



USER MANUAL

DINgate DSO

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DOCUMENT INFO

Version: 1.0
Status: Draft
Version date: 1/10/2021
Filename: User Manual - DINgate DSO.docx
Author: Luc Olieslagers
Number of pages: 16

HISTORY CHANGES

VERSION	DATE	DESCRIPTION
1.0	11/08/2021	Draft

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1 Introduction

1.1 Scope

This manual is applicable to DINgate DSO, a communication gateway for the ABB B21/B23 E-meter family. It describes the specifications, installation and operation of the product. Please read this document carefully before installation and operating.

1.2 Target group

The installation and the operation of this device and any maintenance must be carried out by a qualified person in accordance with specific local standards and safety regulations.

1.3 Disclaimer

The information in this document is subject to change without notice and should not be construed as a promise by Xemex. Xemex assumes no liability for possible errors in this document. In no event shall Xemex be liable for direct, indirect, special, incidental, or consequential damages of any kind arising out of the use of this document, nor shall Xemex be liable for incidental or consequential damages arising out of the use of this document, described software or hardware.

1.4 Applicable product versions

This manual is applicable for following product versions:

Product version	Description
DINgate 1.0 – DSO	4G Cat-1 with GPRS fallback communication gateway for ABB B21/B23 E-meters
DINgate 1.1 – DSO	4G Cat-M communication gateway for ABB B21/B23 E-meters

1.5 Intended usage

The DINgate DSO module can only be used in combination with the ABB B21/B23 E-meter family and shall operate within the specified values only.

1.6 Technical assistance


In case technical assistance is needed, contact Xemex NV:





XEMEX NV
Metropoolstraat 11a
B-2900 Schoten
Belgium

Tel: +32 201 95 95
E-mail: support@xemex.eu

1.7 Used symbols

Following symbols are used in this document and/or are marked on the product:

	Alternating current
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	Three-phase alternating current
	Equipment protected throughout by DOUBLE INSULATION or REINFORCED INSULATION
	Caution, possibility of electric shock
	Caution

1.8 Safety precautions



DANGER — HAZARDOUS VOLTAGES

WARNING - These installation/servicing instructions are for use by qualified personnel only. To avoid electrical shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so.



WARNING – Mains protection

WARNING - The DINgate module must always be protected by fuses on the incoming side. To enable maintenance DINgate module, it is recommended to install a short circuit protection. Do not operate the equipment other than indicated by the technical data.

Always adhere to the following checklist:

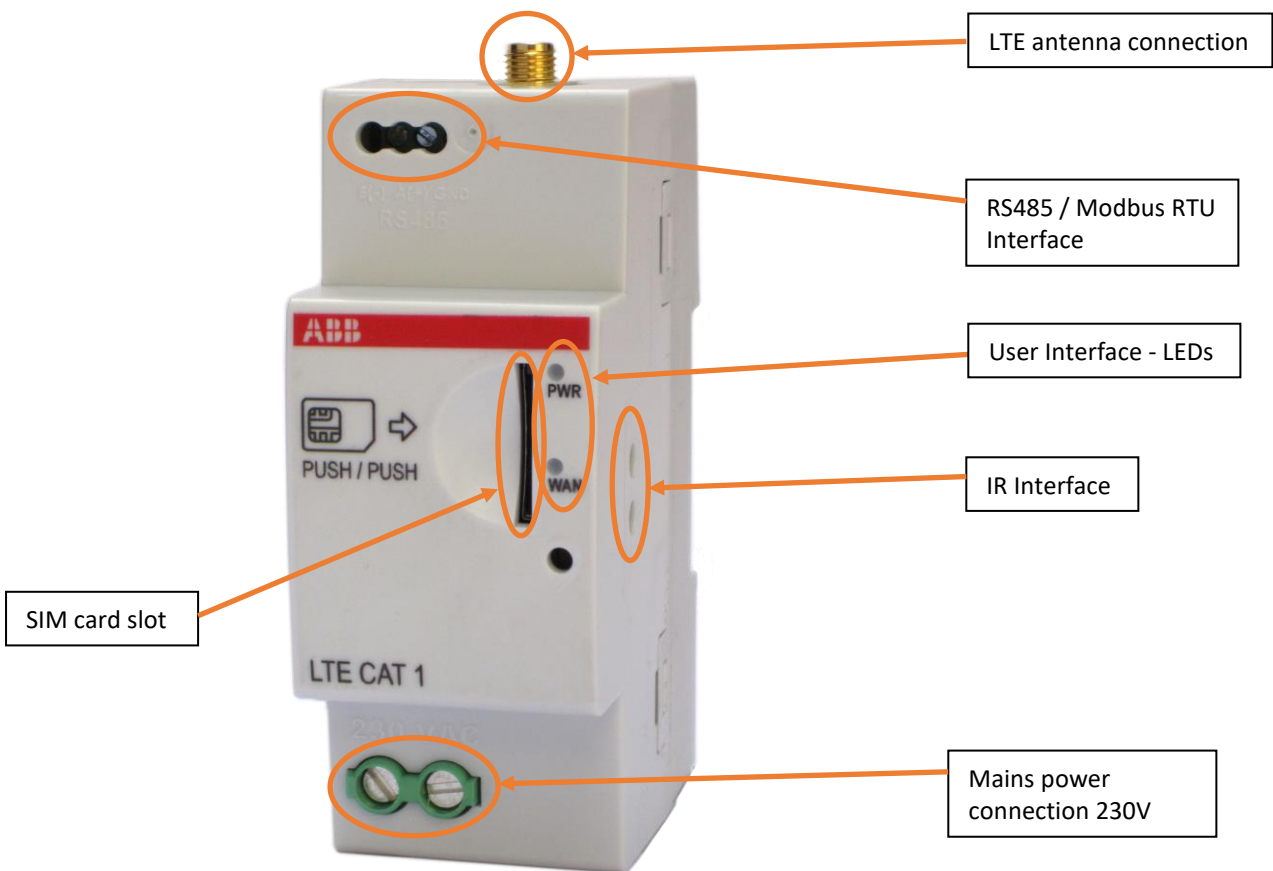
1. Only qualified personnel or licensed electricians should install the Xemex DINgate DSO. The mains voltages of 230 Vac can be lethal!
2. Follow all applicable local and national electrical and safety codes.
3. Install the device in an electrical enclosure (panel or junction box) or in a limited access electrical room.
4. Verify that circuit voltages and currents are within the proper range for the DINgate module.
5. Ensure that the DINgate is placed behind fuses or circuit breakers.
6. Equipment must be disconnected from the HAZARDOUS LIVE voltages before access.
7. Before applying power, check that all the wires are securely installed by tugging on each wire.
8. Do not install the DINgate module where it may be exposed to temperatures below -20°C or above 70°C , excessive moisture, dust, salt spray, or other contamination. The device requires an environment no worse than pollution degree 2 (normally only non-conductive pollution; occasionally, a temporary conductivity caused by condensation must be expected).
9. Do not drill mounting holes in the device. Click the module on a DIN Rail instead.
10. If the DINgate device is installed incorrectly, the safety protections may be impaired.

2 Technical description

The Xemex DINgate DSO device is a communication gateway with a Modbus Interface and an optical interface to connect an ABB B21 or B23 E-meter.

It has following interfaces:

- Main power connection 230V
- RS485 / Modbus RTU Communication Interface
- Optical Interface
- User Interface - LEDs
- SIM card slot (for 2FF SIMs)
- LTE antenna connection (SMA)



The DINgate DSO module reads out the ABB B21 or B23 E-meter every 10 seconds and logs the data. Data can be readout using the DLMS protocol via a TCP/IP connection over LTE.

The DLMS object model uses the SMR5 specification as a reference. Extra OBIS objects are added to provide LTE connection settings and diagnostics. For these extra objects, the ESMR specification is used as reference.

The combination DINgate DSO + ABB E-meter can be seen as a compact version of the Dutch smart meter.

3 Technical specifications

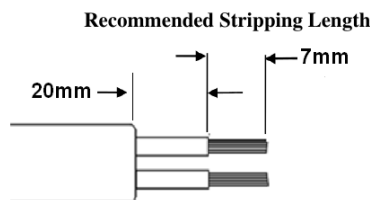
3.1 Mains power connection



DANGER

Working with high voltages is a potential danger to life. Persons exposed to high voltages can suffer cardiac arrest, burns or other serious injuries. To avoid such accidents, make sure to disconnect the power supply before starting the installation.

Nominal Voltage:	230 Vac
Voltage range:	220-240 Vac +/-10%
Frequency:	50 or 60 Hz
I nom:	10 mA
Connector:	2-pole screw terminal connector
Terminal wire:	Solid wire / 0.2 – 6 mm ² Stranded wire / 0.2 – 4 mm ²
Max torque:	0.6 Nm
Wire stripping:	7 mm



3.2 RS485 / Modbus RTU Interface

3.2.1 Physical Interface

Connector:	Screw terminal connector for A, B and Shield
Terminal wire:	0.2 -1.5 mm ²
Wire stripping length:	5 – 6 mm
Max torque:	0.2 Nm
Max cable length:	30 meter
Cable location:	indoor

3.2.2 Protocol Description

Protocol:	Modbus RTU master over RS485
Modbus address	default value = 1
Baud rate:	1200 ... 115200 default value = 19200 baud
Line setting:	8N1 (line settings register value = 0x04) , 8E1 (line settings register value = 0x24) default value = 8E1

3.3 IR Interface

Optical interface to connect to ABB meter without wire connection.

Is an alternative for the RS485 Modbus connection between DINgate DSO and the ABB E-meter.

3.4 User Interface - LEDs

Power / Modbus indicator: Red LED
WAN indicator: Green LED
(See operating instruction 5.1 and 5.2 for functional explanation of the LEDs.)

3.5 SIM card slot

SIM card type: mini SIM (2FF) 25 x 15 mm
SIM Insert / extract: push / push

3.6 LTE antenna connection

The DINgate DSO is equipped with an LTE Cat-1 modem with GPRS fallback (DINgate DSO 1.0) or an LTE Cat-M modem (DINgate DSO 1.1) functionality.

The supported frequency bands are:

3.6.1 DINgate DSO 1.0

- LTE Cat-1: B1, B3, B7, B8, B20
- GPRS: 900/1800 MHz
- Connector type on DINgate: SMA Female

3.6.2 DINgate DSO 1.1

- LTE-M: B3 (1800MHz) / B8 (900MHz) / B20 (800MHz)
- Connector type on DINgate: SMA Female

3.7 Enclosure

DIN rail mount: DIN 43880 / 2 units
Dimensions: 90 x 36 x 65 mm
Weight: 106 gr
Material: PA66-FR

3.8 Environmental conditions

Protection class II
Operating temperature -20 °C - +70 °C
Storage temperature -40 °C - +70 °C
Relative humidity < 75 % year's average at 21 °C
< 95 % less than 30 days/year, at 25 °C
Pollution Degree 2
Altitude < 2000m
Application area Residential, Indoors in suitable meter cabinet

3.9 Standards

Safety: IEC 60950-1
Radiated emission: EN 55016-3-2
Conducted emission: EN 55016-2-1
Harmonic current emission: EN 61000-3-2
Voltage changes, fluctuations & flicker: EN 61000-3-3
Electrostatic discharge: EN 61000-4-2
RF immunity: EN 61000-4-3
Electrical fast transient: EN 61000-4-4
Surges: EN 61000-4-5



RF common mode:
Voltage dips:

EN 61000-4-6
EN 61000-4-11

4 Installation instructions

4.1 Guidelines for safety and installation



This installation guide must be consulted in all cases when manipulating parts which are marked with the Caution symbol.

The installation and the operation of this device and any maintenance must be carried out by a qualified person in accordance with specific local standards and safety regulations.



Caution: never open the secondary circuit of a Current Transformer while current is flowing through the primary circuit!

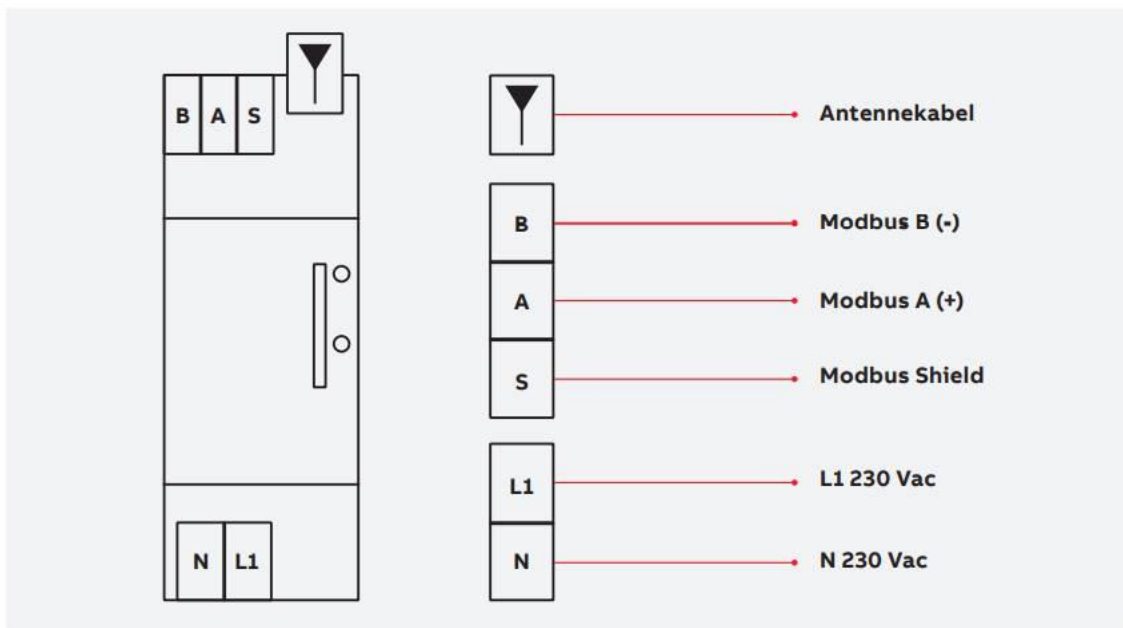
If the secondary circuit is opened when primary current is flowing, then the voltage will go to a very high value, possibly causing electrical arcing and/or electrical shock to service personnel. Therefore CT's with internal TVS must be used.

Failing to obey the "Guidelines for safety and installation", the guarantee no longer applies.

4.2 Mounting

Mount the device in a DIN rail cabinet.

4.3 Electrical wiring diagram



WARNING

The DINgate DSO module power connection always needs to be protected with a circuit breaker.

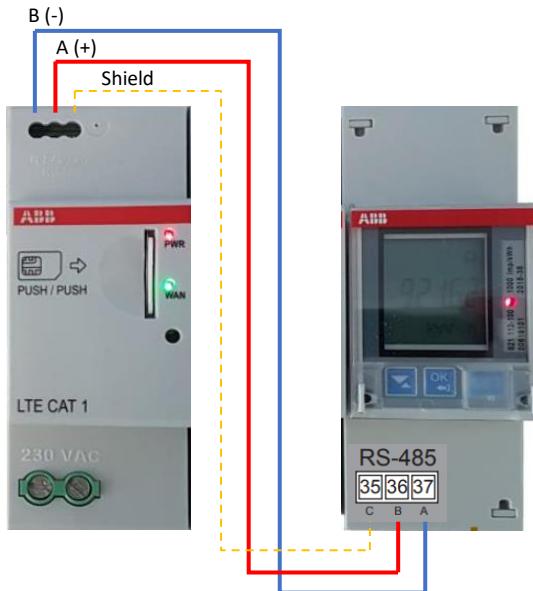
4.4 Data connection with ABB B21 / B23 E-meter

4.4.1 Via IR Interface

Place the DINgate DSO module on the left side of the ABB E-meter so both IR interfaces make contact.



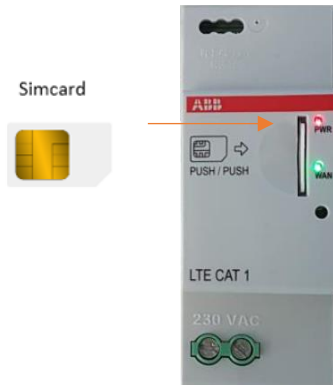
4.4.2 Via Modbus Interface



4.5 Insert/extract SIM card

The DINgate DSO has a slot on the front to insert a SIM card:

- Formfactor: mini SIM or 2FF
- To insert: push the SIM, with the contact area on the right side, in the slot until it clicks.
- To extract: push the SIM a bit further in the housing until it clicks and then release it to let it spring back.



4.6 LTE Antenna

The antenna used to connect to the DINgate DSO needs to have an SMA male connector.

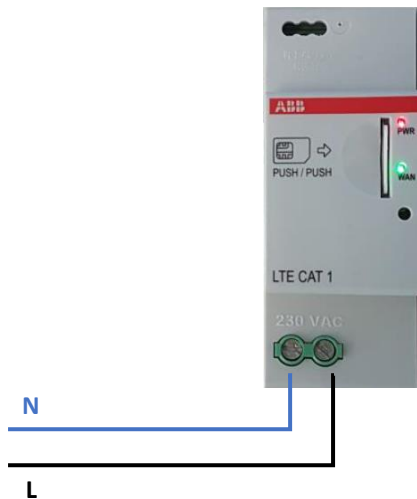
The supported bands need to correspond with the bands provided by the SIM operator within the available LTE and GPRS bands. (see 3.6)

4.7 Mains power



DANGER

Working with high voltages is a potential danger to life. Persons exposed to high voltages can suffer cardiac arrest, burns or other serious injuries. To avoid such accidents, make sure to disconnect the power supply before starting the installation.



WARNING

The DINgate DSO module power connection always needs to be protected with a circuit breaker.

4.8 Configuration

The DINGate DSO modules are preconfigured in production.

Some configuration settings can be changed using specific tooling (remote or local via optical interface). This is described in document "Xemex product configuration via Gurux.docx" but out of scope for this document.

5 Operating instructions

The DINGate DSO module in combination with the ABB E-meter acts as small version of a smart meter. The unit supports the industry-standard protocol DLMS-COSEM for the WAN connection. This protocol implements the SMR5 application layer.

The DINGate module gives visual feedback on its working state by its 2 Status LED Indicators:

5.1 PWR – POWER Status LED – Red LED

- Not lit: DINGate module is not powered
- Blinking: DINGate module is powered, but did not (yet) able to readout the ABB meter
- Lit: DINGate module is powered, and has readout the ABB meter

5.2 WAN – Network Status LED – Green LED

- Not lit: The DINGate module is not connected to a radio network. This may have one of the following causes
 - No or wrong SIM card (disabled)
 - No network coverage
 - Modem is defect
- Blinking: The DINGate module is registered to the radio network. In this state the module is able to receive an SMS or RING trigger. No end to end data session with the head-end system can be established.
- Lit: The DINGate module is registered to the radio network and a PDP context was established. This means the module got an IP address from the network and the head-end system is able to establish a data connection with the module.

Warning: the nominal state of the network status LED depends on the configuration of the module:

1. Always on configuration: Nominal state is 'LED Lit'. This means the module can always be reached on its IP address by the head-end system.
2. Triggered configuration: Nominal state is 'LED blinking'. In this state the module first needs to receive a 'trigger' before a PDP context will be established and the LED temporary be lit.

5.3 Service button

For future use.

6 Cleaning

Clean the unit with a slightly damp cloth and mild detergent.

7 Lifting and carrying

Use care when lifting and carrying the product.

8 Maintenance and Service

There are no serviceable parts inside.

End Of Document.