NPS/003/014 – Technical Specification for Ground Mounted Distribution RMU & Extensible Switchgear for use on 11kV & 20kV Networks

1. Purpose

The purpose of this document is to specify the technical requirements for distribution Ring Main Units (RMU) and extensible switchgear utilised in ground mounted substations on the Northern Powergrid distribution 11kV and 20kV networks.

This specification seeks to be functional and to clarify, or vary, existing national specifications and requirements only where necessary.

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

Reference	Version	Date	Title
NPS/003/014	6.0	May 2023	Technical Specification for Ground Mounted Distribution RMU & Extensible Switchgear for use on 11kV & 20kV Networks

2. Scope

This specification includes cable connected or transformer mounted extensible and non-extensible Ring Main Units, extensible switchgear and metering units, having a rated voltage of 12 or 24kV.

It requires suppliers to provide periodic inspection and maintenance information.

It will also be necessary to consider and include any project specific requirements as detailed in Appendix 9, Addendum to Supplier Requirements, which will be completed for a specific project when the need arises.

The following appendices form part of this technical specification:

- Appendix 1 - Technical Schedules Sheet
- Appendix 2 - Routine Testing and Commissioning Testing
- Appendix 3 - Self Certification Conformance Declaration against ENA TS 41-36 requirements
- Appendix 4 - Self Certification Conformance Declaration against ENA TS 41-41 requirements
- Appendix 5 - Self Certification Conformance Declaration against ENA TS 48-05 requirements
- Appendix 6 - Self Certification Conformance Declaration against ENA TS 48-6-6 requirements
- Appendix 7 - Self Certification Conformance Declaration against NPS/003/014 requirements
- Appendix 8 - Individual Item Summary Technical Details
- Appendix 9 - Pre-Commission Testing, Routine Inspection and Maintenance Requirements
- Appendix 10 - Addendum to Supplier Requirements, including Logistics Requirements
- Appendix 11 - Technical Information Check List

2.1. Table of Contents

3. Technical Requirements

3.1. Compliance with other Specifications and Standards

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

3.2. Overall

Products shall comply fully with, and meet all the requirements of, Issue 3 2012 of "ENA TS 41-36 - Distribution Switchgear for Service Up to 36kV (Cable and Overhead Conductor Connected)", or Issue 1 2020 of "ENA TS 41-41 - Ground Mounted Distribution Substation 12 to 24 kV Rated RMU & Extensible Switchgear" except where varied by this specification.

The switchgear will preferably have been, or in the process of being assessed by the Energy Networks Association and granted a Notice of Conformance against ENA TS 41-36, or ENA TS 41-41.

3.3. Environment and Suitability for Indoor or Outdoor Use

Switchgear is required for use in two general categories:

Indoor

Typically installed in a masonry, Glass-Reinforced-Plastic (GRP), or steel housing. This will provide protection from the direct effects of most elements of the weather but is not actively temperature maintained or climate controlled. The housing will usually have multiple, large louvered air vents and is unlikely to prevent dust, high humidity air or salt fog entering the housing.

Outdoor

Open to the direct effects of all UK weather elements and climatic effects. (Note: HV metering units will not be used outdoors)

3.4. Remote Control

All primary circuits on all switchgear types shall be supplied equipped with the capability of being remotely controlled and operated by motorised actuators. These shall either be fitted by the manufacturer before delivery to Northern Powergrid on specified circuits, or retrofitted on site at a later date

The remote-control option(s) shall allow full compliance with Northern Powergrid technical specification NPS/003/017.

Manually operated circuit breakers and switch disconnectors shall have the option to be supplied with a factory fitted motorised actuator specifically designed by the manufacturer of that switchgear. This actuator shall be fully capable of replicating all operating functions as are available manually.

Manually operated switch disconnectors shall be supplied equipped with all necessary internal wiring and connections to facilitate the future installation of a motorised actuator on site if not supplied fitted.

The removal and re-fitting or disengagement and re-engagement or disabling and enabling of a motorised actuator function on switchgear in service shall be: non-intrusive, not require the switchgear to be taken out of normal service condition and shall not require the operational position of the switchgear to be changed.

Where the motorised actuator is of an internal, in-built type then there shall be the provision for electrical and/or mechanical isolation of the motorised function for the purposes of safety isolation as defined and prescribed in ENA TS 41-41 Clause 6.12.202.1

All switchgear shall have the option to be supplied equipped with fault sensing instruments or current transformers (CTs) on any or all primary circuits for use with fault passage indicators and/or direct interface with RTUs. The ratio shall be 500:1 and each phase shall have a sensor / CT.

The secondary wiring marshalling compartment shall have a split gland plate arrangement so that pre-formed umbilical cabling with connectors can be utilised. Air vent(s) shall be incorporated to allow for free breathing, without impacting on the IP rating.

3.5. Electrical Protection

All circuit breakers shall be supplied equipped with a protection system that provides a minimum of two pole overcurrent and single pole earth fault protection.

Where current sensing instruments are offered in place of traditional wire-wound CTs, this shall be explicitly identified. All wire wound CTs and current sensing instruments shall conform to the relevant standard from the BS EN 61869 series for that particular technology. Northern Powergrid reserves the right to reject current sensing instruments and instead insist on traditional wound CTs.

All circuit breakers rated at 630A or above shall be supplied equipped with a self-powered, two pole overcurrent and earth fault time delayed (IDMT) multi-function relay. The selectable protection characteristics shall include: IEC IDMT standard inverse (SI), very inverse (VI), extremely inverse (EI) curves and definite time lag (DTL).

Circuit breakers rated below 630A:

- Shall provide protection by the utilisation of Time Fuse-Links (ENA TS 12-6 and 12-8). If this option is not available then (subject to formal agreement) a self-powered relay, as for the 630A variants above, shall be utilised.
- Where the standard protection arrangement utilises time fuse-links then an option for a self-powered relay shall also be provided.

Switchgear that will be used to provide metered HV supplies to customers shall be equipped with facilities for accepting both 110V DC and/or 30V DC remote emergency tripping signals (shunt trip).

Circuits with Embedded Generation shall have an option for a three-phase voltage transformer capable of measuring residual voltages.

Circuits with Embedded Generation shall have the option of conventional wire wound CT's that shall be wired out to terminals for connection of a standalone protection panel.

Every circuit breaker and switch disconnector shall have additional spare auxiliary switches that will be available for connection to external RTU/Protection panels.

3.6. Electrical Protection Relays

Relays shall have been assessed for compliance with BSEN / IEC 60255, ENA TS 48-5 and 48-6-6 and preferably type tested to confirm compliance. This assessment shall, preferably, have been carried out by the Protection Assessment Panel of the Energy Networks Association

All relays shall, as a minimum, incorporate the following features:

(a) Self-powered operation, without reliance on an internal or external battery for tripping

(b) Easily re-settable, without the use of special tools, or IT equipment.

(c) Unambiguous, visual indication of operation

(d) The relay and this indication shall be capable of remaining indefinitely in the operated state.

(e) Protection settings/configurations shall be directly selectable, via the relay front panel, without the use of a laptop, PC or any external CPU running software.

3.7. Metering and Metering Equipment

The specification for metering is dictated by the customer requirements and the Electricity Meter Operations Code of Practice (MOCoP).

The following are the basic burden and accuracy class required for the Metering Units. Detailed ratios can be found in Appendix 1 as these will be ordered on a site specific basis.

All CTs shall comply with BE EN 61869 Part 1 and 2. Electronic CTs are not currently accepted for Tariff Metering duties.

Specific details of the CTs and VTs required are in Appendix 1c

3.8. Testing

Northern Powergrid policies and procedures require switchgear to be over-voltage tested in accordance with the Northern Powergrid Operational Practice Manual (OPM). The test voltages appropriate to this equipment are specified in Table WE.1 in section WE TESTING of the OPM. A copy of this table is included as Appendix 2.

The switchgear and all ancillary components and features shall be designed and manufactured to withstand these test voltages when applied to associated cables and/or plant without any degradation in performance to the switchgear or ancillary functions. This specifically includes Voltage presence or detecting systems incorporated into the switchgear.

Where VTs are installed for metering or protection purposes it shall be possible to easily isolate the VTs from the switchgear primary circuit to allow testing of the switchgear and any connected cables and/or plant without applying overvoltage to the VTs. Clear, concise instructions on how to achieve this shall be provided.

Where current sensing instruments are offered in place of traditional wire-wound CT's the impact in terms of compatibility with established company procedures and test equipment will be assessed and shall only be regarded as accepted when written confirmation is provided by the Northern Powergrid Policy & Standards section. Northern Powergrid reserves the right to reject current sensing instruments and instead insist on traditional wound CTs.

Access to the protection CTs or current sensing instruments secondary wiring terminals for the purposes of secondary injection testing remains a strong preference.

Where this cannot be achieved and/or the CT or current sensing instruments secondary wiring is directly connected to a protection relay then the option for additional Test windings shall be offered with their secondary output connections being available for secondary injection testing within the LV marshalling compartment.

Northern Powergrid requires manufacturers to carry out a number of additional pre-commissioning checks on the equipment prior to its final despatch. These tests are detailed in Appendix 2.

3.9. Enclosure of Conductors that do not have Continuous Metallic Earth Screens

Conductors, such as separable connectors and external busbars that are not surrounded by a continuous metallic earth screen shall be protected by an earthed metal enclosure that:

(a) Provides a minimum IP rating of IP21B in accordance with BS EN 60529. For the purposes of this test, the unscreened insulation is to be classed as a hazardous part that requires 20mm clearance from the end of the IP21B test probe.

(b) For indoor switchgear provides 5J protection to level IK 08 in accordance with IEC62262, at 40°C and at -5°C to align with the temperature range of the associated switchgear. (ii) For outdoor switchgear provides 10J protection to level IK 09 in accordance with IEC62262, when tested at 40°C and at -25°C to align with the temperature range of the associated switchgear. During testing the enclosure shall be mounted on a surface, representative of the switchgear on which it will be used in service and shall be fixed to this surface using production fixings and methods that

will be used with the switchgear and enclosures as supplied to Northern Powergrid. The pass criterion is the maintenance of the IP21B provision.

(c) Is designed and manufactured to prevent the development of a microclimate inside this housing.

(d) Provides the same physical appearance, environmental performance characteristics and longevity as the switchgear it is associated with.

3.10. Switchgear Enclosures

Switchgear enclosures designed to allow indoor switchgear to be used in an outdoor substation environment shall conform to the general performance requirements of Northern Powergrid specification NPS/006/002 – Technical Specification for Distribution Substation Enclosures.

The housing shall be designed, tested and manufactured to ensure that the climate is controlled by the use of heating and natural airflow to maintain the conditions required for the switchgear and auxiliary equipment installed inside it.

3.11. Variances from and Clarifications of ENATS 41-36 Issue 3 2012 and ENATS 41-41 Issue 1 2020

The following are intended to highlight, or are additional requirements to ENA TS 41-36 and 41-41, therefore the Clause numbers in this section that relate to ENA TS 14-36 and 41-41 are represented in italics with the applicable ENATS clause being explicitly stated:

ENATS 41-36 - 1.4 Ratings / ENATS 41-41 – 5 Ratings

1.4.2.1 Table 1.1 Normal Rated Insulation Levels / 5.3 Table 1 - Rated insulation levels (Up & Ud);

For 12kV switchgear the higher values of Rated Lightning Impulse Withstand Voltage (Up) shall be applied; i.e95kV/110kV (peak value) shall be the minimum.

1.4.4.1 Table 1.3 Rated Normal Current (I_r) / 5.5 Rated continuous current (I_r) [BS EN 62271-1]

The busbars shall have a current rating of at least 630A.

1.4.5 Table 1.3 Rated Short-Time Withstand Current (I_k) / 5.6 Rated short-time withstand current (I_k) [BS EN 62271-1]:

12kV rated units shall have a short-time withstand current rating of at least 20kA. 24kV rated units shall have a short-time withstand current rating of at least 16kA.

1.4.8 Rated Supply Voltage of Closing and Opening Devices and of Auxiliary and Control Circuits (U_a) / 5.9 Rated supply voltage of auxiliary and control circuits (U_a) [BS EN 62271-1]

Remote control facilities shall be rated to operate with 24V DC supplies.

All switchgear utilised for metered HV supplies shall be supplied equipped with a range-taking input that will accept either 110V DC or 30V DC remote emergency tripping signals.

ENATS 41-36 - 1.5 Design and construction / ENATS 41-41 – 6 Design and construction [BS EN 62271-1]

1.5.0.1 General / 6.0 Design and construction requirements

There is a requirement in 41-36 and 41-40 to “design in” features” for “installation, operation, testing, inspection, maintenance, and repair”. This requirement shall be taken to include the requirement to allow these activities to be performed whilst the RMU support legs remain in position without the use of supplementary support(s) for the switchgear.

1.5.0.3.2 Ground mounted equipment - cable connected

Representative diagrams of the equipment, shall be provided by the manufacturer, as illustrated in: 1.5.0.3.2.1 Equipment incorporating fixed switching devices (Groups F & G) and 1.5.0.3.2.2 Equipment incorporating withdrawable switching devices (circuit breakers)

1.5.0.4.1 - Requirements for devices - General

1.5.0.4.4 Facilities for testing primary circuits and busbars / 6.103.202.6 Facilities for testing primary circuits and busbars

1.5.0.4.5.1 Facilities for checking and testing - Testing via primary circuits / 6.103.202.7 testing via primary circuits

1.5.105 Provisions for dielectric tests on cables & 1.5.202 Test devices

> Particular attention must be paid to ensure that the insertion, removal, or replacement of any components (e.g. test bushings, separable connector blanking plugs, etc.) required as part of the procedures to facilitate testing activities can be carried out in an ergonomically acceptable manner. Manufacturers shall provide detailed instructions on how this can be achieved.

1.5.0.4.5.1 Facilities for checking and testing - Testing via primary circuits

> The option for a Voltage Presence Indication System (VPIS), or Voltage Detecting System (VDS), system for phase comparison shall be provided on all switchgear primary circuits, regardless of whether the switchgear is fixed pattern, or able to be withdrawn.

1.5.0.4.7 Facilities for checking voltage and phase identification / 6.103.202.10 Facilities for checking voltage and phase identification

> This system shall be capable of withstanding; or be suitably protected from the TEST voltages that will be applied prior to commissioning as detailed in clause 3.7 and Appendix 2 of this specification.

1.5.1 Requirements for Liquids

> Oil filled switchgear is not acceptable.

1.5.2 Requirements for Gases in Switchgear and Control gear / 6.2 Requirements for gases in switchgear and control gear [BS EN 62271-1]

> SF6 Filled switchgear shall be sealed for life and designed with the target and expectation that it shall not require re-filling or “topping-up” within the expected lifespan of the switchgear; which for the avoidance of doubt is 30 years. Northern Powergrid Environmental policy is to allow for one single “top-up” as a temporary return to service measure for the purposes of planning time to implement a permanent repair to leaking equipment or replacement if a permanent repair is not possible or viable.

Gas filled switchgear using an alternative gas with a lower global warming potential to SF6 will be considered when offered with full Type test evidence. In this instance, the manufacturer will state whether:

- “topping up” will be required within the expected (30 Year) lifetime of the switchgear, and if so then if,
- “topping up” can be carried out with the switchgear in-situ in service on-site, and if so then
- the conditions under which “topping up” can be carried in terms of Energised or Dead.

1.5.4.4.5.2 Terminals and terminations

> With the update of ENATS 50-18 to issue 4 (2013), the reference in ENATS 41-36 (Issue 3 2012) is now incorrect as it references Issue 3 (2008) of ENATS 50-18. The updated clause reference and therefore requirement for conformity to ENATS 50-18 (2013) is now 7.2.1
>
> All secondary wiring terminals that may give rise to high potential voltages (such as CTs and current sensing instruments) regardless of their function shall be of the spring loaded or cage clamp design and shall have a shorting/disconnecting facility.
>
> It is a strong preference for the CT or current sensing instrument outputs to be routed via the switchgear LV marshalling compartment, with terminals in the LV marshalling compartment being provided to

allow for testing and and/or other connections to be made to the CT or current sensing instruments output circuits.

1.5.8 Operation of Releases / 6.9 Operation of releases [BS EN 62271-1]

All switchgear utilised for controlling metered HV supplies shall be provided with facilities for accepting remote signals for emergency tripping.

ENATS 41-36 1.5.9 Low and high pressure interlocking and monitoring devices

The gas pressure of any pressurised tank shall be monitored and include a single stage pressure switch to operate at the minimal functional pressure to indicate "Low Gas". This alarm condition shall not inhibit operation.

ENATS 41-41 6.10 Pressure/level indication [BS EN 62271-1]

All requirements a) to f) shall apply in addition to Table 7 additions

1.5.13.2 Protection against Ingress of Water.

Switchgear (including metering units) categorised as 'Indoor' shall be certified to at least IPX1, and preferably to IPX2, to protect against damage from water ingress into the substation. This requirement does not apply when the switchgear is in the state required to allow normal operations, i.e. when the switchgear enclosure/shutters are opened to perform the normal operation.

1.5.15 Gas and vacuum tightness / 6.16 Gas and vacuum tightness [BS EN 62271-1]

Suppliers shall provide extended warranty and onsite repair response support for the full duration of the standard stated operating life from the date of install in the event that products fail to conform with the stated requirement of this clause where the loss of gas is not caused by another influential event or external influence. For the avoidance of doubt; the stated performance requirements of this clause are:

1.5.15 of ENA TS 41-36

Sub-clause 5.15 of IEC 62271-1 and, for metal-enclosed switchgear, sub-clauses 5.15 and 5.103.2.3 of IEC 62271-200 are applicable with the following additions:

- The leakage rate F_{rel} of the gas of a closed pressure system shall be such that it shall not require replenishment during its expected minimum operating life of 30 years.;
- The tightness of sealed pressure systems is specified by their expected operating life. The standard value is 30 years;
- The leakage rate shall not exceed 0.5% per year at 20°C.

6.16 of ENATS 41-41

In addition to BS EN 62271-1, the requirements in "gas and vacuum tightness" and "fluid filled compartment –tightness" Clauses of BS EN 62271-200 are applicable with the following additions:

- The leakage rate F_{rel} of the gas of a closed pressure system shall be such that it shall not require replenishment during its expected minimum operating life of 30 years.
- The tightness of sealed pressure systems is specified by their expected operating life. The standard value is 30 years.
- The leakage rate shall not exceed 0.1% per year at 20 °C

1.5.101 Internal Fault / 6.101 Internal arc fault [BS EN 62271-200]

Options for avoiding, or restricting, the venting of arc products into the substation building shall be provided; e.g. ducting to divert arc products out of the building, arc quenchers/filters, etc.

1.5.102.103 Transformer Mounting Arrangement

12 kV rated switchgear shall also be designed and constructed to allow it to be directly connected to the HV flange of a 'Ground mounted transformer-not close coupled as specified in ENATS 35-1. The transformer flange height and facing will be the same as for a 'Ground mounted transformer-close coupled.

A busbar extension option shall be provided for use in situations where the transformer radiator arrangement restricts the space available for the switchgear.

1.5.102.104 Heater

Where indoor class switchgear is offered with an enclosure for outdoor use, then the provision of a thermostatically controlled heater as an anti-condensation measure shall be included. The supply voltage for the heater shall be 230V a.c. and an appropriately rated combined protection / isolating device shall be included.

1.5.103.1.101 Cable Compartments / 6.103.1.201 Connection compartments

Northern Powergrid has a strong preference for cold shrink cable terminations.

Where the switchgear utilises separable connectors the bushing interfaces shall be:

Dead Break plug-in cable terminations with bolted contact (M16)) interface type "C" according to EN 50181/Din EN 50181 and rated for 400/630A.

All switchgear with integrated internal cable / connection compartments shall be supplied complete with cable support clamps suitable for accommodating the range of cable sizes detailed in Appendix 1 of the Northern Powergrid network product specification NPS/002/020 – Technical Specification for 11 & 20kV Power Cables.

All units supplied with external cable / connection compartments; options shall be provided for the variants of gland plate detailed in Appendix 1a and 1b as Ancillary items.

For each primary circuit way, all switchgear shall be supplied equipped with an insulated connection arrangement suitable to connect cable earths inside the cable compartment to a substation earth outside of the compartment. This insulated connector shall be rated, as a minimum for 16kA and shall provide 6.7kV insulation from the switchgear, cable box and gland plate.

Where available, a cable / connection compartment cover with a clear, anti-mist viewing window that provides a view of the cable terminations sufficient to ascertain the general external condition of the termination arrangement shall be offered as an alternative option to a standard solid cover. Any such alternative viewing facility shall not compromise any Internal Arc Rating Classification (IAC); which shall in any case be IAC AF 12.5kA 1s to BS EN 62271-200 as a minimum

1.5.105 Provisions for dielectric tests on cables

A dedicated test connection for tests on cables shall be supplied

ENATS 41-36 - 1.10 Rules for Transport, Storage, Installation, Operation, Maintenance and Disposal / ENATS 41-41 – 11 Transport, storage, installation, operating instructions and maintenance [BS EN 62271-1]

The installation, testing, commissioning, operating, maintaining and removal procedures for the switchgear shall take into account the requirements of UK safety legislation and requirements, including legislation governing working at heights. Suppliers, or manufacturers, shall demonstrate compliance with all of these.

The switchgear must be able to be installed in existing substations or third party buildings which preclude the use of mechanical lifting devices. It shall be possible to manually move and locate the switchgear in a safe and ergonomically acceptable manner. Manufacturers shall provide detailed instructions on how this can be achieved.

ENATS 41-36 - 2 ADDITIONAL CLAUSES FOR METAL-ENCLOSED CIRCUIT-BREAKERS

ENATS 41-36 - 2.4 Ratings

All Circuit Breakers shall be rated for 'line-charging breaking current'

ENATS 41-36 - 2.5.10 Nameplates and labelling

2.5.10.1 Nameplates and labelling - Nameplates

The nameplate shall also include:

- the version of ENA TS 41-XX that the switchgear complies with and,
- The ENA Notice of Conformance (NOC) number (if an NOC has been issued).

ENATS 41-36 - 4 Switch Fuse Combinations

The characteristics of the network and feeder protection at primary substations effectively preclude the addition of switch fuse combinations onto the Northern Powergrid distribution network.

ENATS 41-36 - 6 Additional Clauses for Overhead Conductor Connected Air-Break Switch-Disconnectors, Disconnectors and Earthing Switches

This section is not applicable to this Network Product Specification.

ENATS 41-36 - 7 Additional Clauses for Pole-Mounted Enclosed Switchgear

This section is not applicable to this Network Product Specification.

ENATS 41-36 - 8 Additional Clauses for Overhead Conductor Connected Expulsion Fuses, Solid Links and Automatic Sectionalising Links

This section is not applicable to this Network Product Specification.

ENATS 41-36 - 9 Additional Clauses for 36kv Fault-Throwing Switches

This section is not applicable to this Network Product Specification.

ENATS 41-36 - 10.7 Fault Passage Indication / ENATS 41-41 – 6.204 Fault Passage indication

10.7.1 of ENATS 41-36 Local fault indication

6.204 of ENATS 41-41 Fault passage indicators shall conform with ENA TS 48-2

All primary circuits on all switchgear types shall have the option to be supplied equipped with integral, individual phase CTs or current sensing instruments and a company specified Fault Passage indicator (FPI) to enable the detection of an earth fault, or phase fault current.

The CTs or current sensing instruments shall be Class PX, 500:1 ratio and rated to the same current ratings assigned to the switchgear.

All Ring Main Units shall be supplied equipped with integral CTs or current sensing instruments wired to a corresponding company specified Fault Passage Indicator on the left hand side feeder switch circuit, as viewed from the normal operating position of the switchgear

These CTs or current sensing instruments shall allow full compliance with Northern Powergrid network product specification NPS/003/013 and shall provide an output to operate a fault passage indicator relay that complies with NPS/003/013.

The CT or current sensing instrument outputs and the on-going circuits to the FPI relay shall be routed via the switchgear LV marshalling compartment, with terminals in the LV marshalling compartment being provided to allow for testing and additional connections to be made to the CT or current sensing

instrument output circuits. This will allow the addition of monitoring equipment associated with Smart Grid projects, system real time monitoring, etc.

4. References

The products described within this specification shall comply with all current versions of the relevant International Standards, British Standard Specifications and all relevant Energy Networks Association Technical Specifications (ENATS) current at the time of supply.

4.1. External Documentation

Reference	Title
BS 2562	Cable boxes for transformers and reactors
BS 6121-5	Mechanical cable glands. Code of practice for selection, installation and inspection of cable glands and armour glands
BS EN 60529	Specification for classification of degrees of protection provided by enclosures
BS EN 61869 series	General Requirements for Instrument Transformers
BS EN 62262	Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)
BSEN IEC 60255 series	Measuring relays and protection equipment
ENA TS 35-1 Part 1	Energy Networks Association; Distribution Transformers Part 1 Common Clauses
ENA TS 35-1 Part 2	Energy Networks Association; Distribution Transformers Part 2 – Ground mounted transformers – not close coupled
ENA TS 35-1 Part 3	Energy Networks Association; Distribution Transformers Part 3 - Ground mounted transformers – close coupled
ENA TS 41-36	Energy Networks Association; Distribution Switchgear For Service Up To 36kV (Cable And Overhead Connected)
ENA TS 41-41	Energy Networks Association; Ground Mounted Distribution Substation 12 to 24 kV Rated RMU & Extensible Switchgear
ENA TS 48-2	Fault Passage Indicators up to 36 kV for underground and overhead distribution systems
ENA TS 48-5	Energy Networks Association; Environmental Test Requirements for Protection Relays and Systems
ENA TS 48-6-6	Energy Networks Association; Functional Test Requirements – Overcurrent and Earth Fault Protection Equipment
ENA TS 50-18	Energy Networks Association. “Application of Ancillary Electrical Equipment”
ENA TS 50-19	Energy Networks Association. “Standard Numbering for Small Wiring”
IEC 62271-1	High-voltage switchgear and controlgear - Part 1: Common specifications
IEC 62271-200	High-voltage switchgear and controlgear – Part 200: AC metal-enclosed switchgear and controlgear for rated voltages above 1kV and up to and including 52kV

4.2. Internal Documentation

Reference	Title
IMP/010/011	Code of Practice for Earthing LV Networks and HV Distribution Substations
NPS/002/020	Technical Specification for 11 & 20kV Power Cables
NPS/002/032	Technical Specification for Metering Base/Panel Unit for Connection to High Voltage Metering Circuit Breakers in Accordance with CoP3 up to a Circuit Capacity not Exceeding 10 MVA
NPS/003/013	Specification for Fault Passage Indicators and their associated Current and Voltage Sensing Instruments for use with Ground Mounted 11 & 20kV Switchgear
NPS/003/017	Technical Specification for a Ground Mounted Distribution Switchgear Remote Control System
NPS/006/002	Technical Specification for Distribution Substation Enclosures

4.3. Amendments from Previous Version

Reference	Amendments
Appendices	Improvements in cross references and minor numbering corrections and removal of duplicated lines
3	Minor refresh and clarification of terms and requirements.
3.11 ENATS variations	Improved format to improve readability.
3.4 Remote Control	Expansion on wording to clarify requirements for internal motorisation
3.5 Protection	Title changed to Electrical Protection to be clear and concise around the section subject i.e. NOT Ingress or Impact protection (IP / IK)
3.6 Protection relays	As above – Electrical Protection Relays.
3.7 Metering and Metering Equipment	Removed obsolete reference. Clear statement on basic specific parameters with further reference to applicable Appendices.

5. Definitions

Term	Definition
Company	Northern Powergrid
Current sensing Instruments	Sensors designed, calibrated, tested and utilised to indirectly and accurately measure the current flowing in primary conductors that use an alternative to the established principles of wire wound current transformation
Embedded Generation	Electricity generation connected to the Distribution System rather than the National Grid
Hot Site	A substation site designation where the Earth Potential Rise (EPR) under fault conditions exceeds a permissible value depending on the fault clearance time as stated in IMP/010/11

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	06/06/2023

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
Alan MacDonald	Policy & Standards Engineer	09/05/2023

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
Joe Helm	Policy & Standards Manager	13/04/2023
Michael Crowe	Technical Services Manager - Northeast	18/04/2023
Andrew Scott	Technical Services Manager - Yorkshire	21/04/2023
Anuj Chhettri	Smartgrid Development Engineer	06/04/2023
Steve White	Plant Engineer	27/04/2023
Jim Cummings	Design Team Manager	20/04/2023
James Fletcher	Design Team Manager	25/04/2023

6.4. Authorisation

Authorisation is granted for publication of this document.

		Date
Paul Black	Head of System Engineering	27/04/2023

Appendix 1a – Technical Schedules for 11kV Items

Outline Requirements for 11kV Items	Manufacturer's Reference(s)	
	Indoor	Outdoor*
Ring Main Unit – Non- Extensible - Close Coupled. **Three devices; Two Ring Switch-disconnectors + one circuit breaker** With ≥200A TFL protected Circuit Breaker tee circuit directly or trunk connectable to an ENATS 35-1 transformer or Metering unit with a type E HV flange to BS 2562 Figure 25 and also cable connectable by the addition of a cable box with the same type of tee off flange.		
Ring Main Unit – Non- Extensible - Close Coupled. **Three devices; Two Ring Switch-disconnectors + one circuit breaker** With ≥200A Self powered relay protected Circuit Breaker tee circuit directly or trunk connectable to an ENATS 35-1 transformer or Metering unit with a type E HV flange to BS 2562 Figure 25 and also cable connectable by the addition of a cable box with the same type of tee off flange.		
Ring Main Unit – Non- Extensible - Close Coupled. **Three devices; Two Ring Switch-disconnectors + one circuit breaker** With ≥630A self –powered relay protected tee circuit directly or trunk connectable to an ENATS 35-1 transformer or Metering unit with a type E HV flange to BS 2562 Figure 25 and also cable connectable by the addition of a cable box with the same type of tee off flange.		
Ring Main Unit – Extensible - Close Coupled. **Three devices; Two Ring Switch-disconnectors + one circuit breaker** With ≥200A TFL protected Circuit Breaker tee circuit directly or trunk connectable to an ENATS 35-1 transformer or Metering unit with a type E HV flange to BS 2562 Figure 25 and also cable connectable by the addition of a cable box with the same type of tee off flange.		
Ring Main Unit – Extensible - Close Coupled. **Three devices; Two Ring Switch-disconnectors + one circuit breaker** With ≥200A Self powered relay protected Circuit Breaker tee circuit directly or trunk connectable to an ENATS 35-1 transformer or Metering unit with a type E HV flange to BS 2562 Figure 25 and also cable connectable by the addition of a cable box with the same type of tee off flange		
Ring Main Unit – Extended - Close Coupled. **Four devices, Two Ring Switch-disconnectors + two circuit breakers** With ≥200A TFL protected Circuit Breaker tee circuit directly or trunk connectable to an ENATS 35-1 transformer or Metering unit with a type E HV flange to BS 2562 Figure 25 and also cable connectable by the addition of a cable box with the same type of tee off flange. An additional ≥630A self –powered relay protected Circuit Breaker circuit directly coupled to the main busbars.		
Ring Main Unit – Extended - Close Coupled. **Four devices, Three Ring Switch-disconnectors + one circuit breaker** With ≥200A TFL protected Circuit Breaker tee circuit directly or trunk connectable to an ENATS 35-1 transformer or Metering unit with a type E HV flange to BS 2562 Figure 25 and also cable connectable by the addition of a cable box with the same type of tee off flange. An additional ≥630A Switch-disconnector circuit directly coupled to the main busbars.		

Outline Requirements for 11kV Items	Manufacturer's Reference(s)	
	Indoor	Outdoor*
Ring Main Unit – Extended - Close Coupled. Four devices, Two Ring Switch-disconnectors + two circuit breakers With ≥200A TFL protected Circuit Breaker tee circuit directly or trunk connectable to an ENATS 35-1 transformer or Metering unit with a type E HV flange to BS 2562 Figure 25 and also cable connectable by the addition of a cable box with the same type of tee off flange. An additional ≥ 200A TFL protected Circuit Breaker circuit directly coupled to the main busbars.		
Circuit Breaker – Extensible Switchpanels (10 items)	**Indoor**	**Outdoor***
Extensible Switchpanel - Bus Section Circuit Breaker 630A - with self-powered relay protection With ≥630A self –powered relay protected Circuit Breaker.		
Extensible Switchpanel - Busbar Earthing Switch Fully rated switching device to earth the busbars.		
Extensible Switchpanel - Circuit Breaker 200A -TFL protection With ≥200A TFL protected cable connectable Circuit Breaker.		
Extensible Switchpanel - Circuit Breaker 200A - with self-powered relay protection With ≥200A self –powered relay protected cable connectable Circuit Breaker.		
Extensible Switchpanel - Circuit Breaker 630A- with self-powered relay protection With ≥630A self –powered relay protected cable connectable Circuit Breaker.		
Extensible Switchpanel - Metering Bus-Section Circuit Breaker 630A - with self-powered relay protection and shunt trip With ≥630A self –powered relay protected Circuit Breaker and shunt trip coil.		
Extensible Switchpanel - Metering Circuit Breaker 200A - with self-powered relay protection; Version1 With ≥200A self –powered relay protected cable connectable Circuit Breaker , shunt trip coil, 100/50/5A CTs and 2 x VTs.		
Extensible Switchpanel - Metering Circuit Breaker 200A- with self-powered relay protection; Version 2 With ≥200A self –powered relay protected cable connectable Circuit Breaker, shunt trip coil, 200/100/5A CTs and 2 x VTs.		
Extensible Switchpanel - Metering Circuit Breaker 630A - with self-powered relay protection and shunt trip With ≥630A self –powered relay protected cable connectable Circuit Breaker, shunt trip coil, 400/200/5A CTs and 2 x VTs.		
Extensible Switchpanel - Switch Disconnector 630A With ≥630A cable connectable switch disconnector with 3-phase FPI and integral current sensing instruments		

Outline Requirements for 11kV Items	Manufacturer's Reference(s)	
	Indoor	Outdoor*
Non-Extensible Single circuit Switchpanels	**Indoor**	**Outdoor***
Single circuit Non-Extensible Circuit Breaker 200A- Close Coupled or Cable connected With ≥200A TFL protected Circuit Breaker tee circuit directly or trunk connectable to an ENATS 35-1 transformer or Metering unit with a type E HV flange to BS 2562 Figure 25 and also cable connectable by the addition of a cable box with the same type of tee off flange, includes earthing facilities on load side, in addition to fully rated earthing facilities on the supply side.		
Single circuit Non-Extensible Circuit Breaker 200A- Close Coupled or cable connected With ≥200A self-powered relay protected Circuit Breaker tee circuit directly or trunk connectable to an ENATS 35-1 transformer or Metering unit with a type E HV flange to BS 2562 Figure 25 and also cable connectable by the addition of a cable box with the same type of tee off flange, includes earthing facilities on load side, in addition to fully rated earthing facilities on the supply side.		
Single circuit Non-Extensible Circuit Breaker 630A- Close Coupled or cable connected With ≥630A self-powered relay protected Circuit Breaker tee circuit directly or trunk connectable to an ENATS 35-1 Metering unit with a type E HV flange to BS 2562 Figure 25 and also cable connectable by the addition of a cable box with the same type of tee off flange, includes earthing facilities on load side, in addition to fully rated earthing facilities on the supply side.		
Metering Units - as detailed in the Metering Unit section.	Metering units may only be used indoors on NPg networks	
Ancillary and Optional additions for RMU's, Extended RMU's, Extensible and Non-extensible switchpanels	**Outdoor**	
RMU – Ancillary – "Traditional" Wire wound single ratio 200/1 current transformers (set of three) in lieu of current sensors and NO Protection Relay installed		
RMU – Ancillary – "Traditional" Wire wound dual ratio 800/400/1 current transformers (set of three) in lieu of current sensors and NO Protection Relay installed		
RMU - Ancillary - 630A Tee Circuit Trunking Kit - To extend rear busbar flange to directly Connect to ENA TS 35-1 compliant Transformer flanged device.		
RMU – Ancillary – Remote Control 2-Bay RTU in accordance with NPS/003/017 included as either a built-in or attached item		
RMU – Ancillary – Remote Control 3-Bay RTU in accordance with NPS/003/017 included as either a built-in or attached item		
RMU – Ancillary – Remote Control 4-Bay RTU in accordance with NPS/003/017 included as either a built-in or attached item		
RMU - Ancillary - Actuator Like for like onsite replacement on RMU 630A Ring Sw		
RMU - Ancillary - Actuator Factory Fitted on RMU ≥200A Tee Circuit Breaker		
RMU - Ancillary - Actuator Factory Fitted on RMU ≥630A Tee Circuit Breaker		
RMU - Ancillary - Actuator Factory Fitted on Left Hand 630A Ring Switch		

Outline Requirements for 11kV Items	Manufacturer's Reference(s)	
	Indoor	Outdoor*
RMU - Ancillary - Actuator Factory Fitted on BOTH Ring Switches – to include added FPI and current sensing instruments on RH RSw		
RMU - Ancillary - Cable Box suitable for use on the Tee CB Circuit on RMU - to include flat, split, three-hole gland plate		
RMU - Ancillary - Cable Box Gland Plate - 3 hole -Flat & Horizontal, For Bottom Entry of Vertical Cables. RMU Ring Switches		
RMU - Ancillary - Cable Box Gland Plate - 3 hole - Flat & Horizontal, For Bottom Entry of Vertical Cables. RMU Tee circuit & Extensible range		
RMU - Ancillary - Cable Box Gland Plate - 3 hole - Flat & Horizontal, For Bottom Entry of Vertical Cables. Extensible & Non-extensible switchpanels		
RMU - Ancillary – Cable Box Gland Plate Angled - Left Hand Ring Switch - For Bottom Entry of Cable(s) at an angle of ~45 degrees to the rear.		
RMU - Ancillary – Cable Box Gland Plate Angled - Right Hand Ring Switch - For Bottom Entry of Cable(s) at an angle of ~45 degrees to the rear.		
RMU - Ancillary - Cable Box Gland Plate - Single Hole Flat, split - for use with triplexed single core 11kV cable.		
RMU - Ancillary - Factory Fitted Option of Fault Passage Indicator on the Right-Hand Ring Sw		
RMU - Ancillary - Shunt Trip Coil For Tee CB Circuit - Factory Fitted Option		
RMU – Ancillary – Cable Box pin insulator for High EPR (Hot) substation site HV Earth isolation - 12kV rated Insulation.		
RMU Extensible - Ancillary - Busbar End Cap		
RMU Extensible - Ancillary - Kit to connect Extension Switchpanels to RMU		
Extensible Switchpanel - Ancillary - Kit To Connect Extension Switchpanels		
Extensible Switchpanel - Ancillary - Option For Actuator - Factory Fitted on 200/630A Circuit Breaker or 630A Switch		
Extensible Switchpanel - Ancillary - Factory Fitted option of Fault Passage Indicator on a Circuit Breaker or Switch-Disconnector		

Appendix 1b – Technical Schedules for 20kV Items

Outline Requirements for 20kV Switchgear Items *(Note Clause 3.5 on TFL protection preference)*	Manufacturer's Reference(s)		Protection type on <630A Circuit Breakers (state)
	Indoor	Outdoor*	
Ring Main Unit – Non- Extensible - Close Coupled. **Three devices; Two Ring Switch-disconnectors + one circuit breaker** With ≥200A protected Circuit Breaker tee circuit directly or trunk connectable to an ENATS 35-1 transformer or Metering unit with a type J HV flange to BS 2562 Figure 24 and also cable connectable by the addition of a cable box with the same type of tee off flange.			
Ring Main Unit – Non- Extensible - Close Coupled. **Three devices; Two Ring Switch-disconnectors + one circuit breaker** With ≥630A self –powered relay protected tee circuit directly or trunk connectable to an ENATS 35-1 transformer or Metering unit with a type J HV flange to BS 2562 Figure 24 and also cable connectable by the addition of a cable box with the same type of tee off flange.			
Ring Main Unit – Non- Extensible - Cable Connected. **Three devices; Two Ring Switch-disconnectors + one circuit breaker** With ≥200A protected Circuit Breaker device. Cable connected on all circuits. Where the circuit breaker is a tee off circuit utilising a cable box, this shall connect with a type J HV flange to BS 2562 Figure 24.			
Ring Main Unit – Non- Extensible - Cable Connected. **Three devices; Two Ring Switch-disconnectors + one circuit breaker** With ≥630A self –powered relay protected Circuit Breaker device. Cable connected on all circuits. Where the circuit breaker is a tee off circuit utilising a cable box, this shall connect with a type J HV flange to BS 2562 Figure 24.			
Ring Main Unit – Non- Extensible - Cable Connected. **Three devices; One Ring Switch-disconnector + two circuit breakers** With ≥200A protected Circuit Breaker AND ≥630A self –powered relay protected Circuit Breaker device. Cable connected on all circuits. Where the ≥200A protected circuit breaker is a tee off circuit utilising a cable box, this shall connect with a type J HV flange to BS 2562 Figure 24.			

Outline Requirements for 20kV Switchgear Items *(Note Clause 3.5 on TFL protection preference)*	Manufacturer's Reference(s)		Protection type on <630A Circuit Breakers (state)
	Indoor	Outdoor*	
Ring Main Unit – Extensible - Close Coupled. Three devices; Two Ring Switch-disconnectors + one circuit breaker With ≥200A protected Circuit Breaker tee circuit directly or trunk connectable to an ENATS 35-1 transformer or Metering unit with a type J HV flange to BS 2562 Figure 24 and also cable connectable by the addition of a cable box with the same type of tee off flange.			
Ring Main Unit – Extensible - Cable Connected. Three devices; Two Ring Switch-disconnectors + one circuit breaker With one ≥200A protected Circuit Breaker circuit. Cable connected on all circuits. Where the circuit breaker is a tee off circuit utilising a cable box, this shall connect with a type J HV flange to BS 2562 Figure 24.			
Ring Main Unit – Extended - Close Coupled. Four devices, Two Ring Switch-disconnectors + two circuit breakers With ≥200A protected Circuit Breaker tee circuit directly or trunk connectable to an ENATS 35-1 transformer or Metering unit with a type J HV flange to BS 2562 Figure 24 and also cable connectable by the addition of a cable box with the same type of tee off flange. An additional ≥630A self –powered relay protected Circuit Breaker circuit fed from the main busbars and cable connected output.			
Ring Main Unit – Extended – Cable connected. Four devices, Two Ring Switch-disconnectors + two circuit breakers With ≥200A protected Circuit Breaker and additional ≥630A self –powered relay protected Circuit Breaker circuit fed from the main busbars. Cable connected on all circuits. Where one circuit breaker is a tee off circuit utilising a cable box, this shall connect with a type J HV flange to BS 2562 Figure 24.			
Ring Main Unit – Extended – Cable connected. Four devices, Two Ring Switch-disconnectors + two circuit breakers With ≥200A protected Circuit Breaker and additional ≥200A protected Circuit Breaker circuit fed from the main busbars. Cable connected on all circuits. Where one circuit breaker is a tee off circuit utilising a cable box, this shall connect with a type J HV flange to BS 2562 Figure 24.			
Ring Main Unit – Extended - Close Coupled. Four devices, Three Ring Switch-disconnectors + one circuit breaker With ≥200A protected Circuit Breaker tee circuit directly or trunk connectable to an ENATS 35-1 transformer or Metering unit with a type J HV flange to BS 2562 Figure 24 and also cable connectable by the addition of a cable box with the same type of tee off flange. An additional ≥630A switch-disconnector circuit fed from the main busbars.			
Circuit Breaker – Extensible and Non-Extensible Switch panels	**Indoor**	**Outdoor***	**Protection (state)**
Extensible switch panel - Bus Section Circuit Breaker 630A - with self-powered relay protection With ≥630A self –powered relay protected Circuit Breaker.			

Outline Requirements for 20kV Switchgear Items *(Note Clause 3.5 on TFL protection preference)*	Manufacturer's Reference(s)		Protection type on <630A Circuit Breakers (state)
	Indoor	Outdoor*	
Extensible switch panel - Busbar Earthing Switch Fully rated switching device to earth the busbars.			
Extensible switch panel – Feeder Circuit Breaker ≥200A With ≥200A protected cable connectable Circuit Breaker.			
Extensible switch panel – Feeder Circuit Breaker ≥630A With ≥630A protected cable connectable Circuit Breaker.			
Extensible switch panel – Feeder Switch-disconnector 630A			
Non-Extensible switch panel - Bus Section Circuit Breaker 630A - with self-powered relay protection With ≥630A self –powered relay protected Circuit Breaker.			
Metering Units - as detailed in the Metering Unit section.	Metering units may only be used indoors on NPg networks		

***Reference for outdoor offering is to be a complete unit for outdoor use; i.e. where indoor switchgear is offered for outdoor use the outdoor unit includes: switchgear, housing, heaters, etc. required.**

Outline Requirements for 20kV Items – Ancillary and options	Manufacturer's Reference Outdoor
RMU – Ancillary – "Traditional" Wire wound dual ratio 40/70/5 current transformers (set of three) in lieu of current sensors	
RMU – Ancillary – "Traditional" Wire wound multi ratio 50/100/200/1 current transformers (set of three) in lieu of current sensors	
RMU – Ancillary – "Traditional" Wire wound dual ratio 300/600/1 current transformers (set of three) in lieu of current sensors	
Ancillary and Optional additions for RMU's, Extended RMU's, Extensible and Non-extensible switch panels	
RMU - Ancillary - 630A Tee Circuit Trunking Kit - To extend rear busbar flange to directly Connect to ENA TS 35-1 compliant Transformer flanged device.	
RMU – Ancillary – Remote Control 2-Bay RTU in accordance with NPS/003/017 included as either a built-in or attached item	
RMU – Ancillary – Remote Control 3-Bay RTU in accordance with NPS/003/017 included as either a built-in or attached item	
RMU – Ancillary – Remote Control 4-Bay RTU in accordance with NPS/003/017 included as either a built-in or attached item	
RMU - Ancillary - Actuator Like for like onsite replacement on RMU 630A Ring Sw	
RMU - Ancillary - Actuator Factory Fitted on RMU ≥200A Circuit Breaker	
RMU - Ancillary - Actuator Factory Fitted on RMU ≥630A Circuit Breaker	
RMU - Ancillary - Actuator Factory Fitted on Left Hand 630A Ring Switch	
RMU - Ancillary - Actuator Factory Fitted on TWO Ring Switches – to include added FPI and current sensing instruments on 2nd RSw	
RMU - Ancillary - Actuator Factory Fitted on THREE Ring Switches – to include added FPI and current sensing instruments on 2nd & 3rd RSw	
RMU - Ancillary - Cable Box suitable for use on the Tee CB Circuit on RMU - to include flat, split, three-hole gland plate	
RMU - Ancillary - Cable Box Gland Plate - 3 hole -Flat & Horizontal, For Bottom Entry of Vertical Cables. RMU Ring Switches	
RMU - Ancillary - Cable Box Gland Plate - 3 hole - Flat & Horizontal, For Bottom Entry of Vertical Cables. RMU Tee circuit & Extensible range	
RMU - Ancillary - Cable Box Gland Plate - 3 hole - Flat & Horizontal, For Bottom Entry of Vertical Cables. Extensible & Non-extensible switch panels	
RMU - Ancillary – Cable Box Gland Plate Angled - Left Hand Ring Switch - For Bottom Entry of Cable(s) at an angle of ~45 degrees to the rear.	
RMU - Ancillary – Cable Box Gland Plate Angled - Right Hand Ring Switch - For Bottom Entry of Cable(s) at an angle of ~45 degrees to the rear.	
RMU - Ancillary - Factory Fitted Option of Fault Passage Indicator on the SECOND Ring Sw circuit	
RMU - Ancillary - Factory Fitted Option of Fault Passage Indicator on the SECOND and THIRD Ring Sw circuit	
RMU - Ancillary - Shunt Trip Coil for CB Circuit - Factory Fitted Option	
RMU – Ancillary – Cable Box pin insulator for High EPR (Hot) substation site HV Earth isolation - 20kV rated Insulation.	
RMU Extensible - Ancillary - Busbar Extension option for future connectivity	
RMU Extensible - Ancillary - Kit to connect Extension Switch panels to RMU	
Extensible Switch panel - Ancillary - Kit To Connect Extension Switch panels	

Outline Requirements for 20kV Items – Ancillary and options	Manufacturer's Reference Outdoor
Extensible Switch panel - Ancillary - Option For Actuator - Factory Fitted On Circuit Breaker	
Extensible Switch panel - Ancillary - Factory Fitted option of Fault Passage Indicator on a Circuit Breaker or Switch-Disconnector	
RMU - Ancillary - Outdoor Enclosure for INDOOR class Switchgear	

Appendix 1c – Technical Schedules for 11kV and 20kV Metering Items

Metering Units Required by Northern Powergrid

Overview:

The metering unit shall be in accordance with ENATS 41-36 or 41-41 as applicable and shall NOT be oil insulated.

Characteristics of metering units are dictated by agreement between the meter owners/operators/installers and may vary from site to site.
However, the following rules and examples are, in the absence of any other directions, typical requirements for use on Northern Powergrid networks.

Metering units are generally:

- Directly coupled to Ring Main Units, or
- Directly coupled to, or integral to extensible switchgear, or
- Free standing independent units.
- **Only used Indoors**

Due to multiple parties being involved in the installation, commissioning, and operation of the metering unit, it is of particular importance that the secondary and auxiliary wiring in the metering unit and associated equipment is fully compliant with both ENATS 50-19 Energy Networks Association "Standard Numbering for Small Wiring" and ENATS 50-18 Energy Networks Association. "Application of Ancillary Electrical Equipment"

To allow termination of the cables associated with metering; a metal enclosed multicore cable box shall be provided, complete with cable glands complying with BS6121: Type E1W or equivalent.
Because multiple parties are involved in the installation, commissioning, and operation of the metering; it is strongly preferred that access to this cable box is independent of access into any switchgear or control gear compartments.
Access to the metering terminals shall not require the use of tools.

VTs shall be at least class 1.0 or better, have a minimum output of 100VA per phase and have a rated voltage factor of 1.2 continuous and 1.9 for 30s.
VTs shall, preferably, be connected to the primary conductors via readily removable fuse links with current limiting characteristics to BS2692, or equivalent.

CTs shall have a minimum output of 15VA and an accuracy class of 0.5S or better, a continuous Thermal Rating >1.2x Circuit Breaker rating and a Rated Short Term Thermal Current (Ith) to match the switchgear rating.

General Typical Requirements
11kV Metering Unit Version 1 2 x **100/50/5 A current transformers** for metering, Class 0.5S, burden 15VA 2 x voltage transformers, ratio **11,000/110 V**, Class 1, burden 100VA, rated voltage factor of 1.2 continuous and 1.9 for 30 seconds
11kV Metering Unit Version 2 2 x **200/100/5 A current transformers** for metering, Class 0.5S, burden 15VA 2 x voltage transformers, ratio **11,000/110 V**, Class 1, burden 100VA, rated voltage factor of 1.2 continuous and 1.9 for 30 seconds
11kV Metering Unit Version 3 2 x **400/200/5 A current transformers** for metering, class 0.5S, burden 15VA 2 x voltage transformers, ratio **11,000/110 V**, Class 1, burden 100VA, rated voltage factor of 1.2 continuous and 1.9 for 30 seconds
20kV Metering Unit. 2 x **100/50/5 A current transformers** for metering, Class 0.5S, burden 15VA 3 x voltage transformers, ratio **22,000/110 V**, Class 1, burden 100VA, rated voltage factor of 1.2 continuous and 1.9 for 30 seconds
20kV Metering Unit. 2 x **50/5/1 A current transformers** for metering, Class 0.5S, burden 15VA 3 x voltage transformers, ratio **22,000/110 V**, Class 1, burden 100VA, rated voltage factor of 1.2 continuous and 1.9 for 30 seconds
20kV Metering Unit. 2 x **200/5/1 A current transformers** for metering, Class 0.5S, burden 15VA 3 x voltage transformers, ratio **22,000/110 V**, Class 1, burden 100VA, rated voltage factor of 1.2 continuous and 1.9 for 30 seconds

Outline Requirements for Metering Items	Detailed Requirements for Metering Items	Manufacturer's Reference
11kV RMU Metering 630A Non-Extensible Complete Assembly Unit		
RMU - Metering Unit 200A *Version1* Suitable for Close Coupling to a RMU conforming to ENA TS 41-36 or 41-41	**200A Metering Unit suitable for close coupling** to an ENA TS 35-1 compliant transformer flanged device on incoming AND outgoing sides Including: 100/50/5A CTs VTs Cable box for outgoing cable including complete gland plate (3 hole), glands, all fixings & seals and 16kA rated insulated arrangement to connect cable earths inside the cable box to substation earth outside the cable box, whilst providing insulation from the switchgear, cable box and gland plate. All hardware required to close couple and connect the incoming side to an ENA TS 41-36 or 41-41 RMU **Excludes RMU**	
RMU - Metering Unit 200A *Version2* Suitable for Close Coupling to a RMU conforming to ENA TS 41-36 or 41-41	**200A Metering Unit suitable for close coupling** to an ENA TS 35-1 compliant transformer flanged device on incoming AND outgoing sides Including: 200/100/5A CTs VTs Cable box for outgoing cable including complete gland plate, glands, all fixings & seals and 16kA rated insulated arrangement to connect cable earths inside the cable box to substation earth outside the cable box, whilst providing insulation from the switchgear, cable box and gland plate. All hardware required to close couple and connect the incoming side to an ENA TS 41-36 or 41-41 RMU **Excludes RMU**	

Outline Requirements for Metering Items	Detailed Requirements for Metering Items	Manufacturer's Reference
RMU - Metering Unit 630A Suitable For Close Coupling to a RMU conforming to ENA TS 41-36 or 41-41	**630A Metering Unit suitable for close coupling** to an ENA TS 35-1 compliant transformer flanged device on incoming AND outgoing sides Including: 400/200/5A CTs VTs Cable box for outgoing customer's cable including complete gland plate, glands, all fixings & seals and 16kA rated insulated arrangement to connect cable earths inside the cable box to substation earth outside the cable box, whilst providing insulation from the switchgear, cable box and gland plate. All hardware required to close couple and connect the incoming side to an ENA TS 41-36 RMU **Excludes RMU**	
RMU Metering 200A Non-Extensible Complete Assembly - 200A Ring Main Unit With 200A Metering Unit Close Coupled On The Tee Circuit. Version1.	**200A Non-Extensible RMU with self-powered relay protection** and **200A Metering Unit Close Coupled on the RMU Tee Circuit.** Supplied as a Complete Assembly and Equipped with all ancillary components and equipment as for a 200A RMU with self-powered relay protection including shunt trip and a 200A Metering Unit. **100/50/5A CTs**	
RMU Metering 200A Non-Extensible Complete Assembly - 200A Ring Main Unit With 200A Metering Unit Close Coupled On The Tee Circuit. Version2.	**200A Non-Extensible RMU with self-powered relay protection** and **200A Metering Unit Close Coupled on the RMU Tee Circuit.** Supplied as a Complete Assembly and Equipped with all ancillary components and equipment as for a 200A RMU with self-powered relay protection including shunt trip and a 200A Metering Unit. **200/100/5A CTs**	

Outline Requirements for Metering Items	Detailed Requirements for Metering Items	Manufacturer's Reference
RMU Metering 630A Non-Extensible Complete Assembly **- 630A Ring Main Unit With 630A Metering Unit Close Coupled On The Tee Circuit.**	**630A Non-Extensible RMU with self-powered relay protection, shunt trip coil and 630A Metering Unit Close Coupled on the RMU Tee Circuit.** Supplied as a Complete Assembly and Equipped with all ancillary components and equipment as for a 630A RMU with self-powered relay protection and a 630A Metering Unit. **400/200/5A CTs**	
11kV Generator Metering Unit		
Generator Metering Unit - Extensible switch panel **- Metering Circuit Breaker 630A – Externally protected**	**630A Generator Metering Circuit Breaker with NO relay protection for G99 protection** scheme Supplied equipped with all ancillary components, and equipment as for a 630A Metering CB with the following variations: Additional 3 x 800/400/1 A, 15VA 5P20 class X Protection CT's 2 x 400/200/5 Metering CTs 3 x single phase connected VTs, 2 secondary windings with a ratio 11,000/110 V, Class 1, burden 100VA, rated voltage factor of 1.2 continuous and 1.9 for 30 seconds. Winding 1 for Metering, Winding 2 for NVD protection Shunt Trip Coil NO Protection Relay provision as this is externally provided **Excludes metering panel.** Does NOT require pre-wiring for actuator or FPI CTs or Fault Passage Indicator.	
Generator Metering CB - Extensible switch panel Based **- Metering Circuit Breaker 200A – Externally protected**	**200A Generator Metering Circuit Breaker with NO relay protection for G99 protection scheme** Supplied equipped with all ancillary components, and equipment as for a 200A Metering CB with the following variations: Additional 3 x 200/1 A, 15VA 5P20 class X Protection CT's 2 x 100/50/5 Metering CTs 3 x single phase connected VTs, 2 secondary windings with ratio 11,000/110 V, Class 1, burden 100VA, rated voltage factor of 1.2 continuous and 1.9 for 30 seconds Winding 1 for Metering, Winding 2 for NVD protection Shunt Trip Coil Cable box (for outgoing HV customer's cable), with single hole gland plate and glands, etc. Does NOT require pre-wiring for actuator or FPI CTs or Fault Passage Indicator.	

Outline Requirements for Metering Items	Detailed Requirements for Metering Items	Manufacturer's Reference
Generator Metering Assembly- RMU Based Non-extensible Complete Assembly **- 200A Ring Main Unit With 200A Metering Unit Close Coupled On The externally protected RMU Tee Circuit. Version 1**	**200A Non-Extensible RMU with NO relay protection and 200A Metering Unit Close Coupled on the Externally protected Tee Circuit for G99 Protection Scheme** Supplied as a Complete Assembly and Equipped with all ancillary components, and equipment as for a 200A RMU and a 200A Metering Unit, with the following variations: **Additional 3 x 200/1 A**, 15VA 5P20 class X Protection CT's 2 x 100/50/5 Metering CTs 3 x single phase connected VTs, 2 secondary windings with a ratio 11,000/110 V, Class 1, burden 100VA, rated voltage factor of 1.2 continuous and 1.9 for 30 seconds Winding 1 for Metering, Winding 2 for NVD protection Shunt Trip Coil Cable box (for outgoing HV customer's cable), with single hole gland plate and glands, etc. **Includes RMU and Metering Unit.** **NO Protection Relay or provision** **Excludes metering panel** Does NOT require pre-wiring for actuator or FPI CTs or Fault Passage Indicator.	
Generator Metering Assembly -RMU Based Non-extensible Complete Assembly **- 200A Ring Main Unit With 200A Metering Unit Close Coupled On The externally protected RMU Tee Circuit. Version2**	**200A Non-Extensible RMU with NO relay protection and 200A Metering Unit Close Coupled on the Externally protected Tee Circuit for G99 Protection Scheme** Supplied as a Complete Assembly and Equipped with all ancillary components, and equipment as for a 200A RMU and a 200A Metering Unit, with the following variations: **Additional 3 x 200/1 A,** 15VA 5P20 class X Protection CT's 2 x 200/100/5 Metering CTs 3 x single phase connected VTs, 2 secondary windings with a ratio 11,000/110 V, Class 1, burden 100VA, rated voltage factor of 1.2 continuous and 1.9 for 30 seconds Winding 1 for Metering, Winding 2 for NVD protection Shunt Trip Coil Cable box (for outgoing HV customer's cable), with single hole gland plate and glands, etc. **Includes RMU and Metering Unit.** **Excludes metering panel** **NO Protection Relay or provision** Does NOT require pre-wiring for actuator or FPI CTs or Fault Passage Indicator.	

Outline Requirements for Metering Items	Detailed Requirements for Metering Items	Manufacturer's Reference
Generator Metering Assembly- RMU Based Non-extensible Complete Assembly **- 630A Ring Main Unit With 630A Metering Unit Close Coupled On The externally protected RMU Tee Circuit.**	**630A Non-Extensible RMU with NO relay protection and 630A G99 Metering Unit Close Coupled on the Externally protected Tee Circuit.** Supplied as a Complete Assembly and Equipped with all ancillary components, and equipment as for a 630A RMU and a 630A Metering Unit, with the following variations: Additional 3 x 800/400/1 A, 15VA 5P20 class X Protection CT's 2 x 400/200/5 Metering CTs 3 x single phase connected VTs, 2 secondary windings with ratio 11,000/110 V, Class 1, burden 100VA, rated voltage factor of 1.2 continuous and 1.9 for 30 seconds Winding 1 for Metering, Winding 2 for NVD protection Shunt Trip Coil Cable box (for outgoing HV customer's cable), with single hole gland plate and glands, etc. **Includes RMU and Metering Unit.** **Excludes metering panel** **NO Protection Relay or provision** Does NOT require pre-wiring for actuator or FPI CTs or Fault Passage Indicator.	
11kV Customer Metering Unit		
HV Customer Metering Unit 200A - Freestanding, Cable Connected On Incoming And Outgoing Sides. Version 1	**200A Metering Panel free-standing, cable connected on incoming AND outgoing sides** Including: 100/50/5A 0.5S class CTs 2 x VTs with a ratio 11,000/110 V, Class 1, burden 100VA, rated voltage factor of 1.2 continuous and 1.9 for 30 seconds Cable box for incoming/supply side cable 1 x Gland Plate - flat, split, three hole, for use with Triplex or single core 11kV cable 3 x CES4 glands Cable box for outgoing /customer's cable 1 x Gland Plate - flat, split, single hole, for use with single core 11kV cable 1 x CES5 gland 2 x 16kA rated insulated arrangement to connect cable earths inside the cable box to substation earth outside the cable box, whilst providing insulation from the switchgear, cable box and gland plate. **Excludes CB and metering panel.**	

Outline Requirements for Metering Items	Detailed Requirements for Metering Items	Manufacturer's Reference
HV Customer Metering Unit 200A - Freestanding, Cable Connected On Incoming And Outgoing Sides. Version 2	**200A Metering Panel free-standing, cable connected on incoming AND outgoing sides** Including: 200/100/5A 0.5S class CTs 2 x VTs with a ratio 11,000/110 V, Class 1, burden 100VA, rated voltage factor of 1.2 continuous and 1.9 for 30 seconds Cable box for incoming/supply side cable 1 x Gland Plate - flat, split, three hole, for use with Triplex or single core 11kV cable 3 x CES4 glands Cable box for outgoing /customer's cable 1 x Gland Plate - flat, split, single hole, for use with single core 11kV cable 1 x CES5 gland 2 x 16kA rated insulated arrangement to connect cable earths inside the cable box to substation earth outside the cable box, whilst providing insulation from the switchgear, cable box and gland plate. **Excludes CB and metering panel.**	
HV Customer Metering Unit 630A - Freestanding, Cable Connected On Incoming And Outgoing Sides.	**630A Metering Panel freestanding, cable connected on incoming AND outgoing sides** Including: 2x 400/200/5A 0.5S class CTs 2 x VTs with a ratio 11,000/110 V, Class 1, burden 100VA, rated voltage factor of 1.2 continuous and 1.9 for 30 seconds Cable box for incoming/supply side cable 1 x Gland Plate - flat, split, three hole, for use with Triplex or single core 11kV cable 3 x CES4 glands Cable box for outgoing /customer's cable 1 x Gland Plate - flat, split, single hole, for use with single core 11kV cable 1 x CES5 gland 2 x 16kA rated insulated arrangement to connect cable earths inside the cable box to substation earth outside the cable box, whilst providing insulation from the switchgear, cable box and gland plate. **Excludes CB and metering panel.**	

20kV Ring Main Unit Metering Items		
HV Metering Switchboard. Four Circuit, Fixed Pattern Assembly – Version 1	**630A Metering Switchboard** Four Circuit, Fixed Pattern Assembly Two 630A Switches, one with NPg specified FPI 630A Bus Section Metering CB, Including BB E/Sw **with self-powered relay protection** Metering Panel Including 3x 50/5/1 0.5s/5P20 15VA Class CTs & 3x 22000/110 Single Phase to Earth VTs Class 1 100VA Winding 1 for Metering, Winding 2 for NVD protection 630A Metered Cable Connection Panel 16kA, 3s Rating	
HV Metering Switchboard. Four Circuit, Fixed Pattern Assembly – Version 2	**630A Metering Switchboard** Four Circuit, Fixed Pattern Assembly Two 630A Switches, one with NPg specified FPI 630A Bus Section Metering CB, Including BB E/Sw **with self-powered relay protection** Metering Panel Including 3x 100/5/1 0.5S/5P20 15VA Class CTs & 3x 22000/110 Single Phase to Earth VTs Class 1 100VA Winding 1 for Metering, Winding 2 for NVD protection 630A Metered Cable Connection Panel 16kA, 3s Rating	
HV Metering Switchboard. Four Circuit, Fixed Pattern Assembly – Version 3	**630A Metering Switchboard** Four Circuit, Fixed Pattern Assembly Two 630A Switches, one with NPg specified FPI 630A Bus Section Metering CB, Including BB E/Sw **with self-powered relay protection** Metering Panel Including 3x 200/5/1 0.5S/5P20 15VA Class CTs & 3x 22000/110 Single Phase to Earth VTs Class 1 100VA Winding 1 for Metering, Winding 2 for NVD protection 630A Metered Cable Connection Panel 16kA, 3s Rating	
20kV Metering - Ancillary - HRC HV VT Fuses For Metering Units. Set Of Three Fuse Links	Replacement or Spare 24kV 0.5Amp HV fuses for Voltage transformers in metering panels.	

Appendix 2 – Routine Testing and Commissioning Testing

a) Test Voltages Applied by Northern Powergrid

As defined in 'WE TESTING' section of the Northern Powergrid Operational Practice Manual

WE 4.2.1 Tests **Shall** be applied to earth, between phases and across the gap.

WE 4.2.2 Vacuum Interrupter: Where testing is required, to avoid a possible X ray hazard, no personnel **Shall** approach within 3 metres of a vacuum interrupter which is subjected to an overvoltage test. Test values to be applied across the break are detailed in Table WE.2

Table WE.2 Switchgear Test Voltages (kV)

Working Voltage	DC 1 min	AC 1 min
11kV	20	16
20kV	37	30

(b) Testing to be carried out by the Supplier

The supplier shall provide Northern Powergrid with details of proposed: test arrangements and combinations, test values, test pass/fail criteria, tolerances applicable and associated test record content and layout for each of the tests listed below:

1. All protection and metering VTs and CTs shall be primary injection tested, at all available ratios, to prove ratio and polarity.
2. All trip coils shall be primary and secondary injected to test operation of the trip coil and subsequent operation of the circuit breaker.
3. Self-powered relays shall have a factory default setting applied and a primary or secondary injection test carried out to determine and record the current pickup and 2x setting time values.
4. All secondary wiring shall be insulation resistance tested.
5. All fault flow indicator CTs shall be primary injected to prove ratio and polarity and the indicator unit shall be tested for detection and operation for both phase-phase and for phase-earth faults. This shall extend to manual and automatic reset functions.
6. Power frequency tests shall be applied, using the criteria specified in the Northern Powergrid Operational Practice Manual as included in part (a) of this Appendix.
   Tests shall prove all combinations of operational condition: between each phase, between phase and earth and across all isolation gaps.
7. Tests shall be carried out, after all assembly operations have been completed, to confirm the phase relationship between primary conductors and all VDS, or VPIS, outputs and displays.
8. Partial discharge testing, preferably of the complete assembly. But at least of critical components, by agreement with Northern Powergrid.

With every switch panel the supplier shall provide Northern Powergrid with copies of the tests arrangements and test values applied, test results and associated test records for each of the above tests.
For all metering CTs and VTs the supplier shall also provide Northern Powergrid with copies of the CT and/or VT manufacturers' magnetising curve and ratio test certificates.
A complete set of printed hard copies of these records shall be shipped in the associated LV control cabinet.

Electronic copies of these records shall also be available to Northern Powergrid.

Appendix 3 – Self-Certification Conformance Declarations against ENA TS 41-36 Requirements

Appendix 3a – ENATS 41-36 - Schedule Part 1 – COMMON CLAUSES.

CLAUSE BY CLAUSE CONFORMANCE WITH ENATS 41-36 – Part 1

Appendix 3b – ENATS 41-36 - Schedule Part 2 – METAL ENCLOSED CIRCUIT BREAKERS.

CLAUSE BY CLAUSE CONFORMANCE WITH ENATS 41-36 – Part 2
TYPE TEST CONFORMANCE DECLARATION

Appendix 3c – ENATS 41-36 - Schedule Part 3 – METAL ENCLOSED SWITCHES.

CLAUSE BY CLAUSE CONFORMANCE WITH ENATS 41-36 – Part 3
TYPE TEST CONFORMANCE DECLARATION D3

Appendix 3d – ENATS 41-36 - Schedule Part 5 – METAL ENCLOSED RING MAIN UNITS.

CLAUSE BY CLAUSE CONFORMANCE WITH ENATS 41-36 – Part 5
TYPE TEST CONFORMANCE DECLARATION 5.2 - Type tests for ring main equipment (RME) with circuit-breaker tee-off.

Appendix 3e – ENATS 41-36 - Schedule Part 10 – PROTECTION, INSTRUMENTATION & METERING.

CLAUSE BY CLAUSE CONFORMANCE WITH ENATS 41-36 – Part 10

Appendix 3a – ENATS 41-36 - Schedule Part 1 – COMMON CLAUSES.

SELF CERTIFICATION CONFORMANCE DECLARATION - NOTE: One sheet shall be completed for each item or variant submitted.

The following sheets replicate the self-declaration section of ENATS 41-36 and also include the clauses of the international Standards relevant to common specifications for high-voltage switchgear and control gear standards.

If the product has already been assessed by ENA then re-completion of these self-declaration sheets is not required and the manufacturer may simply state the ENA Notice Of Conformance or Approval Notice number in the boxes below and supply copies of the sheets used in the ENA assessment.

If NOT already ENA assessed then the manufacturer shall declare conformance or otherwise, clause by clause, using ENA standard conformance declaration codes below.

Conformance declaration codes:

N/A = Clause is not applicable/appropriate to the product
Cs1 = The test conforms fully with the requirements of this clause
Cs2 = The test conforms partially with the requirements of this clause
Cs3 = The test does not conform to the requirements of this clause
Cs4 = Test not performed, but alternative evidence/ technical case offered

Instructions for completion

- **When Cs1 code is entered then details of how compliance is achieved SHALL be provided in the remarks column.**
  This shall include details of type tests, where appropriate.
- **When any other code is entered; an explanation of the reason for non-conformance shall be entered**
- Prefix each remark with the relevant 'IEC' or 'ENATS' as appropriate

Manufacturer:		**ENA Reference:**
Product Reference:	**Ratings:**	
Name:	**Signature:**	**Date:**

IEC 60694, IEC 62271-200				ENATS 41-36			
Clause / Sub-clause		Requirement	Conformance code	ENATS 41-36 - Part 1 Clause / Sub- clause	Requirement	Conformance code	Remarks
IEC60694	IEC62271-200						
1	1	General		1.1	General		
2	2	Normal and special service conditions		1.2	Normal and special service conditions		
				1.2.1.1	Class minus 5 indoor		
				1.2.1.2	Class minus 25 outdoor		
				1.2.1.2	Class 10 – ice coating		
				1.2.1.2	Class III – pollution level		
				1.2.1.2	Influence of solar radiation		
3	3	Definitions		1.3	Definitions		
4	4	Ratings		1.4	Ratings		
4.1	4.1	Rated voltage		1.4.1	Rated voltage		
4.2	4.2	Rated insulation level		1.4.2	Rated insulation level		
				1.4.2.1	Disconnectors (0 bar gauge)		
				1.4.2.2.	Provision for cable tests		
4.3	4.3	Rated frequency		1.4.3	Rated frequency		
4.4	4.4	Rated normal current and temperature rise		1.4.4	Rated normal current and temperature rise		
				1.4.4.1	Rated normal current		
4.5	4.5	Rated short-time withstand		1.4.5	Rated short-time withstand		
4.6	4.6	Rated peak withstand current		1.4.6	Rated peak withstand current		
4.7	4.7	Rated duration of short circuit		1.4.7	Rated duration of short circuit		
4.8	4.8	Rated supply voltage of closing and opening devices and of auxiliary and control circuits		1.4.8	Rated supply voltage of closing and opening devices and of auxiliary and control circuits		
4.9	4.9	Rated supply frequency of closing and opening devices and of auxiliary circuits		1.4.9	Rated supply frequency of closing and opening devices and of auxiliary circuits		
4.10	4.10	Rated pressure of compressed gas supply for insulation and/or operation		1.4.10	Rated pressure of compressed gas supply for insulation and/or operation		
	4.10.1	Rated filling level (of fluid-filled compartments					
5.1	5.1	Requirements for liquids		1.5.1	Requirements for liquids		
				1.5.1	Oil level indication		
				1.5.1	Drain plugs, indicators, valves		
				1.5.1	Controlled gasket compression		
				1.5.1	No communicating bolts		
				1.5.1	BS 148		
				1.5.1	Bolt access		
				1.5.1	Breather design/position (IP3XDW)		
5.2	5.2	Requirements for gasses		1.5.2	Requirements for gasses		
				1.5.2	Gas filling valve		
				1.5.2	Recycled SF6		

IEC 60694, IEC 62271-200				ENATS 41-36			
Clause / Sub-clause		Requirement	Conformance code	ENATS 41-36 - Part 1 Clause / Sub- clause	Requirement	Conformance code	Remarks
IEC60694	IEC62271-200						
5.3	5.3	Earthing of switchgear and control gear		1.5.3	Earthing of switchgear and control gear		
				1.5.3	Earthing conductor		
				1.5.3	Earthing terminals.		
				1.5.3	Earthing conductor coupling		
				1.5.3	Withdrawable /removable parts earth connection.		
				1.5.3	Cable sheath earth connection		
				1.5.3	Relay/instrument case earthing		
				1.5.3	Specific means for earthing		
				1.5.3	Frame-earth busbar protection		
5.4	5.4	Auxiliary and control equipment		1.5.4	Auxiliary and control equipment		
				1.5.4.1.3	Degrees of protection – LV terminals		
				1.5.4.4.4.4	ENATS 50-19		
				1.5.4.4.4.4	Identification		
				1.5.4.4.5.1	Segregation (>125V).		
				1.5.4.4.5.1	Interchangeable - identical		
				1.5.4.4.5.1	Conductor material/size.		
				1.5.4.4.5.1	HV compartment segregation.		
				1.5.4.4.5.1	Actuator control/indication		
				1.5.4.4.5.1	Micro switches		
				1.5.4.4.5.2	Terminals/terminations reliability 50 breaks		
				1.5.4.4.5.2	CT terminal blocks – screw clamp with spring (ENATS 50-18 type B)		
5.5	5.5	Dependent power operation		1.5.5	Dependent power operation		
				1.5.5	Positively driven contacts		
				1.5.5	Movement gap withstand voltage		
				1.5.5	Maintenance / slow operation		
				1.5.5	Labelled - maintenance		
5.6	5.6	Stored energy operation		1.5.6	Stored energy operation		
				1.5.6	Sub-clause 1.5.5 applicable plus the following		
				1.5.6	Main contact movement		
				1.5.6	Dedicated handle		
				1.5.6	Handle direction indication		
				1.5.6	Handle release and stowed		
				1.5.6	Motor actuator fitting		
				1.5.6	Motor actuator disconnection		
				1.5.6	Actuator ‘in step’ (methods a or b)		
				1.5.6	Manual charging motor-charge		
				1.5.6	Max/min handle heights		
				1.5.6	Re-charge closing springs		

IEC 60694, IEC 62271-200				ENATS 41-36			
Clause / Sub-clause		Requirement	Conformance code	ENATS 41-36 - Part 1 Clause / Sub- clause	Requirement	Conformance code	Remarks
IEC60694	IEC62271-200						
				1.5.6	Spring charge indication		
				1.5.7	Manual operation		
				1.5.7	Handles and padlocking accessible from front		
				1.5.7	Handle storage facilities		
5.7	5.7	Independent manual operation		1.5.7.1	Independent manual operation		
				1.5.7.1	Sub-clause 1.5.6 applicable plus the following		
				1.5.7.1	Inhibit closing spring charge in closed position		
				1.5.7.1	No stored energy from Incomplete operation		
				1.5.7.1	Anti-reflex =>3 secs (manual)		
				1.5.7.1	Anti-reflex =>3 secs (actuator)		
				1.5.7.2	Dependent manual operation. - as 1.5.7.1 plus: Inhibit op handle removal		
5.8	5.8	Operation of releases		1.5.8	Operation of releases		
				1.5.8	Local manual release		
				1.5.8	Operation outside switchroom		
				1.5.8	No movement of spring charge handle.		
5.9	5.9	Low and high-pressure interlocking and monitoring devices		1.5.9	Low and high-pressure interlocking and monitoring devices		
				1.5.9	Pressure/density gauge/indicator		
				1.5.9	20°C filling mark		
				1.5.9	Green/red, Go/No go		
				1.5.9	Single/two stage pressure switch		
				1.5.9	36kV equipment – a) & c)		
				1.5.9	Temperature fluctuations		
5.10	5.10	Nameplates		1.5.10.1	Nameplates		
				1.5.10.1	Internal arc test Fig		
				1.5.10.101	Labelling		
				1.5.10.101.1	Safety signs BS 5499		
				1.5.10.101.1	Durable/non-fading		
				1.5.10.101.1	Contrast with background		
				1.5.10.101.1	In accordance with Table 1.4		
				1.5.10.101.1	Symbols to Annex C		
				1.5.10.101.1	BS381C or RAL colours		
				1.5.10.101.2	Phase identification		
				1.5.10.101.3	Circuit labels to Fig 1		
				1.5.10.101.3	Additional labels to Fig 2		
				1.5.10.101.3	Repeat labels		
				1.5.10.101.3	Safely detachable		

IEC 60694, IEC 62271-200				ENATS 41-36			
Clause / Sub-clause		Requirement	Conformance code	ENATS 41-36 - Part 1 Clause / Sub- clause	Requirement	Conformance code	Remarks
IEC60694	IEC62271-200						
5.11	5.11	Interlocking devices		1.5.11	Interlocking devices and padlocking facilities		
				1.5.11	No removal of covers when part of interlock/padlock facility		
				1.5.11.101	Interlocking devices		
				1.5.11.101.1	General		
				1.5.11.101.1	Interlocking devices- Mechanical, key, electro-mechanical		
				1.5.11.101.2	Test access – interlocks a) to d)		
				1.5.11.102	Padlocking facilities		
				1.5.11.102	Size of padlock		
				1.5.11.102.1	Safety padlocks – facilities a) to c)		
				1.5.11.102.1	Single padlock for electrical and mechanical		
				1.5.11.102.1	Electrical/Electro-mechanical ‘FMA’		
				1.5.11.102.1	Inhibit facia removal		
				1.5.11.102.1	Warning label		
				1.5.11.102.2	Operational padlocking		
				1.5.11.102.2	Facilities (a) to (e)		
5.12	5.12	Position indication		1.5.12	Position indication		
				1.5.12	Positively driven mechanical		
				1.5.12	Output side of mechanism		
				1.5.12	Inscribed as Table 1.4		
				1.5.12	Mimic diagram symbols–Annex C		
				1.5.12	One indicator visible		
5.13	5.13	Degrees of protection by enclosures		1.5.13	Degrees of protection by enclosures		
				1.5.13.1	Hazardous parts / solid foreign objects IP4X,IP3X,IP3XD		
				1.5.13.1	Doors open IP2X		
				1.5.13.1	Requirements a)		
				1.5.13.2	Ingress of water		
				1.5.13.2	IP3XDW		
				1.5.13.2	Weather proofing test		
				1.5.13.2	IP34D - pole mounted		
				1.5.13.2	Material/water lodging		
				1.5.13.3	Mechanical impact 2J - indoor		
				1.5.13.3	Mechanical impact 5J - outdoor		
5.14	5.14	Creepage distances		1.5.14	Creepage distances and environmental considerations		
				1.5.14	Outdoor - class 3 –IEC 60815		
				1.5.14	Insulating system design		
				1.5.14	30 year life		

IEC 60694, IEC 62271-200				ENATS 41-36			
Clause / Sub-clause		Requirement	Conformance code	ENATS 41-36 - Part 1 Clause / Sub- clause	Requirement	Conformance code	Remarks
IEC60694	IEC62271-200						
				1.5.14	Condensation/heaters		
				1.5.14	Shrouding in air filled cable box		
5.15	5.15	Gas and vacuum tightness		1.5.15	Gas and vacuum tightness		
				1.5.15	Leakage rate =< 1% per year (closed pressure) 30 year life expected		
				1.5.15	30 year life expected (sealed pressure)		
5.16	5.16	Liquid tightness		1.5.16	Liquid tightness		
5.17	5.17	Flammability		1.5.17	Flammability		
5.18	5.18	EMC		1.5.18	EMC		
	5.101	Internal fault		1.5.101	Internal fault		
				1.5.101	Class IAC		
				1.5.101	a) Metal enclosed – class IAC AF		
				1.5.101	b) Pole mounted – class IAC C		
				1.5.101	c) Air		
				1.5.101	d) 1 second duration		
				1.5.101	e) Prospective test current		
				1.5.101	f) Criteria of acceptance		
				1.5.101	g) Test arrangement		
				1.5.101	h) Compartments tested		
				1.5.101	Cable box prospective current		
	5.102	Enclosure		1.5.102	Enclosure		
				1.5.102.1	General		
				1.5.102.1	Support weight of personnel		
				1.5.102.1	Identify areas not safe to stand		
				1.5.102.1	Safe access - CDM Regs 1994		
				1.5.102.1	Lifting facilities		
				1.5.102.1	Integral step (150kg)		
				1.5.102.1	No communicating holes		
				1.5.102.2	Covers and doors		
				1.5.102.2	Interlock controlled accessible types for test access and provided with locking facilities		
				1.5.102.2	Controlled compression gaskets		
				1.5.102.2	No communicating holes		
				1.5.102.101	Surface preparation and coatings - ENATS 98-1		
				1.5.102.101	Colour		
				1.5.102.102	Foundation arrangements		
				1.5.102.102	Cable gland positions		
				1.5.102.102	Floor fixing (M12 bolts)		
				1.5.102.103	Transformer mounting		
				1.5.102.103	Access (fig 16 ENATS 35-1)		
				1.5.102.103	Transformer circuit flange as fig3		

IEC 60694, IEC 62271-200				ENATS 41-36			
Clause / Sub-clause		Requirement	Conformance code	ENATS 41-36 - Part 1 Clause / Sub- clause	Requirement	Conformance code	Remarks
IEC60694	IEC62271-200						
				1.5.102.103	Dimensional limitations a) to g)		
				1.5.102.103	600mm max projection		
				1.5.102.103	Adjustable support		
				1.5.102.103	Load distribution		
				1.5.102.103	Assembly instructions		
				1.5.102.104	Heater		
				1.5.102.104	Easily accessible		
	5.103	Compartments		1.5.103	Compartments		
				1.5.103.1	Service continuity class LSC2 (except RME)		
				1.5.103.1.101	Cable compartments		
				1.5.103.1.101	Separate cable compartment		
				1.5.103.1.101	Cable compartment-ENATS 12-11		
				1.5.103.1.101	Compartment/termination design - manufacturers		
				1.5.103.1.101	Min of two propriety cable terminations systems		
				1.5.103.1.101	Accommodation / compatibility		
				1.5.103.1.101	Method statement		
				1.5.103.2	Fluid filled compartments		
				1.5.103.2.2	Solar radiation influences		
				1.5.103.2.3	Tightness		
				1.5.103.2.4	Pressure relief to be provided		
				1.5.103.2.4	No burn-through		
				1.5.103.2.4	Satisfactory performance in Outdoor environment		
				1.5.103.3	Partitions and shutters		
				1.5.103.3.1	Partitions metallic – class PM		
					Shutters metallic - class PM		
					Individually operated		
					Independently padlockable closed		
					Open/close automatically		
					Provision for retaining open		
					Re-engagement of removable part Restores automatic operation		
					Colour to table 1.4		
	5.104	Removable parts					
	5.105	Provisions for dielectric tests on cables					
				1.5.201.1.1	Testing via primary ccts a) to g)		
				1.5.201.1.2	Testing via secondary ccts a) to c)		
				1.5.201.2	Test facilities provided a) or b)		

IEC 60694, IEC 62271-200				ENATS 41-36			
Clause / Sub-clause		Requirement	Conformance code	ENATS 41-36 - Part 1 Clause / Sub- clause	Requirement	Conformance code	Remarks
IEC60694	IEC62271-200						
				1.5.201.2	Test connections/main circuit- DC test (table 1.5)		
				1.5.201.2	Test connections/main circuit- 200A		
				1.5.201.2	Test terminals to cable =<500 microhms		
				1.5.201.2	Security of test contacts		
				1.5.201.2	Access to provide for safe working		
				1.5.201.2	Test point on mimic		
				1.5.201.3	Fixed equipment – VDS or VPIS		
				1.5.201.3	Withdrawable equipment - VDS		
				1.5.201.3	Min 60mm dia test access		
				1.5.201.4	Test access cover – 1.5.102.2)		
				1.5.201.4	“EARTH ON” for test access		
				1.5.201.4	Interlock on cable compartment		
				1.5.201.4	Test access at front		
				1.5.201.4	Physical indication of test access open (amber lamp for open, white lamp for closed)		
				1.5.201.4	Single lamp push to test facility		
				1.5.201.4	“EARTH ON” indication		
				1.5.201.4	No access to compartment containing live HV conductors.		
				1.5.201.4	Position to avoid water/debris ingress		
				1.5.201.4	Inhibit close of test access with test device inserted		
				1.5.201.4	Inhibit closing of disconnector or compromise POI with test access open		
				1.5.201.5	Test device security a) to c)		
				1.5.201.5	100 connections/disconnections		
				1.5.201.5	Test device identification		
				1.5.201.5	Test device container		
				1.5.202	Busbars - same current rating		
				1.5.202	Extension busbar trunking		
				1.5.202	Standard length		
				1.5.203	Conductor terminations		
				1.5.203	ENATS 41-16		
				1.5.203	BS 7354 clearances		
				1.5.203	BS 7354 clearances + 300mm		
6	6	Type tests		1.6	Type tests		
				1.6	Short circuit testing liaison(STL)		
				1.6	Criteria to pass lightning impulse		

IEC 60694, IEC 62271-200				ENATS 41-36			
Clause / Sub-clause		Requirement	Conformance code	ENATS 41-36 - Part 1 Clause / Sub- clause	Requirement	Conformance code	Remarks
IEC60694	IEC62271-200						
				1.6	Dielectric (arrangement representative of cable termination systems in 1.5.103.1)		
				1.6	Most unfavourable arrangement		
				1.6	Production handle –most onerous in-service condition.		
				1.6	Partial discharge (ENATS 41-18 levels)		
				1.6	High temp or equivalent		
				1.6	Influence of solar radiation		
				1.6	Temperature rise at max solar gain		
7	7	Routine tests		1.7	Routine tests		
				1.7	Partial discharge (ENATS 41-18 Levels		
8	8	Guide to the selection of switchgear and controlgear		1.8	Guide to the selection of switchgear and controlgear		
9	9	Information to be given with enquiries, tenders and orders		1.9	Information to be given with enquiries, tenders and orders		
10	10	Rules for Transport, Storage, installation, operation and maintenance		1.10	Rules for Transport, Storage, installation, operation, maintenance and disposal		
				1.10	Safe methods for extending and/or replacement		
				1.10	Extension of corresponding types		
				1.10	Stable during storage/transport		
				1.10	Prevent water ingress		
				1.10	Temporary labels		
				1.10	Protect bushings		
				1.10	Maintenance design (BS 6626)		
				1.10	Handbook contents + storage		
11	11	Safety		1.11	Safety		

Appendix 3b – ENATS 41-36 - Schedule Part 2 – METAL ENCLOSED CIRCUIT BREAKERS.

SELF CERTIFICATION CONFORMANCE DECLARATION - NOTE: One sheet shall be completed for each item or variant submitted.

The following sheets replicate the self-declaration section of ENATS 41-36 and also include the clauses of the international Standards relevant to common specifications for high-voltage switchgear and control gear standards.

If the product has already been assessed by ENA then re-completion of these self-declaration sheets is not required and the manufacturer may simply state the ENA Notice Of Conformance or Approval Notice number in the boxes below and supply copies of the sheets used in the ENA assessment.

If NOT already ENA assessed then the manufacturer shall declare conformance or otherwise, clause by clause, using ENA standard conformance declaration codes below.

Conformance declaration codes:

N/A = Clause is not applicable/appropriate to the product
Cs1 = The test conforms fully with the requirements of this clause
Cs2 = The test conforms partially with the requirements of this clause
Cs3 = The test does not conform to the requirements of this clause
Cs4 = Test not performed, but alternative evidence/ technical case offered

Instructions for completion

- **When Cs1 code is entered then details of how compliance is achieved SHALL be provided in the remarks column.**
  This shall include details of type tests, where appropriate.
- **When any other code is entered; an explanation of the reason for non-conformance shall be entered**
- Prefix each remark with the relevant 'IEC' or 'ENATS' as appropriate

Manufacturer:		**ENA Reference:**
Product Reference:	**Ratings:**	
Name:	**Signature:**	**Date:**

IEC62271-100			ENATS 41-36 - Part 2			
Clause / Sub-clause	**Requirement**	**Conformance code**	**Clause / Sub-clause**	**Requirement**	**Conformance code**	**Remarks**
1	General		2.1	General		
2	Service conditions		2.2	Service conditions		
3	Definitions		2.3	Definitions		
4	Ratings		2.4	Ratings		
4.101	Rated short-circuit breaking current		2.4.101	Rated short-circuit breaking current		
4.101.1	AC component of the rated short-circuit breaking current					
4.101.2	DC component of the rated short-circuit breaking current		2.4.101	Time constant (45ms)		
4.102	Transient recovery voltage related to the rated short-circuit breaking current		2.4.102	Transient recovery voltage related to the rated short-circuit breaking current		
4.102.1	Representation of TRV waves					
4.102.2	Representation of TRV					
4.102.3	Standard values of TRV related to the rated short-circuit breaking current		2.4.102	Table 1A of IEC 62271-100		
4.103	Rated short-circuit making current		2.4.103	Rated short-circuit making current		
4.104	Rated operating sequence		2.4.104	Rated operating sequence		
			2.4.104	O-0.3s-CO-15s-CO intended for auto-reclose		
			2.4.104	O-3min-CO-3min-CO not intended for auto-reclose		
4.105	Characteristics for short-line faults		2.4.105	Characteristics for short-line faults		
4.106	Rated out-of-phase making and breaking current		2.4.106	Rated out-of-phase making and breaking current		
4.107	Rated capacitive switching currents		2.4.107	Rated capacitive switching currents		
			2.4.107	Class C1		
4.107.1	Rated line-charging breaking		2.4.107	Line-charging breaking – Table 2.1 ENATS 41-36		
4.107.2	Rated cable-charging breaking		2.4.107	Cable-charging breaking - Table 2.1 ENATS 41-36		
4.108	Rated small inductive breaking current		2.4.108	Rated small inductive breaking current		
4.109	Rated time quantities		2.4.109	Rated time quantities		
4.109.1	Rated break time			Rated break time		
4.110	Number of mechanical operations		2.4.110	Number of mechanical operations		
			2.4.110	Class M2 (10000 Ops) (5000 Ops)		
			2.4.110	Class M1 (2000 Ops)		

IEC62271-100			ENATS 41-36 - Part 2			
Clause / Sub-clause	Requirement	Conformance code	Clause / Sub-clause	Requirement	Conformance code	Remarks
4.111	Classification of circuit-breakers as a function of electrical endurance		2.4.111	Classification of circuit-breakers as a function of electrical endurance		
			2.4.111	Class E2		
			2.4.111	Auto-reclosing		
			2.4.111	Non auto-reclosing		
5.1	Requirements for liquids in circuit-breakers		2.5.1	Requirements for liquids in circuit-breakers		
			2.5.1	Correct tank mounting.		
			2.5.1	Inhibit service/earth position without tank.		
			2.5.1	Correct contact/arc device positions		
5.2	Requirements for gasses		2.5.2	Requirements for gasses		
5.3	Earthing of circuit-breakers		2.5.3	Earthing of circuit-breakers		
			2.5.3.101	Earthing facilities		
			2.5.3.101.1	Short circuit making ability		
			2.5.3.101.1	CB or class E2 earthing switch		
			2.5.2.101.1	Kinematic chain test on CB used for earthing		
			2.5.3.101.1	CT short circuit facility		
			2.5.3.101.1	Earthing device ratings		
			2.5.3.101.2	Disconnector / earthing switch		
			2.5.3.101.2	AC + DC withstand test		
			2.5.3.101.2	Class E0		
			2.5.3.101.2	Class M0		
			2.5.3.101.2	Number of mech ops		
			2.5.3.101.2	Selector arrangements (a to d)		
5.4	Auxiliary equipment		2.5.4	Auxiliary equipment		
			2.5.4	Isolating features		
			2.5.4	Secondary connections		
			2.5.4	Secondary circuit coupling for maintenance		
			2.5.4	Contact location/screening		
5.5	Dependent power closing		2.5.5	Dependent power closing		
5.6	Stored energy closing		2.5.6	Stored energy closing		
5.7	Independent manual		2.5.7	Independent manual		
5.8	Operation of releases		2.5.8.	Operation of releases		
			2.5.8.	Inhibit continuous open/close		
			2.5.8.	Padlockable device - RED		
			2.5.8.	Closing facility - BLACK		
			2.5.8.	Push buttons RED/BLACK		
			2.5.8.	Remote operation socket		
			2.5.8.	Local/remote selector		
5.9	Low and high-pressure interlocking and monitoring devices		2.5.9	Low and high-pressure interlocking and monitoring devices		

IEC62271-100			ENATS 41-36 - Part 2			
Clause / Sub-clause	Requirement	Conformance code	Clause / Sub-clause	Requirement	Conformance code	Remarks
5.10	Nameplates		2.5.10.1	Nameplates		
			2.5.10.1	Supplementary (a to c)		
			2.5.10.101	Labelling		
			2.5.10.101	Mimic diagram		
			2.5.10.101	Test points		
			2.5.10.101	VT /VT disconnection		
			2.5.10.101	Mimic colour/symbols (Annex C)		
			2.5.10.101	Pictogram for busbar earthing (Annex C)		
5.11	Interlocking devices		2.5.11	Interlocking / padlocking		
			2.5.11.101	Interlocking devices		
			2.5.11.101.1	Indoor circuit-breakers		
			2.5.11.101.1	Inhibit close of disconnector with test access open		
			2.5.11.101.1	No CB trip on attempted isolation / disconnector selection		
			2.5.11.101.1	No main circuit access		
			2.5.11.101.1	Safety shutters remain closed		
			2.5.11.101.1	Earthing device located		
			2.5.11.101.1	Inhibit disconnector closure		
			2.5.11.101.1	Move before BB earthing device		
			2.5.11.101.1	Inhibit circuit breaker trip		
			2.5.11.101.2	Outdoor circuit-breakers		
			2.5.11.101.2	Key interlock		
5.12	Position indication		2.5.12	Position indication		
5.13	Degrees of protection		2.5.13	Degrees of protection		
5.14	Creepage distances		2.5.14	Creepage distances		
5.15	Gas and vacuum tightness		2.5.15	Gas and vacuum tightness		
5.16	Liquid tightness		2.5.16	Liquid tightness		
5.17	Flammability		2.5.17	Flammability		
5.18	Electromagnetic compatibility		2.5.18	Electromagnetic compatibility		
5.101	Requirements for simultaneity of poles during single closing and single opening operations.					

IEC62271-100			ENATS 41-36 - Part 2			
Clause / Sub-clause	Requirement	Conformance code	Clause / Sub-clause	Requirement	Conformance code	Remarks
5.102	General requirement for operation					
5.103	Pressure limits of fluids for operation					
5.104	Vent outlets					
			2.5.201	Test facilities		
			2.5.202	Open-terminal circuit-breaker bushings		
			2.5.202	Prismatic gauge		
			2.5.202	Terminals (ENATS 41-16) BS 7354 design		
			2.5.203	Outdoor open-terminal circuit-breaker control facilities		
			2.5.203	Operation facilities		
			2.5.203	Selector switch		
			2.5.203	Close/open control switch		
			2.5.204	Open-terminal circuit-breaker mechanism cabinet		
			2.5.204	ON/OFF indicator		
			2.5.204	Inside and outside labels		
			2.5.204	Multicore terminal blocks		
			2.5.204	Power socket +RCD		
			2.5.205	Transformer mounting		
6	Type tests		2.6	Type Tests - Table 2.3		
6.1	General					
6.2	Dielectric tests					
6.3	Radio interference voltage tests					
6.4	Measurement of resistance of the main circuit					
6.5	Temperature rise tests					
6.6	Short-time withstand current and peak withstand current tests					
6.7	Verification of the degree of protection					
6.8	Tightness test					
6.9	Electromagnetic compatibility (EMC) tests					
6.101	Mechanical and environmental tests					
6.102	Miscellaneous provisions for making and breaking tests					

IEC62271-100			ENATS 41-36 - Part 2			
Clause / Sub-clause	Requirement	Conformance code	Clause / Sub-clause	Requirement	Conformance code	Remarks
6.103	Test circuits for short-circuit making and breaking tests					
6.104	Short-circuit test quantities					
6.105	Short-circuit test procedure					
6.106	Basic short-circuit test duties					
6.107	Critical current tests					
6.108	Single phase and double earth fault tests					
6.109	Short-line fault tests					
6.110	Out of phase making and breaking tests					
6.111	Capacitive current switching tests					
6.112	Special requirements for making and breaking tests on class E2 circuit-breakers.					
7	Routine Tests		2.7	Routine Tests		
7.1	Dielectric test on the main circuit					
7.2	Dielectric test on auxiliary and control circuits					
7.3	Measurement of resistance of the main circuit					
7.4	Tightness test					
7.5	Design and visual checks					
8	Guide to the Selection of Circuit-breakers for service		2.8	Guide to the Selection of Circuit-breakers for service		
9	Information to be Given with Enquiries, Tenders and Orders		2.9	Information to be Given with Enquiries, Tenders and Orders-schedule 2.1		
10	Rules for Transport, Storage, Erection and Maintenance		2.10	Rules for Transport, Storage, Erection and Maintenance		
			2.10	Contact erosion		
			2.10	Operation counter		
11	Safety		2.11	Safety		

Appendix 3b – ENATS 41-36 - Schedule Part 2 – METAL ENCLOSED CIRCUIT BREAKERS.

SELF CERTIFICATION CONFORMANCE DECLARATION

PART 2 – METAL ENCLOSED CIRCUIT-BREAKERS

TYPE TEST CONFORMANCE DECLARATION

Type tests for feeder or bus-section circuit-breaker including enclosure, disconnector, VT, CTs and earthing switch as appropriate.

Manufacturer: **Ratings**
Product reference:
Name: **Signature:** **Date:**

Instructions for completion:

- Complete a separate table for each variant and rating
- ENA/SAP to complete columns 1 to 4
- Manufacturer to complete columns 5 to 10
- When test report also covers another rating insert 'See ???A unit' in the Remarks column
  Tests not requested may be shown as 'Additional tests' at the bottom of the table

Type test reports table based on ENATS 41-36 Table 2.3
*See bottom of table for conformance declaration codes
** I = Independent; M= Manufacturer; ENA= Energy Networks Association

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
	Test Requirement	**Specification & Standards**	**Rated value**	**Test req' d Y or N**	**Conformance***	**Test value**	**Date of test**	**Test station Report / Cert No**	**Witness I, M or ENA ****	**Remarks**
1.	Dielectric. Partial discharge ≤ 10pC For cable connected circuit-breakers, tests to be representative of two cable termination systems, in addition to switchgear manufacturer's own system if any.	IEC60694. Sub-clause 6.2, IEC62271-100. Sub-clause 6.2, IEC62271-200. Sub-clause 6.2. Tables 1.1a and 1.1b of ENATS 41-36. IEC 62271-200. Sub-clause 6.2.9 and annex BB, ENATS 41-18 Sub-clauses 1.5.103.1 and 1.6 of ENATS 41- 36.								
2.	" - Busbars	"								
3.	Voltage Withstand - Isolating Gap (provision for dielectric tests on cables).	IEC62271-200. Sub-clause 5.105. and 6.2.101 Sub-clause 1.4.2.2 of ENATS 41-36.								
4.	DC Withstand Test on Test Devices, including all parts of main circuit, which cannot be disconnected from the test connections.	IEC62271-200. Sub-clause 5.105. Sub-clause 1.5.201.1 of ENATS 41-36.								
5.	Insulation level - electrically stressed gap due to possible movement of earthing switch contacts	Sub-clause 1.5.6 of ENATS 41-36								
6.	Measurement of the resistance of main circuit – Panel	IEC 60694. Sub-clause 6.4, IEC62271-100. Sub-clause 6.4, IEC62271-200. Sub-clause 6.4.								
7.	" - Busbars	"								
8.	Temperature Rise - Panel	IEC 60694. Sub-clause 6.5, IEC62271-100. Sub-clause 6.5, IEC62271-200. Sub-clause 6.5								
9.	" - Busbars	"								
10	Short-time withstand current and peak withstand current tests - Circuit-breaker and Enclosure.(3sec short time)	IEC60694.Sub-clause 6.6, IEC62271-100. Sub-clause 6.6, IEC62271-200. Sub-clause 6.6.								
11	" - Busbars	"								
12.	" - Earthing Switch	IEC60694.Sub-clause 6.6, IEC62271-102. Sub-clause 6.6, IEC62271-200. Sub-clause 6.5.								
13.	" - Single phase test of earth circuit (sub-clause 1.4.5 of ENATS 41-36)	IEC60694.Sub-clause 6.6, IEC62271-100. Sub-clause 6.6, IEC62271-200. Sub-clause 6.6.								
14.	Verification of protection. (Indoor – IP3X min) Weatherproofing for outdoor equipment (IP3XDW min) Mechanical impact (indoor – 2J, outdoor – 5J)	IEC60694.Sub-clause 6.7, IEC62271-100. Sub-clause 6.7, IEC62271-200. Sub-clause 6.7. IEC 529								

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
	Test Requirement	**Specification & Standards**	**Rated value**	**Test req' d Y or N**	**Conformance***	**Test value**	**Date of test**	**Test station Report / Cert No**	**Witness I, M or ENA ****	**Remarks**
		Sub-clause 1.5.13 of ENATS 41-36.								
15.	Tightness test	IEC60694.Sub-clause 6.8, IEC62271-100. Sub-clause 6.8, IEC62271-200. Sub-clause 6.8.								
16.	EMC tests	IEC60694.Sub-clause 6.9, IEC62271-100. Sub-clause 6.9,								
17.	Mechanical operations - Circuit-breaker. a) Auto-reclosing circuit-breaker -min 5000 ops, preferably class M2 - 10,000 operating cycles, auto- reclosing sequences - Table 8, IEC 62271-100) b) Non auto-reclosing circuit-breaker - class M1 - 2000 operating cycles If used as earthing device -mechanical strength of kinematic chain between movable contacts and the position indicating device	IEC62271-100. Sub-clause 6.101.2. IEC62271-200. Sub-clause 6.102 Sub-clause 2.4.110 of ENATS 41-36 IEC62271-102. Sub-clause 6.105 and Annex A								
18.	Mechanical operations - Earthing switch and disconnector - Manual - 1000 operating cycles Disconnectors operating in conjunction with circuit -breaker –2000, (5000) or 10,000 operating cycles depending on class of circuit-breaker Mechanical strength of kinematic chain between movable contacts and the position indicating device.	IEC62271-102. Sub-clause 6.102 IEC62271-200. Sub-clause 6.102 IEC62271-102. Sub-clause 6.105 and Annex A								
19.	Mechanical operations- switching devices and removable parts-50ops - interlocks (mechanical and electro-mechanical - 50 ops	IEC62271-200. Sub-clause 6.102								
20	Cable-charging current breaking test*	Sub clause 6.111,5.2 IEC 62271-100								
21.	Low temperature tests	IEC 62271-100. Sub-clause 6.101.3								
22.	High temperature tests - subject to design (see clause 1.6)	IEC 62271-100. Sub-clause 6.101.3. Clause 1.6 of ENATS 41-36								
23.	Short-circuit making and breaking tests - Circuit-breaker class E2 Auto-reclosing circuit-breaker - tested for duty as specified in IEC62271-100. table 21, list 1. Non auto-reclosing circuit-breaker - tested in accordance with sub-clauses 6.112.1 and 6.106 of IEC 62271-100	IEC62271-100. Sub-clauses 6.102 to 6.106, and 6.112 IEC62271-200. Sub-clause 6.101 Sub-clause 2.4.111 of ENATS 41-36								

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
	Test Requirement	**Specification & Standards**	**Rated value**	**Test req' d Y or N**	**Conformance***	**Test value**	**Date of test**	**Test station Report / Cert No**	**Witness I, M or ENA ****	**Remarks**
24.	Short-circuit making tests - Earthing switch (class E2 - Test duty 5 of IEC 60265 sub-clause 6.101.10 - 5 making ops).	IEC62271-102. Sub-clause 6.101, IEC60265: PART 1. Sub-clause 6.101.10								
25	Out of phase making and breaking current	IEC62271-100. Sub-clause 6.110, Sub-clause 2.4.106 of ENATS 41-36								
26.	Line-charging breaking current tests	IEC62271-100. Sub-clause 6.111 Sub-clause 2.4.107 of ENATS 41-36								
27.	Cable-charging breaking current tests	IEC62271-100. Sub-clause 6.111 Sub-clause 2.4.107 of ENATS 41-36								
28.	Internal Arc -- C B Chamber, C T Chamber, B B Chamber, Cable box. (36kV cable boxes using separable connectors – min 5kA).	IEC62271-200. Sub-clause 6.106. and Annex A Sub-clause 1.5.101 of ENATS 41-36								
29.	Gas-filled Compartment – Pressure Withstand	IEC62271-200. Sub-clause 6.103								
30.	Voltage presence indicating system (VPIS)	IEC 61958. Clause 6								
31	Voltage detecting system (VDS)	IEC 61243-5. Clause 5								
32.	Tests on auxiliary and control circuits/ equipment - Dielectric - Measurement of resistance - Temperature rise - Functional - Electrical continuity or earthed metallic parts - Verification of operational characteristics (Auxiliary contacts) - Ripple on d.c. input power port immunity - Environmental (Cold; Dry heat; Damp heat, steady state; Cyclic humidity; Vibration response & seismic; Final condition check)	Subclauses of IEC 60694 IEC 60694 incorporating Amd 2 Sub-clause 6.2.10 IEC 60694 incorporating Amd 2 Sub-clause 6.4.2 IEC 60694 Sub-clause 6.5.5 IEC 60694 incorporating Amd 2 Sub-clause 6.10.2 IEC 60694 incorporating Amd 2 Sub-clause 6.10.3 IEC 60694 incorporating Amd 2 Sub-clause 6.10.4 IEC 60694 incorporating Amd 2 Sub-clause 6.10.5 IEC 60694 incorporating Amd 2 Sub-clause 6.10.7								
33.	Finish	Performance to ENATS 98-1								24 monthly surveillance checks to maintain validity of the Notice
34	Process Control	ISO 9001 ER G79 Parts 1 & 2a								

* Conformance declaration codes

N/A = Clause is not applicable/appropriate to the product
Cs1 = The test conforms fully with the requirements of this clause
Cs2 = The test conforms partially with the requirements of this clause
Cs3 = The test does not conform to the requirements of this clause
Cs4 = Test not performed, but alternative evidence/ technical case offered

Ct1 = Independent witnessed tests
Ct2 = Not fully independent witnessed tests
Ct3 = Self verified tests
Ct4 = Alternative tests / evidence offered
Ct5 = Manufacturer has underwritten that the product meets the functional and performance requirements without further testing.
Ct6 = Not tested

Appendix 3c – ENATS 41-36 - Schedule Part 3 – METAL ENCLOSED SWITCHES

SELF CERTIFICATION CONFORMANCE DECLARATION - NOTE: One sheet shall be completed for each item or variant submitted.

The following sheets replicate the self-declaration section of ENATS 41-36 and also include the clauses of the international Standards relevant to common specifications for high-voltage switchgear and control gear standards.

If the product has already been assessed by ENA then re-completion of these self-declaration sheets is not required and the manufacturer may simply state the ENA Notice Of Conformance or Approval Notice number in the boxes below and supply copies of the sheets used in the ENA assessment.

If NOT already ENA assessed then the manufacturer shall declare conformance or otherwise, clause by clause, using ENA standard conformance declaration codes below.

Conformance declaration codes:

N/A = Clause is not applicable/appropriate to the product
Cs1 = The test conforms fully with the requirements of this clause
Cs2 = The test conforms partially with the requirements of this clause
Cs3 = The test does not conform to the requirements of this clause
Cs4 = Test not performed, but alternative evidence/ technical case offered

Instructions for completion

- **When Cs1 code is entered then details of how compliance is achieved SHALL be provided in the remarks column.**
  This shall include details of type tests, where appropriate.
- **When any other code is entered; an explanation of the reason for non-conformance shall be entered**
- Prefix each remark with the relevant 'IEC' or 'ENATS' as appropriate

Manufacturer:		**ENA Reference:**
Product Reference:	**Ratings:**	
Name:	**Signature:**	**Date:**

IEC60265-1, IEC 62271-102				ENATS 41-36 - Part 3			
Clause / Sub-clause		Requirement	Conformance code	Clause / Sub-clause	Requirement	Conformance code	Remarks
IEC 60265-1	IEC 62271-102						
1	1	General		3.1	General		
				3.1	Switch disconnector		
				3.1	Class E3 - IEC 600265		
				3.1	10 closing ops at rated s/c		
				3.1	≤ 24kV- Class M2 - 5000 ops		
				3.1	36Kv - Class M1 -1000 ops		
2	2	Normal service and special service conditions		3.2	Normal service and special service conditions		
3	3	Definitions		3.3	Definitions		
4	4	Ratings		3.4	Ratings		
	4.101	Rated short-circuit making current					
4.101		Rated mainly active load breaking current		3.4.101	Rated mainly active load breaking current		
4.102		Rated closed-loop breaking current		3.4.102	Rated closed-loop breaking current		
4.103		Rated no-load transformer breaking current		3.4.103	Rated no-load transformer breaking current		
4.104		Rated cable-charge breaking current		3.4.104	Rated cable-charge breaking current		
4.105		Rated line-charging breaking current		3.4.105	Rated line-charging breaking current		
4.112		Rated short-circuit making current		3.4.112	Rated short-circuit making current		
4.113		Rated breaking and making currents Class E3 / 10 x TD5		3.4.113	Rated breaking and making currents Class E3 / 10 x TD5		
				3.4.201	Rated Mechanical Endurance		
5	5	Design and construction		3.5	Design and construction		
5.1	5.1	Requirements for liquids		3.5.1	Requirements for liquids		
5.2	5.2	Requirements for gasses		3.5.2	Requirements for gasses		
5.3	5.3	Earthing of high voltage switches		3.5.3	Earthing of high voltage switches and earthing facilities		
				3.5.3	Class E2 earthing switch		
				3.5.3	Earthing switch ratings		
5.4	5.4	Auxiliary and control equipment		3.5.4	Auxiliary and control equipment		
5.5	5.5	Dependent power closing		3.5.5	Dependent power closing		
5.6	5.6	Stored energy operation		3.5.6	Stored energy operation		
				3.5.6	Switch mechanisms		
				3.5.6	Earthing switch mechanism		
5.7	5.7	Independent manual operation		3.5.7	Independent manual operation		
5.8	5.8	Operation of releases		3.5.8	Operation of releases		
5.9	5.9			3.5.9	Low and high-pressure interlocking and monitoring devices		

IEC60265-1, IEC 62271-102				ENATS 41-36 - Part 3			
Clause / Sub-clause IEC 60265-1	Clause / Sub-clause IEC 62271-102	Requirement	Conformance code	Clause / Sub-clause	Requirement	Conformance code	Remarks
5.10	5.10	Nameplates		3.5.10	Nameplates and labelling		
				3.5.10	Mimic diagram		
				3.5.10	Test points		
				3.5.10	Mimic symbols/colours - Annex C		
				3.5.10	Labels - typically Fig 6		
5.11	5.11	Interlocking devices		3.5.11	Interlocking devices and padlocking facilities		
				3.5.11	Move before earthing device		
				3.5.11	Interlocks (a) to (f)		
5.12	5.12	Position indicating		3.5.12	Position indicating		
5.13	5.13	Degrees of protection by enclosures		3.5.13	Degrees of protection by enclosures		
5.14	5.14	Creepage distance		3.5.14	Creepage distance		
5.15	5.15	Gas and vacuum tightness		3.5.15	Gas and vacuum tightness		
5.16	5.16	Liquid tightness		3.5.16	Liquid tightness		
5.17	5.17	Flammability		3.5.17	Flammability		
5.18	5.18	Electromagnetic compatibility		3.5.18	Electromagnetic compatibility		
5.101		Making and breaking operations					
	5.101	Special requirements for earthing switches					
5.102	5.102	Requirements for switch-disconnectors					
5.103	5.103	Mechanical strength					
5.104		Securing the position					
	5.104	Operation of disconnectors and earthing switches – Position of the movable contact system and its indicating and signalling devices					
	5.104.1	Securing of position					
	5.104.2	Additional requirements for power-operated mechanisms					
	5.104.3	Indication and signalling of position					
	5.104.3.1	Indication of position					
	5.104.3.2	Electrical position signalling by auxiliary contacts					
5.105		Auxiliary contacts for signalling					
	5.105	Maximum force required for manual operation					
	5.105.1	Operation requiring more than one revolution					

IEC60265-1, IEC 62271-102				ENATS 41-36 - Part 3			
Clause / Sub-clause IEC 60265-1	Clause / Sub-clause IEC 62271-102	Requirement	Conformance code	Clause / Sub-clause	Requirement	Conformance code	Remarks
	5.105.2	Operation requiring up to one revolution					
	5.106	Dimensional tolerances					
				3.5.201	Test facilities		
				3.5.201	Separate		
				3.5.201	integral		
				3.5.201	Test symbol indication		
				3.5.201	Test symbol - Annex C		
				3.5.202	Transformer mounting		
6		Type tests		3.6	Type Tests		
				3.6	Table 3.2		
6.1		General					
6.2		Dielectric tests					
6.3		Radio interference voltage tests					
6.4		Measurement of resistance of the main circuit					
6.5		Temperature rise tests					
6.6		Short-time withstand current and peak withstand current tests					
6.7		Verification of the degree of protection					
6.8		Tightness test					
6.9		Electromagnetic compatibility (EMC) tests					
6.101		Making and breaking tests					
6.102		Mechanical operations test					
6.103		Operation under severe ice conditions					
7		Routine Tests		3.7	Routine Tests		
8		Guide to the Selection of high-voltage switches for service		3.8	Guide to the Selection of high-voltage switches for service		
9		Information to be Given with enquiries, tenders and orders		3.9	Information to be Given with enquiries, tenders and orders- schedule 3.1		
10		Rules for transport, storage, erection, operation and maintenance		3.10	Rules for transport, storage, erection, operation and maintenance		
11		Safety		3.11	Safety		

Appendix 3c – ENATS 41-36 - Schedule Part 3 – METAL ENCLOSED SWITCHES.

SELF CERTIFICATION CONFORMANCE DECLARATION

PART 3 – METAL ENCLOSED SWITCHES

TYPE TEST CONFORMANCE DECLARATION D3

Type tests for switch-disconnector including enclosure and earthing switch.

Manufacturer:

Product Reference: **Ratings:**

Name: **Signature:** **Date:**

Instructions for completion:

- Complete a separate table for each variant and rating
- ENA/SAP to complete columns 1 to 4
- Manufacturer to complete columns 5 to 10
- When test report also covers another rating insert 'See ???A unit' in the Remarks column
  Tests not requested may be shown as 'Additional tests' at the bottom of the table

Type test reports table based on ENATS 41-36 Table 3.2
*See bottom of table for conformance declaration codes
** I = Independent; M= Manufacturer; ENA= Energy Networks Association

N.B. All tests on ???A unit unless otherwise stated

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
	Test Requirement	**Specification and standards**	**Rated value**	**Test req'd Y or N**	**Conformance ***	**Test value**	**Date of test**	**Test station Report / Cert No**	**Witness I, M or ENA ****	**Remarks**
1	Dielectric - Panel, including switch-disconnector and earthing switch as appropriate Partial discharge ≤ 10pC For cable connected switches, tests to be representative of two cable termination systems, in addition to switchgear manufacturer's own system if any	IEC 60694. Sub-clause 6.2, IEC 60265: PART 1. Sub-clause 6.2, IEC 62271-200. Sub-clause 6.2. Tables 1.1a and 1.1b of ENATS 41-36. IEC 62271-200. Sub-clause 6.2.9 and Annex FF ENATS 41-18 Sub-clauses 1.5.103.1 and 1.6 of ENATS 41-36								
2	" - Busbars	"								
3	Voltage Withstand - Isolating Gap (provision for dielectric tests on cables).	IEC 62271-200. Sub-clause 5.105 and 6.2.101. Sub-clause 1.4.2.2 of ENATS 41-36.								
4	DC Withstand Test on Test Devices, including all parts of main circuit which cannot be disconnected from the test connections	IEC 62271-200. Sub-clause 5.105. Sub-clause 1.5.201.1 of ENATS 41-36.								
5	Insulation level - electrically stressed gap due to possible movement of earthing switch contacts	Sub-clause 1.5.6 of ENATS 41-36								
6	Measurement of the resistance of main circuit – Panel	IEC 60694. Sub-clause 6.4, IEC 60265: PART 1. Sub-clause 6.4, IEC 62271-200. Sub-clause 6.4								
7	" - Busbars	"								
8	Temperature Rise - Panel	IEC 60694. Sub-clause 6.5, IEC 60265: PART 1. Sub-clause 6.5, IEC 62271-200. Sub-clause 6.5								
9	" - Busbars	"								
10	Short-time withstand current and peak withstand current tests - switch-disconnector and Enclosure.(3sec short time)	IEC 60694.Sub-clause 6.6, IEC 60265: PART 1. Sub-clause 6.6, IEC 62271-200. Sub-clause 6.6.								
11	" - Busbars	"								
12	" - Earthing Switch	IEC 60694.Sub-clause 6.6, IEC 62271-102. Sub-clause 6.6, IEC 62271-200. Sub-clause 6.6.								
13	" -Single phase test of earth circuit	IEC 60694.Sub-clause 6.6, IEC 62271-102. Sub-clause 6.6, IEC 62271-200. Sub-clause 6.6.								
14	Verification of protection. (indoor – IP3X min) Weatherproofing for outdoor equipment. (IP3XDW min) Mechanical impact (indoor 2J, outdoor 5J)	IEC 60694.Sub-clause 6.7, IEC 60265: PART 1 . Sub-clause 6.7, IEC 62271-200. Sub-clause 6.7 IEC 529 Sub-clause 1.5.13 of ENATS 41-36.								
15	Tightness test	IEC 60694.Sub-clause 6.8, IEC 60265: PART 1 . Sub-clause 6.8, IEC 62271-200. Sub-clause 6.8.								
16	EMC tests	IEC 60694.Sub-clause 6.9, IEC 60265: PART 1 . Sub-clause 6.9,								
17	Short-circuit making and breaking tests - Switch-disconnector class E3 (7.2kV, 12kV, 24kV Test duty 5 = 10ops)	IEC 60265: PART 1 . Sub-clauses 6.101, (TD 1 to 5, Table 5) IEC 62271-200. Sub-clause 6.101								

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
	Test Requirement	**Specification and standards**	**Rated value**	**Test req'd Y or N**	**Conformance ***	**Test value**	**Date of test**	**Test station Report / Cert No**	**Witness I, M or ENA ****	**Remarks**
	(36kV test duty 5 = 5 ops)	Sub-clause 3.4.113 of ENATS 41-36								
18	Short-circuit making tests - Earthing switch (class E2) Test duty 5 of IEC 60265 sub-clause 6.101.10 - 5 making operations.	IEC 62271-102. Sub-clause 6.101, IEC60265. Sub-clause 6.101.10								
19	Mechanical operations - Switch-disconnector - class M2 General purpose switch - 5000 operations. (including mechanical strength of kinematic chain between movable contacts and the position indicating device).	IEC 60265: PART 1 . Sub-clause 6.102.4, IEC 62271-200. Sub-clause 6.102 IEC 62271-102. Sub-clause 6.105 and Annex A								
20	Mechanical operations - Earthing switch (including mechanical strength of kinematic chain between movable contacts and the position indicating device).	IEC 62271-102. Sub-clause 6.102 IEC 62271-200. Sub-clause 6.102 IEC 62271-102. Sub-clause 6.105 and Annex A								
21	Mechanical operations -Switching devices and removable parts- 50 ops -Interlocks-50 ops(mechanical and electro-mechanical)	IEC 62271-200. Sub-clause 6.102								
22	Low temperature tests	IEC 62271-102. Sub-clause 6.104								
23	High temperature tests- subject to design (see clause 1.6)	IEC 62271-102. Sub-clause 6.104, Clause 1.6 of ENATS 41-36								
24	Cable-charging breaking current tests	IEC 60265: PART 1. Sub-clause 6.101.8.4(f)								
25	Line-charging breaking current tests	IEC 60265: PART 1. Sub-clause 6.101.8.4(g)								
26	Internal Arc -- Switch-disconnector chamber, BB Chamber, Cable box (36kV cable boxes using screened separable connectors – min 5kA.)	IEC 62271-200. Sub-clause 6.106. Sub-clause 1.5.101 of ENATS 41-36								
27	Gas-filled Compartment Pressure Withstand	IEC 62271-200. Sub-clause 6.103								
28	Voltage presence indicating system (VPIS)	IEC 61958. Clause 6								
29	Voltage detecting device (VDS)	IEC 61243-5. Clause 5								
30	Tests on auxiliary and control circuits/ equipment - Dielectric - Measurement of resistance - Temperature rise - Functional - Electrical continuity or earthed metallic parts - Verification of operational characteristics (Auxiliary contacts) - Ripple on d.c. input power port immunity	Subclauses of IEC 60694 IEC 60694 incorporating Amd 2 Sub-clause 6.2.10 IEC 60694 incorporating Amd 2 Sub-clause 6.4.2 IEC 60694 Sub-clause 6.5.5 IEC 60694 incorporating Amd 2 Sub-clause 6.10.2 IEC 60694 incorporating Amd 2 Sub-clause 6.10.3 IEC 60694 incorporating Amd 2 Sub-clause 6.10.4 IEC 60694 incorporating Amd 2 Sub-clause 6.10.5								

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
	Test Requirement	**Specification and standards**	**Rated value**	**Test req'd Y or N**	**Conformance ***	**Test value**	**Date of test**	**Test station Report / Cert No**	**Witness I, M or ENA ****	**Remarks**
	- Environmental (Cold; Dry heat; Damp heat, steady state; Cyclic humidity; Vibration response & seismic; Final condition check)	IEC 60694 incorporating Amd 2 Sub-clause 6.10.7								
31	Finish	Performance to ENATS 98-1								
32	Process Control	ISO 9001 ER G79 Parts 1 & 2a								36 monthly surveillance checks to maintain validity of the Notice

* Conformance declaration codes

N/A = Clause is not applicable/appropriate to the product
Cs1 = The test conforms fully with the requirements of this clause
Cs2 = The test conforms partially with the requirements of this clause
Cs3 = The test does not conform to the requirements of this clause
Cs4 = Test not performed, but alternative evidence/ technical case offered

Ct1 = Independent witnessed tests
Ct2 = Not fully independent witnessed tests
Ct3 = Self verified tests
Ct4 = Alternative tests / evidence offered
Ct5 = Manufacturer has underwritten that the product meets the functional and performance requirements without further testing.
Ct6 = Not tested

Appendix 3d – ENATS 41-36 - Schedule Part 5 – METAL ENCLOSED RING MAIN UNITS

SELF CERTIFICATION CONFORMANCE DECLARATION - NOTE: One sheet shall be completed for each item or variant submitted.

The following sheets replicate the self-declaration section of ENATS 41-36 and also include the clauses of the international Standards relevant to common specifications for high-voltage switchgear and control gear standards.

If the product has already been assessed by ENA then re-completion of these self-declaration sheets is not required and the manufacturer may simply state the ENA Notice Of Conformance or Approval Notice number in the boxes below and supply copies of the sheets used in the ENA assessment.

If NOT already ENA assessed then the manufacturer shall declare conformance or otherwise, clause by clause, using ENA standard conformance declaration codes below.

Conformance declaration codes:

N/A = Clause is not applicable/appropriate to the product
Cs1 = The test conforms fully with the requirements of this clause
Cs2 = The test conforms partially with the requirements of this clause
Cs3 = The test does not conform to the requirements of this clause
Cs4 = Test not performed, but alternative evidence/ technical case offered

Instructions for completion

- **When Cs1 code is entered then details of how compliance is achieved SHALL be provided in the remarks column.**
  This shall include details of type tests, where appropriate.
- **When any other code is entered; an explanation of the reason for non-conformance shall be entered**
- Prefix each remark with the relevant 'IEC' or 'ENATS' as appropriate

Manufacturer:		**ENA Reference:**
Product Reference:	**Ratings:**	
Name:	**Signature:**	**Date:**

ENATS 41-36 Part 5 Clause /Sub-clause	Requirement	Conformance codes	Remarks
5.1 “ “	General Combination (Parts 2 and 3) Combination (Parts 4 and 5)		
5.2 “	Service conditions Indoor and outdoor		
5.4.1	Rated operating sequence		
5.5 “ “ “ “ “	Design and construction Extensible / Non-extensible Mimic diagram Test points Symbols/colours - Annex C Handles, padlocking, labels, indicators -access Bolting to transformer		
5.6	Type tests - Table 5.1 or Table 5.2		
5.7	Routine tests		
5.8	Guide to the selection of ring main equipment		
5.9	Information to be given with enquiries, tenders and orders - schedule 5.1		
5.10	Rules for transport, storage, erection, operation and maintenance		
5.11	Safety		

Appendix 3d – ENATS 41-36 - Schedule Part 5 – METAL ENCLOSED RING MAIN UNITS.

PART 5 – METAL ENCLOSED RING MAIN EQUIPMENT WITH CIRCUIT BREAKER TEE OFF

TYPE TEST CONFORMANCE DECLARATION 5.2 - Type tests for ring main equipment (RME) with circuit-breaker tee-off.

Manufacturer: **Ratings**

Product reference:

Name: **Signature:** **Date:**

Instructions for completion:

- Complete a separate table for each variant and rating
- ENA/SAP to complete columns 1 to 4
- Manufacturer to complete columns 5 to 10
- When test report also covers another rating insert 'See ???A unit' in the Remarks column
  Tests not requested may be shown as 'Additional tests' at the bottom of the table

Type test reports table based on ENATS 41-36 Table 5.2
*See bottom of table for conformance declaration codes
** I = Independent; M= Manufacturer; ENA= Energy Networks Association

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
	Test Requirement	Specifications and Standards	Rated value	Test req' d Y or N	Conformance	Test value	Date of test	Test station Report/Cert No	Witness I, M or ENA**	Remarks
1	Dielectric - RME, including switch-disconnectors, circuit-breaker and earthing switches as appropriate. Tests to include VT and CTs when fitted. Partial discharge. Tests to be representative of two cable termination systems, in addition to switchgear manufacturer's own system if any.	IEC 60694. Sub-clause 6.2, IEC 62271-100. Sub-clause 6.2, IEC 60265: Part 1.Sub-clause 6.2, IEC 62271-200. Sub-clause 6.2. Tables 1.1a and 1.1b of ENATS 41-36 IEC 62271-200. Sub-clause 6.2.9 and Annex B ENATS 41-18 Sub-clauses 1.5.103.1 and 1.6 of ENATS 41-36								
2	voltage Withstand – Isolating Gap (provision for dielectric tests on cables).	IEC62271-200. Sub-clauses 5.105 and 6.2.101. Sub-clause 1.4.2.2 of ENATS 41-36.								
3	d.c. Withstand Test on Test Devices, including all parts of the main circuit which cannot be disconnected from the test connections.	IEC 62271-200. Sub-clause 5.105. Sub-clause 1.5.201.1 of ENATS 41-36								
4	Insulation level - electrically stressed gap due to movement of earthing switch contacts.	Sub-clause 1.5.6 of ENATS 41-36								
5	Measurement of the resistance of main circuit - RME, including switch -disconnectors and circuit-breaker as appropriate.	IEC 60694. Sub-clause 6.4, IEC 62271-100. Sub-clause 6.4.IEC 60265: Part 1. Sub-clause 6.4, IEC 62271-200. Sub-clause 6.4								
6	Temperature Rise - RME, including switch - disconnectors and circuit breaker as appropriate.	IEC 60694. Sub-clause 6.5, IEC 62271-100. Sub-clause 6.5 IEC 60265: Part 1. Sub-clause 6.5, IEC 62271-200. Sub-clause 6.5								
7	Short-time withstand current and peak withstand current tests - Ring switch-disconnectors, busbar and connections .(3sec short time).	IEC 60694.Sub-clause 6.6, IEC 60265: PART 1.Sub-clause 6.6, IEC 62271-200. Sub-clause 6.6.								
8	Short-time withstand current and peak withstand current tests - Tee-off circuit-breaker. (3sec short time).	IEC 60694.Sub-clause 6.6, IEC 62271-100. Sub-clause 6.6, IEC 62271-200. Sub-clause 6.6.								
9	Short-time withstand current and peak withstand current tests - Tee-off Earthing switch (3sec short time)..	IEC 60694.Sub-clause 6.6, IEC 62271-102. Sub-clause 6.6, IEC 62271-200. Sub-clause 6.6.								
10	" - Ring Earthing switches.	"								
11	" - Single phase test of earth circuit. (sub-clause 1.4.5 of ENATS 41-36)	IEC60694.Sub-clause 6.6, IEC62271-100. Sub-clause 6.6, IEC62271-200. Sub-clause 6.6.								
12	Verification of protection. (indoor – IP3X minimum) Weatherproofing for outdoor equipment. (outdoor IP3XDW minimum) Mechanical impact. (indoor – 2J, outdoor – 5J)	IEC 60694.Sub-clause 6.7 and annex C IEC 529, IEC 62271-200. Sub-clause 6.7 Sub-clause 1.5.13 of ENATS 41-36.								
13	Tightness test.	IEC 60694.Sub-clause 6.8, IEC 62271-200. Sub-clause 6.8.								
14	EMC tests.	IEC 60694.Sub-clause 6.9								
15	Short-circuit making and breaking tests - Circuit-breaker class E2. Non auto-reclosing circuit-breaker - tested in accordance with sub-clauses 6.112.1 and 6.106 of IEC 62271-100.	IEC62271-100. Sub-clauses 6.102 to 6.106, and 6.112 IEC62271-200. Sub-clause 6.101								
16	Short-circuit making and breaking tests - Ring switch-disconnector (Switch-disconnector class E3 and Test duty 5 = 10 operations).	IEC 60265: PART 1.Sub-clauses 6.101, (TD1 to 5,Table 5), IEC 62271-200. Sub-clause 6.101								

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
	Test Requirement	Specifications and Standards	Rated value	Test req' d Y or N	Conformance	Test value	Date of test	Test station Report/Cert No	Witness I, M or ENA**	Remarks
17	Short-circuit making tests - Tee-off earthing switch (class E2) (Test duty 5 of IEC 60265 sub-clause 6.101.10 - 5 making operations)	IEC 62271-102. Sub-clause 6.101, IEC60265. Sub-clause 6.101.10								
18	Short-circuit making tests - Ring earth switch (class E2) (Test duty 5 of IEC 60265 sub-clause 6.101.10 - 5 making operations).	IEC 62271-102. Sub-clause 6.101, IEC60265. Sub-clause 6.101.10								
19	Mechanical operations - Circuit-breaker. Non auto-reclosing circuit-breaker - class M1 - 2000 operating cycles. If used as earthing device - mechanical strength of kinematic chain between movable contacts and the position indicating device).	IEC62271-100. Sub-clause 6.101.2. IEC62271-200. Sub-clause 6.102 IEC 62271-102. Sub-clause 6.105 and Annex A								
20	Mechanical operations - Ring switch-disconnector - class M2 General purpose switch - 5,000 operations. (Including mechanical strength of kinematic chain between movable contacts and the position indicating device).	IEC 60265: PART 1. Sub-clause 6.102.4, IEC 62271-200. Sub-clause 6.102 IEC 62271-102. Sub-clause 6.105 and Annex A								
21	Mechanical operations - Tee-off earthing switch. (Including mechanical strength of kinematic chain between movable contacts and the position indicating device).	IEC 62271-102. Sub-clause 6.102 IEC 62271-200. Sub-clause 6.102 IEC 62271-102. Sub-clause 6.105 and Annex A								
22	Mechanical operations - Ring earthing switches. (Including mechanical strength of kinematic chain between movable contacts and the position indicating device).	IEC 62271-102. Sub-clause 6.102 IEC 62271-200. Sub-clause 6.102 IEC 62271-102. Sub-clause 6.105 and Annex A								
23	Mechanical operations- switching devices and removable parts - 50 ops - interlocks - 50 ops(mechanical and electro-mechanical).	IEC 62271-200. Sub-clause 6.102								
24	Low temperature tests.	IEC 62271-100. Sub-clause 6.101.3								
25	High temperature tests - subject to design (see clause 1.6 of this specification).	IEC 62271-100.Sub-clause 6.101.3								
26	Out of phase breaking current – Circuit-breaker	IEC62271-100. Sub-clause 6.110								
27	Cable-charging breaking current tests - Ring switch- disconnectors.	IEC 60265: PART 1. Sub-clause 6.101.8.4(f)								
28	Cable-charging breaking current tests - Circuit-breaker.	IEC 62271-100. Sub-clause6.111								
29	Line-charging breaking current tests - Ring switch-disconnectors.	IEC 60265: PART 1. Sub-clause 6.101.8.4(g)								
30	Line-charging breaking current tests - Circuit-breaker.	IEC 62271-100, Sub-clause 6.111								
31	Internal Arc –C B Chamber, C T Chamber, BB Chamber, Cable box. (36kV cable-boxes using screened separate connectors – min 5kA)	IEC62271-200. Sub-clause 6.106 and Annex A. Sub-clause 1.5.101 of ENATS 41-36								
32	Gas-filled Compartment Pressure Withstand.	IEC 62271-200. Sub-clause 6.103								
33	Voltage presence indicating system (VPIS).	IEC 61958. Clause 6								
34	Voltage detecting system (VDS)	IEC 61243-5. Clause 5								
35	Tests on auxiliary and control circuits/ equipment	Subclauses of IEC 60694								
	- Dielectric	IEC 60694 incorporating Amd 2 Sub-clause 6.2.10								
	- Measurement of resistance	IEC 60694 incorporating Amd 2 Sub-clause 6.4.2								
	- Temperature rise	IEC 60694 Sub-clause 6.5.5								

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
	Test Requirement	**Specifications and Standards**	**Rated value**	**Test req' d Y or N**	**Conformance**	**Test value**	**Date of test**	**Test station Report/Cert No**	**Witness I, M or ENA****	**Remarks**
	- Functional	IEC 60694 incorporating Amd 2 Sub-clause 6.10.2								
	- Electrical continuity or earthed metallic parts	IEC 60694 incorporating Amd 2 Sub-clause 6.10.3								
	- Verification of operational characteristics (Auxiliary contacts)	IEC 60694 incorporating Amd 2 Sub-clause 6.10.4								
	- Ripple on d.c. input power port immunity	IEC 60694 incorporating Amd 2 Sub-clause 6.10.5								
	- Environmental (Cold; Dry heat; Damp heat, steady state; Cyclic humidity; Vibration response & seismic; Final condition check)	IEC 60694 incorporating Amd 2 Sub-clause 6.10.7								
36	Finish.	Performance to ENATS 98-1								
37	Process Control.	ISO 9001 ERG79 Parts 1 & 2a								24 monthly surveillance checks to maintain validity of the Notice

*** Conformance declaration codes**

N/A = Clause is not applicable/appropriate to the product
Cs1 = The test conforms fully with the requirements of this clause
Cs2 = The test conforms partially with the requirements of this clause
Cs3 = The test does not conform to the requirements of this clause
Cs4 = Test not performed, but alternative evidence/ technical case offered

Ct1 = Independent witnessed tests
Ct2 = Not fully independent witnessed tests
Ct3 = Self verified tests
Ct4 = Alternative tests / evidence offered
Ct5 = Manufacturer has underwritten that the product meets the functional and performance requirements without further testing.
Ct6 = Not tested

Appendix 3e – ENATS 41-36 - Schedule Pt 10 – PROTECTION, INSTRUMENTATION & METERING EQUIPMENT

SELF CERTIFICATION CONFORMANCE DECLARATION - NOTE: One sheet shall be completed for each item or variant submitted.

The following sheets replicate the self-declaration section of ENATS 41-36 and also include the clauses of the international Standards relevant to common specifications for high-voltage switchgear and control gear standards.

If the product has already been assessed by ENA then re-completion of these self-declaration sheets is not required and the manufacturer may simply state the ENA Notice Of Conformance or Approval Notice number in the boxes below and supply copies of the sheets used in the ENA assessment.

If NOT already ENA assessed then the manufacturer shall declare conformance or otherwise, clause by clause, using ENA standard conformance declaration codes below.

Conformance declaration codes:

N/A = Clause is not applicable/appropriate to the product
Cs1 = The test conforms fully with the requirements of this clause
Cs2 = The test conforms partially with the requirements of this clause
Cs3 = The test does not conform to the requirements of this clause
Cs4 = Test not performed, but alternative evidence/ technical case offered

Instructions for completion

- **When Cs1 code is entered then details of how compliance is achieved SHALL be provided in the remarks column.**
  This shall include details of type tests, where appropriate.
- **When any other code is entered; an explanation of the reason for non-conformance shall be entered**
- Prefix each remark with the relevant 'IEC' or 'ENATS' as appropriate

Manufacturer:		**ENA Reference:**
Product Reference:	**Ratings:**	
Name:	**Signature:**	**Date:**

ENATS 41-36 Part 10 Clause / Sub- clause	Requirements	Conformance code	Remarks
10.1	General		
10.1	Ratings as associated switching device		
10.1	ENATS 35-15		
10.2	Current transformers		
10.2.1	General		
10.2.1	CTs to IEC 61869 Part 1		
10.2.1	Characteristics to ENATS 35-15		
10.2.1	Position of CT data plates		
10.2.1	Secondary winding connections		
10.2.1	No common leads (metering CTs)		
10.2.1	Earth screen – accessible		
10.2.1	ER S15 and ENATS 50-18		
10.2.1	Individual test certificates		
10.2.1	Low energy output devices		
10.2.1	CT installation		
10.2.2	Performance characteristics ENATS 35-15		
10.3	Voltage transformers		
10.3.1	General		
10.3.1	VTs to IEC 60044-2		
10.3.1	Dry, encapsulated, isolatable		

ENATS 41-36 Part 10 Clause / Sub- clause	Requirements	Conformance code	Remarks
10.3.1	VT design		
10.3.1	Low energy output devices		
10.3.1	Individual test certificates		
10.3.1	Prevent access to metering circuits		
10.3.2	Performance characteristics ENATS 35-15		
10.3.3	VT connections		
10.3.3.1	General		
10.3.3.1	Means of breaking primary connections		
10.3.3.1	Secondary windings fuses and links		
10.3.3.1	Removal of secondary fuse-links in service		
10.3.3.1	Means of breaking connections labelled		
10.3.3.1	Padlockable shutters – primary isolation		
10.3.3.1	Primary connection fuse links – BS 2692		
10.3.3.1	Fuse rating – 3.15A		
10.3.3.1	Fuses for oil insulated VT		
10.3.3.2	Star point connections compartment – fixed cover		
10.3.3.2	Fixed cover labelled		
10.3.4	Padlocking facilities		
10.3.4.1	Safety padlocking facilities a) to c)		
10.4	Metering equipment		
10.4	LV connections brought out		
10.4	Sealable terminal block		
10.4	VT accuracy class 1.0 (10MVA)		
10.4	VT accuracy class 0.5 (>10MVA)		
10.4	Two windings as (a) or (b)		
10.4	CT accuracy class 0.5S (10MVA)		
10.4	CT accuracy class 0.2S (<100MVA)		
10.4.1	Self-contained metering unit		
10.4.1	Metal enclosed free standing		
10.4.1	Flange for ENATS 35-1 transformer		
10.4.1	Multicore cable box – BS6121 (E1W)		
10.5	Instruments		
10.5	ENATS 50-18		
10.5	Scale		
10.6.1	Earth fault passage indication		

ENATS 41-36 Part 10 Clause / Sub- clause	Requirements	Conformance code	Remarks
10.6.1	Readily visible		
10.6.1	Core balance CT		
10.6.1	Insulated cable gland		
10.6.2	Remote earth fault indication		

Appendix 4 – Self-Certification Conformance Declarations against ENA TS 41-41 Requirements

SELF CERTIFICATION CONFORMANCE DECLARATION - NOTE: One sheet shall be completed for each item or variant submitted.

The following sheets replicate the self-declaration section of ENATS 41-41.

If the product has already been assessed by ENA then re-completion of these self-declaration sheets is not required and the manufacturer may simply state the ENA Notice Of Conformance or Approval Notice number in the boxes below and supply copies of the sheets used in the ENA assessment.

If NOT already ENA assessed then the manufacturer shall declare conformance or otherwise, clause by clause, using ENA standard conformance declaration codes below.

Conformance declaration codes:

N/A = Clause is not applicable/appropriate to the product
Cs1 = The test conforms fully with the requirements of this clause
Cs2 = The test conforms partially with the requirements of this clause
Cs3 = The test does not conform to the requirements of this clause
Cs4 = Test not performed, but alternative evidence/ technical case offered

Instructions for completion

- **When Cs1 code is entered then details of how compliance is achieved SHALL be provided in the remarks column.**
  This shall include details of type tests, where appropriate.
- **When any other code is entered; an explanation of the reason for non-conformance shall be entered**
- Prefix each remark with the relevant 'IEC' or 'ENATS' as appropriate

Manufacturer:		**ENA Reference:**
Product Reference:	**Ratings:**	
Name:	**Signature:**	**Date:**

Clause	Requirement	ENA TS 41-41 code	BS EN Code	Remarks
1	Scope [BS EN 62271-1]			
2	Normative references			
3	Terms and definitions [BS EN 62271-1]			
4	Normal and special service conditions [BS EN 62271-1]			
4.1.2	Indoor switchgear and controlgear [BS EN 62271-1]			
4.1.3	Outdoor switchgear and controlgear [BS EN 62271-1]			
5	Ratings [BS EN 62271-1]			
5.3	Rated insulation level (U_p & U_d) [BS EN 62271-1]			
5.4	Rated frequency (f_r) [BS EN 62271-1]			
5.5	Rated continuous current (I_r) [BS EN 62271-1]			
5.6	Rated short-time withstand current (I_k) [BS EN 62271-1]			
5.6.201	Rated short-time withstand current of the earthing circuit (I_{ke})			
5.7	Rated peak withstand current (I_p) [BS EN 62271-1]			
5.8	Rated duration of short-circuit (t_k) [BS EN 62271-1]			
5.8.201	5.8.201 Rated duration of short-circuit of the earthing circuit (t_{ke})			
5.9	Rated supply voltage of auxiliary and control circuits (U_a) [BS EN 62271-1]			
5.10	Rated supply frequency of auxiliary and control circuits [BS EN 62271-1]			
5.11	Rated pressure of compressed gas supply for controlled pressure systems [BS EN 62271-1]			
5.101	Rated internal arc classification (IAC) [BS EN 62271-200]			
5.101.1	General [BS EN 62271-200]			
5.101.2	Types of accessibility [BS EN 62271-200]			
5.101.3	Classified sides [BS EN 62271-200]			
5.101.4	Rated arc fault currents (I_A, I_{Ae}) [BS EN 62271-200]			
5.101.5	Rated arc fault duration (t_A, t_{Ae}) [BS EN 62271-200]			
5.102	Rated cable test access [BS EN 62271-200]			
5.102.1	General [BS EN 62271-200]			
5.102.2	Rated AC cable test voltage U_{ct} (AC) [BS EN 62271-200]			
5.102.3	Rated DC cable test voltage U_{ct} (DC) [BS EN 62271-200]			
5.300	Circuit-breaker requirements [BS EN 62271-100]			
5.300.100	General circuit-breaker requirements			
5.300.101	Rated short-circuit breaking current (I_{sc}) [BS EN 62271-100]			
5.300.102	Transient recovery voltage related to the rated short-circuit breaking current [BS EN 62271-100]			
5.300.103	Rated short-circuit making current (I_{ma}) [BS EN 62271-100]			

Clause	Requirement	ENA TS 41-41 code	BS EN Code	Remarks
5.300.104	Rated operating sequence [BS EN 62271-100]			
5.300.105	Characteristics for short-line faults [BS EN 62271-100]			
5.300.106	Rated out-of-phase making and breaking currents [BS EN 62271-100]			
5.300.107	Rated capacitive switching currents [BS EN 62271-100]			
5.300.108	Inductive load switching [BS EN 62271-100]			
5.300.110	Number of mechanical operations [BS EN 62271-100]			
5.300.111	Classification of circuit-breakers as a function of electrical endurance			
5.302	Disconnector and earthing switch requirements [BS EN 62271-102]			
5.302.101	Rated short-circuit making current (Ima) [BS EN 62271-102]			
5.302.106	Classification of earthing switches for mechanical endurance [BS EN 62271-102]			
5.302.107	Classification of earthing switches for mechanical endurance [BS EN 62271-102]			
5.303	Switches requirements [BS EN 62271-103]			
5.303.101	Rated mainly active load-breaking current (I_{load}) [BS EN 62271-103]			
5.303.102	Rated closed-loop breaking current (I_{loop}) [BS EN 62271-103]			
5.303.103	Rated cable-charging breaking current (I_{cc}) [BS EN 62271-103]			
5.303.104	Rated line-charging breaking current (I_{lc}) [BS EN 62271-103]			
5.303.111	Rated short-circuit making current (I_{ma}) [BS EN 62271-103]			
5.303.116	Type and classes for a general purpose switch [BS EN 62271-103]			
5.303.201	Rated mechanical endurance of switches			
6	Design and construction [BS EN 62271-1]			
6.0	Design and construction requirements			
6.2	Requirements for gases in switchgear and controlgear [BS EN 62271-1]			
6.3	Earthing of switchgear and controlgear [BS EN 62271-1]			
6.4	Auxiliary and control equipment and circuits [BS EN 62271-1]			
6.4.201	Identification			
6.4.202	Cables and wiring			
6.4.203	Terminals and terminations			
6.5	Dependent power operation [BS EN 62271-1]			
6.6	Stored energy operation [BS EN 62271-1]			
6.7	Independent unlatched operation (independent manual or power operation) [BS EN 62271-1]			
6.7.2011	Independent manual or power operation (independent unlatched operation)			
6.7.202	Dependent manual operation			
6.8	Manually operated actuators [BS EN 62271-1]			

Clause	Requirement	ENA TS 41-41 code	BS EN Code	Remarks
6.9	Operation of releases [BS EN 62271-1]			
6.9.300	Operational releases circuit-breaker requirements [BS EN 62271-100]			
6.10	Pressure/level indication [BS EN 62271-1]			
6.11	Nameplates [BS EN 62271-1]			
6.11.201	Labelling			
6.11.201.1	General			
6.11.201.2	Motorised disconnectors			
6.11.201.3	Phase identification			
6.11.201.4	Circuit labels			
6.11.202	Mimic diagrams			
6.11.302	Disconnector nameplates [BS EN 62271-102]			
6.11.303	Switch nameplates [BS EN 62271-103]			
6.12	Locking devices [BS EN 62271-1]			
6.12.201	Interlocking devices			
6.12.201.1	General			
6.12.201.2	3-position device			
6.12.201.2.1	Move before earth 3-position device			
6.12.201.3	Test access			
6.12.201.4	Test devices			
6.12.202	Padlocking facilities			
6.12.202.1	Safety padlocking			
6.12.202.2	Operational padlocking			
6.13	Position indication [BS EN 62271-1]			
6.14	Degrees of protection provided by enclosures [BS EN 62271-1]			
6.14.1	General [BS EN 62271-1]			
6.14.2	Protection of persons against access to hazardous parts and protection of the equipment against ingress of solid foreign objects (IP coding) [BS EN 62271-1]			
6.14.4	Protection of equipment against mechanical impact under normal service conditions (IK coding) [BS EN 62271-1]			
6.16	Gas and vacuum tightness [BS EN 62271-1]			
6.20	X-ray emission [BS EN 62271-1]			
6.22	Filling levels for insulation, switching and/or operation [BS EN 62271-1]			
6.101	Internal arc fault [BS EN 62271-200]			
6.102	Enclosure [BS EN 62271-200]			
6.102.1	General [BS EN 62271-200]			

Clause	Requirement	ENA TS 41-41 code	BS EN Code	Remarks
6.102.2	Covers and doors [BS EN 62271-200]			
6.102.2.201	Surface preparation and coating			
6.102.2.202	Foundation arrangements			
6.102.3	Partition or shutter being part of the enclosure [BS EN 62271-200]			
6.102.4	Inspection windows [BS EN 62271-200]			
6.102.5	Ventilating openings, vent outlets [BS EN 62271-200]			
6.103	High voltage compartments [BS EN 62271-200]			
6.103.1	General [BS EN 62271-200]			
6.103.1.201	Connection compartments			
6.103.2	Fluid filled compartments (gas or liquid) [BS EN 62271-200]			
6.103.2.2	Design [BS EN 62271-200]			
6.103.2.3	Tightness [BS EN 62271-200]			
6.103.2.4	Pressure relief of fluid-filled compartments [BS EN 62271-200]			
6.103.3	Partitions and shutters [BS EN 62271-200]			
6.103.201	Busbars and busbar connections [BS EN 62271-200]			
6.103.202	Requirements for combinations of switching devices			
6.103.202.1	General			
6.103.202.2	Facilities for disconnecting the circuit			
6.103.202.3	Facilities for earthing circuits and busbars			
6.103.202.4	Facilities for earthing circuits			
6.103.202.5	Facilities for earthing busbars			
6.103.202.6	Facilities for testing primary circuits and busbars			
6.103.202.7	Testing via primary circuits			
6.103.202.8	Testing via secondary circuits			
6.103.202.9	Fault location, voltage withstand and protection testing			
6.103.202.10	Facilities for checking voltage and phase identification			
6.103.202.11	Facilities for measuring voltage			
6.201	CT and VT general requirements			
6.201.1	CT requirements			
6.201.2	VT general requirements			
6.201.2.1	VT performance characteristics			
6.201.2.2	VT general connections			
6.201.2.3	Star point connection			

Clause	Requirement	ENA TS 41-41 code	BS EN Code	Remarks
6.201.3	Safety padlocking facilities			
6.202	Metering requirements			
6.203	Instrument requirements			
6.204	Fault passage indication			
6.205	Transformer mounting arrangement			
7	Type tests [BS EN 62271-1]			
7.2	Dielectric tests [BS EN 62271-1] (including tests on 2 cable systems)			Declare cable systems tested: -
7.2.201	Dielectric type test for cable connected equipment with AC test voltages			
7.2.202	Test facilities			
7.11	X-radiation test procedures for vacuum interrupters [BS EN 62271-1]			
7.101	Verification of making and breaking capacities [BS EN 62271-200]			
7.102	Mechanical operation tests [BS EN 62271-200]			
7.102.2	Mechanical operation type test for interlocks [BS EN 62271-200]			
7.201	Solar radiation			
7.202	Ageing of composite bushings and insulation			
7.203	Voltage transformer type tests			
7.300	Circuit-breaker requirements [BS EN 62271-100]			
7.300.111	Capacitive switching type tests [BS EN 62271-100]			
7.302	Disconnector type tests [BS EN 62271-102]			
7.303	Switch type tests [BS EN 62271-103]			
7.303. 101	Making and breaking tests			
7.303. 102	Mechanical endurance type test [BS EN 62271-103]			
8	Routine tests [BS EN 62271-1]			
8.101	Partial discharge measurement [BS EN 62271-200]			
9	Guide to the selection of switchgear and controlgear			
9.101	Selection of design and construction [BS EN 62271-200]			
11	Transport, storage, installation, operating instructions and maintenance [BS EN 62271-1]			
11.2	Conditions during transport, storage and installation [BS EN 62271-1]			
11.4	Operating instructions [BS EN 62271-1]			
11.5	Maintenance [BS EN 62271-1]			
11.201	Extension limitations			
11.202	Replacement and disposal			
12	Safety [BS EN 62271-1]			
12.1	General safety			

Clause	Requirement	ENA TS 41-41 code	BS EN Code	Remarks
12.101	Procedures [BS EN 62271-200]			
12.102	Internal arc aspects [BS EN 62271-200]			
13	Influence of the product on the environment [BS EN 62271-1]			
Annex A	Explanatory notes			
A.1	Test devices			
A.2	Small inductive breaking current			
A.2.1	Circuit-breakers			
A.2.1.1	General			
A.2.1.2	Transformer magnetising current for circuit-breakers with rated voltage (U_r) of 100 kV and above			
A.2.1.3	Transformer magnetising current for circuit-breakers with rated voltage below 100 kV			
A.2.2	Switches			
A.3	Mimic diagrams and symbols			
Annex B	Self Certification Conformance Declaration			
Annex C	Symbols for mimic diagrams			
C.1	Position indication			
C.1.1	Position indication for circuit-breaker, disconnector and earthing switch			
C.1.2	Position indication for switch-disconnector / earthing switch			
C.1.3	Position indication of earthing switch when integral earth star point is removed for testing purposes			
C.2	Graphical symbols for equipment			
C.2.1	VT symbol - IEC 60617-6 symbol No. 06-13-01A			
C.2.2	VT with VT HV disconnector - IEC 60617-7 symbol no. 07-13-06			
C.2.3	Primary test point			
C.2.4	Capacitively coupled test point			
C.3	Typical pictogram for busbar earthing			
Annex D	Standard labels			

Appendix 5 - Self Certification Conformance Declarations against ENATS 48-05 Requirements

CLAUSE BY CLAUSE CONFORMANCE WITH ENATS 48-5 – 'Environmental Test Requirements for protection Relays and Systems'

Protection relays shall comply with the latest issues of the relevant International and British Standards. ENATS 48-05 is intended to amplify and/or clarify the requirements of those Standards.

This check sheet identifies the clauses in ENATS 48-05 relevant to Environmental Test Requirements for protection relays and systems.

If the product has already been assessed by ENA then re-completion of these self-declaration sheets is not required and the manufacturer may simply state the ENA Notice Of Conformance or Approval Notice number in the boxes below and supply copies of the sheets used in the ENA assessment.

If NOT already ENA assessed then the manufacturer shall declare conformance or otherwise, clause by clause, using ENA standard conformance declaration codes below.

Conformance declaration codes:

N/A = Clause is not applicable/appropriate to the product
Cs1 = The test conforms fully with the requirements of this clause
Cs2 = The test conforms partially with the requirements of this clause
Cs3 = The test does not conform to the requirements of this clause
Cs4 = Test not performed, but alternative evidence/ technical case offered

Instructions for completion

- **When Cs1 code is entered then details of how compliance is achieved SHALL be provided in the remarks column.**
  This shall include details of type tests, where appropriate.
- **When any other code is entered; an explanation of the reason for non-conformance shall be entered**
- Prefix each remark with the relevant 'IEC' or 'ENATS' as appropriate

Manufacturer:		**ENA Reference:**
Product Reference:	**Ratings:**	
Name:	**Signature:**	**Date:**

Protection Relay Type Testing – Atmospheric Environment Requirements				
Standard	**Test**	**Requirement**	**Conformance Code**	**Remarks**
IEC 60068-2-1	Temperature Cold Heat	-25°C, 96 hours, operate and storage		
IEC 60068-2-2	Temperature Dry Heat	-70°C, 96 hours, operate and storage		
IEC 60068-2-3	Relative Humidity			
IEC 60068-2-30	Relative Humidity Alternative	100% RH, 40ºC, 56 cycles of +25°C to +55°C		
BS EN 60529	Enclosure	IP54		

Protection Relay Type Testing Continued – Mechanical Environment Requirements				
Standard	**Test**	**Requirement**	**Conformance Code**	**Remarks**
IEC 60255-21-1	Vibration	Response and Endurance Class 1		
IEC 60255-21-2	Shock	Response and Endurance Class 1		
IEC 60255-21-2	Bump	Class 1		
IEC 60255-21-3	Seismic	Class 1		

Protection Relay Type Testing Continued – Electrical Requirements				
Standard	**Test**	**Requirement**	**Conformance Code**	**Remarks**
IEC 60255-6	48 V DC Supply Voltage	Table 1, 38.5 to 53 V with a maximum of > 60 V		
IEC 60255-11	Voltage Dips, Short Interruptions and Voltage Immunity Test	10ms interruption, 12% AC ripple		
	DC Supply Voltage General	Ramp up and down over 1 minute or similar		
ENA TS 48-4	Low Burden Trip Relays	Captive discharge ENA 1		
ENA TS 48-4	High Burden Trip Relays	Captive discharge ENA 1		
ENA TS 48 – 5	Thermal requirement of CT inputs	2.4 x In, continuous 3.0A, 20 mins 3.5A, 10 mins 4.0A, 5 mins 5.0A, 3 mins 6.0A, 2 mins		
ENA TS 48 – 5	Thermal requirements of VT inputs	120% of Vn, continuous		
ENA TS 48 - 5	Dielectric	Test values selected according to insulation voltage. High Impedance circulating current schemes, test at 2.5kV. Circuits connected to instrument transformers or batteries, rated insulation not below 250V, test at 2.0kV. Open output relay contacts 1kV.		
IEC 60255 - 5	Impulse Voltage	Test at 5kV, 0.5J		

Electromagnetic Compatibility (EMC) Requirements

Standard	Test	Requirement	Conformance Code	Remarks
IEC 60255	Oscillatory waves immunity test (High Frequency Disturbance)	Class III, 1MHz 2.5kV common, 1 kV diff. Applied to all ports, except diff on comms at the discretion of the approving panel		
IEC 60255	Electrostatic Discharge Immunity Tests	Class III. 6kV, contact, 8kV air. Applied to the enclosure		
IEC 60255	Radiated electromagnetic Field Disturbance test (RFI)	10V/m, 1kHz, 80 to 1000MHz sweep and 80, 160, 450, 900 Mhz spot frequencies. Applied to the enclosure		
IEC 60255	Radiated electromagnetic field from digital radio telephones immunity test	10V/m, 900 and 1890Mhz. Applied to the enclosure		
IEC 60255	Electrical fast transient/burst immunity	Level IV, 4kV. Applied to all ports		
	Surge immunity	Level III, 2kV common, 1kV diff. (Level 4, 4kV, 2kV preferred for CT and VT inputs) Applied to all ports		
IEC 60255	Conducted electromagnetic field disturbance tests	10Vrms, 80% mod, 1kHz. 0.15 to 80MHz sweep and 27 and 68 MHz spot frequencies. Applied to all ports		
EN 61000-4-8 (IEC 61000-4-8)	Power frequency magnetic field immunity test	1000 A/m for 1 sec and 100 A/m for 1 min. Applied to all ports		
EN 61000-4-9 (IEC 61000-4-9)	Pulse magnetic field immunity test	6.4/16 µs magnetic pulse, 1000 A/m. Applied to enclosure. Not currently mandatory		
EN 61000-4-10 (IEC 61000-4-10)	Damped oscillatory magnetic field immunity test	0.1 and 1.0 MHz, 100A/m. Applied to the enclosure. Not currently mandatory		
IEC 60255-22-7 & EATS 48-5	Power Frequency	Level 4, 300V for 1 s at 50Hz, common mode. Appendix A, EATS 48-5 for differential, at discretion of panel		
IEC 60834-1 & IEC 60834-2	Communication channel Noise immunity			
IEC 60255-25	Conducted and radiated Emission	Class A, conducted, power supply: 0.15 to 0.5 MHz, 79dB(µV) quasi peak, 66dB (µV) average, 0.5 to 30 MHz, 71dB(µV) quasi peak, 60dB (µV) average. Radiated, enclosure at 10M: 30 to 230 MHz, 40dB(µV) quasi peak, 230 to 1000 MHz, 47dB(µV) quasi peak,		

Appendix 6 - Self Certification Conformance Declarations against ENATS 48-6-6 Requirements

CLAUSE BY CLAUSE CONFORMANCE WITH ENATS 48-6-6 Functional Test Requirements – Overcurrent & Earth Fault Protection

Protection relays shall comply with the latest issues of the relevant International and British Standards. ENATS 48-05 is intended to amplify and/or clarify the requirements of those Standards.

This check sheet identifies the clauses in ENATS 48-05 relevant to Environmental Test Requirements for protection relays and systems.

If the product has already been assessed by ENA then re-completion of these self-declaration sheets is not required and the manufacturer may simply state the ENA Notice Of Conformance or Approval Notice number in the boxes below and supply copies of the sheets used in the ENA assessment.

If NOT already ENA assessed then the manufacturer shall declare conformance or otherwise, clause by clause, using ENA standard conformance declaration codes below.

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Instructions for completion

- **When Cs1 code is entered then details of how compliance is achieved SHALL be provided in the remarks column.**
  This shall include details of type tests, where appropriate.
- **When any other code is entered; an explanation of the reason for non-conformance shall be entered**
- Prefix each remark with the relevant 'IEC' or 'ENATS' as appropriate

Manufacturer:		**ENA Reference:**
Product Reference:	**Ratings:**	
Name:	**Signature:**	**Date:**

ENATS 48-6-6 clause / Sub-clause	Requirements	Conformance code	Remarks
10.3.4.1	Safety padlocking facilities a) to c)		
10.4	Metering equipment		
10.4	LV connections brought out		
10.4	Sealable terminal block		
10.4	VT accuracy class 1.0 (10MVA)		
10.4	VT accuracy class 0.5 (>10MVA)		
10.4	Two windings as (a) or (b)		
10.4	CT accuracy class 0.5S (10MVA)		
10.4	CT accuracy class 0.2S (<100MVA)		
10.4.1	Self-contained metering unit		
10.4.1	Metal enclosed free standing		
10.4.1	Flange for ENATS 35-1 transformer		
10.4.1	Multicore cable box – BS6121 (E1W)		
10.5	Instruments		
10.5	ENATS 50-18		
10.5	Scale		
10.6.1	Earth fault passage indication		
10.6.1	Readily visible		
10.6.1	Core balance CT		
10.6.1	Insulated cable gland		
10.6.2	Remote earth fault indication		

Appendix 7 - Declaration of Compliance with NPS/003/014 Technical Specification for Ground Mounted 11 & 20kV Distribution Switchgear

Switchgear range name and voltage range:			
NPS/003/014 Clause		**Full Compliance (Yes or No)**	**Details/Remarks/Description** *For ALL clauses; provide a short summary in this column*
3.1	Compliance with IEC, BSEN, BS, etc.		
3.2	Compliance with ENA TS 41-36 or ENA TS 41-41	State which	
3.2	ENA Assessed		ENA assessment ref:
3.3	Indoor design		
3.3	Outdoor design		
3.4	Level of remote control provision available		
3.4	Level of remote control provision offered as 'standard'		
3.4	Provision of isolation for internal motor drive actuators		
3.5	Wire wound CTs or Current sensing Instruments (state)	State which	
3.5	Options for Time fuse-links and/or self-powered relay		
3.5	Time fuse-links and/or self-powered relay provision offered as 'standard'		
3.6	Relays compliant with ENA TS-48-5 and ENA TS 48-6-6	State	
3.6	Relays ENA assessed	State	ENA assessment ref:
3.6	Relays IEC 60255 compliance	State	
3.6	Relays compliant with requirements (a) to (e)		
3.7	Metering and Metering Equipment (also see Appendix1)		
3.8	Test voltages		
3.9	Enclosures & Housings Conductors without continuous metal sheath		
3.10	Enclosures & Housings Indoor to outdoor enclosures		

Appendix 7 continued…

Switchgear range name and voltage range:			
NPS/003/014 Clause ***ENA TS 41-36 / ENA TS 41-41***		**Compliance (Yes or No)**	**Details/Remarks/Description** ***For ALL clauses; provide a short summary in this column identifying to which ENA TS compliance is met***
3.11	**Variations from ENATS 41-36 Issue 3 2012 and ENA TS 41-41 Issue 1 2020:**		
1.4.2.1Table 1.1/ 5.3 Table 1	95kV BIL for 12kV eqpt		
1.4.4.1Table 1.3 / 5.5	Busbars >=630A		
1.4.5 Table 1.3 / 5.6	Short-time withstand: 12kV >=20kA 24kV >=16kA		
1.4.8 / 5.9	Remote Control; 24V DC supply		
1.4.8 / 5.9	Emergency (shunt) trip 110V AC and/or 30V DC		
1.5.0.1 / 6.0	Activities can be performed with supporting legs in position and without supplementary support		
1.5.0.3.2	Diagrams provided		
1.5.0.4.4 / 6.103.202.6	Testing facilities		
1.5.0.4.5.1	VPIS/VDS on all circuits		
1.5.0.4.7 / 6.103.202.10	Capability to withstand, or be protected from TEST voltages		
1.5.1	Non-oil filled switchgear		
1.5.1	Non-oil filled metering units		
1.5.2 / 6.2	SF6 tanks and chambers sealed for life		
1.5.2 / 6.2	SF6 topping up live & associated instructions		
1.5.2 / 6.2	Alternative gas with lower GWP to SF6.		
1.5.4.4.5.2	Secondary wiring terminals spring loaded or cage clamp type with shorting/disconnecting facility		
1.5.4.4.5.2	Secondary wiring access for testing purposes in LV compartment		
1.5.4.4.5.2	Test winding where direct secondary connections are made		
1.5.8 / 6.9	Shunt trip		
1.5.9	Single stage pressure switch to operate on minimum functional pressure		
1.5.13.2	Water ingress IPX1 or IPX2		
1.5.15 / 6.16	Warranty and support for full duration of standard operating life where gas loss rate exceeds stated values in ENA TS		

Switchgear range name and voltage range:			
NPS/003/014 Clause ***ENA TS 41-36 / ENA TS 41-41***		**Compliance (Yes or No)**	**Details/Remarks/Description** ***For ALL clauses; provide a short summary in this column identifying to which ENA TS compliance is met***
1.5.101 / 6.101	Internal arc relief ducting away and/or arc quenching option		
1.5.102.103	Tx mounting option for 12kV 'cable connected' switchgear		
1.5.102.104	Thermostatic heater for anti-condensation where indoor class switchgear is offered with an enclosure		
1.5.103.1.101 / 6.103.1.201	Cable bushing interface		
1.5.103.1.101 / 6.103.1.201	Options for gland plates to include those for HOT sites		
1.5.103.1.101 / 6.103.1.201	Option for IAC rated anti-mist transparent inspection window on cable compartment covers		
1.10 / 11	UK legislation compliance, including Working at Heights		
1.10 / 11	Manual handling instructions		

Appendix 7 continued…

Switchgear range name and voltage range:			
NPS/003/014 Clause ***ENA TS 41-36 / ENA TS 41-41***		**Compliance (Yes or No)**	**Details/Remarks/Description** ***For ALL clauses; provide a short summary in this column identifying to which ENA TS compliance is met***
3.11	**Variations from ENATS 41-36:**		
2	**Metal enclosed circuit breakers**		
2.4	Line charging/breaking		
2.5.10.1	Rating plate include ENA TS compliance and ENA NOC ref.		
3.11	**Variations from ENATS 41-36 Issue 3 2012 and ENA TS 41-41 Issue 1 2020:**		
10.7 / 6.204	Fault passage indicators All circuits have option for integral 3x500:1 CTs		
10.7 / 6.204	All RMUs to have 3x500:1CTs on left hand ring switch		
10.7 / 6.204	All circuits supplied equipped with remote control actuators shall have integral 3x500:1 CTs		
10.7 / 6.204	CTs or Current sensing instruments allow compliance with NPS/003/013		
10.7 / 6.206	CTs or Current sensing secondary and FPI terminations accessible from front of switchgear.		
10.7 / 6.204	Conformity to ENA TS 48-2		

Appendix 8 - Individual Item Summary Technical Details

One column to be completed for <u>EACH</u> unit/variant type listed in Appendix 1, including metering units.

	NOTE: This column contains example entries only				
Unit Type	Close Coupled RMU Non-extensible. Switch Disconnector / CB / Switch Disconnector	Unit 2	Unit 3	Unit 4	Etc.
Manufacturers Type Reference	RMUABC-3a MkII				
Rated Voltage	12kV				
Rated Normal Current for switching devices (for RMUs: e.g. xA/yA/zA)	630 / 200 / 630 A				
Rated Short time Current	20 kA (1s)				
Impulse Withstand Voltage (BIL)	95kV				
Rated Normal Current for busbar	630A				
Indoor or Outdoor design	Outdoor				
Rating of Earthing Device(s)	Feeder Earth Switch = 20kA Tee Earth Switch = 2kA				
Assigned number of fault-make operations, at full rating, before maintenance of each switching device (inc feeder earths)	Switch Disconnector = 500 CB = 1000				
Assigned number of fault-break operations before maintenance of each switching device	Switch Disconnector = 0 CB = 1000				
Insulation and Switching Principle Characteristics					
Switching medium (e.g. vacuum, SF6, etc.)	Feeder: SF_6 2 position Switch-Disconnector Tee: CB vacuum in SF_6				
Busbar insulation	SF_6, cast resin, air, etc.				
Earth switch application	Feeder: Switch-Disconnector Tee: Disconnector, via CB				
Physical Aspects					
Width of Unit	1100 mm				
Depth of Unit	1100 mm				
Height of Unit	1500 mm				
Weight (complete with filling medium)	400 kg				
Height of Centre of Gravity	850 mm				
Distance of Centre of Gravity from Rear of Unit (or, for closed coupled units, or from Tx Mounting Flange)	450 mm				
Distance of Centre of Gravity, from left hand side (looking at it from the normal operating position)	550 mm				
Environmental					
Mass of SF_6 or other gas, and/or Volume of oil or other liquid, per complete unit	2.5 kg SF_6				

Mass of SF_6 or other gas, and/or Volume of oil or other liquid, per compartment	Sw/CB/Sw common tank 2 kg SF_6 Busbars 0.5 kg SF_6				
Mass of SF6 in components such as cast resin VTs, CTs, cable bushings, etc.	Cast resin VT: 20g per VT				

Appendix 8 Continued…

IEC Pressure (or density) significant values	NOTE: This column contains example entries only
Rated Filling Pressure, or density, for Insulation and/or Switching P_{re} – IEC62271-1 3.6.5.1 (assembly) *Declaration Required for EACH gas zone/chamber*	Sw/CB/Sw common tank = 0.75 barG Busbars = 0.75 barG
Rated Filling Pressure, or density, for Operation P_m – IEC62271-1 3.6.5.2 (control device) *Declaration Required for EACH gas zone/chamber*	As above, because all in common tank.
Alarm Pressure, or density, for Operation P_{am} – IEC62271-1 3.6.5.4 - pressure at which a monitoring signal may be provided. P_{am} – IEC60694 3.6.4.4 - pressure at which a monitoring signal may be provided to indicate that replenishment may be necessary in a relatively short time. *Declaration Required for EACH gas zone/chamber*	Sw/CB/Sw common tank = 0.75 barG Busbars = 0.75 barG
Minimum Functional Pressure, or density, for Operation P_{mm} – IEC62271-1 3.6.5.6 *Declaration Required for EACH gas zone/chamber*	Sw/CB/Sw common tank = 0.75 barG Busbars = 0.75 barG
Alarm Pressure, or density, for Insulation and/or Switching P_{ae} – IEC62271-1 3.6.5.3 - pressure at which a monitoring signal may be provided. P_{ae} – IEC60694 3.6.4.3 - pressure at which a monitoring signal may be provided to indicate that replenishment may be necessary in a relatively short time. *Declaration Required for EACH gas zone/chamber*	Sw/CB/Sw common tank = 0.75 barG Busbars = 0.75 barG
Minimum Functional Pressure, or density, for Operation and/or Switching P_{me} – IEC62271-1 3.6.5.5 - pressure at which and above which rated characteristics of switchgear and controlgear are maintained *Declaration Required for EACH gas zone/chamber and function.*	Sw/CB/Sw common tank CB = 0.6 barG Busbars = 0.6 barG

Appendix 8 Continued…

Practical Statement of Significant Pressures & Consequences

	NOTE: This column contains example entries only			
Normal operating pressure (or density)	X barG	Unit 1	Unit 2	Etc.
First Alarm Level and details of any associated alarm contacts and details of implications for serviceability	Y barG Indicated on green/red zoned pressure gauge. When in gauge needle is in red area; switchgear cannot be guaranteed to provide rated characteristics. If has positive pressure then …. 1 set N/O contacts & 1 set N/C contacts.			
Second Alarm Level and details of any associated alarm contacts and details of implications for serviceability.	Not provided as standard; Option for …			
Pressure (or density) at, or above which, rated characteristics for use as a Point of Isolation are maintained. Minimum Functional Pressure; I.e. disconnector duty.	a bar G			
Pressure (or density) at or above which, rated characteristics for Breaking Fault Current are maintained. I.e. CB duty.	b bar G			
Pressure (or density) at or above which, rated characteristics for Making/Breaking Normal Load Current and Making Fault Current are maintained. I.e. Switch duty.	c bar G			
Pressure (or density) at or above which, rated characteristics for BIL are maintained.	d bar G			
Pressure (or density) at or above which, rated characteristics, except BIL, are maintained; allowing the units to remain in service, without carrying out switching duties. I.e. Busbar duty.	e bar G			
Under what operational conditions is it safe to top up the gas?				

Continued…

Cable Terminations	NOTE: This column contains example entries only			
Unit Type (for RMU; as default use 2xSwitch & 1xCircuit Breaker example)	Close Coupled RMU Non-extensible. Switch / CB / Switch	Unit 1	Unit 2	Etc.
Height of Cable Gland Plate above Floor Level	0 mm			
Cable Bushing Type	Outer cone, IECxxx, type Z			
Distance from Gland Plate to Cable Bushing centre/Lug Position	500 mm			
Cable Bushing - Phase/Phase distance between centres	250 mm			
Cable Bushing - Minimum Clearance Phase/Earth	N/A - solid, screened connectors			
Cable terminations and switchgear interface. *Please confirm the make and type of cable termination and cable combinations type tested with the switchgear*	(1) 185mm xyz single core cable from CableCo terminated with hjk separable connector kit from CableTermCo. (2) 185mm rst three core cable from CableCo terminated with rty cable termination kit from CableFixCo and uvw cable lugs from LugCo			

Appendix 9 - Pre-commission testing, Routine Inspection and Maintenance requirements

Suppliers shall provide details of the recommended pre-commission testing and inspection required in the form of an electronic manual.

Suppliers 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 also be provided.

Appendix 10 - Addendum to Supplier Requirement, including Logistical Requirements

Supporting evidence of compliance with type tests shall be submitted with the completed tender documents. This shall include the cover sheet and the scope/summary sheet of the type tests.

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.

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

Details should be provided of the minimum and maximum exposure levels, frequency of exposure and duration of exposure of the packaged item with respect to;

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

The Tenderer shall ensure that each item is suitably packaged and protection to maintain the product and packaging as "fit for service" prior to installation taking account of the potential for an outdoor storage environment. 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.

Palletised goods shall be supplied on standard 1200mm x 1000mm pallets.

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

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

Appendix 11 - Check Sheet of Technical Information to be Supplied

ALL of the following information shall be provided by the supplier/tenderer to Northern Powergrid.

Requirement	Provided (Yes/No)	Key / Reference(s) for provided document(s) *(To help Northern Powergrid understand what the submitted documents relate to)*
This sheet: Appendix 11 – **Check sheet of technical information to be supplied**		
Copy of pricing schedule **template populated with product names and codes**		
General overview/descriptions of products offered, technical catalogues, brochures, etc.		
General arrangement drawings of products offered		
Appendix 8 - Individual item **summary technical details**		
Electrical wiring diagrams for each variant		
Appendix 7- Completed self-certification conformance **declaration against this NPS/003/014**		
Declaration of significant **technical non-conformances** for each product		
Appendix 2 – Declaration of **product conformance against test values & acceptance of testing**		
Appendix 3 - Completed self-certification conformance **declaration against ENA TS 41-36**		
Appendix 3a – ENATS 41-36 - schedule part 1 – **common clauses**. **Clause by clause conformance** with ENATS 41-36 – part 1		
Appendix 3b – ENATS 41-36 - schedule part 2 – **metal enclosed circuit breakers**. **Clause by clause conformance** with ENATS 41-36 – part 2		
Appendix 3b – ENATS 41-36 - schedule part 2 – **metal enclosed circuit breakers**. **Type test conformance** declaration		
Appendix 3c – ENATS 41-36 - schedule part 3 – **metal enclosed switches**. **Clause by clause conformance** with ENATS 41-36 – part 3		
Appendix 3c – ENATS 41-36 - schedule part 3 – **metal enclosed switches**. **Type test conformance** declaration d3		

Requirement	Provided (Yes/No)	Key / Reference(s) for provided document(s) *(To help Northern Powergrid understand what the submitted documents relate to)*
Appendix 3d – ENATS 41-36 - schedule part 5 – **metal enclosed Ring Main Units with CB** **Clause by clause conformance** with ENATS 41-36 – part 5		
Appendix 3d – ENATS 41-36 - schedule part 5 – **metal enclosed Ring Main Units with CB** **Type test conformance** declaration 5.2 - type tests for ring main equipment (RME) with CB tee-off.		
Appendix 3e – ENATS 41-36 - schedule pt 10 – **protection, instrumentation & metering.** **clause by clause conformance** with ENATS 41-36 – part 10		
Appendix 4 - Completed self-certification conformance **declaration against ENA TS 41-41**		
Appendix 5 - Completed self-certification conformance **declaration against ENA TS 48-05**		
Appendix 6 - Completed self-certification conformance **declaration against ENA TS 48-6-6**		
Type test evidence: summary list and copies of all type test evidence		
Statement and drawings of **placement and/or options required to achieve AF and AFL arc relief**		
Summary of activities at each of the main manufacturing facilities and **Copies of ISO 9001 certificates** of accreditation for main manufacturing facilities		
Appendix 9 - **Pre-commission testing, routine inspection and maintenance requirements**		
Routine test plan example (including test values, duration, pass/fail criteria and tolerances)		
Appendix 10 - **Addendum to supplier requirements**, including logistics requirements		
Instructions/Manuals for: manual and mechanical handling, storage, installation, commissioning, operation, maintenance, end of life recycling and disposal. And Packaging/delivery information		
Associated **COSHH sheets**		
UK DNO **references/previous customers** that have been supplied with these products.		