TORQSENSE®

RWT310/320 SERIES TRANSDUCER

PRODUCT DATA SHEET
0.5Nm to 100Nm

Omni Instruments
Measurement > Control > Data Acquisition

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PRELIMINARY

RWT310/320 Series Torque Transducers

TORQSENSE
Rotary torque has historically been difficult and expensive to measure. However with TORQSENSE technology that was developed in conjunction with a UK government programme, RWT310 & 320 series transducers can now offer *cost effective*, *non-contact* rotary torque transducers suitable for monitoring, testing or assist controlling drive mechanisms. TORQSENSE RWT310 & 320 series transducers are particularly *appropriate for OEM* applications.

Benefits

- Minimal shaft length
- Low inertia
- No physical contact between shaft and housing
- Wide bandwidth
- 250% mechanical overload
- High accuracy and resolution
- Excellent noise immunity
- Integral electronics
- Operates statically as well as dynamically - Clockwise/anti-clockwise
- Ability to specify any full scale torque

Additionally, TORQSENSE RWT320 series transducers offer

- Digital and analog user selectable features such as voltage and current outputs
- USB
- RS232
- Self-diagnostics

Standard range: 500mNm through to 10,000Nm. Above 10,000Nm on request.
High speeds on request.

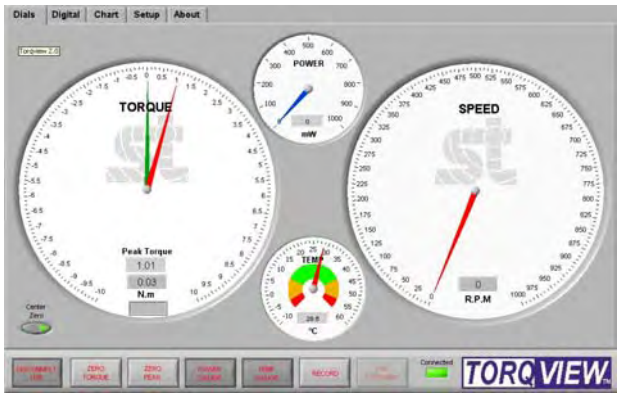
Technology

TORQSENSE patented technology uses 'frequency dependent' surface acoustic wave devices to measure the change in resonant frequency caused by an applied shaft strain. The signal is coupled via a non-contact RF rotating couple from the shaft to a fixed pick-up. SAW devices are not affected by magnetic fields. Integral electronics allows the resonant frequencies to be measured and offer user selectable features, digital outputs and diagnostics.

TORQVIEW 2

An easy to use software tool, TORQVIEW 2, a Virtual Instrumentation Display PC Interface Software, can also be used to assist data recording.

Features: 3 display types, and text files compatible with Matlab and Excel.



Lifetime Warranty

Sensor Technology Ltd's standard range of torque measuring products are warranted against manufacturing defects and component failure for two years from date of purchase, subject to fair wear and tear and return for the first year's free of charge annual re-calibration. This warranty is extended indefinitely if the equipment is returned to Sensor Technology, or its distributor for annual re-calibration, when software and hardware updates, if required, will be carried out free of charge. Standard range means those products described in the company's product data sheets.

US Patents: US5585571, US6478584.

PRELIMINARY

RWT310/320 Series Torque Transducers - Data Specification

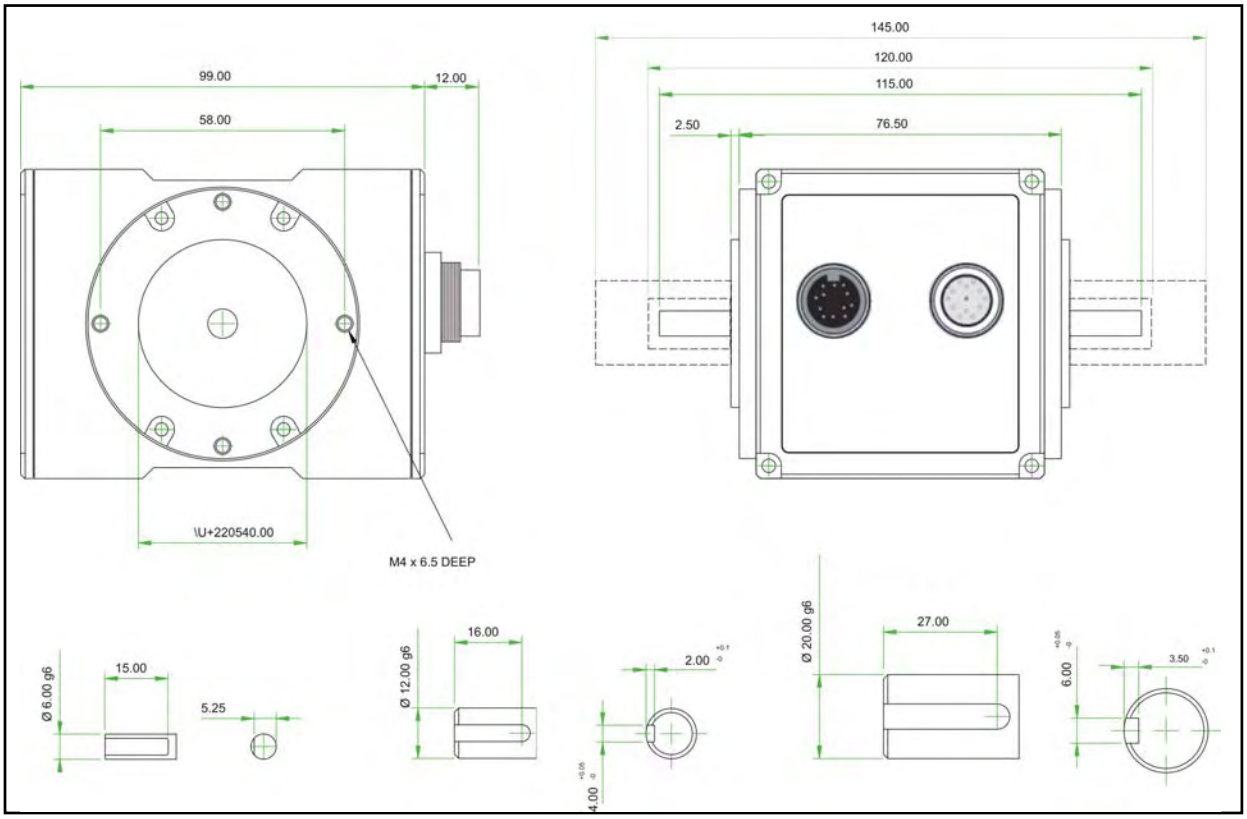
Parameter	Condition	Data			Units
RWT310/320 Torque measurement system					
• Measurement method	Strain-sensitive Surface Acoustic Wave devices				
• Torque range *(see Notes 1 & 2 below)*		0.5 to 1 [5 to 10]	1.1 to 20 [11 to 200]	21 to 100 [201 to 1000]	Nm [lbf in]
• Shaft size (diameter)		6	12	20	mm
• Linearity	@ 20^{0}C	<0.5			%FS
• Hysteresis	@ 20^{0}C	<0.1			%FS
• Accuracy	@ 20^{0}C	±0.25			%FS
• Resolution	@ 20^{0}C	±0.1			%FS
• Long term stability	48h	0.8			%FS
Rotation speed/angle of rotation measurement system					
• Measurement method	IR optical transceiver through slotted disc				
• Output signal	Digital, TTL level (5V, square wave signal)				
• Update rate (frequency mode above 80 rpm)	Fixed output	1			second
• Update time (period mode below 80 rpm)	Variable output	1000/(rpm x 60)			ms
• Rotation speed	@ 20^{0}C	30,000 (max)	20,000 (max)	15,000 (max)	Rpm
Temperature					
• Measurement method	IR temperature sensor monitoring actual shaft temperature				
• Temperature accuracy		±1			^{0}C
• Reference temperature, T_{RT}		20			^{0}C
• Operating range, ΔT_O		-10 to +50			^{0}C
• Storage range, ΔT_S		-20 to +70			^{0}C
• Temperature drift		0.05			%FS/^{0}C
Digital output (RWT320 Series Transducers ONLY)					
• Output type	RS-232, USB (optional)				
• Sampling rate		1.62			ksps
• Digital averaging *(see Note 3)*		Accuracy	Bandwidth		%FS Hz
○ N=1		±1	1620		
○ N=2		±0.7	810		
○ N=4		±0.5	405		
○ N=8		±0.4	202		
○ N=16 (default)		±0.25	101		
○ N=32		±0.25	50		
○ N=64		±0.25	25		
○ N=128		±0.25	12		
Analogue output					
• Output voltage		±1 to ±10 (user selectable on RWT320 Series)			Vdc
• Output current		0-20 or 4-20 (user selectable on RWT320 Series)			mA
• Load impedance		25			KΩ
Power supply					
• Nominal voltage, V_S		11 to 32 (max)			V
• Current consumption, I_S		290 (max)			mA
• Power consumption, W_S		3.5			W
• Allowed residual ripple of excitation voltage, V_{ripple}		500 (above nominal supply voltage)			mVp-p
Electromagnetic compatibility					
EMC compatibility		EN 55011 & EN 61326-1			

Note 1. Any torque/FSD is possible between ranges – please specify rated torque.
Note 2. Max rated torque should not be exceeded.
Note 3. Digital averaging can be configured to optimise accuracy/bandwidth for specific customer applications. For details see User Manual.

PRELIMINARY

RWT310/320 Series Torque Transducers

Dimensions (0.5Nm to 100Nm)



Parameter	Condition	Data											Units
Mechanical Properties													
• Torque (Max)		0.6	1	2.5	6	12	17.5	20	30	55	85	100	Nm
• Shaft Code		CE	CF	DA	DB	DC	DD	DE	EB	EC	ED	EE	
• Shaft Size (Diameter)	@ 20^{0}C	6		12					20				mm
• Torsional stiffness, c_T	@ 20^{0}C	1.3	1.7	3.2	4.3	5.8	1.7	1.9	6.3	9.3	11.4	12.6	KNm/rad
• Mass moment of inertia, L_V	@ 20^{0}C	3.03	3.06	5.89	5.65	6.05	6.09	6.26	1.68	1.77	1.92	2.11	$^x10^{-6}$ kg$\cdot$m^2
• Max measurable load limit	@ 20^{0}C	120 (of rated torque)											%
• Static load breaking	@ 20^{0}C	250 (of rated torque)											%
• Shaft weight, approx	@ 20^{0}C	0.03	0.03	0.14	0.14	0.14	0.15	0.15	0.36	0.37	0.40	0.41	kg
• Transducer with shaft weight, approx	@ 20^{0}C	0.71	0.71	0.82	0.82	0.82	0.83	0.83	1.04	1.05	1.08	1.09	kg

PRELIMINARY

RWT310/320 Series Torque Transducers - Standard Range

● – Standard feature ○ – Optional feature

	RWT310/320 Series		Option Code	Remarks
Torque, Speed, Power Outputs	**RWT310**	**RWT320**		
Torque only	310	320		
Torque & Speed (Low Resolution)	311			*Specify RPM/FSD (60 pulses / rev)*
Torque & Speed (High Resolution)	312			*Not yet available (360 pulses / rev)*
Torque & Power	313			*Specify Power/FSD*
Torque & Angle	314			*Not yet available*
Torque & Speed (Low Resolution) or Power		321		*User self selectable (60 pulses / rev)*
Torque & Speed (High Resolution) or Power or Angle		322		*Not yet available (360 pulses / rev)*
Standard features				
Keyed Shaft Ends	●	●	K	
Voltage Output ±5v FSD	●		B	
Voltage Output ±1v to ±10v FSD		●		*User self selectable*
RS232 Output		●		
Torque Averaging		●		
Torque Peak		●		
Self Diagnostics		●		
Internal Temperature Reading		●		
Deep grooved shielded bearings with oil lubrication	●	●		
Optional features				
Plain Shaft Ends	○	○	P	
Voltage Output ±1v FSD	○		A	
Voltage Output ±10v FSD	○		C	
Current Output 0-20mA	○		D	
Current Output 4-20mA	○		E	
Current Output (0-20mA or 4-20mA)		○	F	*User self selectable*
USB Digital Output		○	G	
High Speed Bearings *(See Note 3 below)*	○	○	J	*Consult factory for max speed allowances*
Sealed Bearings	○	○	S	
IP65 *(See Note 4 below)*	○	○	L	

When you order a Torque Transducer please note that any torque/FSD is possible between ranges – please specify rated torque and options. Please use the following format:

For example: ***RWT***	***311 - 15Nm -***	***K-BEL***	A 'basic' transducer with torque and speed output rated and calibrated to 15Nm FSD with keyed ends, ±5v, 4-20mA outputs and IP65 protection.
Your transducer requirement: ***RWT***			
Speed (if applicable)		RPM	
Connector & Lead Code (if applicable) *See over*			

Note 1. Any torque/FSD is possible between ranges – please specify rated torque.
Note 2. Max rated torque specified should not be exceeded.
Note 3. At very high speeds, for better balance the factory recommend plain or splined shafts.
Note 4. Max running speeds will be considerably reduced and drag torque will increase.

PRELIMINARY

RWT310/320 Series Torque Transducers - Connector and Lead Options

○ – Optional accessory

	RWT310/320 Series		Option Code	Remarks
Connectors & Leads	**RWT310**	**RWT320**		
12 Pin Lumberg (female)	○	○	ACC 1	
12 Pin Lumberg (male)		○	ACC 2	
2.5 m Analog Lead - 15 way 'D' type connector (female) to 12 pin Lumberg (female) and Dongle	○	○	ACC 3	
2.5m Digital Lead - 15 way 'D' type connector (male) to 12 pin Lumberg (male)) and 15 way 'D' type Connector blank (female)		○	ACC 4	
Digital Lead Adapter containing Power Connector and RS232 Connector		○	ACC 5	
Digital Lead Adapter containing Power Connector, RS232 Connector and USB Connector		○	ACC 6	
AC Mains Adapter Power Supply	○	○	ACC 7	
Breakout Box	○	○	ACC 8	*Not yet available*

Please specify your connector and lead option code, if applicable, with your order.

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