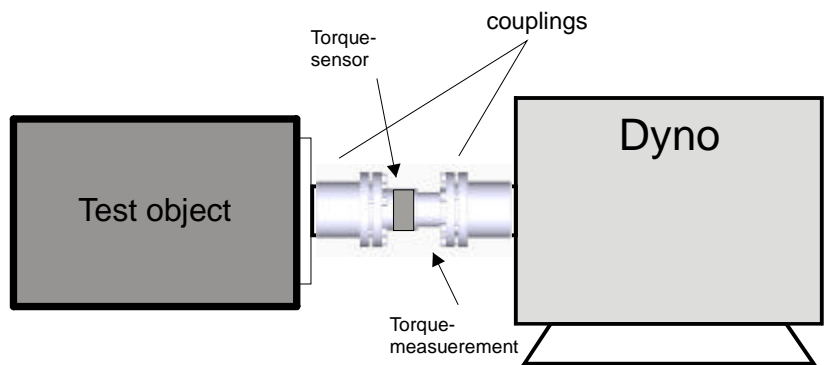


Torque measuring shaft Xtrema MW

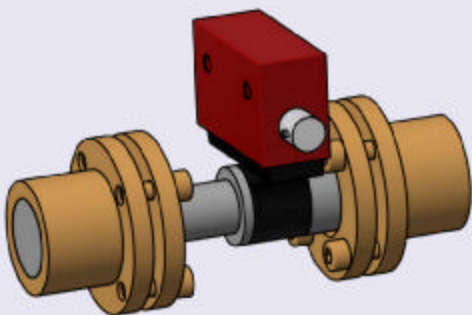


Characteristic features:

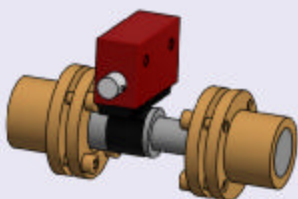
- ✓ Nominal torque
1 N m; 2 N m; 5 N m; 10 N m
50 N m; 100 N m; 200 N m; 500 N m
- ✓ Nominal (rated) speed from 12000 bis 24 000 rpm
 (depending on the measuring range and variant)
 Optional speed up to 100 000 rpm
- ✓ Accuracy class 0.1 (option 0.05)
- ✓ Large measuring frequency range up to 1 kHz
 (option 5kHz, 10 kHz (-3dB))
- ✓ Low rotor weights and low moments of inertia
- ✓ Digital transmission of measured values
- ✓ without bearings
- ✓ Gap between rotor and stator > 6 mm
- ✓ Temperature range -40..+160°C (option)
- ✓ Integriertated speed mesurement (option)
 (high resolution)



Topology



- Frequency (60+/-30kHz)
- Voltage (U) +/10V
- Current (I) 4..20mA
- Remote Control
- Energy
- Remote Shunt on/off



Torque shaft with
Pick Up 8a

- 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

Technical Data

Torque measuring system										
Type	XtreMA MW HS									
Accuracy Class	0,1 (0,05 ¹⁾)									
Nominal (rated) torque M_{nom}	kN m	0,001	0,002	0,005	0,01	0,02	0,05	0,1	0,2	0,5
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										
with positive nominal torque	V	+10								
with negative nominal torque	V	-10								
Frequency Output 60 kHz ⁷⁾										
with positive nominal torque	kHz	90 (5V TTL 0/5V)								
with negative nominal torque	kHz	30 (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⁾)								
	mV	<10								
Residual ripple voltage output										
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 bandwidth 2 kHz

5) Option measuring bandwidth 5 kHz

6) Option measuring bandwidth 10 kHz

Technical Data (Continuation 1)

	kN m										
Linearity deviation including hysteresis, related to the nominal sensitivity		0,001	0,002	0,005	0,01	0,02	0,05	0,1	0,2	0,5	
Voltage output 10 V	%	< +/- 0,1 (0,05 ¹⁾)									
Frequency output 10 kHz ⁷⁾	%	< +/- 0,1 (0,05 ¹⁾)									
Digital output	%	< +/- 0,1 (0,05 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: 0,1					Accuracy class: 0,05 ¹⁾				
60..100 % of M _{nom}	%	+/- 0,08					+/- 0,04 ¹⁾				
20..60 % of M _{nom}	%	+/- 0,04					+/- 0,02 ¹⁾				
0..20 % off M _{nom}	%	+/- 0,02					+/- 0,01 ¹⁾				
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	0,2	0,2	0,2	0,4	0,4	0,5	0,5	0,7	1,3	
approx. Stator	kg			0,25			0,25		0,25		
Reference temperature	°C	23									
Operating temperature range	°C	-10..+85									
extended temperature range⁹⁾	°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	50000			35000			30000	25000		
Increased speed stability¹⁰⁾	rpm	100000			100000			100000			
Limitations of liability¹¹⁾											
Limit torque related M_{nom}	%	400									
Breaking torque relative to M_{nom}	%	800									
Axial limit force¹¹⁾	kN	0,1	0,2	0,5	1	2	5	10	20	50	
Lateral force limit¹¹⁾	kN	0,02	0,04	0,1	0,2	0,4	1,0	2,0	4,0	10,0	
Bending limit moment¹¹⁾	% M _{nom}	5	5	5	5	5	5	5	5	5	

1) Option accuracy class 0.05

8) Option protection class IP67

9) Option extended service temperature range

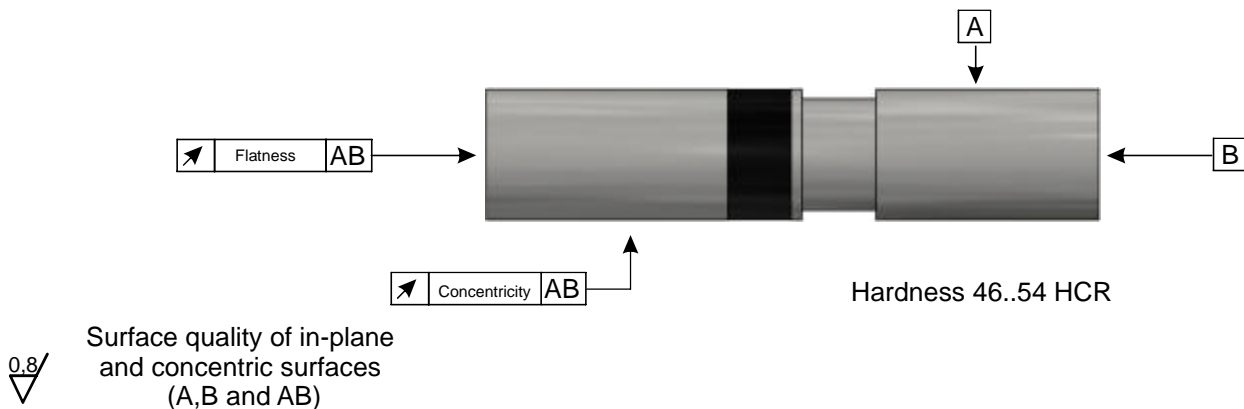
10) Option increased speed stability

11) static and dynamic

Technical Data (Continuation 2)

Nominal torque M_{nom}	kN m	0,001	0,002	0,005	0,01	0,02	0,05	0,1	0,2	0,5
Effect of measured values by parasitic forces¹⁴⁾										
Crosstalk bending moment M_B	kN m/kN m	< 0,004								
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	0,22	0,32	0,75	1,4	4,7	10,5	15,1	26,3	112
Torsion angle at M_{nom}	Rad	0,26	0,36	0,4	0,4	0,24	0,27	0,38	0,43	0,35
Axial stiffness c_a	kN/mm	100	125	187	256	455	625	747	1000	2000
Radial stiffness c_r	mm	<0,002	<0,002	<0,002	<0,002	<0,002	<0,002	<0,002	<0,002	<0,002
Max. deflection at axial limit force	mm	<0,02								
Additional planeparallel deviation at bending limit moment d_p	mm	<0,015	<0,015	<0,015	<0,015	<0,015	<0,015	<0,015	<0,02	<0,02
Balance quality level to DIN ISO 1940		G6.3								
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 I_v	kg mm ²	3	3	3	3	17	18	18,5	36	172
Axis of rotation, without consideration of the flange screws										
Max. permissible static eccentricity	mm	3								
Rotor - stator spacing										
Max. permissible axial displacement	mm	+/-1								
between rotor and stator										
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



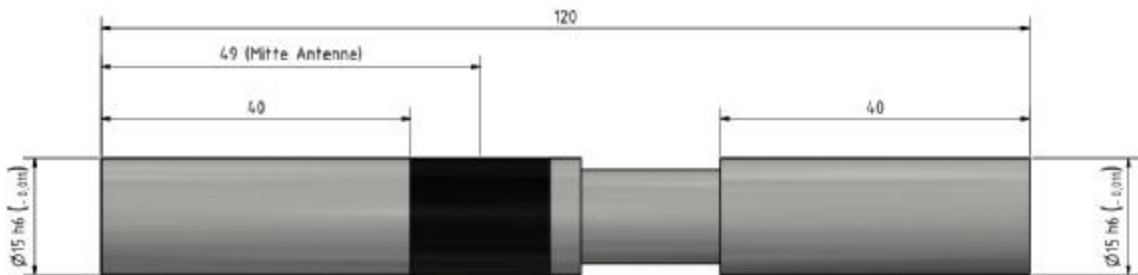
Rated torque M_{nom}	kN m	0,001	0,002	0,005	0,01	0,02	0,05	0,1	0,2	0,5
Flatness tolerances	mm	0,015	0,015	0,015	0,015	0,015	0,015	0,015	0,015	0,015
Concentricity tolerances	mm	0,015	0,015	0,015	0,015	0,015	0,015	0,015	0,015	0,015
Integrated speed acquisition (magnets in rotor antenna)										
Magnet (trace A)	Marks/turn	2								
Gap rotor - pick up	mm	3								
Integrated speed acquisition (version laser, IP42)										
Optical (trace A)	Marks/turn	20			30			40		50
Gap rotor - Laser-pick up	mm	20+/-19								

13) Option accuracy class 0.05

Dimensions:

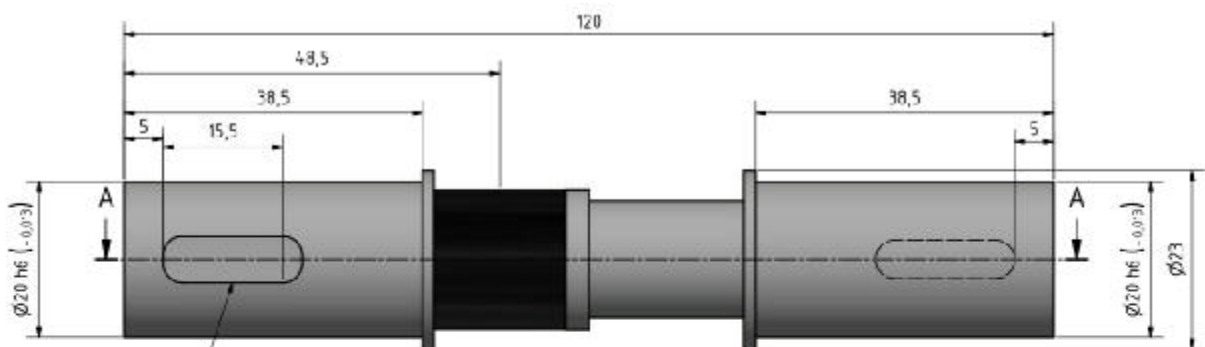
XtreMA MW

0,001kN·m, 0,002kN·m, 0,005kN·m, 0,010kN·m

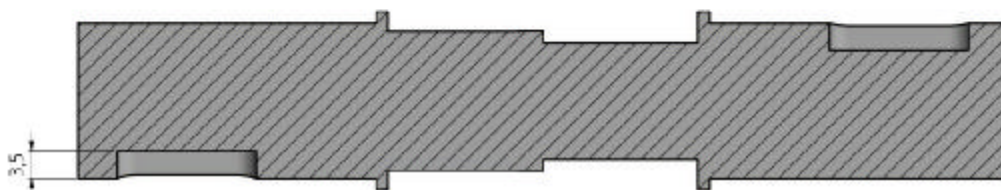


XtreMA MW - Variant with feather key

0,001kN·m, 0,002kN·m, 0,005kN·m, 0,010kN·m

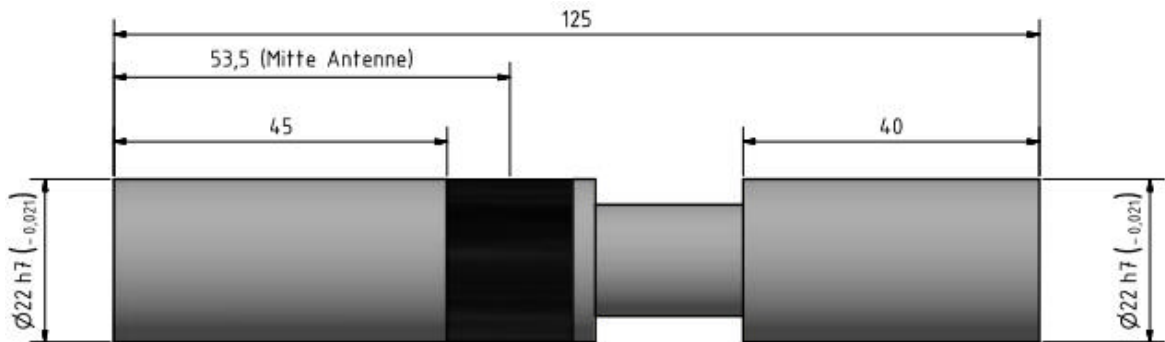


Passfeder DIN 5885 - A 6 x 6 x 18

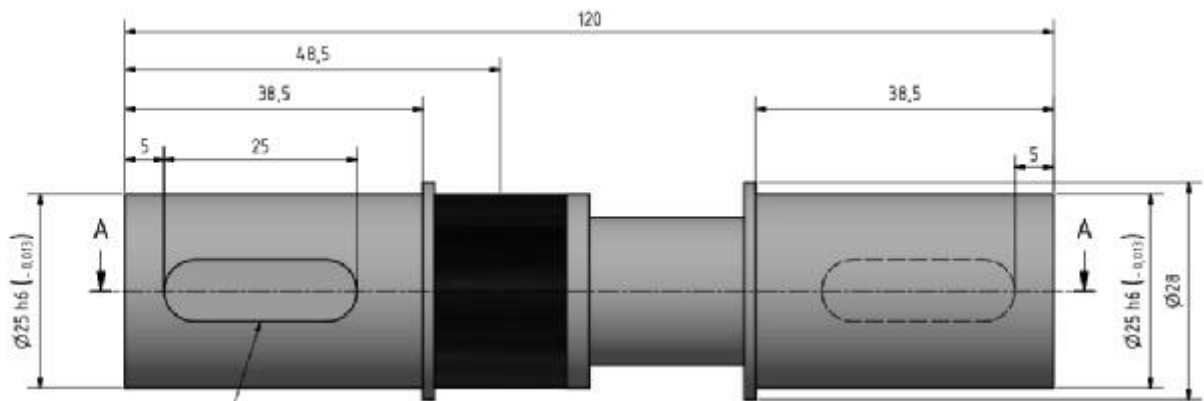


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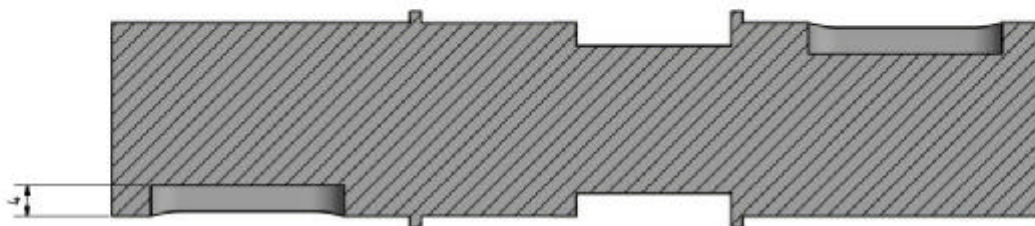
XtreMA MW 0,02kN·m, 0,05kN·m, 0,1kN·m



XtreMA MW - Variant with feather key 0,02kN·m, 0,05kN·m, 0,1kN·m

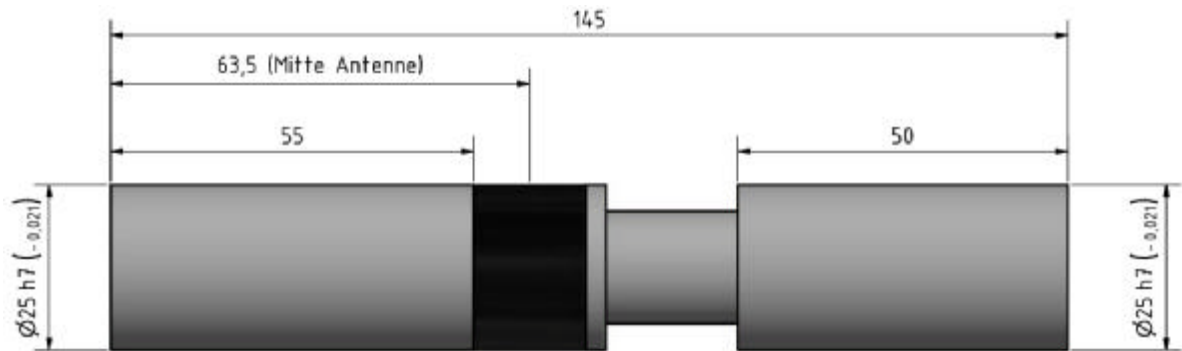


Passfeder DIN 6885 - A 8 x 7 x 25

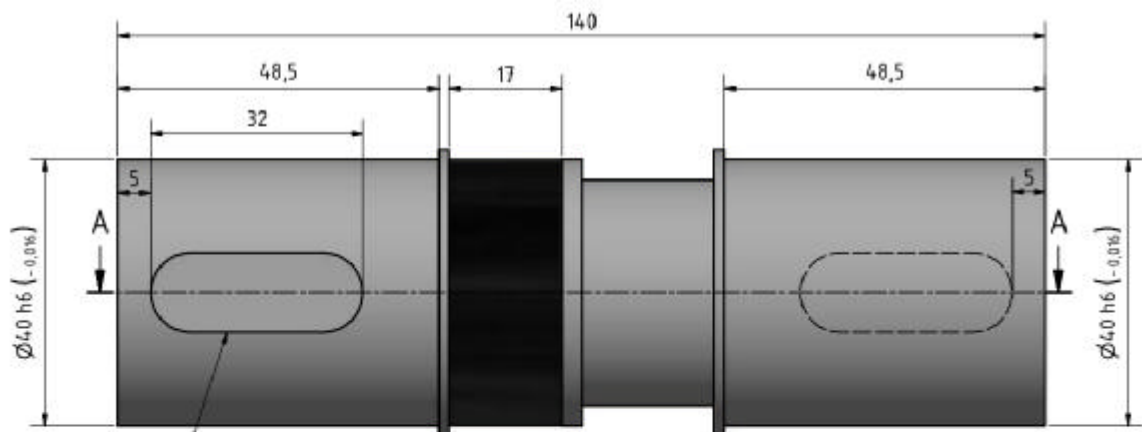


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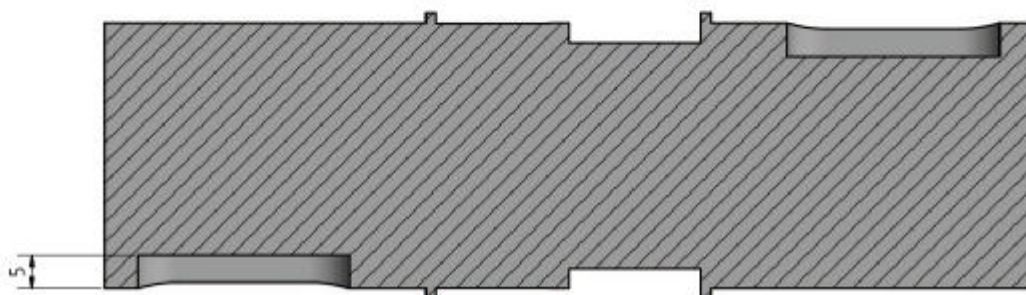
XtreMA MW 0,2kN·m



XtreMA MW Variant with feather key 0,2kN·m

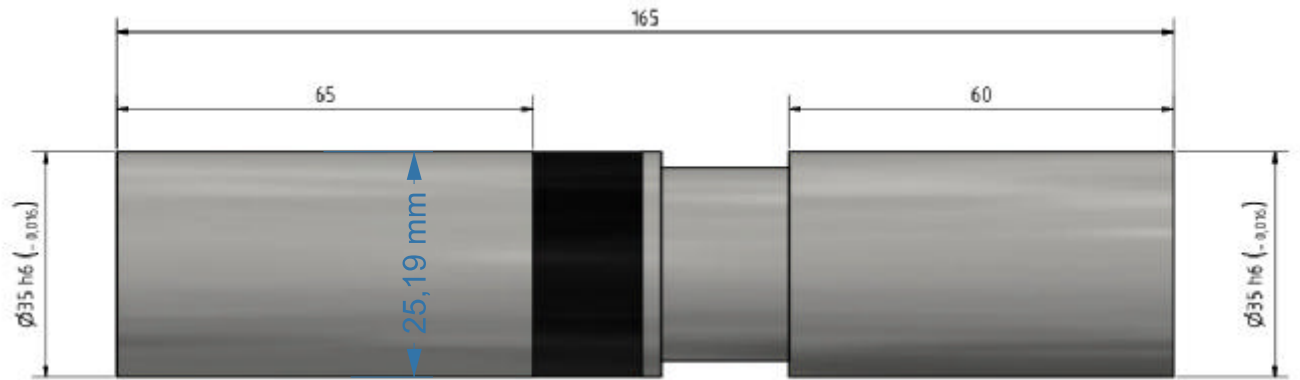


Passfeder DIN 6885 - A 12 x 8 x 32

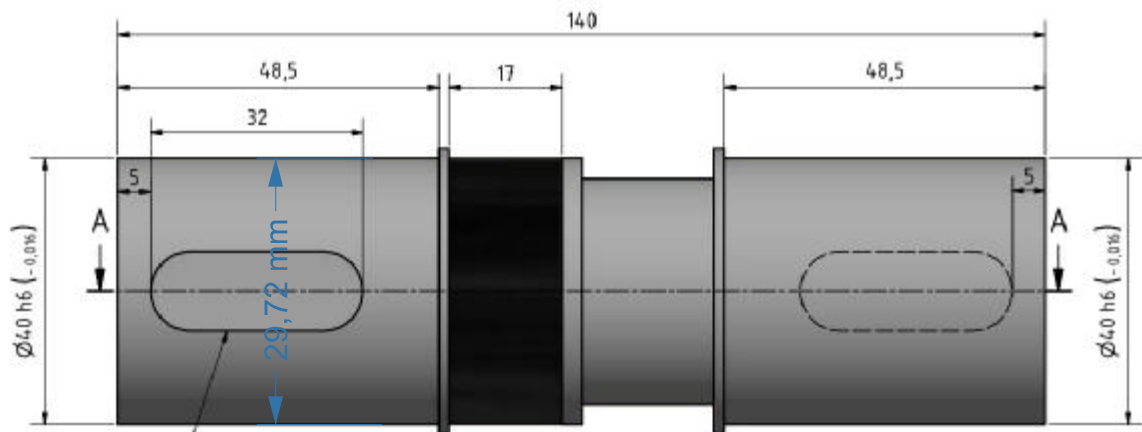


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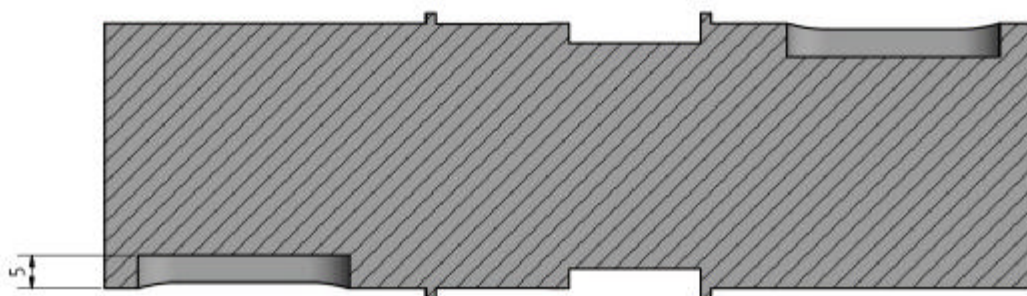
XtreMA MW 0,5kN·m



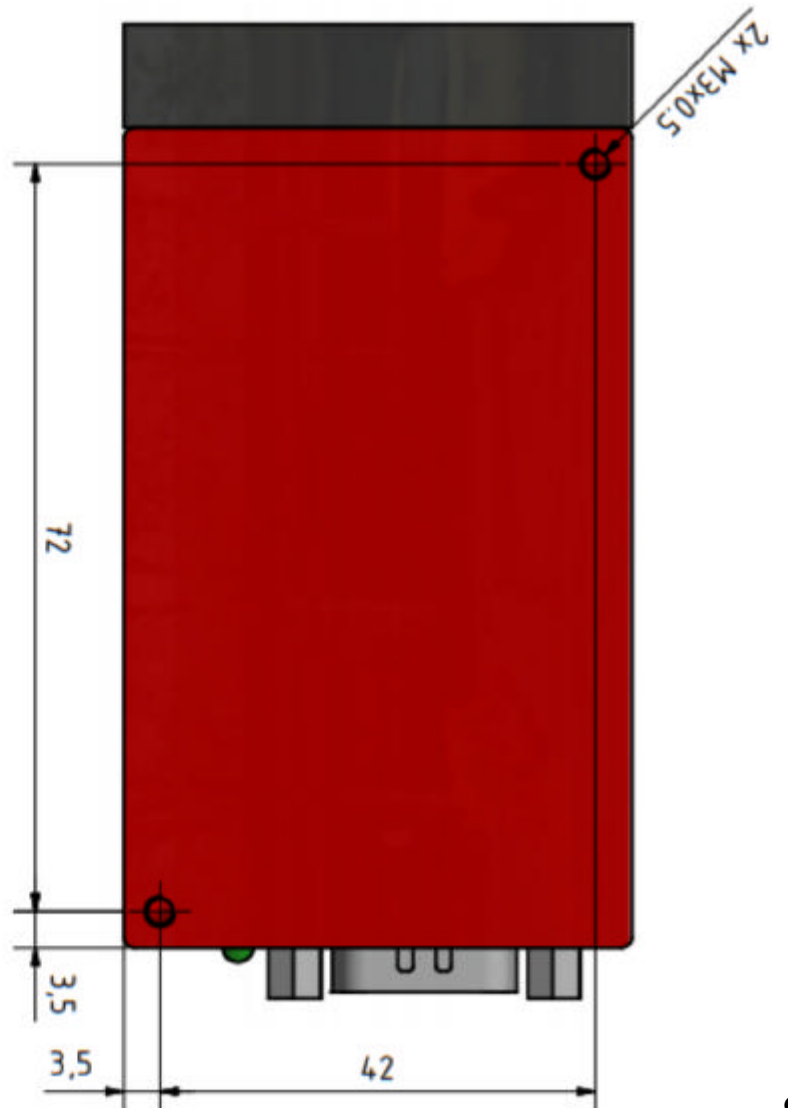
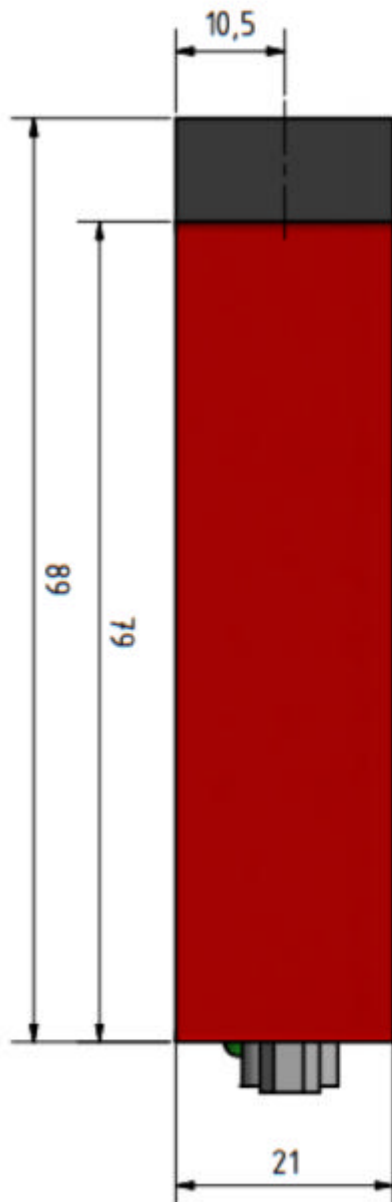
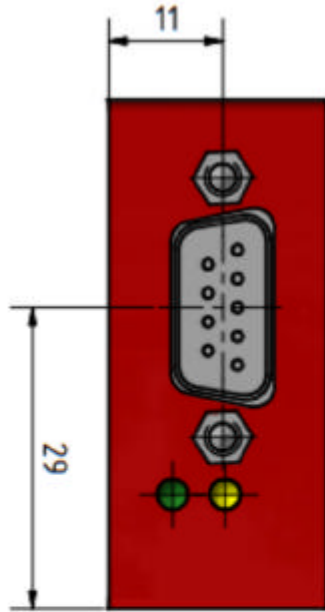
XtreMA MW Variant with feather key 0,5kN·m



Passfeder DIN 6885 - A 12 x 8 x 32



Dimensions evaluation unit AWD





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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