WESTERN POWER DISTRIBUTION

Serving the Midlands, South West and Wales

ST: TP14D/4

POST-ENERGISATION GUIDANCE NOTE

(For Installations Other Than LV Combined Cut-Out, CT & Meter Cabinet Type)

Summary

This Guidance Note has been prepared to support the testing of Remote Metering Panel Installations in accordance with Standard Technique ST: TP14D/3.

For the purpose of this document "Remote Metering Panel Installations" means any installation other than the LV Combined Cut-Out, CT & Meter Cabinet type.

Author: Graham Brewster

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1.0 INTRODUCTION

This Guidance Note has been prepared to support the post-energisation testing of installations other than the LV Combined Cut-out, CT & Meter Cabinet in accordance with Standard technique TP14D/4.

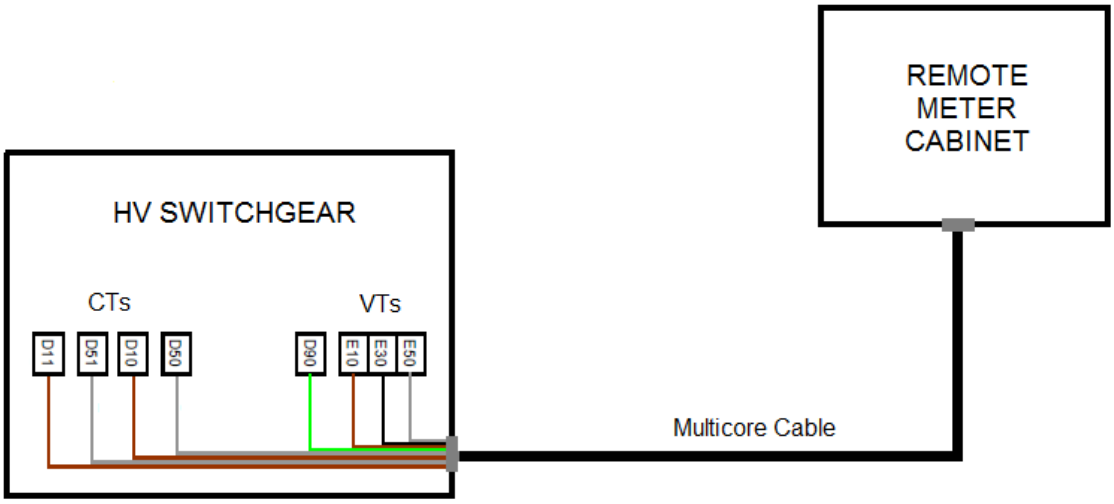
2.0 REMOTE METER CABINET ARRANGEMENT

A remote meter cabinet arrangement the settlement meter, test terminal block and meter potential fuses are incorporated within a standalone cabinet which is remote from the metering CTs and VTs and is connected to them via a cable.

A remote meter cabinet is associated with all the installations subject to this Guidance Note with the exception of the LV CT & Meter Cabinet {Separate Cut-out) type.

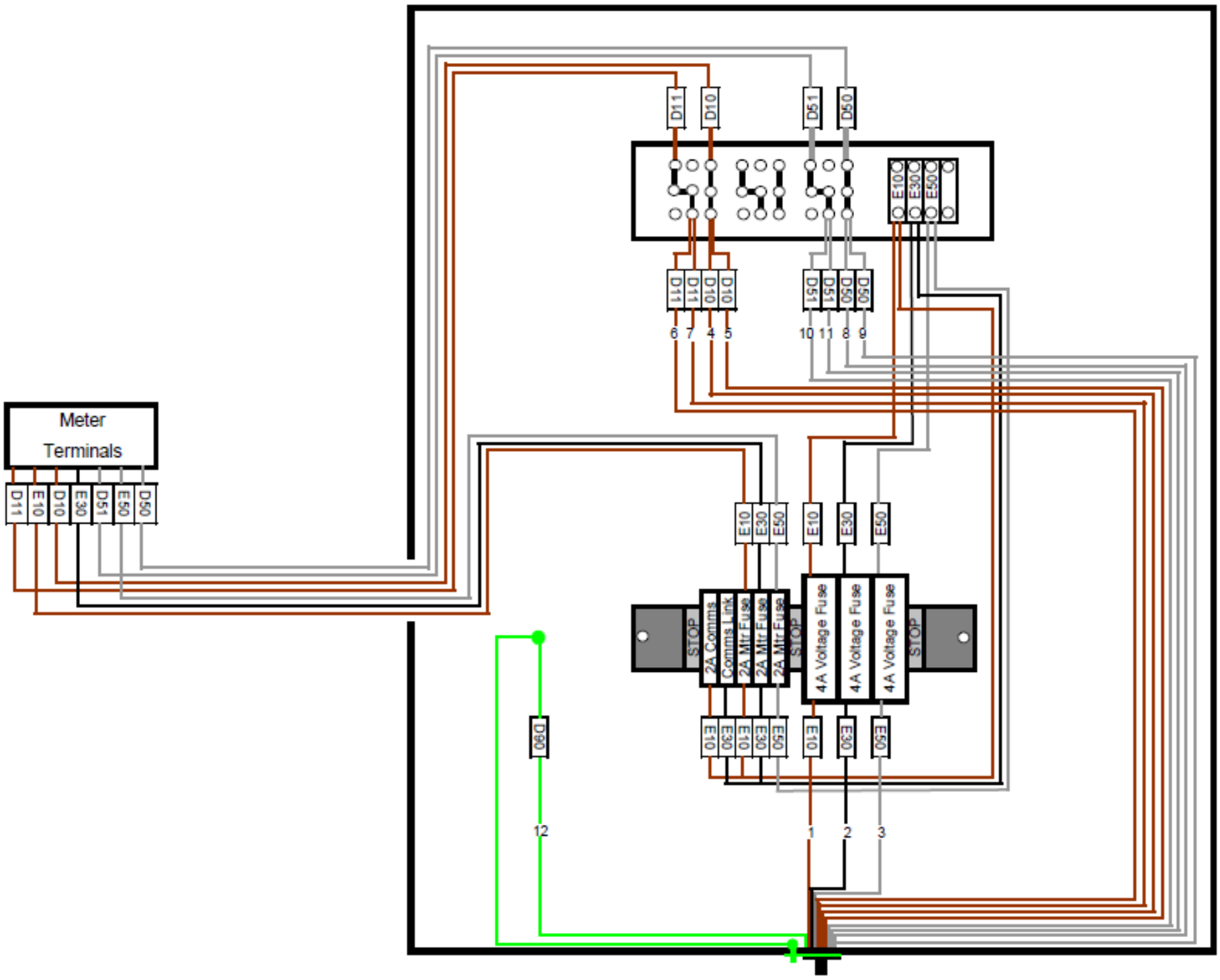
2.1 General Layout

The general layout of an indicative metering system with a remote meter cabinet is as follows:



2.2 Wiring Diagram of Remote Meter Cabinet

A schematic diagram of the secondary circuits within an indicative remote meter cabinet is as follows:



2.3 Test Terminal Block

2.3.1 “CT” Links

“CT” links are used for shorting the CT secondary winding. Photographs of the test terminal block displaying the “CT” links are shown below. The “CT” link is the top one / one on the right on each of the three pairs.

The photograph on the left shows the “CT” link in the in the “open” position (i.e. CTs not shorted). The photograph on the right shows the “CT” link in the in the “closed” position (i.e. CTs shorted).

“CT” LINKS **OPEN**

“CT” LINKS **CLOSED**
(CTs Shorted)

2.3.2 “Meter” Links

“Meter” links are used for disconnecting the meter from the CT. Photographs of the test terminal block displaying the “meter” links are shown below. The “meter” link is the bottom one / one on the left on each of the three pairs.

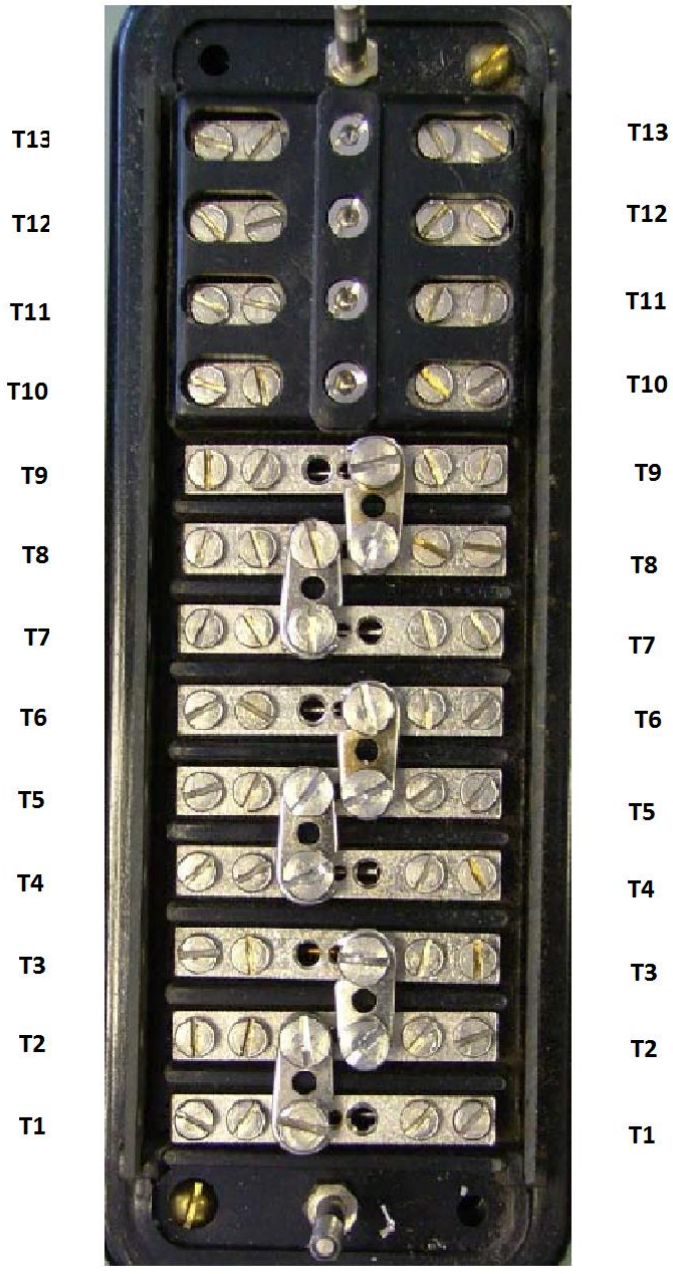
The photograph on the left shows the “meter” links in the in the “open” position (i.e. meter disconnected from the CT). The photograph on the right shows the “meter” links in the in the “closed” position (i.e. meter connected to the CTs).

“METER” LINKS **OPEN**
(Meter Disconnected From CTs)

“METER” LINKS **CLOSED**

2.4 Test Terminal Block Reference Diagram

The following reference diagram of the test terminal block will be employed in the following sections:



2.5 "Birth Certificate" Documentation

Two paper copies of the manufacturer's "Birth Certificate" (aka Test Certificate) should have been supplied with the equipment housing the metering CTs and VTs.

These certificates must be retained and kept in good condition as they are an essential part of WPD's metering CT/VT commissioning process. One copy must be left with the equipment on site on completion of the testing, and one copy must be returned to the office along with the completed Test Sheet for uploading into Crown.

3.0 TESTING PROCEDURE

This procedure presumes that the metering point is energised and carrying load current.

3.1 General

a) Confirm that the meter is connected and has been commissioned.

b) Confirm that the meter point is energised and carrying load current.

c) Confirm that the CT shorting links are open (see Section 2.3.1 above).

d) Confirm that the Meter links are closed (see Section 2.3.2 above).

e) Confirm all test instruments have an in-date calibration.

f) Complete "General Details" part of the Test Sheet.

g) Complete "LV CT & Meter Cabinet Details (Separate Cut-out)" part of the Test Sheet if the connection comprises an LV heavy duty cut-out with separate CT & meter cabinet.

h) Complete "LV Intake CB Details" part of the Test Sheet if the connection comprises an LV Intake circuit breaker.

i) Complete "HV Metering Unit Details" part of the Test Sheet if the connection comprises of 6.6kV or 11kV ring main unit / extensible switchgear / free standing circuit breaker equipped with a metering unit.

j) Complete “6.6, 11, 25, 33, 66, 132 kV Metering CB Details” part of the Test Sheet for any connection not covered by g), h) or i) above.

k) Complete “Metering CT Details” part of the Test Sheet.

l) Complete “Metering VT Details” part of the Test Sheet for HV connections only.

m) Complete “Remote Meter Cabinet Details” part of the Test Sheet for connections other than LV heavy duty cut-out with separate CT & meter cabinet type.

n) Complete “Multicore Cable Details” part of the Test Sheet for connections other than LV heavy duty cut-out with separate CT & meter cabinet type.

3.2 Voltage Checks At Test Terminal Block

The following section makes reference to the diagram in Section 2.4 above.

a) Check polarity on the test terminal block is correct and record.

- Connect the Polarity Tester to terminals T10, T11, T12 and 13.

b) Check phase rotation on the test terminal block is correct and record.

- Connect the Phase Rotation Meter between terminals T10, T11 and T12. The phase rotation is required to be standard.
- Where this is not the case investigations need to be carried out to identify where the connections have been crossed. The panel must NOT be left with incorrect phase rotation for metering purposes.

c) Check and record voltages on the test terminal block.

- Measure the L1 - L2 voltage by connecting the voltmeter between terminals T10 and T11.
- Measure the L1 - L3 voltage by connecting the voltmeter between terminals T10 and T12.
- Measure the L2 - L3 voltage by connecting the voltmeter between terminals T11 and T12.
- Measure the L1 - N voltage by connecting the voltmeter between terminals T10 and T13.
- Measure the L2 - N voltage by connecting the voltmeter between terminals T10 and T13.

- Measure the L3 - N voltage by connecting the voltmeter between terminals T11 and T13.

d) Ascertain the prevailing voltage at the metering point.

e) Calculate and record the effective VT ratio.

3.3 Current Checks At Test Terminal Block

a) Measure the prevailing load current at the metering point.

- For LV installations this should, where at all possible, be by the use of a clip-on meter attached to the phase conductors.

- For HV installations this could be by use a clip-on meter attached to a protection CT secondary circuit of known ratio, or by telecontrol instrumentation, or by a customer's ammeter.

b) Measure and record the CT secondary current at the test terminal block by the use of a clip-on meter attached to the CT secondary wiring:

- Measure the L1 current by connecting the clip-on meter around wire D11 (terminal T1).
- Measure the L2 current by connecting the clip-on meter around wire D31 (terminal T4) *{only applicable on LV connections}*.
- Measure the L3 current by connecting the clip-on meter around wire D51 (terminal T7).

c) Calculate and record the effective CT ratio.

3.4 Connect Three Phase Energy Analyser

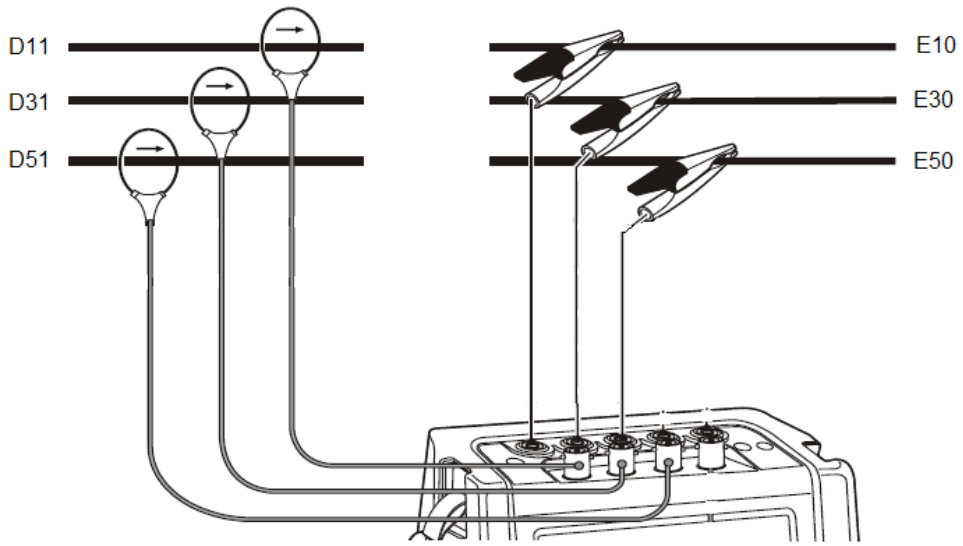
The following refers to the diagram in Section 2.4 above.

a) Before making any connections, set the Analyser up for the expected nominal voltage, nominal frequency, CT ratio and VT ratio for the metering point in question.

b) Clip current probes around the CT wires D11, D31*{only applicable on LV connections}* & D51 on terminals T2, T5 & T8 respectively. Ensure that the polarity of the three

probes are identical i.e. that the marked face of the probes all point in the same direction.

c) Attach voltage probes to the VT wires E10, E30 & E50 on terminals T10, T11 & T12 respectively.



d) Check that the current measured by the Three Phase Energy Analyser is the same as the current measured in 3.3 a) above i.e. confirm that the CT ratio setting on the analyser is correct. .

e) Check that the voltage measured by the Three Phase Energy Analyser is the same as the voltages measured in 3.2 d) above i.e. confirm that the VT ratio setting on the analyser is correct.

3.5 Power Checks At Test Terminal Block

a) Using the Three Phase Energy Analyser measure and record the following power flows:

- Apparent Power (KVA)
- Real Power (KW)
- Reactive Power (KVAr)

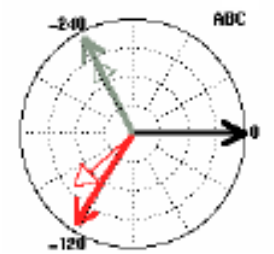
b) Using the Three Phase Energy Analyser measure the Power Factor (PF). Record whether the power flow is import or export

- A power factor in the range 0 to 1 indicates an import condition i.e. power is being consumed by the customer
- A power factor in the range -1 to 0 indicates an export condition i.e. power is being generated by the customer

3.6 Phase Relation Checks At Test Terminal Block

a) Using the Scope Phasor on the Three Phase Energy Analyser confirm that the phase relation between voltages and currents is correct i.e. L1 current is associated with L1 voltage, L2 current is associated with L2 voltage & L3 current is associated with L3 voltage

- The phase current and voltage vectors should be broadly in line for an import condition



- The phase current and voltage vectors should be broadly 180 degrees apart for an export condition

3.7 Checks On Completion

a) Disconnect the Three Phase Energy Analyser.

b) Secure external panels and door then seal.

c) Complete Test Sheet.

3.8 Test Sheet & “Birth Certificate” Documentation

The completed test sheet and one paper copy of the manufacturer’s “Birth Certificate” (aka Test Certificate) must be kept in good condition and returned to the office for uploading into Crown.

The second paper copy of the manufacturer's "Birth Certificate" should be securely retained within the LV CT & Meter Cabinet or the Remote Meter Cabinet (as appropriate).