

6-Axis Force Sensor K6D175 10kN/1kNm/UP13

Item number: 10099



The K6D175 multi-axis sensor is designed for measuring force and torque in three mutually perpendicular axes.

The measurement ranges for the forces and moments can be factory adapted in a wide range. The K6D175 was developed for the following applications:

- Robotics
- Measurements in automation technology.

The force and torque loadings are evaluated e.g. using GSV-8DS SubD44HD or GSV-8AS measurement amplifier. The 6 load values can be calculated using a Windows DLL or using LabVIEW with the aid of a digital calibration document provided.

The calibration document contains the individual calibration factors and error corrections for the sensor.

Technical Data

| Basic Data | | Unit |
|----------------------|----------------------|------|
| Type | 6-Achsen Kraftsensor | |
| Force direction | Tension/Compression | |
| Rated force Fx | 10 | kN |
| Rated force Fy | 10 | kN |
| Rated force Fz | 20 | kN |
| Force introduction | Innengewinde | |
| Dimension 1 | 6x M16x2 | |
| Sensor Fastening | internal thread | |
| Dimension 2 | 6x M16x2 | |
| Operating force | 200 | %FS |
| Rated displacement | 0.1 | mm |
| Twist | 0.01 | rad |
| Material | Stainless steel | |
| Natural frequency | 1.2 | kHz |
| Dimensions | Ø175 x 110 | |
| Height | 110 | mm |
| Length or Diameter | 175 | mm |
| Rated torque Mx | 1 | kNm |
| Rated torque My | 1 | kNm |
| Rated torque Mz | 1 | kNm |
| Torque limit | 300 | %FS |
| Bending moment limit | 300 | %FS |
| Variants | 10kN... 50kN | |

| Electrical Data | | Unit |
|--|-------|-------------|
| Input resistance | 350 | Ohm |
| Tolerance input resistance | 10 | Ohm |
| Output resistance | 350 | Ohm |
| Tolerance output resistance | 10 | Ohm |
| Insulation resistance | 2 | GOhm |
| Rated range of excitation voltage from | 2.5 | V |
| Rated range of excitation voltage to | 5 | V |
| Operating range of excitation voltage from | 1 | V |
| Operating range of excitation voltage to | 10 | V |
| Zero signal from | -0.05 | mV/V |
| Zero signal to | 0.05 | mV/V |
| Characteristic value range from | 0.45 | mV/V |
| Characteristic value range to | 0.7 | mV/V |

| Eccentricity and Crosstalk | | Unit |
|-----------------------------------|---|-------------|
| Crosstalk | 1 | %FS |

| Accuracy Data | | Unit |
|--|------|-------------|
| Accuracy class | 0,5 | |
| Relative linearity error | 0.1 | %FS |
| Relative zero signal hysteresis | 0.1 | %FS |
| Temperature effect on zero signal | 0.1 | %FS/K |
| Temperature effect on characteristic value | 0.05 | %RD/K |
| Relative creep | 0.1 | %FS |
| Relative repeatability error | 0.5 | %FS |

| Environmental Data | | Unit |
|----------------------------------|------|------|
| Rated temperature range from | -10 | °C |
| Rated temperature range to | 70 | °C |
| Operating temperature range from | -10 | °C |
| Operating temperature range to | 85 | °C |
| Storage temperature range from | -10 | °C |
| Storage temperature range to | 85 | °C |
| Environmental protection | IP65 | |

Abbreviation : RD: „Reading“; FS: „Full Scale“; The application of a calibration matrix is required for the determination of the forces F_x , F_y , F_z and moments M_x , M_y , and M_z from the 6 measurement channels, and to compensate for the crosstalk.

The calibration data are individually determined and documented for the sensor.

The measurement error is expressed individually by the specification of the extended measurement uncertainty ($k = 2$) for the forces F_x , F_y , F_z , and moments M_x , M_y , M_z .

Pin Assignment

| Channel | Symbol | Description | Wire color | PIN |
|---------|--------|------------------------|--------------|-----|
| 1 | +Us | positive bridge supply | green | 4 |
| | -Us | negative bridge supply | yellow | 3 |
| | +Ud | positive bridge output | white | 9 |
| | -Ud | negative bridge output | brown | 8 |
| 2 | +Us | positive bridge supply | blue | 10 |
| | -Us | negative bridge supply | red | 11 |
| | +Ud | positive bridge output | gray | 2 |
| | -Ud | negative bridge output | pink | 1 |
| 3 | +Us | positive bridge supply | gray-pink | 6 |
| | -Us | negative bridge supply | red-blue | 5 |
| | +Ud | positive bridge output | black | 12 |
| | -Ud | negative bridge output | purple | 7 |
| 4 | +Us | positive bridge supply | white-yellow | 23 |
| | -Us | negative bridge supply | yellow-brown | 18 |
| | +Ud | positive bridge output | white-green | 21 |
| | -Ud | negative bridge output | brown-green | 22 |
| 5 | +Us | positive bridge supply | white-pink | 15 |
| | -Us | negative bridge supply | brown-pink | 14 |
| | +Ud | positive bridge output | white-gray | 17 |
| | -Ud | negative bridge output | gray-brown | 16 |
| 6 | +Us | positive bridge | white-red | 20 |

| | | | | |
|-----|--------|------------------------|-------------|----|
| | | supply | | |
| -Us | | negative bridge supply | brown-red | 24 |
| +Ud | | positive bridge output | white-blue | 13 |
| -Ud | | negative bridge output | brown-blue | 19 |
| - | shield | | transparent | |

Shield: connected with sensor housing;

Mounting

The force is applied to an annulus/to 6 segments of a circle, 155 mm – 140 mm in diameter, on the end faces of the sensor. No force is applied to the area inside the 140 mm in diameter ring.

The areas outside the annuli can be used for centring purposes. A centring hole is provided to secure the angular position.

Recommended tightening torque: 250Nm.