



Technical Specification code: MAT-E&C-NC-2022-0115-GRI
Version no. 1 dated 29/07/2022

Subject: Enel Grids – MV GIS with fixed mounted MV Circuit Breaker for HV/MV and MV/MV substation

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

This document provides technical requirements for MV Gas-Insulated metal-enclosed Switchgear (GIS) with fixed mounted MV Circuit Breaker Ur=24 and 36kV to be installed as indoor equipment in the HV/MV and MV/MV 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 and in compliance with any applicable laws, regulations and governance rules, including any stock exchange and unbundling-relevant provisions, which in any case prevail over the provisions contained in this document.

1.1 RELATED DOCUMENTS TO BE IMPLEMENTED AT COUNTRY LEVEL

This document applies to both Enel Grids Srl Company and to Enel Grids Line perimeter, when each Company does not have to issue further documents.



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2 DOCUMENT VERSION MANAGEMENT

Version	Date	Main changes description
1	29/07/2022	First issuing of “Global Infrastructure and Networks – Global Infrastructure and Networks – GSCM011 “MV GIS with fixed mounted MV Circuit Breaker for HV/MV and MV/MV substation” technical specification

3 UNITS IN CHARGE OF THE DOCUMENT

Responsible for drawing up the document:

- Enel Grids: Engineering and Construction / Components and Devices Design/ Network Components unit.

Responsible for authorizing the document:

- Enel Grids: Head of Engineering and Construction unit;
- Enel Grids: Head of Quality unit.

4 REFERENCES

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

In case which standard edition and paragraph are indicated in this technical specification, Manufacturer shall consider the edition in force at the contract date and relative paragraph.

For South America destinations, the reference standards are the IEC/ISO, whilst for Europe destinations the reference standards are the correspondent European ones (EN).

- Code of Ethics of Enel Group;
- Enel Human Right Policy;
- 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;
- MAT-O&M-NCS-2021-0033-EGIN “GSCG002 Technical Conformity Assessment”;
- MAT-E&C-NC-2021-0057-GIN “GSCG003 - Employer’s Information Requirements for supplier components”;
- Contractual Requirements for Components and Materials Quality management;
- CNS-O&M-S&L-2021-0032-EGIN “Barcode specification”;
- GSC001 “Underground Medium voltage cables”;



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- GSCC023 “Single phase medium voltage cables for primary substations and special applications”;
- GSCT005 “Technical characteristic of LPITs for RGDM/RGDAT”;
- 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/IEC 17000:2020 - Conformity assessment – Vocabulary and general principles;
- ISO/IEC 17020:2012 - General criteria for the operation of various types of bodies performing inspection;
- ISO/IEC 17025:2017 - General requirements for the competence of testing and calibration laboratories;
- ISO/IEC 17050-1:2004 - Conformity assessment - Supplier’s declaration of conformity - Part 1: General requirements (ISO/IEC 17050-1:2004, corrected version 2007-06-15);
- ISO/IEC 17050-2:2004 - Conformity assessment - Supplier’s declaration of conformity - Part 2: Supporting documentation (ISO/IEC 17050-2:2004);
- ISO/IEC 17065:2012 - Conformity assessment – Requirements for bodies certifying products, processes and services;
- IEC 62271-1 “High-voltage switchgear and controlgear - Part 1: Common specifications for alternating current switchgear and controlgear”;
- IEC 62271-100 “High-voltage switchgear and controlgear - Part 100: Alternating current circuit-breakers”;
- IEC 62271-102 “High-voltage switchgear and controlgear - Part 100: Alternating current disconnectors and earthing switches”;
- 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”;
- 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 62271-213 High-voltage switchgear and controlgear - Part 213: Voltage detecting and indicating system;
- IEC 61243-5 Live working - Voltage detectors - Part 5: Voltage detecting systems (VDS);



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- EN 50187 Gas-filled compartments for a.c. switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV
- IEC 61869-1 Instrument transformers - Part 1: General requirements;
- IEC 61869-2 Instrument transformers - Part 2: Additional requirements for current transformers;
- IEC 61869-3 Instrument transformers - Part 3: Additional requirements for inductive voltage transformers;
- IEC 61869-6 Instrument transformers - Part 6: Additional general requirements for low-power instrument transformers;
- IEC 61869-10 Instrument transformers - Part 10: Additional requirements for low-power passive current transformers;
- IEC 61869-11 Instrument transformers - Part 11: Additional requirements for low power passive voltage transformers;
- 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”;
- HD 629-1 “Test requirements for accessories for use on power cables of rated voltage from 3,6/6(7,2) kV up to 20,8/36(42) kV - Part 1: Accessories for cables with extruded insulation”;
- IEC 61869-3 “Instrument transformers - Part 3: Additional requirements for inductive voltage transformers”;
- IEC 60332-1-2 “Tests on electric and optical fibre cables under fire conditions - Part 1-2: Test for vertical flame propagation for a single insulated wire or cable - Procedure for 1 kW pre-mixed flame”;
- EN 50399 “Common test methods for cables under fire conditions - Heat release and smoke production measurement on cables during flame spread test - Test apparatus, procedures, results”;
- IEC 60445 Basic and safety principles for man-machine interface, marking and identification - Identification of equipment terminals, conductor terminations and conductors;
- ISO 12944 “Paints and varnishes — Corrosion protection of steel structures by protective paint systems”;
- Regulation (EU) of the European Parliament and of the Council 517/2014 of the 16th April 2014.

Argentina

Brazil

- NR-10 – Segurança em instalações e serviços em eletricidade.

Chile

- Norma técnica de calidad de servicios para sistema de distribución, Comisión Nacional de Energía,



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Diciembre 2019;

- ETG-1020 “Requisitos de Diseño Sísmico para Equipo Eléctrico”;
- IEEE 693-2005 “Recommended Practice for Seismic Design of Substations”;
- Norma Técnica de Seguridad y Calidad de Servicio, Comisión Nacional de Energía, Septiembre 2020;
- Reglamento de producción, transporte y distribución de energía eléctrica – Decreto N°109;
- Pliego Técnico normativo RPTD N°09 Señalización de seguridad de instalaciones. Decreto N°109
- Pliego Técnico normativo RPTD N°15 Operación y Mantenimiento. Decreto N°109;
- Pliego Técnico normativo RPTD N°17 Sistema de Gestión de integridade de instalaciones eléctricas. Decreto N°109.

Colombia

- RETIE – Reglamento Técnico de Instalaciones Eléctricas.

Perú

Italy

- D.Lgs n. 81 of the 9 of April 2008 and subsequent modifications;
- D.P.R. n. 43 of the 27th of January 2012;
- Nota Operativa PVR001 – Rev. 2 – Ott. 2012 - Gestione Garanzie dei materiali di ENEL Distribuzione.
- GUI 101 “Caratteristiche generali e prescrizioni di impiego del pallet in legno da utilizzare per imballo di trasporto”.

Spain

- RAT, Seguridad, Declaracion de conformidad;
- R.D. 614/2001, de 8 de junio, sobre disposiciones mínimas para la protección de la salud y seguridad de los trabajadores frente al riesgo eléctrico;
- R.D. 337/2014, de 9 de mayo, por el que se aprueban el 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. 223/2008, de 15 de febrero, por el que se aprueban el Reglamento sobre condiciones técnicas y garantías de seguridad en líneas eléctricas de alta tensión y sus instrucciones técnicas complementarias ITC-LAT 01 a 09.



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Romania

- Prescripția Energetică PE 101/85 – Normativ pentru construcția instalațiilor electrice de conexiuni și transformare cu tensiuni peste 1 kV;
- GUI 101RO "Caracteristicile generale și cerințele de utilizare ale paletului de lemn care urmează să fie utilizat pentru ambalarea de transport.

5 ORGANIZATIONAL PROCESS POSITION IN THE PROCESS TAXONOMY

Value Chain/Process Area: Engineering and Construction.

Macro Process: Devices and Components Development.

Process: Standard Catalog Management.

6 DEFINITIONS AND ACRONYMS

Acronym and Key words	Description
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
High Voltage (HV)	Electrical system with 230kV to 35kV nominal operative voltage between the phases
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"



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Technical Conformity Assessment (TCA)	A “conformity assessment” ¹ with respect to “specified requirements” ² consists in functional, dimensional, constructional and test characteristics required for a product (or a series of products) and quoted in technical specifications and quality requirements issued by Enel Group distribution companies. This also includes the verification of conformity with respect to local applicable regulation and laws and possession of relevant requested certifications
Type A documentation	Not confidential documents used for product manufacturing and management from which it is possible to verify the product conformity to all technical specification requirements, directly or indirectly
TCA report	Document describing the activities carried out for TCA

¹ Definition 2.1 of ISO/IEC 17000

² Definition 3.1 of ISO/IEC 17000



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7 DESCRIPTION

7.1 List of Components

Type code	Description	Type code	Description
GSCM011/1	Line/Auxiliary services functional unit switchgear 24kV 2500A	GSCM011/25	Line/Auxiliary services functional unit switchgear 36kV 2000A
GSCM011/2	Active line functional unit switchgear 24kV 2500A	GSCM011/26	Active line functional unit switchgear 36kV 2000A
GSCM011/3	Neutral maker transformer functional unit switchgear 24kV 2500A	GSCM011/27	Neutral maker transformer functional unit switchgear 36kV 2000A
GSCM011/5	Capacitor bank functional unit switchgear 24kV 2500A	GSCM011/29	Capacitor bank functional unit switchgear 36kV 2000A
GSCM011/6	Transformer functional unit switchgear 24kV 2500A	GSCM011/30	Transformer functional unit switchgear 36kV 2000A
GSCM011/7	Riser (No Circuit Breaker) functional unit switchgear 24kV 2500A	GSCM011/31	Riser (No Circuit Breaker) functional unit switchgear 36kV 2000A
GSCM011/8	Longitudinal Bus-bar-tie with riser functional unit switchgear 24kV 2500A	GSCM011/32	Longitudinal Bus-bar-tie with riser functional unit switchgear 36kV 2000A
GSCM011/9	Line/Auxiliary services functional unit switchgear 24kV 2000A	GSCM011/33	Line/Auxiliary services functional unit switchgear 36kV 1600A
GSCM011/10	Active line functional unit switchgear 24kV 2000A	GSCM011/34	Active line functional unit switchgear 36kV 1600A
GSCM011/11	Neutral maker transformer functional unit switchgear 24kV 2000A	GSCM011/35	Neutral maker transformer functional unit switchgear 36kV 1600A
GSCM011/13	Capacitor bank functional unit switchgear 24kV 2000A	GSCM011/37	Capacitor bank functional unit switchgear 36kV 1600A
GSCM011/14	Transformer functional unit switchgear 24kV 2000A	GSCM011/38	Transformer functional unit switchgear 36kV 1600A
GSCM011/15	Riser (No Circuit Breaker) functional unit switchgear 24kV 2000A	GSCM011/39	Riser (No Circuit Breaker) functional unit switchgear 36kV 1600A
GSCM011/16	Longitudinal Bus-bar-tie with riser functional unit switchgear 24kV 2000A	GSCM011/40	Longitudinal Bus-bar-tie with riser functional unit switchgear 36kV 1600A
GSCM011/17	Line/Auxiliary services functional unit switchgear 24kV 1600A	GSCM011/41	Line/Auxiliary services functional unit switchgear 36kV 1250A
GSCM011/18	Active line functional unit switchgear 24kV 1600A	GSCM011/42	Active line functional unit switchgear 36kV 1250A
GSCM011/19	Neutral maker transformer functional unit switchgear 24kV 1600A	GSCM011/43	Neutral maker transformer functional unit switchgear 36kV 1250A
GSCM011/21	Capacitor bank functional unit switchgear 24kV 1600A	GSCM011/45	Capacitor bank functional unit switchgear 36kV 1250A
GSCM011/22	Transformer functional unit switchgear 24kV 1600A	GSCM011/46	Transformer functional unit switchgear 36kV 1250A
GSCM011/23	Riser (No Circuit Breaker) functional unit switchgear 24kV 1600A	GSCM011/47	Riser (No Circuit Breaker) functional unit switchgear 36kV 1250A
GSCM011/24	Longitudinal Bus-bar-tie with riser functional unit switchgear 24kV 1600A	GSCM011/48	Longitudinal Bus-bar-tie with riser functional unit switchgear 36kV 1250A
GSCM011/49	Bus Bar measures functional unit switchgear 24kV 2500A	GSCM011/52	Bus Bar measures functional unit switchgear 36kV 2000A
GSCM011/50	Bus Bar measures functional unit switchgear 24kV 2000A	GSCM011/53	Bus Bar measures functional unit switchgear 36kV 1600A
GSCM011/51	Bus Bar measures functional unit switchgear 24kV 1600A	GSCM011/54	Bus Bar measures functional unit switchgear 36kV 1250A
GSCM011/55	Transversal Bus Bar-tie functional unit switchgear 24kV 2500A	GSCM011/58	Transversal Bus Bar-tie functional unit switchgear 36kV 2000A
GSCM011/56	Transversal Bus Bar-tie functional unit switchgear 24kV 2000A	GSCM011/59	Transversal Bus Bar-tie functional unit switchgear 36kV 1600A
GSCM011/57	Transversal Bus Bar-tie functional unit switchgear 24kV 1600A	GSCM011/60	Transversal Bus Bar-tie functional unit switchgear 36kV 1250A

Table 2 – Type codes

For material codes please refer to Annex G.



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7.2 SERVICE CONDITIONS

MV Gas-Insulated metal-enclosed Switchgear with fixed mounted MV Circuit Breaker, shall be compliant with normal service conditions for indoor installation, as defined in IEC 62271-1, considering as minimum value of ambient temperature -5°C.

Maximum altitude shall be 1000 m.

The Manufacturer shall consider de-ratings related to 2700 m of altitude for specific installation, these de-rating shall be subjected to **enel** approval.

Seismic level of apparatuses shall be compliant with:

- seismic severity 1 (seismic severity 2 is required for equipment to be supplied for Chile);
- acceptance class 2;

as defined in IEC/TS 62271-210.

MV Gas-Insulated metal-enclosed Switchgear with fixed mounted MV Circuit Breaker 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).

The carpentry shall have a protective coating compliant with ISO 12944 with the following minimum features:

- Durability: High (H);
- Atmospheric corrosivity category:C3.

7.3 TECNICAL CHARACTERISTICS

7.3.1 MV Gas-Insulated metal-enclosed Switchgear

MV Gas-Insulated metal-enclosed Switchgear shall be compliant with IEC 62271-200, for insulation GAS compliant with IEC 62271-1 shall be evaluated by **enel**.

EN 50187 shall be applied to pressurized compartments (gas-filled compartments).

Gas-filled compartment shall be sealed for life as described by par.6.16 IEC 62271-1 ed.2.

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.

The different functional units of MV Gas-Insulated metal-enclosed Switchgear built by the same Manufacturer shall be fit to be assembled to respect the HV-MV and MV-MV substation requirement.

Air forced and cooling solutions are not generally allowed but they could be evaluated by **enel** only for equipment with $U_r=24\text{kV}$ and $I_r=2500\text{A}$ ratings.

The followings main components and compartment are foreseen inside the functional units (each one or a subset):



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- MV Bus bar;
- MV Circuit Breaker (CB);
- MV Line disconnecter (LD);
- Earthing switch (ES) for MV cables;
- Current transformers (CTs) and Voltage transformers (VTs);
- MV cables compartment;
- LV cabinet.

In the par. 8.5 annex E, minimum electrical ratings for each functional unit GSCM011 **enel** type, are defined.

7.3.2 MV BUS BAR

Solid material shall be used for MV Bus Bar insulation, alternative solution shall be evaluated by **enel**.

7.3.3 MV Circuit Breaker

Fixed mounted MV CB shall be compliant with IEC 62271-100.

Arc extinction shall be performed with vacuum bottle, other type of extinction shall be evaluated by **enel**.

In the par. 8.6 annex F, minimum electrical ratings of MV CB for each functional unit GSCM011 **enel** type, are defined.

The following electrical ratings of MV CB:

- Rated Frequency f_r (Hz);
- Rated Voltage U_r (kV);
- Rated lightning impulse withstand voltage U_p (kV);
- Rated supply voltage of auxiliary and control circuits U_a (Vdc);
- Rated duration of short circuit t_k (s);
- Rated peak withstand current I_p (kA);

shall be the same defined for the entire functional unit GSCM011 **enel** type where MV CB is present, see par. 8.5 annex E.

For each MV CB the following minimum ratings shall be satisfied:

- Circuit breaker class: S1;
- Mechanical endurance class: M2;
- Electrical endurance class: E2;
- Probability of restrike during capacitive current breaking class: C2.

7.3.4 MV Line disconnecter

MV LD shall be compliant with IEC 62271-102, manually operated compliant with IEC 62271-1.



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In the following table minimum electrical ratings of the LD according to related U_r , are defined.

Rated Voltage U_r (kV)	24	36
Rated Frequency f_r (Hz)	50 and 60	
Rated power-frequency withstand voltage U_d (kV) Common value	50	70
Rated power-frequency withstand voltage U_d (kV) Across the isolating distance	60	80
Rated lightning impulse withstand voltage U_p (kV) Common value	125	170
Rated lightning impulse withstand voltage U_p (kV) Across the isolating distance	145	195
Rated short-time withstand current I_k (kA)	25	25
Rated duration of short circuit t_k (s)	1	1
Rated peak withstand current I_p (kA)	65 (d.c. time = 45 ms)	65 (d.c. time = 45 ms)
Mechanical endurance class	M1	

Table 3 – Electrical features of LD

Rated normal current I_r of each LD present in the MV Gas-Insulated metal-enclosed Switchgear functional unit GSCM011 shall be the same defined for entire functional unit GSCM011 **enel** type where MV LD is present, see par. 8.5 annex E.

7.3.5 Earthing switch

ES shall be compliant with IEC 62271-102, manually operated compliant with IEC 62271-1.

In the following table, minimum electrical ratings of the ES according to related U_r , are defined.

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 (kA) and Rated establishment short circuit current I_{ma} (kA)	25	25
Rated duration of short circuit t_k (s)	1	
Rated peak withstand current I_p (kA)	65 (d.c. time = 45 ms)	65 (d.c. time = 45 ms)
Electrical endurance class	E2* (E0)	
Mechanical endurance class	M1	

Table 4 – Electrical features of ES

*Since 3-way disconnecter is used as principal solution electrical endurance E2 of ES can be covered by electrical endurance class of MV CB.



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7.3.6 MV cable compartment

MV cable compartment shall be suitable for MV cables connection (see table 5).

MV cable terminations shall be compliant with EN 50181 and HD 629-1.

MV cable terminations shall be defined in tender phase by the Manufacturer and shall be supplied for each functional unit GSCM011 *enel* type.

MV aluminum cable up to 400 mm² shall be compliant with GSC001 *enel* technical specification.

MV copper cable up to 630 mm² shall be compliant with GSCC023 *enel* technical specification.

In the following table, minimum quantities, and maximum sections of MV cables for each functional unit are defined.

<i>enel</i> Type GSCM011	1_2_3_5_ 9_10_11_13_ 17_18_19_21_ 25_26_27_29_ 33_34_35_37_ 41_43_44_45	6_7_55	14_15_30_31_ 56_58	22_23_38_39_ 46_47_57_59_ 60
Number of MV cables	3 (1 per phase)	12 (4 per phase)	9 (3 per phase)	6 (2 per phase)
Section (mm2)	400 (AL)	630 (CU)		
Ir (A)	630	2500	2000	1600/1250

Table 5 – MV cables compartment features

7.3.7 LV cabinet

LV cabinet shall be designed foreseeing adequate space for terminal blocks and LV cabling.

Cabling and terminal blocks shall be installed according the *enel* LV schemes GSCM010.

Previous schemes are intended as general indication that could be subjected at modifications due to:

- Country's needs ;
 - E.g for Colombia humidity sensor and smoke detector presences;
- Type technical specification for protection relay and I/O modules ;
- Modifications protection relay and I/O module technical specifications.

LV cabinet shall be designed to allow the protection relay, remote I/O module, and energy meter installation with the following maximum dimensions for protection relay hole:

- Width of 19 inch, different values shall be evaluated by *enel*;



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- 6U of height.

If **enel** does not require protection relay installation, its hole shall be closed.

LV cabinet shall have a minimum IP degree of 3XD, 2X IP degree shall be guaranteed for LV devices placed in the LV cabinet.

The minimum insulation level shall be 0,6/1kV for cable and 450/750V for conductor (single core).

The minimum fire reaction of LV cable and conductors shall be Cca-s1b, d1, a1 as described below

- Cca: EN 50399: Flame Spread (FS) $\leq 2,00\text{m}$; Total Heat Release (THR) $\leq 30\text{MJ}$; Maximum Heat Release Rate (HHR) $\leq 60\text{kW}$; Fire Growth Rate, index of heat release rate (FIGRA) $\leq 300\text{Ws}^{-1}$ /// IEC 60332-1-2: Flame Spread, vertical flame propagation $H \leq 425\text{ mm}$;
- s1b: Total Smoke Production (TSP1200) $\leq 50\text{ m}^2$; Smoke Production Rate, maximum smoke (SPR) $0,25\text{ m}^2/\text{s}$; transmittance $\geq 60\% < 80\%$;
- a1: electrical conductivity $< 2,5\text{ }\mu\text{S}/\text{mm}$; pH $> 4,3$;
- d1: No flaming droplets/particles persisting longer than 10 s within 1200 s.

LV conductors shall be of proper dimension and shall be protected by LV MCB (Miniature Circuit Braker) according Manufacturer design.

At least 90° degree of opening shall be guaranteed for LV compartment door.

Internal light of LV cabinet shall be foreseen.

7.4 CONSTRUCTION CHARACTERISTICS

7.4.1 Dimensions

MV Gas-Insulated metal-enclosed Switchgear could be installed as “free-standing”, “wall-standing” or “rear/rear”.

The Manufacturer shall indicate wall distances and gas duct type of installation.

MV Gas-Insulated metal-enclosed Switchgear shall be fixed at the floor.

In the table below the maximum dimensions for each **enel** type are present.



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enel type GSCM011/	High (mm) *	Depth (mm)	Width (mm)
1_2_3_5_7_9_10_11_13_15_17_18_19_21_23_25_26_27_29_31_33_34_35_37_39_41_42_43_45_47_49_50_51_52_53_54	2900	1600	650
6_14_22_30_38_46_55_56_57_58_59_60	2900	1600	1300
8_16_24_32_40_48	2900	1600	2000

Table 6 – Switchgear functional unit maximum dimension

* maximum high with eventually gas duct included.

Longitudinal Bus-bar-tie with riser functional units (GSCM011/8_16_24_32_40_48) could be two physical MV switchgears accoupled.

Different dimensions could be evaluated by **enel**.

7.4.2 GAS pressure control indicator

Gas pressure control indicator compliant with IEC 62271-1 shall be supplied for each independent gas filled compartment with temperature compensation.

Gas leaks must be avoided by gas pressure control design, in normal conditions, the pressure indication shall be in the area marked as safe.

Gas pressure control indicator shall be placed in front of each functional unit to make it reading easier.

Gas pressure control indicator shall have a local indication of the pressure and a set of low gas pressure alarm contacts.

7.4.3 Insulator

Post and bushing insulator present shall be compliant with the main standards applicable.

Insulators shall be made by insulating material, considering par. 6.18 of IEC 62271-1 ed. 2 to minimize the risk of fire.

7.4.4 Interlocking

Interlocking compliant with IEC 62271-200 shall be present.

Earthing switches, line disconnecter and circuit breaker shall be pad lockable in both positions.

Removable keys for earthing switch (in both position) are required for Transformer (GSCM011/6_14_22_30_38_46), Longitudinal Bus-bar-tie with riser (GSCM011/8_16_24_32_40_48), Transversal Bus Bar-tie (GSCM011/55_56_57_58_59_60) and Riser (GSCM011/7_15_23_31_39_47), functional units.



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Removable keys for earthing switch (in close position) are required for the rest of functional units. If they are not available in the manufacturer design alternative solution could be evaluated by **enel**.

Shall be present an interlock between VDIS (VDS) and ES, ES cannot be closed if voltage is detected by VDIS (VDS).

During earthing maneuver (ES closed) shall be avoid untimely and unwanted opening (mechanical and electrical) of MV circuit breaker.

Automatic operation of the CB when ES is closing or opening, shall be an option that **enel** could request.

7.4.5 VDIS

VDIS for detecting MV cables voltage (or lower MV connection) compliant with IEC 62271-213 or IEC 61243-5 (VDS only LRM type, until apparatuses compliant to IEC 62271-213 will be available) with capacitive sensor shall be present for each MV Gas-Insulated metal-enclosed Switchgear functional unit.

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

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

Labeling of VDIS shall be translated in the local language of destination of equipment.

VDIS shall be in visible position and unambiguously checked before operations.

7.4.6 Earthing contact

Each MV Gas-Insulated metal-enclosed Switchgear functional unit shall be equipped with a copper earthing bar of proper dimensions compliant with electrical ratings, equipped with clamping screw or bolt to be coupled with the earthing system of HV-MV or MV-MV substation.

7.5 SINGLE LINE DIAGRAM

In the figures below there are the single line diagrams for each **enel** type.

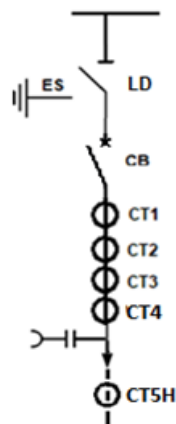


Figure 1- Single line diagram GSCM011/1_3_5_9_11_13_17_19_21_25_27_29_33_35_37_41_43_45_55_56_57_58_59_60.



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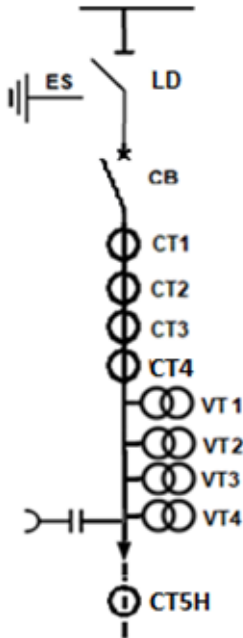


Figure 2- single line diagram
GSCM011/2_10_18_26_34_42.

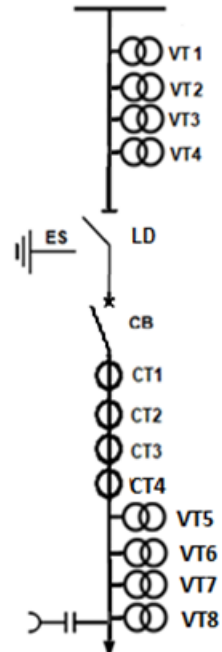


Figure 3 - single line diagram
GSCM011/6_14_22_30_38_46.

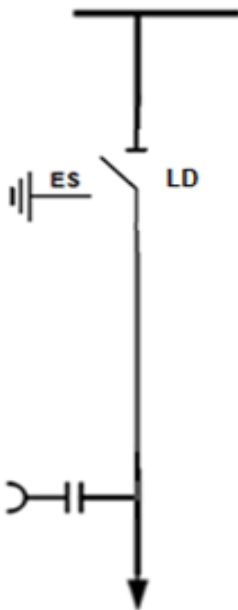


Figure 4 - Single line diagram
GSCM011/7_15_23_31_39_47.

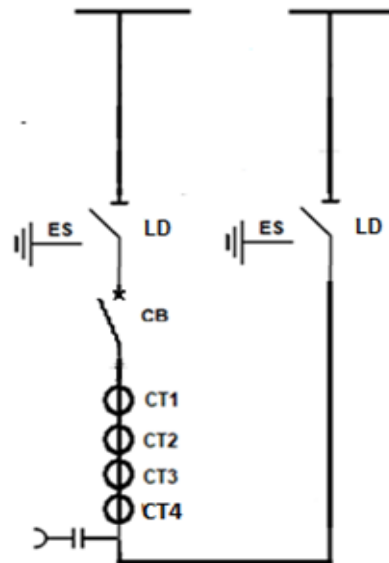


Figure 5- single line diagram
GSCM011/8_16_24_32_40_48.

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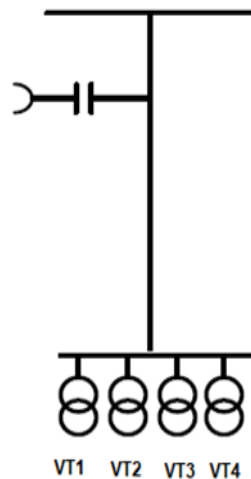


Figure 6- single line diagram GSCM011/49_50_51_52_53_54.

Different VT's configurations shall be evaluated by **enel**, for example VT installed using LD and ES.

Current CTs and Voltage Transformer VTs shall be compliant with IEC 61869 series, in the single line diagrams are indicated the maximum number of them.

CTs number, function, rated frequency, rated transformation ratio and rated output and accuracy class will be described by each country of GIS supply filling the table in paragraph 8.3 annex C and made available during tender phase.

CT5H shall be included in the supply; it is an homopolar current transformer to be installed inside switchgear functional unit if allowed by Manufacturer design or under the switchgear functional unit if not.

VTs number, function, rated frequency, rated transformation ratio, rated output and accuracy class and rated voltage factor shall be described by each country of GIS supply filling the table in paragraph 8.4 annex D available during tender phase.

In case that CTs and VTs are dedicated units (for specific function e.g. fiscal measurement) it will be indicated in the tables in paragraphs 8.3 annex C and 8.4 annex D.

In order to avoid ferroresonance effect for VTs, the induction value shall be kept below 0.7 T when rated voltage is applied, alternative solution shall be evaluated by **enel**.

Installation of CTs and VTs compliant with IEC 61869-6-10-11 and GSCT005 (LPIT) shall be evaluated by **enel**.

MV bus bar earthing method shall be proposed by Manufacturer using transversal and longitudinal Bus Bar Tie functional units.



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7.6 MV CIRCUIT BREAKER

7.6.1 Power contacts

Power contacts movement of the MV CB shall be mechanical, energy storage device shall be mechanical type (springs command), other solution shall be evaluated by **enel**.

Alternative constructive solutions for energy storage device can be take in consideration, given the respect of all functional requirements of this specification.

Charging of energy storage devices shall be obtained in two ways:

- 1) DC electric engine;
- 2) mechanical device manually activated by operator.

CB command shall achieve the followings rated operating cycles:

- with DC engine working:
 - O – 0,3" – CO – 15" – CO, starting by condition of circuit breaker closed and springs of closing charged;
- with DC engine out of working:
 - O – 0,3" – CO, starting by condition of circuit breaker closed and springs of closure load;
 - 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.

Maximum values of DC engine absorption (without rush value) shall not exceed 3A.

When MV CB is closed, opening springs shall always be charged.

Enabling to execute of a maneuver will be given only after the conclusion of any ongoing operation.

Functional conditions for release, both closure and open (by launch and under voltage), and maximum actuating force required for restoration of mechanical device shall be as indicated in IEC 62271-100.

LV cabling shall be compliant with par.7.3.7.

7.6.2 Types of command

MV CB shall be equipped with a three-polar command:

- Type "A" command for all CB;
- Type "B" command for CB present in the transformer and neutral maker functional units supplied in Italy and Romanian;

Type "A" command shall be equipped with following circuit and devices:

- Three-polar shunt closing release by launch of voltage;
- 2-Three-polar shunt opening release by launch of voltage;



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- Anti-reclosing device (anti-pumping) with the scope of inhibiting further closures after the first, in case there is an opening command during the initial request of closing. This device cannot be deactivated by functional inhibitions.

Type “B” command shall be equipped with same devices of type “A” replacing one three-polar shunt opening release by launch of voltage with:

- Three-polar opening under-voltage release that can be de-activated with a selector positioned on front of command (see par. 7.7.3). Operation of activation and/or de-activation shall not produce untimely maneuvers.

Three-polar shunt opening, closing and opening under-voltage releases shall have a maximum power of 1200VA, eventually higher values shall be evaluated by **enel**.

For more details see par.8.1 annex A and GSCM010, in case Circuit Breaker with GAS use, terminal blocks 25-26 and 27-28 should be used for gas alarm and block signals (parallel contacts of each pole).

7.6.3 Inhibit and interlocks circuits

Circuits and/or devices shall be foreseen that shall inhibit command of closing when there is at least one of follow events:

- Not enough energy of closing maneuver (springs not charged);
- Command and/or maneuverer of opening on going;
- Under-voltage release active with under-voltage coil unenergized (only for type “B” command).

7.7 LV AUXILIARY SUPPLY AND DEVICES

Auxiliary devices of MV Gas-Insulated metal-enclosed Switchgear shall be compliant with IEC 62271-1.

MV Gas-Insulated metal-enclosed Switchgear and equipment installed inside it shall be compliant with 110 Vdc or 125 Vdc (both if it is possible) DC rated supply voltage of auxiliary and control circuits U_a with the tolerance described by IEC standard.

DC and AC rated supplies voltage of auxiliary and control circuits U_a for each country of supply are listed in the table below.



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Country	Rated supply DC voltage of auxiliary circuits Ua (VDC)	Rated supply AC voltage of auxiliary circuits Ua (VAC)
Italy	110	230 single phase 50 Hz
Romanian	110	230 single phase 50 Hz
Spain	125	230 single phase 50 Hz
Brazil*	125	127 single phase (SP/RJ) 60Hz 220 single phase (CE/GO) 60Hz
Colombia	125	120 single phase 60 Hz
Perù	125	220 between phases 60 Hz
Chile	125	220 single phase 50 Hz
Argentina	125	220 single phase - 50 Hz

Table 7- DC and AC rated supplies voltage of auxiliary circuits Ua

*For Brasil, RJ=Enel Distribuição Rio; CE=Enel Distribuição Ceará; GO=Enel Distribuição Goiás Enel SP=Enel Distribuição São Paulo

Connecting to ground a polarity of 110 and 125 Vdc supply is not allowed.

7.7.1 Auxiliary contacts of MV CB, LD and ES

Auxiliary contacts of MV CB, LD and ES state shall be mechanically joint to principal contacts as described by par.6.13 of IEC 62271-200 ed.3.

Electrical features of auxiliary contacts shall be compliant with the class 1 table 6 of IEC 62271-1 ed.2.

Auxiliary contacts of MV CB are defined in the par.8.1 annex A; for line disconnector and earthing switch see GSCM010.

7.7.2 Anti-reclosing device (anti-pumping) for MV CB

If the device is designed with relays, these shall be compliant with IEC 61810-1 with electric life of 100.000 maneuverers.

Relays shall be of extractable type, with insertion on the base having frontal sockets fixed by screws and protection degree at least IP2X.

Auxiliary contacts of relays shall be compliant with the class 1 table 6 of IEC 62271-1.

7.7.3 Bistable selector for under voltage release

Bistable selector shall be equipped with auxiliary contacts, closed when three-polar opening under-voltage release is activated whose features shall be compliant with the class 1 table 6 of IEC 62271-1 ed.2.



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Other solutions for three-polar opening under voltage deactivation/activation, without MV CB or switchgear cover dismounting, shall be evaluated by **enel**.

7.7.4 Devices to be installed on front of MV GIS

Devices to be installed on front MV Gas-Insulated metal-enclosed Switchgear shall be visible also whit frontal cover removed.

Following devices compliant to IEC 62271-1 shall be installed:

- MV CB commands symbology:

Operation	All countries except Brazil (according with IEC 62271-1)	Brazil (according with NR10)
Closing	White (green is permitted in all countries excluded Perù)	White "L" on Red background
Opening	Black (red is permitted in all countries excluded Perù)	White "D" on Green background

Table 8 - MV CB commands symbology

- MV CB opening button permits the opening maneuver of CB without using electric circuits. This button shall be equipped with protection again accidental bumps;
- MV CB closing button permits the closing of CB only when the energy maneuver is full. This button shall be operable only once the cover of command has been removed, solutions that foreseen particular cover only for closing button could by evaluated by **enel**.
- switchgear functional unit single line diagram with MV circuit breaker, line disconnecter and earthing switch position indicator. The device used for position indication shall be mechanically connected with main mobile contacts compliant with IEC 62271-200.
- manual operating seats for ES and LD;
- manual device for restoring the energy for CB maneuver, actuation sense shall be indicated on the command panel. For operator's safety the use of this device shall inhibit the restoring of energy by DC engine;
- bistable selector, properly indicated, for activation and de-activation of under-voltage release (only for "B" type of command) with clear indication of its state;
- MV CB energy storage device state indicator;
- operation counter of MV CB, five digits, un-resettable;
- GAS pressure control indicator;
- VDIS (VDS) system;
- Local /Remote selector.



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7.8 MANUALS

Manual compliant with IEC 62271-200, shall be produced by the Manufacturer, it shall include all components present in the MV Gas-Insulated metal-enclosed Switchgear (circuit breaker, line disconnector, earthing switch, CT, VT, etc.)

Each one of the components described shall be referred to the relevant IEC standard.

Minimum time of maintenance shall be 60 months.

The maintenance shall not include the substitution of main components as MV circuit breaker, line disconnector, earthing switch, vacuum bottle, springs, poles, closing and opening release and electronic parts if present.

Following point shall be described inside the manual:

- measuring procedure for typical parameters (see paragraph 7.10), like opening and closing time, current absorption and all parameters normally checked during routine tests and for maintenance operation;
- operations allowed when GAS alarms are present;
- MV bus bar earthing method.

List of spare parts suggested by Manufacturer shall be included in the manual.

7.9 NAMEPLATE

MV Gas-Insulated metal-enclosed Switchgear on frontal side and visible position, shall be equipped with a nameplate where data (mass included) indicated by IEC 62271-200 shall be listed.

On each nameplate shall also be indicated the data of MV CB compliant with IEC 62271-100 and of LD and ES compliant with IEC 62271-102.

CTs and VTs present inside the MV Gas-Insulated metal-enclosed Switchgear functional unit shall be equipped with a nameplate where data indicated by IEC 61869-1, IEC 61869-2 and IEC 61869-3 are listed.

Adhesive copies of CTs and VTs nameplates shall be installed in visible position inside each LV compartment of Gas-Insulated metal-enclosed Switchgear functional unit.

Also on the nameplate for each **enel** type shall be included the followings indications:

- **enel** type;
- **enel** material code;
- Barcode compliant with CNS-O&M-S&L-2021-0032-EGIN (in case there is not enough space on the nameplate, barcode could be insert out of nameplate).



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7.10 TESTING

Type, routine and factory acceptance tests shall be performed in compliance with the main IEC standards and the clarifications indicated in the followings paragraphs.

Technical Conformity Assessment (TCA) process shall be compliant with GSCG002.

Drawings and ratings included in the type A documentations shall be compliant with GSCG003.

The Manufacturer shall produce a “values declared by Manufacturer” document necessary for Routine test to be inserted in the TCA report.

In this document at least the following values declared by the Manufacturer and obtained from type test, shall be present:

- Adsorption at rated, minimum and maximum auxiliary voltage and relative gas pressure defined by IEC 62271-100 of following devices:
 - Under voltage opening release (only to rated voltage), shunt opening and closing launch releases of MV CB;
 - Recharge spring electrical engine of MV CB.
- Timing operation at rated, minimum and maximum auxiliary voltage and relative gas pressure defined by IEC 62271-100 of following device:
 - Under voltage opening release (only to rated voltage), shunt opening and closing launch releases;
 - Recharge spring electrical engine.
- Resistance of main circuit of MV switchgear;
- Movement time or speed of earthing switch.

In case of GAS used as arc extinction for MV CB, rate, minimum and maximum operation filling pressure shall be take in the account for previous values as described from IEC 62271-100.

7.10.1 Type test

MV Gas insulated metal – enclosed Switchgear shall be tested in compliance with IEC 62271-200.

Equipment (CB, DL, ES, CT's, VT's, etc.) present inside the MV Gas insulated metal – enclosed Switchgear shall be tested in compliance with their relative IEC standard.

Possible overlays of single equipment type test are allowed if those foreseen by relative IEC standard are the same type tests present in the IEC 62271-200.

7.10.1.1 MV Gas-Insulated metal-enclosed Switchgear type test

Each **enel** type shall be tested in compliance to IEC 62271-200.



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Tests shall be performed on MV Gas-Insulated metal-enclosed Switchgear functional unit equipped as ordinary use, intended with MV circuit breaker, line disconnecter, earthing switch, VTs and CT's installed and connected.

All type tests compliant with IEC 62271-200 shall be performed with the following additions and prescriptions:

- PDs measurements compliant with IEC 62271-200 shall be performed, and the maximum values of PDs shall be defined by the Manufacturer taking into account the annex B of IEC 62271-200 ed.3;
- Seismic test compliant IEC TS 62271-210 shall be performed;
- VDIS type tests compliant with IEC 62271-213 (or IEC 61243-5) shall be performed. Services conditions defined in the paragraph 7.2 shall be checked. Alternatively, VDIS Manufacturer IEC certification can be accepted;
- Protective coating verifications compliant with ISO 12944-6 shall be performed.

7.10.1.2 MV Circuit Breaker type test

MV CB shall be tested in compliance with IEC 62271-100.

All type tests (fixed mounted MV CB) shall be performed on CB fully equipped as for ordinary use, installed inside the MV Gas-Insulated metal-enclosed Switchgear functional unit.

Alternative configuration compliant with IEC standard could be evaluated by **enel**.

7.10.1.3 Line disconnectors and earthing switch type test

Line disconnectors and earthing switch shall be tested in compliance with IEC 62271-102.

Tests shall be performed on LD and ES fully equipped as for ordinary use, installed inside the MV Gas-Insulated metal-enclosed Switchgear functional unit.

7.10.1.4 Current and Voltage transformers type tests

CTs and VTs shall be tested in compliance with IEC 61869 series.

In case that CTs and VTs shall be substituted by LPIT's, they shall be tested in compliance to IEC 61869 series and GSCT005.

Manufacturer IEC certification can be accepted as proper demonstration.

7.10.2 Routine tests

Routine tests for each **enel** type shall be compliant with IEC 62271-200.

Routine test shall be performed on MV Gas-Insulated metal-enclosed Switchgear functional unit equipped as ordinary use, intended with MV circuit breaker, line disconnecter, earthing switch, VT's and CT's installed and connected.

Routine tests for each MV CB shall be compliant with IEC 62271-100.



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Routine tests for LD and ES shall be compliant with IEC62271-102, and routine tests for CTs and VTs shall be compliant with IEC 61869 series.

In case that CTs and VTs shall be substituted by LPITs, they shall be tested in compliance to main components standard IEC 61869 series and GSCT005.

VDIS (VSD) routine tests compliant with IEC 62271-213 (or IEC 61243-5) shall be performed.

Possible overlays of single equipment routine test are allowed if those foreseen by relative IEC standard are the same routine tests present in the IEC 62271-200.

These tests shall be carried out by the Manufacturer on all the specimen prepared for the commissioning.

For each piece belonging to the prepared batch, the supplier shall produce a test report with the results of the tests performed.

Values declared by the Manufacturer (see paragraph 7.10) shall be used as reference values and acceptability ranges.

All measured values, times and maximum values of absorption, shall be checked with document “values declared by the Manufacturer”; at any case they shall not exceed the tolerance defined as below:

- $\pm 10\%$ for MV CB operation time;
- $\pm 15\%$ absorption of releases and DC electric engine;
- recharge spring electrical engine operation time tolerance defined by the Manufacturer (CB rated operation cycle shall be taken in the account).

7.10.3 Factory acceptance test

Factory acceptance tests shall be the same of the Routine tests.

Factory acceptance tests shall be carried out on a sample basis, on a number of samples which depends on the consistency of the supply according to conditions establish in document Contractual Requirements for Components and Materials Quality management and its following modifications.

7.10.4 Site acceptance tests

Site acceptance tests compliant with IEC 62271-200.

Site acceptance tests shall be performed in compliance with par. 8.104 of IEC 62271-200 ed.3 adding the followings tests:

- Functional test compliant with 8.3.2 of IEC 62271-200 ed.3;
- Mechanical operation tests compliant with 8.10.2 of IEC 62271-200 ed.3;

At the end of site acceptance tests activities Manufacturer shall issue and make available a specific document where all activities are detailed and recorded confirming the equipment availability for proper service, operation and energization.



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7.11 SUPPLY REQUIREMENTS

Each **enel** type devices shall be supplied to ensure a proper protection during the transportation and storage.

For each **enel** type the followings elements shall be supplied:

- MV Gas-Insulated metal-enclosed Switchgear functional unit completely equipped;
- All accessories necessary for the complete installation and commissioning of Switchgear;
- Functional and cabling schemes;
- Manuals;
- Energy restores manual device of springs for MV CB;
- Manual maneuver devices for line disconnecter and earthing switch;
- Only for Spain, annex D.2 GSCG002 for each equipment supplied;
- MV cable terminations (see par 7.3.6);
- Any other device eventually needed for the operation of equipment.

Out of the package followings indications shall be present:

- **enel** DSO;
- Name of supplier;
- Description of product;
- **enel** material and type code;
- Manufacturer type code and serial number;
- Gross weight.

7.11.1 Optional supply

Protection relays, I/O module, and energy meter compliant with **enel** specification could be required.

7.11.2 Warranty

60 months of warranty period.

7.12 DOCUMENTATIONS TO BE PROVIDED IN TECHNICAL OFFER

Documentations:

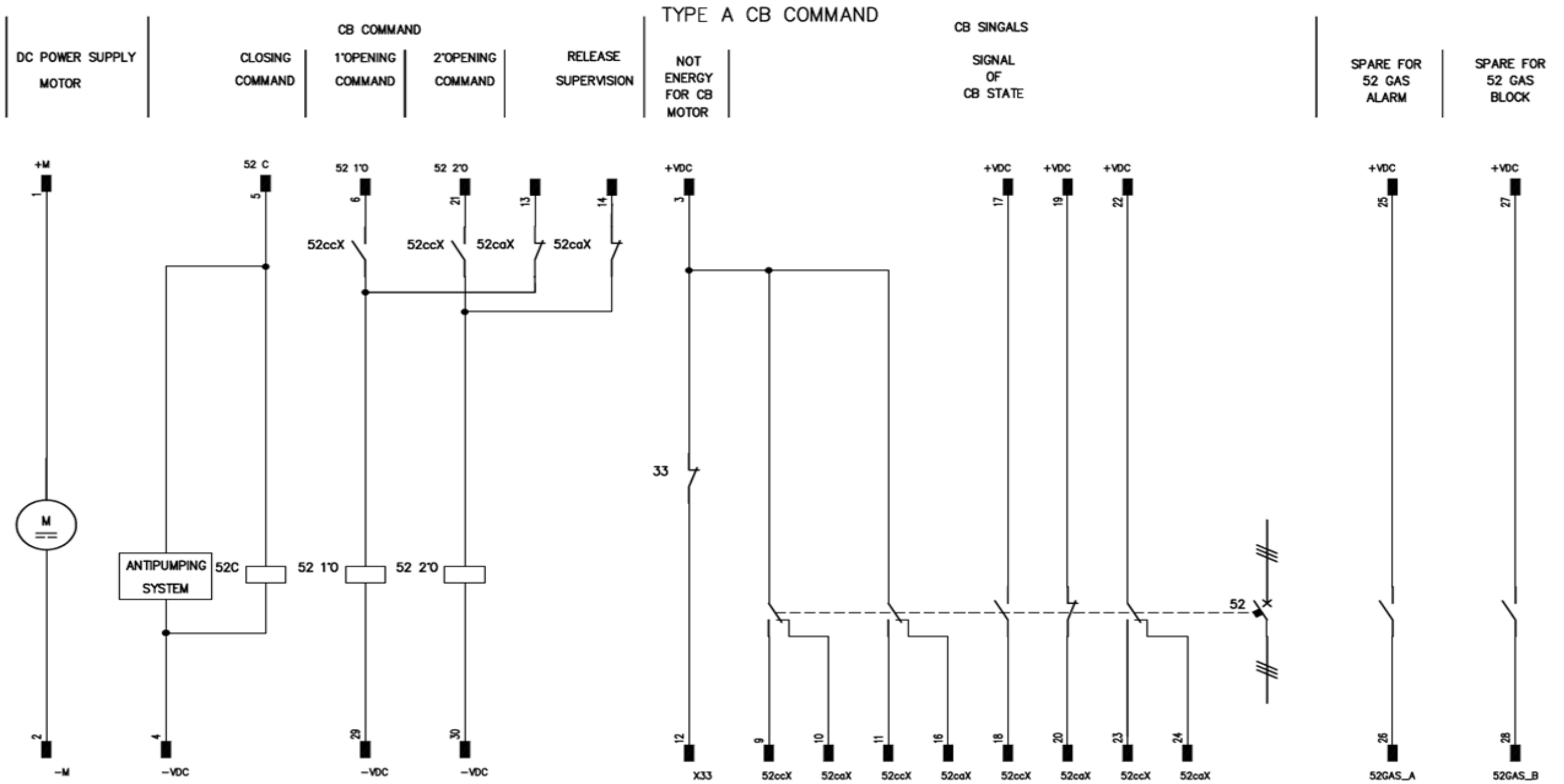
- Check list see par. 8.2 annex B to fill in for each **enel** type code;
- Manufacturer confirmation of tables present in paragraphs 8.3 annex C and 8.4 annex D for CTs and VTs.

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8 ANNEXES

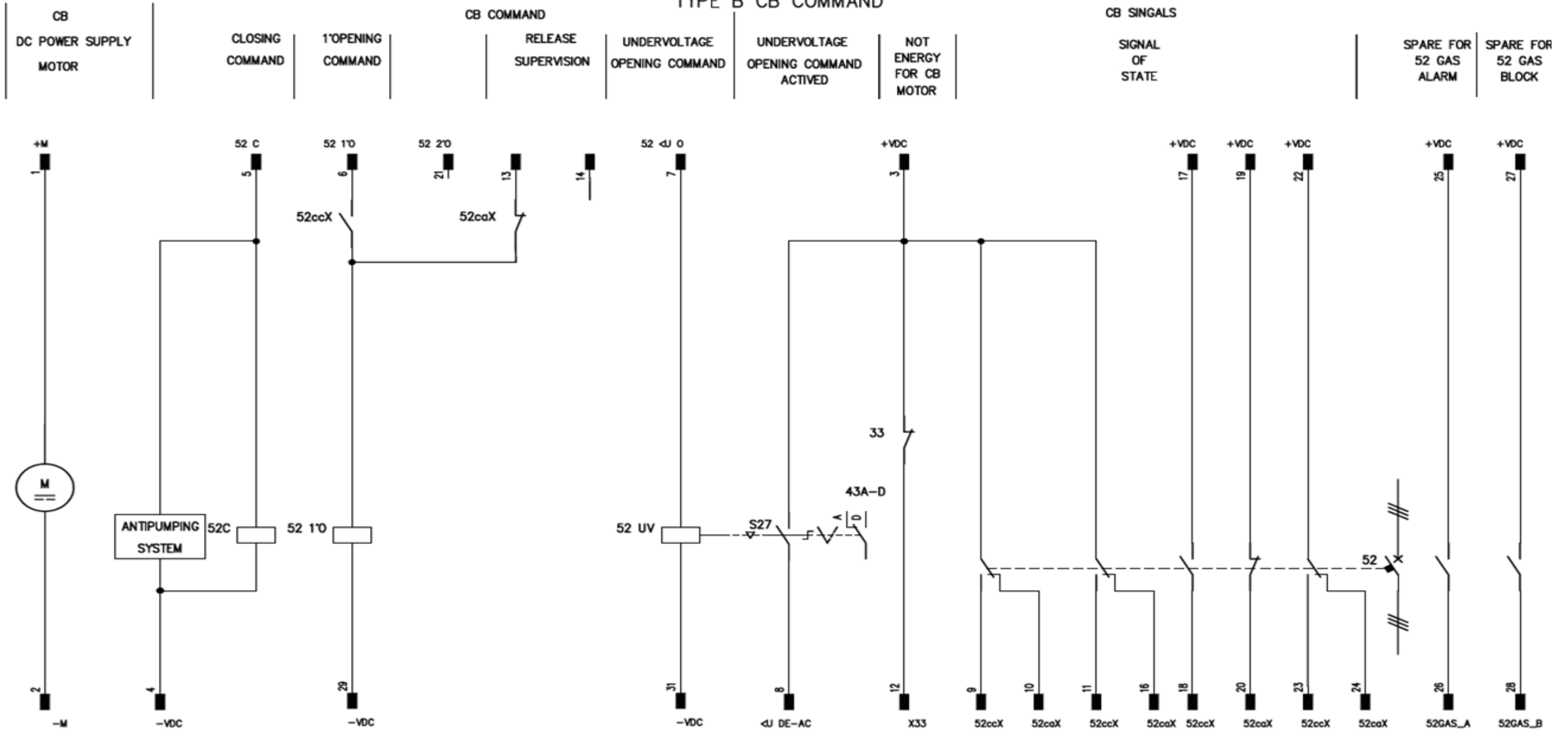
8.1 Annex A- Command Circuits



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TYPE B CB COMMAND





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8.2 Annex B - Check list

Technical specification:		Offer number:	
Manufacturer:		Manufacturing Factory:	
enel type code:		Manufacturer type code or designation:	
enel material code:			
Technical ratings		Request	Manufacturer offer
MV Gas-Insulated metal-enclosed Switchgear functional unit			
1	Service conditions	par 7.2	
2	Minimum ambient air temperature (°C)	-5	
3	Protective coating	H; C3	
4	Seismic level; acceptance class	1 (2 for Chile);2	
5	Rated normal current I _r (A)	see par.8.5 annex E	
6	Rated frequency f _r (Hz)	50 and 60	
7	Grid rated Voltage (kV)	Country information before tender	
8	Maximum grid rated voltage (kV)	Country information before tender	
9	Rated voltage U _r (kV)	see par.8.5 annex E	
10	Rated voltage U _r (kV) and Rated normal current I _r (A) to 2700 m	Manufacturer information	
11	Rated power-frequency withstand voltage U _d (kV)	see par.8.5 annex E	
12	Rated lightning impulse withstand voltage U _p (kV)	see par.8.5 annex E	
13	Rated short-circuit breaking current (kA)	25	
14	Rated duration of short circuit t _k (s)	1	
15	Rated short-circuit making current & Rated peak withstand current I _p (kA)	65	
16	Rated supplies voltage of auxiliary and control circuits U _a (Vdc)	see table 7	
17	IK degree	07	
18	IP degree	3XD (65 for GAS compartment)	
19	Loss of service continuity category	LSC2	
20	Class of partitions and shutters	PM	
21	Classification IAC/I _A (kA)/t _A (s)	AFLR/25/1	
22	Number and section of MV cables	Table 5	
23	Overall dimension	Table 6	
24	Life expectancy (years)	40	
25	Filling level for insulation and/or switching p _{re} , ρ _{re} , m _{re} (KPa, kg/m ³ kg)	Manufacturer information	
	Alarm level for insulation and/or switching p _{ae} , ρ _{ae} , m _{ae}	Manufacturer information	



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Staff Function: -

Service Function: -

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	(KPa, kg/m ³ kg)		
27	Minimum functional level for insulation and/or switching $p_{me}, \rho_{me}, m_{me}$ (KPa, kg/m ³ kg)	Manufacturer information	
28	Filling level for operation $p_{rm}, \rho_{rm}, m_{rm}$ (KPa, kg/m ³ kg)	Manufacturer information	
29	Alarm level for operation $p_{am}, \rho_{am}, m_{am}$ (KPa, kg/m ³ kg)	Manufacturer information	
30	Minimum functional level for operation $p_{mm}, \rho_{mm}, m_{mm}$ (kPa, kg/m ³ Kg)	Manufacturer information	
31	Type and mass of fluid (liquid or gas) for insulation M_f (kg)	Manufacturer information	
32	Mass of the assembly (including any fluid) M (kg)	Manufacturer information	
33	Type of installation allowed (free standing, wall standing and rear)	Manufacturer information	
34	Wall minimum distances	Manufacturer information	
35	Gas duct type of installation (lateral, rear etc)	Manufacturer information	
36	MV cables terminations type	Manufacturer information	
MV Circuit Breaker			
1	Extinction type	Manufacturer information	
2	Rated normal current I_r (A)	see par.8.6 annex F	
3	Rated frequency f_r (Hz)	50 and 60	
4	Rated voltage U_r (kV)	see par.8.5 annex E	
5	Rated power-frequency withstand voltage U_d (kV)	see par.8.5 annex E	
6	Rated lightning impulse withstand voltage U_p (kV)	see par.8.5 annex E	
7	Rated short-circuit breaking current (kA)	25	
8	Rated duration of short circuit t_k (s)	1	
9	Rated short-circuit making current & Rated peak withstand current I_p (kA)	65	
10	Rated supply voltage of auxiliary and control circuits U_a (Vdc)	see table 7	
11	Rated operating sequence	see par.8.6 annex F	
13	Break-time (ms)	60 ±100	
14	Rated first-pole-to-clear factor k_{pp}	1,3 and 1,5	
15	Auxiliary devices	Par. 7.7	
16	TRV for terminal faults	Manufacturer information	
17	Circuit breaker class	S1	
18	Electrical endurance class	E2	
19	Mechanical endurance class	M2	
20	Probability of restrike during capacitive current breaking class	C2	
21	Rated line charging breaking current I_l (A)	see par.8.6 annex F	
22	Rated cable-charging breaking current I_c (A)	see par.8.6 annex F	
23	Rated single capacitor bank-breaking current I_{sb} (A)	see par.8.6 annex F	
24	Rated back-to-back capacitor bank breaking current I_{bb} (A)	see par.8.6 annex F	
25	Rated back-to-back capacitor bank inrush making current I_{bi} (kA) f_{bi} 4250 Hz	see par.8.6 annex F	
26	Filling pressure for operation p_{rm} (MPa) (if any)	Manufacturer information	
27	Filling pressure for making and breaking p_{re} (MPa) (if any)	Manufacturer information	
28	Type and mass of fluid (liquid or gas) for insulation M_f (kg) (if any)	Manufacturer information	



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Staff Function: -

Service Function: -

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29	Circuit Breaker command Type	see par.8.6 annex F	
Line Disconnecter			
1	Rated Frequency fr (Hz)	50 and 60	
2	Rated normal current Ir (A)	Table 3	
3	Rated Voltage Ur (kV)	Table 3	
4	Rated power-frequency withstand voltage Ud (kV)	Table 3	
5	Rated lightning impulse withstand voltage Up (kV)	Table 3	
6	Rated short-time withstand current Ik (kA)	25	
7	Rated duration of short circuit tk (s)	1	
8	Rated peak withstand current Ip (kA)	65	
9	Mechanical endurance class	M1	
10	Auxiliary devices	Par. 7.7	
Earthing Switch			
1	Rated Frequency fr (Hz)	50 and 60	
2	Rated Voltage Ur (kV)	Table 4	
3	Rated power-frequency withstand voltage Ud (kV)	Table 4	
4	Rated lightning impulse withstand voltage Up (kV)	Table 4	
5	Rated short-time withstand current Ik (kA) and Rated establishment short circuit current Ima (kA)	25	
6	Rated duration of short circuit tk (s)	1	
7	Rated peak withstand current Ip (kA)	65	
8	Electrical endurance class	Table 4	
9	Mechanical endurance class	M1	
10	Auxiliary devices	Par. 7.7	
Protection relay			
1	Supply included	Country information before tender (yes/no)	
2	Enel technical specification	Country information before tender	
I/O module			
1	Supply included	Country information before tender (yes/no)	
2	Enel technical specification	Country information before tender	
Energy meter			
1	Supply included	Country information before tender (yes/no)	
2	Enel technical specification	Country information before tender	

Table 9 – Check list



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Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: Enel Grids

8.3 Annex C - CTs Country ratings

enel Type Switchgear functional unit	Country	CT	Function protection (P) or measurement (M) or fiscal measurement (FM)	Rated frequency f_r (Hz)	Rated transformation ratio k_r	Rated output	Rated accuracy class	Accuracy limit factor (ALF) or security factor (FS)	CT dedicated unit (Y/N)
GSCM011/1		1							
		2							
		3							
		4							
		5H							
GSCM011/2		1							
		2							
		3							
		4							
		5H							
GSCM011/3		1							
		2							
		3							
		4							
		5H							
GSCM011/5		1							
		2							
		3							
		4							
		5H							
GSCM011/6		1							
		2							
		3							
		4							
GSCM011/8		1							
		2							



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Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: Enel Grids

	3							
	4							
GSCM011/9	1							
	2							
	3							
	4							
	5H							
GSCM011/10	1							
	2							
	3							
	4							
	5H							
GSCM011/11	1							
	2							
	3							
	4							
	5H							
GSCM011/13	1							
	2							
	3							
	4							
	5H							
GSCM011/14	1							
	2							
	3							
	4							
GSCM011/16	1							
	2							



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Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: Enel Grids

	3							
	4							
GSCM011/17	1							
	2							
	3							
	4							
	5H							
GSCM011/18	1							
	2							
	3							
	4							
	5H							
GSCM011/19	1							
	2							
	3							
	4							
	5H							
GSCM011/21	1							
	2							
	3							
	4							
	5H							
GSCM011/22	1							
	2							
	3							
	4							
GSCM011/24	1							
	2							



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Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: Enel Grids

	3							
	4							
GSCM011/25	1							
	2							
	3							
	4							
	5H							
GSCM011/26	1							
	2							
	3							
	4							
	5H							
GSCM011/27	1							
	2							
	3							
	4							
	5H							
GSCM011/29	1							
	2							
	3							
	4							
	5H							
GSCM011/30	1							
	2							
	3							
	4							
GSCM011/32	1							
	2							



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Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: Enel Grids

	3							
	4							
GSCM011/33	1							
	2							
	3							
	4							
	5H							
GSCM011/34	1							
	2							
	3							
	4							
	5H							
GSCM011/35	1							
	2							
	3							
	4							
	5H							
GSCM011/37	1							
	2							
	3							
	4							
	5H							
GSCM011/38	1							
	2							
	3							
	4							
GSCM011/40	1							
	2							



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Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: Enel Grids

	3							
	4							
GSCM011/41	1							
	2							
	3							
	4							
	5H							
GSCM011/42	1							
	2							
	3							
	4							
	5H							
GSCM011/43	1							
	2							
	3							
	4							
	5H							
GSCM011/45	1							
	2							
	3							
	4							
	5H							
GSCM011/46	1							
	2							
	3							
	4							
GSCM011/48	1							
	2							



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Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: Enel Grids

	3							
	4							
GSCM011/55	1							
	2							
	3							
	4							
	5H							
GSCM011/56	1							
	2							
	3							
	4							
	5H							
GSCM011/57	1							
	2							
	3							
	4							
	5H							
GSCM011/58	1							
	2							
	3							
	4							
	5H							
GSCM011/59	1							
	2							
	3							
	4							
	5H							
GSCM011/60	1							



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Application Areas

Perimeter: *Global*
 Staff Function: -
 Service Function: -
 Business Line: Enel Grids

		2							
		3							
		4							
		5H							

Table 10 – CTs Check list

The Manufacturer shall made the same previous table with the values offered for CTs.



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Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: Enel Grids

8.4 Annex D - VTs Country ratings

enel Type Switchgear functional unit	Country	VT	Function protection (P) or measurement (M) or fiscal measurement (FM)	Rated frequency f_r (Hz)	Rated transformation ratio k_r	Rated output	Rated accuracy class	Rated voltage factor	VT dedicated unit (Y/N)
GSCM011/2		1							
		2							
		3							
		4							
GSCM011/6		1							
		2							
		3							
		4							
		5							
		6							
		7							
		8							
GSCM011/10		1							
		2							
		3							
		4							
GSCM011/14		1							
		2							
		3							
		4							
		5							
		6							
		7							
		8							
GSCM011/18		1							
		2							
		3							
		4							
GSCM011/22		1							
		2							
		3							
		4							



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

	5								
	6								
	7								
	8								
GSCM011/26	1								
	2								
	3								
	4								
GSCM011/30	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								
GSCM011/34	1								
	2								
	3								
	4								
GSCM011/38	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								
GSCM011/42	1								
	2								
	3								
	4								
GSCM011/46	1								
	2								



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Application Areas

Perimeter: *Global*
Staff Function: -
Service Function: -
Business Line: Enel Grids

	3								
	4								
	5								
	6								
	7								
	8								
	GSCM011/49	1							
		2							
3									
4									
GSCM011/50	1								
	2								
	3								
	4								
GSCM011/51	1								
	2								
	3								
	4								
GSCM011/52	1								
	2								
	3								
	4								
GSCM011/53	1								
	2								
	3								
	4								
GSCM011/54	1								
	2								
	3								
	4								

Table 11 – VTs Check list

The Manufacturer shall made the same previous table with the values offered for VTs.

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Application Areas
Perimeter: *Global*
Staff Function: -
Service Function: -
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8.5 Annex E –Switchgear functional unit electrical ratings

Type code	Description	Rated frequency f_r (Hz)	Rated normal current I_r (A)	Rated Voltage U_r (kV)	Rated power-frequency withstand voltage U_d (kV)	Rated lightning impulse withstand voltage U_p (kV)	Rated short-time withstand current I_k (kA)	Rated duration of short circuit t_k (s)	Rated peak withstand current I_p (kA)	Rated supply voltage of auxiliary and control circuits U_a (Vdc)	Rated supply voltage of auxiliary circuits U_a (Vac)	Class of partitions and shutters	IK degree	IP degree	Loss of service continuity category	Classification IAC	Arc fault current and duration I_A (kA); t_A (s)	Life expectancy (years)
GSCM011/1	Line/ Auxiliary services functional unit switchgear 24kV 2500A	50 and 60	630	24	50	125	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/2	Active line functional unit switchgear 24kV 2500A	50 and 60	630	24	50	125	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/3	Neutral maker transformer functional unit switchgear 24kV 2500A	50 and 60	630	24	50	125	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/5	Capacitor bank functional unit switchgear 24kV 2500A	50 and 60	630	24	50	125	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/6	Transformer functional unit switchgear 24kV 2500A	50 and 60	2500	24	50	125	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/7	Riser (No Circuit Breaker) functional unit switchgear 24kV 2500A	50 and 60	2500	24	50	125	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/8	Longitudinal Bus-bar-tie with riser functional unit switchgear 24kV 2500A	50 and 60	2500	24	50	125	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/9	Line/ Auxiliary services functional unit switchgear 24kV 2000A	50 and 60	630	24	50	125	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/10	Active line functional unit switchgear 24kV 2000A	50 and 60	630	24	50	125	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/11	Neutral maker transformer functional unit switchgear 24kV 2000A	50 and 60	630	24	50	125	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40

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Type code	Description	Rated frequency f_r (Hz)	Rated normal current I_r (A)	Rated Voltage U_r (kV)	Rated power-frequency withstand voltage U_d (kV)	Rated lightning impulse withstand voltage U_p (kV)	Rated short-time withstand current I_k (kA)	Rated duration of short circuit t_k (s)	Rated peak withstand current I_p (kA)	Rated supply voltage of auxiliary and control circuits U_a (Vdc)	Rated supply voltage of auxiliary circuits U_a (Vac)	Class of partitions and shutters	IK degree	IP degree	Loss of service continuity category	Classification IAC	Arc fault current and duration I_A (kA); t_A (s)	Life expectancy (years)
GSCM011/13	Capacitor bank functional unit switchgear 24kV 2000A	50 and 60	630	24	50	125	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/14	Transformer functional unit switchgear 24kV 2000A	50 and 60	2000	24	50	125	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/15	Riser (No Circuit Breaker) functional unit switchgear 24kV 2000A	50 and 60	2000	24	50	125	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/16	Longitudinal Bus-bar-tie with riser functional unit switchgear 24kV 2000A	50 and 60	2000	24	50	125	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/17	Line/ Auxiliary services functional unit switchgear 24kV 1600A	50 and 60	630	24	50	125	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/18	Active line functional unit switchgear 24kV 1600A	50 and 60	630	24	50	125	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/19	Neutral maker transformer functional unit switchgear 24kV 1600A	50 and 60	630	24	50	125	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/21	Capacitor bank functional unit switchgear 24kV 1600A	50 and 60	630	24	50	125	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/22	Transformer functional unit switchgear 24kV 1600A	50 and 60	1600	24	50	125	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/23	Riser (No Circuit Breaker) functional unit switchgear 24kV 1600A	50 and 60	1600	24	50	125	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/24	Longitudinal Bus-bar-tie with riser functional unit switchgear 24kV 1600A	50 and 60	1600	24	50	125	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40

Subject: Enel Grids – MV GIS with fixed mounted MV Circuit Breaker for HV/MV and MV/MV substation

Application Areas

Perimeter: *Global*
Staff Function: -
Service Function: -
Business Line: Enel Grids

Type code	Description	Rated frequency f_r (Hz)	Rated normal current I_r (A)	Rated Voltage U_r (kV)	Rated power-frequency withstand voltage U_d (kV)	Rated lightning impulse withstand voltage U_p (kV)	Rated short-time withstand current I_k (kA)	Rated duration of short circuit t_k (s)	Rated peak withstand current I_p (kA)	Rated supply voltage of auxiliary and control circuits U_a (Vdc)	Rated supply voltage of auxiliary circuits U_a (Vac)	Class of partitions and shutters	IK degree	IP degree	Loss of service continuity category	Classification IAC	Arc fault current and duration I_A (kA); t_A (s)	Life expectancy (years)
GSCM011/25	Line/ Auxiliary services functional unit switchgear 36kV 2000A	50 and 60	630	36	70	170	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/26	Active line functional unit switchgear 36kV 2000A	50 and 60	630	36	70	170	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/27	Neutral maker transformer functional unit switchgear 36kV 2000A	50 and 60	630	36	70	170	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/29	Capacitor bank functional unit switchgear 36kV 2000A	50 and 60	630	36	70	170	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/30	Transformer functional unit switchgear 36kV 2000A	50 and 60	2000	36	70	170	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/31	Riser (No Circuit Breaker) functional unit switchgear 36kV 2000A	50 and 60	2000	36	70	170	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/32	Longitudinal Bus-bar-tie with riser functional unit switchgear 36kV 2000A	50 and 60	2000	36	70	170	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/33	Line/ Auxiliary services functional unit switchgear 36kV 1600A	50 and 60	630	36	70	170	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/34	Active line functional unit switchgear 36kV 1600A	50 and 60	630	36	70	170	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/35	Neutral maker transformer functional unit switchgear 36kV 1600A	50 and 60	630	36	70	170	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/37	Capacitor bank functional unit switchgear 36kV 1600A	50 and 60	630	36	70	170	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40

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Application Areas

Perimeter: *Global*
Staff Function: -
Service Function: -
Business Line: Enel Grids

Type code	Description	Rated frequency f_r (Hz)	Rated normal current I_r (A)	Rated Voltage U_r (kV)	Rated power-frequency withstand voltage U_d (kV)	Rated lightning impulse withstand voltage U_p (kV)	Rated short-time withstand current I_k (kA)	Rated duration of short circuit t_k (s)	Rated peak withstand current I_p (kA)	Rated supply voltage of auxiliary and control circuits U_a (Vdc)	Rated supply voltage of auxiliary circuits U_a (Vac)	Class of partitions and shutters	IK degree	IP degree	Loss of service continuity category	Classification IAC	Arc fault current and duration I_A (kA); t_A (s)	Life expectancy (years)
GSCM011/38	Transformer functional unit switchgear 36kV 1600A	50 and 60	1600	36	70	170	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/39	Riser (No Circuit Breaker) functional unit switchgear 36kV 1600A	50 and 60	1600	36	70	170	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/40	Longitudinal Bus-bar-tie with riser functional unit switchgear 36kV 1600A	50 and 60	1600	36	70	170	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/41	Line/ Auxiliary services functional unit switchgear 36kV 1250A	50 and 60	630	36	70	170	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/42	Active line functional unit switchgear 36kV 1250A	50 and 60	630	36	70	170	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/43	Neutral maker transformer functional unit switchgear 36kV 1250A	50 and 60	630	36	70	170	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/45	Capacitor bank functional unit switchgear 36kV 1250A	50 and 60	630	36	70	170	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/46	Transformer functional unit switchgear 36kV 1250A	50 and 60	1250	36	70	170	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/47	Riser (No Circuit Breaker) functional unit switchgear 36kV 1250A	50 and 60	1250	36	70	170	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/48	Longitudinal Bus-bar-tie with riser functional unit switchgear 36kV 1250A	50 and 60	1250	36	70	170	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/49	Bus Bar measures functional unit switchgear 24kV 2500A	50 and 60	2500	24	50	125	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40

Subject: Enel Grids – MV GIS with fixed mounted MV Circuit Breaker for HV/MV and MV/MV substation

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

Type code	Description	Rated frequency f_r (Hz)	Rated normal current I_r (A)	Rated Voltage U_r (kV)	Rated power-frequency withstand voltage U_d (kV)	Rated lightning impulse withstand voltage U_p (kV)	Rated short-time withstand current I_k (kA)	Rated duration of short circuit t_k (s)	Rated peak withstand current I_p (kA)	Rated supply voltage of auxiliary and control circuits U_a (Vdc)	Rated supply voltage of auxiliary circuits U_a (Vac)	Class of partitions and shutters	IK degree	IP degree	Loss of service continuity category	Classification IAC	Arc fault current and duration I_A (kA); t_A (s)	Life expectancy (years)
GSCM011/50	Bus Bar measures functional unit switchgear 24kV 2000A	50 and 60	2000	24	50	125	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/51	Bus Bar measures functional unit switchgear 24kV 1600A	50 and 60	1600	24	50	125	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/52	Bus Bar measures functional unit switchgear 36kV 2000A	50 and 60	2000	36	70	170	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/53	Bus Bar measures functional unit switchgear 36kV 1600A	50 and 60	1600	36	70	170	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/54	Bus Bar measures functional unit switchgear 36kV 1250A	50 and 60	1250	36	70	170	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/55	Transversal Bus Bar-tie functional unit switchgear 24kV 2500A	50 and 60	2500	24	50	125	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/56	Transversal Bus Bar-tie functional unit switchgear 24kV 2000A	50 and 60	2000	24	50	125	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/57	Transversal Bus Bar-tie functional unit switchgear 24kV 1600A	50 and 60	1600	24	50	125	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/58	Transversal Bus Bar-tie functional unit switchgear 36kV 2000A	50 and 60	2000	36	70	170	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/59	Transversal Bus Bar-tie functional unit switchgear 36kV 1600A	50 and 60	1600	36	70	170	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40
GSCM011/60	Transversal Bus Bar-tie functional unit switchgear 36kV 1250A	50 and 60	1250	36	70	170	25	1	65 (with d.c. time = 45 ms)	According to table 7	According to table 7	PM	07	3XD (65 for GAS compartment)	LSC2	AFLR	25;1	40

Table 12 – Switchgear functional unit electrical ratings



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Subject: Enel Grids – MV GIS with fixed mounted MV Circuit Breaker for HV/MV and MV/MV substation

Application Areas

Perimeter: *Global*
Staff Function: -
Service Function: -
Business Line: Enel Grids

8.6 Annex F – Circuit Breaker electrical ratings

Type code	Description	Rated normal current I _r (A)	Rated short circuit breaking current I _{sc} (kA)	Rated operating sequence CB for rapid auto-reclosing*	Break-time (ms)	Rated first-pole-to-clear factor k _{pp}	Rated line charging breaking current I _l (A)	Rated cable-charging breaking current I _c (A)	Rated single capacitor bank-breaking current I _{sb} (A)	Rated back-to-back capacitor bank breaking current I _{bb} (A)	Rated back-to-back capacitor bank inrush making current I _{bi} (kA) fbi 4250 Hz	Circuit Breaker command Type
GSCM011/1	Line/Auxiliary services functional unit switchgear 24kV 2500A	630	25	O – 0,3'' – CO – 15'' – CO	60 ÷ 100	1,3 and 1,5	10	31,5	400	NA	NA	A
GSCM011/2	Active line functional unit switchgear 24kV 2500A	630	25	O – 0,3'' – CO – 15'' – CO	60 ÷ 100	1,3 and 1,5	10	31,5	400	NA	NA	A
GSCM011/3	Neutral maker transformer functional unit switchgear 24kV 2500A	630	25	O – 0,3'' – CO – 15'' – CO	60 ÷ 100	1,3 and 1,5	10	31,5	400	NA	NA	A (B only for IT and RO supplies)
GSCM011/5	Capacitor bank functional unit switchgear 24kV 2500A	630	25	O – 0,3'' – CO – 15'' – CO	60 ÷ 100	1,3 and 1,5	10	31,5	400	400	20	A
GSCM011/6	Transformer functional unit switchgear 24kV 2500A	2500	25	O – 0,3'' – CO – 15'' – CO	60 ÷ 100	1,3 and 1,5	10	31,5	400	NA	NA	A (B only for IT and RO supplies)
GSCM011/8	Longitudinal Bus-bar-tie with riser functional unit switchgear 24kV 2500A	2500	25	O – 0,3'' – CO – 15'' – CO	60 ÷ 100	1,3 and 1,5	10	31,5	400	NA	NA	A
GSCM011/9	Line/Auxiliary services functional unit switchgear 24kV 2000A	630	25	O – 0,3'' – CO – 15'' – CO	60 ÷ 100	1,3 and 1,5	10	31,5	400	NA	NA	A
GSCM011/10	Active line functional unit switchgear 24kV 2000A	630	25	O – 0,3'' – CO – 15'' – CO	60 ÷ 100	1,3 and 1,5	10	31,5	400	NA	NA	A
GSCM011/11	Neutral maker transformer functional unit switchgear 24kV 2000A	630	25	O – 0,3'' – CO – 15'' – CO	60 ÷ 100	1,3 and 1,5	10	31,5	400	NA	NA	A (B only for IT and RO supplies)
GSCM011/13	Capacitor bank functional unit switchgear 24kV 2000A	630	25	O – 0,3'' – CO – 15'' – CO	60 ÷ 100	1,3 and 1,5	10	31,5	400	400	20	A
GSCM011/14	Transformer functional unit switchgear 24kV 2000A	2000	25	O – 0,3'' – CO – 15'' – CO	60 ÷ 100	1,3 and 1,5	10	31,5	400	NA	NA	A (B only for IT and RO supplies)
GSCM011/16	Longitudinal Bus-bar-tie with riser functional unit switchgear 24kV 2000A	2000	25	O – 0,3'' – CO – 15'' – CO	60 ÷ 100	1,3 and 1,5	10	31,5	400	NA	NA	A
GSCM011/17	Line/Auxiliary services functional unit switchgear 24kV 1600A	630	25	O – 0,3'' – CO – 15'' – CO	60 ÷ 100	1,3 and 1,5	10	31,5	400	NA	NA	A



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Application Areas

Perimeter: *Global*
Staff Function: -
Service Function: -
Business Line: Enel Grids

Type code	Description	Rated normal current I _r (A)	Rated short circuit breaking current I _{sc} (kA)	Rated operating sequence CB for rapid auto-reclosing*	Break-time (ms)	Rated first-pole-to-clear factor k _{pp}	Rated line charging breaking current I _l (A)	Rated cable-charging breaking current I _c (A)	Rated single capacitor bank-breaking current I _{sb} (A)	Rated back-to-back capacitor bank breaking current I _{bb} (A)	Rated back-to-back capacitor bank inrush making current I _{bi} (kA) fbi 4250 Hz	Circuit Breaker command Type
GSCM011/18	Active line functional unit switchgear 24kV 1600A	630	25	O – 0,3'' – CO – 15'' – CO	60 ÷100	1,3 and 1,5	10	31,5	400	NA	NA	A
GSCM011/19	Neutral maker transformer functional unit switchgear 24kV 1600A	630	25	O – 0,3'' – CO – 15'' – CO	60 ÷100	1,3 and 1,5	10	31,5	400	NA	NA	A (B only for IT and RO supplies)
GSCM011/21	Capacitor bank functional unit switchgear 24kV 1600A	630	25	O – 0,3'' – CO – 15'' – CO	60 ÷100	1,3 and 1,5	10	31,5	400	400	20	A
GSCM011/22	Transformer functional unit switchgear 24kV 1600A	1600	25	O – 0,3'' – CO – 15'' – CO	60 ÷100	1,3 and 1,5	10	31,5	400	NA	NA	A (B only for IT and RO supplies)
GSCM011/24	Longitudinal Bus-bar-tie with riser functional unit switchgear 24kV 1600A	1600	25	O – 0,3'' – CO – 15'' – CO	60 ÷100	1,3 and 1,5	10	31,5	400	NA	NA	A
GSCM011/25	Line/Auxiliary services functional unit switchgear 36kV 2000A	630	25	O – 0,3'' – CO – 15'' – CO	60 ÷100	1,3 and 1,5	10	50	400	NA	NA	A
GSCM011/26	Active line functional unit switchgear 36kV 2000A	630	25	O – 0,3'' – CO – 15'' – CO	60 ÷100	1,3 and 1,5	10	50	400	NA	NA	A
GSCM011/27	Neutral maker transformer functional unit switchgear 36kV 2000A	630	25	O – 0,3'' – CO – 15'' – CO	60 ÷100	1,3 and 1,5	10	50	400	NA	NA	A (B only for IT and RO supplies)
GSCM011/29	Capacitor bank functional unit switchgear 36kV 2000A	630	25	O – 0,3'' – CO – 15'' – CO	60 ÷100	1,3 and 1,5	10	50	400	400	20	A
GSCM011/30	Transformer functional unit switchgear 36kV 2000A	2000	25	O – 0,3'' – CO – 15'' – CO	60 ÷100	1,3 and 1,5	10	50	400	NA	NA	A (B only for IT and RO supplies)
GSCM011/32	Longitudinal Bus-bar-tie with riser functional unit switchgear 36kV 2000A	2000	25	O – 0,3'' – CO – 15'' – CO	60 ÷100	1,3 and 1,5	10	50	400	NA	NA	A
GSCM011/33	Line/Auxiliary services functional unit switchgear 36kV 1600A	630	25	O – 0,3'' – CO – 15'' – CO	60 ÷100	1,3 and 1,5	10	50	400	NA	NA	A
GSCM011/34	Active line functional unit switchgear 36kV 1600A	630	25	O – 0,3'' – CO – 15'' – CO	60 ÷100	1,3 and 1,5	10	50	400	NA	NA	A
GSCM011/35	Neutral maker transformer functional unit switchgear 36kV 1600A	630	25	O – 0,3'' – CO – 15'' – CO	60 ÷100	1,3 and 1,5	10	50	400	NA	NA	A (B only for IT and RO supplies)

Subject: Enel Grids – MV GIS with fixed mounted MV Circuit Breaker for HV/MV and MV/MV substation

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

Type code	Description	Rated normal current I _r (A)	Rated short circuit breaking current I _{sc} (kA)	Rated operating sequence CB for rapid auto-reclosing*	Break-time (ms)	Rated first-pole-to-clear factor k _{pp}	Rated line charging breaking current I _l (A)	Rated cable-charging breaking current I _c (A)	Rated single capacitor bank-breaking current I _{sb} (A)	Rated back-to-back capacitor bank breaking current I _{bb} (A)	Rated back-to-back capacitor bank inrush making current I _{bi} (kA) fbi 4250 Hz	Circuit Breaker command Type
GSCM011/37	Capacitor bank functional unit switchgear 36kV 1600A	630	25	O – 0,3'' – CO – 15'' – CO	60 ÷100	1,3 and 1,5	10	50	400	400	20	A
GSCM011/38	Transformer functional unit switchgear 36kV 1600A	1600	25	O – 0,3'' – CO – 15'' – CO	60 ÷100	1,3 and 1,5	10	50	400	NA	NA	A (B only for IT and RO supplies)
GSCM011/40	Longitudinal Bus-bar-tie with riser functional unit switchgear 36kV 1600A	1600	25	O – 0,3'' – CO – 15'' – CO	60 ÷100	1,3 and 1,5	10	50	400	NA	NA	A
GSCM011/41	Line/Auxiliary services functional unit switchgear 36kV 1250A	630	25	O – 0,3'' – CO – 15'' – CO	60 ÷100	1,3 and 1,5	10	50	400	NA	NA	A
GSCM011/42	Active line functional unit switchgear 36kV 1250A	630	25	O – 0,3'' – CO – 15'' – CO	60 ÷100	1,3 and 1,5	10	50	400	NA	NA	A
GSCM011/43	Neutral maker transformer functional unit switchgear 36kV 1250A	630	25	O – 0,3'' – CO – 15'' – CO	60 ÷100	1,3 and 1,5	10	50	400	NA	NA	A (B only for IT and RO supplies)
GSCM011/45	Capacitor bank functional unit switchgear 36kV 1250A	630	25	O – 0,3'' – CO – 15'' – CO	60 ÷100	1,3 and 1,5	10	50	400	400	20	A
GSCM011/46	Transformer functional unit switchgear 36kV 1250A	1250	25	O – 0,3'' – CO – 15'' – CO	60 ÷100	1,3 and 1,5	10	50	400	NA	NA	A
GSCM011/48	Longitudinal Bus-bar-tie with riser functional unit switchgear 36kV 1250A	1250	25	O – 0,3'' – CO – 15'' – CO	60 ÷100	1,3 and 1,5	10	50	400	NA	NA	A
GSCM011/55	Transversal Bus Bar-tie functional unit switchgear 24kV 2500A	2500	25	O – 0,3'' – CO – 15'' – CO	60 ÷100	1,3 and 1,5	10	31,5	400	NA	NA	A
GSCM011/56	Transversal Bus Bar-tie functional unit switchgear 24kV 2000A	2000	25	O – 0,3'' – CO – 15'' – CO	60 ÷100	1,3 and 1,5	10	31,5	400	NA	NA	A
GSCM011/57	Transversal Bus Bar-tie functional unit switchgear 24kV 1600A	1600	25	O – 0,3'' – CO – 15'' – CO	60 ÷100	1,3 and 1,5	10	31,5	400	NA	NA	A
GSCM011/58	Transversal Bus Bar-tie functional unit switchgear 36kV 2000A	2000	25	O – 0,3'' – CO – 15'' – CO	60 ÷100	1,3 and 1,5	10	50	400	NA	NA	A

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Application Areas

Perimeter: *Global*
Staff Function: -
Service Function: -
Business Line: Enel Grids

Type code	Description	Rated normal current I _r (A)	Rated short circuit breaking current I _{sc} (kA)	Rated operating sequence CB for rapid auto-reclosing*	Break-time (ms)	Rated first-pole-to-clear factor k _{pp}	Rated line charging breaking current I _l (A)	Rated cable-charging breaking current I _c (A)	Rated single capacitor bank-breaking current I _{sb} (A)	Rated back-to-back capacitor bank breaking current I _{bb} (A)	Rated back-to-back capacitor bank inrush making current I _{bi} (kA) fbi 4250 Hz	Circuit Breaker command Type
GSCM011/59	Transversal Bus Bar-tie functional unit switchgear 36kV 1600A	1600	25	O – 0,3” – CO – 15” – CO	60 ÷ 100	1,3 and 1,5	10	50	400	NA	NA	A
GSCM011/60	Transversal Bus Bar-tie functional unit switchgear 36kV 1250A	1250	25	O – 0,3” – CO – 15” – CO	60 ÷ 100	1,3 and 1,5	10	50	400	NA	NA	A

*O - 1s - CO – 25” - CO -35”- CO operating cycle shall be considered for Enel Distribuição São Paulo. Manufacturer shall send a declaration for this value

Table 13 – Circuit Breaker electrical ratings



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Application Areas

Perimeter: Global
Staff Function: -
Service Function: -
Business Line: Enel Grids

8.7 Annex G – Material Codes

enel type	Description	Argentina	Brazil	Chile	Colombia	Italy	Perú	Rumania	Spain
GSCM011/1	Line/Auxiliary services functional unit switchgear 24kV 2500A	0109-0477	140461	140592	140663	140307	140769	140053	
GSCM011/1	Line/Auxiliary services functional unit switchgear 24kV 2500A SF6 Free	0109-0478	140691	140532	140601	140413	140760	140063	
GSCM011/2	Active line functional unit switchgear 24kV 2500A		140447	140591		140305	140768	140055	
GSCM011/2	Active line functional unit switchgear 24kV 2500A SF6 Free		140690	140531		140412	140759	140064	
GSCM011/3	Neutral maker transformer functional unit switchgear 24kV 2500A		140451	140590	140660	140306	140767	140054	
GSCM011/3	Neutral maker transformer functional unit switchgear 24kV 2500A SF6 Free		140689	140530	140598	140411	140758	140065	
GSCM011/5	Capacitor bank functional unit switchgear 24kV 2500A	0109-0479	140424	140588	140659	140303	140765	140057	
GSCM011/5	Capacitor bank functional unit switchgear 24kV 2500A SF6 Free	0109-0480	140687	140528	140597	140409	140756	140067	
GSCM011/6	Transformer functional unit switchgear 24kV 2500A	0109-0489	140459	140587	140664	140267	140764	140058	
GSCM011/6	Transformer functional unit switchgear 24kV 2500A SF6 Free	0109-0490	140686	140527	140602	140408	140753	140068	
GSCM011/7	Riser (No Circuit Breaker) functional unit switchgear 24kV 2500A	0109-0483	140423	140586		140302	140763	140059	
GSCM011/7	Riser (No Circuit Breaker) functional unit switchgear 24kV 2500A SF6 Free	0109-0484	140685	140526		140407	140754	140069	
GSCM011/8	Longitudinal Bus-bar-tie with riser functional unit switchgear 24kV 2500A	0109-0485	140457	140585	140661	140301	140762	140060	
GSCM011/8	Longitudinal Bus-bar-tie with riser functional unit switchgear 24kV 2500A SF6 Free	0109-0486	140675	140525	140599	140406	140755	140070	
GSCM011/9	Line/Auxiliary services functional unit switchgear 24kV 2000A		140456	140584		140299	140749	140094	140872
GSCM011/9	Line/Auxiliary services functional unit switchgear 24kV 2000A SF6 Free		140684	140524		140355	140740	140071	140915
GSCM011/10	Active line functional unit switchgear 24kV 2000A		140455	140583		140298	140750	140095	140868
GSCM011/10	Active line functional unit switchgear 24kV 2000A SF6 Free		140683	140523		140405	140739	140072	140914
GSCM011/11	Neutral maker transformer functional unit switchgear 24kV 2000A		140453	140582		140297	140751	140096	
GSCM011/11	Neutral maker transformer functional unit switchgear 24kV 2000A SF6 Free		140682	140522		140404	140738	140073	
GSCM011/13	Capacitor bank functional unit switchgear 24kV 2000A		140443	140580		140295	140746	140098	140871
GSCM011/13	Capacitor bank functional unit switchgear 24kV 2000A SF6 Free		140680	140520		140402	140736	140076	140911
GSCM011/14	Transformer functional unit switchgear 24kV 2000A		140439	140579		140265	140745	140099	140869
GSCM011/14	Transformer functional unit switchgear 24kV 2000A SF6 Free		140679	140519		140401	140735	140077	140913
GSCM011/15	Riser (No Circuit Breaker) functional unit switchgear 24kV 2000A		140436	140578		140294	140744	140100	140870
GSCM011/15	Riser (No Circuit Breaker) functional unit switchgear 24kV 2000A SF6 Free		140678	140518		140400	140734	140078	140909
GSCM011/16	Longitudinal Bus-bar-tie with riser functional unit switchgear 24kV 2000A		140438	140577		140293	140743	140101	140864
GSCM011/16	Longitudinal Bus-bar-tie with riser functional unit switchgear 24kV 2000A SF6 Free		140677	140517		140399	140733	140079	140918
GSCM011/17	Line/Auxiliary services functional unit switchgear 24kV 1600A		140445	140576		140291		140102	140862
GSCM011/17	Line/Auxiliary services functional unit switchgear 24kV 1600A SF6 Free		140656	140516		140398		140080	140906
GSCM011/18	Active line functional unit switchgear 24kV 1600A		140422	140575		140290		140103	140861
GSCM011/18	Active line functional unit switchgear 24kV 1600A SF6 Free		140655	140515		140397		140081	140910
GSCM011/19	Neutral maker transformer functional unit switchgear 24kV 1600A		140421	140574		140289		140074	
GSCM011/19	Neutral maker transformer functional unit switchgear 24kV 1600A SF6 Free		140676	140514		140396		140082	
GSCM011/21	Capacitor bank functional unit switchgear 24kV 1600A		140420	140572		140287		140105	140854
GSCM011/21	Capacitor bank functional unit switchgear 24kV 1600A SF6 Free		140653	140512		140414		140084	140905
GSCM011/22	Transformer functional unit switchgear 24kV 1600A		140418	140571		140263		140106	140859
GSCM011/22	Transformer functional unit switchgear 24kV 1600A SF6 Free		140652	140511		140394		140085	140902



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Application Areas

Perimeter: *Global*
Staff Function: -
Service Function: -
Business Line: Enel Grids

enel type	Description	Argentina	Brazil	Chile	Colombia	Italy	Perú	Rumania	Spain
GSCM011/23	Riser (No Circuit Breaker) functional unit switchgear 24kV 1600A		140417	140570		140286		140107	140858
GSCM011/23	Riser (No Circuit Breaker) functional unit switchgear 24kV 1600A SF6 Free		140643	140510		140393		140086	140901
GSCM011/24	Longitudinal Bus-bar-tie with riser functional unit switchgear 24kV 1600A		140416	140569		140285		140108	140853
GSCM011/24	Longitudinal Bus-bar-tie with riser functional unit switchgear 24kV 1600A SF6 Free		140644	140509		140392		140087	140904
GSCM011/25	Line/Auxiliary services functional unit switchgear 36kV 2000A		140415	140568		140315			140857
GSCM011/25	Line/Auxiliary services functional unit switchgear 36kV 2000A SF6 Free		140645	140508		140391			140894
GSCM011/26	Active line functional unit switchgear 36kV 2000A		140414	140567		140314			140855
GSCM011/26	Active line functional unit switchgear 36kV 2000A SF6 Free		140646	140507		140390			140895
GSCM011/27	Neutral maker transformer functional unit switchgear 36kV 2000A		140413	140566		140313			
GSCM011/27	Neutral maker transformer functional unit switchgear 36kV 2000A SF6 Free		140647	140506		140389			
GSCM011/29	Capacitor bank functional unit switchgear 36kV 2000A		140410	140564		140311			140856
GSCM011/29	Capacitor bank functional unit switchgear 36kV 2000A SF6 Free		140650	140504		140387			140888
GSCM011/30	Transformer functional unit switchgear 36kV 2000A		140409	140563		140261			140849
GSCM011/30	Transformer functional unit switchgear 36kV 2000A SF6 Free		140651	140503		140386			140892
GSCM011/31	Riser (No Circuit Breaker) functional unit switchgear 36kV 2000A		140408	140562		140310			140848
GSCM011/31	Riser (No Circuit Breaker) functional unit switchgear 36kV 2000A SF6 Free		140642	140502		140385			140896
GSCM011/32	Longitudinal Bus-bar-tie with riser functional unit switchgear 36kV 2000A		140407	140561		140309			140844
GSCM011/32	Longitudinal Bus-bar-tie with riser functional unit switchgear 36kV 2000A SF6 Free		140641	140501		140384			140891
GSCM011/33	Line/Auxiliary services functional unit switchgear 36kV 1600A		140458	140560		140284			140839
GSCM011/33	Line/Auxiliary services functional unit switchgear 36kV 1600A SF6 Free		140637	140500		140383			140887
GSCM011/34	Active line functional unit switchgear 36kV 1600A		140446	140559		140283			140840
GSCM011/34	Active line functional unit switchgear 36kV 1600A SF6 Free		140635	140499		140382			140886
GSCM011/35	Neutral maker transformer functional unit switchgear 36kV 1600A		140454	140558		140282			
GSCM011/35	Neutral maker transformer functional unit switchgear 36kV 1600A SF6 Free		140630	140498		140381			
GSCM011/37	Capacitor bank functional unit switchgear 36kV 1600A		140442	140556		140273			140847
GSCM011/37	Capacitor bank functional unit switchgear 36kV 1600A SF6 Free		140631	140496		140379			140884
GSCM011/38	Transformer/ Bus-bar-tie functional unit switchgear 36kV 1600A		140444	140555		140259			140837
GSCM011/38	Transformer/ Bus-bar-tie functional unit switchgear 36kV 1600A SF6 Free		140648	140495		140378			140883
GSCM011/39	Riser (No Circuit Breaker) functional unit switchgear 36kV 1600A		140441	140554		140280			140836
GSCM011/39	Riser (No Circuit Breaker) functional unit switchgear 36kV 1600A SF6 Free		140632	140494		140377			140882
GSCM011/40	Longitudinal Bus-bar-tie with riser functional unit switchgear 36kV 1600A		140437	140553		140272			140835
GSCM011/40	Longitudinal Bus-bar-tie with riser functional unit switchgear 36kV 1600A SF6 Free		140633	140493		140376			140885
GSCM011/41	Line/Auxiliary services functional unit switchgear 36kV 1250A		140450	140551	140669	140270			140846
GSCM011/41	Line/Auxiliary services functional unit switchgear 36kV 1250A SF6 Free		140636	140492	140607	140375			140879
GSCM011/42	Active line functional unit switchgear 36kV 1250A		140449	140552		140269			140831
GSCM011/42	Active line functional unit switchgear 36kV 1250A SF6 Free		140639	140491		140374			140880
GSCM011/43	Neutral maker transformer functional unit switchgear 36kV 1250A		140433	140550	140667	140279			
GSCM011/43	Neutral maker transformer functional unit switchgear 36kV 1250A SF6 Free		140640	140490	140604	140373			



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enel type	Description	Argentina	Brazil	Chile	Colombia	Italy	Perú	Rumania	Spain
GSCM011/45	Capacitor bank functional unit switchgear 36kV 1250A		140435	140548	140666	140277			140833
GSCM011/45	Capacitor bank functional unit switchgear 36kV 1250A SF6 Free		140634	140488	140603	140371			140919
GSCM011/46	Transformer functional unit switchgear 36kV 1250A		140429	140547	140670	140257			140845
GSCM011/46	Transformer functional unit switchgear 36kV 1250A SF6 Free		140629	140487	140608	140370			140878
GSCM011/47	Riser (No Circuit Breaker) functional unit switchgear 36kV 1250A		140432	140546		140276			140828
GSCM011/47	Riser (No Circuit Breaker) functional unit switchgear 36kV 1250A SF6 Free		140627	140486		140369			140877
GSCM011/48	Longitudinal Bus-bar-tie with riser functional unit switchgear 36kV 1250A		140430	140545	140730	140275			140897
GSCM011/48	Longitudinal Bus-bar-tie with riser functional unit switchgear 36kV 1250A SF6 Free		140626	140485	140605	140368			140876
GSCM011/49	Bus Bar measures functional unit switchgear 24kV 2500A	0109-0487	140440	140544	140662	140300	140674	140061	
GSCM011/49	Bus Bar measures functional unit switchgear 24kV 2500A SF6 Free	0109-0488	140625	140484	140600	140367	140747	140088	
GSCM011/50	Bus Bar measures functional unit switchgear 24kV 2000A		140431	140543		140292	140742	140109	140865
GSCM011/50	Bus Bar measures functional unit switchgear 24kV 2000A SF6 Free		140624	140483		140366	140732	140089	140907
GSCM011/51	Bus Bar measures functional unit switchgear 24kV 1600A		140428	140542		140268		140110	140851
GSCM011/51	Bus Bar measures functional unit switchgear 24kV 1600A SF6 Free		140623	140482		140365		140090	140899
GSCM011/52	Bus Bar measures functional unit switchgear 36kV 2000A		140427	140541		140308			140842
GSCM011/52	Bus Bar measures functional unit switchgear 36kV 2000A SF6 Free		140622	140481		140364			140874
GSCM011/53	Bus Bar measures functional unit switchgear 36kV 1600A		140426	140540		140271			140838
GSCM011/53	Bus Bar measures functional unit switchgear 36kV 1600A SF6 Free		140621	140480		140363			140900
GSCM011/54	Bus Bar measures functional unit switchgear 36kV 1250A		140425	140539	140668	140274			140829
GSCM011/54	Bus Bar measures functional unit switchgear 36kV 1250A SF6 Free		140620	140479	140606	140362			140916
GSCM011/55	Transversal Bus Bar-tie functional unit switchgear 24kV 2500A	0109-0481	140696	140538	140658	140266	140761	140062	
GSCM011/55	Transversal Bus Bar-tie functional unit switchgear 24kV 2500A SF6 Free	0109-0482	140619	140478	140657	140361	140748	140091	
GSCM011/56	Transversal Bus Bar-tie functional unit switchgear 24kV 2000A		140695	140537		140264	140741	140111	140863
GSCM011/56	Transversal Bus Bar-tie functional unit switchgear 24kV 2000A SF6 Free		140618	140477		140360	140731	140092	140908
GSCM011/57	Transversal Bus Bar-tie functional unit switchgear 24kV 1600A		140694	140536		140262		140112	140852
GSCM011/57	Transversal Bus Bar-tie functional unit switchgear 24kV 1600A SF6 Free		140617	140476		140359		140093	140898
GSCM011/58	Transversal Bus Bar-tie functional unit switchgear 36kV 2000A		140697	140535		140260			140843
GSCM011/58	Transversal Bus Bar-tie functional unit switchgear 36kV 2000A SF6 Free		140615	140475		140358			140889
GSCM011/59	Transversal Bus Bar-tie functional unit switchgear 36kV 1600A		140693	140534		140258			140832
GSCM011/59	Transversal Bus Bar-tie functional unit switchgear 36kV 1600A SF6 Free		140616	140474		140357			140881
GSCM011/60	Transversal Bus Bar-tie functional unit switchgear 36kV 1250A		140692	140533	140665	140256			140830
GSCM011/60	Transversal Bus Bar-tie functional unit switchgear 36kV 1250A SF6 Free		140614	140473	140673	140356			140875

Table 14 – Material codes