Guardian – Installation and Operation

Description: The Coastal ***Guardian*** consists of a black panel measuring 5”w x 2”h that incorporates a Coastal MK II Digital Thermostat/Thermometer, a compressor speed adjustment knob, and a diagnostic fault LED. The panel is supplied with a 10’ thermostat sensor and a 10’ control cable that connects to a Danfoss compressor controller. If a Merlin SSC is installed on the Danfoss electronic controller (module), or an “AEO” module is fitted in place of the standard version, the “AUTO” setting will give automatic speed control. Without either of these options there will be no automatic speed control capability. A Power Terminal Multiplier circuit board is included to facilitate easy power connections to the Danfoss controller, and a 2 amp in-line fuse is installed in the positive power feed wire. Standard model is for 12v power supplies only. 24v versions available on request.

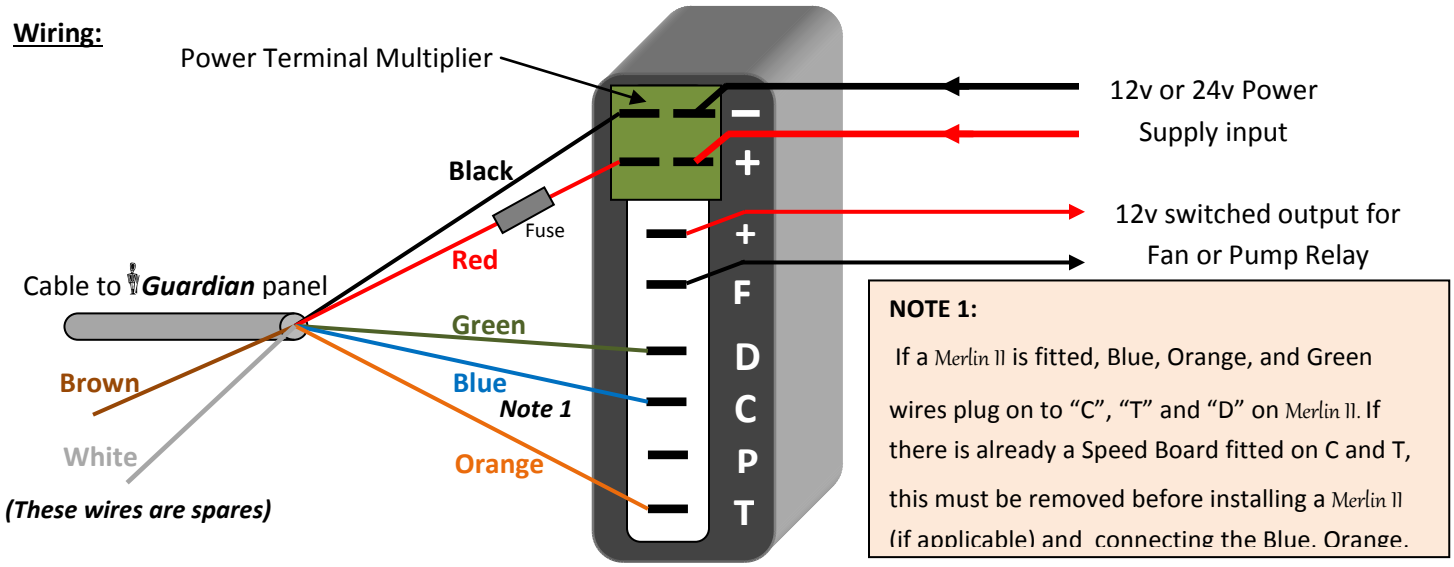


Location: The panel is designed to be mounted on a vertical surface, secured by the four screws provided. Care must be taken to ensure that the location chosen will not subject the panel or its components to splashing or running water, steam, corrosive gasses, excessive vibration, or physical damage. Ideally the location will allow the 10’ thermostat sensor and control cable to be installed without being extended. If it is necessary to extend either cable, the electrical joints should be soldered. The panel requires a cut-out measuring 4.5” x 1.5”, depth of 3”.



Installation: The Power Terminal Multiplier is to be installed on the top two terminals of the Danfoss controller. This provides two sets of + and – terminals: one set for the incoming 12v power feed from the distribution panel via a breaker, and one for the power supply to the ***Guardian***. Ensure that the female connectors on the Power Terminal Multiplier mate correctly with the male pins. The ***Guardian*** panel is then mounted and secured and the thermostat sensor and control cables run to their respective locations. The control wires connect to the Danfoss controller as shown below. The thermostat sensor should ideally be located at mid-height in the box, and not on a wall that has any portion of an evaporator mounted on it. The sensor should be isolated from the box wall with a plastic tie or similar.

Wiring:



NOTE 1:

If a Merlin II is fitted, Blue, Orange, and Green wires plug on to “C”, “T” and “D” on Merlin II. If there is already a Speed Board fitted on C and T, this must be removed before installing a Merlin II (if applicable) and connecting the Blue, Orange,

Danfoss Standard (101N0210) or AEO (101N0300) Compressor Controller

Over:

Guardian - Operation

Operation: The Coastal ***Guardian*** performs three functions:

1) ***Box Temperature Control***
2) ***Compressor Speed Control***
3) ***System protection***

Box Temperature Control - The Coastal MK II Digital Thermostat is pre-installed and set to work as a refrigerator control with a set point of 40 degrees Fahrenheit. Refer to separate instruction sheet for details on how to adjust temperature set point, differential, temperature scale (F or C) etc., and to set audible alarm thresholds.

Compressor Speed Control - Controlled by adjusting the rotary knob. When set in the "AUTO" position and with either a Merlin Smart Speed Controller or an AEO module installed, the compressor will automatically run at the most efficient speed. Changing the knob to a different speed after the compressor has started while in Auto mode will have no effect, but the compressor will start and run at the new speed on the next compressor cycle. Without Merlin SSC or AEO module installed, the "AUTO" setting is non-operational and will become the lowest speed setting. For manual control, the lowest possible speed should be set so that: (a) the box maintains the desired temperature, and (b) the compressor runs for between 30 and 45 minutes in the hour. Long run times at low speed = greater efficiency. When stocking the box with warm goods when Auto mode is engaged, set speed to "Max" 1 hour before restocking to ensure maximum speed is engaged, then restore to "Auto" once restocking is completed.

System Protection – In addition to the high and low audible temperature alarms featured on the Coastal MK II thermostat, there is a red diagnostic LED labeled "FAULT". This will display a flashing error code of between one and five flashes dependent on the nature of the fault, as listed below. Each flashing error code cycle is repeated every 4 seconds. When a fault is detected, the compressor will stop but the fan or water pump, if applicable, will continue to run. A re-start will be attempted approximately every 60-90 seconds. The fan or water pump will stop during restart attempts.

- **One Flash** – Indicates low voltage. Voltage at terminals on the Danfoss controller has dropped to less than 10.4v. Voltage must rise above the cut-in voltage of 11.7v before the compressor will attempt a re-start. NOTE: If the initial power applied at start-up is less than 11.8 volts there will be no code flashing on the diagnostic LED. The digital display will be lit, but the compressor will not start until the voltage has risen above 11.8 volts.
- **Two Flashes** - Indicates an overload on the Fan output. The fan output cannot support an average load greater than 0.5 amp, or a peak load greater than 1 amp for two seconds.
- **Three Flashes** – Indicates that the compressor cannot start due to too high a differential pressure in the compressor. This is a common problem where poor voltage, or breaks in the power supply or thermostat wiring cause the controller to attempt a compressor re-start too soon after it has been stopped for some reason.
- **Four Flashes** – Indicates that the compressor cannot reach minimum speed of 1,850 RPM.
- **Five Flashes** – Indicates that the electronics heat sink has exceeded 212 deg F (100 deg C). This can be due to an overcharge of refrigerant, water in the system, or excessive ambient temperatures combined with a compressor operating under extreme load. A re-start will be attempted when heat sink has cooled to 170 deg F (80 deg C).

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