# Universal Source Controller - Feed Through

## ⚠ WARNING

**Risk of Fire, Electrical Shock, Cuts or other Casualty Hazards- Installation and maintenance of this product must be performed by a qualified electrician. This product must be installed in accordance with the applicable installation code by a person familiar with the construction and operation of the product and hazards involved. For continued protection against shock hazard replace all covers and guards after field wiring is completed.**

**Risk of Fire and Electric Shock- Before installing or performing any service, the power MUST be turned OFF. All installations should be in compliance with the National Electric Code and all state and local codes.**

**Risk of Burn- Disconnect power and allow product to cool before handling or servicing.**

**Risk of Personal Injury- Due to sharp edges, handle with care.**

**Failure to comply with these instructions may result in death, serious bodily injury and property damage.**

**DISCLAIMER OF LIABILITY:** Cooper Lighting Solutions assumes no liability for damages or losses of any kind that may arise from the improper, careless, or negligent installation, handling or use of this product.

**IMPORTANT:** Read carefully before installing product. Retain for future reference.

**NOTICE:** Product may become damaged and/or unstable if not installed properly.

**Note:** Specifications and dimensions subject to change without notice.

**ATTENTION Receiving Department:** Note actual product description of any shortage or noticeable damage on delivery receipt. File claim for common carrier (LTL) directly with carrier. Claims for concealed damage must be filed within 15 days of delivery. All damaged material, complete with original packing must be retained.

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**NOTICE:** All new wiring must be fully verified before applying power.

**NOTICE:** Designed for indoor installation and use only. Dry location rated.

**Please Read This First**

The Universal Source Controllers are designed, built and tested to strict safety regulations. By following the steps listed below and elsewhere within this guide, you can ensure safe installation and operation of these controller units.

- The Universal Source Controllers must be installed only by a qualified electrician
- The installation must comply with the appropriate electrical codes and regulations in force in your area
- The Universal Source Controllers are designed for indoor installation and use only. The units can, however, be used to control appropriately certified exterior lighting fixtures
- Ensure that all wiring used conforms fully to local specifications and is sufficiently rated for the installation
- All new wiring must be fully verified before applying power
- The high voltage supply should be fed to the Universal Source Controller via an external isolation breaker with sufficient capacity for the planned installation
- All Universal Source Controllers exceed the weight limit for one person lifting - always use at least two people when lifting and mounting the units
- Do not mix load types within a single channel (e.g. 120V tungsten and low voltage ballast control)
- Ensure that the supply is fully isolated at an external breaker before removing the chassis covers. Test that power has been removed before starting to handle conductors
- Ensure that high voltage and low voltage wiring remains separate

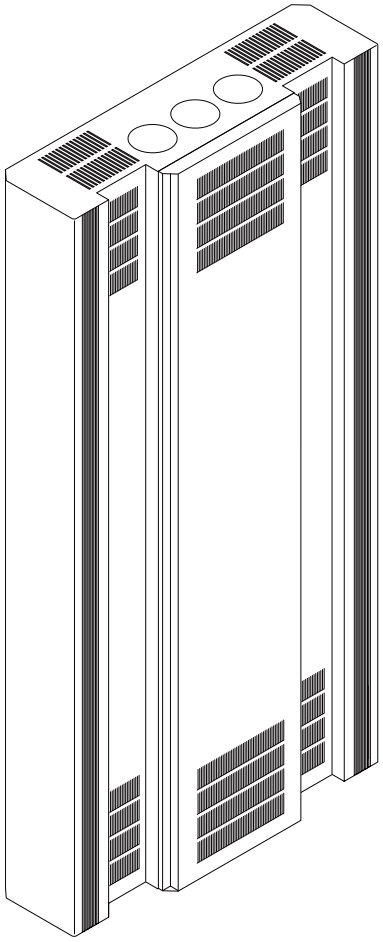
**Important Points For Consideration**

- The Universal Source Controllers must be mounted flush with the wall, do not recess the controller chassis
- Upper and lower raceways must not be located within 8 inches (200 mm) of the upper and lower panels of the Universal Source Controller. Use suitable conduits and couplers to link the raceways to the controller chassis
- Allow adequate space for future maintenance of the unit. Do not install in a location that will later be difficult to access
- The Universal Source Controllers are designed to be mounted vertically
- During operation, the Universal Source Controllers will produce audible noise caused by electrical noise suppression circuitry and also the circuit relays within the unit. The noise is a low level buzz that varies with the level of dimming and also clicks when relays are energised. Take these matters into consideration when deciding on a suitable mounting position.
- The hinged cover must be unscrewed and removed from the front cover when the Universal Source Controller operates at full load in a high ambient environment

COOPER Lighting Solutions

## Contents





# Introduction

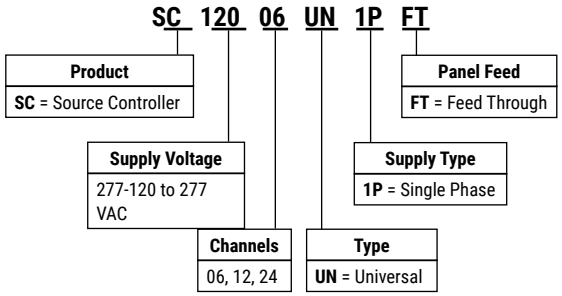
## Welcome

The WaveLinx Wired Universal Source Controller range from Cooper Lighting Solutions has been designed to provide maximum flexibility in both installation and operation. Every model in the range can accept a variety of industry standard control options, from iCANbus to DMX, from ethernet to RS-485. Similarly, every model can drive a wide range of lighting loads, from incandescents to dimmable fluorescents, from non-dim apparatus to DALI digital modules.

Much care and attention has been applied to the installation and maintenance of the Universal Source Controllers. Each model provides clear, logical cable routing and every high voltage channel is controlled by an individual, easy to replace dimmer card.

### *Range Overview*

Each model is specified using a part number in the following format:




| Model Number | Supply Voltage | Supply Type | Circuits | Maximum Load |
|---|---|---|---|---|
| SC277-06-UN-1P-FT | 120 to 277 VAC | 1 Phase | 6 | 16A per Channel |
| SC277-12-UN-1P-FT | | | 12 | |
| SC277-24-UN-3P-FT | | | 24 | |

### *Cabinet Dimensions*

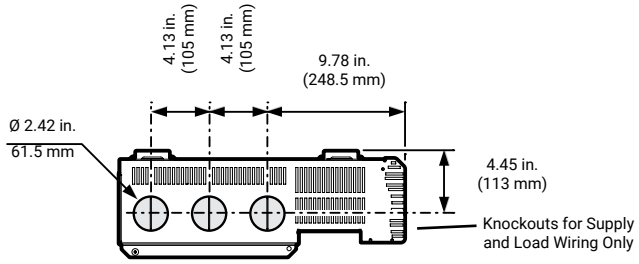
Three overall cabinet sizes are available as shown on this and the following pages.

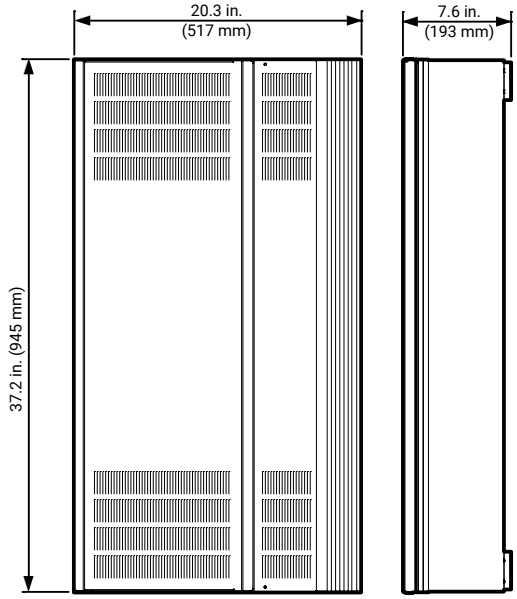
## 6 Circuit Cabinet

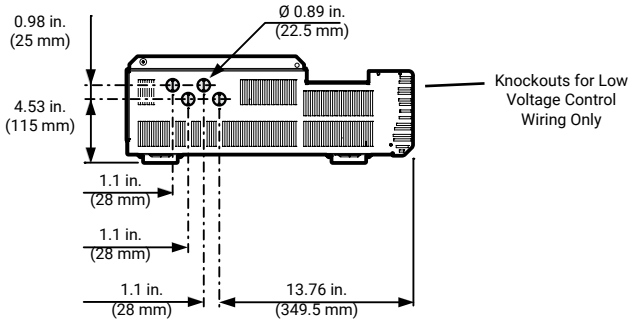
### Weight

Packed: 100 lbs (45 Kg)

Unpacked: 88 lbs (40 Kg)



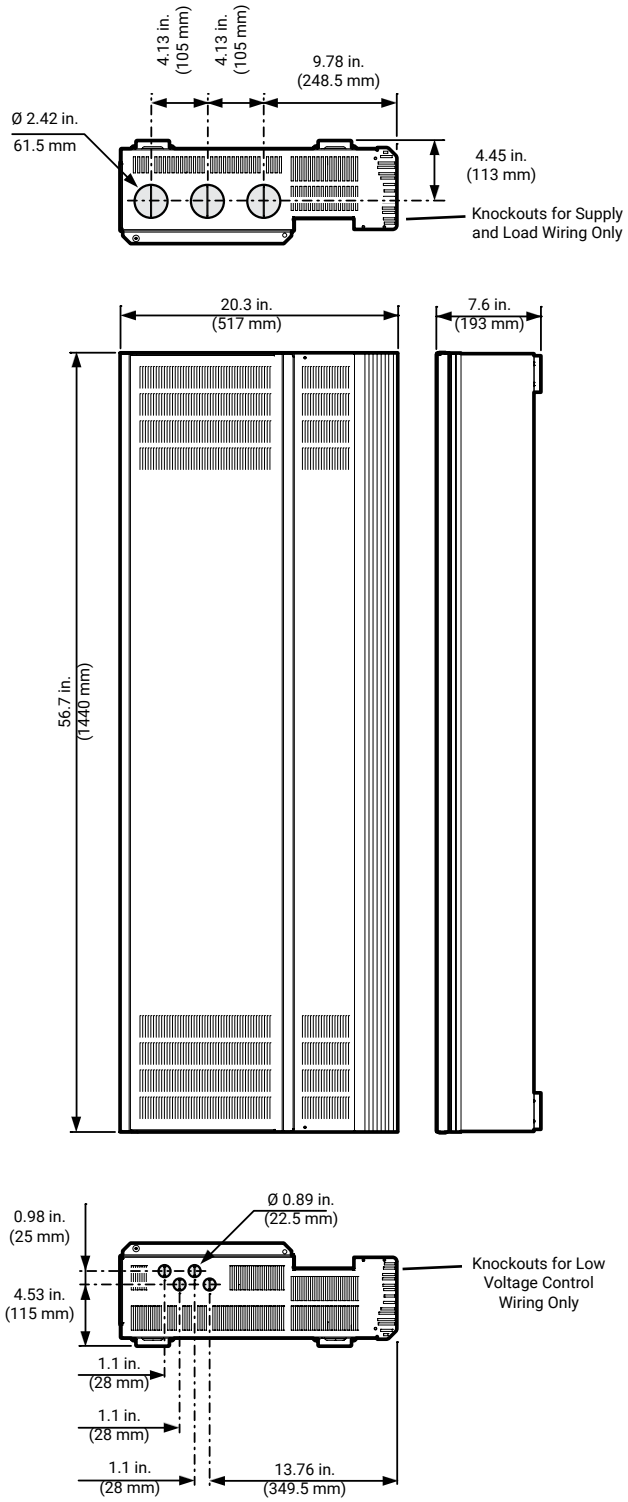



## 12 Circuit Cabinet

### Weight

Packed: 160 lbs (72 Kg)

Unpacked: 132 lbs (60 Kg)

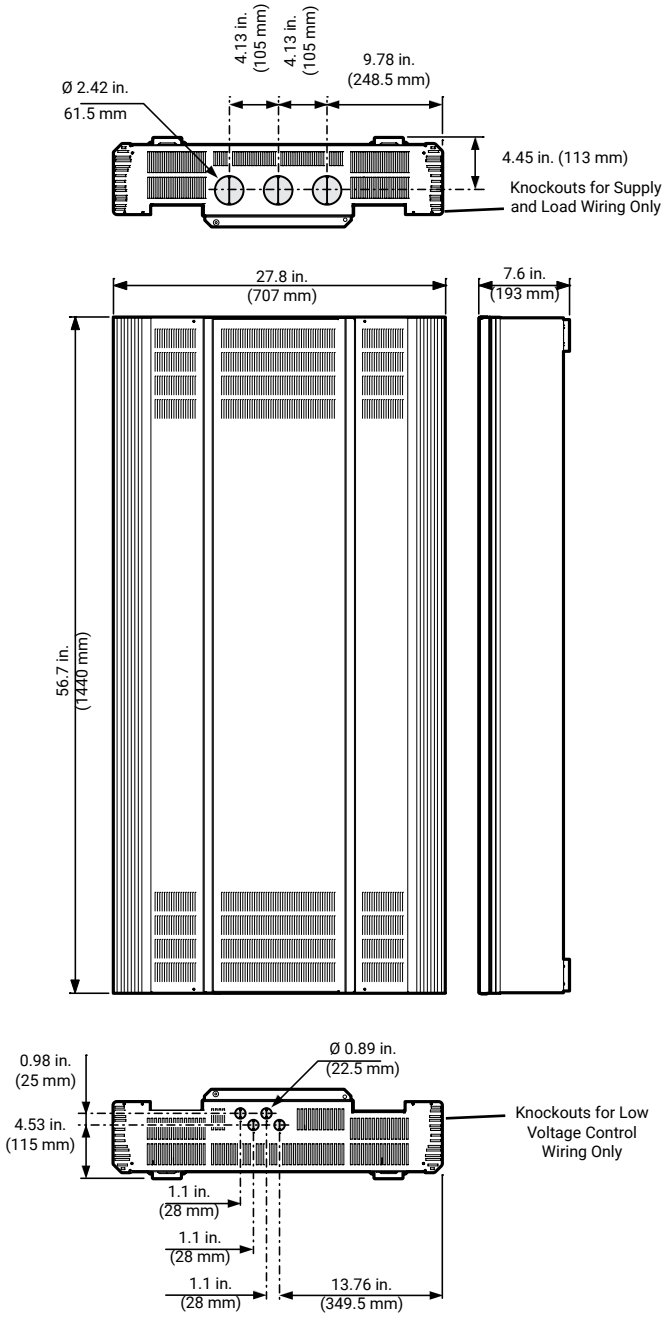



## 24 Circuit Cabinet

### Weight

Packed (24): 220 lbs (100 Kg)

Unpacked (24): 200 lbs (90 Kg)



### Specifications

The numerous models within the Universal Source Controller range share the following key specifications. Information specific to each cabinet model are provided elsewhere throughout this guide.

- All channels provide switched (non-dim) and dimmed high voltage load control as standard
- Leading-edge triac dimmer engines capable of withstanding repetitive inrush currents of 50 times operating current without impacting lifetime
- All dimming and switching circuitry for every channel located on individual boards for quick and easy swap-out, if necessary
- Voltage and frequency compensation to maintain light level during supply fluctuations
- Power monitoring for each circuit and the total panel
- Bypass jumpering fitted as standard to protect circuits and allow work lighting during installation
- Selectable low voltage load control available per channel for dimmable ballast control
- Low maintenance and quiet operation thanks to fanless, convection cooled operation
- Support for multiple control protocols: iCAN for links to multiple control sources; DMX512A for links with entertainment systems; RS-485 for integration with building management schemes and ethernet for connection to a variety of systems
- Dual volt-free switch inputs, with programmable responses, for integration with emergency control devices, building management systems, etc
- Compact wall mounted design with easy access to all internal items and lockable front panel door for added security
- Intuitive control panel provides straightforward programming and configuration of the system. The control panel allows a base level installation to be configured without the use of separate PC programming
- Overcurrent protection provided externally in field installation (Per Canadian electrical code)

## Safety

### *Please Read This First*

The Universal Source Controllers are designed, built and tested to strict safety regulations. By following the steps listed below and elsewhere within this guide, you can ensure safe installation and operation of these controller units.

- The Universal Source Controllers must be installed only by a qualified electrician
- The installation must comply with the appropriate electrical codes and regulations in force in your area
- The Universal Source Controllers are designed for indoor installation and use only. The units can, however, be used to control appropriately certified exterior lighting fixtures
- Ensure that all wiring used conforms fully to local specifications and is sufficiently rated for the installation
- All new wiring must be fully verified before applying power
- The high voltage supply should be fed to the Universal Source Controller via an external isolation breaker with sufficient capacity for the planned installation
- All Universal Source Controllers exceed the weight limit for one person lifting - always use at least two people when lifting and mounting the units
- Do not mix load types within a single channel (e.g. 120V tungsten and low voltage ballast control)
- Ensure that the supply is fully isolated at an external breaker before removing the chassis covers. Test that power has been removed before starting to handle conductors
- Ensure that high voltage and low voltage wiring remains separate
- Each dimmer channel should be protected by its own dedicated external circuit breaker.

### Important Points For Consideration

- The Universal Source Controllers must be mounted flush with the wall, do not recess the controller chassis
- Upper and lower raceways must not be located within 8 inches (200 mm) of the upper and lower panels of the Universal Source Controller. Use suitable conduits and couplers to link the raceways to the controller chassis
- Allow adequate space for future maintenance of the unit. Do not install in a location that will later be difficult to access
- The Universal Source Controllers are designed to be mounted vertically
- During operation, the Universal Source Controllers will produce audible noise caused by electrical noise suppression circuitry and also the circuit relays within the unit. The noise is a low level buzz that varies with the level of dimming and also clicks when relays are energised. Take these matters into consideration when deciding on a suitable mounting position.
- The hinged cover must be unscrewed and removed from the front cover when the Universal Source Controller operates at full load in a high ambient environment

### *Ambient Atmosphere Requirements*

| | |
|---|---|
| Temperature | $32^0$ F to $104^0$ F ($0^0$ C to $+40^0$ C) |
| Humidity | 0 to 95% non-condensing |

## Mounting

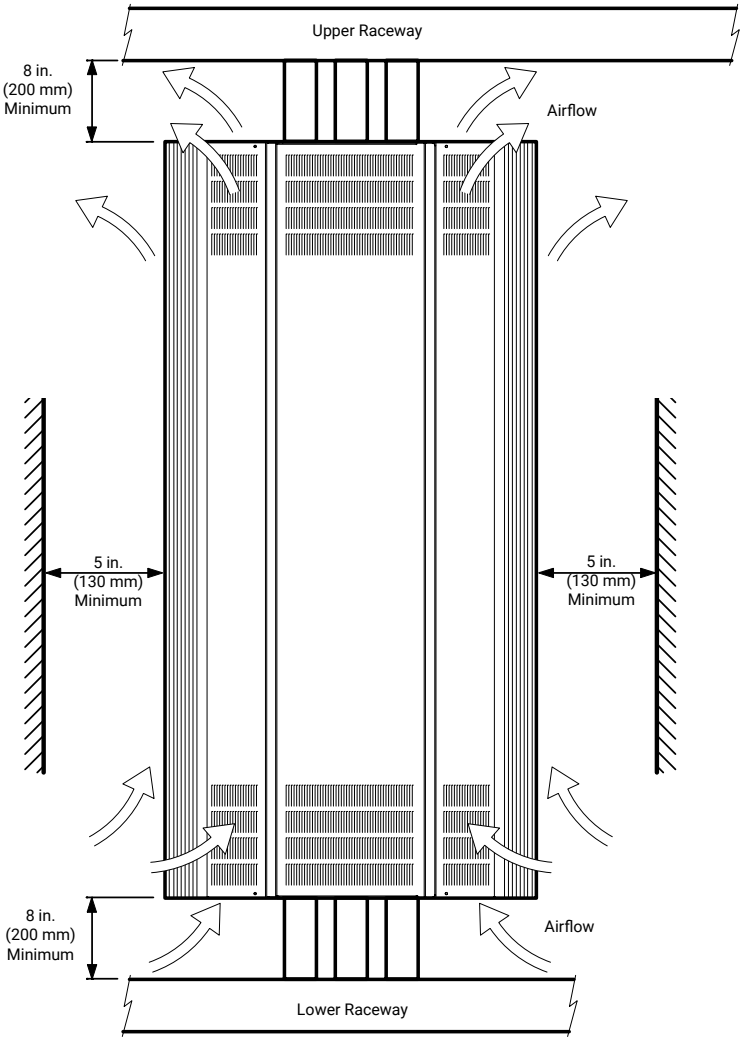
### *Location and Spacing*

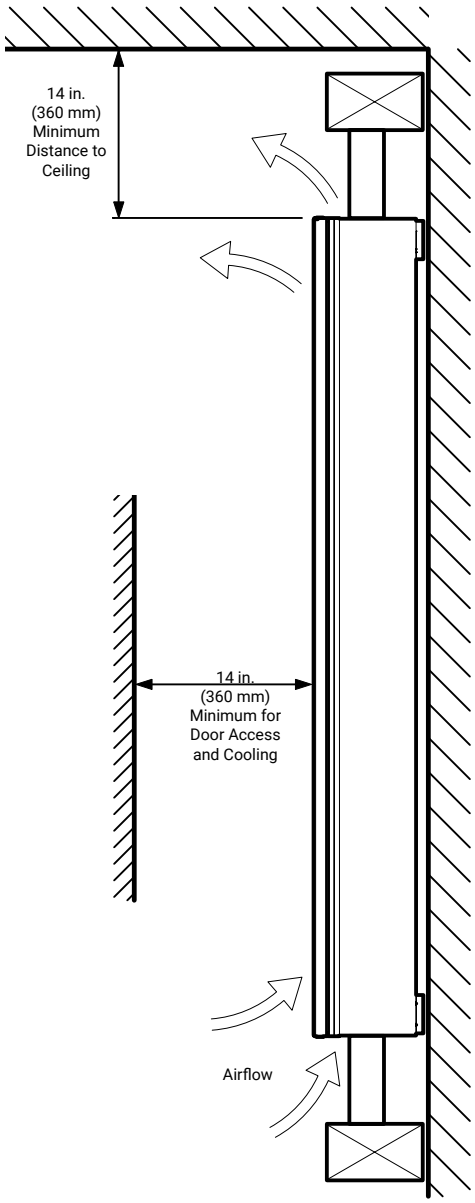
The Universal Source Controller models are all fully convection cooled, therefore it is vitally important to ensure that each unit is installed in a ventilated location that permits sufficient airflow and provides the correct ambient conditions.

Ensure that the minimum distances to walls and other equipment shown in the diagrams below are maintained.

Also ensure that the stated ambient atmosphere requirements are not exceeded.

Refer to 'Important points for consideration' when choosing a mounting location.



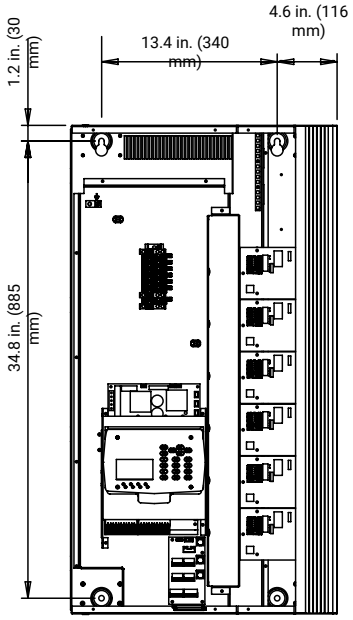
### *Mounting Holes*

All models within the Universal Source Controller range are **NEMA Type 1 IP20** rated for indoor use only. Four mounting holes are provided within the rear of each chassis for attachment to a suitable wall.

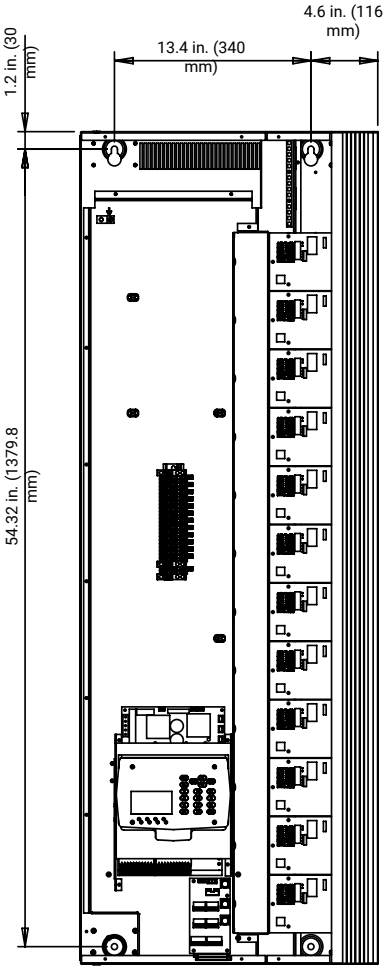
Ensure that the mounting wall is able to safely support the weight of the unit plus all wiring hardware and that it complies with local codes. Reinforce where necessary.

Ensure also that the mounting bolts and fixings used are of sufficient strength and quality to safely hold the unit.

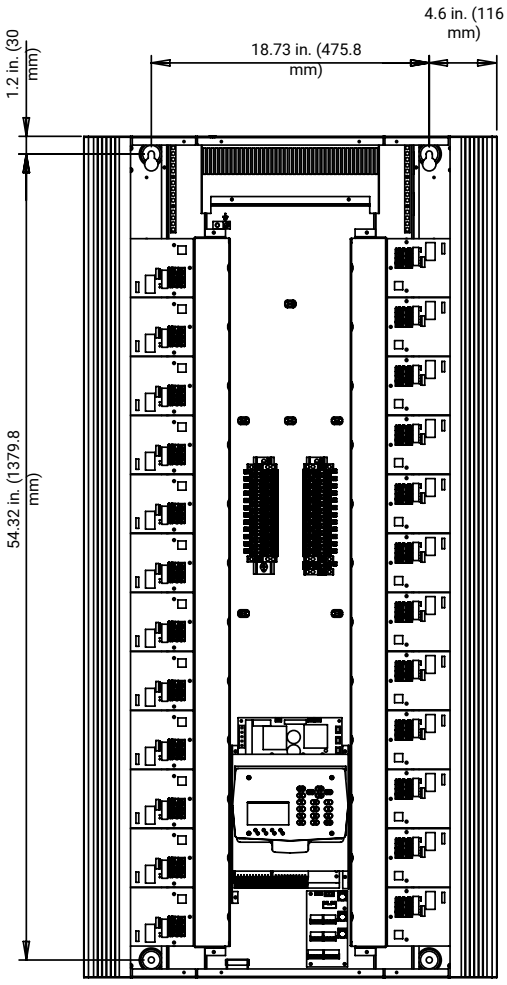
**6 Circuit Models**




**12 Circuit Models**




**24 Circuit Models**




**Note:** The mounting holes (for all models) have diameters of 0.41 in (10.5 mm).

**Standard Weights**

| Cabinet | Unpacked Weight |
|---|---|
| 6 Circuit | 88 lbs (40 Kg) |
| 12 Circuit | 132 lbs (60 Kg) |
| 24 Circuit | 200 lbs (90 Kg) |

### *Accessing the Mounting Holes*

The mounting holes are located within the rear panel of the Source Controller. To access the mounting holes (and circuit wiring terminals) it is necessary to remove the front panels.

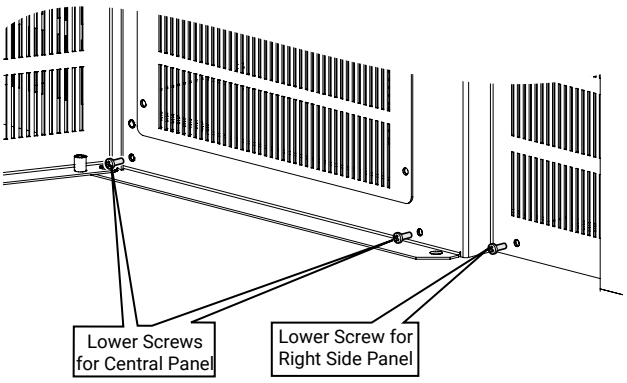
### To Remove the Front Panels

CAUTION: If removing panels on a previously installed Source Controller, power down breakers for the main supply and dimmer channels first.

1. Open the main panel door.
2. Remove the two upper and two lower screws that hold the main panel in place and carefully lift off the complete panel.
3. Now remove the single upper and single lower screw holding the right side panel in place. Carefully lift off the panel.
4. For 24 circuit models, repeat step 3 for the left side panel.

### To Replace the Front Panels

1. Replace the side panel(s) first. Place the right side panel onto the chassis and replace the upper and lower fixing screws.
2. For 24 circuit models, repeat step 1 for the left side panel.
3. Place the main panel onto the chassis and open the door. Replace the two upper and two lower fixing screws.




## Supply Wiring

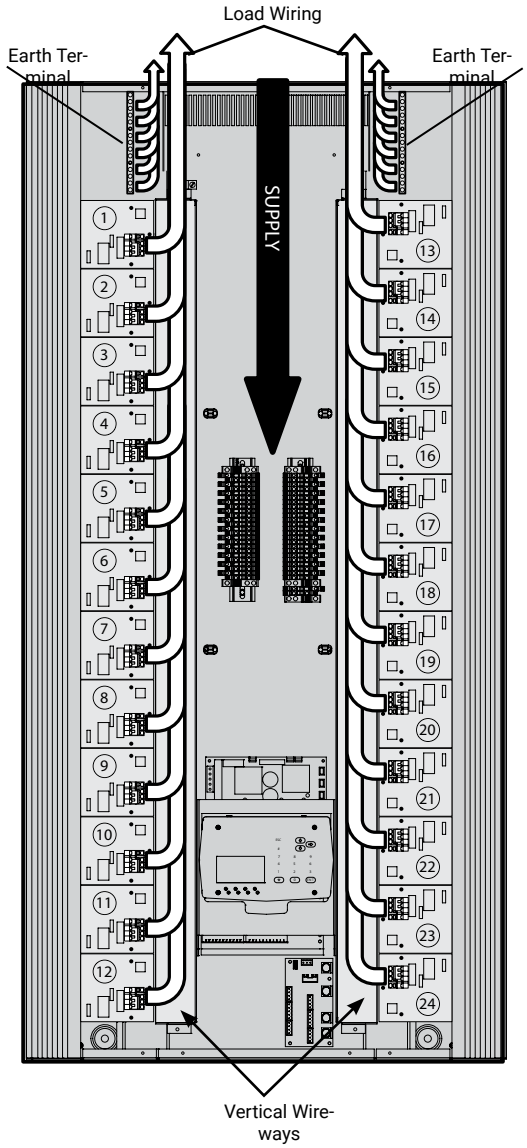
### *Wiring Flow*

The Universal Source Controller range has been designed to provide a clear layout and logical progression for all power circuits.

The main supply and dimmer channel supply conductors enter at the top panel and connect directly to Hot and Neutral input screw terminals. Input power is then distributed from these to each of the individual dimmer cards.

Two vertical wireways (one for 6 and 12 circuit models) provide clear routes from the dimmer card outputs up to the earth terminals and the exit knockouts within the top panel of the chassis.

The diagram shown right indicates a typical wiring flow with the high voltage load wiring from the various channels (and their earth connections) exiting from the top panel.



### *Single Phase Supply*

The SC-UN-FT is provided with a single phase main power supply connection that supports an incoming supply of 120 VAC or 277 VAC.

### *Connecting the Supply*

The suggested entry point for the supply wiring is via the center knockout on the top panel of the chassis. This provides immediate access to the supply screw terminals and also leaves the two knockouts either side for exiting load wiring. Use a suitable conduit and coupler to feed the source wiring safely into the chassis.

See the diagram on the right and on the next page for connection details. The main earth terminal is located near to the left hand supply knockout at the top of the panel. The earth connection is bonded to the main backplane of the chassis and the outer panels.

Top panel knockouts: 3 x 2.42 inches (61.5 mm)

### *Supply Power to the Panel*

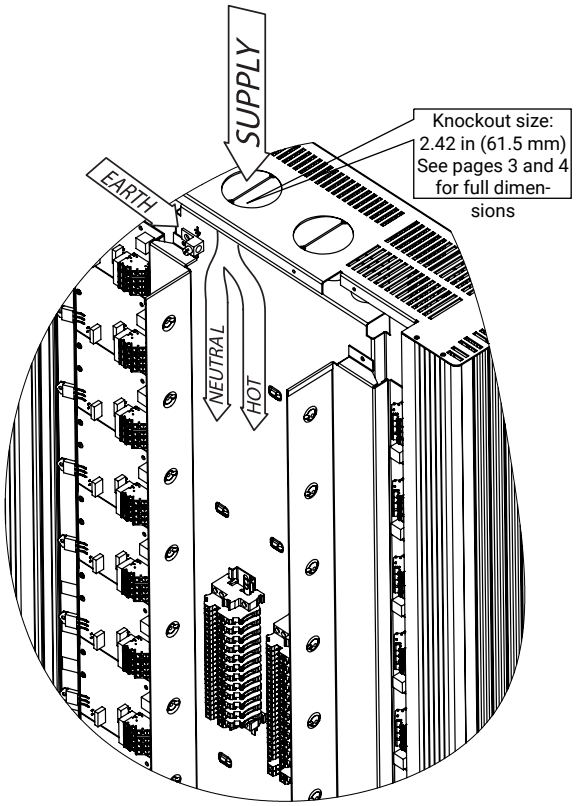
The main power supply terminals are spaced slightly below the dimmer channel supply terminals. Connect the supply conductors to the screw terminals marked “H” and “N”.

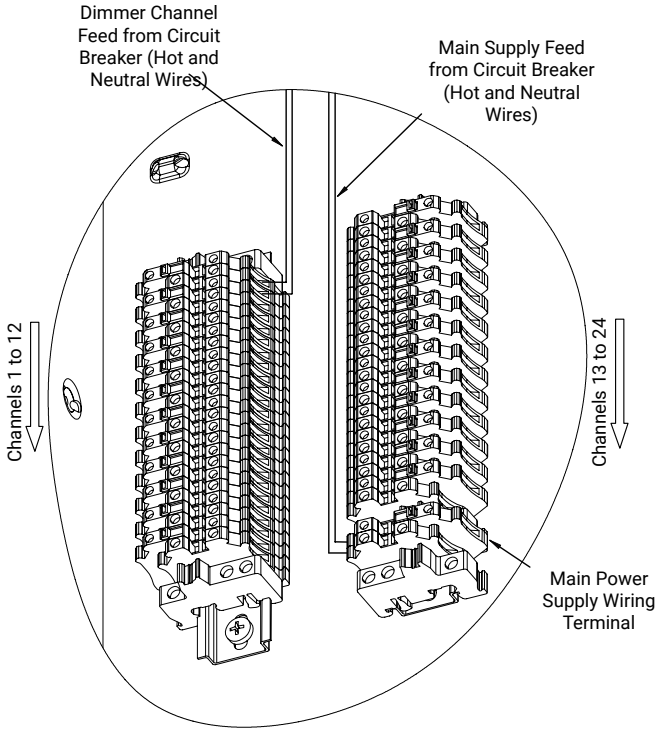
### *Supply Power to the Dimmer Channels*

Connect the dedicated breaker feeds for each dimmer channel to the terminals for each used dimmer channel. Connect the supply conductors to the screw terminals marked “H” and “N”.

### Supply Power Notes

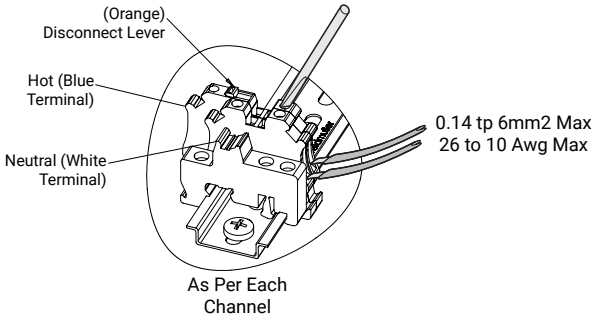
In 6 and 12 size controllers, all supply power connects to the left side of the terminal block. In 24 size controllers, all supply power connects to the interior side of the terminal block, i.e. channels 1-12 will connect on the right side and channels 13-24 will connect on the left side of the terminal block.



### Additional Wiring Detail

**Note:** Wiring terminal may face alternate direction. Connections should be made to terminal blocks on the side that is not pre-wired by the factory. Observe color and labeling which designates Hot and Neutral location for each terminal.

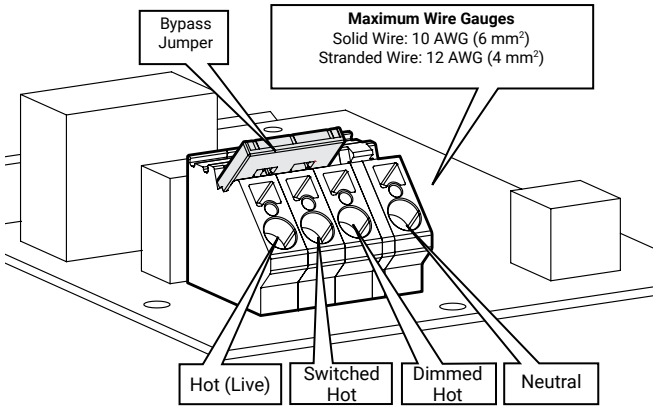



## Load Wiring

### *High Voltage Load Wiring*

Each load channel is served by a dedicated control card fed from a designated circuit breaker. For each card, load connections are made using a four-way rapid connection block.

Available at the connection block are a permanent **Hot** (subject to circuit breaker status), **Switched hot** (via relay control), **Dimmed hot** (via triac control) and **Neutral** - see diagram below.




**Note:** Earth connections for each channel are made using the connector blocks located at the top of each wireway (see the figure for Earth Connection).

A red 3-way bypass jumper is installed within each connection block to serve three purposes:

- To bind the three outputs in order to protect each channel card from load faults during installation
- To energize each channel output (subject to the status of the associated circuit breaker) for use as work lighting control during installation and
- To assist with circuit testing during commissioning

IMPORTANT: The bypass jumper must remain in place on each channel until the commissioning process is complete.

### Total Load Per Channel

The load on each channel **must not exceed 16A**.

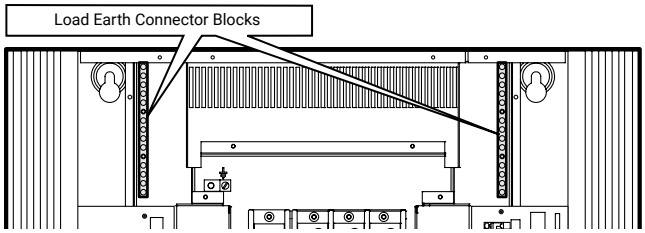
### Load Wire Gauges

Load wiring must be sized according to the nature of the channel load(s) and with strict regard to regulations and codes in force within your locality. The maximum permissible wire gauges accepted by the connector blocks are:

Solid wire: 10 AWG (6 $mm^2$)
Stranded wire: 12 AWG (4 $mm^2$)

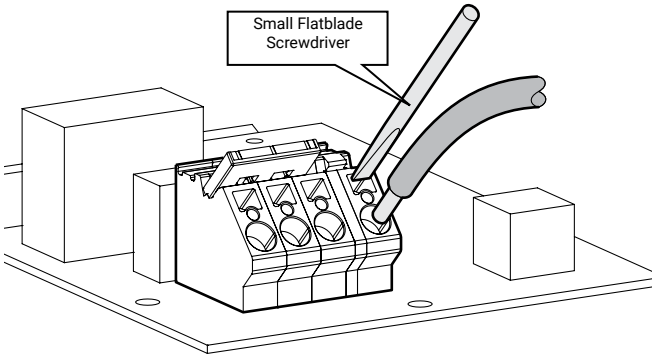
### Earth Connections

Earth connections for each channel are available at the connector blocks located at the top of each wireway:




### *To Insert a Wire*

1. Strip roughly a quarter inch (6 mm) of insulation from the wire end.
2. Place a small flat blade screwdriver all the way into the upper rectangular hole (keep the tip of the screwdriver against the top edge of the hole).
3. Press the screwdriver tip downwards towards the base of the connection block and push the stripped wire into the large circular hole.
4. When the wire is in place, release the screwdriver and check that the wire is firmly held by the internal spring clip.



### *High Voltage Load Wiring Flows*

A knockout (diameter 2.42 inches/61.5 mm) is provided above each load wireway within the top panel of the chassis. Use suitable conduits and couplers. Please see the wiring flow diagram on page 8.

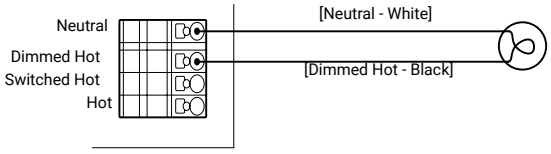
## Typical Load Connections

The examples below show some of the most typical loads and the way in which they are connected to a Source Controller dimmer card.

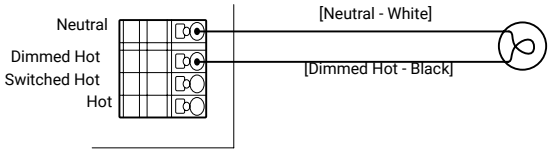
### *Defining Load Types*

The type of load placed upon each channel must be defined within the Configuration menu of the control panel. For further details on how to do this, please refer to the accompanying System manual.

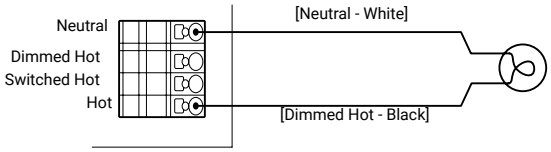
### *Standard Dimmable Load*



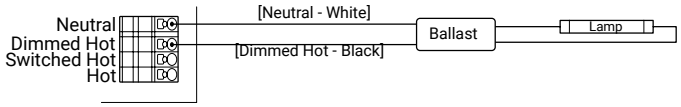

### *Non-Dim Load*



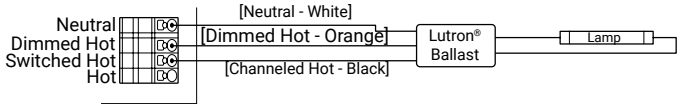

### *Constant Load*



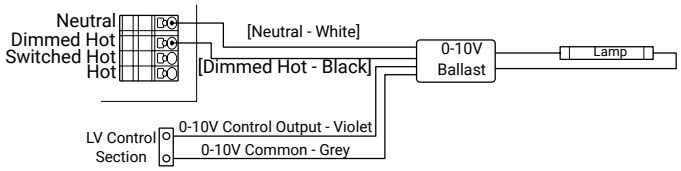

### *2 Wire Fluorescent Dimmable Ballast (E.g. Advance Mark X™)*




### *3 Wire Fluorescent Dimmable Ballast (E.g. Lutron® Hi-Lume® Or Eco-10™)*




### *4 Wire Fluorescent Dimmable Ballast (E.g. 0-10 VDC Control)*



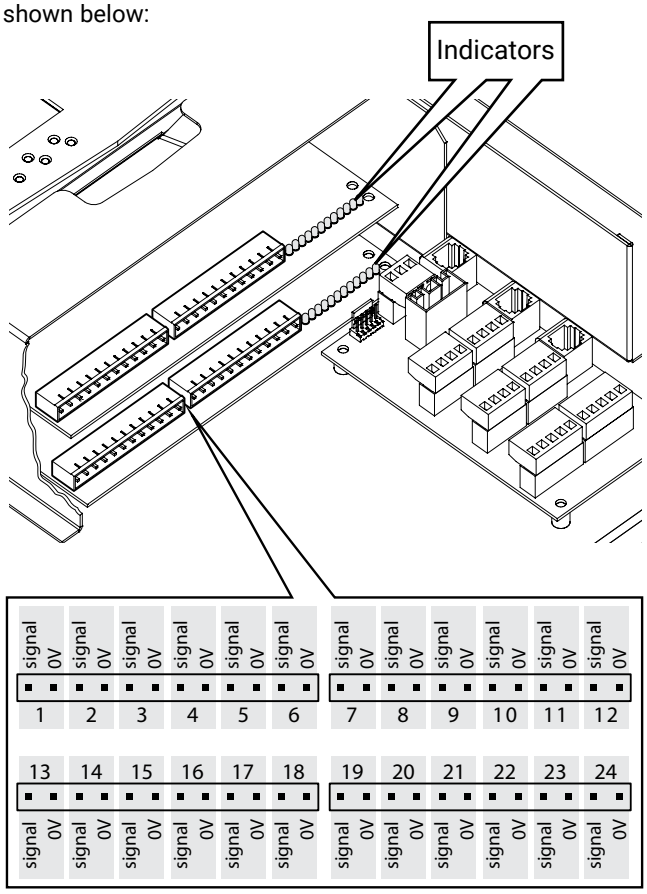
### *Low Voltage Load Wiring*

Each channel can be individually configured to support any of the following low voltage load control standards: 0-10V, DSI or broadcast DALI (DSI and DALI - Canada and Mexico Only). The high voltage sections for each channel continue to provide switched hot outputs to power the controlled loads.

**Note:** Support for multiple low voltage load control standards may not be permissible in certain countries. In such cases, the required control standard must be stated when ordering.

The low voltage load wiring circuits are located just below the control panel, accessible either through a removable mini panel or when the complete casing is removed.

Connections are made easy by using removable plug blocks which snap into terminals mounted on the circuit boards shown below:




For each circuit, the low voltage control protocol to be used is selected using the configuration menu on the control panel. The programming of the Source Controller channels is covered within the accompanying System Manual.

**Note:** DALI signals for each channel are output in broadcast mode only - it is not possible to individually address multiple DALI luminaires on the same control wire.

The low voltage load control circuits are PELV (Protected Extra Low Voltage).

### Low Voltage Load Wiring Flows

The casing provides four knockouts on the base panel for use by exiting low voltage load cables as well as control wiring. Each knockout is 0.89 inches (22.5 mm) in diameter.

Use appropriate conduits and couplers to link with raceways or cable runs, as necessary.

IMPORTANT: Low voltage load wiring should be installed with a suitable separation to parallel high voltage cables, according to local and national codes.

### Indicators

An indicator is assigned to each low voltage output channel to provide quick visual feedback. In each case, the indicator (located next to the output connectors) will mimic the dimmed status of the associated channel, from zero to full brightness.

## Control Wiring

### *Multiple Control Protocols*

To ensure maximum versatility, the Universal Source Controllers provide full compatibility with a range of control protocols, including:

- iCAN bus
- DMX512A
- RS-485
- Ethernet

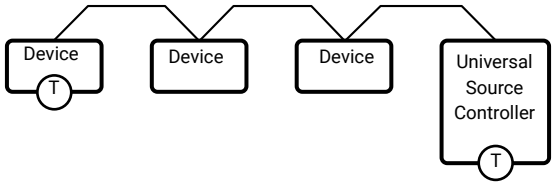
Connections for the iCAN bus, DMX512A and RS-485 protocols are made using removable plug blocks which snap into terminals mounted on the control circuit board. A standard RJ45 socket is provided for the ethernet connection.

In addition, a separate connector block (labeled 'Contact closure') allows two, volt-free switch inputs from external systems. Wire distance should not exceed 32 feet (10m) from the Source Controller. Subject to configuration menu settings, these inputs can be used to affect selected channels.

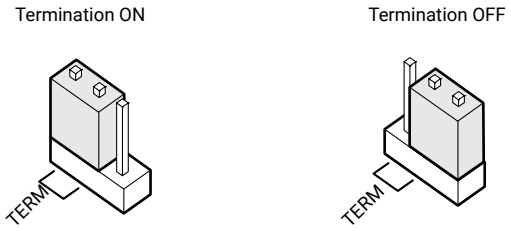
The control connections are located just below the control panel, accessible either through a removable mini panel or when the complete casing is removed.

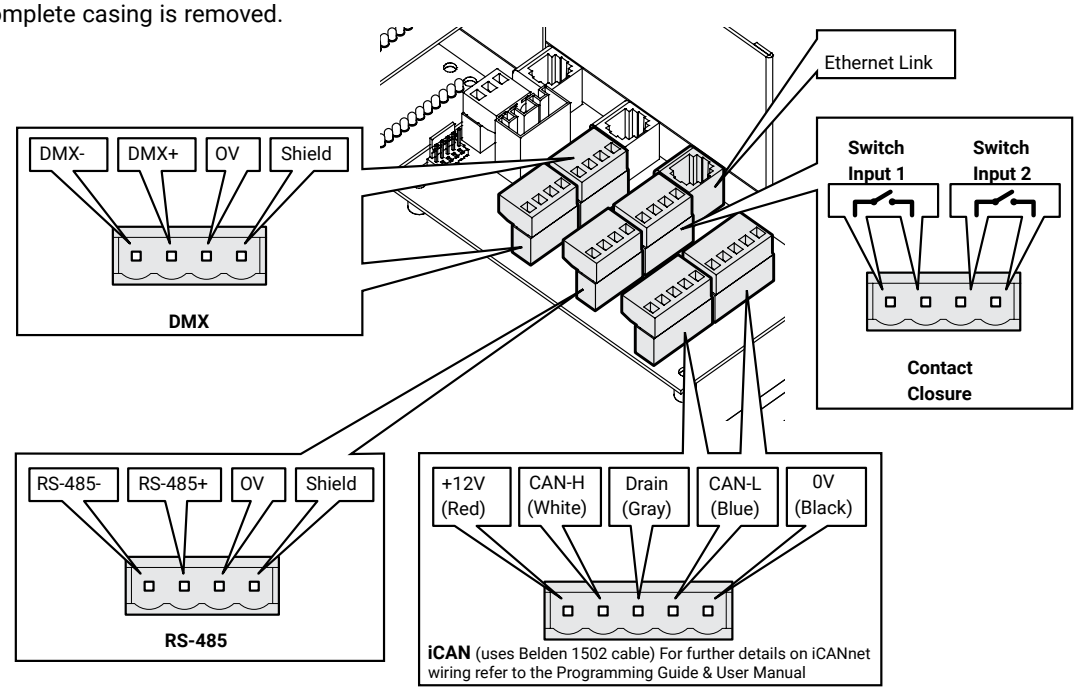
### *Termination*

The iCAN, DMX and RS-485 are 'daisy-chain' protocols that all require termination on the devices located at either end of the chain.




The Switched Relay Controller provide jumper links adjacent to the iCAN, DMX and RS-485 connectors. As standard all of these interfaces are terminated. To remove termination for a particular bus, move the associated termination jumper from the upper two pins to the lower two pins.



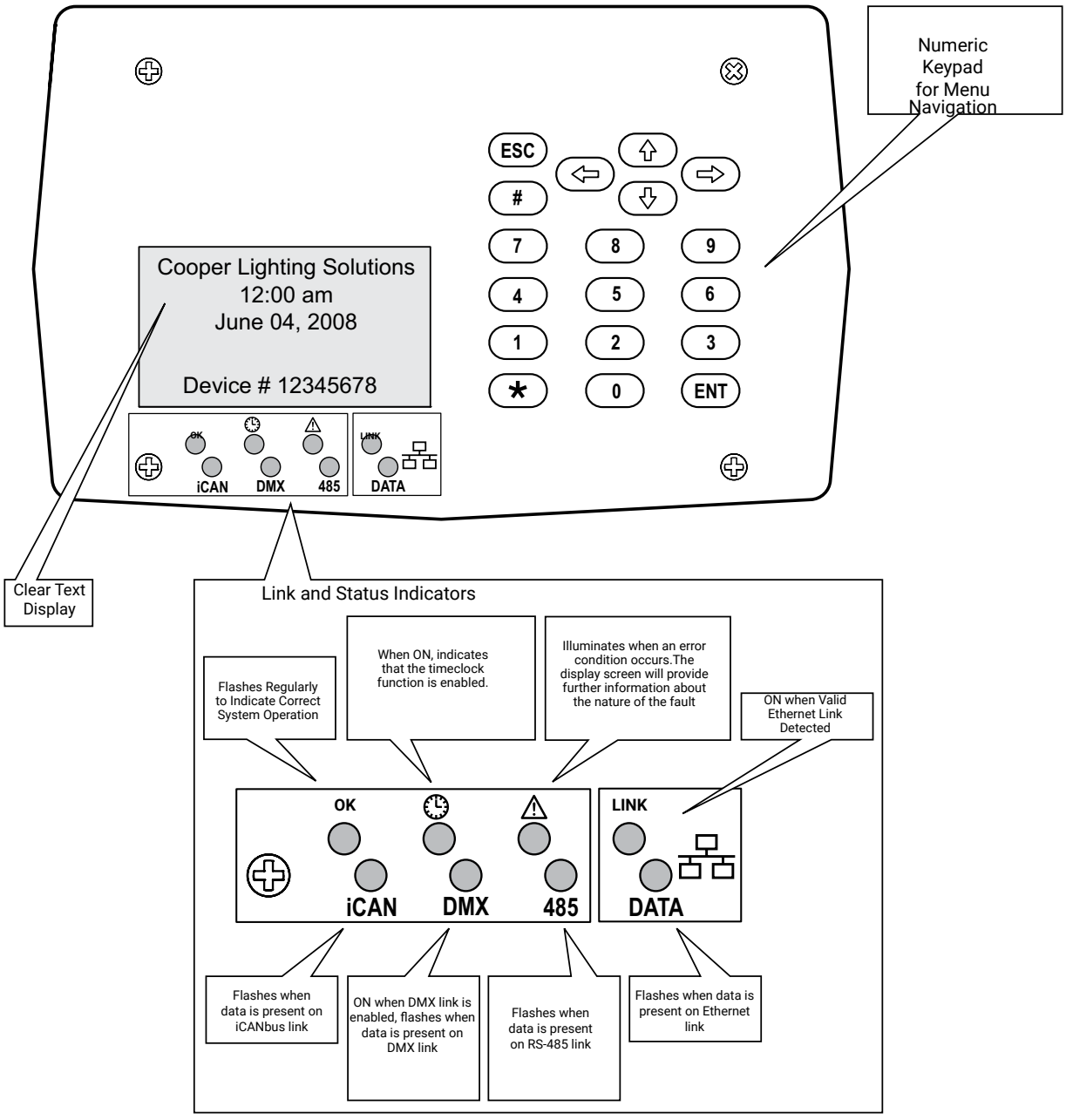



## Control Panel Operation

### *Using the Control Panel*

Each Universal Source Controller provides a control panel to make programming and operation as straightforward as possible. To access the control panel, open the main panel door on the front of the unit.

The main configuration procedures within the control panel are covered within the accompanying System Manual. This section provides a brief overview of some common functions.



### *Menu Navigation*

Within the control panel menu system, use the following buttons to navigate:

(⇦) (⇨) (⇩) (⇧) Press to select an item or to save changes.

(ENT) Press to enter an option or select an item.

(ESC) Press to escape from an option and return to the previous level.

(*) The Asterisk will be used on some Scenes to perform special functions.

The menu system is comprised of two main sections:

### The Operation menu

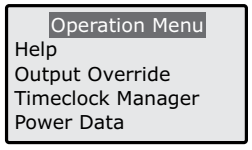
Contains functions for users to operate the system. Functions include: Output override, Timeclock functions, Power data figures, etc.

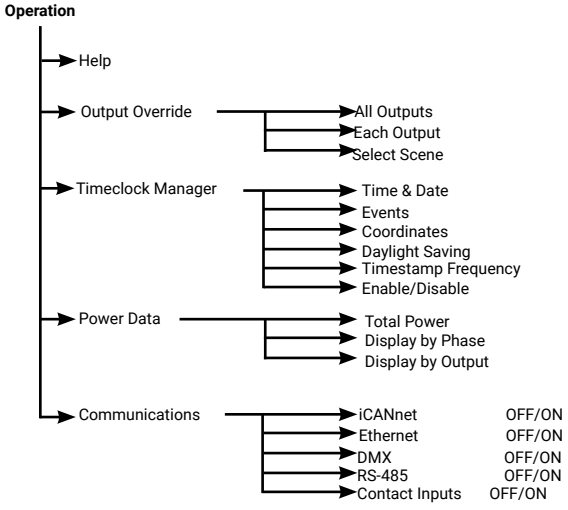
### The Configuration menu

Provides functions primarily used during initial commissioning and subsequent fine tuning of the installation by engineers.

To prevent unauthorized access, use the Password Manager to configure four-digit passwords for the Operation and Configuration menus.

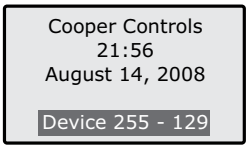
Operation Menu Layout



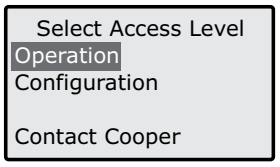

### *Accessing the Menus*

During normal operation, the control panel screen shows only the time, date and device number ⇨




### To Access the Menus

1. Press the (ENT) button to display the Select Access Level menu ⇨.
2. Use the (⇩) or (⇧) buttons to highlight the required menu (Operation or Configuration) and then press the (ENT) button to select.

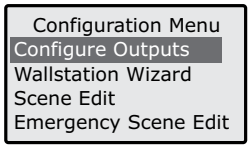


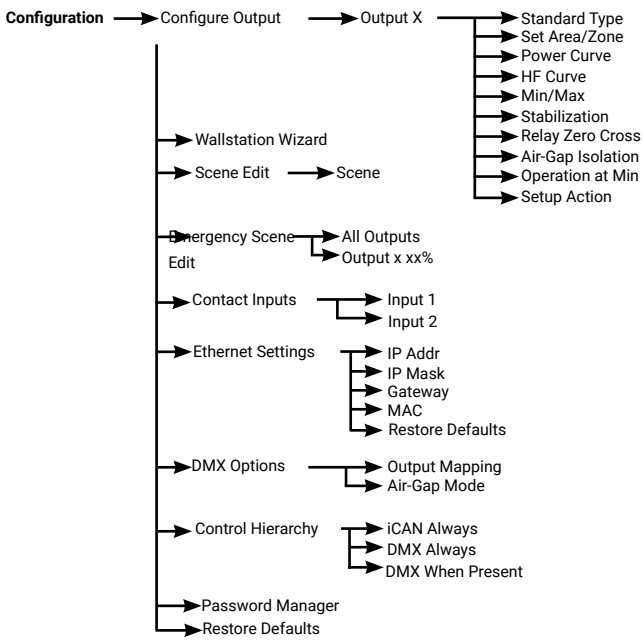

3. If requested, enter the four-digit password and press the (ENT) button.

**Note:** When the unit is supplied, there are initially no passwords - see the section 'Configuring passwords'.

4. If the password is accepted, the chosen menu will be displayed.

Configuration Menu Layout



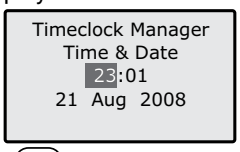
### *Setting the Time and Date*

The Timeclock manager option contains numerous features related to the time and date, including daylight saving time, global coordinates and the selection of changes to channel outputs at set times. For further information about the other Timeclock manager features, please refer to the accompanying System Manual.

#### To Set the Time and Date

1. From the Operation menu, highlight the 'Timeclock Manager' option and press the (ENT) button. The display will show the available options:


2. Highlight the 'Time & Date' option and press the (ENT) button. The display will show the current time and date:




3. Use the (⇩) or (⇧) buttons to move the highlight between the items: hour, minute, day, month or year.

   Use the (⇦) or (⇨) buttons to change the highlighted item, as required.

4. When all items have been updated, press the (ENT) button to save and exit.

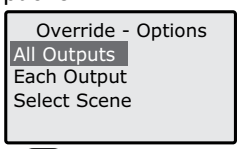
   To exit without saving your changes, press the (ESC) button.

### *Overriding Outputs*

On occasions it may be necessary to override the levels of one or more outputs. This option provides the ability to affect outputs individually or all of them collectively. You may also select any of the first 128 standard Scenes or even the Emergency Scene (Scene 132).

#### To Override Outputs

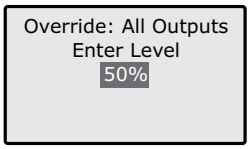
1. From the Operation menu, highlight the 'Output Override' option and press the (ENT) button. The display will show the available options:




2. Use the (⇩) or (⇧) buttons to highlight the required option and press the (ENT) button to select:

   **All Outputs** - Use (⇦) and (⇨), or the keypad (and (ENT)) to select the dimming level (0 to 100%).

   Press the (ESC) button to exit




   **Each Output** - Use (⇩) and (⇧) to highlight the required Output.

   Use (⇦) and (⇨), or the keypad (and (ENT)) to select the dimming level (0 to 100%).

   Press the (ESC) button to exit.

   To Flash the selected Output press the (*) button. Press the (*) button a second time to stop the channel from flashing.

   **Select Scene** - Use (⇦) and (⇨), or the keypad (and (ENT)) to select the required Scene. Press the (ESC) button to exit.

**Note:** If there are no settings within a selected Scene, the display will show 'Scene Empty'.

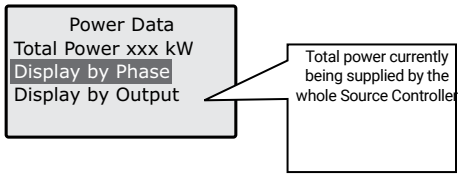
3. Press the (ESC) button to return to the Operation menu.

### *Viewing Power Data Readings*

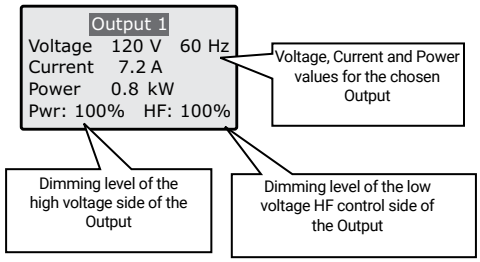
The Power Data section provides useful feedback and confirmation of the total power demanded within the Source Controller, listed as a total for the whole unit, as totals by phase or values for individual Outputs.

#### To View Power Data from the Menu

1. From the Operation menu, highlight the 'Power Data' option and press the (ENT) button. The display will show the available options:




2. Use the (⇩) or (⇧) buttons to highlight the 'Display by Output' option and press the (ENT) button to select:




3. Use (⇩) and (⇧) to view the required output number.

4. When finished, press the (ESC) button to exit to the previous level and then press the (ESC) button to return to the Operation menu.

**Note:** On SC-UN-FT controllers only, please refer to the Total Power information and display by output information only. Display by phase may not be accurate as feeding breakers are not housed within the controller.

## Warranties and Limitation of Liability

Please refer to **www.cooperlighting.com** for our terms and conditions.

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