POLICY DOCUMENT

GE-NOP-PL-0065

TITLE: **Metering CT and VT Asset Recording Requirements**			DOCUMENT NO: **GE-NOP-PL-0065**			
Business Documents Owner			Electricity Networks Director			
Rev	Date		Author	Production	Approval	Authorisation
1	Feb 2015	Issued	SA	SMc	MS	DO
2	Feb 2015	Amendment to Appendix 1	SA	SMc	MS	DO
Vn3	Mar 2017	Document reviewed and revised extensively, removed appendix 3 and replaced appendices 1 and 2	CS	SMc	MS	DO
Vn3	June 2018	Document reviewed, no change required so revision number retained	CS	SMc	MS	DO
Vn4	Aug 2019	Updated process change for off site commissioning	JN	HH	MS	DO
Vn4	Dec 2020	Document reviewed, no change required so revision number retained	JN	SC	SM	DO

Next review due December 2021

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REFERENCES

GE-NOP-FM-0730 – CT VT Commissioning Test Results Record

GE-NOP-ES-0020 – Network Operations Process

Balancing and Settlement Metering Code of Practice 4 – Code of Practice for the Calibration, Testing and Commissioning Requirements of Metering Equipment for Settlement Purposes.

Balancing and Settlement Code procedure 27 - Technical Assurance of Half Hourly Metering Systems for Settlement Purposes

FOREWORD

Every electricity company has a duty to comply with the Balancing and Settlement code and its subsidiary codes. Elexon has made some mandatory changes in COP 4 after consultation with industry where responsibility of keeping manufacturing and commissioning record of metering CT and Metering VT is fixed on to distribution businesses. Distibution Buisnesses have set timescales to send the relevant CT/VT calibration and commissioning documents to the supplier – supply must be commissioned within 16working days of energisation and sent to the supplier within 5 working days of commissioning.

This document is intended as a guide to direct GTC staff, UIP's, ICP's and contractors for the commissioning and record keeping requirements of CT/VT metering transformers placed on GTC as the asset owner.

1 SCOPE

This *Metering CT and Metering VT Asset Recording Requirement GE-NOP-PL-0065,* applies to all GTC Electricity Distribution Networks. Plant and Equipment under the ownership or control of GTC under whose authority they have been issued need to follow policy *GE-NOP-PL-0065.*

2 POLICY

GTC require all metering CT and metering VT manufacturing/commission records from GTC Construction and GTC Construction Contractors, utility adoption partners, ICPs and fault attending contractors. Receipt of manufacturing /commissioning records in conjunction with form *GE-NOP-FM-0730 – CT VT Commissioning Test Results Record*, in an electronic format is a mandatory essential requirement for the energisation of a network and payment authorisation. Either a scanned copy or a high quality photo of the documents taken on a smart phone with all details visible and readable will be accepted.

Records must be sent to the relevant GTC control mail box in accordance with Appendix 1 (HVControl@gtc-uk.co.uk or LVControl@bu-uk.co.uk) prior to approval being given to energise or extend the network in accordance with document *GE-NOP-ES-0020 Network Operations Process, ,* all submissions must include the MPAN number of the supply being energised or worked on. For work undertaken as part of a fault or switchgear / CT and VT re-

placement all calibration and commissioning documents must be sent to Asset-data@gtc-uk.co.uk within 5 working days.

Where a supply has been commissioned off-site the records need to be sent to GTC cleatly identifying the unit equipment is used for to trace to relevant MPAN.

P1 Relevant Installers/Maintainers/Commissioners for GTC owned equipment

The commissioning and record keeping requirements of this policy *SHALL* be complied with and are relevant to the following scenarios;

- On new build or reinforcement works where electrical contractors install metering CTs and/or metering VTs
- On any fault repair works requiring work on or replacement of switchgear located metering CTs or metering VTs
- On any planned or more major replacement of switchgear or other plant containing metering CTs or metering VTs

The tests carried out are to be in accordance with Balance and Settlement COP 4 and the results recorded on *GE-NOP-FM-0730 – CT VT Commissioning Test Results Record* part 1.

Tests performed SHALL establish the CTs and VTs are of the correct ratio and polarity, the relationships between voltages and currents and that the phase sequence at the test facility are correct. (CT pole face P1 should face toward the distribution or transmission system in all cases however the orientation of each CT must be clearly indicated on the commissioning record). All ratios of multi ratio equipment must be tested and verified, with the ratios that have been selected are clearly recorded. The test record should describe the methods used to establish ratios and polarities.

In addition to this, the location of the measurement transformers in relation to the metering position must be recorded.

P2 Asset Item Requirement

To have a distinct Asset Item type of metering CT and metering VT. A new, upgrade or replacement CT or VT would be a new asset. Old Asset data should not be overwritten.

Asset Item Data

Metering CT	Metering VT
Make: Type: Serial Number: Ratio: Rating (VA): Date of commissioning: dd/mm/yyyy Date of Decommissioning: dd/mm/yyyy Any other technical attributes for Asset Management to retain	Make: Type: Serial Number: Rating (VA): Primary Voltage Secondary Voltage Date of commissioning: dd/mm/yyyy Date of Decommissioning: dd/mm/yyyy Any other technical attributes for Asset Management to retain
In order to associate the Asset item the following must be detailed on the calibration and commissioning form; • Related Metering Point Administration Number (MPAN) • Related full premises address • Related switchgear, metering unit or CT chamber as required	

Asset Item: Manufacturer's Calibration Certificate

The manufacturer's calibration certificate MUST be provided, in an electronic file format which is clear and easily readable, and associated with the relevant asset item(s).

Asset Item: Commissioning Test Results sheet

To be in an electronic file format which is clear and easily readable and associated with the relevant asset item(s).

Note: If commissioning test results are meant for multiple items, it must associate to multiple asset items with serial numbers.

P3 Balancing and Settlement Code procedure 27 Calibration (BSCP 27)

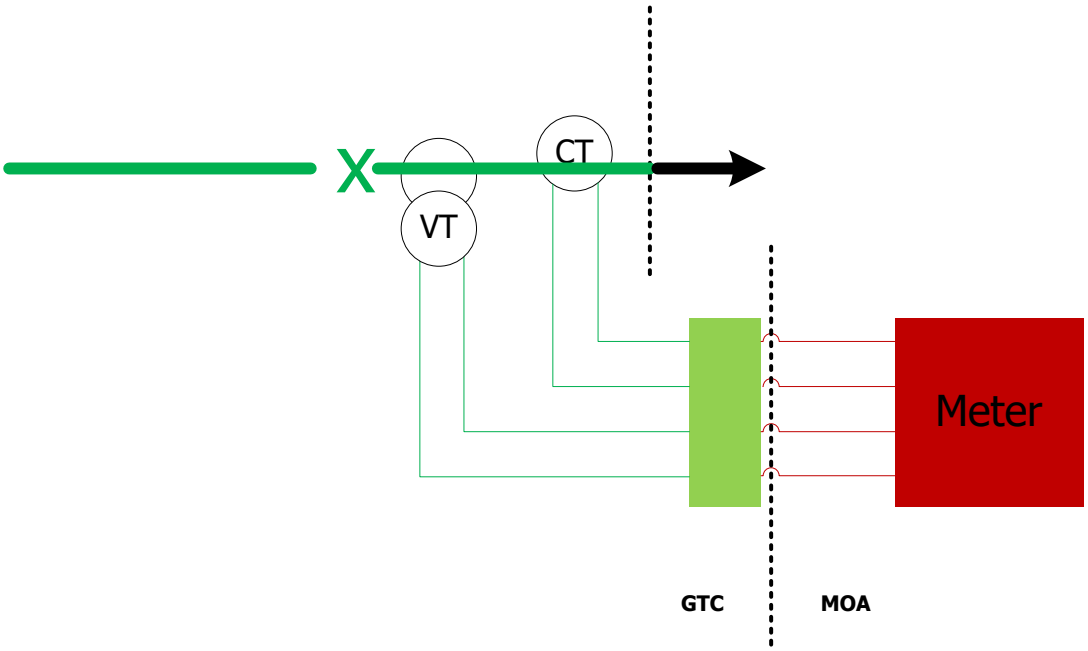
In accordance with BSCP 27, BSC Party members require assurance that Metering Equipment operates within the accuracy limits defined in the appropriate Code of Practice. As part of the process of establishing this assurance, evidence is required of the measurement transformer errors associated with the Metering System. Historically this information is to be provided within 10 working days of the request.

Compliance with BSC Procedure 27 is mandatory.

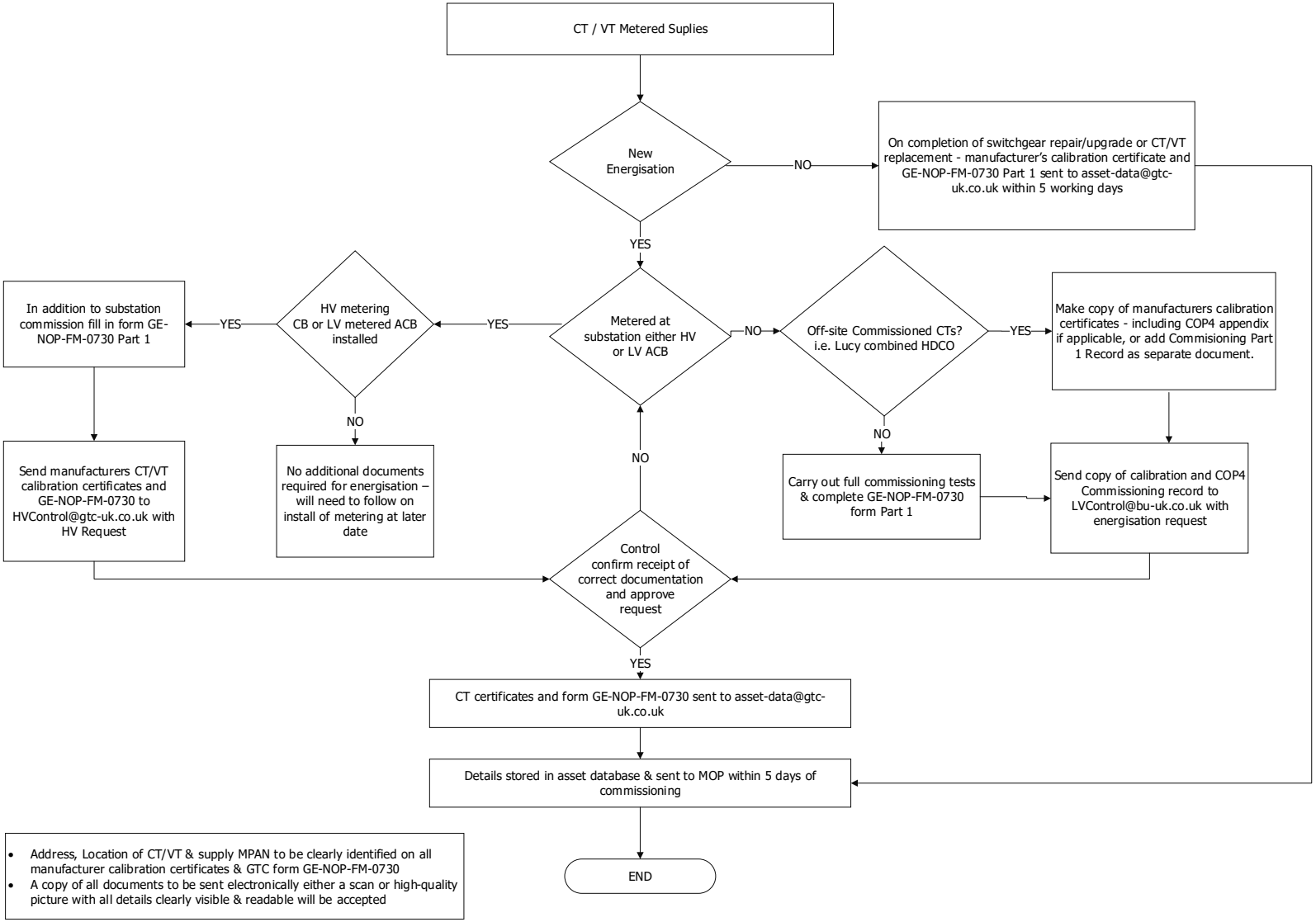
P4 BSC Metering Code of Practice 4 (BSC COP4) Commissioning Records

Requirement directly upon GTC as equipment owner of metering CTs and metering VTs to conduct adequate commissioning tests and to provide the commissioning test results to relevant Meter Operator Agent (MOA) within 5 days of commissioning, where the commissioning is undertaken no later than 16 working days following energisation of the measurement transformers.

CT/VT commissioning test results must be sent to GTC in an electronic file format.



Appendix 1 - Process flow chart



Appendix 2 – example of CT /VT Manufacturer's Certificate with COP 4 Commissioning

Document Title	**CT Metering Chamber – Birth Certificate**	
Document No.	LGL-OLP-PRO-F-08	
Reference Document		
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Lucy Electric

Section 5 Final Assembly

		Tick
1	Ensure all Primary & Neutral Covers for the top and bottom covers are fitted and all labeling fitted to the unit.	✓
2	Ensure all instruction sheets are enclosed.	✓
3	All Kit Parts for the assembly correct to BOM specification enclosed?	✓
4	Enclose any manuals and any other customer related documents as required by the order specification.	✓
5	Enclose a copy of the Test Certificate of metering CT with the unit.	✓
6	Enclose a copy of the Continuity Test Sheet with the unit.	✓
7	Fit Meter security seals **Note: All assembly checks, inspections and tests must have been completed and passed prior to these seals being crimped.**	✓

Section 5 Assembled by (Operator) D.T.George **Date** 27.7.19

Section 6 Pre Release Inspection

This Section to be completed by Team Leader/Supervisor.

		Tick
1	Ensure unit is correct to the works order, Drawing and BOM Specification	✓
2	Ensure all Kit Parts are supplied (if applicable)	✓
3	Ensure CT test certificates and any additional customer specific related documents are enclosed.	✓
4	Ensure all sections of the birth certificate have been fully completed.	✓
5	Ensure all electrical tests have been fully completed.	✓
6	Carry out a visual final inspection of unit.	✓

Unit fully built to BOM / CSD instructions and all relevant testing documentation supplied with birth certificate. All stages within Birth certificate are complete and signed off. Concessions applicable to this unit are available for inspection and are logged on front sheet of birth cert. BOM and CSD Information available for PPA. Unit booked onto Sage and Dispatch labels printed.

Final Inspection Completed by

(Print Name) : D.T.George

Signature: D.T.George **Date** 27.7.19

Document Title	CT Metering Chamber – Birth Certificate	
Document No.	LGL-OLP-PRO-F-08	
Reference Document		
Issue No. 9	Date : 11/02/2019	Page 4 of 6

Section 4 Electrical Testing

Tests to be conducted as described in LGL-QUA-PRO-I-110 and LGL-QUA-PRO-I-111

Note: a copy of the test results are to be supplied with this unit.

All units	**Unit Serial Number**		**CTT1006007**		
	Ratio of CT's fitted (e.g. 400/5)		**400A**		
	CT Serial Numbers	**L1:** 156547/2/035	**L2:** 156547/2/036	**L3:** 156547/2/045	
	Verify CT P1 facing incoming supply (tick)	**L1:** ✓	**L2:** ✓	**L3:** ✓	
	Location of CT's	**Inside CTMC top chamber**			
	Burden (e.g 5VA)	**5VA**			
	Accuracy Class (e.g. 0.5)	**0.5**			
	WPD Specific product information.				**Tick**
	GRP CT PANEL 200A	**E5 Code: 42018**	**THM0043083**		
	GRP CT PANEL 400A	**E5 Code: 42019**	**THM0042170**		
	GRP CT PANEL 600A	**E5 Code: 42020**	**THM0043084**		
	GRP CT PANEL 600A 0.5S	**E5 Code: 62639**	**THM0121892**		

Continuity Testing

Conduct Continuity test between the following points:

		Tick
All units	Fuse Holder Functionality checks - Operate each fuse holder five times before carrying out any electrical tests.	✓
	Test Terminal Block Connections to the CT Connections.	✓
	DIN Rail Connections to the CT Connections.	✓
	Busbar Primary and the Primary and Secondary Fuse Holder.	✓
	Secondary Fuse Holder and the Test Terminal Rail.	✓
	Circuit continuity completed in accordance with LIMS Document LGL-QUA-PRO-I-110-1.	✓

Resistance Test Results

	Main circuit	**L1**	**L2**	**L3**	**Neutral**
All units	HDCO (Point A) to Terminal Block (Point B)	123.0	144.5	81.3	53.9
	HDCO (Point A) to Terminal Block (Point C)	122.4	106.6	87.9	66.3

	Aux Circuit/Test block	**L1**	**L2**	**L3**	**Neutral**
All units	HDCO Top fuse contact to Test Block /Terminal Block Voltage connection(MAX 60mΩ)	...N/A.....	...N/A.....	...N/A.....	...N/A.....
	Note: All recorded results for 400A and 600A units MUST be within acceptance limits (<200 µΩ.) All recorded results for 200A units MUST be within acceptance limits (<350 µΩ.)				Tick ✓

Document Title	CT Metering Chamber – Birth Certificate	
Document No.	LGL-OLP-PRO-F-08	
Reference Document		
Issue No. 9	Date : 11/02/2019	Page 5 of 6

CoP4 only	CT secondary resistance	L1	L2	L3
	DC resistance	0.2 Ω	0.2 Ω	0.2 Ω
	Wiring not crossed (tick)	✓	✓	✓

CoP4 only	Insulation Resistance Tests (Megger test at 1kV DC)			
	Busbars and Voltage connections	L1-E: > 200 GΩ	L2-E: >200 GΩ	L3-E: >200 GΩ
		L1-L2: >200 GΩ	L2-L3: >200 GΩ	L3-L1: >200 GΩ
	Expected results to be greater than 200MΩ			

CT Polarity Test:

		Tick
All units	CTs tested and confirmed to be facing the same direction - no polarity errors	✓

CT Ratio Tests

CoP4 only		L1	L2	L3
	Primary (input) current	100.7 A	100.7 A	100.4 A
	Secondary (output) current	1.2 A	1.2 A	1.2 A
	Calculated ratio (Primary A/ secondary A)	83.9	83.9	83.6

Wiring checks after test, any disconnections refitted

CoP4 only		L1	L2	L3	N
	Colour of voltage wiring (tick)	Brown ✓	Black ✓	Grey ✓	Blue ✓
	Colour of CT secondary wiring (tick)	Brown ✓	Black ✓	Grey ✓	Blue N/A
	Colour of test terminal wiring (tick)	Brown ✓	Black ✓	Grey ✓	Blue ✓
	Test block terminals (tick each)	T1 T2 T3 T10	T4 T5 T6 T11	T7 T8 T9 T12	T13

Copy of Section 4 (Electrical testing) and CT calibration charts included in package	✓

Tested by (Print name): D.J. FORDE Sign D.J. Forde Date: 22.7.19

Company Name:	LUCY ELECTRIC UK LTD
Company Address:	
Order Number:	

OMICRON

General test information: Date/Time: 2019-06-10, 08:16:57

Test device:	CT-Analyzer	Device Serial No.:	LF498J
File name:	C:\Users\Howard Butler\Documents\OMICRON\CTAnalyzer\RemoteEFL\TEMP\XMLData(1).xml		
Assessments:	OK		

Used test settings:

I-pn:	400.0 A	Location:		Object:	
I-sn:	5.0 A	Company:		Manufacturer:	HOBUT
Rated burden:	5.0 VA / 0.8	Country:		Type:	CT164DM
Operating burden:	5.0 VA / 0.8	Station:		Serial number:	156547/2/035
Applied standard:	IEC 61869-2	Feeder/Bay:		Core number:	
Core type (P/M):	M	Phase:		Tap:	
Class:	0.5	IEC-ID		Optional:	
FS: 5.0	ext (lctn): 120 %				
f: 50.0 Hz	max. Rct: 0.159 Ω				

Resistance test:

Rmeas (20°C):	0.1311 Ω
Rref (75°C):	0.15944 Ω

Burden test:

Burden:	cos φ:	Z:
Vmeas:	Imeas:	

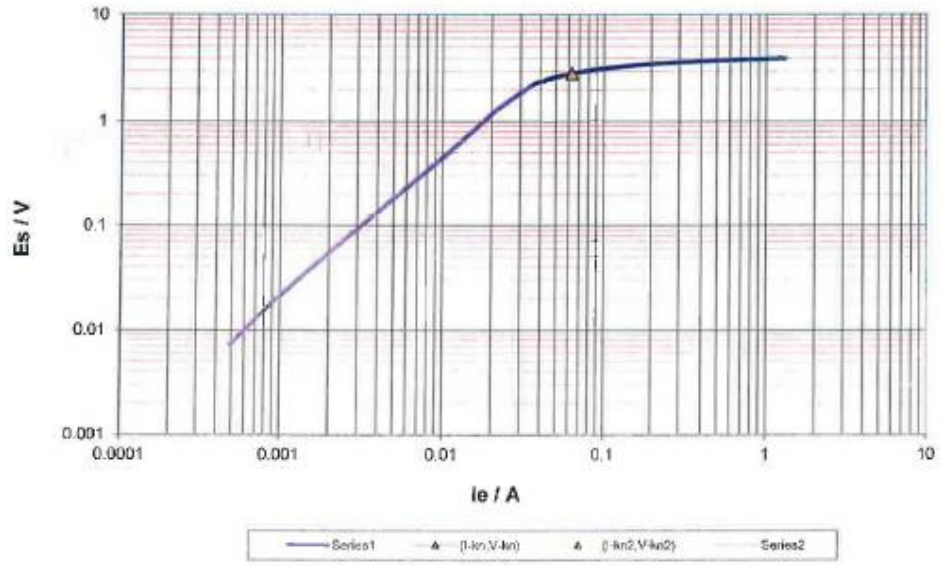
Excitation test:

V-kn:	2.864 V	I-kn:	0.06271 A	Result with rated burden:			Result with operating burden:		
V-kn 2:	#N/A	I-kn 2:	#N/A	FS:	>2.38580925	FSi: 2.32	FS:	>2.38580925	FSi: 2.32
Ls:	0.0002241H	Lm:	0.1996H	Ts:	0.625s		Ts:	0.625s	
Kr:	76.74 %								

Ratio test:

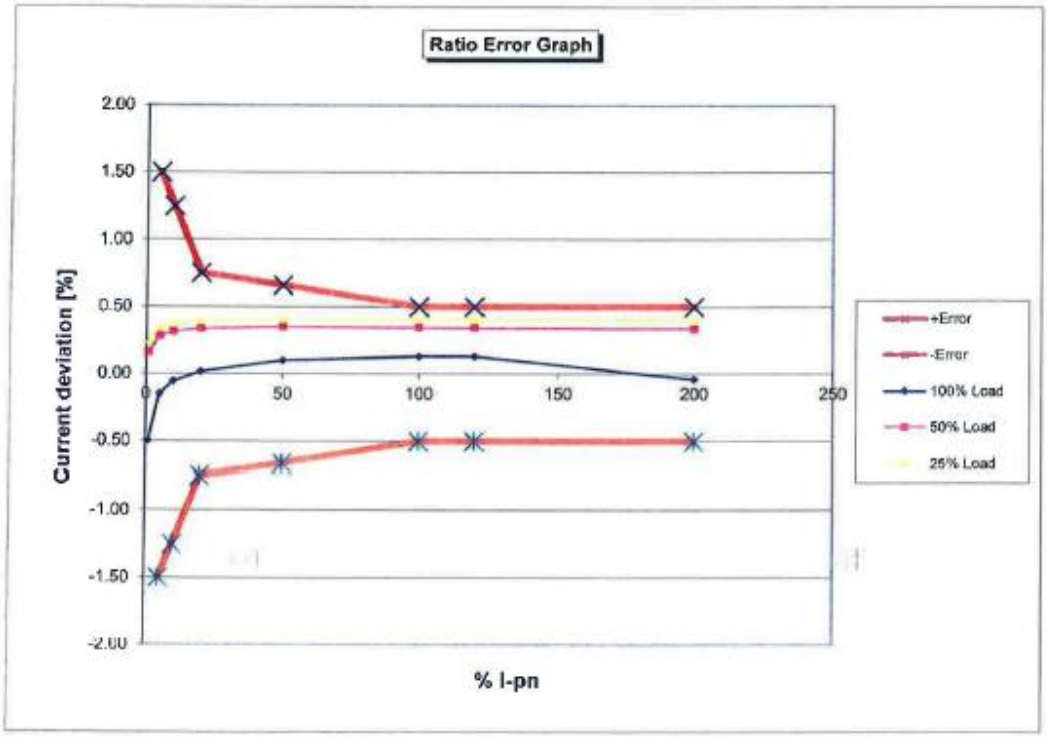
Ratio:	400.0 : 5.00656	ε:	0.1311 %	Δφ:	5.96 min	Polarity:	OK	N:	79.50
		ε_S:	0.222 %				

Excitation curve data



	Current ratio error in % at % of rated current							
VA/cosPhi	1	5	10	20	50	100	120	200
5 VA/ 0.8	-0.499	-0.147	-0.055	0.016	0.099	0.131	0.132	-0.040
2.5 VA/ 1	0.157	0.282	0.313	0.332	0.347	0.343	0.340	0.336
1.25 VA/ 1	0.247	0.345	0.374	0.392	0.405	0.408	0.406	0.400
1 VA/ 1	0.264	0.358	0.386	0.404	0.417	0.420	0.419	0.413
VA/								

	Phase displacement in [min] at % rated current							
VA/cosPhi	1	5	10	20	50	100	120	200
5 VA/ 0.8	39.654	24.059	19.574	15.448	9.785	5.954	5.618	16.851
2.5 VA/ 1	41.980	25.800	21.518	17.896	13.353	9.657	8.953	9.077
1.25 VA/ 1	36.102	21.616	17.967	15.000	11.462	8.586	7.822	6.767
1 VA/ 1	34.845	20.740	17.238	14.388	11.032	8.344	7.606	6.449
VA/								



Company Name:	LUCY ELECTRIC UK LTD
Company Address:	
Order Number:	

OMICRON

General test information:

Date/Time: 2019-06-10, 08:15:52

Test device:	CT-Analyzer	Device Serial No.:	PC019N
File name:	C:\Users\Howard Butler\Documents\OMICRON\CTAnalyzer\RemoteEFL\TEMP\XMLData(1).xml		
Assessments:	OK		

Used test settings:

I-pn:	400.0 A		Location:	Object:	
I-sn:	5.0 A		Company:	Manufacturer:	HOBUT
Rated burden:	5.0 VA / 0.8		Country:	Type:	CT164DM
Operating burden:	5.0 VA / 0.8		Station:	Serial number:	156547/2/036
Applied standard:	IEC 61869-2		Feeder/Bay:	Core number:	
Core type (P/M):	M		Phase:	Tap:	
Class:	0.5		IEC-ID	Optional:	
FS: 5.0	ext (Icth): 120 %				
f: 50.0 Hz	max. Rct: 0.159 Ω				

Resistance test:

Rmeas (20°C):	0.13109 Ω
Rref (75°C):	0.15943 Ω

Burden test:

Burden:	cos φ:	Z:
Vmeas:	Imeas:	

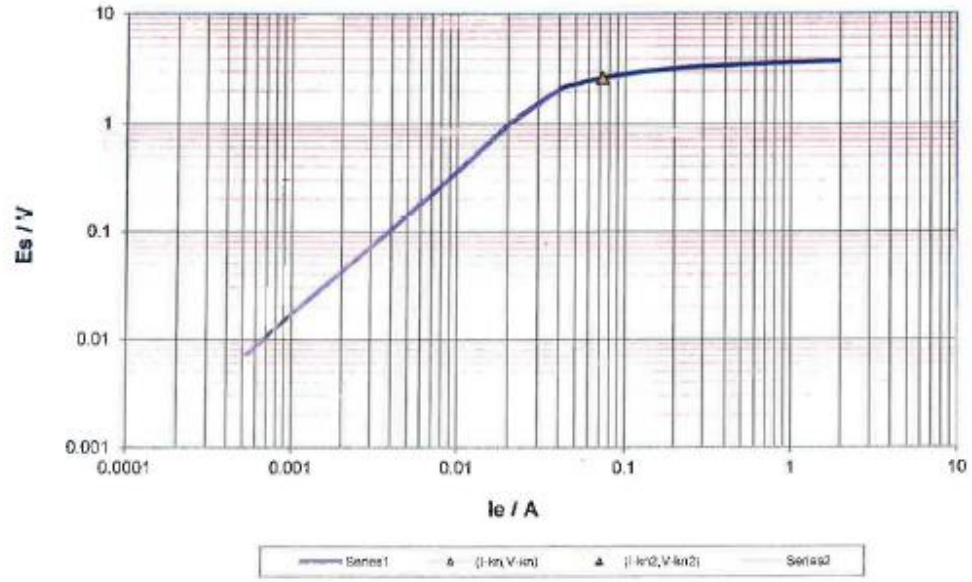
Excitation test:

V-kn:	2.672 V	I-kn:	0.072645 A	Result with rated burden:			Result with operating burden:		
V-kn 2:	#N/A	I-kn 2:	#N/A	FS:	>2.2836415	FSi: 2.15	FS:	>2.2836415	FSi: 2.15
Ls:	0.0001204H	Lm:	0.1625H	Ts:	0.509s		Ts:	0.509s	
Kr:	76.41 %								

Ratio test:

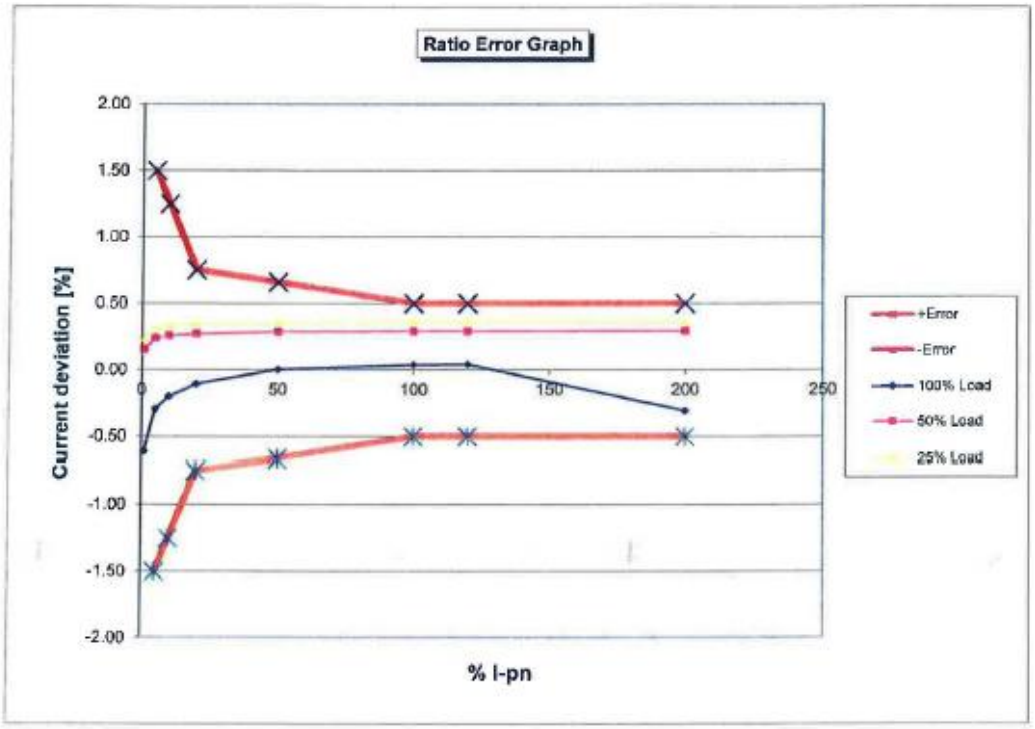
Ratio:	400.0 : 5.00192	ε:	0.0384 %	Δφ:	7.67 min	Polarity:	OK	N:	79.50
		εc:	0.2551 %				

Excitation curve data



	Current ratio error in % at % of rated current							
VA/cosPhi	1	5	10	20	50	100	120	200
5 VA/ 0.8	-0.610	-0.295	-0.202	-0.108	0.002	0.038	0.041	-0.307
2.5 VA/ 1	0.150	0.237	0.255	0.269	0.284	0.290	0.290	0.294
1.25 VA/ 1	0.239	0.317	0.332	0.342	0.355	0.362	0.363	0.362
1 VA/ 1	0.257	0.333	0.347	0.356	0.370	0.377	0.378	0.377
VA/								

	Phase displacement in [min] at % rated current							
VA/cosPhi	1	5	10	20	50	100	120	200
5 VA/ 0.8	47.667	30.315	23.895	18.206	10.355	7.669	7.258	31.252
2.5 VA/ 1	48.042	31.983	26.504	21.553	15.180	11.318	11.058	12.499
1.25 VA/ 1	40.365	26.696	22.245	18.206	13.251	9.512	8.940	8.335
1 VA/ 1	38.755	25.589	21.350	17.494	12.815	9.256	8.503	7.947
VA/								



Company Name:	LUCY ELECTRIC UK LTD
Company Address:	
Order Number:	

OMICRON

General test information: Date/Time: 2019-06-10, 08:24:41

Test device:	CT-Analyzer	Device Serial No.:	PC019N
File name:	C:\Users\Howard Butler\Documents\OMICRON\CTAnalyzer\RemoteEFL\TEMP\XMLData(1).xml		
Assessments:	OK		

Used test settings:

I-pn:	400.0 A		Location:		Object:
I-sn:	5.0 A		Company:	Manufacturer:	HOBUT
Rated burden:	5.0 VA / 0.8		Country:	Type:	CT164DM
Operating burden:	5.0 VA / 0.8		Station:	Serial number:	156547/2/045
Applied standard:	IEC 61869-2		Feeder/Bay:	Core number:	
Core type (P/M):	M		Phase:	Tap:	
Class:	0.5		IEC-ID	Optional:	
FS: 5.0	ext (Icth): 120 %				
f: 50.0 Hz	max. Rct: 0.162 Ω				

Resistance test:

Rmeas (20°C):	0.13304 Ω
Rref (75°C):	0.16179 Ω

Burden test:

Burden:		cos φ:	Z:
Vmeas:		Imeas:	

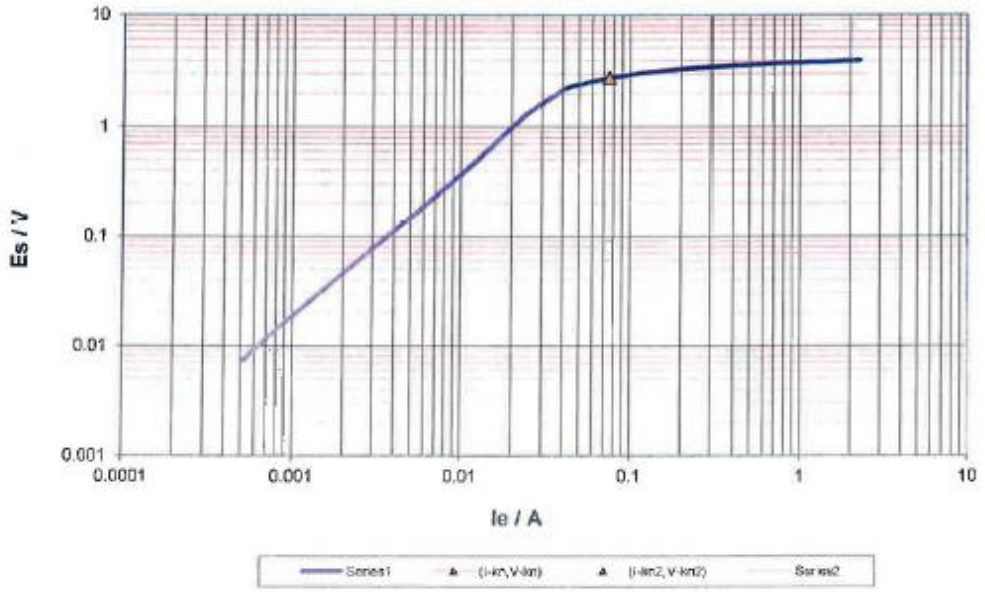
Excitation test:

V-kn:	2.786 V	I-kn:	0.075067 A	Result with rated burden:			Result with operating burden:		
V-kn 2:	#N/A	I-kn 2:	#N/A	FS:	2.4	FSi: 2.25	FS:	2.4	FSi: 2.25
Ls:	0.0001037H	Lm:	0.1765H	Ts:	0.548s		Ts:	0.548s	
Kr:	72.5 %								

Ratio test:

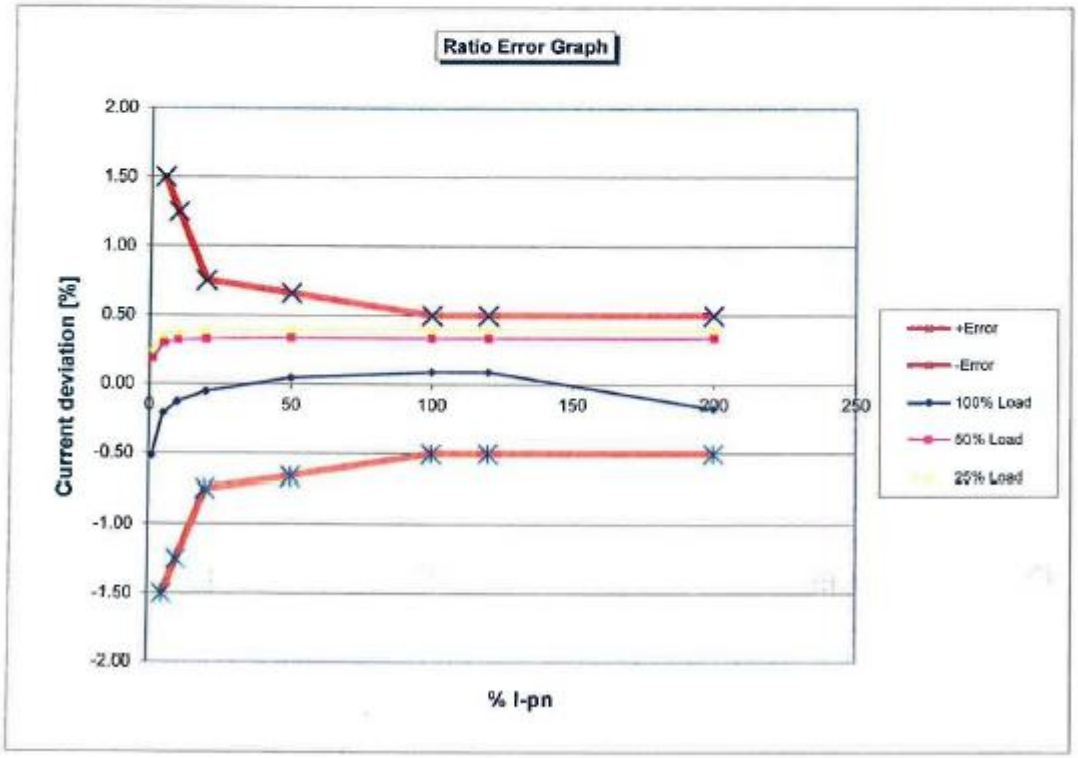
Ratio:	400.0 : 5.00444	ε :	0.0888 %	Δφ:	8.16 min	Polarity:	OK	N:	79.49
		εc :	0.2804 %				

Excitation curve data



	Current ratio error in % at % of rated current							
VA/cosPhi	1	5	10	20	50	100	120	200
5 VA/ 0.8	-0.518	-0.209	-0.125	-0.054	0.046	0.089	0.090	-0.175
2.5 VA/ 1	0.184	0.293	0.315	0.323	0.332	0.332	0.330	0.333
1.25 VA/ 1	0.263	0.361	0.380	0.390	0.395	0.400	0.399	0.398
1 VA/ 1	0.279	0.374	0.394	0.403	0.409	0.414	0.412	0.411
VA/								

	Phase displacement in [min] at % rated current							
VA/cosPhi	1	5	10	20	50	100	120	200
5 VA/ 0.8	44.695	29.959	24.751	19.483	12.232	8.162	8.126	26.746
2.5 VA/ 1	45.176	30.652	26.102	21.833	16.038	11.547	10.872	12.028
1.25 VA/ 1	38.199	25.443	21.716	18.327	13.862	10.255	9.353	8.504
1 VA/ 1	36.734	24.361	20.803	17.588	13.365	9.974	9.091	8.049
VA/								



Document Title	CT Metering Chamber Electrical Tests (Including COP4 requirements)	
Document No.	LGL-QUA-PRO-I-111	
Reference Document	QMS	
Issue No. 6	Date : 03/12/2018	Page 1 of 4

Appendix: Pre-Commissioning Test Sheets
COP4 Testing

Document Title	CT Metering Chamber Electrical Tests (Including COP4 requirements)	
Document No.	LGL-QUA-PRO-I-111	
Reference Document	QMS	
Issue No. 6	Date : 03/12/2018	Page 2 of 4

PRE-COMMISSIONING TEST RESULTS - SHEET 1

Serial No: CTT1006007

Details

Current Transformer	**L1**	**L2**	**L3**
Location of CTs	HDCO	HDCO	HDCO
Serial Number	156547/2/035	156547/2/036	156547/2/045
Burden	5VA	5VA	5VA
Accuracy Class	0.5	0.5	0.5
Make	Lucy	Lucy	Lucy
Type	Bar Primary	Bar Primary	Bar Primary
Available Ratios (in Amps)	400/5	400/5	400/5
Ratio Selected (in Amps)	400/5	400/5	400/5
CT P1 facing Supply System?	YES ☑ NO ☐	YES ☑ NO ☐	YES ☑ NO ☐

Voltage Transformer *(if applicable)*	**Feeder L1**	**Feeder L2**	**Feeder L3**
Location of VT			
Serial Number			
Burden			
Accuracy Class			
Make			
Type			
Available Ratios (in Volts)			
Ratio Selected (in Volts)			

L1 CT associated with L1 voltage?	Yes ☐	No ☐
L2 CT associated with L2 voltage?	Yes ☐	No ☐
L3 CT associated with L3 voltage?	Yes ☐	No ☐
Standard Phase sequence at Testing Facility (L1,L2,L3)?	Yes ☐	No ☐
CT shorting links left closed?	Yes ☑	No ☐
CTs and VTs Calibration Record attached?	Yes ☑	No ☐

PRE-COMMISSIONING TEST RESULTS - SHEET 2

PREPARED BY:G Whelan APPROVED BY: C Conlon DATE: 03/12/18

Document Title	CT Metering Chamber Electrical Tests (Including COP4 requirements)	
Document No.	LGL-QUA-PRO-I-111	
Reference Document	QMS	
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Primary Injection Tests

Instrument Used:	Primary injection & Clamp meter
Include description and serial numbers:	T & R 200 ADM-P (CIS005) FLUKE 375 (CLA 001)
Calibration expiry dates:	8/2/2020 8/2/2020

	L1	L2	L3
Primary Current measured (A)	100.7	100.7	100.4
Secondary Current measured *(High Ratio)*	1.2	1.2	1.2
Secondary Current measured *(Middle Ratio)*			
Secondary Current measured *(Low Ratio)*			
Ratio Calculation *(High Ratio).* *Primary A/Secondary A = Ratio*	83.9	83.9	83.6
Ratio Calculation *(Middle Ratio)* *Primary A/Secondary A = Ratio*			
Ratio Calculation *(Middle Ratio)* *Primary A/Secondary A = Ratio*			

Prevailing Load Tests *(Metering Installer only)*

Instrument Used:			
Include description and serial numbers:			
Calibration expiry dates:			
	L1	**L2**	**L3**
Primary Measurement			
Secondary Measurement			
Ratio Calculation			

CT Polarity Verification

Description of test performed: D C flick test	
e.g. verification with known standard CT (Buck and Boost tests); CT flick test using Galvanometer & DC source; or specialist CT test device (Omicron CT Analyzer – specify details)	
Instrument Used: 9VA Battery A & M (AMM01)	
Calibration expiry dates: 5/2/2020	
All tests performed and are correct	Yes ☑ No ☐

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PRE-COMMISSIONING TEST RESULTS - SHEET 3

DC Insulation & Circuit Resistance Checks

	L1	L2	L3
DC Resistance of CT secondary	0·2 Ω	0·2 Ω	0·2 Ω
Voltage wiring OK(Not crossed). Tick	[✓]	[✓]	[✓]
Insulation Resistance of Busbars & Voltage connections	L1-E >200 GΩ	L2-E >200 GΩ	L3-E >200 GΩ
	L1-L2 >200 GΩ	L2-L3 >200 GΩ	L3-L1 >200 GΩ
Insulation resistance to Earth of CT secondary	70 GΩ		
CT secondary circuit confirmed earthed	[✓]	[✓]	[✓]

Wiring Checks (according to build diagram)

	L1	L2	L3	N
Colour of Voltage Wiring	Brown [✓]	Black [✓]	Grey [✓]	Blue [✓]
Colour of CT secondary Wiring	Brown [✓]	Black [✓]	Grey [✓]	
Colour of Test Terminal Wiring	Brown T1 [ ] T2 [ ] T3 [ ] T10 [ ]	Black T4 [ ] T5 [ ] T6 [ ] T11 [ ]	Grey T7 [ ] T8 [ ] T9 [ ] T12 [ ]	Blue T13 [ ]

Main Circuit DC Resistance Checks

	L1	L2	L3	N
HDCO incomer to top outgoer (points A-B) in LIMS procedure	123·0	144·5	81·3	53·9
HDCO incomer to top outgoer (points A-C) in LIMS procedure	122·4	106·6	87·9	66·3

Aux Voltage Circuit DC Resistance Checks

	L1	L2	L3	N
HDCO top fuse contact to test block terminal (MAX 60mOhm)	N/A mΩ	N/A mΩ	N/A mΩ	N/A mΩ

TESTED BY:	D. J. Ganyo	Date	27.7.19

PREPARED BY:G Whelan APPROVED BY: C Conlon DATE: 03/12/18