

## Rotating Torque Sensors: DR-2112-R/DR-2112-R-P (contactless) with Rated Torque from 0.1 ... 1000 N·m



*This sensor has a contactless and digital signal transmission from rotor to stator without signal falsification of the measurement data. It is therefore highly accurate and maintenance-free.*

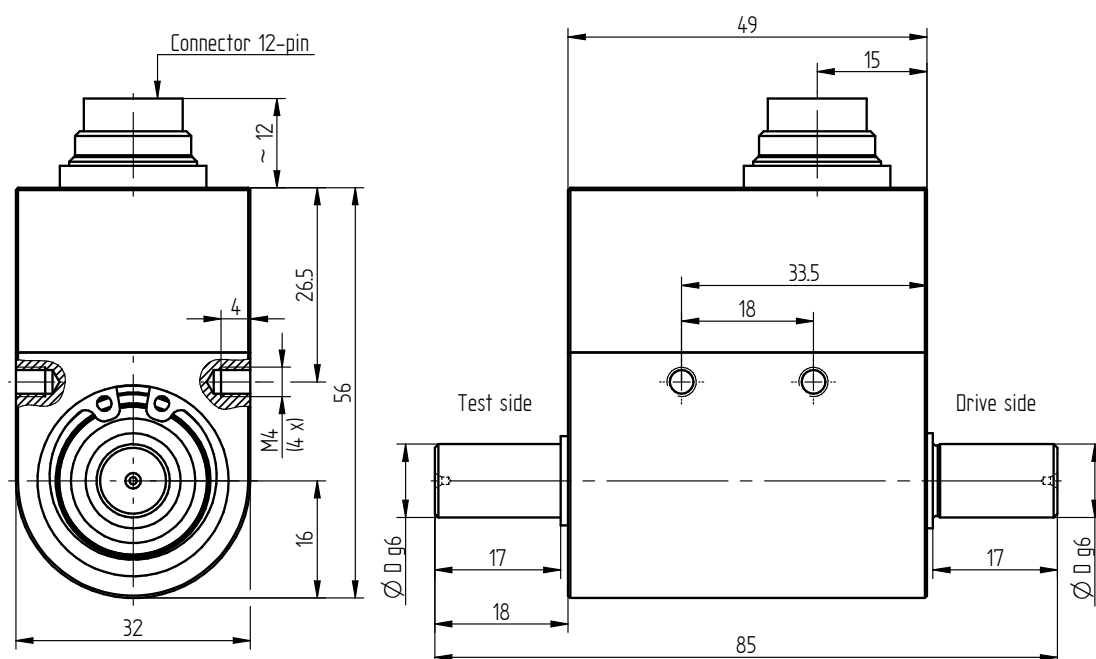
### Performance Features

- Torque sensor for e.g. test bench applications
- Accuracy class 0.2 %
- Active output  $\pm 5V$  (optional  $\pm 10V$ )
- Integrated speed/angle measurement, optional
- Speed up to  $15000 \text{ min}^{-1}$
- Very short axial length
- High torsional stiffness
- Simple handling and assembly
- Special versions on request

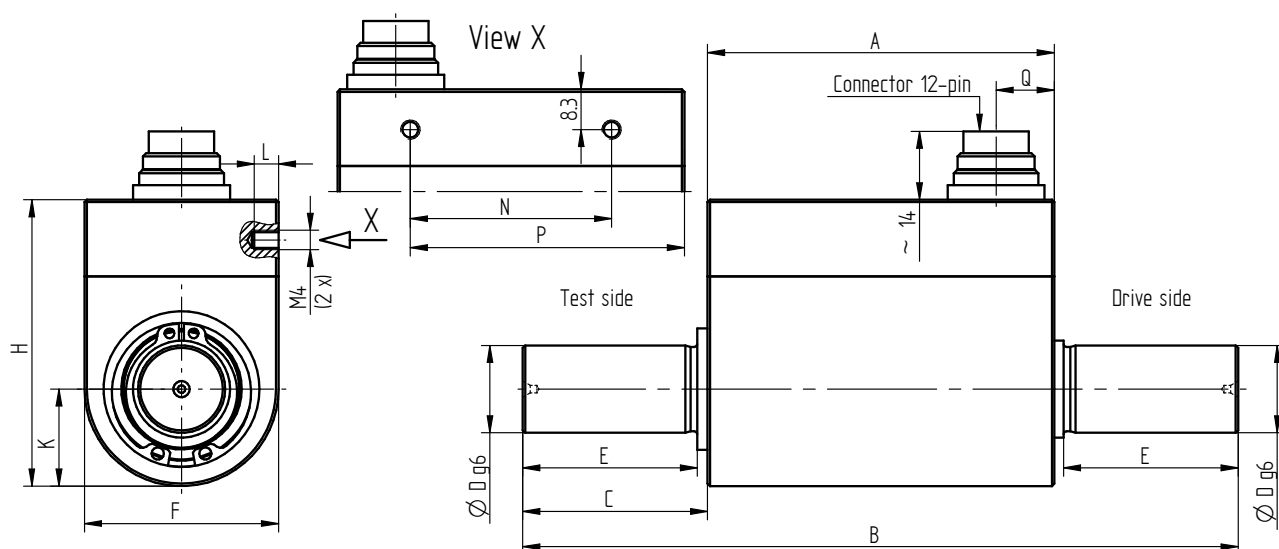
### Application

- Research and development
- Process measuring and control technology
- Fully automated machining centres
- Measuring and control devices
- Tool engineering
- Special mechanical engineering

### Dimensions of DR-2112-R/DR-2112-R-P in mm

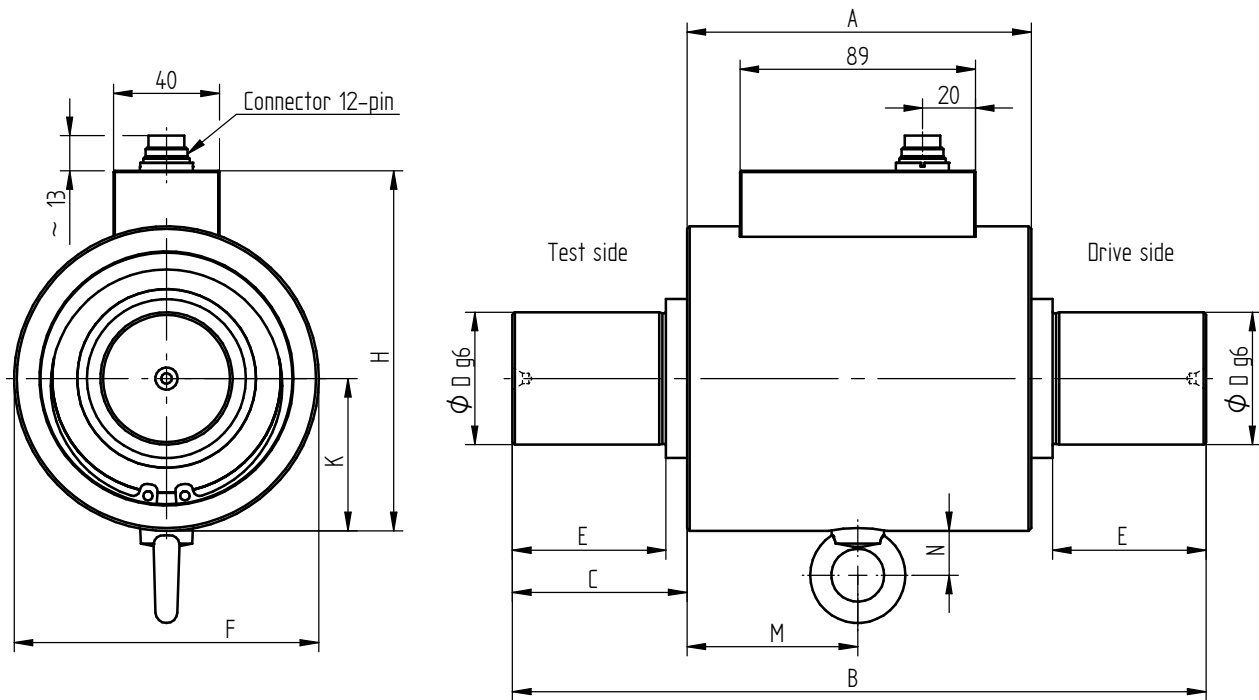


| Rated Torque<br>[N·m] | Dimensions [mm]<br>Ø D | Weight<br>[kg] |
|-----------------------|------------------------|----------------|
| 0.1/0.2/0.5/1/2/5     | 8                      | 0.2            |
| 10                    | 10                     | 0.2            |



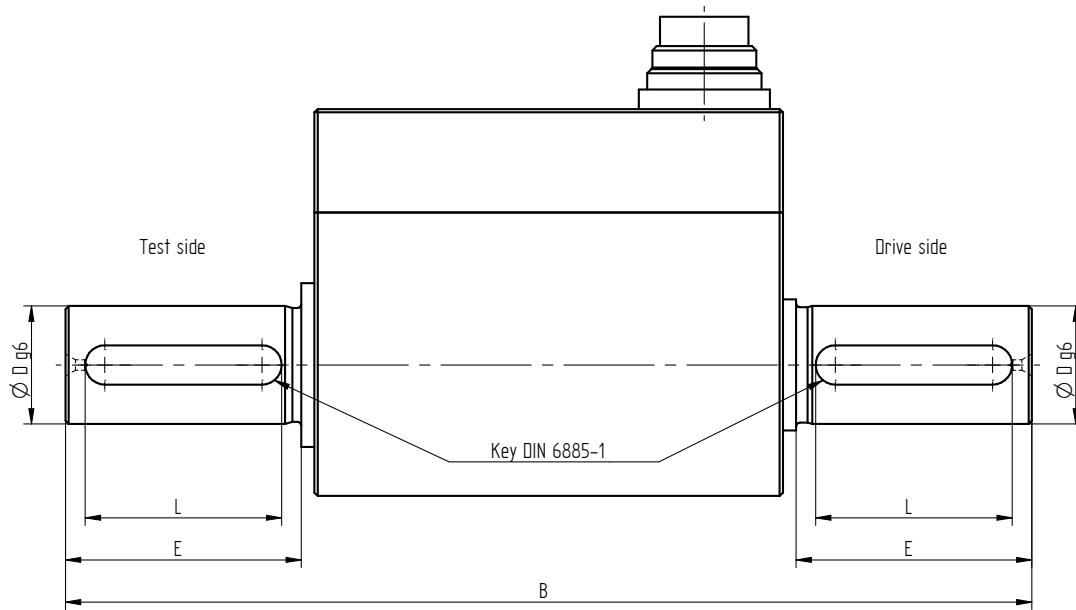
| Rated Torque<br>[N·m] | Dimensions [mm] |       |      |     |    |    |    |    |   |      |      |    | Weight<br>[kg] |
|-----------------------|-----------------|-------|------|-----|----|----|----|----|---|------|------|----|----------------|
|                       | A               | B     | C    | Ø D | E  | F  | H  | K  | L | N    | P    | Q  |                |
| 20/30                 | 71.5            | 111.5 | 20   | 18  | 18 | 40 | 59 | 20 | 5 | 41.5 | 56.5 | 12 | 0.5            |
| 50/100                | 71.5            | 147.5 | 38   | 18  | 36 | 40 | 59 | 20 | 5 | 41.5 | 56.5 | 12 | 0.6            |
| 200/500               | 72.5            | 159.5 | 43.5 | 32  | 38 | 58 | 76 | 29 | 6 | 29.5 | 51.5 | 15 | 1.5            |

## Dimensions of DR-2112-R/DR-2112-R-P in mm



| Rated Torque<br>[N·m] | Dimensions [mm] |     |    |     |    |     |     |      |      |     | Weight<br>[kg] |
|-----------------------|-----------------|-----|----|-----|----|-----|-----|------|------|-----|----------------|
|                       | A               | B   | C  | Ø D | E  | Ø F | H   | K    | M    | N   |                |
| 1000                  | 130             | 262 | 66 | 50  | 58 | 115 | 136 | 57.5 | 64.5 | ~17 | 7.2            |

## Dimensions of Version with Feather Keys in mm



| Rated Torque [N·m] | Dimensions [mm] |     |    |    |                          | Weight [kg] |
|--------------------|-----------------|-----|----|----|--------------------------|-------------|
|                    | B               | Ø D | E  | L  | Feather Key <sup>1</sup> |             |
| 0.1/0.2/0.5/1/2/5  | 85              | 8   | 17 | 14 | 2 x 2 x 14               | 0.2         |
| 10                 | 85              | 10  | 17 | 14 | 3 x 3 x 14               | 0.2         |
| 20/30              | 111.5           | 18  | 18 | 14 | 6 x 6 x 14               | 0.5         |
| 50/100             | 147.5           | 18  | 36 | 30 | 6 x 6 x 30               | 0.6         |
| 200/500            | 159.5           | 32  | 38 | 36 | 10 x 8 x 36              | 1.5         |
| 1000               | 262             | 50  | 58 | 50 | 14 x 9 x 50              | 7.2         |

## Connection Assignment

| 12-pin | DR-2112-R/DR-2112-R-P   |                    | Series 581 |
|--------|-------------------------|--------------------|------------|
| Pin A  | NC                      | -                  |            |
| Pin B  | Signal angle B (option) | 5V TTL             |            |
| Pin C  | Signal (+)              | ±5V (±10V)         |            |
| Pin D  | Signal (GND)            | 0V                 |            |
| Pin E  | Supply (GND)            | 0V                 |            |
| Pin F  | Supply (+)              | 12 ... 28VDC       |            |
| Pin G  | Signal angle A (option) | 5V TTL             |            |
| Pin H  | NC                      | -                  |            |
| Pin J  | NC                      | -                  |            |
| Pin K  | Control signal          | L < 2.0V; H > 3.5V |            |
| Pin L  | NC                      | -                  |            |
| Pin M  | Shield                  |                    |            |

<sup>1</sup> Calculated load type for feather key: single side light shocks

## Technical Data acc. to VDI/VDE/DKD 2639

| Torque Sensor                                                                 |                          | DR-2112-R/DR-2112-R-P          |
|-------------------------------------------------------------------------------|--------------------------|--------------------------------|
| Rated torque <b>M<sub>nom</sub></b>                                           | N·m                      | 0.1 ... 1000                   |
| Accuracy class                                                                | % M <sub>nom</sub>       | 0.2                            |
| Relative repeatability error in unchanged mounting position <b>b'</b>         | % M <sub>nom</sub>       | ±0.04                          |
| Rated range of supply voltage                                                 | VDC                      | 12 ... 28                      |
| Current consumption                                                           | mA                       | ≤60                            |
| Output signal                                                                 | V                        | ±5                             |
| Control signal excitation                                                     | V                        | L <2.0; H >3.5                 |
| Sample rate                                                                   | kSample/s                | 10                             |
| Electrical connection                                                         |                          | 12-pin series 581 <sup>2</sup> |
| Reference temperature <b>T<sub>ref</sub></b>                                  | °C                       | 23                             |
| Rated temperature range                                                       | °C                       | 5 ... 45                       |
| Operating temperature range                                                   | °C                       | 0 ... 60                       |
| Storage temperature range                                                     | °C                       | -10 ... 70                     |
| Temperature effect on zero signal <b>TK<sub>0</sub></b>                       | % M <sub>nom</sub> /10 K | ±0.3                           |
| Temperature effect on characteristic value <b>TK<sub>C</sub></b>              | % M <sub>nom</sub> /10 K | ±0.15                          |
| Maximum operating torque <b>M<sub>G</sub></b> (static)                        | % M <sub>nom</sub>       | 150                            |
| Torque limit <b>M<sub>max</sub></b> (static)                                  | % M <sub>nom</sub>       | 200                            |
| Breaking torque <b>M<sub>B</sub></b> (static)                                 | % M <sub>nom</sub>       | >300                           |
| Permissible oscillation stress when subjected to torque <b>M<sub>df</sub></b> | % M <sub>nom</sub>       | 70 (peak-to-peak)              |
| Level of protection                                                           |                          | IP50                           |

<sup>2</sup> Female cable connector in scope of delivery at first delivery

<sup>3</sup> Version '-P' feather key

<sup>4</sup> Without option speed/angle measurement

<sup>5</sup> Unsupported shaft (free floating assembly)

## Technical Data acc. to VDI/VDE/DKD 2639 (continued)

| Article-No.<br>DR-2112-R <sup>6</sup> | Article-No.<br>DR-2112-R-P <sup>3</sup> | Rated Torque<br>[N·m] | Limit Speed<br>[min <sup>-1</sup> ] | Spring Rate<br>[N·m/rad] | Mass Moment of Inertia<br>[kg·m <sup>2</sup> ] <sup>4</sup> |           | Axial Force<br>Limit [N] <sup>5</sup> | Lateral Force<br>Limit [N] <sup>5</sup> |
|---------------------------------------|-----------------------------------------|-----------------------|-------------------------------------|--------------------------|-------------------------------------------------------------|-----------|---------------------------------------|-----------------------------------------|
|                                       |                                         |                       |                                     |                          | Drive Side                                                  | Test Side |                                       |                                         |
| 108678                                | 113453                                  | 0.1                   | 15000                               | 1.8E+01                  | 1.9E-06                                                     | 2.8E-07   | 42                                    | 0.9                                     |
| 108679                                | 115279                                  | 0.2                   | 15000                               | 1.8E+01                  | 1.9E-06                                                     | 2.8E-07   | 58                                    | 1.2                                     |
| 108680                                | 115280                                  | 0.5                   | 15000                               | 1.2E+02                  | 1.9E-06                                                     | 2.8E-07   | 172                                   | 1.9                                     |
| 108681                                | 115281                                  | 1                     | 15000                               | 1.2E+02                  | 1.9E-06                                                     | 2.8E-07   | 227                                   | 2.9                                     |
| 108682                                | 114491                                  | 2                     | 15000                               | 3.6E+02                  | 1.9E-06                                                     | 2.9E-07   | 348                                   | 5.5                                     |
| 108683                                | 113452                                  | 5                     | 15000                               | 4.0E+02                  | 1.9E-06                                                     | 2.9E-07   | 650                                   | 14                                      |
| 108684                                | 109657                                  | 10                    | 15000                               | 9.3E+02                  | 2.1E-06                                                     | 3.8E-07   | 1000                                  | 26                                      |
| 108686                                | 113223                                  | 20                    | 15000                               | 4.5E+03                  | 1.2E-05                                                     | 9.9E-06   | 1680                                  | 43                                      |
| 108687                                | 111395                                  | 30                    | 15000                               | 4.5E+03                  | 1.2E-05                                                     | 9.9E-06   | 2200                                  | 65                                      |
| 108688                                | 110093                                  | 50                    | 15000                               | 8.5E+03                  | 1.3E-05                                                     | 1.2E-05   | 3100                                  | 80                                      |
| 108689                                | 110500                                  | 100                   | 12000                               | 8.5E+03                  | 1.3E-05                                                     | 1.2E-05   | 4800                                  | 160                                     |
| 108690                                | 110149                                  | 200                   | 10000                               | 6.7E+04                  | 1.0E-04                                                     | 9.0E-05   | 8000                                  | 290                                     |
| 108691                                | 109209                                  | 500                   | 10000                               | 7.1E+04                  | 1.0E-04                                                     | 9.0E-05   | 14000                                 | 700                                     |
| 108692                                | 115278                                  | 1000                  | 8000                                | 3.1E+05                  | 1.6E-03                                                     | 1.1E-03   | 23000                                 | 900                                     |

## Options

| Article-No.         | Description                                              |                                                                                                                                                                                                             |
|---------------------|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 101695              | Accuracy class                                           | 0.05 % M <sub>nom</sub>                                                                                                                                                                                     |
| 103562              | Output signal                                            | ±10V                                                                                                                                                                                                        |
| 101560              | Speed/angle measurement, 2 x 360 impulses, 90° displaced | 5V TTL, CW-turn<br>CH A <br>CH B  |
| 104097 <sup>7</sup> | Speed measurement, 1 x 60 impulses                       | 5V TTL                                                                                                                                                                                                      |
| 106154              | Control signal                                           | 50 % M <sub>nom</sub>                                                                                                                                                                                       |
| 100739              | Control signal                                           | 80 % M <sub>nom</sub>                                                                                                                                                                                       |

## Calibrations

| Article-No. | Description                                                              |            |
|-------------|--------------------------------------------------------------------------|------------|
| 400676      | Linearity diagram in accordance to factory standard                      | 25 % steps |
| 400664      | Linearity diagram in accordance to factory standard                      | 10 % steps |
| 400961      | Proprietary calibration acc. to VDI/VDE 2646                             | 3 steps    |
| 400700      | Proprietary calibration acc. to VDI/VDE 2646                             | 5 steps    |
| 400688      | Proprietary calibration acc. to VDI/VDE 2646                             | 8 steps    |
| 401023      | Proprietary calibration for the angle of rotation acc. to VDI/VDE 2648-1 |            |
|             | DAkKS-Calibration/Standard on request                                    |            |

<sup>3</sup> Version 'P' feather key

<sup>4</sup> Without option speed/angle measurement

<sup>5</sup> Unsupported shaft (free floating assembly)

<sup>6</sup> Version 'R' accuracy class 0.2 % M<sub>nom</sub>

<sup>7</sup> Rated torque ≥10000 N·m

## Accessories

### Electrical Connection

| Article-No. | Description                                                                                   |
|-------------|-----------------------------------------------------------------------------------------------|
| 41382       | Female cable connector 12-pin series 581                                                      |
| 45598       | Female angled connector 12-pin series 682                                                     |
| 10270       | Connection cable, 3 m, with 12-pin female cable connector series 581 and free strands         |
| 10345       | Connection cable angled, 3 m, with 12-pin female angled connector series 682 and free strands |

### Amplifiers

Examples of suitable amplifiers for the torque sensors DR-2112/DR-2112-P and DR-2112-R/DR-2112-R-P:



Further suitable amplifiers you can find on our homepage under <https://www.lorenz-messtechnik.de/english/products/>.