SOLUTIONS FOR INDUSTRIES AND MORE

Whitepaper

Engineered and manufactured in Taiwan

atop Technologies

ATOP's solutions for the factory floor

Introduction To The Smart Factory

04 Welcome to the Smart Factory
05 How we face challenges of the Smart Factory

06

ATOP's Smart Factory

06 ATOP Products: Where in the Smart Factory?

08

ATOP's Solution

08 ATOP's Factory Automation Solutions
09 ATOP's Computing and Networking solutions

10

ATOP Computing

10 ATOP Computing
Embedded ARM computers
Industrial PCs
11 IIoT Edge Node-RED computers

12

ATOP Networking

12 ATOP Networking
13 ATOP Switches: Unmanaged, Managed, PoE, L3
ATOP Wireless
ATOP Media Converters and PoE Injectors

14

ATOP Legacy

14 ATOP Legacy
Serial Servers

15

ATOP I/O

15 IIoT Remote I/Os

16

ATOP Embedded

16 ATOP Embedded Industrial Communication Solutions
17 Application examples
Our Chip, module, development boards solutions

18

ATOP Protocol Gateways

18 Legacy Retrofitting
19 Supported Protocols
20 ATOP's Hardware Flexibility

21

ATOP Modbus Gateways

21 Modbus Gateways overview
22 Concentrator Function
22 Redundancy Function

Welcome to the Smart Factory

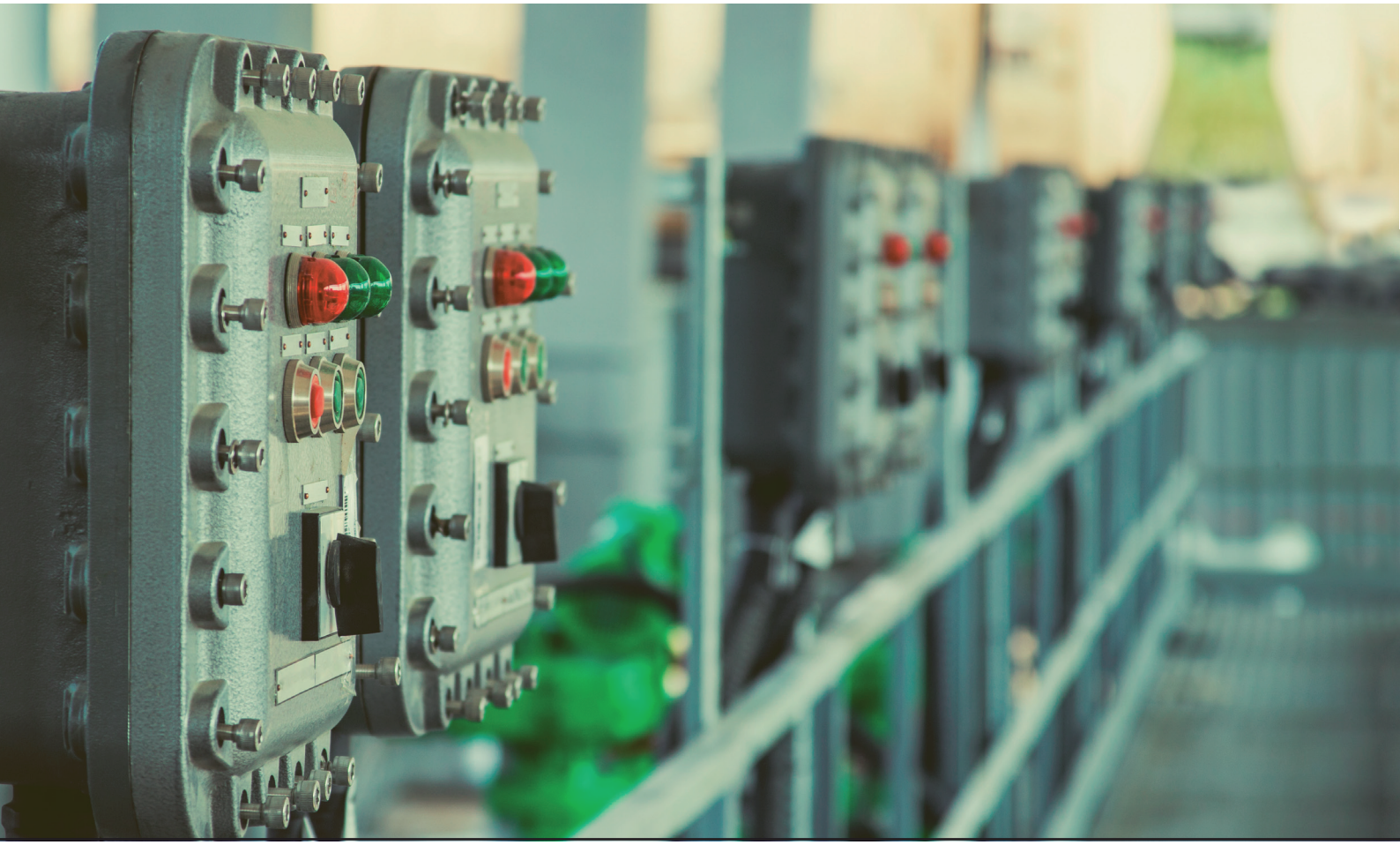
The new imperative of manufacturing systems

Conventional manufacturing is undergoing a massive transformation. And so is customer demand and expectation. As if dealing with disruptive forces like macroeconomic shifts, political uncertainty, policy and regulatory compliances are not enough, today's manufacturers also need to adapt to rapid evolutions across disruptive digital and data centric environment. The new frontier of manufacturing needs to move up over simple automated production processes helmed erstwhile by traditional application in factory operations with conventional IT intervention.

Welcome to the era of responsive, adaptive and connected manufacturing. Are you ready to shift from linear, sequential supply network operation to an interconnected, intelligent and insightful operation? The stakes are high. There is demand for specific and customized products to enable traceability and improve delivery performance. It not only makes supervision more informed and effective but also maximizes overall asset utilization, minimizes downtime, synchronizes direct and indirect efficiency, ensures stability, accuracy and fuel next wave of growth.

Today's connected smart factory is a giant leap from its traditional avatar. In almost real time it is expected to integrate operations technology with information technology. It is expected to extract data from connected operations and production systems by converging the physical and digital world. By interacting in almost real time with customer relationship management, it would highlight deviations from the plan. By integrating customer demand with broader supply network, a smart factory would leverage multiple mandates to accelerate speed and fulfillment.

In Industry 4.0, devices, people, machines, sensors, suppliers and customers communicate in a flexible and decentralized way with a common principle: interoperability. ATOP products are designed in order to simplify and standardize the way different protocols and devices get together on the shop floor.



How we face challenges of the smart factory

Interoperability

Success lies in efficient and flexible integration. Complexities arise when different manufacturers adopt to different gateways with various ports and interfaces. How do you integrate all of them together then? ATOP Protocol Gateway and industrial communication modules are designed to solve this problem and make integration seamless. They simplify connectivity, make older equipment blend with new, provide data conversion among industrial protocols to ensure compatibility of various devices. Modbus, Profinet, Ethernet/IP, EtherCAT, MQTT and OPC UA are no longer an obstacle, but an opportunity to take the best from each technology.

Security

With digital transformation and interconnected nature of Industry 4.0, managing risks in the age of IIoT has become a new industry mandate. The more devices are connected, the more points of entry lay vulnerable to threats and malicious activities. From disruptions of operations to gaining control of systems, in the recent past, cyberattacks have caused far reaching, extensive damages to manufacturers and supply networks. ATOP hardware features security solutions to provide seamless security and encryption: MACsec for security over LANs; IPsec, OpenVPN and PPTP for security over WANs and the Internet is embedded in all advanced products.

Reliability

With MTBF of up to 25 years, ATOP's range of hardware is built to minimize downtime events. Built-in redundancy features such as ERPS Ring, RSTP, DLR and Media Redundancy Protocol (MRP) ensure ideal upkeep times. For instance, in the event of a link or device failure, these features detect the failure and relay the cause of the failure to the control center, by recovering automatically from the failure to provide continuous operation.

Environment

From blast furnaces to operating in sub-zero degree environments, ATOP's line of hardware is designed to withstand the harshest of environments. By supporting temperatures from range of -40°C to +85°C, our hardware uses industrial-grade materials to guarantee also a long MTBF. And, because our devices feature fanless designs to reduce the number of moving parts, breakdowns and failures are reduced, thereby prolonging the operational lifetime of your investment.

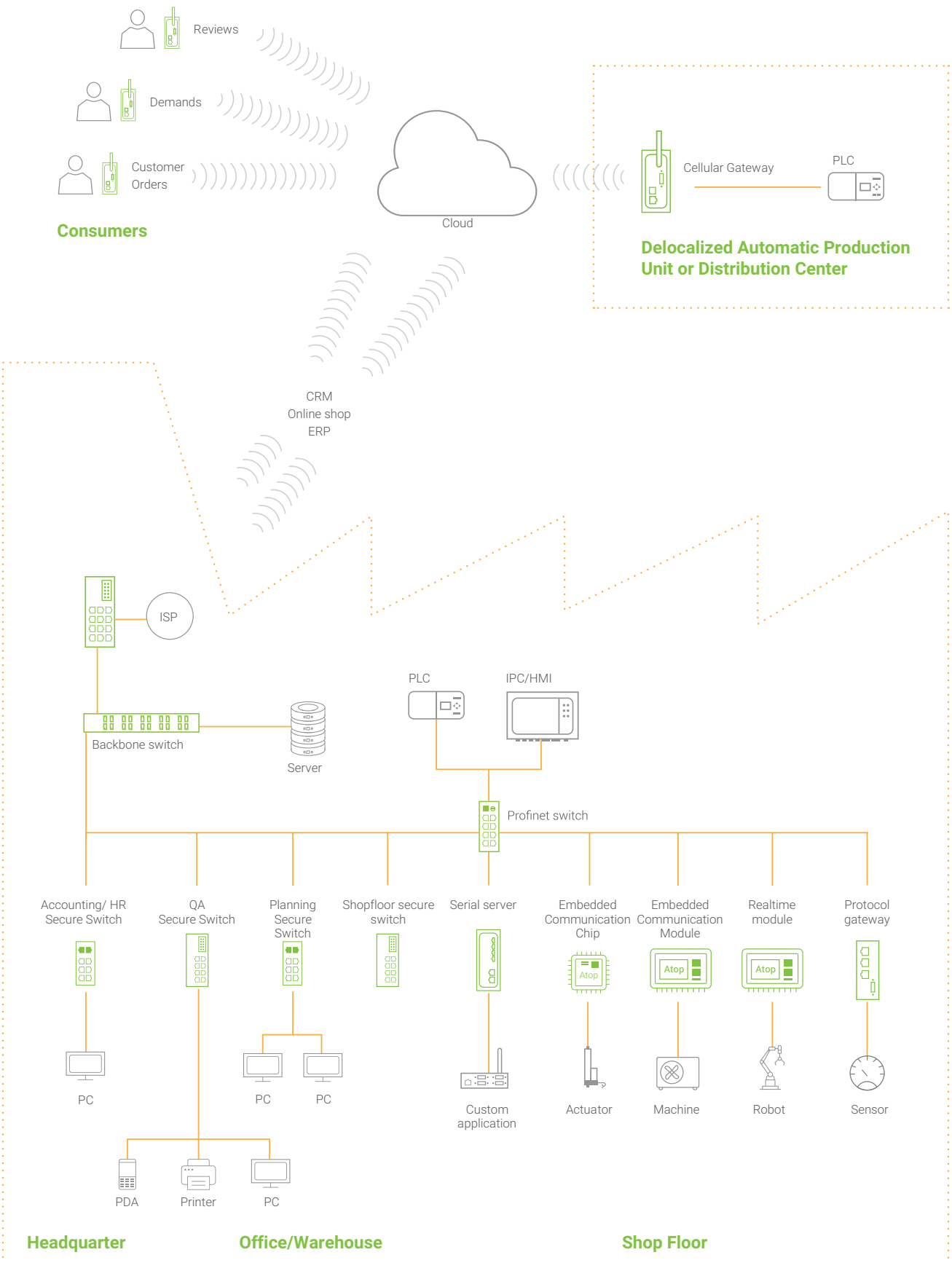
EMI/EMS

High-voltages and electromagnetic interferences in factories can be fatal if installed devices are not properly shielded and isolated. Without proper precautions, there could be equipment failures. Devices should also be designed in a way so as to not to interfere with their surrounding equipment, as their own radiated emissions can generate noise and interference. ATOP's hardware conforms with high EMS and EMI standards, such as UL61010-2-101, UL60950-1, UL/EN/IEC62368 and EN61000-6-2 and EN61000-6-4.

ATOP products: where in the Smart Factory?

ATOP covers a wide range of industrial communication equipment. For network integration, ATOP's Protocol Gateways provide easy, reliable and cost-effective solutions for multi-protocol networks. ATOP's smart communication modules on the other hand enable almost every field device to gain different protocol capability; ATOP's Industrial Computers support the factory with reliable and powerful computation.

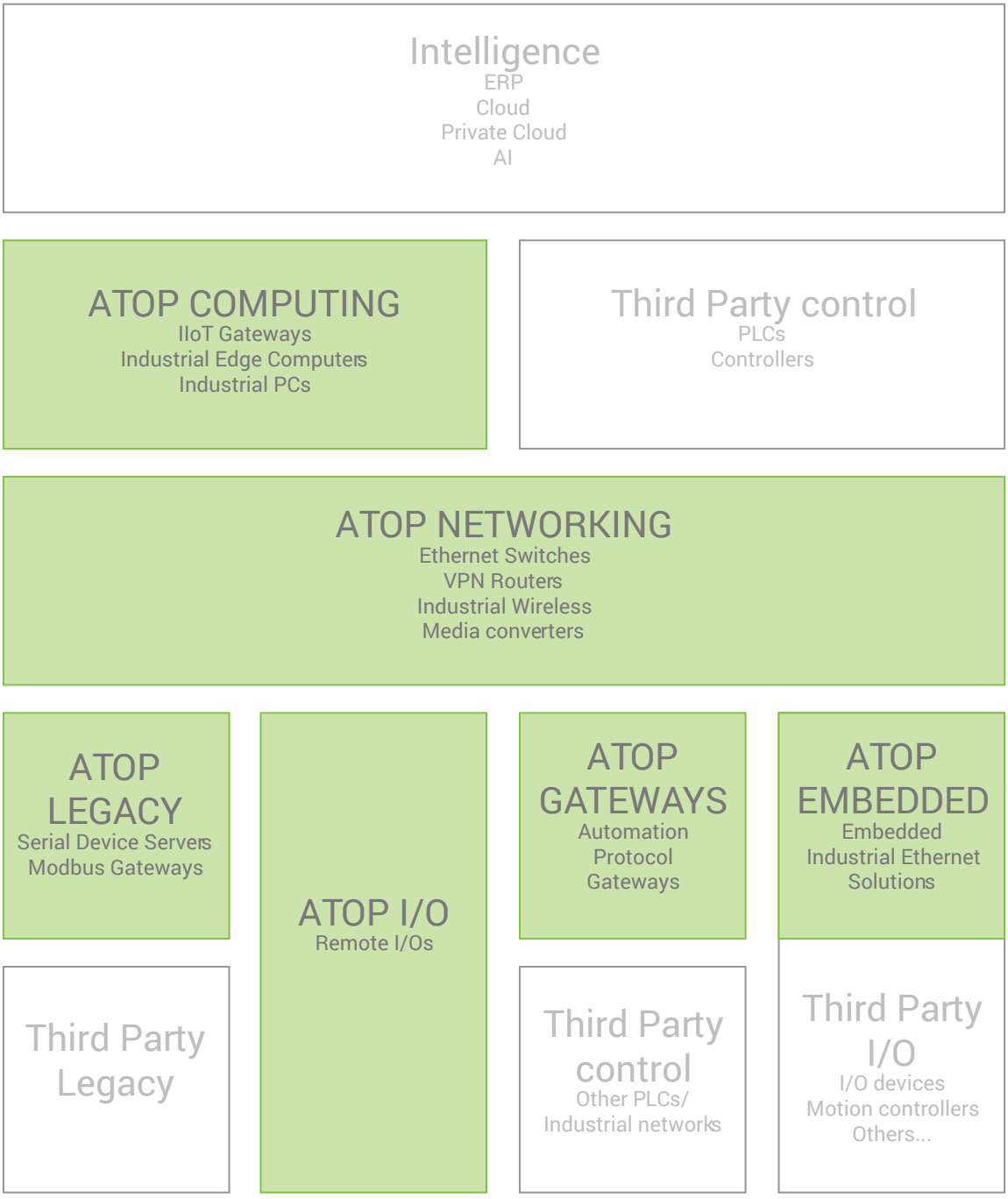
On Network Management, ATOP's leading industrial networking devices provide the backbone through which all information goes, with advanced additional features such as ERPS, RSTP and MRP Ring, QoS management, VLAN management, Link aggregation and port trunking (if required) as well as Layer-3 static and dynamic routing.


Reviews
Demands
Customer Orders
Consumers
Cloud
Cellular Gateway
PLC
Delocalized Automatic Production Unit or Distribution Center
CRM
Online shop
ERP
ISP
Backbone switch
Server
PLC
IPC/HMI
Profinet switch
Accounting/ HR Secure Switch
QA Secure Switch
Planning Secure Switch
Shopfloor secure switch
Serial server
Embedded Communication Chip
Embedded Communication Module
Realtime module
Protocol gateway
PC
PC
PC
PC
PDA
Printer
PC
Custom application
Actuator
Machine
Robot
Sensor
Headquarter
Office/Warehouse
Shop Floor

ATOP Factory Automation Solutions

ATOP Provides 360 Degrees solutions for Industry 4.0. From your Information Gateway to the cloud, no matter public or private, we empower businesses with IIoT connectivity through our Networking backbone (switches, VPN routers, Wireless and Wi-Fi mesh), field level actuators with ATOP Industrial Serial Device Servers and Modbus Gateways for Legacy equipment, Remote I/O, or directly inside the I/O device through our Embedded Industrial Ethernet Chips and Modules.

And if you need to bridge two different Industrial Networks, ATOP Gateways will help you overcome this challenge easily with high level of integration, seamless communication and reliability.



ATOP Computing

Need a shortcut to Industry 4.0? ATOP provides rugged, wide-temperature, industrial embedded ARM-computers to help your business benefit from intelligence and insight of cloud-based services.
With 9 different hardware platforms available, each one of those customizable in many more combinations, ATOP enables you to have a powerful C-programmable embedded computer, or a user-friendly Programming interface running Node-RED.

ATOP Networking

PoE? Profinet? Ring? Industrial EMC? Redundant power supply? Network Redundancy? Serial connectivity? No problem. ATOP's Industrial Networking brochure covers more than 100 different combinations for all industrial needs. Unmanaged and Managed switches, Field-Mount, Din-Rail or Rack-Mount serial servers, Wireless access points, Media converters and much more.

ATOP Legacy

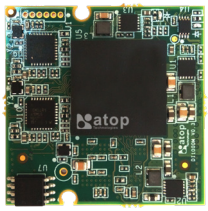
ATOP Serial Device Servers are designed for superior performance amid electrically extreme and climatically challenging industrial environments. While Entry Level Serial Servers offer both wired and wireless connectivity options, industrial serial servers act as a powerful platform to integrate legacy devices with modern network infrastructure. Compact Wi-Fi Serial Device Servers extend network range and Wireless Serial Devices servers deliver rugged, industrial strength wireless solutions for deployment in harsh environments.

ATOP I/O

ATOP's new generation IIoT I/O module, IO5202 Series connects digital, analog devices and sensors. It enables you to monitor, acquire and process data from remote sensors to control digital and analog outputs. It's a cost-effective solution for integrating existing applications into an IIoT framework, such as automated manufacturing, building management and control, and agricultural and irrigation systems.

ATOP Embedded

Trouble with Industrial Ethernet? Difficult to catch up with the innovations? Need to outsource heavy investments in non-core activities? Managing communication can become tedious and labor intensive. ATOP's communication modules provide a simple, cost-effective alternative to internal development. Let us provide the module and protocol-independent APIs and we will do the rest. You'll be able to enable your device to talk Profinet, Ethernet/IP, EtherCAT, Modbus, and be Industry 4.0-ready with miniscule development effort.

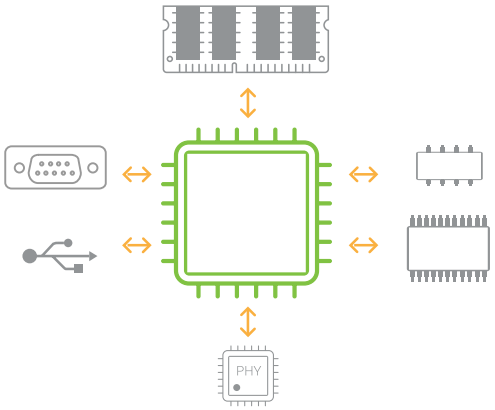


ATOP Gateways

ATOP's Industrial Protocol Gateways enable different industrial Ethernet protocols to work on the same network, including Profinet, Ethernet/IP, Modbus, EtherCAT and OPC UA. Designed to work in most demanding industries, the Gateways' come with high performance, low cost, seamless conversion, exception/error management and unsolicited event management for the protocols requiring them (such as DNP3).
Our range of Modbus Gateways, provides seamless conversion between Ethernet-based Modbus TCP and serial-based Modbus RTU/ASCII. There is also web-based configuration UI, so the users can select the serial interface easily.

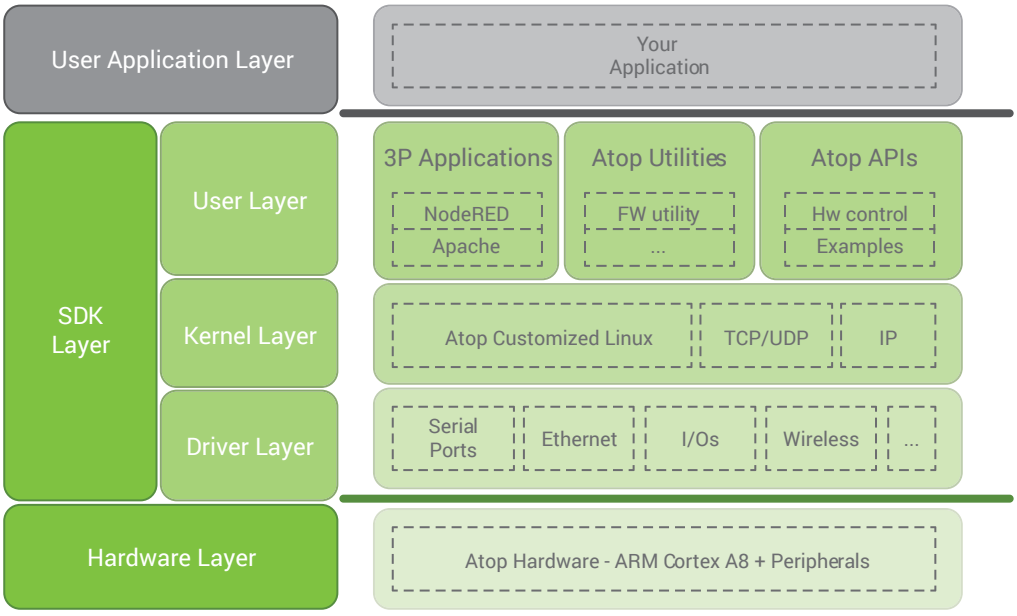
ATOP Computing

We seamlessly integrate the most reliable and in-synch hardware components with our developed software solutions to leverage the best in our hardware, we have 9 of them for wide-ranging occasions. **Powered with robust CPUs** and delivered in either **Standard SDK or Node-RED** version are all geared up to bring IoT and IIoT connectivity to your network by providing you with full hardware control for tailoring communications between devices, the Cloud, and your application requirements.
Devices are comprehensively tested in ATOP state-of-the-art technology center for maximum performance and reliability to withstand the harshest of environments.



Embedded ARM computers

ATOP provides rugged, wide-temperature, high performance, energy efficient industrial ARM based computing platforms. Our SDK-ready devices have extensive customization options for optimized precisions. SDK embeds customized Kernels and perfectly integrates stacks. It also enables a Webserver with a series of pre-loaded APIs along with countless Application Source Code examples and the supporting toolchain.

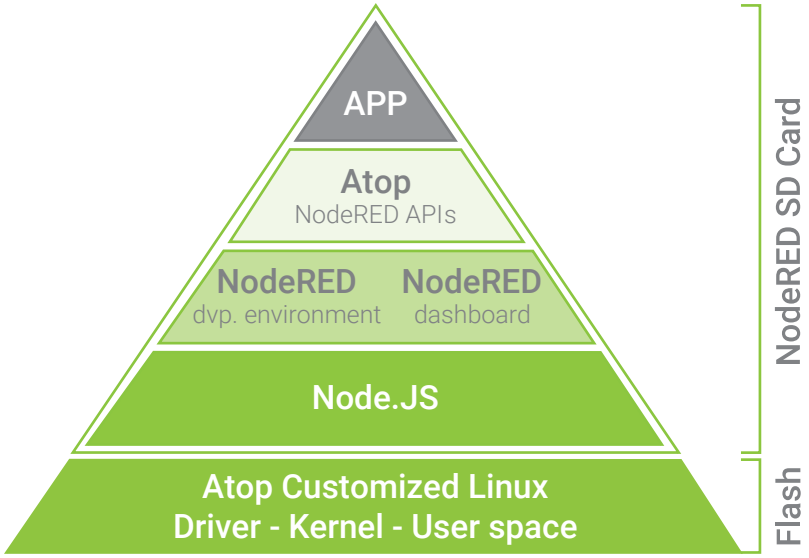


Industrial PCs

Encased in a rugged 2U rack-mountable form, our industrial computers support a wide operating temperature range of -40°C~85°C and Industrial EMC protection, allowing it to perform under a variety of environmental conditions, such as power input voltage, shock, drop and vibration.

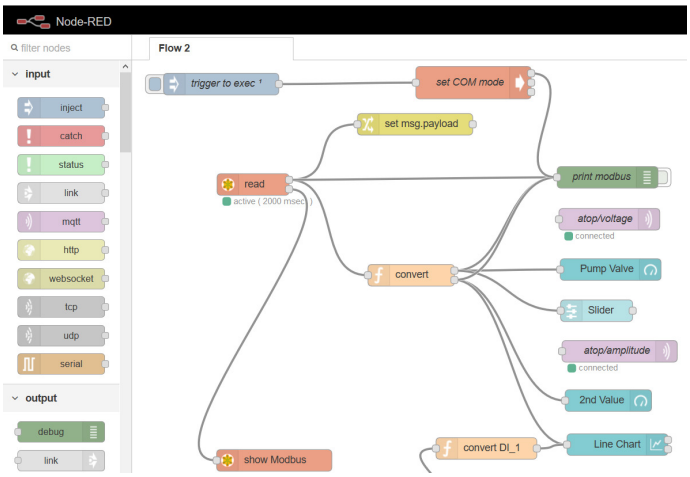
IIoT Edge Node-RED computers

On ATOP's devices, Node.JS and NodeRED run on ATOP's Customized version of Linux, so there is no hassle of having to install and port Node-RED to the platform. ATOP's customized version of Node-RED is supplied on SD and Micro SD cards or USB sticks. Node-RED will automatically run on ATOP's devices out of the box, so you won't have to write any startup script, which normally requires knowledge of both Linux and ATOP's platform to perform. This allows you to concentrate better on developing, without worrying about how to build an environment.

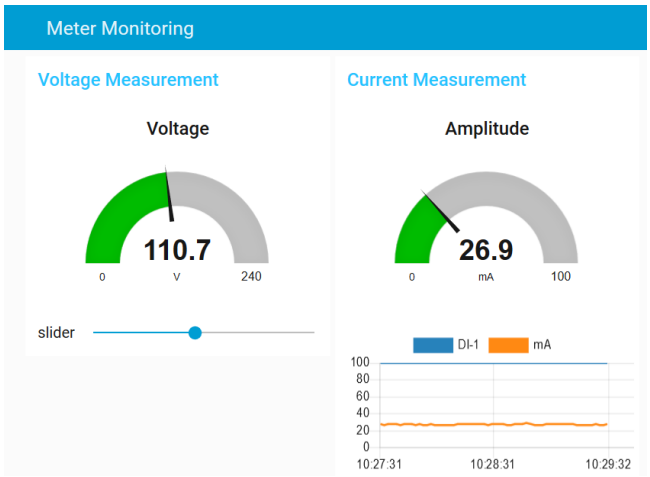


Node-RED is born as an advanced development tool to wire the IIoT. Software codes aka nodes make IIoT application development simpler, easier to repeat, and faster to scale. In many applications, Node-RED requires an extensive Linux development experience for successful integration. But not with ATOP's devices. The ATOP Node-RED embedded computers are equipped with a default user friendly Web UI that allows you to easily set up the device with all its related settings, such as IP Addressing, Serial Port configuration, 4G configuration, etc. It also enables a slew of advanced services that the device provides, such as VPN through IPsec, PPTP or OpenVPN, SNMP, NTP Server/Client and many more. And that's not all: you will also be able to access ATOP's reliable hardware with supremely designed and proofed applications.

NodeRED development enrivonment



NodeRED dashboard

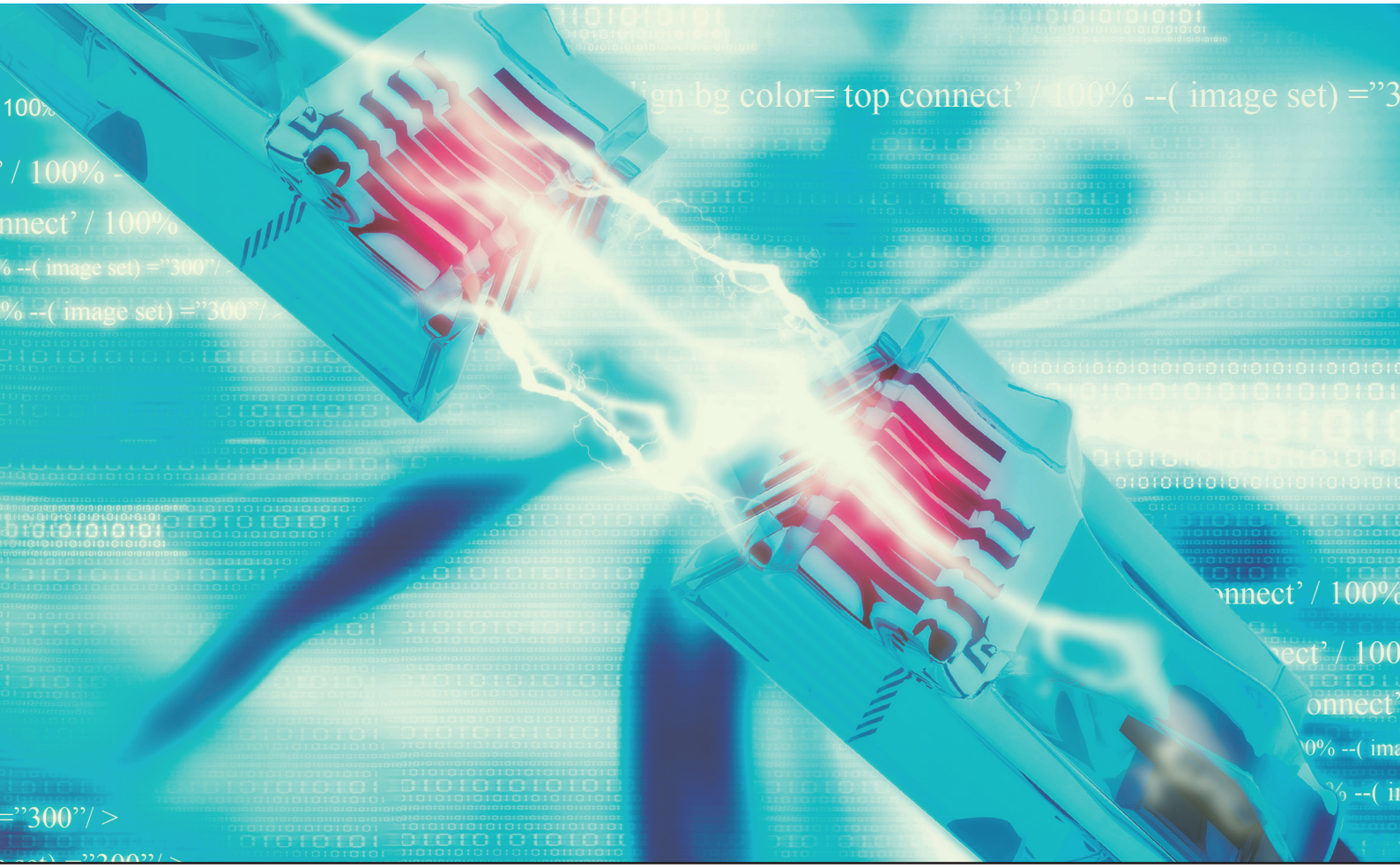


ATOP Networking

ATOP Networking catalogue covers more than 100 different combinations for all industrial needs. For the simplest of applications, ATOP offers Din-Rail Unmanaged Ethernet Switches, available in 10/100 Mbps, 10/100/1000 Mbps with RJ45 or SFP Fiber in Plastic or Aluminum housings that embed packet prioritization based on IEEE 802.1q as defined in the Profinet Specifications. Our Profinet CC-B compatible Managed Din-Rail or modular Rack-Mount Ethernet Switches will allow you to draw up the most appropriate network topology to support a trouble-free application and a reliable backbone to your network, all of them complying with the strictest Industrial EMC standards and are suitable for wide temperature operating conditions.

ATOP has brought together a comprehensive portfolio of industrial networking products to support the need of tomorrow's smart factories. We develop and constantly upgrade our product portfolio that broadly includes industrial Ethernet Switches, VPN Routers, Industrial Wireless and Media Converters. Our extensive 29+ years of experience, has helped us earn a reputation. We have always been at the forefront of networking hardware that delivers solutions to the problems that Industries face. Business benefits include reduced downtime, lowered operating expenditure cost, enhanced security and investment protection.

Driven by industry insights and customer mandates from all across the world and industries, our range extends from entry level to high performance hardware that operates in the harshest of environments under the most demanding network loads.
Our Industrial Ethernet switches come with advanced security features such as redundancy (through RSTP, ERPS, MRP Rings or high availability protocols such as HSR/PRP), QoS, VLAN management, LACP link aggregation/port trunking, and Layer-3 routing. Smart media converters provide reliable solutions to all conversions between Single-mode or Multi-mode fiber optics to Ethernet conversion, Industrial Wireless provide infrastructure for WLAN from entry level to to high-end multifunctional APs/ stations.



ATOP Switching: Unmanaged, Managed, PoE and Layer-3

Entry Level: ATOP's entry level din-rail mount Unmanaged Switches offer a reliable, robust but cost-effective solution to the most simple network topologies. IP30 rated, all of them are certified for Industrial EMC (EN61000-6-4 and EN61000-6-2). The items have plastic, steel or aluminum housing, all support redundant power-supply for enhanced safety and operate in temperatures ranging from -10 to 70 °C (Plastic Housing products support 0~60 °C operating temperature). Selected products are Prioritizing Profinet Packets and are equipped with the specific Profinet-Plug. Our products range from 4 to 8 Fast Ethernet or Gigabit Ethernet ports and selected versions have single-mode or multi-mode fiber-optic uplink.

Harsh Environments: ATOP's most advanced product line offers around 14 models available in up to 60 different possible configurations. Ranging from **4 up to 20 Fast Ethernet or Gigabit ports**, with minimum supported operating temperatures from -20 to +70 °C, **Relay Output**, **Redundant power input,** Profinet Packet Prioritization (for Unmanaged Switches) and **Profinet CC-B compatibility** (Managed Switches), our Harsh environment switches are the best choice to support high-demanding networks. Selected products offer **MIL-STD** shock, vibration, temperature and humidity performance and operating temperatures **from -45 to + 80 °C**.

ATOP's Managed Switches provide advanced network management features to maximize network performance and minimize downtime.

Want to know more? Detailed information is available into ATOP's Industrial Networking brochure, ATOP's Switch Product Selection guide or in the datasheets.

ATOP Wireless

ATOP's Wi-Fi Access points provide a reliable, robust, rugged and cost-effective solutions to Industrial applications that require contactless connection. Our single-radio, high-performance 2x2 MIMO IEEE 802.11 a/b/g/n Access Points provide a built in DIN-Rail mount Access point/Bridge/Client capability are designed to be fully operational between -20 and +60°C.

AW5900 and SW5901/02 Series embed a high-performing Industrial Wi-Fi Mesh Chipset, allowing you to build complex topologies relying on the self-healing capabilities of Wi-Fi mesh.

AW5200, our entry-level Industrial Wireless Access point provides IEEE802.11 a/b/g/n at 2.4GHz connectivity for data mining in a low-cost reliable platform that can also be used in combination with our IO5202 IIoT Remote I/O

Want to know more? Detailed information is available into ATOP's Industrial Networking brochure or in the datasheets.

ATOP Media converters and PoE Injectors

Ethernet to Fiber? SFP to Ethernet? No problem. **ATOP's Media Converters and smart media converters provide reliable solutions to all conversion between Single-mode or Multi-mode fiber optics to Ethernet conversion.** Available in different versions according to the cable length, selected versions embed a redundant power supply input for enhanced power fault security.

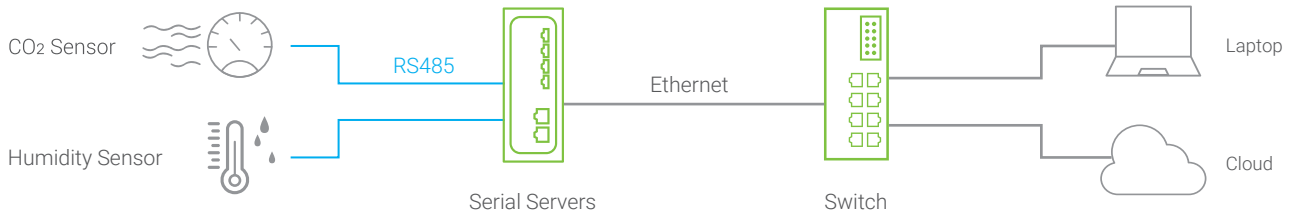
Our new, next-generation PoE injector allows you to provide high-power PoE up to 60W through the new IEEE802.3bt, with the advantage of a power input starting from only 12 VDC.

Want to know more? Detailed information is available into ATOP's Industrial Networking brochure or in the datasheets.

ATOP Legacy

Our hardened, rugged industry specific Serial Device Servers and Modbus Gateways ensure optimized operational safety and network reliability. Easy to install and configure, our serial server family enables precise monitoring and controlling of legacy serial devices via wired and wireless networks.

The product line provides plethora of operational modes to comply with your industrial automation needs. Our Modbus Gateways provide seamless conversion between Ethernet-based Modbus TCP and serial based Modbus RTU/ASCII. Our ruggedized Industrial Modbus Gateways are ideal for harshest of environments.



ATOP Serial servers

Available in field-mount, din-rail mount or rack-mount versions from **1 up to 16 ports** and **with different Operation temperature/EMC variants**, ATOP's serial server family covers all the need that you may have in easily converting Ethernet to Serial port (RS-232, RS-485, RS-422). **Using our Serial Manager Software configuration tool will make the set-up job of device easy and immediate.** If your application requires VirtualCOM, we provide a specific suite to make it fully functional within minutes.

Entry level:

Available in a rugged metal case with an optional 2kV magnetic isolation and operating temperatures ranging from 0 to 60 °C, **ATOP's entry-level serial servers provide the simplest but reliable Ethernet to Serial converter.**

Advanced:

ATOP's advanced serial device servers, available in 1 (field mount or DIN-Rail), 4 (DIN-Rail) or 8/16 (rack-mount) serial ports versions, provide the ultimate solution to your needs. Supporting operating temperatures up to -40/85 °C (exceptions apply), they provide Industrial EMC protection, Serial port isolation and high-performance. Selected versions can be PoE powered. If wireless connectivity (either 802.11 a/b/g/n or Cellular 3G/4G LTE) is what you need. Don't worry. ATOP has the solution for you too.

Want to know more? **Detailed information is available into ATOP's Industrial Networking brochure, ATOP's Serial/ Modbus/Protocol Gateway Product Selection Guide** or in the datasheets.

ATOP I/O

IIoT Remote I/Os

ATOP's new generation IIoT I/O module, IO5202 Series connects digital, and analog devices and sensors. It enables you to monitor, acquire and process data from remote sensors to control digital and analog outputs. **It's a cost-effective solution for integrating existing applications into an IIoT framework,** such as automated manufacturing, building management and control, agricultural and irrigation systems.


IO5202 with Digital Input/Outputs

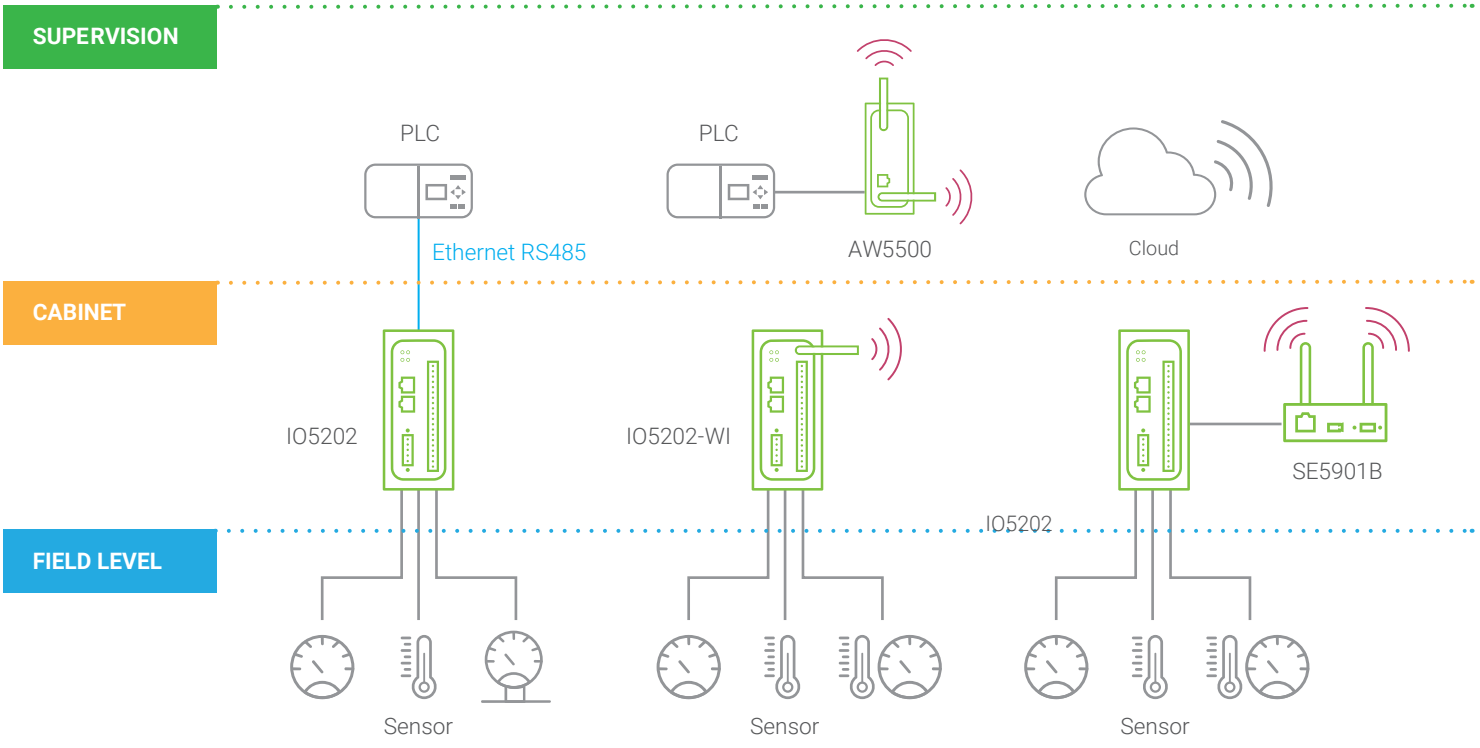

IO5202 with Analog Inputs


IO5202 with DIOs and Relays


IO5202 with Relays and Universal Inputs


IO5202 with Analog Inputs and Outputs

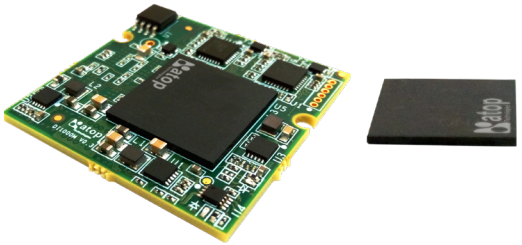
In situations where running cable is impractical, IO5202 WiFi-equipped version comes handy as a cable-free solution for widely disappeared devices and sensors. It also allows better scalability for operations that continue to evolve and grow.
The IO5202 Series supports numerous protocols, including **Modbus TCP/RTU/ASCII, MQTT, RESTful APIs** and SNMP. Using the intelligent processing and publishing features of the IO5202 Series, data can be polled, logged, or even automatically pushed when I/O statuses change. And **with RESTful API, data can be pushed to connect and interact with a public or private cloud servers**, which can be set up using the provided RESTful API and the user's own platform.

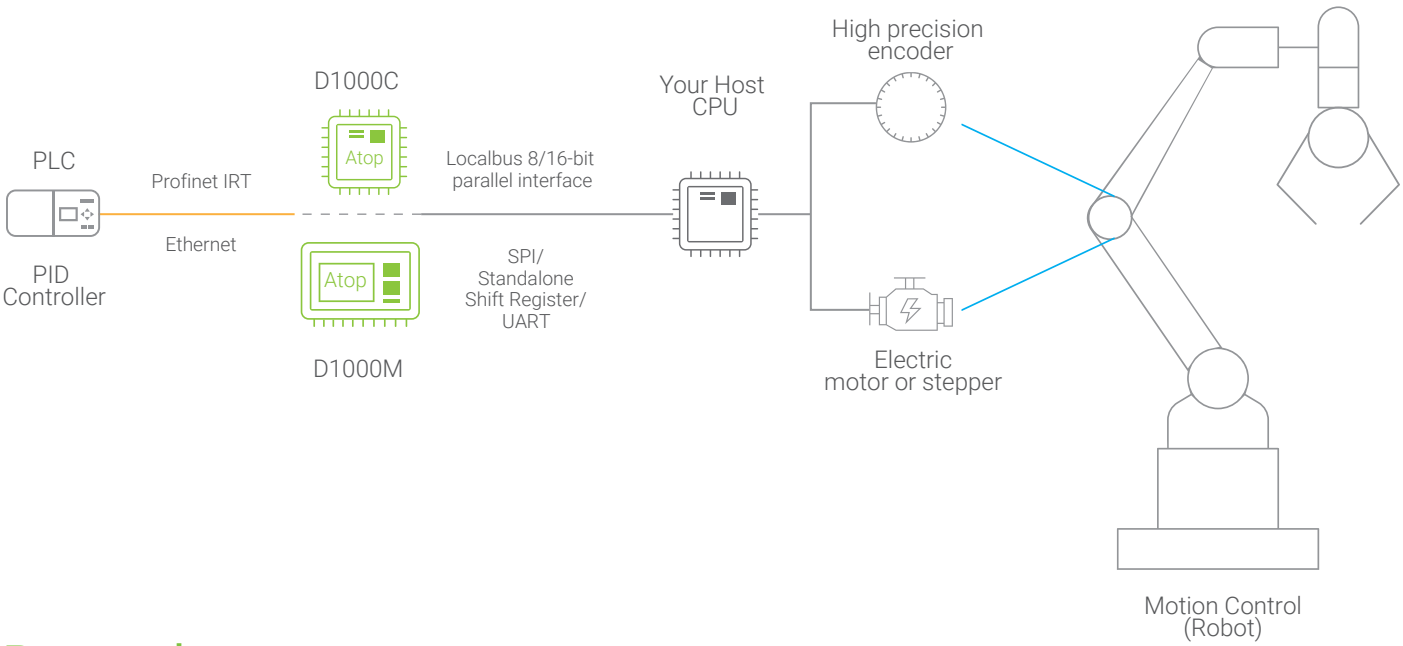


ATOP Embedded
Industrial Communication solutions

ATOP's embedded real-time protocol interface modules are the right choice to allow easy, cost-effective and standardized protocol support for your field equipment**. Forget about a dedicated and expensive Industrial-Communication team**. With ATOP, being fully up-to-date with the communication standards will be flexible and your company will be allowed to enable your robot, machine or I/O with Industrial Ethernet.

Being a hardware-based solution, **ATOP's chips and modules can provide extremely fast processing speed and guarantee the deadlines set in Real-Time protocols,** making our products an excellent choice for all the applications requiring such performance, such as Motion-Control, High-Frequency sampling, etc..





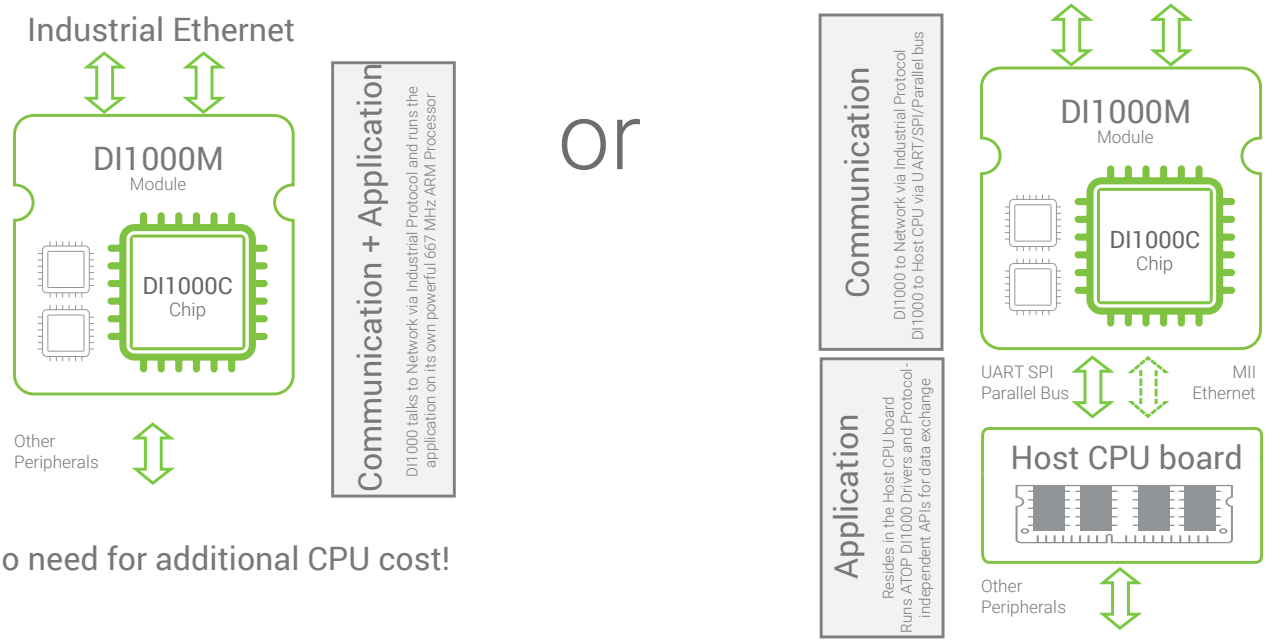
Protocols

ATOP's Industrial Ethernet Embedded solutions are certified for the following Fieldbus/Industrial Ethernet Protocols

PROFINET® Modbus EtherNet/IP™ EtherCAT®

Powerful Processor and Flexibility

ATOP DI1000 is a robust Industrial Ethernet Interface series comes with a powerful 667 MHz ARM Core CPU. It enables a "classic" communication module in operating mode, or on your request has the capability to run the application on the ARM core. Thus, allowing You to design your own device without the need of an additional, expensive, Host Application CPU. There is no additional or related cost in both development and components such as RAM and Flash.

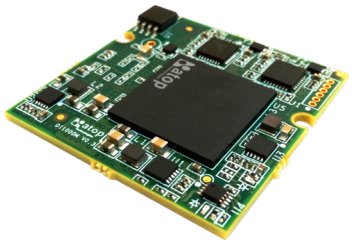


No need for additional CPU cost!

Chip Solution

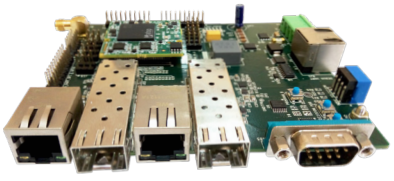
For the most advanced and quantity intensive applications, ATOP's Industrial communication Chips – along with design reference boards and the APIs- will provide your device with much needed communication capability.

Module Solution



For applications smaller in volume, and if you'd like to be flexible to change from one protocol to another, ATOP's modules may be the right choice for you. Sharing a common hardware and software interface, they can be easily integrated into the device. And if you'd like to change the communication protocol… simply replace it! No additional software implementation is required.

Product Development Board and Support



Comprehensive support quality acts as enablers for successful implementation. Here at ATOP, we are committed in consistently delivering the best service and support in the implementation. This includes hardware reference designs, a Implementation development and testing board, source code examples and more.

Do you want to know more? **Datasheets and detailed information available.** For questions or pricing please contact your local ATOP representative.`

ATOP Industrial Protocol Gateways for Legacy Retrofitting

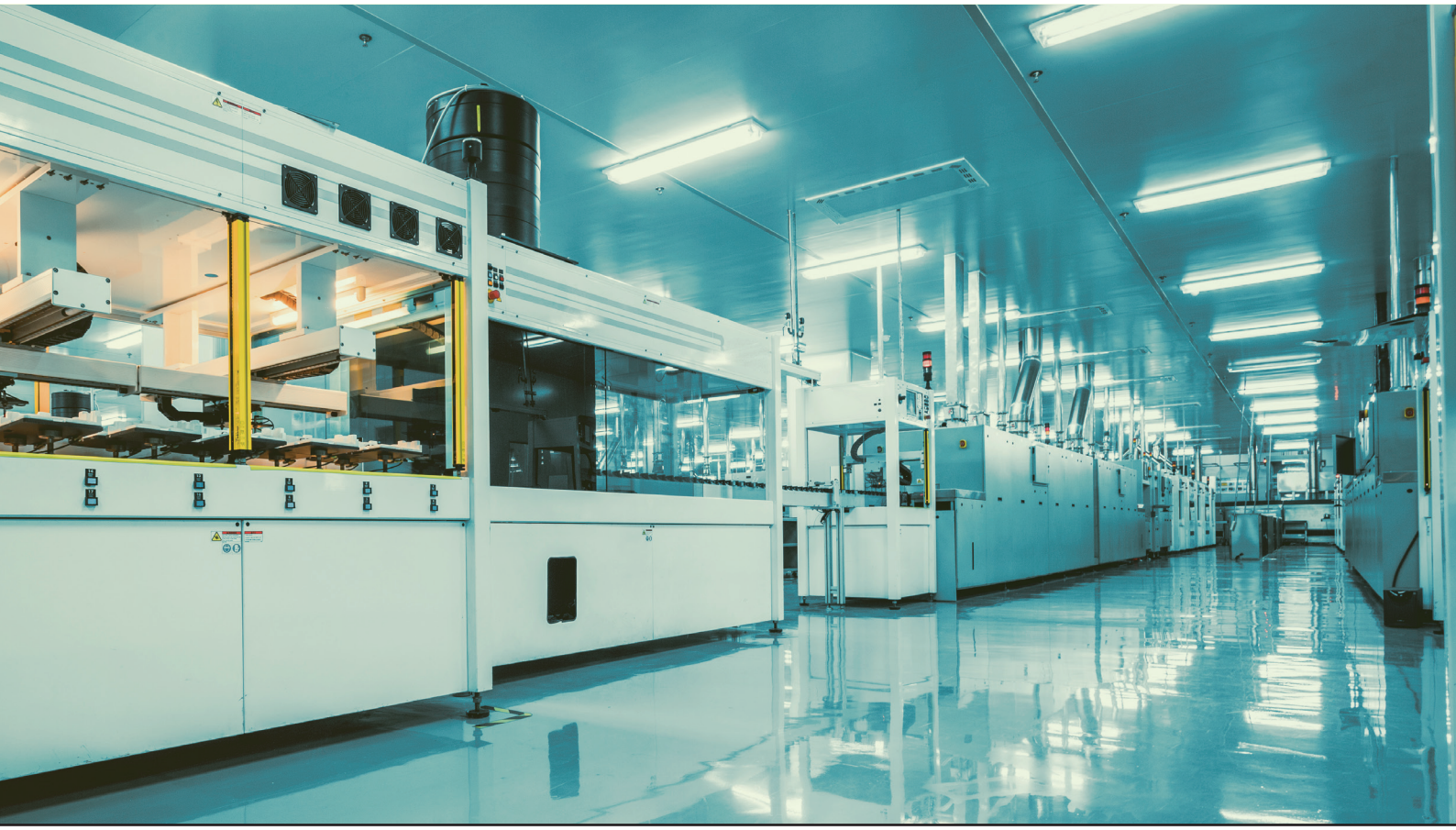
Times change and technologies evolve. Not long time ago, Serial-based communication was the standard inside the Industry.

Investments in equipment, machinery, robots, PLCs made earlier than a decade ago were mainly serial or CAN-based. Upgrading or enhancing existing production lines can be exhausting and without much bottom-line benefits. Since modern industry needs more data, faster, the standards evolved and equipment using new-technologies won't always be compatible with older equipment. Upgrading perfectly-running equipment due to network or protocol constrains can be an extremely heavy financial pain. Readapting existing equipment into a new layout can also be almost impossible.

In the world of Industry 4.0, it's the system integration and interoperability that can make all the difference. How to bring Profinet and Modbus together? How to supervise an Ethernet/IP-based architecture with OPC UA? ATOP has the right solution for you.

ATOP's Protocol Gateway family has been specifically designed in order to make seamless integration easy and provide a fast and flexible solution to upgrade or retrofit an existing network. A powerful hardware platform with a stable and reliable software will manage the translation from one specific protocol to another specific protocol. A user-friendly configuration tool will help the Customer or the System Integrator to map data points and commands within minutes, enabling the customer to manage changeovers, upgrades or integration in a fast and cost-effective way.

Do you want to know more? **Detailed information is available into ATOP's Serial Server/ Modbus Gateways and Protocol Gateways Selection guide**



Industrial Protocol Gateways - Supported protocols

By integrating new and legacy devices into new and expanding networks, ATOP's Protocol Gateway product range offers a configurable product that can be built in 9 different hardware versions and in more than a hundred protocol combinations. Modbus RTU, Modbus TCP, Profinet RT/IRT, DNP3.0 Ethernet, DNP3.0 Serial, IEC 60870-5-101, IEC 60870-5-103, IEC 60870-5-104 and IEC 61850 devices and PLCs and PLCs can now be seamlessly integrated in a single network.

All products are embedded with Security. Now supporting VPN over **PPTP**, **IPSec** or **OpenVPN** in case your application requires data to travel through the intenret. Through ATOP Protocol Gateways, remote or unmanned site monitoring will be set up in a heartbeat.

Protocol	Interface	Features
Modbus TCP	Ethernet	Client/Server
Modbus RTU/ASCII	Serial	Master/Slave
DNP3.0	Ethernet	Client/Server
DNP3.0	Serial	Master/Slave
IEC 60870-5-101	Serial	Master/Slave
IEC 60870-5-103	Serial	Master/Slave
IEC 60870-5-104	Ethernet	Client/Server
IEC 61850	Ethernet	Client/Server

Industrial Protocol Gateways
ATOP's Hardware flexibility

From entry level to advanced hardware bases, to support the customer, ATOP offers combinations of all supported protocols on 9 different hardware platforms, enabling the customer to choose among hundreds of different products! Din-Rail, Rack-mount, SFP, Ethernet, TB5 or DB9 serial connector are available.

All products are embedded with Security. Now supporting VPN over **PPTP**, **IPSec** or **OpenVPN** in case your application requires data to travel through the intenret. Through ATOP Protocol Gateways, remote or unmanned site monitoring will be set up in a heartbeat.

Do you want to know more? Datasheets and detailed information available into ATOP's Protocol Gateways brochure. For questions or pricing please contact your local ATOP representative.

Hardware	Mount	Ethernet Ports	RS-485 RS-232 RS-422 ports	Temperature range	Additional features
PG5901	DIN-Rail	2 (RJ45)	1 (TB5 or DB9)	-40/+85 °C	PoE-powered [optional]
PG5901B	DIN-Rail	1 (RJ45)	1 (DB9) or 2 (TB14, IO version only)	-40/+70 °C	4G LTE or 3G connectivity DI/DO [opt], Battery [opt]
PG5904D	DIN-Rail	2 (RJ45 or SFP)	4 (TB5 or DB9)	-40/+85 °C	PoE-powered [optional] Serial Isolation [optional]
PG5908	Rack-Mount	2 (RJ45)	8 (RJ45)	-20/+70 °C	Serial Isolation [optional]
PG5916	Rack-Mount	2 (RJ45)	16 (RJ45)	-20/+70 °C	Serial Isolation [optional]
PG5908A	Rack-Mount	6 (SFP or RJ45)	8 (TB5 or DB9)	-40/+85 °C	Serial Isolation [optional] IEC61850-3 certification
PG5916A	Rack-Mount	6 (SFP or RJ45)	16(TB5 or DB9)	-40/+85 °C	Serial Isolation [optional] IEC61850-3 certification
PG5900A	Rack-Mount	6 (SFP or RJ45)	-	-40/+85 °C	IEC61850-3 certification






Modbus Gateways

Since its introduction, all over the world, due to its quick configuration, flexible deployment and easy troubleshooting capabilities, Modbus has become one of the most sought after protocols for eliminating complicate processes, quickly connecting different protocols, making older equipment more functional and simplifying networking activities. Modbus RTU (through serial connection) and Modbus TCP (through Ethernet networks) are often used in the backbone of industrial automation, substation automation, and building automation. Because of its lightweight and broad market penetration, ATOP creates a specific product line for Modbus devices. The slow migration of the communication standard from serial-based (RS-232, RS-485, and RS-422) devices to Ethernet-based devices introduces the need of smart converters.

Our Range

From simple to complex applications, ATOP has 10 products supporting Modbus in a wide variety of options. ATOP's entry-level products provide seamless conversion of Modbus RTU to Modbus TCP with almost no configuration required. ATOP's devices are available from one to sixteen serial ports and with flexibility in their installation using DIN-rail, Field Mount, or Rack-Mount. An advanced LTE version also enables recent high-speed wireless communication for Modbus protocol.

Our products are enhanced with harsh environment operational capability, vibration resistance, power or serial port isolation for equipment and device protection, redundant power supplies, and many more special options. For the most critical application, ATOP provides additional reliability through redundancy function and supports enhanced responsiveness through concentrator function

Concentrator function

Data concentrator function is a unique feature on ATOP's Advanced Modbus Gateways. This feature is ATOP's proprietary mechanism for responsiveness enhancement. Generally, a Modbus Gateway is working in the following manners. First, it waits for a master device's request, then it has to convert and relay information to a field device. Once a response is returned from the field device, the response is then converted and relayed back to the master device.

This has significant negative impact on the responsiveness. Instead, ATOP's Advanced Modbus Gateways with data concentrator function will continuously poll (at an interval specified by the customer) IEDs autonomously and store the data in their internal memory waiting for master device's requests. Once the request arrived, the return data would be retrieved from the internal memory of the Modbus Gateways.

This has several positive implications on the system performance: the master device may need just one connection and one query to get all data at once, the response time will be dramatically reduced, and many different data structures can be accessible based on specific need.

• Want to learn more? Datasheets and detailed information are available in ATOP's Product Selection Guide.

Redundancy function

ATOP's Advanced Modbus Concentrators can be embedded with additional redundancy feature implemented through ATOP's proprietary communication protocol. For instance, a number of IEDs can be connected in multiple chains through serial ports where the primary Modbus gateway and the secondary Modbus gateway are connected on different ends of the chains as shown in the figure below. There can be an Ethernet link which could be either fiber or copper connection between the primary gateway and the secondary gateway. Both primary and secondary gateways may be further connected to a master through different redundant rings.

In normal situation, the secondary gateway will be silent, listening, and recording the data. In the event of a network breakdown, one of the gateway that is still reachable will take over communication with the master and relay back the link requested data to the master together with a link failure notification. One the other hand, if there is a serial link failure the secondary gateway will autonomously poll the missing data and update the primary gateway memory ensuring the data relayed to master is complete.

This feature enables the customer to manage the network with much fewer down-times than before and provides additional safety feature protecting the utility or the substation from accidental or intentional failure coming from the outside of the system.

Modbus Gateaway

Category	Picture	Model	Ethernet Ports	Serial ports	Mount	Isolation	Concentrator	Redundancy	Power Supply	Additional Features
Entry Level		MB5201	1	1	Field-Mount	No	No	No	1xDC	
Industrial		MB5901	2 RJ45	1	DIN-Rail	No	No	No	1xDC	PoE PD version available
		MB5901E	2 RJ45	1	DIN-Rail	Yes	No	No	1xDC	
		MB5904D	2 RJ45 or 2 SFP	4	Din-Rail	Optional	No	No	2x DC	PoE PD version available
		MB5908/ MB5916	2 RJ45	8~16 RJ45	Rack-Mount	Optional	No	No	AC/DC	
		MB5901B	1 RJ45	1 + 1 (RS-232, IO version only)	Din-Rail	Optional	No	No	DC	3G-4G connectivity
Advanced		MB5904D-CT	2 RJ45 or 2G SFP	4	Din-Rail	Optional	Yes	Opt	2x DC	PoE PD version available
		MB5908-CT/ MB5916-CT	2 RJ45	8~16 RJ45	Rack-Mount	Optional	Yes	Opt	AC/DC	
		MB5900A MB5908A-CT MB5916A-CT	6 RJ45 or SFP	0 8 16	Rack-Mount	Optional	Yes	Opt	2x AC/ DC/ HV DC	IEC 61850-3 certification

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