

INSTALLATION GUIDE

INSTALLER - READ THIS FIRST:

Use this Installation Guide for relay panel hook-up directions.
 Use the System Start-Up Guide for system-wide wiring and programming initialization.

READ, FOLLOW AND SAVE THIS INSTRUCTION MANUAL

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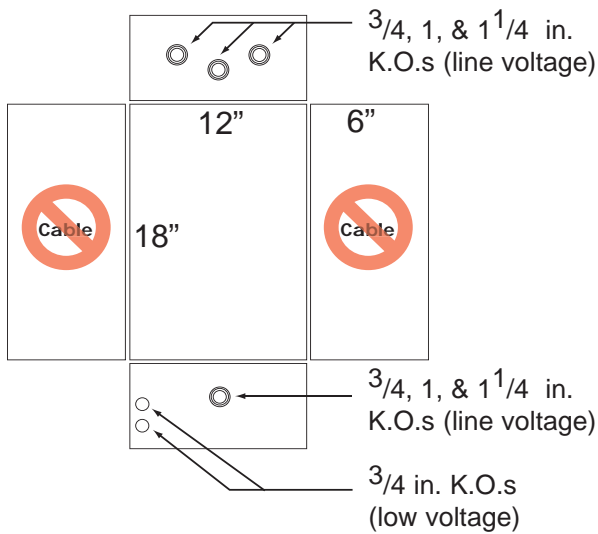


The EM1400 series is a programmable relay panel with 8 or 16 relays. A master panel can stand alone or can control up to 16 digital devices: photocell cards, digital switches, contact closure input cards (DigiLinks), slave Blue Box panels or other digital devices.

- 8 or 16 normally closed latching relays
- 14 optional programmable contact closure inputs can control any relay(s) in any panel(s)
- On-board manual override for each relay
- 32 individual 365 day astronomical and time-of-day schedules can control any relay(s)
- Clock schedules can be overridden by digital switches through simple programming steps

Installation Instructions: Low Voltage

1. Mount relay panel. Use the drill template in the plastic pocket of the panel door.



- ! Routing line voltage cables through the sides of the enclosure is not allowed as it will violate NEC requirements separating Class 1 and Class 2 circuits.



2. Plan where to land the line and load conductors before routing cables. Write down your plan on the panel schedule in the plastic pocket on the panel door.



3. Power supply should be supplied from a dedicated breaker. Land 120v or 277v on appropriate lugs and Neutral and Ground as indicated.



- ! Do not power-up the panel electronics until the bus has been activated (see the Quick Start Guide).

You can check for faults while landing conductors on the relays with the following steps:

4. Land Line and Load conductors on the same terminal lug. Label "line" conductor with the breaker ID.



5. Check the line. Switch breakers on and clear any faults. Switch breakers off.
6. Move the load conductors to the load terminal lug on each relay once tested.

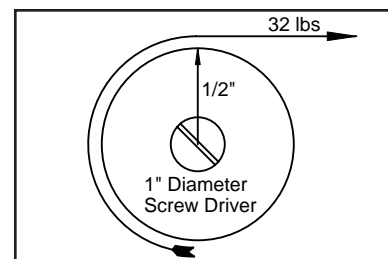


Installation Instructions: Line Voltage

Torque Spec Instructions

The Torque spec for the relay terminal block is 16in-lbs.

With a 1" diameter = 1/2" radius screw driver, this means a turning force of 32 lbs.



Tighten and Wiggle

Copper is "ductile." That means that it can compress and flow. To ensure a good connection in the terminal lug, follow this procedure.

1. Tighten the terminal to the specified torque.

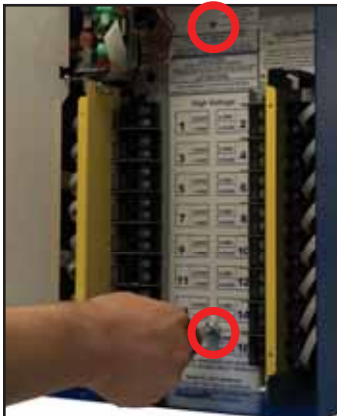


2. "Wiggle" the wire; move it slowly from side to side while pulling gently.



3. Tighten again to the specified torque. Usually this takes 1/16 to 1/4 of a turn or more.
4. Repeat as needed.

Removing the Chassis

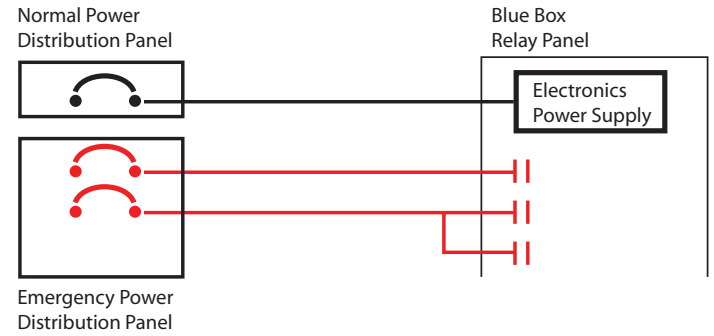


If the rough-in is going to create a lot of dust or metal shavings, it may prove best to remove the Chassis prior to installation. To remove the Chassis:

1. Remove the two locking nylon nuts from the line voltage backplate (red circles above).
2. With the front plate closed, gently remove the chassis from the enclosure. Avoid rubbing the sides of the chassis against the enclosure.

Store the chassis in the original shipping case or any safe location until needed.

Control of Emergency Power Loads



The EM1400 series is listed for controlling emergency circuits (ETL Listed to UL 924), but may not control both normal and emergency loads in the same enclosure.

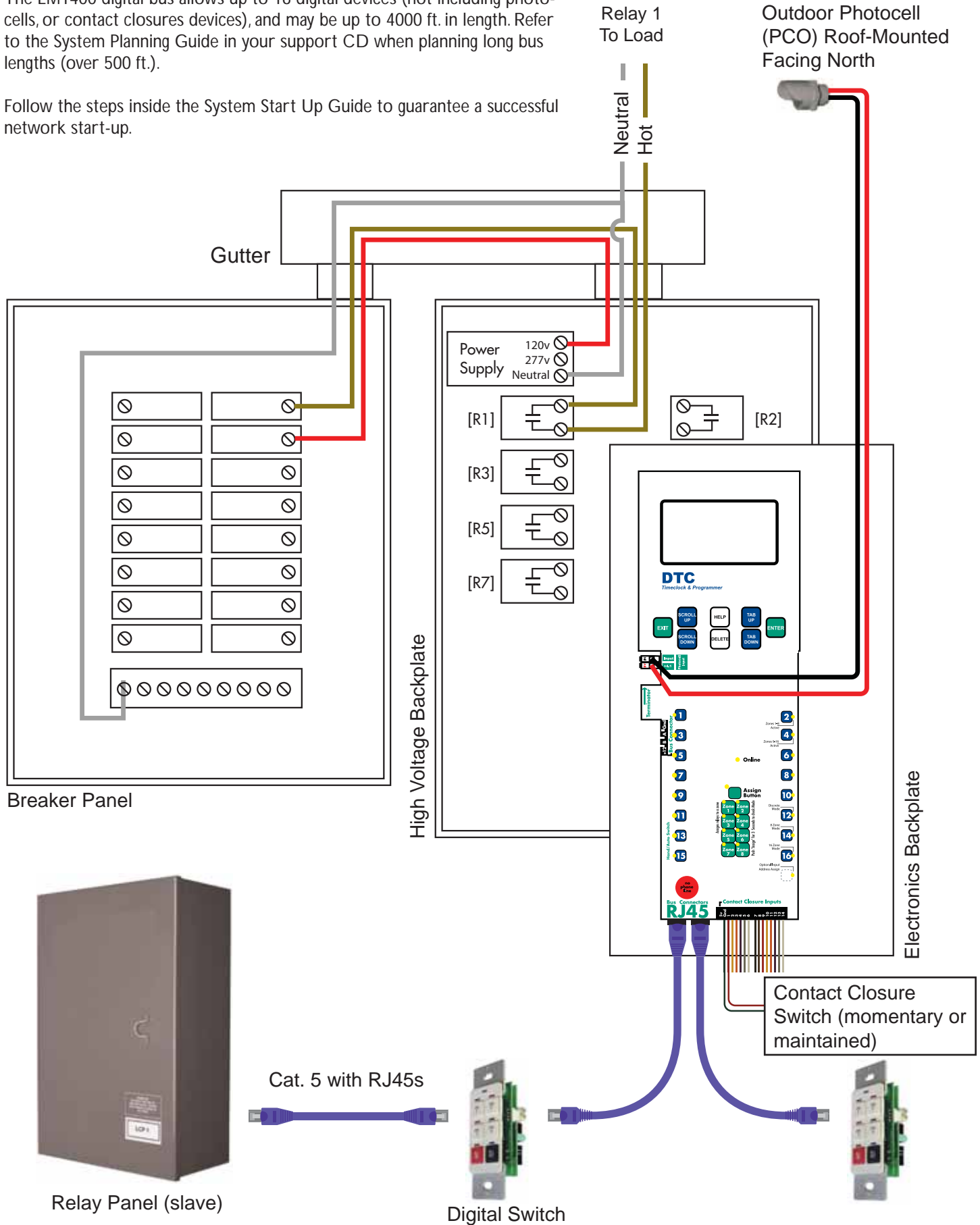
When controlling emergency loads, use normal power to supply panel electronics, and the (NC) relays will automatically close in the event of any normal power loss.

When power is restored, relays will return to the appropriate status (on or off).

Overview - Line & Low Voltage Connections

The EM1400 digital bus allows up to 16 digital devices (not including photo-cells, or contact closures devices), and may be up to 4000 ft. in length. Refer to the System Planning Guide in your support CD when planning long bus lengths (over 500 ft.).

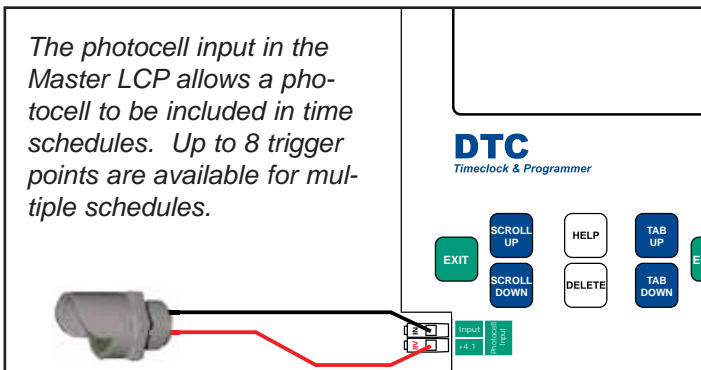
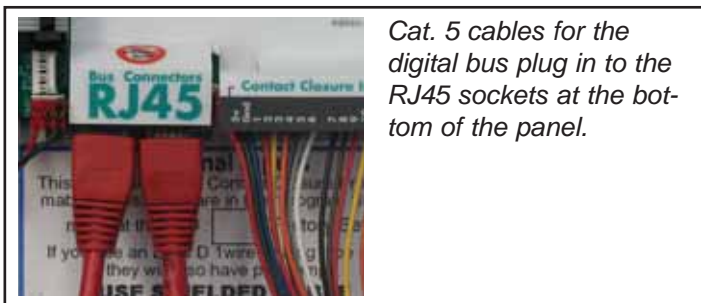
Follow the steps inside the System Start Up Guide to guarantee a successful network start-up.



Low Voltage Inputs

Any EM1400 series relay panel may be used with “digital” switches that sit on the data bus and are connected with Cat. 5 cable with RJ45 connectors. Additionally, one may order the EM1400 with the optional contact closure inputs. These can be used with contact closure devices - even ordinary wall switches available from any hardware store.

! This Product Guide does not contain system-wide wiring or activation procedures. Please refer to the System Start-Up Guide for system wiring and activation details and for hook-up details to other panels or digital devices.



Contact Closure Inputs

14 programmable contact inputs can control any relay(s) in any panel(s), for manual (on/off) or override.

Use shielded cable for distances over 150 feet. Connect the drain wire to the GND input of the panel only. Do not connect the drain wire to a remote switch!

! This system uses a floating ground - do not use earth ground.

This maintained switch is programmed as “maintain” in the Button Sub-Menu for up to 8 relays or as a Maintain Group for more than 8 relays (see Basic Programming Guide).



Occupant sensors with isolated dry contacts may be used to control relays or groups. Set the timer on the occupant sensor at the desired time delay and program the input as “maintain.”



Center-Off momentary switches are two separate contacts, and use two inputs. Program one as “momentary on” and the other as “momentary off.”



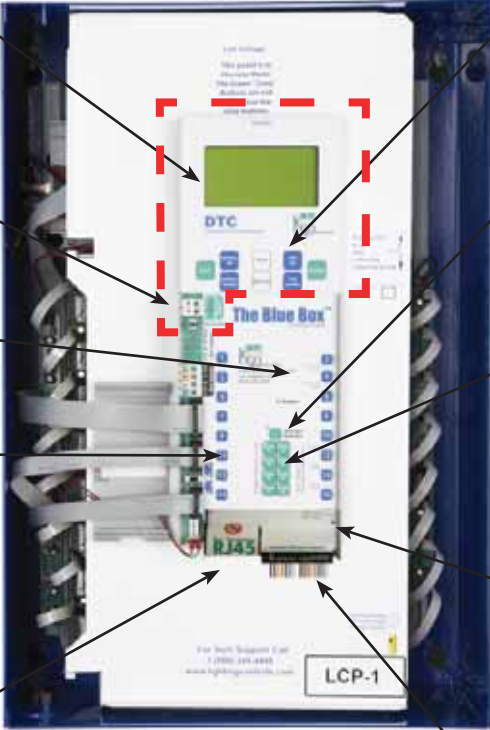
Relay outputs from any external system, such as security, are usually programmed “maintained” or as “momentary on” for a timer.



Momentary switches are often programmed as “toggle” or “momentary on” (for an override switch). They can also be “off” or “mixed mode”.



Panel Details



DTC Clock
(in Master Panel only):
32-channel, 365-day astro clock to access and program the entire system

Photocell Input
(in Master Panel only):
Outdoor photocell input

Relay Control Card:
Manual control and network control of individual relays

Manual Control Buttons (Relays 1-16)
Toggles each relay ON and OFF. When the pilot LED is ON, the Relay Status LED is OFF ("Relay Status LED" below)

Digital Bus Connectors:
Two RJ45 connectors

Electronics Backplate
High voltage - low voltage barrier


Programming Buttons(in Master Panel only):
Scroll and tab to access control features for the system

Assign Button:
Used to assign an address or change an existing address to the relay control card

Zone Buttons:
To enable the zone buttons push and hold assign button for 10 sec. The push 2, 4, 6, 2, 6. Repeat twice to get back to discreet mode.

Contact Closure Address Button:
Assign/change an address or existing address on optional contact closure input portion of the relay control card.

Contact Closure Inputs: 14 programmable/global inputs



Power Supply Card
Supplies power to the different cards inside the relay panel

Electronics Backplate:
(when open exposes the high voltage backplate)
High voltage - low voltage barrier

Mixed voltages are allowed (120v and 277v) in accordance with the NEC and local code requirements.

Dual Voltage Input Card
120v or 277v

Lighting Relays:
Normally Closed (NCL)
30A @ 277Vac Ballast
20A @ 120Vac Tungsten
20A @ 347Vac Ballast
SCCR 18Ka @ 277Vac
Rated 250,000 Cycles

Relay Status LED
LED is ON when the relay is OFF (the relay is NC).

Smacker Strip
provides relay coils with power so that they can be controlled by the control card

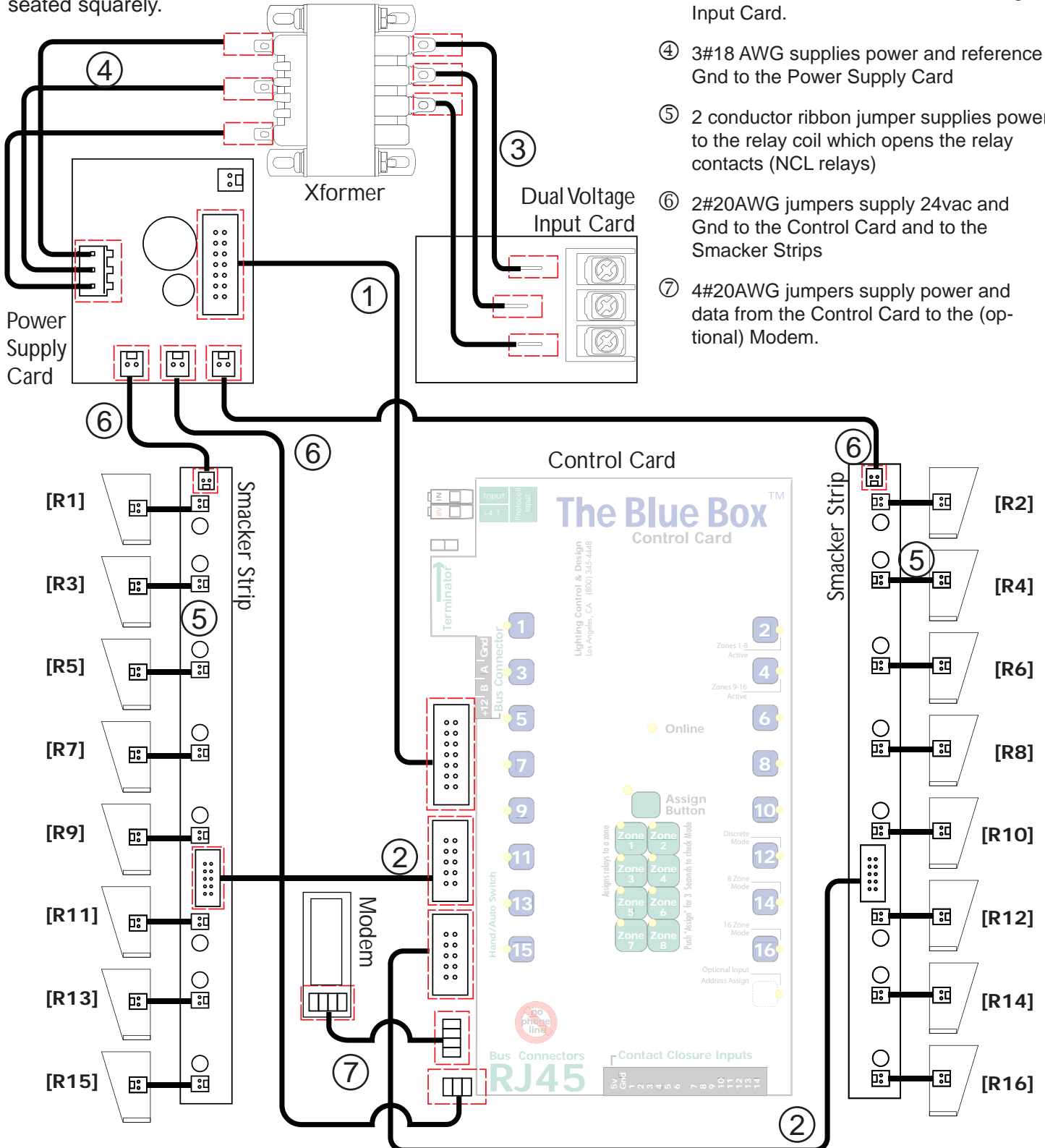
High Voltage Barrier:
(16 gauge steel)

High Voltage Backplate

Internal Wiring Schematic

Internal jumpers and cables for the EM1400 series are shown below. All jumpers and internal wiring connections use depluggable connectors.

Gently tug a connector after connecting to ensure a firm fit and then visually inspect that the connector is seated squarely.

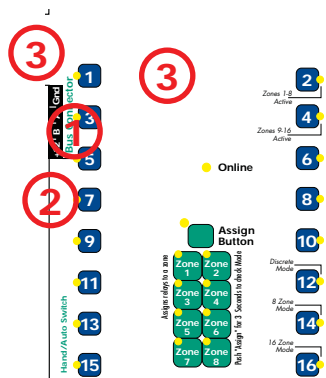


- ① 14-conductor ribbon cable supplies 5vdc, 12vdc gnd, and 60 hz to the Control Card
- ② 10-conductor ribbon cable supplies control signal to each relay via the Smacker Strips
- ③ 3#14 AWG supplies power and neutral to the transformer from the Dual Voltage Input Card.
- ④ 3#18 AWG supplies power and reference Gnd to the Power Supply Card
- ⑤ 2 conductor ribbon jumper supplies power to the relay coil which opens the relay contacts (NCL relays)
- ⑥ 2#20AWG jumpers supply 24vac and Gnd to the Control Card and to the Smacker Strips
- ⑦ 4#20AWG jumpers supply power and data from the Control Card to the (optional) Modem.

Trouble Shooting

What do Flashing LEDs Mean?

- ① The online LED flashes “on” once per second when the panel can see the clock.
- ① If flashing about 10 times per second, the card is storing data to memory, so do not de-power the board.
- ① If it is flashing slowly, but is mostly on with a flash off, the card cannot see the clock. If this is the Master Panel (with the DTC) the control card needs to be replaced. If it is a slave panel, it is disconnected from the DTC Clock. Check that the Cat. 5 is plugged in and that your crimping is OK.
- ② If the Assign LED is flashing, one of the relay drivers has gone into Protect mode. There may be a short on the driver or a power spike may have caused it to trigger.
- ② Press the ASSIGN button and it should clear. If it does not clear, toggle each relay with the manual override and observe which relay does not operate. If it does not clear by unplugging the relay, transfer the load to a spare.
- ② If the control card has been damaged, and it is not possible to clear the problem, the card may need to be replaced.
- ③ A blinking Relay LED means the relay is in Timer mode and will perform an automatic shut-off within several hours. Timer mode is initiated when a clock schedule sweeps off relays in a group which is programmed as Maintain+Timer or Maintain+Off Sweep (see page 10 of the Basic Programming Guide).
- ③ If it is blinking rapidly, shut-off is imminent (usually within 5 minutes) and unless an override switch is activated the relay will turn off.



- ③ To initiate an override (re-start the timer) from the control card, press the relay button once. Or use an override switch.

Lights Won't Turn Off

1. Is the panel on and receiving power? Check that the breaker feeding the panel electronics is on; check the input voltage with a meter.
2. Check that the Hand-Auto switch is set to “Auto.”
3. Check that the jumpers from the control cards to the relays are properly seated and plugged in.
4. Press the Toggle buttons for each relay and listen for a clicking sound. If the relays sound like they are responding then check the relay contacts. Check for continuity when the relay is “on” and then “off”. If the relay continuity is correct, the problem lies with the wiring (no neutrals, wrong circuits, etc).

Lights Won't Turn On

1. Check that the breakers feeding the relays are powered up. Check the Line side of each relay with a volt meter for proper voltage.
2. Press the Toggle buttons for each relay and listen for a clicking sound. If the relays sound like they are responding, then check continuity with a meter (ensure that breaker is de-powered) when the relay is “on” and “off”. If the relay is responding and the lights are not turning on or off, the problem lies within the wiring (no neutrals, wrong circuits, etc).

Can't See the Clock Display

1. Adjust the contrast level on the top of the DTC Clock.

