INSTRUCTION MANUAL

2-WIRE POSITION TRANSMITTER
(linear motion type; 45-degree rotation)

MODEL **VOS2T**

BEFORE USE ....

Thank you for choosing us. Before use, please check contents of the package you received as outlined below.
If you have any problems or questions with the product, please contact our sales office or representatives.

■ PACKAGE INCLUDES:

VOS2T unit.....(1)
Cable, approx. 1 meter long (optional).....(1)
Cable connector (optional).....(1)
Lever assembly
- Lever.....(1)
- Connecting pin.....(1)
- Nailed nut.....(1)
- Nut with washer (M5).....(1)

Screws for attaching the lever (M5 × 8).....(1)
Plain washer (M5).....(1)
Toothed washer (M5, external teeth).....(1)

Note: Bracket and other components necessary to attach the VOS2T to an actuator are to be provided by the customer.
Clamp Set (model: VOCP) is available to simplify the connection.

■ MODEL NO.

Confirm Model No. marking on the product to be exactly what you ordered.

POINTS OF CAUTION

■ CONFORMITY WITH EU DIRECTIVES

- When the unit is mounted onto a grounded metal bracket, insert a noise filter for the output. COSEL Noise Filter Model NAC-04-472 or equivalent is recommended.

■ GENERAL PRECAUTION

- Cut power supply to the unit before wiring to it.

■ ENVIRONMENT

- Inside building. If outside, keep away from direct sunlight.
- Operating temperature -5 to +60°C (23 to 140°F)
- Operating humidity 30 to 90% RH

■ DESIGN OF MOUNTING BRACKET

- The size '*x*' indicated in Figure 2 must be longer than 10% of full-stroke of the actuator when it is in the middle position.
- The VOS2T unit must be positioned in parallel or in vertical to the actuator stroke.

■ ACTUATOR SIDE LEVER

- When the actuator side lever is provided by the customer, be sure that width of the hole threading the connecting pin is 5 millimeters or wider. Diameter of connecting pin: $5\,^{0}_{-0.03}$ mm

■ GASKET

- Be sure to return the gasket when you close the unit cover after wiring or adjustments.

■ TORQUE

- For the screws attached to the cover, tightening torque is between 1.2 and 1.6 N·m.

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COMPONENT IDENTIFICATION

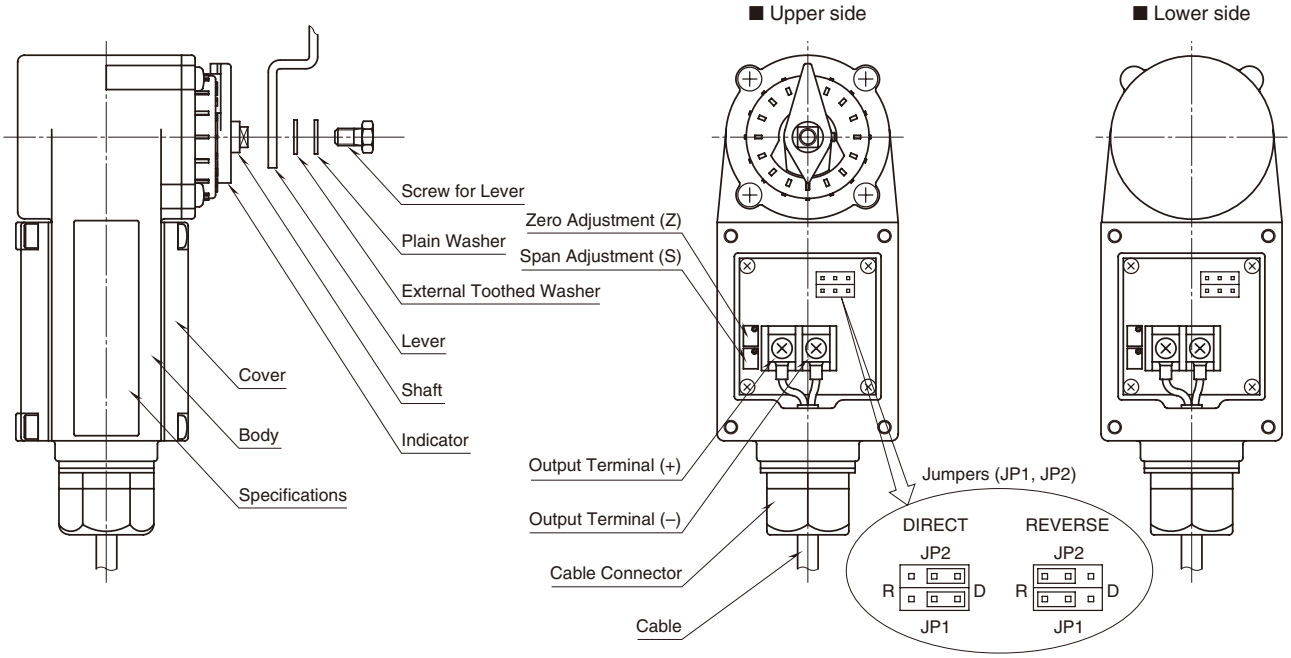

Figure 1

INSTALLATION

The output accuracy of the VOS2T is largely affected by its mechanical position relative to the actuator. The VOS2T should be installed according to the following instructions because an improper installation may lower its performance. No unnecessary strain should be applied to the VOS2T unit or the lever.

■ ATTACHING THE CONNECTING PIN TO THE VOS2T SIDE LEVER

Attach the connecting pin to the VOS2T side lever utilizing the nailed nut and the nut as in Figure 2. The nail could be positioned in either side of the lever, however it is limited to one side at the extreme end of the lever hole.

As you see in Figure 3, the output signal of the VOS2T is proportional to the sine θ of the lever angle. Position of the connecting pin is determined by the following equation.

$$R = 2.613 \times \frac{S}{2}$$

where R = Distance between the centers of pin and lever (radius)
S = Actuator stroke

Note: It is recommended to set the connecting pin at this stage to the position a little nearer to the actuator than the calculated position in order to prevent over-range rotation of the VOS2T side lever. Move it back to the correct position later in the adjustment procedure.

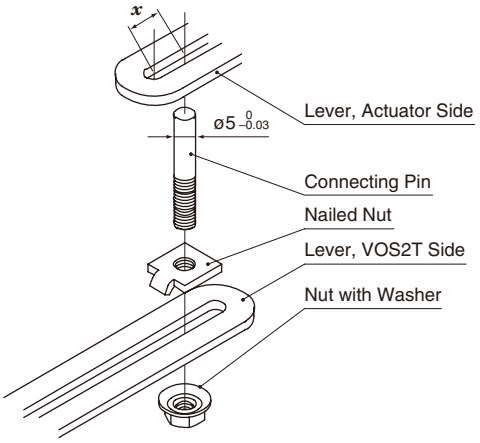

Figure 2

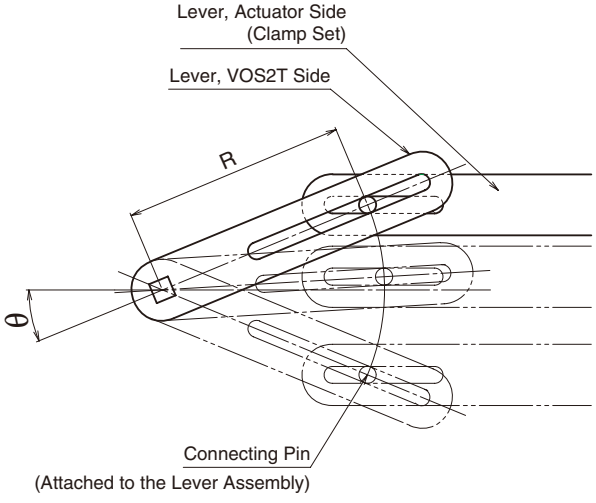

Figure 3

■ CONNECTING THE VOS2T SIDE LEVER

Connect the lever to the VOS2T unit with a screw included in the package, with a plain washer and a toothed washer between them as in Figure 1.
Lever direction can be changed by 90 degrees.

■ CONNECTING THE VOS2T UNIT TO THE ACTUATOR

Set the VOS2T unit to the position where the VOS2T output is approximately 12mA with 50% actuator position (θ = 0° in Figure 3), and where the VOS2T side lever and the actuator side lever are positioned in a straight line. See Figure 4 below. The actuator side lever should be threaded with the connecting pin but left loose. Do not fix the connecting pin to the actuator side lever.

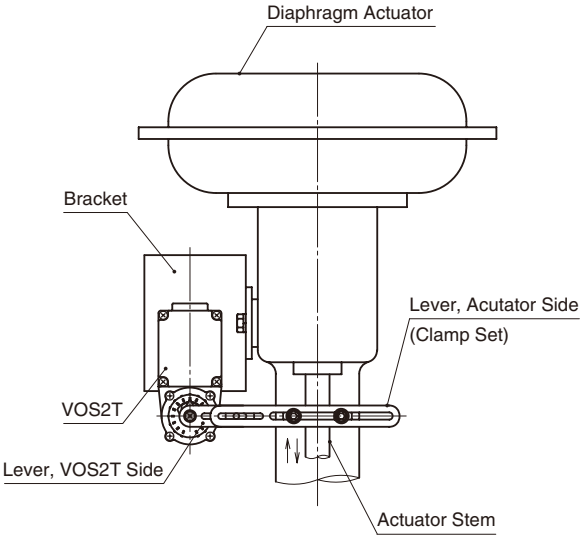

Figure 4

ELECTRICAL CONNECTIONS

Remove the VOS2T unit cover (or the terminal box cover with limit switch box option) and wire to the terminals according to Figure 5.

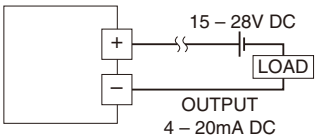

Figure 5

ADJUSTMENT PROCEDURE

Open the VOS2T unit cover. Set the action direction* with jumpers (JP1, JP2 in Figure 1) and adjust Zero (Z) and Span (S) behind it.

*Direct action: the output increases when the shaft turns clockwise (seen from the lever side).
Reverse action: the output increases when the shaft turns counterclockwise (seen from the lever side).

■ HOW TO ADJUST ZERO AND SPAN

1) If you need reverse action, change the setting now. Remove the cover and set the jumpers JP1 and JP2 to R position according to Figure 1. Factory set zero point may be slided by changing the action direction. Re-adjust according to the following.

2) First operate the actuator slowly for full-stroke and check that the VOS2T outputs approximately 0 – 100% (4 – 20mA DC) accordingly. Be sure also that the output signal increases or decreases without interruption.

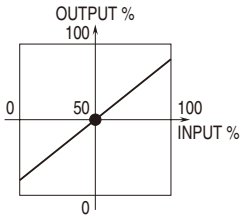

Fig. 6

3) With 50% input (actuator position), check that the output is approximately 50%. See Figure 6.

4) With 0% input, adjust the output to 0% with Zero adjustment. See Figure 7.

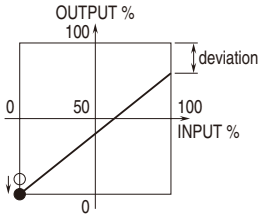

Fig. 7

5) Set the input to 100%. If there is a deviation in output signal, compensate half of the deviation via the Zero adjustment. See Figure 8.

6) With 100% input, adjust the other half of the deviation with Span adjustment in order to get 100% output. See Figure 9.

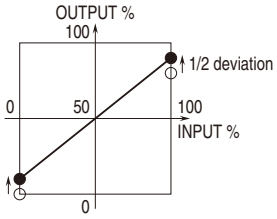

Fig. 8

7) Input 0%, 50% and 100% signals and check the output according to the respective input value. If the output value is shifted, repeat the above procedure (3) – (6).

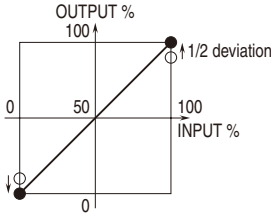

Fig. 9

Note: If you set a wider output span (narrower input span), the VOS2T does not output above or below the full-scale range.

MAINTENANCE

■ MECHANICAL PARTS

- Check that screws are fastened tightly and if some of them are loosened, be sure to re-tighten them.
  If you find the connecting pin loose, go through “ADJUSTMENT PROCEDURE” again.
- Inspect visually that the connecting section of levers is stable and smooth. Check also that the connecting pin or lever is not worn. If it is, it must be replaced. Consult us or local representative. If the abrasion advances fairly quickly, there may be a problem in the link mechanism (e.g. connecting pin position)
- If the VOS2T is installed outside the building or where it is subject to water or metallic dust particles, check that there is no crack or bruise on the gasket. If you find any, consult us or local representative.
- Consult us or local representative also for inspection of packing (O-ring) in the moving parts.

■ ELECTRICAL PARTS

- Check first the mechanical parts as above.
- Change actuator positions and input 0%, 25%, 50%, 75% and 100% signals. Check the output with respective input value is within allowance indicated in the specifications. If not, go through “ADJUSTMENT PROCEDURE” again.

LIGHTNING SURGE PROTECTION

We offer a series of lightning surge protectors for protection against induced lightning surges. Please contact us to choose appropriate models.