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Zollner Location Case

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 Zollner Location Case 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 Zollner Location Case system and equipment.
- **Chapter 4 : SafeBox Installation**
Gives details on installation of the Zollner Location Case 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 Zollner Location Case 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 must only be replaced by another Class II unit. |
|--|

1.1.2 Component Repair

Repair of the Zollner Location Case 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 Zollner Location Case 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 |
| 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 – Zollner Location Case Systems




Each Zollner Location Case 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 Zollner Location Case system typically consists of:

- HW Ltd Layout drawing – General Arrangement (Inc. parts list).
- HW Ltd Circuit drawing – Wiring Diagram
- Zollner Circuit drawings (Provided by Zollner)

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

The drawing to use should be the correct version of the drawings detailed in Figure 1. This provides the generic wiring for a Zollner Location case. For the wiring of the Zollner equipment, then use of the correct version of the Zollner drawings should be used

| | | |
|--|---|--|
| CUBICLE ID: | | |
|  | Henry Williams Ltd - Electrical Projects | DARLINGTON ENGLAND |
| PRODUCED  | Zollner Location Case Wiring Schematic | DWG. No 2020.003-A1-001 E001 |
| CHECKED  | | |
| <small>The copyright and all other rights related to this drawing or document remains at all times with Messrs. Henry Williams Ltd. Without their written authorisation it must neither be copied or reproduced nor be communicated or rendered acceptable or profitable in any form to any third parties.</small> | | ISSUE A |


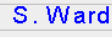

| | | | | | |
|---|-------------|---|--|---|---|
| PART DESCRIPTION: ZOLLNER CASE - FITTED | | | HW DRAWING No: 2020.003-A1-001 | | |
| | | | PARENT PROJECT: | | |
| | NAME | SIGNATURE | DATE | A2 | |
| DRAWN: | M. Brewster |  | 13/02/2020 | | |
| CHECKED: | S. Ward |  | 03/02/2020 | | |
| APPROVED: | | | |  | SHEET No. 1 of 1 REVISION No. M5 NOT TO SCALE |

Figure 1: Drawing Borders of HW drawings

2 Safety

2.1 Isolation and Risk of Electrocution

Zollner Location Cases systems are designed to work with voltages up to (and including) 230VAC 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 Zollner Location Case system MUST be ISOLATED and LOCKED OFF BEFORE opening any of the internal SafeBox doors or removal of any of the covers.

A 230VAC 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.

Personnel working on any Zollner Location case 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

Zollner Location case systems are very heavy (approx. 250-350Kg) 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! – Zollner FSP enclosures contain heavy equipment.



**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 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 Zollner Location case system.

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

3 Details of the Zollner Location Case Equipment

3.1 General Information

The Zollner Location case is a location case style enclosure which houses a Class II power box along with the Zollner system equipment.

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 230VAC 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.

3.2 Zollner Location Case General Arrangement

The photographs below show the layout of the Zollner Location case.

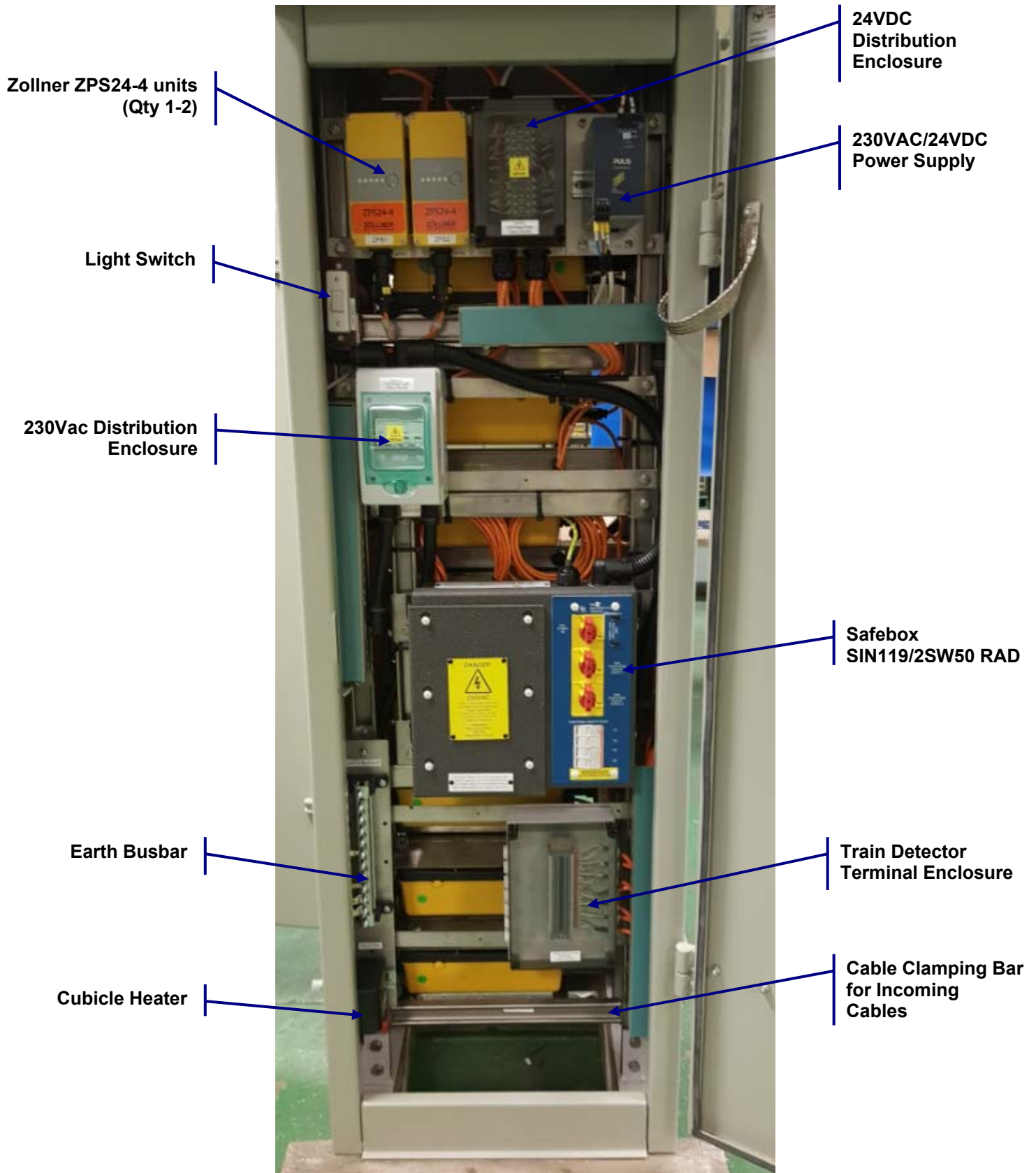


Figure 2: Zollner Location Case Front Arrangement

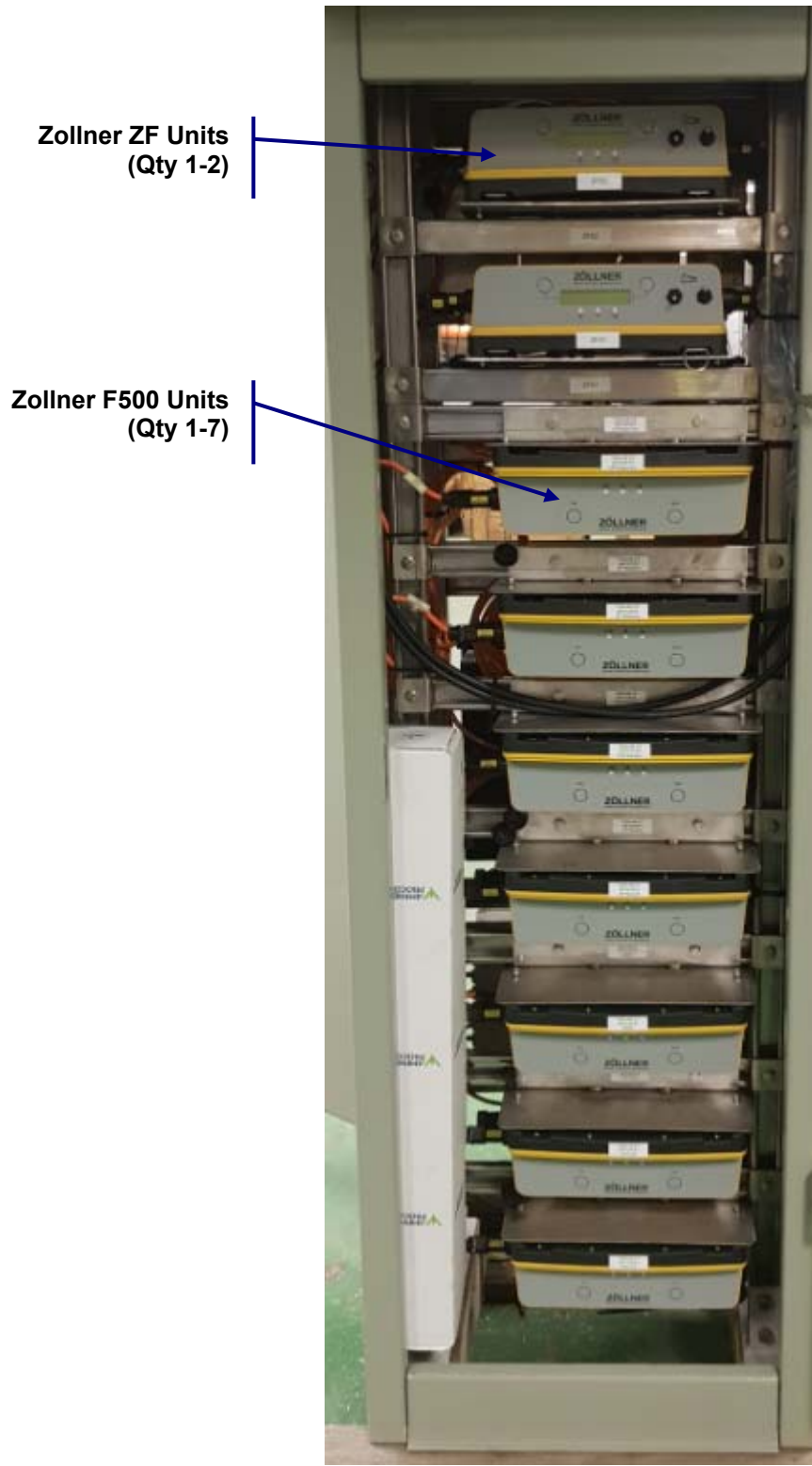


Figure 3: Zollner Location Case Rear Arrangement

4 Zollner Location Case Installation

4.1 Installation of Zollner Location Case to Base

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

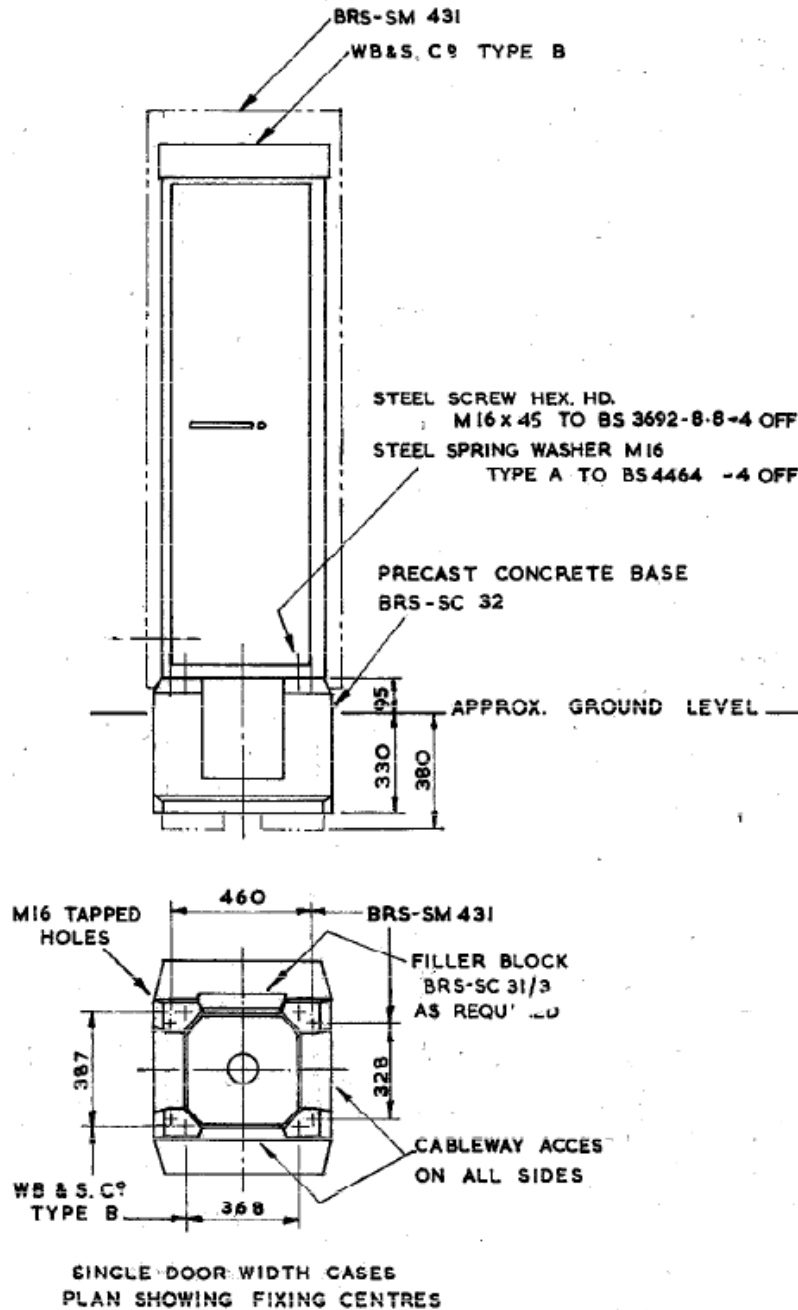


Figure 4: Zollner Location Case fitting to Base Detail

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

4.2 Note on Class II Conduits and Fittings

All conduits and fittings which are used inside the roduct 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.

5 Maintenance

All electrical power feeds to the Zollner Location case 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 Zollner Location Case are given in the parts list table on each 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 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.

For maintenance of the Zollner Equipment refer to the manufacturer's literature

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 5 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

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**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

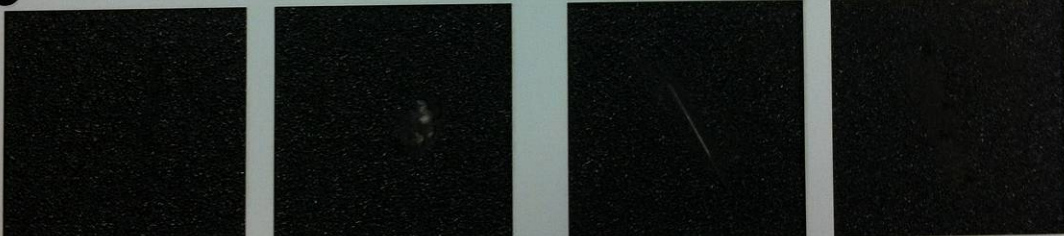
ACTION LEVEL 2
UNIT CAN BE RETURN TO SERVICE WITH DAMAGED CLEARLY LABELLED. INCREASE LEVEL OF INSPECTION.

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

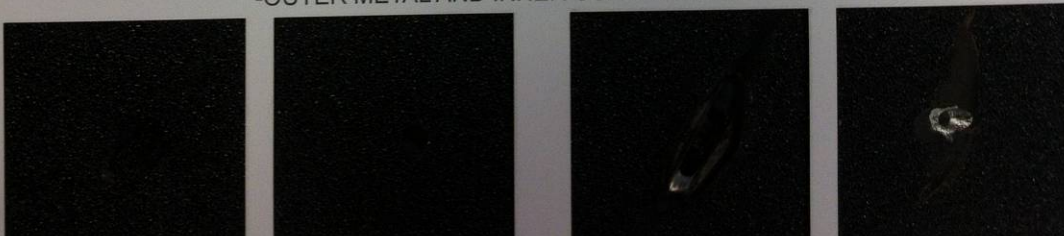


Figure 5: EIC Damage Guide

6 Part Numbers

The table below details the part numbers for the main items used in the Zollner Location case, with the description and supplier for each item.

| Description | Supplier | Part Number |
|--|-----------------|--|
| SafeBox 2SW50 RAD (230 VAC Complete Unit) | Henry Williams | 2017.037-A1-230 |
| Zollner Equipment: Project Specific – See Zollner Drawings | | |
| Earth Disconnect Link | Termate | (HWE-TERMATE-001) - TE19/10 |
| Anti-Condensation Heater | Stego | (HWE-STEGO-004) - 01160.0-000 |
| Internal Light | Knightsbridge | (HWE-LIGHT-002) - AMLEDW |
| Light Switch | Crabtree | HWE-SIGNALLING-(039/040) Crabtree – 4005 & 4177 |
| 230VAC/24VDC 10A PSU | PULS | (HWE-PULS-001) - QS20.244 |
| 230VAC Distribution Enclosure | Schneider | (HWE-SAFEBOX-044) KAEDRA 13441 |
| 24VDC Through Terminal | ABB | (HWE-SAFEBOX-013) M10/10 - 1SNA115120R1700 |
| Train Detector Terminal | ABB | (HWE-SAFEBOX-015) MA2.5/5 - 1SNA115486R0300 |
| MCB DP 2A TYP B (ACTI 9) | Schneider | (HWE-MCB-028) Schneider A9F53202 |