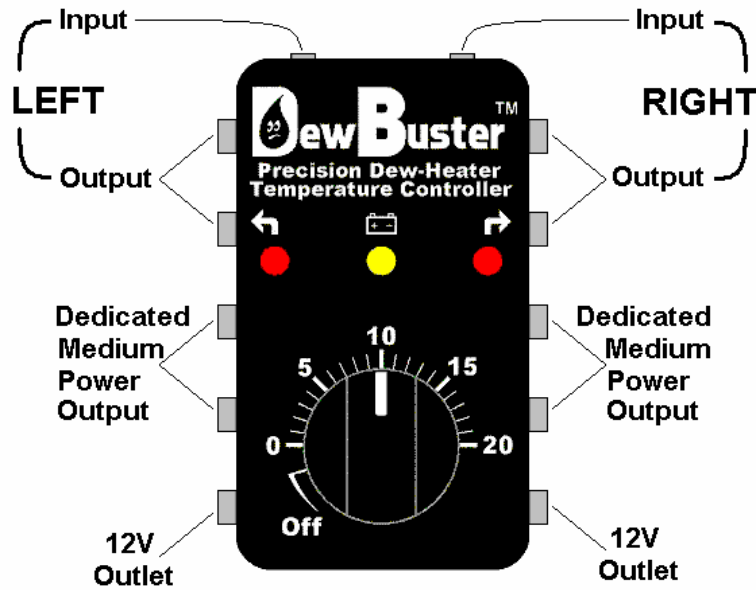


# DewBuster™ Controller Instruction Manual



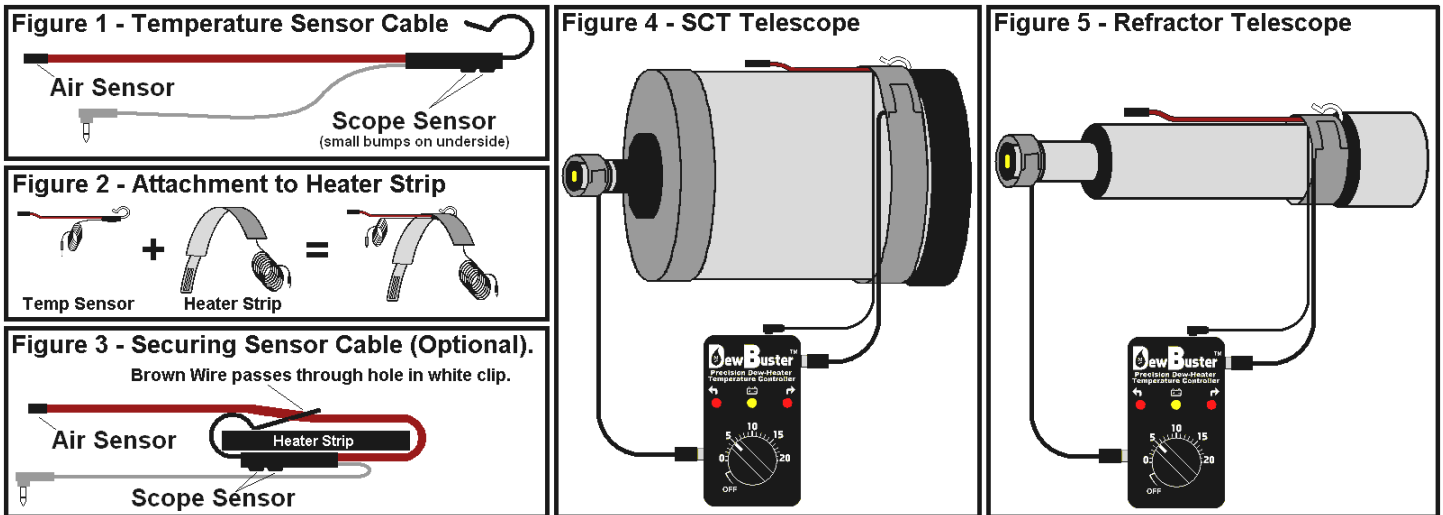
Keeping your lens warmer than the air will prevent dew, but too much heat will blur the highly magnified images. Your DewBuster™ Controller solves this problem by applying exactly enough heat to warm the lens just slightly above the air temperature and no more. As an added bonus the energy savings will allow longer running time on a single battery charge. Temperature measurement is accomplished through a Sensor Cable which conveniently clips onto your heater strip and measures both air and telescope temperatures. The Sensor Cable plugs into either the Left or Right Sensor Input switching the associated outputs into Temperature Control Mode where they warm the telescope above the air temperature by the amount set by the control knob (when set to 5 the telescope is heated 5°F warmer than the air). The Left and Right inputs dual function, they operate in Temperature Control Mode when the Sensor Cable is plugged in and switch to Medium Power Mode when the Sensor Cable is unplugged.

Medium Power is intended for small heaters such as finderscope, eyepiece, Telrad, etc. These heaters do not affect telescope performance so rather than measure their temperature they are simply run at a Medium Power level which is sufficient to prevent dew. The Dedicated Medium Power outputs always operate at Medium Power, the Left and Right outputs switch to Medium Power mode when no Sensor Cable is plugged into the associated input jack. Medium Power operates at a 40% duty cycle (40% of maximum heat) when the control knob is set within the normal operating range of 0 to 10. For flexibility, as the control knob is increased higher than 10 the duty cycle of the Medium Power outputs increases gradually until it reaches full power (100%) at a control knob setting of approximately 20.

The Left and Right red LED's are wired to the heater outputs and blink as the associated heater cycles on and off to regulate heat (Pulse Width Modulation). The duty cycle (% time heater is on) determines the heater power level so maximum heat is produced when the LED is on constantly. The LED's are dim so that they will not impair your night vision and thus may be difficult to see during daytime. The center dual-purpose LED normally blinks red as the Dedicated Medium Power Outputs are cycled on, however it will illuminate yellow as a Battery Warning light when your battery is low on charge and you can gain additional run time by unplugging any heaters that you can do without. As the battery weakens the yellow light will brighten and heater power is automatically reduced to prevent running the battery below 10.5V and damaging it. When the battery is exhausted the red LED's will be off and the yellow light will remain on constantly but your battery is protected from further discharge. Since the Battery Warning circuitry monitors voltage, if it illuminates yellow with a fully charged battery or while using a power supply this indicates that your power source is unable to provide sufficient current for your heaters. This could be due to a poor connection (check for loose connections) or that your power source is unable to provide the necessary current. Contact DewBuster™ Controller Tech Support (page 3) if you need assistance.

Your DewBuster™ Controller is fully compatible with Dew-Not, Astrozap, Kendrick, and many other 12-Volt heating strips. You may also build your own heaters (instructions at [www.dewbuster.com](http://www.dewbuster.com)) without worry because your warranty even covers damage caused by homemade heaters. The unit is fully protected from reverse polarity, over-current, and shorted heaters (if red LED goes out when a heater is plugged in it has a short). The controller is rugged and may be operated continuously 24/7 if desired. The 12-Volt Power Outlets can supply up to 10 Amps of power for any accessories that you may have and are color coded red so that they will not be confused with the heater outputs.

# Installing the DewBuster™ Controller on Your Telescope



## TEMPERATURE CONTROLLED HEATERS:

**NOTE: If Sensor Cable is unplugged the associated outputs switch to Medium Power Mode.**

- Attach Sensor Cable (Fig.1) to heater strip as shown in Fig.2. If desired, Sensor Cable may be secured to heater strip by passing brown wire through hole in white plastic clip as shown in Fig.3.
- Attach heater strip to telescope (Fig. 4 or 5) making sure Scope Sensor (Fig.1) contacts telescope tube and Air Sensor does not touch anything. **NOTE: The best location for the heater strip is just behind the corrector plate casting (Fig.4) or refractor dew shield (Fig.5) so that it warms the air inside the telescope as close to the lens as possible. Do not place heater around dew shield because the heat will just escape into the atmosphere.**
- On an SCT Telescope install the dew shield taking care that the Sensor Cable remains in position. It is imperative to use a dew shield and if you do not have one they can be easily made (see instructions at [www.dewbuster.com](http://www.dewbuster.com)).
- Plug Sensor Cable(s) into Left or Right Sensor input (Fig. 4 or 5) and plug heater strip into the associated Temperature Controlled Output (see diagram on page 1).

## MEDIUM POWER HEATERS:

- Install heater strips and plug into any Dedicated Medium Power output or into a Left Output or Right Output that is operating in Medium Power Mode (Temperature Sensor Cable unplugged).

## TURNING ON CONTROLLER:

- Connect controller to 12 Volt battery or DC power supply (12.5V to 15V). **CAUTION: Do NOT power your controller from the DC Power Output on your telescope because it may damage your telescope! Also do not use a power source greater than 15 VDC because the high voltage may damage your heaters strips.**
- Turn control knob to desired temperature setting (first time users see DETERMINING TEMPERATURE SETTING below).
- The Temperature Controlled Output may go to full power (LED on) until the telescope warms up, but should blink after a few minutes when the telescope has reached the set temperature. The LED may stop blinking for a short time if the telescope needs to cool down.
- The Medium Power Output should blink (middle LED blinks red).
- The Battery Warning should remain off (middle LED illuminates yellow for Battery warning).

## DETERMINING TEMPERATURE SETTING:

- The lower you can run the better your telescope will perform. As a starting point set the control knob to 5 degrees for telescopes 8" and under or 10 degrees for larger scopes. Operate at this setting for the first night.
- If no dew forms on the first night, try a lower setting each subsequent night until you find the lowest setting that never allows dew to form.
- If any dew forms the setting is too low, so use a higher setting. To quickly clear the dew, temporarily unplug the Sensor Cable and turn the control knob to maximum. When dew clears plug the Sensor Cable in and set the control knob a few degrees higher than the setting when dew formed.
- Once you learn the ideal setting for your telescope, just set it there each night and forget about it. If dew forms every once in a while then your setting is too low, the ideal setting should prevent dew from forming under all conditions. Do not readjust the setting throughout the night as this prevents your telescope from reaching thermal equilibrium and performing at its best.

**Dew Burn-Off Mode** - It takes much more heat to clear dew than to prevent it from forming. To remove dew, place the controller in Dew Burn-Off mode by unplugging the Sensor Cable(s) and turning the control knob to maximum. All outputs will go to full power (red LED's remain on). After the dew clears, plug the Sensor Cable(s) back in and return the control knob to a slightly higher setting than when the dew formed.

**Moisture Inside Telescope** – condensation inside a closed tube telescope is not dew but rather moisture that has been trapped inside your telescope. This usually occurs during winter months when a telescope that was stored indoors is brought out into the cold outside air. Indoor air is warm so it absorbs moisture and has at best a 50 degree dew point. If that air enters the telescope, when it is brought outside and cools below 50 degrees the moisture condenses onto the interior optical surfaces. This moisture can not be removed with just a dew heater, the air must be replaced by drier outside air. **During winter:** Uncap telescope as soon as it is brought outside so that the humid air inside can escape. If the problem is particularly bad, buy or build an SCT cooler (a device which blows outside air into telescope pushing out the air trapped inside). At the end of your observing session, dry any moisture from the exterior of the telescope and place the tube in an air-tight plastic bag to prevent condensation when the telescope is brought indoors. Do not remove the telescope from the bag until it has warmed up to the indoor air temperature and keep the openings capped as much as possible. If desired, the telescope can be left in the bag for storage since the dew point of the air within the bag is much drier than the air within your home. **During summer:** The telescope should be stored in an air conditioned environment because it is less humid. To prevent the lenses from fogging up when the cool telescope is brought outside, put the telescope in a bag or keep the lenses capped until the telescope has warmed to the outside air temperature. Since the air conditioned environment is drier, when the telescope is brought back indoors you may uncap the telescope to allow any moisture to dry up.

## Troubleshooting Problems

Symptom	Most Likely Cause
Center of corrector plate or lens dews up.	<ul style="list-style-type: none"> <li>• Be sure to use a dew shield (heater strip alone can't keep up with corrector plate heat loss).</li> <li>• Is heater strip installed just behind corrector plate casting or lens dew shield? This is the most effective because it warms the air inside tube just behind lens.</li> <li>• Temperature set too low. See "DETERMINING TEMPERATURE SETTING" on page 2.</li> </ul>
No LED's lit.	<ul style="list-style-type: none"> <li>• Check that polarity is not reversed on your power source.</li> <li>• LED may be difficult to see during daylight (optimized for night time conditions).</li> <li>• Is cigarette plug power LED lit? Check that plug is fully inserted into socket, battery polarity is correct, and fuse is not blown (AGC10 fuse is accessed by unscrewing tip of cigarette plug).</li> <li>• Heavy Duty power cord has PST fuse, disconnect power and fuse will reset when it cools off.</li> </ul>
One LED will not illuminate.	<ul style="list-style-type: none"> <li>• A heater may be shorted, unplug heaters one at a time and if LED comes on that heater has a short in it. Check the heater per Tech Bulletin "RCA Plug Shorts" at <a href="http://www.dewbuster.com">www.dewbuster.com</a> . Shorts may be intermittent so check heater even if problem disappears.</li> </ul>
Temp Controlled LED stays on constantly.	<ul style="list-style-type: none"> <li>• Normal when first turned on, but LED should blink after a few minutes when scope warms up.</li> <li>• Scope Sensor (page 2 Fig.1) not in contact with telescope (page 2 Fig.1).</li> <li>• Air Sensor (page 2 Fig.1) too close to heater strip, your body, or another heat source.</li> </ul>
Battery runs down very quickly	<ul style="list-style-type: none"> <li>• Shorted heater strip (see Tech Bulletin "RCA Plug Shorts" at <a href="http://www.dewbuster.com">www.dewbuster.com</a>).</li> <li>• Insufficient battery capacity, use at least 17AH battery for an 8" SCT.</li> <li>• If dead battery recharges very quickly it is not storing energy and should be replaced.</li> </ul>

## Warranty and Technical Support

Your DewBuster™ Controller is warranted to the original purchaser for 2 years from the date of purchase. If it fails for any reason, contact me for return instructions. I will expedite the repair to minimize the time you are without your controller. Failures beyond the warranty period and controllers purchased second hand will be repaired at a very reasonable flat-rate fee. Contact me for a quote.

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