NPS/002/035 - Technical Specification for Metering Base/Panel Unit for Connection to 132kV Metering Circuit Breakers in accordance with CoP1 Up to a Circuit Capacity Exceeding 100 MVA

1. Purpose

The purpose of this document is to detail the requirements of Northern Powergrid (the Company) in relation to the technical requirements for a metering base/panel unit and associated metering wiring loom for three phase systems typically operating at 132kV. This is in accordance with requirements of Balancing and Settlement Code, Code of Practice 1 (CoP1). This document supersedes the following documents, all copies of which should be destroyed.

Document Reference	Document Title	Version	Published Date
NPS/002/035	Technical Specification for Metering Base/Panel Unit for Connection to 132kV Metering Circuit Breakers in accordance with CoP1 up to a Circuit Capacity Exceeding 100 MVA	2.1	July 2019

2. Scope

This document refers to the baseline specification requirements of the Company with respect to a metering base/panel unit that will typically connect via a metering wiring loom to a metering circuit breaker (132kV). All of which have already been fitted with suitable voltage transformers (VTs), current transformers (CTs) and metering voltage fuses/links as required in Northern Powergrid specifications:

- NPS/003/008 – Technical Specification for Open Bushing, Air Insulated (AIS), 66kV and 132kV Circuit Breakers
- NPS/003/024 – Technical Specification for 66kV & 132kV Gas Insulated Switchgear
- NPS/003/001 – Technical Specification for 33kV, 66kV and 132kV Voltage Transformers
- NPS/003/023 – Technical Specification for 33kV, 66kV and 132kV Post CTs

132kV metering circuit breakers are used to provide power supplies to commercial and industrial premises with circuit capacities typically exceeding 100MVA.

To ensure the metering base/panel unit functions correctly, it is assumed the metering circuit breaker will have the following components pre-installed:

- metering VTs and associated wiring,
- metering CTs and associated wiring, and,
- metering voltage fuses/links 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 meters),
- terminal test block with fuse/link terminals and CT shorting links, and,
- the metering wiring loom and associated cable glands (connects the terminal test block to the VTs/CTs and metering voltage fuses/links).

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 (ENATS) 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 CoP1 Arrangement – Typical Example,
- Appendix 9 Terminal Test Block – Typical Cop1 Layout,
- Appendix 10 - CT and Metering Voltage Fuses/Links – Labelling, and
- Appendix 11 – CT/VT Metering Unit Label.

2.1. Table of Contents

3. Technical requirements

3.1. Metering Requirements

It is assumed that the 33kV to 132kV metering circuit breaker will have the following equipment (3.1.1 and 3.1.2) already installed within them.

3.1.1. Voltage and Current Transformers (VT & CT)

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

- NPS/003/008 – Technical Specification for Open Bushing, Air Insulated (AIS), 66kV and 132kV Circuit Breakers
- NPS/003/024 – Technical Specification for 66kV & 132kV Gas Insulated Switchgear
- NPS/003/001 – Technical Specification for 33kV, 66kV and 132kV Voltage Transformers
- NPS/003/023 – Technical Specification for 33kV, 66kV and 132kV Post CTs

3.1.2. Metering Voltage Fuses/Links

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

- NPS/003/008 – Technical Specification for Open Bushing, Air Insulated (AIS), 66kV and 132kV Circuit Breakers
- NPS/003/024 – Technical Specification for 66kV & 132kV Gas Insulated Switchgear
- NPS/003/001 – Technical Specification for 33kV, 66kV and 132kV Voltage Transformers
- NPS/003/023 – Technical Specification for 33kV, 66kV and 132kV Post CTs

Please Note: The following items (3.1.3, 3.1.4, 3.1.5, 3.1.6) are required to provide a metering facility for the provision/installation of metering equipment and as such form part 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 metering VT fuse wiring shall terminate into the terminal test block.

The terminal test block shall consist of:

- **CT Connections (Main)** - 2 x terminals for each of the 3 x main CTs and include the functionality to short circuit each of the individual CTs at the terminal test block. The wiring from the main CTs shall be connected to the incoming connections of 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 CoP1 Layout.

- **CT Connections (Check)** - 2 x terminals for each of the 3 x check CTs and include the functionality to short circuit each of the individual CTs at the terminal test block. The wiring from the check CTs shall be connected to the incoming connections of 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 CoP1 Layout.

- **Connections for Meters 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 meters are connected as described in Appendix 9 – Terminal Test Block – Typical CoP1 Layout.

- **Voltage Connections (Main)** - The wiring from the main metering VT fuses/links shall be connected to the incoming connections of the main 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 connection off L1 and neutral for the meter communications equipment. The secondary phase connection shall be fused at 2 amps with a link in the neutral.

- **Voltage Connections (Check)** - The wiring from the check metering VT fuses/links shall be connected to the incoming connections of the check 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 connection off L1 and neutral for the meter communications equipment. The secondary phase connection shall be fused at 2 amps with a link in the neutral.

- **Earth Connection** - An earth terminal suitable for connecting 1 x 2.5mm^2 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 and Metering Voltage Fuses/Links - Labelling.

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

See Appendix 9 which shows a typical terminal test block CoP1 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 metering circuit breaker 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 2 x electricity meters 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 main and check meters (in line with CoP1) on the front of the unit. Meter type examples are presented in Appendix 7 – List of Example Meter Types. Typical dimensions for meter base/panel units are nominally H=360mm,

W=540mm, D=180mm as can be seen in Appendix 8 – Metering Base/Panel Unit for CoP1 Arrangement – Typical Example.

3.1.5. Metering Wiring Loom

CTs to Terminal Test Block - 2 x metering wiring looms shall be required to connect the main and check CT secondary terminals and metering voltage connections in the metering circuit breaker with the terminal test block in the metering base/panel unit.

The metering wiring looms 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 cables shall have a minimum of 12 cores. The cores shall be white insulation with number identification though out its length.

Suitable cable glands to BS 6121, Part 1 of 25mm diameter shall be provided to adequately terminate each of the 12 x 2.5mm^2 copper stranded SWA cable between the metering circuit breaker and the metering base/panel unit.

The wiring loom labelling for the CT and metering voltage connections will be standard numbering in accordance with the ENA TS 50-19. See Appendix 10 – CT and Metering Voltage Fuses/Links - Labelling.

3.1.6. CT/VT Metering Unit Label

The unit shall be delivered with a CT/VT label in line with the requirements of MOCOPA, Appendix 2, section A2.3. See Appendix 11 - CT/VT 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
CoP1	Issue 2 / V13 / Jun 2019	Balancing and Settlement Code, Code of Practice 1, Code of practice for the metering of circuits with a rated capacity exceeding 100 MVA for settlement purposes
IEC 62262 Ed 1	2002	Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)
MOCOPA	V4.8 / Jun 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/001/914	4.0/Jun 2020	IMP/001/914 - Code of Practice for the Economic Development of the 132kV System
NPS/002/018	5.0/July 2018	Technical Specification for Pilot, Control and Telephone Cables.
NPS/002/034	2.1/Jul 2019	Technical Specification for Metering Base/Panel Unit for Connection to Extra High Voltage Metering Circuit Breakers in accordance with CoP2 up to a circuit capacity not exceeding 100 MVA.
NPS/003/001	5.1/Jul 2019	Technical Specification for 33kV, 66kV and 132kV Voltage Transformers
NPS/003/008	4.1/Jul 2019	Technical Specification for Open Bushing, Air Insulated (AIS), 66kV and 132kV Circuit Breakers
NPS/003/023	3.0 Feb 2016	Technical Specification for 33kV, 66kV and 132kV Post CTs
NPS/003/024	2.0/Feb 2016	Technical Specification for 66kV & 132kV Gas Insulated Switchgear

4.3. Amendments From Previous Version

Reference	Title
2.0 Scope	# The word 'baseline' added to the specification requirements to acknowledge that site specific additions/ modifications may be required.
3.1.3 Terminal test block	CT Connections # Reference added to cover CT connections separately for Main and Check CTs. # Reference added to the inclusion of a third CT for both Main and Check CTs. 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. Voltage Connections # Reference added to cover VT connections separately for Main and Check VTs. # Additional clarification with regard to the terminal test block integral wiring added to align with Appendix 9 - Terminal test block – Typical layout.
3.1.4 Metering base/panel unit	# Updated to reference 2 meters as a CoP1 arrangement has a main and check meter.
4.1 External documentation	# Section updated to reference latest documentation.
4.2 Internal documentation	# Section updated to reference latest documentation.
6.0 Authority for issue	# W Lacey included instead of H Jones # M Emsley added in Technical Assurance section
Appendix 10 - CT and metering fuses – Labelling	# Section updated to represent latest wiring layout.
Appendix 11 – CT/VT Metering Unit Label	# Section updated to represent latest wiring layout.
Appendix 9 - Terminal Test Block – Typical Layout	Diagram updated to represent latest wiring layout and changes to the document. Specific changes as follows: # Reference added to the inclusion of a third CT for both Main and Check CTs. # The shorting loops on the outgoing side of the terminal test block has reference to confirm they shall be coloured white. # Reference added to cover VT connections for the addition of 2 x neutral connections for Main and Check VTs. # Additional clarification with regard to the terminal test block integral wiring added to align with Appendix 9 - Terminal test block – Typical layout. # Local metering voltage fuse/link label descriptions updated.

5. Definitions

Term	Definition
CoP	Code of Practice
CT	Current transformer
DIN	Deutsches Institute Fur Normung (German Institute for Standardisation)
ENA TS	Energy Networks Association Technical Specifications
kV	kilovolt
MOCOPA	Meter operation code of practice agreement
MVA	Megavolt ampare
PVC	Polyvinyl chloride
SWA	Steel wire armoured
The Company	Northern Powergrid
VT	Voltage transformer
XLPE	Cross 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	03/02/2021

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 and Standards Engineer	03/02/2021

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	03/02/2021
Michael Crowe	Technical Services Manager	08/02/2021
Steve McDonald	General Manager West Yorkshire	04/02/2021
Warren Lacey	Metering Specialist	05/02/2021
David Sillito	Head of Major Projects	15/02/2021
Mick Emsley	Policy and Standards Manager	04/02/2021

6.4. Authorisation

Authorisation is granted for publication of this document.

		Date
Greg Farrell	Head of System Engineering	01/03/2021

Appendix 1 – Product Requirements

Description	Commodity Code
132kV (CoP1) metering base/panel unit including terminal test block, cable glands and wiring identification labels	044967

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

The 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/002/035 - Technical Specification for Metering Base Unit for Connection to 132kv Metering Circuit Breakers in Accordance with COP1 Up to a Circuit Capacity Exceeding 100 MVA				
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 (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(s) in an open/closed position			
	Secured by captive screws & secured by accepting 2mm sealing wire			
3.1.4 Metering Base/Panel Unit	To meet the requirements of 3.1.4			
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.

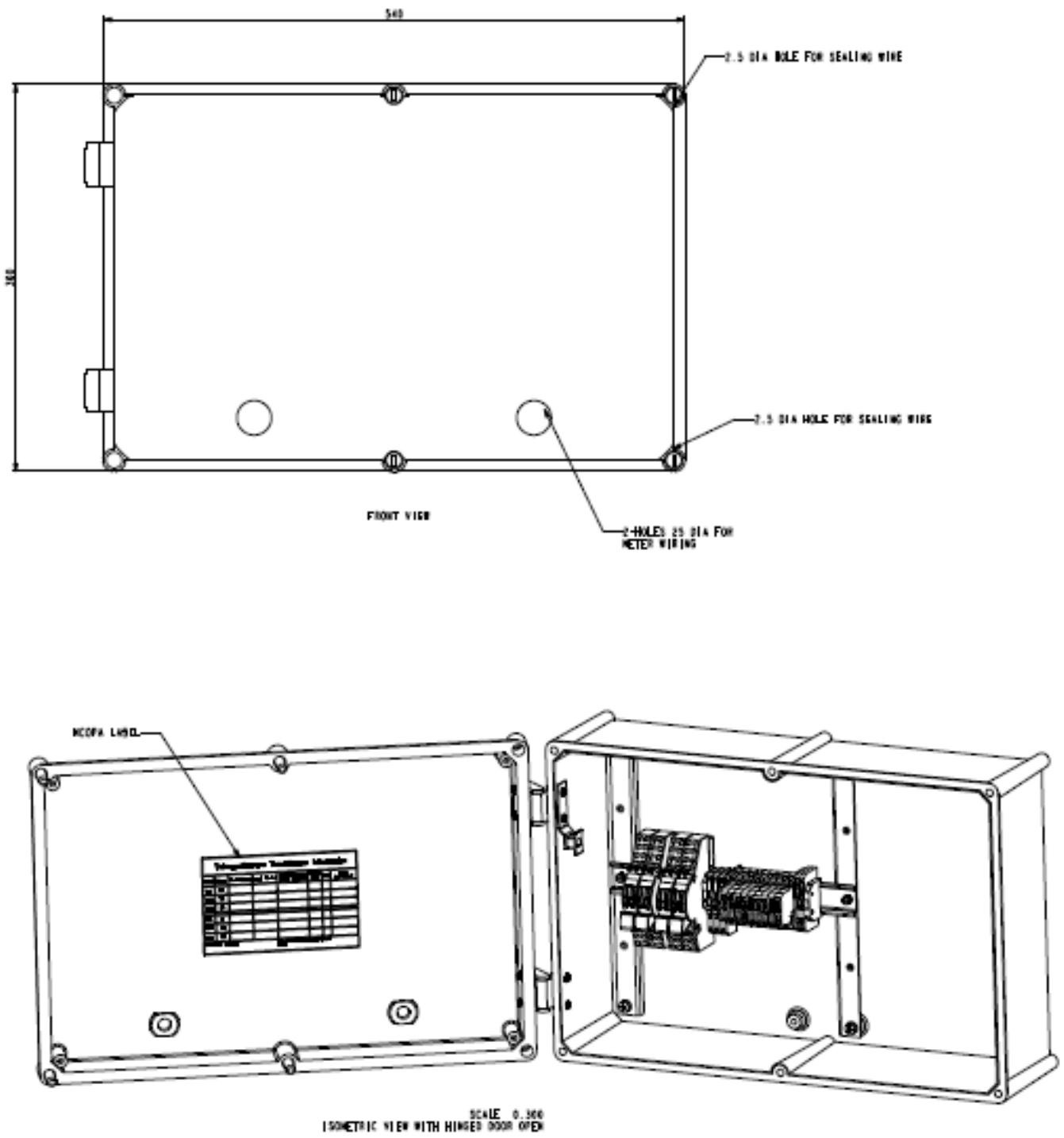
Requirement	Provided (Y/N)
Full product descriptions and part number/reference	
Appendix 3 – Completed self-certification conformance declaration	
Complete set of drawings for each variant	
Type test evidence	
Routine test plan (example)	
Pre-commissioning testing/inspection requirements	
Recommended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

Appendix 7 – List of Example Meter Types

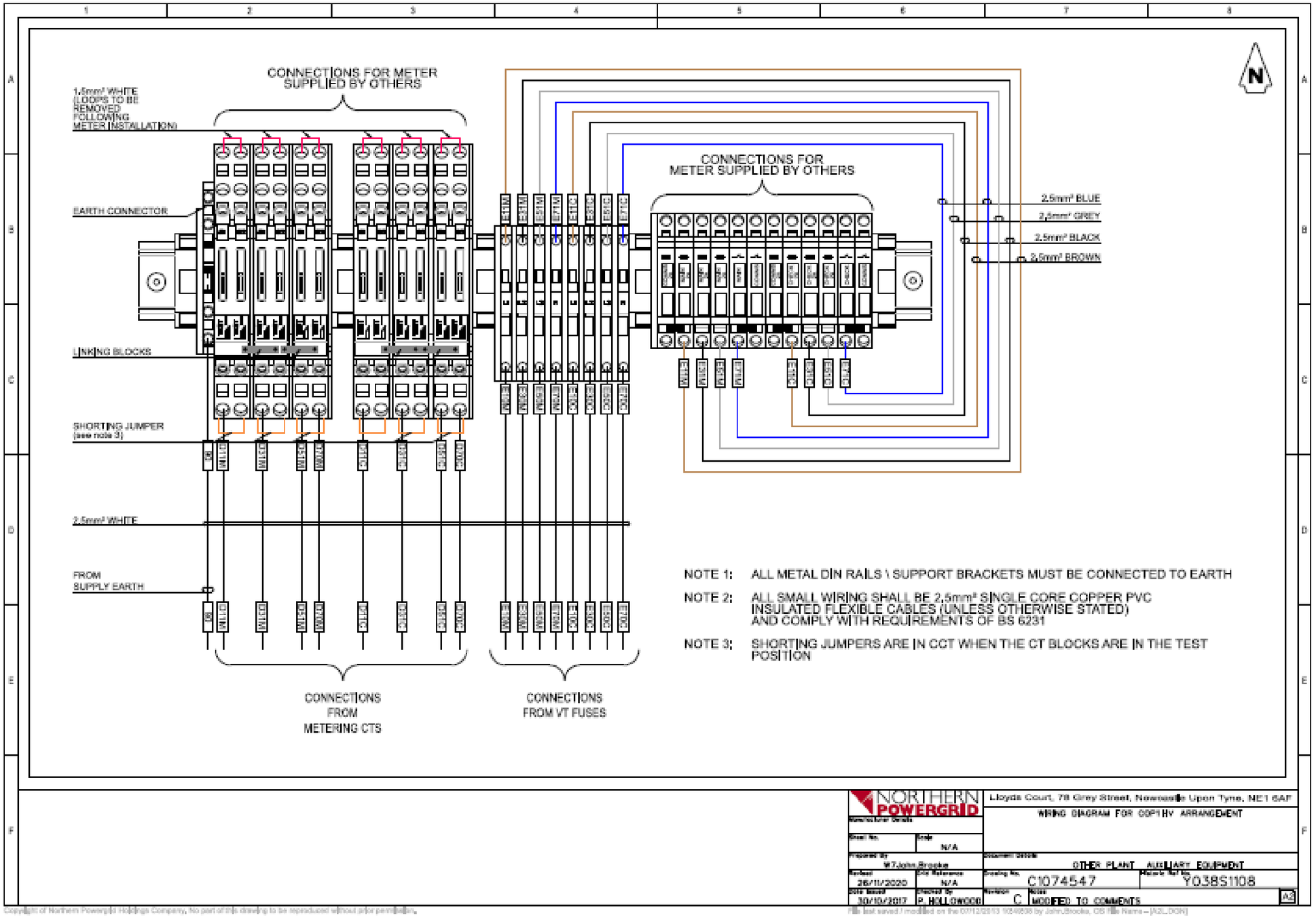
The following details the types of meters that may by employed with the metering base/panel unit described within this document.

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

Appendix 8 – Metering Base/Panel Unit for CoP1 Arrangement – Typical Example



Appendix 9 – Terminal Test Block – Typical CoP1 Layout



Appendix 10 - CT and Metering Voltage Fuses/Links – Labelling

Voltage Conductor Main		
Voltage Conductor	**Between mvf/l and ttb voltage link**	**Between ttb voltage link and ttb fuse/link**
L1	E10M	E11M
L2	E30M	E31M
L3	E50M	E51M
Neutral	E70M	E71M

Voltage Conductor Check		
Voltage Conductor	**Between mvf/l and ttb voltage link**	**Between ttb voltage link and ttb fuse/link**
L1	E10C	E11C
L2	E30C	E31C
L3	E50C	E51C
Neutral	E70C	E71C

CT Output Conductor		
CT Output Conductor	**Between S1 on CT and ttb (Main)**	**Between S1 on CT and ttb (Check)**
L1	D11M	D11C
L2	D31M	D31C
L3	D51M	D51C

CT Return Conductor		
CT Return Conductor	**Between S2 on CT and ttb (Main)**	**Between S2 on CT and ttb (Check)**
L1	D10M	D10C
L2	D30M	D30C
L3	D50M	D50C

Combined CT Return Conductor	
Between S2 on CTs, and ttb, (Main) where CT return conductors are combined	**Between S2 on CTs and ttb (Check) where CT return conductors are combined**
D70M	D70C

Earth Conductor
90

Key:

mvf/l = metering voltage fuse/link
ttb = terminal test block

Appendix 11 – CT/VT Metering Unit Label

One label to be completed for each of the Main and Check metering equipment.

CT and VT Metering Equipment Label Information Main / Check* (*delete where not applicable)							
CT/VT	**Phase**	**Manufacturer**	**Serial Number**	**Single/Dual/Multi (Ratios Available)**	**Rating (VA)**	**Class**	**Ratio Connected**
CT	L1						
CT	L2						
CT	L3						
VT	L1						
VT	L2						
VT	L3						
Distributor Company: Northern Powergrid			**Installation/Commissioning Engineer**:			**Date**: / /	