USER'S GUIDE

CIC-152 / CIC-152-4
DUAL CONTROL DOSIN/INJECTION TDS/EC CONTROLLER

HM DIGITAL®

MADE IN KOREA

Thank you for purchasing HM Digital's CIC-152. The CIC-152 is a TDS/EC controller that monitors and controls levels of Total Dissolved Solids (TDS) or Electrical Conductivity (EC) in water. The controller has two programmable control points (maximum limit (CP2) and minimum level (CP1)) to help maintain the TDS/EC within a designated range. If the TDS/EC level is within the range, the controller will display a green light. Each control point can be used to control a distinct device, or both can be used to control a single device. If the TDS/EC level descends to Control Point 1 (CP1), the controller will activate a yellow warning light, and switch the dry contact position of Relay 1 from the normal position (to operate a valve, pump, etc). Once the TDS/EC ascends over CP1, the light will revert to green and switch the contacts of Relay 1 back to the normal position (normally open or closed). If the TDS/EC level rises to Control Point 2 (CP2), the controller will activate a red warning light, and switch the dry contact position of Relay 2 from the normal position (to operate a valve, pump, etc). Once the TDS/EC level drops below CP2, the light will revert to green and switch the contacts of Relay 2 back to the normal position (normally open or closed).

CONTACT INFO

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

HM Digital, Inc
Los Angeles, CA USA

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HMDigital.com
1-800-383-2777

BOX CONTENTS

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

SPECIFICATIONS

EC Range: 0~9999 µS (µS/cm)
TDS Range: Model CIC-152 (NaCl): 0 - 4995 ppm (mg/L); Model CIC-152-4 (442™): 0 - 8500 ppm
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) (1~60°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.
Relay Control: 5V (the connected device needs its own power source)
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 L.E.D.
Power Supply: 110V/220V, ±10% Vac; 50/60Hz
Enclosure: Front and back with ABS
Environment: 0~50°C (32 to 122°F); RH max 95% 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. Same for # 5,6,& 7 for Relay #2. Refer to the Contact Diagram in the last page
7. Connect the 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. 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.

USAGE INSTRUCTIONS (continued)

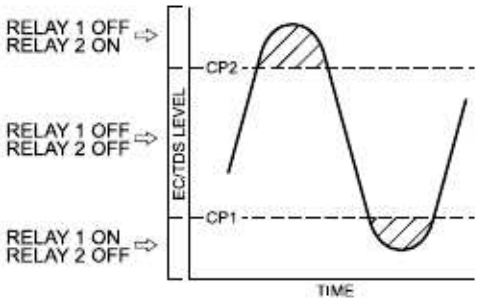
The controller is equiped with two relay and can be controlled by setting CP1 and CP2. CP1 for RELAY#1 and CP2 for RELAY #2

Setting the Control Set Point

1. Adjust Control set Point 1 (CP1-Minimum EC/TDS Level)
2. Press the 'SET' button once. The temperature reading will switch to "CP1"
3. Press the UP and DOWN buttons to adjust the measurement reading. Pressing the button will advance the reading by a single digit. Holding the button down will advance the reading quickly. NOTE: The highest level for CP1 will be 1ppm (or 1µS) below CP2. Therefore, if you reach the maximum, but wish to go higher, you will need to increase CP2.
4. When the CP1 reading is at the desired point, press the 'SET' button again. This will save the CP1 and advance to CP2 (Control set Point 2).
5. Adjust Control set Point 2 (CP2-Maximum EC/TDS Level). You will see "CP2".
6. Press the UP and DOWN buttons to adjust the measurement reading. Pressing the button will advance the reading by a single digit. Holding the button down will advance the reading quickly. NOTE: The lowest level for CP2 will be 1µS (or 1ppm) above CP1. Therefore, if you reach the minimum, but wish to go lower, you will need to decrease CP1. The two Control set Point cannot pass.

Using the Controller

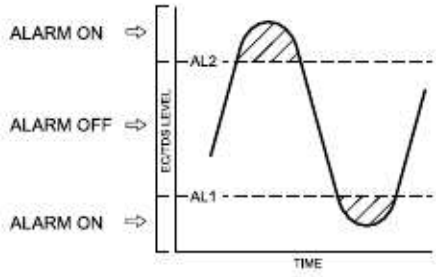
1. Once the desired EC/TDS range is set and your device (pump, valve, injector, etc) is connected to the controller.
   (For Relay #1, in the correct normal position to contacts 12 & 13 or 13 & 14
   For Relay #2, in the correct normal position to contacts 5 & 6 or 6 &7).
   Install the sensor into a tank, tube or pipe so that the electrodes touch the water.
2. For the controller to operate the connected device (via opening or closing the dry contacts), CP2 must be triggered first. Therefore, you will need to start with water that has an EC/TDS level below CP2. Once the EC/TDS level reaches the CP2 limit, the alarm LED light will activate. The alarm will sound if set. and the dry contact position will reverse from the normal position.
3. Once the EC/TDS level falls back down between CP1 and CP2 settings, the LED will turn green and the dry contact position will switch back to the normal position.
4. The cycle will continue indefinitely, but remember that CP2 must be always be triggered first. If the EC/TDS level falls below CP1 without first reaching CP2, Then nothing will happen.



NOTE:
It is advisable to set the Control set Points before operation or production.

Setting and using alarm

1. After Setting CP1 and CP2, The Screen will show AL1 (Alarm for Minimum EC/TDS Level)
2. Press the UP and DOWN buttons to adjust the measurement reading. Pressing the button will advance the reading by a single digit. Holding the button down will advance the reading quickly. NOTE: The highest level for AL1 will be 1ppm (or 1µS) below AL2. Therefore, if you reach the maximum, but wish to go higher, you will need to increase AL2.
3. When the AL1 reading is at the desired point, press the 'SET' button again. This will save the AL1 and advance to AL2 (Alarm 2).
4. Adjust AL2 (Alarm for Maximum EC/TDS Level). You will see "AL2".
5. Press the UP and DOWN buttons to adjust the measurement reading. Pressing the button will advance the reading by a single digit. Holding the button down will advance the reading quickly NOTE: The lowest level for AL2 will be 1µS (or 1ppm) above AL1. Therefore, if you reach the minimum, but wish to go lower, you will need to decrease AL1. The two Alarm Points cannot pass.



Calibration:

1. HM Digital factory calibrates the controller to a 1413 µS NaCl solution. (700 ppm)
2. If you wish to recalibrate, press and hold the CAL button.
   The temperature reading will switch to a flashing "CAL".
3. 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.
   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-N) without the need to purchase a new controller. Contact HM Digital or your authorized HM Digital distributor.

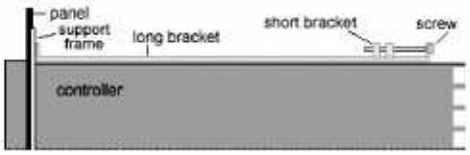
TROUBLESHOOTING

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. (also #5, 6 & 7) 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.

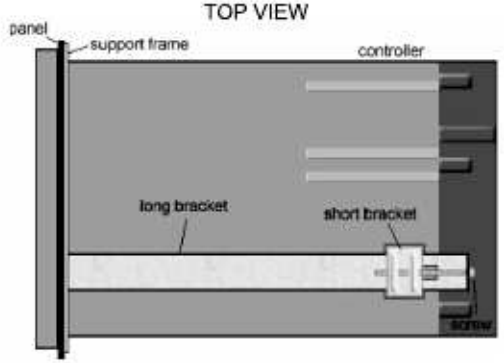
ATTACHING THE MOUNTING BRACKETS

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 CIC-152, including both the controller and sensor, 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 notes below.

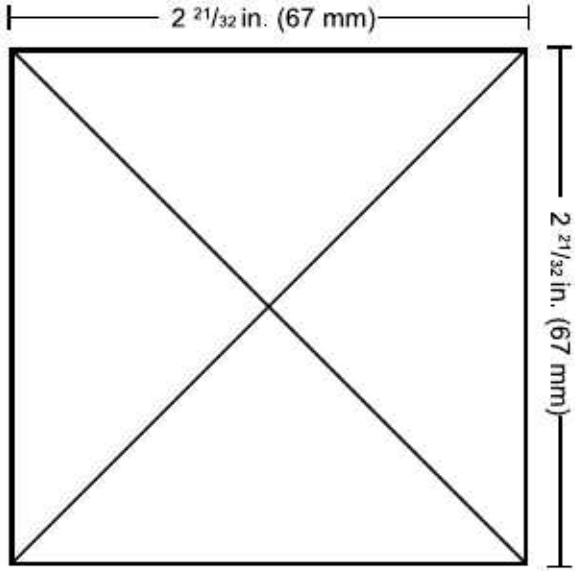
To obtain warranty service, please contact 800.383.2777 or email Warranty@HMDigital.com to receive further instructions. Before sending the product back to us, please include the following below,

- Your name
- Phone number/ Address
- Description of problem
- 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



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