

BJ-AT Joint Transducers

INSTRUCTION MANUAL

Thank you for purchasing the KYOWA product. Before using it, please read this instruction manual carefully. Also, keep the manual within easy reach so that you can refer to it whenever necessary.

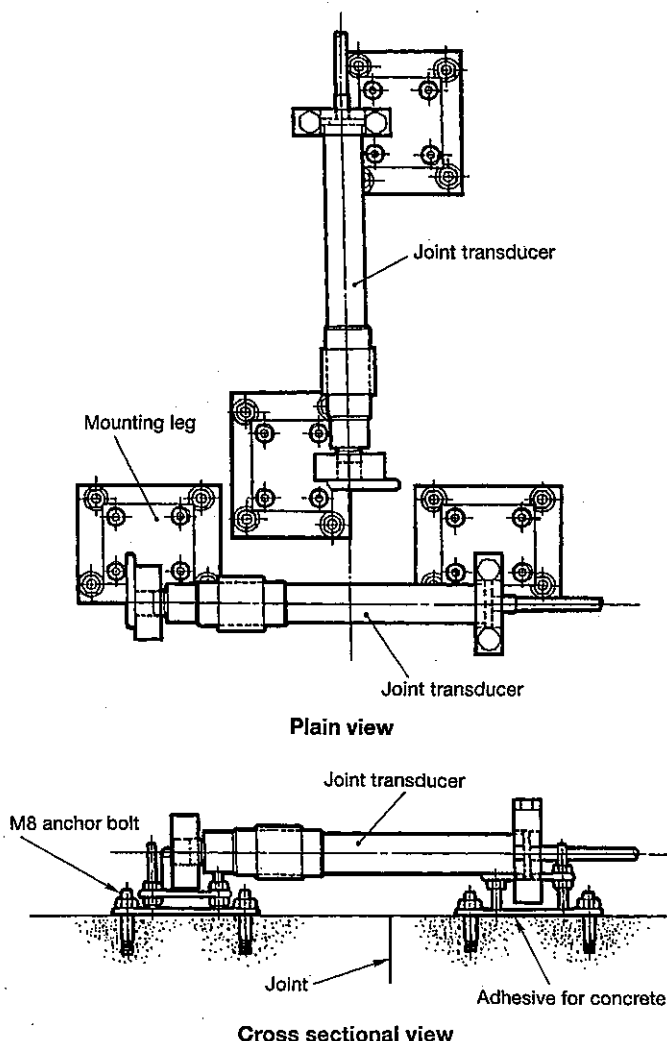
1. Installation

Two methods are available; installation on or embedment in concrete.

1.1 Installing on concrete

- The figures below show installation on concrete to measure a joint into two directions.
- Determine the proper position of the joint transducer.
- Drive the anchor bolts into concrete and fix the mounting legs to them.
- Tentatively fix the joint transducer to the mounting legs.
- Connect the joint transducer's cable to the indicator. While reading the indicator, adjust the measuring range of the transducer, then fix the transducer.
- Using the cable connection kit, connect the extension cable to the cable direct from the joint transducer.
- Measure the transducer's initial unbalance and insulation resistances to be sure that they are proper.

Installation of the joint transducer



1.2 Embedding in concrete

- Embed the joint transducer in dam concrete in a manner that it crosses two concrete blocks to measure their joint under construction. The prime purpose of this embedment is to observe the behavior of the joint at the time of joint grouting. Use the dedicated socket to embed the joint transducer. The socket acts as an anchor for one concrete block to which it is attached. By installing the transducer to the socket, relative displacement between the two blocks can be measured.

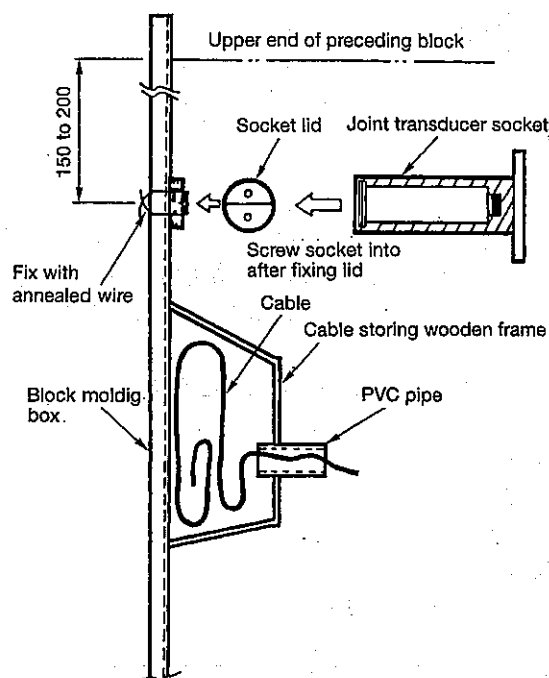


Fig.1 How to install the dedicated socket.

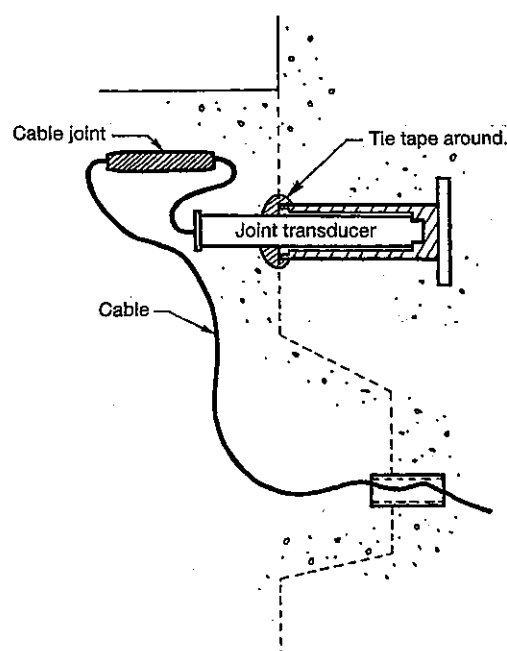


Fig.2 How to install the joint transducer

- Using the two holes in the lid of the socket, fix the socket to the preceding block embedded. At this time, be sure that the grooved lid is opposite to the molding box. If the molding box is wooden, use nails or annealing wire to fix the lid; and if the box is steel-made, make holes in the box — holes of about 3mm in diameter, then use annealing wire to fix the lid. After the lid has been fixed, screw the socket mainframe into the lid, then place concrete.
- (See Fig.1)
Before placing concrete on the other block, whose level is same as the embedded socket, remove the lid from the socket embedded previously, screw the joint transducer into the socket to fix. When placing concrete, take care not to damage the installation by a vibrator used. (See Fig. 1 and 2.)

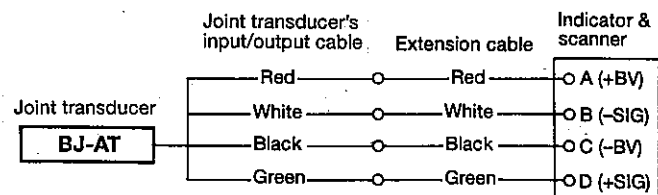
2. Handling precautions

- Check that the stress transducer's manufacturing number agrees with the calibration sheet.
- Using the tester, check that the transducer's insulation resistance is 100M Ω /50VDC or higher. Do not use a tester whose excitation voltage exceeds 50VDC.
- Using the tester, check that the transducer's input/output resistance are as follows.
Input resistance (between red and black wires): approx. 350 Ω
Output resistance (between white and green wires): approx. 450 Ω
- Avoid shocks on the transducer, or disconnection or damage may occur. If shocks should be given to the transducer, its performance stability may be adversely affected in long-term continuous operation.
- Do not twist or bend the transducer, or disconnection or damage may occur.
- If the transducer is carried by holding the cable only, the cable may be damaged to cause disconnection and/or deterioration of the insulation resistance. Measurement may thus become impossible.

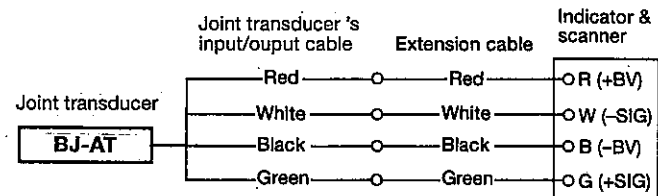
3. Connection

- Connections of the joint transducer's input/output cable and extension cable with the indicator terminals as well as with the scanner terminals are illustrated below. The indicator terminals and the scanner terminals will come with either A, B, C, D description or R, W, B, G description.

① A, B, C, D description



② R, W, B, G description



- Use the indicator selected from those listed below.

- SMD-20A
- UCAM-70A-20 (Use these in combination)
USB-70A-30
- UCAM-20PC (Use these in combination)
USB-23A
USS-23A
- UCAM-5DM99
- RMH-201A, 210A
- RDT-110A, 170A

4. Conversion

- For conversion, use the calibration factor stated in the calibration sheet.
- When a strain amplifier is used, its outputs read in $\epsilon \times 10^{-6}$ equivalent strain. Displacement corresponding to 1×10^{-6} equivalent strain is stated in the calibration sheet. Displacement can then be found through multiplication.

$$\text{Displacement} = (\text{Strain amplifier's output: } \epsilon \times 10^{-6}) \times (\text{Calibration factor: mm/}1 \times 10^{-6})$$

- When other type of amplifier or a recorder is used, it is necessary to accurately measure the bridge excitation voltage applied. The calibration sheet states displacement corresponding to $1\mu\text{V}$ voltage output against 1V bridge excitation voltage. Displacement can then be found through multiplication.

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

- Conversion of temperatures sensed by the temperature measuring function

Temperature conversion formula:

$$\text{Temperature } t = (S - S_0) \times \beta$$

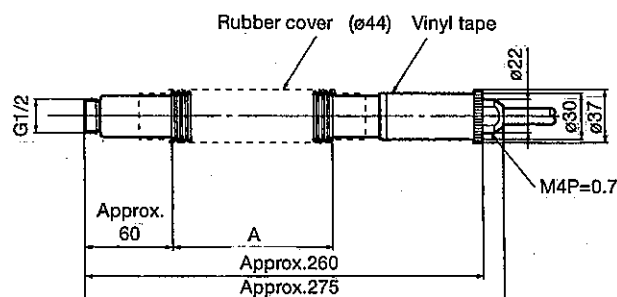
S: Temperature reading on measuring instrument ($\times 0.01\Omega$)

S₀: Reading at 0°C ($\times 0.01\Omega$)

β : Temperature coefficient ($^{\circ}\text{C}/0.01\Omega$)

5. Dimensions

Model	A
BJ-5, 10	Approx. 25
BJ-20	Approx. 50
BJ-50	Approx.100



Size tolerances not indicated above conform to JIS B 0405-C.

6. Specifications

6.1 Strain measurement

Rated capacity:	BJ-5AT: 0 ~ 5mm BJ-10AT: 0 ~ 10mm BJ-20AT: 0 ~ 20mm BJ-50AT: 0 ~ 50mm
Rated output:	1mV/V (2000 x 10 ⁻⁶ strain) or higher
Safe overload rating:	120%
Non-linearity:	±1.5%RO or better
Hysteresis:	±1.5%RO or better
Input resistance:	350Ω±3.5Ω
Output resistance:	450Ω±3.5Ω
Recommended bridge voltage:	2 to 10V, AC or DC
Compensated temp. range:	-20 to +70°C
Safe temperature range:	-30 to +80°C
Thermal effect on zero balance:	±0.05%RO/°C or better
Thermal effect on output:	±0.05%/°C or better

6.2 Temperature measurement

Rated capacity:	-30 to +70°C
Temp. meas. error:	±0.5°C (-30 to +70°C)
(Using UCAM-5D M99, UCAM-70A-20, UCAM-20PC, RMH-201A, RMH-210A, SMD-20A, RDT-110A, RDT-170A)	

6.3 Weight: Approx. 790g

6.4 Cable: 0.5mm², 4-conductor chloroprene
1m, ø11.5mm, terminated in exposed wires

■ Accessories

Calibration sheet	1
Instruction manual	1
Warranty	1
Vinyl cap	1

7. Other

If any question should arise, contact KYOWA or KYOWA representative.