



Outdoor Power Unit, Installation, Operation and Maintenance Manual



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IMPORTANT: The information contained in this manual is not intended as a training manual for unqualified personnel. It does not relieve the installer or user of responsibility to use sound practices in installation, operation and maintenance or in personnel safety precautions.

CAUTION: ONLY QUALIFIED PERSONNEL SHOULD INSTALL, INSPECT, OR MAINTAIN POWER SUPPLIES SINCE NORMAL OPERATING VOLTAGES CAN BE HAZARDOUS.



INTRODUCTION

The outdoor power units are totally enclosed with encapsulated core/coils and are designed for rugged outdoor applications. The units are single phase and available with ratings from 300W to 1800W. All units have Class 180°C insulation systems. The 12-15V units are listed to UL Standard 1838 and the 12-22V 5085 units are listed to the UL Standard.

The units are fully modular, allowing for the installer to easily add a photocell, a timer or both. As required by UL 1838, the 12-15V unit's output is limited to a maximum of 15V and 300W per circuit. The 12-22V unit's output is limited to a maximum of 22V and 300W per circuit. Each circuit is protected by a magnetic circuit breaker.

SAFETY WARNING

ELECTRICAL POTENTIALS HAZARDOUS TO HUMAN LIFE CAN EXIST WITHIN THIS EQUIPMENT WHEN ENERGIZED. DISCONNECT ALL INPUT POWER BEFORE OPENING THE CASE OR TOUCHING INTERNAL PARTS. USE PROPER LOCK-OUT/TAG-OUT PROCEDURES.

INSPECTION UPON RECEIPT

Outdoor power units should be carefully inspected upon receipt to ensure that no damage has occurred during shipment. Any damage detected should be reported at once and a claim placed against the transportation company. This claim is the responsibility of the Purchaser.

DESIGN FEATURES

ENCLOSURE STYLE

The outdoor power units are totally enclosed with encapsulated transformers and are designed for outdoor applications. They are available in ratings of 300W, 600W, 900W, 1200W, 1500W and 1800W single phase.

The outdoor power unit should always be in a vertical position with the wiring compartment down with a minimum of six inches around the unit for air flow with the exception of the mounting surface.

ENVIRONMENTAL CONDITIONS

The outdoor power units are designed and manufactured with UL Recognized Class 180°C insulation systems. Average winding temperature rises are rated at 135°C above ambient temperature. The insulation rating is guaranteed for altitudes of less than 3300 feet (1005 m) above sea level.

Overloading, operating in an average ambient temperature greater than 30°C and/or elevation greater than 3300 feet will result in reduction of power supply life unless de-rating of the unit is calculated using IEEE Loading Guide in IEEE C57.96.

OUTDOOR POWER UNIT LIFE

Outdoor power unit's life is dependent upon the thermal stress on the insulation system which in turn is dependent upon the winding temperature and duration of operation at that temperature. Factors which affect power supply life are line voltage, load current, load cycle, ambient temperature, and other environmental conditions such as moisture, corrosive atmosphere, vibration, and maintenance. Normal conditions of operation are covered in this document and through various industry standards.

CIRCUITS AND CONNECTIONS

Input Circuits -120 VAC

Outdoor power units are pre-wired for connection to a grounded 120Vac receptacle. Receptacle must be GFCI protected; hooded, flush type cover plate marked "Wet Location". The range of input current is 3.0 Amperes for a 300W unit to 18 Amperes for an 1800W unit.



The receptacles and branch circuits supplying the power supply need to be sized accordingly.

Loads MUST BE balanced to ensure that each terminal does not exceed 100 amps.

Output Circuits-COM

Outdoor power units can have up to six output circuits. Each circuit is rated for 25A or 300W maximum. Each is protected by a magnetic over-current circuit breaker. The circuits are designated as COM1 – COM6 depending on number of output circuits. Each breaker will have its own COM terminal located in the wiring compartment.

Output Circuits- Voltage

The outdoor power unit may supply a number of output voltages. Each output voltage terminal is identified by its open circuit voltage rating. A single voltage terminal can supply power to a number of COM circuits.

Output Circuit Breakers

Units are shipped with the output breaker(s) in the OFF position. To operate lamps switch breaker(s) up to the ON position. Each output circuit is equipped with a circuit breaker that will trip if the total lamp load exceeds the rating or if there is a short circuit (fault) condition present. To reset a breaker, move its switch to the "OFF" then to the "ON" position. If the breaker continues to trip, examine the circuit for excessive loading or shorts. If none are found consult an electrician or technician.

Output Terminal Blocks

Units are shipped with output compression style terminal blocks rated at 125A. The terminal blocks can accept four (4) 10 AWG wires per connection point.

Each terminal block has a maximum capacity of 100 amps. On a 22 volt system, the 1500 and 1800 watt models include dual terminals for voltages less than 15V or 18V respectively.

INSTALLATION

The minimum requirements for installation and maintenance and limitations of operation are set forth in this manual. Following these procedures will result in satisfactory performance, disregarding them can void the warranty.

Special notations:

1. For outdoor power units.
2. The device is accepted as a component of an outdoor power unit where the suitability of the combination shall be determined by CSA or local authorities having jurisdiction.
3. Suitable for indoor AND outdoor use (in Canada, outdoor use ONLY).
4. Not for use in dwelling units.
5. Do not connect two or more power supplies in parallel.
6. Risk of fire if installation involves running wiring through building structure special wiring methods are needed. Consult a qualified electrician.
7. Not for use with submersible fixtures.

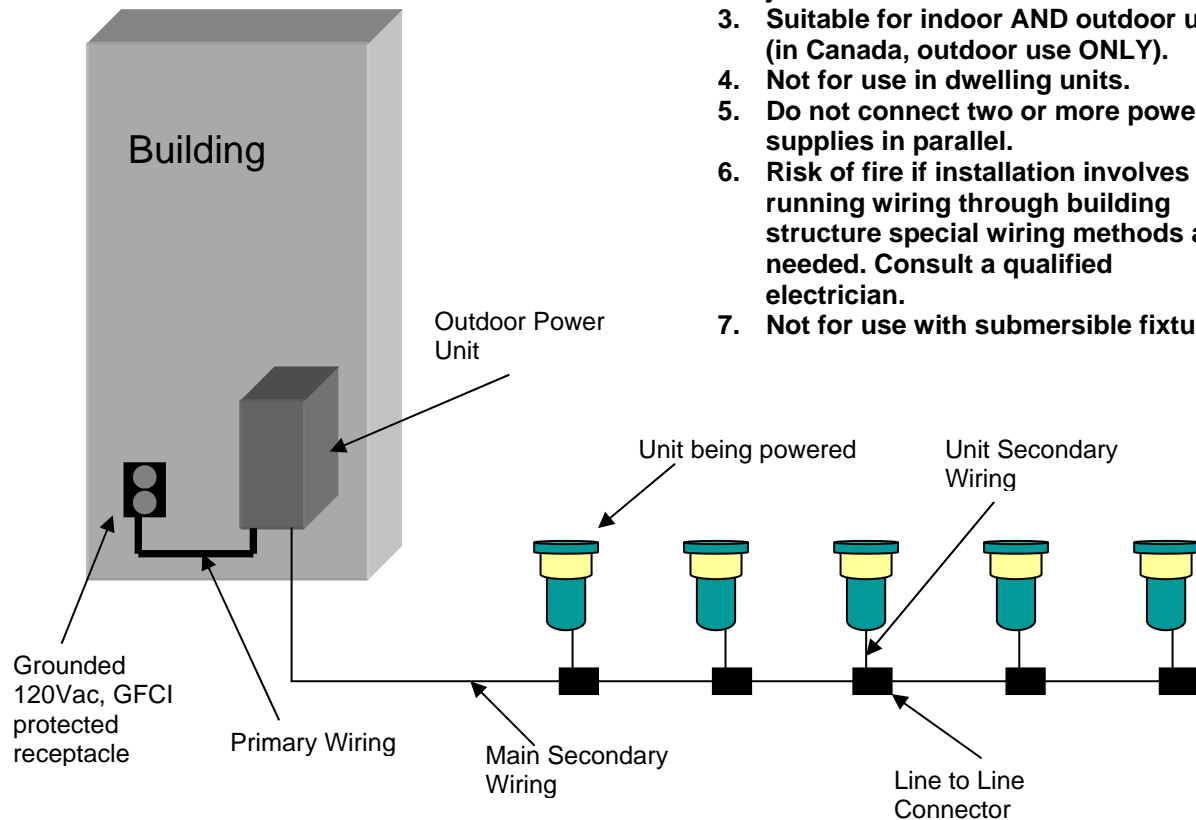


Figure 1 – Typical Outdoor Installation

Additional warnings:

1. Installation and wiring must be in compliance with local building and electrical codes.
2. Do not use an extension cord
3. Unit not to be used within 5' (1.53m) of a pool or spa.

Installation Procedure

1. Remove unit from box and packaging material.
2. Mount the outdoor power unit to a solid surface using the bracket with the offset tongue. Mount the bracket with the tongue side up. Slide the rear of the unit over the tongue and secure through the extruded hole in the wiring compartment. Using ¼" flathead hardware is recommended. See Fig 2.

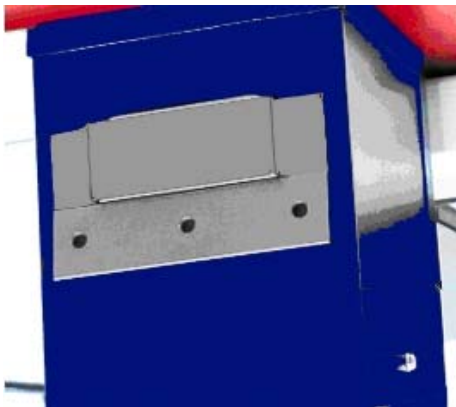


Figure 2 - Mounting Bracket

3. The unit must be mounted 1 foot (31 cm) above ground level or higher.
4. When the unit has been positioned properly, the wiring terminals will be at the bottom of the unit.
5. Wire from the outdoor power unit to outdoor fixtures should be suitable for the application. Use wire intended for direct underground burial unless a depth of less than 6" is maintained.
6. Strip approximately 3/8 to ½ inch of insulation from each of the low-voltage lamp cables. Each terminal is marked with its output voltage or as a COM for common. **DO NOT OVERLOAD THE COM circuit.**

7. Good design practices recommend that the total number of lamp wattages connected to each common circuit 15-300 watts should never exceed 250W (this leaves 50W to allow for cable drop and lamp power fluctuation.) See Table 5 for proper Cable Sizing.

Sizing Example: For 14 luminaries of 7 Watts and 5 luminaries of 30 Watts; Total equals 14*7W + 5*30W = 248 Watts.

8. Push the stripped wires into the terminals and tighten screws. Refer to a cable drop table for voltage selection instructions. Plug power cord into a standard 3 prong, grounded 120Vac receptacle. NEC Code requires that the receptacle must be GFCI protected; hooded, flush type cover plate marked "Wet Location".

Outdoor power units are provided with access covers to facilitate installation and should never be operated without these access covers securely mounted in place.

GROUNDING

The 120 Vac outdoor power unit is equipped with a grounded plug. The ground wire on the plug is bonded to the metal enclosure and electrostatic shield of transformer. All units are provided with dedicated grounding studs in the wiring compartment.

A three-prong, grounded receptacle must be provided for 120Vac units. A GFI type is a NEC requirement.

For the 120Vac and all other input voltage ratings, grounding must be in accordance with NEC and local electrical codes.



OPTIONAL ACCESSORIES

NOTE: Outdoor power units can be operated as shipped without the optional accessories.

24 HOUR CLOCK TIMERS (SEE FIG 3)

It is recommended using a Jefferson Timer (p/n 417-0008-TM1) or UL Listed equivalent, rated for an operating range of -30°C and 30°C. If another timer is used it must be rated for the input voltage rating, current rating, and temperature range of the power supply.

To Install a Timer:

1. Unplug unit power cord from receptacle.
2. Open the front cover of the outdoor system.
3. Unplug internal timer cord from timer receptacle.
4. Plug the 24 hour clock timer into the timer receptacle.
5. Plug the timer cord into the timer.
6. Set the on-off times according to the instructions provided with the timer.

PHOTO SENSOR (SEE FIG 3)

The photo sensor option is intended to turn unit on during low light conditions and off during daylight. Be sure that the photo sensor is not near an artificial light source or the power supply will not operate and the lamps will not operate.

The unit can be equipped with a photo sensor using Jefferson Photo Sensor (417-0008-PS1 or 417-0008-PS2) or UL Listed equivalent, rated for an operating range of -30°C and 30°C.

To Install a Photo Sensor:

1. Unplug unit power cord from receptacle.
2. Open the front cover of the outdoor system.

3. Remove the 7/8" diameter knockout from the side of the enclosure.
4. Install the photo sensor connector-first through the side panel and secure using the conduit nut.
5. Remove the jumper connector from the outdoor system panel.
6. Insert the white, triangular (trapezoidal) photo sensor connector into the photo sensor receptacle on the panel.
7. Locate and position the sensor so that no artificial light will affect the unit and the absence of natural light will turn the unit on.



Figure 3 – 24 hour clock timer and photocell installation

MAINTENANCE

Outdoor power units should require very little maintenance. Periodic inspection and care are recommended practices especially if the power units are operating in a harsh environment.



Inspect for loose connections, condition of terminals, condition of options plugs (if so equipped), overheating, rust, paint deterioration, debris, bug carcasses and the general condition of the unit. Corrective measures should be taken if necessary.

If maintenance includes removal of enclosure panels, the outdoor system must be de-energized.

The unit has been designed to withstand sprinklers and rain. DO NOT attempt to clean the unit by directly hosing it down.

Internal maintenance should include:

1. Inspection and tightening of terminal connections.
2. Inspection of optional features such as timers and photo sensors and their connectors.
3. Periodically clean and dry the internal components. Reseat and tighten the front access cover if excess dirt and moisture are observed.
4. Removal of insects and debris from the inside of the unit.



TROUBLE SHOOTING

Problem	Cause	Solution
No power at plug	Tripped breaker or GFI	Reset circuit breaker in main panel or the GFI.
GFI keeps tripping	Ground problem or defective GFI	Many times GFI will trip erroneously. Use a higher grade, industrial model.
Breakers are tripping	Excessive wattage load or short	Reduce lamp wattage, fixture quantity or increase size of transformer. Check for short in wiring.
One cable run not working	Cut cable or short	Test cable for voltage - if none then it is cut - if there is very low voltage and the cable is hot then there is a short. Check all fixtures and splices for defects.
Lamps are burning out prematurely	Excessive voltage at lamp	Drop the affected cable run down to the next lower voltage tap or increase wattage load on that cable to drop the voltage.
The closest lamp to the transformer is burning out prematurely	Excessive voltage at lamp	The closest lamp will always have a higher voltage reading than the last lamp. If there is only one lamp (fixture) very close to the transformer then use a 16 gauge wire on that run. The smaller the cable, the higher the voltage drop associated with that cable.
Lamps have a yellow or golden tone	Voltage too low	Move affected cable to the next higher voltage tap or reduce load on cable. If possible, run larger cable to first fixture to reduce voltage loss.
Photocell is coming on too soon	Transformer is in dark location	In order to operate properly, the photocell must be in daylight. Reposition arm-style photocell or remote mount the photocell.
Lamps stay on all the time	Photocell has failed or cover is on photocell.	Remove cover or replace photocell. Verify photocell is properly installed. Shine light on photocell to confirm proper operation.
Lamps go on and off (22V product)	Power unit is overloaded	Reduce # of lamps



TECHNICAL SPECIFICATIONS 12-22V

Table 1 - General specifications

Primary Voltage	120 Volts
Primary Frequency	60 Hz
Temperature rise	135°C
Humidity	5% to 95%
Altitude	0 to 1000 m.s.l.
Noise	40dB
Enclosure	NEMA 3R, stainless steel with brushed finish, removable hinged door, opens with hinges on left side and lockable latch on right side.
Mid-Plate	Standard mid-plate is white-painted steel.
Construction	Encapsulated Core and Coil
Electrical Shielding	Grounded Safety Shield between the primary and secondary windings.
Primary connection	6 foot, 3 wire cord with grounded three-prong plug.
Secondary Connection Terminal block	DIN rail mounted, 35mm ² opening for up to four (4) #10AWG conductors. Single terminal label over top of the terminal for easy viewing.
Wiring Access	Three dual 1" & 1 ½ "knockouts and one 1.75 "diameter access port on bottom of unit with plug.
Photo sensor knockout	7/8" diameter on right side of unit (for ½" conduit connector)
Photocell Plug	Socketed male electrical connector on unit
Timer Bypass Cord & Plug	Outdoor weather rated cord.
Timer receptacle	Grounded, polarized UL recognized outlet (Nema-15R).
Agency listings	15 volt units listed to UL 1838 & CSA 22.2-250. 22 Volt units listed to UL 5085.
Circuit breaker	25 AMP, Magnetic, 120 Volt, 60Hz, single pole switch.
Limited Warranty	Limited Lifetime Warranty for repair or replacement of stainless steel units.
Labeling	Nameplate wiring diagram and caution text.
Literature	Installation manual included in each unit.
Voltage Compensation	Yes, Provides Lower Voltage Drop under loaded conditions.



Table 2, 12-15V - Ratings and Dimensions

Stainless Steel Enclosure	Input Amps	Output	Output Circuits	Dimensions in inches			Weight Lbs	Minimum Branch Current
				Height	Width	Depth*		
417-1111-130	3	300	1	17.6	6.8	6.19	27	15 Amp
417-1121-130	6	600	2	17.6	6.8	6.19	29	15 Amp
417-1131-130	9	900	3	18.6	7.8	6.19	34	15 Amp
417-1141-130	12	1200	4	18.6	7.8	6.19	37	15 Amp
417-1151-130	15	1500	5	19.6	9.5	7.19	52	20 Amp
417-1161-130	18	1800	6	19.6	9.5	7.19	57	25 Amp

*Depth includes approximately 3/8" for the mounting bracket

Table 3, 12-22V - Ratings and Dimensions

Stainless Steel Enclosure	Input Amps	Output	Output Circuits	Dimensions in inches			Weight Lbs	Minimum Branch Current
				Height	Width	Depth*		
417-2211-130	3	300	1	17.6	6.8	6.19	29	15 Amp
417-2221-130	6	600	2	17.6	6.8	6.19	29	15 Amp
417-2231-130	9	900	3	18.6	7.8	6.19	33	15 Amp
417-2241-130	12	1200	4	18.6	7.8	6.19	35	15 Amp
417-2251-130	15	1500	5	19.6	9.5	7.19	52	20 Amp
417-2261-130	18	1800	6	19.6	9.5	7.19	57	25 Amp

*Depth includes approximately 3/8" for the mounting bracket

Table 4 – List of Outdoor Systems and accessories

Catalog #	Description
Accessories	
417-0008-PS1	Photo sensor - Button Type
417-0008-PS2	Photo sensor - Arm Type
417-0008-PER	Photo sensor – Arm-Type with 10" remote cable
417-0008-TM1	Timer - Dial Type

Table 5, 12-15V and 12-22V - Maximum Ampacities of secondary wires and cords with copper conductors

Wire gauge – AWG/mm2	18 AWG / 0.82 mm2	16 AWG / 1.3 mm2	14 AWG / 2.1 mm2	12 AWG / 3.3 mm2	10 AWG / 5.3 mm2
Ampacity (Amperes)	7 (10)a	10 (13)a	15 (18)a	20 (25)a	25 (30)a

a.) These ampacities are applicable to 3-conductor cords and 4-conductor cords with three conductors carrying current. The corresponding ampacities for these sizes of 2-conductor cords and 3-conductor cords with two conductors carrying current are shown in parentheses.

