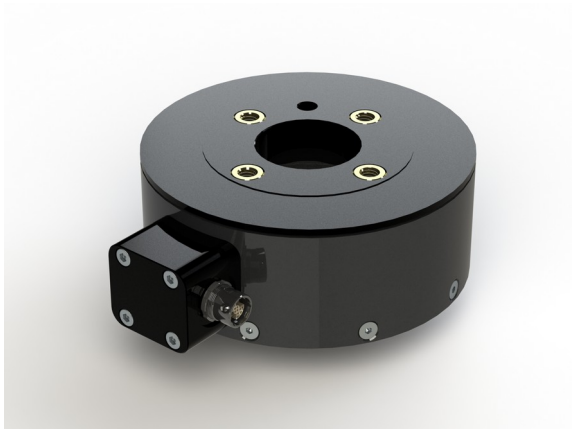
6-Axis Force Sensor F6D100-50 200N/20Nm/MP11

Item number: 8182



The multi-component sensor F6D100 is used for force and torque measurement in three mutually perpendicular axes.

The multi-component sensor F6D100 is equipped with mounting flanges according to DIN EN ISO 9409-1 for industrial robots. The measuring flange of the sensor contains tapped holes M6 on the same pitch circle. The F6D force / torque sensor can be mounted to the robot flange without additional adapters, making it particularly flat and light compared to the K6D series sensors.

The evaluation of the force and moment load is carried out with an external measuring amplifier GSV-8DS SubD44HD or GSV-8AS.

The sensors are made of an aluminum alloy.

Our partner IPR – Intelligente Peripherien für Roboter GmbH offers solutions for applications of force / torque sensors.

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Stand: 18.12.2024

Technical Data

Basic Data		Unit
Type	6-axis force sensor	
Force direction	Tension/Compression	
Rated force Fx	200	N
Rated force Fy	200	N
Rated force Fz	400	N
Force introduction	Internal thread	
Dimension 1	4xM6	
Sensor Fastening	Through-hole	
Dimension 2	M6	
Operating force	200	% FS
Rated displacement	0.05	mm
Twist	0.04	rad
Material	alluminum-alloy	
Height	40	mm
Length or Diameter	100	mm
Rated torque Mx	20	Nm
Rated torque My	20	Nm
Rated torque Mz	20	Nm
Torque limit	200	% FS
Bending moment limit	200	% FS

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Electrical Data		Unit
Input resistance	1000	Ohm
Tolerance input resistance	50	Ohm
Output resistance	1000	Ohm
Tolerance output resistance	50	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	10	V
Zero signal	1	mV/V
Characteristic value range from	0.25	mV/V
Characteristic value range to	0.75	mV/V

Eccentricity and Crosstalk	Unit

Accuracy Data		Unit
Accuracy class	1	
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

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Environmental Data		Unit
Rated temperature range from	-10	°C
Rated temperature range to	70	°C
Operating temperature range from	-10	°C
Operating temperature range to	85	°C
Storage temperature range from	-10	°C
Storage temperature range to	85	°C
Environmental protection	IP64	

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.

PIN Assignment

Channel	Symbol	Designation	Color	PIN
1	+Us	positive bridge supply	red	1
	-Us	negative bridge supply	black	2
	+Ud	positive bridge output	green	3
	-Ud	negative bridge output	white	4
2	+Us	positive bridge supply	blue	5
	-Us	negative bridge supply	yellow	6
	+Ud	positive bridge output	purple	7
	-Ud	negative bridge output	grey	8
3	+Us	positive bridge supply	orange	9
	-Us	negative bridge supply	brown	10
	+Ud	positive bridge output	pink	11
	-Ud	negative bridge output	transparent	12
4	+Us	positive bridge supply	green-black	13
	-Us	negative bridge supply	black-white	14
	+Ud	positive bridge output	red-black	15
	-Ud	negative bridge output	white-black	16
5	+Us	positive bridge supply	purple-black	17
	-Us	negative bridge supply	yellow-black	18
	+Ud	positive bridge output	bue-black	19
	-Ud	negative bridge output	gray-black	20
6	+Us	positive bridge supply	pink-black	21
	-Us	negative bridge supply	brown-black	22
	+Ud	positive bridge output	orange-black	23
	-Ud	negative bridge output	transparent-black	24

Shield: connected with sensor housing;

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Mounting

Calibration matrix

The calibration matrix contains 36 calibration factors for calculating the forces and torques from the 6 output signals of the force sensor. A Labview vi is available for processing the calibration matrix

Measuring amplifier

The measuring amplifier GSV-8DS or GSV-8AS has 24-pole plug connector to connect the 6-axis froce/torque sensor. The mechanical forces and torques are calculated from 6 output voltages of each measuring channel with the calibration matrix.

Software

The GSVmulti software is included in delivery with measuring amplifiers GSV-8. The software allows the application of the calibration matrix and the displacement of the coordinate system to represent the torques around a freely selectable reference point.

To create your own software, a Labview VI is available.

Mounting instruction

The force is applied to a circular ring (Ø80-Ø40) on the live end of the sensor. The area inside the circular ring remains unloaded.

A center hole Ø6 serves to secure the angular position.

4x M6 external thread for mounting on robot flange (mounted with Allen key from the tool side, the screws are integrated in the F6D sensor, can not be lost);

4x M6 internal thread for mounting the tool (this flange corresponds again to the robot flange);

Summary: The sensor has M6 internal thread and M6 external thread.

Robotics solutions from IPR

Our robotics partner IPR offers solutions for applications of force / torque sensors in the areas of

- Mounting and handling technology
- Machine loading
- Foundry and blacksmith
- Cavity preservation
- Sealing and damping

- Lack and paint
- Services

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Stiffness Matrix

36.6 kN/mm	0.0	0.0	0.0	329 kN	0.0
0.0	36.6 kN/mm	0.0	-329 kN	0.0	0.0
0.0	0.0	357.9 kN/mm	0.0	0.0	0.0
0.0	-329 kN	0.0	316.1 kNm	0.0	0.0
329 kN	0.0	0.0	0.0	316.1 kNm	0.0
0.0	0.0	0.0	0.0	0.0	102.6 kNm

- The elements with the unit kN/mm describe the relationship between force and path.
- The elements with the unit kNm describe the relationship between torque and twist.
- The elements with the unit kN describe the relationship between torque and path (columns 1 to 3) or the relationship between force and twist (columns 4 to 6)