Technical Specification code: GRI-GRI-MAT-E&C-0025
Version no. 01 dated 20/12/2022

Subject: GSCT008 Single-phase indoor voltage transformers

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

CONTENTS

THE HEAD OF GLOBAL NETWORK COMPONENTS
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1 DOCUMENT AIMS AND APPLICATION AREA

This document prescribes the technical characteristics, the performance, and the testing methods for indoor voltage transformers to be used in Enel compact type air insulated switchboard of Liberty substation (GSCM690). It applies for the Enel Group Distribution Companies located in the countries listed below:

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

Table 1 - Distribution Companies

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

1.1 Related documents to be implemented at country level

This document doesn't require implementation of further documents.

Anyway, each Enel Grids Company can issue, under the supervision of Enel Grids Global Network Components a detailed document, according to the provisions of the present document and in case of specific needs.

2 DOCUMENT VERSION MANAGEMENT

Version	Date	Main changes description
01	20/12/2022	Issuing of "GSCT008 Single-phase indoor voltage transformers" 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 Network Components unit.
- Enel Grids: Head of Quality unit.

4 REFERENCES

- Integrated Policy for Quality, Health and Safety, Environment, Anti-Bribery and Information Security;
- Stop Work Policy;
- ISO 9001 - Quality Management System – Requirements;
- ISO 14001 - Environmental Management System - Requirements with guidance for use;
- ISO 45001 - Occupational Health and Safety Management System - Requirements with guidance for use;
- ISO 37001 - Anti-bribery Management System - Requirements with guidance for use;
- ISO/IEC 17000 - Conformity assessment – Vocabulary and general principles;
- ISO/IEC 17020 - General criteria for the operation of various types of bodies performing inspection;
- ISO/IEC 17025 - General requirements for the competence of testing and calibration laboratories;
- ISO/IEC 17050-1 - Conformity assessment - Supplier's declaration of conformity - Part 1: General requirements (ISO/IEC 17050-1:2004, corrected version 2007-06-15);
- ISO/IEC 17050-2 - Conformity assessment - Supplier's declaration of conformity - Part 2: Supporting documentation (ISO/IEC 17050-2:2004);

- ISO/IEC 17065 - Conformity assessment – Requirements for bodies certifying products, processes and services;
- IEC 61869-1 “Instrument transformers - Part 1: General requirements”;
- IEC 61869-3 “Instrument transformers - Part 3: Additional requirements for inductive voltage transformers”;
- Material Specification MAT-O&M-NCS-2021-0033-EGIN “GSCG002 Technical Conformity Assessment”;
- Material Specification MAT-E&C-NC-2021-0057-GIN “GSCG003 Employer’s Information Requirements for supplier components”;
- Working instruction WKI-QPT-CMQ-2020-0019-EGIN “Contractual Requirements for Components and Materials Quality management”;
- Construction Specification CNS-O&M-S&L-2021-0032-EGIN “Barcode specification;

4.1 Laws

4.1.1 Argentina

- Norma IRAM.

4.1.2 Brazil

- NR-10 - segurança em instalações e serviços em eletricidade.

4.1.3 Chile

- NSEG 5. E.n.71 - Reglamento de Instalaciones Eléctricas de Corrientes Fuertes.

4.1.4 Colombia

- RETIE - Reglamento Técnico de Instalaciones Eléctricas.
- Ley 400 de 1997.

4.1.5 Italy

- D.Lgs n. 81 of the 9th of April 2008 and subsequent modifications.

4.1.6 Peru

- Código Nacional de Electricidad Suministro.

4.1.7 Romania

- Legea securităţii şi sănătăţii în muncă nr.319/2006, cu modificările şi completările ulterioare.

4.1.8 Spain

- 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.

Group Pillar References:

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

5 ORGANIZATIONAL PROCESS POSITION IN THE PROCESS TAXONOMY

Value Chain/Process Area: Engineering and Construction

Macro Process: Devices and Components Development

Process: Standard Catalog Management

6 DEFINITIONS AND ACRONYMS

Acronym and Key words	Description
Medium Voltage (MV)	System with a nominal operative voltage between the phases higher than 1 kV to 35 kV included. NOTE: The boundary value between medium voltage and high voltage depends on local and historical circumstances or on common usage. Nevertheless for internal standardization purposes, medium voltage is defined as a system with a nominal operative voltage between the phases higher than 1 kV to 35 kV included”

Technical Conformity Assessment (TCA)	A “conformity assessment”[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

7 DESCRIPTION

7.1 List of Components

Components are identified with the Global Types indicated in the following table, also indicating the codes that are to be determined (TBD).

Global types are associated with country codes (identification numbers) for the relevant countries of application.

GS Type Code	Material Code (TAM)							
	Argentina	Chile	Italy	Romania	Spain	Brazil	Colombia	Peru
GSCT008/1			530030	TBD	TBD			
GSCT008/2								TBD
GSCT008/3			530029		TBD			
GSCT008/4						530085	TBD	
GSCT008/5	TBD				TBD			
GSCT008/6							TBD	
GSCT008/7		TBD						
GSCT008/8						530084		
GSCT008/9						530083	TBD	
GSCT008/10					TBD			
GSCT008/11			530028	TBD	TBD			
GSCT008/12								TBD

Table 2 – Type codes

7.2 Service conditions

Unless otherwise specified the normal service conditions defined in IEC 61869 series apply.

- The temperature category to be considered is -5/40 °C;
- For Colombia the altitude to be considered is 2700 m.

7.3 Technical characteristics

Global types associated with main ratings, requirements and service conditions prescribed are indicated in the following tables:

GS Type Code	Rated frequency (Hz)	Rated primary voltage (kV)	Insulation level	VT Trolley Enel Global Type
GSCT008/1	50	20/√3	24/50/125	GSCM734/3
GSCT008/2	60	20/√3		
GSCT008/3	50	15/√3	17,5/38/95	GSCM734/2
GSCT008/4	60	13,8/√3		
GSCT008/5	50	13,2/√3		
GSCT008/6	60	13,2/√3		
GSCT008/7	50	12/√3		
GSCT008/8	60	12/√3		
GSCT008/9	60	11,4/√3		
GSCT008/10	50	11/√3		
GSCT008/11	50	10/√3	12/28/75	GSCM734/1
GSCT008/12	60	10/√3		

Table 3 – List of components

MAIN RATINGS FOR ALL GLOBAL TYPES		
Secondary winding 1 (measurement) rated voltage (V)		$\frac{100}{\sqrt{3}}$
Secondary winding 2 (protection) rated voltage (V)		$\frac{100}{3}$
Rated burden and accuracy class	Secondary winding 1	0-10 VA 0,2 / 40 VA 0,5 – 3P (*)
	Secondary winding 2	10 VA 6P / 50 VA 3P
Rated voltage factor		1.9 for 8 hours
Maximum dimensions (mm)		440L x 200W x 300H *(see Figure 1)*

Table 4 – Common main ratings

(*) 100/√3 winding can meet accuracy requirements when the other secondary winding is open.

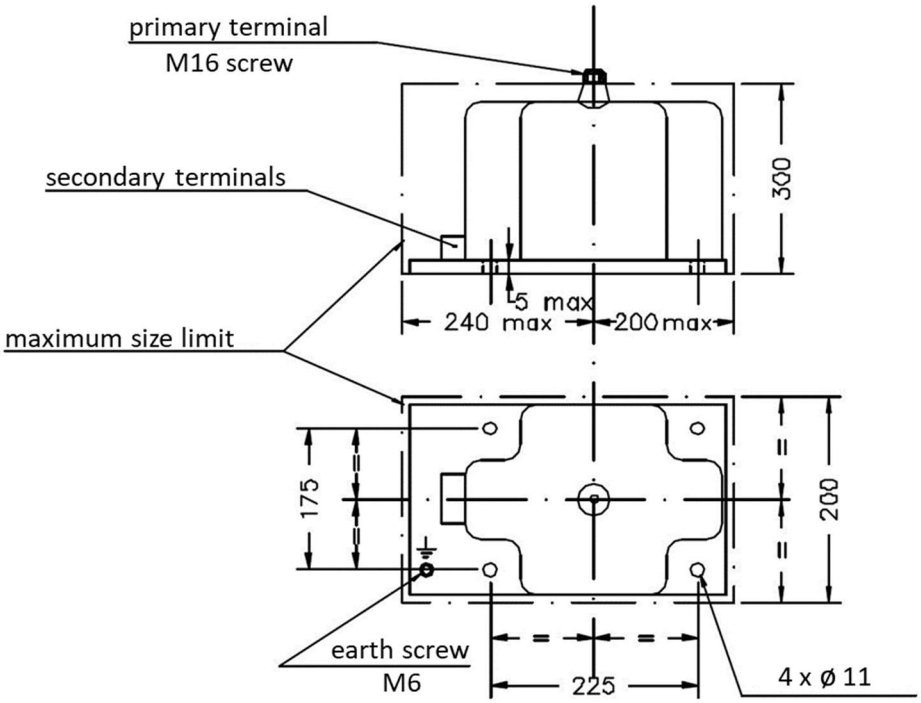

Figure 1 - Example of single-phase voltage transformer

7.4 Construction characteristics

7.4.1 General

Refers to IEC 61869-Series for indoor voltage transformer.

Voltage transformers shall be made in resin, the type of resin and the characteristics shall be defined in the manufacturer documentation.

In order to avoid ferroresonance effect, the induction value shall be kept below 0.7 Tesla when rated voltage is applied.

Primary terminal shall be realized with a thread suitable for a screw M16 x 20 mm, included in the supply.

Secondary terminals shall be realized with M6 screws, suitable for conductor of 4 ÷ 10 mm2.

Secondary terminals shall be protected with a proper removable box suitable for cable connection.

All external parts made of steel shall have an electrolytic zinc coating not less than Fe/Zn 12 (UNI ISO 2081).

The voltage transformer shall be provided with proper earth connecting point.

The rating plate shall be in compliance with IEC-61869 Series.

7.4.2 Mechanical resistance of the terminals

Primary and secondary terminals fixed on the resin shall be designed to withstand the mechanical stresses indicated in the following table:

	Thread diameters (M)	Tightening torque (Nm)
Primary terminal	16	50 (*)
Secondary terminals	6	3,0

Table 5 - Mechanical resistance of the terminals

(*) 50 Nm of tightening torque is intended only for type test. For installation refer to the manual provided by the supplier.

7.4.3 Manual and packaging

For each VT the manual for installation and operation, in the language of the Country to be delivered, shall be provided. It shall also include the procedures to be adopted for storage, transportation, and dismantling.

Packing for transportation and storage (which does not take part in the technical conformity assessment process) shall be compliant to the documents referring of each Country.

7.5 List of tests

7.5.1 General

Type, routine and special tests shall be performed in accordance with IEC 61869-1 and IEC 61869-3 for this typology of voltage transformers, with the additional tests prescribed in the following.

7.5.2 Type tests

7.5.2.1 Verification of the compliance to this technical specification

The characteristics of the components, including ratings and design requirements, shall be in compliance with this technical specification.

The visual inspection shall be performed to verify the absence of imperfections and defects.

7.5.2.2 Tightening torque test on terminals

To be performed on primary and secondary terminals to verify the mechanical resistance prescribed in this document (p. 7.4.2).

7.5.2.3 Mechanical stress test on primary terminal

The primary terminal shall resist to the stress transmitted by a force of 25 daN applied to the upper contact. This force shall be applied alternately along the 4 principal and perpendicular directions, for a time of 30 s for each application. At the end of the test the VT mustn’t be damaged.

7.5.3 Routine tests

7.5.3.1 Visual inspection

The visual inspection shall verify the compliance with this technical specification and the approved prototype and the absence of imperfections and defects.

7.6 Documentation

The documentation for approval of prototypes shall be arranged in accordance with the specific procedure for the Technical Conformity Assessment (TCA).

For delivery generally the VT shall be supplied with the following documentation:

- Drawings of the VT with overall dimensions, primary and secondary terminals arrangement;
- Tests report;
- Manual for installation and operation with clear indication for secondary terminals connections.

8 ANNEXES

8.1 Annex A - Check list for tender

Example of check list to be used for tender:

Global Standard:			**To be filled by the Supplier**
GSCT008 …			
Enel Type:	CSCT008/1		**Supplier code:**
Enel Code:	……..		…..
Enel Company:	All		**Supplier Name:**
Country:	All		……
Description	**Required value**		**Offered value:**
Highest voltage for equipment - Um (kV)	24		……
Rated power frequency withstand voltage (kV)	50		……
Rated lightnig impulse withstand voltage (kV)	125		……
Rated frequency (Hz)	50		……
Rated transformation ratio (kV/V/V)	20/√3 ; 100/√3 ; 100/3		……
Rated voltage factor	1,9 for 8 hour		……
Accuracy class designation for 100/√3 winding	0-10 VA 0,2 / 40 VA 0,5 – 3 P		……
Accuracy class designation for 100/3 winding	10 VA 6P / 50 VA 3P		
Ambient temperature (°C)	-5 / + 40		……
Type of resin insulation	Epoxy /poliuretanic resin		……
Overall dimensions (L x W x H) (mm)	440 x 200 x 300		……
Documentation			
Drawing with overall dimensions	to be attached		……
Electrical scheme of instrument transformer	to be attached		……
List of deviations to technical specifications	No / List attached		……

Table 6 – Check list