Energy Management | Smarter Grids

EVOGate 2.0

with RTU+Server2

Installation Manual

Serial Number

Document Code

EMNL000057_01_EN EVOGate 2.0

Table of contents

Safety Precautions

Precautions The EVOGate 2.0 with RTU+® Server2 has been designed and tested with US norms and has left the factory in a safe condition. The present installation manual contains important information and warnings which have to be followed by the user to ensure safe operation and to retain the unit in safe condition.

Interventions Any interventions to the EVOGate 2.0 with RTU+® Server2 must be done by technical service staff only.

Note

+ Changes or modifications not expressly approved by the responsible party for compliance (EnergyICT®) could void the user's authority to operate the equipment.

Clock The device contains a real-time clock with 6 day autonomy in case of absence of power.

WARNING! When activating the Wavenis modem, an RF antenna must already be connected to the EVOGate 2.0! The absence of an antenna during activation will cause irreparable damage to the modem.

Consult "Wavenis RF Modem" on page 27 for more information.

Notice on Interference

FCC

The EVOGate 2.0 complies with Part 15 of the FCC Rules / Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Class B digital device

This Class B digital apparatus complies with Canadian ICES-003.

Use of radio frequency energy

This device generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation.

Preventing interference

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

+ Reorient or relocate the receiving antenna
+ Increase the distance between the equipment and the receiver
+ Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
+ Consult the dealer or an experienced radio/TV technician for help.

Notice on Industry Canada (IC) certification

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

This radio transmitter (IC: 9864A-RTUS2WC) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device

Antenna type used for certification measurements : Antenex FG9026

Antenna specs:

- Frequency range : 902 – 928 MHz
- VSWR : < 1.5:1 Max
- Nominal Gain : 6 dBd
- Nominal impedance : 50 Ohm
- Polarization : vertical

Chapter 1: Introduction

Introduction

This chapter provides the user with an introduction to the EVOGate 2.0, its main internal components (including EnergyICT's RTU+ Server2 data concentrator) and its main functions.

Chapter description

This chapter describes the following topics:

About the EVOGate 2.0

Description

The EVOGate 2.0 is positioned as the generic ODM Water solution for utility applications in the United States.

EVOGate 2.0's main component is the RTU+ Server2 concentrator; which is built around a core feature set and is provided with a robust casing. The RTU+ Server2 is installed inside the EVOGate 2.0's IP enclosure resisting easily to any industrial environment. The RTU+ Server2 also offers unprecedented upstream and downstream flexibility and splits expensive communication over multiple endpoints, allowing utilities to optimize the implementation of various AMI technologies.

Main functions

The table below lists the main functions of the RTU+ Server2:

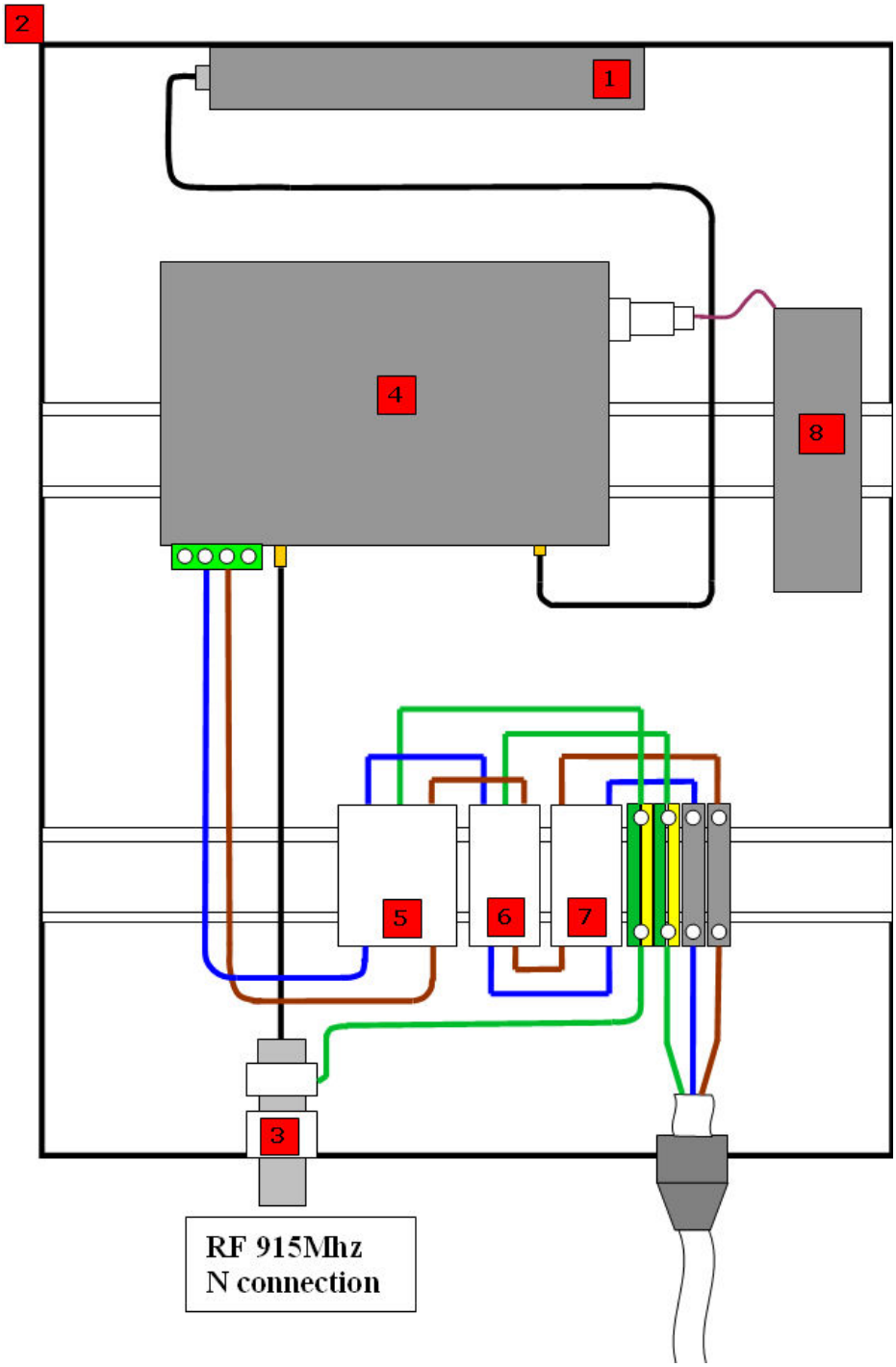
Function	Description
Data collection	Data is collected and stored per definable interval period; the device is able to store a virtually unlimited amount of data, depending on its memory capacity. For more information on memory capacity, see "Technical Specifications" on page 10. Pulse data is collected via the digital inputs and meter data is collected via the standard serial interface or via an optional communication interface.
Data transfer	The RTU+ Server2 can transfer data to EnergyICT's advanced EIServer meter data management solution using the EIWebp+ push protocol, via its Ethernet ports, or via an optional communication interface.
Fixed network management and remote monitoring	The RTU+ Server2 has embedded network management capability and serves as master concentrator in a *Wavenis* RF network, with multiple Wavenis endpoints acting as slaves. For more information, see "Wavenis RF Modem" on page 27.

EVOGate 2.0 Component Overview

Overview

Listed below are **EVOGate 2.0**'s main components.

The EVOGate 2.0 entails all components described here at purchase, except for the Wavenis antenna (and coax cable) which need to be purchased separately. Consult the Appendix for more information.



Description

Component	Type
1. GSM Antenna	**CANT000021**
2. IP Polyester enclosure	**Schneider Electric NSYPLM43**
3. N-to-N Surge protection	**Phoenix contact 2818148**
4. Data concentrator	**DIN Rail mounted RTU+Server2**
5. Net Filter	**DIN Rail mounted Phoenix contact 2788977**
6. Surge Protector	**DIN Rail mounted Phoenix contact 2856812**
7. Automatic Fuse	**DIN Rail mounted Phoenix contact 0916608**
8. Battery	**CBAT000003** **Important!** Battery may need to be installed by the customer (application dependent).

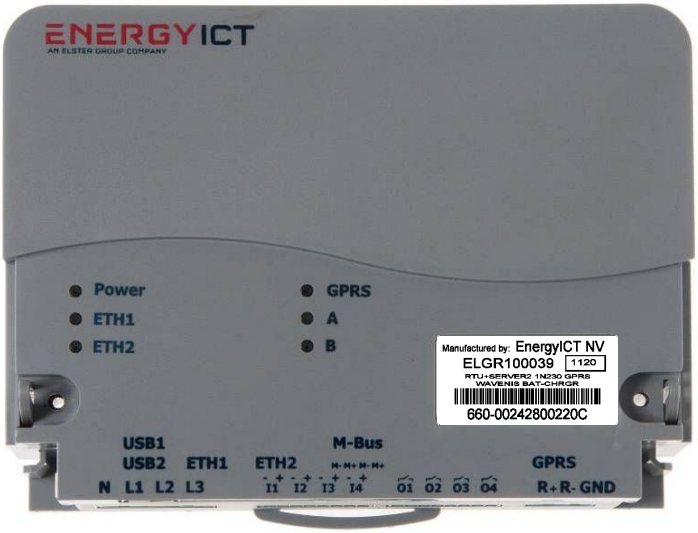
Technical Specifications

Feature	Implementation
HOUSING	IP Enclosure Housing Protection: • IP 66 • Type NSYPLM43 (See p. 12 for more technical characteristics) Internal RTU+Server2 Housing: • Plastic enclosure 183 * 174 * 62 mm. (including optional connector cover) • Material: PC ABS (UL94 5VA compliant) • Fixation: DIN Rail connection
POWER	• Universal Power Supply: 100 VAC - 230 VAC
BATTERY	• Internal Lithium ion battery pack, based on GP Battery Swing 4400 Cells • Usage: UPS functionality. ○ When main power is cut, unit survives for maximum 6 days. • Discharge temp: -40 °C - +65°C • Charge temp: -10°C - +60°C • Voltage: 7,4V / 12Ah • Fuel Gauge circuit with I^2C communication 5V signaling • Configuration: 2S3P • Recharging time: 24 to 48 hours • Certification: UN3480
CONSUMPTION	• Max. 6 VA
FUSE	• 6 A
MEMORY RTU+SERVER2	• 128 MByte SDRAM (32-bit wide) • 256 MByte Managed NAND Flash (up to 2GByte on request). Memory extension is not possible.
OPERATING SYSTEM	• Linux
SOFTWARE	• Plug and Play configured software cooperating with EIServer • Data collection software with extended protocol library
SOFTWARE UPGRADES	• via Ethernet • via USB • via GPRS (possible but not recommended)
TEMPERATURE	• Extended temperature range from -20° C to +60° C
TAMPER DETECTION	• Tamper contact via a "cover-removed" alarm: when the internal cover is removed, an alarm signal is sent to the meter data management platform.
CERTIFICATIONS	• $_{C}CSA_{US}$ certified • Emission: FCC Part 15, FCC ID : VS7RTUS2-WC / IC : 9864A-RTUS2WC

RTU+Server2 Casing

Overview

The RTU+ Server2 resides in a **PC ABS** UL94 5VA-compliant plastic enclosure. This cover shields the motherboard and all internal components from the outside. 3 screws are used to fasten this cover to the mounting plate.



Dimensions

Plastic enclosure 183 * 174 * 62 mm.

IP Enclosure Casing

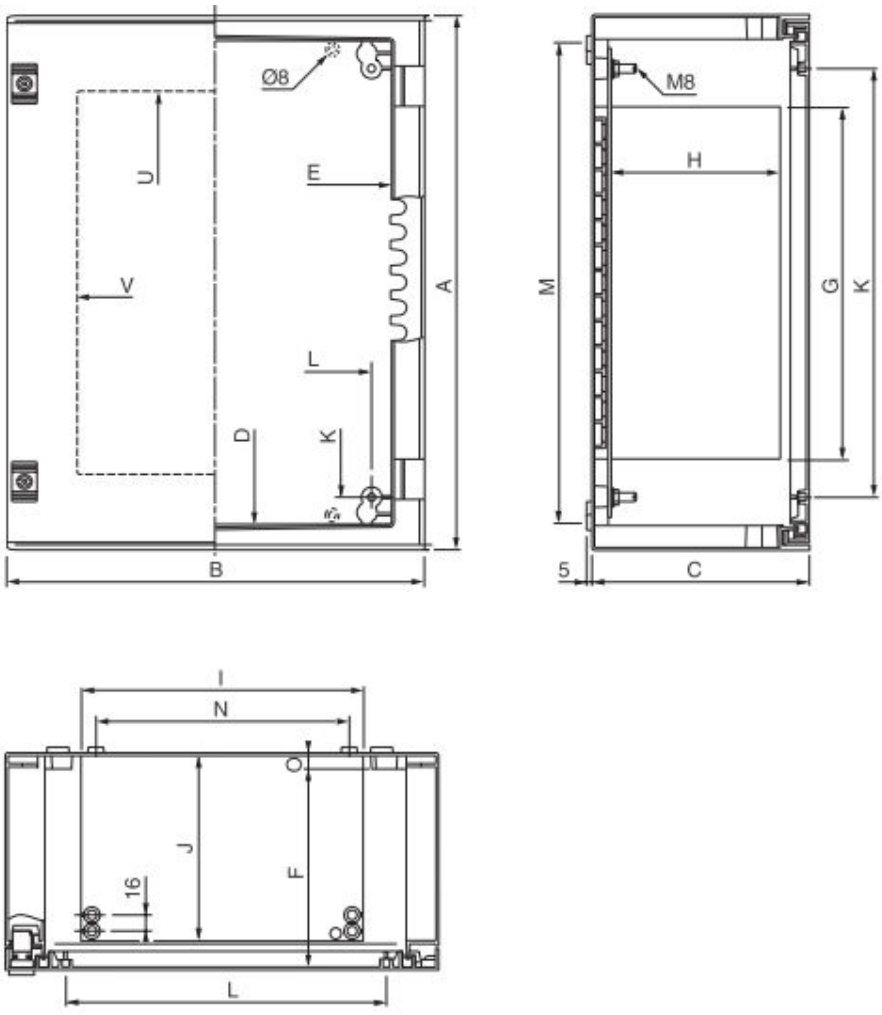
Overview

The RTU+ Server2 and all EVOGate 2.0 components are mounted into a Polyester wall-mounting enclosure IP 66 Type **NSYPLM43**:

Technical specifications

- Monobloc wall-mounting enclosure made from polyester reinforced with fiberglass, molded by hot compression, RAL 7032 grey color.
- Degree of protection **IP 66** according to IEC 60529.
- Resistance to external mechanical impacts:
  - Plain door enclosures IK 10 (20 joules).
- Locking device outside the sealed area, guaranteeing the tightness of IP 66 over time.
- Locking system:
  - 2 locks with double-bar insert
- Door opening angle: 180°.

Dimensions

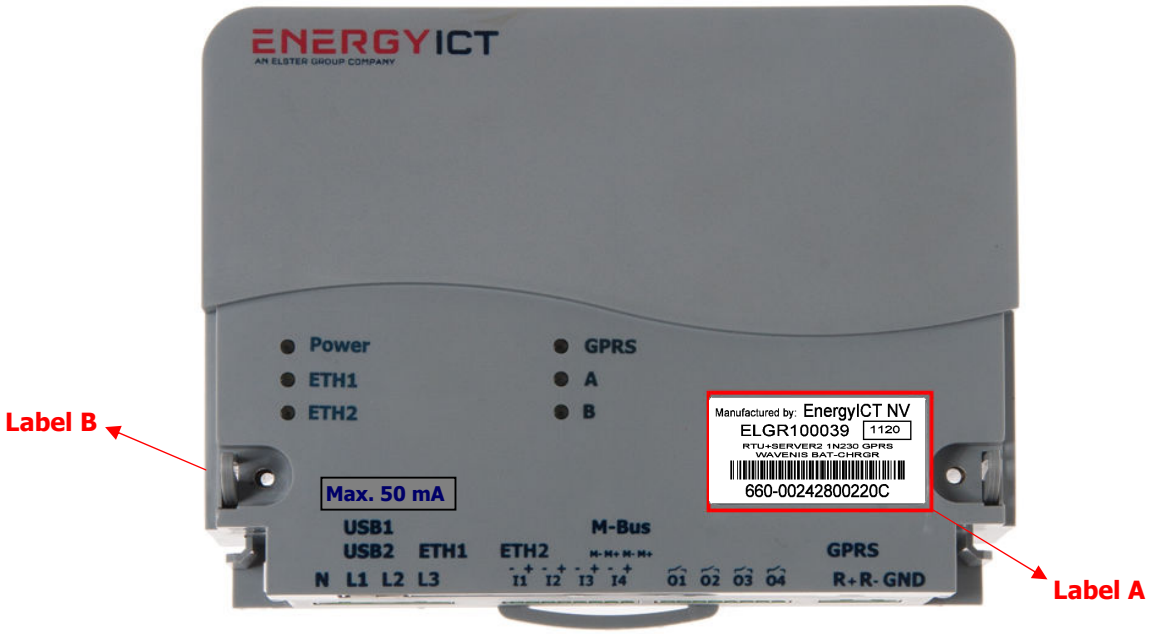


Dimensions (mm)									
A	B	C	D	E	F	G	H	I	J
430	330	200	380	260	181	247	150	179	168

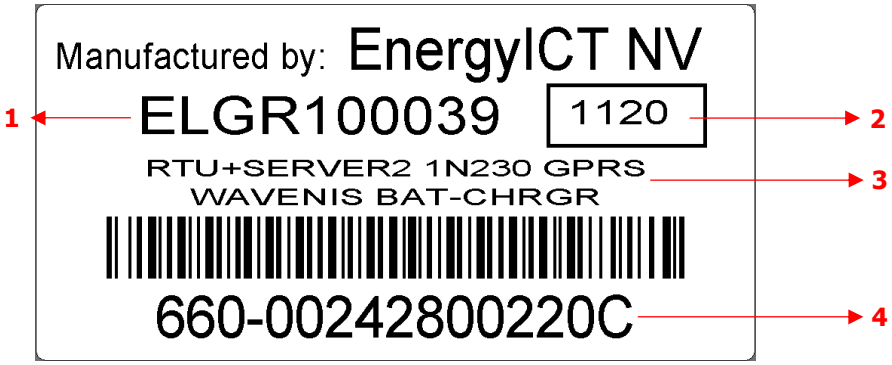
Bottom screw and door bosses (mm)		Internal fixing (m)			Glazed door (mm)	
K	L	M	N	O	U	V
325	225	375	150	13	273	194

RTU+Server2 Labels

Overview The RTU+ Server2 has the following 2 labels located on its casing:



Label A This label contains the RTU+Server2's article code and unique serial number:



1. Article code	The code of the product. Consult the Appendix for a full overview of available product types, their article codes and spare parts.
2. Production Time	XXYY: • XX: Production Year (last two digits of the year) • YY: Production Week
3. Description	The description of the data concentrator
4. Serial number	XXX – YYYYYYYYYYY • XXX: Family Type • YYYYYYYYYYY: Unique Serial Number

Label B This label depicts the power input specifications and warning content:

WARNING

CAUTION-RISK OF ELECTRIC SHOCK- DO NOT OPEN
AVIS- RISQUE DE CHOC ELECTRIQUE-NE PAS OUVRIR

Access to this panel is restricted to qualified electricians. Disconnect the power supply and inputs before removing the cover. The user should read the manual to protect himself & the device against damage.

Nom. current: 140mA
Power Input: AC
Power Supply: 100-230 Vac / 50-60Hz

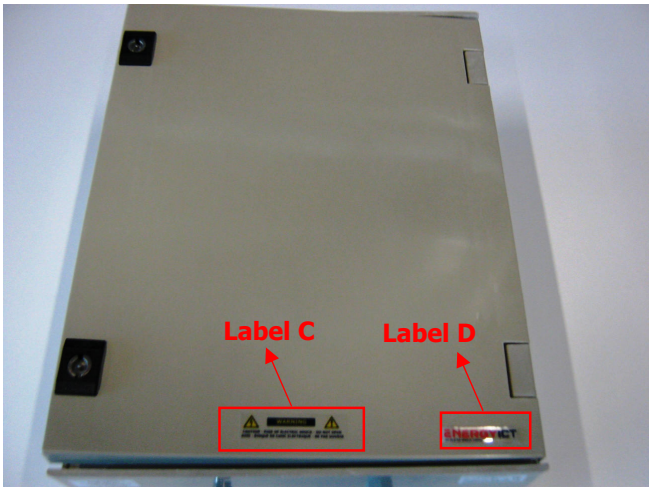
www.EnergyICT.com made in Belgium

IP Enclosure Labels

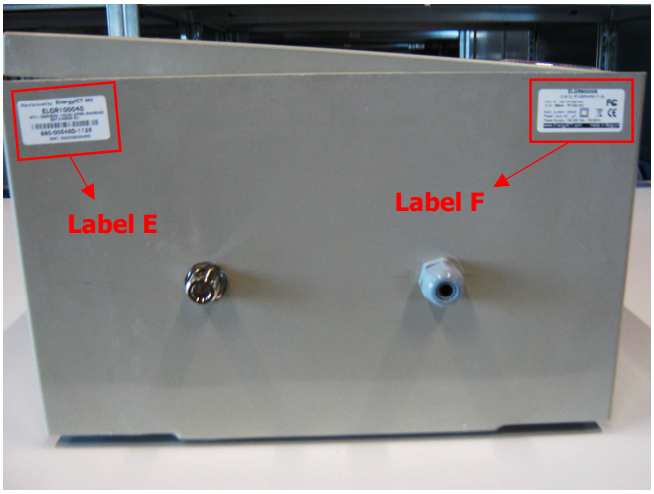
Overview

The IP enclosure has:

- **2 labels** located on its front panel:



- **2 labels** located on its bottom panel:



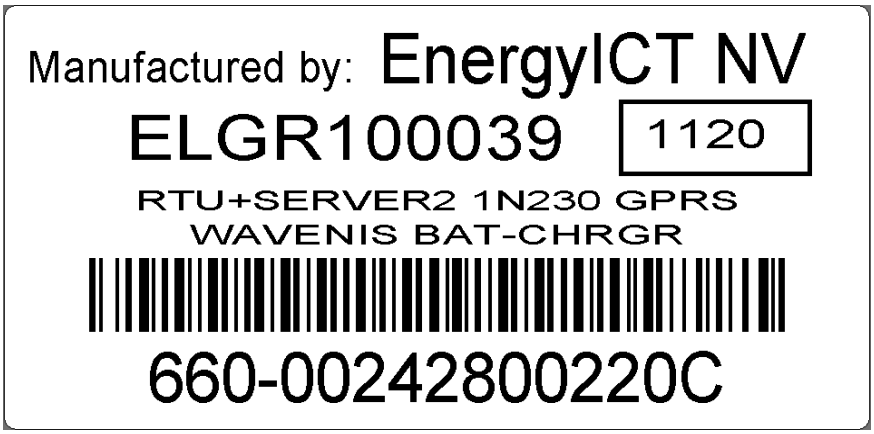
- **1 label** located on the inside of its door:

Label C Warning label:

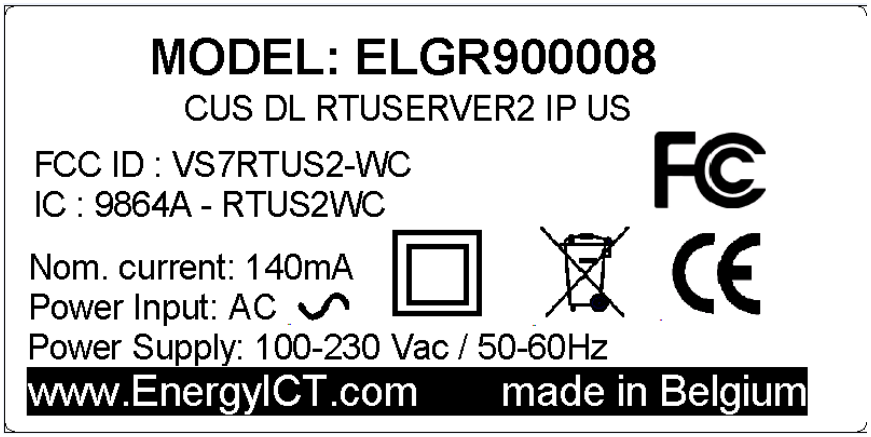
Label D EnergyICT logo:

ENERGYICT
AN ELSTER GROUP COMPANY

Label E Identical as Label A:



Label F The FCC and IC Label; also depicts the article number of the EVOGate 2.0:

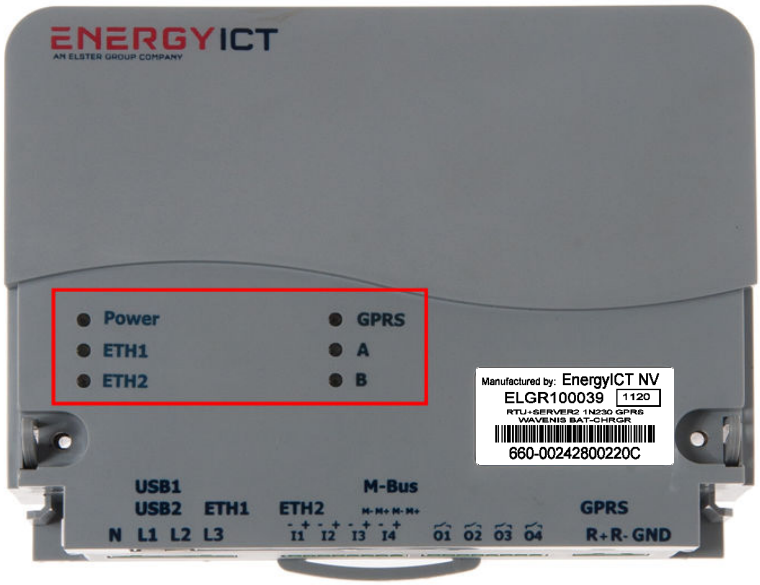


This device complies with part 15 of the FCC rules.
Operation is subject to the following two conditions:
1 This device may not cause harmful interference, and
2 this device must accept any interference received,
including interference that may cause undesired operation.

Label G The WaveCard Radio address label:

LED Indications

Introduction The RTU+Server2 data concentrator has 6 LEDs located on the top cover of the enclosure.



Power	Power LED	ON when the unit is powered.
ETH1	1st Ethernet port LED.	- When OFF: no link integrity (no cable connected) - When ON: link integrity (link with HUB) - When blinking: receiving data
ETH2	2nd Ethernet port LED.	
GPRS	GPRS LED	ON when transmitting data
A	Application Dependent	- When blinking at 0.5Hz: receiving data
B	*Reserved*	*Reserved*

Chapter 2: Mounting and Wiring

Introduction

This chapter provides information on the physical installation of the polyester enclosure, including mounting and wiring instructions.

Chapter description

This chapter describes the following topics:

Mounting Instructions IP Enclosure

Mounting the IP Enclosure

The IP enclosure can be mounted directly on the walls. The seals and caps supplied as standard with the enclosure guarantee that it maintains its degree of protection and insulation.

There are 3 options:

- **Wall-fixing lugs**
- **Post-fixing device**
- **Blanking Plates**

Important!

Included in the EVOGate 2.0 package is a document which describes these options. However, none of these options are part of the EVOGate package and need to be purchased from Schneider. Please refer to the Schneider website to purchase these options.

Power Supply Wiring Safety Guidelines

Securing the device

The RTU+Server2 concentrator is internally protected by fuse resistors. Power rating: 2W. Fuse type : Welwyn Components ULW2-100RJA25

Wiring

The following additional guidelines must be taken into account:

+ The unit must have a permanent connection to fixed wiring
+ The power supply must be connected to the power connector of the RTU+ Server2 by means of solid wiring.

Cables

The concentrator was designed and tested to operate safely in an industrial and residential environment. However, you must take care to use one of two options:

+ Shielded network cables (FTP cables)
+ Unshielded network cables (UTP cables)

Power specifications

Power specifications are located on **label B** and **label F**, as mentioned under the labels section on page 14 and 16.

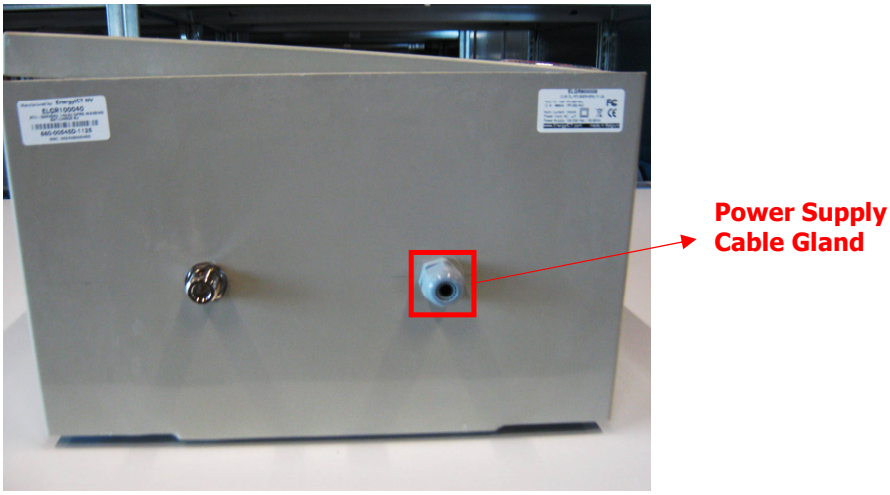
Power Supply Wiring Instructions EVOGate 2.0

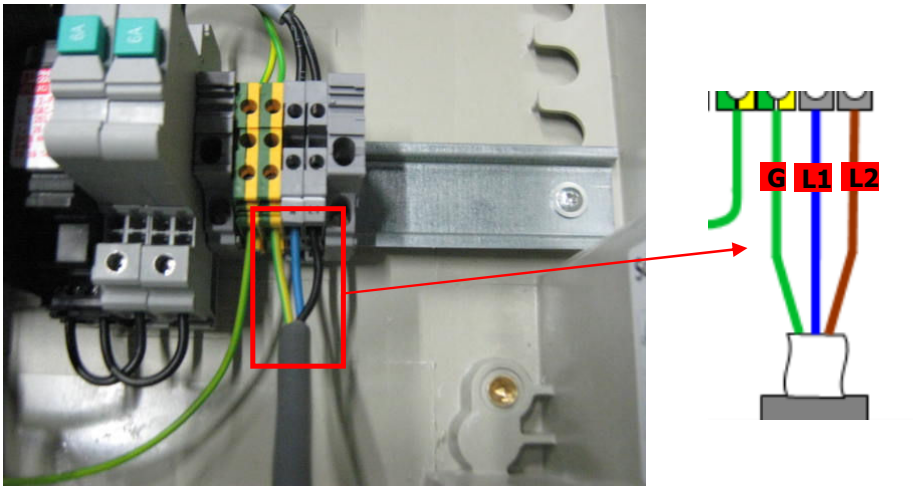
Power connector

The power supply cable gland is located to the right on the bottom panel of the EVOGate 2.0's enclosure. The cable gland only accepts AC input signals.

Power supply wiring connections

Connect the electrical wire to the cable gland carefully.





Power Supply Wiring RTU+Server2

Power connector

The power supply connector is located at the bottom left corner of the RTU+ Server2. The connector only accepts AC input signals.

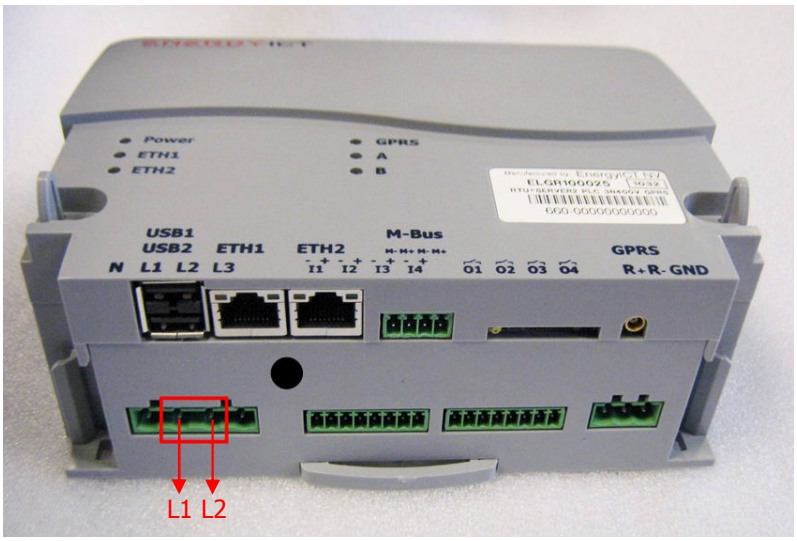
Single wire or two wires

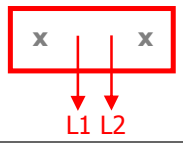
The connector accepts single wires of 0,2 to 2,5 mm² (24 to 14 AWG) or two wires of 0,2 to 1,0 mm² (24 to 18 AWG).

Power supply wiring connections

Important!

The RTU+Server2 is already fully connected at EVOGate 2.0 purchase.



Circuit	Physical Connection
2F 115V	

Chapter 3: Communication Interfaces

Introduction

The EnergyICT RTU+ Server2 is configured with a number of communication interfaces for downstream communication to the meters as well as upstream communication to a central data management system.

Chapter description

This chapter contains information on the communication cards of the RTU+Server2.

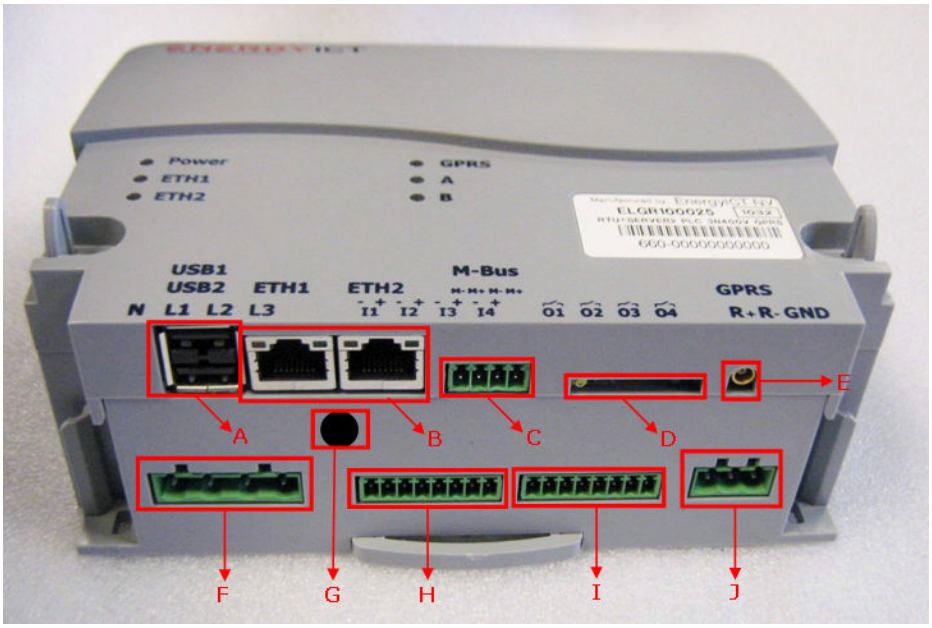
Important!

All communication interfaces are already in place at purchase; installation and maintenance may only be carried out by qualified personnel.

Overview Communication Interfaces

Description

The overview of the RTU+ Server2 standard communication interfaces is shown below:



A. Double USB connectors

B. Double Ethernet connectors

C. Wired M-Bus connector
(Not Applicable)

D. SIM-card interface

E. GSM/GPRS antenna connector

F. Power input connector

G. RF Wavenis antenna connector

H. Digital inputs
(Not Applicable)

I. Digital outputs
(Not Applicable)

J. RS-485 connector
(Not Applicable)

Double Ethernet Connection

Description The RTU+ Server2 uses the Ethernet 10/100 Base-T standard. Every unit features 2 standard Ethernet ports, as depicted below, and can be connected to a LAN network using standard straight-through LAN RJ-45 connectors. Link Integrity and Rx indication LEDs are located on the connector.

To make a direct connection to a PC, a crossover LAN cable should be used.

Double USB 2.0 Host Connection

Description The RTU+ Server2 uses the USB 2.0 standard. Every unit features 2 standard USB interfaces, as depicted below, next to the Ethernet ports. Both connections can, for example, be used to connect keyboards and memory sticks for software updates.

IMPORTANT USB ports may exclusively be used for service purposes.
A maximum of 50 mA is allowed.
USB devices must be removed during normal operation.

GSM/GPRS Modem

Description

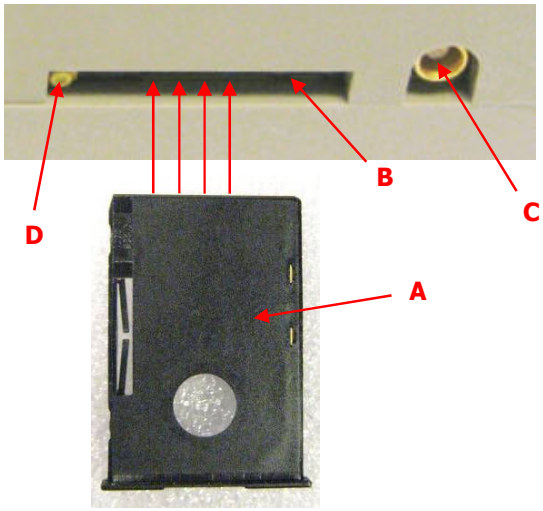
This card equips the RTU+ Server2 with a high tech GSM/GPRS modem. This allows collected data to be transmitted over the Internet without a need for a fixed connection.

Note

+ The advanced GSM/GPRS EDGE modem is available on request: this technology offers increased data transmission speeds and is supported by all major providers.

Installation

In order to function, the GSM/GPRS modem requires a SIM-card.



This SIM-card has to be placed inside a SIM-card holder **A** and placed inside **B** on the modem itself, before switching on the RTU+ Server2. Next, the GSM-antenna has to be screwed into **C**. Press **D** to eject the SIM-card holder.

Technical specifications

Feature	Implementation
Frequency Bands	Quad-band module includes support for **GSM 850** and **PCS 1900** Compliant to GSM Phase 2/2+
Transmit Power	Class 1 (1W) at GSM 850 and PCS 1900
GPRS Connectivity	GPRS multi-slot class 10 GPRS mobile station class B
Temperature Range	Normal operation: -20°C to +60°C
GPRS	GPRS data downlink transfer: max. 85.6 kbps GPRS data uplink transfer: max. 42.8 kbps Coding scheme: CS-1, CS-2, CS-3 and CS-4
SIM Interface	Supported SIM card: 1V8, 3V

Wavenis RF Modem

Description

This module empowers the RTU+ Server2 to serve as master in a Wavenis RF network.

Wavenis is an integrated wireless communication application capable of high performance network management and 2-way endpoint monitoring, remote data collection and scheduled polling.

Communication management for extended networks is achieved via smart gateways, repeaters and end-points.

Stored data is uploaded to EIServer via EnergyICT's proprietary EIWeb+ protocol.

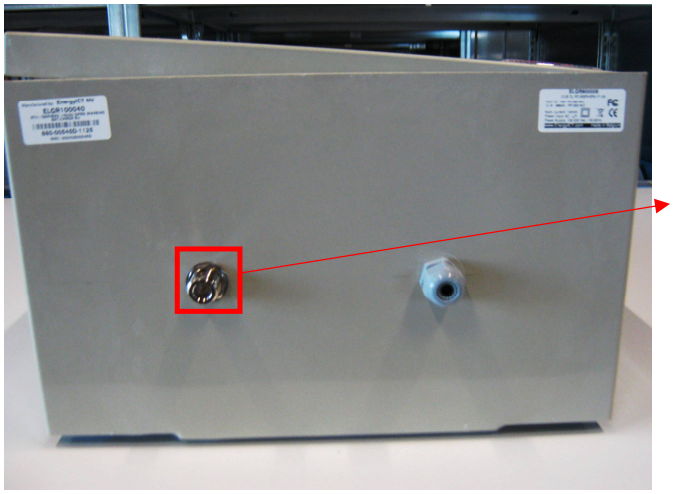
The RF module is embedded at the factory.

Important!:

- The Wavenis RF antenna and coax cable need to be ordered separately! EnergyICT recommends the **Antenex FG9026** as this was used for the **FCC** / **IC** tests.
- When activating the Wavenis modem, an RF antenna must already be connected to the EVOGate 2.0! The absence of an antenna during activation will cause irreparable damage to the modem.

Consult the Appendix for more information.

Antenna connection



Technical specifications

Feature	Implementation
Frequency range	915 MHz
Output power	Maximum +27 dBm (500 mW)
Receiver sensitivity	(-110)dBm @ 19.2 kbps (-113)dBm @ 4.8 kbps
Channels	16 channels (hopping)
Data rate	Maximum: up tot 100 kbps
Range	Outdoor: up to 1000 meters (line-of-sight)

Appendix

Article numbers This number represents the code for the concentrator type. If you experience problems with your concentrator or wish to purchase spare parts, please refer to the specific article number:

Article Number	**Description**
EVOGate 2.0	
ELGR900008	RTU+Server2 + IP Enclosure + Wavenis 915Mhz 500mW US + Battery + Protection GPRS/GSM + Protection Wavenis + Breaker + Filter + GPRS Antenna + NO Wavenis Antenna
Antenex FG9026	Wavenis Antenna *(Needs to be purchased separately)*
CCBL000033	Low loss coax cable, 10meter. N–male both sides *(Needs to be purchased separately)*
Spare Parts	
CBAT000003	Battery
CANT000021	GSM Antenna