



Wireless Protocol Gateway ARP600 Product Guide

Wireless Protocol Gateway	1MRS758463 B
ARP600	
Product version: 3.3	

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Wireless Protocol Gateway	1MRS758463 B
ARP600	
Product version: 3.3	Issued: 2017-06-07
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1. Description

Wireless Protocol Gateway ARP600 provides wireless monitoring and control of field devices via cellular network from a central site or a control center. The devices offer industrial quality connectivity for the IEC 60870 and Modbus based protocols. Wireless Protocol Gateway ARP600 exhibits integrated communication capability and seamless integration to the SCADA systems.

Wireless Protocol Gateway ARP600 is a member of ABB's Arctic product family and part of its 600 Wireless Gateway product series.

With Wireless Protocol Gateway ARP600, conventional IEC60870-101 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. ARP600 also supports Modbus RTU to Modbus TCP protocol conversion.

By using Wireless Protocol Gateway ARP600, Ethernet and serial devices can be attached to a TCP/IP based control system. DNP3 serial devices can also be attached to a DNP3 TCP SCADA system. In this case, DNP3 protocol is transferred to TCP/IP communication (transparent serial gateway mode).

Wireless Protocol Gateway ARP600 can be utilized for various industrial and utility applications to maximize the benefits.

- Integrated protocol conversion enables connecting the legacy serial-based devices into a TCP/IP-based supervisory control system (SCADA)
- Ideal for retrofitting by allowing the user to extend the life cycle of existing serial-based substation devices due to the integrated protocol converter
- Remote access to field devices means less site visits for operations and maintenance
- Industrial grade TCP/IP router: several serial and TCP/IP based field devices can be integrated into a central supervisory and control system (SCADA)
- Optimizing the cost of communication by using public cellular networks

2. Complete communication system

Wireless Protocol Gateway ARP600 is typically part of a complete communication system which consists of Arctic 600 series gateways and a central M2M Gateway ARM600 communication server. The M2M gateway is an essential part of the total communication solution and offers features that are needed to build a reliable end-to-end communication system.

- Static IP addressing for Arctic 600 series devices – Possibility to use operator independent standard SIM cards
- VPN Concentrator – Secure communication between a central location and remote sites
- Arctic Patrol – Centralized device management application for the Arctic 600 series devices monitoring and controlling
- Firewall – A network security system to control the incoming and outgoing network traffic

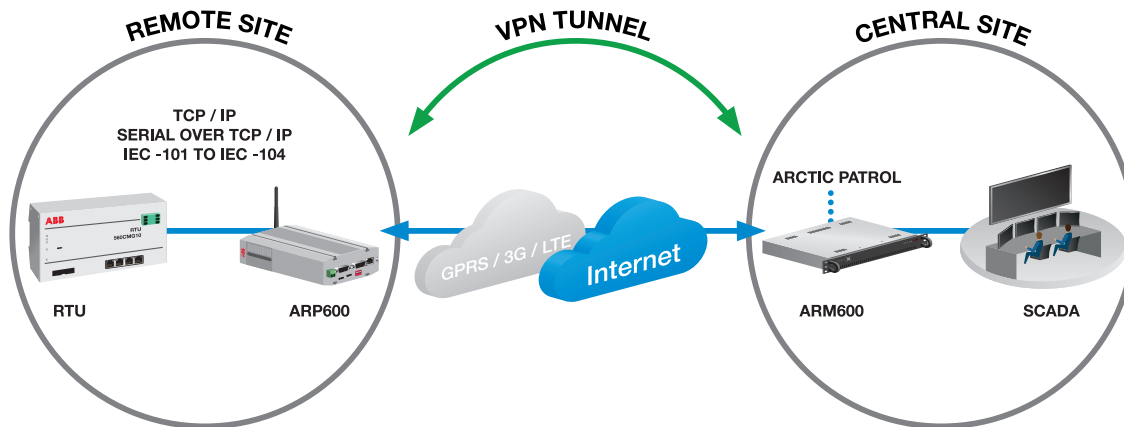


Figure 1. Communication system overview and IEC-101 to IEC-104 protocol conversion example with Wireless Protocol Gateway ARP600 and remote terminal unit (RTU)

3. Application

Wireless Protocol Gateway ARP600 can be used in feeder automation and substation applications to automate distribution networks in cooperation with other ABB grid automation equipment. Further, the devices can be used in secondary substations for various monitoring and control applications.

ARP600 can also be used in various industrial applications.

- Connecting IEC-101 or Modbus RTU protocol based meters and fault passage indicators into an upper-level system
- Enables remote service and maintenance opportunities by allowing service personnel to remotely access any type of field devices. For example, these field devices can securely report the condition monitoring information, which allows planning of preventative maintenance.
- Provides a fast, reliable and secure wireless link between Ethernet devices, such as COM600 Substation Management Unit and 615 series protection relays
- Backup connectivity for any communication link

Key features

- Wireless monitoring and control of IEC-101, IEC-104 and Modbus field devices via cellular network
- Protocol converter for multiple communication protocols
- Enables always-on TCP/IP routing and serial over TCP/IP based two-way communication
- Arctic Patrol connectivity supervision of the communication
- Secure communication maintained with VPN and Firewall

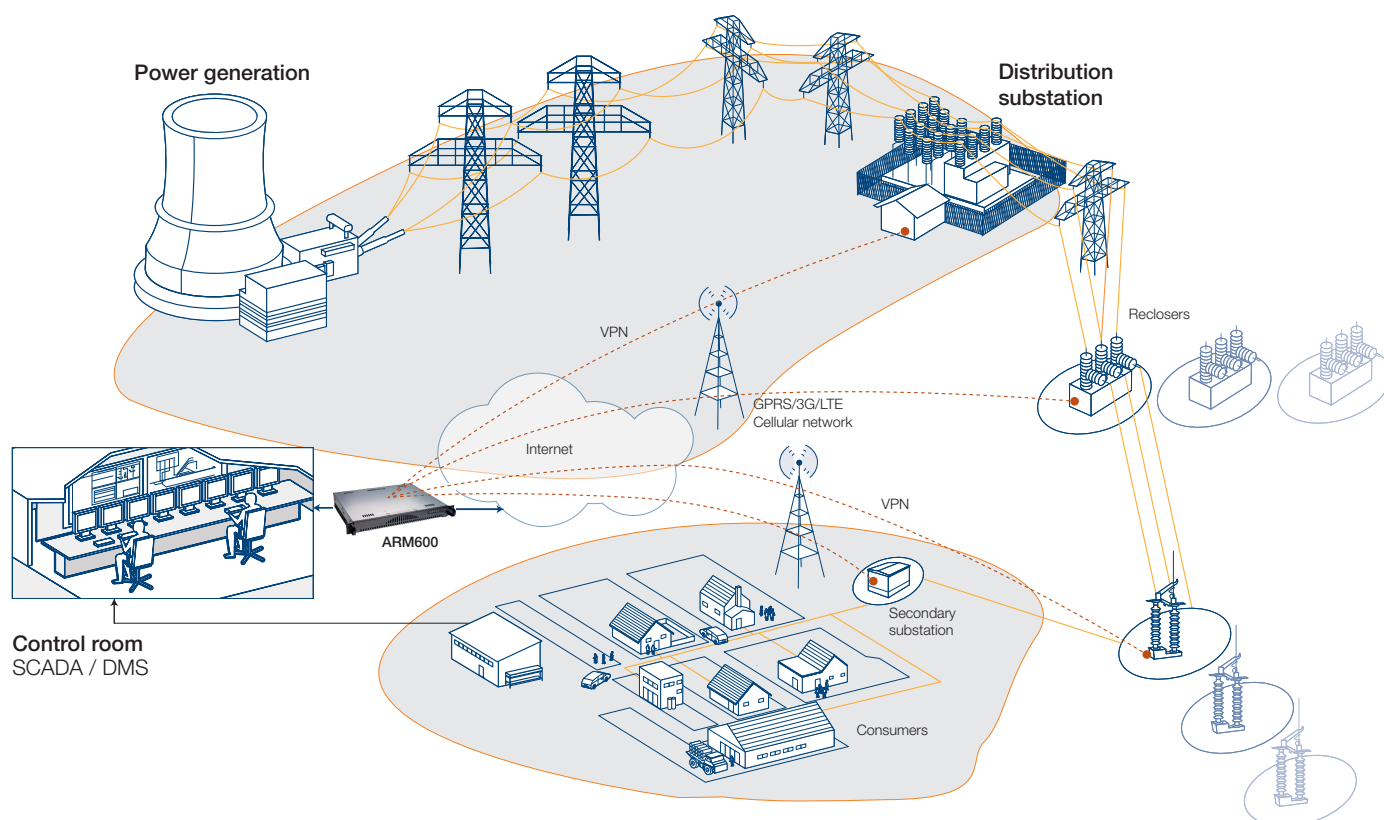


Figure 2. Communication solution in distribution automation overview

4. Physical interfaces

ARP600 has two hardware variants called dual SIM and single SIM. Mechanically, the variants are different but include the same protocol conversion functionality.

Variant with dual SIM

The dual SIM variant has two serial ports (RS-232, RS-485) and a four port LAN/WAN switch (RJ-45) for device connectivity. For communication to an upper-level system, the dual SIM version supports 4G (LTE) connectivity, but is also compatible with GPRS and 3G.. The dual SIM variant also has two SIM card slots for operator redundancy.

Variant with single SIM

The single SIM variant has two serial ports (RS-232, RS-485) and one LAN/WAN port (RJ-45) for device connectivity. For communication to an upper-level system, the single SIM version supports 4G (LTE) connectivity, but is also compatible with GPRS and 3G..

LED panel

The LED panel of the device contains LEDs to indicate the complete operational status of the device.

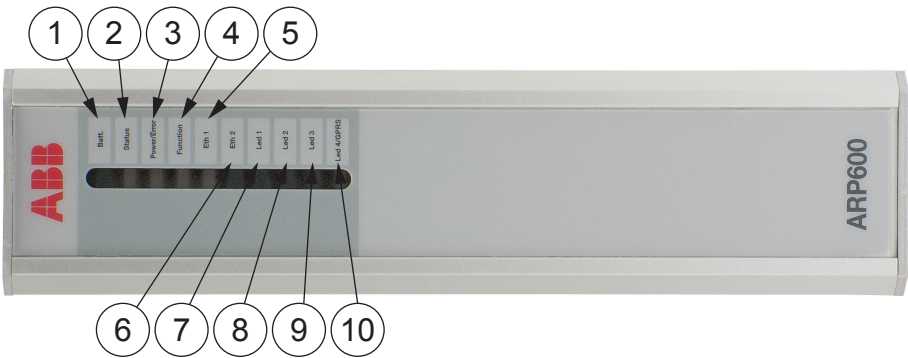


Figure 3. LEDs in single SIM variant

- 1 Batt.
- 2 Status
- 3 Power/Error
- 4 Function
- 5 Eth 1
- 6 Eth 2
- 7 Led 1
- 8 Led 2
- 9 Led 3
- 10 Led 4/GPRS

Table 1. Description of available LEDs on the side panel (single SIM variants)

LED	Label	State	Description
1	Batt	-	LED unassigned
2	Status	On	VPN connection is up
		Flashing	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
		Flashing	Device is operating normally
		Off	Device is not operational
5	Eth 1	On	Ethernet link is up
		Flashing	Ethernet link is transferring data
		Off	Ethernet link down
6	Eth 2	-	LED reserved for future use
7	Led 1	-	LED reserved for future use
8	Led 2	-	LED reserved for future use
9	Led 2	-	LED reserved for future use
10	Led 4/GPRS	Flashing	Cellular connections up and active
		Off	Cellular connection is inactive

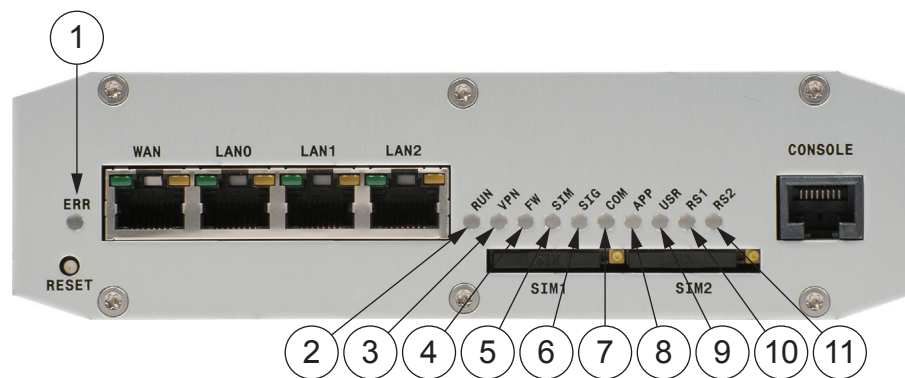


Figure 4. LEDs in dual SIM variant

- 1 ERR
- 2 RUN
- 3 VPN
- 4 FW
- 5 SIM
- 6 SIG
- 7 COM
- 8 APP
- 9 USR
- 10 RS1
- 11 RS2

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Table 2. Description of available LEDs on the side panel (dual SIM variants)

LED	Label	State	Description
1	ERR	On	Unit is restarting. LED should be turned off after restart (usually about 30 seconds)
		Flashing	Error with power supply. Device restarts constantly.
		Off	Device is operating normally
2	RUN	Flashing	Device is operating normally
		Off	If the unit is turned on and RUN led is not blinking, the system has an error and is waiting for restart. The unit should restart soon.
3	VPN	On	VPN connection is up
		Flashing	VPN connection is starting
		Off	VPN connection is disabled
4	FW	-	Reserved for future use
5	SIM	On	SIM card has been initialized and it is ready for use
		Flashing	SIM card initialization is in progress
		Off	SIM card is not used
6	SIG	On	Signal level is normal or good
		Flashing	Signal level is weak
		Off	There is no signal
7	COM	On	Cellular network (Wireless WAN) connection is up
		Flashing	Cellular connection is starting. If the connection is not coming up, check the SIM and SIG LEDs
		Off	Cellular connection is stopped
8	APP	-	Reserved for future use
9	USR	-	Reserved for future use
10	RS1	-	Reserved for future use
11	RS2	-	Reserved for future use

Front panel

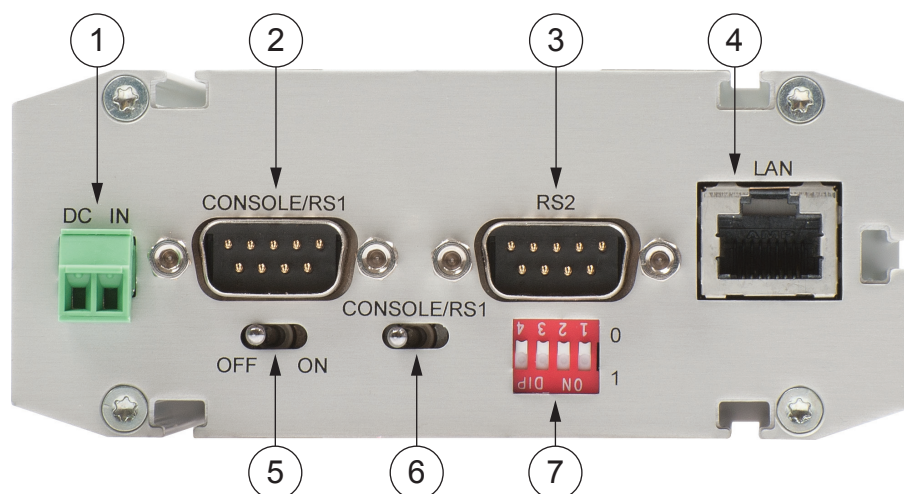


Figure 5. Front panel for single SIM variants

- 1 Power supply 12...48 VDC
- 2 Console/serial port
- 3 Application serial ports
- 4 LAN/WAN port
- 5 Power switch
- 6 Console/serial port switch
- 7 DIP switches

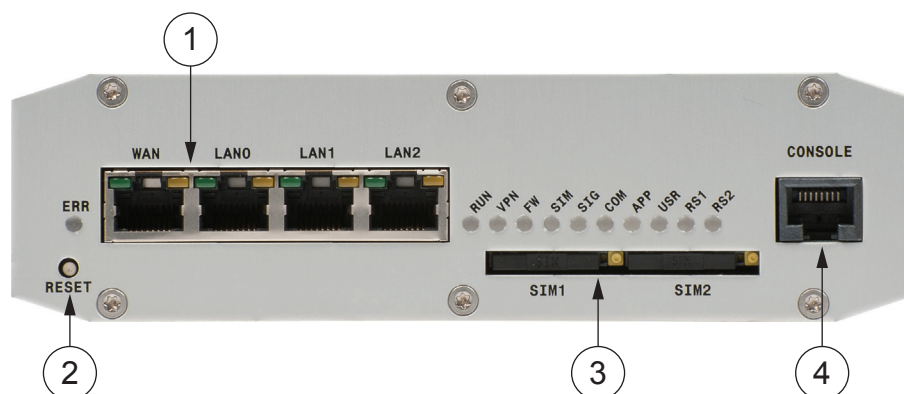


Figure 6. Front panel for dual SIM variants

- 1 LAN/WAN ports
- 2 Reset button
- 3 SIM card slots
- 4 Console/serial port

Back panel

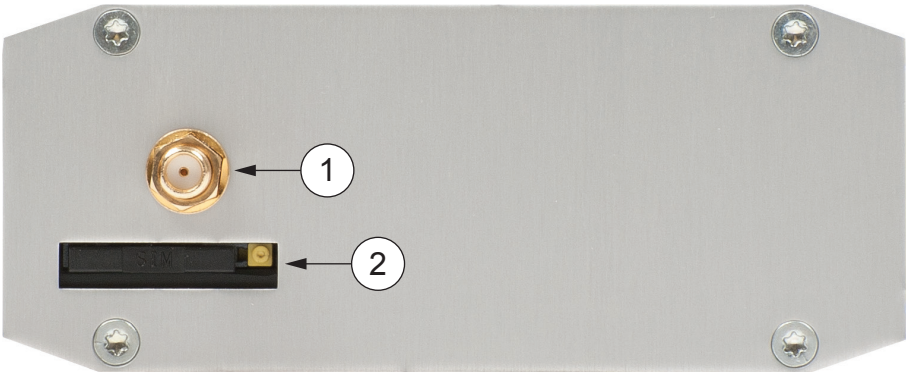


Figure 7. Back panel for single SIM variants

- 1 Antenna connector SMA (female)
- 2 SIM card slot

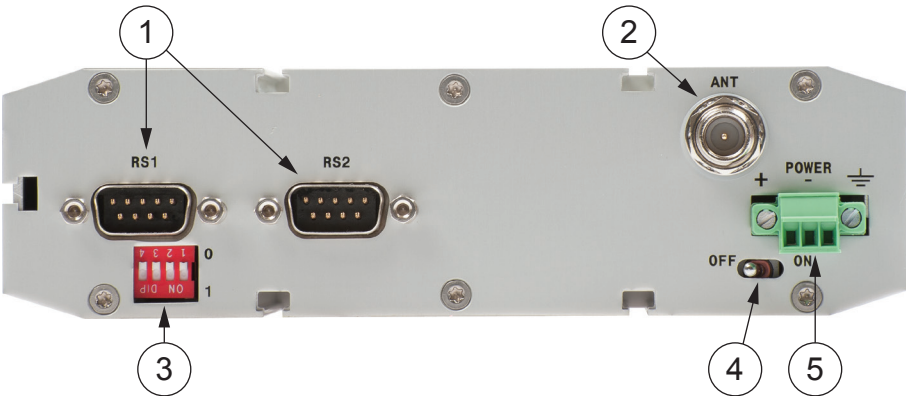


Figure 8. Back panel for dual SIM variants

- 1 Application serial ports
- 2 Antenna connector FME (male)
- 3 DIP switches
- 4 Power switch
- 5 Power supply 12...36 VDC

Antenna panel

The SIM card slots and antenna connector can be found on the antenna panel.

5. Communication

Wireless Protocol Gateway ARP600 provides a complete solution for integrating remote serial (RS-232/RS-485) or Ethernet devices with a central management system over a GPRS, 3G or LTE connection. Industrial protocols IEC-104 and Modbus TCP are supported for the SCADA connectivity. With

the Wireless Protocol Gateway ARP600 protocol conversion feature, conventional IEC-101 and Modbus serial devices can be connected in a reliable way to modern TCP/IP based IEC-104 and Modbus TCP control systems.

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Dual SIM variants include a four port LAN/WAN switch and two SIM card slots. This can be used in applications such as multiple device connectivity and backup re-routing for a primary communication link.

ARP600 provides a secure and reliable communication solution with support for secure VPN communication, static IP routing,

an intelligent self-testing system, NAT, port forwarding and a firewall for monitoring IP traffic and blocking unwanted connections.

More information is available in the Technical data section of this product guide or technical manual available at www.abb.com/substationautomation.

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6. Technical data

Table 3. Dimensions

Description	Value
Width × Height × Depth	108 × 45 × 175 mm (without antenna) for single SIM variants
Width × Height × Depth	167 × 46 × 114 mm (without antenna) for dual SIM variants

Table 4. Hardware

Description		Value/Single SIM variants	Value/Dual SIM variants
Processor environment	Processor	32 bit RISC	32 bit RISC
	Memory	128 MB Flash	32 MB Flash
		128 MB RAM	64 MB RAM
Power	Power supply	12...48 VDC (nominal)	12...36 VDC (nominal)
	Power consumption	1...5 W	1...7 W
Other	Internal clock	Real time	Real time
Approvals		CE	CE
Environmental conditions	Temperature range	-30...+70°C (operating)	-30...+70°C (operating)
		-40...+85°C (storage)	-40...+85°C (storage)
	Humidity	5...85% RH (non condensing)	5...85% RH (non condensing)
	Protection class	IP30	IP30

Table 5. Software

Description	Value
Network protocols	PPP, IP, ICMP, UDP, TCP, ARP, DNS, DHCP, FTP, TFTP, HTTPS, POP3, SMTP
Tunneling (VPN)	Open VPN server and client
	IPSec
	SSH server and client
	L2TP
Configuration and management	WEB UI, SSH and serial console
	SW remote update
	Arctic Patrol asset management application for remote configuration and upgrades
Routing and firewall	Static routing, Ethernet over TCP/IP (bridge), Proxy ARP, Port Forward, IP Masquerading/NAT, Firewall
Serial device connectivity	Device server application, Serial data over TCP/IP (such as DNP3 over TCP/IP)

Table 6. Supported protocols

Master protocol	Slave protocol
IEC 60870-5-104	IEC 60870-5-101
Modbus TCP	Modbus RTU/ASCII
TCP/IP, UDP/IP (DNP3)	Serial gateway - serial port data stream (such as DNP3)

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Table 7. Network interfaces

Description		Value
Ethernet ports	Ethernet/LAN	10/100 Base-T. Shielded RJ-45
		1.5 kV isolation transformer
		Ethernet IEEE 802-3, 802-2
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	RS-232 DTE, RS-422, RS-485 (selectable)
		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

Table 8. Wireless network interfaces (WAN)

Variant type	Air interface	Frequency	Maximum data rate
4G (LTE)	GPRS/EDGE	1900/1800/900/850 MHz	85.2 Kbps/236.8 kbps
	WCDMA/HSPA+	2100/1900/900/850 MHz	21 Mbit/s
	LTE	2600 (band 7)/2100 (band 1)/1800 (band 3)/900 (band 8)/800 (band 20) MHz	100 Mbit/s

Table 9. Antenna connectors

Description	Type
Antenna connector for single SIM variants	SMA (female, 50 Ω)
Antenna connector for dual SIM variants	FME (male, 50 Ω)

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Table 10. Electromagnetic compatibility tests (single SIM variants)

Description	Reference
Emission tests according to the test specification IEC 61850-3 (Edition 2.0 2013-12)	Radiated disturbance
	CISPR 16-2-3
Immunity tests according to the test specification IEC 61850-3 (Edition 2.0 2013-12)	Conducted disturbance
	CISPR 16-2-1
Immunity tests according to the test specification IEC 61850-3 (Edition 2.0 2013-12)	Electrostatic discharge (ESD)
	EN 61000-4-2 (2008-12)
	Radiated radiofrequency electromagnetic field
	EN 61000-4-3 (2006-02)
	Electrical fast transient (EFT)
	EN 61000-4-4 (2012-04)
	Surge
Immunity tests according to the test specification IEC 61850-3 (Edition 2.0 2013-12)	EN 61000-4-5 (2005-11)
	Conducted radiofrequency electromagnetic field
	EN 61000-4-6 (2008-10)
	Power frequency magnetic field
	EN 61000-4-8 (2009-09)

Table 11. Electromagnetic compatibility tests (dual SIM variants)

Description	Reference
Emission tests according to the test specification ETSI EN 301489-1 (V1.8.1 2008-04)	Conducted spurious emissions 0.15...30 MHz
	CISPR 22 (2006-03)
Immunity tests according to the test specification ETSI EN 301489-1 (V1.8.1 2008-04)	Radiated spurious emissions 30...1000 MHz
	CISPR 22 (2006-03)
Immunity tests according to the test specification ETSI EN 301489-1 (V1.8.1 2008-04)	Electrostatic discharge (ESD)
	EN 61000-4-2 (2008-12)
	Radiated radiofrequency electromagnetic field
	EN 61000-4-3 (2006-02)

Table 12. EMC compliancy

Description	Reference
Standard	ETSI EN 301489-1 (V1.8.1 2008-04)

Table 13. RoHS and REACH compliancy

Description	Reference
Directive	RoHS directive 2002/95/EC
	REACH directive 2006/1907/EC

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7. Mounting

The devices have been equipped with mounting arrangements that are specially designed for DIN rail mounting. A set of DIN rail mounting clips is recommended to be used when mounting. The device should be mounted preferably inside a robust, locked and weatherproof control cabinet.

As the device uses a cellular radio for data transmission, the surrounding environment can negatively affect the efficacy of these radio signals. Therefore, if a device with the antenna is mounted on the antenna connector, the unit should not be placed in a location where the radio signal might be shadowed, and therefore deteriorated by nearby obstacles or enclosures.

The large metallic surfaces, racks or walls with metallic structures (cabling, concrete iron, and so on) 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 during installation 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 are met.

8. Ordering data

The product label contains basic information about the unit such as product name, serial number and Ethernet MAC address.

The product label is found at the bottom of the device.

Table 14. Ordering data

Description	ARP600A2260NA	ARP600A2560NA
Radio IF	LTE	LTE
Data speed max	100 Mbps	100 Mbps
LAN/WAN	1	4
RS-232/RS-485	2	2
SIM card	1	2
Supply voltage	12...48 VDC	12...36 VDC
Modbus RTU to Modbus TCP conversion	x	x
IEC-101 to IEC-104 conversion	x	x
DNP3 serial over TPC/IP	x	x

9. Accessories and ordering data

Table 15. Single SIM variant accessories

Accessory	Description	Order code
Rooflex puck antenna	GPRS, 3G and LTE compatible antenna. SMA (m) connector. Gain 0 dBi.	2RCA037240
Rooflex Laird Phantom	GPRS, 3G and LTE compatible antenna. SMA (m) connector. Gain 5.5 dBi.	2RCA037660
DIN rail clip set	DIN rail clips set (copper clips + screws)	2RCA028234
Accessory kit	Includes power supply, two-pin device power connector, Main cable (euro), Null modem cable (2 × D9), Ethernet cable (RJ-45, Cat5e UTP, cross)	2RCA037645
Power supply	External power supply, two-pin, 100-240 VAC/12 VDC.	2RCA037246
Mains cable	Main cable for external power supply, Euro plug.	2RCA037647
Antenna adapter	FME (m) to SMA (m)	2RCA037659

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Table 16. Dual SIM variant accessories

Accessory	Description	Order code
Rooflex puck antenna	GPRS, 3G and LTE compatible antenna. FME (f) connector. Gain 0 dBi.	2RCA037239
Rooflex Laird Phantom	GPRS, 3G and LTE compatible antenna. SMA (m) connector. Gain 5.5 dBi. ¹⁾	2RCA037660
DIN rail clips	DIN rail clips set (plastic clip + screws)	2RCA028233
Accessory kit	Includes power supply, three-pin device power connector, Main cable (euro), Ethernet cable (RJ-45, Cat5e UTP, cross), RJ-45 console adapter (RJ-45-D9)	2RCA037646
Power supply	External power supply, three-pin, 100-240 VAC/ 12 VDC.	2RCA037247
Mains cable	Main cable for external power supply, Euro plug.	2RCA037647
Antenna adapter	FME (f) to SMA (f)	2RCA037658

1) The antenna adapter 2RCA037658 is required

10. Tools

The devices can be configured using a graphical user interface via a Web based browser. 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.

11. References

The www.abb.com/substationautomation portal provides information on the entire range of distribution automation products and services.

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12. Document revision history

Document revision/date	Product version	History
A/2015-12-18	A	First release
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