Data Sheet | Force Transducer Series K

Nominal Force
0.2 kN — 630 kN

Applications | Key Facts

▶ Applications: materials testing | component and structural testing | industrial quality and process control
▶ Compressive and tensile forces, static and dynamic
▶ Flat, robust design | low mass, high resonance frequency
▶ Accuracy class: 0.02 to 0.05 | high-precision measurement results over the entire measuring range
▶ Force introduction via flange or thread
▶ Fatigue and long-term stability | cycles: > 100 million cycles
▶ Standard variants with short delivery time or configurable variants for maximum flexibility

Options | Accessories

▶ Available as flange, threaded or flange and threaded version
▶ Optional second axial measuring circuit for redundancy
▶ Optional bending moment measuring circuits Mx, My
▶ Optional extended temperature range from -40°C to 180°C
▶ Extensive electrical connection options
▶ Extensive mechanical accessories
▶ Tension Torsion combination with Series M torque transducer

*note amplitude
# Technical Data | 0.2 – 2.5 kN

<table>
<thead>
<tr>
<th>Nominal force compression/tension</th>
<th>± $F_{\text{nom}}$</th>
<th>kN</th>
<th>0.2</th>
<th>0.5</th>
<th>1</th>
<th>2.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy class</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Force measurement range</td>
<td></td>
<td>%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linearity error</td>
<td>$d_{\text{ln}}$</td>
<td>%</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Interpolation error</td>
<td>$f_c$</td>
<td>%</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Hysteresis</td>
<td>$h$</td>
<td>%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reversibility error</td>
<td>$v$</td>
<td>%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeatability (f.s.)</td>
<td></td>
<td>%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creep</td>
<td></td>
<td>%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature effect on characteristic value per 10 K</td>
<td>$TK_C$</td>
<td>%/10 K</td>
<td>0.02</td>
<td></td>
<td></td>
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<tr>
<td>Temperature effect on zero signal per 10 K</td>
<td>$TK_0$</td>
<td>%/10 K</td>
<td>0.025</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Eccentricity effect</td>
<td></td>
<td>%/mm</td>
<td>0.015</td>
<td></td>
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<tr>
<td>Bending moment effect</td>
<td></td>
<td>%/N·m</td>
<td>0.075</td>
<td>0.03</td>
<td>0.015</td>
<td>0.006</td>
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<tr>
<td>Lateral force effect</td>
<td></td>
<td>%/(0.1·$F_{\text{nom}}$)</td>
<td>0.02</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Torque effect</td>
<td></td>
<td>%/(mm·$F_{\text{nom}}$)</td>
<td>0.2</td>
<td></td>
<td></td>
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<tr>
<td>Characteristic value difference, tension/compression force</td>
<td>$d_{ZD}$</td>
<td>%</td>
<td>0.15</td>
<td></td>
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<td></td>
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<td>Rated characteristic value</td>
<td>$C_{\text{nom}}$</td>
<td>mV/V</td>
<td>2</td>
<td></td>
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<td>Characteristic value tolerance</td>
<td>$d_c$</td>
<td>%</td>
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<tr>
<td>Zero signal deviation</td>
<td>$d_{S,0}$</td>
<td>%</td>
<td></td>
<td></td>
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<tr>
<td>Input resistance</td>
<td>$R_x$</td>
<td>Ω</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Output resistance</td>
<td>$R_{\alpha}$</td>
<td>Ω</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Insulation resistance</td>
<td>$R_{\alpha}$</td>
<td>Ω</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating range of excitation voltage</td>
<td>$B_{U,G}$</td>
<td>V</td>
<td>5 - 20</td>
<td></td>
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<td></td>
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<tr>
<td>Protection (DIN EN 60529)</td>
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## Metrological Data

<table>
<thead>
<tr>
<th></th>
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<th>0.2</th>
<th>0.5</th>
<th>1</th>
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<tr>
<td>Input resistance</td>
<td>$R_x$</td>
<td>Ω</td>
<td></td>
<td></td>
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<tr>
<td>Output resistance</td>
<td>$R_{\alpha}$</td>
<td>Ω</td>
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<tr>
<td>Insulation resistance</td>
<td>$R_{\alpha}$</td>
<td>Ω</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating range of excitation voltage</td>
<td>$B_{U,G}$</td>
<td>V</td>
<td>5 - 20</td>
<td></td>
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## Electrical Data

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<th>0.5</th>
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<tbody>
<tr>
<td>Protection (DIN EN 60529)</td>
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1) 50; 2) 67
## Technical Data | 0.2 – 2.5 kN

<table>
<thead>
<tr>
<th>Mechanical Data</th>
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<tbody>
<tr>
<td>Nominal force (compression/tension)</td>
<td>± $F_{nom}$</td>
</tr>
<tr>
<td>Rated Displacement</td>
<td>$s_{nom}$</td>
</tr>
<tr>
<td>Spring rigidity</td>
<td>$c_{ax}$</td>
</tr>
<tr>
<td>Mass</td>
<td>$m$</td>
</tr>
<tr>
<td>Proportionate moving mass</td>
<td>$m_{mass}$</td>
</tr>
<tr>
<td>Spring rigidity</td>
<td>$c_{ax}$</td>
</tr>
<tr>
<td>Rated Displacement</td>
<td>$s_{nom}$</td>
</tr>
</tbody>
</table>

### Permissible oscillation stress
- %: ± 80
- %: ± 150
- %: > 300
- %: ± 100

### Force limit
- %: 0.5
- %: ± 150

### Breaking force
- %: ± 150
- %: > 300

### Lateral force limit
- %: ± 150
- %: > 300

### Permissible eccentricity
- $e_G$ | mm | 10

### Bending moment limit
- $M_{b,zul}$ | Nm | 2.5 | 5 | 15 | 30

<table>
<thead>
<tr>
<th>Limits</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated temperature range</td>
<td>$B_{T,nom}$</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>$B_{T,G}$</td>
</tr>
</tbody>
</table>

1) Connection pluggable
2) Permanent connection
## Technical Data | 4 – 630 kN

| Nominal force compression/tension | ± \( F_{\text{nom}} \) kN | 4 5 6.3 10 20 25 30 40 50 63 100 150 160 200 250 300 400 500 630 |
|----------------------------------|--------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Accuracy class | % | 0.02 | 0.03 | 0.05 |
| Force measurement range | % | 1 - 100 |
| Linearity error | \( d_{\text{lin}} \) % | 0.02 | 0.03 |
| Interpolation error | \( f_{\text{c}} \) % | 0.4 |
| Hysteresis | % | 0.02 | 0.03 | 0.05 | 0.08 |
| Reversibility error | % | 0.2 |
| Repeatability (f.s.) | % | 0.003 |
| Creep | % | 0.025 |
| Temperature effect on characteristic value per 10 K | \( T_{K_c} \) %/10 K | 0.04 |
| Temperature effect on zero signal per 10 K | \( T_{K_0} \) %/10 K | 0.025 |
| Eccentricity effect | %/mm | 0.015 |
| Bending moment effect | %/N·m | <0.003 |
| Lateral force effect | %/(0.1·\( F_{\text{nom}} \)) | 0.02 |
| Torque effect | %/(mm·\( F_{\text{nom}} \)) | 0.005 |
| Characteristic value difference, tension/compression force | \( d_{ZD} \) % | 0.07 | 0.1 |
| Rated characteristic value | \( C_{\text{nom}} \) mV/V | 2 | 1;2 | 1;2 | 2 |
| Characteristic value tolerance | \( d_{c} \) % | 0.2 |
| Zero signal deviation | \( d_{S,0} \) % | 0.5 |
| Input resistance | \( R_e \) Ω | 1000 1100 1100 1200 1000 1100 1200 1400 1200 1500 1200 1500 |
| Output resistance | \( R_a \) Ω | 900 900 900 1000 800 900 1000 1000 1100 1200 1200 1100 1200 |
| Insulation resistance | \( R_i \) Ω | >10⁶ |
| Operating range of excitation voltage | \( B_{U,G} \) V | 5 - 20 |
| Protection (DIN EN 60529) | | 50¹; 68² |

¹ For resistance materials other than copper and aluminum.
² Connect to earth potential.

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### Metrological Data

### Electrical Data
# Technical Data | 4 - 630 kN

| Nominal force compression/tension | ± $F_{\text{nom}}$ kN | 4 | 5 | 6.3 | 10 | 20 | 25 | 30 | 40 | 50 | 63 | 100 | 150 | 160 | 200 | 250 | 300 | 400 | 500 | 630 |
|----------------------------------|---------------------|--------|--------|--------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Rated Displacement<br> $x_{\text{nom}}$ mm | 0.093 | 0.08 | 0.086 | 0.071 | 0.12 | 0.15 | 0.16 | 0.19 | 0.21 | 0.32 |
| Spring rigidity<br> $c_{\text{ax}}$ kN/mm | 43 | 70 | 73 | 140 | 280 | 350 | 420 | 560 | 700 | 890 | 830 | 1000 | 1050 | 1300 | 1580 | 1900 | 2400 | 2000 |
| Mass m kg | 0.5 | 1 | 1.2 | 3.7 | 10.4 | 20 | 31 |
| Proportionate moving mass<br> $m_{\text{nom}}$ kg | 0.12 | 0.22 | 0.35 | 0.8 | 2.4 | 4 | 5 |
| Fundamental resonant frequency<br> $f_G$ kHz | 3 | 3.5 | 4 | 6.8 | 5 | 3.7 | 4 | 3 |
| Permissible oscillation stress<br> $\pm F_{\text{nom}}$ % | ± 80 |
| Force limit % | 150 |
| Breaking force % | 300 |
| Lateral force limit % | 100 |
| Permissible eccentricity<br> $e_G$ mm | 10 | 15 | 20 | 25 |
| Bending moment limit<br> $M_{b\text{zul}}$ kN-m | 0.25 | 0.4 | 1 | 3.5 | 5 | 10 | 20 |
| Rated temperature range<br> $B_{T, \text{nom}}$ °C | -40 | -60 |
| Operating temperature range<br> $B_{T, G}$ °C | -40 | +120 |

1) Plug-in connection  
2) Permanent connection  
3) Rated characteristic value 1 mV/V with permissible oscillation stress ± 100 % available on request.  
4) Information for rated characteristic value 2 mV/V; 1 mV/V available on request.

## Miscellaneous

| Nominal force [kN] compression/tension | 0.2 | 0.5 | 1 | 2.5 | 4 | 5 | 6.3 | 10 | 20 | 25 | 30 | 40 | 50 | 63 | 100 | 150 | 160 | 200 | 250 | 300 | 400 | 500 | 630 |
|---------------------------------------|-----|-----|---|-----|---|---|-----|----|----|----|----|----|----|----|-----|------|------|------|------|------|------|------|
| Series K transducer version: flange = F | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Series K transducer version: thread = T | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Series K transducer version: thread and flange = B | ✓ | ✓ | ✓ |
| Measuring principle | bending beam according to the principle of the symmetrical spoke | ✓ | |
| Measuring principle | bending ring | ✓ | |
| Material spring body | 0.2 kN - 0.5 kN: high-strength aluminium alloy | 1 kN - 630 kN: alloyed heat treated steel | Other special steels on request |
## Cable Connection | 0.2 – 630 kN

### Configurable variants
Fixed cable connection with open cable ends
- SMC: grey | Ø 6.5 mm | twisted in pairs | 3 x 2 x 0.25 mm² | -35 °C to +90 °C
- TMC: red | Ø 7.2 mm | twisted in pairs | 3 x 2 x 0.25 mm² | -50 °C to +180 °C

### All standard variants
Plug-in cable connection
- 7-pole LEMO Series 1
  - Female: [Image]
  - Male: [Image]

<table>
<thead>
<tr>
<th>Connection</th>
<th>Wire colour</th>
<th>Pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage (+)</td>
<td>U₂⁺</td>
<td>SMC: blue</td>
</tr>
<tr>
<td>Supply voltage (-)</td>
<td>U₁⁻</td>
<td>SMC: black</td>
</tr>
<tr>
<td>Measurement signal (+)</td>
<td>U₄⁺</td>
<td>SMC: white</td>
</tr>
<tr>
<td>Measurement signal (-)</td>
<td>U₄⁻</td>
<td>SMC: red</td>
</tr>
<tr>
<td>Sense (+)</td>
<td>Sense⁺</td>
<td>SMC: green</td>
</tr>
<tr>
<td>Sense (-)</td>
<td>Sense⁻</td>
<td>SMC: grey</td>
</tr>
<tr>
<td>Shielding</td>
<td>SHIELD</td>
<td>SMC: yellow</td>
</tr>
</tbody>
</table>

1) View to welding side
2) Female LEMO S.A. Typ: EGG.1.B.307.CLL; Male: FGG.1.B.307.CLA.D72

### Pluggable cable connection

All standard variants of the series K are equipped with a pluggable LEMO socket. Suitable measuring cables S-CAB / C-CAB are available as accessories.

#### Plug-in cable connection with shielded measuring cable type SMC (S-CAB-L-5M-F), always with straight connector plug.

#### Note: When using angled 90° plugs, the alignment in the application must be observed. The alignment of the connected 90° angled plugs is determined by the C-CAB measuring cable. When using measuring cables / plugs from other manufacturers, we recommend checking the alignment in advance.

<table>
<thead>
<tr>
<th>Connection</th>
<th>Wire colour</th>
<th>Pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage (+)</td>
<td>U₂⁺</td>
<td>SMC: blue</td>
</tr>
<tr>
<td>Supply voltage (-)</td>
<td>U₁⁻</td>
<td>SMC: black</td>
</tr>
<tr>
<td>Measurement signal (+)</td>
<td>U₄⁺</td>
<td>SMC: white</td>
</tr>
<tr>
<td>Measurement signal (-)</td>
<td>U₄⁻</td>
<td>SMC: red</td>
</tr>
<tr>
<td>Sense (+)</td>
<td>Sense⁺</td>
<td>SMC: green</td>
</tr>
<tr>
<td>Sense (-)</td>
<td>Sense⁻</td>
<td>SMC: grey</td>
</tr>
<tr>
<td>Shielding</td>
<td>SHIELD</td>
<td>SMC: yellow</td>
</tr>
</tbody>
</table>

### Fixed measuring cable

All configurable variants of the series K are optionally available with fixed measuring cables, e.g. with 5 / 10 m shielded standard measuring cable type SMC or 5 m high / low temperature measuring cables and open cable ends or various connectors for strain gauge measuring amplifier connections.

- Fixed shielded measuring cable type SMC with open cable ends
- Fixed shielded high/low temperature measuring cable type TMC with open cable ends
- Fixed shielded high/low temperature measuring cable type TMC with connector

Alignment downwards: A-CAB-XXX-LE7A-XXX-XXX
Alignment to the left: A-CAB-XXX-LE7B-XXX-XXX
Alignment upwards: A-CAB-XXX-LE7C-XXX-XXX
Alignment to the right: A-CAB-XXX-LE7D-XXX-XXX
Double Bridge | 4 – 630 kN

For the double measuring bridge (available as configurable variant), the technical data apply equally to both measuring circuits.

Bending Moment Measuring Circuits | 4 – 630 kN

The bending moment measuring circuits (available as configurable variant) Mx and My can be used advantageously with the use of a multi-channel measuring amplifier to control the force application.

<table>
<thead>
<tr>
<th>Nominal force</th>
<th>$F_{\text{nom}}$ kN</th>
<th>4 - 630 (2 mV/V)</th>
<th>100 - 630 (1 mV/V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated bending moment</td>
<td>$M_{b, \text{nom}}$ N·m</td>
<td>$F_{\text{nom}}$ · 8 mm</td>
<td>$F_{\text{nom}}$ · 12 mm</td>
</tr>
<tr>
<td>Reproducibility</td>
<td>%</td>
<td></td>
<td>0.01</td>
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<tr>
<td>Temperature effect on characteristic value per 10 K</td>
<td>$T_{K_C}$ %/10 K</td>
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<td>0.2</td>
</tr>
<tr>
<td>Temperature effect on zero signal per 10 K</td>
<td>$T_{K_0}$ %/10 K</td>
<td></td>
<td>0.2</td>
</tr>
<tr>
<td>Rated characteristic value</td>
<td>$C_{\text{nom}}$ mV/V</td>
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<td>ca. 0.3</td>
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<tr>
<td>Input resistance</td>
<td>$R_e$ Ω</td>
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<td>400</td>
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<tr>
<td>Operating range of excitation voltage</td>
<td>$B_{U,G}$ V</td>
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<td>5 - 12</td>
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</tbody>
</table>

Configurable force transducer series K

Single bridge | 2 x LEMO push-pull connection sockets (female) | flange version

Standard force transducer series K

Single bridge | 1 x LEMO push-pull connection socket (female) | flange version

Configurable force transducer series K

Single bridge | bending moment measuring circuits Mx, My | 3 x LEMO push-pull connection sockets (female) | flange version
**Dimensions | Threaded Version | 0.2 – 2.5 kN**

- Force transducer Series K design: thread
- Transducer design: 0.2 kN - 2.5 kN

<table>
<thead>
<tr>
<th>Nominal force compression/tension</th>
<th>± $F_{nom}$</th>
<th>kN</th>
<th>0.2</th>
<th>0.5</th>
<th>1</th>
<th>2.5</th>
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<tbody>
<tr>
<td>Bore $ØB_1$</td>
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<tr>
<td>Diameter $ØD_1$</td>
<td>mm</td>
<td>77</td>
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<tr>
<td>Diameter $ØD_2$</td>
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<td>68</td>
<td>-0.1</td>
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<tr>
<td>Diameter $ØD_3$</td>
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<tr>
<td>Diameter $ØD_4$</td>
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<td>12</td>
<td>-0.1</td>
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<tr>
<td>Pitch circle diameter $ØP_1$</td>
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<td>±0.1</td>
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<td>M8</td>
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<tr>
<td>Height $H_1$</td>
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<td>Height $H_2$</td>
<td>mm</td>
<td>12.5</td>
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<tr>
<td>Height $H_3$</td>
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<tr>
<td>Height $H_4$</td>
<td>mm</td>
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<tr>
<td>Height $H_5$</td>
<td>mm</td>
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<tr>
<td>Angle $a_1$</td>
<td>mm</td>
<td>60°</td>
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<td>Angle $a_2$</td>
<td>mm</td>
<td>30°</td>
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## Dimensions | Flange & Threaded Version | 4 – 6.3 kN

- Force transducer Series K design: flange and thread
- Transducer design: 4 kN - 6.3 kN

<table>
<thead>
<tr>
<th>Nominal force compression/tension</th>
<th>± $F_{nom}$ kN</th>
<th>4</th>
<th>5</th>
<th>6.3</th>
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<tr>
<td>Bore $\varnothing B_1$ mm</td>
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<td>5.3</td>
<td></td>
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</tr>
<tr>
<td>Bore $\varnothing B_2$ mm</td>
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<td>20±0.1</td>
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<tr>
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<td>Diameter $\varnothing D_4$ mm</td>
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<tr>
<td>Height $H_2$ mm</td>
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<td>Height $H_4$ mm</td>
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<tr>
<td>Height $H_5$ mm</td>
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<td>16</td>
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<tr>
<td>Angle $a_1$ °</td>
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<td>Angle $a_2$ °</td>
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**Dimensions | Threaded Version | 10 – 63 kN**

- Force transducer Series K design: thread
- Transducer design: 10 kN - 63 kN

---

<table>
<thead>
<tr>
<th>Nominal force compression/tension</th>
<th>± $F_{nom}$</th>
<th>kN</th>
<th>10</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>63</th>
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<tbody>
<tr>
<td>Bore</td>
<td>$\phi B_1$</td>
<td>mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6,6</td>
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<tr>
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<td>$\phi D_1$</td>
<td>mm</td>
<td>95,-1</td>
<td>101,-0,1</td>
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<tr>
<td>Diameter</td>
<td>$\phi D_2$</td>
<td>mm</td>
<td>81,-0,1</td>
<td>87,5,-0,1</td>
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<tr>
<td>Diameter</td>
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<td>mm</td>
<td>40,-0,1</td>
<td>38,6,-0,1</td>
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<td>Pitch circle diameter</td>
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<td>86,0,1</td>
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<td>Thread</td>
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<td>M20 x 1,5</td>
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<tr>
<td>Height</td>
<td>$H_1$</td>
<td>mm</td>
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<td></td>
<td></td>
<td></td>
<td>31,0,1</td>
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<tr>
<td>Height</td>
<td>$H_2$</td>
<td>mm</td>
<td></td>
<td></td>
<td></td>
<td>18</td>
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<td>Height</td>
<td>$H_3$</td>
<td>mm</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1,5</td>
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</tr>
<tr>
<td>Height</td>
<td>$H_4$</td>
<td>mm</td>
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<td></td>
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<td></td>
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<tr>
<td>Angle</td>
<td>$a_1$</td>
<td></td>
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<td></td>
<td></td>
<td>8 x 45°</td>
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</tr>
<tr>
<td>Angle</td>
<td>$a_2$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>22,5°</td>
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<td></td>
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</tbody>
</table>
**Dimension | Flange Version | 10 – 160 kN**

- Force transducer Series K design: flange
- Transducer design: 10 kN - 160 kN

<table>
<thead>
<tr>
<th>Nominal force compression/tension</th>
<th>± $F_{\text{nom}}$ kN</th>
<th>10 20 25 30 40 50 63 100 150 160</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bore $OB_1$ mm</td>
<td></td>
<td>6,6</td>
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<tr>
<td>Bore $OB_2$ mm</td>
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<td>6,6</td>
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<tr>
<td>Diameter $OD_1$ mm</td>
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<td>95±0,1</td>
</tr>
<tr>
<td>Diameter $OD_2$ mm</td>
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<td>81±0,1</td>
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<td></td>
<td>40±0,1</td>
</tr>
<tr>
<td>Diameter $OD_4$ mm</td>
<td></td>
<td>8±0</td>
</tr>
<tr>
<td>Pitch circle diameter $OP_1$ mm</td>
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<td>80±0,1</td>
</tr>
<tr>
<td>Pitch circle diameter $OP_2$ mm</td>
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<tr>
<td>Height $H_1$ mm</td>
<td></td>
<td>31±0,1</td>
</tr>
<tr>
<td>Height $H_2$ mm</td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>Height $H_3$ mm</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Height $H_4$ mm</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Angle $a_1$</td>
<td></td>
<td>8 x 45°</td>
</tr>
<tr>
<td>Angle $a_2$</td>
<td></td>
<td>22,5°</td>
</tr>
</tbody>
</table>
**Dimension | Flange Version | 200 – 630 kN**

- Force transducer Series K design: flange
- Transducer design: 200 kN - 630 kN

<table>
<thead>
<tr>
<th>Nominal force compression/tension</th>
<th>± $F_{nom}$</th>
<th>kN</th>
<th>200</th>
<th>250</th>
<th>300</th>
<th>400</th>
<th>500</th>
<th>630</th>
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</thead>
<tbody>
<tr>
<td>Bore $\varnothing B_1$ mm</td>
<td>17</td>
<td>22</td>
<td>26</td>
<td></td>
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<tr>
<td>Bore $\varnothing B_2$ mm</td>
<td>17</td>
<td>22</td>
<td>26</td>
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<td></td>
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</tr>
<tr>
<td>Diameter $\varnothing D_1$ mm</td>
<td>219±0.1</td>
<td>270±0.1</td>
<td>312±0.2</td>
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<tr>
<td>Diameter $\varnothing D_2$ mm</td>
<td>171.05±0.1</td>
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<tr>
<td>Diameter $\varnothing D_3$ mm</td>
<td>97±0.1</td>
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<tr>
<td>Diameter $\varnothing D_4$ mm</td>
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<td></td>
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<tr>
<td>Pitch circle diameter $\varnothing P_1$ mm</td>
<td>194±0.1</td>
<td>235±0.1</td>
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<tr>
<td>Pitch circle diameter $\varnothing P_2$ mm</td>
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<td>Height $H_1$ mm</td>
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<td>Height $H_3$ mm</td>
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<td></td>
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<td></td>
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<tr>
<td>Angle $a_1$</td>
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<td>8 x 45°</td>
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<tr>
<td>Angle $a_2$</td>
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<td>22.5°</td>
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# Order Numbers | Standard Variants

*Force transducer Series K | standard variants available at short notice*

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<thead>
<tr>
<th>Nominal force</th>
<th>Description</th>
<th>Order number</th>
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<tbody>
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<td>200 N</td>
<td>Standard force transducer series K</td>
<td>0.2 kN</td>
</tr>
<tr>
<td>500 N</td>
<td>Standard force transducer series K</td>
<td>0.5 kN</td>
</tr>
<tr>
<td>1 kN</td>
<td>Standard force transducer series K</td>
<td>1 kN</td>
</tr>
<tr>
<td>2.5 kN</td>
<td>Standard force transducer series K</td>
<td>2.5 kN</td>
</tr>
<tr>
<td>5 kN</td>
<td>Standard force transducer series K</td>
<td>5 kN</td>
</tr>
<tr>
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<td>Standard force transducer series K</td>
<td>10 kN</td>
</tr>
<tr>
<td>10 kN</td>
<td>Standard force transducer series K</td>
<td>10 kN</td>
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<td>20 kN</td>
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<td>Standard force transducer series K</td>
<td>20 kN</td>
</tr>
<tr>
<td>25 kN</td>
<td>Standard force transducer series K</td>
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<td>Standard force transducer series K</td>
<td>50 kN</td>
</tr>
<tr>
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<tr>
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<td>Standard force transducer series K</td>
<td>63 kN</td>
</tr>
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<td>Standard force transducer series K</td>
<td>100 kN</td>
</tr>
<tr>
<td>150 kN</td>
<td>Standard force transducer series K</td>
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<td>500 kN</td>
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<tr>
<td>630 kN</td>
<td>Standard force transducer series K</td>
<td>630 kN</td>
</tr>
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</table>

Note: all standard versions always (1) without attachments (2) no plug protection (3) 2 mV/V (4) single measuring bridge (5) standard temperature range (6) 1x LEM O connection socket 7-pin push-pull | no measuring cables included
## Order Numbers | Configurable Variants

### Force transducer Series K | configurable variants

<table>
<thead>
<tr>
<th>Item</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Force Transducer Series K</td>
<td>C-K</td>
<td>Configurable force transducer series K</td>
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#### Nominal Force

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<th>Description</th>
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</tr>
<tr>
<td>K500</td>
<td>500 N</td>
</tr>
<tr>
<td>1K00</td>
<td>1 kN</td>
</tr>
<tr>
<td>2K50</td>
<td>2.5 kN</td>
</tr>
<tr>
<td>4K00</td>
<td>4 kN</td>
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<td>5K00</td>
<td>5 kN</td>
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<td>6K30</td>
<td>6.3 kN</td>
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<td>10 kN</td>
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<td>20K0</td>
<td>20 kN</td>
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<tr>
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<td>25 kN</td>
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<td>160K</td>
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<td>400K</td>
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<td>500K</td>
<td>500 kN</td>
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#### Mechanical design

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<tr>
<td>F</td>
<td>Flange</td>
</tr>
<tr>
<td>T</td>
<td>Thread</td>
</tr>
<tr>
<td>B</td>
<td>Flange and thread</td>
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#### Mounting adapter

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<tr>
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<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>No mounting parts</td>
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<tr>
<td>Y</td>
<td>With mounting parts</td>
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#### Plug protection

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</thead>
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<td>N</td>
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<td>2</td>
<td>2 mV/V</td>
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<td>1</td>
<td>1 mV/V</td>
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#### Nominal sensitivity

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<th>Description</th>
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</thead>
<tbody>
<tr>
<td>2</td>
<td>2 mV/V</td>
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<tr>
<td>1</td>
<td>1 mV/V</td>
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#### Single or double measuring bridge

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<td>SB</td>
<td>Single bridge</td>
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<tr>
<td>DB</td>
<td>Double bridge</td>
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#### Bending moment measuring circuits Mx, My

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<tr>
<td>NO</td>
<td>No bending moment measuring circuits Mx, My</td>
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<tr>
<td>BM</td>
<td>Bending moment measuring circuits Mx, My</td>
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#### Temperature range

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<th>Description</th>
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<td>S</td>
<td>Standard temp. range</td>
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<tr>
<td>E</td>
<td>Extended temp. range</td>
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<tr>
<td>B</td>
<td>High and low temp. range</td>
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#### Electrical transducer connection (for all selected measuring circuits)

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<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>P</td>
<td>LEMO connection sockets(s) selected</td>
</tr>
<tr>
<td>A</td>
<td>1 x 5 m</td>
</tr>
<tr>
<td>B</td>
<td>1 x 10 m</td>
</tr>
<tr>
<td>S</td>
<td>1 x 5 m</td>
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#### Cable connection type (for all selected measuring circuits)

<table>
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<th>Description</th>
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<tbody>
<tr>
<td>P</td>
<td>LEMO connection sockets(s) selected</td>
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<tr>
<td>F</td>
<td>Free cable ends</td>
</tr>
<tr>
<td>A</td>
<td>D-Sub 9-pole plug</td>
</tr>
<tr>
<td>B</td>
<td>D-Sub 15-pole plug</td>
</tr>
<tr>
<td>C</td>
<td>MS 7-pole plug</td>
</tr>
<tr>
<td>M</td>
<td>M12 8-pole plug (for in-line amplifier series ILA)</td>
</tr>
</tbody>
</table>

#### Item Code Description

- C-K: Configurable force transducer series K
- 630 K: 630 kN flange
- N: no mounting parts
- N: no plug protection
- K: 630 kN
- 2: 2 mV/V
double bridge
- NO: no bending moment Mx, My
- S: standard temperatur
- A: 5 m fixed cable type SMC
- F: free ends

---

Series K (eng.) 01/07/2024

#PrecisionWins
### Mechanical design
The series K force transducer has different mechanical interfaces depending on the nominal load.
- **F = Flange version** | nominal load: 10 - 630 kN
- **T = Threaded version** | nominal load: 0.2 - 2.5 kN and 10 - 63 kN
- **B = Flange & threaded version** | nominal load: 4 - 6.3 kN

### Mounting adapter
Depending on the nominal load, the force transducer series K can be equipped with additional attachments. The attachments are all pre-assembled at the factory.
- **Nominal load**: 0.2 - 2.5 kN with base plate M8 | screwed
- **Nominal load**: 4 - 6.3 kN with base plate M10x1 | screwed
- **Nominal load**: 10 - 63 kN with base plate M20x1.5 | screwed
- **Nominal load**: 100 - 160 kN with base plate and thread adapter M30x2 | screwed
- **Nominal load**: 200 - 300 kN with base plate and thread adapter M42x3 | screwed
- **Nominal load**: 400 - 500 kN with base plate and thread adapter M56x4 | screwed
- **Nominal load**: 630 kN with base plate and thread adapter M56x4 | screwed

### Plug protection
In special cases it may be necessary to additionally equip the electrical connections on the force transducer series K with a protective profile around the plug connection. Dimensions depending on nominal load.

### Nominal sensitivity
The series K force transducer is specified for a permissible oscillation stress ± 80% (@2 mV/V). For the nominal forces 100 kN - 500 kN the option nominal value 2 mV/V can be selected. This allows a permissible oscillation stress of ±100% (@1 mV/V) to be achieved for these nominal force ranges.

### Single or double measuring bridge 4 - 630 kN
For redundancy reasons, it is necessary, for example in safety-relevant applications, to check the safety-relevant integrity of the measuring signal by means of a second measuring bridge (functional redundancy in the same force transducer). Via two separate measuring amplifier channels, two series K force transducers output signals are processed and evaluated independently of each other. This makes it possible to connect two measuring amplifiers with different characteristics (DC / CF). The second redundant measuring circuit is characterised by no crosstalk between the channels at different carrier frequencies. The selection of a double measuring bridge affects the number of connection sockets and measuring cables (if selected).

### Bending moment measuring circuits Mx, My 4 - 630 kN
The series K force transducer can be optionally equipped with bending moment measuring circuits. The additional bending moment measuring circuits can be measured to control the horizontal bending moments Mx and My and can be provided as separate channels. The selection of bending moment measuring circuits affects the number of connection sockets and measuring cables (if selected).

### Temperature range
The selection of the temperature range has an effect on the feature electrical transducer connection / measuring cables, additional temperature compensation and additional protective measures for high and / or low temperature ranges.
- **S = For the standard temperature range** -10°C - +60°C shielded measuring cables type SMC are used.
- **E = For the extended temperature range** -10°C - less than or equal to +120°C shielded high/low temperature measuring cables type TMC are used | additional temperature compensation
- **B = For the high and low temperature range** -40°C - +180°C shielded high/low temperature measuring cables type TMC are used | additional temperature compensation and additional protective measures for high and / or low temperature range.

Note: temperature compensation ensures that the series K force transducer fullfills the metrological characteristics over the selected temperature range.

### Electrical transducer connection
The series K force transducer can be configured with fixed push-pull connection plugs (female) or fixed cables (type SMC or TMC) in different lengths.
- **P = LEMO connection socket(s)** | 7-pole | push-pull
- **A = 5 m** | fixed standard measuring cable type SMC
- **B = 10 m** | fixed standard measuring cable type SMC
- **S = 5 m** | fixed high/low temperature measuring cable type TMC

Notes:
1. The number of connection plugs and measuring cables results from the number of selected measuring bridges.
2. The type of measuring cable depends on the selected temperature range.
3. When using 90° angle plugs, the orientation of the plugs is determined by the C-CAB.

### Cable connection type
If the series K force transducer is configured with fixed measuring cables, different connector types for strain-gauge measuring amplifiers can be selected in addition to open cable ends. The assembly of the selected connectors is carried out by GTM. The force transducer can be connected directly to a measuring amplifier.
- **P = LEMO push-pull connection socket(s)** | no fixed measuring cable(s)
- **F = free cable ends** | on all configured measuring circuits
- **A = D-Sub 9-pin** | on all configured measuring circuits
- **B = D-Sub 15-pin** | on all configured measuring circuits
- **C = M5 7-pole** | on all configured measuring circuits
- **M = M12 8-pole** | on all configured measuring circuits
#Order Numbers | Accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Order number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring cable</td>
<td></td>
</tr>
<tr>
<td>Standard measuring cable</td>
<td>grey</td>
</tr>
<tr>
<td>Double-shielded measuring cable</td>
<td>yellow</td>
</tr>
<tr>
<td>Temperature-resistant measuring cable</td>
<td>red</td>
</tr>
<tr>
<td>High flexible measuring cable</td>
<td>black</td>
</tr>
<tr>
<td>Configurable measuring cable type SMC, DMC, TMC, FMC</td>
<td>in different lengths</td>
</tr>
<tr>
<td>1. Alignment downwards</td>
<td>alignment A: C-CAB-XXX-LE7A-XXX-XXX</td>
</tr>
<tr>
<td>2. Alignment to the left</td>
<td>alignment B: C-CAB-XXX-LE7B-XXX-XXX</td>
</tr>
<tr>
<td>3. Alignment upwards</td>
<td>alignment A: C-CAB-XXX-LE7C-XXX-XXX</td>
</tr>
<tr>
<td>4. Alignment to the right</td>
<td>alignment B: C-CAB-XXX-LE7D-XXX-XXX</td>
</tr>
<tr>
<td>Series K</td>
<td>base plate (1 piece)</td>
</tr>
<tr>
<td>Series K</td>
<td>0.2 - 0.5 kN</td>
</tr>
<tr>
<td>Series K</td>
<td>1 - 2.5 kN</td>
</tr>
<tr>
<td>Series K</td>
<td>4 - 6.3 kN</td>
</tr>
<tr>
<td>Series K</td>
<td>10 - 30 kN</td>
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<tr>
<td>Series K</td>
<td>40 - 63 kN</td>
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<tr>
<td>Series K</td>
<td>100 - 160 kN</td>
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<tr>
<td>Series K</td>
<td>200 - 300 kN</td>
</tr>
<tr>
<td>Series K</td>
<td>400 - 500 kN</td>
</tr>
<tr>
<td>Series K</td>
<td>630 kN</td>
</tr>
<tr>
<td>Note: 0.2 - 0.5 kN</td>
<td>material: aluminium</td>
</tr>
<tr>
<td>Series K</td>
<td>bolts outer hole circle (1 set)</td>
</tr>
<tr>
<td>Series K</td>
<td>0.2 - 0.5 kN</td>
</tr>
<tr>
<td>Series K</td>
<td>1 - 2.5 kN</td>
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<tr>
<td>Series K</td>
<td>4 - 6.3 kN</td>
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<td>Series K</td>
<td>10 - 63 kN</td>
</tr>
<tr>
<td>Series K</td>
<td>100 - 160 kN</td>
</tr>
<tr>
<td>Series K</td>
<td>200 - 300 kN</td>
</tr>
<tr>
<td>Series K</td>
<td>400 - 500 kN</td>
</tr>
<tr>
<td>Series K</td>
<td>630 kN</td>
</tr>
<tr>
<td>Note: 1 set for mounting the bottom / base plate over outer hole circle</td>
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</tr>
</tbody>
</table>
## Order Numbers | Accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Order number</th>
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</thead>
<tbody>
<tr>
<td>**Series K</td>
<td>load button</td>
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<tr>
<td>Series K</td>
<td>0.2 - 2.5 kN</td>
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<tr>
<td>Series K</td>
<td>4 - 6.3 kN</td>
</tr>
<tr>
<td>Series K</td>
<td>10 - 63 kN</td>
</tr>
<tr>
<td>Series K</td>
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<td>Series K</td>
<td>200 - 300 kN</td>
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<tr>
<td>Series K</td>
<td>400 - 630 kN</td>
</tr>
<tr>
<td>**Series K</td>
<td>load button</td>
</tr>
<tr>
<td>Series K</td>
<td>4 - 6.3 kN</td>
</tr>
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<td>Series K</td>
<td>10 - 63 kN</td>
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<tr>
<td>Series K</td>
<td>100 - 160 kN</td>
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<td>200 - 300 kN</td>
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<tr>
<td>Series K</td>
<td>400 - 500 kN</td>
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<tr>
<td>Series K</td>
<td>630 kN</td>
</tr>
<tr>
<td>**Series K</td>
<td>flange tensile force introduction (1 piece)**</td>
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<tr>
<td>Series K</td>
<td>4 - 6.3 kN</td>
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<td>Series K</td>
<td>10 - 63 kN</td>
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<tr>
<td>Series K</td>
<td>100 - 160 kN</td>
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<tr>
<td>Series K</td>
<td>200 - 300 kN</td>
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<tr>
<td>Series K</td>
<td>630 kN</td>
</tr>
<tr>
<td>**Series K</td>
<td>bolts inner hole circle (1 set)**</td>
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<td>Series K</td>
<td>4 - 6.3 kN</td>
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<tr>
<td>Series K</td>
<td>10 - 63 kN</td>
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<tr>
<td>Series K</td>
<td>100 - 160 kN</td>
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<tr>
<td>Series K</td>
<td>200 - 300 kN</td>
</tr>
<tr>
<td>Series K</td>
<td>400 - 500 kN</td>
</tr>
<tr>
<td>Series K</td>
<td>630 kN</td>
</tr>
</tbody>
</table>

**Note:** 1 set for mounting the tensile force introduction via inner hole circle

| **Series K | tension bolts (1 set)** | |
| Series K | 4 - 6.3 kN | tension bolts | S-MA-K-TB-00 |
| Series K | 10 - 63 kN | tension bolts | S-MA-K-TB-01 |
| Series K | 100 - 160 kN | tension bolts | S-MA-K-TB-02 |
| Series K | 200 - 300 kN | tension bolts | S-MA-K-TB-03 |
| Series K | 400 - 500 kN | tension bolts | S-MA-K-TB-04 |
| Series K | 630 kN | tension bolts | S-MA-K-TB-05 |

**Note:** tension bolts are recommended for dynamic use
## Order Numbers | Accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Order number</th>
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<tbody>
<tr>
<td>**Series K</td>
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<td>4 - 6.3 kN</td>
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<td>200 - 300 kN</td>
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<td>Series K</td>
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<td>**Series K</td>
<td>threaded adapter flange (1 piece)**</td>
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<td>**Series K</td>
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<td>630 kN</td>
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