

Method Statement

Esprit Control Equipment Rail 350 Pole Mount Installation

Document revision history for Esprit Installation Method Statement

Version	Date	Comments/Amendments	Main author
1.0	27/02/2015	Initial document release	Andrew Moon

1. Background

This method statement has been prepared by EA Technology Limited, to provide the instructions that should be followed in order to connect the Rail 350 Power Quality Monitor to the Esprit control and monitoring equipment, which will be situated on a OHL pole.

2. Introduction

This method statement defines the principles that should be followed in order to connect the Rail 350v equipment¹.

All equipment should be installed DEAD when possible and LIVE only when it is safe to do so and if justified by a written risk assessment. Where it is possible to install this type equipment DEAD, whilst maintaining supplies to customers connected to the network to be controlled, this option must be taken. However, it is recognised that in many cases it will be impractical to make the pole mounted distribution transformer DEAD and therefore the guidance within this work instruction must be followed. In order to minimise time working on a LIVE system, Esprit equipment connection to the energised part of the network should be carried out last.

Where appropriate, instruction for the installation of equipment will be specific to the chosen location. The following generic instructions regarding installation will generally apply.

3. Management of Safety

The following requirements will be complied with at all times throughout the installation process.

1. Safety rules and other existing procedures must be followed whilst undertaking work in accordance with this work instruction. The following documents are particularly relevant and must be adhered to at all times:
 - Safety precautions and procedures applicable to low voltage systems as detailed in **section 8 of the Operational Safety rules**.
 - When work is to be undertaken in proximity to live LV conductors it is necessary to justify this decision. A risk assessment complying with **PR-PS-421, Justification for Live Low Voltage Working** is therefore required.
2. Prior to commencing work, a full assessment of risk will be undertaken in accordance with **SSE Injury Prevention Process**. This will include a stage one assessment in advance of work commencing and a stage two on site assessment which shall be undertaken prior to work commencing. This assessment must be agreed by all members of the working party and signed off accordingly.
3. The working party will consist of at least two persons who will be appropriately authorised to undertake the proposed installation work in accordance with **SSE Operational Safety Rules**.
4. System control will be advised prior to work starting and upon completion of the work.
5. Personal Protective Equipment will be worn in accordance with SSE PPE matrix (see S&E Manual Section 1, Appendix 1 of WI-HSE-001).
6. The following reference documents are also relevant for pole mounted installations:

¹ For the purposes of this document, relating to the installation of the equipment on the trial networks of the My Electric Avenue project, the Rail 350 equipment comprises the IP65 rated cabinet containing the Rail 350 Power Quality Monitor along with the external connections for load monitoring and power supply.

- SP-PS-140 Specification for conductor fittings and associated apparatus for use with LV aerial bundled conductor
- TG-PS-569 ABC tension and non-tension fittings, lugs, end caps, main joints and cable connections
- PR-PS-045 Procedure for Safe Access to wood Poles
- PR-PS-431 Procedure for Live Working on Low Voltage Overhead Networks
- TG-PS-529 Conductors to be used on Pole Mounted Transformers - LV connections

4. First Installation – Lyndhurst

This method statement is for installation of the Esprit technology that is under development. The method statement is written to encompass the majority of arrangements of PMTs. However, the PMT where the Esprit is installed is sited at Lyndhurst.

The characteristics of the PMT are:

- One set of fuses leading to 3 spurs.
- The PMT is mounted on robust H pole but there are overhanging trees.
- The 3 spurs separate from a pole approximately 4 metres from the transformer H pole.
- The conductors are ABC and require cable piercing.

5. General Requirements for Installation

This method statement provides details regarding how to install Rail 350 equipment safely to an OHL pole supporting the Esprit MC. It focuses on the methods to be followed in order to make the necessary current connections via Rogowski Coils (RCs) into the rail 350 unit and power supply cable into terminal blocks in the MC housing. This method statement also provides guidance regarding the positioning of Rail 350 equipment in relation to the MC.

The below installation instructions shall be followed. Some site specific modifications may be required.

- 1.1. Rail 350 equipment, specifically the Rail 350 enclosure, will always be installed as close to the Esprit Monitor Controller enclosure as possible.
- 1.2. Current References – All 3 phase² (no neutral) current values will be obtained by using fully insulated sensing transducers (RCs). The sensors will be installed around the cable connections at suitable locations as close as practically possible to the Rail 350 enclosure.
- 1.3. Where a generic installation instruction is to be followed, a full assessment of options for the connection of current sensors will be made prior to any work commencing.
- 1.4. Prior to work commencing, a visual inspection of the connection points will be carried out with particular attention being made to positions where current sensors are to be installed. If there is any doubt regarding the condition of the connection

² Where CTs cannot be placed around all 3 phase connections then they shall be connected in order of priority to be confirmed on a site-by-site basis by the EA Technology on-site representative.

point, work shall not commence and the issue shall be referred to the person responsible for instructing the installation.

6. Order of Installation

The order of installation and connections will be the same in each case:

1. Detailed visual Inspection;
2. Cable routes and ducting prepared and installed or existing routes identified;
3. Power off Esprit enclosure by disconnecting commando socket;
4. Additional cable entry holes to be drilled and prepared with glands in MC enclosure bottom plate;
5. Secure RAIL 350 to pole using provide M10 coach screws and washers;
6. Power supply connections to be made through the Esprit Monitor Controller power supply terminals;
7. Attachment of RCs to OHL cables and connection Rail 350 Unit;
8. Secure RC junction box to pole;
9. MODBUS cable to be disconnected from RAIL 350 unit and put through glad hole; Green connector block to Envoy MODBUS port and the reconnection to RAIL 350v Unit;
10. All MC and RAIL 350v IP64/5 glands secured;
11. Esprit unit commando plug connected to Power supply socket.

The work required for each of the steps and the options available are described in the next sections.

The order that the cables should be connected can be summarised as follows.

1. Connect the Rail 350v 5 core flex earth to the topside terminal block within the MC enclosure;
2. Connect the Rail 350 5 core flex N, L1, L2 and L3 cables to the topside terminal; block within the MC enclosure. Connect the neutral first, then the three phases. Do not connect the commando socket at this stage;
3. RCs are to be attached to OHL;
4. RCs are to be made off to the Rail 350 enclosure;
5. Connect the supply commando plug and socket after all works have been completed.

7. Detailed Visual Inspection

In addition to the requirements detailed in sections 3 and 0 a visual inspection shall be carried out:

1. A detailed visual inspection shall include:
 - Cables and connection methods; this shall include the inspection of all cable cores to identify any damage/ breakdown of insulation and overheating issues.
 - Inspection of abnormal connections.
 2. Where an unsafe situation is identified all work on site will cease and appropriate repairs will be instigated. No monitoring equipment will be installed until repairs have been completed and any unsafe situation has been rectified.
 3. Wherever possible, the enclosure for the Rail 350 unit will be fixed in its permanent position before installation of the associated connections commences.
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Care should be taken to ensure that any equipment installed will not interfere with or prevent the safe operation of any equipment related to the pole mounted equipment already in place.

8. On-site Civil Installation Works

The Rail 350v enclosure will be provided with a suitably insulated bracket that can be fixed to the pole by 10mm diameter coach screws at the top and bottom. The coach screws should be 75mm long, as they will avoid the need to drill through the pole which may introduce risks to the PMT equipment and cables.

1. The Rail 350 enclosure shall be positioned such that the distance between the MC and the Rail 350 enclosure is minimized. It is recommended that this is the other side of the pole to the MC enclosure
2. Position of Rail 350 – The Rail 350 enclosure should be placed at a suitable location at the same or greater height than the MC enclosure and securely fixed to the pole with 10 mm diameter, 75mm length coach screws provided by:
 - (a) Marking points where bolts will be inserted into the pole.
 - (b) Drill holes for bolts.
 - (c) Use 'coach screws' to penetrate the pole
3. All cables (power supply, current measuring etc.) exiting the equipment will be protected using suitable flexible ducting or conduits or other similar materials. It is important that the cable access route shall be installed at a practical position, where it must not obstruct or affect the operation of doors.

9. Rail 350 Power Supply Installation

Reminder - This is a Live Network, appropriate PPE must be worn at all times and only approved insulated tools shall be used!

9.1. Rail 350 Power Supply (general).

Wherever possible existing MC enclosure terminal blocks will be used as power supply points. The Rail 350 equipment requires power supply points one per phase and neutral (3P+N+E) connection. All connection points should be connected before the commando socket is connected to the Esprit equipment.

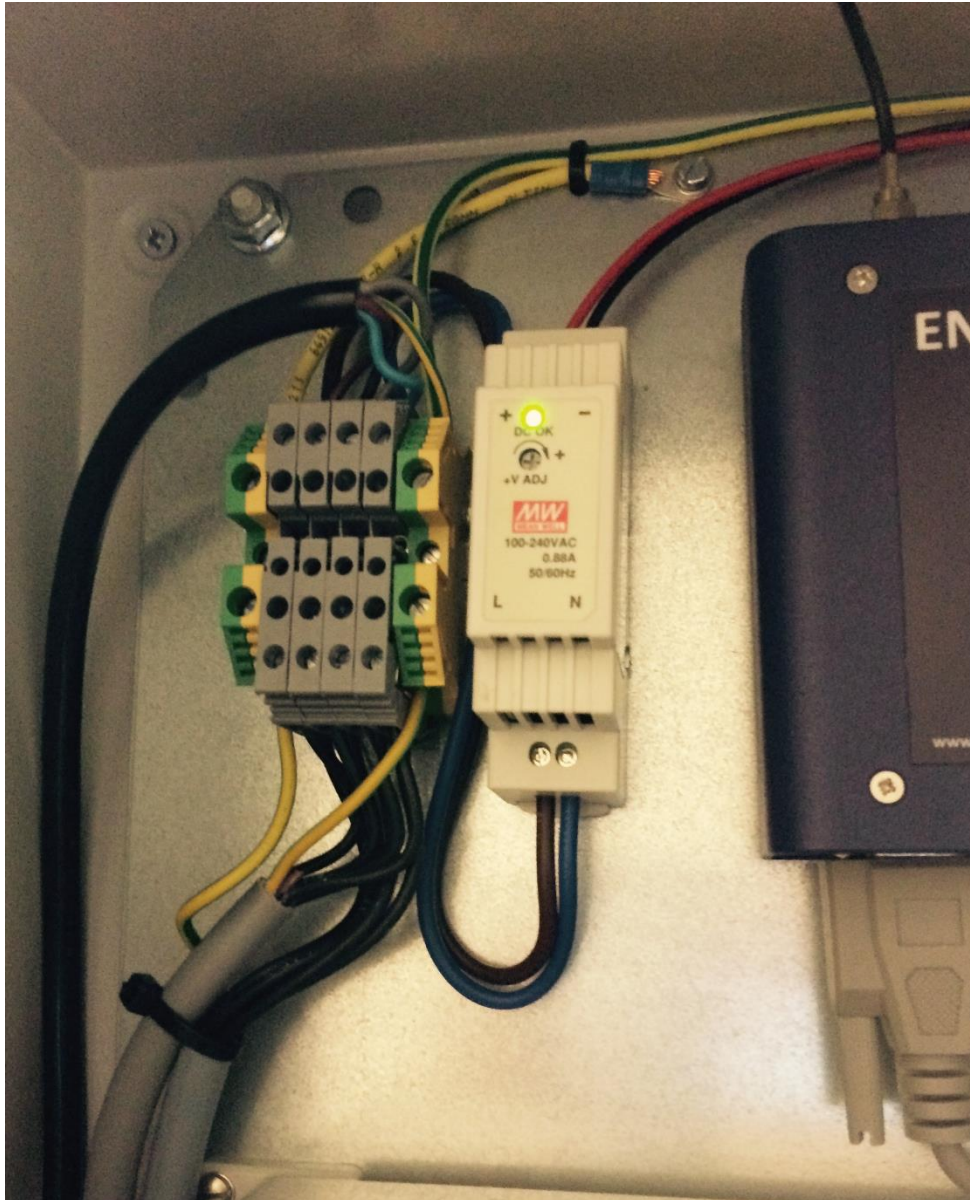


Figure 1 Power Supply Terminal block within MC enclosure.

9.2. Installation of Rail 350 Power Supply at the Monitor Controller Enclosure

A 5 core flex cable will be provided, which will be connected to the Rail 350 enclosure. It should be connected to the MC enclosure terminal block in Figure 1. This should be carried out in the sequenced outlined in Section 6. Cable entry should be through the bottom plate on the MC enclosure pictured in Figure 2. To allow this, a new entry point should be drilled and a gland added. Tools and glands are to be supplied by the installer. The new 5 core flex cable within the MC should be cable tied and made secure.



Figure 2. MC Enclosure bottom plate with Rail 350v MODBUS and power supply cable. Note, gland not shown. Note Class 2 enclosure on Lyndhurst site will be a polymer class II.

10. Installation of Current Transformers

A 5 core flex cable will be provided, which will be connected to the Rail 350 enclosure.

There is no set arrangement for connection of the RCs and therefore great caution should be taken when installing these cables.

Install and secure the coil (1 per phase) in position making sure that the arrows on the coil are pointing in the direction that the load is flowing away from the Transformer pole for outgoing cables as per the manufacturer's instructions.

Once installed, position all coil / transducer cables in their final location – in line with manufacturer's instructions.

Run all cables through the pre- prepared cable access route / duct from the original Esprit installation.

Secure junction IP64/5 RC cable junction box to pole with screws provided.

Coils are to be positioned so as not to block the removal or replacement of cable fuse-links, minimise strain on connections, and to avoid locations where cables could be abraded or otherwise damaged.

If installed around cable crutches etc., the cable must first be inspected to confirm its integrity and stability.

Cable cores may only be flexed or moved using very gentle force, and connections at the points where the cable cores are made off should be inspected afterwards to ensure that cable remains intact and correctly fixed.

11. Installation of MODBUS Cable



Figure 3. Nortech EV10 with MODBUS RS485 port (green).

A 3 core MODBUS cable will be provided, which will come connected to the Rail 350 enclosure. It should be connected to Envoy EV10 MODBUS input block in Figure 3. MODBUS terminal numbers are prewired. An EA representative will provide instruction. Cable entry should be through the bottom plate on the MC enclosure pictured in Figure 2. To allow this, a new entry point of appropriate size should be drilled and a gland added. The new 3 core MODBUS cable, within the MC, should be cable tied and made secure.

12. Supply of Equipment

All specialised equipment will be supplied by the MEA team. All signage and risk assessments when under operation is the responsibility of responsible person onsite. All other ancillary equipment is to be supplied by IDEC or SSEC in NPG and SSEPD area respectively.

Appendix I Esprit Monitor Controller

The Monitor Controller is connected to the LV mains electricity network, close to the distribution board. The unit monitors the current on each of the three phases & can make intelligent decisions about the distribution network – issuing commands, via PLC, to connected Intelligent Control boxes.

The external enclosure dimensions of the Monitor Controller are: (WxDxH) 320x230x85mm.

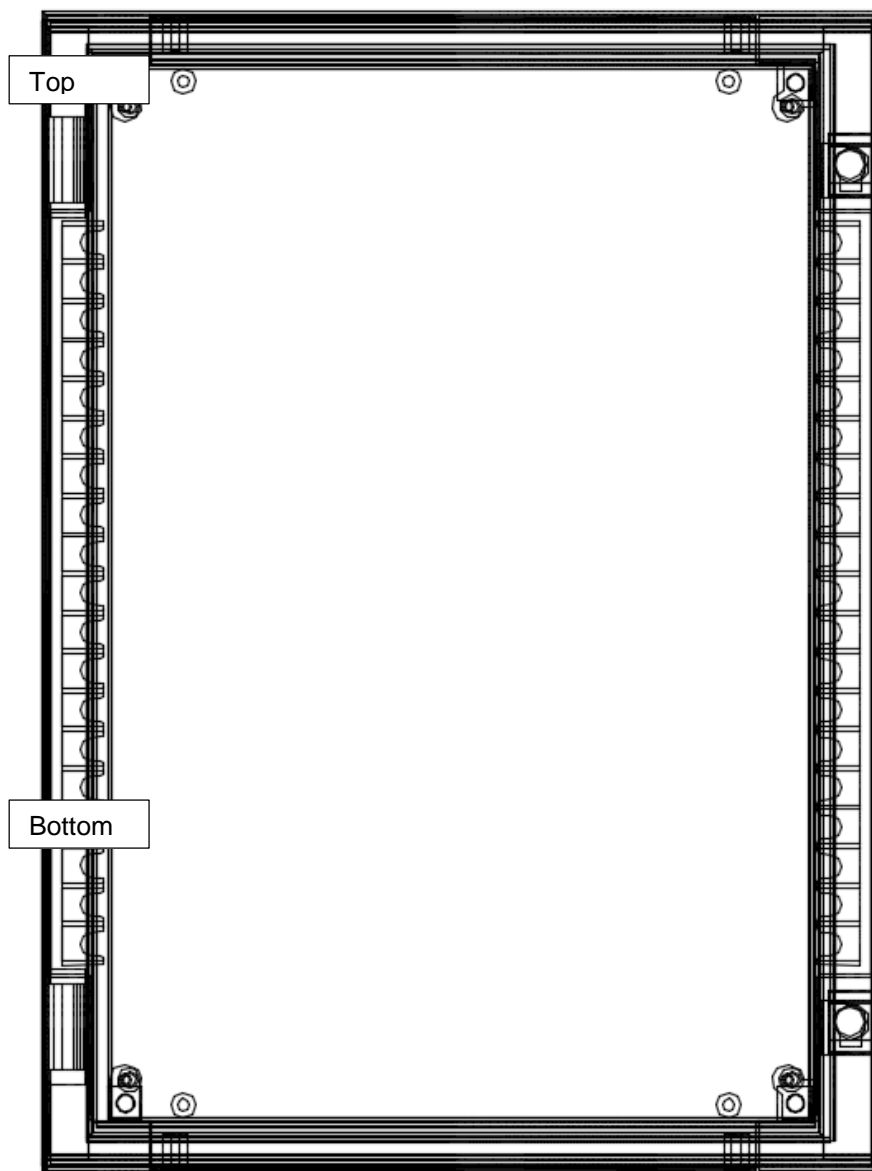
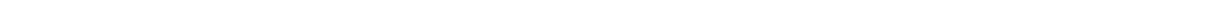


Figure 4 Esprit Monitor Controller enclosure.

Figure 5. Rail 350v enclosure and double dagger bracket rear view.

Figure 6. Rail 350v enclosure and double dagger bracket front view.



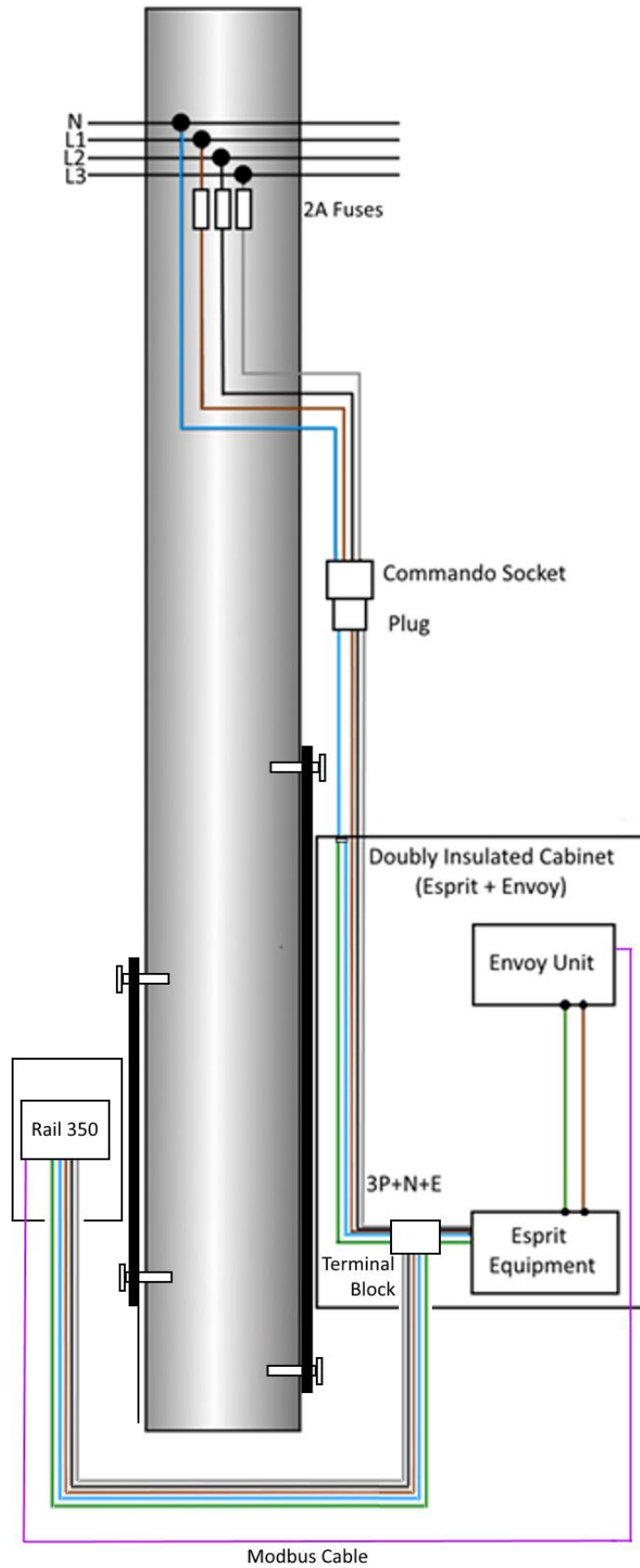


Figure 7. Esprit Enclosure with Rail 350 equipment installed with RC details omitted.