Harlaxton
Energy Networks Limited

Commissioning of Distribution Business Provided Metering Facilities

Summary

This standard technique document details the tests to be undertaken and the test results and test certificates to be provided by the distribution business in order to enable the accurate measurement of electricity transfers at defined metering points.

Impact

This policy is relevant to all staff who are involved with the planning, design, installation, commissioning and modification of customer connections where instrument transformer operating metering is employed.

The policy is also relevant to Independent Connection Providers (ICP's).

Implementation Actions

Managers should notify staff of this policy and brief them on its requirements.

Implementation Timetable

This policy shall be implemented with immediate effect.

Implementation date: November 2018

Approved by: Lucy Mair

Date: 19th November 2018

DOCUMENT REVISISON AND REVIEW TABLE		
Date	**Comments**	**Author**
Feb 2016	Initial Implementation	Hayley Connors
Nov 2016	Inclusion of P283 Timetable	Hayley Connors
Oct 2017	Annual Review	Hayley Connors
Nov 2018	Inclusion of Industry Changes – CP1496 and CP1497	Hayley Connors
Oct 2019	Annual Review	Hayley Noon
Sep 2020	Annual Review	Hayley Noon

Contents

IMPLEMENTATION PLAN 5

Introduction 5

Implementation Actions 5

Definitions 6

Introduction 7

Requirements 9

General 9

Test Certificates 9

Test Equipment and Instruments 9

Inspections and Tests 9

Commissioning Tests 11

Off-Load Testing 12

On-Load Testing 12

Commissioning Report 12

Commissioning Report Check and Approval / Rejection 13

Remedial Actions Following "Commissioning Report" Rejection 13

Notification of Commissioning Information 13

Remedial Actions Following Escalation by the Registrant (Supplier) 14

Metering Labels 14

Asset Database Records 14

Responsibilities 15

Contestable Connections 15

Commissioning Timescales 16

Commissioning Timescales 19

Test Sheets 19

IMPLEMENTATION PLAN

Introduction

This standard technique document details the tests to be undertaken by the distribution business and the test results and test certificates to be provided to the Meter Operator (MOP), at customer connections where instrument transformer (i.e. CT and VT) operated metering systems are employed. By ensuring the commissioning process is completed correctly, parties can be assured that the data submitted for Settlement purposes is accurate. This reduces the probability of trading disputes arising from the use of inaccurate data.

This Standard Technique is relevant to all staff who are involved with the planning, costing, sign, installation, testing and modification of customer connections where instrument transformer operated metering is employed.

This Standard Technique is also relevant to Independent Connection Providers.

Implementation Actions

Mangers should notify relevant staff that this Standard Technique has been revised and brief them on the changes.

This revised Standard Technique shall be implemented with effect from Monday 19th November 2018.

Definitions

CT	Current transformer.
Commissioning	A process to ensure that the energy flowing across a defined metering point is accurately recorded by the associated metering system.
Commissioning Report	A convenient label for the collection of the following documents: - Metering CT test certificates - Metering VT test certificates - Test sheets
ICP	Independent Connection Provider.
MOP	Meter Operator. An agent of the Registrant who has overall responsibility for the commissioning of the metering system. Also known as a Meter Operator Agent (MOA).
Test Certificate	A certificate provided by the manufacturer which identifies the magnitude and phase displacement errors in the metering CT or VT. Also known as calibration certificate, error certificate or test certificate.
Test Terminal Block	The facilities provided close to the meter which enable such meters to be routinely tested. Sometimes referred to as the Test Facilities.
VT	Voltage transformer.
HEN	Harlaxton Energy Networks Limited.

Introduction

The responsibility for the commissioning of the overall Metering System lies with the Registrant of the Metering System (usually the Supplier). However, responsibility for the commissioning of specific items of Metering Equipment lies with the Registrants appointed Meter Operator (MOP) or the Licensed Distribution System Operator (LDSO), dependent on the type of Metering Equipment and the ownership of the Metering Equipment. Where a measurement transformer is owned by a Balancing and Settlement Code (BSC) Party, the owning BSC Party shall be responsible for its Commissioning up to, and including, the testing facilities. The MOA in this case would be responsible for Commissioning the remainder of the Metering System. Where a measurement transformer is not owned by a BSC Party, the Registrant, (via its appointed MOP), shall be responsible for the Commissioning of all the metering equipment within the Metering System, including the measurement transformer.

The commissioning obligations were last modified on:

- 1st November 2018 with the introduction of data flows for exchanging commissioning information and for escalating a deficiency or omission (CP1496).
- 1st November 2018 with the allowing of off-site commissioning of current transformers (CTs) preinstalled in cut outs or switchgear at manufacture for use in low voltage (LV) installations. (CP1505).

Guidance

Settlement Metering comes under the auspices of the Balancing and Settlement Code. There are a number of associated Codes of Practice and Code of Practice 4 (COP 4) specifies the requirements for the calibration, sample calibration and commissioning of metering equipment and the maintaining of associated records.

Compliance with the Balancing and Settlement Code is a condition of HEN's Distribution Licence (Licence Condition 20).

In the event of an inconsistency between the requirements contained within this document and the Balancing and Settlement Code and its associated Code of Practice 4, the provisions of the Code and the associated Code of Practice shall prevail.

This Standard Technique document details the inspections and tests to be undertaken by the distribution business and by Independent Connections Providers in order to satisfy the metering Code of Practice 4 requirements.

It applies:

- To all new (i.e. commissioned on or after 06/11/2014) instrument transformer operated metering systems.
- To any existing (i.e. in commission prior to 06/11/2014) instrument transformer operated metering systems in the event of changing:

- An instrument transformer, or
- The connected ratio on a multi-ratio instrument transformer, or
- The connections between an instrument transformer and the test terminal block

- Only where HEN owns or is to adopt the metering instrument transformers.
- Only to metering systems employed for settlement purposes.

It does not apply:

- To existing instrument transformer operated metering systems (until they are modified)
- Where the metering instrument transformers are owned by a third party, for example, the customer, another distribution network operator (DNO) or the transmission network operator (National Grid).
- Where metering is not used for settlement purposes.

Harlaxton Energy Networks Limited are responsible for commissioning the following distribution owned metering assets:

- LV Combined Cut-out, CT & Meter Cabinet #
- LV CT & Meter Cabinet (Separate Cut-out) where it has been supplied by the manufacturer with CTs pre-fitted #
- LV Intake CB & Remote Meter Cabinet where the cabinet is 'plug-in' type
- HV Metering Unit & Remote Meter Cabinet where the cabinet is a 'plug-in' type

#Except where installed by an ICP and adopted by HEN, in which case testing is a contestable activity.

Requirements

General

Where metering instrument transformers are owned or are to be adopted by HEN then the inspections and tests described in the section labelled 'Inspections and Test' shall be performed up to and including the Test Terminal Block. The tests shall be completed at the earliest opportunity but no later than 16 working days after energisation of the customer's installation.

In addition, the following actions must be completed at the earliest opportunity, but no later than 5 working days after completion of the inspection and test:

- A "Commissioning Report" in accordance with the section 'Commissioning report' shall be prepared.
- A "Notification of Commissioning Information" dataflow shall be sent to the appointed MOP.

Test Certificates

Test certificates are supplied by the manufacturer of the metering CT's / VT's.

Copies of metering CT and VT test Certificates shall be obtained from the manufacturer at the earliest convenience but no later than 3 working days after completion of the inspections and test.

The metering CT and VT Test Certificates shall be retained for the life if the associated metering CT's / VT's.

Guidance

Test certificates are sometimes incorporated into the "Birth Certificate" information provided by the manufacturer.

Test Equipment and Instruments

All test equipment and instruments used during commissioning shall be suitable for the application intended and have been commercially manufactured.

All test equipment and instruments shall have been calibrated / re-calibrated within the last 24 months (and preferably within the last 12 months).

Calibration shall comprise checking for compliance with the published specification at appropriate points, using working standards which are periodically verified and which are traceable to National Standards.

Inspections and Tests

Inspections and tests shall be carried out for the purpose of verifying and recording:

- That the current transformers are of the correct ratio and polarity and correctly located to record the required power flow;

- The voltage transformers are the correct ratio and polarity and correctly located to record the required power flow;
- The relationships between voltages and currents are correct and that phase rotation is standard at the Meter terminals;
- The burdens on the measurement transformers are within the correct limits;
- The Meters are set to the same current transformer and voltage transformer ratios as the installed measurement transformers;
- The Meters have the correct Compensation for errors in the measurement; transformers/connections and losses in power transformers where appropriate;
- The output of the Metering System correctly records the energy in the primary system at the Defined Metering Point;
- The Metering Equipment detects phase failure and operates the required alarms.

Where individual items of Metering Equipment are to be replaced then only those items are required to be commissioned. For clarification Metering Systems in their entirety need not to be re-Commissioned when items are replaced within that system.

Guidance

Phase rotation must be standard on both the test block terminals and on the terminals at which the supply is delivered to the customer's installation.

The inspections and tests are split into three parts, namely, pre-energisation tests, energisation tests and post energisation tests.

- Pre-energisation tests are normally carried out off-site prior to installation, for example, at the HEN depot. However, they may alternatively be carried out on-site when the metering asset has been fully installed.
- Energisation tests are carried out on-site when the metering asset has been fully installed and the incoming service cable has been energised, but with the customer's installation off-load.
- Post energisation tests are carried out on site with the customer's installation energised and on load.

Pre-energisation tests, energisation tests, and post-energisation tests shall be completed for each metering asset as per the following table:

ASSET	PRE ENERGISATION TESTS	ENERGISATION TESTS	POST ENERGISATION TESTS
LV Combined Cut-out, CT & Meter Cabinet	Yes	Yes	No
LV CT & Meter Cabinet (Separate Cut-out) supplied with manufacturer fitted CTs	Yes	Yes	No
LV CT & Meter Cabinet (Separate Cut-out) supplied without manufacturer fitted CTs	No	No	Yes
LV Intake Circuit Breaker with a 'plug-in' remote meter cabinet	Yes	Yes	No
LV Intake Circuit Breaker without a 'plug-in' remote meter cabinet	No	No	Yes
HV Metering Unit with a 'plug-in' remote meter cabinet	Yes	Yes	No
HV Metering Unit without a 'plug-in' remote meter cabinet	No	No	Yes
HV Metering Circuit Breakers	No	No	Yes
EHV Metering Circuit Breakers	No	No	Yes
66kV Metering Circuit Breakers	No	No	Yes
132kV Metering Circuit Breakers	No	No	Yes
25kV Metering Circuit Breakers	No	No	Yes

Pre-energisation tests, energisation tests, and post-energisation tests shall be carried out in accordance with the 'Test Sheets' section of this document.

A copy of the completed test sheets shall be recorded on internal systems at the earliest convenience, but no later than 3 working days after completion of the associated inspection and tests.

The test sheets shall be retained for the life of the associated metering CT's / VT's.

Commissioning Tests

Whilst Commissioning tests are required, it is not always practical or convenient for these to be completed 'on site' where the Metering Equipment is used in low voltage (LV) installations. This is the case for current transformers (CTs) preinstalled in cut outs or switchgear at the manufacturer.

In some installations for example, CTs are delivered in sealed units and have already been tested (and certain requirements of CoP4 confirmed) by the manufacturer 'off site' (i.e. in the factory). In these instances it may not be cost effective or necessary to complete all Commissioning tests 'on site', as elements of accuracy, such as ratios and polarity will have been confirmed at manufacture. Furthermore,

it may not be practicable to perform tests on site as the sealed design of the equipment prevents tampering of the transformers between manufacture and delivery for connection. For this reason it may not be physically possible to access the CTs prior to energisation (the preferred Commissioning test method for LV connections of this type) and so meaningful Commissioning tests cannot be completed easily 'on site'.

For High Voltage (HV) and Extra HV (EHV) Metering Equipment, multi-ratio CTs may be used. Therefore 'on site' Commissioning tests are necessary to confirm the correct configuration of the equipment.

Off-Load Testing

Off-load tests are those that are performed with the primary equipment off-load and include verifying and recording:

- That metering instrument transformers are correctly located (in relation to the defined metering point) to record the required power flow
- That metering instrument transformers are of the correct ratio, phase and polarity
- The burden on the metering instrument transformers up to and including the test terminal block

A copy of the completed off-load test sheet shall be included within the commissioning file held by HEN.

On-Load Testing

On-load tests are those that are performed with the primary equipment carrying load current and include verifying and recording:

- That metering instrument transformers are of the correct ratio
- That the relationship between voltages and currents is correct
- That the meter has been programmed with the correct CT and VT ratio

A copy of the completed on-load test sheet will be included within the commissioning file held by HEN.

Commissioning Report

A "commissioning report" shall be prepared which shall contain, as a minimum and where applicable, the following information.

- Site name
- Site address
- MPAN (where relevant)
- Supply/ Feeder number (where there is more than one)
- Date of commissioning
- Name of person responsible for undertaking the commissioning
- A copy of metering CT test certificates
- A copy of metering VT test certificates (where relevant)
- A copy of the completed pre-energisation, energisation, and post energisation test sheets (as appropriate)
- A copy of the completed off-load test sheet

- A copy of the on load test sheet
- Reason for commissioning

Guidance

The "commissioning report" is not an actual document but a collection of test certificates and test sheets which incorporate the metering CT and VT asset attributes and test result data.

'Supply / feeder number' is applicable at premises where the customer has multiple connections at the HEN network and a unique MPAN (or import / export MPAN pair) has not been assigned to each connection i.e. the MPAN is shared by the multiple connections. The supply / feeder number is the means by which each separate connection to the customer is identified. Note that it does not mean the distribution substation feeder number that the customer is connected to.

Commissioning Report Check and Approval / Rejection

The "commissioning report" shall be checked to ensure that all applicable test sheets and CT/VT test certificates are present and that no blank pages, blank forms, partially completed forms or other spurious documents have been collected instead.

The "commissioning report" shall only be approved where all applicable information is present and correct.

The check and approval / rejection shall be competed no later than one working day after receiving the "commissioning report" for approval.

Remedial Actions Following "Commissioning Report" Rejection

In the event of the "commissioning report" being rejected the relevant team shall be automatically notified. The notification shall include the reason for the rejection.

Remedial actions must be completed by the relevant team without delay if non-conformance with the Balancing and Settlement Code timescales is to be avoided.

Notification of Commissioning Information

Salient data from the commissioning report shall be sent automatically to the appointed Meter Operator following its approval. The data shall be sent using dataflow D0383.

Guidance

The Meter Operator commissions the meter and receives the data from HEN about the metering CT and VT commissioning.

The Meter Operator reviews all the data and informs the Registrant (i.e. the Supplier) of the commissioning status i.e. whether commissioning of the meter and metering CT's and VT's have been completed satisfactorily. Where this is not the case, the MOP provides the Supplier with details of the

deficiency / omission and the level of risk it represents to the settlement process.

Remedial Actions Following Escalation by the Registrant (Supplier)

Where the Registrant (Supplier) is notified of a deficiency or omission relating to HEN's commissioning of the metering CT's and VT's it will escalate the matter to HEN using dataflow D0384.

Remedial actions must be completed by the relevant team promptly. Deficiency / omission resolution must be communicated to the Supplier. All responses shall be provided using dataflow D0384.

Metering Labels

A metering label shall be provided at each metering point in order to furnish relevant instrument transformer data to the meter operator, BSC Technical Assurance Agent and any other relevant party.

Asset Database Records

The "Metering Details" page in HEN's Asset Database shall be updated with the "as commissioned" CT and VT details. This information is used on dataflows to Suppliers / Meter Operators and must be accurate.

Independent Connection Providers (ICP)

Where an Independent Connection provider (ICP) offers up metering CT's and VT's for adoption the ICP is responsible for:

a) Obtaining metering CT and VT test certificates from the manufacturer
b) Providing HEN with copies of the metering CT and VT test certificates
c) Carrying out pre-energisation tests specified in the 'inspections and tests' section above on LV combined cut-out, CT and meter cabinet and LV CT and meter cabinet (separate cut-out) installations only and completing a paper copy of the relevant pre-energisation test sheets.
d) Carrying out energisation tests specified in the 'inspections and tests' section above on LV combined cut-out, CT and meter cabinet and LV CT and Meter Cabinet (separate cut-out) installations only and completing a paper copy of the relevant energisation test sheets.
e) Providing HEN with copies of the completed pre-energisation and energisation test sheets.

Item b), c), d) and e) shall be completed at the earliest possible opportunity but no later than the date of energisation of the metered connection.

HEN undertakes inspection of an ICP's contestable works prior to adoption.

The adoption shall be rejected in the event that metering CT and VT test certificates and pre-energisation and energisation test sheets have not been provided, or are incomplete, or are inaccurate. The ICP's nominated contact shall be informed of the reason for the rejection and confirm it in writing. The ICP's contestable works shall not be connected to HEN's distribution system until fully completed and accurate test sheets and test certificates have been provided.

Where HEN are satisfied with the accuracy and completeness of the documentation it shall make arrangements for the contestable works to be energised.

Distribution Services

Where a contested connection is taking place HEN are responsible for:

a) Obtaining metering CT and VT test certificates from the ICP
b) Obtaining a completed off-load test sheet from the ICP
c) Checking that the off-load test sheet provided by the ICP is fully completed
d) Ensuring a "metering label" has been affixed to the metering cabinet
e) Updating the "metering details" page in the Asset Database

HEN undertakes inspections of an ICP's contestable works prior to adoption. Inspections are carried out by a HEN inspector who is appointed by the local HEN manager.

HEN shall reject the adoption in the event that off-load commissioning test sheets, CT test sheets and VT test certificates have not been provided, or are incomplete, or are inaccurate. Distribution services shall inform the ICP's nominated contact of the reason for the rejection and confirm it in writing.

The ICP's contestable works shall not be connected to the HARL distribution system until fully completed and accurate off-load commissioning test sheets, CT test certificates and VT test certificates have been provided.

Where HEN are satisfied with accuracy and completeness of the documentation it shall make arrangements for the contestable works to be energised, and for the completion of the on-load test.

If the ICP's contestable works do not pass the on-load test then HEN shall inform the ICP's nominated contact of the failure to pass a commissioning test and confirm it in writing.

Commissioning Timescales

The overall process is shown in diagrammatic form below:

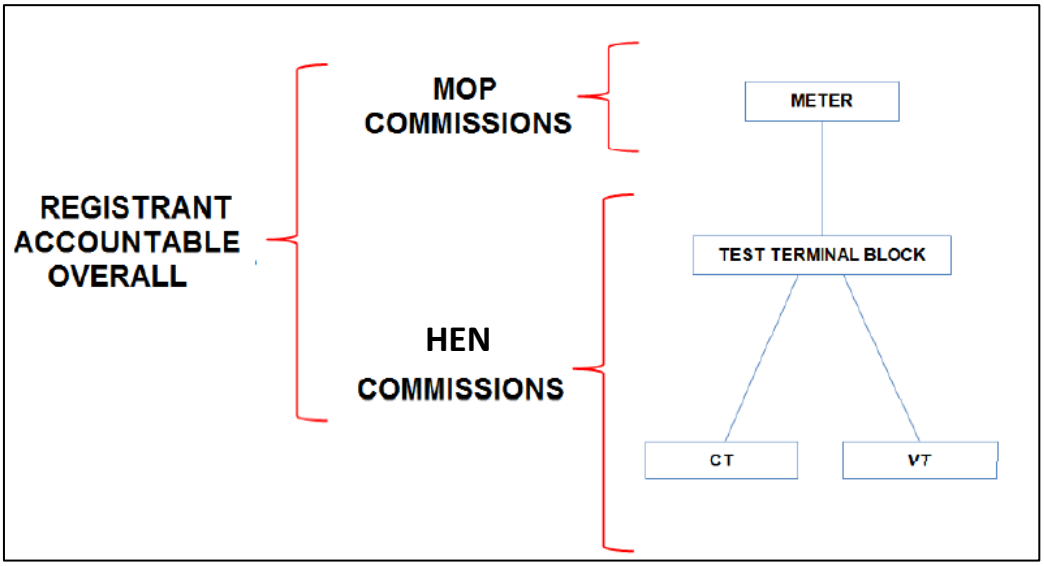
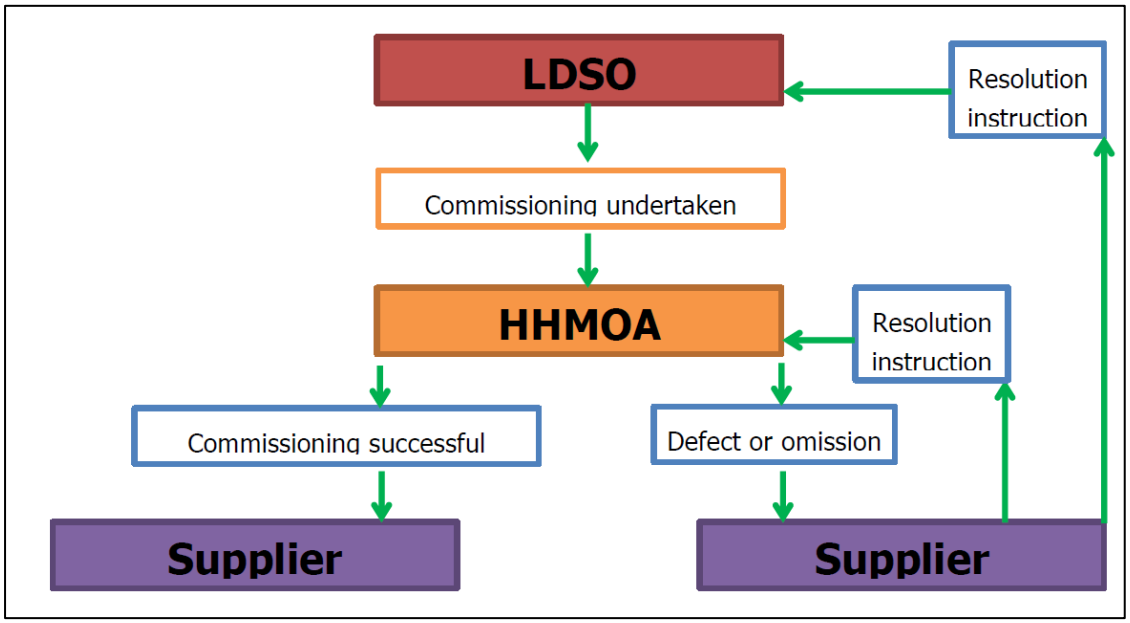


Diagram showing the process flow for Commissioning communications



Where an LDSO is responsible for Commissioning measurement transformers, CoP4 requires that they prepare, and make available to the appointed MOP, complete and accurate Commissioning records. Where the measurement transformers are not owned by an LDSO, this responsibility lies with the Registrant. In all cases, it is the responsibility of the MOP to notify its Registrant (Supplier), via an electronic method, that either:

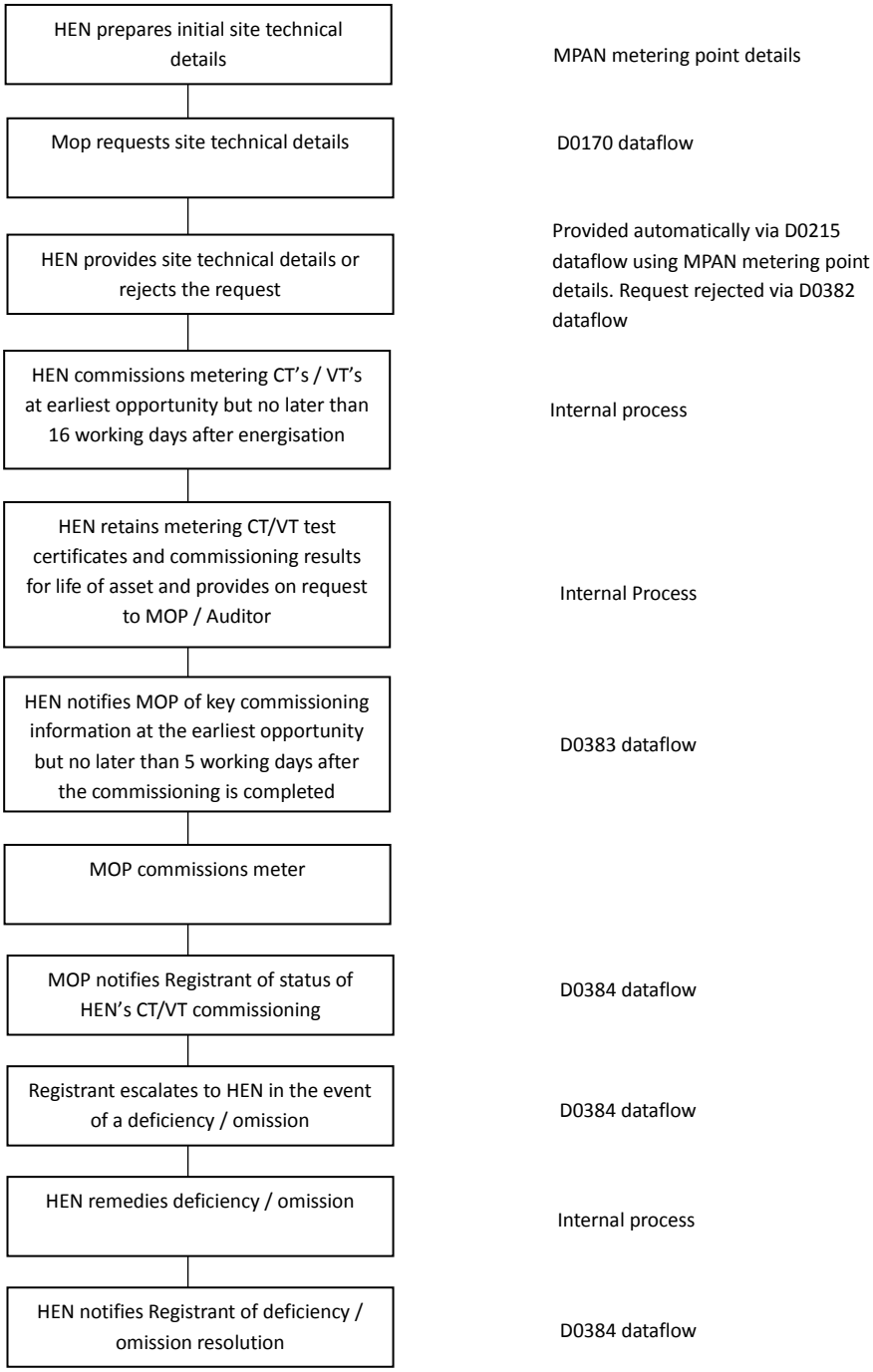
- All Metering Equipment has been fully and successfully commissioned; or
- There is a defect or omission preventing the Commissioning from being completed.

There are three occasions when communications are required:

- The LDSO informs the HHMOA of measurement transformer Commissioning;
- The HHMOA informs the Supplier that Commissioning has been completed; and
- The HHMOA informs the Supplier that there was a defect or omission that has prevented complete Commissioning.

In order for the process to work, the following communications are also required:

- The Supplier instructs the LDSO to resolve a gap in the process regarding measurement transformers; and
- The Supplier instructs the HHMOA to resolve a gap in the process regarding Metering Equipment


HEN prepares initial site technical details
MPAN metering point details
Mop requests site technical details
D0170 dataflow
HEN provides site technical details or rejects the request
Provided automatically via D0215 dataflow using MPAN metering point details. Request rejected via D0382 dataflow
HEN commissions metering CT's / VT's at earliest opportunity but no later than 16 working days after energisation
Internal process
HEN retains metering CT/VT test certificates and commissioning results for life of asset and provides on request to MOP / Auditor
Internal Process
HEN notifies MOP of key commissioning information at the earliest opportunity but no later than 5 working days after the commissioning is completed
D0383 dataflow
MOP commissions meter
MOP notifies Registrant of status of HEN's CT/VT commissioning
D0384 dataflow
Registrant escalates to HEN in the event of a deficiency / omission
D0384 dataflow
HEN remedies deficiency / omission
Internal process
HEN notifies Registrant of deficiency / omission resolution
D0384 dataflow

Commissioning Timescales

Action	Current Timescale	Approved timescale
LDSO Commissioning	16 working days (WD) after energisation	16 WD after energisation
LDSO pass Commissioning information to HHMOA	22 WD after energisation	21 WD after energisation
HHMOA first attempt at Commissioning	16 WD after energisation	32 WD after energisation
HHMOA advise Supplier of completion after first attempt	5 WD after Commissioning complete; or	5 WD after Commissioning complete; or
HHMOA advise Supplier of defect/omission	5 WD after first attempt	5 WD after first attempt
Supplier resolution of any defect or omission	Nil – this is a new step to make existing obligations clearer	65 WD after energisation
Final deadline for HHMOA to complete Commissioning	Nil – this is a new step to make existing obligations clearer	80 WD after energisation

Test Sheets

The following test sheets shall be employed:

- HEN44 - CT Metering and Installation Record Part A
- HEN45 – Low Voltage CT Metering and Commissioning Record
- HEN46 – CT Metering Installation and Commissioning Record - Part B1
- Hen47 – CT Metering Installation and Commissioning Record - Part B2

End of Document