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# SafeBox Legacy Connect Range FSP02/04 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 Legacy Connect 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 Legacy Connect system and equipment.
- **Chapter 4: SafeBox Installation**  
Gives details on installation of the Legacy Connect 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 Legacy Connect 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 Legacy Connect 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 Legacy Connect 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 – Legacy Connect Systems

Each Legacy Connect 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 Legacy Connect system typically consists of:

- 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 will have the Legacy Connect reference ID in the drawing border.

This should match the ID reference which is printed on the outside of the enclosure.

## 2 Safety

### 2.1 Isolation and Risk of Electrocutation

Legacy Connect 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 Legacy Connect system  
MUST be ISOLATED, LOCKED OFF, AND PROVEN BEFORE  
opening any of the 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 Legacy Connect enclosure also has a thick yellow warning band around the case, with various other warning labels clearly visible on the outside.

Personnel working on this electrical equipment 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 Legacy Connect enclosure contains a class II power box (SafeBox Legacy SL11/C, SafeBox Legacy SL21/R or SafeBox Legacy SL22/A4C). Contained within this power box are the connections for the 650VAC power.

The SafeBox Range 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.



The bottom of this unit consists of a Tufnol® (non-conducting) gland plate which can be supplied blank or pre-drilled to your required size if detail is provided upon order placement.

### 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

The Legacy Connect systems are of moderate weight (max. 86Kg depending upon transformer installed) and care should be exercised when handling these units.

**CAUTION!** – These enclosures contain heavy transformers.



**These not only increase the weight of the overall unit  
but 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 installation, removal, and/or replacement of the Legacy Connect enclosure 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 and also when transformers are moved into/out of the enclosure. It is recommended that heavy duty gloves are worn when carrying out these processes.

It is recommended that door stays are used or movable parts are otherwise secured in place 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 these products/components contain batteries or other toxic materials.

It should be noted that 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**

## 3 Details of the Legacy Connect Equipment

### 3.1 General Information

The Legacy Connect (FSP02/04) are aluminium enclosures which houses a Class II power box along with the hybrid (Class II to Class I) transformer.

The Class II power box (SafeBox Legacy SL11/C, SafeBox Legacy SL21/R or SafeBox Legacy SL22/4AC) 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 either 1 (FSP04 Style Circuit) or 2 650V loop isolators (FSP02 Style Circuit), and 1 fused (functional) output. The fused output feeds the transformer in Class II approved conduit.

For further details of the SafeBox range, refer to the SafeBox O & M manual. This can be found on our website <https://hwilliams.co.uk/technical-support/>.

### 3.2 Models and Weights

The table below gives the product model reference number and weight of each product in the range.

Legacy Connect				
Model	VA Rating	FSP Type	Weight (KG)	PADS No.
LC0.51	500	FSP04 Legacy (2 Core) Fitted with SL11/C	59	0054/212938
LC1.01	1,000		64	0054/212939
LC1.51	1,500		68	0054/212940
LC2.01	2,000		75	0054/212941
LC3.01	3,000		80	0054/212942
LC20.51	500	FSP02 Ring (2 Core) Fitted with SL21/R	65	0054/212943
LC21.01	1,000		70	0054/212944
LC21.51	1,500		74	0054/212945
LC22.01	2,000		81	0054/212946
LC23.01	3,000		86	0054/212947

Legacy Connect Short Annexe				
Model	VA Rating	FSP Type	Weight (KG)	PADS No.
LCS0.51	500	FSP04 Legacy (2 Core) Fitted with SL11/C	58	0054/213074
LCS1.01	1,000		63	0054/213075
LCS1.51	1,500		67	0054/213076
LCS2.01	2,000		74	0054/213077
LCS3.01	3,000		79	0054/213078
LCS20.51	500	FSP02 Ring (2 Core) Fitted with SL21/R	59	0054/215104
LCS21.01	1,000		64	0054/215105
LCS21.51	1,500		68	0054/215106
LCS22.01	2,000		75	0054/215107
LCS23.01	3,000		80	
LCS40.51	500	FSP02 Ring (2 Core) Fitted with SL22/A4C	64	0054/213079
LCS41.01	1,000		69	0054/213080
LCS41.51	1,500		73	0054/213081
LCS42.01	2,000		80	0054/213082
LCS43.01	3,000		85	0054/213083

Note that the approximate weights given above are the total weight of the cabinet including the fitted transformer. These weights will vary if alternative equipment is installed within the power annexe.

### 3.3 Fuse Types and Ratings

All fuses installed into the Legacy Connect system fuse carriers must be rated to the system voltage.

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

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

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

It should be noted that the fuses fitted into all fuse holders must be rated correctly to protect the corresponding loads. Refer to the transformer manufacturers' datasheet and assess the functional load as required.

#### 3.3.1 SafeBox Legacy

The SafeBox Legacy unit requires 2 fuses for the functional circuit. These are identified as F1 & F2. The fuses required differ depending on the SafeBox Legacy unit installed. The below table shows the fuses required for each unit used in a Legacy Connect.

SafeBox Legacy SL11/C	SafeBox Legacy SL21/R	SafeBox Legacy SL22/A4C
BS88, Size A1	BS88, Size A1	IEC 60269 10 x 38mm

#### 3.3.2 Outgoing Functional Supply

The outgoing supply of the Legacy Connect enclosure is protected by a 2-pole IEC 60269 fuse holder that accepts 10 x 38mm fuses. These are identified as F3 and F4. They are housed in the plastic termination enclosure.

### 3.4 650V Power Loop Cables Configuration

The Legacy Connect case is fitted with an internal power box (either SafeBox Legacy SL11/C, SafeBox Legacy SL21/R or SafeBox Legacy SL22/A4C). These power boxes are Class II and fully rated for use on all AC voltages up to a maximum of 690VAC.

#### 3.4.1 Power cables for the SafeBox Legacy SL11/C

There are two sets of two terminal studs to accommodate the incoming and outgoing power cables. The terminals are separated by an insulated partition and (under the main cover) each pair of terminals are fitted with a clear warning cover for added protection.

For installation detail see Section 4.6

### **3.4.2 Power cables for the SafeBox Legacy SL22/A4C**

There are two sets of four terminal studs to accommodate the incoming and outgoing power cables. The terminals are separated by an insulated partition and (under the main cover) each pair of terminals are fitted with a clear warning cover for added protection.

For installation detail see Section 4.6

### **3.4.3 Power cables for the SafeBox Legacy SL21/R**

There are two sets of two terminal studs to accommodate the incoming and outgoing power cables. The terminals are separated by an insulated partition and (under the main cover) each pair of terminals are fitted with a clear warning cover for added protection.

For installation detail see Section 4.6

## **3.5 Outgoing/Functional Circuits Configuration**

The secondary winding/s of the internal transformer feed the output (functional) supplies for the system to be supplied. This is generally at 110VAC; however, this depends on the transformer installed.

The top shelf fitted inside the enclosure will support the internal transformer. The maximum area size allowance for the transformer is 300mm High x 330mm Wide x 320mm Deep. The maximum weight for the shelf support is 40Kg.

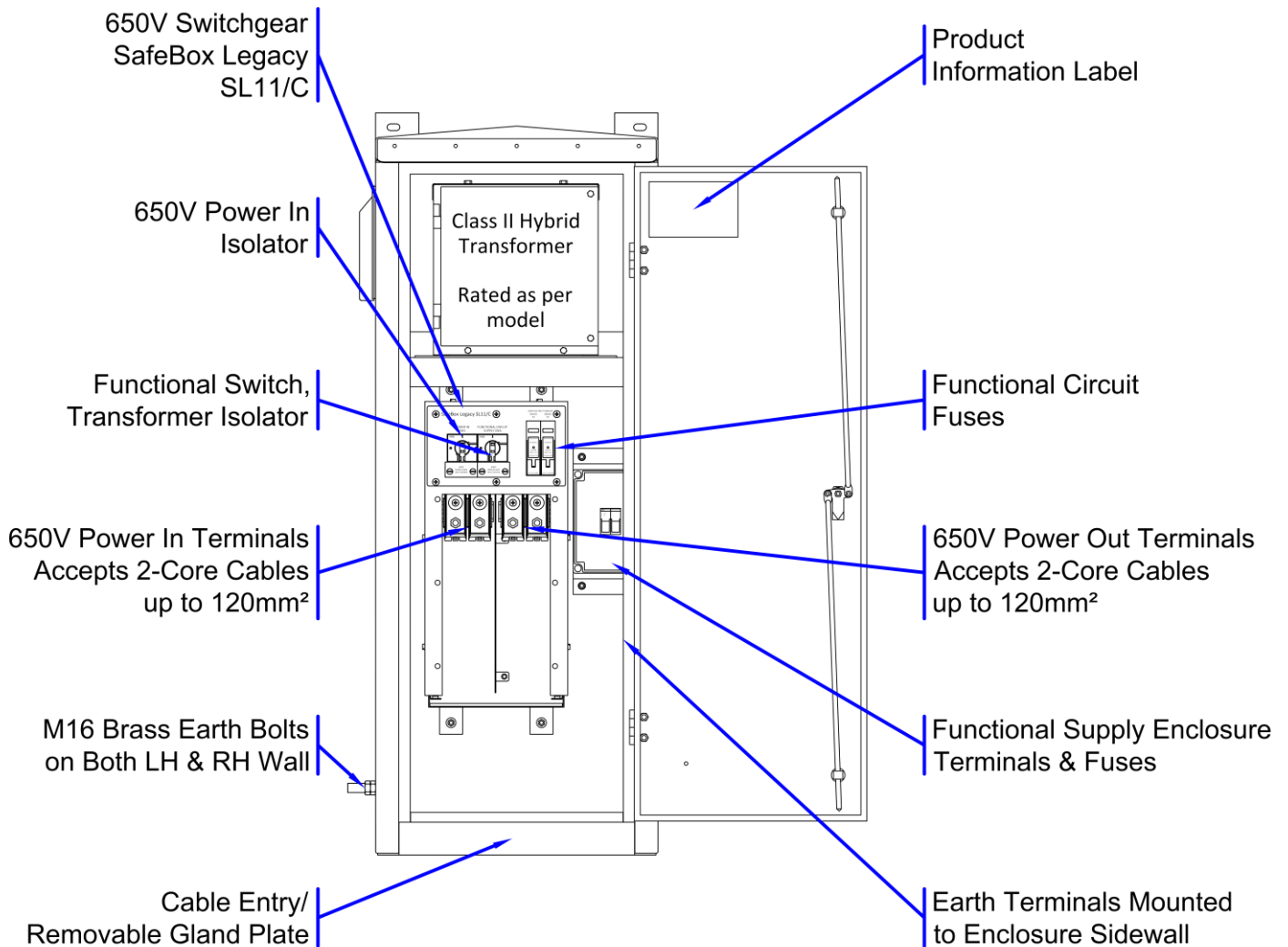
The output (Class I) from the hybrid transformer (typically 110VAC) feeds to output fuses within the Legacy Connect enclosure. These output fuses are of the IEC type and are fitted within an insulated enclosure adjacent to the SafeBox Legacy SL11/C and SafeBox Legacy SL21/R or below the SafeBox Legacy SL22/A4C.

The outgoing cables are connected to these output fuses to feed the local location case.

For installation details see Section 4.7

### 3.6 Legacy Connect (FSP04 with SL11/C) General Arrangement

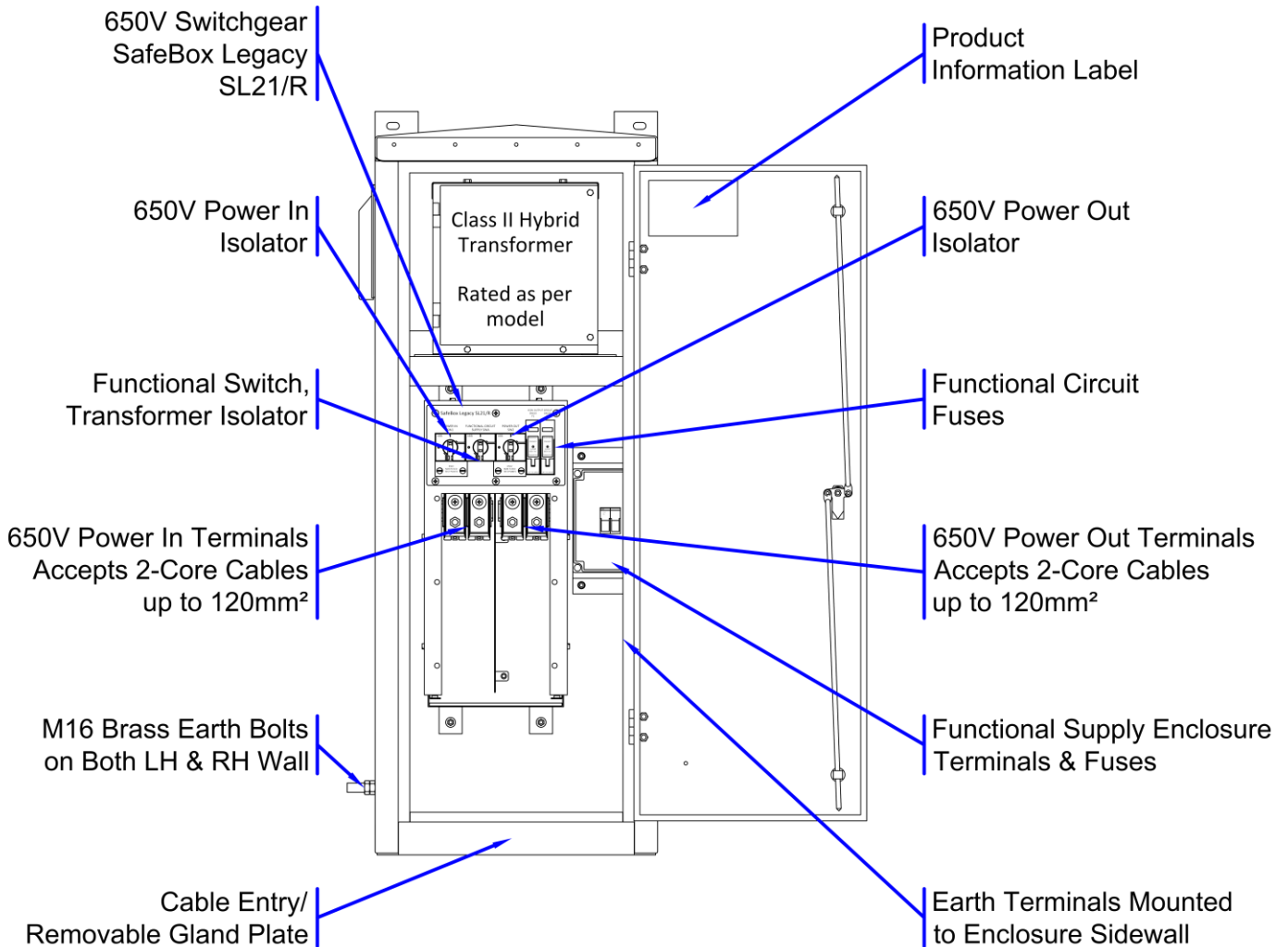
The photograph below shows the general layout of the Legacy Connect enclosure complete with a SafeBox SL11/C Power Enclosure. This enclosure is used for 2-core cables.



**Figure 1: Legacy Connect (SL11/C) Internal Arrangement**

### 3.7 Legacy Connect (FSP02 with SL21/R) General Arrangement

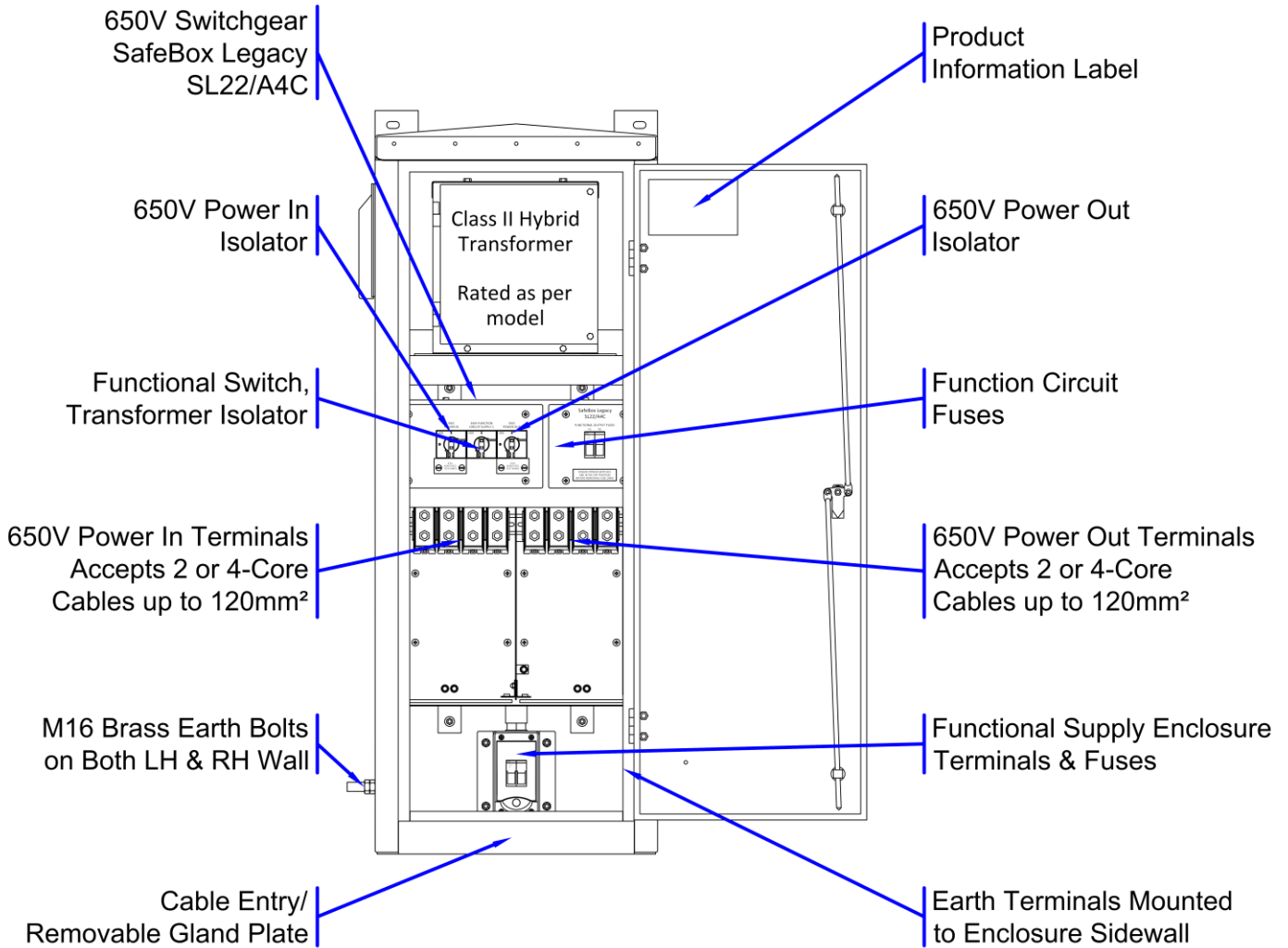
The photograph below shows the general layout of the Legacy Connect enclosure complete with a SafeBox SL21/R Power Enclosure. This enclosure is used for 2-core cables.



**Figure 2: Legacy Connect (SL21/R) Internal Arrangement**

### 3.8 Legacy Connect (FSP02 with SL22/A4C) General Arrangement

The photograph below shows the general layout of the Legacy Connect enclosure complete with a SafeBox SL22/A4C Power Enclosure. This enclosure is used for 2 or 4-core cables.



**Figure 3: Legacy Connect (SL22/A4C) Internal Arrangement**



## 4 Legacy Connect Installation

### 4.1 Electrical Safety when Working on and Inside Location Cases



**It is important to note that it is possible that any electrical enclosure on the Railway Infrastructure may be at a live potential.**

**It is therefore ESSENTIAL that Network Rail Safety Bulletin (NRS 278) is read and the instructions contained within are complied with prior to any works being carried out on the location case.**

**See: Appendix C – Network Rail Safety Bulletin (NRS 278 Issue 2) for the latest version at the time of writing.**

All Live working to be risk assessed and method statements generated for each enclosure to be worked on.

Below is extract from the Electricity at work regulations.

The risk assessment should inform managers and supervisors whether it is reasonable in all the circumstances to work live. The decision should not be taken lightly. At this stage the economic and operational factors should be evaluated against the risks involved before making a decision, bearing in mind that the risks associated with working live can be very serious. Minor inconveniences arising from working with the equipment dead, sometimes arising from commercial and time pressures, will very rarely outweigh the risks associated with live work.

Providing the requirements above have been met, live working can still only be justified if suitable precautions are taken to prevent injury arising from the hazards identified in the risk assessment. The precautions should have been identified in the risk assessment and might include:

- installing temporary insulation, protective enclosures, or screens to prevent parts at different potentials being touched at the same time;
- using temporary barriers with warning notices affixed to keep unauthorised people away from the work area;
- ensuring that adequate clearances are established and maintained when working near to live equipment (see Appendix 3 of the Memorandum and Section 729 of BS 7671:2008 (+A1:2011) for information on clearances). For work near live

overhead power lines, see GS6 Avoiding danger from overhead power lines; 13  
Electricity at work: Safe working practices Page 15 of 33 Health and Safety  
Executive

- making sure that workers understand the task and the system to be worked on (clarity of instructions is essential), are trained and experienced, and follow the correct procedures. They must be competent to realise their own limitations and know when to seek help;
- providing lighting and working space that is adequate and free from trip hazards. Further details on lighting at work can be found in HSG38 Lighting at work; 14
- using robust and properly insulated tools (see BS EN 6090015);
- using test instruments with insulated probes and fused leads (see GS38 Electrical test equipment for use by electricians16);
- maintaining tools and test equipment in good condition and replacing them if damaged;
- storing tools correctly – horizontal surfaces and projections inside control cabinets should not be used – and ensuring that objects such as tools and bolts cannot fall onto exposed live parts;
- avoiding lone live working. Quick action is needed in the event of an electric shock to disconnect the supply and give assistance, so it will usually be necessary to be accompanied by someone who is competent to make the system safe and avoid injury;
- providing and using correct personal protective equipment (PPE) to reduce the risk of contact with live parts or earth, eg insulating gloves, insulating matting (see BS EN 61111:200917). If there is a risk of burns from arcing or flashover that cannot be avoided, consider the use of adequately rated, thermally insulating, flame-resistant PPE (including face/eye protection). PPE should be frequently inspected and replaced if damaged. Requirements relating to PPE are covered by the Personal Protective Equipment at Work Regulations 1992.18

## 4.2 Assessment of Existing Location Case

The Legacy Connect enclosure is designed to be installed onto standard ‘large’ size (A), ‘half’ size (B) railway location cases or other similar style signalling apparatus housings. The UMB01 mounting bracket is required for half sized and other manufacturer’s location cases.

In order to ensure that the existing case is of sound construction, it is essential that a site visit is undertaken in order to carry out a detailed inspection of the mounting points (see Figure 4).

The checklist given in Appendix A at the end of this manual should be used to record each location inspection. This should include the date and person carrying out the assessment.

It is also recommended that photographs be taken to supplement the inspection information.

### **4.3 Assessment of Existing Base and Ground Area**

It is essential that a thorough investigation of the existing base, foundations, and surrounding ground is carried out by a suitably qualified and competent person.

This must be carried out in order to ensure that the location case is sufficiently supported once the Legacy Connect case is affixed.

**Any assessments of the suitability of an existing installation must consider the expected additional weight of the Legacy Extension Product. The weight of each of model is given in Section 3.2.**

#### 4.4 Installation of Legacy Connect enclosure to Location Case (Direct Mounting to Henry Williams Case)

The Legacy Connect enclosure is designed to be installed onto a standard 'large' size (A) railway location case.

The Legacy Connect enclosure has fixing tabs at the top and bottom of the enclosure. The fixing holes in these tabs line-up with the bolt fixings of one bolt in each of the four door hinge brackets. These are the existing hinge brackets which are fitted to the side of a location case. See Figure 4 for the positions of these bolts.



**Figure 4: Location Case Hinge Bolt Positions**

For trackside enclosures with alternative side bolt arrangements, a suitable bracket can be manufactured to interface with the Legacy Connect enclosure.

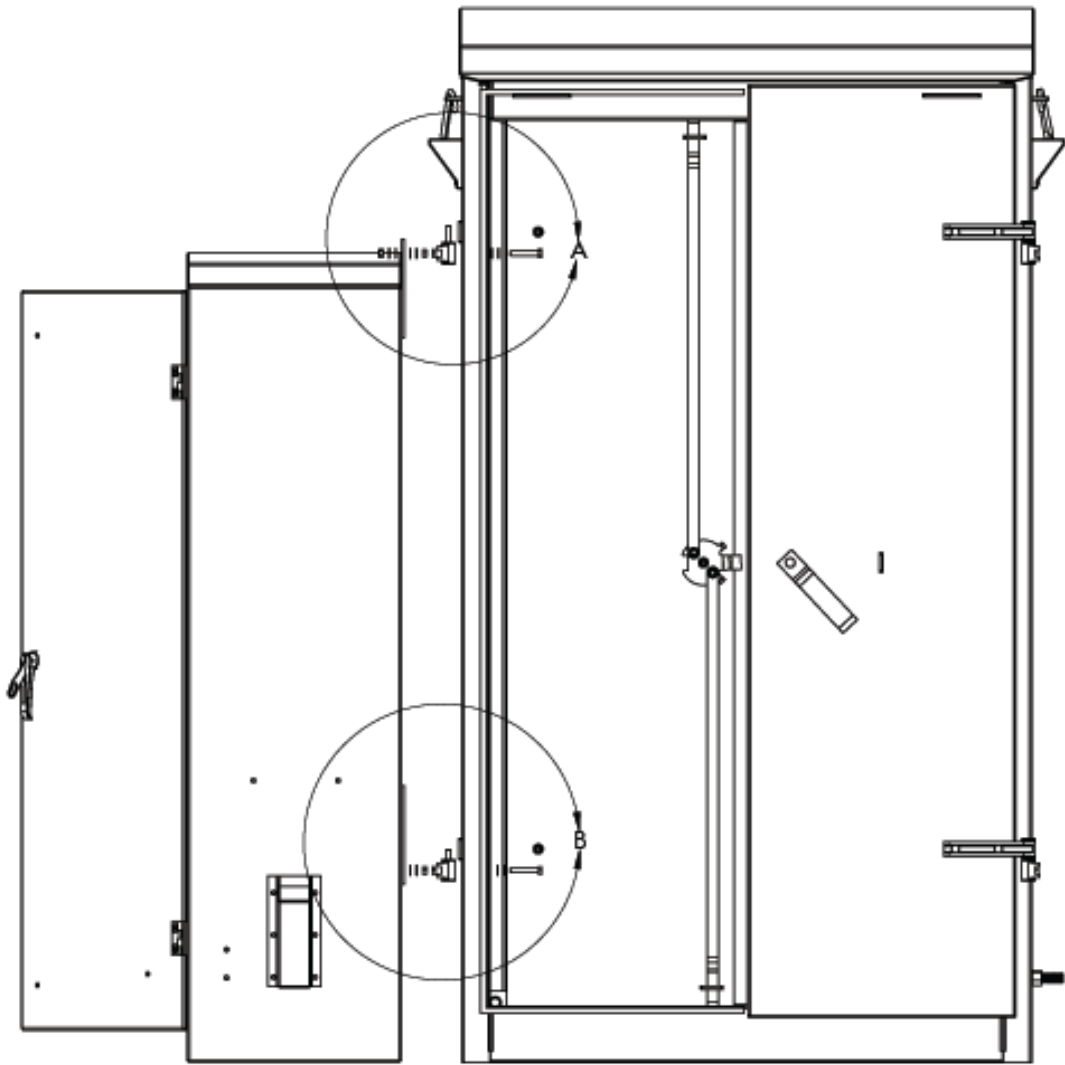
#### 4.4.1 Legacy Connect enclosure fixing kit

Each enclosure comes with a fixings kit which must be used to ensure the correct installation to the location case.

The fixing kit comprises the following components:

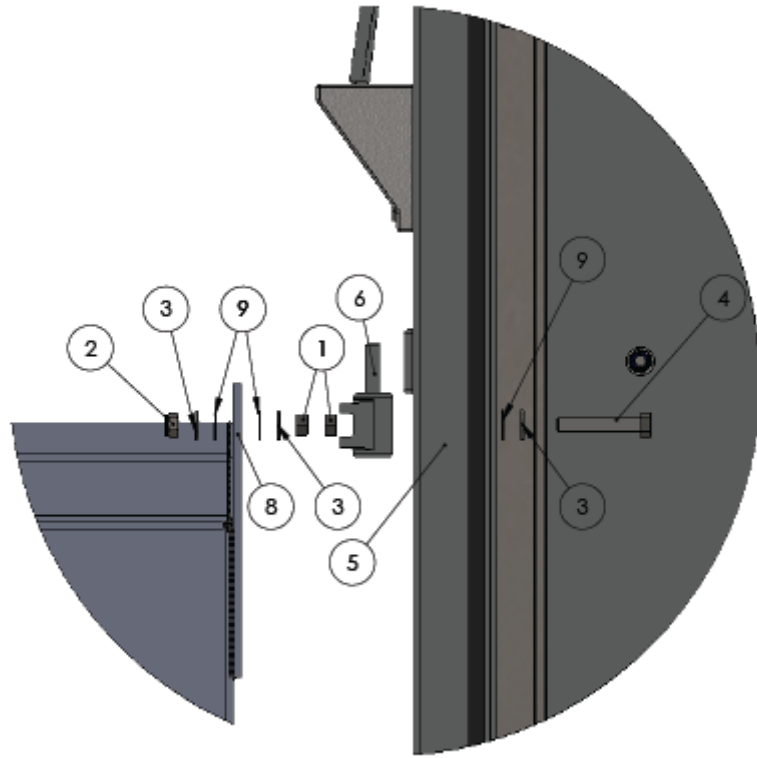
Description	Quantity
M8 x 50 Hex Head Bolt (Stainless A2)	4
M8 Plain Washer (Stainless A2)	12
M8 Vulcanised Washer (Fibre)	12
M8 Full Nut (Stainless A2)	8
M8 Nyloc Nut (Stainless A2)	4

**Note that the parts supplied in the above fixing kit are pre-treated with a special coating which enhances their anti-corrosion and galvanic properties.**



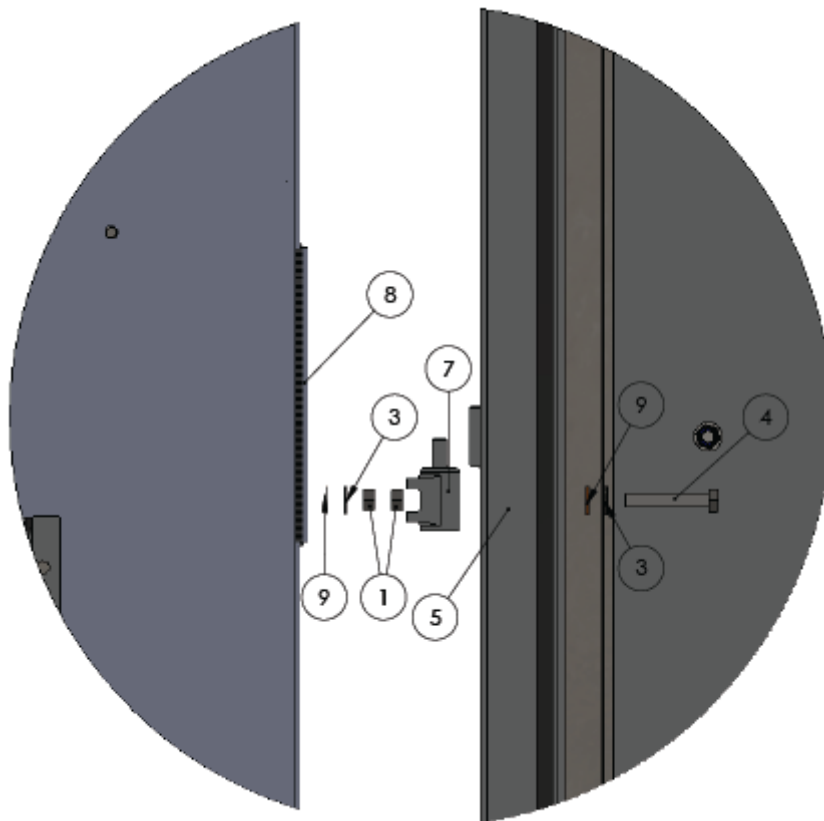
**Figure 5: Legacy Connect Fixing Detail**

See Figure 6 and Figure 7 below for detailed exploded views of areas A & B as shown on the diagram above.



DETAIL A

**Figure 6: Legacy Connect Top Fixing Detail**



DETAIL B

**Figure 7: Legacy Connect Bottom Fixing Detail**

#### 4.4.2 Legacy Connect enclosure mounting installation sequence:

**Note that all new bolts, nuts, and washers required are issued in the fixing kit which is issued with each Legacy Connect product.**

1. Remove the outer securing bolts from each of the door hinges (4 in total) – see Figure 4 for the location of the bolts to be removed. Figure 8 shows removal using socket wrench from inside the location case.
2. Using the M8 x 50 bolts (4 in total) from the fixing kit, fit one plain washer followed by one vulcanised washer and feed each bolt (through the hinge mounting hole) from the inside of the location case. Figure 9 shows this step for the bottom left hinge fixing, repeat for the other three fixings.
3. Fit two M8 plain nuts onto the bolt (and run them down the bolt thread until they sit into the hinge groove which secures them across the flats. Tighten the bolt head from the inside of the case to a torque of 16.0 Nm. Repeat for the other three fixings. See Figure 10
4. Fit one plain followed by one vulcanised washer onto the bolt thread and push down to the plain nut. Repeat for the other three fixings. The fixings are now ready to receive the enclosure. See Figure 10
5. Lift the enclosure so that the four fixing holes fit onto the four protruding fixing bolts. See Figure 11
6. Fit one vulcanised washer followed by one plain washer followed by a Nyloc locking nut and tighten to a torque of 16.0 Nm. See Figure 12



**Figure 8: Remove existing outer door hinge bolts**





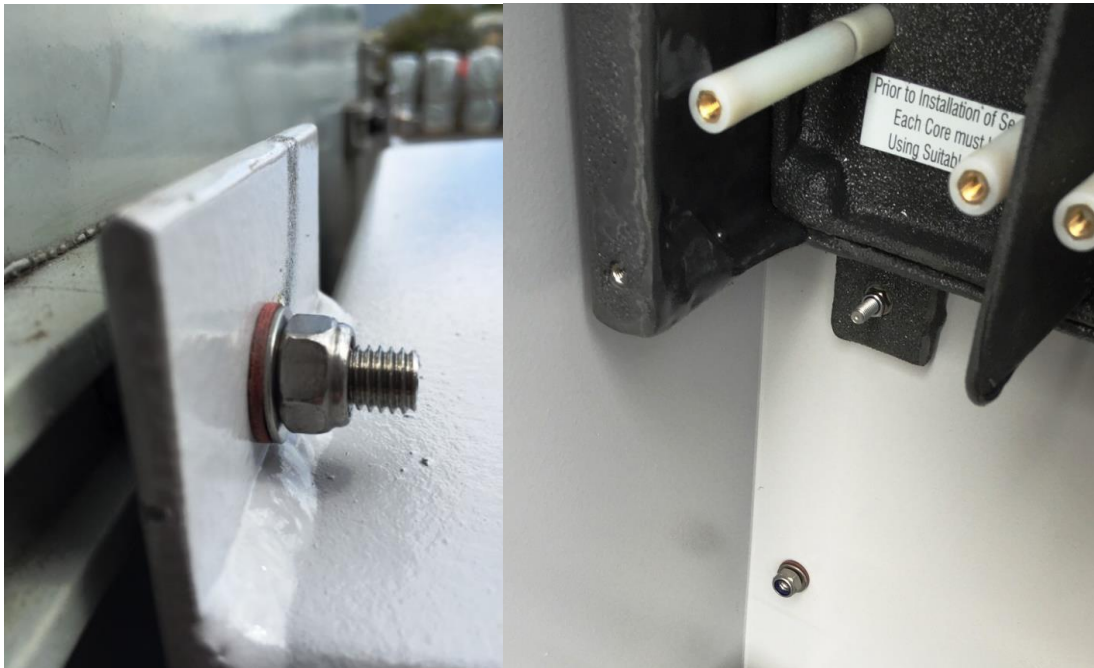
**Figure 9: Plain and vulcanised washers on M8 x 50 bolt**



**Figure 10: Two plain M8 nuts followed by plain and vulcanised washer**



**Figure 11: Lift enclosure into position onto the protruding bolts**



**Figure 12: Vulcanised washer followed by plain nut and final locking nut**

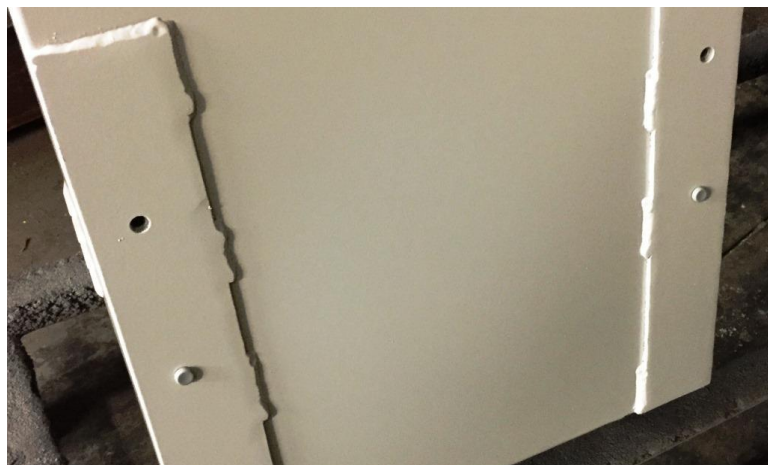


**Figure 13: Extended Rear Fixing Pad Areas**

Note that the lower fixing area on the rear of the SafeBox Legacy Connect product consists of two sets of fixing holes as shown in the picture above.

The position of these fixing holes should accommodate the position of the majority of hinge bolt locations of existing railway location cases.

These fixing hole positions can be pre-punched at the time of manufacture should the relevant dimensions be given at the placement of order. As an alternative, the provision of the extended fixing areas allows site drilling to suit should this be necessary.



**Figure 14: Round Hole Inserts Fitted**

Two of the fixing holes will be fitted with inserts during manufacture. These can be released and refitted in the alternative holes as required. The fixing holes are nominally 10mm diameter. The hole insert's part number is given in Section 6.

#### 4.5 Installation of Legacy Connect enclosure to Location Case (using Universal Mounting Bracket UMB01)

Our Universal Mounting Bracket (UMB01) can be used to mount the power annexe enclosure to Henry Williams' and other manufacturers' location cases. This bracket will fit half and full-sized location cases.

See UMB01 Installation Guide for installation instructions of the Universal Mounting Bracket. This can be found online at <https://hwilliams.co.uk/technical-support/>



Figure 15: Short Power Annexe mounted using a UMB01 bracket

## 4.6 Installation of In and Out 650V Power Cables

The main power 650V cables to/from the Legacy Connect are terminated into the class II SafeBox units (SL11/C, SL21/R or SL22/A4C) which are fitted inside the enclosure.

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 touch cover and warning label.

The SafeBox units fitted within the Legacy Connect have been designed to accommodate power cables up to 120mm<sup>2</sup>. The terminal studs are 10mm and the correctly sized cable lugs must be fitted to suit both the cable and the terminal studs.

### 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.

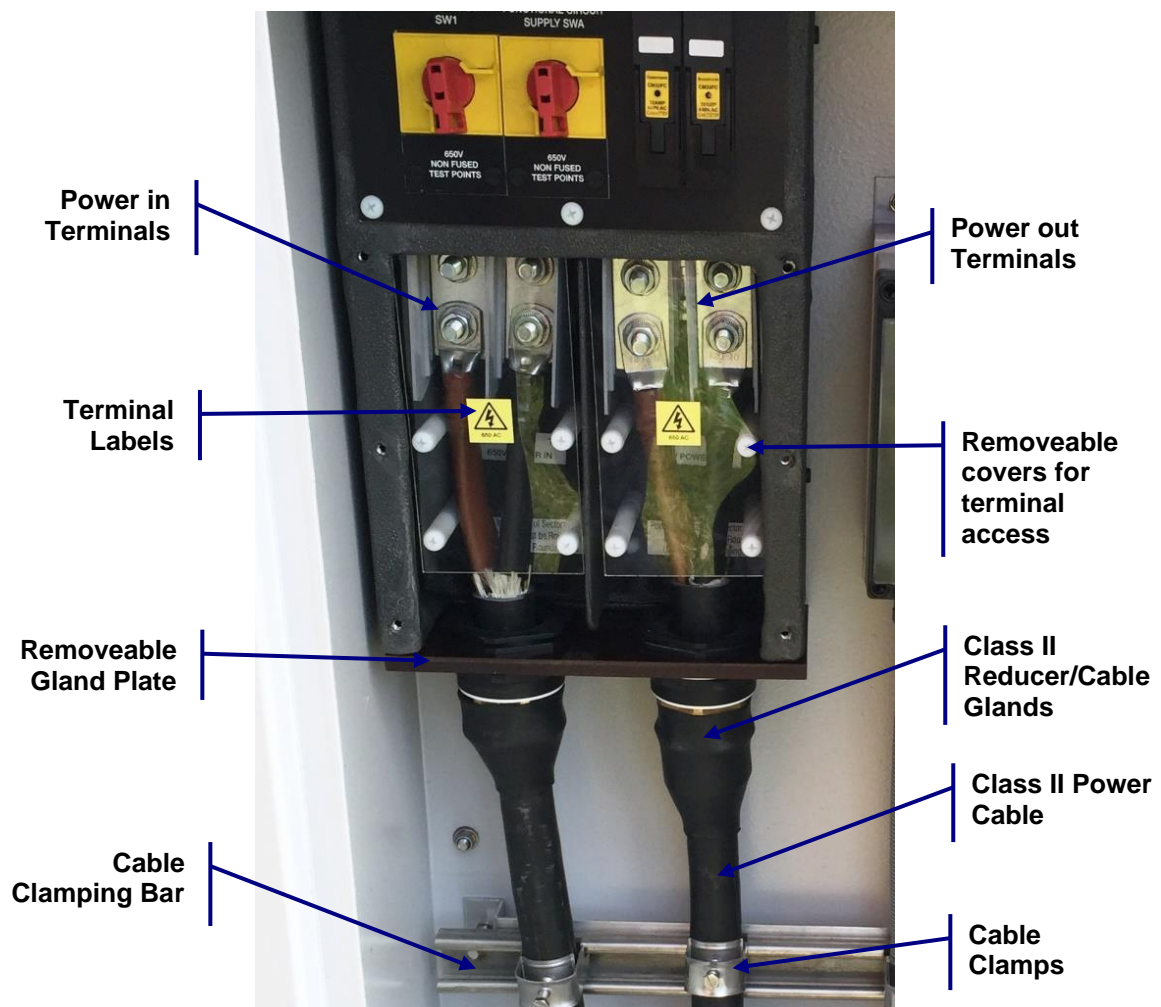


Figure 16: Power In/Out Terminal Arrangement (2-core version)

The power box gland plate is pre-drilled with 2 x 63mm holes. These are designed to accommodate a standard Network Rail approved insulated reducer/gland. These must be used in order to ensure the class II integrity of the unit.

Note that insulated (Class II) gland plates can be supplied with alternative pre-drilled hole sizes if the sizes are given with placement of order.

The correctly sized cable (Class II) gland adaptor and bush must be used – See section 4.10 for further information on Class II cable glands.



**Figure 17: Use of Cable Rounding Die in Crimp Tool**



*It is **very important** that the stripped cable ends are correctly rounded prior to the fitting of the crimp lugs.*

*This allows the crimp lug 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, and the cable lug is twisted to force it to line up with the connection stud, it will place undue force on the stud terminals.*

*This will damage the stud terminals and can pull them off their mounting rail.*

#### 4.7 Installation of Outgoing Functional Circuits Wiring

Terminals are provided for connection of the outgoing (110Vac) cables. These terminals are fitted within a separate plastic enclosure which is adjacent to the SafeBox Legacy SL11/C and SafeBox Legacy SL21/R or below the SafeBox Legacy SL22/A4C.

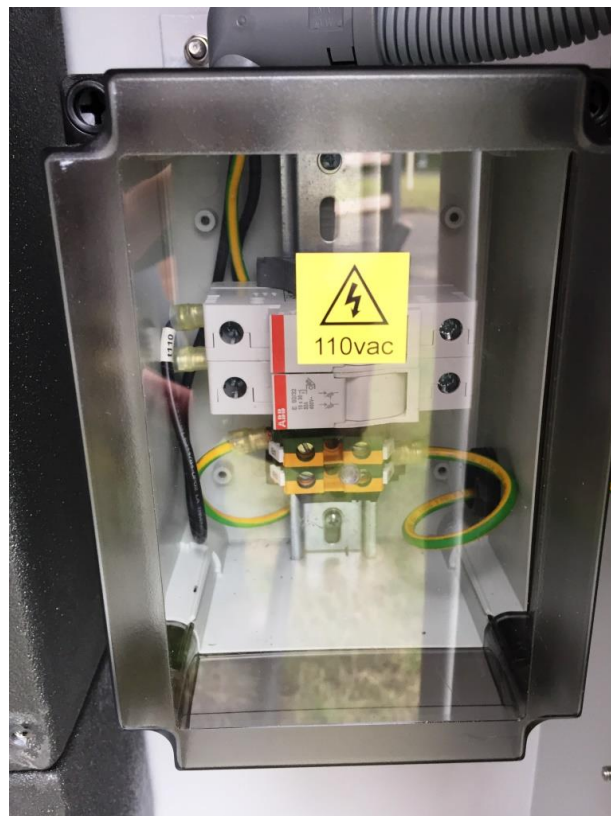
The fuses and terminals within this enclosure are numbered to correspond with the electrical schematic diagram for the relevant model. The electrical schematic diagram (which matches the model being installed) must be consulted before terminations are carried out to ensure the correct connections are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

Holes can be pre-drilled into this enclosure suitable for the fitting of conduit or cable glands to retain the functional power (outgoing/load) cable.

It is essential that all power is isolated and locked off **before** the functional terminal 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 18: Functional Supplies (110v) Enclosure, Terminals, Fuses.**

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

#### **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 Lower Gland Plate Cable Sealing**

The SafeBox Legacy Connect enclosure is provided with a removable gland plate which is located in the base.

This gland plate can be supplied undrilled for users to install cable sealing glands as required.

We would recommend that the sealing of the cable access holes be carried out using Adjustable Membrane Glands.



**Figure 19: Adjustable Membrane Glands Installed.**

The adjustable membrane glands fitted above (See Figure 19) are Schneider Electric part no. NSYECPC9. The hole size required for fitting them is 63mm.





**Figure 20: Cutting the Membrane Gland.**

Each membrane gland can be left unused (if not required) or cut to size to fit around the cable sheath – see Figure 20.



**Figure 21: Membrane Gland Cable Sealing.**

Figure 21 shows the membrane gland cut to the correct size to seal the cable gland entry hole.

Any plastic conduit which may be used can also be sealed in the same way. See the bottom right gland plate entry in Figure 1.

#### 4.10 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 FSP04 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 22.



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 16mm<sup>2</sup> to 120mm<sup>2</sup>.

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 (16mm<sup>2</sup> to 120mm<sup>2</sup>).

#### 4.11 Note on Class II Conduits and Fittings

All conduits and fittings which are used inside the FSP04 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.



## 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 </td <td>Plastic</td>	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 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 22: Insulated Reducers & Cable Glands

#### 4.12 Summary of Recommended Torque Settings

The recommended tightening torque settings used in the SafeBox Legacy Connect Product are given below:

Item	Description	Torque
Enclosure Fixing Bolt	M8 x 50 Hex Head Bolt (Stainless A2)	16.0 Nm
Enclosure mounting Locking Nut	M8 Nyloc Nut (Stainless A2)	16.0 Nm
Cable Lug Securing Nut	M10 Nut – Fitted (inside SafeBox SL11/C) to M300/42 Main Stud Terminals	10.0 Nm
Fuse holder (IEC Type)	Wire connection screws	2.0 – 2.5 Nm
Functional Circuits Terminals (M10/10 Type)	Wire connection screws	1.2 – 1.4 Nm
Fuse holder (CM32FC type)	Fuse securing screws	2.0 Nm
Fuse holder (CM32FC type)	Wire connection screws	3.0 – 3.5 Nm

## 5 Maintenance of Legacy Connect System

**All electrical power feeds to the Legacy Connect 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 enclosure are given in the parts list table in Section 6.

### 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).
- Carry out a detailed inspection of each of the four mounting fixings to ensure they are secure/tight and not suffering from any form of rust or corrosion.
- Check that the Electrically Insulated Coating (EIC) on the SafeBox, does not show any signs of damage and in particular any exposure of the metal base material. 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 or other damage.
- 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 (Applies to SafeBox only)**

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 23 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

**Henry Williams**  
Henry Williams Ltd  
Dodsworth Street, Darlington, DL12NJ  
Tel: 01325 482722 Fax: 01325 245220  
Web: www.hwilliams.co.uk Email: sales@hwilliams.co.uk

**HENRY WILLIAMS  
SAFEBOX APPLICATION**

THE GRID BELOW IS DESIGNED TO PROVIDE A GUIDE AS TO WHAT ACTION IS TO BE TAKEN WHEN CONFRONTED WITH EXTERNAL COATING DAMAGE. ALL SCENARIOS ARE NOT COVERED AND ADVICE SHOULD BE SOUGHT FROM HENRY WILLIAMS LTD IF YOU ARE UNSURE HOW TO PROCEED


**E I C DAMAGE GUIDE**

**ACTION LEVEL 1**  
DO NOTHING BUT RECORD ANY DAMAGE FOR FURTHER INSPECTION AND MONITORING

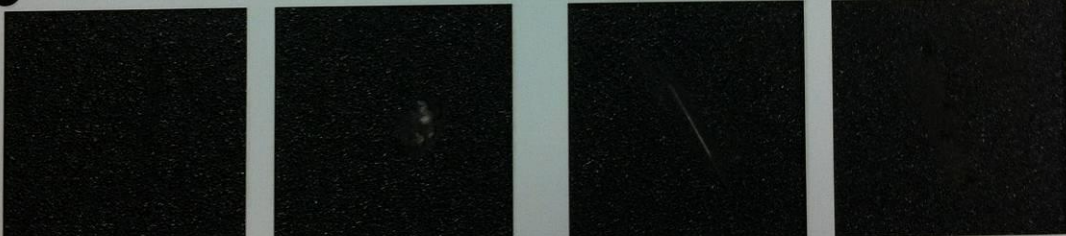
**ACTION LEVEL 2**  
UNIT CAN BE RETURN TO SERVICE WITH DAMAGED CLEARLY LABELLED. INCREASE LEVEL OF INSPECTION.

**ACTION LEVEL 3**  
UNIT CAN BE RETURN TO SERVICE WITH DAMAGED CLEARLY LABELLED. REPLACE UNIT AT NEXT AVAILABLE OPPORTUNITY.

**LIGHT DAMAGE-** **ACTION LEVEL 1**  
-SURFACE DAMAGED BUT NO METAL EXPOSED



**MEDIUM DAMAGE-** **ACTION LEVEL 2**  
-OUTER COATING LAYER BREACHED BUT METAL STILL IN PLACE



**HEAVY DAMAGE-** **ACTION LEVEL 3**  
-OUTER METAL AND INNER COATING BREACHED

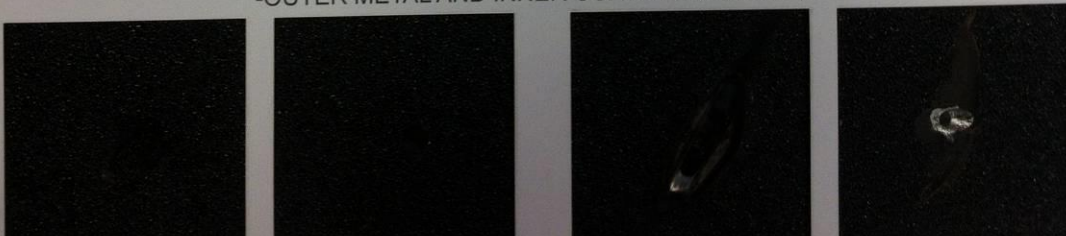


Figure 23: EIC Damage Guide

## 6 Part Numbers

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

For parts relating to the SafeBox equipment, refer to the SafeBox Class II Compact Range O&M Manual Ref: HWC2SafeBoxCMP.

All FSP isolating transformers used should be of the type manufactured in accordance with Network Rail Specification NR/L2/SIGELP/30007.

### 6.1 SafeBox Units

Description	HW Part No.	PADS Number
SafeBox Legacy SL11/C	2017.033-A1-001	091/019322
SafeBox Legacy SL21/R	2017.033-A1-500	091/019092
SafeBox Legacy SL22/A4C	2017.061-A1-001	0054/213084

### 6.2 Transformers

Description	Supplier	Part Number	PADS Number
Class II Hybrid Transformer (650/110V 500VA)	ATL Transformers	T3068	091/049117
Class II Hybrid Transformer (650/110V 1000VA)	ATL Transformers	T2966	091/049118
Class II Hybrid Transformer (650/110V 1500VA)	ATL Transformers	T3065	091/049119
Class II Hybrid Transformer (650/110V 2000VA)	ATL Transformers	T2967	091/049120
Class II Hybrid Transformer (650/110V 3000VA)	ATL Transformers	T2968	091/049121



### 6.3 Miscellaneous Spares

Description	Supplier	Part Number
Functional Terminals Enclosure (SafeBox SL11/C & SafeBox SL21/R version)	Fibox	6013935
Functional Terminals Enclosure (SafeBox SL22/A4C version)	Schneider Electric	13975
2-Pole IEC Fuse Holder	ABB	E92/32
Earth Terminals	Entrelec	M10/10.P
Through Terminal	Entrelec	M10/10
Adjustable Membrane Gland	Schneider Electric	NSYECPC9
Round Insert 10mm Hole (Ref 111113 Mid Grey) Rear fixing hole plug inserts	Henry Williams	CON-439

## Appendix A - Legacy Connect Range Installation Guide

Location ID .....

Step	Question	Answer	Action
1	Does the location case conform to BR-SM 431 Apparatus Cases and BR SM851 1,2,3&4?	Yes	Proceed to 2
		No	Contact Henry Williams for specialist fitting adapters
2	Does the location case have more than a 10° lean on it?	Yes	Do not proceed with install - potential for equipment damage
		No	Proceed to 3
3	Is the location case damaged or bent	Yes	Do not proceed with install - potential for equipment damage
		No	Proceed to 4
4	Are all fastenings within the Location Case tight and in good condition	Yes	Proceed to 5
		No	Tighten and replace where necessary
5	Is the location case showing signs of corrosion?	Yes	Repair as necessary, contact Henry Williams for repair kit
		No	Proceed to installation
6	Is the location able to be isolated?	Yes	Fit enclosure as per installation instructions
		No	Carry out Risk Assessment to determine if location case can be installed live.
7	Can the fixing bolts be removed without disturbing the installed equipment in the loc?	Yes	Fit enclosure as per installation instructions
		No	carry out remedial work to allow for bolts be removed without disturbing the installed equipment in the loc
8	Do the cables show any signs of wire degradation within the loc?	Yes	carry out remedial work to replace cables prior to installation of the enclosure
		No	Fit enclosure as per installation instructions

Assessment Carried Out By .....

Date .....

Please retain this record with the O&M manual for the installation it forms part of the technical file

**Henry Williams Ltd, Dodsworth St, Darlington, DL1 2NJ. Tel (01325) 462722. Email: [sales@hwilliams.co.uk](mailto:sales@hwilliams.co.uk)**

## Appendix B – Product CE Certificate



Henry Williams



### DECLARATION OF CONFORMITY

SI 2016 No. 1101 "The Electrical Equipment (Safety) Regulations 2016"

**Name of Manufacturer or Supplier:** Henry Williams Ltd.

**Full Postal Address (including country of origin):** Dodsworth Street,  
Darlington,  
County Durham,  
DL1 2NJ, UK.  
Tel: (01325) 462722  
Web: hwilliams.co.uk

**Description of Product Range:** SafeBox & FSP's (Class I/II switch enclosures)

**Name, Type or Model, Batch or Serial Numbers:**

**SafeBox models:** 12, 13, 22, 32, 35, 105, 105L, 100+5, Blue 32, Blue 105, Blue 100+5.

**SafeBox Compact models:** C11, C12, C13, C22, C32.

**SafeBox Legacy models:** SL11/A, SL11/B, SL11/C, SL21/R SL22A4C.

**SafeBox Terminal Enclosures:** HW/T1, HW/T2, HW/T3.

**SafeBox Legacy Split** LSP11.

**SafeBox (FSP03 System)** 3004, 3008 (+ Aux modules).

**Safebox (Modular FSP03 System):** FSP FARS, FSP F, FSP 2FS, FSP 4FS, FSP 4FSREB, FSP SPM1.

**SafeBox Legacy Connect:** LC&LCS versions (0.51, 1.01, 1.51, 2.01, 3.01, 40.51, 41.01, 41.51, 42.01, 43.01).

**SafeBox SIN119 models:** 1SW50, 2SW50, 1SW50R, 1SW95, 2SW95, 1SW95R, 1SW120, 2SW120, 1SW120R, MINI21, 2SW120R/V/RH, 2SW50-230V

**Class I FSP:** FSP02, FSP03

**Also model variants:** Marine (prefixed with M/) & Optional Surge Arrestor (Postfixed with /SA).

**Standards Used Including Number, Title, Issue Date, and Other Relevant Documentation:**

- BS EN 60947-3:2009 + A2:2015 Low Voltage Switch gear & Control Gear
- BS 7671:2018+A1:2020 Requirements for Electrical Installations
- BS EN 61439-1:2011 Low-voltage switchgear and control gear assemblies, General Rules
- BS EN 61439-2:2011 Power switchgear and control gear assemblies
- BS EN 60529:1992 + A2:2013 Degrees of Protection provided by Enclosures
- BS EN 50121-5:2017+A1:2019 Railway applications. Electromagnetic Compatibility. Emission and immunity of fixed power supply installations and apparatus
- BS EN 62262:2002 Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)

All products are suitable for a 2 wire 690VAC (max) supply at 50/60Hz, with the exception of:

- Safebox Blue Range suitable for 230-690VAC (max) supply at 50/60Hz
- Safebox 2SW50-230V suitable for 230VAC (max) supply at 50/60Hz

**Place of Issue:** Henry Williams Limited

**Name of Manufacturers Representative:** Calvin Stephenson

**Position of Manufacturers Representative:** EP Production Director

### DECLARATION

I declare that as the authorised representative, the above information in relation to the supply/manufacture of this product is in conformity with the stated standards.

**Signature of Authorised Representative:**

V3.0 – May 2023

## Appendix C – Network Rail Safety Bulletin (NRS 278 Issue 2)



Network Rail  
The Quadrant:MK  
Elder Gate  
Milton Keynes  
MK1 9EN

26 April 2013

No: NRS 278 Issue 2

### Network Rail Safety Bulletin

#### **Access to Signalling Power Systems Operating Between 175 V ac and 650 V ac**

##### **For the attention of all staff and contractors working with signalling power supply systems**

This Safety Bulletin is produced in conjunction with the Electricity at Work Regulations 1989.

This Safety Bulletin does not apply to equipment housings that have been

- certified as complying with BS 7671 "Requirements for Electrical Installations" (The IET Wiring Regulations) or
- made dead before work commences.

Its purpose is to identify and control the electrical safety risk from signalling power supply systems operating at or above the nominal voltage of 175 V as distinct from signalling control systems which operate with a nominal voltage of less than 175 V. This includes Location Cases, Supply Terminal Pillars, Functional Supply Points (FSP) and Relay Rooms, herein all referred to as FSPs. In general, FSPs will be of metallic construction but also included are those of wooden or GRP construction.

**It is important to note that the maximum safe voltage for working live is 60 V ac and 120 V dc.**

In this Safety Bulletin, the word "conductor" refers to both conductors that are designed to be live during normal conditions and those which could become live under fault conditions. A conductor under fault conditions includes any external or internal metalwork associated with the FSP.

All staff should

- avoid making contact with FSPs that could contain signalling power supply equipment operating at a voltage greater than 60V and
- report all electric shocks to the Network Rail Safety Management Information System (SMIS).

The relevant electrical safety and lifesaving rules are:-



**Work should be carried out with the supply dead, unless it is unreasonable to work dead, and it is reasonable to work live.**



**Never assume the equipment is safe, always test before touch**



**Never undertake an activity unless you have been trained, assessed as competent and have the right equipment**

## 1 Introduction

Following a recent incident where a person received an electric shock, the Office of Rail Regulation has investigated Network Rail's compliance with legislation relating to management of risk arising from non-earthed power systems. As a result, an Improvement Notice has been served on Network Rail. This Safety Bulletin informs staff of immediate and reasonably practical actions to be taken to address the requirements of the Improvement Notice.

Live working is not permitted unless it can be shown that;

- it is unreasonable in all the circumstances for it to be dead; **and**
- it is reasonable in all the circumstances for a person to be at work on, or near it while it is live; **and**
- suitable precautions (including where necessary the provision of suitable protective equipment) are taken to prevent injury.

Work that you can normally carry out on or near a live conductor is shown below in Section 3.

## 2 Approach and Entry to an FSP

All tests shall be made with a device using fused and insulated test leads and that the testing device itself be tested before and after the testing for voltage. The device may be fitted with a 150 k ohms shunt if required and there is no need to scrape paint away from the point of testing.

Because there is a risk of an electrical fault having taken place, you must, before you touch a Location Case (FSP), test the external metalwork of the cabinet for voltage between it and;

- each metallic structure, for example, hand rail, barrier, signal post, other FSP or OLE support, within a 2 metre touch distance
- the earth immediately adjacent to the FSP

The test to earth can, for example, use a metal plate (as described in BS EN 50122-1, approximately A4 sized and stood on by a person) or where this is unavailable, via the meters test prod connected to earth immediately adjacent to the cabinet.

- If the test above shows a voltage of greater than 60 V, you must now work live. You may open the cabinet door, but you must
  - use insulated gloves as in Section 4 and
  - follow the instructions shown below in Section 5.
- If the test above shows a voltage of less than 60 V then you may open the FSP door without additional precautions.

Once the FSP door has been opened, you must:

- Repeat the voltage test described above but, this time, between all metal covers within the case and:
  - the location case itself
  - each metallic structure, for example hand rail, barrier, signal post, other FSP or OLE support, within a 2 metre touch distance;
  - the earth immediately adjacent to the cabinet.
- Look out for any insulation on a live conductor above 60 V that is damaged or missing for any reason (which includes the originally designed arrangement), which could provide a risk of electric shock. In this context, damaged or missing insulation means that
  - For horizontal surfaces, an access hole greater than 1 mm diameter is present or
  - For all other surfaces, an access hole greater than 12.5 mm diameter is present.

If any voltage measured within the cabinet exceeds 60 V or you are already working on or near a live conductor because the voltage test of the cabinet external metalwork showed above 60 V, or there are exposed live conductors above 60 V, then you must continue working with the precautions for working on or near a live conductor until the task is complete.

If you are not working on or near a live conductor because the equipment is fully insulated or no voltage above 60 V has been measured, you may carry out any task that you are instructed to do without additional precautions unless the work that you are going to do exposes live conductors.

### **3 Work that is reasonable to carry out on or near a live conductor**

You may only carry out any work on or near a live conductor above 60 V if it is permitted under Section 1 and you have been judged to be competent to carry out the specific task without the risk of injury.

### **4 Precautions for Working On or Near a Live Conductor**

When working on or near a live conductor suitable precautions must be taken to prevent injury. These should include at least one of the following precautions during all work on or near a live conductor.

- Insulated gloves in good condition to BS EN 60903 Class 0 (Network Rail part number FBC90VSE), for example when opening a FSP door with greater than 60 V measured.
- Insulated tools in good condition to BS EN 60900 Class 0, for example when working on live conductors
- Insulated mat in good and dry condition to BS EN 61111 Class 0, for example when kneeling in front of a cabinet

- Temporary additional insulated screening to protect against contact with live conductors and/or metalwork.

When working in heavy rain, the use of a portable tent is required.

## 5 Actions When a Live Cabinet is Found

If a cabinet is found to have a voltage above 60 V then you must

- Report it to fault control on an urgent basis and
- Not leave the cabinet unattended until it has been disconnected or the fault repaired or a suitable exclusion zone around the cabinet has been erected. The preferred option is to repair the electrical fault that has caused the presence of a voltage over 60 V. NOTE Where a faulty cabinet is found in a location which is accessible to the public it must not be left unattended in any circumstances unless it has been made safe by disconnection or repair.

## 6 Working alone

When working on or near live equipment, you must not work alone.

Further guidance can be found in

- Network Rail Technical Instruction TI 164 - 650/400 V IT Signalling Power Supplies
- NR/L2/10064 - General Instructions to Staff Working on S&T Equipment, Modules E022 and X002.
- NR/GN/ELP/27318 - Insulation Monitoring of 650 V Earth - Free (IT System) Power Cables
- NR/L2/ELP/27238 - Maintenance specification for fixed plant equipment
- NR/L3/RCS0216/DP10 – Working on low voltage equipment
- NR/L3/ELP/27241 “Fixed Plant Work instructions”
- TNC8785 and Management plan
- Route based TNCs

**A Guidance Note is available to support this Safety Bulletin**

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