

## Load Cell and Torque Sensor – X/Y/Z

Configurable up to 3x force / 3x torque

# MODEL 8565 NEW

**Preliminary data sheet**



### Highlights

- 6-axis sensor
- Measuring range Fx: 1 kN / Fy: 1 kN / Fz: 2 kN  
Mx: 50 Nm / My: 50 Nm / Mz: 50 Nm
- Other measuring ranges available on request
- Non-linearity < 0.1 % F.S.
- Excellent price/performance ratio
- Customer-specific axis configuration

### Applications

- Robot-assisted applications
- Pick & place
- Tactile sensing in manufacturing
- Collision detection
- Force-controlled machining



Strain gage output



Robot flange in accordance with DIN ISO 9049-1



Direction of action

### Product description

In robotics and automation engineering, the requirements for precise, tactile handling are constantly increasing. The robust 8565 multi-axis sensor with its low crosstalk enables you to monitor and evaluate your process at any time, regardless of the sensor's orientation.

With just one sensor, you can obtain accurate three-dimensional load information. Its six independent outputs let you selectively evaluate the direction of action of the loads (axial force [Fz] / lateral forces [Fx/Fy] / torque [Mz] / bending moment [Mx/My]).

Thanks to its compact design and adaptation via the standardized robot flange in accordance with DIN ISO 9049-1, the sensor can be integrated into many applications quickly and easily.

When the slightest deviations are detected in your fast-moving and complex production processes, you can intervene immediately to make adjustments. This helps to prevent faulty parts and reduce manufacturing costs.

## Technical data

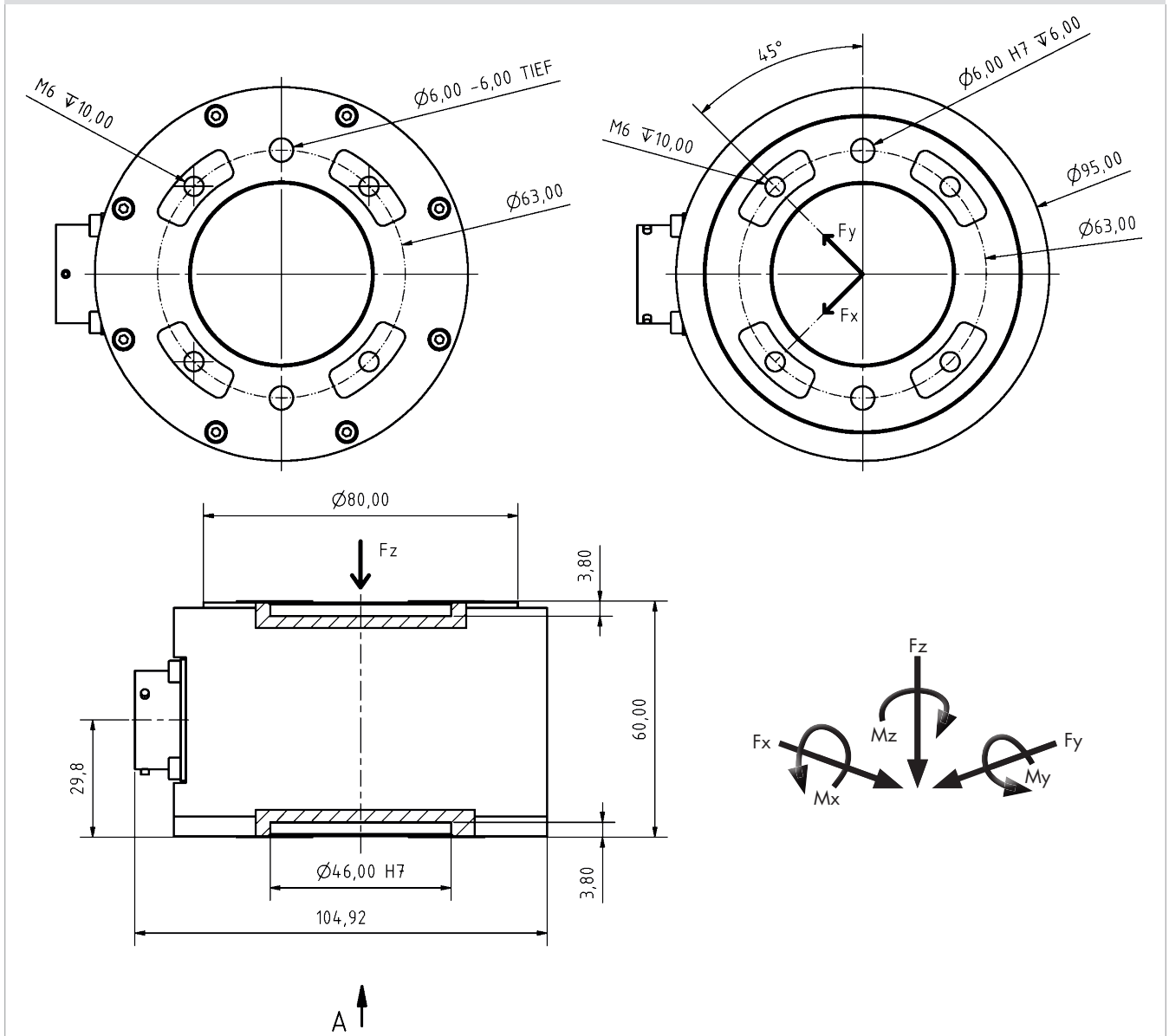
8565	-	60025050
Measuring range Fx calibrated in N from 0 ...		Fx = 0 ... ±1 kN (0 ... ±224.8 lbs)
Measuring range Fy calibrated in N from 0 ...		Fy = 0 ... ±1 kN (0 ... ±224.8 lbs)
Measuring range Fz calibrated in N from 0 ...		Fz = 0 ... ±2 kN (0 ... ±449.6 lbs)
Measuring range Mx calibrated in Nm from 0 ...		Mx = 0 ... ±50 Nm (0 ... ±442.51 lbs in)
Measuring range My calibrated in Nm from 0 ...		My = 0 ... ±50 Nm (0 ... ±442.51 lbs in)
Measuring range Mz calibrated in Nm from 0 ...		Mz = 0 ... ±50 Nm (0 ... ±442.51 lbs in)
<b>Accuracy</b>		
Relative non-linearity *		< ±0.1 % F.S.
Relative hysteresis		0.2 % F.S.
Characteristic curve deviation *		< ±0.15 % F.S.
Crosstalk		< 5 % from Fz to other axes (other crosstalk significantly less)
Temperature effect on zero output		≤ ±0.02 % F.S./K
Temperature effect on nominal sensitivity		≤ ±0.02 % F.S./K
<b>Electrical values</b>		
Sensitivity (nominal) Fx:		1.2 mV/V
Sensitivity (nominal) Fy:		1.2 mV/V
Sensitivity (nominal) Fz:		0.4 mV/V
Sensitivity (nominal) Mx:		1 mV/V
Sensitivity (nominal) My:		1 mV/V
Sensitivity (nominal) Mz:		0.9 mV/V
Measurement direction		Positive output signal for compressive load / torque in the direction of the marked X, Y or Z axis
Bridge resistance		350 Ω / 700 Ω nominal (deviations are possible)
Excitation voltage		5 V DC (max. 10 V DC)
<b>Environmental conditions</b>		
Nominal temperature range		+15 °C ... +70 °C
Operating temperature range		-10 °C ... +80 °C
<b>Mechanical values</b>		
Deflection full scale		Fx and Fy < 0.04 mm / Fz < 0.015 mm
Max. operational force (Dynamic load limit 250)		$L_{max} = 100 * \frac{\sqrt{F_x^2 + F_y^2}}{F_x \text{ nom.}} + 50 * \frac{ F_z }{F_z \text{ nom.}} + 70 * \frac{\sqrt{M_x^2 + M_y^2}}{M_x \text{ nom.}} + 100 * \frac{ M_z }{M_z \text{ nom.}} \leq 250$ <p>Please note: The sensor's coordinate origin is in the geometric center of the sensor. When calculating the maximum operational force, the additional bending moments due to leverage effects must be taken into account for the acting lateral forces.</p> <p>Example: Force-controlled grinding process with simultaneous dynamic loads of up to: Fx = 500 N / Fy = 500 N / Fz = 1.5 kN / Mx = 20 Nm / My = 20 Nm / Mz = 40 Nm</p> $L_{max} = 100 * \frac{\sqrt{500N^2 + 500N^2}}{1000N} + 50 * \frac{1500N}{2000N} + 70 * \frac{\sqrt{20Nm^2 + 20Nm^2}}{50Nm} + 100 * \frac{40Nm}{50Nm} = 227.80$
Dynamic performance		recommended: 50 %
Material		high-strength aluminum
Protection class (EN 60529)		IP40
<b>Other</b>		
Natural frequency		> 1800 Hz
Mass	[g]	800

**Geometry**

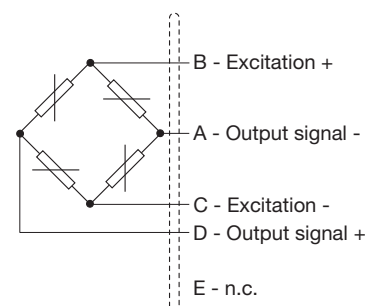
see dimensional drawing

**Installation**

Intended mounting screws	4 x M6
Tightening torque mounting screws	10 Nm
Mounting screws	strength 8.8 or higher
Weight	800 g

**Dimensional drawing****Electrical termination****Output signal**

burster load cells are based on a strain-gage Wheatstone bridge. This measurement principle means that the output voltage mV/V is highly dependent on the sensor supply voltage. Our website contains details of suitable instrumentation amplifiers, indicator and display devices and process instruments.



Connector pin assignment			
Measurement channel	Assignment		Pin
Fx	Us+	Excitation (+)	A
	Us-	Excitation (-)	B
	Um+	Measurement signal (+)	C
	Um-	Measurement signal (-)	D
Fy	Us+	Excitation (+)	E
	Us-	Excitation (-)	F
	Um+	Measurement signal (+)	G
	Um-	Measurement signal (-)	H
Fz	Us+	Excitation (+)	J
	Us-	Excitation (-)	K
	Um+	Measurement signal (+)	L
	Um-	Measurement signal (-)	M
Mx	Us+	Excitation (+)	N
	Us-	Excitation (-)	P
	Um+	Measurement signal (+)	R
	Um-	Measurement signal (-)	S
My	Us+	Excitation (+)	T
	Us-	Excitation (-)	U
	Um+	Measurement signal (+)	V
	Um-	Measurement signal (-)	W
Mz	Us+	Excitation (+)	X
	Us-	Excitation (-)	Y
	Um+	Measurement signal (+)	Z
	Um-	Measurement signal (-)	a
	N.C.		b
	N.C.		c

Electrical connection	
9900-V724	Souriau 26-pin connector, series 851 cable installation

## Accessories

### Connector, cables and devices

#### Order code

Connector	
9900-V724	Connector socket 26 pin (included with device)
Cables	
99724-000A-0090030	Connecting cable, 3m, 3x strain gage (Fx/Fy/Fz)
99724-000B-0090030	Connecting cable, 3m, 3x strain gage (Mx/My/Mz)
99724-000F-0090030	Connecting cable, 3m, 6x strain gage
99209-724A-0090030	Connecting cable to USB interface 9206-V3xxxx, 3x force, length 3 m, suitable for drag chains
99209-724B-0090030	Connecting cable to USB interface 9206-V3xxxx, 3x torque, length 3 m, suitable for drag chains
99209-724F-0090030	Connecting cable to USB interface 9206-V3xxxx, 3x force / 3x torque, length 3 m, suitable for drag chains
Devices	
9250-VXXXXXX	Universal instrumentation amplifier
9251-VXXXX	Fieldbus controller for the 9250 instrumentation amplifier series
9236-V...	In-line instrumentation amplifier for strain gage sensors
9206-V...	USB sensor interface for strain gage sensors

## Order Code

Measuring range	Code								Measuring range
	Fz				Mz				
Fz = 0 ... ±2 kN	6	0	0	2	5	0	5	0	Fz = 0 ... ±449.6 lbs
Fy = 0 ... ±1 kN									Fy = 0 ... ±224.8 lbs
Fx = 0 ... ±1 kN									Fx = 0 ... ±224.8 lbs
Mz = 0 ... ±50 Nm									Mz = 0 ... ±442.5 lbs in
My = 0 ... ±50 Nm									My = 0 ... ±442.5 lbs in
Mx = 0 ... ±50 Nm									Mx = 0 ... ±442.5 lbs in

<b>8</b>	<b>5</b>	<b>6</b>	<b>5</b>	<b>-</b>									<b>-</b>			<b>0</b>	<b>0</b>
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■ Force: Fz / Fy / Fx	0
■ Force: Fz / Fy / <b>Fx</b>	1
■ Force: Fz / <b>Fy</b> / Fx	2
■ Force: Fz / <b>Fy</b> / <b>Fx</b>	3
■ Force: <b>Fz</b> / Fy / Fx	4
■ Force: <b>Fz</b> / Fy / <b>Fx</b>	5
■ Force: <b>Fz</b> / <b>Fy</b> / Fx	6
■ Force: <b>Fz</b> / <b>Fy</b> / <b>Fx</b>	7
■ Torque: Mz / My / Mx	0
■ Torque: Mz / My / <b>Mx</b>	1
■ Torque: Mz / <b>My</b> / Mx	2
■ Torque: Mz / <b>My</b> / <b>Mx</b>	3
■ Torque: <b>Mz</b> / My / Mx	4
■ Torque: <b>Mz</b> / My / <b>Mx</b>	5
■ Torque: <b>Mz</b> / <b>My</b> / Mx	6
■ Torque: <b>Mz</b> / <b>My</b> / <b>Mx</b>	7

### Example order

Ordering example			
1x		Sensor with application 3x force / 3x torque	Type 8565-6002-5050-7700
1x		Connecting cable, open cable end, length 3 m, suitable for drag chains	Type 99209-724F-0090030
6x		Single-channel in-line instrumentation amplifier for strain gage sensors	Type 9236-V000
6x		Calibrate a measuring chain	92ABG

