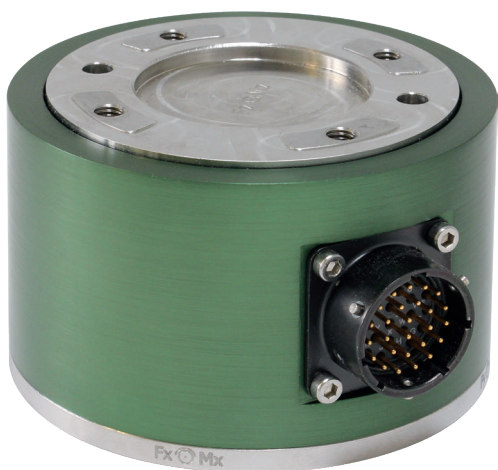


## Load cell and torque sensor – X/Y/Z

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<br>calibrated in N from 0 ...   |        | Fx = 0 ... ±1 kN (0 ... ±224.8 lbs)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Measuring range Fy<br>calibrated in N from 0 ...   |        | Fy = 0 ... ±1 kN (0 ... ±224.8 lbs)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Measuring range Fz<br>calibrated in N from 0 ...   |        | Fz = 0 ... ±2 kN (0 ... ±449.6 lbs)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Measuring range Mx<br>calibrated in Nm from 0 ...  |        | Mx = 0 ... ±50 Nm (0 ... ±442.51 lbs in)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Measuring range My<br>calibrated in Nm from 0 ...  |        | My = 0 ... ±50 Nm (0 ... ±442.51 lbs in)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Measuring range Mz<br>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.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Relative combined<br>error *                       |        | < ±0.15 % F.S.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Crosstalk                                          |        | < 5 % from Fz to other axes (other crosstalk significantly less)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Temperature effect<br>on zero                      |        | ≤ ±0.02 % F.S./K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Temperature effect<br>on characteristic value      |        | ≤ ±0.02 % F.S./K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Electrical values</b>                           |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Characteristic value (nominal) Fx:                 | [mV/V] | 1.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Characteristic value (nominal) Fy:                 | [mV/V] | 1.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Characteristic value (nominal) Fz:                 | [mV/V] | 0.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Characteristic value (nominal) Mx:                 | [mV/V] | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Characteristic value (nominal) My:                 | [mV/V] | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Characteristic value (nominal) Mz:                 | [mV/V] | 0.9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Measurement direction                              |        | Positive output signal for compressive load /<br>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>Ambient conditions</b>                          |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Rated temperature range                            |        | +15 °C ... +70 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Operating temperature range                        |        | -10 °C ... +80 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Mechanical values</b>                           |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Full-scale deflection                              |        | Fx and Fy < 0.04 mm / Fz < 0.015 mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Max. operational force (Dynamic<br>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.<br/>When calculating the maximum operational force, the additional bending moments due to<br/>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:<br/>Fx = 500 N / Fy = 500 N / Fz = 1.5 kN / Mx = 20 N / My = 20 N / Mz = 40 N</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 stress                                     |        | Recommended: 50 %                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Material                                           |        | High-strength aluminum                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Degree of protection<br>(EN 60529)                 |        | IP40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Miscellaneous</b>                               |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Resonant frequency                                 |        | > 1800 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Weight                                             | [g]    | 800                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

\* Specifications in the range 20 % - 100 %

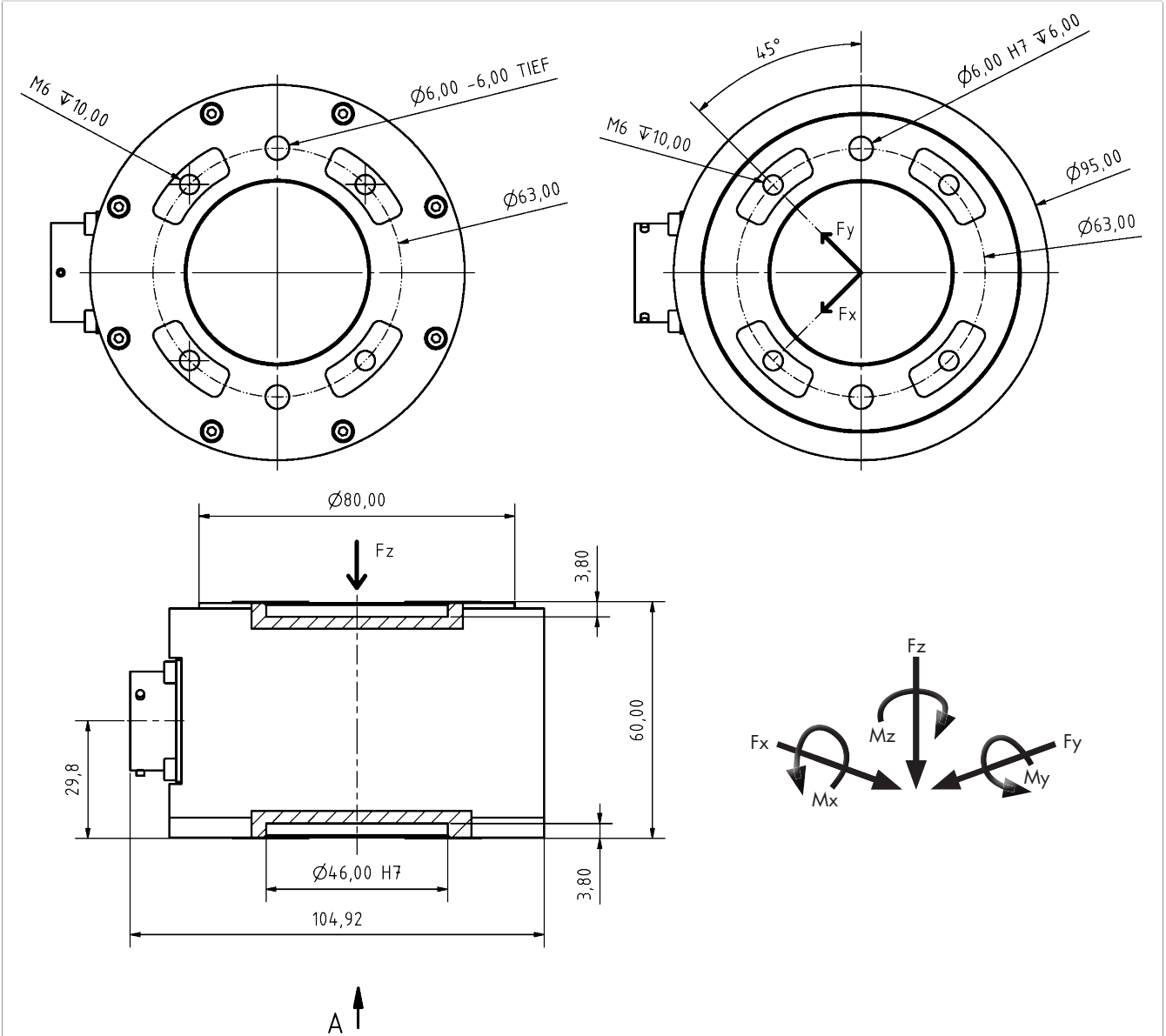
4292-008670EN-5999-091531

**Geometry**

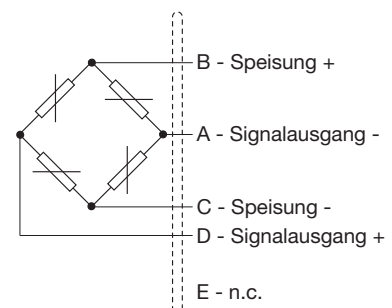
See dimensional drawing

**Installation**

|                                   |                        |
|-----------------------------------|------------------------|
| Intended mounting screws          | 4 x M6                 |
| Mounting screw tightening torques | 10 Nm                  |
| Mounting screws                   | Strength 8.8 or higher |
| Weight                            | 800 g                  |

**Dimensional drawing****Electrical connection****Output signal**

burster load cells are based on a strain-gage Wheatstone bridge. With this measuring principle, the output voltage (mV/V) is highly dependent on the sensor supply voltage. Suitable instrumentation amplifiers, indicator and display devices, and process instruments can be found on our website.



| 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             |  |                                                                                                           |
| 99209-000A-0090030 |  | Connecting cable, open cable end, length 3 m, suitable for drag chains                                    |
| 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                                                              |

**Volume discount** – When purchasing identical versions in a single order we offer the following discounts:

| Discount scale                        |  |     |
|---------------------------------------|--|-----|
| From 2 units                          |  | 2 % |
| From 3 units                          |  | 3 % |
| From 10 units                         |  | 4 % |
| For larger quantities and call orders |  | POA |

## Order Code

| Measuring range                                                                                                         |   |   |   |   | Code |   |   |   |    |   |   |   | Measuring range                                                                                                                                             |  |  |   |   |
|-------------------------------------------------------------------------------------------------------------------------|---|---|---|---|------|---|---|---|----|---|---|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|---|---|
| Fz = 0 ... ±2 kN<br>Fy = 0 ... ±1 kN<br>Fx = 0 ... ±1 kN<br>Mz = 0 ... ±50 Nm<br>My = 0 ... ±50 Nm<br>Mx = 0 ... ±50 Nm |   |   |   |   | Fz   |   |   |   | Mz |   |   |   | Fz = 0 ... ±449.6 lbs<br>Fy = 0 ... ±224.8 lbs<br>Fx = 0 ... ±224.8 lbs<br>Mz = 0 ... ±442.5 lbs in<br>My = 0 ... ±442.5 lbs in<br>Mx = 0 ... ±442.5 lbs in |  |  |   |   |
|                                                                                                                         |   |   |   |   | 6    | 0 | 0 | 2 | 5  | 0 | 5 | 0 |                                                                                                                                                             |  |  |   |   |
|                                                                                                                         |   |   |   |   | ⋮    | ⋮ | ⋮ | ⋮ | ⋮  | ⋮ | ⋮ | ⋮ |                                                                                                                                                             |  |  |   |   |
| 8                                                                                                                       | 5 | 6 | 5 | - |      |   |   |   |    |   |   |   | -                                                                                                                                                           |  |  | 0 | 0 |

|                                             |   |
|---------------------------------------------|---|
| ■ 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                    |

## General information

### ■ Brochure

Our brochure **“Load cells – for production automation, R&D and quality assurance”** is available for download on our website or can be requested. It contains numerous applications, detailed product descriptions and overviews.

### ■ Product videos

You can find our **installation videos** at: [www.youtube.com/bursterVideo](http://www.youtube.com/bursterVideo)

### ■ CAD data

Download via [www.burster.de](http://www.burster.de) or directly from [www.traceparts.de](http://www.traceparts.de)

