

# HYDROLIN®

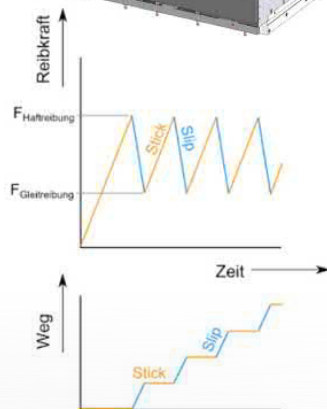
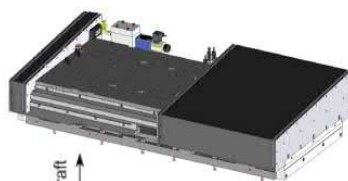
## HIGH-DYNAMICS HYDROSTATIC LINEAR AXES



### PRODUCT INFORMATION

#### HYDROSTATICS

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



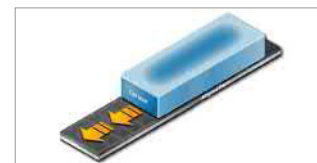
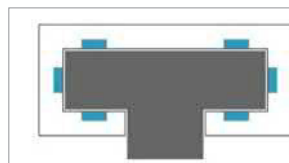
#### LINEAR DIRECT DRIVE

- 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

### 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 <math><0.2\text{ }^\circ\text{C}</math>
- 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

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/s <sup>2</sup>
Max. acceleration oscillation	3 m/s <sup>2</sup>
Max. double-retraction frequency	10 Hz (retraction of sleeve 1 mm)
Axis resolution	0.0000025 mm (2.5 nm)
Positioning error	<math><0.002\text{ mm}</math>
Repeat accuracy	<math><0.001\text{ mm}</math>



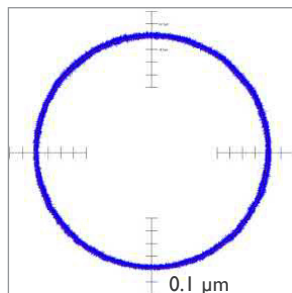
# HYDROLIN

## HIGH-DYNAMICS HYDROSTATIC LINEAR AXES

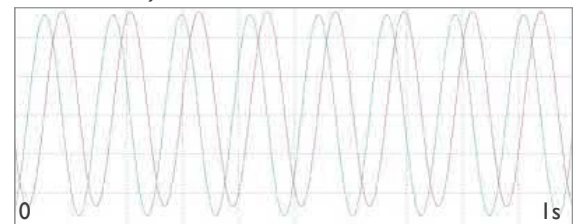
### PERFORMANCE

#### THEORETICAL CIRCULARITY TEST

X-Z-scale values, radius 50  
feed 200, scale 0.1  $\mu\text{m}$



#### 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 ( $\pm 25$  mm/s)

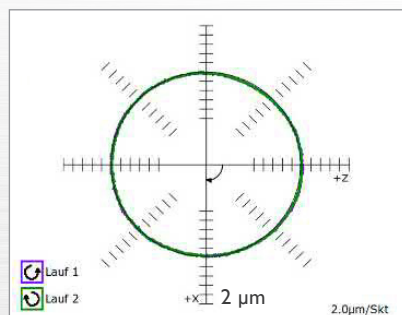
#### BIDIRECTIONAL CIRCULARITY DEVIATION

Value 1.1  $\mu\text{m}$

#### TEST PARAMETERS

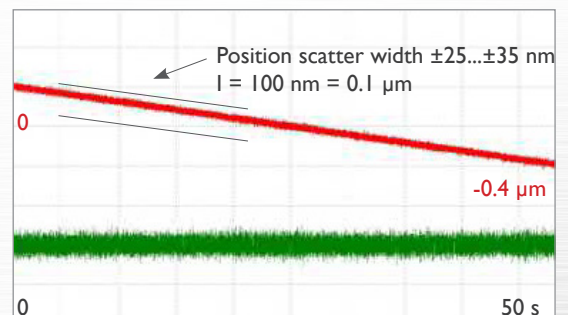
Radius	50 mm
Feed	200 mm/min
Measuring sequence	IUS GUS
Test level	ZX
Center	X axis Software End position rear-10 mm adjustment
Software	90°
End position	90°

#### 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 INFEEED (0.5 $\mu\text{m}/\text{min}$ )



Red line: Path 0... -0.4  $\mu\text{m}$  in 50 seconds  
Green line: Speed (0.5  $\mu\text{m}/\text{min}$ )