

DewBuster™ Controller Instruction Manual

QUICK START GUIDE

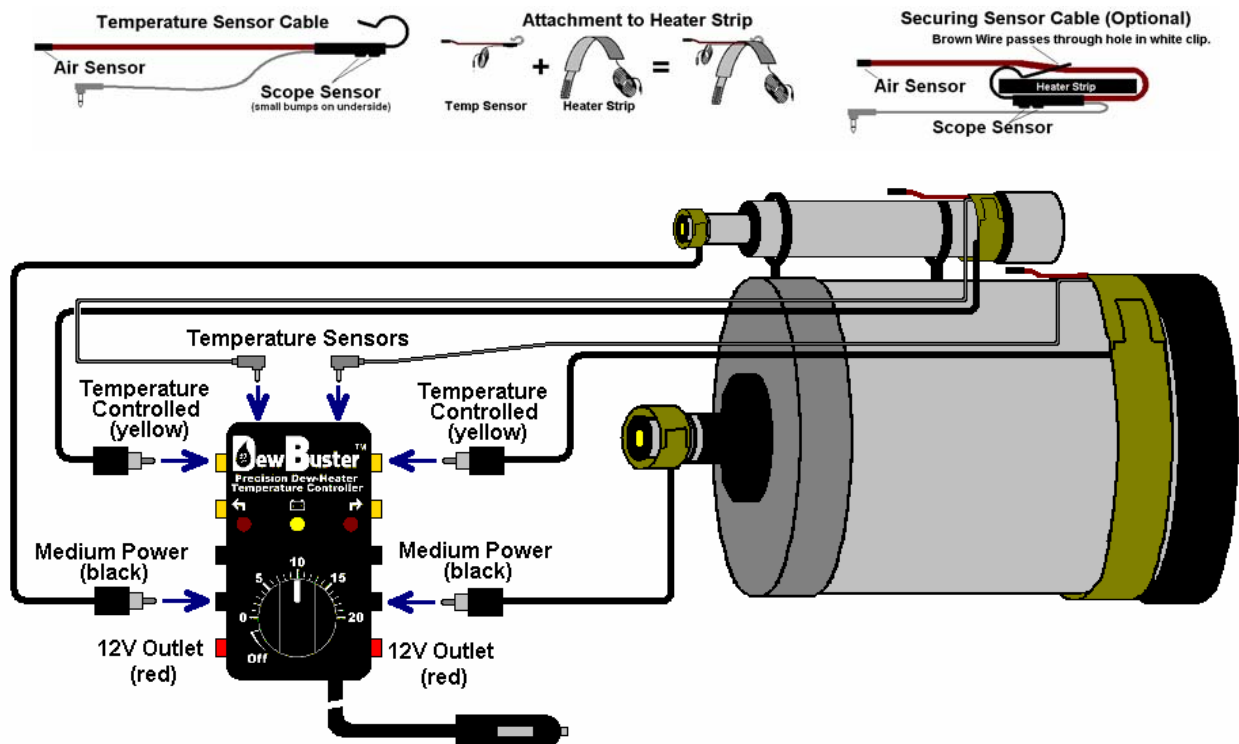
The RCA output jacks are color coded for easy identification:

YELLOW = Temperature Controlled Outputs

BLACK = Medium Power Outputs

RED = 12V Power Outlets

The diagram below shows the standard configuration (your controller may differ):



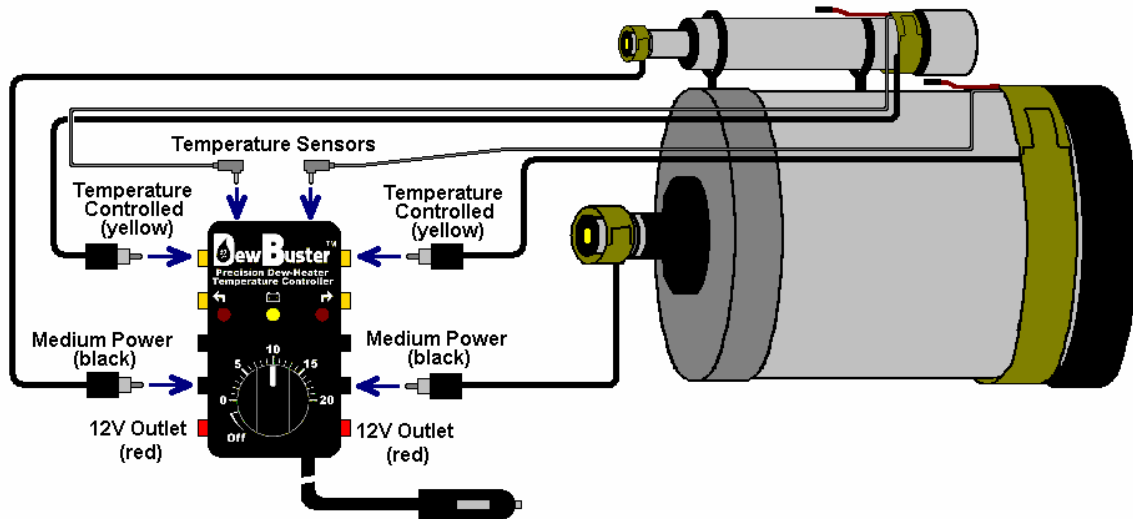
As shown above, attach Temperature Sensor to Corrector Plate (or Objective Lens) heater strip and place heater just behind dew shield (the goal is to warm the tube just behind the glass). Plug heater into a yellow Temperature Controlled Output and plug Temperature Sensor into input jack on same side as heater is plugged in. If a second Temperature Sensor is being used for a guide scope, the sensor and heater should be plugged into the jacks on the opposite side of the controller. If a second Temperature sensor is not being used, then the yellow outputs on the side without a sensor will switch to Medium Power outputs as described below.

Attach heaters strips to the eyepiece, finder scope, Telrad, etc. and plug these heaters into any of the black Medium Power Outputs (or yellow outputs on the side that has no sensor plugged in).

If you have any 12V accessories they may be plugged into the red 12V Outlets. Note that these outlets are not regulated; they will be the same voltage as the controller's power source.

OVERVIEW

Heating your primary lens will prevent dew, but any more heat than needed will blur the highly magnified images. Your DewBuster™ Controller solves this problem by precisely controlling power to the heater in order to warm the lens just above the air temperature and no more. This also saves energy so your battery lasts longer. The Temperature Sensor Cable clips onto your heater strip to measure both air and telescope temperature. The cable plugs into either the Left or Right Temperature Sensor Input to control that side's Temperature Controlled Outputs (yellow) heating the telescope to the control knob temperature setting (5 means telescope 5°F warmer than the air). When no temperature sensor is plugged in, the Temperature Controlled Outputs operate at Medium Power and function as described below.



The Medium Power Outputs (color coded black) are intended for small heaters such as finderscope, eyepiece, Telrad, etc. These heaters do not use much power and do not affect telescope performance so instead of running them at low power and measuring their temperature, they are run at a Medium Power level to prevent dew. The black Medium Power outputs always operate at Medium Power, and the yellow Temperature Controlled Outputs will switch to Medium Power level when no Temperature Sensor is plugged into the associated input jack (left input for left outputs, right input for right outputs). Medium Power operates at a 40% duty cycle when the control knob is set within the normal operating range of 0 to 10. If the control knob is set higher than 10 the duty cycle of the Medium Power outputs increases gradually (LED's blink faster) until it reaches Full Power (LED's stay on) at a control knob setting of approximately 20. This can be useful when no temperature sensors are being used and extra power is needed.

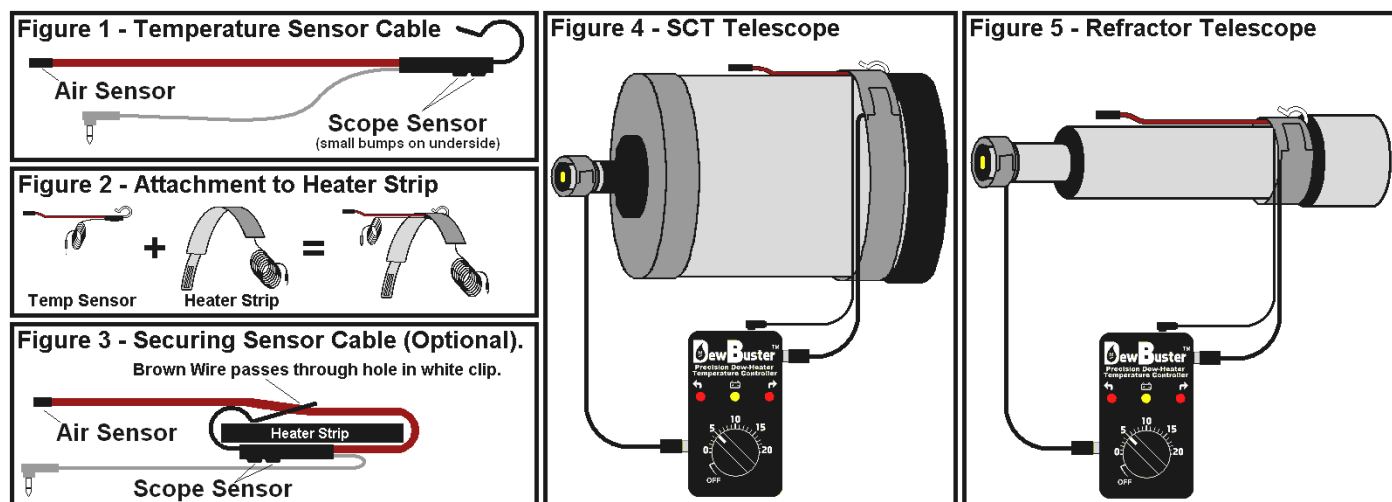
The DewBuster™ Controller has 3 LED's:

LEFT and RIGHT – these red LED's blink as the LEFT and RIGHT Temperature Controlled Outputs (yellow) are pulsed with 12V power to control the temperature. The longer the blink time the more heat will be generated (Pulse Width Modulation). The LED's are optimized for night vision and thus may be dim and difficult to see during daytime.

CENTER – this yellow LED is backlit and blinks red as the Medium Power Outputs (black) are pulsed. It also doubles as a Battery Warning light, blinking yellow when your battery is low on charge, so that you unplug accessories or heaters that you can do without. As the battery weakens the yellow LED brightens and heater power is automatically reduced to prevent running the battery below 10.5V so that it will not be damaged. 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 damage. 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. Check for loose connections and that your power source is able to provide sufficient current. If you need assistance contact Tech Support (page 3).

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) and your warranty even covers damage caused by flaws in your 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.

Installation on Your Telescope



TEMPERATURE CONTROLLED HEATERS:

NOTE: If Sensor Cable is unplugged the associated outputs (yellow) operate as Medium Power Outputs.

- 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).
- Plug Sensor Cable(s) into Left or Right Sensor input (Fig. 4 or 5) and plug heater strip into the associated Temperature Controlled Output (color coded yellow, see diagram on page 1).

MEDIUM POWER HEATERS:

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

12V OUTPUTS:

The 12V outputs (color coded red) may be used to power accessories or to drive a heater at full power (constant 100% output). **Center terminal is +.** Note that they do not turn off when the control knob is turned to the OFF position.

TURNING ON CONTROLLER:

- Connect controller to 12 Volt battery or 13.8VDC power supply.
CAUTION: Do NOT power controller from your telescope's DC Power Output Jack because the high current may burn up wires inside 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 setting (first time users see DETERMINING TEMPERATURE SETTING below).
- The Temperature Controlled Output may go to full power (LED on) as telescope warms up, but should blink when it reaches correct temperature. The LED may stop blinking for a short time if the telescope needs to cool down.
- The **middle LED should blink red** (Dedicated Medium Power) but should not illuminate yellow (Battery Warning).

DETERMINING TEMPERATURE SETTING:

- The lowest setting that prevents dew will deliver the best telescope images. As a starting point set the control knob to 5 degrees (10 degrees for 12" or larger scopes). Operate at this setting for the first night and if no dew forms then try a slightly lower setting each subsequent night until dew forms.
- If dew forms, temporarily unplug the Sensor Cable and turn the control knob to maximum. When the dew clears plug the Sensor Cable back in and set the control knob 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. 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"> • Be sure to use a dew shield (heater strip alone can't keep up with corrector plate heat loss). • 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. • Temperature set too low. See "DETERMINING TEMPERATURE SETTING" on page 2.
Center LED blinks red	<ul style="list-style-type: none"> • This is normal. Center LED blinks red to indicate Dedicated Medium Power outputs are pulsing. Center LED blinks yellow when battery is low and will brighten as battery discharges.
No LED's lit.	<ul style="list-style-type: none"> • Check that polarity is not reversed on your power source. • LED may be difficult to see during daylight (optimized for night time conditions). • 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). • Heavy Duty power cord has PST fuse, disconnect power and fuse will reset when it cools off.
One LED will not illuminate.	<ul style="list-style-type: none"> • 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 www.dewbuster.com . Shorts may be intermittent so check heater even if problem disappears.
Temp Controlled LED stays on constantly.	<ul style="list-style-type: none"> • Normal when first turned on, but LED should blink after a few minutes when scope warms up. • Scope Sensor (page 2 Fig.1) not in contact with telescope (page 2 Fig.1). • Air Sensor (page 2 Fig.1) too close to heater strip, your body, or another heat source.
Battery runs down very quickly	<ul style="list-style-type: none"> • Shorted heater strip (see Tech Bulletin "RCA Plug Shorts" at www.dewbuster.com). • Insufficient battery capacity, use at least 17AH battery for an 8" SCT. • If dead battery recharges very quickly it is not storing energy and should be replaced.

Warranty and Technical Support

Your DewBuster™ Controller is warranted to the original purchaser for 5 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 flat-rate fee. Contact me for a quote.

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E-mail address changes frequently due to spam
 see www.dewbuster.com for current e-mail address.