

Linear Encoders

Model no. LE/12/S, LE/12/P, LE/25/S, LE/25/P



user manual



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2.0: Safety Summary

Terms in this Handbook

WARNING statements identify conditions or practices that could result in personal injury or loss of life.

CAUTION statements identify conditions or practices that could result in damage to the equipment or other property.



Symbols in this manual

This symbol indicates where applicable cautionary or other information is to be found.

WARNINGS:

Do not operate in an explosive atmosphere

To avoid explosion, do not operate this equipment in an explosive atmosphere.

Air Pressure

On LE/12/P and LE/25/P under no circumstances should the recommended maximum overpressure of 1.0 bar be exceeded.

NOTES:

This equipment contains no user serviceable parts

This equipment must be returned to your Solartron dealer for all servicing and repair.

Low Voltage

This equipment operates at below the SELV and is therefore outside the scope of the Low Voltage Directive.

3.0: Handling & Maintenance

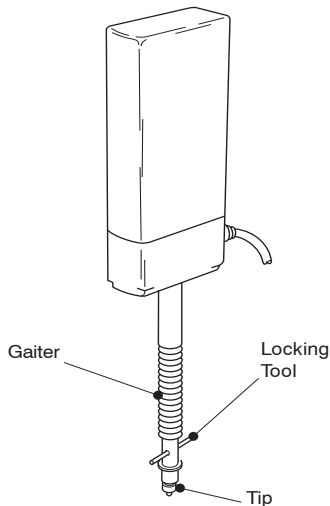
The Solartron range of Linear Encoders are precision instruments and should be handled with care. Where possible the Linear Encoder should be stored in its protective box when not being used.

These Linear Encoders are designed to be maintenance free, additional periodic lubrication is unnecessary. Contacts with solvents should be avoided. Any attempt to dismantle the Linear Encoder will invalidate the warranty.

3.0: Handling & Maintenance (continued)

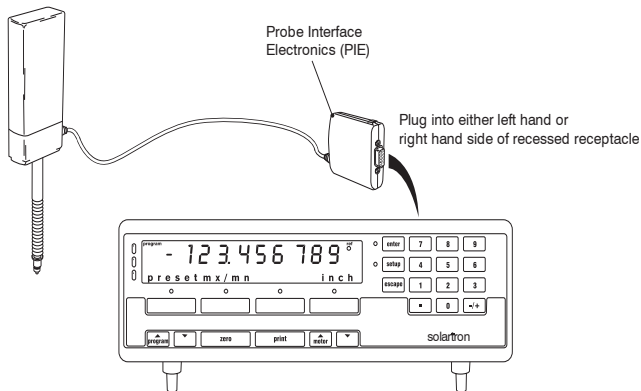
Replacing the probe tip

1. Slide back gaiter (fitted to IP65 and pneumatic versions only) to reveal the hole in the shaft.
2. Insert locking tool (supplied) in the hole.
3. Unscrew tip while holding locking tool to prevent any damage to the read head.
4. Install new tip while holding locking tool.
5. Hand tighten tip.
6. Slide down gaiter, (IP65 and pneumatic versions only).



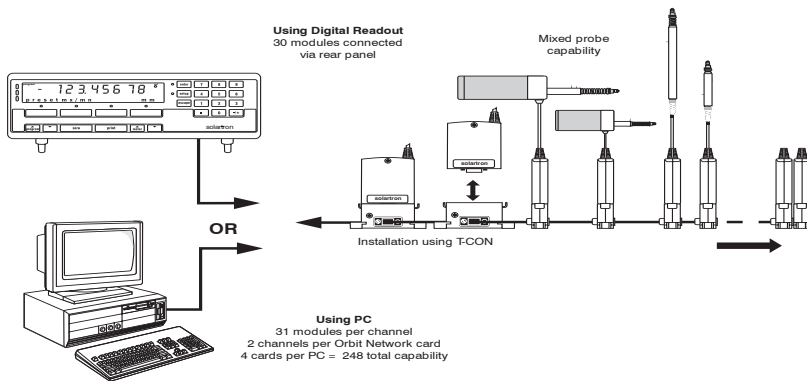
4.0: Linear Encoder Connection

4.1: Connection to Digital Readout

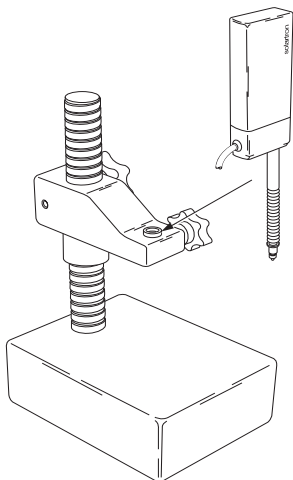


4.0: Linear Encoder Connection (Continued)

4.2: Connection to a PC or Digital Readout via Orbit Network



5.0: Mechanical Installation



CAUTIONS:

Ensure that the probe is not subjected to excessive over-travel, or side loading at the tip greater than that corresponding to a 0.5 mm lift on a Ø3 ball

When mounting the Linear Encoder avoid the risk of distortion of the bearing assembly by over-tightening of the mounting screws.

Notes:

It is important to ensure that the probe is perpendicular to measuring table to avoid introducing cosine errors.

Do not use excessive torque when tightening gauge stand clamp screws.

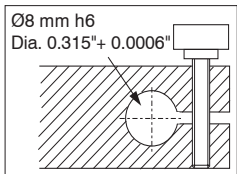
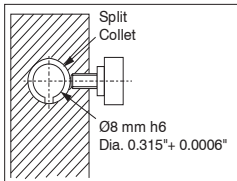
Keep cable away from moving parts to avoid potential damage.

Protect probe against shock loading or impact!

5.0: Mechanical Installation (continued)

Clamping Configurations

When mounting Linear Encoder do not over tighten clamp screws.



Recommended maximum tightening torque

$$= \frac{0.28d \left(\left(\frac{P}{\pi d} \right) + 0.15 \right)}{(1 - (0.15 \frac{P}{\pi d}))}$$

Where d = screw dia mm
 P = screw pitch mm

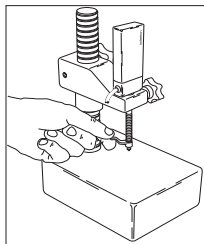
assuming a 'V' form thread and 0.15 coefficient of friction.

Note: A clearance hole in the fixturing of Ø9.5 mm is advisable around the gaiter for satisfactory operation.

6.0: Operation

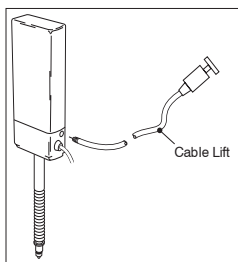
Finger Lift

Snaps over probe tip enabling tip to be lifted without transferring heat to shaft.



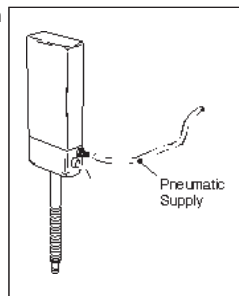
Cable Lift

Allows tip to be retracted without touching Linear Encoder. Cable retract screws into probe body after removal of blanking screw.



Pneumatic Operation

A Pneumatic nozzle is fitted as standard to LE/12/P & LE/25/P. By applying air between 0.5 & 0.8 bar measuring tip will extend to meet component under test. On no account should a pressure exceeding 1.0 bar be applied.



WARNING:

Damage/injury could be caused if the maximum recommended air pressure is exceeded.



CAUTION

Ensure that air supply for pneumatic operation is clean, dry and oil free.

7.0: Specification

Model	LE12	LE25
Stroke	12 mm (0.5 ")	25 mm (1.0 ")
Resolution	0.05 µm (2 millionths inch)	
Accuracy	± 0.5 µm (20 millionths inch)	
Reference temp	20 °C (68 °F)	
Slew rate	0.5 m/sec (1.5 ft/sec)	
Operating attitude	ANY	
Gauging forces: (typical at mid stroke)		
Downwards	60 gm (2.1 oz)	
Upwards	10 gm (0.3 oz)	
Horizontal	50 gm (1.7 oz)	
Max side load	100 gm (3.5 oz)	
Shock	100 g (6 ms)	
Vibration	10 g (50-2000 Hz)	
Cable length	2 m	

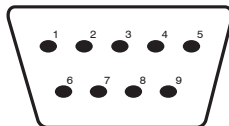
Temp range - Operating - Storage	0 ° to 50 °C (32 ° to 122 °F) -20 ° to +70 °C (-4 ° to 158 °F)
IP Rating Probe: Interface Electronics:	IP50 (IP65 optional) IP63
Mounting	8 mm h6
Tip thread size	M2.5 x 6 deep
Supply Voltage	5 V ± 0.25 VDC
Supply Current (max)	60 mA
Serial Communications	9600 Baud or
Baud Rate	187.5 K Baud
Serial Communications Protocol	Orbit Network Protocol
Maximum Reading Rate	1000 readings/sec
EMC	EN50081-1 & EN50082-1

8.0: Connections

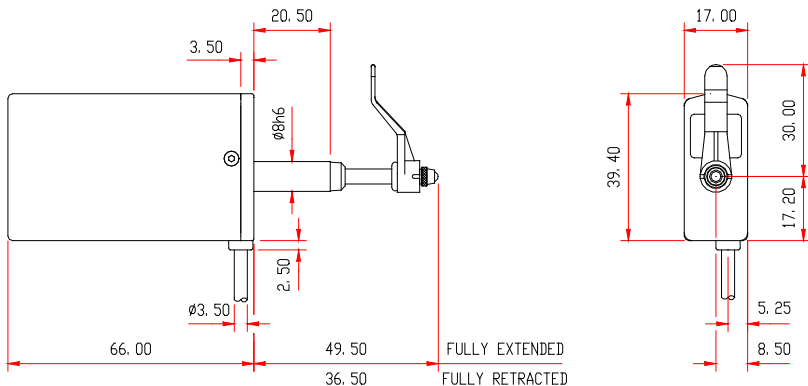
PIE Pin assignment

Pin	Function
1	(none)
2	RS485(A)
3	RS485(B)
4	0V
5	0V
6	+5V
7	+5V
8	+5V
9	0V

PIE can be fitted directly into the back of the Digital Readout or linked into the 'Orbit' Network using the stackable T-CON connectors.



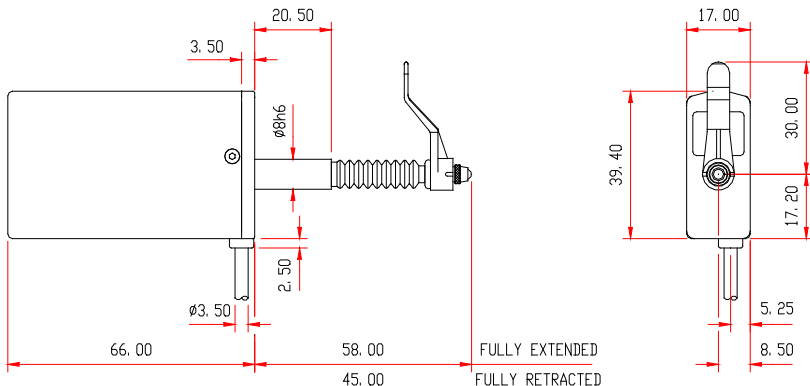
9.0: Outline Drawings



LE/I2/S IP50

DIMENSIONS ARE NOMINAL AND SPECIFIED IN MILLIMETRES

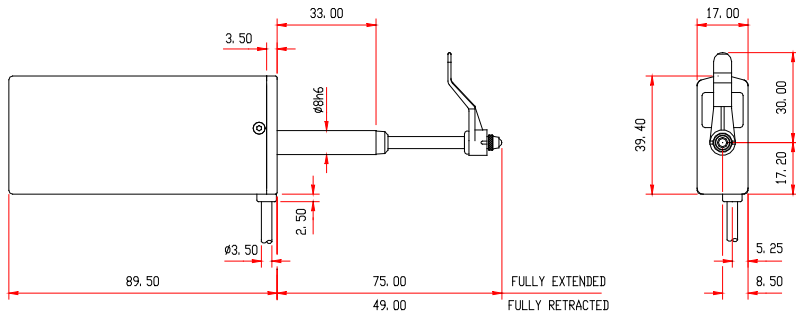
9.0: Outline Drawings (continued)



LE/I2/S IP65

DIMENSIONS ARE NOMINAL AND SPECIFIED IN MILLIMETRES

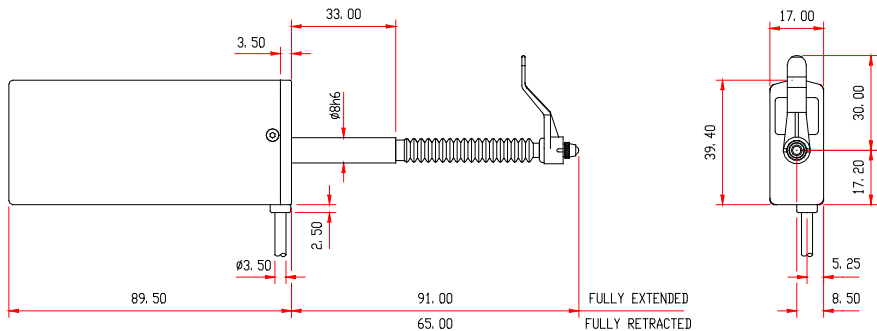
9.0: Outline Drawings (continued)



LE/25/S IP50

DIMENSIONS ARE NOMINAL AND SPECIFIED IN MILLIMETRES

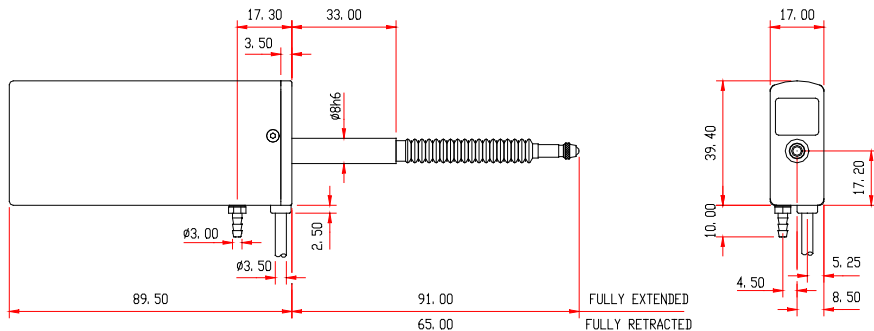
9.0: Outline Drawings (continued)



LE/25/S IP65

DIMENSIONS ARE NOMINAL AND SPECIFIED IN MILLIMETRES

9.0: Outline Drawings (continued)

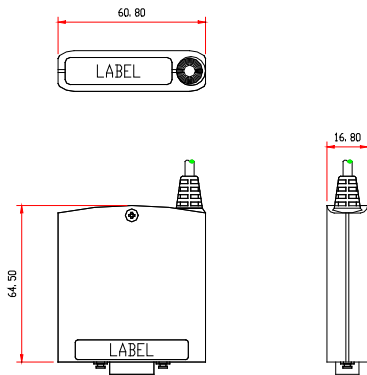


LE/25/P IP65

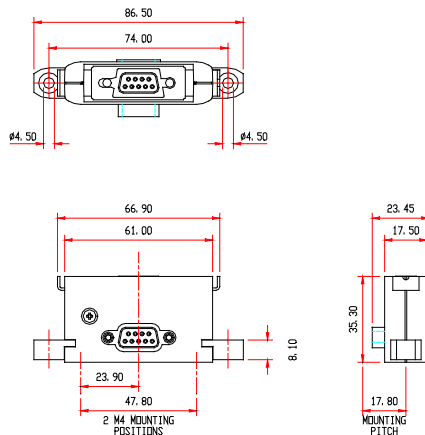
DIMENSIONS ARE NOMINAL AND SPECIFIED IN MILLIMETRES

9.0: Outline Drawings (continued)

Interface Electronics



'T-Con' Connector



Note:

All dimensions in mm

All dimensions stated are nominal

solartron

linear encoders

with current or
voltage output



user manual



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1.0: Introduction

Introduction

The LE12/25 Linear Encoder with current or voltage output, when used with suitable interfacing electronics, provide a precision linear measurement system. The current version (designated I) provides industrial standard current in-phase and quadrature-phase signals. The voltage version (designated V) provides equivalent voltage signals.

model no. LE/12/SV
LE/12/SI
LE/25/SV
LE/25/SI
LE/12/PV
LE/12/PI
LE/25/PV
LE/25/PI

Solartron also produce a digital version of the Linear Encoders, which can be used with Solartron DRO's or the Orbit network to create measuring systems.

This Manual

Describes the Linear Encoder types LE12/25 both pneumatic and spring versions with either current or voltage output.

This manual details the handling, installation and operation of the encoder and describes the electrical interfaces.

2.0: Safety Summary

Terms in this manual

WARNING statements identify conditions or practices that could result in personal injury or loss of life.

CAUTION statements identify conditions or practices that could result in damage to the equipment or other property.

Symbols in this manual



This symbol indicates where applicable cautionary or other information is to be found.

WARNINGS:

Do not operate in an explosive atmosphere

To avoid explosion, do not operate this equipment in an explosive atmosphere.

Air Pressure

On LE/12/P and LE/25/P variants under no circumstances should the recommended maximum overpressure of 1.0 bar be exceeded.

NOTES:

This equipment contains no user serviceable parts

This equipment must be returned to your Solartron dealer for all servicing and repair (see section 10.0).

Low Voltage

This equipment operates at below the SELV and is therefore outside the scope of the Low Voltage Directive.

3.0: Designation of Parts

Items Supplied

Linear Encoder Probe in packaging case.

Standard tip (measuring contact) fitted.

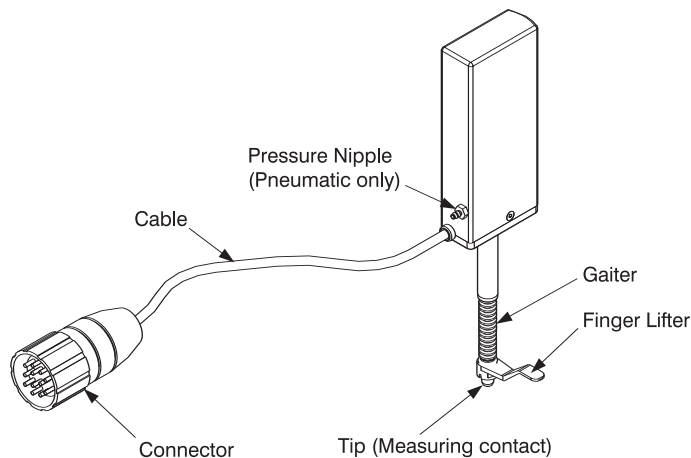
Finger lift lever.

Locking tool.

Operating instructions.

Calibration chart.

Plus other accessories as ordered.

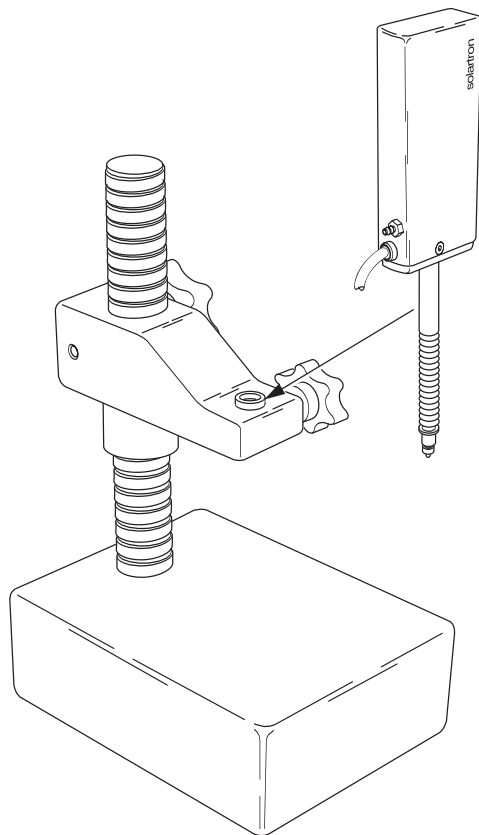


4.0: Handling & Maintenance

The Solartron range of Linear Encoders are precision instruments and should be handled with care. Where possible, the Linear Encoder should be stored in its protective box when not being used.

These Linear Encoders are designed to be maintenance free; additional periodic lubrication is unnecessary. Contacts with solvents should be avoided. Any attempt to dismantle the Linear Encoder will invalidate the warranty.

5.0: Mechanical Installation



CAUTIONS



Ensure that the probe is not subjected to excessive over-travel, or side loading at the tip greater than that corresponding to a 0.5mm lift on a $\varnothing 3$ ball.

When mounting the Linear Encoder avoid the risk of distortion of the bearing assembly by over-tightening of the mounting screws around the clamping shank.

Notes:

It is important to ensure that the probe is perpendicular to the measuring table to avoid introducing cosine errors.

Do not use excessive torque when tightening gauge stand clamp screws (see next section).

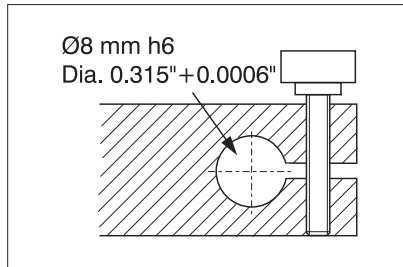
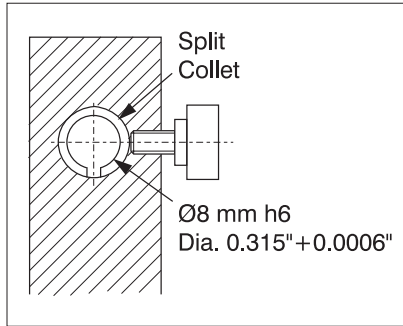
Keep cable away from moving parts to avoid potential damage.

Protect probe against shock loading or impact!

5.0: Mechanical Installation (continued)

5.1 Clamping Configurations

When mounting Linear Encoder do not over tighten clamp screws.



Recommended maximum tightening torque

$$= \frac{0.28d \left(\left(\frac{P}{\pi d} \right) + 0.15 \right)}{(1 - (0.15 \frac{P}{\pi d}))}$$

Where d = screw dia mm

P = screw pitch mm

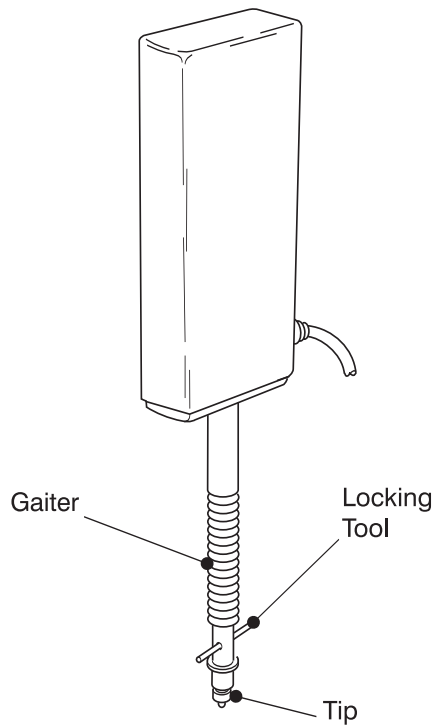
assuming a 'V' form thread and 0.15 coefficient of friction.

Note: A clearance hole in the fixturing of Ø9.5mm is advisable around the gaiter for satisfactory operation.

5.0: Mechanical Installation (continued)

5.2 Replacing the probe tip

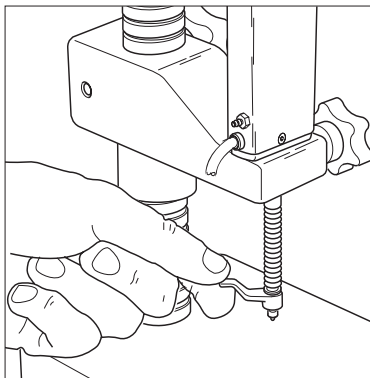
1. Slide back gaiter (fitted to IP65 and pneumatic versions only) to reveal the hole in the shaft.
2. Insert locking tool (supplied) in the hole.
3. Unscrew tip while holding locking tool to prevent any damage to the read head.
4. Install new tip while holding locking tool.
5. Torque tip to 18-22 cNm.
6. Slide down gaiter, (IP65 and pneumatic versions only).



6.0: Operation

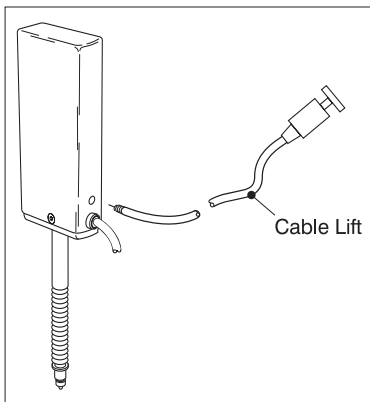
6.1 Finger lift lever

Snaps over probe tip enabling tip to be lifted without transferring heat to shaft.



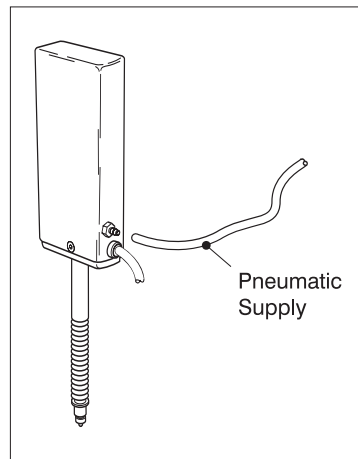
6.2 Cable lift

Allows tip to be retracted without touching Linear Encoder. Cable retract screws into probe body after removal of blanking screw.



6.3 Pneumatic operation

A Pneumatic nozzle is fitted as standard to LE/12/P & LE/25/P. By applying air between 0.5 & 0.8 bar, measuring tip will extend to meet component under test. On no account should a pressure exceeding 1.0 bar be applied.



WARNING: Damage/injury could be caused if the maximum recommended air pressure is exceeded.

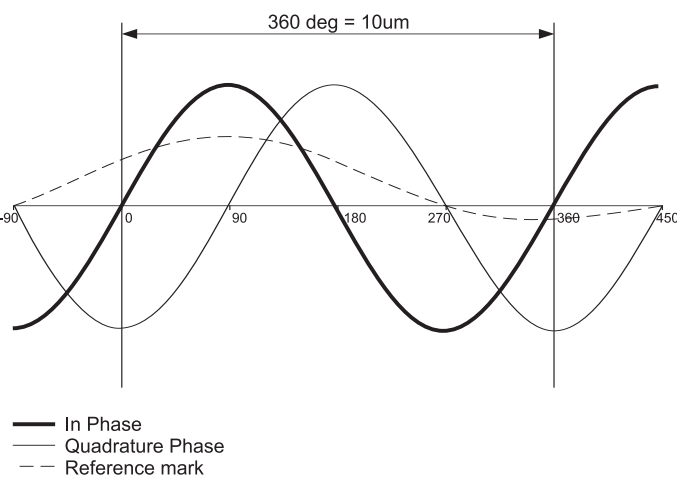
CAUTION



Ensure that the air supply for pneumatic operation is clean, dry and oil free.

7.0: Electrical Interface

The Linear Encoder provides either a current output or a voltage output corresponding to the format below. The signals are differential. These signals are designed to be compatible with industry standard electronics.

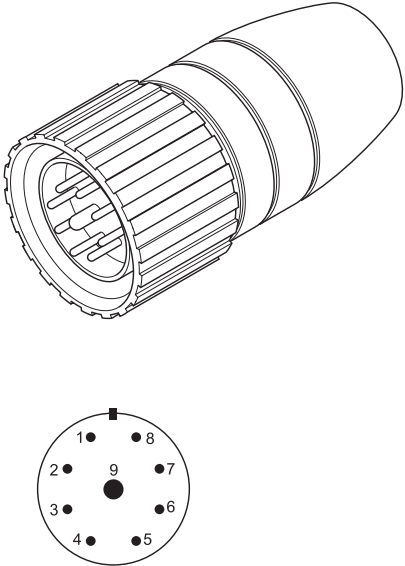


Signals	Current	Voltage
In Phase	7 - 16 uApp	0.6 to 1.2Vpp
Quadrature Phase	7 - 16 uApp	0.6 to 1.2Vpp
Reference Mark	5 uApp nominal	0.5Vp nominal into 120 ohm load

7.0: Electrical Interface (continued)

7.1 Current probe

Pin Number	Signal	Description
1	I_1	In Phase current +
2	$/I_1$	In Phase current -
3	+ 5 Vdc	Probe power supply
4	0 Vdc	Probe power return
5	I_2	Quadrature phase current +
6	$/I_2$	Quadrature phase current -
7	I_0	Reference current +
8	$/I_0$	Reference current -
9		Not connected to probe



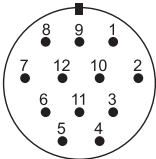
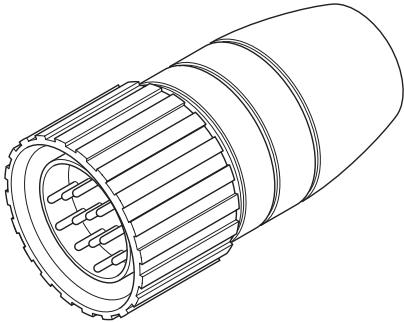
Note: Connector housing is connected to cable screen and therefore probe body.

7.0: Electrical Interface (continued)

7.2 Voltage probe

Pin Number	Signal	Description
1	$/V_2$	Quadrature phase voltage -
2	5V dc	Sense
3	V_0	Reference voltage +
4	$/V_0$	Reference voltage -
5	V_1	In Phase voltage +
6	$/V_1$	In Phase voltage -
7		No connection
8	V_2	Quadrature phase voltage +
9		No connection
10	0V dc	Probe power return
11	0V dc	Sense
12	5V dc	Probe power supply

Note: Connector housing is connected to cable screen and therefore probe body.

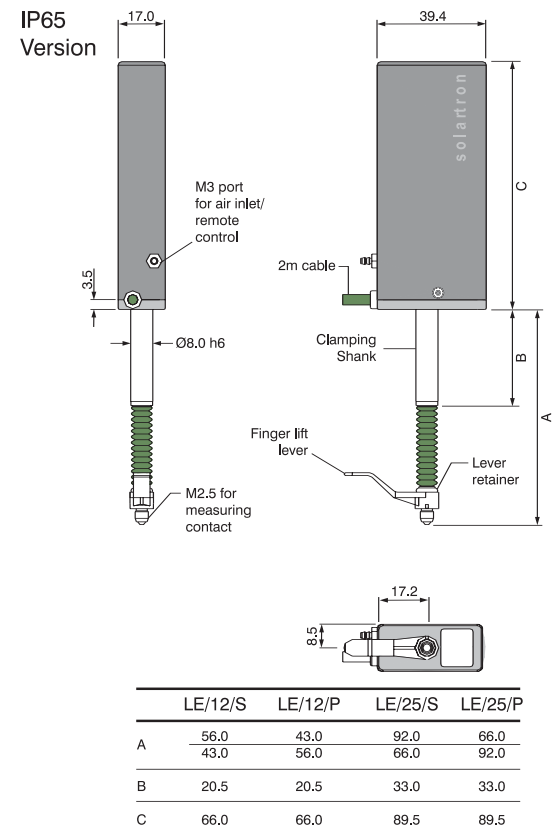


8.0: Specification

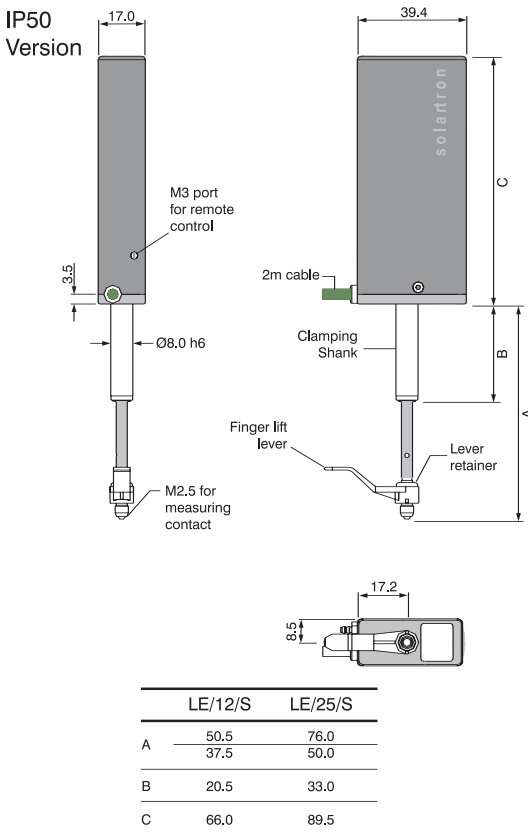
Model	LE12	LE25
Stroke	12mm (0.5")	25mm(1.0")
Resolution	Dependant on subsequent electronics	
Accuracy	$\pm 0.5\mu\text{m}$ (20 millionths inch)	
Reference temp	20°C (68°F)	
Slew rate	0.5 m/sec (1.5 ft/sec)	
Operating attitude	ANY	
Gauging forces: (typical at mid stroke)		
Downwards	0.6N (60gm) (2.1 oz)	
Upwards	0.01N (10gm) (0.3 oz)	
Horizontal	0.5N (50gm) (1.7 oz)	
Max side load	0.1N (100gm) (3.5 oz)	
Shock	100g (6ms)	
Vibration	10g (50-2000 Hz)	
Cable length	2m	

Temp range - Operating - Storage	0° to 50°C (32° to 122°F) -20° to +70°C (-4° to 158°F)
IP Rating Probe:	IP50 (IP65 optional)
Mounting	8mm h6
Tip thread size	M2.5x6 deep
Supply Voltage	5V \pm 0.25VDC
Supply Current (max)	20mA
EMC	EN50081-1 & EN50082-2

9.0: Outline Drawings



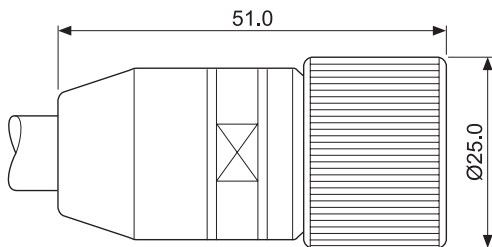
9.0:Outline Drawings



Note:
All dimensions in mm
All dimensions stated
are nominal

9.0: Outline Drawings (continued)

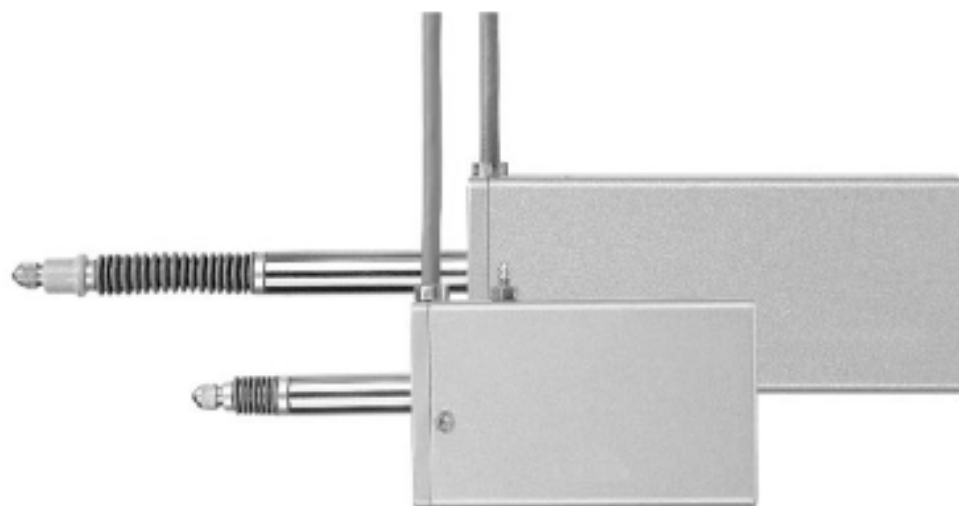
Connector



Note:

All dimensions in mm
All dimensions stated
are nominal

Linear Encoders with TTL output



user manual



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Return of Goods

1.0: Introduction

Introduction

The LE12/25 Linear Encoder with interpolation box and TTL square wave output provides a precision linear measurement system, when used with a suitable counter card. The Linear Encoder is available with a number of different pre-set resolutions.

Solartron also produce an Orbit digital version of the Linear Encoders, which can be used with Solartron DRO's or the Orbit network to create measuring systems.

This Manual

Describes the Linear Encoder types LE12/25 both pneumatic and spring version with TTL square wave output.

This manual details the handling, installation and operation of the encoder and describes the electrical interface.

2.0: Safety Summary

Terms in this Handbook

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CAUTION statements identify conditions or practices that could result in damage to the equipment or other property.

Symbols in this manual

This symbol indicates where applicable cautionary or other information is to be found.



WARNINGS:

Do not operate in an explosive atmosphere

To avoid explosion, do not operate this equipment in an explosive atmosphere.

Air Pressure

On LE/12/P and LE/25/P under no circumstances should the recommended maximum overpressure of 1.0 bar be exceeded.

NOTES:

This equipment contains no user serviceable parts

This equipment must be returned to your Solartron dealer for all servicing and repair (see section 11.0).

Low Voltage

This equipment operates at below the SELV and is therefore outside the scope of the Low Voltage Directive.

3.0: Designation of Parts

Items Supplied

Linear Encoder Probe in packing case, with inline Digitising module and end connection.

Data sheet on connector details and pin out, if the Linear Encoder is supplied with a connector.

Standard tip (measuring contact) fitted.

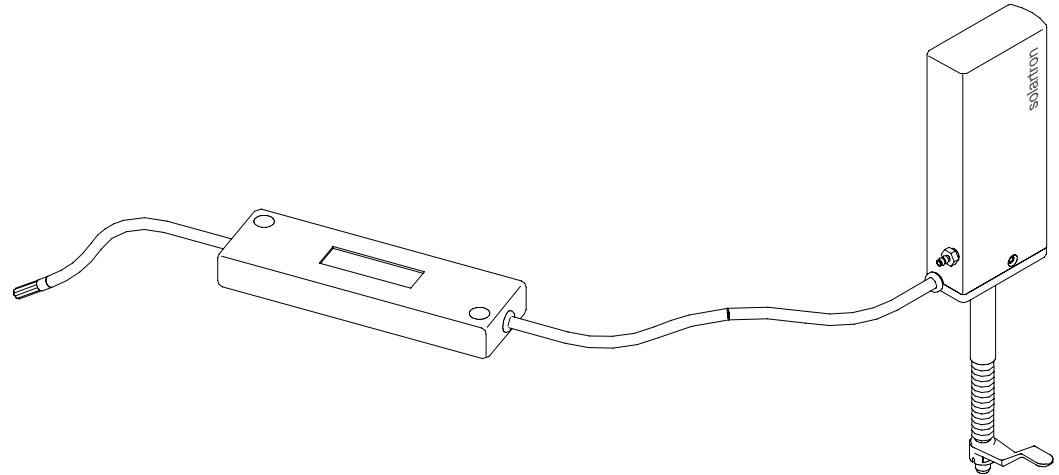
Finger lifter lever. (Spring probes only)

Locking tool.

Operating instructions.

Calibration chart.

Plus other accessories as ordered.

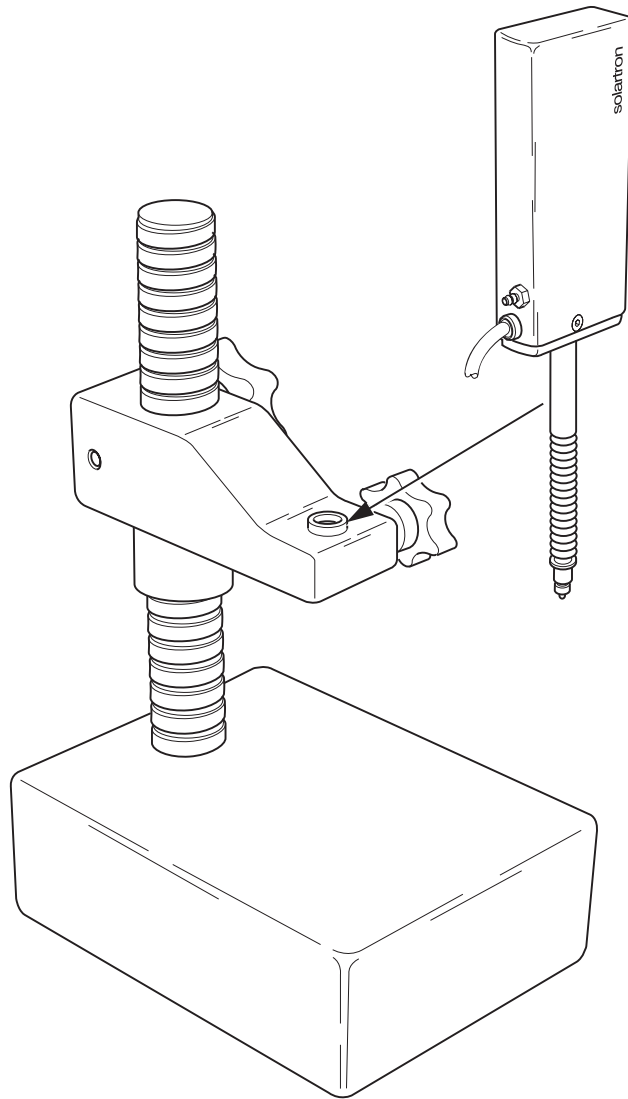


4.0: Handling & Maintenance

The Solartron range of Linear Encoders are precision instruments and should be handled with care. Where possible the Linear Encoder should be stored in its protective box when not being used.

These Linear Encoders are designed to be maintenance free, additional periodic lubrication is unnecessary. Contact with solvents should be avoided. Any attempt to dismantle the Linear Encoder will invalidate the warranty.

5.0: Mechanical Installation



CAUTIONS:

Ensure that the probe is not subjected to excessive over-travel, or side loading at the tip greater than that corresponding to a 0.5mm lift on a Ø3 ball.

When mounting the Linear Encoder avoid the risk of distortion of the bearing assembly by over-tightening of the mounting screws.

Notes:

It is important to ensure that the probe is perpendicular to measuring table to avoid introducing cosine errors.

Do not use excessive torque when tightening gauge stand clamp screws.

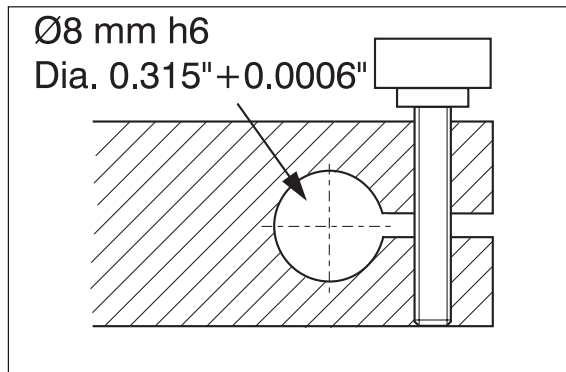
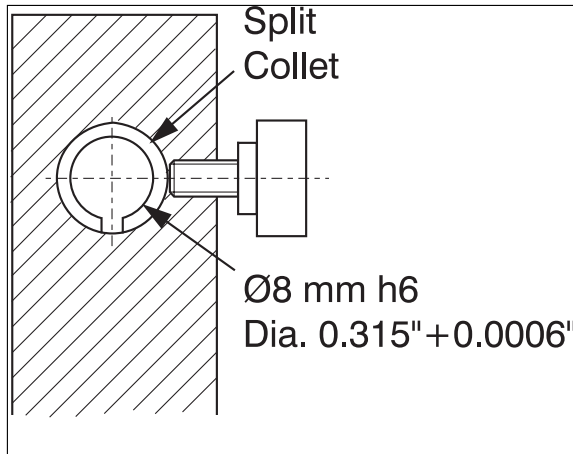
Keep cable away from moving parts to avoid potential damage.

Protect probe against shock loading or impact!

5.0: Mechanical Installation (continued)

5.1 Clamping Configurations

When mounting
Linear Encoder do
not over tighten
clamp screws.



Recommended maximum tightening torque

$$= \frac{0.28d \left(\left(\frac{P}{\pi d} \right) + 0.15 \right)}{(1 - (0.15 \frac{P}{\pi d}))}$$

Where d = screw dia mm

P = screw pitch mm

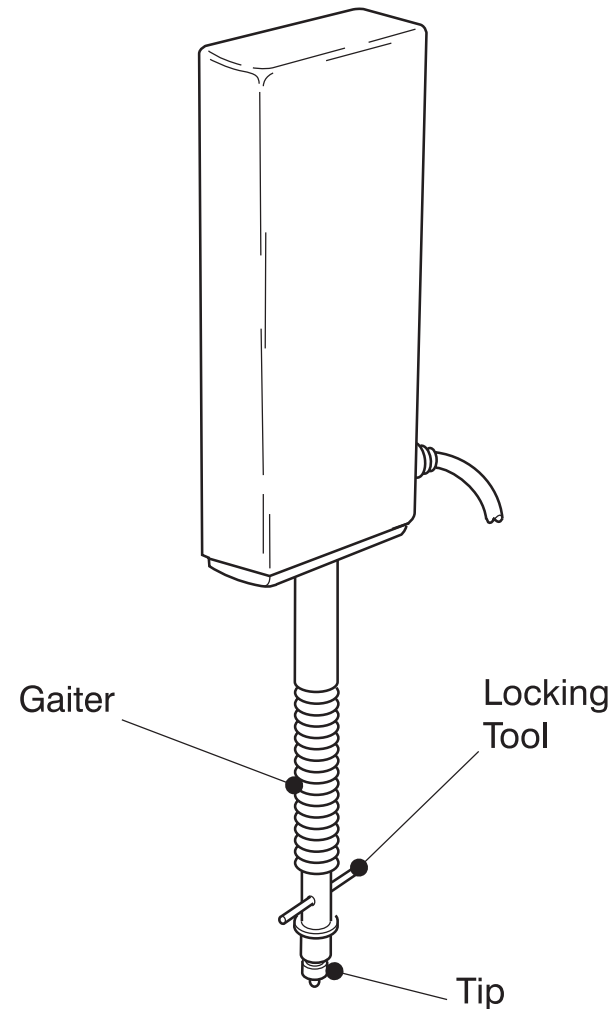
assuming a 'V' form thread and 0.15 coefficient of friction.

Note: A clearance hole in the fixturing of Ø9.5mm is advisable around the gaiter for satisfactory operation.

5.0: Handling & Maintenance (continued)

5.2 Replacing the probe tip

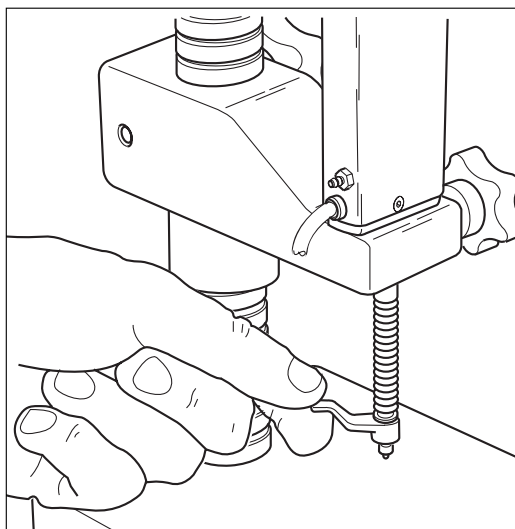
1. Slide back gaiter (fitted to IP65 and pneumatic versions only) to reveal the hole in the shaft.
2. Insert locking tool (supplied) in the hole.
3. Unscrew tip while holding locking tool to prevent any damage to the read head.
4. Install new tip while holding locking tool.
5. Torque tip to 18-22cNm.
6. Slide down gaiter (IP65 and pneumatic versions only).



6.0: Operation

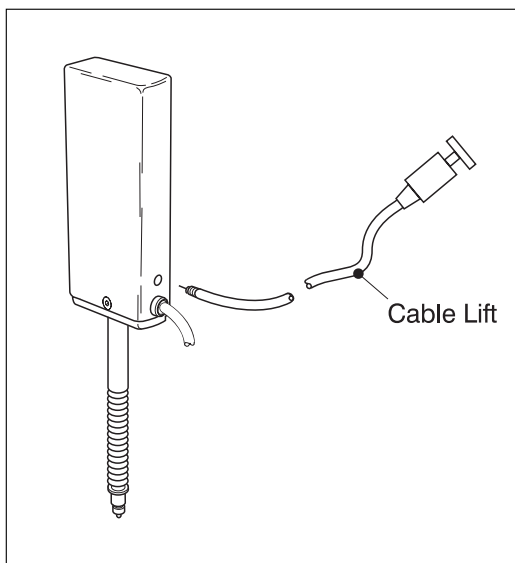
6.1 Finger Lift

Snaps over probe tip enabling tip to be lifted without transferring heat to shaft.



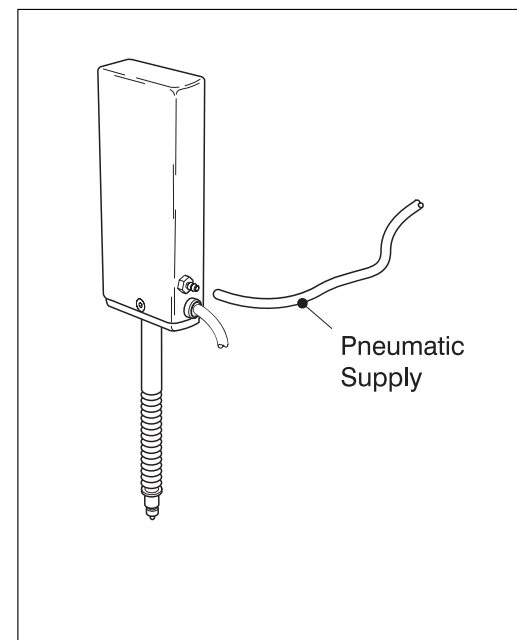
6.2 Cable Lift

Allows tip to be retracted without touching Linear Encoder. Cable retract screws into probe body after removal of blanking screw.



6.3 Pneumatic Operation

A pneumatic nozzle is fitted as standard to LE/12/P & LE/25/P. By applying air between 0.5 & 0.8 bar measuring tip will extend to meet component under test. On no account should a pressure exceeding 1.0 bar be applied.



WARNING: Damage/injury could be caused if the maximum recommended air pressure is exceeded.

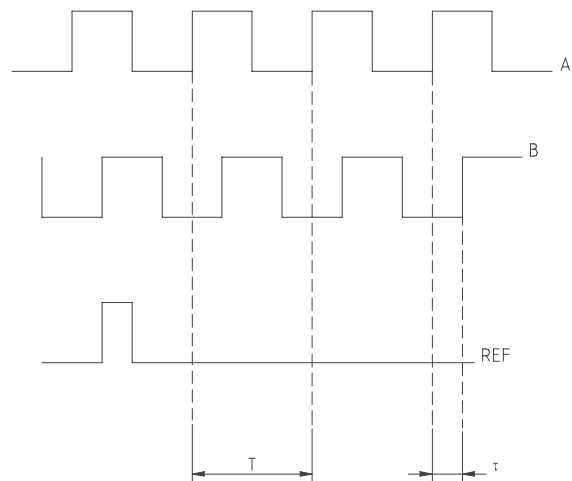


CAUTION

Ensure that air supply for pneumatic operation is clean, dry and oil free.

7.0: Electrical Interface

The Linear Encoder with integral digitising electronics provides incremental TTL compatible square wave outputs. (RS422)



Incremental Signal: are square pulse trains APOS and BPOS, which are phase shifted 90° apart. The inverted equivalent of APOS and BPOS (ANEG and BNEG) are provided for differential applications.

Reference Signal: a positive reference pulse signal REFPOS, its inverted equivalent REFNEG is provided.

Fault Detection: a single ended active low signal, (ERROR) is generated if the probe gauging speed is too high for correct operation, or if the probe signals are out of specification.

7.1 Measuring Technique

The incremental signals can be used to give two resolutions or measuring steps. Using either A or B the resolution is T. Combining A and B together gives a resolution between successive edges t. The available resolutions are:

Available Resolutions (Factory Set)

Probe Output Resolution (T)	Quad Edge Resolution (t)	Gauging Speed/ Slew Rate	Interpolation Rate (See Note)
0.4µm	0.1µm	0.5ms ⁻¹	x100 (A)
0.2µm	0.05µm	0.5ms ⁻¹	x200 (B)
0.1µm	0.025µm	0.4ms ⁻¹	x300 (C)
0.05µm	0.0125µm	0.2ms ⁻²	x800 (D)

Note: A,B,C and D refer to the Interpolation rate, as stated in the product part number.

7.0: Electrical Interface (continued)

7.2 Connections

The Linear Encoder is available with wire ends or different electrical connectors as specified. (The bare wire colours and signals are detailed.)

Please refer to the separate attachment to the manual if the Linear Encoder is supplied with a connector, for technical data on the connector and pin out.

Wire Ended Versions

Signal	Bare Wire Colour
A POS	Red
A NEG	Pink
B POS	Yellow
B NEG	Green
0V	Black
5V	Blue
REF POS	Brown
REF NEG	Orange
ERROR	Grey
SCREEN	Screen (connect to 0V)

Option	Phase Relationship
-00	A leads B for Outward Stroke
-06 (Reverse)	A leads B in Inward Stroke

7.3 Cable Length

For maximum protection against electrically induced interference, it is advised to add a ferrite to the output cable from the ibox. This should comprise 3 turns through a ferrite type TDKZCAT3035-1330.

8.0: Application Note

Consideration of Output Signal Frequency and Shaft Velocity for Linear Encoders with TTL Interpolation Module (LE TTL)

Linear Encoders with TTL Interpolation Module (LE TTL)

When using LE TTL variants it is important that the interface electronics (counter card, EIM etc.) used to read the output has a suitable frequency specification. If the maximum input frequency range is too low the encoder will appear to lose count.

The output frequency from the LE TTL is dependent on:

- Shaft velocity (gauging speed)
- Interpolation Rate

The maximum LE TTL output frequency from the interpolation module is calculated as follows:

- Output Frequency (kHz) =
Shaft Velocity (ms^{-1}) \times 25 \times Configurator Interpolation Rate*.

The table shows typical values of Output frequency versus Velocity and Interpolation Rate*.

Configurator Interpolation Rate	A (X100)	B (X200)	C (X400)	D (X800)
Shaft	Square Wave Output Frequency			
m/s	kHz	kHz	kHz	kHz
0.1	250	500	1000	2000
0.2	500	1000	2000	4000
0.3	750	1500	3000	
0.4	1000	2000	4000	
0.5	1250	2500		

*The Interpolation Rates shown assume that the counter used to read the LE TTL output is set to quadrature count mode (quad edge detection.)

Note: With pneumatic Linear Encoders the inherently higher shaft velocity results in a higher output frequency, therefore the interpolation rate must be limited to type A (X100) and Type B (X200)

There are restrictions on cable lengths for LE TTL. See specification. Technical advice is available.

8.0: Application Note (continued)

Dynamic Linear Encoder (LEIM)

To allow the Linear Encoder to be used as part of the Dynamic Orbit network, a special version of the Linear Encoder has been developed. The LEIM combines a LE TTL and an Encoder Input Module (EIM) to provide a 'Dynamic' Linear Encoder, a feature not possible with the standard Orbit Linear Encoder.

The EIM has a maximum input frequency of 1.2MHz, this limits the shaft velocity of the Linear Encoder to 0.24ms^{-1} . If the probe is moved faster than this, the system will lose count. There is currently no method of signalling this condition and care should be taken when designing measurement systems with the LEIM.

Note: cable length and power supply voltage.

9.0: Specification

Model	LE12	LE25
Stroke	12mm (0.5")	25mm (1.0")
Resolution	0.4µm to 0.0125µm (Refer to 7.0)	
Accuracy	± 0.5µm (20 millionths inch)	
Reference temp	20°C (68°F)	
Slew rate	Refer to 7.0	
Operating attitude	ANY	
Gauging forces: (typical at mid stroke)		
Downwards	0.6N	
Upwards	0.01N	
Horizontal	0.5N	
Max side load	0.1N	
Shock	100g (6ms)	
Vibration	10g (50-2000 Hz)	
Temp range		
- Operating	0° to 50°C (32° to 122°F)	
- Storage	-20° to +70°C (-4° to 158°F)	

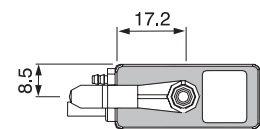
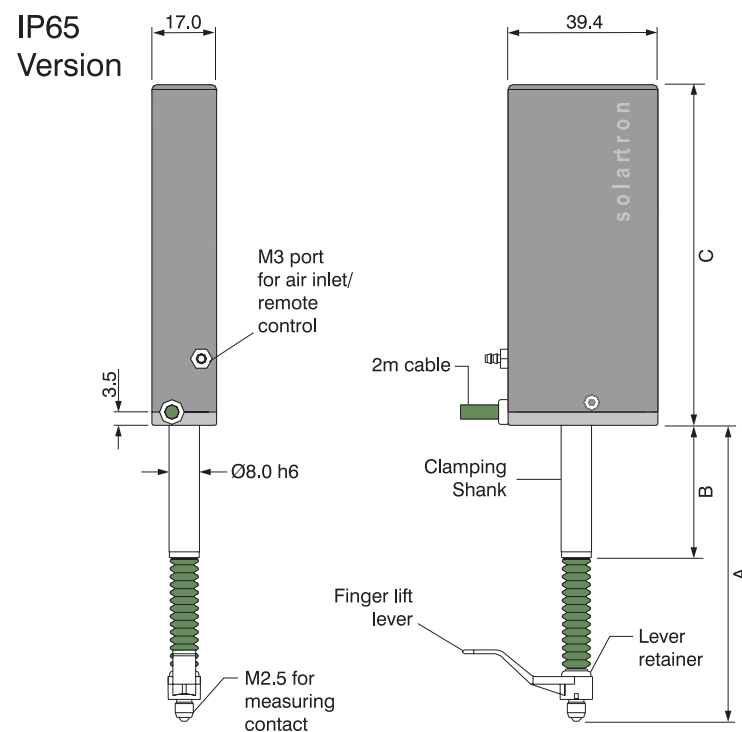
IP Rating	
Probe:	Depending upon probe option
Digitising Module:	IP50
Mounting	8mm h6
Tip thread size	M2.5x6 deep
Supply Voltage (see note1)	5V to 5.25 VDC
Supply Current (max)	180mA
EMC (see section 7.3)	EN50081-1 & EN61000-6-2

Note 1:

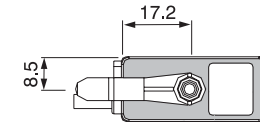
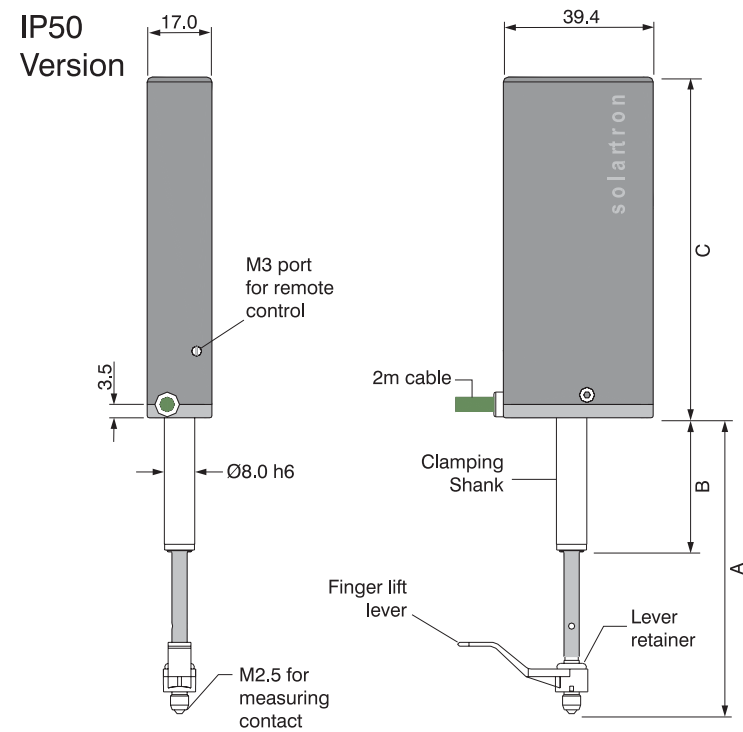
The supply voltage should not be less than 5V (5V to 5.25V)

For cable length greater than 3m please refer to technical support.

10.0: Outline Drawings



	LE/12/S	LE/12/P	LE/25/S	LE/25/P
A	56.0	43.0	92.0	66.0
	43.0	56.0	66.0	92.0
B	20.5	20.5	33.0	33.0
C	66.0	66.0	89.5	89.5



	LE/12/S	LE/25/S
A	50.5	76.0
	37.5	50.0
B	20.5	33.0
C	66.0	89.5

Note:
All dimensions in mm
All dimensions stated
are nominal