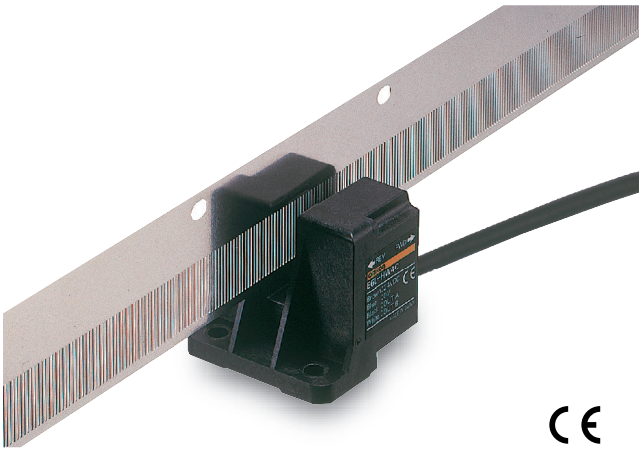
Easy Scale Linear Encoder

E6L

CSM_E6L_DS_E_4_1

Ideal for Conveyance Applications: Easy Scale

- Unique optical system design effectively handles floppy scales.
- Unique optical system, path, and structure realize a lower cost.
- Resolution of 1 mm enables positioning in conveyance applications.
- Two detection scale lengths: 280 mm and 475 mm.
- Detection scale can be extended by connecting multiple scales.



⚠ Be sure to read *Safety Precautions* on page 3.

Ordering Information

Linear Encoders [Refer to Dimensions on page 4.]

Power supply voltage	Resolution	Model
24 VDC	1 mm	**E6L-HW4C 1M**

Detection Scales [Refer to Dimensions on page 4.]

Total length	No. in package	Model
280 mm	1	**E6L-S1M-1 280**
	10	**E6L-S1M-10 280**
475 mm	1	**E6L-S1M-1 475**
	10	**E6L-S1M-10 475**

Ratings and Specifications

Linear Encoder

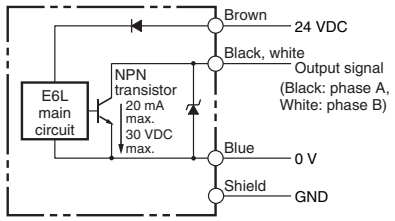
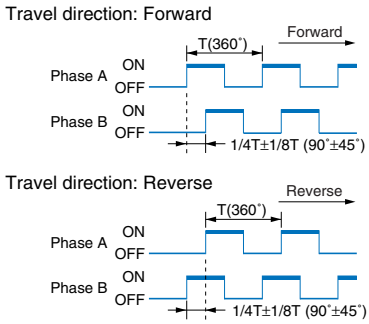
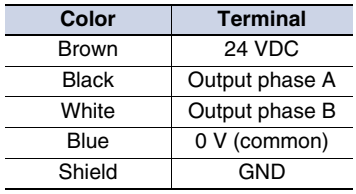
Item / Model	E6L-HW4C
Power supply voltage	24 VDC ±10%, ripple (p-p): 5% max.
Current consumption *	60 mA max.
Resolution (signal period)	1 mm
Output phases	Phases A and B (Phase A is first in forward direction.)
Phase difference between outputs	90°±45° between A and B (1/4 T ± 1/8 T)
Detection Scales	E6L-S (Slit pitch: 1 mm, Slit width: 0.5 mm) or equivalent
Allowable detection scale variation	Detection scale position variation: ±3 mm
	Inclination: ±1° For details, refer to *Mounting Dimensions* on the next page.
Output configuration	NPN open-collector output
Output capacity	Applied voltage: 30 VDC max., Sink current: 20 mA max., Residual voltage: 1.0 V max. (at sink current of 20 mA)
Output logic	Negative logic (high = 0, low = 1)
Maximum response speed	2 m/s
Rise and fall times of output	1 μs max. (Control output voltage: 30 V, Sink current: 20 mA, Cable length: 1 m)
Protection circuits	Power supply reverse polarity protection
Ambient illumination	5,000 lx max. (Light source: incandescent lamp, Color temperature: 3,200±100 K)
Ambient temperature range	Operating: −10 to 55°C (with no icing), Storage: −25 to 65°C (with no icing)
Ambient humidity range	Operating/Storage: 35% to 85% (with no condensation)
Insulation resistance	20 MΩ min. (at 500 VDC) between current-carrying parts and case
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min between current-carrying parts and case
Vibration resistance	Destruction: 10 to 500 Hz, 100 m/s^2 or 1.5-mm double amplitude for 11 min 10 times each in X, Y, and Z directions
Shock resistance	Destruction: 500 m/s^2 3 times each in X, Y, and Z directions
Degree of protection	IEC 60529 IP50
Connection method	Pre-wired Models (Standard cable length: 1 m)
Material	Case: PBT
Weight (packed state)	Approx. 200 g
Accessories	Instruction manual

* An inrush current of approximately 9 A will flow for approximately 0.5 ms when the power is turned ON.

Detection Scales

Item / Model	E6L-S1M-1 280	E6L-S1M-10 280	E6L-S1M-1 475	E6L-S1M-10 475
No. in package	1	10	1	10
Total length	280 mm		475 mm	
Effective stroke length	275 mm		470 mm	
Material	Stainless steel (SUS304)			
Slit pitch	1 mm (slit width: 0.5 mm)			

I/O Circuit Diagrams

Output Circuits	Output mode	Connection
		

Color	Terminal
Brown	24 VDC
Black	Output phase A
White	Output phase B
Blue	0 V (common)
Shield	GND

Safety Precautions

Refer to *Warranty and Limitations of Liability*.

⚠ WARNING

This product is not designed or rated for ensuring safety of persons either directly or indirectly. Do not use it for such purposes.

⚠ CAUTION

Do not touch the E6L-S1M Detection Scale with bare hands. The edge may cause injuries.

Precautions for Safe Use

● Mounting

The E6L-S1M is made of stainless steel (SUS304). If the material to which the E6L-S1M is mounted has a different thermal expansion coefficient that SUS304, the E6L-S1M may be deformed or bent by thermal stress. Take measure to prevent deformation and bending and use the E6L-S1M within the detectable range. The thermal expansion coefficient of SUS304 is approximately 17.3×10^{-6} (1/K).

● Wiring

Always turn OFF the power supply before wiring. If the output line comes into contact with the power supply when the power supply is turned ON, the output circuits may be destroyed.

● Connection

Spurious pulses may be generated when power is turned ON and OFF. Wait at least 0.1 s after turning ON the power to the Encoder before using the connected device, and stop using the connected device at least 0.1 s before turning OFF the power to the Encoder. Also, turn ON the power to the load only after turning ON the power to the Encoder.

Precautions for Correct Use

Do not use the Encoder under ambient conditions that exceed the ratings.

● Wiring

If wiring after securing the E6L-HW4C, do not pull on the cable with a force exceeding 30 N.

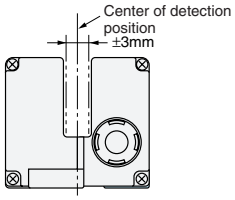
● Mounting

(1) The E6L-HW4C consists of precision parts. Do not subject it to excessive force or shock.
(2) Always handle the E6L-S1M with care, being careful not to bend or fold it.
(3) Do not allow water drops or oil to come into contact with the product.
(4) When mounting the E6L-HW4C with screws, tighten the screws to a torque of 0.5 N·m.
(5) Outputs may malfunction if the E6L-S1M slits are not in the detection range (5-mm dia.) of the E6L-HW4C. Mount the Encoder so that the slits are in the detection range.

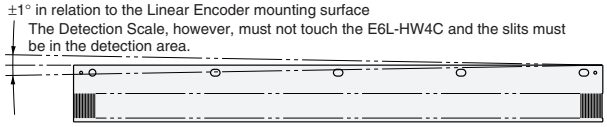
Mounting Dimensions

Mount the E6L-HW4C and E6L-S1M within the following allowable range along the entire stroke length. Proper operation will not be possible if the allowable range is exceeded.

Allowable detection scale position variation



Detection Scale incline



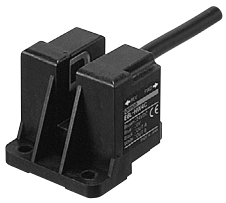
(Unit: mm)

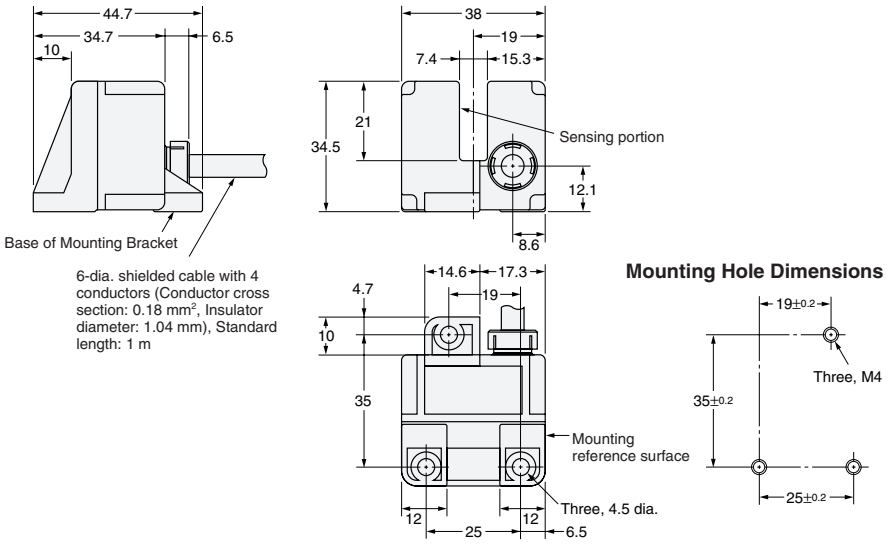
Dimensions

Tolerance class IT16 applies to dimensions in this datasheet unless otherwise specified.

Linear Encoder

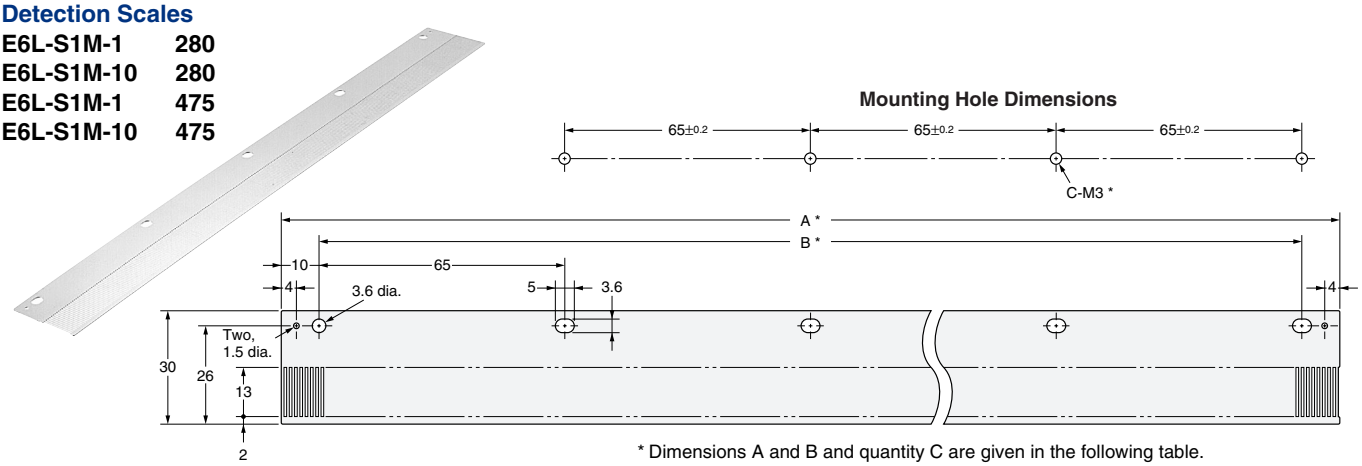
E6L-HW4C





Detection Scales

E6L-S1M-1 280
E6L-S1M-10 280
E6L-S1M-1 475
E6L-S1M-10 475



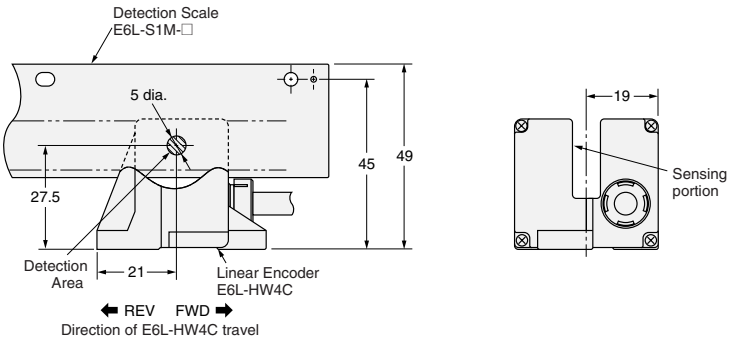
* Dimensions A and B and quantity C are given in the following table.

Model	A	B	C
E6L-S1M-1 280/E6L-S1M-10 280	280	4×65 = 260	5
E6L-S1M-1 475/E6L-S1M-10 475	475	7×65 = 455	8

Material: Stainless steel (SUS304)
Thickness: 0.3 mm

Mounting Dimensions

E6L-HW4C + E6L-S1M-□



Note: The directions of travel given on the nameplate of the E6L-HW4C ("FWD" and "REV") indicate the direction of E6L-HW4C travel relative to the E6L-S1M, regardless of whether the E6L-HW4C or E6L-S1M actually moves. (That is, the Detection Scale is the reference for these indications.)

Read and Understand This Catalog

Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

Warranty and Limitations of Liability

WARRANTY

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The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

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- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

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Disclaimers

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DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

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