



E102 - Advanced Strain Gauge Transducer Display Interface

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*Strain Gauge Transducer Display Interface [E102]
Operating Guide: TSE2098V (Includes Introduction,
Description of Controls, Programmable Options,
Operating Instructions & Options Applicable to Your
Unit & External Connections)*

Torque Transducer Display Interface

A Transducer Interface is required with the E200 ORT Series (Optical Rotary Torque) Transducers, and is an option for the E100SIT/SBT (strain gauge) Transducers.

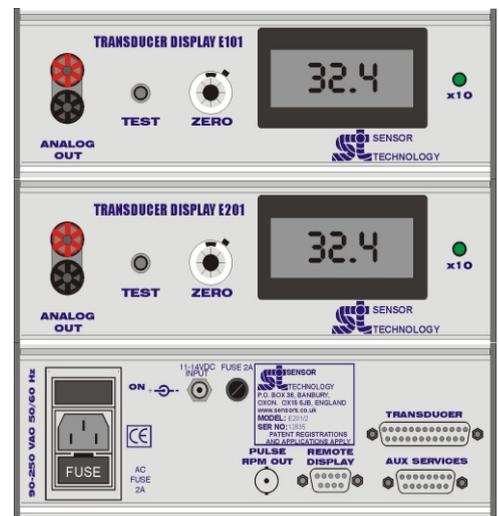
Transducer Displays E101/E102 integrate with the E100 SIT/SBT (Strain Gauge) transducers and Transducer Displays E201/E202 integrate with the E200 ORT Series (Optical Rotary Torque) Transducers.



A typical E Series Transducer Display unit. Front panel varies depending on model.

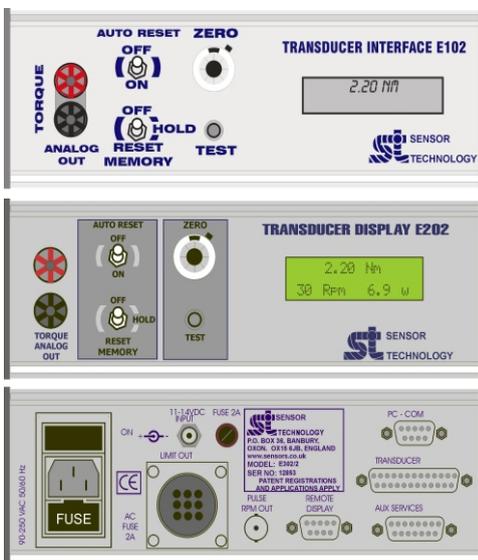
Common Features

- E101/E102 automatically detects and sets the full-scale range of any E100 transducer.
- E201/E202 automatically detects and sets the full-scale range of any E200 transducer.
- The display is automatically programmed to read the full scale of the transducer.
- $\pm 5v$ analog output for Torque FSD.
- 90-250V ac or 12 v dc operation.



Additional Features for E102/E202

- Operates independently or under control from remote PC.
- Operates with TorqView to give advanced display modes (see TorqView data sheet).
- 2 external analog input channels. (**Option only**)
- Peak readings can be displayed and reset manually or automatically.
- Options menu to allow user to:
 - Set torque limits.
 - Average torque readings.
 - Set instrument display to feature other options (e.g. analog inputs).
 - Fast record facility.



Additional Features for E202 (if Optical RPM pickoff fitted to E200 transducer)

- Speed and power displayed.
- Options menu also allows user to:
 - Average speed readings.
 - Adjust speed output full scale setting.

Display Interface Technical Data and Option Sheet

		E101	E102	E201	E202		
Display Interface Accuracy	±0.1% Digital readout	•	•	•	•		
Resolution	0.1% Digital readout	•	•	•	•		
	0.05% Analog out	•	•	•	•		
Display	LCD (max 1999) with x10 LED indicator	•		•			
	LCD 16 x 2		•		•		
Analog Bandwith	10KHz @-3dB	•	•				
Analog Bandwith	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	-10°C - 50°C	•	•	•	•		
Front Panel (Language)	English	•	•	•	•		
						Option	
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		◇		◇	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

• – Standard ◇ – Option available

Data parameters measured at 20°C

Sensor Technology Ltd reserves the right to change specification and dimensions without notice.



Strain Gauge Transducer Display Interface [E102] Operating Guide

TSE2098V
Rev 2

1. Introduction

The E102 interface is an advanced instrument, digitally displaying the output signals of the E100 SBT or E100 SIT torque transducer. The E102 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 E102.

The E102 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.

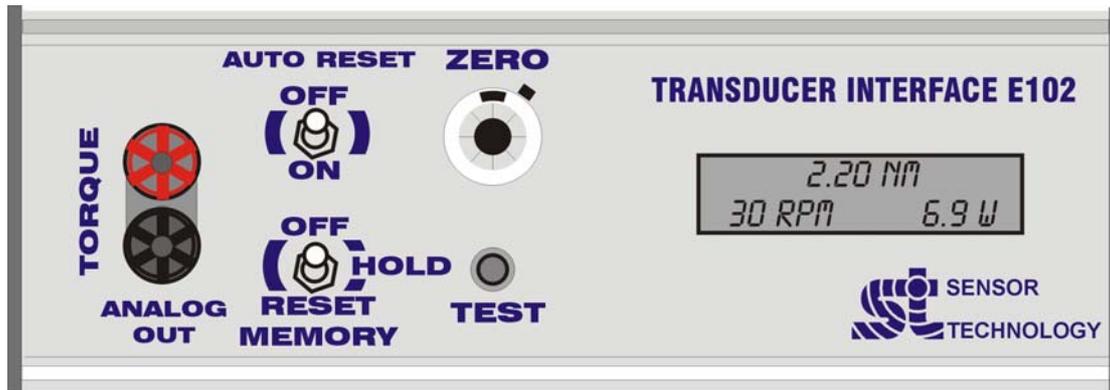
1.1 TORQVIEW2 Software

As an option PC software is available to interface the E102 to any standard PC Running under Windows 3.1/95/98/NT. See Data Sheet TSE2096R for further information. If TORQVIEW2 has been supplied with the system the operating instructions are at the rear of this manual.

NOTE: TORQVIEW2 INSTALLATION DISCS ARE SERIAL NUMBERED AND WILL ONLY WORK WITH INSTRUMENTS HAVING THE SAME SERIAL NUMBER.

2. Description of Controls

Front Panel



2.1 "Zero Control"

This multi- turn potentiometer is used to zero the torque signal output of the transducer (when no torque is applied to it), if necessary, 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. The normal setting of this control is close to the position. (5.00) If the zero is away from this position by more than ± 1.00 , recalibration should be carried out as the transducer may have been overstrained.

2.2 "Test" Push Button

This button is for checking the integrity of the transducer & display electronics. With the E102 on, and an E100 SBT or E100 SIT Transducer connected, pressing this button will cause the E102 torque display to show the FSD of the transducer, indicating that the system is functioning correctly. The reading should be within 13 digits, if not, check the zero setting. This is not a calibration check.

2.3 “Analog Out” 2x4mm Front Panel Connector

This connector outputs the torque reading from the E100 SBT or E100 SIT, giving (as standard) + Full Scale Deflection = + 5.000v* and – Full Scale Deflection = - 5.000v*. 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 $\pm 1.000v$ FSD.

2.4 “Memory” and “Auto Reset” Switches

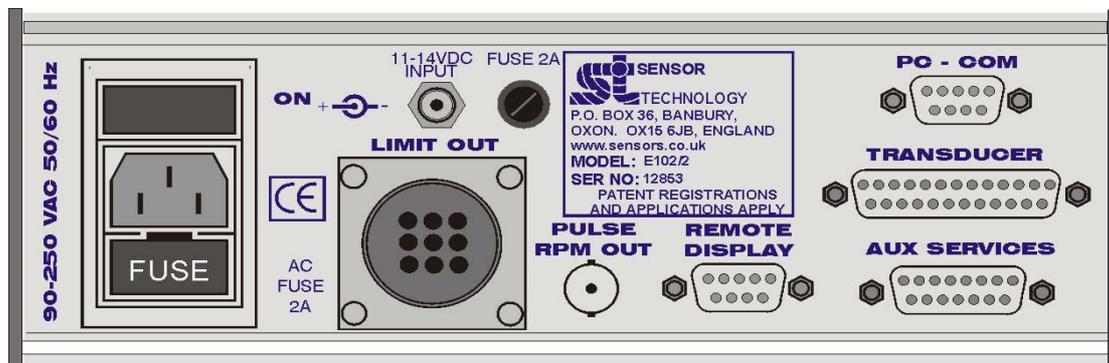
These switches combine to give the user a number of memory options.

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.

Back Panel (Connectors fitted will depend on options)



2.5 Power Supply Connectors

AC Mains power is connected through the combined switch / fuse / plug on the back panel of the E102. 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 marked “Fuse 2A”.

DO NOT CONNECT AC AND DC SUPPLIES AT THE SAME TIME

2.6 “Transducer” Socket

The E100 SBT or E100 SIT should be connected to the 25 pin ‘D’ socket marked “TRANSDUCER” on the rear of the E102. To ensure a good connection, the locking screws should be tightened.

2.7 “PC COM” Socket

This is the socket used to connect the E102 to a PC, using standard RS232 protocols and connections.

2.8 “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 modified through zero crossing signal. Do not load below 500 Ohms, accidental short circuit protection is provided.

2.9 “Auxiliary Services” Socket (Option)

This connector allows the user access to auxiliary input channels and supplies outputs from the D/A channels for Analog speed and power. See Section 5 for details of options fitted and Pin Out connections.

2.10 “Limit Out” Socket (Option)

This connector is fitted when option 7a of E102 is specified. It is used to supply contact closure outputs to command external loads such as motors, control valves, emergency shutdown, etc. Section 5 gives rating and connection details.

3. Programmable Options

The E102 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 |

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”
“Functions”

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

To activate 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, switch the “Auto Reset” switch to “Off” position. (An “Esc” key on the PC keyboard).

On completion of option setting, save settings permanently by using Save option. See 3.2E.

IMPORTANT

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

The E100 SBT or E100 SIT transducer shaft must not rotate while the menu selection is in operation.

It is not possible to operate the menu while the **TORQVIEW.2 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 provide 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 the 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 E102 is in a stand-alone mode, (that is, not connected to a PC with **TORQ VIEW.2** 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 **TORQ VIEW.2** software is in operation, any limits set on the PC via the **TORQ VIEW.2** software may override the E102 set limits.

See TorqView2 operating instructions for more details.

3.2B SpeR - Set Speed Analog Full Scale Output

The original full scale of the Speed Analog output is set at the factory to Customers specification. However, it is possible to change the full scale of the Speed Analog output, if fitted, to 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 confirm by depressing “Memory” switch.

It is not possible to save the selection by using 3.2E Save below, and the full scale output will revert to the original setting when the E102 is switched off.

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 confirm by depressing the "Memory" switch.

3.2E Save - Saves Option Settings

It is not possible to save the following options permanently.

3.2 A - Lims

3.2 C - Filt

3.2 D - Disp

Select Save and confirm by depressing the "Memory" switch and releasing. This will save the above selections permanently or until altered. It is not possible to save permanently Speed Analog Output settings. (See Section 3.2B above)

If options are not saved, the E102 will revert to the normal settings when switched off.

4. Operating Instructions

Connect the E102 and the E100 SBT or E100 SIT using the correct E100 SBT or E100 SIT lead.

THE SERIAL NUMBER OF THE LEAD MUST MATCH THE E100 SIT SERIAL NUMBER

This is important because the lead carries important calibration and scaling information, which is reported to the E102. This ensures that the E102 gives the torque readings correctly.

The E102 must be connected to either 96-250V, 50/60Hz, AC mains, or an 11-14 V DC source to supply power for the E102 and the E100 SBT or E100 SIT.

DO NOT CONNECT AC AND DC SUPPLIES AT THE SAME TIME

When the E102 is turned on, the transducer reports to the E102, 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 E100 SBT or E100 SIT can be zeroed by the zero control on the front panel. The E100 SBT or E100 SIT is now ready for use.

To check the validity of the E100 SBT or E100 SIT, press the test button, and the display will show the Full Scale Deflection of the E100 SBT or E100 SIT. For example, if the E100 SBT or E100 SIT is a 1000Nm device, then the display will show 1000Nm, ± 13 Digits.

Should the message 'SENSOR ERROR, RESET OFF/ON' be shown, turning the E102 power off, and then on again can reset the E102.

5. E102 Serial No

Options Fitted & External Connection Details

5.1 Options Fitted

Option 2) Torque Analog Output

Standard) Analog Output $\pm 5v$ Transducer FSD where:

+5v = Clockwise Transducer FSD

0v = Zero Torque

-5v = Anticlockwise Transducer FSD

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	<u>+5v</u>
	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