



Quick Start Guide REX 100 3G|LTE

Version

5^{en}
as of FW 1.9.0

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1. Introduction

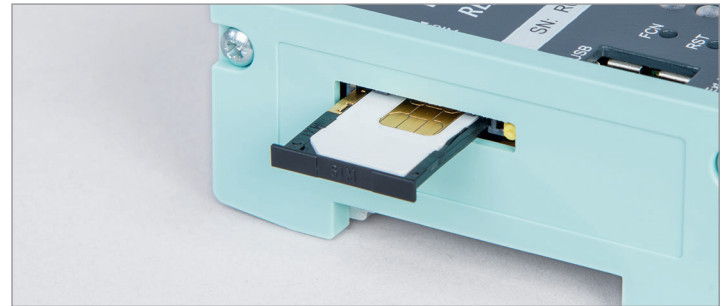
The REX 100 is an industrial router suitable for worldwide remote access to IPv4-enabled devices (PLCs, HMIs, IP cameras, etc.) It is mounted on the DIN rail. This Quick Start Guide explains the basic configuration of the REX 100 router. The configuration is created in the myREX24 V2 portal and then transferred to the REX 100.

2. Preparing the REX 100 unit

Access to a GSM network requires a mini SIM card of a provider. This serves the purpose of identification for the network operator. The insert is found on the left housing side. In order to unlock and remove the insert, please press the recessed yellow button next to the card reader.

The LAN ports P1 to P4 are available for connection to the machinery network. They are also active when the REX 100 router has no connection with the Internet.

Important advance information: Please use the latest version of the dial-up software “shDIALUP” (as of version v3.7 R1.0). You can acquire it as a download at www.helmholz.de. For successful connection with the myREX24 V2 portal, REX 100 routers require at least the firmware status V1.5.0 or newer.



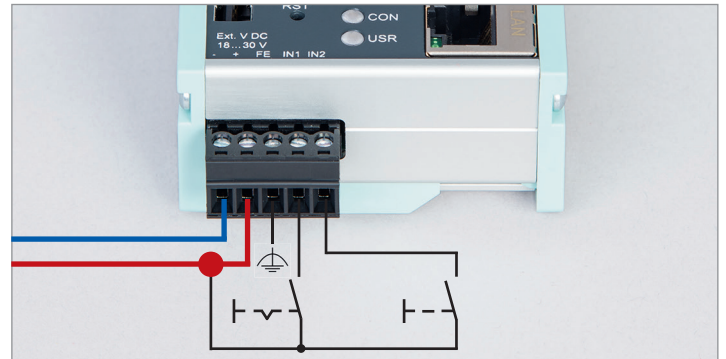
2.1 Power supply

The REX 100 must be supplied with 24 V DC at the wide range input 18 ... 30 V DC via the provided connector.

Note: For the REX 100 3G (700-875-UMT01) and REX 100 LTE (700-875-LTE01), please be sure to connect the function grounding connection (FE) of the device with the ground of your control cabinet or system setup in order to ensure correct ESD discharge of the antenna sockets.

2.2 Digital inputs IN1 and IN2

The alarm inputs can be activated with potential-free switches, buttons or relay contacts. IN1 can, for example, be used for the VPN establishing of connection with the myREX24 portal. An alarm can be triggered with the IN2. The use of both inputs for the alarm is also possible. The configuration of the alarms takes place via alarm management in the myREX24 V2 portal.



2.3 Antenna connections

Please ensure prior to installation that the antenna is positioned in such a way that it receives an adequate mobile wireless signal. Also be sure to follow the instructions from the technical data sheets of the antenna manufacturer and do not install these into metal housings (e.g. control cabinet).

2.3.1 REX 100 3G (UMTS)

The antenna required for radio reception is screwed onto the SMA socket “ANT”.

2.3.2 REX 100 LTE (4G)

For radio reception, a suitable antenna must at least be screwed onto the SMA socket “MAIN”.

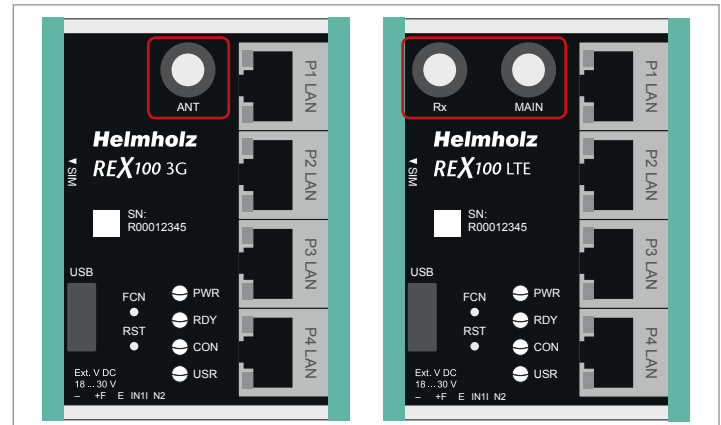
In order to improve the data throughput, a second antenna terminal is available on the REX 100 LTE router with the SMA socket “Rx” that can be used as an option. This functionality is called antenna diversity in the “WCDMA mode” and Downlink-MIMO in the “LTE mode”.

The second receiver antenna should not be located in the immediate vicinity of the main antenna. In order to improve the diversity gain and reduce other reciprocal interactions (interference effects), the two antennas should be (taking the space available in the application into account) installed with the greatest possible distance between them.

For the same reason, the second antenna should be mounted cross-polarized (rotated by 90° in relation to the main antenna).

2.4 Boot procedure

The green PWR LED lights up when the supply voltage is switched on. The boot process starts following the internal system check (duration of approx. 25 sec.), which is indicated by the blinking RDY LED (for approx. 90 sec.). The REX 100 is ready for operation as soon as the RDY LED lights solid.



3. Access to the myREX24-V2 portal

The REX 100 can be fully configured using the myREX24 V2 portal. A secure connection with the portal is required to this purpose:

- The remote client software shDIALUP allows you to undertake administration in the myREX24 V2 portal and the VPN establishing of a connection with an REX router. You can find the software (shDIALUP) in the download area under www.helmholz.de. There you can also download further documents with additional example applications at any time.
- Alternatively, you can also create the configuration with an HTTPS-secured direct call-up from your browser. The call-up is realized with the following URL: <https://v2.myREX24.net>. However, remote maintenance via VPN tunnel cannot be set up via the browser.

Always use your myREX24-V2 portal access data to log in.

3.1. Registration

If you don't yet have a myREX24-V2 portal account, you can register under <http://www.myREX24.net>.

Fill out the required fields there. After your data is checked by our service team (Mon.-Fri. 8 a.m. to 5 p.m. CET), you will receive two separate e-mails with the access data.

The first e-mail contains the user name, the second the password.

The screenshot shows the 'Request Access to myREX24 V2' page on the Helmholz website. The page has a navigation bar with 'About Helmholz', 'Quality Management', 'News & Events', and 'Career'. The main navigation includes 'Products', 'Applications', 'Download', 'Support', and 'Contact'. The page content includes a breadcrumb trail 'Home / Support / Request access to myREX24 V2', a heading 'Request Access to myREX24 V2', and a sub-heading 'You can request an access for the myREX24 V2 portal here.' Below this is a link to 'General Terms and Conditions of myREX24 V2'. The registration form consists of the following fields: 'Company*' (text input), 'Salutation' (dropdown menu with 'Mr' selected), 'First name*' (text input), 'Last name*' (text input), 'Street, No*' (text input), 'Zip code*' (text input), and 'City*' (text input).

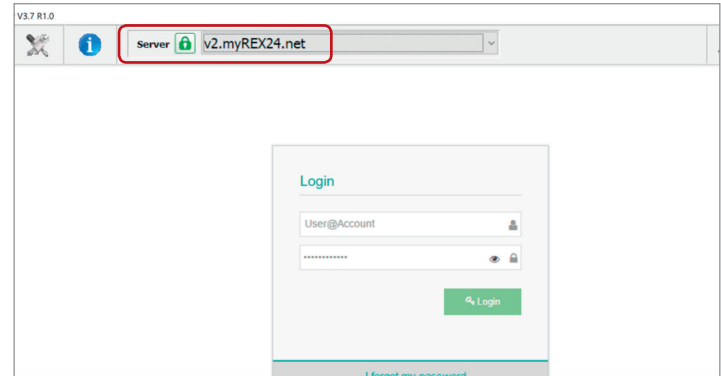
3.2 Logging in to the myREX24 V2 portal

Once you install and start the shDIALUP software, you can use your login data to log in to the myREX24 V2 portal.

Select “V2.myREX24.net” in the server list.

Notes:

- *Alternatively, the login page can also be reached under: <https://v2.myrex24.net>. Any up-to-date browser can be used for this purpose. Chrome and Firefox are recommended.*
- *Your login name is composed of a user name preceding the @ character and the name of your company. Example: User@Account*
- *Please change your password after logging in for the first time.*
- *If necessary, you can also create and administer additional users after logging into the myREX24-V2 portal.*



3.3 Navigation in the portal

Once a user has logged in for the first time, he or she is guided through a tutorial. The navigation, basic settings, and the change from the Simplified to the Extended view is shown.

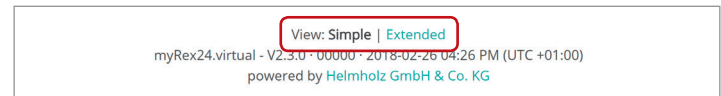


3.4 Simplified and extended view

The configuration of the devices can be carried out in the myREX24 V2 portal in two views: simplified and extended.

Standard is the simplified view, but one can switch between the views at any time.

The simplified view is used for the most part in the subsequent course of the Quick Start Guide. The extended view is also presented in some places for purposes of illustration.



Simple view

myREX24 V2

Dashboard

Projects

Clients

Users

User Groups

REX100LTE (700-875-LTE01)

REX100WANCB (700-875-WAN01)

REX100M12 (700-875-WAN01)

REX300UMT5 (700-872-LMT02)

Schulungheute (700-875-WAN01)

REX100LTE

Information - 700-875-LTE01

Name: REX100LTE

Serial Number: R50003515

Firmware: 1.9.12

Online since: 03/15/2018 12:55:39 AM (UTC +01:00) (0 days, 16 hours, 28 minutes)

Configuration

System

LAN [172.17.0.207]

Internet [109.41.128.134]

Modem

USB

Affiliated Devices

Extended view

myREX24 V2

Administration > REX100LTE

REX100LTE > REX 100 LTE bei Cablo

Information - 700-875-LTE01

Interfaces

System Access Restricted

LAN IP: 172.17.0.207 - Netmask: 255.255.255.0 - SF SEARChoverIP

Internet Always - Modem

Modem +4915255306355 - web.vodafone.de - vodafone

USB Enabled

Location

Systeme Helmholtz GmbH

Services

System Settings Firmware: 1.9.12 - 1 Connection

Mail Settings Automatic Settings

Firewall maximum Security - SF SNAT

Alarmmanagement Input 2

VPN 10.0.7.8 - TCP: 1194

User Administration

NTP Server Enabled - 0.de.pool.ntp.org - 99h

Time Zone Berlin, Germany


WEB Server HTTP: 80

Direct Device Web2Go Enabled - REX100LTE

Logging Syslog - USB Log - Remote Logging

4. Initial REX configuration via the myREX24-V2 portal

The following information describes the basic configuration steps required in order to be able to set up a REX router for a VPN connection.

A description of the extended functions can be found with the online help or in the manuals/white papers. You can go to the online help in the myREX24 V2 portal via the question mark symbol in the lower left area of the screen .

When you have logged in for the first time, the myREX24 portal guides you through a brief tutorial.

Please change the password for your myREX24 account following the tutorial.

4.1 Create new project

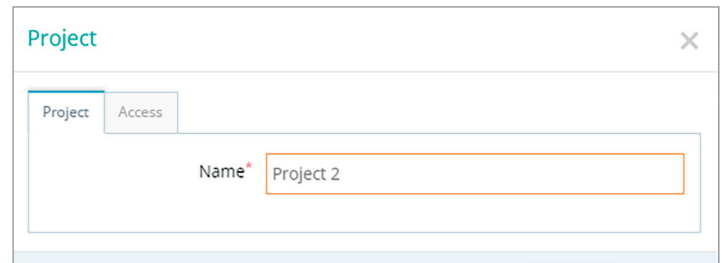
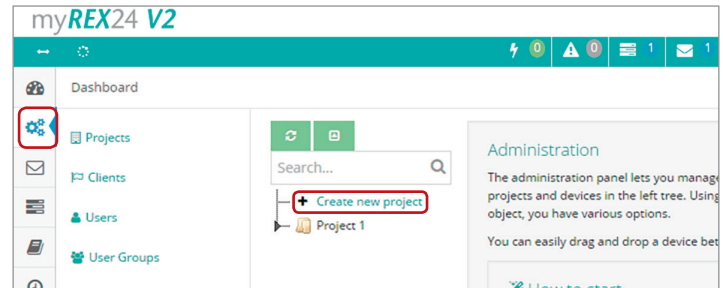
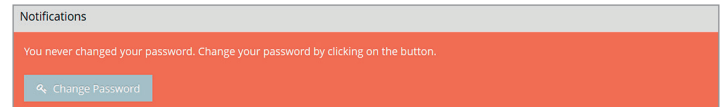
A project is the highest level for carrying out the following tasks:

- Device administration
- Remote maintenance
- Monitoring and alarms
- Data protocolling
- Visualizations

Each router is assigned to a project. In order to create a new project, please click on Administration.

The tutorial also leads to this point .

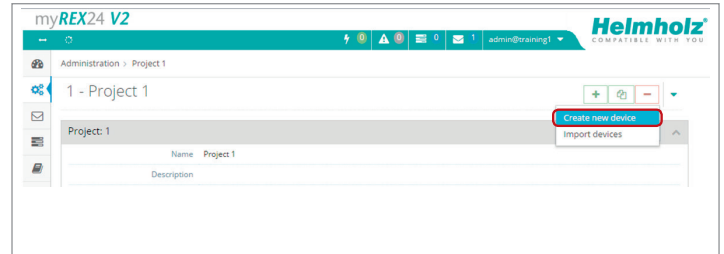
The project is now assigned a name.



4.2 Create new device

A router can be added in the tree structure using the plus symbol or with a right-click of the mouse. If a project does not yet have a router, the same function is made available in the main view by way of the green button “Create new device”.

Clicking on the respective button starts the configuration assistant, which guides the user through the settings.



4.3 Configure REX 100 (connection data)

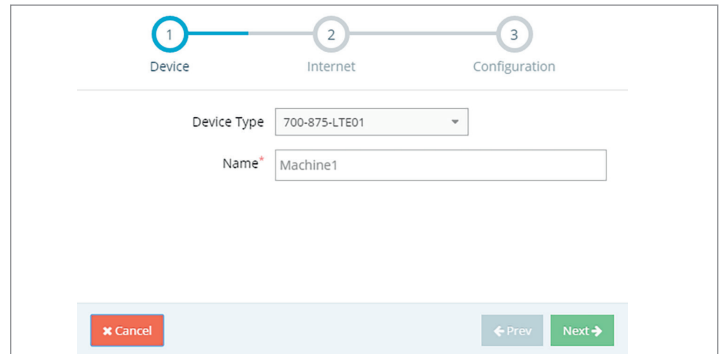
Three simple steps are adequate for the minimal configuration of the router:

- Selection of the device type
- Network settings
- Transfer of the configuration to the REX router

4.3.1 Step 1 “Device” – Selection of the type and name

In step 1, only the selection of the router type and the assignment of a clear name is necessary.

The name can be freely selected, but only numbers and letters are allowed. (0 to 9, A to Z, a to z, no spaces).



4.3.2 Step 2 “Internet” – Network settings

In step 2, the network configuration for the LAN and mobile wireless side of the device is defined.

- **LAN** All REX 100 routers come with the IP address of 192.168.0.100/24 as a default. Modify the IP address and the subnet mask in keeping with the specifications from the machinery network.
- **Modem** The parameters for the APN access point (Access Point Name) of the card provider and the correct SIM PIN must be available to you and be stored here. There are already several providers available for selection (sorted by country). In the event that the correct provider is not present, this can also be entered manually.

Device Internet Configuration

LAN

IP 192.168.0.100

Netmask 255.255.255.0

Modem

Mobile APN (Provider) enter login information

APN

User

4.3.3 Step 3 “Configuration” – Transfer of the configuration

The minimal configuration is now complete and must be transferred to the REX 100. The configuration is downloaded with a click on the download button and can be transferred with a FAT-formatted USB stick to the REX router. This step is described in chapter 5.1 (page 12).

Device Internet Configuration

Download

Download the device configuration file by clicking on the download icon above.

Once downloaded, put it on a USB drive and plug it into your device.

As soon as the LED Ustr starts blinking, press the Function button until the Ustr LED is constantly on.

Finish

5. Router configuration transfer options

The created device configuration can be transferred to the actual REX 100 unit in a variety of ways.

- Download configuration to the PC (via USB stick)

The configuration file is saved on the PC and can subsequently be transferred to the REX 100 using a USB stick. (Subsequent procedure described in chapter 5.1)

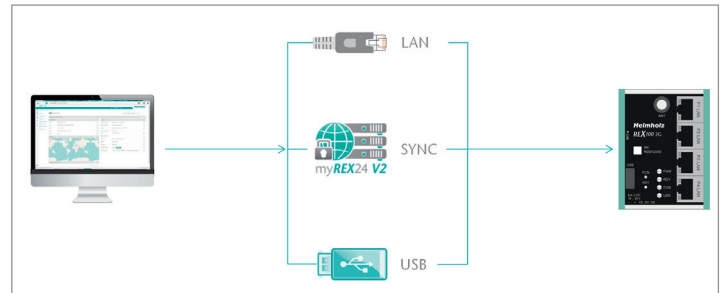
- Transfer configuration to the device (LAN connection – only possible via shDIALUP)

The configuration is transferred via a local LAN connection from the PC on which shDIALUP is installed to the device. You can select this procedure if the REX 100 can be reached directly through the local network (LAN).

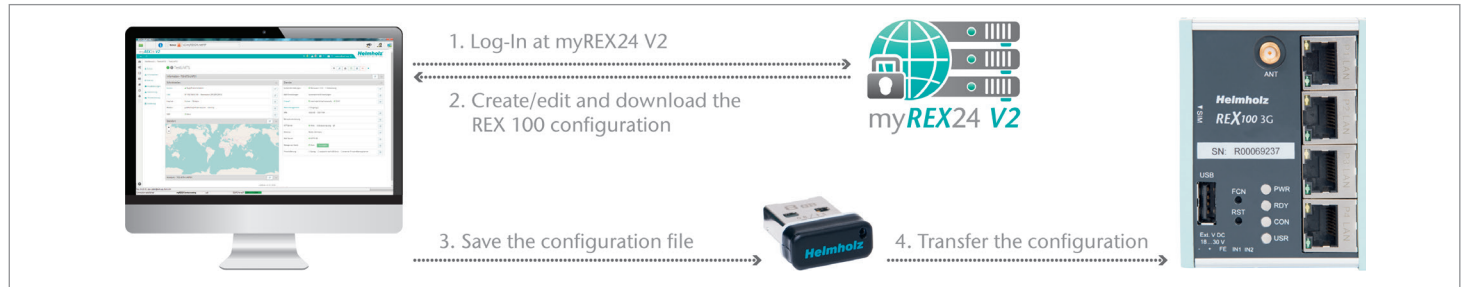
- Synchronization (retroactive changes)

When the router has already been configured and a connection with the portal established, any change to the configuration can be carried out via the existing VPN connection (subsequent procedure described in chapter 5.2).

For purposes of simplification, only the transfer via USB stick (point 1) is explained in this Quick Start Guide, and how retroactive changes can be transferred via the function “Synchronization” (Point 3).



5.1 Transferring the configuration using a USB flash drive



Prerequisites for this are:

- A PC with USB connection
- An Internet connection with the myREX24 V2 portal
- A FAT-formatted USB stick

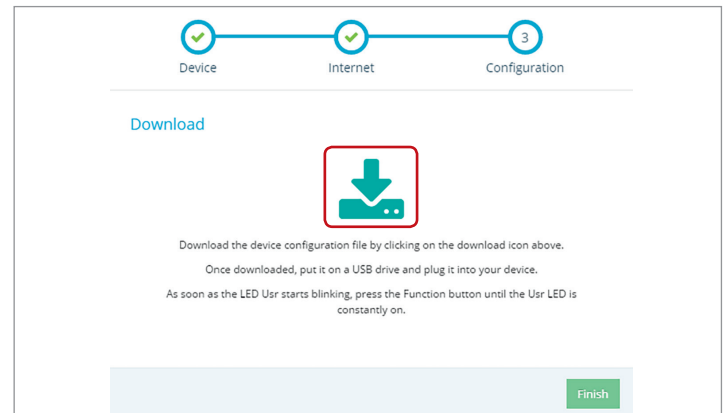
In the myREX24-V2 portal, select the “Download configuration to PC” option in the device settings.

Download the configuration file provided by the myREX24 portal to your PC and save it on a FAT-formatted USB stick.

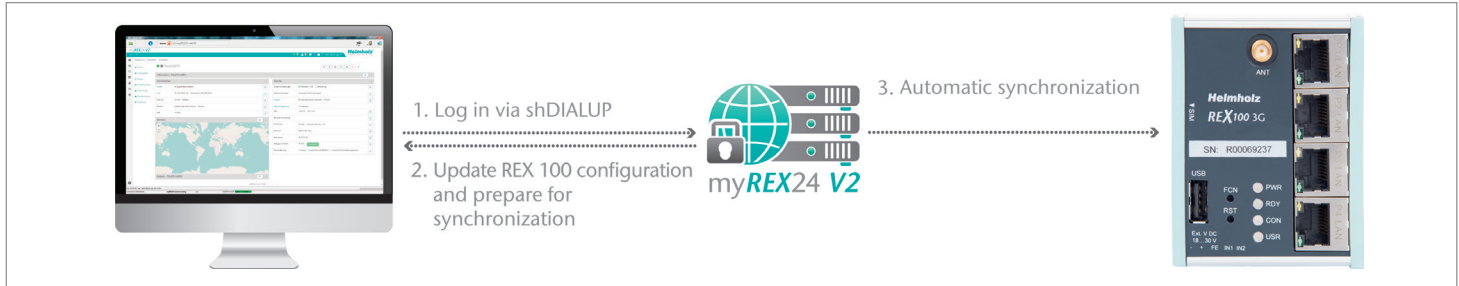
The file is called myrex24.mbn for the initial commissioning of the REX 100. (All of the following configuration files generated for this router are automatically generated by the system as myrex24.mbn(x).)

Do not rename this file.


Now carry out the steps described on page 21 in chapter 11 “Load configuration/firmware update from the USB stick”.



5.2 Synchronization

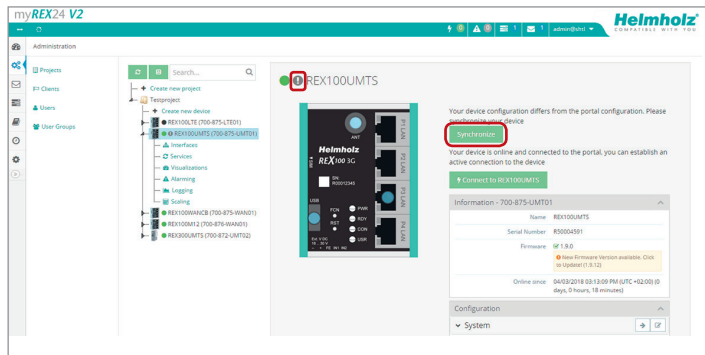


As soon as you have logged into your account of the REX 100, you can transfer retroactive changes at any time through “Synchronization”.

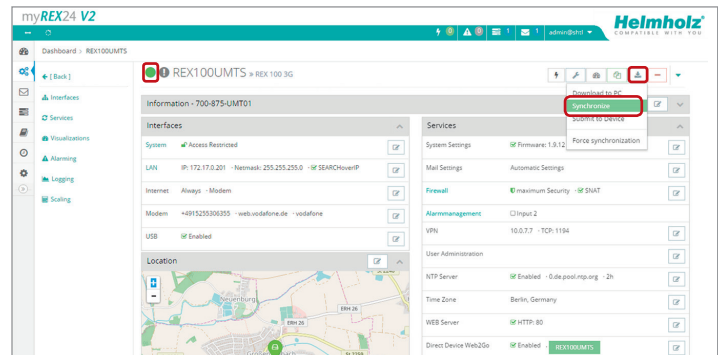
Where there is an existing myREX24-V2 portal connection, the REX 100 checks cyclically whether there is a new configuration available and then loads it automatically. When, for example, you have edited the LAN IP address, the “Device configuration is not up to date” symbol  appears next to the Online LED.

Click on Synchronization to initiate this.

Synchronization in the simplified view



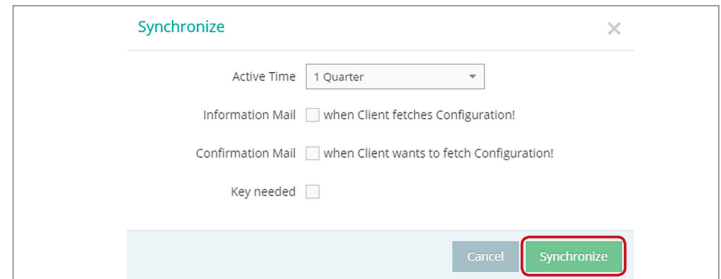
Synchronization in the extended view



The synchronization function is confirmed through the following dialog.


In this menu you can set a variety of user-defined settings, such as the sending of information/confirmation mails.


The REX router now adopts the new settings and restarts. As soon as the boot process has concluded, the REX router logs into the portal again.



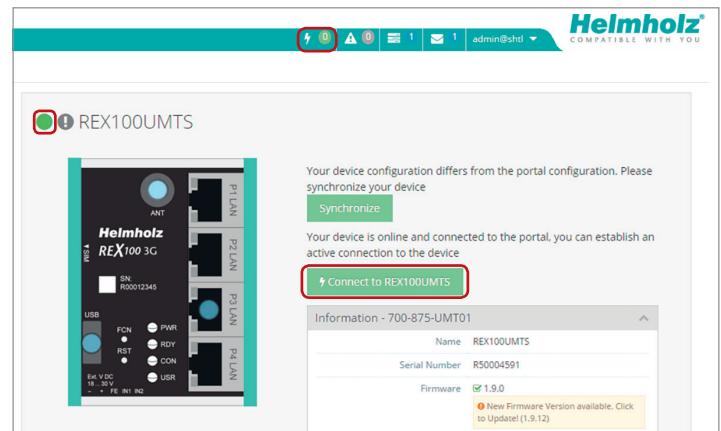
6. Establishing a VPN connection to your REX 100

Note: The following steps presume that the REX 100 has already been configured and that you have successfully logged into your account at the portal. A VPN connection can only be started with shDIALUP. The connection button is not shown in the browser view.

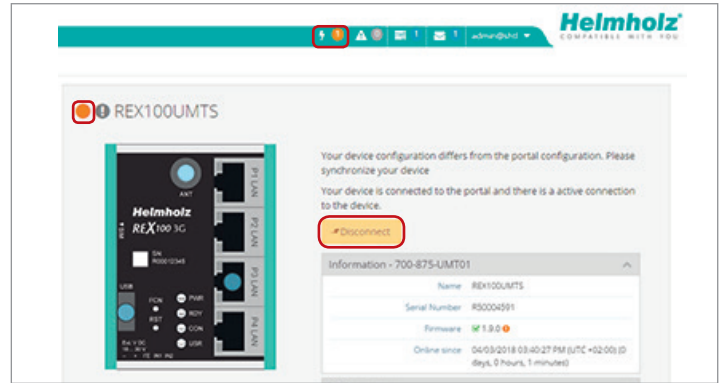
Logged in REX 100 routers are identified with a green circle in the dashboard. The VPN connection is established by clicking on the connection button .

The number of active connections is shown in the menu bar. .

Once a connection to the REX 100 has been established, all the IP packets that are valid for the applicable LAN network on the system side will be forwarded. Further parameters for the VPN-IP/IP subnet mask are shown in the lower status bar.



The connection status with the REX 100 is represented with an orange LED ●. In order to end the connection of a remote access, please click the in the meantime yellow and animated connection button and then confirm the disconnection of the remote connection.



7. Tips and tricks


7.1 Establishing of connection isn't working

7.1.1 Check device status

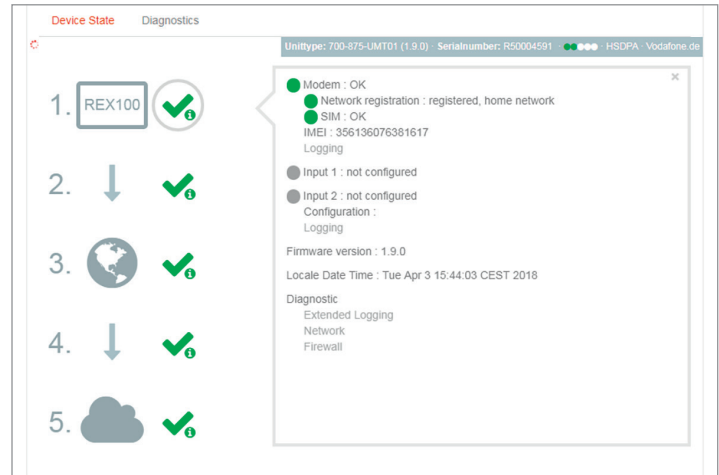
The status of the REX 100 shows the connection status and the active configuration data of the router. To this purpose, the REX 100 must be accessible in the LAN, meaning that the TCP/IP address of a PC must be in the same IP subnet. To this purpose, enter the LAN IP address of the REX 100 into the address bar of a browser.

Authenticate yourself with the standard

- **user:** **helmholz** and the
- **password:** **router**

To view more information on each step of the connection, click on the Info icon  in the status fields.

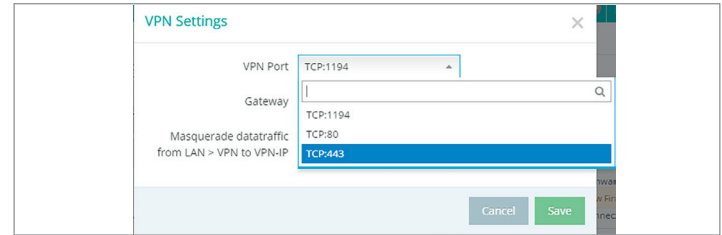
Note: If the interface is not accessible, please check the corresponding setting in the myREX24 portal. Make sure that there are no address space conflicts with any other network interfaces (do not assign the same IP address more than once) in order to be able to communicate with the REX 100.



7.1.2 VPN port

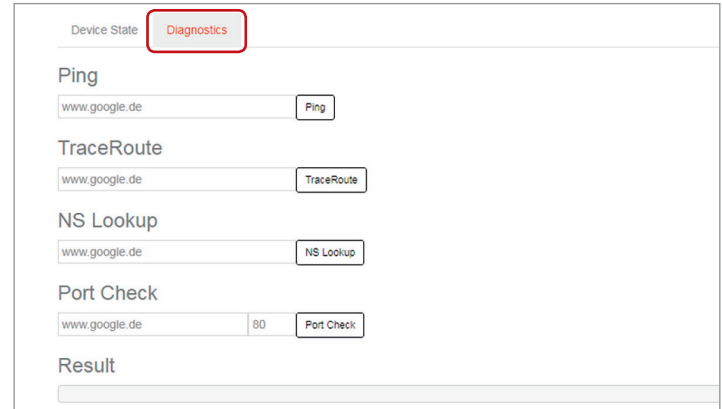
- The REX 100 establish an outbound TCP connection with the address VPN-V2.myrex24.net (5.39.123.21). This communication takes place via the port 1194 as a standard.
- In order to be able to establish a secure connection to the myREX24 V2 server, at least one of the following TCP ports (80, 443, or 1194) for the VPN tunnel must be open.

Please clarify which setting is required in advance with the responsible IT department on site. You can adjust the port correspondingly in the VPN settings of the REX 100.



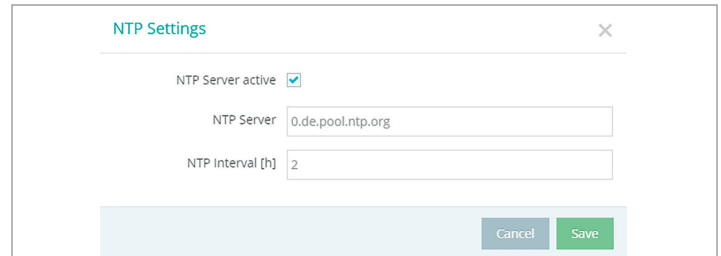
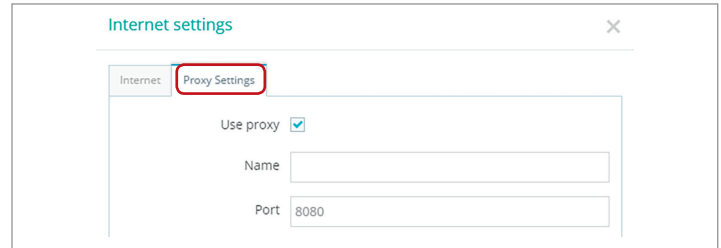
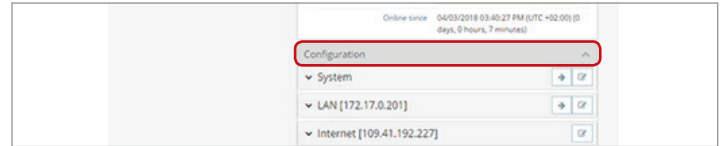
7.1.3 Diagnostics page

In the event of irregularities or malfunctions when establishing the connection, the diagnostics page of the REX 100 supports you with troubleshooting. In the event of an error, the technical support of Helmholtz requires the respective result from the individual and autonomous test functions.



7.1.4 Establishing a connection via a proxy

It is possible to store a proxy on the configuration page of the REX 100. The required parameters can be adapted under the Internet settings of the router.



7.2 Device configuration: Services – NTP server

For purposes of time synchronization of the REX 100, this carries out a comparison at regular intervals. Where necessary, you can individually set the preset NTP server and the interval.

Note: The REX 100 requires a current time setting to function correctly.

7.3 Mobile connection is interrupted

If the provider for mobile communication remote maintenance interrupts the connection of your REX 100 router, this may have occurred for the following reasons, among others:

- Wrong user name/ password
- Ports blocked by the provider
- Credit of prepaid SIM cards used up

8. Remote maintenance of Ethernet CPUs

The integrated 3 or 4-port switch is suitable for 100 Mbps and full duplex operation and supports auto-crossover and auto-negotiation. No special PROFINET functions are supported.

8.1 Device settings: Services – Firewall Settings – SNAT

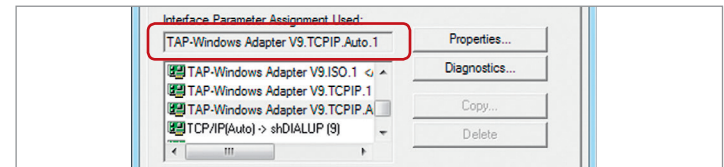
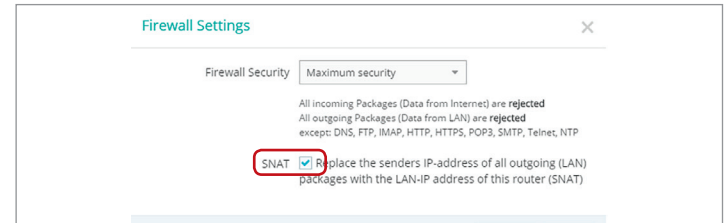
With a REX 100, the SNAT function is activated as a default. With this setting, participants for which no gateway*/router has been entered are reached via the VPN tunnel. For the CPUs and panels of some manufacturers, it can be the case that you need to explicitly enter the gateway* and deactivate the SNAT function in order that a remote connection with the end device is possible.

In order to reach a PLC or a panel via the VPN tunnel, the open VPN adapter must be selected in the corresponding software modules as the interface. The virtual network connection responsible for this is the TAP Windows² Adapter V9.

The setting to be selected in the PG/PC interface module from the SIMATIC STEP 7¹ software is emphasized in the detail to the right.

Notes:

- Please note that the P1 LAN interface is started delayed for technical reasons in the event of a device reset/switching on of the device in the case of REX 100 Wi-Fi devices.
- When connecting additional Ethernet participants (PLC/panel) on the REX 100, it must be ensured that the IP addresses of the devices lie within the address range of the LAN interface of the REX 100.



* Gateway: This refers to the LAN IP address of the REX 100.

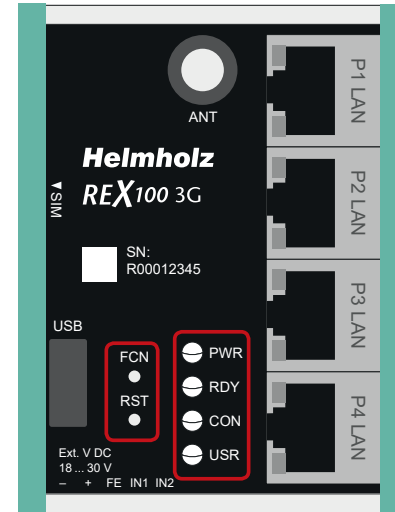
9. Description of LEDs and buttons

9.1 Description of LEDs and buttons

PWR	Indicator light for the power supply
RDY	Readiness indicator (this LED must show a solid light after a max. of 110 sec.)
CON	Off: There is no active Internet or VPN connection Solid light: Internet connection active or possible, but VPN connection inactive Flashing (1.5 Hz): VPN connection is active Rapid flashing (3 Hz): The router is attempting to establish a VPN connection
USR	Solid light: When loading default settings, firmware files, or device configurations Flashing (1.5 Hz): A portal configuration was recognized on the USB stick (see FCN button) Rapid flashing (3 Hz): A firmware file was recognized on the USB stick (see FCN button)

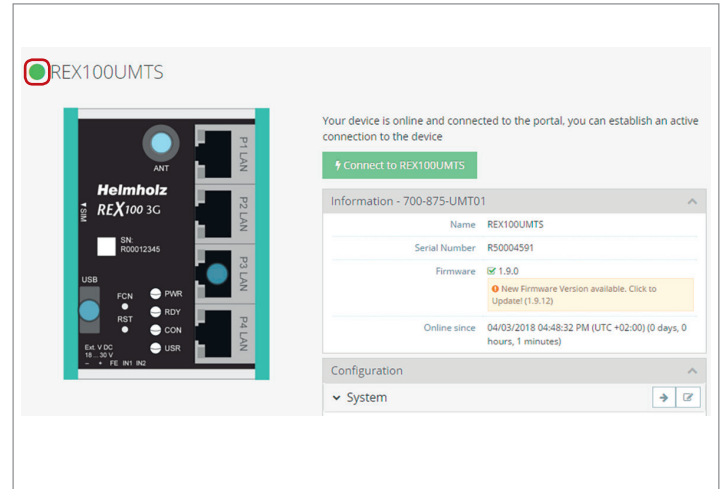
Button functions

FCN	1. Function key for manually establishing the connection with the portal server 2. If the USR LED starts flashing, this means that you have ten seconds to press this button in order to load data from an inserted USB stick.
RST	Reset button for restarting the router



9.2 myREX24 V2 portal LEDs

●	The device is not connected with the portal
●	The device has logged in at the portal and is thus online.
●	Depending upon the device type, the device is connected with <ul style="list-style-type: none">- a machine connected with the device (PLC)- the website of a connected machine- the integrated web server of the device (router)
!	The device configuration is not up to date. This means: <ul style="list-style-type: none">- the configuration of a newly created device has not yet been transferred to the device- or the changed configuration of an existing device has not yet been transferred to the device/no synchronization has been carried out. This symbol can be displayed in connection with any of the symbols named above.



The screenshot displays the REX100UMTS web interface. On the left, there is a photograph of the physical device, a Helmholtz REX100 3G LTE module, with various ports and LEDs labeled. On the right, the software interface shows the device is online and connected. A green button labeled 'Connect to REX100UMTS' is visible. Below this, the 'Information - 700-875-UMT01' section provides details: Name (REX100UMTS), Serial Number (R50004591), and Firmware (1.9.0). A yellow notification box indicates that a new firmware version (1.9.12) is available for update. The 'Online since' status is shown as 04/03/2018 04:48:32 PM (UTC +02:00) with 0 days, 0 hours, and 1 minute. A 'Configuration' section is partially visible at the bottom, showing a 'System' tab.

Information points ● for detailed information about the status of the interface

10. Restoring the REX 100 router to its default settings

In order to reset the REX 100 to the factory settings, the following steps are necessary:

- Apply a supply voltage (or press “RST”) until the PWR LED lights up.
- Wait until the RDY LED flashes.
- Press the FCN button for approx. 10–15 seconds until the USR LED flashes orange.
- After you release the FCN button, the REX 100 reboots and once again has the factory settings.

Important: The IP address of the REX 100 LAN interface is reset to 192.168.0.100/24.

11. Load configuration/firmware update from USB stick

To provide the REX 100 with a configuration or perform a firmware update from a USB stick, please carry out the following steps:

- The start process of the device must be completed (PWR & RDY LEDs light up continuously).
- Save the file in the root directory of a standard FAT-formatted USB stick. Important! Do not change the file name.
- Insert the USB stick into the USB interface of the REX 100.
- Once the USR LED starts flashing, you will have ten seconds to press the FCN button. Then hold it pressed until the USR LED lights steadily.
- During the operation, the voltage supply should not be interrupted.
- Once the USR LED lights up continuously, you can release the FCN button, at which point the data will be loaded from the USB stick.
- The process is complete once the PWR and RDY LEDs light up again permanently.

Note: Ensure that either only the firmware file or only the configuration file is found in the root directory of the USB stick. If you wish to update both the firmware and the configuration, carry out the following steps consecutively for each file.

Note: Once the configuration file has been successfully transferred, the file will automatically be renamed “Xmyrex24.mbn(x)”, making it impossible to accidentally reuse it a second time.

12. Technical data

REX 100 3G, 4 x LAN (switch)/1 x 3G modem (UMTS) (700-875-UMT01)

Dimensions (DxWxH)	32 x 59 x 76 mm
Weight	Approx. 130 g
Number of inputs type	2 (DC) 24 V, as per DIN EN 61131-2 Type 2
GSM modem	Quad-band GPRS/EDGE data interface
- Antenna terminal	SMA socket (exterior thread)
- SIM card type	Mini SIM (2FF), 1.8 V/3 V
- GSM frequency bands	GSM/GPRS/EDGE: 850, 900, 1800, 1900
- UMTS frequency bands	UMTS/HSPA: 800/850, 900, AWS 1700, 1900, 2100 class 1
- Transmit power	Class 1, E2, 3, 4
- Data transmission rate	HSPA+ (upload: 5.76 Mbps download: 21.0 Mbps)
LAN interface	4
- Type	10 Base-T/100 Base-T
- Connection	RJ45 socket
- Transmission rate	10/100 Mbps
USB interface	
- Protocol	USB 2.0 host
- Connection	USB A socket
Status indicator	4 LEDs function status 8 LEDs Ethernet status
Voltage supply	24 V DC, 18–30 V DC
Current draw	Max. 200 mA with DC 24 V
Power dissipation	Max. 4.8 W
Environment requirements	
- Ambient temperature	-40 °C ... +75 °C
- Transport and storage temperature	-40 °C ... +85 °C
- Relative air humidity	95 % r H without condensation

- Pollution degree	2
- Protection rating	IP20
Certifications	CE, UL
UL	UL 61010-1/ UL 61010-2-201
- Voltage supply	DC 24 V (18 ... 30 V DC, SELV and limited energy circuit)
- Pollution degree	2
- Altitude	Up to 2,000 m
- Temperature cable rating	87 °C

REX 100 LTE, 4 x LAN (switch)/1 x LTE modem (700-875-LTE01)

Dimensions (DxWxH)	32 x 59 x 76 mm
Weight	Approx. 130 g
Number of inputs type	2 (DC) 24 V, as per DIN EN 61131-2 Type 2
GSM modem	
- GSM modem	Multiband GSM/GPRS/WCDMA/LTE data interface
- Antenna terminal	SMA socket (exterior thread)
- SIM card type	Mini SIM (2FF), 1.8 V/3 V
- GSM frequency bands	GSM 900, DCS1800
- UMTS frequency bands	B5(850), B8 (900), B1 (2100)
- LTE frequency bands (MHz)	B20 (800), B3 (1800), B7 (2600)
- Transmit power	Class 1, E2, 3, 4
- Data transmission rate	HSPA+ (upload 5.76 Mbps download 42.0 Mbps); LTE (upload 50 Mbps download 100 Mbps)
LAN interface	4
Type	10 Base-T/100 Base-T
Connection	RJ45 socket
Transmission rate	10/100 Mbps
USB interface	
- Protocol	USB 2.0 host
- Connection	USB A socket
Status indicator	4 LEDs function status 8 LEDs Ethernet status
Voltage supply	DC 24 V, 18 ... 30 V DC
Current draw	max. 200 mA with DC 24 V
Power dissipation	Max. 4.8 W
Environment requirements	
- Ambient temperature	-40 °C ... +75 °C
- Transport and storage temperature	-40 °C ... +85 °C

- Relative air humidity	95 % r H without condensation
- Pollution degree	2
- Protection rating	IP20
- Certifications	CE, UL
UL	UL 61010-1/ UL 61010-2-201
- Voltage supply	DC 24 V (18 ... 30 V DC, SELV and limited energy circuitv)
- Pollution degree	2
- Altitude	Up to 2,000 m
- Temperature cable rating	87 °C

Notes:

The contents of this Quick Start Guide have been checked by us so as to ensure that they match the hardware and software described. However, we assume no liability for any existing differences, as these cannot be fully ruled out. The information in this Quick Start Guide is, however, updated on a regular basis.

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