Issue - Nov. 2002

E-Series Rayleigh Wave Rotary Torque Transducer

Developed in conjunction with a UK government programme, TORQSENSE RWT (Rayleigh Wave Transducers) are the worlds first low cost non-contact rotary torque transducers which can be used for OEM applications. Rotary torque has always been difficult and expensive to measure, but, by using existing technology in a novel way, inexpensive transducers can be produced for situations where monitoring or control of drive mechanisms is required.

Principle of operation

The patented method uses a Surface Acoustic Wave (SAW) device as a frequency dependant strain gauge which measures the change in the resonant frequency caused by induced stresses in the shaft. The signal is transmitted via an RF couple from the rotating shaft to a fixed pick-up. By using a VHF based device the signal bandwidth is increased, and the problem of electronic interference common with analogue signals is eliminated.

General Description

TORQSENSE transducers require a minimal length of shaft, have low inertia, no physical contact between shaft and housing, wide bandwidth, high resolution, high accuracy and excellent noise immunity. Each transducer in the family contains an embedded non-volatile memory chip storing data on parameters, calibration etc., which are passed to the stand alone interface/readout module E301 or E302 (see data sheets TSE 2102R, TSE2103R) and then as an option to a host PC running under Windows software, operating TORQSENSE our new virtual instrumentation display system technology. (See data sheet TSE2099R). This provides the user with a very cost-effective solution to measuring, recording and displaying data from a wide variety of applications.

Specific OEM Applications

The Technology lends itself to design of customised OEM transducers, and enquires for specific volume applications are welcome.

Options

Option 1 – Optical RPM Pickoff

An optical RPM pick-off is optional on all transducers in the range. External dimensions of the transducers are not affected.

Option 2 – Transducer Sealing to IP65

All Transducers can be supplied sealed to IP65. Some external dimensions change. Maximum running speeds will be considerably reduced, and drag torque will increase - Consult Factory.

Option 3 – Extension Cable

The transducer is supplied with a standard 2-metre transducer lead. However, some applications require longer lead lengths. For up to 10 metres, a standard or heavy-duty extension lead of the required length may be used. Specify required length.

Option 4 – Amplifier

Between 10 metres and a maximum of 120 metres, a cable amplifier which is fitted close to the transducer is required together with an extension lead. Specify required length.

CE Product complies with EMC Regulation BS EN 5501

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Maximum Speed of Operation

Bearing Type	Standard	Option5 High Speed*	Option 6 Sealed
E300RWT1-1	30,000	50,000	15,000
E300RWT1-2	20,000	35,000	12,000
E300RWT1-3	15,000	25,000	9,000
E300RWT1-4	14,000	23,000	8,000
E300RWT1-5	12,000	20,000	7,000
E300RWT1-6	9,000	14,000	4,500
E300RWT1-7	6,000	9,000	3,000

Bearings

Deep grooved shielded bearings with oil lubrication are fitted as standard.

* At very high speeds, for better balance, we recommend plain or splined shafts – Consult Factory

All maximum speeds are quoted with no radial or side loads.

Full Scale Deflection

E300RWT1-	S.I. units	F.P.S units	M.K.S units
E300RWT1-1	500 mNm – 1 Nm	5 – 10 lbf.in	5-10 kgf.cm
E300RWT1-2	1 Nm – 20 Nm	10-200 lbf.in	10-200 kgf.cm
E300RWT1-3	20 Nm – 100 Nm	200 – 1000 lbf.in	200 – 1000 kgf.in
E300RWT1-4	50 Nm – 200 Nm	500 – 2000 lbf.in	500 – 2000 kgf.cm
E300RWT1-5	100 Nm – 500 Nm	1000 – 5000 lbf.in	1000 – 5000 kgf.cm
E300RWT1-6	200 Nm – 2000 Nm	2000 – 20,000 lbf.in	2000 – 20,000 kgf.cm
E300RWT1-7	2000 Nm – 10000 Nm	20,000 – 200,000 lbf.in	20,000 – 200,000 kgf.cm

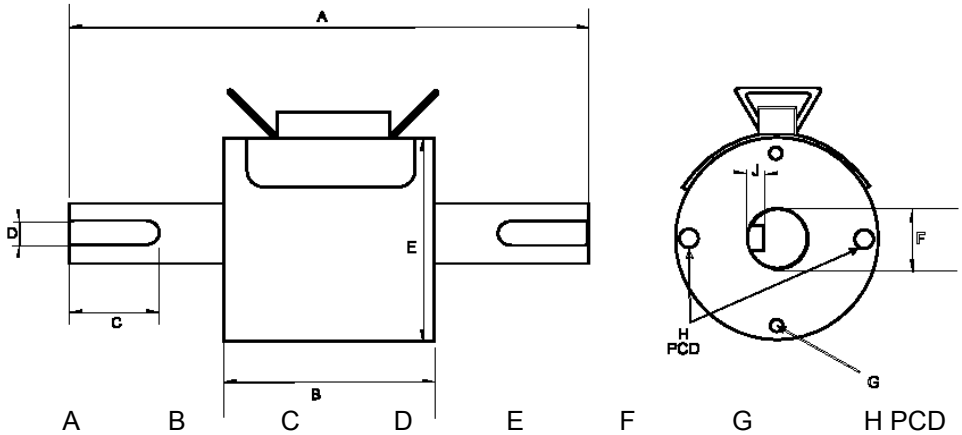
Transducers may be calibrated in any equivalent units. Please select size from chart and specify range and units required, for example ozf.in, lbf.ft, Ncm.

Specification

Cable length: 2 metres standard.
Power supply: From E301/2 module (±5V).
Outputs: See data sheets for E301 and E302.
Accuracy: ± 0.25% standard; ±0.1% to order.
Hysteresis: Better than 0.1%
Bandwidth: better than 1Khz

Safe mechanical overload: 200% of rating.
Temperature range: 0-50ºC standard.
Others to order
Temperature coefficient: Less than 0.01% per ºC.
Output frequency change: ± 200Khz for ±full scale at 500 microstrain.

Mechanical Parameters



Dimension	A	B	C	D	E	F	G	H PCD	J
E300RWT1-1	125	72	n/a	n/a	62	6	M3	56	n/a
E300RWT1-2	125	72	18	4	62	12	M3	56	2
E300RWT1-3	172	80	30	6	68	20	M3	62	3.5
E300RWT1-4	194	80	37.5	8	70	25	M3	64	4
E300RWT1-5	216	82	45	10	80	30	M3	74	5
E300RWT1-6	260	90	70	16	98	50	M3	92	6
E300RWT1-7	284	96	85	22	150	75	M5	140	9

All measurements in mm.

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