



**Pathfinder**  
INSTRUMENTS

## Operating Manual

### Pathfinder Model TSC-20 Conductivity Controller



#### Description

The Model, TSC-20 is a programmable controller that accepts a Conductivity electrode as an input. Output is; one on-off control relay; this output can be an SSR drive pulse, or a 3A mechanical contacts The output can be programmed to operate above or below the set point; Optional programmable alarms can be added to alarm high, low, zone, with absolute or deviation set points. Optional RS 485(Modbus Protocol) output monitors up to 31 controllers and comes with free windows based software Optional digital input for remote set point, timer In addition to the programmable outputs and alarms there is a programmable on delay or off delay timer that works in conjunction with the output or alarm relays. The power source is from 100 to 240 VAC, 50/ 60Hz free voltage there is no need to change connections for different voltages. The controller is programmable from the front panel via 3 switches, and calibration is done using two front panel adjustment pots. The front panel is a 1/16 DIN, NEMA 4X rated and mounting hardware is provided.

#### Features

- \*Field range programmable
- \*1/16 DIN Panel mount,
- \*NEMA 4X panel
- \*UL, CSA, CE approvals
- \*Dual Display, Conductivity & Setpoint
- \*Universal power supply, 100-240, 50/60Hz
- \*Optional: Alarm, RS 485, Timer function,
- \*Remote set point

#### Specifications:

Inputs.....Conductivity electrode  
Range..... 0 to 10uS up to 0 to 75 mS  
Control outputs..... ( 1 ) 3A SPDT relay, or voltage pulse  
Alarm outputs (option).....(up to 2) 1A SPST relay  
Front panel.....NEMA-4X rated  
Enclosure.....1/16DIN panel mount (48x 48 x 95.8mm)  
Power.....100 to 240vac 50/60 Hz  
Programmable timer.....0 to 99h59m  
Indicating Accuracy..... +2% of Fullscale + 1 digit  
ATC.....Automatic 0-50 deg C

## Installation

**A. First Things:** Upon receiving your order of TSC-20 controller check to verify that the part number and quantities agree with the enclosed packing slip. If any discrepancies exist, be sure to contact Pathfinder Instruments immediately. Inspect all controllers for damage. Check for damaged boxes, scratches on the controller's enclosures and face plates, or any damage that may exist due to improper handling. If such a case exists save the shipping carton and shipping material, and contact your shipping agent immediately.

**B. Mounting** To flush mount your controller, first verify that the depth of your cabinet will accommodate the length of your instruments. Also verify that where the controllers are to be mounted there are no corrosive gasses present and no vibration, impact, water, or extreme temperature exposure. Once verified, follow the diagrams below and cut the correct sized hole from the cabinet's panel; the panel should be between 1 and 8 millimeters thick. Insert each unit through the front of the panel. The controller's bezel should catch and not feed through the cut out. When the controller is properly fitted in the panel, slide the plastic mounting clamp in place and tighten the clamp screws for a firm fit.

**C. Wiring Power to Controllers** AC power is to be connected to the power input terminals located on the back of your TSC-20 refer to the wiring diagram in the manual or on the side of the controller for the correct terminals. Your power connections should be made with 18 gauge or larger insulated wire. A 3 amp fuse should be connected in series with power and your controller to help eliminate any problems which could occur due to an over current situation. The TSC-20's unique power supply circuit, incorporating a free voltage transformer accepts line voltages between 100 and 240 VAC; no need to change your wiring to accommodate voltage differences within the rated voltage range.

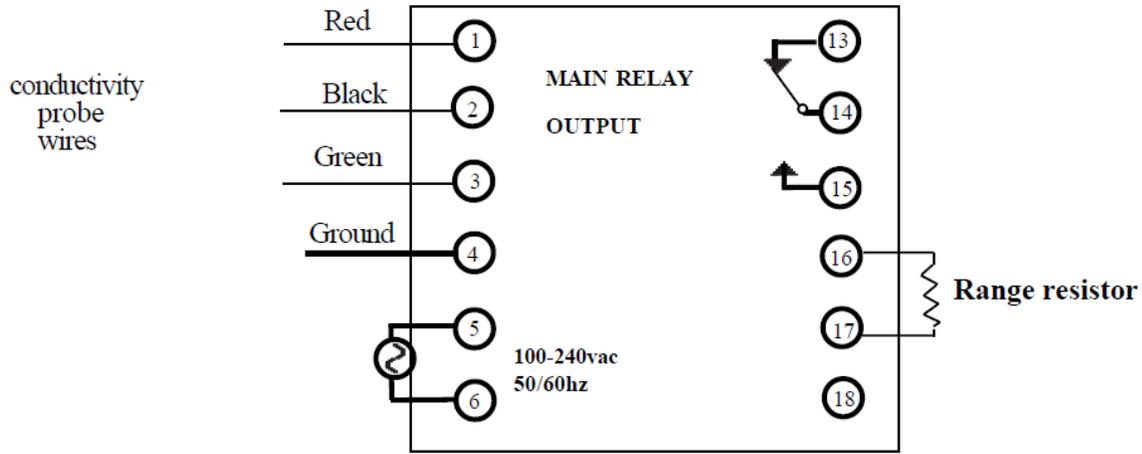
## Probes available for the TSC-20

### **Part Numbers and Description:**

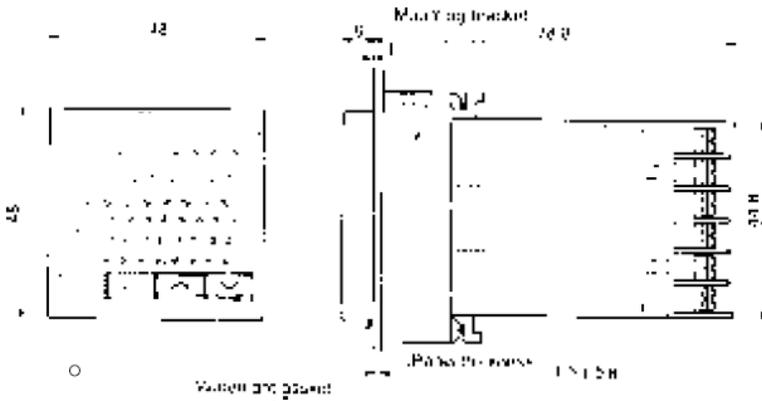
**Pathfinder** - CS-100 - 0 To 100  $\mu$ S / K=0.1

**Pathfinder** - CS1000 - 100 To 2000  $\mu$ S / K=1.0

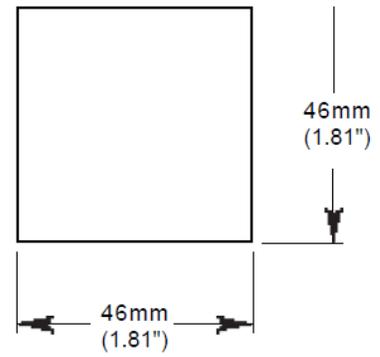
**Pathfinder** - CS5000 - 2000 To 10,000  $\mu$ S / K=2.5



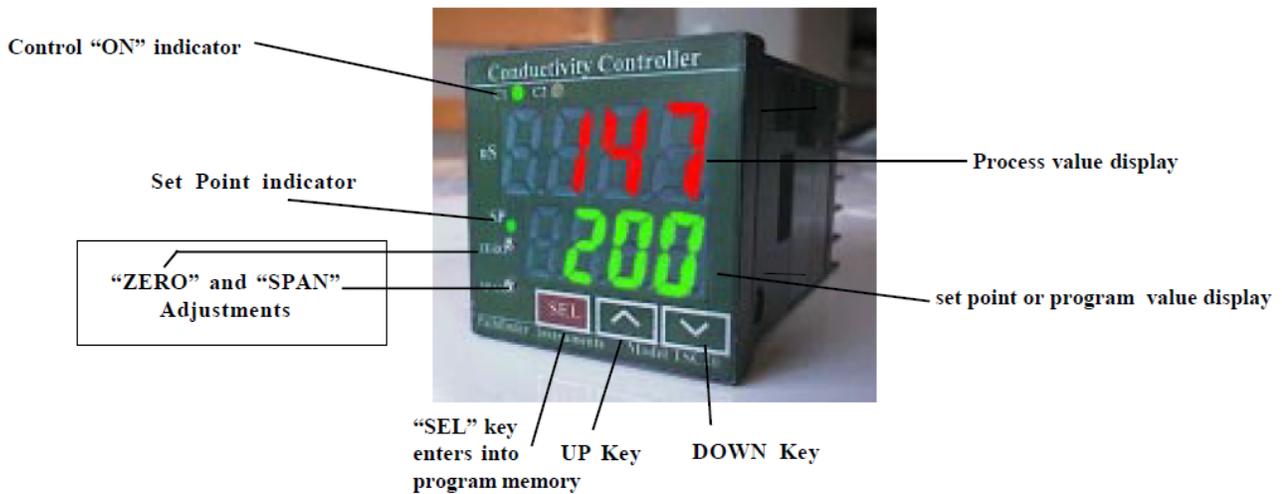
wiring diagram



Dimensions



panel cut out



Front Panel

## Operation

### Keyboard Operation

1. **"SEL"** Key; changes upper display to the first programming menu, advances the display through the menu and sets the programmed information into memory.
2. **"▲"** up arrow key, increases value displayed in the green (lower) display.
3. **"▼"** down arrow key, decreases value displayed in the green (lower) display
4. Press and hold **"SEL"** key for approximately 3 seconds and **"HYS"** will appear in the upper display. Hold The **"SEL"** key for approximately 6 seconds and P-n1 will appear.

### Programming

1. **How to change the SET Point:** Press and hold the **"▲"** up or **"▼"** down arrow until the correct number appears, the new set point will be active after 5 seconds.
2. **How to change the control action:** (Relay activates above or below the set point) Hold the **"SEL"** key for approximately 6 seconds and "P-n1" will appear in the upper display, the control code will appear in the lower display, "0" or "1" will actuate **below** the set point, "2" or "3" will actuate **above** the set point. Press the **"SEL"** key once, the value will flash, change the value with the "up" or "down" keys, and press the **"SEL"** key again to set it in memory, Holding the **"SEL"** key for approximately 2 seconds will return to normal operation.
3. **How to Program Hysteresis (Deadband)** Hold the **"SEL"** key for approximately 3 seconds and **"HYS"** will appear in the upper display, the hysteresis amount will appear in the lower display, press the **"SEL"** key once and the amount will flash, change the amount to the desired value with the "up" or "down" keys, press **"SEL"** again to set it in memory. Holding the **"SEL"** key for approximately 2 seconds will return to normal operation. The default setting, as shipped is **"5"** this is in percent Span.

## Calibration

**How to Calibrate:** The front panel has two adjustments labeled **"ZERO"** and **"SPAN"**, always adjust the **ZERO** first. Allow the controller to warm up for at least 30 minutes, place the conductivity electrode in air, wait for the reading to stabilize and adjust the **"ZERO"** pot for a reading of 0000, place the electrodes in a calibration solution of 1000 PPM, allow the reading to stabilize and adjust the **"SPAN"** pot for a reading of 1000.

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