



LIGHTING SYSTEMS



UNITY

POWER TO CONTROL

# UNITY MODULAR POWER SYSTEM RACK INSTALLATION MANUAL VERSION V 1.01

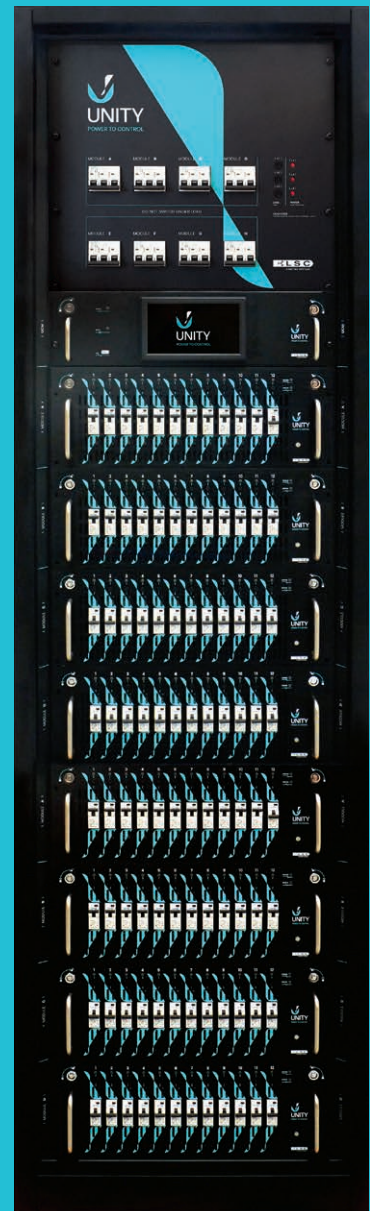
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> 48 CHANNELS



> 96 CHANNELS

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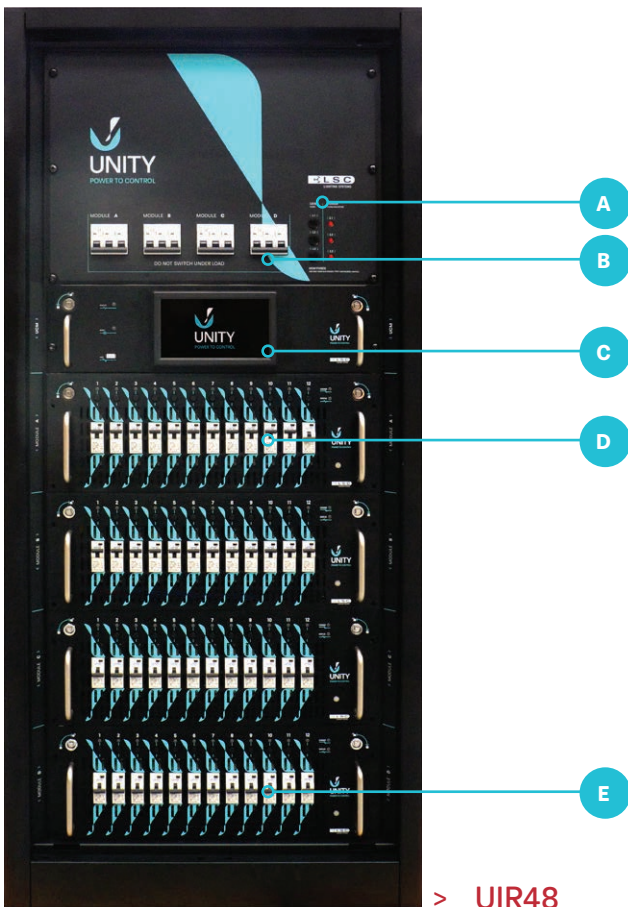
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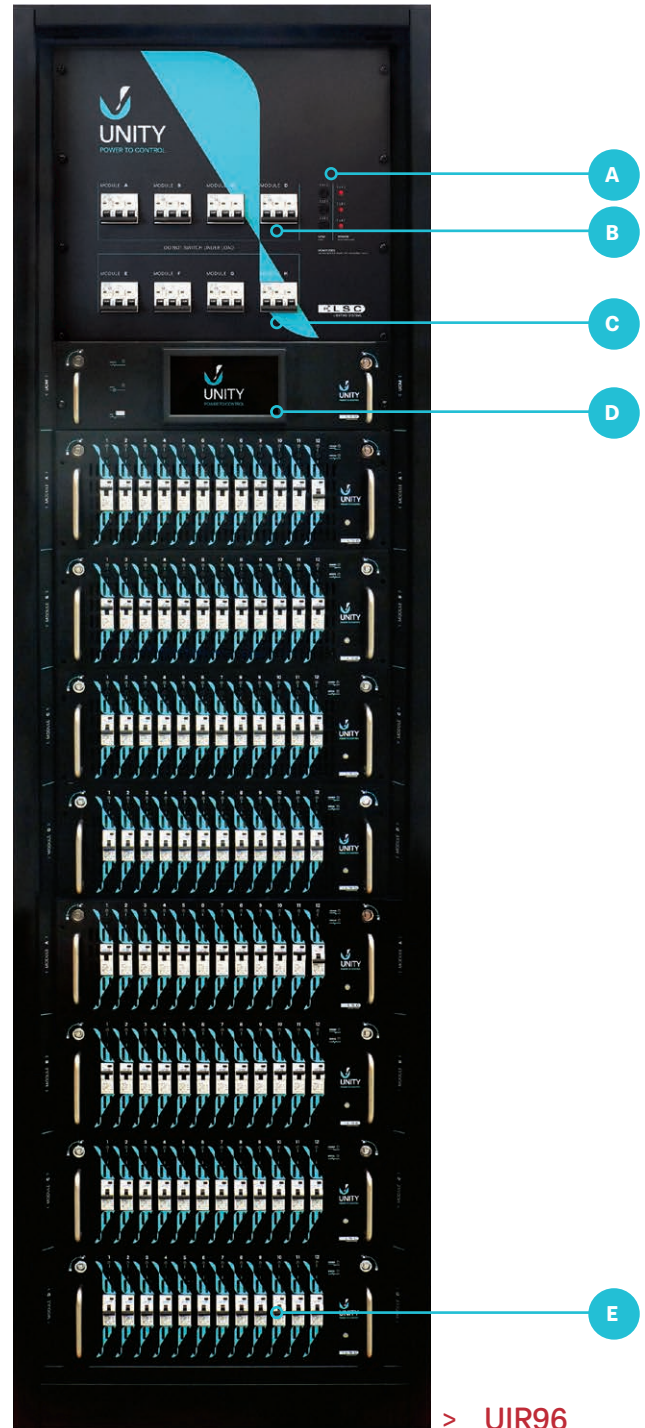
# 1 PRODUCT DESCRIPTION

## 1.1 ABOUT THIS MANUAL

This manual describes the installation of the Unity Modular Power System Rack including all power and control connections to the rack. The fitting of the control module and the output modules into the rack and the configuration/operation of the modules is described in the Unity Operation Manual.



> UIR48



> UIR96

- A INPUT POWER LED INDICATORS
- B 4 CIRCUIT BREAKERS FEEDING OUTPUT MODULES
- C CONTROL MODULE
- D OUTPUT MODULE 1
- E OUTPUT MODULE 4

- A INPUT POWER LED INDICATORS
- B 8 CIRCUIT BREAKERS FEEDING OUTPUT MODULES
- C CONTROL MODULE
- D OUTPUT MODULE 1
- E OUTPUT MODULE 8



## 1.2 UNITY OVERVIEW

Unity is a modular dimming and power switching system for permanent installations. It consists of a floor mounted installation rack that contains all external connection terminals and internal power distribution. The rack is fitted with one control module, plus your choice of:

- > LED or conventional dimming/power switching module.
- > Conventional dimming/power switching module.
- > Power switching module

Each output module controls 12 output channels.

There are two rack sizes available:

- > The UIR48 (Unity Installation Rack) accommodates 4 output modules giving a total of 48 output channels.
- > The UIR96 accommodates 8 output modules giving a total of 96 output channels.

Unity systems can be fitted with any combination of output modules. Any of the 3 types of output module can be fitted in any output module location.

## 1.3 UNITY RACK

The Unity rack contains all input power connections, output load connections and control connections. It has slots for the control and output modules that are shipped separately to the rack and are fitted after all connections have been made to the rack and all building works have been completed.

## 1.4 INSPECTION

Every Unity system is fully checked in the factory before it is shipped.

When you receive your Unity rack, check it thoroughly for any signs of damage that may have occurred during shipping. If you find any damage please document and photograph the damage then contact your LSC agent or LSC.

## 1.5 CONTACTING LSC

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## 1.6 SAFETY

All electrical work must be carried out by suitably qualified persons.

Each Unity rack must have its input power supplied by a main circuit breaker or other readily accessible input power disconnect device.

## 2 INSTALLATION

### 2.1 OVERVIEW

This manual covers the installation of the Unity rack including the connection of the load circuits, control circuits and the input power to the rack.



> **ALL CABLE ACCESS IS FROM ABOVE**

- A OUTPUT CABLES IN DUCTS OR TRAY
- B INPUT POWER CABLES
- C CONTROL CABLES

### 2.2 INSTALLATION SUMMARY

The recommended steps to installing a Unity rack are summarised here to give you an overall view of the task ahead. Detailed descriptions of the installation procedures are described in the next sections. The order of installation takes into account the space available to work in and is based on front access to the cabinet only. The tasks will be easier should access from multiple sides be available.

1. The rack frame is mounted onto a plinth or to a level floor. See section 2.4
2. The cable shutters and centre cable access plate on the top of the rack are removed for access.
3. The control circuit cables are fed into the rack via a cable gland (not supplied) and are connected to the rack.
4. The Earth input cable is connected via a cable gland (not supplied) and connected to the Earth lug. See Section 2.8.
5. The hinged load terminals are moved to one side to allow clear access then the load cables are fed into the rear of the rack.
6. The hinged load terminals are moved back into position and the load cables are terminated.
7. The load cables are tested.
8. The input power cable cables are fed into the rack via cable glands (not supplied) and are connected to the bus bars.
9. The input voltages are checked.
10. The centre cable access plate cable and the cables shutters are replaced to ensure correct ventilation.

### 2.3 RACK FRAME LOCATION

The rack should be located in a clean, dust free and temperature controlled room. LSC recommends that the room should have restricted public access to prevent tampering.

### 2.3.1 COOLING

Ventilation of the rack is provided by fans in each output module that draw in cool room air from the front and expel it into the rear cavity of the rack. The air is then exhausted from the top of the rack by 4 fans located in the top cover.

The air conditioning plant for the room should be of sufficient capacity to maintain the room at approximately 25 degrees Celsius.

The heat generated by a Unity rack will vary depending upon several factors.

- > The quantity of output channels.
- > The load on each channel.
- > The quantity and type of Modules fitted into the rack

The maximum worst-case BTU (British Thermal Unit) output of a Unity rack fitted with all ULM12/16 modules with all channels operating at full rated load is:

- > UIR48 Rack = 7,700 BTU (max)
- > UIR96 Rack = 15,400 BTU (max).

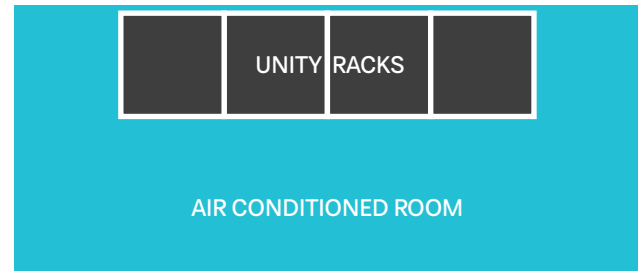
### 2.3.2 RACK CLEARANCE AND CABLE ACCESS

The rack can be positioned against a wall and racks can be mounted adjacent to each other.

- > No rear or side access is required.
- > All connections to the rack are accessed from the front.
- > All cable entry to the rack is from above.

A minimum clearance of **300mm above the rack** is required for cable entry and ventilation. However, a larger clearance should be allowed if possible for ease of installation access.

A minimum clearance of **600mm** is required at the front of the rack to allow electronics modules to be inserted or removed.



### > TYPICAL FOUR RACK INSTALLATION

## 2.4 MOUNTING THE RACK FRAME

Remove the Unity rack from its shipping pallet. The rack is heavy and must be securely mounted to onto a solid plinth or to the floor.

### 2.4.1 PLINTH MOUNTING

If the rack is to be mounted on a plinth, it is important that the top of the plinth is flat and level so that the rack is not distorted when it is secured to the plinth.

### 2.4.2 FLOOR MOUNTING

If the rack is to be bolted directly to the floor, it is important that the floor is flat and level so that the rack is not distorted when it is secured to the floor. Position the rack then use a spirit level to check that the rack is plumb. Use suitable shims under the corners to ensure that the rack evenly supported in all corners.

### 2.4.3 MOUNTING HOLES

Mounting holes are provided in the four corners at the bottom of the rack to secure the rack to the floor or plinth.



### > RACK MOUNTING HOLES

## 2.5 CABLE ACCESS

The top of the rack is fitted with a “cable management system” of shutters and clamps to maintain a tight seal around the cables. This allows the 4 exhaust fans on the top of the rack to operate efficiently.

The load terminals at the rear of the rack are hinged allowing them to be moved to one side to allow clear access for the load cables to be run down the rear of the rack.

Connect the cables to the rack in the following order:

1. Output load cables.
2. Control cables.
3. Input power cables.

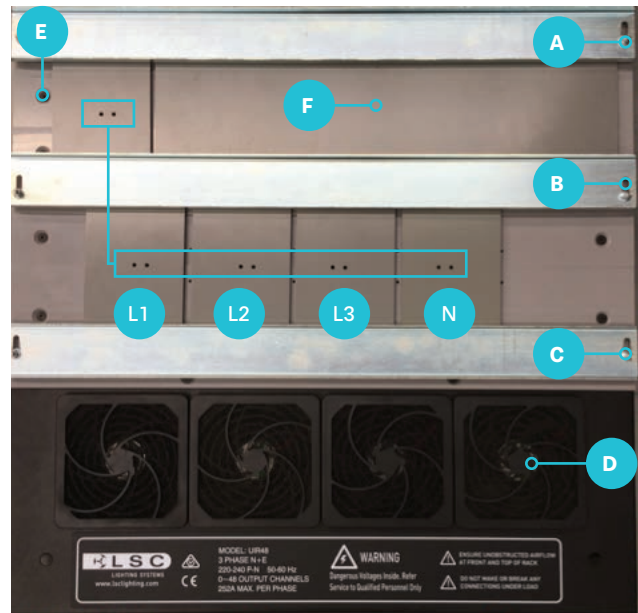
Following this order will give you maximum working space when running the cables.



### > ALL CABLE ENTRY IS FROM ABOVE

- A OUTPUT CABLES IN DUCTS OR TRAY
- B ENTRY GLANDS FOR INPUT POWER
- C ENTRY GLAND FOR CONTROL CABLES
- D CABLE MANAGEMENT SYSTEM

## 2.5.1 CABLE MANAGEMENT SYSTEM



### > TOP VIEW SHOWING CABLE MANAGEMENT SYSTEM

- A REAR SHUTTER CLAMP
- B CENTRE SHUTTER CLAMP
- C FRONT SHUTTER CLAMP
- D 4 EXHAUST FANS
- E EARTH
- F LARGE SHUTTER CAN BE CUT FOR OUTPUT POWER CABLE ACCESS AND CONTROL CABLES GLAND
- G 5 SMALL SHUTTERS FOR FITTING CABLE GLANDS FOR L1, L2, L3, N AND EARTH.

The rear, centre and front “shutter clamps” hold the cable shutters in place. The cable shutters allow the cables to enter the rack with minimum air gaps so that the exhaust fans can operate efficiently. The large cable shutter is for the output load cables and the control cables. You can cut the large cable shutter into two parts and use one part to fit a gland (not supplied) for the entry of the control cables. The remainder of the large shutter is used for the output load cables. It can be cut and adapted to attach cable ducts to the rack or it can be shaped to fit around the load cables entering from a cable tray.



### 2.5.1 CABLE MANAGEMENT SYSTEM (CONTINUED)

The 5 small cable shutters (Line 1, Line 2, Line 3, Neutral and Earth) have pre-drilled pilot holes, ready for you to drill holes and fit cable glands (not supplied) to suit your power input cable diameters. Typically, the centre pilot hole would be used for the cable gland so that the cable enters directly above the lug when it is bolted to the bus bar.

In a small installation (for example, 48 channels of 6 amp LED dimming) you might use smaller input power cables. In this case, use the offset pilot hole so that the smaller cable still enters directly above the lug when it is bolted to the bus bar. This allows the shutters to remain in their correct positions above the bus bars without any air gaps between the shutters.

**Note:** Do not drill and fit the cable glands at this stage. The power input cables are fitted after all the output load cables have been connected. This will give you the maximum amount of working room when running the output load cables.

### 2.5.2 OPENING THE CABLE MANAGEMENT SYSTEM

Completely remove the centre shutter clamp. Safely store the nylock nuts, washers and spacer nuts.

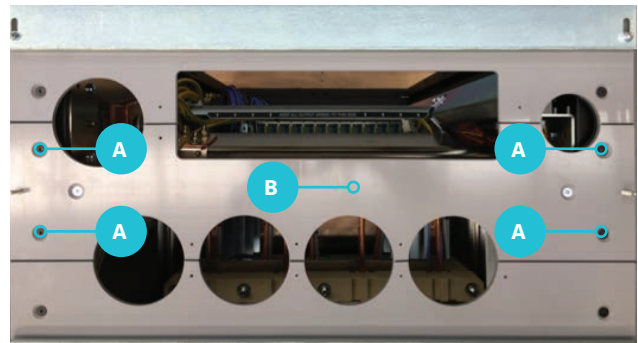


#### > REMOVE THE CENTRE SHUTTER CLAMP

- A REAR SHUTTER CLAMP
- B CENTRE SHUTTER CLAMP
- C FRONT SHUTTER CLAMP

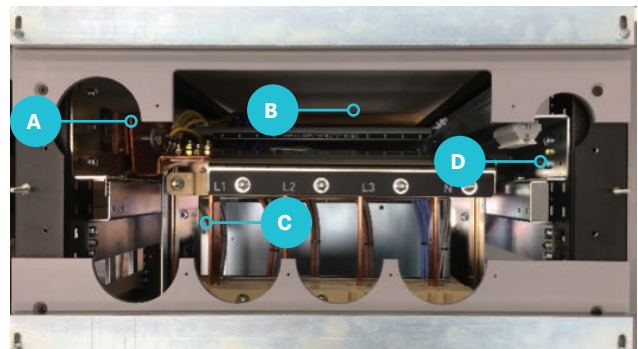
Slightly loosen the nyloc nuts on the front and rear “shutter clamps” then slide out all 6 cable shutters and place them aside.

Remove the centre cable access plate by undoing the 4 screws (10mm Hex Key) indicated below. The front and rear cable access plates may also be removed for better access.



#### > REMOVE 4 SCREWS AND CENTRE CABLE ACCESS PLATE

- A REMOVE
- B CENTRE CABLE ACCESS PLATE



#### > CENTRE PLATE REMOVED FOR CABLE ACCESS

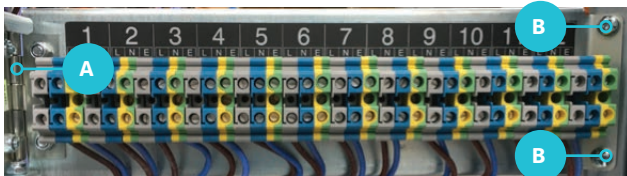
- A EARTH CONNECTION
- B ACCESS FOR OUTPUT LOAD CABLES
- C L1, L2, L3 & N CONNECTIONS TO BUS BARS
- D CONTROL CONNECTIONS

## 2.6 OUTPUT LOAD CONNECTIONS

**NOTE:** Each load circuit requires its own separate neutral. Shared or common neutrals are not permitted.

### 2.6.1 MOVING THE LOAD TERMINALS

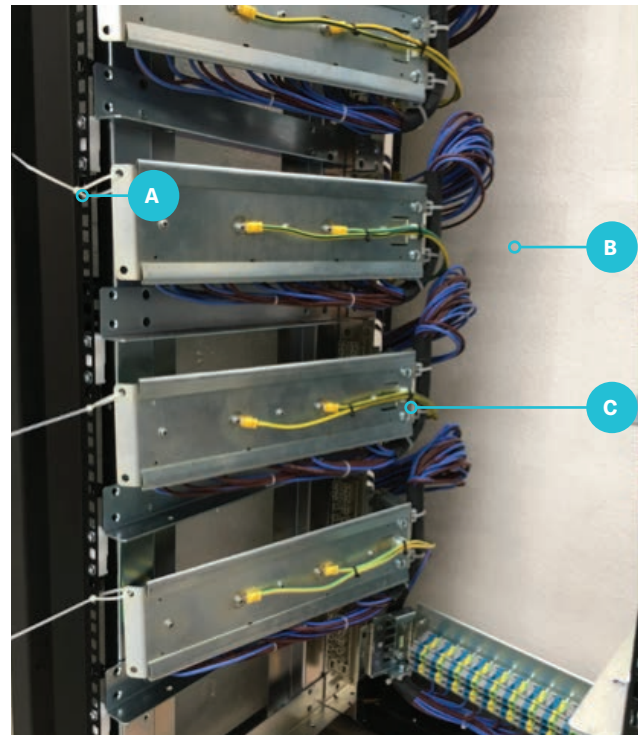
The load terminals for each module at the rear of the rack are hinged and can be moved to one side to allow clear access for the load cables to be fed into the rear of the rack from above.



#### > HINGED LOAD TERMINALS

- A** HINGE
- B** REMOVE SCREW

Remove the 2 screws (captive nuts) indicated above then push the load terminals to the left and hinge them forwards and towards the left side. The load terminals can be held to the side with a temporary cable tie. There is usually no need to move the bottom load terminals.



#### > LOAD TERMINAL HELD TO ONE SIDE WITH TEMPORARY CABLE TIES

- A** TEMPORARY CABLE TIE
- B** CABLE ACCESS
- C** LOAD TERMINALS HINGED TO ONE SIDE TO ALLOW LOAD CABLE ACCESS

### 2.6.2 OUTPUT LOAD TYPES

Three different types of 12 channel output modules are available for the Unity rack.

- > LED/conventional dimming and power switching module.
- > Conventional dimming and power switching module.
- > Power switching module.

The type of output modules that are fitted to your Unity rack are usually determined at the design stage of your installation when you specify the types of loads that you want to control.

Loads of the same type are usually arranged in groups 12 and connected to a 12-channel output module designed for that type of load.

See section 4 for more information on arrangement of different types of loads.

### 2.6.3 LOAD CABLE NUMBERING

Output modules in each rack number from top to bottom. The load terminal wiring is labelled as 1 to 12 for each circuit of the relevant module (see picture on previous page). Note that in a typical installation the circuit layout for the rack would be as shown here.

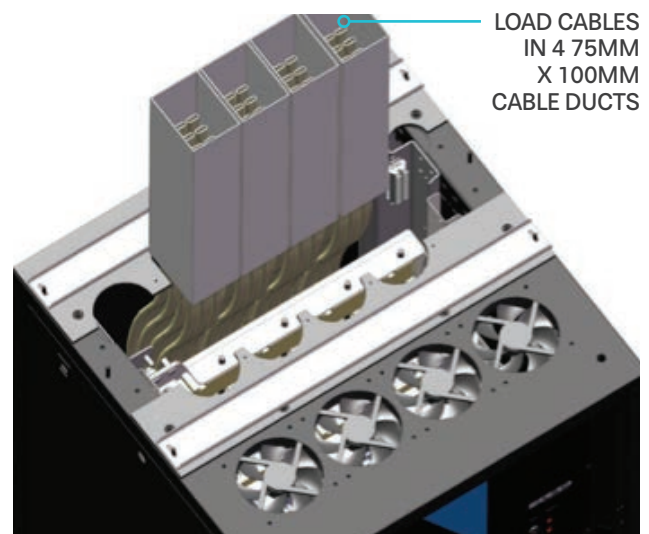
UIR48 RACK	OUTPUT NUMBERS
Module 1 (Top)	1 - 12
Module 2	13 - 24
Module 3	25 - 36
Module 4 (Bottom)	37 - 48

UIR96 RACK	OUTPUT NUMBERS
Module 1 (Top)	1 - 12
Module 2	13 - 24
Module 3	25 - 36
Module 4	37 - 48
Module 5	49 - 60
Module 6	61 - 72
Module 7	73 - 84
Module 8 (Bottom)	85 - 96

### 2.6.4 LOAD CABLE ORDER

All load cable access is from the top of the rack. The cables can be contained within ducts or attached to a vertical cable tray.

Arrange the cables in the ducts or on a cable tray as shown below with the low numbers towards the front and numbering from left to right. Following this order minimizes cable crossovers in the confined space inside the rack.



#### > LOAD CABLES IN DUCTS

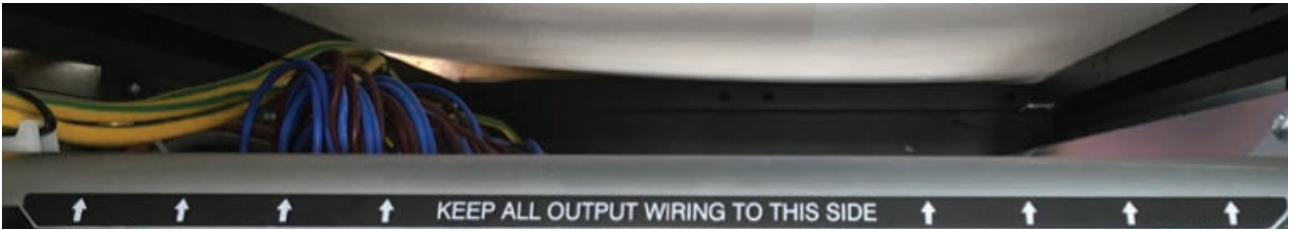
37	38	39	40	41	42	43	44	45	46	47	48
25	26	27	28	29	30	31	32	33	34	35	36
13	14	15	16	17	18	19	20	21	22	23	24
1	2	3	4	5	6	7	8	9	10	11	12

#### > 48 OUTPUT LOAD CABLES VIEWED FROM ABOVE

85	86	87	88	89	90	91	92	93	94	95	96
73	74	75	76	77	78	79	80	81	82	83	84
61	62	63	64	65	66	67	68	69	70	71	72
49	50	51	52	53	54	55	56	57	58	59	60
37	38	39	40	41	42	43	44	45	46	47	48
25	26	27	28	29	30	31	32	33	34	35	36
13	14	15	16	17	18	19	20	21	22	23	24
1	2	3	4	5	6	7	8	9	10	11	12

#### > 96 OUTPUT LOAD CABLES VIEWED FROM ABOVE

Run the load cables into the rack ensuring that they are behind the curved cable guide as shown below.



> ENSURE ALL OUTPUT LOAD CABLES ARE RUN BEHIND THE CABLE GUIDE

### 2.6.5 CONNECTING LOAD CABLES

Select the 12 load cables for module A and whilst holding them up, move their load terminal block back into position. Secure the terminal block bracket with its 2 screws then terminate the load cables to the top connectors of the terminal blocks.

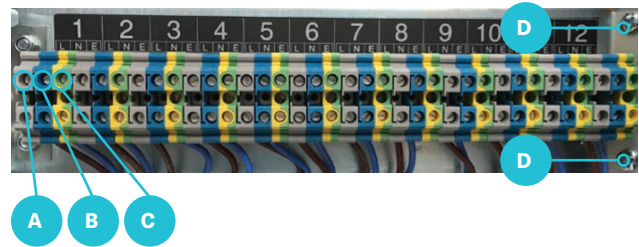
When securing the bracket ensure that the signal loom, located near the area where the securing screws attach, is not inadvertently snagged or trapped in this process.

The numbers above the load terminals represent the numbers for that particular output module. The actual output channel number will depend upon the output module position, A, B, C, etcetera. See section 2.6.3. The module position letters are shown on the front edge of the rack adjacent to each module.

- > Maximum cable sizes for Output Load Terminals:
  - > Solid cable: 10 sq. mm.
  - > Flexible cable with ferrel: 6 sq. mm.
- > Cable strip length: 10mm.

When the module A loads have been connected, move the module B terminal block back into position with its cables above it then secure it with the screws. Terminate the loads for this module.

Repeat the above procedure working towards the bottom until all loads are connected.



> OUTPUT LOAD TERMINALS

- A LOAD 1 ACTIVE
- B LOAD 2 NEUTRAL
- C LOAD 3 EARTH
- D SECURING SCREW

### 2.6.6 TESTING THE LOAD CIRCUITS

Each load circuit must be tested before input power is connected to the Unity rack.

**Note: If a load device has already been connected to the other end of the circuit then it must be disconnected before this test is performed.**

With the load cables connected to the Unity rack and no load connected at the end of the load cable, use an Insulation Tester to perform the following resistance checks on each load circuit at the Unity rack load terminals.

TEST	RESISTANCE
PHASE TO NEUTRAL	As per local electrical regulations or 500K ohm, whichever is higher.
PHASE TO EARTH	
NEUTRAL TO EARTH	

> LOAD CIRCUIT TESTS



## 2.7 CONNECTING THE CONTROL CIRCUITS

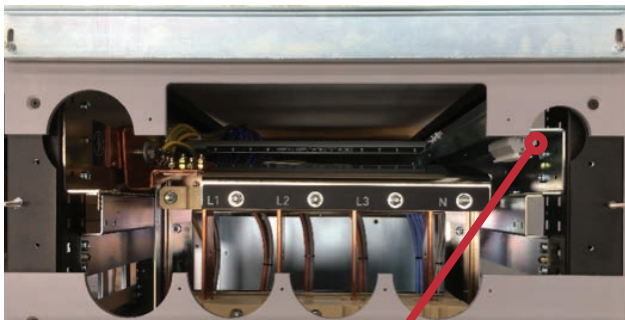
Connections are provided for Unity to be controlled by:

- > DMX512
- > Fire Alarm
- > GPIO
- > Ethernet (ArtNet and sACN).

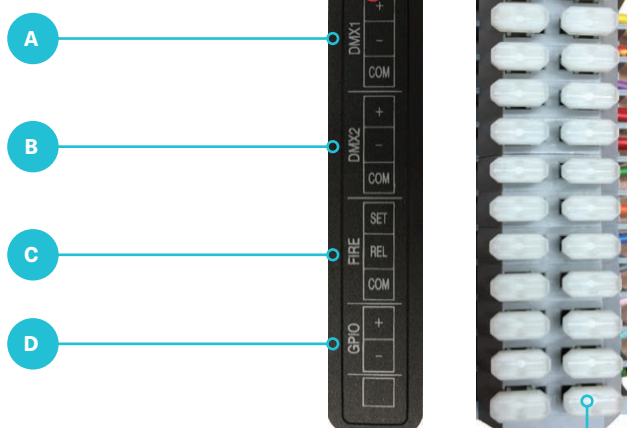
All control circuits enter the top of the rack through a common cable gland (up to M32, not supplied). The gland is fitted to the large cable shutter or to a section cut from the large cable shutter.

Ethernet is connected via an RJ45 connector located on the rear of the UCM (Unity Control Module). See section 2.7.4

DMX512, Fire Alarm and GPIO are all connected via the external control connector located in the rear top right of the rack.



### > TOP VIEW



### > CONTROL CONNECTOR

- A DMX1
- B DMX2
- C FIRE
- D GPIO

PRESS FLAT BLADE SCREWDRIVER INTO THE SLOT THEN INSERT CABLE INTO SIDE OPENING

- > The control connector accommodates cables up to 2.5 sq.mm.
- > Strip the wire 8-9mm. Fitting a bootlace ferrule to each wire is recommended.

To make a connection, press a flat blade screwdriver into the slot then insert the cable and release the screwdriver.

### 2.7.1 DMX512 CONTROL

There are two DMX inputs. Each Unity output channel can be individually assigned to be controlled by either DMX1 or DMX2.

Only use specific DMX cable. LSC recommends using Beldon 9842 (or equivalent) or shielded CAT 5 or CAT 6 cable.

Each DMX input has an internal terminating resistor fitted to it. When DMX is to be connected to multiple Unity racks, each rack should be fed from a separate output of a DMX splitter. Do not loop the DMX from one rack to another. DMX splitters also provide isolation so that a fault in one DMX circuit does not affect any other DMX circuit. DMX splitters are available from LSC.

## 2.7.2 FIRE INPUT

The “Fire” input provides emergency evacuation lighting that can be easily recalled by either a simple “Fire” or “Evacuate” button or it can be connected to a BMS (Building Management System) so that it is automatically operated when a fire alarm is activated.

Activating “Fire” recalls a “Fire Memory” in the Unity system. This memory will typically contain channel levels that will provide suitable lighting for evacuation purposes. See the Unity Operation Manual for details on how to program a fire memory.

The “Fire” function uses two connections, one to activate and one to release. Both connections share the common connection.



- > A momentary contact closure between SET and COM will activate the Fire memory.
- > A momentary contact closure between REL and COM will release the Fire memory.
- > The wetting current will vary depending on the number of modules it is connected to but is typically > 10mA per module. Gold-plated contact closures are recommended for reliability.

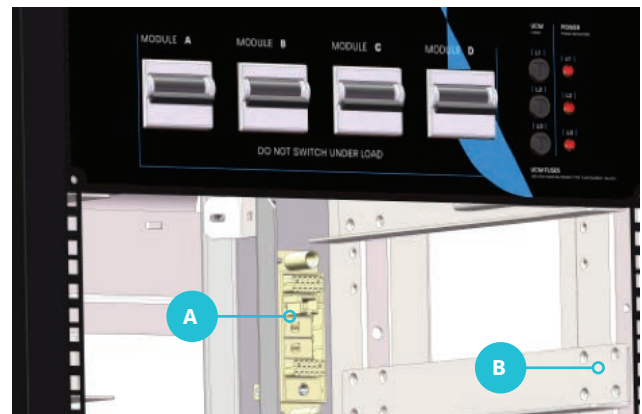
## 2.7.3 GPIO

A GPIO (General Purpose Input/Output) allows a contact closure to be used to activate a function in Unity or Unity to activate an external function. (Future feature).

## 2.7.4 NETWORK CONTROL

Ethernet provides the transport mechanism for ArtNet and sACN and is connected via a single RJ45 network connection socket located on the rear of the UCM (Unity Control Module) connector. A standard RJ45 network cable termination is required the incoming Cat-5e cable.

Access to the rear of the connector is obtained when the UCM (Unity Control Module) is removed by reaching around behind the signal connector located on the right-hand side of the rack.



### > UNITY WITHOUT UCM MODULE

- A RJ45 PLUGS INTO REAR OF THIS CONNECTOR
- B UCM MODULE SLOT

Insert the network RJ45 cable into the RJ45 socket in the rear of the UCM mating socket ensuring it clicks and locks into place.

## 2.8 CONNECTING THE INPUT POWER

The nominal input voltage is 220-240 Volts. 3-phase Star (380-415V). 50-60Hz.

A Unity Rack input supply and phase cabling must be sized according to the total of the connected downstream loads.

The Neutral cable must be rated at a minimum of 1.5 times of a phase cable.

A fully loaded **UIR48** (4 x 12ch x 16A modules) will draw 256A per phase.

A fully loaded **UIR96** (8 x 12ch x 16A modules) will draw 512A per phase.

A main input circuit breaker or other input power disconnect device should be located close to the rack. If the main breaker/

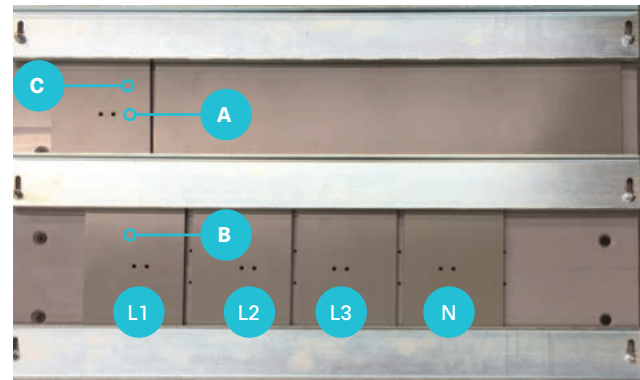
## 2.8 CONNECTING THE INPUT POWER (CONTINUED)

disconnect device is not in the same room then it must have a physical means to be locked off to allow safe access to the rack.

**Note: The main input breaker/disconnect device should not disconnect the neutral. However, if the device does switch the neutral, it must disconnect the neutral last and connect the neutral first.**

The 5 input power cables (L1, L2, L3, N, Earth) enter the top of the rack through individual cable glands (not supplied). The glands are fitted to their individual shutters allowing each cable to be individually positioned. Two pilot holes for the glands are provided on each input shutter to suit different cable diameters to position the cable so that it enters directly above the lug when it is clamped flush on the bus bar. Drill the shutters and fit the glands to suit your cable sizes.

Pass each cable through its gland then then crimp a lug (not supplied) onto each cable. The bus bars accept a lug with a 12mm hole.

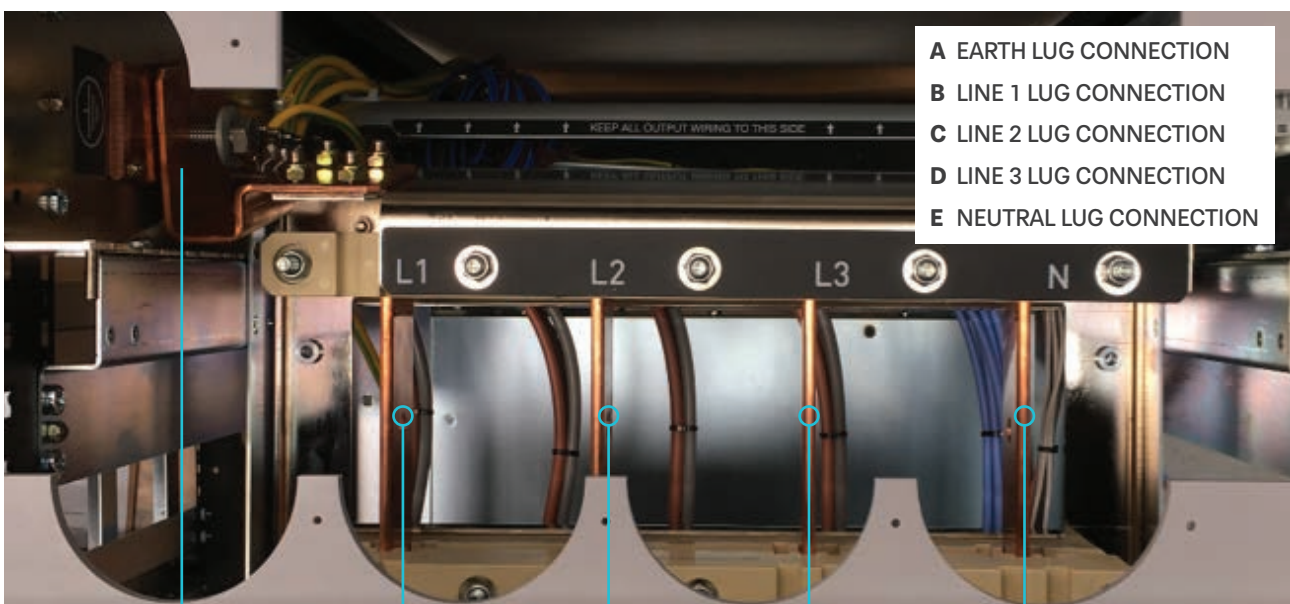


### > CABLE GLAND SHUTTERS

- A PILOT HOLES FOR DRILLING GLAND HOLES
- B 5 SHUTTERS FOR INPUT POWER CABLE GLANDS
- C EARTH



### > TYPICAL CABLE GLAND FITTED TO A SHUTTER



- A EARTH LUG CONNECTION
- B LINE 1 LUG CONNECTION
- C LINE 2 LUG CONNECTION
- D LINE 3 LUG CONNECTION
- E NEUTRAL LUG CONNECTION

### > TOP VIEW



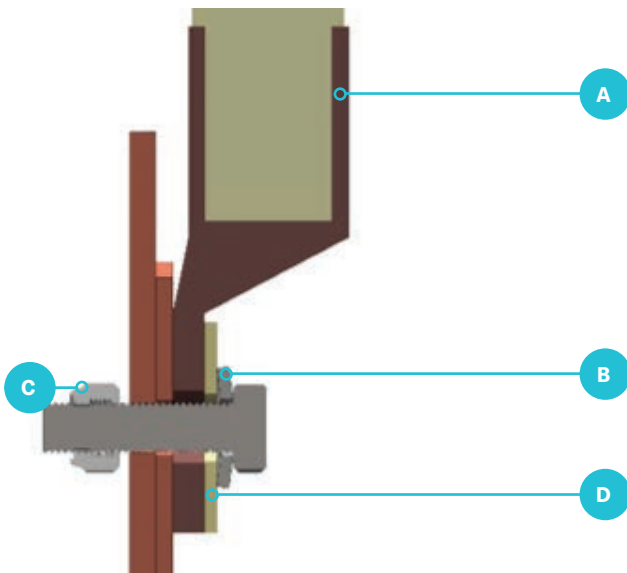
## 2.8 CONNECTING THE INPUT POWER (CONTINUED)

The three phase input connections are labelled L1 (phase No. 1), L2 (phase No. 2,) and L3 (phase No. 3). The Neutral busbar is labelled N and the earth bus bar has the earth symbol.

All input connections (lugs and bus bars) need to be cleaned prior to connection to remove surface oxidation. LSC recommends using a fine steel wool but great care must be taken to prevent any material falling into the rack. After cleaning apply a thin layer of conductive grease to the mating surfaces prior to assembly.

All input connection bolts must be tightened using a torque wrench. The recommended torque is 75Nm ±5Nm.

The earth cable should be fitted first as clear access is required for a torque wrench. The Earth busbar is fitted with a M12 bolt and a load spreading conical washer. There is a captive nyloc nut located inside the rack. If the lug size is larger than the conical washer then a load spreading flat washer equal in size to the lug should be inserted between the conical washer and the lug.



### > EARTH LUG CONNECTION

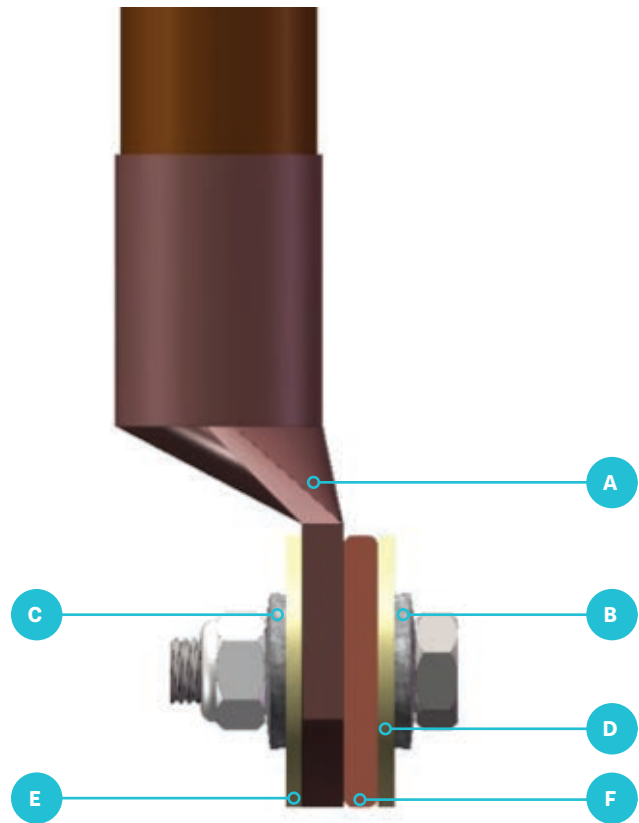
- A CABLE LUG
- B CONICAL WASHER
- C CAPTIVE NYLOC NUT
- D OPTIONAL LOAD SPREADING WASHER TO MATCH LUG SIZE

Fit the L1 cable next, then the L2, L3 and N cables. Fitting the cables in this order allows maximum space for tool access.

The Phase and Neutral busbars have a M12 hole fitted a M12 x 45mm full thread 316 SS hex head bolt, 2 load spreading conical washers and a M12 316 SS Nyloc nut.

If the lug size is larger than the conical washer then load spreading flat washers equal in size to the lug should be inserted under the conical washers.

M12 bolts and nuts and conical washers are provided in the kit of parts supplied with the Unity Rack, however load spreading washer if required must be obtained separately.



### > PHASE AND NEUTRAL LUG CONNECTION

- A CABLE LUG
- B CONICAL WASHER
- C CONICAL WASHER
- D OPTIONAL LOAD SPREADING WASHER TO MATCH LUG SIZE
- E OPTIONAL LOAD SPREADING WASHER TO MATCH LUG SIZE
- F BUS BAR



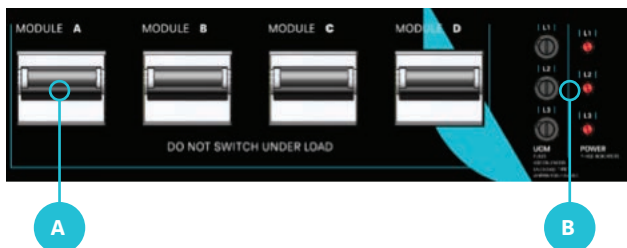
## 2.9 FINISHING THE RACK INSTALLATION

Perform the following tasks before you close the cable management system (on the top of the rack) and switch on the power.

- > Use a vacuum cleaner to remove any installation debris from the rack.
- > Blow out any remaining debris using compressed air.
- > Check all connections are tight.
- > Check for any damage to any of the cables, particularly in the load wiring area.
- > Ensure that you have performed the load circuit tests described in section 2.6.6

Switch off all the module input power circuit breakers located on the front panel.

Switch on the 3-phase supply to the rack and observe that the three input power LED indicators (on the distro panel) show the 3 phase power is available.



### > DISTRO PANEL

- A** MODULE INPUT POWER CIRCUIT BREAKERS
- B** INPUT POWER LED INDICATORS

Before installing any modules into the rack use a voltmeter to check that all the phase to neutral input voltages on the bus bars are correct and that the neutral to earth voltage is within the acceptable limits of the local electrical standards.

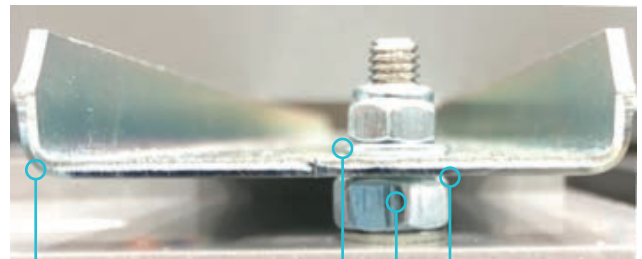
Power off and replace the “centre cable access plate” and secure it with its 4 screws.



### > CENTRE CABLE ACCESS PLATE

Position the cables shutters for no air gaps to ensure correct ventilation.

Replace the centre “shutter clamp” ensuring that the washers and spacer nuts are in position.



- A** SHUTTER CLAMP
- B** WASHER
- C** SPACER NUT
- D** WASHER

Tighten the Nyloc nuts on all three shutter clamps.

### 3 INSTALLATION CHECK LIST

Check each item and confirm by ticking the box.

- Rack is securely mounted.
- All installation debris removed from the rack.
- All output terminals are tight.
- All load circuits tested. See 2.6.6
- All input lug connections cleaned.
- Dielectric grease applied to all lug connections.
- All lug bolts torqued to spec. See 2.8
- Input phase voltages checked.
- Cable Management System secured. See 2.9
- Room air conditioning is operational.

### 4 TYPES OF LOAD

#### 4.1 OVERVIEW

Three different types of 12 channel output modules are available for the Unity rack.

1. ULM - LED or conventional dimming/power switching module.
2. UDM - Conventional dimming/power switching module.
3. USM - Power switching module.

The type of output modules that are fitted to your Unity rack are usually determined at the design stage of your installation when you specify the types of loads that you want to control.

Therefore, loads of the same type are usually arranged in groups 12 and connected to a 12-channel output module designed for that type of load.

#### 4.1.1 ULM - LED DIMMING MODULE

The ULM (Unity Led Module) provides 12 output channels. Each channel can be individually configured for either:

- > Dimming of leading edge phase controlled dimmable mains powered LEDs.
- > Dimming of traditional incandescent lamps.
- > Remotely controlled power switching.

6 amps or 10 amps per channel modules are available.

#### 4.1.2 UDM - DIMMER OUTPUT MODULES

The UDM (Unity Dimmer Module) provides 12 output channels. Each channel can be individually configured for either:

- > Dimming of traditional incandescent lamps.
- > Remotely controlled power switching.

10 amps or 16 amps per channel modules are available.

### 4.1.3 USM - SWITCHING RELAY MODULE

The USM (Unity Switching Module) provides 12 output channels. Each channel can be used for:

- > Remotely controlled power switching.

10 amps or 16 amps per channel modules are available.

**Note: All remotely controlled power switching occurs when the mains voltage is at zero volts (zero crossing point) to minimise inrush currents thus preventing nuisance tripping of breakers.**

### 4.2 PLANNING YOUR LOAD TYPES

There are two Unity rack sizes available:

- > The UIR48 (Unity Installation Rack) accommodates 4 output modules. Each output module has 12 channels giving a total of 48 output channels.
- > The UIR96 accommodates 8 output modules. Each output module has 12 channels giving a total of 96 output channels.

Any type of output module can be fitted to any output module position. Therefore, loads of the same type are usually arranged in groups 12 and connected to a 12-channel output module designed for that type of load.

If the Unity rack is going to be fitted with only one type of output module to control one type of load, then loads can be connected to any of the outputs of the rack.

However, if different types of output modules (to control more than one type of load) are to be fitted to a Unity rack then you need to plan your load connections so that each type of module has 12 of the appropriate type of loads connected to it.

### EXAMPLE 1:

A UIR48 (4 module rack) is going to be used to control 36 LED's and 12 switched power circuits. The top 3 positions in the rack are fitted with ULM LED dimming modules and the bottom position is fitted with a USM switching module. Therefore, the switched circuits must be connected to the bottom module connectors and the LED circuits to the other three module connectors.

OUTPUT MODULES	LOADS
ULM (Unity LED Module)	12 x LED circuits
ULM (Unity LED Module)	12 x LED circuits
ULM (Unity LED Module)	12 x LED circuits
USM (Unity Switch Module)	12 x switched circuits

### 48 CHANNEL RACK

### EXAMPLE 2:

A UIR96 (8 module rack) is going to be used to control 36 LED's, 24 conventional lamps and 36 switched outputs. The top 3 positions in the rack are fitted with ULM LED dimming modules, the next 2 positions are fitted with UDM 16 amp incandescent dimming modules and the bottom 3 positions have USM switching modules. Therefore, the loads requiring switched power must be connected to the 3 bottom module connectors, the incandescent dimmer circuits must be connected to the next 2 module output connectors and the LED circuits to the top three module output connectors.

OUTPUT MODULES	LOADS
ULM (Unity LED Module)	12 x LED circuits
ULM (Unity LED Module)	12 x LED circuits
ULM (Unity LED Module)	12 x LED circuits
UDM (Unity Dim Module)	12 x 16amp dim circuits
UDM (Unity Dim Module)	12 x 16amp dim circuits
USM (Unity Switch Module)	12 x Switched circuits
USM (Unity Switch Module)	12 x Switched circuits
USM (Unity Switch Module)	12 x Switched circuits
USM (Unity Switch Module)	12 x Switched circuits

### 96 CHANNEL RACK

Remember that any channel of a ULM (LED dimming module) can also be configured to dim a conventional incandescent load, however its load limit is either 6 or 10 amps depending upon the model.

However, a UDM (conventional dimmer module) has a load limit of either 10 or 16 amps depending upon the model.

All three types of output module may be configured for remote power switching.



#### 4.2.1 MULTIPLE RACK NUMBERING

If more than one rack is being installed then the load numbering should be arranged to start with the left rack and work to the right. For example, an installation of 3 UIR 96 racks would have the following output load numbering:

With the intelligent Unity Control Module, any output circuit can be patched to any incoming DMX slot but using a layout as above will make any fault finding simpler and logical.

UIR96	RACK 1 O/P'S	RACK 2 O/P'S	RACK 3 O/P'S
Module 1 (Top)	1-12	97-108	193-204
Module 2	13-24	110-120	205-216
Module 3	25-36	121-132	217-228
Module 4	37-48	133-144	229-240
Module 5	49-60	145-156	241-252
Module 6	61-72	157-168	253-264
Module 7	73-84	169-180	265-276
Module 8 (Bottom)	85-96	181-192	277-288

## 5 COMPLIANCE STATEMENTS

### 5.1 RCM COMPLIANCE

The Unity Installation Racks from LSC Lighting Systems (Aust) Pty. Ltd. comply with the Australian Regulatory Compliance Mark (RCM).

### 5.2 CE COMPLIANCE STATEMENT

The Unity Installation Racks from LSC Lighting Systems (Aust) Pty. Ltd. have been designed and tested to the European Committee for Electrotechnical Standardization (CENELEC) standard– EN 62368-1, June 2015.