



MP11



CG



M16

Description

The multi-component sensor K6D110 allows force and torque measurement in three mutually perpendicular axes.

The multi-component sensor K6D110 is characterized by a big measuring range for torques at the same time with the small outer diameter.

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

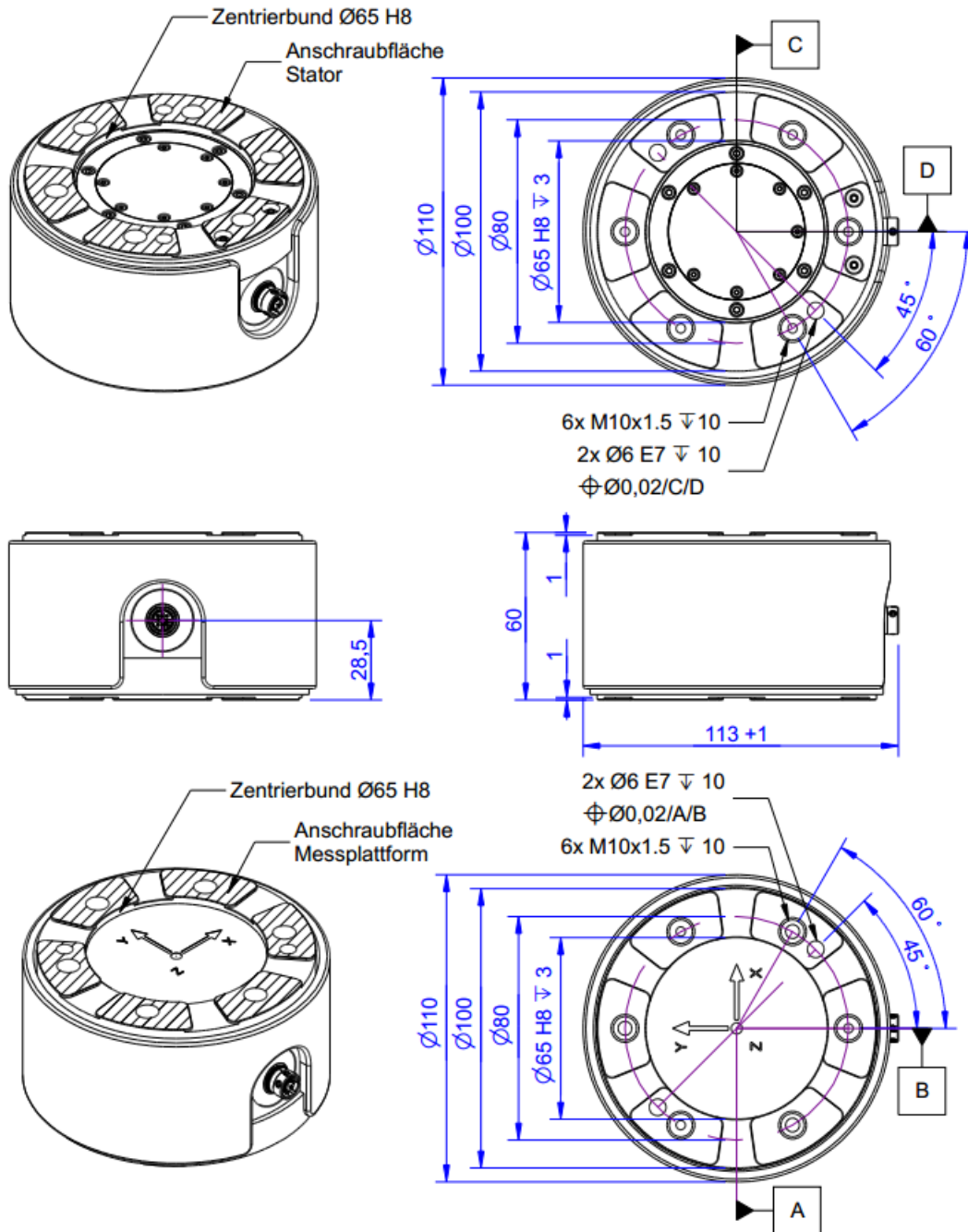
The force and torque loadings are evaluated e.g. using a GSV-8AS measurement amplifier or an integrated electronic of type GSV-6.

The sensor K6D110 4kN/250Nm is made of aluminium alloy, the sensor K6D110 10kN/750Nm is made of high-strength stainless steel 1.4542.

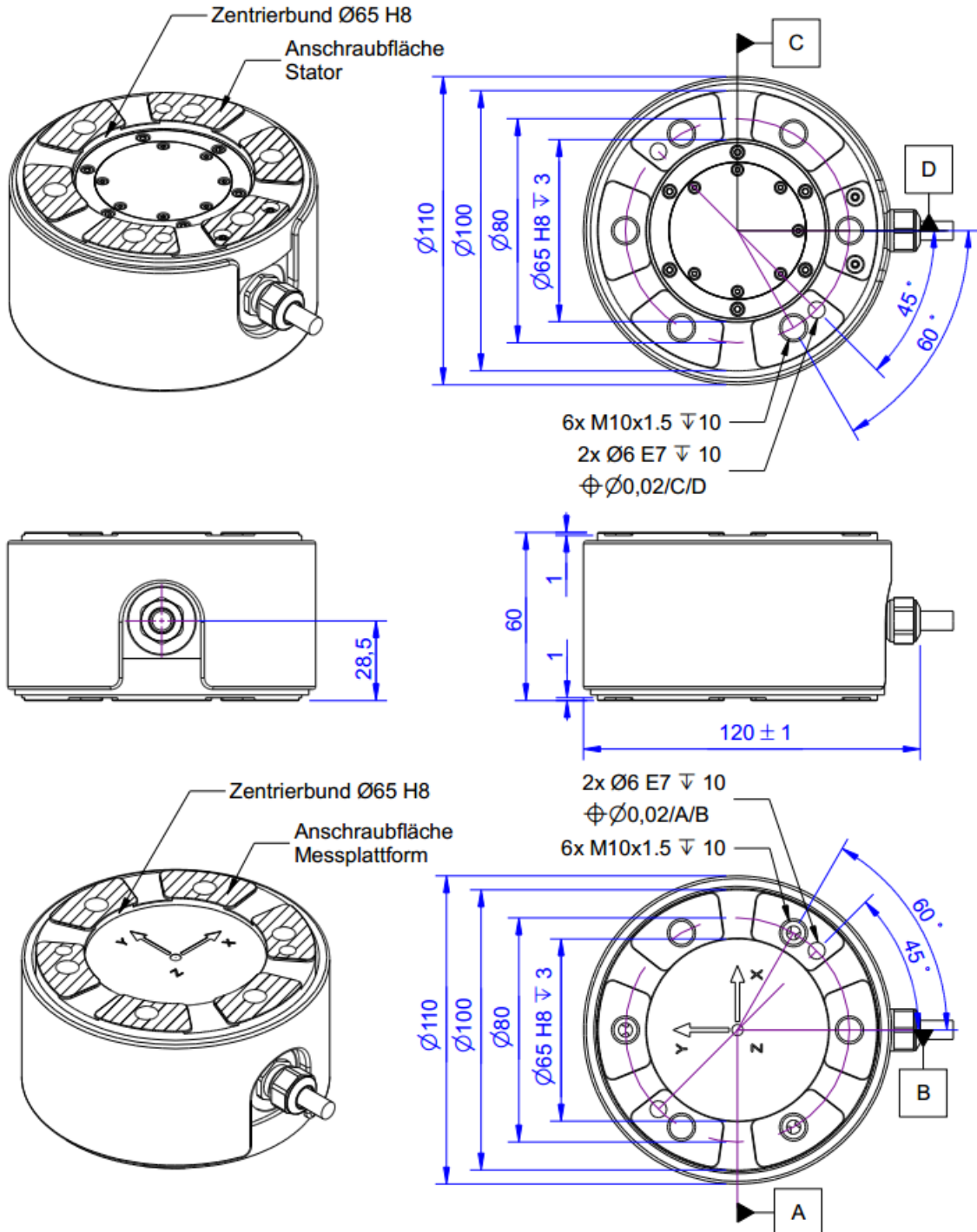
Technical characteristics

Modèles	Fx [kN]	Fy [kN]	Fz [kN]	Mx [Nm]	My [Nm]	Mz [Nm]	Connectique	Page
K6D110 - 1kN/100Nm/MP11	1	1	2,5	100	100	100	24 conducteurs ouverts	5-6
K6D110 - 4kN/250Nm/MP11	4	4	10	250	250	250	24 conducteurs ouverts	7-8
K6D110 - 4kN/250Nm/CG	4	4	10	250	250	250	24 conducteurs ouverts	9-10
K6D110 - 4kN/250Nm/M16	4	4	10	250	250	250	24 conducteurs ouverts	11-12
K6D110 - 8kN/500Nm/MP11	8	8	20	500	500	500	24 conducteurs ouverts	13-14
K6D110 - 10kN/750Nm/MP11	10	10	25	750	750	750	24 conducteurs ouverts	15-16
K6D110 - 10kN/750Nm/CG	10	10	25	750	750	750	24 conducteurs ouverts	17-18
K6D110 - 10kN/750Nm/M16	10	10	25	750	750	750	24 conducteurs ouverts	19-20

Dimensions (MP11)

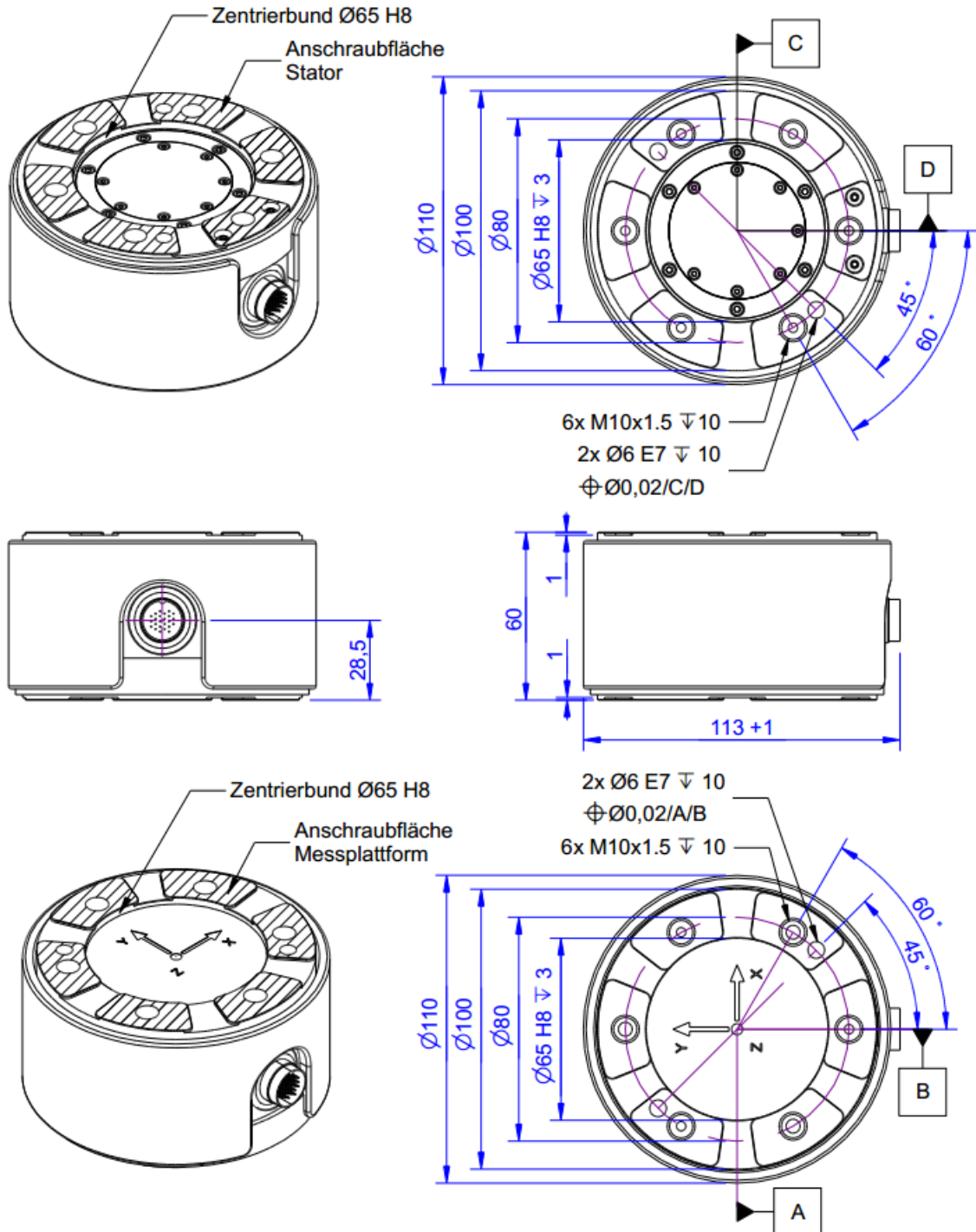


Dimensions (CG)



K6D110_2.5KN_100NM_MP11.pdf | K6D110_10KN_250NM_MP11.pdf | K6D110_20KN_500NM_MP11.pdf | K6D110_25KN_750NM_MP11.pdf | K6D110_50KN_1000NM_MP11.pdf | K6D110_10KN_250NM_CG.pdf | K6D110_20KN_500NM_CG.pdf | K6D110_25KN_750NM_CG.pdf | K6D110_50KN_1000NM_CG.pdf | K6D110_10KN_250NM_M16.pdf | K6D110_25KN_750NM_M16.pdf

Dimensions (M16)



K6D110_2.5KN_100NM_MPT1.pdf | K6D110_10KN_250NM_MPT1.pdf | K6D110_20KN_500NM_MPT1.pdf | K6D110_25KN_750NM_MPT1.pdf | K6D110_25KN_10KN_250NM_CG.pdf | K6D110_25KN_250NM_CG.pdf | K6D110_25KN_500NM_CG.pdf | K6D110_25KN_750NM_CG.pdf | K6D110_25KN_10KN_250NM_M16.pdf | K6D110_25KN_250NM_M16.pdf

Specification : Model K6D110 - 1kN/100Nm/MP11

Force sensor

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	Inner thread
Dimension 1	6x M10x1,5
Sensor Fastening	Inner thread
Dimension 2	6x M10x1,5
Operating force	300 % FS
Material	Aluminium alloy
Dimensions	Ø110 x 60 mm
Height	60 mm
Length or Diameter	110 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

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

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	24 conductor open
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Specification : Model K6D110 - 1kN/100Nm/MP11

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

Specification : Model K6D110 - 4kN/250Nm/MP11

Force sensor

Type	6-Axis force sensor
Force direction	Tension / Compression
Rated force Fx	4 kN
Rated force Fy	4 kN
Rated force Fz	10 kN
Force introduction	Inner thread
Dimension 1	6x M10x1,5
Sensor Fastening	Inner thread
Dimension 2	6x M10x1,5
Operating force	300 % FS
Natural frequency	4.1 kHz
Dimensions	Ø110 x 60 mm
Height	60 mm
Length or Diameter	110 mm
Rated torque Mx	250 Nm
Rated torque My	250 Nm
Rated torque Mz	250 Nm
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	-0.05 mV/V
Zero signal from	0.05 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	24 conductor open
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Specification : Model K6D110 - 4kN/250Nm/MP11

Name of the connection	round plug connector MP11, 24-pole, male
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Eccentricity and Crosstalk

Crosstalk	1 %FS
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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“;

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

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Specification : Model K6D110 - 4kN/250Nm/CG

Force sensor	
Type	6-Axis force sensor
Force direction	Tension / Compression
Rated force Fx	4 kN
Rated force Fy	4 kN
Rated force Fz	10 kN
Force introduction	Inner thread
Dimension 1	6x M10x1,5
Sensor Fastening	Inner thread
Dimension 2	6x M10x1,5
Operating force	300 % FS
Material	Aluminium alloy
Natural frequency	4.1 kHz
Dimensions	Ø110 x 60 mm
Height	60 mm
Length or Diameter	110 mm
Rated torque Mx	250 Nm
Rated torque My	250 Nm
Rated torque Mz	250 Nm
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	-0.05 mV/V
Zero signal from	0.05 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	24 conductor open



Specification : Model K6D110 - 4kN/250Nm/CG

Name of the connection	30-24 PUR / 24x0,06 mm ²
Cable length	5 m
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 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 .

Specification : Model K6D110 - 4kN/250Nm/M16

Force sensor	
Type	6-Axis force sensor
Force direction	Tension / Compression
Rated force Fx	4 kN
Rated force Fy	4 kN
Rated force Fz	10 kN
Force introduction	Inner thread
Dimension 1	6x M10x1,5
Sensor Fastening	Inner thread
Dimension 2	6x M10x1,5
Operating force	300 % FS
Material	Aluminium alloy
Natural frequency	4.1 kHz
Dimensions	Ø110 x 60 mm
Height	60 mm
Length or Diameter	110 mm
Rated torque Mx	250 Nm
Rated torque My	250 Nm
Rated torque Mz	250 Nm
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	-0.05 mV/V
Zero signal from	0.05 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	24 conductor open

Specification : Model K6D110 - 4kN/250Nm/M16

Name of the connection	round plug connector M16, 24-pole, male
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Eccentricity and Crosstalk

Crosstalk	1 %FS
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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 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 .

Specification : Model K6D110 - 8kN/500Nm/MP11

Force sensor	
Type	6-Axis force sensor
Force direction	Tension / Compression
Rated force Fx	8 kN
Rated force Fy	8 kN
Rated force Fz	20 kN
Force introduction	Inner thread
Dimension 1	6x M10x1,5
Sensor Fastening	Inner thread
Dimension 2	6x M10x1,5
Operating force	300 % FS
Material	Aluminium alloy
Dimensions	Ø110 x 60 mm
Height	60 mm
Length or Diameter	110 mm
Rated torque Mx	500 Nm
Rated torque My	500 Nm
Rated torque Mz	500 Nm
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	-0.05 mV/V
Zero signal from	0.05 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	24 conductor open



Specification : Model K6D110 - 8kN/500Nm/MP11

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 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 .

Specification : Model K6D110 - 10kN/750Nm/MP11

Force sensor	
Type	6-Axis force sensor
Force direction	Tension / Compression
Rated force Fx	10 kN
Rated force Fy	10 kN
Rated force Fz	25 kN
Force introduction	Inner thread
Dimension 1	6x M10x1,5
Sensor Fastening	Inner thread
Dimension 2	6x M10x1,5
Operating force	300 % FS
Material	Stainless steel
Natural frequency	4.2 kHz
Dimensions	Ø110 x 60 mm
Height	60 mm
Length or Diameter	110 mm
Rated torque Mx	750 Nm
Rated torque My	750 Nm
Rated torque Mz	750 Nm
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	-0.05 mV/V
Zero signal from	0.05 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	24 conductor open

Specification : Model K6D110 - 10kN/750Nm/MP11

Name of the connection	round plug connector MP11, 24-pole, male
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Eccentricity and Crosstalk

Crosstalk	1 %FS
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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 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 .

Specification : Model K6D110 - 10kN/750Nm/CG

Force sensor	
Type	6-Axis force sensor
Force direction	Tension / Compression
Rated force Fx	10 kN
Rated force Fy	10 kN
Rated force Fz	25 kN
Force introduction	Inner thread
Dimension 1	6x M10x1,5
Sensor Fastening	Inner thread
Dimension 2	6x M10x1,5
Operating force	300 % FS
Material	Stainless steel
Natural frequency	4.2 kHz
Dimensions	Ø110 x 60 mm
Height	60 mm
Length or Diameter	110 mm
Rated torque Mx	750 Nm
Rated torque My	750 Nm
Rated torque Mz	750 Nm
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	-0.05 mV/V
Zero signal from	0.05 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	24 conductor open



Specification : Model K6D110 - 10kN/750Nm/CG

Name of the connection	LiYCY 24x0,03/PUR
Cable length	5 m
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“;

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Specification : Model K6D110 - 10kN/750Nm/M16

Force sensor	
Type	6-Axis force sensor
Force direction	Tension / Compression
Rated force Fx	10 kN
Rated force Fy	10 kN
Rated force Fz	25 kN
Force introduction	Inner thread
Dimension 1	6x M10x1,5
Sensor Fastening	Inner thread
Dimension 2	6x M10x1,5
Operating force	300 % FS
Material	Stainless steel
Natural frequency	4.2 kHz
Dimensions	Ø110 x 60 mm
Height	60 mm
Length or Diameter	110 mm
Rated torque Mx	750 Nm
Rated torque My	750 Nm
Rated torque Mz	750 Nm
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	-0.05 mV/V
Zero signal from	0.05 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	24 conductor open



Specification : Model K6D110 - 10kN/750Nm/M16

Name of the connection	round plug connector M16, 24-pole, male
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Eccentricity and Crosstalk

Crosstalk	1 %FS
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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 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.

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Manual

Stiffness Matrix K6D130 (1kN/200Nm - MP11)

34.3 kN/mm	0.0	0.0	0.0	1030 kN	0.0	u_x
0.0	34.3 kN/mm	0.0	-1030 kN	0.0	0.0	u_y
0.0	0.0	140.8 kN/mm	0.0	0.0	0.0	u_z
0.0	-1030 kN	0.0	124.8 kNm	0.0	0.0	ϕ_{ix}
1030 kN	0.0	0.0	0.0	124.8 kNm	0.0	ϕ_{iy}
0.0	0.0	0.0	0.0	0.0	91.6 kNm	ϕ_{iz}

Stiffness Matrix K6D130 (5kN/500Nm - MP11, CG & M16)

96.1 kN/mm	0.0	0.0	0.0	2884 kN	0.0	u_x
0.0	96.1 kN/mm	0.0	-2884 kN	0.0	0.0	u_y
0.0	0.0	394.3 kN/mm	0.0	0.0	0.0	u_z
0.0	-2884 kN	0.0	349.6 kNm	0.0	0.0	ϕ_{ix}
2884 kN	0.0	0.0	0.0	349.6 kNm	0.0	ϕ_{iy}
0.0	0.0	0.0	0.0	0.0	256.5 kNm	ϕ_{iz}

Stiffness Matrix K6D130 (15kN/1.2kNm - MP11, CG & M16)

163.1 kN/mm	0.0	0.0	0.0	4894 kN	0.0	u_x
0.0	163.1 kN/mm	0.0	-4894 kN	0.0	0.0	u_y
0.0	0.0	868.7 kN/mm	0.0	0.0	0.0	u_z
0.0	-4894 kN	0.0	737.3 kNm	0.0	0.0	ϕ_{ix}
4894 kN	0.0	0.0	0.0	737.3 kNm	0.0	ϕ_{iy}
0.0	0.0	0.0	0.0	0.0	443.6 kNm	ϕ_{iz}

Stiffness Matrix K6D110 (15kN/1.2kNm - MP11, CG & M16)

255.0 kN/mm	0.0	0.0	0.0	4117 kN	0.0	u_x
0.0	255.0 kN/mm	0.0	-4117 kN	0.0	0.0	u_y
0.0	0.0	1112.9 kN/mm	0.0	0.0	0.0	u_z
0.0	-4117 kN	0.0	975.7 kNm	0.0	0.0	ϕ_{ix}
4117 kN	0.0	0.0	0.0	975.7 kNm	0.0	ϕ_{iy}
0.0	0.0	0.0	0.0	0.0	684.0 kNm	ϕ_{iz}

Caption

Element	Description
[kN/mm]	force- displacement
[kNm]	torque- twist
[kN]	force- twist and torque- displacement

