# 3-Axis Force Sensor K3D160 2kN

Item number: 4557

## Highlights

- Compensation matrix "s" for minimized crosstalk

The 3-axis sensor **K3D160** is suitable for measuring force in three mutually perpendicular axes.

Force is applied from the 42mm x 50mm recess. A component can be installed on this surface with four M10 screws. The bottom of the sensor is fixed to the bottom with four M12 screws.

### Calibration of 3-Axis Force Sensors – From Standard (cv) to High Precision (s)

A key characteristic of 3D force sensors is crosstalk: applying a force also triggers a measurement in the two unloaded axes. Thanks to several compensation mechanisms (mechanical and electrical), crosstalk is typically less than 3% of the nominal load. Crosstalk is reproducible and proportional to the amplitude of the applied force. By applying an additional compensation matrix, crosstalk in all axes can be reduced to a maximum of less than 1%.

By default, you receive two factory calibrations, each with two measurement points:

one **without a compensation matrix (“cv”)** and one **with extended matrix compensation (“s”)**.

For detailed proof of the sensor's linearity, you can optionally **extend the calibration to 4 or 6 measurement points:**

- Factory calibration certificate HL/4 (4 measurement points)
- Factory calibration certificate SL/6 (6 measurement points)

ME-Meßsysteme GmbH
Eduard-Maurer-Str. 9
DE-16761 Hennigsdorf

Tel: +49 (0)3302 8982 4 10
Mail: vertrieb@me-systeme.de
Web: www.me-systeme.de

Stand: 07.05.2026

This ensures your sensor is optimally calibrated to your application from the very first measurement.

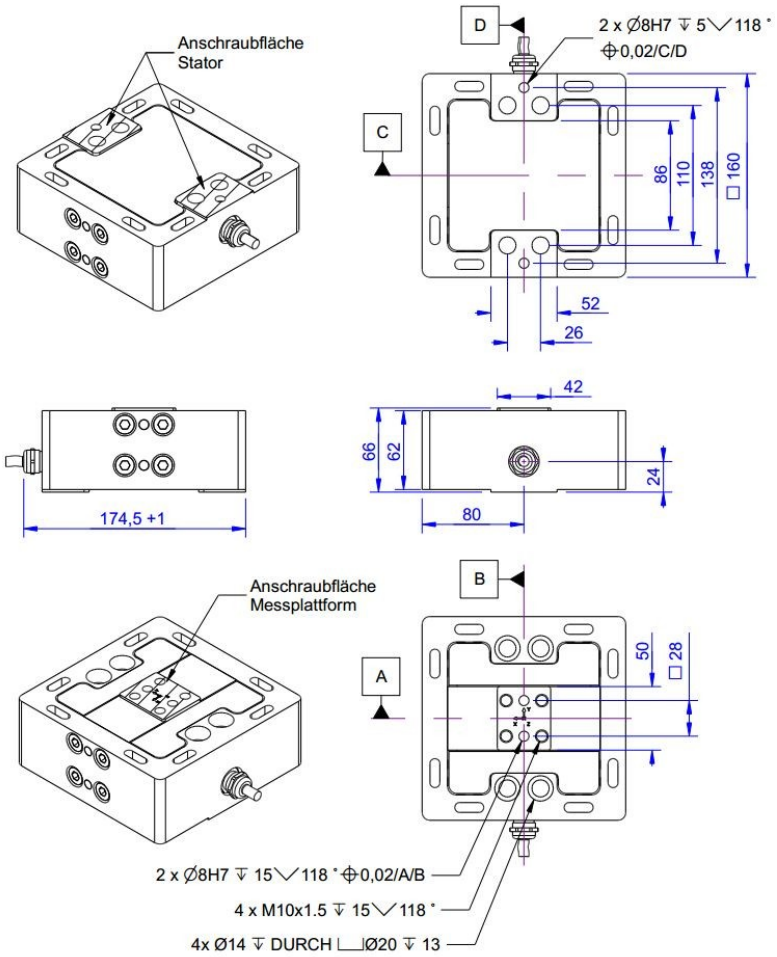
## Application areas

Areas of application are, for example, force measurement during production processes, force control in handling machines, force measurement during assembly processes, three-dimensional load measurement, measurement of friction forces.

## Optional special version

- Protection class IP68: from rated force 200 N
- Vacuum version from $10^{-5}$ mbar
- Pressure range up to 8 bar

## Technical Drawing

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## Technical Data

| Basic Data | | Unit |
|---|---|---|
| Type | 3-axis force sensor | |
| Force direction | Tension/Compression | |
| Rated force Fx | 2 | kN |
| Rated force Fy | 2 | kN |
| Rated force Fz | 2 | kN |
| Force introduction | Internal thread | |
| Dimension 1 | 4xM10 | |
| Sensor Fastening | Through-hole | |
| Dimension 2 | 4xØ14 | |
| Operating force | 150 | %FS |
| Rated displacement | 0.08 | mm |
| Material | tool steel | |
| Natural frequency fx | 2 | kHz |
| Dimensions | 160 x 160 x 66 | mm³ |
| Height | 66 | mm |
| Length or Diameter | 160 | mm |
| Torque limit | 1 | kNm |
| Bending moment limit | 1 | kNm |
| Variants | 2kN... 50kN | |

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| Electrical Data | | Unit |
|---|---|---|
| Rated output x-axis | 1 | mV/V |
| Rated output y-axis | 1 | mV/V |
| Rated output z-axis | 1 | mV/V |
| Zero signal | 0.05 | mV/V |
| 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 |
| Input resistance x-axis | 740 | Ohm |
| Output resistance x-axis | 700 | Ohm |
| Input resistance y-axis | 740 | Ohm |
| Output resistance y-axis | 700 | Ohm |
| Input resistance z-axis | 740 | Ohm |
| Output resistance z-axis | 700 | Ohm |
| Insulation resistance | 5 | GOhm |
| Tolerance input resistance | 10 | Ohm |
| Tolerance output resistance | 5 | Ohm |

| Eccentricity and Crosstalk | | Unit |
|---|---|---|
| Allowed torque according of eccentric load | 1000 | Nm |
| Influence of eccentric load to FS | 1 | %FS / 500Nm |
| Crosstalk from x to y at rated load | 2 | %FS |
| Crosstalk from y to x at rated load | 2 | %FS |
| Crosstalk from z to x/y at rated load | 2 | %FS |
| Crosstalk from x/y to z at rated load | 2 | %FS |

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| Accuracy Data | | Unit |
|---|---|---|
| Accuracy class | 0,5 | |
| Relative linearity error | 0.4 | %FS |
| Relative zero signal hysteresis | 0.1 | %FS |
| Temperature effect on zero signal | 0.02 | %FS/K |
| Temperature effect on characteristic value | 0.01 | %RD/K |
| Relative creep | 0.1 | %FS |

| Environmental Data | | Unit |
|---|---|---|
| Rated temperature range from | -10 | °C |
| Rated temperature range to | 50 | °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 | IP67 | |

Abbreviation : RD: „Reading"; FS: „Full Scale"The exact nominal sensitivity is indicated in the test reportCrosstalk is less than 2% when using the compensation matrix (type s).
Without using the compensation matrix, crosstalk is less than 3% (matrix type cv).

## Pin Assignment

| Channel | Symbol | Description | Wire color | PIN |
|---|---|---|---|---|
| X-Axis | +Us | sensor supply | brown | 2 |
| | -Us | sensor supply | white | 1 |
| | +Ud | bridge output | green | 3 |
| | -Ud | bridge output | yellow | 4 |
| Y-Axis | +Us | sensor supply | pink | 6 |
| | -Us | sensor supply | grey | 5 |
| | +Ud | bridge output | blue | 7 |
| | -Ud | bridge output | red | 8 |
| Z-Axis | +Us | sensor supply | purple | 10 |
| | -Us | sensor supply | black | 9 |
| | +Ud | bridge output | grey / pink | 11 |
| | -Ud | bridge output | red / blue | 12 |

Pressure load: positive output signal.Shield- transparent.

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