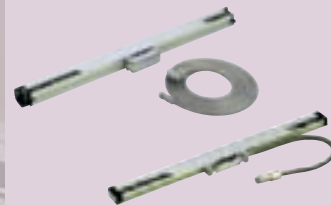




“Linear Scale”
Digital Length Measuring System



Pages 332-338



“Linear Scale”
Digital Display Units



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Signal probe

Page 339

"Linear Scale" Digital Length Measuring System

- Linear Scale and counter enable the most accurate detection and display of axial displacements on tool machines or measuring instruments.
- The System can be combined according to your specific requirements, e.g. for application on lathes, milling or grinding machines. Select the optimum combination of scale and display unit for your special requirements.

"Linear Scale" Type AT 202 / AT 500-S/H

- Mitutoyo linear scales for NC (numerical control) applications are glass scales with outstanding accuracy for direct installation in machines with automatic control systems.
- Should you require information on installation in your NC machine tools, we will be pleased to send you further details.
- Selection of NC glass scales e.g.:

Type AT 202

- Output of rectangular pulse signals (according to RS-422 A).
- Resolution 0.5 μm /1 μm (switchable).
- Error limits $(3 + 3L/1000) \mu\text{m} / (5 + 5L/1000) \mu\text{m}$.
- Scale with reference mark.
- Max. drive speed 72 m/min.
- Measuring ranges L between 100 mm and 3000 mm.



Type AT 500-S/H

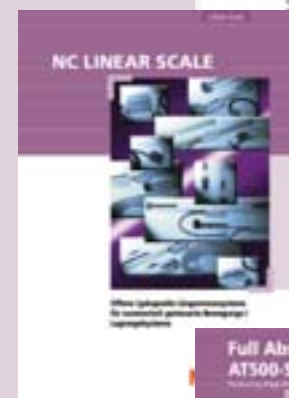
- Absolute linear scale.
- For applications with high speeds up to 150 m/min.
- AT 500-S series with high stability, vibration and impact resistance.
- AT 500-H series with maximum accuracy.
($2 + 2L/1000) \mu\text{m}$ and influence of temperature characteristic by selecting the reference point.



Underground linear scale factory



Mitutoyo is the only manufacturer in Japan with an underground scale production site – protected against tremors and temperature fluctuations. Production is executed under clean room conditions (degree of purity 100). In this way, all sections of production remain free from even microscopic contaminations.



Request our detailed brochure!

"Linear Scale" Digital Length Measuring System Type AT 115

Specifications

Accuracy (20 °C): (5 + 5 L⁰/1000) μm
 Max. drive speed: 50 m/min
 Graduation: 20 μm
 Reference points: every 50 mm
 Operation temperature: 3° to 40 °C
 Protection IP 53: IEC 529, DIN 40050

Note: The signal cable is fixed to the scale.

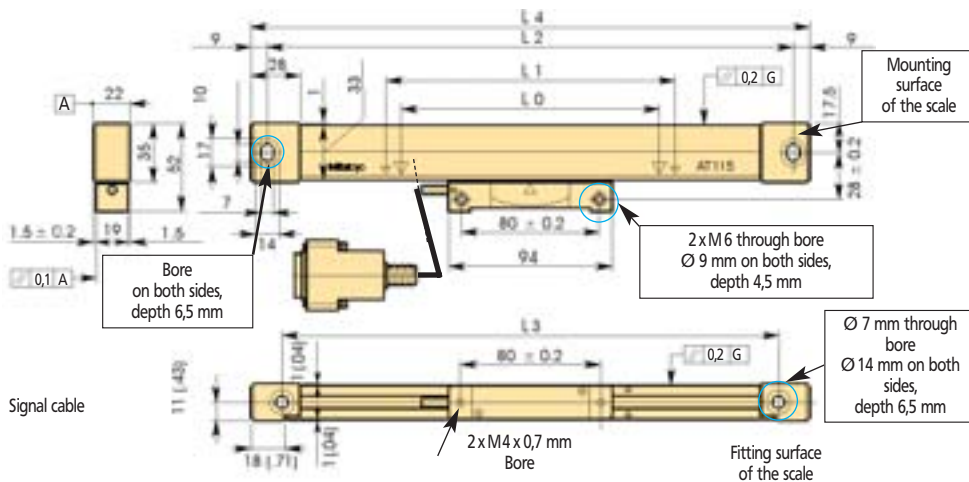
Extension cable (AT 115)

2 m No. 09AAA720A
 5 m No. 09AAA720B
 7 m No. 09AAA720C

Series 539

Standard version

Measuring range 100–1500 mm



"Linear Scale" Digital Length Measuring System Type AT 102

Series 539

Long version

Measuring range 1600–3000 mm

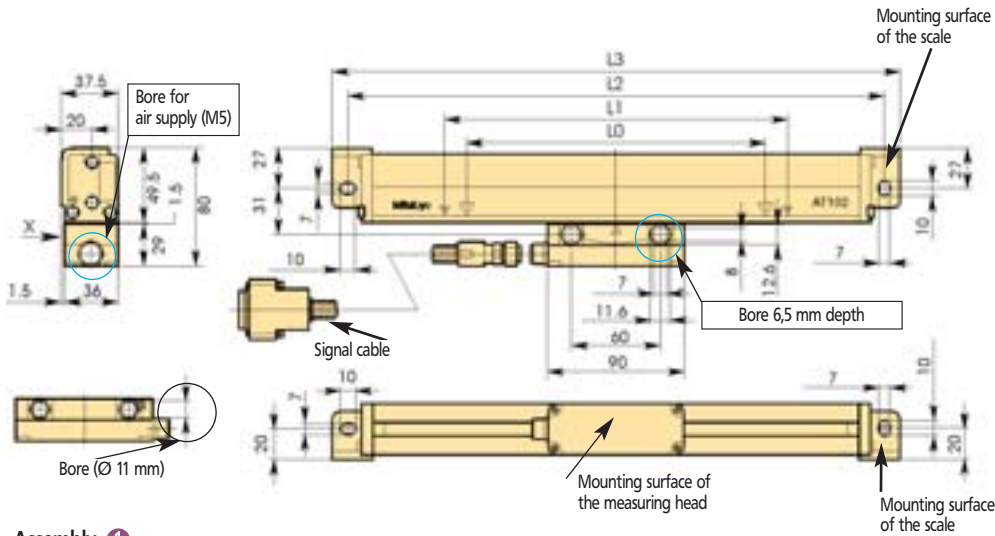


Specifications

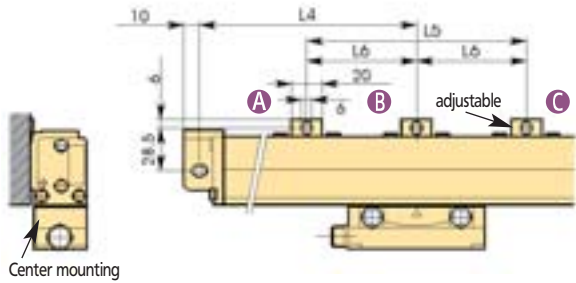
| | |
|------------------------|---------------------------------|
| Accuracy (20 °C): | (5 + 5 L ⁰ /1000) μm |
| Max. drive speed: | 50 m/min |
| Graduation: | 20 μm |
| Reference points: | every 50 mm |
| Operation temperature: | 3° to 40 °C |
| Protection IP 53: | IEC 529, DIN 40050 |

Extension cable

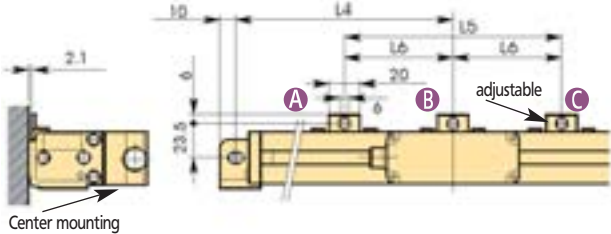
| | |
|-----|---------------|
| 2 m | No. 09AAA033A |
| 5 m | No. 09AAA033B |
| 7 m | No. 09AAA033C |



Assembly ①



Assembly ②



Legend

| | |
|----------------------------------|--------------------------------------|
| Effective measuring | (L ⁰) mm |
| Max. measuring head displacement | (L ¹) mm |
| Bore center distance | (L ²) mm |
| Total length | (L ³) mm |
| Distance of mountings | (L ⁴ –L ⁶) mm |

| No. | (L ⁰) mm | (L ¹) mm | (L ²) mm | (L ³) mm | Signal cable | Mountings | | | (L ⁴) mm | (L ⁵) mm | (L ⁶) mm |
|---------|-------------------------|-------------------------|-------------------------|-------------------------|-----------------|-----------|---|---|-------------------------|-------------------------|-------------------------|
| | | | | | | A | B | C | | | |
| 539-133 | 1600 | 1690 | 1818 | 1838 | 5 m | ● | ● | | | 610 | |
| 539-134 | 1700 | 1790 | 1918 | 1938 | 5 m | ● | ● | | | 650 | |
| 539-135 | 1800 | 1890 | 2018 | 2038 | 5 m | ● | ● | | | 670 | |
| 539-136 | 2000 | 2100 | 2228 | 2248 | 5 m | ● | ● | | | 740 | |
| 539-137 | 2200 | 2300 | 2428 | 2448 | 5 m | ● | ● | | | 800 | |
| 539-138 | 2400 | 2500 | 2628 | 2648 | 7 m | ● | ● | ● | 1314 | 1300 | 650 |
| 539-139 | 2500 | 2600 | 2728 | 2748 | 7 m | ● | ● | ● | 1364 | 1340 | 670 |
| 539-140 | 2600 | 2700 | 2828 | 2848 | 7 m | ● | ● | ● | 1414 | 1400 | 700 |
| 539-141 | 2800 | 2900 | 3028 | 3048 | 7 m | ● | ● | ● | 1514 | 1500 | 750 |
| 539-142 | 3000 | 3000 | 3228 | 3248 | 7 m | ● | ● | ● | 1614 | 1600 | 800 |

"Linear Scale" Digital Length Measuring System Type AT 102

Series 539

Long version

Measuring range greater than 3000 mm



Specifications

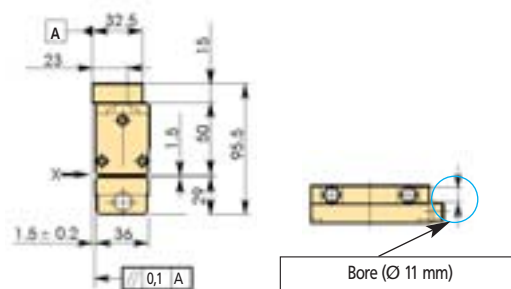
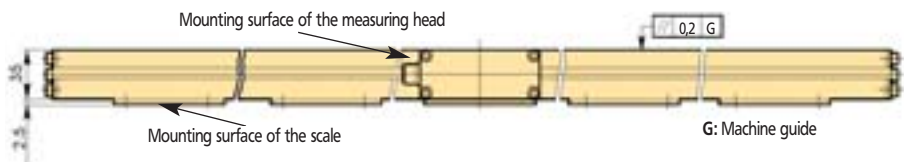
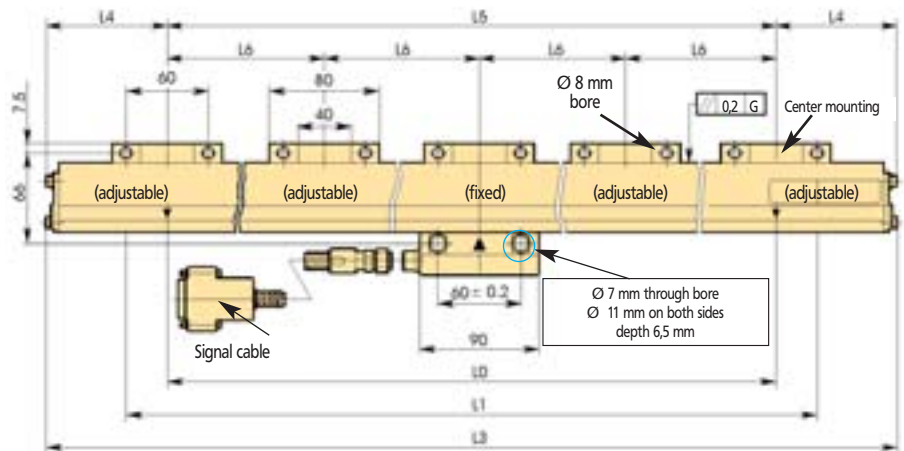
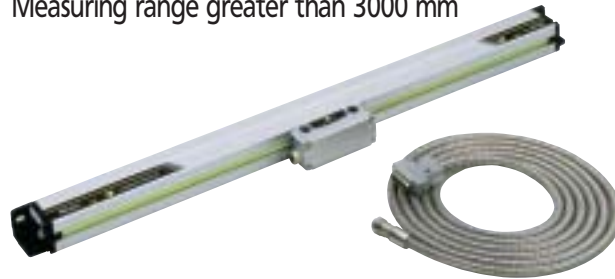
| | |
|------------------------|---------------------------------|
| Accuracy (20 °C): | (5 + 8 L ⁰ /1000) μm |
| Max. drive speed: | 50 m/min |
| Graduation: | 20 μm |
| Reference points: | every 50 mm |
| Operation temperature: | 3° to 40 °C |
| Protection IP 53: | IEC 529, DIN 40050 |

Standard accessory

Mounting Set for Type AT 102

Extension cable

| | |
|-----|---------------|
| 2 m | No. 09AAA033A |
| 5 m | No. 09AAA033B |
| 7 m | No. 09AAA033C |



Legend

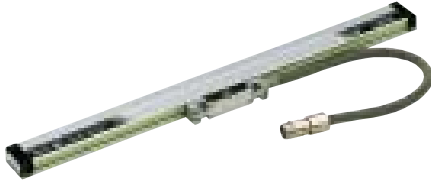
| | |
|----------------------------------|--------------------------------------|
| Effective measuring | (L ⁰) mm |
| Max. measuring head displacement | (L ¹) mm |
| Total length | (L ³) mm |
| Distance of mountings | (L ⁴ -L ⁶) mm |

| No. | (L ⁰) mm | (L ¹) mm | (L ³) mm | Signal cable | Mountings | (L ⁴) mm | (L ⁵) mm | (L ⁶) mm |
|---------|-------------------------|-------------------------|-------------------------|-----------------|-----------|-------------------------|-------------------------|-------------------------|
| 539-143 | 3250 | 3350 | 3470 | 10 m | 5 pcs. | 135 | 3200 | 800 |
| 539-144 | 3500 | 3600 | 3720 | 10 m | 5 pcs. | 160 | 3400 | 850 |
| 539-145 | 3750 | 3850 | 3970 | 10 m | 5 pcs. | 125 | 3720 | 930 |
| 539-146 | 4000 | 4100 | 4220 | 10 m | 5 pcs. | 110 | 4000 | 1000 |
| 539-147 | 4250 | 4350 | 4470 | 10 m | 5 pcs. | 135 | 4200 | 1050 |
| 539-148 | 4500 | 4600 | 4720 | 10 m | 5 pcs. | 160 | 4400 | 1100 |
| 539-149 | 4750 | 4850 | 4970 | 15 m | 7 pcs. | 85 | 4800 | 800 |
| 539-150 | 5000 | 5100 | 5220 | 15 m | 7 pcs. | 120 | 4980 | 830 |
| 539-151 | 5250 | 5350 | 5470 | 15 m | 7 pcs. | 125 | 5220 | 870 |
| 539-152 | 5500 | 5600 | 5720 | 15 m | 7 pcs. | 130 | 5460 | 910 |
| 539-153 | 5750 | 5850 | 5970 | 15 m | 7 pcs. | 135 | 5700 | 950 |
| 539-154 | 6000 | 6100 | 6220 | 15 m | 7 pcs. | 110 | 6000 | 1000 |

"Linear Scale" Digital Length Measuring System Type AT 112 F

Series 539

Extra slim construction
Measuring range 50–1020 mm



Specifications

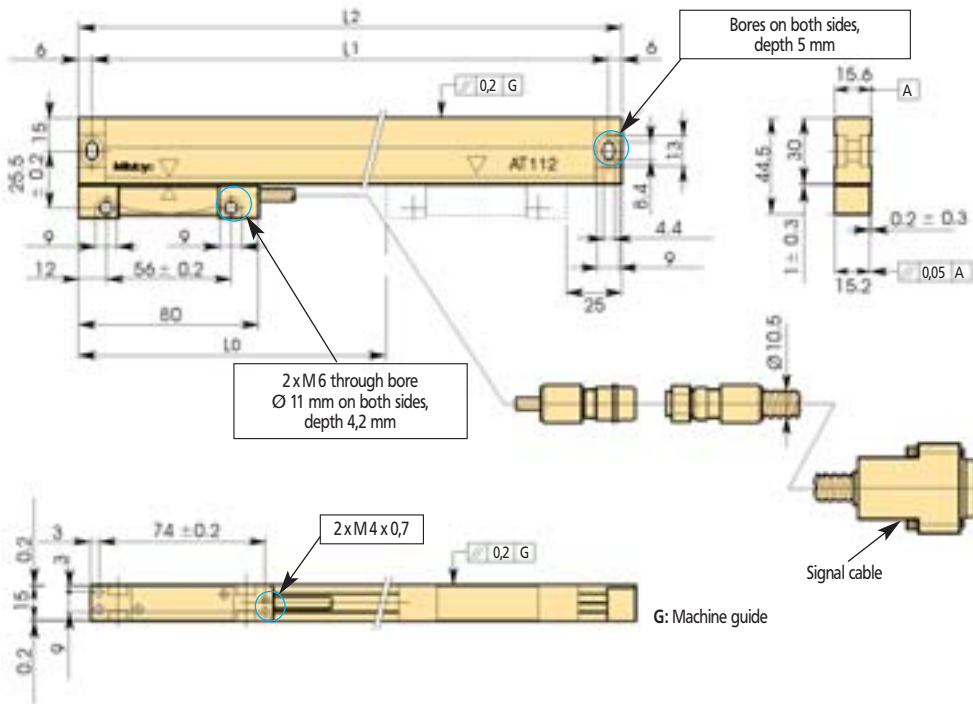
| | |
|------------------------|---------------------------------|
| Accuracy (20 °C): | (3 + 3 L ⁰ /1000) μm |
| Max. drive speed: | 50 m/min |
| Graduation: | 20 μm |
| Reference points: | every 50 mm |
| Operation temperature: | 3° to 40 °C |
| Protection IP 53: | IEC 529, DIN 40050 |

Standard accessory

Mounting Set for Type AT 112 F

Extension cable

| | |
|-----|---------------|
| 2 m | No. 09AAA033A |
| 5 m | No. 09AAA033B |
| 7 m | No. 09AAA033C |



| No. | (L ⁰) mm | (L ¹) mm | (L ²) mm | Signal cable |
|------------|-------------------------|-------------------------|-------------------------|-----------------|
| 539-251-10 | 50 | 143 | 155 | 3 m |
| 539-252-10 | 70 | 163 | 175 | 3 m |
| 539-253-10 | 120 | 213 | 225 | 3 m |
| 539-254-10 | 170 | 263 | 275 | 3 m |
| 539-255-10 | 220 | 313 | 325 | 3 m |
| 539-256-10 | 270 | 363 | 375 | 3 m |
| 539-257-10 | 320 | 413 | 425 | 3 m |
| 539-258-10 | 370 | 463 | 475 | 3 m |
| 539-259-10 | 420 | 513 | 525 | 3 m |
| 539-260-10 | 470 | 563 | 575 | 3 m |
| 539-261-10 | 520 | 613 | 625 | 3 m |
| 539-262-10 | 570 | 663 | 675 | 3 m |
| 539-263-10 | 620 | 713 | 725 | 3 m |
| 539-264-10 | 670 | 763 | 775 | 3 m |
| 539-265-10 | 720 | 813 | 825 | 3 m |
| 539-266-10 | 770 | 863 | 875 | 3 m |
| 539-267-10 | 820 | 913 | 925 | 3 m |
| 539-268-10 | 920 | 1013 | 1025 | 3 m |
| 539-269-10 | 1020 | 1113 | 1125 | 3 m |

Legend

| | |
|----------------------|----------------------|
| Effective measuring | (L ⁰) mm |
| Bore center distance | (L ¹) mm |
| Total length | (L ²) mm |

“Linear Scale” Digital Length Measuring System

Series 174

Displays

KA Counter

- The KA Counter is an easy to operate and multifunction display unit for all kinds of processing machines.

Counters of series K are available in two versions: as 2- and 3-axial types

| Functions | KA Counter |
|--|---|
| |  Easy to operate and multifunction display unit |
| Zero setting | ● |
| ABS origin (ABS zero point) | ● (only with AT 715) |
| Switchable resolution | ● |
| Counting direction switching | ● |
| mm/inch switching | ● |
| PRESET/ZERO setting | ● |
| Halving of the display value | ● |
| ABS/INC coordinates switching | ● |
| ZERO approach function (INC coordinate) | ● |
| Signal probe | optional** |
| Pitch circle processing | ● |
| Processing of hole sequences | ● |
| Scale reference points (call up) | ●** |
| Tool specification | ● |
| Addition of values from 2 axes | ●* |
| Copying of coordinate data | ● |
| RS-232 C output | optional |
| Linear error compensation | ● |
| Stabilisation of the last display digits | ● |

● Standard function

* This function is not available on the 2-axis version

** Connection only with the use of glass scales AT-100 series

"Linear Scale" Digital Display Unit

Specifications

Resolution: 0,005 mm, 0,001 mm
Connectable linear scale: AT 100 Series
AT 700 Series
Display: 7 digits, sign (-)
Operation temperature: 0°C to 45°C

Optional accessories

- No. 938140 Signal probe with clamping shaft
Ø 20 mm
No. 935094 Signal probe with clamping shaft
Ø 32 mm
No. 09CAB217 RS-232 C output
No. 011418 Footswitch for KA Counter
for data output No. 09CAB217
No. 09CAB231 Adapter for Micrometer Head
164-122

Series 174

KA Counter

Easy to operate and multifunction display unit



174-173 D

| No. | Axes | Dimensions (W x H x D) mm | Mass kg |
|-----------|------|------------------------------|------------|
| 174-173 D | 2 | 260 x 167 x 80 | 1,1 |
| 174-175 D | 3 | 260 x 167 x 80 | 1,2 |

Signal probe

- For setting the zero point in linear-scale display devices.
- For holding the current value on the display on contact with the workpiece.



938140

| No. | Shaft diameter | Ball diameter | Connecting cable |
|--------|-------------------|------------------|---------------------|
| 938140 | 20 mm | 10 ± 0,002 mm | 3 m |
| 935094 | 32 mm | 10 ± 0,002 mm | 3 m |