

Data sheet

# FxiS / FxeS



## Technical data

Type		F0iS-SV	F0iS-SV	F0eS-SV	F0eS-SV	
Accuracy class	%	≤±0.05				
Rated torque (Md <sub>n</sub> )	Nm	200 400	500 1,000	200 400	500 1,000	

Torque measuring system						
Technology	-	Rotating				
Rated torque (Md <sub>n</sub> ) #1	Nm	200 400	500 1,000	200 400	500 1,000	
Rated torque short measurement range (optional, minimum) (Md <sub>ns</sub> ) #2	Nm	70 140	170 340	70 140	170 340	
Accuracy class (extended for Md <sub>n</sub> )	%	N/A				
Outer diameter of rotor #3	mm	94				
Lengths (Rotor, without centering)	mm	54				
Pitch circle diameter #4	mm	75.0				
Outputs	-	Frequency, Voltage, Current, CAN bus, Alert				
Test signal	-	see test report				

Speeds and speed measuring systems						
Speed detection (integrated)	-	without				
Speed detection (optional)	-	optical				
Maximum Speed without optional speed detection system	rpm	20,000				
Optional increased speed	rpm	30,000				
Maximum speed with magnetic speed encoder	rpm	N/A				
Maximum speed with optical speed encoder	rpm	see below				
Maximum speed with inductive speed encoder	rpm	N/A				

Torque accuracy class per output type (related to Md <sub>n</sub> )						
Frequency output / CAN	%	≤±0.05				
Voltage output	%	≤±0.10				
Current output	%	≤±0.10				
Frequency output / CAN (option higher accuracy)	%	N/A				

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Accuracy class	%	≤±0.05				
Rated torque (Md <sub>n</sub> )	Nm	200 400	500 1,000	200 400	500 1,000	
<b>Linearity deviation including hysteresis related to Md<sub>n</sub> #5</b>						
Frequency / CAN, 0%...30%	%	≤±0.010				
Frequency / CAN, 30%...60%	%	≤±0.020				
Frequency / CAN, 60%...100%	%	≤±0.030				
Voltage output	%	≤±0.05				
Current output	%	≤±0.05				
<b>Rel. standard deviation of the reproducibility according to DIN 1319, by reference to variation of the output signal (rel. to Md<sub>n</sub>)</b>						
Frequency output / CAN	%	≤±0.03				
Voltage output	%	≤±0.05				
Current output	%	≤±0.05				
<b>Temperature influence per 10K in the nominal temperature range on the output signal related to the actual value of signal span (rel. to Md<sub>n</sub>)</b>						
Frequency output / CAN	%	≤±0.05				
Voltage output	%	≤±0.10				
Current output	%	≤±0.10				
<b>Temperature influence per 10K in the nominal temperature range on the zero signal (rel. to Md<sub>n</sub>)</b>						
Frequency output / CAN	%	≤±0.05				
Voltage output	%	≤±0.10				
Current output	%	≤±0.10				
<b>Long-term drift over 48h at reference temperature</b>						
Voltage output	mV	<1.0				
Current output	μA	<0.80				

## Technical data

Type		F0iS-SV	F0iS-SV	F0eS-SV	F0eS-SV
Accuracy class	%	≤±0.05			
Rated torque (Md <sub>n</sub> )	Nm	200 400	500 1,000	200 400	500 1,000
<b>Nominal sensitivity (range between zero torque and rated torque)</b>					
Frequency output	kHz	20			
Voltage output	V	5.0 / 10.0 / 2.5 / 5.0			
Current output	mA	8 / 10			
<b>Output signal at zero torque</b>					
Frequency output	kHz	60			
Voltage output	V	0.0 / 0.0 / 2.5 / 5.0			
Current output	mA	12 / 10			
<b>Nominal output signal</b>					
Frequency output at positive nominal value	kHz	80			
Frequency output at negative nominal value	kHz	40			
Voltage output at positive nominal value	V	5 / 10 / 5 / 10			
Voltage output at negative nominal value	V	-5 / -10 / 0 / 0			
Current output at positive nominal value	mA	20			
Current output at negative nominal value	mA	4 / 0			
<b>Max. modulation range</b>					
Frequency output	kHz	30...90			
Voltage output	V	-10.5...10.5			
Current output	mA	0...24			
<b>Group delay time</b>					
Frequency output	μs	10			
Voltage output	μs	3,000			
CAN	μs	1,000			

## Technical data

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Accuracy class	%	≤±0.05				
Rated torque (Md <sub>n</sub> )	Nm	200 400	500 1,000	200 400	500 1,000	

### Speed measuring system Inductive (integrated track at rotor)

Pulse per rev (PPR)	ppr.	N/A				
Maximum speeds (related to PPR)	rpm	N/A				
Max. output frequency (RS422)	kHz	N/A				
Minimum speed for sufficient pulse stability	rpm	N/A				

### Speed measuring system Magneto resistive (2 tracks approx. 90 degree phase shifted)

Pulses per rev (PPR)	ppr.	N/A				
Maximum speeds (related to PPR)	rpm	N/A				
Max. output frequency (RS422)	kHz	N/A				
Minimum speed for sufficient pulse stability	rpm	N/A				
Nominal clearance (sensor - pole ring)	mm	N/A				
Working airgap (sensor - pole ring)	mm	N/A				
Nominal axial displacement (rotor - stator) #6	mm	N/A				
Tolerance to nominal axial displacement (rotor - stator)	mm	N/A				

### Speed measuring system Optical

Pulses per rev (PPR)	ppr.	240 / 360 / 400				
Maximum speeds (related to PPR)	rpm	20,000 / 16,000 / 15,000				
Max. output frequency (RS422)	kHz	80 / 96 / 100				
Minimum speed for sufficient pulse stability	rpm	>0				
Nominal radial displacement (rotor - stator)	mm	1.5				
Tolerated radial displacement (rotor - stator) #6	mm	1.4...1.6				
Nominal axial displacement (rotor - stator) #6	mm	4				
Tolerance to nominal axial displacement (rotor - stator)	mm	+0.5/-0.3				

## Technical data

Type		F0iS-SV	F0iS-SV	F0eS-SV	F0eS-SV	
Accuracy class	%	≤±0.05				
Rated torque (Md <sub>n</sub> )	Nm	200 400	500 1,000	200 400	500 1,000	
<b>Temperature ranges</b>						
Nominal temperature range ( <i>Rotor</i> )	°C	0...80				
Operating temperature range ( <i>Rotor</i> ) #7	°C	-20...85				
Storage temperature range ( <i>Rotor</i> )	°C	-30...85				
Nominal temperature range ( <i>Stator</i> )	°C	0...80				
Operating temperature range ( <i>Stator</i> ) #8	°C	-20...80	-20...80	-20...85	-20...85	
Storage temperature range ( <i>Stator</i> )	°C	-30...85				
<b>Mechanical shock (EN 60068-2-27)</b>						
Quantity	-	1,000				
Duration	ms	3				
Acceleration	m/s <sup>2</sup>	650				
<b>Vibration load (EN 60068-2-6)</b>						
Frequency	Hz	10...2,000				
Duration	min.	150				
Acceleration	m/s <sup>2</sup>	200				
<b>Load limits #9</b>						
Limit torque, related to Md <sub>n</sub>	%	500				
Breaking torque approx., related to Md <sub>n</sub>	%	1,000				
Axial limit force	kN	23.00 27.00	31.00 62.00	23.00 27.00	31.00 62.00	
Lateral limit force	N	4200.00 5100.00	6200.00 11700.00	4200.00 5100.00	6200.00 11700.00	
Bending limit torque	Nm	161.00 177.00	208.00 430.00	161.00 177.00	208.00 430.00	

## Technical data

Type		F0iS-SV	F0iS-SV	F0eS-SV	F0eS-SV
Accuracy class	%	≤±0.05			
Rated torque (Md <sub>n</sub> )	Nm	200 400	500 1,000	200 400	500 1,000

Mechanical values					
Torsional stiffness	kNm/rad	355 462	550 939	355 462	550 939
Angle of twist at Md <sub>n</sub>	°	0.030 0.050	0.050 0.060	0.030 0.050	0.050 0.060
Axial stiffness	kN/mm	767 918	1,040 2,072	767 918	1,040 2,072
Radial stiffness	kN/mm	249 324	387 731	249 324	387 731
Bending stiffness	kNm/°	4.00 4.40	5.20 10.70	4.00 4.40	5.20 10.70
Deflection at axial limit force	mm	<0.04			
Additional radial deviation at lateral limit force	mm	<0.02			
Parallel deviation at bending limit torque	mm	<0.07			
Inherent frequency	Hz	2,900 3,300	3,600 4,800	2,900 3,300	3,600 4,800
Balance quality-level to DIN ISO 1949	-	G2.5			
Inertia of rotor	kgm <sup>2</sup>	0.0013	0.0013 0.0011	0.0013	0.0013 0.0011
Max. limits for relative shaft vibration (peak to peak) #10	µm	$S_{(p-p)} = \frac{9000}{\sqrt{n}}$			

## Technical data

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Accuracy class	%	≤±0.05			
Rated torque (Md <sub>n</sub> )	Nm	200 400	500 1,000	200 400	500 1,000
<b>Weight approx.</b>					
Rotor #11	kg	1.0	1.0 0.9	1.0	1.0 0.9
Stator (without speed encoder) #11	kg	2.10	2.10	1.10	1.10
<b>Mounting distances (without optional speed detection system)</b>					
Nominal radial displacement (rotor - stator)	mm	2.1			
Tolerance to nominal radial displacement (rotor - stator)	mm	≤±0.1			
Nominal axial displacement (rotor - stator) #6	mm	4			
Tolerance to nominal axial displacement (rotor - stator)	mm	≤±0.5			
<b>Flatness and concentricity tolerances rotor</b>					
Circular run-out-axial tolerance #12	mm	0.01			
Circular run-out-radial tolerance #12	mm	0.01			
<b>Power supply</b>					
Nominal supply	V (DC)	24			
Supply range #13	V (DC)	23...25			
Max. current consumption in measuring mode	A	<0.70			
Max. current consumption in start-up mode	A	<2			
Nominal power consumption	W	<17			
<b>Load resistance</b>					
Frequency output	-	RS422			
Voltage output	kOhm	≥5			
<b>Dynamic</b>					
Frequency output	kHz	≤7			
Voltage output	kHz	≤1			
Current output	kHz	≤1			
CAN output conversation rate	1/s	≤1,000			



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Accuracy class	%	≤±0.05			
Rated torque (Md <sub>n</sub> )	Nm	200 400	500 1,000	200 400	500 1,000
<b>Miscellaneous</b>					
Protection class (rotor)	-	IP54			
Protection class (stator)	-	IP54			
Protection class (rotor, extended)	-	On request			
Protection class (stator, extended)	-	On request			
Pitch circle screw information	-	4 * M10 (12.9)	4 * M10 (12.9) 8 * M10 (12.9)	4 * M10 (12.9)	4 * M10 (12.9) 8 * M10 (12.9)
CAN	-	2B			
Configuration interface	-	RS232			
Central hole	mm	N/A			
Material	-	Steel			
Measuring range (related to Md <sub>n</sub> )	%	120			
Matching evaluation units	-	Integrate d	Integrate d	TCU2	TCU2
Stator type	-	iS	iS	eS	eS
<b>Sales information</b>					
Article number	-	1000331 5	1000331 5	1000418 6	1000418 6

## Remarks and information

Link no.	Topic	Remark
#1	Nominal torque	Based on customer requests, the measurement systems can optionally be optimized for not listed nominal torque values (intermediate ranges possible).
#2	Second torque range	The written second nominal torque value ( $M_{d_{ns}}$ ) is the smallest possible. Greater second torque ranges can be chosen on demand. Mechanical values and load limits vary between single and dual range torque meters. A data sheet for dual range torque meters with specific values can be requested.
#3	Detail in the drawings	Value can vary by optional components. Please find details to this attribute in the integrated drawings.
#4	Pitch circle diameter	The pitch circle diameter is identically at input and output side for most systems. More information is given in the drawings of a product.
#5	Linearity	Values of Linearity deviation incl. Hysteresis can only be reached if positive and negative sensitivity values are used.
#6	Reference planes	Please check the drawings for information about the reference planes of this attribute.
#7	Temperature range (rotor)	No condensation allowed.
#8	Temperature range (stator)	No condensation allowed. Temperature related to housing ground point.
#9	Load limits	The given values are only valid if no other load occurs at the same time. If the loads in sum are 100%, the max. error will be 0.3% of the nominal torque.
#10	Vibration limits	Vibration limits are not an influence to the machine. They reflect the allowed effect onto the rotor (ISO 7919-3). Parameter "n" is given in "r/min".

## Remarks and information

Link no.	Topic	Remark
#11	Weights	Weights are related to components without speed detection system and based on calculations. Please contact us for exact weight information.
#12	Flatness and concentricity tolerances	The parameters of "Flatness and concentricity tolerances rotor" are manufacturing tolerances.
#13	Supply voltage	The supply voltage range must be given at measurement system side. Long wires can reduce the voltage level from power supply to measurement system.

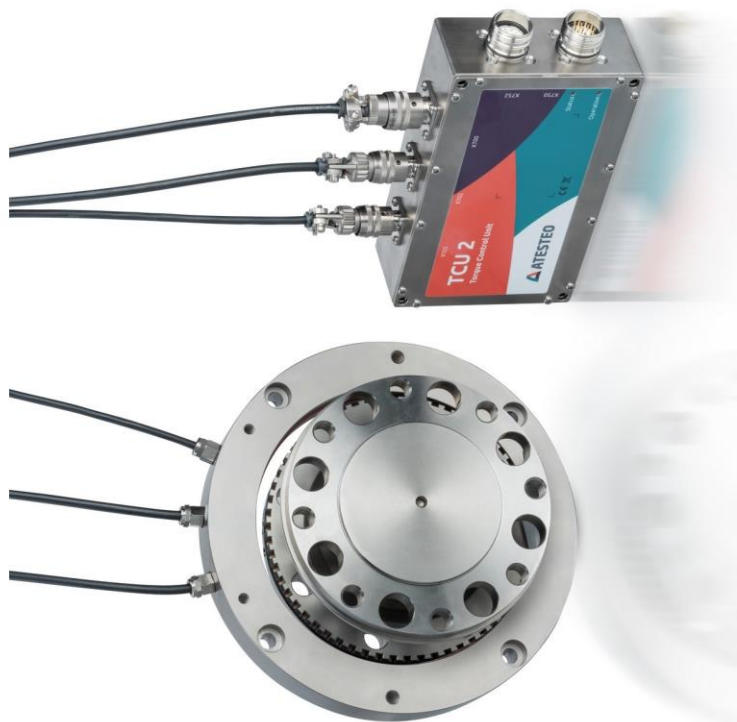
### Drawing

iS



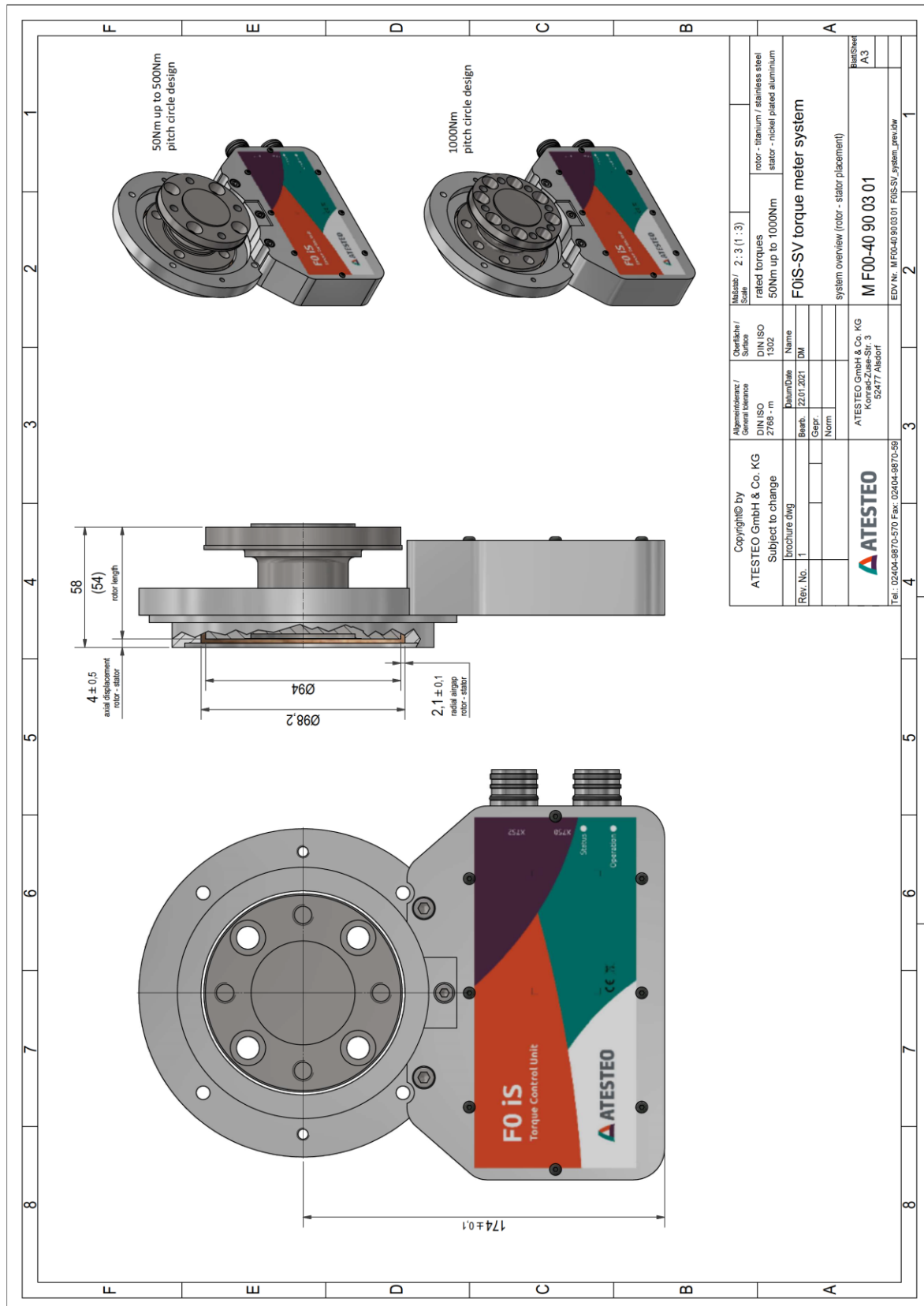
Rotor & stator with integrated evaluation unit (TCU)  
Rotor & Stator mit integrierter Auswerteeinheit (TCU)

eS



Rotor, ring stator & external evaluation unit (TCU)  
Rotor, Ringstator & abgesetzte Auswerteeinheit (TCU)

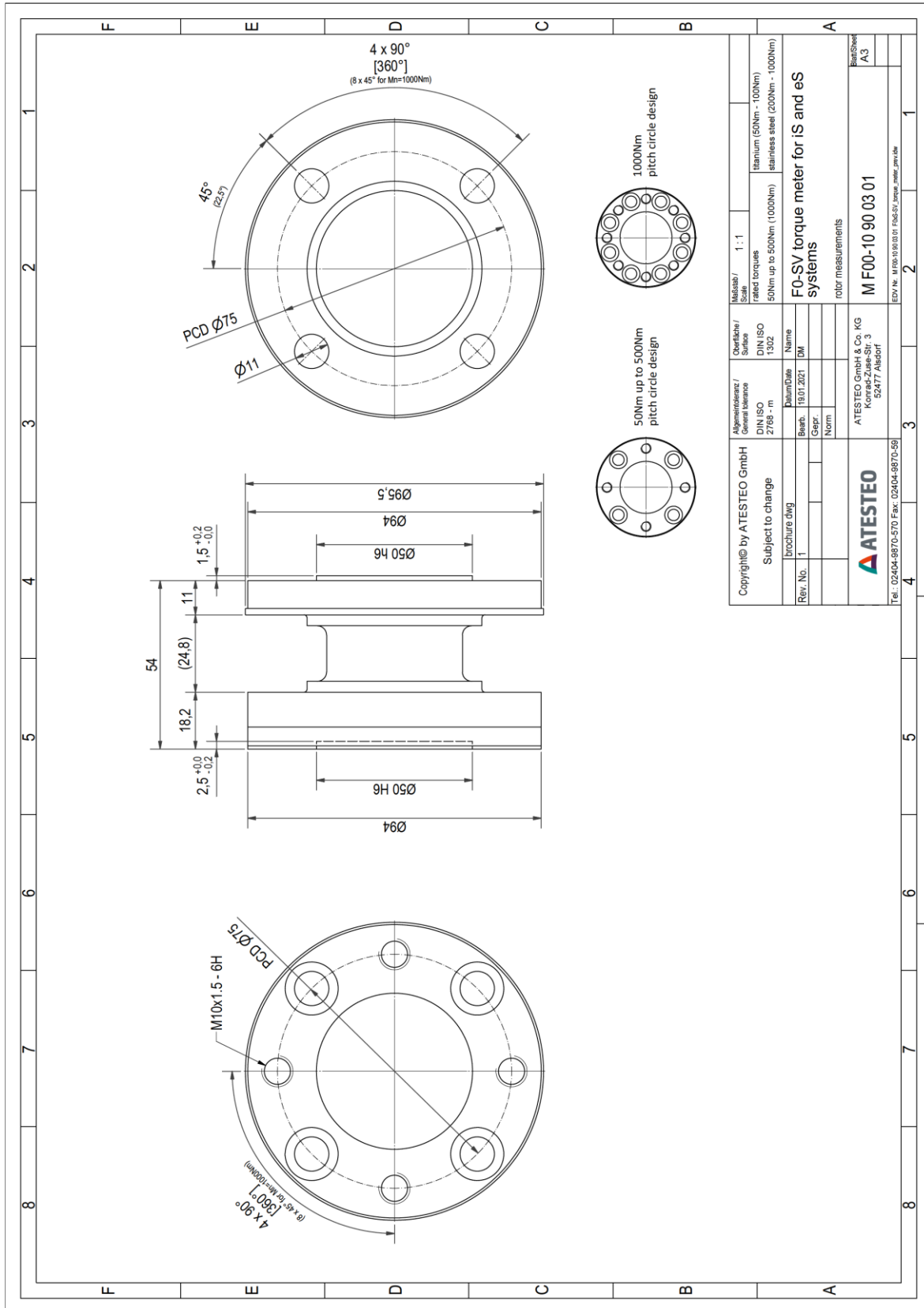
## Drawing



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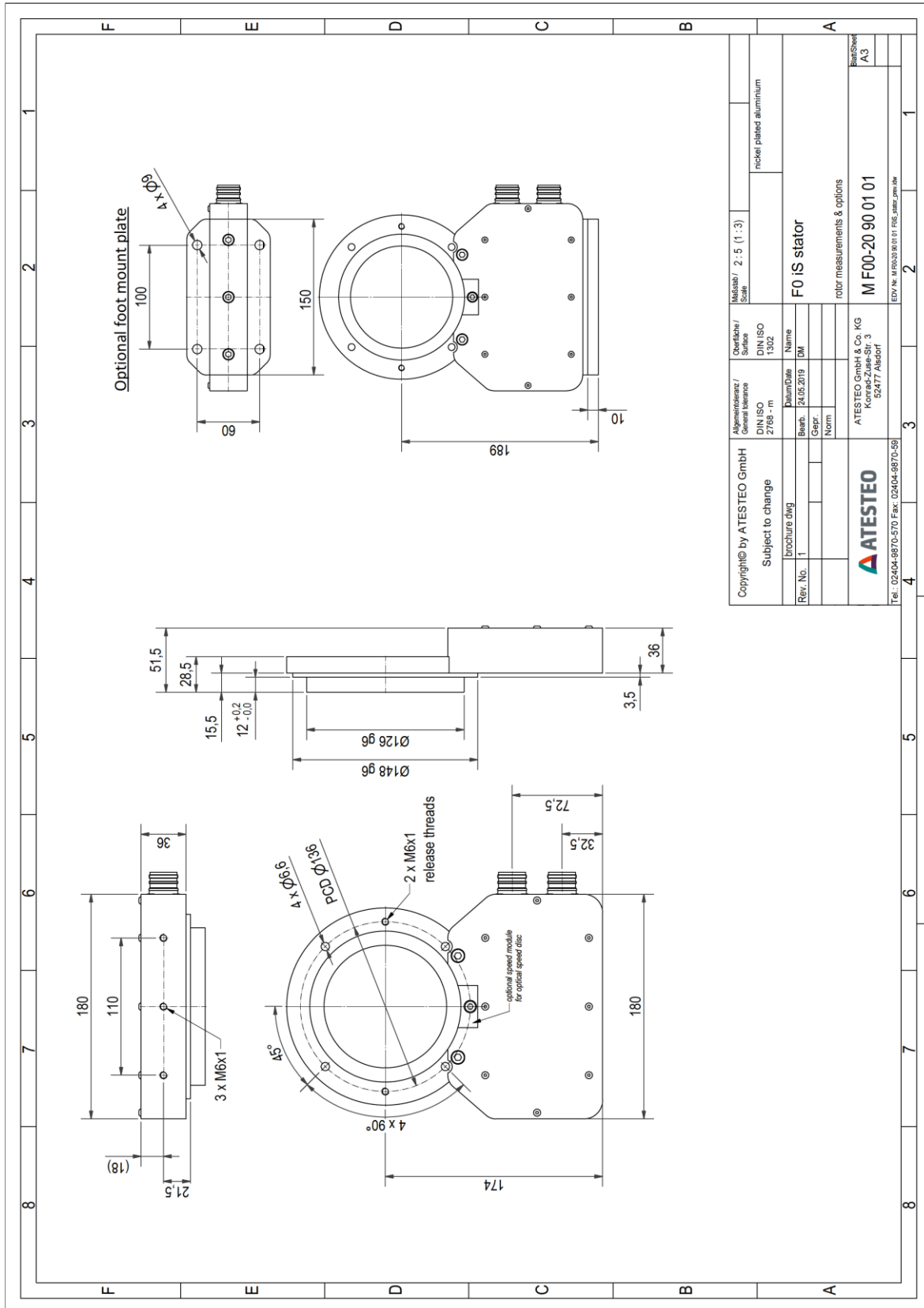
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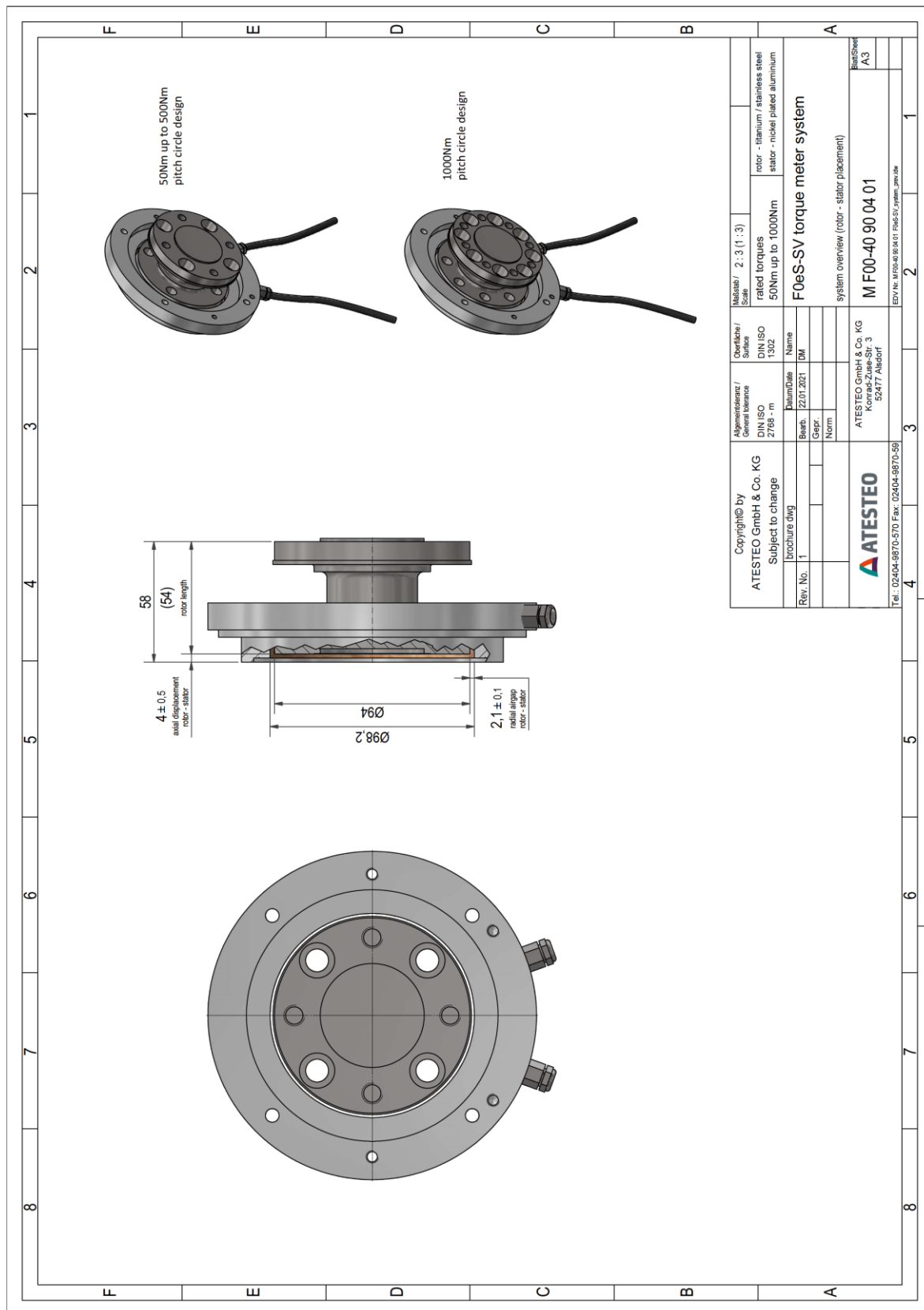
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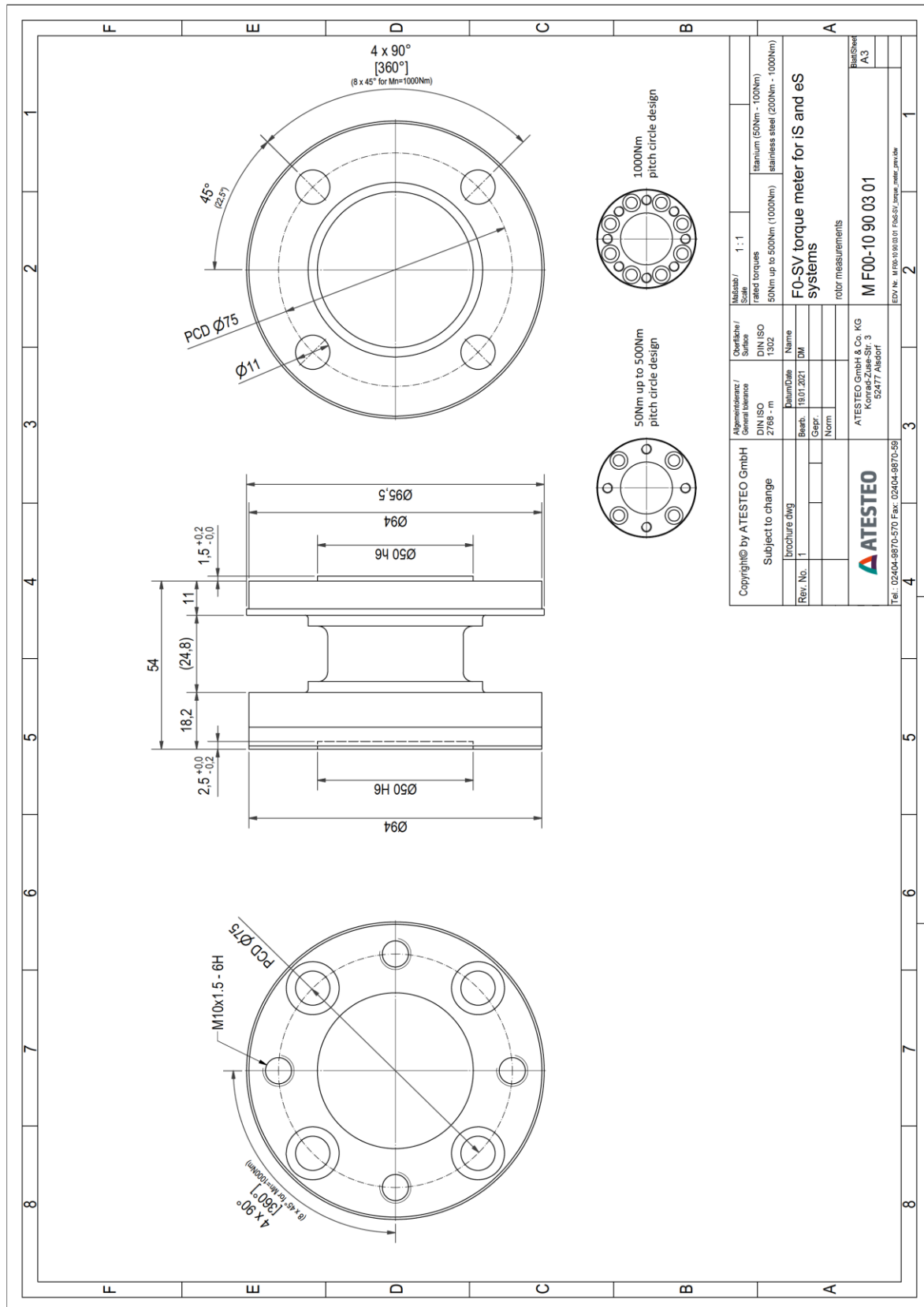


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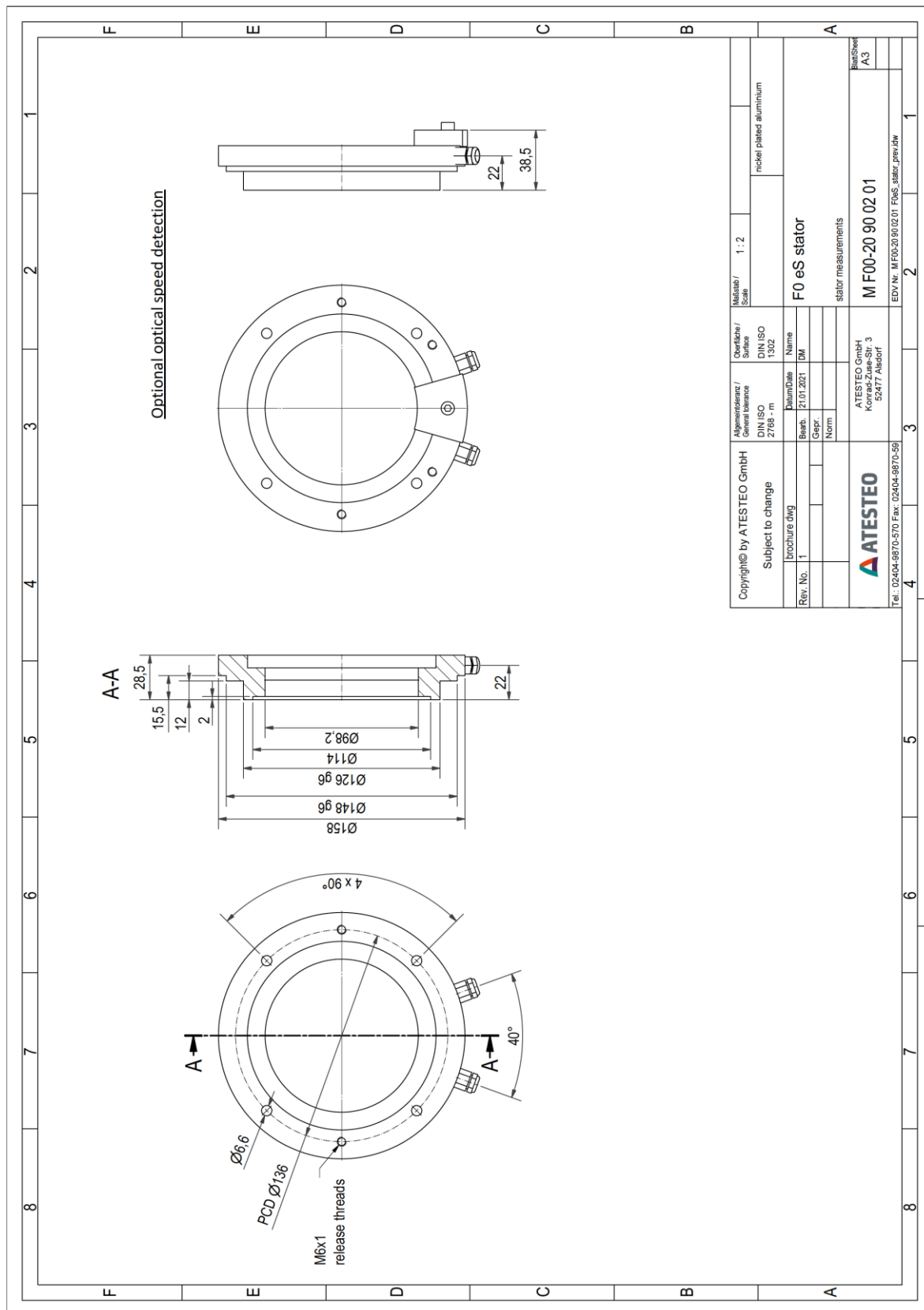
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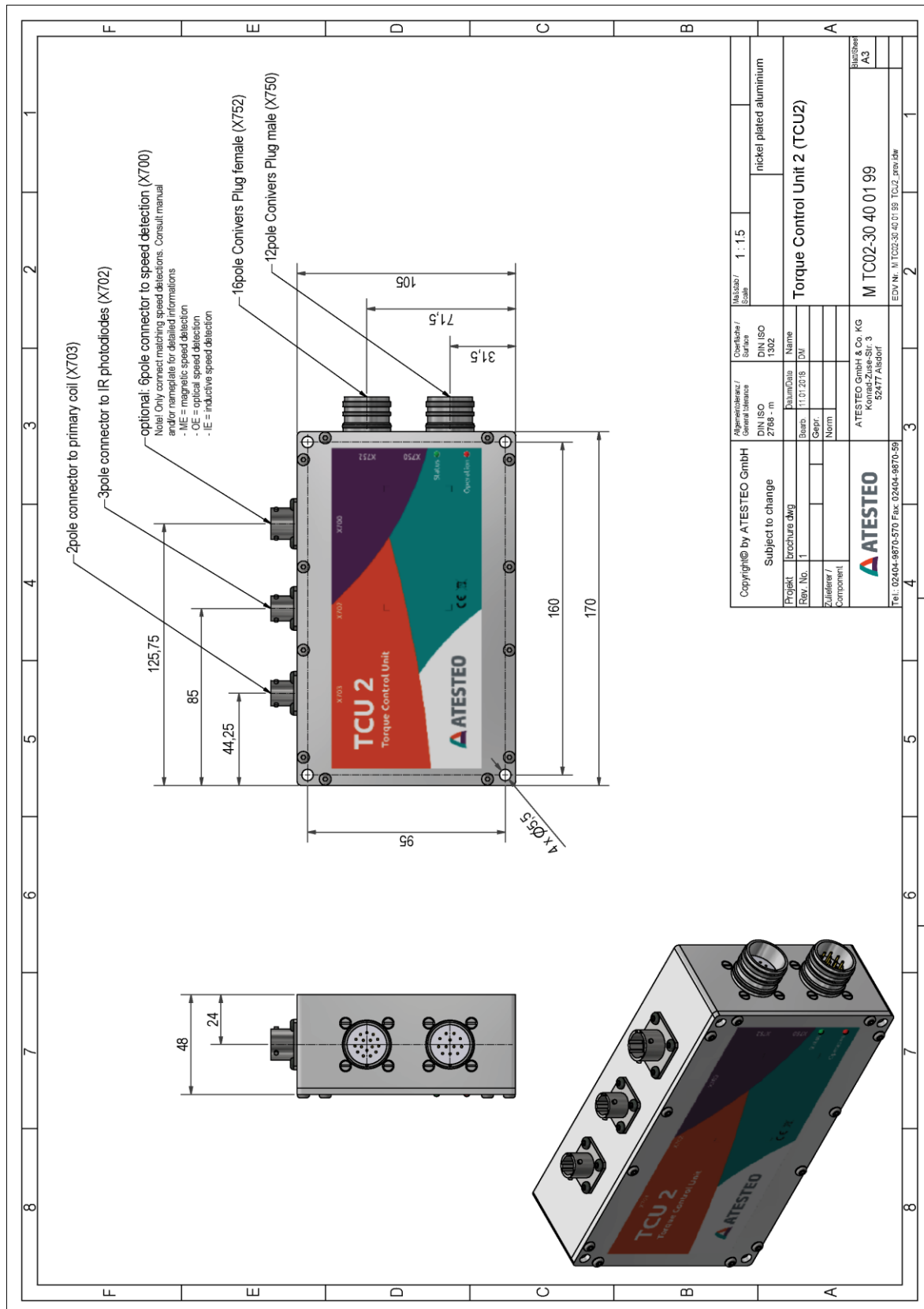
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