

Linear scale

Move to other products

- 1 SPC
 - 2 Caliper
 - 3 Depth gage
 - 4 Height gage
 - 5 Micrometer
 - 6 Inside micrometer
 - 7 Micrometer head
 - 8 Indicator
 - 9 Test indicator
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 - 11 Gauge Block
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- 16 Digimatic scale unit
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 - 24 CMM
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List of products

KA Counter
SERIES 174



KM Counter
SERIES 174



KC Counter
SERIES 174



KLD Counter
SERIES 174



Accessories for Display Unit



AT715 Linear Scales
SERIES 539



AT115 Linear Scales
SERIES 539



AT102 Linear Scales
SERIES 539



AT111 Linear Scales
SERIES 539



AT112 Linear Scales
SERIES 539



AT181 Linear Scales
SERIES 539



PSU-200 Pulse Signal
Conversion Interface
SERIES 539



AT202 Linear Scales
SERIES 539



AT211 Linear Scales
SERIES 539



AT212 Linear Scales
SERIES 539



AT332 Linear Scales
SERIES 539



AT303/343/353 Linear Scales
SERIES 539



AT503/543 Linear Scales
SERIES 539



AT553 Linear Scales
SERIES 539



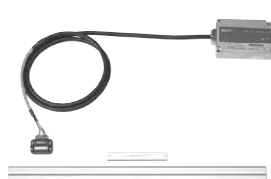
ST34C Linear Scales
SERIES 579



ST322/323 Linear Scales
SERIES 579



ST422 Linear Scales
SERIES 579



Linear Scale

Digital Readout System



The Mitutoyo Linear Scale is a digital readout system that accurately detects and displays the displacement of machine tools or measuring equipment. The optimum system, to meet your specific application, can be selected from a wide range of scale

sizes and a wide variety of counters. High-precision Linear Scales and their interface units for the feedback system of NC machine tools, and custom-tailored scale for special applications are also available.

Scale Units

AT715

Economy Type
Environmental Resistance Slim Spars
Ranging from 100mm up to 1800mm

AT115

Economy Type Slim Spars
Ranging from 100mm up to 1500mm

AT102

Standard-size Spars
Ranging from 100mm up to 6000mm

AT111

Slim Spars
Ranging from 100mm up to 1500mm

AT112

Super Slim Spars
Ranging from 50mm up to 1020mm

AT181

Plunger Type
Ranging from 100mm up to 600mm

Display Units

KA Counter

Standard Type

KM Counter

Multi-function Type

KC Counter

Multi-function Type available
with data output unit

KLD Counter

Special purpose Type
with Limit Signal Output

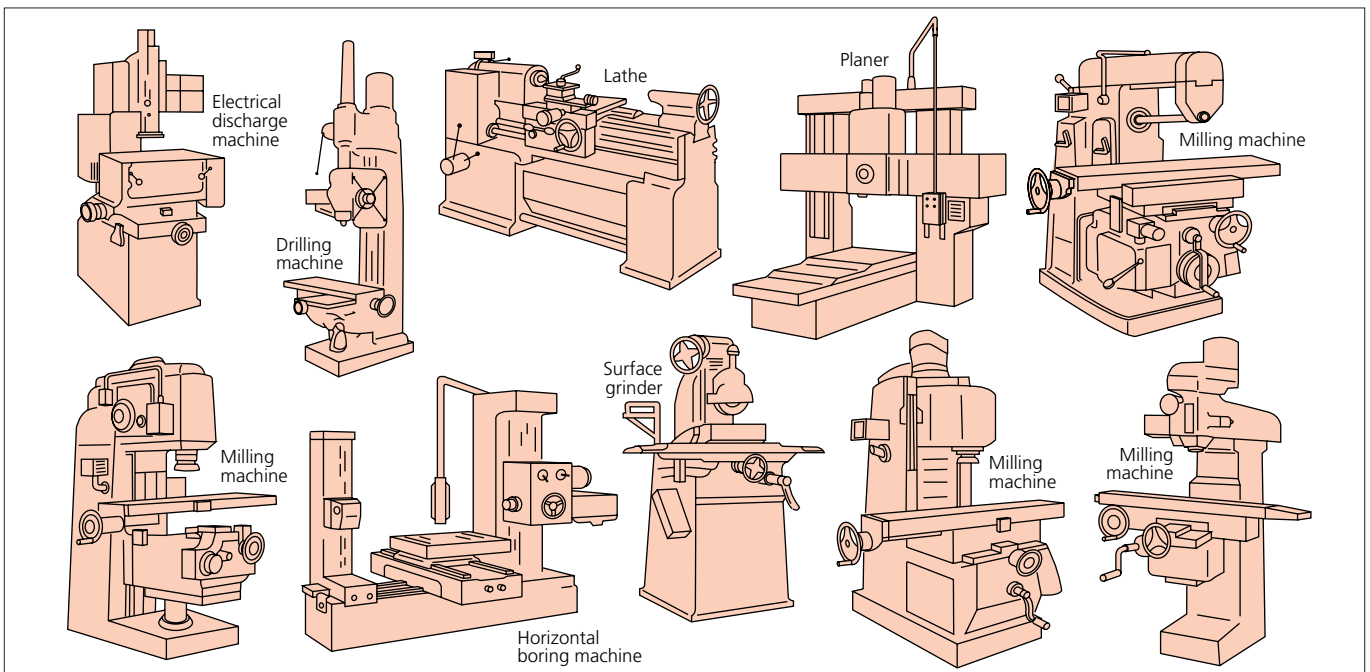
Functions	KA Counter	KM Counter	KC Counter	KLD Counter
Zero-setting	●	●	●	●
Zero-set remote controller	—	▲	▲	—
Preset	●	●	●	●
Resolution setting	●	●	●	●
Counting direction setting	●	●	●	●
mm/inch conversion	●	●	●	●
1/2 calculation	●	●	●	●
ABS/INC coordinate selection	●	●	●	—
Lower digit blanking out	●	●	●	●
Memory backup	●	●	●	●
Expansion/contraction coefficient setting	—	●	●	●
Zero approach machining (ABS mode)	—	●	●	—
Zero approach machining (INC mode)	●	●	●	—
Bolt-hole circle machining	●	●	●	—
Touch-signal probe	▲*	▲	▲	▲
Scale reference point setting	●	●	●	●
Addition/subtraction	—	●	●	—
Maximum/minimum value hold	—	—	—	●
Diameter display	●	●	●	●
Addition of 2-scale data	●*	●	●	—
Direct data entry with Digimatic gage	—	●	●	—
Cutting tool selection	—	●	●	—
Coordinate data copy	—	●	●	—
One-touch macro keys	—	●	●	—
Part-program setting	—	●	●	—
Programmable remote controller	—	▲	▲	—
Linearity error compensation	●	●	●	●
Pitch error compensation	—	●	●	—
Lost motion compensation	—	●	●	—
Smoothing	●	●	●	●
RS-232C Interface Unit	▲	—	▲	▲
Limit signal output via RS-232C	—	—	▲	—
BCD Code Out	—	—	▲	▲
Digimatic Code Out	—	—	▲	—
GP-IB Interface	—	—	▲	—
Limit signal output	—	—	▲	●

●: Provided as standard, ▲: Optional accessory, —:Not available

▲*: Only available for AT100 series

●*: Only available for 3-axis counter

APPLICATIONS OF LINEAR SCALES



KA Counter

SERIES 174 — Standard Type



174-173



174-173

FEATURES

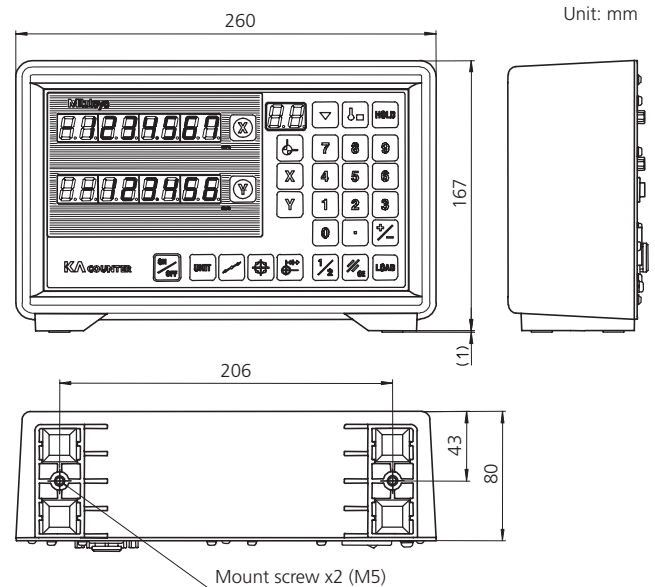
- High cost performance 2/3-axis counter with new 10-coordinate function and existing KL counter functions
- The KA counter can be used as the "standard counter" or a "lathe counter" by modifying parameters.
- Both the existing AT100 series optical scales and the new AT715 electromagnetic induction scale can be connected.

SPECIFICATIONS

Inch/Metric			
Order No.	100V AC	174-173	174-175
	120V AC	174-173A	174-175A
	110V AC	174-173B	174-175B
	230V AC	174-173D	174-175D
	240V AC *	174-173E	174-175E
	240V AC **	174-173F	174-175F
	220V AC ***	174-173DC	174-175DC
	220V AC ****	174-173K	174-175K
Scale input ports		2	3
Resolution	0.001mm, 0.005mm, .0001", .0005" (changeable)		
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, addition of 2-scale data, zero approach machining, bolt-hole circle machining, pitch machining, touch-signal probe input (See page 317 for more details.)		
Power supply	100V-240V AC, 50/60Hz		
Operating temperature	0°C to 40°C		0°C to 40°C
Mass	1.1kg		1.2kg

* for UK/** For Australia/***/ For China**** For Korea

Dimensions



OPTIONAL ACCESSORIES

Order No.	Description
938140	Touch signal probe (shank diameter: 20mm)
935094	Touch signal probe (shank diameter: 32mm)
09CAB217	RS232C code out unit
09CAB231	Digimatic micrometer head adapter

KM Counter

SERIES 174 — Multi-function Type



174-113

SPECIFICATIONS

Metric				
Order No.	100V AC	174-111	174-113	174-115
	120V AC	174-111A	174-113A	174-115A
	230V AC	174-111D	174-113D	174-115D
	240V AC*	174-111E	174-113E	174-115E
	240V AC**	174-111F	174-113F	174-115F
Scale input ports	1	2	3	
Resolution	0.0005mm, 0.001mm, 0.002mm, 0.005mm, 0.01mm			
Display	8-digit LED and a negative [-] sign			
Functions	(See page 323.)			
Power supply	100-120V/200-240V AC, 50/60Hz			
Operating temperature	0°C to 40°C			
Dimensions (WxDxH)	335x203x158mm			
Mass	3.3kg	3.4kg	3.5kg	

*For UK/**For Australia

Inch/Metric				
Order No.	100V AC	174-112	174-114	174-116
	120V AC	174-112A	174-114A	174-116A
	230V AC	174-112D	174-114D	174-116D
	240V AC*	174-112E	174-114E	174-116E
	240V AC**	174-112F	174-114F	174-116F
Scale input ports	1	2	3	
Resolution	.00002", .00005", .0001", .0002", .0005", .001", 0.0005mm, 0.001mm, 0.002mm, 0.005mm, 0.01mm			

*For UK/**For Australia

FEATURES

- Frequently used functions can be registered to one-touch macro keys for easy use with various applications, including milling, turning, and grinding.
- Suitable for use with a variety of machine tools.
- A Mitutoyo SPC gage, such as the Digimatic Micrometer, Digimatic Caliper, etc., can be connected for direct data entry. This function facilitates turning operation.
- Zero-setting remote controller is optional.



KC Counter

SERIES 174 — Multi-function Type available with data output unit



174-125

SPECIFICATIONS

Metric

Order No.	100V AC	174-121	174-123	174-125
	120V AC	174-121A	174-123A	174-125A
	230V AC	174-121D	174-123D	174-125D
	240V AC*	174-121E	174-123E	174-125E
	240V AC**	174-121F	174-123F	174-125F
Scale input ports		1	2	3
Resolution	0.0005mm, 0.001mm, 0.002mm, 0.005mm, 0.01mm			
Display	8-digit LED and a negative [-] sign			
Functions	(See page 323.)			
Power supply	100-120V/200-240V AC, 50/60Hz			
Operating temperature	0°C to 40°C			
Dimensions (WxDxH)	335x203x158mm			
Mass		3.5kg	3.6kg	3.7kg

*For UK/**For Australia

Inch/Metric

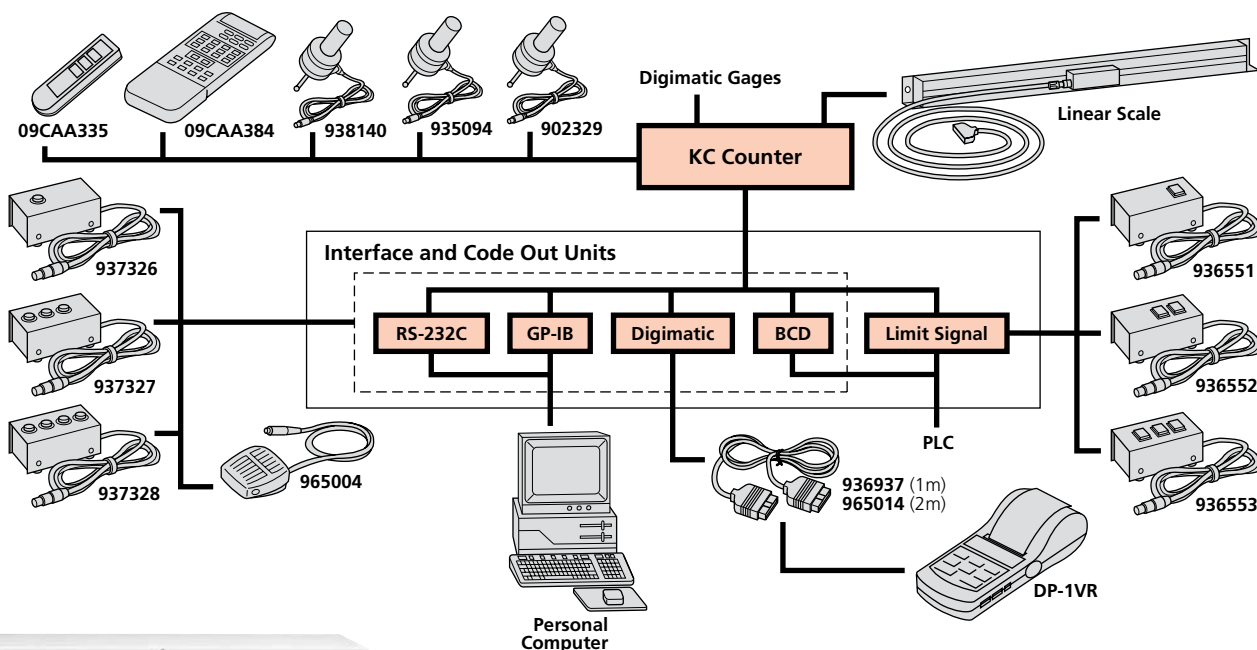
Order No.	100V AC	174-122	174-124	174-126
	120V AC	174-122A	174-124A	174-126A
	230V AC	174-122D	174-124D	174-126D
	240V AC*	174-122E	174-124E	174-126E
	240V AC**	174-122F	174-124F	174-126F
Scale input ports		1	2	3
Resolution	.00002", .00005", .0001", .0002", .0005", .001", 0.0005mm, 0.001mm, 0.002mm, 0.005mm, 0.01mm			

*For UK/**For Australia

FEATURES

- In addition to having the same functions of the KM Counter, the KC Counter allows connection to an external devices, such as a printer, personal computer, etc., with the optional data output unit.
- All the data output units are factory-installed-option. Specify the type of Interface Unit or Code Out Unit required when ordering a KC Counter.

SYSTEM DIAGRAM



Data Output Units for KC Counter (Factory-installed-option)

Order No.	Description
09CAA402	RS-232C Interface Unit
09CAA412	Parallel BCD Code Out Unit (1-axis)
09CAA424	Parallel BCD Code Out Unit (2-axis)
09CAA430	Parallel BCD Code Out Unit (3-axis)
09CAA452	GP-IB Interface Unit
09CAA462	Digimatic Code Out Unit
09CAA472	Limit Signal Output Unit



RS-232C Interface Unit



GP-IB Interface Unit



Parallel BCD (3-axis) Code Out



Digimatic Code Out

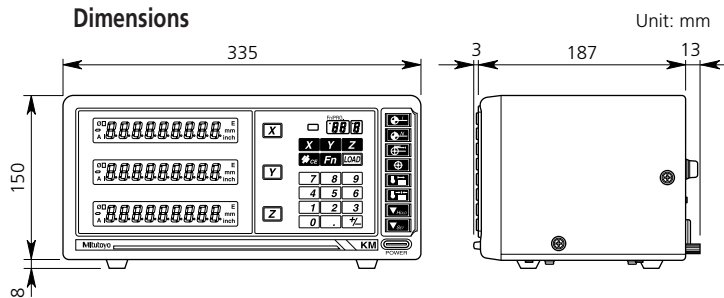


Limit Signal Output

OPTIONAL ACCESSORIES

Order No.	Description
09CAA335	Zero-set remote controller
09CAA384	Programable remote controller
938140	Touch-signal probe (shank diameter: 20mm)
935094	Touch-signal probe (shank diameter: 32mm)
902329	Touch-signal probe (shank diameter: .5")
937326	External load box (1-axis)
937327	External load box (2-axis)
937328	External load box (3-axis)
965004	External load foot switch (for all axes)
936551	External zero-set box (1-axis)
936552	External zero-set box (2-axis)
936553	External zero-set box (3-axis)
936937	SPC cable (1m)
965014	SPC cable (2m)

Dimensions



Note: The dimensions are compatible between KM Counter and KC Counter.

LINEAR SCALES



KLD Counter

SERIES 174 — Special Purpose Type with Limit Signal Output



4-step limit setting type



8-step limit setting type

FEATURES

- A 1-axis counter dedicated to sending signals when a linear scale displacement value and a preset limit value coincide.
- Three types of limit settings are available: 2 steps, 4 steps, and 8 steps.
- For controlling a vertical position of an EDM or a grinding machine.
- Can be connected to a personal computer or a sequencer by installing an RS-232C Interface Unit or a BCD Code Out Unit. (Both interface units are optional accessories.)

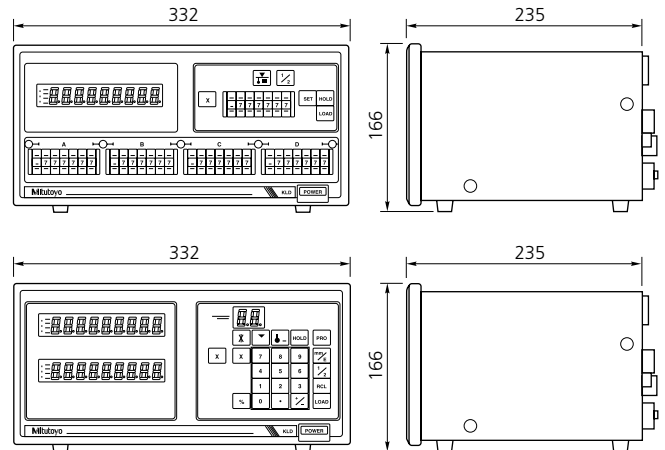
SPECIFICATIONS

Inch/Metric

Order No.	100V AC	174-141	174-143	174-145
	120V AC	174-141A	174-143A	174-145A
	230V AC	174-141D	174-143D	174-145D
	240V AC	174-141E	174-143E	174-145E
Limit signal output		1-step	4-step	8-step
Scale input ports		1		
Resolution		0.0005mm, 0.001mm, 0.002mm, 0.005mm, 0.01mm, .00002", .00005", .0001", .0002", .0005", .001"		
Display		9-digit LED and a negative [-] sign		
Limit value setting method		Digital switch	Digital switch	Ten-keyboard
Functions		(See page 323.)		
Power supply		100-120V/200-240V AC, 50/60Hz		
Operating temperature		0°C to 40°C		
Dimensions (WxDxH)		332x165.5x235mm (13.07"x6.52"x9.25")		
Mass		4.5kg (9.9 lbs.)		

Dimensions

Unit: mm



OPTIONAL ACCESSORIES

Order No.	Description
907569	RS-232C Interface Unit
907570	BCD Code Out Unit
965004	External load foot switch
937326	External load box
936551	External zero-set box
938140	Touch-signal probe (shank dia.: 20mm)
935094	Touch-signal probe (shank dia.: 32mm)
902329	Touch-signal probe (shank dia.: 1/2")

Accessories for Display Unit

Zero-set Remote Controller



09CAA335

FEATURES

- Allows the displayed value to be remotely zero set.

External Load Foot Switch



965004

FEATURES

- Connected to the optional EXT.LOAD connector of KS or KC Counter, the foot switch can output the displayed data in this order X-Y-Z (on 3-axis model).

Programmable Remote Controller



09CAA384

FEATURES

- The programming function of KM/KC Counter facilitates the repeated machining of multiple workpieces. The Programmable Remote Controller can be used to edit the programs by deleting or inserting machining operations.

Touch-signal Probes



FEATURES

- Makes it easy to perform such operations as datum point setting (detecting the workpiece edge and setting the counter display to zero), workpiece centering, and dimensional measurement (detecting the workpiece end point and holding the counter display).

SPECIFICATIONS

Shank diameter	Order No.	Contact point diameter	Connecting cable length
20mm	938140	10±0.002mm	3m
32mm	935094	10±0.002mm	3m
.5"	902329	.2"	9.8 feet

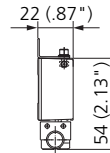


AT715 Linear Scales

SERIES 539 — Economy Type Environmental Resistance Slim Spars



Unit: mm (inch)



FEATURES

- Due to the employment of an electromagnetic induction system, environmental resistance against coolant is greatly improved when compared to the conventional optical system.
- Thanks to an absolute scale, there is no need to set reference point at every power-on so that productivity can be enhanced.
- Offers high-performance and high cost-to-performance ratio DRO system for manual machine tools in combination with the KA counter.
- The best solution for the digitalization of conventional milling machines in combination with the KA counter.

Technical Data

Detecting method: Electromagnetic induction method

Sectional dimensions: 22x54mm

Maximum response speed: 50m/min.

Dust/water protection level: Conforming to IP55

Operating temperature: 0°C to 45°C

SPECIFICATIONS

Effective range L ₀	Order No.	Signal cable length	Mass
100mm (4")	539-801	3.5m	0.70kg
150mm (6")	539-802	3.5m	0.75kg
200mm (8")	539-803	3.5m	0.80kg
250mm (10")	539-804	3.5m	0.85kg
300mm (12")	539-805	3.5m	0.90kg
350mm (14")	539-806	3.5m	0.95kg
400mm (16")	539-807	3.5m	1.00kg
450mm (18")	539-808	3.5m	1.05kg
500mm (20")	539-809	3.5m	1.10kg
600mm (24")	539-811	3.5m	1.20kg
700mm (28")	539-813	3.5m	1.30kg
750mm (30")	539-814	3.5m	1.35kg
800mm (32")	539-815	3.5m	1.40kg
900mm (36")	539-816	3.5m	1.50kg
1000mm (40")	539-817	5m	1.65kg
1100mm (44")	539-818	5m	1.75kg
1200mm (48")	539-819	5m	1.85kg
1300mm (52")	539-820	5m	1.95kg
1400mm (56")	539-821	5m	2.05kg
1500mm (60")	539-822	5m	2.15kg
1600mm (64")	539-823	5m	2.25kg
1700mm (68")	539-824	5m	2.35kg
1800mm (72")	539-82 5	5m	2.45kg

Accuracy at 20°C

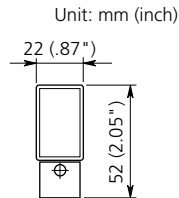
- $(7+13L_0/1000)\mu\text{m}^*$ *L₀=Effective range (mm)

OPTIONAL ACCESSORIES

Order No.	Description
09AAB674A	Extension cable for AT series & AT715 (2m)
09AAB674B	Extension cable for AT series & AT715 (5m)
09AAB674C	Extension cable for AT series & AT715 (7m)

AT115 Linear Scales

SERIES 539 — Economy Type Slim Spars



FEATURES

- Suitable for milling machines, XY tables, jigs, etc.
- Dimensionally compatible with AT111 linear scale units.
- Provided with scale reference points at a 50mm pitch over the entire scale. Even after the power is turned off, the datum point for machining can be easily determined by using these reference points.

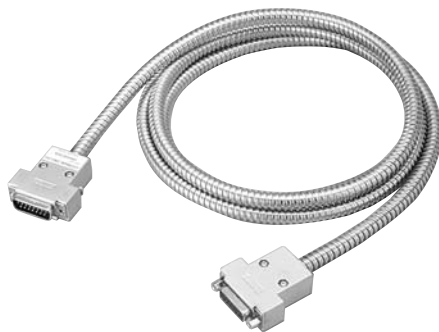
Technical Data

Sectional dimensions: 22x52mm
 Scale grating pitch: 20μm
 Scale reference point pitch: 50mm
 Maximum response speed: 50m/min.
 Dust/water protection level: Conforming to IP-53
 Operating temperature: 0°C to 45°C

SPECIFICATIONS

Effective range L ₀	Order No.	Signal cable length	Mass
100mm (4")	539-271	3.5m	1.0kg
150mm (6")	539-272	3.5m	1.0kg
200mm (8")	539-273	3.5m	1.0kg
250mm (10")	539-274	3.5m	1.1kg
300mm (12")	539-275	3.5m	1.1kg
350mm (14")	539-276	3.5m	1.1kg
400mm (16")	539-277	3.5m	1.2kg
450mm (18")	539-278	3.5m	1.2kg
500mm (20")	539-279	3.5m	1.2kg
600mm (24")	539-281	3.5m	1.3kg
700mm (28")	539-283	3.5m	1.3kg
750mm (30")	539-284	3.5m	1.3kg
800mm (32")	539-285	3.5m	1.4kg
900mm (36")	539-286	3.5m	1.4kg
1000mm (40")	539-287	5m	1.8kg
1100mm (44")	539-288	5m	1.8kg
1200mm (48")	539-289	5m	1.9kg
1300mm (52")	539-290	5m	1.9kg
1400mm (56")	539-291	5m	2.0kg
1500mm (60")	539-292	5m	2.0kg

OPTIONAL ACCESSORIES



Order No.	Description
09AAA720A	Extension cable for AT115 (2m)
09AAA720B	Extension cable for AT115 (5m)
09AAA720C	Extension cable for AT115 (7m)

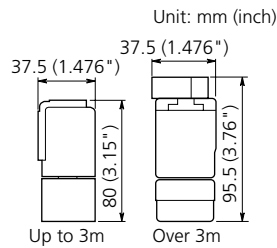
Accuracy at 20°C

- $(5+5L_0/1000)\mu\text{m}^*$ *L₀= Effective range (mm)



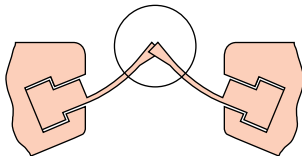
AT102 Linear Scales

SERIES 539 — Standard-size Spars



FEATURES

- Enhanced vibration-resistance and durability.
- The innovative rubber lips keep out contaminants on a machine shop.



- An armored signal cable is used to connect the scale unit to the DRO counter for safe operation in harsh shop environment.
- The signal cable outlet can be positioned on either side of the detecting head so the signal cable can be connected from either direction.

Technical Data

Scale grating pitch: 20 μ m

Scale reference point pitch: 50mm

Maximum response speed:

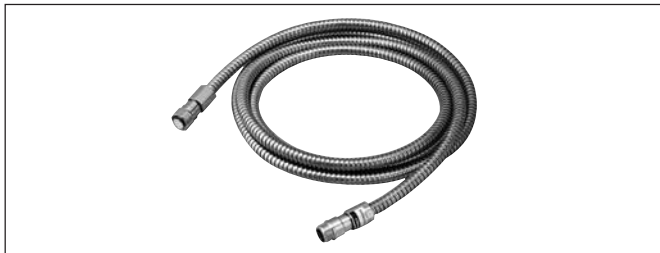
- 72m/min. for scales up to 3000mm
- 50m/min. for 3250mm scale and over

Dust/water protection level: Conforming to IP-53

Operating temperature: 0°C to 45°C

OPTIONAL ACCESSORIES

(Common to AT102, AT111 and AT112)



Order No.	Description
09AAA033A	Extension cable (2m)
09AAA033B	Extension cable (5m)
09AAA033C	Extension cable (7m)

SPECIFICATIONS

Effective range L ₀	Order No. Standard type	Order No. High-accuracy type	Signal cable length
100mm (4")	539-111	539-111-10	3m
150mm (6")	539-112	539-112-10	3m
200mm (8")	539-113	539-113-10	3m
250mm (10")	539-114	539-114-10	3m
300mm (12")	539-115	539-115-10	3m
350mm (14")	539-116	539-116-10	3m
400mm (16")	539-117	539-117-10	3m
450mm (18")	539-118	539-118-10	3m
500mm (20")	539-119	539-119-10	3m
600mm (24")	539-121	539-121-10	3m
700mm (28")	539-123	539-123-10	3m
750mm (30")	539-124	539-124-10	3m
800mm (32")	539-125	539-125-10	3m
900mm (36")	539-126	539-126-10	3m
1000mm (40")	539-127	539-127-10	5m
1100mm (44")	539-128	539-128-10	5m
1200mm (48")	539-129	539-129-10	5m
1300mm (52")	539-130	539-130-10	5m
1400mm (56")	539-131	539-131-10	5m
1500mm (60")	539-132	539-132-10	5m
1600mm (64")	539-133	539-133-10	5m
1700mm (68")	539-134	539-134-10	5m
1800mm (72")	539-135	539-135-10	5m
2000mm (80")	539-136	539-136-10	5m
2200mm (88")	539-137	—	5m
2400mm (96")	539-138	—	7m
2500mm (100")	539-138	—	7m
2600mm (104")	539-140	—	7m
2800mm (112")	539-141	—	7m
3000mm (120")	539-142	—	7m
3250mm (130")	539-143	—	10m
3500mm (140")	539-144	—	10m
3750mm (150")	539-145	—	10m
4000mm (160")	539-146	—	10m
4250mm (170")	539-147	—	10m
4500mm (180")	539-148	—	10m
4750mm (190")	539-149	—	15m
5000mm (200")	539-150	—	15m
5250mm (210")	539-151	—	15m
5500mm (220")	539-152	—	15m
5750mm (230")	539-153	—	15m
6000mm (240")	539-154	—	15m

Accuracy at 20°C

Effective range L ₀	Standard type	High-accuracy type
100 to 2000mm	(5+5L ₀ /1000) μ m	(3+3L ₀ /1000) μ m
2200 to 3000mm	(5+5L ₀ /1000) μ m	—
3250 to 6000mm	(5+8L ₀ /1000) μ m	—

AT111 Linear Scales

SERIES 539 — Slim Spars



Technical Data

Scale grating pitch: 20 μ m
 Scale reference point pitch: 50mm
 Maximum response speed: 72m/min.
 Dust/water protection level: Conforming to IP-53
 Operating temperature: 0°C to 45°C

Accuracy at 20°C

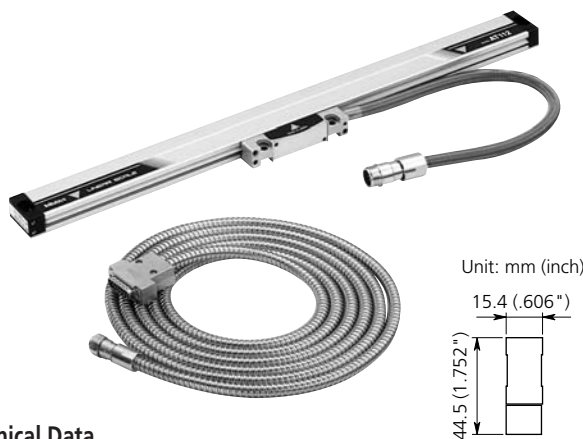
Effective range L ₀	Standard type	High-accuracy type
100 to 1500mm	(5+5L ₀ /1000) μ m	(3+3L ₀ /1000) μ m

SPECIFICATIONS

Effective range L ₀	Order No. Standard type	Order No. High-accuracy type	Signal cable length
100mm (4")	539-201	539-201-10	3m
150mm (6")	539-202	539-202-10	3m
200mm (8")	539-203	539-203-10	3m
250mm (10")	539-204	539-204-10	3m
300mm (12")	539-205	539-205-10	3m
350mm (14")	539-206	539-206-10	3m
400mm (16")	539-207	539-207-10	3m
450mm (18")	539-208	539-208-10	3m
500mm (20")	539-209	539-209-10	3m
600mm (24")	539-211	539-211-10	3m
700mm (28")	539-213	539-213-10	3m
750mm (30")	539-214	539-214-10	3m
800mm (32")	539-215	539-215-10	3m
900mm (36")	539-216	539-216-10	3m
1000mm (40")	539-217	539-217-10	5m
1100mm (44")	539-218	539-218-10	5m
1200mm (48")	539-219	539-219-10	5m
1300mm (52")	539-220	539-220-10	5m
1400mm (56")	539-221	539-221-10	5m
1500mm (60")	539-222	539-222-10	5m

AT112 Linear Scales

SERIES 539 — Super Slim Spars



Technical Data

Scale grating pitch: 20 μ m
 Scale reference point pitch: 50mm
 Maximum response speed: 72m/min.
 Dust/water protection level: Conforming to IP-53
 Operating temperature: 0°C to 45°C

Accuracy at 20°C

Effective range L ₀	Standard type	High-accuracy type
50 to 1020mm	(5+5L ₀ /1000) μ m	(3+3L ₀ /1000) μ m

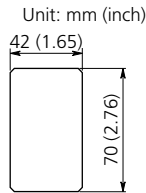
SPECIFICATIONS

Effective range L ₀	Order No. Standard type	Order No. High-accuracy type	Signal cable length
50mm (1.5")	539-251	539-251-10	3m
70mm (2.5")	539-252	539-252-10	3m
120mm (4.5")	539-253	539-253-10	3m
170mm (6.5")	539-254	539-254-10	3m
220mm (8.5")	539-255	539-255-10	3m
270mm (10.5")	539-256	539-256-10	3m
320mm (12.5")	539-257	539-257-10	3m
370mm (14.5")	539-258	539-258-10	3m
420mm (16.5")	539-259	539-259-10	3m
470mm (18.5")	539-260	539-260-10	3m
520mm (20")	539-261	539-261-10	3m
570mm (22")	539-262	539-262-10	3m
620mm (24")	539-263	539-263-10	3m
670mm (26")	539-264	539-264-10	3m
720mm (28")	539-265	539-265-10	3m
770mm (30")	539-266	539-266-10	3m
820mm (32")	539-267	539-267-10	3m
920mm (36")	539-268	539-268-10	3m
1020mm (40")	539-269	539-269-10	3m



AT181 Linear Scales

SERIES 539 — Plunger Type (High Water-proof Design)



Technical Data

Scale grating pitch: 20µm
 Scale reference point pitch: 50mm
 Maximum response speed: 50m/min.
 Dust/water protection level: Conforming to IP-54
 Operating temperature: 0°C to 45°C

OPTIONAL ACCESSORIES

Order No.	Description
09AAA033A	Extension cable (2m)
09AAA033B	Extension cable (5m)
09AAA033C	Extension cable (7m)

SPECIFICATIONS

Effective range L ₀	Order No. Standard type	Order No. High-accuracy type	Signal cable length
100mm (4")	539-301	539-301-10	3m
150mm (6")	539-302	539-302-10	3m
200mm (8")	539-303	539-303-10	3m
250mm (10")	539-304	539-304-10	3m
300mm (12")	539-305	539-305-10	3m
350mm (14")	539-306	539-306-10	3m
400mm (16")	539-307	539-307-10	3m
450mm (18")	539-308	539-308-10	3m
500mm (20")	539-309	539-309-10	3m
550mm (22")	539-310	539-310-10	3m
600mm (24")	539-311	539-311-10	3m

Accuracy at 20°C

Effective range L ₀	Standard type	High-accuracy type
100 to 600mm	(5+5L ₀ /1000)µm	(3+3L ₀ /1000)µm

PSU-200

SERIES 539 — Pulse Signal Conversion Interface



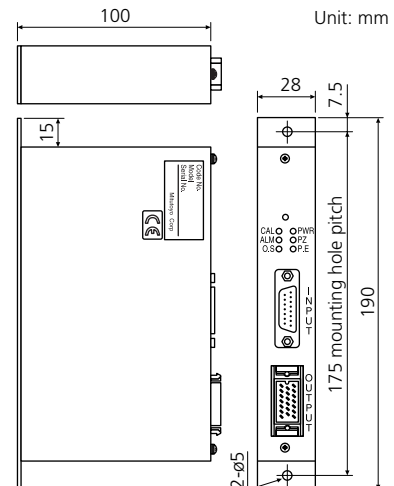
SPECIFICATIONS

Order No.	539-005
Number of axes	1
Number of deviation	4, 8, 10, 20, 40, 80, 100 or 200 (switchable)
Functions	Division setting, Min. edge interval setting, LED for alarm indication, Alarm output mode switching, LED for origin detection, LED for low-level power supply voltage warning
Power supply	5VDC±5% on the power terminal
Consumption	200mA (except the scale)
Operating temperature	0°C to 40°C
Mass	Approx. 620g (1.4 lbs.)

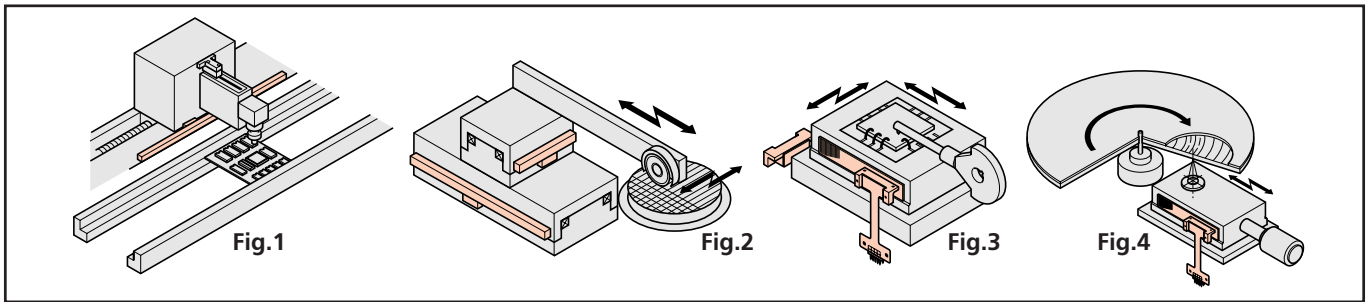
FEATURES

- Applicable with Linear Scales with the sinusoidal signal output.
- Quadrature signal output (conforming to EIA standard RS422-A).
- Alarm function for detecting broken wires or short circuits in the detector, over-speed and fluctuation errors in the input signal from the detector.

Dimensions



Linear Scales for Numerical Motion Control System



The Linear Scales for the Numerical Motion Control System are high-accuracy linear measurement systems for a wide range of applications. These types of linear scales are designed to be integrated into precision machines and instruments including measuring machines and instruments, as well as machine tools, optics, data equipment, industrial robots, etc. Two types of linear scales for the Numerical Motion Control System are available: the AT series have the high-accuracy glass scale and the detector head encased together in an aluminum casing for improved durability and resistance against vibration;

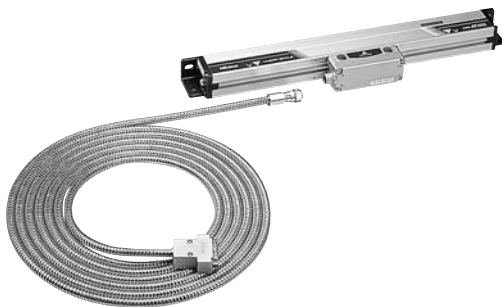
the ultra-portable and lighter ST series have the scale and the detector head separately.

APPLICATIONS

- High-speed, high-accuracy installation of electronics in industrial robots (Fig.1)
- Positioning dicing saw in semiconductor production process (Fig.2)
- Positioning IC tip for wire-bonding (Fig.3)
- Improving seek-time of disk drive system (Fig.4)

AT202 Linear Scales

SERIES 539 — Sealed Type Linear Encoder



FEATURES

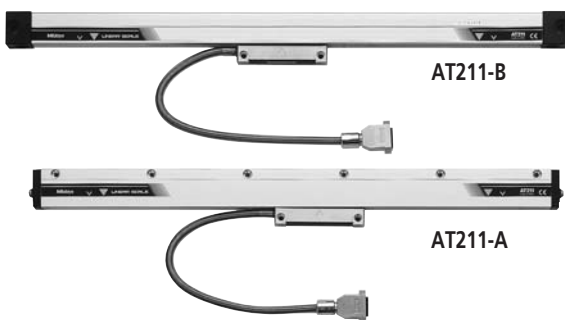
- Sealed type incremental linear scales suitable for feedback system of NC machine tools.
- Direct connection with NC machine tools are possible.

Technical Data

Resolution: 0.5 μ m or 1 μ m
Effective range L_e : 100mm - 3000mm (30 sizes)
Accuracy (at 20°C): (3+3 L_e /1000) μ m (standard type)
Max. response speed: 72m/min.
Dust/Water protection level: Conforming to IP-53

AT211 Linear Scales

SERIES 539 — Sealed Type Linear Encoder



FEATURES

- High-resolution, high-accuracy sealed type linear scales. Most ideal for feedback control in positioning a semiconductor manufacturing system, CNC machine tool, etc.
- Two types of models are available: the AT211-A, the multiple-point installation type designed for improved resistance against vibration and shock, and the AT211-B, which attaches to a machine at both ends. The AT211-B is compatible with the AT111 slim type in size.

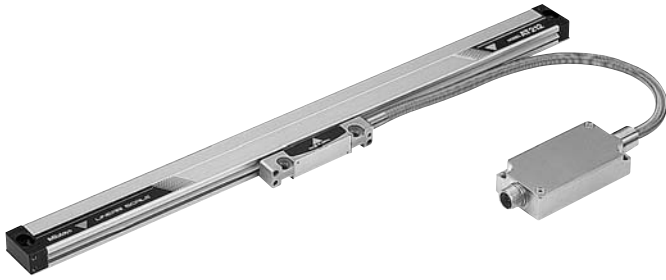
Technical Data

Resolution: 0.1 μ m, 0.2 μ m, 0.5 μ m, 1 μ m, 2.5 μ m, or 5 μ m
Effective range L_e : 100mm - 1500mm (20 sizes)
Accuracy (at 20°C): (3+3 L_e /1000) μ m (standard type)
Max. response speed: 5.4 - 120m/min. (depending on resolution)



AT212 Linear Scales

SERIES 539 — Super Slim Sealed Type Linear Encoder



FEATURES

- Super slim sealed type incremental linear scales suitable for feedback system of NC machine tools (dimensions are equivalent to that of the AT112 linear scales).
- Direct connection with NC machine tools are possible.

Technical Data

Resolution: 0.5 μ m or 1 μ m
Effective range L: 50mm - 1020mm (19 sizes)
Accuracy (at 20°C): (3+3Lo/1000) μ m (standard type)
Maximum response speed: 50m/min.
Dust/water protection level: Conforming to IP53

AT332 Linear Scales

SERIES 539 — Sealed Type Linear Encoder



FEATURES

- Sealed type absolute linear scales suitable for feedback system of high-speed NC machine tools.
- Direct connection with FANUC NC controller is possible.

Technical Data

Resolution: 0.5 μ m
Effective range L: 100mm - 3000mm (30 sizes)
Accuracy (at 20°C): (3+3Lo/1000) μ m (standard type)
Maximum response speed: 110m/min.
Dust/water protection level: Conforming to IP53

AT303/343/353 Linear Scales

SERIES 539 — Sealed Type Linear Encoder



FEATURES

- Sealed type absolute linear scales with very fine resolution up to 0.05 μ m.
- Direct connection with NC machine tools are possible.
 - AT303: Supports Mitutoyo standard serial interface
 - AT343: Supports Mitsubishi Electric high-speed serial interface
 - AT353: Supports Fanuc high-speed serial interface

Technical Data

Resolution: 0.05 μ m
Effective range L: 100mm - 3000mm (30 sizes)
Accuracy (at 20°C): (3+3Lo/1000) μ m (standard type)
Maximum response speed: 120m/min.
Dust/water protection level: Conforming to IP53

AT503/543 Linear Scales

SERIES 539 — Sealed Type Linear Encoder



FEATURES

- Sealed type absolute linear scales suitable for feedback system of high-speed NC machine tools.
- Direct connection with FANUC NC controller is possible.

Technical Data

Resolution: 0.05 μ m
Effective range L: 100mm - 1500mm (20 sizes)
Accuracy (at 20°C): (3+3Lo/1000) μ m (standard type)
Maximum response speed: 120m/min.
Dust/water protection level: Conforming to IP53

AT553 Linear Scales

SERIES 539 — Sealed Type Linear Encoder



FEATURES

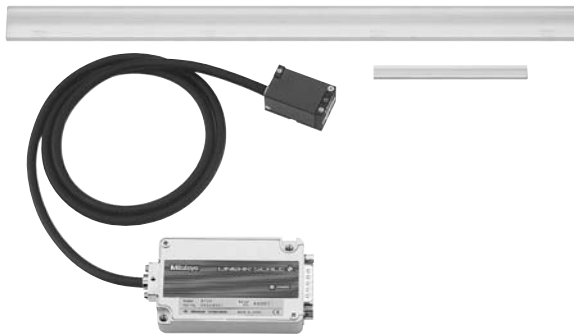
- New slim spar design sealed type absolute linear scales with very fine resolution up to 0.05μm.
- Two types are available: the AT553-SC, a high-rigid type, and the AT553-HC, a high-accuracy type.
- Direct connection with FANUC NC controller is possible.

Technical Data

Resolution: 0.5μm
Effective range L_e: 100mm - 2200mm (high-rigid type)
 100mm - 1000mm (high-accuracy type)
Accuracy (at 20°C): (3+3L_e/1000)μm (high-rigid type)
 (2+2L_e/1000)μm (high-accuracy type)
Maximum response speed: 150m/min.
Dust/water protection level: Conforming to IP53

ST34C Linear Scales

SERIES 579 — Exposed Type Linear Encoder



FEATURES

- High-resolution, high-accuracy and portable model designed for exposed installation.
- Outputs two-phase sine wave signal (signal pitch 4μm) and two-phase pulse signal simultaneously.
- High-reliability with stable signal output.
- Equipped with a compact interface box.

Technical Data

Resolution: 0.02μm, 0.05μm, or 0.1μm
Effective range L_e: 10mm - 1000mm (14 sizes)
Accuracy (at 20°C): ±0.5μm (up to 300mm), ±1μm (from 350mm up to 500mm), ±2μm (from 600mm up to 1000mm)
Maximum response speed: 720mm/s (depending on resolution)

ST322/323 Linear Scales

SERIES 579 — Exposed Type Linear Encoder



FEATURES

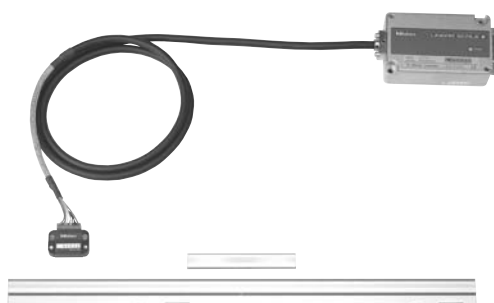
- Ultra compact design exposed type incremental linear scales adopting very thin and compact detector head.
- Suitable for installation on various testing equipment, compact/high-density mounting devices.

Technical Data

Resolution: 1μm or 2μm (ST322), 2.5μm or 5μm (ST323)
Effective range L_e: 50mm - 350mm (7 sizes)
Accuracy (at 20°C): ±3μm
Maximum response speed: 600mm/s (ST322), 1500mm/s (ST323)

ST422 Linear Scales

SERIES 579 — Exposed Type Linear Encoder



FEATURES

- Compact design exposed type incremental linear scales.
- Maximum of up to 5000mm/s high response speed.
- Provided with alarm LED error indication with fault detection signal output for over speed and sinusoidal signal anomaly errors.

Technical Data

Resolution: 0.2μm, 0.5μm, 1μm, or 5μm
Effective range L_e: 10mm - 1000mm (18 sizes)
Accuracy (at 20°C): ±1μm (up to 300mm), ±2μm (from 350mm up to 500mm), ±3μm (from 600mm up to 1000mm)
Maximum response speed: 5000mm/s (depending on resolution)

