USER'S GUIDE

PSC-150 / PSC-154
EXTENDED RANGE TDS/EC CONTROLLER

MADE IN KOREA

Thank you for purchasing HM Digital's PSC Series. The PSC-150 and PSC-154 are TDS/EC controllers that monitor and controls levels of Total Dissolved Solids (TDS) or Electrical Conductivity (EC) in water. The controller has a maximum setpoint to help maintain a limit of TDS/EC allowed in the water. If the TDS/EC level rises to the set point, the controller will activate a warning light, sound an alarm (optional) and switch the dry contact position from the normal position (to operate a valve, pump, etc.). Once the TDS/EC level drops below the setpoint, this will deactivate the light and alarm and switch the contacts back to the normal position (normally open or closed). The PSC-154 also has a 4-20mA output signal so that you can record the TDS/EC values registered by the controller.

CONTACT INFO

If you have any problems or questions regarding your controller, please contact HM Digtal, Inc.

HM Digital, Inc.   info@HMDigital.com
Los Angeles, CA USA   HMDigital.com
                                                           1-800-383-2777

BOX CONTENTS

1. Controller   3. Sensor cable   5. Mounting brackets
2. Sensor   4. Power cord   6. U.S. plug adapter

SPECIFICATIONS

EC Range: 0~9999 µS (µS/cm)
TDS Range: 0~9999 ppm (mg/l)
Temperature Range: 1~80°C; 33~176°F
Resolution: 0~999: 0.1 µS/ppm; 1000~9999: 1µS/ppm ; 0.1°C/°F
Accuracy: ±2% (of the reading); Thermometer: ±0.5°C
Temperature Compensation: Automatic (ATC) (1~80°C)
Calibration: Digital by push button (manual fine-tuning in high ranges)
Set-Point: Single point, controlled by on-screen up/down buttons (to any point within the range)
Set-Point Relay: single, isolated, 2A, Max. 220V, resistive load 100,000 strokes
Relay Control: The unit will open or close a circuit via dry contacts when the ppm/pS level reaches
            or exceeds the control setting (simple switch). It can be used to control a pump, solenoid
            valve or other device.
Analog Output (ONLY FOR PSC-154): 4~20mA (Max load 5000)
Output Accuracy (mA) (ONLY FOR PSC-154): ±1.5%
Alarm: Optional steady beep (set by user)
Probe: 1/2" NPTF bushing
Cable Length: 3 meter (9.8 ft) shielded cable
Display: Bright tri-color LED.
Power Supply: 110V/220V, ±10% Vac; 50/60Hz
Enclosure: Front and back with ABS
Environment: 0~50°C (32 to 122°F); RH max 80% non-condensing
Dimensions: 7.2 x 7.2 x 11.1 cm (2.8 x 2.8 x 4.4 in.)
Monitor Weight: 241 grams (8.5 oz)

INSTALLATION INSTRUCTIONS

IMPORTANT: Double-check your contacts prior to connecting the controller to a power source. Incorrect connections could result in shorting out the unit.

1. Remove the contents from the box.
2. Insert the controller into the panel. A square hole must be cut into the panel with dimensions of 2-21/32 in. x 2-21/32 in. (67 mm x 67 mm). Page 8 includes a cut-out diagram.
3. Mount the controller to the panel by inserting the mounting brackets into the grooves on the bottom and top of the controller. Fasten the brackets with the included screws.
4. View the contact diagram on the side of the controller (also on page 8).
5. Do NOT connect to a power source yet! Connect the black power cord to the contacts #8 & #9 (for either 110 or 220V). It does not matter which color wire is connected to the contacts. Screw in tight with a Phillips head screwdriver. (Note - If in the U.S. (or a country that uses Type A or B plugs/sockets), connect the included plug adapter to the power cord).
6. If using a pump, valve, etc., connect a relay cord (not included) to contacts #13 and #14 for a normally open position OR to contacts #12 and #13 for a normally closed position.
7. Connect the gray sensor cable by attaching the blue wire to contact #1, the red to #2, the white to #3 and the black to #4.
8. Align the pins of the sensor to the cable and attach. Screw the tightening ring closed.
9. Insert the sensor electrode into a female1/2"NPTF threaded fitting. Attach to your water source.
10. To DISCONNECT the audible alarm, disconnect the blue wire from contacts #10 and #11.
11. (ONLY FOR PSC-154) To transmit the TDS data to a PLC via the 4-20mA output signal, connect a cable (not included) from contacts #6 (positive) & 7 (negative) to a PLC or other device.
12. Plug the power cord into an electrical outlet. The controller does not have a power switch and will automatically power on when the power is connected.

USAGE INSTRUCTIONS

1. The controller will turn on when the power cord is plugged into an electrical outlet.
2. Open the cover on the front of the controller by gently pulling down.
3. To change the temperature mode, quickly press the°C/°F' button. This will toggle the temperature between Fahrenheit and Celsius.
4. To change the measurement between TDS and EC, press and hold the MODE button. This will toggle between ppm and µS.
5. To turn off the controller, unplug it from the electrical outlet.

Setting the Control Set Point

1. To set the control set point (to activate a device via the relay), press the SET button once. The temperature reading will switch to "SET".
2. Press the UP or DOWN buttons until the desired set point is reached. Pressing once will advance the reading by a single digit. Holding down the button will advance the reading quickly.
3. Press the SET button again. This will save the set point to memory.
4. If the TDS/EC level reaches the saved set point, the controller will switch the contacts from the normal position (either normally open or normally closed), thereby operating the pump, solenoid valve, or other device attached to contacts #12 & 13 or #13 & 14.

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5. Once the TDS/EC falls below the set point, the contacts will switch back to the normal position.

Calibration:

1. HM Digital factory calibrates the controller to a 1413 µS NaCl solution. (700 ppm)
   If you wish to recalibrate, press and hold the CAL button.
   The temperature reading will switch to a flashing "CAL".
2. Insert the sensor (with the fitting on) into a calibration solution with a known value.
   NOTE: If using a fitting, you must calibrate with the fitting on the sensor.
3. Press the UP or DOWN buttons to adjust the measurement reading until it matches the value
   of the calibration solution.

   CALIBRATION ICONS
   Maximum range reached: --|
   Minimum range reached: |--
   Middle range reached: CAL (not flashing)

4. Once the display matches the calibration solution, press and hold the CAL button again to
   set the calibration.

Cleaning

To clean the sensor electrodes, use rubbing alcohol and a cotton swab.
Lightly clean the electrodes. Rinse with DI, RO or distilled water. Air dry.

Sensor Replacement

If your sensor has been damaged, you can purchase a new one (model SP-1-PSC) without the
need to purchase a new controller. Contact HM Digital or your authorized HM Digital distributor.

Alarm Setting

After setting the set point the device, the bottom screen will display "AL"(alarm) and the top will
display "oFF" or "on". Press the SET button to choose between on or off. Press SET button to
save the setting.

Set-Up

1. Ensure the power is OFF prior to any wiring! For complete installation instrucitons, see page 3.
2. The PSC-154 requires a remote powered device.
   (The receiving instrument provides the power to drive the 4-20mA current).
3. To transmit TDS/EC data to a PLC via the 4-20mA output signal, connect a cable (not included) from contacts #10 (positive) & 11 (negative) to the positive and negative contacts on a PLC or other device.

Data Formula:

(µS Measurement x 0.0016) + 4 = Output mA
(Output mA - 4) x 625 = µS Measurement

Sample Data

Note: The following measurements/outputs are samples within the controller's range.
       The formula above should be used for specific values.

Measurement (µS)	Output (mA)	Measurement (µS)	Output (mA)
0	4.000	500	4.800
10	4.016	1000	5.600
20	4.032	2000	7.200
30	4.048	3000	8.800
40	4.064	4000	10.400
50	4.080	5000	12.000
60	4.096	6000	13.600
70	4.112	7000	15.200
80	4.128	8000	16.800
90	4.144	9000	18.400
100	4.160	10000	20.000

TROUBLESHOOTING

| Problem	Potential Solution(s)
The unit will not power on.	1. Check to ensure the connections are correct (double-check contacts 8 and 9 are connected properly). 2. Check to ensure the power cable is plugged in.
Incorrect readings.	1. Try to recalibrate the controller. Note that calibration should be done with a fitting on (if using a fitting). 2. Note the instructions for upper level calibration. 3. Check for interference caused by other machinery or electronics (near the controller or cables).
The relay control does not work.	1. Double-check the connections for contacts #12, 13 & 14. 2. Make sure that the set point is properly set.
The display shows ERR.	1. The TDS/EC level is out of range. 2. The sensor is not connected. 3. The sensor is dirty or damaged.

A. What is S.A function?

The S. A function adjusts the sensitivity of the Relay Contact Points to ± a margin above and below the Control Points.

B.Examples of S.A Operation

The S. A function adjusts the sensitivity of the Relay Contact Points to ± a margin above and below the Control Points.
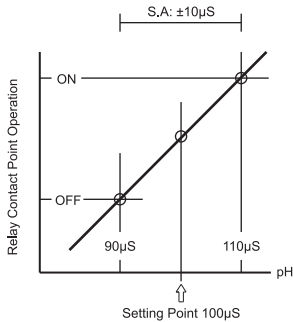
Example of Relay Contact Point
Set Point Setting: 100µS
S.A Setting: 10µS

As the diagram illustrates, the Relay will be turned off', if the pH value descends below 90µS and
the Relay will be turned "on" if it rises above 110µS.

ATTACHING THE MOUNTING BRACKETS

1. Slide the controller through the hole in the panel.
2. From the rear of the controller, slide the metal square support frame over the controller, so that it is pressed against the interior of the panel. The metal frame may be a very tight fit.
3. If not assembled, on the top of the controller, place one long bracket with the ridge side facing up. Insert the short bracket into the slots on the controller, so that it fits snugly against the long bracket.
4. Slide the long bracket towards the controller face, so that the front end is pressed against the support frame (or the panel, if not using the support frame).
5. Secure a screw from the hole in the long bracket through the hole in the short bracket. Tighten, but do not overtighten.
6. Do the same for the bracket on the bottom of the controller. Tighten both brackets equally.

SIDE VIEW (of the top bracket)

TOP VIEW
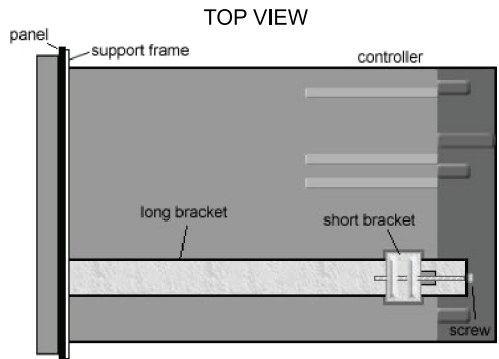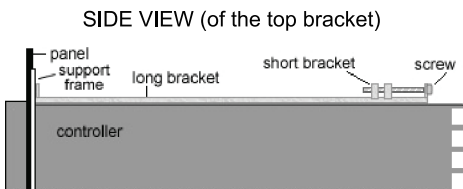
WARRANTY

ONE YEAR LIMITED WARRANTY

The PSC-150 or PSC-154, including both the <u>controller</u> and <u>sensor</u>, is warranted by HM Digital, Inc. ("the Company") to the purchaser against defective materials and workmanship for one (1) year from the date of purchase.

What is covered: Repair parts and labor, or replacement at the Company's option. Transportation charges for repaired of new product to be returned to the purchaser.

What is not covered: Transportation charges for the defective product to be sent to the Company. Any consequential damages, incidental damages, or incidental expenses, including damages to property. This includes damages from abuse or improper maintenance such as tampering, wear and tear, water damage, or any other physical damage. The Company's products are not waterproof and should not be fully submerged in water. Products with any evidence of such damage will not be repaired or replaced. See additional note below.

To obtain warranty service, please contact 800.383.2777 or email Warranty@HMDigital.com to receive further instructions.
Before sending the product back to us, please include the following below,

- Your name
- Description of problem
- Phone number/ Address
- Proof of purchase, must include Date

Implied Warranties: Any implied warranties, including implied warranties of merchantability and fitness for a particular purpose, are limited in duration to five years from date of purchase. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. To the extent any provision of this warranty is prohibited by federal and state law and cannot be preempted, it shall not be applicable. This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state.

NOTE: Warranties are product-specific. Third-party products and products deemed by HM Digital as "accessories" are not covered under warranty. Third-party products and accessories include, but are not limited to, batteries, fuses, mounting brackets, plug adaptors and fittings.
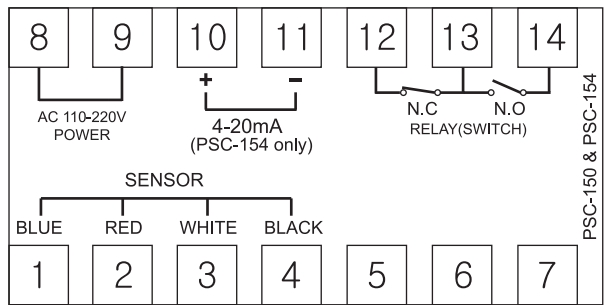
PANEL CUT-OUT DIAGRAM

$2\ ^{21}/_{32}$ in. (67 mm)
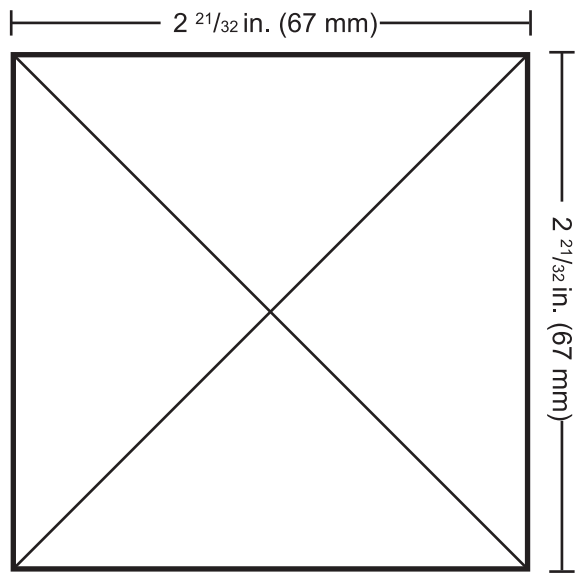
$2\ ^{21}/_{32}$ in. (67 mm)

1. Using a knife, cut the diagram out (cut on the outer part of the line).
2. Align the cut-out to your panel and draw cut marks.
3. Cut the hole in the panel to the precise dimensions of the cut-out:
   2-21/32 in. x 2-21/32 in. (67 mm x 67 mm)

See the installation section for complete instructions.

CONTACT DIAGRAM

8	9	10	11	12	13	14

AC 110-220V
POWER

+ 4-20mA −
(PSC-154 only)

N.C   N.O
RELAY(SWITCH)

PSC-150 & PSC-154

SENSOR

BLUE   RED   WHITE   BLACK

1	2	3	4	5	6	7

* Contact #10 & #11 which is for 4-20mA is ONLY FOR PSC-154