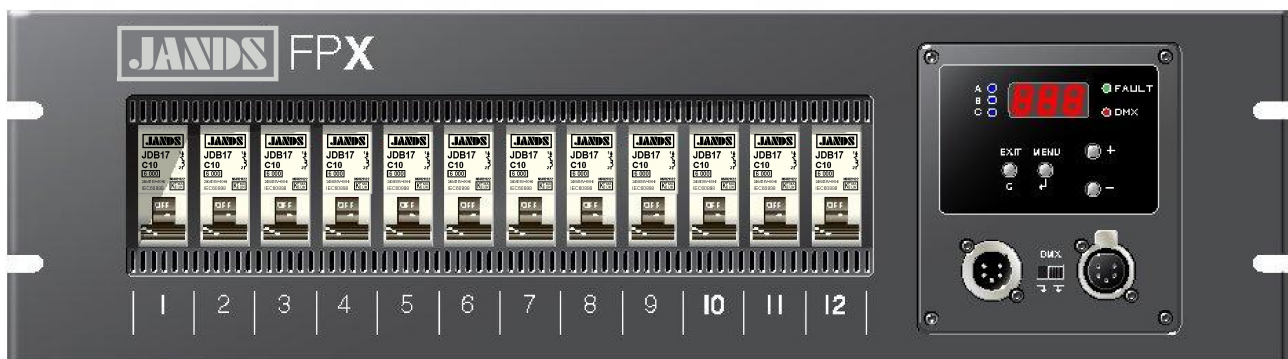


FPX

Digitally Controlled Dimmer Rack



OPERATING MANUAL



EMC COMPLIANCE



This product is approved for use in Australia/New Zealand and conforms to the following standards:

Australian / New Zealand Standards
AS/NZS 3439.1:2002
AS/NZS 60960:2003
AS/NZS CISPR 15:2002

To ensure continued compliance with EMC Directive 89/336 and the Australian Radiocommunications Act 1992, use only high quality data cables with continuous shield, and connectors with conductive backshells. Examples of such cables are:

DMX: Belden 8102 100% Aluminium foil screen, 65% Copper braid.

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JANDS FPX Series dimmers must only be used for the purpose they were intended by the manufacturer and in conjunction with this operating manual.

Disconnect mains power when not in use.

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1.0 Introduction

The JANDS FPX is a high quality, rugged, 12 channel, 2.4kVA per channel (10A/240V) dimmer rack specifically designed for demanding touring and theatre applications.

The FPX can be powered from three-phase or single-phase mains supplies. The FPX features opto-controlled Triacs and medium risetime chokes protected by thermal/magnetic circuit breakers. The FPX uses microprocessor-based digital control for accurate dimming and in-built test functions. Digital control is via standard DMX-512 protocol.

The FPX features toroidal output chokes. These chokes provide excellent high frequency noise suppression and, together with the temperature-controlled fan, low acoustic noise.

Control signal to the dimmer is via a standard DMX-512 socket at the front panel, while the dimmed outlets and three phase power entry are located on the rear panel.

Features

- 12 x 2.4KW dimming channels
- DMX-512 digital control protocol
- DMX terminating switch
- Suitable for both touring and permanent installations
- Soft turn on characteristic
- Low acoustic/electrical noise
- Toroidal output chokes
- Circuit breaker protection of output devices
- Three mains phase indicator LEDs
- Built in test facilities
- Dimmer curve set for linear relationship between the control input and output power
- Compensates for fluctuations in the mains supply voltage, and filters superimposed mains control tones, ensuring a constant light output and increased lamp life
- Rack mounted (3 rack units)
- Microprocessor control
- Temperature-controlled cooling fan
- Temperature monitor and thermal cut-out
- Dimmer will hold last DMX value should control data be interrupted
- 50/60Hz operation
- C-Tick approved

2.0 Equipment Description

2.1 Front panel layout

Refer to Figure 2.1 (below) for a description of the front panel controls.

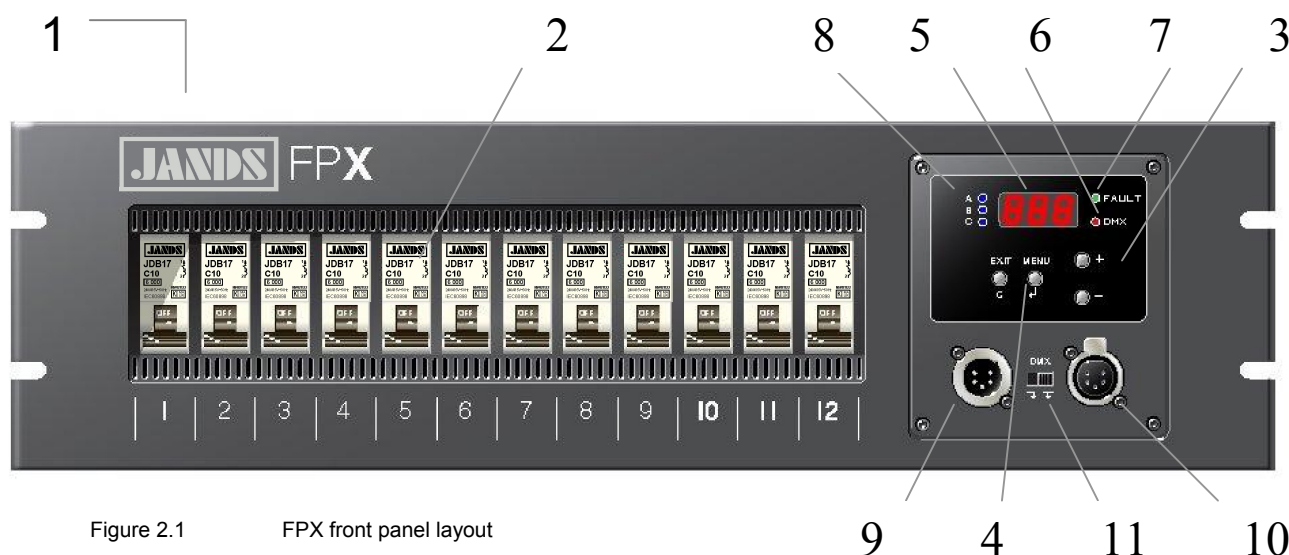


Figure 2.1

FPX front panel layout

1. **Channel output sockets (rear panel):** The twelve output sockets are each rated at 10 amps.
2. **Channel circuit breakers:** If a breaker trips during use ensure the fault has been cleared before resetting.
3. **Up/Down select buttons:** These buttons select the DMX start channel and various Test functions.
4. **Exit and Menu/Confirm buttons:** These buttons are used to navigate through the Test menu levels and set DMX address.
5. **3-Digit Display:** Indicates currently selected DMX start channel, and various Test function options.
6. **DMX IN LED:** A green LED indicates the presence of DMX signals when in DMX mode. If there is no DMX signal, the LED will flash at a rate of approximately 2 seconds on - 2 seconds off.
7. **FAULT LED:** A red LED flashes in the presence of a fault. In normal operation this LED should be off.
8. **PHASE LEDs:** Three blue LEDs (one for each phase) indicate that the three phase mains supply is available.
9. **DMX IN SOCKET:** Standard 5-pin AXR connector accepts DMX-512 signals from controller.
10. **DMX LOOP SOCKET:** Standard 5-pin AXR connector links the DMX-512 signals to other dimmers or devices.
11. **TERMINATE SWITCH:** In the right hand Loop ∇ position it links the male IN socket to the female LOOP socket, continuing the DMX signal to other devices. The left hand Terminate ∇ position is used to terminate the DMX signal if this unit is the last device in DMX chain.

3.0 Getting Started

The FPX would normally be rack mounted before any wiring is terminated. Refer to section 6.0 *Installation* for installation details.

3.1 Connecting power

The FPX dimmer is supplied with a flexible cable fitted with a multipin power plug for the connection of incoming mains power. The FPX is ideally powered from a three phase star (four wire plus earth) supply. If the dimmer power cable is damaged it must be replaced with another cable available from JANDS or its service agents.

The upstream supply must be protected by fuses or circuit breakers at not more than the rated maximum.

The power plug should be connected to an appropriately rated socket outlet. The plug's retaining lock ring (if present) must be screwed home.

WARNING

DAMAGE TO THE PLUG MAY OCCUR IF THE RETAINING LOCK RING IS NOT PROPERLY SECURED.

Ensure adequate mains plug access once the dimmer is installed.

3.2 Setting the mains frequency

The FPX can be configured to run from either 50Hz or 60Hz mains power. As supplied from the factory the dimmer is configured for 50Hz.

The dimmer operating frequency may be changed as follows:

- Disconnect the mains supply to the dimmer
- Remove the lid
- Change the three jumpers on the main circuit card as shown in Figure 3.4
- Replace the lid and reconnect power

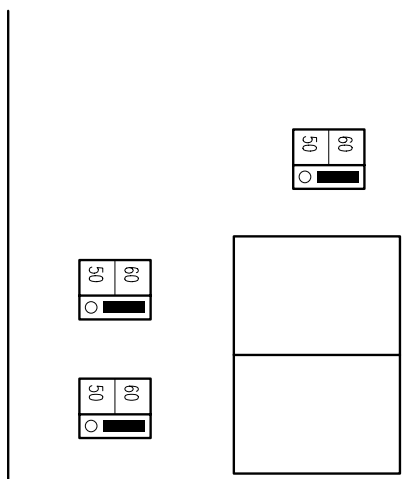


Figure 3.4: 60Hz jumper locations

3.3 Powering up

Turn on the power and check that the three PHASE indicator LEDs are illuminated before connecting any loads. If any of the PHASE LEDs are dim or off, power down and remedy the fault before trying again. Refer to section 5.3 *Phase fault indication*.

If all is well, power down and connect loads.

3.4 Connecting loads

The standard output connectors are twelve Clipsal 415P 10 amp sockets. Ensure any plugs are pushed firmly into their sockets.

The FPX will drive most incandescent loads as well as pinspots, fans, and dimmable fluorescent tubes. The load should be within the specified limits.

3.5 Connecting DMX-512 input

The input signal to the dimmer should conform to the ANSI E1.11 USITT DMX-512-A specification. Plug the DMX signal to the “DMX IN” socket. The DMX signal may be daisy-chained to the next dimmer via the LOOP connector.

The DMX IN LED indicates the presence of DMX signals.

The DMX receiver input is protected against extreme over-voltages across any input pins and from any input to chassis. The “terminating” resistor is not protected against over-voltages.

3.6 DMX Termination

In any DMX-512 system the signal should be terminated at the last dimmer or receiver in the chain, and the FPX can provide this function. To terminate the DMX signal, set the frontpanel slide switch from LOOP ↴ to the Terminate ↴ position. Note that in this position no signal is present at the LOOP connector.

3.7 Power-up sequence

When powering up lighting systems, the following sequence should be used:

1. First the control desk;
2. Then any softpatches and/or DMX receivers;
3. Finally the dimmers, preferably one at a time starting from the first dimmer rack in the DMX loop.

This procedure minimises the risk of lamps and fixtures responding to any false DMX data produced by control desks or ancillary equipment at turn-on (producing the lighting equivalent of an audio “thump”) and prevents damage to lamps, dimmers, and other controlled devices.

Use the reverse procedure when powering down.

Disconnect mains power when not in use.

4.0 Dimmer Operation

This section assumes the dimmer has been correctly connected to three phase power and a source of DMX-512 control signal.

- Pressing “Menu/←” at any time moves up menu level or confirms a new setting.
- Pressing the “Exit/C” button at any time moves back a menu level with no setting change.
- When adjusting a setting, the display will flash briefly once per second for three seconds. If the “Menu/←” button is pressed within that three seconds, the new value is retained and subsequently takes effect. If no button is pressed within that 3 seconds, or if the “Exit/C” button is pressed within 3 seconds, the setting reverts to the previous value.

4.1 Operating modes

The FPX has two operating modes:

1. **DMX mode:** the dimmer is controlled from an external DMX-512 control console,
2. **Test mode:** the dimmer is controlled by the internal microprocessor and the front panel buttons.

4.1.1 DMX mode

In this mode, the “+” and “-” buttons are used to select which bank of 12 channels (from the 43 possible DMX-512 banks) will control the FPX.

By default the display shows the DMX start channel. The start channel can only be changed in steps of 12. Pressing the “+” or “-” button results in the display increasing or decreasing by one bank of 12 channels. Eg. 1, 13, 25, etc.

For example, if DMX Channels 25 to 36 are desired, set the start channel to “25”. FPX Channel #1 is now DMX Channel #25. A FPX with this setting ignores DMX Channels 1 to 24 and 37 to 512, and only decodes Channels 25 to 36 as its dimmer information.

Pressing and holding the “+” or “-” button results in the display changing by one bank, and after 0.5 seconds it will start changing automatically at a fast rate.

The display will halt at 505 in the up direction and at 1 in the down direction, but if the button is released and pressed again the menu will wrap around from 505 to 1 (or from 1 to 505 in the other direction).




Once selected, the start channel is retained in memory if the power is switched off.

4.1.2 Test mode

In this mode, the FPX’s internal controller is used to drive the selected dimmer channels. No DMX control is necessary, but a control signal may be left connected if desired.

Pressing the “Menu” button displays the first menu item. The menu items are listed in Table 2.

Table 2: Menu items

Display	Description
	Turn selected Channel on full
	Turn Phase channels on at set level
	Turn on all channels sequentially at set rate

Pressing the “–” button when the display shows *Chn* changes it to *CHS*; pressing the “+” button when the display shows *CHS* changes it to *Chn*, ie. the menu wraps around.

Pressing the “Exit/C” button returns the dimmer to normal operation, displaying the previously set DMX start channel.

4.1.2.1 Chn

Pressing “Enter” while *Chn* is displayed moves into the Channel Test menu. The display shows the last channel tested (*C 1* ... *C12*) and immediately turns it on full.

The “+” and “–” buttons may be used to select a different channel. The channel is output live and there is no need to press “Enter”. The display (and output) remains in that state until the “Exit/C” button is pressed, even if power is disconnected; ie. when power is restored the dimmer will continue to drive the selected channel to full.

Pressing the “–” button when the display shows *C 1* changes it to *C12*. Pressing the “+” button when the display shows *C12* changes it to *C 1*; ie. the menu wraps around.

When “Exit/C” is pressed, the dimmer returns to the menu displaying flashing *Chn*. If no button is pressed within 3 seconds the dimmer returns to normal operation, displaying the previously set DMX start channel.

























4.1.2.2 PHS

Pressing “Enter” while *PHS* is displayed moves into the Phase Test menu, and the display shows the last phase tested (*A*, *B*, *C*, or *ALL*). Pressing “+” or “–” and then “Enter” selects a phase to test. That phase is indicated on the display with a top, middle, or lower horizontal bar in the left-most display digit, signifying phases A, B and C respectively. The display initially shows a phase level of 0. All channels fed from the selected phase will be tested simultaneously.

ie. Phase A = Channels 1-4, Phase B = Channels 5-8, Phase C = Channels 9-12.

The “+” and “–” buttons are used to select a different level in 20% increments, ie. 20, 40, 60, 80, FL (100). Refer to table 3 for the display output in each state.

Table 3: Display data to output level relationship

Output Level	Phase A Display	Phase B Display	Phase C Display	ALL Phases Display
0%				
20%				
40%				
60%				
80%				
100%				

The output is live and there is no need to press “Enter”. The display (and output) remains in its current state until the “Exit/C” button is pressed, even if power is disconnected. ie. when power is restored the dimmer will continue to drive the selected phase to the same level.

When “Exit/C” is pressed, the dimmer returns to the menu displaying flashing *A*, *B*, *C* or *ALL*. If no button is pressed within 3 seconds the dimmer returns to normal operation, displaying the previously set DMX start channel.

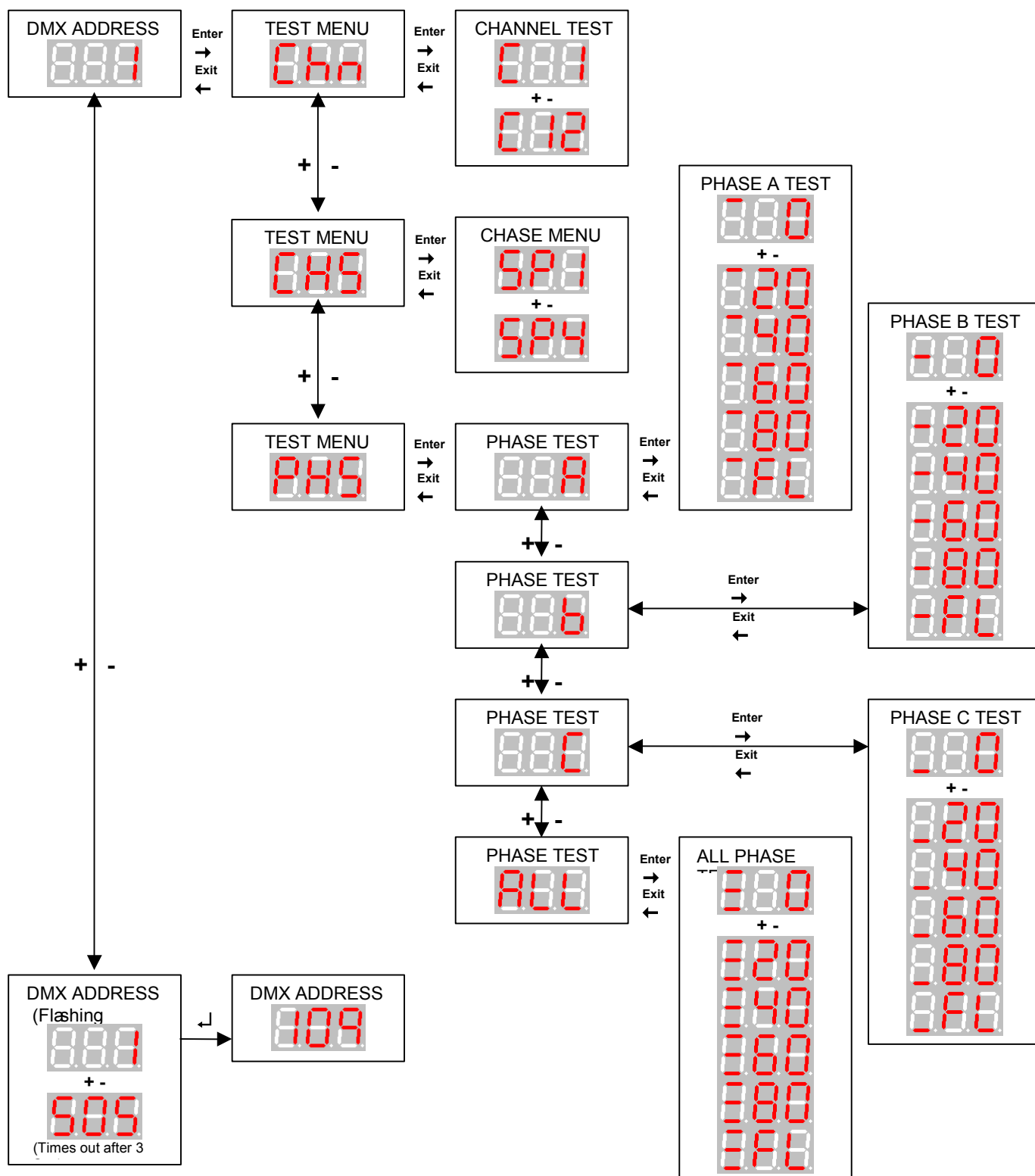
4.1.2.3 CHS

Pressing “Enter” while *CHS* is displayed moves into the Chase menu, where the display shows the last chase speed selected (*SP1...SP4*) and the chaser is immediately turned on. Each channel from 1 to 12 is sequentially driven to full output and then the chase sequence keeps repeating.

The “+” or “-” buttons are used to select a chase speed; *SP1* is slowest and *SP4* is fastest. The display (and output) remains in its current state until the “Exit/C” button is pressed, even if power is disconnected. ie when power is restored the dimmer will continue to run the chase at the selected rate.

When “Exit/C” is pressed, the dimmer returns to the menu displaying flashing *CHS*. If no button is pressed within 3 seconds the dimmer returns to normal operation, displaying the previously set DMX start channel.

4.1.3 Front Panel Menu Structure



4.2 Fault LED

The Fault LED is used to indicate fault conditions. In normal operation this LED should not illuminate. When active this LED will either be flashing or on continuously.

1. When the LED is flashing an over-temperature or over-voltage condition is present, and the dimmer outputs will be off until the over-voltage or over-temperature condition is removed.

2. When the Fault LED is on continuously, one or more of the following error conditions have occurred:
 - Over-voltage
 - Over-temperature
 - Serial data errors
 - Software failure

The dimmer outputs are active while the Status LED is on continuously.

If the Fault LED is on it may be cleared by pressing the “+” or “–” buttons, or by switching the dimmer off momentarily.

5.0 Fault Diagnosis

NOTE

Contact your authorised JANDS Distributor for repairs or servicing.

In Australia refer all repairs to an authorised JANDS service agent or return the faulty unit in suitable packaging to:

**JANDS Service Dept,
40 Kent Rd
Mascot NSW 2020
Australia**

5.1 Output protection

Each of the twelve output circuits is protected by a 10 Amp fast-acting thermal/magnetic circuit breaker. These breakers are designed to pass the rated current, but will disconnect the output circuit for any overload condition (the larger the overload, the quicker the disconnection).

NOTE: 3-pin GPO outlet sockets are rated at 10 Amps. Dimmer channels should not be loaded beyond the socket capacity.

The breakers protect the dimmer's output devices from short-circuit loads and faulty wiring looms, and save on expensive dimmer repairs. A tripped circuit breaker indicates a load fault that requires immediate attention.

If a short-circuit lamp or output cable is plugged into the dimmer, the breaker will trip to disconnect the fault from the dimmer. In nearly all circumstances, this is quick enough to prevent damage to the output devices.

In some circumstances however, a triac failure may be experienced, although these devices are usually quite reliable and robust. If a triac does fail, it will either turn a channel on to full (triac short-circuit), or turn it off (triac open-circuit). If a triac fault should occur, that channel may be isolated by manually tripping that channel's circuit breaker.

These breakers have been specified for electrical protection, reliability and safety. They will allow repeated turn-on surges to cold lamps without failure, while still protecting the triacs. The breakers will interrupt large short-circuit fault currents without damage.

5.2 DMX faults

The FPX dimmer features an "Output Hold" facility that "remembers" the last received DMX message. In the event of a cable being unplugged or severed, the FPX dimmer rack will continue to output the "Held" DMX levels until a new DMX message is provided. If no new data is received within 10 minutes the outputs are driven to 0.

The **DMX LED** will "flash" slowly if the DMX signal is removed.

Note that control consoles, when powered down, may transmit spurious DMX data which can unintentionally cause dimmer channels to turn on. Disconnect mains power when not in use.

The DMX receiver input is protected against extreme over-voltages across any input pins and from any input to chassis. The “terminating” resistor is not protected against over-voltages.

5.3 Phase fault indication

The three blue **PHASE** LEDs will show when all three power input phases are present.

WARNING

IF ONE OR MORE PHASE LEDS IS OFF, IMMEDIATELY DISCONNECT POWER TO THE DIMMER AND CHECK THE MAINS SUPPLIES AND WIRING BEFORE RE-CONNECTING POWER TO THE DIMMER.

Although the dimmer will survive most power supply faults, indications of unusual or potentially dangerous power conditions should never be ignored.

5.4 Thermal protection

The FPX dimmers feature temperature-controlled fan cooling. As the internal temperature of the dimmer increases, the fan speed also increases.

The internal heatsink temperature is constantly monitored by the dimmer. If the heatsink temperature rises above the specified maximum, the dimmer will automatically shut down the output drive. The fan will continue to cool the heatsink during the shut down period.

The electronic shutdown is backed up by a buried cutout, which shuts down power to all electronics other than the cooling fan should the temperature continue to rise.

Even though the FPX is a fan-cooled dimmer, it is very important that adequate ventilation is provided when in use, particularly around the sides of the chassis. If air circulation to the air vents is blocked and/or the ambient air temperature is too high, the dimmer will shut down and the status LED will flash until the temperature is reduced.

Refer to section *6.1 Dimmer Ventilation* regarding FPX ventilation requirements.

5.5 Over-voltage

The FPX incorporates an over-voltage cutout that constantly monitors the incoming mains voltage. If the mains voltage rises above the specified maximum the dimmer will shut down and the status LED will flash until the over-voltage condition is removed.

5.6 Fault finding guide

FAULT SYMPTOM	POSSIBLE CAUSE	REMEDY
Breaker trips when desk channel flashed to full or near full	Large incandescent load Excessive load	Use console preheat facility Reduce channel loading
Breaker trips after prolonged operation	Excessive load Lamp or wiring fault	Reduce channel loading Check lamps and wiring
Breaker trips immediately when channel is driven	Output short Triac short	Check lamps and wiring Factory service
One channel flickers when dimmed Same load flickers on another Channel	DMX source problem Faulty dimmer channel Insufficient or very inductive load	Softpatch another console fader Service console Factory service Connect >100W incandescent lamp in parallel
Radio interference	Faulty EMC filtering	Factory service
All Channels flicker when dimmed	Incorrect DMX protocol / wiring Unterminated DMX line Mains control tones exceed limits	Replace DMX source / wiring Set Terminate switch on last DMX receiver to TERM Contact factory
DMX LED flickers	Faulty DMX wiring/connections Faulty console Faulty dimmer rack	Repair Repair Factory service
Fault LED flashing	Over-voltage Over-temperature	Check mains connection/supply Improve dimmer cooling
Fault LED on continuously	Recent over-voltage Recent over-temperature DMX control errors Software failure	Check mains connection/supply Improve dimmer cooling Check DMX wiring, console Factory service
No signal at DMX Loop output	Terminate switch set to TERM	Set Terminate switch to LOOP

6.0 Installation

The FPX dimmer is designed for use in 19 inch racks or a 19 inch bar frame, and occupies 3 rack units. The dimmer is supplied with rear rack mounting support brackets, which provide additional support for touring applications. If you need longer brackets please contact JANDS Pty. Ltd.

The three phase power cable entry is located at the rear right side of the rack when viewed from the front. Ensure adequate access to the power plug when mounting dimmers in racks.

6.1 Dimmer Ventilation

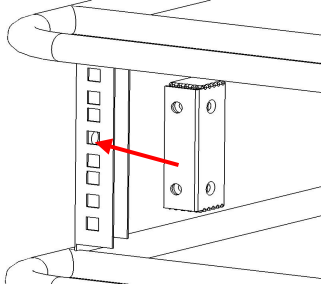
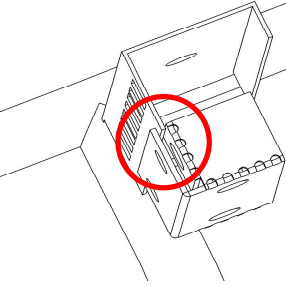
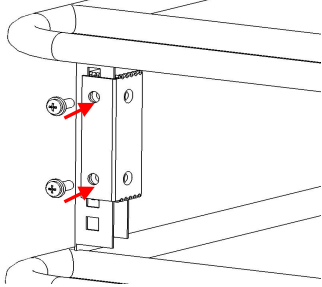
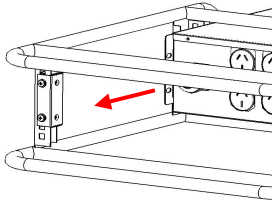
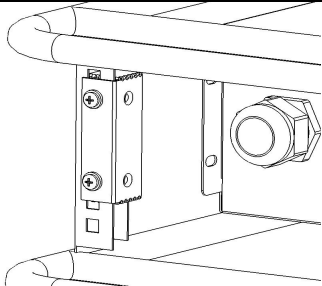
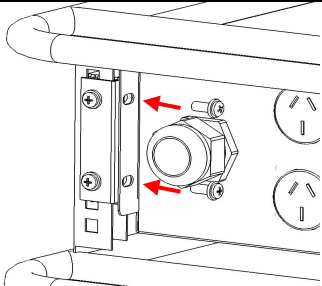
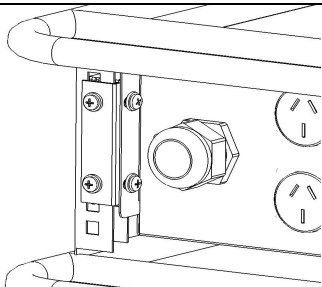
The FPX dimmer is fan-cooled, with the air intake at the right and air exhaust at the left when viewed from the front. All racks must have adequate ventilation for the side-to-side airflow of the dimmers. Fully enclosed racks will cause overheating problems.

Racks must allow **at least** 100 square centimetres of air venting per dimmer at each side of the rack, level with the dimmer's intake and exhaust slots. Additional venting area will serve to further reduce internal dimmer temperatures and will enhance the dimmer's operational reliability.

Dimmers may be stacked in racks without intervening rack spaces as long as the racks are adequately vented.

Racks of dimmers must be placed such that one rack does not breathe the hot exhaust of the rack to its right. Allow at least 0.5m (18") between racks unless duty cycles are light

6.2 Dimmer Rear Mounting Bracket

 <p>1</p> <p>Slide bracket onto rack strip.</p>	 <p>2</p> <p>Rack strip should fit into gap in mounting bracket.</p>
 <p>3</p> <p>Secure mounting bracket with two M6 bolts. Repeat for other side of rack.</p>	 <p>4</p> <p>Slide FPX dimmer into rack.</p>
 <p>5</p> <p>FPX dimmer should slide between mounting brackets..</p>	 <p>6</p> <p>Secure FPX dimmer to mounting brackets using two M6 bolts on each side.</p>
 <p>7</p>	

7.0 Maintenance

With care, the FPX dimmer will require little or no maintenance.

Periodic electrical safety checks may be required by law in some applications.

WARNING

DO NOT ALLOW THE ENTRY OF LIQUIDS OF ANY SORT INTO THE DIMMER CHASSIS.

EXTERNAL CLEANING:

If the front panel requires cleaning, wipe with a mild detergent on a damp soft cloth.

DO NOT spray liquids onto the front panel.

DO NOT use solvents for cleaning the front panel.

INTERNAL CLEANING:

The FPX dimmer will require little internal maintenance other than periodic flushing of dust build up to prevent the fan and air-path becoming clogged with dirt or fluff.

- ISOLATE POWER to the dimmer (by disconnecting the power cable or locking off the mains supply isolator).
- Remove the lid.
- Blow clean the fan and internals with compressed air from left to right.
- DO NOT "spin" the fan with compressed air - the blades may break off.
- When the fan and internals are clean, replace the lid and screws, and re-connect the power cable.

ROUTINE MAINTENANCE:

Installed dimmers should be routinely flushed of dust at six- to twelve-month periods.

Touring dimmers may need a more rigorous maintenance routine, which should include:

- Inspection of chassis for evidence of impact damage and physical abuse
- Inspection of outlets for wear and damage
- Inspection of power cable for wear and damage
- Electrical checking of ground integrity from power cable to chassis
- Electrical checking of ground integrity from power cable to outlet grounds
- Flushing of dust build up
- Testing the operation of all front panel switches and breakers

8.0 Technical Data and Specifications

PARAMETER	FPX
No. of Channels:	12
Input Power Requirements: 3 phase Star only	415 VAC Phase-Phase @ 40A/phase protected at 50A/phase Full size neutral required
Maximum Power / Channel	2.4 kW
Minimum Power/Channel	25W
Maximum Dissipation	<24 W/channel (<300 W total)
Maximum Ambient Temp	40°C
Control Signal	ANSI E1.11 DMX-512-A Protocol
DMX Input	5 pin AXR male / female
Test Function Level	Individual Channels @ 100% Group Channels @ 20% steps
LED Indicators	DMX, FAULT, Phases A, B, and C
Output Protection	12 x 10 Amp thermal/magnetic circuit breakers
Over-temperature cutout	Electronic: 83°C rising, 78°C falling Mechanical: 90°C
Over-voltage cutout	Average 290VAC
Ingress protection	IP20
Size (mm)	482 (w) x 133 (h) x 425 (d)
Weight	17.8 kg net
Rack mounting requirements	3 x 19" rack spaces / standard spacing for mounting holes Ventilation required at sides of rack No blank spaces required between units Power inlet at rear right (looking from front of unit) Rear access required for patching outputs

8.1 DMX connector pin-outs

PIN No	CONNECTION (DMX IN)	CONNECTION (LOOP)
1	SHIELD	SHIELD
2	IN-	OUT-
3	IN+	OUT+
4	nc	nc
5	nc	nc

8.2 Mains wiring colour codes

PHASE A	RED
PHASE B	WHITE
PHASE C	BLUE
NEUTRAL	BLACK
EARTH	GREEN / YELLOW

8.3 Internal Mains Wiring

The FPX dimmer has been designed to run from most commonly used power systems.

8.3.1 Normal Three Phase plus Neutral Operation

The FPX is normally supplied with a three-phase power cable and plug attached, suiting the vast majority of available mains supplies (ie. three phase and neutral).

The incoming mains supply must be protected at not more than the specified maximum. It is the responsibility of the user to ensure that the dimmer is used in a manner that does not exceed the available supply capacity.

The power cable is terminated within the dimmer at a six-way terminal block and an earthing stud. The six-way terminal block has three poles for the three live mains phases (labelled A1, A2, A3), and three poles for the mains neutral (N1, N2, N3). The three neutral poles are bridged by a copper link, with the incoming mains neutral connected to terminal N2.

8.3.2 Single Phase Operation

The dimmer may be configured for single phase operation where three phase mains supply is unavailable.

The dimmer should be supplied with three same-phase actives and three neutrals. The three active lines must each be protected at not more than the specified maximum. The three neutral conductors must each be rated at the same current as the actives. The earth conductor should be similarly rated.

The bridge between the three neutral terminal poles (N1, N2, N3) must be removed before the three incoming neutral lines are connected.

Although it is possible to supply the dimmer with one large single phase feed, the dimmer's breakers may not be rated to clear faults if the supply is protected at currents greater than the specified maximum.

The overvoltage detection will operate as normal.

8.4 C-Tick Declaration of Conformity



C-Tick Declaration of Conformity

Declaration of Conformity with Electromagnetic Compatibility Standards as required under the Radiocommunications Act.

I/We Jands Pty Ltd
of 40 Kent Road
 Mascot NSW 2020
 Australia
 ACN 001.187.837

Declare under our sole responsibility that the product(s)

<i>ID</i>	<i>Product Code</i>	<i>Supplier</i>	<i>Suppliers Model No</i>
888	JND-FPX-A	Jands Pty Ltd	JND-FPX-A

Product Description

Dimmer Rack DMX512 w/Breakers

Included Accessories

Additional Models Covered by this Declaration

Statement as to Why They are Also Covered

to which this declaration relates is in conformity with the following standard(s):

<i>Title</i>	<i>Number: Date of Issue</i>
Electrical Lighting and Similar Equipment	AS/NZ CISPR 15:2002

Name of Authorised Person: Paul Mulholland

Title of Authorised Person: Managing Director

Date of Issue: 3/06/2005

Signature of Authorised Person: _____

❧ **MANUAL ENDS** ❧