New possibilities in metrology

MQ Series

Metrology Solutions

2023

Main catalog

08/2023 | EN

Position and measure without reclamping, efficiently and close to production

LEHMANN®

Swiss precision technology

Since 1974

Today, pL LEHMANN is still a family-owned and managed company in the hands of the second generation and present in over 20 countries (see the back of this catalog).

The company is committed to typical Swiss values: ...

- Depth of manufacturing – over 90% developed and manufactured in-house
- Product quality – reliable, durable, safe
- High-tech – Industry 4.0-compatible, ready to be automated
- Innovation – in tune with the times, adaptable, trendsetting
- Sustainability – long-term approach to business, environmentally conscious
- Basic values – honest, correct, fair

all wins – all smile!

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

... and 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 Series 400
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 Series 500
2011	Start of internationalization / lean production
2013	Development of the high-speed version of Series 500
2016	Expansion of factory building
2019	Introduction of the Series 900 DD up to 5,450 rpm and market launch of AM-LOCK, as well as the development and introduction of the AM-SHAFT construction shaft concept
2022	Presentation of Q-Line, market launch in metrology Market launch of P-Line for simple positioning tasks

Other pL products

CNC rotary tables
classic

Main catalog – Series 500

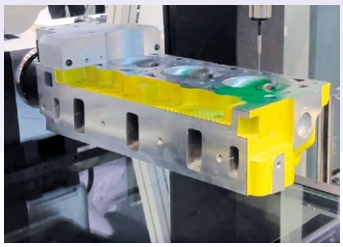
CNC rotary tables
direct drive

Main catalog – Series 900

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

Produce and measure economically: Manufacturing and metrology are moving closer together

The trend is obvious: Metrology is shifting from the measurement laboratory to production – post-line or in-line



A wide range of workpieces can be measured precisely and efficiently both vertically and horizontally thanks to heavy-duty CNC rotary tables, ideally with zero point clamping.
The measuring process is thus determined by the cycle time of the production machine.
Methods that have long proven themselves in production are needed. pL LEHMANN offers them.

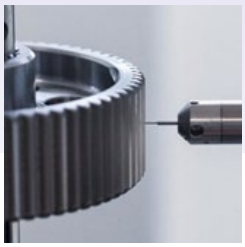
Goal

- Measure in the same way production took place
- Without loss of the reference point
- Maximum benefit with minimum investment

Result

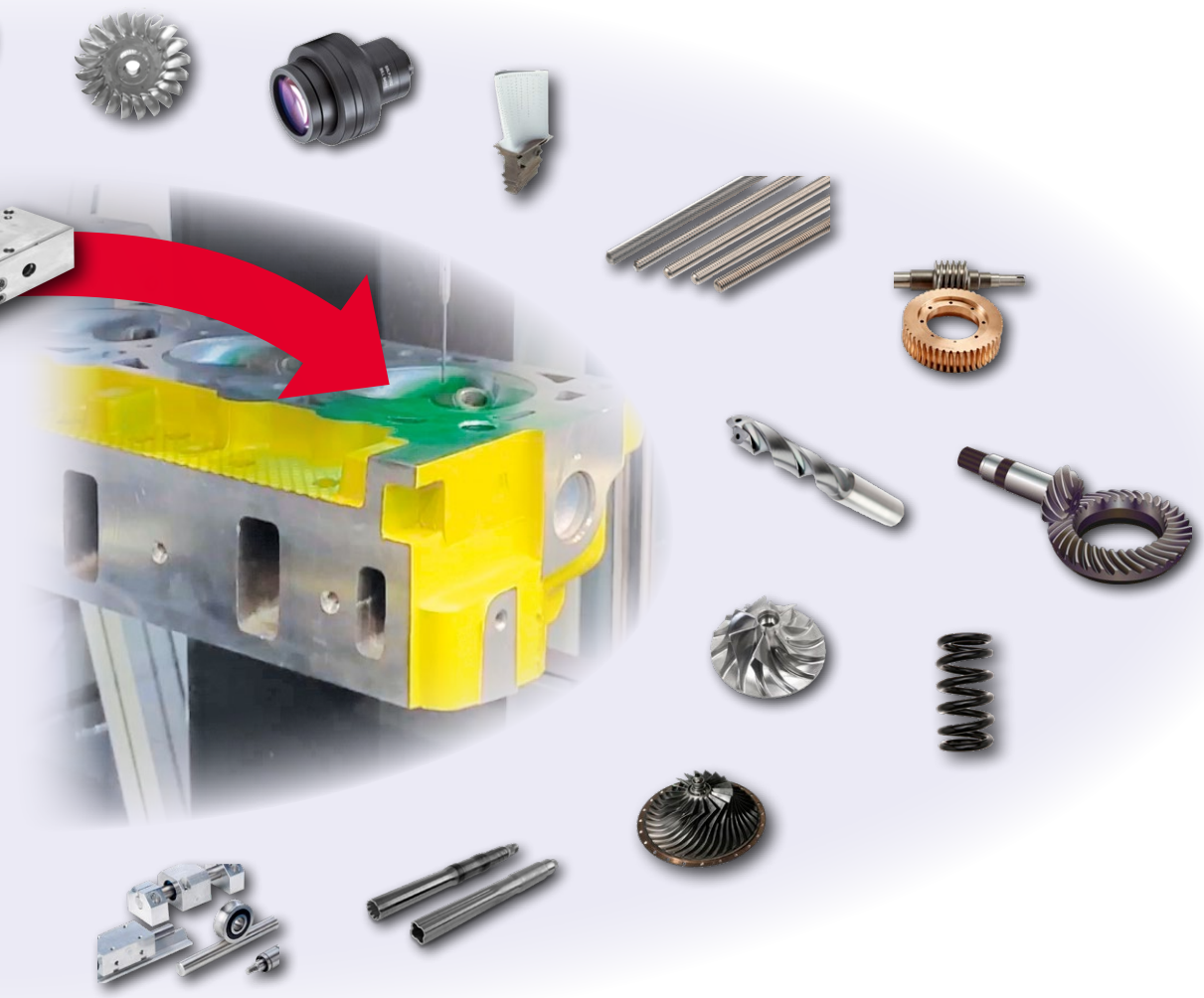
- More precise
- More efficient

From the machining center directly to the measuring machine



ONE measuring machine for (almost) ALL applications

- Easier for the machine operator
- Less space required
- More economical
- Greater time savings



Need for new technologies

H-mobility
Hydrogen-powered vehicles (hydrogen fuel cells)

E-mobility
Electric vehicles

Robotics
Automation and autonomy

Energy efficiency
Environmental and health protection

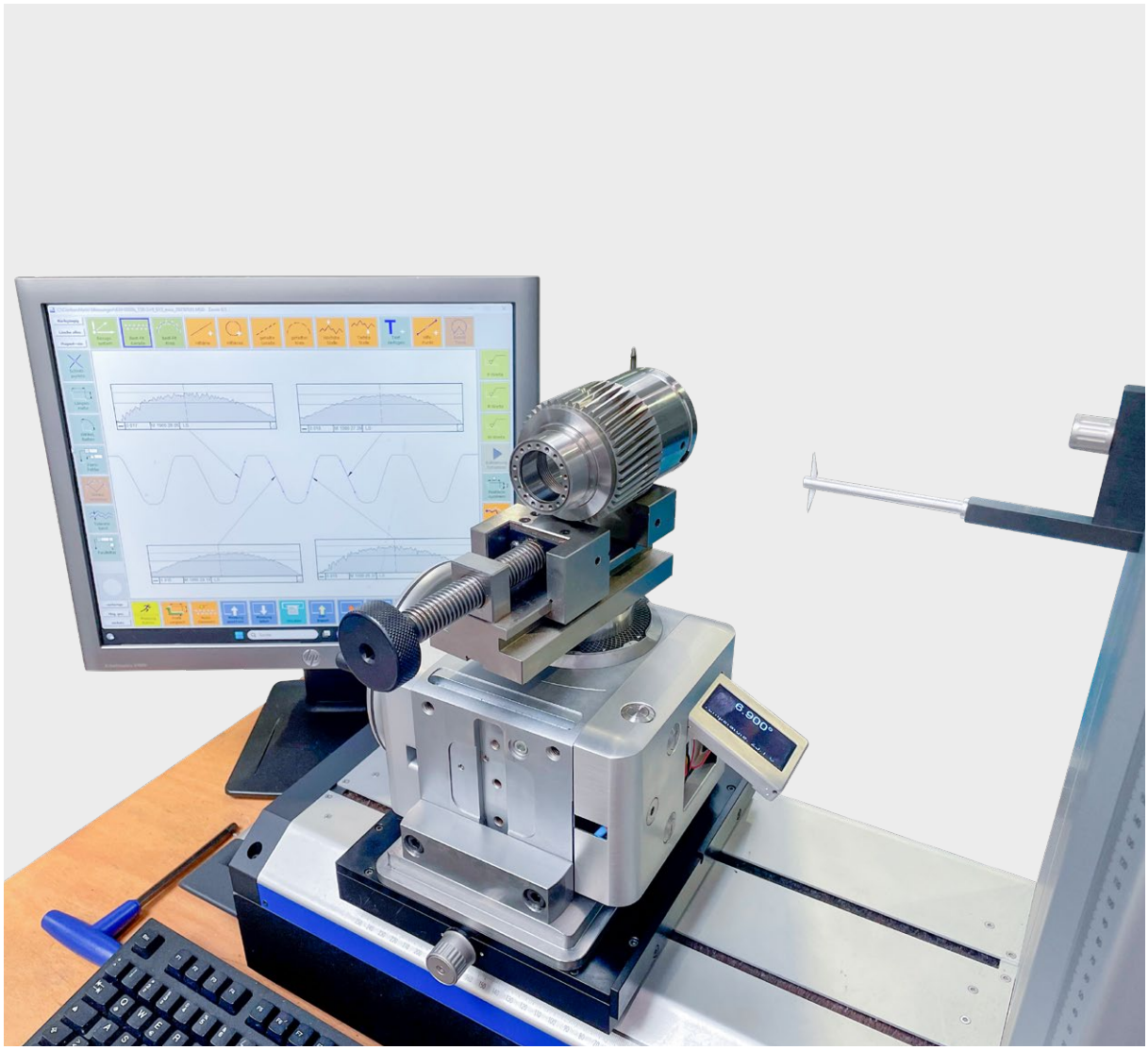
Impression 1 - Q-Line in use

Measured on an ingenious 3D testing device from RENISHAW:
EQUATOR 500 EH with insight rotary table

EA-Q08 in use for fully automatic measurement of a series part with zero point clamping from SCHUNK

Impression 2 - Q-Line in use

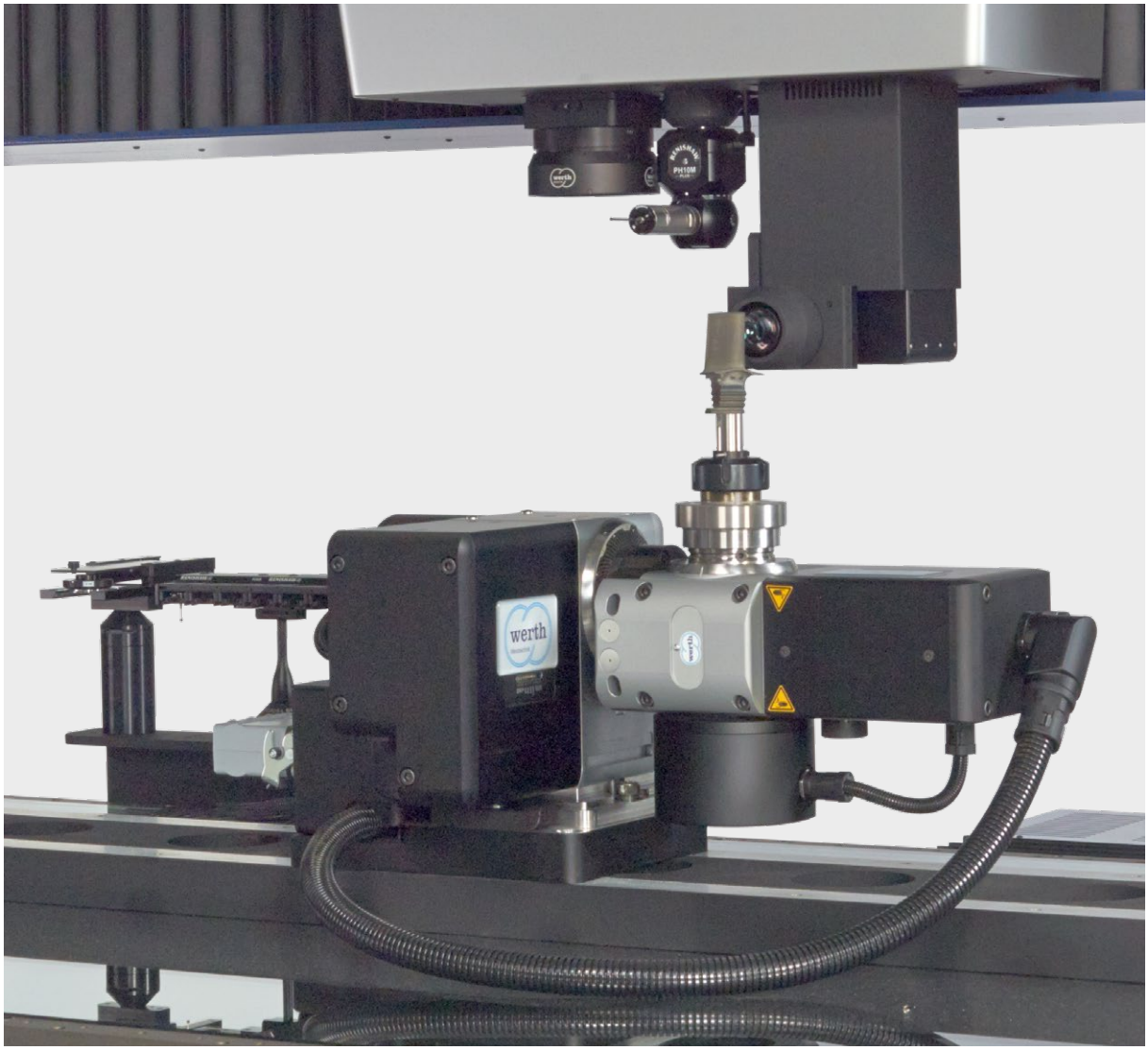
Contour and surface measurement of a shaft



MA-Q08 vertical in use for spline measurement

Impression 3 - M-Line in use

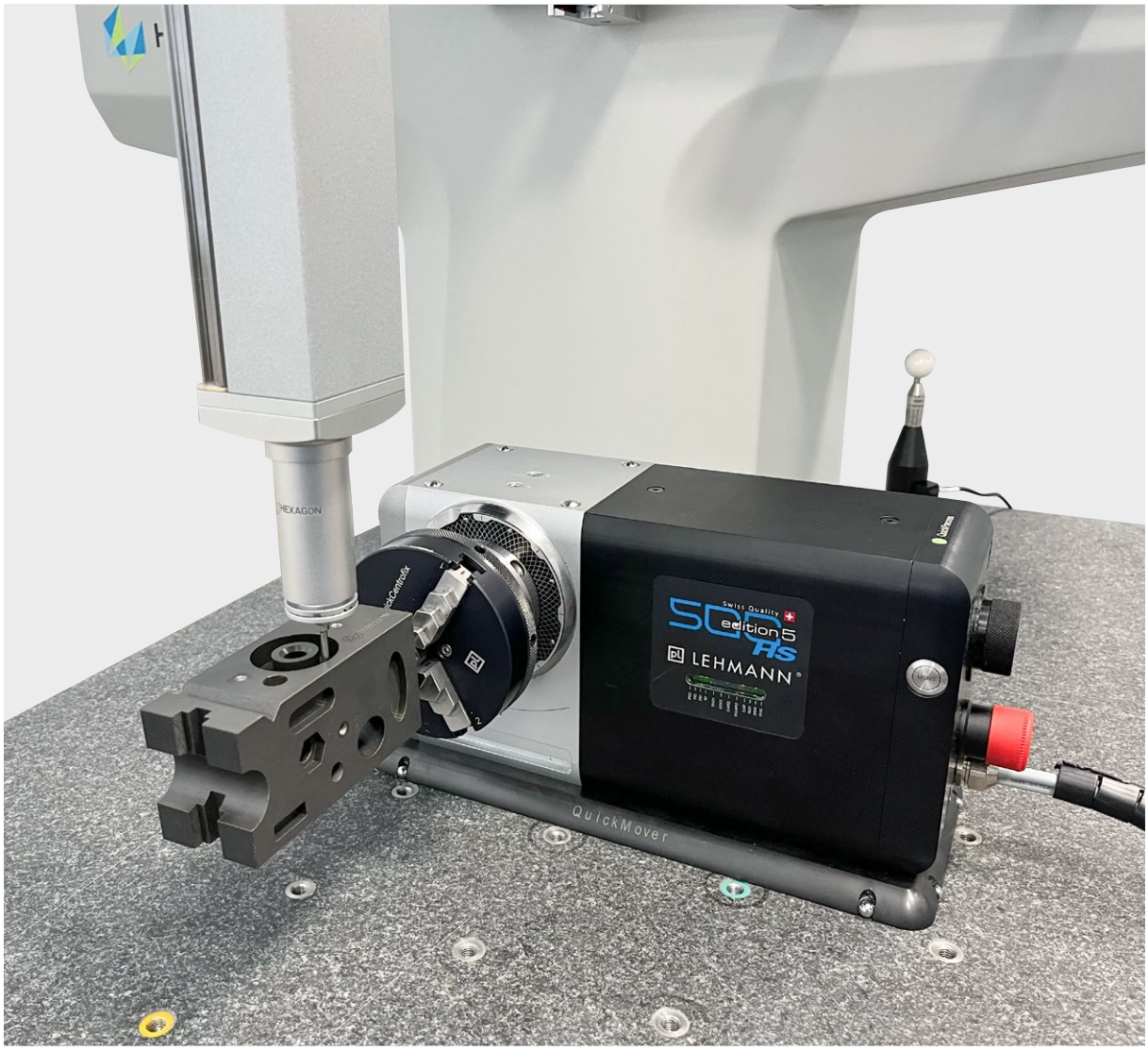
Measuring complex workpieces with 5 axes



TF-M07M10 on a WERT Scope-Check in use for measuring a turbine blade

Impression 4 - Q-Line in use

Angle, slot, surface and bore measurement of a complex, 5-sided machined workpiece in one set-up



Fully automatic measurement via I/O interface or QuickProcess

Swivel the stylus or workpiece?

There are good reasons why, in many cases, it is better to swivel the workpiece ...

Rotate workpieces ...

- Positioning and scanning
- High repeatability
- Also measure horizontally
- Great degree of freedom
- Difficult workpieces
- Can be automated
- Can be retrofitted
- Much faster than with rotary switch

→ Positioning the measuring point
→ Also for surface measurements
→ Also in space

... Instead of rotary switch

Benefits

- Workpiece does not need to be reclamped
- Multiple clamping solutions no longer necessary
- Horizontal scanning possible – long workpieces
- Be able to measure undercuts
- Fast and universal
- Positioning accuracy up to ± 1 arcsec

Disadvantage

- Movement of a larger mass

Common clamping devices

- Large assortment available as standard
- No complicated measuring devices
- Highly efficient zero point clamping
- Supports inline measurements (close to production)
- No training for the machine operator

→ For measurements of all kinds
→ Also suitable for automation

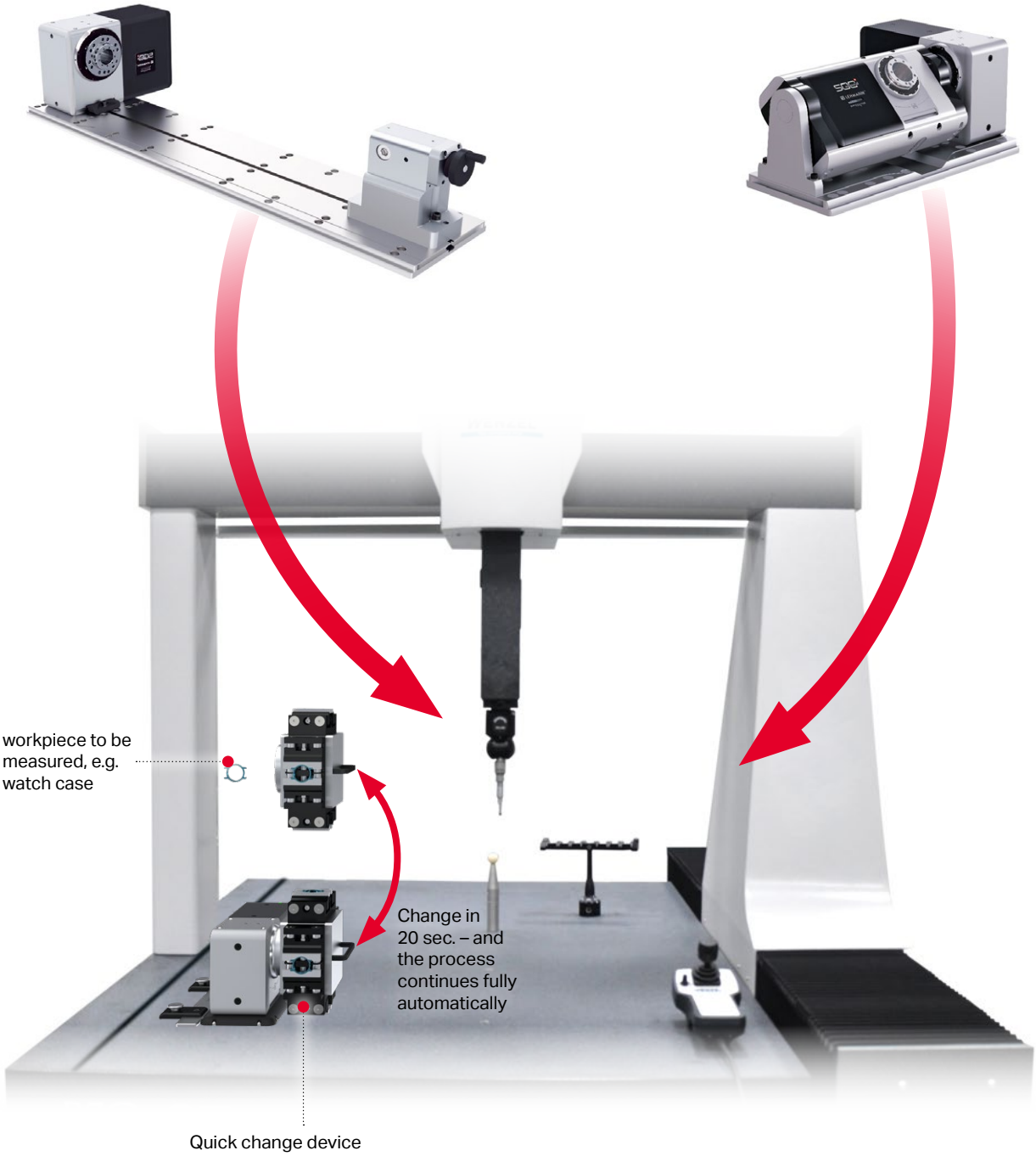
For M-Line:
Automation made easy! pL LEHMANN rotary and tilting axes have already been equipped with an iBox – so they are prepared for implementation in Industry 4.0

The solution

4th and 4th/5th axis with high-precision rolling bearing technology, away from air bearing support, also for large loads in all positions

Solution with 4th axis

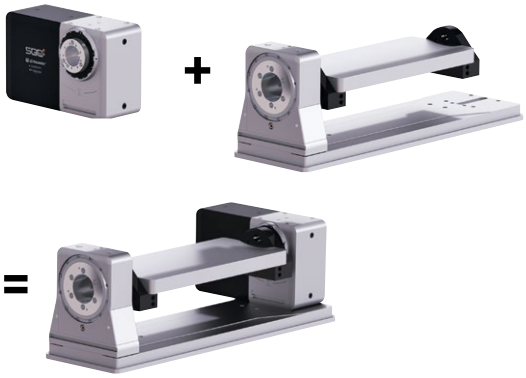
Solution with 4th/5th axis



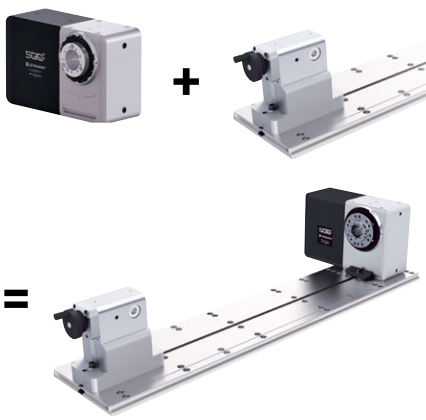
High value retention: can be modified at any time, only 4 sizes ø100 – 500 mm – over 290 standard configurations

EA ➔ TF TIP

EA ➔ EA with rotoFIX



EA ➔ EA with longFLEX



Diversity of products

unique

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

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

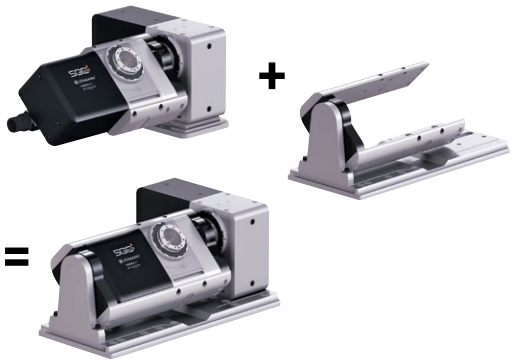
Standard machine in stock, available at short notice, equipped with matching rotary table

Highest level of flexibility

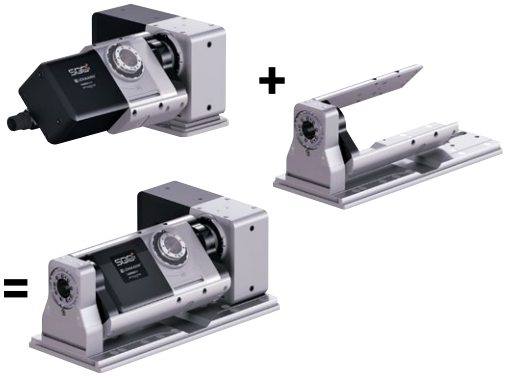
unique

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

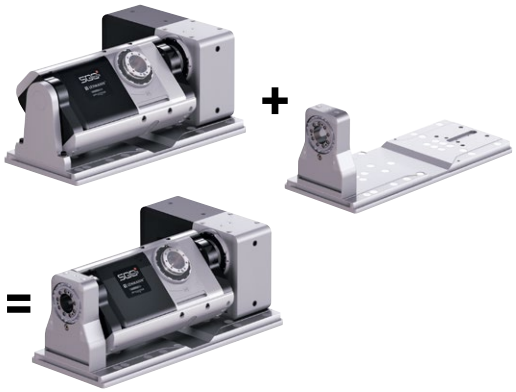
TF TIP ➔ T1 TAP



TF TIP ➔ T1 TOP

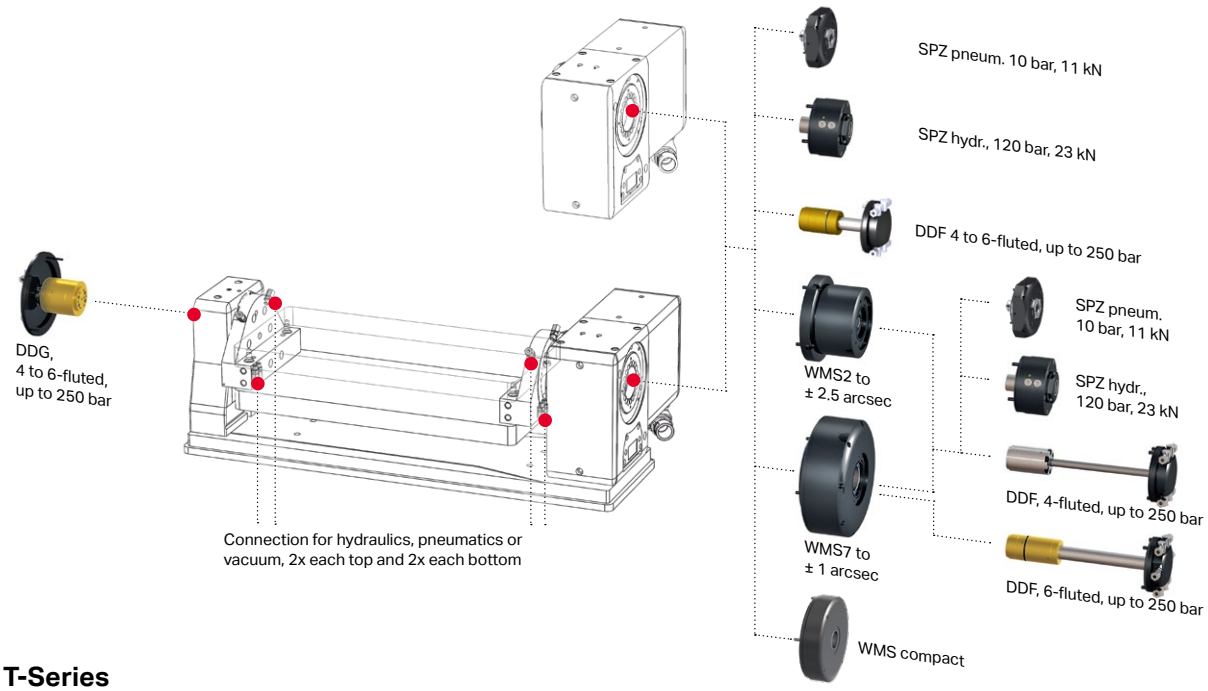


T1 TAP ➔ T1 TOP

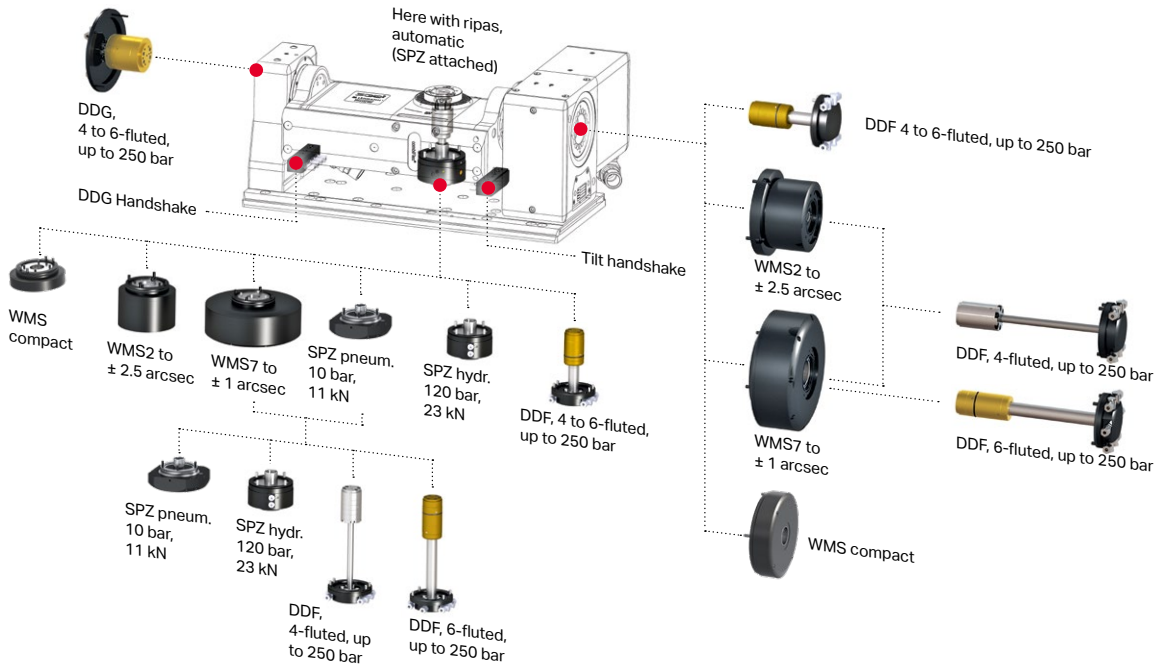


- Positioning accuracy up to ± 1 arcsec
- Up to 12 channels on rotary axis or clamping yoke
- Medium: Oil, air or vacuum, up to 250 bar
- Many standard combinations

E-Series

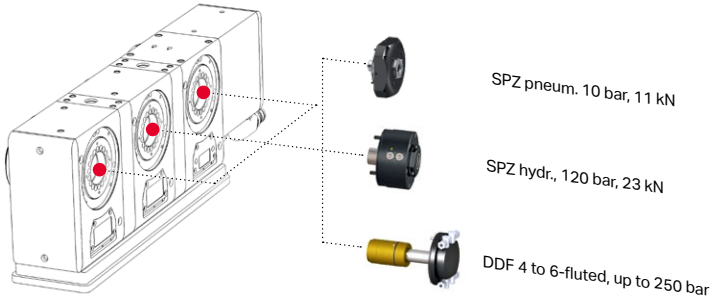


T-Series

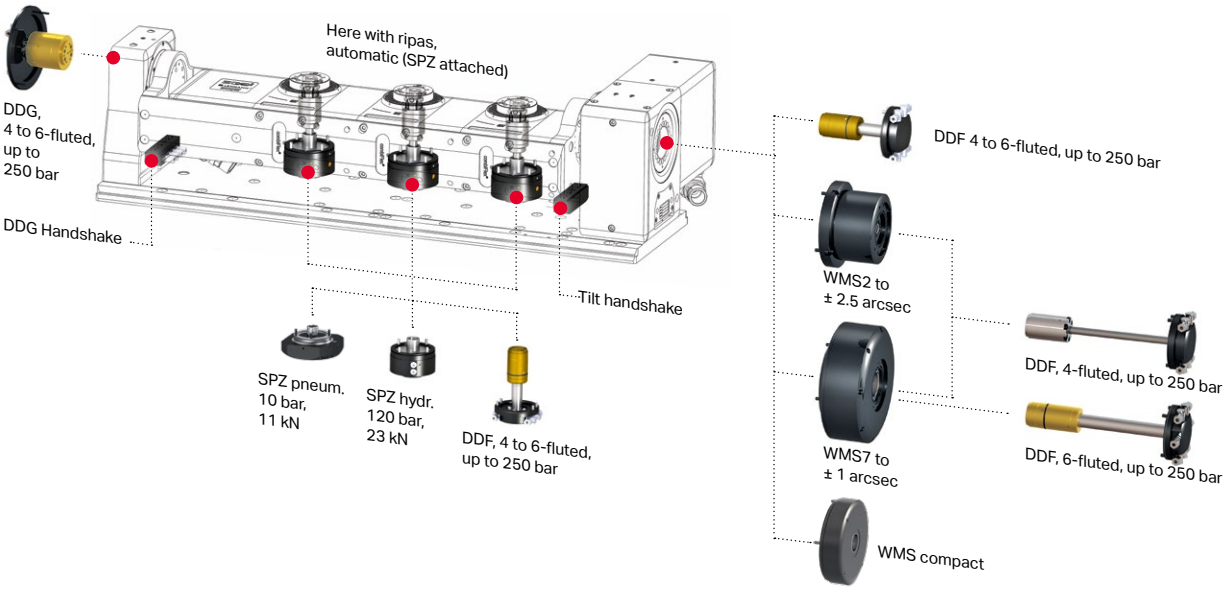


- Rotary union in combination with angle measuring systems small and large
- Easy to retrofit
- Clamping cylinder up to 23 kN

M-Series



T2 to T3-Series



Note

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

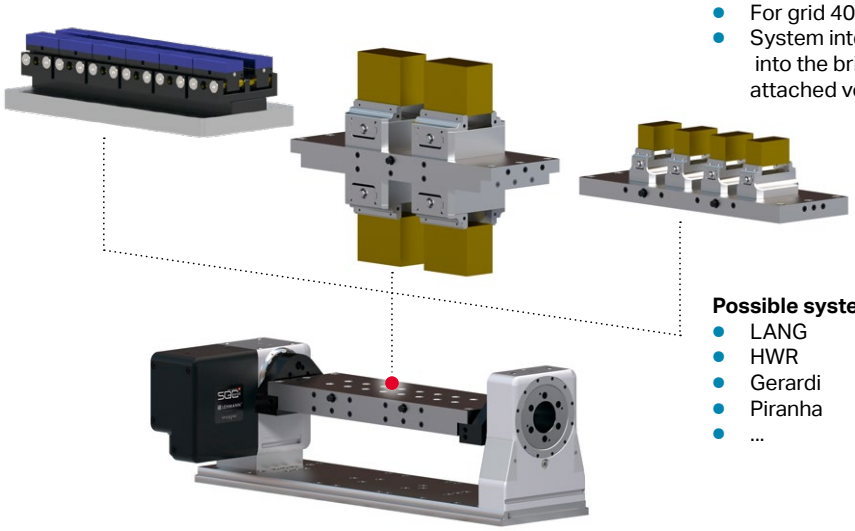
WMS Direct measuring system
2 = Size 2000, Heidenhain, Magnescale
7 = Size 8000, Heidenhain
DDF Rotary union on rotary table

DDG Rotary union for counterbearing
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 **p. 45**.

Possibilities of clamping yokes with integrated or attached zero point clamping system

Bridge with manual zero point clamping system

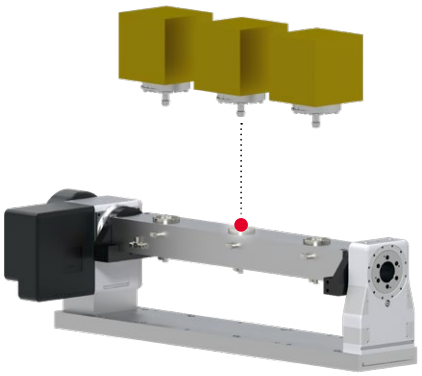


- Single or double-sided
- For grid 40, 50, 52, 96
- System integrated into the bridge or as an attached version

Possible systems
- LANG
- HWR
- Gerardi
- Piranha
- ...

Manual version

Bridge with automatic zero point clamping system



- For automatic loading
- With media channel through clamping yoke

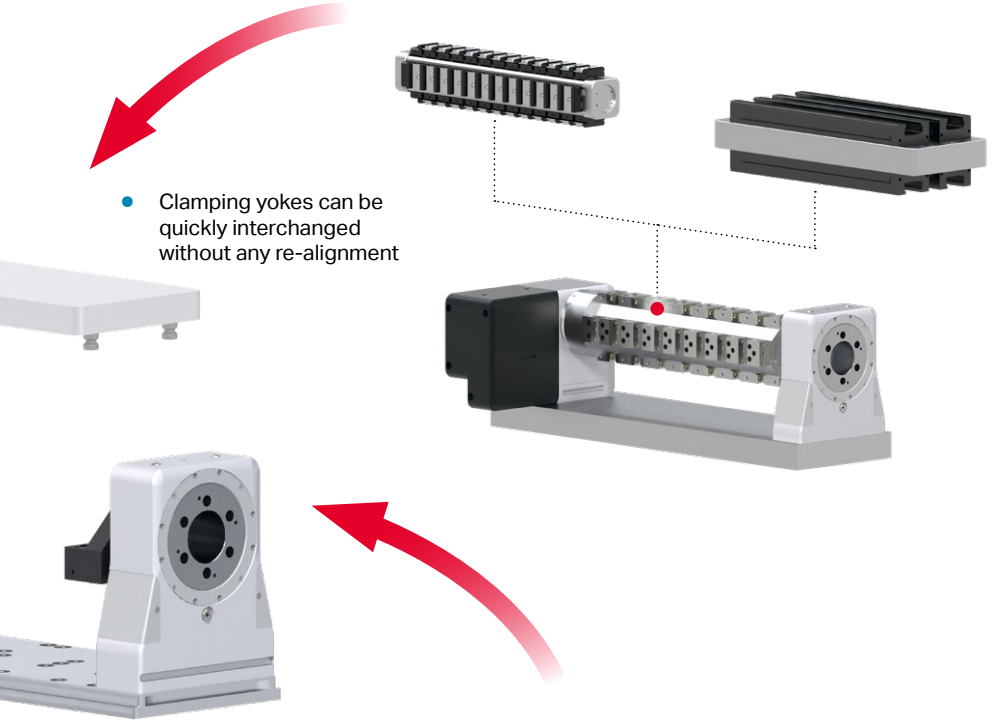
Possible systems
- EROWA
- ROEMHELD
- AMF
- ...

Automatic version

- With quick couplings for media transfer

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

Bridge with rail system

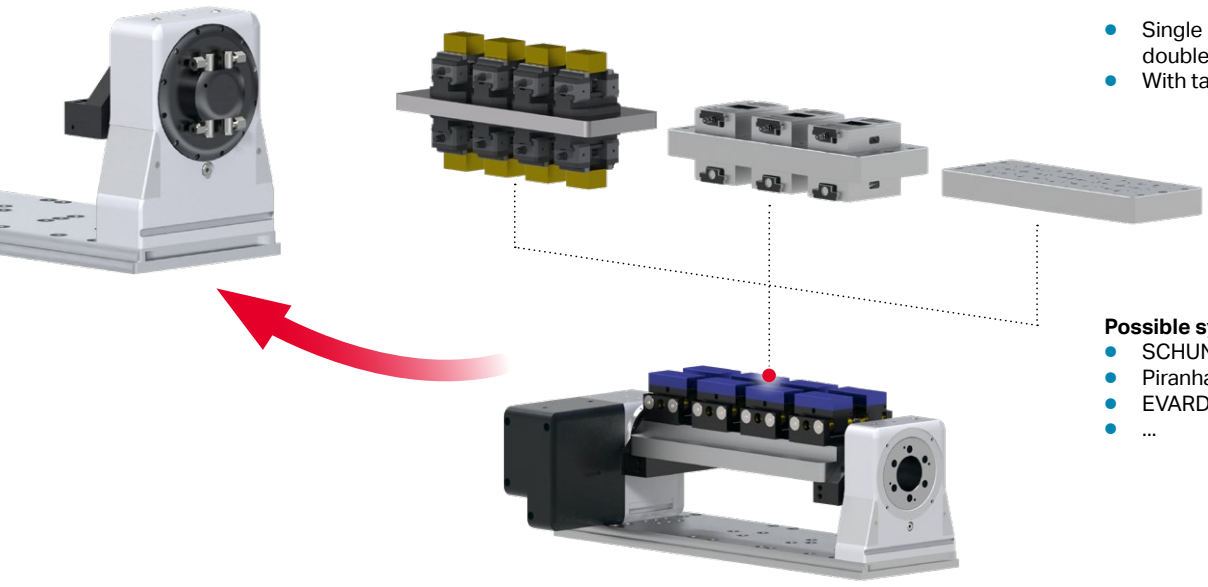


- Clamping yokes can be quickly interchanged without any re-alignment

- Vises can be moved without any re-alignment
- Easily adaptable to part size

Possible systems
- SCHUNK
- TRIAG
- EVARD
- ...

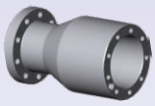
Bridge with bolted on clamping devices (manual or automatic)



- Single or double-sided
- With tapped hole pattern

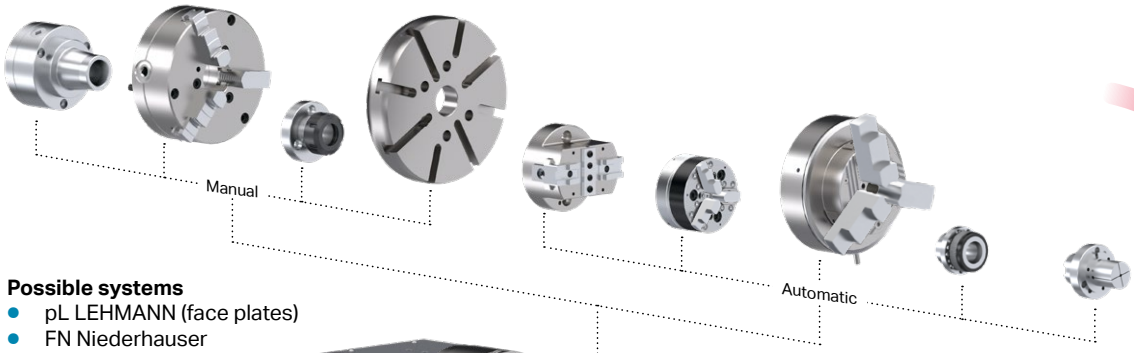
Possible systems
- SCHUNK
- Piranha
- EVARD
- ...

From manual clamping devices for single-piece production through to fully automated systems



Spindle extension: to accommodate all manual and automatic clamping systems, but HSK man+auto not possible

Face plates, force clamp and jaw chucks, collet chucks

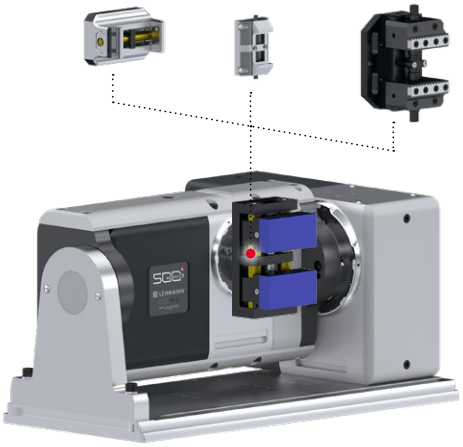


Possible systems

- pL LEHMANN (face plates)
- FN Niederhauser
- SMW AUTOBLOK
- SwissChuck
- Hainbuch
- Erowa
- TG Colin
- YERLY
- ...

automatable: with rotary unions and clamping cylinders

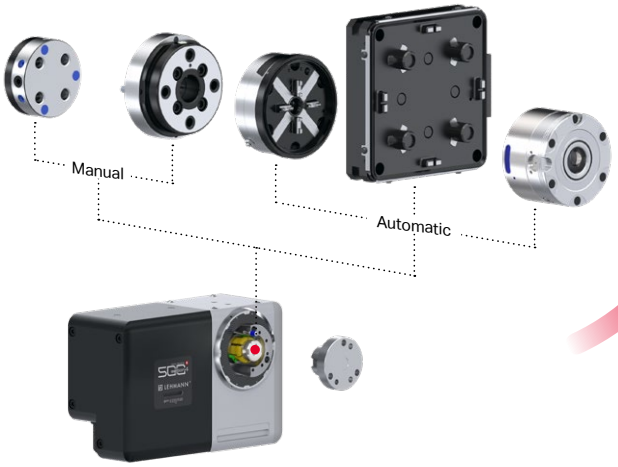
Centric clamping unit



Possible systems

- SCHUNK
- LANG
- Gressel
- Piranha Clamp
- EVARD
- TRIAG
- ...

Zero point clamping systems

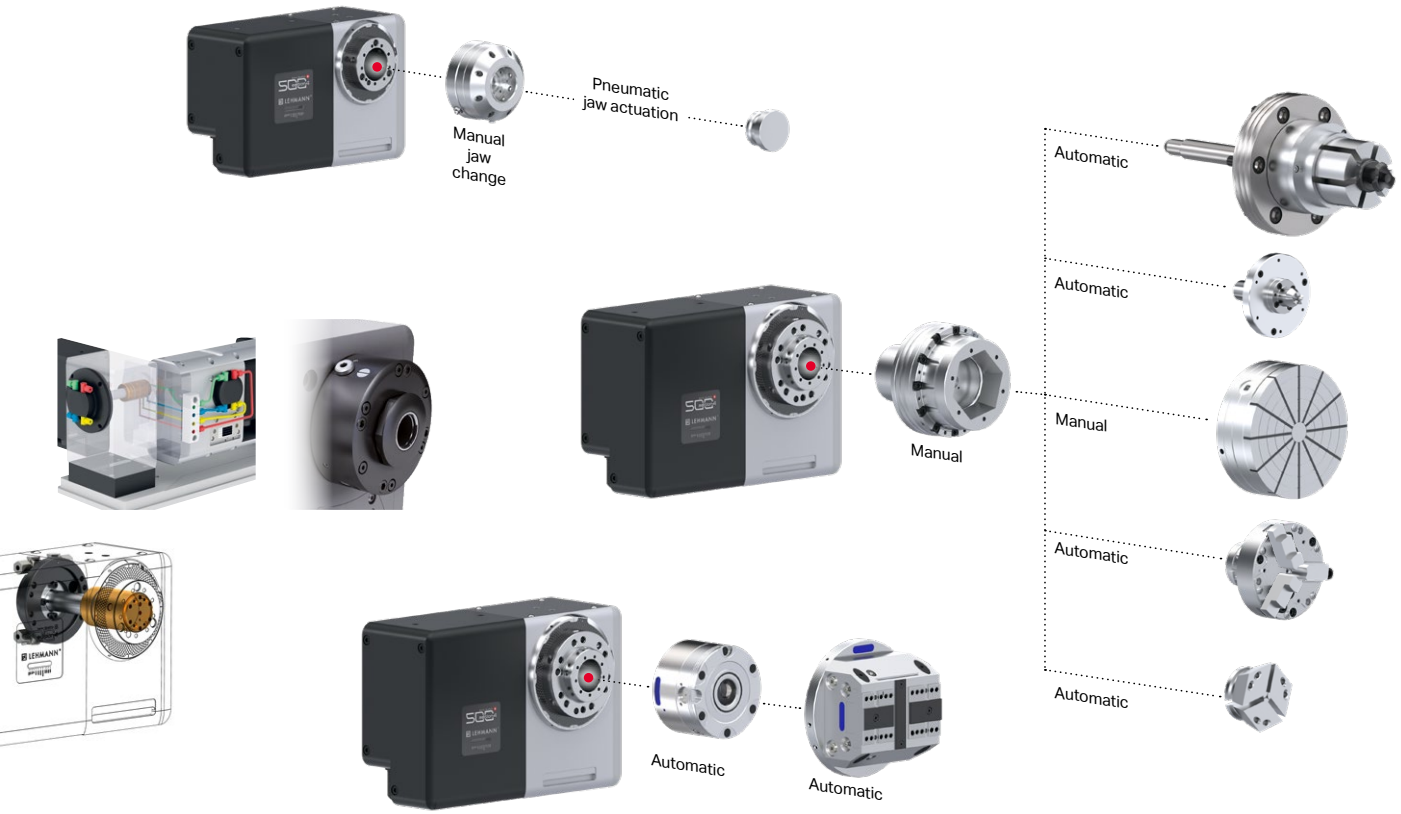


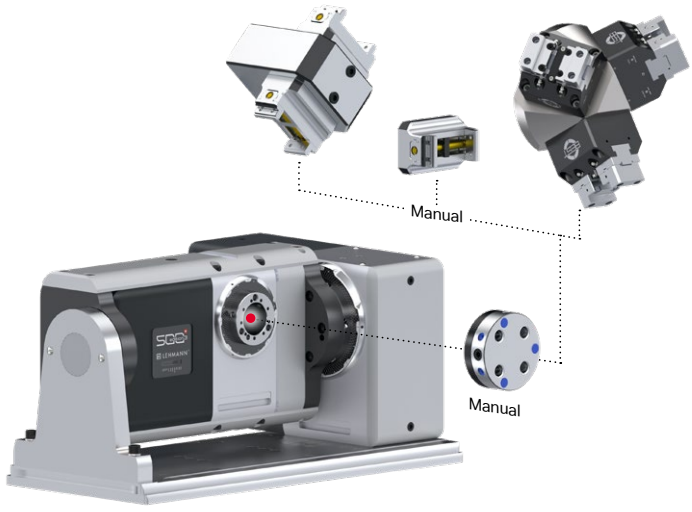
Possible systems

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

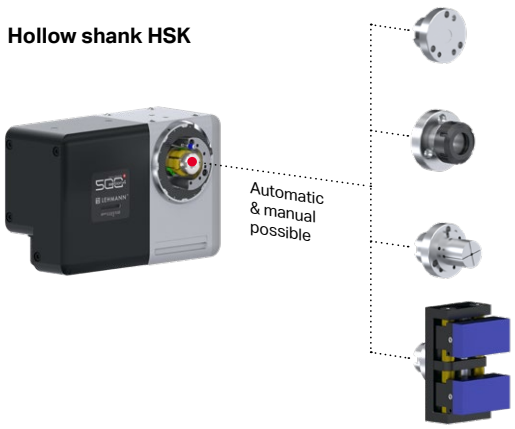
Centering clamping unit for workpiece handling, attached zero point clamping system for quick vise interchange

Possible combinations





Hollow shank HSK



Bearing technology for the most stringent requirements

Backlash-free preloaded high-precision rolling bearings ensure maximum repeatability and extremely high rigidity

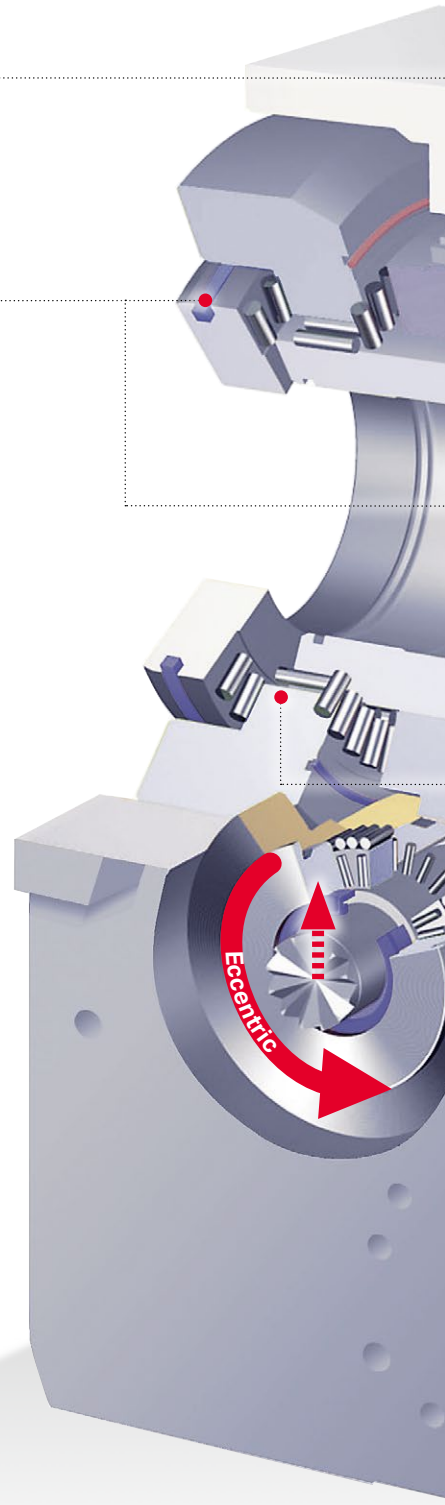
PGD gear unit (Preloaded Gear Drive)

- 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 mount
- Permanent backlash-free preload
- 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

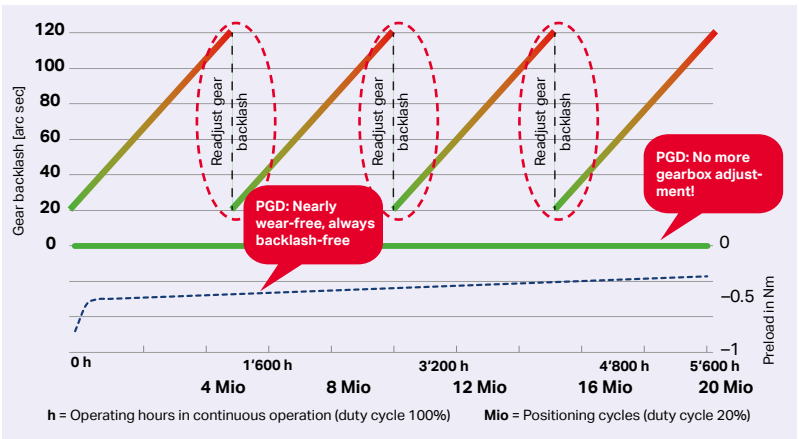
* Based on long-term tests of more than 20,000 h with over 23 million 90° cycles; valid under appropriate use; the limit reached first is valid

IP 67 protection (M-Line)

- All models are fully sealed



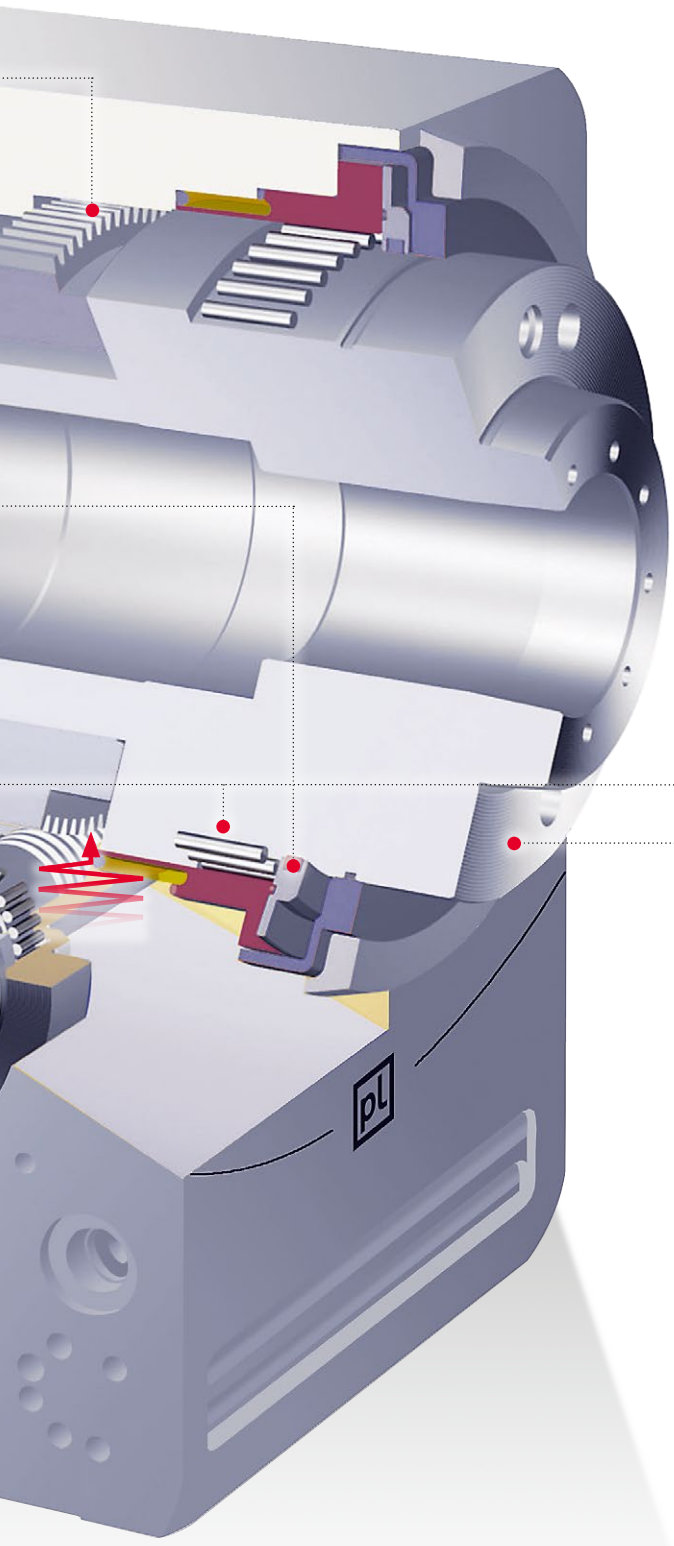
Maintenance-free gear unit – permanently preloaded



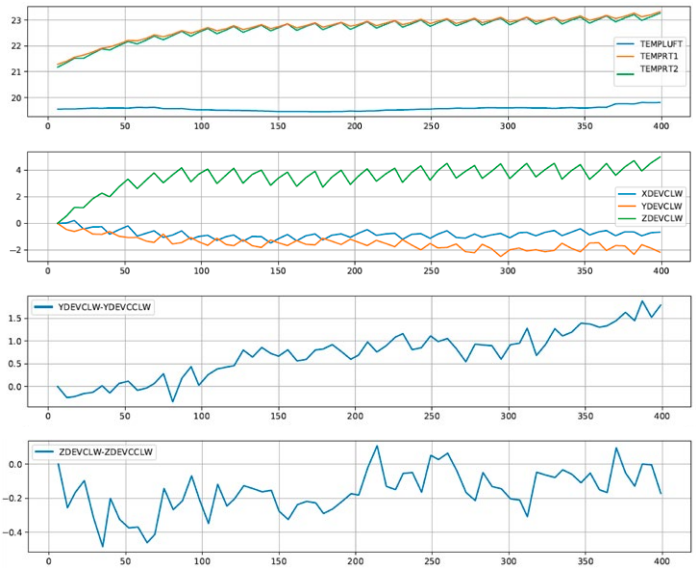
All values based on internal testing using standard load and catalog values (speed, cycle time). Duty cycle as defined by pL LEHMANN.

Thermally optimized gear unit

PGD gear unit has backlash-free preload for excellent synchronization characteristics. FR, FT and FA in 0.005 mm (in accordance with ISO 10360-3)



Stress test during 70 cycles: FR, FT and FA in 0.005mm



Spindle bearing

- 4x large precision roller bearings, fitted without play
- 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
- Universal interface with HSK cone and / or short cone KK (both to DIN)
- Accessories for manual or automatic HSK/ISO clamping, various collet systems, face plates and jaw chucks, palletizing systems, rotary unions and clamping cylinders, etc.

Thermally insulated motor mounting

Special thermal insulation minimizes thermally induced shifts and inaccuracies

Transport and bleeding holes

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

Drive motor

- A single housing for different AC, DC and stepper motors
- Motors are easy to replace
- Mounted thermally insulated

USB slot (M-Line)

unique

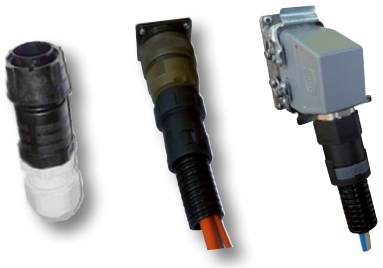
- Fast, simple data output for evaluation on a PC in case of malfunction
- Licensing possibility with registration code via USB stick (OEM feature)
- Fully sealed, placed in well protected location
- PC connection for remote diagnostics

Cable feed (M-Line)

- Cable feed up to 150° (in different directions) swiveling and can be secured
- Circlip for quick change in the event of a mal-function
- All wires and hoses plugged into the motor housing

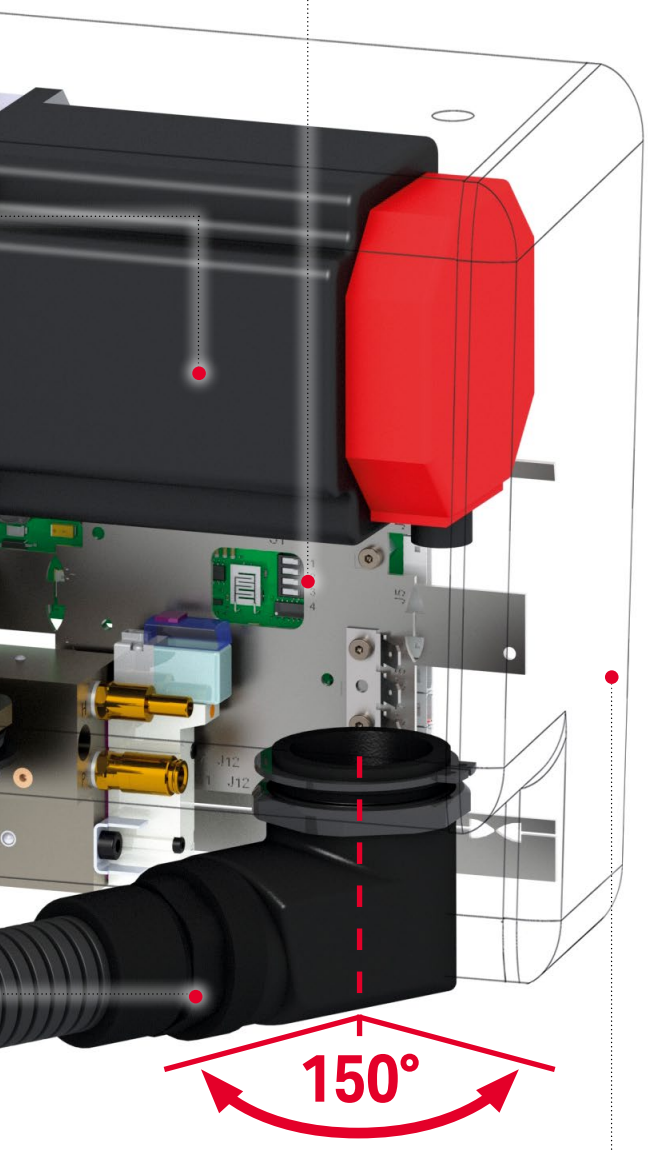
Connector interfaces

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



Industry 4.0 for metrology

5 sensors monitor the most important functions
and provide data for significant performance improvement
in accuracy and efficiency (in preparation)



IP 67 protection (M-Line)

- Fully sealed motor compartment to IP67
- Prevents damage to motor, wiring, connectors, etc.

unique

-iBox – for real industry 4.0 (M-Line)

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

Sensors for ...

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

Components

- Faster microprocessor
- 3D acceleration sensor – shock sensor

Monitoring

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

Interfaces

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

Prepared for options

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

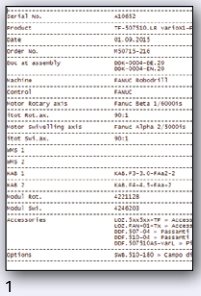
Never search for documents again – everything at hand at all times
No Internet connection necessary!

The everyday life of a commissioning technician

The information you need is missing: Electrical diagrams, drive data, parameter lists, commissioning instructions, etc. Commissioning must be interrupted, the search for data begins: Paper? Internet? Passwords? The clock is ticking. The deadline is approaching. Necessity forces us to do the best we can with the knowledge we have.

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

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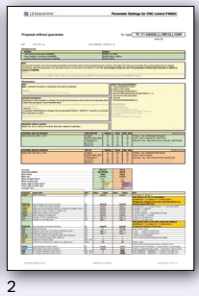
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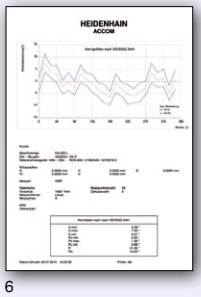

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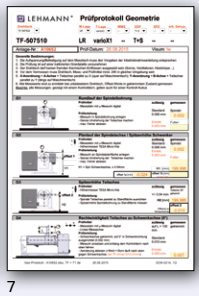


7

smart doc on the USB stick

- A mini USB stick is plugged into a USB slot (in the tilting axis on T-type rotary tables)
- The following new 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 Helpliner) as well as in the «full documentation» on the pL website at all times (accessible to all pL representatives)
- All files at the current revision level – version control not needed, risk of errors minimized

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

Your benefit

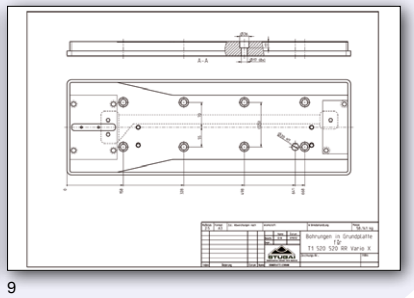
- Download no longer necessary – extra work eliminated
- Password no longer necessary – waiting time for registration eliminated
- Internet connection no longer necessary – problems with poor or no network connection eliminated
- No lost documents, no missing USB stick – stick is always inserted, «loaded»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

3

4

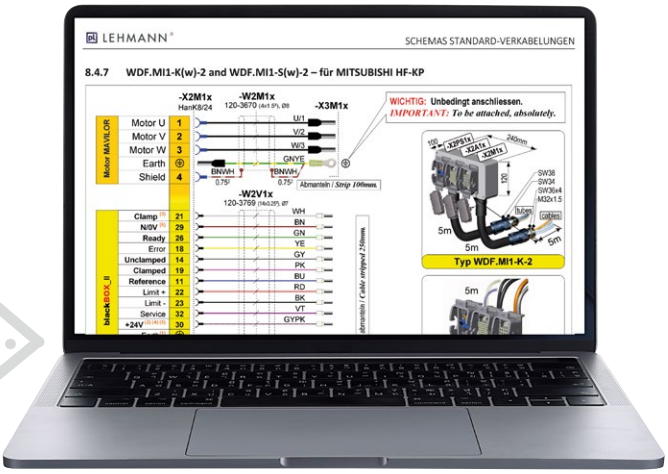
5

8



9

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



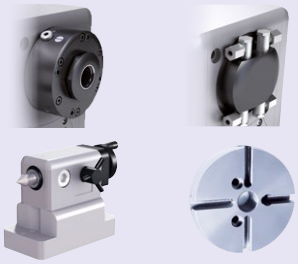
ROTOLUTION – customer-specific turnkey solutions «on top», largely with proven standard elements, from CAD to commissioning.

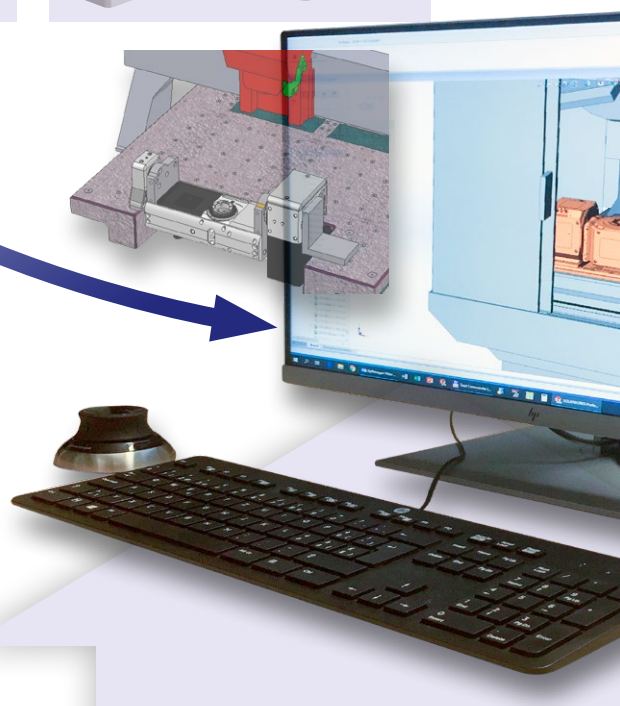
ROTOMATION – The ideal expansion with standardized automation. Economical. Professional. Simple.

Standard

Rotary tables see **pp. 30–40**

Accessories
see **p. 42–49, 66–68**





Customer

Problem situation
«help me» –
don't know,
don't have time,
don't have the experience!

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

*Examples

amf · HAINBUCH · PAROTEC spanntechnik · robotik · engineering · ROEMHELD HILMA ■ STARK · system 3R
EROWA · LANG TECHNIK einfach. zukunft. greifen. · RANHA-CLAMP · ROHM driven by technology · ITG COLIN
EVARD PRECISION S.A. · NIEDERHAUSER SPANNTECHNIK UND SYSTEME · ripas · SCHUNK · TRIAG INTERNATIONAL
GRESSEL Spanntechnik · maprox swiss made · reinmechanic feinmechanische Lösungen · SwissChuck Precision Workholding · YERLY

ROTOLUTION

CAD & adaptation
- Installation check
- Adjustment to standard parts
- Special parts

CAD & clamping devices
- Workpiece clamping
- Standard/special

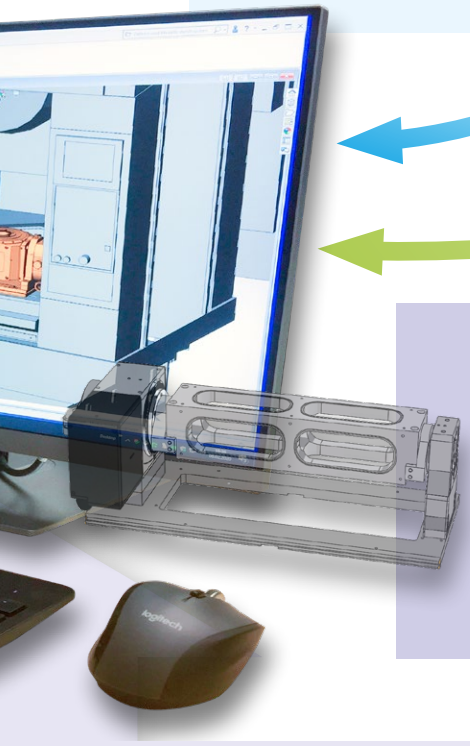
see **pp. 65–95**

*Examples

ROTOMATION

CAD & automation
- Workpiece handling
- Partnerships (general contractor with partners) e.g. reinmechanic – mobile concept

see **pp. 96/97**



Project management and execution, direct if needed

Plug-&-work package

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

Customer

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

Services from A to Z

Pre-sales
- First class literature
- Application drawings 2D
- 3D models
- Example of applications

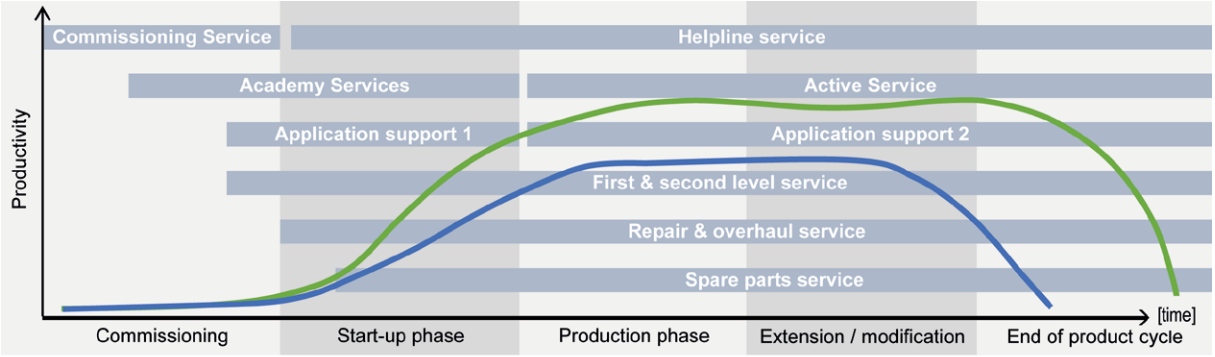
Sales & Post Sales
- Specified offers for each machine
- Wide range of workpiece clamping systems
- Standardized interfaces

Commissioning
- Parameter lists
- Machine specified commissioning instructions
- User manual
- Partner kit
- On-site support

After Sales
- Service points in 25 countries PTSE
- Spare parts worldwide by eShop
- In-field support by «flying doctors»

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

Excerpt from our production: High vertical range of manufacture gives flexibility and quality

With workpiece pool for unmanned production

High precision circular and flat grinding

Material is in flow

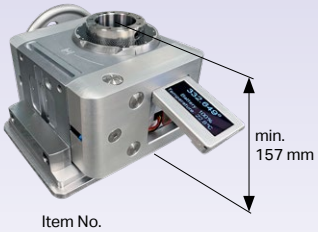
Assembly areas with Kanban System

Efficient equipping of spare parts packages

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

pL LEHMANN rotary table MA-Q08

- Components that have proven themselves in production
- Very precise CNC heavy duty rotary tables
- Multifunction holder for various workpiece clamping systems
- Intelligent accessories such as the QuickMover
- → For CMMs and other measuring devices



Item No.
GPL.507ver-157

Application

In production as well as in the metrology laboratory, fast and easy, in combination with height, contour and surface measuring devices, for roundness testers and coordinate measuring machines or machine tools.

Handwheel with crank (supplied loose, for fast positioning)

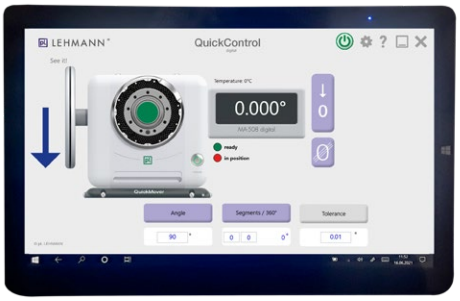
QuickMover for feather-light moving with the help of an electrically generated air cushion

MA-Q08

On the opposite side: foldable digital display (exact angle position in 0.001°)

Metrology package

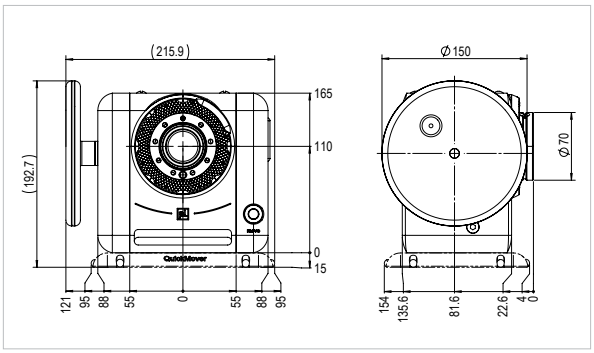
- Rotary table, cast iron housing for stable positioning
- QuickMover - protects the granite slab and enables feather-light movement
- Elegant handwheel and zeroing button
- Reading accuracy 0.001° (integrated angle encoder)
- Three jaw chuck manual or many others available



Optional ControlTablet with QuickControl digital.
Simple intuitive user guidance:
- Zero position
- Target angle
- Segments
- Tolerance band
- In position

Item No.

Item No.	Designation
MA-Q08.Lm	pL LEHMANN rotary table manual, handwheel left
MET.Q0x-Mk	QuickMover compact for MA-50x
CNC.C-digi	Version digital
CNC.Tablet	ControlTablet



LEHMANN®

The manual, user-friendly and super flexible rotary table for manufacturing and metrology lab: ideal for any measuring station

Fast and accurate positioning for more efficient use of a height gauge.
User-friendly and allows measurement of parts without reclamping.

Fast setup thanks to extremely simple zero point clamping system
(here for System 3R)

Roundness measurement with a dial gauge mounted on a grid plate.
Optional dk grid plate as an ideal platform for additional tools.

				MA-Q08
Dimensions	Swing diameter		mm	160
	Center height		mm	125 (with QuickMover)
	Total weight	with motor	kg	9
	Center bore	throughout	mm	31
Bearing / clamping	Max. spindle load [1]	vertical	kg	40
		horizontal	kg	40
Gear unit	Positioning accuracy		± arc sec	20 (opt.: 12)
	Average repeat accuracy Ps		± arc sec	2 (opt.: 1)
	Max. speed		rpm	–
Precision	Radial run-out	at spindle diameter	µm	6 (opt.: 3 to 2)
	Axial run-out	at spindle end face	µm	6 (opt.: 3 to 2)
	Parallelism	of rotary axis relative to footprint	µm/100 mm	5 (opt.: 2)

[1] Depending on the use, the rotary table must be fixed in place

Practical additional option for standard measuring devices

Ready for the production of high quality parts

pL LEHMANN rotary table EA-Q08.L

- Components that have proven themselves in production
- Very precise CNC heavy duty rotary tables
- Multifunction holder for various workpiece clamping systems
- Intelligent accessories such as the QuickMover

→ For CMMs and other measuring devices

Application

In both manufacturing and the metrology lab, fast and easy measurement on various measuring devices (CMMs, shafts, surface, multis.), positioning, radial run-out, scanning; manual/automatic operation

Metrology package

- Rotary table with servomotor and integrated control system
- QuickProcess, actuation by touch
- QuickMover – protects the granite slab and enables feather-light movement
- QuickBar for faster alignment
- Three jaw chuck manual or many others available
- QuickControl software including tablet with functions for angles, index calculations, endless, absolute or incremental rotations, teach-in, program memory

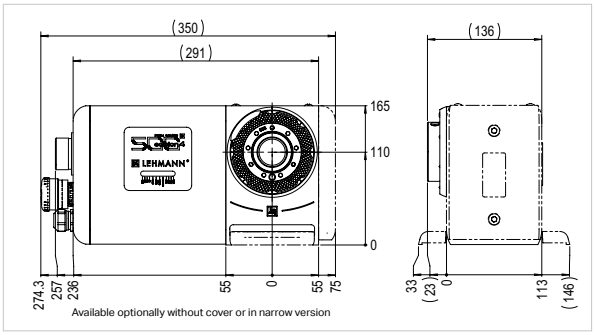
QuickConnect option

- Cable connection to machine control
- «Start» input signal
- «Reset» input signal
- «In Position» output signal
- 24 V emergency stop contact

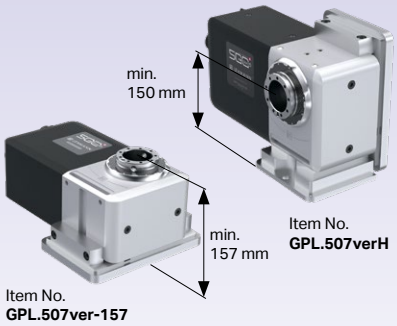
Item No.

Item No.	Designation
EA-Q08.L	EA-Q08 with motor at left
EA-Q08.L light	EA-Q08 with motor at left, light
MOT.NA-PD4-3 **KAB.NAa-3.0-Qli-2**	Required for EA-Q08 /EA-Q08 light
CNC.C-pro	Version professional
CNC.Tablet	ControlTablet

To order ControlTablet with QuickControl basic separately, see **p. 35**
For optional direct measuring system, see **p. 49**; for optional QuickMover, see **p. 34**



Ready for existing and new measuring instruments

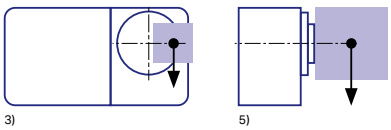


Ready within seconds → Connect power → Connect to tablet or PC → Start QuickControl software

Automation ready → Quick Process – Capacitive sensor → Quick Connect – I/O communi-cation → QuickData – Communication with variables

				EA-Q08 (light)
Dimensions	Swing diameter		mm	160
	Center height		mm	110
	Total weight	with motor	kg	25 (12)
	Center bore	throughout	mm	31
Bearing / clamping	Max. spindle load [3]	with tailstock [4]	kg	120 (40)
		without tailstock	kg	60 (20)
		Standard load [1]	kg	12
	Max. tilting moment [5]		Nm	8 (5)
Gear unit	Positioning accuracy		± arc sec	20 (opt.: 12)
	Average repeat accuracy Ps		± arc sec	2 (opt.: 1)
	Max. speed	with standard load [1]	rpm	16
Precision	Radial run-out [2]	at spindle diameter	µm	6 (opt.: 3 to 2)
	Axial run-out [2]	at spindle end face	µm	6 (opt.: 3 to 1)
	Parallelism [2]	of rotary axis relative to footprint	µm/100 mm	5 (opt.: 2)

[1] Speed with standard load; for higher loads, speed may have to be reduced; drive data for NANOTEC stepper motor ST6018L3008-B
[2] For measurement method and valid values, see **p. 48**
[3] Max. permissible torque due to radial eccentric loads: 9 Nm
[4] Feedstock see **p. 43**
[5] If tilting moment due to spindle load is greater than 8 Nm (light: 5 Nm), the rotary table must be screwed tight. Reference value: max. workpiece 100x100x100 made of steel with BFU.507-125ps light. We charge for other bodies or weights on request.



Simple operation, separately or automated

Ready for the production of high quality parts

QuickMover and QuickBar

Feather-light and gentle moving, perfect positioning and stable measurement

Base plate vertical

QuickMover - Protects the granite slab and makes handling feather-light

At the push of a button, the rotary table can be moved or shifted almost weightlessly and brought smoothly and safely into position. When released, the rotary table is held firmly and securely.

Technical data

- Integrated mini-compressor
- Air cushion approx. 0.009mm
- Parallelism of precision stop to rotary axis 0.001 mm/100 mm
- Center height raised by 15 mm

Items included in delivery

- QuickMover adapter plate with precision-ground AirFlow nozzles
- Integrated precision stop with 2 balls per side
- Built-in manual pushbutton

QuickProcess: briefly probe with measuring probe, then the rotary table moves to the next position – without M-link or integration in the machine control system

Pushbutton for activating the air cushion

Emergency stop (on EA-508 Q-Line only)

Item No.

Item No.	Designation
MET.Q0x-M	QuickMover for EA-50x
MET.Q0x-Mk	QuickMover compact for MA-50x
MET.Q0x-P	QuickProcess

QuickBar - Align quickly and reliably

EA-508.R-Q with stop bar for surface mounting, hole spacing 200 mm, can also be mounted without holes (adhesive can be removed without leaving residue)

Items included in delivery

- Alignment bar with precision notches, for surface or edge mounting
- For hole spacing 200 and 300 mm Adapter for thread M10 + M12
- If thread in granite is available, direct mounting is possible.

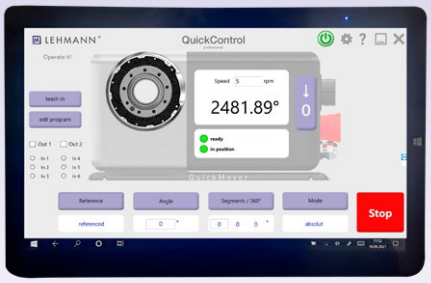
MA-508.m-Q with stop bar for edge mounting, can be mounted without holes (adhesive can be removed without leaving residue)

Item No.

Item No.	Designation
MET.Q0x-Bar-F	QuickBar for edge mounting
MET.Q0x-Bar-W	QuickBar for surface mounting

QuickControl with Microsoft tablet

Easy to operate, stand-alone or automated with M-function



ControlTablet MT – can be easily mounted anywhere and brought into operating position

Easy control via peak interface. Can be mounted anywhere, while equipped with both a suction cup and magnet. Easy to operate, lightweight and universal. Particularly handy in the shopfloor area as well.

Technical data

- Win10 Pro
- Intel Celeron N4120 processor, 4 MB cache, max. 2.6 GHz
- L 300 x W 200 x D 50 mm
- Display 11.6" / resolution 1920 x 1080 pixels

Items included in delivery

- ControlTablet, incl. operating system
- Charger
- Anodized tablet holder with magnets and suction cup
- USB docking station with Ethernet, video, HDMI etc
- QuickControl software, basic or pro
- TeamViewer
- blackBOXcom
- Camera
- Set-up instructions A4

Tablet holder with suction cup or magnet.

QuickDock – the perfect interface for supplementary locator systems e.g. from DK.

QuickControl PROFI - fully automatable without integration

- Manual operation
- Referencing
- Angle
- Indexing calculator
- Absolute / incremental / endless
- Zeroing at each position
- Programming mode
- Program memory
- External control via M-function (fully automatic sequence via machine control)

QuickBox – high-quality box made of white leather for safe and careful transport

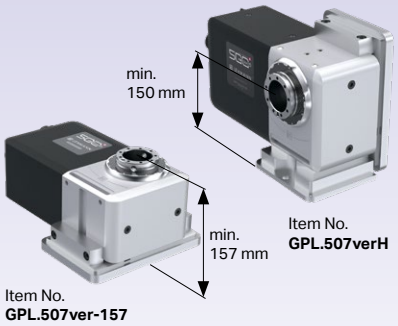
QuickShell – high-quality cover made of leather for protection from dust and impact if rotary table is parked

Item No.

Item No.	Designation
CNC.C-digi	Version digital
CNC.C-pro	Version professional
CNC.PFB-Ct	Box for potential isolation
CNC.Tablet	ControlTablet
MET.Q0x Box	QuickBox
MET.Q0x-D08	QuickDock M8, 15 mm spacing
MET.Q0x-D10	QuickDock M10, 15 mm spacing
MET.Q0x-S	QuickShell for EA-50x
MET.Q0x-Sk	QuickShell compact for MA-50x

EA-M07 / EA-M08

4. Axis, integrated in machine control
Suitable for weights up to 40/80 kg



EA-508.L-mt

					EA-M07	EA-M08
Dimension	Swivel ø			mm	160	
	Center height			mm	110	
	Total weight	with motor		kg	25 (light: 12)	
	Center bore	throughout		mm	31	
Bearing / clamping	Max. spindle load	with tailstock		kg	80 (light: 40)	
		without tailstock		kg	40 (light: 20)	
		Standard load[1]		kg	17	12
	Max. axial force			kN	44 (light: 15)	
	Max. tilting moment			Nm	1,200 (light: 400)	
Gear unit	Max. moment of inertia	Standard load [1]		kgm²	0.05	0.025
		J max		kgm²	0.5	0.25
	Max. feed torque [3]			Nm	27	21
	Torque limit values from eccentric loads [4]			Nm	25	
	Indexing accuracy Pa [2]			± arc sec	without WMS 20 with WMS 25 to 1	
	Repeat accuracy Ps average			± arc sec	2 / 0.5	
	Max speed	with standard load [1]		rpm	20	35
Precision	Radial run-out [2]	on spindle ø		µm	3 / 2	
	Axial run-out [2]	at spindle end face		µm	3 / 2	
	Parallelism [2]	Rotary axis to footprint		µm/100mm	5	

[1] Mutually dependent; drive data valid for SANYO KA511 DC motor at 20% duty cycle
[2] For measurement method and validity of values, see **p. 48**
[3] Limit value for gear unit (valid with above motor), at 1 rpm
[4] Calculation of torque on request; for EA-M08 self-locking max. 8 Nm
Achievable indexing accuracy depends on the selected direct measuring system; see **p. 49**

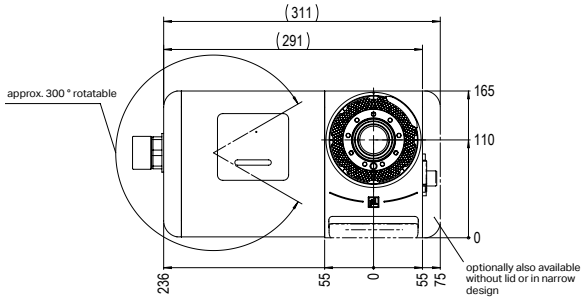
Version

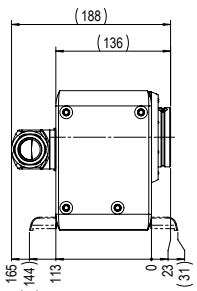
- Externally dry and oil-free, sealed against oil leakage, no compressed air
- Delivered protected against rust without rust inhibitor
- DC motor mounted thermally insulated (standard: SANYO K-type; other motors on request)
- Without clamping
- Sensors with LEDs, data logger and microprocessor, e.g. for
  – Condition monitoring and display
  – Service display
  – Data history for cause analysis
  – Remote diagnostics
  – Data output via USB slot

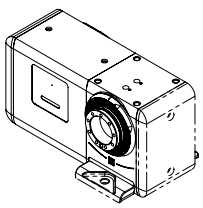
Item No.

Item No.	Designation
EA-M0x.L	Rotary table with motor at left
EA-M0x.L light	Rotary table with motor at left, light
EA-M0x.R	Rotary table with motor at right
EA-M0x.R light	Rotary table with motor at right, light
MOT.SA-KA511TXX*	Sanyo KA511TXX motor (Tacho) → WMS mandatory
KAB.S1-6.0w-o-2	Cable 6 m, without plug
MET.PGD (optional)	ThermoBreak for metrology

Options: For QuickMover, see **p. 34** and for direct measuring systems (WMS), see **p. 49**
* For motor details and other cable versions, see **p. 48**







Only possible in horizontal axis position

EA-M10 / EA-M11

4. Axis, integrated in machine control
Suitable for weights up to 80/160 kg

Item No.
GPL.510ver-180

EA-511.L-mt

				EA-M10	EA-M11
Dimension	Swivel ø		mm	240	
	Center height		mm	150	
	Total weight	with motor	kg	32 (with GPL.510ver-180: 40 kg)	
	Center bore	throughout	mm	34	
Bearing / clamping	Max. spindle load	with tailstock	kg	160	
		without tailstock	kg	80	
		Standard load [1]	kg	42	22
	Max. axial force		kN	46	
	Max. tilting moment		Nm	2,000	
Gear unit	Max. moment of inertia	Standard load [1]	kgm²	0.2	
		J max	kgm²	2	0.7
	Max. feed torque [3]		Nm	33	25
	Torque limit values from eccentric loads [4]		Nm	40	
	Indexing accuracy Pa [2]		± arc sec	without WMS 20 with WMS 25 to 1	
	Repeat accuracy Ps average		± arc sec	2 / 0.5	
	Max speed	with standard load [1]	rpm	25	30
Precision	Radial run-out [2]	on spindle ø	µm	3 / 2	
	Axial run-out [2]	at spindle end face	µm	3 / 2	
	Parallelism [2]	Rotary axis to footprint	µm/100mm	5	

[1] Mutually dependent; drive data valid for SANYO KA720 DC motor at 20% duty cycle
[2] For measurement method and validity of values, see **p. 48**
[3] Limit value for gear unit (valid with above motor), at 1 rpm
[4] Calculation of torque on request; for EA-M11 self-locking max. 20 Nm
Achievable indexing accuracy depends on the selected direct measuring system; see **p. 49**

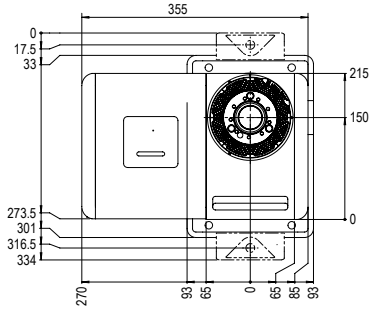
Version

- Externally dry and oil-free, sealed against oil leakage, no compressed air
- Delivered protected against rust without rust inhibitor
- DC motor mounted thermally insulated (standard: SANYO K-type; other motors on request)
- Without clamping
- Sensors with LEDs, data logger and microprocessor, e.g. for
  – Condition monitoring and display
  – Service display
  – Data history for cause analysis
  – Remote diagnostics
  – Data output via USB slot

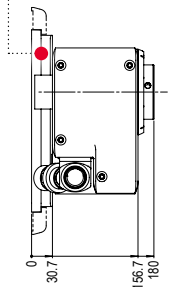
Item No.

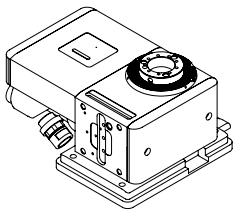
Item No.	Designation
EA-M1x.L	Rotary table with motor at left
EA-M1x.R	Rotary table with motor at right
MOT.SA-KA720TXX*	Sanyo KA720TXX motor (Tacho) → WMS mandatory
KAB.S1-6.0w-o-2	Cable 6 m, without plug
MET.PGD (optional)	ThermoBreak for metrology

Options: For QuickMover, see **p. 34** and for direct measuring systems (WMS), see **p. 49**
* For motor details, see **p. 48**



Add-on housing for installation of 'Vertical axis position' (Item No. GPL.510ver-180)





TF-M07M10 / TF-M08M10

4th/5th axes for demanding measurement tasks, workpieces up to 25 kg, **without** support bearing

Item No.

TF–M07M10.LL–SA-EN

- **Motor** SA-EN = Sanyo Encoder, SA-TX = Sanyo tachometer
- **Tilting axis motor position** L=left, R=right
- **Rotary axis motor position** L=left, R=right
- **Tilting axis size** 510
- **Rotary axis size** 507, 508
- **Rotary table model**

TF-M08M10.LL

					TF-M07M10	TF-M08M10
Dimension	Swivel ø			mm	280 (180)	
	Swiveling range			degrees	90° +5°/-25° (optional 180° ±25°)	
	Center height			mm	180	
	Total weight	with motor		kg	65	
	Center bore	throughout		mm	31	
Bearing / clamping	Max. spindle load	0°-30°		kg	25	
		30°-90°		kg	12	
		Standard load [1]		kg	12	
	Max. axial force	4. axis		kN	6	
	Max. tilting moment	4. axis		Nm	1,200	
		5. axis		Nm	2,000	
Gear unit	Max. moment of inertia	Standard load [1]		kgm²	0.05	0.025
		J max		kgm²	0.5	0.25
	Feed torque max [3]	4. axis		Nm	27	21
		5. axis		Nm	25 to 35	
	Gear unit loading 5. axis	without load		Nm	-12	
		with standard load		Nm	15	10
		M max / M limit eccentric		Nm	250 / 40	
	Indexing accuracy Pa	4. axis [2]		± arc sec	25 to 1	
		5. axis (90°) [4]		± arc sec	25 to 1	
	Repeat accuracy Ps average	4. axis		± arc sec	2 to 0.5	
		5. axis		± arc sec	2 to 0.5	
	Max. speed at standard load	4. axis [1]		min⁻¹	20 to 25	25 to 30
		5. axis [1]		min⁻¹	15	
Precision	Radial run-out [2]	on spindle ø		µm	3 / 2	
	Axial run-out [2]	at spindle end face		µm	3 / 2	
	Parallelism [2]	Spindle to base		µm/100mm	5	

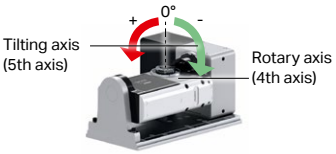
[1] Mutually dependent; drive data valid for SANYO KA511 and. KA720 DC motors
[2] For measurement method and validity of values, see main catalog, **p. 48**
[3] Limit value for gear unit (valid with above motor), at 1 rpm
[4] Torque calculation on request
Achievable indexing accuracy depends on the selected direct measuring system; see **p. 49**

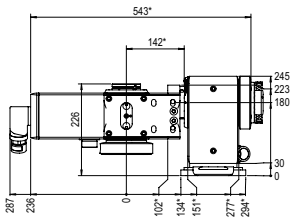
Version

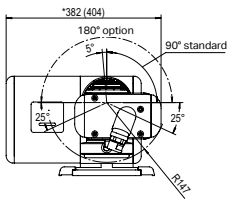
See respective EA rotary table

Attention:
For motor and measuring system data as well as all drive-related data such as speeds, feed torques, and indexing and repeat accuracies, refer to the respective EA rotary table, **pp. 36–37** or **p. 49**

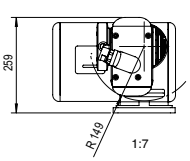
All other item nos. as for respective EA rotary table
Options: For QuickMover, see **p. 34** and direct measuring systems (WMS), see **p. 49**

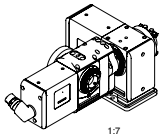






*TF-507510 TIPc all dimensions reduced by 47 mm





T1-M07M10 / T1-M08M10

4th/5th Axes for demanding measurements, workpieces up to 25 kg, **with** support bearing

T1-M08M10.LL

Item No.

T1–M07M10.LL–SA-EN

Motor	SA-EN = Sanyo Encoder, SA-TX = Sanyo tachometer	
Tilting axis motor position	L=left, R=right	
Rotary axis motor position	L=left, R=right	
Tilting axis size	510	
Rotary axis size	507, 508	
Rotary table model		

				T1-M07M10	T1-M08M10
Dimension	Swivel ø		mm	280 (180)	
	Swiveling range		degrees	90° +5°/-25° (optional 180° ±25°)	
	Center height		mm	180	
	Total weight	with motor	kg	85	
	Center bore	throughout	mm	31	
Bearing / clamping	Max. spindle load	0°-30°	kg	25	
		30°-90°	kg	12	
		Standard load [1]	kg	12	
	Max. axial force	4. axis	kN	6	
	Max. tilting moment	4. axis	Nm	1,200	
		5. axis	Nm	2,000	
Gear unit	Max. moment of inertia	Standard load [1]	kgm²	0.05	0.025
		J max	kgm²	0.5	0.25
	Feed torque max [3]	4. axis	Nm	27	21
		5. axis	Nm	25 to 35	
	Gear unit loading 5. axis	without load	Nm	-12	
		with standard load	Nm	15	10
		M max / M limit eccentric	Nm	250 / 40	
	Indexing accuracy Pa	4. axis [2]	± arc sec	25 to 1	
		5. axis (90°) [4]	± arc sec	25 to 1	
	Repeat accuracy Ps average	4. axis	± arc sec	2 to 0.5	
		5. axis	± arc sec	2 to 0.5	
	Max. speed at standard load	4. axis [1]	min⁻¹	20 to 25	25 to 30
		5. axis [1]	min⁻¹	15	
Precision	Radial run-out [2]	on spindle ø	µm	3 / 2	
	Axial run-out [2]	at spindle end face	µm	3 / 2	
	Parallelism [2]	Spindle to base	µm/100mm	5	

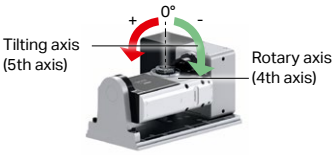
[1] Mutually dependent; drive data valid for SANYO KA511 and KA720 DC motors
[2] For measurement method and validity of values, see **p. 48**
[3] Limit value for gear unit (valid with above motor), at 1 rpm
[4] Torque calculation on request
Achievable indexing accuracy depends on the selected direct measuring system; see **p. 49**

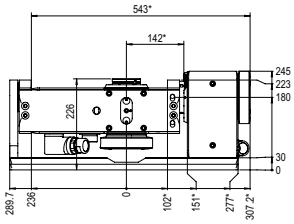
Version

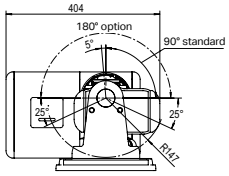
See respective EA rotary table

Attention:
For motor and measuring system data as well as all drive-related data such as speeds, feed torques, and indexing and repeat accuracies, refer to the respective EA rotary table, **pp. 36–37** or **p. 49**

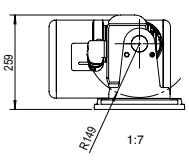
All other item nos. as for respective EA rotary table
Options: For QuickMover, see **p. 34** and direct measuring systems (WMS), see **p. 49**

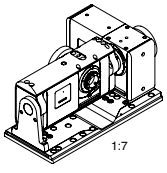






*T1-507510 TIPc all dimensions reduced by 47 mm





T1-M10M20 / T1-M11M20

4th/5th Axes for demanding measurement tasks for workpieces up to 80 kg, **with** support bearing

T1-M08M10.LL

Item No.

T1–M10M20.LL–SA-EN

- **Motor** SA-EN = Sanyo Encoder, SA-TX = Sanyo tachometer
- **Tilting axis motor position** L=left, R=right
- **Rotary axis motor position** L=left, R=right
- **Tilting axis size** 520
- **Rotary axis size** 510, 511
- **Rotary table model**

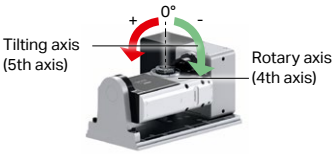
				T1-M10M20	T1-M11M20
Dimension	Swivel ø		mm	340 (220)	
	Swiveling range		degrees	90° +5°/-25° (optional 180° ±25°)	
	Center height		mm	210	
	Total weight	with motor	kg	160	
	Center bore	throughout	mm	31	
Bearing / clamping	Max. spindle load	0°-30°	kg	80	
		30°-90°	kg	42	
		Standard load [1]	kg	42	21
	Max. axial force	4. axis	kN	6	
	Max. tilting moment	4. axis	Nm	2,000	
		5. axis	Nm	3,900	
Gear unit	Max. moment of inertia	Standard load [1]	kgm²	0.2	0.07
		J max	kgm²	2.0	0.7
	Feed torque max [3]	4. axis	Nm	35	25
		5. axis	Nm	125	
	Gear unit loading 5. axis	without load	Nm	-22	
		with standard load	Nm	30	5
		M max / M limit eccentric	Nm	440 / 110	
	Indexing accuracy Pa	4. axis [2]	± arc sec	25 to 1	
		5. axis (90°) [4]	± arc sec	25 to 1	
	Repeat accuracy Ps average	4. axis	± arc sec	2 to 0.5	
		5. axis	± arc sec	2 to 0.5	
	Max. speed at standard load	4. axis [1]	min⁻¹	25	40
		5. axis [1]	min⁻¹	15	
Precision	Radial run-out [2]	on spindle ø	µm	3 / 2	
	Axial run-out [2]	at spindle end face	µm	3 / 2	
	Parallelism [2]	Spindle to base	µm/100mm	5	

Version

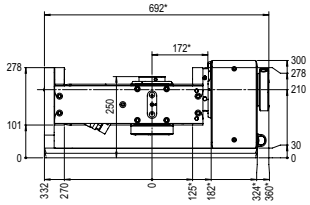
See respective EA rotary table

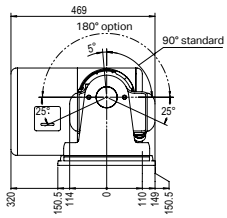
Attention:
For motor and measuring system data as well as all drive-related data such as speeds, feed torques, and indexing and repeat accuracies, refer to the respective EA rotary table, **pp. 36–37** or **p. 49**

All other item nos. as for respective EA rotary table
Options: For QuickMover, see **p. 34** and direct measuring systems (WMS), see **p. 49**

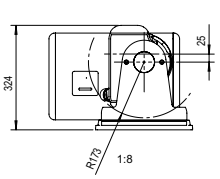


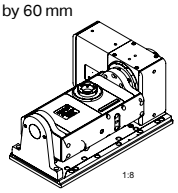
[1] Mutually dependent; drive data valid for SANYO KA720TXX and KA730TXX DC motors
[2] For measurement method and validity of values, see **p. 48**
[3] Limit value for gear unit (valid with above motor), at 1 rpm
[4] Torque calculation on request
Achievable indexing accuracy depends on the selected direct measuring system; see **p. 49**



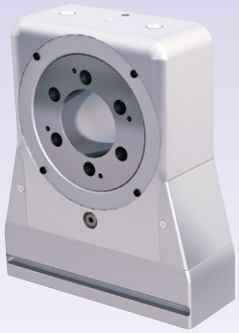


*T1-510520 TIPc all dimensions reduced by 60 mm





GLA.520hd



GLA.TOP2 with 2,000 Nm

GLA.TOP1 with 300 Nm

Counterbearing, incl. bearing journal

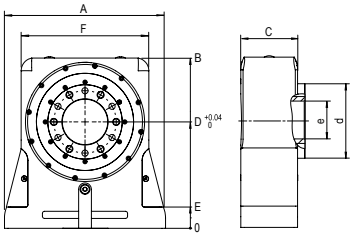
- Compact and stable counterbearing with large roller bearing
- Prepared for automatic clamping, oil connections from below and from side
- Max. permitted hydraulic pressure 220 bar (GLA.TOP2) or max. 150 bar (GLA.TOP1)
- Center height 0 +0.04 mm
- Delivered with bearing journal

	Item No.	Clamping torque* [Nm]	Pull-out torque max. [Nm]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	d [mm]	e [mm]	Weight [kg]
x0x	**GLA.TOP1-110**	300	not available	155	170	55	110	30	110	70	46.55	7
x0x	**GLA.TOP1-150**	300		155	210	55	150	70	110	70	46.55	9
x1x	**GLA.TOP2-150-2**	2,000	On request	227	240	80	150	30	179	105	64	21
all sizes	**GLA.HYD-fix**	Hydraulic kit fix										
all sizes	**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 counterbearing, the clamping torque is reduced by approx. 30% (applies to rotary table and counterbearing)

Suitable alignment elements

	Item No.	Designation	Slot width	Weight [kg]
GLA.TOP1	**AUR.iX-12-16**	Option (1 pair)	12/16	
GLA.TOP1	**AUR.iX-14-18**	Standard (1 pair)	14/18	0.03
GLA.TOP2	**AUR.St-12**	Alignment T-slot nuts, 1 pair	12g6	0.07
GLA.TOP2	**AUR.St-14**		14g6	0.07
GLA.TOP2	**AUR.St-16**		16g6	0.07
GLA.TOP2	**AUR.St-18**		18g6	0.07

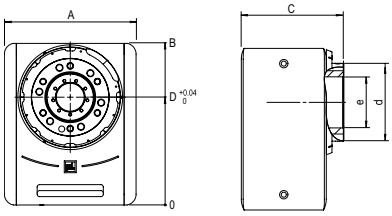


GLA.510hd-150, GLA.520hd-180

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

Item No.	Clamping torque* [Nm]	Pull-out torque max. [Nm]	A [mm]	B [mm]	C [mm]	D [mm]	d [mm]	e [mm]	Weight [kg]
GLA.510hd	800	2,000	170	215	150	150	80	34	
GLA.520hd	2,000	3,900	220	270	171	180	130	46	

* at hydraulic pressure = 220 bar



CYMAX hydraulic unit

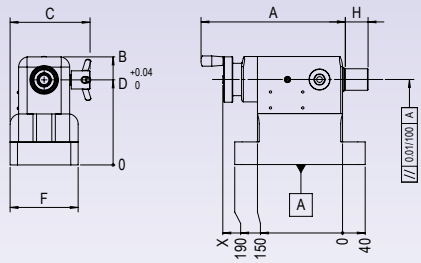
Item No.	Designation	Technical data	Weight [kg]
AGG.CY1-2*	Cymax hydraulic unit	1 clamping circuit, 400 V (can be converted to 200 V)	
AGG.CY2-2*	Cymax hydraulic unit	2 clamping circuits, 400 V (can be converted to 200 V)	
AGG.LEIT-05-2	Hydraulic line with threaded fitting (supplied loose)	1 pair (2 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 end cap, installed opposite motor (see image)	Clamping / unclamping: Manually via hand switch. No separate compressed air infeed necessary	
AGG.520-ph			



Manual version (right-hand)

measured without load, quill extended halfway

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

		Item No.	Designation	A [mm]	B [mm]	C [mm]	F [mm]	H [mm]	Manual	pneu-matic [2]	hydraulic [3]	Weight [kg]	✗	✓
Center height D [mm]	110	**RST.COM-110m** [4]	COMPACT tailstock	222	128	130	100	30	•			11		•
		RST.LIG-110m	LIGHT tailstock	255		142		40	•			20		•
		RST.LIG-110p [1]	LIGHT tailstock	225	150	184	120	40		•		20		•
		RST.LIG-110h [1]	LIGHT tailstock	229		168		40			•	24		•
	150	**RST.COM-150m** [4]	COMPACT tailstock	222	168	130	100	30	•			16		•
		RST.LIG-150m	LIGHT tailstock	255		142		40	•			25		•
		RST.LIG-150p [1]	LIGHT tailstock	238	190	184	120	40		•		25		•
		RST.LIG-150h [1]	LIGHT tailstock			168		40			•	29		•
	180	**RST.LIG-180m**	LIGHT tailstock	255		142		40	•			30		•
		RST.LIG-180p [1]	LIGHT tailstock	238	220	184	120	40		•		30		•
		RST.LIG-180h [1]	LIGHT tailstock			168		40			•	34		•
	220	**RST.LIG-220m**	LIGHT tailstock	255		142		40	•			35		•
		RST.LIG-220p [1]	LIGHT tailstock	238	260	184	120	40		•		35		•
		RST.LIG-220h [1]	LIGHT tailstock			168		40			•	40		•
	280	**RST.LIG-280m**	LIGHT tailstock	255		142		40	•			42		•
		RST.LIG-280p [1]	LIGHT tailstock	238	310	184	120	40		•		42		•
		RST.LIG-280h [1]	LIGHT tailstock			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 valve									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)

[1] Delivered as standard without manual lever valve. Can be ordered as option.
[2] Impact force approx. 660 to 2,000 N at 2 to 6 bar air pressure
[3] Impact force approx. 3,800 N at max. 24 bar oil pressure
[4] Delivered with center height +/-0.01 mm

Morse taper size (DIN 228)
– COMPACT = MK 2
– LIGHT = MK 3

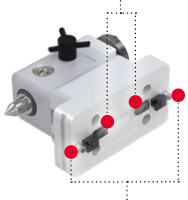
✗ CANNOT be retrofitted
✓ can be retrofitted

Suitable alignment elements

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

Possible alignment elements

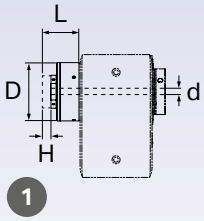
Alignment T-slot nuts



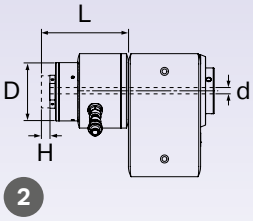
zentriX alignment pins

Revolving centers see **p. 95**

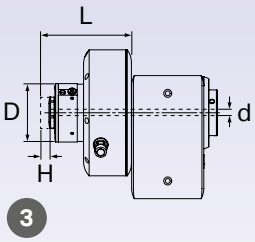
Hydraulic clamping cylinder standard



1 directly on the spindle



2 in combination with WMS RxN-2xxx *



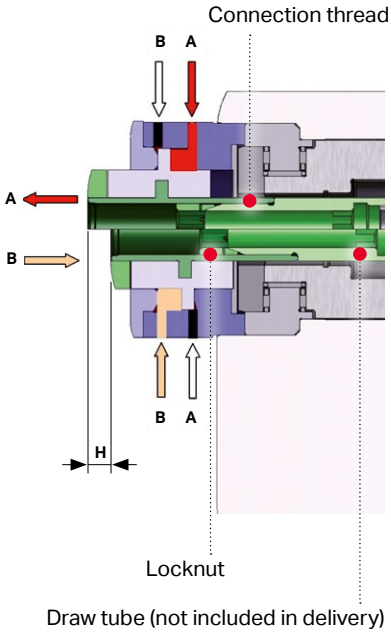
3 in combination with WMS RxN-8xxx

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

	Item No.	Effective direction Designation	H [mm]	Oil [cm³]	D [mm]	d [mm]	Connection thread	L [mm] ①	L [mm] ②*	L [mm] ③	Weight [kg]
x0x	**SPZ.5xx-d2.5**	hydraulic or pneumatic, double	2.5	5.2	102	22	M24x1.5	60	149		2.90
x0x	**SPZ.5xx-9**	hydraulic or pneumatic, double	9	18.8	102	22	M24x1.5	60	149		2.85
x0x	**SPZ.5xx-15**	hydraulic or pneumatic, double	15	18.8	102	22	M24x1.5	72	161		3.44
x0x	**SPZ.507-WMS2**	Draw tube extension, for WMS.510-VOR2				22	M24x1.5		●		
x1x	**SPZ.5xx-d2.5**	hydraulic or pneumatic, double	2.5	5.2	102	22	M24x1.5	52	141	136	2.90
x1x	**SPZ.5xx-9**	hydraulic or pneumatic, double	9	18.8	102	22	M24x1.5	52	141	136	2.85
x1x	**SPZ.5xx-15**	hydraulic or pneumatic, double	15	18.8	102	22	M24x1.5	64	153	148	3.44
x1x	**SPZ.510-WMS2**	Draw tube extension, for WMS.510-VOR2				22	M24x1.5		●		
x1x	**SPZ.510-WMS7**	Draw tube extension, for WMS.510-VOR7				22	M24x1.5			●	0.21
all types	**SPZ.Awk-Vor**	Preparation for presence check (control box optional, SPZ.Awk)									
all types	**SPZ.Awk**	Control box for presence check, incl. 10 m of hose material and wall penetration (in conjunction with SPZ.Awk-Vor)									

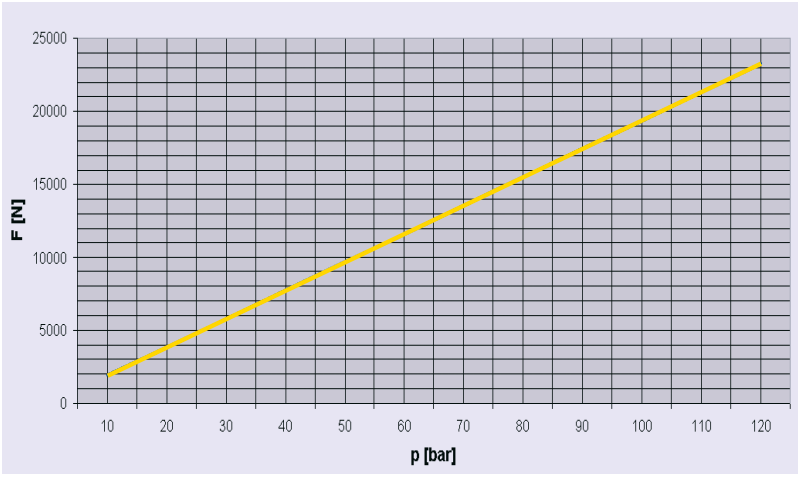
* If in combination with pL accessories, only on request (only possible for stroke of 2.5 mm and 9 mm)

Principle of operation

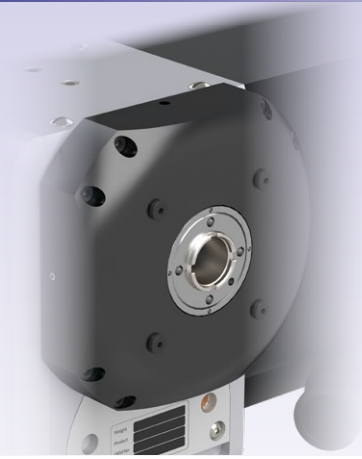


Control box for presence check (SPZ. Awk)

Hydraulically operated: Force diagram 10 to 120 bar (compression or tension; for suitable hydraulic unit **p. 42**)



Pneumatic clamping cylinders with adjustable stroke



(1)

More information about clamping cylinder **p. 44**, rotary union **p. 46**, direct measuring system **p. 49**

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

	pL LEHMANN Item No.	Designation	H min* [mm]	Air [cm³]	D [mm]	d [mm]	Connection thread	L [mm] (1)	Weight [kg]
x0x	SPZ.5xx-P	Pneumatic clamping cylinders	2.5	28	169 / 143x143	22	M24x1.5	57.2	
			9	100				63.7	
			15	167				69.7	
x1x			2.5	28				48.7	
			9	100				55.2	
			15	167				61.2	

* Stroke of 2.5, 9 and 15 mm can be achieved with the same clamping cylinder

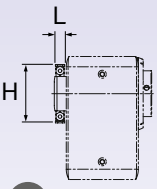
Center height increase on T-type rotary tables

For all combinations of possible spindle accessories.

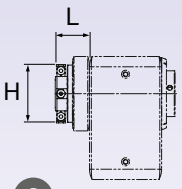
			Hydraulic & pneumatic							Hydraulic								Pneumatic
	Item No.	Increase	(4)(3)(1) WMS2	(2) WMS7	WMSC	(1) DDF	(2) WMS2 + DDF	(2) WMS7 + DDF	WMSC + DDF	(1) SPZ2.5	(1) SPZ9	(1) SPZ15	(2) WMS2 + SPZ2.5	(3) WMS7 + SPZ2.5	(2) WMS2 + SPZ9	(3) WMS7 + SPZ9	(3) WMS7 + SPZ15	SPZ
TIP1		without			•	•			•	•	•	•						•
	SPH.TIP1-40	40mm	•		•	•	•		•	•	•	•						•
	SPH.TIP1-80	80mm	•		•	•	•		•	•	•	•	•		•			•
TIP2		without	•		•	•			•	•	•	•						•
	SPH.TIP2-40	40mm	•	•	•	•	•	•	•	•	•	•						•
	SPH.TIP2-80	80mm	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
TIP3		without			•	•				•								•
	SPH.TIP3-50	50mm	•	•	•	•	•	•	•	•	•	•						•
	SPH.TIP3-100	100mm	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
TAP1		without			•	•				•	•							•
	SPH.TAP1-40	40mm	•		•	•			•	•	•	•						•
TAP2		without			•	•				•	•							•
	SPH.TAP2-30	30mm			•	•				•	•	•						•
	SPH.TAP2-60	60mm	•	•	•	•	•	•	•	•	•	•						•
TOP1		without			•	•				•	•							•
	SPH.TOP1-40	40mm	•		•	•			•	•	•	•						•
	SPH.TOP1-70	70mm	•		•	•	•		•	•	•	•						•
	SPH.TOP1-100	100mm	•		•	•	•		•	•	•	•	•		•			•
TOP2		without			•	•				•	•							•
	SPH.TOP2-30	30mm			•	•				•	•	•						•
	SPH.TOP2-60	60mm	•	•	•	•	•	•	•	•	•	•						•
	SPH.TOP2-120	120mm	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

WMS = direct measuring system, SPZ = clamping cylinder, DDF = rotary union
* pneumatic clamping cylinder with 2.5, 9 and 15 mm stroke

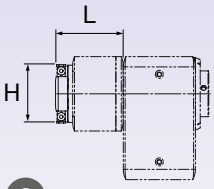
Ultra-compact, for air and oil



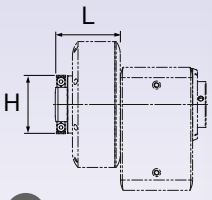
1 directly on the spindle



2 in combination with WMS.5xx-VorCx



3 in combination with WMS.5xx-Vor2

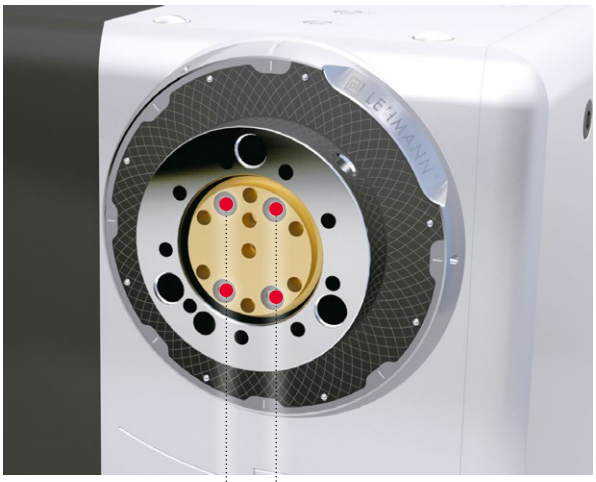


4 in combination with WMS.5xx-Vor7

Rotary unions for rotary table

	Item No.	Flutes	Oil	Air	H [mm]	L [mm] 1	2	3	4	Weight [kg]
x0x	**DDF.507-04**	4	•	•		30				2.56
	DDF.507-04-C	4	•	•	102		66			2.69
	DDF.507-04-2	4	•	•				117		2.43
x1x	**DDF.510-04**	4	•	•	102	21				2.58
	DDF.510-06	6	•	•	122					2.80
	DDF.510-06-C	6	•	•			60			2.93
	DDF.510-04-2	4	•	•	102			119		2.44
	DDF.510-04-7	4	•	•					114	2.89
	DDF.510-06-7	6	•	•	122					3.10

All rotary unions can be used on all T-type rotary tables without increasing the center height unless equipped with direct measuring systems.



Take-off or medium transfer

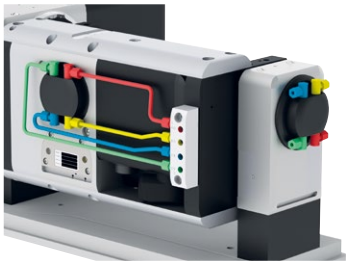
For center height increase on T-type rotary tables, see p. 45

The center height changes only if the rotary union is used on a direct measuring system.

Rotary unions (DDF) for counterbearing (GLA)

	Item No.	Flutes	Oil	Air	H [mm]	L [mm]	Weight [kg]
x0x	**DDG.507-04-TOP**	4	•	•	102	30	2.48
x1x / x2x	**DDG.520-04-TOP**	4	•	•	102	44	3.66
	DDG.520-06-TOP	6	•	•	122	44	4.11

DDF on GLA for T-type rotary table



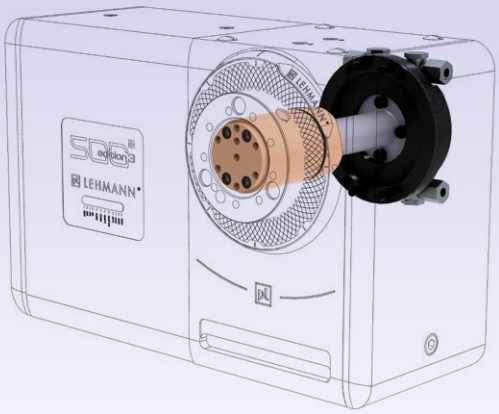
4 connections, at rear

DDF on GLA for rotoFIX

2 connections facing up

2 connections facing down

All rotary unions: Channel size ø3.5 mm, permissible pressure 250 bar



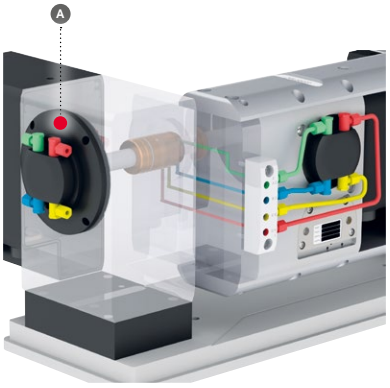
DDF.TxP1.Lx-04(p)

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

Handshake for T-type rotary tables

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

	Item No.	Left	Right	A	B	Remark
TxP	**DDF.TxP1.Lx-04(p)**	●		●		not possible for version TxP1c
	DDF.TxP1.Rx-04(p)		●	●		not possible for version TxP1c
	DDF.TxP2.Lx-04-2(p)	●		●		not possible for versions TxP2c and Oxx
	DDF.TxP2.Lx-06-2(p)	●		●		not possible for versions TxP2c and Oxx
	DDF.TxP2.Rx-04-2(p)		●	●		not possible for versions TxP2c and Oxx
	DDF.TxP2.Rx-06-2(p)		●	●		not possible for versions TxP2c and Oxx
	DDF.TxP3.Lx-04-2(p)	●		●		
	DDF.TxP3.Lx-06-2(p)	●		●		
	DDF.TxP3.Rx-04-2(p)		●	●		
	DDF.TxP3.Rx-06-2(p)		●	●		
TOP	**DDG.TOP1-04(p)**	●	●		●	
	DDG.TOP2-04-2(p)	●	●		●	If Oxx in addition, DDF.WMS-7-TxP needed
	DDG.TOP2-06-2(p)	●	●		●	

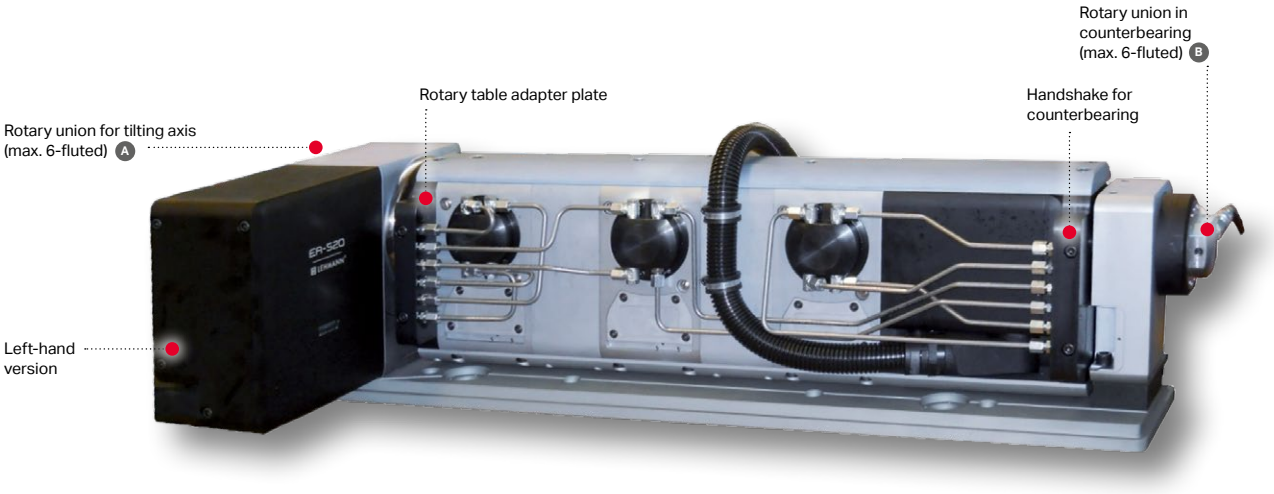


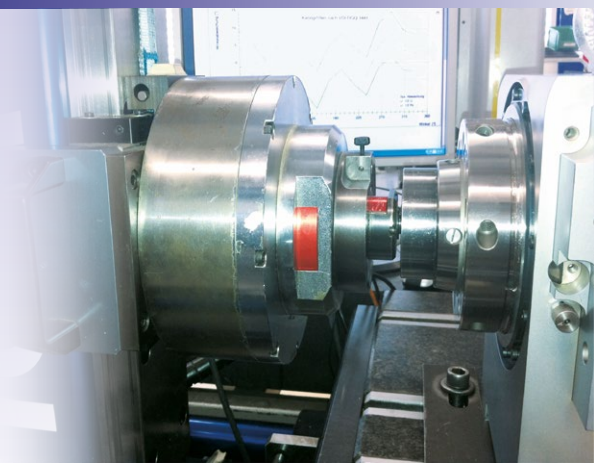
Handshake
Medium transfer from tilting axis to rotary axis (rear)

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

Essential for handshake with WMS.5xx-Vor7

Item No.	Left	Right	Remark
DDF.WMS-7-TxP	●	●	Adjustment of strip, rotary table adapter plate





Measuring / recording

Measuring and recording the angular accuracy, important application instructions

Measuring and recording

Rotary tables with direct measuring systems are supplied with the original report for the encoder. Additional measuring and recording optionally available. Other types of measurements and reports on request.

Encoders for AC motors

A wide range is available for motors from Fanuc, Siemens, Heidenhain, Mitsubishi, etc. See the main catalog 500.

Measuring to ISO 10 360-3

See the tests starting on **p. 52**. Additional documents and certificates available on request.

Motor data

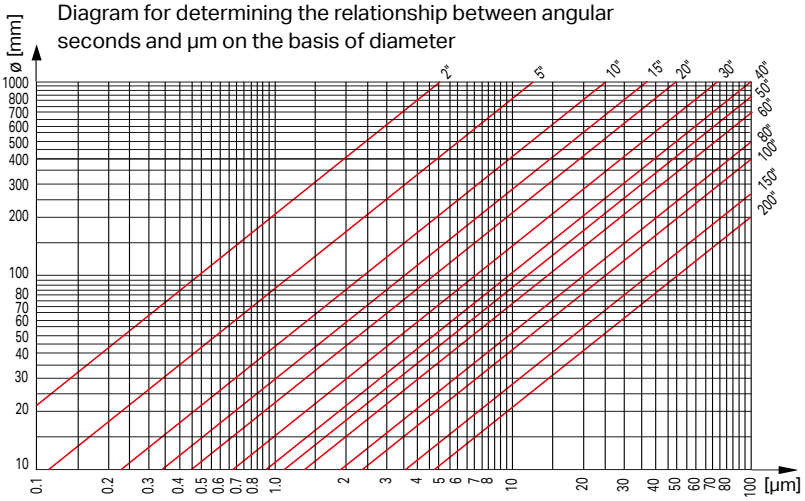
	Motor type	Technology	Rating [W]	Max. voltage [VDC]	Peak current [A]	Feedback	Signal	Line count [pulse/rev]
x0x	**KA511TXX**	DC	110	75	18	Tacho	7V/1000RPM	-
	KA511XS0	DC				Encoder	TTL	2000
	MOT.NA-PD4-3	SM	only for pL Q-Line					
x1x	**KA720TXX**	DC	200	80	25	Tacho	7V/1000RPM	-
	KA720XS0	DC				Encoder	TTL	2000
x2x	**KA730TXX**	DC	300	75	40	Tacho	7V/1000RPM	-
	KA730XS0	DC				Encoder	TTL	2000

Cable

Item No.	Technology	Designation	Manufacturer
KAB.S1-0.5w-WEa2-2	DC	0.5m, Sanyo, tilt, direct measuring system	Werth
KAB.S1-1.3w-WEa-2	DC	1.3 m, Sanyo, direct measuring system	Werth
KAB.S1-1.5w-ZEa	DC	1.5m, Sanyo, direct measuring system	Zeiss
KAB.S1-2.0w-HEa	DC	2.0m, Sanyo, direct measuring system	Hexagon
KAB.S1-6.0w-DSa	DC	6.0m, Sanyo, direct measuring system	Dr. Schneider
KAB.S1-6.0w-o-2	DC	6 m, without plug, Sanyo, WMS	All
KAB.NAa-3.0-Qli-2	SM	3 m, Nanotec	pL Q-Line

Accuracy comparison µm/angular seconds

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



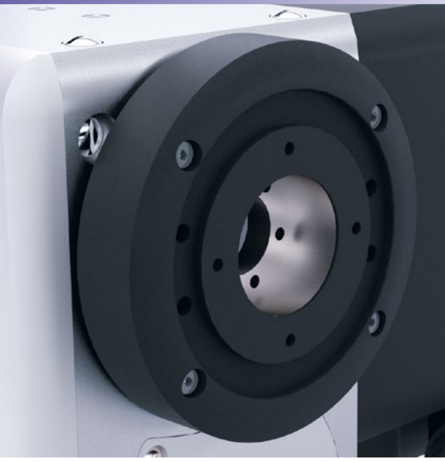
Measuring method used to determine the gear unit's accuracy to VDI/DGQ 3441 or ISO 230-2

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

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

Available direct measuring systems

with signal TTL or 1Vpp



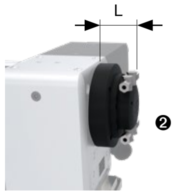
Rear view with angular position measuring system 'compact'

Selecting the direct measuring system

Encoder kit Item no.	Preparation Item no.	System	System**	Indexing accuracy normal	Indexing accuracy comp.*	Type	Read head
WMS.TSM-75	**WMS.50x-Vor2CX**	1Vss	**Renishaw** Line count 11840, or 20 µm pitch	± 25"	± 8"	Tonic RESM	1
WMS.TXM-75				± 10"	± 3"	Tonic REXM	
WMS.VXM25-75.2		TTL***		± 2.5"	± 1"	Tonic VIONIC/REXM-duo	2
WMS.VXM25-75.2T							
WMS.VXM100-75.2							
WMS.VXM100-75.2T							
WMS.285	**WMS.50x-Vor2**	1Vss	**Heidenhain** Line count 18,000	± 5"		RON 285	built-in
WMS.287				± 2.5"		RON 287	

* Sine error compensated for individually by customer
** for other systems from HEIDENHAIN or MAGNESCALE see main catalog 500
*** no spindle clamping possible

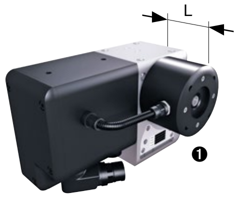
WMScompact



WMScompact with DDF

Dimensions

		x0x		x1x	
		Renishaw	**Heidenhain**	**Renishaw**	**Heidenhain**
Length L [mm]	❶	35.5	88.2	29.9	88.5
	❷	65.5	118.2	59.9	118.5



WMS with Heidenhain

Required TTL input frequency on machine side

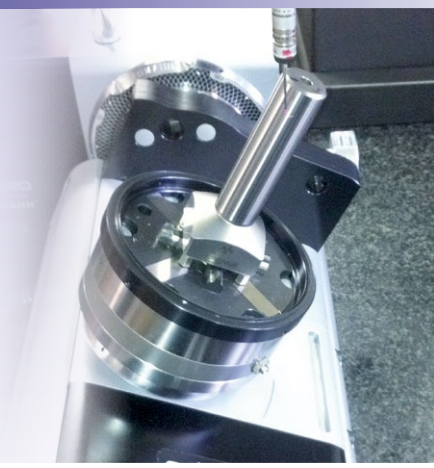
Type of measuring head	V2CKD 10D20F	V2CKX 10D20F	V2CKZ 10D20F	V2CKW 10D20F	V2CKY 10D20F	V2CKH 10D20F	V2CKM 10D20F	V2CKP 10D20F	V2CKI 10D20F	V2CKO 10D20F	V2CKQ 10D20F	V2CKR 10D20F
Measuring head resolution [nm]	5000	1000	500	200	**100**	50	40	**25**	20	10	5	2.5
Measuring head resolution [arc sec]	27.502	5.500	2.750	1.100	0.550	0.275	0.220	0.138	0.110	0.055	0.028	0.014
Speed [rpm] / **Required input frequency TTL at machine-side control** [kHz] *												
1	0	1	2	6	12	25	31	49	61	120	250	490
2	0	2	5	12	25	49	61	98	120	250	490	980
5	1	6	12	31	61	120	150	250	310	610	1,200	2,500
10	2	12	25	61	120	250	310	490	610	1,200	2,500	4,900
15	4	18	37	92	180	370	460	740	920	1,800	3,700	not possible
20	5	25	49	120	250	490	610	980	1,200	2,500	4,900	
25	6	31	61	150	310	610	770	1,200	1,500	3,100	not possible	
30	7	37	74	180	370	740	920	1,500	1,800	3,700		
40	10	49	98	250	490	980	1,200	2,000	2,500	4,900		
50	12	61	120	310	610	1,200	1,500	2,500	3,100	not possible		
60	15	74	150	370	740	1,500	1,800	2,900	3,700			
70	17	86	170	430	860	1,700	2,100	3,400	4,300			
80	20	98	200	490	980	2,000	2,500	3,900	4,900			
90	22	110	220	550	1,100	2,200	2,800	4,400	n. pos-sible			
100	25	120	250	610	1,200	2,500	3,100	4,900				

100 = Standard for system with 1 read head
25 = Standard for system with 2 read heads
Resolution is valid with 4-time evaluation on the machine side (otherwise value is 4x worse)

* Reading example: 100 nm > 250 kHz = 20 rpm

RENISHAW VIONIC with REXM ring
(here with 2 read heads)

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



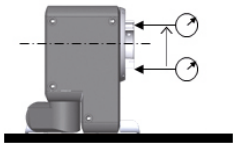
( ) values = increased accuracy. Item no. GEO.5xx-GEN

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, etc.)
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

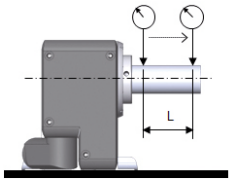
Geometry of EA rotary tables

Perpendicularity
Spindle surface to support surface



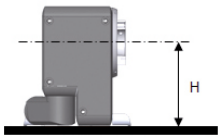
0.01/100 mm (0.005/100 mm)

Parallelism
Spindle axis to support surface



0.01/100 mm (0.005/100 mm)

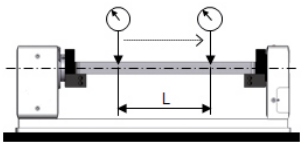
Center height



0 to 0.04 mm

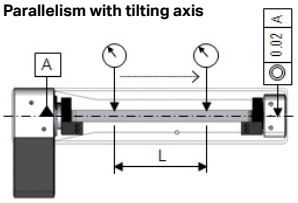
Geometry of EA rotary tables with rotoFIX

Parallelism with support surface



0.007/100 mm (0.0035/100 mm)

Parallelism with tilting axis



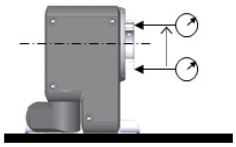
0.007/100 mm (0.0035/100 mm)

For EA vertical see p. 36/37

Geometry of M-rotary tables (only on request)

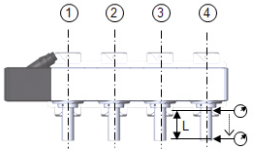
on request

Perpendicularity
Spindle surface to support surface



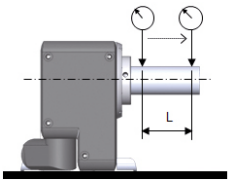
0.01/100 mm (0.005/100 mm)

Axis parallelism
Spindle 2, 3 and 4 to spindle 1



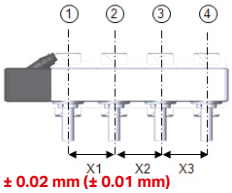
0.01/100 mm (0.005/100 mm)

Parallelism
Spindle axis to support surface



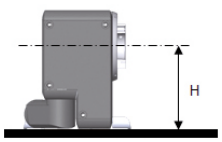
0.01/100 mm (0.005/100 mm)

Center distance
X1, X2 and X3



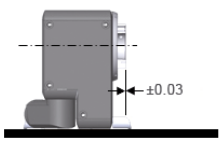
± 0.02 mm (± 0.01 mm)

Center height

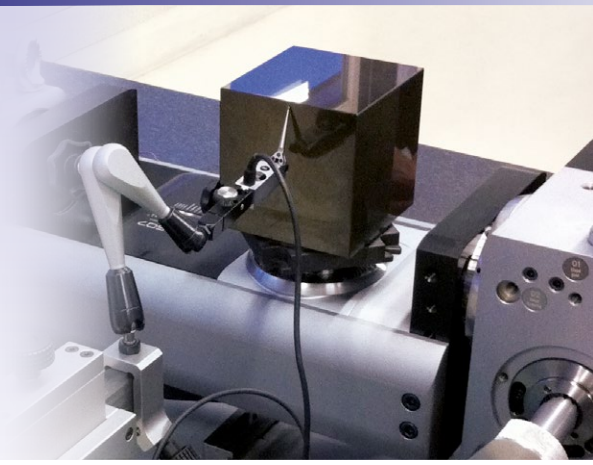


0 to 0.04 mm

Depth difference of the spindles



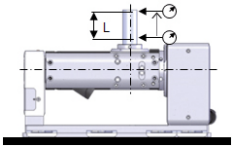
And for the most stringent requirements: 1/2 tolerance as an option



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

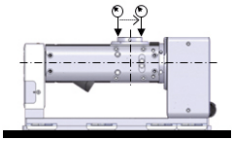
Geometry of TF and T1 rotary tables

Perpendicularity
Rotary axis to tilting axis



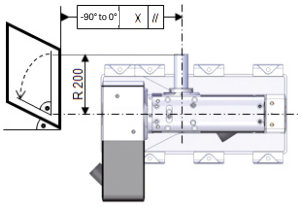
0.01/100 mm (0.005/100 mm)

Parallelism
Spindle surface to support surface



0.01/100 mm (0.005/100 mm)

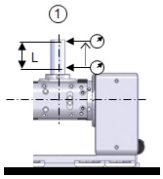
Tilt drift
Change in the angle between the rotary axis and tilting axis during the tilting movement from -90° to 0°



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

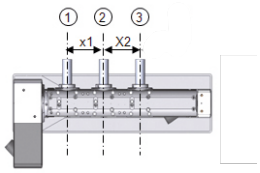
Geometry of T2 to 3-rotary tables (only on request)

Perpendicularity
Rotary axis to tilting axis of spindle 1



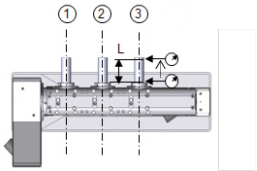
0.01/100 mm (0.005/100 mm)

Center distance
X1, X2 and X3



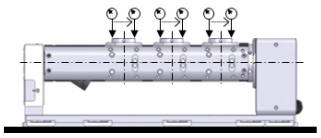
± 0.02 mm (± 0.01 mm)

Axis parallelism
Spindle 2 and 3 to spindle 1



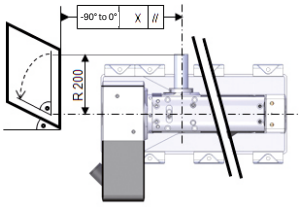
0.01/100 mm (0.005/100 mm)

Parallelism
Spindle surface to support surface



0.01/100 mm (0.005/100 mm)

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

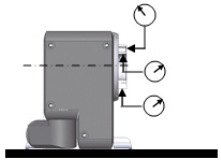


0.01/R150 mm (0.01/R150 mm)

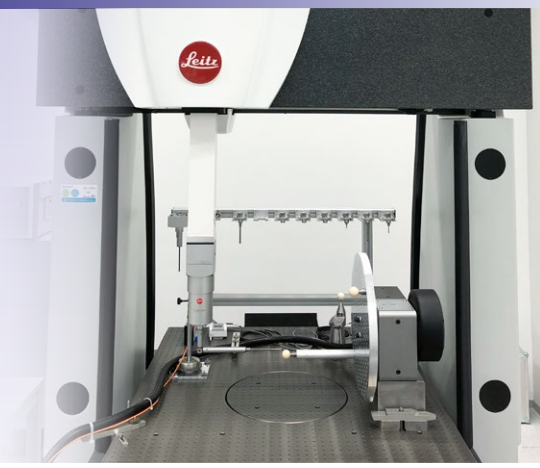
For M- and T-type rotary tables

For all rotary tables

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



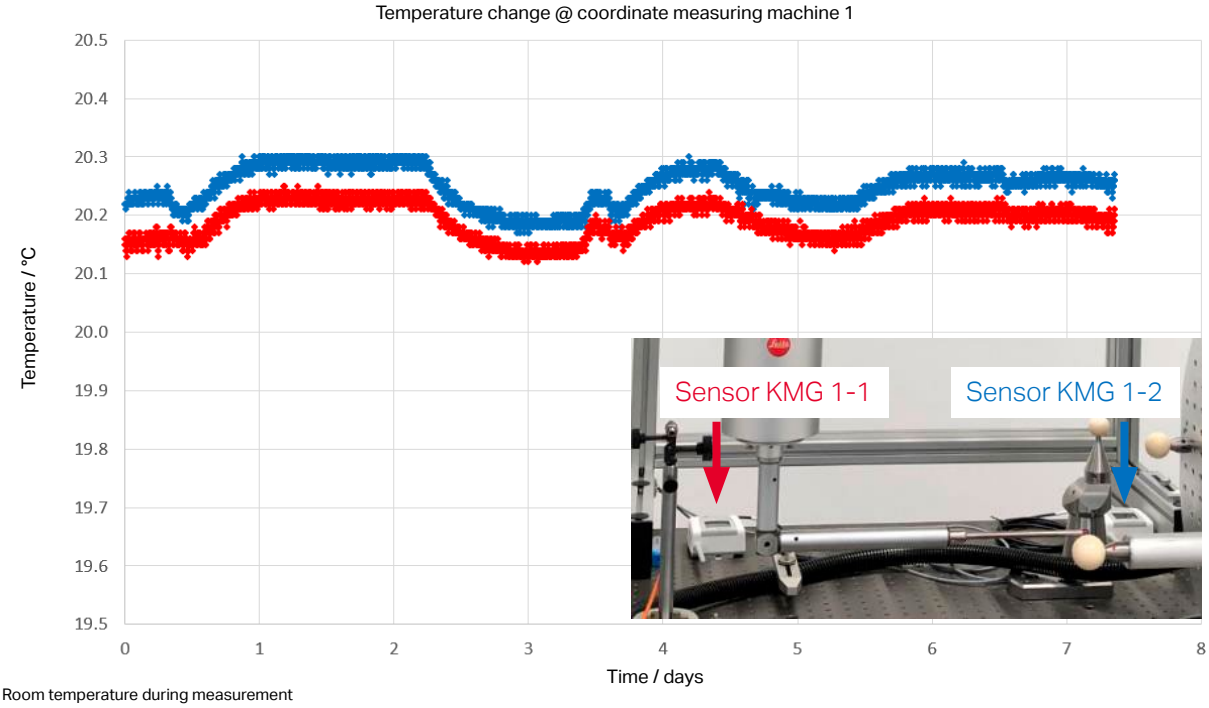
0.006 mm (0.003 mm)



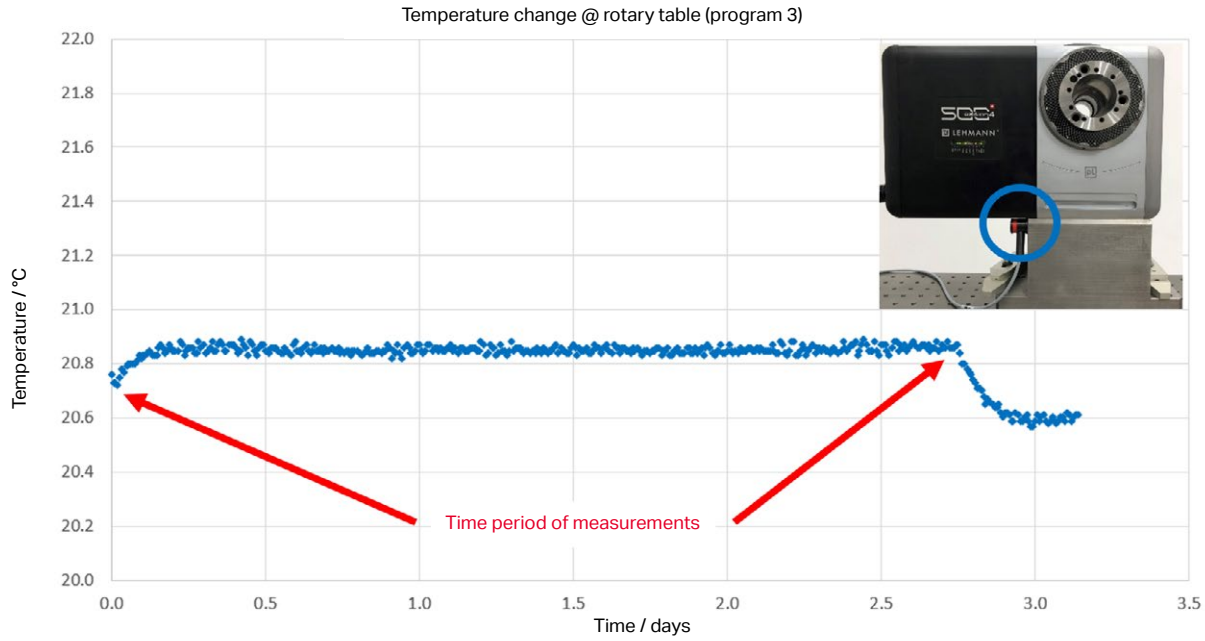
For high-precision measurements

- Excellent repeatability
- Minimal thermal growth
- Fast positioning
- Horizontal or vertical use possible

Performance characteristics to ISO 10360-3 determined at an accredited testing facility on a high-precision coordinate measuring machine.



Room temperature during measurement



Temperature change at critical location on rotary table over several days

Investigation of the effects of loads, cycles, duration, clamping, direct measuring systems, etc.

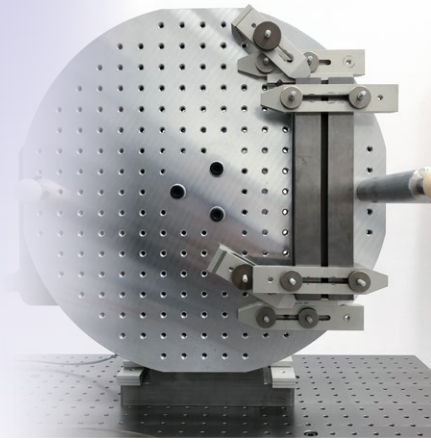
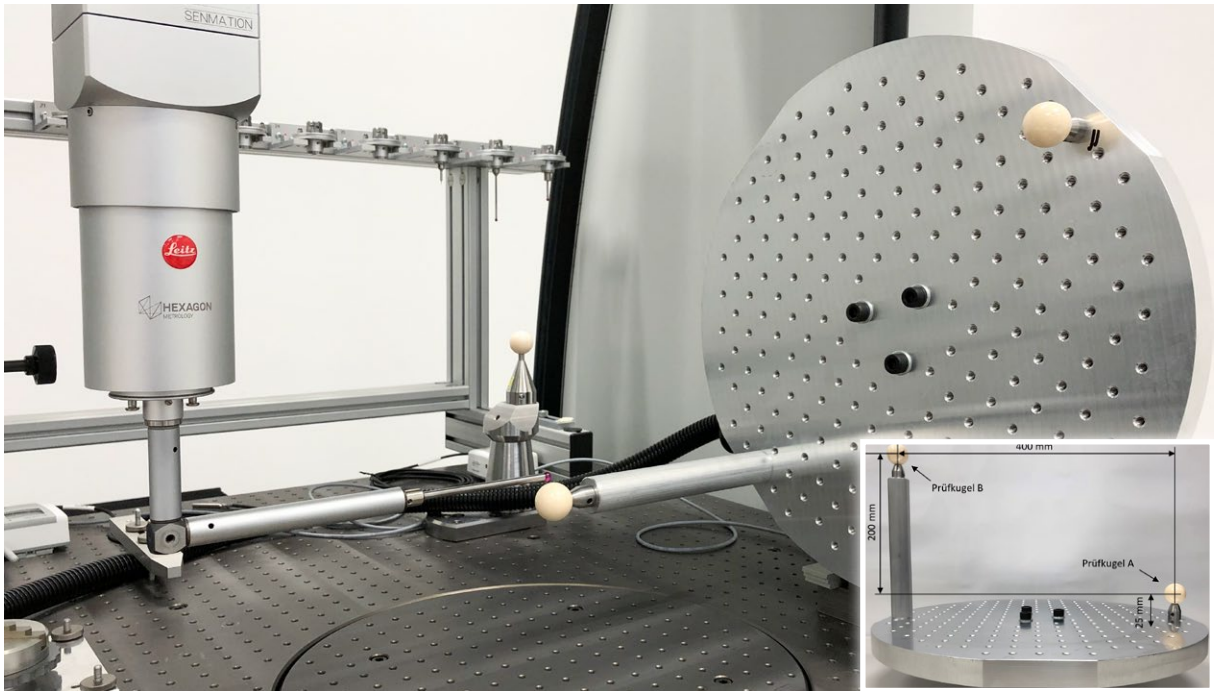
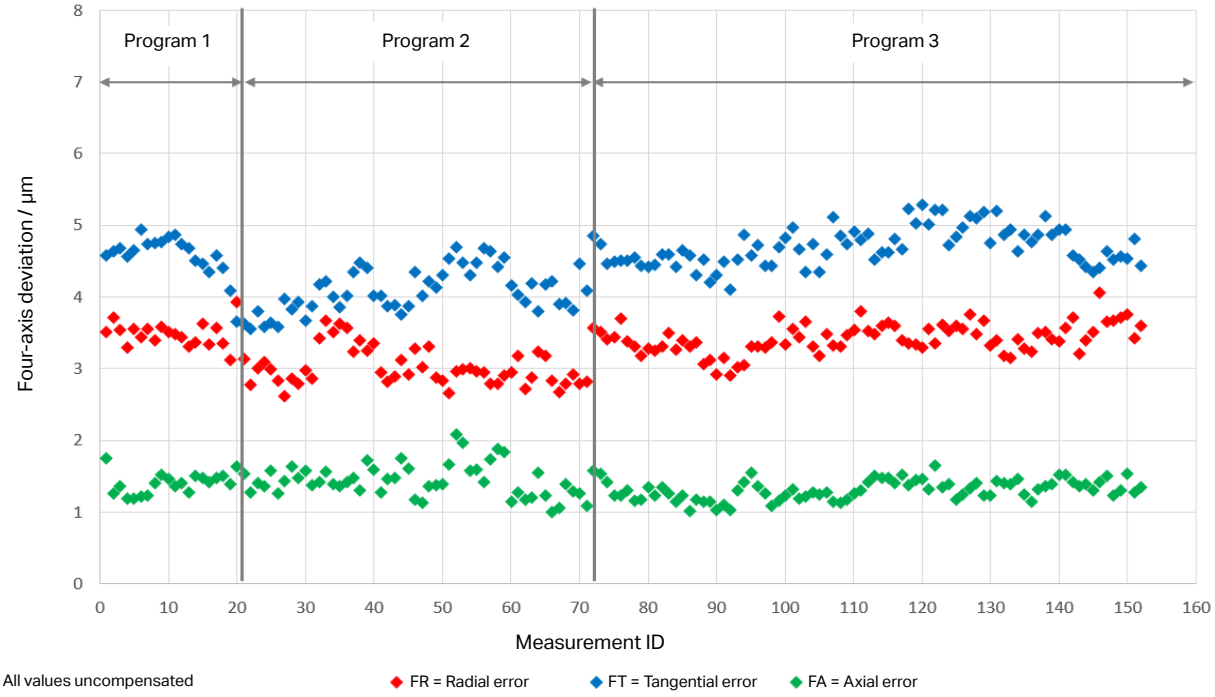


Image right: Example of determining the performance characteristics when rotary table is loaded with an eccentrically positioned weight (approx. 5.5 kg)



Leitz PMM-C 12.10.07 - EA-510



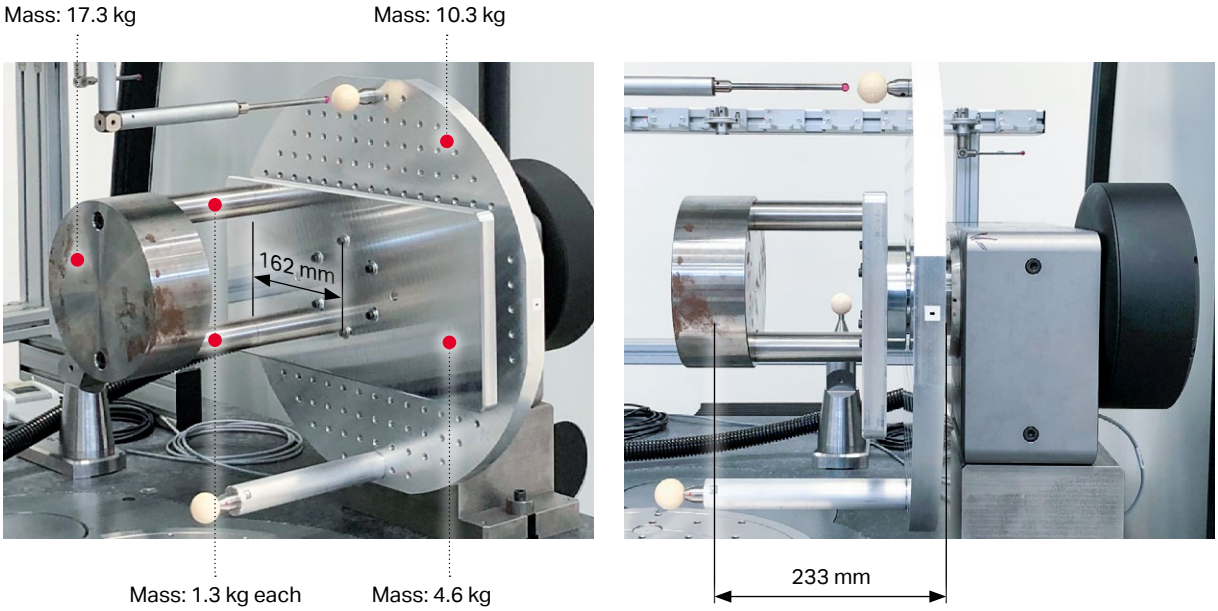
All values uncompensated

FR = Radial error FT = Tangential error FA = Axial error

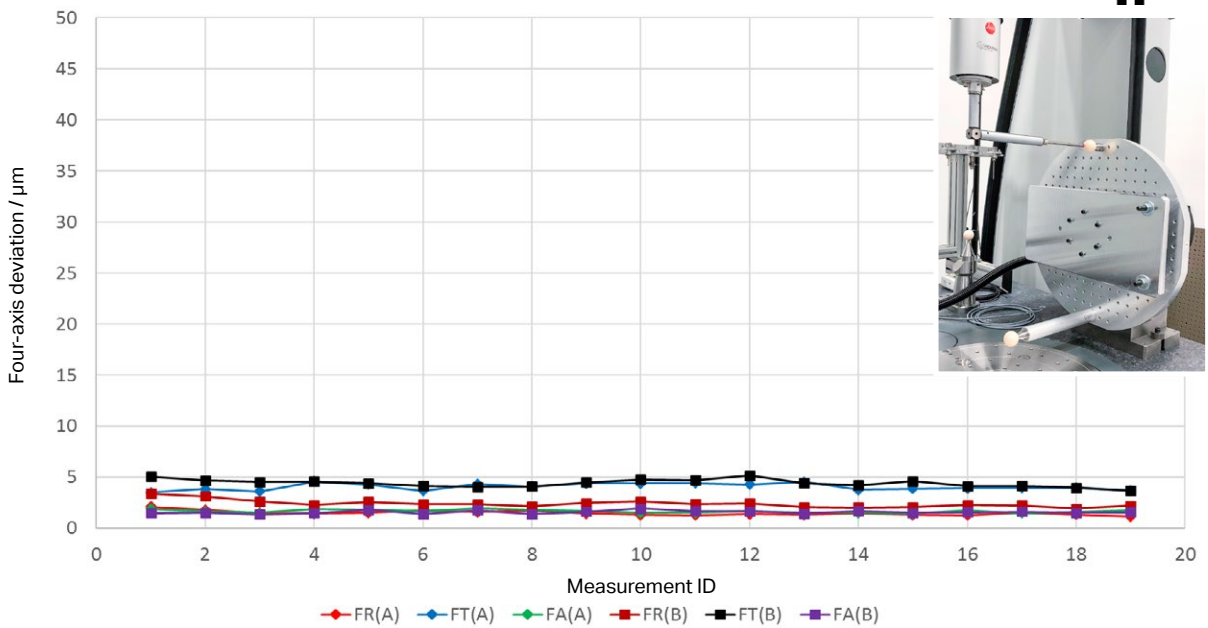
Stress test «4-axis deviation to ISO 10 360-3»

- Without load, horizontal axis position
- With centered load in horizontal axis position
- With eccentric load in horizontal axis position
- Each with and without spindle clamping

Wobble error constant? Components

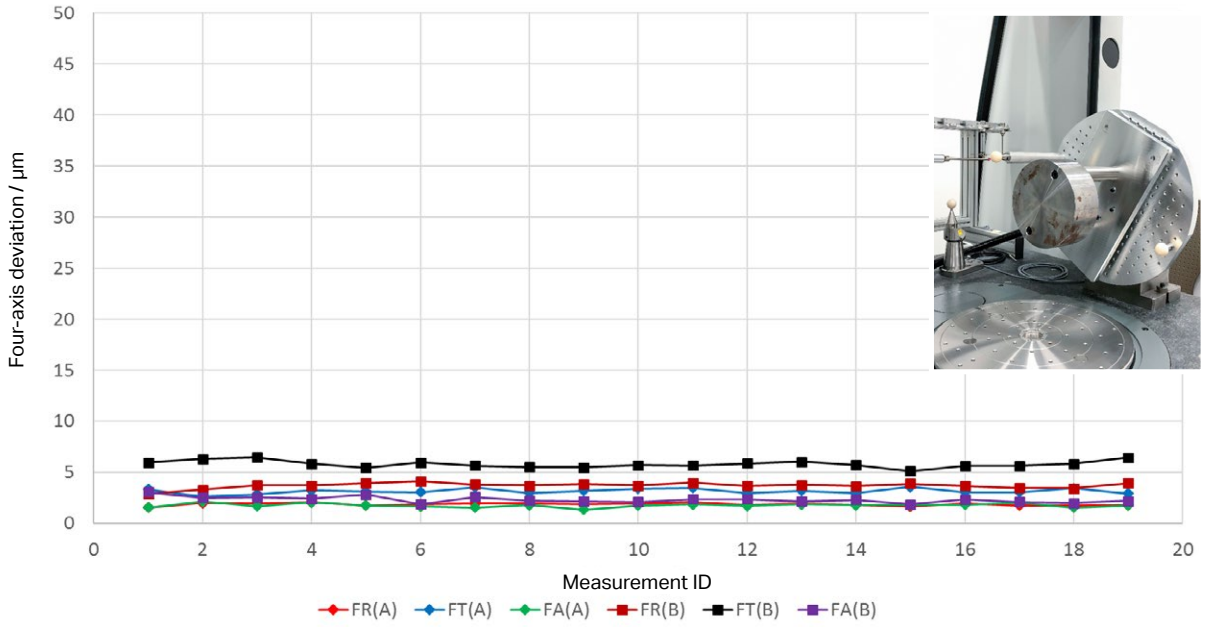


Without load – WITH direct measuring system, WITHOUT clamping

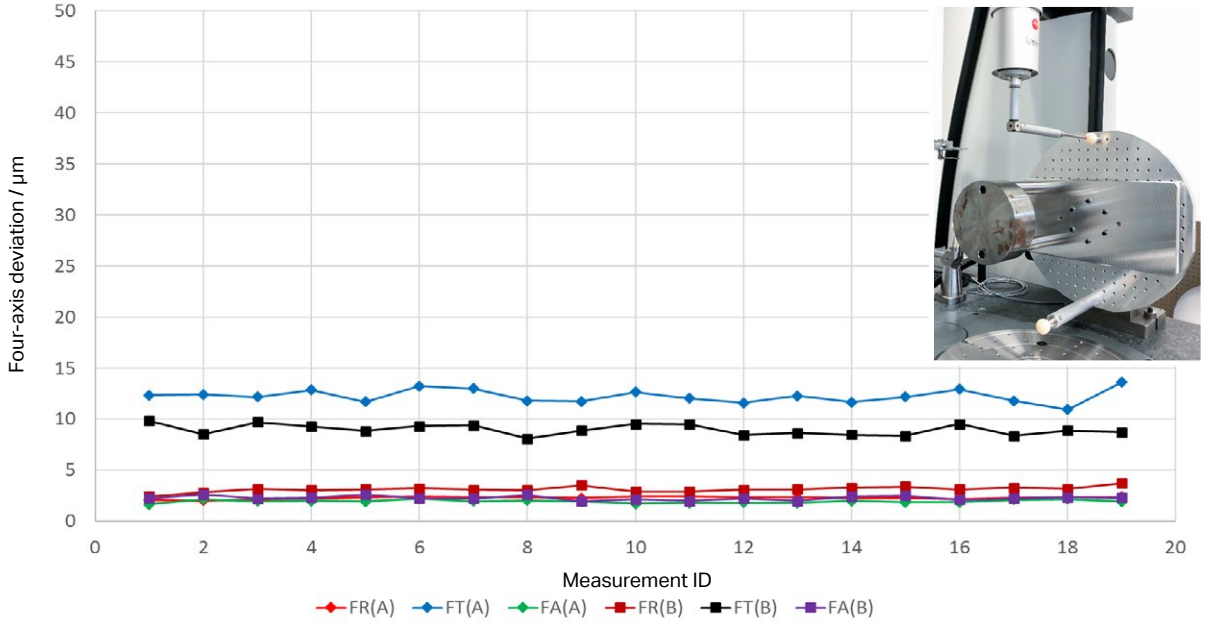


Confirmed under different load conditions at a speed of 8 rpm during many measuring cycles in an extended test: high thermal and mechanical stability and repeatability

With centered load – WITH direct measuring system, WITHOUT clamping

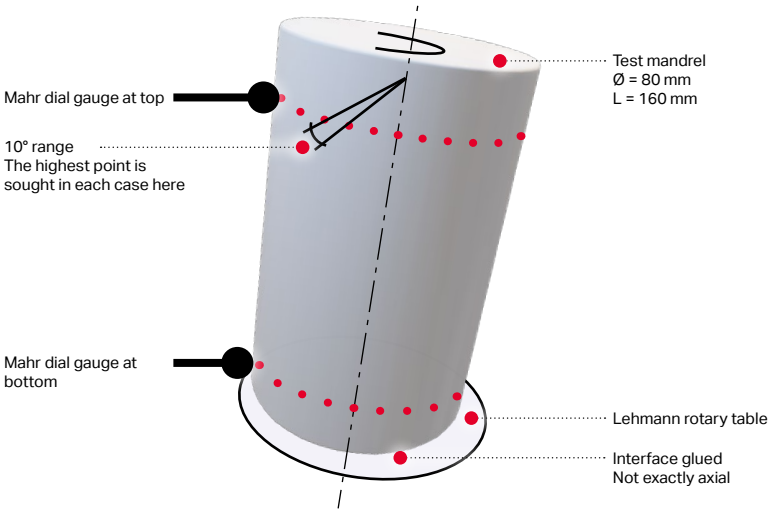


With eccentric load – WITH direct measuring system, WITHOUT clamping



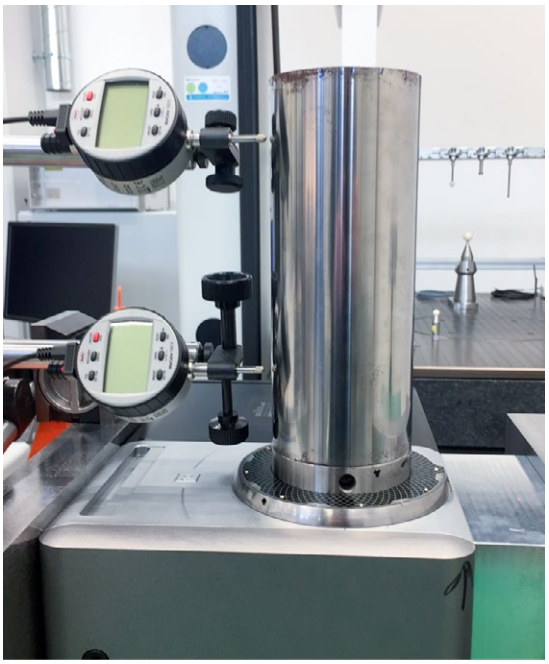
Confirmed for other measurements and in vertical axis position by specific test: Repeatability on cylindrical mandrel

Key data principle



- The highest point in the radial direction in a 10° interval (0° to 10° / 10° to 20° / etc.) is indicated.
- Two measuring positions
- Ten revolutions
- Two series of measurements

Setup



Use of measuring means
Version with maximum resolution:
Increment value 0.1 µm
Extensive measurement functions for:

- Static measurements such as lengths, spacings and length differences
- Dynamic measurements such as radial run-out, straightness and flatness using MAX / MIN / MAX-MIN functions

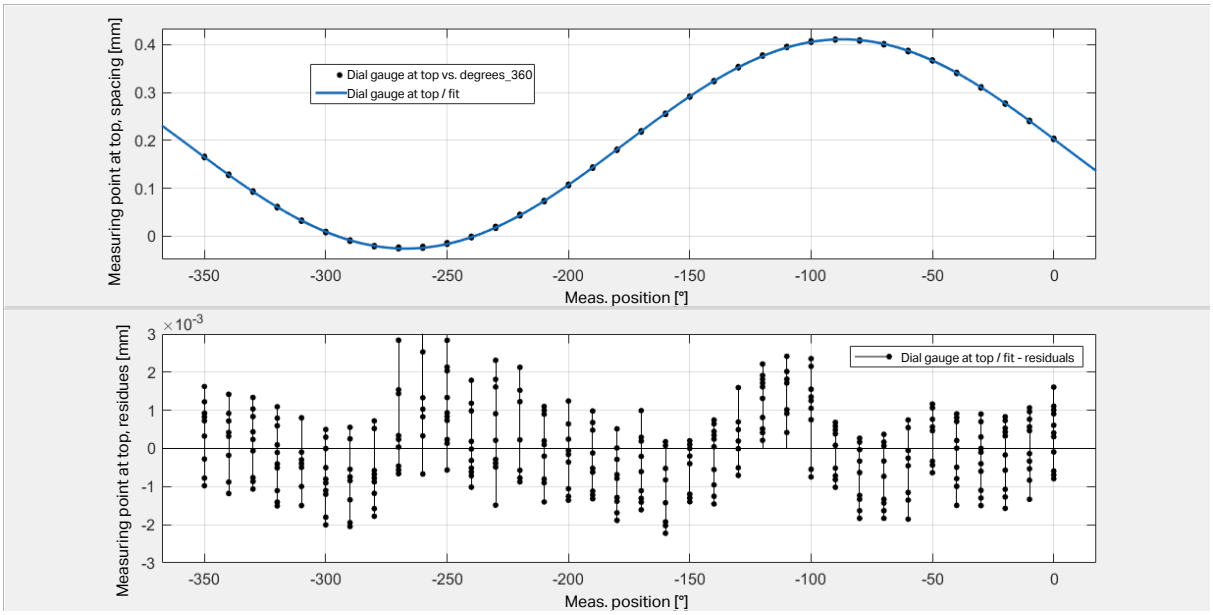
Technical data

		Dial gauge 1	Dial gauge 2
Type		1087 R-HR	
Measuring span	mm	12.5	25
Increment value	mm	0.0001, 0.0005, 0.001, 0.002, 0/005, 0.01	
Scale display range	mm	± 0.002, ± 0.01, ± 0.02, ± 0.04, ± 0.1, ± 0.2	
Error limit	mm	0.0018	0.0022
Error limit over 50 increments	mm	0.0005	
Repeatability	mm		
Measuring force	N	0.65-0.9	0.65-1.15
Standard		Factory standard	
Lifting cap at end of measuring pin		•	

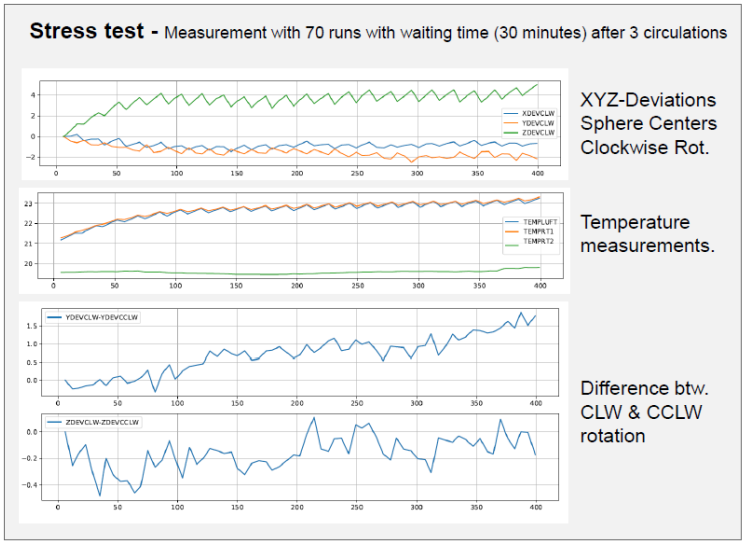
An excerpt from many results

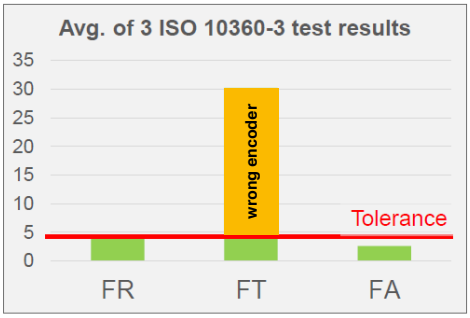
Performance characteristics to ISO 10360-3 by a well-known machine manufacturer on a high-precision coordinate measuring machine.

Maximum span of the 36 measuring points over the 10 revolutions = 0.003 to 0.005 mm



Four-axis deviation EA-511.L-mt (FT yellow: WMS.VXM20.1, FT green: WMS.VXM20.2)
Stress test (initially with EA-507, without insulation, with WMS.287 +/- 2.5")





Observations:
- Significant improvement of thermal stability
- Good mechanical stability
- Warmup in the range of 2°C
- FT exceeds tolerance due to encoder.
- Smaller hysteresis in z compared to EA-507.
- Linear trend in hysteresis in x and y about 1.5 µm.

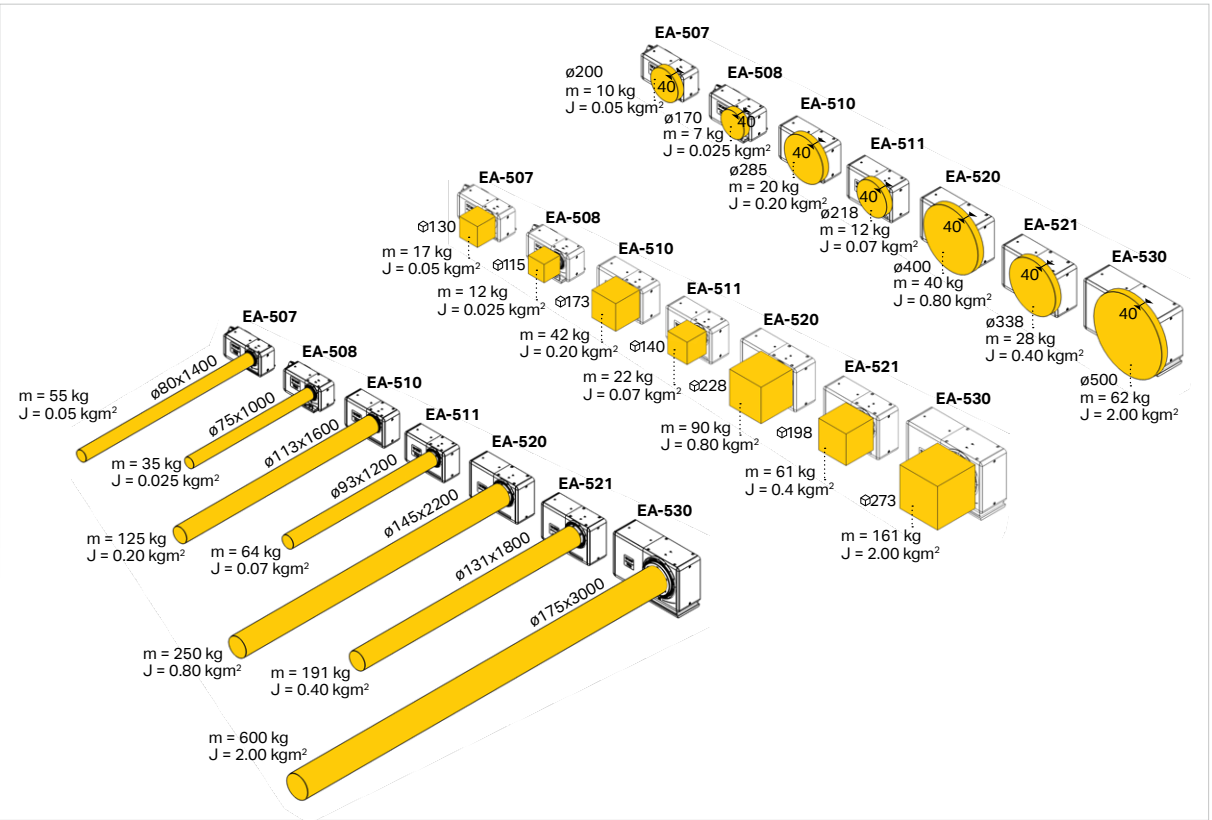
Basics of the drive data

All drive data of pL LEHMANN rotary tables **(30–40)** has been designed for the following standard spindle loads in accordance with DIN/VDE 0530 as follows:

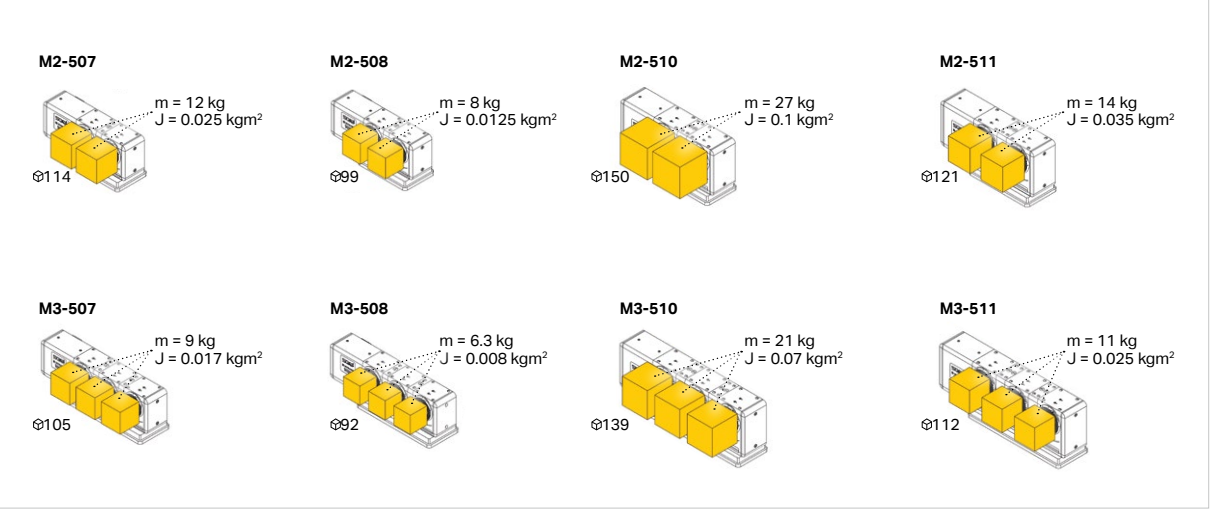
- For intermittent service S3 duty cycle 20%
- Cycle duration 1 minute

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

EA-type rotary tables



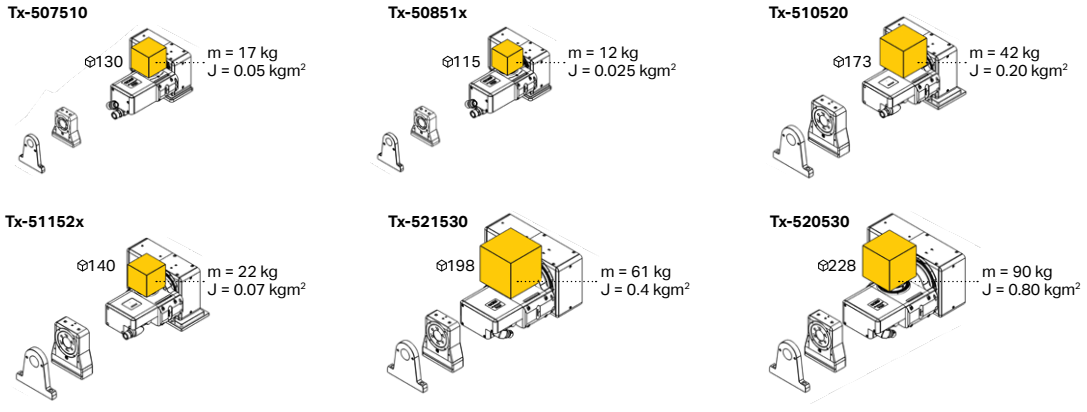
Mx-type rotary tables



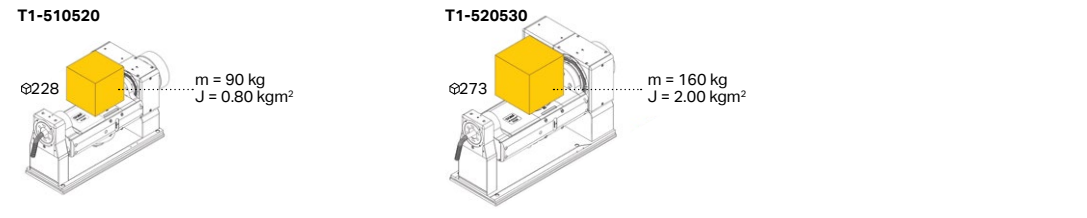
Reference values for duty cycle (ED)

- 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%
- Metrology applications: approx. duty cycle 10–100%

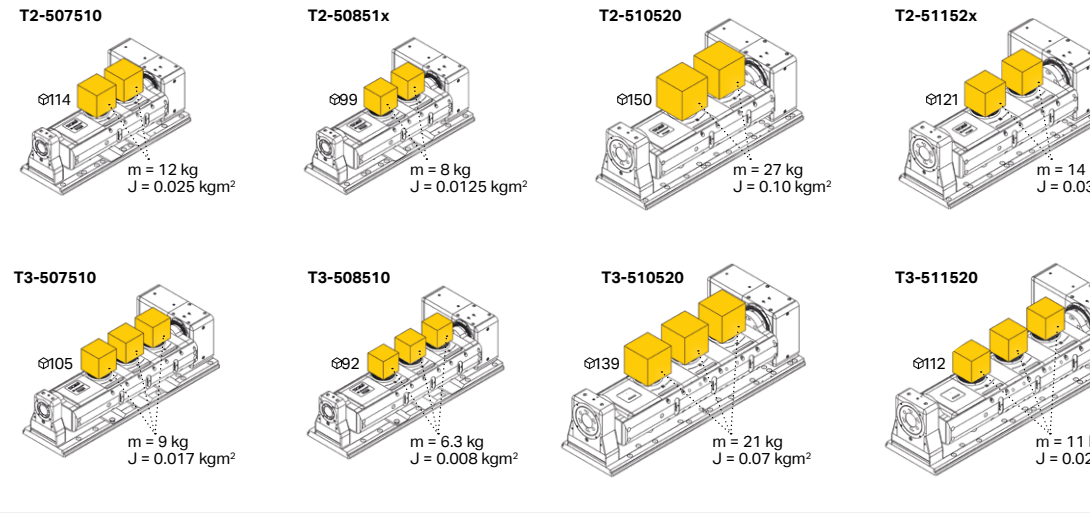
Tx-type rotary tables (TIP, TAP, TOP)



T1-type rotary tables (TGR)



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



Definition of the terms used in this catalog

1 Drive data

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

2 Gear unit

Gear unit load ($M_{gear\ max.}$) **[Nm]**
…refers to the maximum permissible mechanical torque at a spindle speed of 1 rpm.

Feed torque (M_{feed}) **[Nm]**
…refers to the available torque at a 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 ($sl_{eccentric}$) **[Nm]**
The eccentric load catalog* corresponds to

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

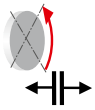
For T-type rotary tables, the eccentric load usual* is identical to the gear unit load with sls. For an EA rotary table, this torque is equal to the value resulting from the maximum eccentric load when using a rotoFIX Alu with a standard load. Please refer to the respective parameter list for usual values.
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 speed of approx. 10 rpm. Please refer to the respective parameter list, max load values.
* For definitions please refer to «Geometry / Integration» **p. 63**

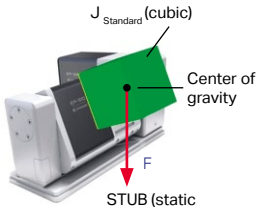
Center of gravity shift without and with load. The greater the red center of gravity, the greater the gear unit load in the tilting axis is. The blue arrow shows the direction in which the center of gravity moves from «without load» to «with load».

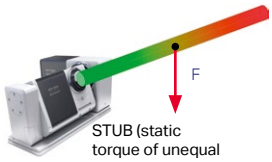
pL standard spindle load (sls = $sl_{standard}$) pp. 30–40 and 58–59 **[kg]**
…refers to the pL spindle load defined as standard, derived from practice, covering approximately 90% of all applications. All drive data and parameter lists are designed for the cubic pL standard load. All masses moving within this volume (workpiece including device) and clamped coaxially to the rotary axis can be moved using the standard drive data. Eccentrically arranged standard pL spindle loads may require a reduction of the drive data.

Standard moment of inertia ($J_{standard}$) pp. 30–40 and 58–59 **[kgm2]**
…refers to the resulting moment of inertia due to the defined pL standard load and its shape, if the load is clamped coaxially relative to the rotary axis. The usual J ratio between load and motor is generally 1:1 or less (e.g. 0.5:1).

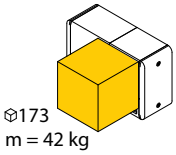
Max. perm. moment of inertia (J_{max}) **[kgm2]**
…corresponds to 10x the standard moment of inertia ($J_{standard}$) In most applications, this moment of inertia is not exceeded even with large workpieces. It should also be noted that the J ratio of 10:1 is NOT exceeded with any motorized model. Higher J ratios can of course be shifted, but this does require the necessary adjustments (upon request).

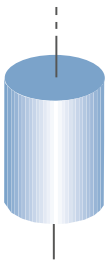






EA-510





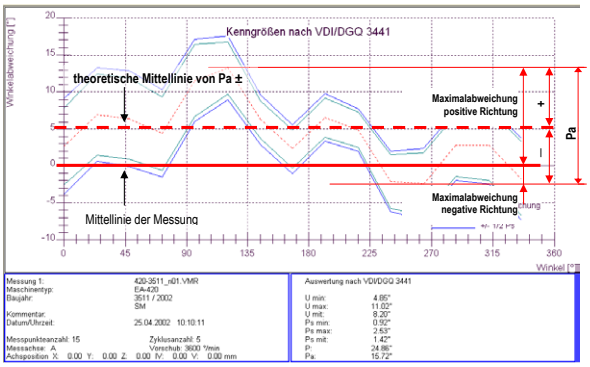
Function explanations, limit values and conditions minimize your risks

3 Gear accuracies

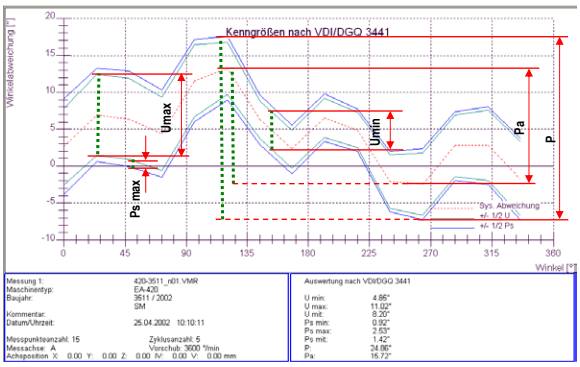
All accuracy data apply to an unloaded rotary table

Measuring process

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



Explanation of indexing accuracy Pa ±:



Explanation of the various parameters in accordance with VDI/DGQ 3441:

Indexing accuracy (Pa ±) [arc sec]

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

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

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

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

- without consideration of the reversal error

Positioning accuracy (P) [arc sec]

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

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

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

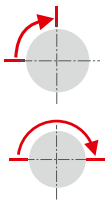
4 Speed

DIN / VDE 0530 S3, ED 20%

Duty cycle (ED) **[%]**
...refers to the duration of the movement per unit of time in accordance with 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.

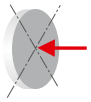
Spindle speed (n_{spi}) **[rpm]**
...always refers to the maximum possible speed of the spindle
- while complying with the duty cycle
- with the corresponding motor
- with the pL standard spindle load (cubic)

Cycle time 90° / 180° ($t_{90°}$ / $t_{180°}$) **[sec]**
...refers to the time required for the entire indexing operation for a 90°/180° movement
- 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 move even before the full clamping pressure is applied. If the full clamping pressure has not been reached after 2 sec, the clamped signal is canceled. This is all controlled by the pL-smartBox.
- 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.

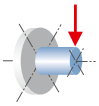


5 Spindle bearing

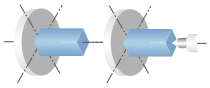
Axial force (F_{axial}) **[N]**
..refers to the maximum permissible axial load on the spindle. It includes the workpiece, devices, machining forces and other forces resulting from the rotational and tilting movement.



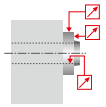
Tilting moment (M_{tilt}) **[Nm]**
..refers to the maximum permissible tilting load on the spindle, measured from the spindle face. It includes the workpiece, devices, machining forces and torques resulting from the rotational and tilting movement.



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.

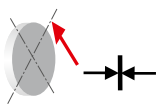


Radial and axial run-out ($ro_{rad/ax}$) **[mm]**
...refers to the maximum deviation occurring in the axial (axial run-out) or radial (radial run-out) direction when measured over 360°. Measured in each case on the maximum possible diameter of the spindle nose.



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 settling behavior in addition to a usual elasticity. We distinguish between three phases when progressing from zero load to maximum load. The settling 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 - 0.01mm*
- Phase 3 «maximum» (up to 100% of the permissible clamping torque) up to approx. 0.035 mm*



The clamping torque is high enough that the rotary package of the 2-axis rotary tables can have significant torsional movement even before the clamping is relaxed. As a result, the maximum clamping torque cannot be used in all cases.

* For unilateral load, in relation to the spindle outside Ø of the respective rotary table. The indexing and repeat accuracy is not impaired by another positioning.

Function explanations, limit values and conditions minimize your risks

7 Leak tightness (in acc. with 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 $_{200}$)
...denotes the deviation of the perpendicularity of the rotary axis relative to the tilting axis over a certain swivel range. pL always measures 3 points: -90° (horizontal), -45° and 0° (vertical), always referred to the rotary axis position and on a radius from the tilting axis center of 200 mm.

3D precision

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.

offset 1: [mm]
0.013

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.

Pitch error: [°]
0.005

Backlash (bl)
...refers to the mechanical and electronic reversal error* (gear unit, angular position measuring system, positioning control, etc.) for the loose backlash compensation on the CNC machine.

* For definition, see «Gear unit» **p. 60**

Parameter lists
To minimize commissioning time and make maximum use of the pL rotary table, you can find parameter lists for various controls at www.lehmann-rotary-tables.com. In the case of load-relevant parameters, we distinguish between...

FANUC
a2/5000is
Fanuc
a1000iA
HEIDENHAIN
RCN x2xF
i 90:1
Value / Value
Catalog: 19800
Usual: 16200
Max. load: 5400

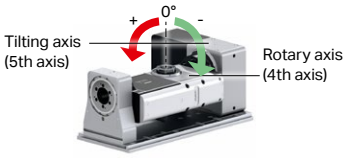
usual
...refers to the practically-oriented drive values for pL standard spindle loads that should usually be set (pL recommendation). This is in order to permit certain reserves to integrate deviations occurring in practice and to allow an easier control comparison. Normally, no warm-up is required here.

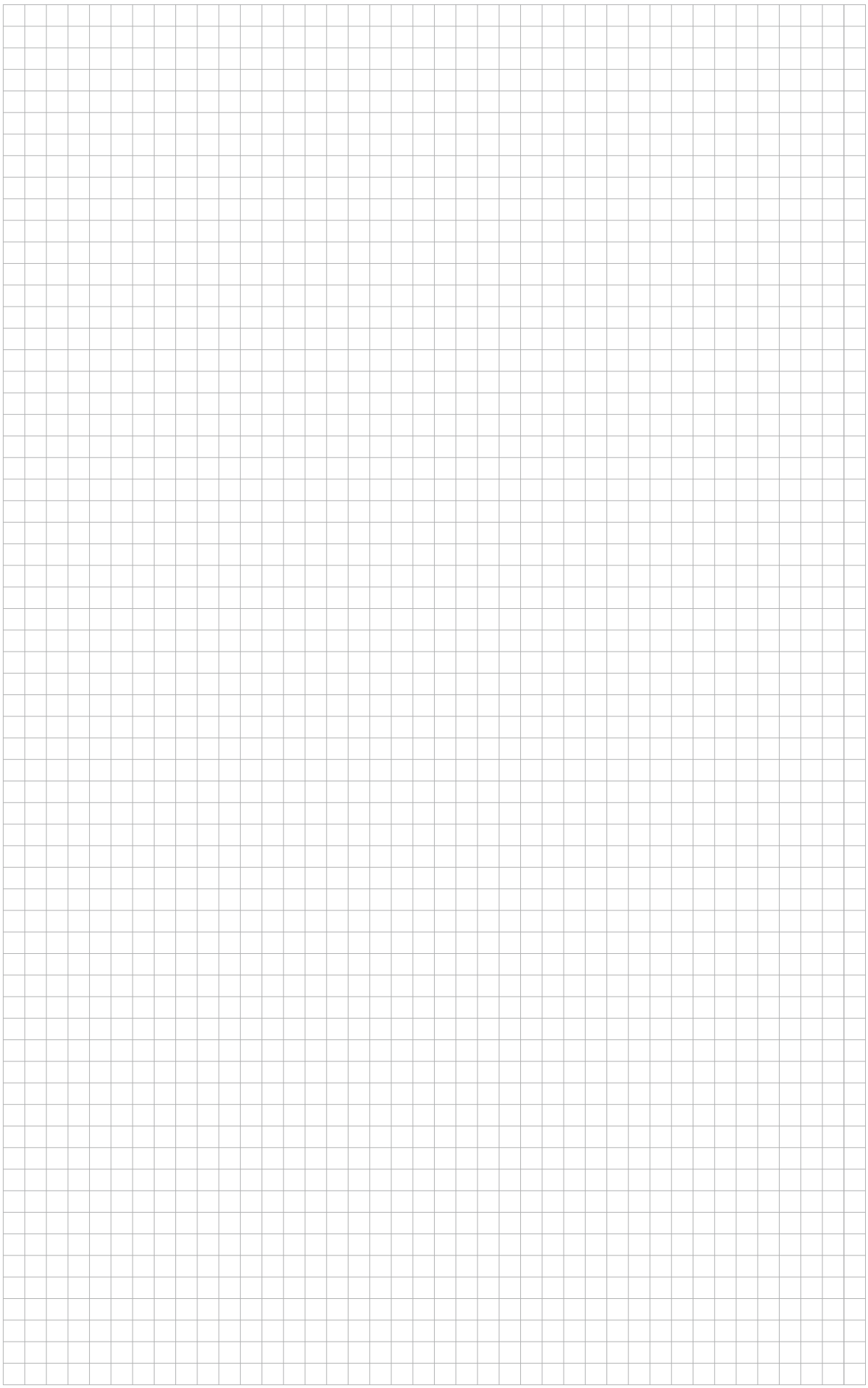
catalog
...refers to the maximum achievable catalog drive values for pL standard spindle loads, for which more stringent requirements are imposed both on the commissioning engineer and on the material in order to achieve these values. Depending on the respective application, they must be reduced (empirically). 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.

9 Axis definition

Tilting axis
Rotary axis





Workpiece clamping

Correct selection – Select the right accessories for each rotary table:

Item No.

x 0 x

- Gear unit: 0 or 7 = Standard, 1 or 8 = Highspeed
- Size: 0 = smallest type, 3 = largest type
- Series: Q = Q-Line, M = M-Line, 5 =Series 500

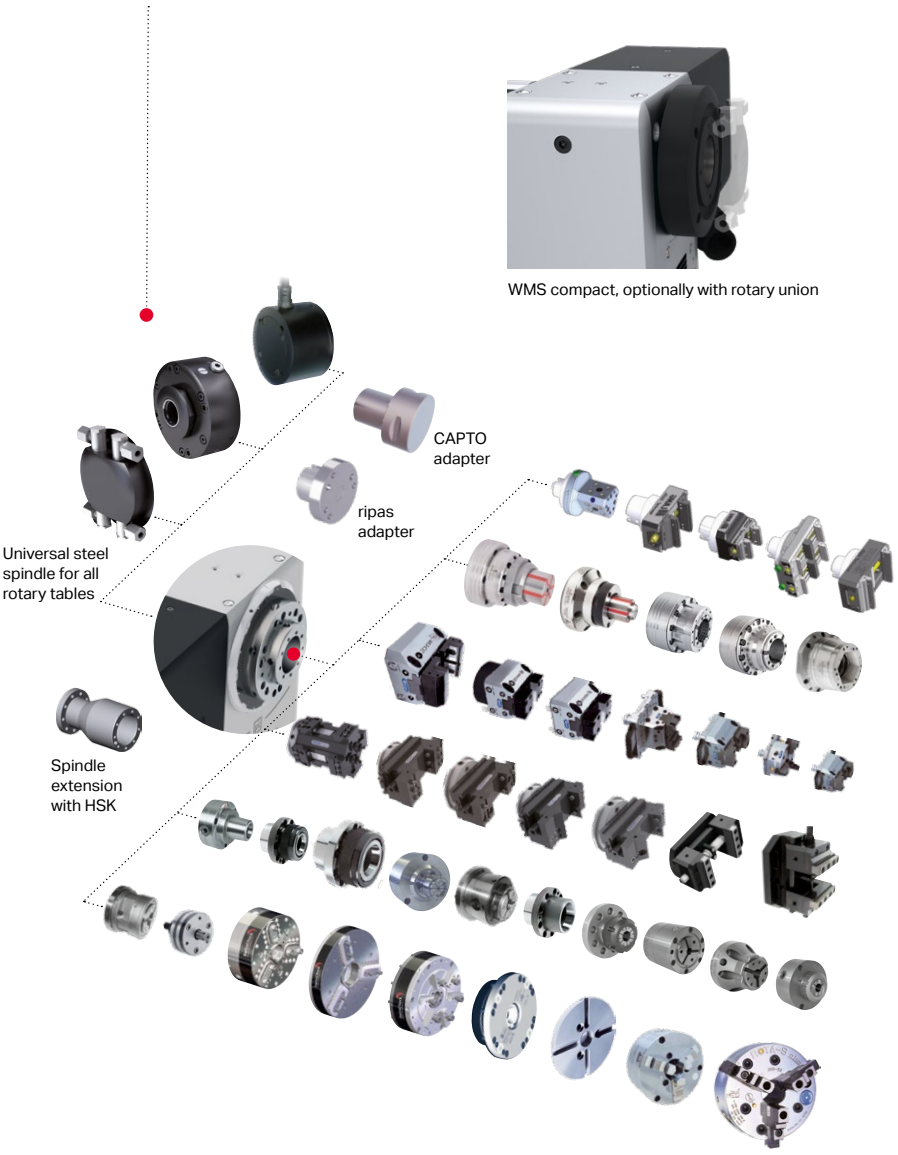
Reading example

The clamping cylinder SPZ.5xx-P fits in the adjacent example for size 0 and 1.

	pL LEHMANN Item no.	Designation
x0x x1x	**SPZ.5xx-P**	Pneumatic clamping cylinders

Spindle accessories in rear

(see **pp. 44 – 49**)



WMS compact, optionally with rotary union

Spindle accessories in front

unique

amf
EROWA
EVARD PRECISION S.A.
GRESSEL Spanntechnik
HAINBUCH
LANG TECHNIK einfach. zukunft. greifen.
maprox swiss made
NIEDERHAUSER SPANNTECHNIK UND SYSTEME
PAROTEC spanntechnik · robotik · engineering
RANHA-CLAMP
reinmechanic feinmechanische Lösungen
ripas
ROEMHELD HILMA ▪ STARK
RÖHM driven by technology
SCHUNK
SwissChuck Precision Workholding
system 3R
TG COLIN
YERLY

HSK clamping with precise angular positioning = compact palletizing system manual and automatic

newChuck: ideal table chuck for machining of the 5th or 6th side, for example, with integrated ripas

All clamping devices installed by pL LEHMANN (if ordered together with a rotary table)

The main advantages of ripas

- Very space-saving because of complete integration into the spindle
- Easy to retrofit
- Very torsionally rigid
- 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.

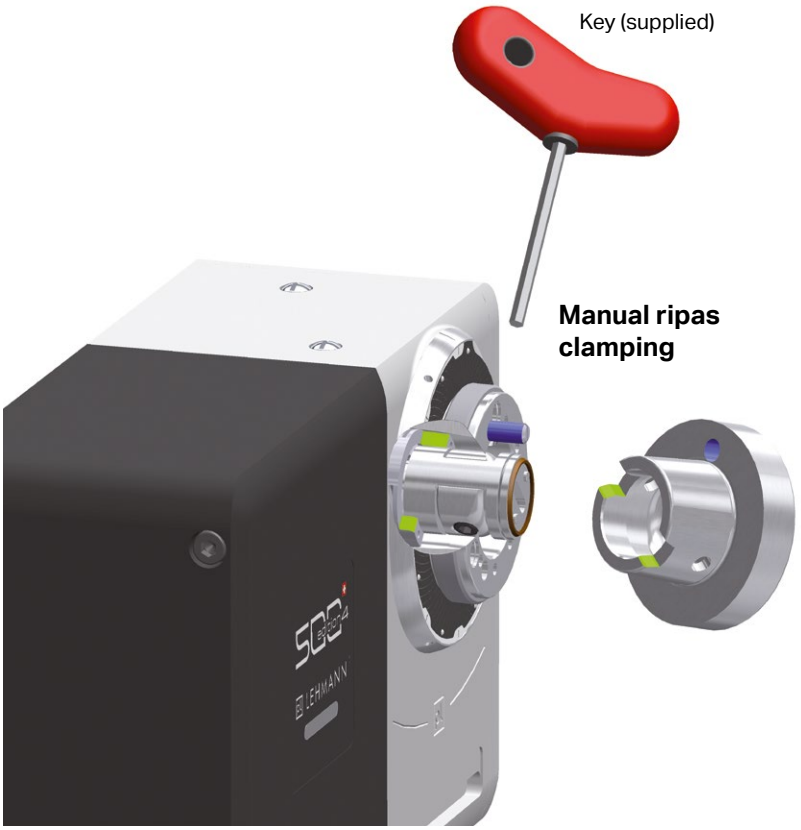
The function

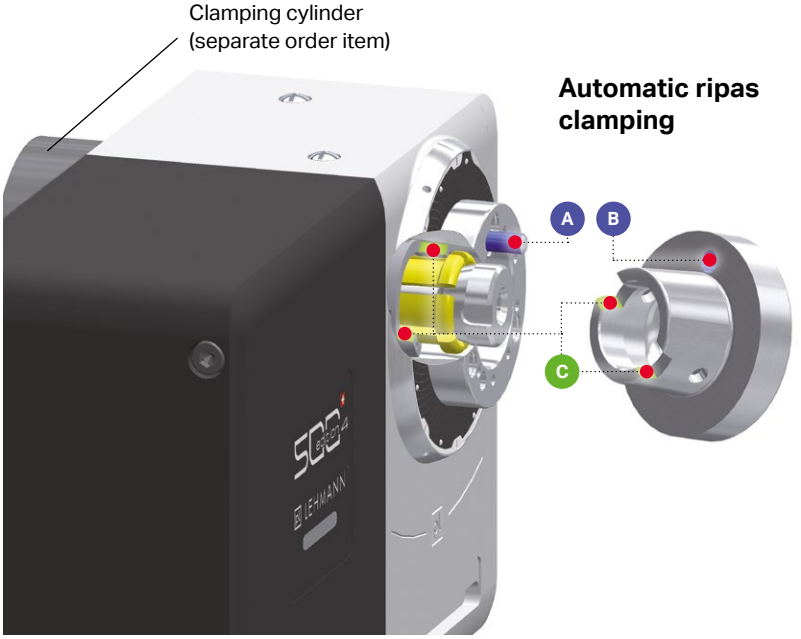
ripas has 3 functions:

A Anti-twist protection
B Rough positioning
C Precision positioning

Process

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

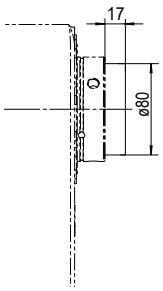




Flexible, precise, compact and automatable – the ripas palletizing system or zero-point clamping system from pL LEHMANN

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

	Item No.	Designation	Weight [kg]	Manual (MAPAL)	automatic (Ortlieb)	Required clamping cylinder *
x0x	**RIP.507-63 m**	ripas clamping, manual, A63	0.97	●		
	RIP.507-63m-OT	ripas clamping, manual, A63, for Ottet system		●		
	RIP.507-63k	ripas clamping, automatic, A63	1.12		●	SPZ.5xx-9 / -p
	RIP.507-63k-OT	ripas clamping, automatic, A63, for Ottet system			●	SPZ.5xx-9 / -p
x1x	**RIP.510-63 m**	ripas clamping, manual, A63	0.97	●		
	RIP.510-63m-OT	ripas clamping, manual, A63, for Ottet system		●		
	RIP.510-63k	ripas clamping, automatic, A63	1.12		●	SPZ.5xx-9 / -p
	RIP.510-63k-OT	ripas clamping, automatic, A63, for Ottet system			●	SPZ.5xx-9 / -p
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. 45**

Technical data for ripas / HSK

	Unit	HSK-A63 manual		HSK-A63 automatic	
		Standard	ripasGrip (option)	Standard	ripasGrip (option)
Perm. tensile force, max.	kN	–		10 for hydr. 50 / pneum. 9 bar [1]	
Resulting insertion force on adapter, max.	kN	30 at 20 Nm [2]		30	
Perm. tilting moment (before losing face contact)	kN	approx. 600		approx. 600	
Transport load	kg	approx. 60		approx. 60	
Perm. torque [3] (slip [4] max. ± 0.003°) **A**	Nm	–	ca. +50%	approx. 150	approx. 300
Perm. torque [3] (slip [4] max. ± 0.01°) **B**	Nm	–	ca. +50%	approx. 250	approx. 450
Repeat accuracy XYZ	mm	< 0.005		< 0.005	
Repeat accuracy, angular	± arc sec	8		4	

[1] With SPZ.5xx-9/ -p
[2] Radial screw
[3] Values apply under static conditions, without any vibrations, with no load, dry, grease-free, clean
[4] Returns to original position after unclamping/clamping

Options for all sizes

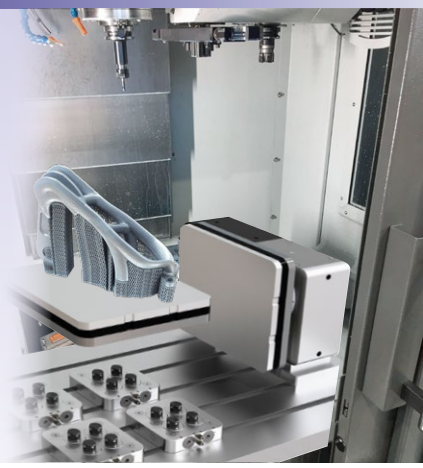
SPZ.Awk-Vor	Preparation for presence check only possible for automatic clamping (only with adapter from pL)
SPZ.Awk	Control box for presence check (see **p. 44**)

CAPTO clamping

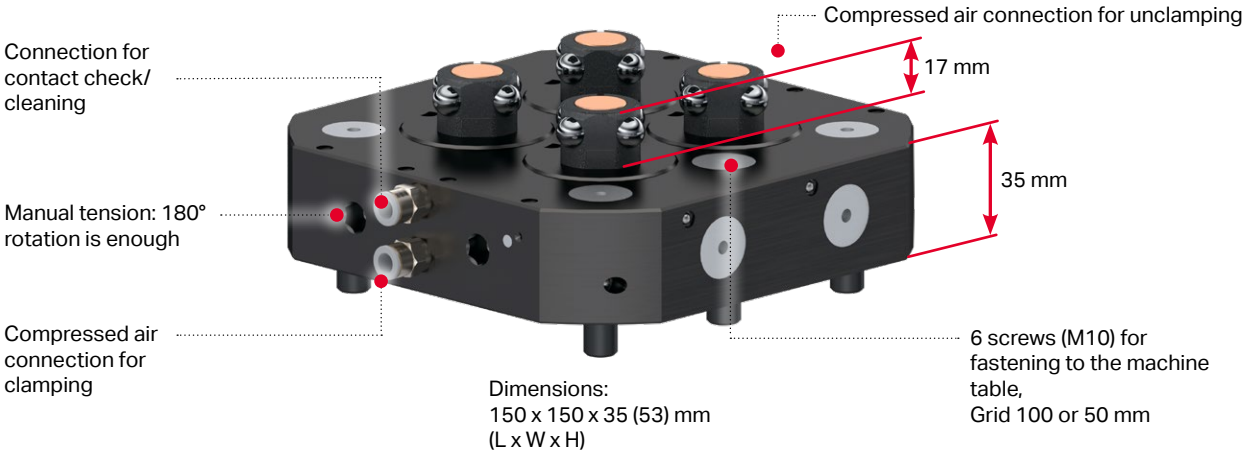
	Item No.	Designation	Weight [kg]	Manual	Automatic	Required clamping cylinder *
x0x	**CAP.507-C3k**	Capto clamping, C3			●	SPZ.5xx-9 / -p
	CAP.507-C4m	Capto clamping, C4		●		
	CAP.507-C4k	Capto clamping, C4			●	SPZ.5xx-9 / -p
x1x	**CAP.510-C4m**	Capto clamping, C4		●		
	CAP.510-C4k	Capto clamping, C4			●	SPZ.5xx-9 / -p

* For T-type rotary tables it may be necessary to increase the center height, see **p. 45**

Zero point clamping combined with additive manufacturing



QUATTRO chuck



UNO chuck

Dimensions:
100 x 100 mm
35 mm tall

6 benefits (applies to QUATTRO and UNO)

- Only 35 mm high
- Manual and pneumatic in one
- Easy to clean
- With pulse voltage
- Easy mounting
- Minimal maintenance

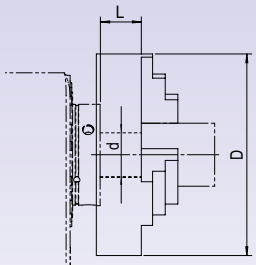
Technical data

		UNO	QUATTRO
Repeat accuracy X/Y/Z		approx. ± 0.005 mm	
Retention force, clamped	Manual	approx. 6 kN	approx. 24 kN
	pneumatic at 6 bar	approx. 10 kN	approx. 40 kN

Item No.

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

maprox
swiss made



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

Further information: www.maprox.ch
Request installation and operating instructions directly from manufacturer

Scroll chucks Maprox ZAS (manual)

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

	Item No.	Designation	D [mm]	d [mm]	L [mm]	Weight [kg]	max. n [min⁻¹]	Moment of inertia J [kgm²]	Clamping Ø inside [mm]	Clamping Ø outside [mm]
x0x	**BFU.507-110ps light** [1]	Scroll chuck, aluminum	110	32	36	1.4	3,000	0.002	22–96	3–106
	BFU.507-125ps light [2]		125	36	26	1.4		0.003	32–410	3–140
	BFU.507-160ps light [1] [2]		160	46	35	2.9		0.01	40–196	3–196
x1x	**BFU.510-125ps light**	Scroll chuck, aluminum	125	36	26	1.4	3,000	0.003	32–410	3–140
	BFU.510-160ps light [1] [2]		160	46	35	2.9		0.01	40–196	3–196
	BFU.510-240ps light [1] [2]		240	68	53	9.5		0.02	38–292	4–292

Not possible in combination with spindle seal with labyrinth SPI.507-Lab
[1] Delivery time at least 3 months
[2] Not possible for TxPc models

Maprox chuck 3 ZAS with steel step jaws:
- Reversible
- Ground
- Case hardened (corrosion protected)

Maprox E-Chuck (automatic)

	Item No.	Designation	D [mm]	d [mm]	L [mm]	Weight [kg]	max. n [rpm]	Clamping Ø [mm]	Moment of inertia J [kgm²]
x0x	**BFU.507-100e**	intelligent, electric chuck	100 (155)	0	86	4		2-78	< 0.01
x1x	**BFU.510-100e**								

Additional technical data
- Concentricity: 0.1mm
- Max. part weight: 1.6kg
- Max. clamping force 0.5Nm
- Special jaws possible on request

Maprox E-Chuck
- LED status ring (RGB)
- Clamp the finest parts precisely and safely
- Control via WLAN and Bluetooth

Maprox Dual-Fix (manual)

Dual-Fix with manual actuation as well as pneumatic actuation possible

Benefits
- Fast and reliable clamping of the component
- Good accessibility of the measuring probe

Technical data
- Scope of delivery without jaws
- Clamping capacities with standard jaws: inside: 2-27 mm, outside: 0-30 mm
- For internal and external clamping
- Body corrosion-protected

Dimensions
- Jaw travel: 10mm
- Housing diameter: 55mm

Options
- Jaws possible for all diameters
- Stops for component-specific positioning
- Pneumatic or manual actuation
- Rotary union for pneumatic actuation

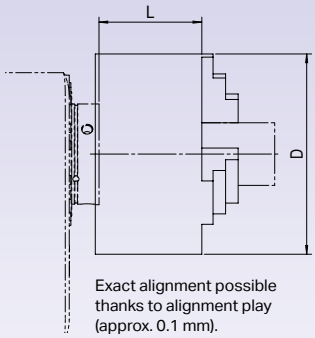
Please contact us for more information.

Maprox collet chuck holder SHG / SH

Example with collet

Type	Collet	h [mm]	a [mm]	f-Ø [mm]	Clamping Ø [mm]
8	B8, 302E	60	65	55 / M8	0.3-10
10	W10, 314E	60	65	55 / M8	0.3-10
12	W12, 318E	70	70	60 / M8	0.3-12.5
20	W20, 349E	100	100	85 / M10	0.3-23
25	W25, 364E	125	100	85 / M10	0.3-29
32	B32, 3713E	125	115	97 / M10	0.3-32

NIEDERHAUSER
SPANNTECHNIK UND SYSTEME



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

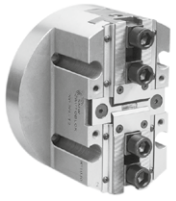
Clamping devices installed and aligned by pL LEHMANN (if ordered together with a rotary table)

Further information at: www.niederhauser.ch
Request installation and operating instructions directly from manufacturer

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 [kgm²]	Required clamping cylinder	Niederhauser item no., incl. adapter flange
x0x	**BFU.507-100ksa-2**	2-CL-C 100 Z92	100	–	68	5	6,000		SPZ.5xx-15 / -p	507-CLC100
x0x	**BFU.507-125ksa-2**	2-CL-C 125 Z115	125	–	90	8	5,000		SPZ.5xx-15 / -p	507-CLC125
x0x	**BFU.507-160ksa-2**	2-CL-C 160 Z140	160	–	105	14	4,100		SPZ.5xx-15 / -p	507-CLC160
x1x	**BFU.510-125ksa-2**	2-CL-C 125 Z115	125	–	92	8	5,000		SPZ.5xx-15 / -p	510-CLC125
x1x	**BFU.510-160ksa-2**	2-CL-C 160 Z140	160	–	107	14	4,100		SPZ.5xx-15 / -p	510-CLC160
x1x	**BFU.510-200ksa-2**	2-CL-D 200 Z170	200	–	118	20	3,300		SPZ.5xx-15 / -p	510-CLD200

- Can be used as centric clamping unit (if clamping cylinder is present)
- Up to size 160 with tongue and groove base jaws



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

	pL LEHMANN Item No.	Designation	D [mm]	Passage [mm]	L from spindle [mm]	Weight [kg]	Max. speed [rpm]	Moment of inertia [kgm²]	Required clamping cylinder	Niederhauser item no., incl. adapter flange
x0x	**BFU.507-130ksa**	BHD-130-32-3-Z	130	32	85	7	7,000		SPZ.5xx-15 / -p	507-BHD130
x0x	**BFU.507-165ksa**	BHD-165-46-3-Z	165	46	95	13	6,000		SPZ.5xx-15 / -p	507-BHD165
x1x	**BFU.510-165ksa**	BHD-165-46-3-Z	165	46	97	13	6,000		SPZ.5xx-15 / -p	510-BHD165
x1x	**BFU.510-210ksa**	BHD-210-52-3-Z	210	52	112	24	5,000		SPZ.5xx-15 / -p	510-BHD210

- Radial run-out approx. 0.02 mm
- Repeatability approx. 0.02 mm
- Fine serration on base jaws
- BHD version is with inch jaws

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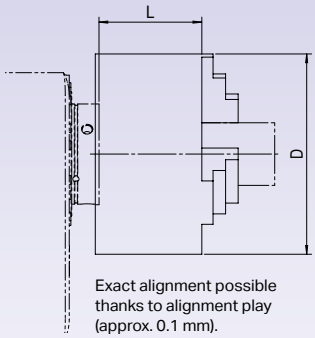


Exact alignment possible thanks to alignment play (approx. 0.1 mm).

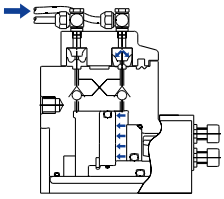
Clamping devices installed and aligned by pL LEHMANN (if ordered together with a rotary table)

Further information at: www.niederhauser.ch
Request installation and operating instructions directly from manufacturer

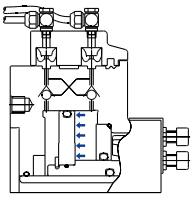
Front-end power chuck, 3-jaw

	pL LEHMANN Item No.	Designation	D [mm]	Passage [mm]	L from spindle [mm]	Weight [kg]	Max. speed [rpm]	Moment of inertia [kgm²]	Niederhauser item no., incl. adapter flange
x0x	**BFU.507-125vsa**	SP 125-26	204	26	135	21	4,000		507-SP125
x1x	**BFU.510-160vsa**	SP 160-38	255	38	163	33	3,500		510-SP160

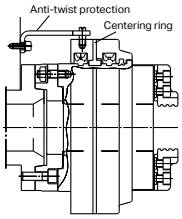
- With finely serrated base jaws



Clamp/open (only possible at standstill). Profile seal is applied to the chuck outer diameter by compressed air and the cylinder chamber is filled. After the clamping pressure has been built up, the compressed air is switched off and the respective cylinder chamber is closed by a pilot-operated check valve in the chuck.



SMW profile seal has lifted off due to inherent elasticity. Clamping pressure is maintained constantly in the cylinder and chuck can rotate.

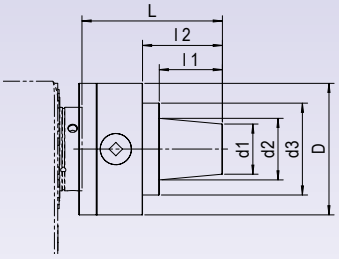


Distributor mounted on chuck outer diameter with centering ring (wear part). An anti-rotation device is required on the machine headstock.

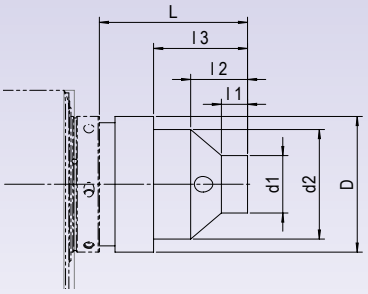
NIEDERHAUSER
SPANNTECHNIK UND SYSTEME

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

Further information at: www.niederhauser.ch
Request installation and operating instructions directly from manufacturer



Mounting chuck, manual
Radial run-out with collet approx. 15µ (Schaublin)



Mounting chuck, automatic Type B axfix

SPZ.5xx = Item number for combined clamping cylinder for types 507 and 510 (see **p. 44**)

	pL LEHMANN Item No.	Designation	System	axfix	Manual	Power-actuated	L [mm]	l 1 [mm]	l 2 [mm]	l 3 [mm]	D [mm]	d1 [mm]	d2 [mm]	d3 [mm]	Weight [kg]	Max. speed [rpm]	Required clamping cylinder ** (Option)	Niederhauser item no., incl. adapter flange
x0x	**ZSP.507-B32Am**	Mounting chuck	B32		●		133	59	75	–	126	53	62	88	8.5	6,000		507-B32
	ZSP.507-B32Aka	Mounting chuck	B32	●		●					130				7.2	8,000	SPZ.5xx-d2.5d25	507-B32KA
x1x	**ZSP.510-B32Am**	Mounting chuck	B32		●		133	59	75	–	126	53	62	88	8.7	6,000		510-B32
	ZSP.510-B32Aka	Mounting chuck	B32	●		●					130				7.2	8,000	SPZ.5xx-d2.5d25	510-B32KA

** For T-type rotary tables it may be necessary to increase the center height, see **p. 45**

Clamping capacity and passage

System	Clamping capacity [mm]	Collet passage [mm]
B32	0.3 to 32	28

Mounting chuck

B32, manual

B32, automatic

Collet holder B32

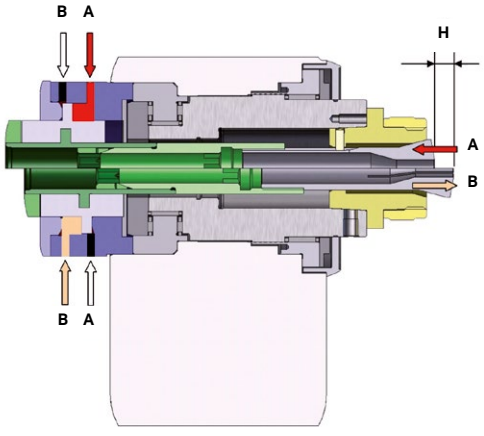
ki-mech gmbh

with pointed B32 collet

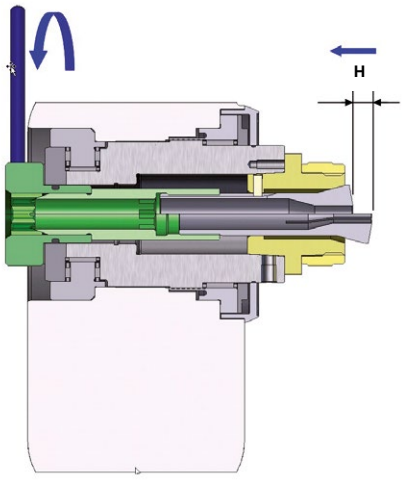
with standard B32 collet

For more, please see **p. 73**

Principle of collet clamping with HSK application



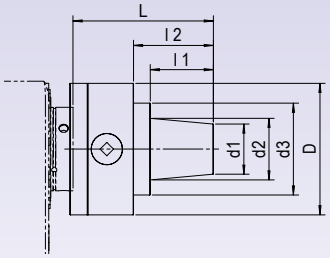
Automatic collet clamping



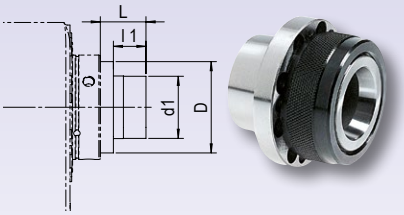
Manual collet clamping

NIEDERHAUSER
SPANNTECHNIK UND SYSTEME

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



Mounting chuck, manual



Collet adapter, installed by pL LEHMANN (if ordered together with a rotary table)

Further information at: www.niederhauser.ch
Request installation and operating instructions directly from manufacturer

SPZ.5xx = Item number for combined clamping cylinder for types 507 and 510 (see **p. 44**)

	pL LEHMANN Item No.	Designation	System	Manual	Power-actuated	L [mm]	L1 [mm]	L2 [mm]	D [mm]	d1 [mm] * without/with threaded protective ring	d2 [mm]	d3 [mm]	Weight [kg]	Max. speed [rpm]	Required clamping cylinder ** (Option)	Niederhauser item no., incl. adapter flange
x0x	**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	6,000		507-W20
	ZSP.507-W20k	with HSK adapter	W20		●	50	35	–	70	38/54*	–	–			SPZ.5xx-d2.5 / -p	
	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	6,000		507-W25
	ZSP.507-W25k	with HSK adapter	W25		●	50	35	–	70	48/60 *	–	–			SPZ.5xx-d2.5 / -p	
	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	6,000		507-W31.75
	ZSP.507-W31k	with HSK adapter	W31.75		●	50	35	–	70	46	–	–			SPZ.5xx-d2.5 / -p	
	ZSP.507-W31kND	with HSK adapter, effective passage increased ø25mm	W31.75		●	50	35	–	70	46	–	–			SPZ.5xx-d2.5d25	
x1x	**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	6,000		510-W20
	ZSP.510-W20k	with HSK adapter	W20		●	50	35	–	70	38/54 *	–	–			SPZ.5xx-d2.5 / -p	
	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	6,000		510-W25
	ZSP.510-W25k	with HSK adapter	W25		●	50	35	–	70	48/60 *	–	–			SPZ.5xx-d2.5 / -p	
	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	6,000		510-W31.75
	ZSP.510-W31k	with HSK adapter	W31.75		●	50	35	–	70	46	–	–			SPZ.5xx-d2.5 / -p	
	ZSP.510-W31kND	with HSK adapter, effective passage increased ø25mm	W31.75		●	50	35	–	70	46	–	–			SPZ.5xx-d2.5d25	

** For T-type rotary tables it may be necessary to increase the center height, see **p. 45**

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 < 0.005 mm

ki-mech gmbh

For further information, please visit: www.ki-mech.ch
Request installation and operating instructions directly from manufacturer

Clamping capacity and (effective) passage

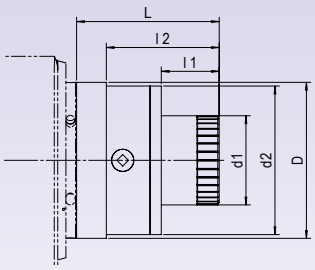
System	Clamping capacity [mm]	Collet passage [mm]	Standard effective passage [mm]
W20	0.3 to 23	14.5	14
W25	0.3 to 29	21	17
W31.75 (5C)	0.5 to 31	27	17
W31.75 (5C), increased passage*	0.5 to 31	27	25

* applies to kND versions in table above

NIEDERHAUSER
SPANNTECHNIK UND SYSTEME

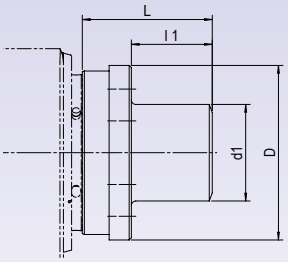
Manual flange-mounted chuck supplied loose, power-operated, set up and aligned by pL LEHMANN (if ordered together with a rotary table)

for sizes 507 to 530



Mounting chuck, manual Type F

for sizes 507 to 530



Mounting chuck, hydraulic Type F

Further information at: www.niederhauser.ch
Request installation and operating instructions directly from manufacturer

Collet clamping Type F

Achievable accuracy with collet 30–40µ

	pL LEHMANN Item No.	Designation	Manual	Pneumatic	Hydraulic	System	Clamping capacity [mm]	L [mm]	l 1 [mm]	D [mm]	d 1 [mm]	Weight [kg]	Max. speed [rpm]	Required clamping cylinder *	Niederhauser item no., incl. adapter flange
x0x	**ZSP.507-F35Am**	Mounting chuck	●			F35	1 to 30	129	40	160	90	12.7	4,500		507-F35
x0x	**ZSP.507-F35Ak**	Mount. chuck, power-actuated			●	F35	1 to 30	117.4	73.4	112	85	8.8	6,000	SPZ.5xx-9 / -p	507-F35K
x1x	**ZSP.510-F35Am**	Mounting chuck	●			F35	1 to 30	129	40	160	90	12.7	4,500		510-F35
x1x	**ZSP.510-F35Ak**	Mount. chuck, power-actuated			●	F35	1 to 30	114.4	73.4	112	85	8.8	6,000	SPZ.5xx-9 / -p	510-F35K

Manual

Automatic

SPZ.5xx = Item number for combined clamping cylinder for types 507 and 510 (see **p. 44**)

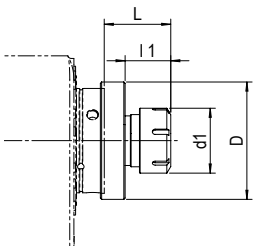
* For T-type rotary tables it may be necessary to increase the center height, see **p. 45**

Collet clamping Type ER

	pL LEHMANN Item No.	Designation	Manual	System	Clamping capacity [mm]	L [mm]	l 1 [mm]	l 2 [mm]	D [mm]	d1 [mm]	d2 [mm]	Weight [kg]	Max. speed [rpm]	Niederhauser item no., incl. adapter flange
x0x	**ZSP.507-E25Am**	Mounting chuck	●	ER-25	0.5 to 17	62	30	–	90	42	–	2.7	6,000	507-ER25
x0x	**ZSP.507-E32Am**	Mounting chuck	●	ER-32	1 to 22	70	38	–	90	50	–	3.0	6,000	507-ER32
x0x	**ZSP.507-E40Am**	Mounting chuck	●	ER-40	2 to 30	72	40	–	90	63	–	3.7	6,000	507-ER40
x1x	**ZSP.510-E25Am**	Mounting chuck	●	ER-25	0.5 to 17	46	30	–	90	42	–	1.5	6,000	510-ER25
x1x	**ZSP.510-E32Am**	Mounting chuck	●	ER-32	1 to 22	54	38	–	90	50	–	1.8	6,000	510-ER32
x1x	**ZSP.510-E40Am**	Mounting chuck	●	ER-40	2 to 30	56	40	–	90	63	–	2.5	6,000	510-ER40

Manual

for sizes 507 and 510



Mounting chuck, manual Type ER

pl LEHMANN®

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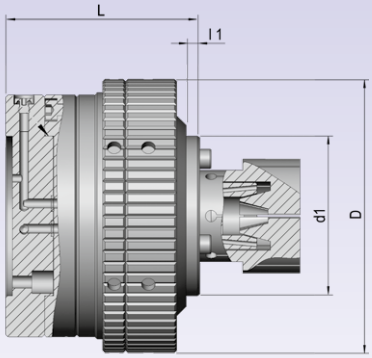
SPANNTECHNIK UND SYSTEME



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

Further information at: www.niederhauser.ch
Request installation and operating instructions directly from manufacturer

OTTET collet chuck

	pL LEHMANN Item No.	Designation	D [mm]	d 1 [mm]	L [mm]	l 1 [mm]	Weight [kg]	Max. speed [rpm]	Power-actuated	Required rotary union or clamping cylinder*	Niederhauser item no., incl. adapter flange
x0x	**ZSP.507-OTp**	OTTET collet chuck	130	–	85	–	12.7	7,000	●	DDF.507-04	507-FNO-1
	ZSP.507-OTph**		120	70	82	–	9.2	7,000	●	DDF.507-04	507-FNO-PH
	ZSP.507-OTkh**		120	70	96	20	9.2	7,000	●	SPZ.5xx-9 / -p	507-FNO-K
x1x	**ZSP.510-OTp**	OTTET collet chuck	130	–	85	–	12.7	7,000	●	DDF.510-04	510-FNO-1
	ZSP.510-OTph**		120	70	85	–	9.2	7,000	●	DDF.510-04	510-FNO-PH
	ZSP.510-OTkh**		120	70	99	20	9.2	7,000	●	SPZ.5xx-9 / -p	510-FNO-K


External clamping


Internal clamping

* see **pp. 44–47**
** h = with stroke limitation

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

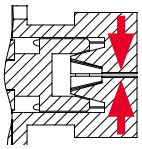
OTTET collet clamping with ripas

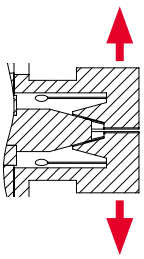
pL LEHMANN

	pL LEHMANN Item No.	Designation	Max. speed [rpm]	Required ripas palletizing system and clamping cylinder*
x0x	**ZSP.507-OTk**	With HSK adapter, power-actuated		RIP.507-63m-OT and SPZ.5xx-2.5 / -p required
	ZSP.507-OTm	With HSK adapter, manual		RIP.507-63k-OT and SPZ.5xx-2.5 / -p required
x1x	**ZSP.510-OTk**	With HSK adapter, power-actuated		RIP.510-63m-OT and SPZ.5xx-2.5 / -p required
	ZSP.510-OTm	With HSK adapter, manual		RIP.510-63k-OT and SPZ.5xx-2.5 / -p required

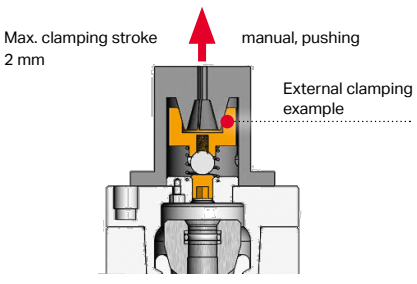
* see **p. 44/47/67**

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

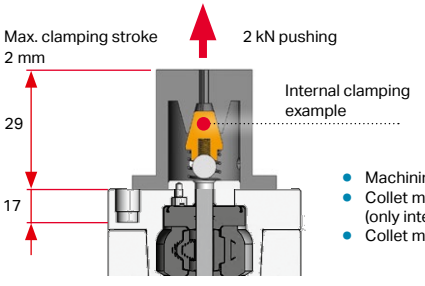

External clamping


Internal clamping


ripas pallet with OTTET collet



ripas automatic (or manual), OTTET manual



- Machining depth 8–13 mm
- Collet min. Ø30
  (only internal clamping possible)
- Collet max. Ø80 mm

ripas manual (automatic not possible), OTTET automatic

HAINBUCH
SPANNENDE TECHNIK

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. The HAINBUCH System offers a multitude of clamping options – without major expense or effort for setup. It doesn't matter whether the clamping requires a round or profiled contour or whether unmachined or finish-machined parts, soft or hard machining, or external or internal clamping are involved.

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

Further information: www. hainbuch.com
Request installation and operating instructions directly from manufacturer

Advantages of Axzug
- More accurate
- More stable
- Cheaper
- Smaller

Advantages of Axfix
- Fewer clamping marks
- No loss of clamping length
- Defined axial positioning (e.g., for work with counter spindle)
- Hainbuch system not possible

Rotating clamping device

TOPlus Chuck

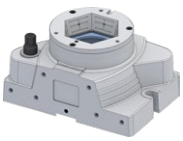
TOPlus mini Chuck

SPANNTOP Chuck

SPANNTOP mini Chuck

TOROK manual chuck (only Axzug available)

Stationary clamping devices



MANOK plus manual vise

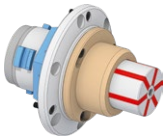
HYDROK hydraulic vise

Clamping element

Clamping head – external clamping

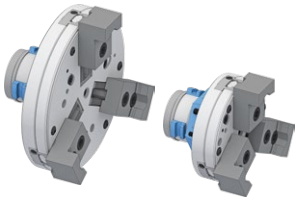
- All-round clamping
- 3 different versions: for raw material, fine machining or boring on your own
- Multitude of profile clamping options
- Coolant-resistant rubber-metal connection, keeps swarf out of the clamping devices
- Clamping capacity SE ø 3 – 65 mm
  Clamping capacity RD ø 3 – 65 mm

Clamping adapters



MANDO Adapt mandrel – internal clamping

- 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 ø 8 – 100 mm



Jaw module size 145 or 215 – jaw clamping (2 jaws also available)

- axfixe 3-jaw clamping
- Can be used in rotating (moving) and stationary applications
- Convert from chuck head to mandrel or jaw clamping in less than 2 minutes
- Jaw stroke with size 65: 2.2 mm

Face driver adaptation

Morse taper adapter

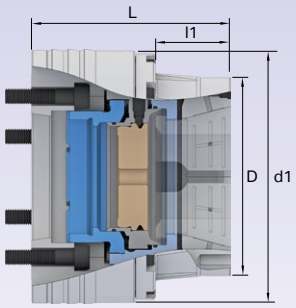
- Enormous flexibility
- Self-centering of adapter in the chuck ≤ 0.003 mm
- Extremely fast conversion without disassembling the chuck S [1 min.]

Magnet module

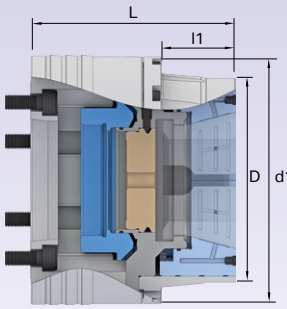
- End face axial clamping via neodymium magnet
- High axial run-out changeover accuracy
- High retention force of 140 N/cm²
- Assembly in 30 sec. without aligning
- Low maintenance, since resistant to contamination
- 1 size Ø200 available

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

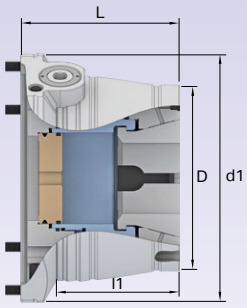
Further information: www. hainbuch.com
Request installation and operating instructions directly from manufacturer



TOPlus mini Axzug
SPANNTOP mini Axzug



TOPlus mini Axfix
SPANNTOP mini Axfix



TOROK SE Axzug
TOROK RD Axzug

HAINBUCH chucks TOPlus mini | TOROK SE

* For T-type rotary tables it may be necessary to increase the center height, see **p. 45**

	pL LEHMANN Item No.	Designation	Manual	Hydraulic	Size	Clamping capacity [mm]	L [mm]	l 1 [mm]	D [mm]	d 1 [mm]	Weight [kg]	Max. speed [rpm]	Required clamping cylinder *	HAINBUCH SYSTEM compatible	HAINBUCH item no., incl. adapter flange
x0x	**HAI.507-tp-axz**	TOPlus mini Axzug		●	26	3 to 26	84.5	31	67 f7	129	5.3	10000	SPZ.5xx-9 / -p		10001281
	HAI.507-tp-axf	TOPlus mini Axfix		●	26	3 to 26	86	33	74 f7	129	5.8	10000	SPZ.5xx-9 / -p		10001285
x1x	**HAI.510-tp-axz**	TOPlus mini Axzug		●	52	3 to 52	103.5	42	119 f7	150	10.9	7000	SPZ.5xx-9 / -p	●	10001282
	HAI.510-tp-axf	TOPlus mini Axfix		●	52	3 to 52	104.5	44	119 f7	150	10.6	7000	SPZ.5xx-9 / -p	●	10001286
	HAI.510-tp-to	TOROK SE Axzug	●		52	3 to 52	137	92	125 f7	174	14.6	7000		●	10001300

TOPlus mini

TOPlus mini

- 25% higher retention force than SPANNTOP
- Outstanding rigidity thanks to large contact surface of the clamping segments
- Insensitive to dirt thanks to clamping head geometry
- Lower centrifugal force losses compared to jaw chucks
- Optimal lubrication thanks to lubrication grooves in the clamping element holder
- Workpiece stabilized through axial pulling against workpiece stop
- Radial run-out < 0.01 mm
- Minimal interference contour and easy changing of the clamping heads

HAINBUCH chucks SPANNTOP mini | TOROK RD

* For T-type rotary tables it may be necessary to increase the center height, see **p. 45**

	pL LEHMANN Item No.	Designation	Manual	Hydraulic	Size	Clamp-ing capacity [mm]	L [mm]	l 1 [mm]	D [mm]	d 1 [mm]	Weight [kg]	Max. speed [rpm]	Required clamping cylinder *	HAINBUCH SYSTEM compatible	HAINBUCH item no., incl. adapter flange
x0x	**HAI.507-st-axz**	SPANNTOP mini Axzug		●	32	3 to 32	101	43	66 f7	133	6.7	8000	SPZ.5xx-9 / -p		10001289
	HAI.507-st-axf	SPANNTOP mini Axfix		●	32	3 to 32	96	44	74 f7	129	6.2	8000	SPZ.5xx-9 / -p		10001293
x1x	**HAI.510-st-axz**	SPANNTOP mini Axzug		●	52	3 to 52	103.5	45	90 f7	150	9.0	7000	SPZ.5xx-9 / -p	●	10001290
	HAI.510-st-axf	SPANNTOP mini Axfix		●	52	3 to 52	104.5	44	98 f7	150	9.2	7000	SPZ.5xx-9 / -p	●	10001294
	HAI.510-st-to	TOROK RD Axzug	●		52	3 to 52	137	92	125 f7	174	14.7	7000		●	10001297

SPANNTOP mini

Adapter flange required in order to use Hainbuch system.

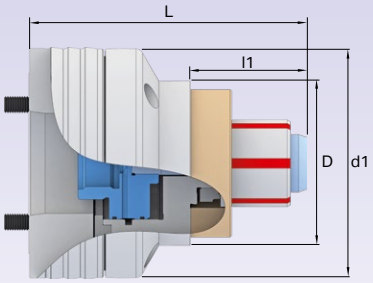
SPANNTOP mini

- Classic 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

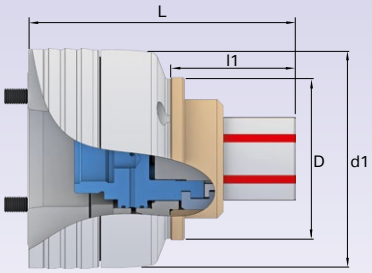
HAINBUCH
SPANNENDE TECHNIK

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

Further information: www. hainbuch.com
Request installation and operating instructions directly from manufacturer



MANDO T211 Axzug

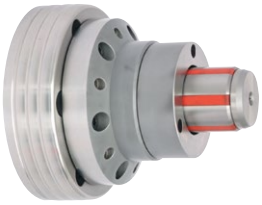


MANDO T212 Axzug
MANDO T812 Axfix

HAINBUCH MANDO clamping mandrels

* For T-type rotary tables it may be necessary to increase the center height, see **p. 45**

	pL LEHMANN Item No.	Designation	Hydraulic	Size	Clamping capacity [mm]	L [mm]	l 1 [mm]	D [mm]	d 1 [mm]	Weight [kg]	Max. speed [rpm]	Required clamping cylinder *	HAINBUCH item no., incl. adapter flange
x0x	**HAI.507-ma-axz1**	MANDO T212 Axzug	●	xxs	8 to 13	121.5	45.5	65	141	8.30	7000	SPZ.5xx-9 / -p	10001308
	HAI.507-ma-axf1	MANDO T812 Axfix	●	xxs	8 to 13	116.75	44.0	65	141	8.20	7000	SPZ.5xx-9 / -p	10001316
	HAI.507-ma-axz2	MANDO T212 Axzug	●	xs	13 to 19	116	45.5	65	141	8.00	7000	SPZ.5xx-9 / -p	10001309
	HAI.507-ma-axf2	MANDO T812 Axfix	●	xs	13 to 19	120	47.5	65	141	8.20	7000	SPZ.5xx-9 / -p	10001317
x1x	**HAI.510-ma-axz1**	MANDO T212 Axzug	●	s	16 to 21	112.5	47.5	70	141	7.50	7000	SPZ.5xx-9 / -p	10001310
	HAI.510-ma-axf1	MANDO T812 Axfix	●	s	16 to 21	117.5	49.5	70	141	7.80	7000	SPZ.5xx-9 / -p	10001318
	HAI.510-ma-axz2	MANDO T211 Axzug	●	0	20 to 28	115.5	40.0	75	141	7.20	7000	SPZ.5xx-9 / -p	10001303
	HAI.510-ma-axz3	MANDO T212 Axzug	●	0	20 to 28	123.5	58.5	90	141	8.00	7000	SPZ.5xx-9 / -p	10001311
	HAI.510-ma-axf2	MANDO T812 Axfix	●	0	20 to 28	129.5	60.5	90	141	8.40	7000	SPZ.5xx-9 / -p	10001319


MANDO T211

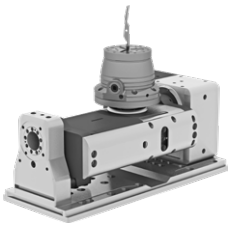
For components with Ø20–200 mm through holes (due to tension bolts)

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
- Concentricity < 0.01 mm, version T812 < 0.025 mm (with +0.003 mm adaptation)
- Large adaptation range through use of vulcanized clamping elements
- Prepared for air system check at workpiece stop


MANDO T212
MANDO T812

For components with blind holes from Ø8–200 mm

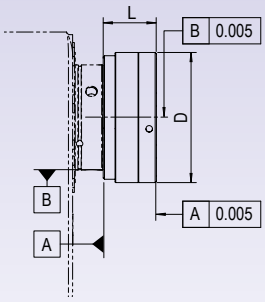

TOROK SE size 52 on T1-507510 TOP1


MANDO T211 size 0 on T1-510520 TAP2

HAINBUCH
SPANNENDE TECHNIK

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

Further information: www. hainbuch.com
Request installation and operating instructions directly from manufacturer



Tolerances apply to all HAINBUCH clamping devices

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*	HAINBUCH item no., incl. adapter flange
x0x	**HAI.507-al**	AirLine		●		120	130	52			>9	40	DDF.507-04	
	HAI.507-SAh	SAFE20			●	120	130	50			>9	40	DDF.507-04	
	HAI.507-SAm	SAFE20	●			120	130	50			>9	40		
x1x	**HAI.510-al**	AirLine		●		120	130	52			>9	40	DDF.510-04	
	HAI.510-SAh	SAFE20			●	120	130	50			>9	40	DDF.510-04	
	HAI.510-SAm	SAFE20	●			120	130	50			>9	40		

* see **pp. 46/47**

Clamping devices for SAFE and AirLine zero point clamping systems

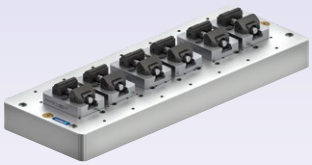
	pL LEHMANN Item No.	Designation	Interference circle ø [mm]	L from support [mm]	Clamping capacity [mm]	Dimensions LxWxH [mm]	Weight [kg]	Max. speed [rpm]	HAINBUCH item no.
Center clamp	**HAI.al-76**	AirLine vb centro76	175	75	5-74/44-120	Ø148x90x75			
	HAI.al-76P	AirLine vb centro76 pendulum	175	75	22-74/62-120	Ø148x90x75			
	HAI.sa-76	SAFE20 vb centro76	175	75	5-74/44-120	Ø148x90x75			
	HAI.sa-76P	SAFE20 vb centro76 pendulum	175	75	22-74/62-120	Ø148x90x75			
Empty pallets	**HAI.al-PalQ**	AirLine Index pallet	206	35		150x150x35			
	HAI.al-PalR	AirLine Index pallet, round	160	35		Ø160x35			
	HAI.sa-PalQ	SAFE20 Index pallet	206	35		150x150x35			
	HAI.sa-PalQ	SAFE20 Index pallet, round	160	35		Ø160x35			

AirLine

SAFE

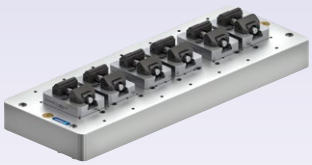
Further information: www.schunk.com
Request installation and operating instructions directly from manufacturer

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



KSC mini
1-sided, 1-row

KSC mini
1-sided, 2-row



KSC mini
2-sided, 1-row

Hole grid plates

	pL LEHMANN Item No.	L [mm]	SCHUNK Item no. Hole grid plate
1x	**SCH.510-LRP500**	500	1505511
	SCH.510-LRP600	600	1505512

Clamping elements

pL LEHMANN Item No.	Clamping system	SCHUNK Item no. Clamping elements
SCH.KSCmini	KSC mini	1505515
SCH.KSC80	KSC 80	1505516
SCH.KSC125	KSC 125	1505518
SCH.KSM400	KSM2 400	1505521
SCH.KSM500	KSM2 500	1505522

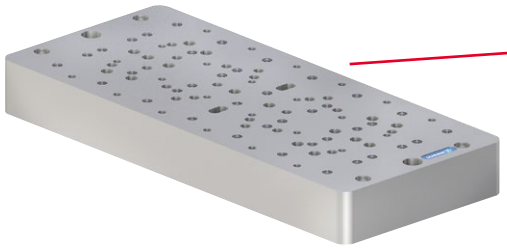
KSC mini

KSM400

Ordering information

Always order together with pL

- Counterbearing GLA.TOP2-xx0 **(p. 42)**
- Mounting kit RFX.5x0-ASa-TOP **(upon request)**
- Base plate RFX.5x0-GPxxxs-TOP **(upon request)** or hydraulic kit GLA.HYD-xxx **(upon request)**



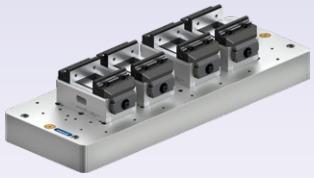
Hole grid plate SCHUNK 40105326, 40105355, 40105356, 40105357

Instead of the standard clamping yoke **(upon request)**, the SCHUNK hole grid plate is used here.

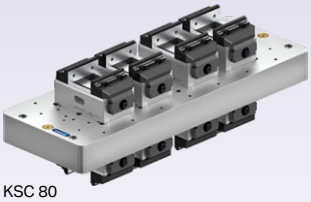
Further information: www.schunk.com
Request installation and operating instructions directly from manufacturer

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

KSC mini
2-sided, 2-row



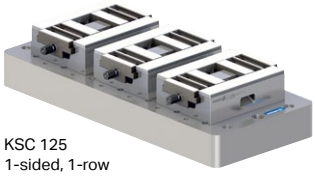
KSC 80
1-sided, 1-row



KSC 80
2-sided, 1-row

Possible combinations

	pL LEHMANN Item no. Hole grid plate	L [mm]	Clamping system	Description	Number of clamping elements
x1x	SCH.510-LRP500	500	KSC mini	1-sided, 1-row	4
		500	KSC mini	1-sided, 2-row	10
		500	KSC mini	2-sided, 1-row	8
		500	KSC mini	2-sided, 2-row	20
		500	KSC 80	1-sided	4
		500	KSC 80	2-sided	8
		500	KSC 125	1-sided, 1-row	3
		500	KSC 125	2-sided 1-row	6
		500	KSM2 400	1-sided, 1-row	max. 5
		500	KSM2 400	1-sided, 2-row	max. 10
		500	KSM2 400	2-sided, 1-row	max. 10
		500	KSM2 400	2-sided, 2-row	max. 20
	SCH.510-LRP600	600	KSC mini	1-sided, 1-row	6
		600	KSC mini	1-sided, 2-row	14
		600	KSC mini	2-sided, 1-row	12
		600	KSC mini	2-sided, 2-row	28
		600	KSC 80	1-sided	4
		600	KSC 80	2-sided	8
		600	KSC 125	1-sided, 1-row	3
		600	KSC 125	2-sided 1-row	6
		600	KSM2 500	1-sided, 1-row	max. 6
		600	KSM2 500	1-sided, 2-row	max. 12
		600	KSM2 500	2-sided, 1-row	max. 12
		600	KSM2 500	2-sided, 2-row	max. 24



KSC 125
1-sided, 1-row

KSC 125
2-sided, 1-row

KSCM2 400
1-sided, 1-row

KSM2 400
2-sided, 1-row

KSCM2 400
1-sided, 2-row

KSM2 400
2-sided, 2-row

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

Further information: www.schunk.com
Request installation and operating instructions directly from manufacturer

Adapter flanges

	pL LEHMANN Item no.		Fits power clamping blocks	L from spindle [mm]	Weight [kg]	SCHUNK Item No.
x0x/ x1x	**SCH.5xx-Ada64**	1	TANDEM3 64	15	0.7	1504986
x1x	**SCH.5xx-Ada100**	2	TANDEM3 100	20	2.4	1504987
x1x	**SCH.510-Ada160**	3	TANDEM3 160	15	4.8	1504112

Power clamping blocks

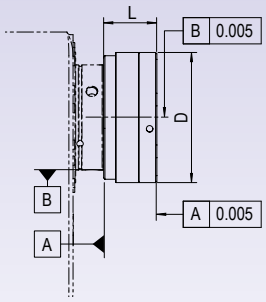
pL LEHMANN Item no.	Designation	Size [mm]	L from spindle (with adapter flange, without jaws) [mm]	Hydraulic	Pneumatic	Centered	Fixed jaw	Jaw stroke [mm]	Clamping force [kN] *	Max. pressure (bar)	Max. range with standard jaws ** [mm]	Weight (with adapter flange) [kg]	Max. speed ****[rpm]	Required adapter flange	Additionally required pL LEHMANN rotary union ***	SCHUNK catalog reference
SCH.KSP64	KSP3 64-Z	64 x 64	65.7		●		●	2	4.5	9	40	1.9	100	1	DDF.5xx-04	1409255
SCH.KSP64F	KSP3-F 64-Z	64 x 64	65.7		●		●	4	4.5	9	40	1.9	100	1	DDF.5xx-04	1409335
SCH.KSP100	KSP3 100-Z	100 x 100	89.2		●	●		2	18	9	70	6.2	100	2	DDF.5xx-04	1409263
SCH.KSP100LH	KSP3-LH 100-Z	100 x 100	89.2		●		●	6	8	9	70	6.2	100	2	DDF.5xx-04	1409301
SCH.KSP100F	KSP3-F 100-Z	100 x 100	89.2		●		●	4	18	9	70	6.2	100	2	DDF.5xx-04	1409343
SCH.KSP160	KSP3 160-Z	160 x 160	97.2		●	●		3	45	9	120	15.80	100	3	DDF.5xx-04	1409272
SCH.KSP160LH	KSP3-LH 160-Z	160 x 160	97.2		●	●		8	20	9	120	16.00	100	3	DDF.5xx-04	1409312
SCH.KSP160F	KSP3-F 160-Z	160 x 160	97.2		●		●	6	45	9	120	15.80	100	3	DDF.5xx-04	1409351
SCH.KSH100	KSH3 100-Z	100 x 100	94.2	●		●		2	18	60	70	7	100	2	DDF.5xx-04	1463173
SCH.KSH100LH	KSH3-LH 100-Z	100 x 100	94.2	●		●		6	16	120	70	7	100	2	DDF.5xx-04	1463180
SCH.KSH100F	KSH3-F 100-Z	100 x 100	94.2	●			●	4	18	60	70	7	100	2	DDF.5xx-04	1463178
SCH.KSH160	KSH3 160-Z	160 x 160	102.2	●		●		3	45	60	120	18.8	100	3	DDF.5xx-04	1463202
SCH.KSH160LH	KSH3-LH 160-Z	160 x 160	102.2	●		●		8	20	120	120	19	100	3	DDF.5xx-04	1463224
SCH.KSH160F	KSH3-F 160-Z	160 x 160	102.2	●			●	6	45	60	120	18.8	100	3	DDF.5xx-04	1463207

* at max. pressure and / or max. torque
** with standard jaws KTR 64 / 100 / 160 / 250 (machining must be carried out by the customer)
*** see **pp. 46/47**
**** only indexing allowed

LH version = long stroke
F version = 1 fixed jaw

KSPZ plus 250

SCHUNK clamping unit on SCHUNK VERO-S **(p. 83)**



NSE3 138-P with two media transfers

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

Further information: www.schunk.com
Request installation and operating instructions directly from manufacturer

Adapter flanges

	pL LEHMANN Item no.		Compatible with zero-point clamping systems	L from spindle [mm]	Weight [kg]	SCHUNK Item No.
x0x/x1x	**SCH.5xx-Ada90**	1	NSE mini 90	15	1	1505504
	SCH.5xx-Ada138	2	NSE3 138	35.7	3.7	1505506
	SCH.5xx-Ada138P	3	NSE3 138 P	35.7	3.7	1505507

Important technical data

	Unit	NSE3 138	NSE +176
Pneumatic system	[mm]	Yes	Yes
Repeat accuracy	[mm]	< 0.005	< 0.005
Actuating pressure	[bar]	6	6
Draw-in force	[kN]	28	40
Retention force M16	[kN]	75	75

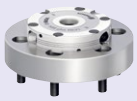
Zero point clamping systems

pL LEHMANN Item No.	Designation non-rusting	Pneumatic 6 bar	Turbo function	non-rusting	D [mm]	L from spindle (with adapter flange) [mm]	Clamping force [kN]	Increased draw-in force with turbo function [kN]	Max. retention force [kN]	Weight (with adapter flange) [kg]	Max. speed **[rpm]	Open	Anti-twist protection	Required adapter flange	Required rotary union*	SCHUNK catalog reference
SCH.90ix	VERO-S NSE mini 90-V1	●	●	●	ø90	35	0.5	1.5	25	1.8	100	●	●	1	DDF.5xx-04	0435105
SCH.138ix	VERO-S NSE3 138-V1	●	●	●	ø138	74.7	8	28	75	8.20	100	●	●	2	DDF.5xx-04	1313723
SCH.138ix-P	VERO-S NSE3 138-V1-P	●	●	●	ø138	74.7	8	28	75	6.7	100	●	●	3	DDF.5xx-04	1359500

* see **pp. 46/47**
** only indexing allowed
P = with media passage

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

NSE plus 90-V1



Empty chuck

Centric clamping unit KSA plus 100

NSE3 138-V1-P

Version -P has 2x media passage

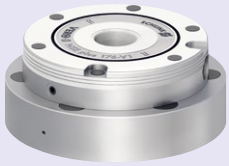
Empty chuck

Diaphragm chuck

Centric clamping unit KSC 125

ROTA-S plus 2.0

NSE plus 176-V1



Empty chuck

GRESSEL Spanntechnik

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

Further information: www.gressel.ch
Request installation and operating instructions directly from manufacturer

GRESSEL gredoc pallet system

	pL LEHMANN Item No.	Designation	Manual	D1 [mm]	D2 [mm]	L1 [mm]	L2 [mm]	Weight [kg]	Max. speed [rpm]	GRESSEL Item no. incl. adapter flange
x0x	**GRE.507-GRU***	gredoc round	•	ø135	148	30	–	3.0		NGS.010.015.01
x1x	**GRE.510-GRU***				148		–	3.0		NGS.010.016.01

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.C280-grip	C2.0 80 L-130 with reversible jaw grip	•	157 x 80 x 78	128		4			CNM.080.001.01	GRE.5xx-GRU*
GRE.C2125-grip	C2.0 125 L-160 with reversible jaw grip	•	208 x 125 x 83	133		8.7			CNM.125.001.01	
GRE.SPZ	gredoc collet, cpl.	•	ø148 x 47.5	97.5	ø148	1.5			NGS.010.030.01	
GRE.LP	Empty pallet, steel	•	ø148 x 30	80	ø148	2.0			NGA.000.002.01	
GRE.LRP	Hole grid pallet, steel	•	ø148 x 30	80	ø148	2.0			NGA.000.003.01	
GRE.NGZ-p	Pyramid 3-way 30° for C3 L-80	•	ø190 x 54 / 30°		ø190	2.6			NGZ.010.135.11	
GRE.C3	C3 L-80 without system jaws	•	70 x 80 x 42			0.9			CGM.070.002.01	
GRE.SWB-grip	SWB grip 3mm width 45 (1 piece)	•	45 x 22 x 22			0.1			CGA.070.001.01	
GRE.NGZ-w	Bracket cube for C2 80	•	260 x 150 x 220			14.6			NGZ.010.060.11	
GRE.AB	Mounting pin, incl. fastening screw	•	ø40			0.1			NGA.000.001.01	

All items must be ordered separately! (Ex. assembly for Lehmann EA-507: NGS.010.015.01 – CGM.080.001.01 NGA.000.001.01)

Possible applications

C2.0 125

SWB grip 3 mm

Bracket cube with C2.0 80

Empty pallets

Pallet with hole grid

gredoc Collet, cpl.

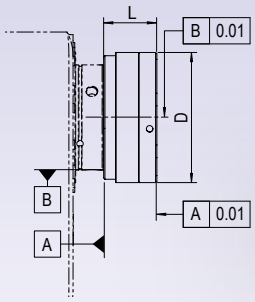
Pyramid 3-way 30° with C3 L-80 grip

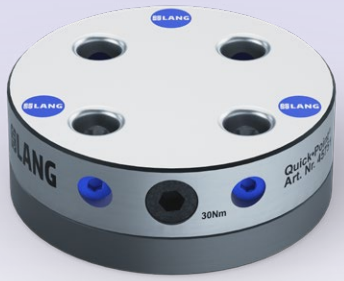
EA application

LANG TECHNIK
einfach. zukunft. greifen.

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

Further information: www.lang-technik.de
Request installation and operating instructions directly from manufacturer





LANG zero point clamping system

pL LEHMANN Item no.	Designation	Manual	Power-actuated**	Dimensions D x L [mm]	Weight [kg]	Max. speed [rpm]	suitable for LEHMANN SPI	suitable for LANG 5-axis vises*
LAN.5xx-QP52m	Quick·Point® 52, incl. adapter flange	●		Ø 116 x 43	3.60	400	507 / 510 / 520	48085-46 / 48085-77 / 48120-46 / 48120-77 / 48160-77
LAN.5xx-QP52k			●		on request			
LAN.5xx-QP52 +96m	Quick·Point® 52/96, incl. adapter flange	●		Ø 196 x 37	on request			48085-46 / 48085-77 / 48120-46 / 48120-77 / 48160-77 / 48155-77 / 48155-125
LAN.5xx-QP96m	Quick·Point® 96, incl. adapter flange	●			7.60		507 / 510	48155-77 / 48155-125
LAN.5xx-QP96m-D* **		●		Ø 196 x 27	on request	400		
LAN.5xx-QP96k			●	Ø 196 x 37		on request		

* The maximum length of the vise base body depends on the rotary axis type. Longer vise variants may be possible. Please inquire.
**Required clamping cylinder: SPZ.5xx-9 / -p or SPZ.520-9 / -p
*** with through hole Ø 46.55 mm

LAN.5xx-QP52m

LAN.5xx-QP96m

Vises suitable for the LANG zero point clamping system

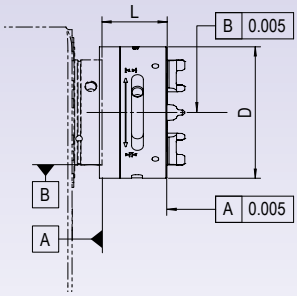
Example of application
Makro·Grip® 125 with Quick·Point® 96, manual on LEHMANN EA-510

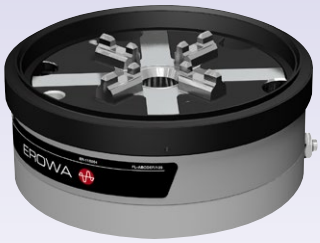
Example of application
Makro·Grip® 77 with Quick·Point® 52, power-actuated on LEHMANN EA-510

pL LEHMANN Item no.	Designation	Clamping capacity [mm]	Weight [kg]	Max. speed [rpm]	LANG Item No.	Base body required
LAN.MG46-S85	Makro·Grip® 46, length 102 mm Jaw width 46 mm	0 – 85			48085-46	
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 vises 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.

EROWA®





PowerChuck P ER-115254

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

Further information: www.erowa.com
Request installation and operating instructions directly from manufacturer

ERO.5xx = Item number for combined 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
x0x	**ERO.507-CTSix**	CTS Chuck Dual Rotation (Inox)		●	ø112	45.3	ø60	4	8,000	●	●	1)	4.3	ER-050316	on request
	ERO.5xx-FTSix	FTS Chuck (Inox)		●	ø74	46.5	ø72	4	4,000	●	●	1)	1.5	ER-057335	ER-073469
	ERO.5xx-Qcix	QuickChuck 100 P (Inox)	●		ø100	50	□50/ø148	35	3,000				2.6	ER-036345	ER-073351
	ERO.5xx-ITS100ix	ITS Chuck 100 P (Inox)		●	ø100	50	□50/ø148	35	5,000	●	●	1)	2.5	ER-043123	ER-073433
	ERO.5xx-PC	PowerChuck P		●	ø150	64.5	□50/ø148	50	5,000	●	●	1)	7.5	ER-115254	ER-073046
	ERO.5xx-MTS	MTS IntegralChuck S-P/A		●	ø130	62	ø148	50	4,500	●	●	1)	4	ER-131210	ER-073457
x1x	**ERO.510-CTSix**	CTS Chuck Dual Rotation (Inox)		●	ø112	45.3	ø60	4	8,000			2)	4.3	ER-050316	on request
	ERO.5xx-FTSix	FTS Chuck (Inox)		●	ø74	46.5	ø72	4	4,000	●	●	2)	1.5	ER-057335	ER-073469
	ERO.5xx-QCix	QuickChuck 100 P (Inox)	●		ø100	50	□50/ø148	35	3,000				2.6	ER-036345	ER-073351
	ERO.5xx-ITS100ix	ITS Chuck 100 P (Inox)		●	ø100	50	□50/ø148	35	5,000	●	●	2)	2.5	ER-043123	ER-073433
	ERO.5xx-PC	PowerChuck P		●	ø150	64.5	□50/ø148	50	5,000	●	●	2)	7.5	ER-115254	ER-073046
	ERO.5xx-MTS	MTS IntegralChuck S-P/A		●	ø130	62	ø148	50	4,500	●	●	2)	4	ER-131210	ER-073457

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

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

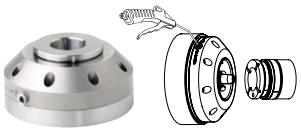
Additionally required rotary union (see **pp. 46/47**):
1) = DDF.507-04, 2) = DDF.510-04, 3) = DDF.520-04, 4) = DDF.530-04

When standard pallets with open holes are used, water, metal chips etc. can get into the pallet chuck, air lines and control valve. To prevent this, seal kits are available from the respective chuck manufacturers.

The speed values are theoretical, application-specific maximum values. The user is responsible for the optimum radial run-out of the pallets (incl. clamping device and workpiece) as well as sufficient workpiece fastening.

FTS Chuck (Inox)
ER-057335

ITS Chuck 100 P (Inox)
ER-043123



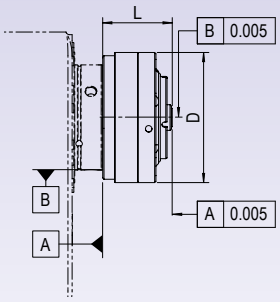
CTS Chuck Rotation (Inox)
ER-057324

MTS IntegralChuck S-P/A
ER-131210

Manual control valve
(option)

Automatic control unit
with monitoring (option)

system 3R



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

For more information, please visit: 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. clamping force/venting	Rotary union	SYSTEM 3R Catalog reference	SYSTEM 3R item no. incl. adapter flange
x0x	**S3R.5xx-G70**	3R GPS 70	●	ø99	56	ø70	10	2.70	5,450	●	●			1)	C198700	X663000
x1x	**S3R.5xx-G70**	3R GPS 70	●	ø99	56	ø70	10	2.70	5,450	●	●			2)	C198700	X663000
	S3R.510-G120	3R GPS 120	●	ø118	56	ø120	20	3.60	5,450	●	●			2)	C188770	X663010
	S3R.510-MGC*	3R Magnum Chuck	●	ø162	46	ø156, w/index pin	100	6.70	5,450	●	●		●	2)	3R-SP26712	90940.02
	S3R.510-MCC	3R Macro Chuck	●	ø100	49	54x54, 70x70	10	2.60	5,450	●	●		●	2)	3R-600.14-30	90940.01
Ref. Palette	**S3R.RP-GPS240**	Reference pallet GPS 240													C846600	
	S3R.RP-GPS70120	Reference pallet GPS 70													C846360	
	S3R.RP-Macro	Reference pallet Macro													36-606.1	
	S3R.RP-Magnum	Reference pallet Magnum													3R-686.1-HD	

Additionally required rotary union (see **pp. 46/47**):
1) = DDF.507-04, 2) = DDF.510-04

* For Magnum pallets only.
Macro pallets may not be clamped

When standard pallets with open holes are used, water, metal chips etc. can get into the pallet chuck, air lines and control valve. To prevent this, seal kits are available from the respective chuck manufacturers.

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

- Repeatability 2 µ
- Angular position accuracy 0.005 mm

GPS 70/120/240
- Cast aluminum design at very good price-performance ratio
- Compact in overall height
- No clamping spigots
- Complete coverage for die-sinking and milling applications
- Ideal for automation
- High precision repeatability

Macro
- High stability and precision
- Especially for milling applications

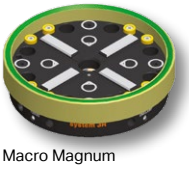
Macro Magnum
- Solid construction
- High stability and precision
- Complete tightness
- Especially for milling applications in the high-precision range

Dynafix
- High holding and pull-in forces
- Extremely precise steel ground 0-point supports
- Mainly milling and sink erosion applications

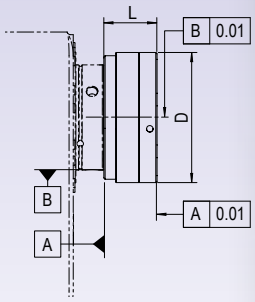

GPS 70

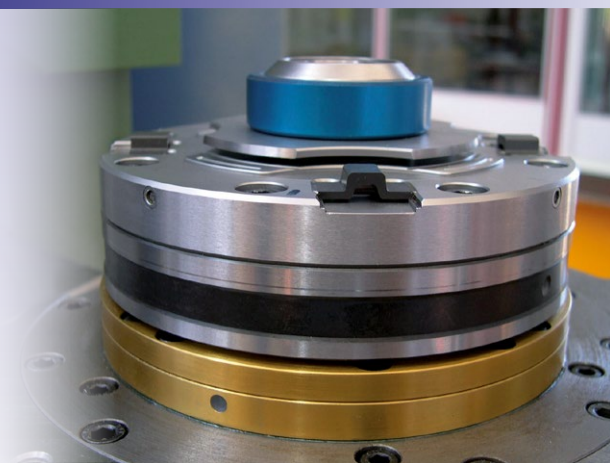

GPS 120


Macro


Macro Magnum

PAROTEC
spanntechnik · robotik · engineering





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

Further information: www.parotec.ch
Request installation and operating instructions directly from manufacturer

	pL LEHMANN Item No.	Designation	Manual	Pneumatic	Hydraulic	D [mm]	L from spindle [mm] (up to Z-support)	Pallet sizes [mm]	Number of media transfers**	Max. workpiece weight [kg]	Weight [kg]	Max. speed [rpm]	Open system [bar]	Clean Z-support	With re-tightening	Required rotary union*	PAROTEC Item no., Incl. adapter flange
x0x	**PAR.507-PG162p**	POWER GRIP 160, 1x		●		Ø162	69	□158/ Ø148	0	250	9.6	6,000	6	●	●	DDF.507-04	XT2160142007
	PAR.507-PG162mp	POWER GRIP 160, 1x (LPA)	●			Ø162	69	□158/ Ø148	0	250	9.9	6,000	6		●	DDF.507-04	XT2160142008
	PAR.507-PG162h	POWER GRIP 160, 1x			●	Ø162	69	□158/ Ø148	0	750	9.9	6,000	30	●	●	DDF.507-04	XT2160142707
	PAR.507-PY162p	POLY GRIP, 1x		●		Ø162	69/76.5	Ø70-Ø148	0	50			6	●	●	DDF.507-04	XT9911420707
	PAR.507-PY162mp	POLY GRIP, 1x (LPA)	●			Ø162	69/76.5	Ø70-Ø148	0	50			6		●	DDF.507-04	XT9911420708
x1x	**PAR.510-PG162p**	POWER GRIP 160, 1x		●		Ø162	69	□158/ Ø148	0	250	9.5	6,000	6	●	●	DDF.510-04	XT2160162010
	PAR.510-PG162mp	POWER GRIP 160, 1x (LPA)	●			Ø162	69	□158/ Ø148	0	250	9.5	6,000	6		●	DDF.510-04	XT2160162011
	PAR.510-PG162p-P	POWER GRIP 160, 1x		●		Ø162	69	□158/ Ø148	3	250	9.6	6,000	6	●	●	DDF.510-06	XT2160162013
	PAR.510-PG162h	POWER GRIP 160, 1x			●	Ø162	69	□158/ Ø148	0	750	9.5	6,000	30	●	●	DDF.510-04	XT2160162710
	PAR.510-PG162h-P	POWER GRIP 160, 1x			●	Ø162	69	□158/ Ø148	3	750	9.6	6,000	30	●	●	DDF.510-06	XT2160162713
	PAR.510-PY162p	POLY GRIP, 1x		●		Ø162	69/76.5	Ø70-Ø148	0	50			6	●	●	DDF.510-04	XT9911420710
	PAR.510-PY162mp	POLY GRIP, 1x (LPA)	●			Ø162	69/76.5	Ø70-Ø148	0	50			6		●	DDF.510-04	XT9911420711

* see **pp. 46/47**
** up to 200 bar

LPA = air gun connection

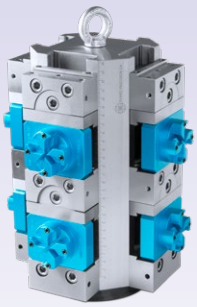
Technical data	Unit	POWER GRIP	POLY GRIP
Repeat accuracy	mm	±0.002	±0.002
Clamping force without re-tightening PNEU	kN	17	7
Clamping force with re-tightening PNEU	kN	28	12
Clamping force without re-tightening HYDR	kN	35	
Clamping force with re-tightening HYDR	kN	45	
Permissible tilting moment without re-tightening PNEU 6 bar	Nm	429	160 / 210*
Permissible tilting moment without re-tightening HYDR 30 bar	Nm	890	

* 2 possible Z-supports. More details on request.

POWER GRIP 160, 1x on EA-507

POWER GRIP 160, 1x on EA-510

EVARD PRECISION S.A.

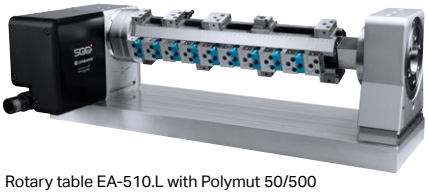


Clamping devices assembled by pL LEHMANN,
final adjustment by customer (if ordered together with a rotary table)

Further information at: www.evard-precision.ch
Request installation and operating instructions directly from manufacturer

Polymut Monoblock towers

	pL LEHMANN Item No.	Designation	Size [mm]	Total length [mm]	Length of gearing [mm]	Weight [kg]	Evard item no., incl. adapter flange
x0x	**EVA.507-350-T50**	Polymut monoblock tower incl. flange set	50	368	318	16	T50350507
	EVA.507-450-T50	Polymut monoblock tower incl. flange set	50	468	418	19	T50450507
x1x	**EVA.510-500-T50**	Polymut monoblock tower incl. flange set	50	503	453	24	T50500510
	EVA.510-600-T50	Polymut monoblock tower incl. flange set	50	603	553	28	T50600510
	EVA.510-500-T80	Polymut monoblock tower incl. flange set	80	503	423	45	T80500510
	EVA.510-600-T80	Polymut monoblock tower incl. flange set	80	603	523	53	T80600510



Rotary table EA-510.L with Polymut 50/500
Compatible with pL LEHMANN rotoFIX base plate.

Simultaneously produce up to 32 workpieces 25 mm wide with a precision and repeat accuracy of +/- 0.01 mm. The modular Polymut system will meet all of your requirements regarding workpiece clamping.

- Accuracy ± 0.01 over all clamps
- Tight & protected guides
- Very stiff, because guide is directly integrated into jaw
- Narrower jaws, thus more workpieces per 100 mm compared to other manufacturers

Fixed and clamping jaws

	pL LEHMANN Item No.	Designation	Size [mm]	Width [mm]	Weight [kg]	Required accessories	Evard item no.
Polymut 50	**EVA.50160**	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
Polymut 80	**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
	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
	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

EVARD PRECISION S.A.

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

Further information at: www.evard-precision.ch
Request installation and operating instructions directly from manufacturer

Centering vise – Type CM

	pL LEHMANN Item No.	Designation	Manual	Pneumatic	Size [mm]	Clamping capacity [mm]	Weight [kg]	Evard catalog Reference	Evard item no., incl. adapter flange
x0x/x1x	**EVA.5xx-2020**	CM centering vise	●		20	25	0.22	2020	2020507
	EVA.5xx-2021	CM stainless steel centering vise	●		20	25	0.22	2021	2021507
	EVA.5xx-3000	CM centering vise	●		30	56	0.66	3000	3000507
	EVA.5xx-3001	CM stainless steel centering vise	●		30	56	0.66	3001	3001507
	EVA.5xx-5000	CM centering vise	●		50	89	2.30	5000	5000510
	EVA.5xx-8000	CM centering vise	●		80	137	6.45	8000	8000510

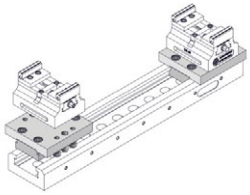
Combine the EA-507 rotary table with the CM 20 centering vise and split the µ's.

Jaws

	pL LEHMANN Item No.	Designation	Size [mm]	Weight [kg]	Required accessories	Evard item no.
CM 50	**EVA.500053**	Standard jaw	50	Included in the weight of the vise	–	500053
	EVA.500051	Stepped jaw	50	Included in the weight of the vise	–	500051
	EVA.500052	Claw jaw	50	Included in the weight of the vise	–	500052
	EVA.500055	Special claw jaw	50	Included in the weight of the vise	–	500055
CM 80	**EVA.800053**	Standard jaw	80	Included in the weight of the vise	–	800053
	EVA.800051	Stepped jaw	80	Included in the weight of the vise	–	800051
	EVA.800052	Claw jaw	80	Included in the weight of the vise	–	800052
	EVA.800055	Special claw jaw	80	Included in the weight of the vise	–	800055
CM 105	**EVA.105053**	Standard jaw	105	Included in the weight of the vise	–	105053
	EVA.105051	Stepped jaw	105	Included in the weight of the vise	–	105051
	EVA.105052	Claw jaw	105	Included in the weight of the vise	–	105052
	EVA.105055	Special claw jaw	105	Included in the weight of the vise	–	105055

Adapter plate for CM 50 on Polymut

pL LEHMANN Item No.	Designation	Size of the CM [mm]	Size of the Polymut [mm]	Required accessories	Evard item no.
EVA.500054	Adapter plate for CM 50 on Polymut 80	50	80	See Monoblock tower	500054
EVA.500057	Adapter plate for CM 50 on Polymut 50	50	50	See Monoblock tower	500057



TRIAG INTERNATIONAL

swissMODULAR

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

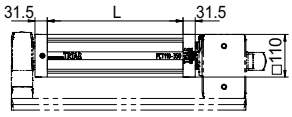
Further information at: www.triag-int.ch
Request installation and operating instructions directly from manufacturer

Clamping bars

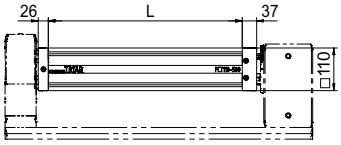
	pL LEHMANN Item No.	Usable length L [mm]	Cube [mm]	Interference circle* Ø [mm]	Weight [kg]	Max. speed [rpm]	Counterbear-ing **	Base plate	TRIAG Item no.
x0x	**TRI.507-350**	350	110x110	156	34		GLA.TOP1-110	RFX.507-GP350s-TOP	PCT110-350-507-PL
x0x	**TRI.507-450**	450	110x110	156	43		GLA.TOP1-110	RFX.507-GP450s-TOP	PCT110-450-507-PL
x1x	**TRI.510-500**	500	110x110	156	45		GLA.TOP2-150	RFX.510-GP500s-TOP	PCT110-500-510-PL
x1x	**TRI.510-600**	600	110x110	156	54		GLA.TOP2-150	RFX.510-GP600s-TOP	PCT110-600-510-PL

* without jaws
** must always be ordered from pL

- Weight for clamping bar and adapter flanges only (without rotary table, counterbearing and common base plate).
- For more information about base plates and counterbearings, our sales team is happy to help, see **p. 42**



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



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

EA-510 with pneumatic centric clamping unit

EA-510 rotoFIX with TRIAG clamping tower 4-sided

Clamping yokes

	pL LEHMANN Item No.	Usable length L [mm]	Dimensions L x W x H [mm]	Weight [kg]	Max. speed [rpm]	Mounting set	Counterbearing *	Base plate
x0x	**TRI.507-SB350**	350	350 x 165 x 20			RFX.507-ASa	GLA.TOP1-110	RFX.507-GP350s-TOP
x1x	**TRI.510-SB500**	500	500 x 215 x 35			RFX.510-ASa	GLA.TOP2-150	RFX.510-GP500s-TOP
x1x	**TRI.510-SB600**	600	600 x 215 x 35				GLA.TOP2-150	RFX.510-GP600s-TOP

* must always be ordered from pL

- Weight for clamping bar and adapter flanges only (without rotary table, counterbearing and common base plate).
- For more information about base plates and counterbearings, our sales team is happy to help, see **p. 42**

EA-510 rotoFIX with clamping yoke pL 500 mm and mounted TRIAG rails

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

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

Manufacturer for adaptation to pL rotary table: www.ivo-oesterle.de
Manufacturer for all other add-on elements: www.triag-int.ch

ZSX 140

ZSX 180

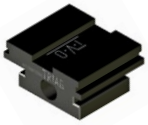
ripas ❶

Flange 507 ❷

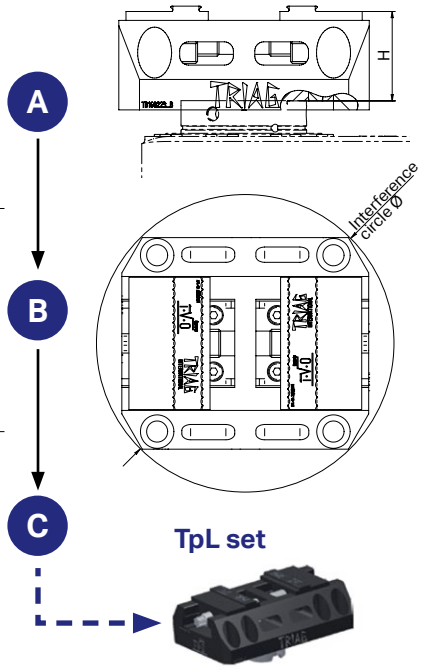
Flange 510 ❸

Slide set 1
Direct stamping jaws (3 mm), width 75 mm

Slide set 2
Direct stamping jaws (3 mm), width 76 mm



Slide set 3
powerCLAMP, interface



A Centric clamping unit

pL LEHMANN Item No.	Designation	L from flange [mm]	Interference circle Ø [mm]	Weight, approx. (without adapter flange) [kg]	Max. speed [rpm]	Required adapter flange	TRIAG item no.
TRI.ZSX-140	ZSX 140 (140 x 120 x 50)	32.5	184	3	400	❶ / ❷ / ❸	ZSX140L50-PL
TRI.ZSX-180	ZSX 180 (180 x 120 x 50)		216	4.2			ZSX180L50-PL

B Hollow shank taper adapter and flange

	pL LEHMANN Item no.		Compatible with centric clamping units	L from spindle [mm]	Weight [kg]	Required*	TRIAG item no.
HSK	**TRI.HSK**	❶		12.5	0.9	RIP.5xx-63x	FLZSX-HSK63-PL
x0x	**TRI.507**	❷	ZSX 140 / ZSX 180	12.5	1		FLZSX-507-PL
x1x	**TRI.510**	❸		15	1.2		FLZSX-510-PL

* see **p. 67**

C Suitable jaw set

	pL LEHMANN Item No.	Designation	Weight [kg]	TRIAG item no.
ZSX 140/180	**TRI.ZB5X**	Slide set 1 direct stamping jaws (3 mm), width 75 mm	1	ZB5XPRG
	TRI.ZB5U	Slide set 2 direct stamping jaws (3 mm), width 76 mm	2	ZB5UPRG
	TRI.ZBM	Slide set 3 powerCLAMP, interface	1.8	ZBM

TRIAG
INTERNATIONAL

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

Further information at: www.triag-int.ch
Request installation and operating instructions directly from manufacturer

Pneumatic centric clamping unit

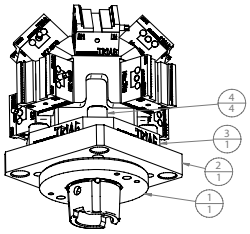
	pL LEHMANN Item No.	Designation	Size [mm]	L from spindle (with adapter flange, without jaws) [mm]	Pneumatic	Jaw stroke [mm]	Clamping force [kN] *	Max. pressure (bar)	Max. range with standard jaws ** [mm]	Weight (with adapter flange) [kg]	Max. speed *** [rpm]	Additionally required pL LEHMANN rotary union **	TRIAG Item no.
x0x/x1x	**TRI.5xx-ZSP150**	Centric clamping unit	150 x 150	105	•	6	24	12	124.5	13.5	400	DDF.5xx-04	ZSP150L100-510-PL

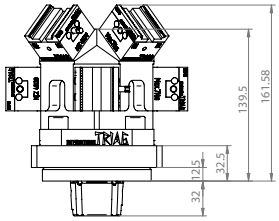
* at max. pressure and / or max. torque
** see **p. 46/47**
*** only indexing allowed

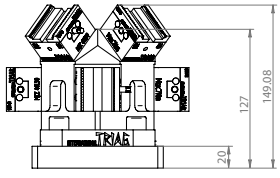
5-axis centric clamping block

	pL LEHMANN Item No.	Designation	Size [mm]	L from spindle (with adapter flange and clamp, without jaws) [mm]	Manual	Weight (with adapter flange) [kg]	Max. speed* [rpm]	Additionally required pL LEHMANN accessories **	TRIAG Item no.
HSK	**TRI.5xx-CENHSK**	5-axis centric clamping block	120 x 120	162	•	7.7	0	RIP.5xx-63x	FLZSX-HSK63-PL UB5AX-MCZ40-45-4 ZF230540
QuickPoint	**TRI.5xx-CENQP**			149		7	0	LAN.5xx-QP96x	UB5AX-MCZ40-45-4 ZF230540

* only indexing allowed
** see **p. 67**







driven by technology

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

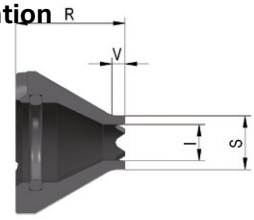
Further information at: www.roehm.biz
Request installation and operating instructions directly from manufacturer

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

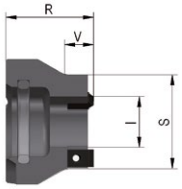
	pL LEHMANN Item No.	Designation	Overhang [mm]	Max. workpiece weight [kg]	Max. axial load [kN]	Weight [kg]	Max. speed [rpm]	RÖHM item no. incl. adapter flange
x0x	**RÖH.507-SM**	Face driver	65	100	20			1340449
x1x	**RÖH.510-SM**	Face driver	65	100	20			1340450

Accessories: Driver plates / play-free / clockwise and counterclockwise rotation

	pL LEHMANN Item No.	Designation	S Clamping circle Ø	Associated center Ø	R Overhang [mm]	I [mm]	V [mm]	Weight [kg]	RÖHM item no.
directly geared	**RÖH.MS-DV08**	Driver plate	8	4	38	4.5	4		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



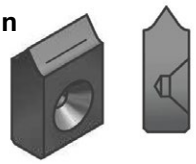
Driver plate directly geared
1209000



Driver plate 3x select.
metal carbide plates 6 x 3.2
1209007

Accessories: Metal carbide driver plates, clockwise and counterclockwise rotation

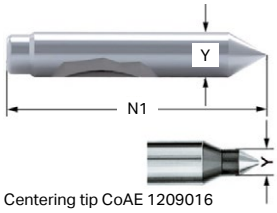
pL LEHMANN Item No.	Designation	Clamping circle Ø	Size	Weight [kg]	RÖHM item no.
RÖH.HMP-20	Metal carbide plate	20-32	6 x 3.2		88970
RÖH.HMP-40	Metal carbide plate	40-80	9.5 x 3.2		87931



Metal carbide driver plates 088970

Accessories: Centering tip

pL LEHMANN Item No.	Designation	Clamping circle Ø	Y Center Ø	N1 [mm]	Weight [kg]	RÖHM item no.
RÖH.ZS-08	Centering tip	8-10	4	90		1209016
RÖH.ZS-12	Centering tip	12	6	90		1209017
RÖH.ZS-16	Centering tip	16	10	90		1209018
RÖH.ZS-20	Centering tip	20	12	90		1209019
RÖH.ZS-25	Centering tip	25-80	16	90		1209020



Centering tip CoAE 1209016

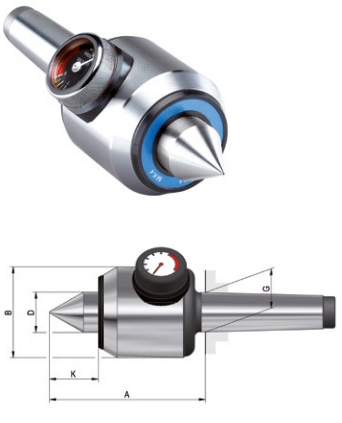
driven by technology

Supplied loose by pL LEHMANN

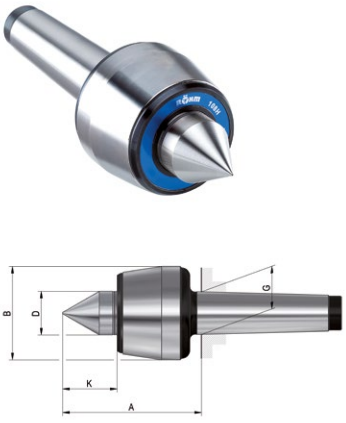
Further information at: www.roehm.biz
Request installation and operating instructions directly from manufacturer

Revolving centers

	pL LEHMANN Item No.	Designation	Mount MK	Max. run-out deviation [mm]	Max. workpiece weight [kg]	Max. radial load [daN]	Max. speed [rpm]	D Moving tip Ø [mm]	B Housing Ø [mm]	A [mm]	G [mm]	K [mm]	Weight [kg]	RÖHM item no.
Tailstock options / accessories	**RÖH.ZS-DAMK3**	with pressure display and length compensation; spring-loaded tip - spring travel max. 1.6 mm at axial clamping force of 550 daN; body hardened and ground – tip angle 60°	3	0.01	400	200	4000	25	64	105	23.8	31		60798
	RÖH.ZS-SAMK2	Standard version; body hardened and ground; tip angle 60°	2	0.005	200	100	7000	20	43	65	17.8	24		43115
	RÖH.ZS-SAMK3		3	0.005	400	200	6300	22	48.5	70.5	23.8	27		42315
	RÖH.ZS-GDMK2	with small housing diameter, body hardened and ground; tip angle 60°	2	0.005	200	100	7000	15	32	62	17.8	19.5		5336
	RÖH.ZS-GDMK3		3	0.005	400	200	7000	15	34	62	23.8	19.5		5429

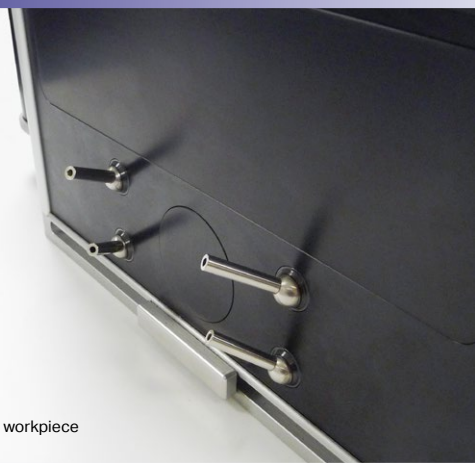


Mikö 60798



Mikö 43115 / 42315

Mikö 5336 / 5429

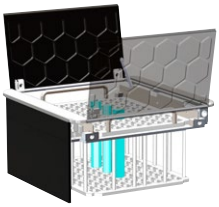


Blow off finished workpiece

ROTOMATION *transferBox*

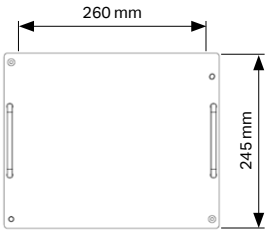
- Plug & play indoor automation
- For unmanned 6-side machining with integrated part changer
- Workpiece storage with quick-change system
- Installed/uninstalled on machine within minutes (with zero-point clamping)

TOP

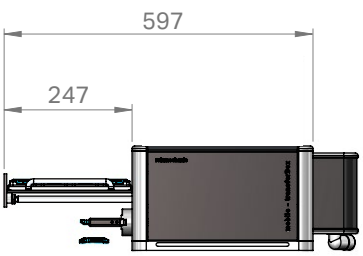


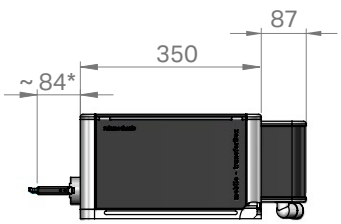
Vertical rod holder

Part reverser for rear side machining

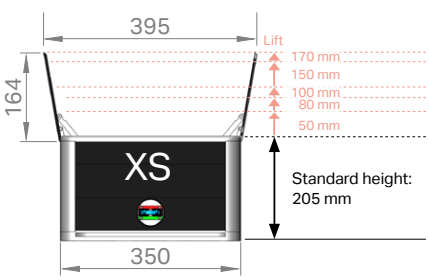


TOP workpiece carrier
Useful depth with standard height*: 94 mm
* Height increase, see below



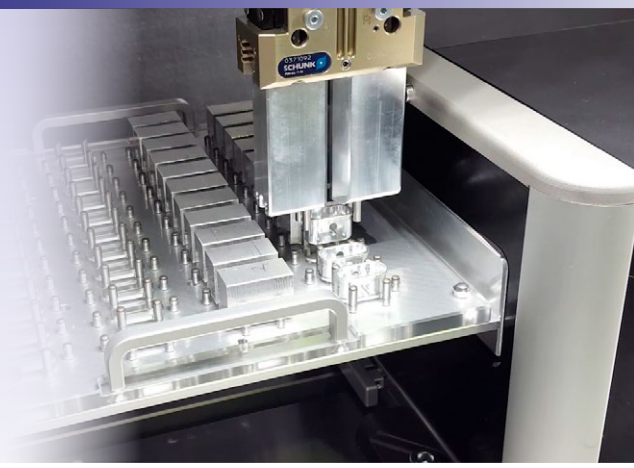


* Example



Ideal for existing and new vertical machining centers
Turn nighttime into production time

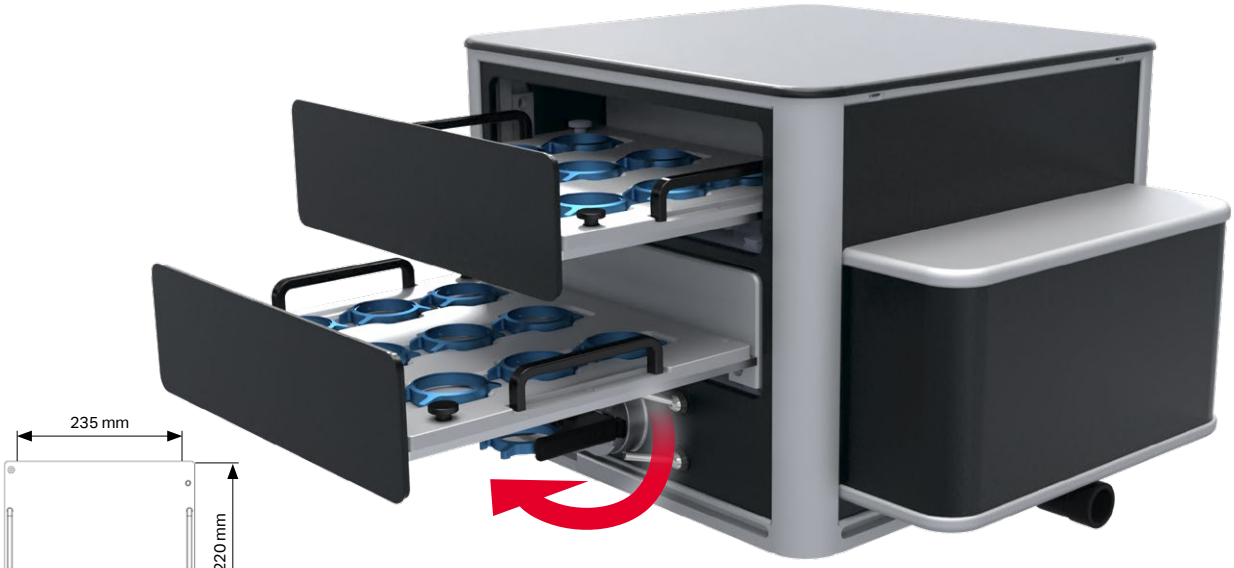
«From real-world applications – for real-world applications»



Deposit finished workpiece

SLIDE

(here, SLIDE-2)



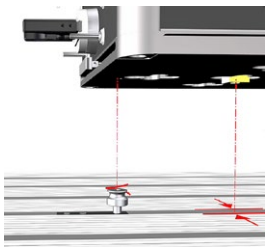
Workpiece carrier SLIDE
Usable height: max. 49 mm

Part reverser for rear side machining

After just a few minutes ... Ready to produce!

Position box and plug it in → Load workpieces → Start program

Zero-point positioning



Interesting expansion

4th axis, one spindle

4th/5th axis

LEHMANN®

ROTARY SOLUTIONS › MACHINE TOOLS & METROLOGY

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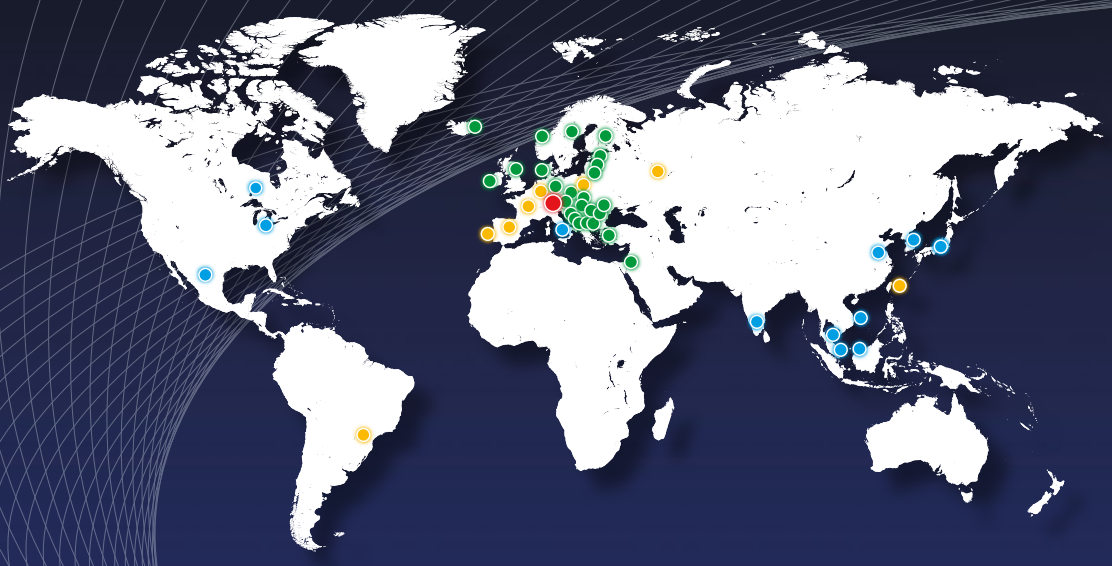
– Vietnam



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

More information (address, telephone number, etc.) at www.lehmann-rotary-tables.com

Subject to change / Edition: 08/2023