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Functional Supply Point
FSP01/02 System

Operation &
Maintenance Manual

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1 Introduction

This document is designed for use by the maintenance staff (technicians and their supervisors) to maintain (fault find, repair or replace) components of the FSP01/02 system and associated components.

Throughout this document, references will be made to other essential information and documentation either prepared by HWL or provided from the equipment supplier/manufacturer.

After safety issues are discussed in Chapter 2 this manual follows a logical path from Description of the relevant components, equipment installation, repair/replacement, routine maintenance and finally a spare parts listing.

- **Chapter 2: Safety**
  Gives details of any relevant safety issues to be observed in the use and disposal of the equipment.
- **Chapter 3: Details of SafeBox Equipment**
  Gives details of the FSP01/02 system and equipment.
- **Chapter 4 : SafeBox Installation**
  Gives details on installation of the FSP01/02 system.
- **Chapter 5: Maintenance**
  Details the recommended maintenance checks required to ensure the ongoing correct operation of the system.
- **Chapter 6: Part Numbers**
  Lists the main parts of the system complete with Supplier and Part numbers to aid in the re-ordering of spare parts.

1.1 Maintenance Policy

The FSP01/02 system comprises highly reliable components. However should a fault occur, the unit can be completely replaced or repaired.

1.1.1 Complete Replacement

If the internal SafeBox unit is completely replaced, note the following:

The SafeBox is a Class II unit and must only be replaced by another Class II unit.

1.1.2 Component Repair

Repair of the FSP01/02 system is assumed to be limited to replacement of either failed complete components or wiring replacement as necessary.

To summarise, the maintenance policy is one of “Repair by Replacement” since:

- Internal components are relatively inexpensive with respect to the cost of fault diagnosis and repair.
- Most internal components are interchangeable although some disassembly may be required for access.

1.2 Competencies and Training Requirements

Staff with the responsibility for installation and maintenance of the FSP01/02 system must hold the required Network Rail licenses.

The training will provide the skills and knowledge needed to identify faulty modules/components and the correct procedures for their replacement. Training for the repair of line replaceable units (modules) is not available. Line replaceable units, where appropriate will be returned to the manufacturer for repair or replaced from spares where repair is not practical.

1.3 Glossary of Terms and Abbreviations

Class II	See definition in Section 2.3
EIC	Electrically Insulated Coating
FSP	Functional Supply Point
HWL	Henry Williams Limited
Loc	Location/Location Case/Trackside Enclosure
mm	millimetres
REB	Relocatable Equipment Building
SafeBox	Enclosure containing integrated electrical components
VAC	Voltage (AC) Alternating Current

1.4 Drawing References – FSP01/02 Systems

Each FSP01/02 system is provided with a complete set of drawings. As the requirements of each system may be different, each drawing set is individual to each system build.

The drawing set for each FSP01/02 system typically consists of:

- Index sheet/s
- Layout sheet/s – General Arrangement (Inc. parts list).
- Circuit drawing/s – Wiring Diagram/s

The user must ensure that the correct drawing set is used before any maintenance or repair work is carried out.

In order to facilitate this, each drawing has the FSP reference ID in the drawing border – In the example in Figure 1, the drawing refers to FSP LOC 20M890.

This should match the ID reference which is printed on the outside of the FSP enclosure – See Figure 2.

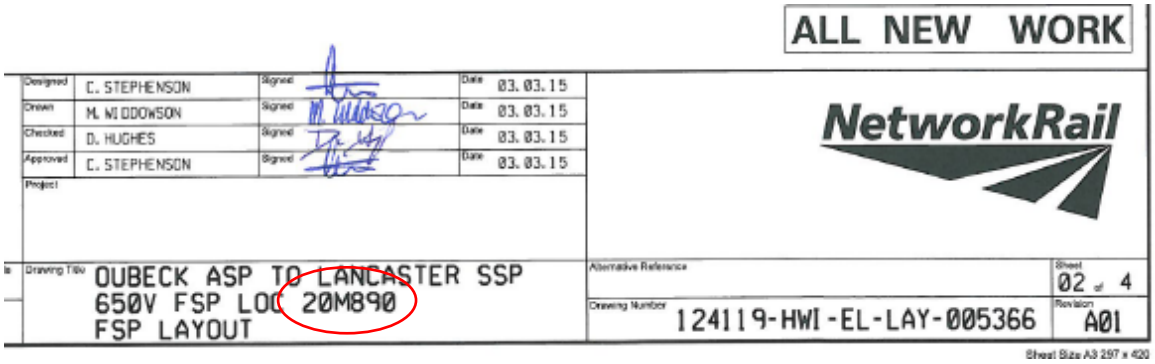


Figure 1: Drawing Border showing ID reference

Figure 2: FSP Enclosure showing ID reference

2 Safety

2.1 Isolation and Risk of Electrocution

FSP01/02 systems are designed to work with voltages up to (and including) 650VAC and as such there is a danger of electrocution once any of the doors are opened and covers are removed.

All electrical power feeds to the FSP01/02 system MUST be ISOLATED and LOCKED OFF BEFORE opening any of the internal SafeBox doors or removal of any of the covers.

A 650VAC supply voltage is commonly used inside power & signalling cubicles, therefore any personnel working inside these units should be appropriately trained. It should also be noted that all electrical equipment is mounted inside a locked enclosure, which also has large caution labels clearly visible from the front and rear.

The FSP enclosure also has a thick yellow warning band around the case, with various other warning labels clearly visible on the outside.

Personnel working on any FSP should be appropriately trained to work with dangerous voltages and be fully conversant with the power circuitry. All connections are shrouded to prevent accidental contact with personnel (fingers etc.) however dangerous voltages may be exposed when using tools such as screwdrivers etc.

Once Isolation has been carried out, it is essential that a proved* voltage indicator is used to recheck that all electrical equipment is dead prior to any works being undertaken.

* It is recommended to use a proving device with the voltage indicator to check for correct operation both before and after checking that the equipment to be worked upon is dead.

2.2 Class II Coating

The internal SafeBox product is coated with a special Electrically Insulated Coating (EIC) which can withstand very high voltages (8KV/mm). This coating must remain intact in order to ensure the integrity of the insulation properties of the enclosure. There must therefore be no further holes or other cut-outs made into this enclosure body post manufacture.

2.3 Class II Definition

A Class II or double insulated electrical appliance is one which has been designed in such a way that it does not require a safety connection to electrical earth.

The basic requirement is that no single failure can result in dangerous voltage becoming exposed so that it might cause an electric shock and that this is achieved without relying on an earthed metal casing.

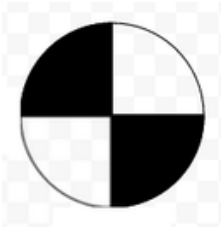
This is usually achieved at least in part by having two layers of insulating material surrounding live parts or by using reinforced insulation.

2.4 Lifting & Trapping

FSP01/02 systems are very heavy (approx. 350Kg to 400Kg depending upon model) and extra care should be exercised when handling these units. The location case is fitted with external lifting eyes which should be used along with suitable lifting equipment. As per the regulations, the load should be assessed prior to any lifting being carried out.

Each of the location case enclosures is designed with lifting eyes on each side. These have been independently tested with a load weight of 1,000Kg. According to LOLER regulations @ 200% this gives a SWL of 500Kg.

CAUTION! – FSP enclosures contain heavy transformers.



These not only increase the weight of the overall unit and may also affect the centre of gravity.

THE LOAD MUST BE ASSESSED PRIOR TO LIFTING

The Manual Handling Regulations should be taken into account when lifting heavy items. Due to the obstructions underfoot in track areas, it is recommended that the removal and/or replacement of the internal SafeBox or Transformers be carried out with either lifting equipment, or a minimum of three people.

There is a risk of trapping of fingers when heavy units are moved into/out of the enclosure. It is recommended that heavy duty gloves are worn when carrying out this process.

All enclosures are fitted with metal hooked door stays which should be used to prevent accidents or damage due to wind or other unforeseen circumstances from closing the doors on unsuspecting personnel.

2.5 Disposal of Equipment

Due consideration must be given when disposing of equipment.

Environmental regulations and standards are continually being updated and therefore a risk assessment must be undertaken at the time of equipment disposal.

None of the FSP components contain batteries or other toxic materials.

Although the Class II coating and other materials used in some of the equipment are designed to release low smoke and less toxic fumes when burnt, burning of any equipment, as a means of disposal is not appropriate.

The equipment must be disposed of in accordance with the

Waste Electrical and Electronic Equipment (WEEE) Regulations

2.6 Fuse Ratings

All fuses installed into the SafeBox fuse carriers must be rated to a minimum of 690VAC.

All other fuses should be voltage rated to at least the operational voltage of where they are fitted in the circuit.

The Amperage rating of each fuse is clearly shown on the electrical schematic drawings included with each FSP system.

It is important that any blown fuses be replaced by fuses of identical rating (both Voltage Rating V, and Current Rating A).

2.7 Surge Arrestor Device

Some of the SafeBoxes installed within the FSP's are fitted with an internal surge arrestor. If this is the case, the SafeBox model no. will have a suffix /SA. The Surge Arrestor is connected across the 650V supply phases and is protected by a pair of BS88 fuses & a separate isolator.

For operational information relating to this device, refer to the manufacturers datasheet.

Only two-wire type surge arrestor devices can be used with the Class II SafeBox. Refer to the SafeBox O & M Manual spares list for the standard type installed. This will identify the part number for the fitted device in order to enable the purchase of any spares required.

3 Details of the FSP01/02 Equipment

3.1 General Information

The Functional Supply Point (FSP01/02) is a location case style enclosure which houses a Class II power box along with hybrid (Class II to Class I) transformers and/or transformer-rectifiers.

The Class II power box (SafeBox) meets the requirements of Network Rail specification NR/L2/ELP/27409 “Product Specification for Functional Supply Points (FSP)”. This is designed to be the unit which will terminate the incoming and outgoing 650VAC Class II power loop cables.

The SafeBox has multiple (quantity depends upon model installed) switched & fused output supplies. These supplies are fed to the primary of the transformers and/or transformer-rectifiers in Class II approved conduit.

For further details of the SafeBox, refer to the O & M manual which is supplied with each FSP system.

3.2 Outgoing/Functional Circuits Configuration

A number of transformers (TX) and/or transformer/rectifiers (TJs) can be fitted into each style of FSP enclosure. This depends upon the size of each of the units (TXs, TJs) to be installed. The list below gives a general guide as to the number of units which can be fitted into each enclosure type:

Enclosure Type	**Qty of TX’s and/or TJ’s**
FSP in B Case	3 maximum
FSP in A Case	5 maximum
FSP in Loc+Power Case	8 maximum

The output (Class I) from the transformers (typically 110VAC) and the transformer-rectifiers (typically 50VDC or 120VDC) then feed to output fuses within the FSP enclosure.

The outgoing cables are connected to these output fuses to feed local location cases etc.

The outgoing functional circuit ways, not used to feed transformers within the FSP may be used to feed cables to other loads (location cases) external to the FSP.

3.3 FSP01/02 (Small Location Case) General Arrangement

The photographs below show the general layouts of the FSP Systems. The general layout is similar for the small and large location cases.

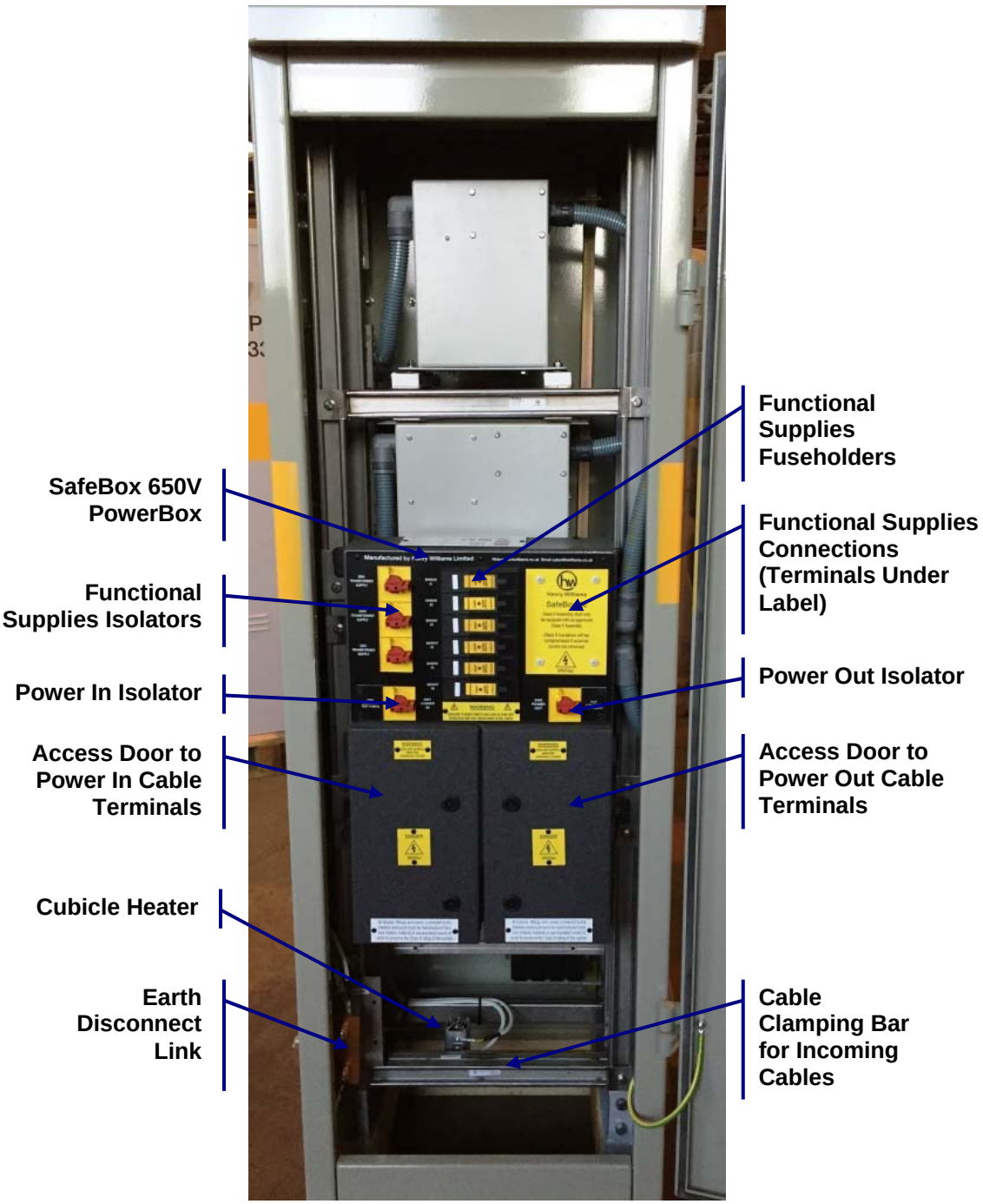


Figure 3: FSP01/02 (Small) Front Arrangement

Figure 3 shows the general layout of the front (incoming) side applicable to the FSP01/02 small location case model.

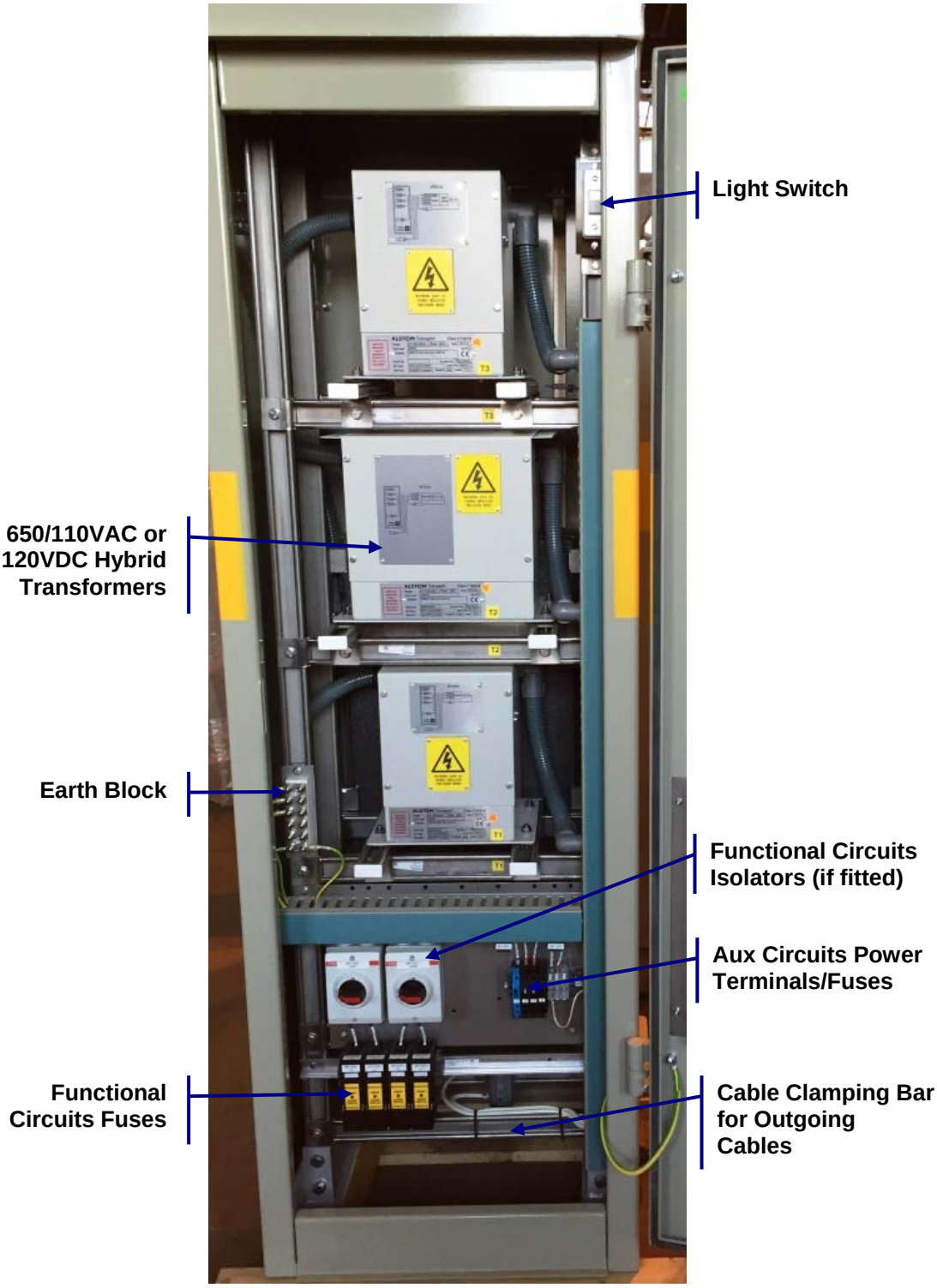


Figure 4: FSP01/02 (Small) Rear Arrangement

Figure 4 shows the general layout of the rear (outgoing) side applicable to the FSP01/02 small location case model.

3.4 FSP01/02 (Large Location Case) General Arrangement

The photographs below show the general layouts of the FSP Systems. The general layout is similar for the small and large location cases.

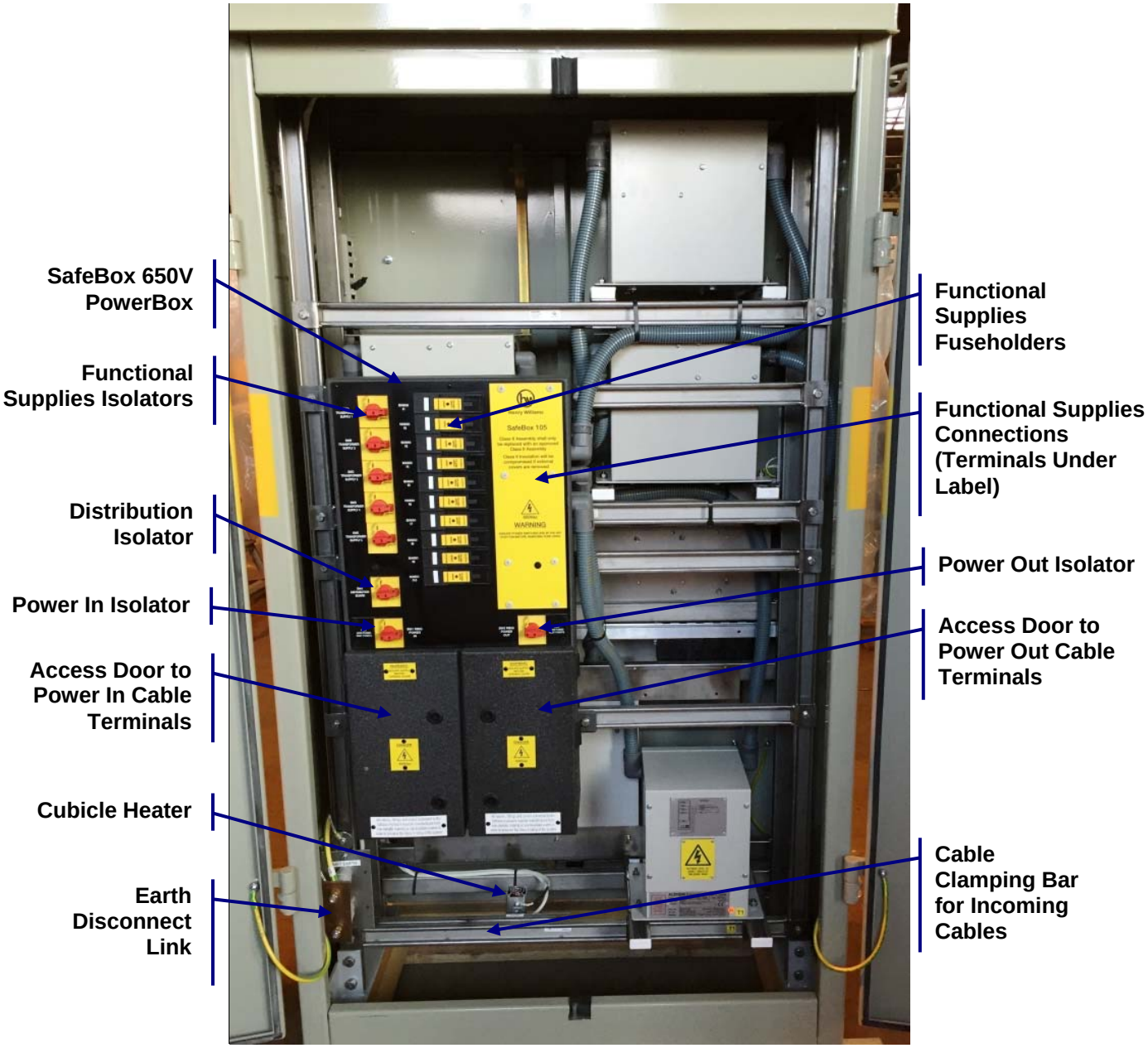


Figure 5: FSP01/02 (Large) Front Arrangement

Figure 5 shows the general layout of the front (incoming) side applicable to the FSP01/02 large location case model.

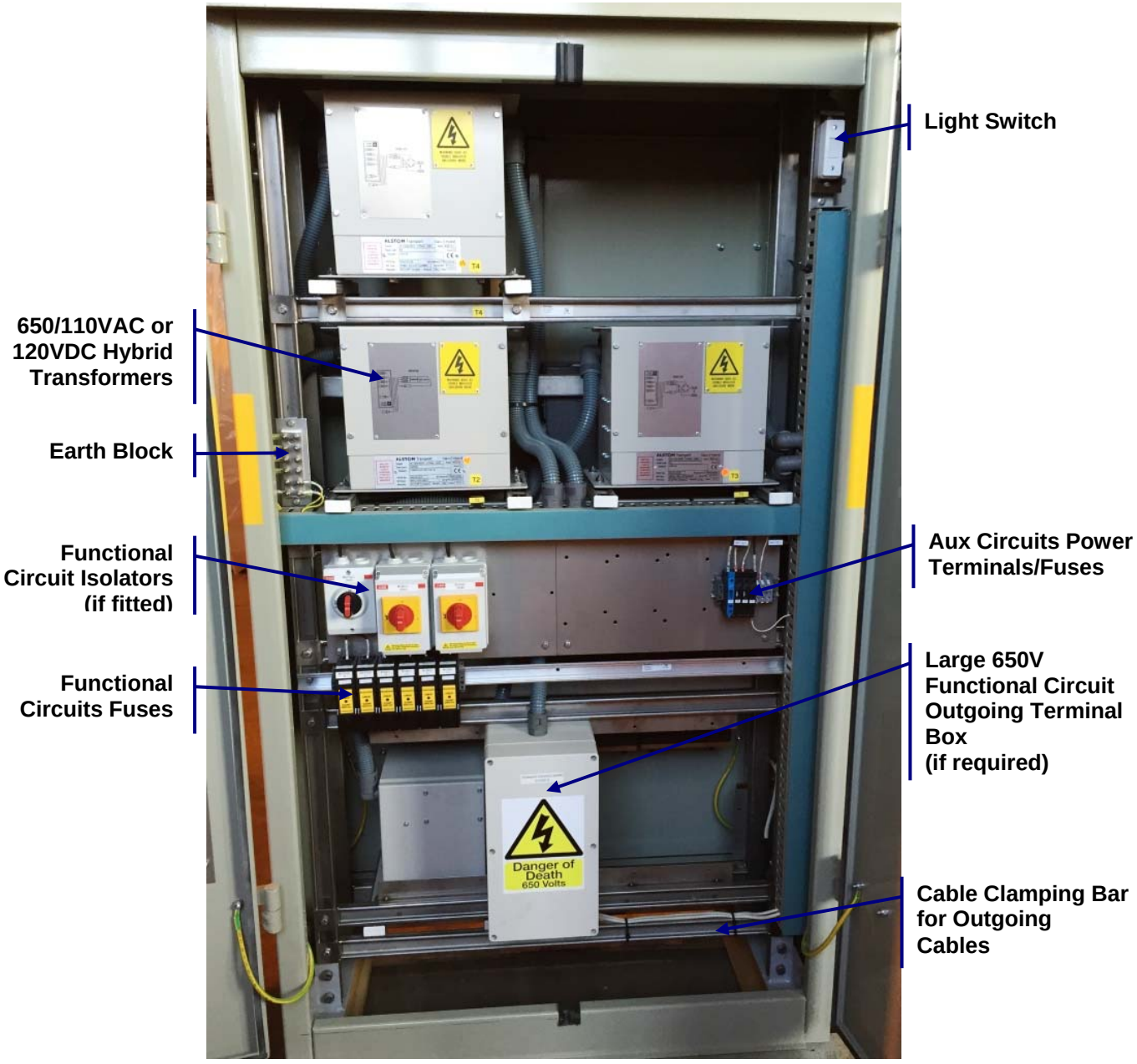


Figure 6: FSP01/02 (Large) Rear Arrangement

Figure 6 shows the general layout of the rear (outgoing) side applicable to the FSP01/02 large location case model.

Note that depending upon the output cable size, a separate terminal box may be fitted into the enclosure (as shown above). This is fitted with stud-type terminals which allow an outgoing (functional circuit) feed cable of up to 120mm².

3.5 FSP01/02 (Loc + Power Case) General Arrangement

The photographs below show the general arrangement for a loc + power style FSP enclosure. The loc + power enclosure has two (double door sides) and also a (single door) end compartment. The end compartment can house the power box which allows more space in the main compartment for equipment.

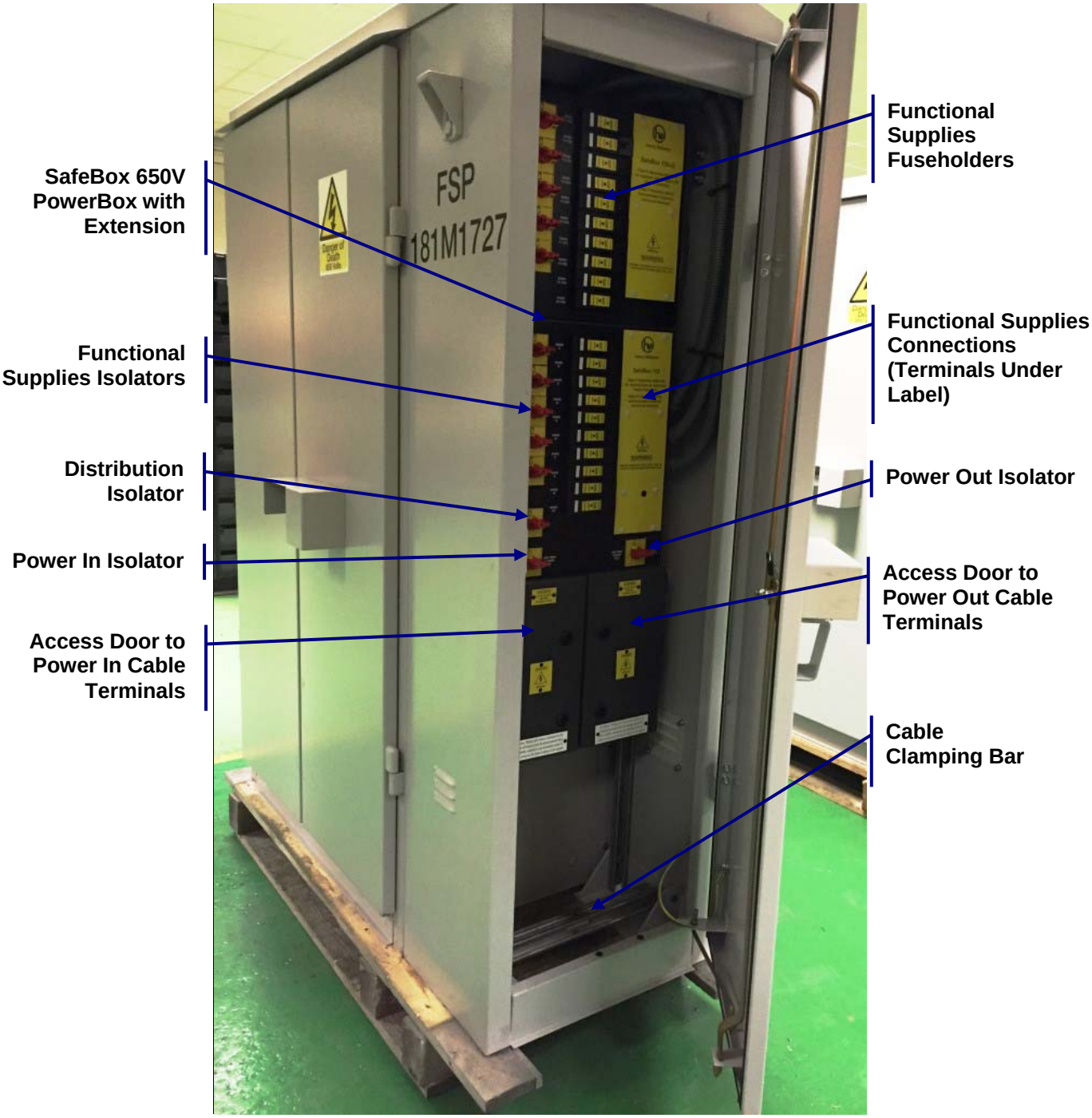


Figure 7: FSP01/02 (Loc + Power) End Compartment Arrangement

Figure 7 shows the general layout of the end (incoming) side applicable to the FSP01/02 location + power case model.

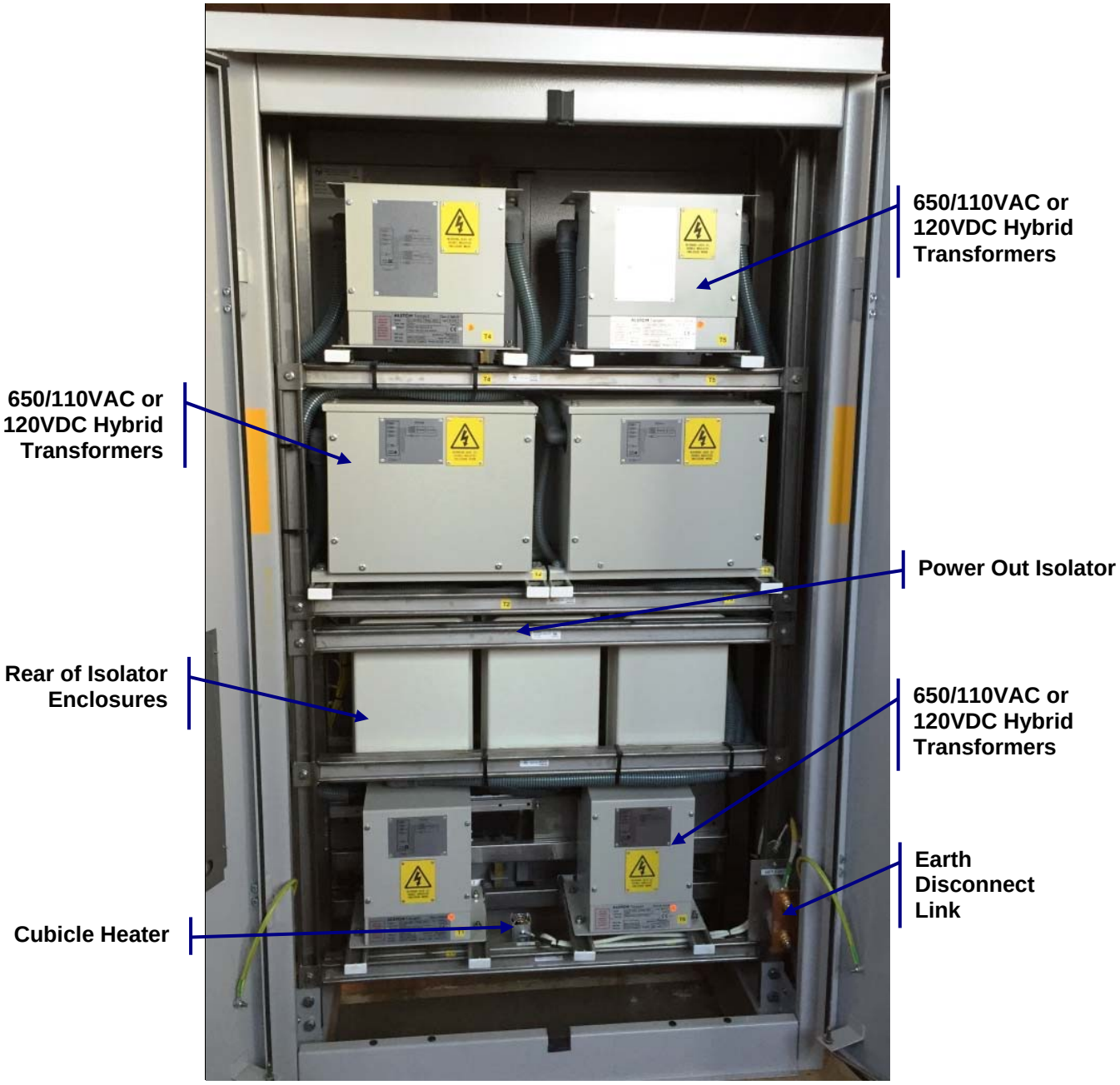


Figure 8: FSP01/02 (Loc + power) Front Arrangement

Figure 8 shows the general layout of the front side applicable to the FSP01/02 location + power case model.

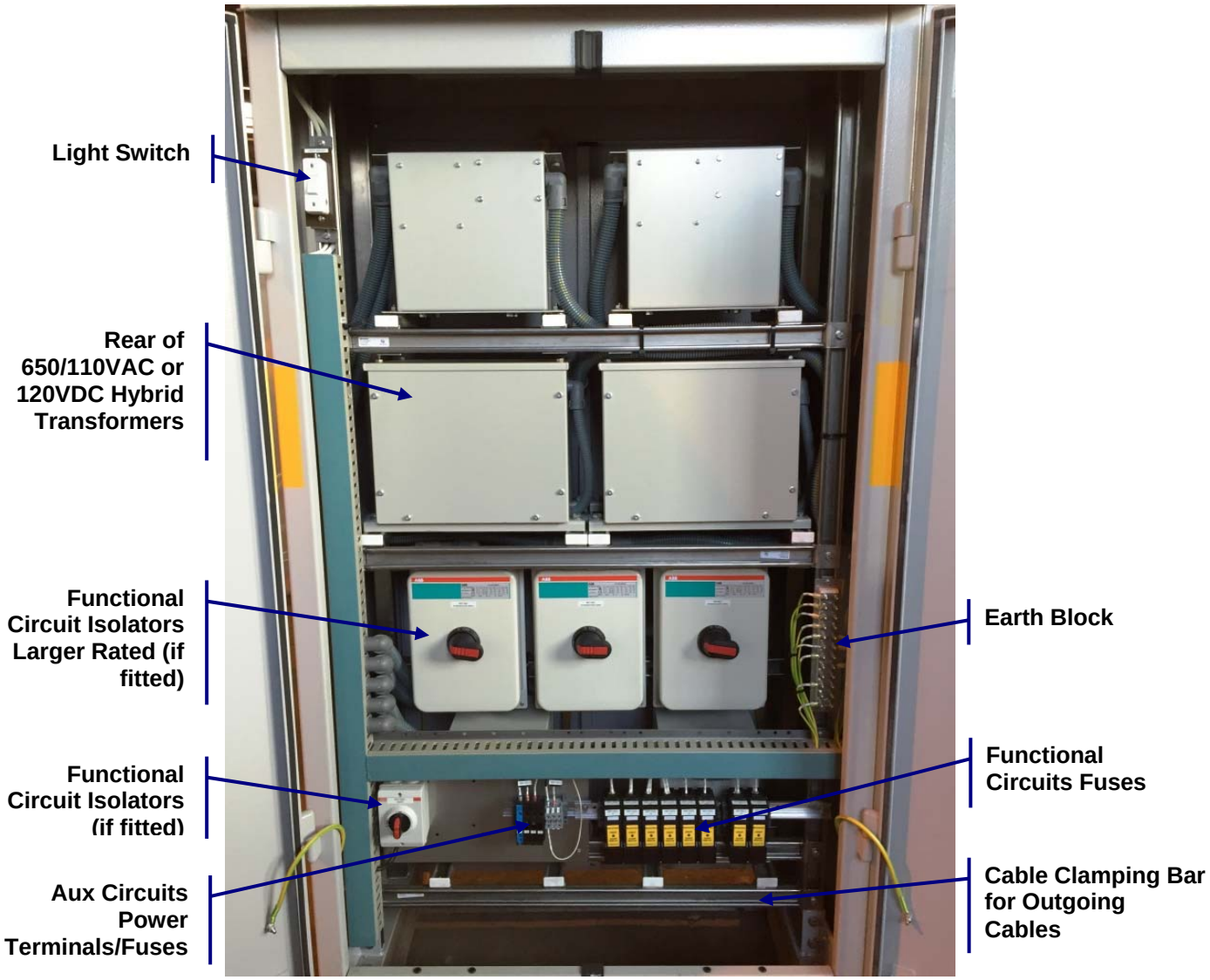


Figure 9: FSP01/02 (Loc + power) Rear Arrangement

Figure 9 shows the general layout of the rear side applicable to the FSP01/02 location + power case model.

Note that depending upon the output cable size, a separate terminal box may be fitted into the enclosure (as shown above). This is fitted with stud-type terminals which allow an outgoing (functional circuit) feed cable of up to 120mm².

Note also that larger rated isolators or bypass/backup may be installed as seen in Figure 9 above.

4 FSP01/02 Installation

4.1 Installation of Small Location Case to Base

The small location case is designed to be installed onto a standard ‘small’ size location case base as shown in the drawing extract below:

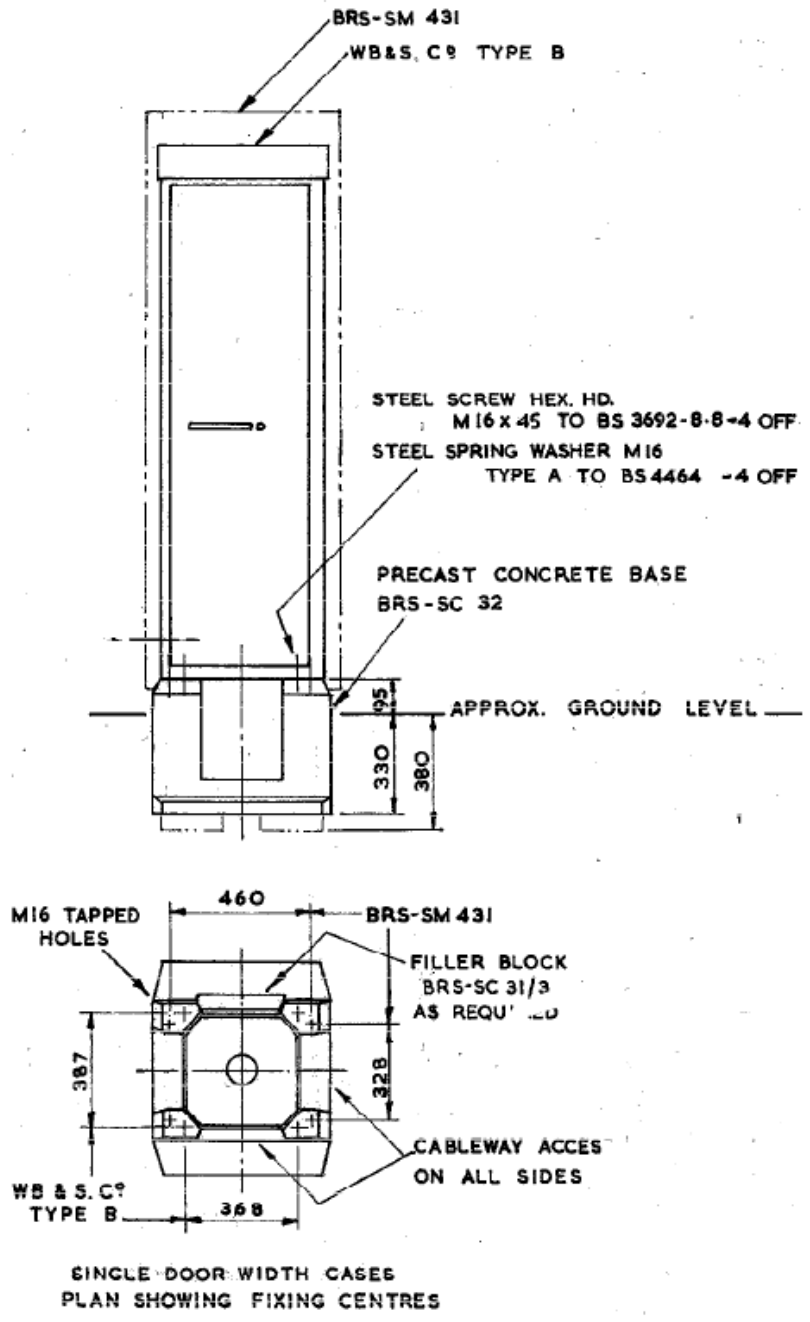


Figure 10: Small Case fitting to Base Detail

For approved base assembly complete with corner units, filler blocks and fixing kit it is recommended to purchase CAT No. K004/104274.

4.2 Installation of Large Location Case to Base

The large Location Case is designed to be installed onto a standard 'large' size location case base as shown in the drawing extract below:

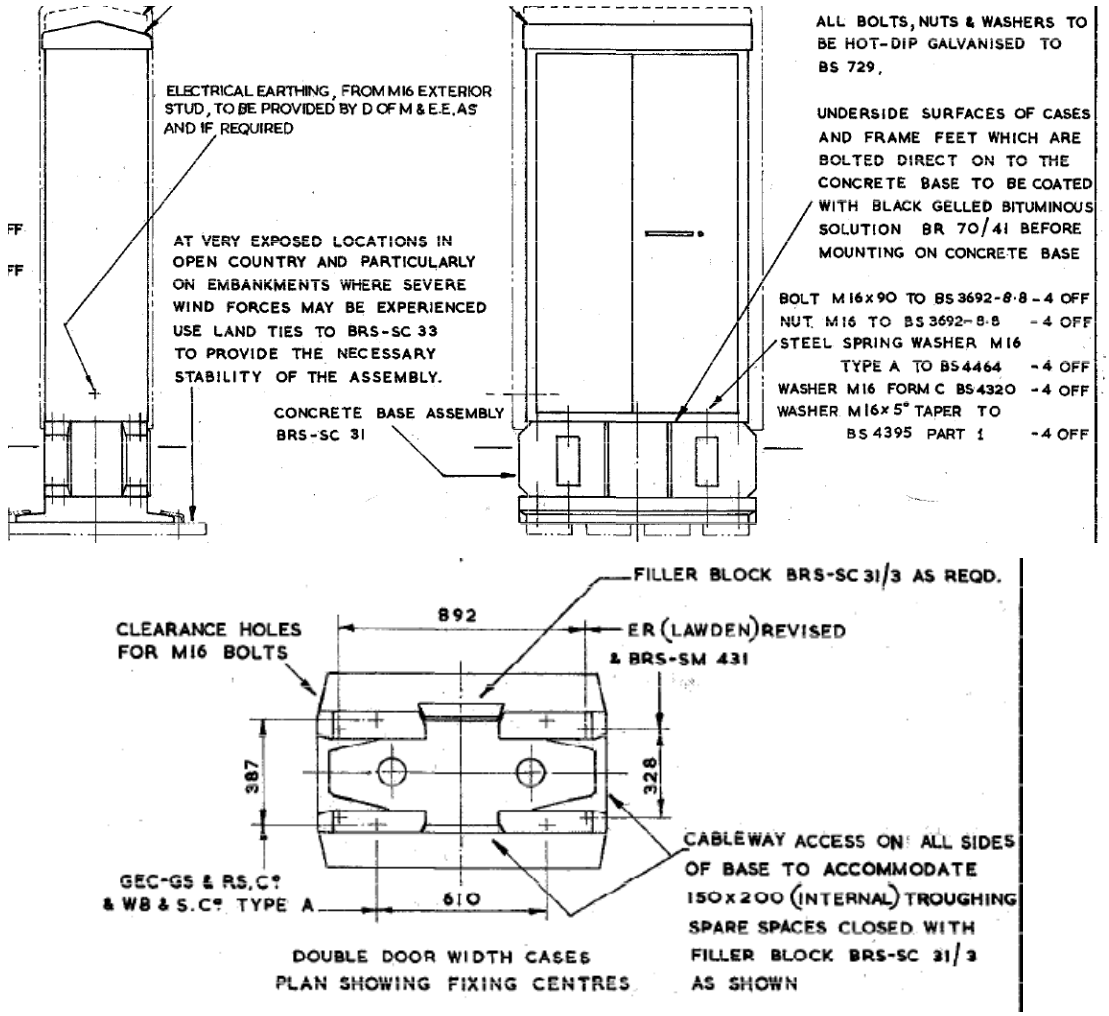


Figure 11: Large Case fitting to Base Detail

For approved base assembly complete with corner units, filler blocks and fixing kit it is recommended to purchase CAT No. K004/104273.

4.3 Installation of Location Case + Power to Base

The location + power case is designed to be installed onto a large concrete base. The detail and dimensions of the base required are as shown in the drawing extract below:

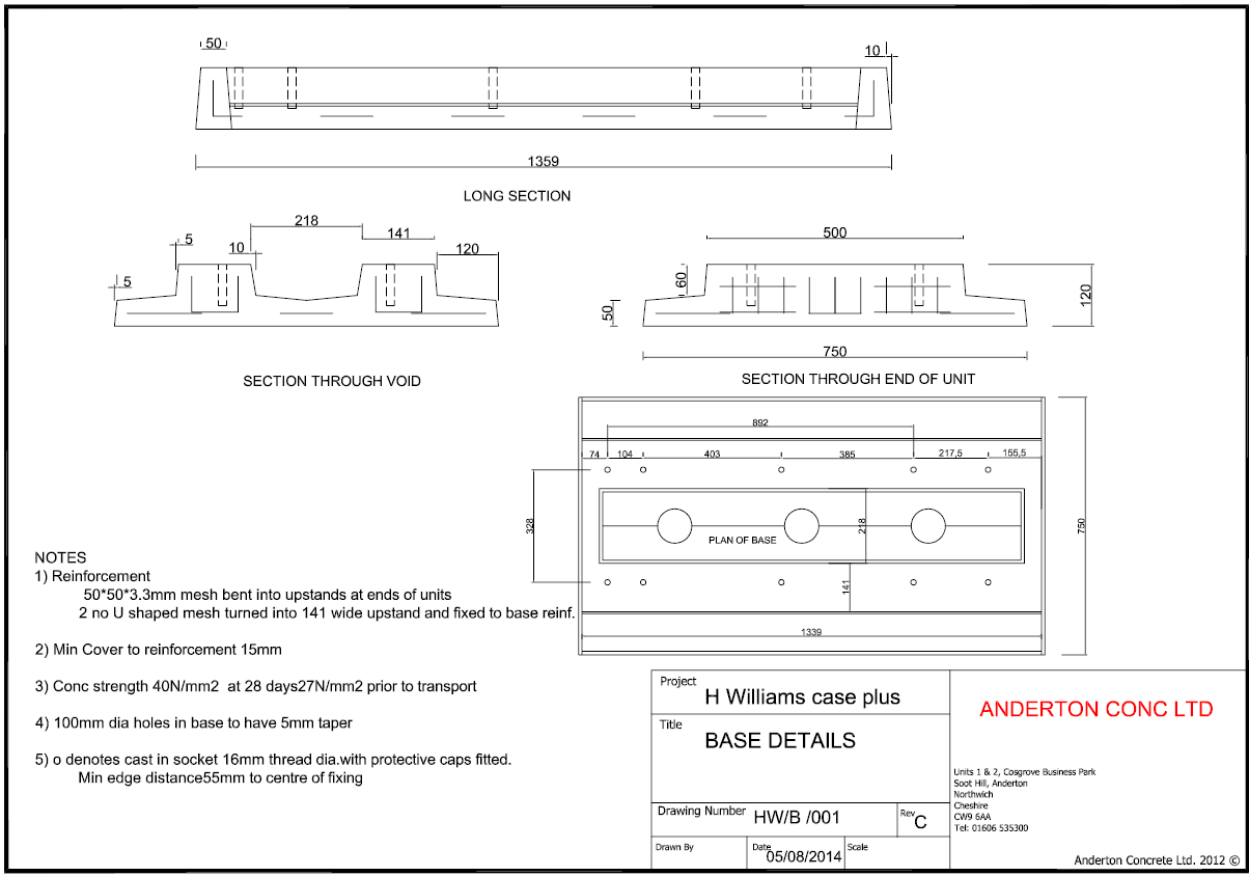


Figure 12: Location + Power Case Base Detail

4.4 Installation of In and Out 650V Power Cables

The main power 650V cables to/from the FSP are terminated into the class II SafeBox. The left-hand terminal chamber is designed to accommodate the power-in cable, with the right-hand terminal chamber the power-out cable. These chambers are separated by an internal partition with each chamber also having a separate access door.

The SafeBox fitted within the FSP has been designed to accommodate power cables up to 120mm². The terminal studs are 10mm and the correctly sized cable lugs must be fitted to suit both the cable and the terminal studs.

For detailed information on the installation of the power cables, the user is referred to the SafeBox Operation & Maintenance manual supplied with the FSP system.

General Notes on 650V Cable Installation

- There should not be any undue stress or twisting forces on the cable terminals. The cables should be formed, rounded & crimped correctly to avoid this.
- Both cable glands & cable clamps must be fitted to ensure a robust installation.

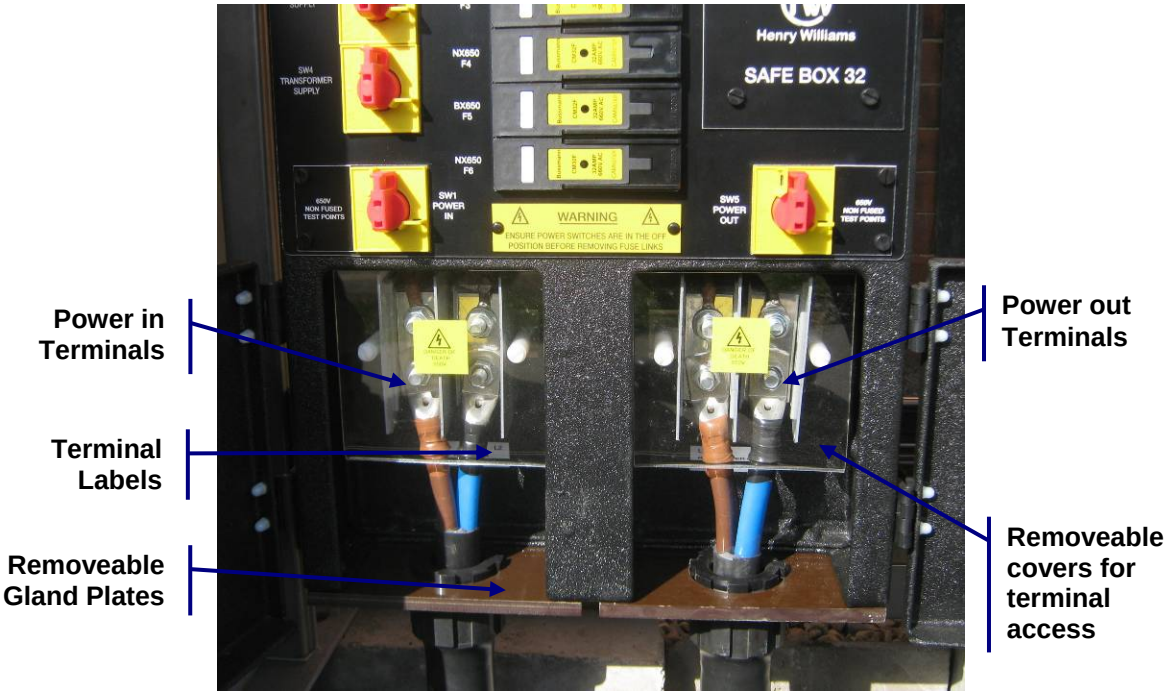


Figure 13: Power In/Out Terminal Arrangement

It is very important that the stripped cable ends are rounded prior to the fitting of the crimp lugs.
This allows the crimp to be rotated on the cable end so that the lug hole correctly lines up with the 10mm stud before the crimp tool is used to form the crimp.

If this is not carried out, the twisted cable will place undue force on the stud terminals which can pull them off the mounting rail.

4.5 Installation of Internal Hybrid Transformer Primary Circuits Wiring

Terminals are provided for connection of the internal transformer primary wiring within the SafeBox fitted within the FSP.

The SafeBox fuses and terminals are numbered to correspond with the electrical schematic diagram for the relevant model. The electrical schematic diagram (which matches the model being installed) must be consulted before terminations are carried out to ensure the correct connections are made.

Pre-drilled holes are provided for the fitting of plastic conduit for the protection of the Hybrid Transformer primary wiring.

It is essential that all power is isolated and locked off **before** the functional terminals covers are removed.

Once Isolation has been carried out, it is essential that a proved* voltage indicator is used to recheck that all electrical equipment is dead prior to any works being undertaken.

* It is recommended to use a proving device with the voltage indicator to check for correct operation both before and after checking that the equipment to be worked upon is dead.

Figure 14: Termination of Hybrid Transformer Primary Feed Cables

Prior to connection of the wires for each functional circuit, the above Safety Precautions MUST be carried out.

For further detailed information on the installation of functional wiring, the user is referred to the SafeBox Operation & Maintenance manual supplied with the FSP system.

4.6 Installation of Hybrid Transformer Secondary Circuits Wiring

Outgoing fuse holders are also provided within the FSP01/02 enclosure for connection of the functional circuits wiring (from each transformer secondary).

These voltages are typically 110VAC or 120VDC (for points). The fuse holders for these outgoing “functional” circuits are located on the rear side of the location case – see items labelled “Functional Circuits Fuses” on Figure 4, Figure 6, and Figure 9.

In some cases (project dependant) each of these functional supplies may have a separate isolator installed in the circuit before these fuse holders.

It is essential that all power is isolated and locked off **before** any connections are made to the functional circuits fuse holders.

Once Isolation has been carried out, it is essential that a proved* voltage indicator is used to recheck that all electrical equipment is dead prior to any works being undertaken.

* It is recommended to use a proving device with the voltage indicator to check for correct operation both before and after checking that the equipment to be worked upon is dead.

4.7 Installation of Functional Load Circuits (650V) External Wiring

Outgoing supplies required at 650V which do not connect to internal transformers may be taken directly from any remaining outgoing ways within the SafeBox.

Any 650V supplies taken directly from the SafeBox will be routed via class II conduit and fittings, to a separate class II terminal enclosure.

The terminal enclosure for these outgoing 650V functional circuits are located on the rear side of the location case – see item labelled “Large 650V Functional Circuit Outgoing Terminal Box” on Figure 6.

It is essential that the functional supplies are isolated & locked off prior to the connection of any cables to the functional circuit terminals.

4.8 FSP Power Distribution Cables

All power distribution cables for wiring to and between Class II FSP assemblies shall be enhanced unarmoured cable in accordance with Network Rail specification NR/L2/SIGELP/27408.

4.9 Note on Class II Cable Glands & Insulated Reducers

Class II enclosures cannot use any metal parts that bridge through the insulation material from outside to inside. To this end standard brass (or other metal) cable glands cannot be used in the SafeBox class II product range or in any other associated class II equipment used in the FSP01/02 products.

The SafeBox product range was designed to accept the Network Rail range of enhanced unarmoured cable, insulated reducers, and cable gland kits. The SafeBox main incoming gland plates are normally pre-drilled with a 63mm diameter hole. This is the correct size to fit the insulated reducer shown in Figure 15.

Product Description	Product Image
Insulated Adaptor/Reducer for use with Enhanced Unarmoured Cable	

Note that alternative Class II gland kits are available to suit other sizes of holes and glands. Entry holes can be pre-drilled to a range of entry diameters: 63mm, 50mm, 40mm, 25mm, and 20mm to accommodate Cables from 16mm² to 120mm².

The Insulated Adaptor/Reducer is to be installed along with its associated Cable Gland in accordance with NR/L2/ELP/27410 Specification for Class II Based Signalling Power Distribution Systems.

The nylon reducers should be fitted with the torque settings according to the Manufacturer's datasheet.

The Type (Part Number) of Insulated Adaptor/Reducer for use is dependent on the size of the Compression Glands. The Gland size shall be determined by the size of the Cable to be installed (16mm² to 120mm²).

4.10 Note on Class II Conduits and Fittings

All conduits and fittings which are used inside the FSP01/02 product which are to carry Class II cables must conform to the following Network Rail specifications:

- NR/L2/SIGELP/27421 Product Specification – Flexible Conduits for Class II Based Signalling Power Distribution Systems.
- NR/L2/SIGELP/27422 Product Specification – Cable Glands for use in Class II Based Signalling Power Distribution Systems.

CLEVELAND CABLE COMPANY

CMP NR737 Insulated Reducer - Compression Glands

NR737 Insulated Reducer/ Gland - Complete Kits

Kit Component List - NR737 Reducer, M63 Back Nut, 1 x M63 Entry Thread Seal, A2 Compression Gland c/w Nylon Washer & PVC Shroud

Reducer/M63 Back Nut	PADS No.	Cleveland Part No	Nylon Washer Seal A	Nylon Washer Seal B	Gland Size	Brass or Plastic
NR/737/20	054/212125	NR737/20/B	M63	M20	20	Brass
NR/737/25	054/212126	NR737/25/B	M63	M25	25	Brass
NR/737/32	054/212127	NR737/32/B	M63	M32	32	Brass
NR/737/40	054/212128	NR737/40/B	M63	M40	40	Brass
NR/737/50	054/212129	NR737/50S/B	M63	M50	50s	Brass
NR/737/50	054/212129	NR737/50/B	M63	M50	50	Brass
NR/737/20	054/212125	NR737/20/P	M63	M20	20	Plastic
NR/737/25	054/212126	NR737/25/P	M63	M25	25	Plastic
NR/737/32	054/212127	NR737/32/P	M63	M32	32	Plastic
NR/737/40	054/212128	NR737/40/P	M63	M40	40	Plastic
NR/737/50	054/212129	NR737/50S/P	M63	M50	50s	Plastic
NR/737/50	054/212129	NR737/50/P	M63	M50	50	Plastic

CMP PRODUCTS

Link-up Registered

CMP A2 Brass Compression Glands

Cleveland Part No	PADS No.	CMP Gland Description	Size
CMPA220	054/029246	A2 20 Indoor/Outdoor Brass Compression Gland	20
CMPA225	054/029247	A2 25 Indoor/Outdoor Brass Compression Gland	25
CMPA232	057/029248	A2 32 Indoor/Outdoor Brass Compression Gland	32
CMPA240	054/029249	A2 40 Indoor/Outdoor Brass Compression Gland	40
CMPA250S	054/029250	A2 50S Indoor/Outdoor Brass Compression Gland	50
CMPA250	054/029251	A2 50 Indoor/Outdoor Brass Compression Gland	50

(NR737 c/w A2 Brass Gland Complete Kit illustrated)

Figure 15: Insulated Reducers & Cable Glands

5 Maintenance

All electrical power feeds to the FSP 01/02 unit MUST be ISOLATED and LOCKED OFF prior to accessing connections, terminals or the removal of access covers.

5.1 Replacement of Components

The internal components can be replaced with new on a like-for-like basis as required. For reference, the part numbers for the main components used within the FSP01/02 enclosure are given in the parts list table on each FSP General Arrangement Drawing.

5.2 Annual Procedure

It is recommended that the following work be carried out yearly:

- General visual inspection as to the condition of the enclosure and components within (including wiring).
- Check that the Electrically Insulated Coating (EIC) on any of the SafeBox components, does not show any signs of damage and in particular any exposure of the metal base material that this damage caused. See guidance given in Section 5.3
- Check presence & legibility of all I.D. labelling and warning notices.
- Check all cable connections and crimps are secure and do not show any sign of heat/burning.
- Check that all fuses are present and of the correct size (and voltage rating on 650VAC) as detailed on the electrical schematic diagrams.
- Remove, inspect, and re-insert fuses. Check carrier tightness & for signs of any burning.
- Ensure all fixing nuts, washers, bolt covers etc. are present, correct, and tight.
- Check cables and glands box for damage or evidence of water ingress.
- Give the equipment a general clean and remove any build-up of dust/debris using a brush and vacuum fitted with small nozzle.
- Before being returned to service, it is recommended to carry out a full operational check of the isolation switches.

Note that if any Class II unit is replaced, it must only

be replaced by another Class II unit.

5.3 EIC Coating Damage Guidance

As the coating is applied to both the inside and the outside of the inner stainless steel enclosure body, the outer coating can take some acceptable damage before the unit requires replacing.

Note that in order for a person to receive an electric shock (with the box closed) the following simultaneous fault conditions must exist:

- The outer coating must be penetrated/damaged (at least to bare metal).
- The inner coating must be penetrated/damaged (at least to bare metal).
- An internal electrical fault must occur so that a live conductor touches exactly the same area where the inner coating is exposed to bare metal.
- The person must make contact with exactly the same area where the outer coating is exposed to bare metal.

Figure 16 shows a practical guide which has been developed by Henry Williams to help maintenance personnel understand what levels of damage are acceptable and which are not.

As can be seen below the damage guide is split up into three action levels:

Action Level 1

The amount of damage is superficial and does not completely penetrate the outer coating. This level of damage should be noted on the maintenance sheet along with its location. The damage can then be monitored during future inspections to ensure that no further worsening occurs.

It is not recommended to increase the frequency of visual inspections for this level of damage.

Action Level 2

The amount of damage is worse than that in action level 1 in that it does completely penetrate the outer coating. This level of damage should be noted on the maintenance sheet along with its location. The damage can then be monitored during future inspections to ensure that no further worsening occurs.

The unit can be put back into service with an affixed label/notice indicating what damage has been observed.

It is recommended to increase the frequency of visual inspections for this level of damage to ensure that there is no further degradation in the coating.

Action Level 3

The amount of damage is much worse than that in action level 2 in that the enclosure is completely penetrated through both the inner & outer coatings and the stainless steel body. This level of damage should be noted on the maintenance sheet along with its location.

The unit can be put back into service with an affixed warning label/notice indicating what damage has been observed.

It is recommended to replace the unit at the next available opportunity.

Note that the EIC Coating is a NON-REPAIRABLE item

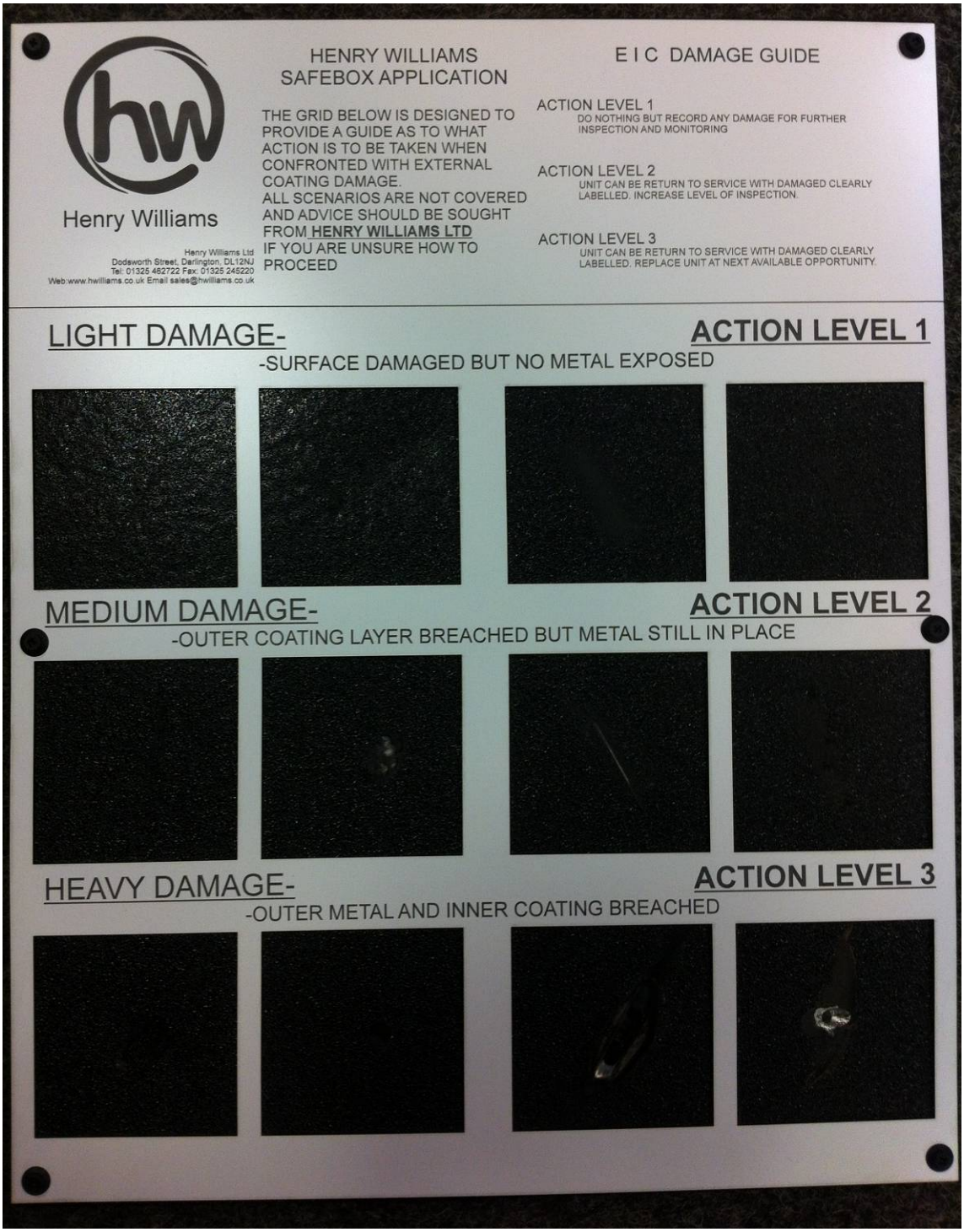


Figure 16: EIC Damage Guide

6 Part Numbers

The table below details the part numbers for the main items used in the FSP01/02 systems with the description, and supplier for each item.

For parts relating to the SafeBox equipment, refer to the SafeBox O&M Manual Ref: HWC2SafeBox.

Note that the transformers and transformer/rectifiers given in the table below are typical ones used in FSP01/02 systems. All FSP isolating transformers used should be of the Class II Hybrid type in accordance with Network Rail Specification NR/L2/SIGELP/30007.

Description	**Supplier**	**Part Number**
SafeBox 32 (Complete Unit)	Henry Williams	092/002047
SafeBox 105 (Complete Unit)	Henry Williams	092/001358
SafeBox 100+5 (Complete Unit)	Henry Williams	092/001362
SafeBox Cable Chamber Extension Kit	Henry Williams	2013/043-A1-000
Class II Hybrid Transformer : NT6703 (650/110V 250VA)	CAT No.	086/045920
Class II Hybrid Transformer : NT6710 (650/110/50V 500VA)	CAT No.	086/045921
Class II Hybrid Transformer : NT6712 (650/110V 500VA)	CAT No.	086/045928
Class II Hybrid Transformer : NT6720 (650/110/110/50V 1000VA)	CAT No.	086/212524
Class II Hybrid Transformer : NT6722 (650/230/50V 1000VA)	CAT No.	086/045929
Class II Hybrid	CAT No.	086/045923

Description	Supplier	Part Number
Transformer : NT6723 (650/110V 1000VA)		
Class II Hybrid Transformer : NT6731 (650/4x110/2x50V 1600VA)	CAT No.	086/212525
Class II Hybrid Transformer : NT6750 (650/2x110V 1650VA)	CAT No.	086/045930
Class II Hybrid Transformer : NT6760 (650/230V 3000VA)	CAT No.	086/045931
Class II Hybrid Transformer : NT6761 (650/110V 3000VA)	CAT No.	086/045926
Class II Hybrid Transformer/Rectifier : NQ6720 (650/120VDC T/J 5A)	CAT No.	054/212526
Class II Hybrid Transformer/Rectifier : NQ6740 (650/120VDC T/J 10A)	CAT No.	054/212527
Enclosed Switch 3P 25A (AC version)	ABB	OTP 25B3M
Enclosed Switch 3P 16A (AC version)	ABB	OTP 16HB3M
Enclosed Switch 2P 16A (DC version)	ABB	OTDCP 16SA11M
Enclosed Switch 3P 40A (AC version)	ABB	OTP 40B3M
Enclosed Switch 3P 40A Changeover	ABB	OT32ELMM3C

Description	Supplier	Part Number
Earth Disconnect Link	Newey & Eyre	NL798
Earth Block 2BA with plate	CAT No.	086/013050
Anti-Condensation Heater (20W) includes inline thermostat	Nimbus	40/1
Internal Light (110VAC, 60W)	Knightsbridge	TR65118HF
Light Switch	Crabtree	CAPITAL 4177
Disconnect Link Holder (Blue Lever)	ABB Entrelec	ML10/13.SN
Fuse Holder (Black Lever)	ABB Entrelec	ML10/13.SF
Through Terminal	ABB Entrelec	M10/10
Camaster Fuseholder (63A)	Cooper-Bussman	CM63F