NPS/003/025 – Technical Specification for Fault Throwers

1. Purpose

This document is the technical specification for Fault Throwers for use on the electrical networks of Northern Powergrid.

This document supersedes the following documents, all copies of which should be removed from circulation;

Document Reference	Document Title	Version	Published Date
NPS/003/025	Technical Specification for Fault Throwers	1.1	Feb 2019

2. Scope

This specification covers the technical requirements for Fault Throwers for use on the Northern Powergrid distribution network. It will be necessary to consider and include any project specific requirements as detailed in Appendix 1, Schedule of Requirements.

2.1. Contents

3. Technical Requirements

3.1. Overview

The requirement is for fault throwers that can be used on the Northern Powergrid distribution network.

Fault throwers are devices used to connect one phase to earth, deliberately causing high levels of current to flow and subsequently causing the upstream protection devices to operate. Fault Throwers shall be suitable for multiple operations, shall maximise the maintenance intervals and shall minimise any maintenance requirements.

Fault thrower ratings are detailed in the sections below and in Appendix 1. The specified ratings shall apply with a 3 second duration of rated short time withstand current and rated short-circuit making current of 2.7 times the rated short time withstand current.

Fault throwers are required for use in different arrangements of substation plant and equipment, including:

- Pedestal or post mounted units where the HV connection is made via separable cable connectors, or
- Pedestal or post mounted units where the HV connection is made via overhead, busbar, or busbar dropper connections.

3.2. Technical Specification

3.2.1. Overall

Unless varied by this Northern Powergrid specification, fault throwers shall comply generally with the appropriate requirements of the Energy Network Association Technical Specifications (ENA TS) 41-36 or 41-37 as appropriate for the network voltage and for the design of the fault thrower.

Fault throwers will preferably possess an ENA Notice of Conformity.

It is preferred that the fault thrower is capable of being operated and reset remotely but shall in all cases provide remote indication to the substation SCADA system.

Where the fault thrower utilises an exposed high voltage operating arm it shall, when in the 'open' position, meet the isolating requirements specified for a disconnector.

Although fault throwers may be used in outdoor or indoor situations they shall be designed, constructed and tested for outdoor use.

Depending upon the schedule of requirements defined in Appendix 1, fault throwers will be accepted either with exposed HV components or earth-screened HV components throughout.

Where exposed connections are required these will be specified in Appendix 1. Ground mounted fault throwers with unscreened HV primary conductors are not acceptable.

Appendix 1 shall be completed by Northern Powergrid and shall state the project specific requirements including the required duties for the unit(s).

Appendices 2, 3 and 4 shall be completed by the manufacturer based on the products offered to meet the project specific requirements;

Appendix 2 is a declaration of technical performance for the fault thrower. This shall be completed for each type of fault thrower offered.

Appendix 3 is a declaration of conformance with this specification (NPS/003/025).

Appendix 4 is a declaration of conformance with ENA technical specification ENA TS 41-36 or 41-37.

3.2.2. Fault Throwers for Use On Systems Up To 33kV Nominal Voltage

Closing times shall not exceed 400ms.

The following variations, additions or clarifications to ENATS 41-36 are referenced to the clause numbers used in ENATS 41-36.

ENATS 41-36 Part 1 Common Clauses

1.2.1 Normal Service Conditions

All fault throwers shall be in accordance with clause 1.2.1.2 Outdoor switchgear and control gear.

1.4.2 Rated Insulation Level

The lightning impulse level for 12kV rated voltage shall be: 95kV common value and 110kV across the isolating distance.

1.4.5 Values of Rated Short Time Withstand Current

Unless varied in the schedule of requirements in Appendix 1, the values of rated short time withstand current that are applicable to the primary conductor circuit and to the earthing circuit shall meet the requirements for time constants of both 45ms and 120ms stated in the table below:

Nominal Network Voltage (kV)	Rated Short Time Withstand Current (kA for 3 secs)	
	Time constant 45ms	Time constant 120ms
11kV	25kA	16kA
20kV	20kA	12.5kA
33kV	31.5kA	20kA

1.4.8 Rated Supply Voltage of Closing and Opening Devices and Aux Circuits
The values shall be as specified in Appendix 1.

1.5.1 Requirements for Liquids

Oil filled equipment is not permitted.

1.5.102.102 Foundation Arrangements

Foundations arrangements shall be as specified in the schedule of requirements in Appendix 1.

1.5.102.103 Transformer Mounting Arrangements

The unit substation design shall not apply to fault throwers.

1.5.103.1.101 Cable Compartments.

The preferred arrangement shall utilise HV cable connections via separable connectors. Where utilised, these connectors shall be DIN type (non load break) disconnectable elbows, tested in accordance with BS7888, or equivalent.

These connections shall be enclosed by a substantial metal cover that shall provide mechanical protection for the connectors. This cover shall be well ventilated, but shall provide protection to class IP3XB of IEC 60529.

1.5.0.4.5 Facilities for checking and testing

Clauses 1.5.0.4.5.1.1 (c), (d) and (e) shall not apply.

Clauses 1.5.0.4.5.2 (b) and (c) shall not apply.

Clause 1.5.0.4.7 shall not apply.

ENATS 41-36 Part 2 Additional Clauses For Metal Enclosed Circuit Breakers

Clauses and requirements relating to making load current, breaking load current, breaking fault current or auto recluse duty shall not apply.

2.4.106 Rated out-of-Phase Making and Breaking

An out-of-phase making rating is required.

2.4.111 Fault thrower circuit breakers shall be classified class E2 (no maintenance of interrupting parts of the main circuit during its expected operating life and only minimal maintenance of its other parts).

ENATS 41-36 Part 3 Additional Clauses For Metal Enclosed Switches

Clauses and requirements relating to making or breaking load current shall not apply.

3.5.3 Earthing – shall not apply.

3.5.11 Interlocking Devices – shall not apply.

ENATS 41-36 Part 4 Additional Clauses For Metal Enclosed Switch Fuse Combinations

Switch fuse combinations shall not be permitted.

ENATS 41-36 Part 5 Ring Main Equipment

Ring Main Equipment arrangements shall not be permitted.

ENATS 41-36 Part 6 Overhead Conductor Connected

Clauses and requirements relating to making or breaking load current shall not apply.

6.5.5.1 General
6.5.7 Integral Operating Rods
6.5.11 Interlocking Devices

} Manual operation via an operating rod shall not be provided.

ENATS 41-36 Part 7 Pole Mounted Enclosed Switchgear
Clauses and requirements relating to making or breaking load current shall not apply.

7.1.3.1 Manual Operation – via an operating rod shall not be permitted.

7.1.3.2 Power
7.1.4 Auxiliary Supplies
7.1.5 Auxiliary Transformer

} shall be supplied by local substation supplies specified in Appendix 1.

7.2 Auto-Reclosing Circuit Breakers – does not apply.

7.3.1 General

A fault thrower having the capability to close ten times at the rated short-circuit making current will be regarded as the absolute minimum capability.

7.3.2 Control & Indication - Clauses (d) and (e) shall not apply.

7.4 Sectionalisers – shall not apply.

ENATS 41-36 Part 8 Overhead Connected Fuses & Links

Part 8 shall not apply.

ENATS 41-36 Part 9 Additional Clauses for 36kV Fault Throwing Switches.

7.3.1 General

A fault thrower having the capability to close ten times at the rated short-circuit making current will be regarded as the absolute minimum capability.

3.2.3. Fault Throwers for Use on Systems with 66kV or 132kV Nominal Voltage

Closing times shall not exceed 400ms.

The following variations, additions or clarifications to ENATS 41-37 are referenced to the numbering system used in ENATS 41-37.

ENATS 41-37 Part 1 – Common Clauses

4.1 Rated Normal Current

This clause shall not apply.

4.5 Values of Rated Short Time Withstand Current

Unless varied in the schedule of requirements in Appendix 1, the values of rated short time withstand current that are applicable to the primary conductor circuit and to the earthing circuit shall meet the requirements for time constants of both 45ms and 120ms stated in the table below:

Nominal Network Voltage (kV)	Rated Short Time Withstand Current (kA for 3 secs)	
	Time constant 45ms	Time constant 120ms
66kV	31.5kA	20kA
132kV	40kA	25kA

5.8.101 Loss Of Control Supply

Loss of the dc opening supply shall **NOT** inhibit closing circuits.

ENATS 41-37 Part 2 – GIS

Clauses, or parts of clauses, relating to the tripping functions or interruption of current shall not apply. Clauses, or parts of clauses, relating to the short circuit making duties and out of phase conditions shall apply.

ENATS 41-37 Part 3 – Circuit Breakers

Clauses, or parts of clauses, relating to the tripping functions or interruption of current shall not apply. Clauses, or parts of clauses, relating to the short circuit making duties and out of phase conditions shall apply.

5.5.102 Operating Systems Interlock

Operating systems shall be arranged to prevent a close operation if sufficient energy is not available to complete the close operation.

5.5.103 Independent Drive Mechanisms

This clause shall not apply.

5.11.101 Mechanical Key Interlocking

This clause shall not apply.

ENATS 41-37 Part 4 – Disconnectors and Earthing Switches

Clauses, or parts of clauses, relating to the tripping functions or interruption of current shall not apply. Clauses, or parts of clauses, relating to the short circuit making duties and out of phase conditions shall apply.

5.11.101 Mechanical Key Interlocking

This clause shall not apply.

4. References

4.1. External Documentation

Reference	Title
BS 7888-4.1:2006+A1:2008	Test requirements on accessories for use on power cables of rated voltage from 3, 6/6(7, 2) kV up to 20, 8/36(42) kV. Cables with extruded insulation.
BS EN 60529:1992+A2:2013	Degrees of protection provided by enclosures (IP code)
BS EN 60694:1997	Common specifications for high-voltage switchgear and control gear standards
BS EN 62271-1:2008+A1:2011	High-voltage switchgear and control gear. Common specifications
BS EN 62271-100:2009+A1:2012	High-voltage switchgear and control gear. Alternating current circuit-breakers
BS EN 62271-102:2002+A2:2013	High-voltage switchgear and control gear. Alternating current disconnectors and earthing switches
BS EN 62271-103:2011	High-voltage switchgear and control gear. Switches for rated voltages above 1 kV up to and including 52 kV
BS EN 62271-203:2012	High-voltage switchgear and control gear. Gas-insulated metal-enclosed switchgear for rated voltages above 52 kV
ENATS 41-36	Distribution Switchgear for Service up to 36kV (Cable and Overhead Conductor Connected)
ENATS 41-37 Part 1	Switchgear for use on 66 kV to 132 kV distribution systems Part 1 Common clauses
ENATS 41-37 Part 2	Switchgear for use on 66 kV to 132 kV distribution systems Part 2 Gas-insulated metal-enclosed switchgear
ENATS 41-37 Part 3	Switchgear for use on 66 kV to 132 kV distribution systems Part 3 Alternating current circuit-breakers
ENATS 41-37 Part 4	Switchgear for use on 66 kV to 132 kV distribution systems Part 4 Disconnectors and earthing switches

4.2. Internal Documentation

Reference	Title
IMP/001/909	Code of Practice for Distribution System Parameters

4.3. Amendments from Previous Version

Reference	Description
Whole Document	Doc approved by email Paul Black 07/12/2023 Doc republished to grid and externally - LB 18/03/2024

5. Definitions

Term	Definition
Rated short time withstand current	The r.m.s. value of the current which the switchgear can carry in the closed position for a period of 3 seconds.
Rated short-circuit making current	The short-circuit current that the switchgear can withstand as it is closing where the act of closing initiates the fault and is expressed in maximum peak value.
SCADA	Supervisory control and data acquisition

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
Dan Rodrigues	Governance Administrator	18/03/2024

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	
Yes	Period: n/a	Reason: n/a
Should this document be displayed on the Northern Powergrid external website?		Yes

		Date
Joseph Helm	Senior Policy and Standards Engineer	02/09/2015

6.3. Technical Assurance

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

		Date
David Blackledge	Senior Policy and Standards Engineer	02/09/2015

6.4. Authorisation

Authorisation is granted for publication of this document.

		Date
Paul Black	Head of System Engineering	18/03/2024

Appendix 1 –Schedule of Requirements

Table to be completed by Northern Powergrid to meet the project specific requirements.

Criteria	Requirement *If none please state 'NONE', where applicable.*
Network Voltage *Specified as nominal phase to phase voltage of electrical network.*	
Fault Current *Default is as specified in the body text of NPS/003/025*	
Cable Connected (no exposed primary conductors) *Specify cable size and type and cable support arrangement required* **or** **Busbar/Overhead connected** *Specify conductor size & type and connection type*	
Auxiliary Supply Voltage *Rated supply voltage of closing, opening and auxiliary circuits*	
Physical constraints *Including height, width, depth, weight, etc.*	
Foundation/support/mounting arrangements	
Other	

Appendix 2 – Summary of Technical Performance of Products Offered

Table to be completed by the manufacturer for each type/variant/rating of fault thrower offered.

Criteria	Declaration/Comment
Generic type and summary of Fault Thrower design *E.g. Vacuum CB in SF6, open terminal spring powered switch disconnector, and based on 3 phase CB type xyz, etc.* *If vacuum bottle switching is used to make the main circuit then provide information on testing to demonstrate the ability of the fault thrower to operate repeatedly to close onto fault current and re-open dead (i.e. without contact face conditioning effect from current breaking) without contact welding.*	
Connection type *E.g. 33kV disconnectable elbow to IEC xyz with DIN cone to jkl, open terminal to accept lug palm type 123, etc.*	
Rated short circuit making duty	
Rated short time withstand current	
Number of closures, at full rated short circuit making duty, before maintenance required *Include details of number of operations at reduced duty, e.g. table, graph or I^2t formula(e).*	
Details of maintenance required after maximum number of operations, at full rated short circuit *Include details of work & consumables required.* *Include details of the maximum number of operations before end of life reached.*	
Routine maintenance requirements *Include details of work required and consumables required.*	
General arrangement *Please supply GA drawings, dimensions, weights, transportation arrangements, lifting & handling recommendations, etc.*	
Documentation *Please supply: Installation, Commissioning, Operation, Maintenance and Decommissioning manuals/documentation.*	
Protection & Control *Please supply details of control and monitoring functionality and drawings. Including details of requirements for auxiliary supplies (including close & open supplies), gas monitoring, self-monitoring of maintenance requirements, etc.*	

Appendix 3 - Declaration of Conformance with this Specification (NPS/003/025)

Table to be completed by the manufacturer for each type/variant/rating of fault thrower offered.

NPS Section	Requirement	Declaration/Comment
3.1	3 second rated duration of short time withstand current.	
3.1	Rated short circuit making of 2.7 times rated short time withstand current.	
3.1	Pedestal **or** post mounted units allowing the HV connection to be made either via; – separable cable connectors, Pedestal or – overhead, busbar, or busbar dropper connections.	
3.2.1	ENA Notice of Conformity.	
3.2.1	Any exposed high voltage operating arm shall, when in the 'open' position, meet the isolating requirements specified for a disconnector.	
3.2.1	Designed, constructed and tested for outdoor use.	
3.2.1	In the case of ground mounted units all primary conductors shall be screened.	
3.2.2	Closing times shall not exceed 400ms.	
3.2.2	Lightning impulse level for 12kV rated voltage shall be: 95kV common value and 110kV across the isolating distance.	
3.2.2	Confirm Rated Short Time Withstand Current	
3.2.2	Oil filled equipment is not permitted.	
3.2.2	HV cable connections via separable connectors. Where utilised, these connectors shall be DIN type (non load break) disconnectable elbows, tested in accordance with BS7888, or equivalent.	
3.2.2	A metal cover shall provide mechanical protection for the connectors. This cover shall be well ventilated, but shall provide protection to class	

NPS Section	Requirement	Declaration/Comment
	IP3XB of IEC 60529.	
3.2.2	Confirm out-of-phase making rating.	
3.2.2	Manual operation via an operating rod shall not be provided.	
3.2.2	Fault thrower circuit breakers shall be classified class E2.	
3.2.2	Confirm a minimum capability of ten close operations at the rated short-circuit making current.	
3.2.3	Confirm Rated Short Time Withstand Current	
3.2.3	Loss of the dc opening supply shall **NOT** inhibit closing circuits.	
3.2.3	Operating systems shall be arranged to prevent a close operation if sufficient energy is not available to complete the close operation.	

Appendix 4 - Declaration of Conformance with ENA Technical Specification 41-36 or 41-37

The self-certification conformance declaration's from the following ENA TS have been added to this Appendix 4 of this specification: -

Explanatory comments must be added for ALL clauses, regardless of conformance code.

Appendix 4a – Applicable for 11kV to 33kV Fault Throwers

- ENA TS 41-36 Distribution Switchgear for Service up to 36kV Part 1 – Common Clauses.
- ENA TS 41-36 Distribution Switchgear for Service up to 36kV Part 9 – Fault Throwing Switches.
- ENA TS 41-36 Distribution Switchgear for Service up to 36kV Part 10 – Protection, Instrumentation and Metering Equipment.

Appendix 4b – Applicable for 66kV and 132kV Fault Throwers

- ENA TS 41-37 Switchgear for use on 66kV to 132kV Distribution Systems – Common Clauses.
- ENA TS 41-37 Switchgear for use on 66kV to 132kV Distribution Systems – GIS Switchgear.
- ENA TS 41-37 Switchgear for use on 66kV to 132kV Distribution Systems – Circuit Breakers.
- ENA TS 41-37 Switchgear for use on 66kV to 132kV Distribution Systems – Disconnectors and Earthing Switches.

The supplier shall complete all clauses relevant to the product being offered. Where the clause is not applicable this should be documented (i.e. N/A).

Appendix 4a – Applicable for 11kV to 33kV Fault Throwers

SELF CERTIFICATION CONFORMANCE DECLARATION

PART 1 – COMMON CLAUSES

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

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 - Part 1 and the clauses of the aforementioned Standards relevant to common specifications for high-voltage switchgear and control gear standards. The manufacturer shall declare conformance or otherwise, clause by clause, using the following levels of conformance declaration codes.

Conformance declaration codes
N/A = Clause is not applicable/appropriate to the product
Cs1 = The 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

- Explanatory comments must be added for ALL clauses, regardless of conformance code.
- Prefix each remark with the relevant 'I EC' or 'ENATS' as appropriate

Manufacturer:		
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		

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						
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		
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		

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						
				1.5.3	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		

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	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		
				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		

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						
				1.5.8	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		

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						
5.13	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		
				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		

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						
5.17	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		

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						
				1.5.102.101	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		
				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		

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						
				1.5.103.1.101	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		

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						
				1.5.201.4	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		
				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)		

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	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 control gear		1.8	Guide to the selection of switchgear and control gear		
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		

SELF CERTIFICATION CONFORMANCE DECLARATION
PART 9 – 36kV FAULT THROWING SWITCHES

CLAUSE BY CLAUSE CONFORMANCE WITH ENATS 41-36 – Part 9

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 - Part 9 and the clauses of the aforementioned Standards relevant to 36kV fault-throwing switches. The manufacturer shall declare conformance or otherwise, clause by clause, using the following levels of conformance declaration codes.

This conformance declaration is to be completed in addition to the ENATS 41-36 – ANNEX D1– Self Certification Conformance Declaration Part 1, 'Common Clauses'.

For associated protection, instrumentation and metering equipment ENATS 41-36 – ANNEX D10 - Self Certification Conformance Declaration Part 10 is to be completed.

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

- Explanatory comments must be added for ALL clauses, regardless of conformance code.
- Prefix each remark with the relevant 'I EC' or 'ENATS' as appropriate

Manufacturer:

Product Reference: **Ratings:**

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

IEC60265-Part 1			ENATS 41-36 - Part 9			
Clause / Sub-clause	Requirement	Conformance code	Clause / Sub-clause	Requirement	Conformance code	Remarks
1	General		9.1	General		
2	Normal service and special service conditions		9.2	Normal service and special service conditions		
3	Definitions		9.3	Definitions		
4	Ratings		9.4	Ratings		
				Rated short-time withstand current		
4.112	Rated short-circuit making current		9.4	Rated short-circuit making current		
5	Design and construction		9.5	Design and construction		
5.1	Requirements for liquids					
5.2	Requirements for gasses					
5.3	Earthing of high voltage switches					
5.4	Auxiliary and control equipment					
5.5	Dependent power closing		9.5.1	Operating mechanism		
			9.5.1	Dependent manual open		
			9.5.1	Stored energy close		
			9.5.1	Padlockable push button		
			9.5.1	Operating handle locking		
			9.5.1	Closing time =< 400ms		
			9.5.1	Instruction label		
			9.5.1	Cubicle heater		
			9.5.1	5 auxiliary switches		
5.6	Stored energy operation					
5.8	Operation of releases					
5.9	Low and high-pressure interlocking and monitoring devices					

IEC60265-Part 1			ENATS 41-36 - Part 9			
Clause / Sub-clause	Requirement	Conformance code	Clause / Sub-clause	Requirement	Conformance code	Remarks
5.10	Nameplates					
5.11	Interlocking devices		9.5.3	Interlocking devices		
5.12	Position indication		9.5.2	Position indication -visible with door closed		
5.13	Degrees of protection by enclosures					
5.14	Creepage distance					
5.15	Gas and vacuum tightness					
5.16	Liquid tightness					
5.17	Flammability					
5.18	Electronic compatibility (EMC)					
			9.5.4	Supporting structure		
			9.5.5	Terminations, conductors and fittings - ENATS 41-16		
			9.5.6	Cable connection		
			9.5.7	Release circuit monitoring		
6	Type tests		9.6	Type tests - Table 9.1		
6.1	General					
6.2	Dielectric tests					
6.6	Short-time withstand current and peak withstand current tests					
6.7	Verification of protection					
6.9	EMC tests					
6.101	Short-circuit making					
6.102	Mechanical operations					
	Position indicating device (IEC 62271-102, Sub-clause 6.105 and Annex A)					

IEC60265-Part 1			ENATS 41-36 - Part 9			
Clause / Sub-clause	Requirement	Conformance code	Clause / Sub-clause	Requirement	Conformance code	Remarks
	Low temperature tests (IEC 62271-100. Sub-clause 6.101.3)					
	High temperature tests (IEC 62271-100. Sub-clause 6.101.3)					
7	Routine tests		9.7	Routine tests		
8	Guide to the selection of fault-throwing switches for service		9.8	Guide to the selection of fault-throwing switches for service		
9	Information to be given with enquiries, tenders and orders - schedule 9.1		9.9	Information to be given with enquiries, tenders and orders - schedule 9.1		
10	Rules for transport, storage, erection, operation and maintenance		9.10	Rules for transport, storage, erection, operation and maintenance		
11	Safety		9.11	Safety		

SELF CERTIFICATION CONFORMANCE DECLARATION

PART 10 – PROTECTION, INSTRUMENTATION AND METERING EQUIPMENT

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

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 - Part 10 and the clauses of the aforementioned Standards relevant to protection, instrumentation and metering equipment.

The manufacturer shall declare conformance or otherwise, clause by clause, using the following levels of conformance declaration codes.

Conformance declaration codes
N/A = Clause is not applicable/appropriate to the product
Cs1 = The 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
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Instructions for completion

- Explanatory comments must be added for ALL clauses, regardless of conformance code.
- Prefix each remark with the relevant 'I EC' or 'ENATS' as appropriate

Manufacturer: **Ratings:**

Product Reference :

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 60044 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		
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		

ENATS 41-36 Part 10 Clause / Sub- clause	Requirements	Conformance code	Remarks
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		

ENATS 41-36 Part 10 Clause / Sub- clause	Requirements	Conformance code	Remarks
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 4b – Applicable for 66kV and 132kV Fault Throwers

SELF CERTIFICATION CONFORMANCE DECLARATION

CLAUSE BY CLAUSE COMPLIANCE WITH ENATS 41-37 – Part 1, 'COMMON CLAUSES'

Switchgear covered by ENATS 41-37 shall conform with the latest issues of the relevant International and British Standards. ENATS 41-37 is intended to amplify and/or clarify the requirements of those Standards.
This check sheet identifies the clauses in ENATS 41-37 - Part 1 and the clauses of the aforementioned Standards relevant to common specifications for high-voltage switchgear and control gear standards. The manufacturer shall declare conformance or otherwise, clause-by-clause, using the following levels of conformance declaration codes.

Conformance declaration codes
N/A = Clause is not applicable/appropriate to the product
Cs1 = the product fully conforms with the requirements of this clause
Cs2 = the product partially conforms with the requirements of this clause
Cs3 = the product does not conform with the requirements of this clause
Cs4 = the product does not currently conform with the requirements of this clause, but the manufacturer proposes to modify and test the product in order to conform.

Instructions for completion

- Explanatory comments must be added for ALL clauses, regardless of conformance code.
- Prefix each remark with the relevant 'I EC' or 'ENATS' as appropriate

Manufacturer: **Rating:**

Product Reference:

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

IEC 0694 Clause/ sub clause	Requirement	Conformance code	ENATS 41-37 Part 1 Clause / Sub clause	Requirement	Conformance code	Remarks
1	General		1.1	General		
2	Normal and special service conditions		2.1	Normal and special service conditions		
2.1	Normal service conditions		2.1	Normal service conditions		
2.1.1	Indoor switchgear and control gear		2.1.1	Indoor switchgear and control gear		
2.1.2	Outdoor switchgear and control gear		2.1.2	Outdoor switchgear and control gear		
3	Definitions		3	Definitions		
			3.201	Dependant manual operation		
			3.202	Independent manual operation		
			3.203	Independent power operation		
			3.204	Safety padlocking		
			3.205	Operational padlocking		
			3.206	Additional earths		
			3.207	Point of Isolation		
4	Ratings		4	Ratings		
4.1	Rated voltage		4.1	Rated voltage		
4.2	Rated insulation level		4.2	Rated insulation level		
4.3	Rated frequency		4.3	Rated frequency		
4.4	Rated normal current and temperature rise		4.4	Rated normal current and temperature rise		
4.5	Rated short-time withstand current		4.5	Rated short-time withstand current		
4.6	Rated peak withstand Current		4.6	Rated peak withstand current		
4.7	Rated duration of short circuit		4.7	Rated duration of short-circuit		
4.8	Rated supply voltage of closing and opening devices and of auxiliary and control ccts		4.8	Rated supply voltage of closing and opening devices and of auxiliary and control circuits		

IEC 0694 Clause/ sub clause	Requirement	Conformance code	ENATS 41-37 Part 1 Clause / Sub clause	Requirement	Conformance code	Remarks
4.9	Rated supply frequency of closing and opening devices and of auxiliary circuits		4.9	Rated supply frequency of closing and opening devices and of auxiliary circuits		
			4.101	Rated DC time constant		
5	Design and construction		5	Design and construction		
5.1	Requirements for liquids		5.1.	Requirements for liquids in switchgear and control gear		
			5.1.101	Liquid level		
5.2	Requirements for gases in switchgear and control gear			Requirements for gases in switchgear and control gear		
			5.2.101	Gas in hydraulic system		
			5.2.102	Excessive running time alarm		
			5.2.103	Minimum gas density		
			5.2.104	Gas filling valve		
			5.2.104.1	Lockable gas service valves		
			5.2.104.2	Valve padlocking		
			5.2.105	Identification of pipe-work		
			5.2.106	Recycled SF6		
			5.2.107	Labelling of compartments		
5.3	Earthing of switchgear and control gear		5.3	Earthing of switchgear and control gear		
			5.3.201	Earthing conductors		
			5.3.202	Cable sheath earth		
			5.3.203	Earthing of relay and instrument metallic cases		

IEC 0694 Clause/ sub clause	Requirement	Conformance code	ENATS 41-37 Part 1 Clause / Sub clause	Requirement	Conformance code	Remarks
			5.3.205	Additional earths		
			5.3.206	Earthing of compartments and enclosures		
5.4	Auxiliary and control equipment		5.4	Auxiliary and control equipment		
			5.4.1.101	control selector switch		
			5.4.1.102	SCADA		
5.4.2.2	Accessibility of auxiliary and control equipment		5.4.2.2	Accessibility of auxiliary and control equipment		
5.4.4.5	Requirements for auxiliary and control components		5.4.4.5	Requirements for auxiliary and control components		
5.4.4.5.1	Cables and wiring		5.4.4.5.1	Cables and wiring		
			5.4.4.5.1.101	Segregation (>125V).		
			5.4.4.5.1.102	Securing of secondary wiring		
			5.4.4.5.1.103	Micro switches		
			5.4.4.5.1.104	Mechanical security of micro switches		
			5.1.105	Conductor size		
5.2	Terminals and terminations		5.2	Terminals and terminations		
			5.2.101	Electrical and mechanical durability		
			5.4.4.5.2.102	Terminal blocks for current transformer circuits		
			5.4.4.5.2.103	Terminal block shorting and isolating facilities		
5.5	Dependent power operation		5.5	Dependent power operation		

IEC 0694 Clause/ sub clause	Requirement	Conformance code	ENATS 41-37 Part 1 Clause / Sub clause	Requirement	Conformance code	Remarks
			5.5.101	Slow operation devices		
			5.5.102	**Simultaneous pole operation**		
5.6	Stored energy operation		5.6	Stored energy operation		
			5.6.101	Hand charging		
			5.6.102	Spring charging stored energy		
			5.6.103	Unambiguous indication of spring state		
			5.6.104	Loss of stored energy		
			5.6.105	Slow operation facility		
5.7	Independent manual operation		5.7.	Independent manual operation		
			5.7.101	Incomplete open/close operation		
			5.7.102	Operating handles for independent manually operated mechanisms		
			5.7.103	Dedicated operating handle		
			5.7.201	Dependant manual operation		
			5.7.201.1	Removal of handle		
5.8	Operation of releases		5.8	Operation of releases		
			5.8.101	Loss of control supply		
5.9	Low and high-pressure interlocking and monitoring devices.		5.9	Low and high-pressure interlocking and monitoring devices		
			5.9.101	Gas monitoring & Indication		
			5.9.101.2	Hydraulic/pneumatic single stage pressure monitoring		
			5.9.102	Hydraulic/pneumatic single stage pressure monitoring		
5.10	Nameplates		5.10.	Nameplates		
			5.10.101	Labelling		
			5.10.102	Phase identification		

IEC 0694 Clause/ sub clause	Requirement	Conformance code	ENATS 41-37 Part 1 Clause / Sub clause	Requirement	Conformance code	Remarks
			5.10.103	Circuit labels		
5.11	Interlocking devices and padlocking facilities		5.11	Interlocking devices and padlocking facilities		
			5.11.101	Interlocking devices		
			5.11.102	Padlocking facilities		
5.12	Position indication		5.12	Position indication		
			5.12.101	Positively driven mechanical indication		
			5.12.102	Visibility of indicating device		
5.13	Degrees of protection by enclosures and compartments		5.13	Degrees of protection by enclosures and compartments		
5.13.1	Hazardous parts/solid-foreign objects		5.13.1	Hazardous parts / solid foreign objects .		
5.13.2	Protection against ingress of water		5.13.2	Protection against ingress of water		
5.13.3	Mechanical impact		5.13.3	Mechanical impact		
5.14	Creepage distances		5.14	Creepage distances		
			5.14.101	Pollution performance		
5.15	Gas and vacuum tightness		5.15	Gas and vacuum tightness		
5.15.1	Closed pressure systems for gas		5.15.3	Closed pressure systems for gas		
			5.101	Ergonomics and access		
			5.102	Single person operation		
			5.103	Moving parts		
			5.104	Mechanism cabinets for outdoor switchgear		
			5.105	Lifting points		
			5.106	Surface preparation and coatings		

IEC 0694 Clause/ sub clause	Requirement	Conformance code	ENATS 41-37 Part 1 Clause / Sub clause	Requirement	Conformance code	Remarks
			5.107	Personal safety clearances		
			5.108	Air insulated bushings		
			5.109	Bushing gauges		
			5.110	Bushing terminals		
			5.111	Minimum expected life		
			5.112	Pressure relief		
6	Type tests		6	Type tests		
6.2	Dielectric tests		6.2	Dielectric tests		
6.2.9	Partial discharge tests		6.2.9	Partial discharge tests		
			6.101	Solar radiation		
			6.102	Type test matrix		
			6.103	Reduced gas density withstand.		
			6.104	Terminal and Terminal blocks		
			6.105	Additional mechanical operations test		
7	Routine tests		7	Routine tests		
8	Guide to the selection of switchgear and control gear		8	Guide to the selection of switchgear and control gear		
9	Information to be given with enquiries, tenders and orders		9	Information to be given with enquiries, tenders and orders		
10	Rules for transport, storage, installation, operation, maintenance		10	Rules for transport, storage, installation, operation, maintenance and disposal		
			10.101	Temporary labels		
			10.102	Manufacturer's handbook		
			10.103	Risk assessment		

IEC 0694 Clause/ sub clause	Requirement	Conformance code	ENATS 41-37 Part 1 Clause / Sub clause	Requirement	Conformance code	Remarks
			10.104	Bay extensions		
11	Safety		11	Safety		
12	Environmental aspects		12	Environmental aspects		
13	Commissioning tests		13	Commissioning tests		

ANNEX C

Summary of technical requirements and ratings for_____

Information	Sub clause of this specification	Enquirer to indicate requirement as appropriate
general characteristics		
Number of poles		
Class - indoor, outdoor	1.2	
Rated voltage - 72.5kV/145kV	4.1	
Rated insulation level (lightning impulse withstand voltage) See table 1a, IEC 60694	4.2	
Rated frequency	4.3	50Hz
Rated normal current 1250A, 2000A, 2500A, 3150A a) Busbars b) Circuit-breaker	4.4	
Rated short-time withstand current 25kA, 31,5ka, 40kA	4.5	
Rated peak withstand current	4.6	
Rated duration of short circuit	4.7	3sec
Rated supply voltage of closing and opening devices and auxiliary and control circuits - See table 3	4.8	
Rated supply frequency of closing and opening and of auxiliary circuits - 50Hz	4.9	
Rated d.c. time constant	4.101	
Requirements for gases in switchgear and control gear	5.2	
Gas in hydraulic system	5.101	
Excessive running alarm	5.102	
Gas filling valve	5.2.104	
Lockable gas service valves	5.2.106	

Gas monitoring - a) Pressure / density gauge / indicator b) Single stage pressure switch c) Two stage pressure switch d) Other monitoring device	5.9.101	
Padlocking facilities , padlock 41mm square body with a 4mm to 7mm shackle inside length 16mm to 45mm	5.11.102	
Protection of persons against access to hazardous parts	5.13.1	
Protection against ingress of water IP 3XDW	5.13.2	
Protection against mechanical impact 2J indoor, 5J outdoor.	5.13.3	
Gas leakage rate not exceed 1% at 20ºC	5.15.1	
Lifting points markings	5.105	
Surface preparation	5.106	

SELF CERTIFICATION CONFORMANCE DECLARATION
CLAUSE BY CLAUSE CONFORMANCE WITH ENA TS 41-37 – Part 2 ADDITIONAL CLAUSES FOR GIS SWITCHGEAR

Switchgear covered by ENA TS 41-37 shall comply with the latest issues of the relevant International and British Standards. ENA TS 41-37 is intended to amplify and/or clarify The Requirements of those Standards.
This check sheet identifies the clauses in ENA TS 41-37 - Part 2 and the clauses of the aforementioned Standards relevant to clauses for GIS for high-voltage switchgear
The manufacturer shall declare conformity or otherwise, clause by clause, using the following levels of conformance declaration codes.

Conformance declaration codes

N/A = Clause is not applicable/appropriate to the product
Cs1 = the product is fully conforms with the requirements of this clause
Cs2 = the product is partially conforms with the requirements of this clause
Cs3 = the product does not conform with the requirements of this clause
Cs4 = the product does not currently conform with the requirements of this clause, but the Manufacturer proposes to modify and test the product in order to comply.

Instructions for completion

- Explanatory comments must be added for ALL clauses, regardless of conformance code.
- Prefix each remark with the relevant 'I EC' or 'ENATS' as appropriate

Manufacturer: **Ratings:**

Product Reference :

Signature: **Date:**

IEC 62271-203, & IEC 62271-102				ENA TS 41-37			
Clause / Subclause		Requirement	Conformance code	ENA TS 41-37 - Part 2 Clause / Subclause	Requirement	Conformance code	Remarks
IEC62271-102	**IEC62271-203**						
2	2	Normal and special service conditions		2	Normal and special service conditions		
4	4	Ratings		4	Ratings		
5		Design and construction		5	Design and construction		
5.1	5.1	Requirements for liquids in switchgear and control gear		5.1	Requirements for liquids in switchgear and control gear		
5.3	5.3	Earthing of switchgear and control gear		5.3	Earthing of switchgear and control gear		
				5.3.201	Earthing facilities general		
				5.3.202	Additional Earths		
5.4	5.4	Auxiliary and control equipment		5.4	Auxiliary and control equipment		
5.5	5.5	Dependent power operation		5.5	Dependent power operation		
5.6	5.6	Stored energy operation		5.6	Stored energy operation		
5.7	5.7	Independent manual operation		5.7.	Independent manual operation		
5.8	5.8	Operation of releases		5.8	Operation of releases		
5.9	5.9	Low and high-pressure interlocking and monitoring devices		5.9	Low and high-pressure interlocking and monitoring devices		
				5.9.101	Remote alarm		
				5.9.102	Temporary blocking of alarms		
				5.9.103	Dual pressure systems		
				5.9.104	Replacement of gas sensors		

IEC 62271-203, & IEC 62271-102				ENA TS 41-37			
Clause / Subclause		Requirement	Conformance code	ENA TS 41-37 - Part 2 Clause / Subclause	Requirement	Conformance code	Remarks
IEC62271-102	**IEC62271-203**						
5.10	5.10	Nameplates		5.10.	Nameplates		
5.11	5.11	Interlocking devices		5.11	Interlocking devices and padlocking facilities		
				5.11.101	Circuit-breakers/disconnector interlocking		
				5.11.102	Earth interlock		
5.13	5.13	Degrees of protection by compartments		5.13	Degrees of protection by compartments		
5.14	5.14	Creepage distances		5.14	Creepage distances and environmental considerations		
5.16	5.16	Liquid tightness		5.16	Sub –clause 5.16 does not apply		
5.105	5.102	Internal Fault		5.102	Internal fault		
	5.102.2	External effects		5.102.2	External effects of the arc		
	5.103	Enclosures		5.103	Enclosures		
	5.104	Partitions		5.104	Partitions		
				5.201	Test facilities General		
				5.201.1	Test bushings		
				5.202	Cable testing		
				5.202.1	Test bushings – DC testing		
				5.202.2	Cable DC testing		
				5.203	Injection testing of CT's		
				5.204	Outage constraints		
6	6	Type tests		6	Type tests		
				6.2.9	Partial discharge tests		
7	7	Routine tests		7	Routine tests		

IEC 62271-203, & IEC 62271-102				ENA TS 41-37			
Clause / Subclause		Requirement	Conformance code	ENA TS 41-37 - Part 2 Clause / Subclause	Requirement	Conformance code	Remarks
IEC62271-102	**IEC62271-203**						
8	8	Guide to the selection of switchgear and control gear		8	Guide to the selection of switchgear and control gear		
9	9	Information to be given with enquiries, tenders and orders		9	Information to be given with enquiries, tenders and orders		
10	10	Rules for Transport, Storage, installation, operation and maintenance		10	Rules for Transport, Storage, installation, operation, maintenance and disposal		
11	11	Safety		11	Safety		
	12	Environmental Aspects		12	Environmental Aspects		
				13	Commissioning		

ANNEX C

Summary of range, technical requirements and ratings for GIS switchgear for_____

Information	Sub clause of this specification	Enquirer to indicate requirement as appropriate
General		
Continuous monitoring of gas density	5.9.101	
Two stage density monitor	5.9.102	
Remote Alarms	5.9.103	
Temporary blocking of alarms	5.9.104	
Replacement of gas sensors	5.9.106	
Name plates	5.10	
Interlocking and padlocking	5.11	
Circuit breaker, disconnector interlocking	5.11.101	
Earth interlock	5.11.102	
Creepage distance and environmental considerations	5.14	
Liquid tightness	5.15	
Internal fault	5.102	
External effect	5.102.1	
Enclosures	5.103	
Performance of gas zones due to internal arc	5.201	
Test facilities	5.202	
Test devices	5.202.1	
Cable testing	5.203	
Test bushings	5.203.1	
Cable DC testing	5.203.2	
Injection testing of CT's	5.204	
Circuit breaker characteristics see part3		
Disconnector /earthing switch characteristics see part 4		

PART 2 – Gas Insulated metal enclosed Switchgear - TYPE TEST CONFORMANCE DECLARATION 2.1

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
- Tests not requested may be shown as 'Additional tests' at the bottom of the table

*See bottom of table for conformance declaration codes

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

	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 Circuit breaker-disconnector and earthing switches as appropriate. Partial discharge DC Withstand Test on Test Devices, including all parts of main circuit, which cannot be disconnected from the test connections.	IEC 60694.sublause6.2, IEC 62271-203. Clause 6.2, IEC 62271-100. Subclause 6.2. Subclause 7.101 IEC62271-103 ENA TS 41-18 Subclause 5.107.1 IEC 62271-203 Subclause 5.202 of ENA TS 41-37 Part 2								
2	Radio interference test	Subclause 6.3 IEC 62271-203								
3	Measurement of the resistance of main circuit -	Subclause 6.4 IEC 62271-203								
4	Temperature Rise	Subclause 6.5, IEC 62271-203.								
5	Short-time withstand current and peak withstand current tests -	Subclause 6.6, IEC 62271-203.								
6	Demonstration of arcing times	Subclause 6.102.10, IEC 62271-100								
7	Three phase tests	Subclause 6.102.10.1, IEC 62271-100								
8	Test duties T10,T30,T60,T100s(b).OP1 and OP2	Subclause 6.102.10.1.1, IEC 62271-100								
9	Test duty T100a	Subclause 6.102.1.2, IEC 62271-100								
10	Tests on earthing circuits	Subclause 6.6.102 IEC 62271-203.								
11	Verification of protection	Subclause 6.7, IEC 62271-203.								
12	EMC tests	IEC 60694.subclause 6.9								
13	Gas tightness test	IEC 60694 subclause 6.8 &IEC 62271-203 subclause 6.8								
14	Electromagnetic compatibility	IEC 60694 subclause 6.9 & IEC 600271-203 subclause 6.9								
15	Mechanical and environmental tests – circuit breaker.	IEC 62271-203 Subclause 6.102, IEC 62271-100. Subclause 6.101								
16	Mechanical and environmental tests – disconnector and earthing switches.	IEC 62271-203 subclause 6.102, IEC 62271-102. subclause 6.102								
17	Proof tests for enclosures	IEC 62271-203. subclause 6.103								
18	Pressure test on partitions	IEC 62271-203. subclause 6.104								
19	Internal fault	IEC 62271-203. subclause 6.105								
20	Insulator tests	IEC 62271-203. subclause 6.106								
21	Additional tests on auxiliary and control circuits	Subclauses of IEC 60694 incorporating Amd 2								

	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
	- 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)	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								
22	Finish	Performance to ENATS 98-1								
23	Process Control	ISO 9001 ERG79 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

SELF CERTIFICATION CONFORMANCE DECLARATION

CLAUSE BY CLAUSE CONFORMANCE WITH ENATS 41-37 – Part 3 ADDITIONAL CLAUSES FOR CIRCUIT BREAKERS

Switchgear covered by ENATS 41-37 shall conform with the latest issues of the relevant International and British Standards. ENATS 41-37 is intended to amplify and/or clarify the Requirements of those Standards.
This check sheet identifies the clauses in ENATS 41-37 - Part 3 and the clauses of the aforementioned Standards relevant to clauses for circuit -breakers. The manufacturer shall declare conformance or otherwise, clause by clause, using the following levels of conformance declaration codes.

Conformance declaration codes

N/A = Clause is not applicable/appropriate to the product
Cs1 = the product is fully conforms with the requirements of this clause
Cs2 = the product partially conforms with the requirements of this clause
Cs3 = the product does not conform with the requirements of this clause
Cs4 = the product does not currently conform with the requirements of this clause, but the Manufacturer proposes to modify and test the product in order to conform

Instructions for completion

- Explanatory comments must be added for ALL clauses, regardless of conformance code.
- Prefix each remark with the relevant 'I EC' or 'ENATS' as appropriate

Manufacturer: **Ratings:**

Product Reference :

Signature: **Date:**

IEC 60694,& IEC 62271-100				ENATS 41-37			
Clause / subclause		Requirement	Conformance code	ENATS 41-37 Part 3 Clause / sub clause	Requirement	Conformance code	Remarks
IEC62271-100	**IEC60694**						
2	2	Normal and special service conditions		2	Normal and special service conditions		
4	4	Ratings		4	Ratings		
				4.101	Rated short-circuit breaking current		
				4.102	TRV related to rated short-circuit breaking current		
				4.103	Rated short circuit making current		
				4.104	Operating sequence		
				4.105	Characteristics for short line faults		
				4.106	Rated out –of- phase making and breaking current		
				4.107	Rated capacitive switching currents		
				4.108	Small inductive breaking current		
				4.109	Rated DC time constant		
4.110	4.110	Number of mechanical operations		4.110	Number of mechanical operations		
5	5	Design and construction		5	Design and construction		
5.2	5.2	Requirements for gases		5.2	Requirements for gases in circuit-breakers		
5.3	5.3	Earthing of switchgear and control gear		5.3	Earthing of circuit-breakers		
5.4	5.4	Auxiliary and control equipment		5.4	Auxiliary and control equipment		
				5.4.101	Trip circuit supervision		

IEC 60694,& IEC 62271-100				ENATS 41-37			
Clause / subclause		**Requirement**	**Conformance code**	**ENATS 41-37 Part 3 Clause / sub clause**	**Requirement**	**Conformance code**	**Remarks**
IEC62271-100	**IEC60694**						
				5.4.102	Trip coil isolation		
				5.4 103	Forced opening		
5.5	5.5	Dependent power operation		5.5	Dependent power operation		
				5.5.101	Anti pumping		
				5.5.102	Operating systems interlocks		
				5.5.103	Circuit breakers with independent drive mechanisms		
				5.5.104	**Simultaneous pole operation**		
5.6	5.6	Stored energy operation		5.6	Stored energy closing		
				5.6.101	Three pole operation		
				5.6.102	Tripping Mechanism		
				5.7	Independent manual operation,		
5.8	5.8	Operation of releases		5.8	Operation of releases		
				5.8.201	Local manual operation		
				5.8.202	Slow closing and opening		
				5.8.203	Operations counter		
5.9	5.9	Low and high-pressure interlocking and monitoring devices		5.9	Low and high-pressure interlocking and monitoring devices		
				5.10	Nameplates		
				5.10.101	Trip and close isolation shall be labelled		
5.11	5.11	Interlocking devices		5.11	Interlocking devices and padlocking facilities		
				5.11.101	Mechanical key interlocking		
5.12	5.12	Position indications		5.12	Position indications		
				5.201	Structure mounted open terminal circuit-breakers		

IEC 60694,& IEC 62271-100				ENATS 41-37			
Clause / subclause		**Requirement**	**Conformance code**	**ENATS 41-37 Part 3 Clause / sub clause**	**Requirement**	**Conformance code**	**Remarks**
IEC62271-100	**IEC60694**						
				5.202	Circuit identification		
				5.203	Noise		
				5.204	CT labels		
6	6	Type tests		6	Type tests		
	6.104.2	Short circuit making current		6.104.2	Short-circuit making current		
	6.104.5.4	Test duty T30		6.104.5.4	Test duty T30		
	6.110	Out-of-phase condition		6.110	Out-of-phase condition		
				6.111	Capacitive current switching		
				6.201	Sound pressure measurement		
				6.202	Breaking test with asymmetrical current		
7	7	Routine tests		7	Routine tests		
8	8	Guide to the selection of switchgear and control gear		8	Guide to the selection of circuit –breakers for service.		
9	9	Information to be given with enquiries, tenders and orders		9	Information to be given with enquiries, tenders and orders		
10	10	Rules for Transport, Storage, installation, operation and maintenance		10	Rules for transport, storage, installation, operation, maintenance and disposal		
11	11	Safety		11	Safety		
	12	Environmental Aspects		12	Environmental aspects		
				13	Commissioning tests		

PART 3 – High Voltage Circuit-breakers - TYPE TEST CONFORMANCE DECLARATION 3.1

Manufacturer: **Ratings:**

Product reference:

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

Instructions for completion

- Explanatory comments must be added for ALL clauses, regardless of conformance code.
- Prefix each remark with the relevant 'I EC' or 'ENATS' as appropriate

Type test reports table based on ENATS 41-37 Table 3.1

	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	Subclause 6.2. IEC 62271-100.								
2	Radio interference test	Subclause 6.3 IEC 62271-100								
3	Measurement of the resistance of main circuit -	Subclause 6.4 IEC 62271-100								
4	Temperature Rise	Subclause 6.5, IEC 62271-100								

	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**
5	Short-time withstand current and peak withstand current tests -	Subclause 6.6, IEC 62271-100								
6	Demonstration of arcing times	Subclause 6.102.10, IEC 62271-100								
7	Three phase tests	Subclause 6.102.10.1, IEC 62271-100								
8	Test duties T10,T30,T60,T100s(b).OP1 and OP2	Subclause 6.102.10.1.1, IEC 62271-100								
9	Test duty T100a	Subclause 6.102.1.2, IEC 62271-100								
10	Tightness test	Subclause 6.8 IEC 62271-100								
11	EMC tests	Subclause 6.9 IEC 62271-100								
12	Mechanical operation test at ambient temperature	Subclause 6.6.101.2.1 to 6.101.2.3 IEC 62271-100								
13	Short-circuit current making and breaking tests	Subclause 6.102 to 6.106 IEC 62271-100								
14	Capacitive current switching tests	Subclause 6.111.5.1 IEC 62271-100								
15	Verification of protection	Subclause 6.7, IEC 62271-100								
16	Low/high Temperature tests	Subclause 6.101.3 IEC 62271-100								
17	Humidity test	Subclause 6.101.4 IEC 62271-100.								

	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**
18	Static terminal load test	Subclause 6.101.6 IEC 62271-100								
19	Critical current test	Subclause 6.107 IEC 62271-100								
20	Out-of-phase making and breaking test*	Subclause 6.110 IEC 62271-100.								
21	Tests to prove operation under severe ice conditions*	Subclause 6.101.5 IEC 62271-100								
22	Single-phase and double earth fault tests*	Subclause 6.108 IEC 62271-100								
23	Cable-charging current breaking test*	Subclause 6.111,5.2 IEC 62271-100								
24	Single capacitor bank switching tests*	Subclause 6.111.5.3 IEC 62271-100								
25	Back-to-back capacitor switching tests*	Subclause 6.111.5.3 IEC 6271-100								
26	Additional tests on auxiliary and control circuits - Dielectric - Measurement of resistance - Temperature rise - Functional - Electrical continuity or earthed metallic parts - Verification of operational characteristics (Auxiliary contacts)	Subclauses of IEC 60694 incorporating Amd 2 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								

	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**
	- Ripple on d.c. input power port immunity - Environmental (Cold; Dry heat; Damp heat, steady state; Cyclic humidity; Vibration response & seismic; Final condition check)	IEC 60694 incorporating Amd 2 Sub-clause 6.10.5 IEC 60694 incorporating Amd 2 Sub-clause 6.10.7								
27	Finish	Performance to ENATS 98-1								
28	Process Control	ISO 9001 ERG79 Parts 1 & 2a								36 monthly surveillance checks to maintain validity of the Notice
Note: All type tests carried out using the number of test samples specified 6.1.1 of IEC 60694 and in 6.102.2 of IEC62271-100 for circuit breakers with a rated voltage of 72.5kV and above tests marked by * an additional test sample is allowed for the marked test.										

*** 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

ANNEX C

Summary of range, technical requirements and ratings for circuit-breaker requirements for_____

Information	Subclause of this specification	Enquirer to indicate requirement as appropriate
Rated short-circuit breaking current Equal to rated short-time withstand current 25kA, 31.5kA 40kA	4.101	
Rated short-circuit making current	4.103	2.7 times rated short-circuit breaking current
Rated operating sequence	4.104	
Characteristics for short line faults	4.105	
Out-of-phase making and breaking	4.106	
Rated capacitive switching currents (Class C2)	4.107	
Rated small inductive breaking current	4.108	
Rated time quantities	4.109	
Classification of mechanical operations Class M1-2000ops, Class M2-10000ops	4.110	
Electrical endurance	4.111	
Forced opening	5.4.103	
Excessive running time alarm	5.1.104	
Minimum withstand level	5.1.105	
Forced opening	5.4.103	
Anti pumping	5.5.101	
Circuit breakers with independent drive mechanisms	5.5.103	
Three pole operation	5.6.101	
Local manual tripping	5.8.201	
Local manual closing	5.8.202	
Noise Not greater than 90db	5.204	
Breaking test with asymmetrical current	6.203	

SELF CERTIFICATION CONFORMANCE DECLARATION

CLAUSE BY CLAUSE CONFORMANCE WITH ENA TS 41-37 – Part 4 ADDITIONAL CLAUSES FOR High Voltage Disconnectors and Earthing switches

Switchgear covered by ENA TS 41-37 shall comply with the latest issues of the relevant International and British Standards. ENA TS 41-37 is intended to amplify and/or clarify the requirements of those Standards.

This check sheet identifies the clauses in ENA TS 41-37 - Part 2 and the clauses of the aforementioned Standards relevant to clauses High voltage Disconnectors and Earthing switches

The manufacturer shall declare conformance or otherwise, clause by clause, using the following levels of conformance declaration codes.

Conformance declaration codes

N/A = Clause is not applicable or appropriate to the product
Cs1 = the product is fully conforms with the requirements of this clause
Cs2 = the product partially conforms with the requirements of this clause
Cs3 = the product does not conform with the requirements of this clause
Cs4 = the product does not currently conform with the requirements of this clause, but the Manufacturer proposes to modify and test the product in order to comply.

Instructions for completion

- Explanatory comments must be added for ALL clauses, regardless of conformance code.
- Prefix each remark with the relevant 'I EC' or 'ENATS' as appropriate

Manufacturer: **Ratings:**

Product Reference:

Signature: **Date:**

IEC 62271-203, & IEC 62271-102				ENA TS 41-37			
Clause / Subclause		**Requirement**	**Conformance code**	**ENA TS 41-37 - Part 4 Clause / Subclause**	**Requirement**	**Conformance code**	**Remarks**
Part I of 41-37	**IEC62271 - 102**						
2	2	Normal and special service conditions		2	Normal and special service conditions		
3	3	Definitions		3	Definitions		
4	4	Ratings		4	Ratings		
	4.104.			4.104	Bus transfer		
	4.105			4.105	Induced current switching Line earthing switches		
	4.106			4.106	Mechanical endurance		
				4.201	Earthing Devices having a rating short circuit making current		
1.5	5	Design and construction		5	Design and construction		
5.4	5.4	Auxiliary and control equipment		5.4	Auxiliary and control equipment		
				5.4.101	Setting adjustment of Auxiliary switches		
5.11	5.11	Interlocking devices		5.11	Interlocking and padlocking facilities		
				5.11.101	Disconnector and earthing switch interlocking		
				5.11.102	Key operated interlocking		
				5.11.102.1	Interlock key release position		
				5.201	Disconnector three- pole operation		
				5.202	Operations counter		

IEC 62271-203, & IEC 62271-102				ENA TS 41-37			
Clause / Subclause		**Requirement**	**Conformance code**	**ENA TS 41-37 - Part 4 Clause / Subclause**	**Requirement**	**Conformance code**	**Remarks**
Part I of 41-37	**IEC62271 - 102**						
				5.203	Manually operation of disconnectors with bus-transfer duty		
				5.204	Installation tolerances		
6	6	Type tests		6	Type tests		
	6.102.3			6.102.3	Mechanical endurance tests		
7	7	Routine tests		7	Routine tests		
8	8	Guide to selection of disconnectors and earthing switches		8	Guide to selection of disconnectors and earthing switches		
9	9	Information to be given with enquires, tenders and orders		9	Information to be given with enquires, tenders and orders		
10	10	Rules for transport, storage, installation, operation and maintenance		10	Rules for transport, storage, installation, operation, maintenance and disposal		
				10.101	Assembly instructions		
11	11	Safety		11	Safety		
	12	Environmental Aspects		12	Environmental aspects		

ANNEX B – ENA TS 41-37

SELF CERTIFICATION CONFORMANCE DECLARATION

PART 4 – High Voltage Disconnectors and Earthing Switches - TYPE TEST CONFORMANCE DECLARATION 4.1

Manufacturer: **Ratings:**

Product reference:

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

Instructions for completion

- Explanatory comments must be added for ALL clauses, regardless of conformance code.
- Prefix each remark with the relevant 'I EC' or 'ENATS' as appropriate

*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 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 Partial discharge	Subclause 6.2. IEC 62271-102. Subclause 7.101 IEC62271-103 ENA TS 41-18								
2	Radio interference test	Subclause 6.3 IEC 60694								
3	Measurement of the resistance of main circuit -	Subclause 6.4 IEC 60694								
4	Temperature Rise	Subclause 6.5, IEC 60694								
5	Short-time withstand current and peak withstand current tests -	Subclause 6.6 IEC 62271-102 and IEC 60694 Subclause6.6.1								
6	Verification of protection	Subclause 6.7 IEC 60694								
7	Tightness test	Subclause 6.8 IEC 60694								
8	EMC tests	Subclause 6.9 IEC 60694								
9	Tests to prove the short circuit making performance of earthing switches.	Subclause 6.101 IEC 62271-102								
10	Operating and mechanical endurance test	Subclause 6.102 IEC 62271-102								
11	Operation under severe ice conditions	Subclause 6.103 IEC 62271-102								
12	Operation at the temperature limits	Subclause 6.104 IEC 62271-102								
13	Tests to prove the proper function of the position – indicating device	Subclause 6.105 IEC 62271-102								
14	Bus-transfer current switching test	Subclause 6.106 IEC 62271-102								
15	Induced current switching tests	Subclause 6.107 IEC 62271-102.								
16	Bus-charging switching tests	Subclause 6.108 IEC 62271-102								
17	Additional tests on auxiliary and control circuits	Subclauses of IEC 60694 incorporating Amd 2								

	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**
	- 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)	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								
18	Finish	Performance to ENA TS 98-1								
19	Process Control	ISO 9001 ERG79 Parts 1 & 2a								24 monthly surveillance checks to maintain validity of the Notice
Note: All type tests carried out using the number of test samples specified in 6.1.1 of IEC 60694. Disconnectors and earthing switches with a rated voltage of 72.5kV and above tests marked by * an additional test sample is allowed for the marked test.										

* 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

ANNEX C

Summary of range, technical requirements and ratings for disconnector and earthing switch requirements for_____

Information	Clause of this specification	Enquirer to indicate requirement as appropriate
Rated short circuit making current	4	
Rated mechanical terminal load IEC 62271-102 subclause 4.103	4.103	
Rated bus-transfer current switching IEC 62271-102 subclause 4.104	4.104	
Rated induced current switching of Earthing switches IEC 62271-102 4.105	4.105	
Classification of mechanical operations Class M0-1000 , M1-2000 ops or M2-10000 ops	4.106	
Rated values of electrical endurance IEC 62271-102 subclause 4.107	4.107	
4.5.4.101 Auxiliary switches	5.4.101	
Earthing of disconnectors and earthing switches Subclause E5.3 of IEC 62271-102	E5.3	