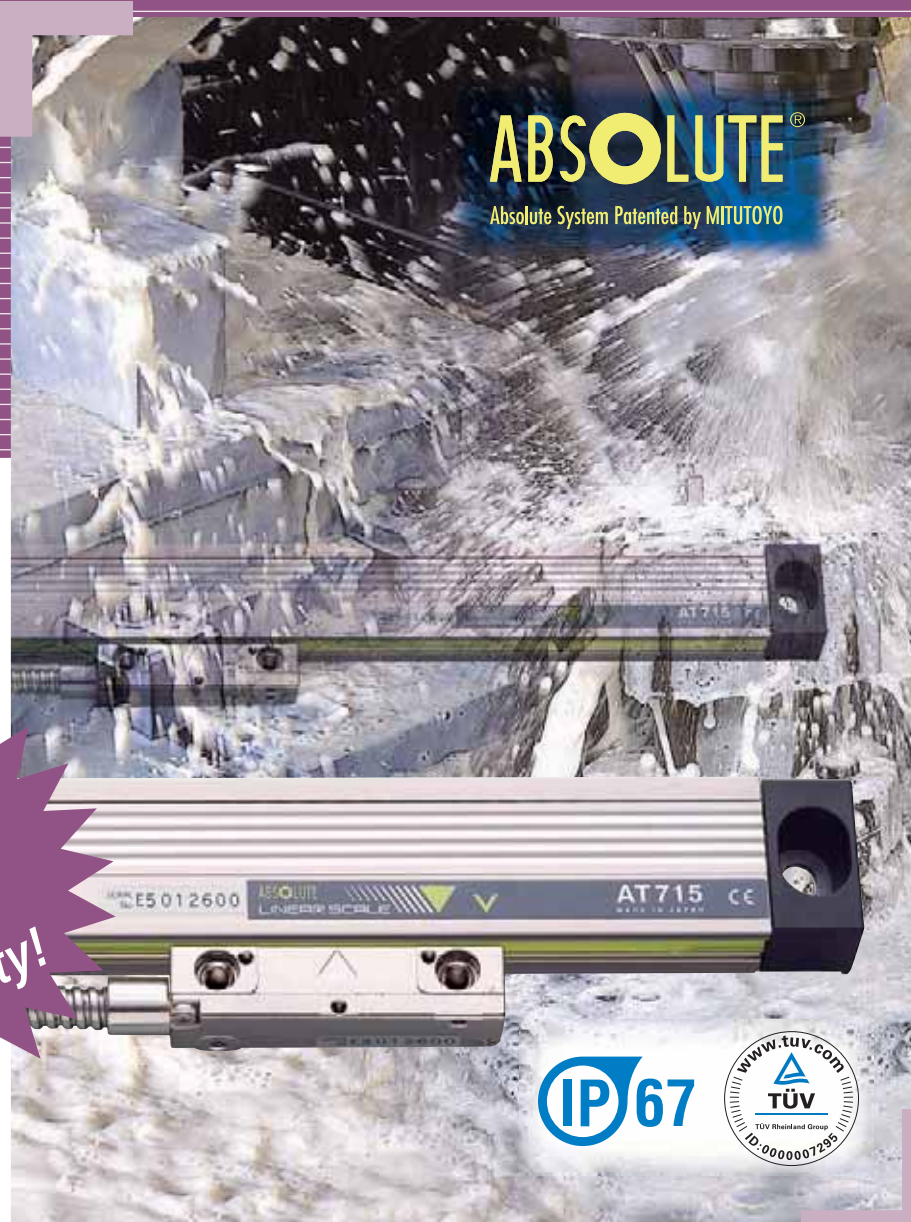


# LINEAR SCALE ABS AT715

## ABSOLUTE Linear Encoder for DRO Systems

Bulletin No. 1986

**NEW!**  
Now with  
5 year  
warranty!



**ABSOLUTE®** electromagnetic induction-type linear encoder technology makes the AT715 scale contamination resistant in the toughest machine tool environments.

**Mitutoyo**

# ABSOLUTE® Linear Scale ABS AT715 achieves IP67 environmental resistance standard



## Features: Absolute Linear Scale ABS AT715

- ABSOLUTE® electromagnetic induction system achieves an IP67 rating to resist the harshest contamination found in machine tool environments.
- Detects and outputs an absolute position - no reference point setup needed at every power-on.



| Order No. | L <sub>0</sub> : Effective length<br>inch(mm) | L <sub>1</sub> : Maximum travel length<br>inch(mm) | L <sub>2</sub> : Mounting hole pitch<br>inch(mm) | L <sub>3</sub> : Mounting hole pitch<br>inch(mm) | L <sub>4</sub> : Total length<br>inch(mm) | L <sub>5</sub> : Middle support position<br>inch(mm) | L <sub>6</sub> : Middle support position<br>inch(mm) | L <sub>7</sub> : Middle support position<br>inch(mm) | Cable<br>inch(m) |
|-----------|-----------------------------------------------|----------------------------------------------------|--------------------------------------------------|--------------------------------------------------|-------------------------------------------|------------------------------------------------------|------------------------------------------------------|------------------------------------------------------|------------------|
| 539-801   | 3.94"(100)                                    | 4.72"(120)                                         | 10.16"(258)                                      | 9.53"(242)                                       | 10.94"(278)                               | —                                                    | —                                                    | —                                                    | 138"(3.5)        |
| 539-802   | 5.91"(150)                                    | 6.69"(170)                                         | 12.13"(308)                                      | 11.50"(292)                                      | 12.91"(328)                               | —                                                    | —                                                    | —                                                    | 138"(3.5)        |
| 539-803   | 7.87"(200)                                    | 8.66"(220)                                         | 14.09"(358)                                      | 13.46"(342)                                      | 14.88"(378)                               | —                                                    | —                                                    | —                                                    | 138"(3.5)        |
| 539-804   | 9.84"(250)                                    | 10.63"(270)                                        | 16.06"(408)                                      | 15.43"(392)                                      | 16.85"(428)                               | —                                                    | —                                                    | —                                                    | 138"(3.5)        |
| 539-805   | 11.81"(300)                                   | 12.99"(330)                                        | 18.43"(468)                                      | 17.80"(452)                                      | 19.21"(488)                               | —                                                    | —                                                    | —                                                    | 138"(3.5)        |
| 539-806   | 13.78"(350)                                   | 14.96"(380)                                        | 20.39"(518)                                      | 19.76"(502)                                      | 21.18"(538)                               | —                                                    | —                                                    | —                                                    | 138"(3.5)        |
| 539-807   | 15.75"(400)                                   | 16.93"(430)                                        | 22.36"(568)                                      | 21.73"(552)                                      | 23.15"(588)                               | —                                                    | —                                                    | —                                                    | 138"(3.5)        |
| 539-808   | 17.72"(450)                                   | 18.90"(480)                                        | 24.33"(618)                                      | 23.70"(602)                                      | 25.12"(638)                               | —                                                    | —                                                    | —                                                    | 138"(3.5)        |
| 539-809   | 19.69"(500)                                   | 21.26"(540)                                        | 26.69"(678)                                      | 26.06"(662)                                      | 27.48"(698)                               | 13.35"(339)                                          | 13.03"(331)                                          | —                                                    | 138"(3.5)        |
| 539-811   | 23.62"(600)                                   | 25.20"(640)                                        | 30.63"(778)                                      | 30.00"(762)                                      | 31.42"(798)                               | 15.31"(389)                                          | 15.00"(381)                                          | —                                                    | 138"(3.5)        |
| 539-813   | 27.56"(700)                                   | 29.13"(740)                                        | 34.57"(878)                                      | 33.94"(862)                                      | 35.35"(898)                               | 17.28"(439)                                          | 16.97"(431)                                          | —                                                    | 138"(3.5)        |
| 539-814   | 29.53"(750)                                   | 30.71"(780)                                        | 36.14"(918)                                      | 35.51"(902)                                      | 36.93"(938)                               | 18.07"(459)                                          | 17.76"(451)                                          | —                                                    | 138"(3.5)        |
| 539-815   | 31.50"(800)                                   | 33.07"(840)                                        | 38.50"(978)                                      | 37.87"(962)                                      | 39.29"(998)                               | 19.25"(489)                                          | 18.94"(481)                                          | —                                                    | 138"(3.5)        |
| 539-816   | 35.43"(900)                                   | 37.01"(940)                                        | 42.44"(1078)                                     | 41.81"(1062)                                     | 43.23"(1098)                              | 21.22"(539)                                          | 20.91"(531)                                          | —                                                    | 138"(3.5)        |
| 539-817   | 39.37"(1000)                                  | 40.94"(1040)                                       | 46.38"(1178)                                     | 45.75"(1162)                                     | 47.17"(1198)                              | 23.19"(589)                                          | 22.87"(581)                                          | —                                                    | 197"(5)          |
| 539-818   | 43.31"(1100)                                  | 44.88"(1140)                                       | 50.31"(1278)                                     | 49.69"(1262)                                     | 51.10"(1298)                              | 16.69"(424)                                          | 16.38"(416)                                          | 16.93"(430)                                          | 197"(5)          |
| 539-819   | 47.24"(1200)                                  | 48.82"(1240)                                       | 54.25"(1378)                                     | 53.62"(1362)                                     | 55.04"(1398)                              | 18.07"(459)                                          | 17.76"(451)                                          | 18.11"(460)                                          | 197"(5)          |
| 539-820   | 51.18"(1300)                                  | 52.76"(1340)                                       | 58.19"(1478)                                     | 57.56"(1462)                                     | 58.98"(1498)                              | 19.45"(494)                                          | 19.13"(486)                                          | 19.29"(490)                                          | 197"(5)          |
| 539-821   | 55.12"(1400)                                  | 56.69"(1440)                                       | 62.13"(1578)                                     | 61.50"(1562)                                     | 62.91"(1598)                              | 20.63"(524)                                          | 20.31"(516)                                          | 20.87"(530)                                          | 197"(5)          |
| 539-822   | 59.06"(1500)                                  | 60.63"(1540)                                       | 66.06"(1678)                                     | 65.43"(1662)                                     | 66.85"(1698)                              | 22.01"(559)                                          | 21.69"(551)                                          | 22.05"(560)                                          | 197"(5)          |
| 539-823   | 62.99"(1600)                                  | 64.57"(1640)                                       | 70.00"(1778)                                     | 69.37"(1762)                                     | 70.79"(1798)                              | 18.07"(459)                                          | 17.76"(451)                                          | 16.93"(430)                                          | 197"(5)          |
| 539-824   | 66.93"(1700)                                  | 68.50"(1740)                                       | 73.94"(1878)                                     | 73.31"(1862)                                     | 74.72"(1898)                              | 18.86"(479)                                          | 18.54"(471)                                          | 18.11"(460)                                          | 197"(5)          |
| 539-825   | 70.87"(1800)                                  | 72.44"(1840)                                       | 77.87"(1978)                                     | 77.24"(1962)                                     | 78.66"(1998)                              | 18.07"(459)                                          | 17.76"(451)                                          | 20.87"(530)                                          | 197"(5)          |
| 539-860   | 80"(2000)                                     | 80.31"(2040)                                       | 85.75"(2178)                                     | 85.12"(2162)                                     | 86.54"(2198)                              | 21.22"(539)                                          | 20.91"(531)                                          | 21.65"(550)                                          | 197"(5)          |
| 539-861   | 88"(2200)                                     | 88.19"(2240)                                       | 93.62"(2378)                                     | 92.99"(2362)                                     | 94.41"(2398)                              | 18.46"(469)                                          | 18.15"(461)                                          | 18.90"(480)                                          | 197"(5)          |
| 539-862   | 96"(2400)                                     | 96.06"(2440)                                       | 101.50"(2578)                                    | 100.87"(2562)                                    | 102.28"(2598)                             | 20.04"(509)                                          | 19.72"(501)                                          | 20.47"(520)                                          | 276"(7)*         |
| 539-863   | 100"(2500)                                    | 100.00"(2540)                                      | 105.43"(2678)                                    | 104.80"(2662)                                    | 106.22"(2698)                             | 20.83"(529)                                          | 20.51"(521)                                          | 21.26"(540)                                          | 276"(7)*         |
| 539-864   | 104"(2600)                                    | 103.94"(2640)                                      | 109.37"(2778)                                    | 108.74"(2762)                                    | 110.16"(2798)                             | 21.61"(549)                                          | 21.30"(541)                                          | 22.05"(560)                                          | 276"(7)*         |
| 539-865   | 112"(2800)                                    | 111.81"(2840)                                      | 117.24"(2978)                                    | 116.61"(2962)                                    | 118.03"(2998)                             | 19.25"(489)                                          | 18.94"(481)                                          | 19.69"(500)                                          | 276"(7)*         |
| 539-866   | 120"(3000)                                    | 119.68"(3040)                                      | 125.12"(3178)                                    | 124.49"(3162)                                    | 125.91"(3198)                             | 20.83"(529)                                          | 20.51"(521)                                          | 20.87"(530)                                          | 276"(7)*         |

\* Length is combination of 5m cable plus 2m extension cable

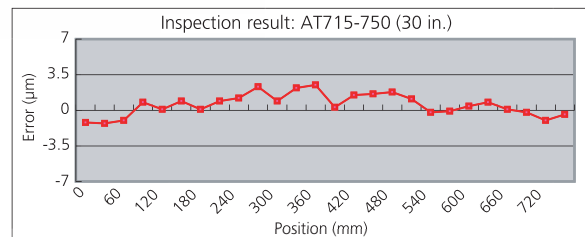
# Linear Scale ABS AT715



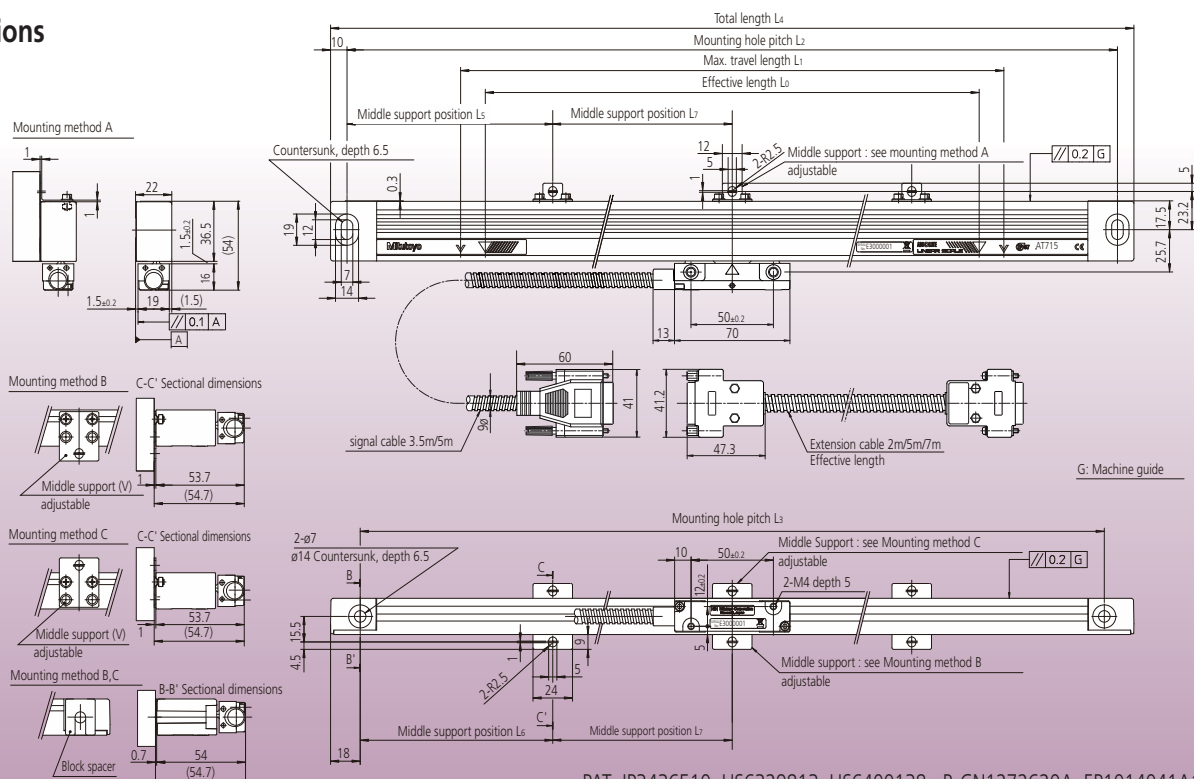
## Specifications

|                            |                                                                                                              |
|----------------------------|--------------------------------------------------------------------------------------------------------------|
| Detecting system           | Electromagnetic induction system*                                                                            |
| Resolution                 | .000005"/.00005"/.0001"/.0005"<br>(0.0001mm/0.0005mm/0.0010mm/0.005mm)<br>(switchable by KA counter setting) |
| Travel range               | 4.72" - 119.68" (120mm - 3040mm)                                                                             |
| Accuracy 68°F(20°C)        | 100-500mm $\pm 5\mu\text{m}$ , 600-1800mm $\pm 7\mu\text{m}$ , 2000-3000mm $\pm 10\mu\text{m}$               |
| Response speed             | 50m/min.                                                                                                     |
| Dust/water protection      | IP67                                                                                                         |
| Sliding force              | Less than 5N                                                                                                 |
| Applicable counter         | KA counter and KLD-200 counter (with limit signal output function)                                           |
| Extension cable (optional) | 79" (2m): <b>09AAB674A</b><br>197" (5m): <b>09AAB674B</b><br>276" (7m): <b>09AAB674C</b>                     |

\*Patented in Japan, USA, India, China, Europe



## Dimensions



PAT. JP3436510, US6329813, US6400138 P. CN1272620A, EP1014041A1

# KA Counter for multiple use applications — Mill/Lathe/Grinder and other general uses, high-performance that's cost-effective, user friendly



174-173A (2 Axis)



174-175A (3 Axis)

## Specifications

Inch / (mm)

| Order No.             | 120V AC | 174-173A                                                                                                                                                                                                                                                                                          | 174-175A          |
|-----------------------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Scale input ports     |         | 2 <sup>-1</sup>                                                                                                                                                                                                                                                                                   | 3                 |
| Resolution            |         | .000005", .00005", .0001", .0005" (0.0001mm, 0.0005mm, 0.001mm, 0.005mm) (selectable)                                                                                                                                                                                                             |                   |
| Display               |         | 7-digit LED and a negative [-] sign                                                                                                                                                                                                                                                               |                   |
| Functions             |         | Zero-setting, preset, counting direction setting, mm/inch conversion, 1/2 calculation, ABS/INC coordinate selection, diameter display, tool offsets, addition of 2-scale data (3 axis model only), zero approach machining, bolt-hole circle machining, pitch machining, touch-signal probe input |                   |
| Applicable scale unit |         | AT100 series (Glass) and ABS AT715 (Electromagnetic Induction)                                                                                                                                                                                                                                    |                   |
| Power supply          |         | 120V AC, 50/60Hz                                                                                                                                                                                                                                                                                  |                   |
| Operating temperature |         | 32°F to 104°F (0°C to 40°C)                                                                                                                                                                                                                                                                       |                   |
| Mass                  |         | 2.43 lbs. (1.1kg)                                                                                                                                                                                                                                                                                 | 2.65 lbs. (1.2kg) |

<sup>-1</sup>: Available as a 1-axis counter by changing the parameter setting

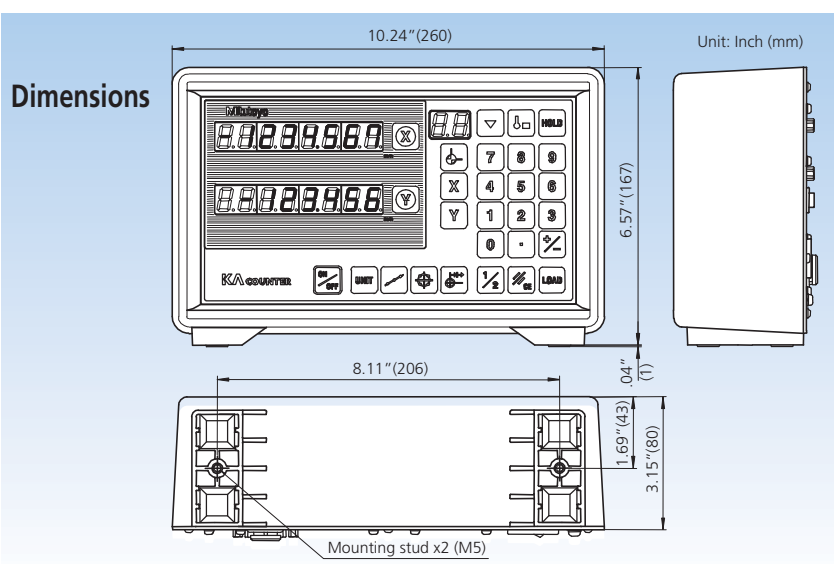
## Optional accessory

RS-232C codeout unit: **09CAB217**

Touch signal probe:

**938140** ø.79" (ø20mm) shank

**935094** ø1.26" (ø32mm) shank



**Mitutoyo**



# KA Counter

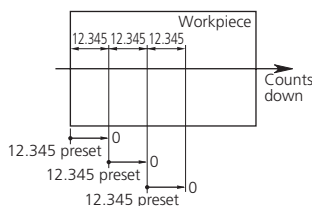
## Zero-setting

The display can be set to "0" (zero) at any scale position.



## Preset

This function allows the user to enter a numeric value on the counter display. Any preset value can be retrieved whenever necessary.

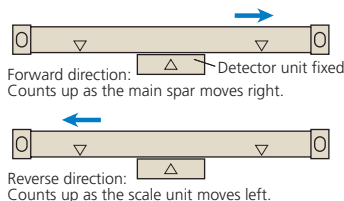


## Resolution setting

The most suitable resolution can be selected to meet measuring applications. Available resolutions depend upon the Counter to be used.

## Counting direction setting

The counting up direction can be selected.



## mm/inch conversion

The counting unit can be changed between "mm" and "inch" (or between "mm" and "E (=1/25.4mm)" depending on the model.)

## 1/2 calculation

This function halves the display value.

## Lower digit blanking out

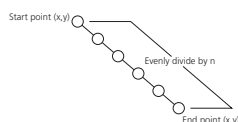
Unnecessary lower digits (up to 9 digits of the lowest digits) can be blanked out.

## Memory backup

The backup battery retains the most recent display value even when the counter is off.

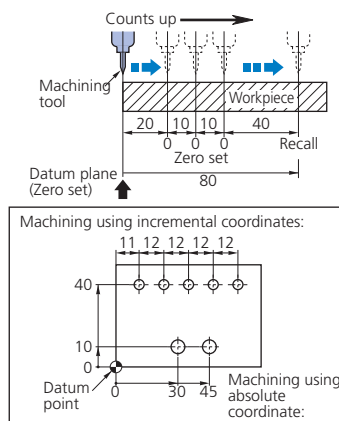
## Pitch machining

This mode allows the line between any two points in the X-Y plane to be divided into any number of equally spaced divisions.



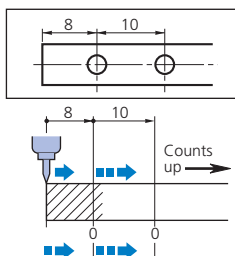
## Absolute/incremental coordinate selection

For each axis, the measured value can be displayed in either absolute (ABS) or incremental (INC) coordinates. This function is useful by enabling incremental mode operations to be performed while the workpiece datum point is retained ready to use for operations based on absolute mode coordinates.



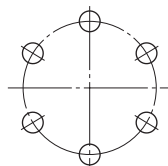
## Zero approach machining [INC mode]

Zero approach machining can be repeated at a preset interval without error. Since the counter keeps the total displacement in the absolute coordinate system, cumulative error is automatically eliminated at each tool position.



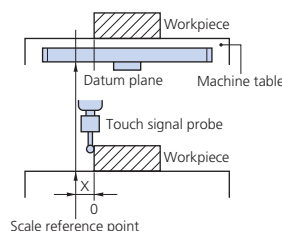
## Bolt-hole circle machining

Drilling positions along the circumference of a bolt-hole circle in the absolute zero approach mode can be easily displayed by entering the center coordinates, diameter, and number of divisions of the base circle.



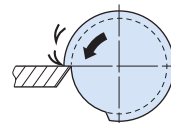
## Scale reference point setting (AT100 Series)

The distance from a scale reference point to the machine origin can be registered as an offset value, and will be retained even when the power is off (hold function). When the power is turned on again, the machine origin (or machining datum) can be easily recalled (set function).



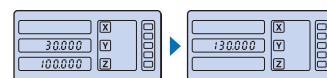
## Diameter display

This convenient feature can be used to directly display the diameter of a workpiece during a turning operation on a lathe.



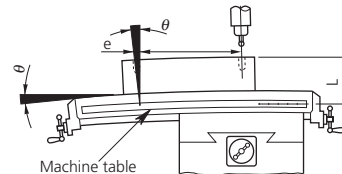
## Addition of 2-scale data (3 Axis Model Only)

If a machine has two slides, each with its own scale, this function can be used to sum the two values to display the total workpiece displacement.



## Linearity error compensation

Machine errors caused due to workpiece weight, inaccurate table adjustment, etc., can be linearly compensated to reduce the positioning error.



## Smoothing

Smoothing makes the display value easier to read when a minimum reading fluctuates due to machine vibration.

## RS-232C Interface Unit

The EIA standard RS-232C connector provides data transfer to/from a personal computer with an RS-232C Interface Unit. Not only can coordinate data be output from this connector, but it can also receive signals from the personal computer to perform zero setting, presetting, etc.





### KLD-200 Counter with limit signal outputs

- A 1-axis counter dedicated to sending signals when a linear scale displacement value and a preset limit value coincide.
- AT715 and AT100 series linear scales can be connected.

### Specifications

| Order No.             | 120V                                                                            | 174-147A |
|-----------------------|---------------------------------------------------------------------------------|----------|
| Type of limit setting | 4 step                                                                          |          |
| Resolution            | .00002"/.00005" .0001"/.0002"/.0005"/.001"<br>(0.0005/0.001/0.002/0.005/0.01mm) |          |

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Data Management

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