



# Wireless Gateway RER601/603 Product Guide

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## 1. Description

Wireless Gateway RER601/603 provides wireless monitoring and control of field devices via GPRS from a central site or control center. The devices offer industrial quality connectivity for the IEC 60870 protocol family and can be connected via digital IO's and controlled through 2 serial ports using IEC 60870-5-104 protocol from the SCADA system. Wireless Gateway RER601/603 exhibits integrated communication capability and seamless integration to SCADA systems.

With the Wireless Gateway RER601/603 conventional IEC 60870-101 devices can be attached to a modern TCP/IP based IEC 60870-5-104 control system. This is made possible by the protocol conversion from IEC 60870-5-101 to IEC 60870-104 (and vice versa).

This means that the Wireless Gateway RER601/603 can be utilized for various industrial applications to maximize the following benefits:

- Integrated communication solution with built-in IO capability
- Less field visits for operations and maintenance
- Centralized real-time information and thereby timely corrective action
- Dual field device connection using the same Wireless Gateway RER601/603 device (Ethernet port can also be used for local device connectivity. With a separate switch there can be several Ethernet devices connected)
- Optimizing the cost of communication
- Wireless Gateway RER603 also includes an I/O extension (8BI/2BO) for additional connectivity

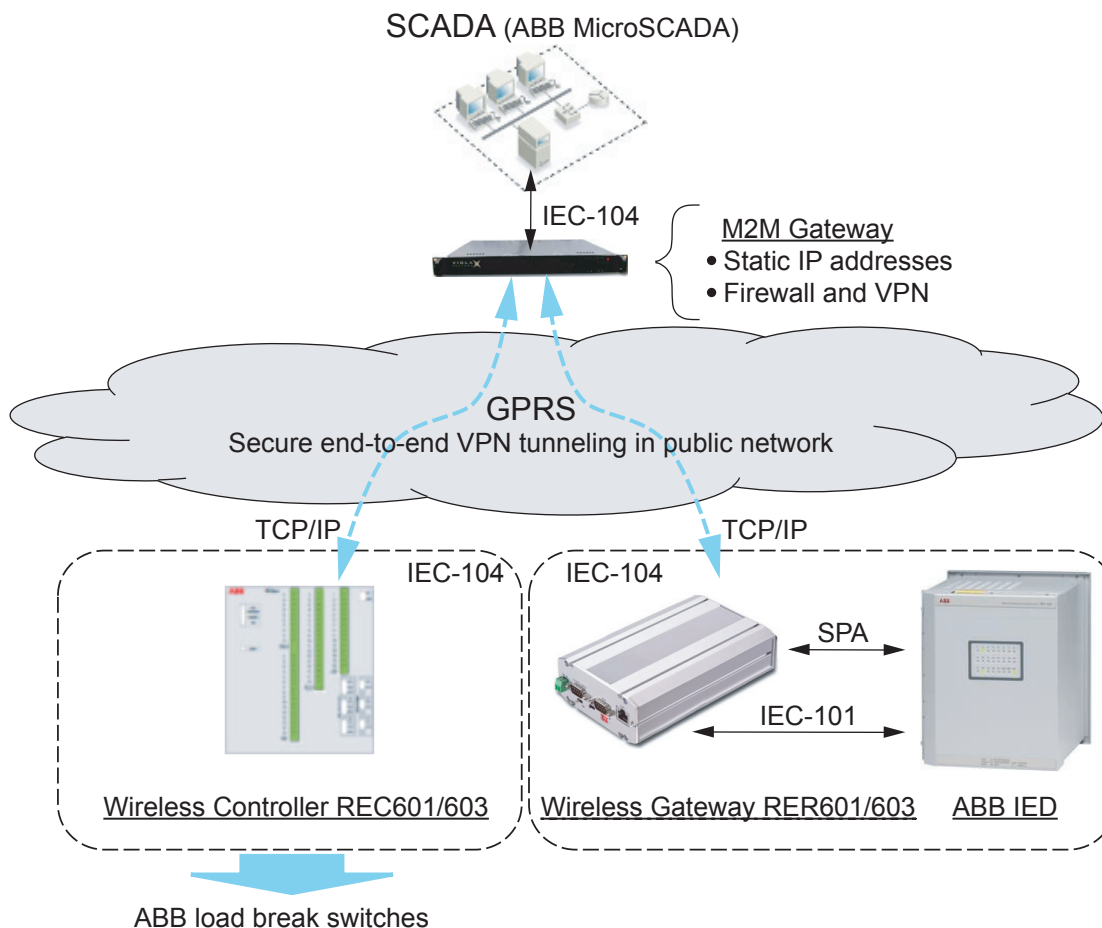


Figure 1. Typical communication system example

## 2. Applications

The Wireless Gateway RER601/RER 603 can be used in most feeder automation and wireless substation applications utilized by utilities to automate their distribution networks in cooperation with ABB protection relays. Further, the devices are recommended for usage in unmanned remote substations and for the monitoring of transformers in distribution networks, as well as other monitoring and control applications in various industries.

Or, in other applications where the following specifications and/or features are needed:

- Redundancy at system level with multiple M2M Gateways (available as optional accessories)
- Always-on two-way communication based on Ethernet and wireless (GPRS) network interface technology
- Easy to read LED display for status monitoring
- Integration of existing devices into a modern control system with field proven products
- Use of the IEC 60870-5-104 event-based communication instead of polling

- Secure communication maintained with internal VPN and Firewall
- Mobile operator independent static IP addressing with an M2M Gateway (available as an accessory)
- Support for Patrol communication status monitoring and diagnostics application
- Self diagnostics of communication, as well as for the device itself
- Packet compression for slow-speed links
- Serves as IEC 60870-5-104 to IEC 60870-5-101 communication gateway
- Local IEC 60870-5-101 polling of Class 1 and Class 2 events
- One RS-232 and one RS-232/422/485 port (for IEC 60870-5-101 device). These ports can also be used in a transparent mode.
- Ultra-high reliability
- Robust aluminium casing design for easy DIN rail mounting

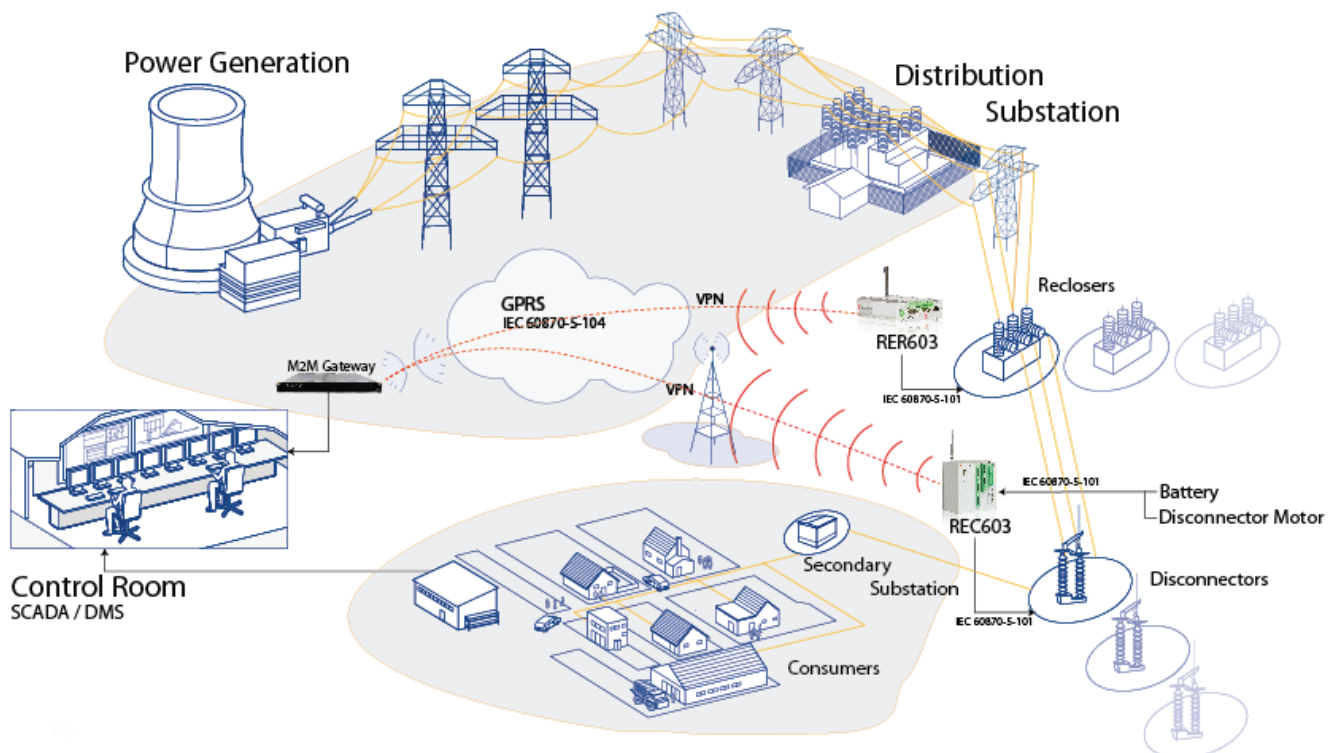


Figure 2. Distribution automation system overview

## 3. Inputs and outputs / Physical interfaces

The Wireless Gateway RER601/603 are equipped with numerous communication connection possibilities to manage

control operations that are communicated via the wireless (GPRS) capabilities of the devices connected to it.

Wireless Gateway RER603 has 8 binary inputs for monitoring and alarms, and 2 binary outputs for control functions.

The Wireless Gateway RER601/603 also has two serial ports (with DIP switches for serial port hardware configuration (RS-232 vs. 485 etc.) and an Ethernet connector for communication and data transfer. Also there is a SIM card insertion slot with SIM card tray and antenna connector.

The status of the operational system is shown by various groupings of LED light indicators. More detailed information can be sourced via the supported WebHMI.

**LED panel description**

The LED panel of the device contains ten LEDs which are used to indicate the complete operational status of the device. The LEDs are numbered from 1 to 10 starting from the antenna panel side.

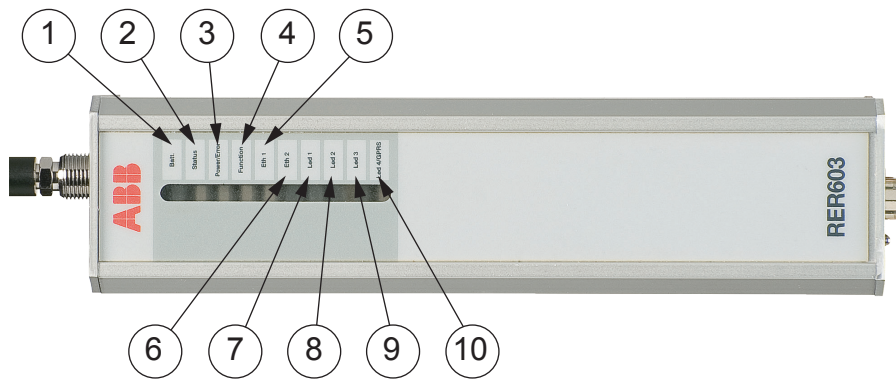


Figure 3. LED description

Table 1. Description of available LEDs on the side panel

LED number	LED	LED status	Description
1	Batt.	-	LED unassigned
2	Status	On	VPN connection is up
		Blinking	VPN connection is starting
		Off	VPN connection is disabled
3	Power/Error	On	Operating power is turned on
		Off	Operating power is turned off
4	Function	On	Device is starting
		Blinking	Device is operating normally
		Off	Device is not operational
5	Eth 1	On	Ethernet link is up
		Blinking	Ethernet link is transferring data
		Off	Ethernet link is down
6	Eth 2	-	LED reserved for future functionality
7	Led 1	-	LED reserved for future functionality
8	Led 2	-	LED reserved for future functionality
9	Led 3	-	LED reserved for future functionality
10	Led 4/GPRS	Blinking	GPRS is starting or transferring data
		Off	GPRS is inactive

### Front panel description

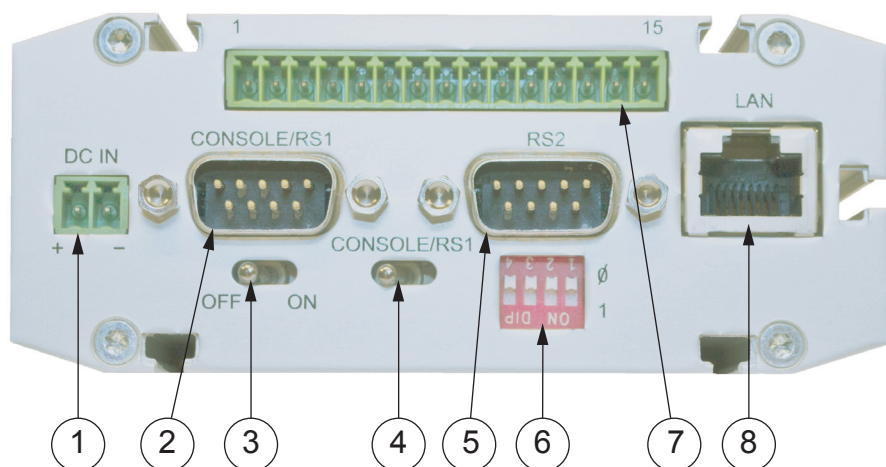


Figure 4. Front panel

- 1 Power supply connector
- 2 Console serial port (DIP switch selectable application or console port RS1)
- 3 Power switch
- 4 Console switch
- 5 Application serial port (RS2)
- 6 DIP switches
- 7 I/O extension (only available for RER603)
- 8 Ethernet connector

### Antenna panel description

Both Wireless Gateways RER601/603 have a SIM card insertion slot with SIM card tray and antenna connector card on the antenna panel.



Figure 5. Antenna panel

- 1 FME connector for an antenna
- 2 SIM card slot

#### 4. Communication

The Wireless Gateways RER601/603 have wireless functionality that allows the use of wireless applications within the customer defined operator's network. High-speed wireless data transfer speed can be supported if needed, however the practical data transfer rates depend on the subscription details and wireless network capacity and bandwidth.

Operating within these wireless networks (GPRS/GSM) the Wireless Gateways RER601/603 may utilize the supported communication protocols. This offers flexibility in system design, allowing users to develop solutions for their own applications with high data availability and reliability. The devices are designed to withstand the operational requirements of most secondary substation environments and offer industrial quality connectivity devices for the IEC 60870 protocol family. The IEC 60870 protocol family is a vendor-independent communication standard for the power distribution industry.

Additionally, with the Wireless Gateways RER601/603 conventional IEC 60870-5-101 devices can be attached to a

modern TCP/IP based IEC 60870-5-104 control system. Ethernet and GPRS/GSM data network interfaces provide a seamless communication solution for most of the applications.

IEC 60870-5-104 is used to communicate towards a SCADA via an approved M2M Gateway (available from ABB) over the available customer chosen GPRS/GSM data network. In the opposite direction IEC 60870-5-101 can be used to communicate with the devices in the field via the serial ports. This communication can also be done using the Ethernet port and a RJ-45 cable between the controlled device and the Wireless Gateways RER601/603.

The Wireless Gateways RER601/603 have two application serial ports. Serial port 1 is configurable to either console or data mode and supports only RS-232, while serial port 2 is configurable to multiple serial modes (RS-232/422/485). Serial port connectors are 9-pin D-sub (male) connectors.

More information is available in the Technical Data section of this product guide or technical manual available at [www.abb.com/substationautomation](http://www.abb.com/substationautomation).



Wireless Gateway	1MRS757424 C
RER601/603	
Product version: 1.2	

## 5. Technical data

Table 2. Dimensions

Description	Value
Width x Height x Depth	45 x 175 x 108 mm (without antenna)

Table 3. Hardware

Description	Value	
Processor environment	Processor	32 bit RISC
	Memory	8 MB FLASH 32 MB SDRAM
Power	Power supply	6...26 VDC nominal voltage input
	Power consumption	1...5 W
	Fuse	Automatic resettable
	Input protection	ESD
Other	Sensor	Temperature
	Internal clock	Real time
Approvals		CE
Environmental conditions	Temperature ranges	-40...+70 °C (operation)
		-40...+85 °C (transport and storage)
	Relative humidity	5...85 % RH

Table 4. Software

Description	Value
Network protocols	PPP, IP, ICMP, UDP, TCP, ARP, DNS, DHCP, FTP, TFTP, HTTP, POP3, SMTP
Tunneling (VPN)	SSH-VPN client (requires M2M Gateway)
	L2TP-VPN client (requires M2M Gateway)
	SSH client
Management	WWW, SSH, Telnet and console FTP, TFTP and HTTP software update
Routing and firewall	Static routing, proxy ARP, port forwarding, IP masquerading/NAT, firewall
Serial device connectivity	Device server application (IEC 60870-5-104 GW)
	Simultaneous GPRS, CSD and SMS
	SMS configuration and status reporting
IEC 60870-5-104 and IEC 60870-5-101	IEC 60870-5-104 over TCP or UDP
	IEC 60870-5-101 FT 1.2 framing
	Local IEC 60870-5-101 polling
	ASDU replacer
	Packet compressor

Table 5. Physical interfaces

Description	Value
I/O interfaces (for Wireless Gateway RER603 only)	8 binary inputs
	2 binary outputs

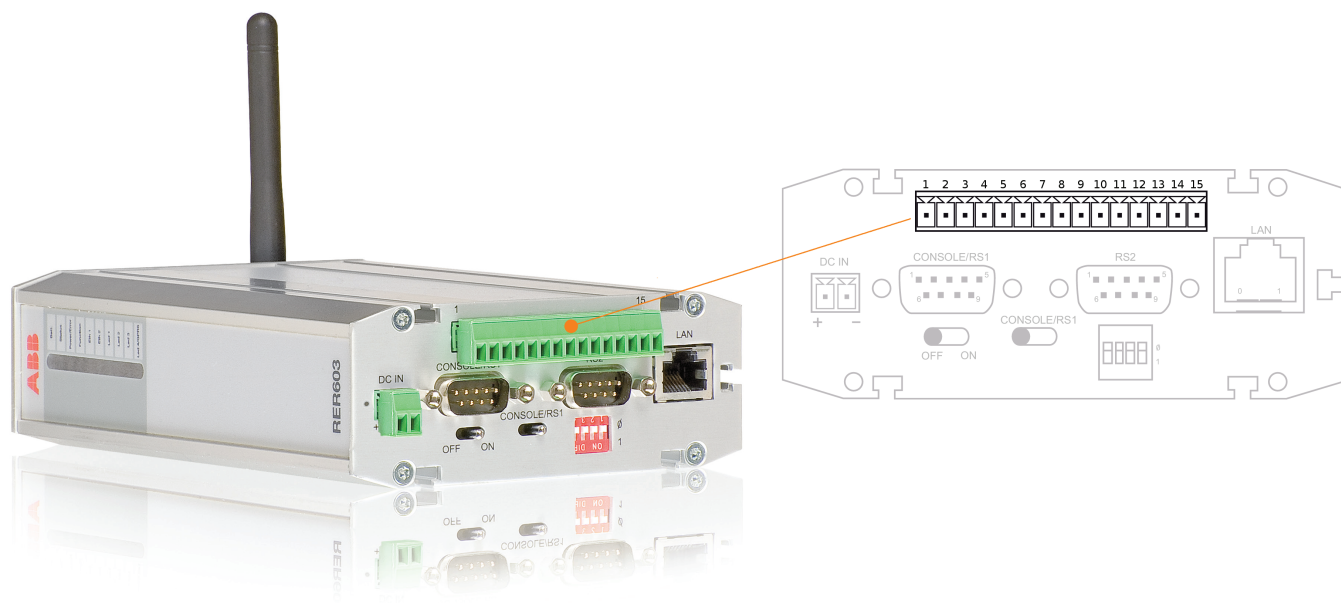


Figure 6. Front view of RER603 showing the I/O connector pin numbering

Table 6. RER603 I/O connector pins

PIN	Symbol	Description
1	V+	Vcc out, 50 mA
2	DI_1	Digital input, 0...60V
3	DI_2	Digital input, 0...60V
4	DI_3	Digital input, 0...60V
5	DI_4	Digital input, 0...60V
6	DI_5	Digital input, 0...60V
7	DI_6	Digital input, 0...60V
8	DI_7	Digital input, 0...60V
9	DI_8	Digital input, 0...60V
10	DI_COM	Digital inputs referense input
11	DO_1A	Digital output pole 1, 0...60V, 50 mA
12	DO_1B	Digital output pole 2
13	DO_2A	Digital output pole 2, 0...60V, 50 mA
14	DO_2B	Digital output pole 2
15	GND	GND output

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Table 7. Network interfaces

Description	Value																
Ethernet	10/100 Base-T. Shielded RJ-45 1.5 kV isolation transformer Ethernet IEEE 802-3, 802-2																
GPRS	<table border="1"> <tr> <td>Bandwidth</td> <td>Quad band (850/900/1800/1900 MHz)</td> </tr> <tr> <td>Module</td> <td>Internal module and SIM card socket</td> </tr> <tr> <td>Class</td> <td>Multi-slot class 12 Mobile station class B</td> </tr> <tr> <td>Downlink speed</td> <td>Max. 85.6 kbps</td> </tr> <tr> <td>Uplink speed</td> <td>Max. 85.6 kbps</td> </tr> <tr> <td>Coding schemes</td> <td>CS1...4</td> </tr> <tr> <td>Antenna connector</td> <td>FME (50 Ω)</td> </tr> <tr> <td>Security</td> <td>Via encrypted VPN</td> </tr> </table>	Bandwidth	Quad band (850/900/1800/1900 MHz)	Module	Internal module and SIM card socket	Class	Multi-slot class 12 Mobile station class B	Downlink speed	Max. 85.6 kbps	Uplink speed	Max. 85.6 kbps	Coding schemes	CS1...4	Antenna connector	FME (50 Ω)	Security	Via encrypted VPN
Bandwidth	Quad band (850/900/1800/1900 MHz)																
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Uplink speed	Max. 85.6 kbps																
Coding schemes	CS1...4																
Antenna connector	FME (50 Ω)																
Security	Via encrypted VPN																
CSD (GSM data)	Up to 14.4 kbps V.110 Non-transparent mode USSD support FME external antenna connector (50Ω) (Stub antenna included)																

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Table 7. Network interfaces, continued

Description	Value
Serial Ports	Serial 1 / Console
	RS-232 DTE Male DB-9 connector IEC 60870-5-101 protocol support Full serial and modem signals 300...460 800 bps. Data bits – 7 or 8 Stop bits - 1 or 2 Parity - None, Even, Odd Flow control – None, RTS/CTS Protection – 15 kV ESD and short circuit Console – RS-232, 19200 bps, 8 data bits, 1 stop bit, no parity (8N1)
	Serial 2 / IEC 60870-5-101
	RS-232 DTE, RS-422, RS-485 (selectable) Male DB-9 connector Full serial and modem signals Biasing and termination selectable 300...460 800 bps Data bits - 7 or 8 Stop bits - 1 or 2 Parity - None, Even, Odd Flow control – None, RTS/CTS Protection – 15 kV ESD and short circuit IEC 60870-5-101 protocol support

Table 8. Electromagnetic compatibility tests

Description	Type test value	Reference
Electrostatic discharge test:		EN 61000-4-2
• Contact discharge	4 kV	
• Indirect contact discharge	4 kV	
Conducted RF Immunity test:		EN 61000-4-6
• 150 kHz...80 MHz	10 V (rms)	
Radiated RF Immunity test:		EN 61000-4-3
• 80...1000 MHz	10 V/m (rms)	
• 1400...2000 MHz	3 V/m (rms)	
• 2000...2700 MHz	1V/m (rms)	
Fast transient disturbance tests:		EN 61000-4-4
• Communication ports	1 kV	
• AC power input ports	2 kV	
Surge immunity test:		EN 61000-4-5
• AC power input ports	2 kV, line-to-earth 1 kV, line-to-line	
Voltage dips and short interruptions	0 % / 1 cycle 40 % / 10 cycles 70 % / 25 cycles	EN 61000-4-11
Emission tests:		CISPR 22 (EN 55022), Class B
• Conducted		
0.15...0.50 MHz	< 79 dB(μV) quasi peak < 66 dB(μV) average	
0.50...30 MHz	< 73 dB(μV) quasi peak < 60 dB(μV) average	
• Radiated		
30...230 Mhz	< 50 dB(μV/m) quasi peak, measured at 3 m distance	
230...1000 MHz	< 58 dB(μV/m) quasi peak, measured at 3 m distance	

Table 9. EMC compliance

Description	Reference
Standard	ETSI EN 301489-1 (V1.8.1 2008-04) IEC 61000-6-1 (Second edition 2005-01) IEC 61000-6-3 (2006-07)

Table 10. RoHS and REACH compliance

Description
Complies with RoHS directive 2002/95/EC
Complies with REACH directive 2006/1907/EC

## 6. Mounting methods

The devices have been equipped with mounting arrangements that are specially designed to enable wall or rack mounting inside the control cabinets. A set of DIN rail mounting clips, included with the devices, are recommended to be used when mounting. The specific mounting position is dependent on the intended application of the device, preferably inside a robust, weatherproof control cabinet.

As the device uses GPRS radio waves for data transmission, the surrounding environment can negatively affect the efficacy of these radio signals. Therefore, if you are using a device with the antenna mounted directly attached to the antenna connector (device with standard antenna without optional extension cable), try to avoid placing the unit in a location where the radio signal might be shadowed, and therefore deteriorated by nearby obstacles or enclosures.

Note also that large metallic surfaces, racks or walls with metallic structures (cabling, concrete iron, etc.) may degrade the antenna performance to a very high extent. In this case it is highly recommended to use the optional external antenna

with appropriate cable. This allows for better positioning of the devices, antennas and thus optimal performance.

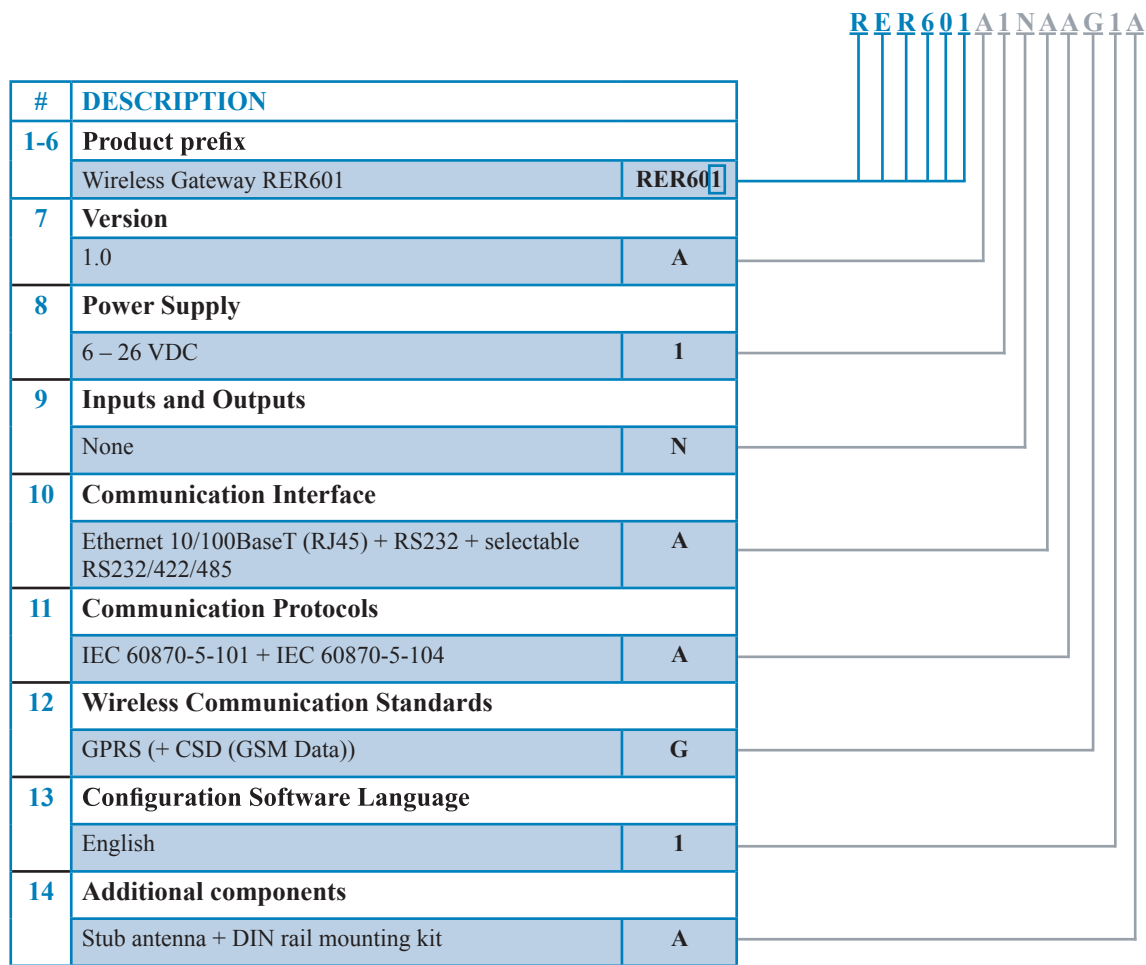
Another restriction to the positioning of the device, when installing it, is that it should be mounted in such a way that the required environmental conditions that are set in the Technical Data section of this Product Guide would also be met.

## 7. Ordering data

Product label is found on the bottom of the device and it contains the basic information about the unit such as product name, serial number and Ethernet MAC address.

The order number consists of a string of codes generated from the device's hardware and software modules. Use the ordering key information to generate the order number when ordering complete devices.

As an example of how the ordering code is generated the following schematics are shown.

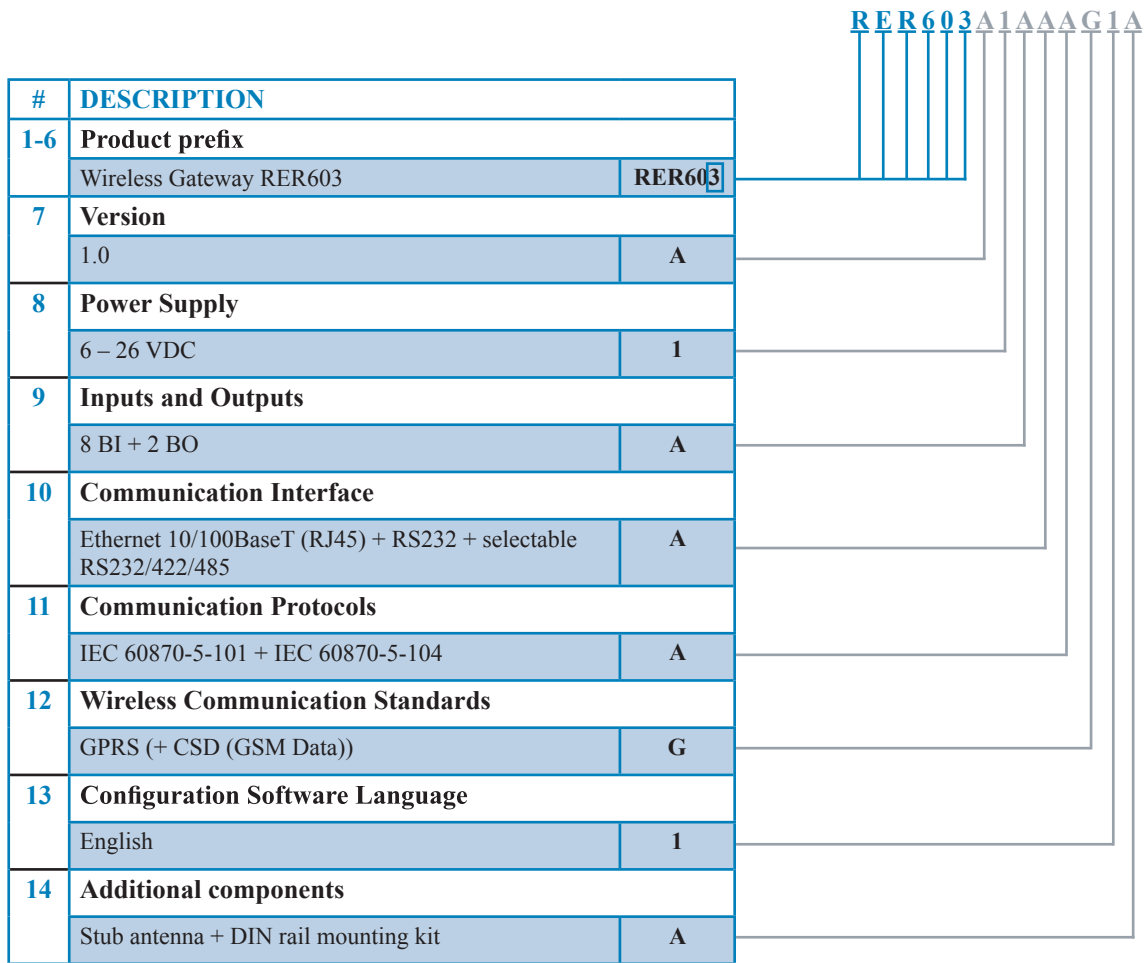


Example code: **R E R 6 0 1 A 1 A A A G 1 A**

Your ordering code:

Digit (#)	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>
Code	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Figure 7. RER601 ordering code example



Example code: **R E R 6 0 3 A 1 A A A G 1 A**

Your ordering code:

Digit (#)	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Code	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Figure 8. RER603 ordering code example



## 8. Accessories and ordering data

Certain equipment accessories can be attached to the devices to increase the flexibility and/or functionality of the devices according to the application requirements within the network. More information regarding these additions should be requested and discussed when planning and ordering the equipment from ABB Distribution Automation.

Replacement parts for the devices are also available from ABB. This includes all external parts or components of the

sold device that could have been damaged or lost. ABB does not supply internal components or parts. The external replacement parts, on the other hand, can be ordered from ABB After-Sales Service via Parts-OnLine [www.abb.com/partsonline](http://www.abb.com/partsonline).

More information is also available from [aftersales.relays@fi.abb.com](mailto:aftersales.relays@fi.abb.com)

Table 11. Accessories

Item	Order number
Null-modem cable (double cable set)	2RCA027811P0001
Roof antenna with 150cm cable	2RCA028207

Table 12. Supporting product

Item	Order number
M2M Gateway	2RCA028228
M2M Gateway Enterprise Edition	2RCA028229

## 9. Tools

The devices can be configured using a graphical user interface via a Web based browser (Internet Explorer 7 or later). A conventional console interface is also provided. Software updates or configuration adjustments for the devices can be made remotely by uploads over the network from the central control center.

For the purpose of configuring the device the default IP address configuration and configuration methods can be found from the Quick Start Guide provided with every device. All other documentation is available online from [www.abb.com/substationautomation](http://www.abb.com/substationautomation).



Summary	Ethernet Settings
<b>Ethernet</b>	Override Ethernet configuration by DHCP? <input type="radio"/> Enabled <input checked="" type="radio"/> Disabled
GPRS	Host name <input type="text" value="ABB"/>
Dial-in	Domain name <input type="text" value="(none)"/>
SSH-VPN	Ethernet IP address <input type="text" value="10.10.10.10"/>
L2TP-VPN	Network mask <input type="text" value="255.0.0.0"/>
GRE tunnel	Use Ethernet as default route (usually No) <input type="button" value="Yes"/> <input type="button" value="No"/>
Monitor	Default router IP address <input type="text" value="10.10.10.1"/>
Routing	MTU <input type="text" value="1500"/>
S-NAT	DNS servers (optional) <input type="text"/>
D-NAT	MAC address 00:06:70:02:09:C9
DNS Update	<input type="button" value="Apply"/> <input type="button" value="Reset"/>
DynDNS client	
NTP client	
SMS Config	
<input type="button" value="Commit"/> <input type="button" value="Reboot"/>	
<input type="button" value="Logout"/>	

Figure 9. RER601/603 WebHMI

## 10. References

The [www.abb.com/substationautomation](http://www.abb.com/substationautomation) portal offers you information about the distribution automation product and service range.

You will find the latest relevant information on the above mentioned devices on the product pages.

The download area on the right hand side of the Web page contains the latest product documentation. The selection tool on the Web page helps you find the documents by the document category and language. The Features and Application tabs contain product related information in a compact format.

Wireless Gateway	1MRS757424 C
RER601/603	
Product version: 1.2	

## 11. Document revision history

Document revision/date	Product version	History
A/2011-09-02	1.0	First release
B/2011-09-29	1.0	Content updated
C/2014-08-18	1.2	Content updated









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