

PG5201B

Industrial M2M Cellular Protocol Gateway LTE Cat-1



FEATURED HIGHLIGHTS

Comprehensive Connectivity

- LTE Cat 1
- 2x 100 Base TX RJ 45 for LAN or WAN
- 1 RS 232/485 COM Ports
- 1 DI & 1 DO I/O Interface

Reliable & Trustworthy Platform

- Secure VPN and Firewall Isolation
- IEC62443-4-2 Cybersecurity Compliance*
- Certified by TAICS Level2

Quick Deployment & Management

- ATOP NMS Management
- Backup/restore system configuration to/from a TFTP server

Compact and Robust Design

- Efficient Power Consumption (<100 mW)
- Dimensions: 136 x 95 x 30 mm
- Industrial EMC Protection
- -30°C to +75°C Operation

Multiple Industrial Protocols

- Supports Modbus TCP/RTU/ASCII
- DNP3, IEC61850, IEC60870-5-101/104
- Ethernet/Serial in client/server master/slave modes
- Optional Full-License version for simultaneous transformation of multiple protocols.

High Quality Guaranteed

- Made in Taiwan with 5 Years Warranty

*Coming soon

PRODUCT DESCRIPTION

With Its super-low power consumption LTE and industrial-grade hardware, PG5201B provides seamless protocol conversion for devices in industrial network operations. With its rugged construction, PG5201B is designed to perform in the most demanding of industries – including power distribution, oil and gas, manufacturing, and agriculture. As a highly reliable and fault-tolerant Industrial Protocol Gateway, also features integrated LTE connectivity, making it ideal for any industry looking to implement devices at remote locations for smart grid operations. Serial reach can also be extended with the Gateway's redundant Ethernet.

Performance

Its rugged, reliable hardware features high EMC protection, wide temperature operation, and programming and installation flexibility in one device, while its advanced performance protects your data over the Internet with IPsec or OpenVPN tunnels.

Configuration

The device can be easily configured using eNode Designer, a user-friendly Windows utility based on Java. The tool allows users to assign various protocols to different ports, define serial port settings, and define protocolspecific parameters, such as data point mapping. eNode uses a project file to represent the system as a whole, with eNode modules representing individual network devices and protocol applications for individual configuration – such as defining where data point information enters and leaves the eNode Designer system.

An additional highlight of ATOP protocol gateways is the ability to enable multiple protocols simultaneously. In contrast to conventional gateways, which require predefinition of a single master and slave protocol each, the Full-License model allows users to transform multiple incoming protocols in our protocol base to others compatible with the output side, achieving powerful protocol conversion functions, flexible operations, and easier maintenance.

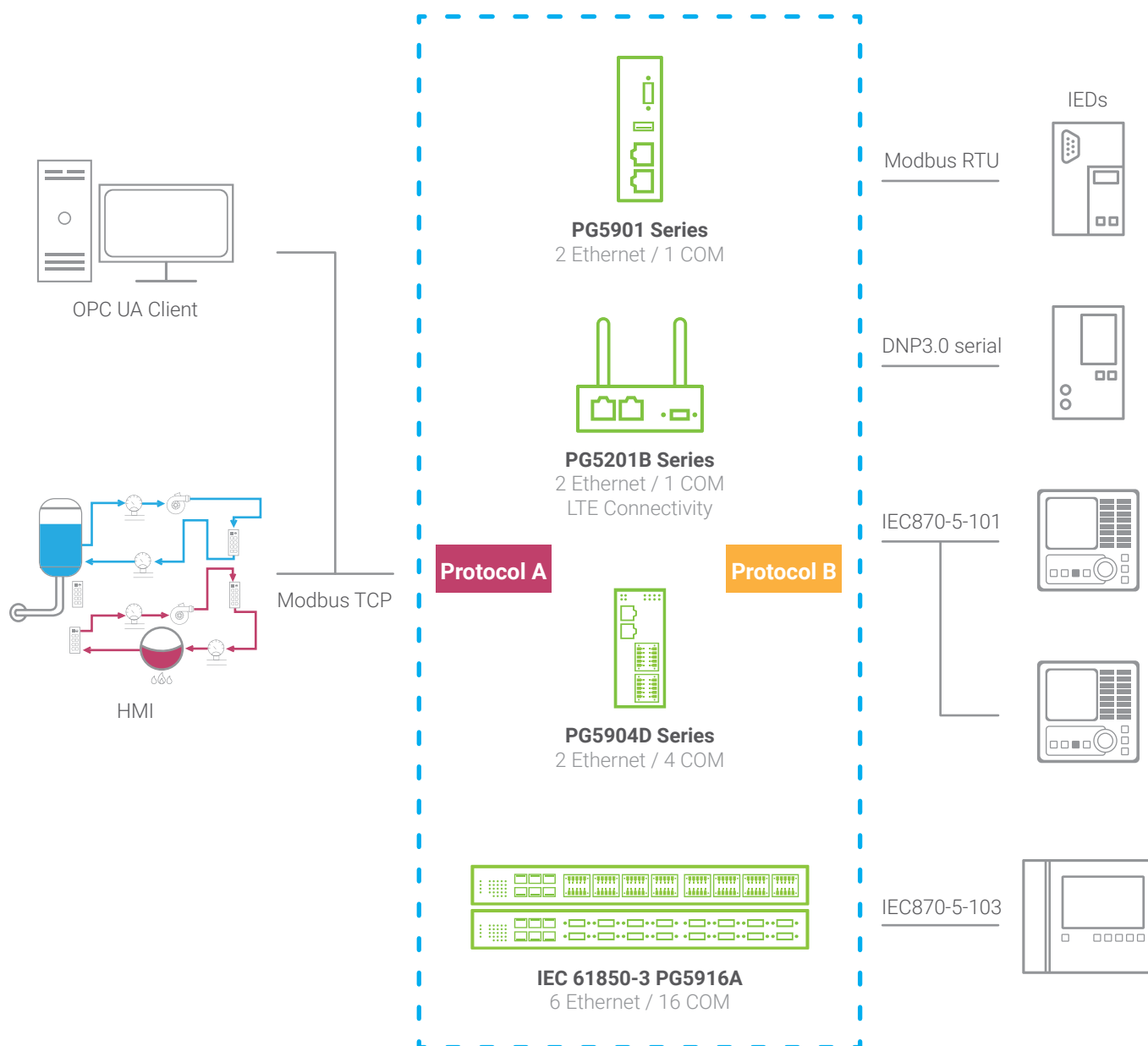
APPLICATIONS

Features

The protocol gateway's embedded protocol stacks allow

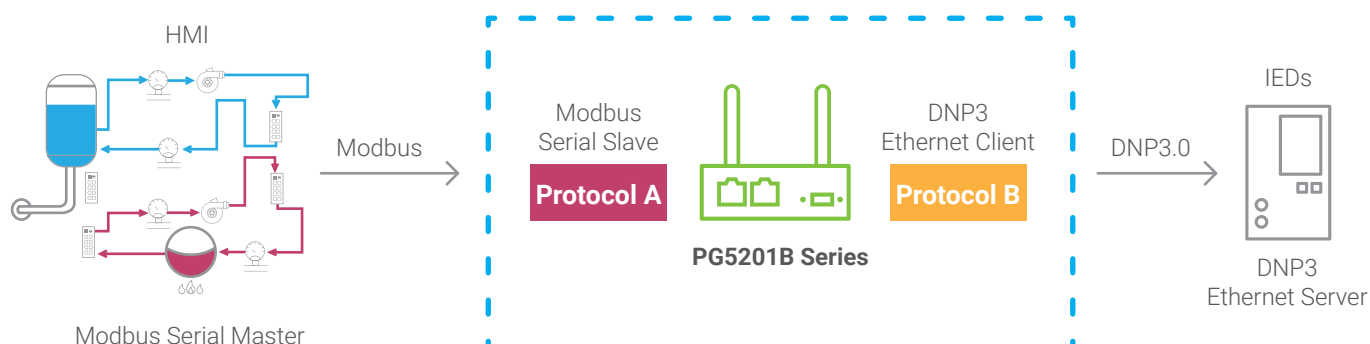
- Seamless conversion
- Exception/error Management
- Unsolicited event management for the protocols requiring them (such as DNP3)
- High performance
- Low cost

General Architecture



* Protocol A and Protocol B - Please refer to Protocol Availability Matrix and order information

Application Example - Modbus Serial HMI to DNP3.0

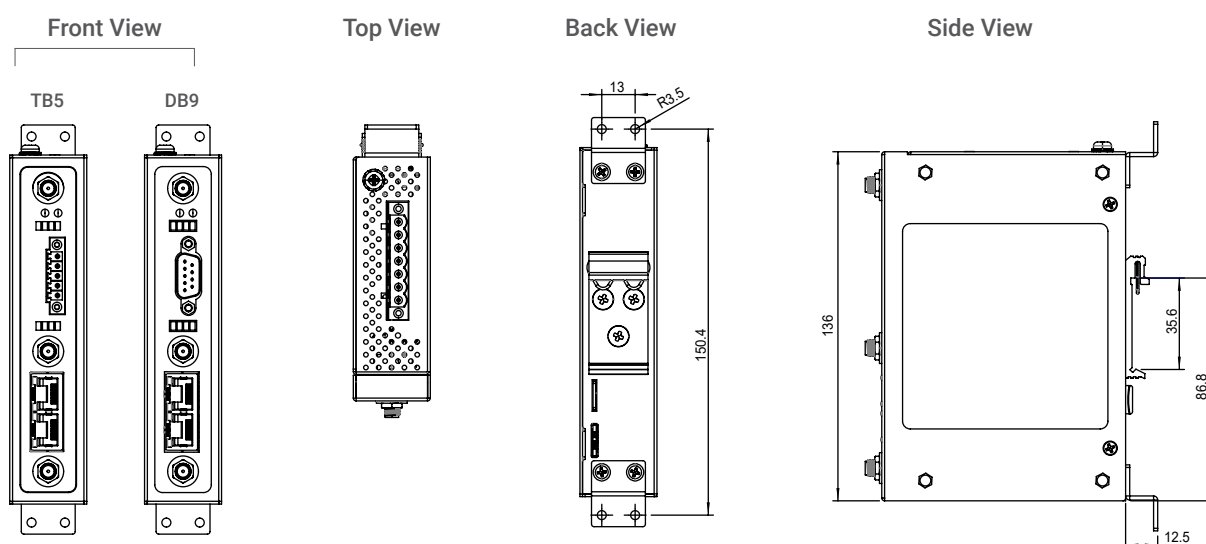


In this example, a Modbus Serial HMI is easily connected to a DNP3 IED through Atop's Protocol Gateway. The host HMI's role is a Modbus Serial Master while the end-device to be accessed is a DNP3.0 Ethernet Server Slave. To the host HMI, Atop's Protocol Gateway acts seamlessly as a Modbus Serial Slave, answering the polling commands and write commands that come from the by using a virtual Modbus ID. Simultaneously, Atop's Protocol Gateway acts as a DNP3 Ethernet Client to any end-device whose DNP3 address is mapped to the virtual Modbus ID that the HMI is accessing.

WARNING

All gateway functions listed in the datasheet refer to the "Gateway" role, and not which "host" or "slave" the gateway is connected to. The SKU shown in this example is "MBSS-DNEC" (Modbus Serial Slave to DNP3.0 Ethernet Client).

DIMENSIONS & LAYOUT



PROTOCOL AVAILABILITY

Protocol Availability Matrix for PG5201B Series

Protocol B		Protocol A						
		Ethernet Server				Serial Slave		
		IEC 61850	DNP3	Modbus TCP	IEC 60870-5-104	DNP3	Modbus RTU/ASCII	IEC 60870-5-101
Ethernet Client	IEC 61850	n/a	DNES-50EC	MBES-50EC	04ES-50EC	DNSS-50EC	MBSS-50EC	01SS-50EC
	DNP3	50ES-DNEC	n/a	MBES-DNEC	04ES-DNEC	DNSS-DNEC	MBSS-DNEC	01SS-DNEC
	Modbus TCP	50ES-MBEC	DNES-MBEC	n/a	04ES-MBEC	DNSS-MBEC	n/a	01SS-MBEC
	IEC 60870-5-104	50ES-04EC	DNES-04EC	MBES-04EC	n/a	DNSS-04EC	MBSS-04EC	01SS-04EC
Serial Master	DNP3	50ES-DNSM	DNES-DNSM	MBES-DNSM	04ES-DNSM	n/a	n/a	n/a
	Modbus RTU/ASCII	50ES-MBSM	DNES-MBSM	n/a	04ES-MBSM	n/a	n/a	n/a
	IEC 60870-5-101	50ES-01SM	DNES-01SM	MBES-01SM	04ES-01SM	n/a	n/a	n/a
	IEC 60870-5-103	50ES-03SM	DNES-03SM	MBES-03SM	04ES-03SM	n/a	n/a	n/a
Full-License PG5201B Series								
Users can run single or multiple protocol(s) in both Protocol A and Protocol B sides.								

PROTOCOL SPECIFICATION

IEC61850 Server/ Client

Supported Functions	<ul style="list-style-type: none"> Generic access to the data (Read, Write) 8 Logical Devices per Port GOOSE (Generic Object Oriented Substation Event) <ul style="list-style-type: none"> a GOOSE message will be generated by the gateway automatically upon event(*) (*)Being other protocols not Real-Time, there is no guarantee that GOOSE message is generated within 1 ms from the event itself.
Supported Control Type of commands	<ul style="list-style-type: none"> Direct-with-Normal-Security Select Before Operate (SBO)-with-Normal-Security Direct-with-Enhanced Security Select Before Operate (SBO)-with-Enhanced-Security
Implemented Protocol Subsets	<ul style="list-style-type: none"> IEC 61850-6 (Substation Configuration Language Description: SCL) IEC 61850-7-1 (Principles and Models) IEC 61850-7-2 (Abstract Communication Service) Interface: ACSI IEC 61850-7-3 (Common Data Classes: CDC) IEC 61850-7-4 (Logical Nodes and data Object Classes) IEC 61850-8-1 (Mapping to Manufacturing Message Specification: MMS) Edition 1 & Edition 2 are both Supported

DNP3 Server/ Client/ Master/ Slave

General Specifications	<ul style="list-style-type: none"> Serial Mode or Ethernet with TCP or UDP Mode Server side supports serving up to 5 client in TCP Mode Client side in a single RS-485 port, supports connecting up to 16 IEDs Client side supports connecting up to 16 IEDs Maximum Fragment size 2048 octets Protocol implementation with configurable parameters conforms to IEEE Std 1815-2012 level 2
Supported Functions	<ul style="list-style-type: none"> Time Synchronization generic access to the data(Read, Write) Commands with or without preselection (Select, Operate, Direct Operate) Transmission of time-tagged events Counter management (Immediate Freeze, Freeze and Clear) Self-address
Supported DNP3 Object Library	<ul style="list-style-type: none"> Binary Inputs up to 8000 pts Binary Outputs up to 2000 pts Double Inputs up to 4000 pts Analog Inputs up to 250 pts Analog Outputs up to 250 pts Counters up to 250 pts

Modbus Server/ Client/ Master/ Slave

General Specifications	<ul style="list-style-type: none"> Support Modbus RTU and ASCII in Serial mode Support Modbus in TCP mode For Modbus Client in TCP mode, support connecting up to 64 Modbus servers For Modbus Server in TCP mode, support serving up to 64 Modbus clients Support maximum number of data points in read direction: 8000 pts Support maximum number of commands in write direction: 4000 pts
Supported Function Codes	<ul style="list-style-type: none"> 1: Read Coils 2: Read Discrete Inputs 3: Read Holding Registers 4: Read Input Registers 5: Write Single Coil 6: Write Single Register 15: Write Multiple Coils 16: Write Multiple Registers 43/14: Read Device Identification (server side only)
Supported Exception Codes	<ul style="list-style-type: none"> 1: illegal function 2: illegal data address 3: illegal data value 4: server device failure 6: server device busy

IEC 60870-5-101 Master/ Slave

General Specifications	<ul style="list-style-type: none"> Protocol implementation with configurable parameters conforms to the IEC 60870-5-101 edition 2 specification Process Information in Monitor and Control Direction Balanced and Unbalanced Modes CP24Time2a or CP56Time2a timestamp for monitor direction report
Supported Functions	<ul style="list-style-type: none"> Station Initialization Interrogation Read Procedure Cyclic Data and Spontaneous Transmission (Slave Side only) Clock Synchronization Transmission of Integrated Totals Direct and SBO command

Supported Data Types	<ul style="list-style-type: none"> Monitors Points: Each supports up to 1000 pts: Single Point, Double Point, Step Position, Bit String, Measured with Normalized Value, Measured with Scaled Value, Measured Short Floating Point Value, Integrated Totals Control Points: Each supports up to 500 pts: Single Command, Double Command, Regulating Step Command, Set Point Command with Normalized Value, Set Point Command with Scaled Value, Set Point Command Short Floating Point, Bit string
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IEC 60870-5-103 Master/ Slave

General Specifications	<ul style="list-style-type: none"> Protocol implementation with configurable parameters conforms to the IEC 60870-5-103:1997 Every serial port supports only one IED Process Information in Monitor and Control Direction Unbalanced Modes
Supported Functions	<ul style="list-style-type: none"> Station Initialization, Supports reset FCB and CU General Interrogation Clock Synchronization Command Transmission Test Mode Blocking of Monitor Direction
Supported Information	<ul style="list-style-type: none"> Monitor direction: <ul style="list-style-type: none"> * Status indications in monitor direction: from <16> to <30> * Supervision indications in monitor direction: <32>, <33>, from <35> to <39>, <46>, <47> * Earth fault indications in monitor direction: from <48> to <52>
Supported Information	<ul style="list-style-type: none"> * Fault indications in monitor direction: from <64> to <93> * Auto-reclosure indications in monitor direction: from <128> to <130> * Measurands in monitor direction: from <144> to <148> Control direction: <ul style="list-style-type: none"> General commands in control direction: from <16> to <19>, from <23> to <26>

IEC 60870-5-104 Server/ Client

General Specifications	<ul style="list-style-type: none"> Server side supports serving up to 5 client Client side supports connecting up to 10 IEDs Protocol implementation with configurable parameters conforms to the IEC 60870-5-104 specification edition 2 Process Information in Monitor and Control Direction CP56Time2a timestamp for Control Commands
Supported Functions	<ul style="list-style-type: none"> Station Initialization Interrogation Read Procedure (Server side only) Cyclic Data and Spontaneous Transmission (Server side only) Clock Synchronization Transmission of Integrated Totals Direct and SBO command
Supported Data Types	<ul style="list-style-type: none"> Monitors Points: Each supports maximum 1000 pts: Single Point, Double Point, Step Position, Bit String, Measured with Normalized Value, Measured with Scaled Value, Measured Short Floating Points Value, Integrated Totals. Control Points: Each supports maximum 500 pts: Single Command, Double Command, Regulating Step Command, Set Point Command with Normalized Value, Set Point Command with Scaled Value, Set Point Command Short Floating Point, Bitstring. Event Logging (Server Side only) Universal Event Buffer up to 20,000 Events

SPECIFICATIONS

Hardware Specifications	
Model Name	PG5201B Series
Cellular Interfaces	
Standards	LTE Cat 1
Ethernet Interfaces	
Standards	802.3 for 10BaseT(X) 802.3u for 100BaseT(X)
Ports	2 x RJ-45 10/100 BaseT(X), 1.5kV isolation
GNSS	
Standards	GPS/GLONASS/BeiDou/Galileo/QZSS
Serial Interfaces (PG5201B only)	
Connector Type	9-Pin D-Sub or 5-Pin Terminal Block
Ports	1 x RS-232/RS-485-2W, software selectable
Baud Rate	1200 to 460,800 bps
Parity	None, Odd, Even
Data Bits	5, 6, 7, 8, software selectable
Stop Bits	1, 2, software selectable
Flow Control	None, Xon/Xoff, RTS/CTS (RS-232 only)
Terminal Resistor (Ω)	120
Pull High/Low Resistor (Ω)	On: 1K; Off: 100K
External I/O Interfaces	
Default/Reset Button	1 key
SIM card slots	1 or 2 push-pull SIM card holder
SD Slot	1x Micro SD slot
LED Indicators	
Power LED	1x Green LED
Run LED	1x Green LED
COM LED	1x Tx Green LED; 1x Rx Green LED
LTE Signal	4X Green LED
Antennas	
Cellular	2 x SMA(M) Antenna for LTE Cat.1
GNSS (Optional)	1 x Wide-Band

Power Characteristics	
Connector Type	Terminal Block
Input Voltage	9 to 48 VDC
Power Consumption	Idle < 3W@12VDC; Hibernate < 100mW@12VDC
Reverse Polarity Protection	Yes
Physical Characteristics	
Housing	Metal housing, IP30 Protection
Dimension (W x H x D)	136 x 95 x 30 mm
Weight	TBD
Installation	DIN-Rail, Wall mount (Optional)
Reset Button	Yes
Environmental Limits	
Operating Temperature	-30 to +75 °C
Storage Temperature	-40 to + 85 °C
Ambient Relative Humidity	5% to 95% (non-condensing)
Ingress Protection Rating	IP30
Software Specifications	
Protocols	IPv4, ARP, ICMP, TCP, UDP, DHCP Client, DNS Client, Telnet, HTTP, HTTPS, NTP, SMTP/TLS, SNMP v1/v2c/v3, Syslog
Network Routing	Flexible network routing rules
Firewall	Port Forwarding, DoS, IP Filter, Static Routing
VPN	IPSec, OpenVPN, L2TP
System Management	WEB, SSH, Telnet, backup/restore system configuration to/from a remote TFTP server

REGULATORY APPROVALS

Regulatory Approvals				
Safety	EN62368-1			
EMC	EN55032, EN61000-6-4, EN55035, EN61000-6-2, FCC Part 15B			
CE	Cellular	EN301489-1/-52, EN301908-1		
	GNSS	EN303413, EN301489-19		
FCC	FCC Part 15B, Part 22H/24E/27L/90			
Test	Item		Value	Level
IEC 61000-4-2	ESD	Contact Discharge Air Discharge	±4KV ±8KV	2 3
IEC 61000-4-3	RS	Enclosure Port	10 (V/m) , 80-1000MHz 3 (V/m), 1.4-6.0GHz	3 3
IEC 61000-4-4	EFT	DC Power Port Signal Port	±1.0KV@ 5.0kHz ±1.0KV @ 5.0kHz	2 3
IEC 61000-4-5	Surge	DC Power Port Signal Port	Line-to-Line ±0.5KV Line-to-Earth ±1.0KV Line-to-Earth ±1.0KV	2 2 2
IEC 61000-4-6	CS	DC Power Port Signal Port	10V, 150KHz to 80MHz, 80%AM 10V, 150KHz to 80MHz, 80%AM	3 3
IEC 61000-4-8	PFMF	Enclosure	30A/m (r.m.s), 50Hz or 60Hz	4
Shock	IEC 60068-2-27			
Freefall	IEC 60068-2-32			
Vibration	IEC60068-2-64			
Others	- ROHS, including 2015 amendment - REACH - TSCA (US) - TPCH (US) - Conflict mineral free			
MTBF	TBD			
Warranty	5 years			

ORDERING INFORMATION

Hardware						
Model name	Description					
	Part Number	Cellular	Band	RS232/485 Serial Port	SIM Slots	GPS
PG5201B-Q-T-C1-DB-EU	1P1PG5201B0011G	LTE Cat.1	B1/B3/B7/B8/B20/B28 (for EU region)	1x DB9	1	-
PG5201B-Q-T-C1-DB-EU-GPS	1P1PG5201B0012G	LTE Cat.1			2	Yes
PG5201B-Q-T-C1-TB-EU	1P1PG5201B0013G	LTE Cat.1		1x TB5	1	-
PG5201B-Q-T-C1-TB-EU-GPS	1P1PG5201B0014G	LTE Cat.1			2	Yes
PG5201B-Q-T-C1-DB-US	1P1PG5201B0001G	LTE Cat.1	B2/B4/B5/B12/B13 (for US region)	1x DB9	1	-
PG5201B-Q-T-C1-DB-US-GPS	1P1PG5201B0002G	LTE Cat.1			2	Yes
PG5201B-Q-T-C1-TB-US	1P1PG5201B0003G	LTE Cat.1		1x TB5	1	-
PG5201B-Q-T-C1-TB-US-GPS	1P1PG5201B0004G	LTE Cat.1			2	Yes
PG5201B-E-T-C1-DB-TW	1P1PG5201B0017G	LTE Cat.1	B1/B3/B7/B8/B20/B28 (for Taiwan region)	1x DB9	1	-
PG5201B-E-T-C1-DB-TW-GPS	1P1PG5201B0019G	LTE Cat.1			2	Yes
PG5201B-E-T-C1-TB-TW	1P1PG5201B0018G	LTE Cat.1		1x TB5	1	-
PG5201B-E-T-C1-TB-TW-GPS	1P1PG5201B001AG	LTE Cat.1			2	Yes

Optional Accessories		
Model Name	Part Number	Description
UN315-1212(US-Y) LV6	50500151120003G	Y-Type (5.08 mm) power adaptor, 100-240VAC input, 1.25A @ 12VDC output, US plug, LV6.
UNE315-1212(EU-Y)LV6	50500151120013G	Y-Type (5.08 mm) power adaptor, 100-240VAC input, 1.25A @ 12VDC output, EU plug, LV6.
ADP-DB9(F)-TB5	59906231G	Female DB9 to Female 3.81mm TB5 Converter
WMK-315-Black	70100000000050G	Black Aluminum Wall Mount Kit

Protocols	
SKU	Description
01SS-04EC	IEC 60870-5-101 Serial Slave to IEC 60870-5-104 Ethernet Client
01SS-50EC	IEC 60870-5-101 Serial Slave to IEC 61850 Client
01SS-DNEC	IEC 60870-5-101 Serial Slave to DNP3 Ethernet Client
01SS-MBEC	IEC 60870-5-101 Serial Slave to Modbus Ethernet Client
04ES-01SM	IEC 60870-5-104 Ethernet Server to IEC 60870-5-101 Serial Master
04ES-03SM	IEC 60870-5-104 Ethernet Server to IEC 60870-5-103 Serial Master
04ES-50EC	IEC 60870-5-104 Ethernet Server to IEC 61850 Ethernet Client
04ES-DNEC	IEC 60870-5-104 Ethernet Server to DNP3 Ethernet Client
04ES-DNSM	IEC 60870-5-104 Ethernet Server to DNP3 Serial Master
04ES-MBEC	IEC 60870-5-104 Ethernet Server to Modbus Ethernet Client

04ES-MBSM	IEC 60870-5-104 Ethernet Server to Modbus Serial Master
50ES-01SM	IEC 61850 Ethernet Server to IEC 60870-5-101 Serial Master
50ES-03SM	IEC 61850 Ethernet Server to IEC 60870-5-103 Serial Master
50ES-04EC	IEC 61850 Ethernet Server to IEC 60870-5-104 Ethernet Client
50ES-DNEC	IEC 61850 Ethernet Server to DNP3 Ethernet Client
50ES-DNSM	IEC 61850 Ethernet Server to DNP3 Serial Master
50ES-MBEC	IEC 61850 Ethernet Server to Modbus Ethernet Client
50ES-MBSM	IEC 61850 Ethernet Server to Modbus Serial Master
DNES-01SM	DNP3 Ethernet Server to IEC 60870-5-101 Serial Master
DNES-03SM	DNP3 Ethernet Server to IEC 60870-5-103 Serial Master
DNES-04EC	DNP3 Ethernet Server to IEC 60870-5-104 Ethernet Client
DNES-50EC	DNP3 Ethernet Server to IEC 61850 Ethernet Client
DNES-DNSM	DNP3 Ethernet Server to DNP3 Serial Master
DNES-MBEC	DNP3 Ethernet Server to Modbus Ethernet Client
DNES-MBSM	DNP3 Ethernet Server to Modbus Serial Master
DNSS-04EC	DNP3 Serial Slave to IEC 60870-5-104 Ethernet Client
DNSS-50EC	DNP3 Serial Slave to IEC 61850 Ethernet Client
DNSS-DNEC	DNP3 Serial Slave to DNP3 Ethernet Client
DNSS-MBEC	DNP3 Serial Slave to Modbus Ethernet Client
MBES-01SM	Modbus Ethernet Server to IEC 60870-5-101 Serial Master
MBES-03SM	Modbus Ethernet Server to IEC 60870-5-103 Serial Master
MBES-04EC	Modbus Ethernet Server to IEC 60870-5-104 Ethernet Client
MBES-50EC	Modbus Ethernet Server to IEC 61850 Ethernet Client
MBES-DNEC	Modbus Ethernet Server to DNP3 Ethernet Client
MBES-DNSM	Modbus Ethernet Server to DNP3 Serial Master
MBSS-04EC	Modbus Serial Slave to IEC 60870-5-104 Ethernet Client
MBSS-50EC	Modbus Serial Slave to IEC 61850 Client
MBSS-DNEC	Modbus Serial Slave to DNP3 Ethernet Client
FL	Allows a model to run single or multiple protocol(s) in both front-end to SCADA and back-end to IED sides