ATESTEO

Excellence in drivetrain testing

Data sheet

FxiS / FxeS

Instrumentation Devices

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Technical Data

Type		F0eS	F1eS	F1eS	F2eS	F2eS
Accuracy class standard	%			0,05		
Rated torque Mn	Nm	50 100 200 500 1000	200 500 1000 1500	2000 2500 3000	2500 5000 7000	10000 15000 20000
Torque measuring system						
Technology	-			Rotating		
Rated torque Mn # 2	Nm	50 100 200 500 1000	200 500 1000 1500	2000 2500 3000	2500 5000 7000	10000 15000 20000
Rated torque second channel (Minimum), optional # 3	Nm	20 20 40 100 200	40 100 200 300	400 500 600	500 1000 2000	2000 3000 4000
Accuracy class optional	%			0,03		
Outer diameter of rotor # 1	mm	94	150	150	230	230
Lengths (Rotor, without centering)	mm	74	80	80	107	107
Pitch circle diameter # 8	mm	75	130	130	196	196
Outputs	-			Frequency, Voltage, Current, CAN bus, Alert		
Speed measuring system						
Speed detection (integrated)	-	without	inductive	inductive	inductive	inductive
Speed detection (optional)	-	inductive / optical	magn.	magn.	magn.	magn.
Maximum Speed without optional speed measuring system	rpm	20000	20000	20000	15000	15000
Optional increased speed	rpm	25000	25000	25000	17000	17000
Maximum speed with magnetic speed encoder	rpm	N/A	9000	9000	6500	6500
Maximum speed with optical speed encoder	rpm	20000	N/A	N/A	N/A	N/A
Maximum speed with inductive speed encoder	rpm	20000	20000	20000	12500	12500
Torque Accuracy (related to rated torque)						
Frequency output / CAN	%			≤±0,05		
Voltage output	%			≤±0,1		
Current output	%			≤±0,1		
Frequency output, option higher accuracy	%			≤±0,03		

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Accuracy class standard	%			0,05		
Rated torque Mn	Nm	50 100 200 500 1000	200 500 1000 1500	2000 2500 3000	2500 5000 7000	10000 15000 20000

Linearity deviation including hysteresis related to nominal value		
Frequency / CAN, 0% ... 30% of Mn	%	≤±0,01
Frequency / CAN, 30% ... 60% of Mn	%	≤±0,02
Frequency / CAN, 60% ... 100% of Mn	%	≤±0,03
Voltage output	%	≤±0,05
Current output	%	≤±0,05
Rel. standard deviation of the reproducibility according to DIN 1319, by reference to variation of the output signal		
Frequency output / CAN	%	≤±0,03
Voltage output	%	≤±0,05
Current output	%	≤±0,05
Test signal	-	see test report
Temperature Influence per 10K in the nominal temperature range on the output signal related to the actual value of signal span		
Frequency output / CAN	%	≤±0,05
Voltage output	%	≤±0,1
Current output	%	≤±0,1
Temperature influence per 10K in the nominal temperature range on the zero signal, related to the nominal sensitivity		
Frequency output / CAN	%	≤±0,05
Voltage output	%	≤±0,1
Current output	%	≤±0,1
Long-term drift over 48h at reference temperature		
Voltage output	mV	<1
Current output	µA	<0,8
Temperature range		
Nominal temperature range rotor/stator	°C	0...+80 / 0...+70
Operating temperature range rotor/stator	°C	-20...+85 / -20...+70
Storage temperature range rotor/stator	°C	-30...+85

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Type		F0eS	F1eS	F1eS	F2eS	F2eS
Accuracy class standard	%			0,05		
Rated torque Mn	Nm	50 100 200 500 1000	200 500 1000 1500	2000 2500 3000	2500 5000 7000	10000 15000 20000

Nominal sensitivity (range between zero torque and rated torque)		
Frequency output	kHz	20
Voltage output	V	5 / 10 / 2,5 / 5
Current output	mA	8 / 10
Output signal at zero torque		
Frequency output	kHz	60
Voltage output	V	0 / 0 / 2,5 / 5
Current output	mA	12 / 10
Nominal output signal		
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
Max. modulation range		
Frequency output	kHz	30...90
Voltage output	V	-10,5...+10,5
Current output	mA	0...24
Group delay time		
Frequency output	µs	10
Voltage output	µs	3000
CAN	µs	1000

Technical Data

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Accuracy class standard	%			0,05		
Rated torque Mn	Nm	50 100 200 500 1000	200 500 1000 1500	2000 2500 3000	2500 5000 7000	10000 15000 20000

Speed measuring system	Inductive (integrated track at rotor)					
Pulse per rev	ppr.	30	60	60	120	120
Max. output frequency	kHz			25		
Minimum speed for sufficient pulse stability	rpm			>0		
Speed measuring system	**Magneto resistive (2 tracks approx. 90 degree phase shifted)**					
Pulses per rev	ppr.	N/A	1000	1000	1448	1448
Max. output frequency	kHz	N/A	250	250	250	250
Minimum speed for sufficient pulse stability	rpm	N/A	>0	>0	>0	>0
Nominal clearance (sensor - pole ring)	mm	N/A	0,7	0,7	0,7	0,7
Working airgap (sensor - pole ring)	mm	N/A	0,1...1,0	0,1...1,0	0,1...1,0	0,1...1,0
Nominal axial displacement (rotor - stator) # 4	mm	N/A	2	2	4	4
Tolerance to nominal axial displacement (rotor - stator)	mm	N/A	±0,5	±0,5	±0,5	±0,5
Speed measuring system	**Optical**					
Pulses per rev	ppr.	360 / 400 / 240	N/A	N/A	N/A	N/A
Max. output frequency	kHz	250 (RS422)	N/A	N/A	N/A	N/A
Minimum speed for sufficient pulse stability	rpm	>0	N/A	N/A	N/A	N/A
Nominal clearance (stator - pole disk)	mm	1,5	N/A	N/A	N/A	N/A
Working airgap (stator - pole disk)	mm	1,4...1,6	N/A	N/A	N/A	N/A
Axial nominal displacement (rotor - stator) # 4	mm	4	N/A	N/A	N/A	N/A
Tolerance to nominal displacement (rotor - stator)	mm	+0,5/-0,3	N/A	N/A	N/A	N/A

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Accuracy class standard	%			0,05		
Rated torque Mn	Nm	50 100 200 500 1000	200 500 1000 1500	2000 2500 3000	2500 5000 7000	10000 15000 20000
Load limits # 7						
Limit torque, related to Mn	%			500		
Breaking torque approx., related to Mn	%			1000		
Axial limit force	kN	9 13 19 40 81	11 15 28 34	40 45 50	112 159 213	213 296 332
Lateral limit force	N	245 480 950 2680 6790	770 1230 3520 4920	6280 7620 8790	6701 11876 20543	20543 41963 55227
Bending limit torque	Nm	14 27 53 150 379	41 66 188 263	336 408 470	457 810 1402	1402 2863 3769

Technical Data

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Accuracy class standard	%			0,05		
Rated torque Mn	Nm	50 100 200 500 1000	200 500 1000 1500	2000 2500 3000	2500 5000 7000	10000 15000 20000
Mechanical values						
Torsional stiffness	kNm/rad	17 40 92 275 630	93 160 490 675	880 1065 1230	897 1701 3244	3244 8769 12630
Angle of twist at Mn	°	0,17 0,14 0,12 0,1 0,09	0,12 0,18 0,12 0,13	0,13 0,13 0,14	0,16 0,17 0,12	0,18 0,1 0,09
Axial stiffness	kN/mm			N/A		
Radial stiffness	kN/mm			N/A		
Bending stiffness	kN/°			N/A		
Deflection at axial limit force	mm			N/A		
Additional radial deviation at lateral limit force	mm			N/A		
Parallel deviation at bending limit torque	mm			N/A		
Inherent frequency	Hz	600 900 1300 2300 3300	590 770 1350 1600	1810 2000 2160	600 850 1200	1200 1800 2100
Balance quality-level to DIN ISO 1949	-			G2.5		
Inertia of rotor	kgm²	0,0013 0,0013 0,0014 0,0014 0,0015	0,0112 0,0113 0,0113 0,0113	0,0114 0,0114 0,0115	0,0788 0,0792 0,0799	0,0799 0,0827 0,0848

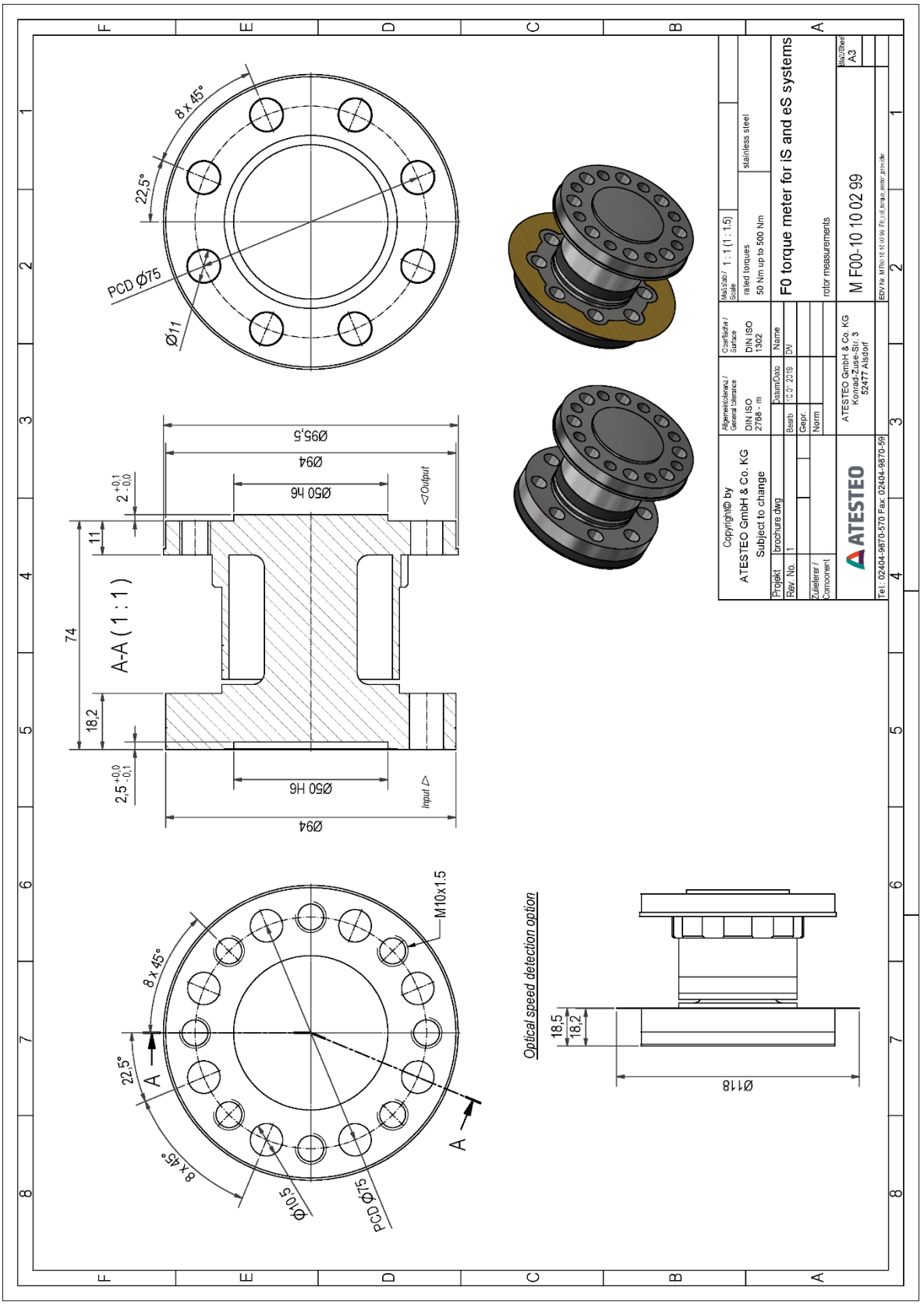
Technical Data

Type		F0eS	F1eS	F1eS	F2eS	F2eS
Accuracy class standard	%			0,05		
Rated torque Mn	Nm	50 100 200 500 1000	200 500 1000 1500	2000 2500 3000	2500 5000 7000	10000 15000 20000
Weight approx.						
Rotor # 6	kg	1,23 1,28 1,35 1,5 1,7	4,1 4,1 4,1 4,2	4,3 4,3 4,4	13,5 13,6 14,1	14,1 15,2 16
Stator (without speed encoder) # 6	kg	1,1	2,2	2,2	3,2	3,2
Mounting distances (without optional speed detection)						
Nominal radial displacement (rotor - stator)	mm	2,1	2,5	2,5	2,5	2,5
Tolerance to nominal radial displacement (rotor - stator)	mm	<±2,1	<±2,5	<±2,5	<±2,5	<±2,5
Nominal axial displacement rotor - stator # 4	mm	4	2	2	4	4
Tolerance to nominal axial displacement rotor - stator	mm	+0,5/-0,3	±0,5	±0,5	±0,5	±0,5
Flatness and concentricity tolerances rotor						
Circular run-out-axial tolerance # 5	mm			0,01		
Circular run-out-radial tolerance # 5	mm			0,01		
Power supply						
Nominal supply	V (DC)			24		
Max. current consumption in measuring mode	A			<0,7		
Max. current consumption in start-up mode	A			<2		
Nominal power consumption	W			<17		
Load resistance						
Frequency output	-			RS422		
Voltage output	kOhm			≥5		
Dynamic						
Frequency output	kHz			≤7		
Voltage output Fx	kHz			1		
Current output Fx	kHz			1		
CAN Output conversation rate	1/s			≤1000		

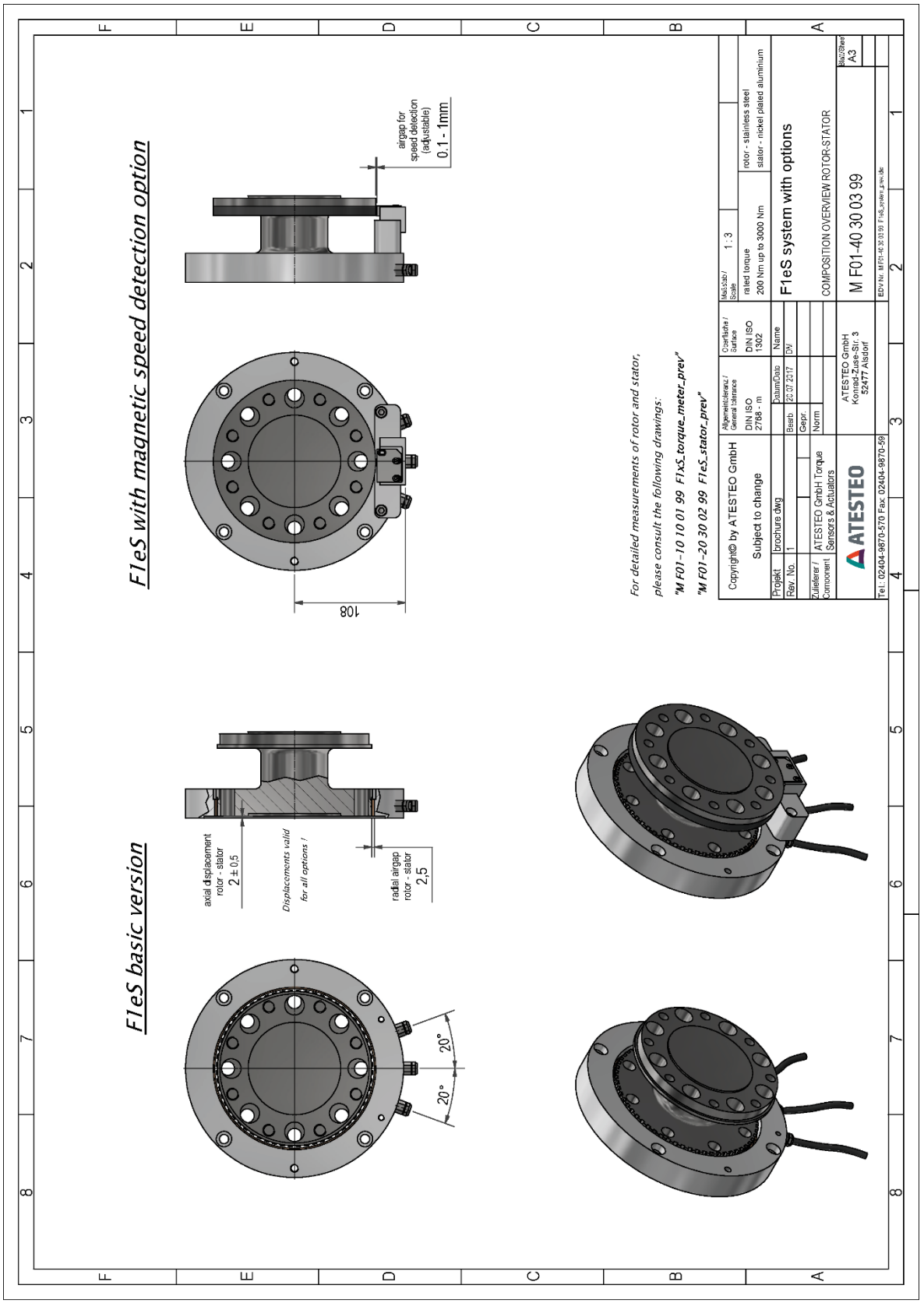
Remarks and information

Link no.	Topic	Remark
#1	Detail in the drawings	Value can vary by optional components. Please find details to this attribute in the integrated drawings.
#2	Nominal torque	Based on customer requests, the measurement systems can optionally be optimized for not listed nominal torque values (intermediate ranges possible).
#3	Second torque range	The written second torque range is the smallest possible complying with the given accuracy class. Greater second torque ranges can be chosen on demand. It must be noticed that the mechanical data and load limts will vary for systems with a second measurement range.
#4	Reference planes	Please check the drawings for information about the reference planes of this attribute.
#5	Flatness and concentricity tolerances	The parameters of "Flatness and concentricity tolerances rotor" are manufacturing tolerances.
#6	Weights	Weights are related to components without speed detection system.
#7	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.
#8	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.

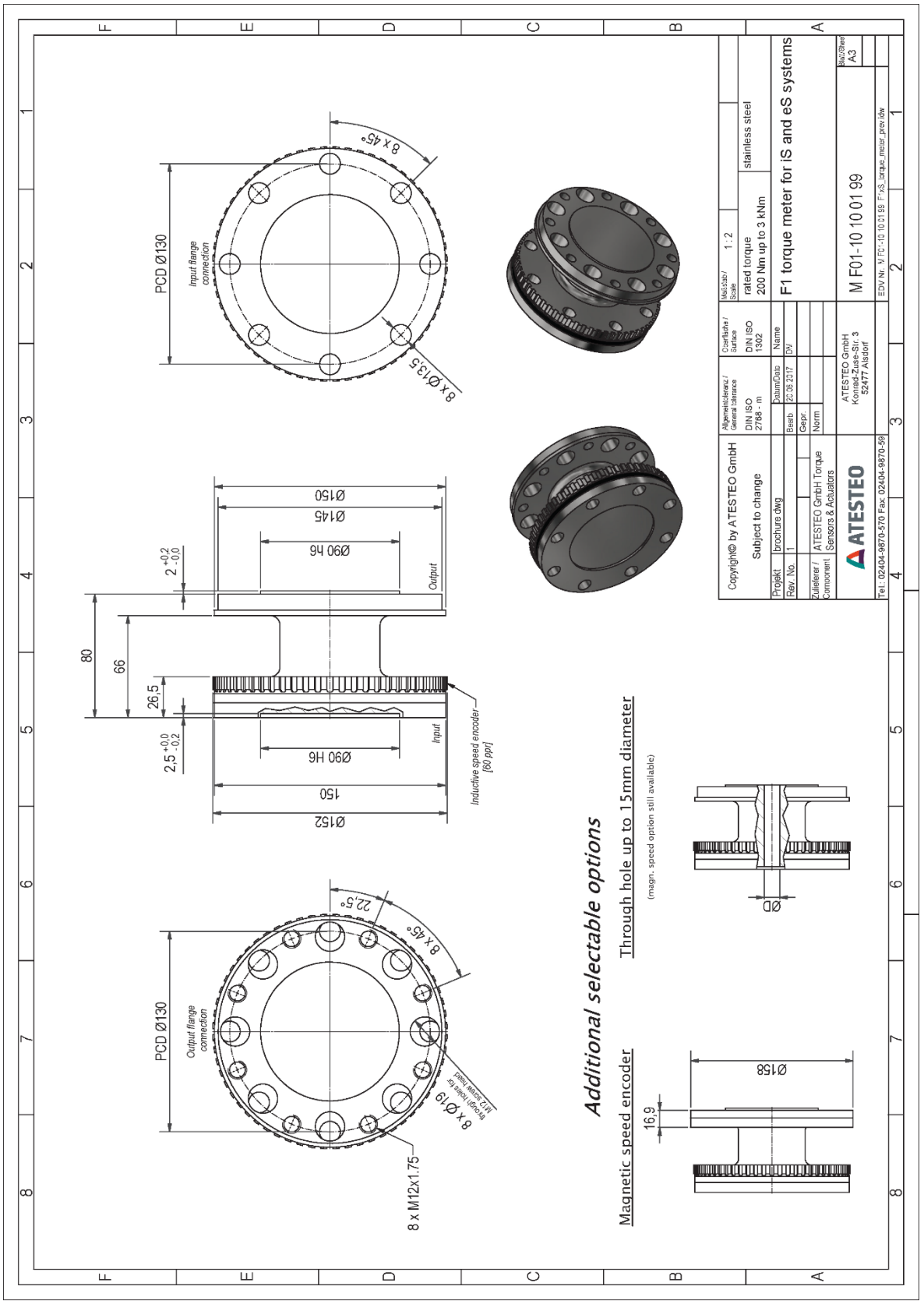
Drawing



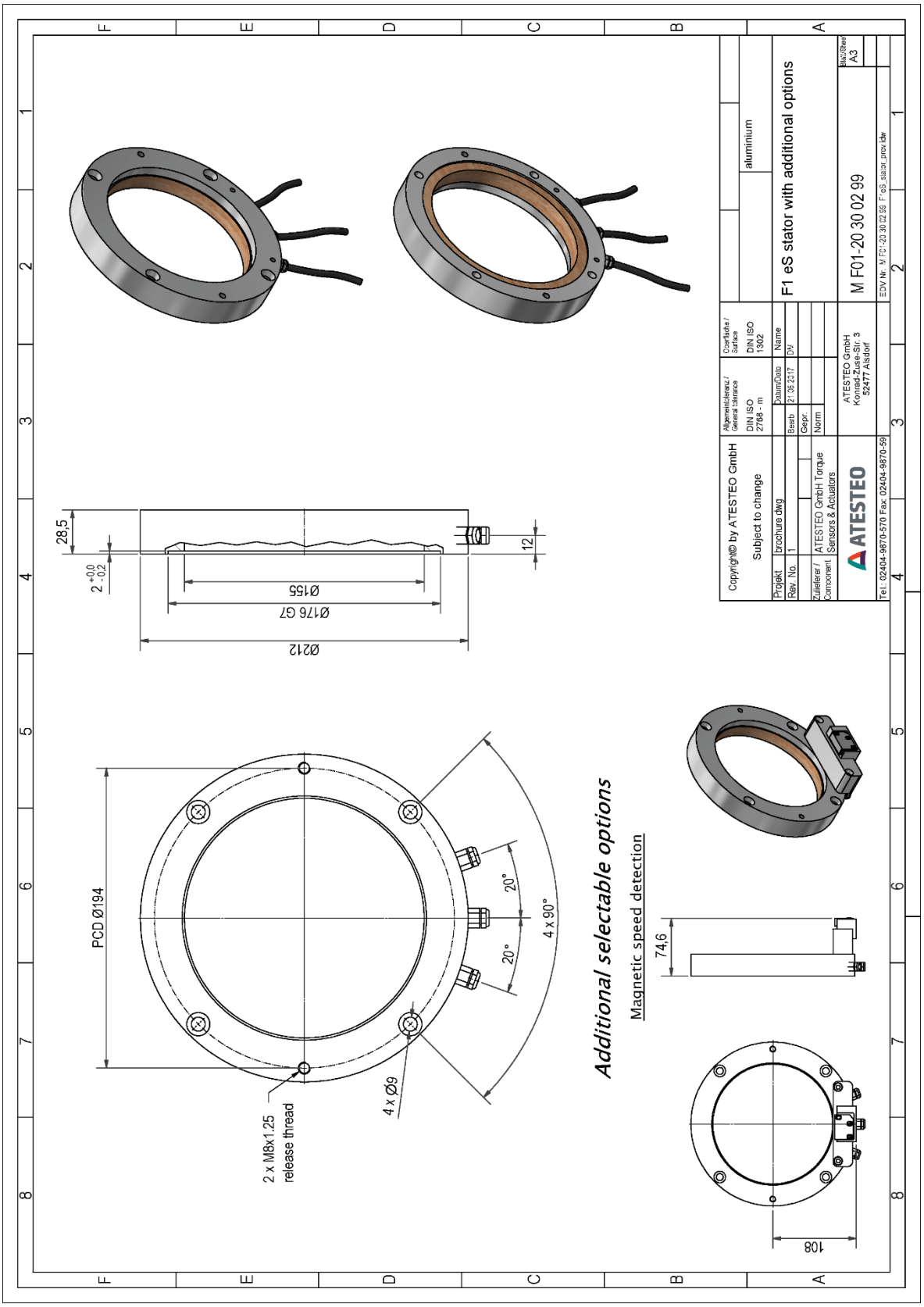
Drawing



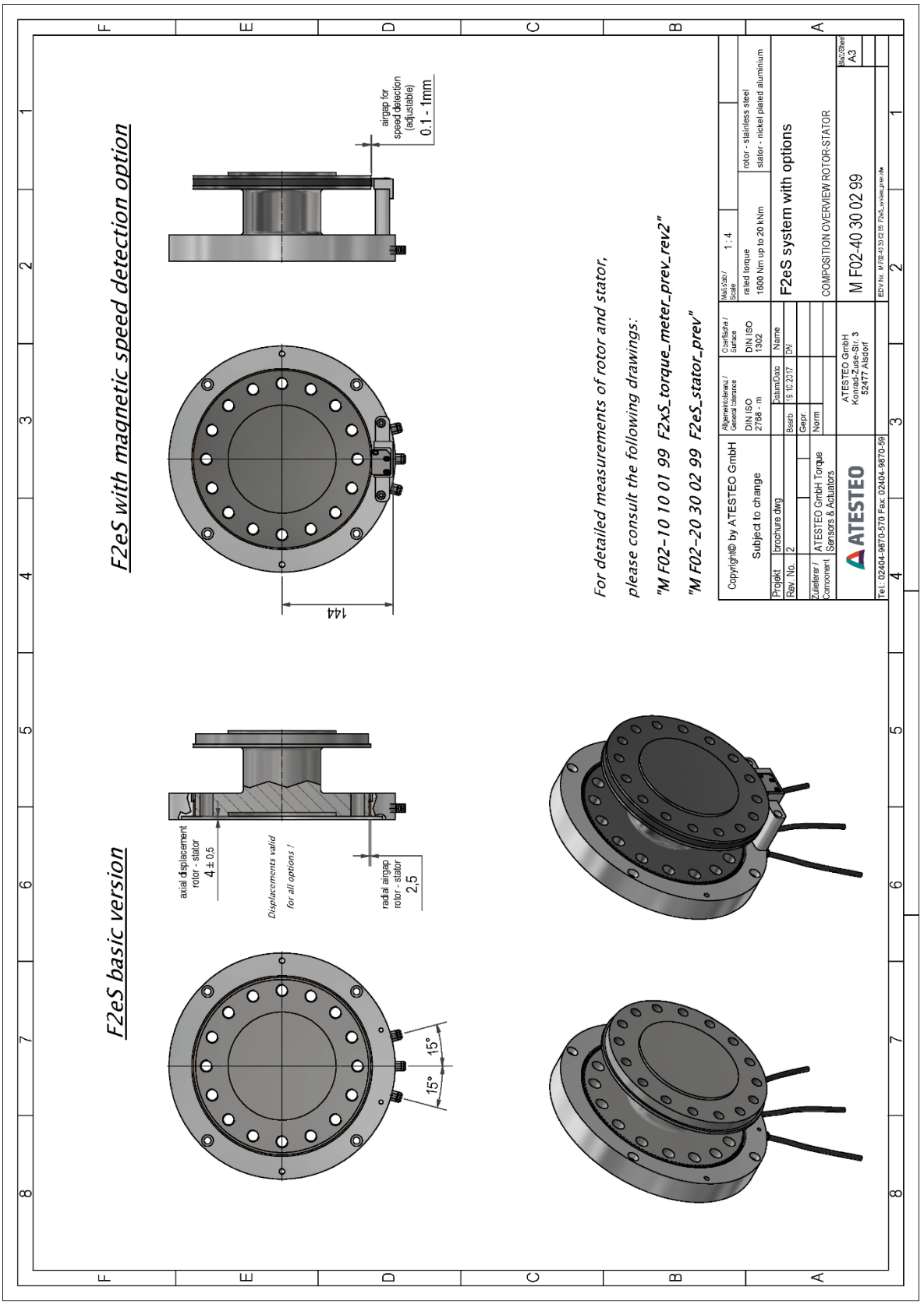
Drawing



Drawing



Drawing



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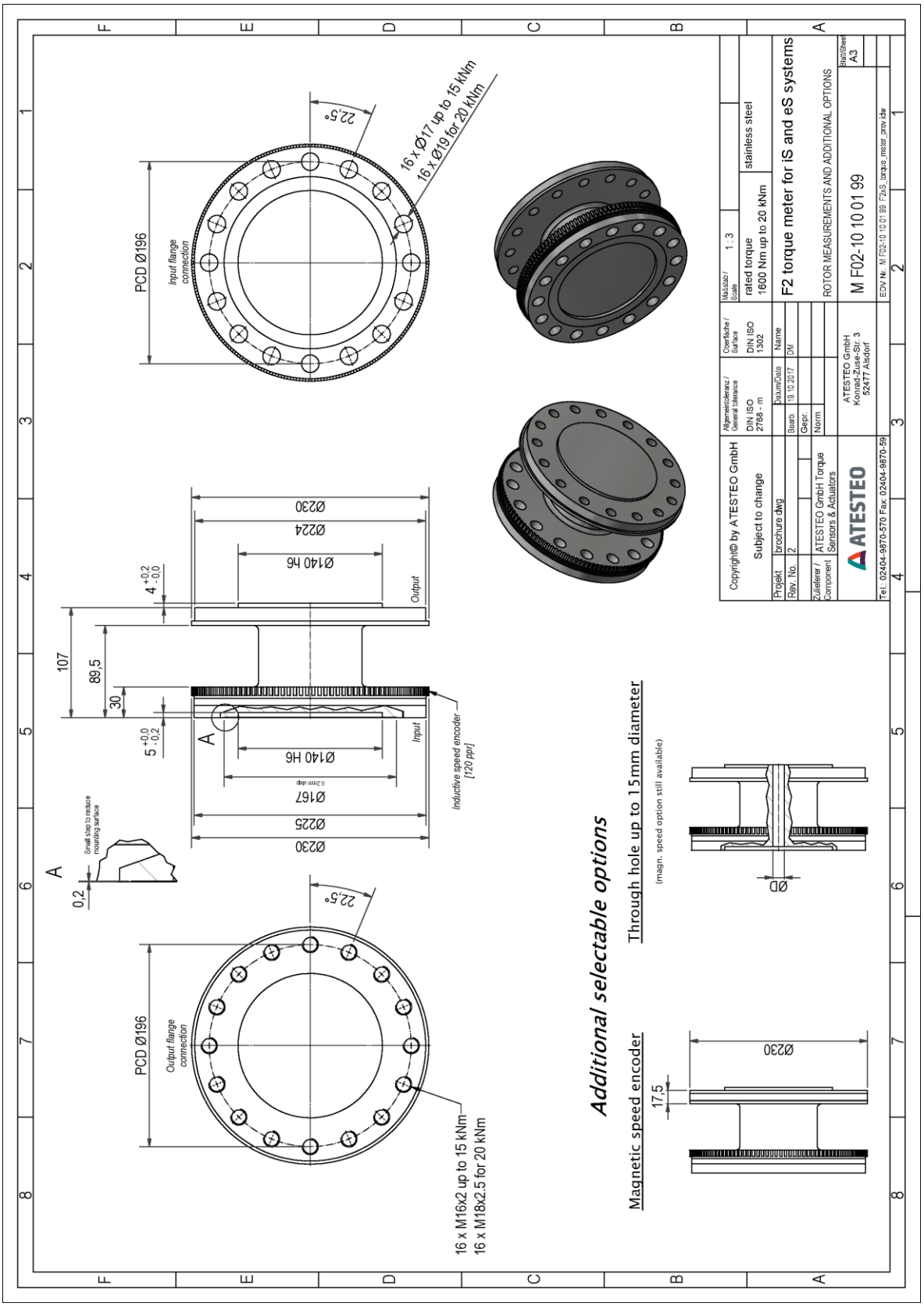

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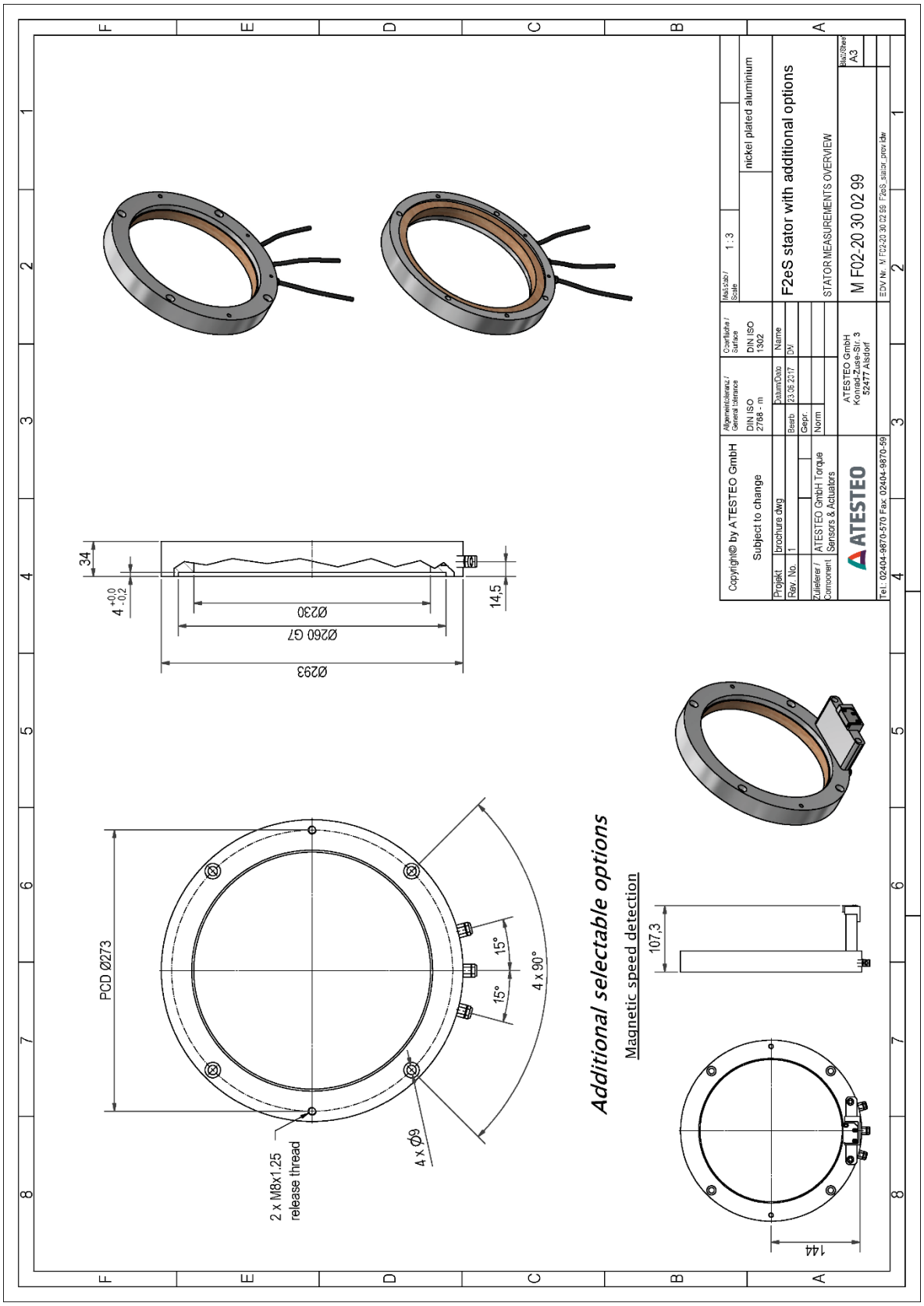

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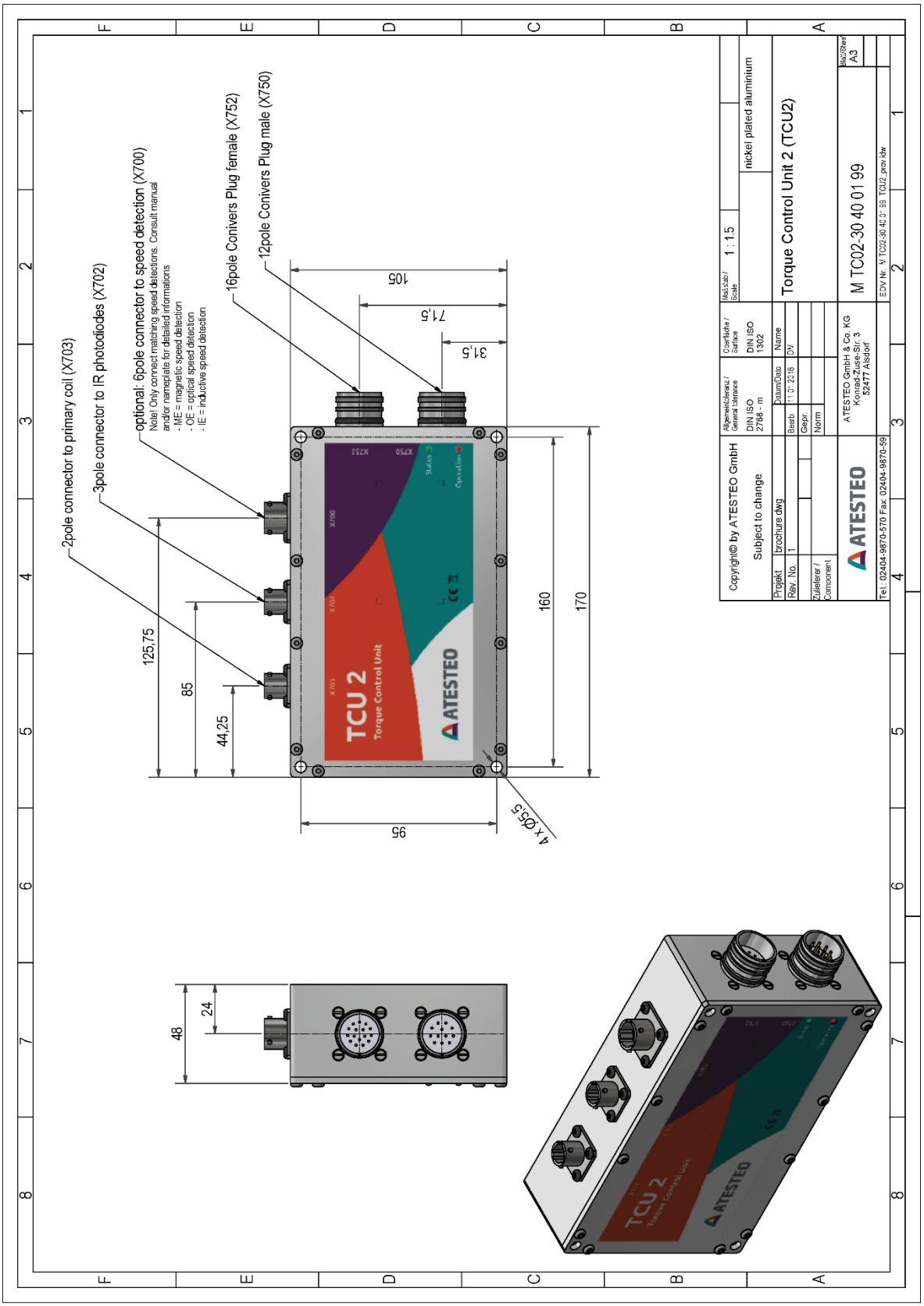

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