup>	0.5	0.25	2	0.7	8	4
	Feed torque max <sup>3)</sup>	4 <sup>th</sup> axis Nm	120	70	250	150	440	220
		5 <sup>th</sup> axis Nm	230		440		650	
	Limited torques due to eccentric loads (acting on the tilting axis) <sup>5)</sup>	Nm	40		110		280	
<b>Swivel</b>	Gear unit loading 5 <sup>th</sup> axis	without load Nm	-12		-22		-44	
		with standard load Nm	15	10	30	5	100	45
	Indexing accuracy Pa	M max Nm	250		440		650	
		4 <sup>th</sup> axis <sup>2)</sup> ± arc sec	20/15		17/10		12/8	
	Repeat accuracy Ps average	5 <sup>th</sup> axis (90°) <sup>4)</sup> ± arc sec	35/20	35/22	21/22	21/13	11/38	11/20
4 <sup>th</sup> axis ± arc sec		2		2		2		
Max speed at standard load	5 <sup>th</sup> axis min <sup>-1</sup>	111	210	80	160	50	100	
	4 <sup>th</sup> axis <sup>1)</sup> min <sup>-1</sup>	70		40		25		
<b>Precision</b>	Radial run-out <sup>2)</sup>	on spindle ø µm			6 / 3			
	Axial run-out <sup>2)</sup>	at spindle end face µm			6 / 3			
	Parallelism <sup>2)</sup>	Spindle to base µm/100 mm			10 / 5			

<sup>1)</sup> Mutually dependent; for individual drive motor data, see right side

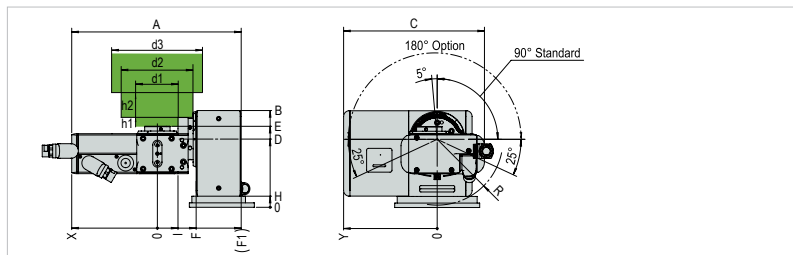
<sup>2)</sup> Standard / increased; for measuring method and validity of the values, please refer to **p. 60**, for optional angular position measuring systems, please refer to **p. 61**

<sup>3)</sup> Limit value for gear unit, at 1 rpm

<sup>4)</sup> Without load / with standard load 0°-90°

<sup>5)</sup> For torque calculation, see **p. 94**

## 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

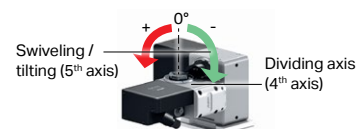
Dimensions with 508, 511 or 521 identical to 507510, 510520 and 520530.

\*With large motor (option)

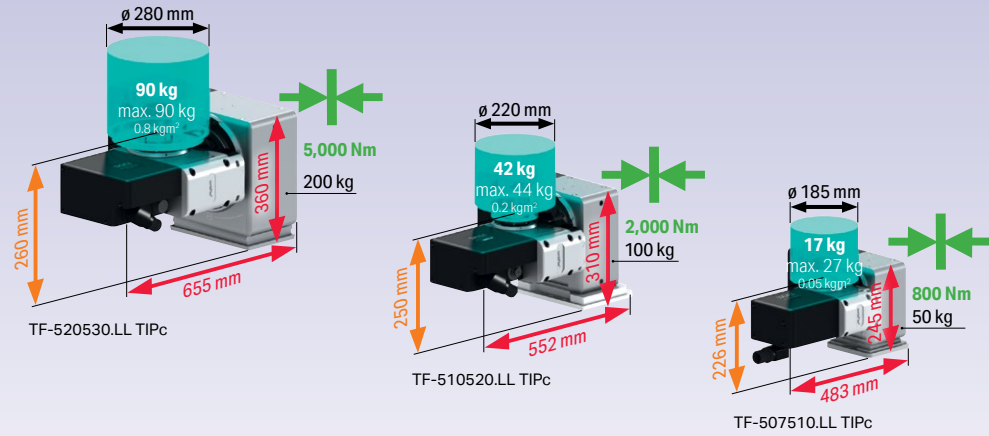
## Important information

### 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. 92/93)

		Motors 4 <sup>th</sup> /5 <sup>th</sup>	Feed* [Nm]		Speed [rpm]		Cycle time*** [sec]			
			4 <sup>th</sup>	5 <sup>th</sup>	4 <sup>th</sup>	5 <sup>th</sup>	90°		180°	
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/α4 (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-520530 TIP3c						on request			
	TF-521530 TIP3c									
	TF-507510 TIP1c	SGMJV 04/08	115	180	66.7	60	0.30	0.44	0.53	0.69
MITSUBISHI	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
	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	0.34	0.46	1.34
	TF-507510 TIP1c	HG56/75	120	170	60	45	0.32	0.49	0.57	0.83
SANYO	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
	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
OKUMA	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
	TF-511520 TIP2c	R2Ax 08075/08075	145	245	130	40	0.22	0.54	0.34	0.92
	TF-520530 TIP3c	BL-ME24J-50SN/ BL-ME80J-40SN	300	650	27.5	25	0.61	0.89	1.15	1.49
	TF-521530 TIP3c	BL-ME80J-40SN	220	650	55	25	0.34	0.74	0.61	1.34
	TF-510520 TIP2c	1FK2204/1FK2205	150	425	65	30	0.33	0.59	0.56	1.09
SIEMENS	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	0.89	0.74	1.49
	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

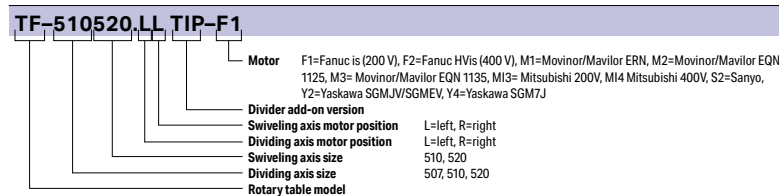
\* At 1 rpm; for more, please refer to p. 98

\*\*\* Without clamping; for times, please refer to p. 110

\*\* for Siemens / Heidenhain

\*\*\*\* not with 35iB

Item no.



For calculation of load, forces and torques, please see p. 94

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](http://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. 62. Accessories starting at p. 54

Options

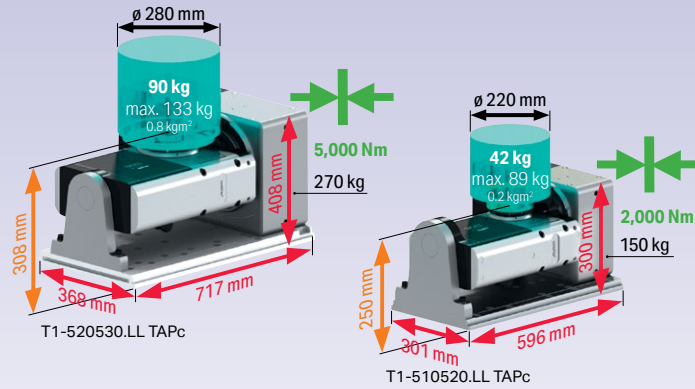
Item no.	Description
GET.5xx-GEN	Increased gear precision <sup>1)</sup>
GEO.5xx-GEN	Incr. geometric precision, 1/2 standard tolerance
SPL.5xx-Lab <sup>2)</sup>	Spindle seal with labyrinth, integrated sealing air pressure control
SWB.510-180	Tilting range increase from 90° to 180° (with overshoot to max.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

<sup>1)</sup> incl. lower radial and axial run-out of 0.003 mm  
<sup>2)</sup> 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	
AUR.St-14	Alignment	14g6	4.67
AUR.St-16	T-slot nuts, 1 pair	16g6	12.15
AUR.St-18		18g6	

# T1-Type Rotary Tables TAP (unclamped supporting bearing)



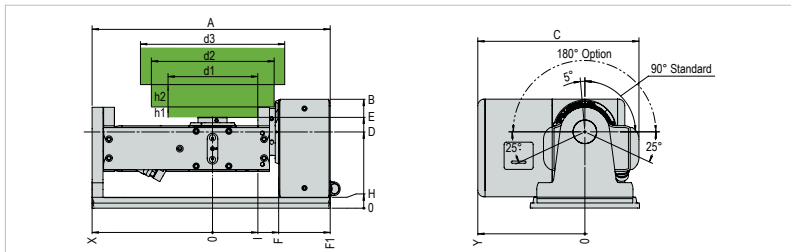
\*optional

			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 <sup>3)</sup> )		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 <sup>th</sup> axis	300	250	800	600	2000	
		5 <sup>th</sup> axis	800		2000		5000	
	Max. spindle load	0°-30°	79		133		200	
		30°-90°	53		89		133	
		Standard load <sup>1)</sup>	17	12	42	21	90	61
	Max. axial force	4 <sup>th</sup> axis	6		10		40	
Max. pull-out torque	4 <sup>th</sup> axis	1200		2000		3900		
	5 <sup>th</sup> axis	2000		3900		10400		
Gear unit	Max. moment of inertia	Standard load <sup>1)</sup>	0.05	0.025	0.2	0.07	0.8	0.4
		J max	0.5	0.25	2	0.7	8	4
	Feed torque max ****	4 <sup>th</sup> axis	120	70	250	150	440	220
		5 <sup>th</sup> axis	250		440		650	
Limited torques due to eccentric loads <sup>6)</sup>		Nm	40		110		280	
Precision	Gear unit loading 5 <sup>th</sup> Axis	without load	-12		-22		-44	
		with standard load	15	10	30	5	100	45
	Indexing accuracy Pa	M max	250		440		650	
		4 <sup>th</sup> axis <sup>2)</sup>	± arc sec		20/15		17/10	
	Repeat accuracy Ps average	5 <sup>th</sup> axis (90°) <sup>5)</sup>	35/20	35/22	21/22	21/13	11/38	11/20
4 <sup>th</sup> axis		± arc sec						2
5 <sup>th</sup> axis		± arc sec						2
Max speed at standard load	4 <sup>th</sup> axis <sup>1)</sup>	111	210	80	160	50	100	
	5 <sup>th</sup> axis <sup>1)</sup>	60		40		25		
Precision	Radial run-out <sup>2)</sup>	on spindle ø	μm		6 / 3			
	Axial run-out <sup>2)</sup>	at spindle end face	μm		6 / 3			
	Parallelism <sup>2)</sup>	Spindle to base	μm/100 mm		10 / 5			

<sup>1)</sup> Mutually dependent; for individual drive motor data, see right side  
<sup>2)</sup> Standard / increased; for measuring method and validity of the values, please refer to p. 60, for optional angular position measuring systems, please refer to p. 61

<sup>3)</sup> In relation to dividing axis when in the horizontal position  
<sup>4)</sup> Limit value for gear unit, at 1 rpm  
<sup>5)</sup> Without load / with standard load 0°-90°  
<sup>6)</sup> For torque calculation, see p. 94

## Dimensions

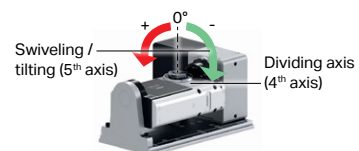


	A	B	C	C*	D	E	F	F1	H	I	R	X	Y	Y*	d1	d2	d3	h1	h2
TAP1	567	245	382	404	180	226	151	277	30	102	149	290	248	270	280	350		55	
TAP1c	520	245	382	404	180	226	104	230	30	55	149	290	248	270	186	350		55	
TAP2	656	300	444	469	210	250	182	324	30	125	173	332	295	320	248	340	400	30	95
TAP2c	596	300	444	469	210	250	122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

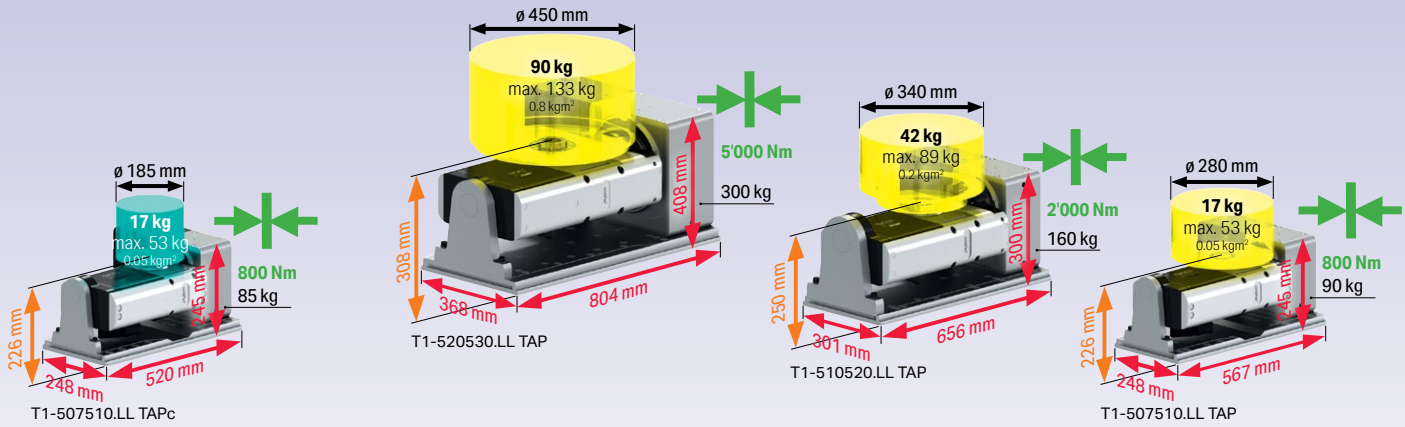
Dimensions with 508, 511 or 521 identical to 507510, 510520 and 520530.  
 \*With large motor (option)

## 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. 92/93)

	Motors 4 <sup>th</sup> /5 <sup>th</sup>	Feed* [Nm]		Speed [rpm]		Cycle time*** [sec]				
		4 <sup>th</sup>	5 <sup>th</sup>	4 <sup>th</sup>	5 <sup>th</sup>	4 <sup>th</sup>	5 <sup>th</sup>	4 <sup>th</sup>	5 <sup>th</sup>	
MAVILOR / MOVINOR**	T1-507510 TAP1	BLS-072/BLS-072	120	230	111	70	0.26	0.43	0.39	0.64
	T1-508510 TAP1	BLS-072/BLS-072	70	230	210	70	0.23	0.43	0.29	0.64
	T1-510520 TAP2	BLS-072/BLS-073	250	425	80	45	0.30	0.50	0.49	0.83
FANUC	T1-510520 TAP2	BLS-072/LN-098	250	440	80	40	0.30	0.50	0.49	0.87
	T1-511520 TAP2	BLS-072/BLS-073	150	425	160	45	0.23	0.50	0.31	0.83
	T1-511520 TAP2	BLS-072/LN-098	150	440	160	40	0.23	0.50	0.31	0.87
YASKAWA SGM7J	T1-520530 TAP3	BLS-073/LN-098	440	650	50	25	0.41	0.89	0.71	1.49
	T1-521530 TAP3	LN-098/LN-098	220	650	90	25	0.27	0.74	0.43	1.34
	T1-507510 TAP1	β1 is/α2 (HV)is	80	110	66.7	45	0.30	0.49	0.53	0.83
YASKAWA SGMJV	T1-508510 TAP1	β1 is/α2 (HV)is	55	110	130	45	0.25	0.49	0.36	0.83
	T1-510520 TAP2	α2 (HV)is/α4 (HV)is	120	195	55	29	0.36	0.66	0.63	1.18
	T1-510520 TAP2	α2 (HV)is/α4 (HV)is	120	335	55	30	0.36	0.64	0.63	1.14
YASKAWA SGM7J	T1-511520 TAP2	α2 (HV)is/α2 (HV)is	85	195	100	29	0.24	0.66	0.39	1.18
	T1-511520 TAP2	α2 (HV)is/α4 (HV)is	85	335	100	30	0.24	0.64	0.39	1.14
	T1-520530 TAP3	α2 (HV)is/α4 (HV)is	210	395	33	20	0.54	0.94	0.99	1.69
YASKAWA SGMJV	T1-520530 TAP3	α4 (HV)is/α8 (HV)is****	355	650	33	25	0.56	0.89	1.01	1.49
	T1-521530 TAP3	α4 (HV)is/ α4 (HV)is	220	355	60	22	0.37	0.84	0.62	1.52
	T1-507510 TAP1	SGM7J 06/08	120	180	66	60	0.30	0.44	0.53	0.69
MITSUBISHI	T1-508510 TAP1	SGM7J 06/08	70	180	133	60	0.22	0.44	0.33	0.69
	T1-510520 TAP2	SGM7J 08/08	195	315	66.6	38	0.32	0.54	0.55	0.94
	T1-511520 TAP2	SGM7J 08/08	135	315	133	38	0.22	0.54	0.33	0.94
SANYO	T1-520530 TAP3	on request								
	T1-521530 TAP3	SGMJV 04/08	115	180	66.7	60	0.30	0.44	0.53	0.69
	T1-508510 TAP1	SGMJV 04/08	70	180	130	60	0.22	0.44	0.33	0.69
OKUMA	T1-510520 TAP2	SGMJV 08/08	195	315	66.7	38	0.32	0.54	0.55	0.94
	T1-511520 TAP2	SGMJV 08/08	140	315	133	38	0.21	0.54	0.32	0.94
	T1-520530 TAP3	SGMJV/EV 08/15	335	650	40	25	0.46	0.89	0.84	1.49
SIEMENS	T1-521530 TAP3	SGMJV/EV 08/15	220	650	80	25	0.28	0.34	0.46	1.34
	T1-507510 TAP1	HG56/75	120	170	60	45	0.32	0.49	0.57	0.83
	T1-508510 TAP1	HG56/75	70	170	110	45	0.22	0.49	0.36	0.83
SIEMENS	T1-510520 TAP2	HG-(H)75/(H)105	185	430	50	30	0.37	0.59	0.67	1.09
	T1-511520 TAP2	HG-(H)75/(H)105	130	430	100	30	0.24	0.59	0.39	1.09
	T1-520530 TAP3	HG-(H)105/(H)104	440	650	32	20	0.54	0.94	1.01	1.69
SIEMENS	T1-521530 TAP3	HG-(H)105/(H)104	220	650	60	22	0.34	0.82	0.59	1.50
	T1-507510 TAP1	R2Ax 06040/08075	120	185	66.7	60	0.30	0.44	0.52	0.69
	T1-508510 TAP1	R2Ax 06040/08075	70	185	130	60	0.22	0.44	0.33	0.69
SIEMENS	T1-510520 TAP2	R2Ax 08075/08075	210	245	66.7	40	0.32	0.54	0.55	0.92
	T1-511520 TAP2	R2Ax 08075/08075	145	245	130	40	0.22	0.54	0.34	0.92
	T1-520530 TAP3	BL-ME24J-50SN/BL-ME80J-40SN	300	650	27.5	25	0.61	0.89	1.15	1.49
SIEMENS	T1-521530 TAP3	1FK2204/1FK2205	220	650	55	25	0.34	0.74	0.61	1.34
	T1-510520 TAP2	1FK2204/1FK2205	105	425	130	30	0.22	0.59	0.33	1.09
	T1-511520 TAP2	1FK2205/1FK2206	425	650	33	25	0.53	0.74	0.98	1.34
SIEMENS	T1-520530 TAP3	1FK7042/1FK7062	435	650	50	25	0.44	0.89	0.74	1.49
	T1-521530 TAP3	1FK2205/1FK2206	220	650	65	25	0.30	0.74	0.53	1.34
	T1-521530 TAP3	1FK7042/1FK7062	220	650	90	25	0.27	0.74	0.43	1.34

\* At 1 rpm; for more, please refer to p. 98

\*\* for Siemens / Heidenhain

\*\*\* Without clamping; for times, please refer to p. 110

\*\*\*\* not with 35iB

## Item no.

**T1-510520.LL TAP-F1**

Motor	F1=Fanuc is (200 V), F2=Fanuc HVs (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
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. 94

## 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](http://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. 62. Accessories starting at p. 54

## Options

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

<sup>1)</sup> incl. lower radial and axial run-out of 0.003 mm

<sup>2)</sup> 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

For lineFIX, refer to p. 74

# T1-Type Rotary Tables TOP (clamped counter bearing)



\*optional

			T1-507510 TOP1	T1-508510 TOP1s	T1-510520 TOP2	T1-511520 TOP2s	T1-520530 TOP3	T1-521530 TOP3s
<b>Dimensions</b>	Swivel ø	mm	180		220		195	
	Swiveling range	degrees	90° +5°/-25° (optional 180° ±25°)					
	Center height	mm	180		210 (235 <sup>3)</sup> )		268 / 308	
	Total weight	with motor kg	95		175		325	
	Center bore	Standard / increased mm	30		34		46 / 64	
<b>Bearing / Clamping</b>	Max. clamping torque	4 <sup>th</sup> axis	300	250	800	600	2000	
		5 <sup>th</sup> axis	1,100		4000		7000	
	Max. spindle load	0°-30°	79		133		200	
		30°-90°	53		89		133	
		Standard load <sup>1)</sup>	17	12	42	21	90	61
	Max. axial force	4 <sup>th</sup> axis	6		10		40	
Max. pull-out torque	4 <sup>th</sup> axis	1200		2000		3900		
	5 <sup>th</sup> axis	2000		3900		10400		
<b>Gear unit</b>	Max. moment of inertia	Standard load <sup>1)</sup>	0.05	0.025	0.2	0.07	0.8	0.4
		J max	0.5	0.25	2	0.7	8	4
	Feed torque max <sup>4)</sup>	4 <sup>th</sup> axis	120	70	250	150	440	220
		5 <sup>th</sup> axis	250		440		650	
	Limited torques due to eccentric loads <sup>6)</sup>		40		110		280	
	Gear unit loading 5 <sup>th</sup> axis	without load	-12		-22		-44	
with standard load		15	10	30	5	100	45	
Indexing accuracy Pa	M max	250		440		650		
	4 <sup>th</sup> axis <sup>2)</sup>	20/15		17/10		12/8		
Repeat accuracy Ps average	5 <sup>th</sup> axis (90°) <sup>5)</sup>	± arc sec	35/20	35/22	21/22	21/13	11/38	11/20
	4 <sup>th</sup> axis	± arc sec			2			
Max speed at standard load	5 <sup>th</sup> axis	± arc sec			2			
	4 <sup>th</sup> axis <sup>1)</sup>	min <sup>-1</sup>	111	210	80	160	50	100
<b>Precision</b>	5 <sup>th</sup> axis <sup>1)</sup>	min <sup>-1</sup>	60		40		25	
	Radial run-out <sup>2)</sup>	on spindle ø			6 / 3			
	Axial run-out <sup>2)</sup>	at spindle end face			6 / 3			
Parallelism <sup>2)</sup>	Spindle to base			10 / 5				

<sup>1)</sup> Mutually dependent; for individual drive motor data, see right side

<sup>2)</sup> Standard / increased; for measuring method and validity of the values, please refer to p. 60, for optional angular position measuring systems, please refer to p. 61

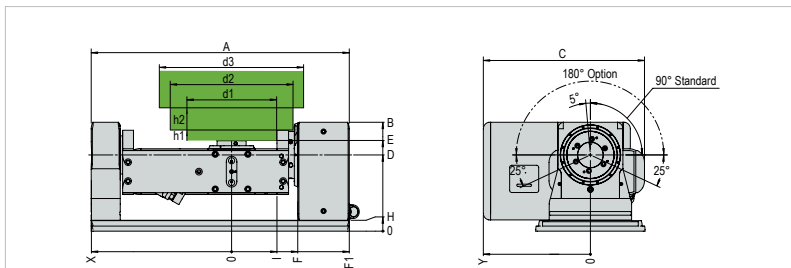
<sup>3)</sup> In relation to dividing axis when in the horizontal position

<sup>4)</sup> Limit value for gear unit, at 1 rpm

<sup>5)</sup> Without load / with standard load 0°-90°

<sup>6)</sup> For torque calculation, see p. 94

## 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

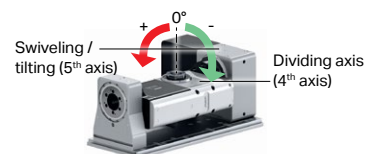
Dimensions with 508, 511 or 521 identical to 507510, 510520 and 520530.

\*With large motor (option)

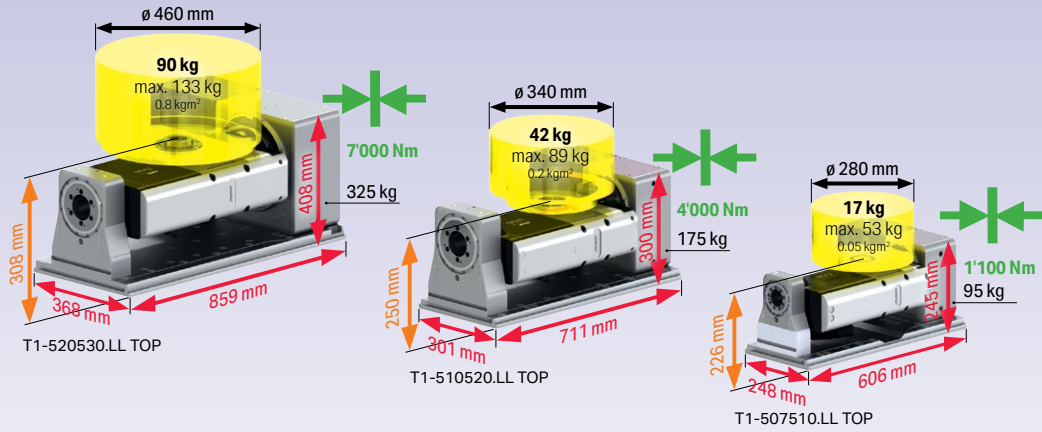
## Important information

### 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)



# T1-Type Rotary Tables TOP (clamped counter bearing)



## Drive data

(based on standard load cube shown on pp. 92/93)

	Motors 4 <sup>th</sup> /5 <sup>th</sup>	Feed* [Nm]		Speed [rpm]		Cycle time*** [sec]				
		4 <sup>th</sup>	5 <sup>th</sup>	4 <sup>th</sup>	5 <sup>th</sup>	4 <sup>th</sup>	5 <sup>th</sup>	4 <sup>th</sup>	5 <sup>th</sup>	
MAVILOR / MOVINOR**	T1-507510 TOP1	BLS-072/BLS-072	120	230	111	70	0.26	0.43	0.39	0.64
	T1-508510 TOP1	BLS-072/BLS-072	70	230	210	70	0.23	0.43	0.29	0.64
	T1-510520 TOP2	BLS-072/BLS-073	250	425	80	45	0.30	0.50	0.49	0.83
	T1-510520 TOP2	BLS-072/LN-098	250	440	80	40	0.30	0.50	0.49	0.87
	T1-511520 TOP2	BLS-072/BLS-073	150	425	160	45	0.23	0.50	0.31	0.83
	T1-511520 TOP2	BLS-072/LN-098	150	440	160	40	0.23	0.50	0.31	0.87
FANUC	T1-520530 TOP3	BLS-073/LN-098	440	650	50	25	0.41	0.89	0.71	1.49
	T1-521530 TOP3	LN-098/ LN-098	220	650	90	25	0.27	0.74	0.43	1.34
	T1-507510 TOP1	β1 is/α2 (HV)is	80	110	66.7	45	0.30	0.49	0.53	0.83
	T1-508510 TOP1	β1 is/α2 (HV)is	55	110	130	45	0.25	0.49	0.36	0.83
	T1-510520 TOP2	α2 (HV)is/α2 (HV)is	120	195	55	29	0.36	0.66	0.63	1.18
	T1-510520 TOP2	α2 (HV)is/α4 (HV)is	120	335	55	30	0.36	0.64	0.63	1.14
YASKAWA SGM7J	T1-511520 TOP2	α2 (HV)is/α2 (HV)is	85	195	100	29	0.24	0.66	0.39	1.18
	T1-511520 TOP2	α2 (HV)is/α4 (HV)is	85	335	100	30	0.24	0.64	0.39	1.14
	T1-520530 TOP3	α2 (HV)is/α4 (HV)is	210	395	33	20	0.54	0.94	0.99	1.69
	T1-520530 TOP3	α4 (HV)is/α8 (HV)is****	355	650	33	25	0.56	0.89	1.01	1.49
	T1-521530 TOP3	α4 (HV)is/ α4 (HV)is	220	355	60	22	0.37	0.84	0.62	1.52
	T1-507510 TOP1	SGM7J 06/08	120	180	66	60	0.30	0.44	0.53	0.69
YASKAWA SGMJV	T1-508510 TOP1	SGM7J 06/08	70	180	133	60	0.22	0.44	0.33	0.69
	T1-510520 TOP2	SGM7J 08/08	195	315	66.6	38	0.32	0.54	0.55	0.94
	T1-511520 TOP2	SGM7J 08/08	135	315	133	38	0.22	0.54	0.33	0.94
	T1-520530 TOP3						on request			
	T1-521530 TOP3									
	T1-507510 TOP1	SGMJV 04/08	115	180	66.7	60	0.30	0.44	0.53	0.69
MITSUBISHI	T1-508510 TOP1	SGMJV 04/08	70	180	130	60	0.22	0.44	0.33	0.69
	T1-510520 TOP2	SGMJV 08/08	195	315	66.7	38	0.32	0.54	0.55	0.94
	T1-511520 TOP2	SGMJV 08/08	140	315	133	38	0.21	0.54	0.32	0.94
	T1-520530 TOP3	SGMJV/EV 08/15	335	650	40	25	0.46	0.89	0.84	1.49
	T1-521530 TOP3	SGMJV/EV 08/15	220	650	80	25	0.28	0.34	0.46	1.34
	T1-507510 TOP1	HG56/75	120	170	60	45	0.32	0.49	0.57	0.83
SANYO	T1-508510 TOP1	HG56/75	70	170	110	45	0.22	0.49	0.36	0.83
	T1-510520 TOP2	HG-(H)75/(H)105	185	430	50	30	0.37	0.59	0.67	1.09
	T1-511520 TOP2	HG-(H)75/(H) 105	130	430	100	30	0.24	0.59	0.39	1.09
	T1-520530 TOP3	HG-(H)105/(H) 104	440	650	32	20	0.54	0.94	1.01	1.69
	T1-521530 TOP3	HG-(H) 105/(H) 104	220	650	60	22	0.34	0.82	0.59	1.50
	T1-507510 TOP1	R2Ax 06040/08075	120	185	66.7	60	0.30	0.44	0.52	0.69
OKUMA	T1-508510 TOP1	R2Ax 06040/08075	70	185	130	60	0.22	0.44	0.33	0.69
	T1-510520 TOP2	R2Ax 08075/08075	210	245	66.7	40	0.32	0.54	0.55	0.92
	T1-511520 TOP2	R2Ax 08075/08075	145	245	130	40	0.22	0.54	0.34	0.92
	T1-520530 TOP3	BL-ME24J-50SN/BL-ME80J-40SN	300	650	27.5	25	0.61	0.89	1.15	1.49
	T1-521530 TOP3	BL-ME80J-40SN	220	650	55	25	0.34	0.74	0.61	1.34
	T1-510520 TOP2	1FK2204/1FK2205	150	425	65	30	0.33	0.59	0.56	1.09
SIEMENS	T1-511520 TOP2	1FK2204/1FK2205	105	425	130	30	0.22	0.59	0.33	1.09
	T1-520530 TOP3	1FK2205/1FK2206	425	650	33	25	0.53	0.74	0.98	1.34
	T1-520530 TOP3	1FK7042/1FK7062	435	650	50	25	0.44	0.89	0.74	1.49
	T1-521530 TOP3	1FK2205/1FK2206	220	650	65	25	0.30	0.74	0.53	1.34
	T1-521530 TOP3	1FK7042/1FK7062	220	650	90	25	0.27	0.74	0.43	1.34

\* At 1 rpm; for more, please refer to p. 98

\*\* for Siemens / Heidenhain

\*\*\* Without clamping; for times, please refer to p. 110

\*\*\*\* not with 35iB

## Item no.

**T1-510520.LL TOP-F1**

Motor	F1=Fanuc is (200 V), F2=Fanuc HVs (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
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. 94

## 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](http://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. 62. Accessories starting at p. 54

## Options

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

<sup>1)</sup> incl. lower radial and axial run-out of 0.003 mm

<sup>2)</sup> 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

For lineFIX, refer to p. 74



\*optional

			T1-510520 TGR2	T1-511520 TGR2s (on request)	T1-520530 TGR3	T1-521530 TGR3s
<b>Dimensions</b>	Swivel $\varnothing$	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	
<b>Bearing / Clamping</b>	Max. clamping torque	4 <sup>th</sup> axis 5 <sup>th</sup> axis	800	600	2000	
	Max. spindle load	0°-30°	4000		7000	
		30°-90°	135		200	
		Standard load <sup>1)</sup>	90		22	160
	Max. axial force	4 <sup>th</sup> axis	10		40	
	Max. pull-out torque	4 <sup>th</sup> axis	2000		3900	
		5 <sup>th</sup> axis	3900		10400	
<b>Gear unit</b>	Max. moment of inertia	Standard load <sup>1)</sup>	0.8	0.07	2.0	0.4
		J max	2	0.7	8	4
	Feed torque max <sup>3)</sup>	4 <sup>th</sup> axis	250	150	440	220
		5 <sup>th</sup> axis	440		650	
	Limited torques due to eccentric loads <sup>5)</sup>		110		280	
Gear unit loading 5 <sup>th</sup> axis	without load	Nm		-105		
	with standard load M max	-86	-15	100	-60	
Indexing accuracy Pa	4 <sup>th</sup> axis <sup>2)</sup>	± arc sec		17/10		
	5 <sup>th</sup> axis (90°) <sup>4)</sup>	49/18	49/42	31/25	31/22	
Repeat accuracy Ps average	4 <sup>th</sup> axis	± arc sec		2		
	5 <sup>th</sup> axis	± arc sec		2		
Max speed at standard load	4 <sup>th</sup> axis <sup>1)</sup>	80	160	50	100	
	5 <sup>th</sup> axis <sup>1)</sup>	35		25		
<b>Precision</b>	Radial run-out <sup>2)</sup>	on spindle $\varnothing$			6 / 3	
	Axial run-out <sup>2)</sup>	at spindle end face			6 / 3	
	Parallelism <sup>2)</sup>	Spindle to base			10 / 5	

<sup>1)</sup> Mutually dependent; for individual drive motor data, see right side

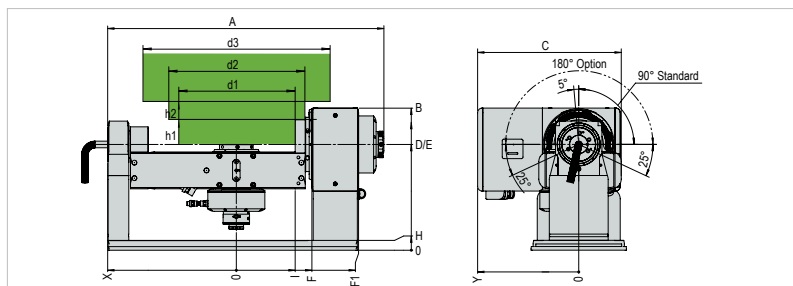
<sup>2)</sup> Standard / increased; for measuring method and validity of the values, please refer to p. 60, for optional angular position measuring systems, please refer to p. 61

<sup>3)</sup> Limit value for gear unit, at 1 rpm

<sup>4)</sup> Without load / with standard load 0°-90°

<sup>5)</sup> For torque calculation, see p. 94

## Dimensions



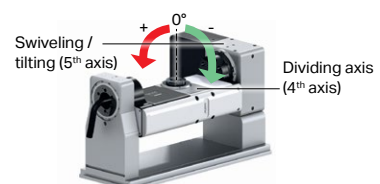
	A	B	C	D	E	F	F1	H	I	R	X	Y	d1	d2	d3	h1	h2
<b>TGR2</b>	928	440	469	350	350	232	374	38	175	196	437	320	352	456	680	56	206
with WMS7:	458																
<b>TGR3</b>	1056	548	554	408	408	292	472	38	227	226	487	390	452	556	800	96	206

Dimensions with 511 or 521 identical to 510520 and 520530.

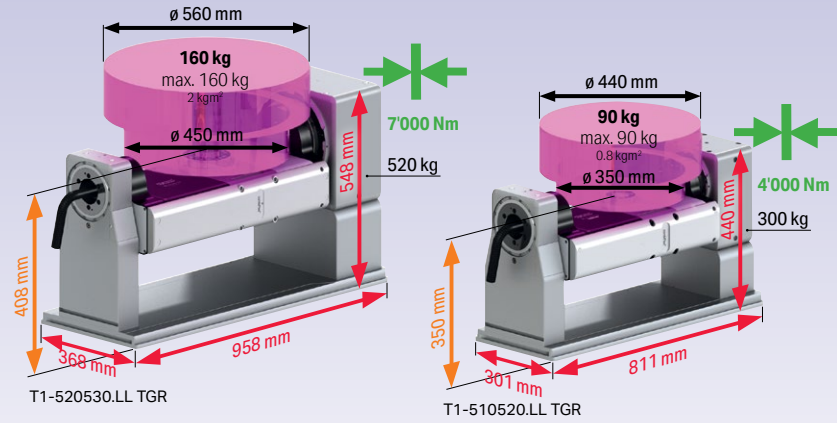
## Important information

### 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)



# T1-Type Rotary Tables TGR (clamped counter bearing)



## Drive data

(based on standard load cube shown on pp. 92/93)

		Motors 4 <sup>th</sup> /5 <sup>th</sup>	Feed* [Nm]		Speed [rpm]		Cycle time*** [sec]					
			4 <sup>th</sup>	5 <sup>th</sup>	4 <sup>th</sup>	5 <sup>th</sup>	90°		180°			
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	T1-510520 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		
	T1-520530 TGR3	α4 (HV)is/α8 (HV)is****	355	650	30	25	0.64	0.89	1.14	1.49		
YASKAWA SGM7J	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		
	T1-520530 TGR3		on request									
	T1-521530 TGR3		on request									
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		
OKU- MA	T1-520530 TGR3	BL-ME24J-50SN/ BL-ME80J-40SN	280	650	27	25	0.67	0.89	1.23	1.49		
	T1-521530 TGR3	BL-ME80J-40SN	200	650	55	25	0.34	0.89	0.61	1.49		
SIEMENS	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		
	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. 98

\*\* for Siemens / Heidenhain

\*\*\* Without clamping; for times, please refer to p. 110

\*\*\*\* not with 35iB

For calculation of load, forces and torques, please see p. 94

## 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](http://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. 62. Accessories starting at p. 54

## Options

Item no.	Description
GET.5xx-GEN	Increased gear precision <sup>1)</sup>
GEO.5xx-GEN	Incr. geometric precision, ½ standard tolerance
SPI.5xx-Lab <sup>2)</sup>	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	Tilting range increase from 90° to 180° (with overshoot to max. 230°)

<sup>1)</sup> incl. lower radial and axial run-out of 0.003 mm

<sup>2)</sup> 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	F1=Fanuc is (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=Sanoyo, Y2=Yaskawa SGM.JV/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

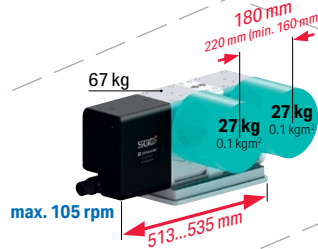
For lineFIX, refer to p. 74



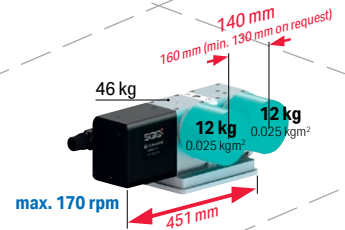
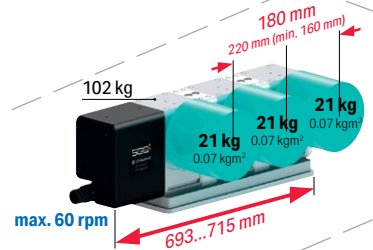
More space for workpiece and fixtures



M2



M3



51x

50x

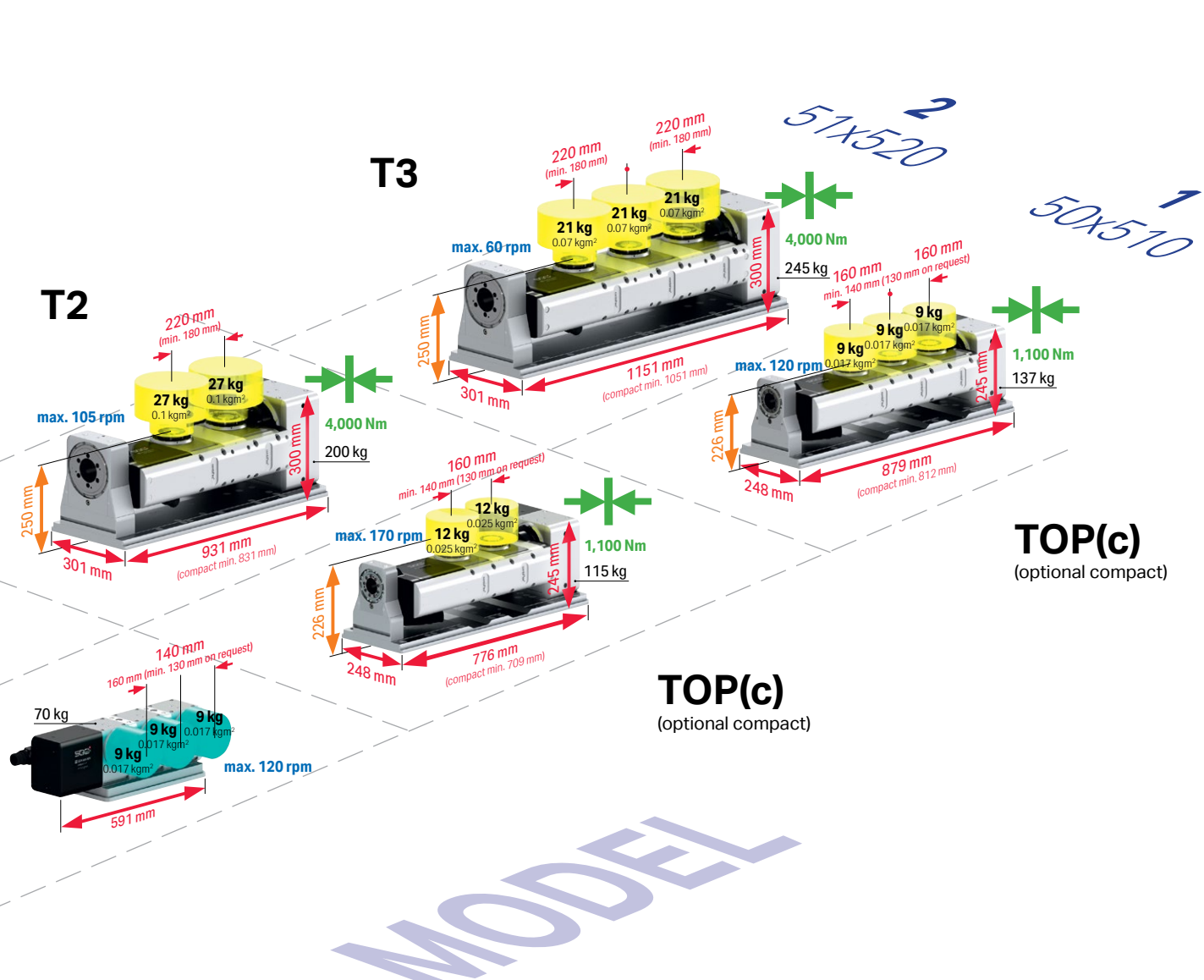
SIZE


- Overview, Applications
- System & Facts, IBox
- Rotary Tables
- SPZ, DDF, WMS
- MOT, KAB, WDF, CNC
- Aligning, GLA, RST, LOZ
- Service & Technology
- Tooling



### Facts

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



 Weight data represent the standard load; higher weights possible, but 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

- Overview, Applications
- System & Facts, IBox
- Rotary Tables
- SPZ, DDF, WMS
- MOT, KAB, WDF, CNC
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- Service & Technology
- Tooling

# M-type rotary tables



M2



M3

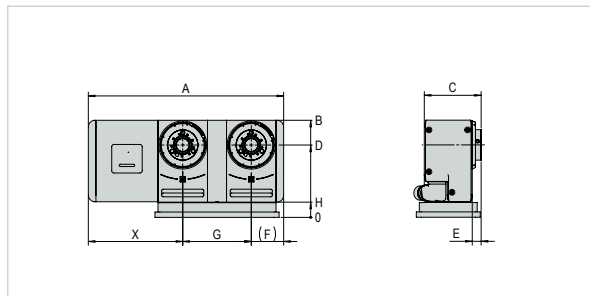
				M2-507	M2-508	M2-510	M2-511	M3-507	M3-508	M3-510	M3-511	
<b>Dimensions</b>	Swivel ø		mm	140		180		140		180		
	Spindle distance		mm	140		180		140		180		
	Center height		mm	150		190		150		190		
	Total weight	with motor	kg	46		67		70		102		
	Center bore		mm	31		34		31		34		
<b>Bearing / Clamping</b>	Max. clamping torque		Nm	300		800	600	300		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			
<b>Gear unit</b>	Max. moment of inertia	Standard load*	kgm <sup>2</sup>	0.05	0.025	0.2	0.07	0.05	0.025	0.21	0.07	
		J max	kgm <sup>2</sup>	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		
<b>Precision</b>	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

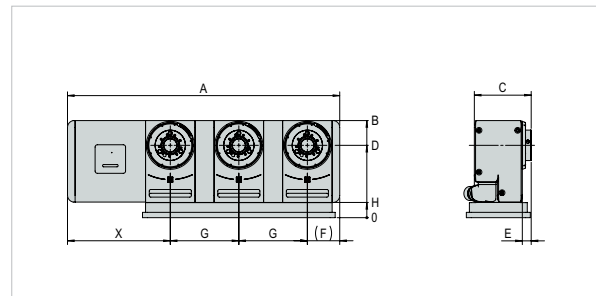
\*\* Standard / increased; for measuring method and validity of the values, please refer to p. 60, for optional angular position measuring systems, please refer to p. 61

\*\*\* For torque calculation, please see p. 94

## Dimensions

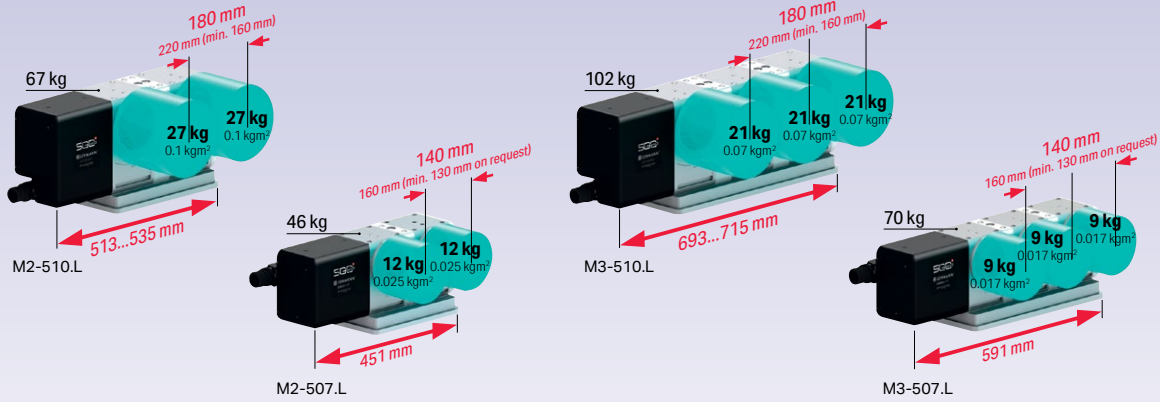


	A	B	C	D	E	F	G	G <sub>min.</sub>	H	X
M2-207	451	205	136	150	23	75	140	130	40	236
M2-510	513	255	150	190	23	85	180	160	40	248



	A	B	C	D	E	F	G	G <sub>min.</sub>	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. 92/93)

		Motors		Feed*	Speed	Cycle time***		
				[Nm]	[rpm]	90°	180°	
						[sec]	[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	
YASKAWA SGM7J	M3-510	α2 (HV)is		65	30	0.66	1.16	
	M3-511	α2 (HV)is		65	35	0.52	0.95	
	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	
YASKAWA SGM7J	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	
M3-508		SGMJV 04		50	55	0.39	0.66	
M3-510		SGMJV 08		105	35	0.54	0.97	
MITSUBISHI	M3-511	SGMJV 08		85	60	0.38	0.63	
	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	
SANYO	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	
	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	
SIEMENS	M3-511	R2Ax 08075		120	60	0.35	0.60	
	M2-510	1FK2204		110	50	0.42	0.72	
	M2-511	1FK2204		85	90	0.28	0.45	
	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. 98

\*\* for Siemens / Heidenhain

\*\*\* without clamping; for times, please refer to p. 110

For calculation of load, forces and torques, please see p. 94

## 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](http://www.lehmann-rotary-tables.com), under Download / Commissioning



Labyrinth seal (cutaway view)

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

## Accessories

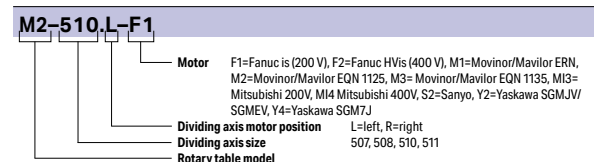
Motor, cable, angular position measuring system and pL CNC starting at p. 62. Accessories starting at p. 54

## Options

Item no.	Description
<b>GEO.5xx-GEN</b>	Incr. geometric precision, 1/2 standard tolerance
<b>SPI.5xx-Lab-x2</b> <sup>1)</sup>	Spindle seal with labyrinth, integrated sealing air pressure control
<b>SPI.5xx-Lab-x3</b> <sup>1)</sup>	Spindle seal with labyrinth, integrated sealing air pressure control

<sup>1)</sup> 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.

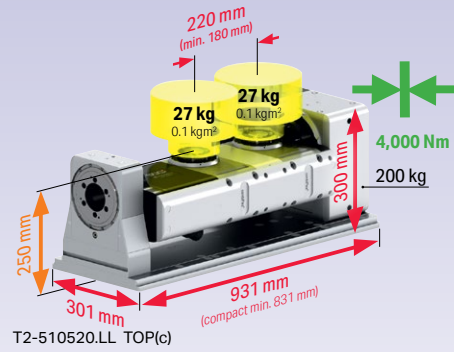




T2



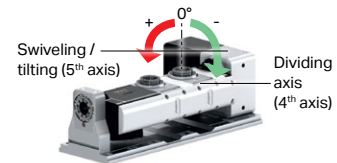
T3



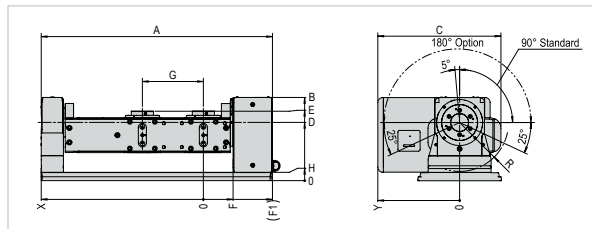
T2-510520.LL TOP(c)

			T2-507510 (508510) TOP1.2(s)	T2-510520 (511520) TOP2.2(s)	T3-507510 (508510) TOP1.3(s)	T3-510520 (511520) TOP2.3(s)	
<b>Dimensions</b>	Swivel ø		160	220	160	220	
	Spindle distance		160	220	160	220	
	Center height		190	220	190	220	
	Total weight	with motor	115	200	137	245	
	Center bore		31	34	31	34	
<b>Bearing / Clamping</b>	Max. clamping torque	4 <sup>th</sup> axis	300	800 (600)	300	800 (600)	
		5 <sup>th</sup> axis	1100	4000	1100	4000	
	Max spindle load per spindle	0°-30°	kg	2x40	2x67	3x27	3x44
		30°-90°	kg	2x27	2x45	3x18	3x30
		Standard load <sup>1)</sup>	kg	2x12 (2x7.5)	2x27 (2x14)	3x9 (3x6)	3x21 (3x11)
	Max. axial force	4 <sup>th</sup> axis per spindle	kN	12	20	12	20
Max. pull-out torque	4 <sup>th</sup> axis	Nm	1200	2000	1200	2000	
	5 <sup>th</sup> axis	Nm	2000	3900	2000	3900	
<b>Gear unit</b>	Max. moment of inertia	Standard load <sup>1)</sup>	kgm <sup>2</sup>	0.05 (0.025)	0.2 (0.07)	0.05 (0.025)	0.21 (0.07)
		J max	kgm <sup>2</sup>	0.5 (0.25)	2 (0.7)	0.5 (0.25)	2 (0.7)
	Feed torque max <sup>3)</sup>	4 <sup>th</sup> axis	Nm	120 (70)	190 (140)	120 (70)	150 (120)
		5 <sup>th</sup> axis	Nm	230	440	230	440
Limited torques due to eccentric loads (acting on the tilting axis) <sup>5)</sup>		Nm	40	110	40	110	
<b>Precision</b>	Gear unit loading 5 <sup>th</sup> Axis	without load	Nm	-20	-33	-22	-45
		with standard load	Nm	18 (16)	30 (8)	22 (20)	25 (13)
	Indexing accuracy Pa	M max	Nm	250	440	250	440
		4 <sup>th</sup> axis <sup>2)</sup>	± arc sec	20	17	20	17
	Repeat accuracy Ps average	5 <sup>th</sup> axis (90°) <sup>4)</sup>	± arc sec	45/20 (45/29)	26/22 (26/15)	56/28 (56/30)	30/20 (30/18)
		4 <sup>th</sup> axis	± arc sec	2			
Max speed at standard load	5 <sup>th</sup> axis	± arc sec	2				
	4 <sup>th</sup> axis <sup>1)</sup>	min <sup>-1</sup>	90 (170)	70 (105)	70 (120)	40 (50)	
<b>Precision</b>	5 <sup>th</sup> axis <sup>1)</sup>	min <sup>-1</sup>	60	40	60	40	
	Radial run-out <sup>2)</sup>	on spindle ø	µm	6 / 3			
	Axial run-out <sup>2)</sup>	at spindle end face	µm	6 / 3			
Parallelism <sup>2)</sup>	Spindle to base	µm/100 mm	10 / 5				

- <sup>1)</sup> Mutually dependent; for individual drive motor data, see right side
- <sup>2)</sup> Standard / increased; for measuring method and validity of the values, please refer to p. 60. for optional angular position measuring systems, please refer to p. 61
- <sup>3)</sup> Limit value for gear unit, at 1 rpm
- <sup>4)</sup> Without load / with standard load 0°-90°
- <sup>5)</sup> For torque calculation, see p. 94



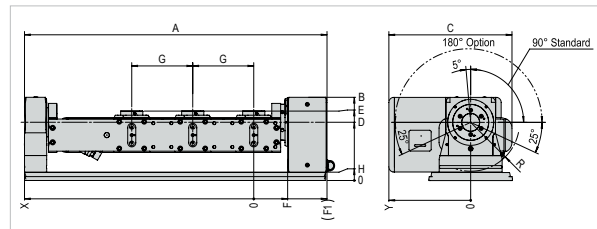
## Dimensions



	A	B	C	D	E	F	F1	G	G2*	H	R	X	Y
<b>T2-507510</b>	766	245	382	180	226	151	230	160	130	30	136	489	248
<b>T2-510520</b>	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)

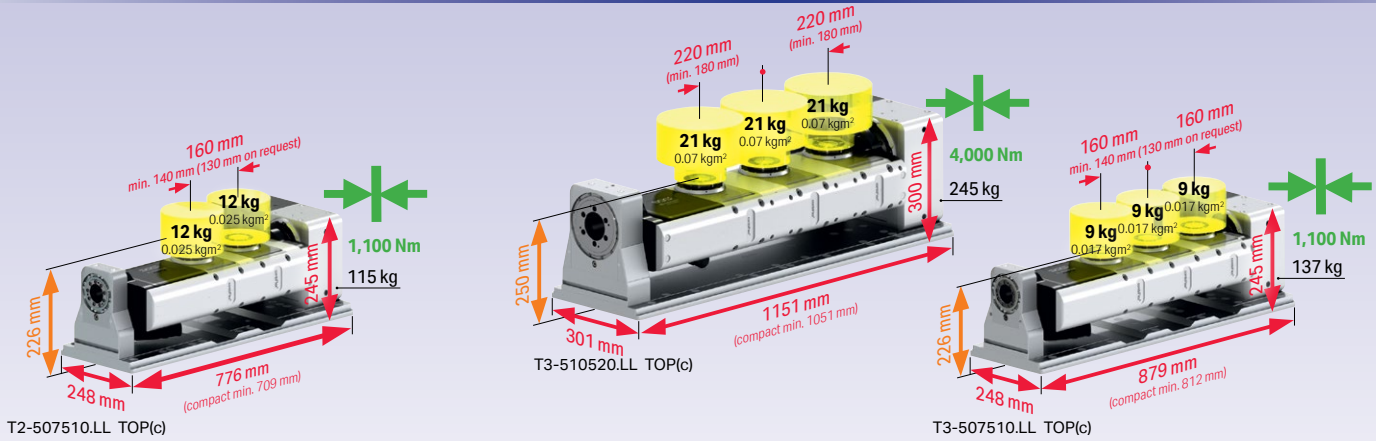
**Compact Versions: Dimension A, F and X**  
507510: 47 mm shorter, 510520: 60 mm shorter



	A	B	C	D	E	F	F1	G	G2*	H	R	X	Y
<b>T3-507510</b>	896	245	382	180	226	151	230	160	130	30	136	658	248
<b>T3-510520</b>	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. 92/93)

		Motors 4 <sup>th</sup> /5 <sup>th</sup>	Feed* [Nm]		Speed [rpm]		Cycle time*** [sec]				
			4 <sup>th</sup>	5 <sup>th</sup>	4 <sup>th</sup>	5 <sup>th</sup>	90°		180°		
							4 <sup>th</sup>	5 <sup>th</sup>	4 <sup>th</sup>	5 <sup>th</sup>	
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	
	YASKAWA SGMJV	T2-507510 TOP1.2	SGMJV 04/08	85	180	50	55	0.41	0.48	0.71	0.75
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	
T3-508510 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		T2-510520 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
	T3-510520 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. 98

\*\* for Siemens / Heidenhain

\*\*\* Without clamping; for times, please refer to p. 110

For calculation of load, forces and torques, please see p. 94

**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](http://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. 62. Accessories starting at p. 54

**Options**

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

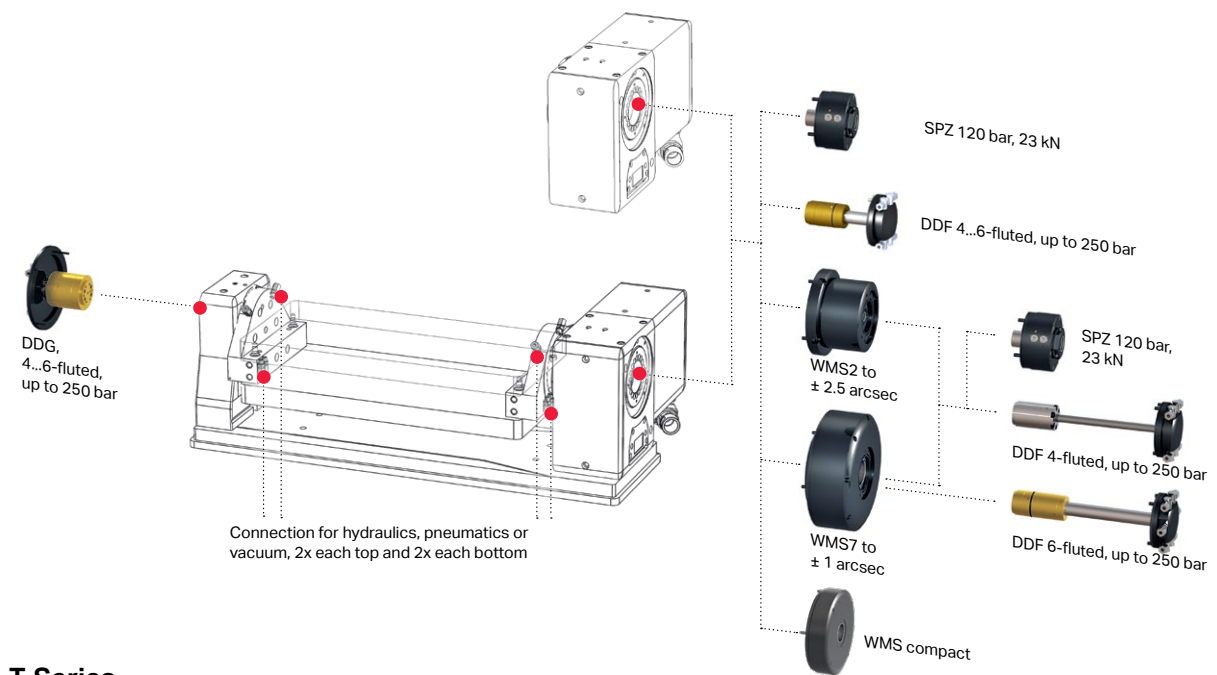
**Suitable alignment elements**

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

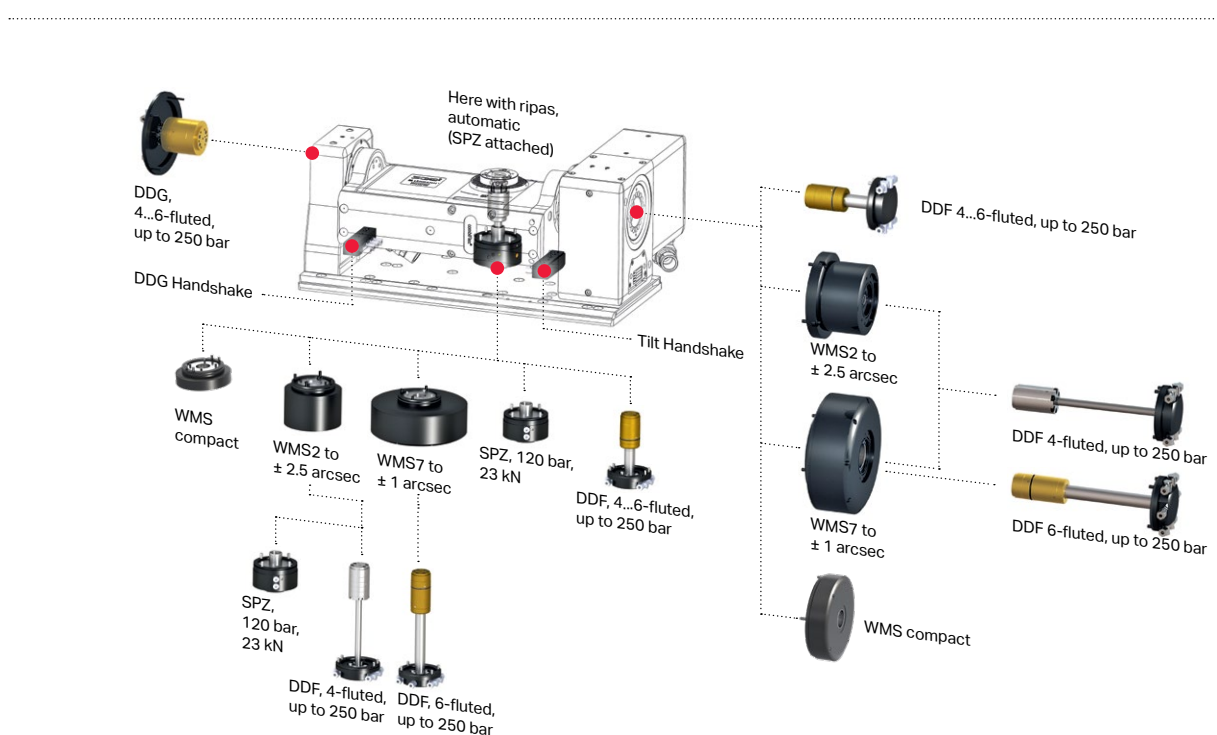
For lineFIX, refer to p. 74

1. Positioning accuracy to  $\pm 1$  arcsec
2. Up to 12 channels on dividing axis or clamping yoke
3. Medium: Oil, air or vacuum, up to 250 bar
4. Many standard combinations

## E-Series



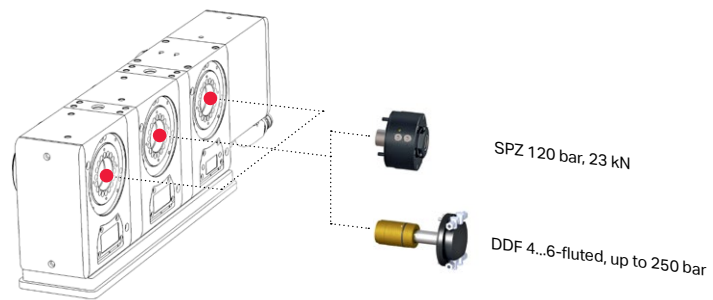
## T-Series



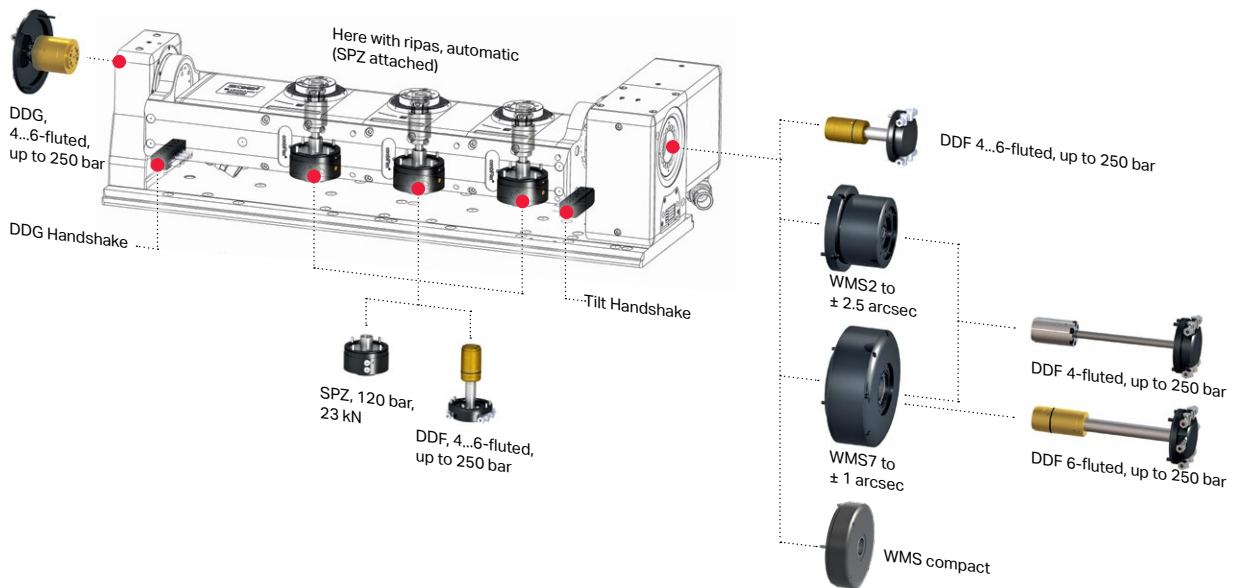
- 5. Rotary union in combination with angular position measuring systems (small and large)
- 6. Easy to retrofit
- 7. Clamping cylinder up to 23 kN

– 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

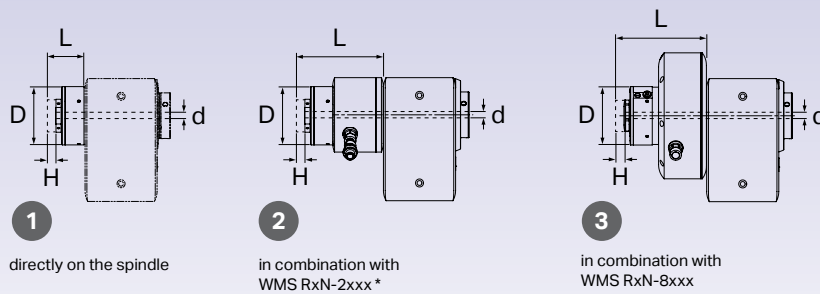
WMS Angular position measuring system  
 2 = Size 2000, Heidenhain, Magnescale  
 7 = Size 8000, Heidenhain  
 DDF Rotary union on rotary table

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. 57**.

- Overview, Applications
- System & Facts, IBox
- Rotary tables
- SPZ, DDF, WMS
- MOT, KAB, WDF, CNC
- Aligning, GLA, RST, LOZ
- Service & Technology
- Tooling

## Hydraulic clamping cylinder standard

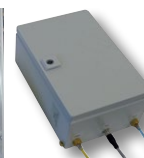
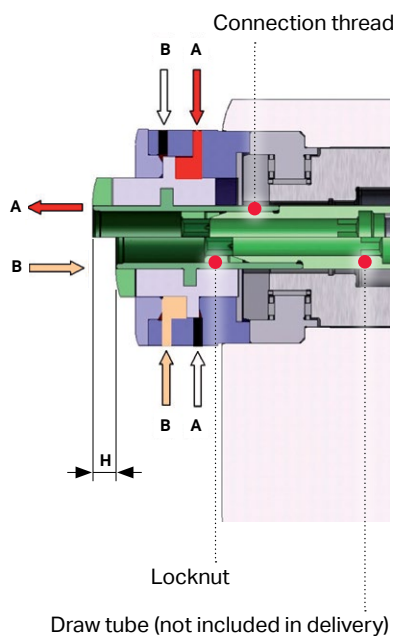


Pulling force max. 23 kN at max. permissible pressure of 120 bar

Item no.	Effective direction Designation	H [mm]	Oil [cm <sup>3</sup> ]	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					72	161		3.44
	SPZ.507-WMS2							•		
510	SPZ.5xx-d2.5	2.5	5.2	102	22	M24x1.5	52	141	136	2.90
	SPZ.5xx-9	9	18.8				64	153	148	2.85
	SPZ.5xx-15	15					64	153	148	3.44
	SPZ.510-WMS2							•		
	SPZ.510-WMS7								•	0.21
520	SPZ.520-d2.5	2.5	5.2	102	22	M24x1.5	73	165	160	3.60
	SPZ.520-9	9	18.8				85	177	172	3.55
	SPZ.520-15	15					85	177	172	4.14
	SPZ.520-WMS2							•		
	SPZ.520-WMS7								•	
530	SPZ.530-d2.5	2.5	5.2	102	22	M24x1.5	65	144	133	5.09
	SPZ.530-9	9	18.8				77	156	145	5.04
	SPZ.530-15	15					77	156	145	5.63
	SPZ.530-WMS2							•		
	SPZ.530-WMS7								•	
all types	SPZ.Awk-Vor	Preparation for presence check (control box optional, SPZ.Awk)								
	SPZ.Awk	Control box for presence check, incl. 10 m of hose material and wall penetration (in conjunction with SPZ.Awk-Vor)								

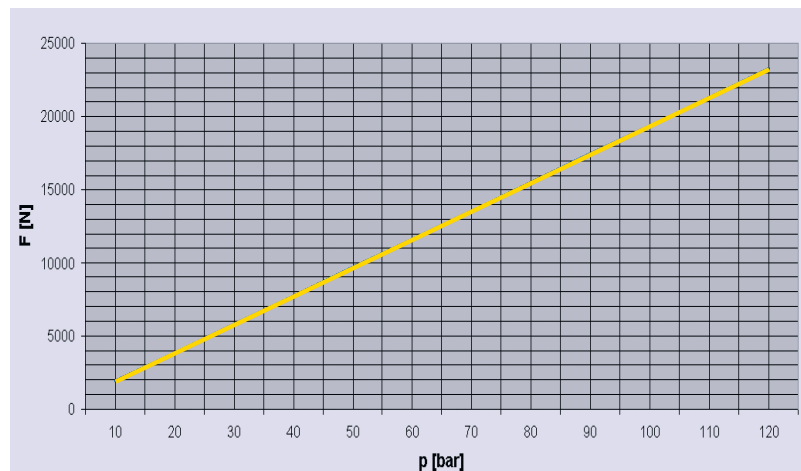
\* If in combination with pL accessories, only on request (only possible for stroke of 2.5 mm and 9 mm)

### 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. 75)





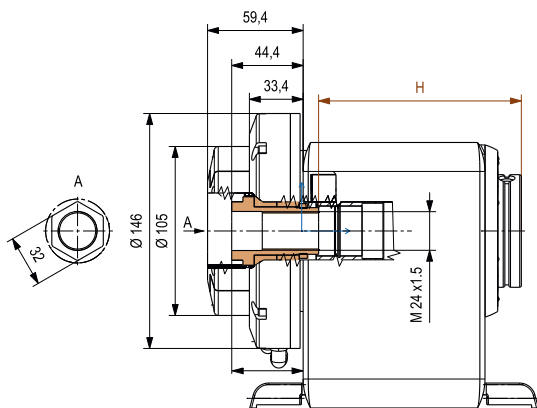
## Pneumatic clamping cylinder with adjustable stroke



- 1
- 2
- 3

More information about clamping cylinder p. 56, rotary union p. 58, angular position measuring system p. 61

### Pulling force 800...8,000 N at 1...10 bar



#### Technical characteristic

Clamping stroke 6.5 mm. The adjustable stop (option) allows stroke to be limited at front and rear

	pL LEHMANN Item no.	Designation	H min [mm]	H max [mm]	Weight [kg]	TGColin Item no.
507	TGC.507-SPZ-6.5	Pneumatic clamping cylinder	124.5	131		CP507-01
	TGC.507-SPZ-6.5A	Pneumatic clamping cylinder with end stop	124.5	131		CPB507-01
510	TGC.510-SPZ-6.5	Pneumatic clamping cylinder	124.5	131		CP510-01
	TGC.510-SPZ-6.5A	Pneumatic clamping cylinder with end stop	124.5	131		CPB510-01



Pneumatic clamping cylinder



Pneumatic clamping cylinder with end stop

### Raised center height on T-type rotary tables

For all combinations of possible spindle accessories.

	Item no.	Increase	1 3 4			2	WMS7	WMSC	1	1	1	1	WMS2 + DDF	WMS7 + DDF	WMSC + DDF	2	3	2	3	2	3	3	
			WMS2	WMS7	WMSC																		DDF
TIP1	SPH.TIP1-40	40 mm	•		•	•	•	•	•	•	•	•	•	•	•								
	SPH.TIP1-80	80 mm	•		•	•	•	•	•	•	•	•	•	•	•	•							
TIP2	SPH.TIP2-40	40 mm	•	•	•	•	•	•	•	•	•	•	•	•	•								
	SPH.TIP2-80	80 mm	•	•	•	•	•	•	•	•	•	•	•	•	•								
TIP3	SPH.TIP3-50	50 mm	•	•	•	•	•	•	•	•	•	•	•	•	•								
	SPH.TIP3-100	100 mm	•	•	•	•	•	•	•	•	•	•	•	•	•								
TAP1	SPH.TAP1-40	40 mm	•		•	•	•	•	•	•	•	•	•	•	•								
	SPH.TAP2-60	60 mm	•		•	•	•	•	•	•	•	•	•	•	•								
TAP3	SPH.TAP3-50	50 mm	•		•	•	•	•	•	•	•	•	•	•	•								
	SPH.TOP1-40	40 mm	•		•	•	•	•	•	•	•	•	•	•	•								
TOP1	SPH.TOP1-70	70 mm	•		•	•	•	•	•	•	•	•	•	•	•								
	SPH.TOP1-100	100 mm	•		•	•	•	•	•	•	•	•	•	•	•								
TOP2	SPH.TOP2-60	60 mm	•		•	•	•	•	•	•	•	•	•	•	•								
	SPH.TOP2-120	120 mm	•		•	•	•	•	•	•	•	•	•	•	•								
TOP3	SPH.TOP3-50	50 mm	•		•	•	•	•	•	•	•	•	•	•	•								
	SPH.TOP3-100	100 mm	•		•	•	•	•	•	•	•	•	•	•	•								

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

Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, WMS

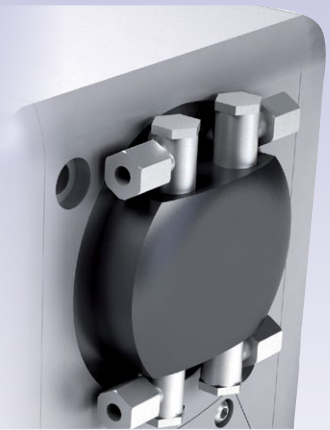
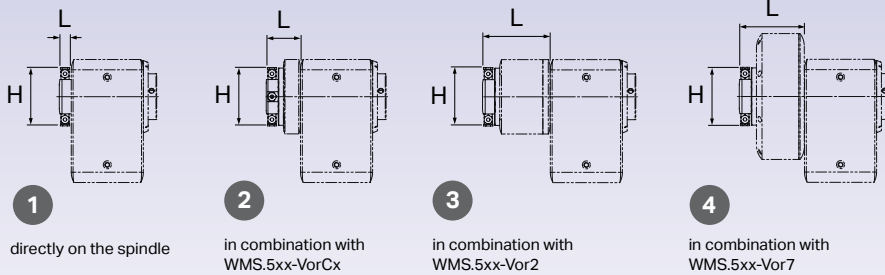
MOT, KAB, WDF, CNC

Aligning, GLA, RST, LOZ

Service & Technology

Tooling

## Ultra-compact, for air and oil



### Rotary unions for rotary table

Item no.	Flutes	Oil	Air	H [mm]	L [mm]				Weight [kg]	
					1	2	3	4		
507	DDF.507-04	4	•	•	30				2.56	
	DDF.507-04-C	4	•	•			66			2.69
	DDF.507-04-2	4	•	•				119		2.43
510	DDF.510-04	4	•	•	21				2.58	
	DDF.510-06	6	•	•					2.80	
	DDF.510-06-C	6	•	•			60			2.93
	DDF.510-04-2	4	•	•				101		2.44
	DDF.510-04-7	4	•	•					96	2.89
	DDF.510-06-7	6	•	•						3.10
	DDF.510-06-C	6	•	•						3.43
520	DDF.520-04	4	•	•	102	42			3.63	
	DDF.520-06	6	•	•			74			3.05
	DDF.520-06-C	6	•	•				134		2.47
	DDF.520-04-2	4	•	•					129	3.03
	DDF.520-04-7	4	•	•						3.18
	DDF.520-06-7	6	•	•						5.82
	DDF.520-06-C	6	•	•						5.97
530	DDF.530-04	4	•	•	34				76	3.87
	DDF.530-06	6	•	•						3.19
	DDF.530-06-C	6	•	•						3.79
	DDF.530-04-2	4	•	•				113		3.95
	DDF.530-04-7	4	•	•					102	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.

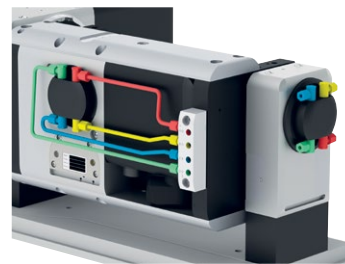


Take-off or medium transfer

### Rotary unions (DDF) for counter bearing (GLA)

Item no.	Flutes	Oil	Air	H [mm]	L [mm]	Weight [kg]
507	DDG.507-04-TOP	4	•	•	30	2.48
	DDG.520-04-TOP	4	•	•	102	3.66
510/520/530	DDG.520-06-TOP	6	•	•	44	4.11

### DDF on GLA for T-type rotary table

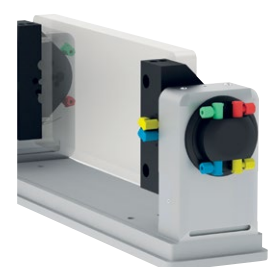


4 connections, at rear

### DDF on GLA for rotoFIX



2 connections facing up

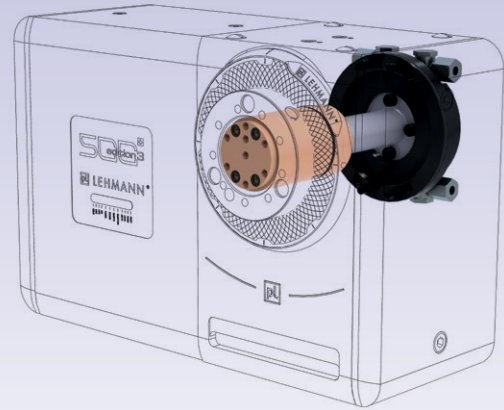


2 connections facing down

### For raised center height on T-type rotary tables, see p. 57

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

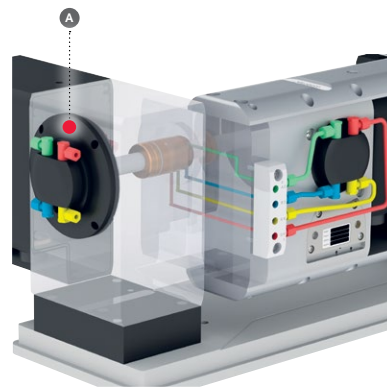
All rotary unions: Channel size  $\varnothing 3.5$  mm, permissible pressure 250 bar



## 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
<b>DDFTxP1.Lx-04</b>	•		•		not possible for version TxP1c
<b>DDFTxP1.Rx-04</b>		•	•		not possible for version TxP1c
<b>DDFTxP2.Lx-04-2</b>	•		•		not possible for versions TxP2c and Oxx
<b>DDFTxP2.Lx-06-2</b>	•		•		not possible for versions TxP2c and Oxx
<b>DDFTxP2.Rx-04-2</b>		•	•		not possible for versions TxP2c and Oxx
<b>DDFTxP2.Rx-06-2</b>		•	•		not possible for versions TxP2c and Oxx
<b>DDFTxP3.Lx-04-2</b>	•		•		
<b>DDFTxP3.Lx-06-2</b>	•		•		
<b>DDFTxP3.Rx-04-2</b>		•	•		
<b>DDFTxP3.Rx-06-2</b>		•	•		
<b>DDG.TOP1-04</b>	•	•		•	
<b>DDG.TOP2-04-2</b>	•	•		•	If Oxx in addition, DDFWMS-7-TxP needed
<b>DDG.TOP2-06-2</b>	•	•		•	
<b>DDG.TOP3-04-2</b>	•	•		•	
<b>DDG.TOP3-06-2</b>	•	•		•	
<b>DDFTGR2.Lx-04</b>	•		•		
<b>DDFTGR2.Lx-06</b>	•		•		
<b>DDFTGR2.Rx-04</b>		•	•		
<b>DDFTGR2.Rx-06</b>		•	•		
<b>DDFTGR3.Lx-04</b>	•		•		
<b>DDFTGR3.Lx-06</b>	•		•		
<b>DDFTGR3.Rx-04</b>		•	•		
<b>DDFTGR3.Rx-06</b>		•	•		



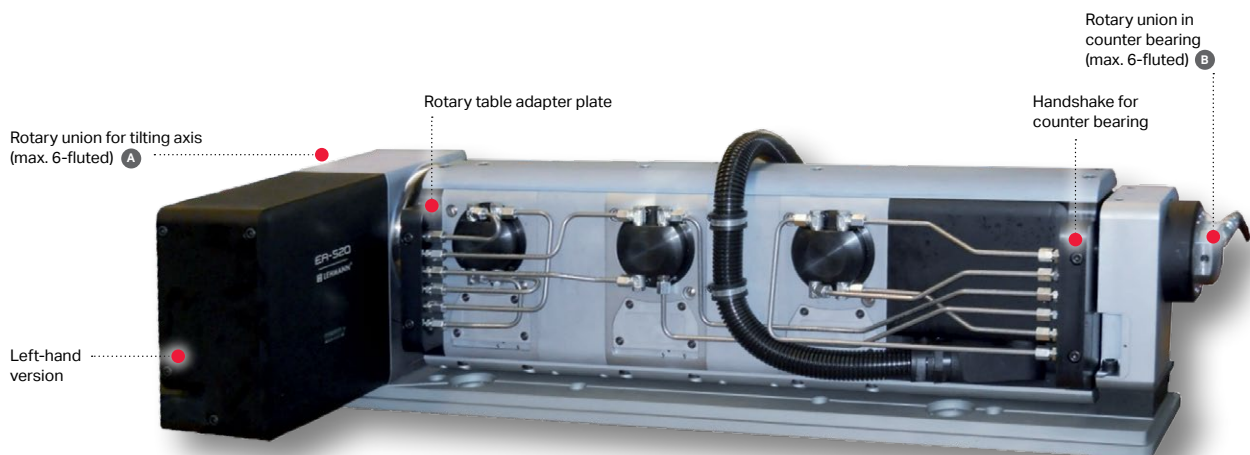
**Handshake**  
Medium transfer from tilting axis to dividing axis (rear)



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

## Essential for handshake with WMS.5xx-Vor7

Item no.	Left	Right	Remarks
<b>DDFWMS-7-TxP</b>	•	•	Adjustment strip, rotary table adapter plate



Rotary union in counter bearing (max. 6-fluted) B

Handshake for counter bearing

Rotary union for tilting axis (max. 6-fluted) A

Rotary table adapter plate

Left-hand version

Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, WMS

MOT, KAB, WDF, CNC

Aligning, GLA, RST, LOZ

Service & Technology

Tooling

Measuring and recording the angular accuracy, important application information

Fully automated measuring system for indexing accuracy measurement

## Measuring method used to determine the gear unit's accuracy 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° steps)
- Acceleration 500°/s<sup>2</sup>
- All measured values apply in the unloaded condition at an ambient temperature of approx. 22°C
- The values WITHOUT load apply

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

## Elasticity of tilting axes (reference values for pitch error)

0°...90° [arc sec]	Unloaded		Standard load sls <sub>crit</sub> *	
	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. 93

**Explanation:** The pitch error corrects the positioning error resulting from elasticity and caused by the eccentric load of the dividing/indexing axis on the swiveling/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 angular position measuring system (option, p. 61). A tilting range of 180° results in other compensation values; please contact the factory if necessary.

## Attainable workpiece accuracies Reference values for T-rotary tables

In order to achieve the best possible accuracies (volumetric accuracy), a few points must be observed. For more information, please refer to p. 111.

	Positioning	Simultaneous
<b>Size</b>	Cube 350 mm	Cube 150 mm
<b>Weight</b>	150 kg	34 kg
<b>Accuracy<sup>1</sup></b>	± 10 µm / 100 mm	
<b>Accuracy<sup>2</sup></b>	± 5 µm/100 mm	not possible
<b>Accuracy WMS<sup>1</sup></b>	± 3 µm / 100 mm	
<b>Accuracy WMS<sup>2</sup></b>	± 2 µm/100 mm	not possible

WMS: Angular position measuring system ±2.5"

<sup>1</sup> only ONE workpiece zero point

<sup>2</sup> multiple workpiece zero points

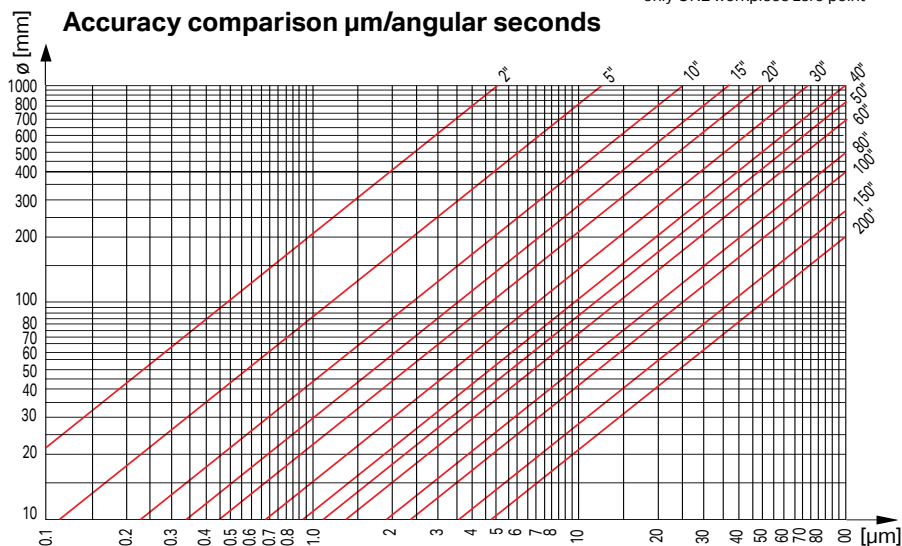
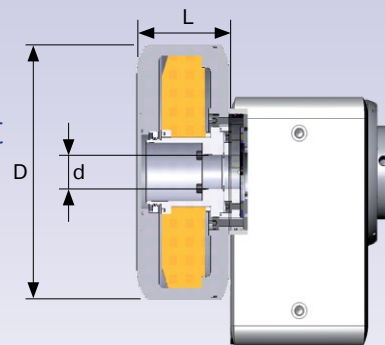


Diagram for determining the relationship between angular seconds and µm on the basis of diameter

For the highest indexing accuracy  
Fully encapsulated, leak-proof, protected against impact, adjusted in a highly precise manner



## WMS.TXM-75.1

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 angular position measuring system

WMS compact for 507/508 with TTL (2 measuring heads) and Siemens only possible without spindle clamping

	Encoder kit Item no.	Preparation Item no.	1Vss	TTL	EnDat02	Siemens driveCliqu	Fanuc	Mitsubishi	System	Indexing accuracy		Type	Read head	
										normal	comp.*			
Rotary table	WMS.xXx-75		x				x	x	Renishaw	± 10"	± 3"		1	5
	WMS.xXx-75.1	WMS.5xx-VorCX		x		x			Line count 11840, or 20 µm pitch	± 10"	± 3"	REX	1	5
	WMS.xXx-75.2			x		x				± 2.5"	± 1"		2	5
	WMS.285	WMS.5xx-Vor2	x							± 5"		RON 285	built-in	1
	WMS.287		x						± 2.5"		RON 287	built-in	1	1
	WMS.2381	WMS.5xx-Vor2			x				± 4"		RCN 2381	built-in	1	1
	WMS.2581	WMS.5xx-Vor2			x				± 2"		RCN 2581	built-in	1	1
	WMS.275	WMS.5xx-Vor2		x					± 5"		RON 275	built-in	1	1
	WMS.RU97A	WMS.5xx-Vor2				x			± 2.5"		RU97A	built-in	3	3
	WMS.RU77F	WMS.5xx-Vor2					x		± 2.5"		RU77	built-in	4	4
	WMS.RU77M	WMS.5xx-Vor2						x	± 2.5"		RU77	built-in	4	4
	WMS.8391F**	WMS.5xx-Vor7					x		± 2"		RCN 8391F	built-in	2	2
	WMS.8391M**	WMS.5xx-Vor7						x	± 2"		RCN 8391M	built-in	2	2
	WMS.8381**	WMS.5xx-Vor7			x				± 2"		RCN 8381	built-in	2	2
WMS.8591F**	WMS.5xx-Vor7					x		± 1"		RCN 8591F	built-in	2	2	
WMS.8591M**	WMS.5xx-Vor7						x	± 1"		RCN 8591M	built-in	2	2	
WMS.8581**	WMS.5xx-Vor7			x				± 1"		RCN 8581	built-in	2	2	
Counter-bearing	WMS.2381	WMS.TOP2-Vor2							± 4"		RCN 2381	built-in	1	1
	WMS.2581	WMS.TOP2-Vor2							± 2"		RCN 2581	built-in	1	1
	WMS.RU97A	WMS.TOP2-Vor2							± 2.5"		RU97A	built-in	3	3
	WMS.RU77F	WMS.TOP2-Vor2							± 2.5"		RU77	built-in	4	4
	WMS.RU77M	WMS.TOP2-Vor2							± 2.5"		RU77	built-in	4	4

\* Sine error compensated individually by customer  
\*\* not available on 507/508

	L	D	d
	[mm]		
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.507-Vor2	88.2	130	15
WMS.510-Vor2	88.5		
WMS.520-Vor2	91.6	220	46
WMS.530-Vor2	79		
WMS.510-Vor7	84	30	
WMS.520-Vor7	87		
WMS.530-Vor7	68	50	
WMS.TOP2-Vor2	102	130	15



Option: Additional cable for retrofitting WMS  
KAB.WMS-14.0-o



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

## Alternative to angular position 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. 30-47)

## Important information

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

## For raised center height on T-type rotary tables, see p. 57

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

Overview, Applications  
System & Facts, IBox  
Rotary tables  
SPZ, DDF, WMS  
MOT, KAB, WDF, CNC  
Aligning, GLA, RST, LOZ  
Service & Technology  
Tooling

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
<b>MOT.dCliq</b>	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. 30–53).

## Motor flange, max

507 = 70x70 mm, 510 = 80x80 mm  
520 = 110x110 mm, 530 = 130x130 mm

## Motor table

	pL LEHMANN Item no.	Motor manufacturer Item no.	Voltage [VAC]	Dimension X							Overall gear ratio $i_{tot}$										
				s = Standard o = Option							Motor pos. L/R										
				507 / 508	510 / 511	520 / 521	530	507 / 508	510 / 511	520 / 521	530	507	508	510	511	520	521	530			
MOVINOR / MAVILOR (Siemens, Heidenh.)	BLS 072 ERN 1185	<b>MOT.MA-072ERN</b>	BLS 072 ERN 1185	400	s	s				236	248			90:1	45:1	120:1	60:1				
	BLS 072 EQN 1125	<b>MOT.MA-072EQN25</b>	BLS 072 EQN 1125	400	o	o				236	248			90:1	45:1	120:1	60:1				
	BLS 072 EQN 1135	<b>MOT.MA-072EQN35</b>	BLS 072 EQN 1135	400	o	o				236	248			90:1	45:1	120:1	60:1				
	BLS 073 ERN 1185*	<b>MOT.MA-073ERN</b>	BLS 073 ERN 1185	400			s						295					150:1	75:1		
	BLS 073 EQN 1125*	<b>MOT.MA-073EQN25</b>	BLS 073 EQN 1125	400			o						295					150:1	75:1		
	BLS 073 EQN 1135*	<b>MOT.MA-073EQN35</b>	BLS 073 EQN 1135	400			o						295					150:1	75:1		
	LN098 ERN 1185	<b>MOT.MO-098ERN</b>	LN098 ERN 1185	400				s					390								150:1
	LN098 EQN 1125	<b>MOT.MO-098EQN25</b>	LN098 EQN 1125	400				o					390								150:1
	LN098 EQN 1135	<b>MOT.MO-098EQN35</b>	LN098 EQN 1135	400				o					390								150:1
FANUC	$\beta$ 1/6000is	<b>MOT.FA-1/6is</b>	A06B-0116-B103	200	s	o				236	248			90:1	45:1	90:1	45:1				
	$\alpha$ 2/5000is*	<b>MOT.FA-2/5is</b>	A06B-0212-B100	200	s	s				248	295					90:1	45:1	150:1	75:1		
	$\alpha$ 2/5000HVis*	<b>MOT.FA-2/5HVis</b>	A06B-0213-B100	400	s	s				248	295					90:1	45:1	150:1	75:1		
	$\alpha$ 4/5000is	<b>MOT.FA-4/5is</b>	A06B-0215-B100	200			s						390								180:1
	$\alpha$ 4/5000HVis	<b>MOT.FA-4/5HVis</b>	A06B-0216-B100	400			s						390								180:1
	$\alpha$ 8/4000is			200																	
	$\alpha$ 8/4000HVis			400																	
YASKAWA	SGMJV-04	<b>MOT.YA-SGMJV04</b>	SGMJV-04ADA61	200	s	o				236	248			90:1	45:1	120:1	60:1				
	SGMJV-08	<b>MOT.YA-SGMJV08</b>	SGMJV-08ADA61	200	s	s				248	295					90:1	45:1	150:1	75:1		
	SGMEV-15	<b>MOT.YA-SGMEV15</b>	SGMEV-15ADA61	200			s						390								180:1
	SGM7J-06	<b>MOT.YA-SGM7J06</b>	SGM7J-06A7A61	200	s	o				236	248			90:1	45:1	120:1	60:1	150:1	75:1		
	SGM7J-08	<b>MOT.YA-SGM7J08</b>	SGM7J-08A7A61	200	s	s				248	295					90:1	45:1				
MITSUBISHI	HG56	<b>MOT.MI-HG-56S</b>	HG-56S-D47	200	s	o				236				90:1	45:1						
	HG75	<b>MOT.MI-HG-75S</b>	HG-75S-D48	200	s					270						90:1	45:1				
	HG-H75	<b>MOT.MI-HG-H75S</b>	HG-H75S-D48	400	s					270						90:1	45:1				
	HG104	<b>MOT.MI-HG-104S</b>	HG-104S-D48	200			s						390								150:1
	HG-H104	<b>MOT.MI-HG-H104S</b>	HG-H104S-D48	400			s						390								150:1
SA-NYO	R2Ax06040	<b>MOT.SA-R2Ax060</b>	R2Ax06040FXP00M	200	s	o				236	248			90:1	45:1	90:1	45:1				
	R2Ax08075	<b>MOT.SA-R2Ax080</b>	R2Ax08075FXP00M	200	s	s				248	295					90:1	45:1	120:1	60:1		
	BL-ME24J-50SN						s						320					180:1	90:1		
OK-UMA	BL-ME80J-40SN						s						390								120:1
SIEMENS	1FK2204	<b>MOT.SI-1FK2204-5A</b>	1FK2204-5AF01-0MB0		s					248						90:1	45:1				
	1FK2205	<b>MOT.SI-1FK2205-2A</b>	1FK2205-2AF01-0MB0				s						295					150:1	75:1		
	1FK2206	<b>MOT.SI-1FK2206-4A</b>	1FK2206-4AF01-0MB0				s						390								150:1
	1FK7042-2AK71	<b>Drive cliq</b>	1FK7042-2AK71-1RG0				s						320					150:1	75:1		
	1FK7062-2AH71	<b>Drive cliq</b>	1FK7062-2AH71-1RG0				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



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



	Machine Type	CNC System	CNC Type	Input Voltage	507 (608)	510 (611)	520 (621)	530
<b>Akira Seiki</b>	Vx Series	Mitsubishi	M700	200 VAC	●	●	●	●
<b>Alzmetall</b>	BAZ35	Heidenhain	TNC426	400 VAC	○	○	○	●
<b>AMS</b>	MVC400	Fanuc	0iMD	200 VAC	●	●	●	○
<b>Awea</b>	AF-1000	Fanuc	18iMB	200 VAC	●	●	●	●
	AF-1060	Heidenhain	iTNC530	400 VAC	●	●	○	○
	AF-1250	Heidenhain	iTNC530	400 VAC	●	●	○	○
<b>Axa</b>	DBZ	Heidenhain	iTNC530	400 VAC	○	○	○	○
<b>BFW</b>	Dhruva 4070HE	Fanuc	0iMD	200 VAC	●	○	●	●
	Dhruva	Siemens	828D	?	○	○	○	○
	Dhruva	Mitsubishi	MV70BV	?	○	○	○	○
<b>Bridgeport</b>	XV2290	Siemens	828D	400 VAC	●	●	●	●
	R450X1	Sanyo	C00	200 VAC	●	○	●	●
	Sx00X1	Sanyo	C00	200 VAC	●	●	○	○
<b>Brother</b>	TC-22Bn	Yaskawa	B00	200 VAC	●	○	●	○
	TC-32Bn/FT/QT	Yaskawa	B00	200 VAC	●	○	●	○
	TC-R2B	Sanyo	B00	200 VAC	●	○	●	○
	TC-S2Dn	Sanyo	B00	200 VAC	●	○	●	○
<b>Chevalier</b>	SMART III Series	Syntec	21MA	200 VAC	●	●	○	○
	FMG 1632CNC-HD	Siemens	840Dsl	400 VAC	●	●	○	○
<b>Chiron</b>	FZ 12W	Fanuc	31iB5	400 VAC	●	●	●	●
	Mill2000	Siemens	840Dsl	400 VAC	○	●	●	○
	DMU 50, 70, 100			400 VAC	○	○	○	○
	Milltap 700	Siemens	840Dsl	400 VAC	●	●	●	●
	DMC xx35V			400 VAC	○	○	○	○
<b>DMG MORI</b>	DMC xx50V	Siemens	840Dsl	400 VAC	○	○	○	○
	DMF			400 VAC	○	○	○	○
	CMX xx35V	Siemens	840Dsl	400 VAC	●	●	○	○
	CMX xx50V	Siemens	840Dsl	400 VAC	●	●	○	○
	CMX xx50V	Fanuc	?	?	○	○	○	○
	NVX5x Series	Mitsubishi	M730BM	200 VAC	●	●	●	●
<b>Doosan</b>	DNM400-650	Siemens	828Dsl	400 VAC	●	●	●	●
	DNM400-650	Fanuc	0iMD	200 VAC	●	●	●	●
	DNM500 II, 650 II	Fanuc	0iMD	200 VAC	●	●	●	●
	DNM400-650HS	Fanuc	30/31/32i-A	200 VAC	○	○	○	○
	DT360D	Fanuc	0iMD	200 VAC	○	○	○	○
	DT400	Fanuc	0iMD	200 VAC	○	○	○	○
	Mynx7500/50	Fanuc	0iMD	200 VAC	○	○	○	○
	VC430 / VC510	Fanuc	0iMD	200 VAC	●	●	○	○
	VM5400, 6400	Fanuc	30/31/32i-A	200 VAC	○	○	○	○
<b>Fanuc Robodrill</b>	a-T14iFx	Fanuc	31i-A5/B5	200 VAC	○	○	○	○
	a-T21iFx	Fanuc	31i-A5/B5	200 VAC	○	○	○	○
	a-D14xiA(5)	Fanuc	31i-B5	200 VAC	●	●	○	○
	a-D21xiA(5)	Fanuc	31i-B5	200 VAC	●	●	○	○
	a-D21xiB(5)	Fanuc	31i-B5	200 VAC	○	○	○	○

	Machine Type	CNC System	CNC Type	Input Voltage	507 (608)	510 (611)	520 (621)	530
<b>GF Mikron</b>	MillS400	Heidenhain	iTNC530	400 VAC	●	●	○	○
	VCE			400 VAC	○	○	○	○
	VCP			400 VAC	○	○	○	○
<b>Haas</b>	Minimill, VF-x, DT-1	HAAS	> M18.7	200 VAC	●	●	○	○
	OM-2A	HAAS	> M18.7	200 VAC	●	●	○	○
	VF-x	HAAS NGC	100.16.000.1021	200 VAC	●	●	○	○
<b>Hasegawa</b>	PM250	Fanuc	31i-B5	200 VAC	●	●	○	○
<b>Hermle</b>	C800U	Siemens	840Dpl	400 VAC	○	○	○	○
<b>Hurco</b>	VMX10(i)	HURCO	WinMax V9.x	200 VAC	●	●	●	●
	VMX24(i), 30(i)	HURCO	WinMax V9.x	200 VAC	●	●	●	●
	VMX24, 30	HURCO	WinMax V8.x	200 VAC	●	●	●	●
	VMX42	HURCO	WinMax V8.x	200 VAC	●	●	●	●
	VMX42(i)	HURCO	WinMax V9.x	200 VAC	●	●	●	●
<b>Hyundai WIA</b>	F400	Fanuc	0iMD	200 VAC	●	●	○	○
<b>Jyoti</b>	VMC640	Siemens	810D	400 VAC	○	○	○	○
<b>KAAST</b>	KAAST	Fanuc			○	○	○	○
<b>Lapmaster</b>	Micron Macro-S/SK	Siemens	840Dpl	400 VAC	●	●	○	○
<b>Leadwell</b>	LCV760	Fanuc	0iMF	200 VAC	●	●	○	○
	Slim3N	Fanuc	0iMD	400 VAC	●	●	○	○
<b>Makino</b>	PS95	Fanuc	?	?	○	○	○	○
<b>Mazak</b>	VCS430	Mazak (Mitsubishi)	SMART or MATRIX NEXUS 2	200 VAC	○	●	●	○
	VCS530CSL	Mazak (Mitsubishi)	SMART	200 VAC	○	●	●	○
	VTC800	Mazak (Mitsubishi)	Mazatrol	400 VAC	○	●	●	○
<b>POSmill</b>	B800	FANUC	0iMD	200 VAC	●	●	○	○
	C1050	Heidenhain	iTNC530 HSCI	400 VAC	●	●	○	○
	C1050	Heidenhain	TNC620	400 VAC	●	●	○	○
	C800	Heidenhain	iTNC530 HSCI	400 VAC	●	●	○	○
<b>Quaser</b>	MV154	Fanuc	?	200 VAC	○	○	○	○
	MV184	Fanuc	0iMFi	200 VAC	●	●	○	○
	MV184	Heidenhain	TNC620	400 VAC	●	●	○	○
	MV184	Siemens	828D	400 VAC	●	●	○	○
	MV234	Fanuc	31iB	200 VAC	●	●	○	○
	MV235	Fanuc	31iB	200 VAC	●	●	○	○
<b>Reckermann</b>	Kombi 1300	Heidenhain	TNC320	400 VAC	●	●	○	○
<b>Republic Lagun</b>	VGC5028	Fanuc	31i-B5	200 VAC	○	○	○	○
<b>Sauer</b>	Lasertech 45	Siemens	840Dsl	400 VAC	●	●	○	○
<b>Spinner</b>	MVC610	Siemens	840Dsl	400 VAC	●	●	○	○
<b>Tongtai</b>	VU5	Siemens	840dDsl	400 VAC	○	○	○	○
<b>Wagner</b>	WMC1100B	Siemens	828D	400 VAC	○	○	○	○

- 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)



	Machine Type	CNC System	CNC Type	Input Voltage	50x510	51x510	51x520	52x520
<b>Akira Seiki</b>	Vx Series	Mitsubishi	M700	200 VAC	●	●	●	●
<b>Alzmetall</b>	BAZ35	Heidenhain	TNC426	400 VAC	○	○	○	○
<b>AMS</b>	MVC400	Fanuc	0iMD	200 VAC	○	○	○	○
<b>Awea</b>	AF-1000	Fanuc	18iMB	200 VAC	●	●	●	●
	AF-1060	Heidenhain	iTNC530	400 VAC	●	●	●	●
	AF-1250	Heidenhain	iTNC530	400 VAC	●	●	●	●
<b>Axa</b>	DBZ	Heidenhain	iTNC530	400 VAC	○	○	○	○
<b>BFW</b>	Dhruva 4070HE	Fanuc	0iMD	200 VAC	○	○	○	○
	Dhruva	Siemens	828D	?	○	○	○	○
	Dhruva	Mitsubishi	MV70BV	?	○	○	○	○
<b>Bridgeport</b>	XV2290	Siemens	828D	400 VAC	○	○	○	○
<b>Brother</b>	R450X1	Sanyo	C00	200 VAC	●	●	●	●
	Sx00X1	Sanyo	C00	200 VAC	●	●	●	●
	TC-22Bn	Yaskawa	B00	200 VAC	●	●	●	●
	TC-32Bn/FT/QT	Yaskawa	B00	200 VAC	●	●	●	●
	TC-R2B	Sanyo	B00	200 VAC	●	●	●	●
<b>Chevalier</b>	SMART III Series	Syntec	21MA	200 VAC	●	●	●	●
<b>Chiron</b>	FZ 12W	Fanuc	31B5	400 VAC	○	○	○	○
	Mill2000	Siemens	840Dsl	400 VAC	●	●	●	●
<b>DMG MORI</b>	DMU 50, 70, 100			400 VAC	○	○	○	○
	Milltap 700	Siemens	840Dsl	400 VAC	●	●	●	●
	DMC xx35V			400 VAC	○	○	○	○
	DMC xx50V	Siemens	840Dsl	400 VAC	○	○	○	○
	DMF			400 VAC	○	○	○	○
	CMX xx35V	Siemens	840Dsl	400 VAC	○	○	○	○
<b>Doosan</b>	CMX xx50V	Siemens	840Dsl	400 VAC	●	●	●	
	CMX xx50V	Fanuc	?	?	○	○	○	
	NVX5x Series	Mitsubishi	M730BM	200 VAC	●	●	●	
	DNM400-650	Siemens	828Dsl	400 VAC	●	●	●	
	DNM400-650	Fanuc	0iMD	200 VAC	○	○	○	
	DNM500 II, 650 II	Fanuc	0iMD	200 VAC	○	○	○	
	DNM400-650HS	Fanuc	30/31/32i-A	200 VAC	○	○	○	
	DT360D	Fanuc	0iMD	200 VAC	○	○	○	
	DT400	Fanuc	0iMD	200 VAC	○	○	○	
	Mynx7500/50	Fanuc	0iMD	200 VAC	○	○	○	
	VC430 / VC510	Fanuc	0iMD	200 VAC	○	○	○	
	VM5400, 6400	Fanuc	30/31/32i-A	200 VAC	○	○	○	
<b>Fanuc Robodril</b>	a-T114iFx	Fanuc	31i-A5/B5	200 VAC	○	○	○	
	a-T211iFx	Fanuc	31i-A5/B5	200 VAC	●	●	●	
	a-D14xiA(5)	Fanuc	31i-B5	200 VAC	●	●	●	
	a-D21xiA(5)	Fanuc	31i-B5	200 VAC	○	○	○	
	a-D21xiB(5)	Fanuc	31i-B5	200 VAC	●	●	●	

	Machine Type	CNC System	CNC Type	Input Voltage	50x510	51x510	51x520	52x520
<b>GF Mikron</b>	MillS400	Heidenhain	iTNC530	400 VAC	○	○	○	○
	VCE			400 VAC	○	○	○	○
	VCP			400 VAC	●	●	●	
<b>Haas</b>	Minimill, VF-x, DT-1	HAAS	> M18.7	200 VAC	●	●	●	
	OM-2A	HAAS	> M18.7	200 VAC	●	●	●	
	VF-x	HAAS NGC	100.16.000.1021	200 VAC	●	●	○	
<b>Hasegawa</b>	PM250	Fanuc	31i-B5	200 VAC	○	○	○	
<b>Hermle</b>	C800U	Siemens	840Dpl	400 VAC	●	●	●	
<b>Hurco</b>	VMX10(i)	HURCO	WinMax V9.x	200 VAC	●	●	●	
	VMX24(i), 30(i)	HURCO	WinMax V9.x	200 VAC	●	●	●	
	VMX24, 30	HURCO	WinMax V8.x	200 VAC	●	●	●	
	VMX42	HURCO	WinMax V8.x	200 VAC	●	●	●	
	VMX42(i)	HURCO	WinMax V9.x	200 VAC	○	○	○	
<b>Hyundai WIA</b>	F400	Fanuc	0iMD	200 VAC	○	○	○	
<b>Jyoti</b>	VMC640	Siemens	810D	400 VAC	○	●	○	
<b>KAAST</b>	KAAST	Fanuc			○	○	○	
<b>Lapmaster</b>	Micron Macro-S/SK	Siemens	840Dpl	400 VAC	●	●	●	
<b>Leadwell</b>	LCV760	Fanuc	0iMF	200 VAC	○	○	○	
<b>Makino</b>	Slim3N	Fanuc	0iMD	400 VAC	○	○	○	
	PS95	Fanuc	?	?	○	○	○	
<b>Mazak</b>	VCS430	Mazak (Mitsubishi)	SMART or MATRIX NEXUS 2	200 VAC	○	○	○	
	VCS530CSL	Mazak (Mitsubishi)	SMART	200 VAC	●	●	●	
	VTC800	Mazak (Mitsubishi)	Mazatrol	400 VAC	●	●	●	
<b>POSmill</b>	B800	FANUC	0iMD	200 VAC	●	●	●	
	C1050	Heidenhain	iTNC530 HSCI	400 VAC	○	○	○	
	C1050	Heidenhain	TNC620	400 VAC	●	●	●	
	C800	Heidenhain	iTNC530 HSCI	400 VAC	●	●	●	
<b>Quaser</b>	MV154	Fanuc	?	200 VAC	○	○	○	
	MV184	Fanuc	0iMFi	200 VAC	○	○	○	
	MV184	Heidenhain	TNC620	400 VAC	○	○	○	
	MV234	Fanuc	311B	200 VAC	○	○	○	
	MV235	Fanuc	311B	200 VAC	○	○	○	
<b>Reckermann</b>	Kombi 1300	Heidenhain	TNC320	400 VAC	○	○	○	
<b>Republic Lagun</b>	VGC5028	Fanuc	31i-B5	200 VAC	○	○	○	
<b>Sauer</b>	Lasertech 45	Siemens	840Dsl	400 VAC	○	○	○	
<b>Spinner</b>	MVC610	Siemens	840Dsl	400 VAC	●	●	●	
<b>Tongtai</b>	VU5	Siemens	840dDsl	400 VAC	●	●	○	
<b>Wagner</b>	WMC1100B	Siemens	828D	400 VAC	○	○	○	

- 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

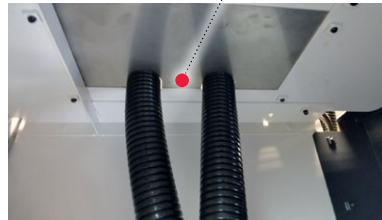


**Connectors suitable for Standard preparation for Kitagawa (Plug and Play):** Pull original cable and connectors into top of cabin and connect to pL LEHMANN connectors.

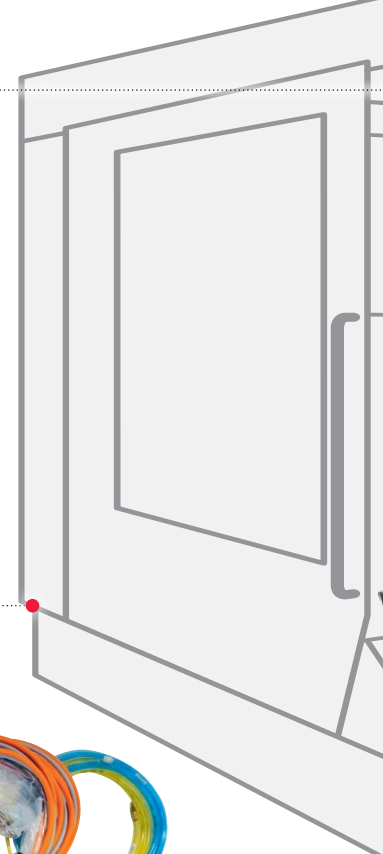
## Connectorless installation, performed through hole in cabin



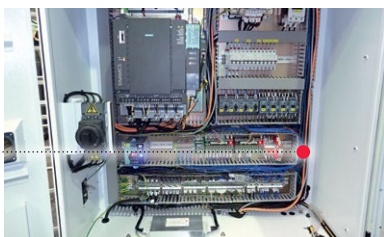
View of outside



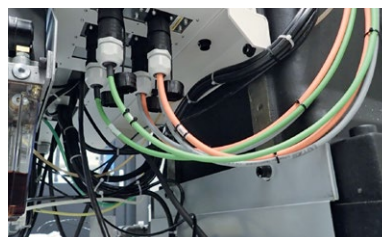
View of inside



## Control cabinet wall penetration, Harting, WDF.xx-S ...



## Control cabinet wall penetration, Clipper, WDF.xx-S



WDFM2-S-2

Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, WMS

MOT, KAB, WDF, CNC

Aligning, GLA, RST, LOZ

Service & Technology

Tooling

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

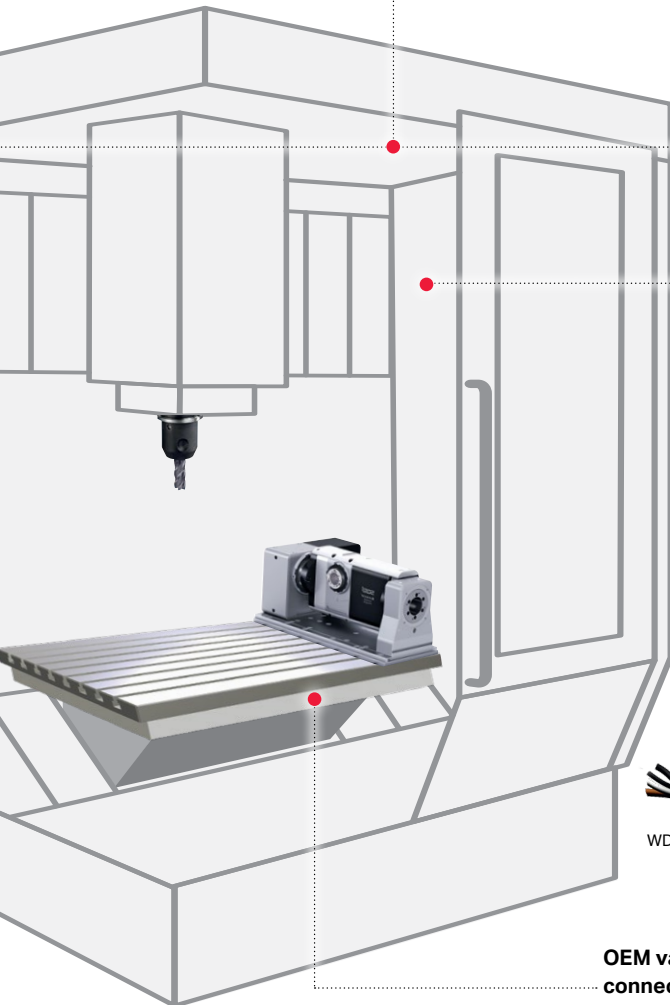
## Cabin wall penetration, round connector (MIL), WDF.xx-R1(z)-S...



WDF.Fx-R1



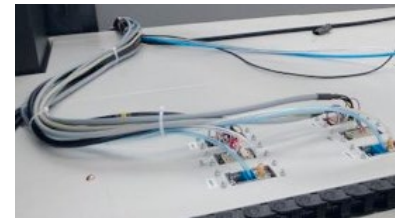
View of outside



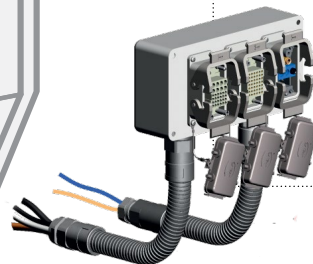
## Harting mating connector (without cable)



WDF.K8 inside



WDF.K8 outside



WDF.xx-K8

## Cabin wall penetration, WDF.xx-K ...



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

Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, WMS

MOT, KAB, WDF, CNC

Aligning, GLA, RST, LOZ

Service & Technology

Tooling

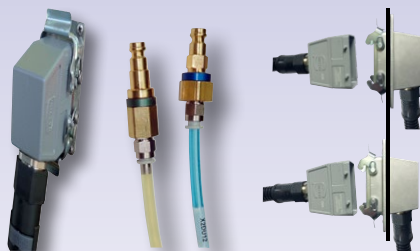
## HARTING K8



(pL-Standard)

all in tight connector housings

## HARTING M4



A cable set is an essential accessory to guarantee imperviousness.

### 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

<b>Connector</b>	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
<b>Motor</b>	F3 = Fanuc α F4 = Fanuc β M1 = Movinor / Mavilor ERN M2 = Movinor / Mavilor EQN MI2 = Mitsubishi HF/HG(-H) SA = Sanyo Y2 = Yaskawa SGMJV / SGMEV, SGM7J OK = Okuma
<b>Cable lengths</b>	Standard = 2 m, 4 m, 6 m Special = 1 m, 3 m, 5 m (additional charge)

### Flexible tubing with splitter

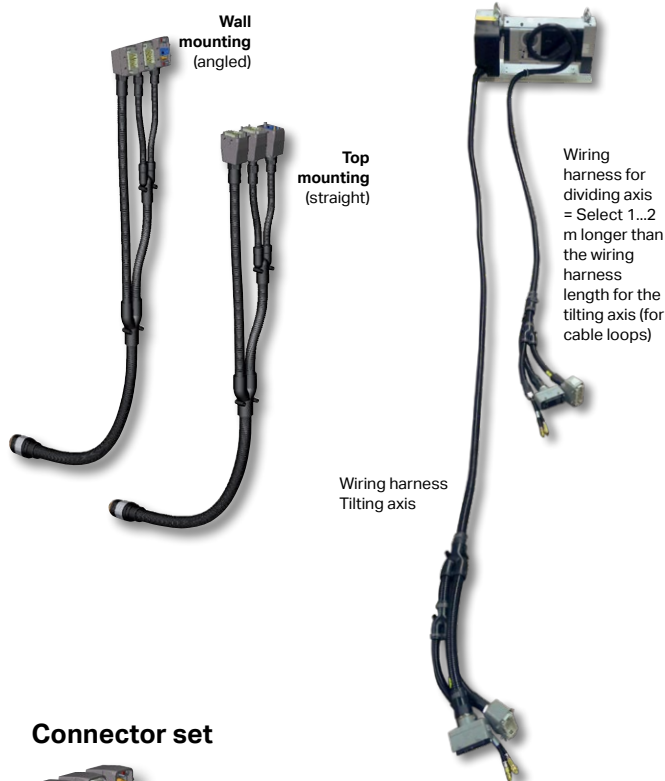
Required when a cable set with free cable ends and connector set STE.xxx is used.

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	Outgoing cable on side
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.DMb	0.76
STE.DMb-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 KAB1Hw	0.42
STE.R1z	MIL round connector 28-11Z/20-29Z	KAB.2H-2, when WMS in add. to KAB1Hw	0.42

## MIL



Electric



Air/oil

## Clipper (FANUC Robodrill Europe)



Electric



Air/oil



## Machine-specific cabling

Item no.	For machine... (ready to plug in)
KAB.F3-1.0-K8w-2	Kitamura Mycenter 2XIF
KAB.F3-1.6-FAbZ-2	Fanuc Robodrill MIL round connector
KAB.F3-4.5-FAa-2	Robodrill Clipper 4th axis, T-type rotary tables
KAB.F3-4.5w-FAa-2	Robodrill Clipper 4th axis, T-type rotary tables
KAB.F3-3.0-FAa-2	Robodrill Clipper, EA-, M-type rotary tables
KAB.F3-3.0-FAa2-2	Robodrill Clipper 5th axis, T-type rotary tables
KAB.F3-1.9-DMa-2	Deckel Maho DMC xx3V, xx4V, xx35V and xx35V eco
KAB.F4-3.0-DOa-2	Doosan 4th axis
KAB.F3-3.0-DOa-2	Doosan 4th axis
KAB.F3-3.0-DOa2-2	Doosan 5th axis
KAB.F3-3.0-HYa-2	Hyundai 4th axis
KAB.F3-2.0-HYaZ-2	Hyundai 5th axis
KAB.F3-3.0-MKaT-2	Makino Slim3
KAB.F3-2.0-MKaSE-2	Makino Slim3
KAB.F3-3.0-MKbT-2	Makino PS95/105
KAB.F3-2.0-MKbSE-2	Makino PS95/105
KAB.F3-3.0-MKcT-2	Makino F
KAB.F3-2.0-MKcSE-2	Makino F
KAB.F4-4.5-FAa-2	Robodrill Clipper 4th axis, T-type rotary tables
KAB.F4-3.0-FAa-2	Robodrill Clipper, EA-, M-type rotary tables
KAB.F4-2.5-FAb-2	Fanuc Robodrill MIL round connector
KAB.M1-0.95-DMa-2	Deckel Maho DMC xx50V, 4th axis
KAB.M1-0.95-DMa2-2	Deckel Maho DMC xx50V, 5th axis
KAB.M1-0.95w-DMa-2	Deckel Maho DMC xx50V, 4th axis
KAB.M1-0.95w-DMa2-2	Deckel Maho DMC xx50V, 5th axis
KAB.M1-1.7-DMa-2	DMG Mori CMX xx00V
KAB.M1-1.9-DMa-2	DMC xx35V(eco) and Milltap 700, 4th axis
KAB.M1-1.9-DMa2-2	DMC xx35V(eco), 5th axis
KAB.M1-1.9w-DMa-2	DMC xx35V(eco) and Milltap 700, 4th axis
KAB.M1-1.9w-DMa2-2	DMC xx35V(eco), 5th axis
KAB.M1-1.7-DMb-2	Deckel Maho DMF and DMU, 4th axis
KAB.M1-1.7-DMb2-2	Deckel Maho DMF and DMU, 5th axis
KAB.M1-1.7w-DMb-2	Deckel Maho DMF and DMU, 4th axis
KAB.M1-1.7w-DMb2-2	Deckel Maho DMF and DMU, 5th axis
KAB.M1-3.0-DMc-2	Deckel Maho Milltap 700 (only when 4th/5th axis)
KAB.M1-3.0w-DMc-2	Deckel Maho Milltap 700 (only when 4th/5th axis)
KAB.M1-3.0-DOa-2	Doosan
KAB.M1-2.0-MIa-2	Mikron VCP 600/800 and VCP1000 Duro
KAB.M1-3.0-MIb-2	Mikron VCE 600 Pro - VCE 1400 Pro
KAB.M1-5.0-MIb-2	Mikron VCE 1600
KAB.M1-1.1-MIc-2	Mikron HSM
KAB.M1-1.5-MIc-2	Mikron HPM
KAB.MI1-3.0-MZa-2	Mazak, 4th axis
KAB.MI2-4.0-MZa-2	Mazak, 4th axis
KAB.MI2-3.0-MZaz-2	Mazak, 5th axis
KAB.OK-3.0-OKa-2	Okuma Genos
KAB.OK-3.0-OKb-2	Okuma MB, 4th axis
KAB.OK-3.0-OKbz-2	Okuma MB, 5th axis
KAB.SA-1.3-BRa-2	Brother Speedio RX1/RX2
KAB.SA-5.0-BRa-2	Brother Speedio SX1/SX2
KAB.SA-6.0-BRa-2	Brother Speedio SX1/SX2
KAB.Y2a-2.5-HUb-2	Hurco 4th axis: Hurco VM1, VM2, VM3, VMX10, VMX24, VMX30, VMX40; 4th/5th axis: VM1, VM2, VM3, VMX10
KAB.Y2-2.5-HUb-2	
KAB.Y2-2.5w-HUb-2	
KAB.Y2-3.5-HUb-2	Hurco 4th axis: Hurco VMX42; 4th/5th axis: VMX24, VMX30, VMX40, VMX42, VMX50, VMX64
KAB.Y2-3.5w-HUb-2	
KAB.Y2-5.0-HUb-2	Hurco 4th axis: Hurco VMX50, VMX60, VMX64, VMX84; 4th/5th axis: VMX60, VMX84
KAB.Y2-5.0w-HUb-2	
KAB.Y2a-5.0-HAa-2	Haas
KAB.Y2-5.0-HAa-2	Haas
KAB.Y2-5.0w-HAa-2	Haas

## Mating plugs / wall penetrations

Item no.	Designation	Weight [kg]	
LOZ.Io	Air/oil		
WDF.K8	Harting Hank8/24	1.37	1
WDF.R1	MIL round connector 28-11N/20-29W		4
WDF.R1z	MIL round connector 28-11Z/20-29Z		4
WDF.WMS	M23, 17-pole		
WDF.WMS-Fx-PCR	M23, 17-pole, Fanuc		
WDF.WMS-MIx-10P	M23, 17-pole, Mitsubishi		
WDF.M1-DOa	Encoder plug for Doosan	0.46	
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		
WDF.MIx-S-2	Control cabinet, per axis for Mitsubishi HF-KP, Hx-(H)		
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		
WDF.M1-M4-2	Cabinet wall, per axis for Fanuc ERN		
WDF.M2-M4-2	Cabinet wall, per axis for Mavilor EQN		
WDF.M2-M4w-2	Cabinet wall, per axis for Mavilor EQN, WMS Endat		
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		
WDF.MIx-K-2	Cabinet wall, per axis for Mitsubishi HF-KP, Hx-(H)		
WDF.MIx-M4-2	Cabinet wall, per axis for Mitsubishi HF-/HG-(H)		
WDF.SIx-M4-2	Cabinet wall, per axis for Siemens DriveCtiQ BR500		
WDF.Io	Air/oil	0.09	
WDF.h	Hydraulics (2 fluted)		

WMS = Angular position measuring system

### 1 Loose mating plugs K8



- 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

### 4 Loose mating plugs MIL



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

Option: Additional cable for retrofitting WMS

KAB.WMS-14.0-o



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

Overview, Applications

System & Facts, IBox

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.



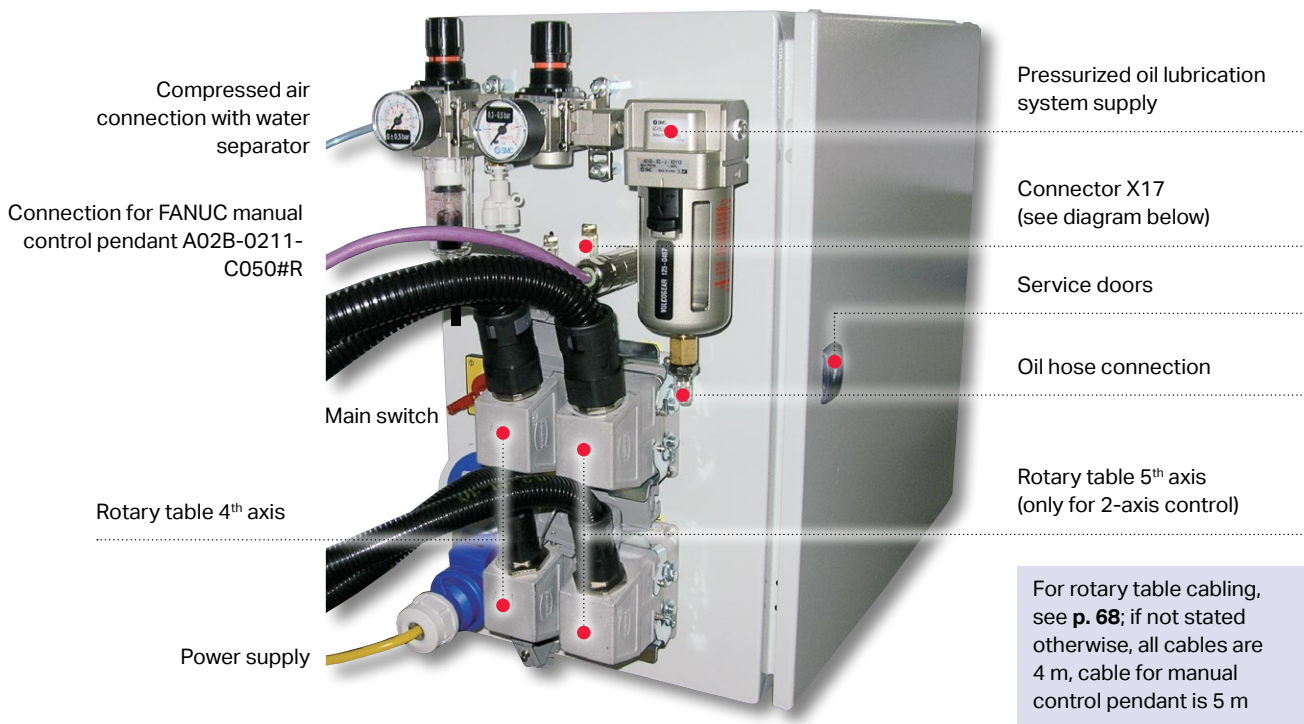
## CNC control system for 1 or 2 axes

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.

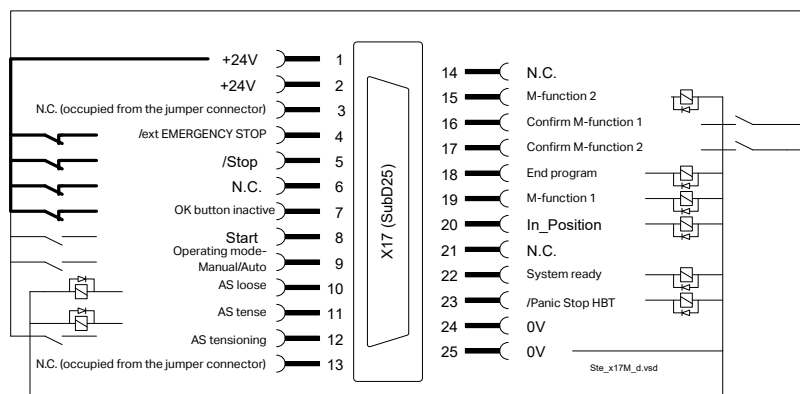
**Control cabinet dimensions** (without connectors):  
230 V version: H = 500, B = 500, T = 300 mm



### Connector X17 for connecting the 4<sup>th</sup> and 5<sup>th</sup> 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
<b>CNC.1AX-FA</b>	CNC control system Fanuc 35iB, 1-axis		see pp. 70/71
<b>CNC.2AX-FA</b>	CNC control system Fanuc 35iB, 2-axis		see pp. 70/71
<b>CNC.MFK</b>	M-function cable	1.05	only in conjunction with CNC.1AX-FA or CNC.2AX-FA
<b>CNC.HaKab-10m</b>	Handycable	1.29	10 m
<b>CNC.WMS-1</b>	Option for angular position measuring system		Only in conjunction with CNC.1AX-FA
<b>CNC.WMS-2</b>	Option for angular position measuring system		Only in conjunction with CNC.2AX-FA
<b>CNC.BAT</b>	Backup battery option	0.05	Only in conjunction with CNC.1AX-FA or CNC.2AX-FA
<b>CNC.Trafo</b>	Transformer	15.11	For Fanuc-CNC (400 V to 200 V)
<b>CNC.TRE</b>	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

<p><b>Angular positioning</b></p>	G91 G00 A45	G91 = Incremental G00 = Rapid traverse A45 = 45° with A-axis	<p><b>Incremental / absolute divisions</b></p>	G91 G00 A45; M00 (cycle stop); A181.567; M00 (cycle stop); A90.987; M00 (cycle stop); G90 A0;	<p><b>Subprogram call</b></p>
<p><b>Circle milling</b></p>	G91 G01 A45 F100	G01 = Feed F = %/min	<p><b>Workpiece zero point offset</b></p>	G53 = Delete zero point offset  G54 = Set zero point offset	<p><b>Delay time</b></p>
<p><b>Unequal divisions</b></p>	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;		<p><b>Continuous turning</b></p>	M04 S0.5; G04 X30000; M05  30 seconds continuous turning in counterclockwise direction at 0.5 [1/min] (only 4 <sup>th</sup> axis)	<p><b>Cycle stop</b></p>
<p><b>Auto reference</b></p>	G28 A00	Moves to reference position	<p><b>M-function</b></p>	M110 M111 M112 M113 M114  Acknowledgeable M-functions, parameterizable	<p><b>Program end</b></p>
					<p><b>Delay time</b></p>
					<p><b>Cycle stop</b></p>
					<p><b>Program end</b></p>

Programming

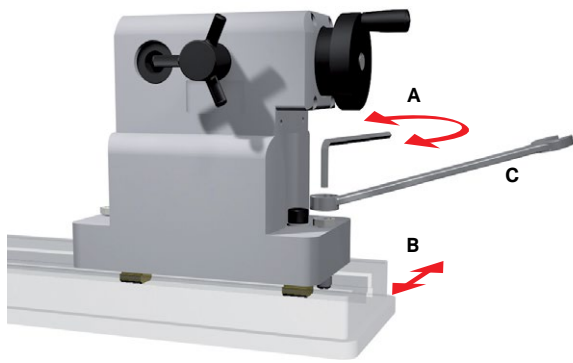
Programming uses the internationally known ISO code.

Programming example 1 – axis:	Programming example 2 – axis:	Example of M-functions	
<pre> %; 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)                     </pre>	<pre> %; 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);                     </pre>	<p><b>CNC machine program</b></p> <pre> N... N1030 G90 G00 X4 Y14 Z40; N1040 M??                     </pre>	<p><b>Fanuc CNC 35iB program</b></p> <pre> %; 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)                     </pre>
		<pre> N1050 G90 G00 X8 Y4 Z30; N1060 M??                     </pre>	<pre> N1070 G90 G00 X16 Y2 Z33; N1080 M??                     </pre>
		<pre> N1090 G90 G00 X16 Y2 Z33; N1100 M30                     </pre>	
		M?? = M-function according to CNC machine	

Overview, Applications  
System & Facts, IBox  
Rotary tables  
SPZ, DDF, WMS  
MOT, KAB, WDF, CNC  
Aligning, GLA, RST, LOZ  
Service & Technology  
Tooling

## 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. Once the desired position is reached, the eccentric screws 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](http://www.lehmann-rotary-tables.com)

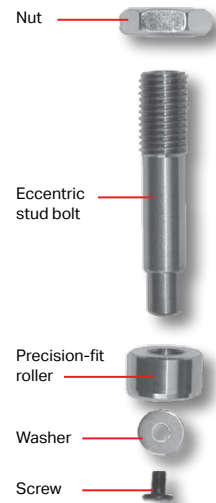
### available for ...



All longFLEX versions



All tailstocks

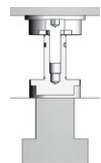


### lineFIX alignment system for T-type rotary tables (not for TIP)

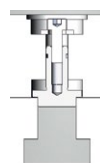


Y-mounting (crosswise)

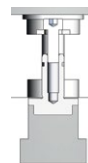
#### Principle of operation



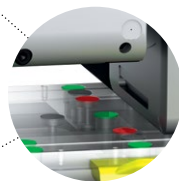
retracted, not used



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



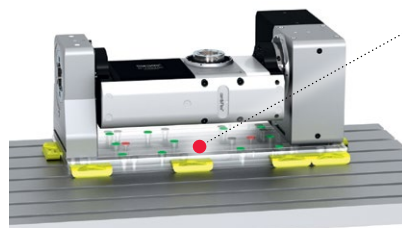
Alignment element in slot 2 (e.g. 18 mm)



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.

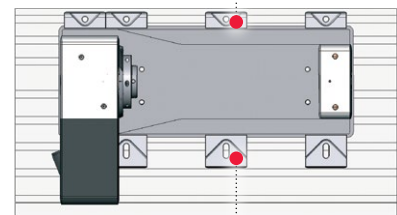
Item no.	Designation	Slot width	Weight [kg]
AUR.iX-12-16	Option (1 pair)	12/16	
AUR.iX-14-18	Standard (1 pair)	14/18	0.03
LOZ.Bride-L	Long clamps, for 63/125 grid pattern*		0.93

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

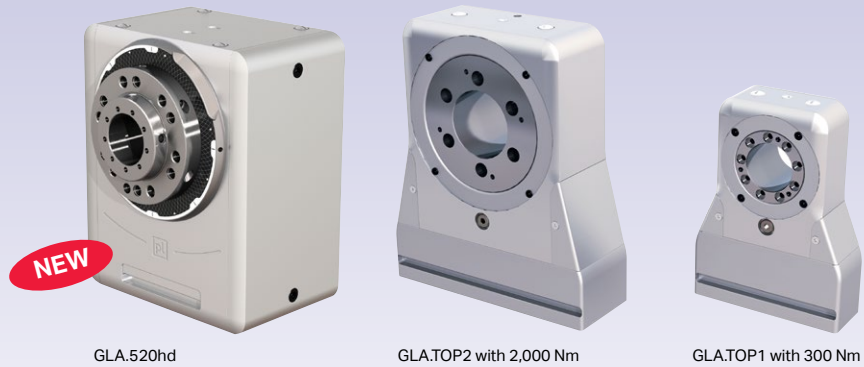
#### Version with clamping claws

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.



## 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	

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

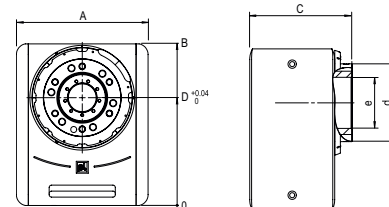
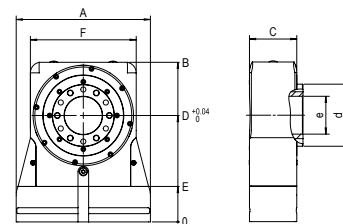
- 3x400 VAC (380–480 V, 50–60 Hz) can be converted to 3x200 VAC (200–280 V, 50–60 Hz)
- Control voltage U = 24 V DC
- Main pressure 10–125 bar

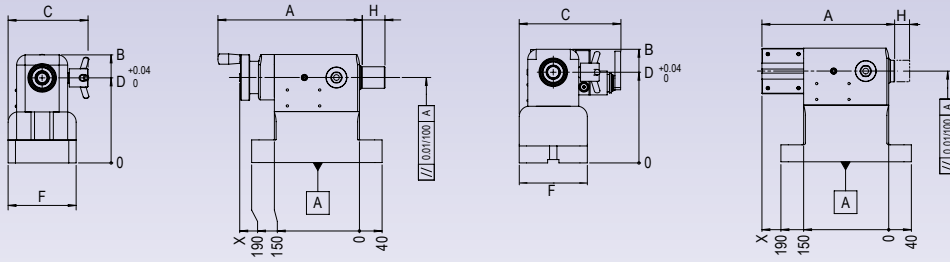
**gripPACK** suitable only for clamping cylinder with 2.5 mm stroke (must be ordered separately)

Item no.	Designation	Technical data	Weight [kg]
AGG.510-ph	Pressure intensifier package, integrated into cover, installed opposite motor (see image)	Clamping / unclamping: Manually via hand switch. No separate compressed air infeed necessary	
AGG.520-ph			

## 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
GLATOP2	AUR.St-12	Alignment T-slot nuts, 1 pair	12g6
	AUR.St-14		14g6
	AUR.St-16		16g6
	AUR.St-18		18g6





measured without load, quill extended halfway

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

Center height D [mm]	Item no.	Designation	A [mm]	B [mm]	C [mm]	F [mm]	H [mm]	manual	pneu-matic <sup>2)</sup>	hydraulic <sup>3)</sup>	Weight [kg]	✗	✓
	110	RST.COM-110m <sup>4)</sup>	COMPACT tailstock	222	128	130	100	30	•			11	
RST.LIG-110m		LIGHT tailstock	255		142		40	•			20		•
RST.LIG-110p <sup>1)</sup>		LIGHT tailstock	225	150	184	120	40		•		20		•
RST.LIG-110h <sup>1)</sup>		LIGHT tailstock	229		168		40			•	24		•
RST.COM-150m <sup>4)</sup>		COMPACT tailstock	222	168	130	100	30	•			16		•
RST.LIG-150m		LIGHT tailstock	255		142		40	•			25		•
RST.LIG-150p <sup>1)</sup>		LIGHT tailstock	238	190	184	120	40		•		25		•
RST.LIG-150h <sup>1)</sup>		LIGHT tailstock	238		168		40			•	29		•
RST.LIG-180m		LIGHT tailstock	255		142		40	•			30		•
RST.LIG-180p <sup>1)</sup>		LIGHT tailstock	238	220	184	120	40		•		30		•
RST.LIG-180h <sup>1)</sup>	LIGHT tailstock	238		168		40			•	34		•	
220	RST.LIG-220m	LIGHT tailstock	255		142		40	•			35		•
	RST.LIG-220p <sup>1)</sup>	LIGHT tailstock	238	260	184	120	40		•		35		•
	RST.LIG-220h <sup>1)</sup>	LIGHT tailstock	238		168		40			•	40		•
	RST.LIG-280m	LIGHT tailstock	255		142		40	•			42		•
280	RST.LIG-280p <sup>1)</sup>	LIGHT tailstock	238	310	184	120	40		•		42		•
	RST.LIG-280h <sup>1)</sup>	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					•
	RST.SPI-MK3s	Fixed center, hardened steel						MK3				0.37	•
	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)

Morse taper size (DIN 228)

– COMPACT = MK 2

– LIGHT = MK 3

<sup>1)</sup> Delivered as standard without manual lever valve. Can be ordered as option.

<sup>2)</sup> Impact force approx. 660...2,000 N at 2...6 bar air pressure

<sup>3)</sup> Impact force approx. 3,800 N at max. 24 bar oil pressure

<sup>4)</sup> Delivered with center height +/-0.01 mm

✗ CANNOT be retrofitted

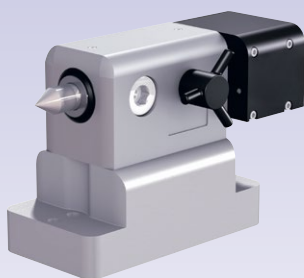
✓ can be retrofitted

## Suitable alignment elements

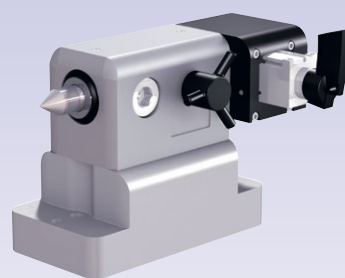
Item no.	Designation	Slot width	Weight [kg]
AUR.zX-12	zentriX alignment pin, 1 pair	12g6	0.10
AUR.zX-14		14g6	0.10
AUR.zX-16		16g6	0.11
AUR.zX-18		18g6	0.12



Manual version (right-hand)

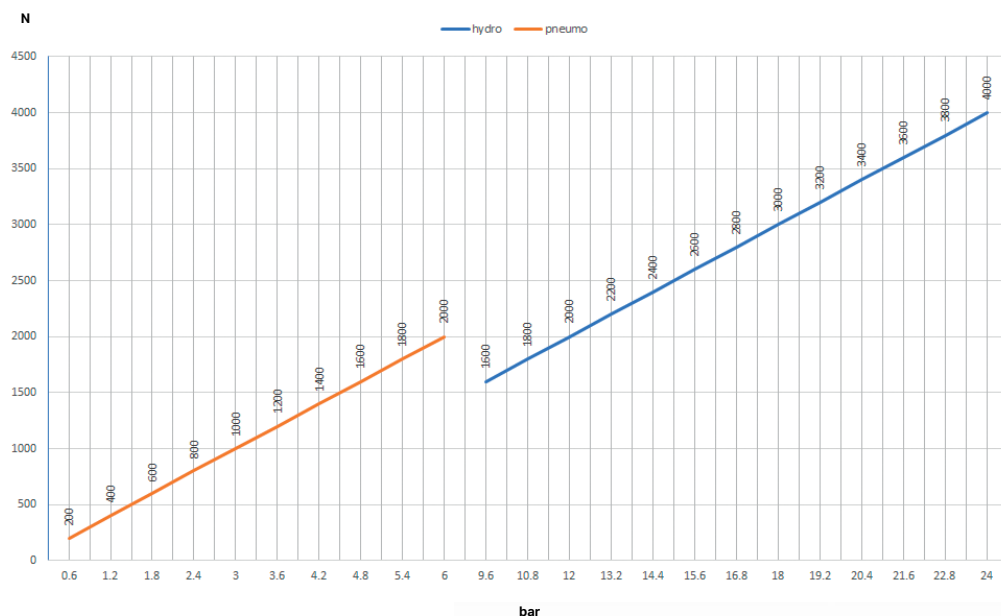


Pneumatic version (right-hand)

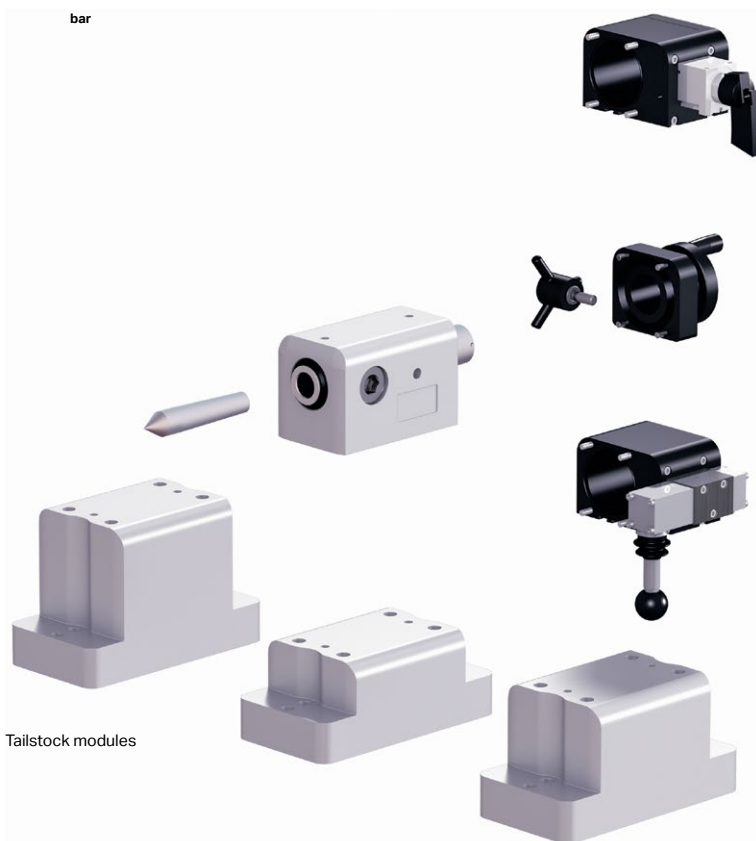


Pneumatic version (right-hand) with manual lever valve (option)

Pressure-force diagram



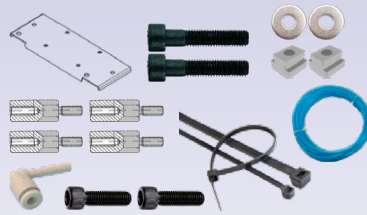
Left-hand model.



Tailstock modules

- Overview, Applications
- System & Facts, IBox
- Rotary tables
- SPZ, DDF, WMS
- MOT, KAB, WDF, CNC
- Aligning GLA, RST, LOZ
- Service & Technology
- Tooling

Everything included



LOZ.FAN-EA



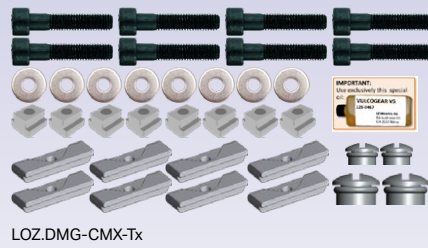
LOZ.5xx-EA

	Item no.	For machine	For product	Weight [kg]						
					Maintenance unit	Gear oil, clamps, steel plugs	Fastening material on machine table (screws, T-slot nuts)	Alignment slot nut (1 pair)	Mating plug	Mating plug, air / oil
50x	LOZ.507-EA		EA-507	2.87	x	x				
	LOZ.507-LFX		longFlex	7.03	x	x				
	LOZ.USB-EA		EA-508 light			x*				
	LOZ.510-EA		EA-510	3.16	x	x				
	LOZ.510-LFX		longFlex	7.41	x	x				
	LOZ.520-EA		EA-520	3.16	x	x				
52x	LOZ.520-LFX		longFlex	7.41	x	x				
	LOZ.530-EA		EA-530	4.01	x	x				
530	LOZ.5x0-EA <sup>o</sup>		EA-510/520.Ox		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, 14 mm				x			
	LOZ.Nute14-Tx		Mx-/Tx, 12 mm				x			
	LOZ.Nute16-EA		EA, 16 mm				x			
	LOZ.Nute16-Tx		Mx-/Tx, 16 mm				x			
	LOZ.Nute18-EA		EA, 18 mm				x			
	LOZ.Nute18-Tx		Mx-/Tx, 18 mm				x			
	LOZ.RST-14		LIGHT tailstock, 14 mm				x			
	LOZ.RST-18		LIGHT tailstock, 18mm				x			
all sizes	LOZ.AKI-Vx-Tx	Akira Seiki Vx	Tx				x			x
	LOZ.AWE-EA	AWEA AF/BM Series	EA				x	x		x
	LOZ.AWE-Tx	AWEA AF/BM Series	Tx				x			x
	LOZ.BRO-22B-Tx	BROTHER TC-22B	Tx							
	LOZ.BRO-32BQT	BROTHER 32BnQT								
	LOZ.BRO-RX1	BROTHER RX1								
	LOZ.BRO-S2D-EA	BROTHER S2Dx	EA							
	LOZ.BRO-SX1-EA	BROTHER S300X1/S500X1/S700X1	EA				x	x		x
	LOZ.BRO-SX1-Tx	BROTHER S300X1/S500X1/S700X1	Tx				x			x
	LOZ.CHE-EA	Chevalier SMART III	EA	0.56			x	x		x
	LOZ.CHI-xZ-Tx	CHIRON DZ, FZ	Tx							
	LOZ.DMG-xxxV	Deckel DMC xxxV	EA	1.74		x	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	x		
	LOZ.DMG-DMF	Deckel DMF				x	x	x		
	LOZ.DMG-DMF (530)	Deckel DMF	EA	1.96 (3.24)		x	x	x		
	LOZ.DMG-DMU	Deckel DMU	EA	1.84		x	x	x		
	LOZ.DMG-JP-EA	DMG Mori CMX xx00V + NVX (JP made)	EA				x	x		
LOZ.DMG-JP-Tx	DMG Mori CMX xx00V + NVX (JP made)	EA				x				
LOZ.DOO-EA	Doosan DNM/DVM/VM & Mynx	EA	1.42			x	x		x	
LOZ.DOO-Tx	Doosan DNM/DVM/VM & Mynx	Tx				x			x	
LOZ.DOO-VC-EA	Doosan VC430/VC510	EA				x			x	

\* without gear oil

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

# Everything included



Item no.	For machine	For product	Weight [kg]	Maintenance unit	Gear oil, clamps, steel plugs	Fastening material on machine table (screws, T-slot nuts)	Alignment slot nut (1 pair)	Mating plug	Mating plug, air / oil
<b>LOZ.FAN-EA</b>	Fanuc Robodrive	EA				x			
<b>LOZ.FAN-Tx</b>	Fanuc Robodrive	Tx	1.65			x			
<b>LOZ.HAA-EA</b>	Haas	EA				x			
<b>LOZ.HAA-Tx</b>	Haas	Tx/Mx				x			
<b>LOZ.HAR-EA</b>	Hardinge V480/710	EA				x	x		x
<b>LOZ.HAR-Tx</b>	Hardinge V480/710	Tx				x			x
<b>LOZ.HAR-GX-EA</b>	GX Series and Hardinge V1000	EA	0.86			x	x		x
<b>LOZ.HAR-GX-Tx</b>	GX Series and Hardinge V1000	Tx				x			x
<b>LOZ.HUR-VMX.1a</b>	HURCO VMX24/30								
<b>LOZ.HUR-VMX.2a</b>	HURCO VMX24/30								
<b>LOZ.HUR-VMX.2b</b>	HURCO VMX42								
<b>LOZ.HWA-VESTA-EA</b>	HWACHEON VESTA	EA				x	x		x
<b>LOZ.HWA-HIT-Tx</b>	HWACHEON HIT400	Tx				x			x
<b>LOZ.HYU-EA</b>	Hyundai WIA F	EA	0.70			x			x
<b>LOZ.HYU-Tx</b>	Hyundai WIA F	Tx				x			x
<b>LOZ.HYU-IC-EA</b>	Hyundai WIA iCUT	EA				x			x
<b>LOZ.HYU-IC-Tx</b>	Hyundai WIA iCUT	Tx				x			x
<b>LOZ.HYU-KF-EA</b>	Hyundai WIA KF	EA				x	x		x
<b>LOZ.HYU-KF-Tx</b>	Hyundai WIA KF	Tx				x			x
<b>LOZ.M10-EA</b>	BROTHER 32BnQT, R650X1	EA				x*			
<b>LOZ.M10-Tx</b>	BROTHER 32BnQT, R650X1	Tx				x			
<b>LOZ.MAK-PS-EA</b>	Makino PS95/105	EA				x	x		x
<b>LOZ.MAK-SLI-EA</b>	Makino Slim3n	EA				x			
<b>LOZ.MAK-SLI-Tx</b>	Makino Slim3n	Tx	0.66			x			
<b>LOZ.MAZ-VCP-EA</b>	Mazak VCP (without APC)	EA				x	x		x
<b>LOZ.MAZ-VCP-2EA</b>	Mazak VCP (with APC)	2 x EA or 2 x M				x			x
<b>LOZ.MAZ-VCx-EA</b>	Mazak VCS/VCN	EA				x	x		x
<b>LOZ.MAZ-VCx-Tx</b>	Mazak VCS/VCN	Tx							
<b>LOZ.MAZ-VTC-EA</b>	Mazak VTC	EA				x	x		x
<b>LOZ.MAZ-VTC-Tx</b>	Mazak VTC	Tx				x			x
<b>LOZ.MIC-Tx</b>	Microlution ML10	Tx							
<b>LOZ.MIK-HxM</b>	Mikron HSM/HPM	EA	1.74		x	x	x		
<b>LOZ.MIK-VCE</b>	Mikron VCE			x	x	x	x		
<b>LOZ.MIK-VCE-530</b>	Mikron VCE			x	x	x	x		
<b>LOZ.MIK-VCE-Tx</b>	Mikron VCE	Tx		x	x	x			
<b>LOZ.OKU-EA</b>	Okuma MB and Genos	EA				x	x		x
<b>LOZ.PRI-EA</b>	Priminer (Kaast) VxL	EA				x	x		x
<b>LOZ.PRI-Tx</b>	Priminer (Kaast) VxL	Tx	1.94			x			x
<b>LOZ.PRI-V6-EA</b>	Priminer (Kaast) V6L	EA				x	x		x
<b>LOZ.QUA-EA</b>	Quaser MV	EA	0.49			x			
<b>LOZ.QUA-Tx</b>	Quaser MV	Tx	1.70			x			
<b>LOZ.ROK-EA</b>	RokuRoku CEGA	EA				x	x		x
<b>LOZ.STA-EA</b>	STAMA MC331	EA		x	x <sup>2</sup>				
<b>LOZ.STA-Tx</b>	STAMA MC331	Tx		x	x <sup>2</sup>				
<b>LOZ.TON-EA</b>	Tongtai VU-5	EA				x			
<b>LOZ.TON-Tx</b>	Tongtai VU-5	Tx				x*			
<b>LOZ.WEL-EA</b>	Wele AQ	EA				x	x		x
<b>LOZ.WEL-Tx</b>	Wele AQ	Tx				x			x
<b>LOZ.WER-EA</b>	WERTH Messtechnik (51x-52x)	EA			x <sup>1</sup>				
<b>LOZ.WER-T1</b>	WERTH Messtechnik	T1			x <sup>1</sup>				
<b>LOZ.WER-TF</b>	WERTH Messtechnik	TF			x <sup>1</sup>				

\* incl. LOZ.Bride-L

<sup>1</sup> without gear oil

<sup>2</sup> without clamping claws

Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, WMS

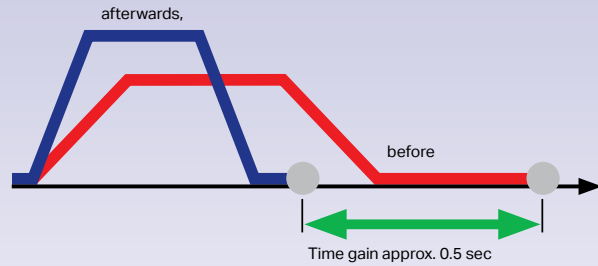
MOT, KAB, WDF, CNC

Aligning GLA, RST, LOZ

Service & Technology

Tooling

We support you from A to Z, whether you have problems or when it's a matter of optimization



optimization of the cycle time (CMS position)

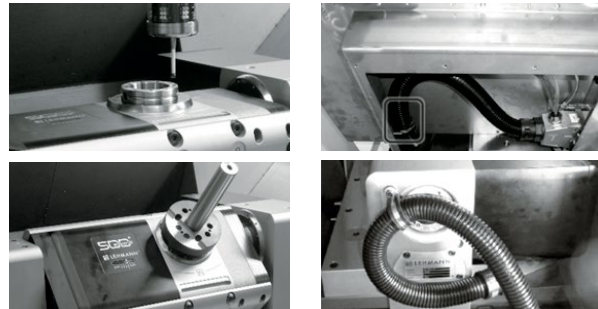
### Commissioning Service

Commissioning of new machines with controls from Siemens, Heidenhain, Fanuc, Brother, Hurco, Mitsubishi, Haas, Mazak, Okuma. In addition to **basic commissioning** (see p. 83), we optimize for positioning and simultaneous operation through our application support on request.

**Goal**

Improved application, optimal adjustment of rotary table and machine, higher productivity

For item no., see p. 84



3-D measurement

Mech. + electr. installation

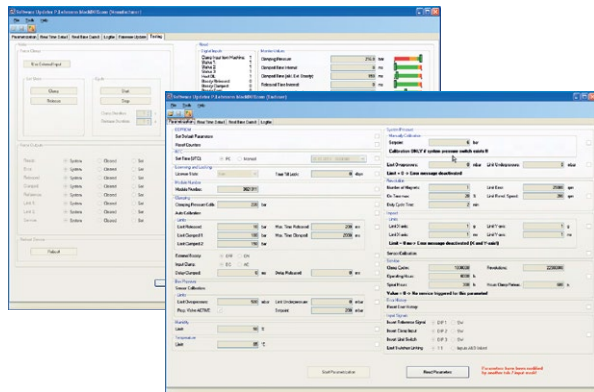
### Helpline Service

Telephone service from 7:30 a.m. – 12:00 noon and 2:00 p.m. – 5:00 p.m. as well as 24-h/5-day telephone service for all pL service centers

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

**Goal**

To help quickly, competently and unbureaucratically



Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, WMS

MOT, KAB, WDF, CNC

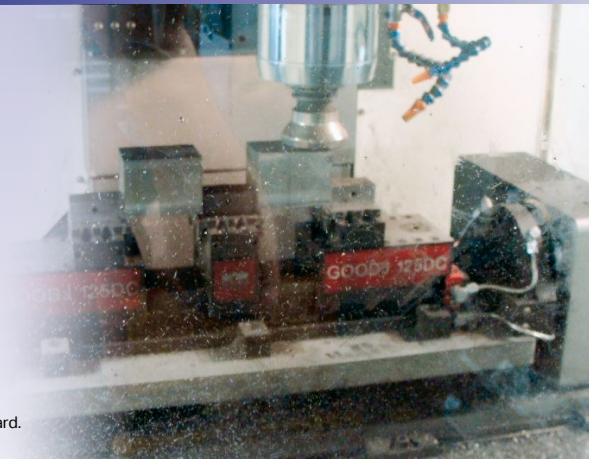
Aligning, GLA, RST, LOZ

Service & Technology

Tooling



Maximum productivity requires that your application be taken in account – we can help you



Optimally clamped? We can also provide on-site assistance in this regard.

## Application Support

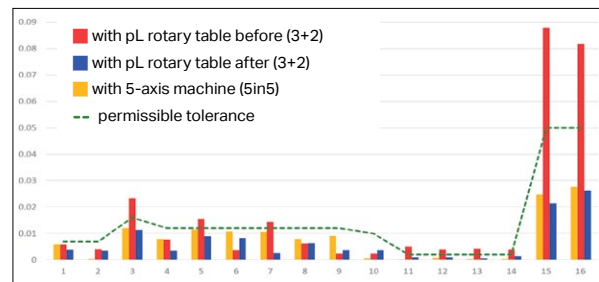
Experience has shown: A considerable improvement in time needed per piece and workpiece accuracy are almost always possible.

- Clamping the workpiece correctly, optimizing machining processes
- Improving workpiece accuracy (alignment, 0-point...)
- Fine-tuning of drives and CNC parameterization

### Goal

To extract the maximum, improve efficiency, lower workpiece costs, increase workpiece accuracy

For item no., see **p. 84**



Errors at the measuring points before and after APS precision for 3-D machining.

### Examples from actual practice:

#### A. Maximization of productivity

1. Clamping deactivated when necessary
  - Reason: Production of small parts
  - Result: Productivity increased significantly
2. Speed increased from 12 to 58 rpm
  - Reason: Non-optimal commissioning by OEM
  - Result: Cycle time shortened noticeably
3. 'Catalog' values (maximum values) set; at the same time, acceleration reduced by 30% (high moment of inertia)
  - Reason: Non-optimal commissioning by OEM
  - Result: Cycle time shortened noticeably, speed increased
4. Parameters adjusted on the basis of pL calculations, idle times reduced from 100 ms to 10 ms, clamping deactivated sometimes
  - Reason: Maximum possible optimization of time needed per piece
  - Result: Time needed per piece before 60 s, after 40 s; productivity increased 33%
5. Parameters for interpolation optimized, clamping idle times reduced from 500 ms to 10 ms / 1000 ms to 300 ms
  - Reason: Making machining an impeller possible with a 3+2 machine concept
  - Result: Duty cycle 100% and impeller production possible, cycle time shortened noticeably

#### B. Prevention of future damage/hazards

1. 'Unclamping' reduced from 300 ms to 100 ms
  - Reason: Unnoticed product flaw (pL)
  - Result: Cycle time shortened noticeably
2. Assignment of B/C-axis clamp/unclamp macros corrected
  - Reason: Incorrect commissioning by OEM
  - Result: Future production downtime prevented
3. Control OFF set after spindle 'clamped'
  - Reason: Incorrect commissioning by OEM
  - Result: Future production downtime prevented

#### C. Optimization of workpiece accuracy

1. Positioning accuracy optimized from 100 to 10 increments
  - Reason: Incorrect commissioning by OEM
  - Result: Noticeably more accurate workpieces
2. Lag after servo OFF eliminated, position drift stopped
  - Reason: Incorrect commissioning by OEM
  - Result: Faulty workpieces during volume production prevented
3. Alignment and 0-point correction of the rotary table
  - Reason: Careless assembly by OEM
  - Result: Volumetric accuracy improved considerably

Overview,  
Applications

System &  
Facts, IBox

Rotary  
tables

SPZ,  
DDF, WMS

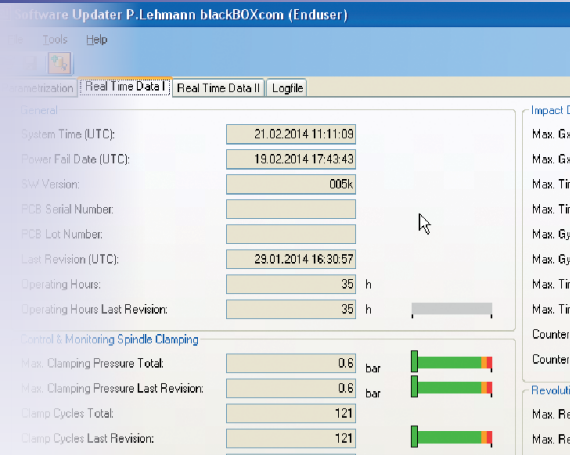
MOT, KAB,  
WDF, CNC

Aligning,  
GLA, RST, LOZ

Service  
& Technology

Tooling

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



## activeService<sup>1)</sup>

<sup>1)</sup> 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

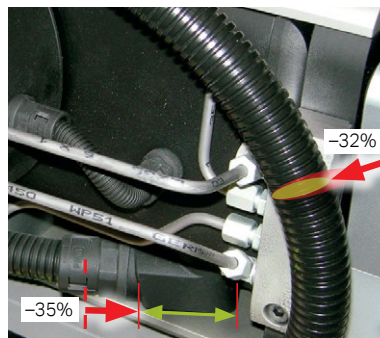
- Without maintenance contract
- We schedule the region on our own
- Then notify the intended customers of the pending visit
- Customers can decide yes or no

### Goal

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

Technischer Kundendienst		R-Nr.	R14-1220				
Erfüllungsort Peter Lehmann AG (extern) Bäraustrasse 43 CH-3652 Bärau		A-Nr.	M40789-081				
dir. Tel/Mail Hr. Mamet: 032 930 83 16		Masch.					
R-Adresse COMADUR SA, Le Locle		CNC					
Arbeiten							
Code	Element	X	Tätigkeit	X	Tätigkeit	X	Tätigkeit
10	Anlage		reinigen		ausmessen		ausrichten
11	Anlagendokumentation		korrigieren		nachführen		
12	Anlagenerschleibe		kontrollieren		einachtfen		ersetzen
13	Bereichsabsicherung		kontrollieren		einstellen		ersetzen
14	blackBOX		testen		Fehler analys.		ersetzen
45	Guardy		testen		Fehler analys.		reparieren
47	Braky		testen		Fehler analys.		ersetzen
15	Drehdurchführung		kontrollieren		abdichten		ersetzen
48	Drucksensor		testen		ersetzen		
36	EROWA / Mecapool		kontrollieren		ausrichten		reparieren

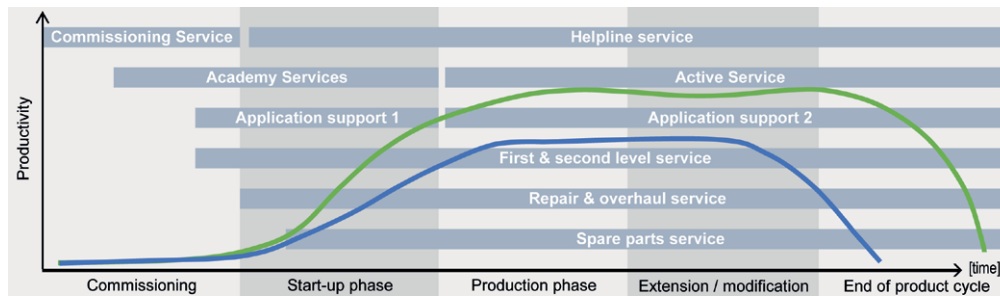
Status report with recommendation



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

Working productively and without problems from day 1: the correct commissioning is decisive



Investigations have shown that 70% of problem situations during the warranty period can be prevented through careful and professional commissioning. At the same time, it was

obvious that productivity could be increased significantly through use of application service. Make use of our services!

## Basic commissioning

### Goal

Rotary cable connected and parameterized, ready for production

### Activities

- Mechanical assembly of the rotary table on the machine table
- Alignment of the rotary axes with respect to the main axes of the machine
- Kinematics setting/check
- Electrical connection of the rotary table on the machine
- Basic parameterization using pL parameter lists, at least with usual values, but possibly to customer requirements
- Brief customer training

### Prerequisite

- Machine must be prepared appropriately (servo, control cabinet cabling, connectors, PLC, CNC with readily available 4<sup>th</sup> and/or 5<sup>th</sup> axis/axes; or can be ordered from pL LEHMANN (depending on machine; PLC not possible)
- During commissioning, a qualified technician from the machine supplier may need to be present (parameter adjustments, possibly adjustment of the PLC etc.); organized and paid by customer, contact us with the request.

## Commissioning of servopack

### Goal

Connection of the rotary table and adjustment to customer requirements if possible, incl. integration of the Servopack retrofit kit

### Activities

- ServoPack installation with cabling in control cabinet up to enclosure wall
- Mechanical assembly of the rotary table on the machine table
- Alignment of the rotary axes with respect to the main axes of the machine
- Kinematics setting/check
- Electrical connection of the rotary table on the machine
- Basic parameterization using pL parameter lists, at least with usual values, but possibly to customer requirements
- Brief customer training

### Prerequisite

- Machine must be prepared appropriately (CNC has readily available 4<sup>th</sup> and/or 5<sup>th</sup> axis, PLC is prepared)
- During commissioning, a qualified technician from the machine supplier may need to be present (parameter adjustments, possibly adjustment of the PLC etc.); organized and paid by customer, contact us with the request.



Overview,  
Applications

System &  
Facts, IBox

Rotary  
tables

SPZ,  
DDF, WMS

MOT, KAB,  
WDF, CNC

Aligning,  
GLA, RST, LOZ

Service  
& Technology

Tooling



## Commissioning of M-function

### Goal

FANUC 35i linked to machine's CNC via M-function

### Activities

- Cabling from the FANUC 35i to the interface on the machine's CNC
- Function test and brief training of the operator
- Linking of EMERGENCY STOP, if possible

### Prerequisite

- Machine and CNC must be prepared appropriately (readily available M-function)

### Note

Please note that we offer training for the operation of the Fanuc 35iB controller in our Academy.

## Application support

### Goal

Rotary table settings optimized for customer application (time optimization and/or accuracy improvement)

### Activities

- Calculation based on rotary table and workpiece (what is possible)
- Check of the geometry, and correct as much as possible
- Check whether the clamping control functions correctly and is not active before the intended position is actually reached
- Check of dividing/indexing errors (0-90° relatively simple; possibly with portable measuring instrument)
- Check of clamping/load placement (no overly eccentric loads, improper clamping), and of the machining sequence and the control response (smooth control)
- Adjustment of gear backlash and pitch error
- Optimization for specific workpiece, incl. clamping device and machining strategy (may require considerably more effort for simultaneous machining; invoiced separately)
- Kinematics setting/check
- Expenses such as travel time, travel costs, hotel and meals are calculated on the basis of actual cost

### Prerequisite

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

	Item no.	Data	Description
EA-type rotary table	INB.1AX-APS	max. 15 h, 1-axis	Application support
	INB.1AX-CMS	basic, max. 10 h, 1-axis	Commissioning of integrated axes
	INB.1AX-SP	max. 15 h, 1 axis	Commissioning of servopack
T-type rotary table	INB.2AX-APS	max. 20 h, 2-axes	Application support
	INB.2AX-CMS	basic, max. 15 h, 2-axis	Commissioning of integrated axes
	INB.2AX-SP	max. 20 h, 2 axis	Commissioning of servopack
with pL CNC	INB.MF	max. 15 h on-site	Commissioning of M-function





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.

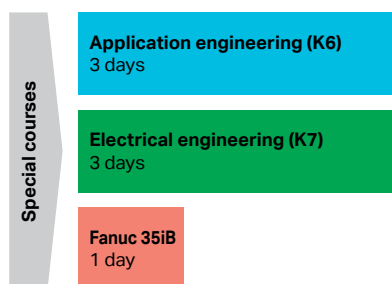
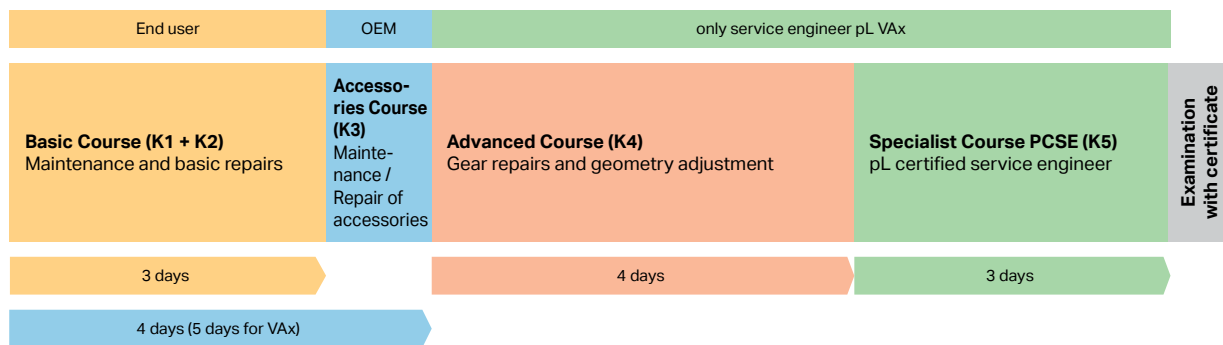
### Goal

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, Applications
- System & Facts, IBox
- Rotary tables
- SPZ, DDF, WMS
- MOT, KAB, WDF, CNC
- Aligning, GLA, RST, LOZ
- 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

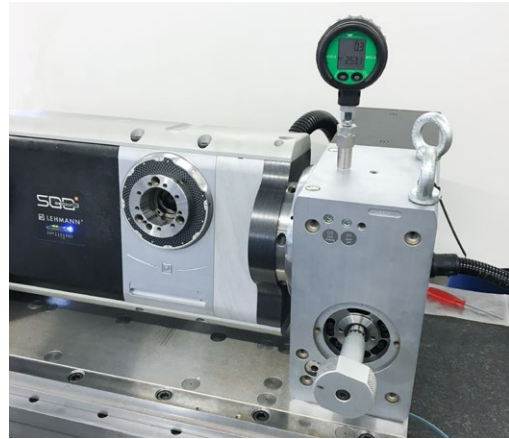
#### Basic Course – for Helpline and maintenance technicians (K1 + K2)

**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!**



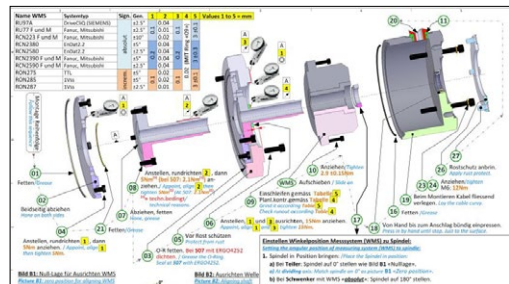
Checking the clamping pressure correctly

#### 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

Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, WMS

MOT, KAB, WDF, CNC

Aligning, GLA, RST, LOZ

Service & Technology

Tooling



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

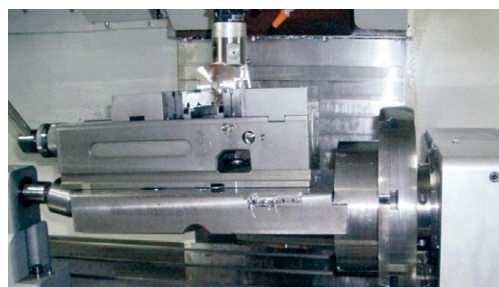
**Prerequisite:** Practical experience in operating and programming machine tools

### Course goal:

- Operation of our Fanuc 35iB control

### Product line 900

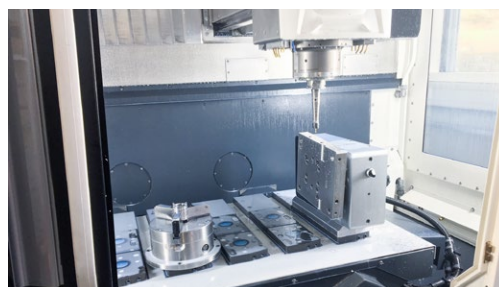
Coming soon after market introduction



Massive crash – a case for the pL professional



Measuring correctly



Application of a 4<sup>th</sup> axis on a 3-axis machining center



Fanuc 35iB manual control pendant

Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, WMS

MOT, KAB, WDF, CNC

Aligning, GLA, RST, LOZ

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**



Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, WIMS

MOT, KAB, WDF, CNC

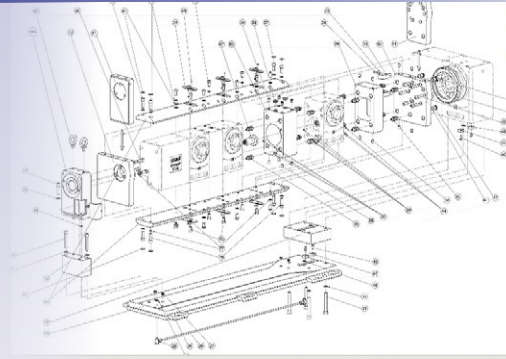
Aligning, GLA, RST, LOZ

Service & Technology

Tooling



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



Web shop example

ModellNr.	Position	Bezeichnung	Bemerkung	Bestand	Preis in CHF	Menge
120-0963	03	Rohrschelle	NW23, schwarz	91 Stück	3,00	- 2 +
120-1928	58	Verschlußzapfen	M10x1,5	877 Stück	3,00	- 1 +



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



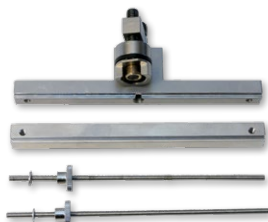
WZP.MANO.30



WZP.WMS



WZP.ZRSP



CNC.Tablet



Overview,  
Applications

System &  
Facts, IBox

Rotary  
tables

SPZ,  
DDF, WMS

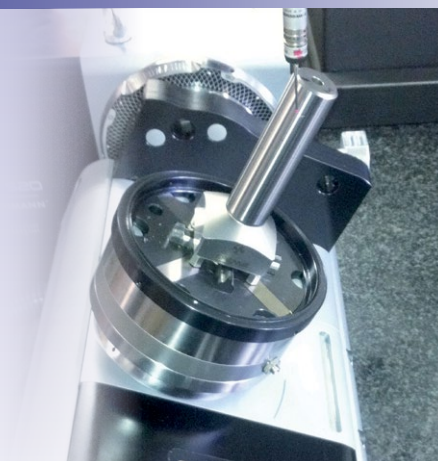
MOT, KAB,  
WDF, CNC

Aligning,  
GLA, RST, LOZ

Service  
& Technology

Tooling

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



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

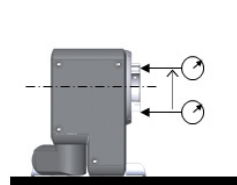
**The tolerances given below apply under the following conditions:**

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**

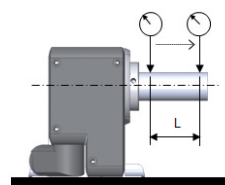


**Perpendicularity**  
Spindle surface to support surface



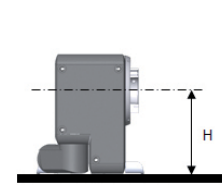
0.01/100 mm (0.005/100 mm)

**Parallelism**  
Spindle axis with support surface



0.01/100 mm (0.005/100 mm)

**Center height**

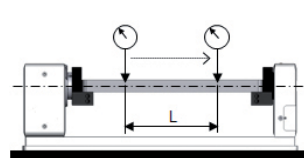


0...0.04 mm

**Geometry of EA rotary tables with rotoFIX**

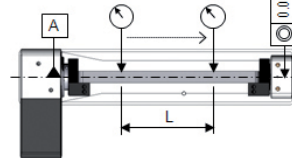


**Parallelism with support surface**



0.007/100 mm (0.0035/100 mm)

**Parallelism with tilting axis**



0.007/100 mm (0.0035/100 mm)

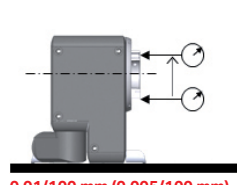
For longFLEX, see p. 37

**Geometry of M-type rotary tables**



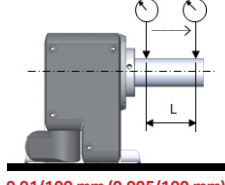
on request

**Perpendicularity**  
Spindle surface to support surface



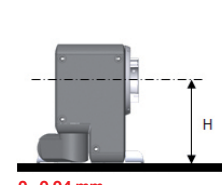
0.01/100 mm (0.005/100 mm)

**Parallelism**  
Spindle axis with support surface



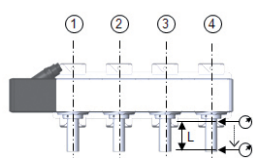
0.01/100 mm (0.005/100 mm)

**Center height**



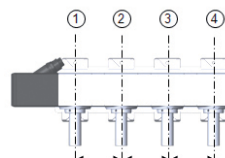
0...0.04 mm

**Axis parallelism**  
Spindle 2, 3 and 4 to spindle 1



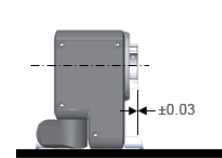
0.01/100 mm (0.005/100 mm)

**Axis distance**  
X1, X2 and X3



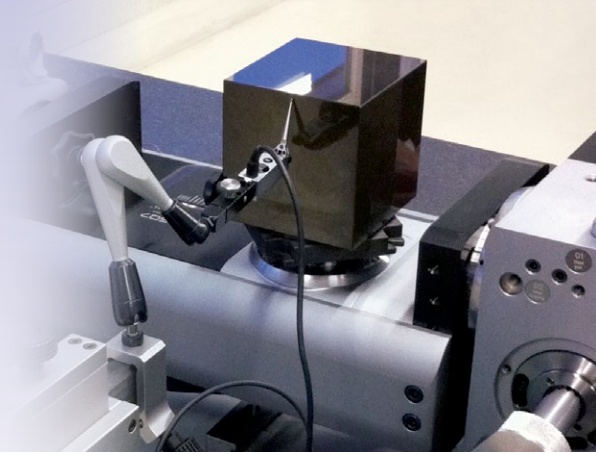
± 0.02 mm (± 0.01 mm)

**Depth difference of the spindles**



± 0.03

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

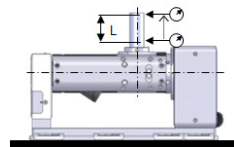


( ) values = increased accuracy. Item no.. GEO.5xx-GEN

### Geometry of TF and T1 rotary tables

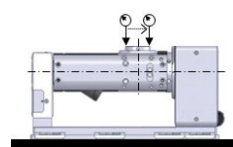


**Perpendicularity**  
Dividing/indexing axis to swiveling/tilting axis



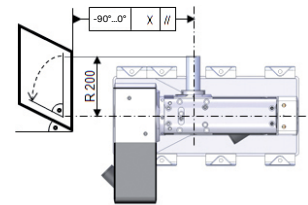
0.01/100 mm (0.005/100 mm)

**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°

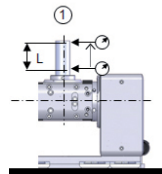


0.01/R150 mm (0.005/R150 mm);  
applies only to T1)

### Geometry of T2...3 rotary tables

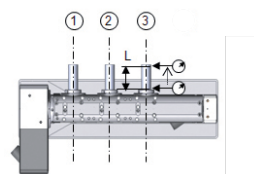


**Perpendicularity**  
Dividing/indexing axis to tilting axis of spindle 1



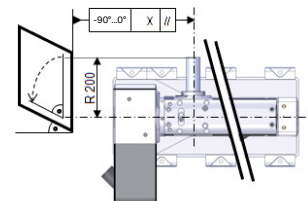
0.01/100 mm (0.005/100 mm)

**Axis parallelism**  
Spindle 2 and 3 to spindle 1



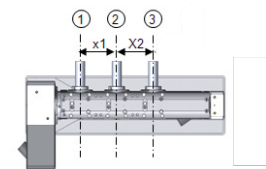
0.01/100 mm (0.005/100 mm)

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



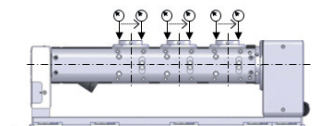
0.01/R150 mm (0.01/R150 mm)

**Axis distance**  
X1, X2 and X3



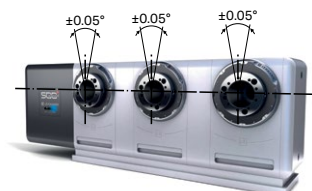
± 0.02 mm (± 0.01 mm)

**Parallelism**  
Spindle surface to support surface



0.01/100 mm (0.005/100 mm)

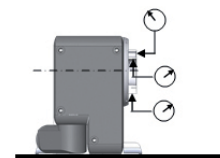
### For M- and T-type rotary tables



### 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)

- Overview, Applications
- System & Facts, IBox
- Rotary tables
- SPZ, DDF, WIMS
- MOT, KAB, WDF, CNC
- Aligning, GLA, RST, LOZ
- Service & Technology
- Tooling

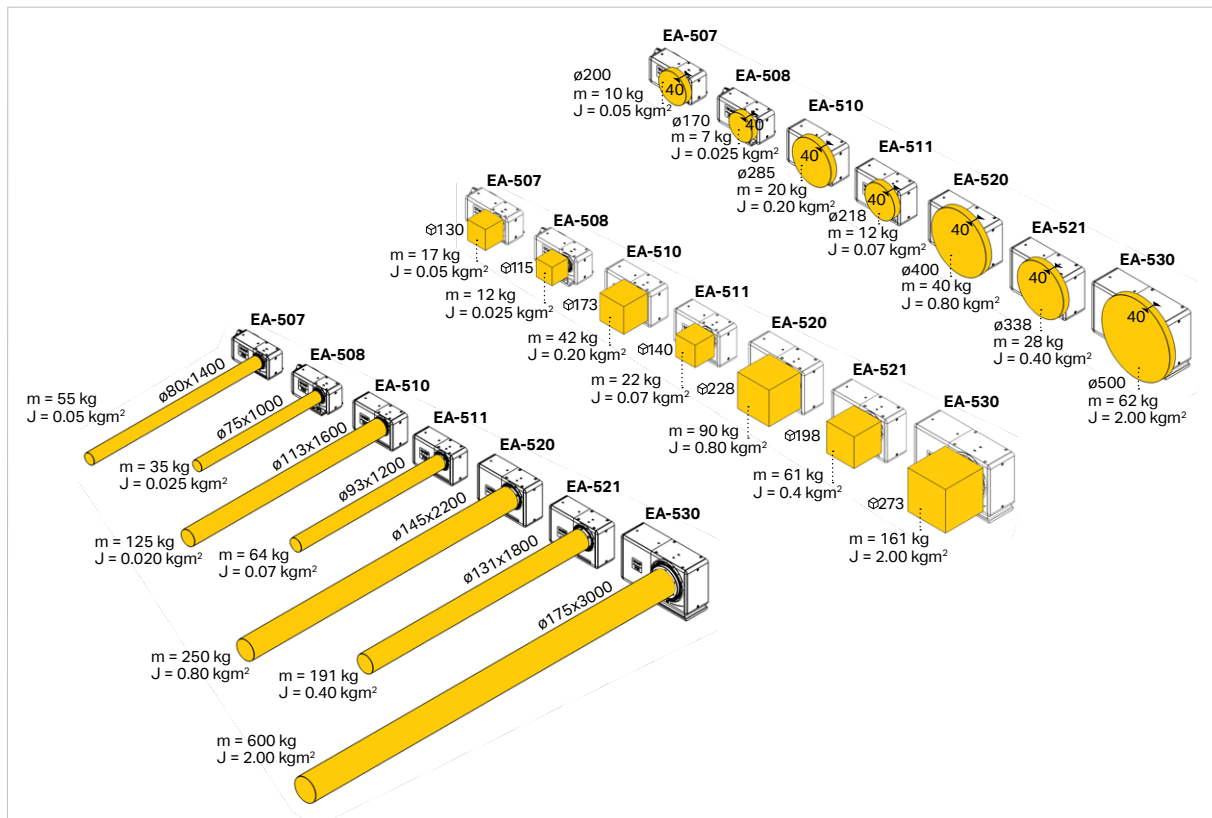
## Basics of the drive data

All drive data of pL LEHMANN rotary tables (pp. 30–53) have been designed for the following standard spindle loads in accordance with DIN/VDE 0530 as follows:

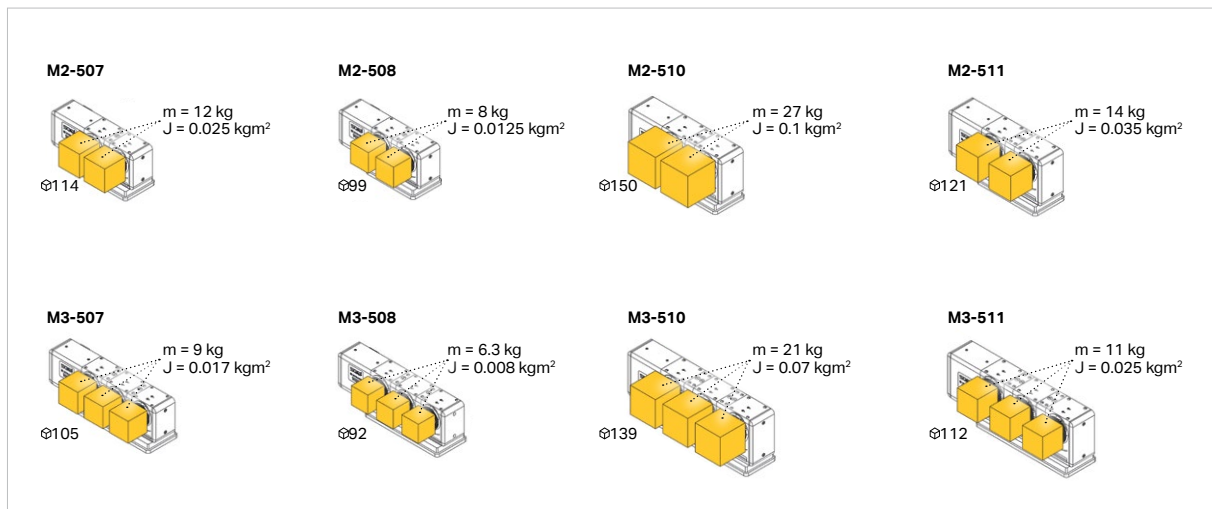
- For intermittent service S3 duty cycle 20%
- Cycle duration 1 minute

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

### EA-type rotary table



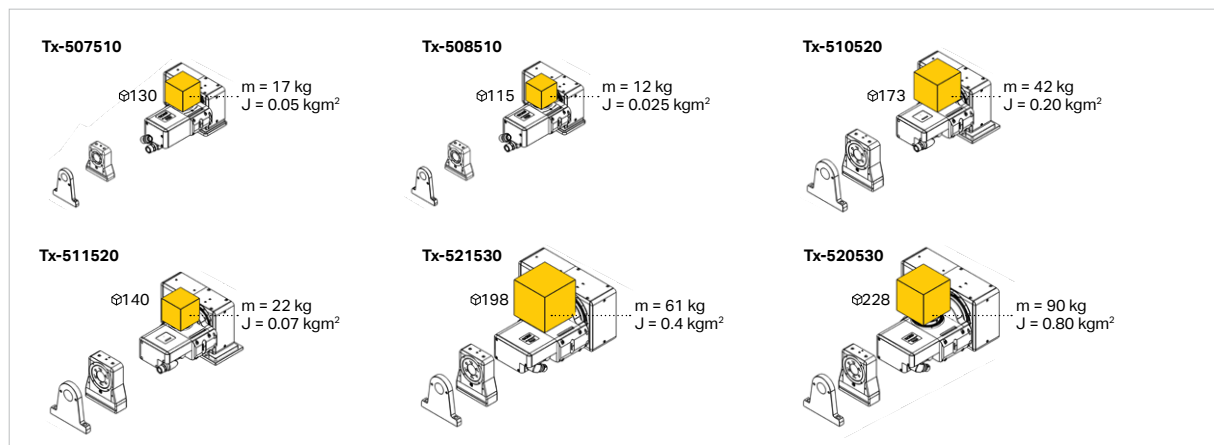
### Mx-type rotary tables



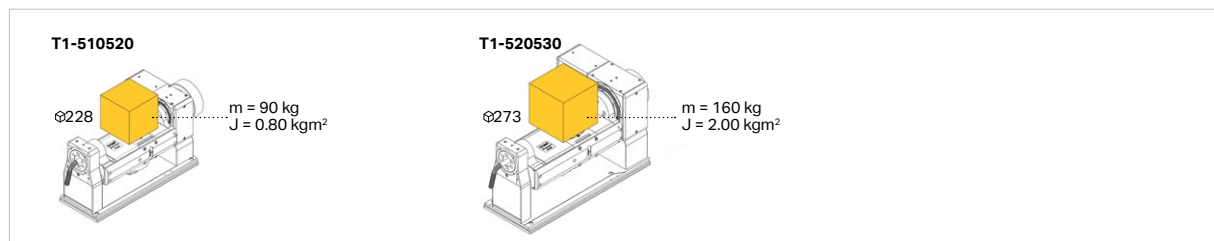
## Reference values for duty cycle (ED)

- 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 %.

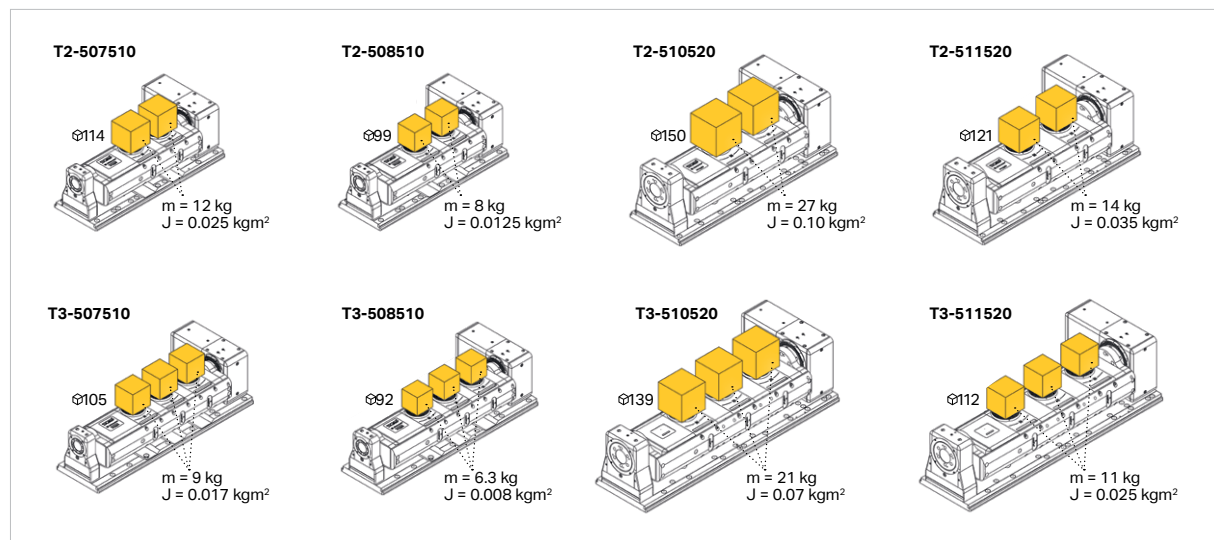
### Tx-type rotary tables (TIP, TAP, TOP)



### T1-type rotary tables (TGR)



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



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



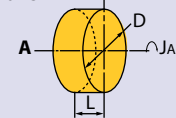
It is not only the weight which counts; shape and position are also often decisive factors

### 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**

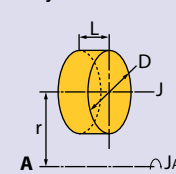


**D:** Outside diameter of the round bar [m]  
**L:** Length of the round bar [m]  
**p:** Density [kg/m<sup>3</sup>]  
**m:** Mass of the round bar [kg]  
**J<sub>A</sub>:** Moment of inertia [kgm<sup>2</sup>]

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

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

**Center of gravity outside rotary axis**



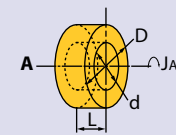
**D:** Outside diameter of the round bar [m]  
**L:** Length of the round bar [m]  
**r:** Turning radius [m]  
**p:** Density [kg/m<sup>3</sup>]  
**m:** Mass of the round bar [kg]  
**J<sub>A</sub>:** Moment of inertia of the round bar at center A [kgm<sup>2</sup>]  
**J:** Moment of inertia [kgm<sup>2</sup>]

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

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

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

**Center of gravity in rotary axis**

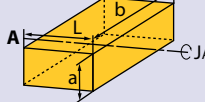


**D:** Outside diameter of the cylinder [m]  
**d:** Bore diameter of the cylinder [m]  
**L:** Length of the round bar [m]  
**p:** Density [kg/m<sup>3</sup>]  
**m:** Mass of the cylinder [kg]  
**J<sub>A</sub>:** Moment of inertia [kgm<sup>2</sup>]

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

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

**Center of gravity in rotary axis**

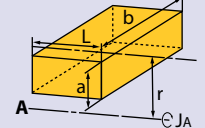


**a:** Side length [m]  
**B:** Side length [m]  
**L:** Side length [m]  
**p:** Density [kg/m<sup>3</sup>]  
**J<sub>A</sub>:** Moment of inertia [kgm<sup>2</sup>]

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

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

**Center of gravity outside rotary axis**



**a:** Side length [m]  
**B:** Side length [m]  
**L:** Side length [m]  
**p:** Density [kg/m<sup>3</sup>]  
**r:** Turning radius [m]  
**J<sub>A</sub>:** Moment of inertia [kgm<sup>2</sup>]

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

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

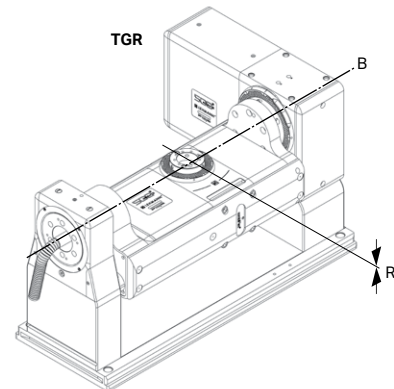
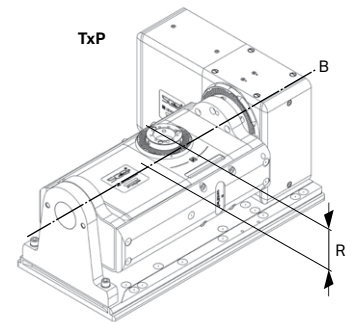
#### Key

- 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/s<sup>2</sup>]

#### Densities of different materials x dynamic speed (p)

Steel	7.85 x 10 <sup>3</sup> kg/m <sup>3</sup>
Cast iron	7.85 x 10 <sup>3</sup> kg/m <sup>3</sup>
Aluminum	2.7 x 10 <sup>3</sup> kg/m <sup>3</sup>
Copper	8.94 x 10 <sup>3</sup> kg/m <sup>3</sup>
Brass	8.5 x 10 <sup>3</sup> kg/m <sup>3</sup>

#### Calculation of the load on the swiveling/tilting axis



#### Distance R

Rotary table	TxP [mm]	TGR [mm]	Limited torques [Nm]*
TF...T1-507510	46	-	40
TF...T1-510520	30	0	100
TF...T1-520520	90	0	100

\* Limited torques due to eccentric loads, see p. 32

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

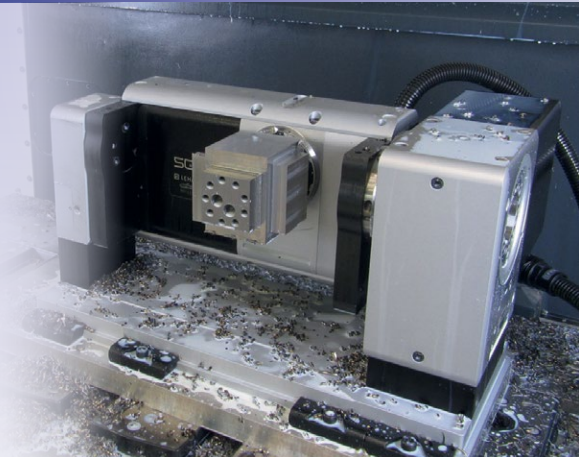
$$Rs = R + L/2$$

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

#### 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 pp. 38-53

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	∅ 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 cm <sup>3</sup> /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\*)



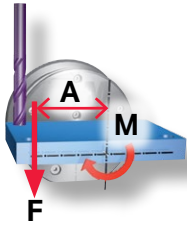
#### Conclusion

- 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

## Reference values for configuring and selecting the correct rotary table

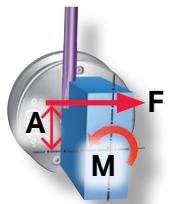
F = Feed force, A = Distance [m] from rotary table axis to feed force (F) during machining, M = Resulting torque (FxA)  
**Resulting torque M = F x A** → must not exceed the max. clamping torque [Nm] or max. feed torque [Nm] of the rotary table!

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



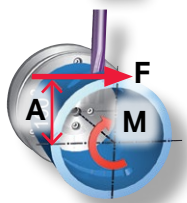
### Boring / drilling

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



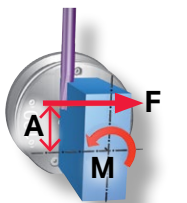
### End milling and slot milling

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



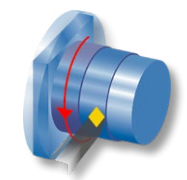
### Hobbing

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

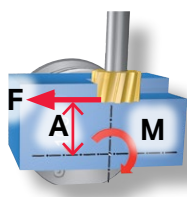
Tool type	Turning ø [mm]	Cutting speed [m/min]	Feed F [mm]	Depth of cut [mm]	Feed force F [N]		
					CK45	X5CrNi18-10	AlMg4.5Mn0.7
Corner lathe tool WP	40	250	0.3	2	541		
		140	0.25	2		286	
		500	0.4	3			65.6





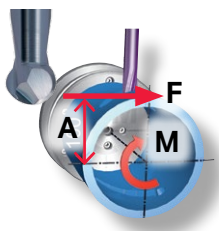
Factory information from well-known tool manufacturers  
(applies to new tool cutting edges)

## Corner milling (slab milling or plane milling)



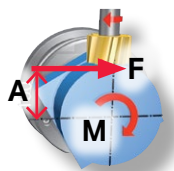
Tool type	Wz ø [mm]	Cutting speed [m/min]	Feed F [mm]	Depth of cut [mm]	Cutting width [mm]	Feed force F [N]		
						CK45	X5CrNi18-10	AlMg4.5Mn0.7
Angular milling cutter WP	40	160	0.12 x 6	2	40	1,750		
		160	0.12 x 6	2.5	25	1,250		
		85	0.12 x 6	2	40		1,550	
		85	0.12 x 6	2.5	25		1,150	
		500	0.15 x 6	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

## Ball end milling



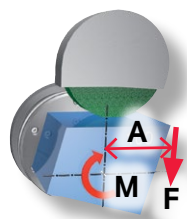
Tool type	Wz ø [mm]	Cutting speed [m/min]	Feed F [mm]	Depth of cut [mm]	Cutting width [mm]	Feed force F [N]		
						CK45	X5CrNi18-10	AlMg4.5Mn0.7
Ball end milling cutter	6	220	0.1 x 2	1.0	1.0	60		
		100	0.08 x 2	0.8	0.8		35	
		530	0.15 x 2	2.0	2.0			50
Ball end milling cutter	12	220	0.14 x 2	1.3	1.3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

Overview,  
Applications

System &  
Facts, IBox

Rotary  
tables

SPZ,  
DDF, WMS

MOT, KAB,  
WDF, CNC

Aligning,  
GLA, RST, LOZ

Service  
& Technology

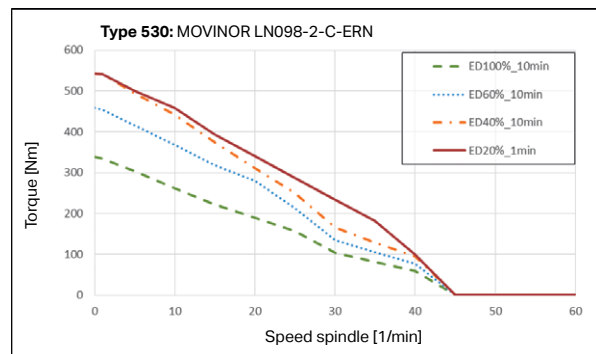
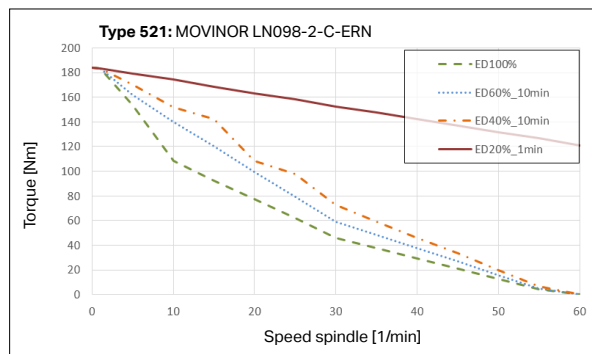
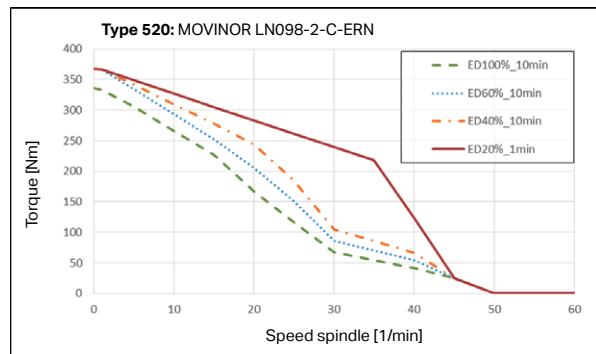
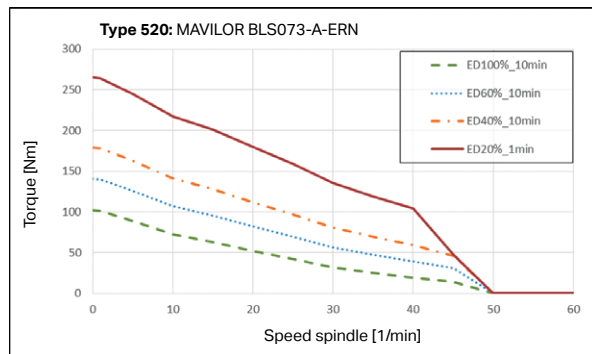
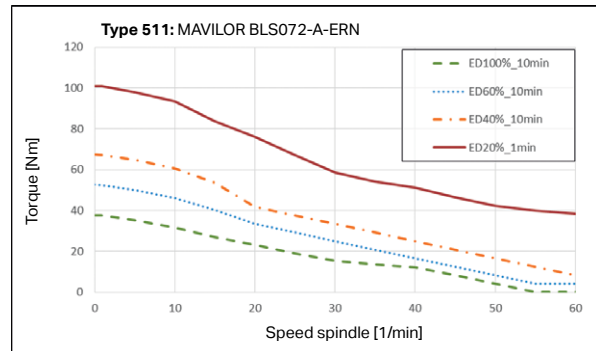
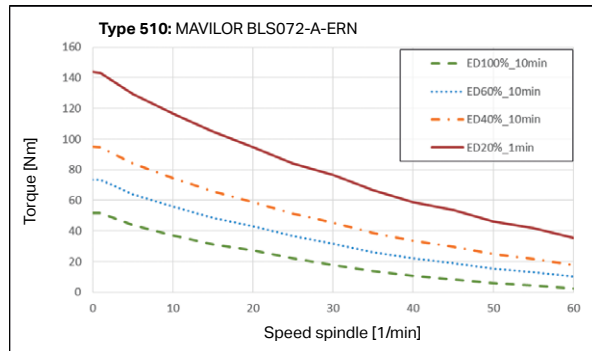
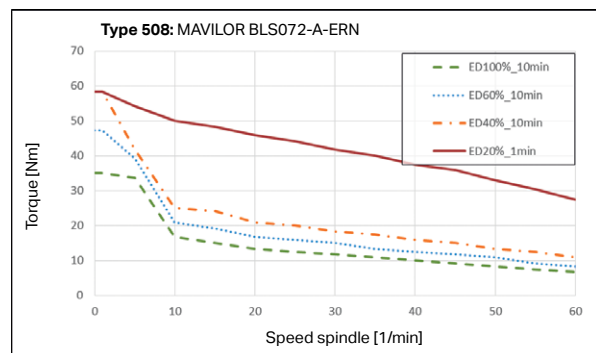
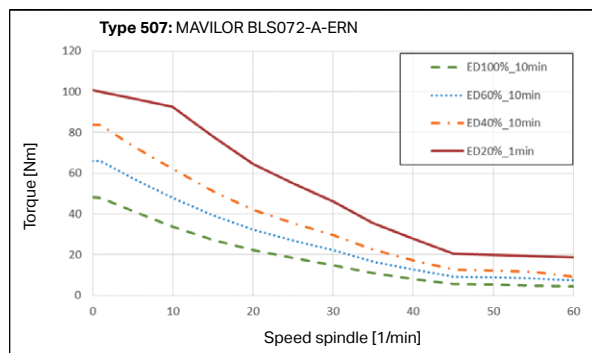
Tooling

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 Siemens and Heidenhain CNCs



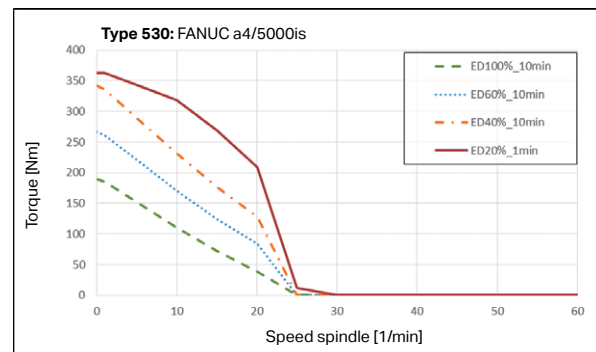
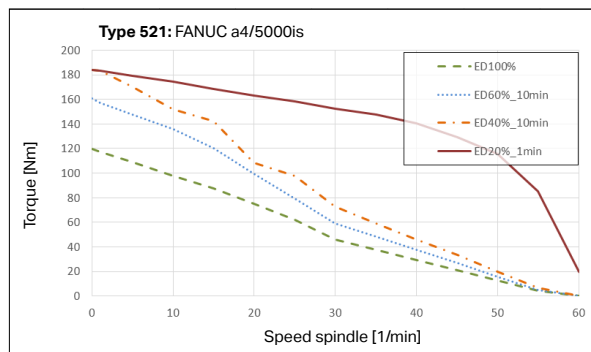
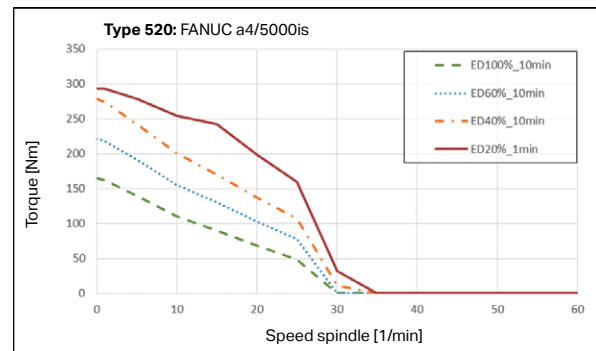
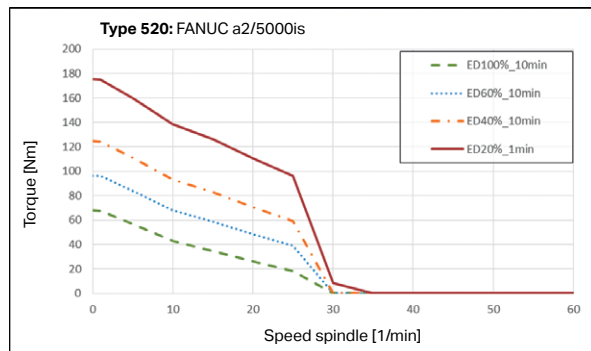
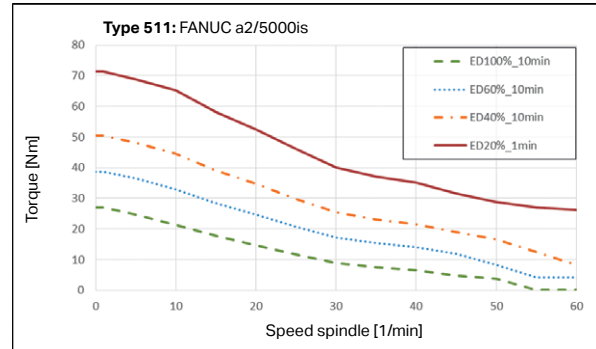
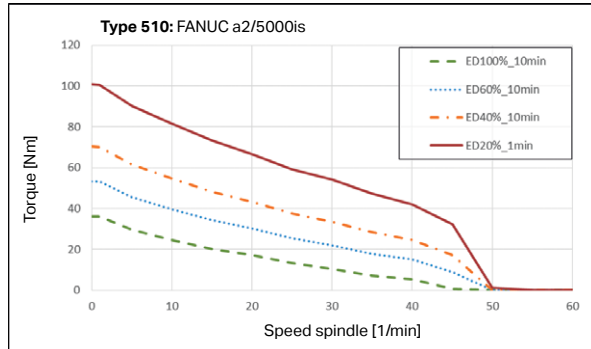
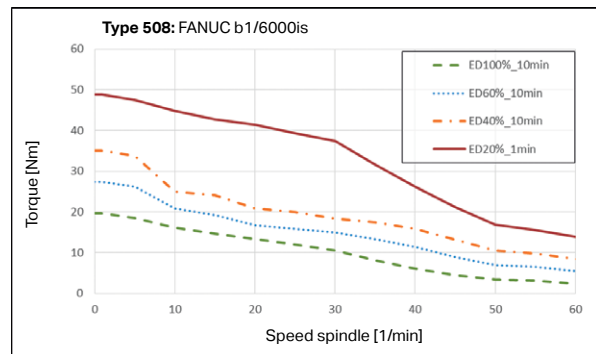
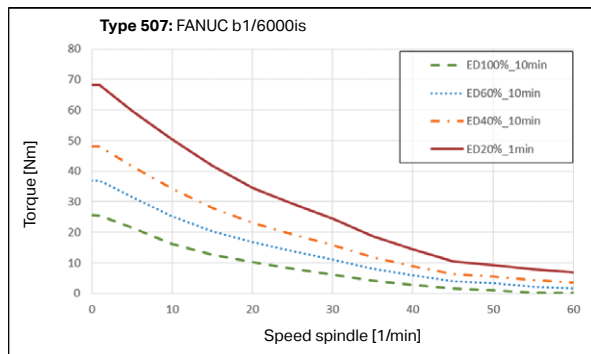
## Reference values for duty cycle (ED)

- 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

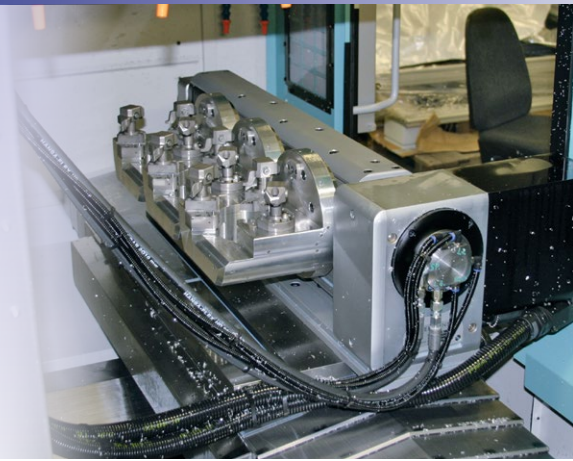


### For Fanuc CNC



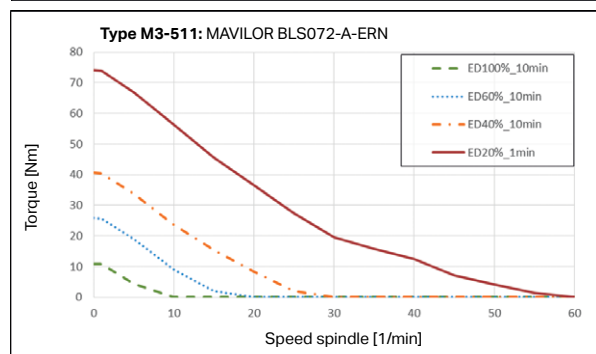
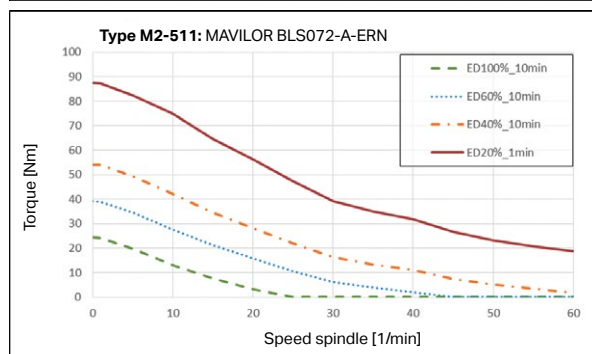
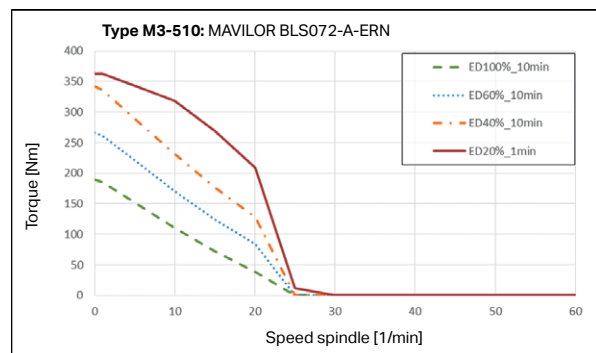
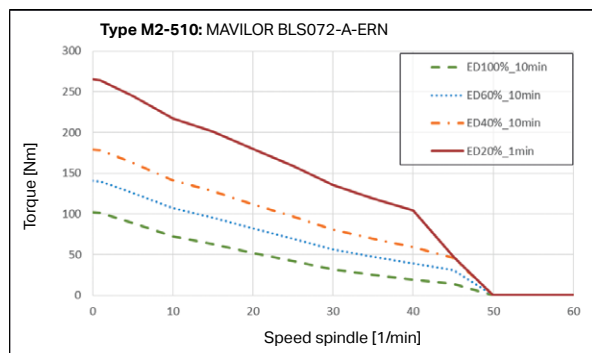
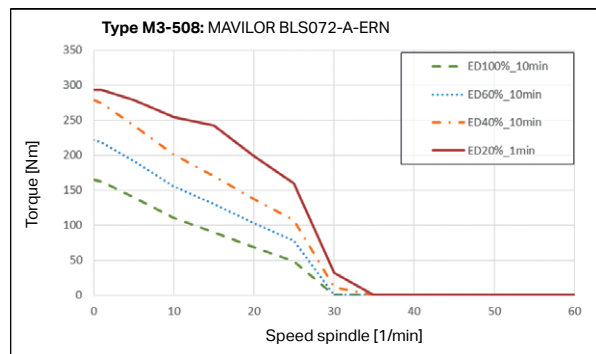
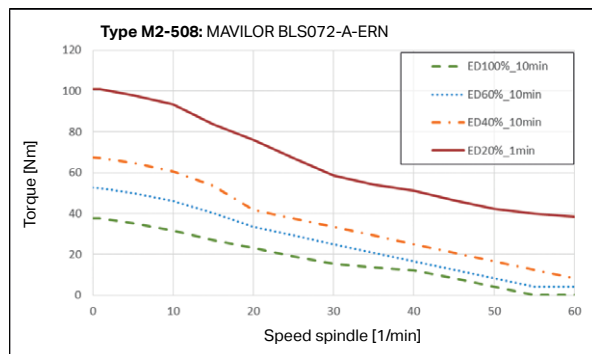
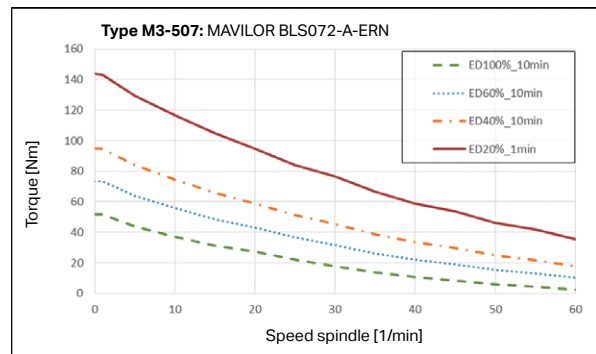
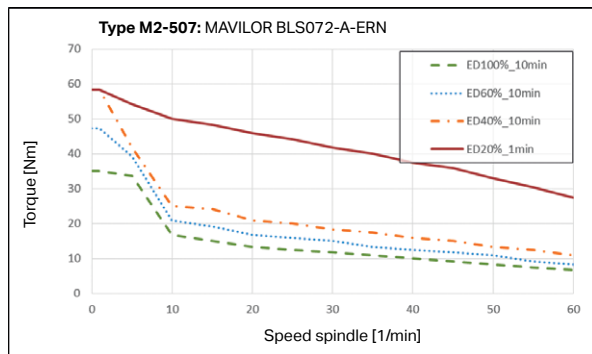
- Overview, Applications
- System & Facts, IBox
- Rotary tables
- SPZ, DDF, WMS
- MOT, KAB, WDF, CNC
- Aligning, GLA, RST, LOZ
- Service & Technology
- Tooling

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



Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, WIMS

MOT, KAB, WDF, CNC

Aligning, GLA, RST, LOZ

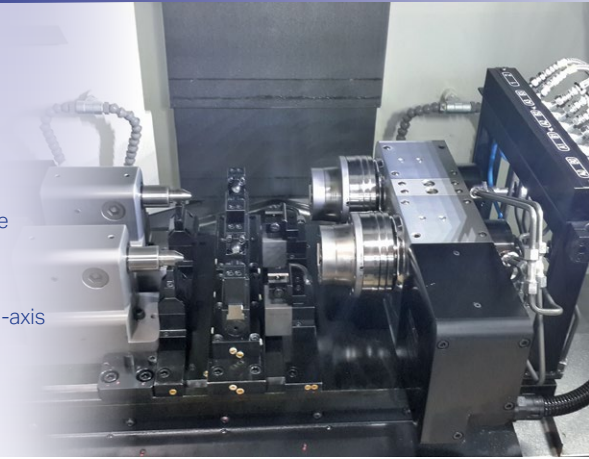
Service & Technology

Tooling

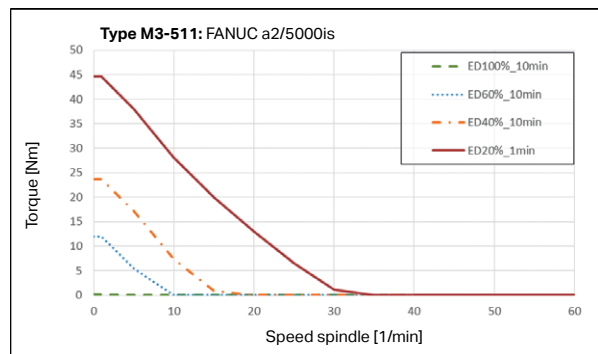
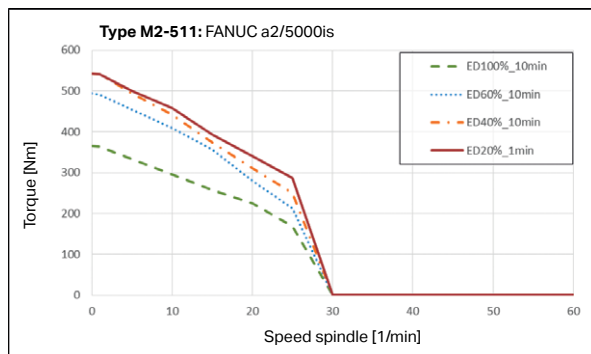
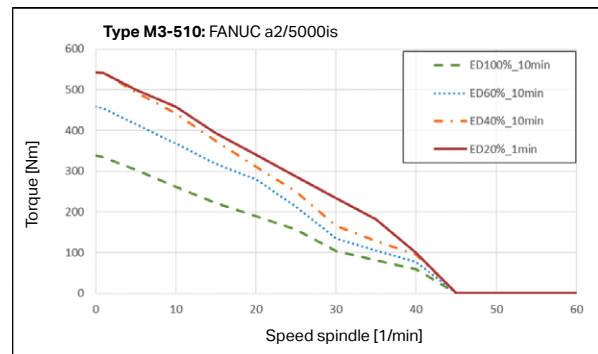
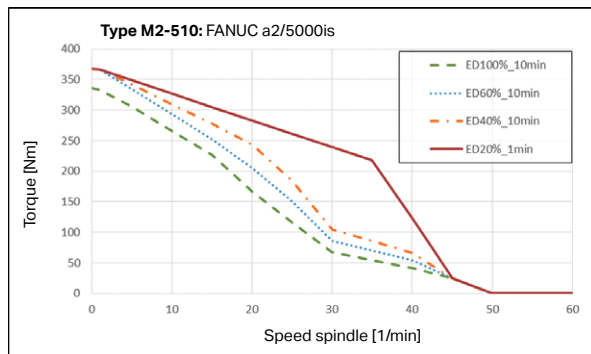
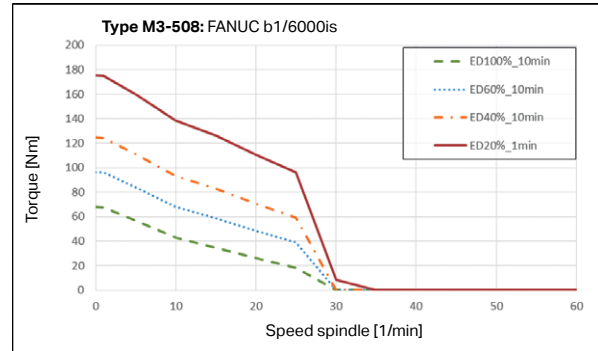
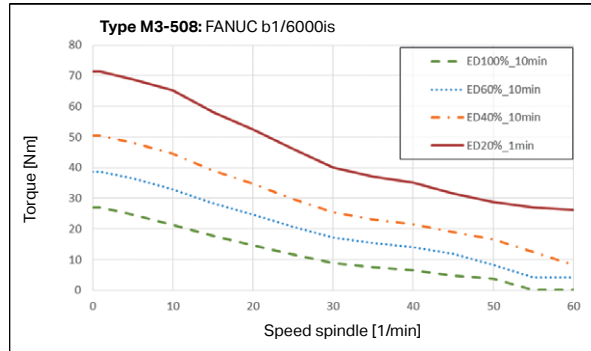
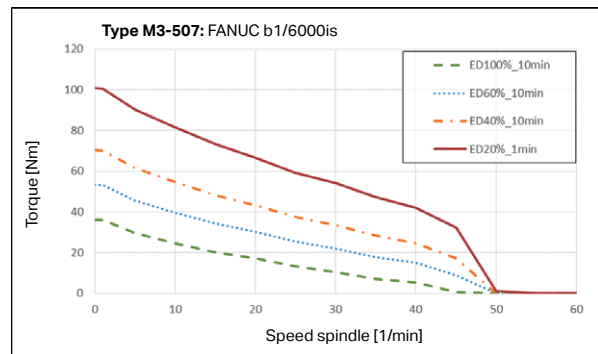
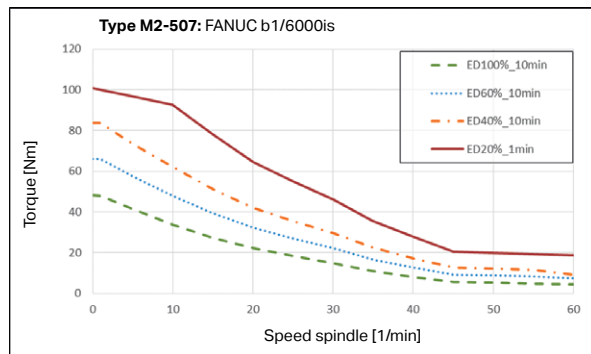
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- Duty cycle 80–100 % → Engraving, impeller machining, tool and die making

All diagram values with 20 % safety



### For Fanuc CNC



- Overview, Applications
- System & Facts, IBox
- 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

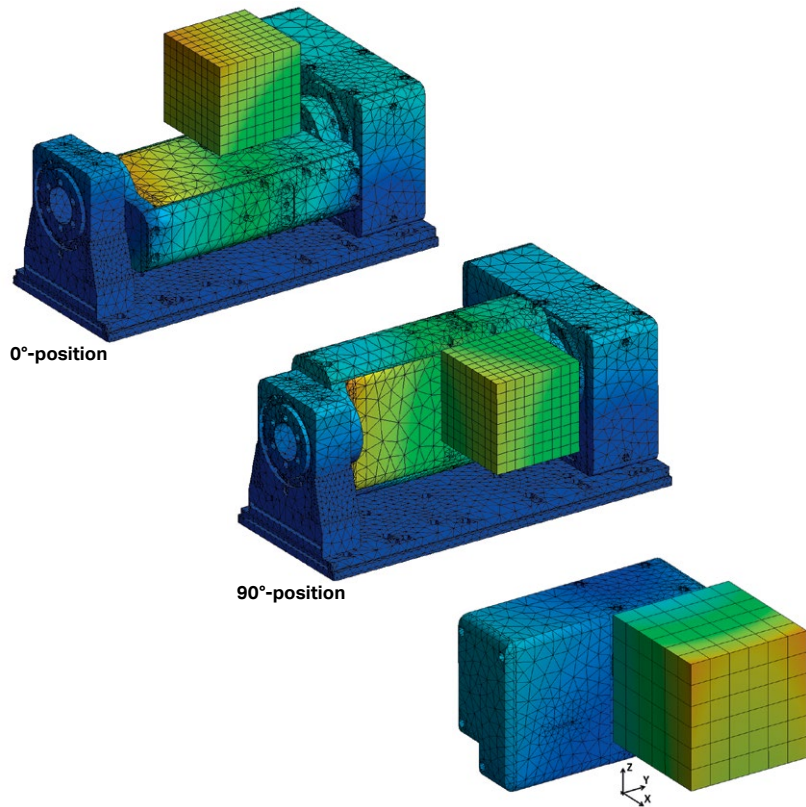
Every material has a certain elasticity. Depending on the orientation and load, these affect the accuracy of machining in different ways. The figures and data shown here provide information on the values to be expected.

## 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

## 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.

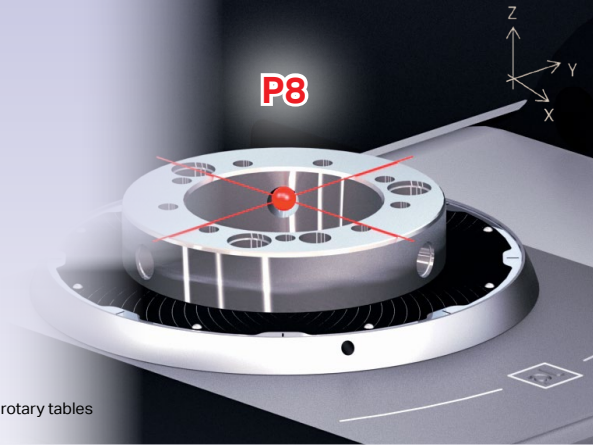
## Static mechanical analysis

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.

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

	$\mu\text{m}/\text{kg}$
EA-507	-0.020
EA-510	-0.015
EA-520	-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)

μm/kg	0°		90°	
	TIPc	TIPc	TIPc	TIPc
TF-507510	-0.110	-0.142	-0.110	-0.142
TF-508510	-0.110	-0.142	-0.110	-0.142
TF-510520	-0.064	-0.076	-0.064	-0.076
TF-511520	-0.064	-0.076	-0.064	-0.076
TF-520530	-0.046	-0.056	-0.046	-0.056
TF-521530	-0.046	-0.056	-0.046	-0.056



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

μm/kg	0°				90°			
	TAPc	TAP	TOP	TGR	TAPc	TAP	TOP	TGR
T1-507510	-0.032	-0.031	-0.039		-0.074	-0.104	-0.132	
T1-508510	-0.032	-0.031	-0.039		-0.074	-0.104	-0.132	
T1-510520	-0.024	-0.038	-0.041	-0.030	-0.051	-0.082	-0.082	-0.069
T1-511520	-0.024	-0.038	-0.041	-0.030	-0.051	-0.082	-0.082	-0.069
T1-520530	-0.026	-0.046	-0.041	-0.041	-0.055	-0.110	-0.097	-0.101
T1-521530	-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)

μm/kg	Spindle distance	0°		90°	
		Spindle 1	Spindle 2	Spindle 1	Spindle 2
T2-507510 TOP1.2	160 mm	-0.042	-0.099	-0.078	-0.219
T2-510520 TOP2.2	220 mm	-0.038	-0.098	-0.069	-0.234
T2-510520 TOP2.2	300 mm	-0.038	-0.117	-0.065	-0.292



Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, WIMS

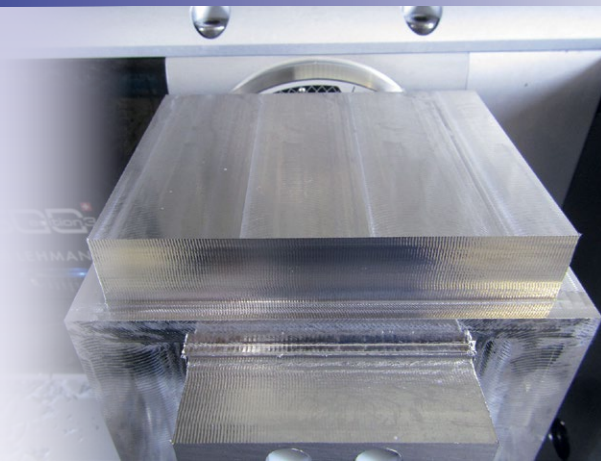
MOT, KAB, WDF, CNC

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:

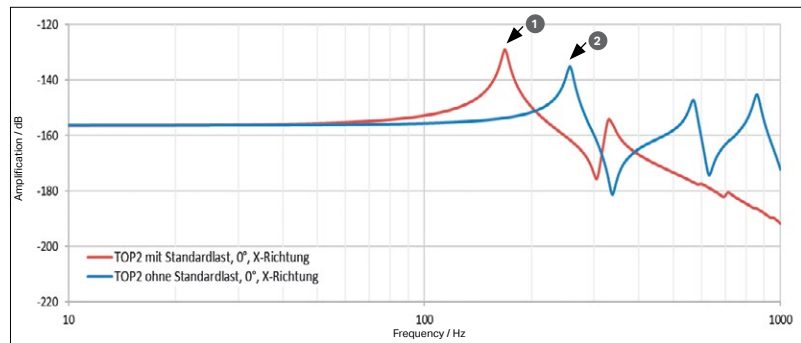
- Tool speed
- Number of teeth on tool
- Machining strategy
- Workpiece orientation

**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

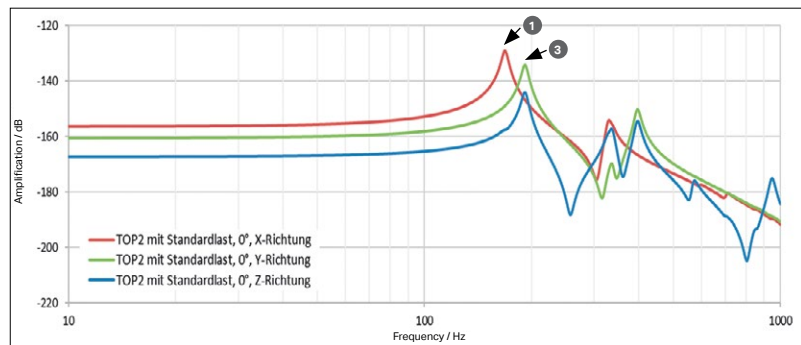
Example: T1-510520 TOP2, excitation in the in X-direction



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

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

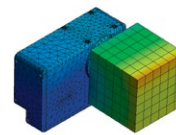


Every object has several natural frequencies (so-called eigenfrequencies) that depend on the object's shape, mass and material. If the machining frequency matches an eigenfrequency, e.g. that of a rotary table, the result is chattering or whistling noises. A vertical machining center has the first eigenfrequency 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)

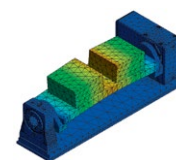
Hz	Rotary table fastened by means of bolted connection from below, without consideration of the compliance of the intermediate plate								Rotary table fastened by means of clamping claws							
	without standard load				with standard load				without standard load				with standard load			
	507	510	520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



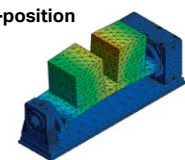
## Eigenfrequency of rotoFIX-type rotary tables, mode 1 and 2 (approximate values)

Hz	without standard load				with standard load				with twice the standard load			
	507	510	520	530	507	510	520	530	507	510	520	530
<b>Mode 1</b>	332	254	166	60	224	194	120	46	165	149	90	35
<b>Mode 2</b>	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.



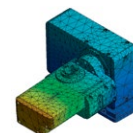
with standard load listed on p. 36



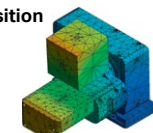
twice the standard load listed on p. 36

## 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°	
<b>Mode 1</b>	<b>50x510</b>	180		185		129		134	
	<b>51x520</b>	187		194		110		126	
	<b>520530</b>	221		222		107		123	
<b>Mode 2</b>	<b>50x510</b>	192		201		141		157	
	<b>51x520</b>	206		215		132		143	
	<b>520530</b>	226		243		133		137	



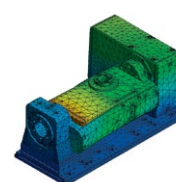
without standard load listed on p. 40



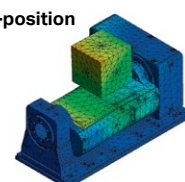
with standard load listed on p. 40

## 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°
<b>Mode 1</b>	<b>50x510</b>	270	283	230	231	241	245			187	201	181	190	183	195		
	<b>51x520</b>	249	233	215	194	257	214	212	196	152	156	143	142	169	154	155	154
	<b>520530</b>	243	211	184	172	195	181	144	122	133	131	107	105	113	112	107	94
<b>Mode 2</b>	<b>50x510</b>	318	315	283	265	312	295			229	238	218	218	244	238		
	<b>51x520</b>	261	296	233	249	294	321	232	247	162	187	158	175	192	210	181	196
	<b>520530</b>	260	314	238	259	259	264	157	196	139	156	134	142	143	145	122	143



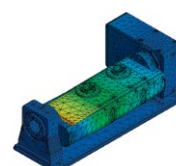
without standard load listed on pp. 42, 44, 46



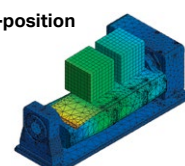
with standard load listed on pp. 42, 44, 46

## 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°
<b>Mode 1</b>	<b>T2-507510 TOP1.2</b>	160 mm	185	188	150	155
	<b>T2-510520 TOP2.2</b>	220 mm	154	142	101	96
	<b>T2-510520 TOP2.2</b>	300 mm	138	129	93	89
<b>Mode 2</b>	<b>T2-507510 TOP1.2</b>	160 mm	272	259	218	211
	<b>T2-510520 TOP2.2</b>	220 mm	221	220	142	146
	<b>T2-510520 TOP2.2</b>	300 mm	206	204	137	139



without standard load listed on p. 52



with standard load listed on p. 52

Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, WMS

MOT, KAB, WDF, CNC

Aligning, GLA, RST, LOZ

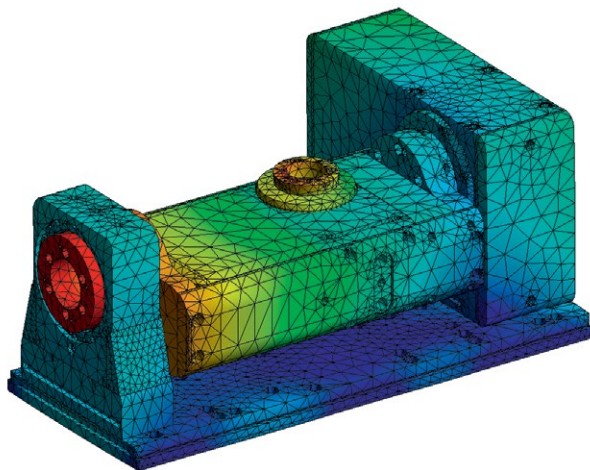
Service & Technology

Tooling

## 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.

### 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:

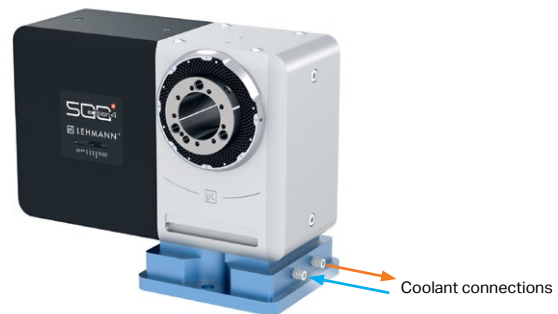
- Operating mode of the table (duty cycle, performance, etc.)
- Idle time between the work cycles
- Optional cooling plate (on request) for removing internal heat from the gear unit, bearings, etc.
- Machine table (thickness, size, material) and how the rotary table is mounted on it

### 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.



### Example of reading the tables

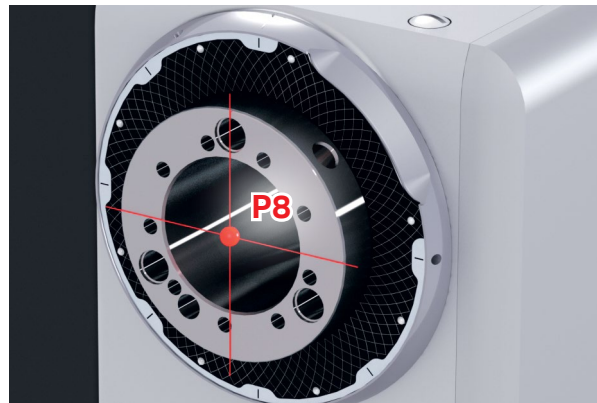
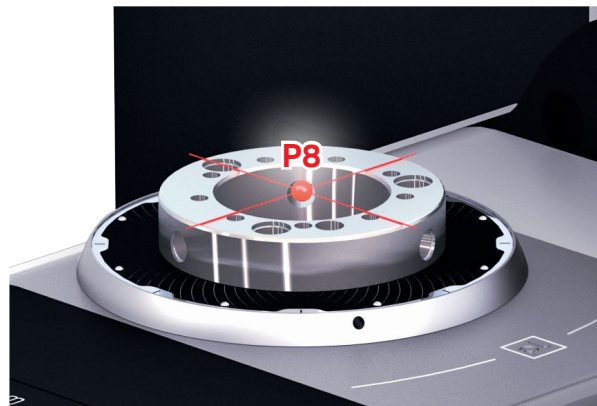
For dry machining with the T1-510520 TOP2, without a cooling plate, the table indicates a displacement at point P8 of 16  $\mu\text{m}$  in the X-direction 60 s after a cold start. This displacement increases in the following minutes and then decreases later. Explanation for this behavior: When starting 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 ...



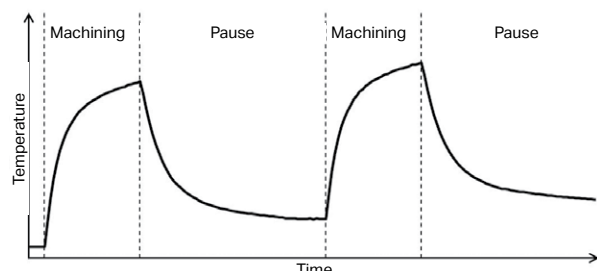
### Measuring point P8

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.



Behavior of temperature during pauses.

- Overview, Applications
- System & Facts, IBox
- Rotary tables
- SPZ, DDF, WIMS
- MOT, KAB, WDF, CNC
- Aligning, GLA, RST, LOZ
- Service & Technology
- Tooling





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 clapping cycle.

	unclamp	clamp *
EA-507	60 ms	90 ms
EA-510	110 ms	140 ms
EA-520	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](http://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	Massenträgheitsmoment	Kriterien (wenn Massenträgheitsmoment nicht bekannt)	
		Last	Dimension
Catalog (Max.Speed)	$J$	$\approx$	$\varnothing$
	< 0.8kgm*2	$\approx$	< 90kg < 230mm
Usual	$J$	$\approx$	$\varnothing$
	< 1.2kgm*2	$\approx$	< 120kg < 320mm
Max.Load	$J$	$\approx$	$\varnothing$
	< 8kgm*2	$\approx$	< 800kg < 450mm

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

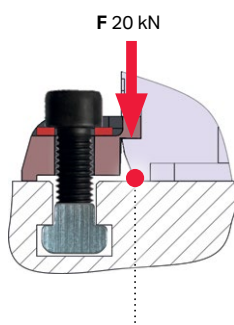
## Pull-out torque

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

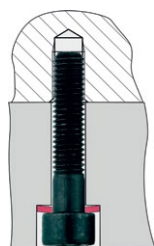
Reference values	Unit	507 / 508	510 / 511	520 / 521	530	Remarks
max. permissible depending on bearing	Nm	1200	2000	3900	10400	Pull-out load, spindle
EA and TF tilter with claw clamps	Nm	700	1000	1000	2000	with max. tensile load on claw clamp, without noteworthy lifting of the housing <sup>1)</sup>
EA and TF tilter with base plate*	Nm	1200	2000	3900	10400	Securely bolted from below <sup>2)</sup> ; 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

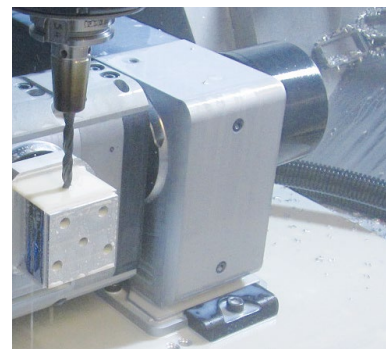
Bolt torque as specified in operating manual:



<sup>1)</sup> Lifting point on housing



<sup>2)</sup> 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.

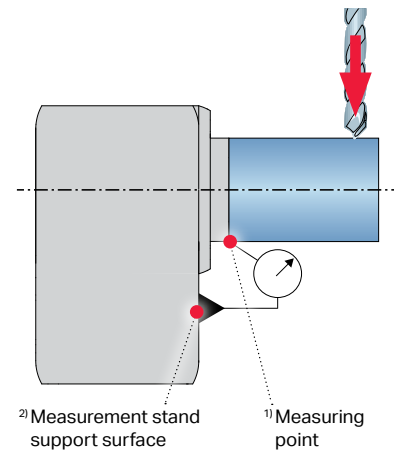
## Specific reference values for individual applications and how to use them

### 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 spindle<sup>1)</sup>, relative to rotary table housing<sup>2)</sup>; spindle clamping active (inactive approx. -10%)



### Achievable workpiece accuracies in three dimensions

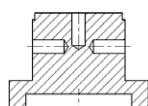
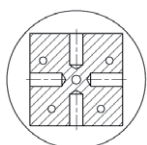
The reference values are based on detailed experiments where, among other things, such sample parts were produced on a DMU 65: with different T-type rotary tables (TF and T1), with and without WMS, with and without compensation. Depending on the machine's accuracy and the conditions listed below, the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

Reference values	Positioning	Simultaneous
Size	Cube 350mm	Cube 150mm
Weight	150 kg	34 kg
Accuracy <sup>1)</sup>	± 10 µm/100 mm	
Accuracy <sup>2)</sup>	± 5 µm/100 mm	not possible
Accuracy WMS <sup>1)</sup>	± 3 µm/100 mm	
Accuracy WMS <sup>2)</sup>	± 2 µm/100 mm	not possible

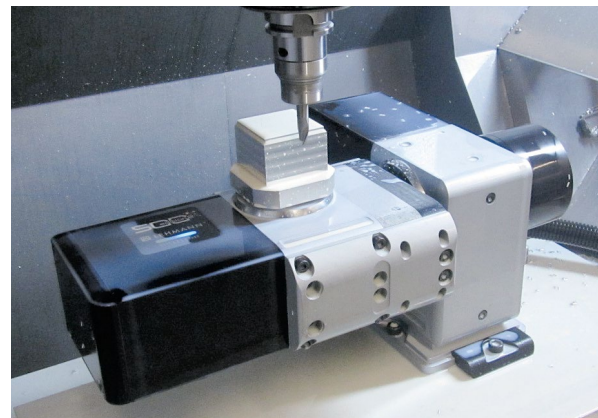
<sup>1)</sup> only ONE workpiece zero point      <sup>2)</sup> multiple workpiece zero points  
WMS = Angular position measuring system ± 2.5"; both axes

### 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



Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, WMS

MOT, KAB, WDF, CNC

Aligning, GLA, RST, LOZ

Service & Technology

Tooling

## 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 ( $M_{\text{feed}}$ ) [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. 115

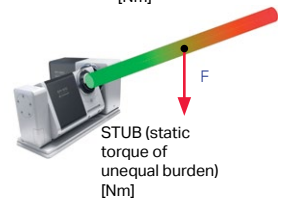
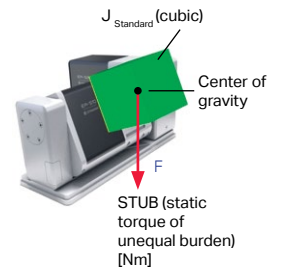
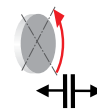


Center of gravity shift without and with load. The greater the red center of gravity, the greater is the gear unit loading in the tilting axis. The blue arrow shows the direction in which the center of gravity moves from «without load» to «with load».

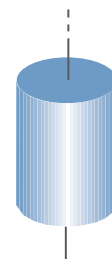
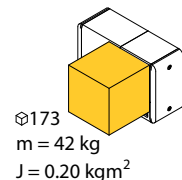
**pL standard spindle load ( $sls = sl_{\text{standard}}$ ) pp. 30–53 and 92–93 [kg]**  
...refers to the pL spindle load defined as standard, derived from practice, covering approximately 90% of all applications. All drive data and parameter lists are designed for the cubic pL standard load. All masses 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 ( $J_{\text{standard}}$ ) pp. 30–53 and 92–93 [kgm<sup>2</sup>]**  
...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 ( $J_{\text{max}}$ ) [kgm<sup>2</sup>]**  
...corresponds to 10x the standard moment of inertia ( $J_{\text{standard}}$ ) 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





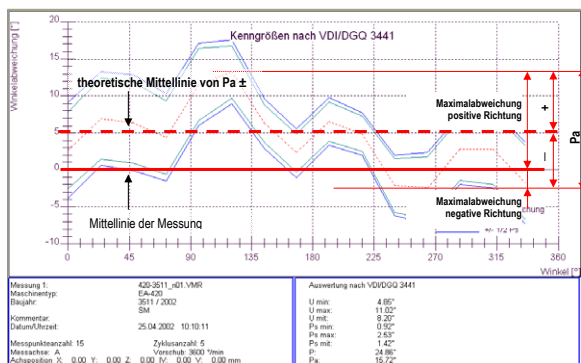
# Function explanations, limit values and conditions minimize your risks

## 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°/s<sup>2</sup>
- 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<sub>with</sub>) [arc sec]

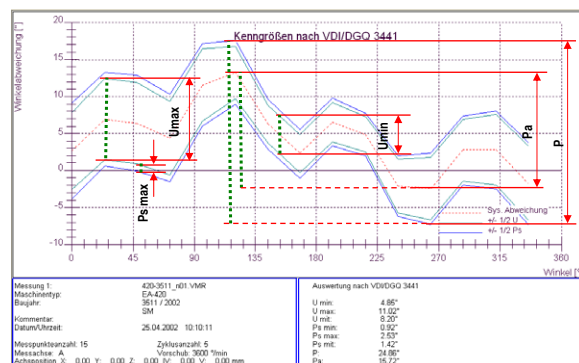
...refers to the maximum deviation within the results of the repeatedly measured angular positions, approached from the same side. This corresponds to the position variation Ps max according to VDI/DGQ 3441, i.e.:

- 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)

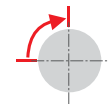
#### Cycle time 90° / 180° ( $t_{90^\circ} / t_{180^\circ}$ )

[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-iBox.
- 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 ( $sl_{max}$ )

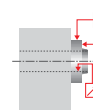
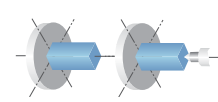
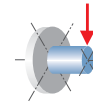
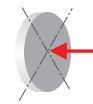
[kg]

...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 ( $M_{clamp}$ )

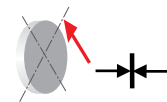
[Nm]

...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  $\varnothing$  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 (sd<sub>200</sub>)

...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. 112

### 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](http://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 x2F		
i 90:1		
Value	Value	V
Catalog: 19800		
Usual: 16200		
Max. load: 5400		

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- MOT, KAB, WDF, CNC
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Tooling	
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Aligning GLA, RST, LOZ	
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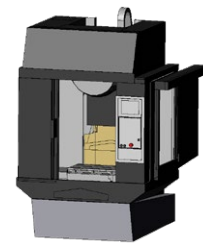
Overview, Applications
System & Facts, IBox
Rotary tables
SPZ, DDF, WMS
MOT, KAB, WDF, CNC
Aligning, GLA, RST, LOZ
Service & Technology
Tooling

Productivity, flexibility, price:  
many things speak for «on-top»

3-axis VMC + rotary table



3-axis VMC (TC) + rotary table



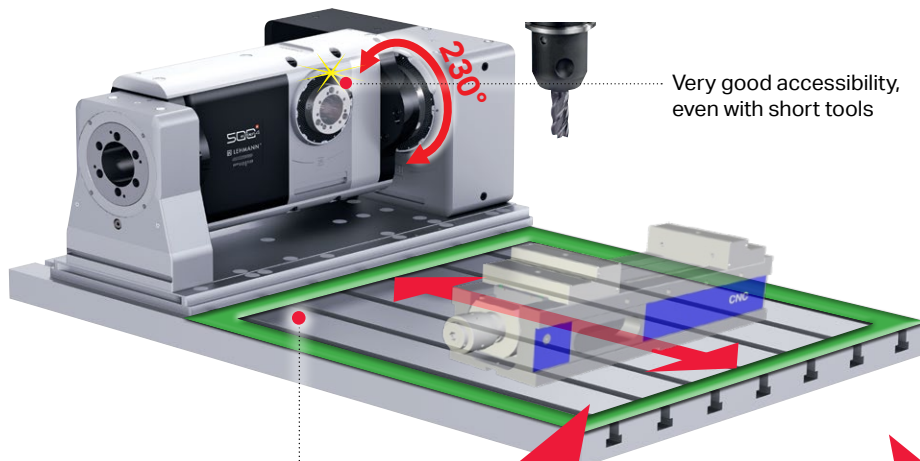
**Plus points for 3+ versus horizontal**

- Low initial investment
- Expandable & scalable
- Short amortization time

**Plus points for 3+ versus 5 axes**

- Maximum universality & efficiency
- Shaft machining
- Complete machining, incl. 6th side
- Clamping yoke & tower machining

**3+2**

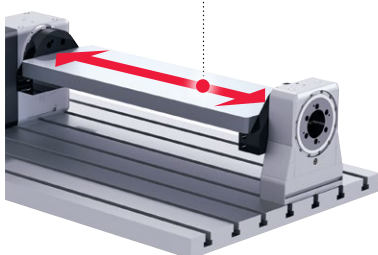


Very good accessibility, even with short tools

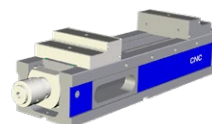
More space for workpieces and fixtures

If necessary, vise, indoor automation, or Clamping yoke

**3+1**



Vises of all kinds



**Indoor automation**

Intelligent automation for small parts or bar stock



Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, WMS

MOT, KAB, WDF, CNC

Aligning, GLA, RST, LOZ

Service & Technology

Tooling

## 4<sup>th</sup> axes, with modular system, single-/multi-spindle

**4 Sizes**

**Center height / Clamping torque**

- EA-507: 110 mm / 300 Nm
- EA-510: 150 mm / 800 Nm
- EA-520: 180 mm / 2,000 Nm
- EA-530: 220 mm / 5,000 Nm

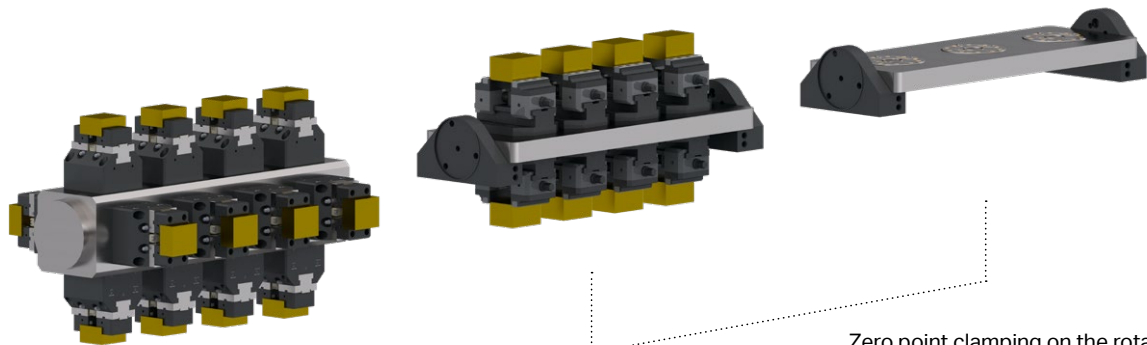
**Workpiece weights, incl. fixture / max. speed**

- EA-507: 240 kg / 111 rpm
- EA-510: 400 kg / 80 rpm
- EA-520: 800 kg / 50 rpm
- EA-530: 1,600 kg / 40 rpm

For simultaneous machining of up to 4 workpieces: the M-type rotary tables from the modular system for efficient series production.

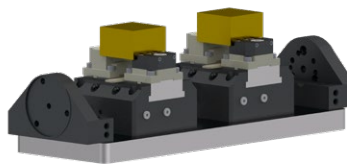
- Overview, Applications
- System & Facts, IBox
- Rotary tables
- SPZ, DDF, WMS
- MOT, KAB, WDF, CNC
- Aligning, GLA, RST, LOZ
- Service & Technology
- Tooling

## 4<sup>th</sup> axes, with modular clamping yoke system



Zero point clamping on the rotary table spindle further increases productivity

Modular quick change system for multiple clamping



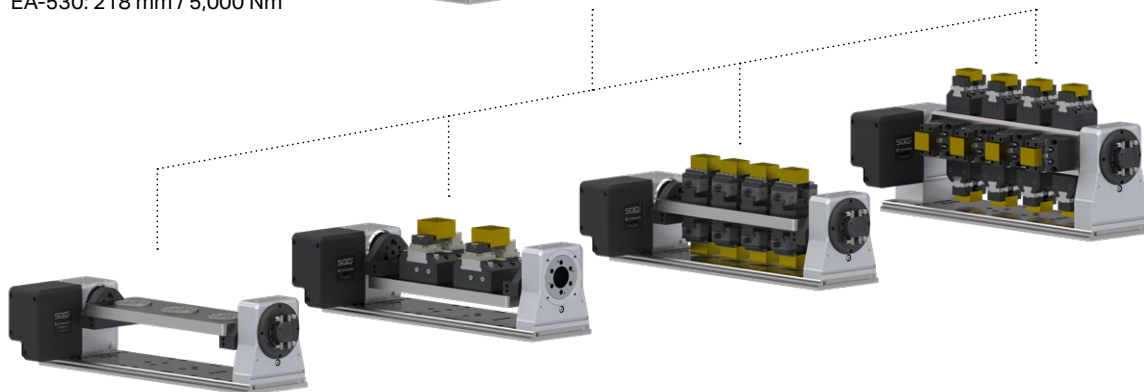
### Workpiece weights, incl. fixture / max. speed

- EA-507: 240 kg / 111 rpm
- EA-510: 400 kg / 80 rpm
- EA-520: 800 kg / 50 rpm
- EA-530: 1,600 kg / 40 rpm

### 4 Sizes

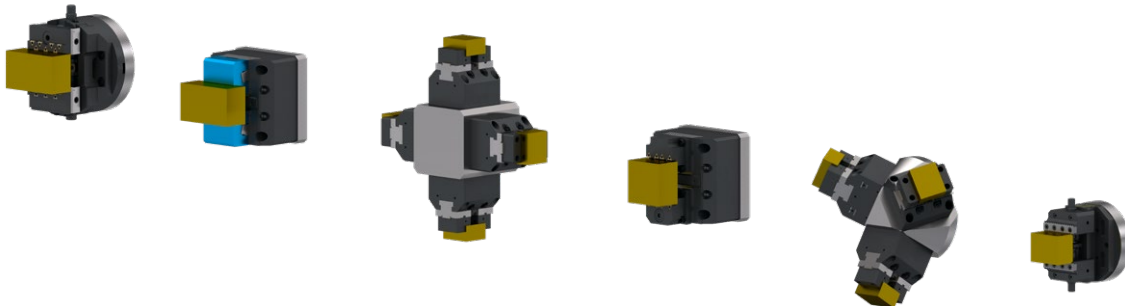
#### Center height / Clamping torque

- EA-507: 140 mm / 300 Nm
- EA-510: 180 mm / 800 Nm
- EA-520: 210 mm / 2,000 Nm
- EA-530: 218 mm / 5,000 Nm





## 4<sup>th</sup>/5<sup>th</sup> axes, with modular system, single-spindle

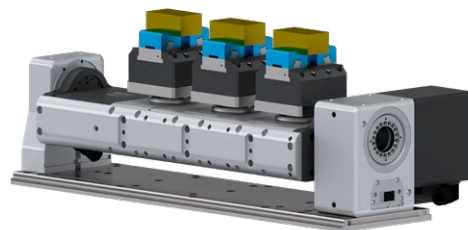


Whatever is possible on the 4th axes is also available for the rotating-tilting rotary tables from the modular system – standardized. Almost all variants also fit on multi-spindle rotating-tilting rotary tables – **extends machine runtime, increases productivity, reduces costs in series production.**



### 3 Sizes

- Tx-507510
- Tx-510520
- Tx-520530



### Center heights

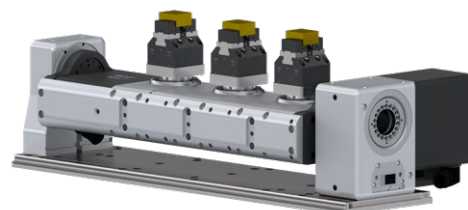
- 180 mm
- 210 mm
- 220 mm



T1-91x915 up to 5,400 rpm possible, here with TOPlus mini 40

### Workpiece weights incl. fixture and max. workpiece Ø

- 53 kg / 280 mm
- 89 kg / 340 mm
- 133 kg / 450 mm



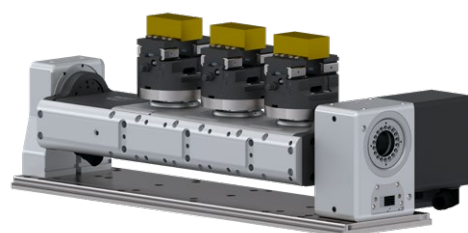
### max. speed 4<sup>th</sup> / 5<sup>th</sup> axis

- 111 rpm / 60 rpm
- 80 rpm / 40 rpm
- 50 rpm / 30 rpm



### Clamping torques 4<sup>th</sup>/5<sup>th</sup>

- 300 Nm / 1,100 Nm
- 800 Nm / 4,000 Nm
- 2,000 Nm / 7,000 Nm



Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, WMS

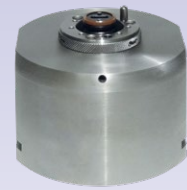
MOT, KAB, WDF, CNC

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.

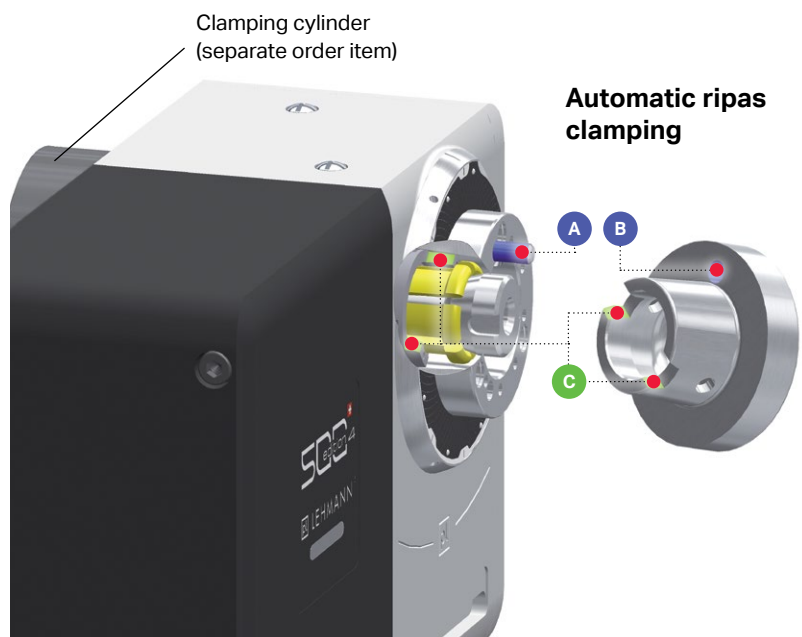
## The function

ripas has 3 functions:

- A Anti-twist protection
- B Rough positioning
- C Precision positioning

## Process

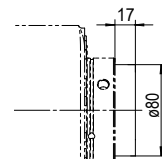
During changes (manually or automatic), the guide pin A ensures proper orientation while providing rough positioning at the same time B. Shortly before the face is reached, the inner precision cams perform the precision positioning C.



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)	Hydraulic (Ortlieb)	Required clamping cylinder *
507	RIP.507-63m**	HSK-A63	0.97	•		
	RIP.507-63h	HSK-A63	1.12		•	SPZ.5xx-9
510	RIP.510-63m**	HSK-A63	0.97	•		
	RIP.510-63h	HSK-A63	1.12		•	SPZ.5xx-9
520	RIP.520-63m	HSK-A63	1.45	•		
	RIP.520-63h	HSK-A63	1.66		•	SPZ.520-9
all sizes	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	•		



Above dimensions apply with ripas adapter inserted. Without adapter, the collet chuck projects approx. 10.5 mm.

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. 57

\*\* Not possible in combination with the «Labyrinth» spindle seal (see p. 33)

## Technical data for ripas / HSK

	Unit	HSK-A63 manual		HSK-A63 automatic	
		Standard	ripasGrip (option)	Standard	ripasGrip (option)
Perm. tension, max.	kN	-		10 at 50 bar <sup>1)</sup>	
Resulting insertion force on adapter, max.	kN	30 at 20 Nm <sup>2)</sup>		30	
Perm. pull-out torque (before losing face contact)	kN	approx. 600		approx. 600	
Transport load	kg	approx. 60		approx. 60	
Perm. torque <sup>3)</sup> (slip <sup>4)</sup> max. ± 0.003°) A	Nm	-	approx. +50%	approx. 150	approx. 300
Perm. torque <sup>3)</sup> (slip <sup>4)</sup> 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	

<sup>1)</sup> With SPZ.5xx-9

<sup>3)</sup> Values apply under static conditions, without any vibrations, with no load, dry, grease-free, clean

<sup>2)</sup> Radial screw

<sup>4)</sup> Returns to original position after unclamping/clamping

## Options for all sizes

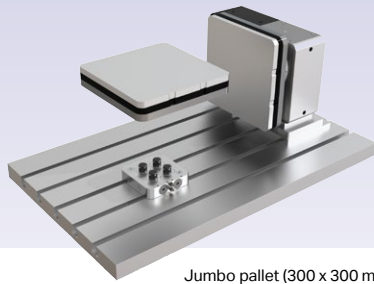
SPZ.Awk-Vor	Preparation for presence check only possible for automatic clamping (only with adapter from pL)
SPZ.Awk	Control box for presence check (see p. 56)

## CAPTO clamping

	Item no.	Designation	Weight [kg]	Manual (MAPAL)	Hydraulic (Ortlieb)	Required clamping cylinder *
507	CAP.507-C4m	Capto clamping, C4		•		
	CAP.507-C4h	Capto clamping, C4			•	SPZ.5xx-9
510	CAP.510-C4m	Capto clamping, C4		•		
	CAP.510-C4h	Capto clamping, C4			•	SPZ.5xx-9



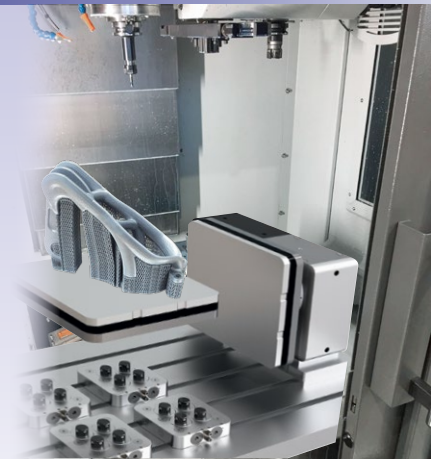
## Tooling for individual finish machining / finishing



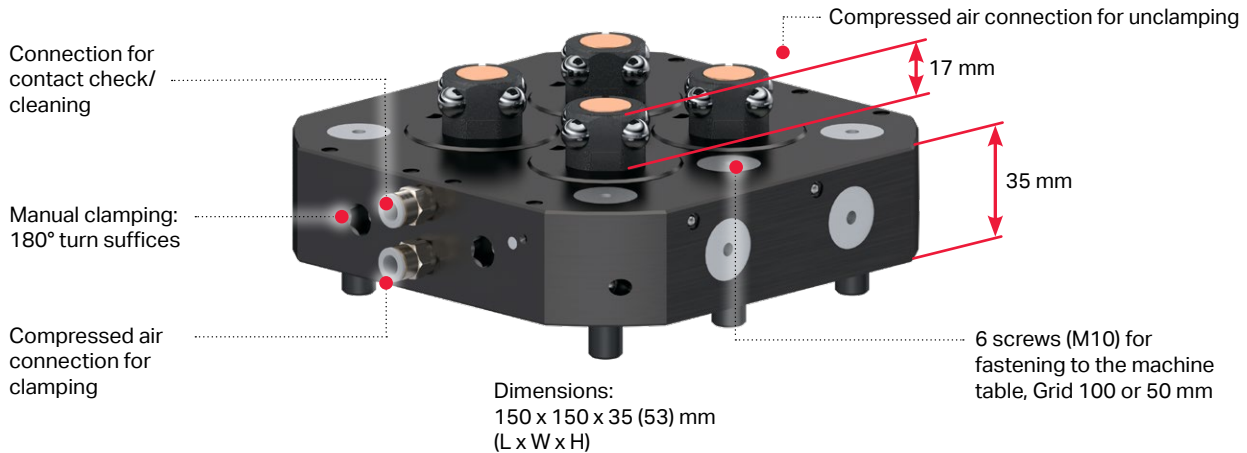
Jumbo pallet (300 x 300 mm) on centric AM-LOCK QUATTRO for light machining



Jumbo pallet (300 x 300 mm) on 4x AMLOCK-QUATTRO chucks for higher machining forces



### QUATTRO chuck



### 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
- Pressureless clamping
- 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.

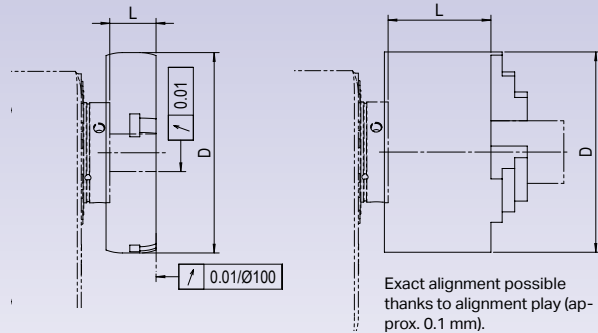
Item no.	Designation	Dimensions	Weight [kg]	max. speed [rpm]
AML.SPF-U	UNO chuck	Ø50x34 mm, 1 pin	1.18	
AML.SPF-Q	QUATTRO chuck	150x150x34 mm, 4 pins	4.70	



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

## 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*	<b>TPL.507-160</b> Faceplate, 4 T-slots 12 mm	160	30	30	27	6		0.02	
510**	<b>TPL.510-160</b> Faceplate, 4 T-slots 12 mm	160	40	30	37	6		0.02	
	<b>TPL.510-200</b> Faceplate, 4 T-slots 12 mm	200	40	30	37	10		0.05	
520***	<b>TPL.510-240</b> Faceplate, 4 T-slots 12 mm	240	45	30	42	16		0.12	
	<b>TPL.520-250</b> Faceplate, 8 T-slots 14 mm	250	45	45	45	17		0.14	
530	<b>TPL.520-300</b> Faceplate, 8 T-slots 14 mm	300	50	45	50	27		0.31	
	<b>TPL.520-350</b> Faceplate, 8 T-slots 14 mm	350	50	45	50	37		0.58	
530	<b>TPL.530-300</b> Faceplate, 8 T-slots 18mm	300	51	45	51	27		0.31	
	<b>TPL.530-400</b> Faceplate, 8 T-slots 18mm	400	51	45	51	49		0.99	
	<b>TPL.530-500**</b> Faceplate, 8 T-slots 18 mm	500	56	45	56	84		2.65	
	<b>TPL.5xx-GEN</b> Increased accuracy = ½ tolerance values								
	<b>TPL.mon</b> Faceplate assembled and measured								

\* Not possible in combination with spindle seal with labyrinth SPI.507-Lab

\*\* Increased center height required (see p. 57)

\*\*\* Not possible for TxPc models



## Scroll chucks, steel (manual)

incl. matching adapter flange, 1 set each of hard boring and turning jaws as well as clamping wrench and fastening screw

507*	<b>BFU.507-100ps</b> Scroll chuck	100		20	62.5	4	6300	0.005	507-100ps
507*	<b>BFU.507-125ps**</b> Scroll chuck	125		35	74	7	5500	0.01	507-125ps
	<b>BFU.507-160ps**</b> Scroll chuck	160		42	82.5	13	4600	0.04	507-160ps
510	<b>BFU.510-125ps</b> Scroll chuck	125		35	74	7	5500	0.01	510-125ps
	<b>BFU.510-160ps**</b> Scroll chuck	160		42	82	13	4600	0.04	510-160ps
520	<b>BFU.510-200ps**</b> Scroll chuck	200		44	92	22	4000	0.07	510-200ps
	<b>BFU.520-160ps</b> Scroll chuck	160		42	85	13	4600	0.04	520-160ps
520	<b>BFU.520-200ps**</b> Scroll chuck	200		55	95	23	4000	0.12	520-200ps
	<b>BFU.520-250ps**</b> Scroll chuck	250		76	106	39	3500	0.31	520-250ps
530	<b>BFU.530-250ps</b> Scroll chuck	250		76	104	32	3500	0.25	530-250ps
	<b>BFU.530-315ps</b> Scroll chuck	315		80	116	56	2800	0.69	530-315ps
	<b>BFU.530-400ps</b> Scroll chuck	400		136	123	97	2000	1.88	530-400ps
	<b>BFU.5xx-GEN</b> Increased accuracy = ½ tolerance values								



**Further information:**  
[www.niederhauser.ch](http://www.niederhauser.ch)  
 Request installation and operating instructions directly from manufacturer

## 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

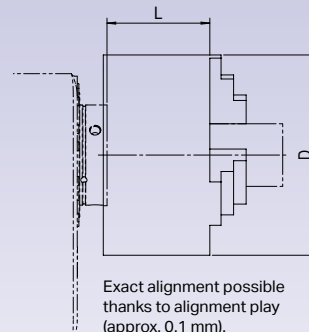
507*	<b>BFU.507-160ks**</b> Wedge bar chuck	160		42	81	11	5500	0.04	507-160ks
510	<b>BFU.510-160ks**</b> Wedge bar chuck	160		42	81	11	5500	0.04	510-160ks
	<b>BFU.510-200ks**</b> Wedge bar chuck	200		42	102.5	22	4800	0.11	510-200ks
520	<b>BFU.520-160ks</b> Wedge bar chuck	160		46	70	11	5500	0.04	520-160ks
	<b>BFU.520-200ks**</b> Wedge bar chuck	210		60	92	22	4800	0.11	520-200ks
530	<b>BFU.520-250ks**</b> Wedge bar chuck	260		81	110	38	4200	0.30	520-250ks
	<b>BFU.530-250ks</b> Wedge bar chuck	260		81	112	38	4200	0.30	520-250ks
530	<b>BFU.530-315ks</b> Wedge bar chuck	315		102	135	58	3500	0.89	520-315ks
	<b>BFU.530-400ks</b> Wedge bar chuck	400		128	153	112	2700	2.58	520-400ks
	<b>BFU.5xx-GEN</b> Increased accuracy = ½ tolerance values								



**Further information:**  
[www.smw-autoblok.de](http://www.smw-autoblok.de)  
 and [www.niederhauser.ch](http://www.niederhauser.ch)  
 Request installation and operating instructions directly from manufacturer

\* Not possible in combination with spindle seal with labyrinth SPI.507-Lab

\*\* Not possible for TxPc models



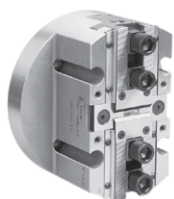
Exact alignment possible thanks to alignment play (approx. 0.1 mm).

Clamping means installed and aligned by pL LEHMANN (if ordered together with a rotary table)

Further information: [www.niederhauser.ch](http://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 [kgf]	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	507-CLC100
	BFU.507-125ksa-2	2-CL-C 125 Z115	125	-	90	8	5000		SPZ.5xx-15	507-CLC125
	BFU.507-160ksa-2	2-CL-C 160 Z140	160	-	105	14	4100		SPZ.5xx-15	507-CLC160
510	BFU.510-125ksa-2	2-CL-C 125 Z115	125	-	92	8	5000		SPZ.5xx-15	510-CLC125
	BFU.510-160ksa-2	2-CL-C 160 Z140	160	-	107	14	4100		SPZ.5xx-15	510-CLC160
	BFU.510-200ksa-2	2-CL-D 200 Z170	200	-	118	20	3300		SPZ.5xx-15	510-CLD200
520	BFU.520-160ksa-2	2-CL-C 160 Z140	160	-	109	15	4100		SPZ.520-15	520-CLC160
	BFU.520-200ksa-2	2-CL-D 200 Z170	200	-	120	20	3300		SPZ.520-15	520-CLD200
530	BFU.530-200ksa-2	2-CL-D 200 Z170	200	-	123	22	3300		SPZ.530-15	530-CLD200



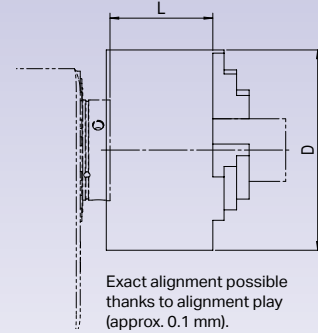
## Precision power chucks, 3- jaw (cylinder-actuated)

	pL LEHMANN Item no.	Designation	D [mm]	Passage [mm]	L from spindle [mm]	Weight [kg]	max. speed [rpm]	Moment of inertia [kgf]	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	507-BHD130
	BFU.507-165ksa	BHD-165-46-3-Z	165	46	95	13	6000		SPZ.5xx-15	507-BHD165
510	BFU.510-165ksa	BHD-165-46-3-Z	165	46	97	13	6000		SPZ.5xx-15	510-BHD165
	BFU.510-210ksa	BHD-210-52-3-Z	210	52	112	24	5000		SPZ.5xx-15	510-BHD210
520	BFU.520-165ksa	BHD-165-46-3-Z	165	46	87	13	6000		SPZ.520-15	520-BHD165
	BFU.520-210ksa	BHD-210-52-3-Z	210	52	114	24	5000		SPZ.520-15	520-BHD210
530	BFU.530-210ksa	BHD-210-52-3-Z	210	52	117	27	5000		SPZ.530-15	530-BHD210



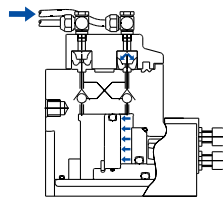
Clamping means installed and aligned by pL LEHMANN  
(if ordered together with a rotary table)

**Further information:** [www.niederhauser.ch](http://www.niederhauser.ch)  
Request installation and operating instructions directly from manufacturer

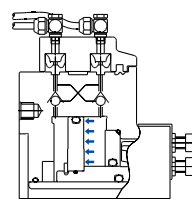


## Front-end power chuck, 3-jaw

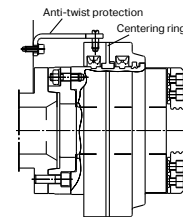
pL LEHMANN Item no.	Designation	D [mm]	Passage [mm]	L from spindle [mm]	Weight [kg]	max. speed [rpm]	Moment of inertia [kgf]	Niederhauser item no., incl. adapter flange
507	BFU.507-125vsa	SP 125-26	204	26	135	21	4000	507-SP125
510	BFU.510-160vsa	SP 160-38	255	38	163	33	3500	510-SP160
520	BFU.520-160vsa	SP 160-38	255	38	163	33	3500	520-SP160



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.



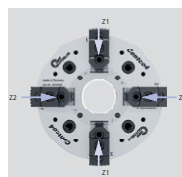
Distributor mounted on chuck outer diameter with centering ring (wear part). An anti-rotation device is required on the machine headstock.

## Precision power chucks, 4-jaw (cylinder-actuated)

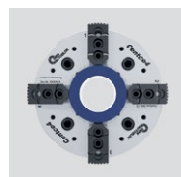
pL LEHMANN Item no.	Designation	D [mm]	Passage [mm]	L from spindle [mm]	Weight [kg]	max. speed [rpm]	Moment of inertia [kgf]	Required clamping cylinder	Niederhauser item no., incl. adapter flange
510	BFU.510-210ksa-4	Centco4-210-52	210	52	129	29	5000	SPZ.5xx-15	510-Centco4
520	BFU.520-210ksa-4	Centco4-210-52	210	52	131	30	5000	SPZ.520-15	520-Centco4
530	BFU.530-210ksa-4	Centco4-210-52	210	52	134	32	5000	SPZ.530-15	530-Centco4



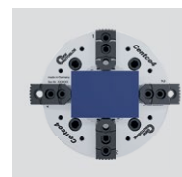
Initially, only the force required for workpiece centering acts on the two pairs of jaws Z1 and Z2. The force required for machining is built up only after both pairs of jaws Z1 and Z2 are in contact with the workpiece.



2+2 centric compensating clamping



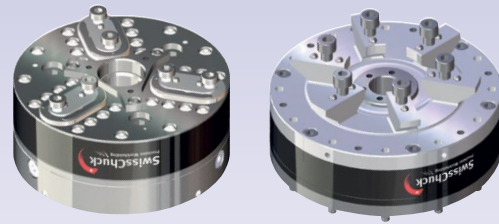
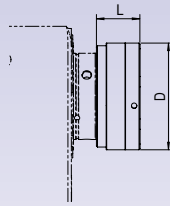
2+2 centric clamping for round or thin-walled workpieces



2+2 centric compensating clamping for rectangular or square workpieces



2+2 centric compensating clamping for workpieces with awkward geometric shape



Clamping device assembled by pL LEHMANN,  
final adjustment by customer (if ordered together with a rotary table)

For further information, please visit: [www.SwissChuck.com](http://www.SwissChuck.com)  
Request installation and operating instructions directly from manufacturer

## Precision power chucks (cylinder-actuated)

	pL LEHMANN Item no.	Designation	D [mm]	Passage [mm]	L from spindle [mm]	Weight [kg]	max. speed [rpm]	Moment of inertia [kgf]	Required clamping cylinder	SwissChuck item no. and adapter flange
507	SWI.507-3-110	3KCHP 110-12	ø110	12	70	3.5		0.003	SPZ.5xx-15	SZ1020101
	SWI.507-3-160	3KCHP 160-30	ø160	14	85	5		0.015	SPZ.5xx-15	SZ1020102
	SWI.510-3-110	3KCHP 110-12	ø110	12	70	3.5		0.003	SPZ.5xx-15	SZ1020103
510	SWI.510-3-160	3KCHP 160-30	ø160	14	85	5		0.015	SPZ.5xx-15	SZ1020104
	SWI.510-3-200	3KCHP 200-40	ø200	14	98	7.8		0.036	SPZ.5xx-15	SZ1020105
520	SWI.520-3-160	3KCHP 160-30	ø160	14	72	5		0.015	SPZ.520-15	SZ1020106
	SWI.520-3-200	3KCHP 200-40	ø200	14	85	7.8		0.036	SPZ.520-15	SZ1020107
	SWI.520-3-250	3KCHP 250-52	ø250	14	91	12.8		0.101	SPZ.520-15	SZ1020108
530	SWI.530-3-250	3KCHP 250-52	ø250	14	91	12.8		0.101	SPZ.530-15	SZ1020109
	SWI.530-3-315	3KFHP 315-48	ø315	0	93	36		0.457	SPZ.530-15	SZ1020110
	SWI.530-3-400	3KFHP 400-120	ø400	0	100	58		1.236	SPZ.530-15	SZ1020111

## Precision diaphragm chuck (pneumatically actuated)

	pL LEHMANN Item no.	Designation	D [mm]	Passage [mm]	L from spindle [mm]	Weight [kg]	max. speed [rpm]	Moment of inertia [kgf]	SwissChuck item no. and adapter flange
507	SWI.507-6-85	6VMCHP 85 V1	ø85	0	53	1.5		0.001	SZ1020112
	SWI.507-6-128	6VMCHP 128 V1	ø128	0	77	4.6		0.01	SZ1020113
	SWI.507-6-160	6VMCHP 160 V1	ø160	0	92	10		0.032	SZ1020114
510	SWI.510-6-128	6VMCHP 128 V1	ø128	0	81	4.6		0.01	SZ1020115
	SWI.510-6-160	6VMCHP 160 V1	ø160	0	96	10		0.032	SZ1020116
	SWI.510-6-200	6VMCHP 200 V1	ø200	0	120	16		0.084	SZ1020117
520	SWI.520-6-128	6VMCHP 128 V1	ø128	0	67	4.6		0.01	SZ1020118
	SWI.520-6-160	6VMCHP 160 V1	ø160	0	96	10		0.032	SZ1020119
	SWI.520-6-200	6VMCHP 200 V1	ø200	0	106	16		0.084	SZ1020120
530	SWI.530-6-128	6VMCHP 128 V1	ø128	0	71	4.6		0.01	SZ1020121
	SWI.530-6-160	6VMCHP 160 V1	ø160	0	82	10		0.032	SZ1020122
	SWI.530-6-200	6VMCHP 200 V1	ø200	0	102	16		0.084	SZ1020123

Interchangeable jaws and accessories on request

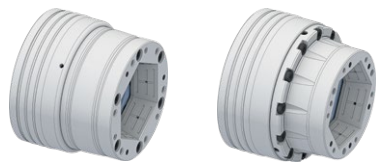


The clamping device serves as the starting point on the Lehmann CNC rotary table and can be set up easily for your workpieces through use of a wide variety of clamping elements and adapters. Regardless of whether the clamping requires a round or profiled contour, whether unmachined or finish-machined 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)

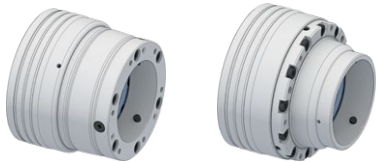
Further information: [www.hainbuch.com](http://www.hainbuch.com)  
Request installation and operating instructions directly from manufacturer

**Rotating clamping means**



TOPlus Chuck

TOPlus mini Chuck



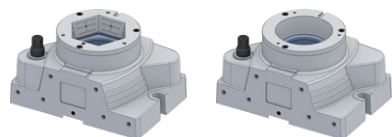
SPANNTOP Chuck

SPANNTOP mini Chuck



TOROK hand chuck

**Stationary clamping means**

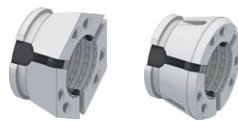


MANOK plus manual vise



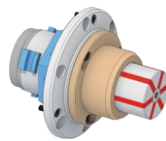
HYDROK hydraulic vise

**Clamping element**

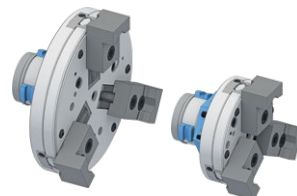


Clamping head – external clamping

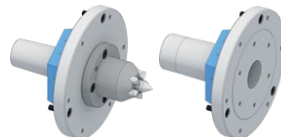
**Clamping adapters**



MANDO Adapt mandrel – Internal clamping



Jaw module, size 145 or 215 – Jaw clamping



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

- 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 neodymium magnet
- High axial run-out changeover accuracy
- High retention force of 140 N/cm<sup>2</sup>
- Assembly in 30 sec. without aligning
- Low maintenance, since resistant to contamination

Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, WMS

MOT, KAB, WDF, CNC

Aligning, GLA, RST, LOZ

Service & Technology

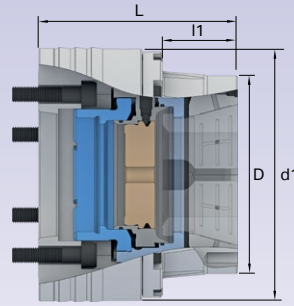
Tooling



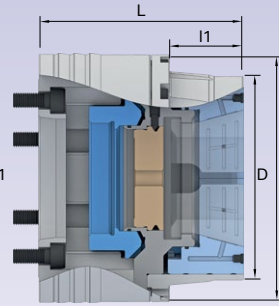
Clamping means installed and aligned by pL LEHMANN (if ordered together with a rotary table)

Further information: [www.hainbuch.com](http://www.hainbuch.com)

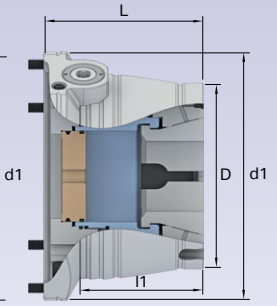
Request installation and operating instructions directly from manufacturer



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. 57

	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	500	SPZ.5xx-9		10001281
	HAI.507-tp-axf	TOPlus mini Axfix	•		26	3...26	86	33	74 f7	129	5.8	500	SPZ.5xx-9		10001285
510	HAI.510-tp-axz	TOPlus mini Axzug	•		52	3...52	103.5	42	119 f7	150	10.9	500	SPZ.5xx-9	•	10001282
	HAI.510-tp-axf	TOPlus mini Axfix	•		52	3...52	104.5	44	119 f7	150	10.6	500	SPZ.5xx-9	•	10001286
	HAI.510-tp-to	TOROK SE Axzug	•		52	3...52	137	92	125 f7	174	14.6	7000		•	10001300
520	HAI.520-tp-axz	TOPlus mini Axzug	•		52	3...52	107	42	119 f7	150	10.4	500	SPZ.520-9	•	10001283
	HAI.520-tp-axf	TOPlus mini Axfix	•		52	3...52	109	44	119 f7	150	10.1	7000	SPZ.520-9	•	10001287
	HAI.520-tp-to	TOROK SE Axzug	•		52	3...52	140	91.5	125 f7	174	14.4	7000		•	10001301
530	HAI.530-tp-axz	TOPlus mini Axzug	•		65	3...65	112	49	129 f7	205	14.9	500	SPZ.530-9	•	10001284
	HAI.530-tp-axf	TOPlus mini Axfix	•		65	3...65	105.5	50	137 f7	203	14.7	500	SPZ.530-9	•	10001288
	HAI.530-tp-to	TOROK SE Axzug	•		65	3...65	151.5	97	145 f7	210	18.8	500		•	10001302

### 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



TOPlus mini

## HAINBUCH chucks SPANNTOP mini | TOROK RD

\* For T-type rotary tables it may be necessary to increase the center height, see p. 57

	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-st-axz	SPANNTOP mini Axzug	•		32	3...32	101	43	66 f7	133	6.7	500	SPZ.5xx-9		10001289
	HAI.507-st-axf	SPANNTOP mini Axfix	•		32	3...32	96	44	74 f7	129	6.2	500	SPZ.5xx-9		10001293
510	HAI.510-st-axz	SPANNTOP mini Axzug	•		52	3...52	103.5	45	90 f7	150	9.0	500	SPZ.5xx-9	•	10001290
	HAI.510-st-axf	SPANNTOP mini Axfix	•		52	3...52	104.5	44	98 f7	150	9.2	500	SPZ.5xx-9	•	10001294
	HAI.510-st-to	TOROK RD Axzug	•		52	3...52	137	92	125 f7	174	14.7	7000		•	10001297
520	HAI.520-st-axz	SPANNTOP mini Axzug	•		52	3...52	107	45	90 f7	150	9.1	500	SPZ.520-9	•	10001291
	HAI.520-st-axf	SPANNTOP mini Axfix	•		52	3...52	109	44	98 f7	150	9.4	500	SPZ.520-9	•	10001295
	HAI.520-st-to	TOROK RD Axzug	•		52	3...52	140	91.5	125 f7	174	14.4	7000		•	10001298
530	HAI.530-st-axz	SPANNTOP mini Axzug	•		65	3...65	112	47	111 f7	205	13.9	500	SPZ.530-9	•	10001292
	HAI.530-st-axf	SPANNTOP mini Axfix	•		65	3...65	105.5	50	119 f7	203	13.3	500	SPZ.530-9	•	10001296
	HAI.530-st-to	TOROK RD Axzug	•		65	3...65	151.5	97	145 f7	210	18.5	500		•	10001299

### SPANNTOP mini

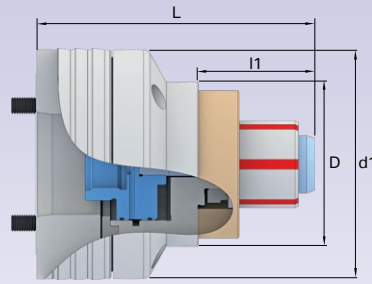
- Classical benefits of all HAINBUCH power chucks, e.g. high retention force, all-around clamping with high accuracy and exceptional ease of setup
- Lower centrifugal force losses compared to jaw chucks
- Workpiece stabilized through axial pulling against workpiece stop
- Radial run-out < 0.01 mm
- Minimal interference contour and easy changing of the clamping heads



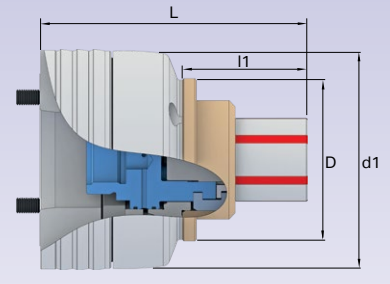
SPANNTOP mini

Clamping means installed and aligned by pL LEHMANN  
(if ordered together with a rotary table)

Further information: [www.hainbuch.com](http://www.hainbuch.com)  
Request installation and operating instructions directly from manufacturer



MANDO T211 Axzug

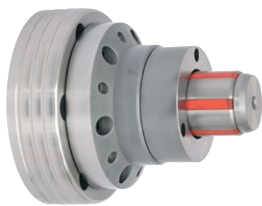


MANDO T212 Axzug  
MANDO T812 Axfix

**HAINBUCH clamping mandrels MANDO**

\* For T-type rotary tables it may be necessary to increase the center height, see p. 57

	pL LEHMANN Item no.	Designation	Hydraulic	Size	Clamping capacity [mm]	L [mm]	l1 [mm]	D [mm]	d1 [mm]	Weight [kg]	max. speed [rpm]	Required clamping 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	500	SPZ.5xx-9	10001308
	HAI.507-ma-axf1	MANDO T812 Axfix	•	xxs	8...13	116.75	44.0	65	141	8.20	500	SPZ.5xx-9	10001316
	HAI.507-ma-axz2	MANDO T212 Axzug	•	xs	13...19	116	45.5	65	141	8.00	500	SPZ.5xx-9	10001309
	HAI.507-ma-axf2	MANDO T812 Axfix	•	xs	13...19	120	47.5	65	141	8.20	500	SPZ.5xx-9	10001317
510	HAI.510-ma-axz1	MANDO T212 Axzug	•	s	16...21	112.5	47.5	70	141	7.50	500	SPZ.5xx-9	10001310
	HAI.510-ma-axf1	MANDO T812 Axfix	•	s	16...21	117.5	49.5	70	141	7.80	500	SPZ.5xx-9	10001318
	HAI.510-ma-axz2	MANDO T211 Axzug	•	0	20...28	115.5	40.0	75	141	7.20	500	SPZ.5xx-9	10001303
	HAI.510-ma-axz3	MANDO T212 Axzug	•	0	20...28	123.5	58.5	90	141	8.00	500	SPZ.5xx-9	10001311
520	HAI.510-ma-axf2	MANDO T812 Axfix	•	0	20...28	129.5	60.5	90	141	8.40	500	SPZ.5xx-9	10001319
	HAI.520-ma-axz1	MANDO T211 Axzug	•	1	26...38	130	51.0	75	141	7.50	500	SPZ.520-9	10001304
	HAI.520-ma-axz2	MANDO T212 Axzug	•	1	26...38	134	64.5	90	141	8.40	500	SPZ.520-9	10001312
	HAI.520-ma-axf1	MANDO T812 Axfix	•	1	26...38	137.5	66.5	90	141	8.60	500	SPZ.520-9	10001320
	HAI.520-ma-axz3	MANDO T211 Axzug	•	2	36...54	150	71.0	100	141	8.10	500	SPZ.520-9	10001305
	HAI.520-ma-axz4	MANDO T212 Axzug	•	2	36...54	152	80.5	104	141	9.30	500	SPZ.520-9	10001313
530	HAI.520-ma-axf2	MANDO T812 Axfix	•	2	36...54	153.5	82.5	104	141	9.30	500	SPZ.520-9	10001321
	HAI.530-ma-axz1	MANDO T211 Axzug	•	3	50...80	172	78.0	100	211	14.1	500	SPZ.530-9	10001306
	HAI.530-ma-axz2	MANDO T212 Axzug	•	3	50...80	172	87.5	120	211	15.5	500	SPZ.530-9	10001314
	HAI.530-ma-axf1	MANDO T812 Axfix	•	3	50...80	173.5	90.0	120	211	15.8	500	SPZ.530-9	10001322
	HAI.530-ma-axz3	MANDO T211 Axzug	•	4	69...100	187	95.0	100	211	15.3	500	SPZ.530-9	10001307
	HAI.530-ma-axz4	MANDO T212 Axzug	•	4	69...100	180.5	97.5	138	211	16.6	500	SPZ.530-9	10001315
	HAI.530-ma-axf2	MANDO T812 Axfix	•	4	69...100	183.5	100.0	138	211	17.3	500	SPZ.530-9	10001323



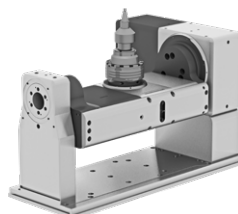
MANDO T211



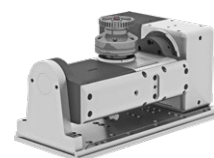
MANDO T212  
MANDO T812

**MANDO**

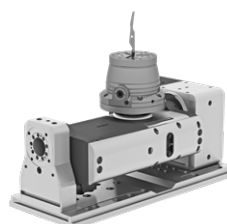
- Typical HAINBUCH features such as ease of setup, parallel clamping, optimal force transmission, high rigidity and retention force as well as low wear
- Workpiece stabilized through axial pulling against workpiece stop
- Radial run-out < 0.01 mm, version T812 < 0.025 mm
- Large adaptation range through use of vulcanized clamping elements
- Prepared for air system check at workpiece stop



SPANNTOP mini Axzug size 52 on T1-520530 TAP3



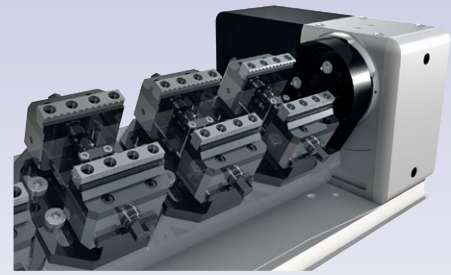
MANDO T211 size 0 on T1-510520 TAP2



TOROK SE size 52 on T1-507510 TOP1



TOPlus mini Axfix size 52 on EA-520



Clamping device assembled by pL LEHMANN, final adjustment by customer (if ordered together with a rotary table)

Further information: [www.vb-tools.com](http://www.vb-tools.com)  
Request installation and operating instructions directly from manufacturer

### SAFE and AirLine zero point clamping systems

	pL LEHMANN Item no.	Designation	Manual open, pneumatic 6 bar	open, hydraulic 65 bar	D1 [mm]	D2 [mm]	L from spindle [mm]	Weight [kg]	max. speed [rpm]	Draw-in force [kN]	Retention force [kN]	required Rotary union*	vb Item no., incl. adapter flange
507	VBO.507-al	AirLine	•		120	130	52			>9	40	DDF.507-04	755 507-04
	VBO.507-SAh	SAFE20		•	120	130	50			>9	40	DDF.507-04	752 507-04
	VBO.507-SAm	SAFE20	•		120	130	50			>9	40		752 507-04-M
510	VBO.510-al	AirLine	•		120	130	52			>9	40	DDF.510-04	755 510-04
	VBO.510-SAh	SAFE20		•	120	130	50			>9	40	DDF.510-04	752 510-04
	VBO.510-SAm	SAFE20	•		120	130	50			>9	40		752 510-04-M
520	VBO.520-al	AirLine	•		120	140	52			>9	40	DDF.520-04	755 520-04
	VBO.520-SAh	SAFE20		•	120	140	50			>9	40	DDF.520-04	752 520-04
	VBO.520-SAm	SAFE20	•		120	140	50			>9	40		752 520-04-M
530	VBO.530-al	AirLine	•		120	220	57			>9	40	DDF.530-04	755 530-04
	VBO.530-SAh	SAFE20		•	120	220	55			>9	40	DDF.530-04	752 530-04
	VBO.530-SAm	SAFE20	•		120	220	55			>9	40		752 530-04-M

\* see pp. 58/59

### Clamping means for SAFE and AirLine zero point clamping systems

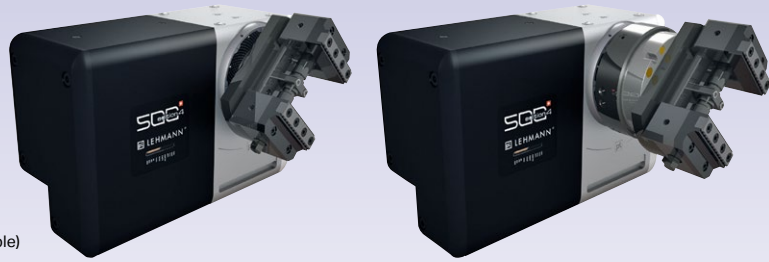
	pL LEHMANN Item no.	Designation	Interference circle Ø [mm]	L from support [mm]	Clamping capacity [mm]	Dimensions LxWxH [mm]	Weight [kg]	max. speed [rpm]	vb Item no.
Center clamp	VBO.al-76	AirLine vb centro76	175	75	5-74/44-120	Ø148x90x75			vb-centro76 AL
	VBO.al-76P	AirLine vb centro76 pendulum	175	75	22-74/62-120	Ø148x90x75			vb-centro76 P AL
	VBO.sa-76	SAFE20 vb centro76	175	75	5-74/44-120	Ø148x90x75			vb-centro76 S
	VBO.sa-76P	SAFE20 vb centro76 pendulum	175	75	22-74/62-120	Ø148x90x75			vb-centro76 P S
Empty pallets	VBO.al-PalQ	AirLine Index pallet	206	35		150x150x35			755601 PL
	VBO.al-PalR	AirLine Index pallet, round	160	35		Ø160x35			755602 PL
	VBO.sa-PalQ	SAFE20 Index pallet	206	35		150x150x35			752601 PL
	VBO.sa-PalR	SAFE20 Index pallet, round	160	35		Ø160x35			752602 PL

### Center clamp on ripas or directly on spindle

	pL LEHMANN Item no.	Designation	Interference circle Ø [mm]	L from support [mm]	Clamping capacity [mm]	Dimensions LxWxH [mm]	Weight [kg]	max. speed [rpm]	vb Item no.
ripas	VBO.RIP-76	vb centro76, ripas	175	83	5-74/44-120	Ø148x90x83			vb-centro76 Ri
	VBO.RIP-76P	vb centro76 pendulum, ripas	175	83	22-74/62-120	Ø148x90x83			vb-centro76 P Ri
507	VBO.507-76	vb-centro76, direct	175	67	5-74/44-120	Ø148x90x75			vb-centro76 pL 507
	VBO.507-76P	vb-centro76 pendulum, direct	175	67	22-74/62-120	Ø148x90x75			vb-centro76 P pL 507
510	VBO.510-76	vb-centro76, direct	175	67	5-74/44-120	Ø148x90x75			vb-centro76 pL 510
	VBO.510-76P	vb-centro76 pendulum, direct	175	67	22-74/62-120	Ø148x90x75			vb-centro76 P pL 510



Vischer & Bolli  
Werkzeug- und Spanntechnik  
Machining and workholding

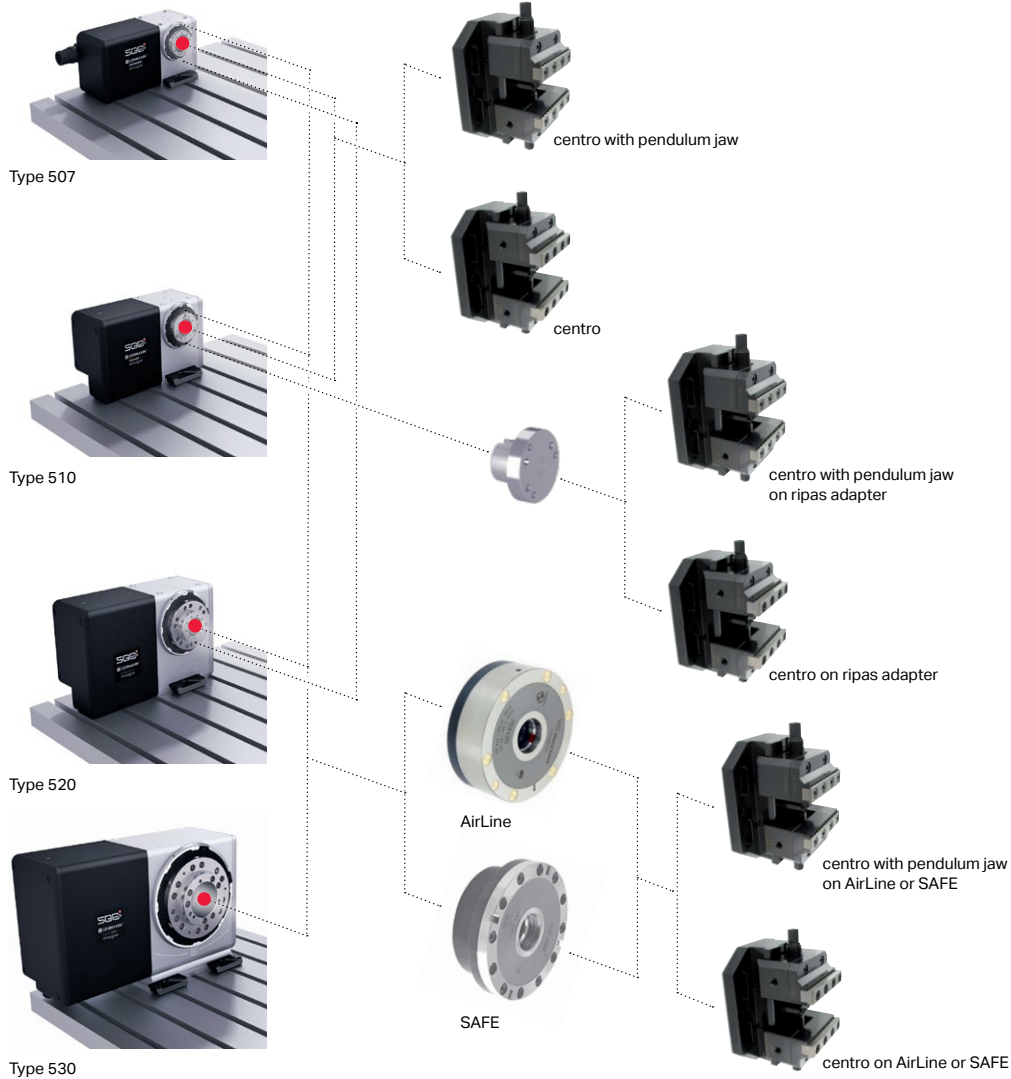


Clamping device assembled by pL LEHMANN, final adjustment by customer (if ordered together with a rotary table)

Further information: [www.vb-tools.com](http://www.vb-tools.com)  
Request installation and operating instructions directly from manufacturer

**vb-centro76 jaw line**

	vb item no.	Designation	Dimension (LxWxH)	Weight [kg]	Speed [rpm]
Soft jaws	748-086ST	Soft steel jaws	86x60x40		
	748-086AL	Soft aluminum jaws	86x60x40		
Grip jaws	748-76-04-ST	Grip jaw, standard			
	748-76-04-RG	Grooved / Grip jaw			
	748-76-04-AL	Grip jaw for aluminum			
	748-76-04-L	Positive-fit jaws			
Accessories	748-76-M8	Workpiece stop			
	748-NM	Torque wrench			
	748-SW12	Wrench socket, 12 mm			



Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, WMS

MOT, KAB, WDF, CNC

Aligning, GLA, RST, LOZ

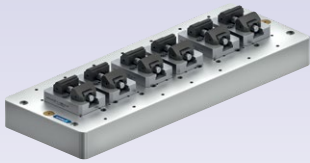
Service & Technology

Tooling



Further information: [www.schunk.com](http://www.schunk.com)  
Request installation and operating instructions directly from manufacturer

Hole grid plate installed by pL LEHMANN  
(if ordered together with a rotary table)



KSC mini  
1-side, 1-row



KSC mini  
1 side, 2 rows



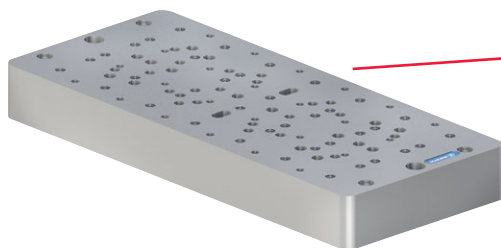
KSC mini  
2 sides, 1 row

	pL LEHMANN Item no.	pL LEHMANN Item no. Hole grid plate*	L [mm]	Clamping system	Description	Number of clamp- ing elements	SCHUNK Item no. Hole grid plate	SCHUNK Item no. Clamping elements
510	SCH.510-5-KSC40-11	Always needed: SCH.510-LRP500	500	KSC mini	1 side, 1 row	4	40105326	40105274
	SCH.510-5-KSC40-12		500	KSC mini	1 side, 2 rows	10		40105276
	SCH.510-5-KSC40-21		500	KSC mini	2 sides, 1 row	8		40105275
	SCH.510-5-KSC40-22		500	KSC mini	2 sides, 2 rows	20		40105277
	SCH.510-5-KSC65-1		500	KSC 80	1-side	4		40105278
	SCH.510-5-KSC65-2		500	KSC 80	2-sides	8		40105279
	SCH.510-5-KSC125-1		500	KSC 125	1 side, 1 row	3		40105280
	SCH.510-5-KSC125-2		500	KSC 125	2-sides 1-row	6		40105281
	SCH.510-5-KSM400-11		500	KSM2 400	1 side, 1 row	max. 5		40105282
	SCH.510-5-KSM400-12		500	KSM2 400	1 side, 2 rows	max. 10		40105284
	SCH.510-5-KSM400-21		500	KSM2 400	2 sides, 1 row	max. 10		40105283
	SCH.510-5-KSM400-22		500	KSM2 400	2 sides, 2 rows	max. 20		40105285
	SCH.510-6-KSC40-11	Always needed: SCH.510-LRP600	600	KSC mini	1 side, 1 row	6	40105355	40105286
	SCH.510-6-KSC40-12		600	KSC mini	1 side, 2 rows	14		40105288
	SCH.510-6-KSC40-21		600	KSC mini	2 sides, 1 row	12		40105287
	SCH.510-6-KSC40-22		600	KSC mini	2 sides, 2 rows	28		40105289
	SCH.510-6-KSC65-1		600	KSC 80	1-side	4		40105290
	SCH.510-6-KSC65-2		600	KSC 80	2-sides	8		40105291
	SCH.510-6-KSC125-1		600	KSC 125	1 side, 1 row	3		40105292
	SCH.510-6-KSC125-2		600	KSC 125	2-sides 1-row	6		40105293
SCH.510-6-KSM500-11	600		KSM2 500	1 side, 1 row	max. 6	40105294		
SCH.510-6-KSM500-12	600		KSM2 500	1 side, 2 rows	max. 12	40105296		
SCH.510-6-KSM500-21	600		KSM2 500	2 sides, 1 row	max. 12	40105295		
SCH.510-6-KSM500-22	600		KSM2 500	2 sides, 2 rows	max. 24	40105297		

## Ordering information

Always order together with pL

- Counter bearing GLA.TOP2-150 (p. 36)
- Mounting kit RFX.510-ASa-TOP (p. 36)
- Base plate RFX.510-GPxxs-TOP (p. 36) or hydraulic kit GLA.HYD-xxx (p. 75)



Hole grid plate SCHUNK 40105326, 40105355, 40105356,  
40105357



Instead of the standard clamping yoke shown on  
p. 36, the SCHUNK hole grid plate is used here.

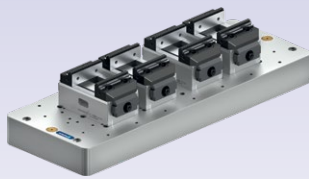


Further information: [www.schunk.com](http://www.schunk.com)  
Request installation and operating instructions directly from manufacturer

Hole grid plate installed by pL LEHMANN  
(if ordered together with a rotary table)



KSC mini  
2 sides, 2 rows



KSC 80  
1 side, 1 row



KSC 80  
2 sides, 1 row

pL LEHMANN Item no.	pL LEHMANN Item no. Hole grid plate*	L [mm]	Clamping system	Description	Number of clamping elements	SCHUNK Item no. Hole grid plate	SCHUNK Item no. Clamping elements		
SCH.520-6-KSC40-11	Always needed: SCH.520-LRP600	600	KSC mini	1 side, 1 row	6	Always needed: 40105356	40105298		
SCH.520-6-KSC40-12		600	KSC mini	1 side, 2 rows	14		40105300		
SCH.520-6-KSC40-21		600	KSC mini	2 sides, 1 row	12		40105299		
SCH.520-6-KSC40-22		600	KSC mini	2 sides, 2 rows	28		40105301		
SCH.520-6-KSC65-1		600	KSC 80	1-side	4		40105302		
SCH.520-6-KSC65-2		600	KSC 80	2-sides	8		40105303		
SCH.520-6-KSC125-1		600	KSC 125	1 side, 1 row	3		40105304		
SCH.520-6-KSC125-2		600	KSC 125	2-sides 1-row	6		40105305		
SCH.520-6-KSM500-11		600	KSM2 500	1 side, 1 row	max. 6		40105306		
SCH.520-6-KSM500-12		600	KSM2 500	1 side, 2 rows	max. 12		40105308		
SCH.520-6-KSM500-21		600	KSM2 500	2 sides, 1 row	max. 12		40105307		
SCH.520-6-KSM500-22		600	KSM2 500	2 sides, 2 rows	max. 24		40105309		
SCH.520-8-KSC40-11		Always needed: SCH.520-LRP800	800	KSC mini	1 side, 1 row		8	Always needed: 40105357	40105310
SCH.520-8-KSC40-12			800	KSC mini	1 side, 2 rows		18		40105312
SCH.520-8-KSC40-21	800		KSC mini	2 sides, 1 row	16	40105311			
SCH.520-8-KSC40-22	800		KSC mini	2 sides, 2 rows	36	40105313			
SCH.520-8-KSC65-1	800		KSC 80	1-side	6	40105314			
SCH.520-8-KSC65-2	800		KSC 80	2-sides	12	40105315			
SCH.520-8-KSC125-1	800		KSC 125	1 side, 1 row	5	40105316			
SCH.520-8-KSC125-2	800		KSC 125	2-sides 1-row	10	40105317			
SCH.520-8-KSM500-11	800		KSM2 500	1 side, 1 row	max. 6	40105318			
SCH.520-8-KSM500-12	800		KSM2 500	1 side, 2 rows	max. 12	40105320			
SCH.520-8-KSM500-21	800		KSM2 500	2 sides, 1 row	max. 12	40105319			
SCH.520-8-KSM500-22	800		KSM2 500	s2 sides, 2 rows	max. 24	40105321			

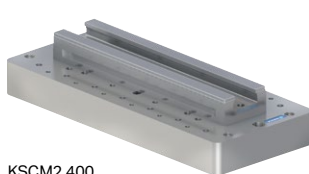
## Ordering information

Always order together with pL

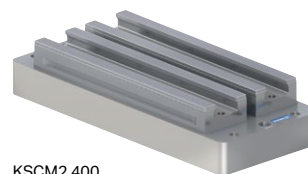
- Counter bearing GLA.TOP2-180 (p. 36)
- Mounting kit RFX.520-ASa-TOP (p. 36)
- Base plate RFX.520-GPxxxx-TOP (p. 36) or hydraulic kit GLA.HYD-xxx (p 75)



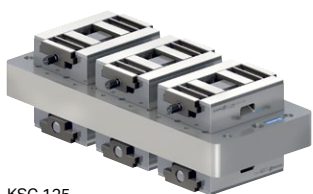
KSC 125  
1 side, 1 row



KSCM2 400  
1 side, 1 row



KSCM2 400  
1 side, 2 rows



KSC 125  
2 sides, 1 row



KSM2 400  
2 sides, 1 row



KSM2 400  
2 side, 2 rows



Clamping device assembled by pL LEHMANN,  
final adjustment by customer (if ordered together with a rotary table)

**Further information:** [www.schunk.com](http://www.schunk.com)  
Request installation and operating instructions directly from manufacturer

	pL LEHMANN Item no.	Designation	Size [mm]	L from spindle (without jaws) [mm]	Pneumatic	Manual	Centered	Fixed jaw	Jaw stroke [mm]	Clamping force [kN] *	Max. pressure [bar]	Max. torque [Nm]	Max. range with standard jaws ** [mm]	Weight [kg]	Max. speed *** [rpm]	Additionally required pL Lehmann rotary union ***	SCHUNK catalog reference	SCHUNK Item no. incl. adapter flange
507	SCH.507-KSP64	KSP-Z plus 64	64 x 64	65.7	•	•	•	•	2	4.5	9		40	6.20	100	DDF.507-04	0405102	40105123
	SCH.507-KSP100	KSP-Z plus 100	100 x 100	80.2	•	•	•	•	2	18	9		70	6.20	100	DDF.507-04	0405202	40101540
	SCH.507-KSP100LH	KSP-LH-Z plus 100	100 x 100	80.2	•	•	•	•	6	8	9		70	6.20	100	DDF.507-04	0405222	40101541
	SCH.507-KSP100F	KSP-F-Z plus 100	100 x 100	80.2	•			•	4	18	9		70	6.20	100	DDF.507-04	0405212	40101542
	SCH.507-KSA100	KSA-Z plus 100	100 x 100	85.2		•	•		2	18	9	8	70	7.20	100		0405291	40101543
	SCH.507-KSA100LH	KSA-LH-Z plus 100	100 x 100	85.2		•	•		6	18	9	20	70	7.20	100		0405295	40101544
510	SCH.507-KSA100F	KSA-F-Z plus 100	100 x 100	85.2		•		•	4	18	9	8	70	7.20	100		0405293	40101545
	SCH.510-KSP64	KSP-Z plus 64	64 x 64	65.7	•			•	2	4.5	9		40	100	DDF.510-04	0405102	40105124	
	SCH.510-KSP100	KSP-Z plus 100	100 x 100	80.2	•		•		2	18	9		70	100	DDF.510-04	0405202	40106193	
	SCH.510-KSP100LH	KSP-LH-Z plus 100	100 x 100	80.2	•			•	6	8	9		70	100	DDF.510-04	0405222	40106253	
	SCH.510-KSP100F	KSP-F-Z plus 100	100 x 100	80.2	•			•	4	18	9		70	100	DDF.510-04	0405212	40106195	
	SCH.510-KSA100	KSA-Z plus 100	100 x 100	85.2		•	•		2	18	9	8	70	100		0405291	40106194	
	SCH.510-KSA100LH	KSA-LH-Z plus 100	100 x 100	85.2		•	•		6	18	9	20	70	100		0405295	40106196	
	SCH.510-KSA100F	KSA-F-Z plus 100	100 x 100	85.2		•		•	4	18	9	8	70	100		0405293	40106197	
	SCH.510-KSP160	KSP-Z plus 160	160 x 160	102.7	•				3	45	9		120	15.80	100	DDF.510-04	0405302	40101546
	SCH.510-KSP160LH	KSP-LH-Z plus 160	160 x 160	102.7	•		•		8	20	9		120	16.00	100	DDF.510-04	0405322	40101547
	SCH.510-KSP160F	KSP-F-Z plus 160	160 x 160	102.7	•			•	6	45	9		120	15.80	100	DDF.510-04	0405312	40101548
	SCH.510-KSA160	KSA-Z plus 160	160 x 160	107.7		•	•		3	45	9	10	120	15.80	100		0405391	40101549
520	SCH.510-KSA160LH	KSA-LH-Z plus 160	160 x 160	107.7		•	•		8	45	9	25	120	15.80	100		0405395	40101550
	SCH.510-KSA160F	KSA-F-Z plus 160	160 x 160	107.7		•		•	6	45	9	10	120	15.80	100		0405393	40101551
	SCH.520-KSP250	KSP-Z plus 250	250 x 250	128.2	•				5	55	6		170	50.00	100	DDF.520-04	0405502	40101552
	SCH.520-KSP250LH	KSP-LH-Z plus 250	250 x 250	128.2	•		•		15	20	6		170	50.00	100	DDF.520-04	0405522	40101553
530	SCH.520-KSP250F	KSP-F-Z plus 250	250 x 250	128.2	•			•	10	55	6		170	50.00	100	DDF.520-04	0405512	40101554
	SCH.530-KSP250	KSP-Z plus 250	250 x 250	128.2	•		•		5	55	6		170	58.00	100	DDF.530-04	0405502	on request
	SCH.530-KSP250LH	KSP-LH-Z plus 250	250 x 250	128.2	•		•		15	20	6		170	58.00	100	DDF.530-04	0405522	on request
	SCH.530-KSP250F	KSP-F-Z plus 250	250 x 250	128.2	•			•	10	55	6		170	58.00	100	DDF.530-04	0405512	on request

\* 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. 58/59  
 \*\*\*\* only indexing allowed

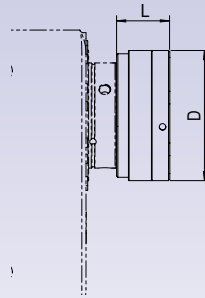


KSPZ plus 250 on EA-520



SCHUNK clamping unit on SCHUNK VERO-S (p. 137)





Clamping device assembled by pL LEHMANN,  
final adjustment by customer (if ordered together with a rotary table)

**Further information:** [www.schunk.com](http://www.schunk.com)  
Request installation and operating instructions directly from manufacturer

	pL LEHMANN Item no.	Designation non-rusting	Pneumatic Turbo function	6 bar non-rusting	D [mm]	L from spindle [mm]	Draw-in force [kN]	Increased draw-in force with turbo function [kN]	Max. retention force [kN]	Weight [kg]	Max. speed ** [rpm]	Open	Anti-twist protection	Required rotary union*	SCHUNK catalog reference	SCHUNK Item no., incl. adapter flange	
507	SCH.507-90ix	VERO-S NSE mini 90-V1	•	•	•	ø90	35	0.5	1.5	25	1.8	100	•	•	DDF.507-04	0435105	40105125
	SCH.507-138ix	VERO-S NSE3 138-V1	•	•	•	ø138	69.5	8	28	75	8.20	100	•	•	DDF.507-04	1313723	40101342
	SCH.507-138ix-P	VERO-S NSE3 138-V1-P	•	•	•	ø138	69.5	8	28	75	6.7	100	•	•	DDF.507-04	1359500	1370794
510	SCH.510-90ix	VERO-S NSE mini 90-V1	•	•	•	ø90	35	0.5	1.5	25	1.8	100	•	•	DDF.510-04	0435105	40105125
	SCH.510-138ix	VERO-S NSE3 138-V1	•	•	•	ø138	79	8	28	75	8.10	100	•	•	DDF.510-04	1313723	40101344
	SCH.510-138ix-P	VERO-S NSE3 138-V1-P	•	•	•	ø138	69.5	8	28	75	6.7	100	•	•	DDF.510-04	1359500	1370794
520	SCH.520-138ix	VERO-S NSE3 138-V1	•	•	•	ø138	79	8	28	75		100	•	•	DDF.520-04	1313723	40105132
	SCH.520-176ix	VERO-S NSE plus 176-V1	•	•	•	ø176	90	9	40	75	12.00	100	•	•	DDF.520-04	0471096	40101346
530	SCH.530-176ix	VERO-S NSE plus 176-V1	•	•	•	ø176	90	9	40	75	14.20	100	•	•	DDF.530-04	0471096	40105138

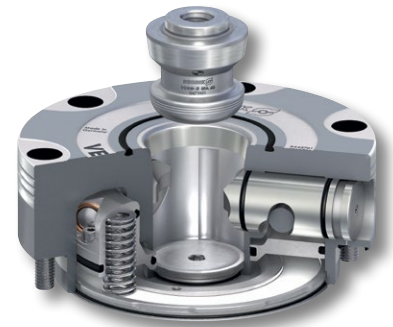
\* see pp. 58/59

\*\* only indexing allowed

Increased accuracy = ½ tolerance values; Item no. NPS.5xx-GEN

## 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



### 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

Overview, Applications

System & Facts, IBox

Rotary tables

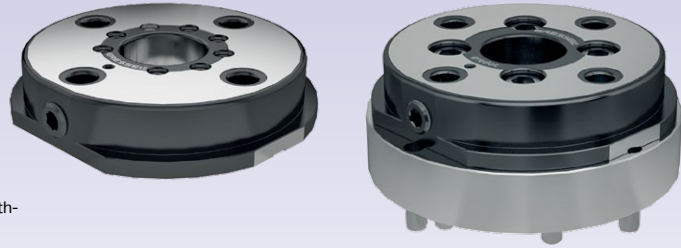
SPZ, DDF, WMS

MOT, KAB, WDF, CNC

Aligning, GLA, RST, LOZ

Service & Technology

Tooling



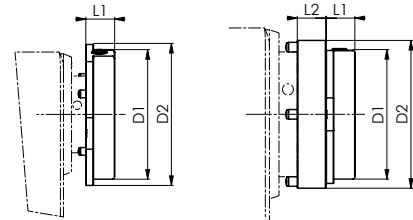
\* Clamping means installed and aligned by pL LEHMANN (if ordered together with a rotary table)

Further information: [www.gressel.ch](http://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]	Workpiece weight (perm.) [kg]	Weight [kg]	max. speed [rpm]	GRESSEL catalog reference	Base body required
GRE.SOL-40	solinos 40-4V-IT	•	148 x 135 x 135	198		8			KLM.040.020.01	GRES.5xx-GRU
GRE.SOL-65	solinos 65-4V-IT	•	193 x 164 x 164	243		18.5			KLM.065.020.01	
GRE.C165-grip	C1 65 grip	•	178 x 65 x 67	117		2.9			CGM.065.001.01	
GRE.C165-präz	C1 65 precision	•	178 x 65 x 67	117		2.9			CGM.065.002.01	
GRE.C280-grip	C2 80 with reversible jaw grip	•	157 x 80 x 78	128		4			CGM.080.001.01	
GRE.C2125-grip	C2 125 L-160 with reversible jaw grip	•	208 x 125 x 83	133		8.7			CGM.125.001.01	
GRE.SPZ	gredoc collect chuck	•	ø148 x 47.5	97.5	ø148	1.5			NGS.010.030.01	
GRE.LP	empty pallet	•	ø148 x 30	80	ø148	2.0			NGA.000.002.01	
GRE.LRP	Pallet with hole grid	•	ø148 x 30	80	ø148	2.0			NGA.000.003.01	
GRE.AB	Mounting pin, incl. fastening screw	•	ø40			0.1			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)

## Possible applications

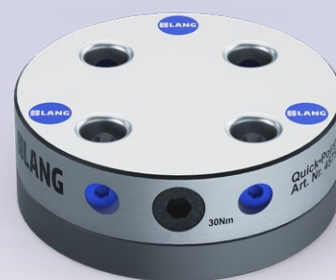
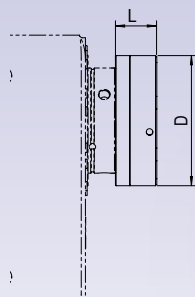




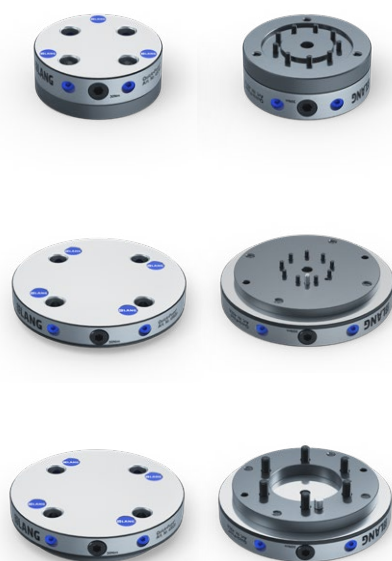
einfach. zukunft. greifen.

Clamping device assembled by pL LEHMANN,  
final adjustment by customer (if ordered together with a rotary table)

Further information: [www.lang-technik.de](http://www.lang-technik.de)  
Request installation and operating instructions directly from manufacturer



## LANG zero point clamping system



pL LEHMANN item no.	LAN.5xx-QP52m	LAN.5xx-QP52k
Designation	Quick-Point® 52, incl. adapter flange	
Actuation	Manual	Power-actuated**
Dimensions	D x L Ø 116 x 43 mm	
Weight [kg]	3.60	on request
Max. speed [rpm]	400	
suitable for LEHMANN SPI	507 / 510 / 520	
suitable for LANG 5-axis vices*	48085-46 / 48085-77 / 48120-46 / 48120-77 / 48160-77	

pL LEHMANN item no.	LAN.5xx-QP96m	LAN.5xx-QP96k
Designation	Quick-Point® 96, incl. adapter flange	
Actuation	Manual	Power-actuated**
Dimensions	D x L Ø 196 x 37 mm	
Weight [kg]	7.60	on request
Max. speed [rpm]	400	
suitable for LEHMANN SPI	507 / 510	
suitable for LANG 5-axis vices*	48155-77 / 48155-125	

pL LEHMANN item no.	LAN.520-QP96m	LAN.520-QP96k
Designation	Quick-Point® 96, incl. adapter flange	
Actuation	Manual	Power-actuated**
Dimensions	D x L Ø 196 x 41.5 mm	
Weight [kg]	7.50	on request
max. speed [rpm]	400	
suitable for LEHMANN SPI	520	
suitable for LANG 5-axis vices*	48155-77 / 48155-125	

\* 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 or SPZ.520-9

## Vices suitable for the LANG zero point clamping system



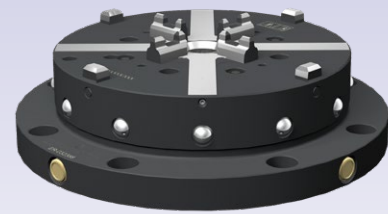
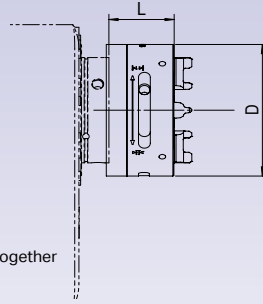
**Example of application**  
Makro-Grip® 125 with Quick-Point® 96, manual on LEHMANN EA-510



**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	
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	pL LEHMANN Item no. LAN.5xx-QP52x
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	pL LEHMANN Item no. LAN.5xx-QP96x / LAN.520-QP96x
LAN.MG125-S155	Makro-Grip® 125, length 160 mm Jaw width 125 mm	0 - 155	8.40	400	48155-125	

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](http://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 catalog 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	•	•	1)	2.6	ER-036345	ER-073351
	ERO.5xx-ITS100ix	ITS Chuck 100 P (Inox)	•	•	ø100	50	□50/ø148	35	5000	•	•	1)	2.5	ER-043123	ER-073433
	ERO.5xx-PC	PowerChuck P	•	•	ø150	64.5	□50/ø148	50	5000	•	•	1)	7.5	ER-115254	ER-073046
	ERO.5xx-MTS	MTS IntegralChuck S-P/A	•	•	ø130	62	ø148	50	4500	•	•	1)	4	ER-131210	ER-073457
510	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	•	•	2)	1.5	ER-057335	ER-073469
	ERO.5xx-QCix	QuickChuck 100 P (Inox)	•	•	ø100	50	□50/ø148	35	3000	•	•	2)	2.6	ER-036345	ER-073351
	ERO.5xx-ITS100ix	ITS Chuck 100 P (Inox)	•	•	ø100	50	□50/ø148	35	5000	•	•	2)	2.5	ER-043123	ER-073433
	ERO.5xx-PC	PowerChuck P	•	•	ø150	64.5	□50/ø148	50	5000	•	•	2)	7.5	ER-115254	ER-073046
	ERO.5xx-MTS	MTS IntegralChuck S-P/A	•	•	ø130	62	ø148	50	4500	•	•	2)	4	ER-131210	ER-073457
520	ERO.520-PC	PowerChuck P	•	•	ø150	75	□50/ø148	50	5000	•	•	3)	8.7	ER-115254	ER-073460
	ERO.520-P210	ProductionChuck 210	•	•	ø81/ø210	98	ø210	120	4500	•	•	3)	16.6	ER-032964	ER-073461
	ERO.520-P210c	Product.Chuck 210 Combi	•	•	ø210	98	□50/ø210	120	4500	•	•	3)	18	ER-032388	ER-073462
530	ERO.530-PC	PowerChuck P	•	•	ø150	75	□50/ø148	50	5000	•	•	4)	7.5	ER-115254	on request
	ERO.530-P210	ProductionChuck 210	•	•	ø81/ø210	98	ø210	120	4500	•	•	4)	16.6	ER-032964	on request
	ERO.530-P210c	Product.Chuck 210 Combi	•	•	ø210	98	□50/ø210	120	4500	•	•	4)	18	ER-032388	on request
	ERO.530-UPCP	UPC P Chuck	•	•	320x300	95	□320	250	1000	•	•	4)	51	ER-016841	ER-077382
	ERO.530-UPCC	UPC Chuck Combi	•	•	280x280	90	□50/□320	200	1000	•	•	4)	48	ER-070649	on request

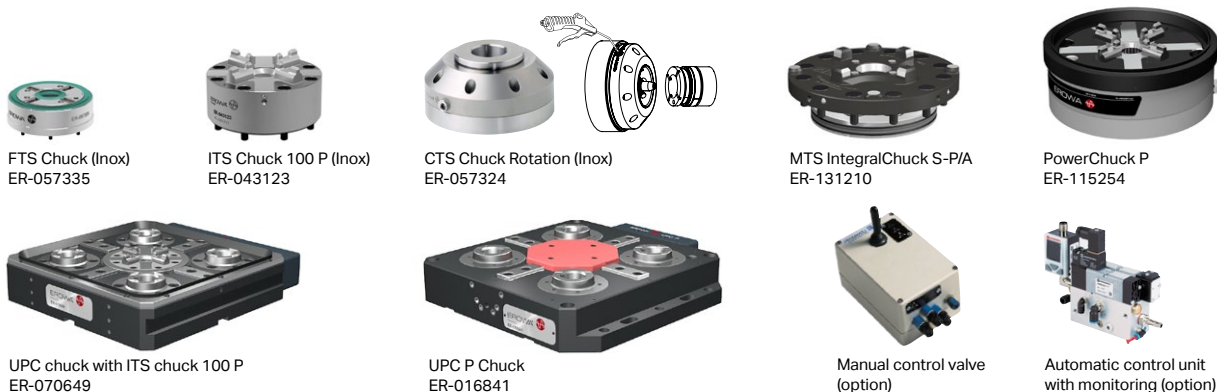
Increased accuracy = 1/2 tolerance values; Item no. NPS.5xx-GEN

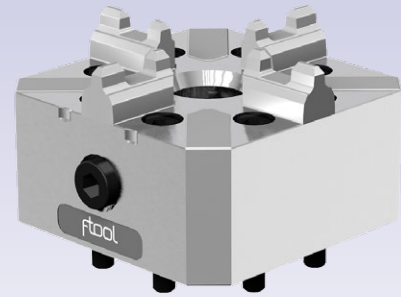
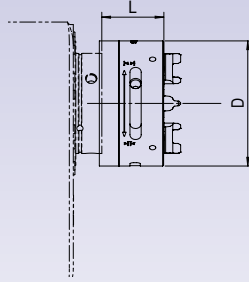
for all automatic chucks		
ERO.HSV	Manual control valve	supplied loose with all necessary cables and hoses, ready to connect
ERO.ASV-2	Automatic control valve	supplied loose, for installation in the control cabinet, with all necessary cables/hoses

Additionally required rotary union (see pp. 58/59):  
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.





Clamping device assembled by pL LEHMANN,  
final adjustment by customer (if ordered together with a rotary table)

**Further information:** [www.f-tool.com](http://www.f-tool.com)  
Request installation and operating instructions directly from manufacturer

	pL LEHMANN Item no.	Designation	Manual	D [mm]	L from spindle [mm]	Pallet sizes, max. [mm]	Workpiece weight (perm.) [kg]	Chuck weight (incl. adapter flange) [kg]	Max. speed [rpm]	F-Tool catalog reference	F-Tool item no., incl. adapter flange
507 / 510	<b>FTO.5xx-80P</b>	Chuck 80 P	•	□80	51	ø148	35	2.3	200	FT 01043	FT 02404
	<b>FTO.5xx-50</b>	Chuck 50	•	□56	50	ø72	15	1.4	200	FT 02110	FT 02406
	<b>FTO.5xx-MC150P</b>	Manual Chuck 150 P	•	ø150	55	ø148	50	4.3	200	FT 02443	FT 02405
	<b>FTO.5xx-PIN</b>	PIN centering chuck	•	ø80	48	ø100	15	2.1	200	FT 01716	FT 02407



Chuck 80 P  
FT 01043



Chuck 50  
FT 02110



Manual Chuck 150 P  
FT 02443



PIN centering chuck  
FT 01716

Overview,  
Applications

System &  
Facts, IBox

Rotary  
tables

SPZ,  
DDF, WMS

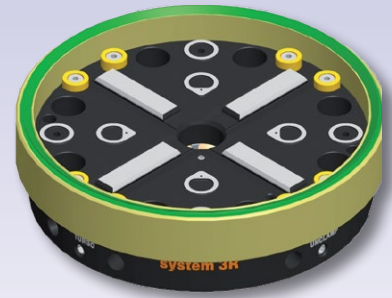
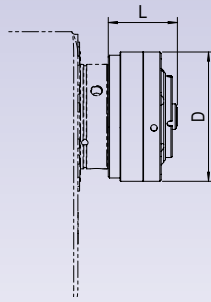
MOT, KAB,  
WDF, CNC

Aligning,  
GLA, RST, LOZ

Service  
& Technology

Tooling

## system 3R



Clamping means installed and aligned by pL LEHMANN  
(if ordered together with a rotary table)

**Further information:** [www.system3r.com](http://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)	Workpiece weight (perm.) (kg)	Weight (kg)	Max. speed (rpm)	Open	Clean Z-support	Clean cams	incr. clamp force/venting	Rotary union	SYSTEM 3R catalog reference	SYSTEM 3R item no. incl. adapter flange
507	<b>S3R.5xx-G70</b>	3R GPS 70	•	ø99	56	ø70	10	2.70	5450	•	•			1)	C198700	X663000
	<b>S3R.5xx-G70</b>	3R GPS 70	•	ø99	56	ø70	10	2.70	5450	•	•			2)	C198700	X663000
510	<b>S3R.510-G120</b>	3R GPS 120	•	ø118	56	ø120	20	3.60	5450	•	•			2)	C188770	X663010
	<b>S3R.510-MGC*</b>	3R Magnum Chuck	•	ø162	46	ø156, & index pin	100	6.70	5450	•	•	•	•	2)	3R-SP26712	90940.02
520	<b>S3R.510-MCC</b>	3R Macro Chuck	•	ø100	49	54x54, 70x70	10	2.60	5450	•	•	•	•	2)	3R-600.14-30	90940.01
	<b>S3R.520-G120</b>	3R GPS 120	•	ø118	70	ø120	20	5.00	5450	•	•			3)	C188770	X663020
	<b>S3R.520-G240</b>	3R GPS 240	•	240x240	84	240x240	100	20.70	1500	•	•	•	•	3)	C219200	X663030
	<b>S3R.520-G240ix</b>	3R GPS 240, rust-resistant	•	240x240	84	240x240	100	21.00	1500	•	•	•	•	3)	X607620	X663040
530	<b>S3R.520-MGC*</b>	3R Magnum Chuck	•	ø162	60	ø156, & index pin	100	7.70	5450	•	•	•	•	3)	3R-SP26712	90940.12
	<b>S3R.520-MCC</b>	3R Macro Chuck	•	ø100	63	54x54, 70x70	10	3.50	5450	•	•	•	•	3)	3R-600.14-30	90940.11
	<b>S3R.530-G240</b>	3R GPS 240	•	240x240	84	240x240	100			•	•	•	•	4)	C219200	a.A.
	<b>S3R.530-G240ix</b>	3R GPS 240, rust-resistant	•	240x240	84	240x240	100			•	•	•	•	4)	X607620	a.A.
Ref. Palette	<b>S3R.RP-GPS240</b>	Reference pallet GPS 240													C846600	
	<b>S3R.RP-GPS70120</b>	Reference pallet GPS 70													C846360	
	<b>S3R.RP-Macro</b>	Reference pallet Macro													36-606.1	
	<b>S3R.RP-Magnum</b>	Reference pallet Magnum													3R-686.1-HD	

Additionally required rotary union (see **pp. 58/59**):  
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



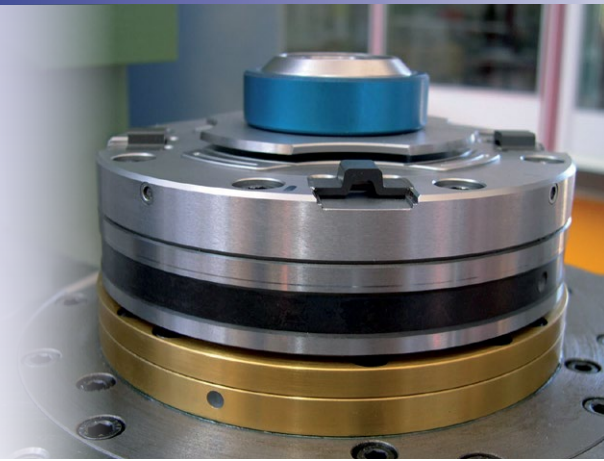
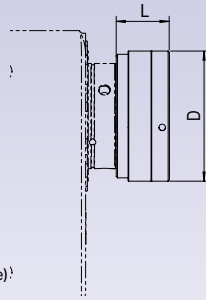
GPS 70

GPS 120

Macro

Macro Magnum

GPS 240



Clamping device assembled by pL LEHMANN,  
final adjustment by customer (if ordered together with a rotary table)<sup>1)</sup>

Further information: [www.parotec.ch](http://www.parotec.ch)  
Request installation and operating instructions directly from manufacturer

SPZ.5xx = Item number for combined clamping cylinder for types 507 and 510

	pL LEHMANN Item no.	PAROTEC catalog reference	Manual	Pneumatic	Hydraulic	D (mm)	L from spindle (mm)	Pallet sizes (mm)	Workpiece weight (perm.) (kg)	Weight (kg)	Max. speed (rpm)	Open (bar)	Clean Z-support	With re-tightening	Required clamping cylinder	Required rotary union*	PAROTEC item no., incl. adapter flange
507	PAR.5xx-PGmp6	POWER GRIP 160	●			ø145	56	□158	50			6					PT 1160102710
	PAR.5xx-PGp6	POWER GRIP 160		●		ø145	56	□158	100			6	●	●		DDF.507-04	PT 1160142710
	PAR.507-PGp40	POWER GRIP 160			●	ø145	35	□158	100			40	●	●	SPZ.5xx-9	SPZ.DDF-01	PT 1160112700
	PAR.5xx-PYmp130	POLY GRIP	●			ø130	55	ø70-148	30			6		o			PT 9911020710
	PAR.5xx-PYp110	POLY GRIP		●		ø110	55	ø70-148	50			6	●	●		DDF.507-04	PT 9911320710
510	PAR.5xx-DGp142	DEFO GRIP 100		●		ø142	55	ø100-148	20			6	●	●		DDF.507-04	PT 6101032710
	PAR.5xx-PGmp6	POWER GRIP 160	●			ø145	56	□158	50			6					PT 1160102710
	PAR.5xx-PGp6	POWER GRIP 160		●		ø145	56	□158	100			6	●	●		DDF.510-04	PT 1160142710
	PAR.510-PGp40	POWER GRIP 160			●	ø145	35	□158	100			40	●	●	SPZ.5xx-9	SPZ.DDF-01	PT 1160112710
	PAR.5xx-PYmp130	POLY GRIP	●			ø130	55	ø70-148	30			6		o			PT 9911020710
520	PAR.5xx-PYp110	POLY GRIP		●		ø110	55	ø70-148	50			6	●	●		DDF.510-04	PT 9911320710
	PAR.5xx-DGp142	DEFO GRIP 100		●		ø142	55	ø100-148	20			6	●	●		DDF.510-04	PT 6101032710
	PAR.5xx-PGmp6	POWER GRIP 160	●			ø145	56	□158	50			6					PT 1160102710
	PAR.5xx-PGp6	POWER GRIP 160		●		ø145	56	□158	50			6	●	●		DDF.520-04	PT 1160142710
	PAR.520-PGp40	POWER GRIP 160			●	ø145	35	□158	50			40	●	●	SPZ.520-9	SPZ.DDF-01	PT 1160112720
530	PAR.5xx-PYmp130	POLY GRIP	●			ø130	55	ø70-148	30			6		o			PT 9911020710
	PAR.5xx-PYp110	POLY GRIP		●		ø110	55	ø70-148	50			6	●	●		DDF.520-04	PT 9911320710
	PAR.5xx-DGp142	DEFO GRIP 100		●		ø142	55	ø100-148	20			6	●	●		DDF.520-04	PT 6101032710
	PAR.530-PGmp6	POWER GRIP 160	●			ø145	56	□158/ø158	50			6					PT 1160102730
	PAR.530-PGp6	POWER GRIP 160		●		ø145	56	□158/ø158	100			6	●	●		DDF.530-04	PT 1160142730
530	PAR.530-PGp40	POWER GRIP 160			●	ø145	35	□158/ø158	100			40	●	●	SPZ.530-9	SPZ.DDF-01	PT 1160112730
	PAR.530-PYmp130	POLY GRIP	●			ø130	55	ø70-148	30			6		o			PT 9911020730
	PAR.530-PYp110	POLY GRIP		●		ø110	55	ø70-148	50			6	●	●		DDF.530-04	PT 9911320730
	PAR.530-DGp142	DEFO GRIP 100		●		ø142	55	ø100-148	20			6	●	●		DDF.530-04	PT 6101032730
	PAR.530-PGp316	POWER GRIP 160-2	●			320x160	76	320x160	100			6	●	●		DDF.530-06	PT 1160232730
PAR.530-PGp320	POWER GRIP 160-4	●			320x320	76	320x320	300			6	●	●		DDF.530-06	PT 1160432730	

\* see pp. 58/59

o = optional

Technical data	Unit	POWER GRIP	POLY GRIP	DEFO GRIP
Repeat accuracy	(mm)	+/- 0.002	+/- 0.002	+/- 0.005
Retention force without re-tightening	(kN)	17*	7	0.75
Retention force with re-tightening	(kN)	30*	12	1.2

\* For POWER GRIP 160--2 and 160--4 = Value x2 and x4, resp.

Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, WMS

MOT, KAB, WDF, CNC

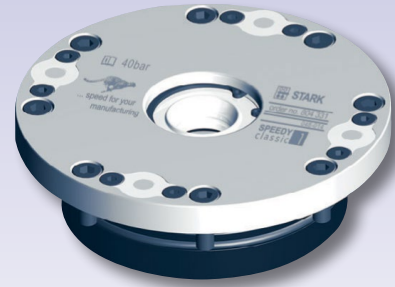
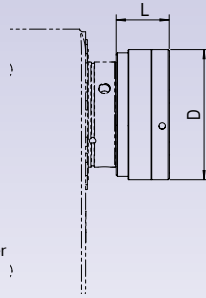
Aligning, GLA, RST, LOZ

Service & Technology

Tooling



**ROEMHELD**  
HILMA ■ STARK



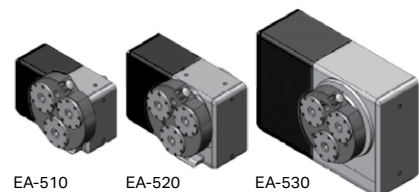
Clamping device assembled by pL LEHMANN, final adjustment by customer (if ordered together with a rotary table)

Further information: [www.stark-inc.com](http://www.stark-inc.com)

Request installation and operating instructions directly from manufacturer

	pL LEHMANN Item no.	Designation	Hydraulic	D [mm]	L from spindle [mm]	Max. pull-out torque [Nm]	Open [bar]	Weight [kg]	Max. speed [rpm]	Suspension mechanism	Manual loading	Can be automated	X-Y-Z positioning/clean support	Z-contact check	Clamping check	Integrated media passage	Increased clamping force	Required rotary union*	STARK catalog reference	STARK Item no., incl. adapter flange		
507	<b>on request</b>																					
	STA.510-01	SVP 510 SPEEDY classic 1	•	ø250	60	1740	40			•	•							-	804 331	SL1-63-0-0-2-01		
STA.510-02	•		ø250	60	2620	80				•	•						•	-	804 348	SL1-63-0-0-3-01		
STA.510-03	•		ø250	60	1740	40					•	•						•	DDF.510-04	804 331	SL1-63-0-1-2-01	
STA.510-04	•		ø250	60	2620	80					•	•						•	DDF.510-04	804 348	SL1-63-0-1-3-01	
STA.510-05	•		ø250	60	1740	40									•				DDF.510-04	804 331	SL1-63-1-1-2-01	
STA.510-06	•		ø250	60	2620	80												•	DDF.510-04	804 348	SL1-63-1-1-3-01	
510	STA.510-21	SVP 510 SPEEDY classic 1 Twister	•	ø250	63	1740	40				•	•	•	•					DDF.510-04	804 500	SL1-63-0-1-2-11	
	STA.510-22		•	ø250	63	2620	80				•	•	•	•				•	DDF.510-04	804 501	SL1-63-0-1-3-11	
	STA.510-23		•	ø250	63	1740	40					•	•	•	•				DDF.510-04	804 500	SL1-63-1-1-2-11	
	STA.510-24		•	ø250	63	2620	80					•	•	•	•				•	DDF.510-04	804 501	SL1-63-1-1-3-11
	STA.520-01		SVP 520 SPEEDY classic 1	•	ø250	60	1740	40				•	•							-	804 331	SL2-63-0-0-2-01
	STA.520-02			•	ø250	60	2620	80				•	•						•	-	804 348	SL2-63-0-0-3-01
STA.520-03	•	ø250		60	1740	40					•	•						DDF.520-04	804 331	SL2-63-0-1-2-01		
STA.520-04	•	ø250		60	2620	80					•	•						•	DDF.520-04	804 348	SL2-63-0-1-3-01	
STA.520-05	•	ø250		60	1740	40									•				DDF.520-04	804 331	SL2-63-1-1-2-01	
STA.520-06	•	ø250		60	2620	80									•				DDF.520-04	804 348	SL2-63-1-1-3-01	
520	STA.520-21	SVP 512 SPEEDY classic 1 Twister	•	ø250	63	1740	40				•	•	•	•					DDF.520-04	804 500	SL2-63-0-1-2-11	
	STA.520-22		•	ø250	63	2620	80				•	•	•	•				•	DDF.520-04	804 501	SL2-63-0-1-3-11	
	STA.520-23		•	ø250	63	1740	40					•	•	•	•				DDF.520-04	804 500	SL2-63-1-1-2-11	
	STA.520-24		•	ø250	63	2620	80					•	•	•	•				•	DDF.520-04	804 501	SL2-63-1-1-3-11
	STA.530-01		SVP 530 SPEEDY classic 1	•	ø250	60	1740	40				•	•							-	804 331	SL3-63-0-0-2-01
	STA.530-02			•	ø250	60	2620	80				•	•						•	-	804 348	SL3-63-0-0-3-01
STA.530-03	•	ø250		60	1740	40					•	•						DDF.530-04	804 331	SL3-63-0-1-2-01		
STA.530-04	•	ø250		60	2620	80					•	•						•	DDF.530-04	804 348	SL3-63-0-1-3-01	
STA.530-05	•	ø250		60	1740	40									•				DDF.530-04	804 331	SL3-63-1-1-2-01	
STA.530-06	•	ø250		60	2620	80												•	DDF.530-04	804 348	SL3-63-1-1-3-01	
530	STA.530-21	SVP 513 SPEEDY classic 1 Twister	•	ø250	63	1740	40				•	•	•	•					DDF.530-04	804 500	SL3-63-0-1-2-11	
	STA.530-22		•	ø250	63	2620	80				•	•	•	•				•	DDF.530-04	804 501	SL3-63-0-1-3-11	
	STA.530-23		•	ø250	63	1740	40					•	•	•	•				DDF.530-04	804 500	SL3-63-1-1-2-11	
	STA.530-24		•	ø250	63	2620	80					•	•	•	•				•	DDF.530-04	804 501	SL3-63-1-1-3-11

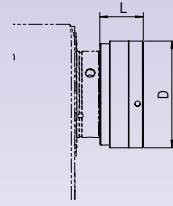
\* see pp. 58/59



### Note permissible pull-out torque (use counter bearing if necessary)

Version 20 kN			Version 30kN		
Distance [mm]	Force [kN]	Weight [kg]	Distance [mm]	Force [kN]	Weight [kg]
200	8.8	897	200	13.1	1335
300	5.9	601	300	8.8	897
400	4.4	449	400	6.6	673
500	3.5	357	500	5.3	540
600	2.9	296	600	4.4	449





Clamping device assembled by pL LEHMANN, final adjustment by customer (if ordered together with a rotary table)

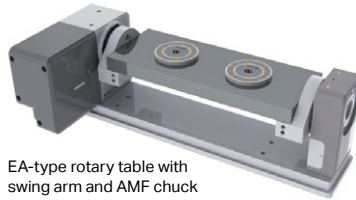
**Further information:** [www.amf.de](http://www.amf.de)  
Request installation and operating instructions directly from manufacturer

	pL LEHMANN Item no.	Designation	Pneumatic, 5 bar	Hydraulic, 50 bar	D [mm]	L from spindle [mm]	Workpiece weight [kg]	Max. speed [rpm]	Draw-in and closing force up to	Retention force	Indexing	Contact check	Required rotary union*	AMF catalog reference	AMF Item no., incl. adapter flange
507	AMF.507-6206-S1	6206ILA-10	•		ø112	47			10 kN	25 kN	•	•	DDF.507-04	428771	533190
510	AMF.510-6206-S1	6206ILA-10	•		ø112	47			10 kN	25 kN	•	•	DDF.510-04	428771	533216
520	AMF.520-6206-S1	6206ILA-20	•		ø138	90			17 kN	55 kN	•	•	DDF.520-04	428797	533232
530	AMF.530-6370-S1	6370EAIHA40	•		ø148	98			40 kN	105 kN	•	•	DDF.530-04	429845	533257

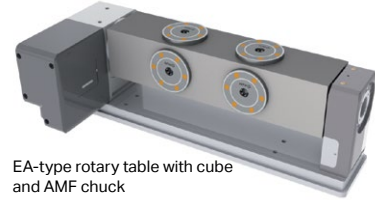
\* see pp. 58/59



AMF zero point clamping system



EA-type rotary table with swing arm and AMF chuck



EA-type rotary table with cube and AMF chuck



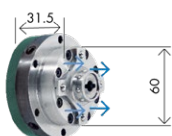
Clamping device assembled by pL LEHMANN, final adjustment by customer (if ordered together with a rotary table)

**Further information at:** <http://fr.yerlymecanique.ch/>  
Request installation and operating instructions directly from manufacturer

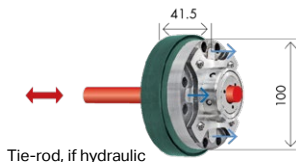
	pL LEHMANN Item no.	Designation	Hydraulic	Pneumatic	D [mm]	L from spindle [mm]	Workpiece size, approx. [mm]	Weight [kg]	Max. speed [rpm]	Required clamping cylinder	Required rotary union**	YERLY catalog reference	YERLY Item no., incl. adapter flange
507	YER.507-060P-*	YERLY* NPS 60	•		60	85	0.1...60				DDF.507-04	MD-60-*	YER.507-60P-*JT
	YER.507-100P-*	YERLY* NPS 100	•		100	108	0.1...100			SPZ.5xx-9		MD-100-*	YER.507-100P-*TI
	YER.507-100M-*	YERLY* NPS 100	•		100	85	0.1...100			SPZ.5xx-9		MD-100-*	YER.507-100M-*TI
510	YER.510-060P-*	YERLY* NPS 60	•		60	85	0.1...60				DDF.510-04	MD-60-*	YER.510-60P-*JT
	YER.510-100P-*	YERLY* NPS 100	•		100	108	0.1...100			SPZ.5xx-9		MD-100-*	YER.510-100P-*TI
	YER.510-100M-*	YERLY* NPS 100	•		100	85	0.1...100			SPZ.5xx-9		MD-100-*	YER.510-100M-*TI

\* 2 = 2-jaw chuck, 3 = 3-jaw chuck, 4 = 4-jaw chuck  
\*\* see pp. 58/59

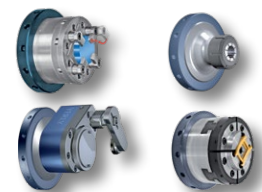
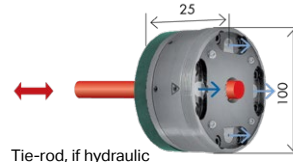
Yerly Basis 60P



Yerly Basis 100P



Yerly Basis 100M

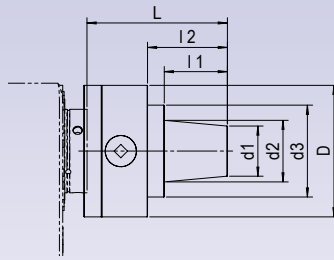


Examples of YERLY chuck attachments. Can be adapted to any chuck type

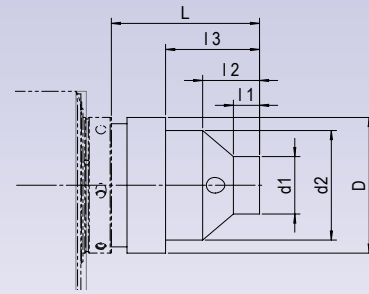
Overview, Applications  
System & Facts, IBox  
Rotary tables  
SPZ, DDF, WMS  
MOT, KAB, WDF, CNC  
Aligning, GLA, RST, LOZ  
Service & Technology  
Tooling



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



Mounting chuck, automatic Type B affix

Further information at: [www.niederhauser.ch](http://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. 56)

	pL LEHMANN Item no.	Designation	System	axfix	Manual	Power-actuated	L [mm]	l1 [mm]	l2 [mm]	l3 [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	520-B45KA

\*\* For T-type rotary tables it may be necessary to increase the center height, see p. 57

## Clamping capacity and passage

System	Clamping capacity [mm]	Collet passage [mm]
B32	0.3...32	28
B45	1...45	36

## Mounting chuck

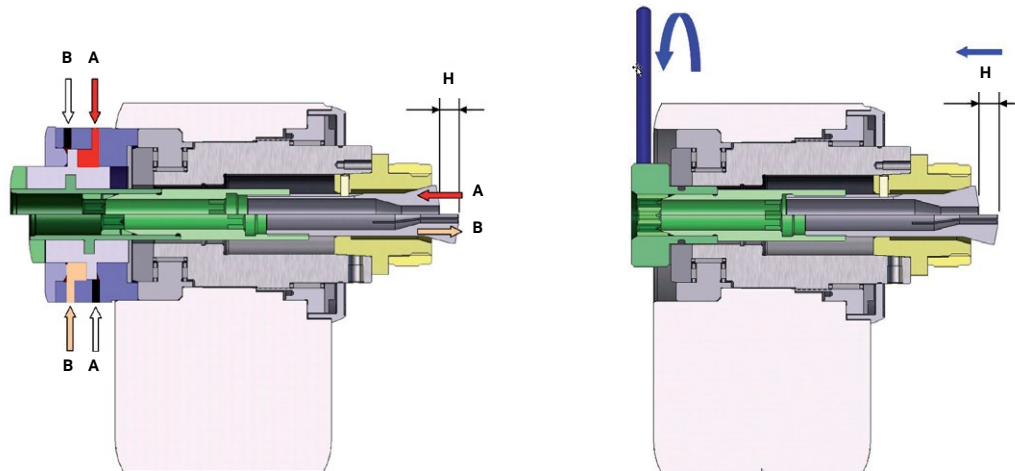


## Collet holder B32



For more, please see p. 147

## Principle of collet clamping with HSK application

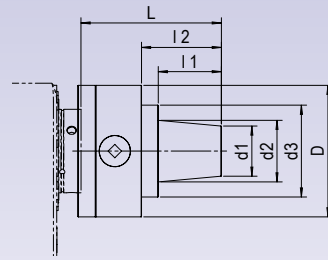


Automatic collet clamping

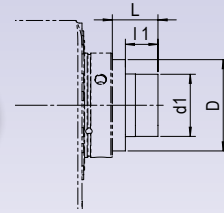
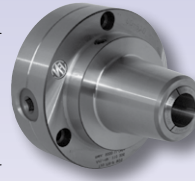
Manual collet clamping



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](http://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. 56)

pL LEHMANN Item no.	Designation	System	Manual	Power-actuated	L [mm]	L1 [mm]	L2 [mm]	D [mm]	d1 [mm]		d2 [mm]	d3 [mm]	Weight [kg]	Max. speed [rpm]	Required clamping cylinder ** (Option)	Niederhauser item no., incl. adapter flange
									* without/ with threaded protective ring							
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	-
	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	-
	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	-
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	-
	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	-
	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	-
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. 57

## Collet adapters (Type W) pL LEHMANN®



W20



W25



W31.75 (5C)

## Collet holder W25



with standard W25 collet



- Rugged and slim design for better accessibility
- Radial run-out < 0.005mm



Further information at: [www.ki-mech.ch](http://www.ki-mech.ch)  
Request installation and operating instructions directly from manufacturer

## Clamping capacity and (effective) passage

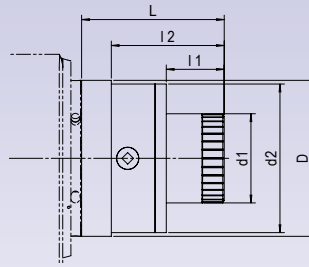
System	Clamping capacity [mm]	Collet passage [mm]	Standard effective passage [mm]	Item no.	Increased effective passage [mm]
W20	0.3...23	14.5	14		
W25	0.3...29	21	17		
W31.75 (5C)	0.5...31	27	17	ZSP.???-W31kND	25

??? = Rotary table type (e.g. 510)



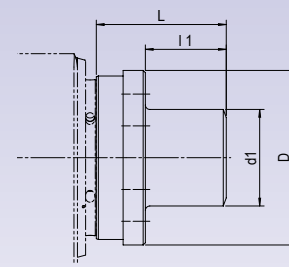
Manual flange-mounted chuck supplied loose, power-operated, set up and aligned by pL LEHMANN (if ordered together with a rotary table)

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](http://www.niederhauser.ch)  
Request installation and operating instructions directly from manufacturer

## Collet clamping Type F

pL LEHMANN Item no.	Designation	Manual	Pneumatic	Hydraulic	System	Clamp- ing capacity [mm]	L	I1	D	d1	Weight [kg]	Max. speed [rpm]	Required clamping cylinder *	Niederhauser item no., incl. adapter flange
							[mm]	[mm]	[mm]	[mm]				
507	ZSP.507-F35Am	●			F35	1...30	129	40	160	90	12.7	4500		507-F35
	ZSP.507-F35Ak		●		F35	1...30	117.4	73.4	112	85	8.8	6000	SPZ.5xx-9	507-F35K
510	ZSP.510-F35Am	●			F35	1...30	129	40	160	90	12.7	4500		510-F35
	ZSP.510-F35Ak		●		F35	1...30	114.4	73.4	112	85	8.8	6000	SPZ.5xx-9	510-F35K
520	ZSP.520-F48Am	●			F48	1...42	145	40	160	90	12.7	4500		520-F48
	ZSP.520-F48Ak		●		F48	1...42	137.9	90.9	155	102	8.8	6000	SPZ.520-9	520-F48K
530	ZSP.530-F66Am	●			F66	4...60	192	78	210	120	24	4000		530-F66
	ZSP.530-F66Ak		●		F66	4...60	174.9	108.9	235	130	18.7	5000	SPZ.530-9	530-F66K

SPZ.5xx = Item number for combined clamping cylinder for types 507 and 510 (see p. 56)

\* For T-type rotary tables it may be necessary to increase the center height, see p. 57



Manual



Automatic

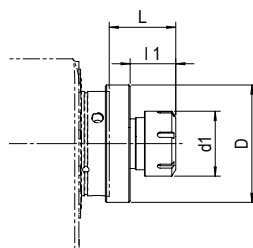
## Collect clamping Type ER

pL LEHMANN Item no.	Designation	Manual	System	Clamp- ing capacity [mm]	L	I1	I2	D	d1	d2	Weight [kg]	Max. speed [rpm]	Niederhauser item no., incl. adapter flange
					[mm]	[mm]	[mm]	[mm]	[mm]	[mm]			
507	ZSP.507-E25Am	●	ER-25	0.5...17	62	30	-	90	42	-	2.7	6000	507-ER25
	ZSP.507-E32Am	●	ER-32	1...22	70	38	-	90	50	-	3.0	6000	507-ER32
	ZSP.507-E40Am	●	ER-40	2...30	72	40	-	90	63	-	3.7	6000	507-ER40
510	ZSP.510-E25Am	●	ER-25	0.5...17	46	30	-	90	42	-	1.5	6000	510-ER25
	ZSP.510-E32Am	●	ER-32	1...22	54	38	-	90	50	-	1.8	6000	510-ER32
	ZSP.510-E40Am	●	ER-40	2...30	56	40	-	90	63	-	2.5	6000	510-ER40
520	ZSP.520-E25Am	●	ER-25	0.5...17	80	30	50	130	42	90	4.2	6000	520-ER25
	ZSP.520-E32Am	●	ER-32	1...22	88	38	50	130	50	90	4.5	6000	520-ER32
	ZSP.520-E40Am	●	ER-40	2...30	90	40	50	130	63	90	5.2	6000	520-ER40



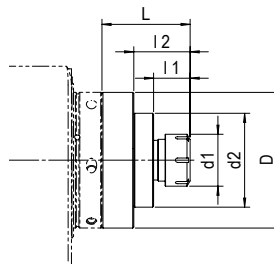
Manual

for sizes 507 and 510



Mounting chuck, manual Type ER

for size 520

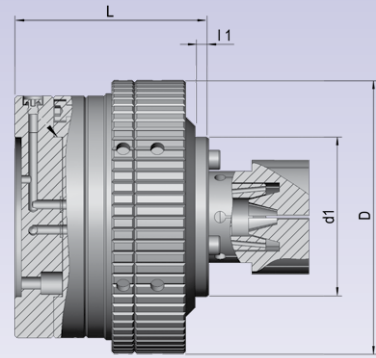


Mounting chuck, manual Type ER

Overview, Applications  
System & Facts, IBox  
Rotary tables  
SPZ, DDF, WMS  
MOT, KAB, WDF, CNC  
Aligning, GLA, RST, LOZ  
Service & Technology  
Tooling

Clamping means installed and aligned by pL LEHMANN  
(if ordered together with a rotary table)

Further information at: [www.niederhauser.ch](http://www.niederhauser.ch)  
Request installation and operating instructions directly from manufacturer



## OTTET collet clamping

	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	OTTET collet chuck	130	-	85	-	12.7	7000	•	DDF.507-04	507-FNO-1
	ZSP.507-OTph		120	70	82	-	9.2	7000	•	DDF.507-04	507-FNO-PH
	ZSP.507-OTkh		120	70	96	20	9.2	7000	•	SPZ.5xx-9	507-FNO-K
510	ZSP.510-OTp	OTTET collet chuck	130	-	85	-	12.7	7000	•	DDF.510-04	510-FNO-1
	ZSP.510-OTph		120	70	85	-	9.2	7000	•	DDF.510-04	510-FNO-PH
	ZSP.510-OTkh		120	70	99	20	9.2	7000	•	SPZ.5xx-9	510-FNO-K
520	ZSP.520-OTp	OTTET collet chuck	130	-	101	-	12.7	7000	•	DDF.520-04	520-FNO-1
	ZSP.520-OTph		130	70	98	-	9.2	7000	•	DDF.520-04	520-FNO-PH
	ZSP.520-OTkh		130	70	102	20	9.2	7000	•	SPZ.520-9	520-FNO-K

\* see pp. 56-59

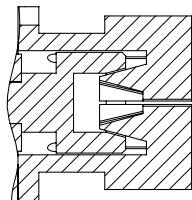
The collet chuck with clamping piston inside is suitable for internal and external clamping, pneumatically actuated.



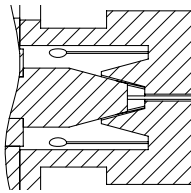
External clamping



Internal clamping



External clamping

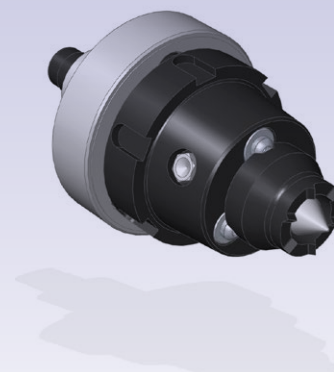


Internal clamping



Installed by pL LEHMANN  
(if ordered together with a rotary table)

Further information at: [www.roehm.biz](http://www.roehm.biz)  
Request installation and operating instructions directly from manufacturer

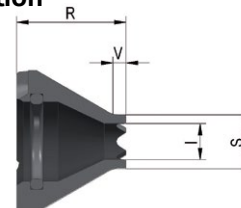


## Face driver, play-free version with hydraulic compensation for clockwise and counterclockwise rotation

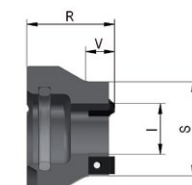
pL LEHMANN Item no.	Designation	Overhang [mm]	Max. workpiece weight [kg]	Max. axial load [kN]	Weight [kg]	Max. speed [rpm]	RÖHM Item no., incl. adapter flange
507	RÖH.507-SM Face driver	65	100	20			1340449
510	RÖH.510-SM Face driver	65	100	20			1340450
520	RÖH.520-SM Face driver	65	100	20			1340451
530	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]	l [mm]	V [mm]	Weight [kg]	RÖHM item no.
directly geared	RÖH.MS-DV08 Driver plate	8	4	38	4.5	4		1209000
	RÖH.MS-DV10 Driver plate	10	4	38	4.5	4		1209001
	RÖH.MS-DV12 Driver plate	12	6	36	7	4		1209002
	RÖH.MS-DV16 Driver plate	16	10	33	11	4		1209003
	RÖH.MS-DV20 Driver plate	20	12	30	13	4		1209004
	RÖH.MS-DV25 Driver plate	25	16	30	17	8		1209005
RÖH.MS-DV32 Driver plate	32	16	30	22	10		1209006	
3x select. HM plates 6 x 3.2	RÖH.MS-HM20 Driver plate	20	6	30	7	8		1209007
	RÖH.MS-HM25 Driver plate	25	10	30	11	8		1209008
	RÖH.MS-HM32 Driver plate	32	16	30	17.5	10		1209009
	RÖH.MS-HM40 Driver plate	40	16	30	27	16		1209010
	RÖH.MS-HM50 Driver plate	50	16	30	36			1209011
	RÖH.MS-HM63 Driver plate	63	16	30	49			1209012
	RÖH.MS-HM80 Driver plate	80	16	30	66			1209013



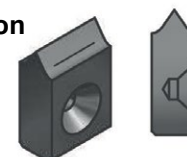
Driver plate directly geared 1209000



Driver plate 3x select. HM plates 6 x 3.2 1209007

## Accessories: Metal carbide driver plates, clockwise and counterclockwise rotation

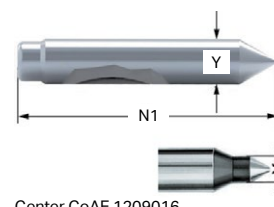
pL LEHMANN Item no.	Designation	Clamping circle Ø	Size	Weight [kg]	RÖHM Item no.
RÖH.HMP-20	Metal carbide plate	20-32	6 x 3.2		88970
RÖH.HMP-40	Metal carbide plate	40-80	9.5 x 3.2		87931



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		1209016
RÖH.ZS-12	Center	12	6	90		1209017
RÖH.ZS-16	Center	16	10	90		1209018
RÖH.ZS-20	Center	20	12	90		1209019
RÖH.ZS-25	Center	25-80	16	90		1209020



Center CoAE 1209016

Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, VMMS

MOT, KAB, WDF, CNC

Aligning, GLA, RST, LOZ

Service & Technology

Tooling

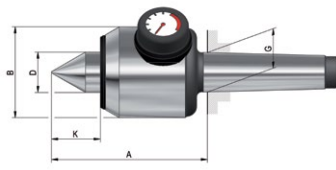


Supplied loose by pL LEHMANN

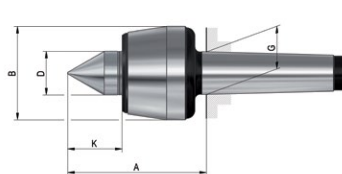
Further information at: [www.roehm.biz](http://www.roehm.biz)  
Request installation and operating instructions directly from manufacturer

### Revolving centers

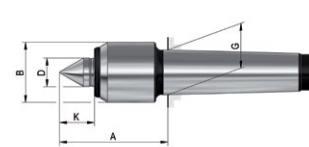
	pL LEHMANN Item no.	Designation	Mount MK	Max. run-out deviation [mm]	Max. workpiece weight [kg]	Max. radial load [daN]	Max. speed [rpm]	D Moving-tip Ø [mm]	B Housing Ø [mm]	A [mm]	G [mm]	K [mm]	Weight [kg]	RÖHM item no.
Tailstock options / accessories	<b>RÖH.ZS-DAMK3</b>	with pressure display and length 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
	<b>RÖH.ZS-SAMK2</b>	Standard version; body hardened and ground; tip angle 60°	2	0.005	200	100	7000	20	43	65	17.8	24		43115
	<b>RÖH.ZS-SAMK3</b>		3	0.005	400	200	6300	22	48.5	70.5	23.8	27		42315
	<b>RÖH.ZS-GDMK2</b>	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
	<b>RÖH.ZS-GDMK3</b>		3	0.005	400	200	7000	15	34	62	23.8	19.5		5429



Mikö 60798



Mikö 43115 / 42315



Mikö 5336 / 5429

Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, WMS

MOT, KAB, WDF, CNC

Aligning, GLA, RST, LOZ

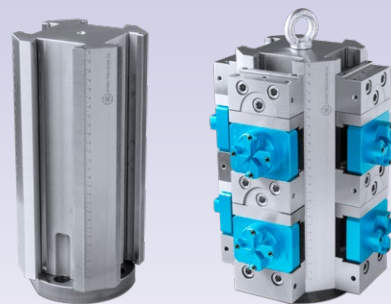
Service & Technology

Tooling



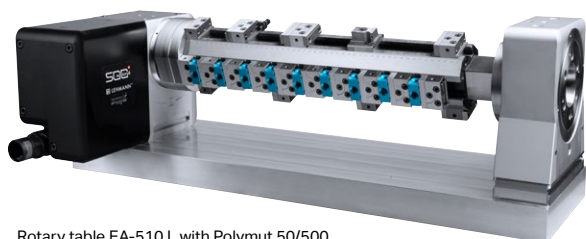
Clamping device assembled by pL LEHMANN,  
final adjustment by customer (if ordered together with a rotary table)

Further information at: [www.evard-precision.ch](http://www.evard-precision.ch)  
Request installation and operating instructions directly from manufacturer



## Polymut Monoblock towers

	pL LEHMANN Item no.	Designation	Size [mm]	Length [mm]	Weight [kg]	Required accessories	Evard Item no.
Polymut 50	EVA.T50280	Monoblock tower	50	280	11	Flange set	T50280
	EVA.T50300	Monoblock tower	50	300	12	Flange set	T50300
	EVA.T50400	Monoblock tower	50	400	16	Flange set	T50400
	EVA.T50500	Monoblock tower	50	500	20	Flange set	T50500
Polymut 80	EVA.T80280	Monoblock tower	80	280	28	Flange set	T80280
	EVA.T80300	Monoblock tower	80	300	30	Flange set	T80300
	EVA.T80400	Monoblock tower	80	400	40	Flange set	T80400
	EVA.T80500	Monoblock tower	80	500	50	Flange set	T80500



Rotary table EA-510.L with Polymut 50/500

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.

## Fixed and clamping jaws

	pL LEHMANN Item no.	Designation	Size [mm]	Width [mm]	Weight [kg]	Required accessories	Evard Item no.
Polymut 50	EVA.50160	Basic jaw, narrow	50	20	0.310	-	50160
	EVA.50161	Clamping jaw, narrow	50	20	0.360	-	50161
	EVA.4101	Base jaw, stepped, Type A	50	49	0.226	-	4101
	EVA.4121	Base jaw, deep stepped, Type B	50	49	0.230	-	4121
	EVA.50105	Base jaw, no step, Type C	50	49	0.340	-	50105
	EVA.4102	Clamping jaw, stepped, Type A	50	49	0.373	-	4102
	EVA.4109	Clamping jaw, deep stepped, Type B	50	49	0.373	-	4109
	EVA.50101	Clamping jaw, no step, Type C	50	49	0.373	-	50101
	EVA.4111	Base jaw, stepped, Type A	80	78	0.880	-	4111
	EVA.4120	Base jaw, deep stepped, Type B	80	78	0.900	-	4120
Polymut 80	EVA.80107	Base jaw, no step, Type C	80	78	1.330	-	80107
	EVA.4110	Clamping jaw, stepped, Type A	80	78	1.446	-	4110
	EVA.4119	Clamping jaw, deep stepped, Type B	80	78	1.430	-	4119
	EVA.80101	Clamping jaw, no step, Type C	80	78	1.475	-	80101
	EVA.105001	Base jaw, stepped, Type A	80	105	2.050	-	105001
	EVA.105005	Base jaw, deep stepped, Type B	80	105	2.070	-	105005
	EVA.105007	Base jaw, no step, Type C	80	105	2.100	-	105007
	EVA.105002	Clamping jaw, stepped, Type A	80	105	2.650	-	105002
	EVA.105006	Clamping jaw, deep stepped, Type B	80	105	2.575	-	105006
	EVA.105008	Clamping jaw, no step, Type C	80	105	2.540	-	105008
Tooling	EVA.120001	Base jaw, stepped, Type A	80	120	2.300	-	120001
	EVA.120005	Base jaw, deep stepped, Type B	80	120	2.200	-	120005
	EVA.120007	Base jaw, no step, Type C	80	120	2.400	-	120007
	EVA.120002	Clamping jaw, stepped, Type A	80	120	2.980	-	120002
	EVA.120006	Clamping jaw, deep stepped, Type B	80	120	2.890	-	120006
	EVA.120008	Clamping jaw, no step, Type C	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](http://www.evard-precision.ch)  
Request installation and operating instructions directly from manufacturer

## Centering vise – Type CM

pL LEHMANN Item no.	Designation	Size	Clamping capacity [mm]	Weight [kg]	Required accessories	Evard Item no.
EVA.2020	CM centering vise	20	25	0.220	adapter flange	2020
EVA.2021	Inox CM centering vise	20	25	0.220	adapter flange	2021
EVA.5000	CM centering vise	50	89	2.3	adapter flange	5000
EVA.8000	CM centering vise	80	137	6.45	adapter flange	8000
EVA.1050	CM centering vise	105	178	15.5	adapter flange	1050



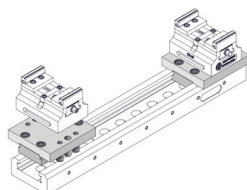
Combine the EA-507 rotary table with the CM 20 centering vise and split the  $\mu$ 's.

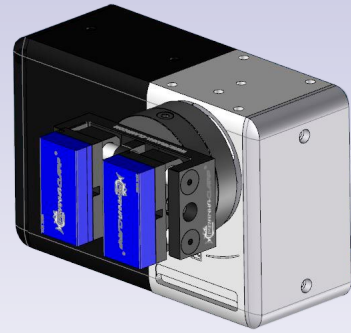
## Jaws

	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
CM 105	EVA.800055	Special claw jaw	80	Included in the weight of the vise	-	800055
	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



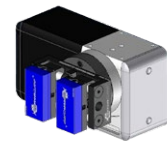


Clamping device assembled by pL LEHMANN,  
final adjustment by customer (if ordered together with a rotary table)

Further information at: [www.piranha-clamp.ch](http://www.piranha-clamp.ch)  
Request installation and operating instructions directly from manufacturer

## Zero-point clamping plates on rotary table

pL LEHMANN Item no.	Designation	Dimensions [mm]	Weight [kg]	Max. speed [rpm]	PiranhaClamp catalog reference	PiranhaClamp item no., incl. HSK adapter
507	Flange 507	Ø 130 x 25			551158	551158
	Zero point clamping plate Ø 130 mm	Ø 130 x 26			551161	551161
510	Flange 510	Ø 130 x 25			551159	551159
	Zero point clamping plate Ø 130 mm	Ø 130 x 26			551161	551161
520	Flange 520	Ø 130 x 25			551160	551160
	Zero point clamping plate Ø 130 mm	Ø 130 x 26			551161	551161



507 with NSP



510 with NSP



520 with NSP

## Zero point clamping plate for faceplates (axial discs) from page 123

pL LEHMANN Item no.	Designation	Dimensions [mm]	Weight [kg]	Max. speed [rpm]	PiranhaClamp catalog reference	PiranhaClamp item no.
507	Zero-point clamping plate Butterfly for faceplate (axial disc)	170 x 170 x 26 Positioning pin Ø 30			540283	540283-507
510		170 x 170 x 26 Positioning pin Ø 40			540283	540283-510

## Compatible centering vices

Article no.	Designation	Dimensions [mm]	Clamping capacity [mm]	Weight [kg]	Speed [rpm]
551112	PV75 clamping vise	75 x 56 x 55	19 – 49 / 25 – 55, 0 – 31 / 5 – 35		
540362	Snapper 170 clamping vise	170 x 90 x 55	5 – 75 / 53 – 118		
540446	Snapper 170 clamping vise with higher jaws	170 x 90 x 65	5 – 75 / 53 – 118		
551076	Snapper 170 double station	170 x 90 x 55	2x 6 – 30 / 2x 26 – 52		
551075	Snapper 170 double station with higher jaws	170 x 90 x 65	2x 6 – 30 / 2x 26 – 52		
540444	Gepard 170 clamping vise, incl. aluminum jaws XS	170 x 90 x 85	0 – 155, varies with jaw type		
551079	Gepard 170 double station, incl. aluminum jaws XS	170 x 90 x 85	2 x 0 – 75		

## Ripas

pL LEHMANN Item no.	Designation	Manual	Clamping capacity [mm]	Centering vise length [mm]	Centering vise dimensions [mm]	Weight [kg]	Max. speed [rpm]	PiranhaClamp catalog Reference	PiranhaClamp item no., incl. HSK adapter
507	PV75, incl. flange	1)	19 – 49 / 25 – 55 0 – 31 / 5 – 35	75	75 x 56 x 55			551112	551112-63
	Snapper 170, incl. flange	1)	5 – 75 / 53 – 18	170	170 x 90 x 55			540362	540362-63
	Gepard 170 with aluminum jaws XS, incl. flange	1)	0 – 155 varies with jaw type	170	170 x 90 x 84			540444	540444-63
510	PV75, incl. flange	2)	19 – 49 / 25 – 55 0 – 31 / 5 – 35	75	75 x 56 x 55			551112	551112-63
	Snapper 170, incl. flange	2)	5 – 75 / 53 – 18	170	170 x 90 x 55			540362	540362-63
	Gepard 170 with aluminum jaws XS, incl. flange	2)	0 – 155 varies with jaw type	170	170 x 90 x 84			540444	540444-63
520	PV75, incl. flange	3)	19 – 49 / 25 – 55 0 – 31 / 5 – 35	75	75 x 56 x 55			551112	551112-63
	Snapper 170, incl. flange	3)	5 – 75 / 53 – 18	170	170 x 90 x 55			540362	540362-63
	Gepard 170 with aluminum jaws XS, incl. flange	3)	0 – 155 varies with jaw type	170	170 x 90 x 84			540444	540444-63
	Snapper 300, incl. flange	3)	5 – 191 / 53 – 238	300	300 x 120 x 66			540401	540401-63
	Gepard 300 with aluminum jaws XS, incl. flange	3)	0 – 268 varies with jaw type	300	300 x 120 x 105			540400	540400-63

Additionally required clamping system (see p. 123)

1) = RIP.507-63m,  
2) = RIP.510-63m,  
3) = RIP.520-63m

With some minor adjustment, all PiranhaClamp clamping devices can also be assembled to other zero-point clamping systems (Lang, Erowa, Schunk, AMF...).



PV 75 Ripas



Snapper 170 Ripas



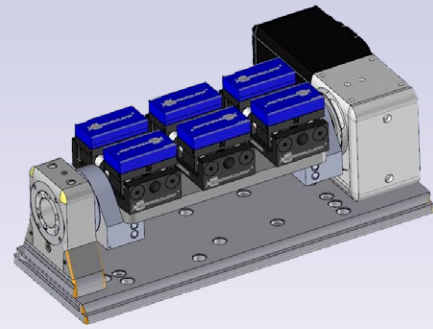
Snapper 300 Ripas



Gepard 170 Ripas



Gepard 300 Ripas



Hole grid plate installed by pL LEHMANN  
(if ordered together with a rotary table)

Further information at: [www.piranha-clamp.ch](http://www.piranha-clamp.ch)  
Request installation and operating instructions directly from manufacturer

### Clamping yoke

	pL LEHMANN Item no.	L [mm]	Weight [kg]	Type of clamping	Clamping system	Number of clamping elements	PiranhaClamp item no. Hole grid plate	PiranhaClamp item no. Zero point clamping plate	PiranhaClamp item no. Clamping system
507*		350		directly mounted	Snapper 170	3	Always needed		540362
		350			Gepard 170	3	551167-1		540444
		350			PV75	3			551112
		350		with zero point clamping plate	Snapper 170	3	Always needed	Additionally needed	540362
		350			Gepard 170	3	551167-2	551162	540444
		350			PV75	3			551112
510**		500		directly mounted	Snapper 170	4	Always needed		540362
		500			Gepard 170	4	551168-1		540444
		500			PV75	4			551112
		500		with zero point clamping plate	Snapper 170	4	Always needed	Additionally needed	540362
		500			Gepard 170	4	551168-2	551163	540444
		600		directly mounted	Snapper 170	5	Always needed		540362
		600			Gepard 170	5	551169-1		540444
		600			PV75	6			551112
		600		with zero point clamping plate	Snapper 170	6	Always needed	Additionally needed	540362
		600			Gepard 170	6	551169-2	551164	540444
		600			PV75	6			551112
	520***		600		directly mounted	Snapper 170	5	Always needed	
		600			Gepard 170	5	551170-1		540444
		600			PV75	6			551112
		600		with zero point clamping plate	Snapper 170	6	Always needed	Additionally needed	540362
		600			Gepard 170	6	551170-2	551164	540444
		800		directly mounted	Snapper 170	6	Always needed		540362
		800			Gepard 170	6	551171-1		540444
		800			PV75	8			551112
		800		with zero point clamping plate	Snapper 170	8	Always needed	Additionally needed	540362
		800			Gepard 170	8	551171-2	551165	540444
		800			PV75	8			551112

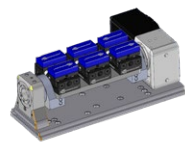
#### Ordering information

Always order together with pL

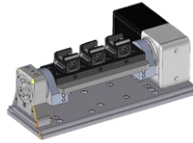
\* Counter bearing GLA.TOP1-110 (p. 36), mounting kit RFX.507-ASa-TOP (p. 36), base plate RFX.507-GP350s-TOP (p. 36) or hydraulic kit GLA.HYD-xxx (p. 75)

\*\* Counter bearing GLA.TOP2-150 (p. 36), mounting kit RFX.510-ASa-TOP (p. 36), base plate RFX.510-GPxxxs-TOP (p. 36) or hydraulic kit GLA.HYD-xxx (p. 75)

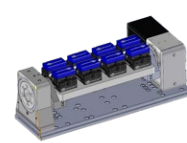
\*\*\* Counter bearing GLA.TOP2-180 (p. 36), mounting kit RFX.520-ASa-TOP (p. 36), base plate RFX.520-GPxxxs-TOP (p. 36) or hydraulic kit GLA.HYD-xxx (p. 75)



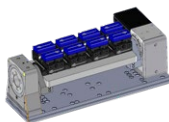
507-350 mm x 165 mm 3 Gepard direct



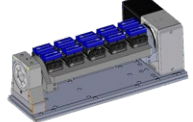
507-350 mm x 165 mm NSP 3 PV75



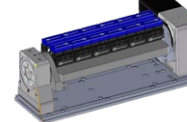
510-500 mm x 215 mm 4 Gepard direct



510-500 mm x 215 mm NSP 4 Gepard



520-600 mm x 270 mm 5 Gepard direct



520-600 mm x 270 mm NSP 6 Gepard



520-800 mm x 270 mm 6 Gepard direct



520-800 mm NSP 8x PV75



Clamping means installed and aligned by pL LEHMANN  
(if ordered together with a rotary table)

Further information at: [www.triag-int.ch](http://www.triag-int.ch)  
Request installation and operating instructions directly from manufacturer

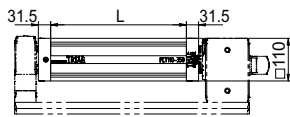
### Clamping bars

	pL LEHMANN Item no.	Usable length L L [mm]	Cube [mm]	Interference circle* Ø [mm]	Weight [kg]	Max. speed [rpm]	Counter bearing **	Base plate	IVO Item no.
507	TRI.507-350	350	110x110	156	34		GLA.TOP1-110	RFX.507-GP350s-TOP	IVO-TRI.507-350
	TRI.507-400	400	110x110	156	39		GLA.TOP1-110	RFX.507-GP450s-TOP	IVO-TRI.507-400
510	TRI.510-500	500	110x110	156	46		GLA.TOP2-150	RFX.510-GP500s-TOP	IVO-TRI.510-500
	TRI.510-600	600	110x110	156	54		GLA.TOP2-150	RFX.510-GP600s-TOP	IVO-TRI.510-600
520	TRI.520-600	600	110x110	198	55		GLA.TOP2-180	RFX.520-GP600s-TOP	IVO-TRI.520-600
	TRI.520-650	650	110x110	198	63		GLA.TOP2-180	RFX.520-GP700s-TOP	IVO-TRI.520-650

\* without jaws

\*\* must always be ordered from pL

- Weight for clamping bar and adapter flanges only (without rotary table, counter bearing and common base plate).
- For more information about base plates, see p. 37 and for counter bearings, see p. 75



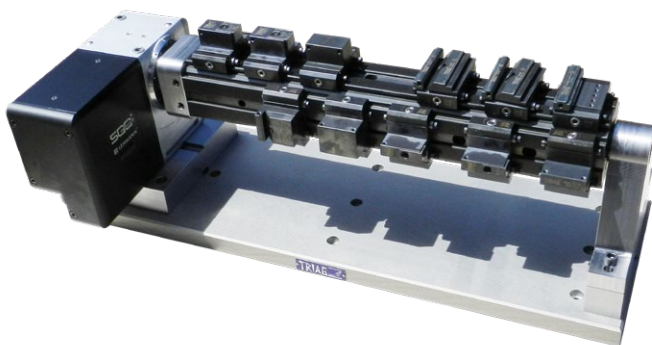
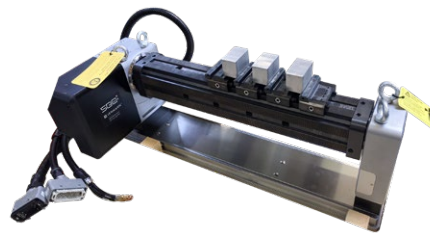
EA-507 for GLA.TOP1-110 and RFX.507-GPxxxs-TOP



EA-510 for GLA.TOP2-150 and RFX.510-GPxxxs-TOP



EA-520 for GLA.TOP2-180 and RFX.520-GPxxxs-TOP



Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, WMS

MOT, KAB, WDF, CNC

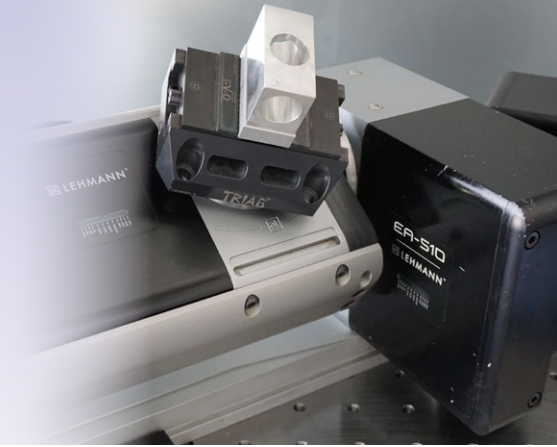
Aligning, GLA, RST, LOZ

Service & Technology

Tooling

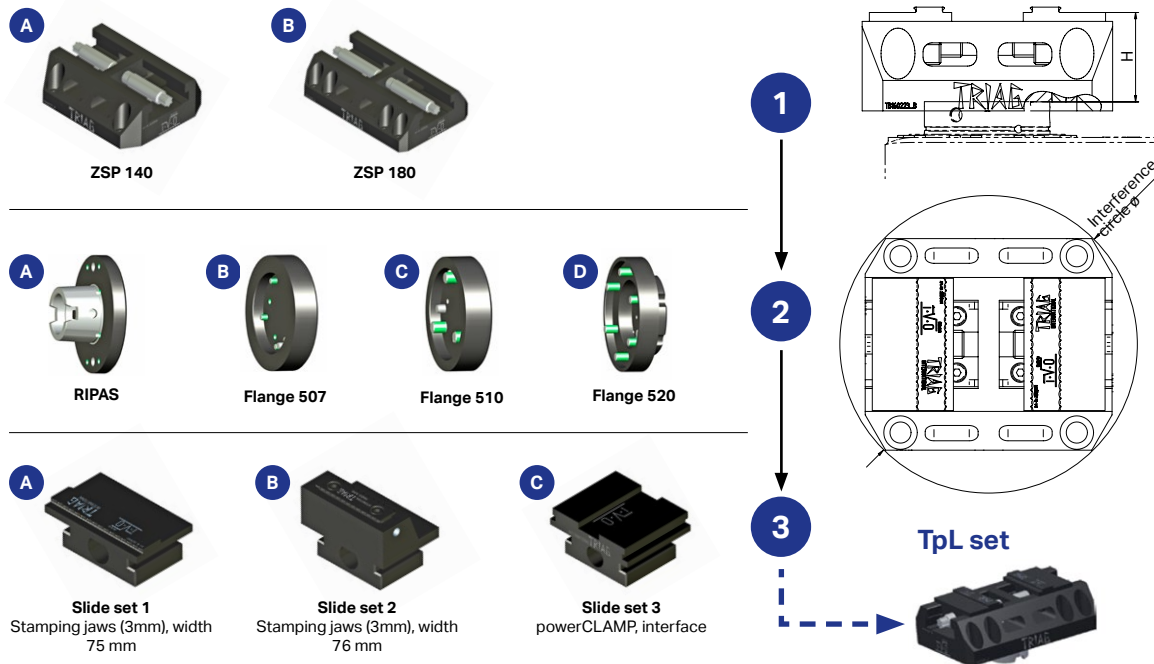


Ultra-compact self-centering vice – only 50 mm above spindle



Clamping device 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](http://www.ivo-oesterle.de)  
 Manufacturer for all other add-on elements: [www.triag-int.ch](http://www.triag-int.ch)



		1	2	3						
	pL LEHMANN Item no.	Centric clamping unit	Adapter	Stamping jaws	H [mm]	Interference circle $\varnothing$ [mm]	Weight, approx. [kg]	Max. speed [rpm]	Required	IVO item no.
HSK	IVO.5xx-140ada	ZSP 140 140 x 120 x 50	HSK adapter	A	50	184	4.8		RIP.5xx-63x	26299-1-1-1
				B			5.8		RIP.5xx-63x	26299-1-1-2
				C			5.6		RIP.5xx-63x	26299-1-1-3
507	IVO.507-140fla	ZSP 140 140 x 120 x 50	Flange	A	52.5	184	5.2			26299-1-2-1
				B			6.2			26299-1-2-2
				C			6			26299-1-2-3
510	IVO.507-180fla	ZSP 180 180 x 120 x 50	Flange	A	52.5	216	6.4			26299-2-2-1
				B			7.4			26299-2-2-2
				C			7.2			26299-2-2-3
520	IVO.510-140fla	ZSP 140 140 x 120 x 50	Flange	A	52.5	184	5.1			26299-1-3-1
				B			6.1			26299-1-3-2
				C			5.9			26299-1-3-3
520	IVO.510-180fla	ZSP 180 180 x 120 x 50	Flange	A	52.5	216	6.3			26299-2-3-1
				B			7.3			26299-2-3-2
				C			7.1			26299-2-3-3
520	IVO.520-140fla	ZSP 140 140 x 120 x 50	Flange	A	52.5	184	6.2			26299-1-4-1
				B			7.2			26299-1-4-2
				C			7			26299-1-4-3
520	IVO.520-180fla	ZSP 180 180 x 120 x 50	Flange	A	52.5	216	7.4			26299-2-4-1
				B			8.4			26299-2-4-2
				C			8.2			26299-2-4-3

Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, WMS

MOT, KAB, WDF, CNC

Aligning, GLA, RST, LOZ

Service & Technology

Tooling

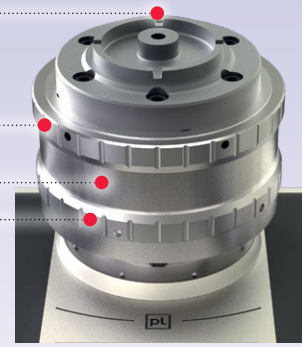


COCN interface, chuck 3R GPS 70 (image) or GPS 120/70

Front clamping stroke setting

Integrated, pneumatic clamping cylinder 600...5'800 N (1...10 bar), Hub 6mm

Rear clamping stroke setting



Clamping device assembled by pL LEHMANN, final adjustment by customer (if ordered together with a rotary table)

Further information: [www.tgcolin.ch](http://www.tgcolin.ch)  
Request installation and operating instructions directly from manufacturer

Overview, Applications

System & Facts, IBox

Rotary tables

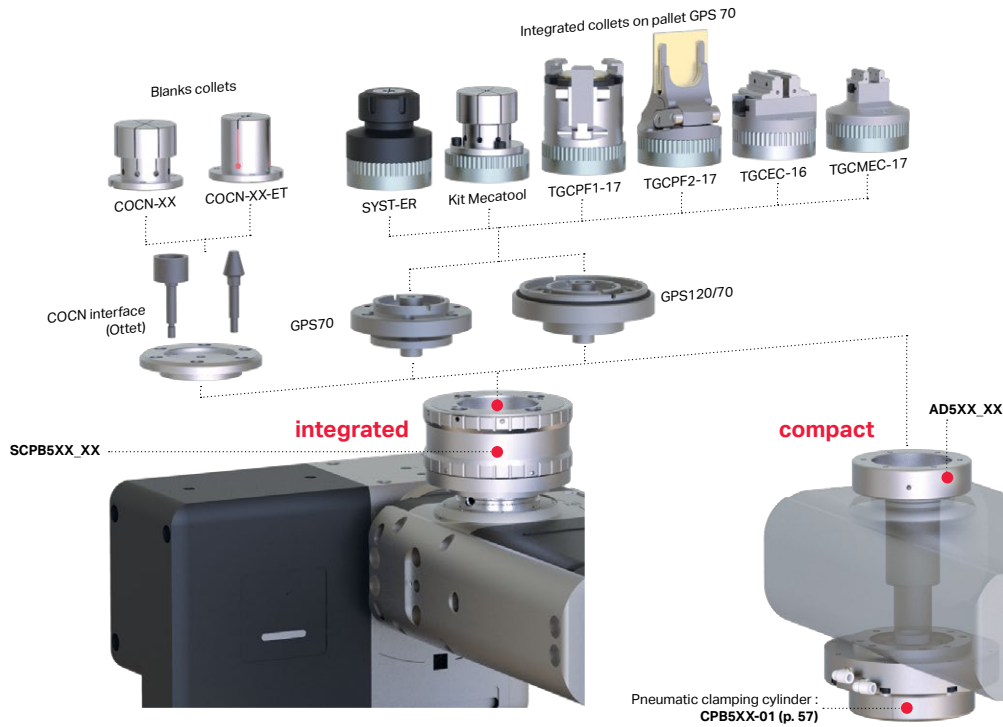
SPZ, DDF, WMS

MOT, KAB, WDF, CNC

Aligning, GLA, RST, LOZ

Service & Technology

Tooling

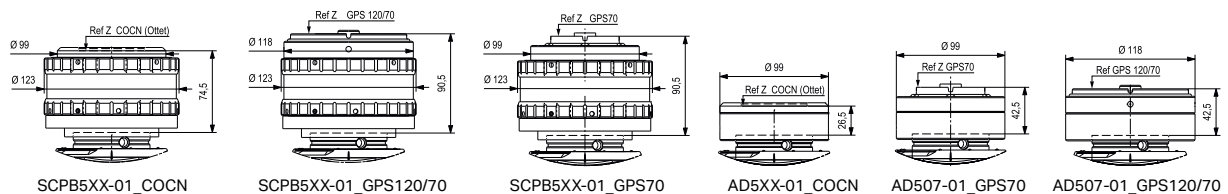


	pL LEHMANN Item no.	Designation	Functions	Weight [kg]	Max. speed [rpm]	integrated	compact	Required rotary union or clamping cylinder*	TGColin Item no.
507	<b>TGC.507-COCN</b>	Clamping device COCN	clamping/unclamping			●		DDF.507-04	SCPB507-01_COCN
	<b>TGC.507-G70</b>	Clamping device GPS70	Pallet enable / clamping/unclamping			●		DDF.507-04	SCPB507-01_GPS70
	<b>TGC.507-G12070</b>	Clamping device GPS120/70	Pallet enable / clamping/unclamping			●		DDF.507-04	SCPB507-01_GPS120/70
	<b>TGC.507-AdaCOCN</b>	Adapter COCN	clamping / unclamping				●	TGC.507-SPZ-6.5A	AD507-01_COCN
	<b>TGC.507-AdaGPS70</b>	Adapter GPS70	clamping / unclamping				●	TGC.507-SPZ-6.5A	AD507-01_GPS70
	<b>TGC.507-AdaGPS12070</b>	Adapter GPS120/70	clamping / unclamping				●	TGC.507-SPZ-6.5A	AD507-01_GPS120/70
510	<b>TGC.510-COCN</b>	Clamping device COCN	clamping / unclamping			●		DDF.510-04	SCPB510-01_COCN
	<b>TGC.510-G70</b>	Clamping device GPS70	Pallet enable / clamping/unclamping			●		DDF.510-04	SCPB510-01_GPS70
	<b>TGC.510-G12070</b>	Clamping device GPS120/70	Pallet enable / clamping/unclamping			●		DDF.510-04	SCPB510-01_GPS120/70
	<b>TGC.510-AdaCOCN</b>	Adapter COCN	clamping / unclamping				●	TGC.510-SPZ-6.5A	AD510-01_COCN
	<b>TGC.510-AdaGPS70</b>	Adapter GPS70	clamping / unclamping				●	TGC.510-SPZ-6.5A	AD510-01_GPS70
	<b>TGC.510-AdaGPS12070</b>	Adapter GPS120/70	clamping / unclamping				●	TGC.510-SPZ-6.5A	AD510-01_GPS120/70

\* see pp. 57-59

## integrated versions

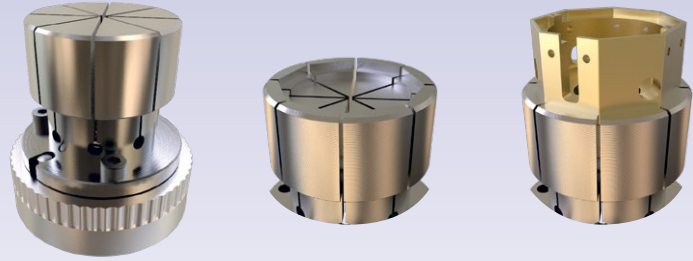
## compact versions





Clamping device assembled by pL LEHMANN,  
final adjustment by customer (if ordered together with a rotary table)

Further information at: [www.tgcolin.ch](http://www.tgcolin.ch)  
Request installation and operating instructions directly from manufacturer



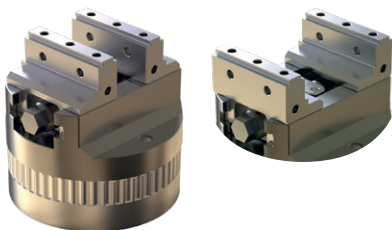
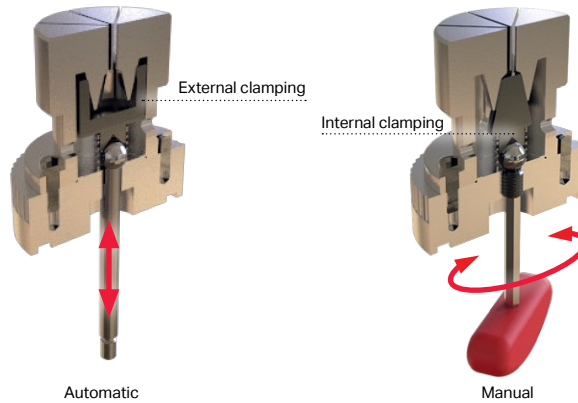
**TGCPF1-17**  
System for precise positioning and axial retention of watch plate



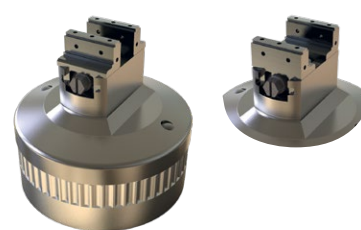
**TGCPF2-17**  
System for clamping plate blanks in order to machine them from above and below



**KIT MECATOOL**  
Collet blank, opening or closing; can be adapted to the workpiece shape



**TGCEC-16**  
Clamping capacity 0–48 mm. Width 40 mm. Total height from pallet surface 45 mm.



**TGCMEC-17**  
Clamping capacity 0–22 mm. Width 20 mm. Total height from pallet surface 43 mm.

Overview,  
Applications

System &  
Facts, IBox

Rotary  
tables

SPZ,  
DDF, WMS

MOT, KAB,  
WDF, CNC

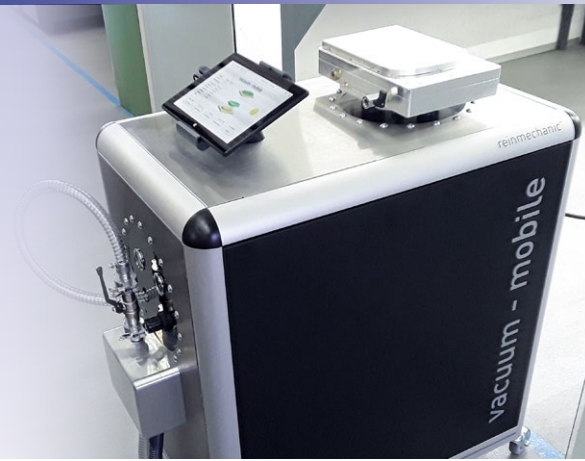
Aligning,  
GLA, RST, LOZ

Service  
& Technology

Tooling

## Control processes interactively

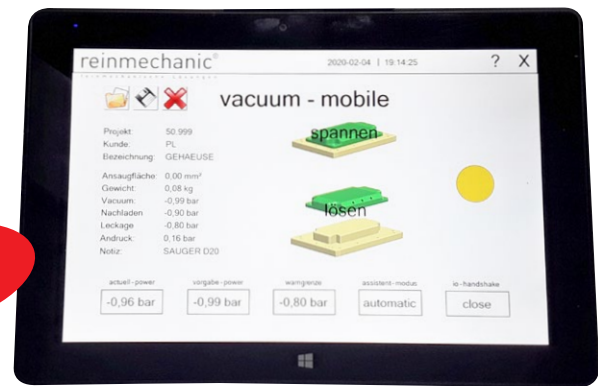
Further information at: [www.reinmechanic.de](http://www.reinmechanic.de)  
Request installation and operating instructions directly from manufacturer



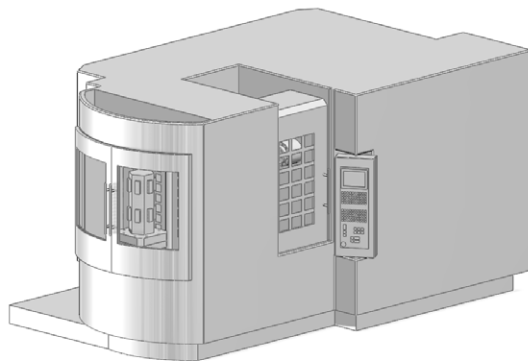
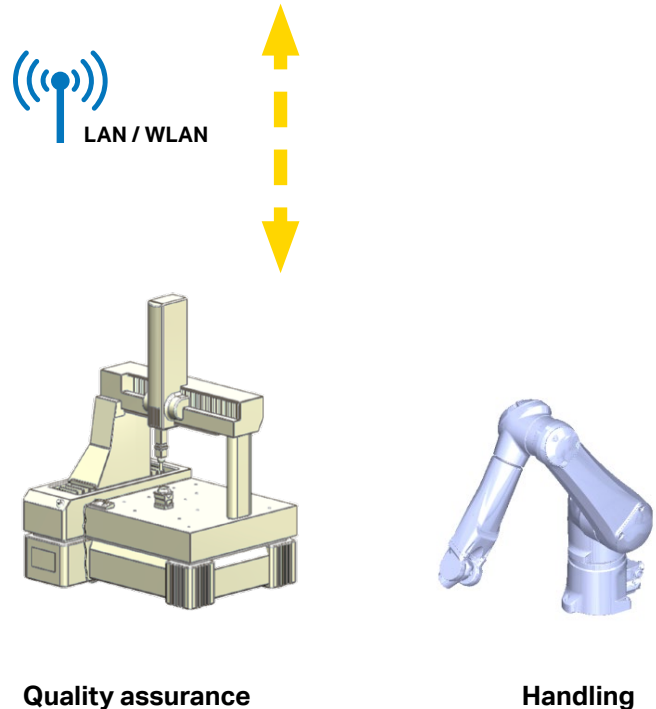
- **mobile - wireless**  
WLAN / Bluetooth
- **mobile - data**  
XML format; Windows-based
- **mobile - assist**  
intelligent and self-monitoring functions
- **mobile - service**  
Remote maintenance and maintenance manager
- **mobile - mail**  
Fault message and process message via e-mail
- **mobile - processing**  
I/O Profinet for integrated automation
- **mobile - test**  
Functions to test / simulate sequences

## mobile - control

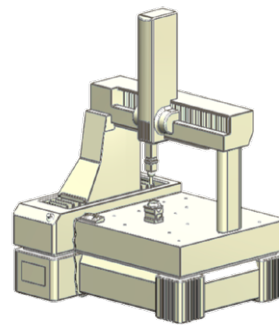
### Control processes interactively



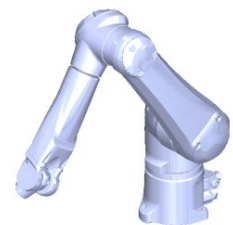
Ready for real Industry 4.0



Production of parts



Quality assurance



Handling

Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, WIMS

MOT, KAB, WDF, CNC

Aligning, GLA, RST, LOZ

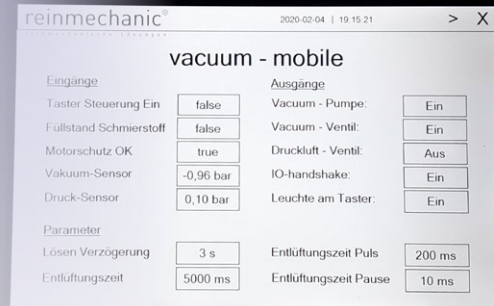
Service & Technology

Tooling



Workpiece-dependent clamping technology  
Monitor and control using a common platform

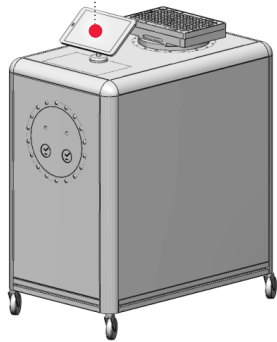
Further information at: [www.reinmechanic.de](http://www.reinmechanic.de)  
Request installation and operating instructions directly from manufacturer



mobile - systems

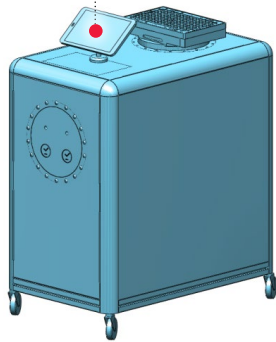
Technology on a common basis

Vacuum



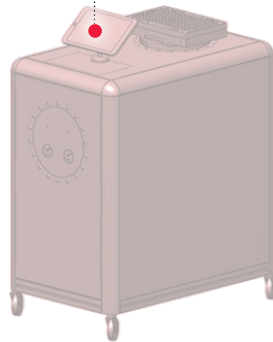
vacuum-mobile  
(see pp. 162 / 163)

Ice



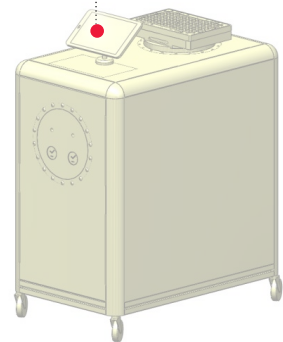
kryo-mobile  
Freeze clamping technology

Hydraulics



hydro-mobile  
(on request)

Magnet



magnet-mobile  
(on request)



pL-compatible

Highlights

- Flexible and mobile
- Standardized modular system
- Available quickly, adaptable easily
- Reliable control & monitoring

mobile - system (e)

- Intelligent clamping technology
- Plug & play

Overview,  
Applications

System &  
Facts, IBox

Rotary  
tables

SPZ,  
DDF, WMS

MOT, KAB,  
WDF, CNC

Aligning,  
GLA, RST, LOZ

Service  
& Technology

Tooling

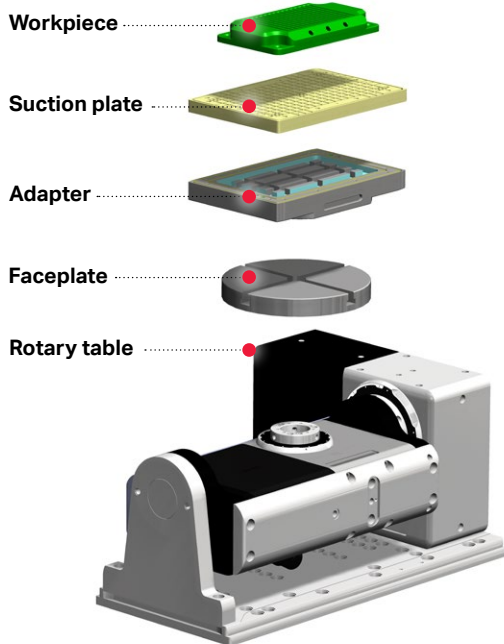
reinmechanic®  
feinmechanische Lösungen

Vacuum clamping technology for mounting  
thin-walled workpieces, housings, plates ...



Further information at: [www.reinmechanic.de](http://www.reinmechanic.de)  
Request installation and operating instructions directly from manufacturer

## vacuum - mobile Workpiece mount for rotary tables



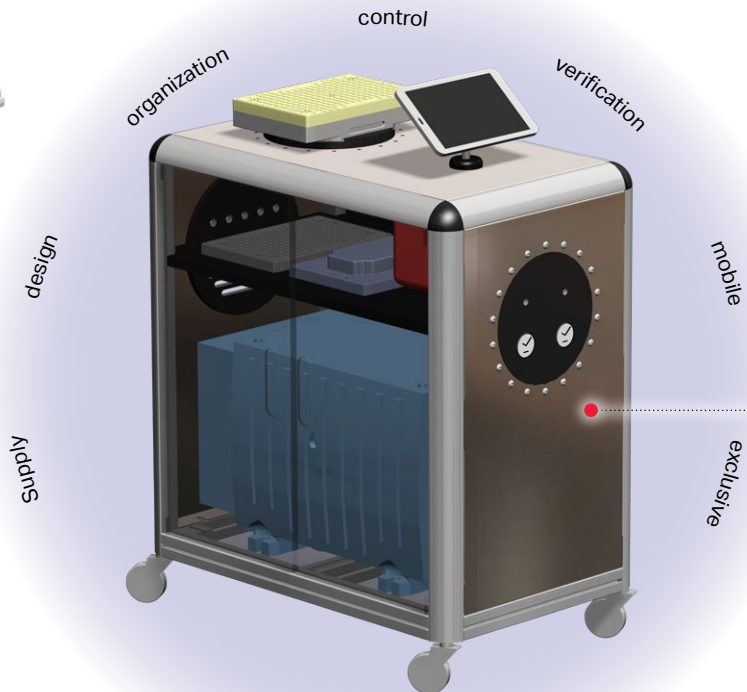
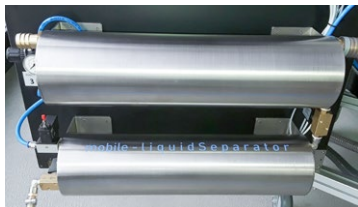
pL rotary table T1-510520 with reinmechanic vacuum adapter and reinmechanic universal suction plate

### Features of the reinmechanic-vacuum system:

- pl-compatible (ready to use)
- Production-oriented solution (manufacturing solutions)
- Individual sizing (lean production)
- reinmechanic adapter service (individual adapter service)
- Manufacturer-independent (all-round use)
- Industry 4.0-compatible
- Touchscreen control (easy-handling)
- Self-monitoring overall system (self-monitoring)
- Command transfer to machine control (I/O handshake)

### mobile-liquidSeparator

- Optional liquid separator
- Process-monitored
- Automatic feedback



reinmechanic-vacuum-mobile «premium» with mechanical-vacuum adapter and mechanical-universal suction plate

### mobile-systems available in three versions

#### «standard»

- Complete design
- Required functions
- Economical

#### «professional»

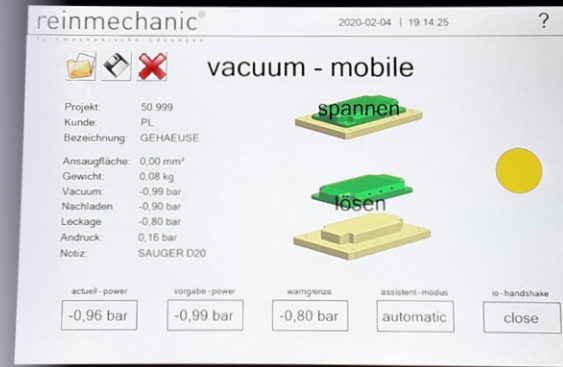
- Complete design
- Advanced functions
- Semi-automated

#### «premium»

- Complete design
- Industry 4.0-capable
- Touchscreen control

Readily accessible machining surfaces as ideal prerequisite for measurement tasks, precision machining ...

Further information at: [www.reinmechanic.de](http://www.reinmechanic.de)  
Request installation and operating instructions directly from manufacturer



## vacuum - mobile modular system

**specific**  
designed by reinmechanic as finished solution

**universal**  
Matrix plate freely adjustable

**individual**  
can be modified by user

**Suction plate**

**Adapter**

**pL faceplate**  
Adapter plate can be fastened to faceplate or spindle nose

	pL LEHMANN Item no.	Designation	Weight [kg]	reinmechanic Item no.
Basic equipment	RMV.BAS	vacuum-mobile systems «basic»		Vpl-20-001-XX
	RMV.PRO	Vacuum-mobile systems «professional»		Vpl-20-002-XX
	RMV.PRE	Vacuum-mobile systems «premium»		Vpl-20-003-XX
	RMV.LIS	mobile-liquidSeparator		Vpl-21-001-XX
507	RMV.507-SPE	vacuum-mobile suction plate «specific»		Vpl-15-001-XX
	RMV.507-UNI	vacuum-mobile suction plate «universal»		Vpl-15-002-XX
	RMV.507-IND	vacuum-mobile suction plate «individual»		Vpl-15-003-XX
	RMV.507-ada	vacuum-mobile adapter plate 507		Vpl-15-004-XX
510	RMV.510-SPE	vacuum-mobile suction plate «specific»		Vpl-15-005-XX
	RMV.510-UNI	vacuum-mobile suction plate «universal»		Vpl-15-006-XX
	RMV.510-IND	vacuum-mobile suction plate «individual»		Vpl-15-007-XX
	RMV.510-ada	vacuum-mobile adapter plate 510		Vpl-15-008-XX
520	RMV.520-SPE	vacuum-mobile suction plate «specific»		Vpl-15-009-XX
	RMV.520-UNI	vacuum-mobile suction plate «universal»		Vpl-15-010-XX
	RMV.520-IND	vacuum-mobile suction plate «individual»		Vpl-15-011-XX
	RMV.520-ada	vacuum-mobile adapter plate 520		Vpl-15-012-XX
530	RMV.530-SPE	vacuum-mobile suction plate «specific»		Vpl-15-013-XX
	RMV.530-UNI	vacuum-mobile suction plate «universal»		Vpl-15-014-XX
	RMV.530-IND	vacuum-mobile suction plate «individual»		Vpl-15-015-XX
	RMV.530-ada	vacuum-mobile adapter plate 530		Vpl-15-016-XX

Spare parts and additional accessories available on request

Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, WMS

MOT, KAB, WDF, CNC

Aligning, GLA, RST, LOZ

Service & Technology

Tooling

reinmechanic®  
feinmechanische Lösungen

## Automation 4.0 – fully integrated

Further information at: [www.reinmechanic.de](http://www.reinmechanic.de)  
Request installation and operating instructions directly from manufacturer



### mobile - transferTool

handling «easy - in»

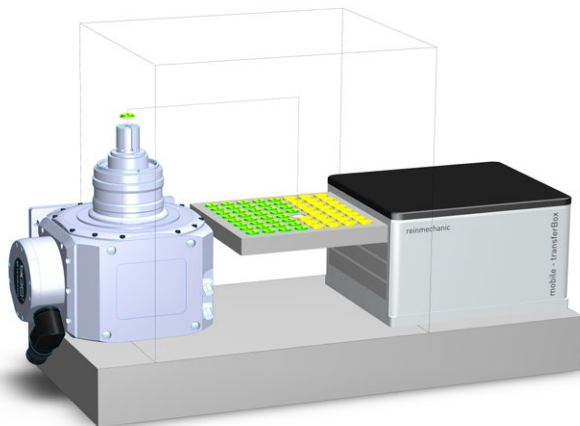
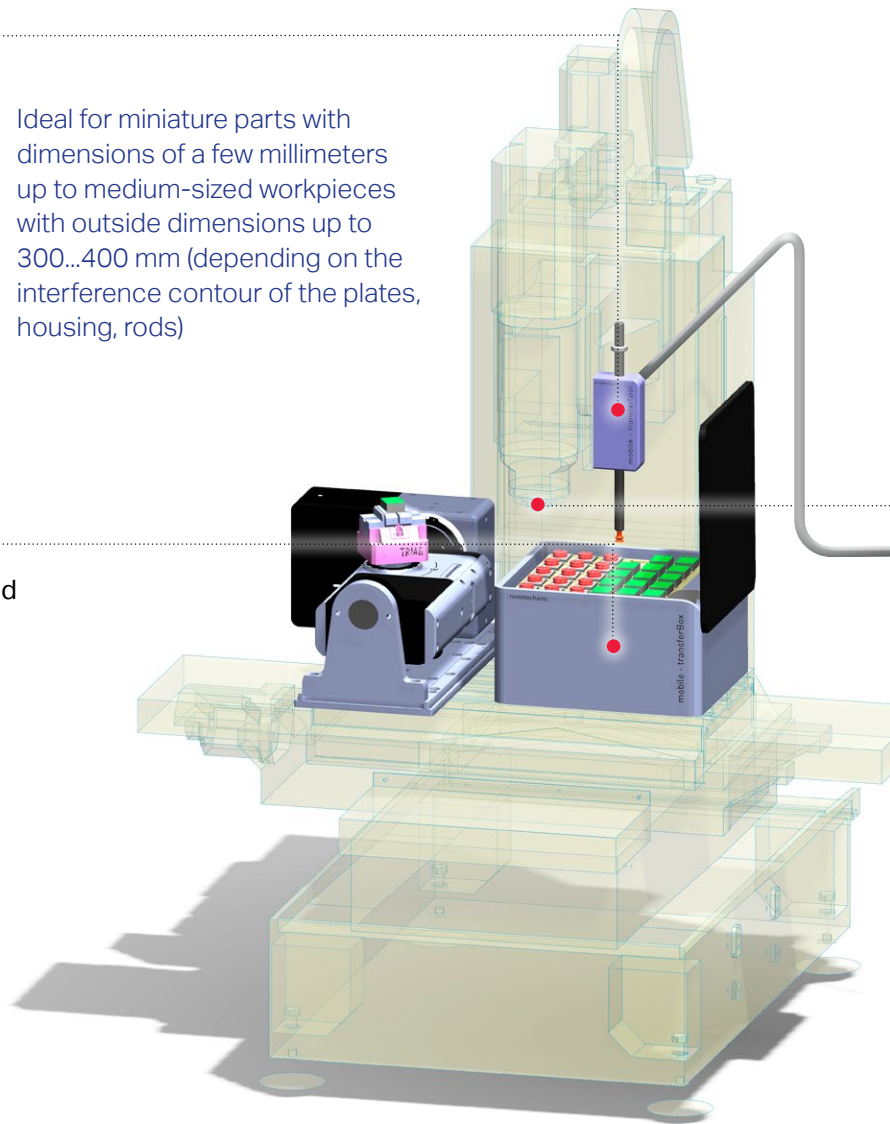
- Integrated suction gripper system
- Process-monitored
- Tightly holding vacuum via suction turbine
- Automatic suction/pressure changeover
- With cleaning function on request

Ideal for miniature parts with dimensions of a few millimeters up to medium-sized workpieces with outside dimensions up to 300...400 mm (depending on the interference contour of the plates, housing, rods)

### mobile - transferBox

Workpiece magazine directly where needed

- Storage area protected from chips
- Time-optimized provision
- Short transfer paths
- Specific placement displays
- High reference accuracy
- With barrier air on request
- In various sizes (S, M, L...)
- Special sizes on request (XS, XL, XXL)



**ROTOMATION solution with**

- Rotary table EA915 DD
- mobile - transferBox (mtB)
- mobile - partTablet (mpT)

Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, WMS

MOT, KAB, WDF, CNC

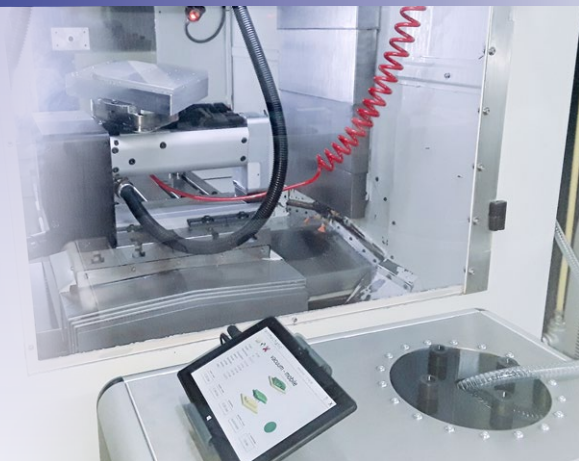
Aligning, GLA, RST, LOZ

Service & Technology

Tooling

Automate standard machines efficiently

Further information at: [www.reinmechanic.de](http://www.reinmechanic.de)  
Request installation and operating instructions directly from manufacturer



Highlights

- No additional handling device necessary
- Installation area for robot cell eliminated
- Only standard CNC program knowledge needed

transferTool

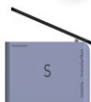
alternatively, in spindle

- Economical (without process monitoring)

vacuum - mobile «premium»

incl. mobile control + processing

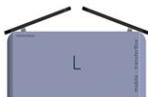
- Fully integrated I/O Profinet solution
- Communication with NC system
- Standard - M-commands



**small – miniature parts magazine**  
Footprint 450 x 400 mm  
Pallet size 350 x 350 mm



**medium – Allrounder**  
Footprint 450 x 600 mm  
Pallet size 350 x 550 mm



**large – large series**  
Footprint 600 x 600mm  
Pallet size 450 x 550mm

pL LEHMANN Item no.	Designation	Weight [kg]	reinmechanic Item no.
	mobile-transferBox, xs		Vpl-20-100-XX
	mobile-transferBox, small		Vpl-20-101-XX
	mobile-transferBox, medium		Vpl-20-102-XX
	mobile-transferBox, large		Vpl-20-103-XX
	mobile-transferBox, individual		Vpl-20-104-XX
	mobile-partTablet, xs		Vpl-21-100-XX
	mobile-partTablet, small		Vpl-21-101-XX
	mobile-partTablet, medium		Vpl-21-102-XX
	mobile-partTablet, large		Vpl-21-103-XX
	mobile-partTablet, individual		Vpl-21-104-XX
	mobile-partPalette, xs		Vpl-21-105-XX
	mobile-partPalette, small		Vpl-21-106-XX
	mobile-partPalette, medium		Vpl-21-107-XX
	mobile-partPalette, large		Vpl-21-108-XX
	mobile-partPalette, individual		Vpl-21-109-XX
	mobile-transferTool, small		Vpl-20-111-XX
	mobile-transferTool, medium		Vpl-20-112-XX
	mobile-transferTool, large		Vpl-20-113-XX
	mobile-transferTool, individual		Vpl-20-114-XX
	mobile-controlTablet		Vpl-50-100-XX
	mobile-controlBox		Vpl-50-101-XX
	mobile-processBox		Vpl-50-102-XX
	mobile-vacuumBox		Vpl-50-103-XX
	mobile-airBox		Vpl-50-104-XX
	mobile-control add-on, transfer-processing		Vpl-51-030-XX

Spare parts and additional accessories available on request

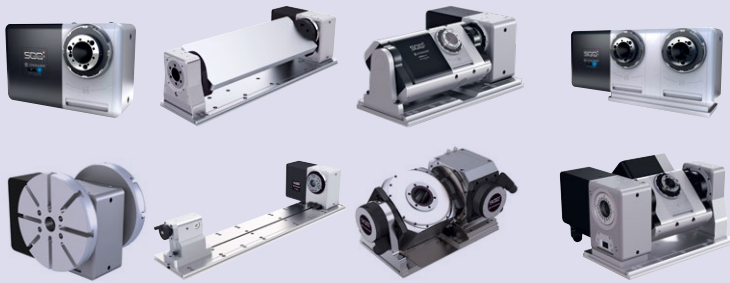
- Overview, Applications
- System & Facts, IBox
- Rotary tables
- SPZ, DDF, WMS
- MOT, KAB, WDF, CNC
- Aligning, GLA, RST, LOZ
- Service & Technology
- Tooling

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

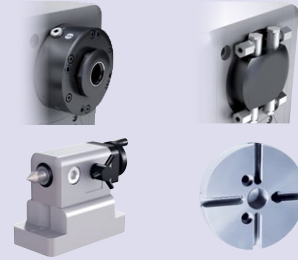
**ROTOMATION** – The ideal expansion with standardized automation. Economical. Professional. Simple.

**Standard**

**Rotary tables** see pp. 30–53

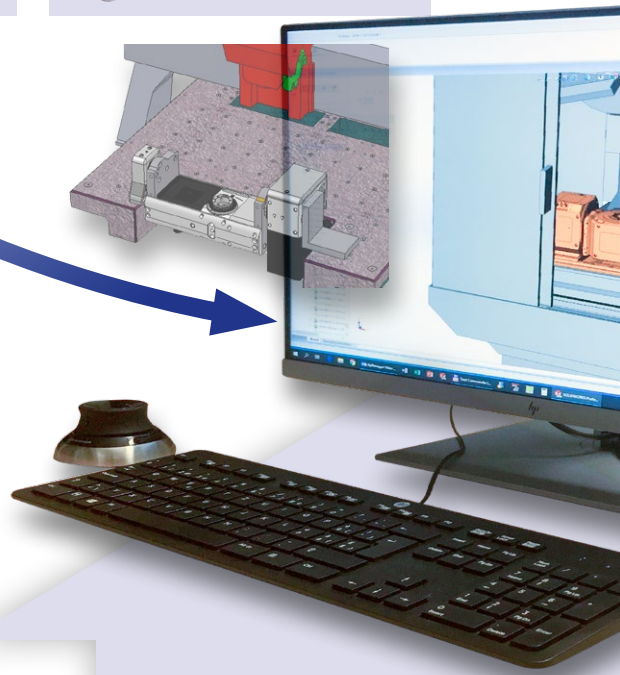


**Accessories**  
see pp. 56–59, 75–77, 122–125



**Customer**

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

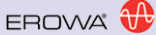


**Vertical machining centers and grinding machines** (a Selection Guide is available for all of these machines at our website)



Overview, Applications  
System & Facts, IBox  
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Tooling

\*Examples



## ROTOLUTION

### CAD & adaptation

- Installation check
- Adjustment to standard parts
- Special parts

### CAD & clamping means

- Workpiece clamping
- Standard/special

see pp. 126–159

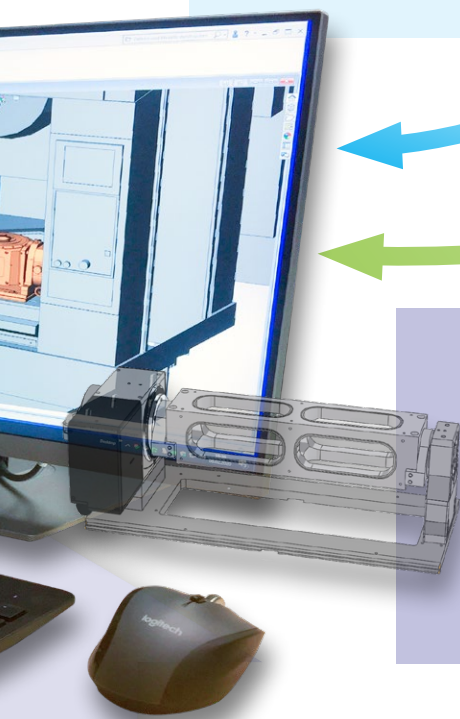
\*Examples

## ROTOMATION

### CAD & automation

- Workpiece handling
- Partnerships (GU with partners) e.g. reinmechanik – mobile - concept

see pp. 160–165



Plug-&-work package

Problem solution «on top» – Standard and ROTOLUTION from a single source, ROTOMATION and machine in partnership

Customer

Project management and execution, direct if needed



Overview, Applications

System & Facts, IBox

Rotary tables

SPZ, DDF, WIMS

MOT, KAB, WDF, CNC

Aligning, GLA, RST, LOZ

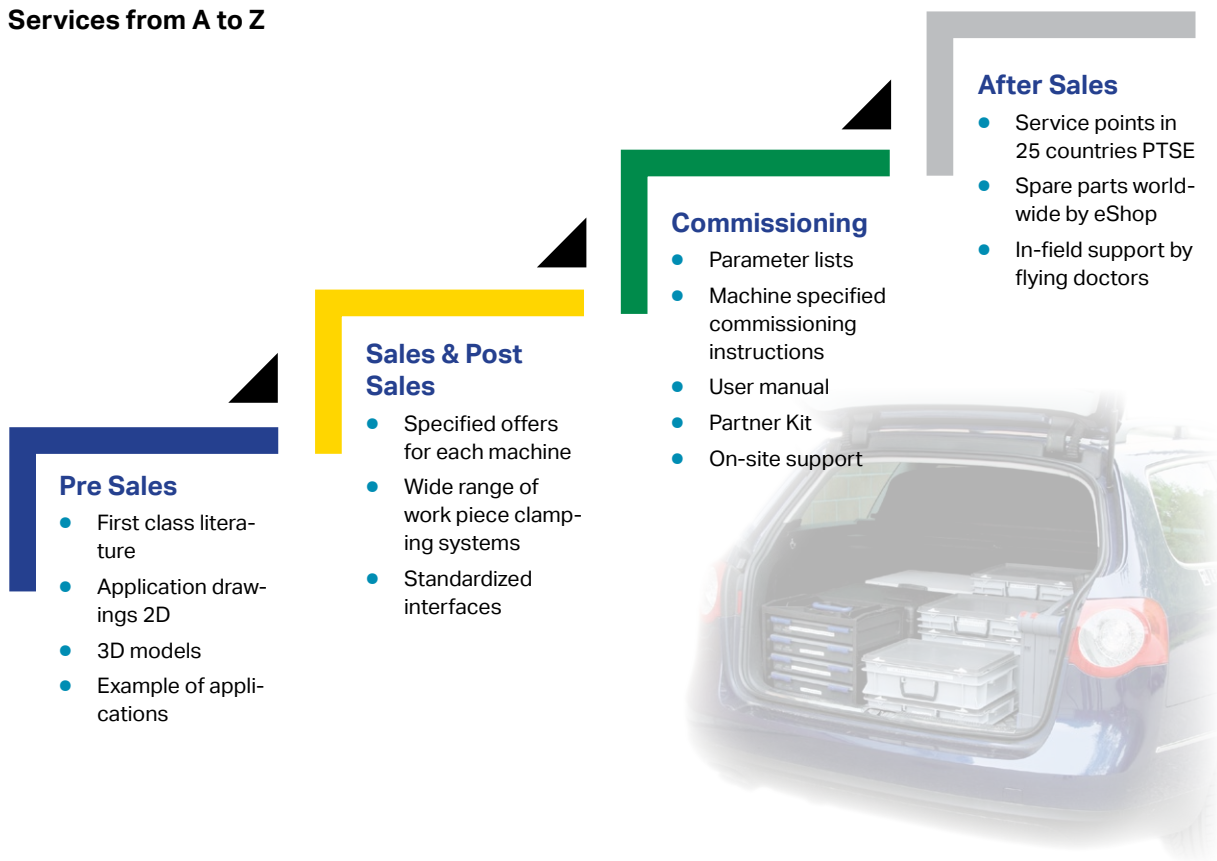
Service & Technology

Tooling

Present in over 20 countries:  
from sales consultation to the final service

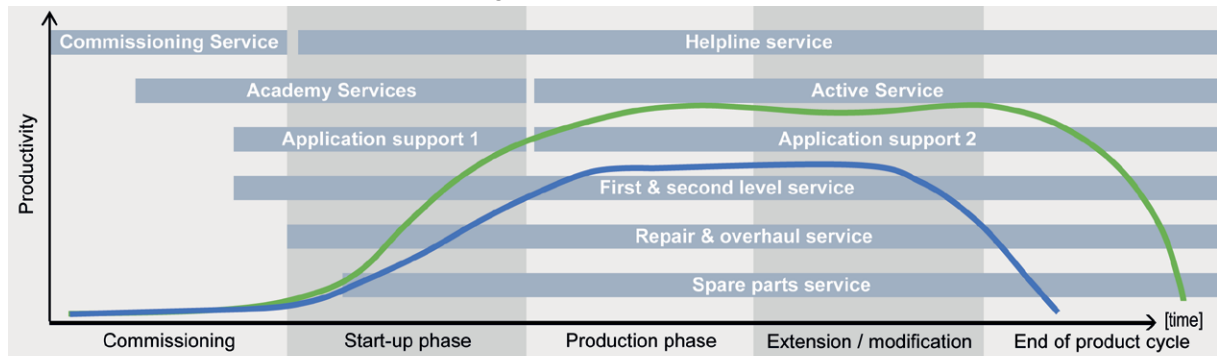


## Services from A to Z



## Increase productivity – Extend life cycle

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



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

For more information please request our service brochure.



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

## Production



Pallet pool for unmanned production



High precision circular and flat grinding



Material flow



Assembly area with Kanban System

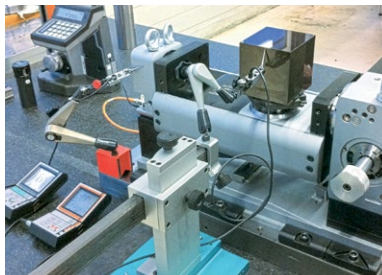


Rational equipping of spare parts packages

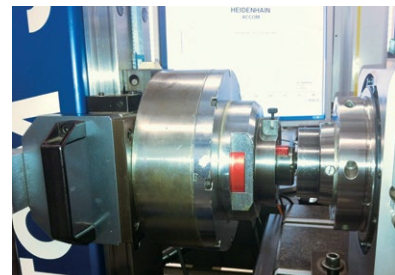
## Quality control



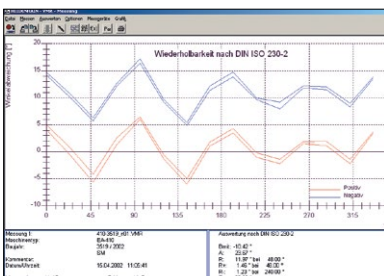
Measuring a housing on a 3D measuring unit



Measuring a T-type rotary table with a cube



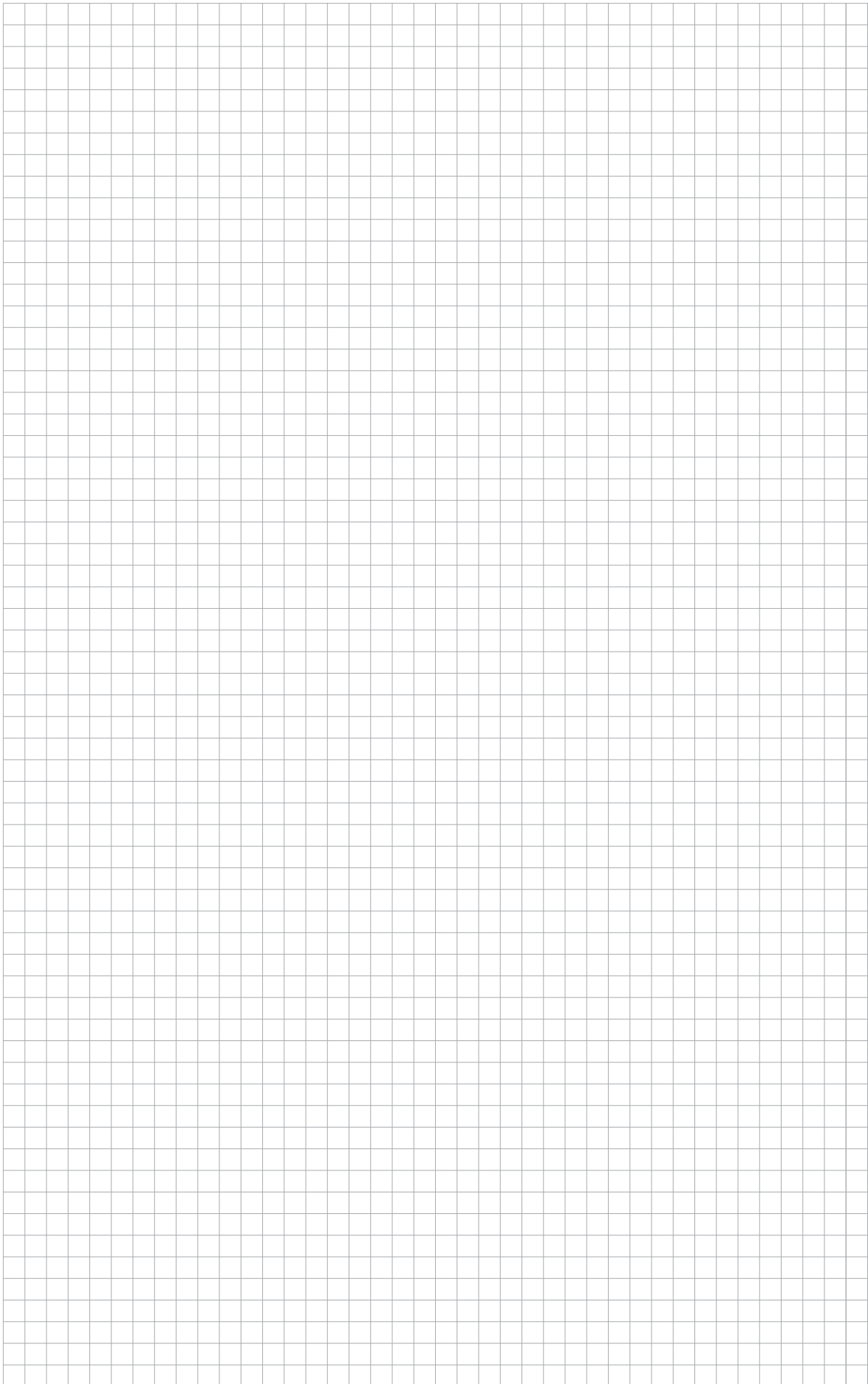
Measuring the indexing accuracy – fully automatically



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](http://www.lehmann-rotary-tables.com)

Tooling	
Service & Technology	
Aligning, GLA, RST, LOZ	
MOT, KAB, WDF, CNC	
SPZ, DDF, WMS	
Rotary tables	
System & Facts, IBox	
Overview, Applications	



- Overview, Applications
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- Tooling



ROTARY TABLES · PRECISION TECHNOLOGY · SOFTWARE

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### Global network

#### Europe

- Austria
- Benelux
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- Denmark
- Finland
- France
- Germany
- Hungary
- Ireland
- Italy
- Norway
- Poland
- Portugal
- Russia
- Slovenia
- Spain
- Sweden
- Turkey
- UK

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- Mexico
- USA

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- India
- Japan
- Malaysia
- Singapore
- South Korea
- Taiwan
- Thailand
- Vietnam



● Headquarters   ● direct sales/service partner   ● pL SOLUTIONS® partner   ● value added reseller & partner

More information (address, telephone number...) at [www.lehmann-rotary-tables.com](http://www.lehmann-rotary-tables.com)