

## Separate Type ABS ST Series

Absolute Scale Unit (High environmental resistance type)

# ABS ST700 Compact Type Series

ABSOLUTE™



Scale base type

### Features

- Absolute measurement with separate type scales
- Non-contact detection is optimal for high speed and high acceleration of linear motors, etc.
- Electromagnetic induction principle means scales are unaffected by contamination
- The detector head is approximately 1/3 the previous model size: 50mm (W) × 28mm (D) × 11mm (H)
- Cable outlets can be in four directions, with mounting holes on the top and sides
- Accuracy (5+5L/1000)μm is realized (previous models: (8+5L/1000) μm)  
\*L: Effective range (mm)
- Compatible with servo amplifiers from a range of companies (high-speed serial interfaces)

### How to read the code

**ABS ST7 0 8 A L - 100 A - R**

Absolute type

Series

Separate type Absolute linear scale

**ABS ST700 compact type series** (effective range ≤ 3m)

**ABS ST700L compact type series** (3.2m ≤ effective range ≤ 6m)

Interface specification\*1

0: For Mitutoyo ENSIS high-speed serial

**ABS ST708A, ST708AL**

4: Mitsubishi Electric Corporation high-speed serial

**ABS ST748A, ST748AL**

**ABS ST748, ST748L**

5: FANUC Ltd. high-speed serial

**ABS ST758, ST758L**

7: Panasonic Corporation, Motor business unit high-speed serial

**ABS ST778A, ST778AL**

8: Yaskawa Electric Corporation high-speed serial

**ABS ST788A, ST788AL**

A: Scale base type

Effective range: 100mm to 6000mm

Blank: 100mm to 3000mm

L: 3200mm to 6000mm

Head cable outlets

R: Right

L: Left

U: Up

D: Down

Communication method

A: 2 wire

Blank: 4 wire

Detector head shape and resolution

8: Shape 50mm (W) × 28mm (D) × 11mm (H)

Resolution 0.1μm

### Applicable interfaces

Applicable interfaces*1	FANUC Ltd. FS-i Series, POWER Mate i Series
	Mitsubishi Electric Corporation MELSERVO MR-J4/MR-J3 Series
	Mitsubishi Electric Corporation CNC Series MDS-D/MDS-DH Series
	Yaskawa Electric Corporation Σ-VII Series
	Panasonic Corporation, Motor business unit MINAS-A5, A5L, A5N, A5NL Series, MINAS-A4, A4P, A4N, A4NL Series
	Mitutoyo Corporation ENSIS*2 Nikki Denso Co., Ltd. VC II / VC / VPS Series Servoland Corporation SVF Series PMAC JAPAN Co., Ltd. UMAC-Turbo PMAC2

\*1 For details (connectivity) regarding the applicable system, please consult with the individual manufacturer.

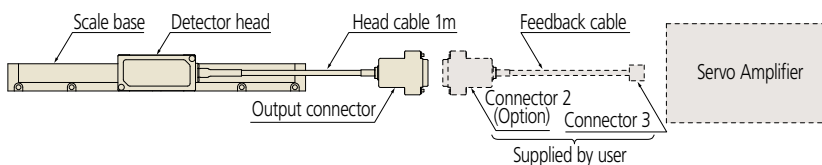
\*2 ENSIS is a registered trademark of Mitutoyo Corporation.

## Specifications

Item	Scale Type	Scale base type
Resolution		0.1μm (0.05μm: special order)
Detection method		Electromagnetic induction Absolute position detection method*
Shape		Separate type scale
Effective range (accuracy guarantee range)		100 to 3000mm / 3200 to 6000mm
Accuracy (20°C)		(5+5L/1000) μm L: Effective range mm
Maximum feed speed		5 m/s
Thermal expansion coefficient		(12.0±1.5) ×10 <sup>-6</sup> /°C (when attached to material equivalent to steel)
Operating conditions	Temperature	0 to 50°C
	Humidity	20 to 80%RH
Storage conditions	Temperature	-20 to 70°C
	Humidity	20 to 80%RH
Power supply voltage		5V±10% (at the detector head) (Ripple and spike noise should not exceed 100mV)
Current consumption		270mA (Max.)
Vibration resistance		300m/s <sup>2</sup> (55 to 2000Hz)
Shock resistance		500m/s <sup>2</sup> (half-sine, 11ms)
Head cable	Length/cable diameter	1m / ø3.8mm (high-flex cable)
	Connector	1) D-sub (15-pin pin type) connector (not waterproof) 2) D-sub (9-pin socket type) connector (not waterproof): for ST788A
Maximum signal cable length		Up to 29m (head cable length included) (Please consult the user's manual)
Detector mounting		1 location each on top and sides
Direction of cable outlet		4 sides (top, bottom, left, right) can be selected
EMC standard		CE mark standard

Note: If considering using in an environment in which cutting fluid, etc., is used, please consult our nearest sales department.

## System configuration



### Feedback cable

Yaskawa Electric Corporation serial cable can be used as the feedback cable for connecting to the Yaskawa Electric Corporation servo amplifier.  
Cable type number: JZSP-CLP70-□□E (03,05,10,15,20)

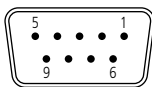
When wishing to connect a feedback cable to the Mitsubishi Electric Corporation MR-J4/MR-J3 series, please reference the code numbers below and order from our company.

For the MR-J4/MR-J3 series 5m: **No.06ACF117A**  
10m: **No.06ACF117B**

## Output specifications

### • ST788A (L)

Output connector (socket type)  
D-sub 9-pin  
Applicable connector  
17JE-23090-02 (D2C) (DDK)



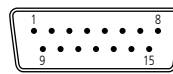
Alternately, an equivalent product (D-sub series) can be used

Pin No.	Signal
1	+5V (Vcc)
2	RQ/DT (S)
3	+5V (Vcc)
4	N.C
5	0V (GND)
6	RQ/DT (/S)
7	N.C
8	N.C
9	0V (GND)
Connector shell	F.G

Note: Leave test terminals (Pin No. 7 and 8) disconnected during use.

### • ST748A (L), ST778A (L), ST708A (L)

Output connector (pin type)  
D-sub 15-pin  
Applicable connector  
HDAB-15S (Hirose Electric)



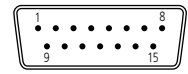
Alternately, an equivalent product (D-sub series) can be used

Pin No.	Signal
1	0V (GND)
2	0V (GND)
3	+5V
4	+5V
5	N.C
6	N.C
7	RQ/DT
8	RQ/DT
9	N.C
10	N.C
11	+5V
12	N.C
13	0V (GND)
14	N.C
15	F.G
Connector shell	F.G

Note: Leave test terminals (Pin No. 9 and 10) disconnected during use.

### • ST748 (L), ST758 (L)

Output connector (pin type)  
D-sub 15-pin  
Applicable connector  
HDAB-15S (Hirose Electric)



Alternately, an equivalent product (D-sub series) can be used

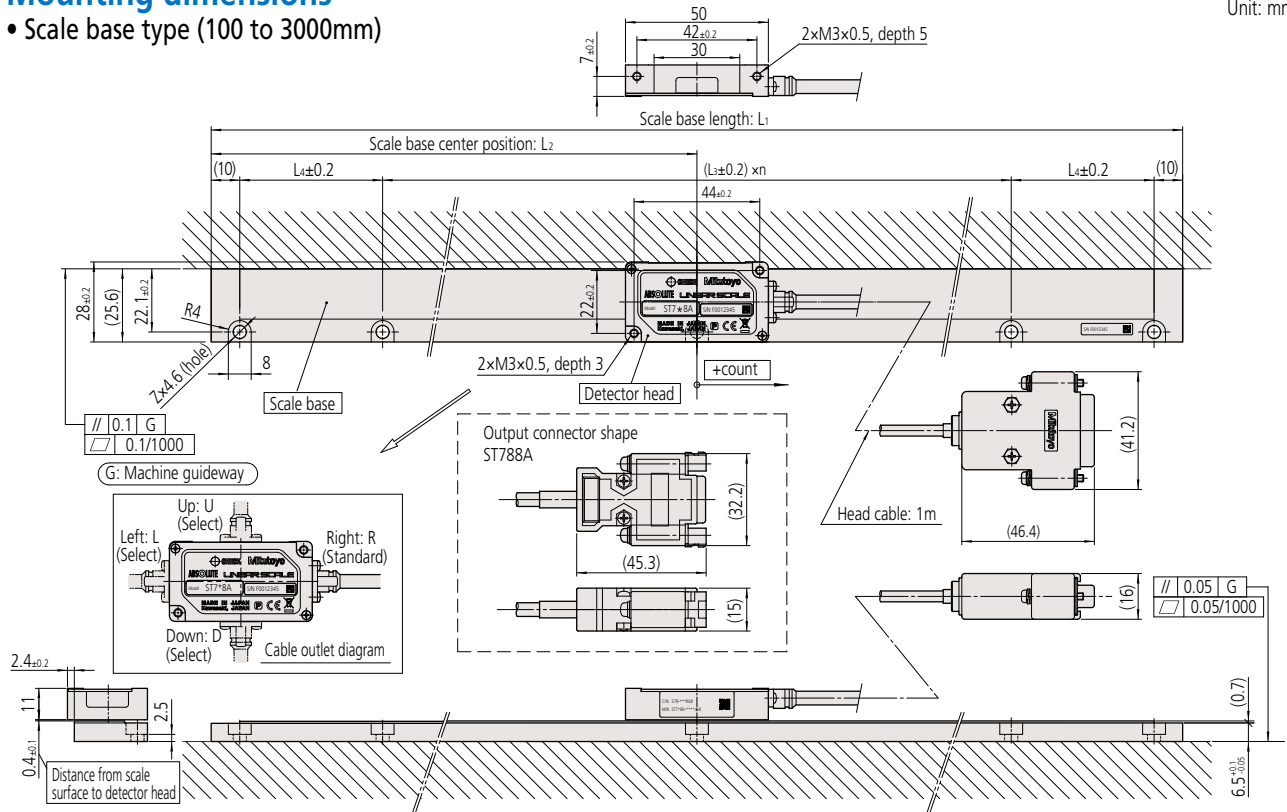
Pin No.	Signal
1	0V (GND)
2	0V (GND)
3	+5V
4	+5V
5	DT
6	DT
7	RQ
8	RQ
9	N.C
10	N.C
11	+5V
12	N.C
13	0V (GND)
14	N.C
15	F.G
Connector shell	F.G

Note: Leave test terminals (Pin No. 9 and 10) disconnected during use.

## Mounting dimensions

- Scale base type (100 to 3000mm)

Unit: mm



## Dimensions

Order No.	Code	Effective range (mm)	Maximum travel length (mm)	L <sub>1</sub> (mm)	L <sub>2</sub> (mm)	L <sub>3</sub> (mm)	n	L <sub>4</sub> (mm)	No. of mounting holes Z
579-301*	8	ST7◇8 (A) -100A-*	100	110	180	90	2	—	3
579-302*	8	ST7◇8 (A) -200A-*	200	210	280	140			
579-303*	8	ST7◇8 (A) -300A-*	300	310	380	190			
579-304*	8	ST7◇8 (A) -400A-*	400	410	480	240	4	5	
579-305*	8	ST7◇8 (A) -500A-*	500	510	580	290			
579-306*	8	ST7◇8 (A) -600A-*	600	610	680	340			
579-307*	8	ST7◇8 (A) -700A-*	700	710	780	390	6	7	
579-308*	8	ST7◇8 (A) -800A-*	800	810	880	440			
579-309*	8	ST7◇8 (A) -900A-*	900	910	980	490			
579-310*	8	ST7◇8 (A) -1000A-*	1000	1010	1080	540	8	9	
579-311*	8	ST7◇8 (A) -1100A-*	1100	1110	1180	590			
579-312*	8	ST7◇8 (A) -1200A-*	1200	1210	1280	640			
579-313*	8	ST7◇8 (A) -1300A-*	1300	1310	1380	690	10	11	
579-314*	8	ST7◇8 (A) -1400A-*	1400	1410	1480	740			
579-315*	8	ST7◇8 (A) -1500A-*	1500	1510	1580	790			
579-316*	8	ST7◇8 (A) -1600A-*	1600	1610	1680	840	12	13	
579-317*	8	ST7◇8 (A) -1700A-*	1700	1710	1780	890			
579-318*	8	ST7◇8 (A) -1800A-*	1800	1810	1880	940			
579-319*	8	ST7◇8 (A) -1900A-*	1900	1910	1980	990	14	15	
579-320*	8	ST7◇8 (A) -2000A-*	2000	2010	2080	1040			
579-321*	8	ST7◇8 (A) -2100A-*	2100	2110	2180	1090			
579-322*	8	ST7◇8 (A) -2200A-*	2200	2210	2280	1140	16	17	
579-323*	8	ST7◇8 (A) -2300A-*	2300	2310	2380	1190			
579-324*	8	ST7◇8 (A) -2400A-*	2400	2410	2480	1240			
579-325*	8	ST7◇8 (A) -2500A-*	2500	2510	2580	1290	18	19	
579-326*	8	ST7◇8 (A) -2600A-*	2600	2610	2680	1340			
579-327*	8	ST7◇8 (A) -2700A-*	2700	2710	2780	1390			
579-328*	8	ST7◇8 (A) -2800A-*	2800	2810	2880	1440	20	21	
579-328*	8	ST7◇8 (A) -2900A-*	2900	2910	2980	1490			
579-330*	8	ST7◇8 (A) -3000A-*	3000	3010	3080	1540			

The ◇ code indicates the interface specification (0,4,5,7,8).

The Order No. and the \* code indicate the direction of the head cable (R, L, U, D).

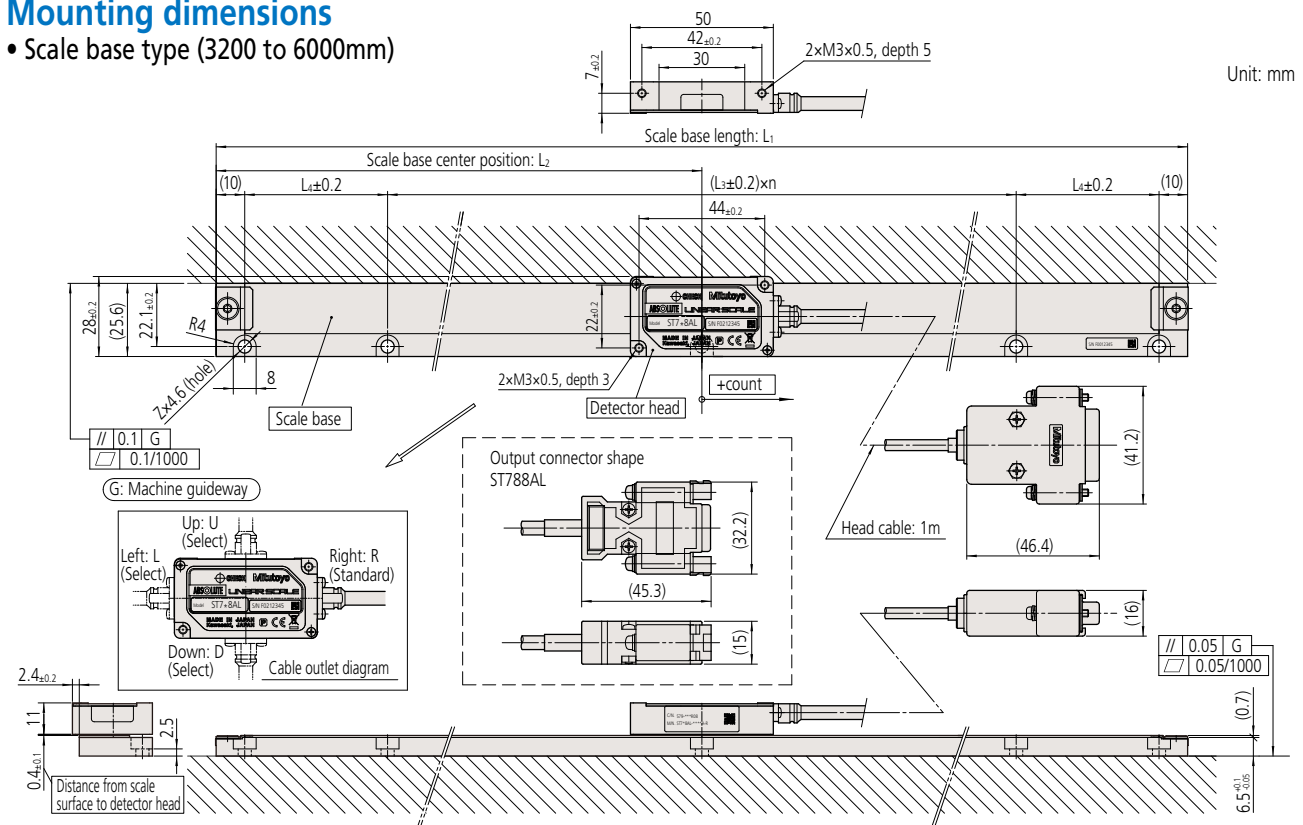
The □ in the Order No. is as described below.

ST708A: 0  
ST748A: 4  
ST748: 3  
ST758: 5  
ST778A: 7  
ST788A: 8

**Mitutoyo**

## Mounting dimensions

- Scale base type (3200 to 6000mm)



## Dimensions

Order No.	Code	Effective range (mm)	Maximum travel length (mm)	L <sub>1</sub> (mm)	L <sub>2</sub> (mm)	L <sub>3</sub> (mm)	n	L <sub>4</sub> (mm)	Z
579-331* □ 8	ST7◇8 (A) L-3200A-*	3200	3210	3280	1640	200	14	230	17
579-332* □ 8	ST7◇8 (A) L-3400A-*	3400	3410	3480	1740		16	130	19
579-333* □ 8	ST7◇8 (A) L-3600A-*	3600	3610	3680	1840		16	230	19
579-334* □ 8	ST7◇8 (A) L-3800A-*	3800	3810	3880	1940		18	130	21
579-335* □ 8	ST7◇8 (A) L-4000A-*	4000	4010	4080	2040		18	230	21
579-336* □ 8	ST7◇8 (A) L-4200A-*	4200	4210	4280	2140		20	130	23
579-337* □ 8	ST7◇8 (A) L-4400A-*	4400	4410	4480	2240		20	230	23
579-338* □ 8	ST7◇8 (A) L-4600A-*	4600	4610	4680	2340		22	130	25
579-339* □ 8	ST7◇8 (A) L-4800A-*	4800	4810	4880	2440		22	230	25
579-340* □ 8	ST7◇8 (A) L-5000A-*	5000	5010	5080	2540		24	130	27
579-341* □ 8	ST7◇8 (A) L-5200A-*	5200	5210	5280	2640		24	230	27
579-342* □ 8	ST7◇8 (A) L-5400A-*	5400	5410	5480	2740		26	130	29
579-343* □ 8	ST7◇8 (A) L-5600A-*	5600	5610	5680	2840		26	230	29
579-344* □ 8	ST7◇8 (A) L-5800A-*	5800	5810	5880	2940		28	130	31
579-345* □ 8	ST7◇8 (A) L-6000A-*	6000	6010	6080	3040		28	230	31

The ◇ code indicates the interface specification (0,4,5,7,8).

The Order No. and the \* code indicate the direction of the head cable (R, L, U, D).

The □ in the Order No. is as described below.

- ST708AL: 0
- ST748AL: 4
- ST748L: 3
- ST758L: 5
- ST778AL: 7
- ST788AL: 8

## Signal Adjusting Method When Mounting ABS ST700 Series

In order to perform signal adjustment and confirmation after the unit is mounted, conditioning is necessary using a PC and application software (ABS ST700 Signal Adjustment Program). (For conditioning, allow a travel distance of at least 60mm.) The following settings and confirmation are possible with this software:

- 1) Scale signal automatic adjustment → It is necessary to mount the scale base and detector head detector with specified dimensions.
- 2) Scale signal amplitude (signal strength) confirmation
- 3) Scale origin (absolute position data of zero) setting
- 4) Absolute position data confirmation
- 5) Error history clear
- 6) ABS resultant error checking (effective range 3200mm to 6000mm)

### • Required items

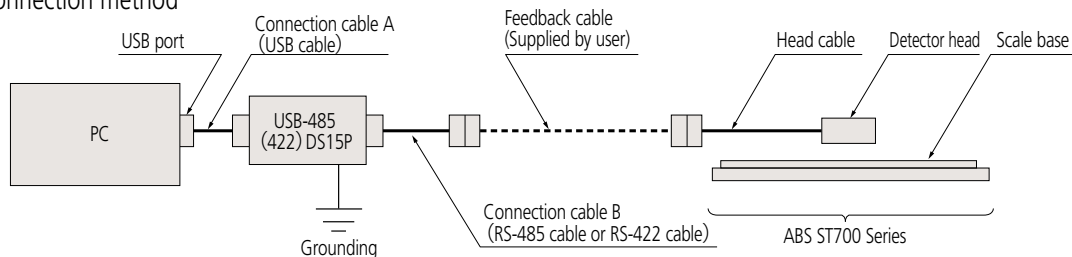
Item	Quantity	Details	Notes
PC*	1	DOS/V (Windows version)	Provided by user
Conversion unit	1	USB-485(422)DS15P (System Sacom Industry Corp.)	Option (bundle)
Connection cable A	1	USB cable	
Connection cable B	1	RS-485 cable or RS-422 cable	
Application software	1	ABS ST700 Signal Adjustment Program	

\* This program requires a PC with the following operating environment.  
 PC: DOS/V with Pentium 200 MHz or faster (with USB port)  
 Memory: 64MB min. (128MB recommended)  
 Program size: 10MB  
 OS: Windows95 or later  
 Monitor: 256 colors, 800×600 or higher (1024×768 or higher is recommended)  
 USB: COM1 is normally used (other ports can also be used)

### • "Conversion unit, application software" set

Set No.	Applicable model	Conversion unit	Connection cable B
<b>06ADZ751</b>	ST70 <input type="checkbox"/> A, ST70 <input type="checkbox"/> AL	USB-485 DS15P (main unit)	MIT cable
<b>06ADT457</b>	ST74 <input type="checkbox"/> A, ST74 <input type="checkbox"/> AL	USB-485 DS15P (main unit)	MEL-J4/J3 cable
<b>06ADP485</b>	ST77 <input type="checkbox"/> A, ST77 <input type="checkbox"/> AL ST78 <input type="checkbox"/> A, ST78 <input type="checkbox"/> AL	USB-485 DS15P (main unit)	Y/MAT cable
<b>06ADZ752</b>	ST74 <input type="checkbox"/> L, ST74 <input type="checkbox"/> L	USB-422 DS15P (main unit)	MDS cable
<b>06ADR760</b>	ST75 <input type="checkbox"/> L, ST75 <input type="checkbox"/> L	USB-422 DS15P (main unit)	FUNAC cable

### • Connection method



- \* To prevent the possibility of electric shock the device must be grounded.
- \* When using Part No.06ADZ751, connect the head cable and the connection cable B together.
- \* The conversion unit's power source is supplied via connection cable A from the PC USB port.
- \* In the "Applicable model" column, 1,2,3,4,8,9 apply to . Prepare the appropriate conversion unit and connection cable B for the scale to be used.

## Compatibility of Detector Head and Main Scale

- Note that for the ST700 series (compact type) with an effective range 3000 mm or less or 3200 mm or more, the main scale and the detector head are different so they are not compatible.
- The communication standards are different for the ST7  (L) and ST7  A (L), so they are not compatible.

Main scale		Detector head
For effective range of 3200mm to 6000mm	← Compatible →	For effective range of 3200mm to 6000mm
	← Not compatible →	
For effective range of 3000mm or less	← Compatible →	For effective range of 3000mm or less