

# LINEAR SCALE AT402E

Linear encoder for NC feedback system

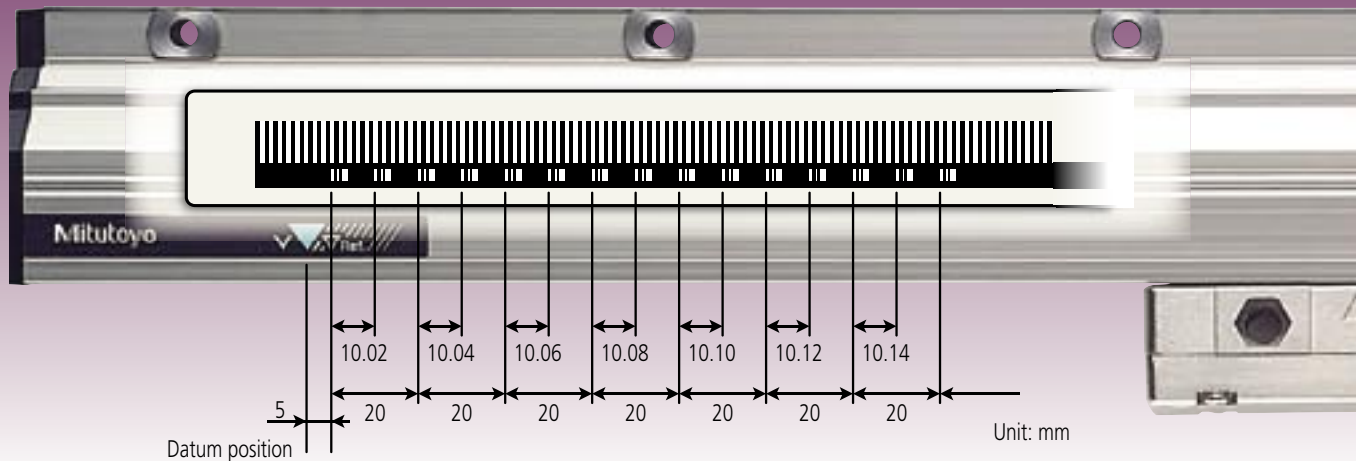
Catalog No. E4287-539



In addition to the high measuring accuracy the world-class vibration resistance (20G) and shock resistance (40G) are achieved.

**Mitutoyo**

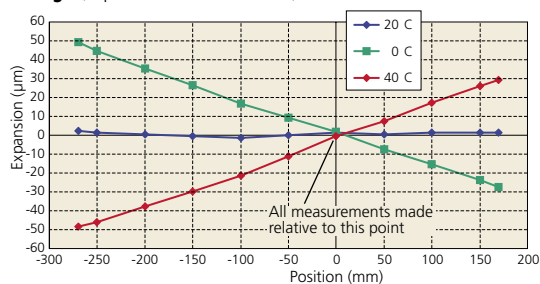
# Linear Scale for NC control with high vibration/shock resistance and linear thermal characteristics



## Features

- Achieving the world-class vibration resistance (20G) and shock resistance (40G) for using with a heavy cutting machine tool.
- Multi-point elastic fixing for very linear and smooth expansion and contraction with temperature changes
- 1Vpp/20 $\mu$ m signal output for high connectivity with various machine controllers.
- Absolute Interval Code for a simple and affordable Absolute Measuring System.
- High-response speed of 120m/min
- High measuring accuracy of  $\pm 2\mu$ m (up to 540mm)
- Thermal characteristics

Scale expansion resulting from ambient air temperature change (expansion factor  $8.5 \times 10^{-6}$ )

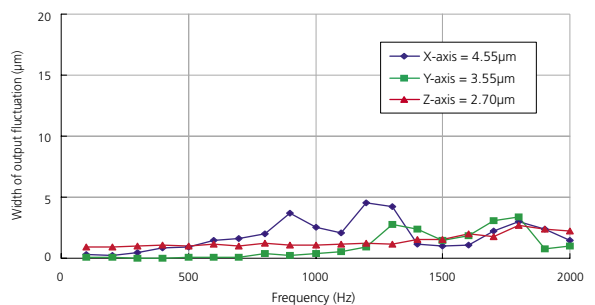


## Absolute Interval Code

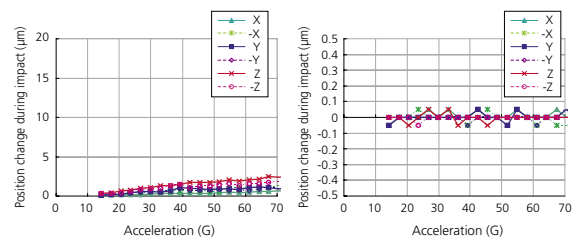
Absolute Interval Code system provides reference marks at every 20mm interval with a 0.02mm offset. This enables unique origin position setting by detection of only two marks (minimum), and the initial setting time required is less.

## World-class vibration/shock resistance

### Vibration test at 20G



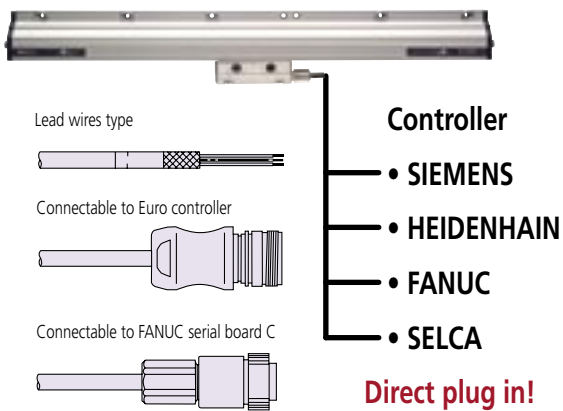
### Shock test at 1/2 sin and 11msec



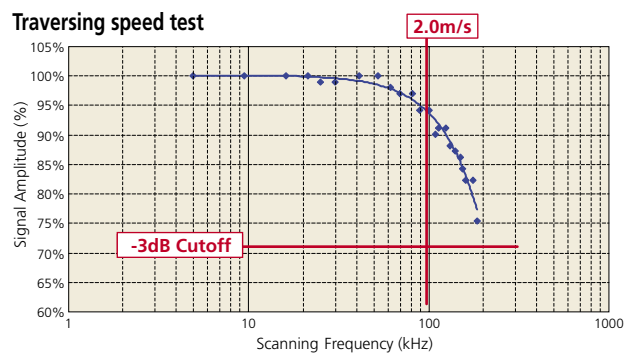
# Linear Scale AT402E



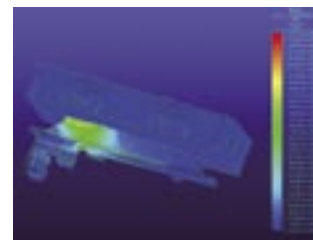
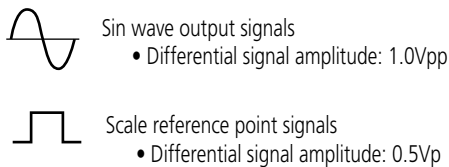
## • Connectable NC Controller



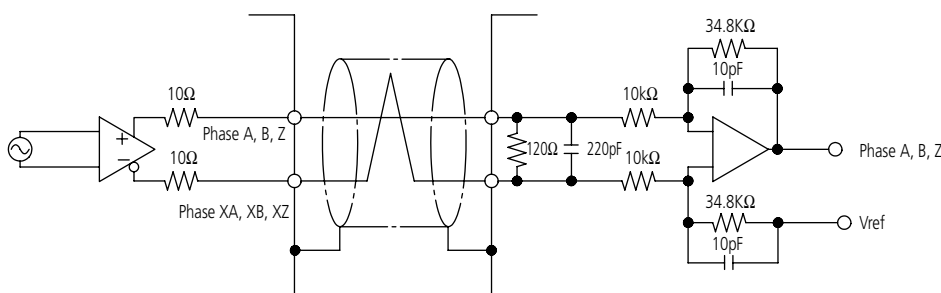
## • Higher traverse speed performance reserve



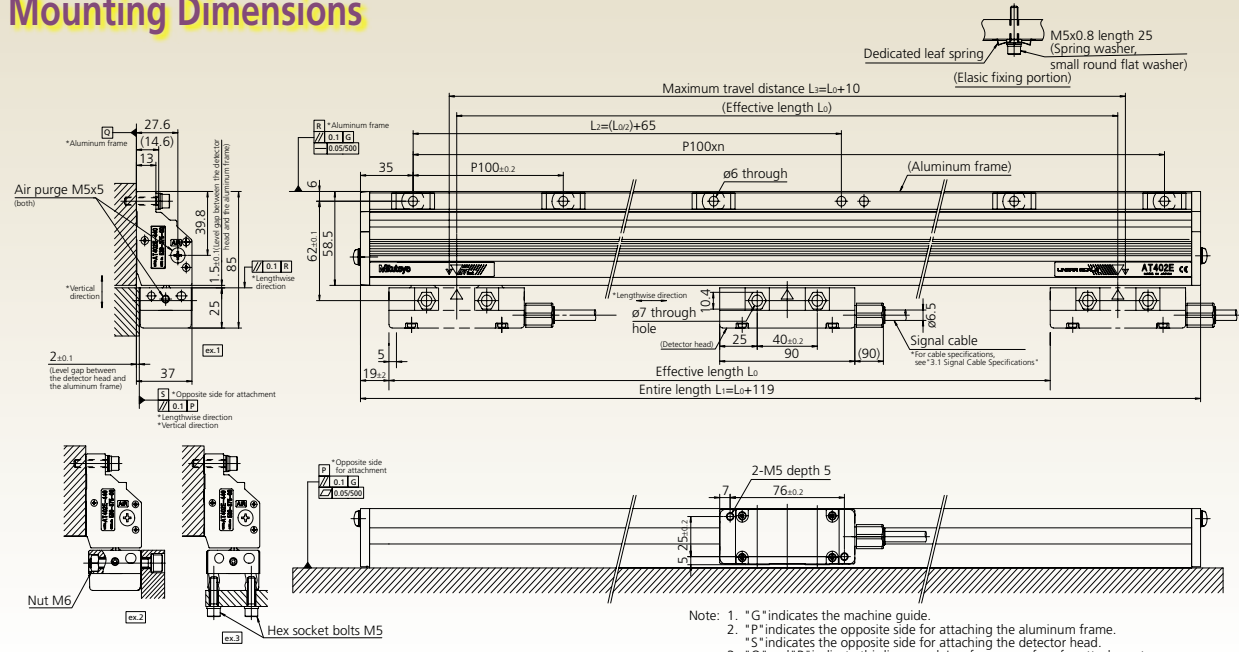
## • 1Vpp Signal Output and Output Circuit



## • FEM analysis of AT402E head mold.

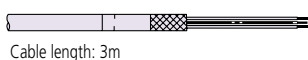


# Mounting Dimensions

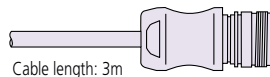


Order No. (w/o cable)	Order No. (w/ 3m cable A)	Order No. (w/ 3m cable B)	Order No. (w/ 3m cable C)	Effective length $L_0$	Entire length $L_1$	$L_2$	Maximum traveling stroke $L_3$	n
539-371-00	539-371-01	539-371-02	539-371-03	140	259	135	259	2
539-373-00	539-373-01	539-373-02	539-373-03	240	359	185	359	3
539-374-00	539-374-01	539-374-02	539-374-03	340	459	235	459	4
539-375-00	539-375-01	539-375-02	539-375-03	440	559	285	559	5
539-376-00	539-376-01	539-376-02	539-376-03	540	659	335	659	6
539-377-00	539-377-01	539-377-02	539-377-03	640	759	385	759	7
539-378-00	539-378-01	539-378-02	539-378-03	740	859	435	859	8
539-379-00	539-379-01	539-379-02	539-379-03	840	959	485	959	9
539-380-00	539-380-01	539-380-02	539-380-03	940	1059	535	1059	10
539-381-00	539-381-01	539-381-02	539-381-03	1040	1159	585	1159	11
539-382-00	539-382-01	539-382-02	539-382-03	1140	1259	635	1259	12
539-383-00	539-383-01	539-383-02	539-383-03	1240	1359	685	1359	13
539-384-00	539-384-01	539-384-02	539-384-03	1340	1459	735	1459	14
539-385-00	539-385-01	539-385-02	539-385-03	1440	1559	785	1559	15
539-386-00	539-386-01	539-386-02	539-386-03	1540	1659	835	1659	16
539-387-00	539-387-01	539-387-02	539-387-03	1640	1759	885	1759	17
539-388-00	539-388-01	539-388-02	539-388-03	1740	1859	935	1859	18
539-389-00	539-389-01	539-389-02	539-389-03	1840	1959	985	1959	19
539-390-00	539-390-01	539-390-02	539-390-03	2040	2159	1085	2159	21
539-391-00	539-391-01	539-391-02	539-391-03	2240	2359	1185	2359	23
539-392-00	539-392-01	539-392-02	539-392-03	2440	2559	1285	2559	25
539-393-00	539-393-01	539-393-02	539-393-03	2640	2759	1385	2759	27
539-394-00	539-394-01	539-394-02	539-394-03	2840	2959	1485	2959	29
539-395-00	539-395-01	539-395-02	539-395-03	3040	3159	1585	3159	31

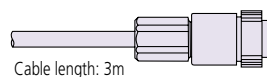
Cable A: Lead wires type



Cable B: Connectable to Euro controller



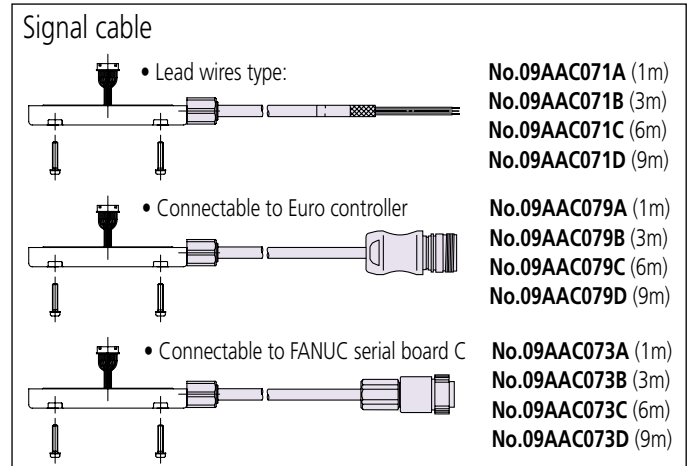
Cable C: Connectable to FANUC serial board C

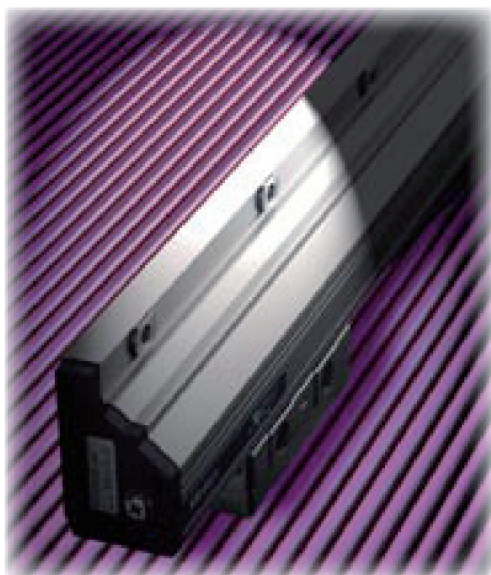




## Specifications

Effective length $L_0$ (mm):	140, 240, 340, 440, 540, 640, 740, 840, 940, 1040, 1140, 1240, 1340, 1440, 1540, 1640, 1740, 1840, 2040, 2240, 2640, 2840, 3040
Detecting method:	Optoelectronic linear encoder
Signal output:	1Vpp (4-phase sin wave), Differential origin point pulse (Absolute Interval Code - Distance Code compatible -)
Signal pitch:	20 $\mu$ m
Maximum response speed:	120m/min (sin wave with -3dB amplitude)
Indication accuracy (20°C):	$\pm 2\mu$ m ( $L_0$ : 140 to 540mm), $\pm 3\mu$ m ( $L_0$ : 640 to 940mm), $\pm 3\mu$ m/1m ( $L_0$ : 1040 to 3040mm)
Coefficient of linear expansion:	$8.5 \times 10^{-6}/^\circ\text{C}$
Temperature (operation):	0°C to 45°C, 20%PH to 80%PH (with no condensation)
Temperature (storage):	-20°C to 70°C, 20%PH to 80%PH (with no condensation)
Vibration resistance:	20G (55 to 2000Hz)
Shock resistance:	40G (1/2Sin 11ms)
Power supply:	DC5V $\pm$ 5%
Power consumption:	120mA
Dust/water protection:	IP53 level
Nozzle for air supply:	Provided





Specifications are subject to change without notice.

Note: All information regarding our products, and in particular the illustrations, drawings, dimensional and performance data contained in this pamphlet, as well as other technical data are to be regarded as approximate average values. We therefore reserve the right to make changes to the corresponding designs, dimensions and weights. The stated standards, similar technical regulations, descriptions and illustrations of the products were valid at the time of printing. In addition, the latest applicable version of our General Trading Conditions will apply. Only quotations submitted by ourselves may be regarded as definitive.

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Mitutoyo Nederland b.v.  
Storkstraat 40  
3905 KX Veenendaal  
T 0031 318 534911  
F 0031 318 534811  
sales@mitutoyo.nl  
www.mitutoyo.nl

**Mitutoyo**