PR-NET-OSM-068

IDENTIFICATION OF LOW VOLTAGE CABLES

OPERATIONAL SAFETY MANUAL - SECTION 10.3

Scottish & Southern Electricity Networks

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CONTENTS

1 Introduction

1.1 This **Approved** procedure sets out the procedures and methods which **Shall** be followed by all staff and contractors when identifying **Low Voltage** cables connected to the **SSEN-D System**, to allow jointing work to be carried out.

1.2 **Low Voltage** cable jointing on existing cables carries the risk of opening a **Live High Voltage** cable in error. This risk is higher when the work involves SWA (Steel Wire Armoured), or STA (Steel Tape Armoured) cables.

1.3 It **Shall** never be assumed that **High Voltage** cables are SWA and **Low Voltage** cables are STA as both can be found in either construction or as unarmoured “Plain Lead” cables.

1.4 The positive methods of verification are listed in section 8 of this document. All cables **Shall** be treated with caution as even black PVC covered **Low Voltage** cables can be confused with EHV single core cables, which are also black.

1.5 The Supervisor or Team Manager referred to throughout this **Approved** procedure **Shall** have sufficient technical knowledge or experience in identifying cables to be able to offer suitable advice where identification is not conclusive and decide what precautions need to be taken in order to eliminate the risk of opening up a **High Voltage** cable in error. Supervisors or Team Managers who do not possess the necessary technical knowledge or experience required above **Shall** seek advice or assistance from staff that do.

1.6 Making safe and repairing damaged **Low Voltage** cables is detailed in PR-NET-OSM-067 Work on Damaged or Faulty **Low Voltage** Cables - Operational Safety Manual - Section 10.2, **High Voltage** cables is detailed in PR-NET-OSM- 064 Management of Faults on **High Voltage** Underground Cables - Operational Safety Manual - Section 8.3. Identification, and working on **High Voltage** cable circuits are detailed in PR-NET-OSM-062 Access and Work on High Voltage Underground Cables - Operational Safety Manual - Section 8.1

2 Scope

2.1 This Approved procedure is provided in addition to the **Operational Safety Rules** and PR-NET-OSM-066 General Requirements for Work on the **Low Voltage System** - Operational Safety Manual – Section 10.1, which **Shall** be used by all persons working on **SSEN-D**’s underground **Low Voltage System**.

2.2 It **Shall** also include all third-party cables believed to be **Low Voltage** that are of a similar construction to **High Voltage** cables, and form part the Distribution **System**.

2.3 Dispensation from this requirement may only be provided by the **Designated Engineer** in accordance with an **Approved** procedure or agreement.

3 References

The documents detailed in Table 3.1 - Scottish and Southern Electricity Networks Documents, should be used in conjunction with this document.

Table 3.1 - Scottish and Southern Electricity Networks Documents

Reference	Title
PR-NET-OSM-006	SSEN Distribution Operational Safety Rules – Operational Safety Manual – Section 1.1
PR-NET-OSM-028	Switching Terminology and Approved Abbreviations - Operational Safety Manual - Section 4.4
PR-NET-OSM-066	General Requirements for Work on the Low Voltage System - Operational Safety Manual – Section 10.1

Reference	Title
PR-NET-OSM-067	Work on Damaged or Faulty Low Voltage Cables - Operational Safety Manual - Section 10.2
PR-NET-OSM-064	Management of Faults on High Voltage Underground Cables - Operational Safety Manual - Section 8.3
PR-NET-OSM-062	Access and Work on High Voltage Underground Cables - Operational Safety Manual - Section 8.1
WI-NET-CAB-400	Identification, Phase Checking and Setting to Work on 11 kV, 33 kV and 132 kV Cable Circuits
WI-NET-CAB-401	Dealing with Damaged LV and HV Cables up to and including 33kV
WI-NET-OSM-002	Personal Protective Equipment and Workwear for Live Environments
N/A	SSEN SHE Handbook (Held in Safety, Health and Wellbeing SharePoint Site)

4 Definitions

4.1 The words printed in bold text within this document are either headings or definitions. Definitions used within this **Approved** Procedure are defined within the list presented immediately below, or within section 2 of the **Operational Safety Rules**.

4.2 **Fault** / **Faulty**

Cable that is mechanically or electrically defective.

4.3 **Operational Safety Rules (OSR)**

The **SSEN-D** Distribution set of rules, as read with related documents and procedures, that provide generic safe systems of work on the **System** therefore ensuring the health and safety of all who are liable to be affected by any **Danger** that might arise from the **System**.

5 General Responsibilities

5.1 Persons who are required to operate and undertake work on the **System Shall** have a thorough understanding of the work and ensure on-site risks are suitably assessed and appropriate control measures put in place before, during and after all activities.

5.2 Persons **Shall** ensure that at all times during the work (or associated testing) **General Safety** arrangements are maintained and that other work areas are not adversely affected by the activities for which they are responsible.

6 Authorisation

6.1 It **Shall** be the responsibility of the individual to ensure that any actions performed are within the bounds of their competency and authorisation level.

6.2 Competence and authorisation certificates **Shall** be retained personally and be made available upon request.

6.3 All persons carrying out work on **Low Voltage** cables **Shall** be Authorised in writing for the tasks.

7 Personal Protective Equipment

7.1 Persons who are required to work or carry out **Switching** on or near the **System Shall** wear suitably **Approved** Personal Protective Equipment (PPE). Furthermore, where warning

labels or signs identify the existence of a particular hazard, additional and appropriate PPE **Shall** be worn.

7.2 As a minimum, PPE **Shall** meet the requirements of WI-NET-OSM-002.

8 General Requirements

8.1 All cables to be worked on **Shall** where reasonably practicable, be positively identified immediately prior to work commencing.

8.2 All **Low Voltage** and **High Voltage** work **Shall** be completed in accordance with the **Operational Safety Rules** and **SSEN-D Approved** Procedures.

8.3 When a cable is believed to be **Low Voltage** but could be **High Voltage**, **it Shall,** where practicable, be traced to a point of common **Low Voltage** connection. If this is not possible, an **Approved** cable identifier **Shall** be used.

8.4 If a cable cannot be identified by visual methods, an A**pproved** cable identifier **Shall** be used. Persons using the A**pproved** cable identifier **Shall**:

- Be trained in the use of the equipment
- Pass a related assessment
- Be fully conversant with the contents of this **Approved** procedure

9 Work Instructions

9.1 Prior to commencing work, all staff and contractors **Shall** be issued with work instructions and these **Shall** contain suitable information to clearly indicate the presence of any cables, especially **High Voltage** cables in the vicinity of the proposed **Low Voltage** jointing work. Team Managers / Supervisors **Shall** be aware of, and take precautions to, avoid **Danger** from cables belonging to third parties.

9.2 Team Managers / Supervisors **Shall** indicate any third-party cable(s) on the work instructions if they believe they exist, or may exist.

9.3 Team Managers / Supervisors **Shall** indicate on the work instructions if jointing work is to be undertaken on any “non-standard” cable.

9.4 The aim **Shall** be to remove any doubt and possible confusion for staff who need to carry out the on-site cable identification.

10 Cable Records

10.1 Staff **Shall** have, on-site, **High Voltage** and **Low Voltage** cable records for the work area. These records **Shall** be no more than 1 month old (if printed). Work instructions **Shall** indicate if there are known **High Voltage** cables in the vicinity of the **Low Voltage** cable to be worked on (see section 9).

10.2 Where the records do not indicate the presence of a **High Voltage** cable, staff **Shall** be aware of the possible presence of unknown third-party cables and that records might not be complete.

10.3 The presence of redundant cables may confuse and mislead. Records **Shall** be checked for redundant cables, where these are available, and any details entered clearly on the work instruction. The primary objective is to remove uncertainty and confusion in the cable identification process.

11 Cable Locating

11.1 A Cable Avoidance Tool (CAT) **Shall** be used to locate all cables in the immediate vicinity of the work area. The immediate vicinity is taken to be 2m from any area of excavation and / or cable laying.

NOTE: The CAT is not an identification instrument and **Shall** be used only to give an indication of the presence of a cable.

11.2 Following location of all cables and other services, safe-digging practices **Shall** be used. Where practicable, all **High Voltage** and **Low Voltage** cables **Shall** be fully or partially exposed to enable staff to make accurate and safe decisions.

11.3 All cables **Shall** be assumed to be **Live High Voltage** cables until proved otherwise.

11.4 Where it is not possible to expose all cables, this **Shall** be referred to a Team Manager / Supervisor who **Shall** then take positive alternative action to ensure that there is no **Danger** from any **High Voltage** cable.

12 Identifying Low Voltage Cables

12.1 **Low Voltage** cables **Shall** be positively identified as **Low Voltage** before work starts on them in order to eliminate the risk of working on a **High Voltage** cable in error.

12.2 Where visual or physical identification is not possible, an **Approved** cable identification instrument **Shall** be used.

12.3 Where there is doubt about the correct identification of a cable, no work **Shall** take place until further identification and actions have taken place to positively identify the cable. Such actions might include switching off **High Voltage** circuits and carrying out positive **High Voltage** cable identification.

12.4 Allowances **Shall** be made when using cable records and detection equipment to accommodate potential inaccuracies. Changes to local geography and the possibility of movement of cable(s) by third parties **Shall** be considered during site assessments.

12.5 **Low Voltage** cables that are identified for the purposes of being worked on **Shall** be marked up with two bands of coloured tape applied either side of the point of work.

12.6 All cables that are identified for the purposes of elimination and are not to be worked on, **Shall** be screened with **Danger** notices and / or tape.

12.7 Verifying Cables

12.7.1 One or more of the following methods can verify **Low Voltage** cables:

- A black plastic outer sheath embossed with “600/1000 Volts”
- Testing using an **Approved Low Voltage** cable identifier
- The presence of a service joint, i.e. house or street lighting joint. (Mains joints **Shall** not be used as an indication that a cable is **Low Voltage**)
- Physically tracing from a known **Low Voltage** termination to the point of work, by using a ‘running noose’

12.7.2 For elimination purposes, one, or more of the following methods can verify **High Voltage** cables:

- A red plastic outer sheath embossed with “11000 Volts”

- Testing using an **Approved High Voltage** cable identifier
- Physically tracing from a known **High Voltage** termination to the point of work, by using a “running noose”

12.8 Positive Identification of a Low Voltage Cable by Testing

12.8.1 The use of an **Approved Low Voltage** cable identifier may be sufficient on its own to positively identify a **Low Voltage** cable. Appendices B and C contain the instructions for the use of the Grumbler and SEBA **Low Voltage** cable identifiers. Staff **Shall** only use **Low Voltage** cable identifiers following suitable training and assessment.

12.8.2 Historically this training and assessment has been recorded in the staff member’s Safety and Environment Manual, however it may also be recognised as an Authorisation on their Operational Authorisation Certificate.

12.8.3 Under no circumstances **Shall** a cable identifier be used as positive identification on a known or suspected **Faulty** cable, this could lead to incorrect identification.

12.8.4 In certain circumstances a cable identifier might not be able to positively identify a **Low Voltage** cable. The reasons for this may include:

- Signals being received in more than one cable
- Interference from electronic equipment, such as radio transmissions and mobile phones
- No suitable connection point on the **Low Voltage** network across two phases beyond the point of work

NOTE: A **Low Voltage** cable identifier can only be used to give a positive identification if it is connected phase to phase. Suitable connection points are open points in **Low Voltage** networks such as pillars, link boxes or 3-phase service cut-outs.

12.8.5 Connections between a phase and neutral will give an indication however, common **Earth** return paths could lead to incorrect identification.

12.8.6 All of the above situations are covered in the operating instructions for the Grumbler and SEBA Cable Identifiers.

12.9 Identification of Service Cables

12.9.1 Identification of service cables **Shall** follow the same methodology as for mains cables; however, it will not be possible to use cable identification instruments for a positive identification of single-phase services connected directly to the **Low Voltage System.**

12.9.2 PVC covered concentric cables are easily identifiable with the outer sheath embossed with “600/1000 Volts” as well as the core size. Whilst small physical size will be an indicator for a PILC construction service cable, care **Shall** be taken to eliminate **High Voltage** cables in the area, referring to cable records.

12.10 Non SSEN-D Cables

12.10.1 Where work is to be undertaken on cables other than **SSEN-D** cables (such as Public Lighting or Customer owned cables), a site-specific risk assessment **Shall** consider how the cable is to be identified to eliminate the risk of opening up a **High Voltage** cable in error.

12.10.2 All relevant **High Voltage** and **Low Voltage SSEN-D** plans and third-party cable plans (where available) **Shall** be on-site and be checked prior to starting work.

12.10.3 Business units who undertake work on private cables not directly connected to the **Low Voltage System**, **Shall** use their own procedures for positive identification of the cables using **Approved** instruments where required.

13 Initial Cable Jointing Work

13.1 Whilst carrying out the initial preparatory jointing work on an identified **Low Voltage** cable, staff **Shall** exercise care when stripping cables.

13.2 In particular when working on a PILC (Paper Insulated Lead Sheath) cable staff **Shall**:

- Apply an **Earth** continuity bond to maintain the **Earth** continuity, whether the cable is presumed **Live** or **Dead**, prior to removal of the lead sheath.
- Stop work immediately if black carbon papers are found below the lead sheath. (This is an indication that the cable may be **High Voltage**) Contact **Shall** be made with a Team Manager or Supervisor for advice on the next steps.
- Check with either an EA Technology polarity tester, or alternatively a VODCA, immediately after the lead sheath has been removed, that the cable is energised at **Low Voltage**. Work **Shall** stop immediately if an indication is given that the cable is **Dead,** (unless **Low Voltage Dead** jointing is being carried out) or may be energised at **High Voltage** until verification or elimination has taken place.
- When stripping off the belting papers be aware that **High Voltage** cables usually have more belting papers than **Low Voltage**, approximately 9 as opposed to 4.

14 Revision History

No	Overview of Amendments	Previous Document	Revision	Authorisation
01	New document created	TBC	1.00	Richard Gough
02				

Appendix A Risk Assessment for Live Low Voltage Jointing

For work on or near **Live** electrical **Apparatus** only.

(If YES to all continue with caution – If NO to any, DO NOT work with **Apparatus Live**.)

Is there an **Approved** procedure?	Yes / No
Is there adequate electrical clearance?	Yes / No
Is the **Apparatus** designed for work on or near when **Live**?	Yes / No
Is there adequate working space?	Yes / No
Is the **Apparatus** in sound condition at the point of work?	Yes / No
Are you and your work adequately protected from the weather and other possible harmful impacts?	Yes / No

1. When carrying out jointing work the **Low Voltage** cable to be worked on **Shall** be POSITIVELY IDENTIFIED using **Approved** procedures before starting work on it.
2. The Flowchart for Cable Identification below provides guidance when identifying cables – more details can be found in the relevant Cable Jointing or Cable Installation Manuals.
3. If there is any doubt as to the voltage of the cable, then the appropriate Team Manager / Supervisor **Shall** be contacted.

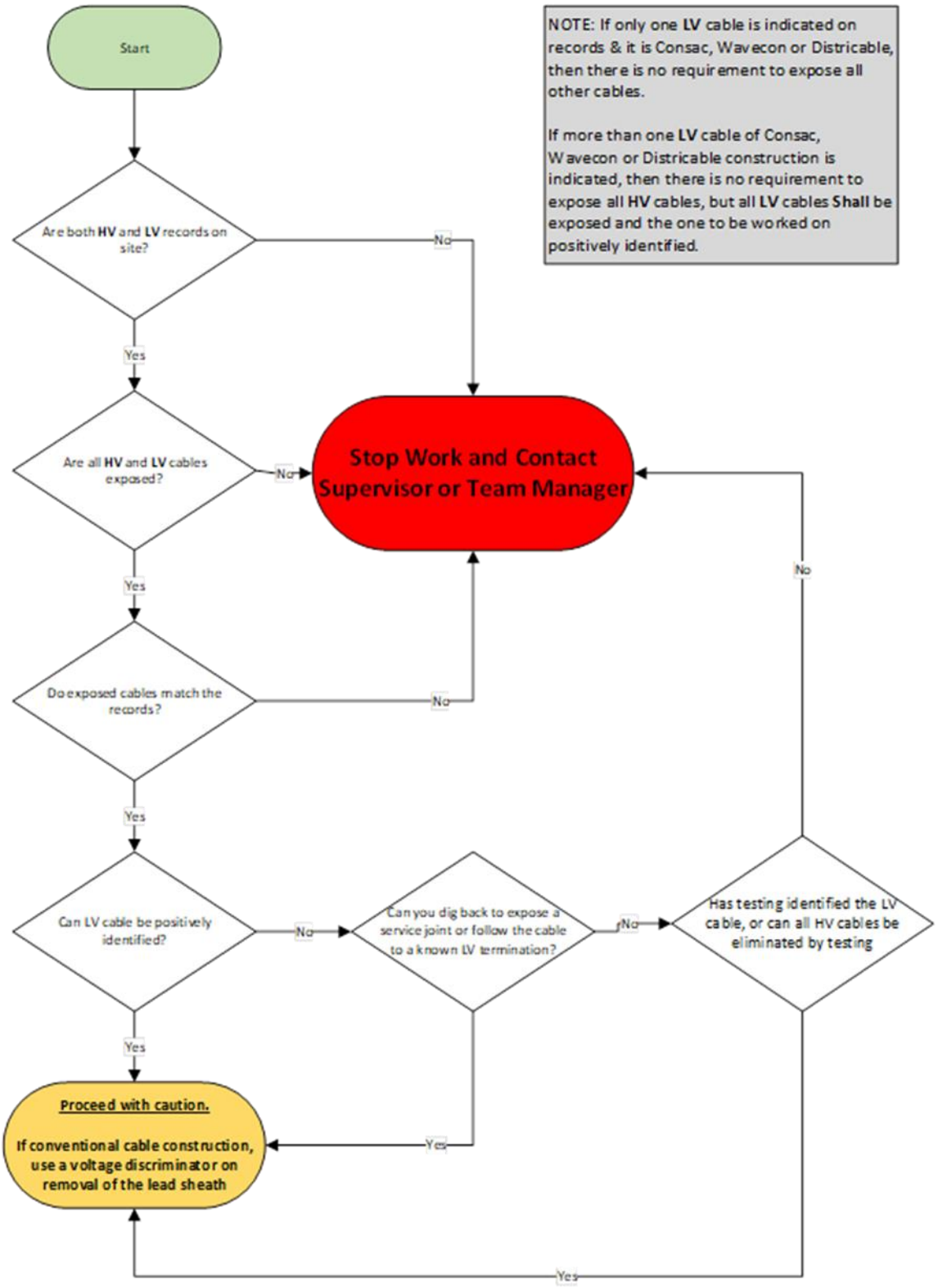


Figure A.1 - Flow Chart for Cable Identification

Appendix B Operating Instructions for Grumbler Cable Identifier

Under no circumstances **Shall** a Grumbler Cable Identifier be used for positive identification on a known or suspected **Faulty** cable as this could lead to incorrect identification.

1. Find a convenient, i.e. safe and readily accessible point for connection of the modulator. When connecting the modulator to the connection point, **Approved** insulated gloves **Shall** be worn.
2. A phase to phase connection **Shall** be used for positive identification so that it will draw current through the cable to be identified at the selected test site. A phase to neutral connection may be used as an aid to identification but **Shall** not be used for positive identification. Do not connect it at this time.
3. Test sites within substations **Shall** be at least 2 metres from power transformers to prevent induction to the search coil.
4. Attend the test site with receiver and search coil.
5. Clean off the surface of all exposed cables for their full circumference over about 150mm of length, down to the outer serving or, if the serving has rotted, the armour.
6. Plug search coil into the receiver.
7. Switch the receiver to 'STA'. Check that the yellow 'BATT' LED lights and stays on. (If it does not, change the batteries). Check that bleep and flashing LED operate for about 6-10 sec.

FIRST NEGATIVE TESTS

1. Apply the search coil to each cable in turn, held so that the signal cable is tangential to the power cable. Press the coil with the palm of a hand to conform to the surface. Very slowly scan the full circumference of each cable.
2. If signals are not received from any cable, this will confirm that there is no interference from customer's or radio equipment at this time.

POSITIVE TEST (see Fig 5 in Grumbler instruction book.)

1. Connect the modulator between two phases at the point selected in Step 1. Attach the crocodile clips positively, each with a single movement to avoid transient stresses. **Approved** insulated gloves **Shall** be worn. If the modulator is in the open, guard it and apply **Danger notices** to avoid interference.
2. Confirm that the modulator LED is flashing, if not check that the source is **Live**, that connections are clipped to bare metal and that fuses and test leads are in good order.
3. Return to the test site, switch receiver to 'STA', and scan the full circumference of each cable very slowly with the coil pressed into contact and in a longitudinal direction along the cable. Note any cables that now give a sustained signal.
4. Signal strength from tape armoured cables will vary as the **Conductor** lay is followed. Weak signals may vary cyclically when the modulator oscillator beats with system frequency.
5. Clearance of at least 80mm is necessary from and between un-armoured and wire armoured cables in the test area.

OTHER CABLES

If any of the cables that gave a response are not steel tape armoured, scan them again with the receiver switch selected to 'OTHER'. If they still respond, it confirms with an enhanced safety margin, that they are **Low Voltage** cables carrying the modulator signal.

REPEAT NEGATIVE TESTS

1. Disconnect the modulator and repeat the negative tests described above. If there are again no interfering signals, it is likely that there were none during the positive tests.
2. If there is interference, the positive test results are suspect, they **Shall** be repeated and / or a Team Manager or Supervisor contacted.

MULTI PATH SIGNAL CURRENT

1. If, in a ring or a parallel feeder **Low Voltage System** of STA cables it is not possible to get a response from those carrying a phase to phase signal, the cause could be current sharing. The difficulty may be overcome if the modulator connections can be changed to maximise field strength by using an opposite pair of **Conductors**.
2. Alternatively, if load conditions allow, a temporary break of parallel would be helpful.

IDENTIFICATION OF DEAD CABLES

1. The Grumbler can also be used to identify **Dead Low Voltage** cables if a temporary supply of 230 or 400V, 50Hz. 3amps is applied to the cable at one end with the modulator in series and two cores looped at the remote end. (See figure 6 in the Grumbler instruction book).
2. The modulator **LV** supply cable **Shall** be identified beforehand to avoid confusion.

ADDITIONAL NOTES

1. Keep the receiver at least 2 metres from any distribution transformers and the modulator.
2. Connect the modulator phase to phase for positive cable identification.
3. Connect the modulator to diametrically opposite cores to give the strongest signal. (This may not be possible if the cable is of 3-core construction.)
4. Always move the sensor coil very slowly round the cable under test.
5. Look for signal amplitude change as the circumference is scanned. This confirms that the signal is from the **Conductors**, not the sheath.
6. Ignore all signals generated by rapid movement of the sensor coil.
7. Use the low sensitivity “Other” range setting for all cables other than steel tape armoured.
8. Do not transmit on personal mobile radios or mobile phones at the site during cable scanning.

14.8

Figure B.1 – Grumbler Receiver

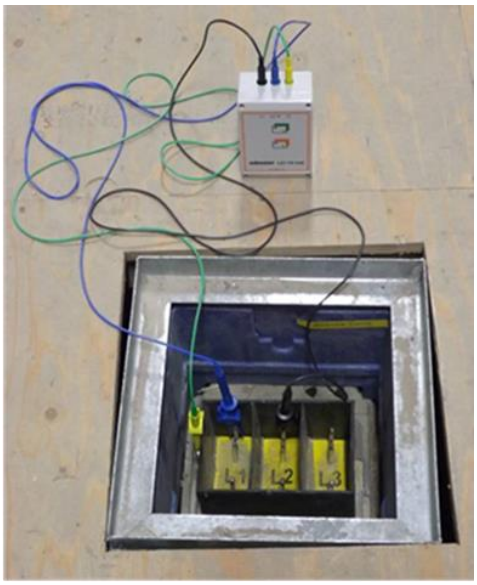
Appendix C Operating Instructions for SEBA Cable Identifier (LCI TX-440 Signal Generator, CI RX Receiver & TFS CI Sensor)

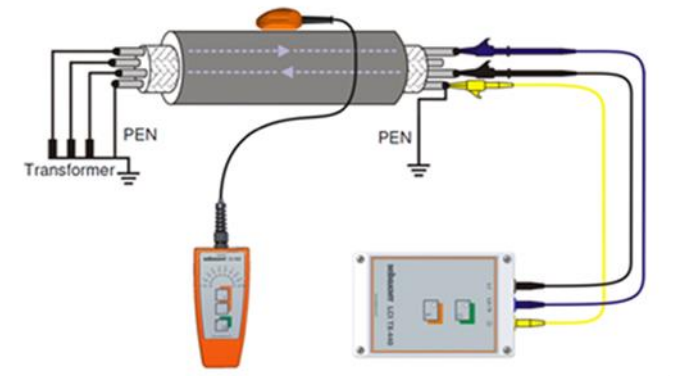
Under no circumstances **Shall** a SEBA Cable Identifier be used for positive identification on a known or suspected **Faulty** cable which could lead to incorrect identification.

1. Find a safe and readily accessible point for connection of the modulator.
2. When connecting the modulator to the connection point, **Approved** insulated gloves **Shal**l be worn.
3. A phase to phase connection beyond the point of work **Shall** be used for positive identification such that it will draw current through the cable to be identified at the selected test site.
4. Connect the LCI TX-440 signal generator across two phases and an **Earth** connection (either SNE **Earth** or neutral if the connection point is a PME link box). The “Twisted Field” method of identification can be used for three or four core cables, but for four core cables it is recommended to use two opposite cores in the cable to give the strongest signal.

NOTE: As the LCI TX-440 signal generator is rated for a maximum input voltage of 440V, it is not recommended for use on split phase 480V systems which may cause damage to the instrument.

5. Connect the Orange TFS CI sensor to the CI RX receiver and switch on, checking that the Red and Green LED indicators are illuminated which will light for approximately 3 seconds from 1 up to 10 depending on the selected gain setting
6. At the point of test, apply the sensor to each cable in turn with the arrow in line with the cable. Very slowly scan the full circumference of each cable and in a longitudinal motion along the cable.
7. As the sensor is moved along and around the cable to be identified, the Green and the Red LEDs light up in rotation. It is essential to move the sensor very slowly with at least 2 seconds between movements, which is the speed at which the pulses are emitted from the signal generator. If the direction of the sensor is reversed at any given point you should see the colour of the LEDs reverse as well.
8. The gain of the receiver must be adjusted using the soft +/- keys using the lowest setting which causes all 10 signal LEDs to light up. If the gain is set too high for the signal it causes an overload, which is indicated by the Red and Green Stage 10 Lights only flashing which requires you to reduce the gain setting until all 10 Red or Green Lights illuminate.
9. For ideal measuring conditions a good signal should be given with low gain settings (stages 1 – 4). With gain settings of 5 or above there is an increased danger of picking up interfering signals which could lead to incorrect identification and the connections **Shall** be checked.
10. If the signal is not improved, hence requiring a high gain setting, it is essential that all other cables are exposed in order to provide a comparison. A control measurement can be carried out if the cable can be accessed at a known identifiable point to establish a suitable gain setting.
11. Adjacent cables should not produce activation of the LEDs when the gain is set correctly.





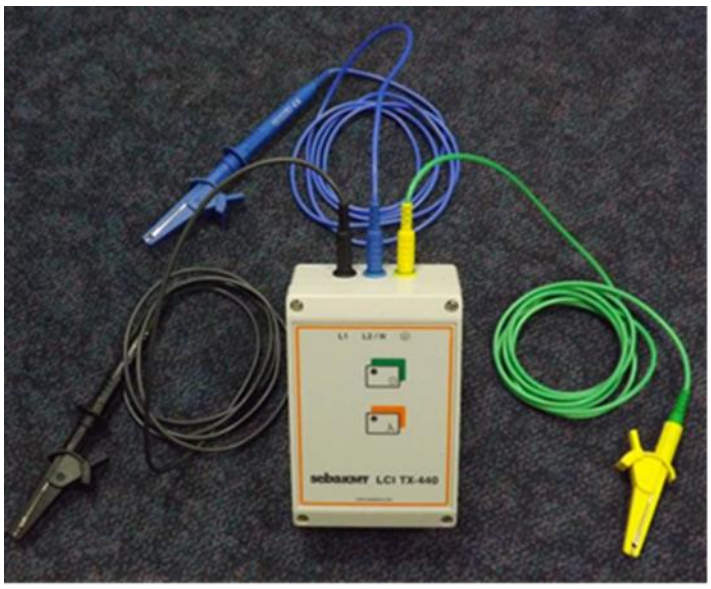


Figure C.1 - SEBA Cable Identifier (LCI TX-440 Signal Generator, CI RX Receiver & TFS CI Sensor

Appendix D Operating Instructions for the EA Technology Polarity Tester used as a Voltage Discriminator

The EA Technology polarity tester is **Approved** for use as a voltage discriminator and will give an indication as to whether a cable is energised at **HV**, **LV** or appears **Dead**.

No other tester, other than the VODCA, is **Approved** for use as a voltage discriminator

Instructions for use:

1. Remove the cable serving and (where present) the armouring from the necessary length of cable.
2. Apply a bonding strap to span the length of exposed metal sheath that you propose to remove.
3. Cut out the necessary length of metal sheath. If, at this stage, you see or hear any "spitting" or electrical discharge then stop work immediately.
4. Check that no black belting papers are present. If there are stop work immediately.
5. Test the polarity tester against a known Live source to check it is working.
6. Hold the polarity tester on the belting papers.
7. If it fails to illuminate:
   - Check against the known **Live** source
   - If it illuminates on the **Live** source, the cable may be **Dead**
   - Carefully remove the belting papers
   - If there are carbon papers or only 3 cores stop work immediately and seek assistance. (If jointing to a 3-core DC cable proceed with caution)
8. If the polarity tester illuminates:
   - Slowly raise the tester from the belting papers
   - If it goes out about 25mm from the cable, the cable is energised at **Low Voltage**
   - Carefully remove the belting papers.
   - If there are carbon papers or only 3 cores, stop work immediately and seek assistance. (If jointing to a 3-core DC cable proceed with caution.)
   - If it stays illuminated until about 150mm from the cable, the cable is energised at **High Voltage** – stop work immediately and seek assistance.

Appendix E Operating Instructions for the VODCA (Voltage Discriminator)

Where available, the VODCA can be used as an alternative to the EA Technology polarity tester.

1. Remove the cable serving and (where present) the armouring from the necessary length of cable.
2. Apply a bonding strap to span the length of exposed metal sheath that you propose to remove.
3. Cut out the necessary length of metal sheath. If, at this stage, any "spitting" or electrical discharge generally is seen or heard, or black carbon papers, then immediately stop work, withdraw from the cable and report to the person in charge of the work.
4. Clip the VODCA instrument **Earth** lead to the exposed metal of the bonding strap.
5. Look at the VODCA lamps. The two yellow lamps should be illuminated. This means that the VODCA is switched on and that its battery voltage is satisfactory.
6. If the yellow lamp fails to light, then the VODCA batteries **Shall** be changed.
7. If, after the batteries have been changed, the yellow lamps still fail to light, then the instrument **Shall** not be used. Work **Shall** not proceed further until a working VODCA is obtained. Alternatively, follow Appendix D and use the EA Technology polarity tester.
8. Hold the VODCA by its handle and place the curved metal sensing plate on the exposed cable belt paper insulation. Press the test button in the handle. All lamps should now be lit. If they are not, stop work. Work **Shall** not proceed further until a working VODCA is obtained. Alternatively, follow Appendix D and use the EA Technology polarity tester.
9. Release the test button and look at the lamps.
10. Check that the yellow lamps are still lit. If they are not lit, then stop the work. Work **Shall** not proceed until a working VODCA is obtained. Alternatively, follow Appendix D and use the EA Technology polarity tester.
11. Look at the other four lamps. According to what is observed, proceed as follows.
12. The two green lamps are lit. This means that this is a **Live Low Voltage** cable. If this is the case proceed to step 15.
13. The two red lamps are lit. This means that this is a **Live High Voltage** cable. Work **Shall** stop immediately and report to the person in charge of the work and the Network Management Centre.
14. Neither the green lamps nor the red lamps are lit. This means that you are working on a **Dead** cable, which may be **Low Voltage**, **High Voltage** or a **Live High Voltage** screened cable. **Work** Shall stop immediately and report to the person in charge of the work.
15. If, during step 12 green lights are observed, use the VODCA sensing plate to scan a further 90 degrees clockwise and anti-clockwise direction around the cable. The green lamps should remain lit. But if the red lamps light up, then stop work and report to the person in charge of the work.
16. If step 15 was satisfactory, then start to remove the belting papers, with extreme caution. While this is being carried out, be on alert for the appearance of a metallic screening tape, or black carbon papers. If one of these is observed, work **Shall** stop and report to the person in charge of the work.
17. Once all the belt papers have been removed, then it is safe to proceed with jointing, using the normal **Live Low Voltage** methods.