OPERATION MANUAL

MODEL 3101
Programable multi-range
Conductivity controller

JENCO ELECTRONICS, LTD.

MANUFACTURER OF PRECISON INSTRUMENTS

GENERAL INTRODUCTION

The model 3101 is a high performance industrial grade digital indicating dual set point ON/OFF controller for conductivity, using the Jenco temperature compensated conductivity probe Cat. No.105

The overall conductivity indication and control range for the model 3101 is 0 to 200mS/cm. The following four different ranges can be selected via internal DIP switch:

0 to 999 µS/cm
0 to 9.99 mS/cm
0 to 99.9 mS/cm
0 to 200 mS/cm

A linearized 1 mV per LSD, least significant digit, is provided to

interface with other instruments with analog input such as recorder, printer, etc.

MOUNTING PROCEDURE

1. Make a cutout on any panel, with a thickness of 1/16 in. (1.5mm) to 3/8 in. (9.5 mm). Refer to Drawing 1.

2. Remove the mounting brackets assembly from the panel meter and insert the panel meter into the cutout. Refer to Drawing 2.

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 Drawing 3.

REAR PANEL CONNECTION DIAGRAM

Refer to Drawing 4

1 . Connect the AC power leads to the terminal strip on the rear of the instrument. The model 3101 can be used with 115 VAC or230VAC, 50/60 Hz.

2. Connect the two conductivity cell leads from the Cat. No.105 probe to the CELL terminals on the rear of the instruments.

3. Connect the two temperature compensation leads from the Cat.No.105 probe to the TH terminals on the rear of the instrument.

4. Connect the load of the high set point relay to the NO and Com of the HIGH SET terminals on the rear panel.

5. Connect the load of the low set point relay to tha NO and COM of the LOW SET terminals on the rear panel.

EARTH GROUND

1. The EARTH terminal on the rear panel must be connected to ground via third lead of the power line. Refer t.o Drawing 4.
2. If the third lead is not available, use a separate lead to connect the Earth terminal to ground.

3. This safety procedure must be observed, to avoid possible human injury and damage to devices connected or in contact with the instrument ,in the event of instrument failure.

Measurement range select

1. Loosen the one earth ground screw on the rear of the instrument . Refer to Drawing 4. Loosen the screw on the front panel. Refer to Drawing 5.

2.Push the rear panel toward the front of the instrument to expose the

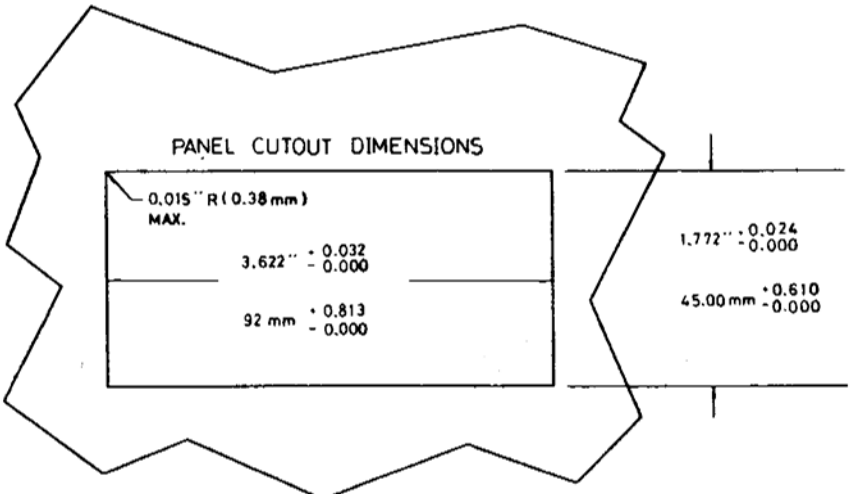
internal DIP switch .Set the DIP switch according to Table 1 for the desired measure and control range.

3.Push the front panel back into the metal case and tighten the screw on the front panel. Replace the screw on the rear panel.

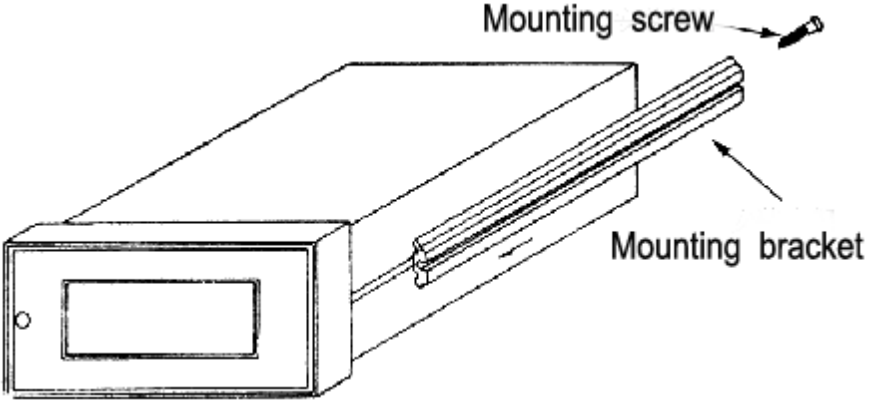
Range
0 to 200 mS/cm
0 to 99.9 mS/cm
0 to 9.99 mS/cm
0 to 999 μS/cm
Note: 1=ON 0=OFF

Dip switch position **Table 1**

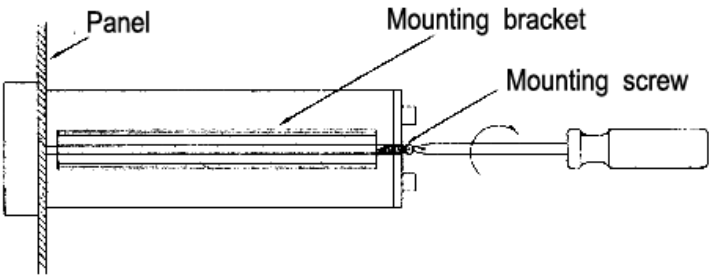
1	2	3	4	5	6	7	8	9
0	1	0	0	1	0	1	0	0
0	0	1	0	1	0	1	1	0
0	0	1	0	0	1	1	0	1
1	0	1	1	0	0	0	0	0



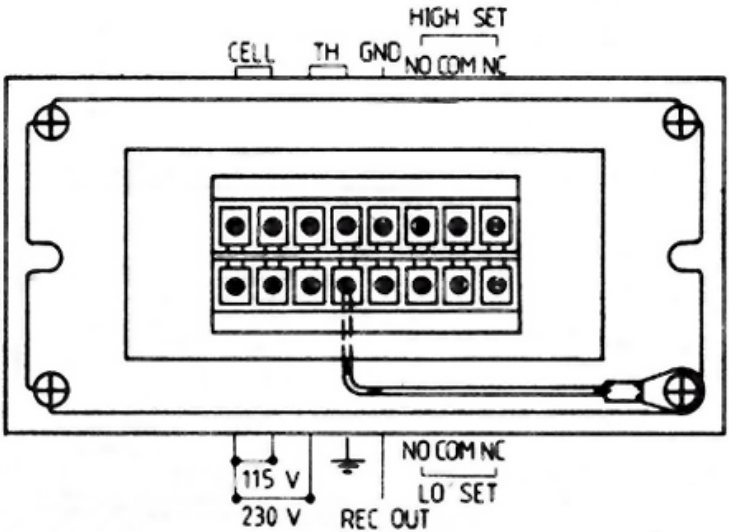
Panel cutout
Drawing 1



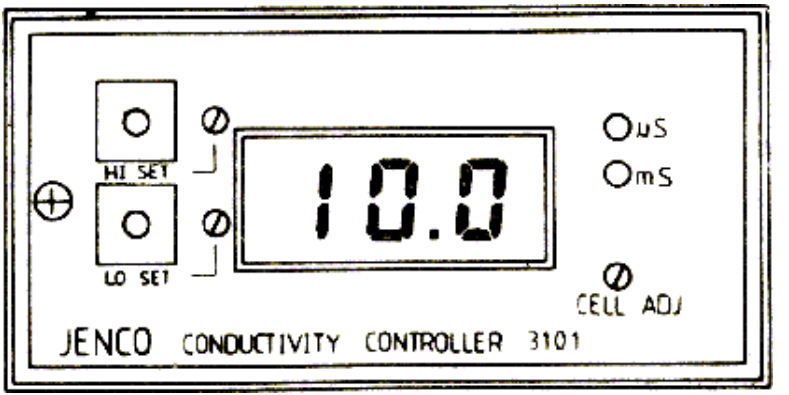
Panel meter mounting bracket and screw
Drawing 2



Mounting method
Drawing 3



Rear panel Drawing 4



Front panel Drawing 5

ANALOG VOLTAGE OUTPUT

Ihe analog voltage output can be used to interface with other instrument

Such as recoder, printer, computer interfacing peripherals, etc .

Output voltage : 1 mV per LSD, least significant digit.
0 mV for 000 display, regardless of the position of the decimal point.

The following rule must be observed in order to avoid reading inaccuracies or possible damage to the instrument.

1. If the sample under test is in contact with earth grounded, the interface device's circuit common must not be connected to earth ground.
2. The input impedance of the interface device must be greater than 1 K

Ohm.

3. Make sure that the AC line voltage is never accidentally connected to the analog output.

Controller Set

1.Press the HI set (Lo) set switch on the front panel. Refer to Drawing 5. The instrument will indicate the conductivity value of the set point.

2.Adjust the Hi(Lo)set control on the front panel for the desired set point conductivity value.

3.Release the Hi(Lo) set switch ,the meter will again indicates the measured conductivity value.

Controller relay output format

The hi set control and Lo set control each activates an independent On/off relay.

The load to the relays should be always connected to the On and COM terminals. The relay load should not exceed the rating of 8 A at 115 V and 4A at 230V .The relay rating is for resistive load only.

The LED in the set point switch ,refer to Drawing 5, will be On when the relay is energized . Power is delivered to the load through the On and COM terminals of the relay.

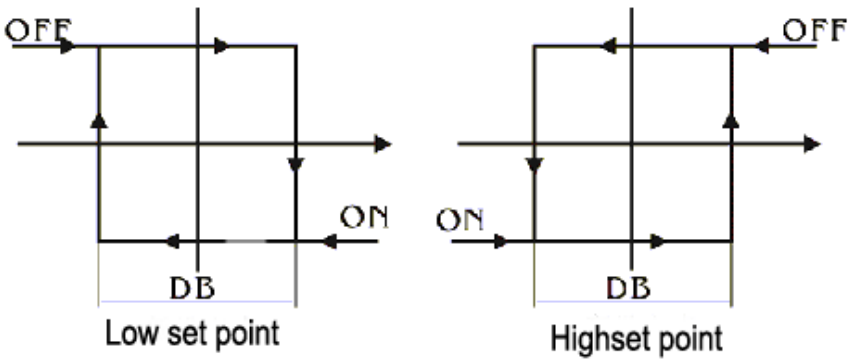
1. High set. point
   The LED will be ON and the relay will be energized when the conductivity value is above the HI SET point value.

2. Low set point

The LEDwill be ON and the relay will be energized when the conductivity value is less than the LO SET point value.

RELAY DEAD BAND (HYSTERESIS)

The DEAD BAND of the ON/OEF relays are factory set to ±5 LSD, least significant, digit, of the displayed value. DEAD BAND is defined as the process value band where the relay is actuate upon rising process value and de-actuated upon failing process value. Refer to Drawing 6. The DEAD BAND is used to suppress relay chattering when excessive noise is picked up from the measurement system.



Dead band

Drawing 6

Temperature compensation

The instrument is calibrated to a temperature coefficient of 2% per degree C over the measurement temperature range of 5 to 55°C. Temperature compensation refers all measure values to 25°C.

Temperature compensation thermistor

External resistive can be used to perform temp. compensation, when conductivity probes other than the Cat. No. 105 probe is used. Refer to following table. The replacement conductivity probe must be made of platinum element and a nominal cell constant of 1.0.

Temp in ℃	Resistance in Kohms
5	22.05
10	17.96
15	14.68
20	12.09
25	10.00
30	8.313
35	6.941
40	5.828

45	4.912
50	4.161
55	3.57

Cell constant

The model 3101 is designed for use with conductivity probes of 1.0 cell constant.

Calibration using standard solutions

1.Rinse the conductivity probe with de-ionized water or the standard

solution.

2.Immerse the conductivity probe in the standard solution .Choose the standard solution closet to the value of the sample solution .Refer to table 2.

3.Set the Cell adjust control on the front panel for the meter to display the value of the standard solution.

4.The instrument is calibrated and ready for measurements.

Table 2

Standard solution	Instrument range	Meter display value
A	0 to 999 μS/cm	147
B	0 to 9.99 mS/cm	1.41

C	0 to 99.9 mS/cm	12.9
D	0 to 200 mS/cm	111

Prepeartion of standard solutions

Solution A- dilute 100ml of solution B to 1000ml with deionized water.

Solution B- weigh out (in air)0.7440g research grade KCL and to 1000ml with deionized water.

Solution C- weigh out (in air)7.4365g research grade KCL and to 1000ml with deionized water.

Solution D- weigh out (in air)74.2640g research grade KCL and to 1000ml with deionized water.

Conductivity measurement

1.The instrument must be calibrated with standard solution before use , as the cell contant is slightly different for each conductivity probe.

2. Rinse the conductivity probe with de-ionized water or the standard solution.

3. Immerse the conductivity probe in the sample to be measured .The instrument will indicate the conductivity value of the sample recoder refered to 25°C.

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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