

RELIABLE SECURE CONNECTIVITY

XGP5908/XGP5916 Series
Industrial Protocol Gateway





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FEATURE HIGHLIGHTS

- Dual 10/100Mbps Ethernet ports, Embedded PPTP, IPsec or OpenVPN for enhanced security
- Remotely monitor, manage, and control industrial field devices
- Relay out indicator for Network link-status
- LCM display with 4-key touch pad for configuration
- Same hardware platform for different protocol conversion (Modbus TCP/RTU/ASCII, DNP3.0 TCP or serial, IEC 60870-5-101, IEC 60870-5-103, IEC 60870-5-104, IEC 61850)
- User friendly configuration with a Java-Based Windows utility
- Integrated RSTP redundancy



PRODUCT DESCRIPTION

The XGP5908/16 Series is a highly reliable and fault tolerant Industrial Protocol Gateway. Its powerful architecture provides seamless conversion between the different protocols Ethernet or Serial based. The serial devices communicating on different protocols could be integrated into the system and extend its reach over the gateway's redundant Ethernet. This device is designed to work in most demanding industries such as power substations, power generation, oil and gas, farming and manufacturing.

The configuration carried out through a use friendly, Java- Based Windows Utility called eNode Designer. It allows configuring target platforms, set device properties and protocol data point mapping. To do so, a project file representing the system should be created. This will include devices and the protocol applications running on them. The configuration is completely dependent on the "eNode Module" which represents that device or application – but may include things such as changing the communication port settings and defining where data point information enters and leaves the eNode Designer system.

XGP5908/16 Series embeds an additional layer of security, allowing the devices to be deployed in topologies that request data to flow through the Internet and preventing sensitive control and monitoring data to be readable from malicious activities. IPsec VPN encryption, configurable in both peer-to-peer and peer-to-side modes will make sure the data passing is encrypted through a strong 128, 192 or 256-bit AES encryption.

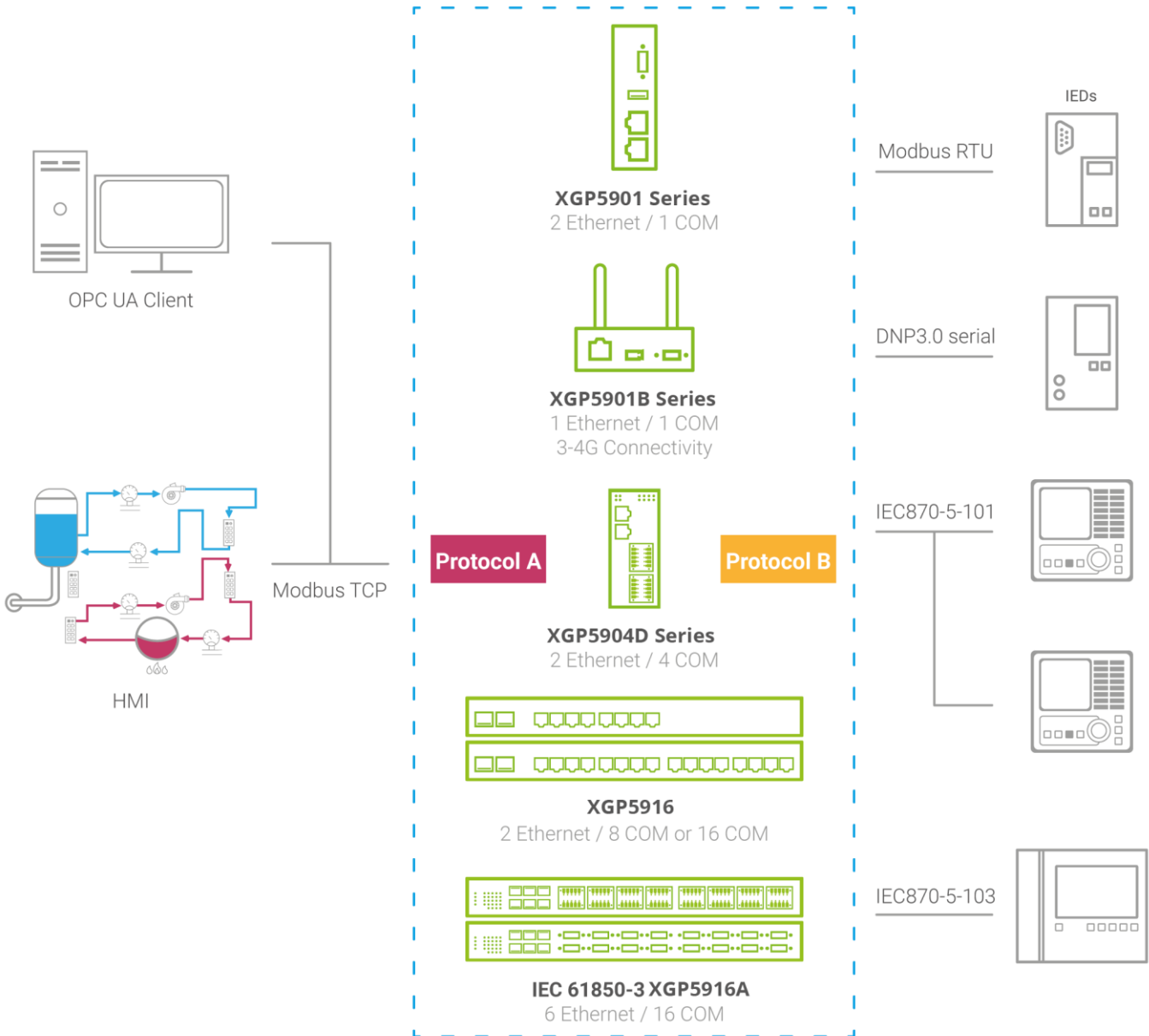


Features

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
- Cost saving

General Architecture



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



Application Example



The example shows how to Easily connect a Modbus Serial HMI, through Agatel’s Protocol Gateway to a DNP3.0 Ethernet slave IED. The host HMI has the role of a Modbus Serial Master while the end-device to be accessed is a DNP3.0 Ethernet Server.

Agatel’s protocol Gateway acts towards the HMI seamlessly as a Modbus Serial Slave, answering the poll commands or the write commands required by the Host by its virtual Modbus ID. Meanwhile, it acts as a DNP3.0 Ethernet Client with regard to the end-device whose DNP3.0 address is mapped to the virtual Modbus ID that the HMI is accessing.

Be careful! – all gateway functions listed in the datasheet refer to the “Gateway” role, and not which “host” or “slave” the gateway is connected to. In this example, the SKU shown is “X2SS-X3EC” (Modbus Serial Slave to DNP3.0 Ethernet Client)



PROTOCOL AVAILABILITY

Protocol Availability Matrix for XGP5908_16 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	X3ES-X5EC	X2ES-X5EC	X4ES-X5EC	X3SS-X5EC	X2SS-X5EC	X1SS-X5EC
	DNP3	X5ES-X3EC	n/a	X2ES-X3EC	X4ES-X3EC	X3SS-X3EC	X2SS-X3EC	X1SS-X3EC
	Modbus TCP	X5ES-X2EC	X3ES-X2EC	n/a	X4ES-X2EC	X3SS-X2EC	n/a	X1SS-X2EC
	IEC 60870-5-104	X5ES-X4EC	X3ES-X4EC	X2ES-X4EC	n/a	X3SS-X4EC	X2SS-X4EC	X1SS-X4EC
Serial Master	DNP3	X5ES-X3SM	X3ES-X3SM	X2ES-X3SM	X4ES-X3SM	X3SS-X3SM	X2SS-X3SM	X1SS-X3SM
	Modbus RTU/ASCII	X5ES-X2SM	X3ES-X2SM	n/a	X4ES-X2SM	X3SS-X2SM	n/a	X1SS-X2SM
	IEC 60870-5-101	X5ES-X1SM	X3ES-X1SM	X2ES-X1SM	X4ES-X1SM	X3SS-X1SM	X2SS-X1SM	n/a
	IEC 60870-5-103	X5ES-03SM	X3ES-03SM	X2ES-03SM	X4ES-03SM	X3SS-03SM	X2SS-03SM	X1SS-03SM





IEC61850 Server/ Client	
Supported Functions	<ul style="list-style-type: none"> • Generic access to the data (Read, Write) • Clock Synchronization • 8 Logical Devices per Port • GOOSE (Generic Object Oriented Substation Event) – a GOOSE message will be generated by the gateway automatically upon event(*) <p>(*)Being other protocols not Real-Time, there is no guarantee that GOOSE message is generated within 1 ms from the event itself.</p>
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 Std1815-2012 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

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 • Master supports connecting up to 16 IEDs • 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> * 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: 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





SPECIFICATION

Network Interface

Ethernet Port	2 x RJ-45
LAN Mode	Dual Subnets or RSTP LAN Redundancy
Compliance	IEEE 802.3 10BASE-T IEEE 802.3u 100BASE-T(X)

Serial Interface

Connector	RJ-45
Port	8 or 16
Mode	RS-232/422/485, software selectable
Baud Rate	1,200~921,600 bps
Parity	None, Odd, Even
Data Bits	5,6,7,8
Stop Bits	1,2

Power Characteristics

Connector	IEC 60320-1 C14 AC Power Inlet (AC models) 5.08mm 3-pin Lockable Terminal Block (DC models)
Input Voltage	24-48 VDC for DC models 100-240 VAC for AC models
Power Consumption	0.54A @ 24 VDC 0.21A @ 100 VAC
Power Redundancy	No
Reverse Polarity Protection	Yes (DC Input only)

Mechanicals

Housing	IP30 protection, metal housing
Dimensions (W x H x D)	436 mm x 43.5 mm x 200 mm
Installation	19" Rack Mount
Reset Button	Yes
Weight	3.2kg (16 ports) / 3.0 kg (8 ports)

Environmental Limits

Operating Temperature	-20°C ~ 70°C (-4°F ~ 158°F)
Storage Temperature	-40°C ~ 85°C (-40°F ~ 185°F)
Ambient Relative Humidity	5 ~ 95% RH, (non-condensing)

Software

Protocols	IPv4, ARP, ICMP, TCP, UDP, DHCP Client, DNS Client, Telnet, HTTP, HTTPS, SMTP/TLS, SNMP v1/v2c/v3, Syslog, RSTP, OpenVPN or IPsec VPN (peer-to-peer or peer-to-side), with a maximum VPN throughput of 37.9Mbps(*), and PPTP
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* Testing conditions may affect the VPN throughput





REGULATORY APPROVALS

Regulatory Approvals				
Safety	EN 60950-1			
EMC	FCC Part 15, Subpart B, Class A EN 55032, Class A EN 61000-3-2 EN 61000-3-3 EN 55024			
Test	Item		Value	Level
IEC 61000-4-2	ESD	Contact Discharge	±8KV	4
		Air Discharge	±15KV	4
IEC 61000-4-3	RS	Enclosure	10 V/m	3
IEC 61000-4-4	EFT	AC Power Port	±4.0KV	4
		DC Power Port	±4.0KV	4
		Signal Port	±2.0KV	3
IEC 61000-4-5	Surge	AC Power Port	Line-to Line±2.0KV	4
		AC Power Port	Line-to Earth±4.0KV	4
		DC Power Port	Line-to Line±1.0KV	3
		DC Power Port	Line-to Earth±2.0KV	3
		Signal Port	Line-to Line±2.0KV	4
IEC 61000-4-6	CS	AC Power Port	10 Vrms	3
		DC Power Port	10 Vrms	3
		Signal Port	10 Vrms	3
IEC 61000-4-8	PFMF	Enclosure	1A/m	3
IEC 61000-4-11	DIP	AC Power Port	-	-
Shock	IEC60068-2-27			
Drop	ISTA Test Procedure 2A			
Vibration	IEC60068-2-64			
RoHS	Yes			
MTBF (MIL-HDBK-217F)	XGP5908-SI-DC: 19.00 years; XGP5908-SI-US/EU: 19.03 years XGP5916-SI-DC: 13.38 years; XGP5916-SI-US/EU: 13.38 years			
Warranty	5 years			



ORDERING INFORMATION

Hardware	
Model Name	Description
XGP5916-DC	Ind. 16-Port Protocol Gateway, RS-232/422/485 Software Selectable, DC TB3
XGP5916-US	Ind. 16-Port Protocol Gateway, RS-232/422/485 Software Selectable, AC Inlet, US Plug
XGP5916-EU	Ind. 16-Port Protocol Gateway, RS-232/422/485 Software Selectable, AC Inlet, EU Plug
XGP5908-DC	Ind. 8-Port Protocol Gateway,RS-232/422/485 Software Selectable, DC TB3
XGP5908-US	Ind. 8 Port Protocol Gateway, RS-232/422/485 Software Selectable, AC Inlet, US Plug
XGP5908-EU	Ind. 8 Port Protocol Gateway, RS-232/422/485 Software Selectable, AC Inlet, EU Plug
XGP5916-SI-DC	Ind. 16-Port Protocol Gateway, RS-422/485 SW Selectable, DC TB3, 2.5kV isolation
XGP5916-SI-US	Ind. 16-P Protocol Gateway,RS-422/485 SW Selectable,AC Inlet,US Plug,2.5kV isolation
XGP5916-SI-EU	Ind. 16-P Protocol Gateway,RS-422/485 SW Selectable,AC Inlet,EU Plug, 2.5kV isolation
XGP5908-SI-DC	Ind. 8-Port Protocol Gateway,RS-422/485 SW Selectable, DC TB3, 2.5kV isolation
XGP5908-SI-US	Ind. 8 Port Protocol Gateway, RS-422/485 SW Selectable, AC Inlet,US Plug,2.5kV isolation
XGP5908-SI-EU	Ind. 8 Port Protocol Gateway, RS-422/485 SW Selectable, AC Inlet EU Plug,2.5kV isolation





OPTIONAL ACCESSORIES

Optional Accessories	
Model Name	Description
XDP-75-24	75W/3.2A DIN-Rail 24VDC power supply 88~264VAC / 124-370VDC input
Power Adapter-AD17-24C (US-Y)	Y-Type power adaptor, 100-240VAC input, 0.6A @ 24VDC output, US plug
Power Adapter-AD17-24D (EU-Y)	Y-Type power adaptor, 100-240VAC input, 0.6A @ 24VDC output, EU plug
GDC-120	120mm copper woven grounding cable
XCA-DB9-TB5	Female DB9 to Female 3.81mm TB5 Converter
XSC-RJ45-DB9-90-M	RJ45 to DB9 Male Cable, 90cm
XSC-RJ45-DB9-200-M	RJ45 to DB9 Male Cable, 200cm
XSC-RJ45-DB9-90-F	RJ45 to DB9 Female Cable, 90cm
XCC-RJ45-DB9-90-F	RJ45 to DB9 Female Cross Over Cable, 90cm
XCC-RJ45-DB9-200-F	RJ45 to DB9 Female Cross Over Cable, 200cm
XRK-718-BK	Rack Mount Mounting-Kit, Black
XPC-US	6 feet Power Cable, US
XPC-EU	6 feet Power Cable, EU
Fuse	250V, 2A, 20mm (length) * 5mm (diameter)



Protocols	
SKU	Description
X1SS-03SM	IEC 60870-5-101 Serial Slave to IEC 60870-5-103 Serial Master
X1SS-X3SM	IEC 60870-5-101 Serial Slave to DNP3 Serial Master
X1SS-X2SM	IEC 60870-5-101 Serial Slave to Modbus Serial Master
X4ES-X1SM	IEC 60870-5-104 Ethernet Server to IEC 60870-5-101 Serial Master
X4ES-03SM	IEC 60870-5-104 Ethernet Server to IEC 60870-5-103 Serial Master
X4ES-X5EC	IEC 60870-5-104 Ethernet Server to IEC 61850 Ethernet Client
X4ES-X3EC	IEC 60870-5-104 Ethernet Server to DNP3 Ethernet Client
X4ES-X3SM	IEC 60870-5-104 Ethernet Server to DNP3 Serial Master
X4ES-X2EC	IEC 60870-5-104 Ethernet Server to Modbus Ethernet Client
X4ES-X2SM	IEC 60870-5-104 Ethernet Server to Modbus Serial Master
X5ES-X1SM	IEC 61850 Ethernet Server to IEC 60870-5-101 Serial Master
X5ES-03SM	IEC 61850 Ethernet Server to IEC 60870-5-103 Serial Master
X5ES-X4EC	IEC 61850 Ethernet Server to IEC 60870-5-104 Ethernet Client
X5ES-X3EC	IEC 61850 Ethernet Server to DNP3 Ethernet Client
X5ES-X3SM	IEC 61850 Ethernet Server to DNP3 Serial Master
X5ES-X2EC	IEC 61850 Ethernet Server to Modbus Ethernet Client
X5ES-X2SM	IEC 61850 Ethernet Server to Modbus Serial Master
X3ES-X1SM	DNP3 Ethernet Server to IEC 60870-5-101 Serial Master
X3ES-03SM	DNP3 Ethernet Server to IEC 60870-5-103 Serial Master
X3ES-X4EC	DNP3 Ethernet Server to IEC 60870-5-104 Ethernet Client
X3ES-X5EC	DNP3 Ethernet Server to IEC 61850 Ethernet Client
X3ES-X3SM	DNP3 Ethernet Server to DNP3 Serial Master
X3ES-X2EC	DNP3 Ethernet Server to Modbus Ethernet Client
X3ES-X2SM	DNP3 Ethernet Server to Modbus Serial Master
X3SS-X1SM	DNP3 Serial Slave to IEC 60870-5-101 Serial Master
X3SS-03SM	DNP3 Serial Slave to IEC 60870-5-103 Serial Master
X3SS-X4EC	DNP3 Serial Slave to IEC 60870-5-104 Ethernet Client
X3SS-X5EC	DNP3 Serial Slave to IEC 61850 Ethernet Client
X3SS-X3EC	DNP3 Serial Slave to DNP3 Ethernet Client
X3SS-X3SM	DNP3 Serial Slave to DNP3 Serial Master
X3SS-X2EC	DNP3 Serial Slave to Modbus Ethernet Client
X3SS-X2SM	DNP3 Serial Slave to Modbus Serial Master
X2ES-X1SM	Modbus Ethernet Server to IEC 60870-5-101 Serial Master
X2ES-03SM	Modbus Ethernet Server to IEC 60870-5-103 Serial Master
X2ES-X4EC	Modbus Ethernet Server to IEC 60870-5-104 Ethernet Client
X2ES-X5EC	Modbus Ethernet Server to IEC 61850 Ethernet Client
X2ES-X3EC	Modbus Ethernet Server to DNP3 Ethernet Client
X2ES-X3SM	Modbus Ethernet Server to DNP3 Serial Master
X2SS-X1SM	Modbus Serial Slave to IEC 60870-5-101 Serial Master
X2SS-03SM	Modbus Serial Slave to IEC 60870-5-103 Serial Master
X2SS-X4EC	Modbus Serial Slave to IEC 60870-5-104 Ethernet Client
X2SS-X5EC	Modbus Serial Slave to IEC 61850 Client
X2SS-X3EC	Modbus Serial Slave to DNP3 Ethernet Client
X2SS-X3SM	Modbus Serial Slave to DNP3 Serial Master





WHO WE ARE

Built on 20 years of experience in designing and manufacturing industrial networking products, **Agatel** was established from the UK to serve the infrastructure and industrial sectors in EMEA markets with reliable connectivity for mission-critical systems in demanding environments.

Experienced in hardware and software design and integration, we produce high-quality yet cost-effective industrial networking and communication products with great customization capabilities and robust implementations, equipping our customers for reliable secure industrial networks.



WHAT WE OFFER

The needs of our customers' industry are different from those of corporate IT environments – industrial operating environments are tough and the impact of failure in the field can lead to business threatening situations, hence our products will have lifetimes in excess of 20 years.

From entry-level to high-performance industry-certified hardware, **Agatel** offers a full solution spectrum to suit our customers' budgets and application requirements, with features such as industrial-grade reliability, integrated security, network redundancy, and advanced performance.

Our product solution profile includes industrial Ethernet switches, network time servers, media converters, industrial wireless devices, and serial device servers, covering a wide array of mission-critical applications such as automation, security, transport, water, oil and gas, and power grids.



WHY CHOOSE US

We help our customers reduce downtime and operational costs of their industrial applications in harsh environments. Leading system integrators in EMEA rely on our niche technical expertise and product quality to increase their applications' robustness, revenues, and competitive differentiation.

Agatel ruggedized high-quality solutions are designed to deliver zero-network-downtime for harsh project demands, allowing for reliable connectivity to keep people and assets safe and secure in harsh and hazardous environments, and allowing customers to focus on growing their business.

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