# Troubleshooting Color Problems with Absolute Light

Rev 1.1

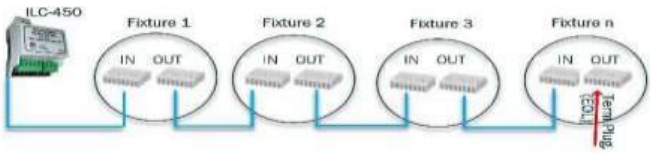
Several problems relating to color output can be diagnosed with the following troubleshooting guide. If you are experiencing any of the following problems, proceed sequentially through the troubleshooting sets in the next section to solve potential problems.

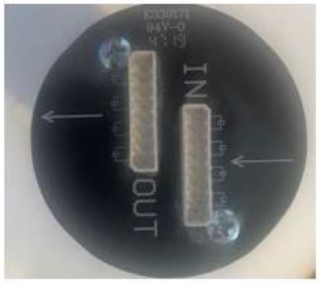
A. No LED light output is generated **on an**y Absolute Light fixtures whatsoever.
B. One or more solid colors (RED, GREEN, BLUE WHITE) are missing from **all** Absolute Light fixtures connected to a single ILC-450 device
C. All colors illuminate but they do no match what is selected from a User Interface (i.e., a GREEN trigger causes some other color to illuminate, or a RED trigger causes some other color to illuminate).
D. Discrete color temperature (CCT) selected does not appear to be output accurately on all connected Absolute Light fixtures.
E. Everything was working perfectly but then something happened and some colors are missing.
F. Some fixtures produce all colors perfectly, but one or more fixtures either produce no colors or are missing some colors.
G. Some fixtures produce all colors perfectly, but at least one fixture either produces no colors or are missing some colors.

## Troubleshooting Steps:

**A. No light output is generated on any connected Absolute Light fixtures.** If you are not seeing any illumination (LED output) on any fixture when properly triggered to turn on, go to A(i) below, otherwise proceed to B(i) below. **This procedure must be followed with power to the head-end ILC-450 turned off. Unplugging and re-plugging in connectors is considered HOT SWAPPING and will void your warranty.**

i. **Check INs and OUTs.** The proper wiring for the 8-conductor interconnect harness (20/8 awg T-STAT wire) from the ILC-450 to the first Absolute Light (IN port) must be observed. See diagram here for the concept of INs and OUTs.




Note: Provided that all wiring is installed properly, should any Absolute Light fail over time, a special internal electronic circuitry engineered within each Absolute Light will automatically enable subsequent downstream fixtures to continue to operate.

A cable with consistent wiring needs to be connected from the **OUT** port on the first Absolute Light fixture to the next subsequent fixture and plugged into that fixture's **IN** port. This same procedure must be followed from the **OUT** port on any fixture that will then connect to the next downstream fixture's **IN** port. The definition of "***downstream fixture***" is a fixture that is physically wired to any ("***upstream***") fixture that is positioned on the blue (thermostat) wiring bus closer to the headend ILC-450 controller. For instance, Fixture #2 is ***downstream*** of Fixture #1, while Fixture #1 is **upstream** of Fixtures #1, #2 and #3. If this does not solve the issue, proceed to Step A(ii).

ii. **Check EOL Terminator.** At the point that the last (allowed) Absolute Light is connected (using the **IN** port as its input), the End-Of-Line terminator that was provided with your Absolute Light order must be properly plugged into the **OUT** port on the last fixture. If this EOL Terminator is not installed, no fixtures will operate. If this does not remedy the issue, proceed to Step A(iii).

iii. **Check Wiring.** The most frequent problem seen in the field is that wiring of the high-density Phoenix connector is not done properly. When using multi-colored 20/8 thermostat solid wire, make sure that you observe 1 to 1, 2 to 2, 3 to 3, 4 to 4, 5 to 5 and 6 to 6 wiring without any **crossovers or skips**. The most common occurrence of how miswiring might cause the condition that NO Absolute light will illuminate is that there are at least two Phoenix connector assemblies that are wired exactly ***backwards*** (i.e., 1-8, 2-7, 3-6,4-5, 5-4,6-3, 7-2 and 8-1). This can happen easily if you do not take notice of the Phoenix Connector itself and basically insert the wires with the "correct" color coding order but just backwards into the connector. In this case, no damage to any fixture or controllers will occur, but the system will just not work. If this does remedy the issue, proceed to Step A(iv)

| This is good | |
|---|---|
| Pin 1 | Pin 1 |
| Pin 2 | Pin 2 |
| Pin3 | Pin 3 |
| Pin 4 | Pin 4 |
| Pin 5 | Pin 5 |
| Pin 6 | Pin 6 |
| Pin 7 | Pin 7 |
| Pin 8 | Pin 8 |

| This is bad | |
|---|---|
| Pin 1 | Pin 8 |
| Pin 2 | Pin 7 |
| Pin3 | Pin 6 |
| Pin 4 | Pin 5 |
| Pin 5 | Pin 4 |
| Pin 6 | Pin 3 |
| Pin 7 | Pin 2 |
| Pin 8 | Pin 1 |

**Note: Any other miswiring other than a total reversal shown above may destroy either an Absolute Light fixture of the ILC-450, so be very careful here.**

**HINT:** If you strip the wire with about 4-5 mm of exposed copper, insert the bare wire into the round hole as shown above. If you happen to insert it into the wrong round hole, use a tiny flat head jewelers type screwdriver to release the wire by inserting it into the narrow rectangular hole (seen at top above each round hole). This frees up the internal spring type latch and allows easy removal.

iv. **Check if all Phoenix Plugs on the entire circuit are properly seated**. See B(v) below for more detail here. You need to verify that all Phoenix Plug are properly seated. Any one of Phoenix connector not seated properly (squarely) will cause the entire system not to operate. Typically, this results from a failure to use the mandatory strain reliefs that are located on the back of each Absolute Light fixture and using provided cable ties to affix the wires nearly permanently to the fixture's body. If this does not remedy the problem, proceed to Step A(v) below.

v. **Swap Out Method**. One again check that all wiring between fixtures is consistent AND that proper adherence to a consistent color coding is utilized. Over 90% of all failures here result from the failures identified in Steps A(i) to A(iv) above. In the rare case where these four steps have not remedied the problem (i.e., such as when a miswiring has actually destroyed either a fixture or the ILC-450), you are encouraged to pursue the Swap Out Method described here to sort out the issue definitely. Let's proceed here. **Power to the ILC-450 must be turned off** here when making any wiring changes. After the changes/corrections have been made, simply power back on the ILC-450 and re-test.

| Swap Out Procedure | |
|---|---|
| Swap Out Step 1 | -Go to the last (downstream) fixture and remove the EOL terminator from the **OUT** port<br>-Go the **Fixture 1** and remove the wiring harness connecter/plug inserted into the **OUT** port.<br>-Plug in the retrieved EOL terminator into **Fixture 1**'s OUT port<br>-Power on ILC-450 and send over a command to test.<br>-If **Fixture 1** illuminates properly, there is a high degree of certainty that **Fixture 1** is GOOD. In this case, proceed to ***Swap Out Step 2*** to continue to troubleshoot the issue.<br><br>-However, if **Fixture 1** does not function properly, three causes are most likely—(a) **Fixture 1** is defective, or (ii) the ILC-450 driving **Fixture 1** is defective, or (iii) a wiring problem still exists.<br>-Assuming that **Fixture 1** is defective, swap the unit out with **Fixture 2** at the location of the **Fixture 1** and power on again and retest. If the replacement fixture works (here **Fixture 2),** you have identified the problem—**Fixture 1** is defective. In this case, secure a replacement and reinstall all wiring as initially installed, then retest. |
| Swap Out Step 2 | -Given the assumption that **Fixture 1** is operational, follow the steps detailed within Swap Out Step 1 but target **Fixture 2** as the device under test in this case.<br>-If **Fixture 2** illuminates properly, there is a high degree of certainty that **Fixture 2** is also GOOD. In this case, proceed to the next downstream fixture and run through the same tests to continue to troubleshoot the issue.<br>- If the device under test fails to operate properly, swap out this unit with **Fixture 3** at the location of **Fixture 2** and power on and retest. If the replacement fixture works (here **Fixture 2),** you have identified the problem—**Fixture 2** is defective. In this case, secure a replacement and reinstall all wiring as initially installed, and retest. |
| Swap Out Step 3 | Continue following in the steps outlined in Swap Out Step 2 but substitute in the next |

| | |
|---|---|
| | downstream fixture. Continue this testing procedure until all fixtures have been tested and the system operates perfectly, or a defective Fixture has been discovered. If a defective Fixture has been discovered through any of these testing steps, simply secure a replacement and reinstall all wiring as initially installed, and retest. |

B. **Absolute Light fixtures produce some colors but are missing one or more other colors. Specifically, you may be able to turn on RED, or GREEN, or BLUE but not WHITE. Or alternatively, you may be able to turn on RED, BLUE, WHITE but not GREEN. If you notice this symptom proceed through the steps within this Section, otherwise proceed to Section C.**

i. Using a keypad or other user control, turn on the solid color of **RED** and observe if all of the Absolute Light fixtures are generating RED. If all fixtures are producing **RED**, proceed to B(ii) below. If all of the Absolute Light fixtures are missing the **RED** output, proceed to B(v). If the **RED** output if fine, proceed to the next section B(ii) below.

ii. Using a keypad or other user control, turn on the solid color of **GREEN** and observe if all of the LED elements are generating **GREEN.** If all fixtures are producing **GREEN,** proceed to B(iii) below. If all of the Absolute Light fixtures are missing the GREEN output, proceed to B(v).

iii. Using a keypad or other user control, turn on the solid color of **BLUE** and observe if all of the LED elements are generating **BLUE**. If all fixtures are producing **BLUE**, proceed to B(iv) below. If all of the Absolute Light fixtures are missing the **BLUE** output, proceed to B(v).

iv. Using a keypad or other user control, turn on the solid color of WHITE and observe if all of the LED elements are generating WHITE. If all fixtures are producing WHITE, proceed to C(i) below. If all of the Absolute Light fixtures are missing the WHITE output, proceed to B(v).

v. **Most Common Problem/Solution—Either Whites are Green are not working**. This is the most common case that we see in the field. It turns out that this is a symptom of the Phoenix plug (that mates with any one of the 8-pin connectors on the back of the Absolute Light fixtures or the similar 8-pin connector on the ILC-450) that has not been seated squarely onto its mating connector. We call this the "**teeter tooter syndrome**." The outer wires control WHITE and GREEN and these are the first not to make good contact if the connector is not properly seated. While the ILC-450 is power off, reseat any connector that is not properly seated to cure this issue. See this document for more information

https://www.convergingsystems.com//bin/doc/technotes/AbsoluteLightImportantIssues.pdf


vi. **<u>Second Most Common Problem/Solution—Miswiring</u>**. This is the second most common situation found in the field. The Absolute Light fixtures have a pair of eight-pin connectors (marked **IN** and OUT). Two wires are utilized to drive each of the RED, GREEN, BLUE and WHITE LEDs within each fixture. **It is mandatory that the polarity of the wiring for each color is maintained**. If the two wires (for any color) are reversed, then those LED (colors) will not be illuminated. And, if the two wires intended for a single (LED) color are cross connected to another (LED) emitter, the ILC-450 is powered on, it is likely that damage to one or more output drivers will occur on the ILC-450. **Therefore, it is absolutely critical that a final check of all wiring is made before the fixtures are powered up.** If any color is missing (from any or all of the connected fixtures to a single ILC-450), it is most likely the case that there is a miswiring of the two wires for that color. Check and correct (with the power to the ILC-450 turned off during the correction process).

C. **LED strips produce all PRIMARY COLORs including WHITE (i.e., RGBW) <u>but the output colors are mismatched</u> to the intended state (i.e., a RED trigger produces GREEN, or a GREEN trigger produces WHITE, etc.). If you notice this symptom proceed through the steps within this Section, otherwise proceed to <u>Section D</u>.**

i. Using a keypad or other user control, turn on the solid color of **RED** and observe if all of the connected Absolute Light fixtures connected to the target ILC-450 are generating a color other than **RED**. If all fixtures are producing **RED**, proceed to C(ii) below. If all of the illuminated LED elements are of a different primary color, proceed to C(v).

ii. Using a keypad or other user control, turn on the solid color of **GREEN** and observe if all of the connected Absolute Light fixtures connected to the target ILC-450 are generating a color other than **GREEN**. If all fixtures are producing **GREEN**, proceed to C(iii) below. If all of the illuminated LED elements are of a different primary color, proceed to C(v).

iii. Using a keypad or other user control, turn on the solid color of **BLUE** and observe if all of the connected Absolute Light fixtures connected to the target ILC-450 are generating a color other

than **BLUE**. If all fixtures are producing **BLUE,** proceed to C(iv) below. If all of the illuminated LED elements are of a different primary color, proceed to C(v).

iv. Using a keypad or other user control, turn on the solid color of WHITE and observe if all of the connected Absolute Light fixtures connected to the target ILC-450 are generating a color other than WHITE. If any of the illuminated LED elements are of a different primary color, proceed to C(v).

v. The Absolute Light fixtures have a pair of eight-pin connectors (marked **IN** and **OUT**). Two wires (+ and -) are utilized to drive each of the Red, Green, Blue and White LEDs within each fixture. **It is mandatory that the polarity of the wiring for each color is maintained.** If the two wires (for any color) are reversed, then those colors will not be illuminated. And, if the two wires intended for a single (LED) color are cross connected to another (LED) emitter, and the ILC-450 is powered on, it is likely that damage to one or more output drivers will occur on the ILC-450. Therefore, it is absolutely critical that a final check of all wiring is made before the fixtures are powered up. If any color is missing (from any or all of the connected fixtures to a single ILC-450), it is most likely the case that there is a miswiring of the two wires for that color. Check and correct (with the power to the ILC-450 turned off during the correction process). We have found that this color coding works well, but whatever color coding is used, it is imperative that you check all wires and make sure that consistency is followed across all wiring.

| | |
|---|---|
| Pin 1 | White |
| Pin 2 | Yellow |
| Pin 3 | Orange |
| Pin 4 | Red |
| Pin 5 | Green |
| Pin 6 | Blue |
| Pin 7 | Brown |
| Pin 8 | Black |

**D. When driven In Color Temperature Mode (i.e., a CCT between the min and max supported by the fixture), the CCT output appears wrong. If you notice this symptom, proceed below, otherwise proceed to Section E.**

**i.** The ILC-450 supports a specified number of Absolute Light fixtures depending upon the size of the Absolute Light fixture and the mandatory power supply selected for the system. See the table below for the maximum number of fixtures for each Absolute Light type and the required power supply necessary to drive the system (i.e., for each ILC-450 connected to any Absolute

Light fixtures, there is a maximum number of fixtures that can be run with a required power supply—no exceptions). **If the number of fixtures is exceeded, or the proper power supply is not selected, either too little or too much power will negatively impact the fixtures' output characteristics**

| Absolute Light Fixture type (full color RGBW) | Max number of fixtures | 24v power supply support range | 48v power supply |
|---|---|---|---|
| Par 8 | 10 | 1 to 5 | 6 to 10 fixtures **(but not 1-5)** |
| Par 16 | 4 | 1 or 2 | 3 or 4 fixtures **(but not 1-2)** |
| Par 20 | 2 | 1 | 2 fixtures **(but not 1)** |

Check the system and make sure these above requirements are met. Typically, we have seen situations where 3-4 Par 16 fixtures are mistakenly connected to a 24v power supply (rather than a 48v power supply) and insufficient power is available such that the BLUE LEDs don't illuminate as bright as required and cooler CCTs therefore are impossible to achieve. If this is the symptom, correct and proceed.

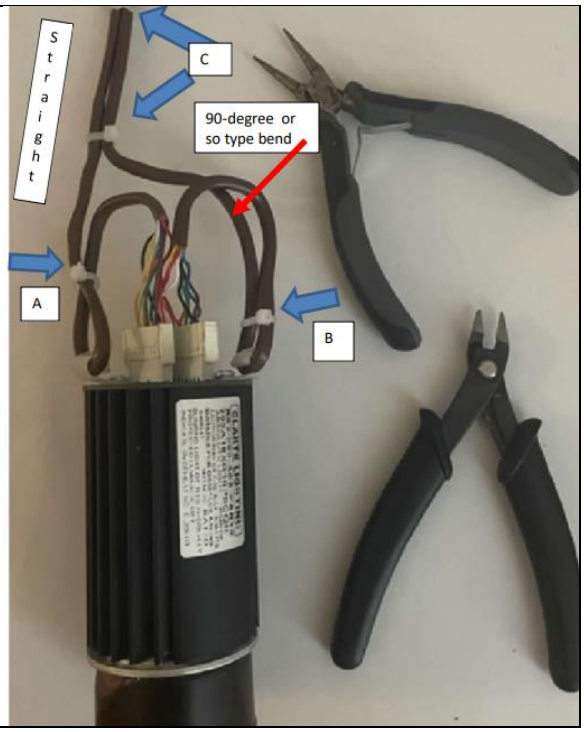
E. **Everything was working just fine but I accidently moved some wires and now I am missing some colors. If you notice this symptom, proceed below**.
   i. We have created a ***Standard Operating Procedure Guide*** for the proper deployment of Absolute Light products. Typically, failures occur when (i) strain reliefs are not being used or (ii) improper 20 awg wire that is of larger Outer Diameter (OD) that what the Phoenix connectors can support is being used. See the link below for important information here.

https://www.convergingsystems.com//bin/doc/technotes/AbsoluteLightImportantIssues.pdf

The following images extracted from the above document can be often times used to check the proper utilization of strain reliefs and proper wire selection.

Maximum OD of jacket (0.17”) 4.32 mm

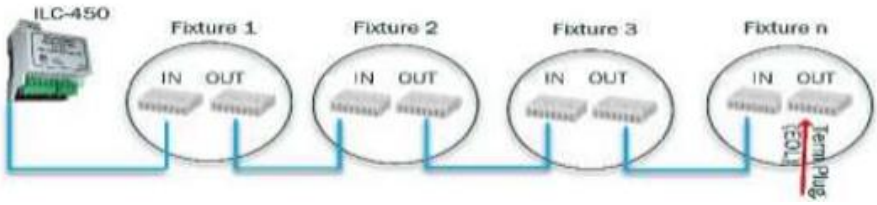
Note Thin outside jacket




ii. Please see this document and follow through the mandatory requirements. Correct and retest.

F. Some fixtures produce all colors perfectly, but at least one fixture either produces no colors or are missing some colors. **If you notice this symptom, proceed below.**

i. There is an electronic bypass circuitry on each Absolute Light fixture that allows downstream functionality of fixtures even though an upstream fixture may be non-functioning or have one or more dead LEDs integrated. In this case, an “upstream” Absolute Light fixture is one that has a position on the blue **IN/OUT** wiring bus (using T-Stat wires) which is closer to the (upstream) ILC-450 controllers. Specifically Fixture 1 is upstream of **Fixture 2**, while Fixture 3 is downstream Fixture 2 and Fixture 1.



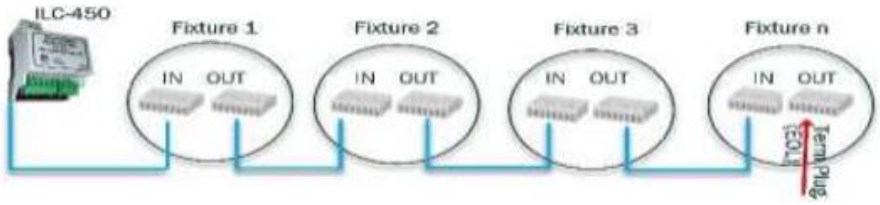

If an “upstream” fixture is showing one or more colors missing but all “downstream” devices are working perfectly, it is possible to make a determination that the upstream device has a fault. To

verify this diagnosis, simply swap out any functioning “downstream” unit with the suspected “upstream” unit and if the problem follows the fixture, you have positively made a determination as to which Absolute Light fixture has a failed component (the initial upstream unit).

iii. Correct and retest.

G. Some fixtures produce all colors perfectly, but at least one fixture either produces no colors or are missing some colors. **If you notice this symptom, proceed below.**

i. There is an electronic bypass circuitry on each Absolute Light fixture that allows downstream functionality of fixtures even though an upstream fixture may be non-functioning or have one or more dead LEDs integrated. In this case, an “upstream” Absolute Light fixture is one that has a position on the blue IN/OUT wiring bus (using T-Stat wires) which is closer to the (upstream) ILC-450 controllers. Specifically **Fixture 1** is upstream of **Fixture 2**, while **Fixture 3** is downstream **Fixture 2** and **Fixture 1**.

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ii. Correct and retest.