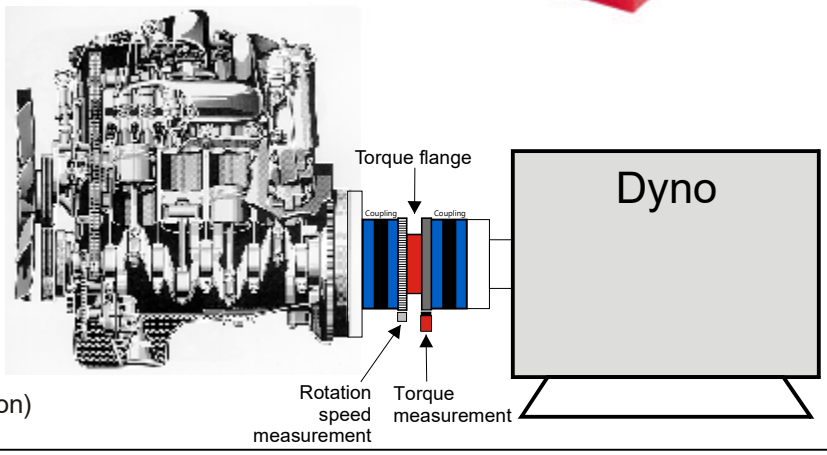
# Torque measuring flange XTREMA HP
# Improved Zerodrift $Tk_0$ 0.005% / 10°C
# Improved Tkc Conduct 0.005% / 10°C

XTREMA HP High Precision TORQUE

**Characteristic features:**

- ✓ Nominal (rated) torques
  **50 N·m; 100 N·m; 200 N·m;**
  **500 N·m; 1 kN·m; 2 kN·m;**
  **3 kN·m; 5 kN·m; 10 kN·m**
- ✓ Nominal (rated) speeds from 10,000 rpm to 32,000 rpm (depending on the measuring range)
- ✓ Integrated correction of speed influence depending on direction of rotation
- ✓ Accuracy class 0.02
- ✓ Large measuring frequency range up to 1 kHz (optional 10 kHz (-3dB))
- ✓ Low rotor weights and moments of inertia
- ✓ Digital transmission of measured values
- ✓ Short design, compatible flange image to HBM (DIN flange)
- ✓ Temperature range -40 to +160°C (optional)
- ✓ Integrated Speed acquistion (high resolution)




# Topology

- Ethernet (digital)
- EtherCat (digital)
- USB (digital)
- Frequency 60 +/-30 kHz
- Strain (U) +/-10 V
- Current (I) 4 to 20 mA
- Remote control
- Energy
- Remote shunt on/off

Integrated Pick Up

- Energy
- Remote shunt on/off
- Torque (digital)
- Temperature (digital)
- Status
- Remote control

**max. Distance: 100 m**

Torque flange with offsetted Pick Up

Evaluation Unit

- Ethernet (digital)
- EtherCat (digital)
- USB (digital)
- Frequency 60 +/-30 kHz
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- Remote control
- Energy
- Remote shunt on/off

# Technical Data

| Torque measuring system | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Type** | | XTREMA-HP TORQUE | | | | | | | | |
| **Accuracy Class** | | 0.02 | | | | | | | | |
| **Nominal (rated) torque $M_{nom}$** | kN·m | 0.05 | 0.1 | 0.2 | 0.5 | 1 | 2 | 3 | 5 | 10 |
| **Nominal sensitivity** (range between torque = zero and nominal torque) | | | | | | | | | | |
| Voltage output 10 V | V | +/-10 | | | | | | | | |
| Frequency output 60 kHz | kHz | +/-30 | | | | | | | | |
| Digital output EtherCat 16 Bit | dig. value | +/-29491 (471859[3]) | | | | | | | | |
| Digital output Ethernet TCP/IP 16 Bit | dig. value | +/-29491 (471859[3]) | | | | | | | | |
| Digital output CAN 16 Bit | dig. value | +/-29491 (471859[3]) | | | | | | | | |
| Sensitivity tolerance (deviation of the actual output value at $M_{nom}$ of nominal sensitivity) | % | 0.05 (0.01[1]) | | | | | | | | |
| **Output signal at torque = zero** | | | | | | | | | | |
| Voltage output | V | 0 | | | | | | | | |
| Frequency output 60 kHz | kHz | 60 | | | | | | | | |
| Digital output | dig. value | 32768 (524288[3]) | | | | | | | | |
| **Nominal output signal** | | | | | | | | | | |
| Voltage output | | | | | | | | | | |
| with positive nominal torque | V | +10 | | | | | | | | |
| with negative nominal torque | V | -10 | | | | | | | | |
| Frequency Output 60 kHz | | | | | | | | | | |
| with positive nominal torque | kHz | 90 (5 V TTL 0/5 V) (15[7]) | | | | | | | | |
| with negative nominal torque | kHz | 30 (5 V TTL 0/5 V) (5[7]) | | | | | | | | |
| Digital output | | | | | | | | | | |
| with positive nominal torque | dig. value | 62258 (996147[3]) | | | | | | | | |
| with negative nominal torque | dig. value | 3278 (52429[3]) | | | | | | | | |
| **Load resistance** | | | | | | | | | | |
| Voltage output | kOhm | >2 | | | | | | | | |
| Frequency output 60 kHz | kOhm | >10 | | | | | | | | |
| **Long-term drift over 48 h** | | | | | | | | | | |
| Voltage output | % | <+/-0.03 | | | | | | | | |
| Frequency output 60 kHz | % | <+/-0.03 | | | | | | | | |
| **Measurement frequency range (-3dB)** | kHz | 1 (2[4], 5[5], 10[6]) | | | | | | | | |
| **Group delay time** | µm | <400 (<250[4], <130[5], <40[6]) | | | | | | | | |
| **Residual ripple** (voltage output) | mV | <10 | | | | | | | | |
| **Temperature influence per 10 °K in the nominal temperature range on the output signal, related to the actual value of signal range** | | | | | | | | | | |
| Frequency output | % | +/-0.02 | | | | | | | | |
| Digital output | % | +/-0.02 | | | | | | | | |
| Voltage output | % | +/-0.05 | | | | | | | | |
| **on the zero signal, related to the nom. sensitivity** | | | | | | | | | | |
| Frequency output | % | +/-0.01 (+/-0.005[2]) | | | | | | | | |
| Digital output | % | +/-0.01 (+/-0.005[2]) | | | | | | | | |
| Voltage output | % | +/-0.04 (+/-0.02[2]) | | | | | | | | |
| **Max. speed effect on zero signal:** | | | | | | | | | | |
| Left: | % | < +/- 0,004 | | | | | | | | |
| Right: | % | < +/- 0,004 | | | | | | | | |
| **Max. modulation range** | | | | | | | | | | |
| Frequency output 60 kHz | kHz | +/-31.62 (+/-5.27[7]) | | | | | | | | |
| Digital output | digits | +/-32768 (524288[3]) | | | | | | | | |
| Voltage output | V | +/-11.2 | | | | | | | | |
| **Power supply** | | | | | | | | | | |
| Nominal supply (protective low voltage DC) | V | 24 V +/-10% (10 to 36 V optional) | | | | | | | | |
| Current consumption in measuring mode | A | <0.7 | | | | | | | | |
| Current consumption in start-up mode | A | <1 A | | | | | | | | |
| Rated input power | W | <5 | | | | | | | | |
| Max. cable length | m | 100 | | | | | | | | |

1) Option improved sensitivity tolerance
2) Option zerodrift
3) Option signal resolution 20 Bit
4) Option measuring signal bandwidth 2 kHz
5) Option measuring signal bandwidth 5 kHz
6) Option measuring signal bandwidth 10 kHz
7) Option frequency output 10 kHz +/-5 kHz

## Technical Data (Continuation 1)

| **Nominal torque $M_{nom}$** | kN·m | 0.05 | 0.1 | 0.2 | 0.5 | 1 | 2 | 3 | 5 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Linearity deviation including hysteresis,** related to the nominal sensitivity | | | | | | | | | | |
| Voltage output 10 V | % | <+/- 0.05 (<+/- 0.02 optional) | | | | | | | | |
| Frequency output 60 kHz | % | <+/- 0.05 (<+/- 0.02 optional) | | | | | | | | |
| Digital output | % | <+/- 0.05 (<+/- 0.02 optional) | | | | | | | | |
| Rel. Standard deviation of repeatability according to DIN 1319 in relation to output signal change (dig. output) | % | <+/-0.004 | | | | | | | | |
| Shunt signal Tolerance of the shunt signal relative to $M_{nom}$ | | approx. 80% of $M_{nom}$ <+/-0.02 | | | | | | | | |
| Shunt signal on (active low) | V | <1 (GND) | | | | | | | | |
| Shunt signal | V | >2.5 | | | | | | | | |
| **Overall accuracy relative to nominal torque $M_{nom}$** based on 10 K temperature change (dig. output) | | | | | | | | | | |
| 60 to 100% of $M_{nom}$ | % | <+/- 0,047 (<+/- 0,018 optional) | | | | | | | | |
| 20 to 60% of $M_{nom}$ | % | <+/- 0,033 (<+/- 0,012 optional) | | | | | | | | |
| 0 to 20% off $M_{nom}$ | % | <+/- 0,015 (<+/- 0,007 optional) | | | | | | | | |
| **General data** | | | | | | | | | | |
| EMC EME (Emission per EN61326−1, sec.7) RFI field strength | - | Klasse B | | | | | | | | |
| Immunity from interference (EN 61326-1, table 2) | | | | | | | | | | |
| Electromagnetic field AM | V/m | 80 | | | | | | | | |
| Magnetic field | A/m | 200 | | | | | | | | |
| Electrostatic discharge (ESD) | | | | | | | | | | |
| Contact discharge | kV | 20 | | | | | | | | |
| Air discharge | kV | 10 | | | | | | | | |
| Fast transients (burst) | kV | 1 | | | | | | | | |
| Shock (surge) | kV | 1 | | | | | | | | |
| Conducted disturbances | V | 10 | | | | | | | | |
| Degree of protection per EN 60529 Standard /Oil-resistant / waterproof[8)] | | IP54 (IP67[2)]) | | | | | | | | |
| Weight approx. Rotor | kg | 0.8 | 2.1 | 2.1 | 2.5 | 2.5 | 4.6 | 4.6 | 8 | 13.5 |
| Weight approx. Stator | kg | 0.2 (new AW_MnAnt 0,4) | | | | | | | | |
| **Reference temperature** | °C | 23 | | | | | | | | |
| **Operating temperature range** | °C | -10 to +70 | | | | | | | | |
| **Extended temperature range[9)]** | °C | -40 to +160 | | | | | | | | |
| **Storage temperature range[9)]** | °C | -50 to +160 | | | | | | | | |
| **Mech. shock resistance according to EN 60068-2-27** | | | | | | | | | | |
| Number of impacts | n | 100 | | | | | | | | |
| Duration | ms | 3 | | | | | | | | |
| Acceleration | $m/s^2$ | 650 | | | | | | | | |
| **Vibration load in 3 directions EN 60068-2-27** | | | | | | | | | | |
| Frequency range | Hz | 10 to 2000 | | | | | | | | |
| Duration | h | 2.5 | | | | | | | | |
| Acceleration (amplitude) | $m/s^2$ | 200 | | | | | | | | |
| **Nominal speed** | $min^{-1}$ | 20000 | | | 20000 | | 15000 | | 12000 | 10000 |
| **Increased speed stability** | $min^{-1}$ | 32000 | | | 25000 | | 18000 | | 15000 | 15000 |
| **Limitations of liability[11)]** | | | | | | | | | | |
| **Limit torque related $M_{nom}$** | % | 400 | | | | | | | | |
| **Breaking torque relative to $M_{nom}$** | % | 800 | | | | | | | | |
| **Axial limit force[11)]** | kN | 5 | 5 | 10 | 20 | 20 | 30 | 35 | 50 | 120 |
| **Laterial force limit[11)]** | kN | 1 | 1.25 | 2 | 4 | 5 | 10 | 15 | 20 | 25 |
| **Bending limit moment[11)]** | kN·m | 0.03 | 0.03 | 0.1 | 0.3 | 0.36 | 0.8 | 0.9 | 1.2 | 1.7 |
| Oscillation bandwith per DIN 50100 (peak-to-peak)[12)] | kN·m | 0.20 | 0.20 | 0.40 | 1.0 | 2.0 | 4.0 | 5.1 | 8.5 | 1.7 |

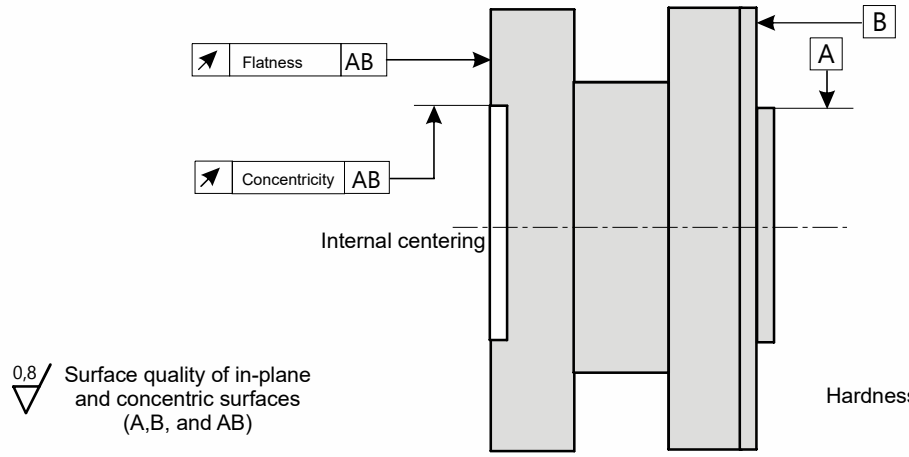
8) Option protection class IP67
9) Option extended service temperature range
10) Option increased speed stability
11) Static and dynamic
12) The nominal torque must not be exceeded

## Technical Data (Continuation 2)

| **Nominal torque $M_{nom}$** | kN·m | 0.05 | 0.1 | 0.2 | 0.5 | 1 | 2 | 3 | 5 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Effect of measured values by parasitic forces[14)] | | | | | | | | | | |
| Crosstalk bending moment $M_B$ | kN·m/kN·m | <0.002 | | | | | | | | |
| Crosstalk side force $F_s$ | kN·m/kN | <0.0002 | | | | | | | | |
| Crosstalk axial force $F_z$ | kN·m/kN | <0.00015 | | | | | | | | |
| **Mechanical values** | | | | | | | | | | |
| Material | | Alu | Steel | Steel | Steel | Steel | Steel | Steel | Steel | Steel |
| Torsional stiffness $c_T$ | kN·m/rad | 79 | 79 | 149 | 561 | 895 | 2293 | 2865 | 4854 | 10989 |
| Torsion angle at $M_{nom}$ | Grad | 0.037 | 0.073 | 0.077 | 0.051 | 0.064 | 0.051 | 0.061 | 0.059 | 0.052 |
| Axial stiffness $c_a$ | kN/mm | 125 | 125 | 167 | 437 | 587 | 939 | 1090 | 1040 | 1412 |
| Radial stiffness $c_r$ | kN/mm | 58 | 58 | 105 | 336 | 541 | 801 | 1028 | 985 | 1272 |
| Stiffness with bending moment about a radial axis $c_b$ | kN·m/Grad | 1.20 | 1.20 | 2.10 | 2.89 | 3.8 | 9.1 | 10.4 | 13.7 | 27.2 |
| Max. deflection at axial limit force | mm | <0.09 | <0.09 | <0.09 | <0.045 | <0.04 | <0.05 | <0.06 | <0.08 | <0.09 |
| Additional max. concentricity error at lateral limit force | mm | <0.02 | | | | | | | | |
| Additional planeparallel deviation at bending limit moment $d_B$ | mm | <0.07 | <0.07 | <0.07 | <0.10 | <0.085 | <0.15 | <0.18 | <0.15 | <0.12 |
| Balance qualitylevel to DIN ISO 1940 | | G6.3 (G2.5 optional) | | | | | | | | |
| Max. limits for relative shaft vibration (peak to peak)[13)]<br>Wave oscillations in the area of the connection flanges acc. to ISO 7919−3<br>Normal mode (continuous operation) | | $s_{(p-p)} = \frac{9000}{\sqrt{n}}$ (n in $min^{-1}$) | | | | | | | | |
| by<br>Start and Stop mode/resonance ranges (temporary) | | $s_{(p-p)} = \frac{13200}{\sqrt{n}}$ (n in $min^{-1}$) | | | | | | | | |
| **Mass moment of inertia of the rotor Lv**<br>Axis of rotation, without consideration of flange screws | kg $m^2$ | 0.0012 | 0.0034 | 0.0034 | 0.0058 | 0.0058 | 0.0175 | 0.0175 | 0.0443 | 0.1192 |
| **Max. permissible static eccentricity**<br>Rotor - stator spacing | mm | 5 | | | | | | | | |
| **Max. permissible axial displacement**<br>between rotor and stator | mm | +/-2 | | | | | | | | |

13) Influencing the vibration measurements by runout, shock, defects in shape, notches, grooves, local residual magnetism have to be separated from the actual wave vibration
14) Basis: only one parasitäric force type is applied

## Flatness and concentricity tolerances

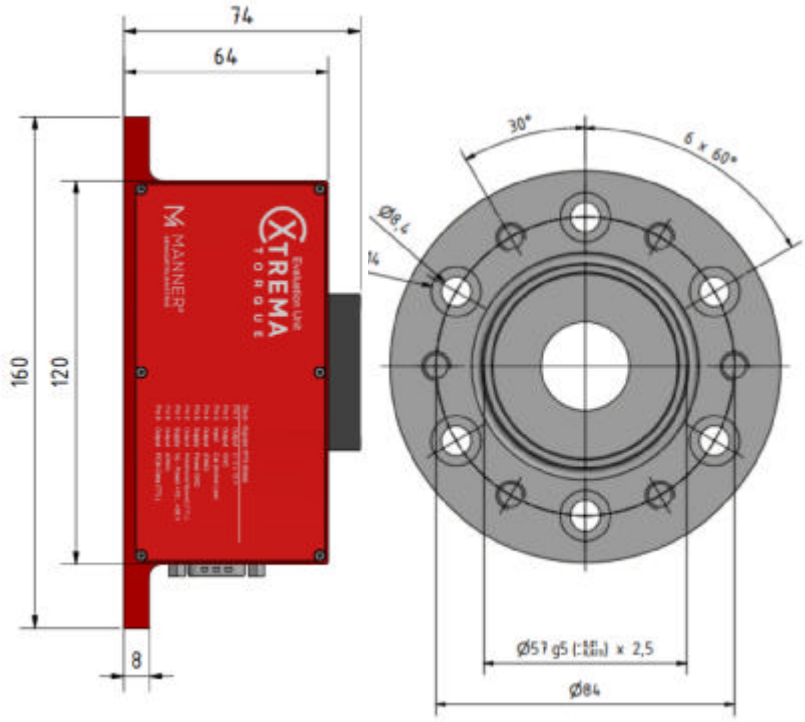


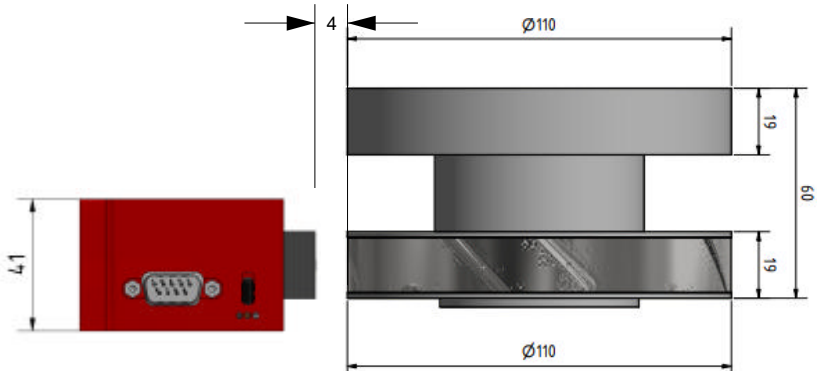

| **Rated torque $M_{nom}$** | kN·m | 0.05 | 0.1 | 0.2 | 0.5 | 1 | 2 | 3 | 5 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Flatness tolerances** | mm | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 | 0.02 | 0.02 |
| **Concentricity tolerances** | mm | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 | 0.02 | 0.02 |

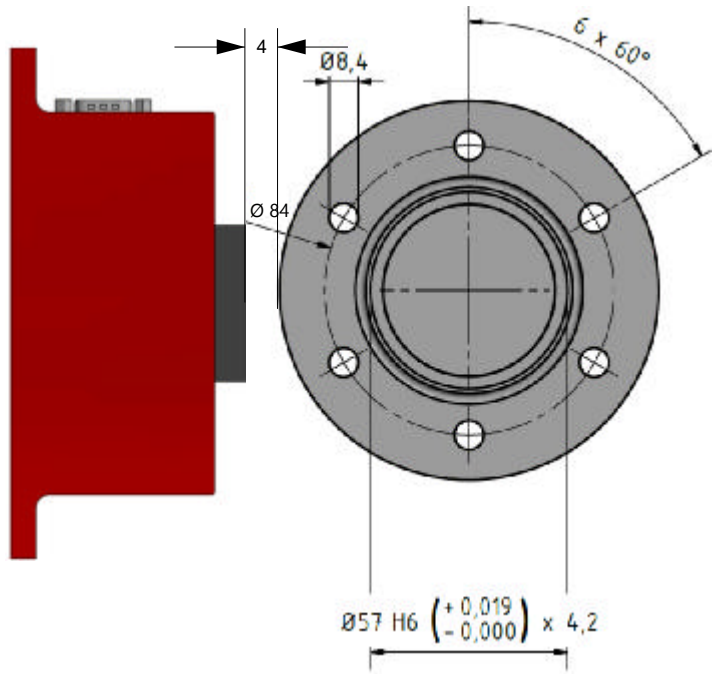
| **Integrated Speed acquisition (Version inductive, IP67)** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Inductive (traces A/B) - nominal speed** | pulses/turn | n.a. | 60 | | | 80 | | 100 | 120 |
| **Distance Rotor - Pick Up** | mm | 0.8+/-0.4 | | | | | | | |
| **Inductive (traces A/B) - increased speed stability** | pulses/turn | n.a. | 36 | | 48 | | 60 | | 80 |
| **Distance Rotor - Pick Up** | mm | 0.8+/-0.4 | | | | | | | |
| **Integrated Speed acquisition (Version Laser, IP42)** | | | | | | | | | |
| **Opticial (trace A)** | pulses/turn | 1024 | | | 1600 | | 2048 | 2400 | 3600 |
| **Distance Rotor - Pick** | mm | 20+/-19 | | | | | | | |

# Dimensions XtreMA HP 0.05 kN·m (in mm)

Receiver with integrated Pick Up

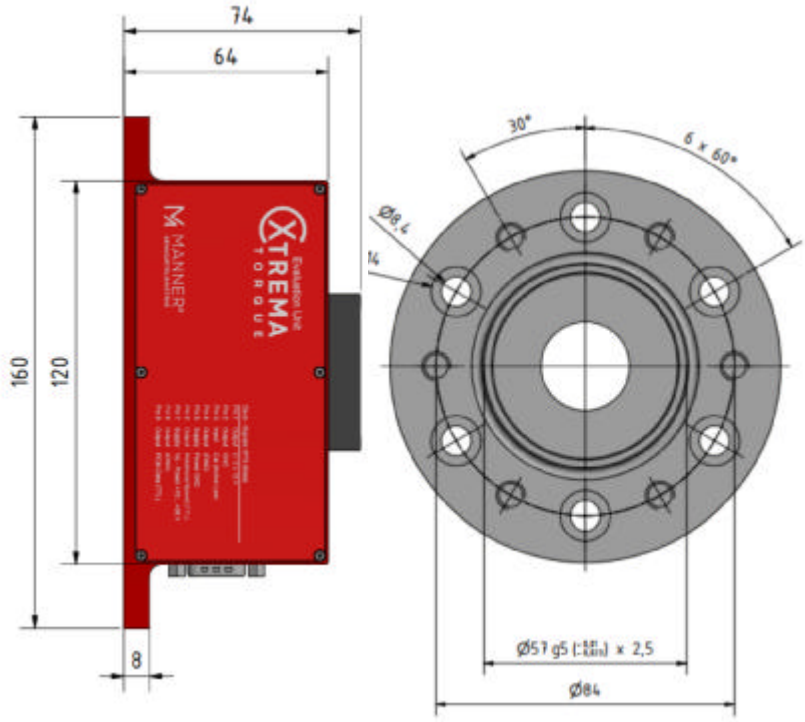


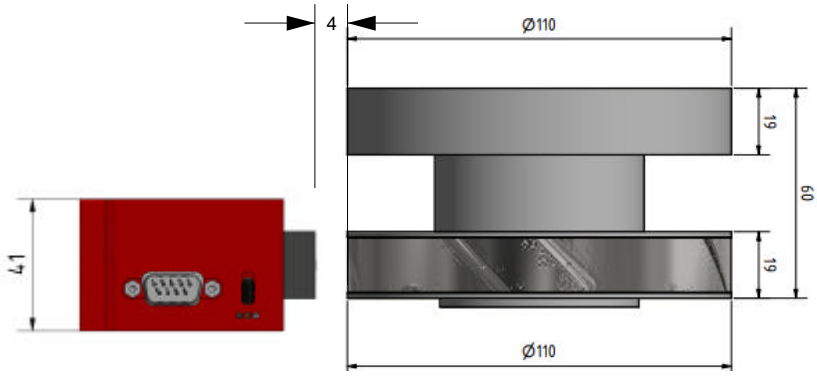



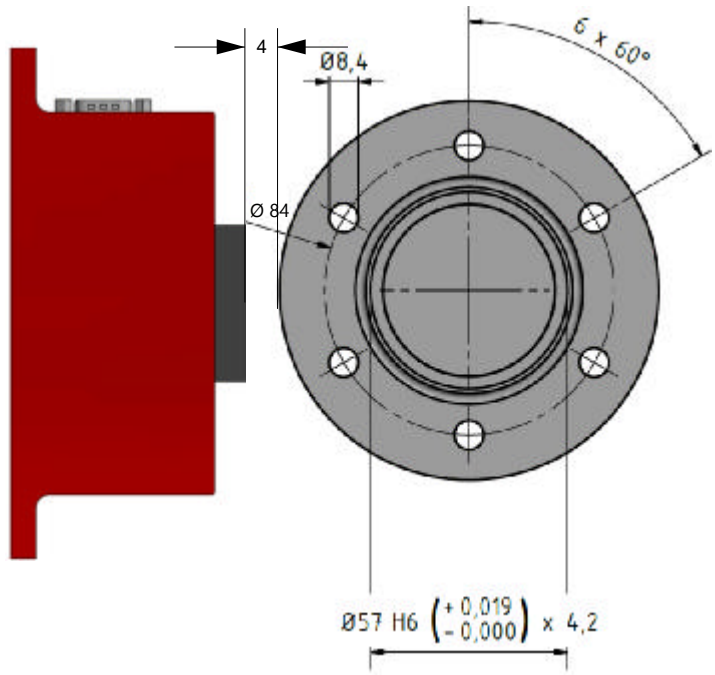



# Dimensions XtreMA HP 0.1 kN·m (in mm)

Receiver with integrated Pick Up

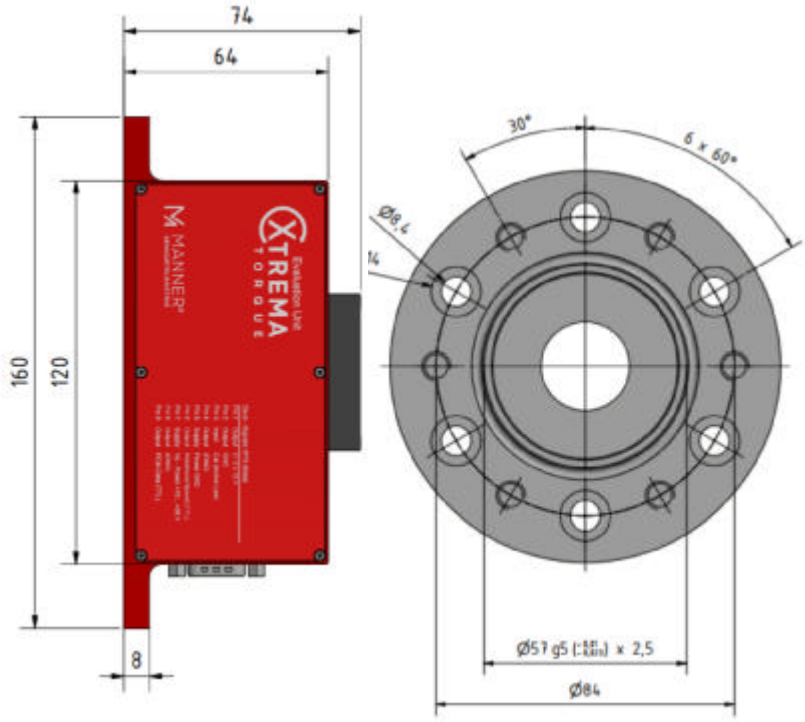


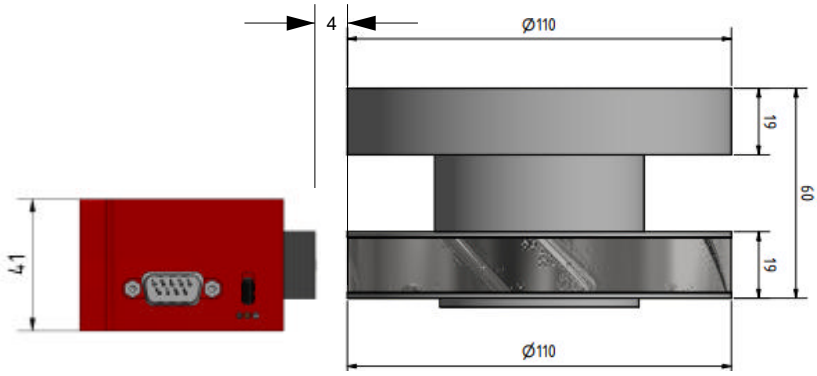



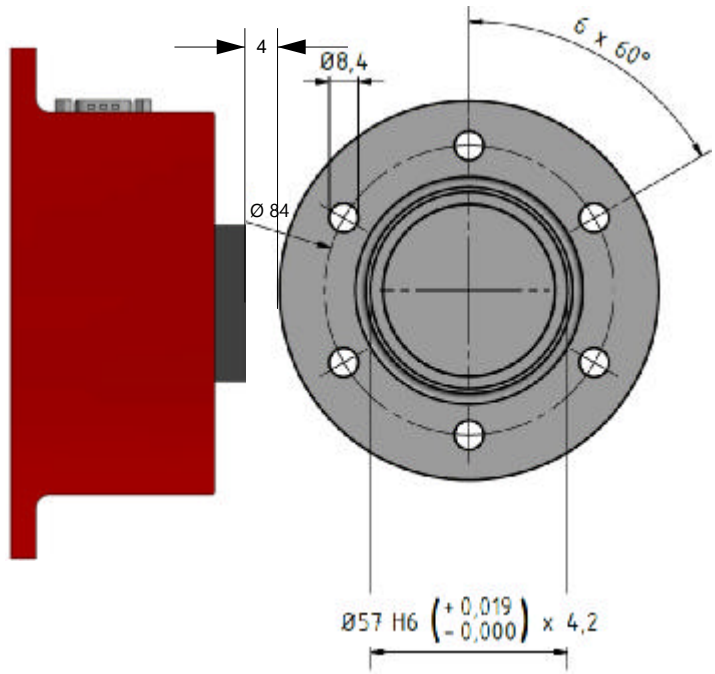



# Dimensions XtreMA HP 0.2 kN·m (in mm)

Receiver with integrated Pick Up

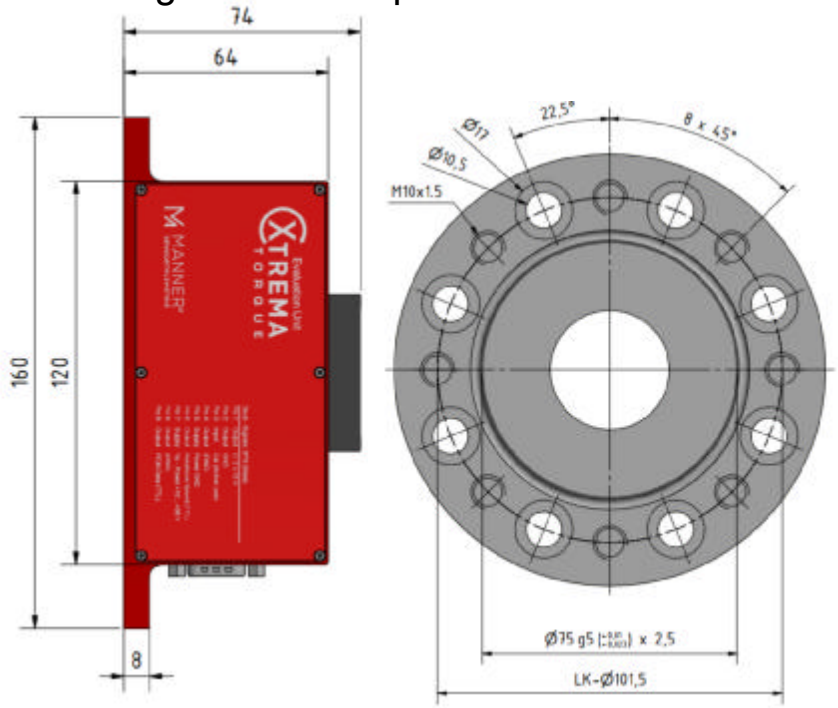


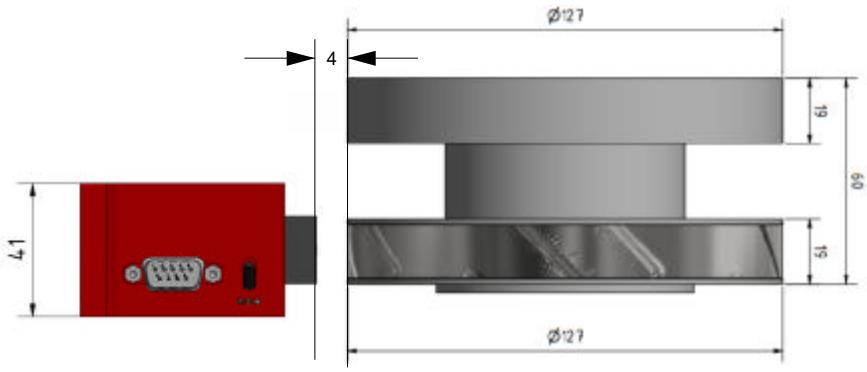



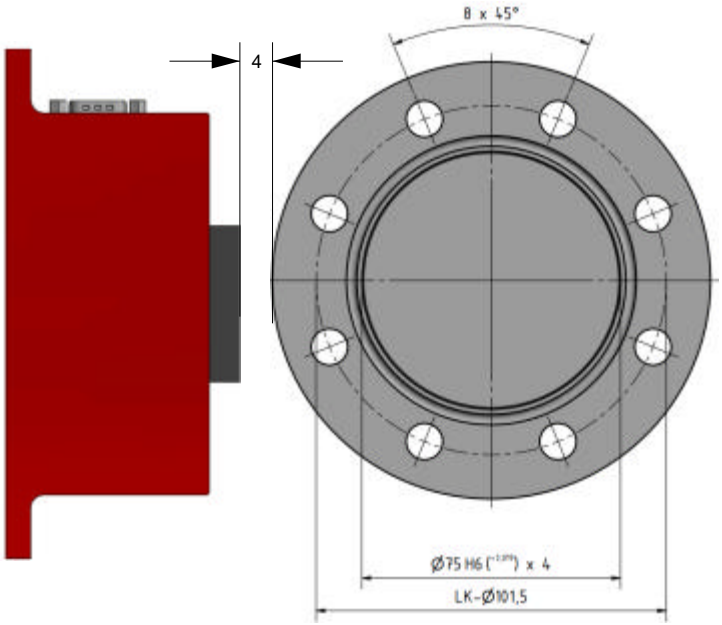



# Dimensions XtreMA HP 0.5 kN·m (in mm)

Receiver with integrated Pick Up

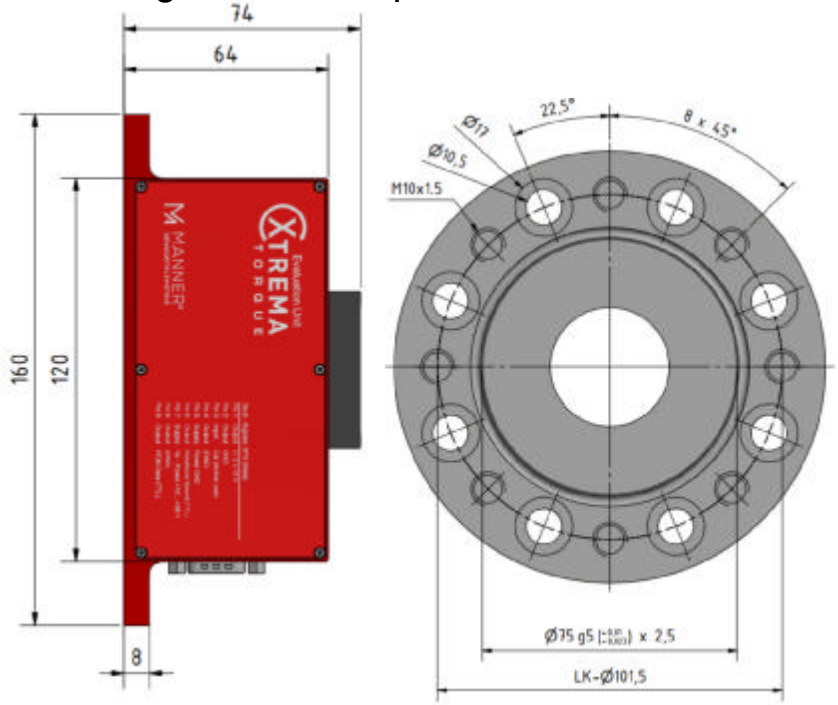


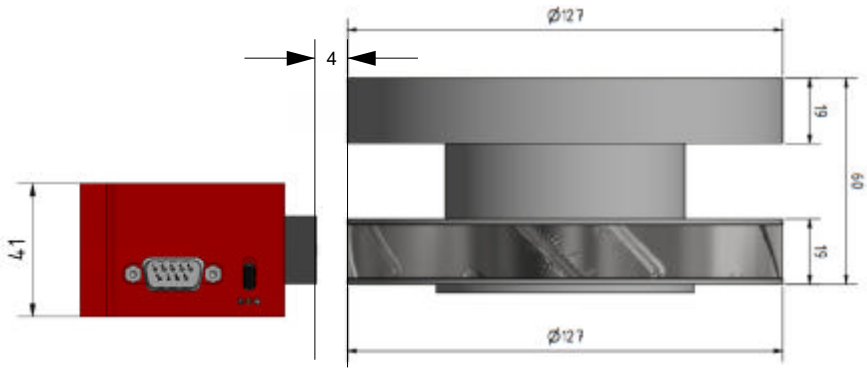



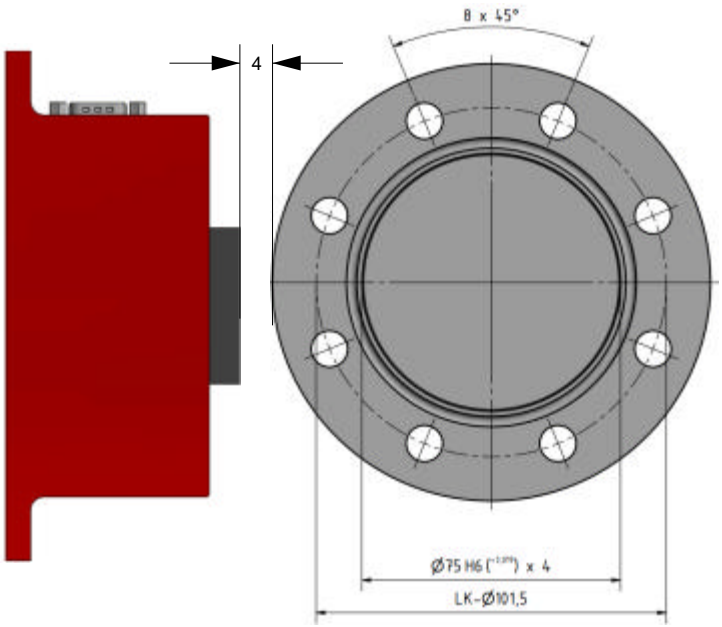



# Dimensions XtreMA HP 1 kN·m (in mm)

Receiver with integrated Pick Up

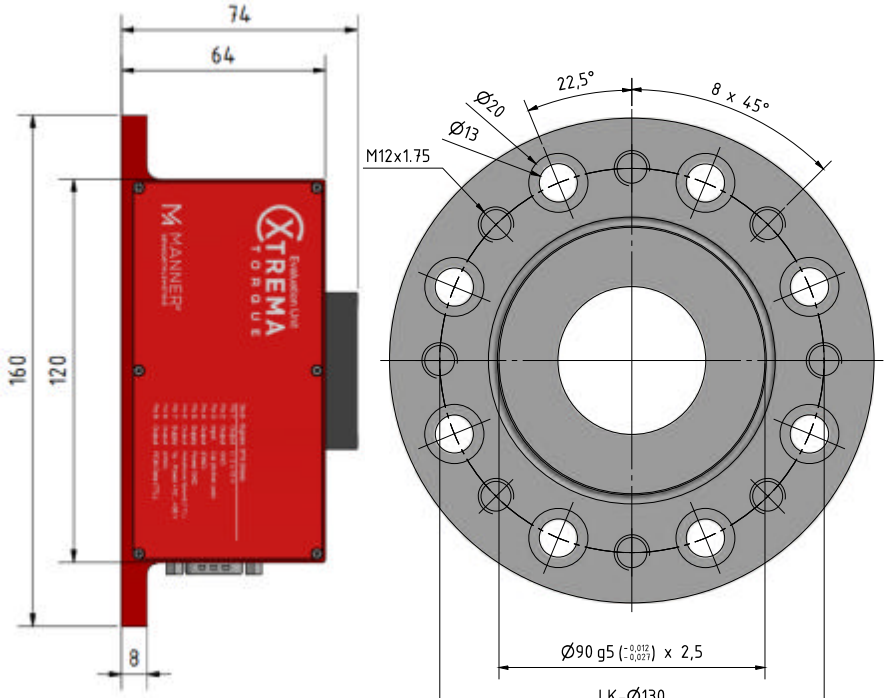


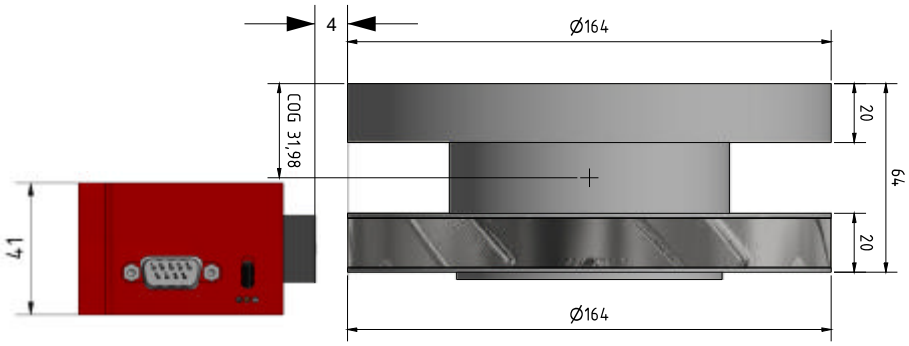



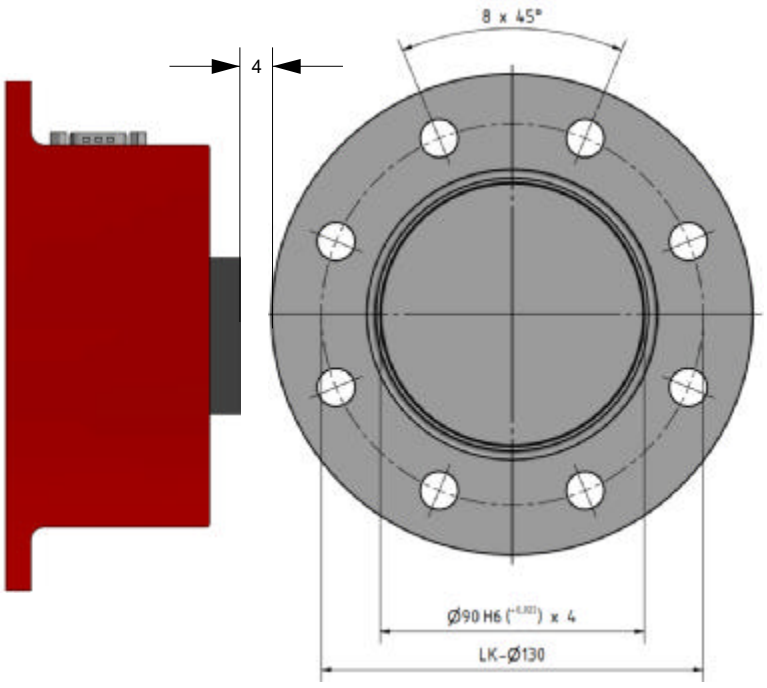



# Dimensions XtreMA HP 2 kN·m (in mm)

Receiver with integrated Pick Up

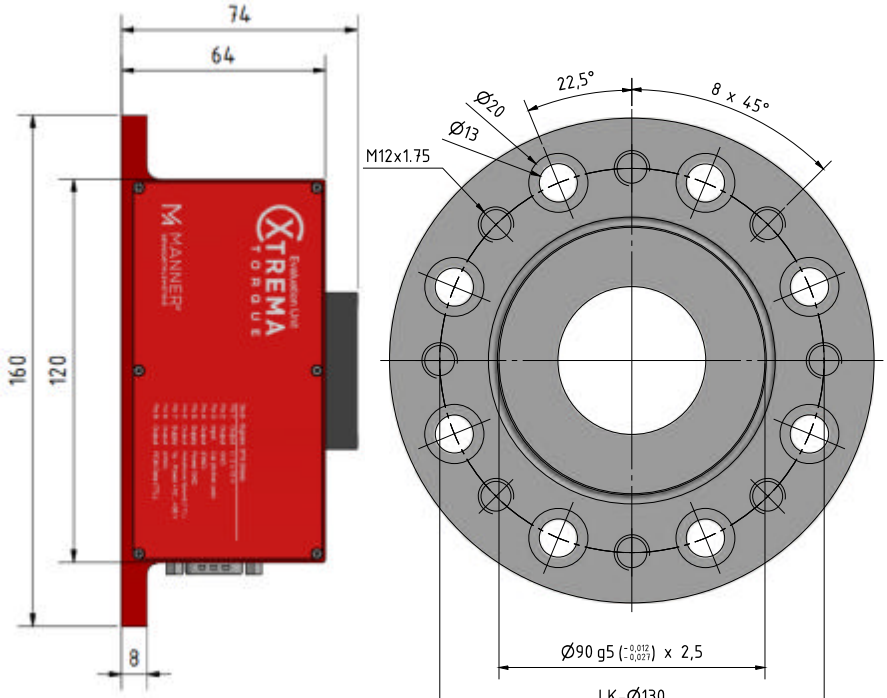


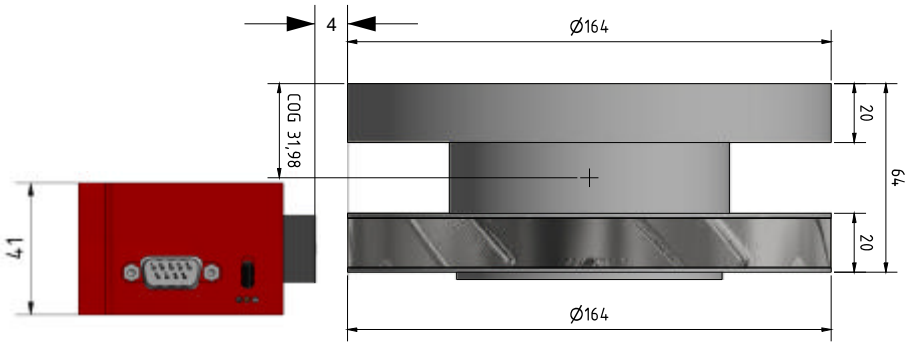



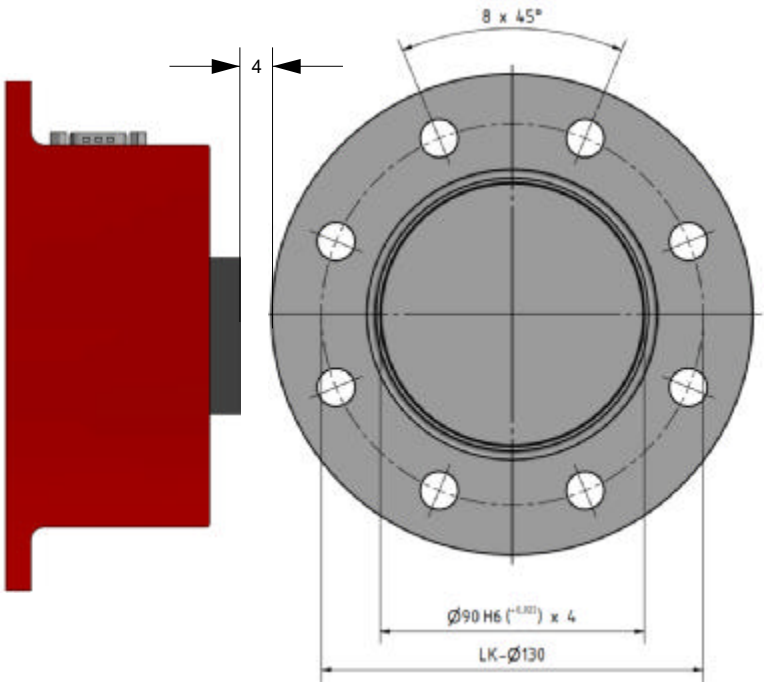



# Dimensions XtreMA HP 3 kN·m (in mm)

Receiver with integrated Pick Up

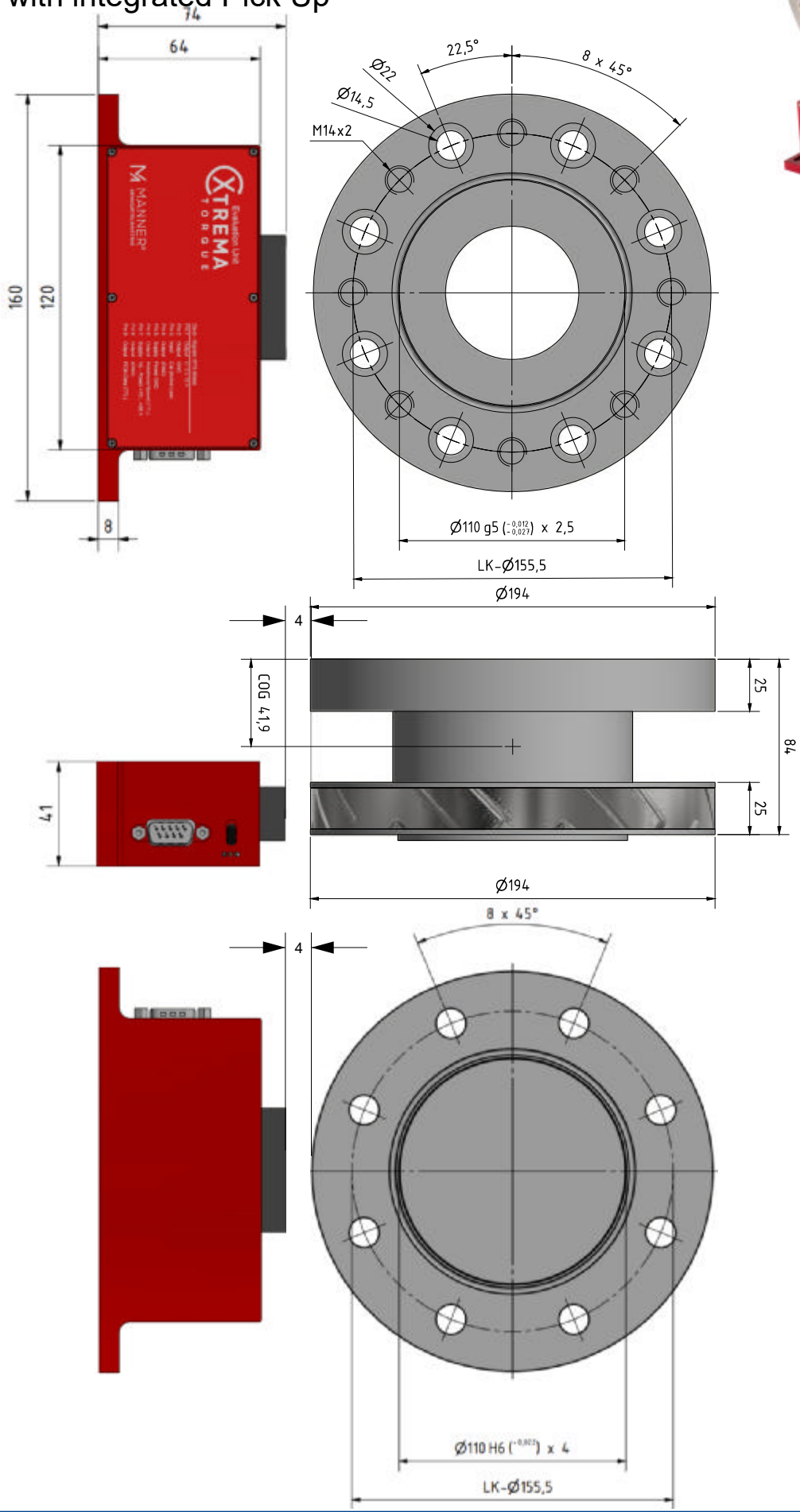


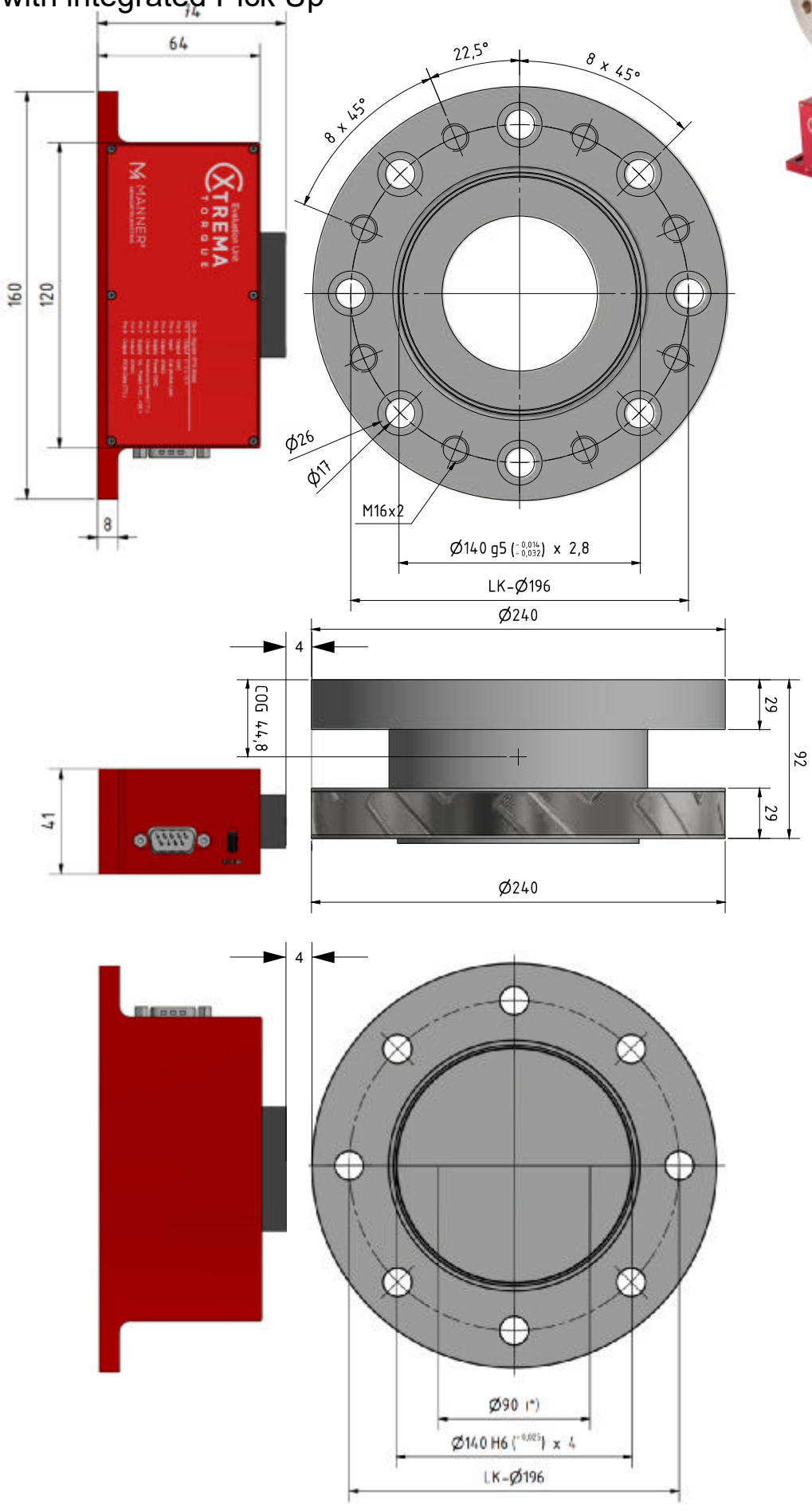
# Dimensions XtreMA HP 5 kN·m (in mm)

Receiver with integrated Pick Up

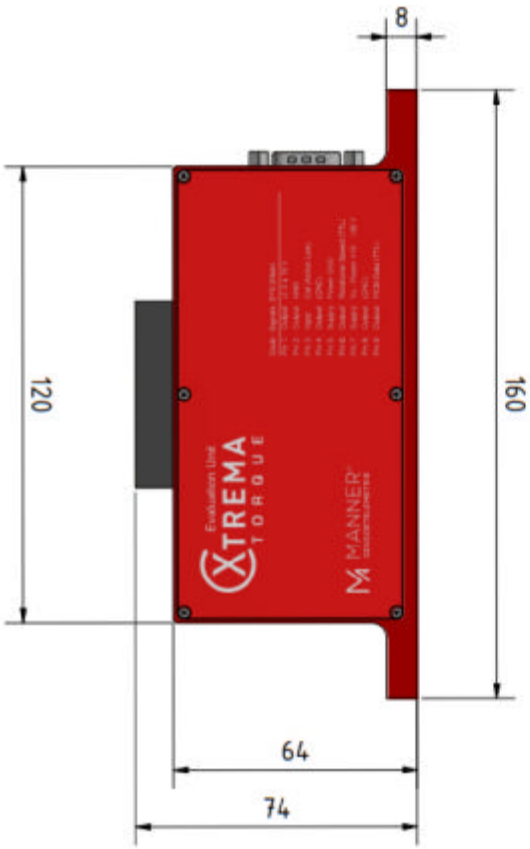


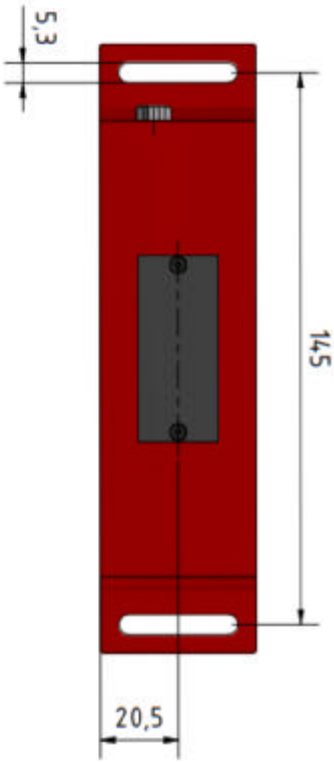
# Dimensions XtreMA HP 10 kN·m (in mm)

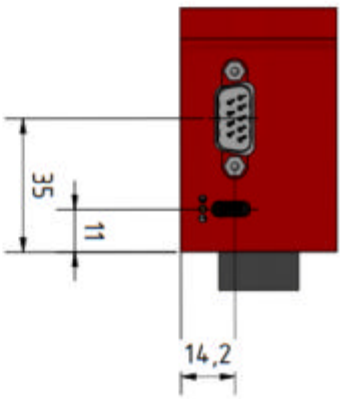
Receiver with integrated Pick Up



# Geometry Receiver Typ MnAnt integrated Pick UP

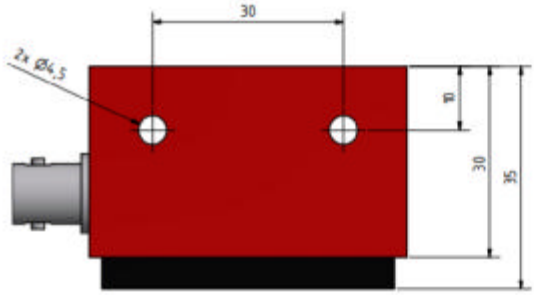



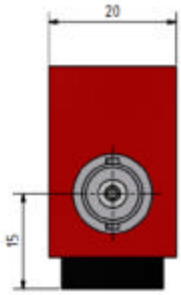



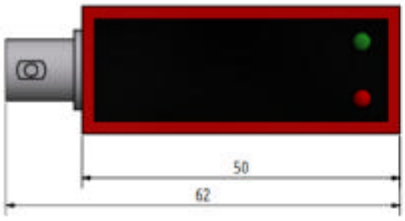



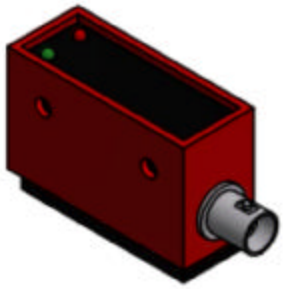
# Variante offsetted  Pick UP

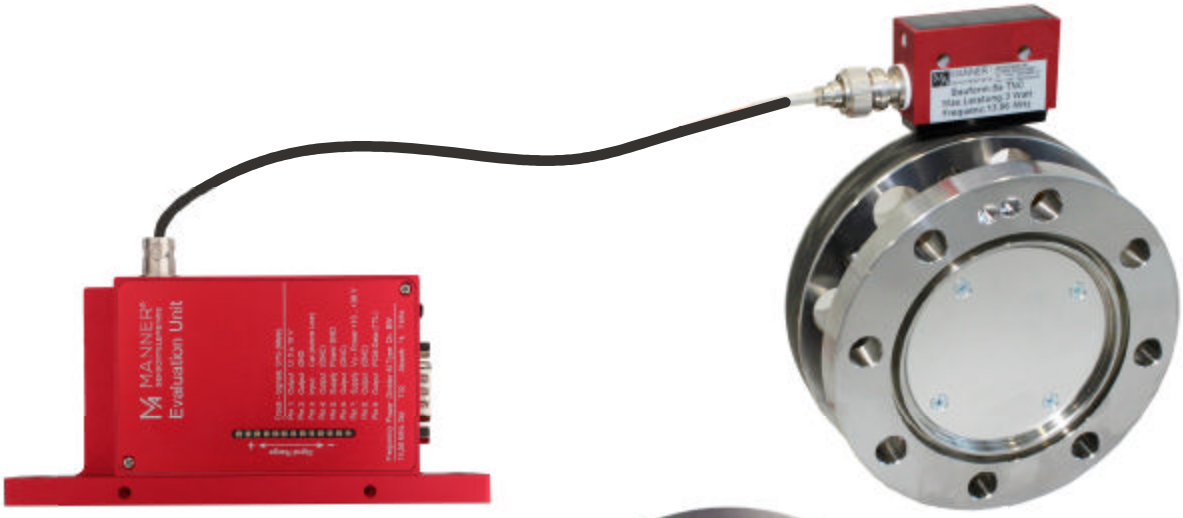
PICK UP 8a

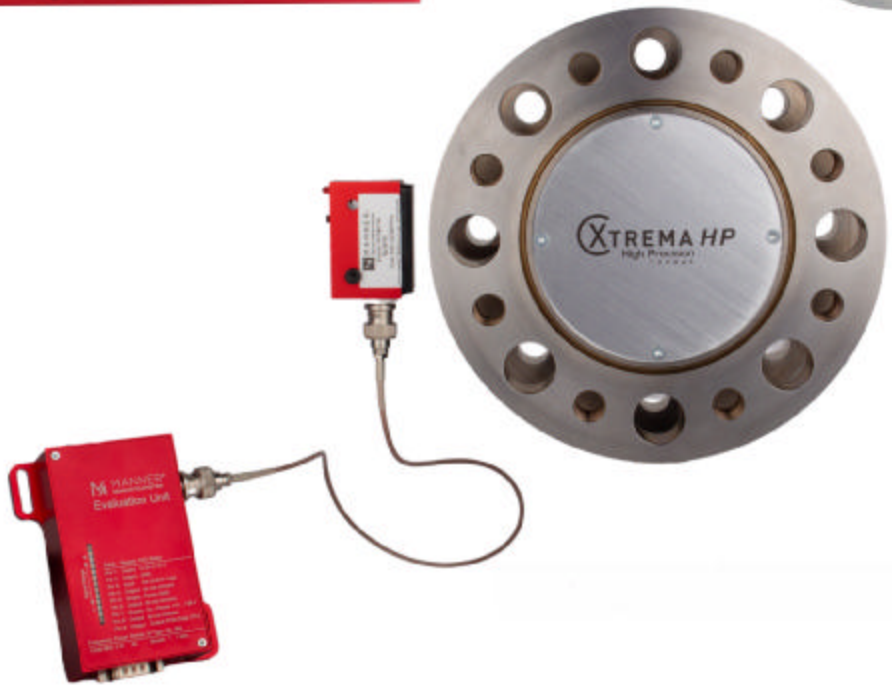


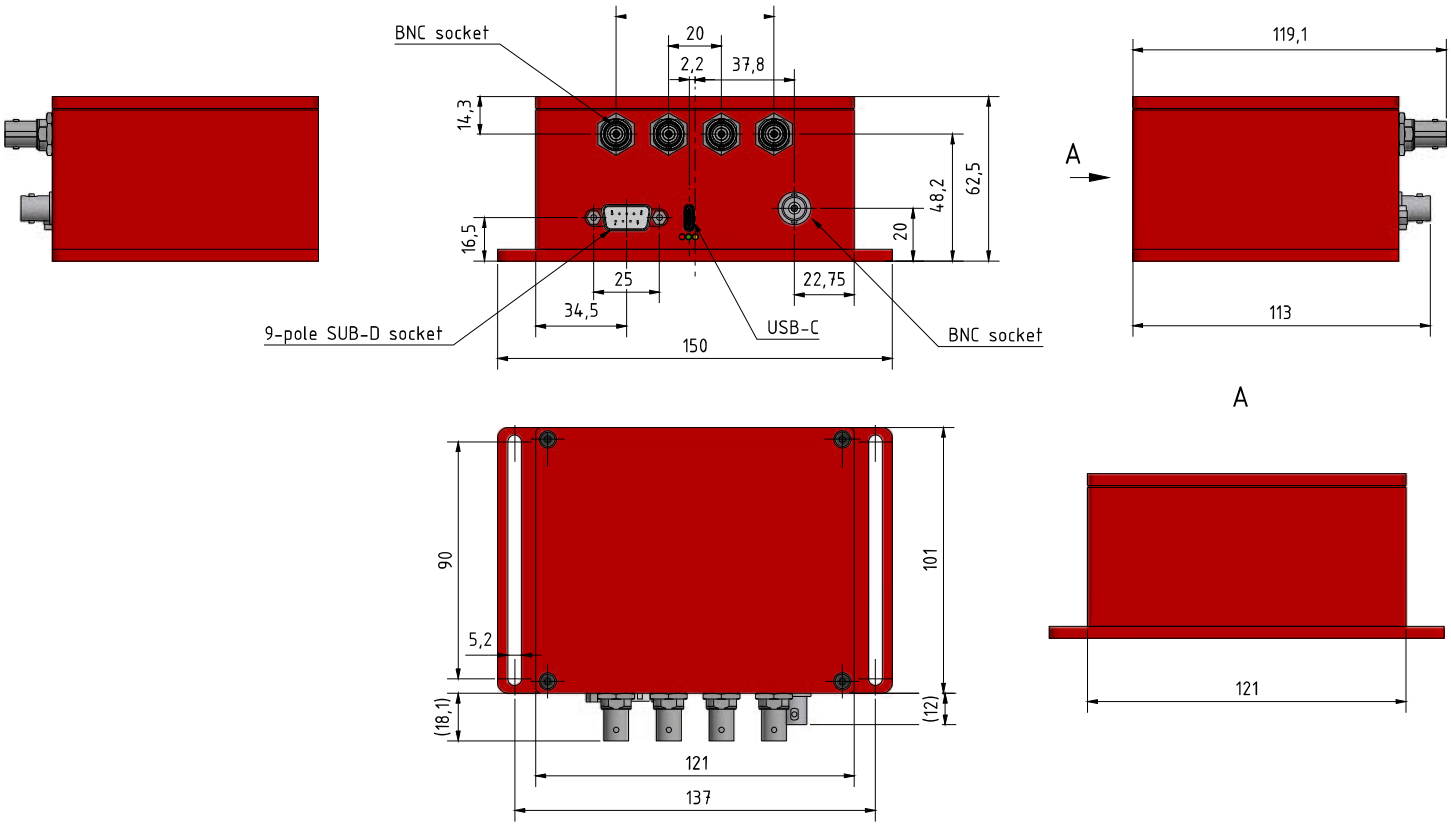



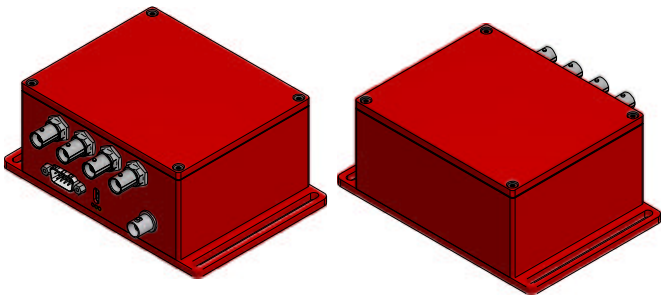





# Geometry Evaluation Unit Type F
# Offsetted pickup, control cabinet installation



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# Deutsche Akkreditierungsstelle

## Anlage zur Akkreditierungsurkunde D-K-20850-01-00 nach DIN EN ISO/IEC 17025:2018

**Gültig ab:** **20.11.2020**

Ausstellungsdatum: 12.10.2023

Inhaber der Akkreditierungsurkunde:

**Manner Sensortelemetrie GmbH**
**Eschenwasen 20, 78549 Spaichingen**

Das Kalibrierlaboratorium erfüllt die Anforderungen gemäß DIN EN ISO/IEC 17025:2018, um die in dieser Anlage aufgeführten Konformitätsbewertungstätigkeiten durchzuführen. Das Kalibrierlaboratorium erfüllt gegebenenfalls zusätzliche gesetzliche und normative Anforderungen, einschließlich solcher in relevanten sektoralen Programmen, sofern diese nachfolgend ausdrücklich bestätigt werden.

Die Anforderungen an das Managementsystem in der DIN EN ISO/IEC 17025 sind in einer für Kalibrierlaboratorien relevanten Sprache verfasst und stehen insgesamt in Übereinstimmung mit den Prinzipien der DIN EN ISO 9001.

Kalibrierungen in den Bereichen:

**Mechanische Messgrößen**
- **Drehmoment**

*Diese Urkundenanlage gilt nur zusammen mit der schriftlich erteilten Urkunde und gibt den Stand zum Zeitpunkt des Ausstellungsdatums wieder. Der jeweils aktuelle Stand der gültigen und überwachten Akkreditierung ist der Datenbank akkreditierter Stellen der Deutschen Akkreditierungsstelle zu entnehmen (www.dakks.de)*

Verwendete Abkürzungen: siehe letzte Seite



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## Deutsche Akkreditierungsstelle GmbH

**Beliehene gemäß § 8 Absatz 1 AkkStelleG i.V.m. § 1 Absatz 1 AkkStelleGBV**
Unterzeichnerin der Multilateralen Abkommen
von EA, ILAC und IAF zur gegenseitigen Anerkennung

# Akkreditierung

Die Deutsche Akkreditierungsstelle GmbH bestätigt hiermit, dass das Kalibrierlaboratorium

**Manner Sensortelemetrie GmbH**
**Eschenwasen 20, 78549 Spaichingen**

die Kompetenz nach DIN EN ISO/IEC 17025:2005 besitzt, Kalibrierungen in folgenden Bereichen durchzuführen:

**Mechanische Messgrößen**
- **Drehmoment**

Die Akkreditierungsurkunde gilt nur in Verbindung mit dem Bescheid vom 22.03.2019 mit der Akkreditierungsnummer D-K-20850-01. Sie besteht aus diesem Deckblatt, der Rückseite des Deckblatts und der folgenden Anlage mit insgesamt 2 Seiten.

Registrierungsnummer der Urkunde: **D-K-20850-01-00**

Braunschweig,
22.03.2019

Im Auftrag Dr. Heike Manke
Abteilungsleiterin

Siehe Hinweise auf der Rückseite

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