Material specification code: GRI-GRI-MAT-NE&D-0017
Version no. 1 dated 19/02/2025.

Subject: GSCM006 MV SINGLE-PHASE SECTIONALIZERS

Application Areas
Perimeter: *Global*
Staff Function: -
Service Function: -
Business Line: *Enel Grids and Innovation*

CONTENTS

THE HEAD OF GLOBAL NETWORK COMPONENTS
ADRIANO SABENE

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1 DOCUMENT AIMS AND APPLICATION AREA

The scope of this document is to provide the technical requirements for the supply of MV single-phase alternating-current automatic line sectionalizers to be used in overhead lines of the Enel Group Distribution Companies, listed in Table 1.

Country	Distribution Company
Argentina	Edesur
Brazil	Enel Distribuição Rio Enel Distribuição Ceará Enel Distribuição São Paulo
Chile	Enel Distribución Chile
Colombia	Enel Distribución Colombia

Table 1 - Distribution Companies

This document shall be implemented and applied to the extent possible within the Enel Grids and Innovation Business Line and in compliance with any applicable laws, regulations and governance rules, including any stock exchange and unbundling-relevant provisions, which in any case prevail over the provisions contained in this document.

1.1 RELATED ORGANIZATIONAL DOCUMENTS TO BE IMPLEMENTED AT COUNTRY LEVEL

Within the corresponding geographical perimeter, each Enel Grids Company shall issue, under the supervision of Enel Grids and Innovation Global Network Devices, a detailed document in accordance with the provisions of this document.

2 DOCUMENT VERSION MANAGEMENT

Version	Date	Main changes description
0	23/12/2019	First Issuing of GSCM006 “MV SINGLE-PHASE SECTIONALIZERS” Material Specification
1	19/02/2025	Alignment to new format Adaptation to fuse bases according to GSCM012 specification. Added sectionalizers with minimum actuating current of 1 and 3 A for Colombia.

3 UNITS IN CHARGE OF THE DOCUMENT

Responsible for drawing up the document:

- ENEL Grids and Innovation: Network Engineering and Development / Engineering Components and Devices/ Engineering Components and Devices/ Network Devices unit.

Responsible for authorizing the document:

- ENEL Grids and Innovation: Head of Networks Devices unit
- ENEL Grids and Innovation: Head of Operational Excellence and Processes Quality unit.

4 REFERENCES

- Integrated Policy for Quality, Health and Safety, Environment, anti-Bribery and Information security.
- ISO 9001- Quality Management System – Requirements.

- ISO 14001 - Environmental Management System - Requirements with guidance for use
- ISO 45001 - Occupational Health and Safety Management System - Requirements with guidance for use.
- ISO 37001 - Anti-bribery Management System - Requirements with guidance for use
- Integrated Policy for Quality, Health and Safety, Environment, anti-Bribery and Information security.
- ISO 27001 - Information Security Management System – Requirements.
- Material specification MAT-O&M-NCS-2021-0033-EGIN “GSCG002 Technical Conformity Assessment”
- Working Instruction GRI-GRI-WKI-O&M-0020 “Contractual Requirements for Components and Materials Quality management” - ex WKI-QPT-CMQ-2020-0022.
- Construction Specification GRI-GRI-CNS-O&M-0002 “Barcode specification” – ex CNS-O&M-S&L-2021-0032-EGIN.
- GSCM012 “Distribution fuse-cutout up to 36 kV”.

Reference documents listed below (amendments included) shall be the edition in-force at the TCA request date.

- ISO/IEC 17000 — Conformity assessment – Vocabulary and general principles.
- ISO/IEC 17020 — General criteria for the operation of various types of bodies performing inspection.
- ISO/IEC 17025 — General requirements for the competence of testing and calibration laboratories.
- ISO/IEC 17050-1 — Conformity assessment - Supplier’s declaration of conformity – Part 1: General requirements (ISO/IEC 17050-1:2004, corrected version 2007-06-15).
- ISO/IEC 17050-2 — Conformity assessment - Supplier’s declaration of conformity - Part 2: Supporting documentation (ISO/IEC 17050-2:2004).
- ANSI/IEEE C37.63 — Standard Requirements for Overhead, Pad-Mounted, Dry-Vault, and Submersible Automatic Line Sectionalizers for Alternating Current Systems up to 38 kV.
- IEC 60529 — Degrees of protection provided by enclosures (IP Code).

Reference laws

Colombia

The sectionalizer shall comply with the requirements established in the “Reglamento Técnico de Instalaciones Eléctricas – RETIE” , Resolución 40117 de 2 Abril de 2024” and demonstrate this by means of a Certificate of Product Conformity.

Group Pillar References

- The Code of Ethics of Enel Group
- The Enel Group Zero Corruption Tolerance Plan (ZTC)
- Human Rights Policy
- Organization and Management Model as per Legislative Decree No. 231/2001
- Enel Global Compliance Program (EGCP).

5 ORGANIZATIONAL PROCESS POSITION IN THE PROCESS TAXONOMY

Value Chain/Process Area: Engineering and Construction
Macro Process: Devices and Components Development.
Process: Standard Catalog Management.

6 DEFINITIONS AND ACRONYMS

Acronym and Key words	Description
Conformity assessment body	Body that performs the conformity assessment activities [ISO 17000]
Enel Equipment Key code	It’s an equipment representative for a group (family) of similar equipment chose by Enel
Enel Equipment Family code	Equipment belonging to a specific group (family) in which another equipment is identified as key code

Manufacturer Product	Component manufactured by a Supplier in accordance with a technical specification
TCA systems	The “conformity assessment systems”, is applicable specifying that the rules and procedures to carry on the TCA are those specified in the present document
TCA dossier	Set of final documents delivered by the Supplier for the TCA
TCA report	Document describing the activities carried out for TCA
Technical Conformity Assessment (TCA)	A “conformity assessment”[1] with respect to “specified requirements”[2] consists in functional, dimensional, constructional and test characteristics required for a product (or a series of products) and quoted in technical specifications and quality requirements issued by Enel Group distribution companies. This also includes the verification of conformity with respect to local applicable regulation and laws and possession of relevant requested certifications
Type A documentation	Not confidential documents used for product manufacturing and management from which it is possible to verify the product conformity to all technical specification requirements, directly or indirectly
Type B documentation	Confidential documents used for product manufacturing and management where all product project details are described, in order to uniquely identify the product object of the TCA

[1] Definition 2.1 of ISO/IEC 17000
[2] Definition 3.1 of ISO/IEC 17000

7 DESCRIPTION

7.1 LIST OF COMPONENTS

Type code	Description
GSCM006/1	MV single-phase sectionalizer 15,5 kV
GSCM006/2	MV single-phase sectionalizer 27 kV
GSCM006/3	MV single-phase sectionalizer 38 kV

Table 2. Type codes for sectionalizers

Type code	Country	Country Code	Rated máximum voltage (kV)	Minimum actuating current (A)	Length (mm)	Cut-out base reference standard
GSCM006/1	Argentina	0104-0511	15,5	5	287 ±2	E-MT-001
GSCM006/1	Brasil	141954	15,5	5	287 ±2	E-MT-001
GSCM006/1	Chile	140164	15,5	5	287 ±2	E-MT-001
GSCM006/1	Colombia	140041	15,5	5	287 ±2	E-MT-001
GSCM006/1	Colombia	141983	15,5	3	287 ±2	E-MT-001
GSCM006/2	Argentina		27	5	375 ±2	GSCM012
GSCM006/2	Brasil	141955	27	5	375 ±2	GSCM012
GSCM006/2	Chile	140163	27	5	375 ±2	GSCM012
GSCM006/2	Colombia		27	5	375 ±2	GSCM012
GSCM006/2	Colombia	141982	27	3	375 ±2	GSCM012
GSCM006/2	Colombia	141981	27	1	375 ±2	GSCM012
GSCM006/3	Argentina	0104-0512	38	5	468 ±2	GSCM012
GSCM006/3	Brasil	141953	38	5	468 ±2	GSCM012
GSCM006/3	Brasil	141985	38	5	375 ±2	ET 277
GSCM006/3	Chile		38	5	468 ±2	GSCM012
GSCM006/3	Colombia	140463	38	5	468 ±2	GSCM012
GSCM006/3	Colombia	141984	38	3	468 ±2	GSCM012

Table 3. List of components

7.2 SERVICE CONDITIONS

7.2.1 General service conditions

Service conditions are the normal service conditions for outdoor switchgear according to IEEE C37.63, with the following modifications:

- SPS class (IEC 60815-1): Heavy (d)

7.3 TECHNICAL CHARACTERISTICS

The sectionalizers shall be manufactured in compliance with the reference national laws and with the standards pointed out in chapter 4.

Table 4 shows the general requirements that all sectionalizers shall observe.

Ratings of sectionalizers			
Rated maximum voltage (kV)	15,5	27	38
Rated power frequency (Hz)	50 and 60	50 and 60	50 and 60
Rated lightning impulse withstand voltage (kV)	110	125	150
Rated power-frequency dry withstand voltage (kV)	50	60	70
Rated power-frequency wet withstand voltage (kV)	45	50	60
Rated continous current (A)	200	200	200
Rated short-time withstand current 1s (A)	8000	8000	8000
Rated short-time withstand current 10s (A)	3000	3000	3000
Rated peak withstand current (A)	20000	20000	20000
Minimum actuating current (A)	5 (*)	5 (*)	5 (*)
Actuating current range (A)	5 to 200 (1A steps)	5 to 200 (1A steps)	5 to 200 (1A steps)
Number of operations for the opening	1 to 4	1 to 4	1 to 4
Dead-line detection current (mA)	<300	<300	<300
Dead-line detection time (ms)	<100	<100	<100
Reset time (s)	10 a 100	10 a 100	10 a 100
Maximum time for opening (s)	0,5	0,5	0,5

Table 4. Ratings of sectionalizers

(*) Only for Colombia, other actuating current below 5 A can be request.

7.4 GENERAL CHARACTERISTICS OF SECTIONALIZERS

7.4.1 Constructive characteristics

The sectionalizer shall be manufactured in compliance with the reference standards pointed out in section 4.

The sectionalizer shall be designed to allow the installation in the distribution fuse cutout support of each Company (refer to E-MT-001 and GSCM012 “Distribution fuse-cutout up to 36 kV” standard for details). It shall allow the use of the load opening tool (loadbuster).

The ring for the opening of the sectionalizers shall be suitable for operation with a standard hookstick from ground and shall withstand a minimum mechanical traction of 200 daN.

The sectionalizers shall have two reflective adhesive strips of 20 mm minimum width, resistant to water and solar radiation, wrapping the tube along its circumference in order to allow its easy visualization in night conditions, either in open or closed position.

It shall have an LED indicator, visible from the ground, that indicates the state of the current in the line.

The degree of protection of the sectionalizer shall be IP 65, according to the IEC 60529 Standard, being installed in its corresponding fuse support in both open and closed positions.

The sectionalizers shall be insensitive to the impulses caused by atmospheric discharges.

The sectionalizer shall have a function that prevents its incorrect operation caused by transient energization currents (inrush).

Electronic circuits shall maintain their operating characteristics in the operating temperature range of the device, without affecting their service life. The printed circuit boards shall be protected against contamination.

The sectionalizer shall allow closing under load.

7.4.2 Operational characteristics

The sectionalizer shall meet the following operational requirements:

It shall have an electronic circuit, controlled and powered by a current transformer mounted (no battery is allowed) on the body of the device. This circuit shall provide the necessary logic to count the trigger operations of the header switch and cause the sectionalizer to open at the appropriate moment. No battery is allowed.

The equipment shall allow single-phase, two-phase and three-phase operation by configuration. The opening signal shall be sent simultaneously to avoid imbalances in the system. The total time from the identification of the fault to the opening of all sectionalizers shall not exceed 0.5 s.

In the case of radiofrequency communication, it shall be possible to adjust the communication channel to avoid interference with equipment installed in the vicinity.
The electronic sectionalizers shall be immune to electromagnetic disturbances coming from the line in which they are connected, as well as from any other distribution line that is in the vicinity. The type test protocols that accredit these conditions shall be presented (EMC Tests and Radio Communication Compliance (FCC & CE Marking))
The sectionalizer shall be configured with the aid of computers through the USB port (or a different port with a suitable USB converter), using software provided by the manufacturer of the equipment compatible with the Windows platform. This software shall be supplied together with the sectionalizer.
It shall be possible to adjust the following parameters in the sectionalizer:

- Number of operations for the opening
- Actuating current
- Reset time
- Communication channel
- Opening type: single-phase, two-phase or three-phase
- Frequency
- Inrush threshold [%] (Inrush current)
- Dead line threshold [mA]

The sectionalizer shall have a non-volatile memory to record the following events:

- Cumulative time of current equal to or greater than that of actuation.
- Cumulative current time greater than the maximum assigned.
- Cumulative number of openings.
- Cumulative number of transient faults.
- Last opening cause indicator Indicator of the type of event that occurred (all events).
- Numbering of the evento.
- Indication of the time when the event occurred.
- Description of the event that occurred.
- Current measurement during events.

The sectionalizer shall have a microcontroller with firmware upgradeable to allow the incorporation of new features.
The sectionalizer must have the possibility of connection to a portable communication/configuration device.

7.4.3 Sectionalizer markings

The fields specified in Table 4 of section 6.10 of the IEEE C37.63 Standard shall be engraved in a legible and indelible manner in each sectionalizer.

7.5 TESTING

Tests are divided in:

- Type tests.
- Routine tests.
- Acceptance test.

7.5.1 Type tests

7.5.1.1 General conditions for tests

The type tests are for the purpose of proving the characteritics of the sectionalizer, its operating device and auxiliary equipement, if any.
Subclause 7.1 of IEEE C37.63 applies.

7.5.1.2 Dielectric Tests

Subclause 7.2 of IEEE C37.63 applies.
The tests shall be performed with the test voltages given in table 4 of this Standard.

7.5.1.3 Measurement of the resistance of circuits

Subclause 7.4 of IEEE C37.63 applies.

7.5.1.4 Temperature rise test

Subclause 7.5 of IEEE C37.63 applies.

7.5.1.5 Short-time withstand current and peak withstand current tests

The sectionalizers shall carry the rated short-time currents as given in table 4 of this Standard.
Subclause 7.6 of IEEE C37.63 applies.

7.5.1.6 Verification of the degree of protection

It shall be realized according to IEC 60529 for a IP 65 degree.

7.5.1.7 Mechanical operation tests

Subclause 7.104 of IEEE C37.63 applies.

7.5.1.8 Operating duty tests

Subclause 7.106 of IEEE C37.63 applies. To verify the closing capacity over load, the sectionalizer shall also pass the test duty 3 of table 8 of C.37.63 Standard considering the 50 closing sequence.

7.5.1.9 Minimum actuating current tests

Subclause 7.109 of IEEE C37.63 applies.

7.5.1.10 Electromagnetic compatibility test

The tests shall be carried according to IEC 61000-4-4 Standard

7.5.2 Routine tests.

The routine tests are for the purpose of revealing faults in material or construction. The routine tests shall be made wherever reasonably practical at the manufacturer's facility on each apparatus manufactured, to ensure that the product is in accordance with the equipment on which the type tests have been passed.

7.5.2.1 Visual inspection

Before carrying out the routine tests, a visual inspection shall be made to verify if the sectionalizer is equipped with all the required accessories and components.
Likewise, the marking of the sectionalizers shall be verified according to section 7.4.3 of this specification.

7.5.2.2 Dimensional control

The dimensional characteristics of the sectionalizer and its components shall be verified according to the drawings approved during the TCA process.

7.5.2.3 Dielectric withstand test; one minute dry power-frequency

Subclause 8.2 of IEEE C37.63 applies.

7.5.2.4 Measurement of the resistance of the main circuit

Subclause 7.4 of IEEE C37.63 applies.

7.5.2.5 Operational calibration

Subclause 8.101 of IEEE C37.63 applies.

7.5.2.6 Mechanical tests

Subclause 8.103 of IEEE C37.63 applies.

7.5.3 Acceptance tests.

a) Visual check: General verification of equipment, existence of accessories, quality of packaging, etc.

b) Dimensional check: Specification compliance and verification that there will be no compatibility problems with fuse support currently in use.

c) Communication test of equipment with PC or portable configuration device.

d) Routine test protocols.

e) Test of operation with reconnection simulator.

f) Manuals and / or assembly instructions, installation and operation of the equipment in Local language, and any other type of information required for the appropriate device performance.

For the inspection, a simple sampling will be carried out, according to the following table in which the quantities for acceptance or rejection of the lot.
An AQL of 2.5, according to IEC 60410, is considered, which can be adjusted from the results of inspections to each supplier in a specific way, so it will be more demanding to the extent that practical experience demonstrates that there are flaws in the materials during its installation or use.
The inspector will select the sample size for the inspection according to Table 5.

		Number of defects	
Size of lot	**Size of sample**	**To accept**	**To reject**
2 to 8	2	0	1
9 to 15	3	0	1
16 to 25	5	0	1
26 to 50	8	0	1
51 to 90	13	1	2
91 to 150	20	1	2
151 to 280	32	2	3
281 to 500	50	3	4

Table 5. Size of samples

7.6 CONDITIONS OF SUPPLY

Each unit of sectionalizer shall be supplied with:

- Sectionalizer with characteristics indicated in chapters 7.4 of this Standard.
- Portable communication/configuration equipment (minimum 1 for every 30 sectionalizer units; 1 for each batch of less than 30 units)
- Installation, operation and maintenance manual in the language of the Country in which the switchgear has to be delivered.
- Manual with procedures to be adopted for storage, after factory test and transportation.

Outside of the box containing the switch-disconnector, it shall be clearly written:

- name of the Distribution Company.
- name of the supplier.
- description of the product.
- code assigned by the supplier.
- type code and serial number of the Distribution Company.
- gross weight.

In case of switchgears for Colombia, the manufacturer shall include the mandatory RETIE certificate in the TCA dossier.