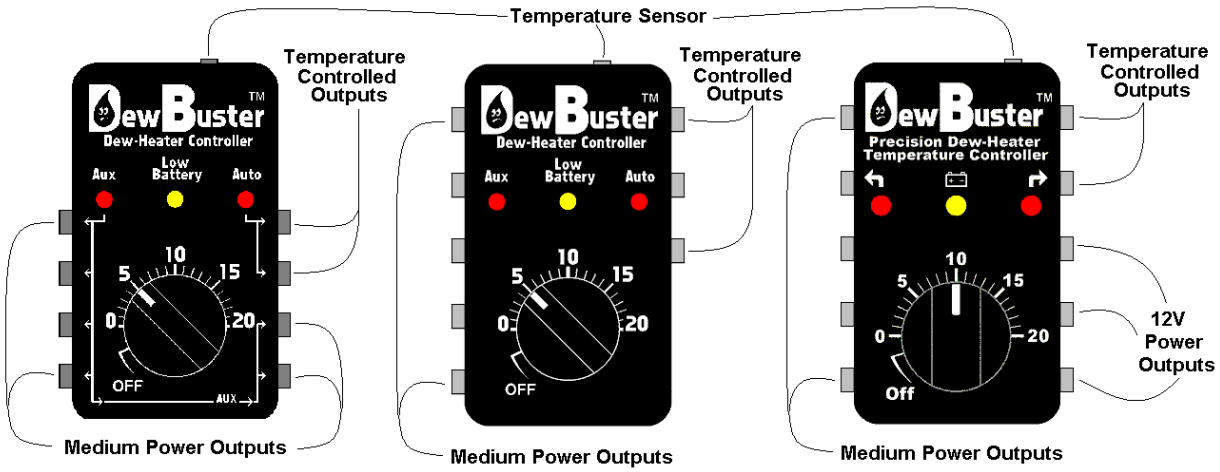
DewBuster™ Controller Instruction Manual



Overview

NOTE: This manual covers several single temperature sensor versions of DewBuster™ Controllers as shown in the figures above. Please refer to the appropriate figure for your controller.

To prevent dew from forming on your primary lens it must be kept slightly warmer than the air temperature, but if warmed any further the excess heat causes destructive air currents in the optical path and prevents your telescope from delivering the sharp highly magnified images that you desire. The DewBuster™ Controller solves this problem by measuring both the air and telescope temperatures and carefully controlling heater power level keep the primary lens slightly above the air temperature and no more. This also minimizes power consumption permitting longer observing sessions from your battery. The Temperature Sensor Cable combines both Air Sensor and Scope Sensor into one cable which conveniently clips onto the heater strip. Simple operation is provided by a single control knob which sets the control point in °F above the air temperature. If the knob is set to 5 the telescope will be maintained 5°F warmer than the surrounding air and as the air temperature changes during the night the telescope will always stay 5°F warmer.

Medium Power Outputs are also provided to keep accessory heaters such as finderscope, eyepiece, and etc. dew free. These accessories do not hinder telescope performance so rather than measure their temperature; they are simply run at a higher power level than the Temperature Controlled output to insure no dew forms. These outputs will go to full power when the controller is placed in Dew Burn-Off Mode.

The DewBuster™ Controller is fully compatible with Dew-Not and Kendrick heater strips that use RCA Plugs. You may also build your own heaters (instructions at www.dewbuster.com) without voiding your warranty. Night vision friendly red LED's are wired to the heater outputs to provide visual indication that voltage pulses are reaching the heaters so you never have to wonder if the controller is working.

A Battery warning LED alerts you with a distinctive yellow flicker when the battery voltage is getting low and the LED acts as a battery monitor, getting brighter as the battery reaches exhaustion. In addition, special power-conservation circuitry reduces heater power levels in proportion to battery discharge to keep your dew heaters running as long as possible without allowing the battery to be drained below 10.5 Volts. When the battery is exhausted the Battery LED will remain on continuously but the Temperature Controlled and Medium Power LED's will be off since the heaters are shut down.

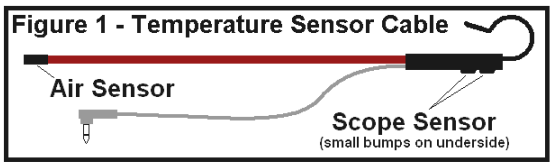
The DewBuster™ Controller is fully protected from reverse polarity, over-current, and shorted heaters. The controller is rugged and may be operated continuously if desired.

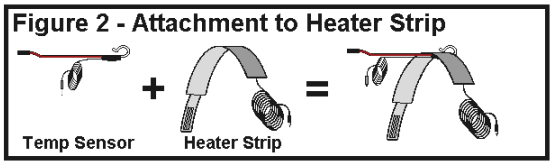
Warranty and Technical Support

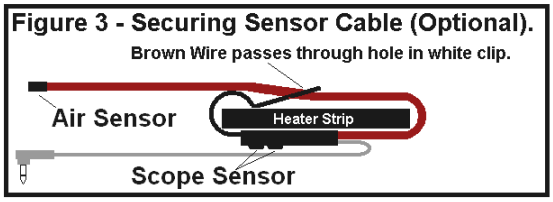
Your DewBuster™ Controller is warranted to the original purchaser for 5 years from the date of purchase. If your DewBuster™ Controller fails for any reason, contact me for return instructions. I will expedite the repair to insure you are not without your controller any longer than necessary. Failures beyond the warranty period and controllers purchased second hand will be repaired at a flat-rate fee, contact me for current price.

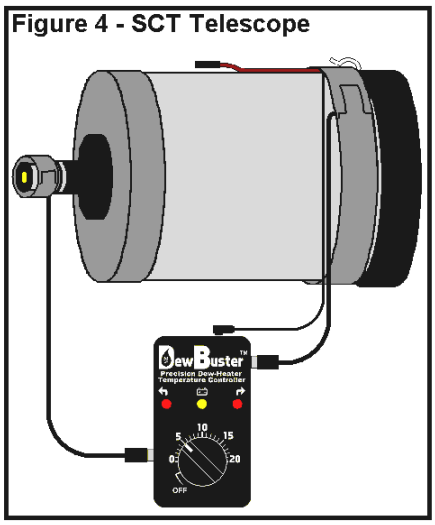
Ron Keating
269 St. Andrews Blvd., Laplace, LA 70068
E-mail address changes frequently due to spam so go to:
www.dewbuster.com
and click on CONTACT ME for current e-mail address.

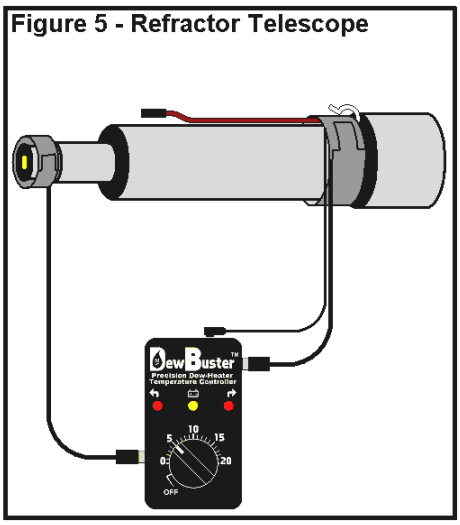
Installing the DewBuster™ Controller on Your Telescope











FOR TEMPERATURE CONTROLLED OUTPUT:

- Attach Temperature Sensor Cable (Fig.1) to heater strip as shown in Fig.2. If desired, Temperature Sensor 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 any part of telescope. NOTE: The best location for the heater strip is just behind the corrector plate casting (Fig.3) or objective lens dew shield (Fig.4) and as close to the lens as possible. The goal is to warm the telescope tube and air inside the telescope just behind the glass. Do not place heater on dew shield as this will only warm the air inside which will then escape to the atmosphere.
- On an SCT Telescope install the dew shield taking care that the Temperature Sensor Cable remains in position. It is imperative to use a dew shield. If you do not have one, see instructions at dewbuster.com for making one.
- Plug Temperature Sensor Cable into jack on top of controller (Fig. 4 or 5) and plug heater strip into one of the associated Temperature Controlled output jacks (upper right side on standard model).

FOR MEDIUM POWER OUTPUTS:

- Install heater strips and plug into Medium Power Output jacks as shown in Fig. 4 or 5 (left side on standard model).

TURNING ON CONTROLLER:

- Connect controller to 12 Volt battery or 13.8 Volt DC power supply (15VDC maximum). **CAUTION: Due to the high current draw of dew heaters, never attempt to power your controller from the DC Power Output on your telescope as it will damage your telescope!**
- Turn control knob to desired temperature setting (first time users see below).
- Temperature Controlled and Medium Power LED's may go to full power (LED on continuously) while the telescope is warming up, but they should start blinking after a few minutes. When Temperature Controlled LED blinks the telescope has reached the temperature that the control knob is set to (°F above air temperature). Note: LED on continuously means warming up, LED off means cooling down.
- Medium Power Outputs will remain at medium power (light blinking).
- The Battery Light should remain off (see below for information on Battery Light).

DETERMINING TEMPERATURE SETTING:

- First time users should set the knob to the same number as your telescope aperture (4"=4 degrees, 10"=10 degrees) and operate at this setting the first night unless dew forms.
- If dew forms, a higher setting is needed. To quickly clear dew, temporarily unplug the Temperature Sensor Cable and turn the control knob to maximum. When dew clears plug the Temperature Sensor Cable in and turn the control knob to a setting a few degrees higher than the setting which allowed dew to form.
- If no dew forms on the first night, try a lower setting the next night because your telescope will deliver the best high magnification performance with the lowest possible temperature setting.
- You will quickly learn the ideal setting for your telescope, then just set it there at the beginning of the 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 interferes with the telescope reaching thermal equilibrium, just set it to the ideal setting and leave it there for the entire night.

Low Battery - The yellow Battery warning LED begins to flicker when the power to the controller falls below 11V meaning the battery is almost exhausted. You may gain time by disconnecting unnecessary loads from your battery or unplugging heaters that you do not need. As the battery weakens the LED will brighten and the smart Low Battery Circuitry will reduce heater power levels to allow as much heat as possible while preventing the battery from falling below 10.5V to protect it from damage. If the Battery Light illuminates with a fully charged battery or when using a power supply, check that your power source is at least 12.5V and check all wiring between the DewBuster™ Controller and power source for poor connections.

Manual Mode – If the Temperature Sensor Cable is unplugged, the controller switches to manual mode (useful for Dobs or if you forget the Temperature Sensor Cable at home). When operating in manual mode, plug all heaters into the MEDIUM POWER outputs and set the control knob to zero. The heaters will be driven at medium power level. For burning off dew or for faster warm-up of a cold telescope, temporarily increase the control knob to maximum which will cause the MEDIUM POWER outputs to go to full power.

Moisture Inside Telescope – condensation on the inside surfaces of a closed tube telescope is not dew, but rather moisture trapped inside the telescope. This usually happens during winter when the telescope was stored indoors and then brought into the cold outside air. Indoor air is not low humidity, because it is warm it absorbs moisture and has at best a 50 degree dew point. When the telescope cools below 50 degrees the moisture will condense onto the interior optical surfaces and can not be removed with just a dew heater. **During winter:** Uncap the 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 outside and then seal the telescope in an air-tight plastic bag to prevent condensation on the cold surfaces when the telescope is brought indoors. The telescope may be left in the bag (the air inside is less humid than the air inside your home) but if you need to remove it then wait until the telescope has warmed up to the indoor temperature and keep the openings capped as much as possible. **During summer:** To prevent the lenses from fogging up when bringing a cool telescope into the warm outside air, keep the lenses capped until the telescope has warmed to the outside air temperature. When the telescope is brought indoors at the end of the observing session, the air conditioned environment is drier so you may uncap the telescope to allow any moisture to dry up. In summer it is best to store the telescope in an air conditioned environment.

Troubleshooting Problems

Symptom	Most Likely Cause
Center of corrector plate or lens dews up.	• Are you using a dew shield? If not, heater strip can't keep up with heat loss from corrector plate. • Is heater strip installed just behind the corrector plate casting or lens dew shield? This is the most effective position because it warms the air inside the tube just behind the lens and the heat rises to warm the lens. Trying to heat the dew shield or corrector plate casting is ineffective. • Temperature set too low. See "DETERMINING TEMPERATURE SETTING" on page 2 for further instructions.
No LED's lit.	• Check that polarity is not reversed on your power source. (Controller will not be damaged). • LED brightness is optimized for night time conditions and may be difficult to see during daylight. • If cigarette plug power LED is not 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). • Non-Cigarette Plug models use a self resetting PST fuse. If fuse trips, unplug controller and when fuse cools it will reset by itself.
Temp Controlled LED not lit.	• If the sun is warming telescope the Temperature Controlled Outputs may shut off since the telescope is warmer than the air. After sunset the LED's should start blinking. • Is Temp Controlled heater plugged into Temperature Controlled output (not Medium Power)?
Temp Controlled or Medium Power LED not lit.	• A heater may be shorted, unplug heaters one at a time to see if LED comes on. If so, that heater probably has a short (see Technical Support article "Repair Shorted Heater" at www.dewbuster.com). NOTE: Shorts may be intermittent so check even if problem disappears.
Both red LED's stay on constantly.	• Normal when first turned on, but LED's should blink after a few minutes when scope warms up. • Temperature Sensor Cable unplugged. • Scope Sensor 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	• Shorted heater strip (see Technical Support article "Repair Shorted Heater" at www.dewbuster.com). • Insufficient battery capacity, use at least 17AH battery for 8" SCT. If dead battery recharges very quickly it has lost its capacity and should be replaced. For example, if a 5A charger takes 2 hours to recharge 17AH battery it is only storing 5A x 2H = 10AH so it is in poor condition.

Dobsonian Owners

Many Dobsonian Telescope Owners will not use the Temperature Control feature of the DewBuster™ Controller so here is a detailed explanation of MANUAL MODE:

When using your DewBuster™ Controller in an application where the Temperature Controlled Outputs are not needed, leave the Temperature Sensor Cable unplugged and set the control knob to 0 degrees. Plug all heaters into the Medium Power Outputs. These outputs run at medium power level (higher power than what the Temperature Controlled Outputs normally run at) which will keep accessory heaters such as finderscope, eyepiece, etc. dew free without a temperature sensor.

If you have a heater that you would like to operate at a different power level, plug it into the Temperature Controlled output and you can adjust the power level from 0 to 100% by adjusting the control knob between 0 and 5 degrees. The Temperature Sensor Cable must remain unplugged.

If the control knob is increased to maximum this will activate Dew Burn-Off Mode and both the Temperature Controlled and Medium Power Outputs will go to full power to quickly evaporate dew. This can also be used to warm up everything quickly such as when the equipment is first turned on.

Optional Power Output Jacks

If your DewBuster™ Controller has the optional 12V Accessory Power Output Jacks they are located in one of the locations shown below. The Power Outlet RCA jacks are color coded with red insulators. The voltage at these jacks is not regulated, it will be the same voltage as the power input to the DewBuster™ Controller and they are limited in current only by the DewBuster™ Controller's main fuse. The Power jacks are powered any time the DewBuster™ Controller is plugged into a power source, even if the control knob is turned to OFF.