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NPS/001/003 – Technical Specification for 11kV, 20kV and 33kV Overhead Line Air Break Switch Disconnectors

1. Purpose

This document details the requirements for all 11kV, 20kV and 33kV Air Break Switch Disconnectors operating on the overhead line distribution network of Northern Powergrid.

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

Document Reference	Document Title	Version	Published Date
NPS/001/003	Technical Specification for 11kV, 20kV and 33kV Overhead Line Air Break Switch-Disconnectors	5.0	June 2019

2. Scope

This specification details the product range, design, constructional and technical requirements for Air Break Switch Disconnectors for 11kV, 20kV and 33kV overhead lines. Northern Powergrid currently has a preference for a single design of disconnector that is suitable for use on both the 11kV and 20kV systems.

The main features of the products detailed in this specification are:-

- Rod operated, high level, hook stick mechanism requiring two step operation with a third step to apply a mechanical safety lock flap
- Independent manually operated (Category 0 as defined in Energy Network Association Engineering Recommendation G18 “Air Break Switch Disconnectors”, clause 4)
- Suitable for mounting on under-slung single pole, rutter or H pole’s

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 (ENAS) current at the time of supply. This specification also includes a requirement for suppliers to provide periodic inspection and maintenance information. The following appendices form part of this technical specification:-

- Appendix 1 – Schedule of requirement
- Appendix 2 – Self-Certification Conformance Declaration
- Appendix 3 – Addendum to Supplier Requirements
- Appendix 4 – Maintenance and Inspection Requirements
- Appendix 5 – Information Return Check List

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3. Technical Requirements

3.1. General Requirements

Air Break Switch Disconnectors shall comply with Energy Networks Association Technical Specification (ENATS) 41-36 and Energy Networks Association Engineering Recommendation G18. The disconnector shall comprise of a three phase, rocking head, gang operated load break switch. The kit shall include an operating rod and mechanism to allow operation via a hook stick (see clause 3.2.5).

The equipment shall be suitable for operating under the environmental and operating conditions detailed within this specification.

3.2. Technical Requirements

3.2.1. Switch Disconnector Category

Switches supplied under this specification shall be in accordance with (Category 0) as defined in ENA ER G18, clause 4 or category B as defined in ENA TS 41-36 Section 6.

3.2.2. Equipment Ratings

The equipment is required for use on three-phase, 50Hz, 11kV, 20kV or 33kV nominal supply systems with the neutral earthed directly.

Rated Voltage (kV)	12/24	36
Rated Insulation Level (kV-peak value)		
Lightning Impulse Withstand Voltage		
Common Value	150	200
Across the isolating distance	165	220
1 Minute Power Frequency Wet Withstand Voltage (kV rms Value) Common Value	60	80
across the isolating distance	66	88
1 Minute Power Frequency Dry Withstand Voltage (kV rms Value) Common Value	70	95
Across the isolating distance	77	105
Rated Normal Current (A)	630	630
3 Second Short-time withstand Current (kA)	12.5	12.5
Short Circuit Making withstand current (kA)		
Independent Manual (Category 0)	10 (25Pk)	10 (25Pk)
Rated Load Breaking Current (A)	630	630

3.2.3. Cable and Line Charging Currents

The rated cable and line charging current values for Air Break Switch Disconnectors shall comply with those specified in table 6.1 of ENA TS 41-36.

3.2.4. Special Service Conditions

Switches shall be designed to operate normally whilst being coated with a minimum of 10mm of ice as required by Clause 6.2 of ENA TS 41-36. It shall also be suitable for use in coastal areas with high salt air pollution.

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3.2.5. Hook Stick Mechanism

It shall be possible to mount the operating mechanism for the switch at a fixed height of 4.8m from ground level, irrespective of the actual pole height and switch mounting position. The pole diameter at this height ranges between 250mm and 450mm. The mechanism shall have an automatic latching pin, which is virtually friction free. The mechanism shall be designed to be suitable for operation from ground level by the use of standard portable insulated operating rods.

There must be at least two distinct operations to open or close the switch. The lever shall incorporate an anti-reflex device to prevent reverse movement of the operation rod, operating the equipment. It should be designed for ease of operation, under all service conditions, e.g., severe weather.

Additionally, the switch mechanism shall incorporate a "Safety Lock Feature". The safety lock shall consist of an interlock or additional lever that when applied prevents the switch from being moved from the open position to the closed position. The lever or interlock shall incorporate a label that becomes visible from ground level when the safety lock is applied. The label shall be white lettering on a red background with the words "SAFETY LOCK". The label shall be permanent, durable and UV stable.

3.2.6. Insulators

The support insulators shall be manufactured in accordance with ENA TS 43-93 and BS EN 61109 and shall be of the composite silicone type. All insulators shall provide minimum creepage levels of 25mm/kV or USCD of 43.3 as detailed for IEC 60815 Part 1 SPS Class "D Heavy". They may be of either cylindrical post type or the pedestal post type.

The composite material shall meet the requirements of clause 3.2 of NPS/001/006 – "Technical Specification for Insulators for Overhead Lines up to and including 132kV".

3.2.7. Mode of Operation

Switches shall of the independent manual type and provide the values of rated short-circuit making current as detailed in table of clause 3.2.2 'Equipment Ratings'.

The switch shall be fully compliant with the requirements for independent manual operation units detailed in clause 1.5.7.1 of ENA TS 41-36.

3.2.8. Contacts

The main fixed and moving contacts shall be self-aligning and shall be manufactured from a suitable high conductivity material.

Where spring loaded devices are used to maintain main contact pressure, they shall be manufactured from corrosion resistant materials which are compatible with the contact. Where separate springs are used, these should not form part of the current carrying circuit. Shrouds may be used as necessary to maintain spring action under ice conditions, but they must not act as a trap for moisture or inhibit free air circulation.

In addition to the "over-toggle" mechanism, there should be positive stops in both the closed and open positions, which are independent of the contacts.

The minimum isolating distance across an open switch shall be 430mm for 11/20kV and 33kV with the gap clearly visible from ground level.

3.2.9. Leads

Any flexible leads which form the main current carrying path shall be of multi-strand, high conductivity annealed copper conductors or laminations of high conductivity strip to BS EN 13599. They shall preferably be covered for long term protection against abrasion and corrosion. Applied coverings shall fully seal the leads to prevent moisture ingress; however, it shall not reduce the flexibility of the lead.

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The leads, terminations and supporting apparatus shall be so arranged and connected to provide mechanical stress relief at the connections. Leads shall be either supported, or so designed to provide adequate clearance between groups of leads and moving parts of the switch and to result in minimum wear of both the leads and their coverings.

Compression lugs shall be manufactured from high conductivity electrolytic copper and generally be in accordance with ENA TS 43-92.

3.2.10. Connections

The connections shall be double-hole tinned copper NEMA lug 41mm centres (Figure 4 of ENA TS 41-16).

3.2.11. Nuts, Bolts and Studs

All nuts and pins shall be locked in position with locknuts, or lock washers, or other suitable devices unless the omission is proved for the application.

All bolts, nuts and washers shall be of non-rusting material and where dissimilar materials are in contact, consideration shall be given to any interactive processes between them. Where electrical connections are involved brass bolts, nuts and washers with a phosphor bronze spring washer shall be used.

All bolts or studs shall project through the nut. Projections exceeding four threads shall be avoided.

The components used in the disconnector will be of standard design such that no special spanners or tools shall be required.

All mounting and connecting bolts, nuts, washer's etc. to be provided except pole bolts.

3.2.12. Mounting

The switch shall be suitable for mounting on both single poles, H type poles and rutter type poles at a distance approximately 2700mm from the pole top. The operating rod connecting the mechanism to the ganged switch shall be suitable for poles between 11m and 14m in length (9m to 11m above ground level).

Manufactures shall provide an option for the supply of common mounting steelwork to accommodate the various mounting options listed above.

All ferrous materials shall be hot dip galvanised in accordance with BS EN ISO 1461 after fabrication.

It shall be possible to offset 2 units to either side of the pole when mounted on a single H pole steelwork will facilitate erection of one phase unit between the poles with one pole outside of each leg.

3.2.13. Labelling

In addition to the rating plate on the operating mechanisms, the manufacturer shall provide a duplicate rating plate for each switch unit and a plate that can be fixed to the pole at ground level. Labelling shall include the information detailed in IEC 62271-102 Table 12 together with the rated short-circuit making current. The plate shall be permanent, durable and UV stable.

3.2.14. Earthing Switch

This is an occasional item, and they will be ordered on project basis. Earthing switch under this specification shall be in accordance with Category E0 as defined in IEC 62271-102 and ENA TS 41-36.

3.3. Testing

All units shall have been subjected to the type tests detailed in Clause 6.6 of ENA TS 41-36 and the routine tests in Clause 6.7 of ENA TS 41-36. Appendix 2 contains self-certification conformance declarations that shall be completed for each variant of ABSD offered.

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4. References

4.1. External Documentation

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

Reference	Title
BS EN 12163	Copper and copper alloys. Rod for general purposes
BS EN 13599	Copper and copper alloys. Copper plate, sheet and strip for electrical purposes
BS EN 61109	Insulators for overhead lines – Composite suspension and tension insulators for a.c. systems with a nominal voltage greater than 1 000V – Definitions, test methods and acceptance criteria
BS EN ISO 1461	Hot dip galvanized coatings on fabricated iron and steel articles. Specifications and test methods
DD IEC/TS 60815 Part 1	Selection and dimensioning of high-voltage insulators intended for use in polluted conditions – Part 1: Definitions, information and general principles
ENA ER G18	Air Break switch disconnectors and expulsion fuses : Recommendations
ENA TS 41-16	Apparatus Terminations, Conductor Sizes and Associated Fittings (Copper) used in Indoor and Outdoor Substations with Outdoor Equipment
ENA TS 41-36	Switchgear for Service up to 36kV (cable and overhead conductor connected)
ENA TS 43-92	Technical Specification for Overhead Line Connectors
ENA TS 43-93	Technical Specification for Overhead Line Insulators
IEC 60265 – 1	Specification for high-voltage switches. Switches for rated voltages above 1 kV and less than 52 kV
IEC 62271 – 102	High-voltage switchgear and control gear – Part 102: Alternating current disconnectors and earthing switches
ISO 14001	Environmental Management Systems
ISO 18001	Occupational Health and Safety Management Systems
ISO 9001	Quality Management Systems

4.2. Internal Documentation

Reference	Title
NPS/001/006	Technical Specification for Insulators for Overhead Lines up to and including 132kV

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4.3. Amendments from Previous Version

Reference	Description
All External Documentation	Document revisions checked and updated where necessary
3.2.14 and Appendix 2 Earthing Switch	New clauses for Earthing Switch
Appendix 1 Schedule	Commodity Code updated
Appendix 2 Self-Certification	Aligned all clauses with latest standards
Appendix 4 Requirements	Undated heading
Appendix 5 Check List	Added Schedule 7.1 of ENA TS 41-36

5. Definitions

Term	Definition
ABSD	Air Break Switch Disconnecter
BS	British Standard
Category 0	Category 0 - ABSDs fitted with a mechanism other than dependent manual or dependent power, and fitted with a self-contained arc extinguishing device ('interrupter heads') (ENA G18)
ENA ER	Energy Networks Association Engineering Recommendation
ENA TS	Energy Networks Association Technical Specification
SPS	Site pollution severity (SPS) classes (IEC 60815-1)
USCD	Unified specific creepage distance (IEC 60815-1)

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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
Deb Dovinson	Governance Administrator	27/03/2024

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: In line with contract award proposals
Should this document be displayed on the Northern Powergrid external website?		Yes
		Date
Aaron Chung	Policy and Standards Engineer	02/04/2024

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
Ged Hammel	Lead Policy and Standards Engineer	27/03/2024
Steve Salkeld	Policy and Standards Engineer	27/03/2024

6.4. Authorisation

Authorisation is granted for publication of this document.

		Date
Paul Black	Head of System Engineering	05/04/2024

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Appendix 1 – Schedule of Requirements

Requirements	Northern Powergrid Commodity Code
11/20kV, Air Break Switch Disconnecter, ENA ER G18 Category '0', with High Level Independent Manual Operating Lever, to Drawing Number 1.09.147.1525 Sheet 7	245587
33kV, Air Break Switch Disconnecter, for Single Pole Fixing with High Level Independent Manual Operating Lever, to Drawing Number 1.09.147.1525 Sheet 7	245586
33kV Air Break Switch Disconnecter with High Level Independent Manual Operating Lever. Supplied with Steelwork suitable for 1830cm H Pole.	245589
33kV Air Break Switch Disconnecter with High Level Independent Manual Operating Lever. Supplied with Steelwork suitable for 2440cm H Pole.	245596
33kV Air Break Switch Disconnecter with High Level Independent Manual Operating Lever. Supplied with Steelwork suitable for 2900cm H Pole.	245597
33kV, Air Break Switch Disconnecter for Single Rutter Pole, with High Level Independent Manual Operating Lever and Extended Phase Centres to Drawing Number 1.09.147.1525 Sheet 7	245588
Air Break Switch Disconnecter Retro-Fit Shoot Bolt Mechanism - for upgrading AB Gevea units with a 12mm pin	245590

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Appendix 2 - Self-Certification Conformance Declaration

Overhead Conductor Connected Air-Break Switch-Disconnectors.

CLAUSE BY CLAUSE CONFORMANCE WITH ENATS 41-36, SECTION 6- OVERHEAD CONDUCTOR CONNECTED AIR-BREAK SWITCH DISCONNECTORS,

Switchgear covered by ENATS 41-36 shall comply with the latest issues of the relevant International and British Standards. ENATS 41-36 is intended to amplify and/or clarify the requirements of those Standards.

This check sheet identifies the clauses in ENATS 41-36 - Section 6 and the clauses of the aforementioned Standards relevant to overhead conductor connected air-break switch-disconnectors. The manufacturer shall declare conformance or otherwise, clause by clause, using the following levels of 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

Note - One complete set shall be completed for each variant offered.

Instructions for completion

- When Cs1 code is entered the supplier shall provide evidence of conformance
- When any other code is entered the reason and supporting evidence for non-Conformance shall be entered
- Prefix each remark with the relevant 'BS EN' or 'ENATS' as appropriate

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

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Clause / Sub-clause		Requirement	Conformance code	ENATS 41-36 - Part 1 Clause / Sub-clause	Requirement	Conformance code	Remarks
IEC 62271-102	IEC 60265: PART 1						
1	1	General		6.1	General		
				6.1	Class M0 (IEC 62271-102)		
				*6.1	*Class E0 (IEC62271-102)		
				6.1	Ganged		
2	2	Normal and special service conditions		6.2	Normal and special service conditions		
				6.2	Class 10 ice		
3		Definitions		6.3	Definitions		
				6.3.3	Switch-disconnector (Cat B)		
5	4	Ratings		6.4	Ratings		
				6.4.101	Rated mainly active load breaking current		
				6.4..102	Rated closed-loop breaking current		
				6.4.103	Rated no-load transformer breaking current		
				6.4.104	Rated cable-charge breaking current		
				6.4.105	Rated line-charging breaking current		
5.105		Classification of disconnectors for mechanical endurance		6.4.106	Rated values of mechanical endurance for disconnectors		
				6.4.106	Class M0 – 1000 ops		

Note: * Only for Earthing Switch

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IEC 62271-102, IEC 60265:Part 1				ENATS 41-36 Section 6			
*5.106		*Classification of earthing switches for mechanical endurance					
*5.106		*M0					
5.101		Rated short-circuit making current		6.4.112	Rated short-circuit making current		
				6.4.112	Table 6.2		
				* 6.4.112	* Clause 5.101 of IEC 62271-102		
				6.4.113	Rated breaking and making currents for a general purpose switch		
				*6.4.113	*Class E1 (IEC 62271-103)		
6.5	5	Design and construction		6.5	Design and construction		
6.5.3		Earthing of disconnectors and earthing switch		6.5.3	Earthing of disconnectors and earthing switch		
6.5.5		Dependent power operation and dependent manual operation		6.5.5	Dependent power operation and dependent manual operation		
				6.5.5.1	a) Manual low-level actuation		
				6.5.5.1	b) Manual high-level actuation		
				6.5.5.1.1	Mechanical strength		
				6.5.5.1.1	Prevent water Accumulation		
				6.5.5.1.1	Mounting		
				6.5.5.1.1	Over toggle		

Note: * Only for Earthing Switch

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IEC 62271-102, IEC 60265:Part 1				ENATS 41-36 Section 6			
Clause / Sub-clause		Requirement	Conformance code	ENATS 41-36 - Section 1 Clause / Sub-clause	Requirement	Conformance code	Remarks
IEC 62271-102	IEC 60265: PART 1						
6.6	5.6	Stored energy operation		6.5.6	Stored energy operation		
6.7	5.7	Independent manual operation		6.5.7	Independent manual Operation		
				6.5.7	Integral rods to 6.5.5.2		
6.9	5.8	Operation of releases		6.5.8	Operation of releases		
6.11	5.10	Nameplates		6.5.10	Nameplates and labeling		
				6.5.10	Short circuit making		
				6.5.10	Open/close indication		
6.12	5.11	Interlocking devices		6.5.11	Interlocking devices and padlocking facilities		
				6.5.11	Locking of high level Actuation		
				*6.5.11	*Earthing switch interlocks		
				6.5.11	Key interlock (36kV disconnecter)		

Note: * Only for Earthing Switch

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IEC 62271-102, IEC 60265: Part 1				ENATS 41-36 Section 6			
Clause / Sub-clause		Requirement	Conformance code	ENATS 41-36 - Section 1 Clause / Sub-	Requirement	Conformance code	Remarks
IEC 62271-102	IEC 60265: PART 1						
6.13	5.12	Position indication		6.5.12	Position indication		
				6.5.12	Only one visible		
6.14	5.13	Degrees of protection by enclosures		6.5.13	Degrees of protection by Enclosures		
6.15	5.14	Creepage distances		6.5.14	Creepage distances		
6.101		Special requirements for earthing switches					
	5.101	Making and Breaking Operation					
5.102		Requirements in respect of the isolating distance of disconnectors					
5.103	5.103	Mechanical strength					
5.104		Operation of disconnectors, and earthing switches - position of the movable contact system and its indicating and signaling devices					

Note: * Only for Earthing Switch

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IEC 62271-102, IEC 60265: Part 1				ENATS 41-36 Section 6			Remarks
Clause / Sub-clause		Requirement	Conformance code	ENATS 41-36 - Section 1 Clause / Sub-clause	Requirement	Conformance code	
IEC 62271-102 IEC 60265: PART 1							
5.105		Maximum force required					
5.106		Dimensional tolerances					
				6.5.201	Flexible leads and Connections		
				6.5.201	Multi-strand / laminations Covered		
				6.5.201	Stress relief at		
				6.5.201	Supported (clearance/ min. wear)		
				6.5.201	Lugs (BS2874, ENATS43-		
				6.5.202	Surface preparation and Coatings		
				6.5.203	Mounting arrangements		
				6.5.204	Support Insulator		
				6.5.205	Contacts		

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IEC 62271-102, IEC 60265: Part 1				ENATS 41-36 Section 6			
Clause / Sub-clause		Requirement	Conformance code	ENATS 41-36 - Section 1 Clause / Sub-clause	Requirement	Conformance code	Remarks
IEC 62271-102	IEC 60265: PART 1						
7	6	Type tests		6.6	Type tests		
				6.6	Table 6.3		
7.1	6.1	General					
7.2	6.2	Dielectric tests					
7.3	6.3	Radio interference voltage tests					
7.4	6.4	Measurement of resistance of the main circuit					
7.5	6.5	Temperature rise tests					
7.6	6.6	Short-time withstand current and peak withstand current tests					
7.7	6.7	Verification of the degree of protection					
7.8	6.8	Tightness tests					
7.9	6.9	Electromagnetic compatibility (EMC) tests					
7.101	6.101	Making and breaking tests					
7.102	6.102	Mechanical operations test					
7.103	6.103	Operation under severe ice conditions					
7.104		Low- and High-Temperature tests					
*7.107		*Induced current switch tests on earthing switches					

Note: * Only for Earthing Switch

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IEC 62271-102, IEC 60265:Part 1				ENATS 41-36 Section 6			Remarks
Clause / Sub-clause		Requirement	Conformance code	ENATS 41-36 - Section 1 Clause / Sub-	Requirement	Conformance code	
IEC 62271-102	IEC 60265: PART 1						
8	7	Routine tests		6.7	Routine tests		
8.2		Dielectric test on the main circuit					
8.3		Dielectric test on auxiliary and control circuits					
8.4		Measurement of the resistance of the main circuit					
8.5		Tightness					
8.6		Design and visual checks					
8.101	7.101	Mechanical operating					
*8.102		*Verification of earthing function					

Note: * Only for Earthing Switch

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Clause / Sub-clause		Requirement	Conformance code	ENATS 41-36 - Section 1 Clause / Sub-clause	Requirement	Conformance code	Remarks
IEC 62271-102	IEC 60265: PART 1						
9	8	Guide to the selection of, disconnectors and earthing switches		6.8	Guide to the selection of switch-disconnectors, disconnectors and earthing switches		
10	9	Information to be given with enquiries, tenders and orders		6.9	Information to be given with enquiries, tenders and orders - schedule 6.1		
11	10	Rules for transport, storage, installation, operation and maintenance		6.10	Rules for transport, storage, installation, operation and maintenance		
12	11	Safety		6.11	Safety		
				Schedule 6.1	Summary declaration		

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Self-Certification Conformance Declaration

Type Tests for Overhead Conductor Connected Air-break Switch-disconnector.

Type test reports table based on ENATS 41-36 Table 6.3

*See bottom of table for conformance declaration codes

** I = Independent; M= Manufacturer; ENA= Energy Networks Association

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 various ratings reference to this in the remarks column
- N.B. All tests on 400A unit unless otherwise stated

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

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	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 **	
1	Dielectric.	IEC 62271-1. Sub-clause 6.2, IEC 62271-103. Sub-clause 6.2. IEC 62271-102. Sub-clause 6.2. Tables 1a and 1b of TS 41-36								
2	Wet 1 minute Voltage withstand test on operating rod insulated insert.	Sub-clause 6.5.5.2 of TS 41-36								
3	Measurement of resistance of circuits.	IEC 62271-1. Sub-clause 6.4, IEC62271-103. Sub-clause 6.4, IEC 62271-102. Sub-clause 6.4.								
4	Temperature Rise -	IEC 62271-1. Sub-clause 6.5, IEC 62271-103. Sub-clause 6.5, IEC 62271-102. Sub-clause 6.5.								
5	Short-time withstand current and peak withstand current tests. (3sec short time).	IEC 62271-1. Sub-clause 6.6, IEC 62271-103. Sub-clause 6.6, IEC 62271-102. Sub-clause 6.6.								
6	Verification of protection Weatherproofing for outdoor equipment. (outdoor IP4XDW minimum) Mechanical impact. (outdoor – IK10 (20J))	IEC 62271-1. Sub-clause 6.7, IEC 62271-103. Sub-clause 6.7, IEC 62271-102. Sub-clause 6.7, Sub-clause 1.5.13 of TS 41-36								
7	EMC tests.	IEC 62271-1. Sub-clause 6.9, IEC 62271-103. Sub-clause 6.9, IEC 62271-102. Sub-clause 6.9.								
8	Mechanical operations - Disconnect / Switch-disconnector - 1000 operations. (Class M0 disconnector - IEC 62271-102 Sub-clause 3.4.101.1). 100 operating cycles with manual handle	IEC 62271-103. Sub-clause 6.102. IEC 62271-102. Sub-clause 6.102. Sub-clause 1.6 of TS 41-36								
*9	* Mechanical operations - Earthing switch - 1000 operations. 100 operating cycles with manual handle	IEC 62271-102. Sub-clause 6.102. Sub-clause 1.6 of TS 41-36								

Note: * Only for Earthing Switch

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	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
10	Operation under severe ice conditions (10mm thickness).	IEC 62271-103. Sub-clause 6.103. IEC 62271-102. Sub-clause 6.103.								
11	Short-circuit making and breaking tests - Switch-disconnector (Class E1 general purpose switch - IEC 62271-103. Sub-clause 3.4.103.1).	IEC 62271-103. Sub-clauses 6.101.1, (TDload, TDloop, TDcc, TDlc, & TDma, Table 3). Test values as per Tables 6.1 & 6.2 of TS 41-36.								
12	Ageing test for outdoor composite bushings and insulation materials – minimum of 5,000 hours duration	Annex C of IEC 61109								
13	Finish.	Performance to ENA TS 98-1.								
14	Process Control.	ISO 9001. ENA ER G79								

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Appendix 3 – Addendum to Suppliers Requirements

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

Manufacturers may provide alternative tenders for items deviating from the above specification. This shall be clearly stated as a deviation together with detailed descriptions of any variation from the specification, together with drawings and test reports.

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

Logistical Requirements

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

- Ambient temperature
- Atmospheric corrosion
- Humidity

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
- * Description of item
- * Date of packaging and/or batch number and/or serial number
- * Northern Powergrid product code
- * Weight

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Appendix 4 – Maintenance and Inspection Requirement

Suppliers shall provide details of the recommended pre-commission testing and inspection required. They shall also provide information regarding periodic inspection and maintenance requirements to be undertaken during the lifetime of their product.

Detailed Installation, Operation and Maintenance instructions shall be provided with each unit supplied.

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Appendix 5 – Information Return Check List

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

Requirement	Provided (Y/N)
Full product descriptions and part number/reference	
Appendix 2 – completed self-certification conformance declaration (for each variant offered)	
Complete Schedule 7.1 of ENA TS 41-36	
Complete set of drawings for each variant	
Type test evidence	
Manufacturing routine test plan	
Periodic inspection, test and maintenance requirements	
Packaging information	
Instructions/Manuals for: transportation & handling, storage, installation, commissioning, operation & maintenance, de-commissioning and disposal.	
Spares availability list	
COSHH data sheets	
ISO:9001, ISO:14001 and ISO:18001 certification and Quality Plan (or routine test plan)	