



Operation/Reference Guide

UPC20+

Universal Power Controller



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UPC20+ Wiring Requirements



In the United States, the UPC20+ must be wired by an authorized electrician in accordance with the National Electrical Code, ANSI/NFPA 70-1987, as well as all local codes.



In the European community, the UPC20+ unit must be wired by an authorized electrician in accordance with all applicable European codes.

A readily accessible disconnect device shall be incorporated into the fixed wiring.

An insulated earthing conductor that is identical in size, insulation material and thickness to be earthed and unearthed branch circuit supply conductors, except that it is green with or without one or more yellow stripes, is to be installed as part of the branch circuit which supplies the unit or system. The earthing conductor described is to be connected to earth at the service equipment, or supplied by a separately derived system, at the supply transformer or motor generator set.

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Product Information

The UPC20+ Universal Power Control is a dual 20 Amp AC power and motor controller designed for conduit installation. The UPC20+ is housed in a compact metal wall-mount enclosure and is configurable for a wide variety of power and motor control modes. Low voltage contact-closures, open collector inputs or serial data from an AMX IR receiver enable control by simple wall panels, remote systems, or hand-held transmitters. A test switch with an LED indicator for each relay is provided for local control and status indication.

Using Motor Control mode, the UPC20+ output alternates between two relays, providing a brief pause in-between relay contacts, to protect the motor. A timing adjustment potentiometer is user adjustable for automatic release of the relays. (The range is 0 to 90 seconds). 1-, 2-, and 3- button control modes are selectable.

In Power Control mode, the UPC20+ provides power control for two independent circuits with a combined total load of 20 Amps. Single-button momentary/latching and 2-button latching modes are selectable.

- **Momentary Power** Relay contacts are closed only as long as a closure from input to common is maintained.
- **Latching Power** Relay contacts are toggled (from open to closed and closed to open) each time a closure from input to common is momentarily pulsed.

All functions and capabilities of the UPC20+ (including information on high voltage wiring, low voltage wiring, and DIP switch settings) are described on a sticker installed inside the enclosure. FIG. 1 shows the UPC20+ (inside view).



The UPC20+ will work the NXC-II/O10 input/output control card.

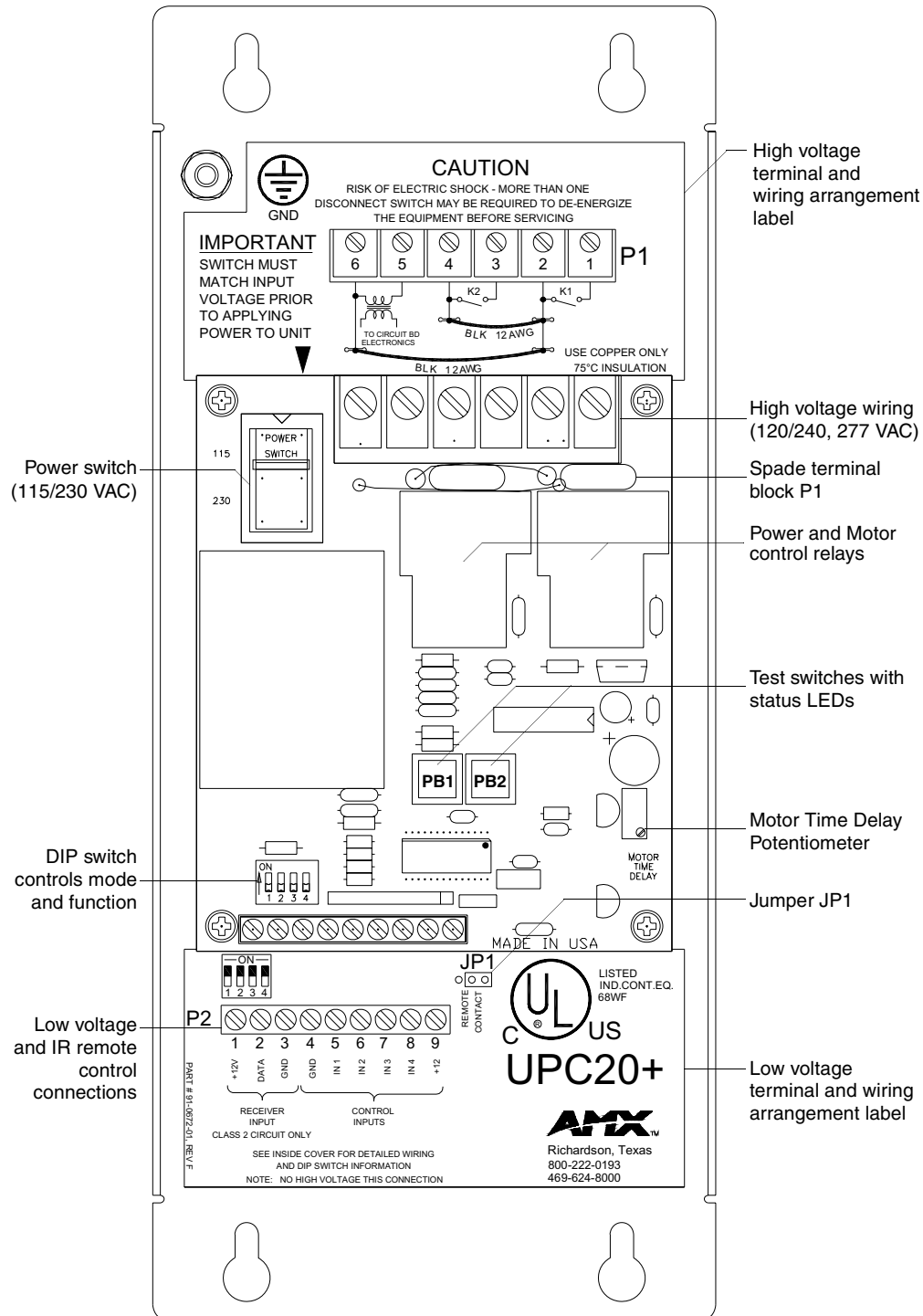


FIG. 1 UPC20+



The UPC+ cover contains information on high voltage wiring, low voltage wiring, and DIP switch settings.

Specifications

UPC20+ Specifications	
Power	Self-powered when used with 110/220 VAC
Power input (for control board)	120/240V ~, 50-60 Hz, 0.05/0.025A -or- 12 VDC, 0.2A max
Power output per relay	• 20A @ 120/240V ~, 50-60 Hz (RESISTIVE LOAD) • 6A @ 277V ~, 50-60 Hz (FLUORESCENT BALLAST) • 1 HP @ 120V ~, 50-60 Hz (INDUCTIVE LOAD) • 2 HP @ 240V ~, 50-60 Hz (INDUCTIVE LOAD) Total Current through both relays CAN NOT exceed 20 amp.
Maximum operating ambient temperature	55°C
Approvals	UL / C-UL / CE
Includes	• 1-, 2-, and 3-button logic modes • Local test switches with status LEDs • 120, 240, and 277 VAC control capability
Inputs	• 4 closure inputs, operation defined by mode. • One IR remote sensor input. • Motor Control mode alternates between the timed operation of the two power relays. • Power Control mode allows independent control of both power relays.
Control Ports	Two 2400 W power relays. Total combined current through both relays is 20 Amps.
Input Power Switch (S1)	• Set this switch according to the high voltage wiring that will be connected to terminals 5 and 6 on P1. Refer to the <i>P1 Terminal Connections</i> section on page 7. • Set switch S1 to the line input voltage value used before applying power to the UPC20+.
High Voltage Terminal Block (P1)	High voltage input and output wiring for motor or power control.
Low voltage and Control Terminal Block (P2)	Contact closure, open-collector or CMOS logic level remote control wiring. Inputs 5 - 8 are referenced to the common connection at pin 4.
Jumper JP1	Sets control mode of the unit to contact closure or remote sensor serial data.
Test Switches (PB1 and PB2)	Provides local operation of relays K1 and K2 for testing power circuits or motors connected to the relay terminals. An LED indicates relay power applied.
Motor Time Delay Potentiometer (R8)	Only used in motor control modes. User adjusted for setting relay release time between 0 and 90 seconds.
DIP Switch (S2)	Provides selection of control mode options. See Motor Control Mode DIP Switch S2 Positions table on page 4 and Control Input Wiring to Connector P2 Terminals table on page 4 for control mode settings.
Enclosure	Metal with black matte finish, knockouts for conduit.
Dimension (HWD)	• 8.5" (10.5" including flange) x 4.5" x 2.2" • (220 mm (270 including flange) x 110 mm x 60 mm)
Weight	3.0 lbs. (1.4 kg) with flange
Options	12 VDC power supply (for 277 VAC applications)

Control Options Modes

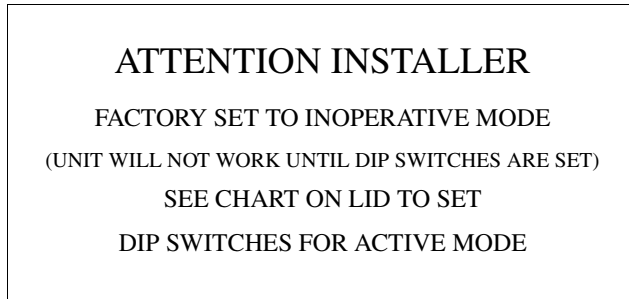


FIG. 2 UPC20+ inoperative mode warning label



If UPC20+ is powered up when changes are made to Dip Switch settings, then power must be cycled before changes can take effect.

Motor Control mode

The table list options and connections for motor control. DIP switch settings provide 1, 2 or 3 button remote control contact arrangements. This mode is typically used for screen and drape motor control.

In motor control mode, only one power relay (motor) can be energized at a time. When switching from one direction to another, the first motor is automatically turned off and a half-second delay is inserted before the other motor will turn on.

Once a motor is turned on, it will automatically be turned off after the amount of time determined by the motor time delay potentiometer, R8. Delay time can range from 0 to 90 seconds. It is typically set to allow direction limit switches to operate, or to reach the desired position.

Motor Control Mode DIP Switch S2 Positions				
1	2	3	4	Control Mode
On	On	Off	On	Single button
Off	Off	Off	On	2-button
Off	On	Off	On	Momentary On/Off

- **Single Button Mode** operates with one pushbutton in a sequence: Up, Stop, Down, Stop and so on for each successive button press.
- **Two/Three Button Mode** operates with two pushbuttons, one for Up and one for Down.
- **Momentary On/Off** operates only when the button is pressed.

Control Input Wiring to Connector P2 Terminals					
4	5	6	7	8	Control Mode
Common	Up	Down	Stop	N/A	Two, three button
Common	Up/Stop/Down	N/A	N/A	N/A	Single button

Power Control mode

The tables below specify the DIP switch settings for momentary, latching, 2-button On/Off, and (momentary or latching) operation of K1 and K2.

Power Control Mode DIP Switch Positions S2				
1	2	3	4	Control Mode
On	On	On	On	Momentary On/Off
Off	On	On	On	Latching On/Off
On	Off	Off	On	Two-Button On, Off
On	Off	On	On	#1 Momentary, #2 Latching
Off	Off	On	On	#1 Latching, #2 Momentary

Control Input Wiring to P2 Terminals					
4	5	6	7	8	Control Mode
Common	#1 On/Off	#2 On/Off	N/A	N/A	Momentary, Latch On/Off
Common	#1 On	#2 On	#1 Off	#2 Off	Two-Button On/Off

Remote Sensor Control mode

The UPC20+ can also be controlled via the serial output from an AMX IR sensor. Remote sensor mode is selected by setting jumper JP1 to the "Remote" position (jumper on the left 2 pins), as shown in FIG. 3. (The jumper must be in position when power is applied to the UPC20+).

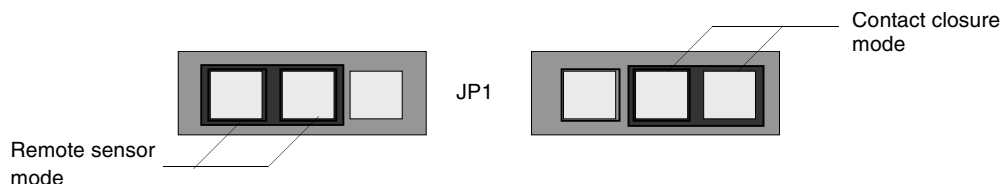


FIG. 3 JP1 mode settings



If motors of any kind are used, do not set to a Power Control mode. When a Power Control mode is selected, both relays can be on at the same time. Motors can be severely damaged if this happens.

When controlled by a remote sensor, the UPC20+ is in 2, 3-button timer motor control mode. When the timing potentiometer R8 adjusted to zero ohms (no time delay), the remote sensor provides momentary control.

A 3-bit code (radio code) set on DIP switch S2 associates an AMX handheld remote control with a UPC20+. This allows up to 8 UPC20+ and IR sensors to be used in the same room without interfering with one another. It is possible to control 2 separate UPC20+'s with one handheld remote control. The 4th switch of DIP switch S2 on the PCB selects between the two UPC20+'s. The table below lists the results of the 16 possible DIP switch selections in remote sensor mode.

The following table lists the DIP switch settings for Remote Sensor Mode.

DIP Switch Settings for Remote Sensor Mode					
Sw. 1	Sw. 2	Sw. 3	Sw. 4	Radio Code	UPC20+
Off	Off	Off	Off	0	First
On	Off	Off	Off	1	First
Off	On	Off	Off	2	First
On	On	Off	Off	3	First
Off	Off	On	Off	4	First
On	Off	On	Off	5	First
Off	On	On	Off	6	First
On	On	On	Off	7	First
Off	Off	Off	On	0	Second
On	Off	Off	On	1	Second
Off	On	Off	On	2	Second
On	On	Off	On	3	Second
Off	Off	On	On	4	Second
On	Off	On	On	5	Second
Off	On	On	On	6	Second
On	On	On	On	7	Second

Channel codes (Remote Sensor mode)

The table below lists the 5 AMX channel codes and their function in the UPC20+ when in Remote Sensor mode.

Channel Codes and Functions	
Channel	Function
6	Stop (K1 and K2)
0	#1 up (K1)
1	#1 down (K2)
7	#2 up (K1)
2	#2 down (K2)

Installation

P1 Terminal Connections

Low voltage power (see the table below) for internal circuitry is provided from an on-board transformer, powered by an external 120 or 240 VAC source. An onboard switch is used to select input voltage. When using the UPC20+ for 277 VAC control, the on-board internal circuitry is powered by a separate 120/240 VAC line, or from an optional 12 VDC power supply.

P1 Terminal Connections		
Terminal	Input/Output	Function
1	Output	Load 1 out
2	Input	Line 1 in
3	Output	Load 2 out
4	Input	Line 2 in
5	Input	Neutral to transformer on PCB which supplies low voltage
6	Input	Line to transformer on PCB which supplies low voltage

K1 and K2 are the power and motor control relay connections to P1 terminals 1 and 2, 3 and 4, respectively. Each relay is capable of switching the following loads:

- Resistive Load 20 Amps at 120/240 VAC
- Fluorescent Ballast 6 Amps at 277 VAC
- Inductive Load 1 HP

The maximum total combined current through both relays is 20 Amps. There are two 12-gauge jumpers that are wired to supply board power at 120/240 VAC, and to connect the common terminals of the relays. The jumpers are removed as needed according to the wiring options selected.

P2 Terminal Connections

The table below defines the inputs and outputs for Terminal P2.

P2 Low Voltage Terminal Inputs/Outputs	
Terminal	Input/Output
1	+12 VDC out
2	Serial data in (IR sensor)
3	Ground
4	Ground (common)
5	Input 1
6	Input 2
7	Input 3
8	Input 4
9	+12 VDC in

Control Mode

The table below defines the control mode functions for Inputs 1 and 2. The UPC20+ Control Mode Functions for Inputs 3 and 4 table on page 9 defines the control mode functions for Inputs 3 and 4.

UPC20+ Control Mode Functions for Inputs 1 and 2				
Control Mode	S2 Switch Setting	R8 Motor Time Delay Pot	Input 1 (P2, pin 5-to GND)	Input 2 (P2, pin-6 to GND)
Motor, Single Button	On, On, Off, On	Minimum	Push 1 = load 1 "on" Release 1 = load 1 "off" Push 1 again = load 2 "off"	Not used
		Minimum	Push 1 = load 1 "on" Release 1 = load 1 "off" after delay time out" Push 1 again = load 2 "on" Release 1 again = load 2 "off after time out" <i>Note: pushing again restarts cycle.</i>	Not used
Motor, 2/3 Button	Off, Off, Off, On	Minimum	Push 1 = load 1 "on" Release 1 = load 1 "off"	Push 2 = load 2 "on" Release 2 = load 2 "off"
		Maximum	Push 1 = load 1 "on" Release 1 = load 1 "off" after time out" <i>Note: both loads cannot be On at the same time.</i>	Push 2 = load 2 "on" Release 2 = load 2 "off" after time out"
Motor, Momentary	Off, On, Off, On	Minimum	Push 1 = load 1 "on" Release 1 = load 1 "off"	Push 2 = load 2 "on" Release 2 = load 2 "off"
		Maximum	Push 1 = load 1 "on" Release 1 = load 1 "off" <i>Note: No delay on release.</i>	Push 2 = load 2 "on" Release 2 = load 2 "off"
Power, Momentary	On, On, On, On	Minimum	Push 1 = load 1 "on" Release 1 = load 1 "off"	Push 2 = load 2 "on" Release 2 = load 2 "off"
		Maximum	Push 1 = load 1 "on" Release 1 = load 1 "off"	Push 2 = load 2 "on" Release 2 = load 2 "off"
Power, Latching	Off, On, On, On	Minimum	Push 1 = load 1 "on" Release 1 = load 1 "still on" Push 1 again = load "off" Release 1 again = load "still off"	Push 2 = load 2 "on" Release 2 = load 2 "still on" Push 2 again = load "off" Release 2 again = load "still off"
		Maximum	Push 1 = load 1 "on" Release 1 = load 1 "still on" Push 1 again = load "off" Release 1 again = load "still off" <i>Note: Both loads can be On at the same time (time delay does not affect).</i>	Push 2 = load 2 "on" Release 2 = load 2 "still on" Push 2 again = load "off" Release 2 again = load "still off"

UPC20+ Control Mode Functions for Inputs 1 and 2 (Cont.)				
Control Mode	S2 Switch Setting	R8 Motor Time Delay Pot	Input 1 (P2, pin 5-to GND)	Input 2 (P2, pin-6 to GND)
Power, 2 Button	On, Off, Off, On	Minimum	Push 1 = load 1 "on" Release 1 = load 1 "still on"	Push 2 = load 2 "on" Release 2 = load 2 "still on"
		Maximum	Push 1 = load 1 "on" Release 1 = load 1 "still on" <i>Note: Both loads can be On at the same time.</i>	Push 2 = load 2 "on" Release 2 = load 2 "still on"
Power, Momentary #1, Latching #2	On, Off, On, On	Minimum	Push 1 = load 1 "on" Release 1 = load 1 "off"	Push 2 = load 2 = "on" Release 2 = load 2 "still on" Push 2 again = load 2 "off" Release 2 again = load 2 "still off"
		Maximum	Push 1 = load 1 "on" Release 1 = load 1 "off" <i>Note: Delay time does not effect loads.</i>	Push 2 = load 2 = "on" Release 2 = load 2 "still on" Push 2 again = load 2 "off" Release 2 again = load 2 "still off"
Power, Momentary #1, Latching #2		Minimum	Push 1 = load 1 "on" Release 1 = load 1 "still on" Push 1 again = load 1 "off" Release 1 again = load 1 "still off"	Push 2 = load 2 "on" Release 2 = load 2 "off"
		Maximum	Push 1 = load 1 "on" Release 1 = load 1 "still on" Push 1 again = load 1 "off" Release 1 again = load 1 "still off" <i>Note: Delay time does not affect loads.</i>	Push 2 = load 2 "on" Release 2 = load 2 "off"

UPC20+ Control Mode Functions for Inputs 3 and 4				
Control Mode	S2 Switch Setting	R8 Motor Time Delay Pot	Input 1 (P2, pin 5-to GND)	Input 2 (P2, pin-6 to GND)
Motor, Single Button	On, On, Off, On	Minimum	Not used	Not used
		Maximum	Not used	Not used
Motor, 2/3 Button	Off, Off, Off, On	Minimum	Not used	Not used
		Maximum	Not used	Not used
Motor, Momentary	Off, On, Off, On	Minimum	Not used	Not used
		Maximum	Not used	Not used
Power, Momentary	On, On, On, On	Minimum	Not used	Not used
		Maximum	Not used	Not used
Power, Latching	Off, On, On, On	Minimum	Not used	Not used
		Maximum	Not used	Not used

UPC20+ Control Mode Functions for Inputs 3 and 4 (Cont.)				
Control Mode	S2 Switch Setting	R8 Motor Time Delay Pot	Input 1 (P2, pin 5-to GND)	Input 2 (P2, pin-6 to GND)
Power, Two Button	On, Off, Off, On	Minimum	Push 3 = load 1 "off" Release 3 = load 1 "still off"	Push 4 = load 2 "off" Release 4 = load 2 "off"
		Maximum	Push 3 = load 1 "off" Release 3 = load 1 "still off"	Push 4 = load 2 "off" Release 4 = load 2 "off"
Power, Momentary #1, Latching #2	On, Off, On, On	Minimum	Not used	Not used
		Maximum	Not used	Not used
Power, Latching #1, Momentary #2	On, Off, On, On	Minimum	Not used	Not used
		Maximum	Not used	Not used

High Voltage Wiring Options

Single circuit 120/240 VAC

Single circuit connections (FIG. 4) are for most motor and screen control applications.

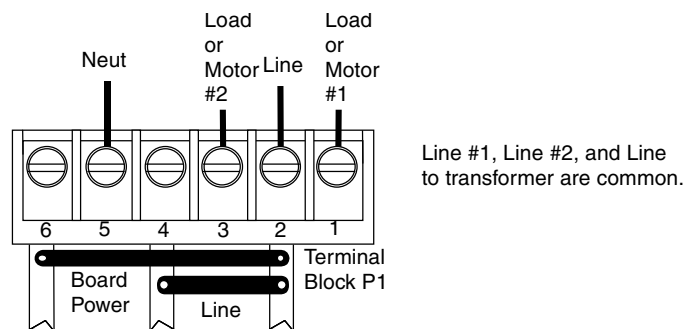


FIG. 4 Single circuit 120/240 VAC power wiring

Dual circuit 120/240 VAC

Dual circuit connections provide power from two 120/240 VAC supply systems. FIG. 5 shows a dual circuit 120/240 VAC power wiring. Refer to FIG. 1 on page 2 for the location of the Terminal Block P1 on the circuit board.

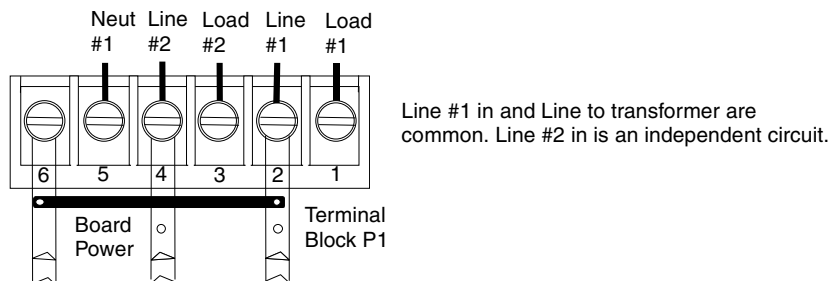


FIG. 5 Dual circuit 120/240 VAC power wiring

Dual circuit 277 VAC

Dual circuit connections provide power from 277 VAC for fluorescent ballasts (FIG. 6). Circuit board power is provided by a separate 120/240 VAC high voltage circuit, or 12 VDC connected to terminals 1 and 6 on the low voltage terminal block. For dual circuit 120/240 VAC operation, remove the short 12 AWG wire jumper.

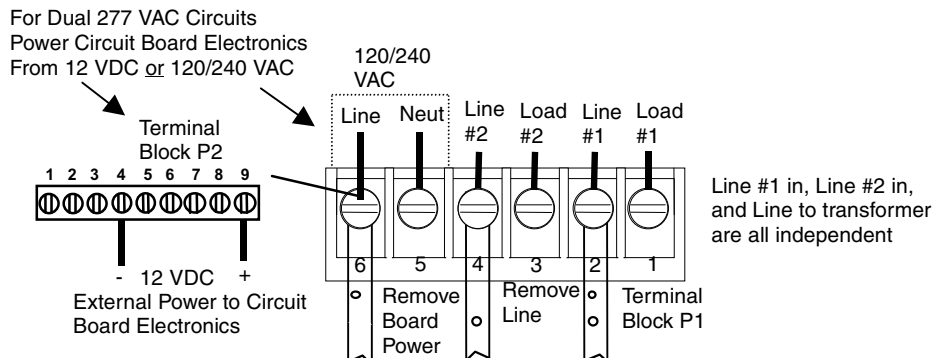


FIG. 6 Low voltage and 277 VAC high voltage wiring



If motors of any kind are used, do not set to a power control mode. When a power control mode is selected, both relays can be on at the same time. Motors can be severely damaged if this happens.

Wiring The UPC20+ to Either The IRX-DM+ Or IRX-SM+

Wire the UPC20+ to the sensor as shown in FIG. 7. .

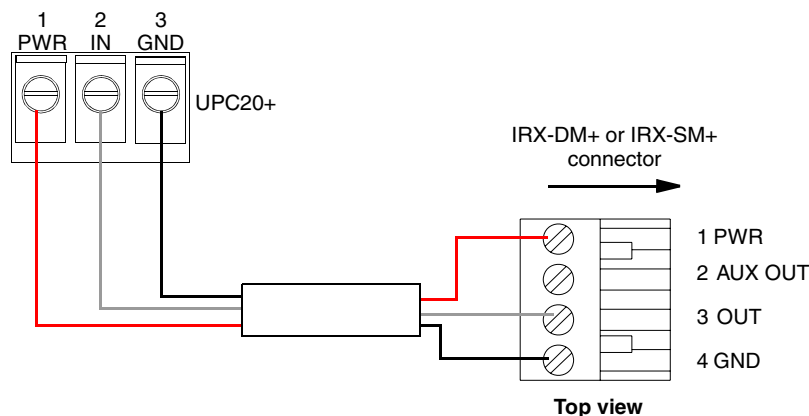


FIG. 7 Wiring diagram for UPC20+ to IRX-DM+ or IRX-SM+

Wireless IR Sensor Connection

The wireless IR sensor connections are located on P2, terminals 1 - 3. Terminal 1 is +12 VDC out, terminal 2 is serial data in, and terminal 3 is GND. The +12 VDC is short circuit protected, and the output supplies up to 25 mA for the remote sensor.

For dual circuit 277 VAC operation, remove both 12 AWG wire jumpers.

Installing the UPC20+

To install the UPC20+ unit:

1. Mount the UPC20+ on a wall or solid surface in the location where it will be used; it can be mounted either horizontally or vertically.
2. Remove the cover.
3. Prepare terminal block P1.
 - a. Set power switch S1.
 - b. Configure jumpers according to high voltage wiring requirements.
4. Install conduit. Provide conduit for high voltage, low voltage and control wiring requirements using the 0.5 inch or 0.75 inch conduit connector knockouts.
5. Connect high voltage wiring to the terminal block P1.
6. Connect control wiring.
 - a. Set control mode DIP switch S2 and control jumper JP1. Refer to the *Control Options Modes* section on page 4 for more detailed information.
 - b. Install wiring for contact closure or remote control mode.
7. Test low voltage and high voltage wiring. Conduct tests to confirm proper installation and functions of desired control modes.



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