USER MANUAL

DINgate TM
Transparent Modem

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1.1	13/10/2021	Added configuration

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1 Introduction

1.1 Scope

This manual is applicable to DINgate TM (Transparent Modem), a communication gateway to connect an RS485 device via a wireless communication link.
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 – TM	4G Cat-1 with GPRS fallback communication gateway for ABB B21/B23 E-meters
DINgate 1.1 – TM	4G Cat-M communication gateway for ABB B21/B23 E-meters

1.5 Intended usage

The DINgate TM module is used to access a 2-wire RS485 bus via a remote IP link. Data is forwarded transparently from the modem to the RS485 interface and vice versa.

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

	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.

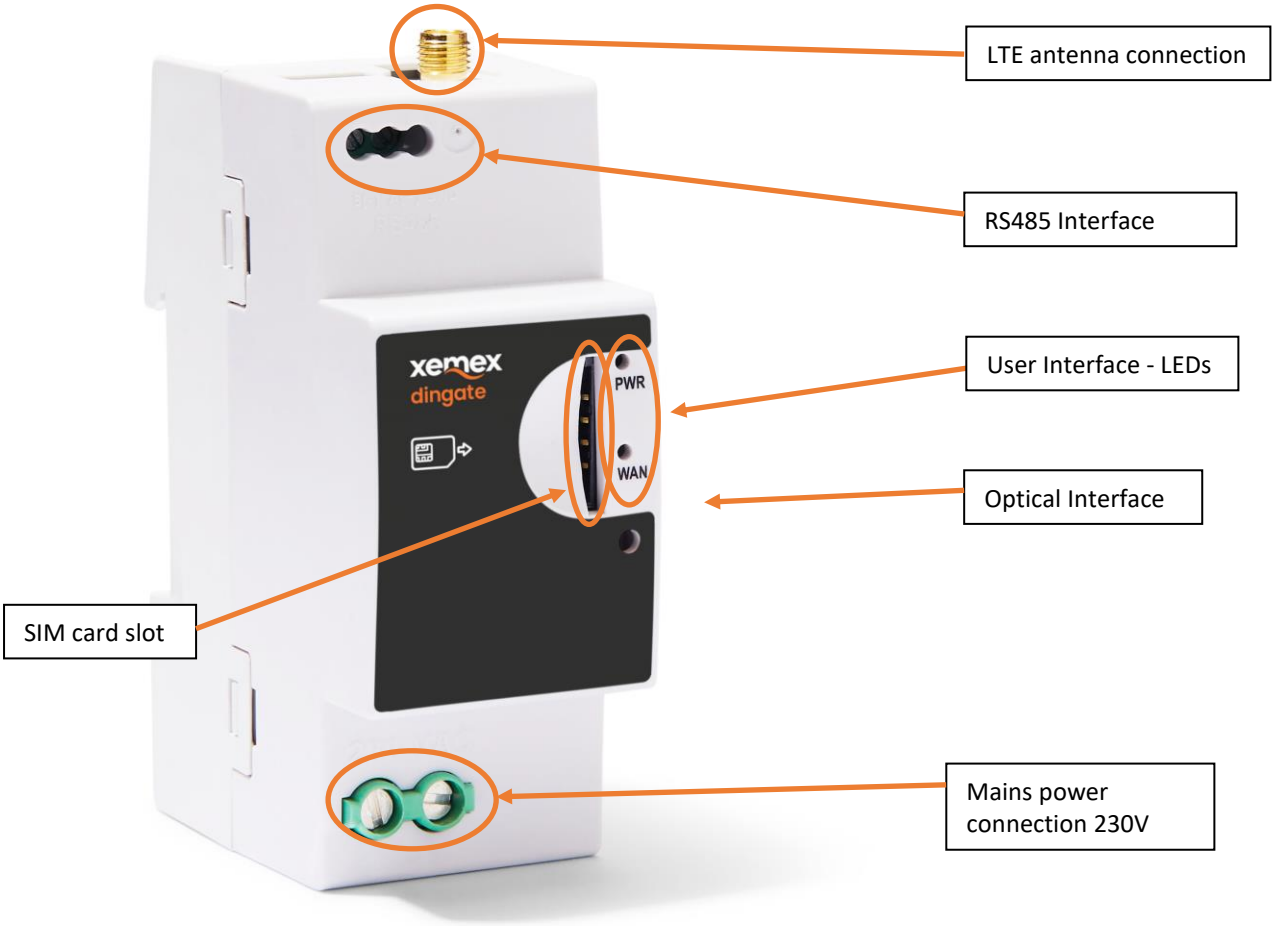
Always adhere to the following checklist:

1. Only qualified personnel or licensed electricians should install the Xemex DINgate TM. 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 TM device is a communication gateway with a 2-wire RS485 interface. An optical interface can be used for configuration purposes.
It has following interfaces:

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



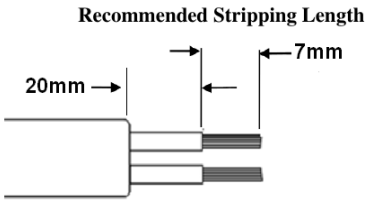
The DINgate TM gateway module is able to setup a transparent IP link between a server application and an RS485 device connected to the gateway. Data send over LTE is forwarded transparently to the RS485 interface and vice versa.
The IDNgate TM also incorporates a management application interface that can be accessed locally via the IR port, or remotely via GSM communication. It can be used to manage settings and perform firmware updates.

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 mm2
	Stranded wire / 0.2 – 4 mm2
Max torque:	0.6 Nm
Wire stripping:	7 mm



3.2 RS485 Interface

3.2.1 Physical Interface

Connector:	Screw terminal connector for A, B and Shield
Terminal wire:	0.2 -1.5 mm2
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:	Transparent link – binary data can be forwarded
Baud rate:	115200, 57600, 38400, 19200 ,9600, 4800, 2400, 1200, 300
	default value = **9600** baud
Line setting:	8N1, 8E1, 7E1
	default value = **8E1**

3.3 IR Interface

Optical interface to configure the settings or update the FW of the DINgate TM device via DLMS protocol.

Protocol:	DLMS
Baud rate:	9600 baud
Line setting	8E1

3.4 User Interface - LEDs

Power / RS485 indicator: Red LED
WAN indicator: Green LED
(See operating instruction 6.1 and 6.2 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 TM is equipped with an LTE Cat-1 modem with GPRS fallback (DINgate TM 1.0) or an LTE Cat-M modem (DINgate TM 1.1) functionality.

The supported frequency bands are:

3.6.1 DINgate TM 1.0

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

3.6.2 DINgate TM 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:	EN 61000-4-6
Voltage dips:	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.

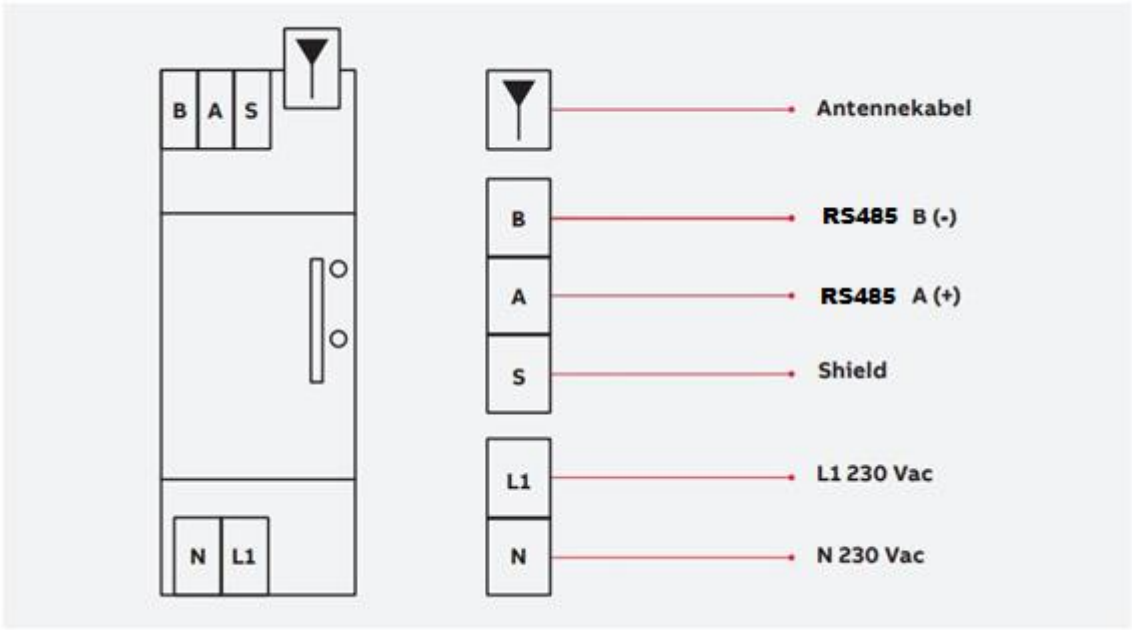
Caution: never open the secondary circuit of a Current Transformer while current is flowing through the primary circuit!
If the secondary circuit is opened when primary current is flowing, then the voltage will go to a very high value, possibly causing electrical arcing and/or electrical shock to service 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

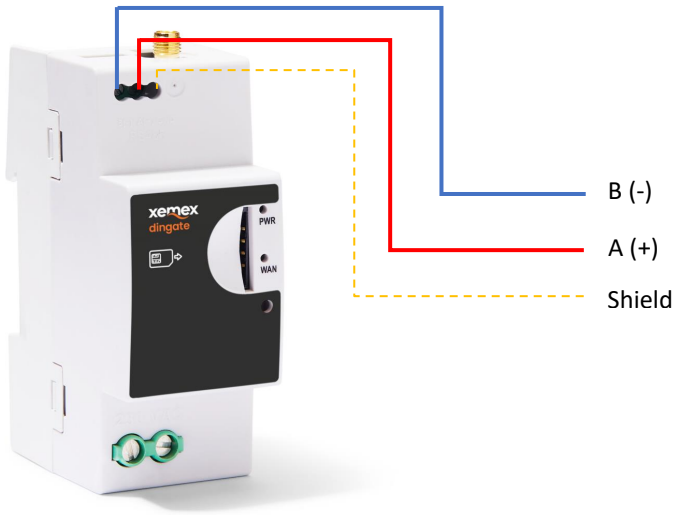
Mount the device in a DIN rail cabinet.

4.3 Electrical wiring diagram



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

4.4 Data connection via RS485



4.5 Insert/extract SIM card

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

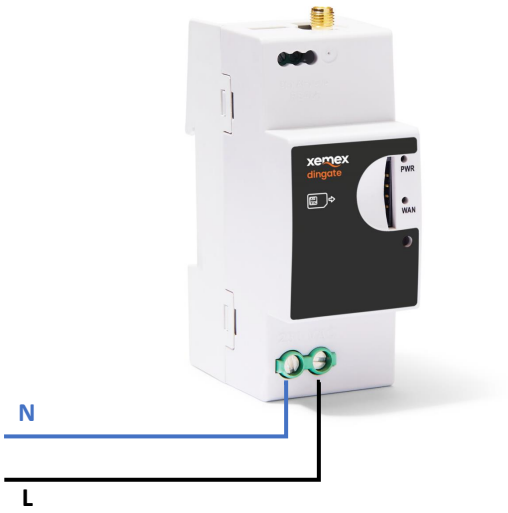
- Formfactor: mini SIM or 2FF
- To insert: push the SIM, with the contact area on the right side, in the slot until it clicks.
- To extract: push the SIM a bit further in the housing until it clicks and then release it to let it spring back.

4.6 LTE Antenna

The antenna used to connect to the DINgate TM 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 TM module power connection always needs to be protected with a circuit breaker.

5 Configuration

By default the DINgate TM modules are preconfigured in production.
Some configuration settings can be changed via the DLMS protocol using specific tooling (remote or local via optical interface). The configuration is described in document "Xemex product configuration via Gurux.docx" and out of scope for this document.

5.1 Configuration tools

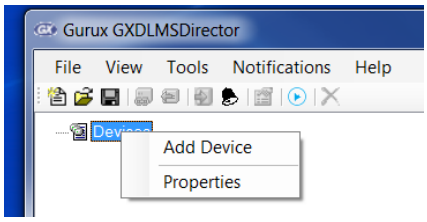
- HW – Optical Reader (IEC1107) 1U DIN rail module
  - Config via optical interface
  - For Initial or field service config

- SW – DLMS Client Application
  - Communication channels
    - IEC/HDLC/Serial (for config via optical channel)
    - DLMS Wrapper/TCP/IP (for config via the modem channel)
  - E.g. GXDLMSDirector
    http://www.gurux.fi/Download

5.2 Gurux GXDLMSDirector - configuration via optical Field Service Interface

Step 1: Add DINgate device

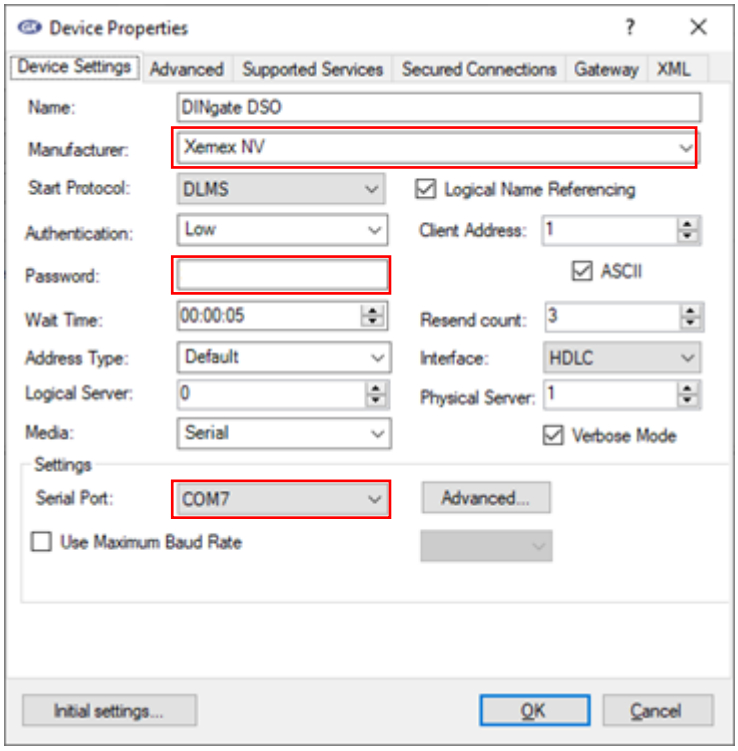
- Open GXDLMSDirector
- Right click "Devices"
- Select "Add Device" from the popup menu



- Fill out the Device Properties for the DINgate connection via Optical Interface and click "OK".

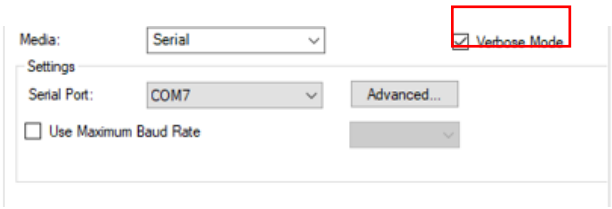
Module dependent settings:

- Fill in the correct LLS password
- Select the Serial Port to which your Optical Reader is connected
- Select the COM-port of the optical reader

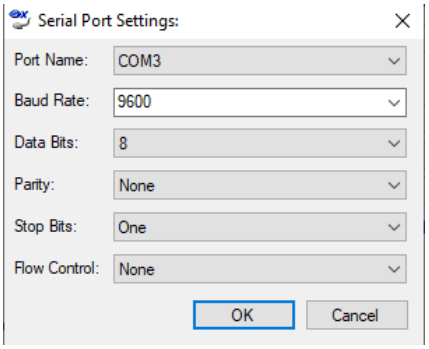


Configure serial port

- Press Advanced button



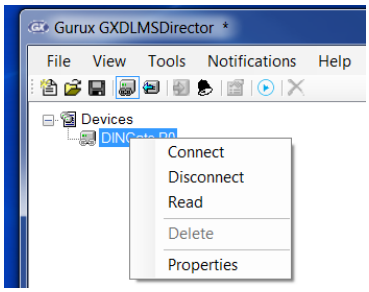
- Fill in settings below
  - Baudrate 9600
  - 8 Data bits, no parity & 1 Stop bit

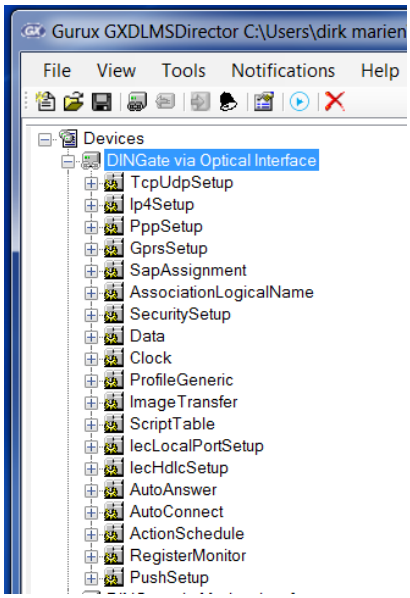


- Click “OK”

Step 2: Read out settings

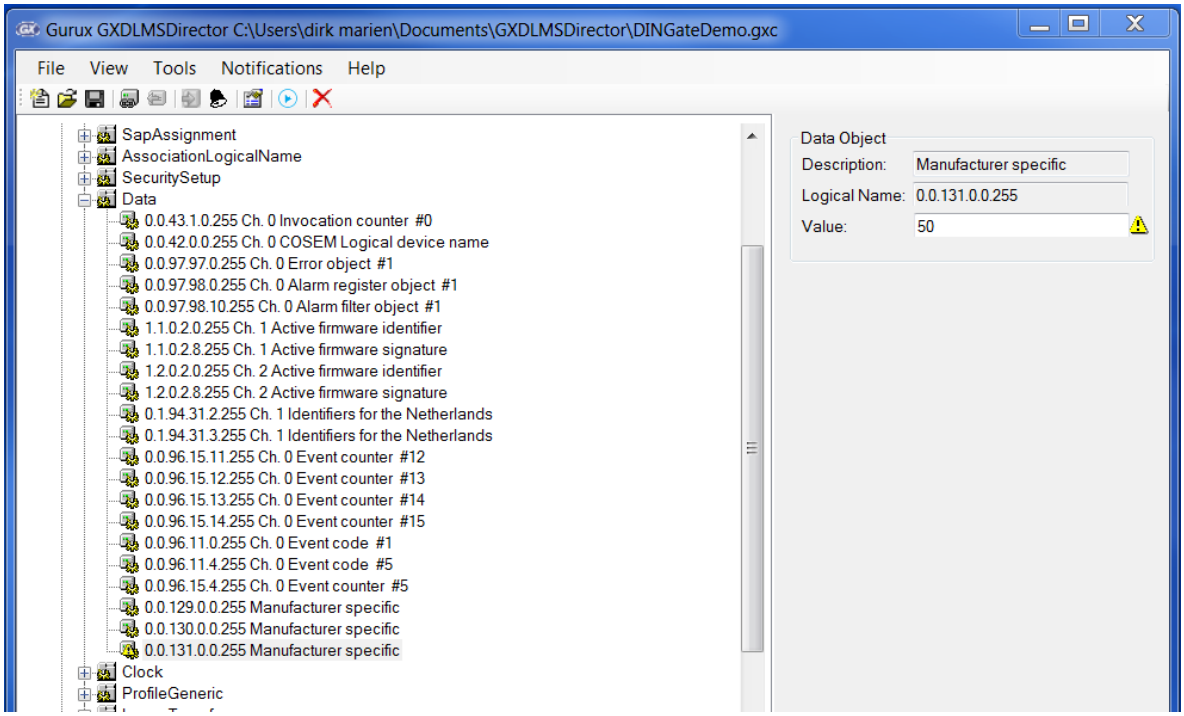
- Expand the “Devices” list (click on + in front of “Devices”)
- First, right click “Transparent Modem via Optical Interface” in the Devices list and select “Connect”
- Next, right click “Transparent Modem via Optical Interface” in the Devices list and select “Read”
- Next, expand the “Transparent Modem via Optical Interface” device to show its DLMS objects:





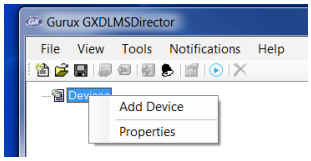
Step 3: Adjust settings

- Select the object to configure
  - First, click on “+” in front of the object Class (e.g. Data) to show all objects of this Class.
  - Next, click on the object (e.g. 0.0.129.0.0.255 Manufacturer specific).
- In the right pane, edit the object attributes values accordingly your settings.
- Click on the right arrow in the toolbar to send the updated attribute values to the Transparent Modem.

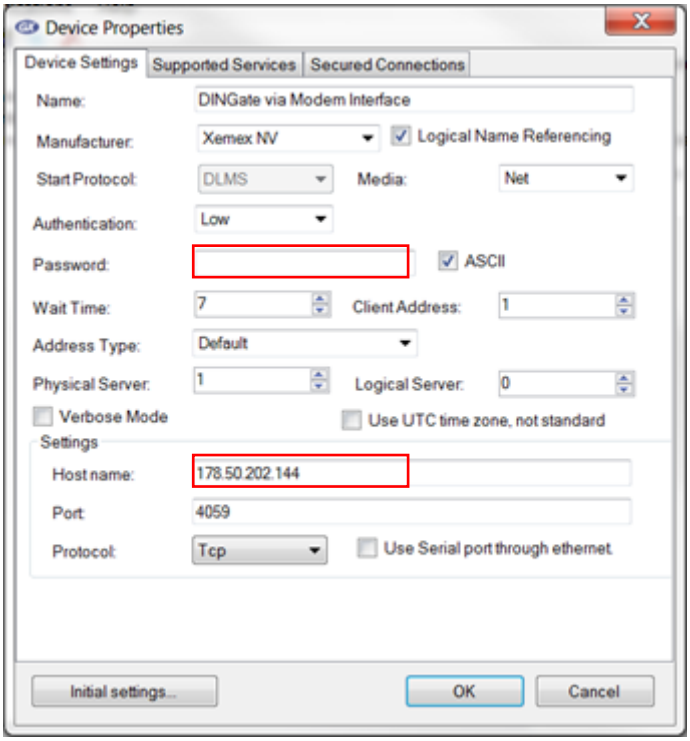


5.3 Gurux GXDLMSDirector - (remote) Configuration via Modem Interface

Step 1: Add Transparent Modem device



- Open GXDLMSDirector
- Right click “Devices”
- Select “Add Device” from the popup menu
- Fill out the Device Properties for the Transparent Modem Optical Interface and click ”OK”. Select the IP address of your Transparent Modem Module:



Module dependent settings:

- Fill in the correct LLS password
- Select the IP address of the DINgate module to connect

Step 2: See 5.2 Step 2

Step 3: See 5.2 Step 3

5.4 Basic configuration parameters

Config Item	DLMS Class	DLMS Object	Attribute Name	Attribute Value
APN *	GprsSetup	0.0.25.4.0.255 Ch. 0 GPRS modem setup	APN	Your network APN string, e.g. "M2M.MOB2MOB"
PIN	GprsSetup	0.0.25.4.0.255 Ch. 0 GPRS modem setup	PIN Code	Your SIM's PIN code (if any)
User Name *	PppSetup	0.0.25.3.0.255 Ch. 0 PPP setup	User Name	Your PPP user name (if any)
Password *	PppSetup	0.0.25.3.0.255 Ch. 0 PPP setup	Password	Your PPP password (if any)
RS-485 baudrate	Data	0.0.129.0.0.255 Manufacturer Specific	Value	115200,57600,38400,19200,9600,4800,2400,1200 or 300
RS-485 line settings	Data	0.0.130.0.0.255 Manufacturer Specific	Value	3 (= 8N1) 26 (= 7E1) 27 (= 8E1)
RS-485 TCP Port	Data	0.0.131.0.0.255 Manufacturer Specific	Value	Your TCP port number used for data forwarding in Transparent Modem mode.
(*) Remark: these values need to be set in ASCII HEX format (e.g. 'ABC' will become '414243')				

6 Operating instructions

The DINgate TM module can setup a remote IP link to a connected RS485 device.
The IR supports the industry-standard protocol DLMS-COSEM for configuration purposes. This protocol implements the SMR5 application layer.

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

6.1 PWR – POWER Status LED – Red LED

- Not lit: DINgate module is not powered
- Blinking: DINgate module is powered, but not (yet) able to readout the connected RS485 device
- Lit: DINgate module is powered, and has readout the connected RS485 device

6.2 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
  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.

The nominal state of the network status LED is 'LED Lit'
This means the module can always be reached on its IP address by the head-end system.

6.3 Service button

For future use.

7 Cleaning

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

8 Lifting and carrying

Use care when lifting and carrying the product.

9 Maintenance and Service

There are no serviceable parts inside.

End Of Document.