

# L35T

## PHOTOELECTRIC LINEAR ENCODER



The precision sealed linear encoder L35T is used to convert linear displacements of key machine components into electrical signals containing information about the value and direction of the displacements.

The encoder consists of a glass scale installed into a rigid hollow housing and a ball-bearing-guided reading head. To be able to work in harsh environments (cooling liquid, lubricants and chips), the encoder has two rows of sealing lips. Filtered compressed air can be supplied into the housing of encoder for extra protection from dust.

Characteristic feature of encoder is a rigid housing that provides better resistance to vibration and higher protection grade due two pairs of sealing lips.

Mounting of encoder on the object is made through two end housings with built-in devices to enhance the thermal stability.



Reference marks can be selected by magnet, which moves in horizontal groove on the front side of encoder (optional).

Three versions of output signals are available:

- L35T-A - sinusoidal signals, with amplitude approx. 11  $\mu$ App.
- L35T-AV - sinusoidal signals, with amplitude approx. 1 Vpp.
- L35T-F - square-wave signals, type TTL or HTL (standard RS422) with integrated subdividing electronics for interpolation x1, x2, x5, x10, x25, x50.

### MECHANICAL DATA

Measuring lengths (ML), mm	170; 220; 270; 320; 370; 420; 470; 520; 620; 720; 820; 920; 1020; 1140; 1240; 1340; 1440; 1540; 1640; 1740; 1840; 1940; 2040; 2140; 2240; 2340; 2440; 2540; 2640; 2740; 2840; 2940; 3040; 3140; 3240 (other intermediate lengths on request)
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Accuracy grades to any metre within the ML (at 20°C):

- for ML from 170 up to 2040 mm  $\pm 5; \pm 3; \pm 2 \mu\text{m}$  (optional)
- or ML from 2040 up to 3240 mm  $\pm 10 \mu\text{m}$

Grating period	20 $\mu\text{m}$ ; 40 $\mu\text{m}$
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Reference marks (RI):

- standard for ML  $\leq 1020$  mm 35mm from both ends of ML
- standard for ML  $> 1140$  mm 45mm from both ends of ML
- optional one RI at any location, two or more RI's separated by distances of (n x 50 mm)

- distance-coded
- selection by magnets

see drawing standard - one magnet (RI) in ML middle

Max. traversing speed:

- when interpolation factor is 1,2,5,10
- when interpolation factor is 25
- when interpolation factor is 50

1 m/s (shortly 2 m/s)  
0.5 m/s  
0.4 m/s

Required moving force with sealing lips

< 5 N

Protection (IEC 529):

- without compressed air
- with compressed air (optional)

IP54  
IP64

Weight

0.4 kg + 2.8 kg/m

Operating temperature

0...+50°C

Storage temperature

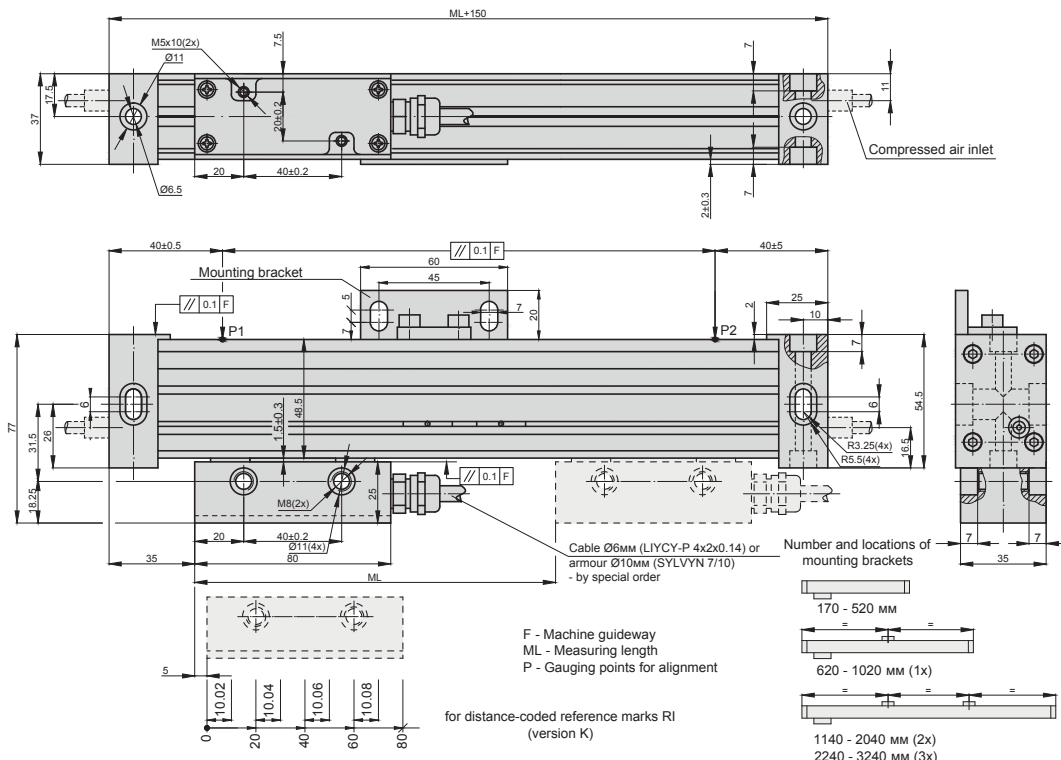
-20...+70°C

Permissible vibration (40 to 2000 Hz)

$\leq 150 \text{ m/s}^2$

Permissible shock (11 ms)

$\leq 300 \text{ m/s}^2$



## ELECTRICAL DATA

VERSION	L35T-A $\sim$ 11 $\mu$ App	L35T-AV $\sim$ 1 Vpp	L35T-F $\square$ TTL; $\square$ HTL
Power supply	+5 V $\pm$ 5% / < 90 mA	+5 V $\pm$ 5% < 90 mA	+5 V $\pm$ 5% / < 120 mA; +12V $\pm$ 5% / < 130mA
Light source	LED	LED	LED
Resolution	Depends on external subdividing electronics	Depends on external subdividing electronics	5; 2.5; 1; 0.5; 0.2; 0.1 $\mu$ m (after 4-fold dividing in subsequent electronics)
Incremental signals	Two sinusoidal I1 and I2 Amplitude at 1 k $\Omega$ load: - I1 = 7-16 $\mu$ A - I2 = 7-16 $\mu$ A	Differential sine +A/-A and +B/-B Amplitude at 120 $\Omega$ load: - A = 0.6-1.2 V - B = 0.6-1.2 V	Differential square-wave U1/ $\bar{U}1$ and U2/ $\bar{U}2$ . Signal levels at 20 mA load current: - low (logic "0") $\leq$ 0.5 V at Up=+5V - high (logic "1") $\geq$ 2.4 V at Up=+5V - low (logic "0") $\leq$ 1.5 V at Up=+12V (HTL) - high (logic "1") $\geq$ (Up-2) V at Up=+12V (HTL)
Reference signal	One quasi-triangular I <sub>0</sub> . Signal magnitude at 1 k $\Omega$ load: - I <sub>0</sub> = 2-8 $\mu$ A (usable component)	One quasi-triangular +R and its complementary -R per revolution. Signals magnitude at 120 $\Omega$ load - R = 0.2-0.8 V (usable component)	One differential square-wave U0/ $\bar{U}0$ per revolution. Signal levels at 20 mA load current: - low (logic "0") $\leq$ 0.5 V at Up=+5V - high (logic "1") $\geq$ 2.4 V at Up=+5V - low (logic "0") $\leq$ 1.5 V at Up=+12V (HTL) - high (logic "1") $\geq$ (Up-2)V at Up=+12V(HTL)
Maximum operating frequency	50 kHz (v=1 m/s) 100 kHz (v=2 m/s shortly) where k- interpolation factor	50 kHz (v=1 m/s) 100 kHz (v=2 m/s shortly)	(50 x k) kHz for k = 1, 2, 5, 10 1000 kHz for k = 25, 50,
Direction of signals	I <sub>2</sub> lags I <sub>1</sub>	B+ lags A+	U <sub>2</sub> lags U <sub>1</sub> , (displacement from left to right and head position down respective glass scale)
Standard cable length	3 m, without connector	3 m, without connector	3 m, without connector
Maximum cable length	5 m	25 m	25 m
Output signals			

Note: If cable extension is used the power supply conductor section should not be smaller than 0.5 mm<sup>2</sup>.

## ACCESSORIES

<b>CONNECTORS FOR CABLE</b>	B12 12-pin round connector	C9 12-pin round connector	C12 12-pin round connector	D9 9-pin flat connector	D15 15-pin flat connector	RS10 10-pin round connector	ONC 10-pin round connector
<b>DIGITAL READOUT DEVICES</b>	CS3000			CS5500			
<b>EXTERNAL INTERPOLATOR</b>	NK						

## ORDER FORM

OUTPUT SIGNALS AND RESOLUTION:	MEASURING LENGTH:	REFERENCE MARKS:	ACCURACY:	SUPPLY VOLTAGE:	COMPRESSED AIR:	CABLE LENGTH:	CONNECTOR TYPE:
A - Sinusoidal AV - Sinusoidal F01 - TTL / HTL 0.1 $\mu$ m F02 - TTL / HTL 0.2 $\mu$ m F05 - TTL / HTL 0.5 $\mu$ m F10 - TTL / HTL 1.0 $\mu$ m F25 - TTL / HTL 2.5 $\mu$ m F50 - TTL / HTL 5.0 $\mu$ m	0070 - 70mm 0520 - 520mm ... 3240 - 3240mm	N - none RI S - standard M - every 50mm K - distance-coded Ln/XXX - nRI with 50-fold steps /XXX distance of the first RI from the beginning of ML, mm O - selection by magnets (standard - one magnet (RI) in ML middle)	10 - $\pm$ 10 $\mu$ m 05 - $\pm$ 5 $\mu$ m 03 - $\pm$ 3 $\mu$ m (optional)	05V - +5V 12V - +12V* *only for HTL	0 - without compressed air 1 - with compressed air	01 - 1m 02 - 2m 03 - 3m ... CP01 - 1m armoured CP02 - 2m armoured CP03 - 3m armoured ...	W - without connector B12 - round, 12 pins C9 - round, 9 pins C12 - round, 12 pins D9 - round, 9 pins D15 - flat, 15 pins RS10 - round, 10 pins ONC - round, 10 pins
ORDER EXAMPLE:	1) L35T-A-0820-S-05-05V-0-03/C9						