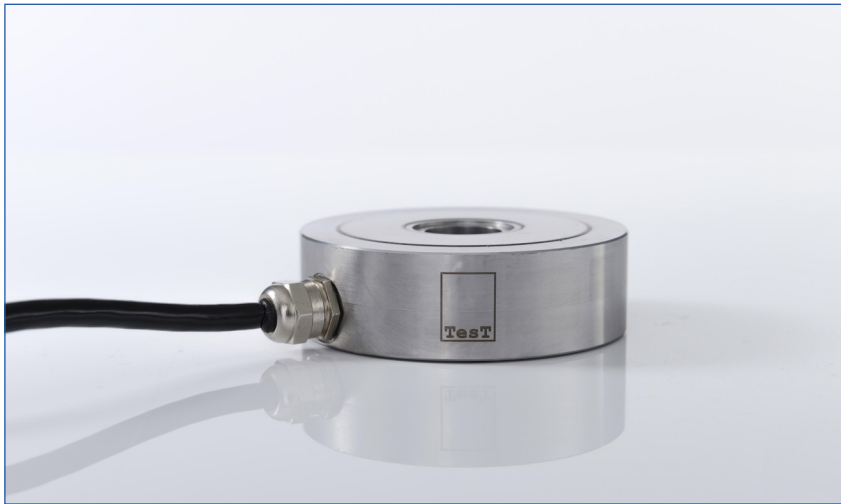


## Electrical Force Transducers – Model 311



- Capacities: 2,5kN to 50kN
- For compression and tension
- From 100kN: compression only
- Highest accuracy
- Reference force transducer
- According to ISO 376
- Calibration version
- Hermetically sealed
- Sensitivity: 2mV/V
- TEDS module available <sup>1)</sup>

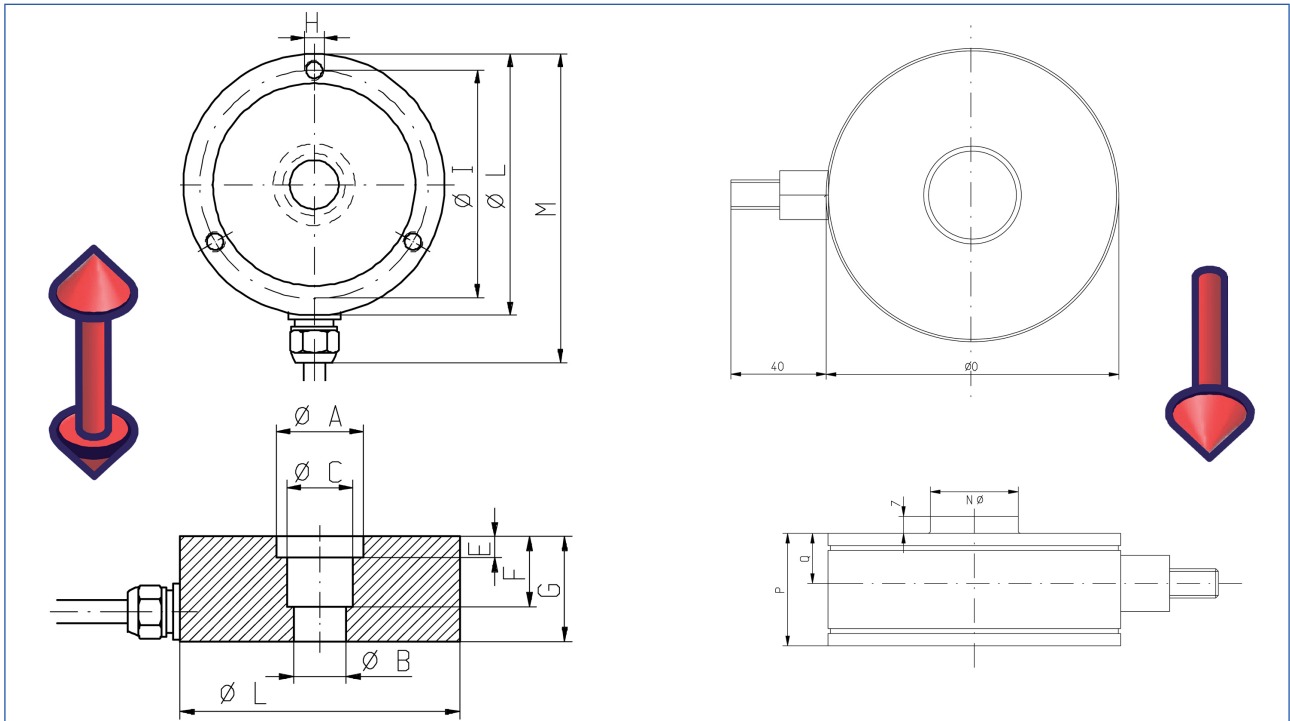
The electrical force transducers of the model series 311 are primarily used for calibration of force sensors and material testing machines <sup>2)</sup> and when highly precise results are required. The devices that are suitable as reference force transducers achieve class 00 according

to ISO 376. They are made of stainless steel, are hermetically sealed and thus are inured to environmental influences. For calibration purposes force transmission parts according to ISO 376 are available. On demand you receive the model 311 also with TEDS module inside

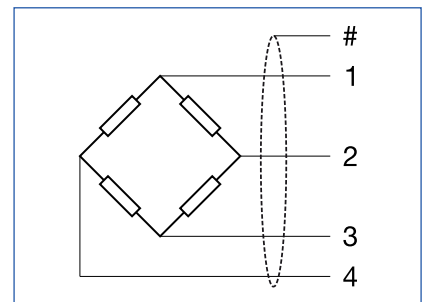
the plug. The model 311 is suitable for compressive as well as for tensile forces between the capacities of 2,5kN and 50kN, from 100kN and higher capacities this model is solely used for compression.

| Model 311   |                     |         |                 |
|---|---------------------|---------|-----------------|
| >> Technical data according to ISO 376, Class 00  |                     |         |                 |
|   | Symbol              | Unit    | Class 00        |
| Zero signal when removed  | S <sub>0</sub>      | mV/V    | 0,02            |
| Rated characteristic value  | C <sub>nom</sub>    | mV/V    | 2               |
| Tolerance of characteristic value   | dc                  | %       | ≤ ± 0,1         |
| Combined error  | F <sub>comb</sub>   | %       | ≤ ± 0,0115      |
| Rated temperature range   | B <sub>T, nom</sub> | °C      | -10...+40       |
| Operating temperature range   | B <sub>T, G</sub>   | °C      | -20...+50       |
| Storage temperature range   | B <sub>T, S</sub>   | °C      | -30...+80       |
| Temp. coefficient of characteristic value in rated temp. range  | TK <sub>C</sub>     | % / 10K | ≤ ± 0,0024      |
| Temperature coefficient of zero signal in rated temp. range   | TK <sub>0</sub>     | % / 10K | ≤ ± 0,0045      |
| Input resistance  | R <sub>e</sub>      | Ω       | 1100 ± 50       |
| Output resistance   | R <sub>a</sub>      | Ω       | 1025 ± 25       |
| Insulation resistance   | R <sub>is</sub>     | GΩ      | > 5             |
| Max. excitation voltage   | U                   | V       | 15              |
| Rated range of excitation voltage   | B <sub>U, nom</sub> | V       | 5 ... 15        |
| Breaking load in reference to nominal load  | F <sub>B</sub>      | %       | ≥ 150           |
| Max. permissible dynamic load <sup>3)</sup>   | L <sub>dy</sub>     | %       | ≤ 50            |
| Degree of protection acc. to DIN 60529  |                     |         | IP66            |
| Material  |                     |         | Stainless Steel |
| <sup>1)</sup> TEDS = Transducer Electronic Data Sheet acc. to IEEE 1451.4   |                     |         |                 |
| <sup>3)</sup> Oscillation amplitude acc. to DIN 50100   |                     |         |                 |
| <sup>2)</sup> The class 00 is suitable as reference force transducer acc. to ISO 376 and also suitable for calibrations of materials testing machines acc. to ISO 7500-1. |                     |         |                 |

# Electrical Force Transducers – Model 311



| Dimensions in mm |       |       |       |       |       |
|------------------|-------|-------|-------|-------|-------|
| Model 311        | 2,5kN | 20kN  | 100kN | 250kN | 600kN |
|                  | 5kN   | 35kN  |       |       |       |
|                  | 10kN  | 50kN  |       |       |       |
| A                | 25,0  | 25,0  |       |       |       |
| B                | M10   | 15 H7 | 24,9  |       |       |
| C                | 19,0  | 19,0  | 29,1  |       |       |
| E                | 1,0   | 6,0   | -     |       |       |
| F                | 15,0  | 20,0  | 14,8  |       |       |
| G                | 25,0  | 30,0  | 35,0  |       |       |
| H                | M6    | M6    | M6    |       |       |
| I                | 70,0  | 70,0  | 83,0  |       |       |
| L                | 80,0  | 80,0  | 95,0  |       |       |
| M                | 97,5  | 97,5  | 112,5 |       |       |
| N                |       |       |       | 35,9  | 47,9  |
| O                |       |       |       | 120,0 | 140,0 |
| P                |       |       |       | 46,0  | 62,0  |
| Q                |       |       |       | 21,0  | 28,0  |



| Connection Drawing |       |              |
|--------------------|-------|--------------|
| 1                  | pink  | Excitation + |
| 2                  | brown | Output +     |
| 3                  | grey  | Excitation - |
| 4                  | white | Output -     |
| #                  |       | Shield       |

| Classification according to ISO 376     |                      |                     |                     |            |                    |            |  |
|---|----------------------|---------------------|---------------------|------------|--------------------|------------|--|
| Relative deviation of the force gauge % |                      |                     |                     |            |                    |            | Expanded uncertainty of applied calibration force (level of confidence 95 %) % |
| Class                                   | of reproducibility b | of repeatability b' | of interpolation fc | of zero fo | of reversability v | of creep c |  |
| 00                                      | 0,05                 | 0,025               | ± 0,025             | ± 0,012    | 0,07               | 0,025      | ± 0,01   |