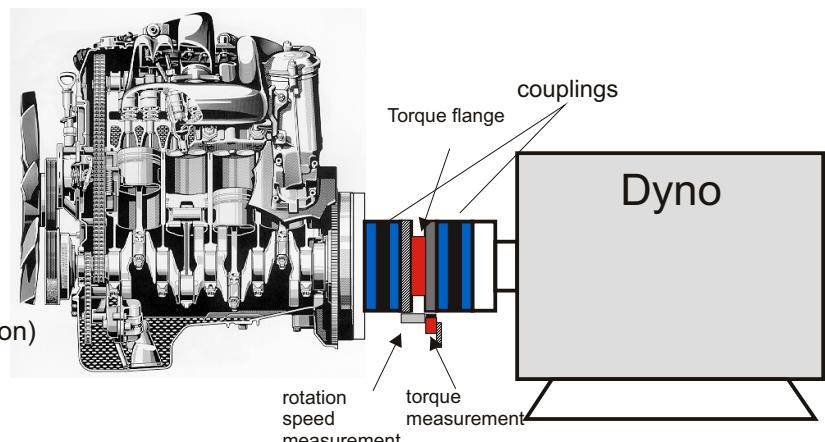


# Torque measuring flange



## Characteristic features:

- ✓ Nominal (rated) torques  
**50N·m, 200N·m; 500N·m;**  
**1kN·m; 2kN·m; 3kN·m; 5kN·m;**  
**10kN·m**
- ✓ Nominal (rated) speeds from 10000 rpm to 25000 rpm (depending on the measuring range)
- ✓ 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 ... 160 ° C (optional)
- ✓ Integrated Speed acquistion (high resolution)



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

## Topology

- frequency(10+/-5kHz)
- strain (U) +/-10V
- current (I) 4..20mA
- Remote Control
- energy
- Remote Shunt on/off



Evaluation Unit

- Ethernet (digital)
- EtherCat (digital)
- USB (digital)
- frequency 10+/-5kHz
- strain U) +/-10V
- current (I) 4..20mA
- remote Control
- energy
- remote shunt on/off

# Technical Data

Torque measuring system																	
Type																	
Accuracy Class	0,02																
Nominal (rated) torque M <sub>nom</sub>	kNm	0,05	0,1	0,2	0,5	1	2	3	5	10							
<b>Nominal sensitivity</b> (range between torque = zero and nominal torque)																	
Voltage output 10 V	V	+/-10															
Frequency output 60 kHz <sup>6)</sup>	kHz	+/-30															
Digital output EtherCat 16(20) Bit	dig. value	+/-29491 (471859 <sup>3)</sup> )															
Digital output EtherNet TCP/IP 16(20) Bit	dig. value	+/-29491 (471859 <sup>3)</sup> )															
Digital output CAN 16(20) Bit	dig. value	+/-29491 (471859 <sup>3)</sup> )															
Sensitivity tolerance (deviation of the actual output value at M <sub>nom</sub> of nominal sensitivity)	%	0,05 (0,01 <sup>1)</sup> )															
<b>Output signal at torque = zero</b>																	
Voltage output	V	0															
Frequency output 60 kHz <sup>7)</sup>	kHz	60															
Digital output	dig. value	32768 (524288 <sup>3)</sup> )															
<b>Nominal output signal</b>																	
<b>Voltage output</b>																	
with positive nominal torque	V	+10															
with negative nominal torque	V	-10															
<b>Frequency Output 60 kHz<sup>7)</sup></b>																	
with positive nominal torque	kHz	90 (5V TTL 0/5V) (15 <sup>7)</sup> )															
with negative nominal torque	kHz	30 (5V TTL 0/5V) (5 <sup>7)</sup> )															
<b>Digital output</b>																	
with positive nominal torque	dig. value	62258 (996147 <sup>3)</sup> )															
with negative nominal torque	dig. value	3278 (52429 <sup>3)</sup> )															
<b>Load resistance</b>																	
Voltage output	kOhm	>2															
Frequency output 60 kHz <sup>7)</sup>	kOhm	>10															
<b>Long-term drift</b>																	
Voltage output	%	<+/-0,03															
Frequency output 60 kHz <sup>7)</sup>	%	<+/-0,03															
<b>Measurement frequency range (-3 dB)</b>																	
	kHz	1 ( 2 <sup>4), 5<sup>5), 10<sup>6)</sup>)</sup></sup>															
<b>Group delay time</b>																	
	us	<400 (<250 <sup>4), &lt;130<sup>5), &lt;40<sup>6)</sup>)</sup></sup>															
<b>Residual ripple (voltage output)</b>																	
	mV	<10															
<b>Temperature influence per 10 °K in the nominal temperature range on the output signal, related to the actual value of signal range</b>																	
Frequency output <sup>7)</sup>	%	+/- 0,02															
Digital output	%	+/- 0,02															
Voltage output	%	+/- 0,05															
<b>on the zero signal, related to the nom. sensitivity</b>																	
Frequency output <sup>7)</sup>	%	+/- 0,01 (+/-0,005 <sup>2)</sup> )															
Digital output	%	+/- 0,03 (+/-0,005 <sup>2)</sup> )															
Voltage output	%	+/- 0,04 (+/-0,02 <sup>2)</sup> )															
<b>Max. modulation range</b>																	
Frequency output 60kHz <sup>7)</sup>	kHz	+/-31,62 (+/-5,27 <sup>7)</sup> )															
Digital output	digits	+/-32768 (524288 <sup>3)</sup> )															
Voltage output	V	+/-11,2															
<b>Power supply</b>																	
Nominal supply (protective low voltage DC)	V	+20..28V															
Current consumption in measuring mode	A	< 0,7															
Current consumption in start-up mode	A	< 1A															
Rated input power	W	< 5															
Max. cable length	m	100															

1) Option improved sensitivity tolerance

5) Option measuring signal bandwidth 5 kHz

2) Option zero drift

6) Option measuring signal bandwidth 10 kHz

3) Option signal resolution 20 Bit

7) Option frequency output 10 kHz +/- 5 kHz

4) Option measuring signal bandwidth 2 kHz



## Technical Data (Continuation 1)

Nominal torque M <sub>nom</sub>	kNm	0,05	0,1	0,2	0,5	1	2	3	5	10	
<b>Linearity deviation including hysteresis,</b> related to the nominal sensitivity											
Voltage output 10 V	%									< +/- 0,02	
Frequency output 60 kHz <sup>7)</sup>	%									< +/- 0,02	
Digital output	%									< +/- 0,02	
Rel. Standard deviation of repeatability according to DIN 1319 in relation to output signal change (dig. output)	%									<+/0,005	
Shunt signal Tolerance of the shunt signal relative to M <sub>nom</sub>										ca. 80 % von M <sub>nom</sub> < +/- 0,02	
Nominal release voltage	%									80	
Limit tripping voltage	%									12	
Shunt signal on (active low)	V									< 1 (GND)	
Shunt signal	V									>2,5	
<b>Overall accuracy relative to nominal torque M<sub>nom</sub></b> based on 10 K temperature change (dig. output)											
60..100 % of M <sub>nom</sub>	%									<±0,007	
20..60 % of M <sub>nom</sub>	%									<±0,005	
0..20 % off M <sub>nom</sub>	%									<±0,003	
<b>General data</b>											
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 <sup>8)</sup>										IP54 (IP67 <sup>2)</sup> )	
Weight	approx. Rotor approx. Stator	kg kg	0,9	0,9	1,0	2,0	2,1	4,0	4,1	6,1	10,2
Reference temperature	°C									23	
Operating temperature range	°C									-10..+70	
extended temperature range <sup>9)</sup>	°C									-40..+160	
Storage temperature range	°C									-50..+160	
<b>mech. shock resistance according to EN 60068-2-27</b>											
Number of impacts	n									100	
Duration	ms									3	
Acceleration	m/s <sup>2</sup>									650	
<b>Vibration load in 3 directions EN 60068-2-27</b>											
Frequency range	Hz									10..2000	
Duration	h									2,5	
Acceleration (amplitude)	m/s <sup>2</sup>									200	
Nominal speed	min <sup>-1</sup>				20000		20000		15000	12000	10000
Increased speed stability <sup>10)</sup>	min <sup>-1</sup>				32000		25000		18000	15000	15000
<b>Limitations of liability<sup>11)</sup></b>											
Limit torque related M <sub>nom</sub>	%									400	
Breaking torque relative to M <sub>nom</sub>	%									800	
Axial limit force <sup>11)</sup>	kN	5	5	10	20	29	45	53	90	120	
Lateral force limit <sup>11)</sup>	kN	1	1	2	6	8	15	17	20	24	
Bending limit moment <sup>11)</sup>	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) <sup>12)</sup>	kNm	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 <sub>nom</sub>		0,05	0,1	0,2	0,5	1	2	3	5	10
Effect of measured values by parasitic forces <sup>14)</sup>										
Crosstalk bending moment M <sub>b</sub>	kN m/kN m						< 0,002			
Crosstalk side force F <sub>s</sub>	kN m/kN						< 0,0002			
Crosstalk axial force F <sub>z</sub>	kN m/kN						< 0,00015			

### Mechanical values

Torsional stiffness c <sub>T</sub>	kN m/rad	79	79	149	561	895	2293	2865	4854	10989
Torsion angle at M <sub>nom</sub>	Grad	0,037	0,073	0,077	0,051	0,064	0,051	0,061	0,059	0,052
Axial stiffness c <sub>a</sub>	kN/mm	125	125	167	437	587	939	1090	1040	1412
Radial stiffness c <sub>r</sub>	kN/mm	58	58	105	336	541	801	1028	985	1272
Stiffness with bending moment about a radial axis c <sub>b</sub>	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 <sub>b</sub>	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)<sup>13)</sup>

Wave oscillations in the area of the connection flanges acc. to ISO 7919-3

$$\text{Normal mode (continuous operation)} \quad \text{um} \quad S_{(\text{p-p})} = \frac{9000}{\sqrt{n}} \quad (\text{n in min}^{-1})$$

$$\text{Start and Stop mode/resonance ranges (temporary)} \quad \text{um} \quad S_{(\text{p-p})} = \frac{13200}{\sqrt{n}} \quad (\text{n in min}^{-1})$$

### Mass moment of inertia of the rotor Lv

Axis of rotation, without consideration of the flange screws kg m<sup>2</sup> 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

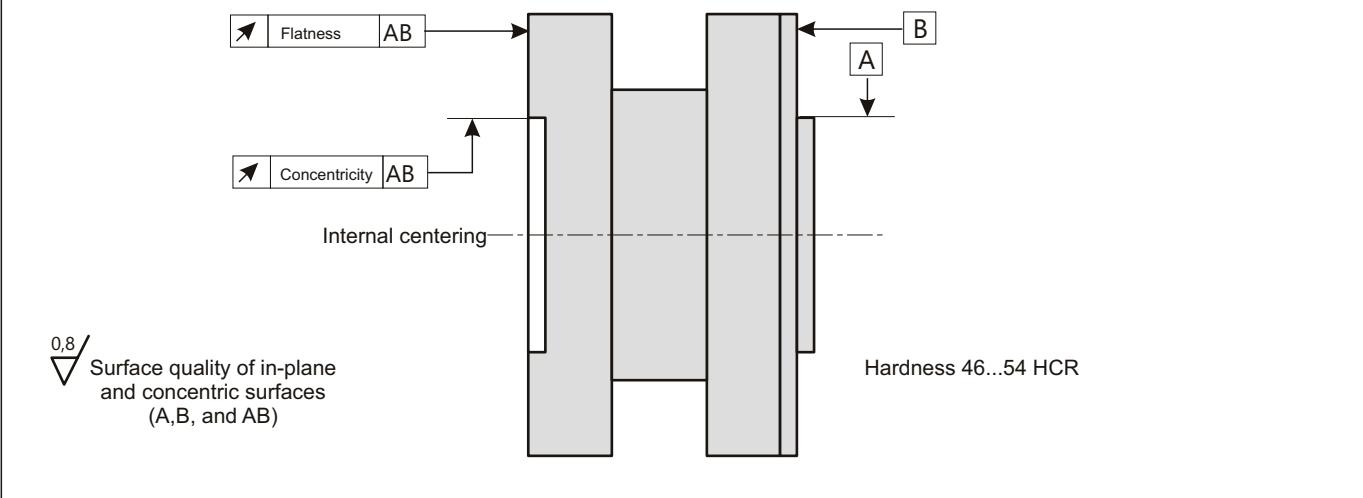
### Max. permissible axial displacement

between rotor and stator mm

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 parasitic force type is applied

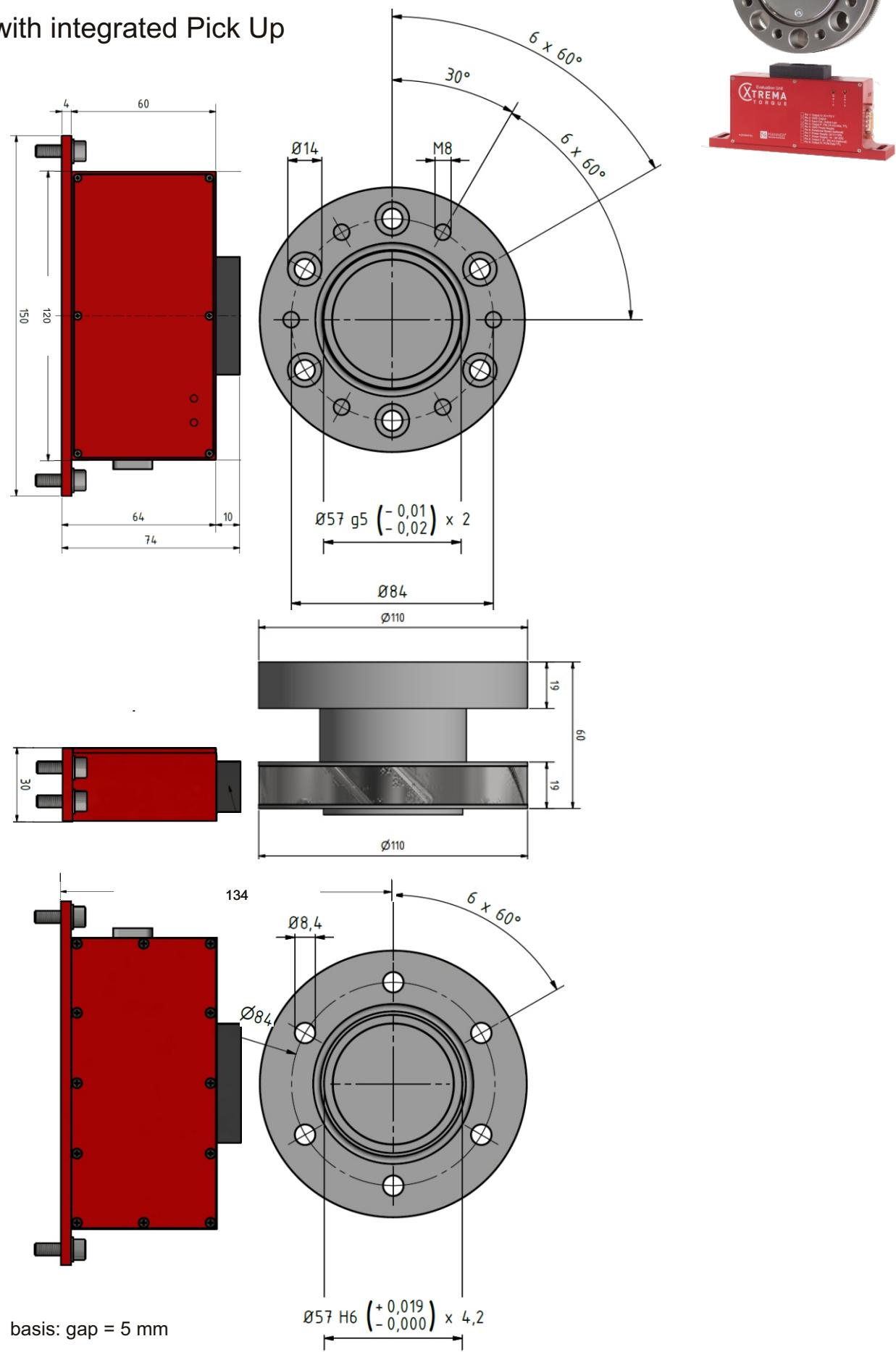
## Flatness and concentricity tolerances



Rated torque M <sub>nom</sub>	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
<b>Integrated Speed acquisition (Version induktive, IP67)</b>										
Induktive (traces A/B)	pulses/turn	n.a.		60		80		100		120
Distance Rotor - Pick Up	mm					0,8+-0,4				
<b>Integrated Speed acquisition (Version Laser, IP42)</b>										
Optical (trace A)	pulses/turn		180		200		260		300	360
Distance Rotor - Pick	mm				20+-19					

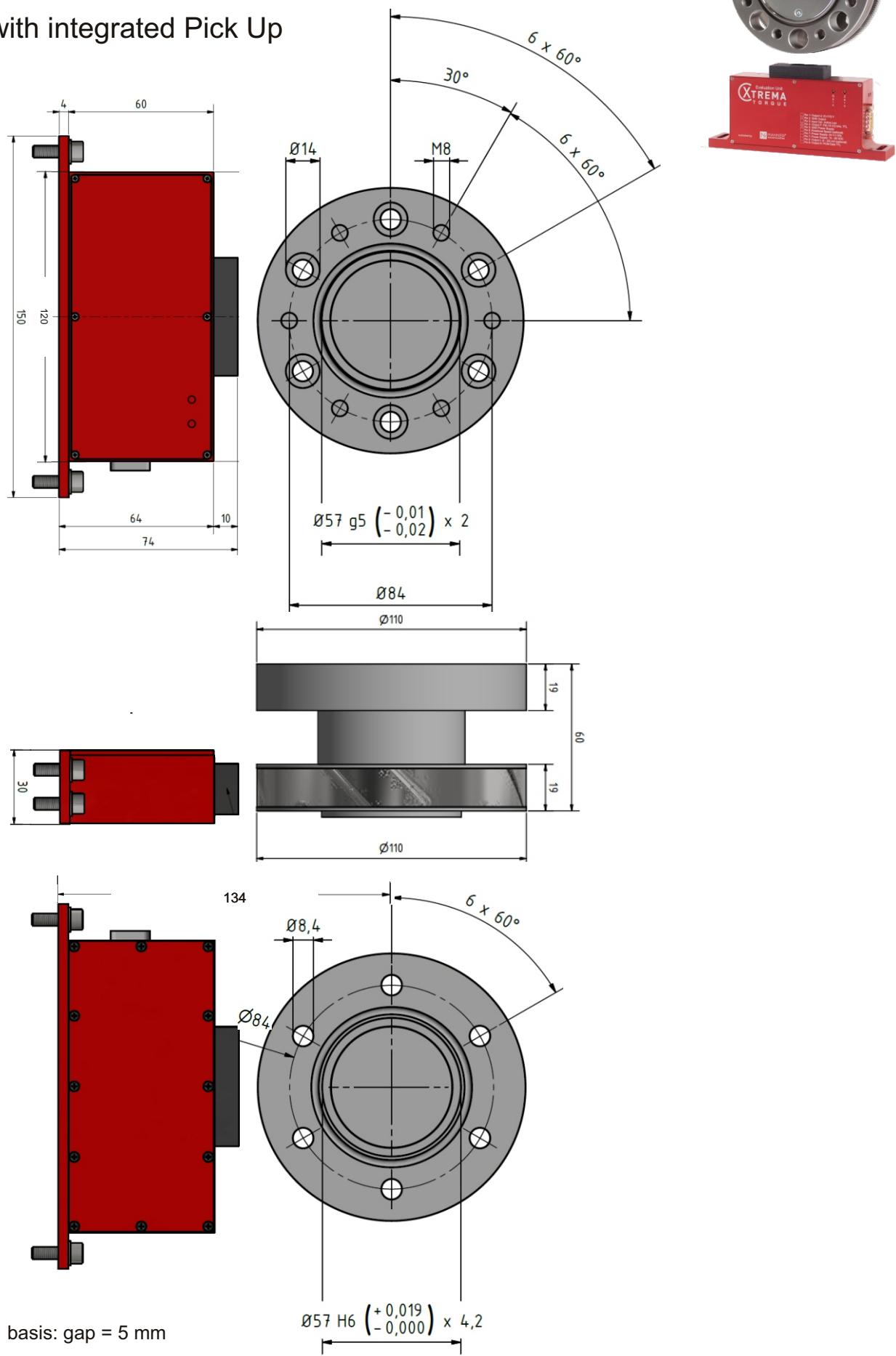
## Dimensions XtreMA HP 0,05 kN·m (in mm)

Receiver with integrated Pick Up



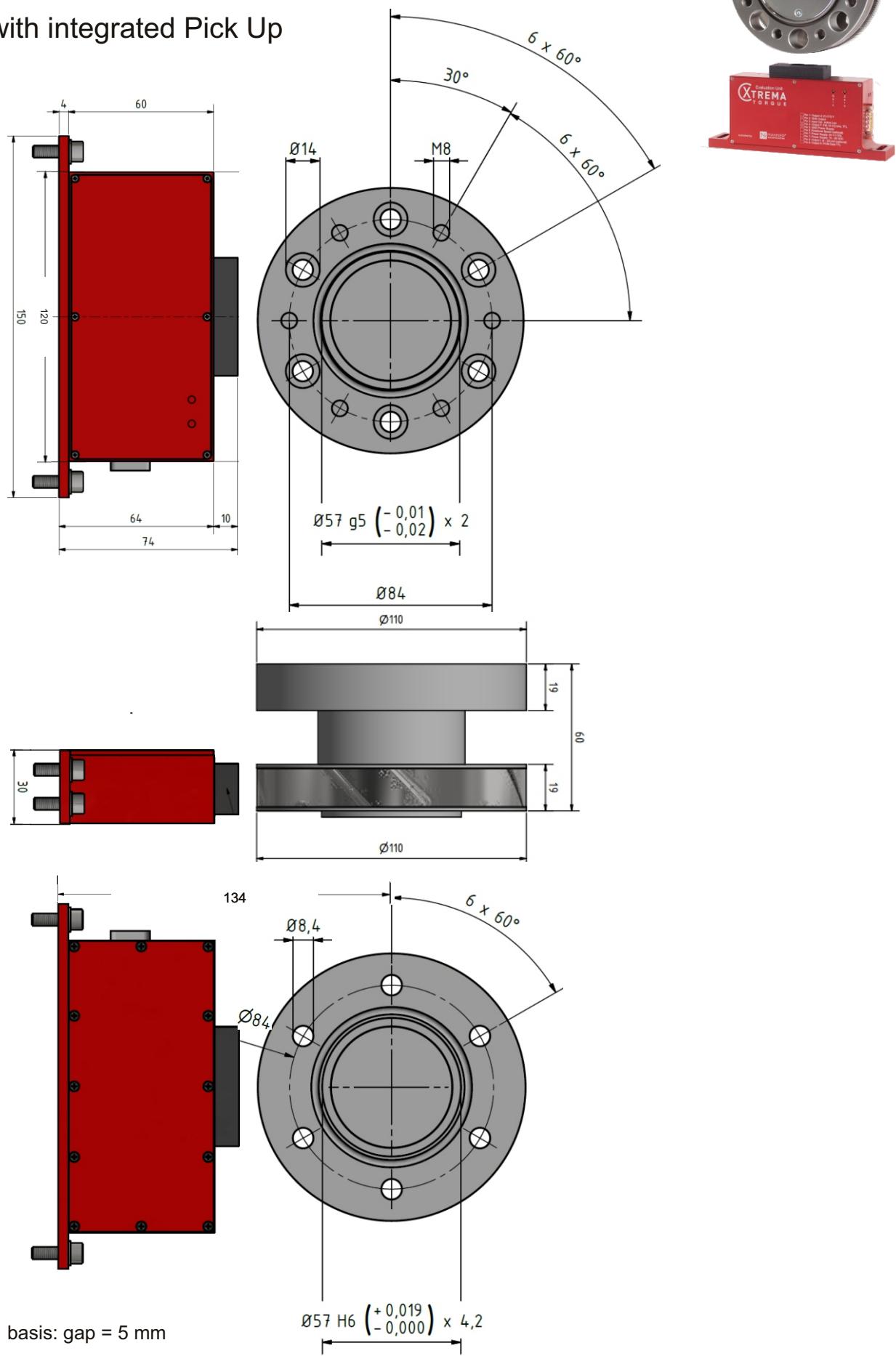
## Dimensions XtreMA HP 0,1 kN·m (in mm)

Receiver with integrated Pick Up



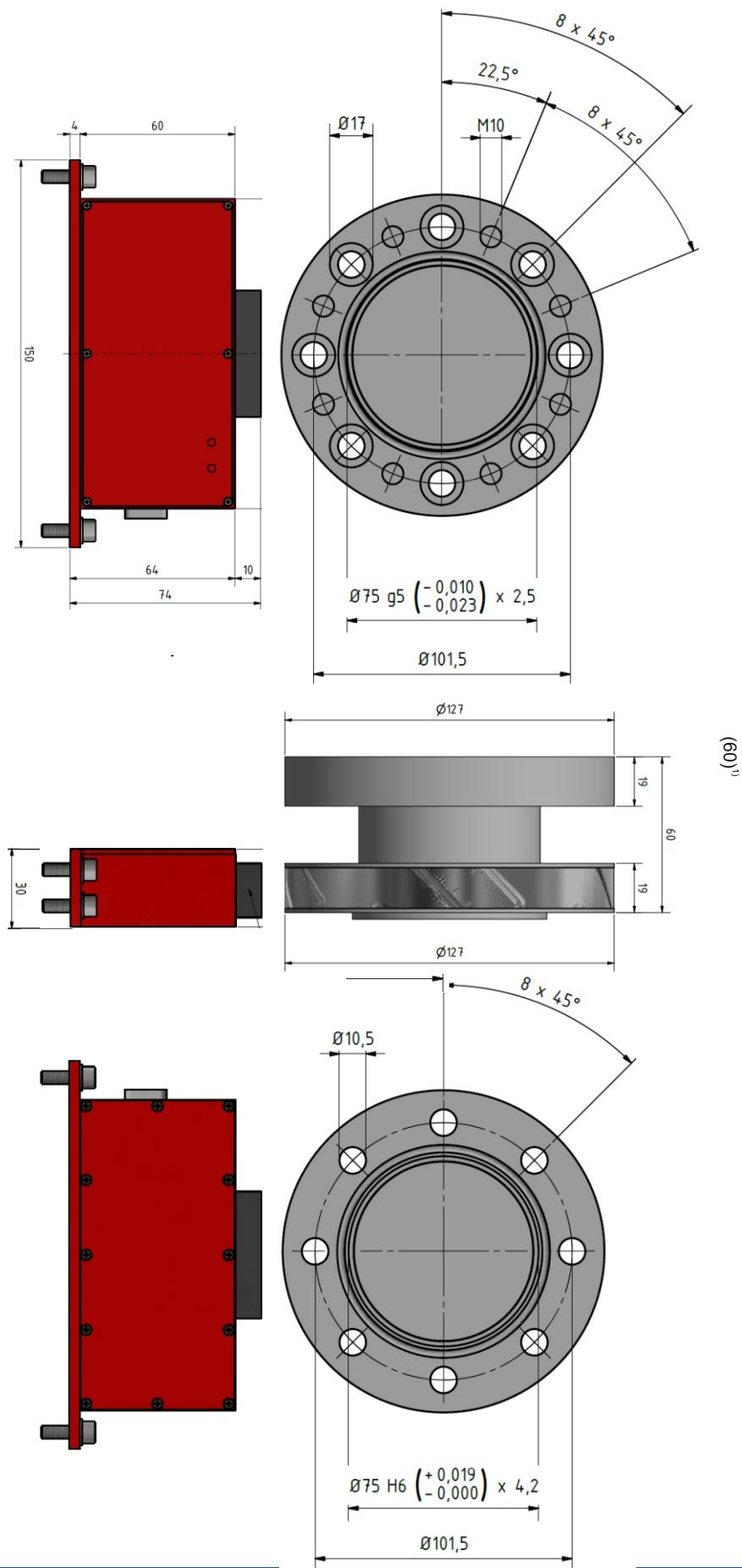
## Dimensions XtreMA HP 0,1 kN·m (in mm)

Receiver with integrated Pick Up



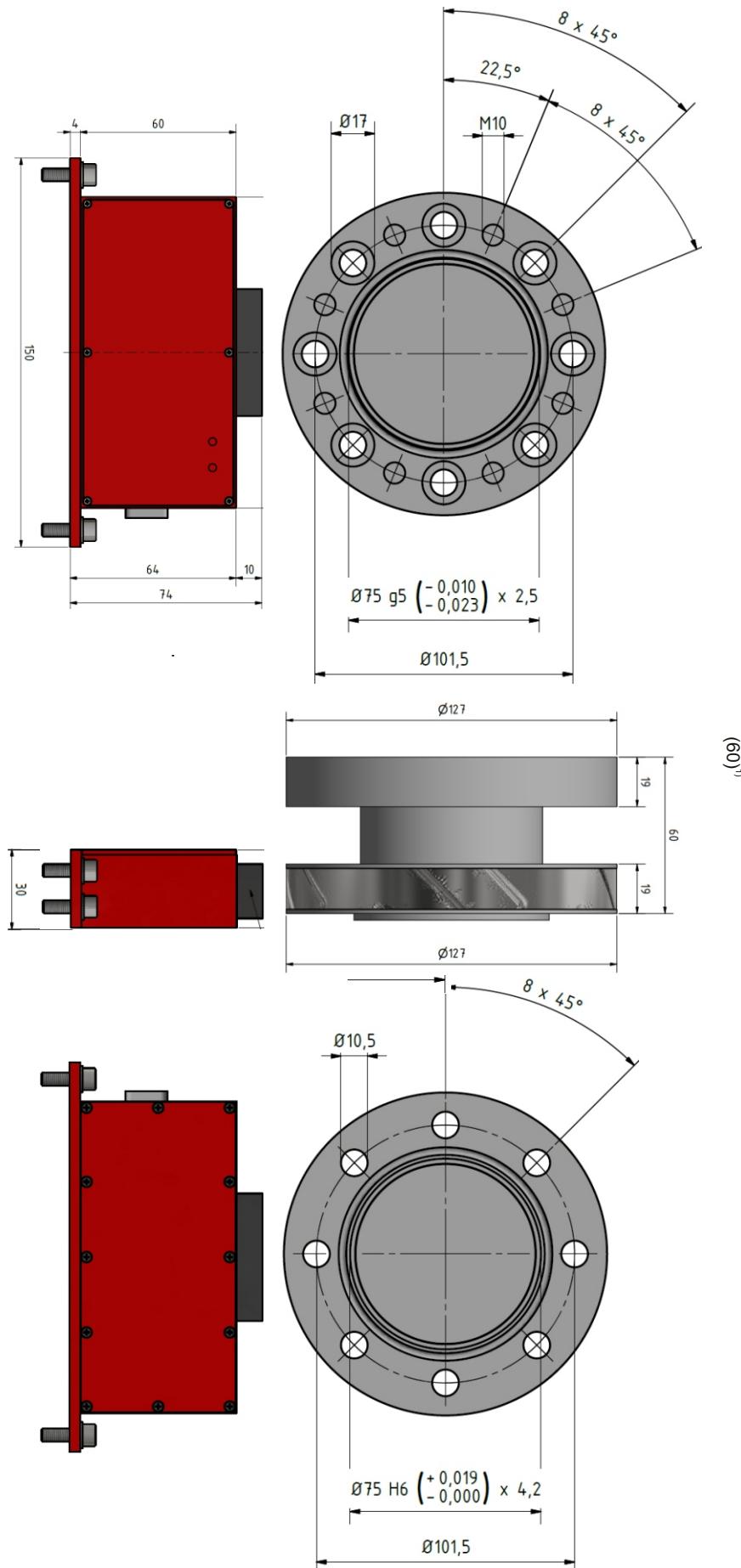
## Dimensions XtreMA HP 0,5 kN·m (mm)

Receiver with integrated Pick Up



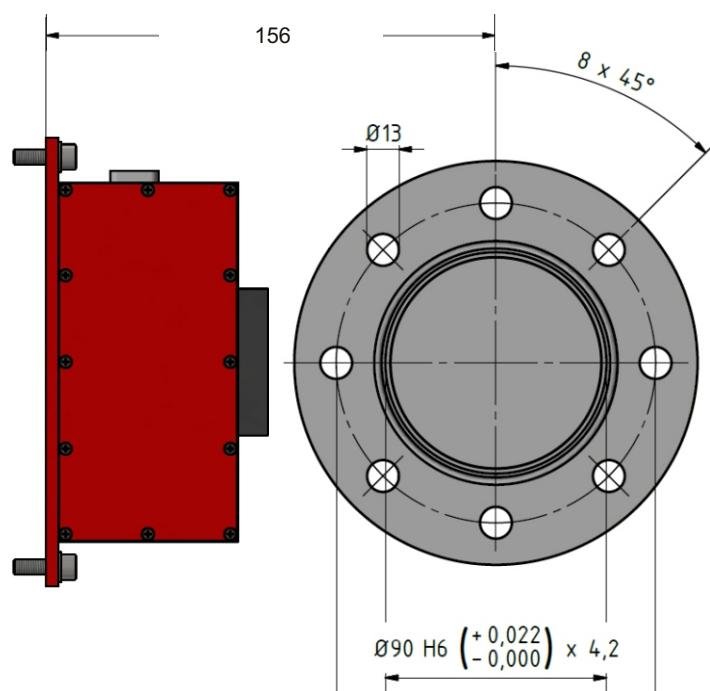
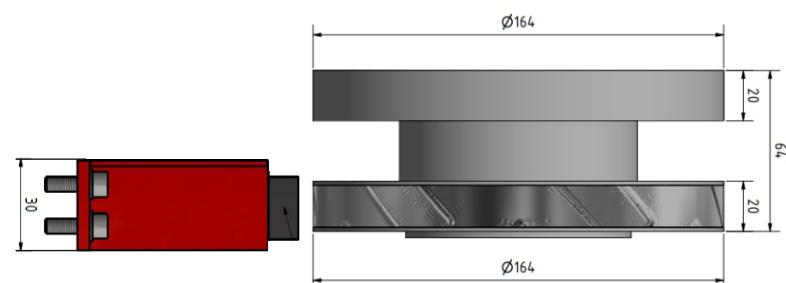
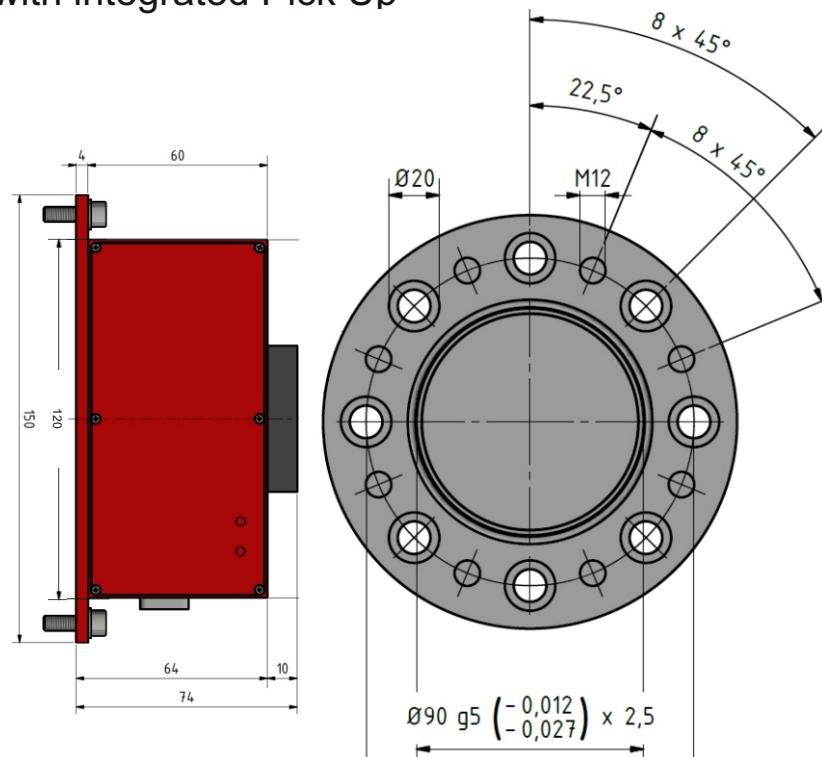
## Dimensions XtreMA HP 1 kN·m (mm)

Receiver with integrated Pick Up



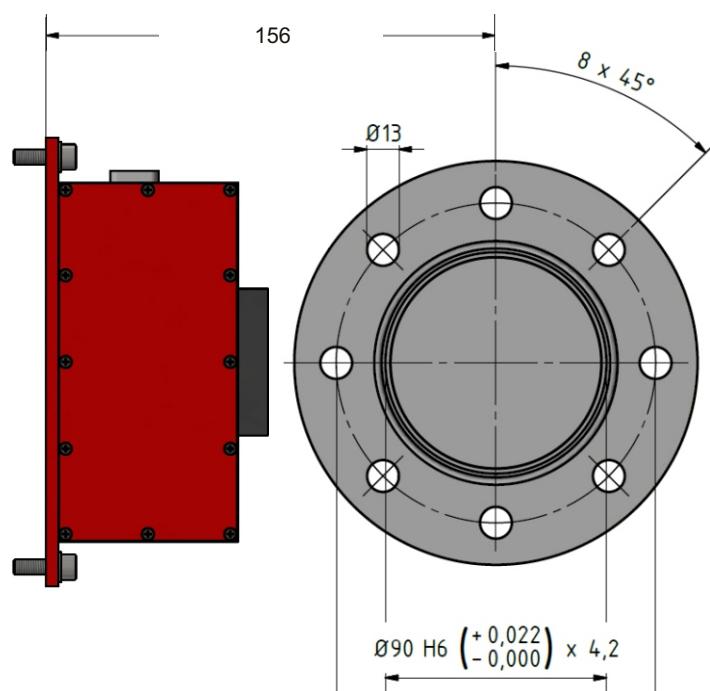
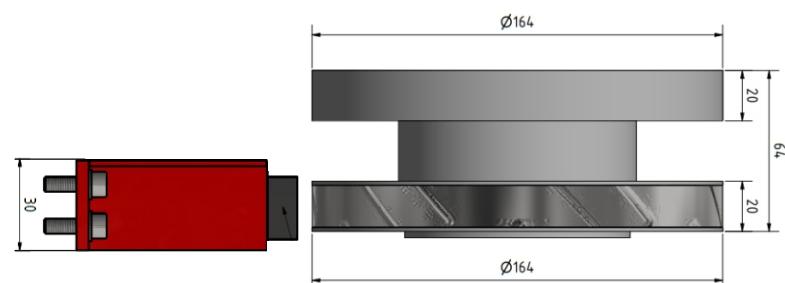
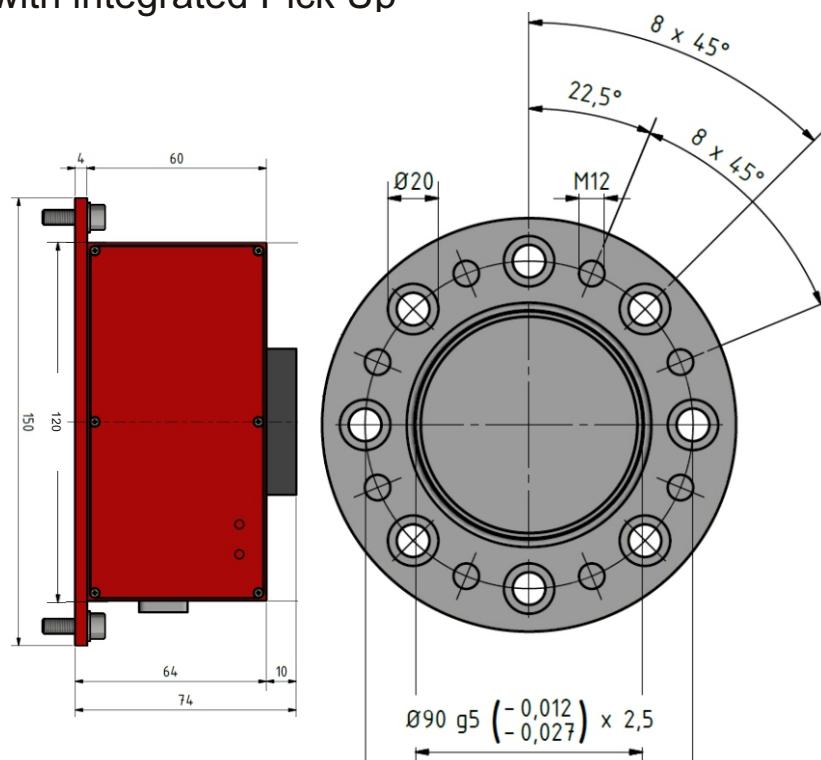
## Dimensions XtreMA HP 2 kN·m (mm)

Receiver with integrated Pick Up



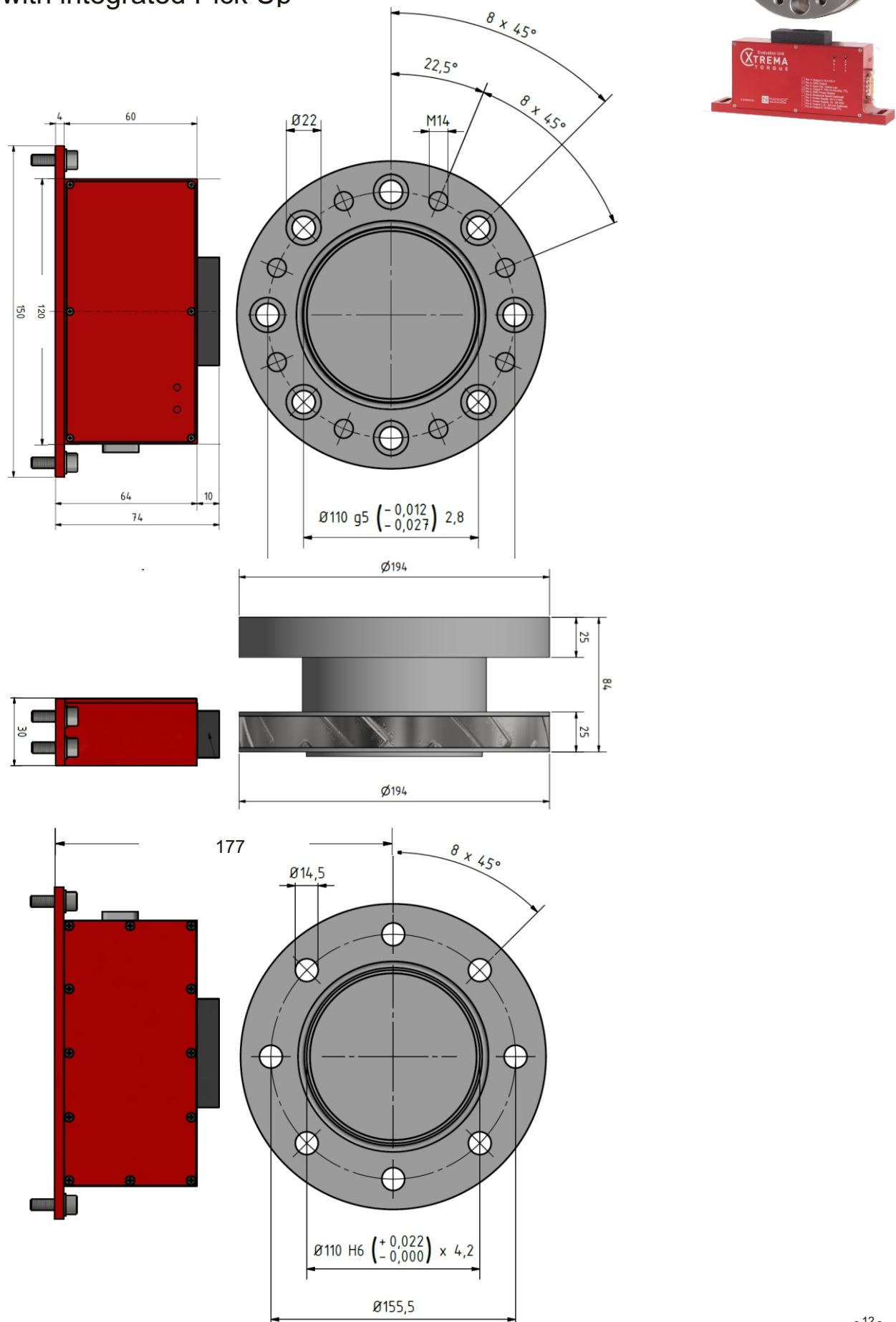
## Dimensions XtreMA HP 3 kN·m (mm)

Receiver with integrated Pick Up



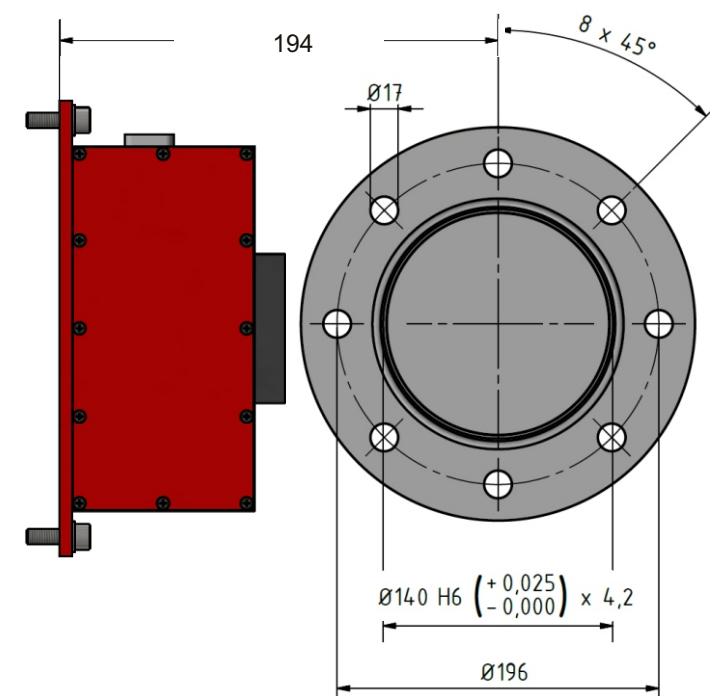
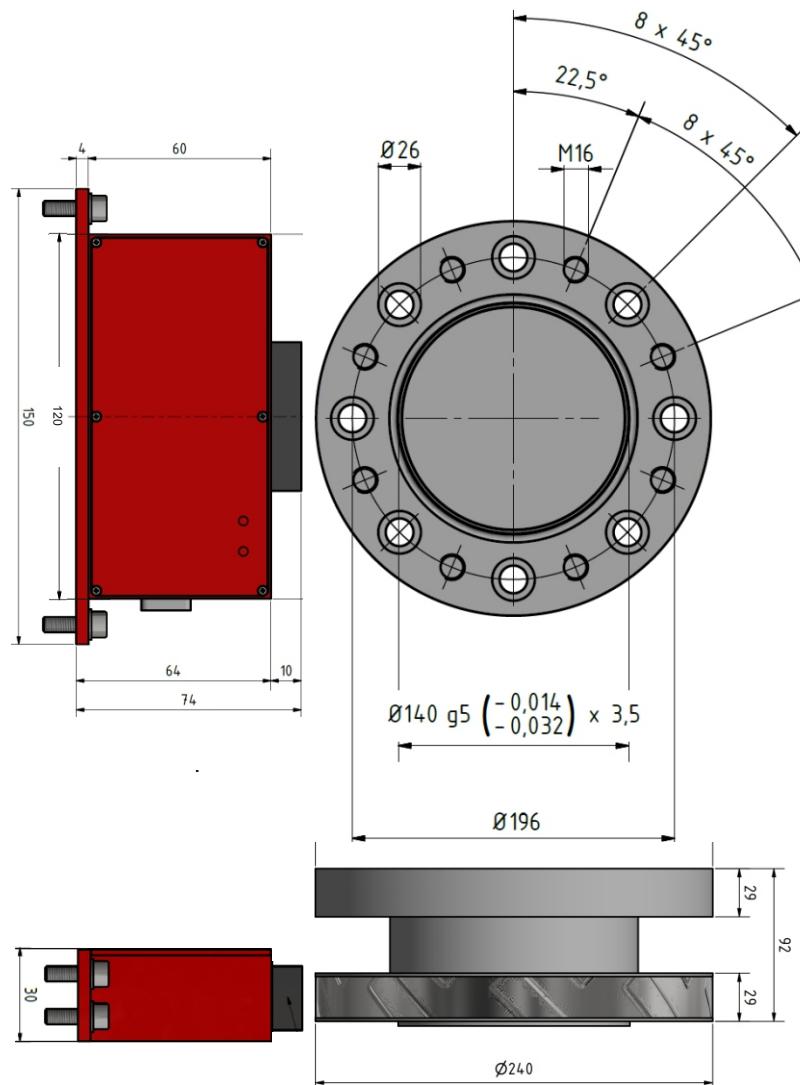
## Dimensions XtreMA HP 5 kN·m (mm)

Receiver with integrated Pick Up

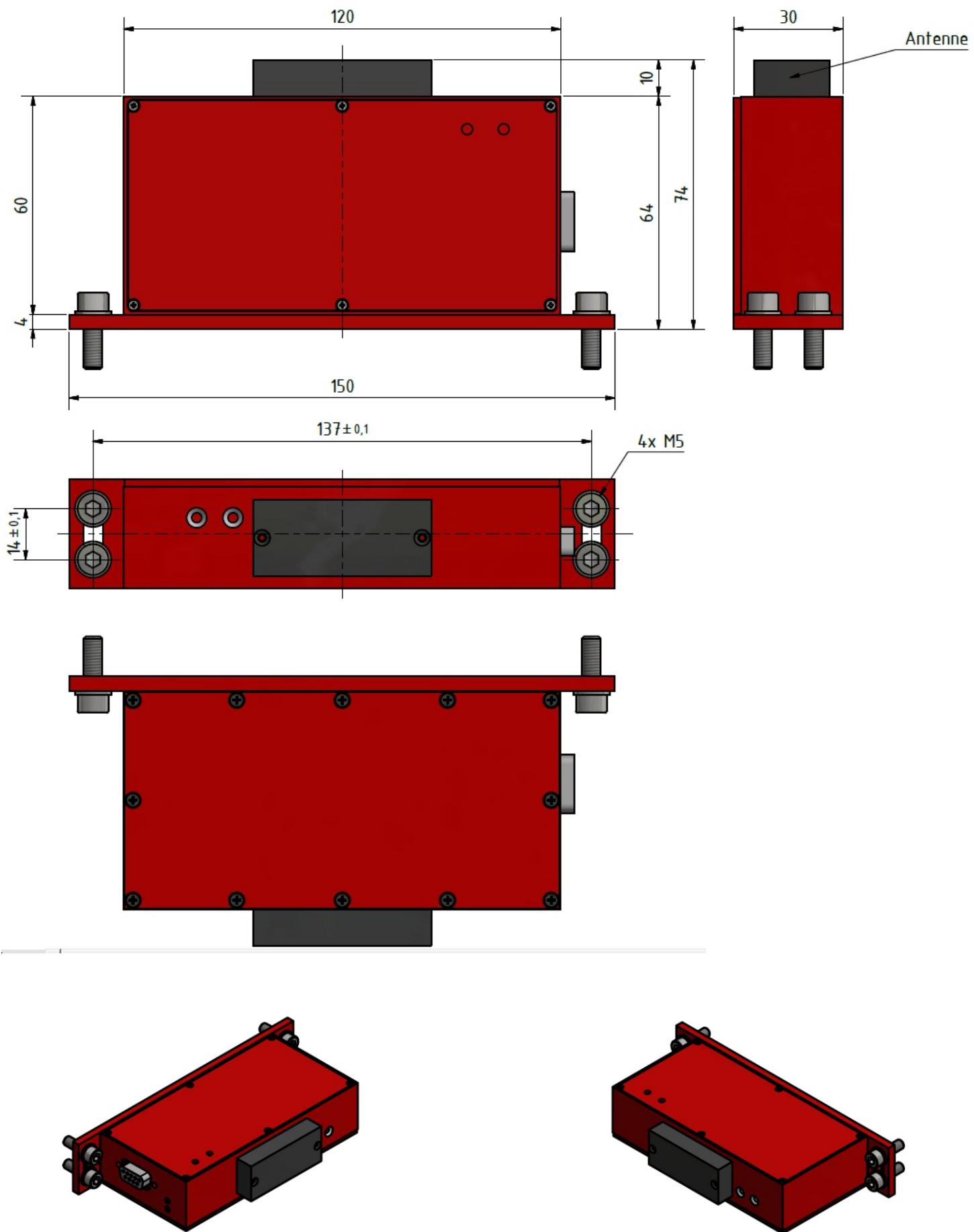


# Dimensions XtreMA HP 10 kN·m (mm)

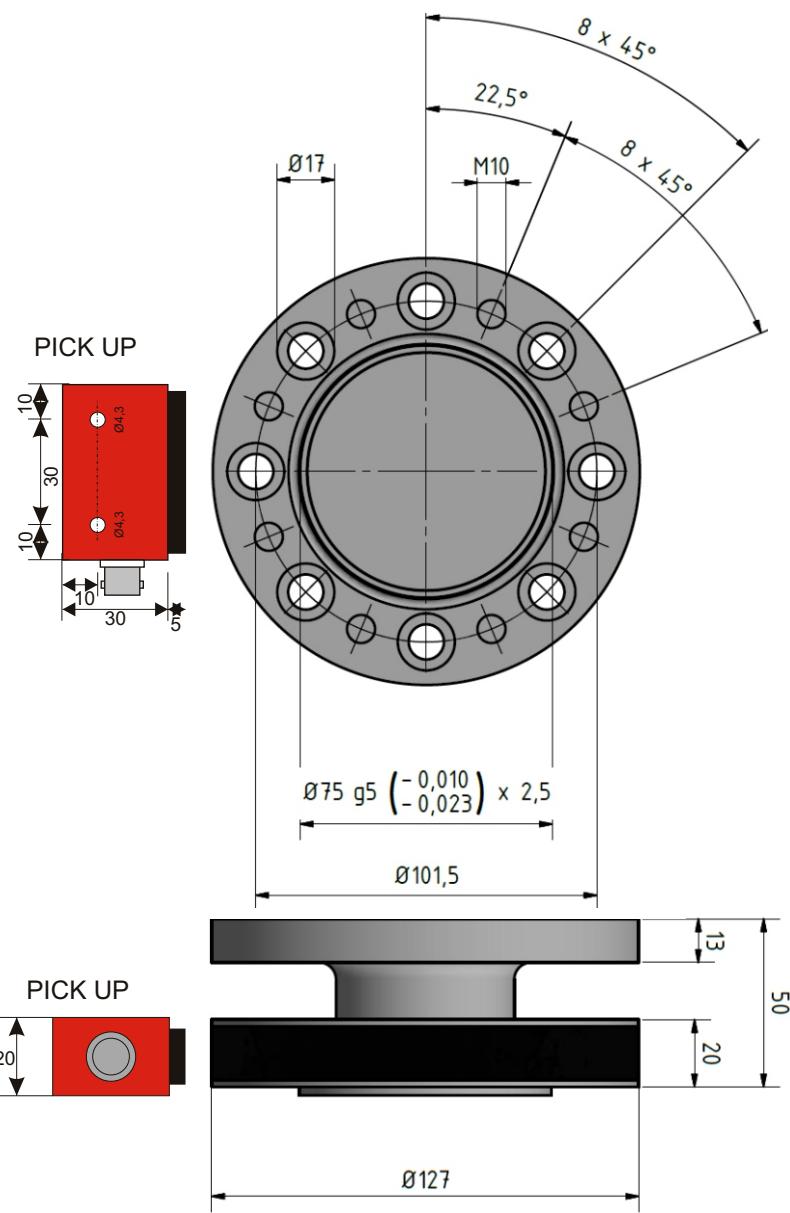
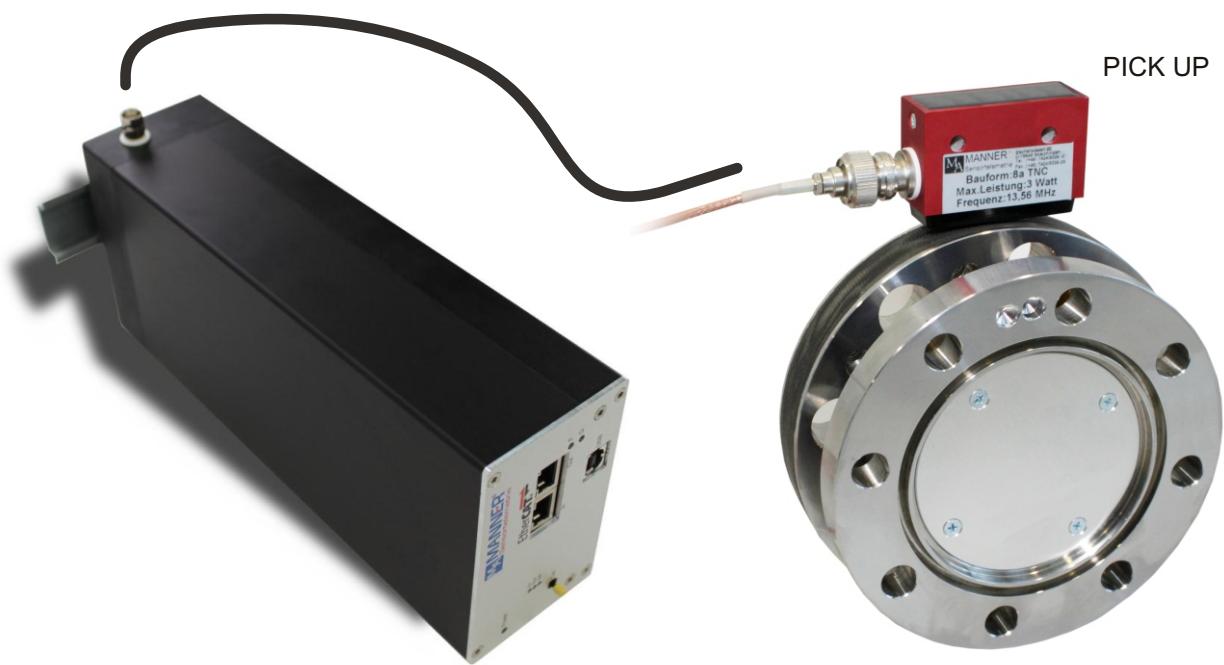
Receiver with integrated Pick Up



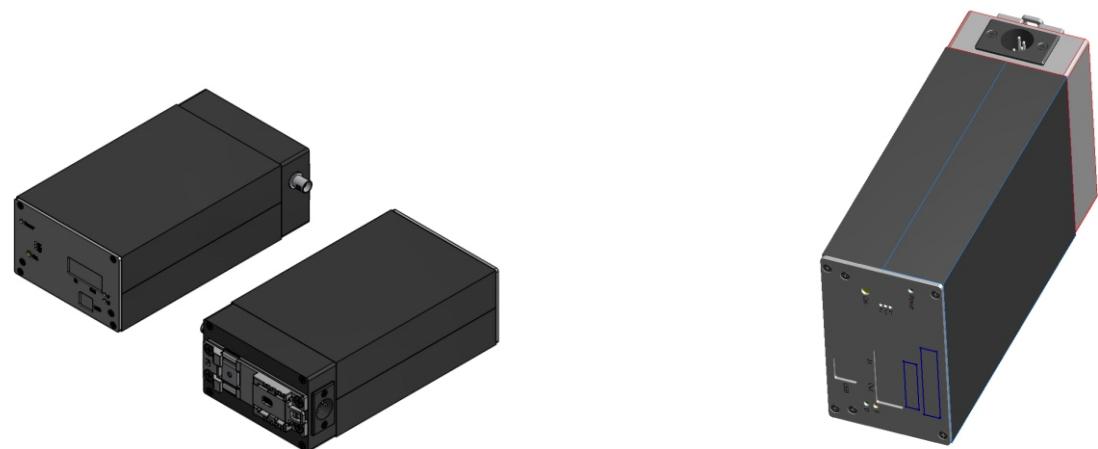
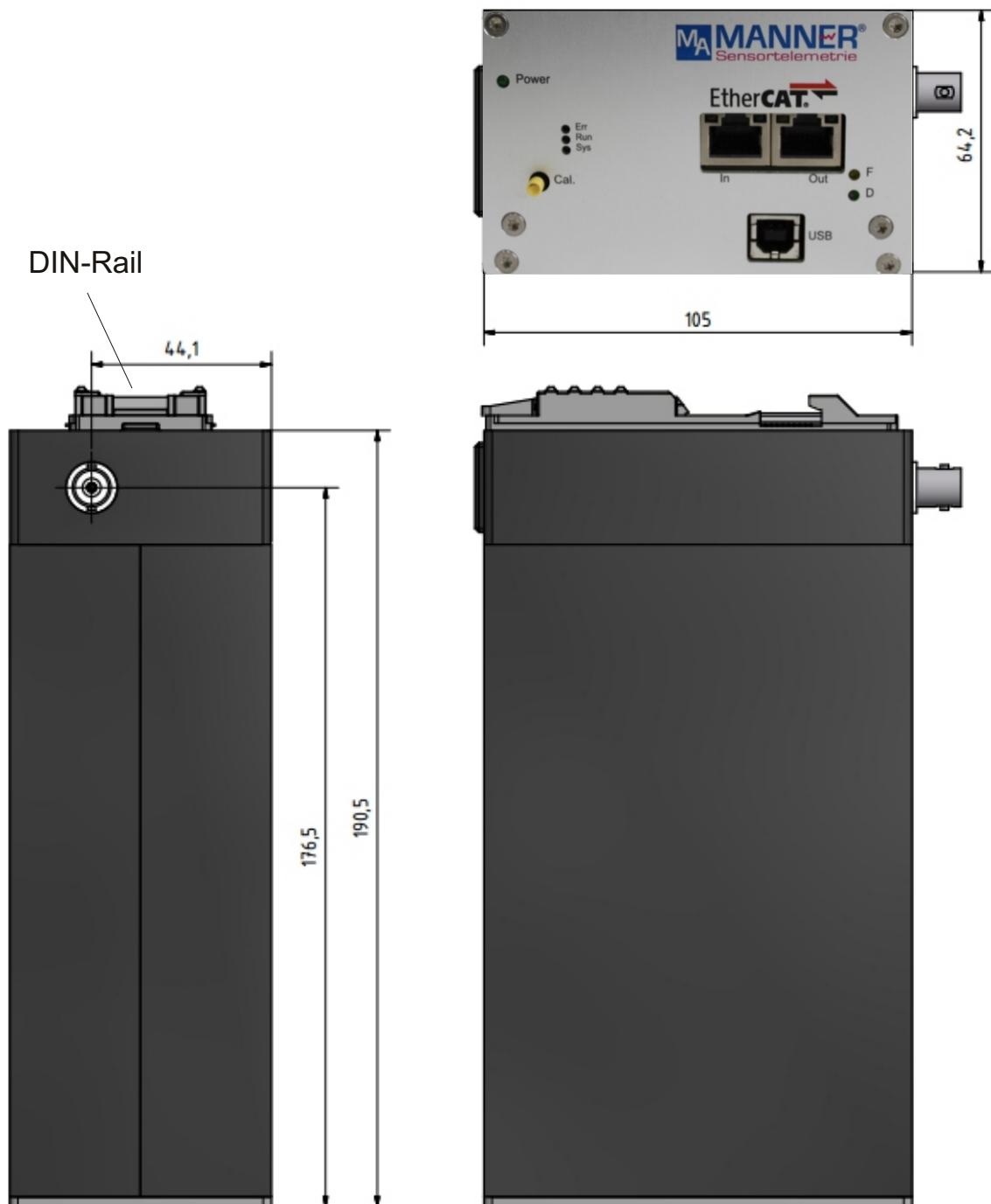
## Geometry Receiver Typ MAnt integrated Pick UP



## Variante offsetted Pick UP

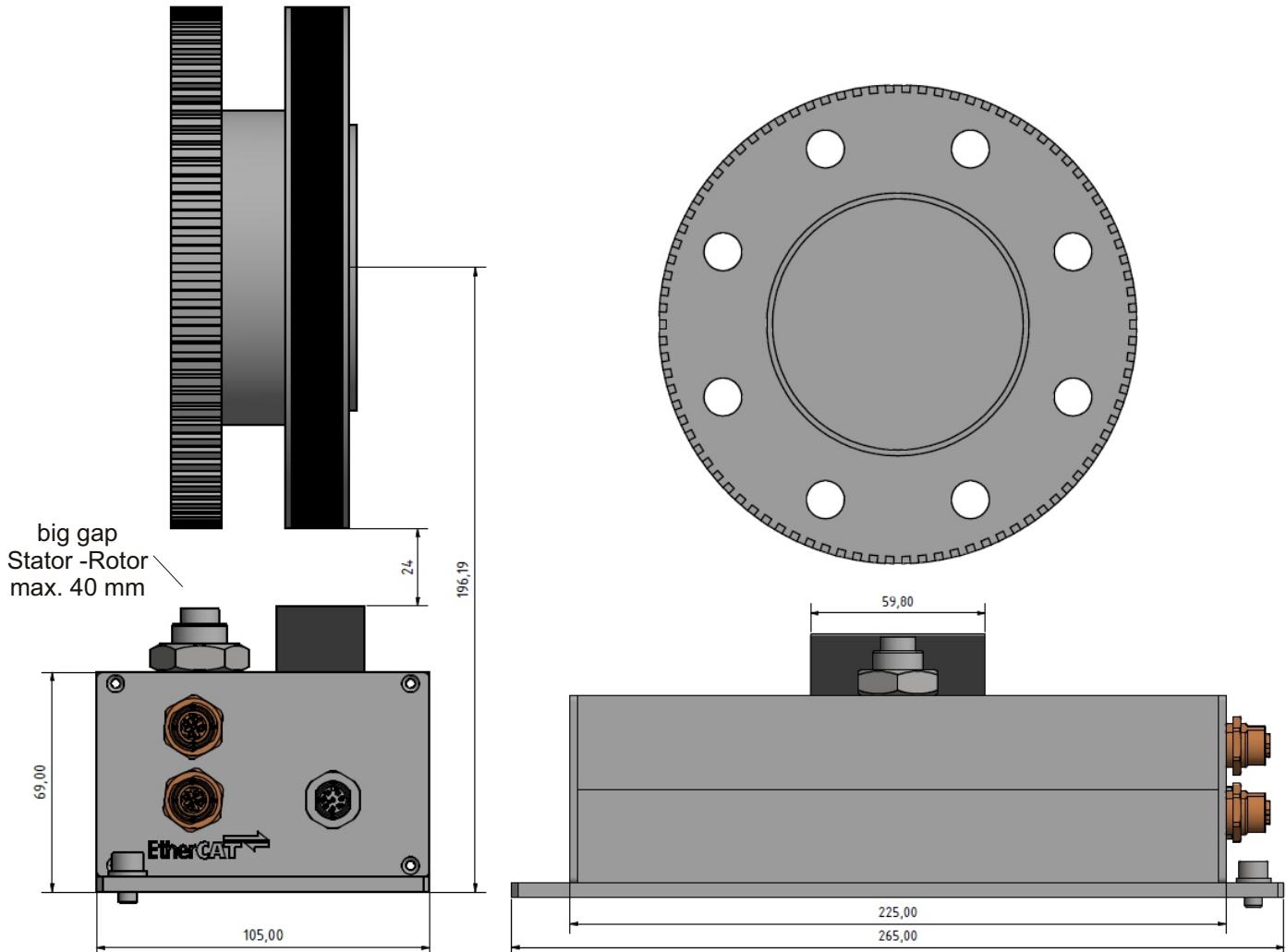
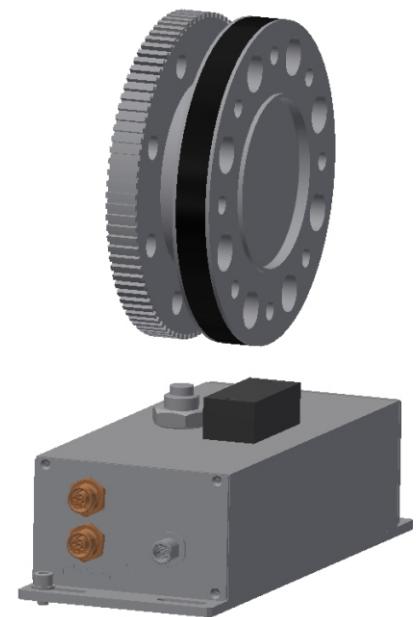


## Geometry Evaluation Unit Type F



## 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





## 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 Sensorlemetrie 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  
Akkreditierungsnr. 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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