

The information in this manual is intended to assist with equipment design and ensure proper installation.

READ THIS INSTRUCTION FIRST

To avoid serious or fatal personal injury or major property damage, read and follow all safety instruction in this manual. If you require additional assistance, please contact SOLEXY.

SAFETY INSTRUCTION TO HAZARDOUS AREA INSTALLATION

- It is the responsibility of the installer and the end-user to ensure that the Solexy WA/WS enclosures are installed and maintained according to the suitable standards for electrical application in potentially explosive atmospheres (example IEC/EN 60079-14, IEC/EN60079-17) and any other relevant electrical code.
- Suitably trained personnel shall carry out installation according with applicable code practice.
- Read this first and keep this instruction manual always available.

MARKING

SWA and SWS unit:

 I M2 Ex db I Mb (SWS only)
II 2G Ex db IIA/IIB/IIC ⁽¹⁾ T6...T4 Gb
II 2D Ex tb IIIC T110°C...T140°C Db

SWA and SWS unit complete of Solexy RX or SX antenna barriers:

 I M2(M1) Ex db mb [ia Ma] I Mb (SWS only)
II 2(1)G Ex db mb [ia Ga] IIA/IIB/IIC ⁽¹⁾ T6...T5 Gb
II 2(1)D Ex tb IIIC T80°C...T100°C Db

⁽¹⁾ Refer to product marking for gas group details

This instruction refers to certified equipment covered by following certificate:

ATEX: FIDI 20 ATEX 0014
IECEx: IECEx EXA 14.0001

WARNINGS

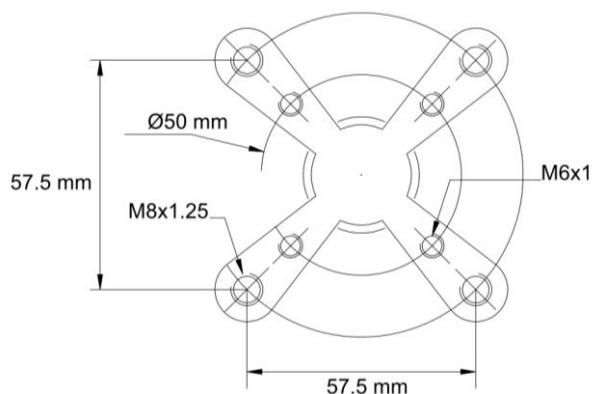
- Warns of hazard that MAY cause serious personal injury, death or major property damage.
- DISCONNECT THE EQUIPMENT FROM THE SUPPLY CIRCUIT BEFORE OPENING. KEEP ASSEMBLY TIGHTLY CLOSED WHEN IN OPERATION.
- DISCONNECT ALL POWER BEFORE SERVICING EQUIPMENT.
- HAZARDOUS VOLTAGE
- DO NOT REMOVE COVER WHEN ENERGISED.
- DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT.

NOTES

- To avoid the thread cover blocking the thread joint can be protected with greases like Nyogel 760G, Uniflor 8512R, Uniflor 8911 or equivalent compatible with Silicone (VMQ) and Fluorosilicone (FVMQ) gasket.
- The user should not repair this equipment.
- The flameproof joints are not intended to be repaired.
- The user should not modify the unit.
- The unit should not be painted by the user.
- If the equipment is likely to come in to contact with aggressive substances, it is responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection is not compromised. Aggressive substances: example Acids, liquids, gases with can affected metals.
- The metallic alloy used for the enclosure, in the event of a rare accident, could cause ignition sources due to impact or friction (sparks may occur). This shall be considered when the box is installed in group Ex area.
- Remove plastic plugs or plastic stickers supplied with enclosure before installation. The conduit plugs supplied are for transit purposes only, these components aren't certified.
- Weatherproof levels depend on cable gland and cabling methods used.
- For functionality of device installed inside the enclosure refer to the device's instruction.
- Use only cable glands and plugs that are suitable for the type of protection and maintain the enclosure's environmental protection rating.
- Any unused entries must be filled with appropriate equipment (i.e. plugs) that are suitable for the type of protection and maintain the enclosure's environmental protection rating.

INSTALLATION

1. The unit can be installed in all position.
2. Fix the unit using n° 4 M6x10 or M8x10 bolts



GROUNDING

1. Grounding needs to be made according to suitable standards for electrical application in potentially explosive atmospheres and/or other national standards.
2. The electrical devices must be grounded using their internal and external M4 grounding connections.

ELECTRICAL WIRING

1. Remove screw cover, remove protection plugs from cable entries and substitute them with cable glands or conduits or plugs suitable for the type of protection required.
2. Connect terminal strip and/or connector according to device's instruction manual.
3. Check that thread joint were free of foreign matters and deformations check the seal is properly fitted in the slot.
4. Reassemble screw cover and lock it by means of the screw or anti-rotation kit.
5. The cover must be screwed and securely locked to the body.

OPERATION

Refer to the device's instruction manual for set-up and functionality

PRODUCT'S STORAGE

Keep the boxes away from atmospheric agents

MAINTENANCE

- The verification and maintenance of the electrical equipment must be performed according to suitable standards for electrical application in potentially explosive atmospheres and/or other national standards.
- The user should guarantee the keeping of the safety characteristic of the device after maintenance.
- The cover must be securely locked to the body.
- After every opening must check before closing that the thread joint is free of foreign matters and deformations and if necessary lubricate the thread joint in order to

avoid cover blocking with greases like Nyogel 760G, Uniflor 8512R, Uniflor 8911 compatible with silicone or fluorosilicone gasket or equivalent according to enclosure temperature range.

- In order to guarantee the weatherproof level, it's necessary that the gasket needs to be in good conditions and it shall be verified after every opening. In case of gasket's damage replace with Solexy spare part.
- The maintenance related to the components used for wiring must be performed according to manufacturer instruction.

DISPOSAL / RECYCLING

Disposal and recycling of the product according to national regulation for waste disposal and recycling.

WARNING: Do not dispose of the product and the components in the environment.

MODEL NOMENCLATURE

X	XX	XXX	XX	-	XX	X	XX	-	XXXXX
1	2	3	4	-	5	6	7	-	8

1 Family

S Enclosure supply with the electronic device

2 Series

WA aluminum enclosure

WS stainless steel enclosure

3 Device

XXX 1 digit for device type installed

2 digit for device version

4 Antenna barrier

XX 2 digit for Solexy Antenna Barrier if used (optional components)

00 for unit without Solexy Antenna Barrier

5 Cable entries

XX 2 digits for cable entries combination

6 Color - Brand

X 1 digit for housing's color and/or brand

7 Certification Mark

X0 Atex and IECEx (group II)

M0 Atex and IECEx (group I and group II)

X* Atex and IECEx (group II) + a second standard marking

M* Atex and IECEx (group I and group II) + a second standard marking

8 Special execution

XXXXX various, consult Solexy

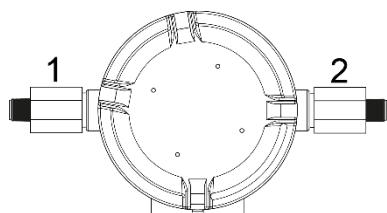
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DESCRIPTION

The SWA & SWS R0x is a 4G LTE & WiFi router with 1 ethernet port, 1 WiFi port and up to 2 4G LTE ports as follows:

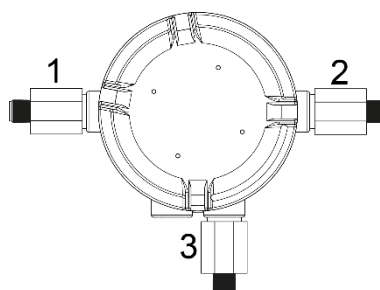
Device version	Model	WiFi Port	Antenna Port
R1x 30	Router RUT241	n°1	n° 2
R1x 33	Router RUT241	n°1	n° 1
R1x 54	Router RUT241	n°1	n° 2
R1x 45	Router RUT241	n°1	n° 1

R0x 33 / R0x 45



Layout 3

R0x 30 / R0x 54



Layout 4

POWER SUPPLY

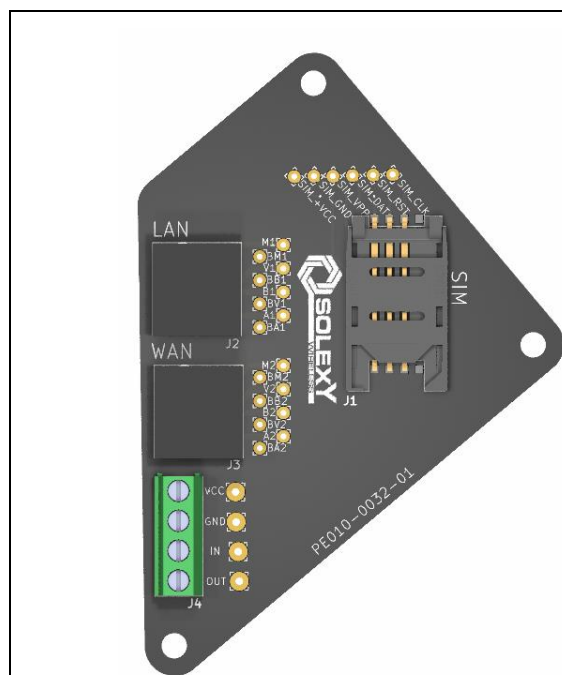
Screw terminals = Supply voltage: 9-30 VDC
Max Power Consumption <6.5W

AMBIENT TEMPERATURE RANGE AND SURFACE TEMPERATURE

	Min. ambient temperature	Max ambient temperature	Max surface temperature	T Class
SWAR1x	-40°C (-40°F)	+68°C (+154°F)	+80°C (+176°F)	Gas = T6...T5 Dust = T80°C...T100°C
SWSR1x	-40°C (-40°F)	+62°C (+143°F)	+80°C (+176°F)	Gas = T6...T5 Dust = T80°C...T100°C

The unit can reach a surface temperature of 70°C, use cable and cable glands / conduit Ex certified suitable for this temperature.

WIRING



J1		
Label	Description	
SIM	SIM socket	
J2		
Label	Description	
LAN	RJ45 LAN connector (PPoE capability 24VDC)	
J3		
Label	Description	
WAN	RJ45 WAN connector	
J4		
Label	Description	
VCC	Power supply + (9V ~ 30V DC)	
GND	Power supply - (9V ~ 30V DC)	
IN	Digital Input	
OUT	Digital Output	

Step 1 – ANTENNA CONNECTION

Connect the antenna before to turn on the device.

WARNING : use antenna only with 50Ω impedance and with operating frequency in according to technical data listed into the above paragraph “RF information”.

The device must be set according to limitation listed at paragraph MAXIMUM PERMITTED RF THRESHOLD POWER (Pth) for installation in Hazardous Location and the national regulation rules.

Step 2 – POWER SUPPLY CONNECTION

WARNING : DO NOT WIRED POWER SUPPLY WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT.

FOR SAFETY REASONS WIRING MUST BE MADE ACCORDING TO WA & WS INSTALLATION AND OPERATION MANUAL IM0009

THE EQUIPMENT MUST BE CONNECTED WITH AN LPS OR CLASS 2 SOURCE

The device can be powered by terminal strip (J4 9 ~ 30 VDC) or through PPoE (Passive Power over Ethernet, 24 VDC) on LAN port.

The device has no ON/OFF switch. It turns on automatically when power is applied.

Step 3 – ETHERNET CONNECTION

Connect the Ethernet cable.

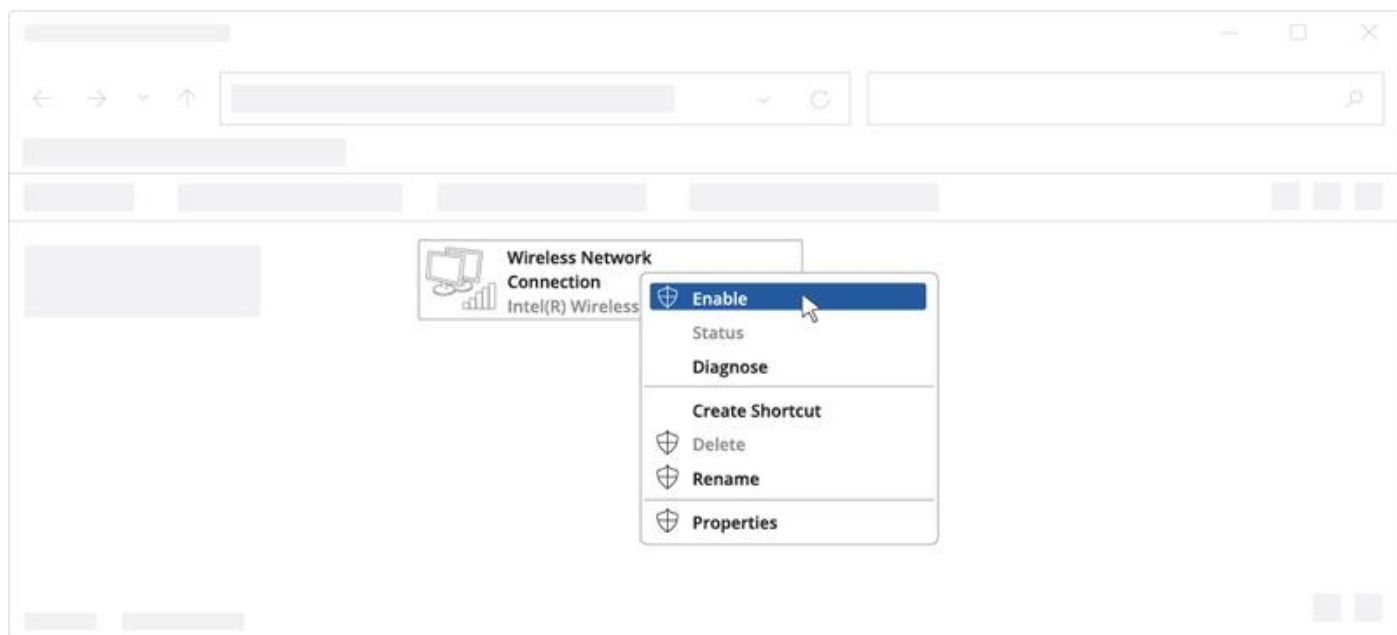
DEVICE CONFIGURATION

FACTORY SETTINGS:

- IP address: 192.168.1.1
- Radio Interface disable, preset for access point mode
- SSID: Teltonika (broadcast)
- No security (no WEP, no WAP, no WAP2, no MAC filter)
- WEB interface for device configuration:
 - IP address: 192.168.1.1
 - User name: admin
 - Password: admin01

Step 1

Ensure the Wireless network connection is Enabled. Go to Start — Control Panel — Network and Internet — Network and Sharing Center. Click on the **Change adapter settings** in the left panel, then right-click on Wireless Network Adapter, and select Enable.

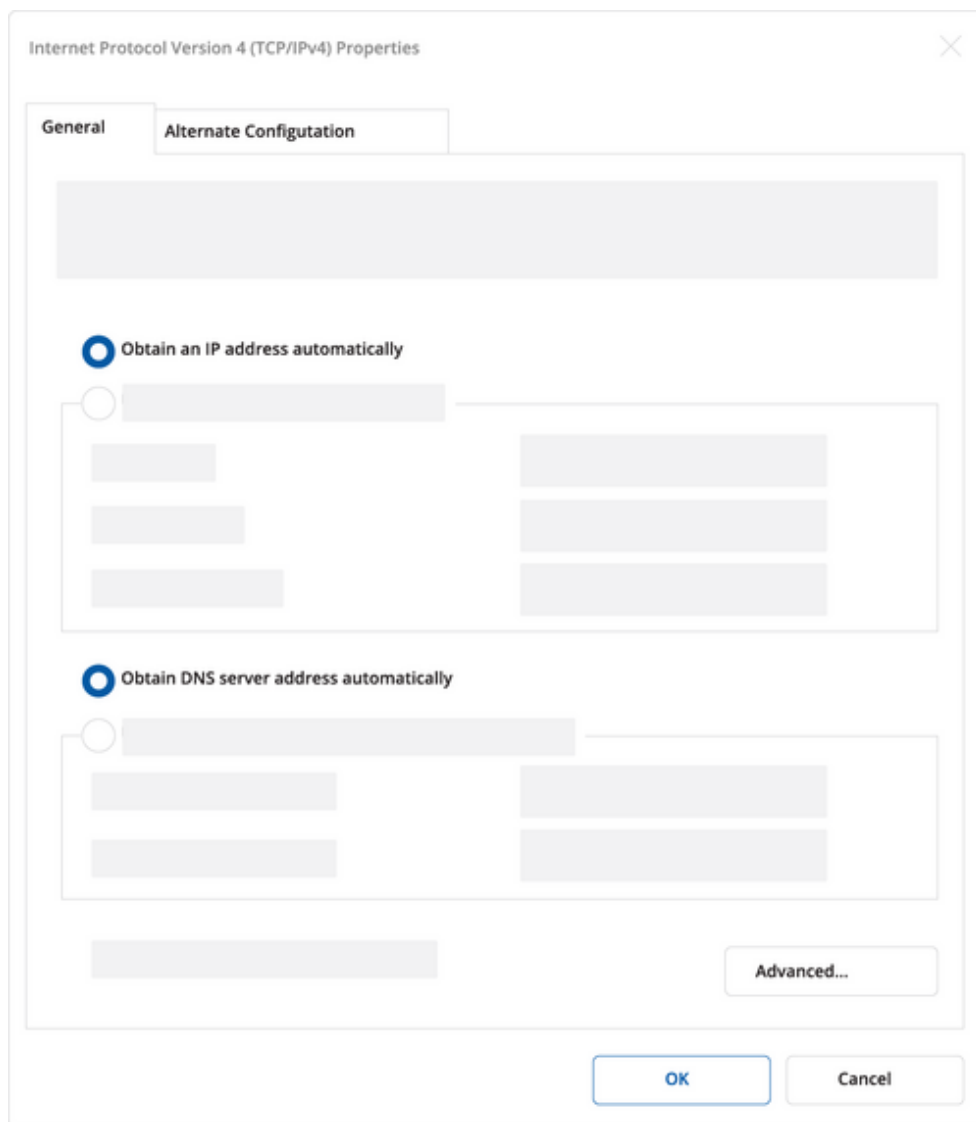


Step 2

Check if IP and DNS are obtained automatically. Right-click on Wireless Network Adapter and select Properties. Then select **Internet Protocol Version 4** and click Properties.

Step 3

If not selected, check to **obtain an IP address** and **obtain DNS server address automatically**. Click OK.



Internet Protocol Version 4 (TCP/IPv4) Properties

General Alternate Configuration

☒ Obtain an IP address automatically

☐ Use the following IP address

☒ Obtain DNS server address automatically

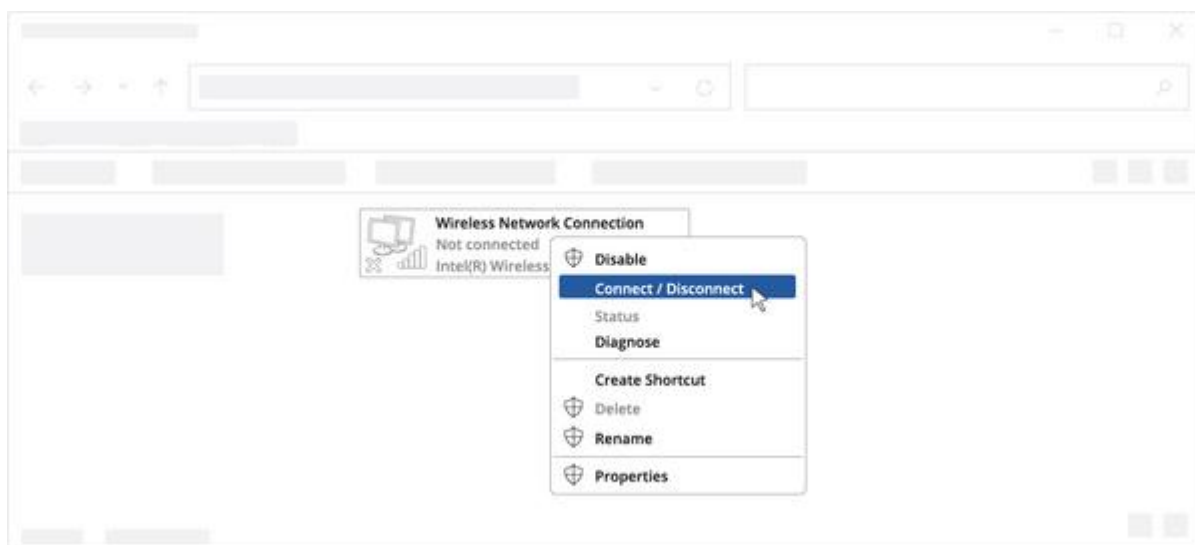
☐ Use the following DNS server addresses

Advanced...

OK Cancel

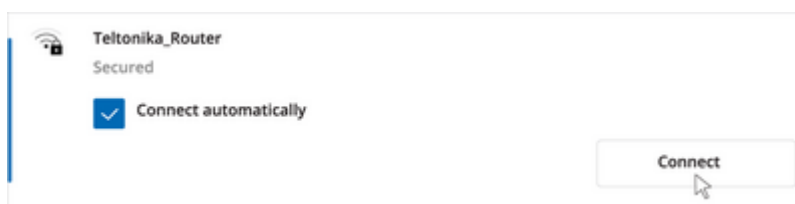
Step 4

Connect to a wireless network by right-clicking on Wireless Network Adapter and selecting Connect.



Step 5

Choose the wireless network RUT241 **** from the list and click Connect. Enter the WiFi password located on the device's label.



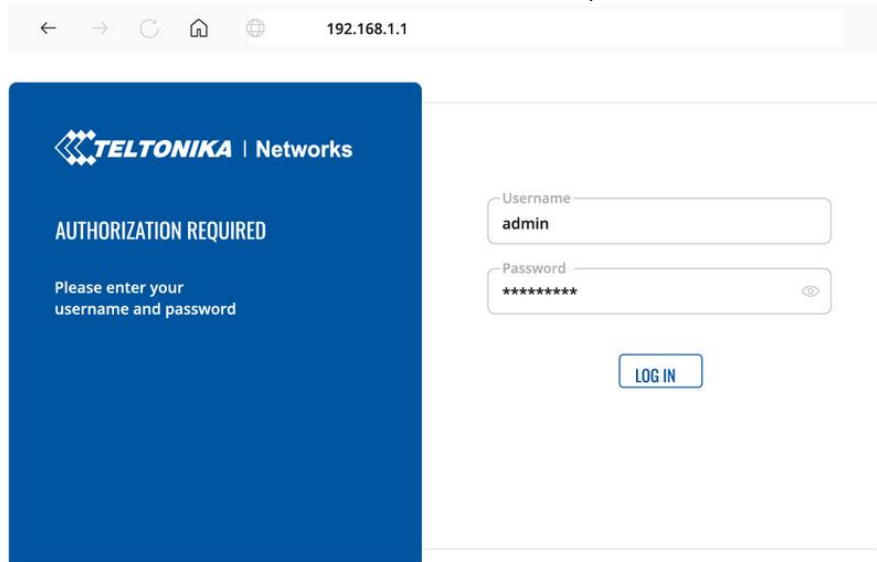
LOGIN TO DEVICE

Step 1

To enter the router's Web interface (WebUI), type `http://192.168.1.1` into the URL field of your Internet browser.

Step 2

When prompted for authentication enter the username `admin` and enter the password located on the label near the device.



Step 3

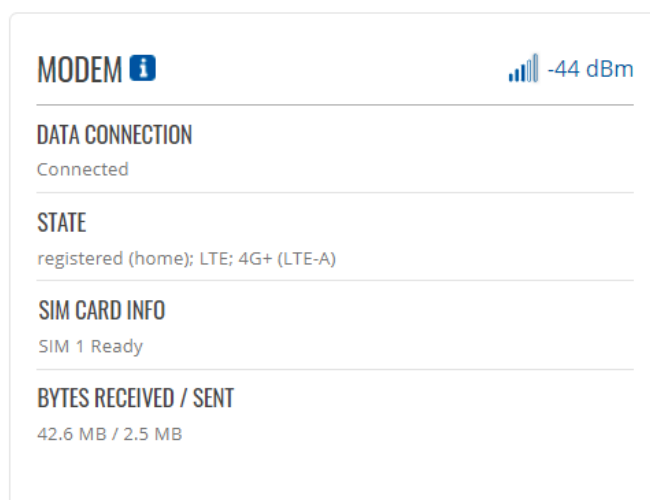
After logging in, you must set a new password for security reasons. You will not be able to interact with the router's WebUI until the default password is changed. The new password must consist of a minimum of **8 characters**. Requirements: one uppercase letter, one lowercase letter, and one digit.

Step 4

Next, the Configuration Wizard will start to help you set up some of the router's main operational parameters.

Step 5

Finally, let's verify the Mobile signal strength. Go to the **Status — Network** page and pay attention to the **Signal Strength** indication.



To achieve the best signal conditions and maximize cellular performance, try adjusting the antennas or changing the location of your device. You can find information on signal strength recommendations here.

WIFI GLOBAL SETTINGS

The **Global Settings** section is used for configuring WiFi hardware parameters. You can find this section by clicking the 'Edit' button next to a wireless device (not an interface) in the Network → Wireless page:

WIFI 2.4GHZ

2.4GHz Device status: Running 802.11bgn Channel 1 (2.41 GHz)			
RUT_XXXX_2G	Interface status: Running  0%	Mode: Access Point BSSID: 00:1E:42:HIDDEN Clients: 0 Encryption: WPA2 PSK (TKIP, CCMP)	 
		 off on	
		<div> <div>MULTI AP</div> <div>SCAN</div> <div>ADD</div> </div>	

General Setup

The **General Setup** section is used to turn a wireless device on or off, select the operating frequency (WiFi mode and channel), transmit power and define a country code.

A wireless 2.4 GHz WiFi channel requires a signaling band roughly 22 MHz wide, radio frequencies of neighboring channels numbers significantly overlap each other. Choose a WiFi channel according to the busyness of other channels. You can download a free WiFi analyzer app on your phone, laptop or other WiFi device and check which channel is the least populated.

Many home networks utilize routers that by default run on channel 6 on the 2.4 GHz band. Neighboring WiFi home networks that run over the same channel generate radio interference that can cause significant network performance slowdowns for users. Reconfiguring a network to run on a different wireless channel helps minimize these slowdowns. Therefore, pick a channel with no other active Access Points and preferably one that has no active Access Point on two adjacent channels on each side as well. If you don't feel like doing this, set the 'Channel' field to Auto and the device will pick the least busy channel in your location automatically.

GLOBAL 2.4GHZ SETTINGS

GENERAL SETUP ADVANCED SETTINGS WIFI SCANNER	Enable 
	<div> <div>Mode</div> <div>Channel</div> <div>Width</div> </div> <div> <div>Operating frequency</div> <div>N</div> <div>Auto</div> <div>20 MHz</div> </div>
	<div>Transmit power</div> <div>100%</div>

Note:

Adjust the output transmit power considering the antenna gain in order to respect your country power limits (that differs from the Ex RF limits indicated in the "MAXIMUM PERMITTED RF THRESHOLD POWER" paragraph). See paragraph "RF INFORMATION" for the device RF output power and antenna gain.

TROUBLESHOOTING AND LED DEFINITION

None of the LED indicators turn ON

- Verify the power supply (voltage, cabling)

The WiFi link does not come up

- Make sure that the Wireless parameters of the Client (case sensitive SSID, 802.11 mode, radio channel and security) match those of the AP.
- Check the radio conditions: distance between devices, placement of antennas, interferences and obstacles to radio waves propagation.
- Try with all securities and encryption settings temporarily disabled.
- Try another radio channel.

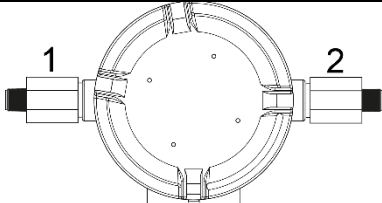
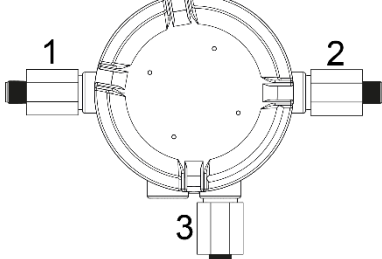
How to restore factory settings?

- If the built-in web-based interface is reachable, you can use a browser to restore factory settings.
- Else, power up the unit, then hold down the reset button (for at least 5 seconds). Then release it. To help the user to determine how long the reset button should be pressed, signal strength LEDs indicates the elapsed time. All 5 lit LEDs means that 5 seconds have passed and reset button can be released. Part of the reset to defaults will be indicated by flashing of all 5 signal strength LEDs together with red connection status LED. SIM PIN on the main SIM card is the only user parameter that is kept after reset to defaults.

LED Definition

LED	Function
POWER	On : power on Off : power not present
LAN/WAN	On : connected Off : not connected
Signal Strength	0 to 5 led's on indicate the signal strength
2G/3G/4G	<ul style="list-style-type: none">• 2G, 3G and 4G LEDs constantly blinking every 1 sec.: no SIM or bad PIN• Blinking from 2G LED to 4G LED every 1 sec.: SIM holder not inserted.• 2G/3G/4G LEDs blinking every 1 sec.: connected to 2G/3G/4G, but no data session established• 2G/3G/4G LED turned on: connected to 2G/3G/4G with data session• 2G/3G/4G LED blinking rapidly: connected to 2G/3G/4G with data session and data is being transferred

ANTENNA LAYOUT

Device version	Model		
R1x 33 R1x 45	Cellular Router		Antenna 1 - WiFi Antenna 2 - Cellular
R1x 30 R1x 54	Cellular Router		Antenna 1 - WiFi Antenna 2 - Cellular Antenna 3 - Cellular

RF INFORMATION

Device version	
R1x	RF technologies: GSM, GPRS, EDGE, UMTS/HSPA+, LTE Max RF power: 33 dBm@GSM, 24 dBm@WCDMA, 23 dBm@LTE
R11	RUT241 *1**** - Europe, the Middle East, Africa, Korea, Thailand, India Frequency Band: 4G (LTE-FDD): B1, B3, B5, B7, B8, B20 4G (LTE-TDD): B40 3G: B1, B5, B8 2G: B3, B8
R12	RUT241 *2**** - South Korea Frequency Band: 4G (LTE-FDD): B1, B3, B5, B7, B8, B20 4G (LTE-TDD): B38, B40, B41 3G: B1, B5, B8 2G: B3, B8
R13	RUT241 *3**** - Global Frequency Band: 4G (LTE-FDD): B1, B2, B3, B4, B5, B7, B8, B12, B13, B18, B19, B20, B25, B26, B28 4G (LTE-TDD): B38, B39, B40, B41 3G: B1, B2, B5, B6, B8, B19 2G: B2, B3, B5, B8
R16	RUT241 *6**** - Australia, New Zealand, Taiwan Frequency Band: 4G (LTE-FDD): B1, B3, B5, B7, B8, B28 4G (LTE-TDD): B40 3G: B1, B5, B8 2G: B3, B5, B8
R17	RUT241 *7**** - Latin America Frequency Band: 4G (LTE-FDD): B1, B2, B3, B4, B5, B7, B8, B28 4G (LTE-TDD): B40 3G: B1, B2, B4, B5, B8 2G: B2, B3, B5, B8
R18	RUT241 *8**** - Japan Frequency Band: 4G (LTE-FDD): B1, B3, B8, B18, B19, B26 4G (LTE-TDD): B41 3G: B1, B6, B8, B19
R19	RUT241 *9**** - North America: Verizon, AT&T, T-Mobile Frequency Band: 4G (LTE-FDD): B2, B4, B5, B12, B13, B14, B66, B71 3G: B2, B4, B5

Device version	WiFi
R1x	<p>WiFi standards : IEEE 802.11b/g/n Frequency range: 2.401 – 2.495 GHz * WiFi TX power : 20 dBm max</p> <p>*Supported frequency bands are dependent on geographical location and may not be available in all markets</p>

Solexy Antenna KIT	Antenna	Antenna Gain
KA-R33U	N° 1 ANHC2 for 4G LTE port	2 dBi
	N° 1 ANH73 for WiFi port	4.35 dBi
KA-R03U	N° 2 ANHC2 for 4G LTE port	2 dBi
	N° 1 ANH73 for WiFi port	4.35 dBi

MAXIMUM PERMITTED RF THRESHOLD POWER (P_{th})

The RF threshold power (P_{th}), sometimes called the effective isotropic radiated power (EIRP), as defined in IEC/EN 60079-0, is the product of the effective output power of the transmitter multiplied by the antenna gain. The maximum threshold powers for each equipment group as defined by Table 4 in IEC/EN 60079-0 are provided below.

Because most antennas list the gain relative to an isotropic radiator (dBi) instead of the raw power gain, it is often easier to simply add the antenna gain in dBi to the radio output power in decibel-milliwatts (dBm). Any added cable loss between the RF output and the antenna may also be factored in.

$$P_{th} \text{ (dBm)} = \text{RF output power (dBm)} + \text{Antenna gain (dBi)} - \text{Coax cable loss between RF output and Antenna (dB)}$$

The resulting threshold power calculated by the above formula MUST be below the threshold power for the operating area group rating below.

Equipment for	Threshold Power (W)	Threshold Power (dBm)
Group I	6	37.7
Group IIA	6	37.7
Group IIB	3.5	35.4
Group IIC	2	33.0
Group III	6	37.7

The above threshold level refer to installation in classified area Ex according to IEC/EN 60079-0 standard.

The use of device differs from one region and/or country to another. The user of the device must take care that the device is operated only according to local rules and standard or without the permission of the local authorities on frequencies other than those specifically reserved and intended for use without a specific permit. More detailed information is available at the local frequency management authority.

MAXIMUM JOULES CALCULATION IN CASE OF COAX CABLE INSTALLATION

In case of use of a coax cable installation for antenna installation the adding cable need to be evaluating to ensure that the maximum energy stored on cable not exceeded the value allowable per IEC/EN 60079-11:

Max energy (Joules) allowed per IEC/EN 60079-11	
Group I	1500 µJ
Group IIA	950 µJ
Group IIB	250 µJ
Group IIC	50 µJ

The calculation can be done according to following equation:

$$E = \frac{1}{2} * \{(C_1 + C_2) * [(1.5 * (\sqrt{R * P}))]^2\}$$

Where:

E = Energy

C₁ = Antenna Barrier Capacitance (18 pF)

C₂ = Coax cable capacitance

R = Impedance (50Ω)

P = RF power output (18 dBm, 63 mW)

1.5 = Safety Factor

Example:

Antenna cable capacitance = 1195 pF

$$E = \frac{1}{2} * \{(18pF + 1195pF) * 7.08\}$$

$$= 0,00858\mu J$$

Answer = 0,00858 µJ acceptable for any Group