

OPERATION MANUAL

THE JENCO MODEL 3677 1/8 DIN pH/ORP CONTROLLER

JENCO ELECTRONICS, LTD.

MANUFACTURER OF PRECISION INSTRUMENTS

GENERAL INTRODUCTION

The model 3677 is a precise instrument for the measurement and control of pH and mV (ORP).

Two output relays are provided in the model 3677 for ON/OFF control. The isolated 4-20 mA output current of the model 3677 covers the input range of 0 to 14 pH and 0 to 1400 mV.

A front panel programmable HIGH/LOW ALARM relay is provided in the model 3677.

A large LCD display is used for readability under bright ambient conditions.

The model 3677 is housed in a rugged 1/8 DIN plastic case, allowing it to fit into standard panel cut-outs as well as the most commonly available industrial weatherproof and environmental housings.

INITIAL INSPECTION

Carefully unpack the instrument and accessories. Inspect for damage in shipment. If any damage is found, NOTIFY YOUR JENCO REPRESENTATIVE IMMEDIATELY. All packing materials should be saved until satisfactory operation is confirmed.

TEMPERATURE COMPENSATION

The model 3677 is designed to be used with a PT-100 RTD temperature probe for automatic temperature compensation, ATC, operations. The alpha value of the PT-100 element is 0.00385.

A precision 0.1% resistor can be connected across the ATC input terminals to simulate a fixed process temperature.

Temperature in	Resistor value in Ohms
0	100.00
10	103.90
20	107.79
25	109.73
30	111.67
40	115.54
50	119.40
60	123.24
70	127.07
80	130.89
90	134.78
100	138.50

Table 1

REAR PANEL CONNECTION PROCEDURE

(REFER TO FIGURE 1 AND FIGURE 2)

1. Connect the AC line to the rear terminal of the instrument. The instrument can be powered by 115VAC or 230VAC, 50/60Hz. Make sure that the EARTH terminal is connected to the earth of AC power line.
2. Connect the proper load to the output relays. Be sure that the load does not exceed the relay rating, 5 Amp at 115VAC and 2.5 Amp at 230VAC for RESISTIVE load only.
3. Set the pH/mV switch to the position for pH or mV operations. (REFER TO FIGURE 3)
4. Load connections

Connect the proper load to 4-20 mA output terminals. Make sure that the load impedance is less than 550 Ohms and the common mode voltage does not exceed 500 VDC.
(Output terminals : OUT + and OUT -)

5. Electrode connections

1) Combination pH (mV) electrodes

Connect the pH (mV) electrode cable to the pH/mV electrode input connector.

2) Separate pH (mV) electrodes

Connect the working electrode to the pH/mV electrode input connector.

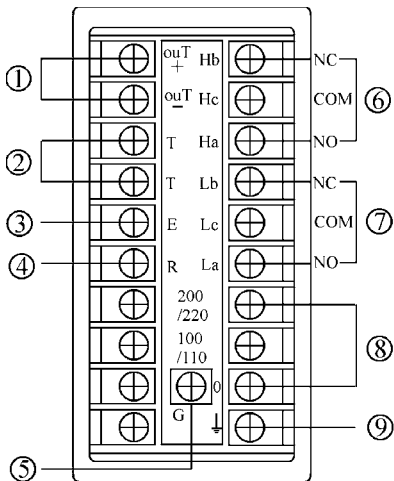
Connect the reference electrode to the Reference input terminal.

6. Temperature compensation input connections

1) ATC mode

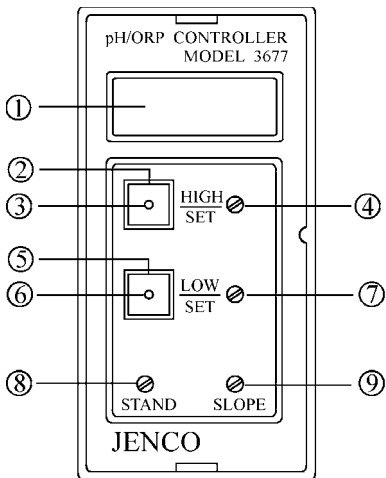
Connect the automatic temperature compensation, ATC, probe to the ATC input terminals, T-T.

2) A precision 0.1% resistor can be connected across the ATC terminals to simulate a fixed process temperature. (REFER TO TABLE 1)



1. Isolated 4-20 mA output
2. ATC probbe input
3. Shield
4. Reference electrode input
5. pH/mV electrode input
6. HIGH ALARM output relay
7. LOW ALARM output relay
8. AC power input
9. EARTH terminal

FIGURE 1 FRONT PANEL FORMAT



- 1. LCD display
- 2. HIGH SET POINT switch
- 3. HIGH SET POINT LED
- 4. HIGH SET POINT control
- 5. LOW SET POINT switch
- 6. LOW SET POINT LED
- 7. LOW SET POINT control
- 8. pH STANDARDIZATION control
- 9. pH SLOPE control

FIGURE 2 REAR PANEL FORMAT

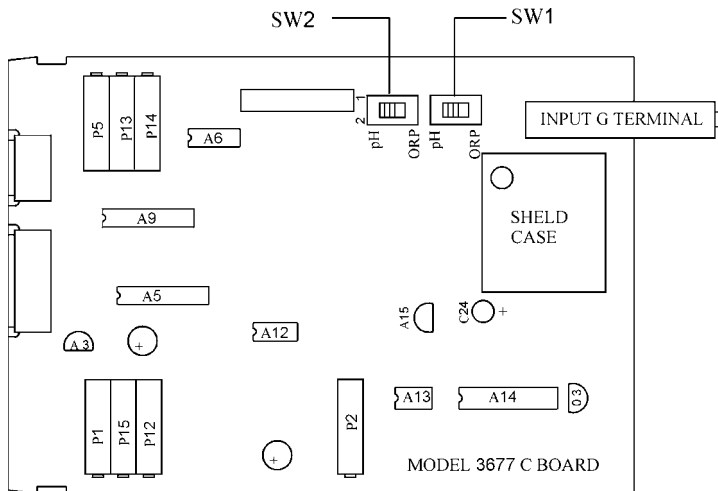


FIGURE 3 pH/ORP SWITCH SETTING

MOUNTING PROCEDURE

1. Make a cutout on any panel, with a thickness of 1/16 inch (1.5 mm) to 3/8 inch (9.5 mm) . (REFER TO FIGURE 4)
2. Remove the mounting brackets assembly from the panel meter and insert the panel meter into the cutout. (REFER TO FIGURE 5)
3. Replace the mounting brackets assembly onto the panel meter and fasten the mounting screws to secure the panel meter to the mounting panel. (REFER TO FIGURE 6)

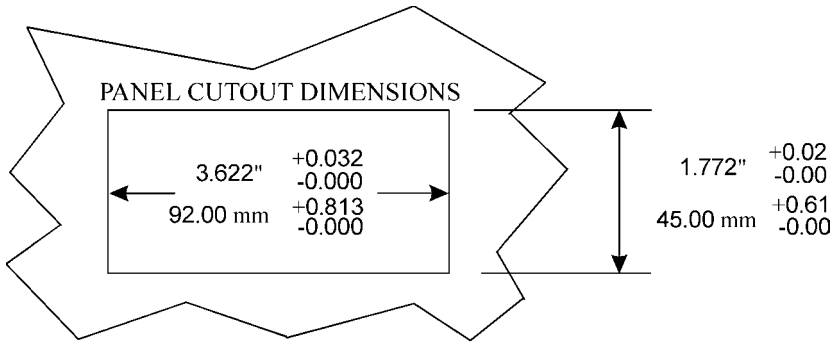


FIGURE 4 PANEL CUTOUT

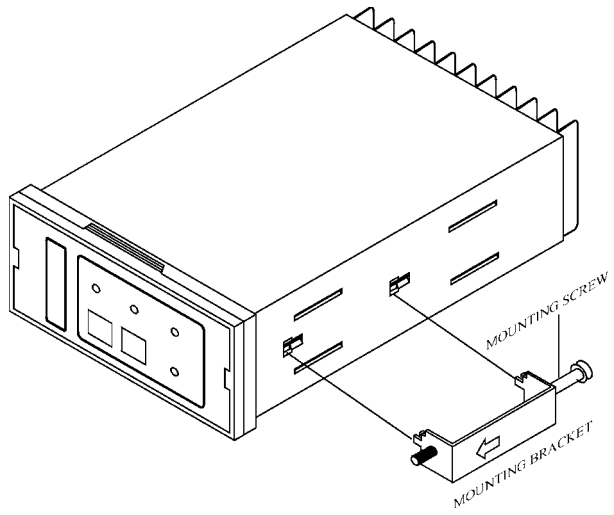


FIGURE 5 PANEL METER WITH MOUNTING BRACKET AND SCREW

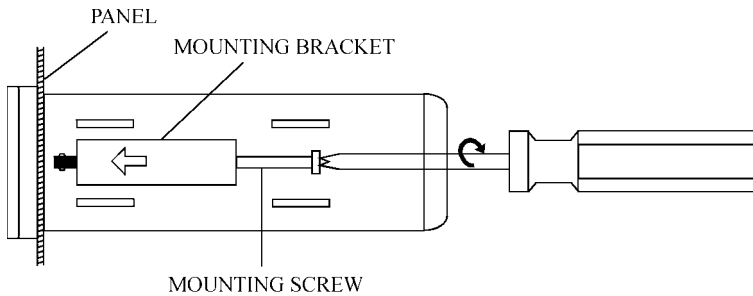


FIGURE 6 MOUNTING METHOD

pH CALIBRATION

(REFER TO REAR PANEL CONNECTION PROCEDURE AND TEMPERATURE COMPENSATION SECTIONS)

1. Rinse the pH electrode and ATC probe with distilled water.
2. Measure the temperature of the buffer 7 solution with a precision thermometer.
3. Immerse the pH electrode and ATC/TEMP probe in buffer 7. Allow sufficient time for the electrode and ATC probe to reach temperature equilibrium with the buffer 7.
4. Adjust the STAND control for the instrument to display the buffer value corresponding to the temperature measured in 2. (REFER TO TABLE 2)
5. Remove the pH electrode and ATC probe from buffer 7 and rinse with distilled water.
6. Measure the temperature of a second buffer with a precision thermometer.
7. Immerse the pH electrode and ATC probe in the second buffer. Allow sufficient time for the pH electrode and ATC probe to reach temperature equilibrium with the second buffer. For accurate pH measurements, the second buffer should be close in pH and temperature values to process under test. In practice, pH buffers 4 and 10 are commonly used.
8. Adjust the SLOPE control for the instrument to display the buffer value corresponding to the temperature measure in 6. (REFER TO TABLE 2)
9. Remove the pH electrode and ATC probe from the second buffer and rinse with distilled water. The instrument is dual point calibrated and ready for measurement.

TEMPERATURE COEFFICIENT OF THE pH BUFFERS

BUFFERS

	10.01	7.00	4.01
0	10.32	7.11	4.00
5	10.25	7.08	4.00
10	10.18	7.06	4.00
15	10.12	7.03	4.00
20	10.06	7.01	4.00
25	10.01	7.00	4.01
30	9.97	6.98	4.02
35	9.93	6.98	4.02
40	9.89	6.97	4.03
45	9.86	6.97	4.04
50	9.83	6.97	4.06
55	9.80	6.97	4.07
60	9.78	6.98	4.10

TABLE 2

ISOLATION VOLTAGE

The differential voltage between the outputs and the load should not exceed the maximum values. Exceeding maximum values may cause permanent damage to the instrument and load.

1. Relay output

The maximum isolation voltage of the relay output contacts is 1500VDC. The voltage differential between the relay output contacts and the load should not exceed 1500 VDC.

2. Current output

The maximum isolation voltage of the 4-20 mA output is 500 VDC. The voltage differential between the 4-20 mA output and the load should not exceed 500 VDC.

CONTROLLER OUTPUT FEATURES OF THE MODEL 3677

The output of the model 3677 consists of two alarm relays and an isolated 4-20 mA output. The operation of the 3677 is described in the following sections.(REFER TO FIGURE 1, FIGURE 2)

CONTROLLER INPUT RANGE

1. Relay outputs
 - pH 0 to 14.00 pH
 - mV § 1999mV
2. Current output
 - pH 0 to 14.00 pH
 - mV 0 to 14.00 mV

ALARM RELAY AND LED LAMP FORMATS

1. HIGH ALARM set point
 - 1) Press the HIGH ALARM SET POINT switch. The instrument will indicate the alarm set point value. The alarm set point value can be adjusted by the HIGH ALARM SET POINT control.
 - 2) Release the HIGH ALARM SET POINT switch. The instrument will indicate the measured process value.
 - 3) The HIGH ALARM SET POINT LED will be ON and the HIGH ALARM output relay will be energized when the measured value is greater than the alarm set point value. The HIGH ALARM SET POINT LED will be OFF and the HIGH ALARM output relay will be de-energized when the measured value is

less than the alarm set point value.

2. LOW ALARM set point

- 1) Press the LOW ALARM SET POINT switch. The instrument will indicate the alarm set point value. The alarm set point value can be adjusted by the LOW ALARM SET POINT control.
- 2) Release the LOW ALARM SET POINT switch. The instrument will indicate the measured process value.
- 3) The LOW ALARM SET POINT LED will be ON and the LOW ALARM output relay will be energized when the measured value is less than the alarm set point value. The LOW ALARM SET POINT LED will be OFF and the LOW ALARM output relay will be de-energized when the measured value is greater than the alarm set point value.

3. Set point hysteresis

The hysteresis of the model 3677 is factory set to ± 0.1 pH (± 10 mV). FOR HIGH ALARM set points, the trigger ON point is 0.1 pH (10 mV) above the set point values and the trigger OFF point is 0.1 pH (10 mV) below the set point values. FOR LOW ALARM set points, the trigger ON point is 0.1 pH (10 mV) below the set point values and the trigger OFF point is 0.1 pH (10 mV) above the set point values.

ISOLATED 4-20 mA OUTPUT

1. pH mode output

The 4-20 mA output is 4 mA at 0 pH and 20 mA at 14 pH. The pH value can be obtained by measuring the output current, A, based on the following equation.

(REFER TO FIGURE 7)

$$\text{pH} = (A-4) \div (14/16)$$

$$\text{Example : } A = 12 \text{ mA for pH} = 7.00$$

2. mV mode output

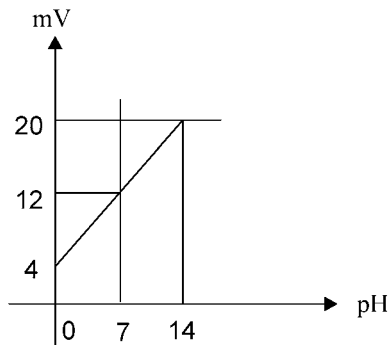
The 4-20 mA output is 4 mA at 0 mV and 20 mA at 1400 mV. The mV value can be obtained by measuring the output current, A, based on the following equation (REFER

TO FIGURE 7)

$$\text{mV} = (A-4) \div (1400/16)$$

$$\text{Example : } A = 12 \text{ mA for mV} = 700$$

pH MODE



mV MODE

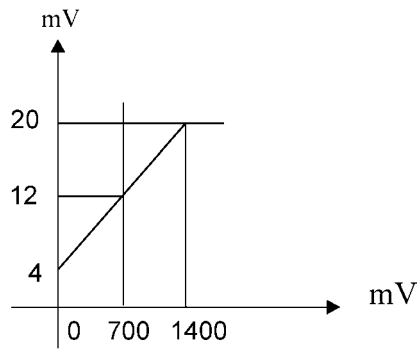


FIGURE 7

WARRANTY

Jenco Instruments, Ltd. Warrants this product to be free from significant deviations in material and workmanship for a period of 1 year from date of purchase. If repair or adjustment is necessary and has not been the result of abuse or misuse, within the year period, please return—freight-prepaid and the correction of the defect will be made without charge. If you purchased the item from our Jenco distributors and it is under warranty, please contact them to notify us of the situation. Jenco Service Department alone will determine if the product problem is due to deviations or customer misuse.

Out-of—warranty products will be repaired on a charge basis.

RETURN OF ITEMS

Authorization must be obtained from one of our representatives before returning items for any reason. When applying for authorization, please have the model and serial number handy, including data regarding the reason for return. For your protection, items must be carefully packed to prevent damage in shipment and insured against possible damage or loss. Jenco will not be responsible for damage resulting from careless or insufficient packing. A fee will be charged on all unauthorized returns.

NOTE: Jenco Instruments, Inc reserves the right to make improvements in design, construction, and appearance of our products without notice.

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