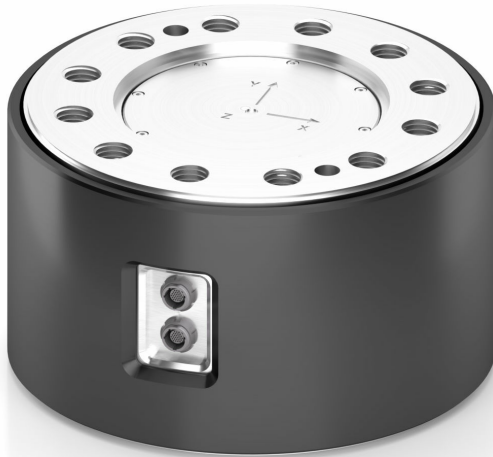


## K6D300 400kN/40kNm



### Description

The multi-component sensor K6D300 is suitable for the simultaneous force and torque measurement in three mutually perpendicular axes. The measuring ranges for the forces and torques can be adapted in a wide range. The K6D300 was designed for the following applications:

- Robotics
- Measurements in automation technology
- Aerospace

The force/torque sensor has 12 output channels. Each 6 channels are arranged with a robust connector of series UP13. The 12 measuring channels can be used for the

- optimal use of measurement accuracy in the range of 0.2% and better,
- for redundant measurement with two measuring amplifiers of series GSV-8DS.

Alternatively, the force/torque transducer can be operated with 6 channels. In this case, only a measurement amplifier of series GSV 8DS is required. The measurement accuracy is up to 20% of the measuring range in each component (FX and FY).

In conjunction with the measurement amplifier GSV-8DS the 12 measuring channels are optimally synchronized in a few nanoseconds time offset. Mathematically, a 6 x 12 matrix provides optimal error compensation and best possible accuracy.

The 6 x 12 matrix can be processed with the software GSVmulti to represent the forces and torques.

When using only 6 channels or redundant measuring the complete calculation of forces, torques and error compensation are proceed in the measuring amplifier GSV-8DS and given out as an analog signal. In this case, no PC and no external software is required.

## Technical Data

### Force sensor

Type	6-Axis force sensor
Force direction	Tension / Compression
Rated force Fx	400 kN
Rated force Fy	400 kN
Rated force Fz	800 kN
Force introduction	Inner thread
Dimension 1	12 x M30
Sensor Fastening	Inner thread
Dimension 2	12 x M30
Operating force	200 %FS
Rated displacement	0.1 mm
Twist	0.01 rad
Material	Stainless steel
Dimensions	Ø300 x 175 mm
Height	175 mm
Length or Diameter	300 mm
Rated torque Mx	40 kNm
Rated torque My	40 kNm
Rated torque Mz	40 kNm
Torque limit	300 %FS

### Electrical Data

Input resistance	350 Ohm
Tolerance input resistance	50 Ohm
Output resistance	350 Ohm
Tolerance output resistance	20 Ohm
Insulation resistance	2 GOhm
Rated range of excitation voltage f	2.5 ... 5 V
Operating range of excitation voltage f	1 ... 10 V
Zero signal	0.1 mV/V
characteristic value range min	0.4 mV/V
characteristic value range max	0.8 mV/V

### Precision

Accuracy class	0,5%
Relative linearity error	0.2 %FS
Relative zero signal hysteresis	0.02 %FS
Temperature effect on zero signal	0.02 %FS/K
Temperature effect on characteristic value	0.02 %RD/K
Relative creep	0.1 %FS

### Connection Data

Connection type	Connector
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Name of the connection 2x integrated round plug  
connector (UP13), 27-pole, male

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**Eccentricity and Crosstalk**

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Crosstalk from x to y at rated load	0.5 %FS
Crosstalk from y to x at rated load	0.5 %FS
Crosstalk from z to x/y at rated load	0.5 %FS
Crosstalk from x/y to z at rated load	0.5

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**Temperature**

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Rated temperature range f	-10 ... 70 °C
Operating temperature range f	-10 ... 85 °C
Storage temperature range f	-10 ... 85 °C
Environmental protection	IP65

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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 12 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 Configuration

Channel	Symbol	Description	Wire colour	PIN
1 and 7	+Us	positive bridge supply	yellow	14
	-Us	negative bridge supply	green	13
	+Ud	positive bridge output	white	1
	-Ud	negative bridge output	brown	5
2 and 8	+Us	positive bridge supply	gray	15
	-Us	negative bridge supply	black	16
	+Ud	positive bridge output	red	7
	-Ud	negative bridge output	pink	6
3 and 9	+Us	positive bridge supply	brown-blue	23
	-Us	negative bridge supply	white-red	24
	+Ud	positive bridge output	brown-red	12
	-Ud	negative bridge output	white-pink	4
4 and 10	+Us	positive bridge supply	white-yellow	13
	-Us	negative bridge supply	yellow-brown	20
	+Ud	positive bridge output	brown-green	9
	-Ud	negative bridge output	white-green	3
5 and 11	+Us	positive bridge supply	white-gray	21
	-Us	negative bridge supply	white-blue	22
	+Ud	positive bridge output	gray-brown	10
	-Ud	negative bridge output	pink-brown	11
6 and 12	+Us	positive bridge supply	gray-pink	18
	-Us	negative bridge supply	purple	17
	+Ud	positive bridge output	red-blue	8
	-Ud	negative bridge output	blue	2
-	shield		transparent	

*Shield: connected with sensor housing;*

*Plug connector 1: channel 1 - 6*

*Plug connector 2: channel 7 - 12*



Manual

Stiffness Matrix K6D300 400kN/40kNm

4369 kN/mm	0.0	0.0	0.0	327660 kN/rad	0.0	$u_x$
0.0	4369 kN/mm	0.0	-327660 kN/rad	0.0	0.0	$u_y$
0.0	0.0	17362 kN/mm	0.0	0.0	0.0	$u_z$
0.0	-327660 kN/mm	0.0	83363 kNm/rad	0.0	0.0	$\phi_{i_x}$
327660 kN/mm	0.0	0.0	0.0	83383 kNm/rad	0.0	$\phi_{i_y}$
0.0	0.0	0.0	0.0	0.0	59172 kNm/rad	$\phi_{i_z}$

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






## Mounting

The force is applied on a circular ring  $\varnothing 275 - \varnothing 170\text{mm}$  on the front sides of the sensor. The surface within the  $\varnothing 170\text{mm}$  circular ring remains unloaded.

The centering collar  $\varnothing 170\text{mm}$  can be used for centering. A centering hole 16E7 serves to secure the angular position.

Recommended tightening torque: 2000 Nm;

## accessories

Description	Description
	K6D-CalibrationMatrix HL Standard calibration matrix "High load" for the sensors with big measuring ranges
	Set 2x GSV-8DS Set of 2x GSV-8DS, for connecting to two 6-axis force/torque sensors or a 6-axis force/torque sensor such as K6D225 or K6D300
	Connection cable Set 2xUP13/27p/m/90°-D-Sub44HD/m Set of 2x connection cable UP13/27p/m/90°-D-Sub44HD/m
	K6D300 Transportation-Box high-quality transport box for 6-axis force sensor K6D300;
	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.