VISTA PROFESSIONAL OUTDOOR LIGHTING

ES-150
12V SERIES
Transformers

INSTALLATION & OPERATORS GUIDE

CONSTANT POWER™

CONSTANT POWER
True Constant Voltage
At All Terminals
Under Maximum Load

Made in the U.S.A.

UL 1838

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Vista Professional Outdoor Lighting reserves the right to modify the design and/or construction of the transformer shown without further notification.

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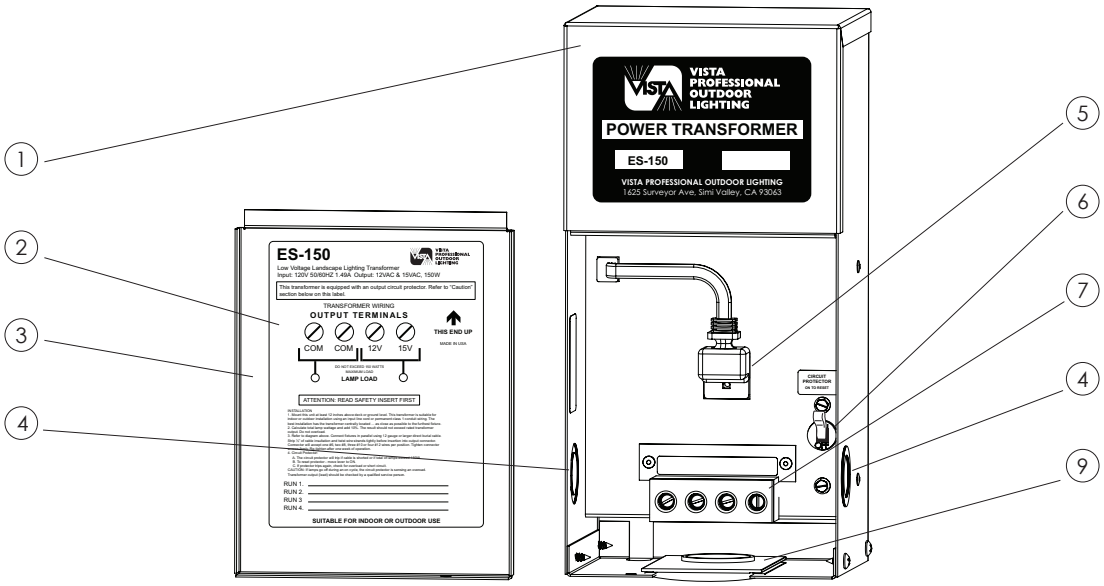
FEATURES AND CONTROLS

1. Stainless Steel Cabinet
20 gauge, top grade, polished & clear-coat finish.
2. Operating Instructions inside door.
Refer to these instructions for additional information on wiring to the transformer.
3. Removable Front Panel
The door can be removed for greater access to wiring compartment during installation.
4. ½" - ¾" Knockouts
For conduit and accessory mounting.
5. 120-volt accessory receptacle
For use with optional, removable multi-setting mechanical (TC-112) 24-hour timer or electronic/digital (DTC-150) 7-day timer (with battery backup).
6. Circuit Protector
Move lever to "ON" to reset.
7. Terminal Strip
Dual voltage taps, 12 volts and 15 volts.
8. Adjustable Cable Raceway Feeder (ACRF)
Vista Exclusive - Easiest in the industry to wire: adjustable cable raceway feeder easily accommodates multiple wire runs. Or use handy 1¾" conduit knockout.



MOUNTING INSTRUCTIONS

WARNING: Transformers must be installed in accordance with the National Electrical Code (NEC) and local codes. Failure to do so will void the warranty and may result in serious injury and/or damage to the transformer.

1. Find a suitable, flat-surfaced location to mount transformer, taking in to consideration proximity to 120 volt AC power source.
2. Attach provided template to wall at desired height. (Should be mounted at least 1.5' from the ground for safe and convenient operation.)
3. Center punch and drill (with an appropriate bit size for the screws to be used) at crosshair marks on the template.
4. Using appropriate screws for the selected mounting surface, insert screws into predrilled holes deep enough to slip transformer keyhole slots over. (Make sure screws are of a load bearing quality.)
5. Hang transformer case securely over screws.

TRANSFORMER SIZING

Low voltage lighting systems require the use of a transformer to reduce the standard 120 volt power from ordinary household electricity to the 12 volt needed to power low voltage lamps. Transformers vary in size or capacity. The total lamp wattage (load) of all fixtures connected to one transformer must not exceed the wattage capacity of the transformer. Therefore, to determine the transformer size needed, simply add up the wattage of all lamps you plan to use +10% for cable & connection factor. (Low voltage cable and fixture connections add hidden watts to your system.)

TRANSFORMER SIZE = TOTAL FIXTURE WATTS x 1.1

TIP: All low voltage connections must be tight and waterproof.

Select a transformer that matches as closely as possible your total lamp wattage. For example: if you have 12 fixtures all rated at 10 watts, you will need a 150-watt transformer (12 x 10 = 120 watts plus 10% = 132). If your total wattage is too great, either divide the total load between two transformers or use a more powerful model. Selecting a transformer with about 20% higher capacity than your total lamp wattage will allow for adding a fixture or two later.

LOW VOLTAGE CABLE LENGTH

In planning a low voltage system, it is necessary to consider the impact of voltage drop. Because of cable's inherent resistance, voltage drops along its length: the end-of-run lamps will be dimmer than those at the beginning. Since voltage drop is a function of cable length and cable size and total fixture wattage, voltage drop can be minimized in several different ways:

- Use multiple cable runs
- Use heavier gauge cable (8 or 10 gauge)
- Shorten cable lengths or runs
- Reduce wattage of individual fixtures
- Reduce the total number of fixtures on a run
- Use multiple transformers in different locations

Cable is measured by gauge. The lower the number, the thicker the cable and the more current it carries. Cable for low voltage lighting is available in three gauges: #12-2, #10-2, and #8-2. As noted, #8-2 gauge is the largest and is capable of carrying the most current. Refer to the Cable Length Guide below to estimate the maximum allowable cable length that will keep the farthest fixture from the transformer from becoming to dim (below 10.5 volts). In addition, your transformer's output options, the design of your lighting system and corresponding cable layout can help minimize voltage drop (see 12-Volt Cable Layout Options, Output Adjustment Switch, and Multi-Tap Installation sections).

TIP: Expect a voltage drop of greater than 1.5 volts when cable length is longer than recommended. Use the formula below to calculate maximum cable length.

$$Vd = \frac{L \times W \times 2}{Kc}$$

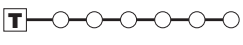
Vd = Voltage drop in the section of cable, in volts.
L = Length of the section of cable (one way distance), in feet.
W = Total Watts carried by the section of cable for the lamps it supplies.
Kc = 'Cable Constant', as follows:

Cable Size (AWG)	K_c
12	7500
10	11920
8	18960

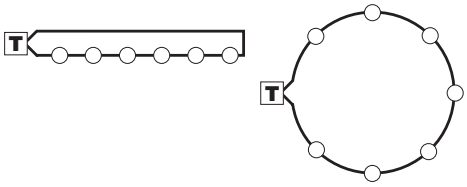
LOW VOLTAGE CABLE LAYOUT OPTIONS:

TIP: Connect all lamps in parallel. EXAMPLE: Connect one side of each lamp to 'COM' terminal, the other side to '12V' terminal.

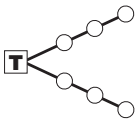
1. Straight run installation: Fixtures run in sequence directly from the transformer.



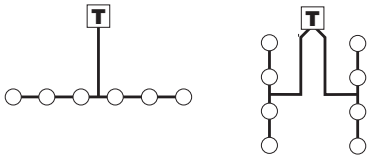
2. Loop installation: Fixtures are arranged in a looped circuit, reducing the effects of voltage drop.



3. Split load installation or multiple cable run: Fixtures run in two or more directions from the transformer. Locating the transformer in the center of the run reduces the effects of voltage drop.



4. "T" installation (RECOMMENDED): Allows more equal distribution of power to the center of the run, or to a run some distance away. Cable running from the transformer must be of a heavier gauge (#8 or #10).



CABLE CONNECTION DETAIL

TIP: For proper connection, strip off 3/4" of cable installation, twist wire strands tightly and use a high quality straight blade screwdriver 3/16" wide tip to tighten all screw terminals firmly.

MULTI-TAP INSTALLATION

TIP: Multi-Tap transformers supply output voltage may exceed 12-volts; extreme care must be taken during installation to avoid premature lamp burnout due to high voltage. Use a voltage meter during installation to ensure proper voltage at the fixture. As a guide when designing your job, expect a 1-volt drop for every 100' of 12/2 cable to which 100-watts of evenly spaced fixtures are connected.

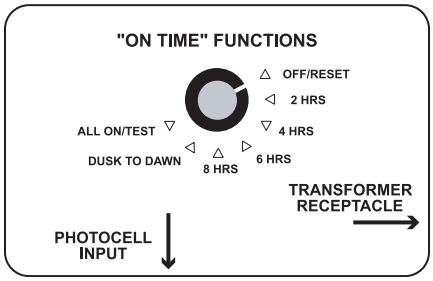
Refer to sample diagram. Connect one side of fixtures (common) up to 150-watts per circuit, using 12 gauge or larger direct burial cable. Strip ¾" of cable insulation and twist wire strands tightly before insertion into transformer's output terminals. Each terminal will accept two #8, four #10, or 6 #12 wires. Tighten connector screws firmly. Retighten after one week of operation. Connect remaining side of fixtures to output tap according to your voltage needs. It is best to connect your fixtures to the 12-volt tap first, then use a voltage meter to measure the AC voltage of the fixture nearest to the transformer. Subtract the measured voltage from 12 and add the result to determine your higher tap. Example: With fixtures connected to 12-volt tap, measured voltage at first equals 9. 12 volts required at fixture minus 9 volts measured equals a 3-volt difference. Add the difference to 12 in order to determine the appropriate tap to be used. (3 + 12 = 15)

REMOTE PHOTOCELL CONTROL FUNCTIONS FOR RPM-100 MODULES

If not already pre-installed, insert RPM-100 into the 120-volt accessory recepticle, then insert 120-volt accessory plug into RPM-100 module.

Photocell Mounting:
1. Disconnect transformer from 120V service.
2. Mount photocell eye where exposed to
sunlight.
3. Run photocell cable with plug end back to
transformer enclosure.
4. Locate square shaped hole in enclosure
bottom and feed plug through to socket marked 'PHOTOCELL INPUT'. Plug photocell
in.
5. To test in daylight hours, apply input power to transformer and turn photocell control knob to desired setting.
6. Cover photocell eye completely so that no light enters. Transformer should turn on within a few seconds.
6. For normal operation, uncover photocell, turn knob to "OFF/RESET", then to your desired setting.
NOTE: Turn photocell control switch to OFF/RESET any time you need to cancel a timed cycle. Next, move switch to your new desired on time. Time period will restart when dark.

Timer Setting:
Timer does not require time-of-day setting or battery backup maintenance. It depends on the photocell 'darkness signal' to begin the 'on duration' cycle. It has six modes of operation.
• By moving the dial to one of the four 'on time' switches (2,4,6,8 hours), you tell the unit to turn on at darkness, begin timing, and turn off when the selected time period ends.
• With dial turned to 'DUSK TO DAWN', the timer never activates, allowing the unit to operate from dusk until dawn.
• To test your system during daylight hours, use 'ALL ON / TEST' to override the photocell and turn the system on. Whenever input power Is applied to the transformer, the lights will remain on.



TC-112 TIMER SETTING PROCEDURE

1. Insert TC-112 into the 120-volt accessory recepticle, then insert 120-volt accessory plug into TC-112.
2. To set time 'ON': Insert green tripper pin(s)
into dial at the approximate start time(s) desired.
3. To set time 'OFF': Insert red tripper pin(s) into
dial at the approximate stop time(s) desired.
4. Turn the outer rim of the timer face clockwise until the arrow on the view window points to
the current time of day.

NOTE: The numbers on the timer face correspond to the hours in a day.

DTC-170 DIGITAL TIMER SETTING PROCEDURE

TIP: Refer to enclosed instructions (included with timer) for comprehensive operating instructions.

Initial Operation:
1. Plug the timer into the Transformer 120-volt
accessory recepticle and turn the power on.
Leave for approximately 14 hours to charge
the memory back-up battery.
2. Clear all current information by pressing **RESET** button with sharp object such as a pen or pencil after charging.
3. Proceed with setting procedures for current
time and programming.

TIMER REMOVAL AND REPLACEMENT

When so equipped, the timer supplied with your new transformer is a removable (plug-in) style. Located Inside the cover of the transformer enclosure, It can be pulled out and replaced with a new timer, remote photocell module, or remote control module. To replace a timer, simply grasp both sides of its plastic case and pull firmly. Next, remove the timer plug from the timer.

To install a new timer, Insert timer plug into timer before plugging into transformer's timer receptacle.

TIMER SETTING PROCEDURE WITH FIELD INSTALLED PHOTOCELL

The combination timer and photocell is designed for photocell-on, timer-off operation.
1. Set ON TIME during daylight hours - 2 PM or so.
2. Set OFF TIME at desired off time.
3. Set timer dial to the current time of day.

EXAMPLE: For on at dusk, off at 12 PM, PUSH DOWN all 40 pins between 2 and 12 PM.

TIP: It is normal for the transformer to temporarily turn on during daylight at the timer on setting. Approximately 5 minutes is required for the photocell to stabilize and turn the unit off.

TIP: When equipped with plug-in timer and photocell, normal operation requires uninterrupted 120 volt power.

ADJUSTABLE CABLE RACEWAY FEEDER (ACRF)

Vista Exclusive - Easiest in the industry to wire: adjustable cable raceway feeder easily accommodates multiple wire runs. Or use handy 1¾" conduit knockout.

TROUBLESHOOTING CHECKLIST

Although low voltage lighting systems operate with a minimum of maintenance, occasionally some problems will occur. Here are solutions to some of the most common problems.

I. Entire system will not operate
1. Check 120-volt outlet to ensure you have
2. power to outlet.
3. Check or reset circuit breakers on
4. transformer.
5. Check low voltage cable connection at
6. transformer.
7. Check transformer alone by disconnecting low voltage cable from output terminals, by-passing timer and/or photocell as explained previously, and checking Input and Output power LEDs for power on status (lit).

II. System operates for 15 minutes, and then turns off.
1. Timer incorrectly set. See setting procedure.

III. Circuit breaker on transformer trips
1. Check end of cable to ensure copper strands are not touching.
2. Check connection of cable at transformer to ensure copper strands are not touching.
3. Recalculate total wattage to ensure that you have not exceeded rated wattage of transformer.
4. Check for other shorts at fixture connection points.

If you have a concern or problem with any Vista product, first contact your local distributor. For continuing or unresolved problems, contact factory technical department at (800) 766-8478 between 8:00am and 5:30pm PST, Monday through Friday.