TOUCHSTONE Control System
General Troubleshooting Guide

FOR USE ONLY BY QUALIFIED SERVICE PERSONNEL.

This guide provides basic information to diagnose and troubleshoot TOUCHSTONE Control Systems. This guide is to be used with the Installation Instruction Sheet provided with each specific system configuration which lists the components required, and the interconnections to be made. After servicing a Control System, the operation of all the features per the specific Operating Instruction Sheet should be thoroughly tested.

PLEASE READ CAREFULLY PRIOR TO
Troubleshooting and Servicing Electrical Equipment

HIGH VOLTAGE CAN SERIOUSLY INJURE OR KILL!

ONLY EXPERIENCED TECHNICIANS SHOULD SERVICE THIS EQUIPMENT.

DO NOT remove the protective covers from any electrical enclosures, or attempt to service any related electrical device. There are no user-serviceable parts in any of the modules, and doing so will void the warranty and may lead to failure that may lead to injury to persons or property.

DANGER: Risk of electric shock. Before working with any electrical connections, make certain that the Main Power breaker from the house breaker box has been turned off.

The system may have more than one circuit. Due to the danger of electrical shock, be certain that all power disconnects are located and turned off prior to servicing. Precautions must be taken whenever working with breaker boxes, GFCI's, or service disconnects.

WARNING: All electrical work must be performed by a qualified licensed electrician and must conform to all national, state, and local codes.

Grounding and Bonding: All components include a ground wire (3-prong plugs and sockets). An additional bonding wire must connect all metal components under the tub. A bonding lug is provided on each part that needs bonding for this use. A minimum of #8 solid bare copper must be used for bonding, per UL 1795 requirements.

NOTE: If a problem is ultimately found with a module of the system, it must be replaced. There are no user serviceable parts in any of the modules and attempting to repair or modify them may lead to injury to persons or property and will void the warranty.

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System Identification and Verification:

The first step in troubleshooting is to verify that the hardware required for the system is complete and installed correctly.

Each Control System is identified by the Keypad Part Number and the Configuration Number.

The Operating Instructions provided to the tub owner will have these numbers listed in the lower right hand corner of the first page. If these Instructions are not available, contact the tub manufacturer for them.

Each Operating Instruction has a corresponding Installation Instruction that lists the required components and connections of the Control System.

Referring to the System Installation Instructions for the system being diagnosed, check to make sure that all components are installed, and that all connections are secure.

Cable Verification:

Verify that the cables are connected correctly, and that the pins are straight and free of damage.

The Display's cable may have a Red Flag on the end, and is connected to the Controller's corresponding port, marked in Red.

The Tub Light Accessory's cable may have a Yellow Flag on the end, and is connected to the Controller's corresponding port, marked in Yellow.

The Solenoid Accessory is plugged into the special green connector shown.

NOTE: If these cables were cross-connected or forced-in at any point, irreparable damage may result, and any warranty will be void. Should this happen, replace all the affected components, ensuring that they are connected correctly.

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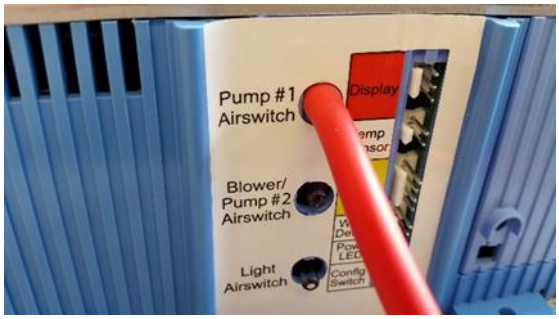
Airswitch Verification:

If the Controller has one or more Airswitches installed (CAST-201 and CMBC-298 Controllers shown for example), verify that each one is connected correctly to their respective port, and that the tubing is free of damage and kinks.



If the Load turns on as soon as power is applied, a residual air pressure may be present in the Airswitch tubing. Disconnect the tubing, re-connect it, and re-test. If the load still turns on, replace the Controller.

Power Verification:

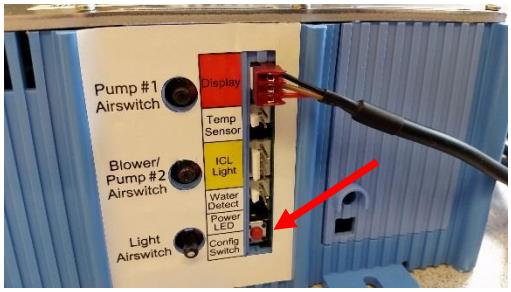
Each blue control box has a green power indicator light on the face where the Keypad plugs in. These should be constantly illuminated when power is on to the system.

If it is not lit, use a meter or suitable device such as a drill motor or hairdryer to verify that there is power to the Control System at the receptacle under the tub. Verify and check that the circuit has GFCI protection, and that the GFCI is functioning properly.

Configuration Verification:

Each system is capable of operating a number of different configurations. In order to run the specific system at hand, the correct Configuration must be selected when components are replaced.

For Controllers that have a "Configuration Button"



-Power the unit on.
-Within 20 seconds, press and hold the Config. Switch, located below the Controller's connectors.
-The Power LED will blink once (Config. #1), then twice (Config #2), etc.
-Release the button when the correct Config. Number has been reached.
-The Power LED will then blink the Config. Number as a confirmation.
-The Controller is now set to the desired Configuration.

For Controllers that do not have a "Configuration Button"

To verify the Configuration that the Keypad is set to, simply cycle the power to the system and observe the Keypad.

-On Keypads with an Alphanumeric LED display, it will show "Cxx" after a few seconds, where "xx" is the Configuration number.
-On Keypads without the Alphanumeric LED display, a combination of lights above the buttons will flash showing the Configuration Number.

The Configuration Number for that particular system can be found in the "Configuration Selecting and Setting Guide" available from the tub manufacturer. If the Configuration is not correct, follow the instructions in the guide to reset the system to the correct Configuration.

NOTE: Once the Configuration is set it will not be affected by cycling the power, it needs only to be set initially.

Load Verification (Pump, Blower, etc.):

If a Load will not turn off: Unplug the Keypad. If the load is still on, there is a fault in the Control Box. Replace the Control Box.

If a Load will not turn on: Referring to the Operating Instructions provided, confirm that the Load is plugged into the correct Receptacle of the correct Control Box.
If it still does not function, verify that the Load is operational by plugging it directly into a known-good wall receptacle.
If not, replace the Control Box or Load accordingly.

Additional Troubleshooting:

Following the above steps should be sufficient to correct any problems with the system. If this is not the case, refer to the additional troubleshooting information in the following pages.

NOTE: If a problem is ultimately found with a module of the system, it must be replaced. There are no user serviceable parts in any of the modules and attempting to repair or modify them may lead to injury to persons or property and will void the warranty.

Non-Functional Keypad:

If the Keypad is not functioning, check that the control box has power by observing the green power indicator LED on the control box is illuminated.
Next, check the cable connecting the Keypad to the control box making sure that both connections are secure and the retaining clips (if present) are attached.
Inspect each cable end to make sure that the pins are not bent or missing.
If the Keypad is still non-functional, replace the Keypad and the Cable.
Set the Keypad to the proper Configuration and test the system.

Error Codes on the Keypad:

The Alphanumeric LED Display registers hardware conflicts as error codes in the form of “E##”. These conflicts will occur if the hardware installed does not agree with the expectations of the Configuration selected, or if there is a faulty component.

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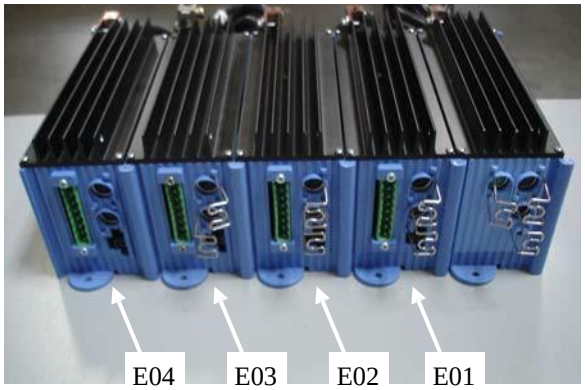
Error Codes "E01" through "E04":

Some control systems require multiple control boxes to be installed side-by-side as shown below:



Error codes "E01" through "E04" indicate an issue with the control box as labeled above. The error message may appear for a number of reasons:

1. The control box is not the type required for the Configuration.
2. The control box is recognized as being installed, but is not required for the Configuration.
3. The control box is required for the Configuration, but is not installed.
4. The DIP switches on the control box are not set correctly (as indicated on the Installation Instructions for the Configuration).
5. There is a communication error between the units.

If Items 1-4 above appear to be correct, then Item 5 must be verified:

The control boxes communicate via infrared signals between themselves. To achieve this, there are transparent red windows that are installed between the adjoining boxes that allow the signals to be transmitted and received. If any of the ports are blocked with a solid blue disc, the signals cannot get through and an error will occur. Check to be sure that red discs are installed between all control boxes, and that blue discs are installed on each end.

Additionally make sure that the entire assembly of control boxes is on a flat, level surface so that all communication ports are aligned correctly.

Error Code "E06":

Error code "E06" indicates an issue with the ITW Temperature/Water sensing unit.

The error message may appear for a number of reasons:

1. The Configuration requires an ITW but one is not installed.
2. An ITW is recognized as being installed, but is not required for the Configuration.
3. The ITW is faulty.

Check and confirm that the ITW is required and installed properly. Check and confirm that the connection to the control box is secure, and the cable is intact. The ITW does not have a power indicator light, but does have a red LED that comes on when water is sensed. The water sensing operation can be checked by placing your hand over the sensor and confirming that the light comes on (there is water in your hand).

If it is determined that the ITW is faulty, install a new ITW. Note may be easier to cut the cable off the faulty ITW and leave it installed and install the new ITW next to the old one at the same elevation. Removing the old ITW from the tub may cause damage to the tub shell.

Calibration of the ITW Water Sensor:

The ITW is calibrated by the manufacturer, therefore on-site calibration should not be required.

In some control configurations, sensing water will trigger the automatic dry cycle for the air jet system, and if the sensitivity is too high, it may lead to "phantom" dry cycle triggerings.

To calibrate the ITW, fill the tub with water to the required level, about 2" above the highest jet. This level is indicated on the ITW by a series wavy lines on the front of the unit.

The red LED should be ON to indicate water is being sensed. To the left of the indicator light, there is a trimming pot. Using a small flat blade screwdriver, very carefully turn the pot counter-clockwise until the light goes out. Slowly turn the pot clockwise until the light comes back on and then turn an additional one-eighth turn.

Tub Lights:

-Press the Airswitch or Keypad Button to activate the Tub Lights.
They should illuminate.

- -If not, is the Keypad or Airswitch operational?
  Check with a known-good Airswitch or Keypad.
- -Is the Controller's ICL Light (Yellow-marked) Connector free of damage?
- -Are the Cables free of damage, and correctly plugged into the Controller and both Lights?
- -Check with known-good Lights and Cables.

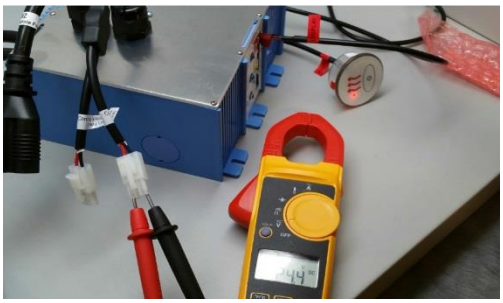
Surface Heaters:

-Turn all of the loads off.
-Press the Heater Button on the Keypad.

- -Its LED will light, and the Seat and Back surfaces will begin to warm up.
- -If area is quiet, you should hear the "click" of unit's power relay engaging.
- -Is the Keypad operational? If not, check with a known-good Cable and Keypad.
- -Is the Controller's 3-Pin Red-Marked Connector free of damage?
- -Is the Red-Flagged Cable free of damage, and correctly plugged into it, and the Keypad?

Use a multi-meter to check the power supply for 24VDC reading at the **"Y"** Splitter exiting the top of control box as shown.

- -If there is no voltage at the **"Y"** splitter, replace the Controller.



COZYHEAT HEATER BLANKETS:

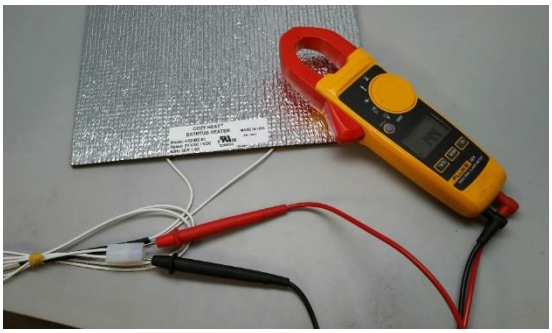
Verify that the blankets are fully bonded to the tub surface.

- -If not, they must be replaced.
- -Apply the blanket with a roller, carefully applying sufficient force to ensure a firm bond.
- -Verify the bond again before closing the Service Panel.

Unplug the Blankets from the Splitter Cable.
Using a Multimeter set to read Resistance, measure across each Blanket's terminals.

-It should read a value of less than 50 ohms.
-If the measured value is greater (or open circuit), the Blanket's internal thermal protection has opened; replace that Heater Blanket.

Verify the other Blanket.



THE WATER PUMP:

Identify the Pump Model Number by checking its label:

PX075000SCB, PA075000UCS, or MB15000SCB:
These pumps have a built-in On/Off Airswitch, which is shipped in the On position.
This can be verified by the presence of a white airswitch tubing retainer nut on the side of the top housing of the motor.

If the pump will not function when plugged directly into a receptacle, it might be that the switch was mistakenly toggled to the Off position at some point.

Take a known-good tubside airswitch actuator. Remove the lock nut from the Pump Airswitch. Put the tubing through the locknut and insert the tubing firmly onto the pump's airswitch nipple, then tighten the locknut. Cycle the airswitch. If the pump runs, the pump is OK. Remove your airswitch actuator.
If the pump does not run, replace the pump.

Other Pump Model Numbers:
There is no Airswitch in these pumps. Testing is accomplished by plugging it directly into a working receptacle.

Other Symptoms:

Symptom / Problem:	Resolution:
"- - -", "C##", or "CAP" appears on the Keypad.	No action is required. These codes appear when the system is initially powered up while the controls are performing internal diagnostics.
"No H2O" appears on the Keypad, and the system will not start.	The controller is not detecting bath water. Adjust the water level to the required height.
"DRY" appears on the Keypad, the air system is on, and cannot be turned off.	The system is running the Automatic Dry Cycle which purges out any residual moisture that is in the air system making the system fresh and ready for the next bath. It will automatically finish after one minute.

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All four lights on the Keypad are on, the air system is on, and cannot be turned off.	The system is running the Automatic Dry Cycle which purges out any residual moisture that is in the air system making the system fresh and ready for the next bath. It will automatically finish after one minute.
The Keypad shows that a pump or blower is on but it is not working.	Verify that the pump or blower does not have a problem by plugging it directly into a power source. If it works with direct power, replace the control box that runs it.
“888” appears and the Keypad is not functioning.	The Cable or Keypad is damaged, replace as needed.
All four lights on the Keypad are on and the Keypad is not functioning.	The Cable or Keypad is damaged, replace as needed.
The Load (Pump/Blower) starts up right away when power is first applied.	Replace the Controller.
An Airswitch is inoperative.	Test with a known-good Airswitch and Tubing, and replace if necessary.
A Solenoid will not turn on.	Test with a known-good Solenoid and Wire Harness, and replace if necessary.