MANNER®
SENSORTELEMETRIE

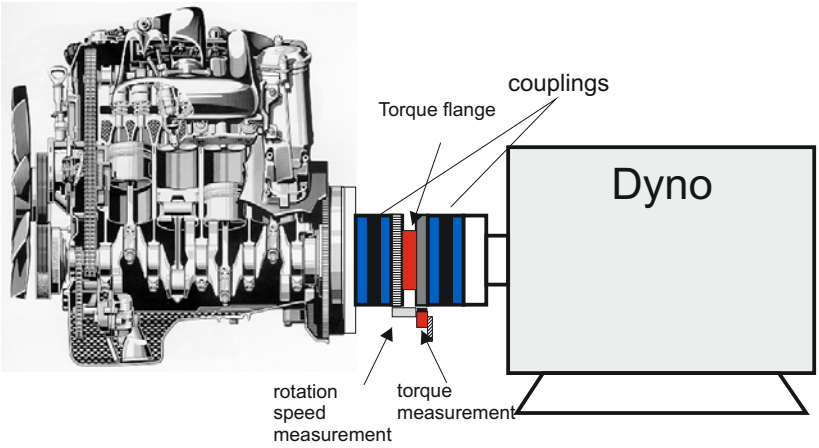
Torque measuring flange

XTREMA TORQUE

Characteristic features:

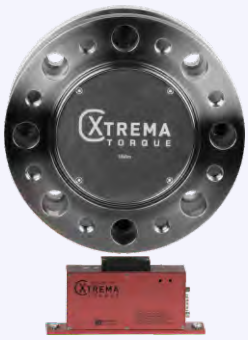
- ✓ Nominal (rated) torques

  50 N m, 100N m, 200N m, 500N m, 1kN m, 2k Nm, 3k Nm, 5kN m, 10kN m
- ✓ Nominal (rated) speeds from 10000 rpm to 25000 rpm (depending on the measuring range)
- ✓ Accuracy class 0.05
- ✓ 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 ... 160 ° C (optional)
- ✓ Integrated Speed acquistion (high resolution)



XTREMA TORQUE

Topology



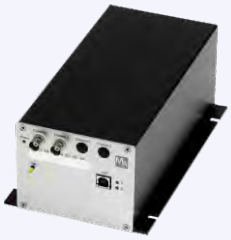
integrated Pick Up

- Frequenz(10+/-5kHz)
- Spannung (U) +/10V
- Strom (I) 4..20mA
- Remote Control
- Energie
- Remote Shunt ein/aus

Torque flange with offsetted Pick Up

- Energie
- Remote Shunt ein/aus
- Drehmoment (digital)
- Temperatur (digital)
- Status
- Remote Control

max. Distance: 100 m



Evaluation Unit

- Ethernet (digital)
- EtherCat (digital)
- USB (digital)
- Frequenz(10+/-5kHz)
- Spannung (U) +/10V
- Strom (I) 4..20mA
- Remote Control
- Energie
- Remote Shunt ein/aus

MANNER® SENSORTELEMETRIE

Technical Data

Torque measuring system

Type		XTREMA								
Accuracy Class		0,05 (0,02 [1])								
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 [6]	KHz	+/-30								
Digital output EtherCat 16(20) Bit	dig. value	+/-29491 (117964[3])								
Digital output EtherNet TCP/IP 16(20) Bit	dig. value	+/-29491 (117964[3])								
Digital output CAN 16(20) Bit	dig. value	+/-29491 (117964[3])								
Sensitivity tolerance (deviation of the actual output value at M_{nom} of nominal sensitivity)	%	0,05 (0,02/0,01[1])								
Output signal at torque = zero										
Voltage output	V	0								
Frequency output 60 kHz [7]	kHz	60								
Digital output	dig. value	32768 (131072[3])								
Nominal output signal										
Voltage output										
with positive nominal torque	V	+10								
with negative nominal torque	V	-10								
Frequency Output 60 kHz [7]										
with positive nominal torque	kHz	15 (5V TTL 0/5V)								
with negative nominal torque	kHz	5 (5V TTL 0/5V)								
Digital output										
with positive nominal torque	dig. value	62258 (996126[3])								
with negative nominal torque	dig. value	3278 (52449[3])								
Load resistance										
Voltage output	kΩ	>2								
Frequency output 60 kHz [7]	kΩ	>10								
Long-term drift										
Voltage output	%	<+/-0.03 (0,012[1])								
Frequency output 60 kHz [7]	%	<+/-0.03 (0,012[1])								
Measurement frequency range (-3 dB)	kHz	1 (2[4] ,5[5] ,10[6])								
Group delay time	us	<400 (<250[4] ,<130[5] ,<40[6])								
Residual ripple voltage output	mV	<10								
Temperature influence per 10 °C in the nominal temperature range on the output signal, related to the actual value of signal range	mV									
Frequency output [7]	%	+/- 0,05								
Digital output	%	+/- 0,03								
Voltage output	%	+/- 0,1								
on the zero signal, related to the nom. sensitivity										
Frequency output [7]	%	+/- 0,05 (+/-0,01[2])								
Digital output	%	+/- 0,03 (+/-0,01[2])								
Voltage output	%	+/- 0,1 (+/-0,03[2])								
Max. modulation range										
Frequency output 60 kHz [7]	kHz	+/-33								
Digital output	digits	+/-32768(131072[5])								
Voltage output	V	+/-11.2								
Power supply										
Nominal supply (protective low voltage DC)	V	+20..28V								
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 accuracy class 0.02
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 [1)])								
Frequency output 10 kHz [7)]	%	< +/- 0,05 (0,02 [1)])								
Digital output	%	< +/- 0,05 (0,02 [1)])								
Rel. Standard deviation of repeatability according to DIN 1319 in relation to output signal change		<+/0,03								
Shunt signal		approx. 80 % of M_{nom}								
Tolerance of the shunt signal relative to M_{nom}	%	< +/- 0.02								
Nominal release voltage	V	5								
Limit tripping voltage	V	12								
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)		Accuracy class: 0,05				Accuracy class: 0,02 [1)]				
60..100 % of M_{nom}	%	+/-0,05								
20..60 % of M_{nom}	%	+/- 0,025								
0..20 % off M_{nom}	%	+/- 0,01								
General data										
EMC **EME** (Emission per EN61326−1, sec.7) RFI field strength	-	Class 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		Ip54 (IP67[2)])								
Oil-resistant / waterproof [8)]										
Weight approx. Rotor	kg	2,0	2,0		2,1	4,0	4,1		6,1	10,2
approx. Stator	kg	0,2								
Reference temperature	°C	23								
Operating temperature range	°C	-10..+70								
extended temperature range[9)]	°C	-40..160								
Storage temperature range	°C	-50..+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...2000								
Duration	h	2,5								
Acceleration (amplitude)	m/s^2	200								
Nominal speed	rpm	20000			20000		15000		12000	10000
Increased speed stability[10)]	rpm	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	29	45	53	90	120
Laterial force limit[11)]	kN	1	1	2	6	8	15	17	20	24
Bending limit moment[11)]	kNm	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)]	kNm	0,20	0,20	0,40	1,0	2,0	4,0	5,1	8,5	17

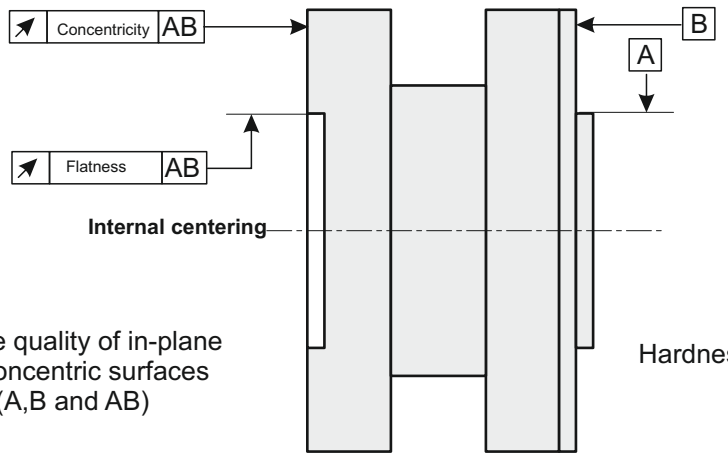
1) Option accuracy class 0.02 %
8) Option protection class IP67
9) Option extended service temperature range
10) Option increased speed stability
11) static and dynamic
12) The nominal torque must not be exceeded

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										
Torsional stiffness c_T	kN m/rad	79	79	149	561	895	2293	2865	4854	10989
Torsion angle at M_{nom}	Rad	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/rad	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								
Max. limits for relative shaft vibration (peakto peak)[13] Wave oscillations in the area of the connection flanges acc. to ISO 7919−3										
Normal mode (continuous operation)	um	$s_{(p-p)} = \frac{9000}{\sqrt{n}}$ (n in rpm)								
Start and Stop mode/resonance ranges (temporary)	um	$s_{(p-p)} = \frac{13200}{\sqrt{n}}$ (n in rpm)								
Mass moment of inertia of the rotor Lv Axis of rotation, without consideration of the flange screws	kg m²	0,0016	0,0016	0,0017	0,0048	0,0050	0,0151	0,0152	0,0335	0,0859
Max. permissible static eccentricity Rotor - stator spacing	mm	5								
Max. permissible axial displacement 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



0,8 Surface quality of in-plane and concentric surfaces (A,B and AB)

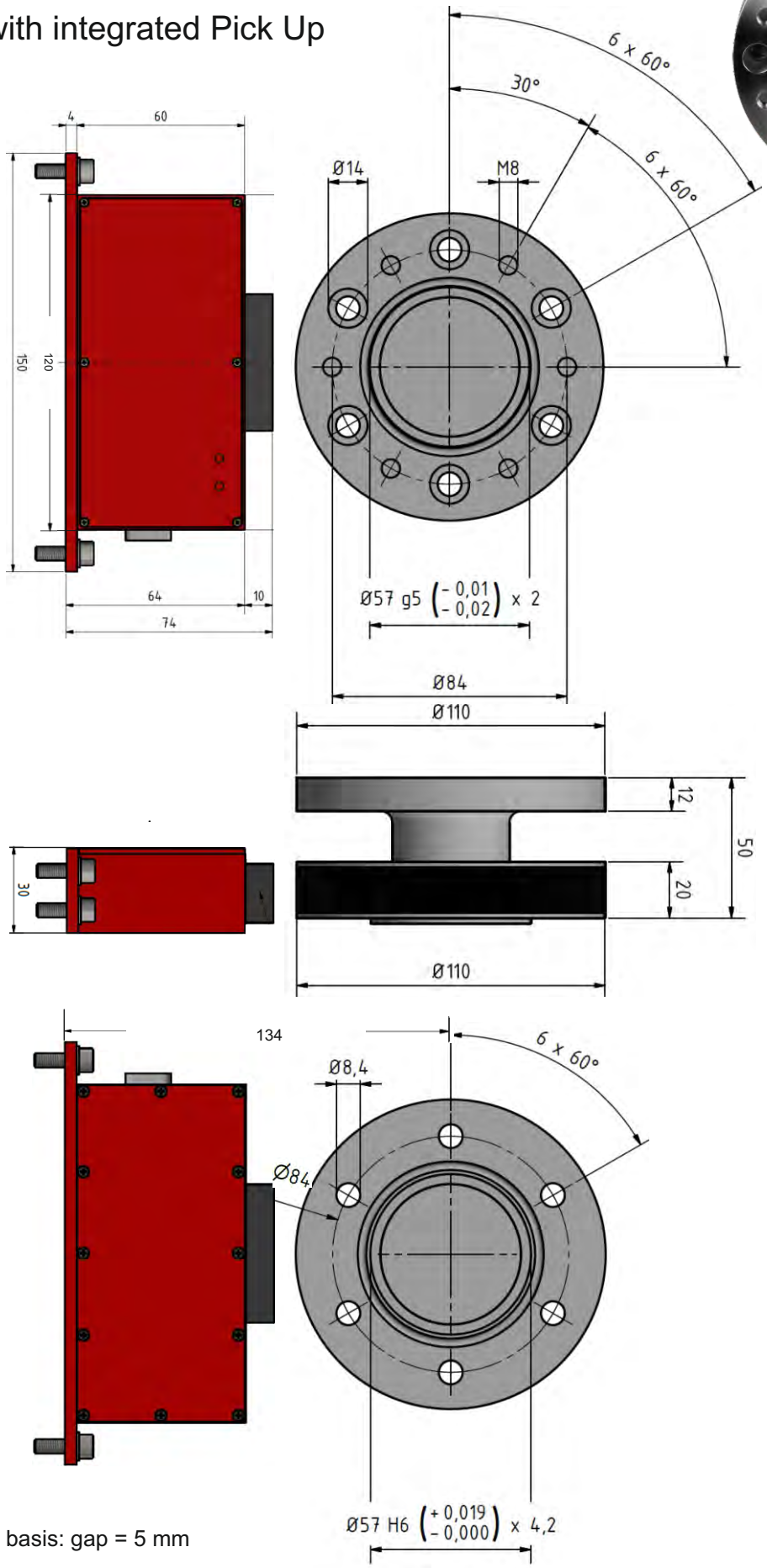
Hardness 46..54 HCR

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 induktive, IP67)										
Induktive (traces A/B)	pulses/turn	85			92		128		150	188
Distance Rotor - Pick Up	mm	0,8+/-0,4								
Integrated Speed acquisition (Version Laser, IP42)										
Opticial (trace A)	pulses/turn	432			498		644		761	942
Distance Rotor - Pick	mm	20+/-19								

13) Option accuracy class 0,02 %

Dimensions XTREMA 0,05 kN m (in mm)

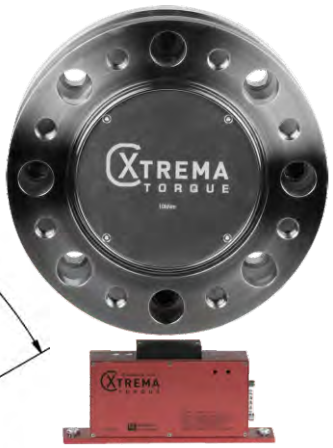
Receiver with integrated Pick Up

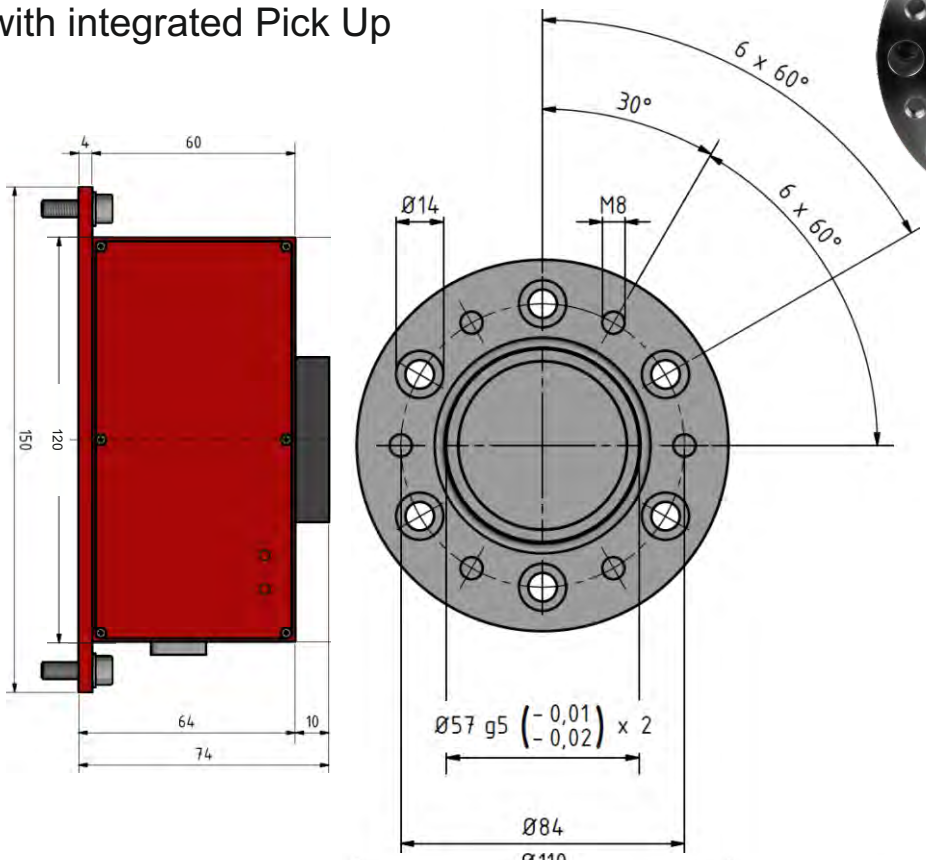


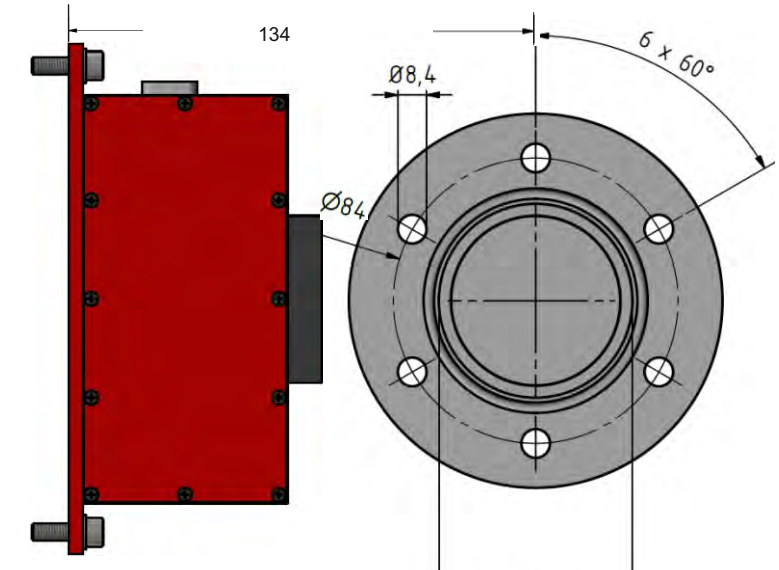
basis: gap = 5 mm

Dimensions XTREMA 0,1 kN m (in mm)

Receiver with integrated Pick Up

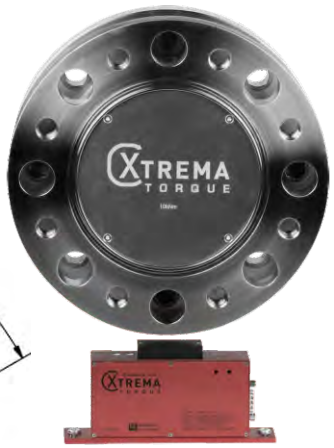




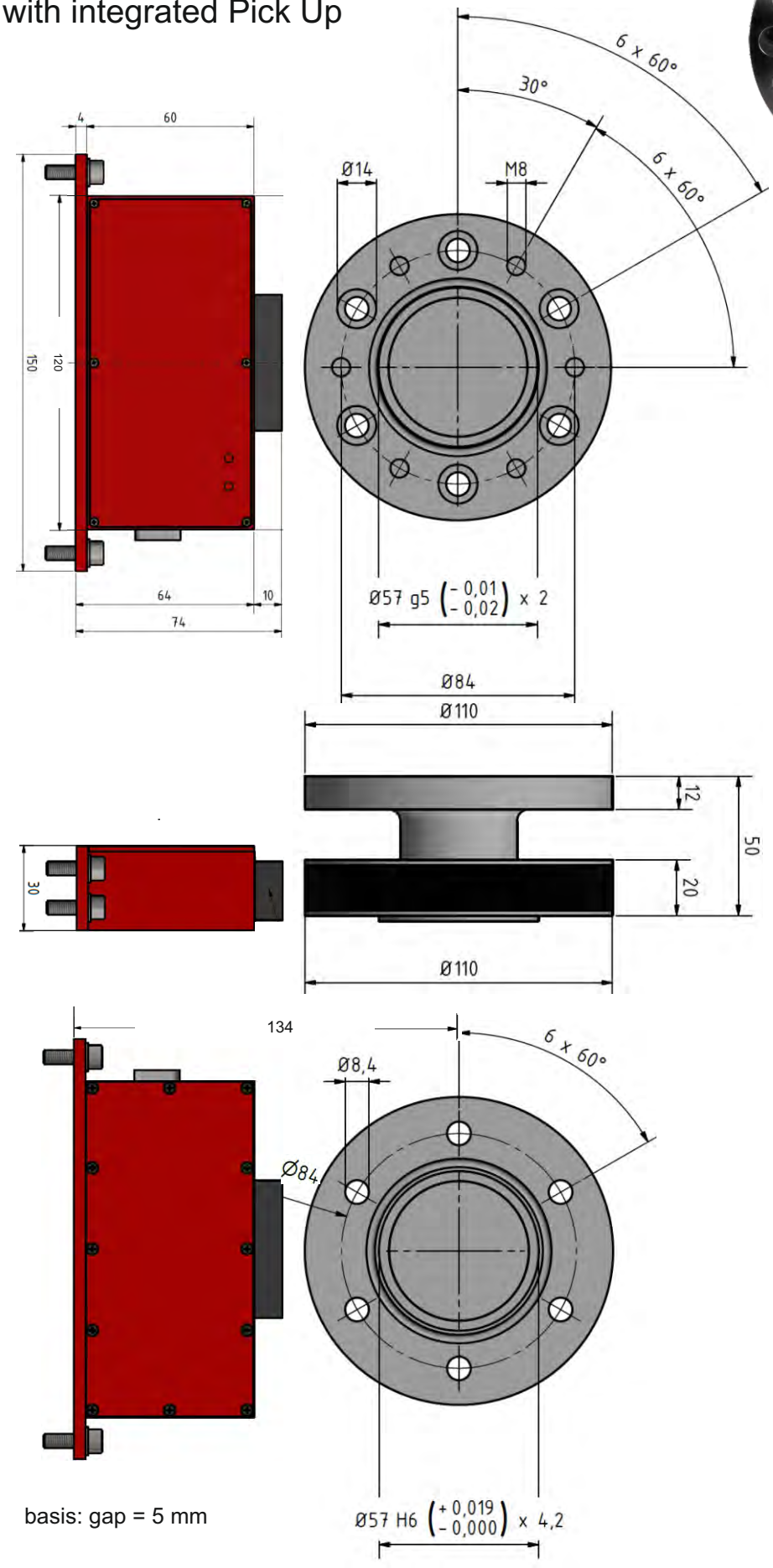


basis: gap = 5 mm

Dimensions XTREMA 0,2 kN m (in mm)



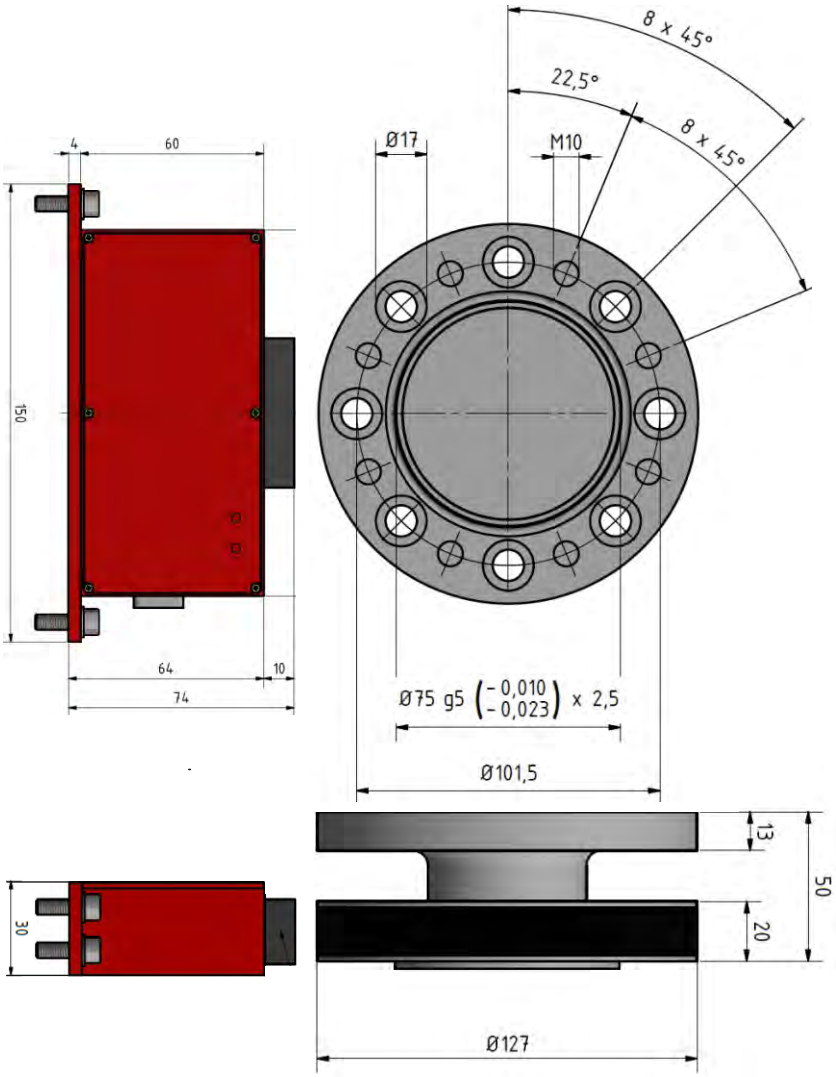
Receiver with integrated Pick Up

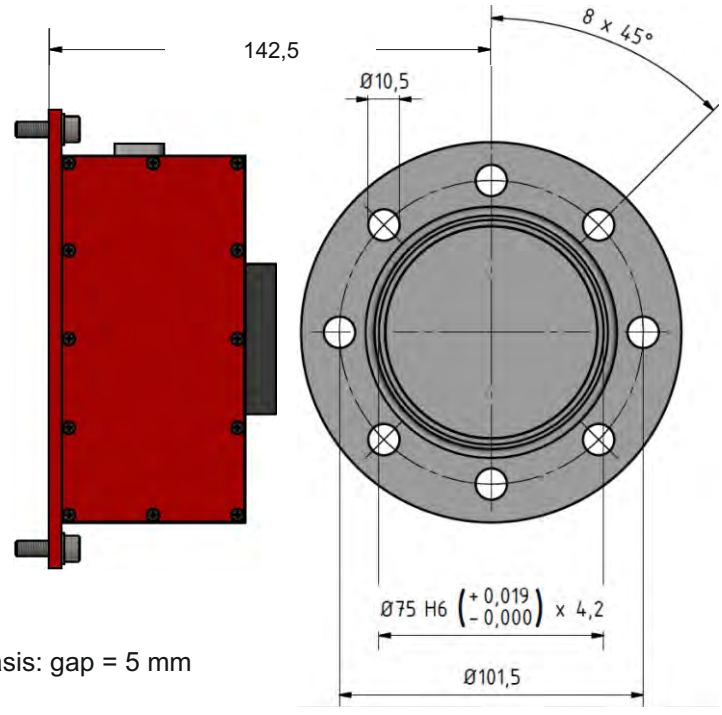


basis: gap = 5 mm

Dimensions XTREMA 0,5 kN m (mm)

Receiver with integrated Pick Up

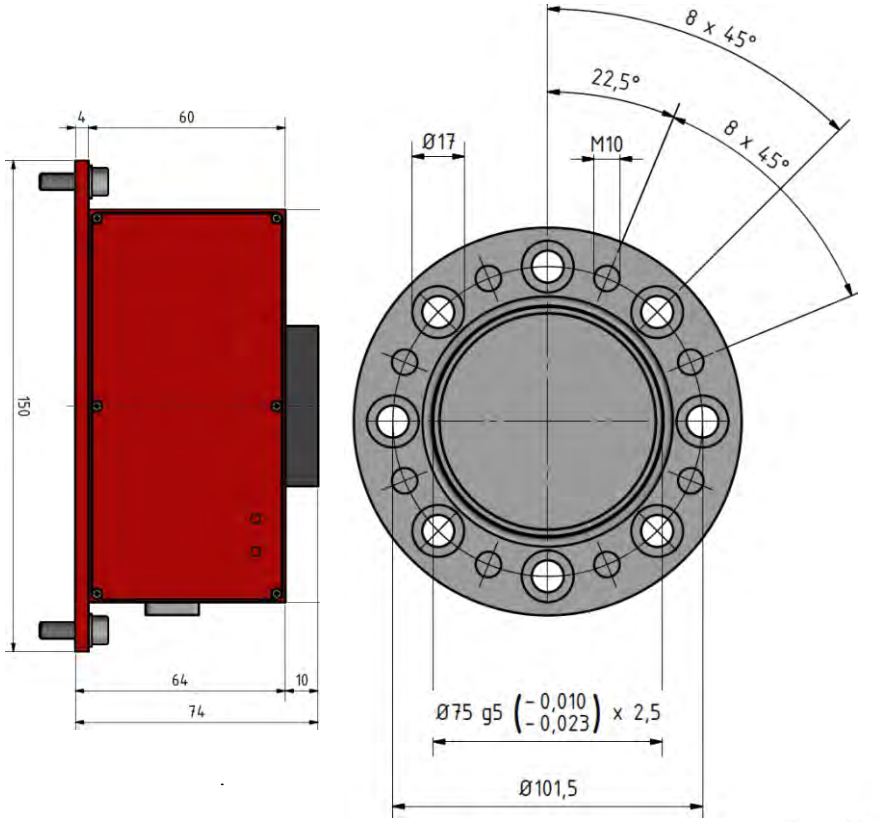


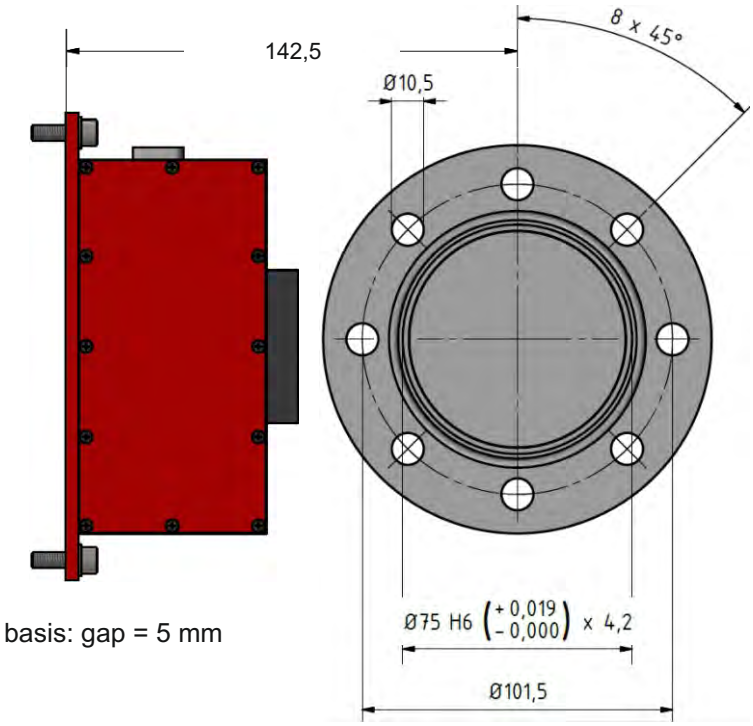


basis: gap = 5 mm

Dimensions XTREMA 1 kN m (mm)

Receiver with integrated Pick Up

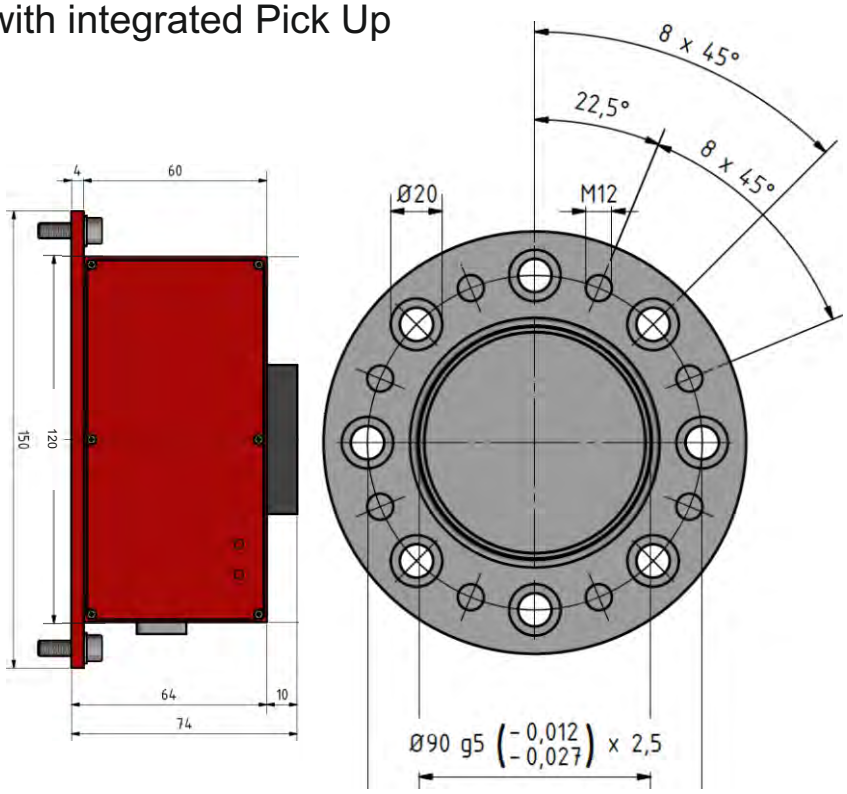


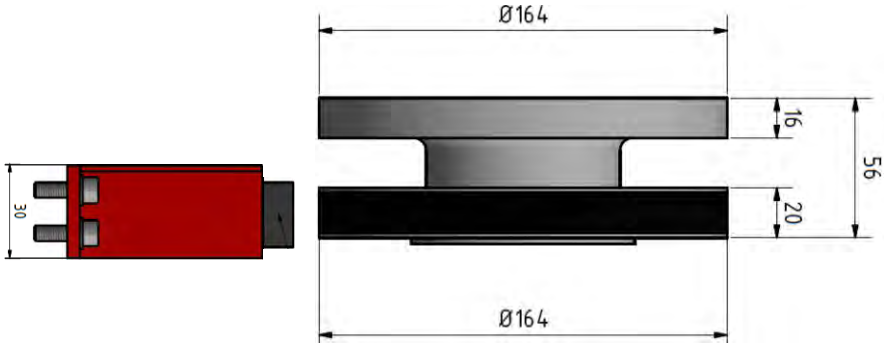


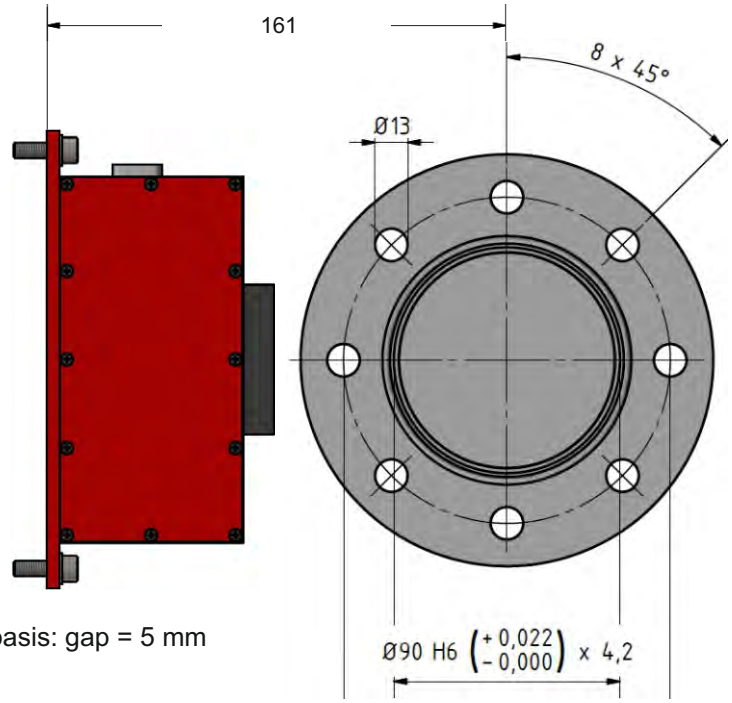
basis: gap = 5 mm

Dimensions XTREMA 2 kN m (mm)

Receiver with integrated Pick Up



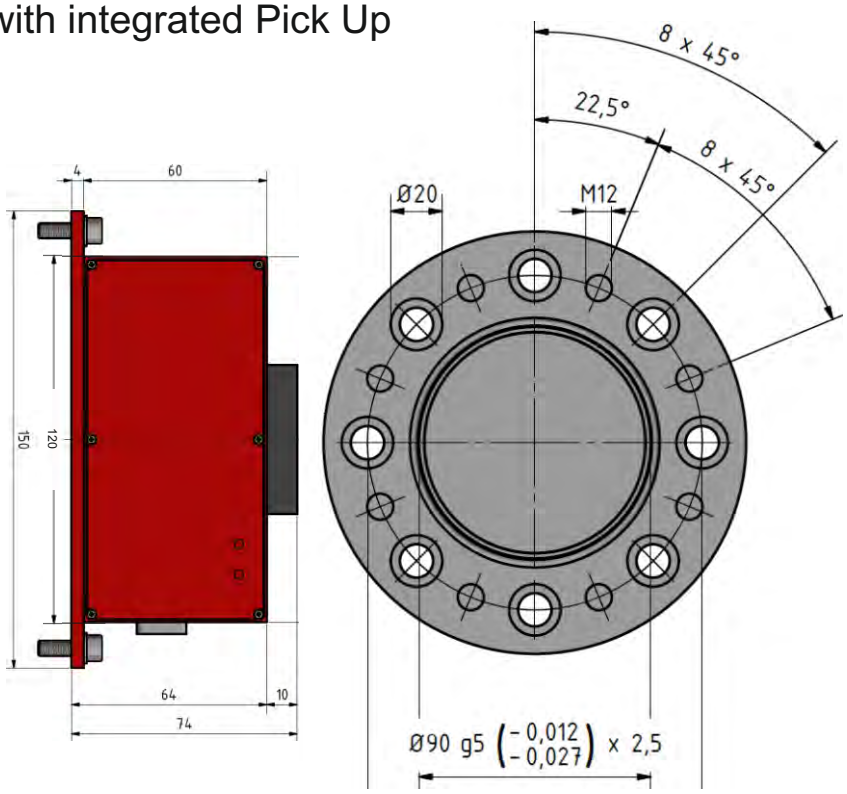


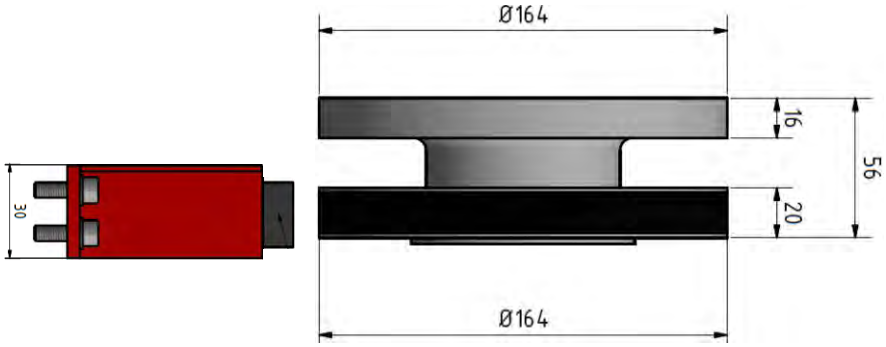


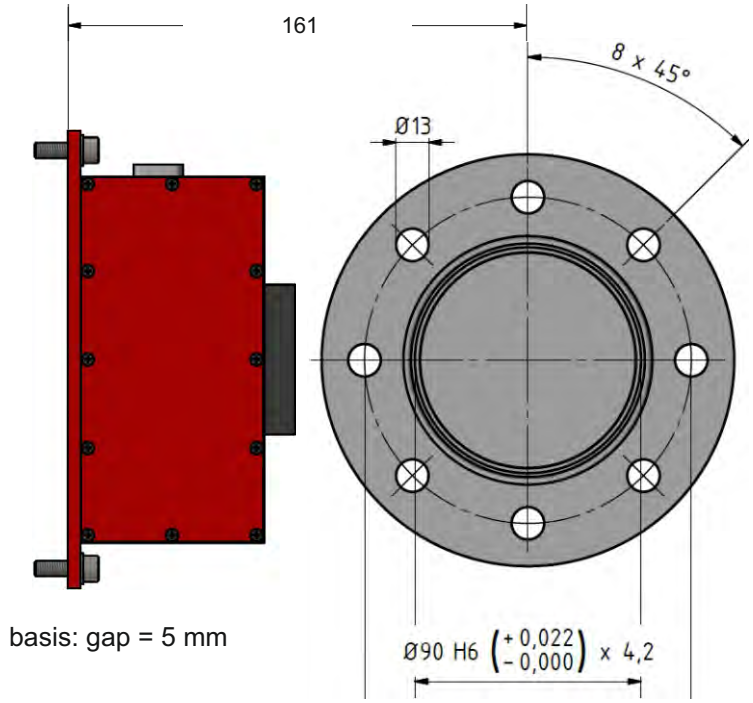
basis: gap = 5 mm

Dimensions XTREMA 3 kN m (mm)

Receiver with integrated Pick Up



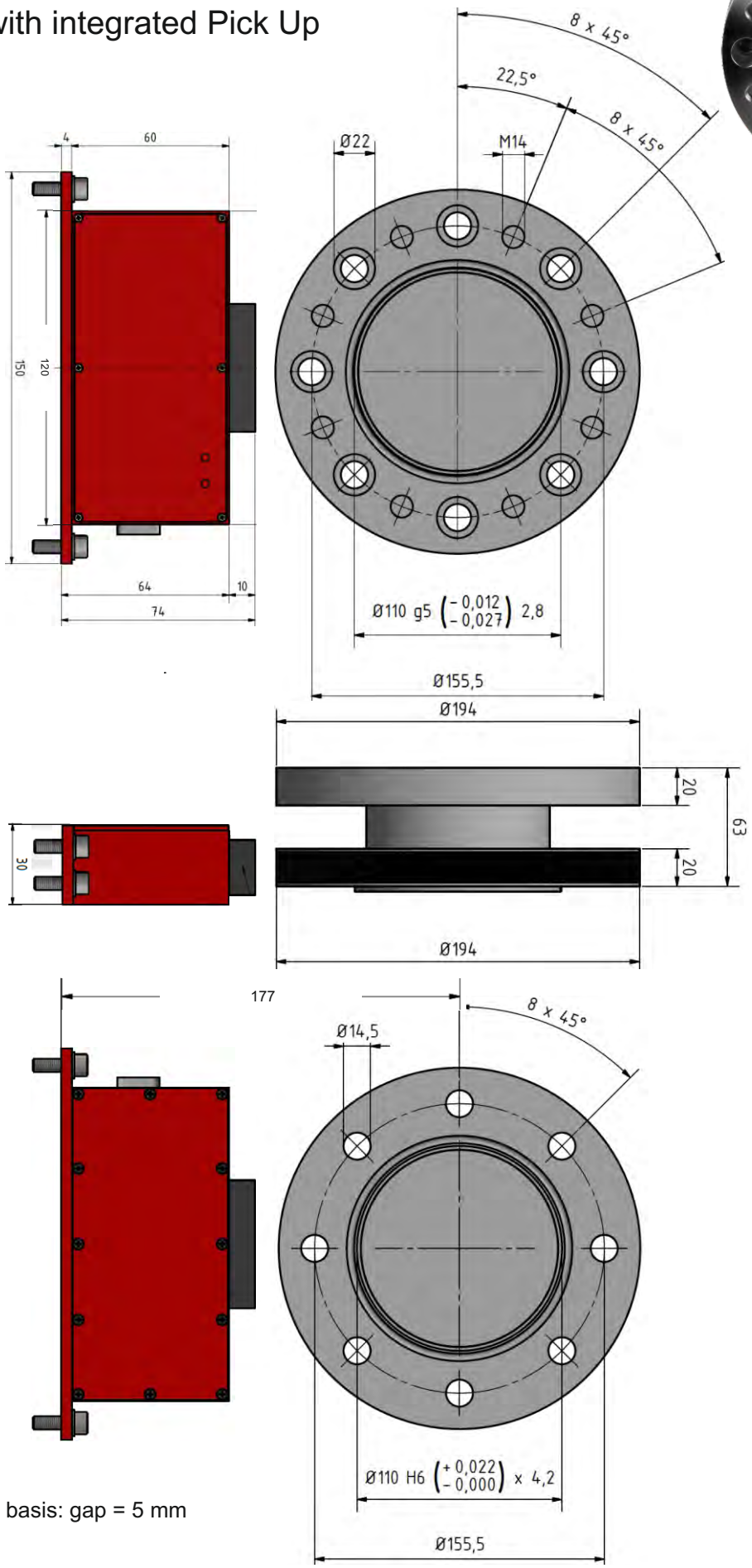




basis: gap = 5 mm

Dimensions XTREMA 5 kN m (mm)

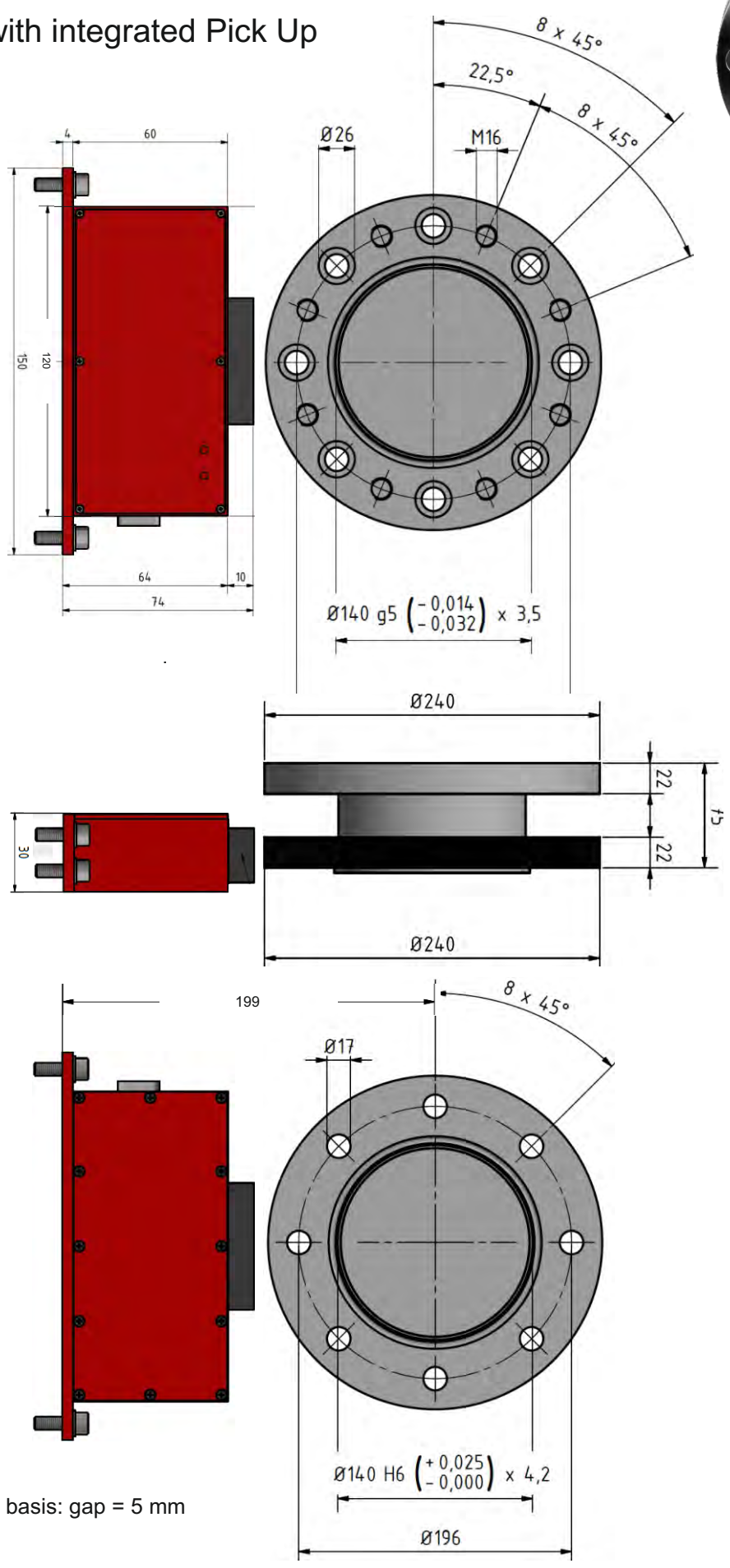
Receiver with integrated Pick Up



basis: gap = 5 mm

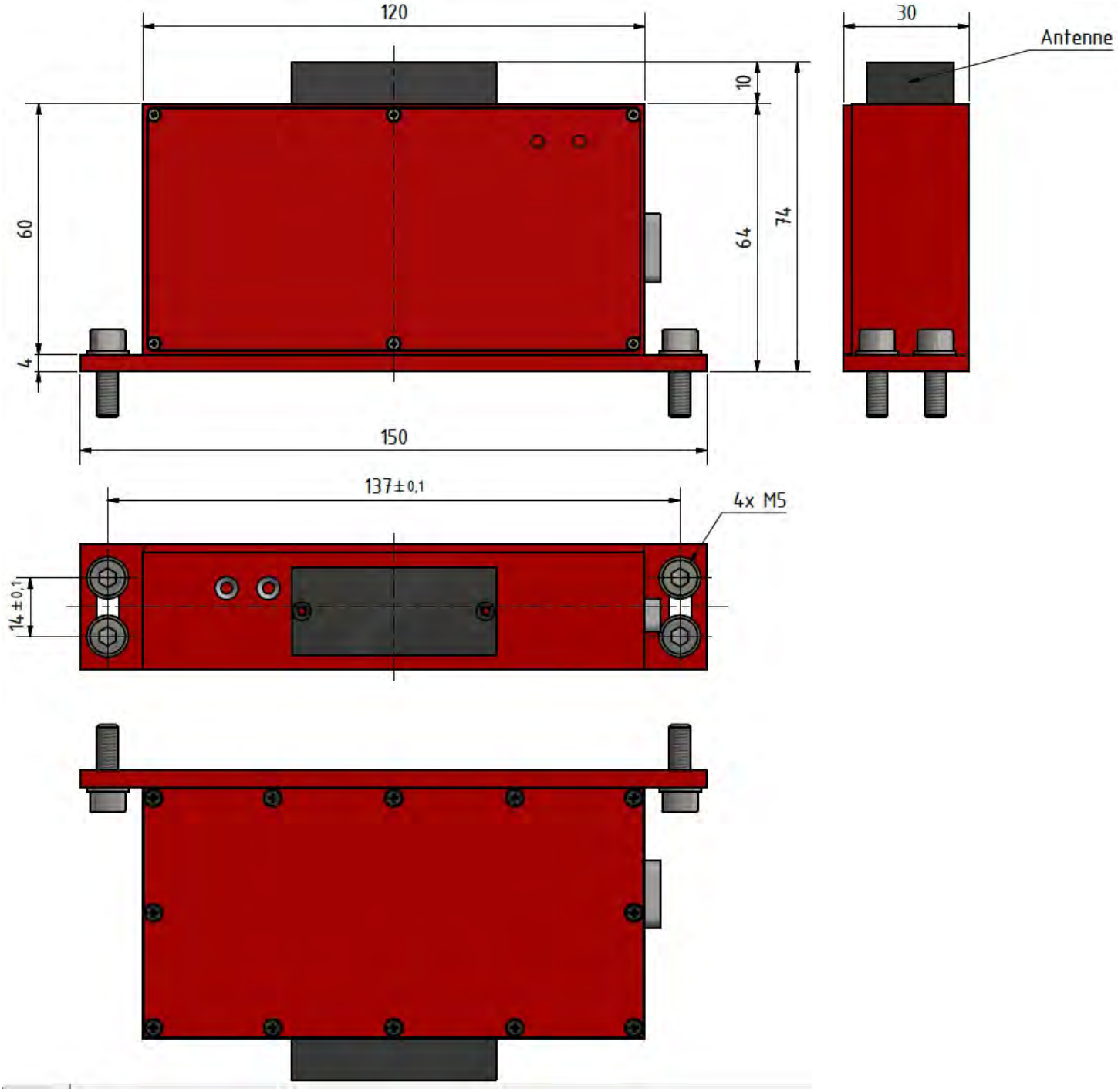
Dimensions XTREMA 10 kN m (mm)

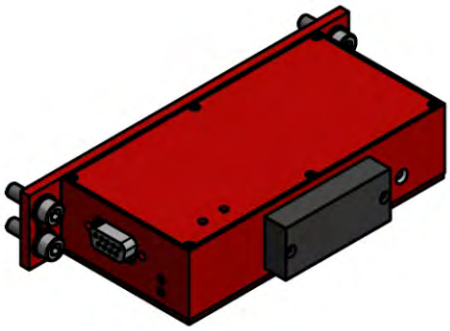
Receiver with integrated Pick Up

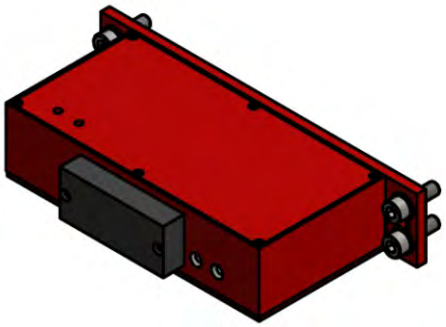


basis: gap = 5 mm

Geometry Receiver Typ MAnt integrated Pick UP

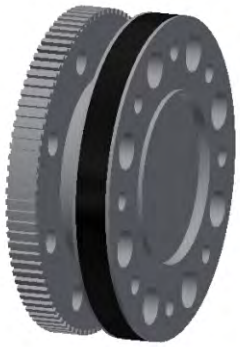


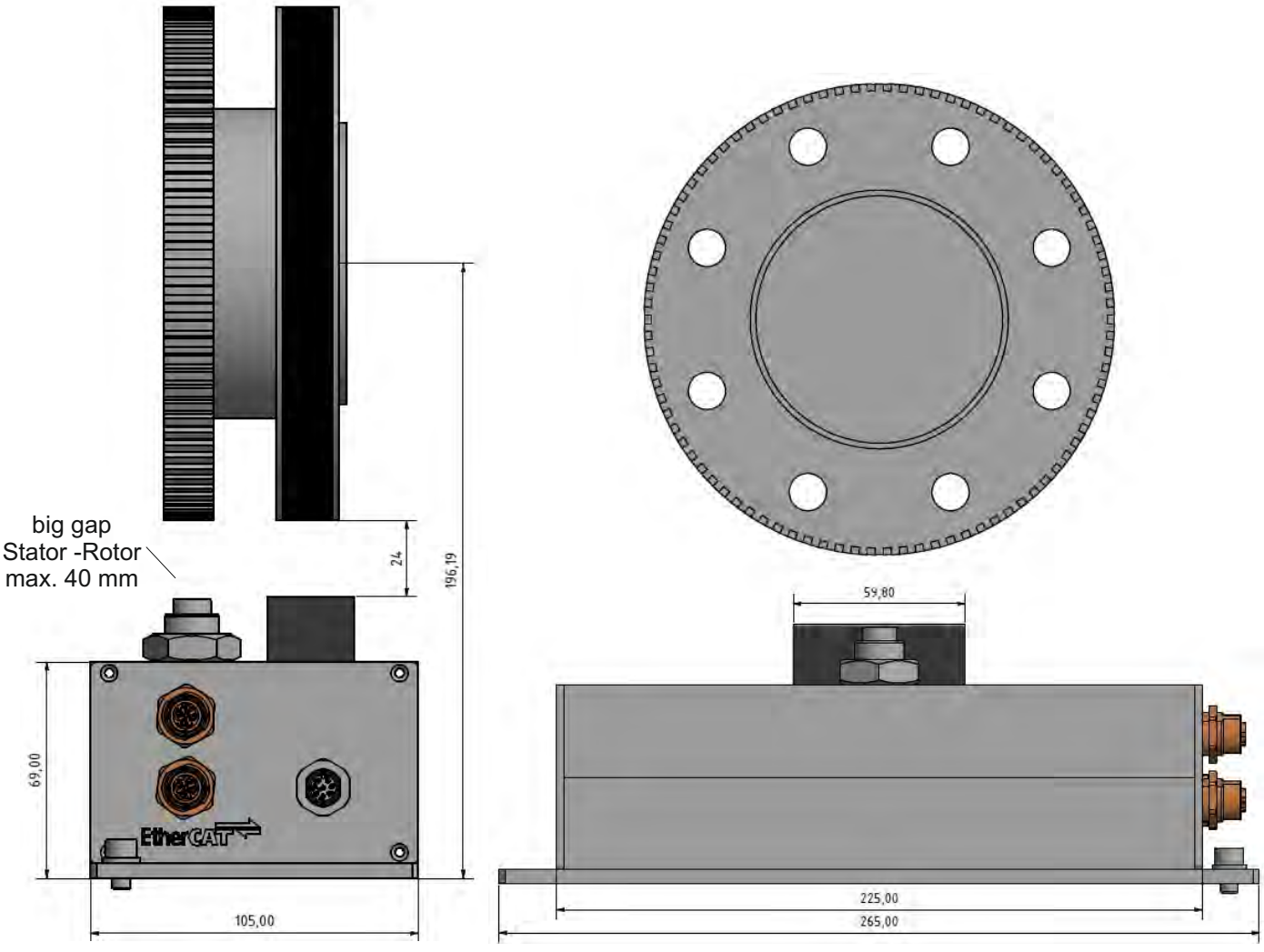




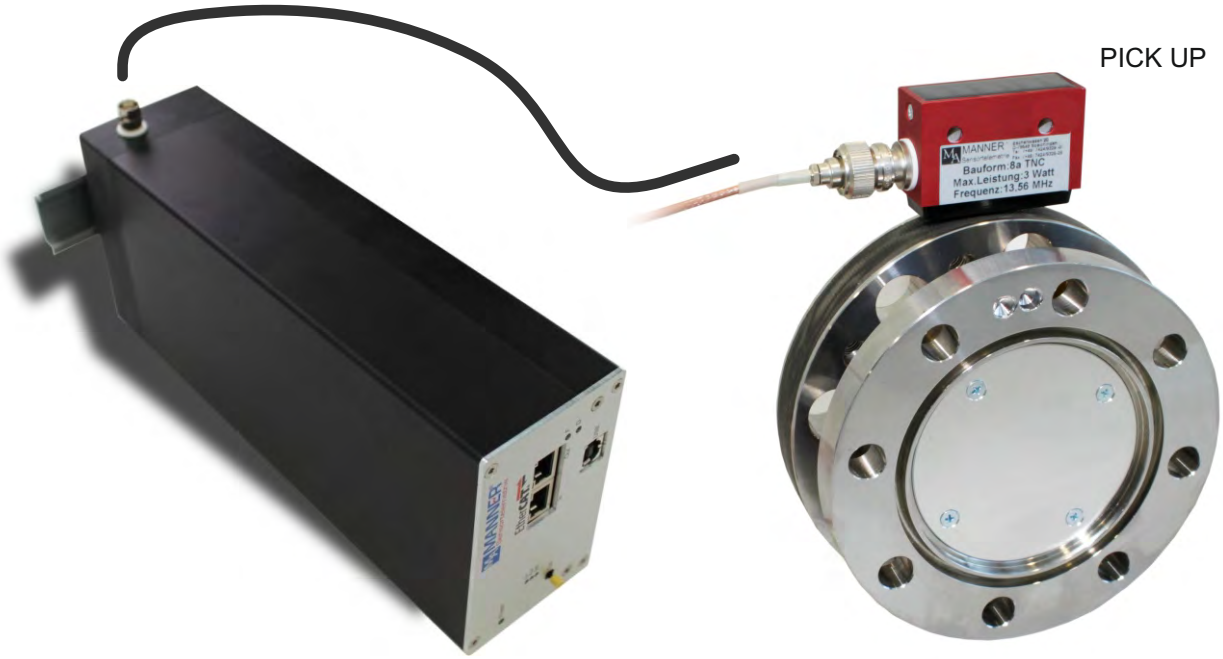
Geometry Rdeceiver Typ FAnt
integrated Pick UP with big transmission range

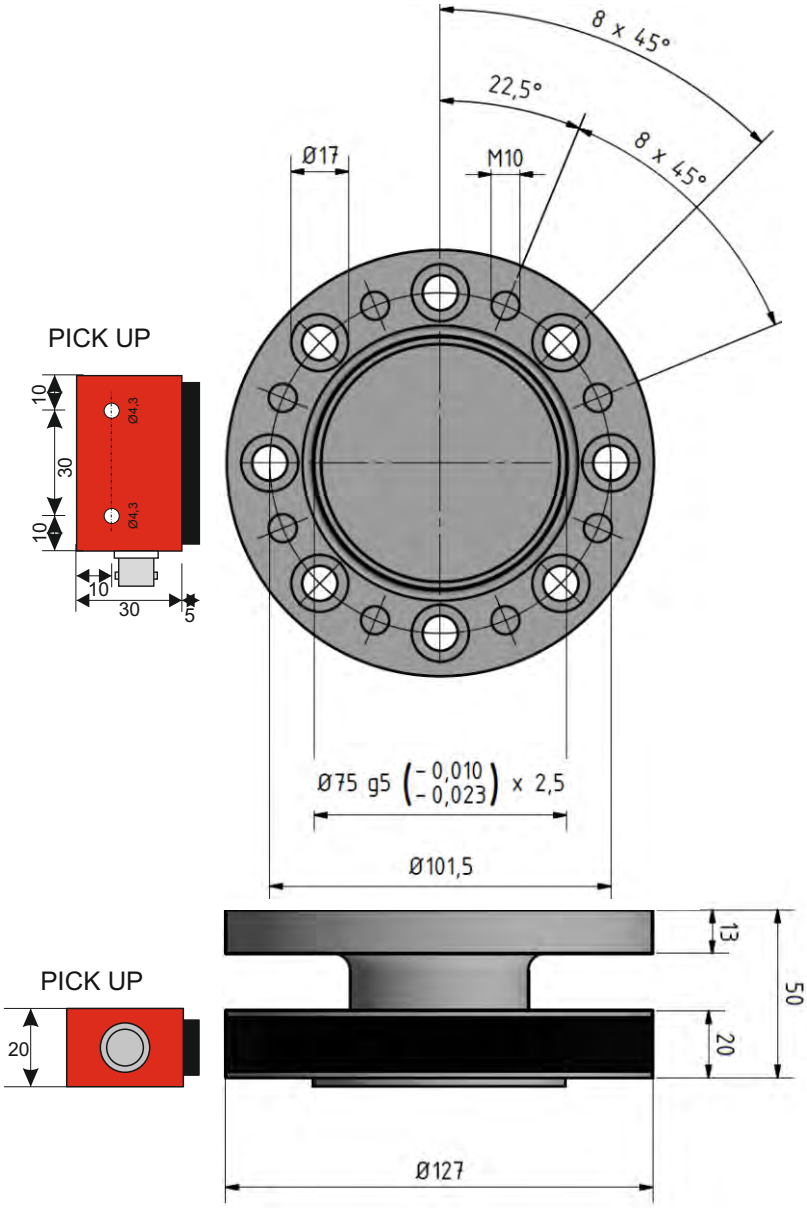
- ✓ **Pick Up with integrated Receiver (compact built up)**
- ✓ **integrated network connection EtherCat oder CAN**
- ✓ **Frequency 10+/-5kHz and analogic output**
- ✓ **Speed /Torque acquisition with distance flange - Pick Up up to 40 mm**



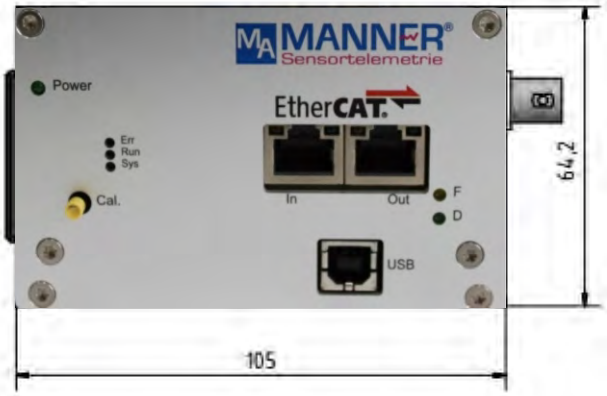


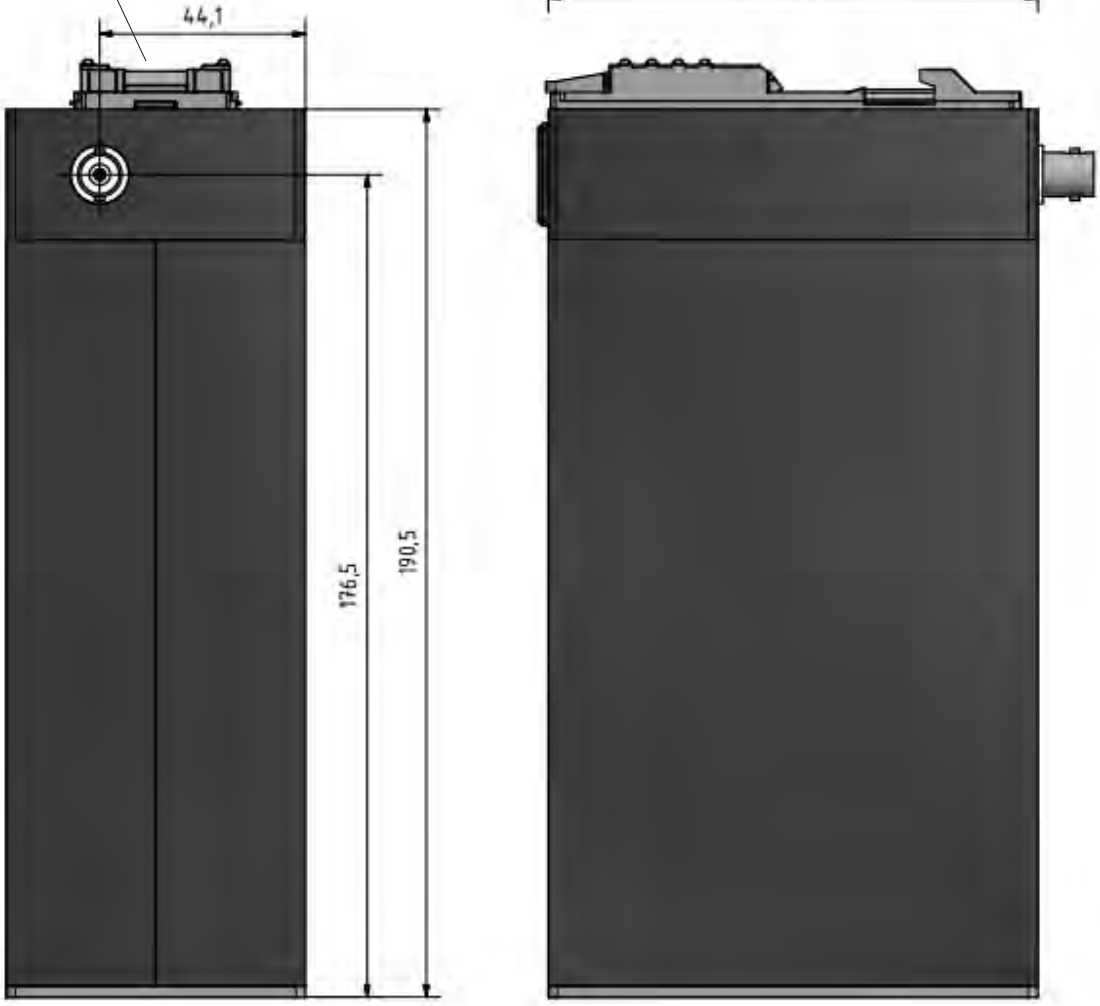
Variante offsetted Pick UP





Geometry Evaluation Unit Type F





DAkkS
Deutsche
Akkreditierungsstelle

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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