Conductivity/TDS Controller Model 160-COND

Features

- Auto/Manual temperature compensation selectable
- Conductivity and TDS selectable from front panel
- Cell Factor selectable for both 1.0 and 0.1
- 4 Step Range selection 0.1µs to 199.9ms for conductivity
- Digital calibration for Conductivity/TDS
- Auto Temp Compensation using PT100 sensor
- Dual set limit with separate relay outputs
- Settable hysteresis for both set limits
- Bright Red LED display with separate display for set limit-1
- Aesthetically designed front panel with membrane switches and ABS cabinet

Specifications

- Display : 0.56" Red LED 7 segment Display for Conductivity/TDS
  0.56" Red LED 7 segment Display for Set-Limit-1

- Ranges : Conductivity: 19.99ms, 1999 µs, 199.9µs, 19.99µs (0.1 Cell); 199.9ms, 19.99ms, 1999 µs, 199.9µs (1.0 Cell)
  TDS: 0-1999ppm

- Resolution : Conductivity: 0.01ms or 0.01µs depending on range & Cell factor
  TDS: 1ppm

- Auto Temp. Comp. : 0-100˚C using PT100 external sensor

- Manual Temp. Comp. : Settable from front panel from 0-100.0˚C

- Cond/TDS Calibration : Digital calibration by factor multiplication from 0.75-1.25

- Recorder Output : Isolated 4-20mA => 0-2000 (for whatever unit and resolution selected
  (Maximum termination 250Ω)

- Control Output : Two set of NO-P-NC, 5 Amps potential free Relay Contacts.
  Relay 1 ON, for Cond/TDS < Set Limit1 – Hysterises1
  Relay 1 OFF, for Cond/TDS > Set Limit1

  Relay 2 OFF, for Cond/TDS < Set Limit2
  Relay 2 ON, for Cond/TDS > Set Limit2 + Hysterises2

- Accuracy : 0.5% ± 1 Digit

- Supply : 220V AC ±10% @ 50Hz

- Enclosure : Plastic (ABS). Size -96x96x110mmm

- Weight : 900gms

Setting up the Instrument

Requirements

1. A Panel cut-out of 92mm x 92mm
2. A Conductivity sensor with Cell Factor 1.0
3. A PT100 temperature sensor
4. A Supply source of 220V AC at 50Hz

Mounting

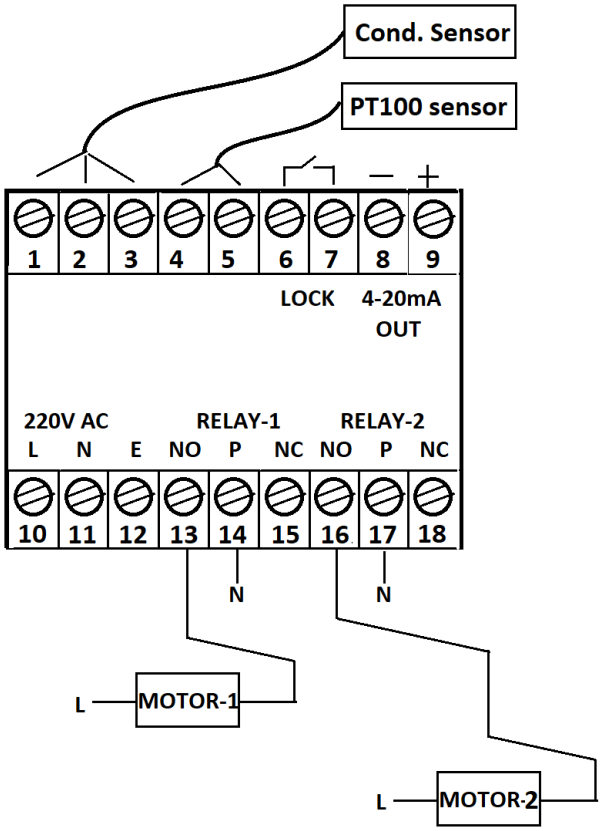
The equipment is pushed in from the front into the 92 x 92mm panel cut-out. The 2 side screws are tightened from the rear after hooking the bracket into the 2 slots provided in each side of the cabinet. Effectively, the instrument will be now vibration free in the panel.

Now connect the PT100 sensor and the conductivity sensor to the terminals marked. Since both these sensors are passive sensors, the polarity of the sensors is not important.
NOTE: The mounting of the conductivity sensor is important to obtain true conductivity readings

The following points may be observed:

a) The solution around the electrode/probe is representative of the solution as a whole
b) A little flow is maintained past the sensor to provide an up-to-date solution sample.
c) Care must be taken to ensure there are no air bubbles close to the sensor. Also avoid mounting the sensor at the top of a large pipe as a layer of air may collect there.
d) The contacting type sensor is mounted so that no sludge/particulate matter collects around the electrode. Avoid mounting the vertical sensor at the bottom as collected sediments may give wrong reading.

Wiring Diagram



Temperature Compensation

The conduction process in aqueous solution is by means of ionic motion and invariably increases with increase in temperature. The relative change is commonly expressed as percent / °C at 25°C. It is also called the slope of the solution. Ultra pure water has 5.2% /°C, while ionic salts have approx 2% /°C. Acids, alkalis and concentrated salt solutions are somewhat lower, typically 1.5% /°C.

The TDS indicator uses a standard PT100 sensor to sense the temperature. The internal electronics is adjusted to make the compensation at the rate of 2% /° as this is most commonly required.

In case, the temperature compensating PT100 is not available, a corresponding resistance must be terminated at the input to provide manual temperature compensation.

Set Limit-1

- The lower display shows the Set Limit-1.
- Use the increment and Decrement switches to make changes
- Relay 1 ON, for Cond/TDS < Set Limit1 – Hysterises1
  Relay 1 OFF, for Cond/TDS > Set Limit1

Set Limit-2

- Press the Limit-2 switch. Keeping this pressed, the lower display shows the Set Limit-2.
- Use the increment and Decrement switches to make changes.
- Relay 2 OFF, for Cond/TDS < Set Limit2
  Relay 2 ON, for Cond/TDS > Set Limit2 + Hysterises2

Hysterises-1

- Press the Mode switch.
- Upper display shows ‘HYS1’ while lower display shows the value.
- Use the Increment and Decrement switches to make changes.
- Relay 1 ON, for TDS < Set Limit1 – Hysterises1
  Relay 1 OFF, for TDS > Set Limit1
- After changes are made, press the Mode switch to go to next setting

Hysterises-2

- Upper display shows ‘HYS2’ while lower display shows the value.
- Use the Increment and Decrement switches to make changes.
- Relay 2 OFF, for Cond/TDS < Set Limit2
  Relay 2 ON, for Cond/TDS > Set Limit2 + Hysterises2
- After changes are made, press the Mode switch to go to next setting

Span Setting (Range and Resolution)

- After previous setting, upper display shows ‘SPAN’ while lower display shows 0000 with the last set resolution.
- Use Up and Down keys to make changes.
- It will toggle between 000.0uS, 0000uS, 00.00mS, 000.0mS. The appropriate LED on the left of the upper display will also change when you move between uS and mS.
- After changes are made, press the Mode switch to go to next setting

Temperature Compensation

- Press MODE switch. The display shows 'Auto' or 'Manual'.
- This refers to the Temperature Compensation that has to be made for Conductivity.
- *Auto:* Temperature value used for compensation is the temperature as sensed by the PT100 sensor or simulation resistance as connected to the rear terminals.
- *Manual:* Temperature value used for compensation is digitally set (next setting) by the user.
- Use the Increment and Decrement switches to toggle between Auto and Manual.
- Press Mode switch to save settings and go to next.

Manual Temperature Compensation

- If Temperature Compensation is selected as 'Manual' this setting is displayed else it is skipped.
- The display shows 'Temp' followed by the temperature value in ˚C .
- Use Increment and Decrement switches to make changes. The range is from 0-100˚C .
- Press Mode switch to save settings and go to next.

Cell Constant of Conductivity Sensor

- After the previous setting, the display shows 'Cell' followed by '1.0' or '0.1' as previously set.
- Depending on the sensor used, use Increment and Decrement switches to toggle between the selections.
- Press Mode switch to save settings and go to next.

Selecting Conductivity/TDS

- After previous setting, the display shows "COND" or "TDS" as per previous selection.
- The selection toggles between Conductivity and TDS.
- Use increment and Decrement switches to make changes.
- After settings have been made, press Mode switch to return to go to next setting.

Conductivity Sensor Calibration

- Conductivity calibration should be done only after the correct range and Cell Constant has been selected.
- Place the Conductivity sensor in a buffer solution. It is advisable to use a buffer solution which is near the required range of usage.
- If the displayed value does not match the conductivity of the buffer solution use the procedure below.
- Press the Mode switch till 'CAL' is displayed on upper display. Lower display shows value between 0.750 to 1.500. This represents a multiplication calibration factor for conductivity.
- Use Increment & Decrement switches change this value.
- If the displayed conductivity was less than the buffer value, increase the value of the 'Conductivity Factor'.
- If the displayed conductivity was greater than the buffer value, decrease the value of the 'Conductivity Factor'.
- The range of the 'Conductivity Factor' is from 0.750 to 1.250 only.
- After settings have been made, press Mode switch to return to normal display

It may be noted that due to varying results from different sensors, it is advisable to always calibrate using the conductivity sensor which is going to be interfaced to the equipment to get accurate indication of Conductivity.

Maintenance

Fault Finding

- For any internal checking on board, check
  - AC fuse
  - Check ±5V DC on 3rd terminal of 7805 and 7905 regulators
- If the display indicates erroneous value for Conductivity:
  - Check conductivity or pH sensor wires which may be broken
  - Sensor may be defective
  - PT100 sensor is not connected or defective in case of Auto Mode
  - Manual temperature has been set incorrectly in case of Manual Mode

For any other faults, the manufacturer's advice may be sought.