

Data sheet

FxiS / FxeS



Technical data

Type	-	F23iS	F23eS
Accuracy class	%	≤±0.05	
Rated torque (Md _n)	Nm	20,000 25,000 30,000	20,000 25,000 30,000

Torque measuring system

Technology	-	Rotating	
Rated torque (Md _n) #1	Nm	20,000 25,000 30,000	20,000 25,000 30,000
Rated torque short measurement range (optional, minimum) (Md _{ns}) #2	Nm	4,000 5,000 6,000	4,000 5,000 6,000
Accuracy class (extended for Md _n)	%	N/A	
Outputs	-	Frequency, Voltage, Current, CAN bus, Alert	
Test signal	-	see test report	

Mechanical dimensions #3

Outer diameter of rotor #4	mm	249
Lengths (Rotor, without centering)	mm	145
Pitch circle diameter #5	mm	218.0

Speeds and speed measuring systems

Speed detection (integrated)	-	inductive
Speed detection (optional)	-	without
Maximum Speed without speed detection system	rpm	13,000
Optional increased speed	rpm	N/A
Maximum speed with magnetic speed encoder	rpm	N/A
Maximum speed with optical speed encoder	rpm	N/A
Maximum speed with inductive speed encoder	rpm	12,500

Torque accuracy class per output type (related to Md_n)

Frequency output	%	≤±0.05
CAN output	%	≤±0.05
Voltage output	%	≤±0.10
Current output	%	≤±0.10
Frequency output (option higher accuracy)	%	N/A
CAN (option higher accuracy)	%	N/A

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Rated torque (Md _n)	Nm	20,000 25,000 30,000	20,000 25,000 30,000

Linearity deviation including hysteresis related to Md_n #6

Frequency, 0%...30%	%	≤±0.015	
Frequency, 30%...60%	%	≤±0.030	
Frequency, 60%...100%	%	≤±0.050	
CAN, 0%...30%	%	≤±0.015	
CAN, 30%...60%	%	≤±0.030	
CAN, 60%...100%	%	≤±0.050	
Voltage output	%	≤±0.10	
Current output	%	≤±0.10	

Rel. standard deviation of the reproducibility according to DIN 1319, by reference to variation of the output signal (rel. to Md_n)

Frequency output	%	≤±0.03	
CAN output	%	≤±0.03	
Voltage output	%	≤±0.05	
Current output	%	≤±0.05	

Temperature influence per 10K in the nominal temperature range on the output signal related to the actual value of signal span (rel. to Md_n)

Frequency output	%	≤±0.05	
CAN output	%	≤±0.05	
Voltage output	%	≤±0.10	
Current output	%	≤±0.10	

Temperature influence per 10K in the nominal temperature range on the zero signal (rel. to Md_n)

Frequency output	%	≤±0.05	
CAN output	%	≤±0.05	
Voltage output	%	≤±0.10	
Current output	%	≤±0.10	

Long-term drift over 48h at reference temperature

Voltage output	mV	<1.0	
Current output	μA	<0.80	

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Rated torque (M _{d1})	Nm	20,000 25,000 30,000	20,000 25,000 30,000

Nominal sensitivity (range between zero torque and rated torque)

Frequency output	kHz	20	
Voltage output	V	5.0 / 10.0 / 2.5 / 5.0	
Current output	mA	8 / 10	

Output signal at zero torque

Frequency output	kHz	60	
Voltage output	V	0.0 / 0.0 / 2.5 / 5.0	
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 / 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 (main TCU)

Frequency output	µs	10	
Voltage output	µs	3,000	
CAN	µs	1,000	

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Rated torque (M _{d1})	Nm	20,000 25,000 30,000	20,000 25,000 30,000

Speed measuring system		Inductive (track at rotor)	
Pulse per rev (PPR)	ppr.	120	
Maximum speeds (related to PPR)	rpm	12,500	
Max. output frequency (RS422)	kHz	25	
Minimum speed for sufficient pulse stability	rpm	>2.5	
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) #7	mm	N/A	
Tolerance to nominal axial displacement (rotor - stator)	mm	N/A	
Speed measuring system		Optical	
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 radial displacement (rotor - stator)	mm	N/A	
Tolerated radial displacement (rotor - stator) #7	mm	N/A	
Nominal axial displacement (rotor - stator) #7	mm	N/A	
Tolerance to nominal axial displacement (rotor - stator)	mm	N/A	

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Rated torque (M _{d1})	Nm	20,000	20,000
		25,000	25,000
		30,000	30,000

Angular measuring system			
Pulses per rev	ppr	N/A	
Resolution	°	N/A	
Output signals	-	N/A	
Measurement ranges	°	N/A	

Technical data

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Accuracy class	%	±0.05	
Rated torque (Md _n)	Nm	20,000 25,000 30,000	20,000 25,000 30,000
Temperature ranges			
Nominal temperature range (<i>Rotor</i>)	°C	0...80	
Operating temperature range (<i>Rotor</i>) #8	°C	-20...85	
Storage temperature range (<i>Rotor</i>)	°C	-30...85	
Nominal temperature range (<i>Stator</i>)	°C	0...70	0...80
Operating temperature range (<i>Stator</i>) #9	°C	-20...70	-20...85
Storage temperature range (<i>Stator</i>)	°C	-30...85	
Nominal temperature range (<i>TCU</i>)	°C	N/A	0...70
Operating temperature range (<i>TCU</i>)	°C	N/A	-20...70
Storage temperature range (<i>TCU</i>)	°C	N/A	-30...85
Mechanical shock (EN 60068-2-27)			
Quantity	-	1,000	
Duration	ms	3	
Acceleration	m/s ²	650	
Vibration load (EN 60068-2-6)			
Frequency	Hz	10...2,000	
Duration	min.	150	
Acceleration	m/s ²	200	
Load limits #10			
Limit torque, related to Md _n	%	225 225 200	225 225 200
Breaking torque approx., related to Md _n	%	450 450 400	450 450 400
Axial limit force	kN	138.00 167.00 192.00	138.00 167.00 192.00
Lateral limit force	N	18,620.00 22,732.00 26,354.00	18,620.00 22,732.00 26,354.00
Bending limit torque	Nm	2,020.00 2,545.00 3,035.00	2,020.00 2,545.00 3,035.00

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Rated torque (Md _n)	Nm	20,000	20,000
		25,000	25,000
		30,000	30,000

Mechanical values			
Torsional stiffness	kNm/rad	1,180	1,180
		14,560	14,560
		16,960	16,960
Angle of twist at Md _n	°	0.097	0.097
		0.098	0.098
		0.101	0.101
Axial stiffness	kN/mm	2,770	2,770
		3,342	3,342
		3,856	3,856
Radial stiffness	kN/mm	1,034	1,034
		1,262	1,262
		1,464	1,464
Bending stiffness	kNm/°	118.00	118.00
		149.00	149.00
		178.00	178.00
Deflection at axial limit force	mm	<0.06	
Additional radial deviation at lateral limit force	mm	<0.02	
Parallel deviation at bending limit torque	mm	<0.08	
Inherent frequency	Hz	1,700	1,700
		1,900	1,900
		2,100	2,100
Balance quality-level (DIN ISO 1949)	-	G2.5	
Inertia of rotor	kgm ²	0.1485	0.1485
		0.1524	0.1524
		0.1558	0.1558
Max. limits for relative shaft vibration (peak to peak) #11	µm	$s_{(p-p)} = \frac{9000}{\sqrt{n}}$	

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		25,000	25,000
		30,000	30,000

Weight approx.

Rotor #12	kg	19.3 20.1 22.0	19.3 20.1 22.0
Stator (without speed encoder) #12	kg	2.30	1.10

Mounting distances (without optional speed detection system)

Nominal radial displacement (rotor - stator)	mm	3.0
Tolerance to nominal radial displacement (rotor - stator)	mm	±0.2
Nominal axial displacement (rotor - stator) #7	mm	10
Tolerance to nominal axial displacement (rotor - stator)	mm	+0.5/-0.5

Flatness and concentricity tolerances rotor

Circular run-out-axial tolerance #13	mm	0.03
Circular run-out-radial tolerance #13	mm	0.03

Power supply

Nominal supply	V (DC)	24
Supply range #14	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

Load resistance

Frequency output	-	RS422
Voltage output	kOhm	≥5

Dynamic

Frequency output	kHz	≤7
Voltage output	kHz	≤1
Current output	kHz	≤1
CAN output conversation rate	1/s	≤1,000

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		25,000	25,000
		30,000	30,000

Miscellaneous			
Protection class (rotor)	-	IP54	
Protection class (stator)	-	IP54	
Protection class (rotor, extended)	-	On request	
Protection class (stator, extended)	-	On request	
Pitch circle screw information	-	16 * M20 (12.9)	
CAN	-	2B	
Configuration interface	-	RS232	
Central hole	mm	N/A	
Material	-	Steel	
Measuring range (related to Md _n)	%	120	
Compatible evaluation units (TCU)	-	Integrated	TCU2
Stator type	-	iS	eS
Sales information			
Article number	-	10000050	10001406
U.S. FCC certificate	-	Not required	

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	Dimensions	Mechanical dimensions are without engagement. Use the drawings and step files as master for your constructions.
#4	Detail in the drawings	Value can vary by optional components. Please find details to this attribute in the integrated drawings.
#5	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.
#6	Linearity	Values of Linearity deviation incl. Hysteresis can only be reached if positive and negative sensitivity values are used.
#7	Reference planes	Please check the drawings for information about the reference planes of this attribute.
#8	Temperature range (rotor)	No condensation allowed.
#9	Temperature range (stator)	No condensation allowed. Temperature related to housing ground point.
#10	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.

Remarks and information

Link no.	Topic	Remark
#11	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."
#12	Weights	Weights are related to components without options like speed detection system. Please contact us for exact weight information of options.
#13	Flatness and concentricity tolerances	The parameters of "Flatness and concentricity tolerances rotor" are manufacturing tolerances.
#14	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.

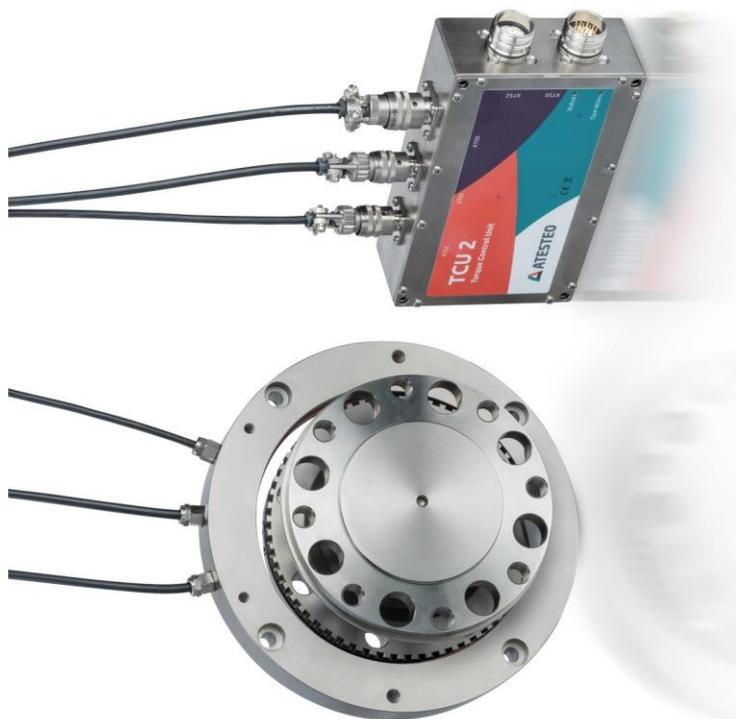
Drawing

iS



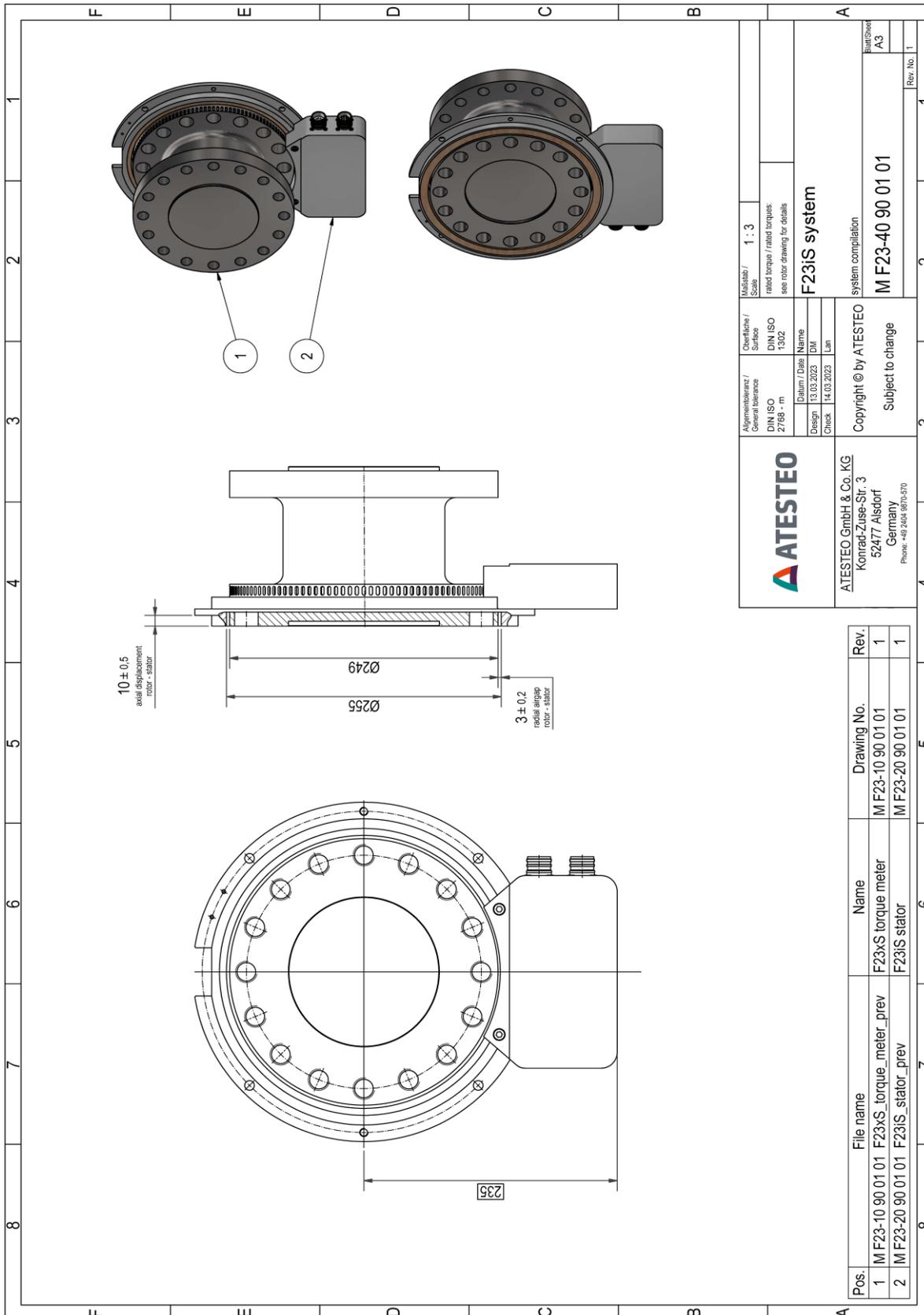
Rotor & stator with integrated evaluation unit (TCU)
Rotor & Stator mit integrierter Auswerteeinheit (TCU)

eS



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

Drawing



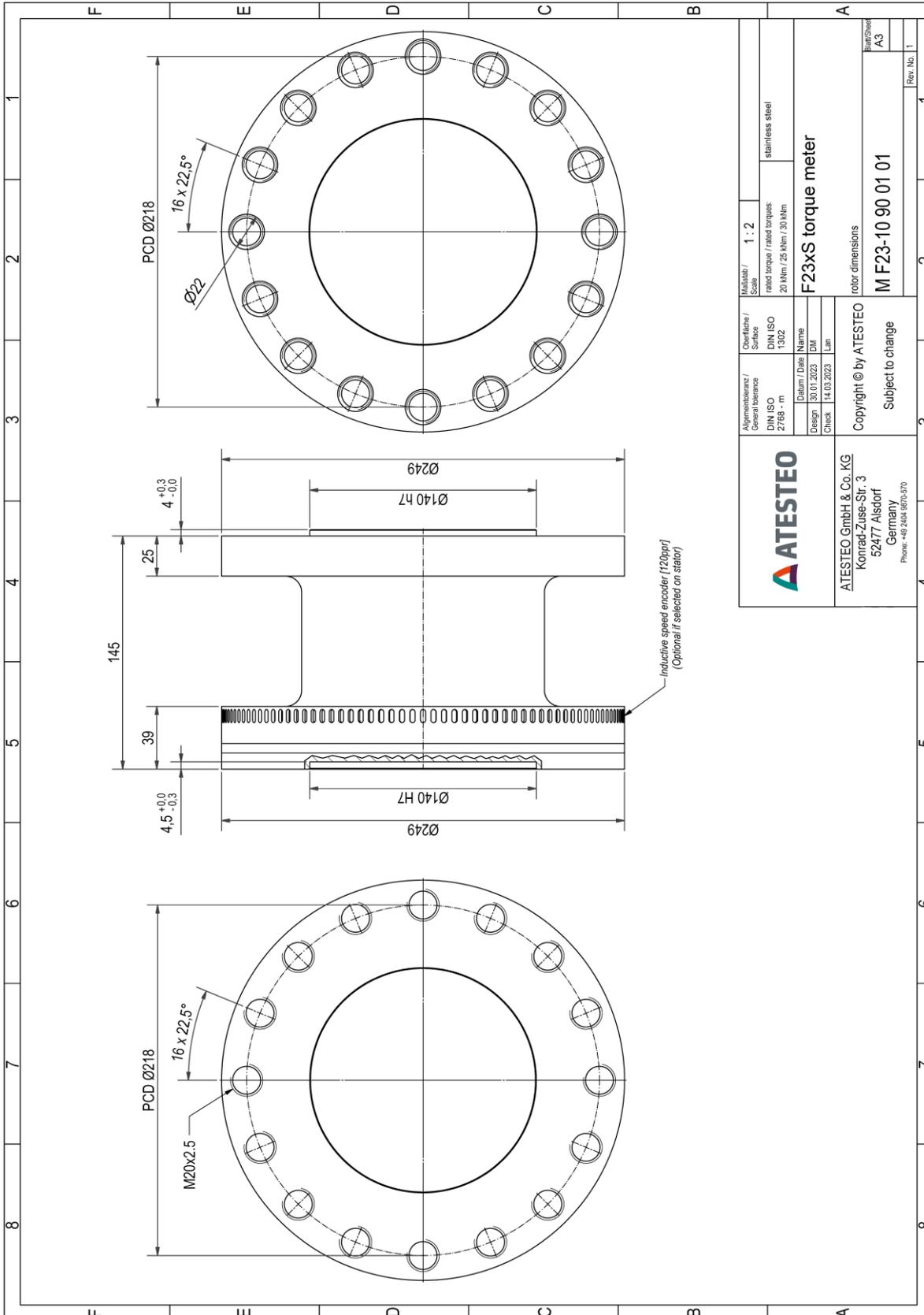
ATESTEO ATESTEO GmbH & Co. KG Konrad-Zuse-Str. 3 52477 Aisdorf Germany Phone: +49 2404 990-570		Alignment / General tolerance DIN ISO 2768 - m	Cleanliness / Surface DIN ISO 1302	Multiplier / Scale 1 : 3 rated torque / rated torques: see rotor drawing for details
Design 13.03.2023 Check 14.03.2023		Date / Date 13.03.2023 14.03.2023	Name F23iS system	System compilation M F23-40 90 01 01
Copyright © by ATESTEO Subject to change		Rev. No. 1		

Pos.	File name	Name	Drawing No.	Rev.
1	M F23-10 90 01 01 F23xS_torque_meter_prev	F23xS torque meter	M F23-10 90 01 01	1
2	M F23-20 90 01 01 F23iS_stator_prev	F23iS stator	M F23-20 90 01 01	1

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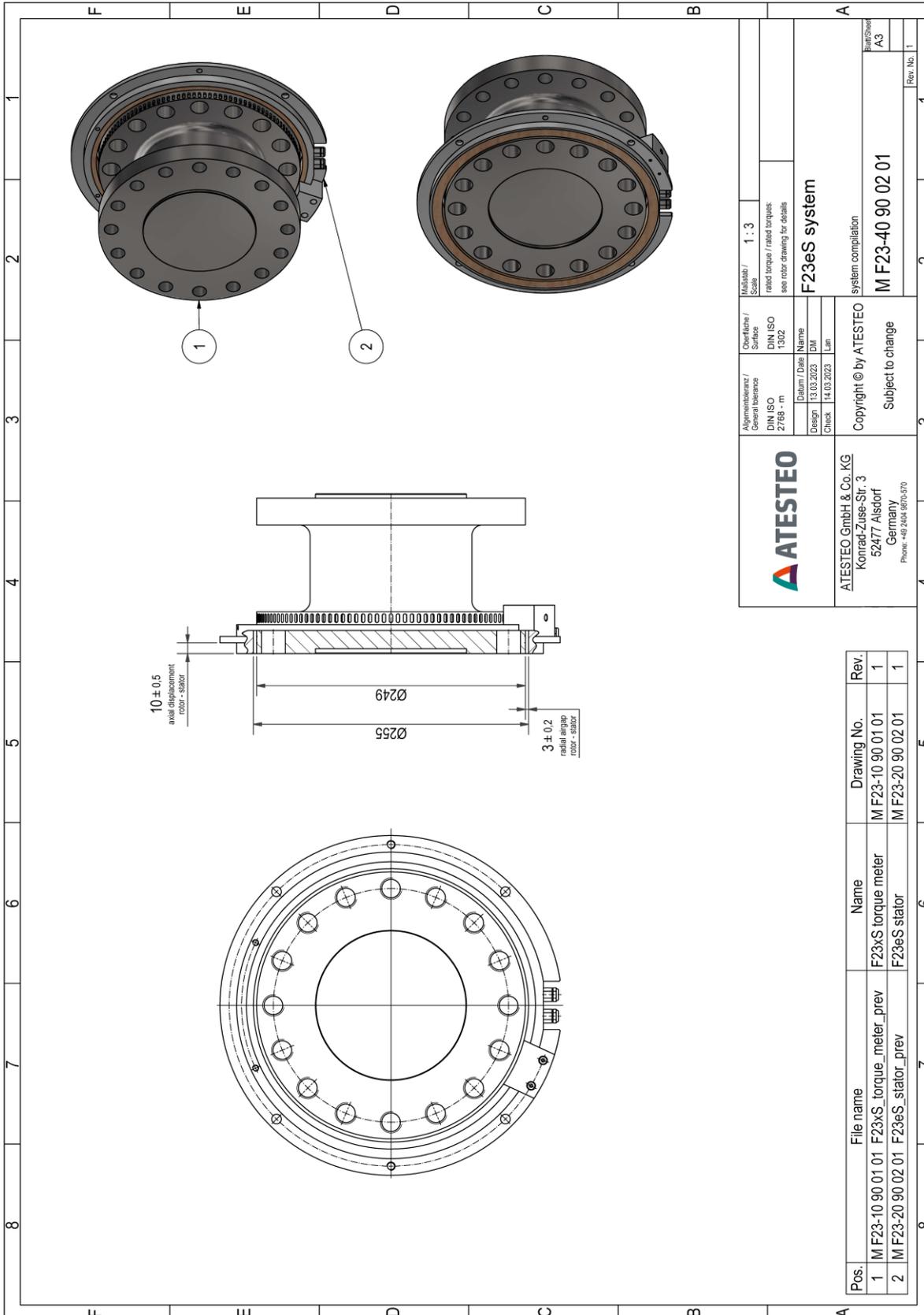
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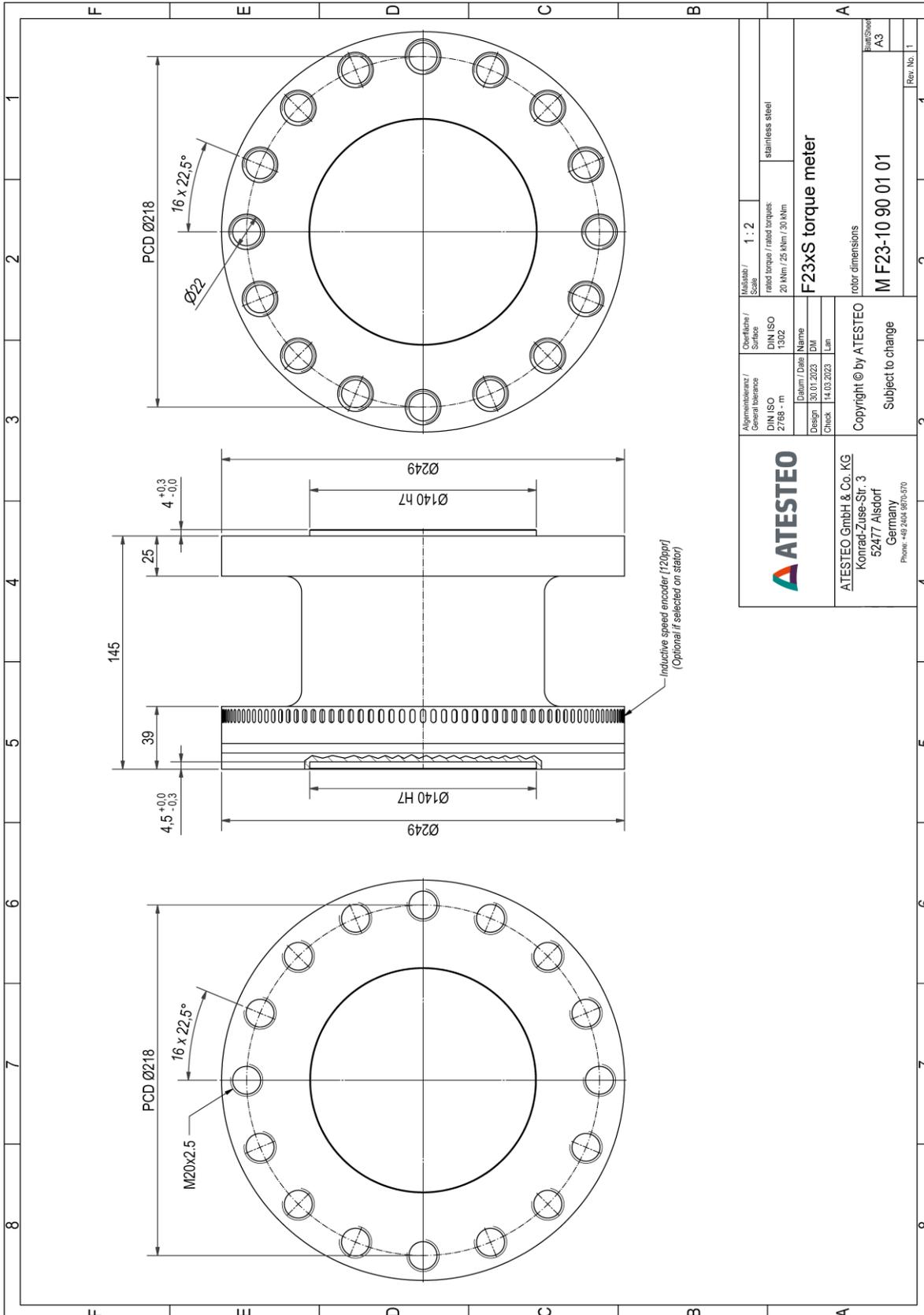
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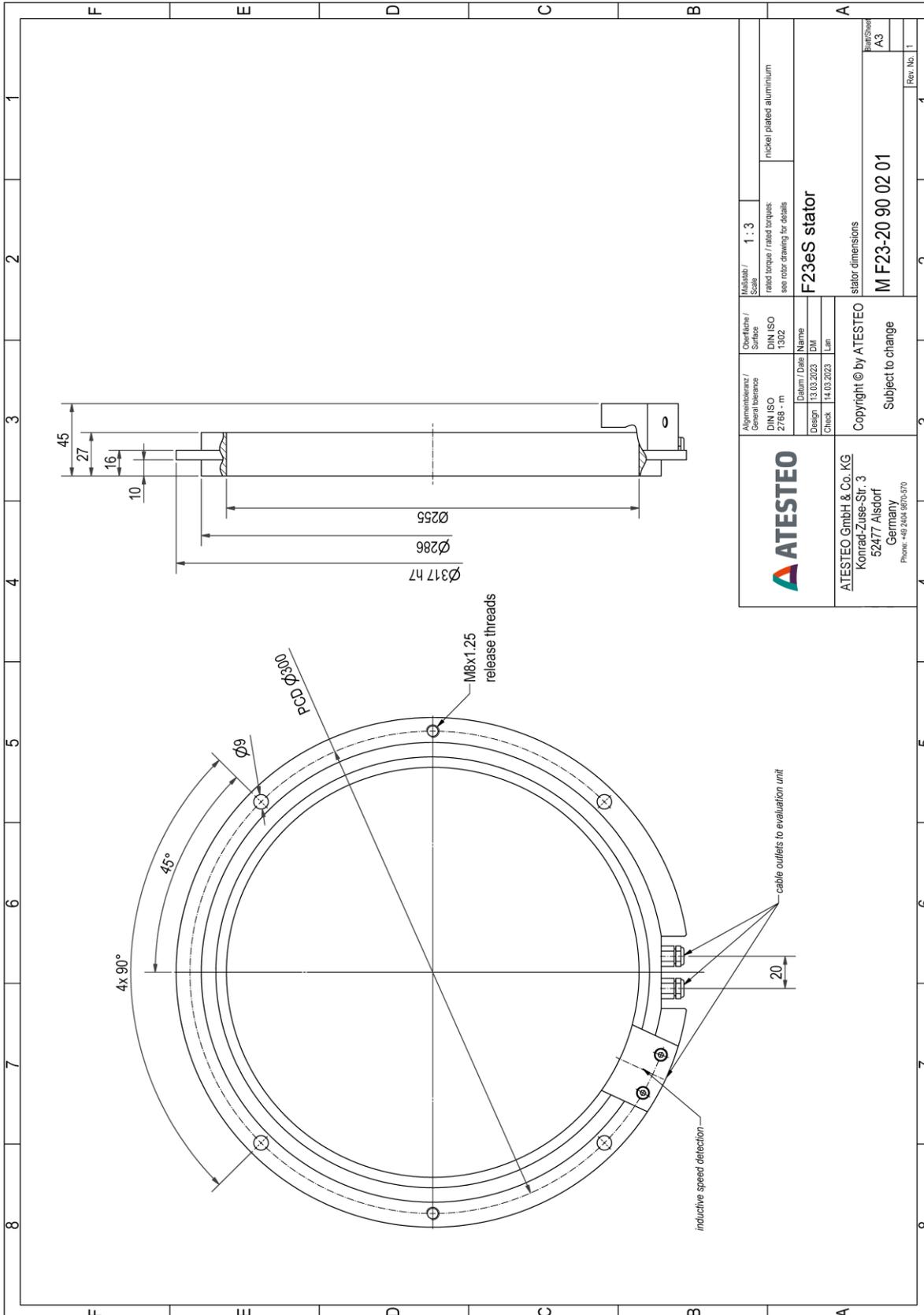
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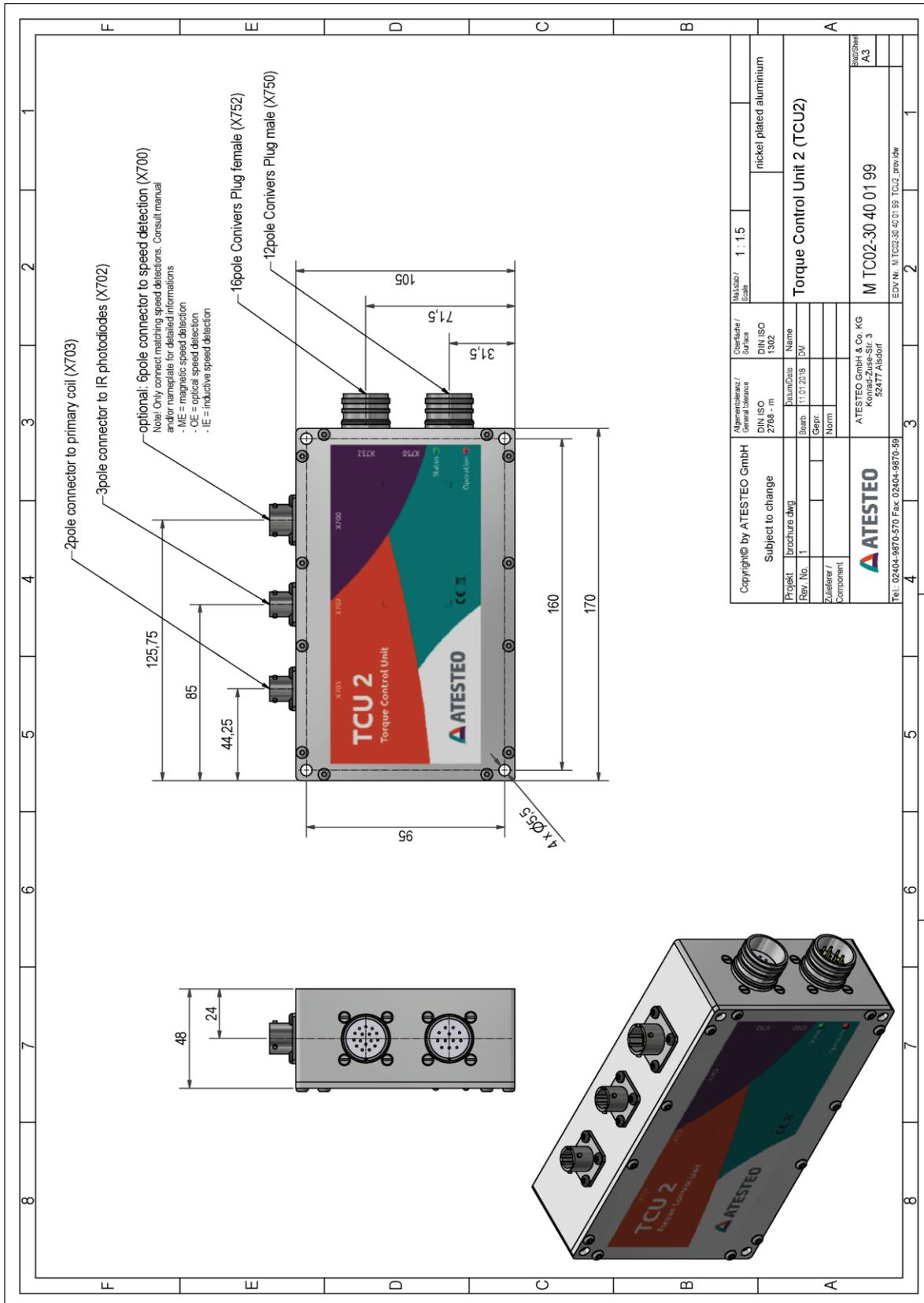
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