

Featuring Environmental Resistance

Separate Type Absolute Linear Scale ST700 Series

Catalog No. E4266-579



Optimal for Use with Linear Motors.

Mitutoyo has achieved a Separate-type Absolute series linear scale. It supports connection to servo amplifiers of various companies.

Highly Resistant to Contamination of Water and Oil.

Environmental resistance has been implemented through the adoption of the electromagnetic induction detector system.

Mitutoyo

Separate Type /ABS ST Series
Environment Resistant Absolute Scale Unit

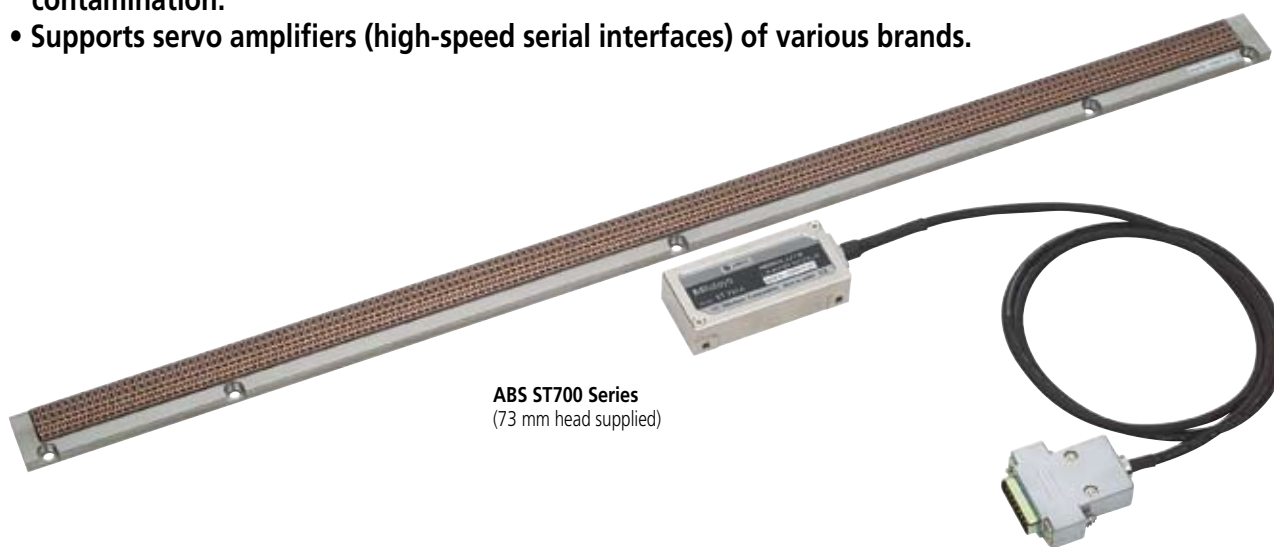
ABS ST 700 Series

Patented (Registered in Japan, the United States, India, China, Germany, England, France, and Switzerland.)

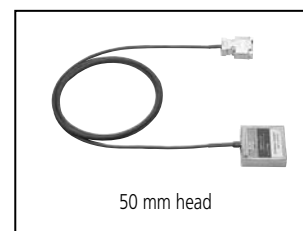


Features

- Absolute measurement has been made possible with a separate type scale unit.
- Non-contact detection is optimal for high-speed/high-acceleration control of linear motors and the like.
- Adoption of the electromagnetic induction method makes the scale resistant to water and oil contamination.
- Supports servo amplifiers (high-speed serial interfaces) of various brands.



ABS ST700 Series
(73 mm head supplied)



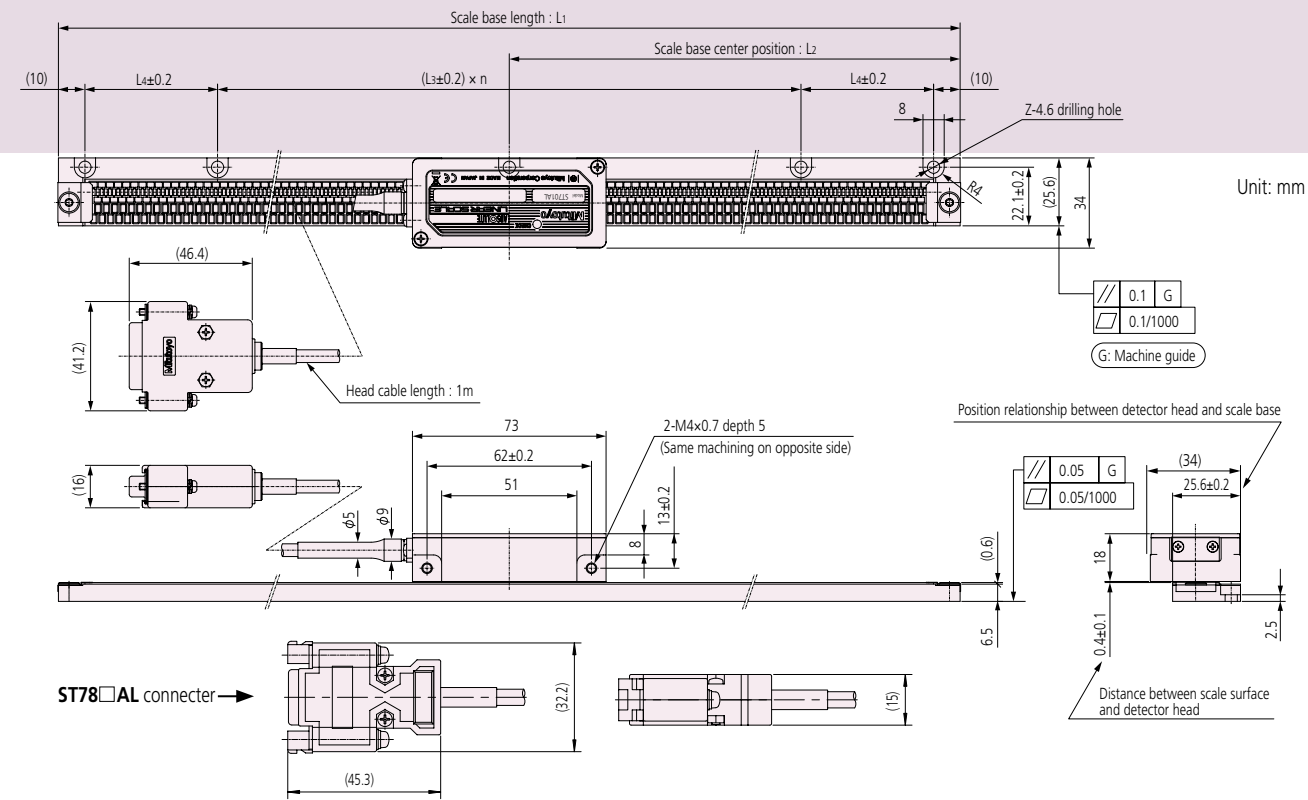
50 mm head

Specifications

Item	ST700 Series
Detecting method	Electromagnetic induction type ABS linear encoder
Maximum effective measuring length	100 to 6,000 mm
Resolution	0.5 μ m / 0.1 μ m
Accuracy (20°C)	(8+5L ₀ /1000) μ m L ₀ : Effective measuring length
Maximum response speed	5m/s
Thermal expansion coefficient	(12 \pm 1.5) \times 10 ⁻⁶ /°C (When type of mounted material is equivalent to iron)
Operating temperature / humidity	0 to 50°C / 20 to 80%RH
Storing temperature / humidity	-20 to 70°C / 20 to 80%RH
Power supply	5V \pm 10%(Ripple + spike noise components are 100 mV or lower)
Maximum current consumption	270mA (Max)
Dust / water resistance	Equivalent to IP 65 (detector head only)
Head cable length	1m (highly flexible cable)
Maximum cable length	29m (including the length of the head cable)

*1: Patented (Registered in Japan, the United States, Europe (England, Germany, France, and Switzerland))
Patent pending (India and China)

73 mm Head type Mounting Dimensions (3,200 to 6,000 mm)



Dimensions of Scale Unit

Code No.	Code	Code (ST743)	Code (ST753)	Effective Measuring Length (mm)	Maximum Travel Length (mm)	L1 (mm)	L2 (mm)	L3 (mm)	n	L4 (mm)	Z
579-331-□□	ST7□□AL-3200A	ST743L-3200A	ST753L-3200A	3200	3210	3280	1640	200	14	230	17
579-332-□□	ST7□□AL-3400A	ST743L-3400A	ST753L-3400A	3400	3410	3480	1740		16	130	19
579-333-□□	ST7□□AL-3600A	ST743L-3600A	ST753L-3600A	3600	3610	3680	1840		16	230	19
579-334-□□	ST7□□AL-3800A	ST743L-3800A	ST753L-3800A	3800	3810	3880	1940		18	130	21
579-335-□□	ST7□□AL-4000A	ST743L-4000A	ST753L-4000A	4000	4010	4080	2040		18	230	21
579-336-□□	ST7□□AL-4200A	ST743L-4200A	ST753L-4200A	4200	4210	4280	2140		20	130	23
579-337-□□	ST7□□AL-4400A	ST743L-4400A	ST753L-4400A	4400	4410	4480	2240		20	230	23
579-338-□□	ST7□□AL-4600A	ST743L-4600A	ST753L-4600A	4600	4610	4680	2340		22	130	25
579-339-□□	ST7□□AL-4800A	ST743L-4800A	ST753L-4800A	4800	4810	4880	2440		22	230	25
579-340-□□	ST7□□AL-5000A	ST743L-5000A	ST753L-5000A	5000	5010	5080	2540		24	130	27
579-341-□□	ST7□□AL-5200A	ST743L-5200A	ST753L-5200A	5200	5210	5280	2640		24	230	27
579-342-□□	ST7□□AL-5400A	ST743L-5400A	ST753L-5400A	5400	5410	5480	2740		26	130	29
579-343-□□	ST7□□AL-5600A	ST743L-5600A	ST753L-5600A	5600	5610	5680	2840		26	230	29
579-344-□□	ST7□□AL-5800A	ST743L-5800A	ST753L-5800A	5800	5810	5880	2940		28	130	31
579-345-□□	ST7□□AL-6000A	ST743L-6000A	ST753L-6000A	6000	6010	6080	3040		28	230	31

□□ of the code no. and codes are as follows: 01 for ST701AL, 03 for ST703AL, 41 for ST741AL, 43 for ST743AL, 71 for ST771AL, 73 for ST773AL, 81 for ST781AL, 83 for ST783AL, 33 for ST743L, and 53 for ST753L.
 * Scale units of an effective measuring length other than those written above are available on special order with the available maximum effective measuring length being 6,000 mm.
 * The distance between the scale surface and the detector head is 0.4 ± 0.1.

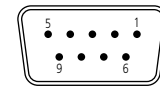


Supplementary Information ABS ST700 Series

Output specifications

•ABS ST87□A/ST78□AL

Output connector (female)
 Dsub 9-pin
 Compatible connector
 17JE-23090-02 (D2C) (DDK) or an equivalent product (Dsub Series) can be used.

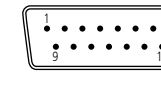


Pin Number	Signal Name
1	+5V (VCC)
2	RQ/DT (S)
3	+5V (VCC)
4	N.C
5	0V (GND)
6	RQ/DT (S)
7	+TEST
8	-TEST
9	0V (GND)
Connector shell	F.G

* Leave the TEST terminals (7 and 8) unconnected.

•ABS ST74□A/ST77□A/ST70□A ST74□AL/ST77□A/ST70□AL

Output connector (male)
 Dsub 15-pin
 Compatible connector
 HDAB-15S (Hirose Electric) or an equivalent product (Dsub Series) can be used.

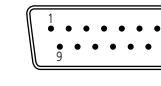


Pin Number	Signal Name
1	0V (GND)
2	0V (GND)
3	+5V
4	+5V
5	N.C
6	N.C
7	RQ/DT
8	RQ/DT
9	+TEST
10	-TEST
11	+5V
12	N.C
13	0V (GND)
14	N.C
15	F.G
Connector shell	F.G

* Leave the TEST terminals (9 and 10) unconnected.

•ABS ST743/ST753 ST743L/ST753L

Output connector (male)
 Dsub 15-pin
 Compatible connector
 HDAB-15S (Hirose Electric) or an equivalent product (Dsub Series) can be used.



Pin Number	Signal Name
1	0V (GND)
2	0V (GND)
3	+5V
4	+5V
5	DT
6	DT
7	RQ
8	RQ
9	+TEST
10	-TEST
11	+5V
12	N.C
13	0V (GND)
14	N.C
15	F.G
Connector shell	F.G

* Leave the TEST terminals (9 and 10) unconnected.

Compatibility of Detector Head and Main Scale

For the ST700A Series with effective range of 3 m or less and the ST700AL series with effective range of 3.2 m or more, note the following differences when mounting the detector head.

- Detector head mounting dimensions : Distance from the scale surface to the detector : 0.5 mm ± 0.1 mm for 3 m or less effective range; 0.4 mm ± 0.1 mm for 3.2 m or more effective range.
- Electrical adjustment procedures : There is an additional adjustment item for the ST700AL Series. Note that the adjustment program differs from the previous ones.
- Compatibility of the main scale : Main scale for an effective range of 3.2 m to 6 m is exclusively for a detector head with the same range. Note that a detector head for an effective range of 3.2 m to 6 m is not compatible with a main scale with an effective range of 3 m or less.

Main Scale		Detector Head
For effective range of 3.2 m to 6 m	← Compatible →	For effective range of 3.2 m to 6 m
	← Incompatible →	
For effective range of 3 m or less	← Compatible →	For effective range of 3 m or less

Signal Adjusting Method When Mounting ABS ST700 Series

Patented (United States), patent pending (Japan, China, and Europe).

In order for signal adjustment and confirmation after the unit is mounted, "ABS ST700 Signal Adjustment Program" dedicated software and a conversion unit are necessary.

Using this software, the following settings and confirmation can be made.

- Automatic adjustment of scale signals fi The scale base and detector head must have been mounted observing the prescribed dimensions.
- Scale signal amplitude (signal intensity) check
- Scale origin (absolute position data = 0) setting
- Absolute position data check
- Error history clear
- ABS synthesis error check (only for models with effective measuring length of 3,200 mm to 6,000 mm).

Required Items

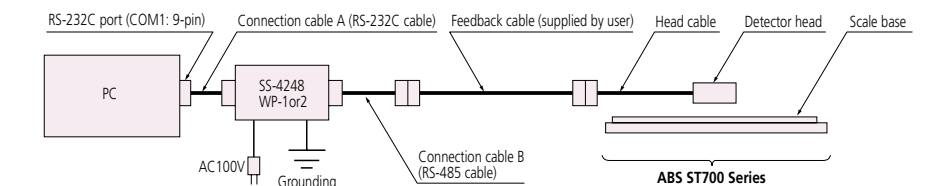
Item	Q'ty	Description	Remarks
PC*	1	DOS/V (Windows version)	Prepared by the customer.
Conversion unit	1	SS-4248WP-1or2 (System Sacom Sales Corp.)	
Connection cable A	1	RS-232C cable	Option (package deal)
Connection cable B	1	RS-485 cable	
Dedicated software	1	Name of software: "ABS ST700 Signal Adjustment Program"	

* The following are the operation environment of the PC necessary to run this program.
 PC : DOS/V with Pentium 200 MHz or faster (with RS-232C port)
 Memory : 64 MB min. (128 MB or more recommended)
 Program size : 10 MB
 OS : Windows 95 or later
 Monitor : 256 colors, 800 x 600 or higher resolution (1,024 x 768 or higher resolution recommended)
 RS-232C : COM1 port normally used (Another can also be used.)

"Conversion Unit, Dedicated Software" Set Parts No.

Power Supply Specifications	Parts No.	Scale Type
AC adaptor specifications	092AA175	ABS ST74□A, ABS ST74□AL Note: When connected to MR-J2S.
	092AA177	ABS ST77□A, ABS ST77□AL, ABS ST78□A, ABS ST78□AL
	092AA179	ABS ST74□A, ABS ST74□AL Note: When connected to MR-J3. ABS ST70□A, ABS ST70□AL, ABS ST743, ABS ST743L
	06ACN747	ABS ST753, ABS ST753L
Power supply cable specifications	092AA176	ABS ST74□A, ABS ST74□AL Note: When connected to MR-J2S.
	092AA178	ABS ST77□A, ABS ST77□AL, ABS ST78□A, ABS ST78□AL
	092AA180	ABS ST74□A, ABS ST74□AL Note: When connected to MR-J2S. ABS ST70□A, ABS ST70□AL, ABS ST743, ABS ST743L
	06ACN750	ABS ST753, ABS ST753L

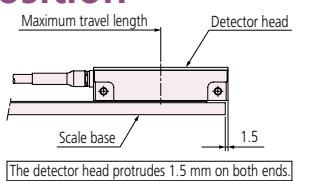
Connection Method



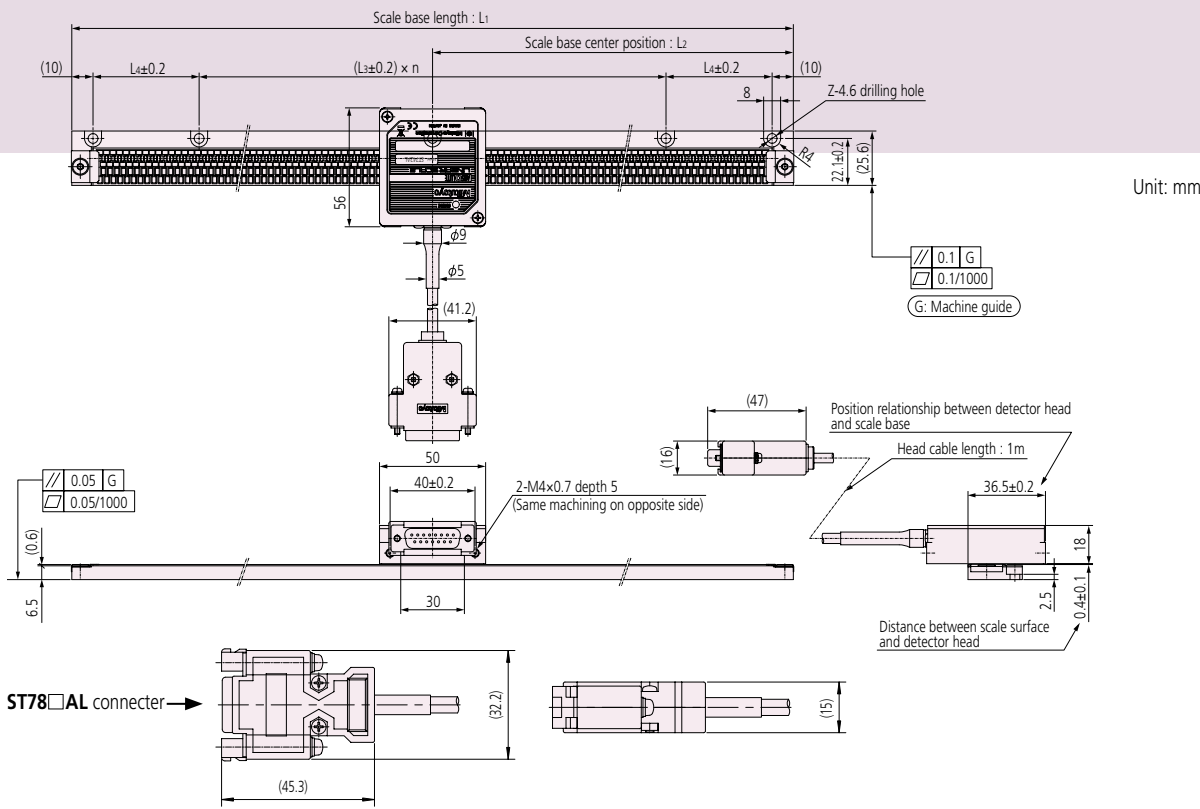
* Ground the device to prevent the risk of electric shock.
 * Connect the head cable with connection cable B when using "Part No.092AA179" and "Part No.092AA180".

ABS ST700 Series Maximum Travel Length and Its Position Relationship with Detector Head

The relationship between the detector head and scale base during scanning at the maximum travel length is as follows (only for the 73 mm head type).



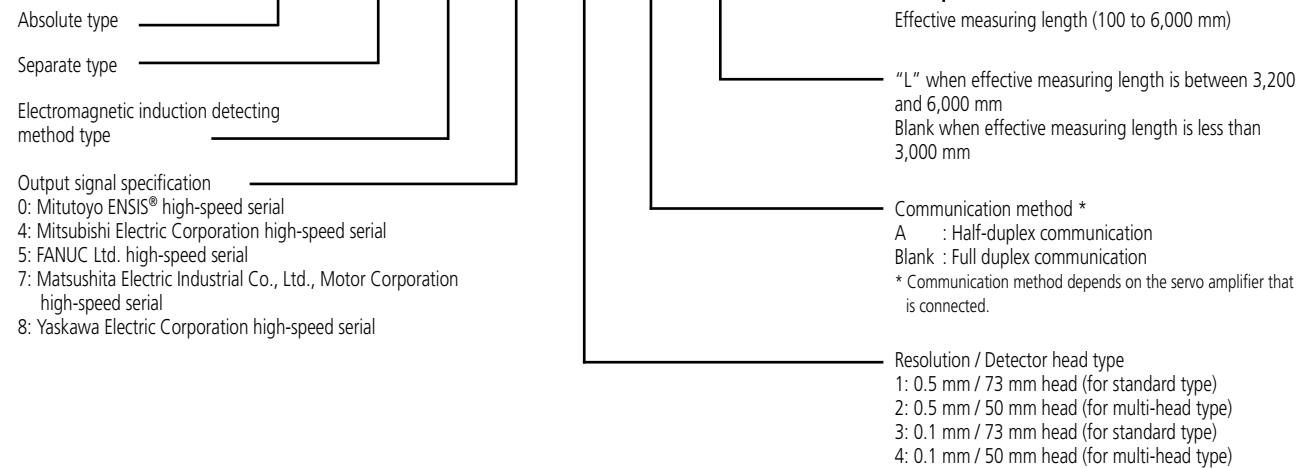
50 mm Head type Mounting Dimensions (3,200 to 6,000 mm)



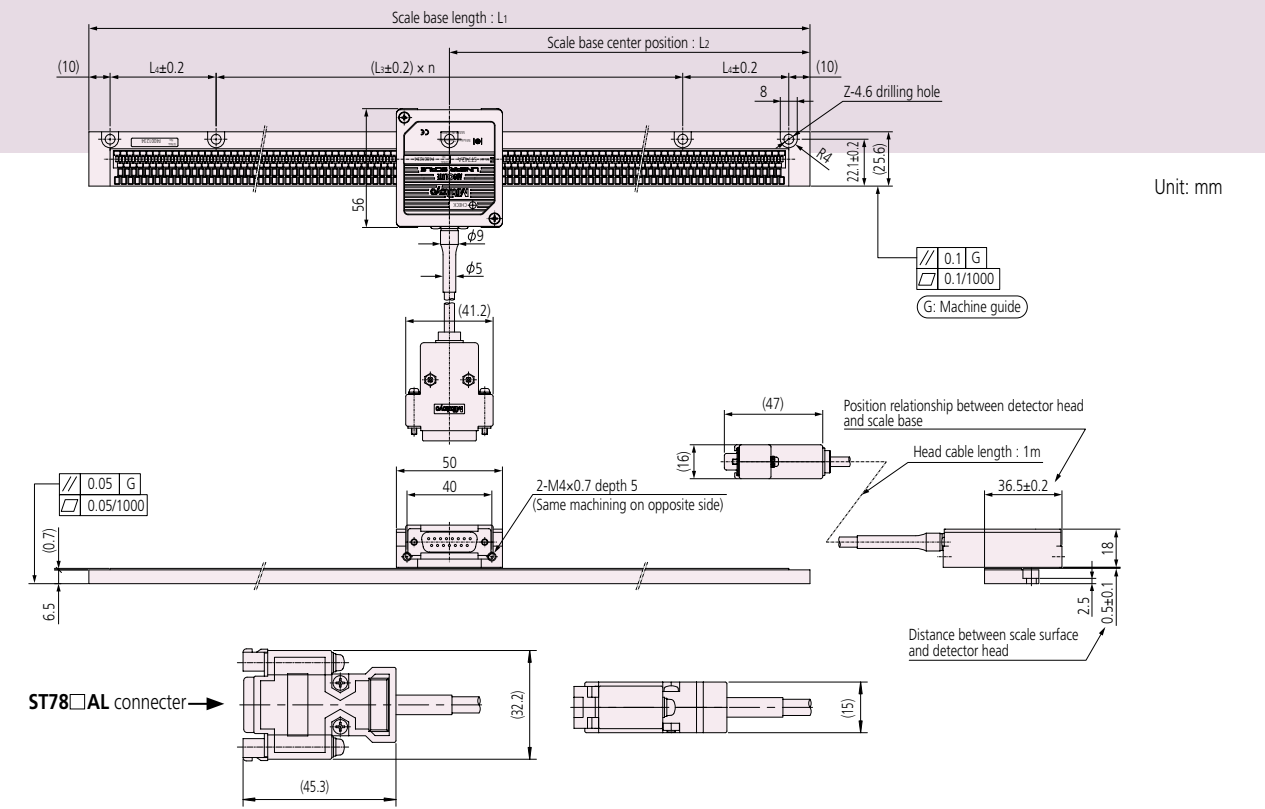
Unit: mm

Scale Type

ABS ST 7 - A



50 mm Head Type Mounting Dimensions (100 to 3,000 mm)



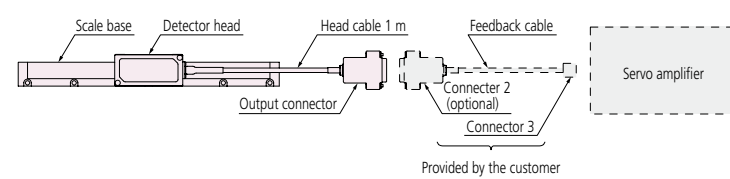
Unit: mm

Model List

Resolution/Detector Head	Resolution 0.5 μm		Resolution 0.1 μm	
	73 mm head	50 mm head	73 mm head	50 mm head
Applicable system*1				
FANUC Ltd. FS-1 Series control unit, POWER Mate i, POWER Mate i	-	-	ABS ST753 ABS ST753L	-
Yaskawa Electric Corporation Σ-II Series Servo pack: SGDS-□□□05□ SGDS-□□□15□	ABS ST781A ABS ST781AL	ABS ST782A ABS ST782AL	ABS ST783A ABS ST783AL	ABS ST784A ABS ST784AL
Mitsubishi Electric Corporation MR-J2S/MR-J3 Series	ABS ST741A ABS ST741AL	ABS ST742A ABS ST742AL	ABS ST743A ABS ST743AL	ABS ST744A ABS ST744AL
Mitsubishi Electric Corporation MELDAS Series Supported amplifier: MDS-Vn-V1 / V2	-	-	ABS ST743 ABS ST743L	-
Matsushita Electric Industrial Co., Ltd., Motor Company MINAS A4, A4P, A4N Series	ABS ST771A ABS ST771AL	-	ABS ST773A ABS ST773AL	-
[Amplifiers supporting Mitutoyo ENSIS® interface] Nikki Denso Co., Ltd. VC Series Servoland Corporation SVF Series PMAC JAPAN Co., Ltd. controller	ABS ST701A ABS ST701AL	(ABS ST702A)*2 (ABS ST702AL)*2	ABS ST703A ABS ST703AL	(ABS ST704A)*2 (ABS ST704AL)*2

*1: For details on the applicable systems, contact their respective manufacturers, listed above.
 *2: Products enclosed in parentheses are available on special order.

System Configuration



Feedback cable

- Yaskawa Electric Corporation serial cable can be used as the feedback cable to connect to a Yaskawa Electric Corporation servo amplifier. Cable model number: JZSP-CLP-□□ (03, 05, 10, 15, 20)
- For the feedback cable to connect to a Mitsubishi Electric Corporation MR-J2S/MR-J3, contact Mitutoyo with the following code numbers.
 For the MR-J2S 5m : No. 06ACF116A
 10m : No. 06ACF116B
 For the MR-J3 5m : No. 06ACF117A
 10m : No. 06ACF117B

Dimensions of Scale Unit

Code No.	Code	Effective Measuring Length (mm)	Maximum Travel Length (mm)	L1 (mm)	L2 (mm)	L3 (mm)	n	L4 (mm)	Z
579-331-□□	ST7□□AL-3200A	3200	3210	3280	1640	200	14	230	17
579-332-□□	ST7□□AL-3400A	3400	3410	3480	1740		16	130	19
579-333-□□	ST7□□AL-3600A	3600	3610	3680	1840		16	230	19
579-334-□□	ST7□□AL-3800A	3800	3810	3880	1940		18	130	21
579-335-□□	ST7□□AL-4000A	4000	4010	4080	2040		18	230	21
579-336-□□	ST7□□AL-4200A	4200	4210	4280	2140		20	130	23
579-337-□□	ST7□□AL-4400A	4400	4410	4480	2240		20	230	23
579-338-□□	ST7□□AL-4600A	4600	4610	4680	2340		22	130	25
579-339-□□	ST7□□AL-4800A	4800	4810	4880	2440		22	230	25
579-340-□□	ST7□□AL-5000A	5000	5010	5080	2540		24	130	27
579-341-□□	ST7□□AL-5200A	5200	5210	5280	2640		24	230	27
579-342-□□	ST7□□AL-5400A	5400	5410	5480	2740		26	130	29
579-343-□□	ST7□□AL-5600A	5600	5610	5680	2840		26	230	29
579-344-□□	ST7□□AL-5800A	5800	5810	5880	2940		28	130	31
579-345-□□	ST7□□AL-6000A	6000	6010	6080	3040		28	230	31

* □□ of the code no. and the codes are as follows: 42 for ST742AL, 44 for ST744AL, 82 for ST782AL, and 84 for ST784AL.

* Scale units of an effective measuring length other than those written above are available on special order with the available maximum effective measuring length being 6,000 mm.

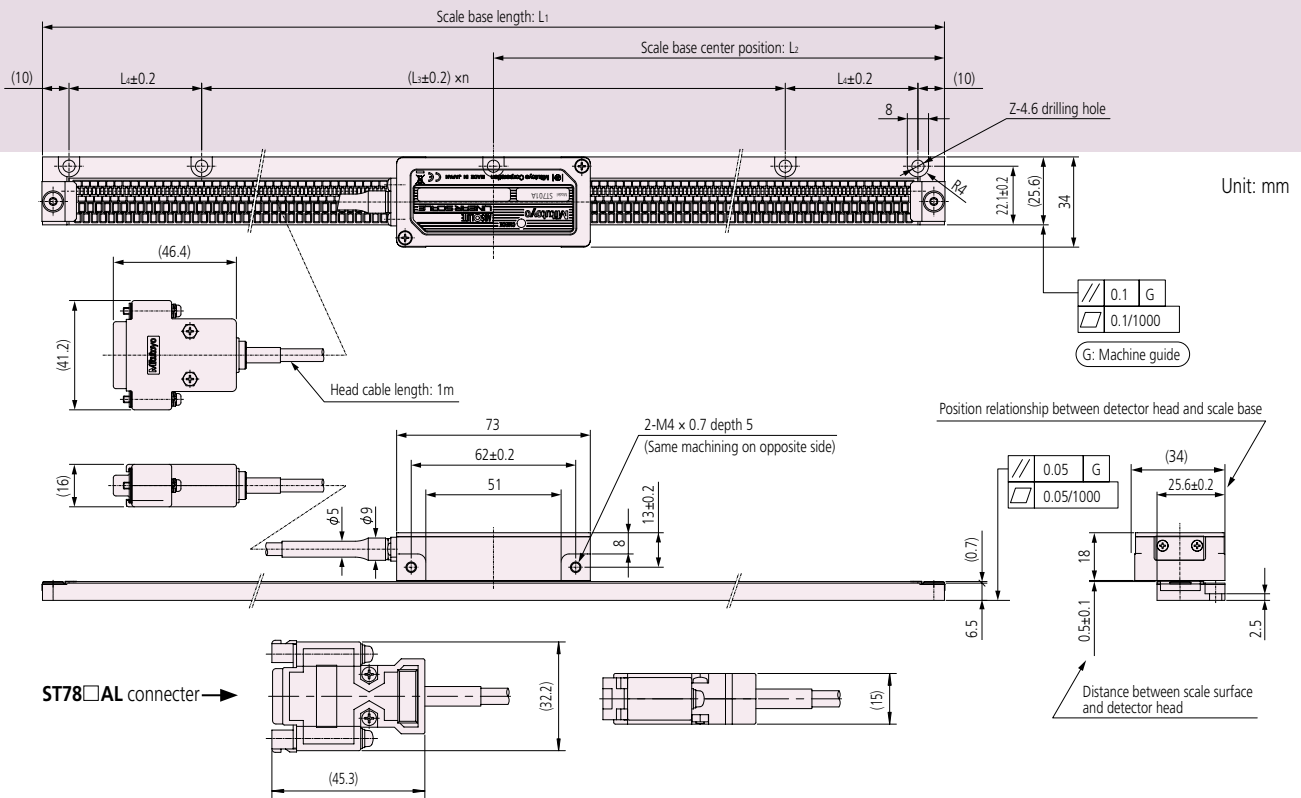
Dimensions of Scale Unit

Code No.	Code	Effective Measuring Length (mm)	Maximum Travel Length (mm)	L1 (mm)	L2 (mm)	L3 (mm)	n	L4 (mm)	Z
579-301-□□	ST7□□A-100A	100	110	180	90	200	2	-	3
579-302-□□	ST7□□A-200A	200	210	280	140			-	
579-303-□□	ST7□□A-300A	300	310	380	190			-	
579-304-□□	ST7□□A-400A	400	410	480	240			230	
579-305-□□	ST7□□A-500A	500	510	580	290			80	
579-306-□□	ST7□□A-600A	600	610	680	340		130	5	
579-307-□□	ST7□□A-700A	700	710	780	390		180		
579-308-□□	ST7□□A-800A	800	810	880	440		230		
579-309-□□	ST7□□A-900A	900	910	980	490		80	4	7
579-310-□□	ST7□□A-1000A	1000	1010	1080	540		130		
579-311-□□	ST7□□A-1100A	1100	1110	1180	590		180		
579-312-□□	ST7□□A-1200A	1200	1210	1280	640		230	6	9
579-313-□□	ST7□□A-1300A	1300	1310	1380	690		80		
579-314-□□	ST7□□A-1400A	1400	1410	1480	740		130		
579-315-□□	ST7□□A-1500A	1500	1510	1580	790		180	8	11
579-316-□□	ST7□□A-1600A	1600	1610	1680	840	230			
579-317-□□	ST7□□A-1700A	1700	1710	1780	890	80			
579-318-□□	ST7□□A-1800A	1800	1810	1880	940	130	10	13	
579-319-□□	ST7□□A-1900A	1900	1910	1980	990	180			
579-320-□□	ST7□□A-2000A	2000	2010	2080	1040	230			
579-321-□□	ST7□□A-2100A	2100	2110	2180	1090	80	12	15	
579-322-□□	ST7□□A-2200A	2200	2210	2280	1140	130			
579-323-□□	ST7□□A-2300A	2300	2310	2380	1190	180			
579-324-□□	ST7□□A-2400A	2400	2410	2480	1240	230	14	17	
579-325-□□	ST7□□A-2500A	2500	2510	2580	1290	80			
579-326-□□	ST7□□A-2600A	2600	2610	2680	1340	130			
579-327-□□	ST7□□A-2700A	2700	2710	2780	1390	180	12	15	
579-328-□□	ST7□□A-2800A	2800	2810	2880	1440	230			
579-329-□□	ST7□□A-2900A	2900	2910	2980	1490	80			
579-330-□□	ST7□□A-3000A	3000	3010	3080	1540	130	14	17	

* □□ of the code no. and the codes are as follows: 42 for ST742A, 44 for ST744A, 82 for ST782A, and 84 for ST784A.

* Scale units of an effective measuring length other than those written above are available on special order with the available minimum effective measuring length being 50 mm.

73 mm Head Type Mounting Dimensions (100 to 3,000 mm)



Dimensions of Scale Unit

Code No.	Code	Code (ST743)	Code (ST753)	Effective Measuring Length (mm)	Maximum Travel Length (mm)	L ₁ (mm)	L ₂ (mm)	L ₃ (mm)	n	L ₄ (mm)	Z
579-301-□□	ST7□□A-100A	ST743-100A	ST753-100A	100	110	180	90	80	2	-	3
579-302-□□	ST7□□A-200A	ST743-200A	ST753-200A	200	210	280	140	130		-	
579-303-□□	ST7□□A-300A	ST743-300A	ST753-300A	300	310	380	190	180		-	
579-304-□□	ST7□□A-400A	ST743-400A	ST753-400A	400	410	480	240	230		-	
579-305-□□	ST7□□A-500A	ST743-500A	ST753-500A	500	510	580	290	80		5	
579-306-□□	ST7□□A-600A	ST743-600A	ST753-600A	600	610	680	340	130			
579-307-□□	ST7□□A-700A	ST743-700A	ST753-700A	700	710	780	390	180			
579-308-□□	ST7□□A-800A	ST743-800A	ST753-800A	800	810	880	440	230		7	
579-309-□□	ST7□□A-900A	ST743-900A	ST753-900A	900	910	980	490	80			
579-310-□□	ST7□□A-1000A	ST743-1000A	ST753-1000A	1000	1010	1080	540	130			
579-311-□□	ST7□□A-1100A	ST743-1100A	ST753-1100A	1100	1110	1180	590	180	9		
579-312-□□	ST7□□A-1200A	ST743-1200A	ST753-1200A	1200	1210	1280	640	230			
579-313-□□	ST7□□A-1300A	ST743-1300A	ST753-1300A	1300	1310	1380	690	80	11		
579-314-□□	ST7□□A-1400A	ST743-1400A	ST753-1400A	1400	1410	1480	740	130			
579-315-□□	ST7□□A-1500A	ST743-1500A	ST753-1500A	1500	1510	1580	790	180			
579-316-□□	ST7□□A-1600A	ST743-1600A	ST753-1600A	1600	1610	1680	840	230	13		
579-317-□□	ST7□□A-1700A	ST743-1700A	ST753-1700A	1700	1710	1780	890	80			
579-318-□□	ST7□□A-1800A	ST743-1800A	ST753-1800A	1800	1810	1880	940	130			
579-319-□□	ST7□□A-1900A	ST743-1900A	ST753-1900A	1900	1910	1980	990	180			
579-320-□□	ST7□□A-2000A	ST743-2000A	ST753-2000A	2000	2010	2080	1040	230	15		
579-321-□□	ST7□□A-2100A	ST743-2100A	ST753-2100A	2100	2110	2180	1090	80			
579-322-□□	ST7□□A-2200A	ST743-2200A	ST753-2200A	2200	2210	2280	1140	130			
579-323-□□	ST7□□A-2300A	ST743-2300A	ST753-2300A	2300	2310	2380	1190	180			
579-324-□□	ST7□□A-2400A	ST743-2400A	ST753-2400A	2400	2410	2480	1240	230	17		
579-325-□□	ST7□□A-2500A	ST743-2500A	ST753-2500A	2500	2510	2580	1290	80			
579-326-□□	ST7□□A-2600A	ST743-2600A	ST753-2600A	2600	2610	2680	1340	130			
579-327-□□	ST7□□A-2700A	ST743-2700A	ST753-2700A	2700	2710	2780	1390	180			
579-328-□□	ST7□□A-2800A	ST743-2800A	ST753-2800A	2800	2810	2880	1440	230			
579-329-□□	ST7□□A-2900A	ST743-2900A	ST753-2900A	2900	2910	2980	1490	80			
579-330-□□	ST7□□A-3000A	ST743-3000A	ST753-3000A	3000	3010	3080	1540	130			

* □□ of the code no. and the codes are as follows: 01 for ST701A, 03 for ST703A, 41 for ST741A, 43 for ST743A, 71 for ST771A, 73 for ST773A, 81 for ST781A, 83 for ST783A, 33 for ST743, and 53 for ST753.

* Scale units of an effective measuring length other than those listed above are available on special order with the available minimum effective measuring length being 50 mm.



ST700 SERIES

**ABSOLUTE
LINEAR
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