


**Technical Specification code: GRI-GRI-MAT-E&C-0003**

Version no.1 dated 03/10/2022

**Subject:** Enel Grids - GSCM004 - Medium Voltage Gas Insulated Ring  
Main Unit for secondary distribution substations

**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

Business Line: Enel Grids

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**THE HEAD OF NETWORK COMPONENTS**

**Fabrizio Gasbarri**


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## 1 DOCUMENT AIMS AND APPLICATION AREA

The scope of this document is to provide the technical requirements for Medium Voltage (MV) Gas-Insulated Ring Main Unit (RMU), with rated voltage 24 kV and 36 kV to be installed as indoor equipment in *Secondary Distribution Substations* of the Enel Group Distribution Companies listed below:

Country	Distribution Company
Argentina	Edesur
Brazil	Enel Distribuição Rio Enel Distribuição Ceará Enel Distribuição Goiás Enel Enel Distribuição São Paulo
Chile	Enel Distribución Chile
Colombia	Enel Codensa
Iberia	e-distribución
Italy	e-distribuzione
Peru	Enel Distribución Perú
Romania	Enel Distribuție Banat Enel Distribuție Dobrogea Enel Distribuție Muntenia

**Table 1 - Distribution Companies**

*This document shall be implemented and applied to the extent possible within the Enel Grids Line Business 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.*


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### 1.1 RELATED DOCUMENTS TO BE IMPLEMENTED AT COUNTRY LEVEL

This document does not require implementation of further documents. Anyway, each Enel Grids Company can issue, under the supervision of Enel Grids Global Network Components detailed documents, according to the provisions of the present document and in case of specific needs.

### 2 DOCUMENT VERSION MANAGEMENT

Version	Date	Main changes description
0	10/2019	First emission
1	03/10/2022	Subject updated. SF6 alternatives are accepted. Editorial corrections. Internal arc test clarification. VDIS alternative is introduced. Routine test redefinition according to Enel QCM indications. Harmonization and reduction of type codes. Introduced busbar VDS design and construction characteristics. Transformer functional unit with circuit breaker is included. Cable connection to RTU excluded from the supply.
1	04/01/2023	Errata corrige for GSCM004 rev.1

### 3 UNITS IN CHARGE OF THE DOCUMENT

Responsible for drawing up the document:

Enel Grids: Engineering and Construction /Components and Devices Design/ Network Components/ MV and LV Equipment unit.

Responsible for authorizing the document:

Enel Grids: Head of Network Components unit.

Enel Grids: Head Quality unit.

### 4 REFERENCES

- Code of Ethics of Enel Group;
- Enel Human Right Policy;


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- The Enel Group Zero Tolerance of Corruption (ZTC) Plan;
- Organization and management model as per Legislative Decree No. 231/2001;
- Enel Global Compliance Program (EGCP);
- Integrated Policy for Quality, Health and Safety, Environment, anti-Bribery and Information security;
- ISO 9001:2015 - Quality Management System – Requirements;
- ISO 14001:2015 - Environmental Management System - Requirements with guidance for use;
- ISO 45001:2018 - Occupational Health and Safety Management System - Requirements with guidance for use;
- ISO 37001:2016 - Anti-bribery Management System - Requirements with guidance for use;
- ISO 27001:2017 - Information Security Management System – Requirements.

#### 4.1 INTERNATIONAL STANDARDS

The listed reference documents shall be intended in the in-force edition at the TCA date (amendments and errata included). Unless otherwise specified, these documents are valid until the new editions:

- IEC 62271-1 High-voltage switchgear and controlgear - Part 1: Common specifications for alternating current switchgear and controlgear.
- IEC 62271-102 High-voltage switchgear and controlgear - Part 102: Alternating current disconnectors and earthing switches.
- IEC 62271-103 High-voltage switchgear and controlgear - Part 103: Switches for rated voltages above 1 kV up to and including 52 kV.
- IEC 62271-105 High-voltage switchgear and controlgear - Part 105: Alternating current switch-fuse combinations for rated voltages above 1 kV up to and including 52 kV.
- IEC 62271-200 High-voltage switchgear and controlgear - Part 200: AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV.


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- IEC TS 62271-210 High-voltage switchgear and controlgear - Part 210: Seismic qualification for metal enclosed and solid-insulation enclosed switchgear and controlgear assemblies for rated voltages above 1 kV and up to and including 52 kV.
- IEC 61243-5 Live working - Voltage detectors - Part 5: Voltage detecting systems (VDS).
- IEC 60282-1 High-voltage fuses - Part 1: Current-limiting fuses.
- IEC 60447 Basic and safety principles for man-machine interface, marking and identification - Actuating principles.
- IEC 60529 Degrees of protection provided by enclosures (IP Code).
- IEC 60068-2-52 Environmental testing – Part 2-52: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution).
- ISO 12944 Paints and varnishes — Corrosion protection of steel structures by protective paint systems.
- ISO 2409 Paints and varnishes — Cross-cut test.
- IEC 60137 Insulated bushings for alternating voltages above 1000 V
- EN 50181 Plug-in type bushings above 1 kV up to 52 kV and from 250 A to 2,50 kA for equipment other than liquid filled transformers
- ISO 4042 Fasteners - Electroplated coatings
- 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)
- ISO/IEC 17065 Conformity assessment – Requirements for bodies certifying products, processes and services



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## 4.2 APPLICABLE LAWS AND REFERENCE STANDARDS

### 4.2.1 Reference Laws

#### 4.2.1.1 Colombia

The switchgear shall comply with the requirements established in the “Anexo General del RETIE Resolución 9 0708 de Agosto 30 de 2013 con sus Ajustes” and demonstrate this by means of a Certificate of Product Conformity.

#### 4.2.1.2 Spain

The switchgear shall comply with the “Reglamento sobre condiciones técnicas y garantías de seguridad en instalaciones eléctricas de alta tensión y sus Instrucciones Técnicas Complementarias ITC-RAT 01 a 23 (R.D. 337/2014, de 9 de mayo)”, and consequently each switchgear shall be supplied accompanied by the "Declaración de Conformidad " required by this regulation, and the manufacturer or his authorized representative established in the European Union must keep the required “Expediente técnico” at disposal of the Spanish national market surveillance authority for inspection up to at least five years from the last date of manufacture of the product.

### 4.2.2 Enel Grid Technical Standards

- GSCC006 12/20(24) kV and 18/30(36) kV Separable connectors for MV cables.
- GSCT005 Technical characteristics of LPITs for RGDM/RGDAT.
- GSC001 Underground Medium voltage cables
  
- CNS-O&M-S&L-2021-0032-EGIN Global Infrastructure and Networks Barcode specification
- GSCC006 12/20(24) kV and 18/30(36) kV Separable connectors for MV cables.
- GSCT005 Technical characteristics of LPITs for RGDM/RGDAT.
- GSC001 Underground Medium voltage cables.
- DMIAC000160 Connector for measurement module
- Construction Specification GRI-GRI-CNS-O&M-0002Barcode specification ex CNS-O&M-S&L-2021-0032-EGIN



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**4.2.3 Colombian Technical Standards**

- NSR-10            Requisitos generales de diseño y construcción sismo resistente.

**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


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## 6 DEFINITIONS AND ACRONYMS

Acronym and Key words	Description
Circuit-Breaker (CB)	Mechanical switching device, capable of making, carrying and breaking currents under normal circuit conditions and also making, carrying for a specified duration and breaking currents under specified abnormal circuit conditions such as those of short circuit
Gas Insulated Switchgear (GIS)	A general term covering switching devices and their combination with associated control, measuring, protective and regulating equipment, also assemblies of such devices and equipment with associated interconnections, accessories, enclosures and supporting structures, intended in principle for use in connection with generation, transmission, distribution and conversion of electric energy, with Gas insulation
Low Voltage (LV)	Any set of nominal voltage levels exceeding 50 V and up to 1 kV a.c. or 1,5 kV d.c.
Medium Voltage (MV)	System with a nominal operative voltage between the phases higher than 1 kV to 35 kV included. NOTE: The boundary value between medium voltage and high voltage depends on local and historical circumstances or on common usage. Nevertheless for internal standardization purposes, medium voltage is defined as a system with a nominal operative voltage between the phases higher than 1 kV to 35 kV included”
Technical Conformity Assessment (TCA)	A “conformity assessment with respect to “specified requirements” 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
TCA report	Document describing the activities carried out for TCA



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TCA dossier	Set of final documents delivered by the Supplier for the TCA
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**7 DESCRIPTION**
**7.1 LIST OF COMPONENTS**

Type Code	Configuration	GIS technology	Distribution Company and Contry	Country Code	Rated frequency [Hz]	Rated normal current Ir [A]	Rated normal current transformer Ir [A]	Rated Voltage Ur [kV]	Rated power-frequency withstand voltage Ud [kV]	Rated lightning impulse withstand voltage Up [kV]	Rated short-time withstand current Ik [kA]	Rated duration of short circuit ts [s]	Rated peak withstand current Ip [kA]	Rated supply voltage of closing and opening devices and of auxiliary circuit Vcc	IK degree	IP degree	Sequence of operations	Circuit Breaker Class	Circuit breaker unit number mechanical endurance class - Electrical endurance class	LD - Mechanical endurance class	SD - Mechanical endurance class- Electrical endurance class	ES - Mechanical endurance class- Electrical endurance class	Classification IAC	Arc fault current and duration Ia [kA]; ta [s]	Protective Coating	Command Type	Busbar Socket	Description
GSCM004/1	1T+1CBL	SF6	AR	0109-0441	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+1CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/1
GSCM004/1	1T+1CBL	SF6	ES	140645	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	NO	MV Switchgear 1T+1CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/1
GSCM004/1	1T+1CBL	FREE GAS	IT	140325	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+1CBL FREE GAS 24 kV 16 kA AFL IP3X C3H GSCM004/1
GSCM004/1	1T+1CBL	SF6	RO	140016	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+1CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/1
GSCM004/1	1T+1CBL	SF6	CL	140113	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+1CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/1
GSCM004/1	1T+1CBL	FREE GAS	RO	140113	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+1CBL FREE GAS 24 kV 16 kA AFL IP3X C3H GSCM004/1
GSCM004/1	1T+1CBL	SF6	IT	140421	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+1CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/1
GSCM004/2	1T+2CBL	SF6 FREE	BR	141741	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+2CBL SF6 FREE 24 kV 16 kA AFL IP3X C3H GSCM004/2
GSCM004/2	1T+2CBL	SF6	AR	0109-0440	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+2CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/2
GSCM004/2	1T+2CBL	FREE GAS	CO	140774	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+2CBL FREE GAS 24 kV 16 kA AFL IP3X C3H GSCM004/2
GSCM004/2	1T+2CBL	SF6	ES	140640	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	NO	MV Switchgear 1T+2CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/2
GSCM004/2	1T+2CBL	SF6	BR	316284	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+2CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/2
GSCM004/2	1T+2CBL	SF6	CL	140114	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+2CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/2
GSCM004/2	1T+2CBL	SF6	CO	140045	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+2CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/2
GSCM004/2	1T+2CBL	FREE GAS	IT	140326	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+2CBL FREE GAS 24 kV 16 kA AFL IP3X C3H GSCM004/2
GSCM004/2	1T+2CBL	SF6	IT	140050	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+2CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/2
GSCM004/2	1T+2CBL	SF6	RO	140017	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+2CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/2
GSCM004/2	1T+2CBL	FREE GAS	RO	140114	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+2CBL FREE GAS 24 kV 16 kA AFL IP3X C3H GSCM004/2
GSCM004/3	1T+3CBL	SF6	AR	0109-0439	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+3CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/3
GSCM004/3	1T+3CBL	SF6	BR	316285	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+3CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/3
GSCM004/3	1T+3CBL	SF6	CL	140115	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+3CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/3
GSCM004/3	1T+3CBL	SF6	CO	140047	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+3CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/3
GSCM004/3	1T+3CBL	FREE GAS	CO	140595	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+3CBL FREE GAS 24 kV 16 kA AFL IP3X C3H GSCM004/3
GSCM004/3	1T+3CBL	SF6	ES	140639	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	NO	MV Switchgear 1T+3CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/3
GSCM004/3	1T+3CBL	SF6	IT	140049	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+3CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/3
GSCM004/3	1T+3CBL	FREE GAS	IT	140327	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+3CBL FREE GAS 24 kV 16 kA AFL IP3X C3H GSCM004/3
GSCM004/3	1T+3CBL	SF6	RO	140018	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+3CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/3
GSCM004/3	1T+3CBL	FREE GAS	RO	140115	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+3CBL FREE GAS 24 kV 16 kA AFL IP3X C3H GSCM004/3


**Technical Specification code: GRI-GRI-MAT-E&C-0003**

Version no.1 dated 03/10/2022

**Subject: Enel Grids - GSCM004 - Medium Voltage Gas Insulated Ring Main Unit for secondary distribution substations**
**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

Business Line: Enel Grids

Type Code	Configuration	GIS technology	Distribution Company and Contry	Country Code	Rated frequency [Hz]	Rated normal current Ir [A]	Rated normal current transformer Ir [A]	Rated Voltage Ur [kV]	Rated power-frequency withstand voltage Ud [kV]	Rated lightning impulse withstand voltage Up [kV]	Rated short-time withstand current Ik [kA]	Rated duration of short circuit ts [s]	Rated peak withstand current Ip [kA]	Rated supply voltage of closing and opening devices and of auxiliary circuit Vcc	IK degree	IP degree	Sequence of operations	Circuit Breaker Class	Circuit breaker unit number mechanical endurance class - Electrical endurance class	LD - Mechanical endurance class	SD - Mechanical endurance class- Electrical endurance class	ES - Mechanical endurance class- Electrical endurance class	Classification IAC	Arc fault current and duration Ia [kA]; ta [s]	Protective Coating	Command Type	Busbar Socket	Description
GSCM004/4	1T+4CBL	SF6	ES	140638	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO – E2	AFL	16; 1	C3H	electrical	NO	MV Switchgear 1T+4CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/4
GSCM004/4	1T+4CBL	SF6	AR	0109-0438	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+4CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/4
GSCM004/4	1T+4CBL	FREE GAS	CO	140775	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+4CBL FREE GAS 24 kV 16 kA AFL IP3X C3H GSCM004/4
GSCM004/4	1T+4CBL	SF6	RO	140019	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+4CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/4
GSCM004/4	1T+4CBL	SF6	CO	140049	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+4CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/4
GSCM004/4	1T+4CBL	SF6	CL	140116	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+4CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/4
GSCM004/4	1T+4CBL	SF6	BR	316286	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+4CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/4
GSCM004/4	1T+4CBL	FREE GAS	RO	140116	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+4CBL FREE GAS 24 kV 16 kA AFL IP3X C3H GSCM004/4
GSCM004/4	1T+4CBL	FREE GAS	IT	140328	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+4CBL FREE GAS 24 kV 16 kA AFL IP3X C3H GSCM004/4
GSCM004/4	1T+4CBL	SF6	IT	140048	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+4CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/4
GSCM004/5	2T+2CBL	SF6	AR	0109-0437	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 2T+2CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/5
GSCM004/5	2T+2CBL	SF6	CL	140117	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 2T+2CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/5
GSCM004/5	2T+2CBL	FREE GAS	CO	140776	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 2T+2CBL FREE GAS 24 kV 16 kA AFL IP3X C3H GSCM004/5
GSCM004/5	2T+2CBL	SF6	CO	140406	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 2T+2CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/5
GSCM004/5	2T+2CBL	FREE GAS	IT	140329	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 2T+2CBL FREE GAS 24 kV 16 kA AFL IP3X C3H GSCM004/5
GSCM004/5	2T+2CBL	SF6	IT	140047	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 2T+2CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/5
GSCM004/5	2T+2CBL	SF6	RO	140020	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 2T+2CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/5
GSCM004/5	2T+2CBL	FREE GAS	RO	140118	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 2T+2CBL FREE GAS 24 kV 16 kA AFL IP3X C3H GSCM004/5
GSCM004/6	3CBL	SF6	ES	140688	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO – E2	AFL	16; 1	C3H	electrical	NO	MV Switchgear 3CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/6
GSCM004/6	3CBL	SF6	AR	0109-0436	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 3CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/6
GSCM004/6	3CBL	SF6	CO	140593	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 3CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/6
GSCM004/6	3CBL	FREE GAS	CO	140777	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 3CBL FREE GAS 24 kV 16 kA AFL IP3X C3H GSCM004/6
GSCM004/6	3CBL	SF6	RO	140021	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 3CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/6
GSCM004/6	3CBL	SF6	CL	140118	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 3CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/6
GSCM004/6	3CBL	SF6	BR	316287	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 3CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/6
GSCM004/6	3CBL	FREE GAS	RO	140119	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 3CBL FREE GAS 24 kV 16 kA AFL IP3X C3H GSCM004/6
GSCM004/6	3CBL	FREE GAS	IT	140330	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 3CBL FREE GAS 24 kV 16 kA AFL IP3X C3H GSCM004/6
GSCM004/6	3CBL	SF6	IT	140046	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 3CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/6
GSCM004/7	4CBL	SF6	ES	140636	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO – E2	AFL	16; 1	C3H	electrical	NO	MV Switchgear 4CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/7
GSCM004/7	4CBL	SF6	AR	0109-0435	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 4CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/7
GSCM004/7	4CBL	SF6	CO	140594	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 4CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/7
GSCM004/7	4CBL	FREE GAS	CO	140778	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 4CBL FREE GAS 24 kV 16 kA AFL IP3X C3H GSCM004/7
GSCM004/7	4CBL	SF6	RO	140022	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 4CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/7
GSCM004/7	4CBL	SF6	CL	140119	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	MO - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 4CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/7


**Technical Specification code: GRI-GRI-MAT-E&C-0003**

Version no.1 dated 03/10/2022

**Subject: Enel Grids - GSCM004 - Medium Voltage Gas Insulated Ring Main Unit for secondary distribution substations**
**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

Business Line: Enel Grids

Type Code	Configuration	GIS technology	Distribution Company and Contry	Country Code	Rated frequency [Hz]	Rated normal current Ir [A]	Rated normal current transformer Ir [A]	Rated Voltage Ur [kV]	Rated power-frequency withstand voltage Ud [kV]	Rated lightning impulse withstand voltage Up [kV]	Rated short-time withstand current Ik [kA]	Rated duration of short circuit ts [s]	Rated peak withstand current Ip [kA]	Rated supply voltage of closing and opening devices and of auxiliary circuit Vcc	IK degree	IP degree	Sequence of operations	Circuit Breaker Class	Circuit breaker unit number mechanical endurance class - Electrical endurance class	LD - Mechanical endurance class	SD - Mechanical endurance class- Electrical endurance class	ES - Mechanical endurance class- Electrical endurance class	Classification IAC	Arc fault current and duration Ia [kA]; ta [s]	Protective Coating	Command Type	Busbar Socket	Description
GSCM004/7	4CBL	SF6	BR	316288	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 4CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/7
GSCM004/7	4CBL	FREE GAS	RO	140120	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 4CBL FREE GAS 24 kV 16 kA AFL IP3X C3H GSCM004/7
GSCM004/7	4CBL	FREE GAS	IT	140331	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 4CBL FREE GAS 24 kV 16 kA AFL IP3X C3H GSCM004/7
GSCM004/7	4CBL	SF6	IT	140045	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 4CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/7
GSCM004/8	1T+2CBL	FREE GAS	PE	140792	50 and 60	630	200	24	50	125	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	20; 1	C5H	electrical	YES	MV Switchgear 1T+2CBL FREE GAS 24 kV 20 kA AFL IP3X C5H GSCM004/8
GSCM004/9	3CBL	FREE GAS	PE	141938	50 and 60	630	200	24	50	125	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	20; 1	C5H	electrical	YES	MV Switchgear 3CBL FREE GAS 24 kV 20 kA AFL IP3X C5H GSCM004/9
GSCM004/9	3CBL	SF6	PE	141939	50 and 60	630	200	24	50	125	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	20; 1	C5H	electrical	YES	MV Switchgear 3CBL SF6 24 kV 20 kA AFL IP3X C5H GSCM004/9
GSCM004/17	1T+1CBL	SF6	ES	140699	50 and 60	630	200	24	50	125	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	20; 1	C3H	electrical	NO	MV Switchgear 1T+1CBL SF6 24 kV 20 kA AFL IP3X C3H GSCM004/17
GSCM004/17	1T+1CBL	SF6	AR	0109-0425	50 and 60	630	200	24	50	125	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	20; 1	C3H	electrical	YES	MV Switchgear 1T+1CBL SF6 24 kV 20 kA AFL IP3X C3H GSCM004/17
GSCM004/18	1T+2CBL	SF6	AR	0109-0424	50 and 60	630	200	24	50	125	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	20; 1	C3H	electrical	YES	MV Switchgear 1T+2CBL SF6 24 kV 20 kA AFL IP3X C3H GSCM004/18
GSCM004/18	1T+2CBL	SF6	ES	140698	50 and 60	630	200	24	50	125	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	20; 1	C3H	electrical	NO	MV Switchgear 1T+2CBL SF6 24 kV 20 kA AFL IP3X C3H GSCM004/18
GSCM004/19	1T+3CBL	SF6	AR	0109-0423	50 and 60	630	200	24	50	125	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	20; 1	C3H	electrical	YES	MV Switchgear 1T+3CBL SF6 24 kV 20 kA AFL IP3X C3H GSCM004/19
GSCM004/19	1T+3CBL	SF6	ES	140696	50 and 60	630	200	24	50	125	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	20; 1	C3H	electrical	NO	MV Switchgear 1T+3CBL SF6 24 kV 20 kA AFL IP3X C3H GSCM004/19
GSCM004/19	1T+3CBL	SF6	PE	141203	50 and 60	630	200	24	50	125	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	20; 1	C5H	electrical	YES	MV Switchgear 1T+3CBL SF6 24 kV 20 kA AFL IP3X C5H GSCM004/19
GSCM004/20	1T+4CBL	SF6	ES	140686	50 and 60	630	200	24	50	125	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	20; 1	C3H	electrical	NO	MV Switchgear 1T+4CBL SF6 24 kV 20 kA AFL IP3X C3H GSCM004/20
GSCM004/20	1T+4CBL	SF6	AR	0109-0422	50 and 60	630	200	24	50	125	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	20; 1	C3H	electrical	YES	MV Switchgear 1T+4CBL SF6 24 kV 20 kA AFL IP3X C3H GSCM004/20
GSCM004/20	1T+4CBL	SF6	PE	141204	50 and 60	630	200	24	50	125	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	20; 1	C5H	electrical	YES	MV Switchgear 1T+4CBL SF6 24 kV 20 kA AFL IP3X C5H GSCM004/20
GSCM004/21	2T+2CBL	SF6	AR	0109-0421	50 and 60	630	200	24	50	125	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	20; 1	C3H	electrical	YES	MV Switchgear 2T+2CBL SF6 24 kV 20 kA AFL IP3X C3H GSCM004/21
GSCM004/22	3CBL	SF6	ES	140697	50 and 60	630	200	24	50	125	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	20; 1	C3H	electrical	NO	MV Switchgear 3CBL SF6 24 kV 20 kA AFL IP3X C3H GSCM004/22
GSCM004/22	3CBL	SF6	AR	0109-0420	50 and 60	630	200	24	50	125	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	20; 1	C3H	electrical	YES	MV Switchgear 3CBL SF6 24 kV 20 kA AFL IP3X C3H GSCM004/22
GSCM004/23	4CBL	SF6	ES	140695	50 and 60	630	200	24	50	125	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	20; 1	C3H	electrical	NO	MV Switchgear 4CBL SF6 24 kV 20 kA AFL IP3X C3H GSCM004/23
GSCM004/23	4CBL	SF6	AR	0109-0419	50 and 60	630	200	24	50	125	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	20; 1	C3H	electrical	YES	MV Switchgear 4CBL SF6 24 kV 20 kA AFL IP3X C3H GSCM004/23
GSCM004/23	4CBL	FREE GAS	PE	141202	50 and 60	630	200	24	50	125	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	20; 1	C5H	electrical	YES	MV Switchgear 4CBL FREE GAS 24 kV 20 kA AFL IP3X C5H GSCM004/23
GSCM004/23	4CBL	SF6	PE	141205	50 and 60	630	200	24	50	125	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	20; 1	C5H	electrical	YES	MV Switchgear 4CBL SF6 24 kV 20 kA AFL IP3X C5H GSCM004/23
GSCM004/33	1T+1CBL	SF6	CL	140097	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+1CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/33
GSCM004/33	1T+1CBL	SF6	ES	140681	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	NO	MV Switchgear 1T+1CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/33
GSCM004/33	1T+1CBL	SF6	AR	0109-0409	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+1CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/33
GSCM004/34	1T+2CBL	SF6	AR	0109-0408	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+2CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/34
GSCM004/34	1T+2CBL	SF6	BR	316289	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+2CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/34
GSCM004/34	1T+2CBL	SF6	CL	140098	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+2CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/34
GSCM004/34	1T+2CBL	SF6	ES	140675	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	NO	MV Switchgear 1T+2CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/34
GSCM004/34	1T+2CBL	FREE GAS	IT	140332	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+2CBL FREE GAS 36 kV 16 kA AFL IP3X C3H GSCM004/34
GSCM004/34	1T+2CBL	SF6	IT	140422	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+2CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/34


**Technical Specification code: GRI-GRI-MAT-E&C-0003**

Version no.1 dated 03/10/2022

**Subject:** Enel Grids - GSCM004 - Medium Voltage Gas Insulated Ring Main Unit for secondary distribution substations

**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

Business Line: Enel Grids

Type Code	Configuration	GIS technology	Distribution Company and Contry	Country Code	Rated frequency [Hz]	Rated normal current Ir [A]	Rated normal current transformer Ir [A]	Rated Voltage Ur [kV]	Rated power-frequency withstand voltage Ud [kV]	Rated lightning impulse withstand voltage Up [kV]	Rated short-time withstand current Ik [kA]	Rated duration of short circuit ts [s]	Rated peak withstand current Ip [kA]	Rated supply voltage of closing and opening devices and of auxiliary circuit Vcc	IK degree	IP degree	Sequence of operations	Circuit Breaker Class	Circuit breaker unit number mechanical endurance class - Electrical endurance class	LD - Mechanical endurance class	SD - Mechanical endurance class- Electrical endurance class	ES - Mechanical endurance class- Electrical endurance class	Classification IAC	Arc fault current and duration Ia [kA]; ta [s]	Protective Coating	Command Type	Busbar Socket	Description
GSCM004/35	1T+3CBL	SF6	IT	140423	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+3CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/35
GSCM004/35	1T+3CBL	SF6	CL	140099	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+3CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/35
GSCM004/35	1T+3CBL	SF6	BR	316290	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+3CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/35
GSCM004/35	1T+3CBL	SF6	ES	140685	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	16; 1	C3H	electrical	NO	MV Switchgear 1T+3CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/35
GSCM004/35	1T+3CBL	SF6	AR	0109-0407	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+3CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/35
GSCM004/35	1T+3CBL	FREE GAS	IT	140333	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+3CBL FREE GAS 36 kV 16 kA AFL IP3X C3H GSCM004/35
GSCM004/36	1T+4CBL	SF6	IT	140424	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+4CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/36
GSCM004/36	1T+4CBL	SF6	CL	140100	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+4CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/36
GSCM004/36	1T+4CBL	SF6	BR	316291	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+4CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/36
GSCM004/36	1T+4CBL	SF6	ES	140677	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	16; 1	C3H	electrical	NO	MV Switchgear 1T+4CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/36
GSCM004/36	1T+4CBL	SF6	AR	0109-0406	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+4CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/36
GSCM004/36	1T+4CBL	FREE GAS	IT	140334	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+4CBL FREE GAS 36 kV 16 kA AFL IP3X C3H GSCM004/36
GSCM004/36	1T+4CBL	FREE GAS	CL	141191	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+4CBL FREE GAS 36 kV 16 kA AFL IP3X C3H GSCM004/36
GSCM004/37	2T+2CBL	SF6	AR	0109-0405	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 2T+2CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/37
GSCM004/37	2T+2CBL	SF6	CL	140101	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 2T+2CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/37
GSCM004/38	3CBL	FREE GAS	CL	141188	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 3CBL FREE GAS 36 kV 16 kA AFL IP3X C3H GSCM004/38
GSCM004/38	3CBL	SF6	CL	140096	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 3CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/38
GSCM004/38	3CBL	SF6	BR	316292	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 3CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/38
GSCM004/38	3CBL	SF6	ES	140674	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	16; 1	C3H	electrical	NO	MV Switchgear 3CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/38
GSCM004/38	3CBL	SF6	AR	0109-0404	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 3CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/38
GSCM004/39	4CBL	FREE GAS	CL	141189	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 4CBL FREE GAS 36 kV 16 kA AFL IP3X C3H GSCM004/39
GSCM004/39	4CBL	SF6	CL	140102	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 4CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/39
GSCM004/39	4CBL	SF6	BR	316293	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 4CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/39
GSCM004/39	4CBL	SF6	ES	140672	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	16; 1	C3H	electrical	NO	MV Switchgear 4CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/39
GSCM004/39	4CBL	SF6	AR	0109-0403	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 4CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/39
GSCM004/49	1T+1CBL	SF6	ES	140656	50 and 60	630	200	36	70	170	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	20; 1	C3H	electrical	NO	MV Switchgear 1T+1CBL SF6 36 kV 20 kA AFL IP3X C3H GSCM004/49
GSCM004/49	1T+1CBL	SF6	CO	140055	50 and 60	630	200	36	70	170	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	20; 1	C3H	electrical	YES	MV Switchgear 1T+1CBL SF6 36 kV 20 kA AFL IP3X C3H GSCM004/49
GSCM004/50	1T+2CBL	SF6	CO	140050	50 and 60	630	200	36	70	170	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	20; 1	C3H	electrical	YES	MV Switchgear 1T+2CBL SF6 36 kV 20 kA AFL IP3X C3H GSCM004/50
GSCM004/50	1T+2CBL	SF6	ES	140654	50 and 60	630	200	36	70	170	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	20; 1	C3H	electrical	NO	MV Switchgear 1T+2CBL SF6 36 kV 20 kA AFL IP3X C3H GSCM004/50
GSCM004/51	1T+3CBL	SF6	ES	140653	50 and 60	630	200	36	70	170	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	20; 1	C3H	electrical	NO	MV Switchgear 1T+3CBL SF6 36 kV 20 kA AFL IP3X C3H GSCM004/51
GSCM004/51	1T+3CBL	SF6	CO	140052	50 and 60	630	200	36	70	170	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	20; 1	C3H	electrical	YES	MV Switchgear 1T+3CBL SF6 36 kV 20 kA AFL IP3X C3H GSCM004/51
GSCM004/52	1T+4CBL	SF6	ES	140652	50 and 60	630	200	36	70	170	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	20; 1	C3H	electrical	NO	MV Switchgear 1T+4CBL SF6 36 kV 20 kA AFL IP3X C3H GSCM004/52
GSCM004/52	1T+4CBL	SF6	CO	140054	50 and 60	630	200	36	70	170	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 – E3	M0 – E2	AFL	20; 1	C3H	electrical	YES	MV Switchgear 1T+4CBL SF6 36 kV 20 kA AFL IP3X C3H GSCM004/52


**Technical Specification code: GRI-GRI-MAT-E&C-0003**

Version no.1 dated 03/10/2022

**Subject:** Enel Grids - GSCM004 - Medium Voltage Gas Insulated Ring Main Unit for secondary distribution substations

**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

Business Line: Enel Grids

Type Code	Configuration	GIS technology	Distribution Company and Contry	Country Code	Rated frequency [Hz]	Rated normal current Ir [A]	Rated normal current transformer Ir [A]	Rated Voltage Ur [kV]	Rated power-frequency withstand voltage Ud [kV]	Rated lightning impulse withstand voltage Up [kV]	Rated short-time withstand current Ik [kA]	Rated duration of short circuit ts [s]	Rated peak withstand current Ip [kA]	Rated supply voltage of closing and opening devices and of auxiliary circuit Vcc	IK degree	IP degree	Sequence of operations	Circuit Breaker Class	Circuit breaker unit number mechanical endurance class - Electrical endurance class	LD - Mechanical endurance class	SD - Mechanical endurance class- Electrical endurance class	ES - Mechanical endurance class- Electrical endurance class	Classification IAC	Arc fault current and duration Ia [kA]; ta [s]	Protective Coating	Command Type	Busbar Socket	Description
GSCM004/54	3CBL	SF6	ES	140651	50 and 60	630	200	36	70	170	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	20; 1	C3H	electrical	NO	MV Switchgear 3CBL SF6 36 kV 20 kA AFL IP3X C3H GSCM004/54
GSCM004/54	3CBL	FREE GAS	CL	141190	50 and 60	630	200	36	70	170	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	20; 1	C3H	electrical	YES	MV Switchgear 3CBL FREE GAS 36 kV 20 kA AFL IP3X C3H GSCM004/54
GSCM004/55	4CBL	SF6	ES	140650	50 and 60	630	200	36	70	170	20	1	50 (and 52)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	20; 1	C3H	electrical	NO	MV Switchgear 4CBL SF6 36 kV 20 kA AFL IP3X C3H GSCM004/55
GSCM004/215	1T+6CBL	FREE GAS	IT	140354	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+6CBL FREE GAS 24 kV 16 kA AFL IP3X C3H GSCM004/215
GSCM004/215	1T+6CBL	SF6	IT	140353	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+6CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/215
GSCM004/215	1T+6CBL	FREE GAS	RO	140151	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+6CBL FREE GAS 24 kV 16 kA AFL IP3X C3H GSCM004/215
GSCM004/215	1T+6CBL	SF6	RO	140152	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 1T+6CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/215
GSCM004/216	5CBL	SF6	BR	141181	50 and 60	630	200	36	70	170	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 5CBL SF6 36 kV 16 kA AFL IP3X C3H GSCM004/216
GSCM004/217	5CBL	SF6	BR	141182	50 and 60	630	200	24	50	125	16	1	40 (and 41,6)	24V -15% +20%	IK08	IP3X	O-0,3s-CO-15s-CO	S1	M2 - E2	M1	M1 - E3	M0 - E2	AFL	16; 1	C3H	electrical	YES	MV Switchgear 5CBL SF6 24 kV 16 kA AFL IP3X C3H GSCM004/217

Type Code	Configuration	GIS technology	Distribution Company and Contry	Country Code	Rated frequency [Hz]	Rated normal current Ir [A]	Rated Voltage Ur [kV]	Rated power-frequency withstand voltage Ud [kV]	Rated lightning impulse withstand voltage Up [kV]	Rated short-time withstand current Ik [kA]	Rated duration of short circuit ts [s]	Rated peak withstand current Ip [kA]	IK degree	IP degree	ES - Mechanical endurance class- Electrical endurance class	Classification IAC	Arc fault current and duration Ia [kA]; ta [s]	Protective Coating	Command Type	Busbar Socket	Voltage Transformer [kV/V]	Current Transformer [A/A]	GSCT003 Type (refer to rev. 2)	Description
GSCM004/75	1AT	AIR	BR	601851	50 and 60	-	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	-	AFL	16; 1	C3H	Manual	YES	13,8 - 13,2 - 12 - 11,4/100	-	GSCT003/02	MV Switchgear 1AT AIR 24 kV 16 kA AFL IP3X C3H GSCT003/02 GSCM004/75
GSCM004/75	1AT	AIR	CL	141187	50 and 60	-	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	-	AFL	16; 1	C3H	Manual	YES	13,8 - 13,2 - 12 - 11,4/100	-	GSCT003/02	MV Switchgear 1AT AIR 24 kV 16 kA AFL IP3X C3H GSCT003/02 GSCM004/75
GSCM004/75	1AT	AIR	BR	313088	50 and 60	-	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	-	AFL	16; 1	C3H	Manual	YES	13,8 - 13,2 - 12 - 11,4/100	-	GSCT003/02	MV Switchgear 1AT AIR 24 kV 16 kA AFL IP3X C3H GSCT003/02 GSCM004/75
GSCM004/75	1AT	AIR	CL	140111	50 and 60	-	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	-	AFL	16; 1	C3H	Manual	YES	13,8 - 13,2 - 12 - 11,4/100	-	GSCT003/02	MV Switchgear 1AT AIR 24 kV 16 kA AFL IP3X C3H GSCT003/02 GSCM004/75
GSCM004/78	1AT	AIR	BR	601852	50 and 60	-	36	70	170	16	1	40 (and 41,6)	IK08	IP3X	-	AFL	16; 1	C3H	Manual	YES	33 - 25 - 23/100	-	GSCT003/03	MV Switchgear 1AT AIR 36 kV 16 kA AFL IP3X C3H GSCT003/03 GSCM004/78
GSCM004/78	1AT	AIR	CL	140112	50 and 60	-	36	70	170	16	1	40 (and 41,6)	IK08	IP3X	-	AFL	16; 1	C3H	Manual	YES	33-25-23/100	-	GSCT003/03	MV Switchgear 1AT AIR 36 kV 16 kA AFL IP3X C3H GSCT003/03 GSCM004/78
GSCM004/78	1AT	AIR	BR	313089	50 and 60	-	36	70	170	16	1	40 (and 41,6)	IK08	IP3X	-	AFL	16; 1	C3H	Manual	YES	33 - 25 - 23/100	-	GSCT003/03	MV Switchgear 1AT AIR 36 kV 16 kA AFL IP3X C3H GSCT003/03 GSCM004/78
GSCM004/84	1AT	AIR	IT	140032	50 and 60	-	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	-	AFL	16; 1	C3H	Manual	YES	20-15 - 13,2 - 10/100	-	GSCT003/01	MV Switchgear 1AT AIR 24 kV 16 kA AFL IP3X C3H GSCT003/01 GSCM004/84
GSCM004/84	1AT	AIR	RO	140041	50 and 60	-	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	-	AFL	16; 1	C3H	Manual	YES	20-15 - 13,2 - 10/100	-	GSCT003/01	MV Switchgear 1AT AIR 24 kV 16 kA AFL IP3X C3H GSCT003/01 GSCM004/84
GSCM004/85	1AT	AIR	PE	140035	50 and 60	-	24	50	125	20	1	50 (and 52)	IK08	IP3X	-	AFL	20; 1	C5H	Manual	YES	20-15 - 13,2 - 10/100	-	GSCT003/01	MV Switchgear 1AT AIR 24 kV 20 kA AFL IP3X C5H GSCT003/01 GSCM004/85
GSCM004/93	1M	SF6	CO	140061	50 and 60	630	36	70	170	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	34/200	100/5	-	MV Switchgear 1M SF6 36 kV 16 kA AFL IP3X C3H VT:34/200 kV/V CT:100/5 A/A GSCM004/93
GSCM004/95	1M	FREE GAS	IT	140341	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	15/100	50/5	-	MV Switchgear 1M FREE GAS 24 kV 16 kA AFL IP3X C3H VT:15/100 kV/V CT:50/5 A/A GSCM004/95
GSCM004/95	1M	SF6	IT	140044	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	15/100	50/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:15/100 kV/V CT:50/5 A/A GSCM004/95
GSCM004/96	1M	FREE GAS	IT	140342	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	15/100	400/5	-	MV Switchgear 1M FREE GAS 24 kV 16 kA AFL IP3X C3H VT:15/100 kV/V CT:400/5 A/A GSCM004/96
GSCM004/96	1M	SF6	IT	140043	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	15/100	400/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:15/100 kV/V CT:400/5 A/A GSCM004/96




**Technical Specification code: GRI-GRI-MAT-E&C-0003**

Version no.1 dated 03/10/2022

**Subject:** Enel Grids - GSCM004 - Medium Voltage Gas Insulated Ring Main Unit for secondary distribution substations

**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

Business Line: Enel Grids

Type Code	Configuration	GIS technology	Distribution Company and Contry	Country Code	Rated frequency [Hz]	Rated normal current I <sub>r</sub> [A]	Rated Voltage U <sub>r</sub> [kV]	Rated power-frequency withstand voltage U <sub>d</sub> [kV]	Rated lightning impulse withstand voltage U <sub>p</sub> [kV]	Rated short-time withstand current I <sub>k</sub> [kA]	Rated duration of short circuit t <sub>k</sub> [s]	Rated peak withstand current I <sub>p</sub> [kA]	IK degree	IP degree	ES - Mechanical endurance class- Electrical endurance class	Classification IAC	Arc fault current and duration I <sub>a</sub> [kA]; t <sub>a</sub> [s]	Protective Coating	Command Type	Busbar Socket	Voltage Transformer [kV/V]	Current Transformer [A/A]	GSCT003 Type (refer to rev. 2)	Description
GSCM004/97	1M	FREE GAS	IT	140343	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	15/100	630/5	-	MV Switchgear 1M FREE GAS 24 kV 16 kA AFL IP3X C3H VT:15/100 kV/V CT:630/5 A/A GSCM004/97
GSCM004/97	1M	SF6	IT	140042	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	15/100	630/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:15/100 kV/V CT:630/5 A/A GSCM004/97
GSCM004/98	1M	FREE GAS	IT	140344	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	20/100	50/5	-	MV Switchgear 1M FREE GAS 24 kV 16 kA AFL IP3X C3H VT:20/100 kV/V CT:50/5 A/A GSCM004/98
GSCM004/98	1M	SF6	IT	140041	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	20/100	50/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:20/100 kV/V CT:50/5 A/A GSCM004/98
GSCM004/98	1M	SF6	RO	140035	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	20/100	50/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:20/100 kV/V CT:50/5 A/A GSCM004/98
GSCM004/98	1M	FREE GAS	RO	140153	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	20/100	50/5	-	MV Switchgear 1M FREE GAS 24 kV 16 kA AFL IP3X C3H VT:20/100 kV/V CT:50/5 A/A GSCM004/98
GSCM004/99	1M	FREE GAS	IT	140345	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	20/100	400/5	-	MV Switchgear 1M FREE GAS 24 kV 16 kA AFL IP3X C3H VT:20/100 kV/V CT:400/5 A/A GSCM004/99
GSCM004/99	1M	SF6	IT	140040	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	20/100	400/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:20/100 kV/V CT:400/5 A/A GSCM004/99
GSCM004/99	1M	SF6	RO	140036	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	20/100	400/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:20/100 kV/V CT:400/5 A/A GSCM004/99
GSCM004/99	1M	FREE GAS	RO	140154	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	20/100	400/5	-	MV Switchgear 1M FREE GAS 24 kV 16 kA AFL IP3X C3H VT:20/100 kV/V CT:400/5 A/A GSCM004/99
GSCM004/100	1M	FREE GAS	RO	140155	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	20/100	630/5	-	MV Switchgear 1M FREE GAS 24 kV 16 kA AFL IP3X C3H VT:20/100 kV/V CT:630/5 A/A GSCM004/100
GSCM004/100	1M	FREE GAS	IT	140346	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	20/100	630/5	-	MV Switchgear 1M FREE GAS 24 kV 16 kA AFL IP3X C3H VT:20/100 kV/V CT:630/5 A/A GSCM004/100
GSCM004/100	1M	SF6	IT	140039	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	20/100	630/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:20/100 kV/V CT:630/5 A/A GSCM004/100
GSCM004/100	1M	SF6	RO	140037	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	20/100	630/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:20/100 kV/V CT:630/5 A/A GSCM004/100
GSCM004/101	1M	FREE GAS	IT	140335	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	8,4/100	50/5	-	MV Switchgear 1M FREE GAS 24 kV 16 kA AFL IP3X C3H VT:8,4/100 kV/V CT:50/5 A/A GSCM004/101
GSCM004/101	1M	SF6	IT	140038	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	8,4/100	50/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:8,4/100 kV/V CT:50/5 A/A GSCM004/101
GSCM004/101	1M	FREE GAS	RO	140156	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	8,4/100	50/5	-	MV Switchgear 1M FREE GAS 24 kV 16 kA AFL IP3X C3H VT:8,4/100 kV/V CT:50/5 A/A GSCM004/101
GSCM004/102	1M	FREE GAS	IT	140336	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	8,4/100	400/5	-	MV Switchgear 1M FREE GAS 24 kV 16 kA AFL IP3X C3H VT:8,4/100 kV/V CT:400/5 A/A GSCM004/102
GSCM004/102	1M	SF6	IT	140037	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	8,4/100	400/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:8,4/100 kV/V CT:400/5 A/A GSCM004/102
GSCM004/102	1M	FREE GAS	RO	140157	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	8,4/100	400/5	-	MV Switchgear 1M FREE GAS 24 kV 16 kA AFL IP3X C3H VT:8,4/100 kV/V CT:400/5 A/A GSCM004/102
GSCM004/103	1M	FREE GAS	RO	140158	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	8,4/100	630/5	-	MV Switchgear 1M FREE GAS 24 kV 16 kA AFL IP3X C3H VT:8,4/100 kV/V CT:630/5 A/A GSCM004/103
GSCM004/103	1M	FREE GAS	IT	140337	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	8,4/100	630/5	-	MV Switchgear 1M FREE GAS 24 kV 16 kA AFL IP3X C3H VT:8,4/100 kV/V CT:630/5 A/A GSCM004/103
GSCM004/103	1M	SF6	IT	140036	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	8,4/100	630/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:8,4/100 kV/V CT:630/5 A/A GSCM004/103
GSCM004/104	1M	FREE GAS	IT	140347	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	22/100	50/5	-	MV Switchgear 1M FREE GAS 24 kV 16 kA AFL IP3X C3H VT:22/100 kV/V CT:50/5 A/A GSCM004/104
GSCM004/104	1M	SF6	IT	140035	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	22/100	50/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:22/100 kV/V CT:50/5 A/A GSCM004/104
GSCM004/105	1M	FREE GAS	IT	140348	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	22/100	400/5	-	MV Switchgear 1M FREE GAS 24 kV 16 kA AFL IP3X C3H VT:22/100 kV/V CT:400/5 A/A GSCM004/105
GSCM004/105	1M	SF6	IT	140034	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	22/100	400/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:22/100 kV/V CT:400/5 A/A GSCM004/105
GSCM004/106	1M	FREE GAS	IT	140349	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	22/100	630/5	-	MV Switchgear 1M FREE GAS 24 kV 16 kA AFL IP3X C3H VT:22/100 kV/V CT:630/5 A/A GSCM004/106
GSCM004/106	1M	SF6	IT	140033	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	22/100	630/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:22/100 kV/V CT:630/5 A/A GSCM004/106
GSCM004/107	1M	SF6	PE	140034	50 and 60	630	24	50	125	20	1	50 (and 52)	IK08	IP3X	M0 - E2	AFL	20; 1	C5H	Manual	YES	20-10/100	150-300/5	-	MV Switchgear 1M SF6 24 kV 20 kA AFL IP3X C5H VT:20-10/100 kV/V CT:150-300/5 A/A GSCM004/107
GSCM004/108	1M	FREE GAS	IT	140338	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	10/100	50/5	-	MV Switchgear 1M FREE GAS 24 kV 16 kA AFL IP3X C3H VT:10/100 kV/V CT:50/5 A/A GSCM004/108
GSCM004/108	1M	SF6	IT	140102	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	10/100	50/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:10/100 kV/V CT:50/5 A/A GSCM004/108


**Technical Specification code: GRI-GRI-MAT-E&C-0003**

Version no.1 dated 03/10/2022

**Subject:** Enel Grids - GSCM004 - Medium Voltage Gas Insulated Ring Main Unit for secondary distribution substations

**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

Business Line: Enel Grids

Type Code	Configuration	GIS technology	Distribution Company and Contry	Country Code	Rated frequency [Hz]	Rated normal current I <sub>r</sub> [A]	Rated Voltage U <sub>r</sub> [kV]	Rated power-frequency withstand voltage U <sub>d</sub> [kV]	Rated lightning impulse withstand voltage U <sub>p</sub> [kV]	Rated short-time withstand current I <sub>k</sub> [kA]	Rated duration of short circuit t <sub>k</sub> [s]	Rated peak withstand current I <sub>p</sub> [kA]	IK degree	IP degree	ES - Mechanical endurance class- Electrical endurance class	Classification IAC	Arc fault current and duration I <sub>a</sub> [kA]; t <sub>a</sub> [s]	Protective Coating	Command Type	Busbar Socket	Voltage Transformer [kV/V]	Current Transformer [A/A]	GSCT003 Type (refer to rev. 2)	Description
GSCM004/108	1M	SF6	RO	140032	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	10/100	50/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:10/100 kV/V CT:50/5 A/A GSCM004/108
GSCM004/108	1M	FREE GAS	RO	140159	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	10/100	50/5	-	MV Switchgear 1M FREE GAS 24 kV 16 kA AFL IP3X C3H VT:10/100 kV/V CT:50/5 A/A GSCM004/108
GSCM004/114	1M	SF6	RO	140038	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	6/100	50/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:6/100 kV/V CT:50/5 A/A GSCM004/114
GSCM004/115	1M	SF6	RO	140039	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	6/100	400/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:6/100 kV/V CT:400/5 A/A GSCM004/115
GSCM004/116	1M	SF6	RO	140040	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	6/100	630/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:6/100 kV/V CT:630/5 A/A GSCM004/116
GSCM004/117	1M	SF6	PE	140031	50 and 60	630	24	50	125	20	1	50 (and 52)	IK08	IP3X	M0 - E2	AFL	20; 1	C5H	Manual	YES	20-10/100	50/5	-	MV Switchgear 1M SF6 24 kV 20 kA AFL IP3X C5H VT:20-10/100 kV/V CT:50/5 A/A GSCM004/117
GSCM004/118	1M	SF6	PE	140030	50 and 60	630	24	50	125	20	1	50 (and 52)	IK08	IP3X	M0 - E2	AFL	20; 1	C5H	Manual	YES	20-10/100	450/5	-	MV Switchgear 1M SF6 24 kV 20 kA AFL IP3X C5H VT:20-10/100 kV/V CT:450/5 A/A GSCM004/118
GSCM004/119	1M	SF6	CO	140038	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	12/200	200/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:12/200 kV/V CT:200/5 A/A GSCM004/119
GSCM004/120	1M	SF6	CO	140060	50 and 60	630	36	70	170	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	34,5/200	100/5	-	MV Switchgear 1M SF6 36 kV 16 kA AFL IP3X C3H VT:34,5/200 kV/V CT:100/5 A/A GSCM004/120
GSCM004/122	1M	SF6	AR	0109-0506	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	13200/110	10/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:13200/110 kV/V CT:10/5 A/A GSCM004/122
GSCM004/123	1M	SF6	AR	0109-0507	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	13200/110	20/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:13200/110 kV/V CT:20/5 A/A GSCM004/123
GSCM004/124	1M	SF6	AR	0109-0508	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	13200/110	30/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:13200/110 kV/V CT:30/5 A/A GSCM004/124
GSCM004/125	1M	SF6	AR	0109-0509	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	13200/110	50/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:13200/110 kV/V CT:50/5 A/A GSCM004/125
GSCM004/126	1M	SF6	AR	0109-0510	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	13200/110	75/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:13200/110 kV/V CT:75/5 A/A GSCM004/126
GSCM004/127	1M	SF6	AR	0109-0511	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	13200/110	100/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:13200/110 kV/V CT:100/5 A/A GSCM004/127
GSCM004/128	1M	SF6	AR	0109-0512	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	13200/110	150/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:13200/110 kV/V CT:150/5 A/A GSCM004/128
GSCM004/129	1M	SF6	AR	0109-0513	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	13200/110	200/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:13200/110 kV/V CT:200/5 A/A GSCM004/129
GSCM004/130	1M	SF6	AR	0109-0514	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	13200/110	300/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:13200/110 kV/V CT:300/5 A/A GSCM004/130
GSCM004/131	1M	SF6	AR	0109-0515	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	13200/110	400/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:13200/110 kV/V CT:400/5 A/A GSCM004/131
GSCM004/132	1M	SF6	AR	0109-0516	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	13200/110	600/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:13200/110 kV/V CT:600/5 A/A GSCM004/132
GSCM004/133	1M	SF6	AR	0109-0517	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	13200/110	2000/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:13200/110 kV/V CT:2000/5 A/A GSCM004/133
GSCM004/163	1M	SF6	CL	140075	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	12V3/120V3	5-10/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:12V3/120V3 kV/V CT:5-10/5 A/A GSCM004/163
GSCM004/164	1M	SF6	CL	140076	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	12V3/120V3	10-15/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:12V3/120V3 kV/V CT:10-15/5 A/A GSCM004/164
GSCM004/165	1M	SF6	CL	140077	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	12V3/120V3	20-25/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:12V3/120V3 kV/V CT:20-25/5 A/A GSCM004/165
GSCM004/166	1M	SF6	CL	140078	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	12V3/120V3	40-50/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:12V3/120V3 kV/V CT:40-50/5 A/A GSCM004/166
GSCM004/167	1M	SF6	CL	140079	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	12V3/120V3	75-100/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:12V3/120V3 kV/V CT:75-100/5 A/A GSCM004/167
GSCM004/168	1M	SF6	CL	140080	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	12V3/120V3	150-200/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:12V3/120V3 kV/V CT:150-200/5 A/A GSCM004/168
GSCM004/169	1M	SF6	CL	140074	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	12V3/120V3	300-400/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:12V3/120V3 kV/V CT:300-400/5 A/A GSCM004/169
GSCM004/170	1M	SF6	CL	140081	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	12V3/120V3	600-800/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:12V3/120V3 kV/V CT:600-800/5 A/A GSCM004/170
GSCM004/171	1M	SF6	CL	140082	50 and 60	630	36	70	170	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	24V3/120V3	5-10/5	-	MV Switchgear 1M SF6 36 kV 16 kA AFL IP3X C3H VT:24V3/120V3 kV/V CT:5-10/5 A/A GSCM004/171
GSCM004/172	1M	SF6	CL	140083	50 and 60	630	36	70	170	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	24V3/120V3	10-15/5	-	MV Switchgear 1M SF6 36 kV 16 kA AFL IP3X C3H VT:24V3/120V3 kV/V CT:10-15/5 A/A GSCM004/172
GSCM004/173	1M	SF6	CL	140084	50 and 60	630	36	70	170	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	24V3/120V3	20-25/5	-	MV Switchgear 1M SF6 36 kV 16 kA AFL IP3X C3H VT:24V3/120V3 kV/V CT:20-25/5 A/A GSCM004/173


**Technical Specification code: GRI-GRI-MAT-E&C-0003**

Version no.1 dated 03/10/2022

**Subject:** Enel Grids - GSCM004 - Medium Voltage Gas Insulated Ring Main Unit for secondary distribution substations

**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

Business Line: Enel Grids

Type Code	Configuration	GIS technology	Distribution Company and Contry	Country Code	Rated frequency [Hz]	Rated normal current I <sub>r</sub> [A]	Rated Voltage U <sub>r</sub> [kV]	Rated power-frequency withstand voltage U <sub>d</sub> [kV]	Rated lightning impulse withstand voltage U <sub>p</sub> [kV]	Rated short-time withstand current I <sub>k</sub> [kA]	Rated duration of short circuit t <sub>k</sub> [s]	Rated peak withstand current I <sub>p</sub> [kA]	IK degree	IP degree	ES - Mechanical endurance class- Electrical endurance class	Classification IAC	Arc fault current and duration I <sub>a</sub> [kA]; t <sub>a</sub> [s]	Protective Coating	Command Type	Busbar Socket	Voltage Transformer [kV/V]	Current Transformer [A/A]	GSCT003 Type (refer to rev. 2)	Description
GSCM004/174	1M	SF6	CL	140085	50 and 60	630	36	70	170	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	24V3/120V3	40-50/5	-	MV Switchgear 1M SF6 36 kV 16 kA AFL IP3X C3H VT:24V3/120V3 kV/V CT:40-50/5 A/A GSCM004/174
GSCM004/175	1M	SF6	CL	140086	50 and 60	630	36	70	170	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	24V3/120V3	75-100/5	-	MV Switchgear 1M SF6 36 kV 16 kA AFL IP3X C3H VT:24V3/120V3 kV/V CT:75-100/5 A/A GSCM004/175
GSCM004/176	1M	SF6	CL	140087	50 and 60	630	36	70	170	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	24V3/120V3	150-200/5	-	MV Switchgear 1M SF6 36 kV 16 kA AFL IP3X C3H VT:24V3/120V3 kV/V CT:150-200/5 A/A GSCM004/176
GSCM004/177	1M	SF6	CL	140088	50 and 60	630	36	70	170	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	24V3/120V3	300-400/5	-	MV Switchgear 1M SF6 36 kV 16 kA AFL IP3X C3H VT:24V3/120V3 kV/V CT:300-400/5 A/A GSCM004/177
GSCM004/178	1M	SF6	CL	140089	50 and 60	630	36	70	170	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	24V3/120V3	600-800/5	-	MV Switchgear 1M SF6 36 kV 16 kA AFL IP3X C3H VT:24V3/120V3 kV/V CT:600-800/5 A/A GSCM004/178
GSCM004/209	1M	FREE GAS	IT	140350	50 and 60	630	36	70	170	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	23/100	50/5	-	MV Switchgear 1M FREE GAS 36 kV 16 kA AFL IP3X C3H VT:23/100 kV/V CT:50/5 A/A GSCM004/209
GSCM004/209	1M	SF6	IT	140192	50 and 60	630	36	70	170	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	23/100	50/5	-	MV Switchgear 1M SF6 36 kV 16 kA AFL IP3X C3H VT:23/100 kV/V CT:50/5 A/A GSCM004/209
GSCM004/210	1M	SF6	IT	140191	50 and 60	630	36	70	170	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	23/100	400/5	-	MV Switchgear 1M SF6 36 kV 16 kA AFL IP3X C3H VT:23/100 kV/V CT:400/5 A/A GSCM004/210
GSCM004/210	1M	FREE GAS	IT	140351	50 and 60	630	36	70	170	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	23/100	400/5	-	MV Switchgear 1M FREE GAS 36 kV 16 kA AFL IP3X C3H VT:23/100 kV/V CT:400/5 A/A GSCM004/210
GSCM004/211	1M	FREE GAS	IT	140352	50 and 60	630	36	70	170	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	23/100	630/5	-	MV Switchgear 1M FREE GAS 36 kV 16 kA AFL IP3X C3H VT:23/100 kV/V CT:630/5 A/A GSCM004/211
GSCM004/211	1M	SF6	IT	140420	50 and 60	630	36	70	170	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	23/100	630/5	-	MV Switchgear 1M SF6 36 kV 16 kA AFL IP3X C3H VT:23/100 kV/V CT:630/5 A/A GSCM004/211
GSCM004/213	1M	FREE GAS	RO	140160	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	10/100	400/5	-	MV Switchgear 1M FREE GAS 24 kV 16 kA AFL IP3X C3H VT:10/100 kV/V CT:400/5 A/A GSCM004/213
GSCM004/213	1M	FREE GAS	IT	140339	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	10/100	400/5	-	MV Switchgear 1M FREE GAS 24 kV 16 kA AFL IP3X C3H VT:10/100 kV/V CT:400/5 A/A GSCM004/213
GSCM004/213	1M	SF6	IT	140101	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	10/100	400/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:10/100 kV/V CT:400/5 A/A GSCM004/213
GSCM004/213	1M	SF6	RO	140033	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	10/100	400/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:10/100 kV/V CT:400/5 A/A GSCM004/213
GSCM004/214	1M	SF6	IT	140100	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	10/100	630/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:10/100 kV/V CT:630/5 A/A GSCM004/214
GSCM004/214	1M	FREE GAS	IT	140340	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	10/100	630/5	-	MV Switchgear 1M FREE GAS 24 kV 16 kA AFL IP3X C3H VT:10/100 kV/V CT:630/5 A/A GSCM004/214
GSCM004/214	1M	SF6	RO	140034	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	10/100	630/5	-	MV Switchgear 1M SF6 24 kV 16 kA AFL IP3X C3H VT:10/100 kV/V CT:630/5 A/A GSCM004/214
GSCM004/214	1M	FREE GAS	RO	140161	50 and 60	630	24	50	125	16	1	40 (and 41,6)	IK08	IP3X	M0 - E2	AFL	16; 1	C3H	Manual	YES	10/100	630/5	-	MV Switchgear 1M FREE GAS 24 kV 16 kA AFL IP3X C3H VT:10/100 kV/V CT:630/5 A/A GSCM004/214

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Version no.1 dated 03/10/2022

**Subject:** Enel Grids - GSCM004 - Medium Voltage Gas Insulated Ring  
Main Unit for secondary distribution substations**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

Business Line: Enel Grids

## 7.2 SERVICE CONDITIONS

Switchgears shall be compliant with normal service conditions for indoor installation, as defined in IEC 62271-1, considering as minimum value of ambient temperature  $-15^{\circ}\text{C}$

Maximum reference altitude shall be 1500 m. (For Colombia 2.700 m)

The Manufacturer shall consider de-ratings related to altitudes up to 3.000 m for specific installations, these de-rating shall be subjected to **enel** approval.

Seismic level of apparatuses shall be compliant with:

- seismic severity 1 - PGA 0,5 g.
- acceptance class 2 according to IEC TS 62271-210.

Switchgears shall be suitable for installation in three-phases MV effectively and non-effectively earthed neutral system (solidly earthed, isolated, impedance earthed, resonant earthed and arc-suppression-coil-earth neutral system).

Unless otherwise indicated, the carpentry shall have a protective coating compliant with ISO 12944 with the following minimum features:

Durability: High (H)

Atmospheric corrosivity category:C3.


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**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

Business Line: Enel Grids

## 7.3 TECHNICAL CHARACTERISTICS

### 7.3.1 Switchgear characteristics

The switchgear shall be compliant with IEC 62271-200.

The solution for the insulation of the switchgear shall be SF6 or alternative gases (e.g. Dry air, Gases containing fluoroketone or perfluoronitrile, etc.). For SF6 insulation gas the characteristics of the *Virgin* gas shall meet the requirements of IEC 60376 and the humidity content shall be less than 15 ppm in weight. In addition, no condensation shall occur during operation at the minimum temperatures described in §7.2.

For SF6 switchgear technology the gas-filled compartment volume shall be less than 1500 liters, its filling shall be performed such as the maximum relative pressure at 45 °C does not exceed 0,5 Bar. For SF6-free switchgear technology any solution is acceptable\*.

The expected operating life of the equipment, regarding leakage performance, shall be 40 years, the gas pressure shall remain greater than (or equal) the minimum operating value.

To fulfil the expected operating life requirement, the leakage rate considered to be 0,1 % per year according to IEC 62271-1.

The tank shall be exclusively filled with gas in the factory. The elements used for filling the gas in the factory, or to recover it at the end of life, shall be identified with a self-adhesive plate protected from accidental shocks. It shall contain the following information in the country language *Remove the cap only for recovery purposes at the end of life of the switchgear.*

Compact MV Switchgears, also known as Ring Main Unit (RMU), could be manufactured with a single gas insulated tank containing the busbars, switching devices, and interconnections or from modular functional units assembled along the busbars by means of coupling device.

When the RMU is built-on using modular *units*, the manufacturer shall ensure that transport, handling, and installation is equivalent to a Compact solution. In addition, the coupling device shall not be accessible, i.e. IP3X between modular units shall be ensured.

Each gas-filled compartment shall have an overpressure valve, equipped with a metallic disc for protection against accidental stress and placed at a suitable distance from the valve. The gas expulsion from the expansion valve shall be directed to the trench.

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Staff Function: -

Service Function: -

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MV Switchgears shall be built-on with external plug-in type bushings according to EN 50181, particularly:

- Circuit Breaker Functional Unit: Plug-in Type C bushings, 630 A rated current, equipped with Low Power Voltage Transformers (LPVT) and Low Power Current Transformers (LPCT) according to GSCT005.
- Transformer Functional Unit: Plug-in Type A bushings, 250 A rated current, for 24 kV switchgears and Type B for 36 kV Switchgears.
- Measurement Functional unit: Plug-in Type C bushings, 630 A rated current.
- Self-protected Transformer Functional unit: Plug-in Type A bushings, 250 A rated current for both internal and external connections.

Equipment using SF6 FREE GAS shall have the front of the electrical control in green (RAL code to be defined in agreement with Enel).


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**7.3.2 Rated characteristics**

Rated Voltage ( $U_r$ )	[kV]	24	36
Rated short-duration power-frequency withstand voltage ( $U_d$ ) – Common value	[kV]	50	70
Rated short-duration power-frequency withstand voltage ( $U_d$ ) – Across the isolating distance	[kV]	60	80
Rated lightning impulse withstand voltage ( $U_p$ ) – Common value	[kV]	125	170
Rated lightning impulse withstand voltage ( $U_p$ ) - Across the isolating distance	[kV]	145	195
Rated frequency ( $f_r$ ) (*)	[Hz]	50 and 60	
Rated normal current ( $I_r$ )			
- for busbars and lines	[A]	630	
- for transformer derivation	[A]	200	
Rated short-time withstand current ( $I_k$ )	[kA]	16/20	
Rated peak withstand current ( $I_p$ )	[kA]	41,6/52	
Rated duration of short-circuit ( $t_k$ )	[s]	1	
Degree of protection for the whole enclosure except for the operating devices:			
- Argentina			IP3X**
- Italy			
- Romania			
- Spain			
- Brazil			
- Chile			
- Colombia			
- Peru			
Degree of protection for the operating devices (even with the operating lever inserted)			IP2XC
Degree of protection of the external part of the switchgear			IK08
Internal arc test	Type of accessibility		AFL
	Rated arc fault current ( $I_A$ )	[kA]	16/20
	Rated arc fault duration ( $t_A$ )	[s]	1
Rated supply voltage of closing and opening devices and of auxiliary circuit	[Vcc]	24V -15% +20%	
Expected operating life regarding leakage performance		40 years	

**Table 2- Characteristics of the switchgear**

(\*) The range of rated frequencies can vary according to the National Regulations and shall not affect the proper behavior of the equipment.

(\*\*) For Special applications in sandy areas nearby the coast IP51 could be required.

**Application Areas**

Perimeter: Global

Staff Function: -

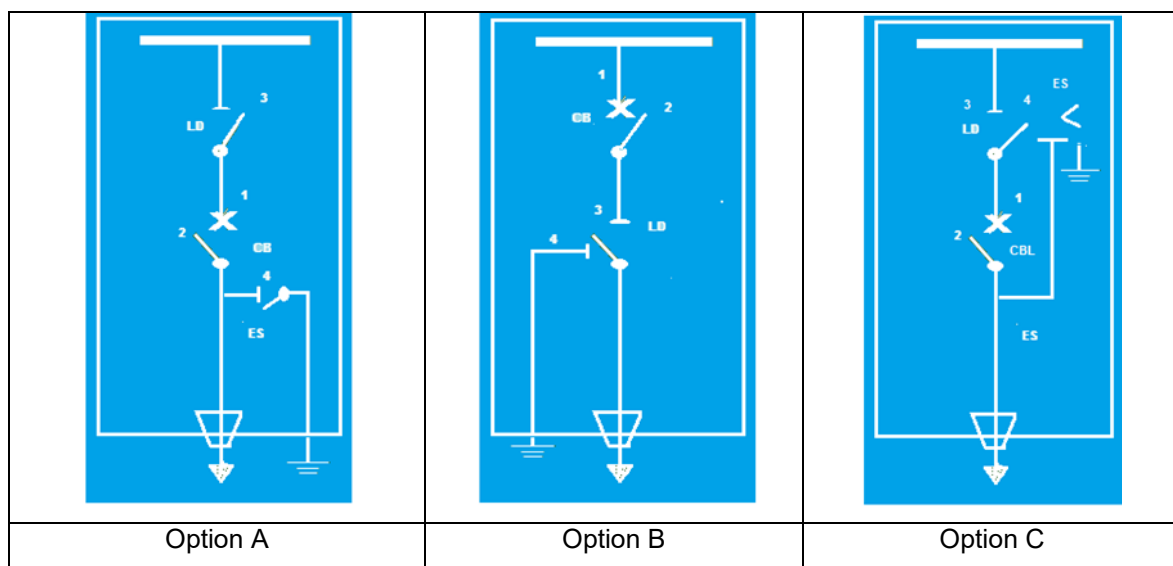
Service Function: -

Business Line: Enel Grids

### 7.3.3 Functional Unit Schemes

In Figure 1 the options for each functional unit are depicted.

#### CBL – CIRCUIT BREAKER FUNCTIONAL UNIT



**Figure 1– Circuit Breaker Functional unit single line diagrams**

OPTION A: Configuration with:

- 2 Position Circuit breaker (OPEN – CLOSED)
- 2 Position Line - Disconnecter (OPEN – CLOSED)
- 2 Position earthing switch (OPEN – EARTHED)

OPTION B: Configuration with:

- 2 Position Circuit breaker (OPEN – CLOSED)
- 3 Position Line – Disconnecter and earthing switch (CLOSED – OPEN – EARTHED).

OPTION C: Configuration with:

- 2 Position Circuit breaker (OPEN – CLOSED)
- 3 Position Line – Disconnecter and earthing switch (CLOSED – OPEN – EARTHED).

Further single line diagrams could be proposed and implemented after Enel technical department approval.



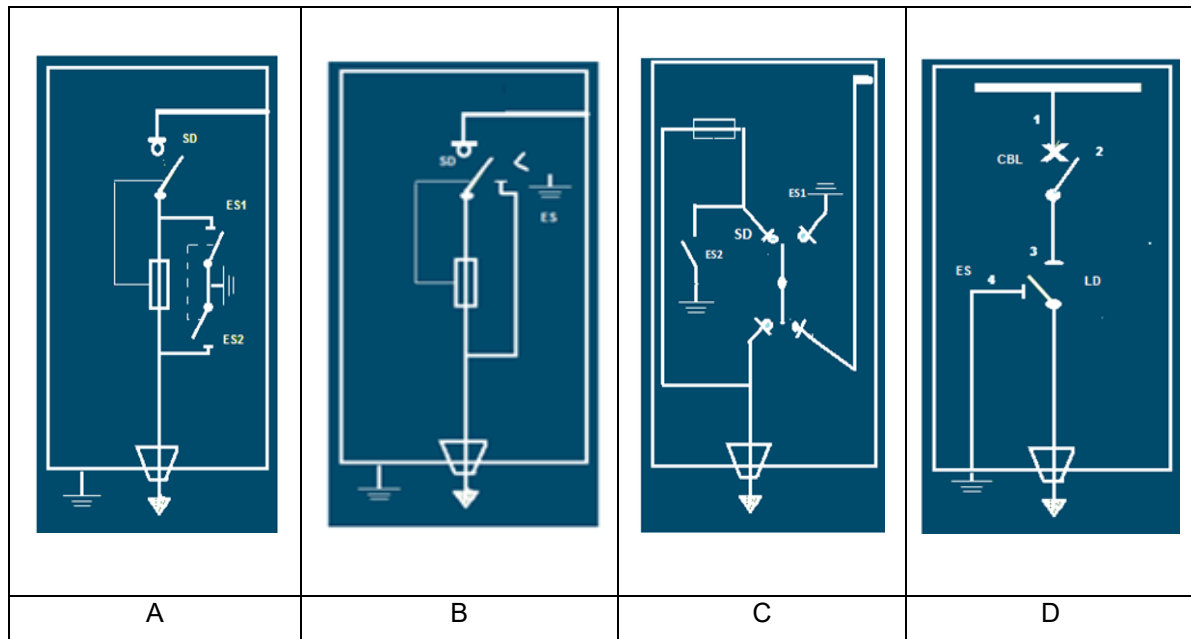
**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

Business Line: Enel Grids

**T - TRANSFORMER PROTECTION FUNCTIONAL UNIT**

**Figure 2– Transformer Protection Functional unit single line diagrams**

OPTION A/B : Configuration with:

- 1 Switch-disconnector with 2 position (OPEN – CLOSED)
- 2 Earthing switches (ES1/ES2) with 2 positions (OPEN – EARTHED)

OPTION B/C: Configuration with

- 1 Switch-disconnector / Earthing switch (ES) with 3 positions (EARTHED - OPEN – CLOSED)

OPTION D: Configuration with

- Vacuum circuit-breaker (CBL) 2 position (CLOSED - OPEN)
- 3 position line-disconnector and earthing switch (CLOSED - OPEN – EARTHED)

Further single line diagrams could be proposed and implemented after Enel technical department approval.

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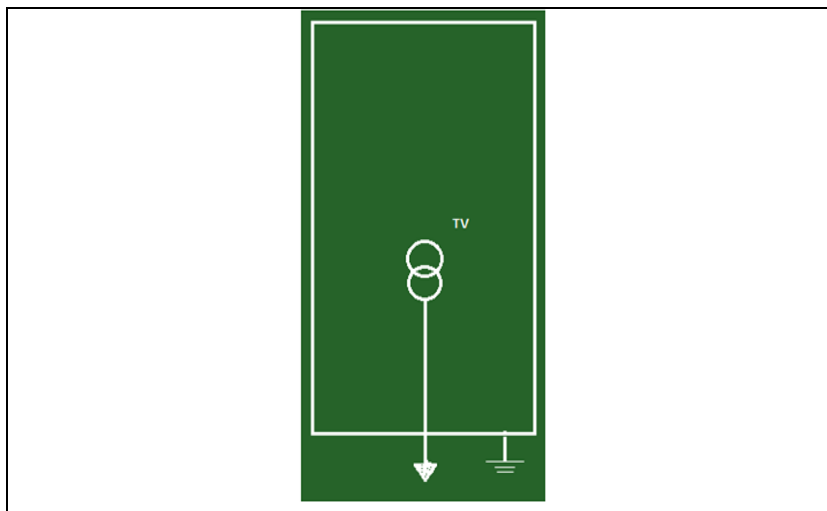
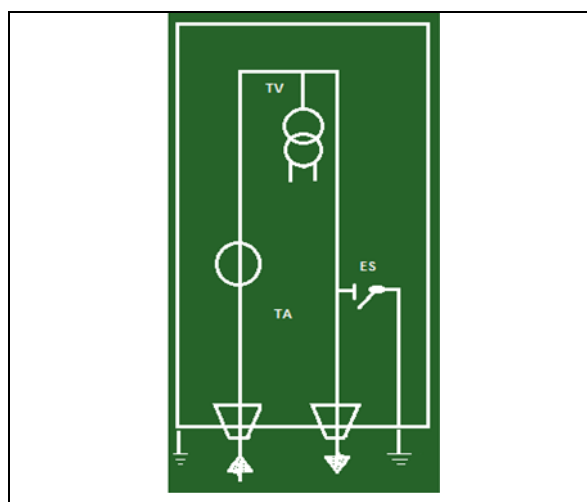
**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

Business Line: Enel Grids

**AT - SELF-PROTECTED TRANSFORMER FUNCTIONAL UNIT**

**Figure 3– Self-protected transformer functional unit**
**M - MEASUREMENT FUNCTIONAL UNIT**

**Figure 4– Measurement Functional Unit**

Configuration with:

- Current Transformer
- Voltage Transformer
- 1 earthing switch (OPEN – EARTHED)


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**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

Business Line: Enel Grids

### 7.3.4 Circuit Breaker Functional Unit (CBL)

The three-pole circuit breaker, switch-disconnector and earthing switch shall comply with IEC 62271-100 IEC 62271-103 and IEC 62271-102 respectively.

The movement of the power contacts of the circuit breaker shall be carried out by means of mechanical transmissions, the switching energy supplied by an accumulation device mechanical type (spring command). A complete system shall be provided for the recovery of the energy storage of the circuit breaker in the absence of auxiliary voltage.

Alternative construction solutions for the energy storage device are subject to Enel approval, without prejudice to compliance with all the requirements functionalities indicated herein.

#### 7.3.4.1 Operating Cycles

- a) With functioning motor:
  - O – 0,3 s – CO – 15 s – CO starting by condition of circuit breaker closed and springs of closing charged.
- b) With non-functioning motor:
  - O– 0,3 s – CO starting by condition of circuit breaker closed and springs of closing charged.
  - CO starting by condition of circuit breaker open and springs of closure charged.
  - O, starting by condition of circuit breaker closed and springs of closure not charged.

When the circuit breaker is closed, the opening springs shall always be charged.

If during an operation appears the request to perform an opposite operation, the consensus to the implementation of the latter shall be given after the completion of the operation in course. The operating conditions of the releases are indicated in the IEC 62271-1.

The MV circuit-breaker shall be equipped with a three-pole control equipped with the following circuits and devices:

- shunt release three-pole closing device.
- shunt release three-pole opening device.
- anti-pumping device with the scope of inhibiting further closures after the first operation, in case there is an opening command during the initial request of closing. This device cannot be deactivated by functional inhibitions.


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**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

Business Line: Enel Grids

Circuits and/or devices shall be provided to inhibit the closing command when at least one of the following events occurs:

- insufficient energy for the closing operation (springs discharged);
- command and/or opening maneuver in progress.

Without the power supply to the motor circuit the motorization circuit shall not absorb any current when it is in the stand-by state.

**7.3.4.2 Rated characteristics**

Circuit Breaker			
Rated Voltage ( $U_r$ )		[kV]	24      36
Rated lightning impulse withstand voltage ( $U_p$ )		[kV]	125      170
Rated normal current ( $I_r$ )		[A]	630
Rated operating sequence CB for rapid auto-reclosing		O – 0,3'' – CO – 15'' – CO	
Break-time		[ms]	≤ 80
Rated first-pole-to-clear factor ( $k_{pp}$ )		1,3 and 1,5	
Rated short circuit breaking current ( $I_{sc}$ )		[kA]	16/20
Circuit Breaker Class		S1	
Mechanical Endurance class		M2	
Electrical Endurance class		E2 (List 1 IEC 62271-100)	
Probability of restrike during capacitive current breaking class		C2	
Rated breaking current	Rated line charging breaking current ( $I_l$ )	[A]	10
	Rated cable-charging breaking current ( $I_c$ )	[A]	31,5
	Rated out-of-phase making and breaking current	[kA]	4/5

**Table 3- Characteristics of the Circuit breaker for Circuit breaker Functional Unit**


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Staff Function: -

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<b>Line-Disconnecter</b>			
Rated Voltage ( $U_r$ )	[kV]	24	36
Rated Frequency ( $f_r$ )	[Hz]	50 and 60	
Rated power-frequency withstand voltage ( $U_d$ ) Common value	[kV]	50	70
Rated power-frequency withstand voltage ( $U_d$ ) Across the isolating distance	[kV]	60	80
Rated lightning impulse withstand voltage ( $U_p$ ) Common value	[kV]	125	170
Rated lightning impulse withstand voltage ( $U_p$ ) Across the isolating distance	[kV]	145	190
Rated normal current ( $I_r$ )	[A]	630	
Rated short-time withstand current ( $I_k$ )	[kA]	16/20	
Rated duration of short circuit ( $t_k$ )	[s]	1	
Rated peak withstand current ( $I_p$ )	[kA]	41,6/52	
Mechanical endurance class		M1	

**Table 4- Characteristics of the line-disconnector for Circuit breaker Functional Unit**

<b>Earthing Switch</b>			
Rated Voltage ( $U_r$ )	[kV]	24	36
Rated Frequency ( $f_r$ )	[Hz]	50 and 60	
Rated power-frequency withstand voltage ( $U_d$ )	[kV]	50	70
Rated lightning impulse withstand voltage ( $U_p$ )	[kV]	125	170
Rated short-time withstand current ( $I_k$ ) and rated establishment short circuit current ( $I_{ma}$ )	[kA]	16/20	
Rated duration of short circuit ( $t_k$ )	[s]	1	
Rated peak withstand current ( $I_p$ )	[kA]	41,6/52	
Mechanical endurance class		M0	
Electrical endurance class		E2	

**Table 5- Characteristics of the earthing switch for Circuit breaker Functional Unit**

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Main Unit for secondary distribution substations

**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

Business Line: Enel Grids

### 7.3.4.3 Circuit breaker functional unit front panel

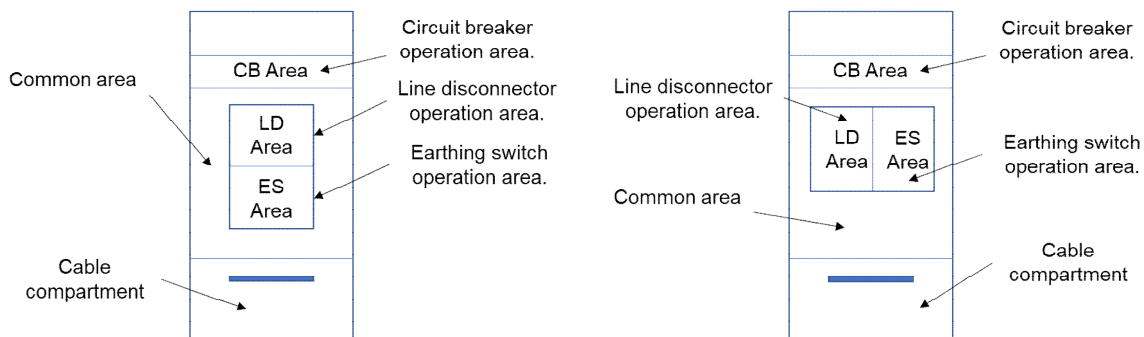
The elements displayed on the front panel of the line unit shall be such as to make them easily visible, readable, and accessible.

The front panel is divided in four areas:

- Circuit breaker operation area.
- Line disconnector operation area.
- Earthing switch operation area.
- Common area.

If the operation of the switchgear is vertically oriented, the order of the areas shall be, from top to bottom:  
Line-disconnector operation area → Earthing switch operation area.

If the operation of the switchgear is horizontally oriented, the order of the areas shall be, from left to right: Line-disconnector operation area → Earthing switch operation area.



**Figure 5– Disposition of areas in the front panel Circuit Breaker Functional Unit**


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Main Unit for secondary distribution substations

**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

Business Line: Enel Grids

**a) Circuit Breaker operation area.**

The following devices shall be provided:

Two electric opening and closing buttons and two mechanical opening and closing buttons (total 4 buttons) for operating the Circuit Breaker. Unless otherwise indicated, the opening buttons shall be green, while the closing buttons shall be red, with the word indicating "OPEN" and "CLOSE" in the country language according to following tab. All the buttons shall be protected against accidental pressure and provided with a plate indicating the function performed.

Language	OPEN	CLOSE
Italian	APRE	CHIUDE
Spanish	ABRIR	CERRAR
Portuguese	ABRIR	FECHAR
Romanian	DESCHIDE	INCHIDE

**Table 6– Function of the operation in country languages.**

- A manual device for restoring switching energy with the sense of operation indicated the front side. To guarantee the safety of the operator, this device shall prevent the return of energy through the engine or the spring, loading lever shall not be dragged by the electric motor.
- The status indication of the circuit breaker. The device used shall be mechanically interconnected with the mobile power contacts and the relative position shall be displayed using the symbols indicated in Figure 6.

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Colombia	 <ul style="list-style-type: none"> <li>• black "O" letter on red background corresponding to the close position of the circuit-breaker.</li> <li>• black "I" letter on green background corresponding to the open position of the circuit-breaker.</li> </ul>
Brazil	 <ul style="list-style-type: none"> <li>• White "L" letter on red background corresponding to the close position of the circuit-breaker.</li> <li>• White "D" letter on green background corresponding to the open position of the circuit-breaker.</li> </ul>
All	 <ul style="list-style-type: none"> <li>• black "I" letter on red background corresponding to the close position of the circuit-breaker.</li> <li>• black "O" letter on green background corresponding to the open position of the circuit-breaker.</li> </ul>

**Figure 6– Circuit Breaker Status indicator**

- The Display of the signal state of the energy store device according to Figure 7. Orange color shall be used for charged spring and white color for discharged spring.


**Figure 7– Energy Storage device status**
**b) Lines Disconnecter operation area**

The background of the line-disconnector operation area shall be colored according to the RAL 5022-F2.

The line-disconnector operation area is composed of the following elements:

- point for the operation of line-disconnector, with indication of the operating directions in local language. The operating directions, according to IEC 60447, shall be displayed using the following colors:
  - Red 3000 RAL-F2 color corresponding to the close direction of the switch-disconnector.



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Service Function: -

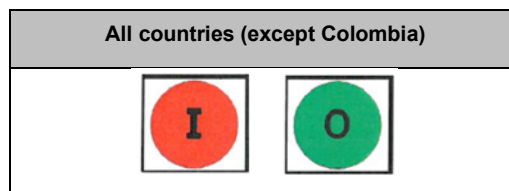
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- Green 6017 RAL-F2 corresponding to the open direction of the switch-disconnector.



**Figure 8– Point for the operation of switch-disconnector in line functional unit**

- Indicator showing the position of the line-disconnector. The indicator shall be mechanically interconnected with the mobile power contacts and the position shall be displayed using the following symbols:
  - Black "I" letter on red background 3000 RAL-F2 corresponding to the closed position of the line-disconnector.
  - Black "O" letter on green background 6017 RAL-F2 corresponding to the open position of the line-disconnector.



**Figure 9- Indicator for the position of the line-disconnector in line functional unit**

For Colombia, the position shall be displayed using the following symbols:

- Black "I" letter on green background 6017 RAL-F2 corresponding to the closed position of the line-disconnector.
- Black "O" letter on red background 3000 RAL-F2 corresponding to the open position of the line-disconnector.

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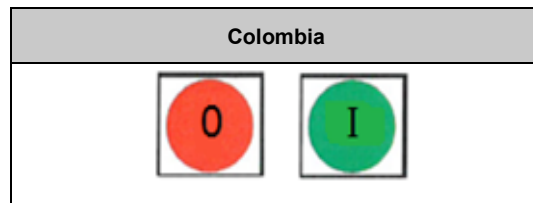
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**Figure 10- Indicator for the position of the line-disconnector in line unit (Colombia)**

The indicators shall be visible even with the front panel removed.

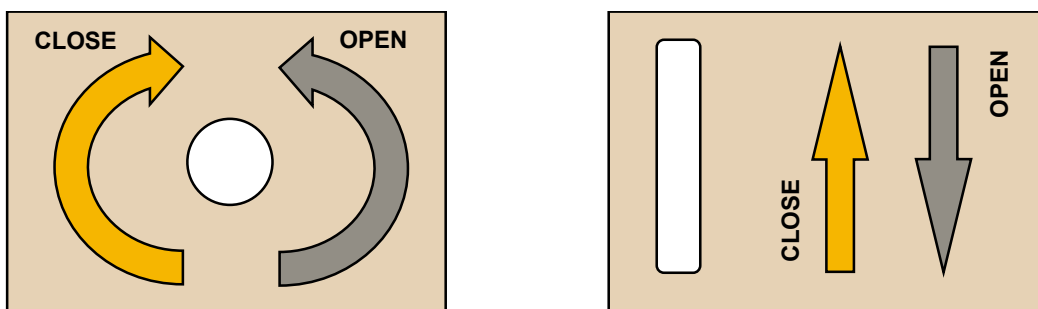
The indicators shall be protected by a transparent window that prevents the entry of external objects to prevent its indication from being altered by external manipulation.

**c) Earthing switch operation area**

The background of the earthing switch area shall be colored according to RAL 1015-F2.

The earthing switch operation area is composed of the following elements:

- Point for operation of the earthing switch, with indication of the operating directions in local language. The operating directions, according to IEC 60447, shall be displayed using the following colors:
  - yellow color 1021 RAL-F2 corresponding to the close direction of the earthing switch.
  - gray color 7030 RAL-F2 corresponding to the open direction of the earthing switch.



**Figure 11– Point for the operation of earthing switch in line functional unit**

- Indicator showing the position of the earthing switch. The indicator shall be mechanically interconnected with the mobile power contacts and the position shall be displayed using the following symbols:

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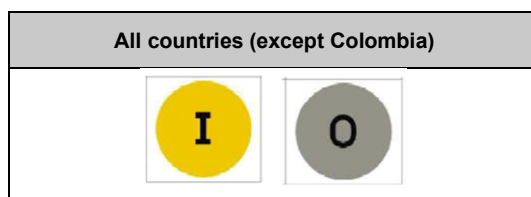
Perimeter: Global

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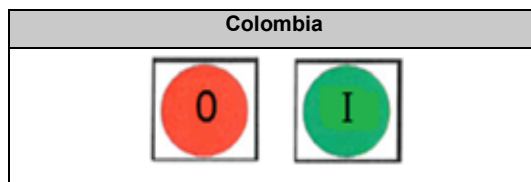
- black "I" letter on yellow background 1021 RAL-F2 corresponding to the closed position of the earthing switch.
- black "O" letter on gray background 7030 RAL-F2 corresponding to the open position of the earthing switch.



**Figure 12- Indicator for the position of the earthing switch in line functional unit**

For Colombia, the position shall be displayed using the following symbols:

- black "I" letter on green background 6017 RAL-F2 corresponding to the closed position of the switch-disconnector.
- black "O" letter on red background 3000 RAL-F2 corresponding to the open position of the switch-disconnector.



**Figure 13- Indicator for the position of the earthing switch in line functional unit (Colombia)**

The indicators shall be visible even with the front panel removed.

The indicators shall be protected by a transparent window that prevents the entry of foreign objects to prevent its indication from being altered by external manipulation.

**d) Common area**

The common area of the front panel is the part of the front panel that contains the elements defined in the circuit breaker operation area, line-disconnector operation area and the earthing switch operation area.

Besides, the following elements shall be provided in such area:

- Voltage detection system (VDS), according to §7.3.12

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- 
- Manometer, if necessary, according to §7.3.8
  - Rating plate according to §7.3.19.1. The rating plate can be attached to any functional unit.
  - Operating sequence nameplate, according to §7.3.19.2
  - Synoptic scheme, according to §7.3.3
  - Label holder, according to §7.3.19.4
  - Switch to enable/disable the motorized electrical operation (both from local buttons and from remote control). The switch shall be lockable and will allow the insertion of a padlock with a shackle up to 6 mm in diameter. The lockable point shall be signalized by a “padlock” symbol. The switch shall have a nameplate indicating its function in the language that corresponds to the Country in which the switchgear will be delivered. In addition, next to the switch, there will be the indications O Off (motor disabled) and I ON (motor enabled).



**Figure 14- Example of switch to enable/disable the electrical operation in line functional unit**


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#### 7.3.4.4 Interlocking

The sequence of operations for putting in service the equipment, irrespective of the possible constructive solutions, shall be:

- opening of the ES earthing switch.
- closing of the LD line disconnecter.
- closing of the CB circuit breaker.

Interlocking and operating directions shall comply with the IEC 62271-200.

The sequence of operations for putting out of service the line shall be the reverse.

The following interlocks, regardless the possible constructive solution, shall be provided:

1. The line disconnecter can be operated only with circuit-breaker in open position; this condition shall be realized by a mechanical interlock.
2. The earthing switch can be closed only with line disconnecter in open position; this condition shall be realized with a mechanical interlock.
3. The line-disconnecter can be closed only with earthing switch in open position; this condition shall be realized with a mechanical interlock.
4. The circuit breaker can be operated electrically and mechanically with the lever not inserted engaged at any point of operation:
  - with the line disconnecter (LD) in the closed position and the earthing switch (ES) in the open position.
  - Interlocking shall be carried out both electrically with an interruption of the electrical controls of the switch (by means of limit switches) and mechanically.
5. The cable compartment access panel shall be removed only in safe conditions, with the earthing switch closed; this condition must be achieved with a mechanical interlock.
6. The earthing switch ES can be opened only with access panel of the cable compartment closed. The access panel of the cable compartment shall be removed only in safe conditions, with the line-disconnecter open and earthing switch closed; this condition must be achieved with mechanical interlock.

Additional connections or interlocks must not be introduced.

In normal conditions, during maneuvering there shall not occur interference nor obstruction or interruption.

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The switchboard contacts must remain in a position where they can retain their functionality; if there are obstructions, it must be verified that they cannot be removed, except intentionally and with special tools defined and provided by the manufacturer.

With the access panel of the cable compartment removed, it shall not be possible to carry out operations. The interlock of the opening of the earthing switch, once removed, shall return to its initial position when the earthing switch has been opened. Always with the panel of the cable compartment removed, it shall not be possible, without the special tools, to remove the interlocks of the earthing switch and, if the interlocks are removed, it shall not be possible to replace the panel until the earthing switch is closed.

Two points shall be provided where a padlock can be inserted to lock the operation of the line-disconnector and of the earthing switch, in both open and closed positions.

For the complete list of interlocks functionalities see §7.6


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### 7.3.5 Transformer Protection Functional Unit (T)

The manual switch-disconnector (SD) combined with fuses, for the MV / LV transformer protection, shall comply with IEC 62271-105 and IEC 62271-103

#### 7.3.5.1 Rated characteristics

Switch-disconnector			
Rated Voltage ( $U_r$ )	[kV]	24	36
Rated normal current ( $I_r$ )	[A]	200	
Rated short-time withstand current ( $I_k$ )	[kA]	16/20	
Rated peak withstand current ( $I_p$ )	[kA]	41,6 / 52	
Rated duration of short-circuit ( $t_k$ )	[s]	1	
Mechanical endurance class	M1		
Electrical endurance class	E3		
Transfer Current ( $TD_{transfer}$ )	A	800	
Earthing switches ES1 or ES (see Error. L'origine riferimento non è stata trovata.)			
Rated short-time withstand current ( $I_k$ ) and Rated establishment short circuit current ( $I_{ma}$ )	[kA]	16/20	
Rated peak withstand current ( $I_p$ )	[kA]	41,6 / 52	
Rated duration of short-circuit ( $t_k$ )	[s]	1	
Mechanical endurance class	M0		
Electrical endurance class	E2		
Earthing switch ES2 (see Error. L'origine riferimento non è stata trovata.)			
Rated short-time withstand current ( $I_k$ ) and Rated establishment short circuit current ( $I_{ma}$ )	[kA]	1	
Rated peak withstand current ( $I_p$ )	[kA]	2,5	
Rated duration of short-circuit ( $t_k$ )	[s]	1	
Mechanical endurance class	M0		
Electrical endurance class	E2		

**Table 7- Characteristics of the switch–disconnector and earthing switches in transformer protection functional unit**

To show the open position of the switch-disconnector, a micro-switch shall be provided. This micro-switch shall be put inside the operating device protective shell and shall be able to switch small currents.

This micro-switch shall be connected to a 2x1.5 mm<sup>2</sup> LV cable with a length of 8 m that protrudes from the switchgear. This cable should be correspondingly identified.

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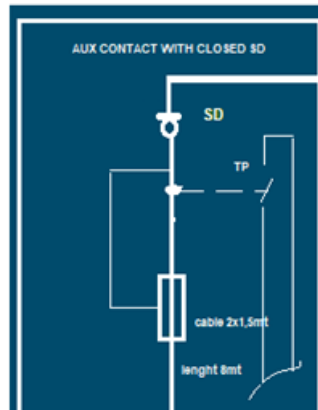
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Staff Function: -

Service Function: -

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**Figure 15 - wiring LV diagram between T and UP cells**

The connection must have a faston with cable end sleeves as shown in Figure 16.



**Figure 16– Faston with cable end sleeves**

### 7.3.5.2 Transformer protection functional unit front panel

The elements displayed on the front panel of the transformer protection functional unit shall be such as to make them easily visible, readable, and accessible.

The front panel is divided in three areas:

- Switch-disconnector operation area.
- Earthing switch operation area.
- Common area.

All three areas shall be the same vertical than the related cable compartment.

If the operation of the switchgear is vertically oriented, the order of the areas shall be, from top to bottom:  
Switch-disconnector operation area → Earthing switch operation area.

If the operation of the switchgear is horizontally oriented, the order of the areas shall be, from left to right:  
Switch-disconnector operation area → Earthing switch operation area.



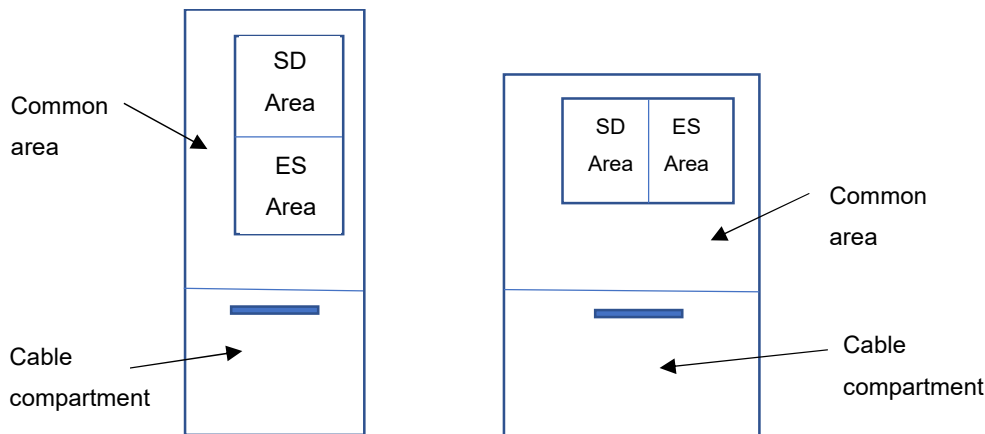
**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

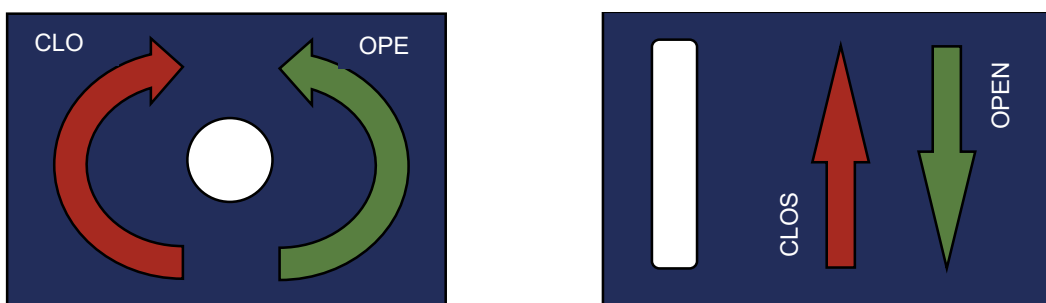
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**Figure 17- Disposition of areas in the front panel in line unit**
**a) Switch-disconnector operation area.**

The background of the switch-disconnector area shall be colored according to the RAL 5022-F2.

The switch-disconnector operation area is composed of the following elements:

- point for the operation of switch-disconnector/spring charger, with indication of the operating directions in local language. The operating directions, according to IEC 60447, shall be displayed using the following colors:
  - Red 3000 RAL-F2 color corresponding to the close direction of the switch-disconnector.
  - Green 6017 RAL-F2 corresponding to the open direction of the switch-disconnector.


**Figure 18- Point for the operation of switch-disconnector in line functional unit**

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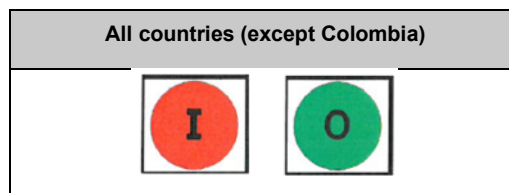
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The opening of the switch-disconnector by means of release spring energy device is also accepted.

Other alternative operation solutions based on buttons could be considered subject to Enel approval.

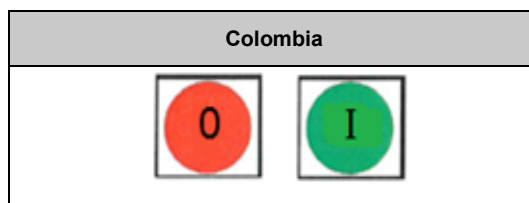
- Indicator showing the position of the switch-disconnector. The indicator shall be mechanically interconnected with the mobile power contacts and the position shall be displayed using the following symbols:
  - Black "I" letter on red background 3000 RAL-F2 corresponding to the closed position of the switch-disconnector.
  - Black "O" letter on green background 6017 RAL-F2 corresponding to the open position of the switch-disconnector.



**Figure 19- Indicator for the position of the switch-disconnector in line functional unit**

For Colombia, the position shall be displayed using the following symbols:

- Black "I" letter on green background 6017 RAL-F2 corresponding to the closed position of the switch-disconnector.
- Black "O" letter on red background 3000 RAL-F2 corresponding to the open position of the switch-disconnector.



**Figure 20- Indicator for the position of the switch-disconnector in line unit (Colombia)**

The indicators shall be visible even with the front panel removed.

The indicators shall be protected by a transparent window that prevents the entry of external objects to prevent its indication from being altered by external manipulation.

**b) Earthing switch operation area**

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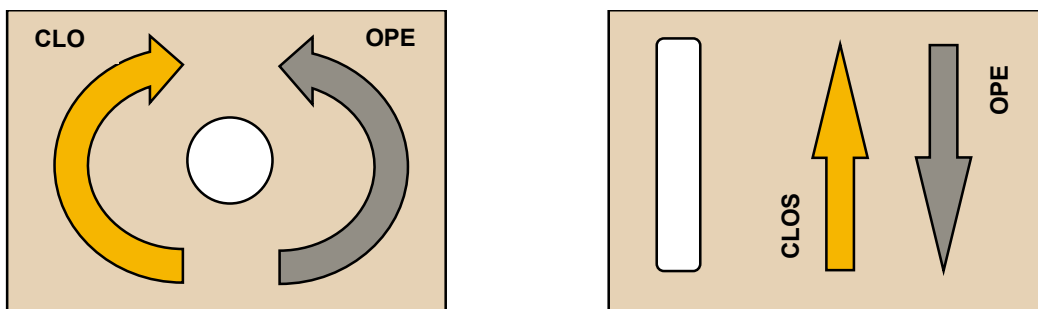
Service Function: -

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The background of the earthing switch area shall be colored according to RAL 1015-F2.

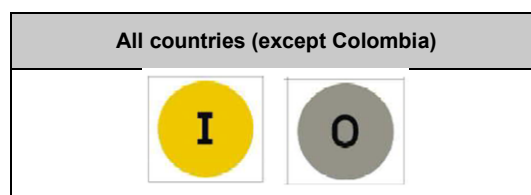
The earthing switch operation area is composed of the following elements:

- Point for operation of the earthing switch, with indication of the operating directions in local language. The operating directions, according to IEC 60447, shall be displayed using the following colors:
  - yellow color 1021 RAL-F2 corresponding to the close direction of the earthing switch.
  - gray color 7030 RAL-F2 corresponding to the open direction of the earthing switch.



**Figure 21– Point for the operation of earthing switch in line functional unit**

- Indicator showing the position of the earthing switch. The indicator shall be mechanically interconnected with the mobile power contacts and the position shall be displayed using the following symbols:
  - black "I" letter on yellow background 1021 RAL-F2 corresponding to the closed position of the earthing switch.
  - black "O" letter on gray background 7030 RAL-F2 corresponding to the open position of the earthing switch.



**Figure 22- Indicator for the position of the earthing switch in line functional unit**

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Perimeter: Global

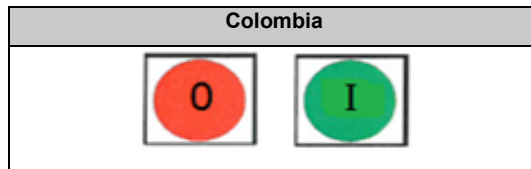
Staff Function: -

Service Function: -

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For Colombia, the position shall be displayed using the following symbols:

- black "I" letter on green background 6017 RAL-F2 corresponding to the closed position of the switch-disconnector.
- black "O" letter on red background 3000 RAL-F2 corresponding to the open position of the switch-disconnector.



**Figure 23- Indicator for the position of the earthing switch in line functional unit (Colombia)**

The indicators shall be visible even with the front panel removed.

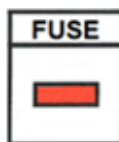
The indicators shall be protected by a transparent window that prevents the entry of foreign objects to prevent its indication from being altered by external manipulation.

**c) Common area**

The common area of the front panel is the part of the front panel that contains the elements defined in the switch-disconnector area and the earthing-switch area.

In the common area are located the following elements:

- Fuse status indicator, with the following symbols:
  - Green indicator: Meaning all the fuses are ok
  - Red Indicator: Meaning one or more fuses blew.



**Figure 24- Example of indicator showing one or more blew fuses**

The fuse indicator shall be protected by a transparent window that prevents the entry of foreign objects to prevent its indication from being altered by external manipulation.

- Voltage detection system (VDS), according to §7.3.12
- Manometer, if necessary, according to §7.3.8.


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- Rating plate according to §7.3.19.1
- Operating sequence nameplate, according to §7.3.19.2
- Synoptic scheme, according to §7.3.3
- Label holder, according to chapter §7.3.19.4

### 7.3.5.3 Interlocking

The sequence of operations to close the transformer output feeder shall be:

1. Opening of the earthing switches.
2. Closing the switch-disconnector.

The sequence of operations to open the transformer output feeder (safe condition) shall be:

1. Opening of the switch-disconnector.
2. Closing the earthing switches.

It will only be possible to operate the switch-disconnector when the earthing switches are in the open position and with the access door of the cable compartment and the transformer fuse compartment closed.

It will only be possible to operate the earthing switches when the switch-disconnector is in the open position and with the access door of the cable compartment and the transformer fuse compartment closed.

The switch-disconnector and the earthing switches shall not be concurrently closed.

Two points shall be provided where a padlock can be inserted to lock the operation of the switch-disconnector and of the earthing switches in an independent way, in both open and closed positions. They will allow the insertion of a padlock with a shackle up to 6 mm in diameter. These points should be signaled by a "padlock" symbol.

The access door of the cable compartment and the transformer fuse compartment shall be removed only in safe condition, with the switch-disconnector open and earthing switches closed. This condition shall be achieved with a mechanical interlock.

When the switch-disconnector is opened for fuse tripping, the switch-disconnector shall be ready to do the spring charging and the closing operation in one single maneuver, without intermediate operations

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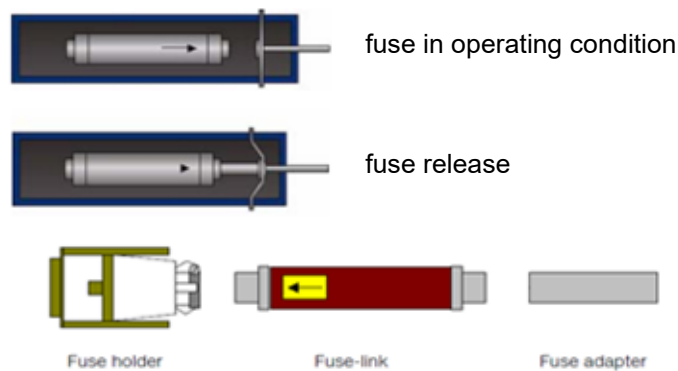
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Melting of one or more fuses shall cause the opening of the switch-disconnector.

For the complete list of interlocks functionalities see §7.6

#### 7.3.5.4 Fuse-carrier and fuses

The fuse-carrier is composed by a container made of insulating material having an appropriate closing device that ensures the protection against dust pollutants with a degree of protection IP4X.



**Figure 25– Fuse and operation scheme**

The MV fuse holder, which shall be protected by a metal compartment, can be installed inside the cable compartment or outside the gas-filled compartment.

The opening of the fuse-holder shall always happen at a pressure which is not dangerous for the operator. The opening of the fuse-holder shall be made in two steps, one step that breaks the tightness and releases any possible overpressure, keeping the fuse mechanically attached to the switchgear, and a second step that releases the fuse and allows its complete extraction.

The fuse-carrier shall have dimensions that are suitable to the use of fuses with maximum rated voltage of 12 kV, 17.5 kV, 24 kV and 36 kV. In case of fuses with a rated voltage other than 24 kV or 36 kV, an appropriate adapter shall be provided.

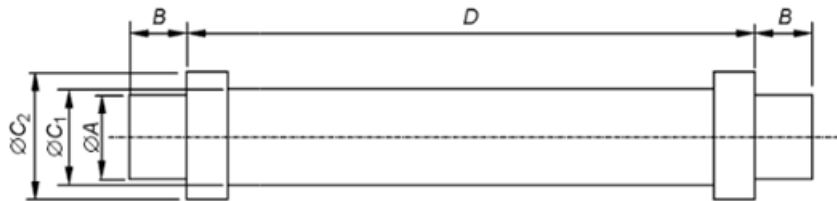
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**Figure 26– Fuse-link dimensions**

The striker shall be on the center-line of the fuse-link.

V	ØA	B	ØC <sub>2</sub> min.	ØC <sub>1</sub> and C <sub>2</sub> max.	D <sub>-1</sub> <sup>0</sup>
7,2 12 17,5 24 36	45 ± 1	33 <sup>+2</sup> <sub>0</sub>	50	88	192 292 367 442 537

**Table 8- Dimensions of fuses**

Dimensions in millimeters

The removal and replacement of fuses shall be made without using any tools, insulating greases or similar products.

Guide discs or similar accessories independent of the fuse container are not allowed. Any guide discs shall be fixed to the fuse tube itself.

The kinematics of the fuse-carrier, where the striker acts for the opening of the switch-disconnector, shall be made to be operated independently from the striker's diameter and, in any case, up to a maximum of 20 mm and should be compatible with medium type strikers described in IEC 60282-1.

The fuse holder contacts shall be spring-loaded silver plated or nickel plated.

The maximum rated current of the fuses shall be 100 A for 24 kV and 63 A for 36 kV.

#### 7.3.5.5 Circuit breaker (for solution without fuses)

If a vacuum circuit breaker is used for the transformer module, it shall comply with the GSCM004 specification and IEC 62271-100.

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The circuit breaker shall operate in systems with insulated neutral and systems with effectively earthed neutral.

In addition, a protective relay with three current transformers shall be installed. The current transformers shall be installed on the cable prior to the installation of the cable termination. The settings for the time-current characteristics of the protective relay shall be as close as possible to the time-current characteristics of the 10-24kV, 25A, 40A, 63A and 100A fuses.

The relay's integrated self-diagnostic system shall continuously monitor the status of the relay hardware and the operation of the relay software. When a relay fault is detected, a red-colored loop should light up. In the event of a critical relay fault, all protective functions of the relay shall be completely blocked to prevent any incorrect operation of the relay. The relay must not open the switch if the protection fails. If a high fault current is present with a faulty relay, the circuit breaker must be able to trip.

The current transformer shall be able to accommodate a 50 mm diameter cable.

The relay shall be self-powered and not connected to the grid.

Alternative solutions for circuit breaker transformer protection could be considered.

#### 7.3.5.6 Trip coil (Only for Spain)

The transformer protection functional unit shall be equipped with a release coil. The coil shall operate with 230 and perform correctly between 85% and 110% of that voltage. The coil shall be put inside the operating device protective shell and can be connected from the outside feeder circuit in a terminal block located under the removable front panel, jointly at the switch-disconnector status micro-switch connection.

This terminal block shall be properly identified, and its replacement shall be possible without service interruption.

The coil circuit shall have an insulation level, towards the earthed metallic parts of the switchgear, of 10kV (1 minute) at short-duration power-frequency withstand voltage and 20kV to lightning impulse withstand voltage (1,2/50 $\mu$ s)

It shall be possible to replace the coil with the switchgear in service.



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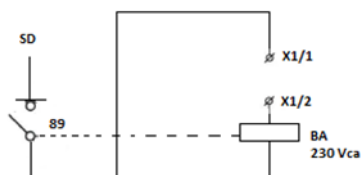
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**Figure 27- Electric diagram of coil connection**

The manufacturer must clearly indicate in the switchgear manual how the connection between outside feeder circuit and the trip coil must be made.

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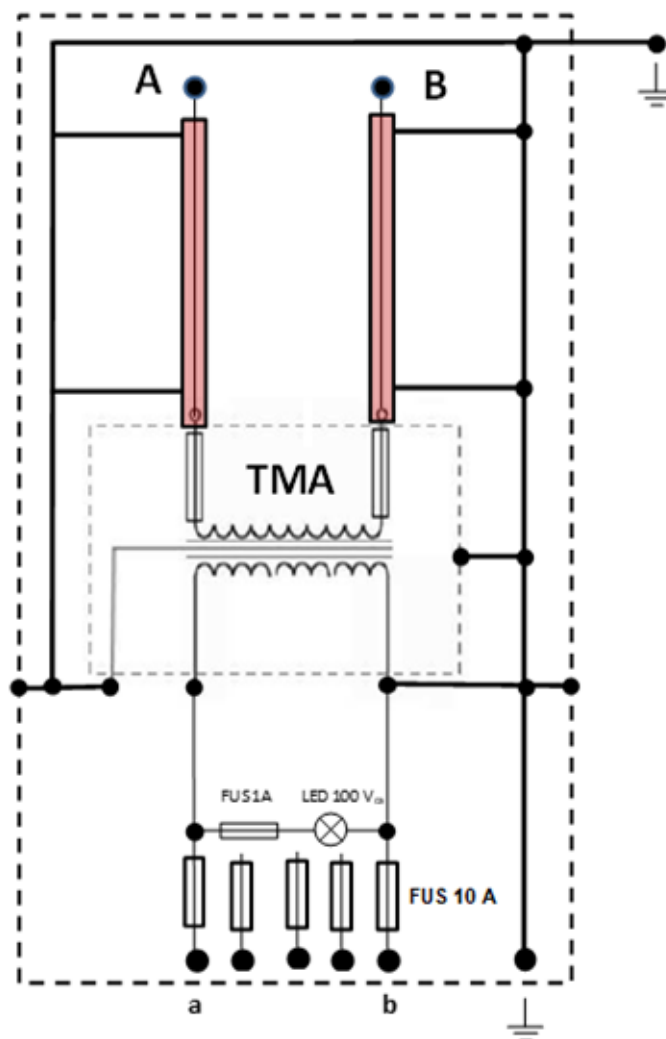
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Service Function: -

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**7.3.6 Self-protected transformer functional unit (AT)**

Self-protected transformer (SVT) functional unit is applied for connection of Enel RTU within secondary distribution substations. The electric scheme of such switchgear is depicted in the Figure 28.



**Figure 28– SVT functional unit electric scheme.**

The construction features AT unit shall be such as any SVT according to GSCT003 can be installed. The vertical working position of the SVT shall be validated by the manufacturer of such equipment and included in the documentation of the TCA process of the switchgear.

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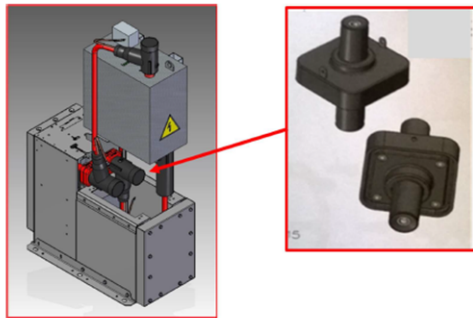
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Internal and external plug-in Type A bushings, 250 A rated current for 24 kV and Type B bushing 400 A rated current for 36 kV.



**Figure 29– Example of internal connections for AT unit**

Downline of the SVT 5 single-pole LV fuse disconnectors shall be provided.

From outside of the switchgear, it shall be possible to select the operating voltage of the SVT, through a commutator protected against accidental maneuvers.

Upstream of the fuses, a device for the presence of voltage according to IEC 61243-5 shall be connected to the secondary SVT GSCT003.

The design and construction of the switchgear shall consider the stresses to which the switchgear is subjected during handling, transport, and installation.

The connection cables and separable connectors shall be compliant with IEC 60502 series.

A rating plate with the indications provided in GSCT003 and IEC 61869-1-3 standard shall be installed.

During TCA process, the manufacturer shall provide dimensional drawings of the equipment (views and sections) with at least the following indications:

- Position of the SVT (GSCT003) inside the switchgear.
- Single-line electrical diagram of the auxiliary circuits of the equipment.
- Plate design.


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**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

Business Line: Enel Grids

**7.3.6.1 Rated characteristics**

Self-protected transformer functional unit			
Rated Voltage ( $U_r$ )	[kV]	24	36
Rated lightning impulse withstand voltage ( $U_p$ )	[kV]	125	170
Rated frequency transformer	[Hz]	50 and 60 With elongation at break according to ISO/R527 between 20-50%	
Classification IAC		AFL	
Arc fault current ( $I_A$ )	[kA]	16/20	
Duration ( $t_A$ )	[s]	1	
External IP degree		IP3X	
Internal IP degree		IP2XC	
Self-protected transformer standard		GSCT003	

**Table 9– AT functional unit characteristics**
**7.3.6.2 Low voltage connections**

The self-protected transformer functional unit shall be provided with an 8-meter LV cable.

The low voltage connections shall be performed using 2x2,5 mm<sup>2</sup> with grey outer sheath with a minimum fire reaction class Cca-s3, d1, a3. The minimum insulation level shall be 0,6/1 kV.

The cable classification shall be FG16H1R16.

On the inside of the MV cable compartment, once the access door has been removed, there must be an additional metal barrier, removable only with a tool, in cold galvanized sheet metal, bearing on the front the following warning sign on a red background and white lettering, minimum dimensions 90 mm x 200 mm:

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**Figure 30– Warning plate for AT unit.**

### 7.3.7 Measurement Functional Unit (M)

The earthing switch shall comply with IEC 62271-102.

The measurement functional unit shall be equipped with voltage and current transformers according to the following technical specifications:

Enel Grids	Current Transformer	Voltage Transformer
Argentina	D.E.M. NRO. 001 DEL 10/96 (REV. 3)	D.E.M. NRO. 001 DEL 10/96 (REV. 3)
Italy	DMI031052	DMI031015
Peru	MAT-OYM-NDS-18-309-ESP	MAT-OYM-NDS-18-309-ESP
Romania	DMI031052RO	DMI031015RO

**Table 10– Voltage and Current transformers technical specifications**


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Perimeter: Global

Staff Function: -

Service Function: -

Business Line: Enel Grids

**7.3.7.1 Rated characteristics**

Measurement Functional Unit			
Rated Voltage ( $U_r$ )	[kV]	24	36
Rated lightning impulse withstand voltage ( $U_p$ )	[kV]	125	170
Rated normal current ( $I_r$ )	[A]	630	
Rated frequency transformer	[Hz]	50 and 60	
Classification IAC		AFL	
Arc fault current ( $I_A$ )	[kA]	16/20	
Duration ( $t_A$ )	[s]	1	
External IP degree		IP3X	
Internal IP degree		IP2XC	
Instrument Transformers		See table 10	

**Table 11– Characteristics Measurement Functional Unit**

Earthing Switch			
Rated Voltage ( $U_r$ )	[kV]	24	36
Rated Frequency ( $f_r$ )	[Hz]	50 and 60	
Rated power-frequency withstand voltage ( $U_d$ )	[kV]	50	70
Rated lightning impulse withstand voltage ( $U_p$ )	[kV]	125	170
Rated short-time withstand current ( $I_k$ ) and rated establishment short circuit current ( $I_{ma}$ )	[kA]	16/20	
Rated duration of short circuit ( $t_k$ )	[s]	1	
Rated peak withstand current ( $I_p$ )	[kA]	41,6/52	
Mechanical endurance class		M0	
Electrical endurance class		E2	

**Table 12- Characteristics of the earthing switch**

**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

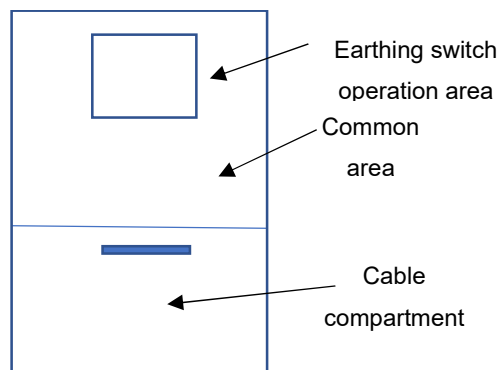
Business Line: Enel Grids

**7.3.7.2 Measurement functional unit front panel**

The elements displayed on the front panel of the measurement unit shall be such as to make them easily visible, readable, and accessible.

The front panel is divided in two areas:

- a) Earthing switch operation area.
- b) Common area.



**Figure 31- Disposition of areas in the front panel of Measurement functional unit**

**a) Earthing switch operation area**

The background of the earthing switch area shall be colored according to RAL 1015-F2.

The earthing switch operation area is composed of the following elements:

- Point for operation of the earthing switch, with indication of the operating directions in local language. The operating directions, according to IEC 60447, shall be displayed using the following colors:
  - yellow color 1021 RAL-F2 corresponding to the close direction of the earthing switch.
  - gray color 7030 RAL-F2 corresponding to the open direction of the earthing switch.

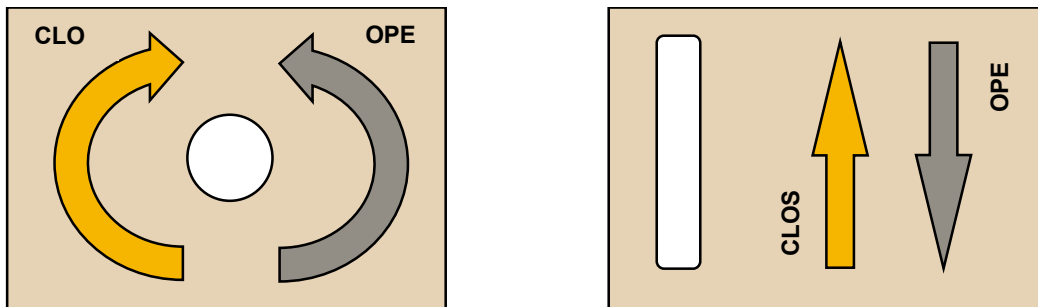
**Application Areas**

Perimeter: Global

Staff Function: -

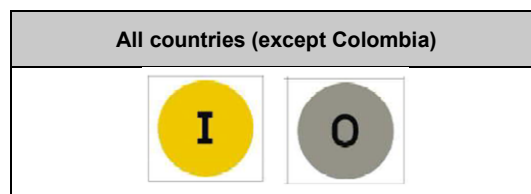
Service Function: -

Business Line: Enel Grids



**Figure 32– Point for the operation of earthing switch in line functional unit**

- Indicator showing the position of the earthing switch. The indicator shall be mechanically interconnected with the mobile power contacts and the position shall be displayed using the following symbols:
  - black "I" letter on yellow background 1021 RAL-F2 corresponding to the closed position of the earthing switch.
  - black "O" letter on gray background 7030 RAL-F2 corresponding to the open position of the earthing switch.



**Figure 33- Indicator for the position of the earthing switch in line functional unit**

The indicators shall be visible even with the front panel removed.

The indicators shall be protected by a transparent window that prevents the entry of foreign objects to prevent its indication from being altered by external manipulation.

**b) Common area**

The common area of the front panel is the part of the front panel that contains the elements defined in the earthing-switch area.

In the common area are located the following elements:

- Voltage detection system (VDS), according to §7.3.12
- Manometer, if necessary, according to §7.3.8.



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- Rating plate according to §7.3.19.1
- Operating sequence nameplate, according to §7.3.19.2
- Synoptic scheme, according to §7.3.3
- Label holder, according to chapter §7.3.19.4

**7.3.7.3 Interlocks**

The cable compartment access panel shall be removed only in safe conditions, with the earthing switch closed; this condition must be achieved with a mechanical interlock.

The earthing switch ES can be opened only with access panel of the cable compartment closed.

In normal conditions, during maneuvering there shall not occur interference nor obstruction or interruption.

A point shall be provided for padlock insertion, to lock the operations of the earthing switch.

The insertion of the operating lever of the earth disconnecting switch in the socket with the switchgear in service shall be precluded with an electromagnetic interlock. The device can be powered by an external 230 Vac voltage. In this case, a power supply cable of 8 m must be provided.

In proximity of the earth disconnecting operating seat, a plate with the following wording: "The earthing switch may operate after the line circuit breaker has been opened".

**7.3.7.4 Measurement connector and wiring**

The secondary circuits of the voltage and current transformers shall be wired with 2.5 mm<sup>2</sup> copper conductors for the *voltage* circuits and 6 mm<sup>2</sup> for the *current* circuits. The conductors relating to the voltage and current transformers inside the equipment shall be properly spaced from each other to avoid the possibility of an accidental short circuit.

The secondary circuits in gas-air through-out shall be connected to a *female* connector, respecting the connection diagram shown in the Figure 34.



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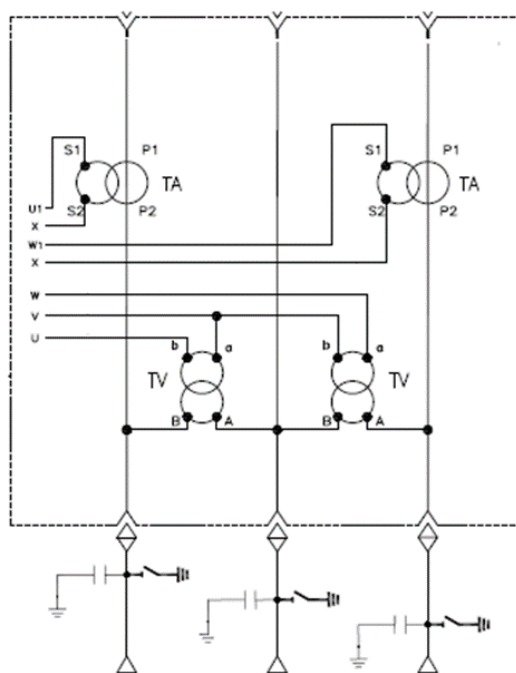
**Application Areas**

Perimeter: Global

Staff Function: -

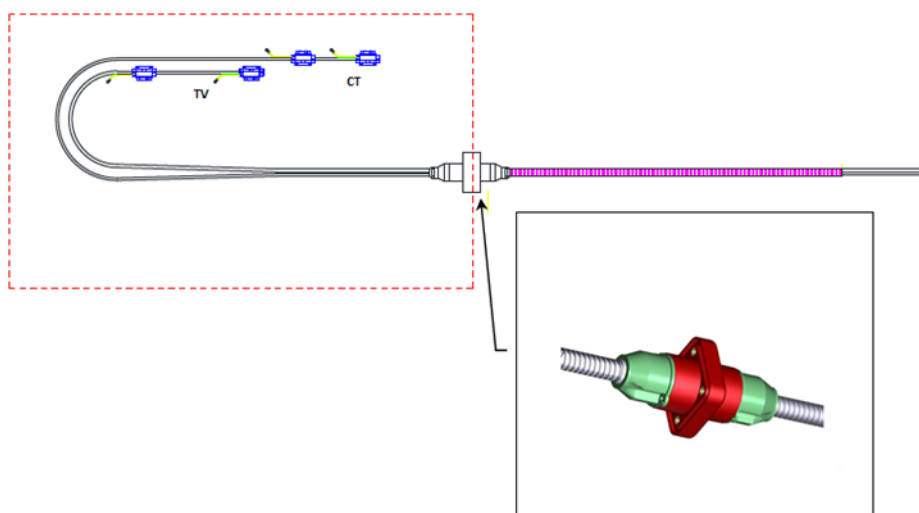
Service Function: -

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**Figure 34- Connection Schemes**

The *female* connector shall be suitable for connection with the *male* connector required by the cable according DMI AC 000160 specification, for connecting the metering units.



**Figure 35- Connection Cables**


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Service Function: -

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The connector shall have a sealable protection cover with IP41 degree.



**Figure 36– Measurement Functional Unit Front Panel Example**

On this equipment the supplier shall have an operating instruction for the production and 100% control of CT and TV wiring.

The checks to be carried out are the following:

- Polarity matching between primary and secondary terminals.
- verification of CT and TV dimensions.
- verification of earthing.
- verification of transformer test reports.

The verification of the correspondence of polarity between the primary and secondary terminals shall be carried out with an instrument (oscilloscope) that compares the amplitudes of the signals with those already known from the reports and the manufacturer of the CTs and VTs.

ES may only be operated with the upstream switch open.

#### 7.3.7.5 Supply requirements

Each switchgear shall be supplied with:

- Current transformer
- Voltage transformer
- cable type DMI AC 000160
- One Command lever
- Coupling kit (if any)
- Installation and operation in the language of the Country in which the switchgear shall be delivered.


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### 7.3.8 Manometer

To verify an acceptable pressure level of SF6, a manometer shall be provided (except in the measurement module).

There shall be one manometer for each independent SF6 gas-filled compartment that integrates the switchgear.

The manometer shall be non-extractable, and, in normal conditions, the pressure indication shall be between 25% and 75% of the area marked as safe. The area marked as safe shall be green RAL 6017 whereas the other area shall be red RAL 3000.

The manometer will be mounted on the common area of the front panel and will be clearly visible under normal operating conditions.



**Figure 37– Example of manometer**

As an alternative to the pressure manometer, magnetic indicators can be used to measure the gas level.

### 7.3.9 Earth connections

The earth of the switchgear shall be made with a copper wire whose cross-section shall not be less than 50 mm<sup>2</sup>.

The operating shafts of the switch-disconnectors and earthing switches shall be connected to the earth (with conductors whose cross-section shall not be less than 30 mm<sup>2</sup>) and to the other metallic objects. This connection is not necessary if the switchgear internal shaft is made of insulating material.

From the earthing point of the switchgear a copper bar with cross-section not less than 50 mm<sup>2</sup>, running the entire length of the switchgear, shall be provided. In addition, M12 bolts shall be provided onto the bar in the line functional unit and transformer functional unit, to connect the earth screen of the MV cable accessories. It shall be possible to connect to the copper bar to the substation's grounding system from both sides of the external part of the switchgear, i.e., two M12 bolts shall be provided.

To remove the copper bar, it shall not be necessary to disassemble, totally or partially, the switchgear by inserting or removing a cable and its corresponding connector.

The earthing points on the outside of the switchgear shall have an earthing symbol.

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Service Function: -

Business Line: Enel Grids

**Figure 38– Earth connections****7.3.10 Design requirement for installation**

The switchgear shall be fixed to the floor through M12 screws.

The switchgear shall be able to be installed and operate correctly even with a floor unevenness up to 5 millimeters per meter, both longitudinally and transversely.

**Figure 39– Floor fixing example****7.3.11 Cable compartments**

For each functional unit single-core steel supports or insulating supports, suitable for the installation of MV cables in a vertical plane, shall be provided.

The separable connectors will be according to GSCC006. In case of metallic supports induced current shall be avoided.

The installation height of the supports shall be at least 450 mm from the connector.

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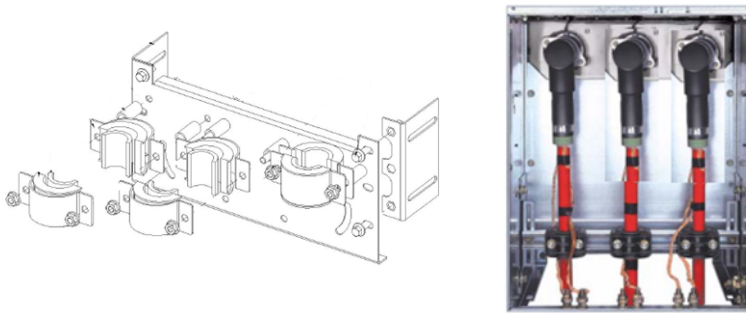
**Application Areas**

Perimeter: Global

Staff Function: -

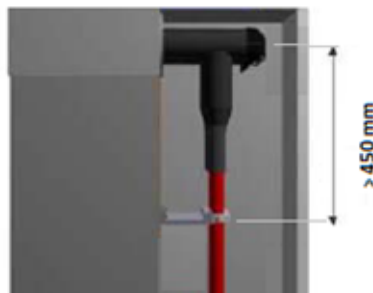
Service Function: -

Business Line: Enel Grids



**Figure 40– Examples of Supports and Separable connectors installation**

Cable supports shall be suitable for installation cables with cross-section ranges from 50 mm<sup>2</sup> to 630 mm<sup>2</sup>, according to GSC001.



**Figure 41- Minimum support height**

The identification of the phases of each bushing shall be carried out using labels according to the following table.

Destination country	Marking of the phases
Colombia	L1 – L2 - L3
Chile	L1 – L2 - L3
Brazil	L1 – L2 - L3
Spain	L1 – L2 - L3
Peru	L1 – L2 - L3
Italy	L1 – L2 - L3
Romania	L1 – L2 - L3
Argentina	R – S - T

**Table 13– Phase designation**


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**Figure 42– Marking of the phases**

The access door to the cable compartment shall not be bolted.

### 7.3.12 Voltage detecting systems

For each functional unit, LRM voltage detection system (VDS) compliant with IEC 61243-5 shall be installed to check voltage presence of the feeders. For this scope, VDIS compliant with IEC 62271-213 are accepted as well.

The identification of the phases on the VDS shall be carried out using labels according to Figure 42.

For all RMU, a MR Type socket according to Annex shall be provided to verify the presence of the MV busbar voltage. In addition to the prescriptions of the IEC standard the following parameters shall be respected:

The capacitive voltage divider could be positioned on top of the busbar or laterally (e.g., by using proper busbar extension devices such as plug-in units for coupling modular units), preferably on the transformer protection functional unit. If such functional unit is not required, the Busbar VDS shall be installed on the upper part of the front panel of the second line functional unit (starting from the left).

The Busbar VDS shall be provided without the voltage free lamps.

The busbar bushings shall be covered to be protected against direct contacts.

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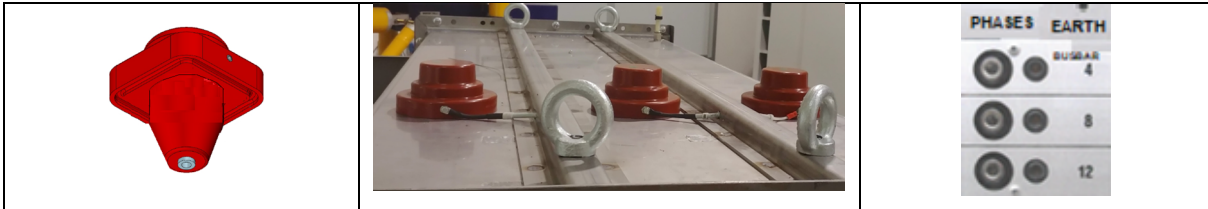
**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

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**Figure 43– Examples for the capacitive voltage divider and capacitive socket for busbar voltage detection (not bidding).**

VDS/HR Socket shall be clearly identified in every single functional unit, surrounded by a box with the words “Busbar Side” or “Cable Side” in Local language.

Language	BUSBAR SIDE	CABLE SIDE
Italian	LATO SBARRE	LATO CAVI
Spanish	LADO BARRAS	LADO CABLES
Portuguese	LADO BARRA	LADO CABO
Romanian	LATERAL BARE	LATERAL CABLU

**Table 14– VDS/VDIS Designation**

VDIS (VDS) for  $U_r=24\text{kV}$  switchgears shall have an  $U_n$  (Rated Voltage) range equal to 6-22 kV.

VDIS (VDS) for  $U_r=36\text{kV}$  switchgears shall have a  $U_n$  (Rated Voltage) range equal to 22-33kV.

The following markings shall be legibly fixed to the interface, in characters at least 3 mm high:

- Capacitive interface symbol (according to IEC 61243-5).
- LRM/VDIS interface symbol
- On each interface: phase designation and earth symbol (according to IEC 61243-5).

The VDS/VDIS shall be accompanied by documentation indicated in IEC 61243-5 or 62271-213.

### 7.3.13 Low Power voltage Transformers

As indicated in §7.3.1 for each phase of the circuit breaker functional unit LPIT shall be provided.

The connection cables, one per phase for each circuit breaker functional unit, and the related connectors, considered an integral part of the LPIT, shall be compliant with GSCT005. Such cables shall be integrated within the switchgear, going out in the upper part of the equipment, i.e., near the



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Service Function: -

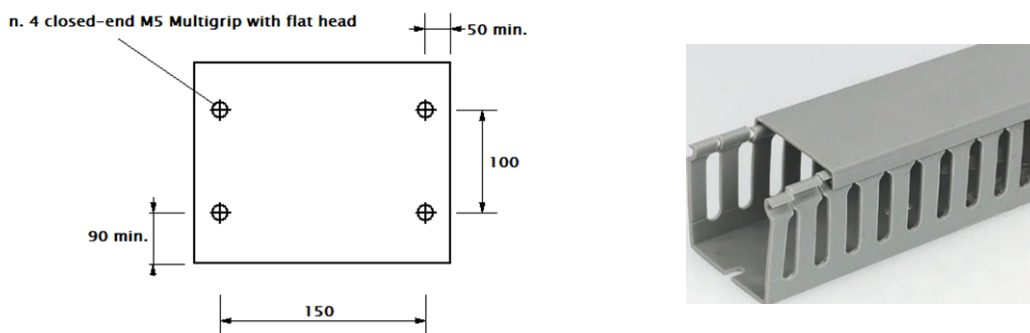
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RGDAT/RGDM support, with enough length to perform the connection (cables shall protrude from the upper part by at least 30 cm).

The secondary terminations of the LPIT, intended to be grounded, shall be connected to the switchgear ground inside it.

**7.3.14 Support for the fault detector device (RGDM/RGDAT) and cable duct.**

In the upper part of each line functional unit a support shall be provided for the fault detector device (as shown in Figure 44), located in its same vertical projection. These supports shall be external and shall allow the removal of the command protection shell without being taken.



**Figure 44– Support for fault detector device and cable duct**

Furthermore, in the upper part of the switchgear, a cable duct shall be provided for the external wiring of the cables that connect the motor and the fault detector (RDGM/RGDAT) to the RTU.

**7.3.15 Command lever**

During the operations, the end of the command lever shall not stick out from the two sides of the switchgear.

The command lever shall be made in steel, treated with electrolytic zinc-plating according to ISO 2081 (FZn 12 III) standard. It shall be stamped with the name of the manufacturer preferably with molding or, in any case, with a permanent indelible solution.

**7.3.16 FSL adapter for RGDM (only module CBL)**

In the switch modules, to enable the FSL function (logic selective function) with the RGDM, a terminal block where cables will be fitted according to the diagram shown in the Figure 46.



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Staff Function: -

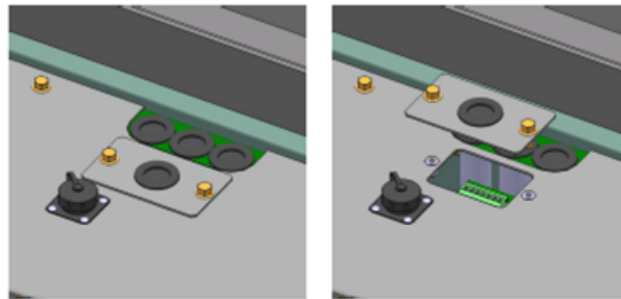
Service Function: -

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The shunt to the terminal block shall be made by connecting the cables of the circular connector of the UP to the terminal block of the electronic board.

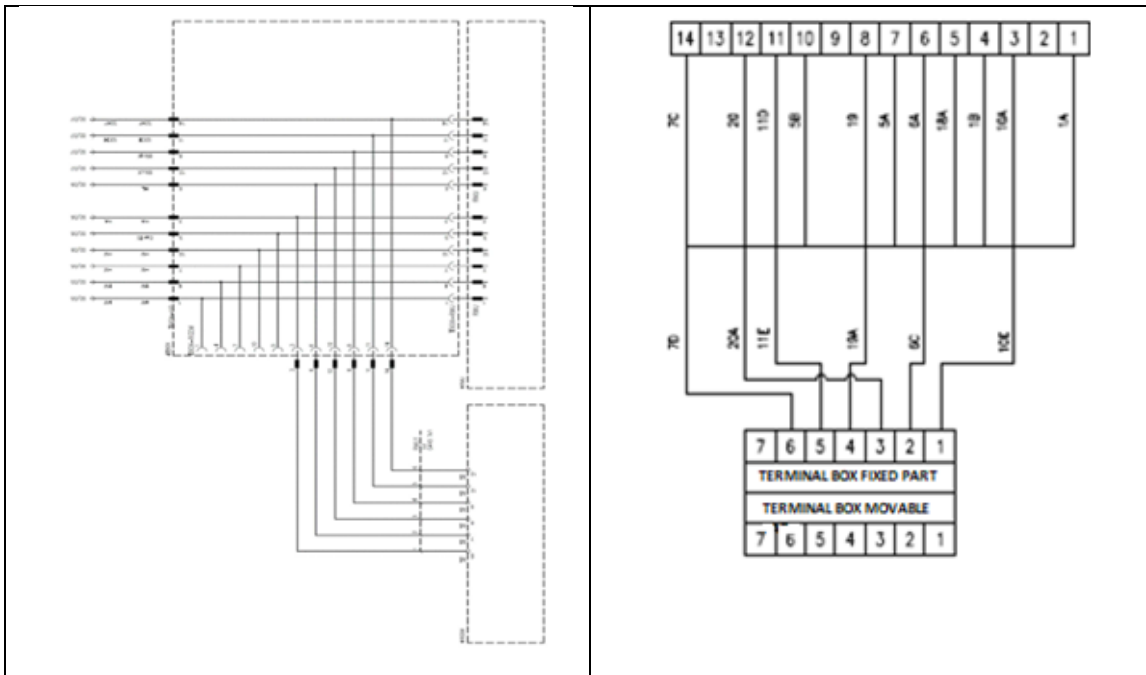
The terminal block should be as close as possible to the RGDM and should be housed inside the panel.

A window that can be opened with screws is installed on the terminal board. A cable gland shall be fitted above the window to which a 7x1.5 mm<sup>2</sup> is connected.



**Figure 45 -Terminal block**

The numbering of the connectors on the terminal block is shown in following down:



**Figure 46- Electrical schemes of FSL Adapter for RGDM**

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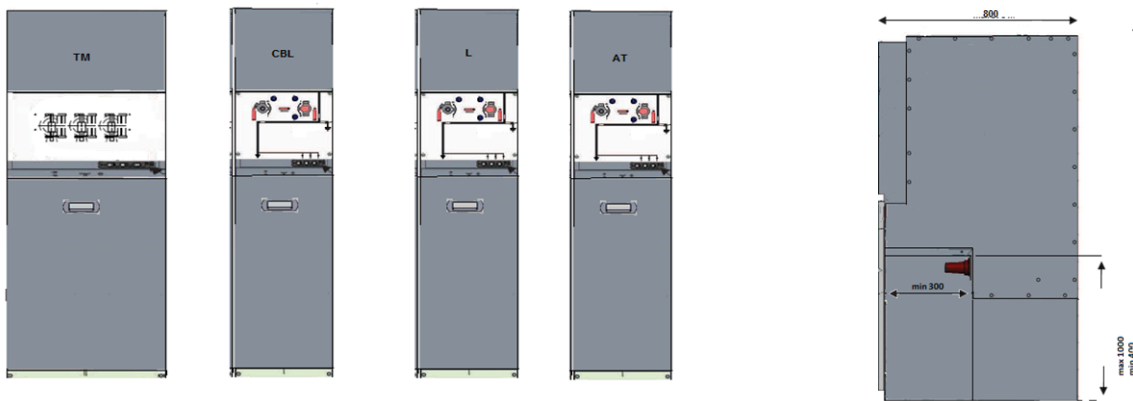
Staff Function: -

Service Function: -

Business Line: Enel Grids

### 7.3.17 Switchgear dimensions

The maximum overall dimensions shall comply with Table 15.



**Figure 47- Switchgear dimensions**

Functional Unit	Max Width [mm] 24 kV	Max Width [mm] 36 kV	Max Depth [mm] 24 kV**	Max Depth [mm] 36 kV*	Max Height [mm]*
Transformer	600	600	900	1200	2000
Circuit Breaker	450	550	900	1200	2000
Self-protected transformer	350	450	900	1200	2000
Measurement	700	700	900	1200	2000

**Table 15- Overall dimensions**

\* Including fault detector (RGDM/RGDAT) support.

\*\* Including the free space required between the switchgear and the rear wall.

### 7.3.18 Protective coating

#### 7.3.18.1 Basic protection

The metal carpentry shall be painted with a paint conforming to series ISO 12944 and for corrosivity class C3 and durability HIGH

No manual painting process is allowed.

To check the performance of the painting system and the behavior to corrosion, a test according to IEC 60068-2-52 with method 5 shall be performed.


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As an alternative it is possible to use pre-galvanized steel type EN 10346 with coating thickness > 200 [g / m<sup>2</sup>] except for the cable compartment door and front panel.

The ferrous parts of the operating controls shall be protected by an electrolytic coating of 9 µm of zinc, or alternatively in stainless steel.

Mounting nuts and bolts and small accessories, unless otherwise specified, shall be protected with electrolyte zinc Fe III Zn EN ISO 4042.

#### 7.3.18.2 High protection

For high pollution environments metal carpentry shall be painted with a paint conforming to ISO 12944 and for corrosivity class C5, durability HIGH.

To check the performance of the painting system and the behavior to corrosion, a test according to IEC 60068-2-52 with method 6 shall be performed.

Alternative solutions/tests to demonstrate the equivalent suitability in this kind of environment can be proposed by the manufacturer and are subject to Enel approval.

### 7.3.19 Nameplates

#### 7.3.19.1 Rating plate and fluorinated gases plate

The switchgear shall be provided with a rating plate containing the information according to IEC 62271-200. In addition to such information Enel Material code and type code shall be indicated.

The plate shall be made of anodized aluminum or adhesive printed with a laser printer and shall be durable and clearly legible under service conditions.

For SF6 insulated switchgears, following the European regulation regarding fluorinated greenhouse gases, the switchgear will include nameplates that comply in number, content, position, and characteristics with:

- Regulation (EU) No 517/2014 of the European Parliament and of the Council of 16 April 2014 on fluorinated greenhouse gases and repealing Regulation (EC) No 842/2006
- Commission Implementing Regulation (EU) 2015/2068 of 17 November 2015 establishing, pursuant to Regulation (EU) No 517/2014 of the European Parliament and of the Council, the format of labels for products and equipment containing fluorinated greenhouse gases.

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### 7.3.19.2 Operating sequence nameplates and synoptic scheme

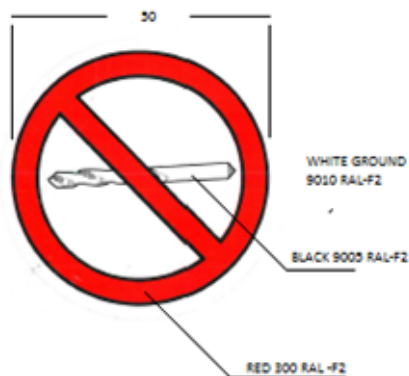
The switchgears shall be equipped with an operating sequence nameplate on which the sequence of operations to be executed shall be reported, respectively (in local language): close line / transformer output (switch-disconnector closed), the sequence open line / transformer output (safe condition) and sequence to access to the fuses (if applicable).

In addition, a label with the operating sequence in the cable compartment, clearly visible with the access panel removed, indicating the sequence for setting the cable test (showing the sequence of the opening of the earthing switch with the cable compartment access door removed).

The synoptic scheme of each single functionality (transformer protection or line functional units) shall be displayed and shall be positioned in the front panel part of each unit, so that it is clearly visible under service condition.

### 7.3.19.3 Warning nameplate against switchgear drilling

Each switchgear shall have circular nameplates, visible from all accessible sides during service, indicating the prohibition to use a drill, or similar tool, to avoid the perforation of the gas-filled compartment.



**Figure 48- Warning plate against drilling**

### 7.3.19.4 Label holder

Every functional unit shall have a label holder with a transparent window with dimensions of 120x50 mm.


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Staff Function: -

Service Function: -

Business Line: Enel Grids



**Figure 49- Label Holder**

### 7.3.19.5 Warning plate

Every functional unit shall have a warning plate on the access door to the cable compartment, clearly visible in-service condition, with the following characteristics:

- Triangle background: yellow.
- Arrow and triangle outline: black.
- Plate: Adhesive or attached to the door with rivets in stainless steel, aluminum, or 3 mm thick plastic.

For Colombia, this sign shall comply with the terms of article 6 of RETIE (Signal and Symbology).



**Figure 50- Warning Plate**

### 7.3.20 Maintenance

The switchgear shall be maintenance free for the entire expected service life.

### 7.3.21 Packaging, handling and impact indicators (Shockwatch)

The switchgear enclosure shall have adequate strength, considering the stresses to which it is subject during transport. On the upper part of the switchgear, eye bolts shall be installed to allow movement by means of bridge crane, forklift, or overhead crane.

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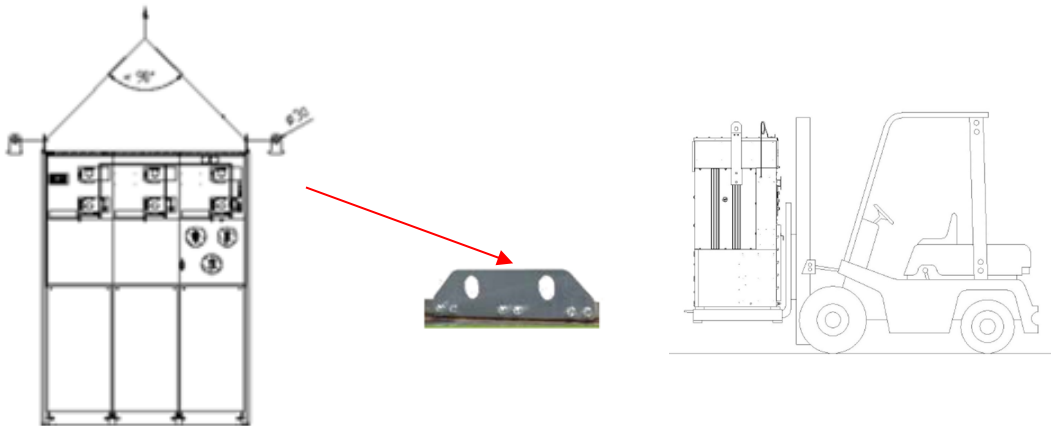
**Application Areas**

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**Figure 51 - Examples of handling**

The switchgear shall be packed with a recyclable material waterproof film wrapped around it, with protective panels to shield the command part.

Each switchgear shall be equipped with a shock indicator (ShockWatch).

Indicators consist of labels containing a red liquid in suspension. If the device is subjected to an impact higher than a specific G level declared by the manufacturer, the impact will cause the red liquid to escape, clearly visible. The label shall be on the front of the appliance and clearly visible.



**Figure 52– ShockWatch**

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## 7.4 TESTING

Type test, routine test and factory acceptance tests shall be performed in compliance with the main IEC standards and the clarifications indicated in the following paragraphs. The tests described in the following paragraphs shall be carried out on the switchgear according to IEC 62271-102, IEC62271-103, IEC 62271-105, IEC 62271-100, and IEC 62271-200.

### 7.4.1 Type tests

Table 16 shows the list of type tests to be carried out on the switchgear.

For the validation of the modular functional units, the type tests shall be carried out, as minimum, on 2L+T switchgears, combined in such a way that all the following elements are tested:

- Line functional unit.
- Transformer protection functional unit.
- The connection kits.
- A final insulating cap installed on a line unit.
- A final insulating cap installed on a transformer unit.




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TEST	STANDARD	CHAPTER
Visual inspection	GSCM004	-
Dielectric tests	IEC 62271-200	7.2
Radio interference voltage (RIV) test	IEC 62271-200	7.3
Measurement of the resistance of the main circuit and auxiliary circuits	IEC 62271-200	7.4
Continuous current test	IEC 62271-200	7.5
Short-time withstand current and peak withstand current tests	IEC 62271-200	7.6
Verification of the protection (IP and IK)	IEC 62271-200	7.7
Tightness tests	IEC 62271-200	7.8
Electromagnetic compatibility tests (EMC)	IEC 62271-200	7.9
Additional test on auxiliary and control circuits	IEC 62271-200	7.10
Verification of making and breaking capacities	IEC 62271-200	7.101
Mechanical operation tests	IEC 62271-200	7.102
Pressure withstand test for gas-filled compartments	IEC 62271-200	7.103
Internal arc test	IEC 62271-200	7-105
Tests to verify the proper functioning of the position-indicating device	IEC 62271-102	7.105
Check painting requirements	ISO 12944-6	ISO 12944-6
Verification of the protective coating	ISO 2409	LEVEL 0
Environmental testing	IEC 60068-2-52	METHOD 5 (for C3H)
Seismic test	IEC TS 62271-210	Severity level 1 PGA 0,5 g– CLASS 2
<b>Circuit breaker</b>		
Dielectric tests	IEC 62271-100	7.2
Radio interference voltage (RIV) test	IEC 62271-100	7.3
Measurement of the resistance of the main circuit and auxiliary circuits	IEC 62271-100	7.4
Continuous current test	IEC 62271-100	7.5
Short-time withstand current and peak withstand current tests	IEC 62271-100	7.6
Verification of the protection (IP and IK)	IEC 62271-100	7.7
Tightness tests	IEC 62271-100	7.8
Electromagnetic compatibility tests (EMC)	IEC 62271-100	7.9
Additional test on auxiliary and control circuits	IEC 62271-100	7.10
X-radiation test for vacuum interrupters	IEC 62271-100	7.11
Verification of making and breaking capacities	IEC 62271-100	7.101
Miscellaneous provisions fro making and breaking tests	IEC 62271-100	7.102
Mechanical shock test on fuses	IEC 62271-100	7.103
Demonstration of arcing times	IEC 62271-100	7.104
Short circuit test quantities and procedure	IEC 62271-100	7.106
Terminal-line fault tests	IEC 62271-100	7.107
Additional short-circuit tests	IEC 62271-100	7.108
Additional short -circuit tests	IEC 62271-100	7.109


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Out-of-phase making and breaking tests	IEC 62271-100	7.110
Capacitive current tests	IEC 62271-100	7.111
Electrical endurance tests	IEC 62271-100	7.112
<b>Switch-disconnector (SD) and Line disconnector (LD)</b>		
Dielectric tests	IEC 62271-102	7.2
Radio interference voltage (RIV) test	IEC 62271-102	7.3
Measurement of the resistance of the main circuit and auxiliary circuits	IEC 62271-102	7.4
Continuous current test	IEC 62271-102	7.5
Short-time withstand current and peak withstand current tests	IEC 62271-102	7.6
Verification of the protection (IP and IK)	IEC 62271-102	7.7
Tightness tests	IEC 62271-102	7.8
Electromagnetic compatibility tests (EMC)	IEC 62271-102	7.9
Additional test on auxiliary and control circuits	IEC 62271-102	7.10
X-radiation test for vacuum interrupters	IEC 62271-102	7.11
Verification of making and breaking capacities	IEC 62271-102	7.101
Operating and mechanical endurance tests	IEC 62271-102	7.102
Low-and high temperature tests	IEC 62271-102	7.104
Tests to verify the proper functioning of the position indicating device	IEC 62271-102	7.105
<b>Earthing switches (ES)</b>		
Continuous current test	IEC 62271-103	7.5
Short-time withstand current and peak withstand current tests	IEC 62271-103	7.6
Verification of the protection (IP and IK)	IEC 62271-103	7.7
Tightness tests	IEC 62271-103	7.8
Electromagnetic compatibility tests (EMC)	IEC 62271-103	7.9
Additional test on auxiliary and control circuits	IEC 62271-103	7.10
X-radiation test for vacuum interrupters	IEC 62271-102	7.11
Making and breaking tests	IEC 62271-103	7.101
<b>Switch-disconnector combined with fuses</b>		
Dielectric tests	IEC 62271-105	7.2
Radio interference voltage (RIV) test	IEC 62271-105	7.3
Measurement of the resistance of the main circuit and auxiliary circuits	IEC 62271-105	7.4
Continuous current test	IEC 62271-105	7.5
Short-time withstand current and peak withstand current tests	IEC 62271-105	7.6
Verification of the protection (IP and IK)	IEC 62271-105	7.7
Tightness tests	IEC 62271-105	7.8
Electromagnetic compatibility tests (EMC)	IEC 62271-105	7.9
Additional test on auxiliary and control circuits	IEC 62271-105	7.10
X-radiation test for vacuum interrupters	IEC 62271-102	7.11
Verification of making and breaking capacities	IEC 62271-105	7.101


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Mechanical operation test	IEC 62271-105	7.102
Mechanical shock test on fuses	IEC 62271-105	7.103
Thermal test with long pre-arcing time of fuse	IEC 62271-105	7.104
<b>LPVT</b>		
TEST	IEC 61869 TABLE 10 - GSCT005 INTEGRATION TEST	
<b>VDS</b>		
TEST	IEC 61243-5	TABLE A.3
Verification of RGDAT/RGDM calibration with VDS busbar side		
<b>VDIS</b>		
TEST	IEC 62271-213	TABLE 4
<b>SELF-PROTECTED TRANSFORMER TMA</b>		
Dielectric tests	IEC 62271-200	7.2
Internal arc test	IEC 62271-200	7-105
Short-time withstand current on earth circuits	IEC 62271-200	7.6
Verification of the protection (IP and IK)	IEC 62271-200	7.7
Check painting requirements	ISO 12944-6	ISO 12944-6
Verification of the protective coating	ISO 2409	LEVEL 0
Environmental testing	IEC 60068-2-52	METHOD 5 (only applicable for "basic protection" switchgear)
Seismic test	IEC TS 62271-210	Severity level 1 – PGA 0,5 g– CLASS 2
Voltage transformer	GSCT003	

**Table 16- List of Type Test on the switchgear**
**7.4.1.1 Internal arc test**

For the internal arc test on the cable trench, gas expansion towards the cable trench is permissible. The verification of the internal arc test in the cable compartment shall be carried according to the following instructions:

The gas pressure generated will have to be dispersed in the cable shaft.

If the pressure valve is triggered, the gas will have to vent into the trench behind the cable compartment.

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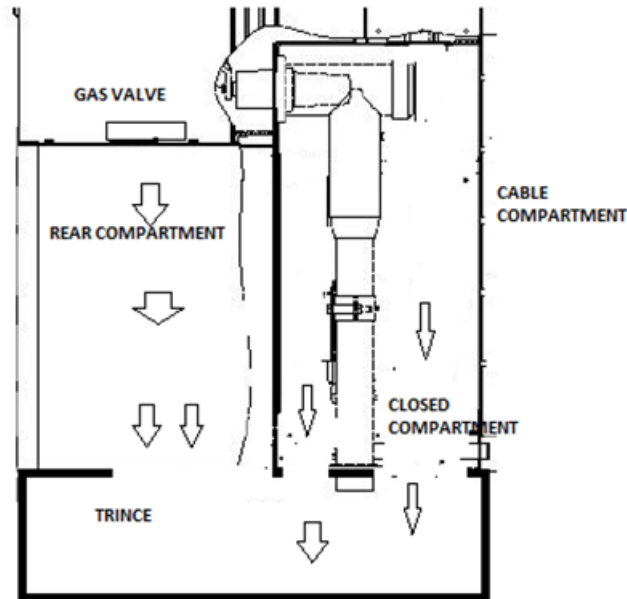
**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

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**Figure 53- Gas expansion for internal arc test**

#### 7.4.1.2 Temperature-rise tests for switch-fuse combinations

The temperature-rise tests of the switch-fuse combination shall be carried out as follows:

- For 24 kV switchgear:
  - The test shall be carried out using a set of fuses with a rated current  $\geq 100$  A
  - During the test, the power dissipation in the fuse-link will be  $\geq 90$  W
  - The minimum current through the fuses shall be 50 A
- For 36 kV switchgear:
  - The test shall be carried out using a set of fuses with a rated current  $\geq 63$  A
  - During the test, the power dissipation in the fuse-link will be  $\geq 90$  W.
  - The minimum current through the fuses shall be 30 A

With these conditions, chapter 7.105.2 of IEC 62271-105 applies.

#### 7.4.2 Routine tests

Table 17 shows the list of routine tests to be carried out on the switchgear.

Routine tests shall be carried out at the factory by the manufacturer on all equipment to ensure that the equipment corresponds to the type-tested equipment.


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Enel reserves the right to attend the routine tests at the SVT sub-supply factory.

TEST	STANDARD
<b>Switchgear and controlgear</b>	
Dielectric test on the main circuit	IEC 62271-200-100- 102-103-105
Tests on auxiliary and control circuits	IEC 62271-200-100- 102-103-105
Measurement of the resistance of the main circuit	IEC 62271-200-100- 102-103-105
Tightness tests	IEC 62271-200-100- 102-103-105
Design and visual checks	IEC 62271-200-100- 102-103-105
Partial discharge measurement	IEC 62271-200-100- 102-103-105
Mechanical operation tests	IEC 62271-200-100- 102-103-105
Pressure tests of gas-filled compartments	IEC 62271-200
Tests of auxiliary electrical, pneumatic, and hydraulic devices	IEC 62271-200
Measurement of fluid condition after filling on site	IEC 62271-200
Verification of earthing function	IEC 62271-102
CT and TV wiring check	GSCM004 – §7.3.7
<b>LPVT</b>	
Power-frequency voltage withstand tests on primary terminals	IEC 61869-11 TABLE11
Partial discharge measurement	IEC 61869-11 TABLE11
Test for accuracy	IEC 61869-11 TABLE11
Verification of markings	IEC 61869-11 TABLE11
Enclosure tightness test at ambient temperature	IEC 61869-11 TABLE11
Pressure test for the enclosure	IEC 61869-11 TABLE11
Measurement of capacitance and dissipation factor at power frequency	IEC 61869-11 TABLE11 AND GSCT005
<b>VDIS</b>	
Arrangement, assembly, markings, instructions for use	IEC 62271-213 TABLE 6
Conditions on testing points	IEC 62271-213 TABLE 6
Indication	IEC 62271-213 TABLE 6
<b>VDS</b>	
Arrangement assembly, markings, instruction for use	EN 61243-5 TABLE A.3
Clear indication	EN 61243-5 TABLE A.3
<b>SELF-PROTECTED TRANSFORMER FUNCTIONAL</b>	
Dielectric tests	IEC 62271-200
Design and visual checks	IEC 62271-200
SVT	GSCT003

**Table 17– Routine Tests List**


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### 7.4.3 Factory acceptance tests

All the tests indicated in Table 16 shall be carried out by the supplier on all the samples prepared for the commissioning. For each piece that belongs to the prepared batch, the supplier shall prepare a test report with the results of the tests performed.

The acceptance tests shall be repeated by the supplier, under the Distribution Companies surveillance, on a sample chosen randomly among those ones of the batch that has already been successfully tested by the supplier. The tests shall be carried out on samples defined by the sampling plan below:

<b>A</b>	1 sample for type				
<b>B</b>	Sampling plan: Single sampling plan for normal inspection - AQL = 2,5% - Level II (in case of negative result, in the new commissioning the sampling plan shall be ordinary)				
<b>C</b>	Documental check of the test reports provided by the supplier regarding the tests performed autonomously on the batch				

Lot size	Sample	Ac	Re
0-5	100%	0	1
6-150	5	0	1
151-500	20	1	2
501-1200	32	2	3
1201-3200	50	3	4
3201-10000	80	5	6

**Table 18– Sampling Plan**

TEST	Standard	Sampling Plan			
		CBL	TF	AT	M
Visual inspection (a)	GSCM004	A	A	A	A
Dielectric test on the main circuit (g)	IEC 62271-200- 100- 102-103-105 § 8.2	B	B	B	B
Tests on auxiliary and control circuits (b)	IEC 62271-200-102-103-105 § 8.3	B	B	B	B
Measurement of the resistance of the main circuit (e)	IEC 62271-200-102-103-105 § 8.4	B	B	B	B
Tightness test (D)	IEC 62271-200-102-103-105 § 8.5	C	C	C	C
Design and visual checks (a)	IEC 62271-200-102-103-105 § 8.6	A	A	A	A
Partial discharge measurement (i)	IEC 62271-200-102-103-105 § § 8.101	C	C	C	C
Mechanical operating tests (c)	IEC 62271-102 -105 §8.101	B	B		B
Mechanical operation tests (c)	IEC 62271-200-103- § 8.102	B	B		B
Verification of earthing function	IEC 62271-102 § 8.102	B	B	B	B


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Verification of proactive coating	ISO 2808	A	A	A	A
Control of the degree of protection (IP51)		C	C	C	C
Assembly check (i)	IEC 62271-200 - § 6.7	B	B		
Indication of VDIS and SOCKET (m)	IEC 62271-213 § 7.7 - IEC 61243-5 § 5.11	B	B	B	B
Dry-film thickness	ISO 2808	B	B	B	B
Verification of the protective coating	ISO 2409	B	B	B	B
CT and TV wiring check					B

**Table 19– Factory Acceptance Tests List**

a	Including the verification of the gas –filled compartment s' degree of protection (IP).
b	1 kV power frequency testing voltage (10 kV for trip coil) during 1 second.
c	perform 5 manual maneuvers of the SD (transformer) measuring the speed of the main contacts in opening and closing and 5 manual operations of the earthing switch Es (line) and of the earthing switches ES1 - ES2 (transformer) measuring the speed of the pristin contacts in closure. During the maneuvers verify all the mechanical interlocks provided. The test also includes verification of correct fuse installation and extraction using a real fuse or a test fuse as defined during the approval process (TCA).
d	5 closing and 5 opening operations at Vmin (24 Vcc-15%) and Vmax (24 Vcc + 20%). At Vn (24 Vcc) perform 5 C-O cycles and 5 Ot-C-O cycles. In the last cycle of every sequence, measure the operation times, the absorption current of the coils and of the spring charging motor. All the measured times and maximum values of absorption shall be included in the limits specified by the Manufacturer and, in any case, they shan't be outside the ± 15% of the reference values obtained during the type test.
e	Test to be performed on the same configuration used during the homologation process.
g	The test shall be performed with the operating devices closed and on the sectioning distance. All the tests shall be performed at a 50 kV power frequency voltage (for 24 kV switch-disconnector)
H	Perform the thickness verification with sampling plan "B" and the adherence verification on one sample only.
i	Test to be certified on single units by the supplier
m	The test will be performed during the dielectric test

**Table 20- Additional information regarding FAT**


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## 7.5 SUPPLY REQUIREMENTS

Each switchgear described herein shall be supplied ensuring a proper protection during the transportation and storage. For each equipment, the manufacturer shall supply:

- In case of modular switchgears, the plug-in unit (contact coupling and screened insulated caps).
- The command levers required to operate the switchgear.
- Manuals (switchgears, VDIS/VDS, LPIT, etc.) in compliance with the reference standard.
- A connection cable to connect the transformer protection functional unit with the RTU.
- For Edesur:
  - For each Line Functional unit separable connectors 3 separable connectors. For 36 kV GSCC006/51 or for 24 kV GSCC006/29;
  - For each transformers protection functional unit 3 separable connectors. For 36 kV GSCC006/18 or for 24 kV GSCC006/12.
- Declaración de Conformidad according to RD337/2014 (Only for Spain).
- RETIE (Only for Colombia).
- The compact module 6CBL+1T (max dimension 3100mm) will be supplied in the following 3CBL and 3CBL+1T compositions. The equipment will be supplied unpacked on two platforms and assembly will take place on site. The equipment will be fitted with extension terminations on the sides of the units to allow for coupling.

Outside the box containing the equipment, the following indications shall be reported with clearly legible characters:

- Distribution system operator (DSO) Company name
- Supplier Name.
- description of the product.
- Supplier product designation
- Enel material code and type code
- gross weight.
- Barcode according to CNS-O&M-S&L-2021-0032-EGIN.




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## 7.6 INTERLOCKS CHECKING

To verify the correct functioning of the interlocks, it is necessary to check their operation according to the Table 21, Table 22 and Table 23:

Status	Switch Disconnecter Transformer	Earthing ES1 and ES2	Allowed	Forbidden	Impossible	Protection fuse and cable compartment
0	OPEN	OPEN	0,1,2		3	NO
1	OPEN	CLOSED	0,1	3	2	YES
2	CLOSED	OPEN	0,2	3	1	NO
3	CLOSED	CLOSED				

**Table 21- Transformer protection unit interlock check**

Status	Switch Disconnecter	Circuit Breaker	Earthing	Allowed	Forbidden	Impossible	Access panel of the cable compartment
0	OPEN	OPEN	OPEN	0,1,7	5	2,3,4,6	NO
1	OPEN	OPEN	CLOSED	0,1,6		2,3,4,5,7	YES
2	CLOSED	OPEN	CLOSED				
3	CLOSED	CLOSED	OPEN	3,7	5	0,1,2,4,6	NO
4	CLOSED	CLOSED	CLOSED				
5	OPEN	CLOSED	OPEN	0,5	3	1,2,4,6,7	NO
6	OPEN	CLOSED	CLOSED	1,6	5	0,2,3,4,7	YES
7	CLOSED	OPEN	OPEN	0,3,7		1,2,4,5,6	NO

**Table 22- Circuit breaker unit - Interlock check**

Status	Status	Earthing ES	Allowed	Forbidden	Impossible	Protection fuse and cable compartment
with powered circuit breaker module	0	OPEN	0			NO
With not powered circuit breaker module	1	CLOSED	1			YES

**Table 23- Line Measurement Unit interlock check**

 Non reachable status

While the access door to the cable compartment or the access panel to the fuses is removed, for the transformer Protection functional unit, it shall be considered:

A mechanical interlock that prevents the manual operation of the switch disconnecter.


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An electrical interlock that prevents the motorized operation of the switch disconnecter (both by pushbutton and remotely).

A mechanical interlock that prevents the operation of the earthing switch.

While the access door to the cable compartment is removed (Circuit breaker unit), it shall be considered:

- The earthing switch could be opened after the insertion of screwdriver, but only one time (for Cable testing purposes).
- The interlock for open the earthing switch returns when the screwdriver is removed. The earthing switch can be closed, but it cannot be opened once gain without the use of the screwdriver.
- The switch-disconnector remains locked in any case, regardless the position of the earthing switch.
- The access door cannot be replaced if the earthing switch is open.

The insertion of the command lever in both operation points (switch-disconnector and earthing switch) prevents the motorized operation of the switch-disconnector.

## 7.7 CHARACTERISTICS OF THE ELECTRICAL COMMAND

### 7.7.1 Electric motor

The circuit breaker motor will be operated by an electric motor, suitable for continuous service, having the following characteristics:

Supply voltage	[V <sub>cc</sub> ]	24 +20% -15%
Power consumption at full speed	[W]	≤ 300
Degree of protection		≥ IP3X

**Table 24– Electric Motor characteristics**

### 7.7.2 Electric command of the circuit breaker

The CB command shall have the following functional characteristics:

- the motorization circuit must not absorb any current when it is in the stand-by state.
- the excitation time of the electric control must be such as to provide self-latching with a command pulse lasting no more than 300 ms.


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Service Function: -

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- when the power supply to the motor circuit is missing, the fallout of all self-retainers must be verified.
- In case of padlock insertion power supply to electric maneuvers shall be cut out.

An electrical interlock must allow the operation of the motor only when the earth blades are completely open.

In case of manual control of the line or earthing switches, the insertion of the operating lever must prevent the electrical and manual controls of the switch; this interlock must as soon as the lever goes to engage the socket of any of the shafts

### 7.7.3 Electric command of the switch-disconnector

The kinematic mechanism of the line disconnector must not be energy storage.

Functional characteristics:

- no component shall have stable positions with spring charged.
- the stability of the switch-disconnector contact position must be guaranteed until the spring has accumulated enough energy to operate.
- if a power failure occurs during any operation, before the spring will have accumulated energy, the system must allow the kinematic mechanism to be reset so that the control lever can be engaged.
- the motorization circuit shall not absorb any current when it is in the stand-by state.
- if the motor circuit has no supply voltage, no command must be memorized.

An electrical interlock shall allow the motorized operation only when the earthing blades are fully open. In case of manual command, the insertion of the lever shall prevent the motorized operation; such interlock must already act before the end of the lever engages on the tang of whatever operating shafts. This condition can be realized with both a mechanical (decoupling the gear motor) and electric solution (cutting the power of the motor).

### 7.7.4 Connections

The energy for the motorized control is supplied by the remote terminal unit (RTU) power supply.

The supply circuits for the motors ( $\pm M$ ) and for the auxiliaries ( $\pm A$ ) shall remain separate and isolated from each other and are protected by different bipolar protections in the power supply.

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Main Unit for secondary distribution substations

**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

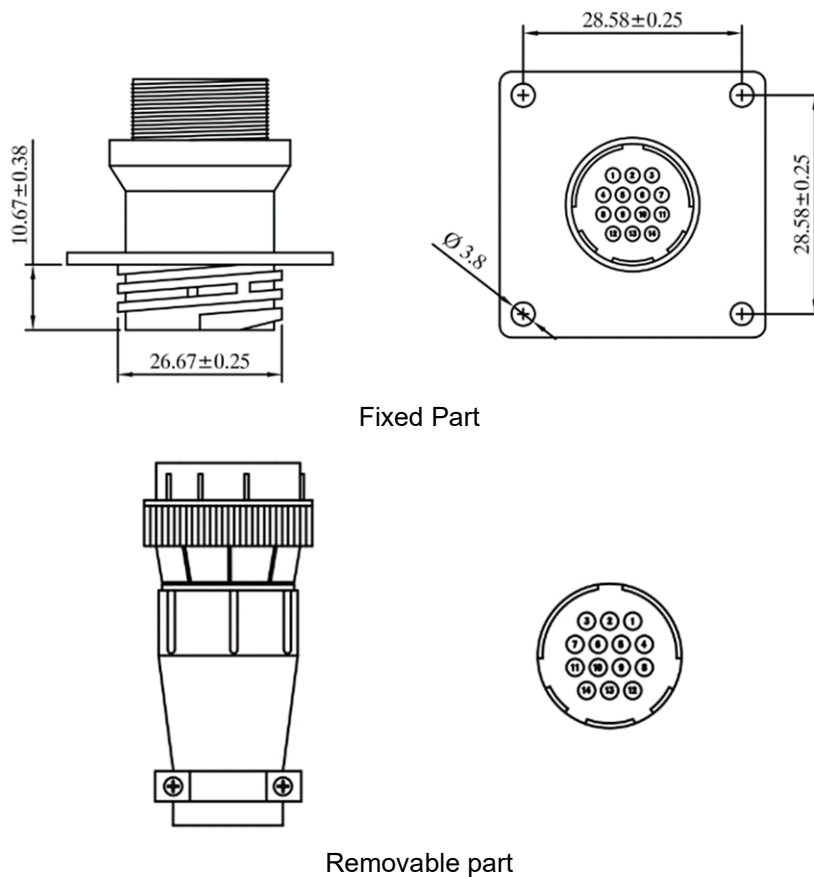
Business Line: Enel Grids

For the unit with circuit-breaker function the total resistance (LV cable + coil) of open and close command circuit shall be between 5 and 5000Ω.

**7.7.5 Connectors**

To interface the electrical control circuit with the external RTU, it is necessary to provide the fixed part of a circular connector, onto which the detachable connector of the type shall be inserted.

The coupling of the parts shall be ensured by means of a quick-release screw ring nut.


**Figure 54- Connector at switchgear side**

The fixed part shall be made of insulating material with dielectric characteristics.

The fixed part of the connector shall be accompanied by a cap (anti loss type); the removable one shall have cable clamps.

**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

Business Line: Enel Grids

The position of the connector shall be placed on the corresponding of the line functional unit and once the removable part is connected, the cable shall not interfere with any of the switching or signaling elements of the control equipment.

The cable must not be supplied.

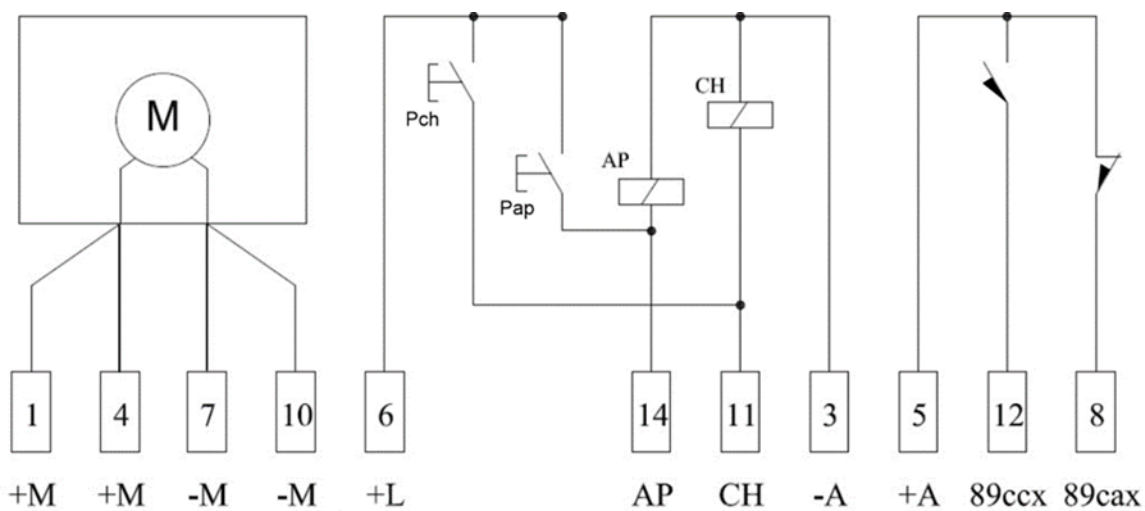
**7.7.6 Wiring**

For internal wiring shall be used wire sections suitable for the correct operation of the equipment.

The end of each connection shall be equipped with pre-insulated terminals suitable for the type of connection required (fasten, cylindrical, eyelet, etc.), identification marks, as well as reference to the wiring diagram.

Each cable passage hole shall be equipped with a suitable cable gland.

The wiring diagram of the cables should be as follows:



**Figure 55- Electric scheme of switch-disconnector command**



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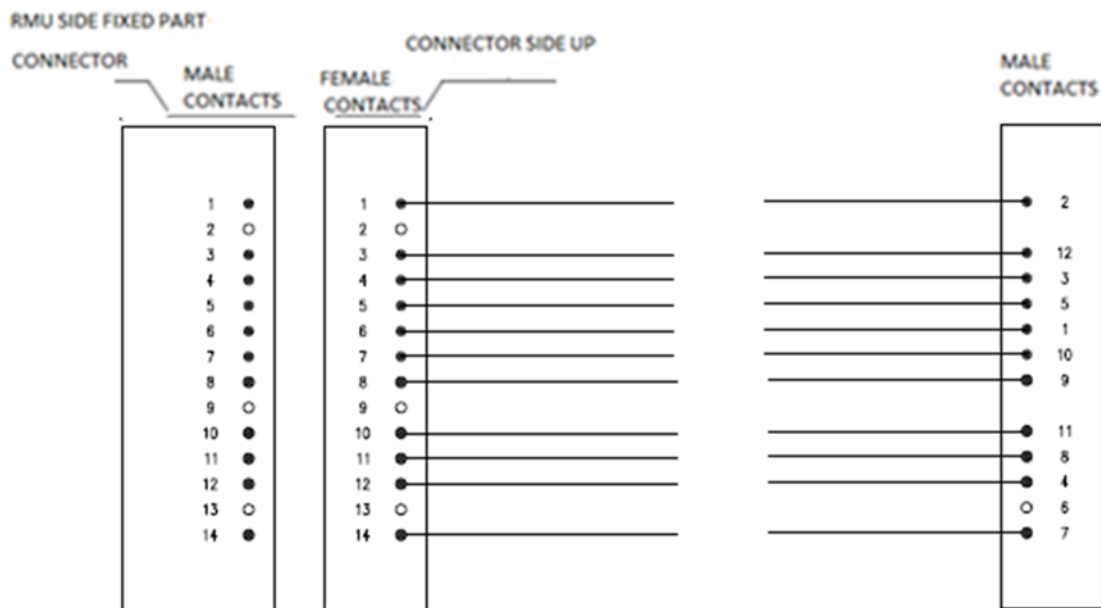
**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

Business Line: Enel Grids



**Figure 56- Pin connection scheme for switch-disconnector command**


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Main Unit for secondary distribution substations

**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

Business Line: Enel Grids

1	+M	Motor supply voltage (+24 Vcc)	8	89cax	Signal opening position switch-disconnector
2		Not used	9		Not used
3	- A	Common (-24 Vcc) commands	10	- M	Motor supply voltage (-24 Vcc)
4	+ M	Motor supply voltage (+24 Vcc)	11	CH	Closing command
5	Com TS	Common position signals switch-disconnector	12	89ccx	Signal closing position switch-disconnector
6	+ L	Local commands supply (+24 Vcc)	13		Not used
7	- M	Power supply (-24 VDC) motor	14	AP	Opening command

**Table 24 - Pin definition on motor side**

1	+ L	Local commands supply (+24 Vcc)	7	AP	Opening command
2	+ M	Motor supply voltage (+24 Vcc)	8	CH	Closing command
3	+ M	Motor supply voltage (+24 Vcc)	9	89cax	Signal opening position switch-disconnector
4	89ccx	Signal closing position switch-disconnector	10	- M	Power supply (-24 VDC) motor
5	Com TS	Common position signals switch-disconnector	11	- M	Power supply (-24 VDC) motor
6		Not used	12	- A	Common (-24 Vcc) commands

**Table 25- Pin definition RTU side**

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**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

Business Line: Enel Grids

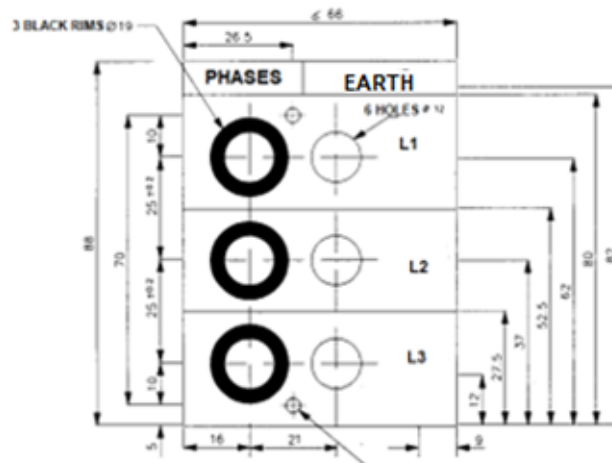
### 7.8 Busbar VDS Constructive characteristics

The busbar VDS is a specific requirement for Enel automation system. It shall be designed following IEC 61243-5 and the additional constructive and testing prescriptions indicated herein.

The device shall be type “MR-Sytem” and shall be supplied without lamps.

The voltage limiting device shall not be installed on the fixed part.

Dimensions fixed part:



**Figure 57 – Fixed Part**

The device shall be equipped with an M6 bolt to which the 16 mm<sup>2</sup> earth conductor shall be connected.





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**Application Areas**

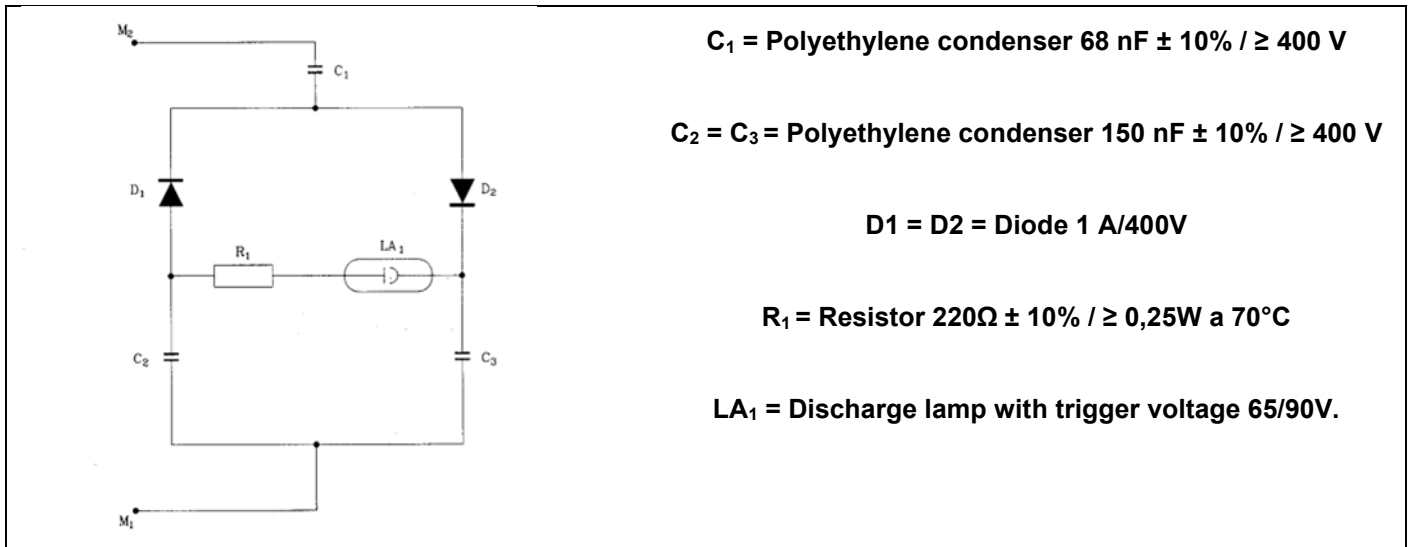
Perimeter: Global

Staff Function: -

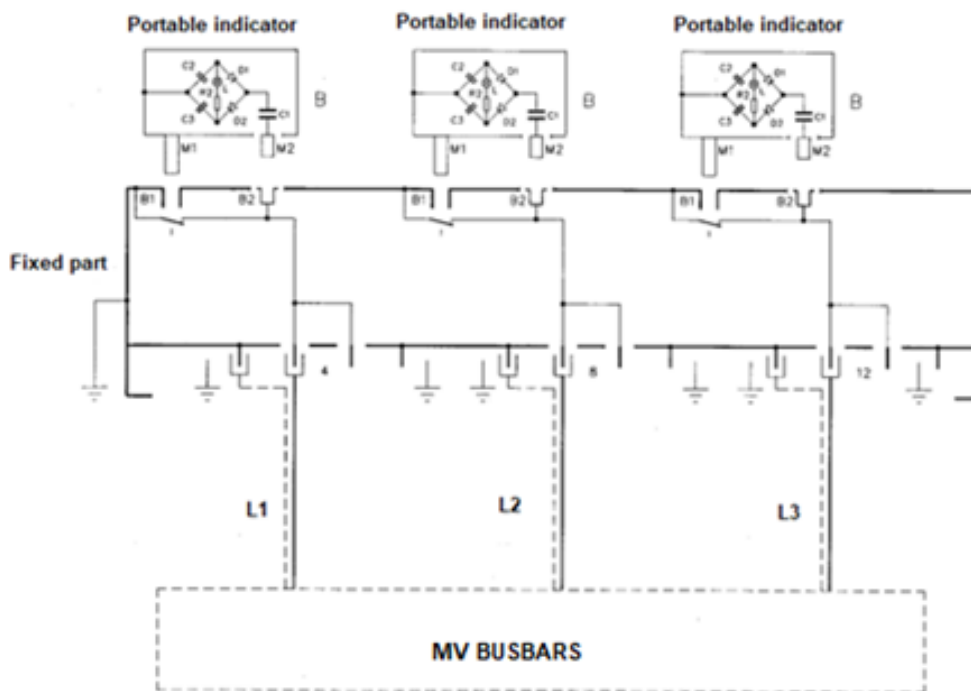
Service Function: -

Business Line: Enel Grids

**7.8.1 Electrical construction characteristics:**



**Figure 58 – Electrical Diagram**



**Figure 59 – Operating principle scheme**


**Technical Specification code: GRI-GRI-MAT-E&C-0003**

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**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

Business Line: Enel Grids

## 7.8.2 Testing

The busbar VDS equipped with capacitive voltage dividers shall be tested as indicated herein this paragraph.

Before carrying out the tests, any capacitive divider conductor on the terminals shall be connected to the earth of the switchgear.

The following tests shall be carried out:

### 7.8.2.1 Measurement of the short-circuit current value.

The short-circuit current value of the capacitive voltage divider shall not exceed 500  $\mu\text{A}$  when applying phase-to-phase voltage same as 24 kV. For the measurement of this current, it is necessary to remove the capacitor  $C_z$ , if any, (See Figure 60) and to proceed indirectly by measuring the voltage drop, with a voltmeter of internal impedance  $Z_i \geq 20 \text{ M}\Omega$ , on a given capacitive reactance of 0,96  $\text{M}\Omega$  (3,3 nF) connected between the two female fastened connections of the capacitive divider under test.

### 7.8.2.2 $I_m$ current measurement.

Using the circuit of Figure 60 the  $I_m$  current values shall be measured as follows:

- a) Applying a phase-to-phase voltage same as 6,6 kV, with the switchgear de-energized, the  $I_m$  current shall be  $> 2,5 \mu\text{A}$
- b) Applying a phase-to-phase voltage same as 2 kV, with the switchgear energized, the  $I_m$  current shall be  $< 2,5 \mu\text{A}$
- c) Applying a phase-to-phase voltage same as 24 kV the  $I_m$  current shall be  $\leq 35 \mu\text{A}$

### 7.8.2.3 Socket verifications

- a) Applying a phase-to-phase voltage same as 6,6 kV, with the switchgear de-energized, the "voltage present" indication shall appear ( $f \geq 0,25 \text{ Hz}$ )
- b) Applying a phase-to-phase voltage same as 2 kV, with the switchgear energized, the "voltage present" indication shall not appear ( $f = 0 \text{ Hz}$ )
- c) Applying a phase-to-phase voltage same from 2 kV up to 6,6 kV the "voltage present" indication could or could not appear ( $f = 0 \text{ Hz}$ )

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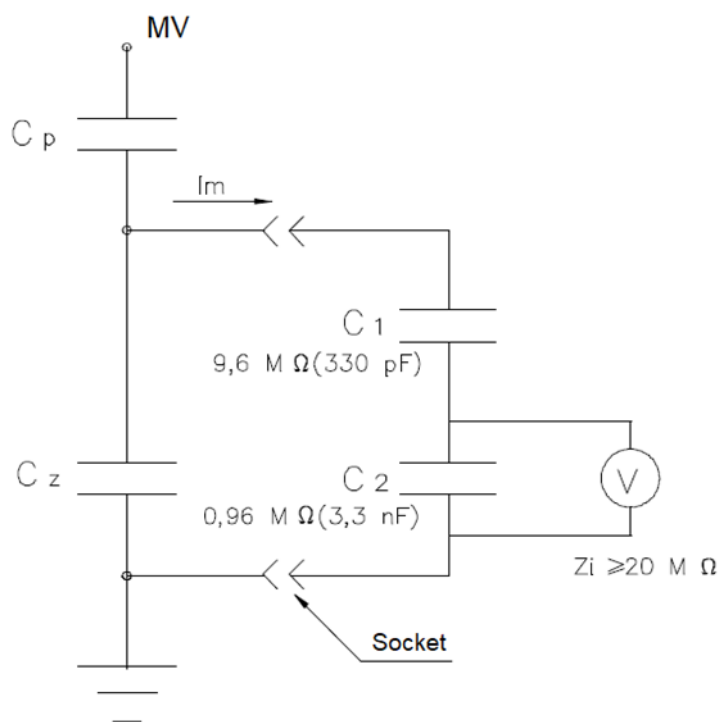
**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

Business Line: Enel Grids


**Figure 60 - Testing arrangement**
**7.8.2.4 Type tests**

The VDS shall be tested according to IEC 61243-5 (to the extent applicable).

**7.8.2.5 Acceptance tests**

Test	Standard	Point
Arrangement assembly markings, instruction for use	IEC 61243-5	5.2
Dielectric strength	IEC 61243-5	5.3
Threshold voltage and input impedance of indicators	IEC 61243-5	5.15
Vibration resistance	IEC 61243-5	5.12
Clear indication	IEC 61243-5	5.11

**Table 26 – Acceptance test for Busbar VDS**


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**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

Business Line: Enel Grids

**ANNEX A – TECHNICAL CHECK-LIST FOR TENDER PROCESS**

GSCM004				
Rated Voltage		[kV]	24	36
Rated insulation level	Rated short-duration power-frequency withstand voltage – Common value	[kV]	50	70
	Rated short-duration power-frequency withstand voltage – Across the isolating distance	[kV]	60	80
	Rated lightning impulse withstand voltage – Common value	[kV]	125	170
	Rated lightning impulse withstand voltage - Across the isolating distance	[kV]	145	195
Rated frequency (*)		[Hz]	50 (and 60)	
Rated normal current:				
- for busbars and lines		[A]	630	
- for transformer derivation		[A]	200	
Rated short-time withstand current		[kA]	16/20	
Rated peak withstand current		[kA]	41,6/52	
Rated duration of short-circuit		[s]	1	
Degree of protection for the whole enclosure except for the operating devices:		IP3X		
Degree of protection for the operating devices (even with the operating lever inserted)		IP2XC		
Degree of protection of the external part of the switchgear		IK08		
Internal arc test	Type of accessibility	AFL		
	Rated arc fault current	[kA]	16/20	
	Rated arc fault duration	[s]	1	
Rated supply voltage of closing and opening devices and of auxiliary circuit		[Vcc]	24V -15% +20%	
Expected operating life regarding leakage performance		40 years		
Circuit Breaker				
Rated operating sequence CB for rapid auto-reclosing		O – 0,3'' – CO – 15'' – CO		
Break-time		[ms]	60 +100	
Rated first-pole-to-clear factor ( $k_{pp}$ )		1,3 and 1,5		
Rated short circuit breaking current ( $I_{sc}$ )		[kA]	16/20	
Circuit Breaker Class		S1		
Mechanical Endurance class		M2		
Electrical Endurance class		E2 (List 1 IEC 62271-100)		
Probability of restrike during capacitive current breaking class		C2		
Rated breaking current	Rated line charging breaking current ( $I_l$ )	[A]	10	
	Rated cable-charging breaking current ( $I_c$ )	[A]	31,5	
	Rated out-of-phase making and breaking current	[kA]	4 - 5	
Break-time		[ms]	≤ 80	


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**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

Business Line: Enel Grids

<b>Line-Disconnecter</b>			
Rated normal current ( $I_r$ )	[A]	630	
Rated short-time withstand current ( $I_k$ )	[kA]	16/20	
Rated duration of short circuit ( $t_k$ )	[s]	1	
Rated peak withstand current ( $I_p$ )	[kA]	41,6/52	
Mechanical endurance class		M1	
<b>Earthing Switch</b>			
Rated short-time withstand current ( $I_k$ ) and rated establishment short circuit current ( $I_{ma}$ )	[kA]	16/20	
Rated duration of short circuit ( $t_k$ )	[s]	1	
Rated peak withstand current ( $I_p$ )	[kA]	41,6/52	
Mechanical endurance class		M0	
Electrical endurance class		E2	
<b>Switch-disconnector transformer</b>			
Rated normal current	[A]	200	
Rated short-time withstand current	[kA]	16/20	
Rated peak withstand current	[kA]	41,6/52	
Rated duration of short-circuit	[s]	1	
Mechanical endurance class		M1	
Electrical endurance class		E3	
<b>Earthing switches ES1 or ES</b>			
Rated short-time withstand current	[kA]	16/20	
Rated peak withstand current	[kA]	41,6/52	
Rated short-circuit duration	[s]	1	
Mechanical endurance class		M0	
Electrical endurance class		E2	
<b>Earthing switch ES2</b>			
Rated short-time withstand current	[kA]	1	
Rated peak withstand current	[kA]	2,5	
Rated short-circuit duration	[s]	1	
Mechanical endurance class		M0	
Electrical endurance class		E2	
<b>Self-protected transformer functional unit</b>			
Arc fault current (IA)	[kA]	16/20	
Duration (tA)	[s]	1	
External IP degree		IP3X	
Internal IP degree		IP2XC	
Self-protected transformer standard		GSCT003	

Table 27 - CHECK-LIST

**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

Business Line: Enel Grids

This amendment substitutes/integrates in every single paragraph some requirements or editorial corrections.

- 7.3.4.3 Circuit breaker functional unit front panel

In section “*b) Lines Disconnecter operation area*” the correct wording for the colors of the operating directions are:”

- *Red 3000 RAL-F2 color corresponding to the close direction of the **line disconnecter**.*
- *Green 6017 RAL-F2 corresponding to the open direction of the **line disconnecter**.”*

The correct caption of Figure 8 is: “*Figure 8 – Point for the operation of **line disconnecter** in line functional unit*”

In section “*c) Earthing switch operation area*” the correct wording for the colors of the operating directions are: “

*For Colombia, the position shall be displayed using the following symbols:*

- *black "I" letter on green background 6017 RAL-F2 corresponding to the closed position of the **earthing switch**.*
- *black "O" letter on red background 3000 RAL-F2 corresponding to the open position of the **earthing switch**.”*

- 7.3.12 Voltage detecting systems

In Table 14 there is not the busbar VDS for Spain.

Only for Measurement functional unit 2 LMR type VDS shall be provided.

- 7.3.17 Switchgear dimensions

In Table 15 – Overall dimensions, in the column “*Max Depth [mm] 36kV\**”, the correct requirement shall be “***Max Depth [mm] 36kV\*\****”

- 7.4.1 Type tests

**Application Areas**

Perimeter: Global

Staff Function: -

Service Function: -

Business Line: Enel Grids

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In Table 16 Type tests for switch-disconnector (SD) shall be performed according to IEC 62271-103. Type test for Line disconnector (LD) and Earthing switch (ES) shall be performed according to IEC 62271-102.

- 7.5 SUPPLY REQUIREMENTS

The supply of the switchgears shall include the UP Cable according to GSCM014.

- 7.5 SUPPLY REQUIREMENTS

In Table 22, the column “Switch disconnector” must instead be “***Line disconnector***”

- 7.7.3 Electric command of the switch-disconnector

First row must be: “*The kinematic mechanism of the **switch disconnector** must not be energy storage....*”

- 7.7.5 Connectors

Final row “...*The RTU connection cable shall be supplied for every functional unit*”

- 7.3.5.1 Rated characteristics

In Table 7 the references not found refer to the Figure 2