

6-Axis Force Sensor K6D80ri 1kN/100Nm/EC

Item number: 16682



Highlights

- Robotic Flange ISO 9409-1-50-4-M6
- EtherCAT P

The K6D80ri 6-axis force-torque sensor, featuring an ISO 9409-1-50-4-M6 robot flange, was developed specifically for demanding applications in robotics, medical technology, and industrial automation.

Thanks to the integrated EtherCAT P signal conditioner, power supply and digital data transmission are handled via a single 4-core connection cable. The cable connects via a strain-relieved plug beneath the mounting plate and can be easily replaced if necessary.

The K6D80ri multi-component sensor simultaneously measures forces and torques in all three spatial directions (F_x , F_y , F_z , M_x , M_y , M_z). A key feature is its wide torque measurement range combined with compact dimensions and a small outer diameter.

Typical application areas

- Collision detection and robot motion monitoring
- Teach-in procedures and force-guided robot programming
- Presence and error detection
- Force and torque-controlled systems
- Load measurements in medical technology, prosthetics, and orthopedics
- Gait analysis and biomechanical studies
- Sports medicine measurements
- Comfort and ergonomics measurements

Measurement principle and signal processing

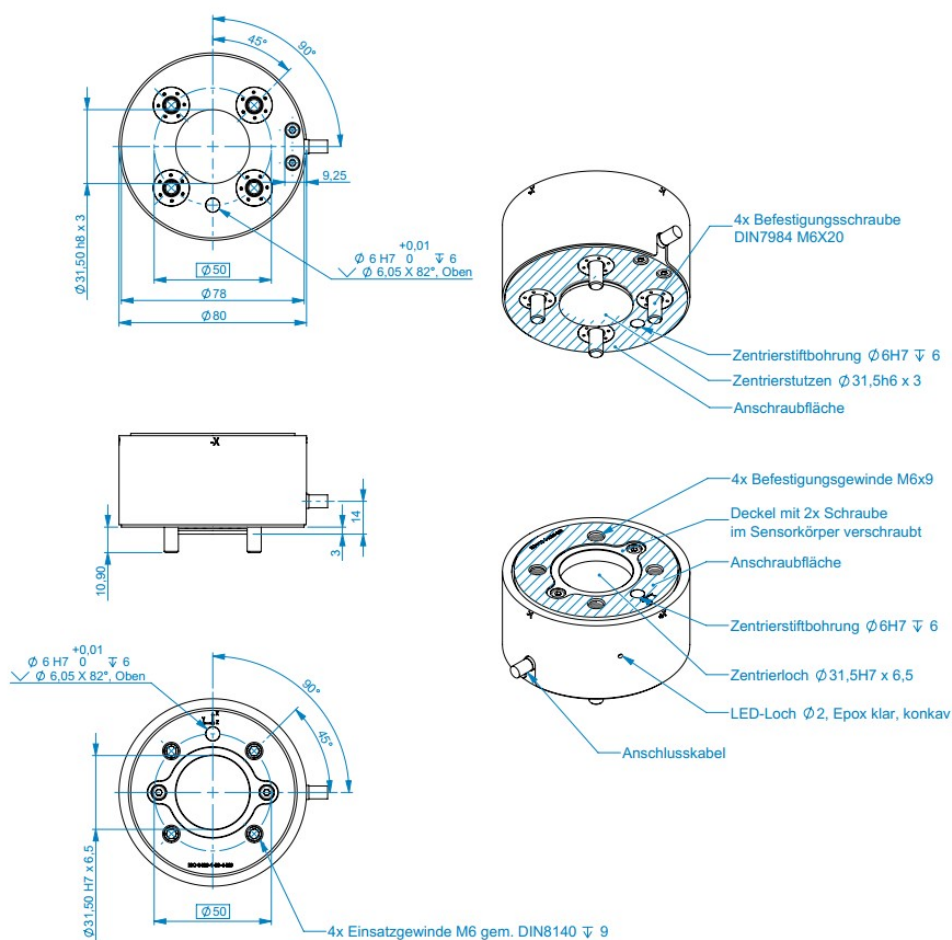
The K6D80ri is based on a hexapod measurement structure, in which applied forces and torques are captured by six sensing elements. The six force and torque components are calculated using an individually determined 6×6 calibration matrix. This process assigns the superimposed measurement signals to the individual force and torque axes and reduces residual crosstalk to typically less than 4%. Signal conditioning and digital data transmission

are handled by the integrated GSV-61i measuring amplifier with an EtherCAT-P interface. The K6D80ri (1 kN / 100 Nm version) is manufactured from a high-quality aluminum alloy.

Optional special versions

- IP68 protection rating: for nominal forces of 200 N and above
- Extended temperature range: -40 °C to +85 °C
- Vacuum version: for vacuum applications down to a residual pressure of 10^{-5} mbar
- Pressure-resistant version: up to 8 bar

Technical Drawing



Technical Data

Basic Data		Unit
Type	6-axis force sensor	
Force direction	Tension/Compression	
Rated force Fx	1	kN
Rated force Fy	1	kN
Rated force Fz	2.5	kN
Force introduction	Internal thread	
Dimension 1	Robotic Flange ISO 9409-1-50-4-M6	
Sensor Fastening	Ringfläche	
Dimension 2	Robotic Flange ISO 9409-1-50-4-M6	
Operating force	300	%FS
Rated displacement	0.05	mm
Twist	0.04	rad
Material	aluminum-alloy	
Natural frequency fx	2.4	kHz
Height	60	mm
Length or Diameter	80	mm
Rated torque Mx	100	Nm
Rated torque My	100	Nm
Rated torque Mz	100	Nm
Torque limit	300	% FS
Bending moment limit	300	% FS
Breaking force	600	%
merkmal_de	EtherCAT P, Robotik Flansch	
merkmal_en	EtherCAT P, Robotic Flange	

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	5	V
Zero signal from	-0.05	mV/V
Zero signal to	0.05	mV/V
Characteristic value range from	0.5	mV/V
Characteristic value range to	0.8	mV/V

Eccentricity and Crosstalk		Unit
Crosstalk	1	%FS

Accuracy Data		Unit
Accuracy class	0,2	
Relative linearity error	0.2	%FS
Relative zero signal hysteresis	0.2	%FS
Temperature effect on zero signal	0.2	%FS/K
Temperature effect on characteristic value	0.05	%RD/K
Relative creep	0.1	%FS
Relative repeatability error	0.2	%FS

Environmental Data		Unit
Rated temperature range from	-10	°C
Rated temperature range to	50	°C
Operating temperature range from	-10	°C
Operating temperature range to	65	°C
Storage temperature range from	-10	°C
Storage temperature range to	65	°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 .

Mounting

Stiffness Matrix

25.2 kN/mm	0.0	0.0	0.0	629.3 kN	0.0
0.0	25.2 kN/mm	0.0	-629.3 kN	0.0	0.0
0.0	0.0	136.9 kN/mm	0.0	0.0	0.0
0.0	-629.3 kN	0.0	63.6 kNm	0.0	0.0
629.3 kN	0.0	0.0	0.0	63.6 kNm	0.0
0.0	0.0	0.0	0.0	0.0	35.2 kNm

- Die Elemente mit der Einheit kN/mm beschreiben den Zusammenhang zwischen Kraft und Weg.
- Die Elemente mit der Einheit kNm beschreiben den Zusammenhang zwischen Drehmoment und Verdrillung.
- Die Elemente mit der Einheit kN beschreiben den Zusammenhang zwischen Drehmoment und Weg (Spalte 1 bis 3) bzw. den Zusammenhang zwischen Kraft und Verdrillung (Spalte 4 bis 6)