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# K6D150 30kN/3kNm/MP11

## Description

The multi-component sensor K6D150 allows force and torque measurement in three mutually perpendicular axes.
The multi-component sensor K6D150 is characterized by a big measuring range for forces and torques.
With this multi-component sensor of the „second generation“ is used rod construction, which absorbs forces and torques directly on the pitch circle of the fastening thread.
The force transmission is applied on the 1 mm raised segments. The inner diameter of segments is used for the centering. Due to segmented, ring-shaped front surface, the optimal force transmission and therefore the best possible reproducibility in the range of about 0,1 % will be obtained.

The multi-component force sensor is very well suited for use in robotics, e.g.

- For collision detection
- "Teach-In"
- Collision detection
- Force or torque-controlled operation
- Load measurement in medicine, prosthetics, orthopaedic engineering
- Measurement in sports medicine
- Comfort / ergonomics measurements

The force and torque loadings are evaluated e.g. using a GSV-8DS measurement amplifier.
The sensor K6D150 2kN/200Nm and 10kN/1kNm is made of aluminium alloy, the sensor K6D150 30kN/3kNm is made of high-strength stainless steel 1.4542.

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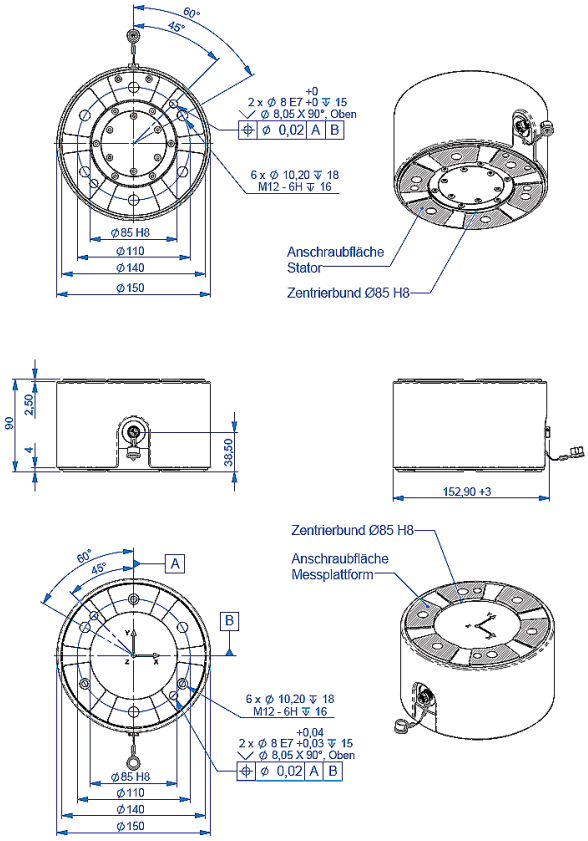
## Dimensions



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## Technical Data

### Force sensor

| | | |
|---|---|---|
| Type | 6-Axis force sensor | |
| Force direction | Tension / Compression | |
| Rated force Fx | 30 | kN |
| Rated force Fy | 30 | kN |
| Rated force Fz | 90 | kN |
| Force introduction | Inner thread | |
| Dimension 1 | 6xM12x1,75 | |
| Sensor Fastening | Inner thread | |
| Dimension 2 | 6xM12x1,75 | |
| Operating force | 300 | %FS |
| Dimensions | Ø150 x 90 | mm |
| Height | 90 | mm |
| Length or Diameter | 150 | mm |
| Rated torque Mx | 3 | kNm |
| Rated torque My | 3 | kNm |
| Rated torque Mz | 3 | kNm |
| Torque limit | 300 | %FS |
| Bending moment limit | 200 | %FS |

### Electrical Data

| | | |
|---|---|---|
| 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 f | 2.5 ... 5 | V |
| Operating range of excitation voltage f | 1 ... 5 | V |
| Zero signal to | -0.05 | mV/V |
| Zero signal from | 0.05 | mV/V |
| Rated output | 0.8 | mV/V |

### Precision

| | | |
|---|---|---|
| Accuracy class | 0,2% | |
| 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 | 0.01 | %RD/K |
| Relative creep | 0.1 | %FS |
| Relative repeatability error | 0.5 | %FS |

### Connection Data

| | | |
|---|---|---|
| Connection type | Connector | |

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| | | |
|---|---|---|
| Name of the connection | round plug connector MP11, 24-pole, male | |

### Eccentricity and Crosstalk

| | | |
|---|---|---|
| Crosstalk | 1 | %FS |

### Temperature

| | | |
|---|---|---|
| Rated temperature range f | -10 ... 70 | °C |
| Operating temperature range f | -10 ... 85 | °C |
| Storage temperature range f | -10 ... 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 Fx, Fy, Fz and moments Mx, My, and Mz 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 Fx, Fy, Fz, and moments Mx, My, Mz.*

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## Manual

### Stiffness Matrix K6D150 30kN/3kNm

| | | | | | | |
|---|---|---|---|---|---|---|
| 428.6 kN/mm | 0.0 | 0.0 | 0.0 | 19288/rad | 0.0 | $u_x$ |
| 0.0 | 428.6 kN/mm | 0.0 | -19288/rad | 0.0 | 0.0 | $u_y$ |
| 0.0 | 0.0 | 2030.7 kN/mm | 0.0 | 0.0 | 0.0 | $u_z$ |
| 0.0 | -19288/mm | 0.0 | 3189.4kNm/rad | 0.0 | 0.0 | $phi_x$ |
| 19288 kN/mm | 0.0 | 0.0 | 0.0 | 3189.4 kNm/rad | 0.0 | $phi_y$ |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1959.9 kNm/rad | $phi_z$ |

| Element | Description of the context |
|---|---|
| [kN/mm] | Force - Displacement |
| [kNm/rad] | Torque - twisting |
| [kN/mm], [kN/rad] | Force - twist and torque - displacement |

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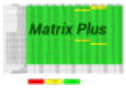
## accessories

| | Description | Description |
|---|---|---|
|  | K6D-CalibrationMatrix SL | Standard calibration matrix "Small load" for the sensors with small measuring ranges |
|   | K6D-CalibrationMatrix SL/Plus | High accuracy calibration matrix for 6-axis force/torque sensors; |
|  | GSV-8DS | 8-channel amplifier with USB port, analog output, UART interface. Other versions GSV-8AS CAN with Canbus and GSV-8AS EC with EtherCAT fieldbus. |
|  | Configuration D-Sub44/m/HD | Assembling the connector to sensor cable;<br>Connector Type SubD, 44 pins, male (male), with hood |
|  | GSV-8AS | 8-channel amplifier with USB port, analog output, UART interface. Other versions GSV-8AS CAN with Canbus and GSV-8AS EC with EtherCAT fieldbus. |
|  | Configuration 24p/m/M16 | Round plug, 24 pole, configured with sensor cable |
|  | Connection cable MP11/f-D-Sub44HD/m | Connection cable for connecting the K6D sensor to an 8-channel measuring amplifier GSV-8DS SubD44HD |
|  | Connection cable MP11/f-D-Sub44HD/m/straight | Straight connection cable for connecting the K6D sensor to an 8-channel measuring amplifier GSV-8DS SubD44HD |
|  | Connection cable MP11/f-D-Sub44HD/m/angled | Angled connection cable for connecting the K6D sensor to an 8-channel measuring amplifier GSV-8DS SubD44HD |
|  | Connection cable MP11/f-M16/24p/m | Connection cable for the K6D sensor to 8-channel measuring amplifier GSV-8AS |
|  | Connection cable MP11/f-M16/24p/m/angled | Angled connection cable for the K6D sensor to 8-channel measuring amplifier GSV-8AS |