NPS/002/031 - Technical Specification for Metering Base/Panel Unit for Connection to Heavy Duty Cut-outs from 100-500 Amps with Integral Current Transformers and LV Air Circuit Breakers in accordance with CoP5 up to 1 MW

1. Purpose

The purpose of this document is to detail the requirements of Northern Powergrid (the Company) in relation to the technical requirements for metering base/panel unit and associated metering wiring loom for three phase systems operating at voltages up to 400V. This is in accordance with requirements of Balancing and Settlement Code, Code of Practice 5 (CoP5).

This document supersedes the following documents, all copies of which should be destroyed.

Document Reference	Document Title	Version	Published Date
NPS/002/031	Technical Specification for Metering Base/Panel Unit for Connection to Heavy Duty Cut-outs from 100-500 Amps with Integral Current Transformers and LV Air Circuit Breakers in accordance with CoP5 up to 1 MW	2.1	July 2019

2. Scope

This document refers to the specification requirements of the Company with respect to a metering base/panel unit that will connect via a metering wiring loom to an industrial Service unit (ISU), heavy duty cut-out (HDCO) or LV air (metering) circuit breaker (LV ACB). All of which have already been fitted with suitable current transformers (CTs) and metering voltage fuses as required in Northern Powergrid specifications:

- NPS/002/005 - Technical Specification for Industrial Service Units,
- NPS/002/006 – Technical Specification for Service Cutouts, Terminal Blocks, Meter Tail Protectors and Pole Mounted Fuse Units,
- NPS/002/029 - Technical Specification for Industrial Service Units with Integral Current Transformers,
- NPS/002/030 - Technical Specification for Heavy Duty Cut-outs with Integral Current Transformers, and,
- NPS/003/005 – Technical Specification for LV PENDA ASSEMBLIES and TFX ASSEMBLIES.

ISU's, HDCOs are used to provide power supplies to commercial and industrial premises with loads between 100 and 500 amps per phase. LV ACBs at CoP5 are used for loads above 500 amps but below 1MW.

To ensure the metering base/panel unit functions correctly, it is assumed the ISU, HDCO or ACB that requires metering will have the following components pre-installed:

- metering CTs and associated wiring, and,
- metering voltage fuses and associated wiring.

This document **only** covers the following equipment contained within or connected to the metering base/panel unit and the metering base/panel unit itself:

- metering base/panel unit (houses the terminal test block and provides a mounting point for the supplier meter),
- terminal test block with fuse terminals and CT shorting links, and
- the metering wiring loom and associated cable glands (connects the terminal test block to the CTs, metering voltage fuses and neutral).

Suppliers shall provide details of any periodic inspection and maintenance information requirements in Appendix 5 - Pre-commission Testing, Routine Inspection and Maintenance Requirements.

Technical documents referenced within this specification refer to the latest versions of the relevant International Standards, British Standard Specifications, all relevant Energy Networks Association Technical Specifications (ENA TS) and Balancing and Settlement Code, Metering Codes of Practice current at the time of supply.

The following appendices form part of this technical specification:

- Appendix 1 – Product Requirements,
- Appendix 2 - Logistical Requirements,
- Appendix 3 - Self Certification Conformance Declaration,
- Appendix 4 - Addendum to Supplier Requirements,
- Appendix 5 – Pre-commission Testing, Routine Inspection and Maintenance Requirements,
- Appendix 6 - Technical Information Check List,
- Appendix 7 – List of Example Meter Types,
- Appendix 8 - Metering Base/Panel Unit for LV CoP 5 Arrangement – Typical Example
- Appendix 9 - Terminal Test Block – Typical Layout
- Appendix 10 – CT, Metering Voltage Fuses and Neutral Link – Labelling, and
- Appendix 11 – CT Metering Unit Label.

2.1. Table of Contents

3. Technical Requirements

3.1. Metering Requirements

It is assumed that the ISU, HDCO, and LV ACB will have the following equipment already installed within them.

3.1.1. Current Transformer (CT)

Although not specified/required under this document, further detail can be found in:

- NPS/002/029 - Technical Specification for Industrial Service Units with Integral CTs,
- NPS/002/030 - Technical Specification for Heavy Duty Cut-outs from 100-500amps with integral CTs,
- NPS/003/005 – Technical Specification for LV PENDA ASSEMBLIES and TFX ASSEMBLIES.

3.1.2. Metering Voltage Fuses and Neutral

Although not specified/required under this document, further detail can be found in:

- NPS/002/029 - Technical Specification for Industrial Service Units with Integral CTs,
- NPS/002/030 - Technical Specification for Heavy Duty Cut-outs from 100-500amps with integral CTs,
- NPS/003/005 – Technical Specification for LV PENDA ASSEMBLIES and TFX ASSEMBLIES.

Please Note: Although the following items (3.1.3, 3.1.4, 3.1.5, 3.1.6) can appear in an ISU, HDCO, and LV ACB, they may need to be sourced separately and as such are presented here in greater detail for the purposes of this specification.

3.1.3. Terminal Test Block

The terminal test block shall be secured on a suitable DIN rail within a metering base/panel unit.

Both the CT wiring and auxiliary metering voltage fuse wiring shall terminate into the terminal test block.

The terminal test block shall consist of:

- **CT Connections -** 2 x terminals labelled for each of the 3 x CTs and include the functionality to short circuit each of the individual CTs at the terminal test block. The wiring from the CTs shall be connected to these terminals.

  Removable linking blocks to be installed across all CT S2 terminals on incoming side of the terminal test block as described in Appendix 9 - Terminal Test Block – Typical CoP 5 Layout.

- **Connections for Meter Supplied by Others** – The outgoing side of the terminal test block shall have shorting loops (coloured white) installed across each CT, which shall be removed once the meter is connected as described in Appendix 9 - Terminal Test Block – Typical CoP 5 Layout.

- **Voltage Connections** - The wiring from the auxiliary metering voltage fuses and neutral shall be connected to the incoming connections of the voltage terminals. 4 x metering voltage connection terminals (3 phase and neutral) wired to 6 x secondary fused/linked voltage connections for 3 phase and neutral with an additional phase connection (off L1) and neutral connection (off neutral) for the meter communications equipment respectively.

The secondary phase connections shall be fused at 2 amps with a link in the neutral secondary connections.

- **Earth Connections** - An earth terminal suitable for connecting 1 x 2.5mm² earth cable.

The terminals that form the terminal test block will be tested and approved to BS EN 60947-7-1. All wiring integral to the design/construction of the terminal test block shall be 2.5mm^2 single core copper PVC insulated flexible cables (unless otherwise stated) and comply with the requirements of BS 6231.

All wiring integral to the design/construction of the terminal test block shall be standard numbering in accordance with ENA TS 50-19. See Appendix 10 – CT, Metering Voltage Fuses and Neutral Link - Labelling.

All metal DIN rails/support brackets shall be suitably earth bonded.

See Appendix 9 for a typical terminal test block CoP5 layout.

3.1.4. Metering Base/Panel Unit

The metering base/panel shall be a polycarbonate, or glass fibre impregnated shell enclosure and shall be finished in a subtle colour e.g. RAL 7035 – light grey. It shall incorporate the terminal test block mounted upon a DIN rail. It shall be connected to the HDCO/ISU/LV ACB with the metering wiring loom described in 3.1.5. The construction of the material shall be such that it can be easily drilled to create access points for the metering wiring loom and connection of the supplier meter.

The unit shall be so designed that an electricity meter as described in Appendix 7 – List of example meter types can be easily fixed to the front of the hinged door and is capable of supporting the associated meter weight in an open/closed position.

Metering base/panel units are to be suitable for internal wall mounting in public locations, but shall only allow access to internal components by appropriately authorised persons. Metering base/panel shall have a minimum of 4 wall mount fixing holes of 7.5mm diameter.

The unit shall have a hinged door to gain access to the terminal test block allowing connection of the meter. The hinge arrangement shall normally be fitted to the left side of the unit.

The hinged door shall be secured with captive screw(s), which shall be capable of being sealed in the closed position using standard galvanised sealing wire of maximum diameter of 2mm.

The construction of the assembly shall be such that the possibility of deliberate damage and the removal of fastenings from the outside are minimised. The assembly shall be intruder resistant and provide ingress protection to IP65 in accordance with IEC BS EN 60529 and impact resistance to IK08 or above in accordance with IEC BS EN 62262. Ferrous metallic parts shall be protected against corrosion, sufficient to pass the tests set out in sub clause 10.2.2 of BS EN 61439-5 and 8.1.2 of BS EN 61439-1 (severity test A).

The dimensions of the metering base/panel shall be suitable to house a standard 3-phase CT meter (in line with CoP 5) on the front of the unit. Meter type examples are presented in Appendix 7 – List of meter types. Typical dimensions for meter base/panel units are nominally H=360mm, W=270mm, D=183mm.

3.1.5. Metering Wiring Loom

CTs to terminal test block - A metering wiring loom shall be required to connect the CT secondary terminals and metering voltage connections in the HDCO/ISU/LV ACB with the terminal test block in the metering base/panel unit.

The metering wiring loom shall be 2.5mm^2 copper stranded multicore conductor, XLPE/PVC insulation, PVC sheathed, steel wire armoured (SWA) cable to BS 5467. Further detail can be found in NPS/002/018 – Technical Specification for Pilot, Control and Telephone Cables.

The multicore cable shall have a minimum of 12 cores. The cores shall be white insulation with number identification throughout its length.

Suitable cable glands to BS 6121, Part 1 of 25mm diameter shall be provided to adequately terminate the 12 x 2.5mm² copper stranded SWA cable between the metering circuit breaker and the metering base/panel unit.

The wiring loom labelling for the CT and potential/metering fuses will be standard numbering in accordance with ENA TS 50-19. See Appendix 10 – CT, Metering Voltage Fuses and Neutral Link - Labelling.

3.1.6. CT Metering Unit Label

The unit shall be delivered with a CT label in line with the requirements of MOCOPA, Appendix 2, section A2.3. See Appendix 11 - CT Metering Unit Label.

4. References

The terminal test block, metering base/panel unit and wiring loom shall comply with the relevant International Standards, British Standard Specifications and all relevant Energy Networks Association Technical Specifications (ENATS) current at the time of tendering, except where varied by this standard. In respect the following documents are particularly relevant.

4.1. External Documentation

Reference	Version / Date	Title
BS 5467	2016	Electric cables. Thermosetting insulated, armoured cables of rated voltages of 600/1 000 V and 1 900/3 300 V for fixed installations. Specification
BS 6121-1	2005	Mechanical cable glands. Armour glands. Requirements and test methods
BS 6231	2006	Electric cables – Single core PVC insulated flexible cables of rated voltage 600/1000 V for switchgear and controlgear wiring
BS EN 60529:1992 + A2:2013	1992	Degrees of protection provided by enclosures (IP Codes)
BS EN 60947-7-1	2009	Low-voltage switchgear and controlgear - Part 7-1: Ancillary equipment - Terminal blocks for copper conductors
BS EN 61439-1	2011	Low-voltage switchgear and controlgear assemblies. Part 1: General rules
BS EN 61439-5	2015	Low-voltage switchgear and controlgear assemblies. Part 5: Assemblies for power distribution in public networks
CoP 5	2019	Balancing and Settlement Code, Code of Practice 5, Code of practice for the metering of energy transfers with a max demand of up to (and inc) 1MW for settlement purposes
IEC 62262 Ed 1	2002	Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)
MOCOPA	2020	Meter Operation Code of Practice Agreement

The supplier shall provide with the tender full technical details of the equipment offered and shall indicate any divergence from these standards or specifications.

4.2. Internal Documentation

Reference	Version / Date	Title
IMP/001/010	7.0/Nov 2018	Code of Practice for Standard Arrangements for Customer Connections
IMP/001/911	6.0/Nov 2018	Code of Practice for the Economic Development of the LV System
NPS/002/005	5.1/Jul 2019	Technical Specification for Industrial Service Units
NPS/002/006	5.0/Jun 2020	Technical Specification for Service Cutouts, Terminal Blocks, Meter Tail Protectors and Pole Mounted Fuse Units
NPS/002/018	5.0/July 2018	Technical Specification for Pilot, Control and Telephone Cables
NPS/002/029	2.1/Jul2019	Technical Specification for Industrial Service Units with Integral Current Transformers
NPS/002/030	2.1/Jul 2019	Technical Specification for Heavy Duty Cut-outs with Integral Current Transformers
NPS/003/005	6.0/May 2020	Technical Specification for LV PENDA ASSEMBLIES and TFX ASSEMBLIES

4.3. Amendments From Previous Version

Reference	Title
2.0 Scope	# Section updated to provide reference to neutral link.
Appendix 9 - Terminal test block – Typical layout	Diagram updated to represent latest wiring layout and changes to the document. Specific changes as follows: # CT shorting loops (which are removed following meter installation) to be coloured white. # Local metering voltage fuse/link label descriptions updated.
3.1.2 Metering Voltage Fuses and Neutral Link	# Section updated to provide reference to neutral link.
3.1.3 Terminal test block	# Connections for Meter Supplied by Others – The shorting loops on the outgoing side of the terminal test block has reference to confirm they shall be coloured white. # Earth Connections - Earth terminal number of connections changed from 4 to 1. # Additional clarification with regard to the terminal test block integral wiring added to align with Appendix 9 - Terminal test block – Typical layout. # Section updated to provide reference to neutral link.
4.1 External documentation	# Section updated to reference latest documentation.
4.2 Internal documentation	# Section updated to reference latest documentation.
4.3 Amendments from Previous Version	# Section updated to capture document changes.
5.0 Definitions	# Section updated.
6.0 Authority for Issue	# H Jones replaced by W Lacey.

5. Definitions

Term	Definition
ACB	Air circuit breaker
CoP	Code of Practice
CT	Current transformer
DIN	Deutsches Institute Fur Normung (German Institute for Standardisation)
ENA TS	Energy Networks Association Technical Specifications
HDCO	Heavy duty cut-out
ISU	Industrial service unit
PVC	Polyvinyl chloride
SWA	Steel Wire Armoured
The Company	Northern Powergrid
VT	Voltage transformer
XLPE	Crossed linked polyethylene

6. Authority For Issue

6.1. CDS Assurance

I sign to confirm that I have completed and checked this document and I am satisfied with its content and submit it for approval and authorisation.

		Date
Liz Beat	Governance Administrator	11/11/2020

6.2. Author

I sign to confirm that I have completed and checked this document and I am satisfied with its content and submit it for approval and authorisation.

Review Period - This document should be reviewed within the following time period.

Standard CDS review of 3 years?	Non Standard Review Period & Reason	
No	Period: 5 years	Reason: Update will be dictated by contract renewal date or any significant changes in the specification or documents referenced.
Should this document be displayed on the Northern Powergrid external website?		Yes

		Date
Paul Hollowood	Policy & Standards Engineer	11/11/2020

6.3. Technical Assurance

I sign to confirm that I am satisfied with all aspects of the content and preparation of this document and submit it for approval and authorisation.

		Date
David Gazda	Senior Policy and Standards Engineer	13/11/2020
Michael Crowe	Technical Services Manager	27/11/2020
Steve McDonald	General Manager West Yorkshire	23/11/2020
Warren Lacey	Metering Specialist	17/11/2020
Mick Emsley	Policy and Standards Manager	13/11/2020

6.4. Authorisation

Authorisation is granted for publication of this document.

		Date
Greg Farrell	Head of System Engineering	06/12/2020

Appendix 1 – Product Requirements

Description	Commodity Code
LV (CoP5) metering base/panel unit including terminal test block, cable glands and wiring identification labels	216357

Supporting evidence of compliance with type tests shall be submitted with the completed tender document.

Manufacturers may provide alternative tenders for items not complying with the above specification. This shall be clearly stated together with detailed descriptions of any variation from the specification, together with drawings and test results.

The supplier shall provide with the tender full technical details of the equipment offered and shall indicate any divergence from these standards or specifications.

Appendix 2 – Logistical Requirements

To enable the Company to store the product(s) in accordance with the manufacturer's recommendations the Tenderer shall provide details of the recommended storage environment with respect to each tendered product.

Details shall be provided where relevant, in respect of the minimum and maximum exposure levels, frequency of exposure and duration of exposure of the packaged item with respect to;

- Ambient temperature
- Atmospheric corrosion
- Humidity
- Impact
- Water
- Vibration
- Dust
- Solar radiation

The Tenderer shall ensure that each item is suitably packaged and protected to enable storage in an outdoor environment whilst maintaining the product and packaging as "fit for service" prior to installation.

All packaging shall be sufficiently durable giving regard to the function, reasonable use and contents of the packaging. Where product packages tendered are made up of sub packages all the sub packages shall unless varied by this specification, be supplied securely packaged together. Where items are provided in bagged/boxed form the material from which the bags are manufactured shall be capable of sustaining the package weight and resisting puncture by the materials within.

Tenderer shall submit at the time of tendering the details of the proposed packaging (i.e. materials composition and structure) to be used for each product. Where the Tenderer is unable to provide packaging suitable for outdoor storage then this should be stated at the time of tender.

In order to maximise storage space all palletised goods shall be supplied in standard returnable box pallets with the following specification. Where applicable, suppliers shall also indicate the maximum number of units of each product that are storable per box pallet.

- Size - 1200mm (w) x 1000mm (d) x 750mm (h)
- Weight (empty) – Up to 33kg
- Load Capacity – Up to 450kg
- Maximum Stacking Capacity – 10 High

Suppliers shall also include details of the type of material used to manufacture the box pallets.

The Company will give consideration to innovative alternatives to this specification.

Clearly legible, easily identifiable, durable and unambiguous labelling shall be applied to each individual and where relevant, multiple package of like products. Where products packages tendered are made up of sub packages each sub packages shall be marked. As a minimum requirement the following shall be included;

- Manufacturer's trademark or name
- Supplier's trademark or name
- Description of item
- Date of packaging and/or batch number
- Northern Powergrid product code
- Weight
- Shelf Life

Tenderer shall submit at the time of tendering a sample of the proposed labelling for each product package type.

Appendix 3 – Self Certification Conformance Declaration

Metering base/panel unit including terminal test block and metering wiring looms shall comply with the latest issues of the relevant national and international standards, including IEC 61439. Additionally this technical specification is intended to amplify and/or clarify requirements relating to these Standards.

This self-declaration sheet identifies the clauses of the aforementioned standards relevant to metering base/panel units including terminal test block and metering wiring loom for use on the Company distribution network. The manufacturer shall declare conformance or otherwise, clause by clause, using the following levels of conformance declaration codes.

Conformance declaration codes

N/A = Clause is not applicable/ appropriate to the product

Cs1 = The product conforms fully with the requirements of this clause

Cs2 = The product conforms partially with the requirements of this clause

Cs3 = The product does not conform to the requirements of this clause

Cs4 = The product does not currently conform to the requirements of this clause, but the manufacturer proposes to modify and test the product in order to conform.

Instructions for completion

- When Cs1 code is entered the supplier shall provide evidence to confirm conformance.
- When any other code is entered the reason and supporting evidence for non - conformance shall be entered.
- Prefix each remark with the relevant 'BS EN' 'IEC' or 'ENATS' as appropriate.
- Provide technical data sheets and associated drawings for each product.

Manufacturer / Supplier:

Manufacturer / Supplier Product Reference:

Northern Powergrid Product Reference (Commodity Code):

Details of the Product Type: (e.g. Voltage, Conductor Type and Size)

Name:

Signature:

Date:

NOTE: One sheet shall be completed for each type of cable offered.

NPS/002/031 - Technical Specification for Metering Base Unit for Connection to Heavy Duty Cut-outs from 100-500 amps with Integral Current Transformers and LV Air Circuit Breakers in accordance with COP5 Up to 1 MW				
Clause/Sub-clause	**Clause / Requirements**	**Conformance Code**	**Evidence Reference**	**Remarks / Comments**
3.1.3 Terminal Test Block	To meet the requirements of 3.1.3			
3.1.4 Metering Base/Panel Unit	To meet the requirements of 3.1.4			
3.1.4 Metering Base/Panel Unit (Fixings)	4 x 7.5mm (internal) “key hole” Type			
3.1.4 Metering Base/Panel Unit (Front Access)	The front panel shall be pre drilled to accept the meters identified in Appendix 7 and drawing in Appendix 8. It shall be suitably hinged for access, taking account of the attached meter. It shall be able to adequately support the weight of the meter in an open/closed position.			
	Secured by captive screws and by accepting 2mm sealing wire			
3.1.5 Metering wiring loom	To meet the requirements of 3.1.5			
3.1.5 Metering wiring loom (Cable gland)	To meet the requirements of 3.1.5			
3.1.6 CT/VT metering unit label	To meet the requirements of 3.1.6			

BS EN 61439-1 Low-voltage switchgear and controlgear assemblies. Part 1: General rules				
Clause/Sub-clause	**Clause / Requirements**	**Conformance Code**	**Evidence Reference**	**Remarks / Comments**
7.1.1 Ambient Air Temperature	≤ 40ºC Av over 24hr ≤ 35ºC			
7.1.2 Humidity	≤ 50% at 40ºC			
7.1.3 Pollution Degree	2			
8.1.2 Protection against Corrosion	According to 10.2.2 (severity test A)			
	10.2.2 of BS EN 61439-5			
8.2.1 Protection against Mechanical Impact	According to 10.2.6			
8.2.2 Degree of Protection	IP41B to BS EN 60529			
	According to 10.3			
8.4.1 Protection against Electric Shock	Min IP2X to BS EN 60529, otherwise IPXXB.			

Appendix 4 – Addendum to Supplier Requirements

No information added.

Appendix 5 – Pre-commission Testing, Routine Inspection and Maintenance Requirements

Suppliers shall provide details of the recommended pre-commission testing and inspection required.

They shall also provide information regarding periodic inspection and maintenance requirements to be undertaken during the lifetime of their product.

Detailed inspection and maintenance instructions shall be also be provided.

Appendix 6 – Technical Information Check List

The following information shall be provided by the supplier for technical review by Northern Powergrid. Additional information shall be provided if requested.

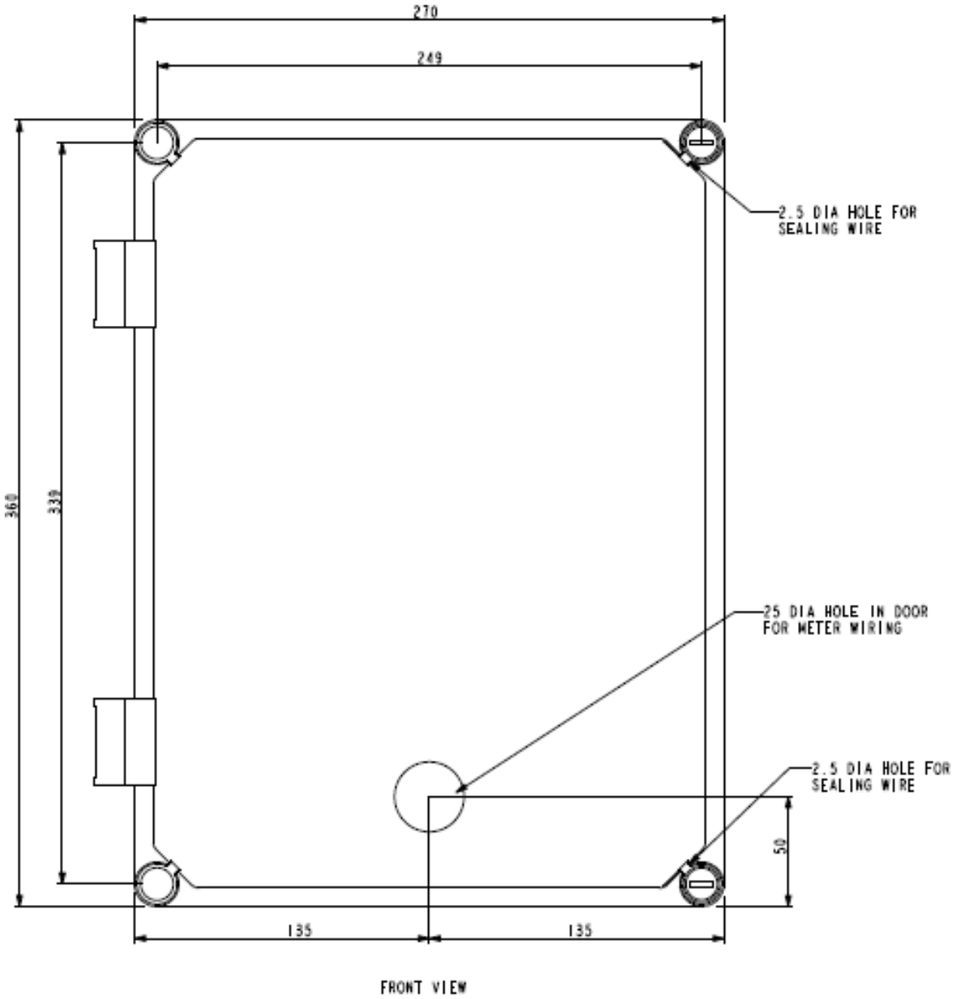
Requirement	Provided (Y/N)
Full product descriptions and part number/reference	
Appendix 3 – completed self-certification conformance declaration	
Complete set of drawings for each variant	
Type test evidence	
Routine test plan (example)	
Pre-commissioning testing/inspection requirements	
Recommended periodical inspection and maintenance requirements	
Packaging/delivery information	

Appendix 7 – List of Example Meter Types

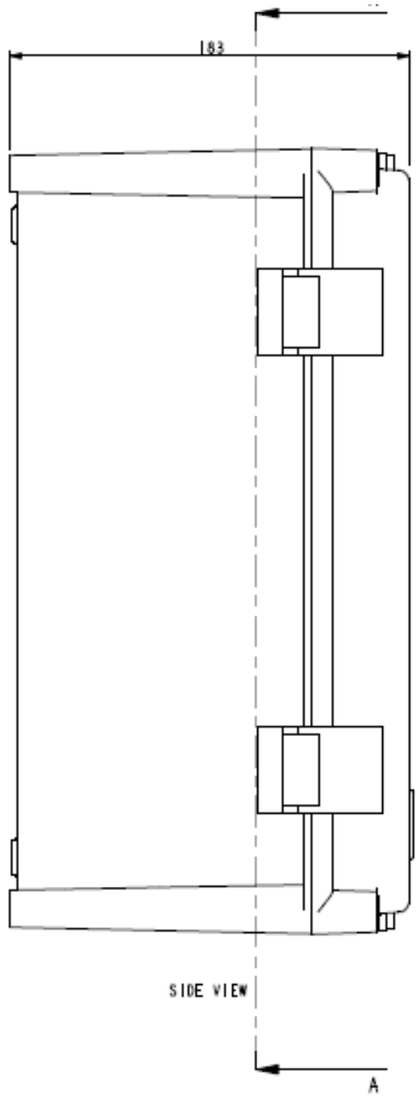
The following details the types of meters that may by employed with the ISU described within this document.

- Secure Premier Meter
- Elster A1700 Meter
- Elster A1120/40 Meter
- EDMI MK 10A

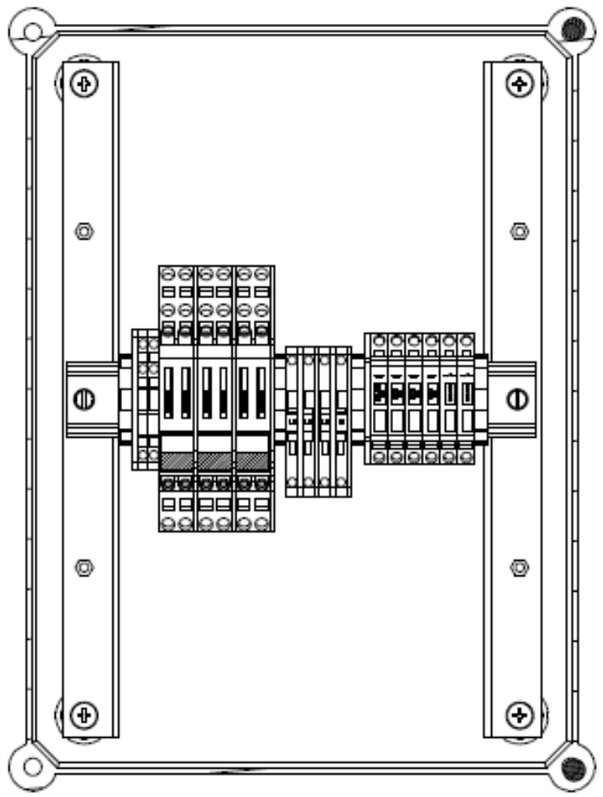
Appendix 8 - Metering Base/Panel Unit for CoP 5 Arrangement – Typical Example



FRONT VIEW



SIDE VIEW

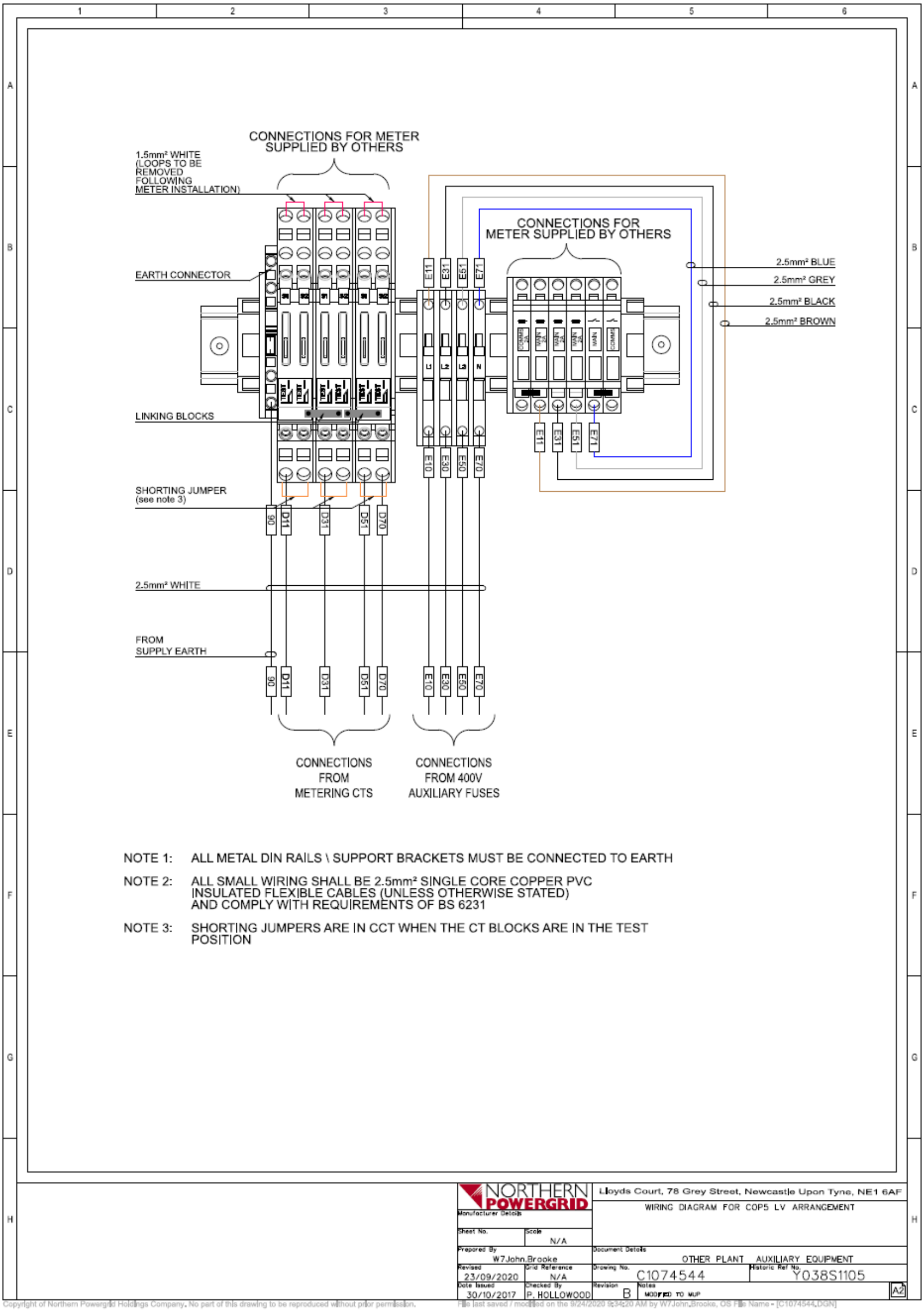


SECTION A-A

MATERIAL :- GLASS FIBRE IMPREGNATED POLYESTER
MECHANICAL IMPACT IK 09 TO BS EN 62262
COLOUR :- RAL 7035
DEGREE OF PROTECTION :- IP65 (EXCLUDING HOLE FOR METER WIRING) TO BS EN 60529

FOR WIRING DIAGRAM SEE DRAWING ENPGCOP5LV-WD

Appendix 9 - Terminal Test Block – Typical CoP 5 Layout



NOTE 1: ALL METAL DIN RAILS \ SUPPORT BRACKETS MUST BE CONNECTED TO EARTH

NOTE 2: ALL SMALL WIRING SHALL BE 2.5mm² SINGLE CORE COPPER PVC INSULATED FLEXIBLE CABLES (UNLESS OTHERWISE STATED) AND COMPLY WITH REQUIREMENTS OF BS 6231

NOTE 3: SHORTING JUMPERS ARE IN CCT WHEN THE CT BLOCKS ARE IN THE TEST POSITION

Manufacturer Details: NORTHERN POWERGRID	Lloyds Court, 78 Grey Street, Newcastle Upon Tyne, NE1 6AF
	WIRING DIAGRAM FOR COP5 LV ARRANGEMENT
Sheet No.:	Scale: N/A
Prepared By: W7John.Brooke	Document Details: OTHER PLANT AUXILIARY EQUIPMENT
Revised: 23/09/2020	Grid Reference: N/A
Drawing No.: C1074544	Historic Ref No.: Y038S1105
Date Issued: 30/10/2017	Checked By: P. HOLLOWOOD
Revision: B	Notes: MODIFIED TO MUP
A2	

File last saved / modified on the 9/24/2020 9:34:20 AM by W7John.Brooke, OS File Name = [C1074544.DGN]

Appendix 10 – CT, Metering Voltage Fuses and Neutral Link – Labelling

Voltage Conductor		
Voltage Conductor	**Between mvf/neutral and ttb voltage link**	**Between ttb voltage link and ttb fuse/neutral**
L1	E10	E11
L2	E30	E31
L3	E50	E51
Neutral	E70	E71

CT Output Conductor	
CT Output Conductor	**Between S1 on CT and ttb**
L1	D11
L2	D31
L3	D51

CT Return Conductor	
CT Return Conductor	**Between S2 on CT and ttb**
L1	D10
L2	D30
L3	D50

Combined CT Return Conductor
Between S2 on CTs and ttb where CT return conductors are combined
D70

Earth Conductor
90

- Key:

- mvf = metering voltage fuse
- ttb = terminal test block

Appendix 11 – CT Metering Unit Label

CT Metering Label Current Transformer Information							
CT	**Phase**	**Manufacturer**	**Serial Number**	**Single/Dual/Multi (Ratios Available)**	**Rating (VA)**	**Class**	**CT Ratio Connected**
CT	L1						
CT	L2						
CT	L3						
Distributor Company: Northern Powergrid				**Installation/Commissioning Engineer**:			**Date**: / /