KELLENBERGER

HYDROLIN®

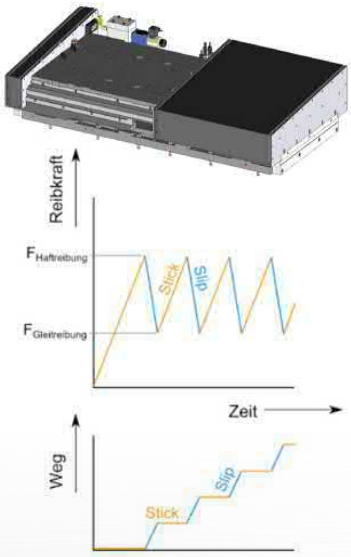
HIGH-DYNAMICS HYDROSTATIC LINEAR AXES



PRODUCT INFORMATION

HYDROSTATICS

- No solid friction
- Permits highly precise infeeds
- No stick-slip effect
- Wear-free
- Extremely good dampening
- High axis rigidity



LINEAR DIRECT DRIVE

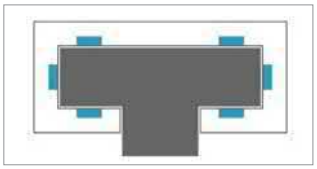
- No material contact
- Wear-free
- No elasticity in the drive train
- Very well adjustable
- Extremely high positioning quality
- Permits highly precise infeeds
- High dynamics – low inertia

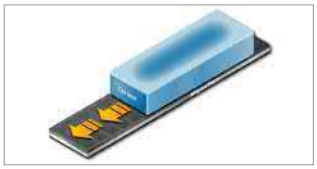
CHARACTERISTIC VALUE	AREA OF USE/SIZE
Length of axis	1200 mm
Width of axis	700 mm (620 mm)
Retraction of sleeve	450 mm
Feed	0.0005 - 20000 mm/min
Max. acceleration rapid traverse 2 m/s2	2 m/s2
Max. acceleration oscillation	3 m/s2
Max. double-retraction frequency	10 Hz (retraction of sleeve 1 mm)
Axis resolution	0.0000025 mm (2.5 nm)
Positioning error	<0.002 mm
Repeat accuracy	<0.001 mm

CONSTRUCTION

ENCOMPASSING GUIDE (HYDROSTATIC)

- Encompassing shape for best rigidity
- Carriage is optimally guided





INTEGRATION OF LINEAR DIRECT DRIVE

- Installed on guide level under the carriage
- Optimal position to the axis center of gravity
- Supports hydrostatics by additional pre-tensioning

COOLING CONCEPT

- Influences from hydrostatics and the linear drive were entirely eliminated
- Three-level cooling of the linear drive
- Efficient cooling of the hydrostatic oil
- Liquid cooling media (water-glycol and hydrostatic oil) flow through the structural parts
- Optimized cooling duct geometry for best heat transfer
- Cooling media are temperature-controlled to <0.2 °C
- Efficient active cooling unit – energetically optimized

APPLICATIONS

- Optimized combination HYDROLIN® & active cooling unit
- Where highest precision and contour compliance is required
  > Profile / eccentricity / conical grinding
- Where robustness and high availability are required
- Where consistently high quality across the life cycle is required
- Quick oscillations improve bore accuracy
- Where short auxiliary process times are required

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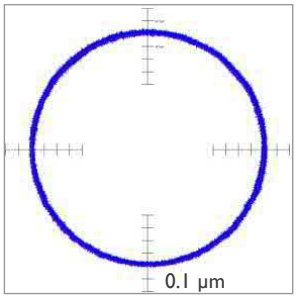
HYDROLIN®

HIGH-DYNAMICS HYDROSTATIC LINEAR AXES

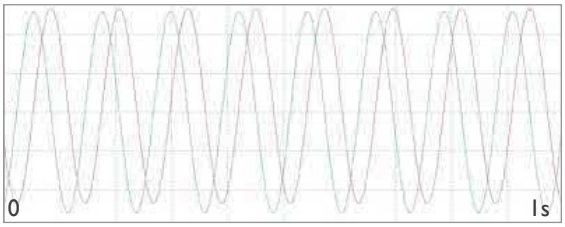
PERFORMANCE

THEORETICAL CIRCULARITY TEST

X-Z-scale values, radius 50
feed 200, scale 0.1 µm



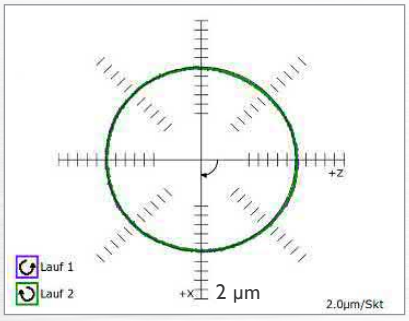
SHORT RETRACTION OSCILLATION (HIGH DYNAMICS)



Plot shows 8 retractions per second across 1 mm (load 220 kg)
Red line: Path (as absolute position)
Green line: Speed (±25 mm/s)

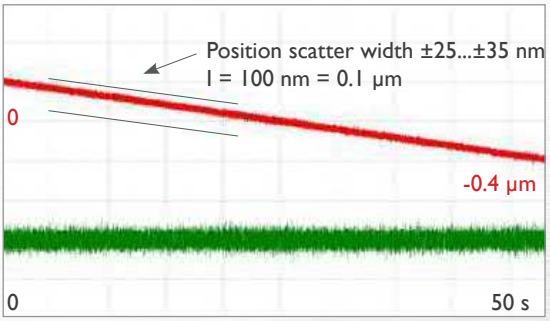
BIDIRECTIONAL CIRCULARITY DEVIATION	
Value	1.1 µ
TEST PARAMETERS	
Radius	50 mm
Feed	200 mm/min
Measuring sequence	IUS GUS
Test level	ZX
Center	X axis Software End position rear-10 mm adjustment
Software	90°
End position	90°

PRACTICAL CIRCULARITY TEST (DOUBLE BALL BAR)



20% out-of-squareness/20% rel. measuring error/20% straightness error X and Z•
High dynamics – low inertia

SLOW INFEED (0.5 µm/min)



Red line: Path 0… -0.4 µm in 50 seconds
Green line: Speed (0.5 µm/min)

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