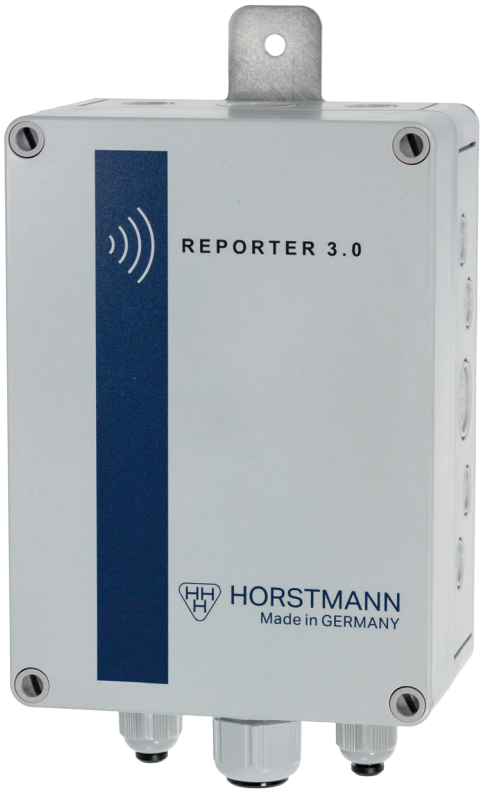
HORSTMANN
GERMANY

Instructions for Use

REPORTER 3.0



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Contents

General notes!

Before using this device, carefully read and understand the contents of this document and keep it for future reference.

The content of these Instructions for Use reflects the current state of the art at the date of printing. We reserve the right to make technical changes at any time and without prior notice as necessary in the framework of on-going developments. This technical documentation becomes invalid when a new issue appears.

Important Terms

The following defined terms are used to save life and limb. In addition to that, they influence the service life of the devices.

DANGER!
... indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

WARNING!
... indicates a hazard with a medium level of risk which, if not avoided, will result in death or serious injury.

CAUTION!
... indicates a hazard with a low level of risk which, if not avoided, will result in minor or moderate injury.

NOTICE!
... highlights useful tips, recommendations and information for efficient and trouble-free operation.

CE Declaration of Conformity

This device is in conformity with the requirements of 2014/53/EU (Radio Equipment Directive), 2014/30/EU (EMC Directive), 2014/35/EU (Low Voltage Directive) and 2011/65/EU (RoHS Directive) in their current form.

If required, the CE -Declaration of Conformity may be obtained from the following address:

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1 Intended Use

The Reporter 3.0 is a Remote Terminal Unit (RTU) and suitable for alarm and condition monitoring applications as well as datalogging applications. The RTU monitors equipment status via digital inputs and analogue inputs.

Typical applications include:

- Faulted circuit indicators monitoring
- General plant alarm panel monitoring
- Tank level monitoring
- Circuit breaker operation monitoring

2 Functionality

2.1 Device description

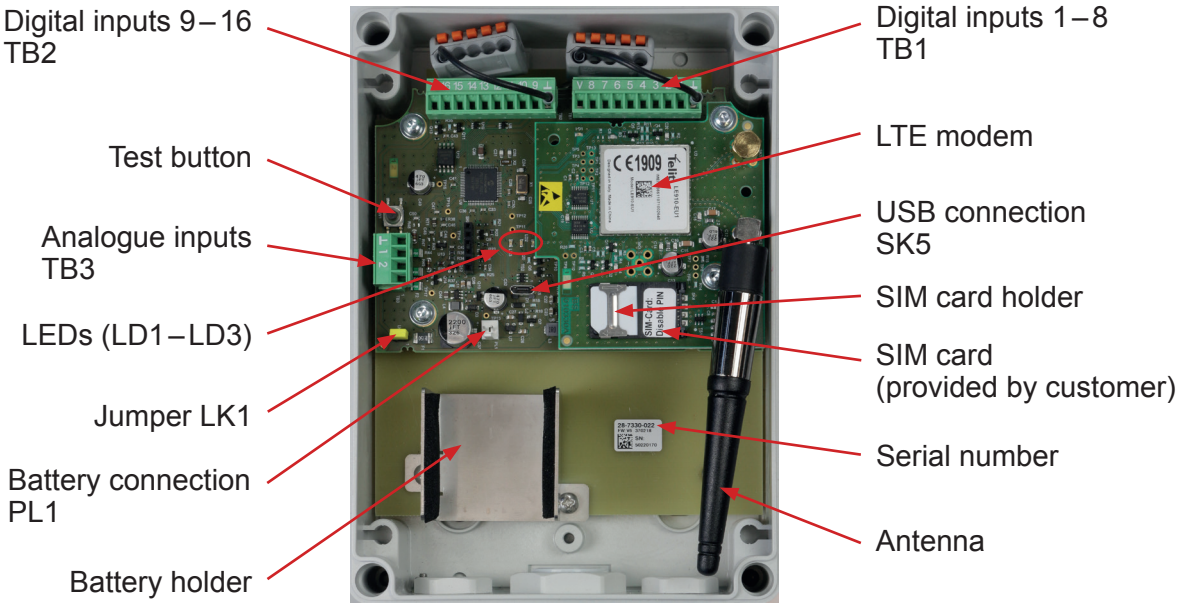


Fig. 1: Reporter 3.0 interior view

2.2 Communication

As standard the RTU will be supplied with a LTE modem and antenna. This provides low cost wide area wireless communications between the RTU site and iHost.

2.3 Energy supply

The RTU can be supplied with a long-life lithium battery pack allowing monitoring at sites where an auxiliary supply is not available. Operational life of up to 10 years is possible between battery replacement depending on the configuration of the RTU sampling and reporting settings.

2.4 Battery voltage and connection at TB1 (Pin1)

If the jumper is connected to LK1, battery voltage is available on connector TB1 (Pin1).
The usage of the battery voltage reduces the battery life time.

3 Installation and commissioning

3.1 Safety instructions

Installation should be carried out observing the 5 Safety Rules according to DIN VDE 0105 as well as the Accident Prevention Regulation pursuant to DGUV 3 “Electrical installations and tools”.

3.2 Mechanical installation

The RTU can be mounted onto a wall or inside an RMU using a M6 screw and a washer, suitable for the material to which the RTU is attached.
The RTU should be mounted vertically for optimum antenna orientation.

3.3 Electrical connection

The terminal strip is located on the top side of the RTU. In case of proprietary cabling use ferrules of L=6 mm, max. 0.75 mm^2. The maximum permissible tightening torque is 0.4 Nm.

Terminal	Assignment
1	Common
2	Digital Input 1
3	Digital Input 2
4	Digital Input 3
5	Digital Input 4
6	Digital Input 5
7	Digital Input 6
8	Digital Input 7
9	Digital Input 8
10	V+ (if Jumper A is shorted)
11	Common
12	Digital Input 9
13	Digital Input 10
14	Digital Input 11
15	Digital Input 12
16	Digital Input 13
17	Digital Input 14
18	Digital Input 15
19	Digital Input 16
20	Not used

Digital inputs are monitored using internal pull-ups, there is no opto isolation between the RTU and the equipment being monitored.

Analogue inputs are monitored via 0–25 mA inputs and are therefore suitable for use with externally powered 4–20 mA sensors. There is an 18 V switched DC supply available as an optional extra which can be used to supply power to external 4–20 mA sensors.

3.4 Commissioning

3.4.1 Introduction

The software program “NX FSK” is needed to configure the internet settings of the modem. Correct internet settings are necessary to connect the RTU to iHost and for data transfer.

NX FSK version 6.4 and higher is designed for use with the Windows 7, 8, 10 operating system.

A standard micro USB cable should be used to connect your PC with the RTU.

3.4.2 Installation of the software

The software NX FSK will be supplied on a memory stick.

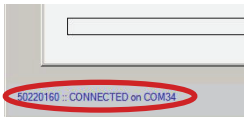
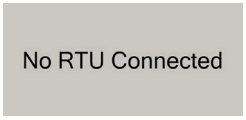
Complete the following steps:

Step 1: **Run the setup program on your PC**

Step 2: **If a warning screen is displayed then select the Install button.**

Step 3: **The program will automatically install. As part of the installation a link on the Windows start menu is created.**

3.4.3 Connecting the PC to the RTU

	**Micro USB cable** Disconnect the battery. Open SIM card holder and remove SIM card. Connect the battery to the Reporter. At least one LED must flash. Use a standard micro USB cable to link the PC and the RTU. When running for the first time the USB driver will automatically be installed. This may take up to 5 minutes.
	**Automatic connection** When running for the first time the program will automatically check all available COM ports and connect to the RTU. The connection status, the RTU's serial number and the used COM port will be displayed in the bottom left of the window.
	**Connection failed** If the RTU is not powered or connected to the NX FSK then the program will fail to connect. Please close the program and disconnect USB. Start from the beginning and make sure that at least one LED flashes.

NOTE!

If another program is already using the COM port then the NX FSK program will not be able to connect.
An battery supply is mandatory. At least one LED must flash.
When the RTU is in a communication session with iHost then it stops responding to the NX FSK.

3.4.4 RTU configuration

The NX FSK configuration window (as shown below) displays the RTU data on the left hand side and the user operation buttons on the right.

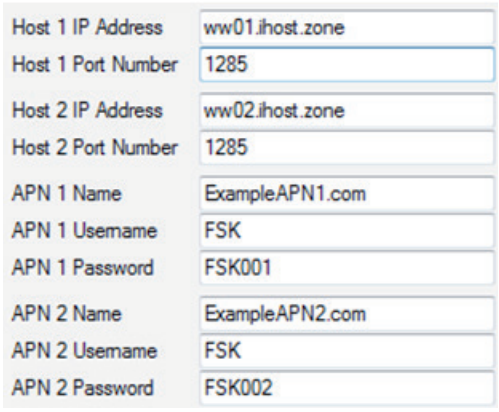


Fig. 2: RTU data

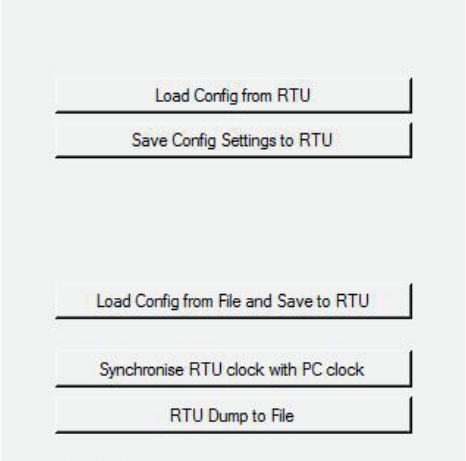


Fig. 3: User operation buttons

Viewing the existing configuration

To view the existing configuration settings of the connected RTU press the "Load Config from RTU" button. The program will automatically retrieve and display the RTU data.

Manually changing data

To change the existing data of the connected RTU input all required data into the appropriate fields (s. fig. 2).

Press the "Save Config Settings to RTU" button. The program will automatically save and display the RTU data.

Document the existing configuration

NOTE!

It is strongly recommended that changes to operational settings in the RTU (for example enabling/disabling inputs) is made from the central iHost platform rather than directly using the NX FSK program. Any changes you make using the NX FSK program will mean that the RTU and iHost RTU settings database are no longer synchronised and unexpected results may be encountered.

Loading existing configuration file

To load a configuration file, press the “Load Config from File and Save to RTU” button.

The program will open a new window on the PC which should be used to navigate to the configuration file. The program will then load the file and save the settings to the RTU.

4 RTU specification

4.1 Clock

The RTU has an internal Real Time Clock (RTC). The clock is synchronised with iHost during every communication.

Date/time stamping in Event and System logs is to 0.1 second granularity.

The RTC has a drift of 1/1,000,000.

4.2 Inputs / Outputs

There are 16 digital inputs. These are configured to operate as binary inputs.

There are 2 analogue inputs with 8-bit resolution each with 4 threshold settings.

4.3 RTU events

Power up from ‘cold’ (Cold Start) will usually be configured to initiate a call to the iHost.

4.4 Binary inputs

The RTU reports the current status of all binary inputs to the host during every call.

The RTU is able to detect binary state changes of 250 ms duration or longer. Once an event has been detected then the RTU can be configured to “fast scan” the binary inputs for up to 4 minutes during which time inputs changes of 10 ms duration will be detected.

Binary inputs are configured to detect OPEN or CLOSE or BOTH changes of state.

Binary inputs can be configured as “latched” with an associated latched timer, in this mode when a change of state occurs the RTU will ignore further changes of state on that input until the timer has expired.

When a monitored change of state occurs a date/time stamped “binary input change” log entry is made.

Binary input change of state can be configured to initiate an immediate call to iHost.

4.5 Analogue inputs

The RTU reports the last reading of the 8-bit analogue value of each input to iHost during every call.

Each analogue input has 4 threshold levels associated with it. If during a reading a threshold level has been crossed since the last reading then the RTU adds a date/time stamped entry in the “analogue threshold” log. The hysteresis for threshold crossings is 5. The 8-bit value of 0–255 corresponds to a 0–25 mA level on the input. E. g. 200 = 19.61 mA.

Analogue inputs crossing threshold can be configured to be logged and initiate an immediate call to iHost.

The 2 analogue inputs are read at configurable intervals in the range 1 to 4000 minutes. When the time for the analogue reading to occur is reached the analogues and the external switched power line are energised for a “stabilise” time prior to taking a readings.

4.6 Datalogging of analogue inputs

Analogue inputs can be configured for datalogging their value each time they are read. If enabled then the RTU stores the current level and the date/time the reading was taken. During the next contact with iHost these datalogs will be transferred.

4.7 Log sizes

Logs are stored in non-volatile memory.

With the standard memory the RTU can store:

- 100 binary logs
- 1500 analogue threshold crossings and datalogs
- 100 RTU and communications events

When a log fills then the 100th (1500th) entry is stored as a “buffer overrun” and then the log loops back and overwrites the oldest data.

4.8 Input monitoring during iHost calls

Inputs continue to be monitored during calls to iHost. If a binary or analogue input event takes place during a call the log entry is still be made.

4.9 Temperature

The RTU takes a temperature reading using its on-board sensor at the same time as the analogue inputs have been configured to be read. The last temperature reading taken is reported to iHost during every contact.

4.10 Signal strength

The RTU monitors the cellular signal strength during each call. The last measured signal strength is reported to iHost during every call.

4.11 Calls between RTU and iHost

When the RTU calls iHost the iHost software answers the call and initiates a transfer of data in both directions using a secure protocol. During contact with iHost the RTU acts as a slave serving information to requests by iHost acting as master. Information from the RTU is stored in the iHost database where users may view it.

4.12 Reconfiguration of the RTU settings

The operational behaviour of the RTU including which inputs are enabled, how data is stored and reported to iHost and how often contact with iHost is required are all configurable centrally from iHost without the need for a site visit.

When an iHost user makes changes to these settings at iHost the new settings will be loaded into the RTU during the next contact between iHost and the RTU.

5 Typical RTU operation

5.1 Cold start

The RTU should be configured to monitor processor power up after periods without mains and battery back-up power, this is known as a “cold start”. The RTU will then initiate a call to iHost when a cold start event takes place.

5.2 LEDs

The red LED (LD1) shows the activity of the modem. The processor LEDs (LD2 and LD3) are used to indicate current operation state of the NX22 along with communication state.

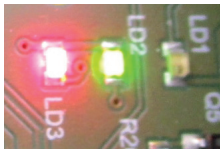


Fig. 4: LD1, LD2, LD3

Mode	Green LED (LD2)	Red LED (LD3)
Normal operation	OFF	OFF
Using modem, dialling, communicating etc.	Follows TX	Follows RX
End of a successful call	5 s ON then OFF	OFF
End of a failed call	OFF	5 s ON then flashing (see below) during retry algorithm
During retry algorithm	OFF	Flashing 200 ms ON, 2 s OFF
end or retry algorithm – same as normal operation	Flashing 200 ms ON, 2 s OFF	OFF

5.3 Reason for the RTU to call iHost

When the user presses the test button the RTU initiates a call to iHost.

When the “Next Routine Call” date / time is reached / exceeded the RTU initiates a call to iHost.

When an event takes place that is configured to initiate a call to iHost.

5.4 Calls to iHost

When the RTU initiates a call to iHost it waits the ‘call in delay timer’ period before dialling.

The RTU keeps track of, and reports to iHost, a set of call success statistics.

5.5 Call Retry Algorithm

If a call to iHost fails then the RTU retries to a total of 10 times over a period of approximately 20 minutes. The interval between retries varies between RTUs so that different RTUs don’t have the same retry interval algorithm. If all 10 attempts fail then the RTU will start retrying again (another 10 attempts) 24 hours later. During this period if any other events occur requiring the RTU to call iHost it should do so in the normal manner.

6 Cellular communication

The RTU supports LTE (4G) connections with automatic 3G or 2G fallback depending on the integrated modem. A SIM card is needed for cellular network access. The SIM card needs to be LTE (4G) and/or 3G or 2G enabled.

7 Wiring diagram

Digital Inputs should be volt-free dry contacts.

Analogue Inputs should be 4-20mA.

Only use a lithium battery pack supplied by Horstmann.

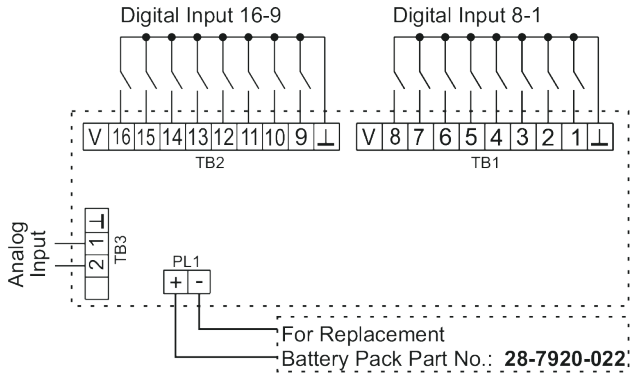


Fig. 5: Wiring diagram

8 Technical data

Electrical Data:

Energy Supply	Lithium battery, 3.6 V, 26 Ah
Hardware interface	USB 2.0 micro

Mechanical Data:

Housing material	Polycarbonate
Size	245 x 130 x 88 mm (H x W x D)
Weight	400 g
Protection degree	IP66
Humidity	max. 93 % rH, non condensing
Operating temperature:	-30 to +60 °C
Storage temperature	-30 to +60 °C

Cellular radio

Cellular radio	LTE with 3G or 2G fallback
Cellular frequencies	4G: 2100, 1800, 900, 850, 700MHz 3G: 2100, 850, 900 MHz or 4G: 2600, 2100, 1800, 900, 800MHz 2G: 1800, 900 MHz
Cellular antenna	LTE/3G/2G antenna, integrated

Appendix A: Dimensions drawing