ATESTEO

Excellence in drivetrain testing

Data sheet

RT11eS

RT11eS

Technical data

Type	-	RT11eS		
Accuracy class	%		≤±0.03	
Rated torque (Md_n)	Nm	5 10	20 25	50

Torque measuring system				
Technology	-		Rotating	
Rated torque (Md_n) #1	Nm	5 10	20 25	50
Rated torque short measurement range (optional, minimum) (Md_{ns}) #2	Nm	1 2	4 5	10
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		50	
Pitch circle diameter #5	mm		63.00 / 40.00	
Speeds and speed measuring systems				
Speed detection (integrated)	-		without	
Speed detection (optional)	-		without	
Maximum Speed without speed detection system	rpm		20,000	
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	

RT11eS

Technical data

Type	-	RT11eS		
Accuracy class	%		≤±0.03	
Rated torque (Md_n)	Nm	5 10	20 25	50

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

Technical data

Type	-	RT11eS		
Accuracy class	%		≤±0.03	
Rated torque (Md_n)	Nm	5 10	20 25	50

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

Technical data

Type	-	RT11eS		
Accuracy class	%		≤±0.03	
Rated torque (Md_n)	Nm	5 10	20 25	50

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	

Technical data

Type	-	RT11eS		
Accuracy class	%	≤±0.03		
Rated torque (Md_n)	Nm	5 10	20 25	50

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

Technical data

Type	-	RT11eS		
Accuracy class	%		≤±0.03	
Rated torque (Md_n)	Nm	5 10	20 25	50

Temperature ranges				
Nominal temperature range *(Rotor)*	°C		0...80	
Operating temperature range *(Rotor)* #8	°C		-20...85	
Storage temperature range *(Rotor)*	°C		-30...85	
Nominal temperature range *(Stator)*	°C		0...80	
Operating temperature range *(Stator)* #9	°C		-20...85	
Storage temperature range *(Stator)*	°C		-30...85	
Nominal temperature range *(TCU)*	°C		0...70	
Operating temperature range *(TCU)*	°C		-20...70	
Storage temperature range *(TCU)*	°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	%	700 350	350	350
Breaking torque approx., related to Md_n	%		1,000	
Axial limit force	kN	1.05	1.35 1.49	2.05
Lateral limit force	N	87.50	157.10 190.00	327.00
Bending limit torque	Nm	1.90	3.80 4.70	8.40

Technical data

Type	-	RT11eS		
Accuracy class	%		≤±0.03	
Rated torque (Md_n)	Nm	5 10	20 25	50

Mechanical values				
Torsional stiffness	kNm/rad	2.35	5.60 7.55	17.45
Angle of twist at Md_n	°	0.120 0.240	0.200 0.190	0.160
Axial stiffness	kN/mm	52	67 74	102
Radial stiffness	kN/mm	5.15	9.20 11.10	19.20
Bending stiffness	kNm/°	0.04	0.08 0.10	0.18
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		<0.05	
Inherent frequency	Hz	1,290	1,735 1,900	2,480
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		$S_{(p-p)} = \frac{9000}{\sqrt{n}}$	

Technical data

Type	-	RT11eS		
Accuracy class	%		≤±0.03	
Rated torque (Md_n)	Nm	5 10	20 25	50
Weight approx.				
Rotor #12	kg	0.31	0.32 0.33	0.33
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	

Technical data

Type	-	RT11eS		
Accuracy class	%		≤±0.03	
Rated torque (Md_n)	Nm	5 10	20 25	50

Miscellaneous		
Protection class *(Rotor)*	-	IP54
Protection class *(Stator)*	-	IP54
Protection class (rotor, extended)	-	N/A
Protection class (stator, extended)	-	On request
Pitch circle screw information	-	4 * M8 (8.8)
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	-	10009570
U.S. FCC certificate	-	Not required

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	

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
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	

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

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

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

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

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

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

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
Temperature ranges			
Nominal temperature range *(Rotor)*	°C	0...80	
Operating temperature range *(Rotor)* #8	°C	-20...85	
Storage temperature range *(Rotor)*	°C	-30...85	
Nominal temperature range *(Stator)*	°C	0...80	
Operating temperature range *(Stator)* #9	°C	-20...85	
Storage temperature range *(Stator)*	°C	-30...85	
Nominal temperature range *(TCU)*	°C	0...70	
Operating temperature range *(TCU)*	°C	-20...70	
Storage temperature range *(TCU)*	°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 1.00 1.15 1.30	0.80 1.00 1.15 1.30
Lateral limit force	N	83.00 133.50 177.00 216.00	83.00 133.50 177.00 216.00
Bending limit torque	Nm	2.50 4.40 5.90 7.20	2.50 4.40 5.90 7.20

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
Mechanical values			
Torsional stiffness	kNm/rad	2.95 6.35 9.95 13.45	2.95 6.35 9.95 13.45
Angle of twist at Md_n	°	0.097 0.090 0.086 0.085	0.097 0.090 0.086 0.085
Axial stiffness	kN/mm	40 50 59 66	40 50 59 66
Radial stiffness	kN/mm	2.96 4.78 6.33 7.71	2.96 4.78 6.33 7.71
Bending stiffness	kNm/°	0.04 0.07 0.10 0.13	0.04 0.07 0.10 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 2,050 2,300 2,500	1,650 2,050 2,300 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	$s_{(p-p)} = \frac{9000}{\sqrt{n}}$	

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
Weight approx.			
Rotor #12	kg	0.28 0.28 0.30 0.30	0.28 0.28 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	

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
Miscellaneous			
Protection class *(Rotor)*	-	IP54	
Protection class *(Stator)*	-	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 (10.9) 8 * M6 (10.9)	8 * M6 (8.8) 8 * M6 (8.8) 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 (Md_{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.