EN

wenglor
the innovative family

EPGG001

PROFINET fieldbus Gateway V 2.4

Operating Instructions

Available as PDF only
Status: 18 December 2014
www.wenglor.com

EN

Index

1. Notes regarding the CE mark on the module

1.1 EMC directive of the European Union

The following applies to the module described in these operating instructions:

Products which bear the CE mark fulfill the requirements of the EU directive on electromagnetic compatibility, as well as the harmonized European standards (EN) listed therein.
EU declarations of conformity are kept on file and made available to the presiding authorities in accordance with article 10 of the EU directive at:

wenglor sensoric GmbH, wenglor Str. 3, DE-88069 Tettnang, Germany

1.2 Scope of application

The module is laid out for use in industrial settings and fulfills the following requirements:

Scope of application	Requirement for	
	Interference emission	Interference immunity
Industry	EN 55011, cl. A (2007)	EN 61000-6-2 (2005)

1.3 Note installation guidelines

The module fulfills the requirements if you:

1) Observe the setup guidelines included in the operating instructions during installation and operation
2) Adhere additionally to the following rules regarding installation of the device and working on control cabinets

1.4 Installing the device

Modules must be installed in areas designated for electrical operating equipment or in closed housings (e.g. switch boxes made of metal or plastic). Furthermore, the device and the switch box (metal box), or at least the H-rail (plastic box) to which the module has been snap mounted, must be grounded.

1.5 Working on control cabinets

In order to protect modules from the discharge of static electricity, personnel must electrostatically discharge themselves before opening control cabinets or switch boxes.

2. Notes for machine manufacturers

2.1 Gateway

The fieldbus Gateway module does not constitute a machine in the spirit of the EU machine directive. Consequently, there is no declaration of conformity for the module with reference to the EU machine directive.

2.2 EU Machine directive

The EU machine directive regulates the requirements stipulated for any given machine. Within this context, the term machine is understood to mean the whole resulting from connected parts or mechanisms (see also EN 292-1, section 3.1).
The module is part of the electrical equipment of a machine and must therefore be incorporated into the declaration of conformity process by the machine manufacturer.

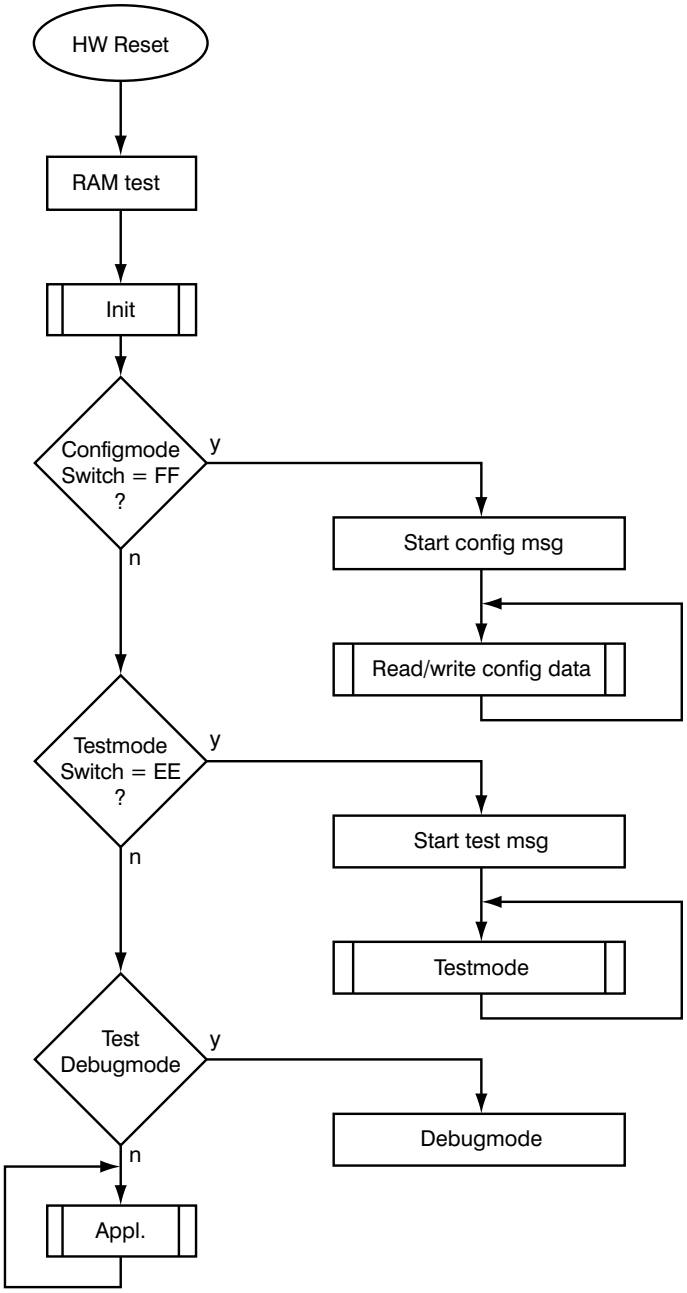
3. Introduction

The PROFINET fieldbus Gateway module is used to adapt a serial interface to PROFINET networks. The device is equipped with 2 PROFINET ports – one port can be used, for example, as an outgoing PROFINET port. The terminal device's protocol is implemented by means of a script in the fieldbus Gateway.

Fundamentally, the PROFINET fieldbus Gateway module consists of the following hardware components:

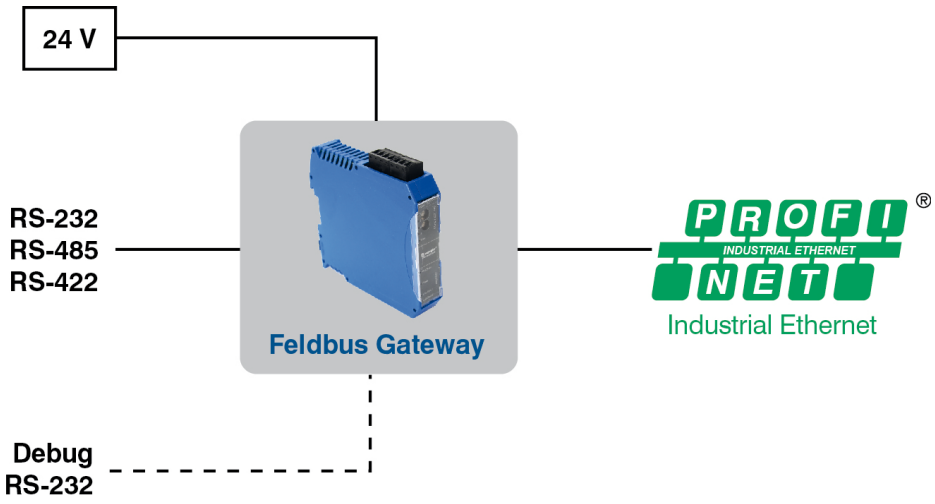
- Electrically isolated PROFINET interface
- "HyNet32s" 32-bit processor
- RAM and flash memory
- Serial interface (RS-232, RS-485 and RS-422) for the externally connected device

3.1 Fieldbus Gateway software flowchart



3.2 Fieldbus Gateway application diagram

The following figure shows a typical connection example.



4. Gateway operating modes

4.1 Configuration mode (config mode)

The configuration mode is used to configure the Gateway. The following settings can be made in this mode:

- Record script
- Update firmware

The Gateway is started in this mode if switches S4 and S5 are both set to “F” when the Gateway is started. Immediately after being started up in the configuration mode, the Gateway transmits its start-up message.

In the configuration mode, the Gateway always uses the following settings: 9600 baud, no parity, 8 data bits and 1 stop bit. The state LED always blinks red and the “Error No/Select ID” LEDs have no significance for the user.

4.2 Test mode

Selecting the test mode

The test mode is selected by setting both the S4 and the S5 switch to “E”. Settings for all other switches are irrelevant for test mode operation. After these settings have been selected, the Gateway must be restarted (by briefly interrupting supply power).
In the test mode, the Gateway always uses the following settings: 9600 baud, no parity, 8 data bits and 1 stop bit.
This mode can be helpful for integrating the Gateway into its respective environment, for instance in order to test the parameters of the RS interfaces.

Test mode functionality

After restarting in the test mode, the Gateway transmits the values 0 through 15 in hexadecimal format (0 ... F) from the serial side once per second in ASCII code. The same values are read out simultaneously from the fieldbus interface in binary format.
The state LED on the RS side blinks red in this mode, and the “Error No/Select ID” LEDs indicate the momentarily read out value in binary format. At the same time, each character received by any of the interfaces is read back out from the same interfaces as a local echo. Only the first byte is used for the local echo on the fieldbus side, i.e. during receiving as well as transmission, only the first byte of the bus data is considered, and other bus data do not change relative to the last data.

4.3 Data exchange mode

Data exchange between the RS side of the Gateway and the fieldbus is only possible when the Gateway is in the data exchange mode. This mode is always active when the Gateway is in the configuration, test or debug mode. The Gateway runs the script which has been read in in the data exchange mode.

5. RS interface

5.1 RS interfaces included with the fieldbus Gateway

The fieldbus Gateway is equipped with RS-232, RS-422 and RS-485 interfaces. The hardware always has a debug interface as well (see section 6).

5.2 Fieldbus Gateway buffer sizes

The fieldbus Gateway has buffers on the serial side for both input and output data, each with a capacity of 1024 bytes.
The FIFO buffer of the application interface (RS interface) can be changed in any script-compatible fieldbus Gateway. Refer to “Device Control” – “Hardware” in the Protocol Developer in this regard.

5.3 Framing check

The length of the stop bit received by the Gateway is checked by means of the “Framing check” function. The stop bit generated by the Gateway is always long enough to be evaluated by connected bus users.

Please note that the “Framing check” function becomes effective only in case of 8 data bits with the “no parity” setting.

If the stop bit does not have a length of 1 bit when the test is activated, an error is detected and indicated by the error LEDs.

Possible adjustment of this parameter can be controlled by the script (see the online help for the Protocol Developer in this regard). The default setting for the “stop bit framing check” is “enabled”.

6. The debug interface

6.1 Overview of the debug interface

The fieldbus Gateway includes a debug interface which makes it possible to run a script step by step. Normally, this interface is only necessary for the development of a script.

6.2 Starting in the debug mode

When supply power is switched on to the fieldbus Gateway (power up), the firmware reads out the binary character 0 (0x00) after executing a self-test at this interface. If the fieldbus Gateway receives an acknowledgment via this interface within 500 ms, it's in the debug mode. The acknowledgment consists of ASCII character O (0x4F).
When the debug mode is started, further execution of script commands is disabled.

6.3 Communication parameters for the debug interface

The debug interface always uses the following settings: 9600 baud, no parity, 8 data bits, 1 stop bit. It's not possible to change these parameters in the Protocol Developer. Please make sure that these settings coincide with those of the COM port at the PC, and that flow control (protocol) is set to "none" there.

6.4 Options provided by the debug interface

Normally, the Protocol Developer is connected to the debug interface. A script can be executed step by step with the Protocol Developer, jumps and decisions can be observed and memory areas can be viewed. In addition to this, stop points can be set. And thus fundamentally, the Protocol Developer is equipped with all of the features typically included in a software development tool. However, it's also possible to run a script update via this interface.
Data can also be read out with the help of the "SerialOutputToDebugInterface" script command.

7. System functionality

7.1 General explanation

According to the ISO/OSI model, communication can be subdivided into 7 layers, namely layers 1 through 7.
Gateways supplied by wenglor sensoric GmbH convert layers 1 and 2 from the customer-specific bus system (RS-485 / RS-232 / RS-422) to the corresponding fieldbus system. Layers 3 and 4 are covered by the UDP/IP / TCP/IP protocol. Layers 5 and 6 are empty. Layer 7 is converted in accordance with section 7.3.

7.2 Interfaces

The Gateway is equipped with RS-232, RS-422 and RS-485 interfaces.

7.3 Data exchange

All data are transmitted by the Gateway depending on the script which has been read in.

7.4 Possible data lengths

The maximum amount of data to be transmitted is shown in the following table:

Input data	Max. 1440 bytes	Variable: here max. value
Output data	Max. 1440 bytes	Variable: here max. value

7.5 Start-up phase

During the start-up phase, the PROFINET controller parametrizes and configures the Gateway. No data exchange takes place with the external device until the start-up phase has been successfully completed.

8. Creating a script

8.1 What's a script?

A script is a series of commands which are executed in precisely the order in which they appear. Due to the fact that mechanisms are also included which monitor the flow of the program within the script, complex sequences can be compiled on the basis of these simple commands.

The script is memory-mapped. This means that all variables always refer to a single memory range. However, there's no need to concern yourself with managing memory when developing a script – that's taken care of by the Protocol Developer.

8.2 Memory efficiency of the programs

A script command can execute, for example, a complex checksum for data such as a CRC-16 calculation. Only 9 bytes of memory are required for the coding of this command (for the command itself). This is only made possible by keeping these complex commands in a library.
A further advantage of the library is the fact that the basic functions have already been in use for many years, and can thus be deemed highly reliable. The fact that these commands are also available in the controller's native code is also favorable for the run-time performance of the script.

8.3 What can you do with a script?

Scripts can run commands, and commands are always small, well defined tasks within this context. All commands can be assigned to various classes or groups. One group of commands deals with communication in general. The commands in this group make it possible for the Gateway to transmit and receive data at the serial side, as well as at the bus side.

8.4 Further Gateway settings

The device don't require any further settings other than those already included in the script.

8.5 Using the protocol developer

The Protocol Developer software tool can be downloaded from our website at www.wenglor.com → Service → Download → Software. It's laid out as a tool for easy creation of scripts for our script Gateways, and its operation is aligned to precisely this task. After starting the program, the last loaded script is reloaded, unless the program is being started for the first time. Script commands can be added using the mouse or the keyboard by means of typical Windows procedures. If specified and necessary for the respective command, the dialog box for the command is displayed and the correct text is added to the script automatically after the values have been entered. New commands are added by the Protocol Developer in such a way that existing commands are never overwritten. A new command is always entered before the command at which the cursor is momentarily positioned. The keyboard can of course also be used to write new commands and edit existing commands.

9. FTP server

This fieldbus Gateway is equipped with an integrated FTP server, via which the file system can be accessed.
The FTP server is password protected and can be accessed by making the following entries: user name “**admin**”, password “**admin**”.
Under no circumstances may the following files, which are located in this file system, be deleted or changed, because they are absolutely necessary for the system:

- project.hex
- ftp_accounts.txt
- script.sys

9.1 Script update via FTP

The DCS file generated by the Protocol Developer as “script.dcs” must be saved to the Gateway via FTP. The Gateway detects this file when it’s started, after which it converts and integrates it as “script.sys”, where the script is normally stored, and then deletes the “script.dcs” file.

10. Hardware connections, switches and LEDs

10.1 Device labelling

Figure 1: Connection labelling und termination

Figure 2: Front panel with rotary switch and LEDs

10.2 Plugs

10.2.1 Plug to external device (RS interface)

The serial interface is available via the plug which can be accessed at the top of the device.
Pin assignments (3-pin + 4-pin screw-in plug connector)

Pin No.	Name	Function
5	Rx 232	Receive signal
6	Tx 232	Transmit signal
7	GND	Application ground
8	Rx 422+ (485+)	Receive signal
9	Rx 422– (485–)	Receive signal
10	Tx 422+ (485+)	Transmit signal
11	Tx 422– (485–)	Transmit signal

For operation at an RS-485 interface, both pins with the designation “485–” have to be connected together.
This applies as well to the pins with the designation “485+”.

10.2.2 Supply power plug and debug interface

Pin assignments (4-pin screw-in plug connector, at the bottom on the back)

Pin No.	Name	Function
1	Tx debug	Transmit signal debug
2	Rx debug	Receive signal debug
3	GND	0 V DC supply power
4	24 V	10 to 32 V DC supply power

Attention:
The ground terminal for the debug interface must be connected to pin 07 (GND) of the RS interface or pin 03 (GND) of the DC signal.

10.2.3 PROFINET plug

There are two RJ45 plugs on the bottom of the device (labelling: PROFINET IO Port 1/2) for connection to PROFINET.

Pin assignments, P1/P2

Pin No.	Name	Function
1	TD+	Transmit cable +
2	TD–	Transmit cable –
3	RD+	Receive cable +
4		
5		
6	RD–	Receive cable –
7		
8		

10.2.4 Power supply

The device must be supplied with 10 to 32 V DC. Power is supplied via the 4-pin screw-in plug connector at the bottom. Please note that the product may not be operated with alternating current (AC).

10.3 LEDs

The PROFINET fieldbus Gateway is equipped with 10 LEDs which have the following significance:

Designation	Status	Function
Power (PROFINET)	green	PROFINET supply power (entire device)
L/A port 1	green	Link network
L/A port 2	green	Link network
PN State	red/green	PROFINET interface state
Power	green	Serial interface supply power
State	red/green	User-defined / general Gateway error
1/2/4/8 (Error No/Select ID)	green	User-defined / general Gateway error

10.3.1 Power LED (PROFINET)

Power supply to the internal PROFINET hardware components

10.3.2 L/A port 1 LED

This LED is driven directly by the PROFINET processor and lights up when port 1 (P1) at the Gateway is connected to a functioning network (Link signals are being received) and it flickers during data traffic via the network.

10.3.3 L/A port 2 LED

This LED is driven directly by the PROFINET processor and lights up when port 2 (P2) at the Gateway is connected to a functioning network (Link signals are being received) and it flickers during data traffic via the network.

10.3.4 PN State LED

Off	Waiting for “Bus Start” script command
Illuminated green	Connection to IO controller established, data exchange in progress
Blinking green	PROFINET initializing waiting for connection to IO controller
Blinking red	PROFINET user blink test

10.3.5 Power LED

Power supply to the internal hardware components of the serial interface (RS-232/422/485)

10.3.6 State LED

Status	Function
Illuminated green	Controllable via script
Blinking green	Controllable via script
Blinking green/red	Controllable via script
Illuminated red	General Gateway error (see LED error no.), controllable via script
Blinking red	The fieldbus Gateway is in the configuration/test mode, controllable via script

10.3.7 LEDs 1, 2, 4 and 8 (Error No/Select ID)

If these 4 LEDs blink and the “State” LED lights up red at the same time, the error number is displayed in binary code (see conversion table in the appendix) in accordance with the table in the “Error Processing” section. These LEDs can also be controlled via script.

10.4 Switches

The Gateway is equipped with 4 switches which have the following functions:

Designation	Function
Termination Rx 422	Switchable Rx 422 terminating resistor for the serial interface
Termination Tx 422	Switchable Tx 422 or RS-485 terminating resistor for the serial interface
S4, top rotary encoding switch	ID high for serial interface, e.g. configuration mode
S5, bottom rotary encoding switch	ID low for serial interface, e.g. configuration mode

10.4.1 Termination Rx 422 + Tx 422 (serial interface)

If the Gateway is operated as the first or last physical device within the an RS-485 bus (e.g. as 422), a bus terminator must be included at the Gateway. The termination switch is set to ON in this case. The 150 Ω resistor integrated into the Gateway is activated as a result. The switch must be left in the OFF position in all other cases.
Further information regarding bus termination is available in the general RS-485 literature.
If the integrated resistor is used, the fact must be taken into consideration that a pull-down resistor (390 Ω) to ground and a pull-up resistor (390 Ω) to VCC are automatically activated.

Both termination switches are set to ON in the case of RS-422.
In the case of RS-485, only the Tx 422 switch may be set to ON.
The Rx 422 switch must be set to OFF.

10.4.2 S4 and S5 rotary encoding switches (serial interface)

These two switches can be read out via the “Get (RS_Switch, Destination)” script command, and the value can be used for other functions. This value is read in when the Gateway is switched on, as well as each time the script command is executed. Switch settings “EE” (test mode) and “FF” (config mode) are not possible with RS-422 or RS-485 operation.

11. Error handling

11.1 Error handling with the fieldbus Gateway

If the Gateway detects an error, the “State” LED light up red and, at the same time, the error number is displayed in accordance with the following table via the “Error No” LEDs. Differentiation is made between two error categories:
Fatal errors (1 - 5): In this case the Gateway has to be switched off and then back on again. If the error occurs again, the Gateway has to be replaced and sent in for repair.
Warnings (6 - 15): These warnings are displayed for 1 minute for information only, and are then reset automatically. If these warning occur frequently, customer service should be notified.
A blinking frequency of 0.5 Hz is used for user-defined errors. The error is indicated for the duration selected with the “Set Warning Time” parameter.

These displays are not valid in the configuration mode and are intended for internal purposes only.

LED 8	LED 4	LED 2	LED 1	Error No. or ID	Error Description
0	0	0	0	0	Reserved
0	0	0	1	1	Hardware error
0	0	1	0	2	EEPROM error
0	0	1	1	3	Internal memory error
0	1	0	0	4	Fieldbus hardware error
0	1	0	1	5	Script error
0	1	1	0	6	Reserved
0	1	1	1	7	RS transmission buffer overflow
1	0	0	0	8	RS receiving buffer overflow
1	0	0	1	9	RS timeout
1	0	1	0	10	General fieldbus error
1	0	1	1	11	Parity or frame check error
1	1	0	0	12	Reserved
1	1	0	1	13	Fieldbus configuration error
1	1	1	0	14	Fieldbus data buffer overflow
1	1	1	1	15	Reserved

Table: Error processing with the fieldbus Gateway

12. Setup guidelines

12.1 Installing the Module

The module has been developed for use in the control cabinet (IP20) and can therefore only be mounted to a standardized profile rail (wide H-rail per EN50022).

12.1.1 Installation

- The module is set onto the H-rail from above and swiveled down until it snaps into place.
- Other modules can be lined up to the left and the right of the Gateway module.
- At least 5 cm of free space must be available for heat dissipation both above and underneath the module.
- The standardized rail must be connected to the control cabinet's equipotential bonding rail. The connecting wire must have a cross-section of at least 10 sq. mm.

12.1.2 Removal

- Supply power and signal lines must first be disconnected.
- The module must then be pushed up and swiveled out of the H-rail.

Vertical Installation
The standardized rail can also be vertically mounted, so that the module is rotated 90°.

12.2 Wiring

12.2.1 Connection technologies

The following connection technologies must/can be used for wiring the module:

- Standard screw/plug connection (power supply and RS)
- 8-pin RJ45 plug connector (PROFINET connection)
- Suitable connection technology can be found on www.wenglor.com.

a) In the case of standard screw terminals, one wire can be connected per terminal. A screwdriver with a blade width of 3.5 mm is the most suitable tool for tightening the terminals.

Permissible wire cross-section:

- Flexible wire with wire-end sleeve: 1 × 0.25 to 1.5 sq. mm
- Massive conductor: 1 × 0.25 to 1.5 sq. mm
- Tightening torque: 0.5 to 0.8 Nm

b) The plug-in terminal strip is a combination of the standard screw terminal and a plug connector.
The plug connector component is coded and thus cannot be plugged in incorrectly.

12.2.1.1 Power supply

The device must be supplied with 10 to 32 V DC.

Connect supply power to the 4-pin plug-in screw terminal according to the labelling on the device.

12.2.1.2 Connecting equipotential bonding

Connection to equipotential bonding is automatic when the module is installed to the H-rail, and the H-rail must be grounded to this end.

12.2.2 PROFINET-IO communication interface

The interface is included on the module in the form of two 8-pin RJ45 sockets on the bottom of the housing.

- Insert the PROFINET connector plug into the RJ45 socket(s) labelled “PROFINET-IO”.
- It must be assured that the length of the cables to neighboring Ethernet users is no less than 0.6 m.

13. Cable selection and laying regulations

13.1 Cable laying, shielding and measures against interference voltage

This section deals with laying bus, signal and supply power cables and is targeted at assuring an EMC-compatible layout for your system.

13.1.1 General information on laying cables

– Inside and Outside of Cabinets –
In order to assure EMC-compatible cable laying, it’s helpful to subdivide cables into the following groups and to lay each group separately.

⇨ Group A:
- Shielded bus and data cables, e.g. for RS-232C, printers etc.
- Shielded analog cables
- Unshielded cables for direct voltage ≥ 60 V
- Unshielded cables for alternating voltage ≥ 25 V
- Coaxial cables for monitors

⇨ Group B:
- Unshielded cables for direct voltage ≥ 60 V and ≥ 400 V
- Unshielded cables for alternating voltage ≥ 24 V und ≥ 400 V

⇨ Group C:
- Unshielded cables for direct voltage > 400 V

With the help of the following table, you can ascertain laying requirements for cable groups by combining the individual groups.

	Group A	Group B	Group C
Group A	1	2	3
Group B	2	1	3
Group C	3	3	1

Table: Cable laying regulations depending on the combination of cable groups

1) Cables can be laid together in common bundles or cable ducts.
2) Cables must be laid in separate bundles or cable ducts (no minimum clearance required).
3) Cables must be laid inside cabinets in separate bundles or cable ducts, or outside of cabinets but inside buildings in separate runs with a minimum clearance of 10 cm.

13.1.1.1 Cable shielding

Shielding is a measure targeted at attenuating magnetic, electrical and electromagnetic interference fields.
Interference current on cable shields is dissipated to ground via the housing which is conductively connected to the shield rail. In order to assure that this interference current does not itself become a source of interference, a low-impedance connection to the protective conductor is especially important.
Wherever possible, use only cables with braided shield. Shield coverage should be greater than 80%. Avoid cables with shielding foil, because the foil can be very easily damaged due to tensile and compression forces during installation, thus resulting in impaired shielding effectiveness.
As a rule, cable shields should be connected at both ends. Good interference suppression in the high-frequency range is only possible by connecting the shield at both ends.
The shield can be connected at one only in exceptional cases only. However, attenuation is only achieved for low frequencies in this case. Connecting the shield at one end may be more favorable if:

- It's not possible to lay an equipotential bonding cable
- Analog signals are being transmitted (a few mV or mA)
- Shielding foil (static shielding) is being used

Always use metallic or metallized plugs on data cables for serial connection. Secure the shield from the data cable to the plug housing.

In the case of voltage gradients between grounding points, compensating current may flow over a shield which is connected at both ends. If this is the case, lay an additional equipotential bonding cable.

Observe the following points when connecting the shield:

- Use metal cable clips when securing the braided shield. The clips must enclose the shield over a large surface area and make good contact.
- Connect the shield to a shield rail directly after the point at which the cable enters the cabinet. Lay the shield up to the module, but don't connect it there again.

14. Technical data

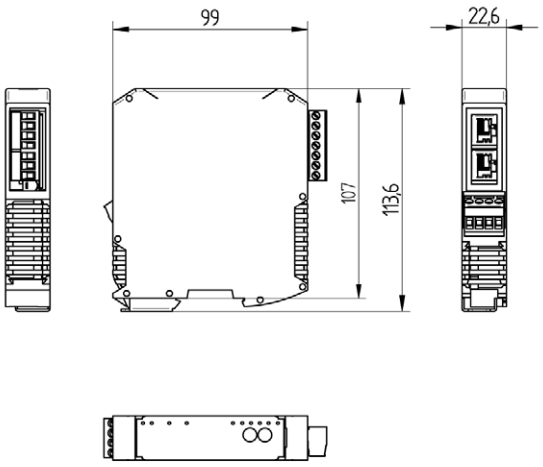
14.1 Device data

The technical data for the module is included in the following table.

Number	Parameter	Data	Explanation
1	Where used	Control cabinet	Mounted to H-rail
2	Protection	IP20	Foreign matter and water protection per IEC 529 (DIN 40050)
3	Service life	> 85,000 hours	
4	Mounting position	Any	
5	Weight	150 g	
6	Operating temperature	0 to 55° C	
7	External power supply	10 to 32 V DC	Standard power pack per DIN 19240
8	Current consumption at 24 V DC	Typically 120 mA, max. 150 mA	
9	Protected against polarity reversal	Yes	Nevertheless, the device does not function!
10	Short circuit protection	Yes	
11	Overload protection	Poly-switch	Thermal fuse
12	Undervoltage detection (USP)	≤ 9 V DC	
13	Power failure bridging	≥ 5 ms	Device fully functional

Table: Technical data, Module

14.2 Housing dimensions



14.2.1 Interface data

The technical data for the interfaces included on the module is listed in the following table. These data have been taken from the corresponding standards.

Number	Interface designation, physical Interface		PROFINET-IO Ethernet 100BASE-T	RS-232-C RS-232-C	RS-485/RS-422 RS-485/RS-422
1	Standard			DIN 66020	EIA standard
2	Type of transmission		Symmetrical Asynchronous Serial Full-duplex ⇨ Differential signal	Asymmetrical Asynchronous Serial Full-duplex ⇨ Level	Symmetrical Asynchronous Serial Half-duplex Full-duplex with RS-422 ⇨ Differential signal
3	Transmission method		Multi-master CSMA/CD	Master/slave	Master/slave
4	Number of users:	– Transmitters – Receivers	512 512	1 1	32 32
5	Cable length:	– Maximum – Baud rate dependent	100 m	15 m No	1200 m < 93.75 kBd ⇨ 1200 m 312 kBd ⇨ 500 m 625 kBd ⇨ 250 m
6	Bus topology		Star/Line/tree	Point-to-point	Line
7	Data rate:	– Maximum – Standard values	100 Mbit/s	120 kBit/s 2.4 k/B 4.8 k/B 9.6 kBit/s 19.2 kBit/s 38.4 kBit/s	520 kBaud 2.4 kBit/s 4.8 kBit/s 9.6 kBit/s 19.2 kBit/s 57.6 kB 312.5 kB
8	Transmitter:	– Load – Max. voltage – Signal without load – Signal with load	100 Ω	3 … 7 kΩ ±25 V ±15 V ±5 V	54 Ω −7 V … 12 V ±5 V ±1.5 V
9	Receiver:	– Input resistance – Max. input signal – Sensitivity	100 Ω	3 … 7 Ω ±15 V ±3 V	12 Ω –7 V … 12 V ±0.2 V
10	Trans. range (SPACE):	– U level – Logic level		+3 to +15 V 0	-0.2 to +0.2 V 0
11	Interval (MARK):	– U level – Logic level		-3 to -15 V 1	+1.5 to +5 V 1

Table: Technical data for the interfaces on the module

15. Initial start-up

15.1 Note:

The fieldbus Gateway may only be started up by trained personnel in compliance with applicable safety regulations.

15.2 Components

You'll need the following components in order to start up the fieldbus Gateway:

- Fieldbus Gateway
- Connection cable from the Gateway to the process
- Connector plug for PROFINET connection to the fieldbus Gateway
- Ethernet cable
- 10 … 32 V DC power supply (DIN 19240)
- The GSDML file and operating instructions can be downloaded from www.wenglor.com.

15.3 Installation

The fieldbus Gateway PN module is equipped with IP20 protection and is thus suitable for use in a control cabinet. The device is designed to be snapped onto a 35 mm H-rail.

15.4 Initial start-up information

It is absolutely essential to complete the following steps during initial start-up in order to assure correct functioning of the module:

15.4.1 PROFINET address assignment

Note: The Gateway is shipped without an IP address!
The IP address is usually assigned to the Gateway by the PROFINET IO controller (PLC) during normal operation (data exchange mode). The Gateway is provided with a device name to this end, via which it's addressed (see section 15.4.2). The IP address can also be assigned manually or by means of a DHCP server.

15.4.2 PROFINET device name

Note: The Gateway is shipped without an device name!
The device name is assigned to the Gateway by the project engineering software. Alternatively, the device name can be changed via FTP or the script.
In accordance with the PROFINET specification, the following rules apply to the device name:

- The name consists of one or several parts separated by points.
- The overall length of the name is 1 to 240 characters.
- The length of any given part of the name is 1 to 63 characters.
- Parts of names consist exclusively of lowercase letters, numbers and the dash.
- Neither the first nor the last character of any part of the name can be a dash.
- The first part of the name may not begin with "port-xyz" or "port-xyz-abcde", where a, b, c, d, e, x, y and z represent, characters.
- The name may not have a format of "k.l.m.n", where k, l, m and n represent numbers from 0 to 999.

15.4.3 PROFINET connection

Connect the device to the controller via the RJ45 socket.

15.4.4 Connecting the process device

Read the operating instructions included with the process device before starting it up.

15.4.5 Connecting the shield

Ground the top hat rail to which the module has been installed.

15.4.6 Connecting supply power

Connect 10 to max. 32 V DC supply power to the terminals intended for this purpose.

15.4.7 Project engineering

Use any desired project engineering tool to this end. If the required GSDML file is not included with your project engineering tools, you can download it from the Internet (www.wenglor.com).

16. Service

If questions should arise which are not addressed in this manual, please contact us directly.

Please have the following information available when you call:

- Device designation
- Serial number (S/N)
- Article number
- Error number and error description

You can reach us during our hotline opening hours from

Monday through Thursday from 8 a.m. to 12 noon and from 1 to 5 p.m., and on Friday from 8 a.m. to 1 p.m.

wenglor sensoric GmbH
wenglor Str. 3
D-88069 Tettnang, Germany

Headquarters and sales	+49-(0)7542-5399-0
Technical hotline e-mail	support@wenglor.com

16.1 Sending in a Device

If you send us a device, we'll need a complete, detailed description of the error. In particular we need the following information:

- Which error number was displayed?
- What is the value of the supply voltage (±0.5 V) with connected Gateway?
- Which were the last activities carried out at the device (programming, error during start-up etc.)?

The more precise your information and the description of the error are, the more exactly we'll be able to check for possible causes.
Downloading PC software:
Current information and software are always available for download from our website free of charge at www.wenglor.com → Product World → Product search (Order No.) → Download.

17. Appendix

17.1 Hexadecimal Table

Hex	Decimal	Binary
0	0	0000
1	1	0001
2	2	0010
3	3	0011
4	4	0100
5	5	0101
6	6	0110
7	7	0111
8	8	1000
9	9	1001
A	10	1010
B	11	1011
C	12	1100
D	13	1101
E	14	1110
F	15	1111

18. Exclusion of liability

The wenglor sensoric GmbH, hereinafter referred to as wenglor, makes explicit reference to the fact that the information contained in these operating instructions may be subject to continuous further development and technical changes. The operating instructions do not imply any guarantee from wenglor with regard to the described technical procedures or specific product characteristics. wenglor assumes no liability for printing errors or other inaccuracies contained in these operating instructions, unless wenglor was verifiably aware of such errors at the point in time at which the operating instructions were prepared. Furthermore, wenglor herewith explicitly informs the user that these operating instructions are only a general description of technical procedures whose implementation may not be suitable in all cases as described in this document.

wenglor sensoric GmbH
www.wenglor.com