

## K6D68 1kN/20Nm, 2kN/50Nm, 5kN/50Nm, 10kN/100Nm, 10kN/500Nm



### Description

The K6D40 multi-component sensor is designed to measure the forces and torques on three mutually perpendicular axes.

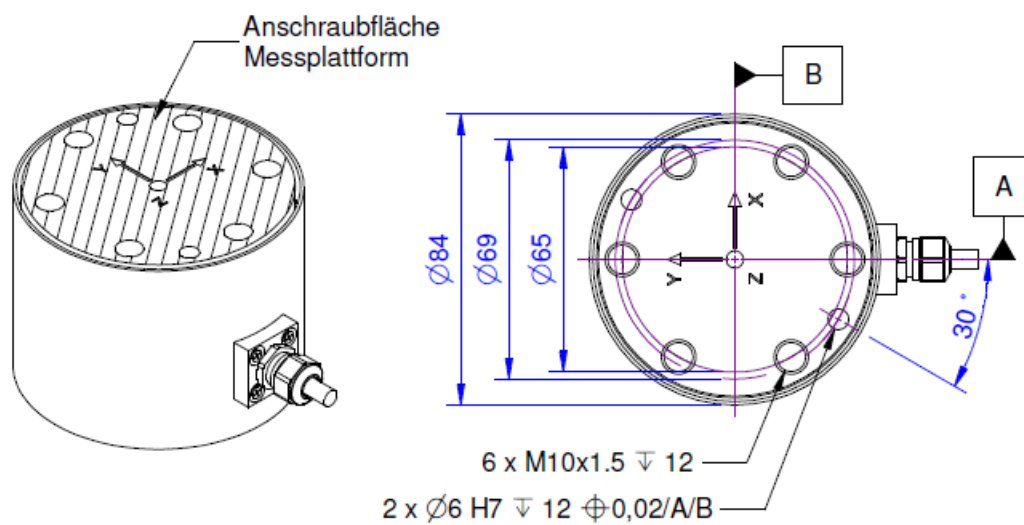
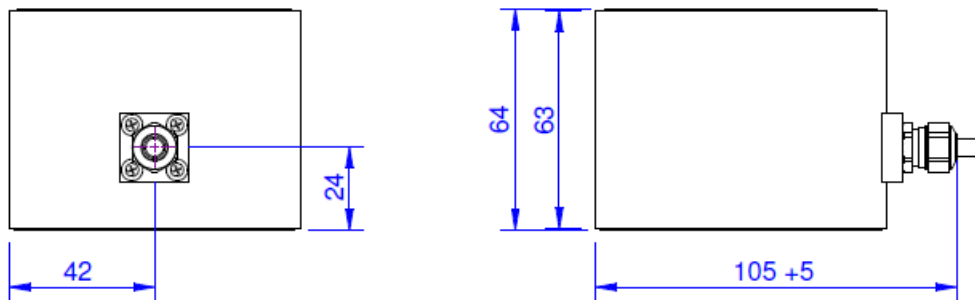
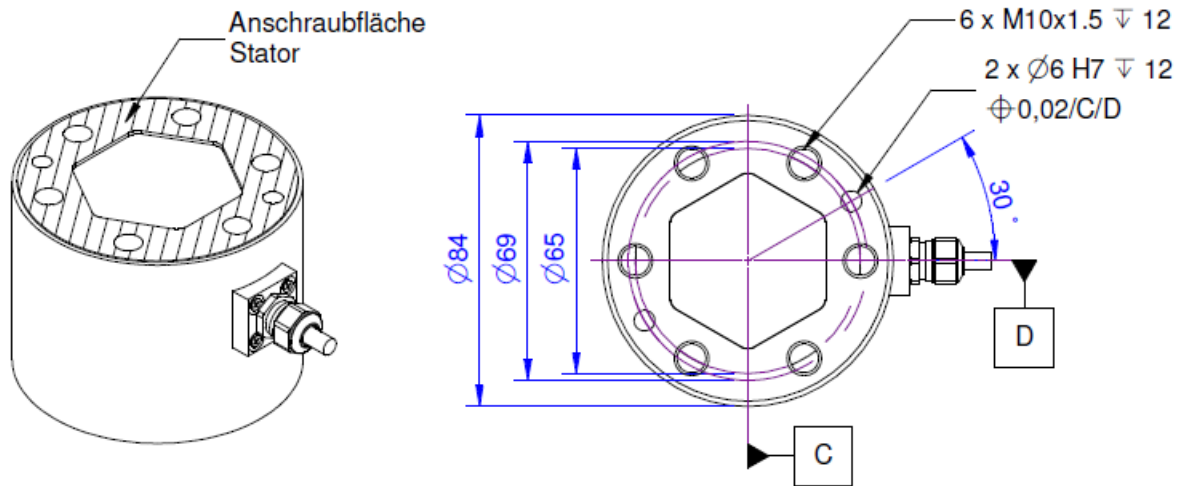
Owing to this sensor's very light weight of only 160 g (K6D40 200 N / 5 Nm) or 450 g (K6D40 500 N / 20 Nm), it is very well suited for use in robotics, e.g.

- For collision detection
- "Teach-In"
- Presence detection and error detection
- Force or torque-controlled operation
- Load measurement in medicine, prosthetics, orthopaedic engineering or gait analysis
- Measurement in sports medicine
- Comfort / ergonomics measurements
- Monitoring of joining and assembly processes

The force and torque loadings are evaluated e.g. using a GSV-8 measurement amplifier. With the Software GSVmulti, record and export the measurement results are possible. 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. Through the detailed documentation of the calculation rule is the use of 6 measuring amplifiers with analog output, for example, GSV-1H, possible with subsequent calculation on the measurement results.

The K6D40 200 N / 5 Nm sensor is made from aluminium alloy with a stainless steel housing. The K6D40 500N/20Nm sensor is made entirely of stainless steel.

Dimensions



## Technical Data

### Force sensor

Type	6-Axis force sensor
Force direction	Tension / Compression
Force introduction	Inner thread
Dimension 1	6x M10x1,5
Sensor Fastening	Inner thread
Dimension 2	6x M10x1,5
Operating force	200 % FS
Material	Stainless steel
Dimensions	Ø83 x 64 mm
Height	64 mm
Length or Diameter	83 mm
Torque limit	300 % FS
Bending moment limit	300 % 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	-1.5 mV/V
Zero signal from	1.5 mV/V
Rated output	0.4 mV/V / FS

### Precision

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

### Connection Data

Connection type	24 conductor open
Name of the connection	33-24 PUR/24x0,03 mm <sup>2</sup>
Cable length	5 m

### 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

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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 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 Configuration

Channel	Symbol	Description	Wire colour
1	+Us	positive bridge supply	red
	-Us	negative bridge supply	black
	+Ud	positive bridge output	green
	-Ud	negative bridge output	white
2	+Us	positive bridge supply	blue
	-Us	negative bridge supply	yellow
	+Ud	positive bridge output	purple
	-Ud	negative bridge output	grey
3	+Us	positive bridge supply	orange
	-Us	negative bridge supply	brown
	+Ud	positive bridge output	pink
	-Ud	negative bridge output	transparent
4	+Us	positive bridge supply	green-black
	-Us	negative bridge supply	black-white
	+Ud	positive bridge output	red-black
	-Ud	negative bridge output	white-black
5	+Us	positive bridge supply	purple-black
	-Us	negative bridge supply	yellow-black
	+Ud	positive bridge output	blue-black
	-Ud	negative bridge output	gray-black
6	+Us	positive bridge supply	pink-black
	-Us	negative bridge supply	brown-black
	+Ud	positive bridge output	orange-black
	-Ud	negative bridge output	transparent-black

Shield: connected with sensor housing;

## Manual

### Stiffness Matrix K6D68 1kN/20Nm

23.6 kN/mm	0.0	0.0	0.0	471.1 kN	0.0	$u_x$
0.0	23.6 kN/mm	0.0	-471.1 kN	0.0	0.0	$u_y$
0.0	0.0	120.6 kN/mm	0.0	0.0	0.0	$u_z$
0.0	-471.1 kN	0.0	37.7 kNm	0.0	0.0	$\phi_{i_x}$
471.1 kN	0.0	0.0	0.0	37.7 kNm	0.0	$\phi_{i_y}$
0.0	0.0	0.0	0.0	0.0	22.1 kNm	$\phi_{i_z}$

Element	Description
[kN/mm]	Force - Shift
[kNm]	Torque - Twist
[kN]	Force - Twist and Torque - Shift








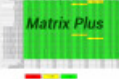


## Mounting

The forces is applied to an annulus (80 - 50 mm in diameter) on the end faces of the sensor. No force is applied to the area inside the ring.

A centring hole is provided to secure the angular position.

## accessories

Description	Description
	K6D-CalibrationMatrix SL
	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 SubD44/m/HD 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
	K6D68-Adapter VA
	K6D-Adapter Development Indicative offer for an adapter set, Consisting of e.g. 2 plates, For mounting a device / flange on K6D sensor;
	K6D-CalibrationMatrix SL/Plus High accuracy calibration matrix for 6-axis force/torque sensors;



## Orderoptions

Type	Description
K6D68 1kN/20Nm	1kN; 1kN; 2kN; 20Nm; 20Nm; 20Nm; Aluminium
K6D68 2kN/50Nm	2kN; 2kN; 5kN; 50Nm; 50Nm; 50Nm; Aluminium
K6D68 5kN/50Nm	5kN; 5kN; 10kN; 50Nm; 50Nm; 50Nm; Steel
K6D68 10kN/100Nm	10kN; 10kN; 20kN; 100Nm; 100Nm; 100Nm; Steel
K6D68 10kN/500Nm	10kN; 10kN; 20kN; 500Nm; 500Nm; 500Nm; Steel

*Fx; Fy; Fz; Mx; My; Mz; Material*