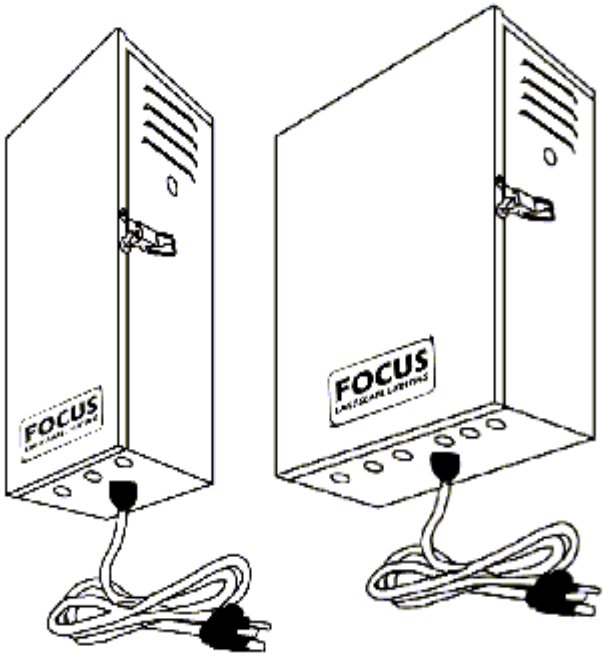
FOCUS INDUSTRIES

RESIDENTIAL - COMMERCIAL - INDUSTRIAL

TRANSFORMERS & CONTROL DEVICES

STAINLESS STEEL & ALUMINUM

MST, MAS, MLT & MAL SERIES



LISTED 1838

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IN FIELD UPGRADES OF CONTROL DEVICES

Operation Instructios

CONGRATULATIONS!!

FOCUS is pleased to introduce the MST, MAS, MLT & MAL Stainless Steel and Aluminum 12 Volt Weatherproof Transformer Series designed with the customer in mind.

Why use a M2000 series transformer?
-Simple
-Affordable
-Upgradeable
-Expandable

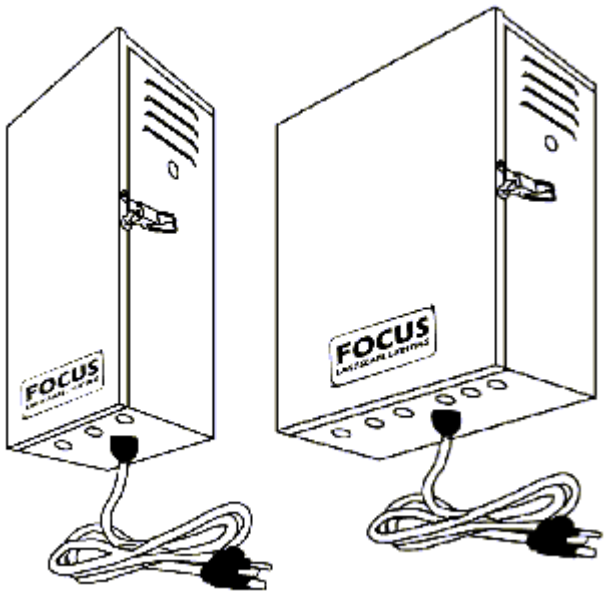
The M2000 is suitable in both residential and commercial applications, all upgrades or repairs can be field installed in minutes (No down time on job site = Happy Customers). The flexibility of this unit enables ease of installation & operation, and gives you the power to grow with your landscape architectural needs and provide years of trouble free maintenance.

The M2000 Series Stainless Steel & Aluminum Transformers are so easy to use that you will rarely need to use this guide after installation. If you do have a question about the M2000, refer to this booklet or abbreviated instructions inside the transformer door. If further information is needed, feel free to call your local FOCUS distributor or FOCUS technical service line for professional contractors at (949) 830-1350 or toll free (888) 882-1350 between 8:00am and 5:00pm pacific time.

You have given yourself the power & flexibility needed in today's ever-changing exterior environment. Got Lights?

SPECIFICATION

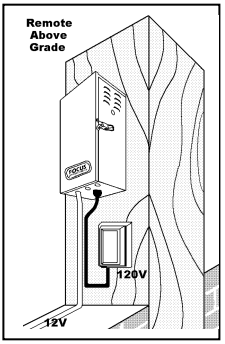
- MST & MLT Heavy Duty 18 Gauge #4 Brushed Stainless Steel Enclosure with Hinged
- Locking Door.
- MAS & MAL Heavy Duty Aluminum Type 50-52-H32 .063" thickness enclosure with
- Hinged locking door.
- Rain Tight Enclosure, Above Grade (Nema 3R Type).
- Long Life, High Temperature (130 C) 266 F Class 'B' Rated Transformers.
- Isolation/Insulation type. No Contact Between 120V and 12V Windings. Copper Shield.
- 1500 Volt Isolation between All Windings and Ground.
- 11 gauge Cold Rolled Steel plate for Stable Mounting.
- Grade M19 Electric Grade Steel for Superior Electrical and Magnetic Properties.
- Strip Copper Secondary Windings for Lower Temperature Rise.
- Single Phase, Open Core and Coil.
- E.I. Laminated Windings (Linear Output) Vacuumed Impregnated w/Black Slate Flour. Filled Varnish for Superior Heat Dissipation and Noise Reduction. Class 180 C.
- 120V Primary, 12.5 Volt Secondary 50/60 Hertz/Cycle Standard.
- 6 Foot (18/3) SJT-WA Weatherproof Grounded Power Cord (120V).
- On/Off Control via Rocker Switch.
- Extra Heavy Duty (75 amp) Terminal Lug easily Handles Extra Sets of Cables.
- Reset able magnetic Circuit Breaker for Overload and Short Circuit Protection.
- U.L. 1838 and 1598 Listed. The Standard for 12 volt Landscape Lighting Systems.
- All Units are supplied with Knock Outs for Easy Upgrading or Adding of Accessories.
- MST & MAS Series has combo knockouts for 12v. cable conduit feed available in
- 2 x ½" and ¾", 1", and 1-1/2" for Commercial Application
- MLT & MAL Series has combo knockouts for 12v. cable conduit feed available in
- 4 x ½" and ¾", 2 x 1", and 2 x 1-1/2" for Commercial Application

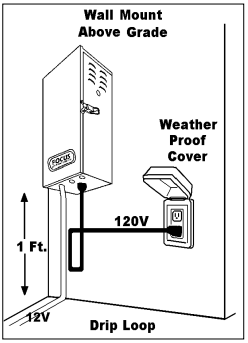


Mounting Your Transformer

Mounting location will be dictated by where the 120 volt power is available.

1. Garage
2. Closet
3. Car Port
4. Utility Shed
5. Pool Enclosure
6. Basement
7. Attic
8. House Exterior



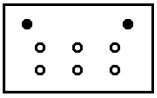


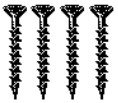
In some cases, 120-volt power must be pulled into or placed in a specific location for the best results. A weatherproof receptacle (GFIC) cover must be used in all exterior applications.

All hardware is included for most installations.

Included:

- Mounting bracket
- 4 sheet metal screws.

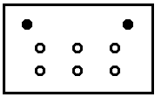




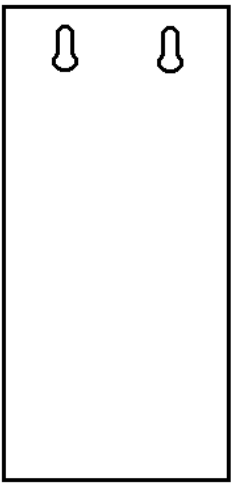
FOR WALL / REMOTE / TREE MOUNT:

1. Using the supplied mounting plate & screws, determine the location & final height of the transformer. (Eye level or below are normally acceptable).
2. Mount MST, MAS, MLT or MAL Transformer within 2 feet of a standard 110/120 volt receptacle. Minimum 1 foot above ground/grade when used outdoors.
3. Place low voltage cable in proper terminal Lug sections and tighten securely.
4. Plug grounded cord into a recommended ground fault interrupter circuit (GFIC) 120V outlet / receptacle.
5. Follow operating instructions on page 31 or see the inside cover of Transformer.

Wall Mounting Bracket



Back of Transformer



Mounting Your Remote Photocell

Since most of the available 120V power is inside the home, the garage or other inconvenient locations, it may be necessary to utilize the remote photocell. Other wise you will be relying on manual or time clock operation. Time clocks require adjustments 2-3 times a year as daylight hour's change.

FOR INSIDE APPLICATIONS:

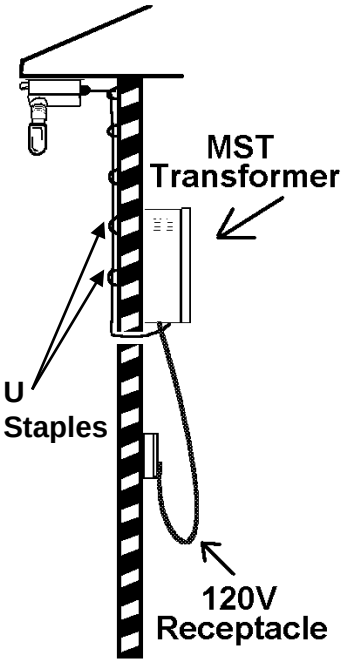
Problem: You cannot use a photocell inside. It must be accessible to daylight.

1. Drill a 3/8" hole to reach exterior. Push wire through hole.
2. Find best location for exterior light access. (Up to 50' from transformer)
3. Mount hub and Photocell with screw provided.
4. Tie up or remove excess power cord by releasing black liquid tight connectors.
5. Secure power cord to wall or surface with appropriate U staples or other every 1 to 2 foot intervals.

FOR OUTSIDE APPLICATIONS:

Problem: Some outdoor 120V power receptacles are located in poor light accessible areas. (Under eves, large trees, shrubbery, or other architectural elements.) Thus making your photocell inoperable (keeping your lights on during the day).

1. Find the best location for daylight access. (Up to 50' away from transformer)
2. Route power cord and hub to this location.
3. Secure cable to wall or surface with appropriate U staples or other every 1 to 2 foot intervals.
4. Remove any excess cable or tie up for future expansion due to plant growth or architectural changes.



Mounting Your Remote Motion Sensor

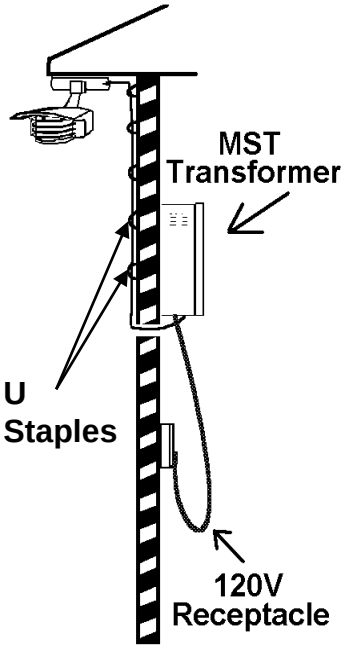
Since most of the available power is inside the home, garage or other inconvenient Locations, it will be necessary to utilize the remote motion sensor.

FOR INSIDE APPLICATIONS:
Problem: You cannot use a motion sensor inside. It must be accessible to movement outside.

Drill a 3/8" hole to reach exterior. Push wire through hole.
Find best location for which the sensor can "see" all paths of movement.
Mount hub and motion sensor with screws provided.
Tie up or remove excess power cord by releasing black liquid tight connector.
Secure power cord to wall or surface with appropriate U staples or other every 1 to 2 foot intervals.

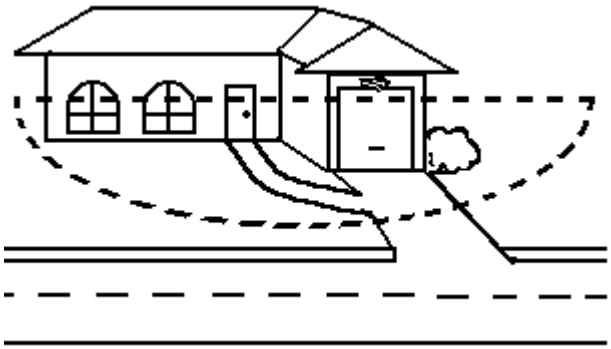
FOR OUTSIDE APPLICATIONS:
Problem: Some outdoor 120 volt power receptacles are located in poor areas where Movement cannot be detected.

Simply find the best location for movement in the detection pattern (up to 200 degrees by 50').
Route power cord and hub to this location.
Secure cable to wall or surface with appropriate U staples or other every 1-2 foot intervals.
Remove any excess cable or tie up for future expansion due to plant material growth/ Architectural changes.
Now follow operating instructions for your motion sensor.



FOR PLACEMENT: Is highly subjective due to your needs. Security will require large quantities of light aimed in specific dark areas. Safety from objects or dark entrances or passageways will require a different type of fixture and placement.
NOTE: It is recommended to keep the landscape lighting system separate from your security lighting system. Security lighting uses large amounts of light where as a landscape
Lighting system is decorative, yet offers safe passage in and around the residence or business.

Range:
Up to 200 degrees
By 50'.



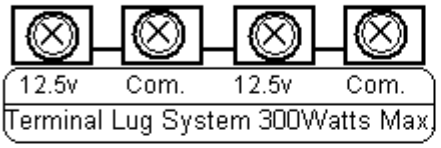
TRANSFORMER TERMINAL LUG SYSTEM CONNECTIONS

80 Amp extra heavy duty terminal lug. 1-4 cable sets can be placed in each terminal

The Super terminal Lug System Wiring advantages: Less tools required, no need for space connector, simply place stripped wire in barrel and screw donw.

Metod 1

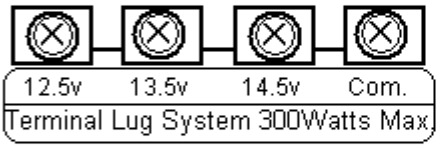
Single Circuit 12.5v Output Transformer



NOTE
Super Terminal Lug Supports
4 x # 12
3 x # 10
2 x # 8 per lug

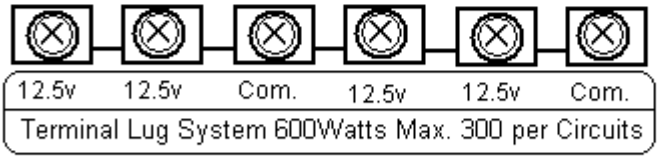
Metod 2

Multi-voltage Output transformer



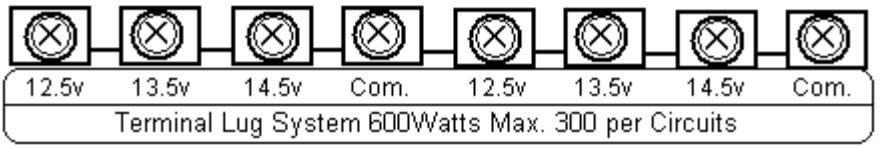
Metod 3

Double Circuits 12.5v Output Transformer



Metod 4

Double Circuits Multi-voltage Output transformer Transformer



To add an Integral Timer (-T) or Digital Timer (-DT) to a Photocell Ready (-PCR) MST or MAS Transformers units

Installation

1. Unplug & remove transformer from wall, 2.Open front door and release thumbscrew to remove inside plate, 3. Punch out and remove 2 ½" timer knockout, 4. Open Hardware bag & thread 3 x ¾" hex coupler spacers to studs on back of inside plate, 5. Mount timer unit right side up with spade terminals down, onto plate and secure with 3 x 6/32" Phillips set screws & lock washer.

Integral or Digital Timer wiring

1. **Plug black wire** labeling inside the box to # 1 on timer, into # 1 on timer.
2. **Plug white wire** labeling inside the box to # 2 on timer, into # 2 on timer.
3. **Unplug red wire** from Switch and then plug it into # 4 on timer.
4. **Use supplied 8"blue jumper wire** and plugs it into # 3 on timer, than plug other side of jumper to Switch.

Finalize

1. Close end secure inside plate, making sure wire are not pinched by plate.
2. Adhere "Important Note" label above Integral Timer dial only.

Removal is the reverse of installation procedure for all.

For Questions Call 1-888-882-1350

To add an Integral Timer (-T) or Digital Timer (-DT) to a Photocell Ready (-PCR) MLT or MAL Transformers units

Installation 1. Unplug & remove transformer from wall, 2.Open front door and release thumbscrew to remove inside plate, 3. Punch out and remove 2 ½" timer knockout, 4. Open Hardware bag & thread 3 x ¾" hex coupler spacers to studs on back of inside plate, 5. Mount timer unit right side up with spade terminals down, onto plate and secure with 3 x 6/32" Phillips set screws & lock washer.

Integral or Digital Timer wiring

1. **Plug black wire** labeling inside the box to # 1 on timer, into # 1 on timer.
2. **Plug white wire** labeling inside the box to # 2 on timer, into # 2 on timer.
3. **Unplug red wire connected** to brown and yellow wires from Switches and then plug it into # 4 on timer.
4. **Use supplied 8"blue jumper wire** and plugs it into # 3 on timer, and plug other side of jumper to Switches

Finalize

1. Close end secure inside plate, making sure wire are not pinched by plate.
2. Adhere "Important Note" label above Integral Timer dial only.

Removal is the reverse of installation procedure for all.

For Questions Call 1-888-882-1350

To add an Photocell **(-PC),** Remote Photocell **(-RPC)**, or Remote Motion Sensor **(-RMS)** to a Photocell Ready (-PCR) MST/ MAS or MLT/MAL Standard Transformers units,

Installation

1. Unplug & remove transformer from wall, 2.Open front door and you will see a male “White plug” on the inside plate, with a black Jumper wire, plugged to a female white connector, 3. Punch out or remove ½” (-7/8 hole) knockout, 4.Remove lock nut, then run wires with plug of (-PC, RPC, or RMS) through hole, then replace & tighten lock nut to secure to housing, 5 remove male white plug then connect male plug from (-PC, RPC, or RMS) to female connector

   Note Save the white plug for amperes check

Removal is the reverse of installation procedure for all.

OPERATING INSTRUCTIONS

No Accessories:

A rocker switch at the bottom of this unit controls transformer. Simply press to ON" position
to bring lights on.

For a TIME CLOCK (-T) or (-T KIT)

Press rocker switch to ON' position to set time of day, rotate switch clockwise to desired time on clock face. To bring lights on automatically, press outward each 15 mm, WHITE tripper for desired 'lights on' time Example: from 5:00 pm - 11:00 pm press all trippers outward within that time range For Testing, press out 2-3 trippers at the top of the WHITE triangle at the 2:00 o'clock position on the clock face. This wills activate power/lights on". Remember to return trippers back when testing is complete.

For PHOTOCELL (-PC) or **(-PC KIT)**

Press rocker switch to ON position. Make sure photocell body is accessing daylight and is not shaded The transformer will automatically operate from dusk to dawn For testing, cover photocell to activate lights Wait a few minutes for activation

For REMOTE PHOTOCELL (-RPC) or (—RPC KIT)

Same as Photocell (-PC) Must be accessible to light. Allow 3-5 mm for activation Plug special adaptor into designated receptacles Cord length can be adjusted to reach Photocell (-PC) location outside

or REMOTE MOTION SENSOR (-RMS) or (-RMS KIT)

Must be mounted 6-10 above ground for optimum range and aimed correctly to ensure proper operation The supplied snap-on blinders enable you to customize your detection pattern to reduce your field from nuisance tripping. The protection pattern is 50' at 2000 Time adjustment is 5 sec - 12 mm. Conduct a walk test to adjust sensor response. Lights will remain on as long as there is movement within the zone. Once vacated lights can be adjusted to remain on from S sec. -12 mm

For Manual operation: Switch ON/OFF rocker switch once within 2 sec There are 3 dials settings on the Motion Sensor:

TIME: Sets time that lights will remain on after detection is vacated from 5 sec to 12 mm

SENSITIVITY: Increases or decreases the responsiveness and range of sensor (From 30%-100%) Factory setting is 70%

PHOTOCELL: For night operation only, turn knob all the way to the right (moon symbol) for
24-hr. operation, turn knob all the way to the left (sun and moon symbol). Adjust clockwise to have sensor come on later at dusk and counter clockwise to have it come on earlier Factory setting: Night only

IMPORTANT NOTICE: RMS is typically wired to a single 100 - 300W circuit Motion controlled circuit will be designated at terminal block. It is recommended to dedicate an entire transformer to motion sensor control for security reasons Your landscape lighting system should be a separate dedicated system For more information, see supplied manual from RAB

For TIME CLOCK and PHOTOCELL (-T & -PC) or TIME CLOCK and REMOTE **PHOTOCELL (-T & -RPCI**

Same as above except photocell will automatically bring lights on at dusk Time clock will override the photocell at a predetermined time you select for "lights off" "Lights off" is set by pressing trippers outward from 3:00 pm to desired time off

SPECIAL NOTES

Halogen lights should not be dimmed for extended periods of time. This will result in shortened lamp life. 12V fluorescent lights will not ignite or light below 10 volts. **DO NOT** use a dimmer with fluorescent fixtures. **WARNING: DO NOT** use an electronic transformer to supply voltage/current to 12V fluorescent fixtures, ONLY use magnetic power source. **NOTE:** Photocell units must have full access to daylight. Any obstruction could affect operation of unit.

CIRCUIT BREAKER

To reset: Press button inward. If it fails to reset, check for overload and/or short circuit. Overload: reduce wattage of lamp/fixture or remove fixtures to meet proper wattage limits. Short Circuit: Check all connections for possible wires touching. Correct before resetting again.

TROUBLESHOOTING

The two most common problems that occur with installing 12V low voltage landscape lighting systems are:

1. Overloading the transformer.
2. Exceeding cable distance or smaller size (gauge) cable than required.

Lights Do Not Work At All

PROBLEM	SOLUTION
1. Is the transformer plugged in?	1. Plug in the transformer.
2. Is the 12V cable attached properly to the terminal block?	2. Make sure solid connection is made. Use eyelet or flange spade connectors (supplied).
3. Are fixtures attached to cable?	3. Make sure connectors or wire nuts are properly installed.
4. Are light bulbs installed in the fixtures?	4. Make sure the light bulb and socket are making good contact.
5. Is the 120V receptacle on?	5. Make sure power is available at the receptacle. Test with voltmeter or any 120V appliance.

One or More Circuit Breakers Trip

1.One or both circuits overloaded.	1. Count the number of fixtures and multiply by their light bulb wattages. Make sure the total wattage does not exceed VA rating of transformer.
2. Short circuit. Cable wire cut or damaged.	2. Check all connections. Repair damaged fixture wire.

Lights On But Very Dim	
1. Possible overload on circuit.	1. Remove fixtures until proper light output is achieved.
2. Exceeding distance requirements	2. Shorten cable run from transformer. Increase wire size to reduce voltage drop. Additional runs of cable to share load/fixture may be needed.
3. Poor connectors.	3. Check and secure all connections from cable to transformer, fixture to cable, and light bulb to socket.
4. Primary voltage is low	4. Increase primary voltage by a boost transformer or increase 120V wire size from panel to receptacle. (Consult licensed electrician). Use a Select proper voltage tap based on distance and load needed. (Must use a voltmeter).

Lights Dim At End Of Run	
1. Cable run exceeds the limits.	1. Shorten cable runs or use only 12/2, 10/2, 8/2 or 12/3 cable. Run additional runs of cable and share load. Use a Focus HV Transformer output 7 voltages 12V, 13V, 14V,15V, 16V, 18V,or 21V. Select proper Voltage base on distance and load needed. (Must use voltmeter).

NOTE:
Prior to laying out fixtures, refer to the voltage tap chart below.
This will assist you in determining the tap voltage required

Note 1: Voltage drop is inherent in all lighting systems. Always use proper size cable. When possible, center the Transformer and minimize your cable distance from it. Make multiple cable runs to achieve desired coverage. The more copper the less voltage drop. If you are planning a run exceeding 100ft., consider using Focus (-MV) Transformers. These Transformers enable greater distances and current loads, reducing voltage drop. Use a voltmeter when making the installation to insure that voltage supplied to each fixture does not exceed 12V.

Note 2: Remember to plan ahead for future growth or additions. Always use a larger size Transformer or leave room on your current one for adding more fixtures or increasing light wattage. By doing this, you will be able to build up your light output as you add more fixtures to your landscape. Replace light bulbs quickly when they burn out. Otherwise, a higher voltage will be supplied to remaining fixtures due to reduced load/resistance. This is extremely important when using multi-voltage Transformers.

REV 0.8 02.2007

FOCUS INDUSTRIES, INC. – LAKE FOREST, CA
www.focusindustries.com
Made In The U.S.A.

Job Layout

***Please have all information filled out before calling Tech Support*

Job Address_____ Contact_____

Job Phone # _____

Product Installed

Fixtures

Circuit #1
Qty. / Type / Wattage
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Circuit #2
Qty. / Type / Wattage
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Transformer Installed

Check One:

- ☐ MST/MAS-12-300
- ☐ MST/MAS-212-600
- ☐ MLT/MAL-312-900
- ☐ MLT/MAL-412-1200

Accessories attached:

- ☐ Timer
- ☐ Dimmer
- ☐ Photocell
- ☐ Remote Photocell
- ☐ Remote Motion Censor
- ☐ Relay
- ☐ Timer Ready

Cable Installed

	Load:	Type:	Distance
Run #1	_____	_____	_____
Run #2	_____	_____	_____
Run #3	_____	_____	_____
Run #4	_____	_____	_____

Specify which circuit is controlling each run.

All Upgrades: Dates:

_____ _____

_____ _____

_____ _____

_____ _____

IMPORTANT NOTE: Use next page for sketch of layout!