USER GUIDE
for the

HES12xxx
HES24xxx

PRE-WIRED
CABINETS

User Guide for the
Imagine HES12xxx & HES24xxx PRE-WIRED CABINETS
Document EPD04011 I293GB issue 5 (22/07/03)

Issued by:

Publications Department,
Electrosonic Ltd.,
Hawley Mill,
Hawley Road,
Dartford,
Kent,
DA2 7SY,
United Kingdom.

Documentation written and designed by Andrew M. Bailey.

Printed in the United Kingdom.

PREFACE

Scope of this document

The descriptions and instructions contained in this document cover the physical and electrical installation of the Helvar Electrosonic *Imagine* range of *PRE-WIRED CABINET*s. Details are also provided on system expansion and the interconnections required between separate cabinets.

The guide does not give specific details on the connection of peripheral devices such as *SCENECOMMANDER*s, *SCENETIMER* or *INPUT* modules. This information may be found in the user guide for the appropriate products.

Technical Specifications

Any technical data required for the correct installation and use of the *PRE-WIRED CABINET*s is included in this guide.

For full technical specifications of these products, reference should be made to the Technical Source leaflet (ref: EPD04010).

Firmware Version

The operational instructions contained in this user guide assume that the *DIMMER* and *SCENESET* modules are using the following firmware:

DIMMER module	version 1.3.
SCENESET module	version 1.3.

Installation Standards

All installations must conform to any applicable building or electrical regulations and standards.

Trade Marks

IMAGINE™, SCENESET™, SCENEMAKER™, SCENETIMER™, SCENE PLANNER™, SCENESOFT™, and SCENE COMMANDER™ are trade marks of Electrosonic.

This page is intentionally left blank.

CONTENTS

SECTION 4
OUTPUT POWER CONNECTIONS 23

SECTION 5
CONTROL CONNECTIONS 27

SECTION 1
INTRODUCTION

This section covers the following topics:

- Overview of the *Imagine* System.
- Basic Specifications.
- Internal Layout.
- Pre-installation Checks.
- *SCENESOFT* Cards.

OVERVIEW OF THE *Imagine* SYSTEM

The heart of the Electrosonic *Imagine* lighting system is the HES91000 *SCENESET* module, which can set the dimming level of up to 128 power outputs. The levels of these outputs are stored as a 'scene' on a *SCENESOFT* card. Three cards are available offering different storage capacities; the largest can store up to 1024 scenes.

The power outputs are controlled by HES92000 *DIMMER* modules. Each module controls two outputs, and each output can be dimmed according to a variety of dimming laws.

Scenes can be recalled from the *SCENESET* module by several different devices, but principally by the HES93xxx range of *SCENECOMMANDER*s.

Up to 8 *SCENESET* modules may be connected together in a full system each with its own *DIMMER* modules and scene-recall devices. This enables up to 1024 power outputs to be controlled.

PRE-WIRED CABINETS

The range of *PRE-WIRED CABINET*s comprise various configurations of *SCENESET* and *DIMMER* modules, input MCB's and power output terminals with all necessary internal wiring. A *BREAKOUT* module is also provided for control circuit connections.

There are two ranges of cabinets – HES12xxx and HES24xxx – providing 12 and 24 power outputs respectively.

'Turbo' models HES12200 / 12300 / 24200 / 24300 are fitted with a cooling fan which enables higher output loads to be driven.

'Slave' models HES12100 / 12300 / 24100 / 24300 are not fitted with a *SCENESET* module and are intended for system expansion.

BASIC SPECIFICATIONS

HES12xxx Range

MODEL >> / FEATURE	HES12000	HES12200	HES12100	HES12300
Controlled Outputs	12	12	12	12
SCENESET Module	Yes	Yes	No	No
Fan Cooling	No	Yes	No	Yes
Max. Current Rating (per output)	10A	20A	10A	20A
Total Supply Current (all outputs at maximum load & level)	121A	241A	120A	241A
Heat Dissipation (all outputs at maximum load & level)	225W	615W	210W	600W
Nominal Weight	35.8kg	38.8kg	34.1kg	37.1kg
Overall Cabinet Size	550mm(W) x 735mm(H) x 220mm(D)			

HES24xxx Range

MODEL >> / FEATURE	HES24000	HES24200	HES24100	HES24300
Controlled Outputs	24	24	24	24
SCENESET Module	Yes	Yes	No	No
Fan Cooling	No	Yes	No	Yes
Max. Current Rating (per output)	10A	20A	10A	20A
Total Supply Current (all outputs at maximum load & level)	241A	481A	240A	481A
Heat Dissipation (all outputs at maximum load & level)	435W	1215W	420W	1200W
Nominal Weight	57.0kg	60.0kg	55.3kg	58.3kg
Overall Cabinet Size	550mm(W) x 1142mm(H) x 220mm(D)			

INTERNAL LAYOUT

The layout of internal components is basically identical for both the HES12xxx and HES24xxx ranges, with only the number of terminals, MCB's and *DIMMER* modules being different.

The input / output terminals and MCB's are mounted on a DIN rail on the left-hand side of the cabinet, whilst the *DIMMER* modules, *SCENESET* module, *BREAKOUT* module and *FAN UNIT* are fitted to the *STACKER* unit on the right-hand side (see Fig.1-1).

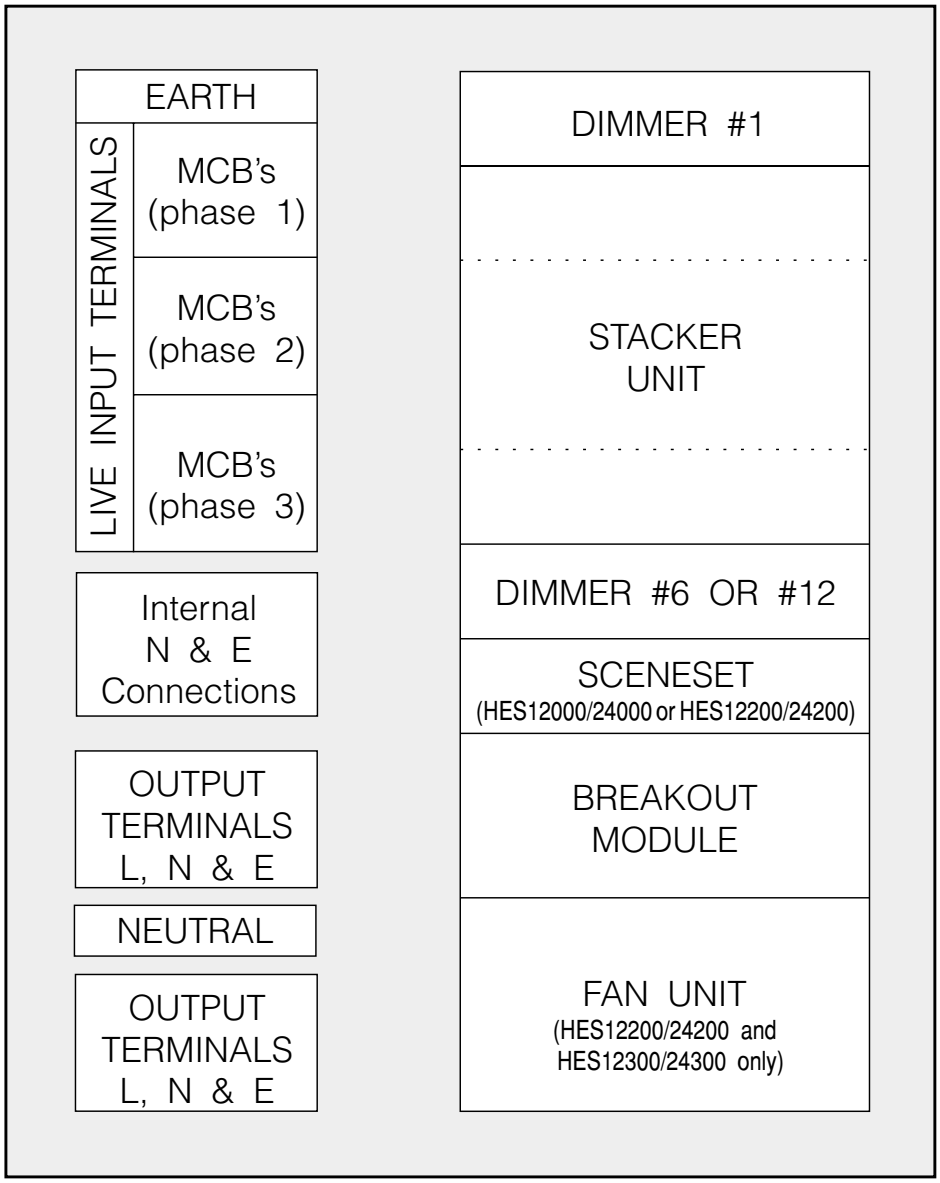


Fig.1-1: Internal layout of Pre-wired Cabinets.

PRE-INSTALLATION CHECKS

Before installing, connecting or using the *PRE-WIRED CABINET*, ensure that any internal packing is removed.

Check that the metal casing is undamaged, and that the internal components have not become damaged or dislodged in transit.

If anything is damaged or missing, contact your supplier immediately.

SCENESOFT CARDS

For the *SCENESET* module to function correctly, a programmed *SCENESOFT* card must be plugged into slot 'A' on the front panel.

The card stores the following information:

- *SCENESET* address.
- *DIMMER* output levels for each scene.
- *DIMMER* parameters.
- Scene parameters (linking, fade times, re-directions, etc).

The number of scenes stored on the card depends on its capacity. Three cards are available offering the following capacities:

SCENESOFT 12 (HES90120):	40 scenes.
SCENESOFT 24 (HES90240):	600 scenes.
SCENESOFT 128 (HES91280):	1024 scenes.

A *SCENESOFT* card is provided with the *PRE-WIRED CABINET*. Although the card is formatted, it is not programmed.

System Programming

Programming is achieved by a *SCENEMAKER* or *SCENEPLANNER* unit (not supplied) which can be plugged into the programmer connector on the *SCENESET* module or on one of the *SCENECOMMANDER*s connected to the S-COM data line.

SECTION 2
CABINET INSTALLATION

This section covers the following topics:

- Siting Requirements.
- Mounting Options, Kits and Methods.
- Reversing the Door.
- Removing the Side Panels.
- Cable Entry Points.
- Terminal Cover Panel.

SITING REQUIREMENTS

The installation site must meet the following criteria:

Temperature range: 0C – 35C.
Humidity: 0% – 90% non-condensing.

There should be sufficient ventilation to dissipate the heat produced from the cabinet(s) when all outputs are at their maximum level and loading. The door ventilation grilles must be kept free from obstruction at all times.

Model >	HES12000	HES12200	HES12100	HES12300
Max. heat dissipation	225W	615W	210W	600W

Model >	HES24000	HES24200	HES24100	HES24300
Max. heat dissipation	435W	1215W	420W	1200W

Cabinet Clearances

Since all necessary ventilation is achieved through the cabinet door, there is no specific clearance required above, below or on either side. However, it is recommended that a gap of at least 100mm is allowed all round to provided access for installation and maintenance. Sufficient space should be available above or below the cabinet to allow for cable entry.

Where more than one cabinet is being installed, it is not recommended that they are mounted one above the other as heat produced by the lower cabinet may affect the ventilation of the upper cabinet.

The door will open to a maximum of 90° within the overall width of the cabinet. If the door is required to open further, then extra clearance needs to be given on the hinged side of the door (Fig.2-1).

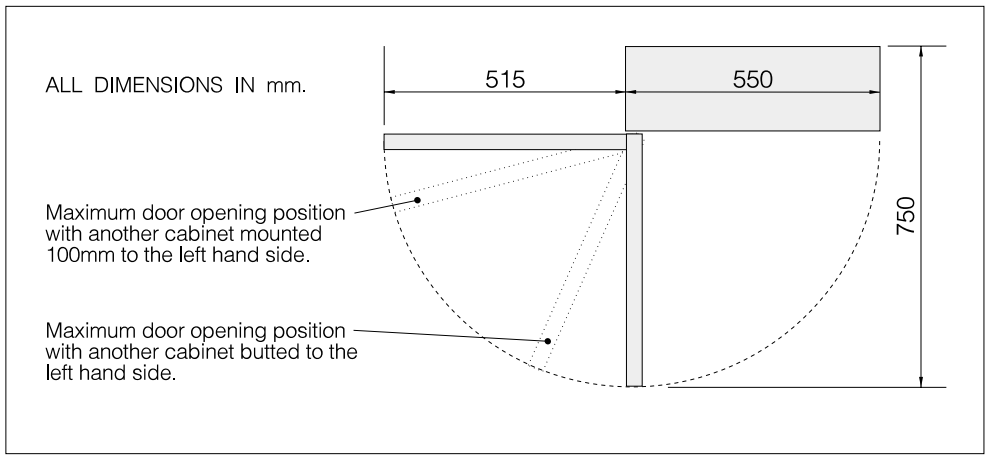


Fig.2-1: Door clearances.

MOUNTING OPTIONS

The cabinet can be installed in a variety of ways depending on the location and user requirements, but must be installed vertically.

The important consideration for any method of installation is that the cabinets are heavy and must be secured accordingly.

Wall Fixing

There are number of 'keyhole' type fixing holes provided on the back of both sizes of cabinet which may be used for wall fixing (Fig.2-2).

It is recommended that the HES97520 Wall Fixing Kit be used.

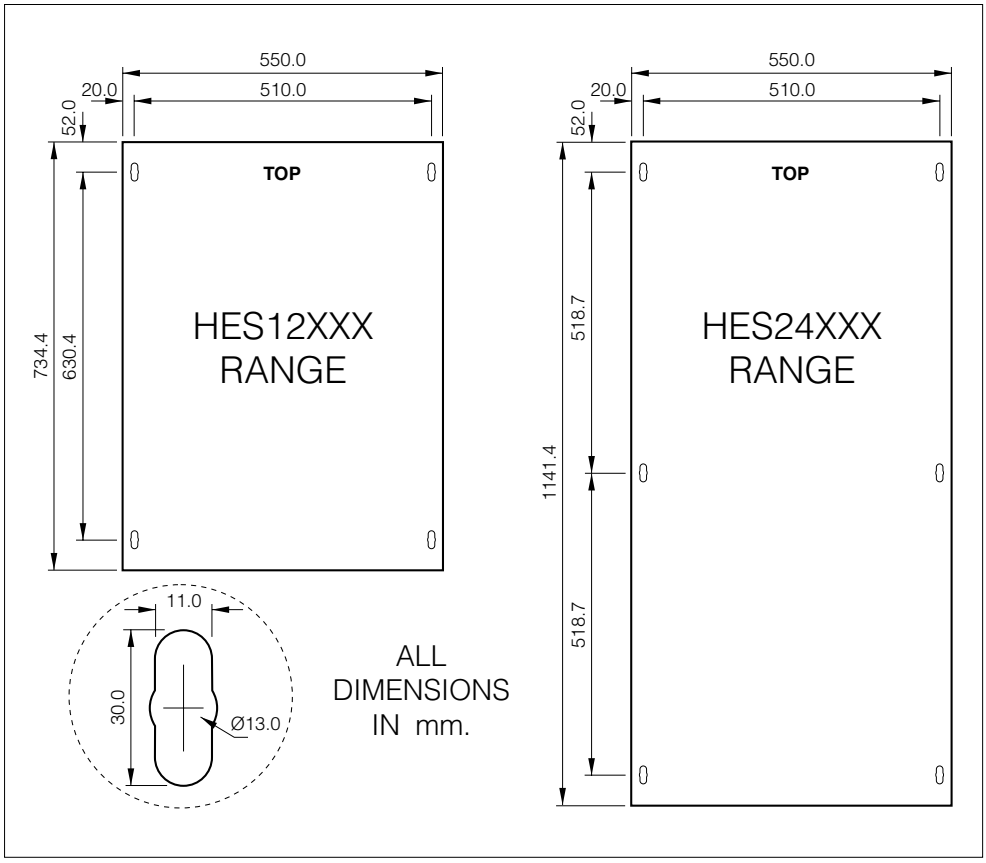


Fig.2-2: Dimensions of cabinet rear fixing holes.

Wall Fixing Kit (HES97520)

A kit of parts is available to assist wall fixing. The kit comprises two metal plates, each with two threaded studs and five fixing holes. The plates are intended to be secured to the wall with suitable screws or bolts (not supplied), with the cabinet then being clamped into position on each stud with nuts and washers provided. Full instructions are included with the kit.

> ***WARNING***
> *Both wall plates must be fitted, and you should ensure that both the wall and the plate fixings are capable of supporting the weight of the cabinet. Remember to take into account that the cabinet may be leant upon or put under other such stresses during installation and use.*

Floor Plinth (HES97540)

A metal plinth is available allowing the cabinet to stand directly on the floor. This is particularly recommended for the HES24xxx range of cabinets.

Fitting the plinth requires the removal of the two cable entry plates from the base of the cabinet. The plinth is then secured to the base of the cabinet with self-tapping screws provided.

Cable entry is not possible through the base of the cabinet when the plinth is fitted.

> ***WARNING***
> *If the cabinet is floor mounted, it is essential that the top of the cabinet is secured to a rear wall (or another supporting arrangement) to prevent the unit from tipping. One of the wall fixing plates detailed above may be used for this purpose.*

Back-to-back

Two cabinets fitted with floor plinths may be installed back-to-back. The two cabinets must be bolted together top and bottom using suitable M10 nuts, bolts and washers (not supplied) through the rear fixing holes.

REVERSING THE DOOR

The door on each type of cabinet is designed to be reversible. This is achieved by transferring the various fittings to the mounting points on the opposite sides of the door and cabinet, as follows:

> ***WARNING***
> *If the cabinet is already connected to the mains supply, for your own safety always ensure that the supply is isolated before attempting to remove the door. Ensure that all earth leads are reconnected.*

1. Unlock the door using the key provided.
2. Open the door and disconnect the earth lead from the stud on the back of the door.
3. Remove the collars from the top and bottom hinge pins by loosening the grub screw with an M4 allen key.
4. Partially close the door (with the open edge approximately 50mm from the cabinet), grasp the door firmly at the top and bottom, and lift it upwards off of the hinge pins.
5. Transfer the lock and finger plate to the opposite side of the door in place of the hole plug (which should be transferred to the vacant hole). Ensure that the lock is orientated correctly before fixing (see Fig.2-3).

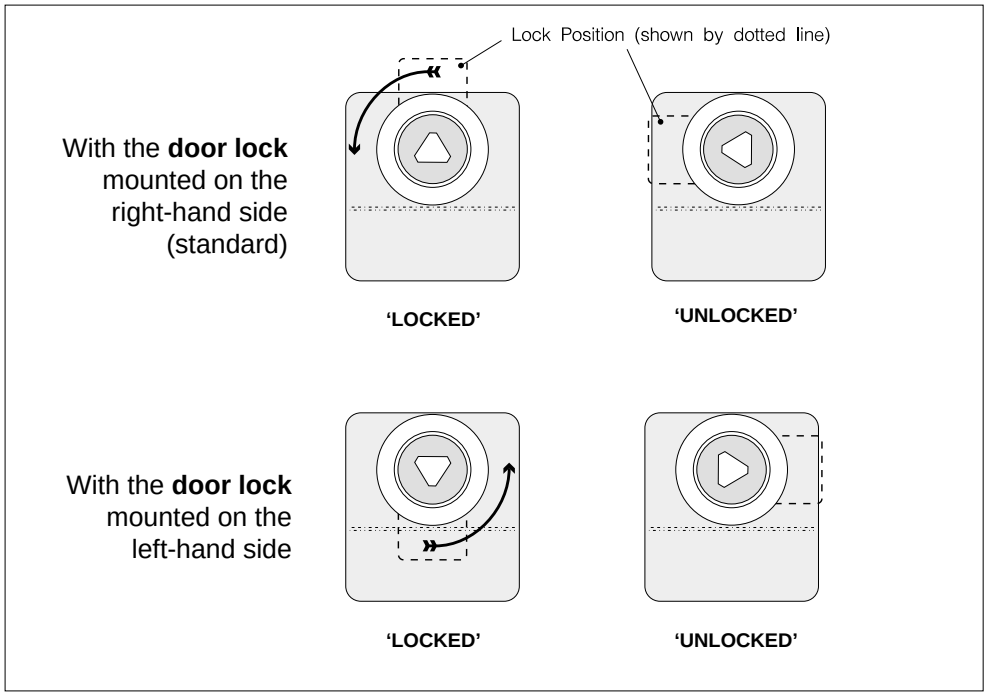


Fig.2-3: Door lock mounting positions.

6. Remove the two hinge plates from the cabinet, move the hinge pin to the other hole in each plate, and refit the hinge plates to the opposite side of the cabinet (see Fig.2-4).

NOTE *There are two groups of four holes where the hinge brackets are to be mounted; use the top two holes only.*

7. Transfer the latch plate and locating stud to the opposite side of the cabinet, noting that the latch plate is inverted (see Fig.2-5).

8. Disconnect the door earth lead from the side panel of the cabinet and transfer it to the opposite side panel earth stud.

NOTE *To improve accessibility when fitting or removing the lead from the right-hand side panel, remove the four screws securing the panel to the cabinet and ease the panel forward. Once the earth wire is secure, refit the side panel ensuring that the fixing screws are securely tightened.*

9. Offer the door up to the cabinet in the 'almost closed' position and hook it on to the hinge pins.

10. Open the door and connect the earth wire to the door earth stud.

11. Resecure the collars to the top and bottom hinge pins.

Removing the Side Panels

To assist with the physical and electrical installation of the cabinet, the side panels can be removed. To remove the side panel with the door hinged to it, first remove the door as described in steps 1 to 4 on page 11, then proceed as follows:

> ***WARNING***
> *If the cabinet is already connected to the mains supply, for your own safety always ensure that the supply is isolated before attempting to remove the sides. Ensure that all earth leads are reconnected.*

1. Disconnect the earth lead to the appropriate side, which is located at the bottom front of the panel.

2. Remove the four screws (two top, two bottom) securing the side panel to the cabinet.

3. Slide the panel forwards until the rear retaining lugs are free, then lift the panel away. When replacing ensure that the rear lugs locate correctly on the rear panel flanges and that the earth lead is reconnected..

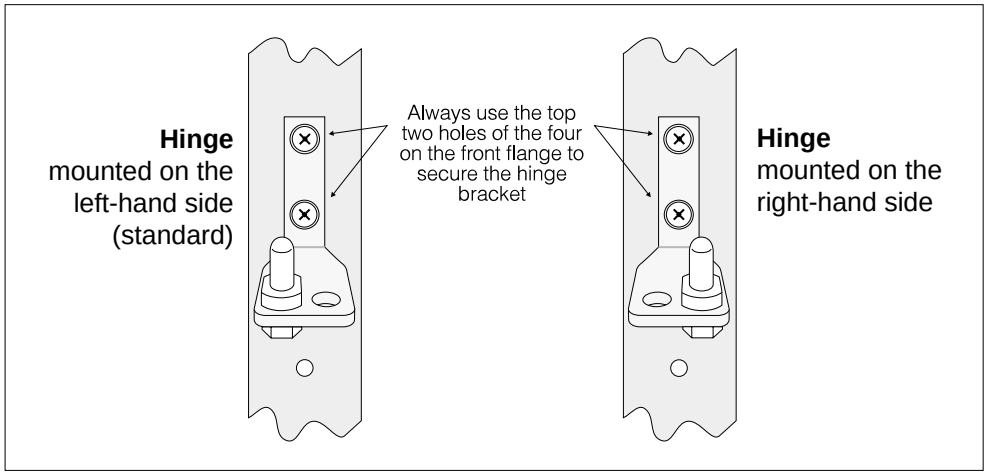


Fig.2-4: Hinge plate and hinge pin positions.

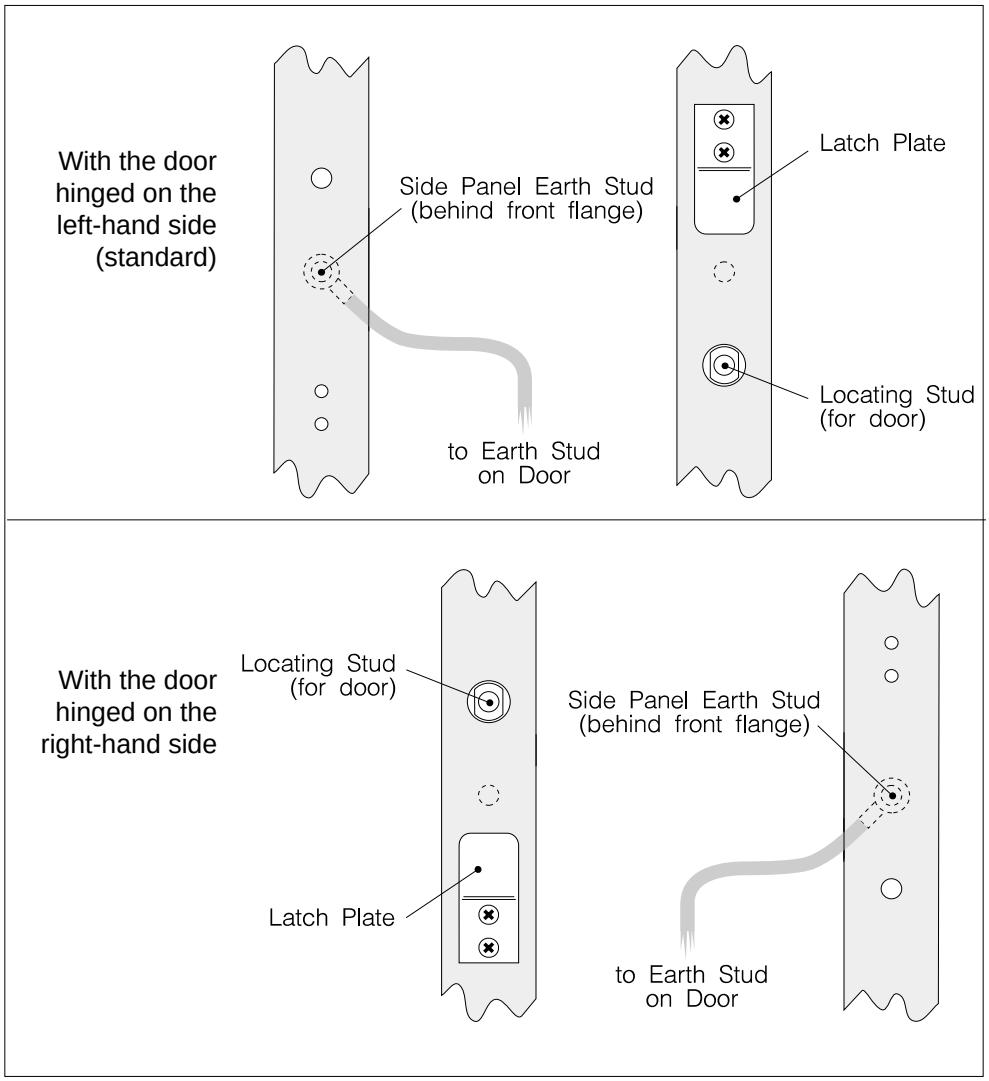


Fig.2-5: Latch plate, locating stud and earth wire.

CABLE ENTRY POINTS

There are cable entry cut-outs located on the top and bottom panels of all types of cabinet. These are covered with plates secured by screws..

The plates may be removed completely for access or can be cut or drilled to allow for fixing to conduit and trunking systems. Fig.2-6 shows the cut-out and plate dimensions viewed from the top and these are the same for both the top and bottom panels.

The large left-hand cut-out is for mains input and output cables, whilst the smaller right-hand cut-out is for FELV (Functional Extra-Low Voltage) cables.

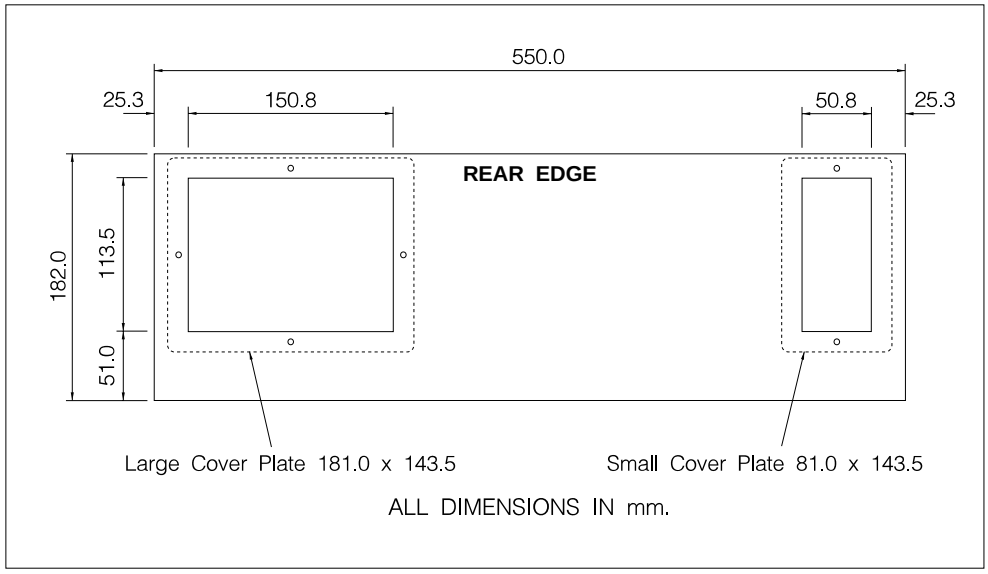


Fig.2-6: Cable entry cut-out and plate dimensions.

Terminal Cover Panel

A plastic cover is fitted around the MCB's, covering the various input and output terminals. The panel provides secondary insulation and also identifies the various MCB's and power connections.

The panel is retained by several pairs of plastic clips which are attached to the DIN rail. To remove the panel, squeeze the lugs of each pair together in turn and ease the panel forwards until completely free. To refit, align the panel with each pair of clips and firmly push the panel into position.

A channel is provided on the panel for a slot-in label, on which details of the input supply, MCB and output functions should be recorded. The label (with its clear protective cover) slides out from the top of the channel.

SECTION 3
INPUT POWER CONNECTIONS

This section covers the following topics:

- Input Supply Requirements.
- Connecting Terminals.
- Cable Sizes.

Voltage Range

The *DIMMER* modules and (where fitted) the *SCENESET* module and *FAN UNIT* within a *PRE-WIRED CABINET* are factory-set for use with one of the following voltage ranges which cannot be changed by the user:

- **230V a.c.** (nominal); **180V – 260V a.c.** (absolute). or
- **115V a.c.** (nominal); **90V – 130V a.c.** (absolute).

Check that the cabinet is set for the correct range for the intended power supply by referring to the serial no./rating plate which is situated on the inside of the cabinet base panel (between the DIN rail and *STACKER* unit).

> ***CAUTION***
> *Connecting a supply which exceeds the maximum limit for the appropriate input range may cause irreparable damage to the cabinet components.*

Frequency Range

The input supply frequency must be within the range 45 – 65Hz.
A supply frequency outside this range will cause the *DIMMER* modules to shut-down.

INPUT SUPPLY

Input Current (3-phase)

The table below shows the maximum possible current that may be drawn with all outputs at maximum load and level. The input supply must be externally protected.

Model	Max. current Phase 1	Max. current Phase 2	Max. current Phase 3	Max. current TOTAL
HES12000	40A	40A	41A	121A
HES12200	80A	80A	81A	241A
HES12100	40A	40A	40A	120A
HES12300	80A	80A	81A	241A
HES24000	80A	80A	81A	241A
HES24200	160A	160A	161A	481A
HES24100	80A	80A	80A	240A
HES24300	160A	160A	161A	481A

Input Current (single phase)

The *PRE-WIRED CABINET* is primarily intended for use with a 3-phase supply.

If the cabinet is to be connected to a single phase supply, the maximum current that can be drawn is limited by the capacity of the neutral bus-bar on the output terminals.

Maximum current: 160A.
(single phase operation)

The input supply must be externally protected.

INPUT CONNECTIONS

Earth Terminal

This is located at the top of the DIN rail and is coloured green and yellow.

Maximum cable size:	35mm^2.
Stripping length:	20mm.
Screw torque setting:	2.5 Nm.

Live Input Terminals (Phase 1, 2 & 3)

The input MCB's are are arranged in three groups (one for each phase). All of the input terminals within each group are linked by an internal bus-bar. Always ensure that the connection to each MCB group is made via the MCB nearest the centre of each group to provide equal load distribution along the bus-bar.

Connection is achieved by various methods according to the cabinet type and size of the input cables; these are illustrated in Fig.3-3 and 3-4. Cables of 16mm^2 size (or less) should be fitted directly into the MCB input terminals. Cables of 35mm^2 size should use the adapter(s) supplied and be connected in the positions indicated. Both screws on each adapter must be fully screwed-in to ensure that the cable is securely clamped.

Maximum cable size:	35mm^2 *(with adapter – see note below).*
	16mm^2 *(MCB terminal).*
Stripping length:	13mm *(one adapter).*
	30mm *(two adapters).*
	10mm *(MCB terminal).*
Screw torque setting:	2Nm *(MCB only).*

NOTE *The adapters are suitable for 35mm^2 cable only. If 25mm^2 cable is used then a different type of adapter must be fitted (available on request).*

Neutral Terminal

This is located on the neutral bus-bar for the power output terminals. The output terminals are arranged in two groups with the neutral terminal situated between them.

Maximum cable size:	35mm^2.
Stripping length:	15mm.
Screw torque setting:	2.5 Nm.

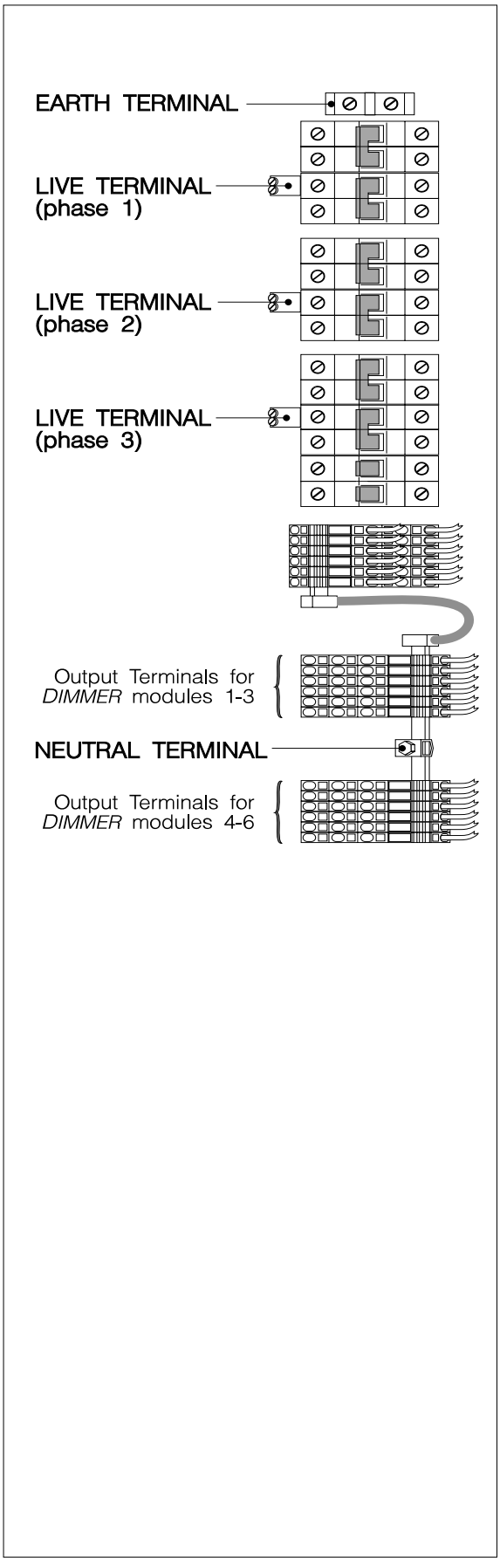


Fig.3-1: Main input terminals for HES12xxx range.

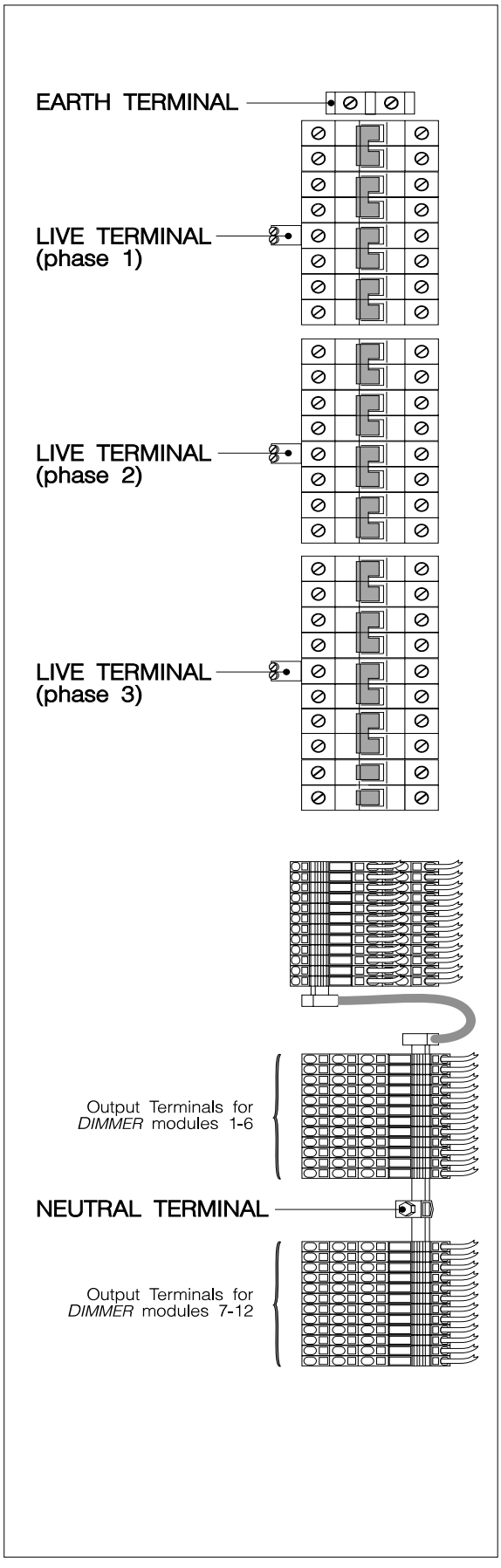


Fig.3-2: Main input terminals for HES24xxx range.

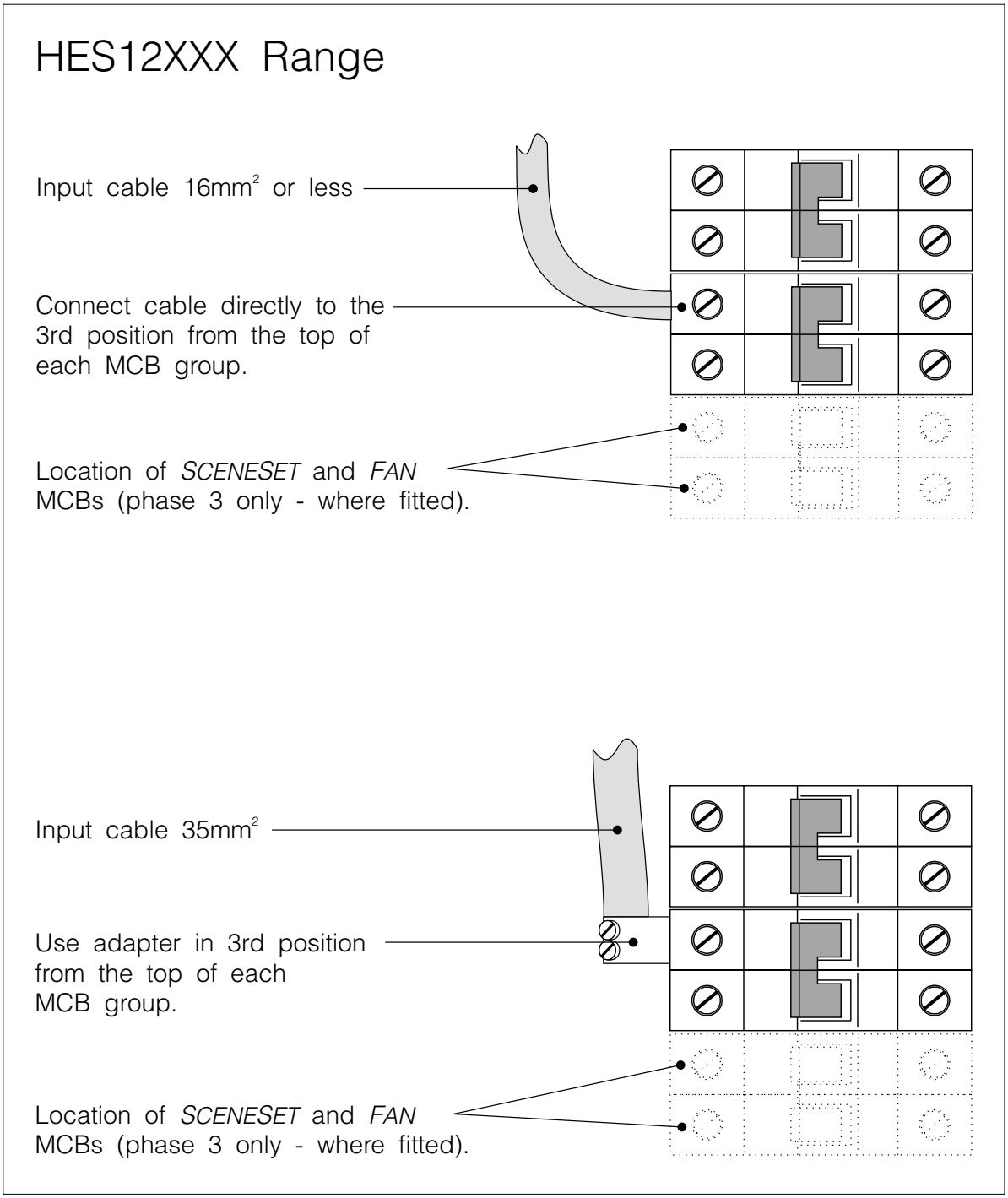


Fig.3-3: HES12xxx range - live input connections.

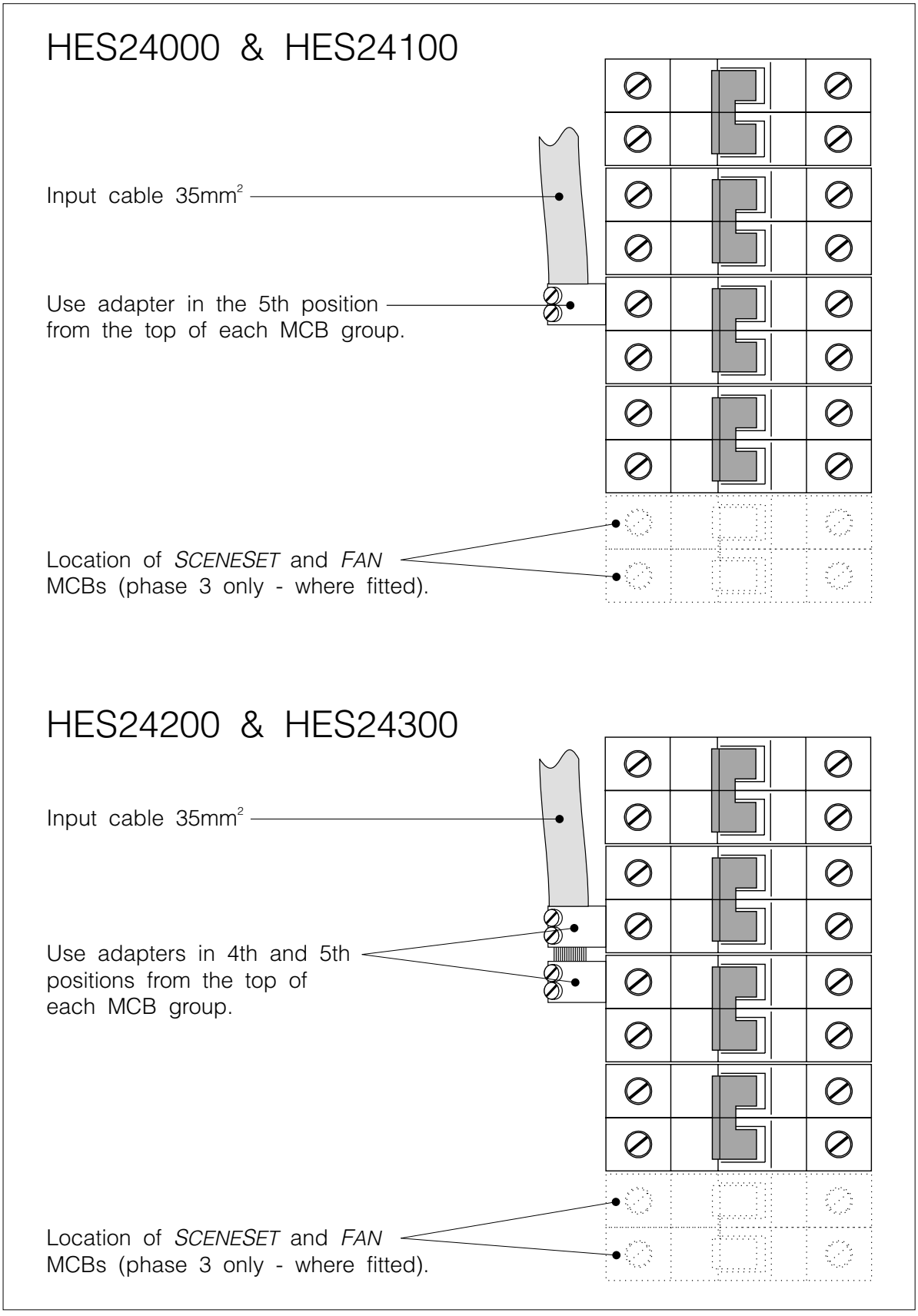


Fig.3-4: HES24xxx range - live input connections.

MCB ANTI-TAMPER CLIP

On cabinets fitted with a cooling fan, the MCB for the *FAN UNIT* is fitted with an anti-tamper clip. This is used to prevent the MCB from being switched-off accidently.

To remove the clip, slide back the plastic sleeve and compress the two retaining springs until they disengage with the holes in the MCB body (Fig.3-5). When refitting, ensure that the MCB is switched-on and that the clipis positioned on the left-hand side.

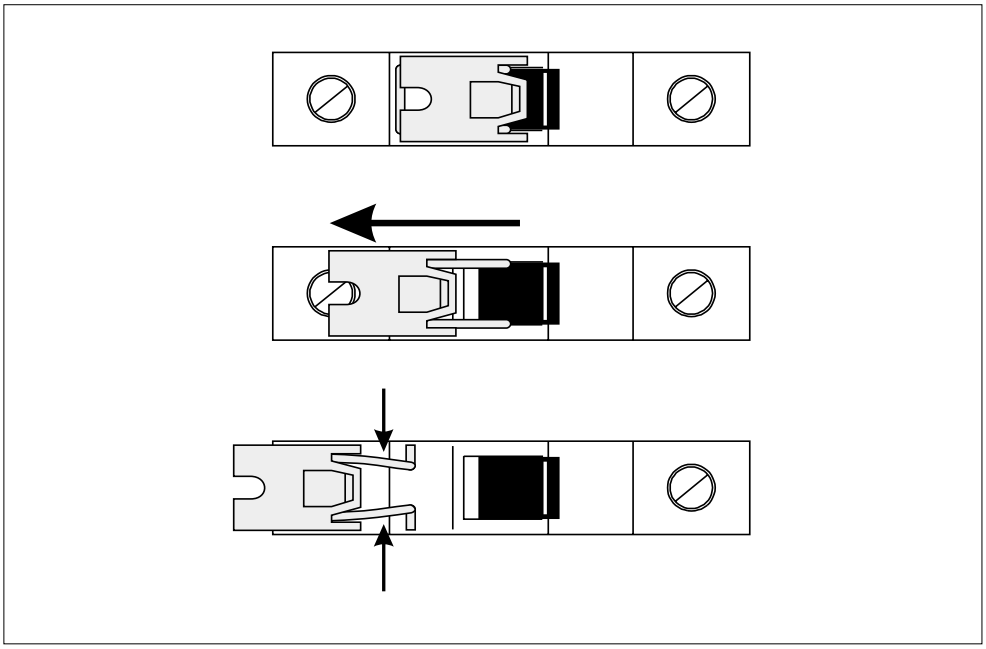


Fig.3-5: Removing the MCB anti-tamper clip.

SECTION 4
OUTPUT POWER CONNECTIONS

This section covers the following topics:

- Cable Type and Sizes.
- Output Loading.
- Connecting to the Output Terminals.
- Connection for Parallel Operation.

OUTPUT POWER CONNECTIONS

The connections for each output circuit are located at the bottom of the DIN mounting rail. A 'triple' terminal arrangement is provided giving a separate neutral and earth terminal for each controlled live output, allowing easy connection and identification of each circuit (see Fig.4-1).

Cable Type

The connecting cables should conform with the following specification:

Suitable cable type:	Solid, stranded or flexible.
Cable size:	$1.5mm^2 – 4mm^2$.
Stripping length:	10mm.

Output Loading

The maximum load for each output must not exceed the rating of the input MCB. If an output is to be used with a switched load (i.e. non-dimming), it is recommended that the load should not exceed 80% of the MCB rating to avoid nuisance tripping.

Method of Connection

The terminals are of a screw-less cage-clamp design and connection is achieved as follows (see Fig.4-2):

1. Insert the blade of a small flat-bladed screwdriver as far as it will go into the terminal release point (square hole) next to the connecting point.
2. Push the screwdriver handle to the right, which will open the cage-clamp.
3. Insert the cable into the connecting point. (If stranded wire is used, ensure that the strands are twisted together).
4. Release pressure on the screwdriver, and check the security of the connection by pulling on the cable.

IMPORTANT NOTE
Only one cable should be inserted into each terminal to ensure a reliable connection. If additional cables are needed (e.g. for Parallel Operation), a separate junction box or splitter must be used.

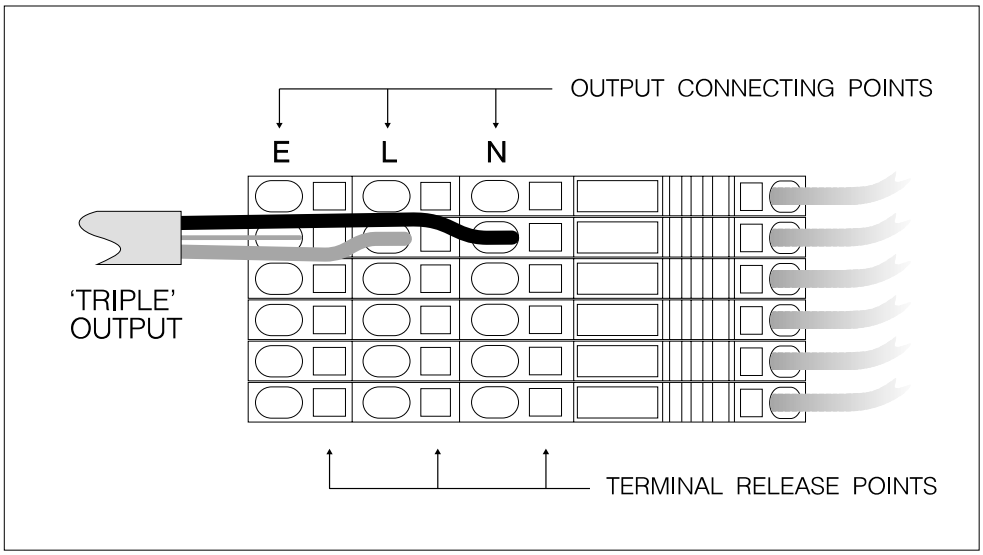


Fig.4-1: Power output connections.

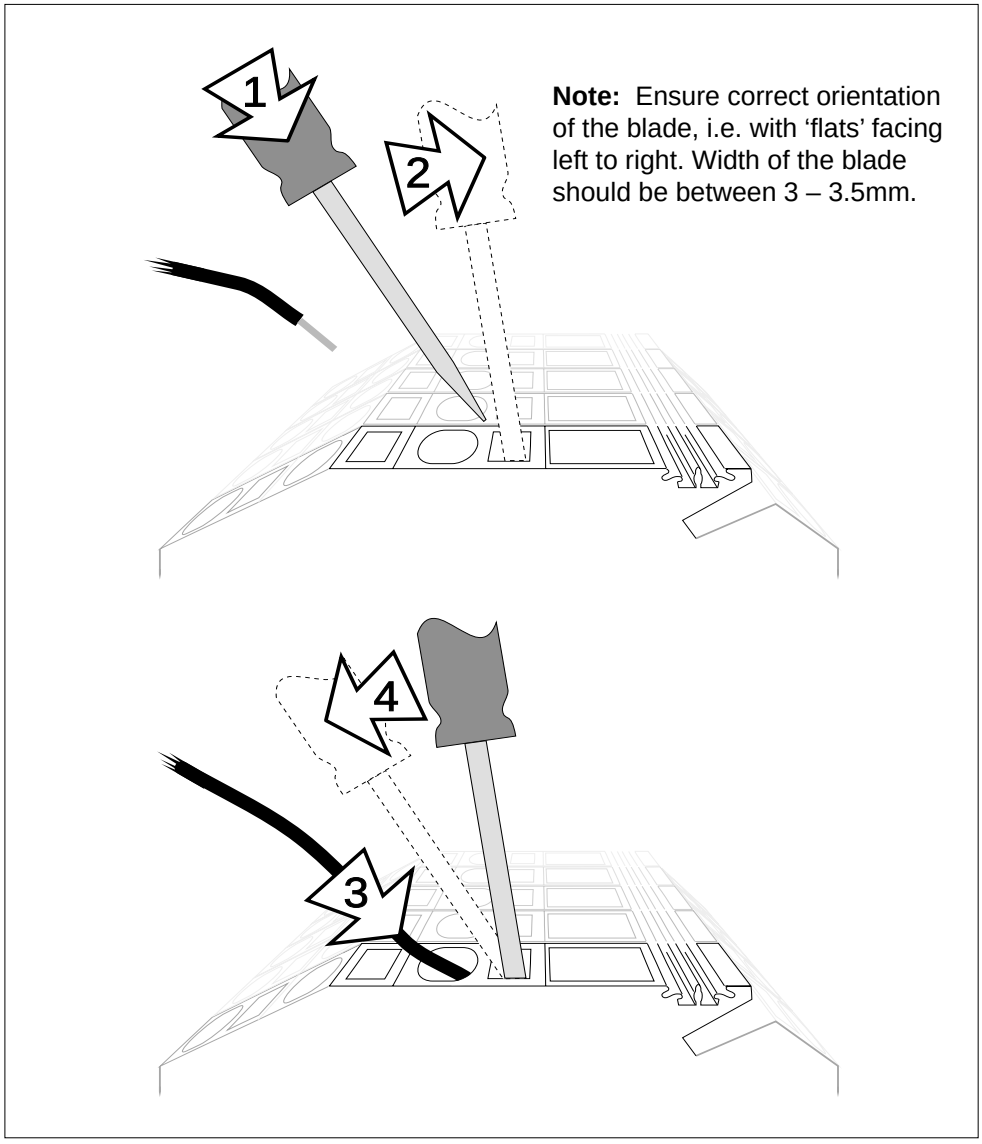


Fig.4-2: Connecting to 'cage-clamp' output terminals.

Parallel Operation

When two *DIMMER* outputs are required to be used in parallel to drive a higher load, a separate feed must be taken from the two output terminals and joined together in a junction box. This ‘double’ feed may then be connected to the load circuit.

For parallel operation, both dimmer outputs must be set to the same channel address (see section 8, page 58).

Securing the Output Cables

When all of the output cables have been connected, they should be tied together using suitable cable ties. If additional support is required, the cables may be tied to the DIN rail support brackets.

SECTION 5
CONTROL CONNECTIONS

This section covers the following topics:

- Breakout Module.
- Suitable Connectors and Cables.
- Configuration Switches.
- Connecting Details for S-COM and S-DIM.
- Watchdog and Level Override Circuit Details.

BREAKOUT MODULE

The *BREAKOUT* module is located at the base of the *STACKER* unit and provides connection points to the various FELV (Functional Extra-Low Voltage) data and control circuits (see Fig.5-1.).

- S-COM (external) power & data highway.
- S-COM (star) data highway.
- S-COM (internal) data highway.
- S-DIM data highways.
- *SCENESET* watchdog relay contacts.
- *BREAKOUT* module relay coil and contacts.
- *DIMMER* level override input.
- Temperature detect output.

These allow the connection of various external control input devices and enable separate cabinets to be linked in various configurations. Details of each connector and its function are given on subsequent pages.

Suitable Cable

All of the S-COM and S-DIM data highways require a screened twisted pair, whilst all other connections should use equipment wire.

Special S-COM cable is available from Electrosonic which comprises the following conductors in an overall sleeve:

- Twisted pair with screen (for data lines).
- Two power wires (for S-COM supply).

This is ideally suited for use with the S-COM (external) line, but may also be used on the other S-COM and S-DIM lines if the two power wires are cut back.

Power Ground, Common & Screen

These connections are all nominally at 0V but are not electrically common except in the following conditions:

- Power ground and common are connected if a *SCENESET* module is present in the *STACKER* unit.
- Power ground and screen are connected if the link LK1 is present (not normally fitted).

All screen connections are electrically connected to the cabinet chassis (i.e. at Earth potential).

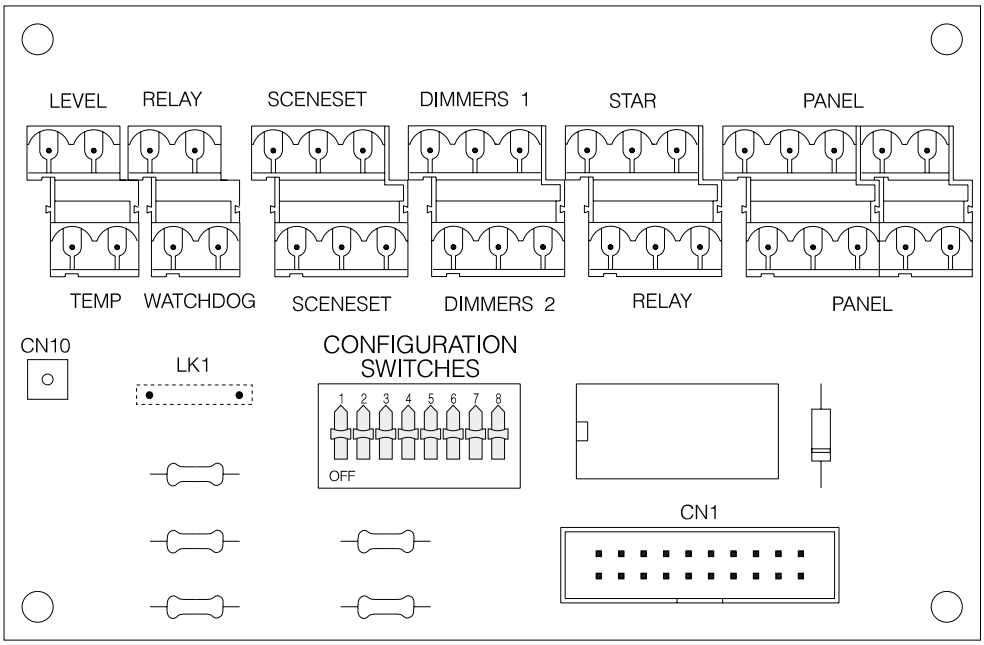


Fig.5-1: Layout of BREAKOUT module.

Suitable Mating Connectors

Electrosonic part numbers:	P9820 (2-way).
	P9830 (3-way).
	P9850 (5-way).
Cable size:	0.2 – 2.5mm^2.
Stripping length:	7.0mm.

Configuration Switches

A bank of eight DIL slide switches is provided on the module which are used for the following purposes:

- To select the various interconnections of the *SCENESET* watchdog and *DIMMER* level override circuits (switches 1 – 3).
- To select line termination on the various data highways (switches 4 – 8).

The configuration switches are factory-set to the following positions:

Switches 1 to 3:	'ON ' *(all models except 'Slave').*
	'OFF ' *('Slave' models only).*
Switches 4 to 8:	'ON ' *(all models).*

GENERAL GUIDELINES FOR S-COM AND S-DIM

The following guidelines apply to S-COM (external), S-COM (internal) and S-DIM data highways. The term 'device' refers to the *BREAKOUT* module or any other unit which may be connected to the S-COM or S-DIM lines.

Data Highway Requirements

Devices may be located at one end of a highway or at some point along it. Each connecting point to a device is defined as a 'node', with each device being linked to the next, to form an open-ended 'daisy-chain' (Fig.5-2).

To ensure reliable operation, the nodes should be positioned as evenly as possible along the length of the highway.

The *total* length of a data highway should not exceed 1000m unless otherwise stated.

Devices must not be connected to highway by means of a 'spur', nor must the two ends of a highway be joined to create a 'ring circuit '.

Line Termination

The line termination switches allow the connection of a resistor across each data line. These are set in accordance with the following conditions.

Set the switch to the 'ON ' position (default) if:

- The data highway connection is not used.
- The device is located at one end of the data highway.

Set the switch to the 'OFF ' position if:

- The device is located along the data highway.

'Slave' Type Cabinets

On 'Slave' type cabinets, the connectors for all S-COM data highways and watchdog relay contacts are not active as no *SCENESET* module is fitted.

If required, these connectors may be used as junction points for longer cable runs.

Where the S-COM connectors are used in this way, the line termination switch for the appropriate highway must be set to the the 'OFF ' position.

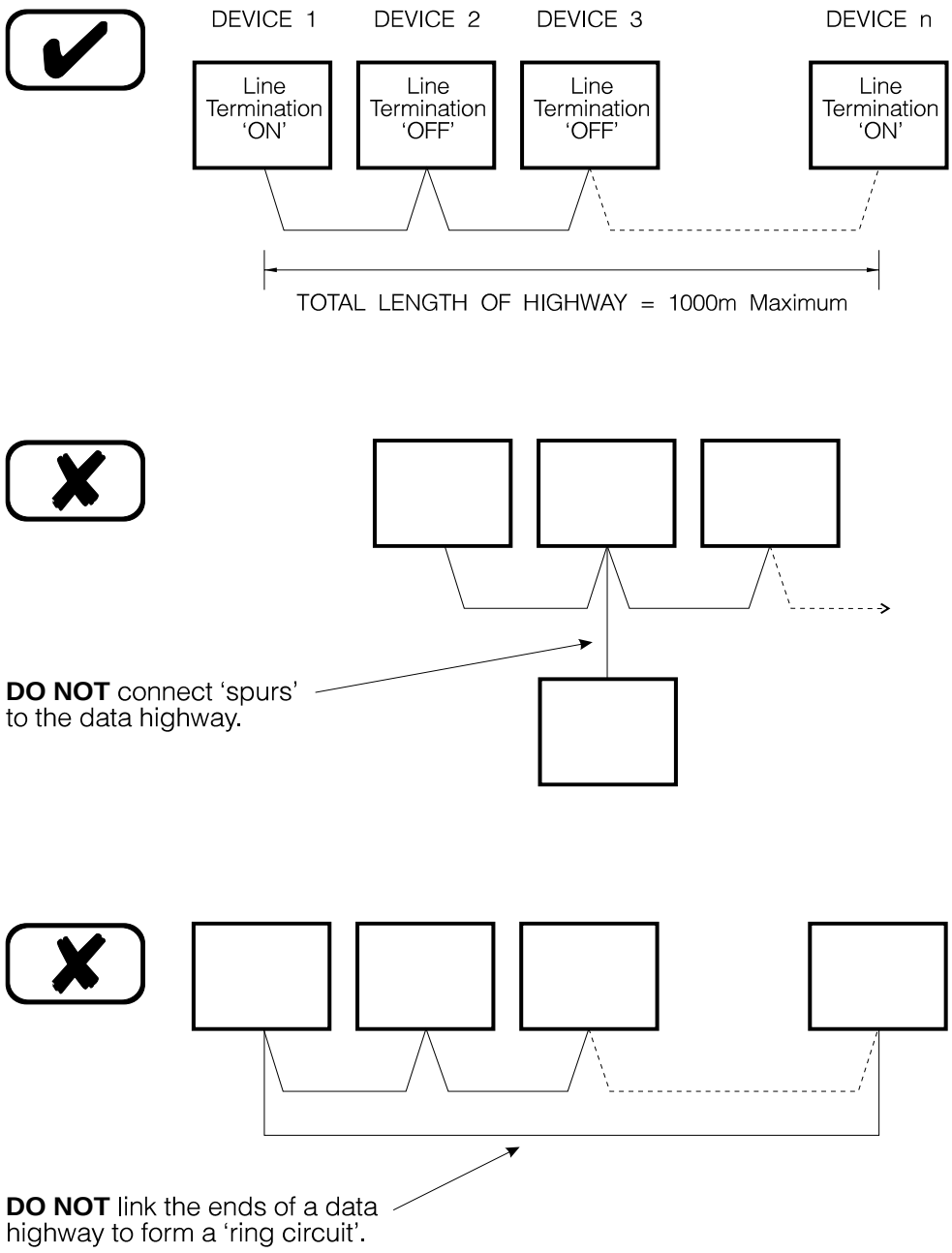


Fig.5-2: Correct configuration of data highways.

S-COM (external)

This data highway is used to connect the following scene-recall devices:

- *SCENECOMMANDER*s.
- *SCENETIMER.*
- *INPUT Module.*
- *CHANNEL COMMANDER*
- *STAR DISTRIBUTION* Unit [also requires S-COM (star) line].

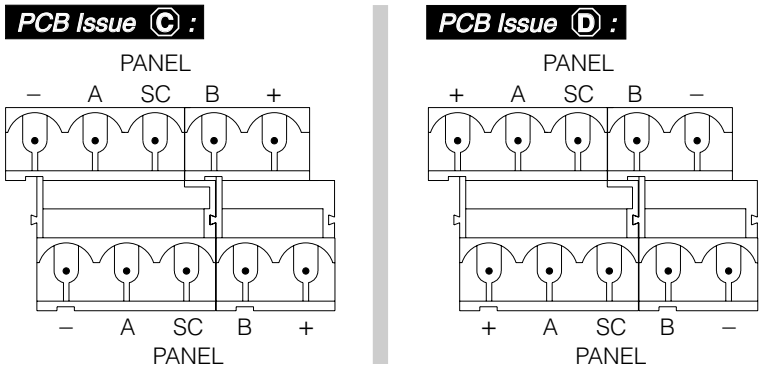
Connection Details

> ***CAUTION***
> *Ensure that the SCENESET controller is turned-off before attempting to connect the S-COM (external) highway.*

Connection of the S-COM (external) highway is made via the 5-way connectors labelled 'PANEL' (Fig.2-6). Both connectors are electrically identical. If the *BREAKOUT* module is located along the data highway, one connector should be used for each half of the highway.

Mating connector part no.: P9850 (5-way).
Cable size: 0.2 – 2.5mm^2.
Stripping length: 7.0mm.

> ***CAUTION***
> *Please note that the power supply connections are different on issue **C** and **D** BREAKOUT Modules — check for correct polarity before powering the S-COM line.*
>
> *Check that all connections are correct and that there are no short-circuits **before** powering-up the SCENESET controller. In particular, ensure that the data lines are not accidentally or deliberately connected to the supply lines.*
>
> *Incorrect connections may result in damage to the internal circuitry of the controller and of any other devices connected to the S-COM (external) highway.*



Pin	Function	Wire Colour		Pin	Function	Wire Colour
–	Power ground (0V)	Grey		+	Power supply (40V)	Purple
A	S-COM data A	Red		A	S-COM data A	Red
SC	Screen (earth)	—		SC	Screen (earth)	—
B	S-COM data B	Black		B	S-COM data B	Black
+	Power supply (40V)	Purple		–	Power ground (0V)	Grey

Fig.5-3: Connection details for S-COM (external).

S-COM Loading

Each device that can be connected to the S-COM (external) data highway has a Unit Loading Factor (ULF) according to its power consumption. Check that no more than 30 devices, for a forced cooled SceneSet, or 15 devices, for a convection cooled SceneSet, are connected to the S-COM (external) highway.

SCENECOMMANDER:	1
SCENETIMER:	1
INPUT module:	1 (using bistable inputs & LCS only).
	1.5 (using LCS, analogue & bistable inputs).
LCS panels:	0.25 (via *INPUT* module only).
LCS infra-red unit:	0.5 (via *INPUT* module only).
CHANNEL COMMANDER:	1
STAR DISTRIBUTION unit:	2.

The S-COM (external) line also has the capacity to support either *SCENEMAKER* or *SCENEPLANNER* without affecting the total number of devices permitted.

Line Termination

If the *BREAKOUT* module is located at one end of the data highway, set switch 4 ('PANEL') to the 'ON ' position (see Fig.5-4).

If the module is located along the highway, set switch 4 to 'OFF '.

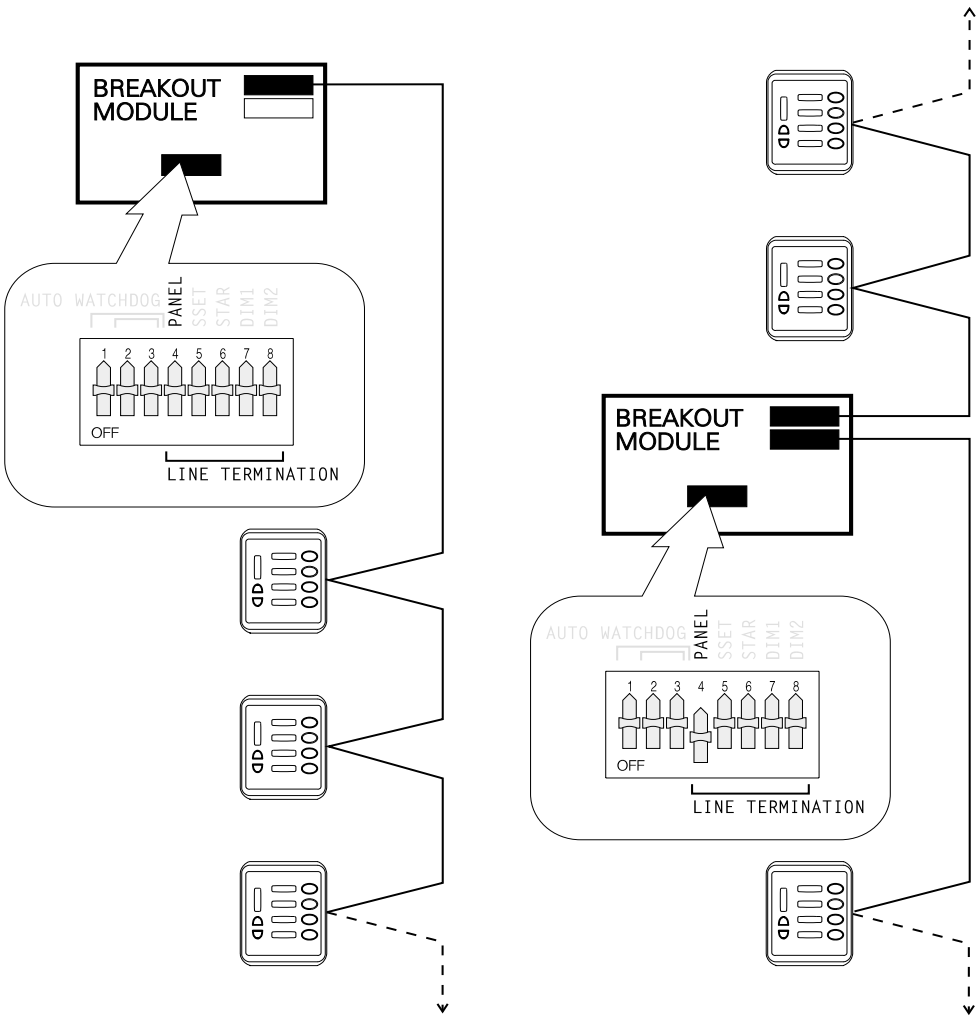


Fig.5-4: S-COM termination on BREAKOUT Module.

S-COM (star)

This data highway is used for the connection of a *STAR DISTRIBUTION* unit. This allows the S-COM (external) to be split into six 'spurs' (Fig.5-6). Each spur is then wired using the normal 'daisy-chain' method.

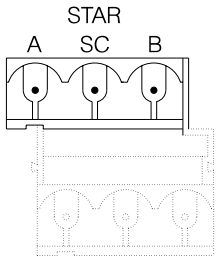
Devices should be distributed as evenly as possible amongst the spurs and along the length of each spur. The 'open' end of each spur must not be linked to another and the total length of each spur must not exceed 1000m.

The length of the S-COM (external & star) lines between the *BREAKOUT* module and the *STAR DISTRIBUTION* unit must not exceed 1000m.

Connection Details

Connection of the S-COM (external) highway is made according to the details given on page 32.

Connection of the S-COM (star) highway is made via the 3-way connector labelled 'STAR' (Fig.5-5):



Pin	Function	Wire Colour
A	S-COM data A	Red
SC	Screen	—
B	S-COM data B	Black

Fig.5-5: Connection details for S-COM (star).

Loading

Only one *STAR DISTRIBUTION* unit can be connected to the S-COM (star) line. No other devices must be connected to the S-COM (external) line between the *BREAKOUT* module and the *STAR DISTRIBUTION* unit.

The total number of devices connected to all of the spurs is calculated in the same manner as described on page 33. But, remember that an additional ULF of 2 is required for the *STAR DISTRIBUTION* unit itself .

Line Termination

Switch 6 ('STAR') must always be set to the 'ON ' position .

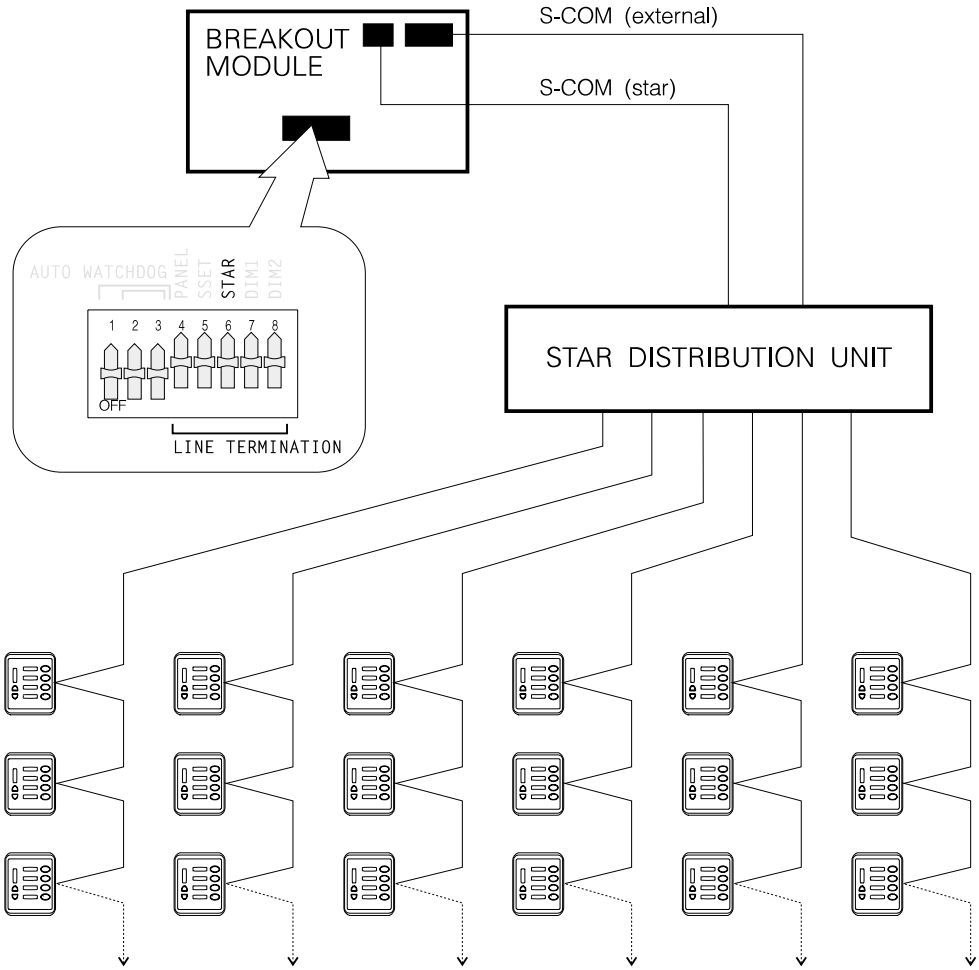


Fig.5-6: STAR DISTRIBUTION Unit.

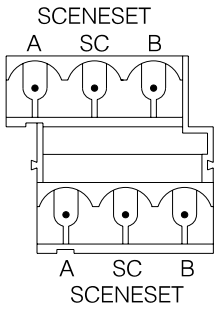
S-COM (internal)

This highway is used to link together *SCENESET* modules in separate cabinets, thus allowing the number of controlled outputs in a system to be increased beyond 128.

In a multi-*SCENESET* system, only one can act as a 'master ' and this is determined by the data programmed into the *SCENESOFT* card. The designated master module can be located at any point along the data highway.

Connection Details

Connection is made via the 3-way connectors labelled 'SCENESET ' (Fig.5-7). Both sets of three pins are electrically identical. If the *BREAKOUT* module is located along the data highway, one connector should be used for each half of the highway.



Pin	Function	Wire Colour
A	S-COM data A	Red
SC	Power ground (0V)	—
B	S-COM data B	Black

Fig.5-7: Connection details for S-COM (internal).

Loading

Up to eight *SCENESET* modules may be connected to to the S-COM (internal) line. This is the maximum number supported by the *Imagine* system

Line Termination

If the *BREAKOUT* module is located at one end of the data highway, or if the connection is not used, set switch 5 ('SSET') to the 'ON ' position.

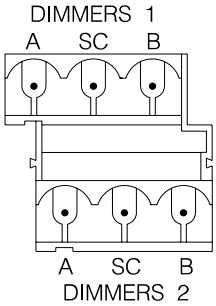
If the module is located along the highway, set switch 5 to the 'OFF ' position.

S-DIM

Two data highways are available (S-DIM #1 and S-DIM #2) which can be used to connect '*DIMMER* only ' (slave) cabinets to a '*SCENESET* ' cabinet.

Connection Details

Connection to each S-DIM highway is made via the 3-way connectors labelled 'DIMMERS 1' and 'DIMMERS 2' (Fig.5-8). Both S-DIM highways are functionally identical but are electrically buffered. If the *BREAKOUT* module is located along either data highway, both halves of the highway need to share the same connector.



Pin	Function	Wire Colour
A	S-DIM data A	Red
SC	Power ground (0V)	—
B	S-DIM data B	Black

Fig.5-8: Connection details for S-DIM #1 & S-DIM #2.

Loading

Each highway can support up to 32 *DIMMER* modules.

However, S-DIM #1 is used to control the *DIMMER* modules in the cabinet where the *SCENESET* module is fitted. Therefore, the number of additional modules that can be connected to this highway is 32 *minus* the number of modules in the *SCENESET*'s cabinet (i.e. 6 or 12).

Line Termination

If the *BREAKOUT* module is located at one end of the data highway(s), or if the connections are not used, set switch 7 ('DIM 1') or switch 8 ('DIM 2') to the 'ON ' position accordingly.

If the module is located at some point along the highway(s), set switches 7 or 8 to the 'OFF ' position.

WATCHDOG/LEVEL OVERRIDE

The *SCENESET* watchdog and *DIMMER* level override circuits are provided to allow the *DIMMER* outputs to be taken to a pre-defined level if the *SCENESET* module loses control (automatic watchdog). This level override facility can also be triggered by a separate security / fire alarm system.

These two circuits, together with a relay on the *BREAKOUT* module can be interconnected by using switches 1, 2 & 3 (see Fig.5-8). With the switches set to the 'ON ' position, automatic watchdog is enabled; with the switches set to the 'OFF ' position, automatic watchdog is disabled – see page 29 for the default positions. Although the *SCENESET* and *DIMMER* 0V lines are shown as separate, they are electrically linked by the *STACKER* unit.

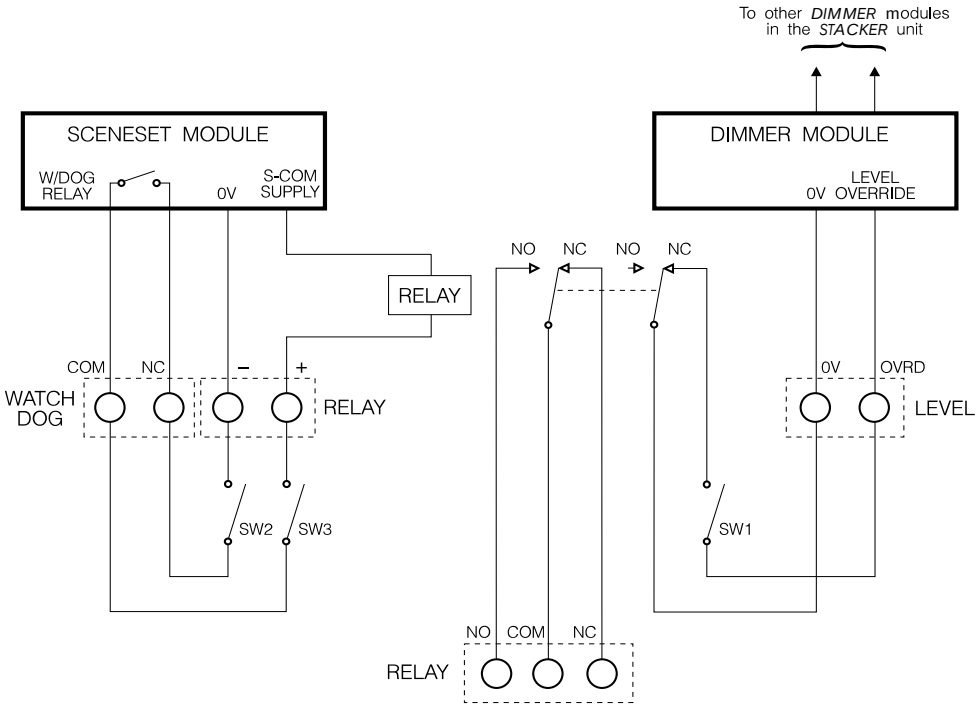
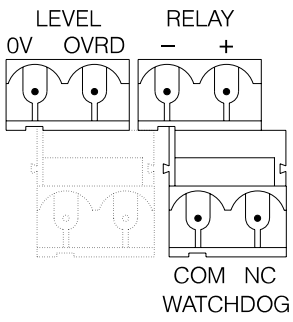


Fig.5-8: Watchdog and level override circuit details.



Pin	Function
0V	Common (0V)
OVRD	*DIMMER* level override input
–	Power ground (0V)
+	*BREAKOUT* relay coil
COM	*SCENESET* watchdog relay contact
NC	*SCENESET* watchdog relay contact

Fig.5-9: Connections for level, relay & watchdog.

DIMMER Level Override

The level override input appears on pin 'OVRD' of the 2-way connector labelled 'LEVEL'. If this is shorted to pin '0V', level override will be activated causing each *DIMMER* output in the cabinet to change to its preset override level.

If slave cabinets are to be controlled, this connector needs to be linked to its equivalent on the other cabinets.

SCENESET Watchdog Relay Contacts

These two contacts appear on pins 'COM ' and 'NC ' of the connector labelled 'WATCHDOG '. When the *SCENESET* module is powered-up and functioning correctly these contacts are shorted together. If the module is removed or de-powered, or if it looses control, the contacts go open circuit.

BREAKOUT Relay Coil

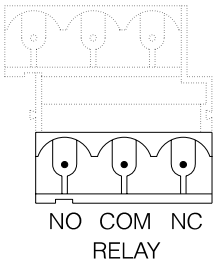
One side of the coil is supplied by the S-COM power supply with the other side open circuit and appearing on pin '+' of the 2-way connector labelled 'RELAY '. To activate the relay, this pin is shorted is shorted pin '– ' (0V).

BREAKOUT Relay Contacts

The relay has two sets of change-over contacts. One set is for use by the level override function, with the common contact connected to 0V; therefore with the relay inactive, contact NC is at 0V.

The other set is available for any user-defined function. These contacts are isolated from all other connections and appear on the 3-way connector labelled 'RELAY ' (see Fig.5-10):

Max. switching voltage: 50V DC.
Max. switching current: 1A resistive.



Pin	Function
NO	*BREAKOUT* relay contact NO
COM	*BREAKOUT* relay contact COM
NC	*BREAKOUT* relay contact NC

Fig.5-10: Connection details for relay spare contacts.

Configuration Switches 1, 2 & 3

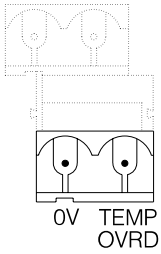
These are factory-set to the positions detailed on page 29, but may be changed as required.

By putting both switches 2 & 3 to the 'ON ' (closed) position, the watchdog relay contacts are connected to the *BREAKOUT* relay coil. Thus if the watchdog relay contacts are closed (normal condition), the coil will be energised. If the watchdog relay opens (fault condition), the coil will be de-energised.

Relay contact NC can be linked to the level override input by putting switch 1 to the 'ON ' position. Thus with the *BREAKOUT* relay de-activated, level override is enabled. With the relay activated, level override is disabled.

Temperature Detect Output

This 2-way connector provides an active-low output if the internal temperature of any of the *DIMMER* modules in the cabinet exceeds 52C. This output is available for any user-defined function e.g. for triggering a cooling fan.



Pin	Function
0V	Common (0V)
TEMP OVRD	Temperature detect output

Fig.5-11: Connection details for temperature detect.

Inactive voltage: 30V maximum (applied).
Active voltage: must be <1V.
Sink current: 50mA maximum.

This page is intentionally left blank.

SECTION 6
ANALOGUE CONTROL

This section covers the following topics:

- Control Priority
- Analogue Connector.

ANALOGUE CONTROL

As well as being controlled by the S-DIM data highway, the level of each *DIMMER* output can also be set by a 0 – 10V analogue input.

The control level is directly proportional to the analogue input, *e.g.* 5V input will give 50% control level, 10V will give 100%, *etc.*

NOTE *The actual output level obtained for a given control level will depend on the dimming law table selected.*

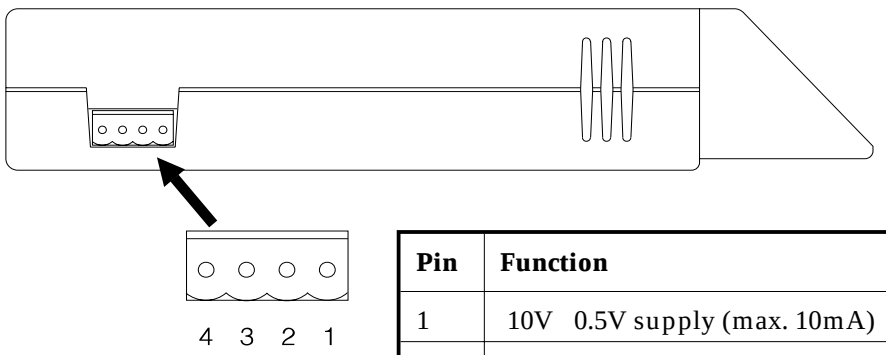
Control Priority

If a particular output is controlled by both an S-DIM and analogue input, the input which defines the highest output level will take priority.

If the output level is required to respond to analogue input only, then the channel address for that output must be set to '255'. For further details on setting the address, refer to section 8, page 58.

Analogue Connector

This is located on the right-hand side of the *DIMMER* module (see Fig.6-1):



Pin	Function
1	10V 0.5V supply (max. 10mA)
2	0 – 10V control input for CHA
3	0 – 10V control input for CHB
4	0V common

Fig.6-1: Analogue input connector.

Suitable mating connector:	Electrosonic part no. P9840 *(not supplied).*
Cable size:	0.2 – 2.5mm^2.
Stripping length:	7mm.
Recommended cable type:	Equipment wire.
Maximum cable length:	100m.

Basic Analogue Control Circuit

A typical analogue control circuit is shown in Fig.6-2. Although both inputs are shown as connected, one input only can be used if required.

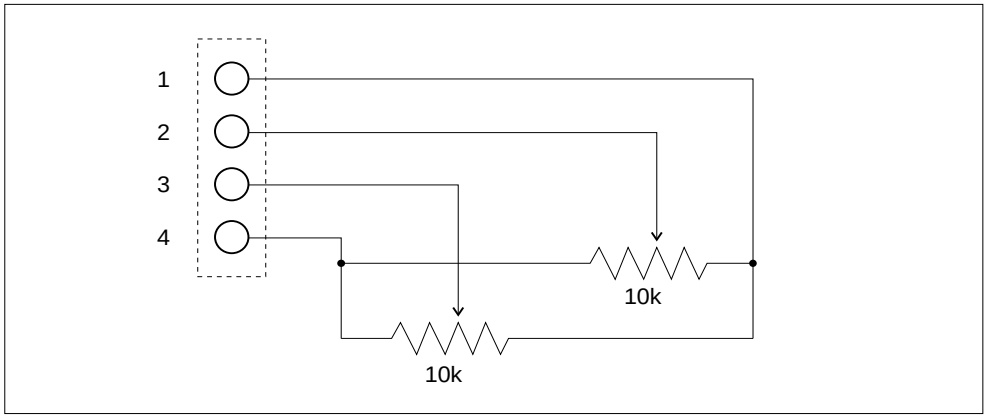


Fig.6-2: Basic analogue control circuit.

This page is intentionally left blank.

SECTION 7
SETTING-UP PROCEDURE

This section covers the following topics:

- Setting-up and Testing the *DIMMER* Modules.
- Testing the *SCENESET* Module.

SETTING-UP PROCEDURE

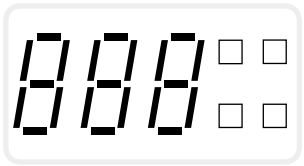
The setting-up procedure for the *PRE-WIRED* C*ABINET*s module is divided into five stages, which must be followed in the order listed below:

- Stage 1 – *DIMMER* Power-up Test.
- Stage 2 – Set the Correct Dimming Laws.
- Stage 3 – Output Test.
- Stage 4 – Set the Output Channel Addresses.
- Stage 5 – *SCENESET* Power-up Test.

If it is not required to test the *DIMMER* outputs (i.e. to check correct load operation and wiring) then stages 2 & 3 may be omitted.

> ***IMPORTANT NOTE***
> *Do not power-up the SCENESET module until stage 5. This will stop S-DIM commands being sent and will prevent any DIMMER parameters from being inadvertently 'locked-out'.*

Stage 1 – *DIMMER* Power-up Test

Procedure	Display & Buttons
1. Switch on the supply to each D*IMMER* in turn; each display should briefly show ‘ 888 ’ . ***Note:*** *The right-hand digit will be noticeably brighter than the others at this point; this is normal and does not indicate a fault.*	
2. The display will then clear to show the default display mode (output levels).	
3. If the display clears to show a diagnostic code (a letter ‘ E ’ or ‘ F ’ followed by a two-digit number), then the module has detected a problem. Refer to section10, page 78 for further details.	 

Stage 2 – Set the Correct Dimming Laws

The Dimming Laws applied to each *DIMMER* output are normally down-loaded via the S-DIM data line from the controlling *SCENESET* module.

However, if the outputs are to be tested before any S-DIM communication has occurred, a Dimming Law appropriate to the output load type *must* be selected manually first.

To set the Dimming Law, refer to section 8, page 60.

Stage 3 – Output Test

> ***CAUTION***
> *Before attempting this test, ensure that any loads connected to the DIMMER module outputs are suited to the Dimming Law selected. An incompatible Dimming Law or load type may result in damage to the module or the load.*

Press and hold the top left-hand button on each *DIMMER* module's control panel in turn. The left hand digit should step-up in value, and any light sources connected to output CHA for each module should be seen to come on and increase in brightness accordingly.

Repeat this process for output CHB by pressing the top right-hand button.

Press and hold the lower buttons to return the outputs to zero level.

NOTE *If Dimming Law Table 0 is selected, the level will toggle between zero ' o ' and full power ' F '. Table 8 causes output CHB to behave as per Table 0 and to act under CHA control.*

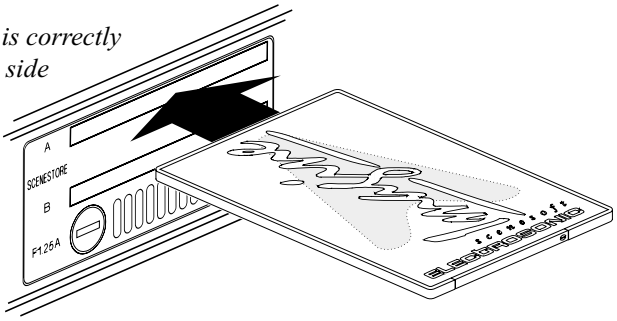
Stage 4 – Set the Output Channel Addresses

The *DIMMER* addresses must correspond to the addresses programmed into the *SCENESOFT* card. A *DIMMER* module will not respond to S-DIM commands unless it is set to a valid system address.

*PRE-WIRED CABINET*s are supplied with the *DIMMER* modules preset to the addresses shown in the table below. If required, these can be changed by referring to Section 8, page 58.

MODEL >> / ***DIMMER* Module**		**HES24000 HES24200**	**HES24100 HES24300**	**HES12000 HES12200**	**HES12100 HES12300**
1	CHA CHB	001 002	025 026	001 002	013 014
2	CHA CHB	003 004	027 028	003 004	015 016
3	CHA CHB	005 006	029 030	005 006	017 018
4	CHA CHB	007 008	031 032	007 008	019 020
5	CHA CHB	009 010	033 034	009 010	021 022
6	CHA CHB	011 012	035 036	011 012	023 024
7	CHA CHB	013 014	037 038	NOT APPLICABLE	
8	CHA CHB	015 016	039 040		
9	CHA CHB	017 018	041 042		
10	CHA CHB	019 020	043 044		
11	CHA CHB	021 022	045 046		
12	CHA CHB	023 024	047 048		

Stage 5 – *SCENESET* Power-up Test

Procedure	Display & Buttons
1. Insert a programmed *SCENESOFT* card into slot 'A' on the *SCENESET* front panel and turn on the power. ***Note:*** *Ensure that the card is correctly orientated i.e. with the logo side facing upwards and with the '∧' symbol pointing towards the slot.* 	
2. After approximately one second, the display should change to show scene zero. If the display shows three dashes, this indicates that the card cannot be read. This may be caused by an unformatted card, or if the card's internal battery is discharged or missing.	 
3. The *SCENESET* will now perform a 'logging on' process of all the devices connected to it. This may take up to 30 seconds in a large system, during which time the display will not change.	
4. If the diagnostic flag indicator is lit (between the first two digits), there is one or more diagnostic codes waiting to be displayed. Refer to section 9, page 70.	

Default Scene

The *SCENESOFT* card can be programmed to perform one of two actions when the *SCENESET* module is powered-up

- Default to scene zero ('000').
- Restore the last known output levels ('000' is displayed but the levels for scene zero are not invoked).

NOTE *Whilst scene zero can be programmed in the same way as any other, it cannot be recalled via the S-COM line.*

SECTION 8
DIMMER OPERATING INSTRUCTIONS

This section covers the following topics:

- Controls and Display Functions.
- Output Level.
- Channel Address.
- Dimming Law.
- Hysteresis (Turn-on and Turn-off Levels).
- *SCENESET* Number.
- Output Level Override.

CONTROLS AND DISPLAY FUNCTIONS

The *DIMMER* module has a control panel with four push-buttons and a a three character digital display (Fig.8-1).

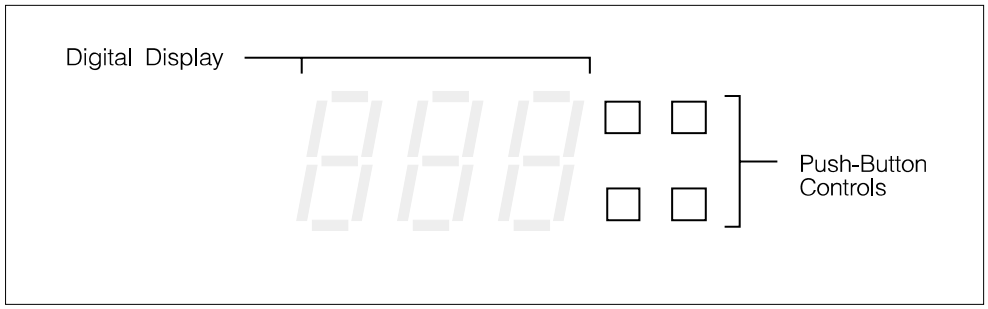


Fig.8-1: DIMMER control panel.

Display Modes

The display can be used in five different modes.

- Output Level.
- Channel Address.
- Dimming Law.
- Hysteresis (turn-on & turn-off level).
- S*CENE*S*ET* Number.

Each mode allows a particular setting for both dimmer outputs to be viewed and if required, a new value (except for the S*CENE*S*ET* number) can be entered.

When controlled by a *SCENE*S*ET* module it is necessary to set the channel addresses only. All other parameters will be set automatically.

Control Lock-out

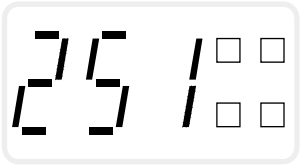
The ability to change individual settings by using the integral control panel can be disabled or 'locked-out' by the controlling *SCENE*S*ET* module.

When a setting is locked-out, the value displayed will flash.

Default Mode

The display defaults to Output Level Mode when the *DIMMER* module is powered-up. The display will also return to this mode if no buttons are pressed for ten seconds while another mode is selected.

Changing the Display Mode

Procedure	Display & Buttons
1. With the display showing Output Level Mode, press and hold the two left-hand buttons. Note: *The left-hand buttons show the settings for output CHA; pressing the two right-hand buttons will show the settings for output CHB.*	
2. After one second approximately, the display will change to the Channel Address Mode. Maintaining pressure on both buttons will cause the display to step through each mode. Dimming Law Mode... Hysteresis Mode... *SCENESET* Number Mode... Then back to Output Level Mode... Channel Address Mode...etc.	    
3. Releasing the buttons will select the mode currently displayed.	
4. The display can be toggled between the two outputs by momentarily pressing one of the right-hand buttons for CHB, or one of the left-hand buttons for CHA.	
5. If no further buttons are pressed within ten seconds, the display will revert to Output Level Mode.	

OUTPUT LEVEL MODE

In this mode, the display shows the following information:

- Output CHA Level.
- Output CHB Level.
- Operating Status.
- S-DIM Data Line Status.

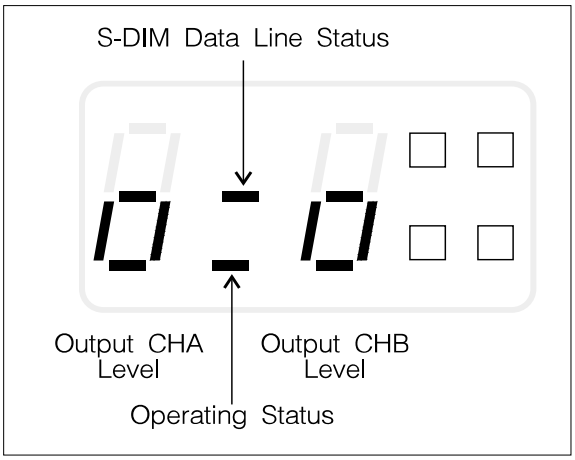


Fig.8-2: Channel level mode display.

Output CHA & CHB Levels

The left-hand digit indicates the level of output CHA, and the right-hand digit indicates the level of CHB.

The level is expressed in terms of percentage control. Note that only the decade (tens) component of the output level is displayed (see Fig.8-3):

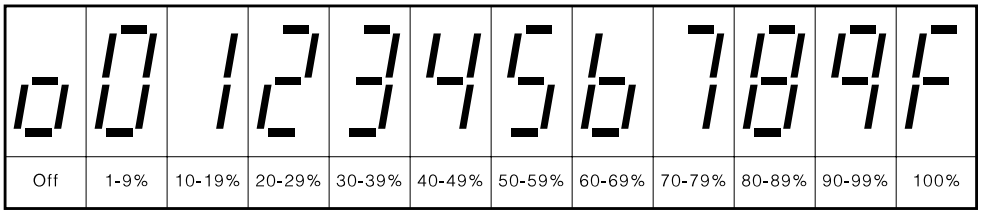


Fig.8-3: Display conventions for output levels.

Operating Status

When this segment is illuminated in Channel Level Mode, it indicates that the *DIMMER* module is operating normally.

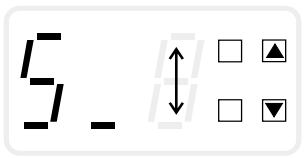
S-DIM Data Line Status

When the S-DIM data highway is functioning correctly, this segment will blink every time a valid S-DIM message has been received and decoded (approximately every five seconds).

However, even if S-DIM messages are being received, this segment will not blink until the channel addresses have been correctly set (see page 58).

Changing the Output Levels

The output levels will normally be set by the controlling *SCENESET* module. However, to change the levels manually, proceed as follows:

Procedure	Display & Buttons
1. Check that the display is showing Output Level Mode.	
2. To change the level of output CHA, press and hold either the top left-hand button to increase the level or the bottom left-hand button to decrease the level.	
3. When the required level is shown, release the button.	
4. To change the level of output CHB, press and hold either the top right-hand button to increase the level or the bottom right-hand button to decrease the level.	
5. When the required level is shown, release the button.	

SCENESET Control

When the *DIMMER* module is under *SCENESET* control, both output levels are checked periodically against the current scene. If the levels are different (*e.g.* have been changed manually), the *SCENESET* module will return the levels to the correct setting for that scene.

Analogue Control

The output levels for both CHA and CHB can also be set by using the analogue input. For further details, refer to section 6, page 44.

CHANNEL ADDRESS MODE

This mode enables the addresses for outputs CHA and CHB to be defined. The *DIMMER* module supports the following addresses:

- **001 – 128** for use with the *Imagine* Lighting System.
- **129 – 250** these are not currently used, and should not be selected unless otherwise instructed.
- **251 – 254** for use with the Electrosonic *Ambience* Lighting System.
- **255** for use when analogue control only is required.
- **000** for test purposes only.

The addresses are preset in accordance with the table in section 7, page 51, but these may be changed as required.

> ***IMPORTANT NOTE***
> *The DIMMER module will not respond to S-DIM commands from an Imagine System until the output channel addresses have been correctly set.*

Parallel Operation

By setting CHA and CHB to the same address, they will operate in unison. This enables the outputs to be wired in parallel to drive higher loads.

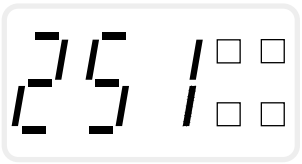
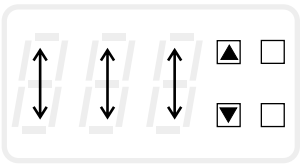
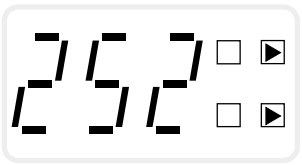
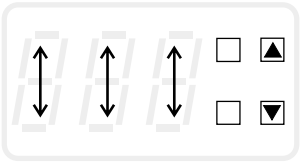
When both outputs are set to the same address, the Dimming Law, Hysteresis, and Level Override settings for CHA are applied to both channels; the settings for CHB are ignored.

Furthermore, if the analogue input is used, then the input for CHA will control both channels; the input for CHB will be ignored.

Control Lock-out

If an address is selected which has been ‘locked’ by the controlling *SCENESET* module, that address cannot be changed again unless the *SCENESET* is reprogrammed or the *DIMMER* module de-powered and the address reset before an S-DIM message is received.

Changing the Channel Addresses

Procedure	Display & Buttons
1. With the display showing Output Level Mode, press and hold the two left-hand buttons.	
2. Wait for the display to change to Channel Address Mode (approximately one second) then release both buttons. ***Note:*** *The display will show the current address for output CHA.*	
3. To change the address, press and hold either the top left-hand button to increase, or the bottom left-hand button to decrease the number. To leave the address as it is, go to step 5.	
4. To store the new address shown, press and hold both left-hand buttons until the display briefly shows '888' to confirm that the new value has been stored in the *DIMMER*'s memory.	
5. To view the address for output CHB, momentarily press either the top or bottom right-hand buttons.	
6. To change the address, press and hold either the top right-hand button to increase, or the bottom right-hand button to decrease the number. To leave the address as it is, go to step 8.	
7. To store the new address shown, press and hold both right-hand buttons until the display briefly shows '888' to confirm the new value has been stored in the *DIMMER*'s memory.	
8. If no further settings need to be changed, release the buttons; the display will revert to Output Level Mode after ten seconds. **OR** Retain pressure on both buttons until the display changes to the next required mode.	

DIMMING LAW MODE

Both outputs need to be configured to the type of load that they are driving. The *DIMMER* module incorporates nine Dimming Law tables which can be applied separately to each output:

No.	HES92000	HES92220
0	Non-Dimming (for switched loads)	Non-Dimming (for switched loads)
1	Tungsten Linear	Tungsten Linear
2	Tungsten Square	Tungsten Square
3	Tungsten 'S'-Law	Tungsten 'S'-Law
4	2-wire Fluorescent with start pulse	EL TX Limited Range with lamp warm
5	2-wire Fluorescent	EL TX Limited Range
6	Cold Cathode	Tungsten Low Wattage
7	Custom	Custom
8	3-wire Fluorescent	EL TX Limited Range + switched channel

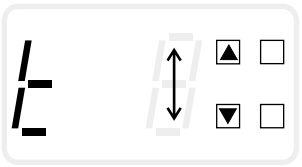
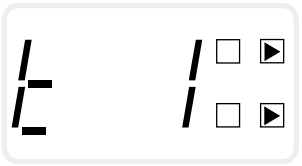
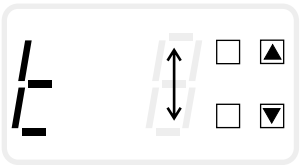
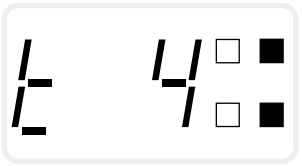
The *DIMMER* module is supplied with both outputs CHA and CHB set to Dimming Law table 1.

Output Characteristics

When table 0 is selected on one channel only, the *DIMMER* module uses different drive characteristics on both outputs. Generally this will not cause any noticeable change on the 'dimming' channel. However, certain capacitive or complex type loads may not respond normally.

Table 8 uses both channel CHA and CHB outputs and must only be selected on CHA for correct operation. When this table is selected, CHA operates using table 5 characteristics, while CHB behaves as a non-dim channel (similar to table 0).

Changing the Dimming Law Table

Procedure	Display & Buttons
1. Press and hold the two left-hand buttons until the display shows the Dimming Law Mode. ***Note:*** *The display will show the current table number for output CHA.*	
2. To change the table, press and hold either the top left-hand button to increase, or the bottom left-hand button to decrease the number. To leave the table number as it is, go to step 4.	
3. To store the new table number shown, press and hold both left-hand buttons until the display briefly shows '888' to confirm that the new value has been stored in the *DIMMER*'s memory.	
4. To view the table number for output CHB, momentarily press either the top or bottom right-hand buttons.	
5. To change the table number, press and hold either the top right-hand button to increase, or the bottom right-hand button to decrease the number. To leave the table number as it is, go to step 7.	
6. To store the new table number shown, press and hold both right-hand buttons until the display briefly shows '888' to confirm the new value has been stored in the *DIMMER*'s memory.	
7. If no further settings need to be changed, release the buttons; the display will revert to Output Level Mode after ten seconds. **OR** Retain pressure on both buttons until the display changes to the next required mode.	

HYSTERESIS MODE (Turn-on/ Turn-off Levels)

This mode is used to set the percentage level at which each output turns on and off (assuming maximum level is 100%). This is referred to as 'hysteresis' or as the turn-on and turn-off levels.

The display will show a letter and a two-digit value. The letter indicates the turn-off level and the digits show the turn-on level.

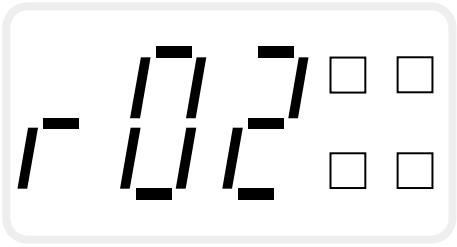
- The turn-on level can be set between 2% and 64% in 2% increments.
- The turn-off level can be set to be either 1% *less than* the turn-on level (display shows the letter 'r') or to 80% *of* the turn-on level (display shows the letter 'h').

When the *DIMMER* module is supplied, both outputs are set to a turn-on level of 2% with a turn-off level of 1% (as example 1):

Example 1

Turn-on level = **2%**.

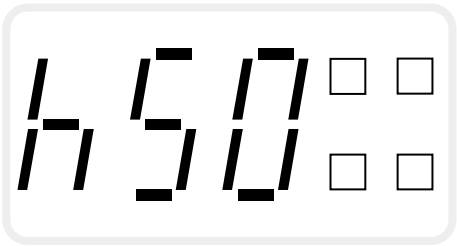
Turn-off level 'r' = (2 – 1)
= **1%.**



Example 2

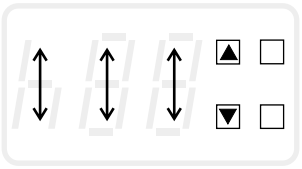
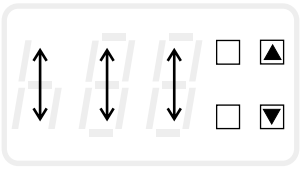
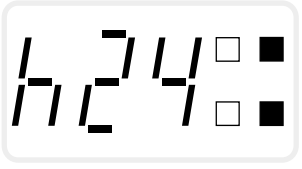
Turn-on level = **50%.**

Turn-off level 'h' = (50 x 0.8)
= **40%.**



Note: *The turn-off level for the ' h ' setting is calculated to the nearest 0.5%.*

Changing the Turn-on and Turn-off Levels

Procedure	Display & Buttons
1. Press and hold the two left-hand buttons until the display shows the Hysteresis Mode. ***Note:*** *The display will show the current setting for output CHA.*	
2. To change the setting, press and hold either the top left-hand button to increase, or the bottom left-hand button to decrease the setting. ***Note:*** *The display will cycle through the turn-on levels for* 'r' and 'h' turn-off settings. To leave the setting as it is, go to step 4.	
3. To store the new setting shown, press and hold both left-hand buttons until the display briefly shows '888' to confirm that the new value has been stored in the *DIMMER's* memory.	
4. To view the setting for output CHB, momentarily press either the top or bottom right-hand buttons.	
5. To change the setting, press and hold either the top right-hand button to increase, or the bottom right-hand button to decrease the setting. ***Note:*** *The display will cycle through the turn-on levels for* 'r' and 'h' turn-off settings. To leave the setting as it is, go to step 7.	
6. To store the new setting shown, press and hold both right-hand buttons until the display briefly shows '888' to confirm the new value has been stored in the *DIMMER*'s memory.	
7. If no further settings need to be changed, release the buttons; the display will revert to Output Level Mode after ten seconds. **OR** Retain pressure on both buttons until the display changes to the next required mode.	

SCENESET NUMBER MODE

In a large system, each *DIMMER* module can be connected to one of up to eight *SCENESET* modules.

In this mode, the display will show the number of the controlling *SCENESET* module. This is an advisory display only and cannot be changed.

The display will show the letters ‘ ch ’ followed by a number from 1 to 8.
If the display shows ‘ ch0 ’, then there is no *SCENESET* connected.

Checking the *SCENESET* Number

Procedure	Display & Buttons
1. Press and hold the two left-hand buttons until the display shows the *SCENESET* Number Mode. ***Note:*** *This value is the same for both outputs; pressing the two right-hand buttons will show the same result.*	
2. The display will revert to Output Level Mode after ten seconds if no buttons are pressed. **OR** Press and hold the two left-hand buttons until the display changes to the next required mode.	

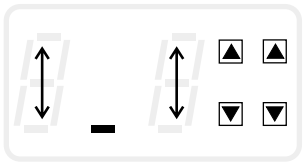
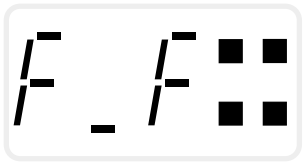
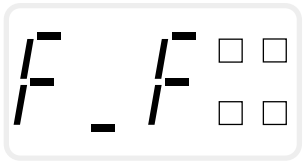
OUTPUT LEVEL OVERRIDE

Each output can be pre-programmed with a an override level. This is the level that will be applied to the output if the *DIMMER* module's Output Level Override circuit is activated. Both outputs CHA and CHB are factory-set to full power (100%), but these can be changed as required.

This function is normally used by the Watchdog facility on the controlling *SCENESET* module.

Setting the Override Levels

Whilst each output can have a different override level, both levels have to be set at the same time by the following method:

Procedure	Display & Buttons
1. With the display showing Output Level Mode, adjust the levels of both outputs to the required value (as described on page 57).	
2. When the correct settings are shown, press and hold all four buttons simultaneously until the display briefly flashes '888' to confirm the values have been stored in the *DIMMER*'s memory.	
3. Release the buttons; the display will revert to Output Level Mode. ***Note:*** *The levels will remain as just set for Level Override, but may be changed if required.*	
4. If the Level Override circuit is now activated, the display will show the programmed levels. Also, vertical bars in the centre of the display will move from side to side. ***Note:*** *Whilst Level Override is active, the levels for outputs CHA and CHB cannot be changed by the DIMMER* module controls.	 

This page is intentionally left blank.

SECTION 9
SCENESET CONTROLS

This section covers the following topics:

- Controls and Display Functions.
- Last Selected Scene.
- *SCENESET* Address.
- Diagnostic Codes.
- Manual Scene Selection.
- Card Copying.

CONTROLS AND DISPLAY FUNCTIONS

The *SCENESET* module has a control panel with two push-buttons and a three-character digital display (Fig.9-1).

In addition there are eight LED indicators (arranged in pairs of red and green) that show the status of the various communications links. Under normal conditions these should all be lit; if any fail to light, there is a fault — refer to section 11, page 89.

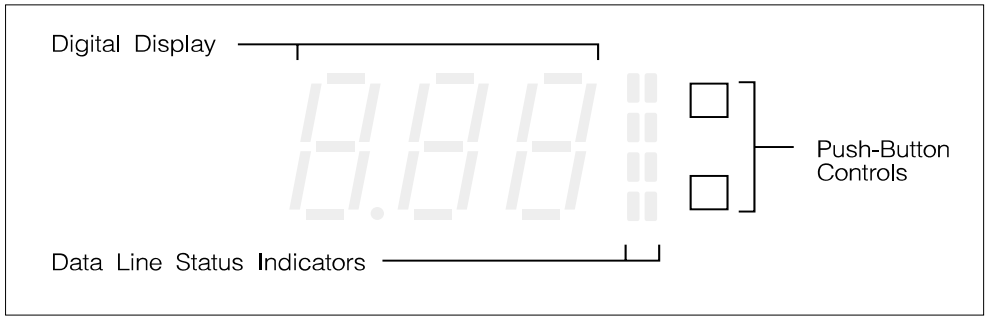


Fig.9-1: SCENESET control panel.

Display Modes

The display can be used in five different modes:

- Last Scene — shows number of the last selected scene.
- *SCENESET* Address — shows the address of the module.
- Diagnostic — shows any diagnostic codes.
- Scene Select — allows a scene to be selected manually.
- Card Copy — allows a *SCENESOFT* card to be copied.

Default Mode

The display always shows the Last Scene mode after the module is powered-up. Any display modes which are selected subsequently will revert to Last Scene mode if no buttons are pressed for 10 seconds.

Address Mode

The *Imagine* system can accommodate up to eight *SCENESET* modules. Each module must be allocated a unique address within the range A01 to A08.

This cannot be set from the *SCENESET* module's control panel, but must be programmed by *SCENEMAKER* or *SCENEPLANNER*. The address is then stored on the *SCENESOFT* card. In a multi-*SCENESET* system, the 'master' *SCENESET* resides at address A01.

Changing the Display Mode

Procedure	Display & Buttons
1. With the display showing the Last Scene Mode, press the lower button.	
2. The display will change to show the *SCENESET* Address Mode. Press the lower button again to select the next mode. Maintaining pressure on the button will cause the display to step through each mode. Diagnostic Mode... Scene Select Mode... Card Copy Mode... Then back to Last Scene Mode... Address Mode... etc.	    
3. Releasing the button will select the mode currently displayed.	
4. Press the top button to return the display to the Last Scene Mode.	

DIAGNOSTIC MODE

If the dot between the first two digits is illuminated in any display mode (Fig.9-2), this indicates that the *SCENESET* module has diagnostic codes waiting to be displayed.

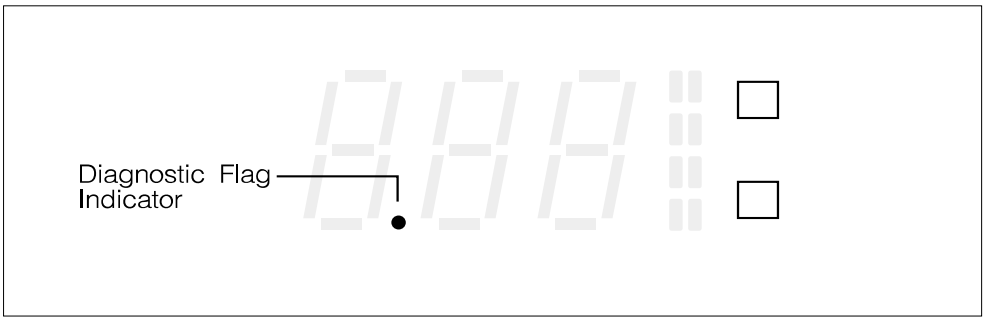


Fig.9-2: Diagnostic flag indicator.

Each code comprises a three-digit number which corresponds to one of the messages or conditions listed in section 11, page 83.

Viewing the Diagnostic Codes

Procedure	Display & Buttons
1. Press the lower button until the display shows the Diagnostic Mode. ***Note:*** *The dot between the first two digits indicates that one or more diagnostic codes are waiting.*	
2. To view the codes, press and hold both buttons at once until the display flashes, then release both buttons.	
3. The display will show a 3-digit number which corresponds to one of the messages listed in section 11, page 83.	
4. Press the lower button again. If there is another code present, its number will be displayed. When the last code has been shown, the display will show ' 000 ' and the diagnostic flag will clear. ***Note:*** *As each code is displayed, an attempt is made to clear it. If a code cannot be cleared, or has recurred, the flag will stay set. If this happens, press the lower button again to view the code number(s).*	 
5. Assuming any codes have been reset successfully, clear the display by pressing the top button.	
6. Press the top button again to return to the Last Scene Mode. **OR** Press the lower button to go on to the next mode.	

SCENE SELECT MODE

This mode enables a scene to be recalled manually.

When the *SCENESET* module is used as part of an *Imagine* system, all parameters are obtained from the pre-programmed *SCENESOFT* card and scenes are recalled by the devices connected to the S-COM data highway.

Therefore, the scene select function is normally used for testing and setting-up purposes only.

Changing the Current Scene

Procedure	Display & Buttons
1. Press the lower button until the display shows the Scene Select Mode.	
2. To activate this mode, press and hold both buttons at once until the display flashes, then release both buttons.	
3. The display will show ' 000 '.	
4. Press the lower button to step up through the available scene numbers. ***Note:*** *Holding the button will cause the display to cycle upwards until the button is released. When the highest is reached (depending on the SCENESOFT card) the display will resume counting from ' 000 '.*	
5. When the required scene number is displayed, press both buttons at once to select that scene. **OR** To keep the scene originally selected, go to step 6. **OR** To make another selection, repeat steps 4 and 5.	
6. Clear the display by pressing the top button.	
7. Press the top button again to return to the Last Scene Mode. **OR** Press the lower button to go on to the next mode.	

CARD COPY MODE

This mode allows the contents of the *SCENESOFT* card in slot 'A' to be copied to another card in slot 'B'.

This is useful for creating backups, or for setting-up a new card to experiment with existing lighting scenes without affecting the originals.

Suitable Cards

Only Electrosonic *SCENESOFT* cards are suitable for use with the *SCENESET* module, and the card must be correctly formatted for the *Imagine* system.

The 'A' card can only be copied to a 'B' card that has the same capacity. For details of card capacities, refer to section 1, page 6.

IMPORTANT NOTE
It is not necessary for the card in slot 'B' to be blank for copying to take place. Any information previously stored on the this card will be erased!

Copying a *SCENESOFT* Card

Procedure	Display & Buttons
1. Press the lower button until the display shows the Card Copy Mode.	
2. Ensure that a suitable card is inserted in slot 'B', then press and hold both buttons at once until the display flashes, then release both buttons.	
3. The display will show '000' while copying is in progress. ***Note:*** *Copying time should not exceed 15 seconds for the largest card capacity.*	
4. When copying is complete, the display will show 'CPY' again. ***Note:*** *If any problems have occurred during the copy process, the diagnostic indicator flag will be set (see page 70).*	
5. Press the top (or lower) button to return to the Last Scene Mode.	

This page is intentionally left blank.

SECTION 10
DIMMER TROUBLESHOOTING

This section covers the following topics:

- Diagnostic Codes.
- Problem Diagnosis.

DIAGNOSTIC CODES

Whenever the *DIMMER* module detects an abnormal condition, a flashing diagnostic code will be displayed on the front panel.

The codes fall into three categories:

- 'Fatal'.
- Self-recoverable.
- Communication.

The tables on the following pages list the codes, their likely causes and what action, if any, needs to be taken.

If a diagnostic code is displayed which is not listed, this may indicate an internal fault condition. If this occurs, please call your service agent.

‘Fatal’ Codes

In the event of a ‘Fatal’ Code , both outputs of the *DIMMER* module will be automatically turned off (*i.e.* set to zero level). Neither output can be used until the cause has been cleared.

Code	Likely Cause	Action
E03	The mains frequency is not in the range 45–65Hz. The mains supply is ‘noisy’. Internal circuit fault.	Turn off the supply to the *DIMMER* module for a few seconds, then turn back on. If the code recurs, check the mains frequency. If the mains frequency is O.K. but the code recurs, call for service.
E04	Internal circuit fault.	Turn off the supply to the *DIMMER* module for a few seconds, then turn back on. If the code recurs, call for service.
E07	The internal circuit temperature has exceeded 90C. Internal circuit fault.	Turn off the supply to the *DIMMER* module ***immediately*** and call for service. ***Warning:*** *Do not turn the supply back on. Internal damage may have resulted from the high temperature.*

Self-recoverable Codes

In the event of a Self-recoverable Code the *DIMMER* module will reduce the current on one or both outputs. Output levels cannot be increased until the cause has been cleared.

Code	LikelyCause	Action
E51	The internal circuit temperature has exceeded 70C. ***Note:*** *Both output levels will reduce.*	Check that all ventilation grilles are free from obstructions. If the module is not being forced-air cooled, check that the load for each output is not exceeding 10A. If the ventilation and loading are O.K., call for service.
C01	Output CHA current has exceeded the maximum of 20A. ***Note:*** *Output CHA level will reduce.*	Press one of the four buttons on the front of the *DIMMER* module; the display should clear. If the code does not clear, the associated lighting circuit is probably overloaded.
C02	Output CHB current has exceeded the maximum of 20A. ***Note:*** *Output CHB level will reduce.*	Press one of the four buttons on the front of the *DIMMER* module; the display should clear. If the code does not clear, the associated lighting circuit is probably overloaded.
C03	The current through both outputs has exceed the maximum of 20A each. ***Note:*** *Both output levels will reduce.*	Press one of the four buttons on the front of the *DIMMER* module; the display should clear. If the code does not clear, the associated lighting circuits are probably overloaded.

Communication Codes

These are advisory codes and will not usually change the current status of the *DIMMER* module. However, subsequent S-DIM or control panel commands may be ignored until the code has been cleared.

Code	Likely Cause	Action
E50	Data corruption in S-DIM message.	The S-DIM message is ignored. The condition should clear automatically after ten seconds.
E52	Error in S-DIM message.	The S-DIM message is ignored. The condition should clear automatically after ten seconds.
E53	Noise detected in S-DIM message.	The S-DIM message is ignored. The condition should clear automatically after ten seconds.
E54	General error in S-DIM communications link.	The S-DIM message is ignored. The condition should clear automatically after ten seconds.
E55	Front panel switch ‘stuck on’.	Call for service.
E56	Checksum error in S-DIM message.	The S-DIM message is ignored. The condition should clear automatically after ten seconds.

Repeated problems with the S-DIM data highway are most likely to be caused by bad connections, data cables running through electrically ‘noisy’ environments or incorrect configuration of other devices in the system.

If further advice is needed, contact the system installer or service agent.

PROBLEM DIAGNOSIS

If the *DIMMER* module fails to operate as expected, it is more likely to be the result of incorrect setting-up and configuration than a fault with the module itself. Alternatively, there may be a problem elsewhere in the system.

Before calling for service, check through the following list of problems and likely causes:

Problem	**Likely Cause & Remedy**
Display is blank.	No power to power input LA. Check appropriate MCB or fuse.
Output CHA or CHB will not dim – will only change between zero and full power.	Dimming Law Table 0 (non-dim) is selected (see section 8, page 60).
Output loads not dimming correctly.	Wrong Dimming Law selected for the load type (see section 8, page 60). Hysteresis set incorrectly (see section 8, page 62).
Output CHA or CHB not responding to S-DIM control.	Channel Addresses not correctly set (see section 8, page 58). Incorrect or faulty connections on the S-DIM data line. Check that the rear connector is fully seated on to the *STACKER* motherboard. *DIMMER* module is not connected to a *SCENESET* (see section 8, page 64).
Channel Address cannot be changed by the front panel controls.	The Channel Address is 'locked-out' by the *SCENESET* module.
A *DIMMER* parameter cannot be changed by front panel controls. When current setting is viewed, the display flashes.	The parameter is 'locked-out' by the *SCENESET* module.

SECTION 11
SCENESET TROUBLESHOOTING

This section covers the following topics:

- Diagnostic Codes.
- Data Line Status Indicators.
- S-COM Fuse Replacement.
- Problem Diagnosis.

DIAGNOSTIC CODES

The diagnostic code numbers that can be viewed on the integral control panel correspond to abnormal conditions or incorrect data. These are most likely to have been caused by incorrect system configuration.

The most commonplace codes are listed on the following pages along with their probable causes and any action that needs to be taken if they occur.

These codes are placed in three categories according to the degree that the system can be affected:

- 'Fatal'.
- Intermediate.
- Communication.

Interference and 'Noise'

If a code number is generated which is not listed, this may indicate a problem caused by incorrect or corrupted data.

This is most likely to have been due to spurious 'noise' on the S-COM or S-DIM data lines. It could also be the result of another device in the system being incorrectly set-up or connected.

If several codes are generated which are seemingly unconnected or if a code only occurs rarely, noise or interference is the most likely problem.

'Fatal' Codes

In the event of a 'Fatal' code, it is highly likely that the system will halt or will be severely disrupted until the cause has been rectified.

Code	Likely Cause	Action
102 103 105 111 121	The *SCENESOFT* card cannot be read correctly because: It is not a valid card. It is not securely inserted. It has been withdrawn with the *SCENESET* still powered. The card's internal battery is discharged or missing.	Check that the card is present and fully inserted into slot 'A'. If the code still occurs, try another card. ***Note:*** *If the battery is found to be at fault, the card will need to be reformatted once a new battery has been fitted.*
104	An attempt to copy a *SCENESOFT* card has failed because a backup card is not present in slot 'B' or cannot be read.	Check that a card is fully inserted into slot 'B'. Check that the backup card capacity is the same as the main card. If the code still occurs try another card.
232	There is a fault on the S-COM line. ***Note:*** *This can be the result of an S-COM power supply failure.*	Check for blown or missing S-COM fuse. Check all S-COM data highway wiring and connections.

Intermediate Codes

These codes will usually cause part of the system to halt or may cause erratic operation of certain functions.

Code	Likely Cause	Action
110	*SCENESET* has received a request for a scene which is outside the range of the *SCENESOFT* card. ***Note:*** *This is likely to have been caused by an input device being set to the wrong address, or by an attempt to call an invalid scene from a programming device.*	Check that the devices connected to the S-COM (external) line are set to a valid address.
106 107 108 112 113 122 132 140 141 142 143 402	An attempt has been made to program an invalid system parameter via *SCENEMAKER* or *SCENEPLANNER*.	Check the User Guide for the programming device, and re-program the system using the correct values. Check that the *SCENESOFT* card is the correct size for the system.
202	The 'master' *SCENESET* has failed to communicate with a 'slave' *SCENESET*. ***Note:*** *This code can also occur if a programming device attempts to communicate with a disconnected or inoperative module. In this case, the code will appear on the programming device's display only.*	Check that all *SCENESET* modules are on-line and functioning correctly – the affected module may have its diagnostic flag set. Check that the rear connector of each module is fully mated with the *STACKER* motherboard. Check all S-COM (internal) data highway wiring, connections and line terminations.
203 204	Communication has failed with a device on the S-COM (internal or external) lines. ***Note:*** *Usually occurs because an input/output device has been disconnected or has become inoperative since the system was powered-up.* Code 204 can also occur when a *SCENEMAKER* is disconnected from the system.	Check that all S-COM devices are on-line and functioning correctly. Check all S-COM data highway wiring, connections and line terminations.

Code	Likely Cause	Action
210	*SCENESET* has received too many messages – some actions may not have been completed. ***Note:*** *This is most likely to occur in smaller systems which are being used at their maximum capacity.*	If this occurs regularly, then the present system configuration is possibly inadequate for the application. System expansion should be considered.
243	A 'slave' *SCENESET* has stopped receiving messages from the 'master' *SCENESET*. ***Note:*** *This code appears on the affected module.*	Check that the 'slave' module is on on-line and functioning correctly. Check that the rear connector is fully mated with the *STACKER* motherboard. Check all S-COM (internal) data highway wiring, connections and line terminations.
244	An S-COM device is occupying an address which is being used by another device.	Check that the addresses for each S-COM device have been set correctly by referring to the appropriate User Guide.
302	A *DIMMER* module is not responding to control messages.	Check that all *DIMMER* modules are on-line and functioning correctly. Check that the rear connector of each module is fully mated with the *STACKER* motherboard. Check all S-DIM data highway wiring, connections and line terminations.
312 313 314 315	Data corruption on S-DIM line.	Check for correct S-DIM line terminations. Check that two or more separate *DIMMER* modules are not sharing the same channel address. Check all S-DIM data highway wiring and connections.
401	An attempt has been made to commence a scene link when a maximum of 32 links are already being processed.	Reduce the number of linked scenes in the system or reduce the link delay times.
601 602 603	Invalid parameters received from *SCENETIMER*.	Check that *SCENETIMER* is set-up with correct time, date, longitude and latitude settings.

Communication Codes

Generally, the occurance of these codes will not cause serious problems, although some minor disruption may be noticed.

Code	Likely Cause	Action
221 222 223 224 225 226 230 231	There has been data corruption on the S-COM lines.	Check that line termination resistors are correctly set on all S-COM devices. Check that two (or more) S-COM devices are not set to the same address.
240	The maximum permissible number of devices that can be connected to the S-COM (external) highway has been exceeded.	Check the No. of devices is ≤30 for a forced cooled Sceneset, ≤15 for a convection cooled Sceneset.
241	A device which was connected to S-COM at power-up has been disconnected or has become inoperative. This code can also occur when a *SCENEMAKER* is disconnected from the system.	Check that all S-COM devices are on-line and functioning correctly. Check all S-COM data highway wiring, connections and line terminations..
305	S-DIM line not reacting correctly.	Check for correct S-DIM line terminations. Check all S-DIM data highway wiring, connections and line terminations.
306 307	*DIMMER* address changed while communications in progress.	Return the *DIMMER* to its original address or re-power the *SCENESET*.
316	A *DIMMER* module has reported an S-DIM communications problem.	Check for an E50, E52, E53, E54 or E56 code displayed on one or more *DIMMER* modules.
317	A *DIMMER* module has reported an over-current condition.	Check for a C01, C02 or C03 code displayed on one or more *DIMMER* modules.
318	A *DIMMER* module has reported an over-temperature condition.	Check for an E51 code displayed on one or more *DIMMER* modules.
319	A *DIMMER* module has reported a severe over-temperature condition.	Check for an E07 code displayed on one or more *DIMMER* modules.
320	A *DIMMER* module has reported a level override condition. ***Note:*** *This is caused if one or more DIMMERs have their level override activated other than by the SCENESET watchdog circuit (e.g. by a separate security system).*	If level override is still active, the affected *DIMMER* display(s) will indicate this. If this is not caused by a security system, check for correct wiring on the watchdog circuit.

DATA STATUS INDICATORS

The four pairs of red and green LEDs on the *SCENESET* control panel show the status of the following data lines:

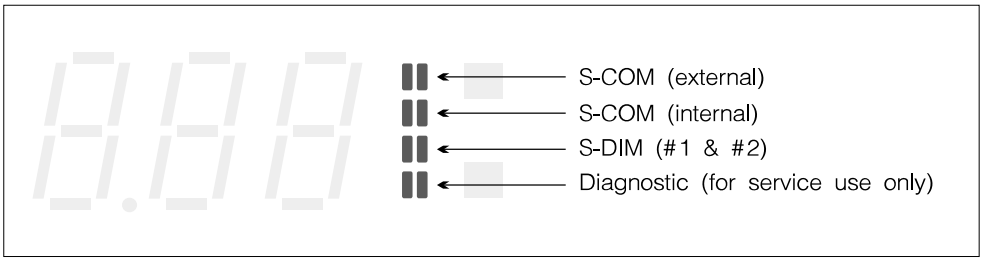


Fig.11-1: Data status indicators.

The left-hand (red) LED in each pair responds to data transmission, whilst the right-hand (green) LED responds to data reception.

These mimic the logic condition (0 or 1) of each data line and all the LEDs should glow brightly during normal operation. If a large number of transactions are occurring, some LEDs may flicker slightly or go dim.

If one (or more) of the LEDs stay dim for a long period or does not light at all, this could indicate a fault on the corresponding data line, in which case a diagnostic code will have been generated.

S-COM Supply Fuse

The power supply for the S-COM data highway is fitted with a fuse to protect against overload or short-circuits. The fuse is located in a holder on the front panel of the *SCENESET*.

Replacement fuse type: 20mm fast-blow.
Fuse rating: 1.25A.

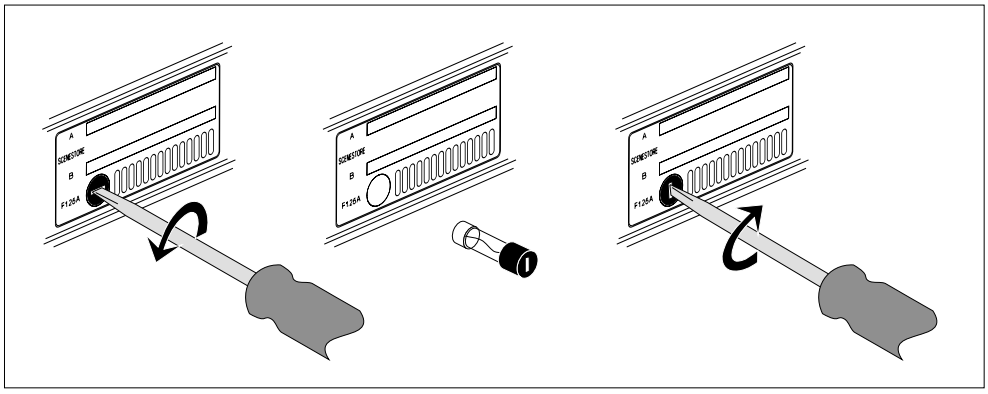


Fig.11-2: Removing the S-COM supply fuse.

PROBLEM DIAGNOSIS

If the *SCENESET* module fails to operate as expected, it is more likely to be the result of incorrect setting-up or programming than a fault with the module itself. Alternatively, there may be a problem elsewhere in the system.

Before calling for service, check through the following list of problems and likely causes:

Problem	**Likely Cause & Remedy**
Display is blank.	No power supply. Check appropriate MCB or fuse.
Display shows three dashes '- - -' and does not operate correctly.	This indicates that the *SCENESET* is unable to read the *SCENESOFT* card. Check for the following: card not present in slot 'A', card not fully inserted, card is wrong way round, card type not valid, card not programmed.
SCENESET appears to be functioning correctly but *DIMMER* outputs are not responding to S-DIM control.	Incorrect or faulty connections on the S-DIM data line. Check that the rear connector is fully mated with the *STACKER* motherboard. *SCENESOFT* card not programmed.
The S-COM line is not functioning correctly.	Incorrect or faulty connections on the S-COM data line. Check that the rear connector is fully seated on to the *STACKER* motherboard. S-COM supply fuse blown.

HELVAR ELECTROSONIC Group
Hawley Mill
Hawley Road
Dartford, Kent. DA2 7SY
United Kingdom.

Telephone: (01322) 22 22 11.
International: +44 3122 22 22 11.
Facsimile: (01322) 282 282.

Part No. I293GB issue 5