SLT190 LINEAR POSITION TRANSDUCER
INNOVATION IN MOTION

The SLT190 linear position transducer is designed to provide reliable, fit-and-forget position sensing within a compact transducer size for the most arduous operating environments. The transducer uses an innovative single coil inductive operating principle within a rugged, stainless steel housing and provides an analogue position signal proportional to the operating sleeve position. Offering one of the most cost-effective solutions for contactless absolute position sensing, this transducer is ideally suited to exterior mounting on off-highway vehicle systems, including military vehicles.

Impressive environmental capability

The SLT190 has been designed with 21st century applications in mind. The transducer can withstand operating temperatures from -40°C to +150°C and has been tested to withstand shocks to 10,000g. With an EMC Immunity of 100V/m, this transducer is ready for the harshest applications, such as steel and aluminium plants and power generating stations.

Choice of transducer strokes

The SLT190 is available with 14 different strokes from 25 to 500mm and has a short body-to-stroke-length ratio. This makes it ideal for the replacement of linear potentiometers in hostile operating conditions, whilst providing a cost saving over equivalent stroke length inductive transducers, such as LVDTs.

Features

- No contact between the sensing elements
- Compact body to stroke length
- Infinite resolution
- Absolute measurement
- Rugged stainless steel construction
- High temperature capability to +150°C (+302°F)
- CE approved
- Rapid despatch of any length

Benefits

- Virtually infinite life
- Reduced installation space
- All displacement will be sensed
- No loss of position on power down
- Maximum reliability under impact and vibration
- Maximum reliability in hostile environments
- Confidence in EMC performance
- Eliminates customer inventory

EMC Directive 2004/108/EC

The products detailed in this document have been tested to the requirements of EN61000-6-3 (Emissions) and EN61000-6-2 (Immunity).

Quality Assurance

Penny+Giles are accredited to BS EN ISO 9001:2008 Quality is at the heart of all our systems ensuring the reliability of our products from initial design to final despatch.
Rugged mounting style
The patented operating principle of the SLT190 position transducer uses a core moving within the transducer body to supply the signal proportional to outer sleeve displacement. The outer sleeve design is captive, with the sleeve and transducer bodies both having a rugged M8 self aligning, stainless steel bearing included for simple installation. The M8 size allows the transducer to be mounted on an 8mm or 5/16in mounting pin.

Separate signal conditioning
To minimise the transducer size and the impact on the overall system, we provide separate signal conditioning electronics (EICT or EICTM) housed in rugged IP66 or IP68 rated enclosures. The electronics module can be located up to 10m away from the transducer, well away from any hostile conditions (vibration, mechanical impact, temperature) that the position transducer may encounter during operation. The result is a more reliable transducer solution, easily installed and adjusted and more flexible in the choice of outputs available – including voltage, current and digital PWM.

Total reliability
The SLT190 provides a highly reliable solution for absolute position sensing in a variety of applications. The contactless operating principle (with no electrical sliding contacts) allows a fit-and-forget installation so that zero maintenance programs can be incorporated within plant or equipment service schedules.

World leading availability
The SLT190 has been ‘designed for manufacture’ enabling assembly in a state-of-the-art manufacturing cell. This means that we can supply any one of the 14 different stroke lengths in a matter of days from ordering. This allows OEMs to reduce or eliminate their inventory, and call on Penny+Giles to supply ‘on demand’.

Performance assured
Penny+Giles’ product development process includes exhaustive qualification testing to ensure that performance specifications published in our product brochures and technical data sheets are backed by real-life test evidence. This is our assurance to you that our designs have been tested at these parameters.
**SLT 190 LINEAR POSITION TRANSDUCER**

**PERFORMANCE**

**ELECTRICAL**
- Electrical stroke range E mm: 25 to 500
- Stroke increments mm: 25 to 200 in 25mm increments, 250 to 500 in 50mm increments
- Non-Linearity* %: Enhanced - typically less than ±0.2% of total stroke, ±0.25% maximum (code A), Standard - typically less than ±0.4% of total stroke, ±0.5% maximum (code B)
- Resolution: Virtually infinite
- Temperature coefficient ppm/°C: < ±100 ppm of electrical stroke/°C (+20 to +60°C)
- Temperature coefficient ppm/°C: < ±200 ppm of electrical stroke/°C (-20 to +100°C)
- Temperature coefficient ppm/°C: < ±300 ppm of electrical stroke/°C (-20 to +150°C)
- Insulation resistance: Greater than 50MΩ at 50Vdc

*Non-linearity is measured using the Least-Squares method on a computerised calibration system

**MECHANICAL**
- Mechanical stroke range mm
- Mounting
- Operating force gf
- Shaft velocity - maximum m/s
- Weight g

**ENVIRONMENTAL**
- Protection class: IP67
- Operational temperature °C: -40 to +150
- Storage temperature °C: -50 to +150
- Life: 5 (see EICT performance for frequency response)
- Vibration: see dimensions on page 5
- Shock: see dimensions on page 5
- EMC Immunity level: see dimensions on page 5

**OPTIONS**
- Non-linearity
- Extended cable length

**AVAILABILITY**

**ORDERING CODE**

All configurations can be supplied within ten days from the factory.

SLT190/ .../ .../ ....

Stroke range E in mm
Non-linearity A = ±0.25%
B = ±0.50%

01 = 1m cable
06 = 6m cable

Electrical stroke +3mm overstroke at each end via M8 stainless steel rod end bearings. Suitable for mounting on 8mm or 5/16in bolts

<500 in horizontal plane (vented sleeve)

5 (see EICT performance for frequency response)

Transducer can withstand a threat of 100V/m

**The performance specified is only valid when the SLT190 is operated in conjunction with the signal conditioning unit - model EICT or EICTM.**

Standard (code B ±0.5% max), or Enhanced (code A ±0.25% max) can be specified

1m or 6m output cable can be specified
SIGNAL CONDITIONING

Input voltage \( V_{dc} \)
Output voltage
  standard \( V_{dc} \)
  options \( V_{dc} \)
Output current - option \( mA \)
Output PWM

See page 6 for full EICT module performance and dimensions

+10 to +60 nominal

0.5 to 4.5
0 to 5, 0 to 10, \( \pm 2.5, \pm 5, \pm 7.5, \pm 10 \) (using Voltage Module \( VM \) output option card)
4 to 20 (using Current Module \( CM \) output option card)
TTL level compatible signal with a 10-90% duty cycle proportional to transducer displacement (using Pulse Width Modulation \( PWM \) output option card)

The transducer is supplied with a Sensor Calibration Module Card (SCMC) which is calibrated to match the transducer electrical stroke. This card must be inserted into the EICT signal conditioning unit before operation. Full details on installation and set-up are included in the manual supplied with the EICT module.

DIMENSIONS

Note: drawings not to scale

<table>
<thead>
<tr>
<th>Electrical stroke ( E ) mm</th>
<th>25</th>
<th>50</th>
<th>75</th>
<th>100</th>
<th>125</th>
<th>150</th>
<th>175</th>
<th>200</th>
<th>250</th>
<th>300</th>
<th>350</th>
<th>400</th>
<th>450</th>
<th>500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical stroke ( M ) mm</td>
<td>31</td>
<td>56</td>
<td>81</td>
<td>106</td>
<td>131</td>
<td>156</td>
<td>181</td>
<td>206</td>
<td>256</td>
<td>306</td>
<td>356</td>
<td>406</td>
<td>456</td>
<td>506</td>
</tr>
<tr>
<td>Sleeve length ( S ) mm</td>
<td>132</td>
<td>157</td>
<td>182</td>
<td>207</td>
<td>232</td>
<td>257</td>
<td>282</td>
<td>307</td>
<td>357</td>
<td>407</td>
<td>457</td>
<td>507</td>
<td>557</td>
<td>607</td>
</tr>
<tr>
<td>Distance between centres ( D ) mm</td>
<td>175</td>
<td>200</td>
<td>225</td>
<td>250</td>
<td>275</td>
<td>300</td>
<td>325</td>
<td>350</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>550</td>
<td>600</td>
<td>650</td>
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<tr>
<td>Approximate weight g</td>
<td>239</td>
<td>258</td>
<td>277</td>
<td>296</td>
<td>314</td>
<td>333</td>
<td>352</td>
<td>370</td>
<td>408</td>
<td>446</td>
<td>483</td>
<td>520</td>
<td>558</td>
<td>595</td>
</tr>
</tbody>
</table>

ELECTRICAL CONNECTIONS

3 core cable: FEP sheathed 1m or 6m long with PTFE insulated 19/0.125 cores. 90% braided screen.

Recommended cable minimum bend radius is 10mm

† The Green wire is internally connected to the transducer case. However, due to the construction of the transducer external moving parts, the Green connection should not be used as a ground connection.
The EICT signal conditioning module has been specifically designed to operate the SLT190 and ICT range of contactless linear position transducers. This module incorporates a high performance circuit that drives the transducer and provides a choice of output signals with zero and span adjustment for simple user configuration. The module can be supplied in a choice of enclosures, with sealing to IP66 or IP68 protection.

10 - 60 or ±(10 - 30) for standard output voltage range (EICT only)
10 - 30 or ±(10 - 30) for extended output voltage range (VM card fitted)
10 - 30 or ±(10 - 30) for current output (CM card fitted) or pulse width modulated output (PWM card fitted)
10 maximum (19 with VM card fitted, 12.6 plus output current with CM card fitted, 13 with PWM card fitted)

0.5-4.5 See details on page 7 for additional output options
4-20 See details on page 7 for options
TTL level compatible signal with a 10-90% duty cycle. See details on page 7
<5
10k minimum (resistive to 0V line)
30 (-3dB) [equivalent to 5mS output lag]
<0.001% output span/ Volt
Within 0.25% of final output in less than 300 milliseconds

-10 to 60% of span
40 to 110% of span
0 to +70
-40 to +85
200 (300 if VM card fitted)
Threat 100V/m : derangement <0.05% FS (EICT module, adjacent to transducer)
Threat 10V/m : derangement <0.05% FS (EICT module, 1m cable)
Will only operate Penny+Giles SLT190 and ICT range of transducers

EICT - corrosion resistant plastic enclosure sealed to IP66, with detail to fit rail DIN EN50022 or EN50035 or bulkhead mount via four M5 screws.
EICTM - powder coated metal enclosure sealed to IP68 with bulkhead mounting only.

105 (250 for EICTM)
Maximum recommended distance between transducer and EICT module is 10m.

Notes:
1. The SLT190 transducer is supplied with a Sensor Calibration Module Card (SCMC) which is calibrated to match the transducer electrical stroke. This card must be inserted into the EICT signal conditioning unit before operation. The EICT is user configurable for input and output options.
2. Full details on installation and set-up are included in the manual supplied with the EICT module.
**OUTPUT OPTIONS**

<table>
<thead>
<tr>
<th>Output option</th>
<th>Supply voltage range Vdc</th>
<th>EICT option card</th>
<th>EICT with VM option card</th>
<th>EICT with CM option card</th>
<th>EICT with PWM option card</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 - 4.5Vdc</td>
<td>10 - 60 or ±(10 - 30)</td>
<td>✔</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>0 - 5Vdc</td>
<td>10 - 30 or ±(10 - 30)</td>
<td>N/A</td>
<td>✔</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>0 - 10Vdc</td>
<td>13.5 - 30 or ±(13.5 - 30)</td>
<td>N/A</td>
<td>✔</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>±2.5Vdc</td>
<td>10 - 30 or ±(10 - 30)</td>
<td>N/A</td>
<td>✔</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>±5Vdc</td>
<td>10 - 30 or ±(10 - 30)</td>
<td>N/A</td>
<td>✔</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>±7.5Vdc</td>
<td>13.5 - 30 or ±(13.5 - 30)</td>
<td>N/A</td>
<td>✔</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>±10Vdc</td>
<td>13.5 - 30 or ±(13.5 - 30)</td>
<td>N/A</td>
<td>✔</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>4 - 20mA</td>
<td>10 - 30 or ±(10 - 30)</td>
<td>N/A</td>
<td>✔</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>TTL (10-90%)</td>
<td>10 - 30 or ±(10 - 30)</td>
<td>N/A</td>
<td>✔</td>
<td>N/A</td>
<td>✔</td>
</tr>
</tbody>
</table>

Slope reversal ✔✔✔✔

**PWM output signal**

- **Output frequencies** Hz: 100, 130, 310, 1000 (user selected)
- **Frequency accuracy** %: ±10
- **Output levels** Vdc: LOGIC HIGH 4.5 ±0.5
- **LOGIC LOW** <0.4
- **Rise/Fall time** μS: <2 with 1nF load capacitance
- **Output range** %: 10 (zero) to 90 (span)

Continual development of output options means we are working on additional **EICT** module output options. Please ask for details.

**DIMENSIONS**

Note: drawings not to scale

**ELECTRICAL CONNECTIONS**

Screw terminals

- Misconnection of the supply may cause permanent damage
- † The Green wire is internally connected to the transducer case. However, due to the construction of the transducer external moving parts, the Green connection should not be used as a ground connection.

**AVAILABLE**

- Normally available from stock

**ORDERING CODES**

- EICT - module with 0.5 to 4.5Vdc output, IP66 protected plastic housing
- EICTM - module with 0.5 to 4.5Vdc output, IP68 protected metal housing

**ACCESSORIES**

- VM - voltage module output option card
- CM - current module output option card
- PWM - pulse width modulation output option card

Note: refer to the EICT set-up guide for details on how to connect to a split rail power supply.
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Innovation In Motion