

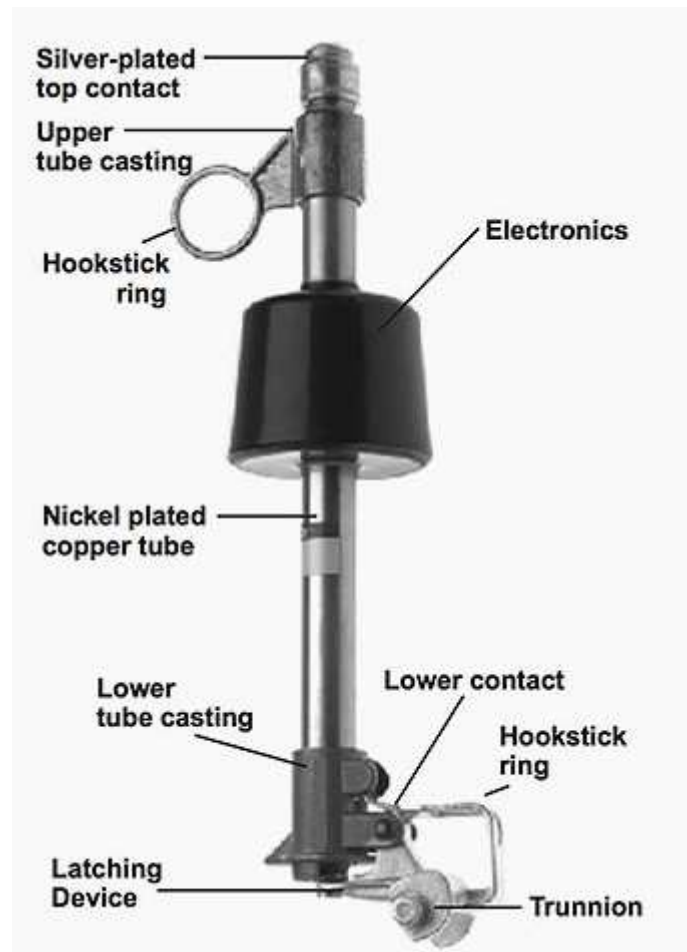
## MV SINGLE-PHASE SECTIONALIZERS


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**EXAMPLE OF SECTIONALIZER**


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## 1. SCOPE

The scope of this document is to provide the technical requirements for the supply of MV single-phase alternating-current automatic line sectionalizers to be used in overhead lines of the Enel Distribution companies listed below:

- **Enel Distribución Colombia**                      **Colombia**
- **Enel Distribución Perú**                              **Perú**
- **Edesur**    **Argentina**
- **Enel Distribución Chile**                              **Chile**
- **Enel Distribuição Ceará**                              **Brazil**
- **Enel Distribuição Rio**                                  **Brazil**
- **Enel Distribuição Goiás**                              **Brazil**
- **Enel Distribuição São Paulo**                          **Brazil**

In order to simplify the terminology in this document, the term “automatic line sectionalizer” has been substituted for “sectionalizer”.

## 2. APPLICATION FIELD

A sectionalizer is a self-contained circuit-opening device that automatically opens the main electrical circuit through it after sensing and responding to a predetermined number of successive main current impulses equal to or greater than a predetermined magnitude.

The sectionalizers are designed to operate in conjunction with three-phase reclosers to be located in the overhead line heads, sectioning the line during one of the reconnection cycles and while the line is deenergized, so that they will not be required to have breaking current capability


The sectionalizer is very similar in outward appearance to a distribution open dropout-type fuse cutout and is used in a distribution cutout fuse support (mounting).

## 3. LIST OF COMPONENTS

The following components are covered by this global standard:

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

**Table 1: List of components**

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## 4. REFERENCE LAWS AND STANDARDS

### 4.1 Laws

#### 4.1.1 Colombia

RETIE - Reglamento Técnico de Instalaciones Eléctricas.

The sectionalizers must have Certificate of Product Compliance with RETIE.

### 4.2 Standards

#### 4.2.1 Common international standards

The below listed reference documents shall be intended in the in-force edition at the contract date. Unless otherwise specified, these documents are valid until the new editions replace them.

- **ANSI/IEEE C37.63-2013** Standard Requirements for Overhead, Pad-Mounted, Dry-Vault, and Submersible Automatic Line Sectionalizers for Alternating Current Systems Up to 38 kV.
- **IEC 60529:1989** Degrees of protection provided by enclosures (IP Code)

#### 4.2.2 Local standards

- **E-MT-001** Especificación de desconectores fusibles monofásicos
- **E.T. 277** Chaves Fusíveis tipo C

## 5. SERVICE CONDITIONS


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

- SPS class (IEC 60815-1):
  - Heavy (d)
  - Enel Ceará (Brasil) - Very Heavy (e)

## 6. DESIGN AND CONSTRUCTION

### 6.1 Constructive characteristics

The sectionalizer has to be manufactured in compliance with the reference standards pointed out in section 4.2.

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The sectionalizer must be designed to allow the installation in the distribution fuse cutout support of each Company (refer to E-MT-001 standard for details). It must allow the use of the load opening tool (loadbuster)

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

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

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

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

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

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

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

The sectionalizer must allow closing under load.

## 6.2 Operational characteristics

The sectionalizer must meet the following operational requirements:

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

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


In the case of radiofrequency communication, it must be possible to adjust the communication channel to avoid interference with equipment installed in the vicinity.

The electronic sectionalizers must be immune to electromagnetic disturbances coming from the line in which they are connected, as well as from any other distribution line that is in the vicinity. The type test protocols that accredit these conditions must be presented (EMC Tests and Radio Communication Compliance (FCC & CE Marking))

The sectionalizer must be configured with the aid of computers through the USB port (or a different port with a suitable USB converter), using software provided by the manufacturer of the equipment compatible with the Windows platform. This software must be supplied together with the sectionalizer.

It must be possible to adjust the following parameters in the sectionalizer:

- Number of operations for the opening
- Actuating current
- Reset time
- Communication channel
- Opening type: single-phase, two-phase or three-phase

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- Frequency
- Inrush threshold [%] (Inrush current)
- Dead line threshold [mA]

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

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

The sectionalizer must have a microcontroller with firmware upgradeable to allow the incorporation of new features.

### 6.3 Sectionalizer markings

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

## 7. RATINGS

Description	Values		
Rated maximum voltage (kV)	15	27	38
Rated power frequency (Hz)	50 and 60	50 and 60	50 and 60
Rated lightning impulse withstand voltage (kV)	110	125	150
Rated power-frequency dry withstand voltage (kV)	50	60	70
Rated power-frequency wet withstand voltage (kV)	45	50	60
Rated continuous current (A)	200	200	200
Rated short-time withstand current 1s (A)	8000	8000	8000
Rated short-time withstand current 10s (A)	3000	3000	3000



Rated peak withstand current (A)	20000	20000	20000
Minimum actuating current (A)	5	5	5
Actuating current range (A)	5 to 200 (1A steps)	5 to 200 (1A steps)	5 to 200 (1A steps)
Number of operations for the opening	1 to 4	1 to 4	1 to 4
Dead-line detection current (mA)	<300	<300	<300
Dead-line detection time (ms)	<100	<100	<100
Reset time (s)	10 a 100	10 a 100	10 a 100
Maximum time for opening (s)	0,5	0,5	0,5

**Table 2. Technical characteristics**

## 8. TESTS

### 8.1 Type Tests

#### 8.1.1 General conditions for tests

The type test are for the purpose of proving the characteristics of the sectionalizer, its operating device and auxiliary equipment, if any.

Subclause 7.1 of IEEE C37.63 applies.

#### 8.1.2 Dielectric Tests

Subclause 7.2 of IEEE C37.63 applies.


The tests shall be performed with the test voltages given in chapter 7 of this Standard.

#### 8.1.3 Measurement of the resistance of circuits

Subclause 7.4 of IEEE C37.63 applies.

#### 8.1.4 Temperature rise test

Subclause 7.5 of IEEE C37.63 applies.

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### 8.1.5 Short-time withstand current and peak withstand current tests

The sectionalizers shall carry the rated short-time currents as given in chapter 7 of this Standard. Subclause 7.6 of IEEE C37.63 applies.

### 8.1.6 Verification of the degree of protection

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

### 8.1.7 Mechanical operation tests

Subclause 7.104 of IEEE C37.63 applies.

### 8.1.8 Operating duty tests

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

### 8.1.9 Minimum actuating current tests


Subclause 7.109 of IEEE C37.63 applies.

### 8.1.10 Electromagnetic compatibility test

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

## 8.2 Routine Tests

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

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### 8.2.1 Visual inspection

Before carrying out the routine tests, a visual inspection must be made to verify if the sectionalizer is equipped with all the required accessories and components.

Likewise, the marking of the sectionalizers must be verified according to section 6.3 of this specification.

### 8.2.2 Dimensional control

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

### 8.2.3 Dielectric withstand test; one minute dry power-frequency

Subclause 8.2 of IEEE C37.63 applies.

### 8.2.4 Measurement of the resistance of the main circuit

Subclause 7.4 of IEEE C37.63 applies.

### 8.2.5 Operational calibration


Subclause 8.101 of IEEE C37.63 applies

### 8.2.6 Mechanical tests

Subclause 8.103 of IEEE C37.63 applies.

## 8.3 Acceptance Tests

- a) Visual check: General verification of equipment, existence of accessories, quality of packaging, etc.
- b) Dimensional check: Specification compliance and verification that there will be no compatibility problems with fuse support currently in use.
- c) Communication test of equipment with PC or portable configuration device.
- d) Routine test protocols.
- e) Test of operation with reconnection simulator.

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

For the inspection, a simple sampling will be carried out, according to the following table in which the quantities for acceptance or rejection of the lot.


An AQL of 2.5, according to IEC 60410, is considered, which can be adjusted from the results of inspections to each supplier in a specific way, so it will be more demanding to the extent that practical experience demonstrates that there are flaws in the materials during its installation or use.

The inspector will select the sample size for the inspection according to the following table.

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

## 9. EXCEPTION TO THIS SPECIFICATION

Any exception to this technical specification, concerning the adoption of techniques and/or special construction different than what is specified in this document, may be taken into account during the homologation process. However, in this case, the Distribution Company reserves the right to prescribe the execution of additional tests other than those ones described in this document, in relation to the specific proposals.

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## ANNEX A – DIMENSIONAL REFERENCES AND BASE CHARACTERISTICS

The dimensions of the sectionalizer and the characteristics of the sectionalizer-base shall be in accordance with E-MT-001 and with Especificação Técnica no. 277 for Brasil.

The sectionalizer must be able to be installed in the current fuse-bases.

## ANNEX B – COUNTRY CODES

Type code	Argentina	Perú	Chile	Colombia	São Paulo	Rio	Ceara	Goiás
GSCM006/1								
GSCM006/2								
GSCM006/3								

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## ANNEX C

This form is used for evaluating the offer in the tender process and also for the technical data validation during the homologation, certification and approval procedure.

Flag here the use of this form:

Offer in the Tender


Technical Data Validation

This document has to be used for checking the compliance of the sectionalizer during the tender process.

Deviations are in principle not acceptable.

Possible deviations have to be clearly reported in the following form for specific deviations.

The acceptance of this document for the next tender stage does not mean the acceptance of any deviation to the technical specification if such deviations are not clearly reported in the form for specific deviations.

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FORM FOR SPECIFIC DEVIATIONS

Each specific deviation shall be reported and explained here below (to be indicated with a progressive number).

NO DEVIATIONS

(to flag in case of no deviations from the Global Standard)

DEVIATION 1

[To indicate possible Deviation

.....  
.....  
.....  
.....  
.....]

DEVIATION 2

[To indicate possible Deviation

.....  
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DEVIATION ...

[To indicate possible Deviation

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Date [.....]

Sign [.....]