

# CX-A450 Amplifier

## Installation & User Guide v4.0

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# CX-A450 Amplifier Installation and operation manual

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## 1 Safety Notes

- Do not expose the unit to water or moisture
- Do not expose the unit to naked flames.
- Do not block or restrict any air vent
- Do not operate the unit in ambient temperatures above 35°C
- Do not touch any part or terminal carrying the hazardous live symbol () while power is supplied to the unit.
- Do not perform any internal adjustments unless you are qualified to do so and fully understand the hazards associated with mains operated equipment.
- The unit has no user serviceable parts. Refer any servicing to qualified service personnel.
- If the moulded plug is cut off the lead for any reason, the discarded plug is a potential hazard and should be disposed of in a responsible manner.

For more detailed information refer to the rear of the manual.

## 2 General

The CX-A450 is a four-channel power amplifier with a typical output of 50 watts per channel into a 4Ω load. The unit features extremely low distortion and low noise together with a high slew rate. Full circuit protection is provided and the load is disconnected if the heat sink overheats or any DC is detected at the output. A five-second switch-on delay operates to avoid any switching thumps or other extraneous signals reaching the speaker system. The CX-A450 also has Dynamic Clip Protection (DCP) that will automatically reduce the signal level when the amplifier is driven into clipping thus limiting any clipping distortion to a low level.

All four input amplifiers are balanced and have 3-pin plug in screw terminal type input connectors with adjacent level controls, all mounted on the rear panel. Input signal routing switches are provided and allow the unit to operate in many configurations whilst retaining simple input connections.

## 3 Installation

The CX-A450 is suitable for mounting in a standard 19" equipment rack and occupies two units of rack space. Sufficient ventilation must be provided for the unit. The amplifier draws cool air through the front panel and exhausts through the rear panel, care must be taken not to obstruct the airflow otherwise the unit may intermittently turn off due to the built-in thermal protection. The unit is 320mm deep but a depth of 400mm should be allowed to clear the connectors.

## 4 Input Facilities

All four inputs are balanced and use 3-pin plug-in screw terminal type connectors (3.5mm pitch). All inputs have a level control adjacent to their respective connector. Rear panel mounted switches provide input routing on channels 2, 3 and 4 allowing a variety of configurations.

In its default configuration, the unit operates as four independent amplifiers. Two stereo pairs, driven from one stereo source and four channels driven from one mono source are also possible by suitably configuring the input routing switches. Schematic diagrams of the switching network in various configurations can be found on page 3.

## 5 Input Routing Diagrams

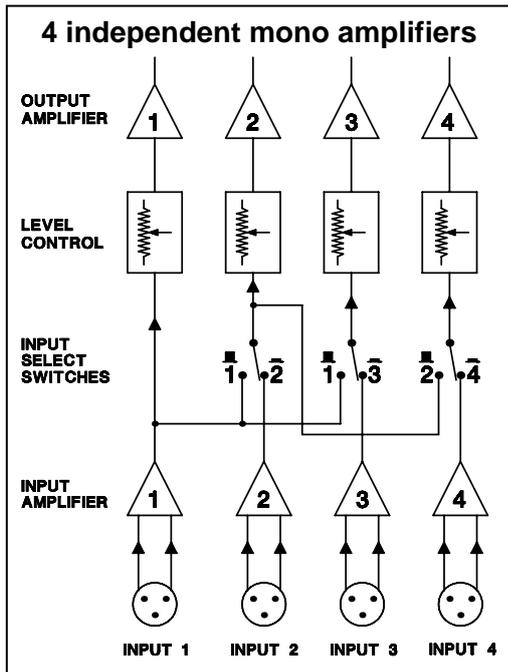


Fig 1

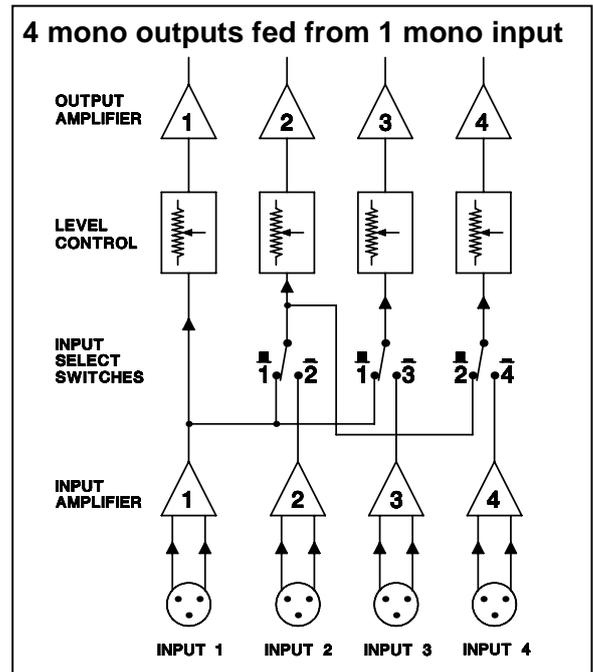


Fig 2

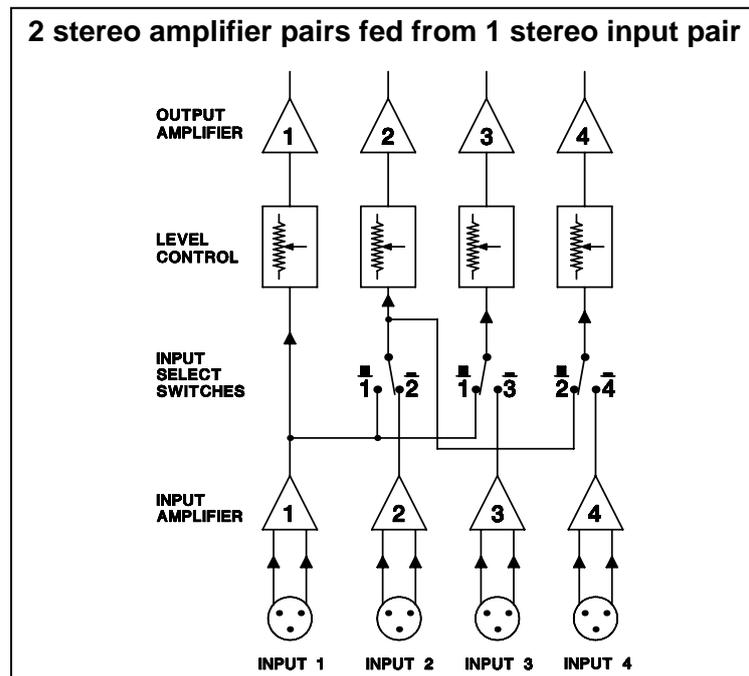


Fig 3

## 6 Output Details

Four 2-pole plug-in screw terminal type connectors (5mm pitch) are provided on the rear panel for the four speaker outputs; these can accommodate flexible leads up to 2.50mm<sup>2</sup>. Do not make any connections to the unit with the power cable attached. It is good practice to distance the output wiring from the input wiring and keep the speaker wires twisted until they are terminated to reduce any cross-talk to a minimum level.

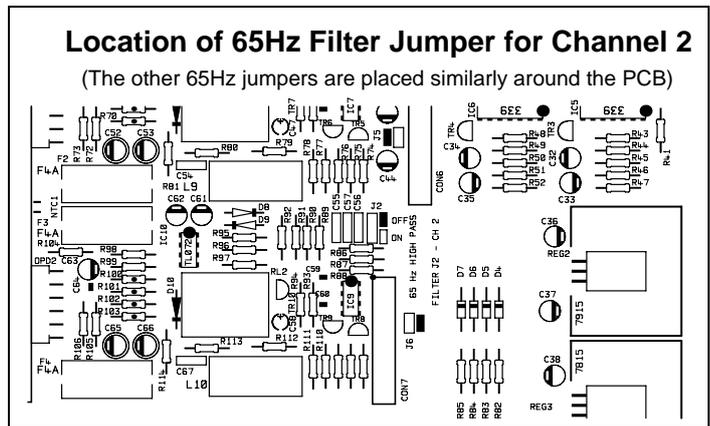
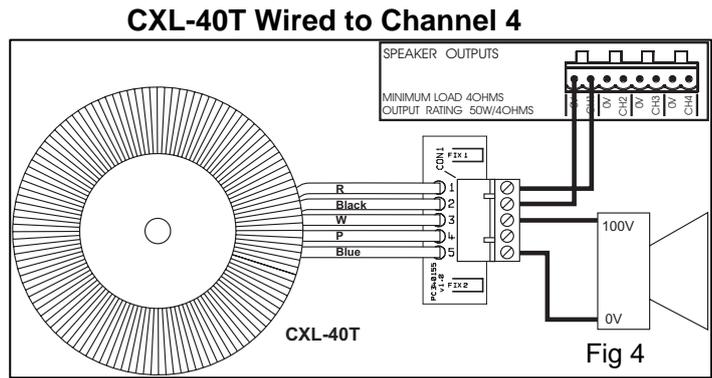
## 7 100V Line operation

An optional four-channel, internally mounted 40W, 70V/100V-line transformer module (CXL-4160) is available for the CX-A450. The installer can select 70 or 100V operation when installing the CXL-4160 by means of soldered links on the underside of the PCB. A single channel externally wired 40W 70V/100V-line transformer module; the CXL-40T, is also available. 70 or 100V operation from the CXL-40T is selected by wiring the speaker network to the correct screw terminal (See Fig 4). When a 70/100V line transformer is installed to a zone, the 65Hz high pass filter for that zone must be switched on, the instructions below detail the procedure you must follow to activate the appropriate filter

- 1) Turn the power off & remove the mains lead.
- 2) Remove the top panel from the unit.
- 3) Turn the relevant 65Hz high pass filter 'on' by moving the relevant jumpers to the 'ON' position (see list below).
  - J1** = Channel 1
  - J2** = Channel 2
  - J3** = Channel 3
  - J4** = Channel 4
- 4) Replace the top panel.

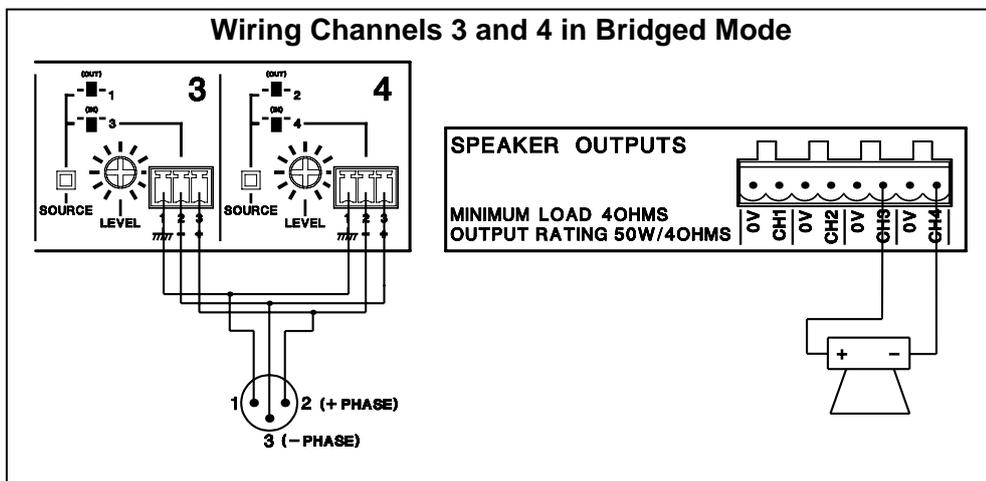
If a filter is not switched on, operation at high input levels and low frequencies may result in the transformer saturating and the amplifier's VI and clip limiting operating.

A 2U 19" rack panel (CXL-800) is available which can accommodate up to 8 CXL-40T transformer modules



## 8 Bridged Mode Operation

The unit can be operated in Bridged Mode using any two channels (see Fig 6). The two amplifiers that are to be bridged must have the same signal input fed to each of them and be out of phase with each other. The input level controls of the two channels should both to be set to the fully clockwise position.



The output load should then be connected between the two positive (HOT) outputs of the relevant channels (no connection to 0V). You must ensure that the positive wire is connected to the "first channel" output and the negative wire is connected to the "second channel" output (see fig 6).

### 9 Status Indicators

The front panel of the CX-A450 has an array of LED's that indicate the status of all four channels (see Fig 7).

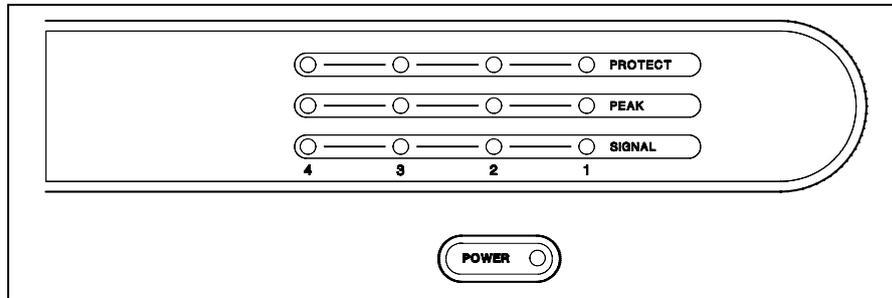


Fig 7

The lower green 'signal' LED illuminates when a signal is detected, the yellow 'peak' LED will illuminate when the amplifier's DCP is operating and the top red 'protect' LED indicates that the protection relay has disconnected the load. Please note that it is normal for all four red LED's to illuminate for approximately five seconds when the unit is switched on, indicating operation of the switch-on delay circuitry. The green 'power' LED at the bottom right of the front panel illuminates when the power is switched on.

### 10 Power Supply Capacity

The CX-A450 has 100mA of current available for optional modules. Exceeding this limit will cause temporary power supply failure. Use the table below to verify your proposed system does not exceed this limit.

Module Name	Current Required
BOSE® EQ cards: M8, M32, MA12, 402, 502A, 802, MB4, MB24, 502B, 502BEX	12mA
BOSE® EQ cards: LT3202, LT4402, LT9402, LT9702	17mA
BOSE® EQ card: M16	34mA
VCA-5	9mA

### 11 VCA Modules

A single channel VCA module 'VCA-5' is available as a plug-in option for each of the four channels. When a VCA-5 is installed to a channel it allows the channel level to be controlled remotely with the optional RL-1 remote plate.

The circuitry uses the industry standard 'Thats 2150A' VCA providing very low distortion and up to 90dB attenuation. The VCA module can be wired to provide muting by using an auxiliary relay connected to a fire alarm control panel. Contact our technical department for further details.

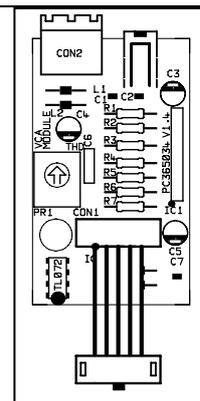


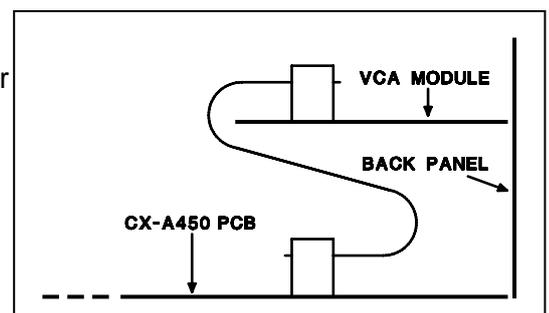
Fig 8

### 12 VCA Module Installation

1. Turn the power off and remove the mains cable
2. Remove the top panel
3. Select the required PCB mounted VCA connector and remove its jumper (see list below)

- CON1 = Channel 1
- CON2 = Channel 2
- CON3 = Channel 3
- CON4 = Channel 4

Fig 9



4. Unscrew the relevant blanking plate from the rear of the unit & retain the screw.
5. Adjacent to the connector there is an M3 fixing screw remove & retain this screw then fit a 35mm M3 hex spacer (supplied) in its place.
6. Push the 10-way VCA plug onto the PCB connector, aligned so the cable enters it from the rear of the chassis (See Fig 9) check there is contact with all 10 pins.
7. Position the VCA module's 3-pin socket through the rear panel cut-out and secure using M3 screws (both removed earlier)
8. Replace the top panel.

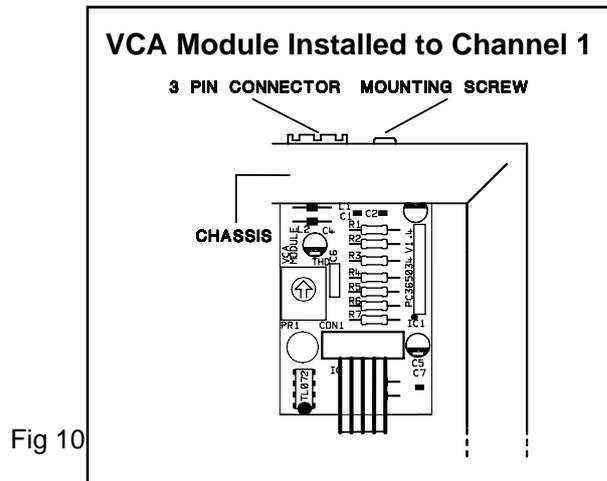


Fig 10

### 13 Remote Level Plate Connections

The RL-1 is a remote control plate that allows the level of a specific channel to be remotely controlled (in conjunction with the VCA-5). The RL-1 is compatible with UK domestic electrical accessories and can be mounted onto a standard British flush or surface mounted 25mm deep back box (The RL-1A is available for the US market).

#### Remote Level Control Wiring

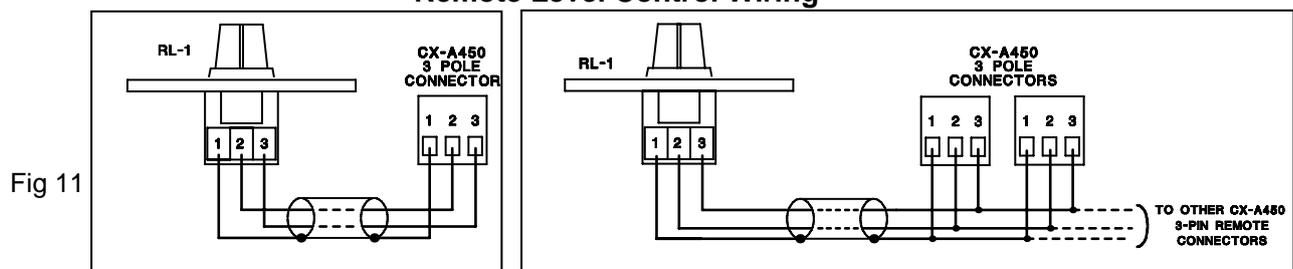


Fig 11

As Fig 10 shows, the RL-1 is connected to a CX-A450 remote connector with a two-core cable that has an overall screen. It is possible to connect a single remote control module to control more than one channel simultaneously (Fig 11). As more channels are linked the law of the control will be compromised resulting in an uneven control of volume; this has proved to be of little consequence operationally.

### 14 Speaker Equalisation Modules

Each channel of the CX-A450 can have a speaker equalisation module installed so that its output will be compensated correctly for a wide range of speakers.

The following speaker models are supported:

- Bose® Speaker models: M8, M16, M32, MA12, 402, 502A, 502B, 502BEX, 802, MB4, MB24, LT3202, LT4402, LT9402, LT9702

## 15 Equalisation Module Installation

1. Turn the power off and remove the mains lead.
2. Remove the top panel from the unit.
3. Select the required PCB connector (see list below) that you wish to install the equalisation module to and remove the bypass jumper adjacent to it.

<b>Ch 1</b>	<b>CON 6</b>	<b>J5</b>
<b>Ch 2</b>	<b>CON 7</b>	<b>J6</b>
<b>Ch 3</b>	<b>CON 9</b>	<b>J7</b>
<b>Ch 4</b>	<b>CON 10</b>	<b>J8</b>

4. Configure the relevant 65Hz filter to 'ON' (See section 7)
5. Fit the EQ card to the connector so that the module board is perpendicular to the main board.
6. Push down on the EQ card until it locates with a click.
7. Replace the top panel.

**NOTE #1:** Before installing your optional modules, ensure that the total power requirement does not exceed the limits of the CX-A450 (see section 10).

**NOTE #2:** Each channel of the CX-A450 can have both the VCA-5 module and Bose® EQ card installed at the same time.

## 16 Field Servicing

The CX-A450 is ruggedly built and uses proven reliable circuitry. It requires no more than the occasional removal of any dust that may have built up inside the unit because of the forced cooling.

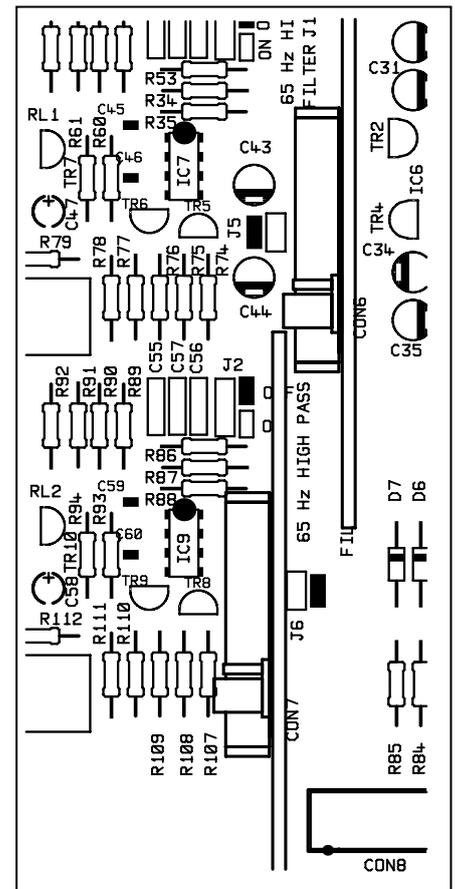


Fig 12

## 17 General Specifications

Inputs	Balanced via 3-pin plug-in screw terminal type connectors
Outputs	2-pin plug-in screw terminal type connectors for flexible cables up to 2.5mm <sup>2</sup>
Protection	VI limiting, DC offset, Thermal, Switch-on Delay & Dynamic Clipping Protection
Status Indicators	LED indicators on each channel for Signal, Peak & Protect
Cooling	Force cooled using variable speed DC fan
Dimensions	482.6mm x 88.0mm (2U) x 300.0mm deep (+ connectors)
Weight	7.15kgs

## 18 Technical Specifications

Rated Output 4 Ohm load(s)	50W nominal
Rated Output 8 Ohm load(s)	35W nominal
Bridged Output	100W nominal into 8 Ohm load, minimum load 8 Ohms
100V Output	40W into 250 Ohms
70V Output	40W into 125 Ohms
Frequency Response	+0dB -0.5dB 10Hz to 20kHz, switch-able high pass filter -3dB @65Hz
THD+N	0.02%, typical, @1kHz, 60W into 4 Ohms, one channel driven, measurement BW 22Hz to 80kHz

VCA Module THD+N	<0.03% 1kHz, measurement BW 22Hz to 80kHz
Crosstalk Typical, between adjacent channels	Typically -70dB @10kHz with 4 Ohm load
Input Sensitivity	0dBu (775mV)
Input Impedance	10k balanced / 5k unbalanced
Noise	<96dB rms below rated output, un-weighted, measurement BW 22Hz to 22kHz
Power Input	230V $\pm$ 5% (115V $\pm$ 5% available)
Fuse rating	230V – T3.15A H    115V – T6.3A H
Fuse type	20mm x 5mm High Breaking Capacity 250V

This product conforms to the following European EMC Standards:



**BS EN 55103-1:1997**

**BS EN 55103-2:1997**

This product has been tested for use in commercial and light industrial environments. If the equipment is used in controlled EMC environments, the urban outdoors, heavy industrial environments or close to railways, transmitters, overhead power lines etc. the performance of the unit may be degraded.

The product conforms to the following European electrical safety standard.

**BS EN 60065:1998**

## Safety Considerations and Information

The unit must be earthed. Ensure that the mains power supply provides an effective earth connection using a three wire termination.

When the mains switch is in the off 'O' position the live and neutral conductors of the mains transformer are disconnected, however some parts of the product will still remain connected to the live and neutral mains conductors

### **CAUTION – Installation**

Do not expose the unit to water or moisture  
Do not expose the unit to naked flames.  
Do not block or restrict any air vent  
Do not place liquid filled containers on or around the unit  
Do not operate the unit in ambient temperatures above 35°C

### **CAUTION – Hazardous Live**

Do not touch any part or terminal carrying the hazardous live symbol () while power is supplied to the unit.

Terminals to which the hazardous live symbol refers require installation by a qualified person.

### **CAUTION - Mains Fuse**

Replace the mains fuse only with the same type and rating as marked on the rear panel. The fuse body size is 20mm x 5mm.

### **CAUTION – Servicing**

The unit contains no user serviceable parts. Refer servicing to qualified service personnel. Do not perform servicing unless you are qualified to do so.

Disconnect the power cable from the unit before removing the top panel and do not make any internal adjustments with the unit switched on.

Only reassemble the unit using bolts/screws identical to the original parts

In the interest of continuing improvements Cloud Electronics Limited reserves the right to alter specifications without prior notice.

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