

**SIGNAL TRANSMITTER**  
(field-selectable range)

MODEL

**6VS**

**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:**

- Signal conditioner .....(1)
- (Option) DIN rail mounting plate (model: A-31) .....(1 set)
- (Option) Spring clip (model: A-02).....(1 set)

**■ MODEL NO.**

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

**■ INSTRUCTION MANUAL**

This manual describes necessary points of caution when you use this product, including installation, connection and basic maintenance procedures.

**POINTS OF CAUTION**

**■ GENERAL PRECAUTIONS**

- Before you remove the unit or mount it, turn off the power supply and input signal for safety.

**■ ENVIRONMENT**

- Indoor use.
- When heavy dust or metal particles are present in the air, install the unit inside proper housing with sufficient ventilation.
- Do not install the unit where it is subjected to continuous vibration. Do not subject the unit to physical impact.
- Environmental temperature must be within -5 to +70°C (23 to 158°F) with relative humidity within 30 to 90% RH in order to ensure adequate life span and operation.

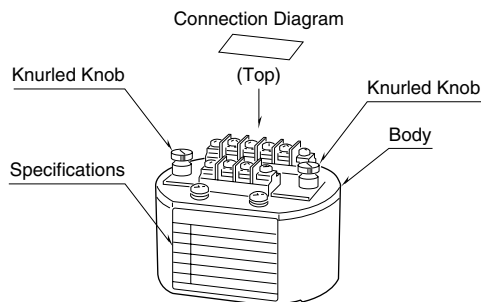
**■ WIRING**

- Do not install cables close to noise sources (relay drive cable, high frequency line, etc.).
- Do not bind these cables together with those in which noises are present. Do not install them in the same duct.

**■ AND ....**

- The unit is designed to function as soon as power is supplied, however, a warm up for 10 minutes is required for satisfying complete performance described in the data sheet.

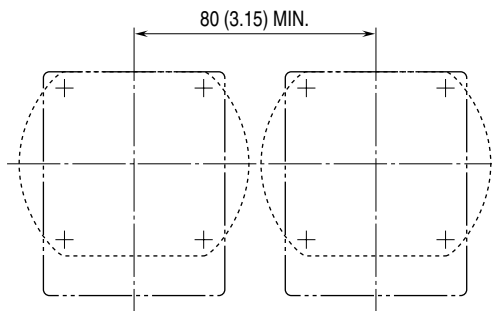
**COMPONENT IDENTIFICATION**



**INSTALLATION**

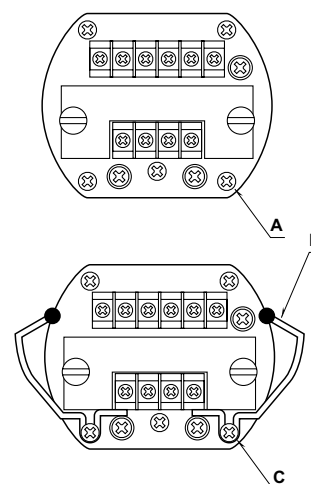
**■ 35-mm DIN RAIL MOUNTING PLATE A-31 (optional) unit: mm (inch)**

- 1) Attach the unit to the DIN rail mounting plate with screws included in the package.
- 2) Set the plate so that its DIN rail adapter is at the bottom. Hang the upper hook at the rear side on the DIN rail and push in the lower. When removing the plate, push down the DIN rail adapter utilizing minus screwdriver and pull.



**■ SPRING CLIP A-02 (optional)**

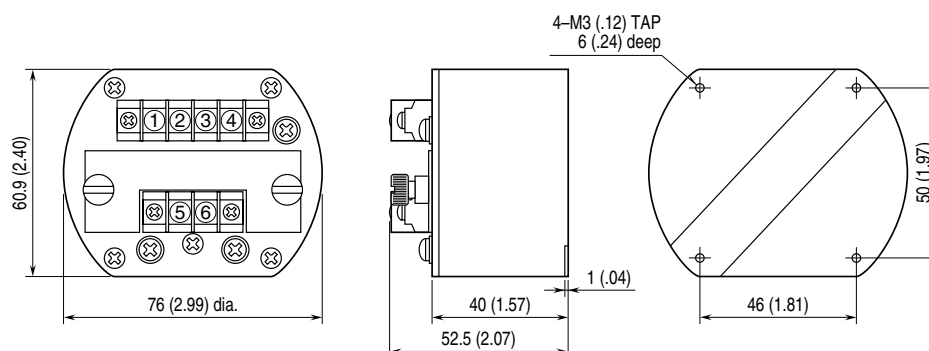
- 1) Remove the two flat-head screws **A** located at the bottom as shown to the right.
- 2) Set Spring Clip **B** on the mounting hole and tighten it as shown to the right with a binding screw **C** included in the package.
- 3) Check that the clips contract and release smoothly.



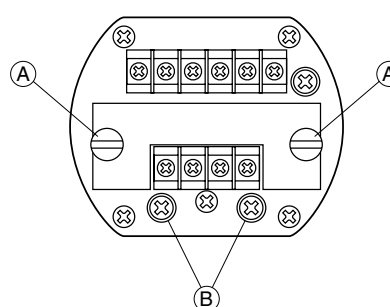
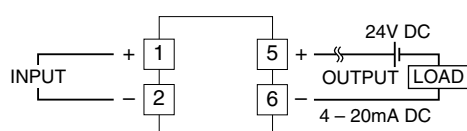
## TERMINAL CONNECTIONS

Connect the unit as in the diagram below or refer to the connection diagram on the top of the unit.

### EXTERNAL DIMENSIONS unit: mm (inch)



### CONNECTION DIAGRAM



## WIRING INSTRUCTIONS

### SCREW TERMINAL

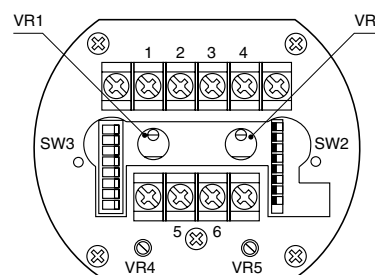
Torque: 0.6 N·m

## CHECKING

- 1) Terminal wiring: Check that all cables are correctly connected according to the connection diagram.
- 2) Input: Check that the input signal is within 0 – 100% of the full-scale.
- 3) Output: Check that the load is within the permissible limit including wiring resistance.

$$\text{Load Resistance } (\Omega) = \frac{\text{Supply Voltage (V)} - 13 \text{ (V)}}{0.02 \text{ (A)}}$$

(including leadwire resistance)



SW2 : Zero Bias Selector  
 SW3 : Span Gain Selector  
 VR1 : 0% Adjustment (fine)  
 VR2 : 100% Adjustment (fine)  
 VR5 : 0% Adjustment (coarse)  
 VR4 : 100% Adjustment (coarse)

## ADJUSTMENT PROCEDURE

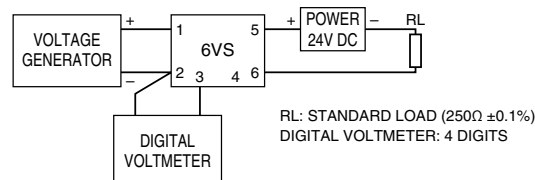
This unit is calibrated at the factory to meet the ordered specifications, therefore you usually do not need any calibration.

For matching the signal to a receiving instrument or in case of regular calibration, adjust the output as explained in the following. Zero and Span adjustments are located behind the top cover. Release the knurled knobs and open the cover.

### PREPARATION

- 1) Loosen Screw (A) on top and open the covering.
- 2) Remove Screw (B) so that internal adjustment potentiometers are exposed.

- 3) Make wiring as shown below. Turn power supply on, and warm up for about 10 minutes.



### Requirements for Calibration Equipment

**Voltage Generator:** Must be able to generate mV.

Accuracy ±0.02% or better required.

**Digital Voltmeter:** 4-digit meter.

Accuracy ±0.01% or better required.

All calibration equipment must meet or exceed the above mentioned specifications. We do not guarantee this product's stated accuracies and specifications if these calibration requirements are not met.

**INPUT BIAS ADJUSTMENT (0% input or lower range value)**

- 1) Connect a voltmeter across the front terminal 3 (+) and 2 (-).
- 2) With minimum (0%) input, adjust SW2 to appropriate positions – nearest to desired value – according to Table 1 to Table 3 [INPUT BIAS SELECTION TABLE], and adjust output reading to  $0 \pm 0.002V$  with VR5 (zero-coarse adjustment).
- 3) With minimum (0%) input, adjust output to  $0 \pm 0.05%$  with VR1 (zero-fine adjustment).

**INPUT RANGE ADJUSTMENT (100% input or upper range value)**

- 4) With maximum (100%) input, adjust SW3 to appropriate positions according to Table 4 to Table 6 [INPUT RANGE SELECTION TABLE], and adjust output to  $100 \pm 0.05%$  with VR4 (span-coarse adjustment) and VR2 (span-fine adjustment).
- 5) With minimum (0%) input, check that input is  $0 \pm 0.05%$ . When the ZERO point is changed, repeat the procedure 1) to 4).

**OUTPUT ZERO & SPAN ADJUSTMENT**

- 1) ZERO: Apply 0% input and adjust output to 0% with the VR1.
- 2) SPAN: Apply 100% input and adjust output to 100% with the VR2.
- 3) Check ZERO adjustment again with 0% input.
- 4) When ZERO value is changed, repeat the above procedure 1) – 3).

**MAINTENANCE**

Regular calibration procedure is explained below:

**CALIBRATION**

Warm up the unit for at least 10 minutes. Apply 0%, 25%, 50%, 75% and 100% input signal. Check that the output signal for the respective input signal remains within accuracy described in the data sheet. When the output is out of tolerance, recalibrate the unit according to the “ADJUSTMENT PROCEDURE” explained earlier.

**LIGHTNING SURGE PROTECTION**

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

**TABLES****INPUT BIAS SELECTION TABLE****[TABLE 1] Input Span 3 to 100mV**

SW2								WEIGHT OF BIT
1	2	3	4	5	6	7	8	
1	1	0	0	0	0	0	0	+129mV
1	0	1	0	0	0	0	0	+ 64mV
1	0	0	1	0	0	0	0	+ 32mV
1	0	0	0	1	0	0	0	+ 16mV
1	0	0	0	0	1	0	0	+ 8mV
1	0	0	0	0	0	1	0	+ 4mV
1	0	0	0	0	0	0	1	+ 2mV
1	0	0	0	0	0	0	0	+ 0mV
0	1	1	1	1	1	1	1	- 2mV
0	1	1	1	1	1	1	0	- 4mV
0	1	1	1	1	1	0	1	- 6mV
0	1	1	1	1	0	1	1	- 10mV
0	1	1	1	0	1	1	1	- 18mV
0	1	1	0	1	1	1	1	- 34mV
0	1	0	1	1	1	1	1	- 66mV
0	0	1	1	1	1	1	1	-131mV

**[TABLE 2] Input Span 100 to 1000mV**

SW2								WEIGHT OF BIT
1	2	3	4	5	6	7	8	
1	1	0	0	0	0	0	0	+650mV
1	0	1	0	0	0	0	0	+325mV
1	0	0	1	0	0	0	0	+163mV
1	0	0	0	1	0	0	0	+ 82mV
1	0	0	0	0	1	0	0	+ 41mV
1	0	0	0	0	0	1	0	+ 21mV
1	0	0	0	0	0	0	1	+ 11mV
1	0	0	0	0	0	0	0	+ 0mV
0	1	1	1	1	1	1	1	- 10mV
0	1	1	1	1	1	1	0	- 21mV
0	1	1	1	1	1	0	1	- 31mV
0	1	1	1	1	0	1	1	- 51mV
0	1	1	1	0	1	1	1	- 91mV
0	1	1	0	1	1	1	1	-172mV
0	1	0	1	1	1	1	1	-330mV
0	0	1	1	1	1	1	1	-650mV

**[TABLE 3] Input Span 1 to 10V**

SW2								WEIGHT OF BIT
1	2	3	4	5	6	7	8	
1	1	0	0	0	0	0	0	+7080mV
1	0	1	0	0	0	0	0	+3540mV
1	0	0	1	0	0	0	0	+1770mV
1	0	0	0	1	0	0	0	+ 890mV
1	0	0	0	0	1	0	0	+ 440mV
1	0	0	0	0	0	1	0	+ 210mV
1	0	0	0	0	0	0	1	+ 100mV
1	0	0	0	0	0	0	0	+ 0mV
0	1	1	1	1	1	1	1	- 120mV
0	1	1	1	1	1	1	0	- 240mV
0	1	1	1	1	1	0	1	- 350mV
0	1	1	1	1	0	1	1	- 560mV
0	1	1	1	0	1	1	1	-1000mV
0	1	1	0	1	1	1	1	-1900mV
0	1	0	1	1	1	1	1	-3660mV
0	0	1	1	1	1	1	1	-7220mV

Note 1: The SW2-1 is turned ON (1) with suppressed zero range, while it is turned OFF (0) with elevated zero range.

Note 2: With suppressed zero range, weight of bit (mV) is added by turning ON (1) each one of the SW2-8 to SW2-2, while with elevated zero range, it is added by turning OFF (0) the same.

For example, in [1 – 10V] span (TABLE 3), 1V bias (zero suppression) is nearly obtained by turning on SW2-1 (positive), SW2-5 and SW2-8 (890mV + 100mV = 990mV).

### INPUT RANGE SELECTION TABLE

[TABLE 4] Input Span 3 to 100mV

SW3								GAIN	SPAN [mV] 100%IN – 0%IN
1	2	3	4	5	6	7	8		
1	1	1	1	1	1	1	1	1 – 2	50 – 100
1	1	1	1	1	1	1	0	2 – 3	33 – 50
1	1	1	1	1	1	0	1	3 – 4	25 – 33
1	1	1	1	1	1	0	0	4 – 5	20 – 25
1	1	1	1	1	0	1	1	5 – 6	16.7 – 20.0
1	1	1	1	1	0	1	0	6 – 7	14.3 – 16.7
1	1	1	1	1	0	0	1	7 – 8	12.5 – 14.3
1	1	1	1	1	0	0	0	8 – 9	11.1 – 12.5
1	1	1	1	0	1	1	1	9 – 10	10.0 – 11.1
1	1	1	1	0	1	1	0	10 – 11	9.0 – 10.0
1	1	1	0	1	1	1	1	11 – 12	8.3 – 9.0
1	1	1	0	1	1	1	0	12 – 13	7.7 – 8.3
1	1	1	0	1	1	0	1	13 – 14	7.3 – 7.7
1	1	1	0	1	1	0	0	14 – 15	6.7 – 7.3
1	1	1	0	1	0	1	1	15 – 16	6.3 – 6.7
1	1	1	0	1	0	1	0	16 – 17	5.9 – 6.3
1	1	1	0	1	0	0	1	17 – 18	5.6 – 5.9
1	1	1	0	1	0	0	0	18 – 19	5.3 – 5.6
1	1	1	0	0	1	1	1	19 – 20	5.0 – 5.3
1	1	1	0	0	1	1	0	20 – 21	4.8 – 5.0
1	1	0	1	1	1	1	1	21 – 22	4.5 – 4.8
1	1	0	1	1	1	1	0	22 – 23	4.3 – 4.5
1	1	0	1	1	1	0	1	23 – 24	4.2 – 4.3
1	1	0	1	1	1	0	0	24 – 25	4.0 – 4.2
1	1	0	1	1	0	1	1	25 – 26	3.8 – 4.0
1	1	0	1	1	0	1	0	26 – 27	3.7 – 3.8
1	1	0	1	1	0	0	1	27 – 28	3.5 – 3.7
1	1	0	1	1	0	0	0	28 – 29	3.4 – 3.5
1	1	0	1	0	1	1	1	29 – 30	3.3 – 3.4
1	1	0	1	0	1	1	0	30 – 31	3.2 – 3.3
1	1	0	0	1	1	1	1	31 – 32	3.1 – 3.2
1	1	0	0	1	1	1	0	32 – 33	3.0 – 3.1

Note 1: Turning SW3 OFF (0) in negative logic adds an weight of bits.

Note 2: Gain indicates the multiplying factor adjustable with SW3.

[TABLE 5] Input Span 100 to 1000mV

SW3								GAIN	SPAN [V] 100%IN – 0%IN
1	2	3	4	5	6	7	8		
1	1	1	1	1	1	1	1	1 – 2	0.05 – 1.00
1	1	1	1	1	1	1	0	2 – 3	0.35 – 0.50
1	1	1	1	1	1	0	1	3 – 4	0.27 – 0.35
1	1	1	1	1	1	0	0	4 – 5	0.21 – 0.27
1	1	1	1	1	0	1	1	5 – 6	0.18 – 0.21
1	1	1	1	1	0	1	0	6 – 7	0.15 – 0.18
1	1	1	1	1	0	0	1	7 – 8	0.13 – 0.15
1	1	1	1	1	0	0	0	8 – 9	0.12 – 0.13
1	1	1	1	0	1	1	1	9 – 10	0.11 – 0.12
1	1	1	1	0	1	1	0	10 – 11	0.10 – 0.11

Note 1: Turning SW3 OFF (0) in negative logic adds an weight of bits.

Note 2: Gain indicates the multiplying factor adjustable with SW3.

[TABLE 6] Input Span 1 to 10V

SW3								GAIN	SPAN [V] 100%IN – 0%IN
1	2	3	4	5	6	7	8		
1	1	1	1	1	1	1	1	1 – 2	5.0 – 10.0
1	1	1	1	1	1	1	0	2 – 3	3.5 – 5.0
1	1	1	1	1	1	0	1	3 – 4	2.7 – 3.5
1	1	1	1	1	1	0	0	4 – 5	2.1 – 2.7
1	1	1	1	1	0	1	1	5 – 6	1.8 – 2.1
1	1	1	1	1	0	1	0	6 – 7	1.5 – 1.8
1	1	1	1	1	0	0	1	7 – 8	1.3 – 1.5
1	1	1	1	1	0	0	0	8 – 9	1.2 – 1.3
1	1	1	1	0	1	1	1	9 – 10	1.1 – 1.2
1	1	1	1	0	1	1	0	10 – 11	1.0 – 1.1

Note 1: Turning SW3 OFF (0) in negative logic adds an weight of bits.

Note 2: Gain indicates the multiplying factor adjustable with SW3.