



**Material Specification code:** GRI-GRI-MAT-NE&D-0005

Version no. 1 dated 21/03/2024

**Subject:** GSSM004 – Data Concentrator Unit for Meters & More Smart Meters

**Application Areas**

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Enel Grids and Innovability*

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THE HEAD OF NETWORK DEVICES

**Fabrizio GASBARRI**



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## 1. DOCUMENT AIMS AND APPLICATION AREA

This document describes the requirements for the purchase of Data Concentrator Unit for remote management of Meters & More Smart Meters.

*This document shall be implemented and applied to the extent possible within the Enel Grids and Innovability 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 does not require implementation of further documents.

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

## 2. DOCUMENT VERSION MANAGEMENT

Version	Date	Main changes description
1	21/03/2024	Issuing of GSSM004 – Data Concentrator Unit for Meters & More Smart Meters

## 3. UNITS IN CHARGE OF THE DOCUMENT

Responsible for drawing up the document:

- Enel Grids and Innovability: Network Engineering and Development / Engineering Components and Devices / Network Devices unit.

Responsible for authorizing the document:

- Enel Grids and Innovability: Network Devices unit.
- Enel Grids and Innovability: Operational Excellence and Processes Quality unit.

## 4. REFERENCES



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- Integrated Policy of Quality, Health and Safety, Environment anti-Bribery and Information Security;
- ISO 9001- Quality Management System - Requirements;
- ISO 14001- Environmental Management System - Requirements with guidance for use;
- ISO 45001- Occupational Health and Safety Management System - Requirements with guidance for use;
- ISO 37001- Anti-bribery Management System - Requirements with guidance for use;
- ISO 27001- Information Security Management System – Requirements;
- ISO 50001- Energy management systems - Requirements with guidance for use;
- DIRECTIVE 2014/53/EU (RED (EMC));
- DIRECTIVE 2014/30/UE (EMC);
- DIRECTIVE 2014/35/EU (LVD);

**For EU Countries**

- EN 55011 - Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement
- EN 50160 - Voltage characteristics of electricity supplied by public distribution systems
- EU directive 2004/108/CEE – EMC directive
- EU directive 2008/95/CEE - Low Voltage directive
- EU directive 93/68/CEE – CE marking directive

**Chile**

- Norma Técnica de Seguridad y Calidad de Servicio, Septiembre 2020;
- Anexo Técnico Exigencias Mínimas de diseño de Instalaciones de Transmisión

**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**



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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
<b>AMI</b>	Advanced Metering Infrastructure
<b>HES</b>	Head End System
<b>IP</b>	Ingress Protection
Low Voltage ( <b>LV</b> )	Any set of nominal voltage levels exceeding 50 V and up to 1 kV a.c. or 1,5 kV d.c.
<b>PLC</b>	Power Line Communication
<b>RED</b>	Radio Equipment Directive
<b>RTC</b>	Real Time Clock

## 7. DESCRIPTION

<b>Type</b>	Data Concentrator for Smart Metering remote management
Material company Code	510024
Merchandise Group (GM)	FSCR04

### 7.1. Electrical Characteristics:

Data concentrator must comply with the following requirements:



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<b>Reference Voltage (Un)</b>	3/N~400/230V 3/N~200/127V
<b>Voltage Range</b>	+/- 15%
<b>Output Power</b>	12 W
<b>Temperature operative range</b>	-25° C to +70° C
<b>Relative humidity</b>	≤ 90% r.h. @ 50°C
<b>Reference Frequency (fn)</b>	50/60 Hz
<b>Time of power on (even after a download procedure)</b>	< 5s
<b>Minimum height above sea level</b>	2000 m
<b>Self-consumption at 230VAC</b>	<3 W (no communication in action)

## 7.2. Dimensions and installation

The reference dimensions (including the terminal cover) of data concentrator must comply with the following table:

	<b>Max dimensions</b>
<b>Height</b>	335 mm
<b>Width</b>	205 mm
<b>Depth</b>	85 mm
<b>Dimension of horizontal fixing points</b>	177.15 mm
<b>Dimensioning of vertical fixing points</b>	250.85 mm



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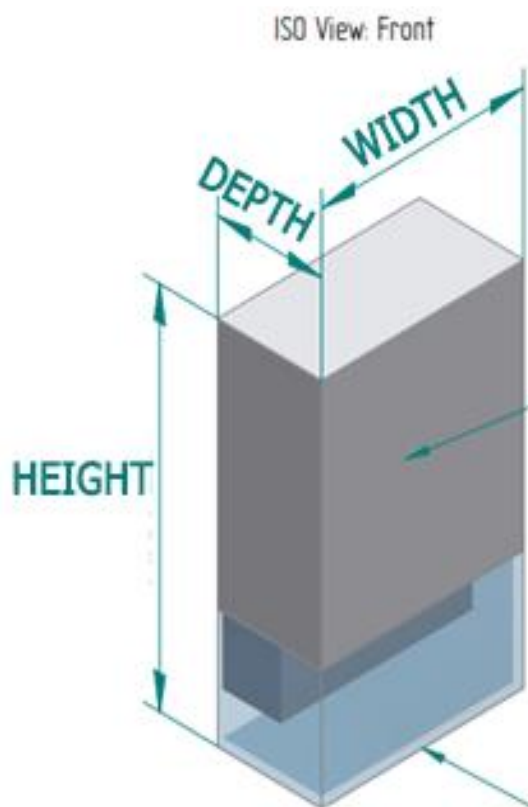
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**Figure 1.** Mechanical Dimensions

### 7.3. Data Concentrator Unit functionalities

The concentrator is a unit of the AMI system for low voltage users. It's the main node (gateway) for communications with the Smart Meters connected to the same network feed by the transformer powering the concentrator as well.

The Concentrator then carries out communication (to and from the LV nodes), which relate to the conveying and the management of the information, the management of the communication network and the AMI functions of remote nodes afferent to LV customers – carried out by the Central System (Head End System - HES) on Smart Meters that populate each “electricity island”.

The most relevant functionalities that must be supported by Data concentrator are summarized below:

- Concentrator must be able to support up to 2048 devices
- Concentrator must integrate
  - Battery back-up element is be coupled to the RTC block to keep the RTC
  - Battery back-up allows logging anti-tampering events as well.
  - Some local indicators (LEDs or equivalent) to show some status conditions and working information.
  - Local Optical Interface
  - 2 Ethernet Ports (10M / 100M)
  - Tampering: Detection of separation between terminal cover and case



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- Activity
  - The main activities that the Concentrator must execute are referred to the LV network and they are:
    - Smart Meters management through power line with BPSK modulation with Meters and More protocol and (using RF module) via RF (if supported by the meter)
    - Determination of the state connection of LV network
    - Estimate of some parameters for the quality of the power supply.
- Procedures:
  - The CONCENTRATOR is always the originator of the management flow.
  - The CONCENTRATOR:
    - can be configured by the HES to perform the procedures to collect data from meters
    - can be clock synchronized
    - can be firmware upgraded
    - can send its Last gasp to HES
    - has to integrate self-diagnostic capabilities
  - Meter management procedures performed by CONCENTRATOR:
    - Commissioning of the Meter
    - Time synchronization of the meter
    - Management messages used to configure meters
    - Meter firmware download
    - Load profile collection procedure
    - Meter data reading procedure
    - Meter alarm indication reception

#### 7.4. Technical data summary

- |                                    |  |
|------------------------------------|--|
| • Description                      | Data Concentrator for remote management of electrical smart meters |
| • Material company Code            | 510024   |
| • Installation in MV/LV substation | Predisposition for Mounting on base socket                         |
| • Communication to HES             | external GPRS, 3G, 4G modem or Router                              |
| • Communication to smart meters    | PLC Band CENELEC A   |
| • Connection                       | Three phase four wires   |
| • Connectors                       | 2 Ethernet Ports (10M / 100M) + RS-232                             |
| • Optical port                     | Available  |
| • LED                              | 6  |
| • Voltage V                        | 3/N 400/230 Vac@50-60Hz & 3/N 220/127 Vac@50-60Hz.                 |
| • ΔVAC                             | ±15%   |
| • ΔF                               | ±5%  |
| • IP Degree                        | IP 20 wiring compartment, IP 41 circuitry compartment              |
| • Maximum altitude                 | 2000 m   |
| • Concentrator case                | Polycarbonate and 10% glass fiber                                  |
| • Sealing                          | Hot blade welding of the concentrator case                         |
| • External power supply            | +12 V <sub>DC</sub> , 12 W   |
| • Operating Temperature range      | - 25 / +70 °C  |
| • Operating Relative humidity      | 90 % RH @ 50°C (without condensation)                              |
| • Self consumption                 | 3 W no communication module, steady state                          |



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- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• Overvoltage Category</li> <li>• Diagnostic</li> <li>• Other functionalities</li> <li>• CE mark</li> </ul> | <p>Category IV</p> <p>Self-diagnostic of the main functions</p> <p>Automatic management of daylight saving time and leap year.</p> <p>Local and remote programming. Time zone</p> <p>Compliant with 2014/53/EU (RED), 2014/30/EU (EMC) and 2014/35/EU (LVD).</p> |
|--|--|

## 7.5. Test

### 7.5.1. Type Test

Data concentrator kit must be certified according to RED Directive.

Data concentrator (material code 510024) must comply with requirements listed in sections 7.1, 7.2, 7.3 and 7.4.

The evaluation of conformity can be based on:

- Type approval certificates/test reports issued by an ISO 17025 laboratory
- Functional Test Report
- Technical documentation of the device
- Manufacturer self-declaration.

### 7.5.2. Routine and Acceptance Test

At the manufacturer's plant the following aspects should be verified on the entire data concentrator production:

- FW Version
- LEDs operation
- Real Time Clock
- PLC Modem
- RS232 and Ethernet Ports.