

# OPERATION MANUAL

---

JENCO MODEL 3679  
pH/ORP CONTROLLER

**JENCO** ELECTRONICS, LTD.  
MANUFACTURER OF PRECISION INSTRUMENTS

## **TABLE OF CONTENTS**

	Page
INITIAL INSPECTION	2
GENERAL INTRODUCTON	2
THE METER	3-5
TEMPERATURE COMPENSATION	5
REAR PANEL CONNECTION	6
MOUNTING PROCEDURES	7
pH CALIBRATION	7
TEMPERATURE COEFFICIENT OF THE pH BUFFERS	8
ISOLATION VOLTAGE	8
OUTPUT LOAD	9
CONTROLLER OUTPUT FEATURES	9
CONTROLLER INPUT RANGE	9
ALARM RELAY AND LED FORMATS	10
ISOLATED 4-20 mA OUTPUT	11
WARRANTY	11

## INITIAL INSPECTION

Carefully unpack the instrument and accessories. Inspect for damages during shipment. If any damage is found, notify your Jenco representative immediately. All packing materials should be saved until satisfactory operation is confirmed.

## GENERAL INTRODUCTION

The model 3679 is a precision instruments for the measurement and control of pH and mV(ORP).

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

The instrument is housed in a rugged 1/4 DIN, IP67 plastic case, providing protection against harsh industrial environmental conditions. The design of the housing allows the meters to fit into standard 1/4 DIN panel cutouts.

# THE METER

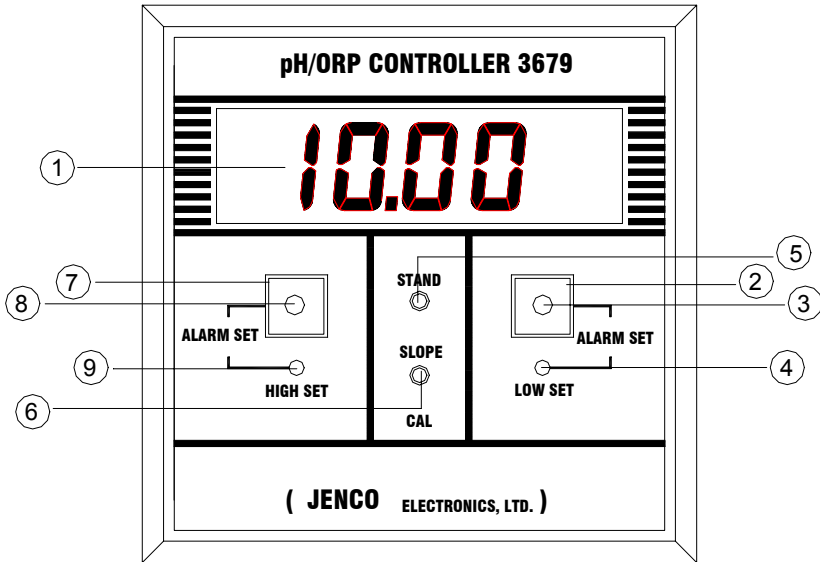


FIGURE 1

1. LCD DISPLAY
2. LOW ALARM SET POINT SWITCH
3. LOW ALARM SET POINT LED
4. LOW ALARM SET POINT CONTROL
5. pH(mV) STANDARDIZATION CONTROL
6. pH(mV) SLOPE CONTROL
7. HIGH ALARM SET POINT SWITCH
8. HIGH ALARM SET POINT LED
9. HIGH ALARM SET POINT CONTROL

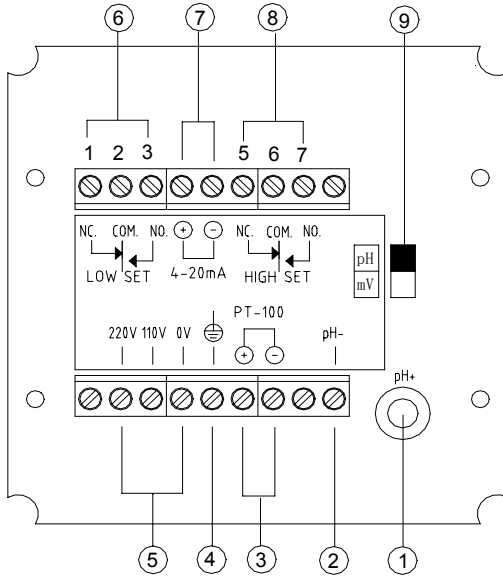


FIGURE 2

1. pH/mV ELECTRODE INPUT
2. REFERENCE ELECTRODE INPUT
3. ATC PROBE INPUT
4. EARTH
5. AC POWER INPUT
6. LOW SET POINT RELAY OUTPUT
7. ISOLATED 4-20 mA OUTPUT
8. HIGH SET POINT RELAY OUTPUT
9. pH/mV MODE

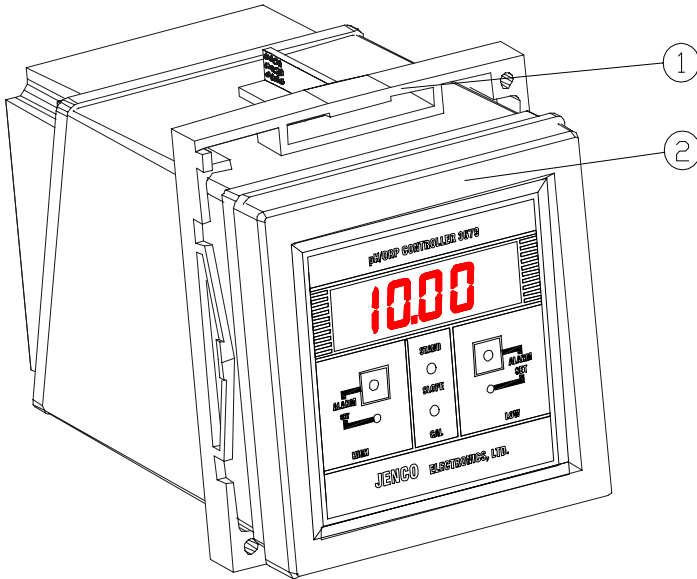


FIGURE 3

1. MOUNTING BRACKET
2. MODEL 3679 METER

## TEMPERATURE COMPENSATION

These meters are designed to be used with a PT-100 RTD temperature probe for Automatic Temperature Compensation (ATC) operations. The alpha value of 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.

Table 1

Temperature °C	Resistor value Ω
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

## REAR PANEL CONNECTION

Refer to FIGURE 2.

1. Connect the AC line to the rear terminals of the instrument. The instrument can be powered by 110V AC or 220V AC, 50/60Hz. Make sure that the EARTH terminal is connected to the earth lead of the 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 110V AC and 2.5 Amp at 220V AC for RESISTIVE load only.
3. Set the pH/mV switch to the position for pH or mV operations.
4. Load Connections: Connect the proper load to the 4-20 mA output terminals. Make sure that the load impedance is less than 550 Ω and the common mode voltage does not exceed 500V DC.
5. Electrode Connections: Connect the pH(mV) electrode to the pH/mV ELECTRODE INPUT connector. Connector reference electrode to the REFERENCE ELECTRODE INPUT.
6. Temperature Compensation Input Connections: In the ATC mode, connect temperature probe to the ATC input terminals. A precision

0.1% resistor can be connected across the ATC terminals to simulate a fixed process temperature. Refer to TABLE 1.

## MOUNTING PROCEDURE

1. Make a cutout of 93.1 mm X 93.1 mm on any mounting panel.
2. Remove the mounting bracket assembly from the panel meter and insert the panel meter into the cutout
3. Replace the mounting bracket assembly onto the panel meter and push the mounting bracket towards the mounting panel until the meter is securely attached on to the mounting panel.

## pH CALIBRATION

Refer to FIGURE 2 and TEMPERATURE COMPENSATION.

1. Rinse the pH electrode and ATC probe with distilled water.
2. Measure the temperature of the first buffer solutions with a precision thermometer.
3. Immerse the pH electrode and ATC/TEMP probe in buffer 7. Allow sufficient time for the pH 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 step 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 the process under test. In practice, pH buffer 4 and 10 are commonly used.



8. Adjust the SLOPE control for the instrument to display the buffer value corresponding to the temperature measured in step 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 is now ready for measurements.

## TEMPERATURE COEFFICIENT OF THE pH BUFFERS

°C	BUFFERS		
	10.01	7.00	4.01
0	10.32	7.11	4.00
5	10.25	7.08	4.003
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 the maximum values may cause permanent damage to the instrument and load.

### 1. Relay Output:

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

## 2. Current Output:

The maximum isolation voltage of the 4-20 mA output is 500V DC. The voltage differential between the 4-20 mA output load and the pH(mV) electrode input should not exceed 500V DC.

## OUTPUT LOAD

### 1. Relay Output:

The current through the relay output contacts should not exceed 5 Amp at 110V AC and 2.5 Amp at 220V AC in order not to cause permanent damage to the relay contacts. This rating is specified for RESISTIVE loads only.

### 2. Current Output

The maximum load is 550  $\Omega$ . Output current inaccuracies may occur for load impedance in excess of 550  $\Omega$ .

## CONTROLLER OUTPUT FEATURES

The output of the meter consists of two alarm relays and an isolated 4-20 mA output. The operation of the meter is described below. Refer to FIGURE 1 and FIGURE 2.

## CONTROLLER INPUT RANGE

### 1. Relay Outputs:

pH	0 to 14.00 pH
mV	$\pm 1999$ mV

### 2. Current Output:

pH	0 to 14.00 pH
mV	0 to 1400 mV

## ALARM RELAY AND LED FORMATS

### 1. HIGH ALARM set point:

- 1.1 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.
- 1.2 Release the HIGH ALARM SET POINT SWITCH. The instrument will indicate the measured process value.
- 1.3 The High ALARM SET POINT LED will be ON and the HIGH SET POINT RELAY OUTPUT 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 RELAY OUTPUT will be de-energized when the measured value is less than the alarm set point value.

### 2. LOW ALARM set point:

- 2.1 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.
- 2.2 Release the LOW ALARM SET POINT SWITCH. The instrument will indicate the measured process value.
- 2.3 The LOW ALARM SET POINT LED will be ON and the LOW ALARM RELAY OUTPUT 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 RELAY OUTPUT will be de-energized when the measured value is greater than the alarm set point value.

### 3. SET POINT HYSTERESIS:

The hysteresis for the meter is factory set to  $\pm 0.1$  pH(10 mV). For HIGH ALARM set point, the trigger ON point is 0.1 pH(10 mV) above the set point values and 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 4mA 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 :

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

Example: A=12 mA, the pH value =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 :

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

Example: A=12 mA, the mV value =700

## WARRANTY

Jenco Instruments, Ltd. Warrants this product to be free from defects in material and workmanship for a period of one year from date of purchase. If repair or adjustment is necessary and has not been the result of abuse or misuse, within the one 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 will determine whether the product problem is due to defects or customer misuse. Out-of-warranty products will be repaired on a fee 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 all relevant information regarding the reasons 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.

**JENCO INSTRUMENTS, INC.**

7968 Arjons Drive, Suite C  
San Diego, CA 92126 USA  
TEL: 858-578-2828 FAX: 858-578-2886  
E-MAIL: jencoi@ix.netcom.com

**JENCO ELECTRONICS, LTD.**

PO. BOX LINKOU 117  
TAIPEI, TAIWAN  
TEL: 02 601-6191 FAX: 02 601-7206  
E-MAIL: jencoe@ms2.hinet.net

**SHANGHAI JENCO ELECTRONICS, LTD.**

18 Wang Dong Zhong Road  
Sijing Town, Songjiang  
SHANGHAI, CHINA  
TEL: (86-021)5761-9599 FAX: (86-021)5761-9598  
E-MAIL: jenco@public.sta.net.cn  
Homepage: <http://www.jenco.com.cn>