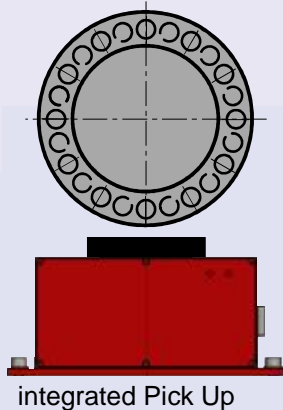
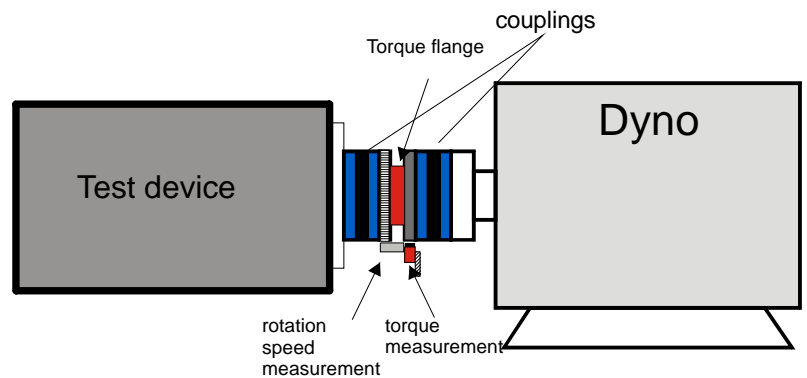


Torque measuring flange XtremeMAX



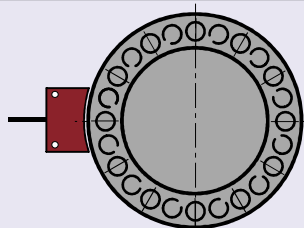
Characteristic features:

- ✓ Nominal (rated torques)
 - 15 kN m; 20 N km; 35 kN m; 50 kN m
 - 100 kN m; 200 kN m; 300 kN m; 500 kN m
- ✓ Nominal (rated) speeds up to 9 000 rpm (depending on measurement range)
- ✓ Accuracy class 0.1 (option 0.05)
- ✓ Large measuring frequency range up to 1 kHz (optional 10 kHz (-3dB))
- ✓ Low rotor weights and moment of inertia
- ✓ Digital transmission of measured values
- ✓ Short design
- ✓ Clearance rotor - stator > 10 mm
- ✓ Temperature range -40..+160°C (optional)
- ✓ Integrated Speed acquisition (high resolution)



- Frequency(10+/-5kHz)
- Voltage (U) +/10V
- Current (I) 4..20mA
- Remote Control
- Energy
- Remote Shunt on/off

Topology



Torque flange with offsetted Pick Up

- Energy
- Remote Shunt on/off
- Torque (digital)
- Temperature (digital)
- Health Monitoring
- Remote Control

max. Distance: 100 m



Evaluation Unit

- Ethernet (digital)
- EtherCat (digital)
- USB (digital)
- Frequency 10+/-5kHz)
- Voltage (U) +/10V
- Current (I) 4..20mA
- Remote Control
- Energy
- Remote Shunt on/off

Technical Data

Torque measuring system									
Type		XtreMAX							
Accuracy Class		0,1 (0,05 ¹⁾)							
Nominal (rated) torque M_{nom}	kN m	15	20	35	50	100	200	300	500
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)									
	%	0,1 (0,05 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	V	+10							
with positive nominal torque	V	-10							
with negative nominal torque									
Frequency Output 60 kHz ⁷⁾	kHz	15 (5V TTL 0/5V)							
with positive nominal torque	kHz	5 (5V TTL 0/5V)							
with negative nominal torque									
Digital output	dig. value	62258 (996126 ³⁾)							
with positive nominal torque	dig. value	3278 (52449 ³⁾)							
with negative nominal torque									
Load resistance									
Voltage output	k Ω	>2							
Frequency output 60 kHz ⁷⁾	k Ω	>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 ⁹⁾ , 5 ⁹⁾ , 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									
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 0.05
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 60 kHz +/- 10kHz

Technical Data (Continuation 1)

Nominal torque M_{nom}	kN m	15	20	35	50	100	200	300	500	
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}										
Nominal release voltage	V	< +/- 0,02								
Limit tripping voltage	V	5								
Shunt signal on (active low)	V	12								
Shunt signal	V	< 1 (GND)								
Accuracy class: 0,1 Accuracy class: 0,05 ¹⁾										
Non-linearity including hysteresis related to nominal torque M_{nom} based on 10 K temperature change (dig. output)										
60..100 % of M_{nom}	%	+/- 0,1				+/- 0,05				
20..60 % of M_{nom}	%	+/- 0,2				+/- 0,1				
0..20 % off M_{nom}	%	+/- 0,4				+/- 0,2				
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	12	18	18	38	77	79	145	148	
approx. Stator	kg	0,2								
Reference temperature										
23										
Operating temperature range										
-10..+70										
extended temperature range⁹⁾										
-40..160										
Storage temperature range										
-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	6000	4000	4000	3000	2000	2000	1700	1500	
Increased speed stability¹⁰⁾										
	rpm	9000	7000	7000	4000	3000	3000	2000	1700	
Limitations of liability¹¹⁾										
Limit torque related M_{nom}										
400										
Breaking torque relative to M_{nom}										
800										
Axial limit force¹¹⁾										
	kN	100	200	300	350	600	1000	1200	2000	
Lateral force limit¹¹⁾										
	kN	100	120	200	220	400	800	800	1400	
Bending limit moment¹¹⁾										
	kN·m	15	20	35	50	100	200	300	500	

- 1) Option accuracy class 0.05
8) Option protection class IP67
9) Option extended service temperature range
10) Option increased speed stability
11) static and dynamic

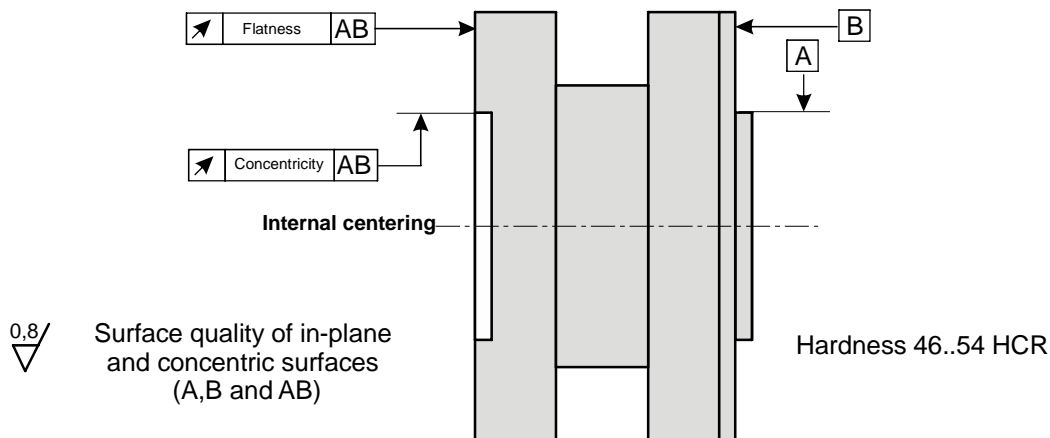
Technical Data (Continuation 2)

Nominal torque M_{nom}	kN m		15	20	35	50	100	200	300	500
Effect of measured values by parasitic forces¹⁴⁾										
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		1.050	2.000	6.000	895	10.000	20.000	25.000	25.000
Torsion angle at M_{nom}	Rad		0,005	0,005	0,001	0,01	0,01	0,01	0,14	0,14
Axial stiffness c_a	kN/mm		1.800	3.600	3.600	6.000	5.000	9.000	600	1.040
Radial stiffness c_r	kN/mm		8.000	16.000	12.000	80.000	20.000	30.000	40.000	40.000
Stiffness with bending moment about a radial axis c_b	kN m/rad		20	40	400	80	160	320	400	400
Max. deflection at axial limit force	mm		<0,08	<0,08	<0,045	<0,04	<0,05	<0,06	<0,15	<0,15
Additional max. concentricity error at lateral limit force	mm									<0,02
Additional planeparallel deviation at bending limit moment d_b	mm		<0,2	<0,2	<0,2	<0,2	<0,2	<0,2	<0,2	<0,2
Balance quality level to DIN ISO 1940			G9.4							
Max. limits for relative shaft vibration (peak to 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 L_v Axis of rotation, without consideration of the flange screws	kg m ²		0,133	0,285	0,285	1,14	3,52	3,52	14,71	14,71
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 parasitic force type is applied

Flatness and concentricity tolerances

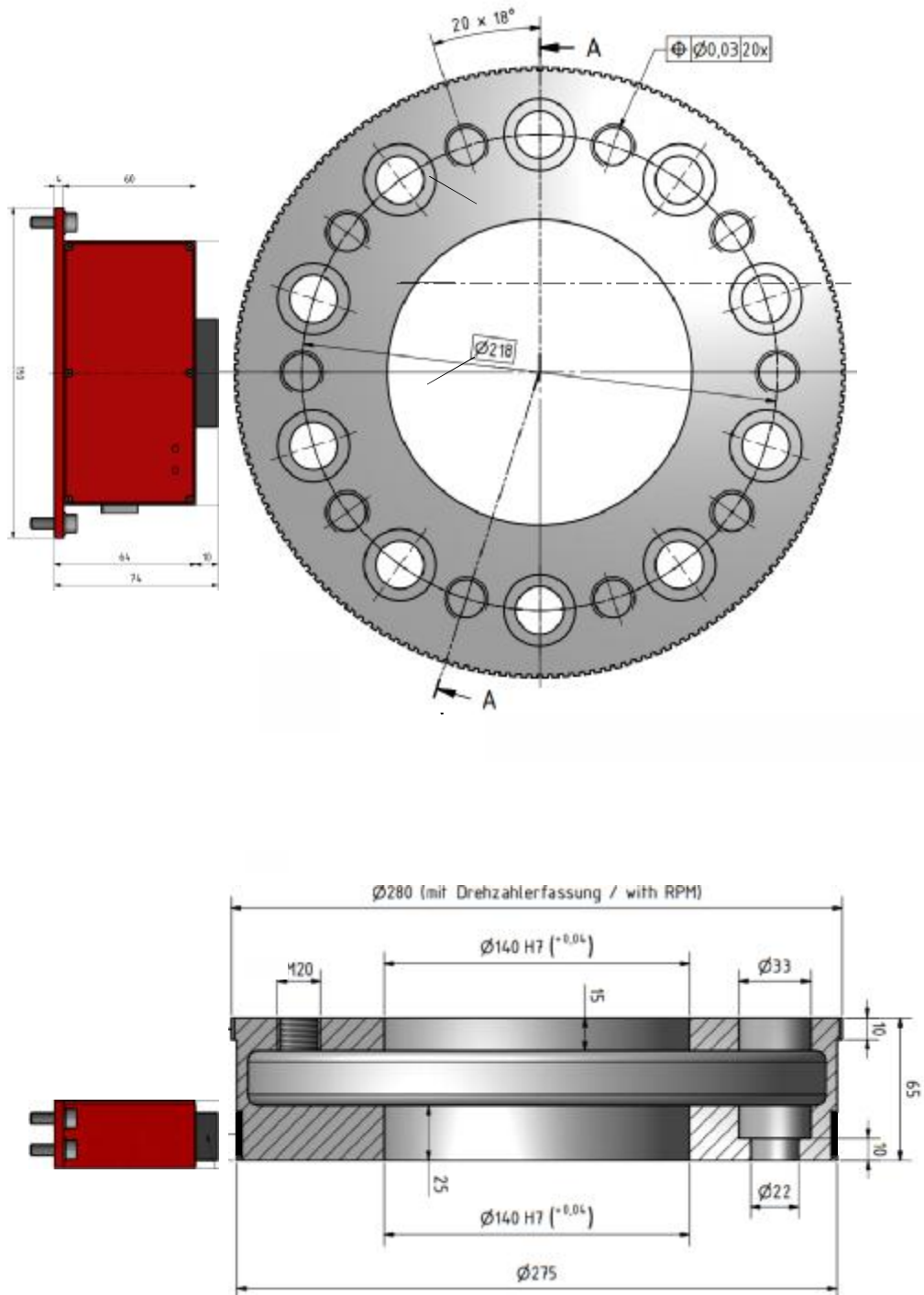


Rated torque M_{nom}	kN m		15	20	35	50	100	200	300	500
Flatness tolerances	mm		0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3
Concentricity tolerances	mm		0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3
Integrated Speed acquisition (Version induktive, IP67)										
Induktive (traces A/B)	pulses/turn		180	180	360	360	360	360	480	480
Distance Rotor - Pick Up	mm		0,8+/-0,4							
Integrated Speed acquisition (Version Laser, IP42)										
Optical (trace A)	pulses/turn		420	420	500	660	660	660	1100	1100
Distance Rotor - Pick	mm		20+/-19							

3) Option accuracy class 0.05 %

Dimensions XtremeMAX 15kN-m

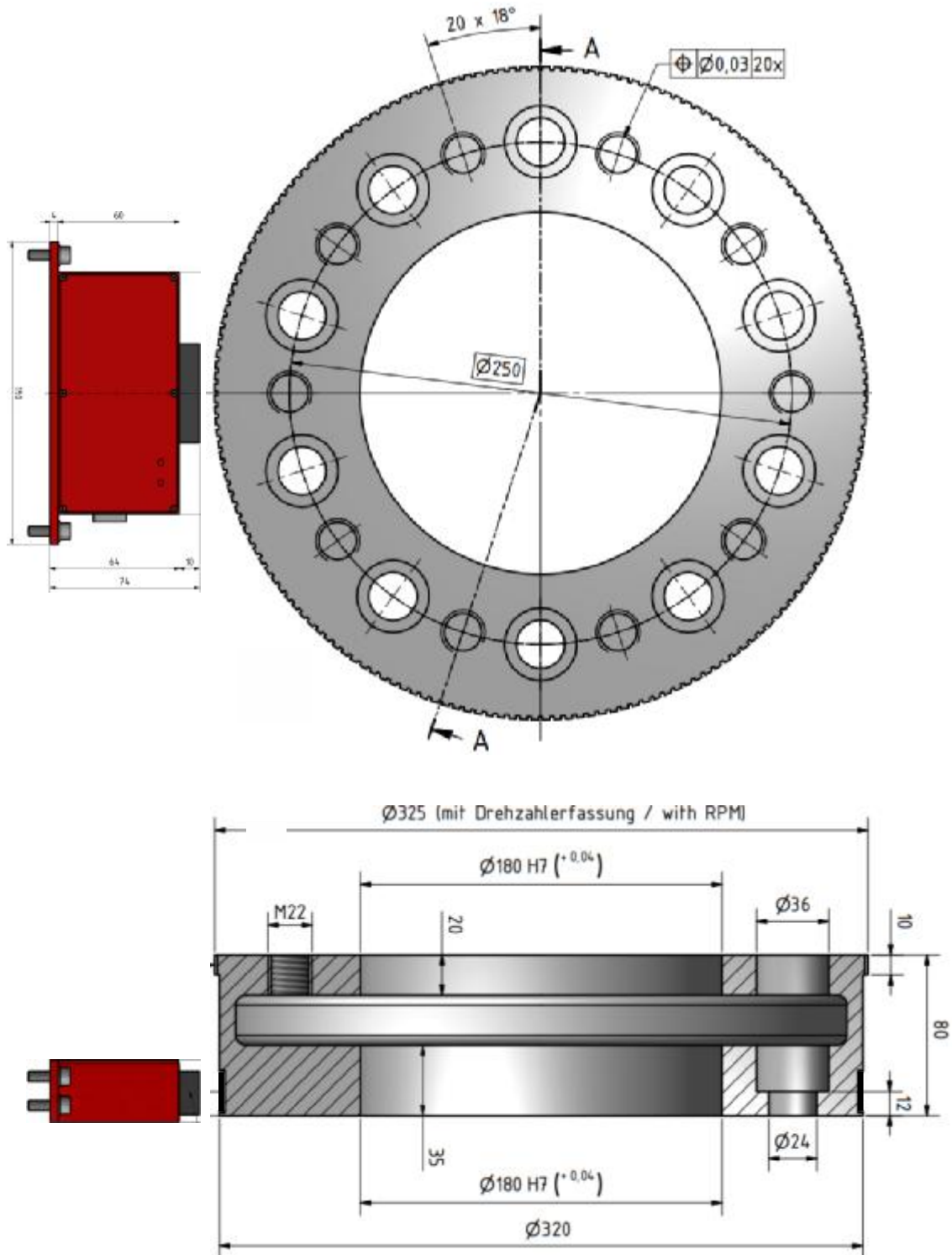
Receiver with integrated Pick Up



basis: gap = 5 mm

Dimensions XtremeMAX 20kN-m, XtremeMAX 35kNm

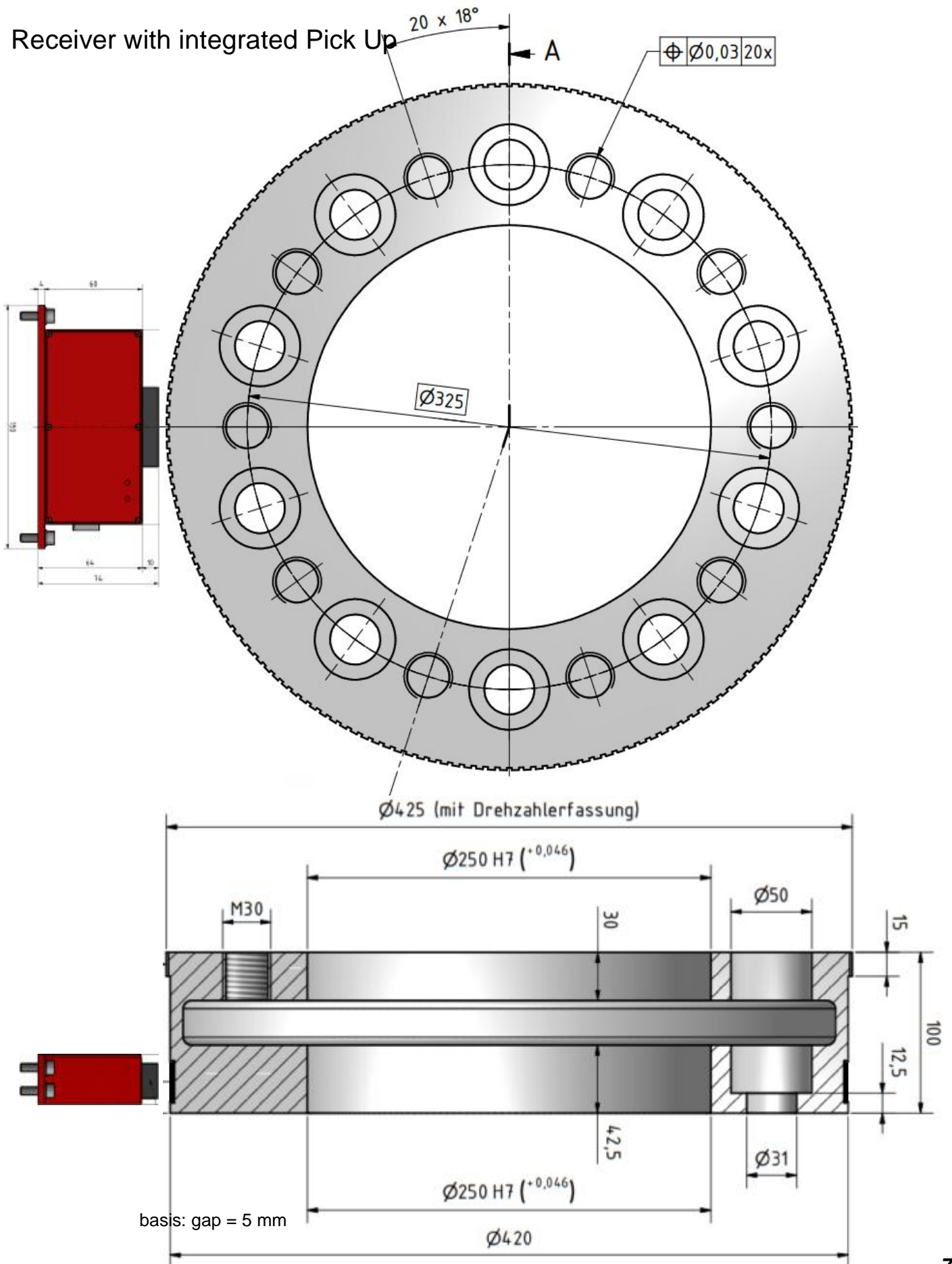
Receiver with integrated Pick Up



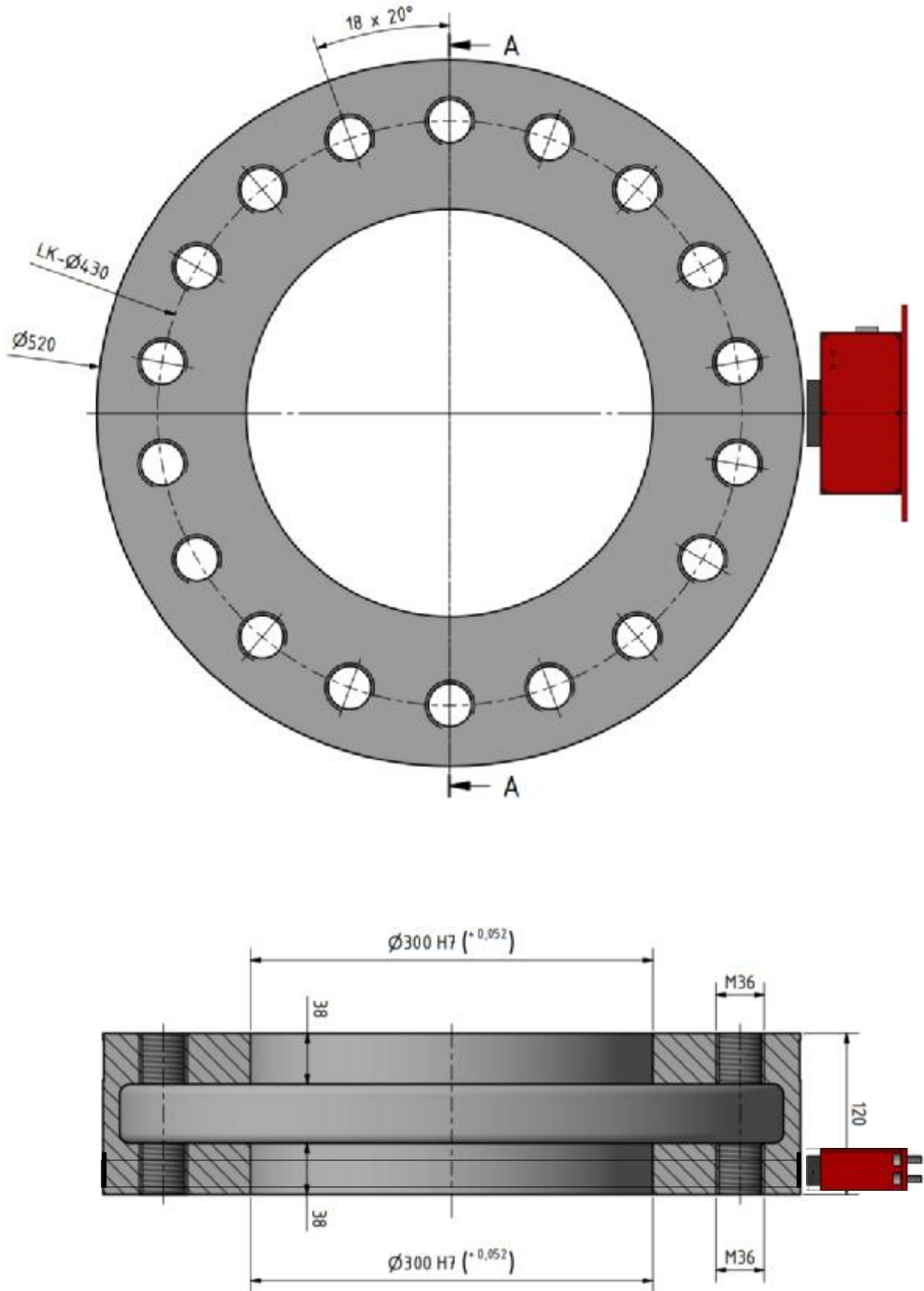
basis: gap = 5 mm

Dimensions XtremeMAX 50kN-m

Receiver with integrated Pick Up

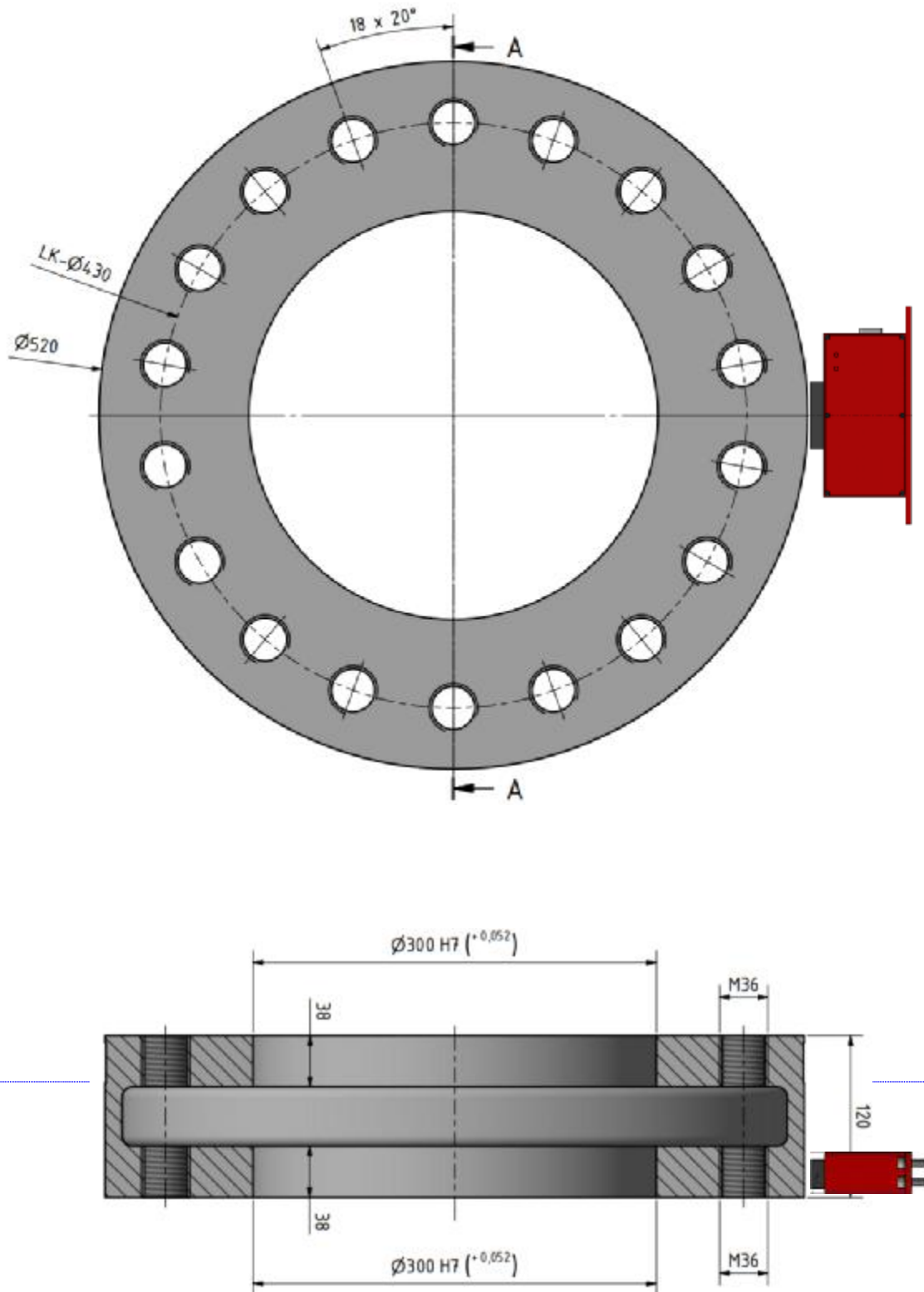


Dimensions XtremeMAX 100kN·m

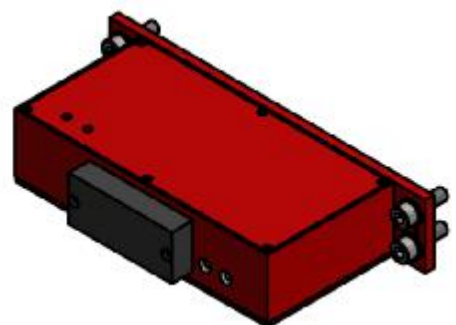
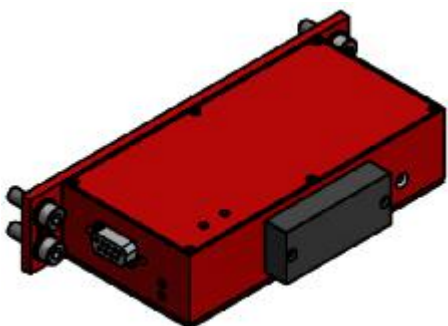
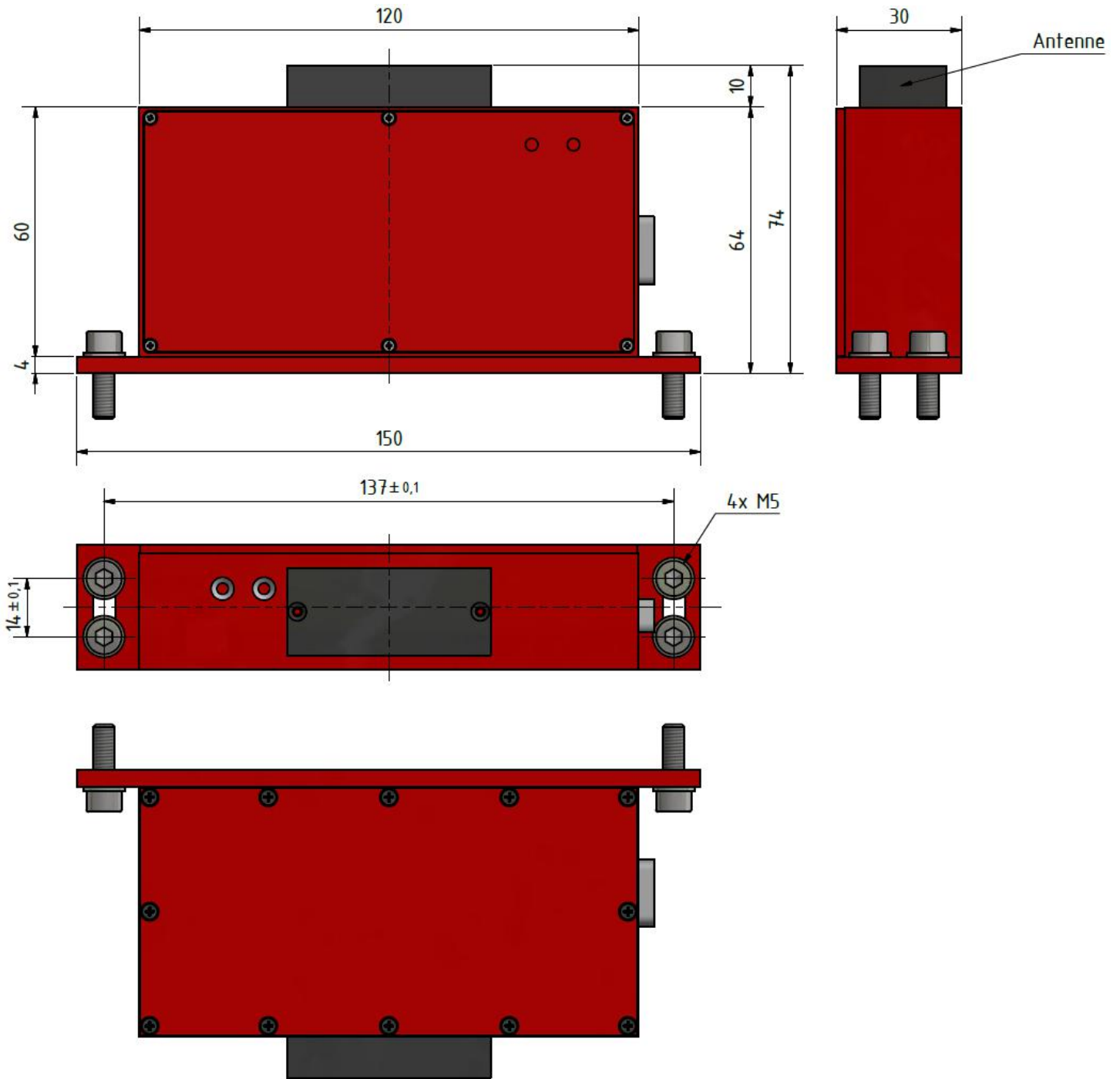


basis: gap = 5 mm

Dimensions XtremeMAX 200kN-m



Geometry Receiver Typ MAnt integrated Pick UP





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 Hinweis auf der Rückseite.

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Manner Sensortelemetrie GmbH

Eschenwasen 20
78549 Spaichingen Germany
Phone +49 74249329 0
Fax: +49 7424 932929
Mail: info@sensortelemetrie.de
www.sensortelemetrie.de