E302 - TORQSENSE Advanced Rayleigh Wave Torque Transducer Display Interface Module

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TORQSENSE Transducer Display Interface [E301/2]: TSE2103

TORQSENSE Transducer Display Interface [E302] Operating Guide: TSE2103V (Includes Introduction, Description of Controls, Programmable Options, Operating Instructions & Options Applicable to Your Unit & External Connections)

April 2005

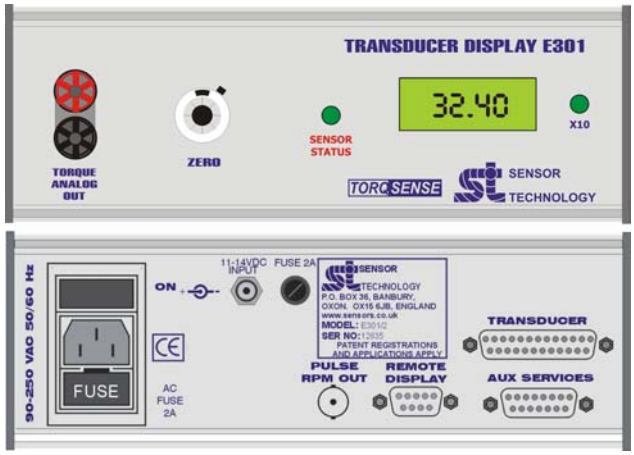
TORQSENSE Transducer Display Interface [E301/2]

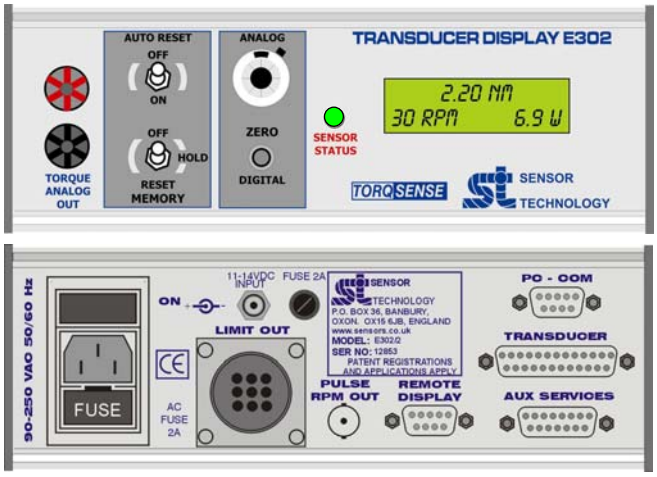
TSE2103R
Rev 7

The E300 Range of Transducer Display Interfaces are compatible with any of the TorqSense E300 RWT1 Transducers.

Common Features

- Automatically detects the full-scale range of any E300 RWT1 transducer.
- The display is automatically programmed to read the full scale of the transducer.
- Continuous self-auditing (sensor status is indicated on a front panel LED or remotely available).
- ±5v analog output for Torque FSD.
- 90-250V ac operation or 12v dc operation.





A typical E-302 Transducer Display unit. Front panel varies depending on model. See over page for sizes.

Additional Features for E302

- Operates independently or under control from remote PC.
- Operates with TorqView2 to give
  - Advanced display modes (see TorqView2 data sheet).
- 2 external analog input channels.
- Peak readings can be displayed and reset manually or automatically.
- Speed and power displayed (transducers require Optical RPM pickoff to be fitted).
- Options menu to allow user to:
  - Set torque limits.
  - Average torque & speed readings.
  - Adjust speed output full scale setting.
  - Set instrument display to feature other options (e.g. analogue inputs).
  - Fast record facility.

Display Interface Technical Data and Option Sheet

		E301	E302	Option	
Display Interface Accuracy	±0.1% Digital readout		●		
	±0.25% Analog out	●	●		
Resolution	0.1% Digital readout	●	●		
	0.05% Analog out	●	●		
Display	LCD (max 1999) with x10 LED indicator	●			
	LCD 16 x 2		●		
Analog Bandwidth	5KHz @ -3dB	●	●		
	10KHz @-3dB				
	50KHz @-3dB				
Local display update rate	10 times/sec		●		
Overall Size (mm)	220w x 290d x 100h (Aluminium enclosure)	●	●		
Fitted Tilt Feet		●	●		
Weight (nominal)	2.5Kg (5lb 10 oz)	●	●		
Temperature Range	-10ºC - 50ºC	●	●		
Power Supply	90-250v AC, 50-400Hz, 20W, IEC connector. 11-14 v DC 1 A 2.1mm jack reverse polarity protected	●	●	1	-
	Power Input - 24v	○	○		a
Torque Analog Output	Analog Output ±5v FSD	●	●	2	-
	Analog Output ±1v FSD	○	○		a
	Analog Output ±10v FSD	○	○		b
	Analog Output +0.5v (fsd ccw) +2.5v(zero) +4.5(fsd cw)	○	○		c
	Analog Output 4-20 mA	○	○		d
Speed Analog Output (Specify RPM FSD required) (Speed pickoff on Transducer reqd)	RPM Analog +1v for FSD		○	3	a
	RPM Analog +5v for FSD		○		b
	RPM Analog + 10v for FSD		○		c
	RPM Analog 4-20 mA for FSD		○		d
Power Analog Output (Specify Power FSD required) (Speed pickoff on Transducer reqd)	Power Analog +1v for FSD		○	4	a
	Power Analog +5v for FSD		○		b
	Power Analog + 10v for FSD		○		c
	Power Analog 4-20 mA for FSD		○		d
Serial Output	TORQVIEW 2		○	5	a
	RS232		○		b
	Optical Fibre Transmitter for RS232		○		c
	RS 422 Output 4800 baud		○		d
	USB Adaptor		○		e
Auxiliary Inputs	4-20mA		○	6	a
	AC RMS (50-400Hz)		○		b
	Dual Analog inputs + 1v		○		c
	Dual Analog inputs +5v		○		d
	Dual Analog inputs +10v		○		e
External Limit Outputs	Limit output (relay)		○	7	a
	Limit output (opto)		○		b
	Limit output TTL/HC +5v positive logic		○		c
Extended Cable Driver	Over 10 Metres		○	8	a
Front Panel (Lanuage)	English	●	●	9	-
	German	○	○		a
	French		○		b
	Italian		○		c

● – Standard ○ – Option available

Patents pending. US Patents: US5585571, US6237417, US6467351.

Sensor Technology Ltd reserves the right to change specification and dimensions without notice.
See cover page or contact company for warranty and EMC compliance

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TORQSENSE Transducer Display Interface [E302] Operating Guide

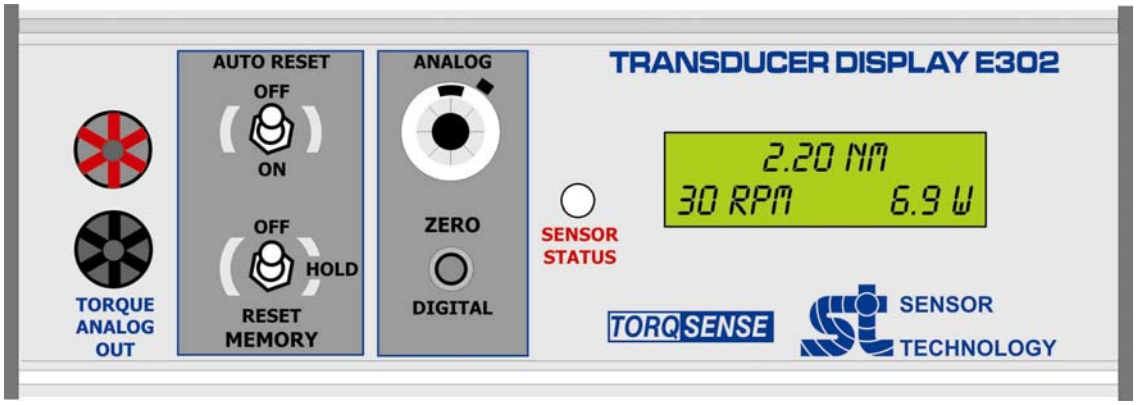
1. Introduction

The E302 interface is an advanced instrument, digitally displaying the output signals of the E300 RWT1 torque transducer. Torque and RPM is displayed together with computed power. There is also an option to display transducer temperature. The E302 can be powered either from 96-250V, 50/ 60 Hz A.C mains supply, or from an 11-14V D.C source. Power to the transducer is also supplied from the E302.

The E302 utilises a powerful digital processor which when used in conjunction with TorqView2 software, allows the transducer signals to be displayed in real time on a PC.

2. Description of Controls

Front Panel



2.1 "Digital Zero Control" Push Button

This push button sets the torque on the E302 Display. Press the button twice to give zero torque on the display. Ensure that there is no torque applied to the transducer when pushing the zero button.

2.2 "Analogue" Multi-turn Dial

This multi-turn potentiometer is used to zero the torque signal output of the transducer (when no torque is applied to it), at the torque analogue out connector (see 2.3), and provides a means of correction of temperature drift. A dial lock is incorporated to prevent accidental movement of the control while measurements are being made.

2.3 "Analog out" 2x4mm Front Panel Connector

This connector outputs the torque reading from the E300 RWT1, giving (as standard) + Full Scale Deflection = + 5.00v* and – Full Scale Deflection = -5.00v*. The black 4mm connector is OV signal ground. This signal should not be loaded with less than 500 Ohms to maintain accuracy and is protected against accidental short circuits.

* On instruments prior to Serial Number 11010, this was ±1.000v FSD.

2.4 Memory and Auto Reset Switches

These switches combine to give the user a number of memory options.

a) With the “Memory” and “Auto Reset” switches in the off position, the display will show the torque reading, continually updated. This is the normal operating mode.

b) With the “Memory” switch set to “Hold”, and the “Auto Reset” switched off, the torque display shows the highest stored value, only updating when this value is exceeded. A flashing ‘P’ in the left-hand corner of the display indicates this. Flicking the “Memory” switch down to “Reset”, returning to “Hold”, or by switching to “off” can clear the memory.

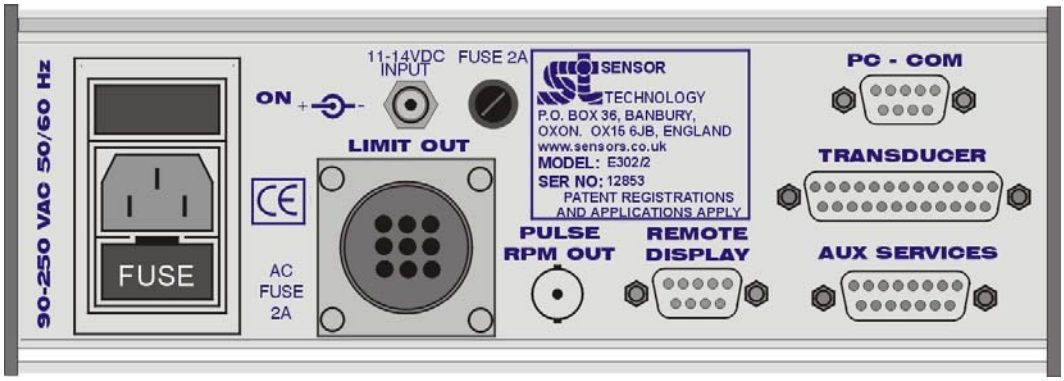
c) With the “Memory” switch set to “Hold” and the “Auto Reset” switch set to “on”, the display will show the peak torque value, and hold it for ten seconds, only being updated by an increased torque value. A flashing ‘A’ in the left-hand corner of the display indicates this function.

d) With the “Memory” switch in the “off” position, and the “Auto Reset” switch set to “on”, the display will show the transducers temperature in “degrees C”.

2.5 “Sensor Status” Indicator

This indicator shows the status of the Transducer. A green light means that the Transducer is functioning normally, a red light means a Transducer error. The operator should check that the Transducer is connected properly.

Back Panel



2.6 Power Supply Connectors

AC Mains power is connected through the combined switch / fuse / plug on the back panel of the E302.

DC power (not switched) is connected through the round socket marked 11-14VDC; the fuse for this supply is the round fuse on the right of the DC input connector.

DO NOT CONNECT AC AND DC SUPPLIES AT THE SAME TIME

2.7 Transducer Socket

The E300/RWT should be connected to the 25 pin ‘D’ socket marked “TRANSDUCER” on the rear of the E302. To ensure a good connection, the locking screws should be tightened.

2.8 "PC COM" Socket

This is the socket used to connect the E302 to a PC, using standard RS232 protocols and connections.

2.9 "RPM OUT" Socket

This socket is connected to the rotary speed sensor of the transducer (if fitted), allows the user to display the RPM on a Frequency Counter at the rate of 1 Hz = 1RPM, and is a TTL signal. Do not load below 500 Ohms, accidental short circuit protection is provided.

2.10 "Auxiliary Services" Socket (Option)

This connector allows the user to access auxiliary input channels and supplies outputs from the D/A channels for Analog speed and power. See Appendix 1 for details of options fitted and PIN OUT connections.

2.11 "Limit Out" Socket (Option)

This connector is fitted when option 7a of E302 is required. It is used to supply Relay outputs to command external loads such as motors, control valves, emergency shutdown, etc. The E302 data sheet gives rating and connection details.

3. Programmable Options

The E302 features a number of options, which can be programmed from the front panel of the instrument.

Lims - Set Limits

SpeR - Set Speed output Full Scale

Filt - Set Average Torque and Speed reading

Disp - Set Instrument Display

Save - Save settings

SerO - Serial Out

3.1 Accessing and Operating the Options Menu

To access the menu from the front panel:

1. Depress the “Auto Reset” switch to “On”.

2. Depress the “Memory” switch to “Reset Memory” and hold on. The word “Menu” will appear on the screen.

3. Release the “Memory” switch.

The display will now read:

“Base Menu”
“Fun : Lims”

Take a note of the current “Zero” setting then use the “Zero” control knob to scroll through the options. While operating the menu, the “Auto Reset” switch must remain “On”, and the “Memory” switch must remain in the “Hold” position.

To confirm selecting of an option, depress the “Memory” switch to “Reset Memory”, and release. (This has the same effect as the “Enter / Return” key on a PC).

To escape the menu at any time, depress the “Auto Reset” switch of “Off” position. (An “Esc” key on the PC keyboard).

On completion of option setting, save setting permanently by using SAVE option. See 3.2E below.

IMPORTANT

After all desired parameters have been set using the “Menu” below, reset the “Zero” knob to the original setting and check zero.

The E300 RWT transducer shaft must not spin while the menu selection is in operation.

It is not possible to operate the menu while the TorqView2 software is in operation.

3.2 MENU OPTIONS

3.2A Lims – Set Limits

This option enables the user to set limit values, and when used in conjunction with option 7, will give outputs for control purposes.

Options available:

OFF	- No limits set
TorL	- Torque Low limit setting
TorH	- Torque High limit setting
SpeL	- Speed Low limit setting
SpeH	- Speed High limit setting
ShaL	- Shaft temperature Low limit setting
ShaH	- Shaft temperature High limit setting

Scroll through the options using the “Zero”, control and confirm selection of option by depressing the “Memory” switch to “Reset Memory” and releasing.

The display will now read:

“Set limit” - followed by a value and limit

Select the value of the limit using the “Zero” control, and when the required value is reached, confirm by depressing the “Memory” switch and releasing.

The display will return to the LIMS menu above. The limit is now set and active. Repeat procedure for any further required limits.

When the E302 is in a stand alone mode, (that is, not connected to a PC with TorqView2 in operation) the letter ‘L’ in the upper right hand corner of the LCD display indicates that a limit has been set.

NOTE: If a PC is connected and the TorqView2 software is in operation, any limits set on the PC via the TorqView2 software may override the E302 set limits.

See TorqView2 operating instructions for more details.

3.2B SpeR - Set Speed Analogue Full Scale Output

The full scale of the Speed Analogue output, if fitted, can be selected from the following ranges:

0 - 10	0 - 2,000
0 - 100	0 - 5,000
0 - 200	0 - 10,000 (Display shows 10E4)
0 - 500	0 - 20,000 (Display shows 20E4)
0 - 1,000	0 - 50,000 (Display shows 50E4)
User Range	

Select range setting using “Zero” control and confirm selection by depressing “Memory” switch. “User Range” can be set for any range by using “Zero” control, and confirmed by depressing the “Memory” switch.

3.2C Filt - Set Averaging of Torque and Speed Displays

Either “Torq” - *torque* or “Spee” - *speed* may be selected using the “Zero” control, and set by depressing the “Memory” switch.

Using the “Zero” control select the required size of memory buffer required from the following:

10 samples Averaging
20 samples Averaging
50 samples Averaging
100 samples Averaging
Averaging OFF.

Confirm selection by depressing the “Memory” switch.

3.2D Disp - Sets Parameters to be Displayed

The “Norm” option is the standard display of “Torque”, “Speed” and “Power”.

The “Auxs” option displays “Torque”, “Aux 1” and “Aux 2”, if auxiliary inputs are fitted.

They are selected using the “Zero” control and confirmed by depressing the “Memory” switch.

3.2E Save - Saves Option Settings

If you wish to set any of the options permanently, select SAVE and confirm by depressing the “Memory” switch, releasing, and then returning to the “off” position. If the options are not saved then the E302 will reset when switched off.

4. Operating Instructions

Connect the E302 and the E300 RWT1 using the correct E300 RWT1 lead.

THE SERIAL NUMBER OF THE LEAD MUST MATCH THE E300/RWT SERIAL NUMBER

This is important because the lead carries important calibration and scaling information, which is reported to the E302. This ensures that the E302 gives the torque readings correctly.

The E302 must be connected to either 96-250V, 50/60Hz,AC mains, or an 11-14 V DC source to supply power for the E302 and the E300 RWT1.

DO NOT CONNECT AC AND DC SUPPLIES AT THE SAME TIME

When the E302 is turned on, the transducer reports to the E302, and the signal ‘INITIALIZING’ is shown on the display. Once this is cleared, the display will show the torque, and if a speed sensor is fitted, speed in RPM, and computed power.

The E300/RWT can be zeroed by the zero controls on the front panel. The E300 RWT1 is now ready for use.

Should the message ‘SENSOR ERROR, RESET OFF/ON’ be shown, turning the E302 off, and then on again can reset the E302.

5. E302 Serial Nos 11806 & 11807

Options Fitted & External Connection Details

5.1 Options Fitted

Option 2) Torque Analog Output

Standard) Analog Output ±5v Transducer FSD where:

+5v = Clockwise Transducer FSD
0v = Zero Torque
-5v = Anticlockwise Transducer FSD

Option 3) Speed Analog Output

d) RPM Analog 4-20mA = 0RPM = 4mA, 1000RPM = 20mA

Option 5) Serial Outputs

b) RS232 – See RS232 Communications Protocol

See Individual Option Sheets Attached for Detailed Specifications

15 Way Auxiliary Services Connector					
Option	PIN	SERVICE	FITTED	RANGE	LEVEL
	1&9	ANALOG GND	✓	N/A	N/A
	8&15	DIGITAL GND			
	2	SPEED OUT			
	3	TORQUE OUT	✓	0 – FSD	±5v
	4	POWER OUT			
	10	ANALOGUE AUX A			
	11	ANALOGUE AUX B			
	5	LIMIT A OUT (TTL)			
	6	LIMIT B OUT (TTL)			
	7	LIMIT C OUT (TTL)			
	12	A (TTL)			
	13	B (TTL)			
	14	+5v OUTPUT			

Mating Connector is 15Way Male “D” Series