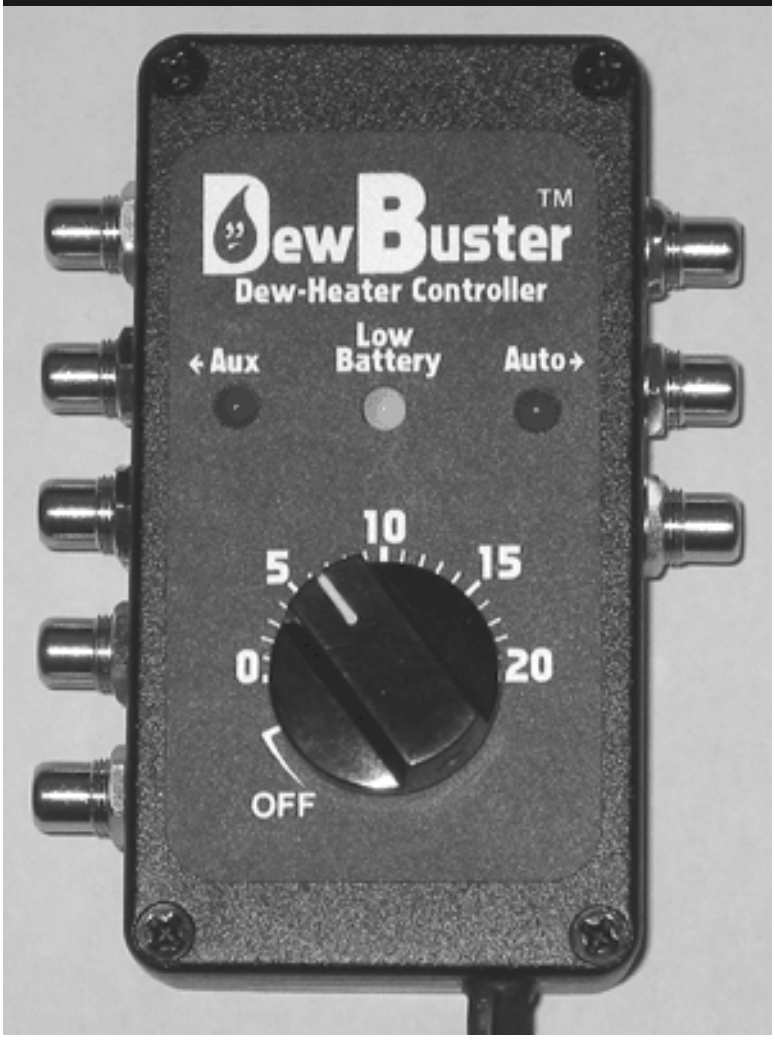
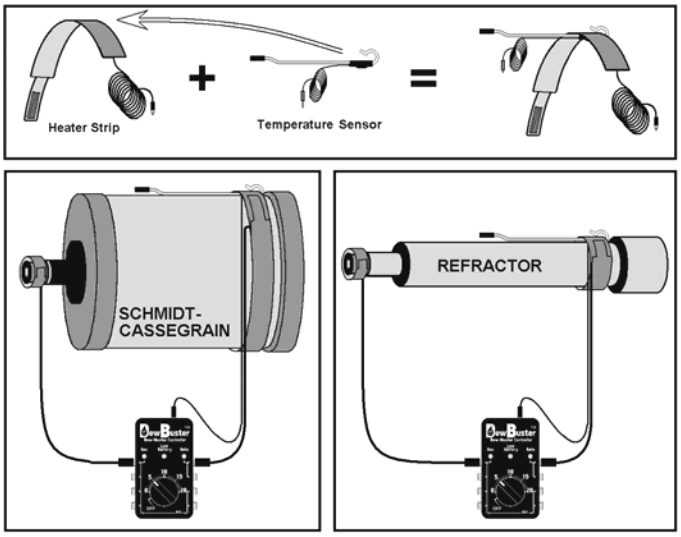
DewBuster™

Dew-Heater Controller



Instruction Manual

Installing the DewBuster™ Controller on Your Telescope



1. Clip Temperature Sensor onto heater strip as shown above. Place heater strip on telescope and insure black band of temperature sensor is in contact with telescope tube. For Schmidt-Cassegrain, install heater strip on telescope just behind corrector plate casting. For refractor, install heater strip around lens cell or as close to it as possible. If lens cell is plastic or covered by the dew shield, place heater strip around telescope tube as close to lens as possible. Do not place heater strip on dew shield as this creates heat currents in front of the lens.
2. On Schmidt-Cassegrain it is imperative to use a dew shield, otherwise dew may form and/or excessive heat will be needed which reduces telescope performance. When installing dew shield, insure that temperature sensor stays in position.
3. Plug temperature sensor into jack on top of controller and plug heater strip into AUTO output jack.
4. Plug remaining heater strips into AUX output jacks.
5. Connect DewBuster™ Controller power cord to 12 Volt battery or 13.8 Volt DC power supply.
6. Set controller to desired temperature setting (see **Determining Temperature Setting** below).
7. Heater output indicator lights may illuminate steadily (full power) while the telescope is warming up, but after a few minutes when desired temperature has been reached they should start blinking (reduced power). The yellow Low Battery light should remain off (see **Low Battery** section below if light is coming on).

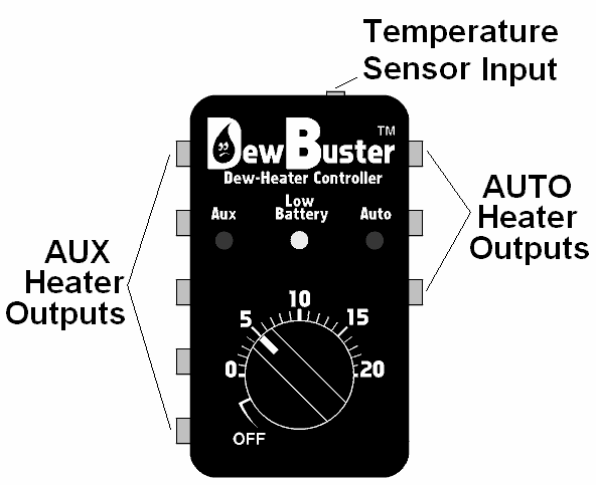
Determining Temperature Setting – The control knob on the DewBuster™ Controller sets the temperature differential (number of degrees the telescope is kept warmer than the air) setting of the will be learned through experience. If this is your first time, as a starting point set the temperature to the same number as your telescope aperture in inches (10” scope = 10 degrees, 4” = 4 degrees). Your telescope will deliver the best high magnification images with the lowest possible temperature setting, however the lenses must be kept warmer than ambient to prevent dew formation. So if you experience dew try a higher temperature setting, if no dew forms try a lower setting. You will soon learn what setting works for your telescope, after which you can set it at the beginning of each night and not bother with it again. Do not keep changing the temperature setting throughout the night as this interferes with the telescope reaching thermal equilibrium. If you are using a guide scope you may try running it on the AUTO output, but if you experience dew then move the guide scope to an AUX output.

Low Battery - Illuminates when a low-voltage condition exists, usually meaning the battery needs to be recharged. When light begins to flash, disconnect unnecessary devices from battery and unplug heater strips that you can do without. You may also preserve battery power by lowering the controller’s temperature setting. As the battery weakens the AUTO and AUX lights will grow dimmer and the Low-Battery Conservation Circuitry reduces heater power to prevent running the battery below 10-1/2 Volts. Dew will eventually form, but preventing battery damage is more important.

If Low Battery illuminates with a fully charged battery, check for poor connections in wiring between the DewBuster™ controller and battery terminals. Alligator clips should not be used because they make poor connections which can create sparks and a battery explosion. If a cigarette plug splitter or extension cables are being used, remove them to see if they are causing the voltage losses. Also try unplugging each heater to see if it is causing the problem. If a heater is at fault, check for a short in the heater strip RCA plug (see the Tech Bulletin at www.dewbuster.com).

If using a power supply, it should be rated for at least twice the current your equipment draws. **Never attempt to power your DewBuster™ controller from your telescope’s DC Power Output connector because it can not handle the current and may damage your telescope!**

 Revised Jul-2008



Controller Overview

It is easy to keep a lens dew-free by applying heat, but if it is heated much above ambient air temperature then the telescope will not perform well. The DewBuster™ controller solves this problem by controlling the AUTO heater power level to apply just enough energy to keep the primary lens slightly above the ambient air temperature. An added benefit is that power consumption is reduced which allows longer observing sessions when running on battery. To reduce cable clutter, both air and telescope sensors are combined into one Dual Temperature Sensor Cable which conveniently clips onto the heater strip. The control knob adjusts the temperature to match the needs of your telescope. Additional AUTO output jacks are provided for special situations such as double corrector plate heaters (needed with some C14's and Mak's) or for a guidescope heater.

5 AUX outputs provide plenty of room for plugging in auxiliary heaters such as finderscope, eyepiece, Telrad, etc. The temperature of these heaters is not measured because they do not affect telescope performance and they are small enough that very little energy is wasted. The AUX heaters normally run at a medium power level but they will go to full power if the telescope is much colder than the set temperature differential, such as when the DewBuster is first turned on.

Both AUTO and AUX heater outputs are protected against damage from heater shorts. Any commercial 12V heater such as Dew-Not, Kendrick, and compatible may be used. You may also build your own heaters, see the instructions at www.dewbuster.com. Red LED's are provided for visual indication of heater power levels. The ON versus OFF time of the LED is indicative of the heater power level (LED on constantly means full power).

The yellow Low-Battery light warns when the battery is running low. At that time the smart low battery circuitry engages reducing heater power levels to maintain dew prevention as long as possible yet preventing battery damage. The controller is fully protected from reverse polarity and over-current. Standard models have a 5 Amp fuse in the cigarette plug and will accept up to a 10 Amp fast-blow fuse (before installing a larger fuse, check the current rating of your cigarette socket, most will not handle more than 7 amps). Ring terminal models have an internal solid state fuse which will automatically reset a few minutes after the short is cleared.

Dew Burn-Off Mode - It takes a much higher temperature to evaporate dew than to prevent it, so once dew has formed, just increasing the control knob setting may not clear your optics. Burn-off the dew by unplugging the temperature sensor cable and setting the control knob to at least 10 degrees. This keeps the heaters at full power until the dew evaporates. When the lens is dew free, plug the temperature sensor cable back in and set the control knob to about 5 degrees higher than where it was set when it dewed up. The AUTO and AUX lights will remain off until the scope cools down to the set temperature.

Moisture Inside Telescope – condensation on the inside lens surfaces is a result of trapped moisture in the telescope. This often happens during winter because the telescope is exposed to warm air to dry it out. Unfortunately warm air absorbs moisture and if trapped in the tube, this moisture condenses on the tube and optical surfaces when the temperature falls at night. **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 (blows air into telescope pushing out trapped air). 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 when the telescope is brought indoors. Wait until the telescope has warmed up before removing it from the bag. **During summer,** keep the caps on when bringing the telescope outdoor so the lenses will not fog up. At the end of the observing session, after the telescope has acclimated to the temperature in your home, uncap the telescope to allow any moisture to dry up. Store the telescope in an air conditioned environment.

Observatory Use – The DewBuster™ controller may be run continuously without problem. This can help prevent morning condensation when the sun rapidly warms the air but the telescope is still cold. If the telescope tube or mount is wet at the end of the observing session, do not cover it until the next day when the moisture has dried up.

Manual Mode – When the temperature sensor cable is unplugged the controller switches to manual mode. Plug all heaters into the AUX outputs and set the control knob so that the AUTO light blinks slowly. The AUX heaters will be driven at 40% power level. If you want to warm up quickly, then temporarily increase the control knob until the AUX light stays on (100% power).

Extension Cables – Commonly available RCA type cords are not designed to carry much current and will get hot and short out. If you need an extension you will need to build your own cables using 18 AWG wire.

Troubleshooting Problems

Symptom	Likely Cause
Center of corrector plate 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? This is the most efficient position and works much better than trying to heat the dew shield or corrector plate casting. • Temperature set too low. Unplug sensor until dew burns off, and then raise temperature setting.
Red LED's never come on.	• If light on cigarette plug is not lit then check that it is fully inserted into socket, battery polarity is correct, and fuse is not blown (unscrew tip of cigarette plug to access fuse). Standard fuse is 5-Amp but up to a 10-Amp fuse may be used if your cigarette socket can handle the current. • Unplug heaters one at a time and if red lights come on then the last heater unplugged has a short in it (see Tech Bulletin at www.dewbuster.com on RCA Plug Shorts).
Both red LED's stay on constantly.	• Normal when first turned on, but lights should blink after telescope warms up. • Scope Temperature Sensor unplugged or not in good contact with telescope. • Air Temperature Sensor too close to heater strip or other heat source.
Battery runs down very quickly	• Shorted heater strip (see Tech Bulletin at www.dewbuster.com on RCA Plug Shorts). • Insufficient battery capacity, use at least 17AH battery for 8" SCT. • If dead battery recharges in less than an hour it has lost its capacity and should be replaced.

Warranty and Technical Support

The DewBuster™ controller is warranted to the **original purchaser** for 2 years from the date of purchase. If your DewBuster™ controller fails for any reason, **contact Tech Support for return instructions.** Failures beyond the warranty period and controllers purchased second hand will be repaired at a flat-rate fee, contact Tech Support for current price.

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