1. LX – Locating Transformer

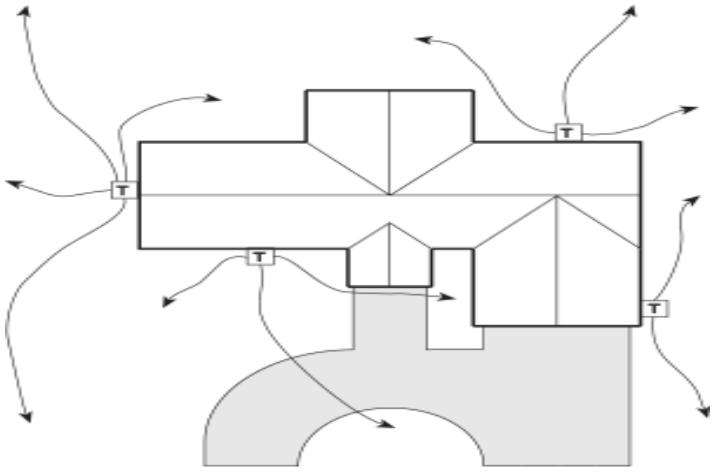
Locate transformer(s) in a well-ventilated area away from direct irrigation spray and central to where the majority of the lighting fixtures will be installed. The goal is to minimize the length of cable runs from your transformer to the lighting fixtures thus minimizing voltage drop and cable size.

Transformer(s) with power cords must be located adjacent to a 120 volt GFCI protected exterior electrical receptacle. If a 120 volt power source is not available at the desired transformer installation location, it is advised that you hire a licensed electrician to run a dedicated 120 volt, 15 amp circuit to the desired location.

Test all existing receptacles with both a receptacle tester and a digital voltmeter or amp clamp to verify proper wiring and voltage at the receptacle.

SINGLE TRANSFORMER

When using only one transformer, it is very important to center the transformer on the wattage load. If the project calls for 75 watts in both front and back yard, the LX Series Transformer should be centered on the side of the house that will receive the most lighting. A common mistake is to locate the single transformer on the service side of the house or in the garage, which might result in excessively long cable runs to reach lighted areas. The primary goal in laying out low voltage systems is to minimize cable runs because of voltage.



Sample diagram of home with transformer and lamp placement

MULTIPLE TRANSFORMERS

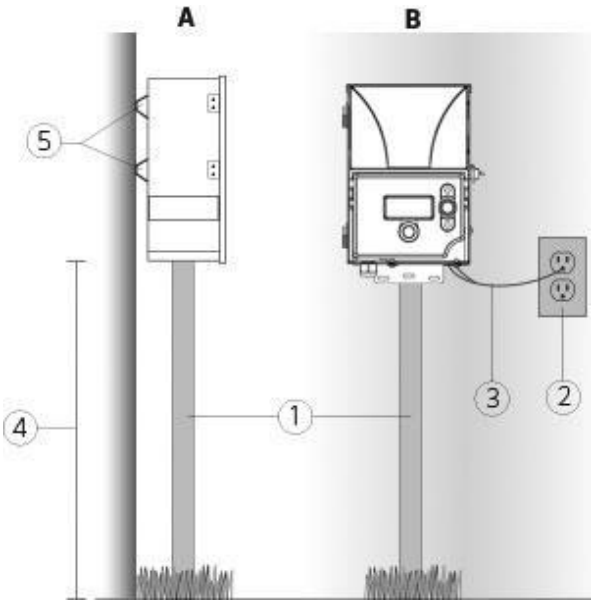
A common mistake in connecting multiple transformer circuits is to group several transformers in one location because of utility or visual considerations only. As with any low voltage layout, the prime directive should be to locate the transformers as close to the fixtures as possible in order to minimize cable runs and resulting voltage drop. The other multi-transformer layout consideration is “use zoning.” Having several transformers allows the client to selectively control light in separate areas. This approach is similar to irrigation design in that the goal is to individually control areas that have similar needs. In lighting, a recreation area has different lighting needs than front entry. Therefore, the lights that serve these different lighting use areas need to be on separate transformers and switch controls.

2. LX - Mounting Transformer

Wall Mount

By code, all transformers must be installed a minimum of 12" above finish grade as measured from finish grade to the bottom of the transformer. Mark top anchor location on wall, drill pilot hole, insert anchor and install screw into anchor leaving approximately 1⁄8" of thread exposed on the screw. Mount transformer on screw.

Mark locations for bottom anchors with permanent marker. Remove transformer from wall. Drill bottom anchor holes and install anchors. Place transformer back on top of anchors and install screw(s) into anchors at bottom of transformer to secure it to the wall.



A - Side View

B - Front View

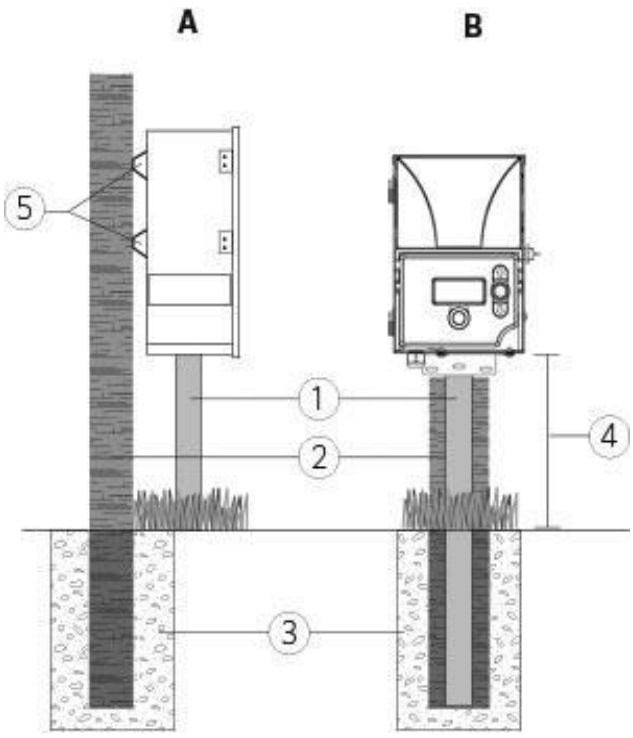
1. 1½" conduit
2. 120 volt receptacle with weatherproof cover
3. Power cord
4. 12" minimum
5. Mounting brackets

Post Mount Installation

Install pressure treated 4" x 4" x 36" (min) post in concrete footing. Install single anchor screw 1½"–2" below the top of post. Place transformer on screw. Place 9" torpedo level on top of transformer and level transformer. Once level, secure transformer to post by installing 1 or 2 screws on the bottom-mounting bracket.

All LX Series Transformers come equipped with a 3 foot, 12 gauge, 3-prong electrical power cord to be used in conjunction with a 120 volt class A type ground fault circuit interrupter electrical receptacle. The LX power cord should be used only in conjunction with a 120 volt receptacle. Do not use an extension cord with a cord connected landscape lighting system.

For hard wire installations, remove the LX power cord and wire the transformer in compliance with local electrical building codes. It is recommended that the electrician install a dedicated 15 or 20 amp circuit breaker in the electrical panel.



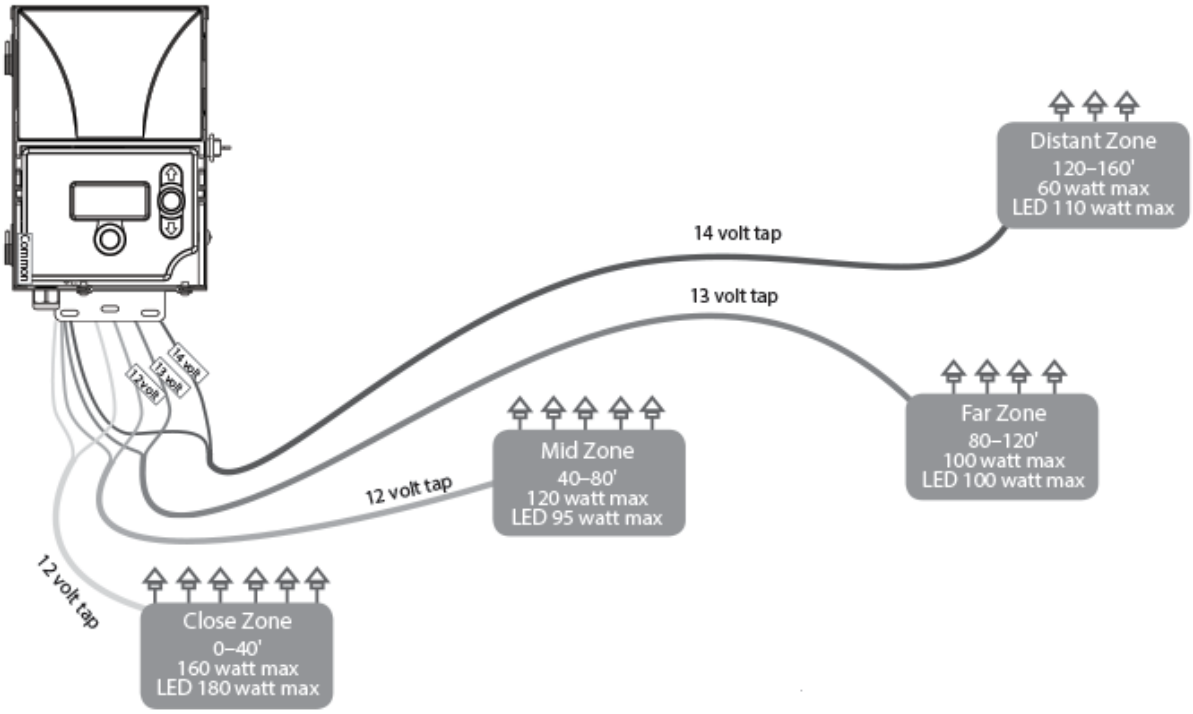
A - Side View
B - Front View

1. 1½" conduit
2. 4 x 4 post
3. Concrete footing
4. 12" minimum
5. Mounting brackets

3. LX - Running Cable to Lighting Fixtures

Once the transformer has been installed and all fixture locations determined, the next step is to run the correct size cable from the transformer to the fixtures while providing each fixture with proper voltage range. LED fixtures should be provided between 10 and 15 volts AC. With incandescent fixtures the voltage range at fixture should be between 10.5-11.5 volts AC. This is accomplished by:

- Grouping fixtures into distance zones as illustrated below. Do not have a fixture that is 10' away from the transformer on the same cable run as one that is 100' away.
- Use the proper cabling method for the application. For incandescent fixtures, try to center load all cable runs when possible to minimize the voltage differential between fixtures. Maximum voltage differential between the first fixture and the last fixture on any given circuit should not exceed 1 volt with a 0.5 volt differential being optimum.
- LED fixtures can vary in voltage and will all have the same brightness as long as between 10 and 15 volts is being supplied to each fixture.
- Use the correct size cable to accommodate voltage drop. As a general rule of thumb, limit the wattage load per each cable run to no more than 100 to 160 watts.



Wattages shown are per 12 gauge cable. Install additional cable runs as needed to complete project. To increase wattage maximum, run 8 gauge or double 12 gauge to the first fixture in the zone. Use a digital voltmeter to fine tune circuits.

Cabling Methods

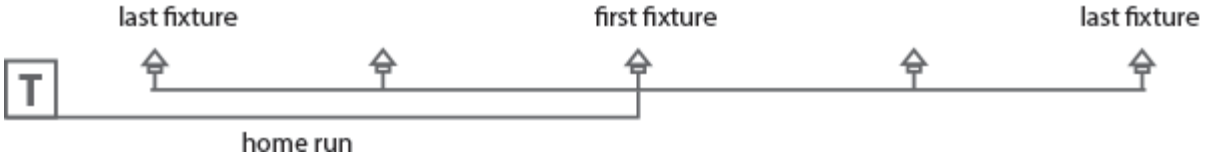
Within each cabling zone, you may utilize any of a number of cabling methods. The primary objective is to minimize voltage drop by installing the proper size feeder cable (home run) to each zone and to make sure that each fixture on each cable run is receiving between 10.5 and 11.5 volts, or 10–15 volts for LED fixtures. Center feeding the “home run” (the main cable run from the transformer to the first fixture on the circuit) will help minimize the voltage differential between the first fixture and the last fixture on the cable run.

Daisy chain method (Recommended for LED systems)

Daisy chained circuits are the least efficient cabling method as more voltage is fed to the first fixture on the run and due to voltage drop, each subsequent fixture receives less and less voltage. This is not a problem for FX LED fixtures due to its large voltage acceptance range of 10–15 volts.

Tee (or Center Load) method (Recommended for Incandescent systems)

The tee method center feeds the “home run” section of the cable and reduces the voltage differential between the first fixture and the last fixture on either side of the “tee.” This method is the preferred circuiting technique as it is easy to install and minimizes the voltage drop between first and last fixtures.



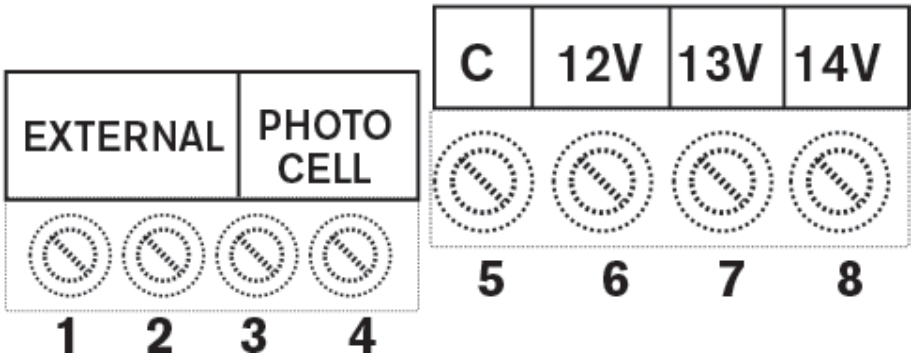
Connecting Cables to Terminal Block

TRANSFORMER TERMINAL BLOCK

The LX Series Transformer includes one “common” lug, and three “hot” lugs. Four smaller lugs are located on left side of the voltage lugs, which provide a connection for an External Transformer Signal of 12-24 volts and two connections for the proprietary low voltage Photocell unit.

COMMON LUGS

One conductor from each cable run coming from the lights to the transformer must be connected to one of the common lugs. The other conductor will be installed into the hot lug that provides the optimum voltage for each circuit.



CHOOSING THE PROPER “HOT” VOLTAGE LUG

Choosing the proper “hot” voltage lug in which to install the conductor is determined by the circuit’s voltage drop. If a circuit’s voltage drop is calculated to be about 3 volts, install the “hot” side of the cable into the 14 volt tap to assure proper voltage at the lamp (14 volts minus 3 volts = 11 volts). The voltage reading at each “hot” lug will vary depending upon the incoming voltage provided by the 120 volt receptacle. If the receptacle reads 128 volts, it is not uncommon for the 12 volt lug on the transformer to read 12.6–12.9 volts. On the other hand, if the receptacle is reading only 116 volts, the 12 volt lug may only read 11.8–12.2 volts. Always verify both high voltage and low voltage readings with a digital voltmeter. Fine-tune each circuit by using a digital voltmeter. Lamps perform best when supplied between 10.5 and 11.5 volts. Before waterproofing wire connections, take a voltage reading at the first and last fixture on each circuit. If the voltage reading at the first fixture on the circuit reads less than 10.5 volts, move the conductor up to a lug that will provide approximately 11 to 11.5 volts. LED fixtures should be provided between 10 and 15 volts.

Note: See all voltage drop charts below.

4. LX - Power Transformer Circuiting Guidelines

CABLE STATS

Low voltage lighting systems are typically installed using UF (underground feeder) rated stranded cable. The most common cable used is referred to as 12/2 stranded cable. The size of cable used in wiring the lighting system will be determined by the wattage load and length of cable run from the transformer to the lighting fixtures.

It is very important to note that all low voltage cable has a maximum safe rating. Overloading cable can create a dangerous safety hazard so be sure to cable your lighting system with the proper size cable.

LOW VOLTAGE CABLE

Each low voltage lighting cable consists of two parts. One part of the cable is designated to carry the voltage load and is referred to as the “hot” lead. The “hot” section is installed into one of the low volt “hot” lugs on the terminal block. The other section is referred to as the “common” lead and is installed into the lugs labeled “common.” Voltage is carried out from the transformer to the fixtures via the “hot” side of the cable and returns back to the transformer “common” tap via the other half of the cable thus completing the circuit.

LOADS PER CABLE

Add cable runs as necessary

Close Zone 0–40'

12 Gauge 160 watts max. 10 Gauge 180 watts max. 8 Gauge 220 watts max.

Mid Zone 40–80'

12 Gauge 120 watts max. 10 Gauge 140 watts max. 8 Gauge 200 watts max.

Far Zone 80–120'

12 Gauge 100 watts max. 10 Gauge 120 watts max. 8 Gauge 180 watts max.

Distant Zone 120–160'

12 Gauge 60 watts max. 10 Gauge 100 watts max. 8 Gauge 160 watts max.

LED LOADS PER CABLE
Add cable runs as necessary.

For maximum efficiency, input voltage to LED should be between 10 and 15 volts

Close-Zone 0–40' using voltage tap 12

14 Gauge 115 watts max. 12 Gauge 180 watts max. 10 Gauge 300 watts max.

Mid-Zone 40–80' using voltage tap 12

12 Gauge 95 watts max. 10 Gauge 150 watts max.

Far-Zone 80–120' using voltage tap 13

12 Gauge 100 watts max. 10 Gauge 160 watts max.

Out There-Zone 120–160' using voltage tap 14

12 Gauge 110 watts max. 10 Gauge 175 watts max.

5. LX - Installing Multiple Transformers

CONTROLLING A TRANSFORMER VIA AN EXTERNAL SOURCE

The LX Transformer can be controlled from another transformer via the 1–24 volt EXTERNAL connection.

Operate multiple transformers from a single source:

1. If you have multiple transformers on a single site, a PRIMARY transformer can be designated to trigger them all.
2. Select PRIMARY controller and ensure that the POWER IS OFF.
3. Run a wire from the common terminal and one of the three voltage taps from the PRIMARY TRANSFORMER.
4. Connect this from PRIMARY TRANSFORMER into the slave controller via the EXT (external) input.
5. At the SLAVE TRANSFORMER, be sure to set the ON TIME to “NONE” so that the unit only comes on due to the EXT input.
6. SLAVE TRANSFORMER is now ready to receive input from the PRIMARY TRANSFORMER.
7. To confirm connection, reestablish power to both PRIMARY and SLAVE transformers.
8. Activate lights via the PRIMARY TRANSFORMER.
9. A positive connection can be confirmed by the EXT light on the faceplate of the SLAVE TRANSFORMER(S) turning green.

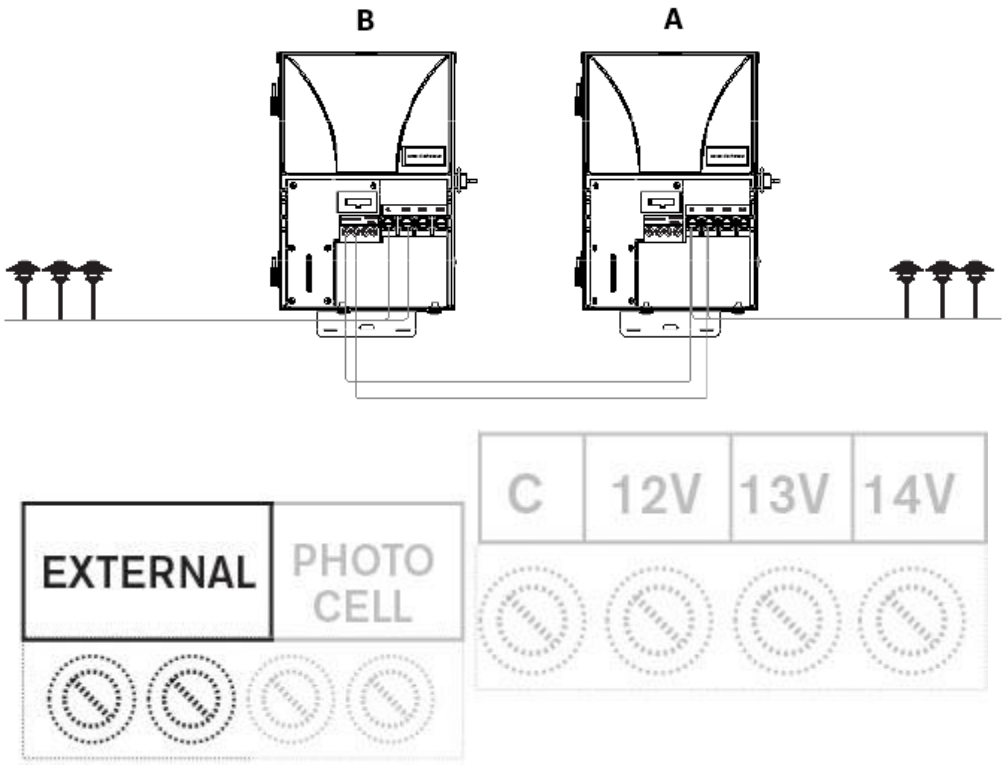
The PRIMARY controls all lighting functions via its timing and/or control functions.

The SLAVE initiates when the PRIMARY starts its lighting function.

As long as the SLAVE transformer is receiving between 1–24 volts as many SLAVES can be connected as needed to a PRIMARY.

A - Primary

B - Slave



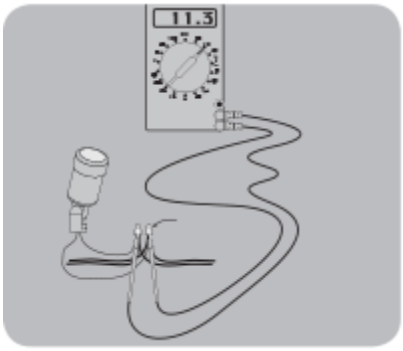
6. LX - Power Transformer Installation Tools

Receptacle Tester

This tool tells you whether or not the 120 volt receptacle you are plugging the LX Series Transformer into is wired properly. Follow the tool manufacturers instruction manual to assure proper wiring on the receptacle you will be using.

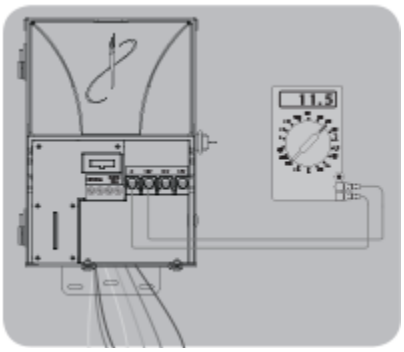
Digital Voltmeter

This tool allows you to take important voltage readings at the transformer, at each fixture and at the receptacle the transformer will be plugged into. Dial the digital voltmeter to the 200 ~ setting.



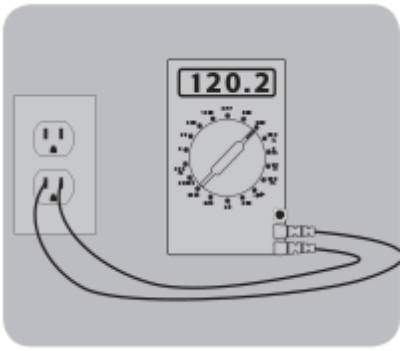
Checking voltage at fixtures

Insert voltmeter probes into each wire connector (Optimum reading between 10.5 and 11.5 V)



Checking voltage at lugs

Each lug should read no more than +/– 0.3 to 0.9 volts of rated output

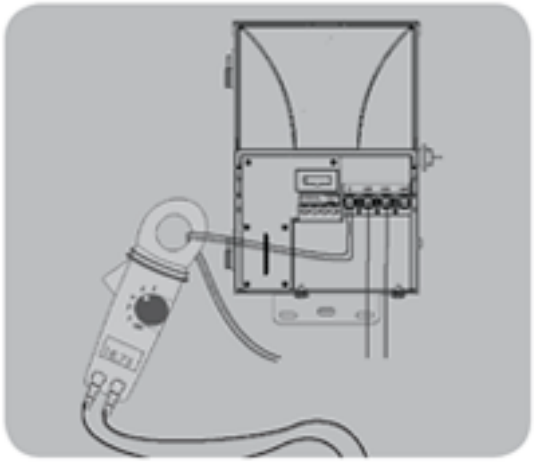


Checking voltage at plug

Safe voltage reading between 117 and 125 V

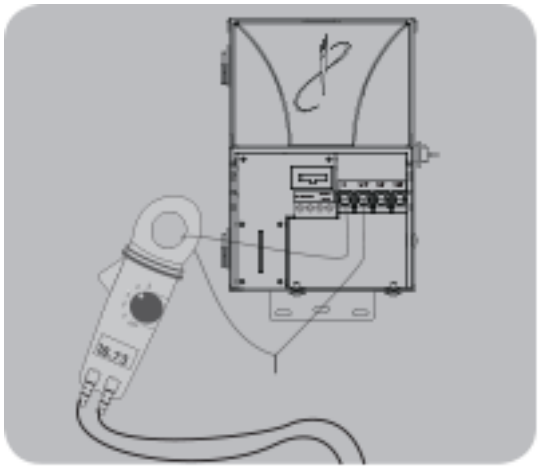
Amp Clamp

The amp clamp is both a digital voltmeter and an amp probe combined, and is the lighting professional's tool of choice. This tool can be used to check system voltage, amperage and continuity. It is a most valuable troubleshooting tool that can save you time and frustration. To test amperage on the fluke amp clamp, set the dial to Ã. To test voltage with a fluke amp clamp, set the dial to V~Set amp clamp to Ã. Clamp all wires on each common. Clamp each wires on commons. Check cable specs to compare amp reading with safe loads.



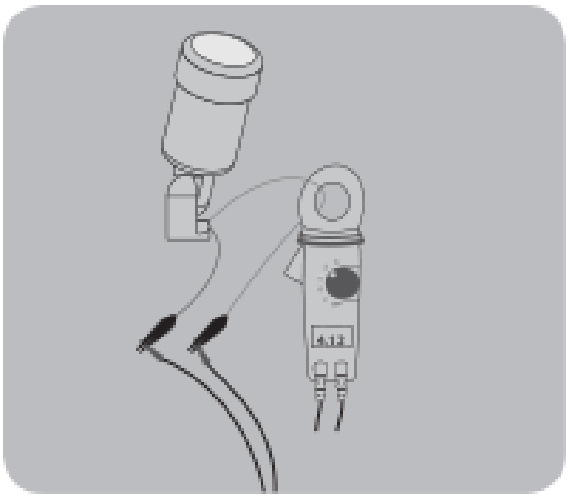
Checking Amperage at Transformer Commons

Set amp clamp to Ã. Clamp all wires on each common. Maximum amp load per common is 15 amps for the LX-150 and 25 amps for the LX-300. If amp reading exceeded, there is either a short in the wiring or a wattage overload on one or more cables installed in the common being tested.



Testing Amperage on single cable

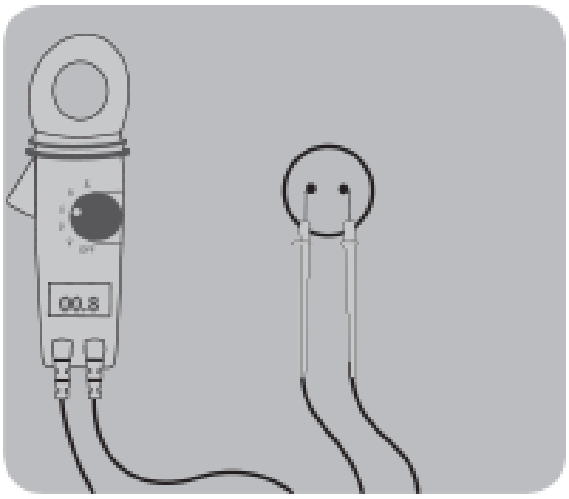
Set amp clamp to Ã. Clamp each wires on commons. Check cable specs to compare amp reading with safe loads.



Testing Amperage at Fixtures

Set amp clamp to Ã. Clamp only one wire lead. This reading will help you determine the wattage rating of the fixture's lamp.

- 0.8 reading (+/-) = 10 watt lamp
- 1.6 reading (+/-) = 20 watt lamp
- 2.9 reading (+/-) = 35 watt lamp
- 4.1 reading (+/-) = 50 watt lamp



Testing Continuity

Place amp clamp on the Ω setting. Put probes on each side of conductor or lamp pins. If clamp tones or attempts to reach 0.000, there is a continuous circuit. Lamp/cable is good. If clamp does not tone and stays at 1.0 setting, there is a break in the line or lamp is no good.