



EHV/HV METERING EQUIPMENT TESTS

SCTS 71

SUBSTATION:.....CIRCUIT:.....of.....

IMPORT MPAN

EXPORT MPAN

SITE ADDRESS.....

UNIT TYPE

UNIT SERIAL NUMBER.....

REASON FOR COMMISSIONING..... NEW / REPLACEMENT METERING EQUIPMENT

METERING TRANSFORMERS AT DEFINED METERING POINT (DMP).....YES/NO.....

NO OF PHASES ON SUPPLY.....TWO/THREE

CT TESTS

SERIAL NO. L1.....L2..... L3.....

CT CLASS:CT RATIO 1:/..... CT RATIO 2 :...../.....

IR VALUE: RATED BURDEN.....VA

Polarity (P1 To CB) (Y/N)	L1		L2		L3	
dc Loop Resistance (CT Cable Run)	L1	Ω	L2	Ω	L3	Ω
Loop Burden (CT Cable Run)	L1	VA	L2	VA	L3	VA

NOTE: This is the Burden of the CT Secondary wiring to the test block and does not include the meter. See Appendix 1 for calculation notes.

PHASE	PRIMARY CURRENT	SECONDARY CURRENT										
		RATIO 1 (AT CB)				RATIO 2 (AT CB)				AT FRAME		
		D11	D31	D51	D70	D11	D31	D51	D70	D11	D51	D70
L1												
L2												
L3												
L1 – L3												

CONFIRM CT SHORT **APPLIED / REMOVED** AT TEST BLOCK OF FRAME (DELETE AS APPLICABLE)

CONFIRM CT STAR POINT EARTHED

CONFIRM CT RATIO CONNECTED /



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VT TESTS

SERIAL NO. L1.....L2..... L3.....

VT CLASS: VT RATIO:/..... RATED BURDEN.....VA

IR VALUE:

Polarity (P1 To LINE) (Y/N)	L1		L2		L3	
dc Loop Resistance (VT Cable Run)	L1	Ω	L2	Ω	L3	Ω
Loop Burden (VT Cable Run)	L1	VA	L2	VA	L3	VA

NOTE: This is the Burden of the VT Secondary wiring to the test block and does not include the meter. See Appendix 2 for calculation notes.

PHASE	PRIMARY APPLIED VOLTAGE	MEASURED SECONDARY VOLTAGE			
		E10 - E	E30 - E	E50 - E	E70 - E
L1 - E (L2)					
L2 - E (L3)					
L3 - E (L1)					

NOTE: MERLIN GERIN VT'S ARE STAR CONNECTED SO MUST BE TESTED PHASE TO PHASE

CONFIRM VT EARTHED ON **YELLOW PHASE / NEUTRAL** ONLY (DELETE AS APPLICABLE)

CONFIRM FEEDER STATE AFTER TESTS ACTIVE / INACTIVE

INSTALLED METERING EQUIPMENT AS PER BSC CoP

CONFIRM COP LABEL COMPLETED ON FRAME

PRINT NAME..... CONTACT NUMBER.....

COMPANY.....

SIGNATURE

DATE OF TEST.....



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APPENDIX 1

NOTES ON CT BURDEN

Calculation of burden is based on wiring loop DC resistance and CT operating at full load. The total burden should not exceed the rated burden of the CT being used.

You should allow 0.5VA for the metering equipment.

EG.

5A CT with a DC cable loop measurement of 0.28ohms

$$\begin{aligned}P &= I^2R \\ &= 5^2 \times 0.281 \\ &= 7.04VA\end{aligned}$$

2.5mm² has a nominal resistance of 7.41mΩ/metre (mΩ/m), so a typical run of 19 metre (38 meter loop) will give a loop resistance of 0.281 ohms, and is seen as the maximum loop that can be installed on 2.5mm².

If longer runs are required consideration should be given to doubling cores on the multicore cable or using CTs with a 1A secondary.



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APPENDIX 2

NOTES ON VT BURDEN

Calculation of burden is based on wiring loop DC resistance and VT operating at full load.

You should allow 0.5VA for the metering equipment.

EG.

110v secondary VT with rated burden of 50VA and a DC cable loop measurement of 0.3ohms.

Load on cable at VT full load is:

$$\begin{aligned}
 P &= \sqrt{3}VI \\
 I &= \frac{P}{\sqrt{3} \times V} \\
 &= \frac{50}{\sqrt{3} \times 110} \\
 &= 0.262A
 \end{aligned}$$

Cable Burden on VT at rating is:

$$\begin{aligned}
 P &= I^2R \\
 &= 0.26^2 \times 0.3 \\
 &= 0.02VA
 \end{aligned}$$

2.5mm² has a nominal resistance of 7.41mΩ/metre (mΩ/m), so a typical run of 20 metre (40 meter loop) will give a loop resistance of 0.3 ohms, and is seen the VT burden has little impact on the overall cable run.

NOTE: For single phase VT's the quoted burden is at phase voltage (63.5v), so the $\sqrt{3}$ is not required and the burden is just divided by the phase voltage, which would give a load current of 0.787A instead.



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APPENDIX 3 - Metering Test Forms – Explanatory Notes

All testing carried out will be in accordance with the BSC Code of Practice 4. This Code of Practice relates to the requirements for the Calibration, sample Calibration, Commissioning of Metering Equipment and the maintaining of associated records with respect to the above for Settlement purposes.

This CoP defines the minimum requirements that participants must meet when carrying out the above.

Circuit Name x of y

The name of the equipment being fed from the switchgear should be placed here e.g. Transformer, Customer LV etc.. The x of y will typically be 1 of 1. New installation would only have one feeder per MPAN, some older sites do have multiple CT's summated onto a single meter. In this instance a second set of test sheets should be completed for the second set of equipment, so the sheets would be marked 1 of 2 and 2 of 2. This would be seen as an exception, and only likely on re-tests of old sites

Metering transformers (CTs and VTs) at Defined Metering Point

The Defined Metering Point for transfer of energy from the Northern Powergrid system to a customer is at the point of supply, so in most cases this will be TRUE. In exceptional circumstances the metering transformers may be placed at another position, HV side of transformer for an LV point of supply, so the metering transformers will not be at the defined metering point, so FALSE.

There are some special cases applicable here, National Grid or IDNO interfaces for example, in these cases please consult the Metering section.

No of Phases on Supply

Typically at HV this will be THREE, some HV sites may be split phase so TWO. Again some special cases at HV (Network Rail Interface) this may be TWO.

This is not the number of metering CT's.

CT Class and Burden

This information will be found on the CT rating plate,

COP 1 is Class 0.2S, with site specific burden.

COP 2 is Class 0.2S with site specific burden.

COP 3 and 5 is Class 0.5S and 7.5VA.

VT Class and Burden

This information will be found on the VT rating plate,

COP 1 is Class 0.2, with site specific burden.

COP 2 is Class 0.5 with site specific burden.

COP 3 and 5 is Class 1 and 50VA.



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CT / VT Ratio

The values must be written as full load primary current or voltage to secondary current or voltage values e.g. 100/5, 11000/110 etc.

Confirm Feeder State

This is at meter level and is the state of the equipment following completion of testing i.e. whether the supply is energised and electricity is passing to/from the customer's plant/apparatus to/from the DMP. This will typically be INACTIVE, as the customer will not be taking a supply. Typically only sites that have been live and have had CT/VT changes will be left as ACTIVE

Metering Equipment as per COP

The BSC Code of Practice documents state different COP's dependent upon the capacity of the connection, as follows:

COP 1	Capacity exceeding 100MVA
COP 2	Capacity greater than 10MVA but not exceeding 100MVA
COP 3	Capacity greater than 1MVA but not exceeding 10MVA
COP 5	Maximum demand up to and including 1MW

Metering Frame Label

All CT/VT details should be entered on the Metering Frame label which is located on the inside of the swing door. This enables MOP's to check details without having to access the primary equipment.

Test Sheet Sign Off

The full name of the test engineer, in legible capitals should be inserted here, along with employed company and Full Mobile Contact Number.

The date of the test entered is the date at which ALL tests on the sheet have been completed.