

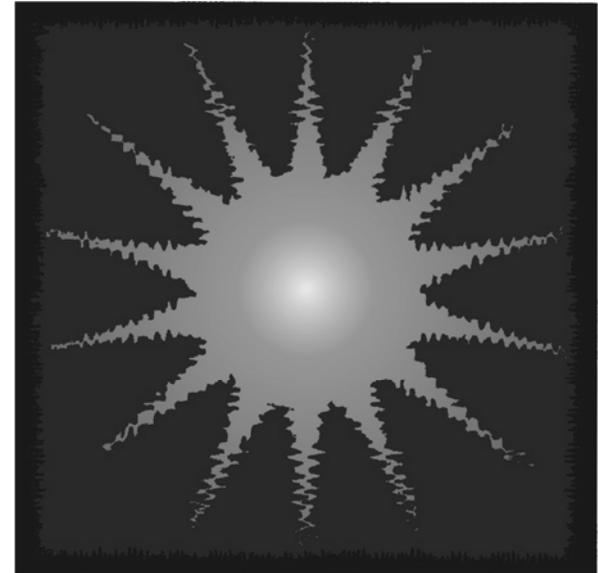
# Owners Manual

Heatizon Systems Low Voltage Products

**CBX6 Series**

**CBX23 Series**

**SLC500 Series**



**HEATIZON**  
S Y S T E M S



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**Owner's Manual**  
**Heatizon Systems Low Voltage Products**  
CBX6, CBX23 and SLC500

Congratulations on your decision to purchase the finest floor warming, space heating, roof snow and ice melting and/or snow melting products available today. We are so confident that your decision to purchase our products will provide you with many years of satisfaction that we have backed them up with the longest warranty in the industry. In the event you ever have questions regarding the Heatizon Systems products please do not hesitate to contact us.

**Heatizon Systems**  
**4137 South 500 West**  
**Murray, Utah 84123**  
**(801) 293-1232 Phone**  
**(801) 293-3077 Fax**  
[www.Heatizon.com](http://www.Heatizon.com)

**Heatizon Systems Products**

Utilizing state of the art components and low-voltage electricity, Heatizon's products are unprecedented in ease of operation. They are virtually maintenance free and efficient in operation. ZMesh and Tuff Cable have a limited 25 year warranty and are engineered to provide simple and problem-free solutions to your floor warming, in floor space heating, snow melting and roof snow and ice melting needs. Heatizon's ZMesh and Tuff Cable are tried and proven, and have been Warming American's Cold Spots since 1979.

Heatizon Systems products do not use chemicals or potentially explosive gases. The secondary side of all of our low voltage products operates at 65 volt AC or less

**Twenty-five Year Limited Warranty for**  
**Heatizon Systems**  
**“Tuff Cable” Element (E101), “Z Mesh” Screen Element (E102) and**  
**Specified Radiant Panel Heating Components**

Heatizon Systems warrants to the original purchaser/end user of the following products that for the periods noted such products shall be free from defects in material and workmanship: Tuff Cable (E101) Heating Element and ZMesh (E102) Heating Element for a period of twenty-five (25) years, the Control Unit for a period of one (1) year, and power Transformer for a period of five (5) years. Such warranty periods shall commence on the date of shipment by Heatizon Systems. If any parts are found to be defective in manufacture during such time period, Heatizon Systems will, at its sole option, replace or repair defective parts.

This Limited Warranty applies only if articles sold hereunder (a) are selected, designed, and installed according to instruction and operation manuals furnished by Heatizon Systems and installed in a “workmanlike manner” according to the building association standards adopted by Heatizon Systems, (b) remain in their originally installed location, (c) are connected to proper power supplies, (d) are not misused or abused, (e) show no evidence of tampering, mishandling, neglect, damage (accidental or otherwise), modifications or repair without the approval of Heatizon Systems, or damage done to the product by anyone other than Heatizon Systems, and (f) are installed in accordance with applicable code requirements. Any warranty claims must be made in writing, no later than one (1) month following expiration of the warranty period, and must be accompanied by the warranted part or component. Any claim not made in such manner shall not be honored by Heatizon Systems.

This Limited Warranty does not cover:

1. The workmanship of any installer of Heatizon Systems radiant panel heating products.
2. Any Heatizon Systems radiant heating products that have a failure or malfunction resulting from improper or negligent operation, accident, abuse, misuse, unauthorized alteration or improper repair or maintenance.
3. Any Heatizon Systems radiant heating products that have had components not purchased from Heatizon Systems integrated into or connected to them.
4. Any labor costs for removal of alleged defective part(s) and/or reinstallation of replacement part(s), transportation to and from Heatizon Systems (if necessary) and any other material necessary to perform the exchange or repair.
5. Any Heatizon Systems heating products that have not been properly registered by completion and return of the Warranty Registration Card attached hereto.

**DISCLAIMER OF WARRANTIES:**

This warranty described above is in lieu of all other warranties, express or implied, including but not limited to any implied warranties of fitness for a particular purpose and merchantability. Heatizon Systems expressly disclaims and excludes any liability for losses, expenses, inconveniences, consequential, incidental, indirect, or punitive damages for breach of any express or implied warranty. By installing and/or purchasing Heatizon Systems products, you accept the terms of this limited warranty.

Some states do not allow the exclusion or limitation of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the above limitations and exclusions may not apply to you. This Limited Warranty gives you specific legal rights, and you may also have other rights which may vary from state to state.

## WARNINGS

Check contents of all boxes immediately upon receipt of your Heatizon shipment and notify Heatizon within 24 hours of any discrepancy or missing part.

Read the Design and Installation Manual in its entirety before attempting to install any Heatizon Systems Products.

Installation of Heatizon Systems products and associated work must be performed by qualified persons and conform to local building codes, ordinances, trade practices, and in accordance with all applicable sections of the National Electric Code (NEC).

Risk of fire! Risk of fire possible if installation of system is not completed according to all of the installation instructions contained within this Installation Manual, including but not limited to the warnings and notes throughout. Risk of fire possible if metal or any other conductive material is allowed to come into contact with the Cold Leads and Tuff Cable or ZMesh Heating Element. Risk of fire possible if connections/joints between Cold Leads and Tuff Cable, Colds Leads and ZMesh, Tuff Cable and Tuff Cable, and or ZMesh and ZMesh are not crimped and/or soldered correctly. Risk of fire possible if loose strands of ZMesh or Tuff Cable Heating Element or cuts or other damage to ZMesh or Tuff Cable are not repaired correctly. Note: The safety features incorporated into Heatizon Systems products cannot detect cuts in Cold Leads and ZMesh or Tuff Cable element. Do not allow ZMesh to cross itself—maintain a minimum of 2" distance between adjacent runs of ZMesh Heating Element. Do not allow Tuff Cable to touch or cross itself.

Risk of shock! Make sure all power to your Heatizon Systems product and thermostat is shut off at the electric distribution panel before installing, removing covers, servicing, or working on any of the components of any Heatizon System product.

All connections/joints between Colds Leads and Tuff Cable heating element must be embedded into mortar, asphalt, or other acceptable cementitious Heatsink.

Knockout openings shall not be used except with devices that are designed to fill such openings.

Obtain written approval from Heatizon Systems for applications and installations that are different from those described herein.

In order for your Heatizon Systems product to operate correctly, the transformer portion of the Control Unit must be installed so that it can dissipate the heat that it generates

Like all electric products, Heatizon Systems products create a magnetic field that may interfere with certain brands of televisions, computer monitors, etc. Unlike Cathode Ray Tubes ("CRT"), Plasma Display Panels ("PDP") and Liquid Crystal Displays ("LCD") do not seem to be affected by magnetic fields. In the event magnetic field interference is a concern for you please consult Heatizon Systems or your sales representative prior to making your purchase.

Mattresses, Bean Bag Chairs, LoveSacs, Futons, and all other items which have high insulating values should never be placed directly on any surface which has a radiant heating product under it.

Never install Heatizon Systems products in space heating or floor warming applications to deliver more than the 15 watts per square foot (or 160 watts/m<sup>2</sup>) recommended by the Radiant Panel Association.

"Field installed wiring is to be in compliance with the National Electrical Code (NFPA-70) and/or ordinances," or equivalent.

Please call Heatizon Systems Technical Support Department at (801) 293-1232 with any questions you have regarding these Design and Installation Instructions, Owners Manual, and The Customer Information Sheet, or the installation, operation, and maintenance of Heatizon Systems products.

## HEATING ELEMENTS

**ZMESH**...is made to go **ON** something...like concrete and wood sub-floors and sub-roofs. ZMesh, Heatizon's bronze mesh heating element, is so advanced that it can be installed under non-conductive roof coverings, ceramic tile, stone, laminant flooring, carpeting, and hardwood flooring. Typical installations for ZMesh include total space heating, roof snow melt, and floor warming.



**TUFF CABLE**...is made to go **IN** something... like asphalt, concrete, a sand bed under pavers or a heatsink kit. Heatizon Tuff Cable heating element is a very durable coated copper cable that is chemical and gasoline resistant. It is designed to be installed in asphalt, concrete, tile mortar bed, thin set, or a Heatizon Heatsink Kit. Typical installations for Tuff Cable include total space heating, floor warming, snow melting, and roof snow melt.



**Danger.** Do not cut, short, or damage the Heatizon ZMesh or Tuff Cable heating elements once they have been installed. If you are performing work in the area where the heating element is located:

1. Turn the power off
2. Identify the exact location of the heating element
3. Contact Heatizon Systems (801-293-1232 or [www.heatizon.com](http://www.heatizon.com)) if the heating element is damaged in any way

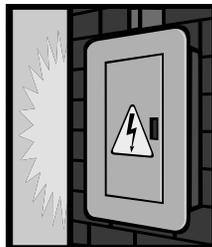
## WARNINGS

The following warning was supplied with your element kit, and should be permanently affixed to an appropriate surface:



Never cut or in any other way damage the Tuff Cable or ZMesh. Never short the ZMesh or Tuff Cable to anything electronically conductive.

It is not recommend that you ever remove any of the covers on the Control Unit. Never open your Heatizon Systems Control Unit without first turning the power to said Control Unit completely off by flipping both the Control Unit Switch and the circuit breaker in the electric distribution panel to the off position.



4. Check for anything that could be shorting between adjacent runs of heating element or cold leads, such as nails that pass through the heating element into air ducts below the floor, metal carpet strips or thresholds, a frayed wire from the screen element, a foil candy wrapper, etc. Correct as necessary.

5. An erratic power source may also cause an erroneous arcing detection in the system. Check for defective panel circuit breakers or loose connections at these breakers. Correct as necessary. If primary power to the breaker panel is the source of the problem, contact your electrician or your power company for technical assistance.

**Problem: System shuts down immediately upon call for heat, status LED flashes rapidly. This indicates SCR has failed.**

Solution: Turn the power to the Control Unit OFF. Contact Heatizon Systems.

**Problem: System will stay in adjustment. After running a given period of time, an overcurrent or undercurrent fault occurs.**

Solution:

1. Check jumpers on control board for proper over/under current tolerance settings. If the system is using Tuff Cable heating element set for 5% tolerance, set it for 15% tolerance (JP5, JP7, JP9 and JP11). If the system is using ZMesh screen element and is set for 15% tolerance, set it for 5% tolerance (JP4, JP6, JP8, and JP10). These adjustments are made on the Control Board.

2. Check for poor connections, burnt or damaged heating element. Correct as necessary.

**Problem: Television Screen or Computer Monitor interference occurs only when Heatizon System is on.**

Solution:

1. Change the distance from the Heatizon heating element and the television or computer monitor, and/or change the location of the television or computer monitor in the room.
2. Turn the Heatizon system thermostat to the off position when watching the affected television or when using the affected computer monitor.
3. Replace the affected television or computer monitor with one that utilizes Plasma Display Panel or Liquid Crystal Display technology.

Note: Prior to returning anything to Heatizon Systems, 4137 South 500 West, Murray, UT 84123, call (801) 293-1232 for a Return Materials Authorization form.

**Problem: System starts, but will not stay running. LED # D21 (undercurrent) or #D22 (overcurrent) turns on and status LED blinks slowly.**

- Solution:
1. Verify secondary voltage and amperage is the same as those taken when heating element was originally installed. If they are the same, return the Control Unit to Heatizon Systems. If they are different, then call Heatizon Systems Technical Support Department at (801) 293-1232.
  2. Open heating element. Test for continuity as described in previous section.

**Problem: System starts and runs, but Transformer is operating at greater than 200EF.**

- Solution: Check thermistor for proper location and connection.

**Problem: System may start and run, but shuts down after a period of time. LED # 23 (overtemp) lights and status indicator flashes a pattern of two blinks and a pause. This is transformer overtemp fault.**

- Solution:
1. Check to see if the Transformer is operating at a temperature less than 200EF. If it is operating at less than 200EF, then:
  2. Check Cold Lead operating amperage. If higher than original Amperage measured when the Control Unit was originally installed, see Trouble Shooting Guide, "System starts, but won't stay running."
  3. Check for restricted air flow to the transformer. Correct as necessary.
  4. Check for air temperature where the Control Unit is mounted. Make certain it is 72EF or less. Correct as necessary.
  5. Check that thermistor is properly installed on the controller, (if thermistor is missing or not installed properly system will not operate).

**Problem: System may or may not start, but shuts down and status LED blinks three times then pauses, LED #D21 & D22 will light. This is an arcing or shorting fault.**

- Solution:
1. Turn primary power off. Check for loose connections at the transformer. Correct as necessary.
  2. Check for loose connections at the Control Unit, (power input and transformer primary). Correct as necessary.
  3. If Control Unit connections are found to be good, the problem could be in the Cold Leads or heating element, or the connections between them at the transition plate or butt splice. Check for poor solder or crimp connections. Repair as necessary.

## PERFORMANCE FEATURES

**Energy Savings.** Heatizon Systems low-voltage products utilize an isolated step down transformer and resistance in the ZMesh or Tuff Cable to create the perfect amount of heat necessary to warm floors, heat buildings, remove snow and ice from roofs and melt snow from driveways, walkways, handicap ramps, loading docks, etc. All of our products are nearly 100 percent efficient and are designed to deliver the heat they create to the exact location necessary to accomplish their objective. The following tips will help your Heatizon Systems products conserve energy:



**Snow Melting** - Heatizon Systems recommends that your snow melting system(s) be turned on prior to a snow and/or ice storm whenever possible. Turning the system on prior to a snow and/or ice storm allows for the temperature of the mass of the asphalt, concrete, or pavers to rise in preparation for the snow/ice fall thereby increasing the possibility that it will be able to melt the snow/ice as it falls and avoiding situations where the snow/ice melt system must play catch-up. If your system is equipped with a temperature/moisture sensor it is designed to turn on whenever the temperature is 38 degrees F or lower and constant moisture is present.



**Floor Warming** - Heatizon Systems offers completely programmable thermostats with remote sensors with its entire floor warming products. The remote sensor coupled with the programmable thermostat allows you to determine when the system will be on and exactly what the temperature of the floor will be.



**Space Heating** - Heatizon Systems total space heating products provide the comfort of radiant heat without the uncomfortable concrete floors and the maintenance expense of its competitors.



**Roof Snow and Ice Melt** - Heatizon Systems under roof snow and ice melt products are designed to last for many, many years and provide uniform heat everywhere that they are installed. Once they are correctly installed, our products do not come down with sliding snow and ice like roof-top cables. Heatizon Systems recommends that your roof snow and ice melting system(s) be turned on prior to a snow and/or ice storm whenever possible. Turning the system on prior to a snow and/or ice storm allows for the temperature of the ZMesh or the mass of the Tuff Cable in a Heatsink to rise in stalled our products do preparation for the snow/ice fall thereby increasing the possibility that it will be able to melt the snow/ice as it falls and avoiding situations where the snow/ice melt system must play catch-up. If your system is equipped with a temperature/moisture sensor it is designed to turn on whenever the temperature is 38 degrees F or lower and constant moisture is present.

2. Test the Control Unit by jumpering Red and White terminals for the activation device, Control Unit should start. If system starts, fault is in the activation device or Thermostat Wire.

3. Check the installation and wiring of the Activation Device. To test Activation Device, connect an ohm meter to the Thermostat Wire terminals (the "R" & "W" terminals) of the Control Unit. The ohm meter should read continuity when the device is adjusted to call for heat, and should read open when the device is set for no heat. Repair or replace Activation Device or Thermostat Wire as necessary.

4. Check to see if LED #D23 ("Overtemp") is illuminated. Check connection and placement of thermistor on the Control Board. If thermistor is missing or not installed properly, system will not operate.

**Problem: System starts when power is turned on, but will not turn off via activation device.**

Solution: Remove red or white wire from Control Unit at activation terminals. If Control Unit shuts off, test activation device as described above.

**Problem: System starts, but won't stay running; LED's #D24 through #D27 won't Change status when potentiometer is adjusted.**

Solution:

1. Check that the torroid is properly installed over one of the Cold Leads and plugged into the proper connector in the Control Unit
2. Attach clamp-on amp meter around a Cold Lead and activate the system. Check for the presence of current in the secondary circuit during the 5-second period prior to system shut down (current should be 40 to 100 amps). If there is no current present in the secondary, check the Transformer for voltage on the taps you are connected to (1.6 to 66 VAC depending on Transformer size). The presence of voltage on the Transformer taps but no current on the Cold Leads indicates no continuity in the heating element or Cold Lead. To check for continuity in the heating element and Cold Lead, remove one of the Cold Leads from the Transformer and place an ohm meter across the Cold Leads. Normal resistance should be less than 1 ohm.
3. If there is current present and the unit will not adjust, check for a feedback voltage using a voltage meter connected to TP3 and TP4 while system is running. Normal volts should be approximately 3 to 4 volts. If none is detected, replace the torroid.
4. CBX23 and CBX23T Control Units are a special case. If a CBX23 Control Unit will not adjust, the problem could be the result of improperly installed dual torroids. To solve this, check the feedback voltage at test points TP3 and TP4. If there is current and the voltage at TP3 and TP4 is zero, turn power off, remove one of the two torroids from its cold lead, reverse direction and reinstall torroid back on the Cold Lead.

## TROUBLESHOOTING PROCEDURES FOR CBX6, CBX23, SLC500

The following procedures cover most problems that can be encountered when installing or servicing Heatizon Systems products with CBX6 and CBX23 Series Control Units. If your Heatizon Systems product cannot be repaired using the following procedures, contact Heatizon Systems for further assistance.

**Problem: The system shuts off every 30 minutes for one minute.**

**Solution:** It is normal for the Control Unit to shut the system off every 30 minutes to perform a diagnostic test of the system's safety features.

**Problem: There is no power to control unit (no LED indication on control board)**

**Solution:**

1. Test for input power.
2. Check panel circuit breaker, reset or turn on as necessary.
3. Check controller circuit breaker, reset or turn on as necessary.
4. If power is measured at the input but the Control Board indicates no power is present, the problem could be within the Control Unit itself. Contact Heatizon for technical assistance.

**Problem: The system is "Hard starting" or a breaker trips when the thermostat is activated.** Under normal conditions the controller incrementally powers up the transformer during the first one second of operation. Failure of the controller to do this properly will result in a "hard start." Hard starting is characterized by a noticeable "bang" or shaking in the transformer and/or conduits upon start-up).

**Solution:**

1. Check for proper wiring of the transformer primary for the supply voltage you are using. Improper wiring of the primary will possibly trip circuit breaker. Improper primary wiring can also damage the transformer if allowed to run for any length of time.
2. Check for continuity of the heating element. Heating element may be damaged, broken or shorted out to something metal or electrically conductive.

**Problem: The Control Unit has power, but the system will not activate**

**Solution:**

1. LED indicators #D24 and #D25 on the Control Board should be lit when system is energized (but not activated). Check voltage select jumpers on control board, (JP12 - JP13 - JP14). Jumper settings must be set for the supply voltage. Control Board will not operate properly if voltage is set incorrectly and **will be damaged if set for a value lower than the supply voltage.**

**Longevity and Reliability.** There are no moving parts in your Heatizon Systems product. All controls are 100% solid-state for long term life and reliability.

**Maintenance.** Other than keeping the airflow vents on the Control Unit clean and unobstructed, Heatizon Systems products do not require any routine maintenance. In the event your Heatizon Systems products are not operating correctly please call a qualified electrical contractor to make any necessary adjustments or repairs.

**Operation.** Other than setting the activators and turning the breaker, Heatizon Systems products have nothing else that require your attention. In the event your Heatizon Systems products are not operating correctly, call a qualified electrical contractor or Heatizon certified installation professional to make any necessary adjustments or repairs.

**Summer Shut-down.** Heatizon Systems recommends that the switch on the Heatizon Systems controller and the circuit breaker (located in your electrical distribution panel) that services your Heatizon Systems product(s) be turned to the "off" position during the summer time and other extended periods of time when it will not be used.

**Comfort and Safety.** Comfort and safety are the main goals for all Heatizon Systems products. Snow and ice free driveways, sidewalks, handicap ramps, loading docks, porches, etc. are safer and last longer when they are not subjected to salt or snow-melting chemicals. Snow and ice falling off of roofs can result in dangerous hazards to both buildings and people. Heatizon Systems in floor radiant heating products provide the utmost in comfort and since no dust is flying around they are good for your health. The comfort of floor warming is the best thing that ever happened to the tile and hardwood industries and your feet are the beneficiaries.

# HEATIZON SYSTEMS COMPONENTS



Backplate

**The Rough-In Kit** (Not required for SLC 500)  
 The Rough-in Kit contains the Control Box and Transformer mounting plate ("Back Plate"), 50 feet of activation wire, Installation Manual, and enough Cold Lead wire to extend the total vertical and horizontal distance between the Back Plate location and the area where the heating element will be installed and back to the Back Plate.



Tuff Cable & Z Mesh Element

**The Heating Element**

- **Tuff Cable** (Heatizon Part Number E101) is a durable 10 ga. coated copper cable that is chemical and gasoline resistant and comes with footage marks, and Heatizon's name on it.
- **ZMesh** (Heatizon Part Number E102) is approximately the same thickness as the fabric in a screen door, and comes in 9" and 12" widths.



Transformer

**The Transformer**  
 The Transformer is the powerhouse that allows Tuff Cable or ZMesh to produce up to 12 watts of heat per lineal foot. ZMesh systems are energized with 1/2, 1, 2, 3, 2x2, and 2x3kVA transformers; and Tuff Cable systems are powered with transformers from 1/2 to 6 kVA.



CBX6/23 Control Box      SLC500 Control Box

**The Control Unit**  
 This component houses the appropriate sized transformer and the other electronic components necessary to provide low-voltage electricity to the heating element. The Control Box continually monitors the system's operation and is self-testing and problem diagnosing. It is engineered to provide simple and problem free operation. Dimensions for the CBX623Control Box are: 17" wide, 12" high and 9" deep; the SLC500 measures 12" wide, 12" high and 9" deep.



Various Activation Devices

**Activation Device**  
 Heatizon Systems has Activation Devices that are as simple or complex as necessary to handle your floor warming, space heating, roof snow melt, and snow melt needs. Most Heatizon Activation Devices include a system indicator light (LED) to notify the owner of the system status.

# TROUBLESHOOTING

**WARNING: HIGH VOLTAGE PRESENT! TROUBLESHOOTING PROCEDURES AND MEASUREMENTS MUST BE PERFORMED WITH THE SYSTEM ENERGIZED AND THE COVERS REMOVED. ALWAYS MAKE CERTAIN THAT THE PERSON PERFORMING THESE PROCEDURES IS FAMILIAR WITH SAFE PRACTICES REQUIRED FOR WORKING WITH HIGH VOLTAGE EQUIPMENT. A QUALIFIED TECHNICIAN OR ELECTRICIAN SHOULD PERFORM THE FOLLOW-**

**NOTE:** Always turn power off prior to removing or reinstalling covers.

**NOTE:** Never install or reinstall the Control Board with the primary power in the "ON" position.

**NOTE:** Prior to trouble-shooting the system, check for obvious problems such as loose connections, cut or broken wires, etc. Check the jumpers on the printed circuit board for proper settings. See Design and Installation Manual.

## STATUS INDICATOR LIGHTS—WHAT DO THEY MEAN?

The **CBX6 and CBX23** series Control Units are equipped with a status indicator LED on most activation devices and the Control Unit itself. This indicator monitors whether the unit is heating or not heating and gives other vital diagnostic information.

<u>Indication</u>	<u>Status</u>
-On -Solid	System heating - normal heating mode
-Off	System not heating - no call for heat
-Slow Blink	Under/Over Current
-2 Blinks - Pause	Transformer over temperature
-3 Blinks - Pause	Arcing or Shorting of Heating Element
-Rapid Blink	SCR Failure--Actions required when a diagnostic signal is given by the status indicator are listed in the troubleshooting section below.