


DTS-A-100 DISPLACEMENT TRANSDUCER INSTRUCTION MANUAL

Thank you for purchasing the KYOWA product. Before using it, read this instruction manual carefully. Also, keep the manual within easy reach so that you can refer to whenever necessary.
Specifications and dimensions described in this manual could be changed without notice. Please visit our website for the latest version.

1. Calling the operator's attention

The following cautionary symbols and headlines are used to invite the operator's attention. Be sure to observe the accompanying precautions in order to safeguard the operator and preserve the performance of the instrument.

	Warning Improper handling can cause serious injury to the operator.
Caution	Cautions are given to invite the operator's attention, in order to avoid instrument failure or mal-function.

2. Important notice

Unless specified, the transducer must not be used under hydrogen environment.

3. Safety Precautions



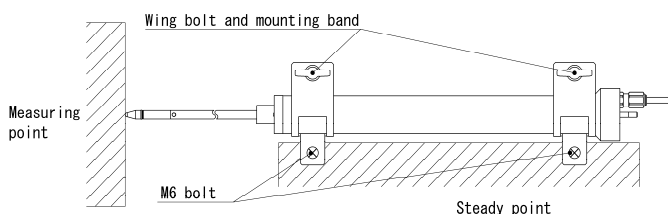
- As you push the rod inward, the rod returns to its initial position by reaction force. Handle the product with care to avoid eye poking.

4. Handling Precautions

Caution

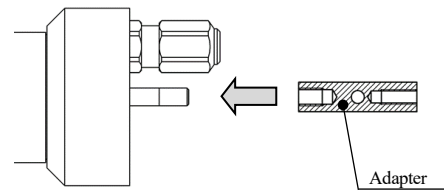
- Do not apply excessive axial or bending force on the rod.
- Do not rotate the rod. (For replacing accessories, see 9.)
- Do not disassemble the product.
- Do not use the product under water and dusty environment.
- Use the product under environment without vibration.
- Pay similar attentions toward the product as one gives to regular dial gages.
- Always keep the rod clean.
- Make sure that the bending radius of cable is longer than 10 times of a diameter of the cable.

5. Installation



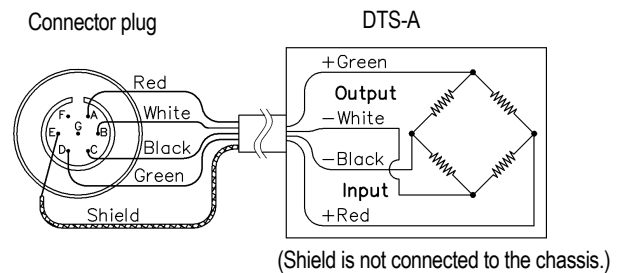
- 5.1 Fix the DTS-A to the fixed point by using the accessory 2 mounting bands (FXBP-100A), 2 wing bolts (M4×12) and M6 bolt. The M6 bolt is not included.
- 5.2 Make sure the displacement of 0.5 mm or more is applied to the DTS-A.
- 5.3 The DTS-A and dial gage measures data by contacting the probe onto the measuring point. However, some DTS-A rods may not track dynamic data correctly. Make sure the rods works correctly.
- 5.4 To fix the rod to the measuring point, remove the prove and fix the rod to the measuring point by using a screw (M2.5).

- 5.5 To measure displacement by pulling the rod, connect the accessory adapter into the rod end.



6. Connection

- 6.1 Connect the DTS-A to a measuring instrument.
- 6.2 Connect the connector plug as follows.



- 6.3 After the power ON, always preheat the product for approximately 5 to 10 minutes.

7. Conversion

- 7.1 Use the calibration constant described on the Test Data Sheet to convert a measured value into a displacement value.
- 7.2 When a strain amplifier is in use, output reads in $\times 10^{-6}$ equivalent strain. Find a displacement value corresponding to $\times 10^{-6}$ strain. Then, obtain a displacement value through multiplication using the following equation.

$$\text{Displacement (mm)} = \text{Strain amplifier's output} (\times 10^{-6} \text{ strain}) \times \text{Calibration constant (mm}/1 \times 10^{-6} \text{ strain})$$
- 7.3 When using an amplifier of other type or a recorder, first find the exact bridge exciting voltage applied. Second, find the displacement value that corresponds to 1(μV) output voltage against 1(V) bridge excitation voltage. Then, obtain the displacement value through multiplication using the following equation.

$$\text{Displacement (mm)} = \frac{\text{Bridge output voltage (}\mu\text{V)}}{\text{Bridge excitation voltage (V)}} \times \text{Calibration constant (mm}/1\mu\text{V/V)}$$

Sensitivity Decrease due to Cable Extension

If a strain-gage transducer is connected to a signal conditioner, digital indicator or strain amplifier via extension cable, we will not ignore the sensitivity decrease due to the extension cable resistance which lowers the voltage applied to the transducer.

The rated output with lowered sensitivity is obtained from the following equation:

$$\text{Rated output : } \varepsilon_0 = \left(\frac{R}{R + (r \times L)} \right) \varepsilon_i$$

- R : Transducer's input resistance (Ω)
 r : Extension cable's reciprocating resistance (Ω/m)
 L : Extension cable length (m)
 ε_i : Rated output written in the Test data sheet

8. Maintenance and inspection

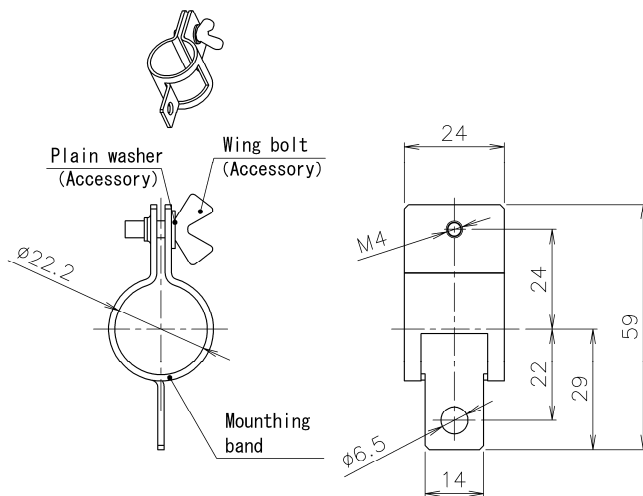
- 8.1 Avoid water, dust and oil from the product.
- 8.2 Recommend calibrate the product once a year or so. (Contact your KYOWA representative.)
- 8.3 If an abnormal initial value or reading appears, measure the resistance (between red and black) and insulation resistance (100 MΩ or higher). If abnormal resistance is found, the DTS-A may be failure. Contact KYOWA or our representatives.

Caution

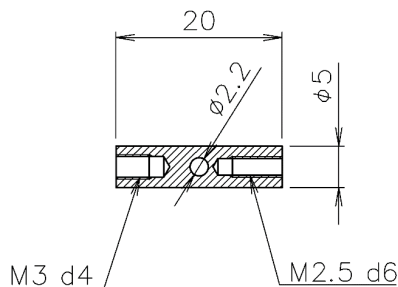
- To measure insulation resistance, apply a voltage lower than 50V to the insulation resistance tester.

9. Standard Accessories

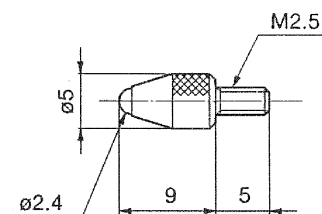
- Mounting band: FXBP-100A



- Adapter



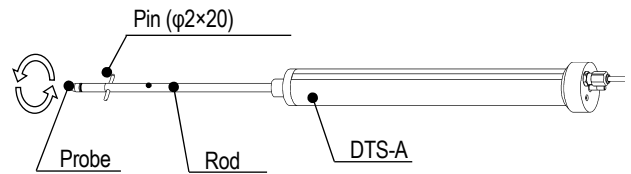
- Ballpoint probe: X-1-DT



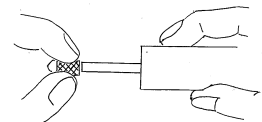
10. Special Accessories (Optional)

Caution

- Before installing probes and screws, be sure to insert the accessory pin (φ2×20) into the rod hole. While installing probes and screws, hold the pin tightly instead of holding the product. Do not apply excessive axial or bending force on the rod. Or, the product may be damaged.



Error!

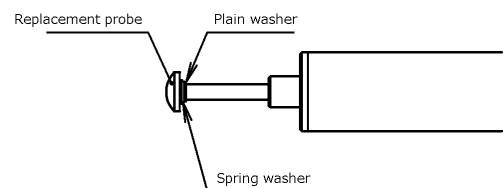


(Supplement)

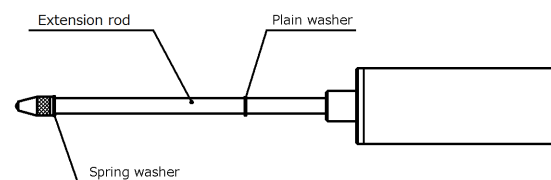
Do not rotate the probe by holding the product. Do not rotate the rod. Or, the product may be damaged.

- 10.1 To install the replacement probe (optional), use the spring washer and plain washer.
- 10.2 After installing the replacement probe or extension rod (optional), some rods may not work correctly depending on the DTS-A direction. Before measuring data, make sure the rods works correctly.

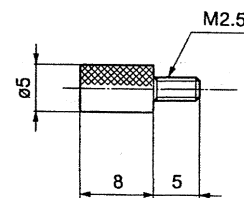
- To install the replacement probe



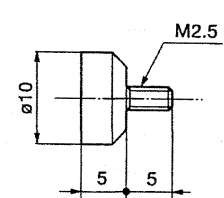
- To install the extension rod



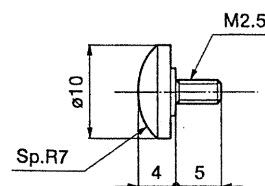
- Flat probe: XS-2-DT



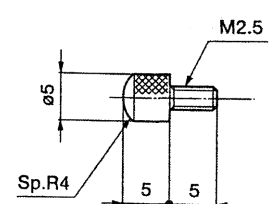
- Flat probe: XS-5-DT



- Spheric probe: XS-6-DT



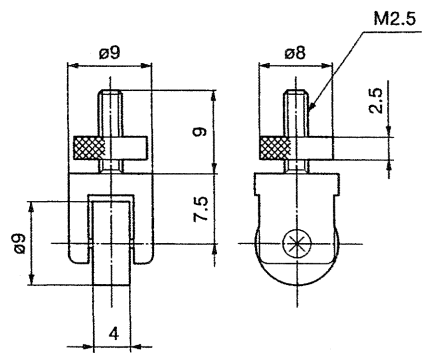
- Spheric probe: XS-105-DT



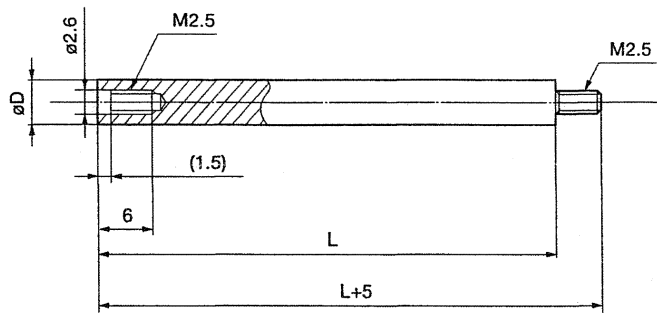
[NOTE]

When the object to be measured is sphere, use the XS-5-DT and XS-2-DT.

● Roller-equipped probe: SH-2-DT

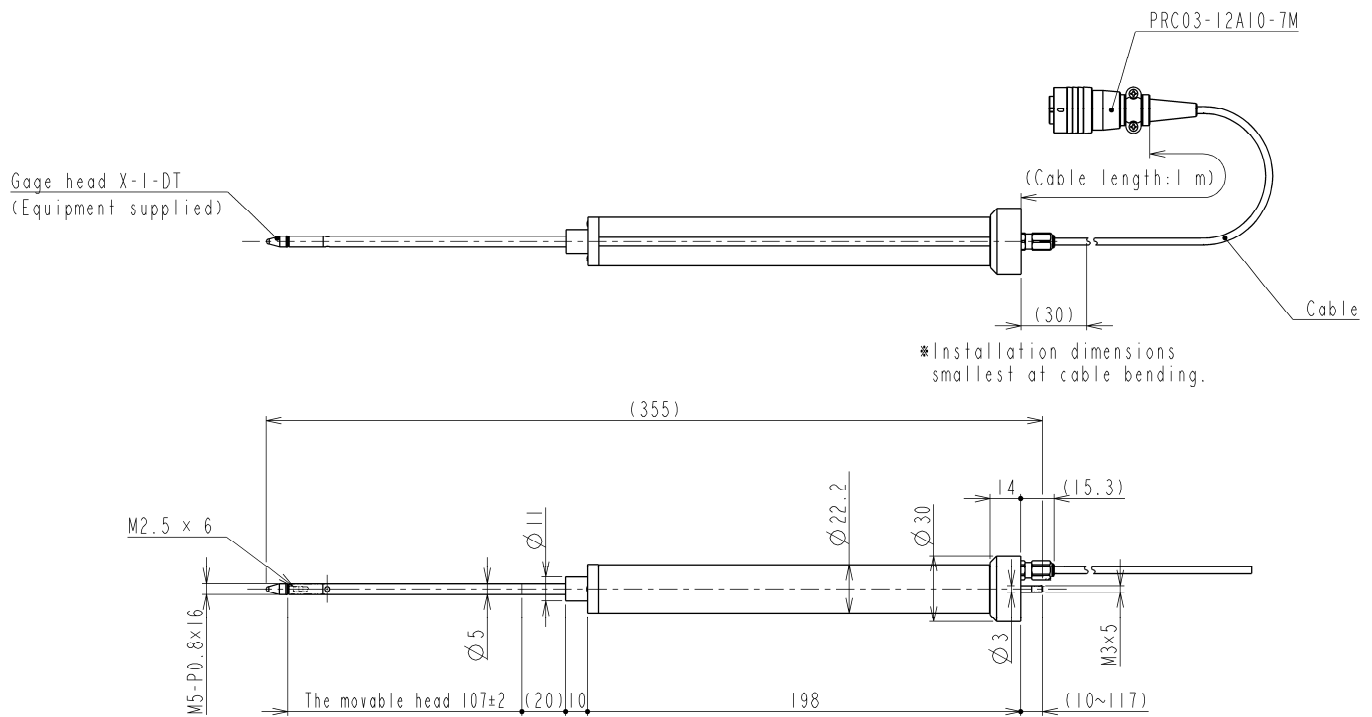


● Extension rod



Model	$\varnothing D$	L
EB-50	4	50
EB-100	5	100
EB-200	6	200
EB-300	6	300

11. Outside Drawing



12. Specifications

◆Performance		◆Accessories	
Rated Capacity	100 mm	Adapter	1
Nonlinearity	Within ±0.3%RO	Pin (φ2×20)	1
Hysteresis	Within ±0.3%RO	Ballpoint probe (X-1-DT)	1
Repeatability	0.1%RO or less	Mounting band (FXBP-100A)	2
Rated Output	2.5mV/V ±10%	Mounting band	1
		Wing bolt (M4×12)	1 ×2
		Plain washer (M4)	1
◆Environmental Characteristics		Test Data Sheet	1
Safe Temperature	-10 to 70°C(Non-condensing)	Instruction manual	1 (This book)
Compensated Temperature	0 to 60°C (Non-condensing)		
Temperature Effect on Zero	Within ±0.05%RO/°C		
Temperature Effect on Output	Within ±0.05%/°C		
◆Electrical Characteristics		◆Optional Accessories	
Safe Excitation	10V AC or DC	Extension Rods	EB-50,100,200,300
Recommended Excitation	1 to 5 VDC	Mounting Band	FXBP-100A
Input Resistance	350 ohm ±3%	Replacement Probes	X,XS,SH
Output Resistance	255 ohm ±10%		
Cable	4-conductor (0.08mm ²) vinyl shielded cable, 3.2mm diameter by 1m long, terminated with a connector plug (PRC03-12A10-7M) (Shield is not connected to the chassis.)		
◆Mechanical Properties			
Frequency Response	DC to 6Hz(When the tip is touching to the testing machine, displacement : 100mm) (Reference : DC to approx. 50Hz, when the tip is fixed, displacement:30mm)		
Measuring Force	Approx. 5 N		
Weight	Approx. 110g (Excluding Cable)		
Degree of protection	IP40 (IEC 60529)		
Compliance	Directive 2011/65/EU, (EU) 2015/863 (10 restricted substances) (RoHS)		

[NOTE]

Products with CE Marking are compliant European RoHS Directive.