

## Rotating Torque Sensor MR-12 (contactless) with Nominal Torque from 20 ... 5000 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.*

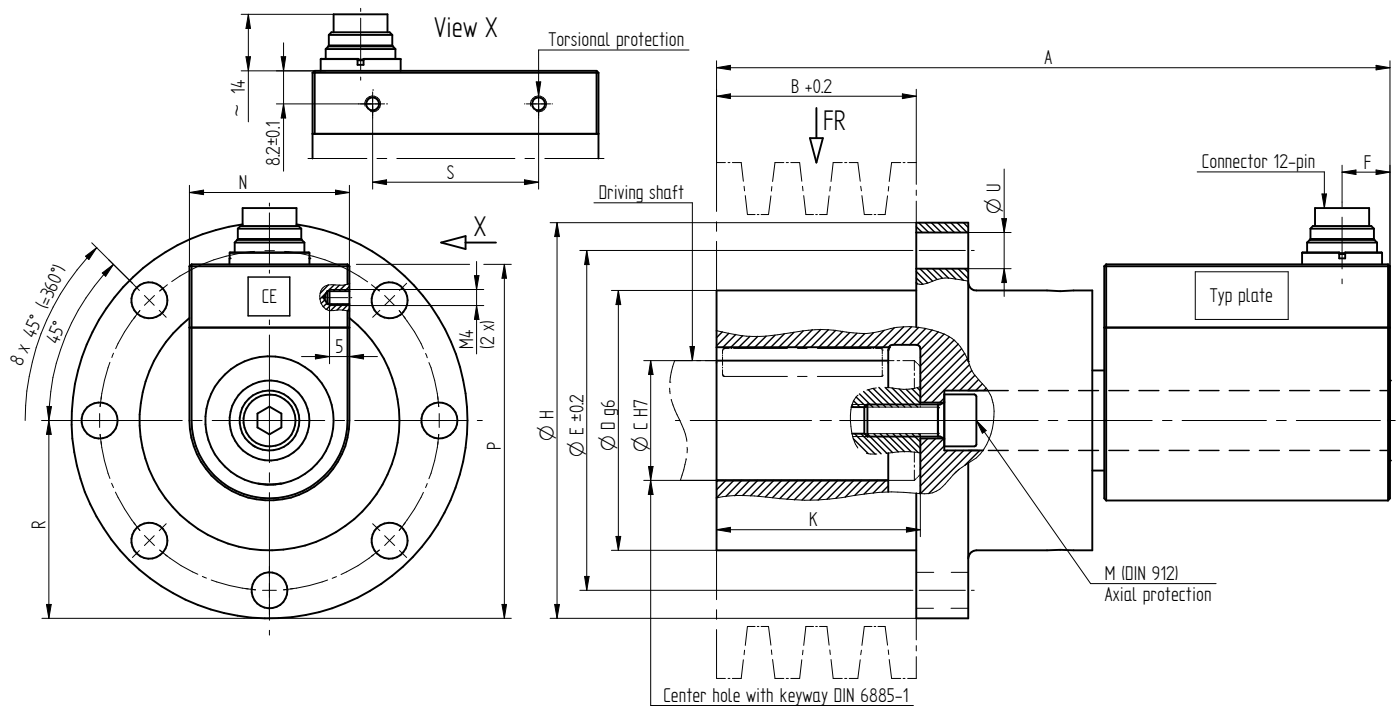
### Performance Features

- Torque sensor for belt-pulleys
- High accuracy
- Active output  $\pm 5V$  (optional  $\pm 10V$ )
- Integrated speed/angle measurement, optional
- Speed up to  $12000 \text{ min}^{-1}$
- Very short axial length
- High torsional stiffness
- Simple handling and assembly
- Special versions on request

### Application

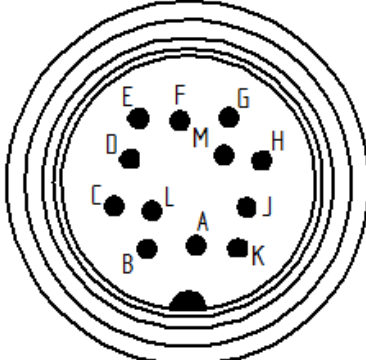
- Research and development
- Process measuring and control technology
- Fully automated machining centres
- Measuring and control devices
- Tool engineering
- Special mechanical engineering

## Dimensions of MR-12 in mm



| Nominal Torque<br>[N·m] | Dimensions [mm] |     |     |     |     |     |    |     |     |     |    |      |      |      |    | Weight<br>[kg] |
|-------------------------|-----------------|-----|-----|-----|-----|-----|----|-----|-----|-----|----|------|------|------|----|----------------|
|                         | A               | B   | ØC  |     | ØD  | ØE  | F  | ØH  | K   | M   | N  | P    | R    | S    | ØU |                |
|                         |                 |     | min | max |     |     |    |     |     |     |    |      |      |      |    |                |
| 20/50/100/200           | 168.5           | 50  | 15  | 30  | 65  | 85  | 12 | 99  | 51  | M8  | 40 | 88.5 | 49.5 | 41.5 | 9  | 2.5            |
| 500                     | 227.5           | 60  | 40  | 55  | 140 | 158 | 15 | 176 | 80  | M12 | 58 | 135  | 88   | 29.5 | 11 | 16.3           |
| 1000                    | 227.5           | 60  | 50  | 55  | 140 | 158 | 15 | 176 | 80  | M12 | 58 | 135  | 88   | 29.5 | 11 | 16.3           |
| 2000/5000               | 287.5           | 110 | 60  | 85  | 170 | 195 | 15 | 220 | 130 | M16 | 58 | 157  | 110  | 29.5 | 13 | 32.5           |

## Connection Assignment

| 12-pin | MR-12                  |                      |  |
|--------|------------------------|----------------------|---------------------------------------------------------------------------------------|
| Pin A  | NC                     | -                    |                                                                                       |
| Pin B  | Signal angle B, option | 5V TTL               |                                                                                       |
| Pin C  | Signal (+)             | $\pm 5V (\pm 10V)$   |                                                                                       |
| 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                 |                      |                                                                                       |

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

### Torque Sensor MR-12

|                                                                               |                          |                                |
|-------------------------------------------------------------------------------|--------------------------|--------------------------------|
| Nominal torque <b>M<sub>nom</sub></b>                                         | N·m                      | 20 ... 5000                    |
| Accuracy class                                                                | % M <sub>nom</sub>       | 0.1                            |
| Relative repeatability error in unchanged mounting position <b>b'</b>         | % M <sub>nom</sub>       | ±0.02                          |
| 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>1</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 | ±0.2                           |
| Temperature effect on characteristic value <b>TK<sub>C</sub></b>              | % M <sub>nom</sub> /10 K | ±0.1                           |
| 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                           |

| Article-No. | Nominal Torque<br>[N·m] | Limit Speed<br>[min <sup>-1</sup> ] | Springrate<br>[N·m/rad] | Mass Moment of Inertia<br>[kg·m²] |                        | Axial Force<br>Limit [N] <sup>2</sup> | Lateral Force<br>Limit [N] <sup>2</sup> |
|-------------|-------------------------|-------------------------------------|-------------------------|-----------------------------------|------------------------|---------------------------------------|-----------------------------------------|
|             |                         |                                     |                         | Drive Side                        | Test Side <sup>3</sup> |                                       |                                         |
| 100716      | 20                      | 12000                               | 1.3E+04                 | 1.6E-04                           | 1.7E-03                | 950                                   | 11000                                   |
| 100717      | 50                      | 12000                               | 2.6E+04                 | 1.6E-04                           | 1.7E-03                | 1900                                  | 11000                                   |
| 100718      | 100                     | 12000                               | 5.3 E+04                | 1.6E-04                           | 1.7E-03                | 4000                                  | 11000                                   |
| 100719      | 200                     | 12000                               | 1.1E+05                 | 1.6E-04                           | 1.7E-03                | 7400                                  | 11000                                   |
| 100720      | 500                     | 10000                               | 3.1E+05                 | 2.4E-03                           | 4.6E-02                | 12500                                 | 37000                                   |
| 100721      | 1000                    | 10000                               | 6.7E+05                 | 2.4E-03                           | 4.6E-02                | 21000                                 | 37000                                   |
| 100722      | 2000                    | 5000                                | 9.4E+05                 | 1.8E-02                           | 1.2E-01                | 24000                                 | 48000                                   |
| 100723      | 5000                    | 5000                                | 2.5E+06                 | 1.8E-02                           | 1.2E-01                | 39000                                 | 48000                                   |

### Options

| Article-No. | Description                                              |                                                                                                                                                                                                             |
|-------------|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 103562      | Output signal                                            | ±10V                                                                                                                                                                                                        |
| 101560      | Speed/angle measurement, 2 x 360 impulses, 90° displaced | 5V TTL, CW-turn<br>CH A <br>CH B  |

<sup>1</sup> Female cable connector in scope of delivery at first delivery

<sup>2</sup> Unsupported shaft

<sup>3</sup> At ØC max. and without belt pulley

## 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                                    |            |

## 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 sensor MR-12:

| LCV-USB2                                                                            | SI-ETH                                                                              | SI-USB3                                                                             | GM 80                                                                                 | GM 80-PA                                                                              |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  |  |  |  |  |

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