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system components for integrators

dynAXIS[®] galvanometer scanners are high-performance rotary motors for optical applications. They consist of a motor section based on moving magnet technology and a high-precision position detector. The primary area of application is the fast and precise positioning of mirrors for the deflection of laser beams.

The exceptional dynamics of SCANLAB's dynAXIS[®] scanners are the result of years of experience in developing and manufacturing scanners, scan systems and scan solutions for industrial use.

The motor section of each dynAXIS[®] is ideally matched to the deflection mirror's inertial load. The optimized rotor design is largely responsible for the favorable dynamic properties and resonance characteristics. Axially pre-loaded precision ball bearings guarantee a backlash-free rotor assembly with high stiffness and low friction. Special attention has been paid to long bearing lifetimes.

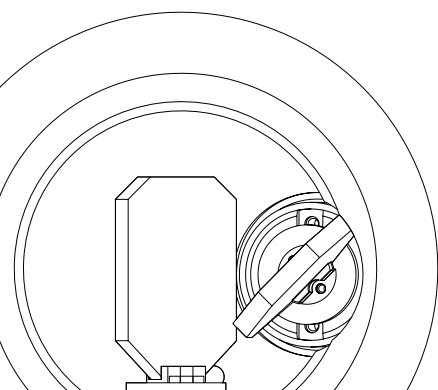
The optical position detector system is characterized by high resolution, as well as good repeatability and drift values. The scanners

are equipped with heaters and temperature sensors (except dynAXIS[®] XS and dynAXIS[®] T). This allows temperature stabilization for further enhancing long-term stability, even under fluctuating ambient conditions.

The new scanners of the dynAXIS[®] 3 series feature a revised position detector for exceptionally low drift, highest linearity and, optionally, extended deflection angles.

For all dynAXIS[®] scanners, SCANLAB provides suitable mirrors and mirror coatings for all common laser wavelengths and power levels. In addition to excellent reflection properties, the mirrors are also optimized with respect to inertial load, stiffness and flatness.

The high quality of SCANLAB's galvanometer scanners enables error-free operation in long-term and continuous use. Comprehensive measurements on custom test benches assure that the highest level of quality is continuously maintained.



Mounting

A rotation-symmetric flange facilitates mounting of the galvanometer scanner. When mounting, ensure that the galvanometer housing is electrically insulated from the machine assembly. Mirror stoppers are already integrated in the scanners.

Mirrors are directly bonded to the galvanometer's shaft. The mirrors of the dynAXIS[®] M and dynAXIS[®] L are attached via a mirror mount to the shaft.

Type-Dependent Specifications

| | dynAXIS [®] , dynAXIS [®] 3 ⁽¹⁾ | | | | |
|---|--|-----------------------------|------------------------|-----------------------|-----------------------|
| | XS | T | S | M | L |
| Rotor inertia ⁽²⁾ | 0.028 g·cm ² | 0.125 g·cm ² | 0.34 g·cm ² | 1.2 g·cm ² | 5.1 g·cm ² |
| Torque constant | 2.3 N·mm/A | 5.3 N·mm/A | 7.5 N·mm/A | 15 N·mm/A | 24 N·mm/A |
| Coil resistance | 3.9 Ω | 2.8 Ω | 2.7 Ω | 2.2 Ω | 0.85 Ω |
| Coil inductance | 90 μH | 145 μH | 165 μH | 275 μH | 300 μH |
| Max. RMS current (max. case temp. 50 °C) | 1.8 A | 2.2 A | 2.5 A | 3.5 A | 5 A |
| Peak current | 6 A | 10 A | 10 A | 10 A | 15 A |
| Weight | | | | | |
| Without cable | approx. 25 g | approx. 40 g ⁽⁵⁾ | approx. 220 g | approx. 300 g | approx. 400 g |
| Connector | | | | | |
| Without heater ⁽³⁾ | DE9M | DE9M | | | |
| With heater ⁽³⁾ | | DA15F | DA15F | DA15F | DA15F |
| Inertial load | | | | | |
| Recommended | 0.02 g·cm ² | 0.1 g·cm ² | 0.35 g·cm ² | 1.2 g·cm ² | 8 g·cm ² |
| Maximum | 0.05 g·cm ² | 0.5 g·cm ² | 1.5 g·cm ² | 6 g·cm ² | 25 g·cm ² |
| Recommended aperture | 7 mm | 8.5 mm | 10 mm | 14 mm | 20 – 30 mm |

Dynamic performance

(with SCANLAB control board)

| Step response time 1% of full scale ⁽⁴⁾ | 0.17 ms | 0.19 ms | 0.25 ms | 0.35 ms | 0.55 ms |
|--|---------|---------|---------|---------|---------|
|--|---------|---------|---------|---------|---------|

⁽¹⁾ only available as dynAXIS[®] 3T, 3S, 3M and 3L

⁽²⁾ dynAXIS[®] XS, S and T with integrated mirror mount, dynAXIS[®] M and L without mirror mount

⁽³⁾ D-sub plugs resp. sockets; heating available for dynAXIS[®] 3T, but not dynAXIS[®] XS or dynAXIS[®] T

⁽⁴⁾ rated for 1/1000 of full scale, with mirrors for the recommended aperture

⁽⁵⁾ weight for dynAXIS[®] 3T: approx. 100 g

Common Specifications

(with SCANLAB control board, all angles are in mechanical degrees)

| | dynAXIS [®] | dynAXIS [®] 3 ⁽⁶⁾ |
|--------------------|----------------------|---------------------------------------|
| Maximum scan angle | ±12° | up to ±20° |

Position detector

| | | |
|-----------------------------|-------------|---------------------------|
| Nonlinearity ⁽⁷⁾ | < 0.4 % | < 0.1 % |
| Offset drift | < 15 μrad/K | < 3 μrad/K ⁽⁸⁾ |
| Gain drift | < 50 ppm/K | < 12 ppm/K ⁽⁸⁾ |
| Repeatability | < 5 μrad | < 5 μrad |
| Typical output signal | | |
| - differential mode | -11 μA/° | -10.5 μA/° |
| - common mode | -140 μA | -110 μA |
| Supply current | 35 – 60 mA | max. 45 mA |

Heater⁽³⁾

| | |
|-------------------------------|-----------------------------------|
| Heater resistance | 120 Ω |
| Temperature sensor resistance | 1000 Ω at 25 °C 578 Ω at 40 °C |
| Max. heater current | 0.25 A |

Cable length standard 0.22 m

Installation electrically insulated

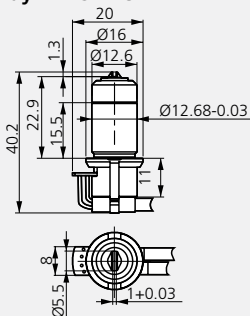
Operating temperature 5 – 50 °C noncondensing

⁽⁶⁾ only available as dynAXIS[®] 3T, 3S, 3M and 3L; preliminary values

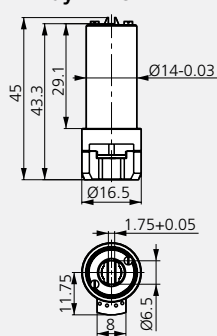
⁽⁷⁾ peak to peak value; for scan angles from -11° to +11°

⁽⁸⁾ without temperature control < 5 μrad/K and < 25 ppm/K

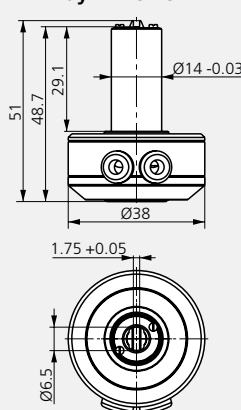
dynAXIS[®] XS



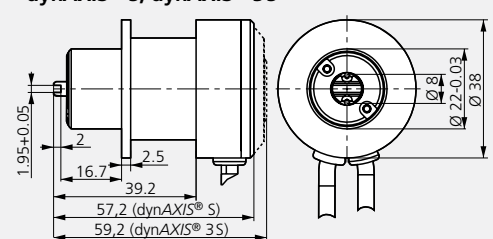
dynAXIS[®] T



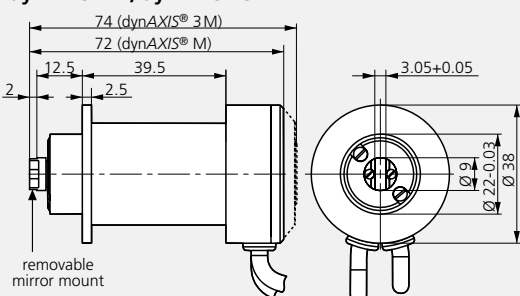
dynAXIS[®] 3T



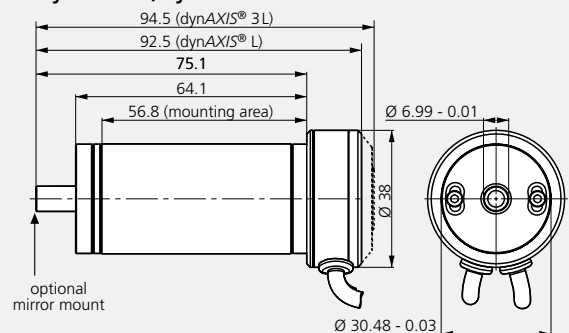
dynAXIS[®] S, dynAXIS[®] 3S



dynAXIS[®] M, dynAXIS[®] 3M



dynAXIS[®] L, dynAXIS[®] 3L



all dimensions in mm

03/2012. Information is subject to change without notice.