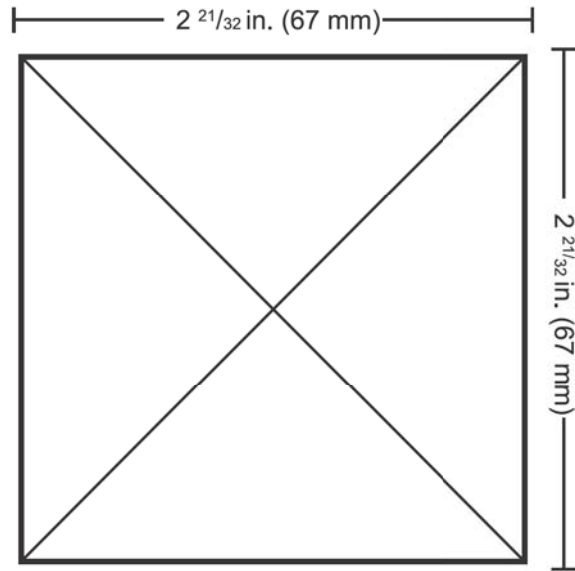


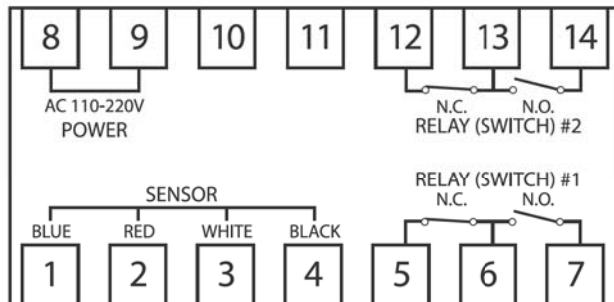
PANEL CUT-OUT DIAGRAM



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



rev. Feb 2014

USER'S GUIDE



CIC-152 DUAL CONTROL DOSING/INJECTION TDS/EC CONTROLLER



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 Digital, Inc.

HM Digital, Inc.
5819 Uplander Way
Culver City, CA 90230, U.S.A.

info@hmdigital.com
www.tdsmeter.com
1-800-383-2777

BOX CONTENTS

- | | | |
|---------------|------------------------|----------------------|
| 1. Controller | 3. Sensor cable (grey) | 5. Mounting brackets |
| 2. Sensor | 4. Power cord (black) | 6. U.S. plug adapter |

SPECIFICATIONS

EC Range: 0-9999 μS ($\mu\text{S}/\text{cm}$)

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 $\mu\text{S}/\text{ppm}$; 1000-9999: 1 $\mu\text{S}/\text{ppm}$

Accuracy: $\pm 2\%$ (of the reading); Thermometer: $\pm 1^\circ\text{C}$, $\pm 1.8^\circ\text{F}$

Conversion Factor: Model CIC-152: NaCl (avg. 0.5); **Model CIC-152-4:** 442™ (avg. 0.4 - 0.7)

Temperature Compensation: Automatic (ATC) (1-60°C)

Calibration: Digital by push button (manual fine-tuning in high ranges)

Control Points: Dual, controlled by on-screen up/down buttons (set points can be any point within the range, but max (CP2) and min (CP1) cannot cross each other).

Control Point Relays: Dual, 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/ μS level reaches or surpasses each minimum or maximum control setting (simple switch). Each relay control can be used to control a separate device.

Relay Coil Voltage (internal): 5V each (the connected devices need their own power source)

Alarms: Two (AP1 and AP2). Optional steady beep (set by user). Independent of control points.

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, $\pm 10\%$ Vac; 50/60Hz

Enclosure: Front and back with ABS

Environment: -10 to 50°C (4 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)

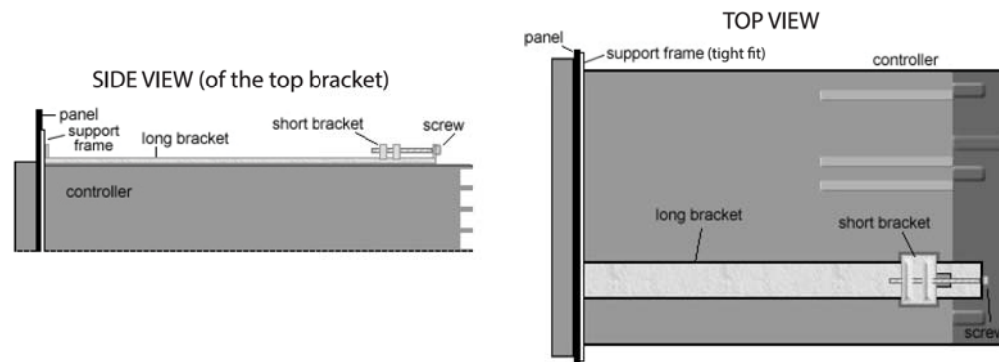
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User's Guide Abbreviations

AL2: Alarm 2 (upper alarm)
AL1: Alarm 1 (lower alarm)
CP2: Control Point 2 (upper limit set point)
CP1: Control Point 1 (lower level set point)
R2: Relay 2 (Relay for CP2 - contacts 12, 13, 14)
R1: Relay 1 (Relay for CP1 - contacts 5, 6, 7)

ATTACHING THE MOUNTING BRACKETS

- Slide the controller through the hole in the panel.
- 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 frame may fit very tightly on the back of the controller.
- 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.
- 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).
- Secure a screw from the hole in the long bracket through the hole in the short bracket. Tighten, but do not overtighten.
- Do the same for the bracket on the bottom of the controller. Tighten both brackets equally.



*442™ is a registered trademark of the Myron L Company.

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 or 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.

How to obtain warranty performance: Attach to the product your name, address, description of problem, phone number, and proof of date of purchase, package and return to:

HM Digital, Inc.
ATTN: Returns
5819 Uplander Way
Culver City, CA 90230
U.S.A.

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.

Please recycle this product or dispose of properly.

INSTALLATION INSTRUCTIONS

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

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 according to the directions on page 7.
4. View the contact diagram on the side of the controller 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 V or 220 V). 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 plug).
6. Connect a device (valve, pump, etc.) to be controlled by the upper limit (CP2) with 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 a device (pump, valve, etc.) to be controlled by the lower level (CP1) with a relay cord (not included) to contacts #6 and #7 for a normally open position OR to contacts #5 and #6 for normally closed.
8. OPTION: Both control points (CP1 and CP2) can operate the same device. To do this, double up on the contacts of the device and connect a set of wires to each set of contacts on the CIC-152.
9. 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.
10. Align the pins of the sensor to the cable and attach. Screw the tightening ring closed.
11. Insert the sensor electrode into a female 1/2" NPTF threaded fitting. The sensor can be in still or flowing water. If using with flowing water, ensure the sensor pins are orientated so that the flow of water is perpendicular to the pair of pins. (If looking through a T-fitting with the sensor in the T, you should be able to see both pins side-by-side.) Attach to your water source.
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.

See page 7 for abbreviations used in this guide.

Using the Control Set Points

When the TDS/EC level is at or below CP1, contacts #5, 6, 7 will switch from the normal position.

→ The **yellow** light will illuminate when the TDS/EC level is below CP1.

When the TDS/EC level is at or above CP2, contacts #12, 13, 14 will switch from the normal position.

→ The **red** light will illuminate when the TDS/EC level is above CP2.

When the TDS/EC level is between CP1 and CP2, both sets of contacts will remain in the normal position.

→ The **green** light will illuminate when the TDS/EC level is between CP1 and CP2.

USAGE INSTRUCTIONS (continued)

Using the Alarms

When the TDS/EC level is at or below AL1, the alarm will sound.

When the TDS/EC level is at or above AL2, the alarm will sound.

The alarms are independent of the control points.

To turn off an alarm, this must be done in set mode (see below).

Setting the Control Points and Alarm Points

HELPFUL TIP:

When the TDS is over CP1, R1 is in the *normal* position.

When the TDS is below CP2, R2 is in the *normal* position.

Lower Level Control Point 1 (CP1)

1. To set the control points (to activate a device via the relay), press the SET button once. The temperature reading will switch to a flashing "CP1" and the measurement will switch to the current control point. CP1 will switch the contacts #5, 6, 7 from the normal position when the TDS level drops to the CP1 setting or below.
2. Press the UP or DOWN buttons until the desired minimum TDS level 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 CP1 to memory and advance to CP2.

Upper Limit Control Point 2 (CP2)

4. After CP1 is set, "CP2" will flash and the current control point will be displayed.
5. Press the UP or DOWN buttons until the desired maximum TDS level set point is reached. Note that CP2 cannot be below CP1 and vice-versa.
6. Press the SET button again. This will save CP2 to memory and advance to AL1.

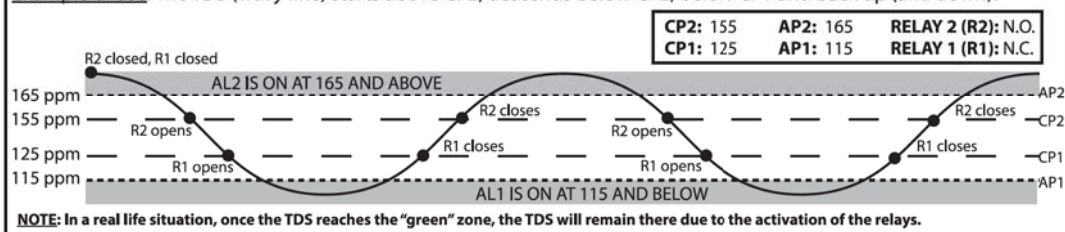
Lower Alarm 1 (AL1)

7. After CP2 is set, "AL1" will flash and the current lower alarm will be displayed.
8. Press the UP or DOWN buttons until the desired lower alarm set point is reached. To DEACTIVATE the alarm, press the ALARM ON/OFF button. "OFF" will flash on the display.
9. Press the SET button again. This will save AL1 to memory and advance to AL2.

Upper Alarm 2 (AL2)

10. After AL1 is set, "AL2" will flash and the current upper alarm will be displayed.
11. Adjust AL2 with the arrow buttons. To DEACTIVATE the alarm, press the ALARM ON/OFF button.
12. Press the SET button again. This will save AL2 to memory and revert to measurement mode.

Example of use: The TDS (wavy line) starts above CP2, descends below CP2, below CP1 and back up (and down).



Calibration

1. HM Digital factory calibrates the controller to a 1413 μ S KCl solution (700 ppm NaCl). 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.
3. Press the UP or DOWN buttons to adjust the reading until it matches the value of the calibration solution.

CALIBRATION ICONS

Maximum range reached: --|

Minimum range reached: |--

Middle range reached: CAL (not flashing)

HIGH RANGE CALIBRATION: In high ranges, the calibration display will advance or decrease by approximately 1% of the reading with each push of the UP or DOWN button. For fine tuning, adjust the display as close as possible to the desired level. Then, with a small screwdriver, adjust the trimmer pot on the top of the controller clockwise or counter-clockwise. This will allow for pinpoint calibration.

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

TROUBLESHOOTING

Problem	Potential Solution(s)
The controller will not power on.	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 1. Try to recalibrate the controller. Note that the 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, cables or sensor).
The relay controls do not work.	<ol style="list-style-type: none"> 1. Double-check the connections for the relays. 2. Make sure that the set point is properly set for CP1 and CP2.
The display shows ERR.	<ol style="list-style-type: none"> 1. The TDS/EC level is out of range. 2. The sensor is not connected. 3. The sensor is dirty or damaged.

If troubleshooting does not solve the problem, please contact HM Digital for assistance. If you feel that the controller is defective, please refer to the warranty (page 6) and return it for repair or replacement.

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. Never touch the electrode pins, as skin oils will affect the reading.

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 your authorized HM Digital distributor for a replacement sensor. If you cannot locate an HM Digital distributor, contact HM Digital at info@hmdigital.com