

# APS

## Advanced Power System

(Power Switching and Distribution Unit)



Rackmount



Wallmount

# INSTALLATION and OPERATION

## Version V 2.0

Covering software Version 2.0  
September 2016  
Document number: APS-T01U-A5

### LSC Lighting Systems (Aust) Pty. Ltd.

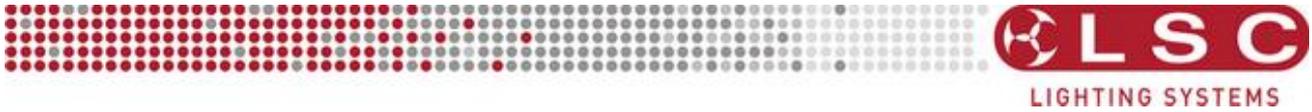
ABN 21 090 801 675

65-67 Discovery Road  
Dandenong South, Victoria 3175 Australia

Tel: +61 3 9702 8000 Fax: +61 3 9768 2631

email: [info@lsclighting.com](mailto:info@lsclighting.com)

web: [www.lsclighting.com](http://www.lsclighting.com)



## **DISCLAIMER**

LSC Lighting Systems (Aust) Pty. Ltd. has a corporate policy of continuous improvement, covering areas such as product design and documentation. To achieve this goal, we undertake to release software updates for all products on a regular basis. In light of this policy, some detail contained in this manual may not match the exact operation of your product. Information contained in this manual is subject to change without notice.

In any event, LSC Lighting Systems (Aust) Pty. Ltd. cannot be held liable for any direct, indirect, special, incidental, or consequential damages or loss whatsoever (including, without limitation, damages for loss of profits, business interruption, or other pecuniary loss) arising out the use or the inability to use this product for its intended purpose as expressed by the manufacturer and in conjunction with this operating manual.

Servicing of this product is recommended to be carried out by LSC Lighting Systems (Aust) Pty. Ltd. or its authorized service agents. No liability will be accepted whatsoever for any loss or damage caused by service, maintenance or repair by unauthorized personnel. In addition, servicing by unauthorized personnel may void your warranty.

LSC Lighting Systems' products must only be used for the purpose for which they were intended.

**Contents**

<b>1 Product Description</b>	<b>4</b>	4.4.2 Power Off Delay	14
1.1 About this Manual	4	4.5 Limits	15
1.2 Introduction	4	4.5.1 Removing Limits	15
1.3 Models/Options	5	4.6 APS/DMX	16
1.3.1 Rackmount APS	5	4.6.1 Selecting DMX or APS Control	16
1.3.2 Wallmount APS	5	4.6.2 DMX Control	16
1.4 Latest Features	5	4.6.1 View DMX	17
		4.6.2 APS Control	17
<b>2 Setting Up and Connecting</b>	<b>6</b>	4.7 Manual APS Off/ON	18
2.1 Safety	6	4.8 Stand alone	18
2.2 Unpacking	6	4.8.1 Unit Number	18
2.3 Mounting the APS	6	4.9 System	19
2.3.1 Rackmount APS	6	4.9.1 Code Upgrade	19
2.3.2 Wallmount APS	6	4.9.2 Reset	19
2.4 Connections	7	4.9.3 Colour Theme	19
2.4.1 Input Power Supply	7	4.9.4 Import Export	20
2.4.2 DMX Input	7	4.9.5 Service	20
2.4.3 DMX Thru	7	4.10 Lock / Unlock	20
2.4.4 GPI Input	7	4.11 About	21
2.4.5 GPI Output	7		
2.4.6 Power Outputs	8	<b>5 RDM 22</b>	
2.4.1 Multipin Output Pin-Outs	9	5.1 Overview	22
		5.2 Commands	22
<b>3 Operation</b>	<b>10</b>	<b>6 Alarms and Troubleshooting</b>	<b>23</b>
3.1 Overview	10	6.1 Maintenance	23
3.2 Switch On/OFF	10	6.2 Trouble Shooting	23
3.2.1 DMX Control	10	6.2.1 Emergency Mode	23
3.2.2 APS Control	10	6.2.2 Tripped Breakers	23
3.3 Multiple APS Units	10		
3.3.1 DMX Cable	10	<b>7 Specifications</b>	<b>24</b>
3.3.2 GPI Cable	11	7.1 Rackmount APS	24
3.4 Front Panel	11	7.2 Wallmount APS	25
3.5 Touch Screen Control Panel	12		
<b>4 Menu System</b>	<b>13</b>	<b>8 Compliance Statements</b>	<b>26</b>
4.1 Overview	13	8.1 RCM Compliance	26
4.2 Help Screens	13	8.2 CE Compliance Statement	26
4.3 Configuration Menu	13	8.3 C Tick Compliance Statement	26
4.4 Timing	13		
4.4.1 Stagger Power On	14		

**Conventions Used in this Manual**

Throughout this manual, certain conventions have been used to make the meaning clearer.

- A word in **Bold** text represents a button on the touch screen.
- Emphasis is indicated by underlining.
- *Notes or Hints are displayed in italic font.*

**Copyright Notices**

APS units are developed by LSC Lighting Systems (Aust) Pty. Ltd.  
 www.lscighting.com  
 Copyright © 2016 LSC Lighting Systems (Aust) Pty. Ltd.  
 All rights reserved.  
 Contents of this manual, Copyright © 2016

## 1 Product Description

### 1.1 ABOUT THIS MANUAL

This manual describes the installation, configuration and operation of the APS (Advanced Power System) intelligent power distribution unit manufactured by LSC Lighting Systems. There are four different colour themes that you can select on the APS touch screen. The screen images in this manual use the default "Gothic" colour theme.

### 1.2 INTRODUCTION

The APS (Advanced Power System) is a power switching and distribution unit with a 3 phase mains input (single phase input available) and either 6 or 12 single phase outputs depending upon the model.

Power Distribution is the most critical components of any system and lighting is no exception particularly these days when almost every fixture now needs its own mains power source. However with each fixture needing power, new problems are introduced particularly during the power up sequence.

Firstly, in-rush currents of all the power supplies and lamps starting up at the same time often causes main breakers to trip and secondly the transient currents drawn by the power supplies can cause earth protection breakers to trip. To avoid these effects, you require complicated power up sequences usually requiring a human sitting there switching circuits on one at a time.

The LSC APS distribution units are a solution to this and other problems by controlling the power-on sequence of each of the individual output circuits. In its simplest form, a single command starts the sequence and then each of the 12 outputs is turned on, one output at a time, with a programmable time before the next circuit turns on. In this way the peak current drawn is always low and upstream breakers should not trip. APS units can be connected together where more than 12 circuits are required and the units automatically cascade - that is, the second unit won't commence its start-up sequence until the first has finished.

But this is just the beginning. The APS is capable of the following:

- Automatic control via DMX512. The presence of DMX turns outputs on and loss of DMX turns outputs off after a pre-set time delay.
- Remote On/Off switching of individual output circuits via DMX512.
- Remote On/Off switching of all output circuits via GPI contact closure (if DMX is not used).
- "Stand Alone" mode for automatic On/Off of output circuits whenever input power is present.
- Manual override (On/Off of output circuits) via front panel touch screen (with user lock out).
- Control via RDM.
- RCBO (**R**esidual **C**urrent **B**reaker with **O**vercurrent) output channel circuit breakers protect against current overload AND earth leakage faults. Also known as RCD (**R**esidual **C**urrent **D**evice) or GFI (**G**round **F**ault **I**ndicator).
- RCBO output channel circuit breakers also provide Neutral Disconnect function.
- Staggered switch on of outputs (with adjustable delay) to prevent start-up surge overloading of the power supply feed.
- Multiple APS units can be configured to start up in sequence.
- Cascading start-up for individual units via XLR5 cabling and/or based on unit number.
- Input voltage monitoring per phase.
- Input current monitoring per phase.
- Input mains frequency monitoring.
- Programmable over-voltage and under-voltage trips to protect loads.

- Voltage and current reporting via RDM.
- Three phase operation.
- Single phase operation possible but input current must be limited to 63A in total.

Being a power control and distribution unit, the APS is equally at home in a variety of applications including (but certainly not limited to):

- Moving Lights.
- LED fixtures.
- Video walls.
- Audio Systems.
- Stall power for Markets and Fairgrounds.

The APS is also ideal for permanent installations such as schools, churches, public halls and other venues where Energy Management is a key goal. By using APS modules to power all the lighting and video system, all the LED fixtures, video screens and moving lights will automatically be powered off a few minutes after the lighting console is turned off. When the console is next turned on, the lighting and video equipment will be sequentially powered up over a few seconds, without any user intervention, a truly Green solution.

### **1.3 MODELS/OPTIONS**

#### **1.3.1 Rackmount APS**

The Rackmount APS is available in the following sizes:

- 12 channels x 10 Amp outputs.
- 12 channels x 16 Amp outputs
- 6 channels x 25 Amp outputs.

Output rear connection options:

- Australian sockets (10 and 13 Amp only).
- Weiland sockets.
- Socapex sockets.
- Shuko sockets.
- Powercon connectors.
- Screw terminals (for permanent installations).

Input rear connection options:

- Three phase tail and plug.
- Screw terminals (for permanent installations).

See section 7 for details on input and output connection options.

#### **1.3.2 Wallmount APS**

The Wallmount APS is available in the following sizes:

- 12 channels x 13 Amp outputs.
- 6 channels x 25 Amp outputs.

Output connection options:

- Front panel 12 X 15 Amp Australian GPO outlets.
- Front panel 6 X paired (20A + 15A per channel) Australian GPO outlets.
- Internal screw terminals (for permanent installations).

Input power connection:

- Internal screw terminals (for permanent installations).

See section 7 for details on input and output connection options.

### **1.4 LATEST FEATURES**

Version 2 of the APS software allows the direct DMX control of individual APS outputs. See section 4.6 for details. APS units with earlier software can be easily upgraded to take advantage of this new feature. See section 4.9.1

## 2 Setting Up and Connecting

### 2.1 SAFETY

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

### 2.2 UNPACKING

The APS is fully tested and inspected before leaving the factory. Upon delivery, inspect the APS for signs of damage or mishandling. In the event of any damage, contact your LSC agent.

### 2.3 MOUNTING THE APS

#### 2.3.1 Rackmount APS

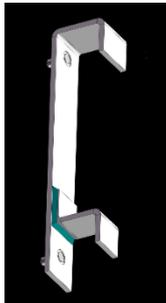
The Rackmount APS is designed for mounting in a standard 19 inch rack. It is 3RU (Rack Units) high.

#### 2.3.2 Wallmount APS

The Wallmount APS housing is in two parts.

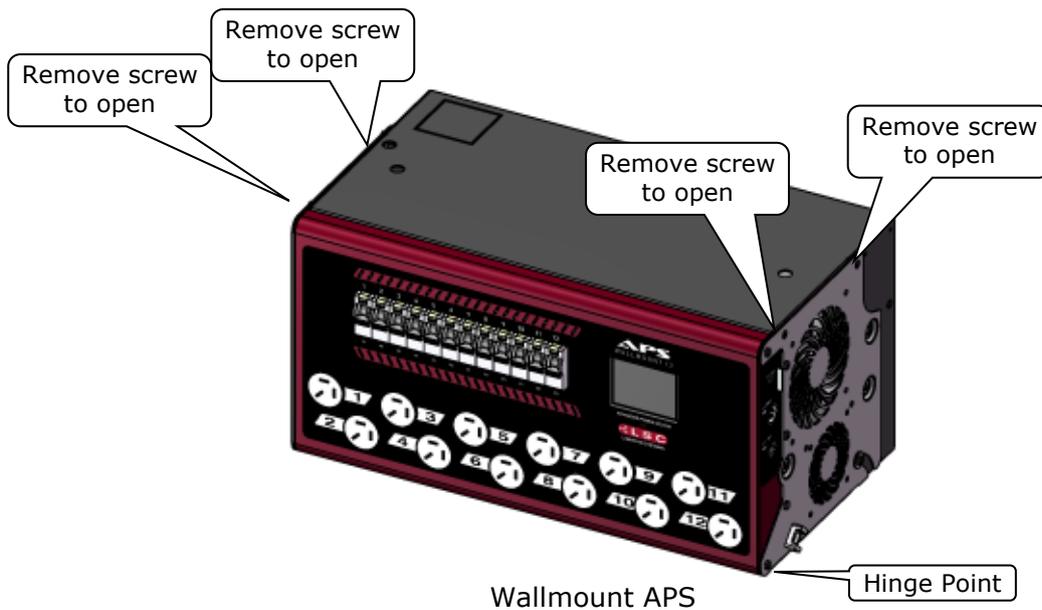
- The rear section which is mounted on the wall.
- The front section which is hinged to the rear section.

The rear section has provisions for mounting to walls and other upright structures such as uni-strut. Mounting brackets for uni-strut are available from LSC.



Uni-Strut mounting bracket LSC Part No: GVW/BRKT

The chassis is hinged and can be opened for access to the mounting points and wiring connections by removing the four screws as shown and lowering the front panel.



The model with internal screw terminal for the loads has the terminals located on the rear section of the chassis forming an installation frame which can be attached to the wall and all

the supply and load cable terminations completed before the main body and electronics are installed. This method ensures far easier access when terminating cables, as well as ensuring no accidental damage to the APS electronics by other trades. When all building works are completed the front section is mounted onto the rear section hinges and connected via internal plugs and sockets.

## **2.4 CONNECTIONS**

### **2.4.1 Input Power Supply**

The **APS** must be fed from a suitable external circuit breaker. The nominal input voltage is 220-240 Volts. 3-phase Star (380-415V). 50-60Hz.

Single phase operation is possible but input current must be limited to 63A in total.

### **2.4.2 DMX Input**

A 5 pin XLR is provided for DMX input.

Two modes of DMX operation are possible:

DMX Control. Each output channel can be configured to be controlled by a specific DMX channel.

APS Control. All output channels can be configured to be automatically switched on by the presence of a valid DMX signal. The APS will automatically and sequentially switch on its outputs when a valid DMX signal is present. In this mode, the APS does not use a DMX address and is not controlled by DMX levels. It only responds to the presence or absence of a valid DMX signal.

The time delay between each output channel switching on is adjustable. See section 4.4.1.

When the DMX signal is not present (when the lighting controller is switched off) the APS will switch off all channels after an adjustable delay time.

The APS also can be manually operated when a DMX signal is not connected.

### **2.4.3 DMX Thru**

A 5 pin XLR is provided for DMX Thru (output). The DMX Thru connector is primarily provided to feed the DMX signal to another APS unit. The APS will automatically connect the DMX input to the DMX Thru at the completion on the switch on sequence when all 12 outputs have been switched on. This provides an automatic method of sequentially switching on multiple APS units. When a unit has completed its staggered switch on of all of its outputs it connects its DMX output to the next APS in the line which then starts its staggered switch on sequence.

When the outputs of an APS are switched off (either automatically by the loss of DMX or manually via the touch screen) the feed of DMX to the DMX Thru connector is also switched off.

### **2.4.4 GPI Input**

The DMX Input connector is also used for a GPI (**G**eneral **P**urpose **I**nterface). If DMX is not being used to automatically control an APS, then the APS can be remotely switched on (starting its standard switch-on sequence) by providing a contact closure between pins 1 and 4 of the DMX Input connector. When the contact closure is opened, the APS will switch off all channels after the adjustable delay time. See section 4.4.2.

### **2.4.5 GPI Output**

The DMX Thru connector provides a GPI output. This is provided to feed a GPI signal to another APS unit. The APS will automatically provide a contact closure between pins 1 and 4 of the DMX Thru connector at the completion on its switch on sequence (when all 12 outputs have been switched on). If the GPI output is connected to the GPI input of the next APS, then multiple APS units can be remotely controlled by a single switch connected to the first APS.

When the outputs of an APS are switched off (either automatically by the loss of DMX or manually via the touch screen) the contact closure on the DMX Thru connector is also switched off. This will therefore automatically switch off any APS connected to the GPI output.

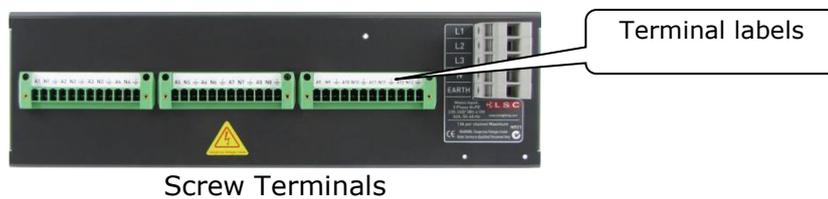
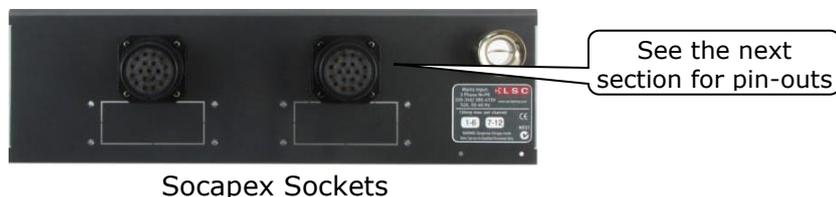
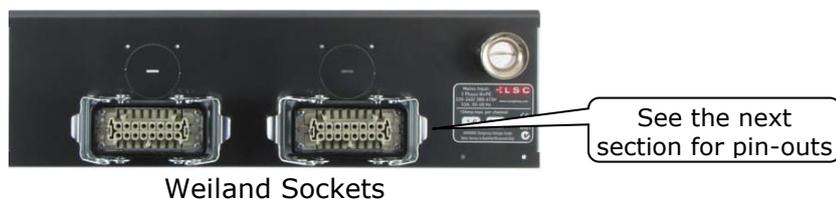
### 2.4.6 Power Outputs

The outputs are fed from the following input power phases:

Input Phase	Output	Output	Output	Output
1	1	4	7	10
2	2	5	8	11
3	3	6	9	12

The input phase for each output is also shown on the front panel below each output circuit breaker.

The rackmount APS has the following output connections available. The channel numbers of the output sockets are shown on the chart below the power input. The pin-outs of the multi-pin sockets are in section 2.4.1. The following illustrations show 12 channel APS rackmount units.



**2.4.1 Multipin Output Pin-Outs**

**2.4.1.1 Harting/Wieland Sockets**



Connector 1	Function	Connector 2	Function
Pin 1	Chan 1 Active	Pin 1	Chan 7 Active
Pin 2	Chan 2 Active	Pin 2	Chan 8 Active
Pin 3	Chan 3 Active	Pin 3	Chan 9 Active
Pin 4	Chan 4 Active	Pin 4	Chan 10 Active
Pin 5	Chan 5 Active	Pin 5	Chan 11 Active
Pin 6	Chan 6 Active	Pin 6	Chan 12 Active
Pin 7	Not used	Pin 7	Not used
Pin 8	Not used	Pin 8	Not used
Pin 9	Chan 1 Neutral	Pin 9	Chan 7 Neutral
Pin 10	Chan 2 Neutral	Pin 10	Chan 8 Neutral
Pin 11	Chan 3 Neutral	Pin 11	Chan 9 Neutral
Pin 12	Chan 4 Neutral	Pin 12	Chan 10 Neutral
Pin 13	Chan 5 Neutral	Pin 13	Chan 11 Neutral
Pin 14	Chan 6 Neutral	Pin 14	Chan 12 Neutral
Pin 15	Not used	Pin 15	Not used
Pin 16	Not used	Pin 16	Not used

**Note:** Earth connection is via the clips on the side of the socket insert.

**Note:** This is the recommended wiring scheme for Harting/Wieland connectors. An alternative wiring scheme exists for these connectors and APS units can be wired to the alternative scheme by special order. If you order the alternative wiring then the pin-outs are listed in a separate document that is included with your APS.

**2.4.1.2 Socapex Sockets**



Connector #1	Function	Connector #2	Function
Pin 1	Chan 1 Active	Pin 1	Chan 7 Active
Pin 2	Chan 1 Neutral	Pin 2	Chan 7 Neutral
Pin 3	Chan 2 Active	Pin 3	Chan 8 Active
Pin 4	Chan 2 Neutral	Pin 4	Chan 8 Neutral
Pin 5	Chan 3 Active	Pin 5	Chan 9 Active
Pin 6	Chan 3 Neutral	Pin 6	Chan 9 Neutral
Pin 7	Chan 4 Active	Pin 7	Chan 10 Active
Pin 8	Chan 4 Neutral	Pin 8	Chan 10 Neutral
Pin 9	Chan 5 Active	Pin 9	Chan 11 Active
Pin 10	Chan 5 Neutral	Pin 10	Chan 11 Neutral
Pin 11	Chan 6 Active	Pin 11	Chan 12 Active
Pin 12	Chan 6 Neutral	Pin 12	Chan 12 Neutral
Pin 13	Earth	Pin 13	Earth
Pin 14	Earth	Pin 14	Earth
Pin 15	Earth	Pin 15	Earth
Pin 16	Earth	Pin 16	Earth
Pin 17	Earth	Pin 17	Earth
Pin 18	Earth	Pin 18	Earth
Pin 19	Earth	Pin 19	Earth

## 3 Operation

### 3.1 OVERVIEW

The APS (Advanced Power System) is a power distribution unit with a 3 phase mains input (single phase input is possible but with limited current) and either 6 or 12 single phase outputs depending upon the model.

### 3.2 SWITCH ON/OFF

APS output channels can be individually configured to be switched ON or OFF by either:

- DMX control.
- APS control.

#### 3.2.1 DMX Control

Channels set to DMX control need to be patched to a DMX channel via the touch screen. They are switched on when the DMX channel to which they are patched exceeds 60%. They are switched off when the DMX channel to which they are patched drops below 40%. They are also automatically switched off when DMX is no longer present on the APS input. A delay time can be set using the touch screen. See section 4.4.2.

#### 3.2.2 APS Control

Channels set to APS control are always switched on sequentially to minimise surge current. This is known as a "staggered switch on". The time delay between channels switching on can be set using the touch screen. The outputs can be switched on via the following methods:

- Whenever DMX is detected on the APS DMX input. See sections 2.4.2 and 2.4.3
- Via a remote switch plugged into to the DMX input. See sections 2.4.4. and 2.4.5
- Manual switch on via the touch screen (with user lock out). See section 4.7.
- In "Stand alone" mode, whenever power is present on the input. See section 4.8.
- Via RDM. See section 5.2.
- Emergency mode. See section 6.2.

Channels set to APS control are switched off via the following methods:

- When DMX is no longer present on the APS input. A delay time can be set using the touch screen.
- Via a remote switch plugged into to the DMX input. See section 2.4.4
- Manual switch off via the touch screen (with user lock out) See section 4.7.
- Via RDM. See section 5.2.

### 3.3 MULTIPLE APS UNITS

When multiple APS units are in use they can be connected together so that APS channels that are set to APS control (above) will automatically cascade. That is, the second APS unit won't commence its start-up sequence until the first unit has finished. When the second unit has finished the third will commence etcetera.

The units are connected together by either a DMX cable or by a GPI cable.

#### 3.3.1 DMX Cable

APS Channels set "APS control" respond to the presence or absence of a valid DMX signal. They do not respond to individual DMX addresses.

Connect your DMX signal to the DMX input of the first APS. Connect the DMX Thru connector of the first unit to the DMX In connector of the next unit and so on. The first APS will automatically and sequentially switch on its (APS controlled) outputs when a valid DMX signal is present. When it has completed its staggered switch on it connects its DMX output to its DMX Thru connector therefore connecting DMX to the next APS in the line. The next unit will then detect the DMX signal and repeat the procedure.

Channels set to "DMX control" are always directly controlled by their DMX channel to which they are patched however when APS units are cascaded, the DMX signal is not connected to the next unit until the preceding unit has completed its switch on sequence.

### 3.3.2 GPI Cable

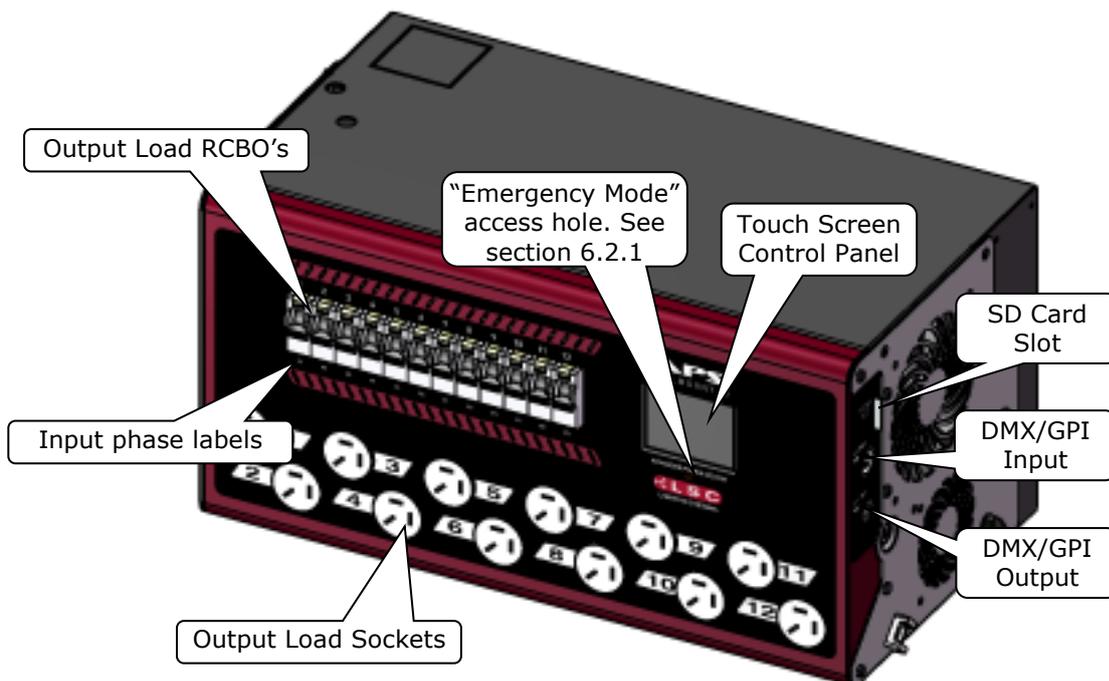
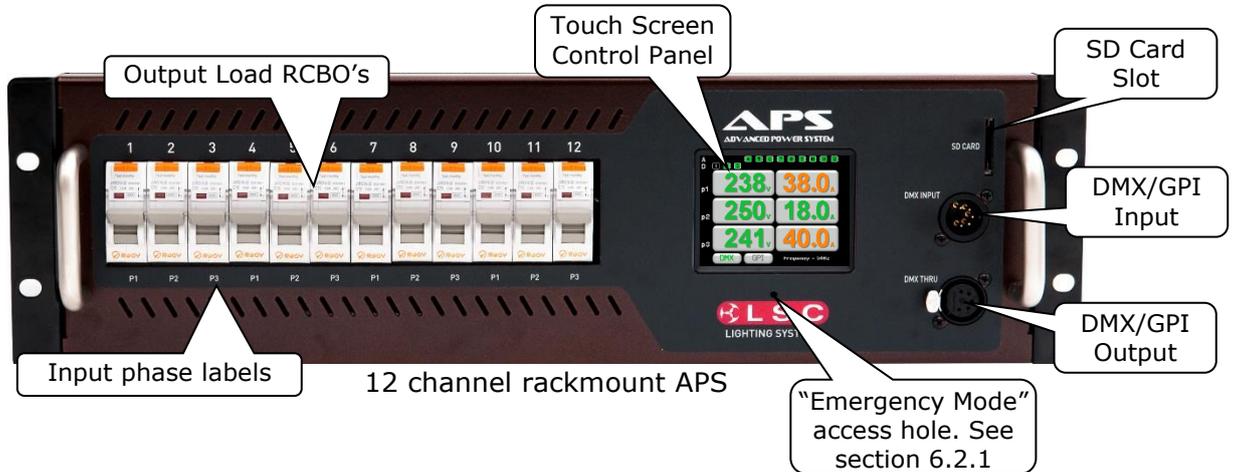
GPI input requires a contact closure between pins 1 and 4 of the DMX connector. Connect the DMX Thru connector of the first unit to the DMX In connector of the next unit and so on.

The first APS will automatically and sequentially switch on its outputs when it is either manually switched on via its touch screen (section 4.7) or remotely switched on by a contact closure between pins 1 and 4 of its DMX connector. When it has completed its staggered switch of all of its outputs it will automatically provide a contact closure between pins 1 and 4 of its DMX Thru connector. The next unit in the line will detect the contact closure and repeat the procedure.

When the outputs of an APS are switched off it will automatically switch off any APS connected to the GPI output.

### 3.4 FRONT PANEL

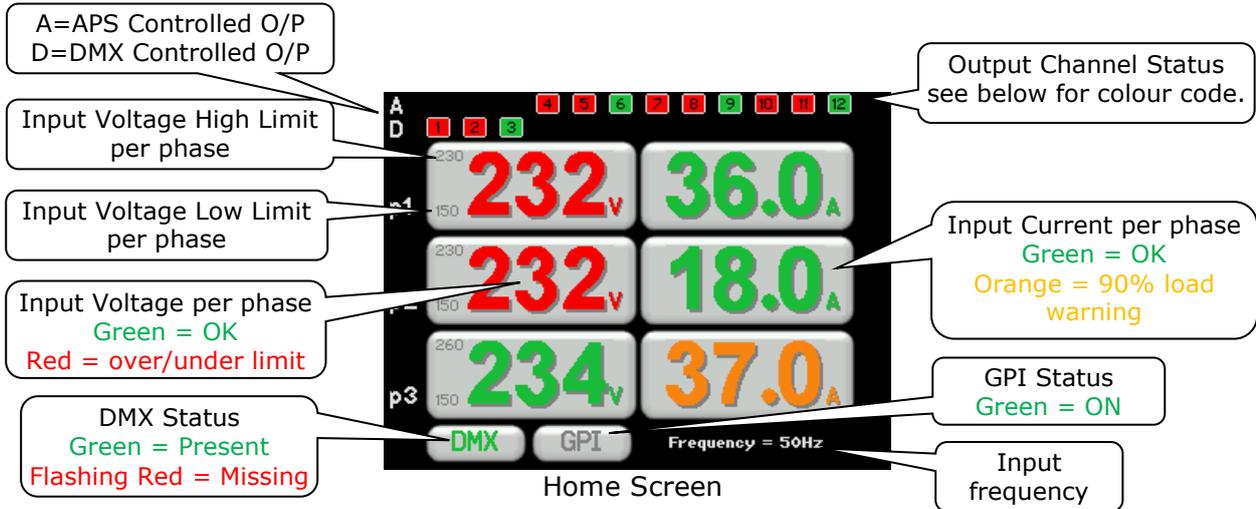
The front panel contains the RCBO (**R**esidual **C**urrent **B**reaker with **O**vercurrent) circuit breakers for each output. The number below each circuit breaker shows which input phase feeds that output channel.



Wallmount APS

### 3.5 TOUCH SCREEN CONTROL PANEL

The APS uses a colour LCD touch screen which is operated by touching the virtual buttons with your finger or a stylus. Do not use sharp objects to operate the touch screen.



The output channel status indicators at the top of the home screen show the current status of each output:

- **Green** = The channel is On.
- **Red** = The channel is Off.
- **Orange** = The channel has been automatically turned "Off" due to an under voltage or over voltage input but the input voltage is now within limits and the channel is about to automatically turn back on after it's staggered start up time delay.

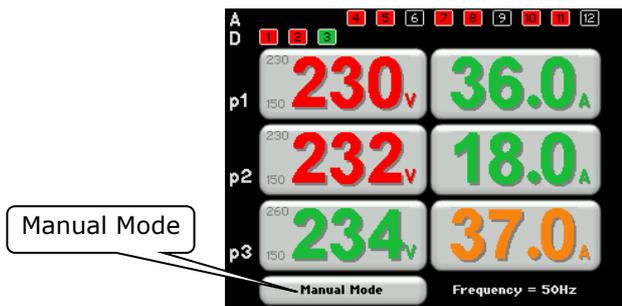
The "Input Voltage High Limit" and "Input Voltage Low Limit" per phase can be set. If these limits are exceeded, the outputs connected to that phase will be switched off and their input voltage displays will turn to flashing **red**. See section 4.5.

The input current per phase is displayed in **green**. The readout turns **orange** as a warning when the input current reaches 90% of the maximum allowable current per phase. Note that this reading is the total input current per phase. The maximum current per output channel is determined by the capacity of its front panel RCBO circuit breaker and is preset in the factory.

The DMX status is **green** when DMX is present and flashes **red** when DMX is not present. See section 2.4.2.

The GPI status is **green** when a GPI signal (contact closure) is present. See section 2.4.4

If the outputs are manually turned off from the touch screen (**Manual Off**), then the DMX and GPI status indicators are replaced by a "Manual Mode" indicator. See section 4.7



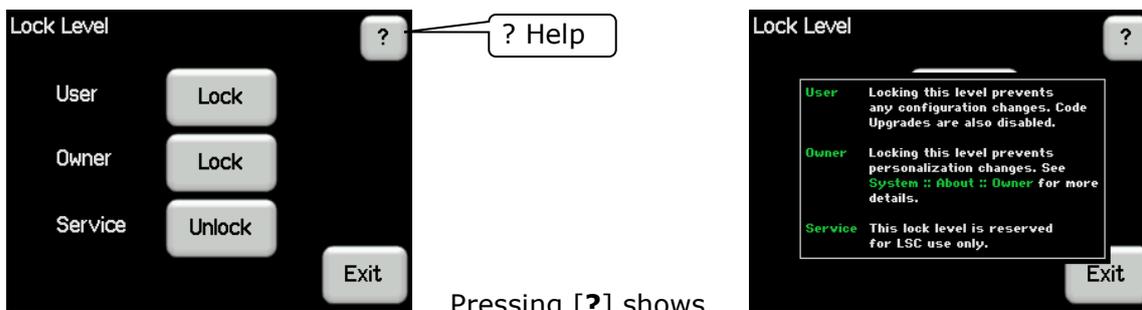
## 4 Menu System

### 4.1 OVERVIEW

The menus on the screen provide the functions to configure and operate the APS.

### 4.2 HELP SCREENS

Some menus have "Help" screens available as indicated by a ? button in the top right corner of the touch screen. Touch ? (when available) to see the help screen.

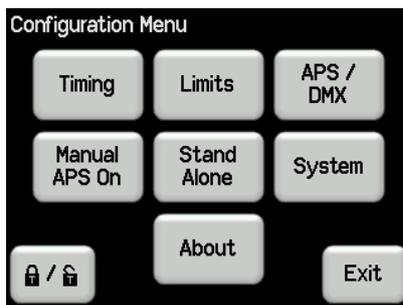


Pressing [?] shows.....

Touch anywhere within the help screen to cancel.

### 4.3 CONFIGURATION MENU

Touch anywhere on the **Home Screen** to access the "Configuration Menu".



The configuration menu provides the following sub menus:

### 4.4 TIMING

APS output channels can be switched on or off by APS control or by DMX control. Pressing **Timing** allows you to set the timing parameters of channels that are under APS control. Channels set to DMX control are not affected by the "Stagger Power On" time.

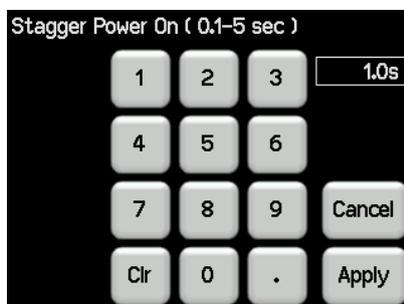


The warning beep can be disabled. This is a toggle function. If it has been disabled, the button will change to "Enable".

**Note: APS units manufactured prior to March 2014 are not fitted with a beeper.**

### 4.4.1 Stagger Power On

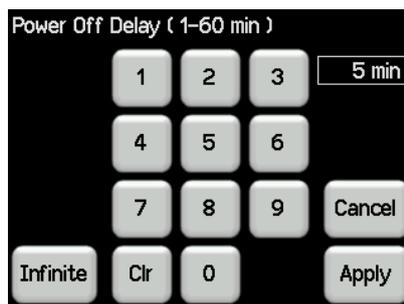
When the command to switch on the outputs is executed, the outputs under APS control are sequentially switched on to avoid an excessive surge current on the power supply. Stagger power on is the delay time between switching on each output. The range is from 0.1 to 5 seconds. The default time is 1 second. To change the stagger power on time touch **Edit**. Type in the required time then touch **Apply**.



**Note:** In Standalone mode, stagger time is fixed. See section 4.8.1

### 4.4.2 Power Off Delay

Power off delay is the time that the outputs stay on when either DMX is lost or the GPI input contact closure is opened. The range is 1 to 60 minutes or infinite. The default time is 5 minutes. To change the power off delay touch **Edit**. Type in the required time then touch **Apply**.



If the DMX signal is lost or the GPI input contact closure is opened, the countdown to power off begins. When it reaches 30 seconds the "warning beep" sounds (if enabled) and a warning appears on the screen and counts down the remaining time to switch off. The warning beep can be enabled or disabled from the "Timing Parameters" menu described above.



You can postpone the switch off and restart the countdown timer by tapping the screen. To disable the automatic switch off, set the time to "Infinite".

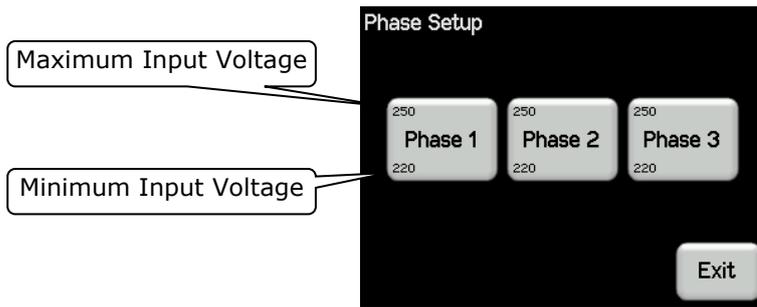
**Hint:** If the APS about to turn off and you want to keep it on, touch the screen to postpone the shutdown then touch the **Home screen** and touch **Stand Alone, Enable**.

### 4.5 LIMITS

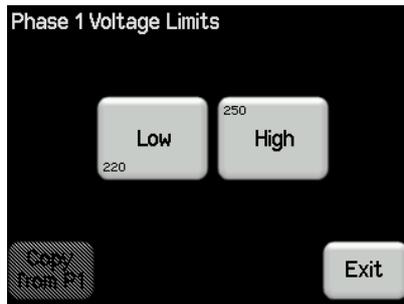
The "Limits" menu allows you to set maximum (High) and minimum (Low) limits on the input voltage for each phase to protect the equipment connected to that phase. If these limits are exceeded, the input voltage display for that phase turns red and the outputs connected to that phase will be switched off and their status indicators also turn red. When the input voltage returns to within the limits, the input voltage display turns green and the channel status indicators turn orange, but the outputs will remain off until the following conditions are met for each limit:

- High. The input voltage drops to 3 volts below the high limit for at least 10 seconds.
- Low. The input voltage rises to 3 volts above the low limit for at least 10 seconds.

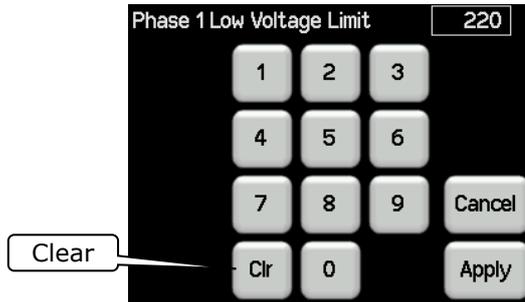
The channels then automatically turn back on after their staggered start up time delay. Touching **Limits** (in the Configuration menu) shows the limit settings for each phase.



Touching a **Phase** button allows you to select either the Low or High limit for that incoming power phase.



Touching either **Low** or **High** allows you to set that limit. Type in the required time then touch **Apply**.



When phases 2 or 3 are selected, the settings for phase 1 can be copied to them by touching **Copy from P1**.

#### 4.5.1 Removing Limits

To remove a limit on a phase touch either **Low** or **High** then touch **Clr** (Clear) then **Apply**.

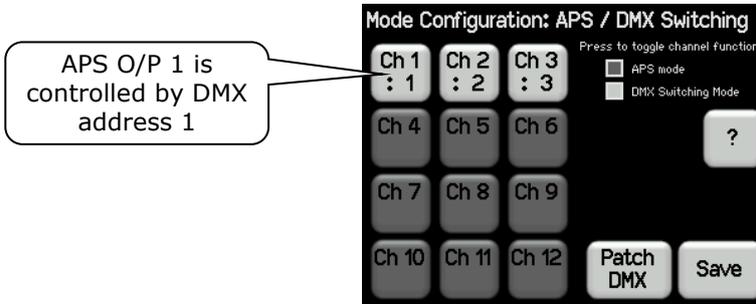
### 4.6 APS/DMX

APS output channels can be individually configured to be switched ON or OFF by either:

- DMX control.
- APS control.

#### 4.6.1 Selecting DMX or APS Control

Touch the home screen then touch **APS/DMX**.



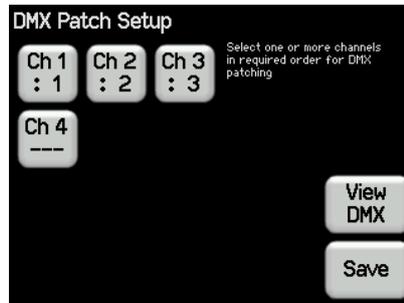
Touch a channel to toggle it between DMX control (light grey) or APS control (dark grey). In the example above, APS channels 1, 2 and 3 are controlled by DMX channels 1, 2 and 3 respectively. APS channels 4 through 12 are APS controlled.

#### 4.6.2 DMX Control

Channels set to DMX control need to be patched to a DMX channel via the touch screen. They are switched on when the DMX channel to which they are patched exceeds 60%. They are switched off when the DMX channel to which they are patched drops below 40%. They are also automatically switched off when DMX is no longer present on the APS input. A delay time can be set using the touch screen.

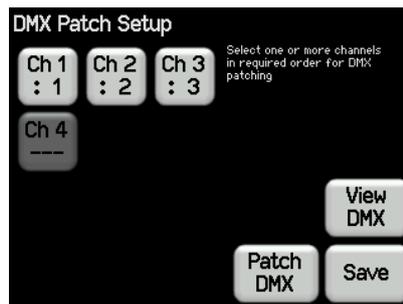
To control an APS channel by DMX, on the "Mode Configuration" screen above, touch the channel (it turns light grey) then touch **Patch DMX**.

For example touch **Ch 4** then touch **Patch DMX**.

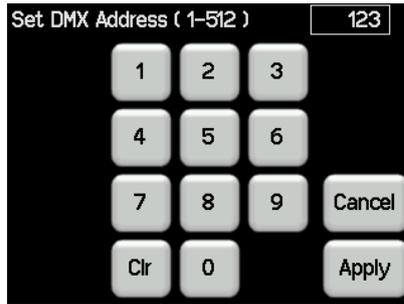


The "DMX Patch Setup" screen shows the APS channels set for DMX control and their DMX address if they have already been patched and to view the DMX channel levels.

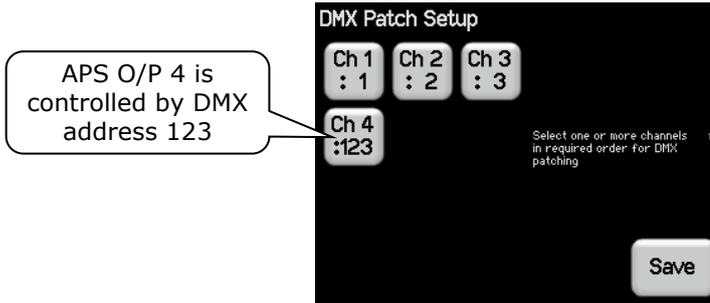
To patch an APS channel (or change the DMX address of an existing patch, touch the APS output channel and the "Patch DMX" button appears.



Press **Patch DMX** then enter the DMX channel to control this APS channel:



Press **Apply**.

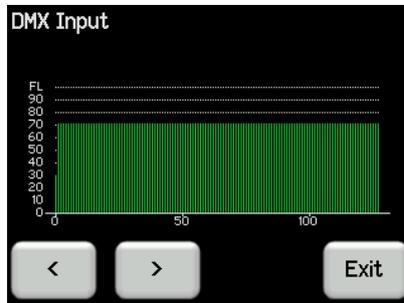


Multiple APS channels can be selected and patched to multiple (sequential) DMX channels in the one operation.

A single DMX channel can be patched to multiple APS channels.

**4.6.1 View DMX**

Touching **View DMX** shows the channel levels of the DMX signal connected to the DMX input.



Touch either > or < to scroll through the DMX channels.

**4.6.2 APS Control**

Channels set to APS control are always switched on sequentially to minimise surge current. This is known as a “staggered switch on”. The time delay between channels switching on can be set using the touch screen. The outputs can be switched on via the following methods:

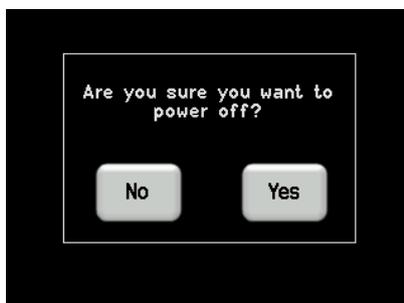
- Whenever DMX is detected on the APS DMX input. See sections 2.4.2 and 2.4.3
- Via a remote switch (GPI) plugged into to the DMX input. See sections 2.4.4. and 2.4.5
- In “Stand alone” mode, whenever power is present on the input. See section 4.8.
- Manual switch on via the touch screen (with user lock out). See section 4.7.
- Via RDM. See section 5.2.

Channels set to APS control are switched off via the following methods:

- When DMX is no longer present on the APS input. A delay time can be set using the touch screen.
- Via a remote switch (GPI) plugged into to the DMX input. See section 2.4.4
- Manual switch off via the touch screen (with user lock out) See section 4.7.
- Via RDM. See section 5.2.

### 4.7 MANUAL APS OFF/ON

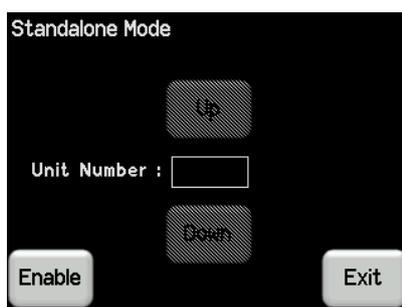
If the APS outputs are ON, touching **Home Screen** then **Manual APS Off** allows you to switch off outputs under APS control after a confirmation warning. Outputs set to DMX control are not affected.



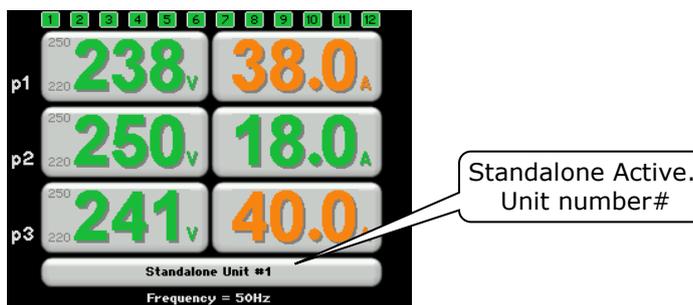
If the APS outputs are OFF, the "Manual Off" button becomes "Manual On". Touching **Manual APS On** starts the staggered power on sequence. If multiple APS units are connected together (GPI out to GPI in) then manually switching off the first unit will switch off all other units.

### 4.8 STAND ALONE

If the APS is not being remotely controlled (either by DMX or by a GPI contact closure) then it can be set to "stand alone" mode by touching the **Home Screen** then touching **Stand Alone, Enable**.



In standalone mode, the APS will automatically start its staggered switch on sequence 3 seconds after power is applied at the input.



#### 4.8.1 Unit Number

If multiple APS units are to be operated in standalone mode, then you can prevent them from all starting their staggered switch on sequence at the same time by assigning a different "unit number" to each APS. Each unit number adds an additional 12 second delay to the start of the staggered switch on sequence.

- Unit 1 starts after 3 seconds.
- Unit 2 starts after 15 seconds.
- Unit 3 starts after 27 seconds etc.

In standalone mode, the stagger power on times of the output channels are fixed to ensure that channels in different size APS units do not turn on at the same time.

- 6 channel APS units have a fixed stagger time of 2 seconds.
- 12 channel APS units have a fixed stagger time of 1 second.
- 24 channel APS units (future release) have a fixed stagger time of 0.5 seconds.

## 4.9 SYSTEM

To access the "System" menu touch anywhere on the **Home Screen** then from the "Configuration Menu" press **System**. The "System Menu" provided the following sub menus:

- Code Upgrade.
- Reset.
- Colour Theme.
- Import Export.
- Service.

### 4.9.1 Code Upgrade

LSC Lighting Systems has a corporate policy of continuous improvement to its products. The APS software (firmware) is subject to this policy as new features are added and existing features improved.

The software version of your **APS** can be checked by touching anywhere on the **Home Screen** then from the "Configuration Menu" press **About**.



To upgrade your APS software, download the latest version from the LSC web site, [www.lscighting.com](http://www.lscighting.com) and save the new software to an SD Card. The file will be called APS\_V\*.BIN where \* is the version number.

Touch the **Home Screen** then touch **System, Code Upgrade**. Insert the SD card containing the file into the SD card socket on the front panel then follow the on screen instructions.

### 4.9.2 Reset

Touching Reset offers two options:

#### 4.9.2.1 Restart

In the unlikely event that the APS fails to respond, the operating system may be restarted so that the software may initialise and recommence normal operation. Touching **Restart** will not affect any of the settings or memory.

#### 4.9.2.2 RESET To Defaults

This will ERASE all memory from the APS and reset to defaults.

The default settings are:

- Set all channels to APS (automatic) control mode.
- Stagger power on = 1second.
- Power off delay = 5 minutes.
- Remove all phase voltage limits.
- Disable "Stand Alone" mode.

### 4.9.3 Colour Theme

You can choose a colour theme for the touch screen. The choices are:

- Gothic
- Antarctic
- Dawn

### 4.9.4 Import Export

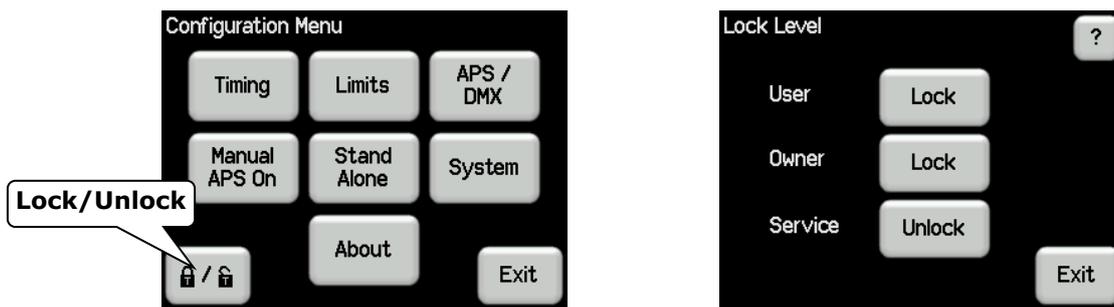
The configuration settings of an APS can be exported to a SD card allowing them to be imported and copied to other APS units. Insert an SD card into the front panel slot then touch the **Home Screen, System, Import Export**, then follow the on screen instructions.

### 4.9.5 Service

The Service menu is for factory use only.

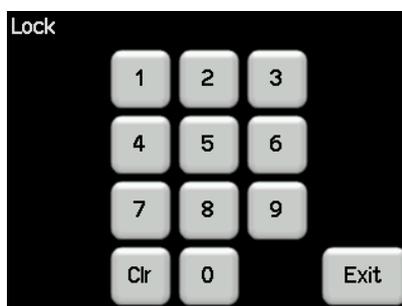
### 4.10 LOCK / UNLOCK

To **lock** the touch screen and prevent unauthorised access press **Lock/Unlock**. Pressing **Lock/Unlock** symbol provides 3 levels of lock.

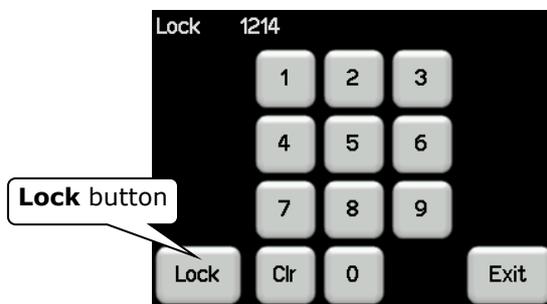


- **User**. Prevents all configuration changes.
- **Owner**. Prevents changes to the Owners name (System/About/Owner).
- **Service**. This lock level is reserved for factory use only.

Pressing a **Lock** button reveals a "Lock" keypad.



Enter a four digit code and the **Lock** button appears.



Press **Lock** to lock the selected level.

Menu buttons that are locked are "greyed out".

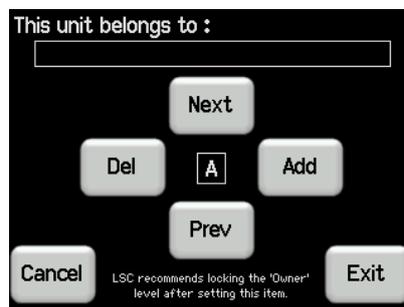
To unlock, press the **Padlock** symbol and enter your 4 digit code.

### 4.11 ABOUT

The **About** menu shows information about the software, capacity and owner of the APS.



Touching **Owner** allows you to enter a name for the APS.



Users can be prevented from changing the Owner name by using the **Lock** menu.

## 5 RDM

### 5.1 OVERVIEW

RDM stands for **R**emote **D**evice **M**anagement. It is an “extension” to DMX.

Since the inception of DMX it has always been a ‘one way’ control system. Data only ever flows in one direction, from the lighting controller outwards to whatever it may be connected to. The controller has no idea what it is connected to, or even if what it's connected to is working, switched on, or even there at all!

RDM changes all that allowing the equipment to answer back and for you to remotely manage your device.

RDM has been designed to work with existing DMX systems. It does this by interleaving its messages with the regular DMX signal over the same wires. There is no need to change any of your cables but because RDM messages now go in two directions, any in-line DMX processing you have needs to be changed for new RDM hardware. This will most commonly mean that DMX splitters and buffers will need to be upgraded to RDM capable devices such as LSC’s MDR data splitters fitted with the RDM option.

### 5.2 COMMANDS

APS provides the following functions over RDM:

- Identify (blinks a message on the screen).
- Voltage, Current, Frequency and Fan speed values are provided as sensors.
- Status of each output are provided as sensors.
- Status of GPI, GPO and DMX are provided as sensors.
- Over/Under voltage events are reported as “alarms”. In RDM language these are known as “Advisory Status Messages”.
- Manual On/Off control using either “Get/Set Lamp State” or “Get/Set Power State” commands.

More information on RDM can be found at:  
<http://www.rdmprotocol.org/>

## 6 Alarms and Troubleshooting

**Warning.** No user controls or user serviceable parts are located inside the APS. Refer all servicing to suitably qualified personnel.

### 6.1 MAINTENANCE

Ensure that the air vents at the side of the frame are free from obstruction and dust. Check that all connector screw terminals (if fitted) are tight. This must be performed by a suitably qualified person. Check that the APS contains the latest software release.

### 6.2 TROUBLE SHOOTING

#### 6.2.1 Emergency Mode

In the unlikely event that the APS does not respond to your commands, you can manually force the APS to switch on all of its outputs. There is a small hole located on the front panel below the touch screen. Inside there is a button which, when pressed with a small pin or paperclip, turns ON all outputs (simultaneously) and shuts down the APS monitoring and control system. The touch screen backlight remains on to show the presence of input power.



The APS remains in this mode until input power is removed.

"Emergency Mode"  
switch access hole

#### 6.2.2 Tripped Breakers

If a channel is not working check the RCBO (**R**esidual **C**urrent circuit **B**reaker with **O**ver current protection) for that channel. If the RCBO has tripped (OFF), firstly try to determine the cause of the breaker tripping. It could be a blown lamp or a circuit overload or an earth leakage fault. Remember that the touch screen shows the load current per phase, not per channel. Rectify the problem (replace the lamp or reduce the load) then restore the RCBO. If the RCBO continues to trip, refer the problem to a suitably qualified person.

## 7 Specifications

### 7.1 RACKMOUNT APS

Power Input	Nominal 220-240 Volts. 3-phase star. 50-60Hz. Single phase operation possible - 63A max. Operating range typically 190-260V, 45-65Hz. 100-120 Volt models available on request				
Power Connection	<p><u>Australian models</u> are fitted with a three phase 1.2m H07 rubber 5 core x 6.0mm<sup>2</sup> cable with 32A 5 pin Clipsal plug (10 amp/channel model) or 40A 5 pin and 6 x 25 amp/channel model) Clipsal plug.</p> <p><u>Export models</u> are supplied with an M25 Nickel Plated Brass cable gland for installing power cable. A 1.2m length of 3-phase cable provided with the APS (but not fitted).</p> <p><u>Hard-wired models</u> are provided with 5 screw terminals for input power - no cable.</p>				
Control Inputs	DMX512 (1990) or DMX512-A (E1-11) and RDM (E1-20) via front panel 5 pin XLR. GPI contact closure on pins 1+4 of XLR5 connector.				
Control Outputs	DMX512 (1990) or DMX512-A (E1-11) and RDM (E1-20) via front panel 5 pin XLR				
Models		<b>APS12/10</b>	<b>APS12/16</b>	<b>APS6/25</b>	
	<b>Channels</b>	12	12	6	
	<b>Max Load per channel</b>	10 Amps	16 Amps	25 Amps	
	<b>RCD/GFI Current Trip</b>	30mA/Channel			
	<b>Output Connector Options</b>	/A	12 x 3-pin Australian GPO style connectors		N/A
		/P	12 x Powercon connectors		
		/S	12 x Shuko Connectors		N/A
		/T	Hardwired (terminals)		
/W		2 x Wieland (Harting) 16-pin multi-pole connectors		N/A	
/X		2 x 19-pin Socapex multi-pole connectors		1 x 19-pin Socapex multi-pole connectors	
Case	19" 3RU rack mount.				
Dimensions and weights	<p>Product Dimensions W x D x H: 483 x 300 x 132 mm 19.0 x 11.8 x 5.25 inches</p> <p>Shipping Dimensions W x D x H: 580 x 500 x 210 mm 22.8 x 19.7 x 8.25 inches</p> <p>Product Weight (Packed): 12 channels 11 kg, 24.2 lb. 6 channels 10.5 kg, 23 lb.</p> <p>Shipping Weight (Australia): 15.5 kg.</p> <p>Shipping Weight (Export): 12.2 kg, 27 lb.</p>				

**7.2 WALLMOUNT APS**

		APW12/13	APW6/25
Channels		12	6
Max Load per channel		10 Amps	25 Amps
RCD/GFI Current Trip		30mA/Channel	
Operating Temperature range		0-40°C	
Output Connector Options	/A	12 x 3-pin 10A Australian GPO style connectors	6 paired Australian GPO outlets (20A + 15A per channel)
	/T	Hardwired (terminals)	
Power Input		Nominal 100-240 Volts. 3-phase star with fully rated neutral. 50-60Hz Operating range typically 90-260V, 45-65Hz. Earthing System: TN-S	
Power Connection		An M25 Nickel Plated Brass cable gland for installing power cable is supplied but not fitted.	
Control Input		DMX512 (1990) or DMX512-A (E1-11) and RDM (E1-20) via right-hand side panel mounted 5-pin AXR in and thru connectors. GPI contact closure on pins 1+4 of XLR5 connector.	
Product Dimensions - W x D x H		490 x 280 x 250mm	
		19.3 x 11 x 9.8 inches	
Shipping Dimensions - W x D x H		550 x 340 x 310 mm	
		21.7 x 13.4 x 12.2 inches	
Product Weight:		15.5 kg / 34 lb	15.5 kg / 34 lb
Product Weight (Packed):		20 kg /44 lb	20 kg /44 lb
Shipping Weight (Australia)		20 kg / 44 lb	20 kg /44 lb
Shipping Weight (Export)		20 kg / 44 lb	20 kg /44 lb

## 8 Compliance Statements

### **8.1 RCM COMPLIANCE**

The **APS** from LSC Lighting Systems (Aust) Pty. Ltd. complies with the Regulatory Compliance Mark (RCM).

### **8.2 CE COMPLIANCE STATEMENT**

The **APS** from LSC Lighting Systems (Aust) Pty. Ltd. has been designed and tested to the European Committee for Electrotechnical Standardization (CENELEC) standard- EN55022 (Information Technology Equipment).

### **8.3 C TICK COMPLIANCE STATEMENT**

All LSC products with CE Compliance automatically comply with C-Tick requirements as per Section 182 of the Radio-communications Act 1992. LSC Company Registration number is N921.