

Featuring High Environmental Resistance Open Type Absolute Linear Scale ST700 Series

Bulletin No. 2048

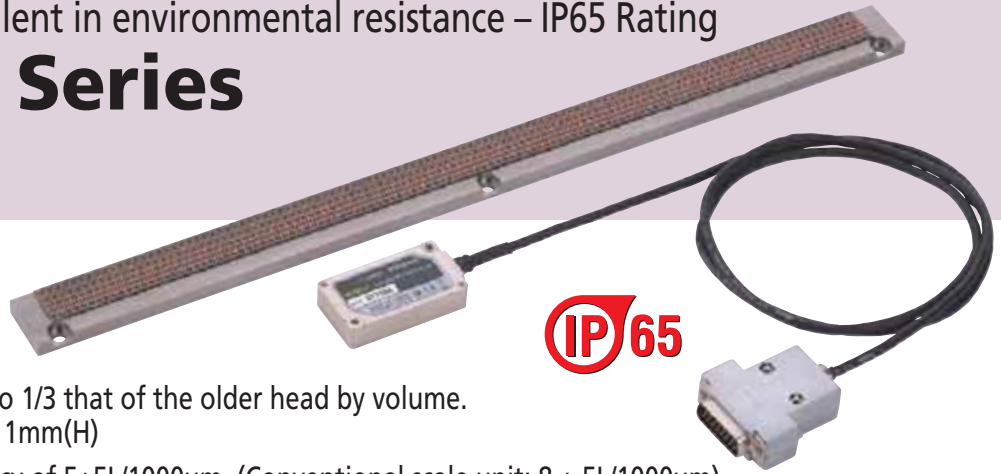


Smaller detector head (1/3 volume of older models)
ideal for building space-saving systems

Mitutoyo

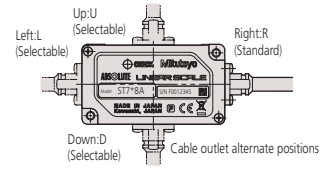
Absolute Scale Unit, excellent in environmental resistance – IP65 Rating

ABS ST700 Series (Compact Type)



Features

- Detector head downsized to 1/3 that of the older head by volume. Now 50mm(W)x28mm(D)x11mm(H)
- Improved indication accuracy of 5+5L/1000µm. (Conventional scale unit: 8 + 5L/1000µm)
- Absolute measurement has been achieved with a separate-type scale unit.
- Non-contact detection is optimal for high-speed/high acceleration control of linear motors, etc.
- Electromagnetic induction system provides high resistance to contamination by water and oil. (IP65 rating)
- Four-way cable connection port. Installation slots are provided in upper and lateral directions. (see example to right)
- Supports servo amplifiers (high-speed serial interfaces) of various brands.



Scale Model Nomenclature

ABS ST708 AL - 100 A - R

Absolute type (ABS) **Open type** (S) **Electromagnetic induction type absolute position detection system** (T) **Interface Specifications*1** (7) **Dimensions and resolution of the detector head*1** (8) **Scale base type** (A) **Cable outlet** (R)

Blank: 100mm-3000mm (L) 3200mm-6000mm (L)

Effective length: 100mm-6000mm

Communication method*
A: Half-duplex communication
BLANK: Full duplex communication
*Communication method depends on the servo amplifier that is connected.

Interface Specifications*1

0: Mitutoyo ENSIS high-speed serial ABS ST708A, ST708AL	5: FANUC Ltd. high-speed serial ABS ST758, ST758L
4: Mitsubishi Electric Corporation high speed serial ABS ST748A, ST708AL ABS ST748, ST748L	7: Panasonic Corporation, Motor business unit high-speed serial ABS ST778A, ST778AL
	8: Yaskawa Electric Corporation high-speed serial ABS ST788A, ST788AL

Dimensions and resolution of the detector head*1

8: Dimensions 50mm (W) x 28mm (D) x 11mm (H)
Resolution 0.1µm
9: Resolution 0.05µm (Available to special order)

Applicable interfaces

Applicable interfaces*1	FANUC Ltd. FS-i Series, POWER Mate i Series
	Mitsubishi Electric Corporation MELSERVO MR-J3 Series
	Mitsubishi Electric Corporation CNC Series MDS-DH Series
	Yaskawa Electric Corporation Σ-V Series (Σ-III Series)
	Panasonic Corporation, Motor business unit MINAS A4, A4A, A4P, A4N, A5 Series
	Mitutoyo ENSIS*2
	Nikki Denso Co., Ltd. VC Series
	Servoland Corporation SVF Series
	PMAC JAPAN Co., Ltd. UMAC-Turbo PMAC2

*1: For details on the applicable systems, contact the respective manufacturers.
 *2: ENSIS is a registered trademark of Mitutoyo.

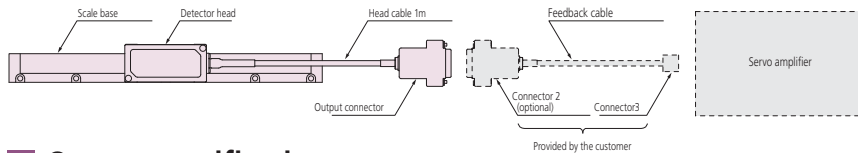


Specifications

Item	Specifications	
Resolution	0.1μm (0.05μm:Available to special order)	
Detecting method	Electromagnetic induction type absolute position detection system*	
Scale type	Open	
Maximum effective measuring length	6000mm (model dependent)	
Accuracy (at 20°C)	(5 + 5L/1000)μm; L is measured length in mm	
Maximum response speed	5 m/s	
Thermal expansion coefficient	(12.0 ± 1.5) × 10 ⁻⁶ /°C (When the mounting surface material has similar thermal expansion characteristics to cast iron or steel)	
Operating conditions	Temperature	0-50°C
	Humidity	20-80%RH
Storing conditions	Temperature	-20 to 70°C
	Humidity	20-80%RH
Power supply	5V±10% (at detector head, with ripple, spike and noise components 100mV or lower)	
Maximum current consumption	270mA (Max.)	
Vibration resistance	300m/s ² (55-2000Hz)	
Impact resistance	500m/s ² (1/2sin, 11ms)	
Head cable	Length / Diameter	1m / ø3.8mm (highly flexible cable)
	Connector	1) D-sub (15 pin male) Connector (Non-waterproof) 2) D-sub (9 pin female) Connector (Non-waterproof) : For ST788A
Maximum feedback cable length	29m (including the length of the head cable)	
Detector head mounting direction	Choice of any two orthogonal directions	
Cable outlet	Right outlet is standard. Alternatively the left, up, or down outlet may be chosen.	
EMC Directives	Compliant with CE marking	

*: Patented (Registered in Japan, the United States, India, China, Europe (UK, Germany, France, and Switzerland))

System Configuration



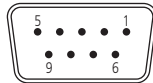
Feedback cable

- 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

Output specifications

ABS ST788A(L)

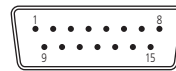
Output connector (female)
Dsub 9-pin
Compatible connector
17JE-23090-02 (D2C) (DDK) or an equivalent product (Dsub Series) can be used.



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	N.C
8	N.C
9	0V (GND)
Connector shell	F.G

ABS ST748A(L)/ST778A(L)/ST708A(L)

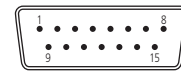
Output connector (male)
Dsub 15-pin
Compatible connector
HDAB-15S (Hirose Electric) or an equivalent product (Dsub Series) can be used.



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	N.C
10	N.C
11	+5V
12	N.C
13	N.C
14	N.C
15	F.G
Connector shell	F.G

ABS ST748(L)/ST758(L)

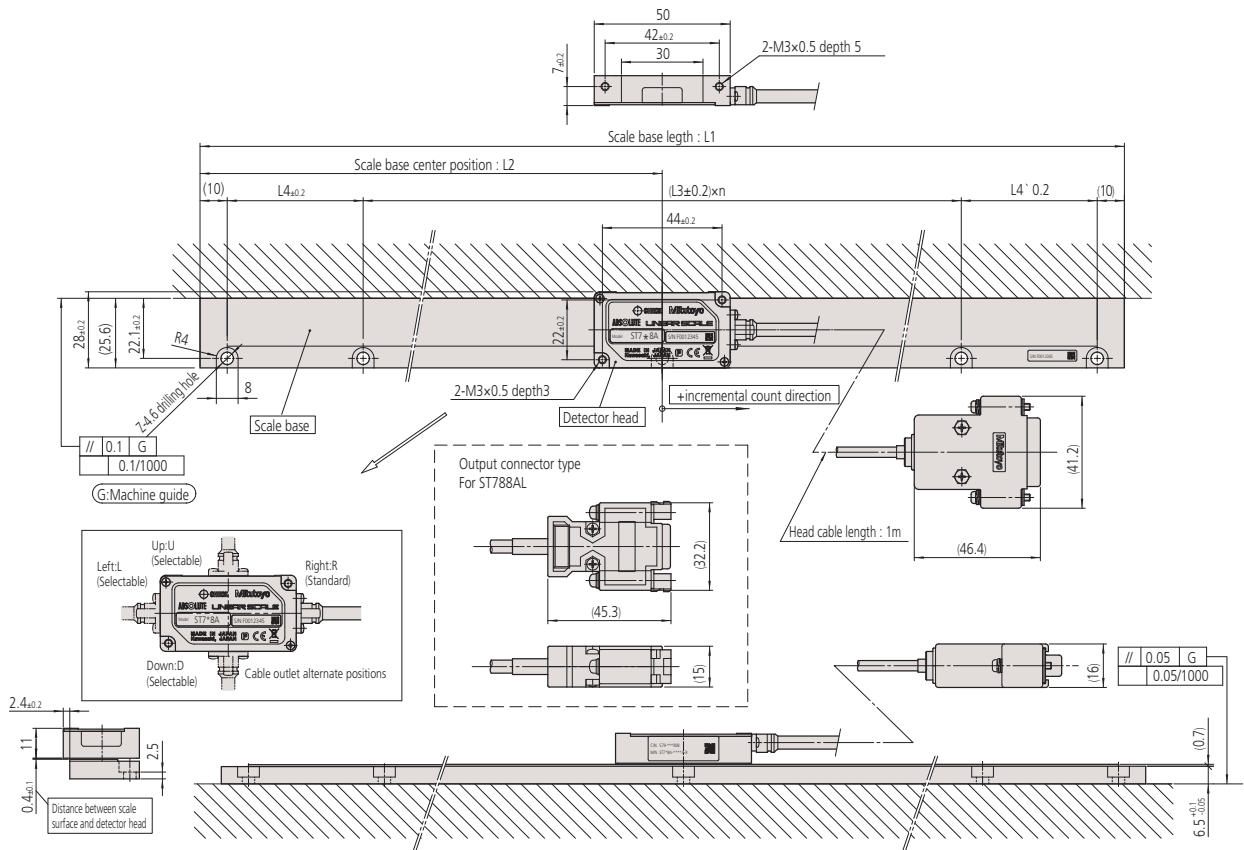
Output connector (male)
Dsub 15-pin
Compatible connector
HDAB-15S (Hirose Electric) or an equivalent product (Dsub Series) can be used.



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

Mounting Dimensions (for measuring range : 100-3000mm)

Unit : mm



Dimensions of Scale Unit

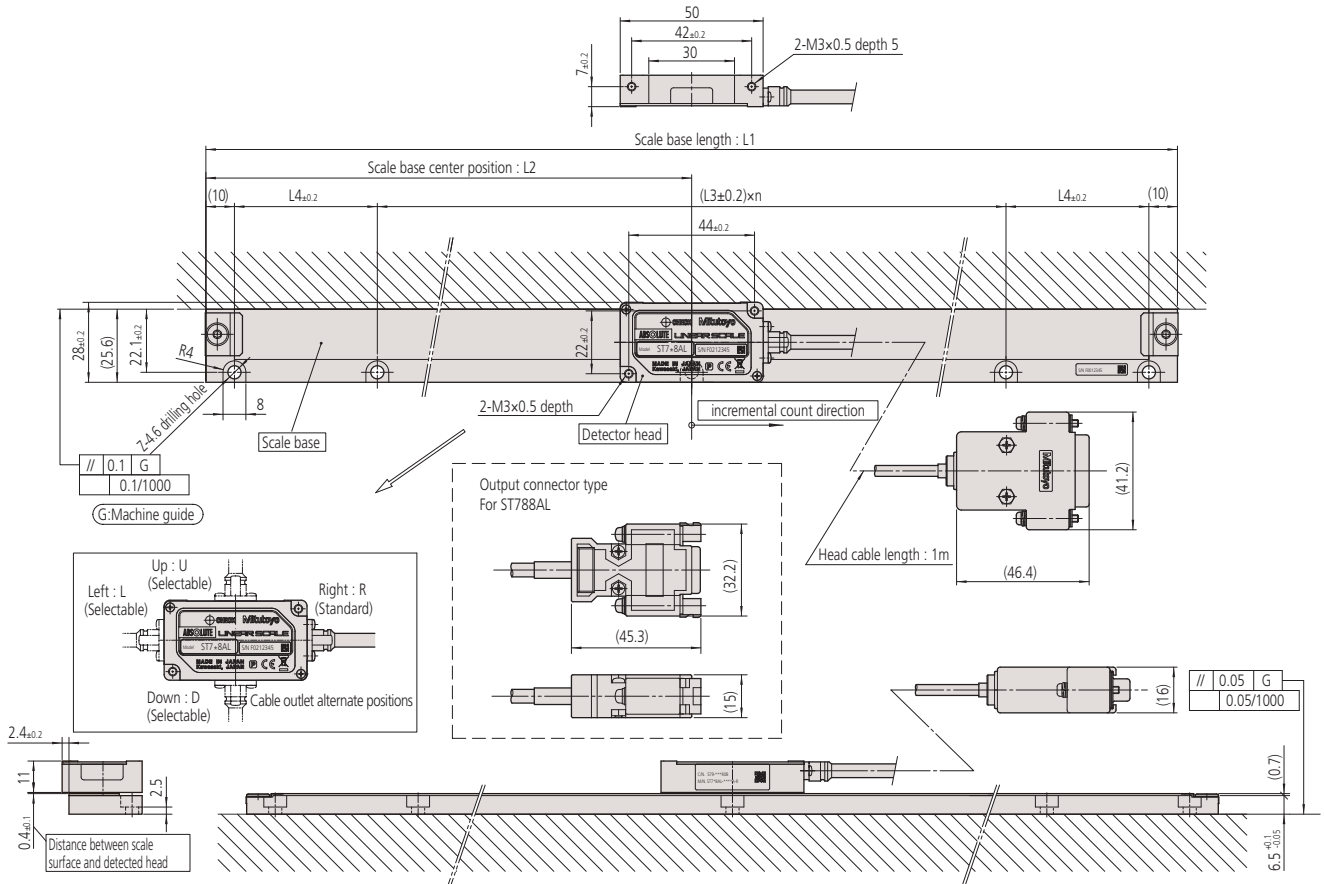
Oder No.	Code	Effective Measuring length (mm)	Maximum Travel Length (mm)	L1 (mm)	L2 (mm)	L3 (mm)	n	L4 (mm)	Z
579-301*□8	ST7□8(A)100A.*	100	110	180	90	80	2		3
579-302*□8	ST7□8(A)200A.*	200	210	280	140	130			
579-303*□8	ST7□8(A)300A.*	300	310	380	190	180			
579-304*□8	ST7□8(A)400A.*	400	410	480	240	230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

□: specifies the interface specification (0, 4, 5, 7, 8)

*: specifies the direction the cable leads out of the head (R, L, U, D)

■ Mounting Dimensions (for measuring range :3200-6000mm)

Unit : mm



■ Dimensions of Scale Unit

Order No.	Code	Effective Measuring Length (mm)	Maximum Travel Length (mm)	L1 (mm)	L2 (mm)	L3 (mm)	n	L4 (mm)	Z
579-331*□8	ST7□8 A X-3200A-*	3200	3210	3280	1640	200	14	230	17
579-332*□8	ST7□8 A X-3400A-*	3400	3410	3480	1740		16	130	19
579-333*□8	ST7□8 A X-3600A-*	3600	3610	3680	1840		16	230	19
579-334*□8	ST7□8 A X-3800A-*	3800	3810	3880	1940		18	130	21
579-335*□8	ST7□8 A X-4000A-*	4000	4010	4080	2040		18	230	21
579-336*□8	ST7□8 A X-4200A-*	4200	4210	4280	2140		20	130	23
579-337*□8	ST7□8 A X-4400A-*	4400	4410	4480	2240		20	230	23
579-338*□8	ST7□8 A X-4600A-*	4600	4610	4680	2340		22	130	25
579-339*□8	ST7□8 A X-4800A-*	4800	4810	4880	2440		22	230	25
579-340*□8	ST7□8 A X-5000A-*	5000	5010	5080	2540		24	130	27
579-341*□8	ST7□8 A X-5200A-*	5200	5210	5280	2640		24	230	27
579-342*□8	ST7□8 A X-5400A-*	5400	5410	5480	2740		26	130	29
579-343*□8	ST7□8 A X-5600A-*	5600	5610	5680	2840		26	230	29
579-344*□8	ST7□8 A X-5800A-*	5800	5810	5880	2940		28	130	31
579-345*□8	ST7□8 A X-6000A-*	6000	6010	6080	3040		28	230	31

□ : specifies the interface specification (0, 4, 5, 7, 8)

* : specifies the direction the cable leads out of the head (R, L, U, D)

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, the "ABS ST700 Signal Adjustment Program" dedicated software and a conversion unit are necessary.

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

- 1) Automatic adjustment of scale signals → The scale base and detector head must have been mounted observing the prescribed dimensions
- 2) Scale signal amplitude (signal intensity) check
- 3) Scale origin (absolute position data = 0) setting
- 4) Absolute position data check
- 5) Error history clear
- 6) ABS synthesis error check (only for models with effective measuring length of 3200mm to 6000mm).

Required Items

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

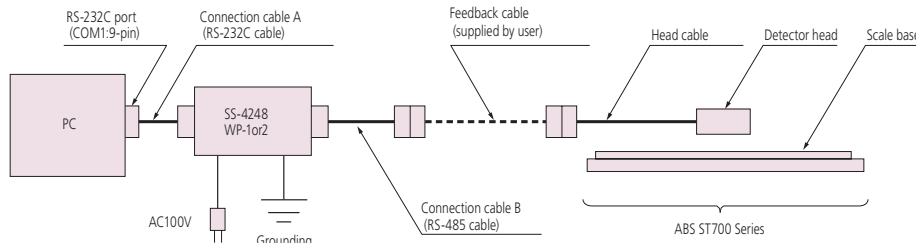
*The following defines the minimum specification of the PC necessary to run this program.
 PC : DOS/V with Pentium 200 MHz or faster (with RS-232C port)
 Memory : 64 MB min. (128 MB or more recommended)
 Program size : 10MB
 OS : Windows95 or later
 Monitor : 256 colors, 800 x 600 or higher resolution
 (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	09ZAA175	ABS ST74□A, ABS ST74□AL Note: When connected to MR-J2S.
	09ZAA177	ABS ST77□A, ABS ST77□AL, ABS ST78□A, ABS ST78□AL
	09ZAA179	ABS ST74□A, ABS ST74□AL Note: When connected to MR-J3. ABS ST70□A, ABS ST70□AL, ABS ST74□, ABS ST74□L
Power supply cable specifications	06ACN747	ABS ST75□, ABS ST75□L
	09ZAA176	ABS ST74□A, ABS ST74□AL Note: When connected to MR-J2S.
	09ZAA178	ABS ST77□A, ABS ST77□AL, ABS ST78□A, ABS ST78□AL
	09ZAA180	ABS ST74□A, ABS ST74□AL Note: When connected to MR-J3. ABS ST70□A, ABS ST70□AL, ABS ST74□, ABS ST74□L
	06ACN750	ABS ST75□, ABS ST75□L

*With 0.05 μm resolution, custom software is required.

Connection Method



*Ground the device to prevent the risk of electric shock
 *Connect the head cable with connection cable B when using "Part No.09ZAA179" and "Part No.09ZAA180".

Compatibility of Detector Head and Main Scale

For the ST700A series with effective range of 3000mm or less and the ST700AL series with effective range of 3200mm or more, note the following differences when mounting the detector head.

Please note that ST700A (100mm–3000mm range) and ST700AL (3200mm–6000mm range) detector head or scale **are not** compatible. ST700A scale and detector head are compatible. Also, ST700AL scale and detector head **are** compatible. ST700AL (3200mm–6000mm) requires signal adjustment software.

Main Scale		Detector Head
For effective range of 3200mm to 6000mm	← Compatible →	For effective range of 3200mm to 6000mm
	← Incompatible →	
For effective range of 3000mm or less	← Compatible →	For effective range of 3000mm or less

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- Vision Measuring Systems
- Form Measurement
- Optical Measuring
- Sensor Systems
- Testing Equipment and Seismometer
- Digital Scale and DRO Systems
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