

Absolute Light Recommend Installation Procedures-- For a hassle-free installation.

We are excited about your upcoming installation of Clarte Lighting's Absolute Light fixtures and Converging Systems ILC-450 controllers and e-Node communication devices. Over the past two years we have been a key component to a number of world-class installations using these products and as a result we have captured important issues from our experience and have assembled all of this information in this short document. These are all important thoughts (i.e., failures) that need to be remembered/avoided in order to guarantee a worry-free installation. Feel free to also review [this document](#) for more general information.

1. Proper Cable Selection

Use the mandated 20/8 solid thermostat wire available from [Mcmaster Carr](#) (pn 8278T16) which is 4.32mm (0.17") OD or similar. The primary reason that we require this type of thin 20/8 wire to be used is because thicker 20/8 wire creates too much torque on system components when installed into the ceiling which results in the PCB-mounted white Phoenix Connectors to be compromised or break when the fixture is fully installed within the ceiling.



Note Thin outside jacket

NOTE: There are other vendors in the industry manufacture 20/8 wire but which have exceeding greater outer sleeve diameters (OD) which reduces the ability of the wire to bend when needed (during the installation process). ***This non-compliant wire is 7-8mm (.28" ~.31") in OD and if used will void our and our partner's warranty if used.***

DO NOT USE 18.8 wire even if you are stuck. 18.8 wire will "fit" within the white Phoenix connectors that are on the Absolute Light fixture and our ILC-450/460 devices, but (i) will break the connector after the first insertion into the mating male connector (believe us we have done this on several occasions), and (ii) will cause the same type of problems described above with thicker 20/8 wire because of even greater amounts of inflexibility.

2. Use provided Strain Reliefs on Absolute Light fixtures (**ABSOLUTE REQUIREMENT**)

Depending upon the model of Absolute Light, there may be an integrated set of connectors on the fixture (see [Type 1 Strain Reliefs](#)) or those same connectors will be located on a separate dongle ([see Type 2 Strain Reliefs](#)).

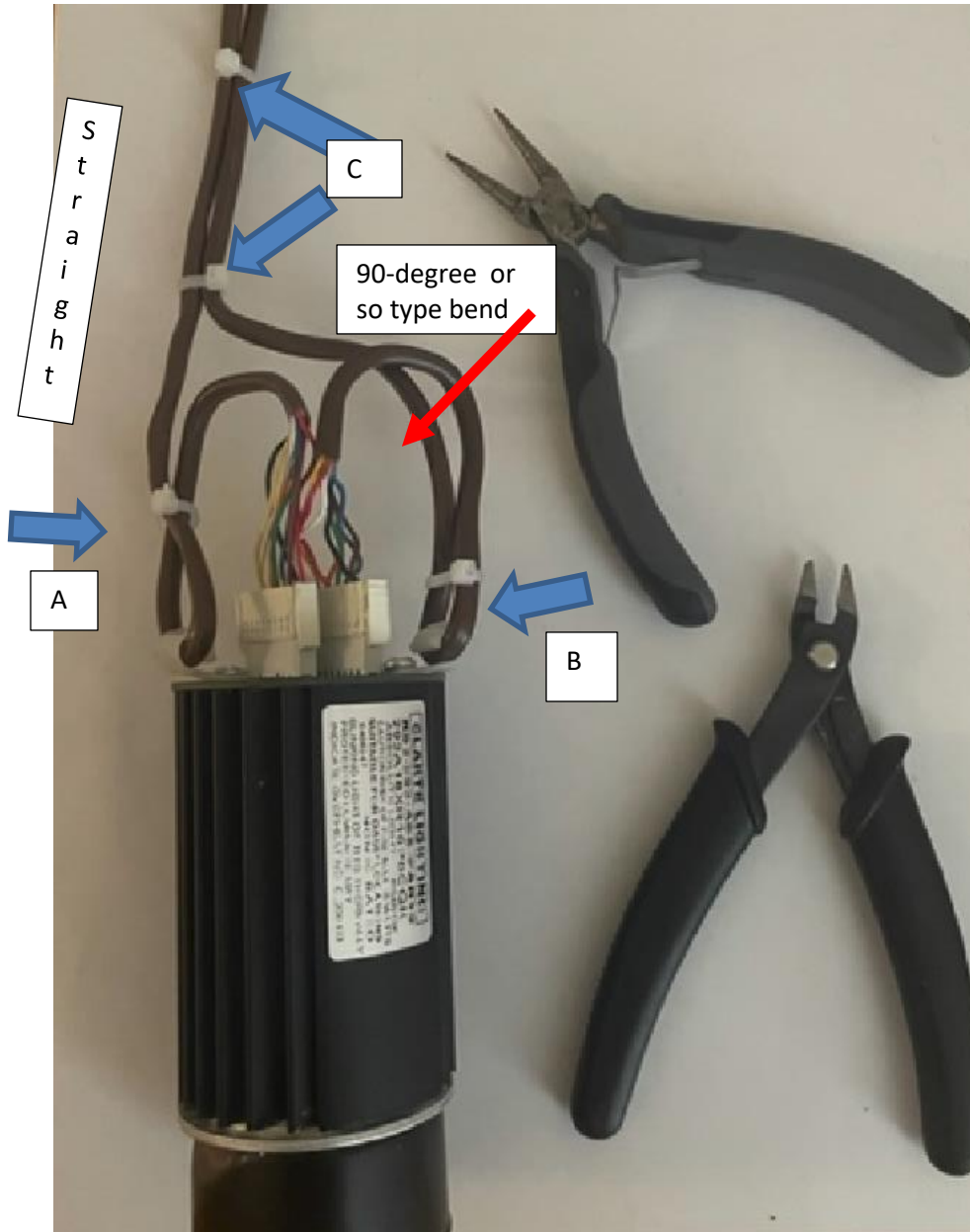
Min Requirements here

Use strain relief kit that comes with your fixture (see image below). If you have lost your kit, call Clarte Lighting for replacement. For Type 1 strain reliefs that are factory installed with two screws, you should secure in addition cable ties to assist in your installation.



To ease installation, you may find the following helpful:

- needle nose pliers
- small cable tie (wire) cutter



Type 1 Strain Reliefs



Type 2 Strain Reliefs

This 1-minute process will save countless hours in troubleshooting. When you are running an **IN** and an **OUT** from the Absolute Light fixture use one on-board strain relief for the IN wire and where there is an OUT wire (as opposed to a terminator plug) use the other strain relief for that 2nd wire. **The strain relief clips will act as a brace or turning point for the wires to guarantee the Phoenix Plugs stay fastened properly (and if not, you will lose one or more colors once the power is turned on).**

Follow these field-tested directions to save countless hours later on with connectors that might otherwise come loose.

- First**, create a 180-degree bend at “A” and wrap the first cable time as close to the strain relief as possible. You will find it useful to use a pair of needle nose (shown above) in order to nudge the 20/8 wire into one strain relief’s movable finger.
- Second**, repeat this operation where there is a second wire at “B.”
- Third**, make the 90-degree bend on one wire (it doesn’t matter which one) as shown above. This will offload any strain on the second wire from the first wire.
- Fourth**, leave the straight wire as shown on the left.
- Fifth**, add the two wire ties at “C.”
- Six**, snip off the excess cable tie material.

-Seven, double check the white Phoenix Connectors to make sure they are snapped into place (with a

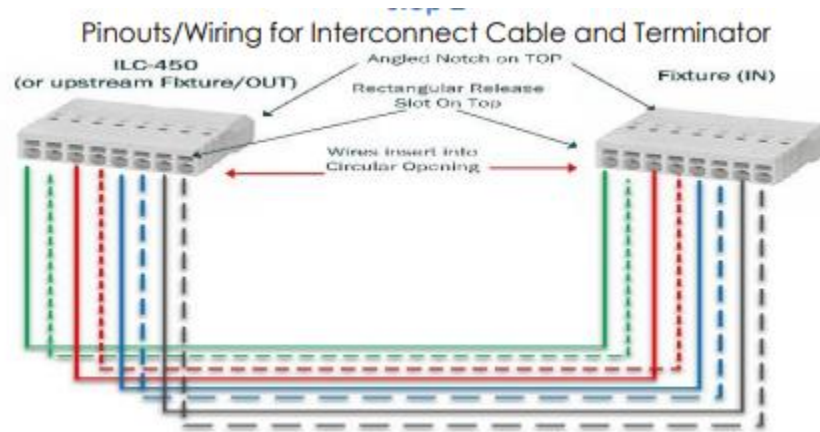
click) **THIS IS SO CRITICAL**

-Final step, insert entire assembly into ceiling without disrupting your wire weaving performed above.



We have found that using small cable ties can be useful to protect your wiring assembly and in insure that the cable will not force their connectors to come unplugged from the Absolute Light fixture.

3. Proper Wiring (1 to 1, 2 to 2, 3 to 3, 4 to 4... you've got the picture)



The most frequent problem seen in the field is that the wiring of the high-density Phoenix connectors 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**. 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.

After you finish the preparation, check your pinouts/color **two** times—just to be sure. **Nearly 60% of the failures in the field have resulted from errors here.**

4. The “teeter totter” syndrome-make sure white plug is properly seated with latches latched tightly and the connector does not rock one way or another.



The second most common problem seen in the field is that the high-density Phoenix connectors have not been properly seated such that all 8 wires are not making proper contact. It is easy to figure out if this is the problem for some colors of LEDs may illuminate while others will not (kind of like the Christmas Tree light problem). The Absolute Light comes with a safety mechanism that will make sure this does not happen provided you use it. So please use it.

If you discover that you have failed to properly seat one or more connectors, simply turn off the power to all of the iLC-450 on the bus, re-insert PROPERLY and try again.

Note: You will be happy to know that there is internal circuitry within each Absolute Light that will automatically bypass a unit if its LEDs are burned out. So, in this case if an upstream fixture has failed, all downstream devices will continue to operate.

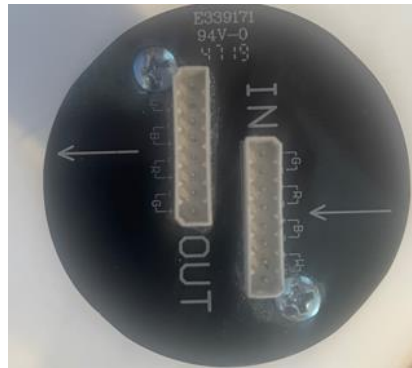
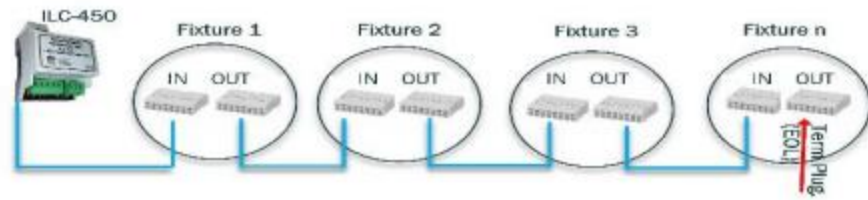
5. Failure to wire properly and insert the EOL final plug into the last fixture.



Our innovative load bus is actually a daisy-chain which requires a final terminator (EOL) plug. Failure to install the EOL will cause no fixtures to illuminate (although no damage will occur). This plug must be plugged in before powering on the load.

If you discover that you have failed to properly insert the EOL, simply turn off the power to all of the iLC-450 on the bus, insert and try again.

6. Failure to obey the IN and OUT markings on the back of the fixture.



You will see from the above, that each fixture is well marked as to the **IN** and **OUT** ports. Follow these directions and you will be set.

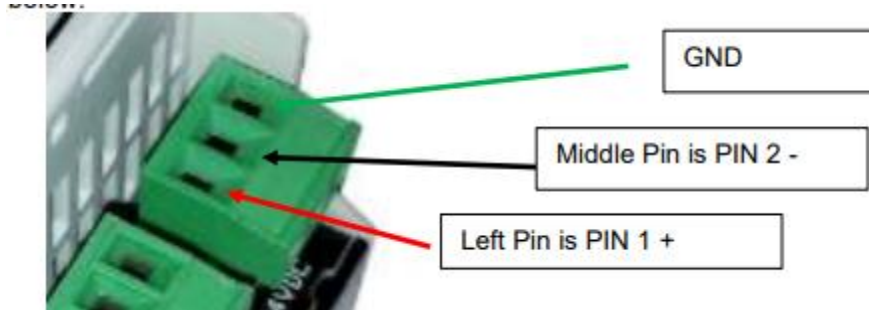
If you discover that you have failed to properly insert the individual harnesses into the correct port, simply turn off the power to all of the iLC-450 on the bus, correct and try again.

7. NO HOTSWAPPING/HOT PLUGGING.



You have probably already figured out that we don't like hot-swapping/hot plugging. If you need to make a correction, just turn off the power to the ILC-450 and power on again. **There is absolutely no warranty coverage for damage resulting from hot swapping/hot plugging.**

8. GROUND/GROUND/GROUND.



On each ILC-450 there is a Green 3-pin connector. If you do not connect the GND to the earth or electrical ground that is feeding your power supply, our communication bus will not work reliably. If you are stuck and failed to bring in a third wire, just connect an earth ground to your 24v or 48v power supply negative **output** terminal and rely on that as your surrogate ground. We can guarantee that you will spend hours diagnosing communication issues if you don't heed this advice. **GOT IT???????????**

9. ONE LAST NOTE-SELECT PROPER POWER SUPPLY DEPENDING UPON CONNECTED FIXTURES

Number of Absolute Light Fixture	Preferred Power Supply
1	24v 96 watts
2	24v 96 watts
3	48v 96 watts
4	48v 96 watts

To maximize LED life, and product reliability we have determined that just two (2) types of power supplies should be used in a system. The determinate is how many fixtures will be connected. For 1 to 2 fixtures, use a 24v power supply. For 3-4 fixtures, use a 48v power supply.

10. ADDITIONAL TROUBLESHOOTING STEPS

Typically, in 95% of the cases this results from one of the White multi-pin plugs not being properly seated. The plug has a spring clip that when properly mated with its Male counterpart, makes a small snap sound. The strain relief build into each ABS light also prevents any movement once the connection is made.



Note: it is not possible to measure voltage at the end of the chain or anywhere else since this is a constant current device and high frequency PWM, so testing using the following procedure is required.

Troubleshooting Step 1

While the ILC-450 is turned off, visually inspect each connection from at the IN and OUT location at the back of each Absolute Light on the chain and make sure the white plug is properly seated (snap heard) and the 8 wires are properly inserted into the Female plug (and their color coding is correct). Correct as necessary and power on the ILC-450 and test using the [Pilot](#) or Web Pilot application each color individually (red, green, blue, and white). This will tell you what color circuit is out.

Troubleshooting Step 2

-While the ILC-450 is turned off, remove the last fixture on the chain with its OUT connector plug still properly inserted and plug that fixture into the wire where the first fixture was located on the chain and test. Run the color test as above and correct any wiring issues found as necessary.
-Then proceed downstream to the location of the second fixture, then the third and finally the fourth to determine where the wiring problem is. Correct as required.

Alternative Wire Testing Apparatus

-If you suspect that the wiring is defective (broken wire, or miswiring), there is a test procedure by which simply off-the-shelf equipment (with one exception) can be used to test the wires.

Note: we recently wired up 66 Absolute Lights in our showroom in NYC and used this tool to test the wires before any fixtures were installed. After all circuits were proved to be 100% wired correctly, Absolute Lights were connected and power was applied to the ILC-450 units and the Pilot application was used to test Red, Green, Blue and White individually. At that point the system was deemed 100% operational.

Key points to remember.

-never perform any testing or plug swapping without turning off power to the Absolute Lights
-check the wiring color code (we like to use the following from light to dark which is easy to proof read after you are all done



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

Here is the equipment necessary to perform a wiring test (with the ILC-450 and the fixtures out of the picture).

Testing Equipment BOM

- a standard CAT 5 cable tester
- two identical dongles to enable Absolute wiring to plug into the CAT 5 cable tester.
- one or more shunts to by-pass each Absolute Light fixture




Those shunts and dongle can be constructed as below with the following equipment

- 8 Phoenix Male plugs 1709456
(Available from Arrow.COM <https://www.arrow.com/en/products/1709456/phoenix-contact>)
- 2 RJ-45 plugs
- a couple feet of CAT 5 or better

Total cost of hardware (other than cable tester is < \$10.00

Note: Dealers will always have a cable tester and RJ-45 plugs
The plugs should be ordered on-line from Arrow or other distributor.

Required Items	Description	Image or link
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Cat 5 cable tester	Fluke Intellitone 700 or similar	
Intermediate jumper (three is you have four fixtures—two if you have three fixtures)	Phoenix M to Phoenix M connected with Cat 5 or better wire (straight wiring) -two Phoenix M plugs -5 " of CAT 5 or better	  <p>Note Arrow marks PIN 1. (See 16 dots and lower two indexes to identify "front side" to determine PIN 1). Make sure that you wire this 1 to 1, 2 to 2, 3-3, 4-4, 5-5, 6-6, 7-7 and 8-8.</p>

Front and
Back adapters
(to connect to
cable tester)

Phoenix M to RJ-45
dongle
-one Phoenix M plug
-one RJ-45 plug
-1 foot of CAT 5 or
better



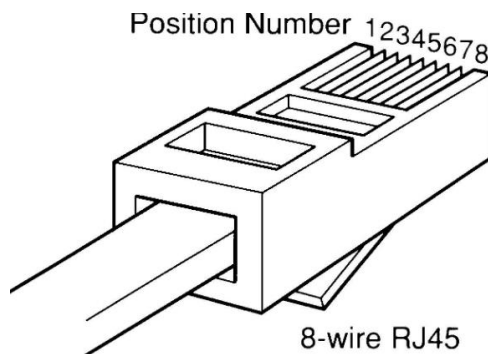
Ends will be prepared as follows:



View looking at top



View looking where wires insert



Pin out

CAT 5 side

Phoenix side

CAT 5 side	Wire color	Phoenix
Pin 1	O./w	Pin 1
Pin 2	Orange	Pin 2
Pin 3	G/W	Pin 3



		Pin 4	Blue	Pin 4	
		Pin 5	Blue/W	Pin 5	
		Pin 6	Green	Pin 6	
		Pin 7	Br/White	Pin 7	
		Pin 8	Brown	Pin 8	

Now simply set the cable tester to test a CAT5 cable and observe any shorts or mis wires. Correct as necessary and test once again. Once satisfied that the wires are good, then plug in the Absolute Light fixtures and power on the ILC-450 devices and test the colors.

Final note. Make sure that you are using the strain relief devices on each Absolute Light device. This will save many hours of headaches.