

Data sheet

RT11eS-B



Technical data

Type	-	RT11eS-B ETP	RT11eS-B RW
Accuracy class	%	≤±0.03	
Rated torque (Md _n)	Nm	5 10 15 20	5 10 15 20

Torque measuring system			
Technology	-	Rotating	
Rated torque (Md _n) #1	Nm	5 10 15 20	5 10 15 20
Rated torque short measurement range (optional, minimum) (Md _{ns}) #2	Nm	2 2 3 4	2 2 3 4
Accuracy class extended (for Md _n)	%	≤±0.03	
Outputs	-	Frequency (RS422), Voltage, Current, CAN bus, Alert	
Test signal	-	see test report	

Mechanical dimensions #3			
Outer diameter of rotor #4	mm	77	
Lengths (Rotor, without centering)	mm	81	62
Pitch circle diameter #5	mm	63.0	

Speeds and speed measuring systems			
Speed detection (integrated)	-	without	
Speed detection (optional)	-	without	
Maximum Speed without speed detection system	rpm	25,000	32,000
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	N/A	

Torque accuracy class per output type (related to Md _n)			
Frequency output	%	≤±0.03	
CAN output	%	≤±0.03	
Voltage output	%	≤±0.05	
Current output	%	≤±0.05	
Frequency output (option higher accuracy)	%	≤±0.03	
CAN (option higher accuracy)	%	N/A	

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Rated torque (Md _n)	Nm	5 10 15 20	5 10 15 20
Linearity deviation including hysteresis related to Md _n #6			
Frequency, 0%...30%	%	≤±0.010	
Frequency, 30%...60%	%	≤±0.020	
Frequency, 60%...100%	%	≤±0.030	
CAN, 0%...30%	%	≤±0.010	
CAN, 30%...60%	%	≤±0.020	
CAN, 60%...100%	%	≤±0.030	
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 (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	%	≤±0.03	
CAN output	%	≤±0.03	
Voltage output	%	≤±0.05	
Current output	%	≤±0.05	
Temperature influence per 10K in the nominal temperature range on the zero signal (rel. to Md _n)			
Frequency output	%	≤±0.03	
CAN output	%	≤±0.03	
Voltage output	%	≤±0.05	
Current output	%	≤±0.05	
Long-term drift over 48h at reference temperature			
Voltage output	mV	<1.0	
Current output	μA	<0.80	

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Accuracy class	%	≤±0.03	
Rated torque (Md _n)	Nm	5	5
		10	10
		15	15
		20	20
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 bus	μs	1,000	

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Speed measuring system		Inductive (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) #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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Angular measuring system		
Requirement	-	N/A
Pulses per rev	ppr.	N/A
Resolution	°	N/A
Output signals	-	N/A
Measurement ranges	°	N/A

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Rated torque (Md _n)	Nm	5	5
		10	10
		15	15
		20	20
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...80	
Operating temperature range (<i>Stator</i>) #9	°C	-20...85	
Storage temperature range (<i>Stator</i>)	°C	-30...85	
Nominal temperature range (<i>TCU</i>)	°C	0...70	
Operating temperature range (<i>TCU</i>)	°C	-20...70	
Storage temperature range (<i>TCU</i>)	°C	-30...85	
Mechanical shock (EN 60068-2-27)			
Quantity	-	1,000	
Duration	ms	3	
Acceleration	m/s²	650	
Vibration load (EN 60068-2-6)			
Frequency	Hz	10...2,000	
Duration	min.	150	
Acceleration	m/s²	200	
Load limits #10			
Limit torque, related to Md _n	%	700	
Breaking torque approx., related to Md _n	%	1,000	
Axial limit force	kN	0.80	0.80
		1.00	1.00
		1.15	1.15
		1.30	1.30
Lateral limit force	N	83.00	83.00
		133.50	133.50
		177.00	177.00
		216.00	216.00
Bending limit torque	Nm	2.50	2.50
		4.40	4.40
		5.90	5.90
		7.20	7.20

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Accuracy class	%	≤±0.03	
Rated torque (Md _n)	Nm	5	5
		10	10
		15	15
		20	20
Mechanical values			
Torsional stiffness	kNm/rad	2.95	2.95
		6.35	6.35
		9.95	9.95
		13.45	13.45
Angle of twist at Md _n	°	0.097	0.097
		0.090	0.090
		0.086	0.086
		0.085	0.085
Axial stiffness	kN/mm	40	40
		50	50
		59	59
		66	66
Radial stiffness	kN/mm	2.96	2.96
		4.78	4.78
		6.33	6.33
		7.71	7.71
Bending stiffness	kNm/°	0.04	0.04
		0.07	0.07
		0.10	0.10
		0.13	0.13
Deflection at axial limit force	mm	<0.03	
Additional radial deviation at lateral limit force	mm	<0.02	
Parallel deviation at bending limit torque	mm	N/A	
Inherent frequency	Hz	1,650	1,650
		2,050	2,050
		2,300	2,300
		2,500	2,500
Balance quality-level (DIN ISO 1949)	-	G2.5	
Inertia of rotor	kgm²	0.0002	
Max. limits for relative shaft vibration (peak to peak) #11	µm	$S_{(p-p)} = \frac{9000}{\sqrt{n}}$	

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Rated torque (Md _n)	Nm	5	5
		10	10
		15	15
		20	20
Weight approx.			
Rotor #12	kg	0.28	0.28
		0.28	0.28
		0.30	0.30
		0.30	0.30
Stator (without speed encoder) #12	kg	0.20	
Mounting distances (without optional speed detection system)			
Nominal radial displacement (rotor - stator)	mm	1.5	
Tolerance to nominal radial displacement (rotor - stator)	mm	≤±0.2	
Nominal axial displacement (rotor - stator) #7	mm	0	
Tolerance to nominal axial displacement (rotor - stator)	mm	≤±0.5	
Flatness and concentricity tolerances rotor			
Circular run-out-axial tolerance #13	mm	0.01	
Circular run-out-radial tolerance #13	mm	0.01	
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	<1	
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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		10	10
		15	15
		20	20
Miscellaneous			
Protection class (<i>Rotor</i>)	-	IP54	
Protection class (<i>Stator</i>)	-	IP54	
Protection class (rotor, extended)	-	N/A	
Protection class (stator, extended)	-	On request	
Pitch circle screw information	-	8 * M6 (8.8)	8 * M6 (8.8)
		8 * M6 (8.8)	8 * M6 (8.8)
		8 * M6 (10.9)	8 * M6 (10.9)
		8 * M6 (10.9)	8 * M6 (10.9)
CAN bus type	-	2B	
Configuration interface	-	RS232	
Central hole	mm	N/A	
Material	-	Titanium	
Measuring range (related to Md _n)	%	120	
Compatible evaluation units (TCU)	-	TCU2	
Stator type	-	eS	
Sales information			
Article number	-	10001457	10001476
U.S. FCC certificate	-	Not required	

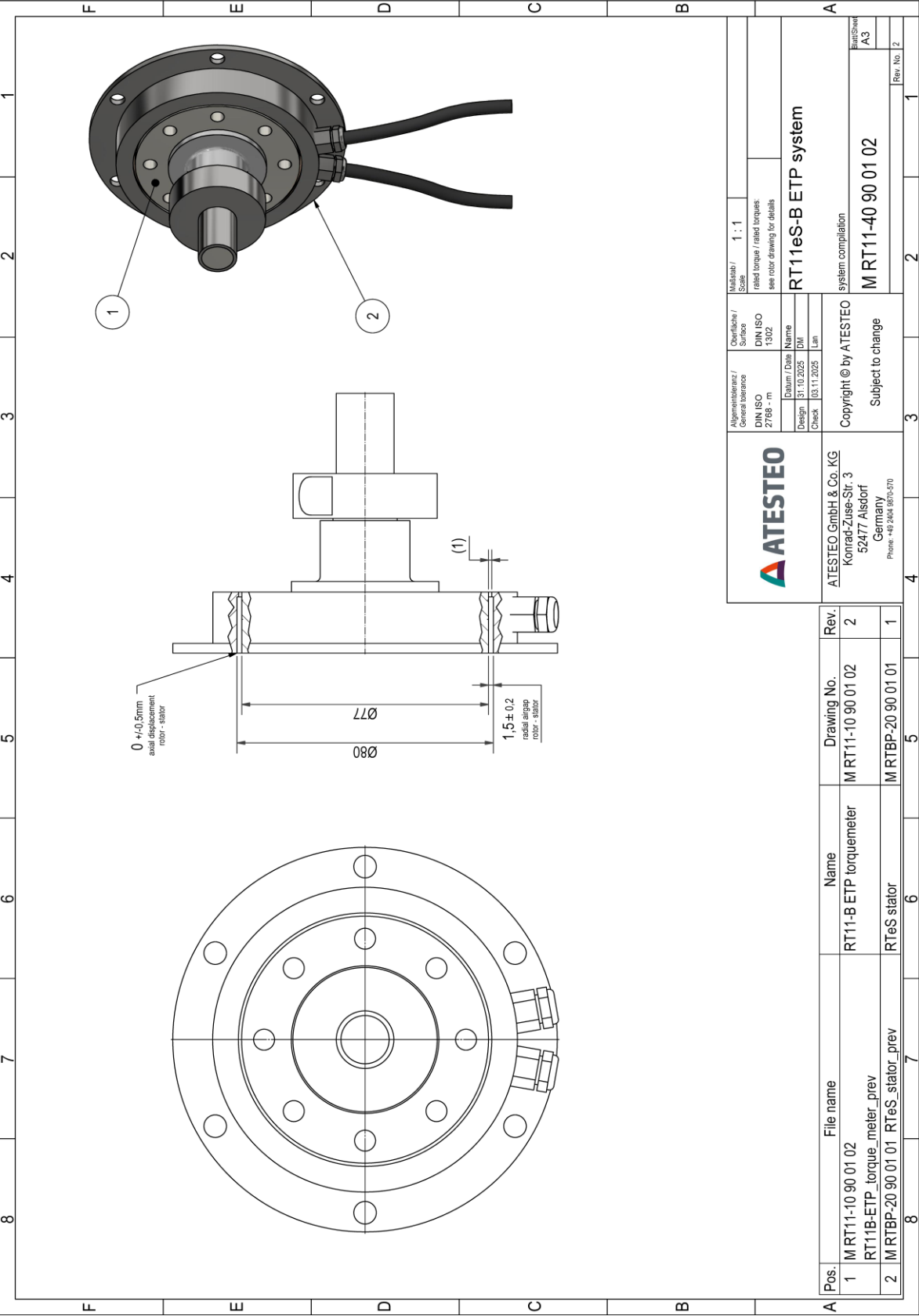
Remarks and information

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	Details 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. Limit and break torque are lower if other loads are applied (such as lateral forces).

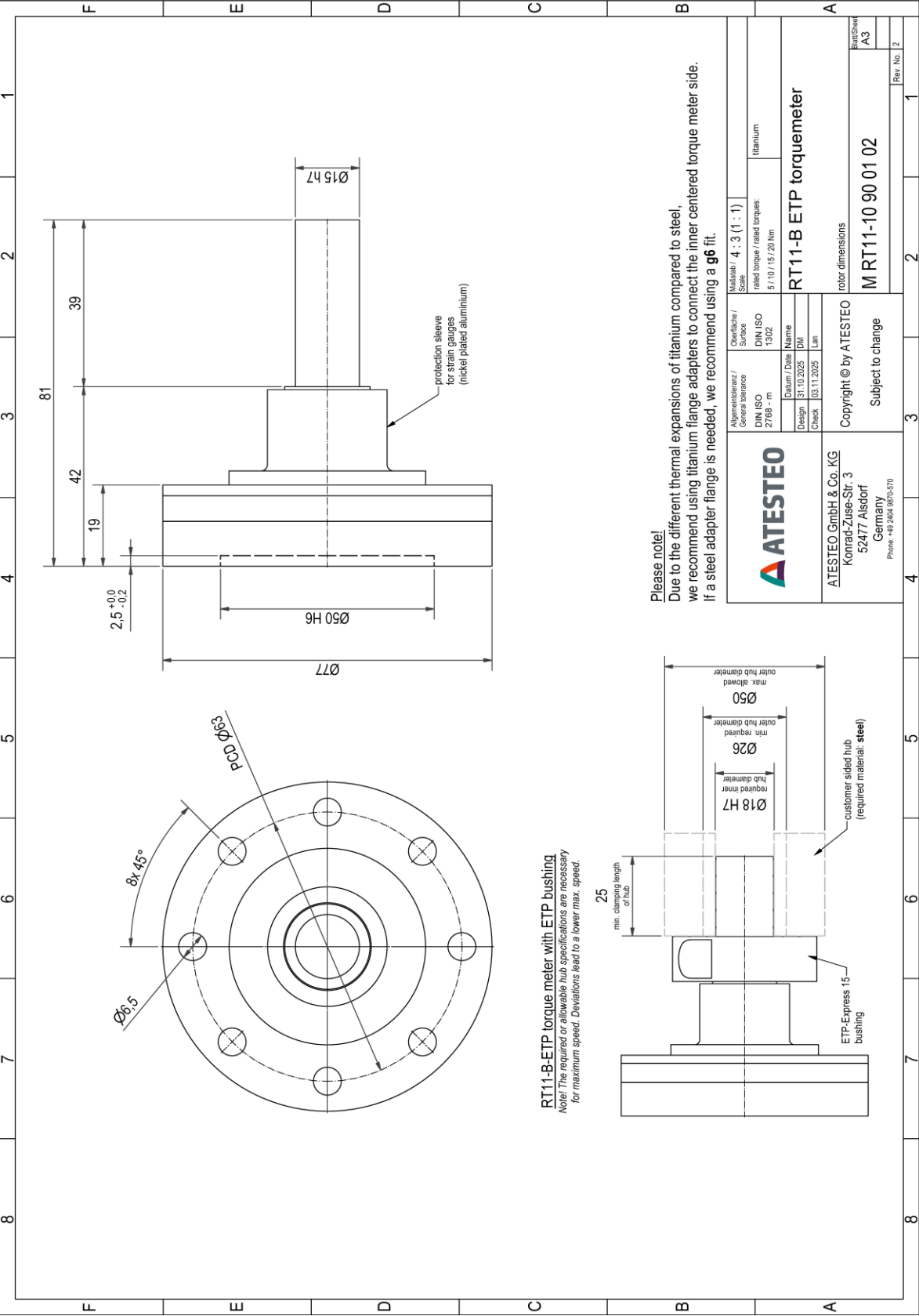
Remarks and information

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.

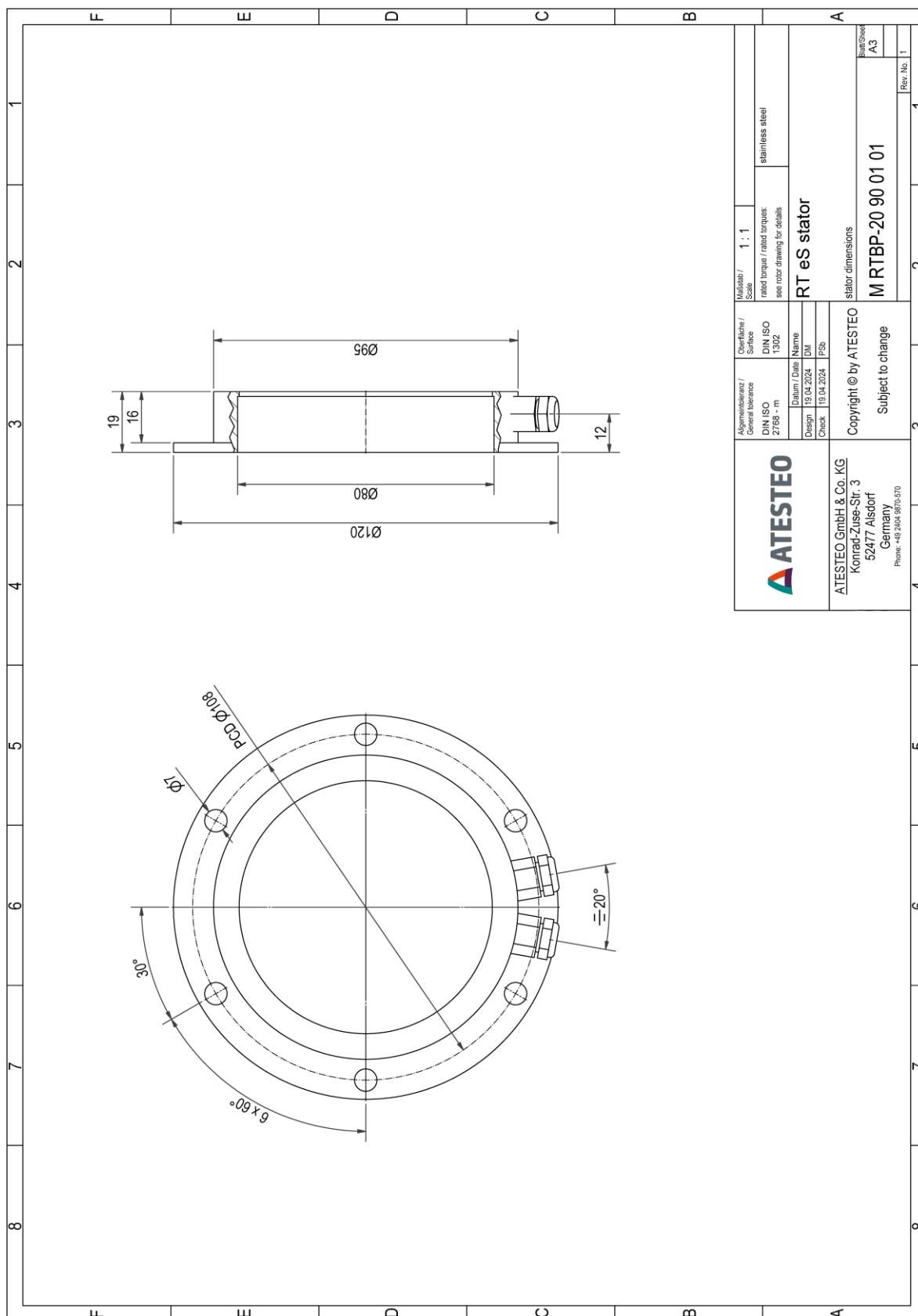
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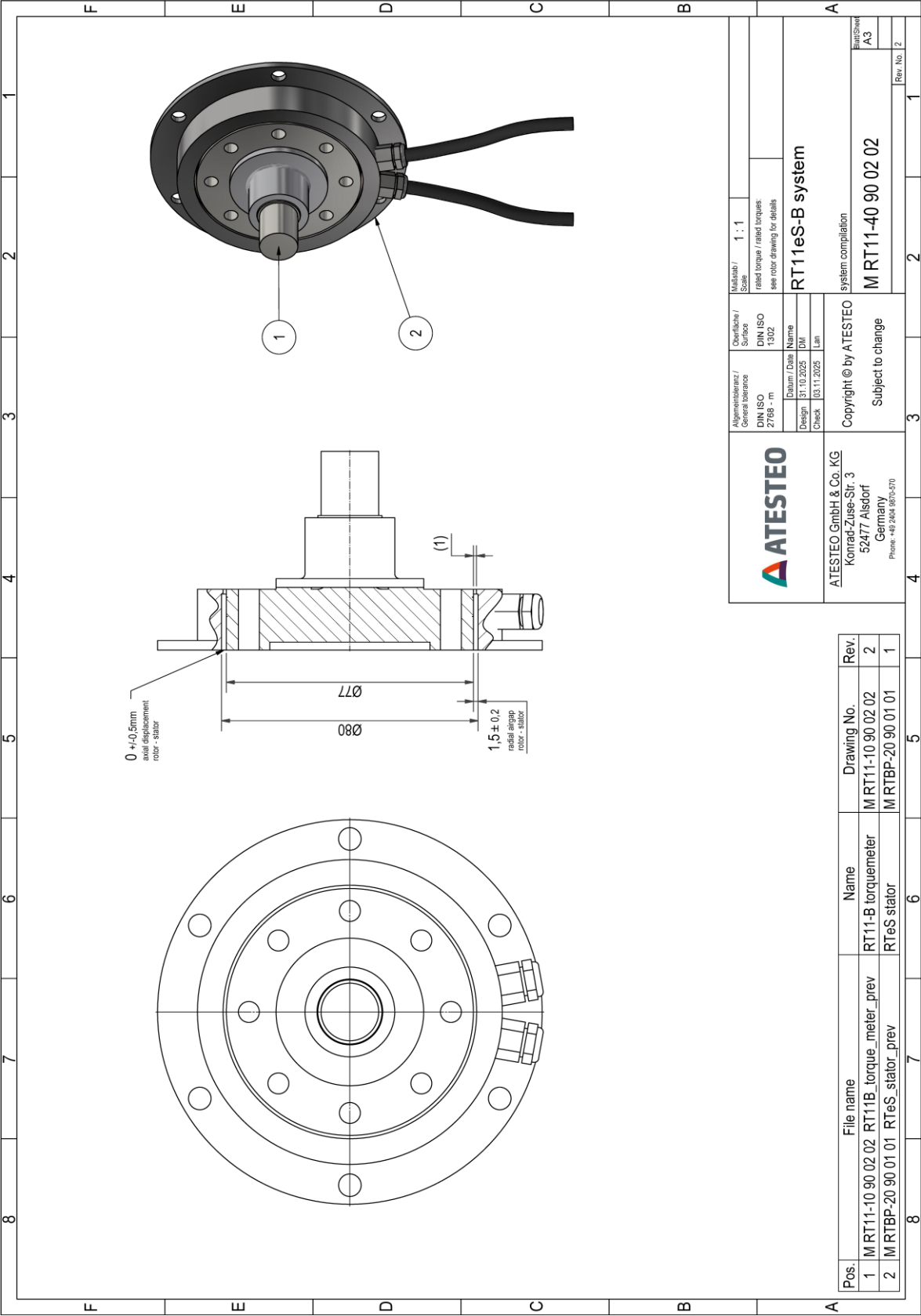
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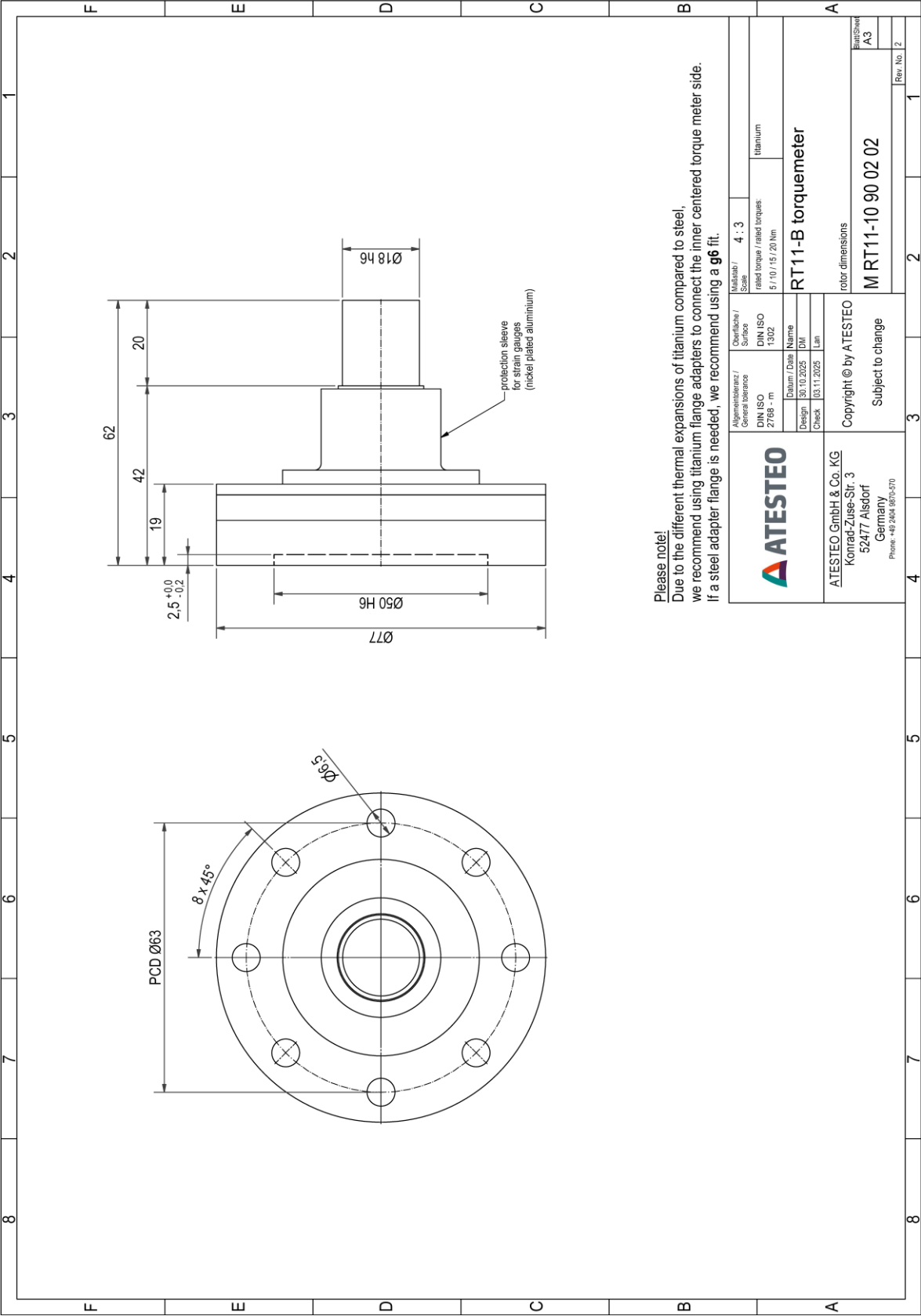
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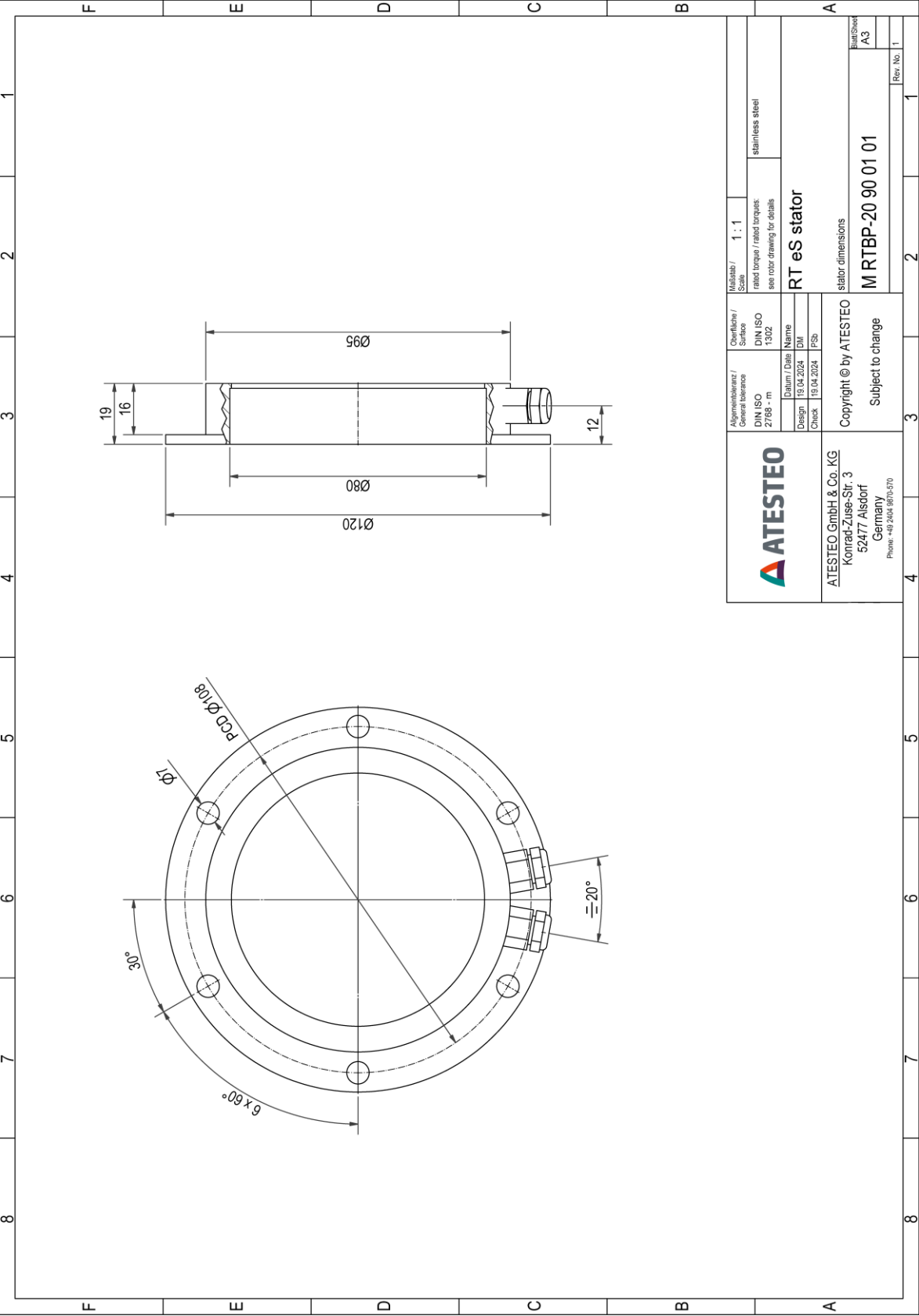
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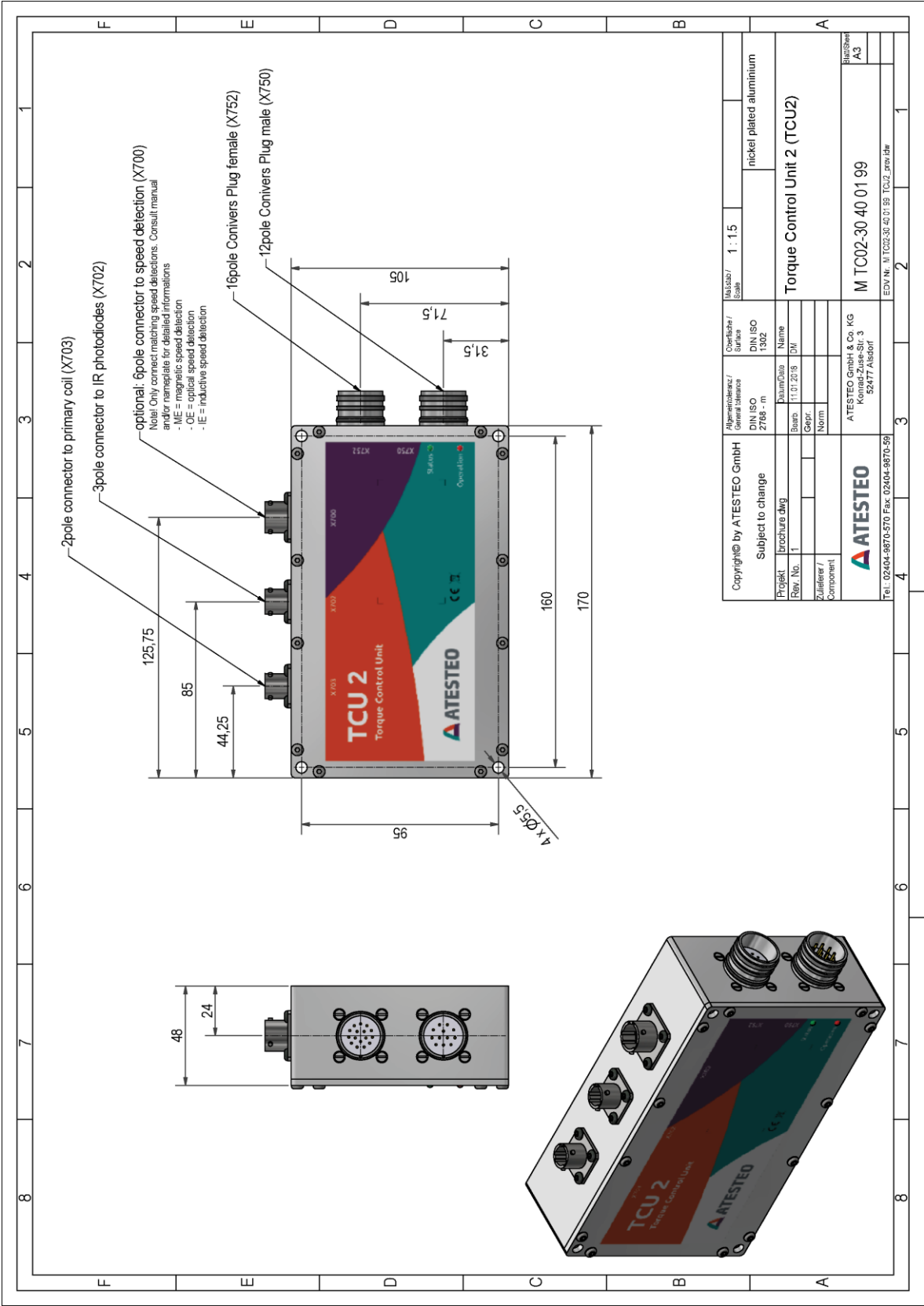
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ATESTEO GmbH & Co. KG
Konrad-Zuse-Straße 3
52477 Alsdorf
Germany

Phone +49 (0) 2404 9870 - 0
Email info@atesteo.com

<https://www.atesteo.com/en/>