



ZEISS ROTOS

Specifications

Version: 2020-11



Seeing beyond

ZEISS ROTOS

Surface finish sensor for CMMs

Rotating axes (A-, B- and C-Axis)

Movement	Continuous, no steps
Rotating Range	$\pm 180^\circ$ (all axes) Measurements can be performed in any spatial orientation.
Rotation Speed	$> 30^\circ/\text{s}$ (B-axis)
Positioning accuracy	$\pm 0,1^\circ$ (all axes)

Profile measurement (Z-Axis)

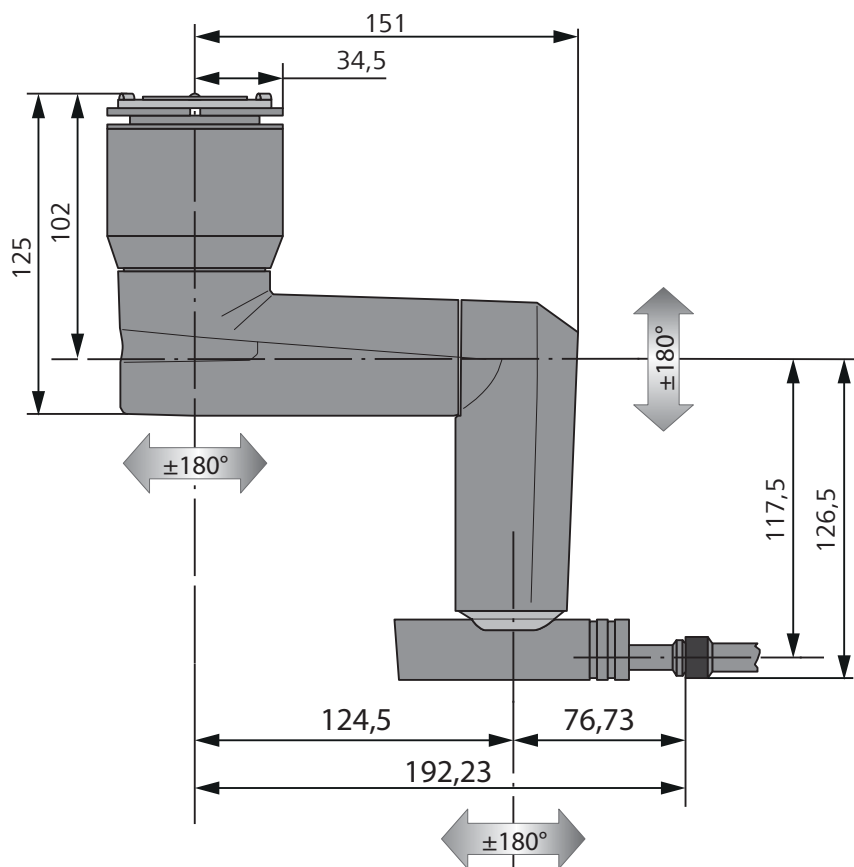
Resolution (digital)	0,005 μm
Measuring force	Stylus tip 5 mN, Skid 200 mN

Tracing driver (X-Axis)

Measuring range	up to 15 mm
Resolution (digital)	0,5 μm
Measurement speed	0,05 - 0,5 mm/s

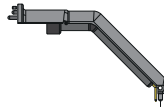
Dimensions

See drawing below	Height: 225 mm, Width: 205 mm (without stylus)
Mass	950 g
Probe Changer Rack	Minimum height (lower edge of changer rack to rack mounting level) depending on the roughness stylus used. No ZEISS ProMax changer rack permissible

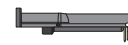


Roughness Styli - Skidless

RS-1



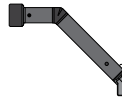
RS-5



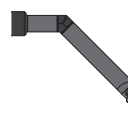
Stylus Configuration	Skidless	Skidless
Stylus tip radius / Cone Angle	2 μm / 90°	2 μm / 90°
Measuring Range (Z)	600 μm	600 μm
Accuracy (of nominal Ra) ¹⁾	$\pm 5\%$ + 60 nm	$\pm 5\%$ + 30 nm
Recommended Application	Skidless Measurements for Ra > 0.4 μm	Skidless Measurements for Ra > 0.2 μm
Wt (optical flat) ²⁾	< 0.8 μm	< 0.8 μm
Minimum Required Surface Length	Traversing length + 4 mm (+ additional 4 mm on steps)	Traversing length + 4.5 mm (+ additional 2.5 mm on steps)
Minimum Stylus Changer Rack Height	280 mm	240 mm

Roughness Styli - high accessibility - deep recess

RS-2



RS-6



Stylus Configuration	Skidded	Skidded
Stylus tip radius / Cone Angle	2 μm / 90°	2 μm / 90°
Measuring Range (Z)	600 μm	600 μm
Accuracy (of nominal Ra) ¹⁾	$\pm 5\%$ + 15 nm	$\pm 5\%$ + 15 nm
Recommended Application	Universal stylus, best performance for Ra > 0.05 μm	Short traversing length / measurement in grooves for Ra > 0.2 μm
Minimum Required Surface Length	Traversing length + 6.5 mm (+ additional 2 mm on steps)	Traversing length + 1.5 mm (+ additional 2 mm on steps)
Minimum Stylus Changer Rack Height	280 mm	280 mm

Roughness Styli - hole inspection - small bore

RS-3



RS-4



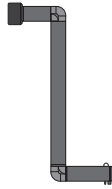
Stylus Configuration	Skidded	Skidded
Stylus tip radius / Cone Angle	2 μm / 90°	2 μm / 90°
Measuring Range (Z)	600 μm	600 μm
Accuracy (of nominal Ra) ¹⁾	$\pm 5\%$ + 30 nm	$\pm 5\%$ + 30 nm
Recommended Application	For bore holes (diameter > 5 mm, up to a depth of 40 mm) for Ra > 0.2 μm	For blind holes (diameter > 5 mm, up to a depth of 40 mm) for Ra > 0.2 μm
Minimum Required Surface Length	Traversing length + 3.5 mm (+ additional 2 mm on steps)	Traversing length + 4.5 mm (+ additional 2 mm on steps)
Minimum Stylus Changer Rack Height	230 mm	230 mm

1) Type C gage (Ra = 0.5 or 3.0 μm with filter $l_c = 0.8$ mm according ISO 3274, tracing speed = 0.5 mm/s) according to ISO 5436-1 available for check (different accuracy depending on machine size and environment vibrations possible).

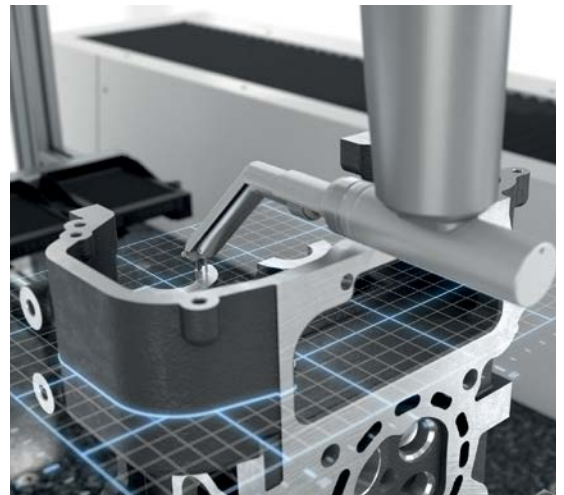
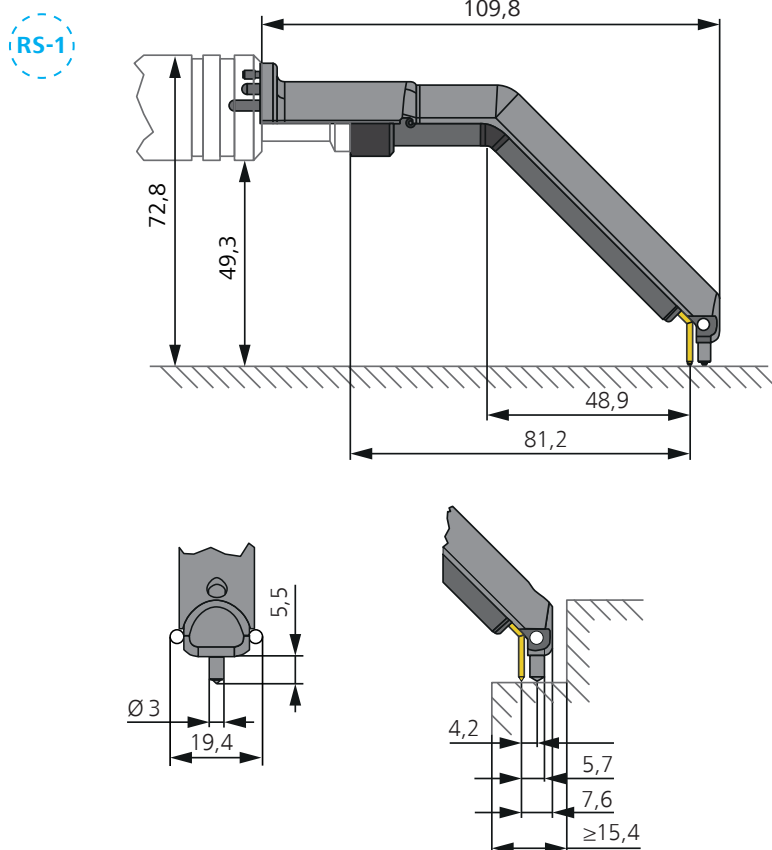
2) Wt for filter $l_c = 2.5$ mm, measurement length 15 mm, profile removal at start-/end, tracing speed = 0.5 mm/s (different accuracy depending on machine size and environment vibrations possible).

Roughness Styli - Powertrain

RS-8

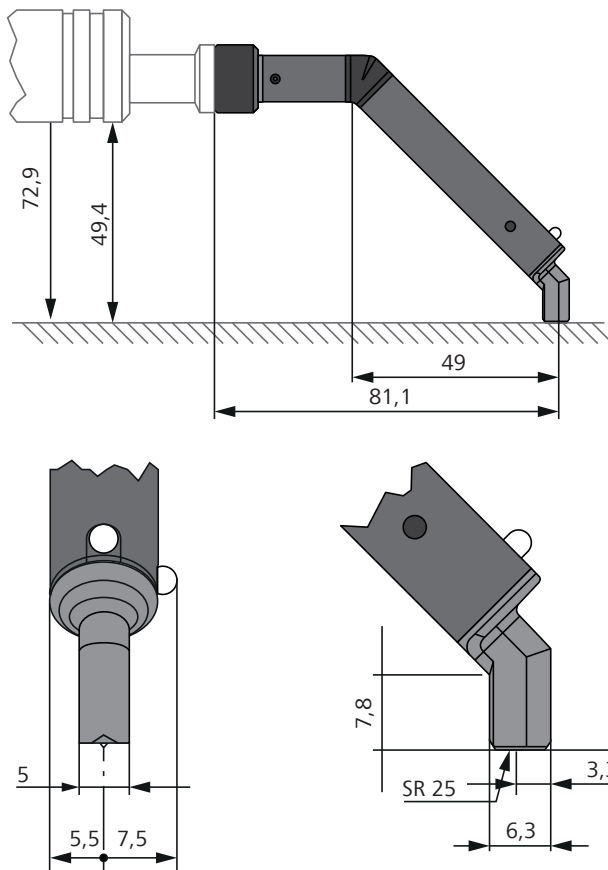


Stylus Configuration	Skidded
Stylus tip radius / Cone Angle	2 µm / 90°
Measuring Range (Z)	600 µm
Accuracy (of nominal Ra) ¹⁾	± 5 % + 30 nm
Recommended Application	For crankshaft and camshaft bearings for Ra > 0,2 µm
Minimum Required Surface Length	Traversing length + 3.5 mm (+ additional 2 mm on steps)
Minimum Stylus Changer Rack Height	320 mm



- 1) Type C gage (Ra = 0.5 or 3.0 µm with filter lc = 0.8 mm according ISO 3274, tracing speed = 0.5 mm/s) according to ISO 5436-1 available for check (different accuracy depending on machine size and environment vibrations possible).
- 2) Wt for filter lc = 2.5 mm, measurement length 15 mm, profile removal at start-/end, tracing speed = 0.5 mm/s (different accuracy depending on machine size and environment vibrations possible).

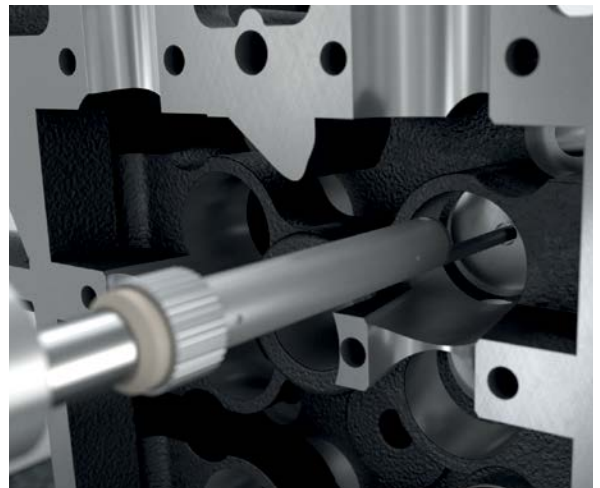
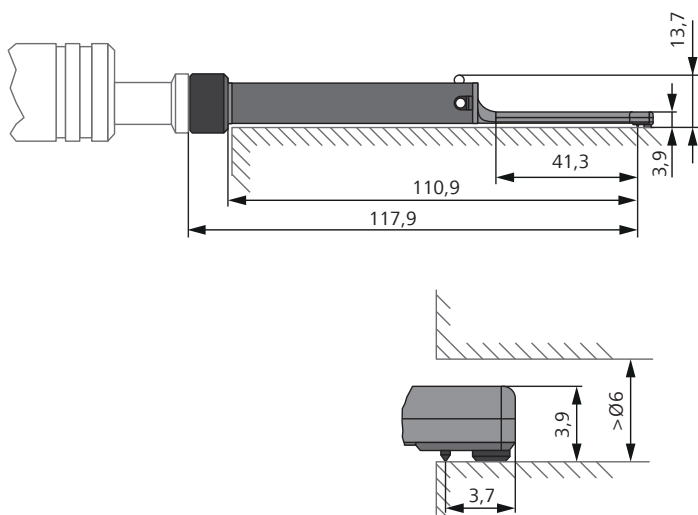
RS-2



RS-1 / RS-2 for ZEISS ROTOS

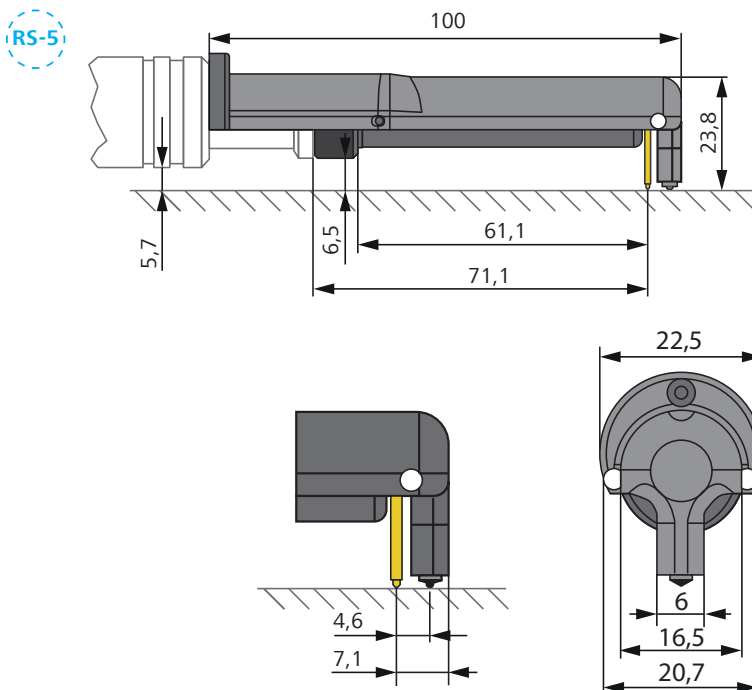
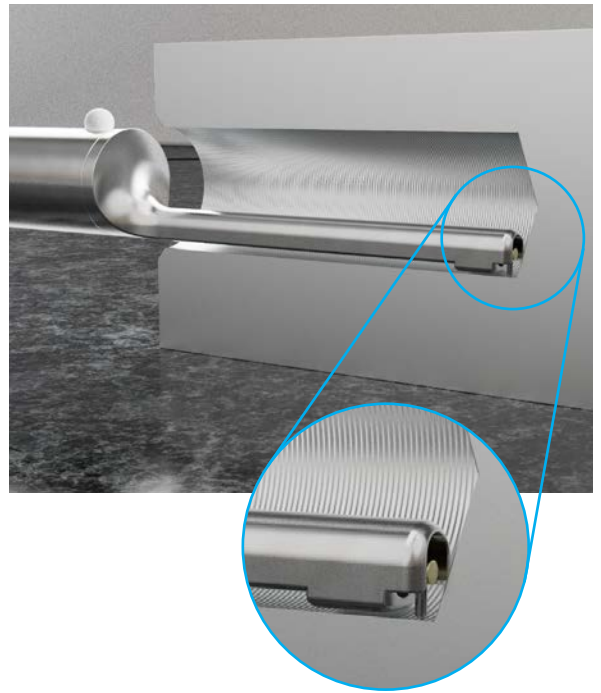
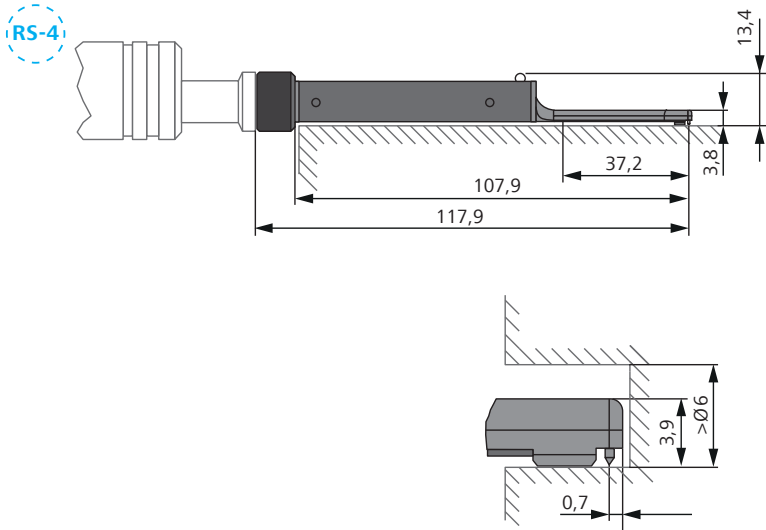
Offset stylus arm for standard applications and optimum accessibility. Also suitable for measuring recessed surfaces

RS-3



RS-3 / RS-4 for ZEISS ROTOS

Small diameter stylus arm for small diameters, e.g. measuring valve guides.

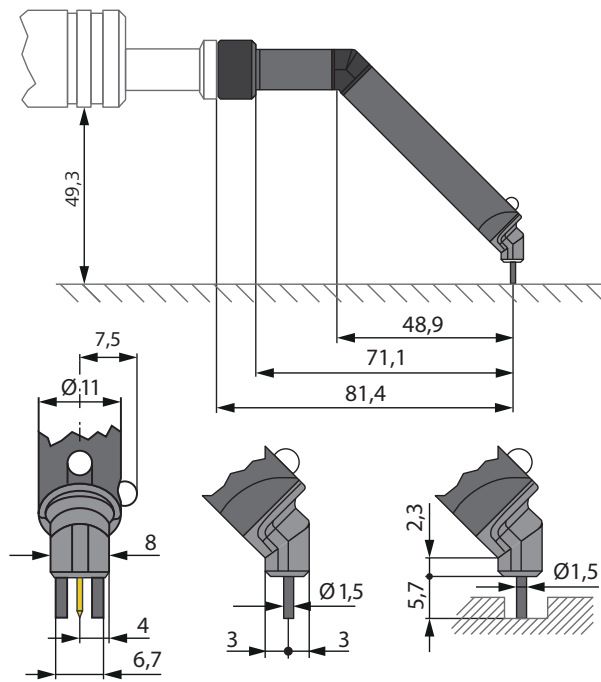


RS-5 for ZEISS ROTOS

Skidless stylus arm for evaluation of waviness and bearing area curve.

Also suitable for measuring on curved surfaces.

RS-6

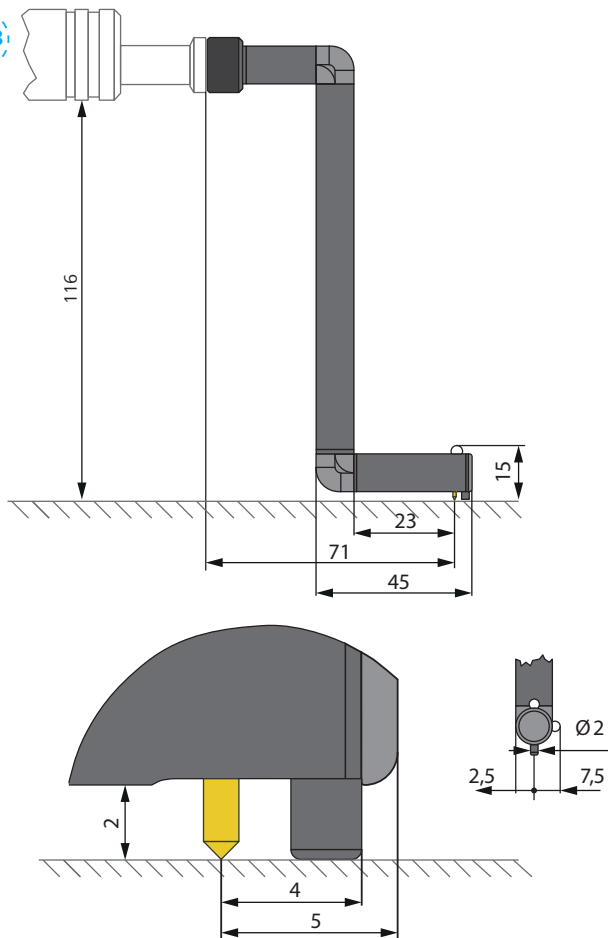


RS-6 for ZEISS ROTOS

Offset stylus arm for measuring inside of sealing ring grooves.

Tracing direction perpendicular to groove direction.

RS-8



RS-8 for ZEISS ROTOS

Cranked stylus arm for measuring in crankshaft and camshaft bearings

Filtering (ZEISS CALYPSO Option Roughness)

Standard Cut-off Lengths (λ_c)	0.08 mm, 0.25 mm, 0.8 mm, 2.5 mm
Standard Short Cut-off Lengths (λ_s)	2.5 μ m, 8 μ m (auto)
Available Filters	Gaussian (ISO 16610-21), Robust Gaussian (ISO 16610-31), Valley suppressing (ISO 13565-1)

Surface profile parameters (ZEISS CALYPSO Option Roughness)

Primary Parameters	ISO 4287	Pa, Pq, Pt, Pz, Pp, Pv, Psk, Pku, P Δ q, Pc, PSm, Pmr, P Δ c, Ppc
Waviness Parameters	ISO 4287 VDA 2007	Wa, Wq, Wt, Wz, Wp, Wv, Wsk, Wku, W Δ q, Wc, WSm, Wmr, Wmr(c), W Δ c, Wpc, Wdc, Wdt, WDSm
Roughness Parameters	ISO 4287 ISO 8503 DBN 31007 VDA 2006	Ra, Rq, Rt, Rz, R3z, Rp, Rv, Rsk, Rku, R Δ q, Rc, RSm, Rmr, Rmr(c), R Δ c, Rpc, R _{ys} , (RzDIN) R3z Rmax
Material Ratio Parameters	ISO 13565-1	Rk, Rpk, Rvk, Mr1, Mr2, A1, A2
Motif Parameters	ISO 12085	AR, R, Rx, AW, W, Wx, Wte

Requirements

Software	ZEISS CALYPSO 6.6 (2018) and later releases
CMM Configuration	ZEISS PRISMO and ZEISS CenterMax with C99 and USS 2.0; 500 mm < Z \leq 1000 mm ZEISS MMZ G Z \leq 2500 mm, ZEISS MMZ M and ZEISS MMZ T with ZEISS VAST gold Not compatible with ZEISS LineScan
Temperature	Operating temperature range +16 °C to +40 °C
Vibration Limits	see limitation curves of installation instructions, additional influences due to dedicated environment vibrations possible
Reference sphere	8 mm qualification sphere for geometry qualification required
Roughness qualification	Roughness qualification kit required

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