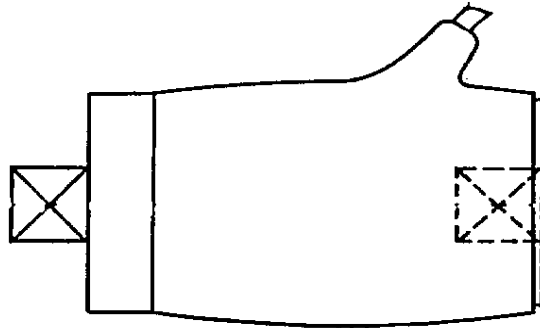


DSIT Strain gauge inline torque transducers with dual and three range option



HANDBOOK

Contents

| | |
|--------|-------------------------|
| STL 2A | DATA SHEET. |
| 1. | INTRODUCTION. |
| 2. | GENERAL DATA. |
| 3. | OPERATING INSTRUCTIONS. |

DSIT Strain gauge inline torque transducers with dual and three range option

A range of extremely compact and versatile strain gauge transducers in a special configuration for easy use in static and semi-rotary applications. Torque may be applied in either direction, the readout of both magnitude and direction being given on the D3A/B Transducer Display Module. Particularly suitable for precision tightening and checking of fastener torques. Designed primarily for use with standard socket wrenches, the transducer body is fitted with standard male/female square drives, size according to torque range (see table below).

The shaft and strain gauge assembly are housed in a sleeve of light alloy. DSIT 1-9 have a synthetic rubber sleeve which acts as a strain relief as shown below. DSIT 10 and above are fitted with Plessey connectors. The signal conditioning amplifier, which incorporates a zero setting

control, is housed in a small unit in the cable run. All transducers have an identical output for full scale, and are therefore completely interchangeable with others in the strain gauge series.

Dual & Three Range Option. Transducers can be supplied with either a dual or a three range option. The basic transducer which must be the size needed for the maximum torque required, will then give full scale readings for 100%, 50% or 20% of its range, depending on the position selected by a rotary switch mounted on the inline amplifier box. Thus a DSIT 3 with the Three Range option will give full scale readings of three consecutive ranges, say 0-1Nm, 0-2Nm or 0-5Nm, with an accuracy of 1% of f.s.d. The range selected is indicated at the rotary switch by illuminated LEDs.

Cable Length. 2 metres from transducer to amp. unit. .5 metres from amp. unit to D3A/B Module.

Power Supply. Provided by the D3A/B Torque Display Module.

Output. ±1 volt d.c. for full scale deflection, the polarity depending on direction of torque applied.

Accuracy. ±1% of full scale, when readout on D3A Module. ±0.5% of full scale to order using D3B Module.

Linearity. Better than 0.25% of f.s.d.

Resolution. Better than 1% analogue (D3A) ±0.25% digital (D3B)

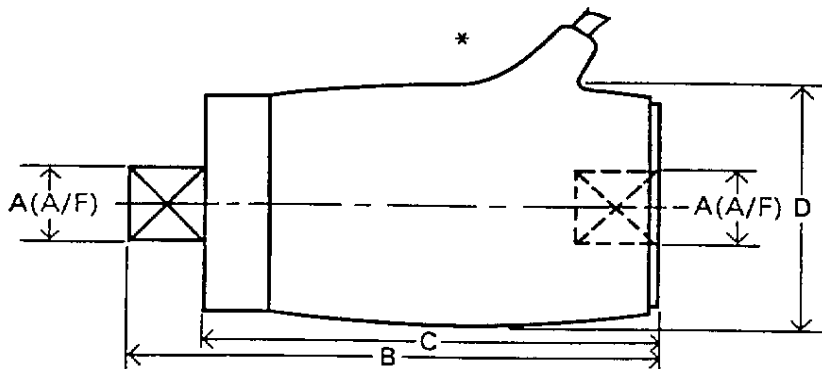
Safe Overload. 150%.

Max. Overload. 300%.

Operating Temperature Range. 0-50°C.

Temperature Coefficient. Better than 0.1% per °C.

Hysteresis. Less than 0.5%.



| | | | | | | | |
|----|-----------------|----------------|------------|-----------|---------|--------|----------|
| 1 | 0-10 lb.f.in. | 1-10 kg.f.cm. | 0-1 Nm | .250 in. | 64 mm. | 56 mm. | 32 mm. |
| 2 | 0-20 lb.f.in. | 0-20 kg.f.cm. | 0-2 Nm | .250 in. | 64 mm. | 56 mm. | 32 mm. |
| 3 | 0-50 lb.f.in. | 0-50 kg.f.cm. | 0-5 Nm | .250 in. | 64 mm. | 56 mm. | 32 mm. |
| 4 | 0-100 lb.f.in. | 0-100 kg.f.cm. | 0-10 Nm. | .375 in. | 67 mm. | 56 mm. | 32 mm. |
| 5 | 0-200 lb.f.in. | 0-200 kg.f.cm. | 0-20 Nm. | .375 in. | 67 mm. | 56 mm. | 32 mm. |
| 6 | 0-500 lb.f.in. | 0-500 kg.f.cm. | 0-50 Nm. | .500 in. | 70 mm. | 56 mm. | 32 mm. |
| 7 | 0-100 lb.f.ft. | 0-10 kg.f.m. | 0-100 Nm. | .500 in. | 106 mm. | 90 mm. | 52 mm. |
| 8 | 0-200 lb.f.ft. | 0-20 kg.f.m. | 0-200 Nm. | .750 in. | 112 mm. | 90 mm. | 52 mm. |
| 9 | 0-500 lb.f.ft. | 0-50 kg.f.m. | 0-500 Nm. | .750 in. | 112 mm. | 90 mm. | 52 mm. |
| 10 | 0-1000 lb.f.ft. | 0-100 kg.f.m. | 0-1000 Nm. | 1 in. | 108 mm. | 76 mm. | 89 mm.* |
| 11 | 0-2000 lb.f.ft. | 0-200 kg.f.m. | 0-2000 Nm. | 1.500 in. | 138 mm. | 93 mm. | 102 mm.* |
| 12 | 0-5000 lb.f.ft. | 0-500 kg.f.m. | 0-5000 Nm. | 2 in. | 138 mm. | 93 mm. | 102 mm.* |

* Units above DSIT 10 are fitted with Plessey Connectors (see description).

1. Introduction.

The DSIT range of torque transducers are robust and simple to use. Designed to measure the magnitude and direction of clockwise and anticlockwise torque in static and limited rotation dynamic mechanical systems, they can be supplied in four sizes and ten ranges from ± 10 Lbs. in. F.S.D. to 5000 Lbs. ft. F.S.D. (and corresponding ranges in MKS and S.I. Units.) The transducers are also available with either two or three consecutive range option.

The transducer is powered from a D3A/B transducer display module and is connected to it, via its amplifier box, by means of a two metre cable and connector plug. All transducers are compatible with any D3A/B transducer display and additional D-range instruments, such as digital displays, limit detectors and chart recorders may be employed to increase the flexibility of the system.

Two or more transducers may be simultaneously connected to one D3A/B by means of the D2A dual transducer selector or the D10A six-way transducer selector. The appropriate sections of the Handbook provide a detailed description of these units. Transducers are equipped with a torque direction indication facility in that torque applied in a clockwise sense about the transducer shaft axis will cause the green indicator lamp on the D3A/B front panel to light up, while anticlockwise torque will light the amber lamp. The transducer consists of a rubber-encapsulated transducer head connected by means of a snatch connector and cable to a transducer amplifier box which has a two metre cable and plug for connection to the 'transducer' socket on the front panel of the D3A/B

A zero adjustment control is provided on the amplifier box for correction of any change in the indicated zero position on the D3/B meter caused by temperature changes ageing of components, and other unavoidable instabilities in the system. A range selection switch is fitted to multi range option transducers.

2. General Data

| | |
|------------------------------|---|
| Torque Ranges: | ± 10 Lb.in.FSD to ± 5000 Lbs.ft.FSD and equivalent metric sizes in M.K.S. and S.I. Units. |
| Accuracy: | $\pm 1\%$ of FSD |
| Linearity: | .25% of FSD. |
| Overload Capacity: | at least 150%. |
| Power Consumption: | 0.5w. |
| Temperature Stability: | Better than 0.1% output variation per $^{\circ}\text{C}$. |
| Operating Temperature Range: | 0 to + 50 $^{\circ}\text{C}$. |

3. Operating Instructions.

Insert the plug of the lead from the transducer head into the similar socket of the shorter lead from the transducer amplifier box into the 'Transducer' socket on the front panel of the D3A/B. Switch on the D3A/B and allow five minutes for the system to reach thermal equilibrium. Adjust the zero of the D3A/B meter if necessary, by turning the zero adjustment control on the transducer amplifier box.

NOTE:- Two and Three Range Transducers.

The zero adjust procedure outlined above must be carried out with the range switch on the transducer set to the most sensitive range.

Press the 'Test' button on the front panel of the D3A/B and check that the meter reads 100% ($\pm 1\%$), with in the case of the D3B, the range switch in the appropriate position (see D3B handbook). For multi range transducers, select required range on the transducer range selector switch. The transducer is now ready for use.

After several hours of continuous use it is advisable to remove any load from the transducer to re-check, and adjust, if necessary, the zero position of the D3A meter as described above.

Note that the D3A/B transducer display is intended for use with both optical and strain-gauge type transducers. If both types of transducer are in use with one D3A/B always ensure that the D7 Optical Transducer Coupler is switched off when using strain-gauge transducers, and conversely ensure that no strain-gauge transducer is connected to the D3A/B when the optical transducer and D7 are in use.