Advantech PoE Total Solution

PoE Introduction | User Scenarios | Product Offerings

Advantech Industrial IoT

Intelligent Connectivity

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What is Power over Ethernet (PoE)?

01

What is Power over Ethernet (PoE)?

Power over Ethernet (PoE) is a technology that allows network cables to carry electric power

With PoE enabled, only a network connection is required
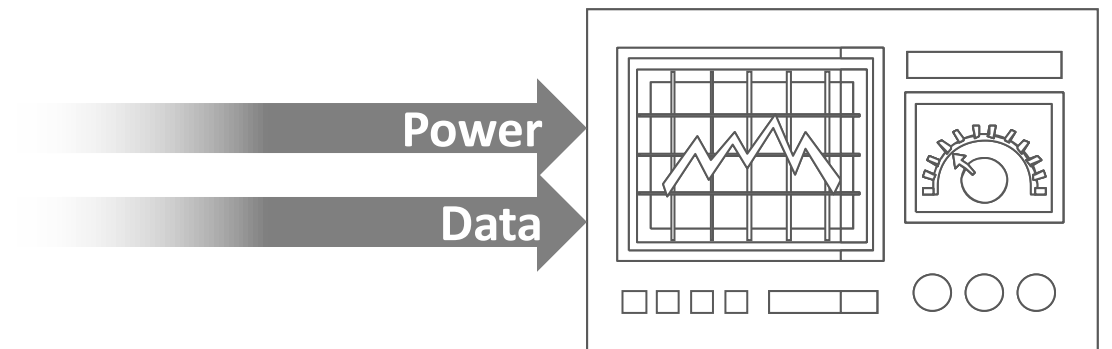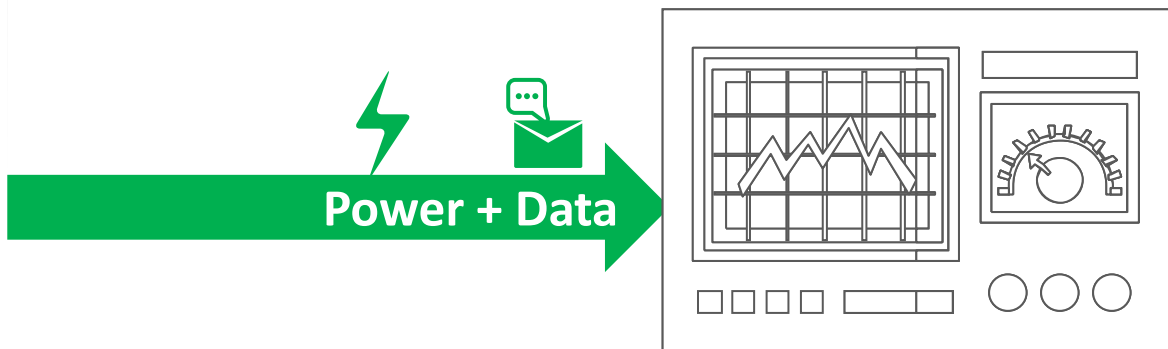
- **With PoE**
  One cable, two functions:
  electric power + data at once

  - Lower cable costs
  - Less space needed
 - Releases I/O space for other ports

- **Without PoE**
  One cable for electric power, another for data transmission

  - Higher cable costs
  - Deployment space needed
  - Occupies I/O space on device

Power + Data

Power

Data

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PoE Standards

| Standard	P.S.E maximum output power	P.D. maximum input power	Cable category	Cable length	Power over
IEEE802.3af	15.4W	12.95W	Cat3	100m	2 pairs
IEEE802.3at	30W	25.5W	Cat5e	100m	2 pairs
uPoE	60W	51W	Cat5e	100m	4 pairs
Power over HDBaseT (PoH)	Type 2: 60W Type 3: 95W	Type 2: 52W Type 3: Depends on cable length	Cat5e/ Cat6	100m	4 pairs
IEEE802.3bt	90W	71.3W	Cat5e/ Cat6	100m	4 pairs
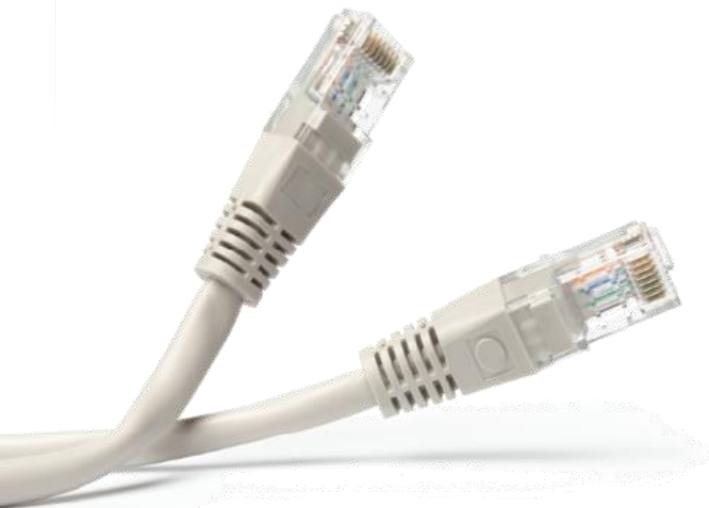
Device Role in PoE Technology

In the PoE world, there are two roles: PSE and PD
Some devices (such as an Ethernet switches) can be PSE and PD

- **PSE= Power Sourcing Equipment**
  Power sourcing equipment (PSE)
  is a PoE provider. It <u>delivers</u> power and
  data to PDs .

- **PD= Powered Device**
  A powered device (PD) is a PoE receiver.
  It <u>receives</u> power and data from PSEs.
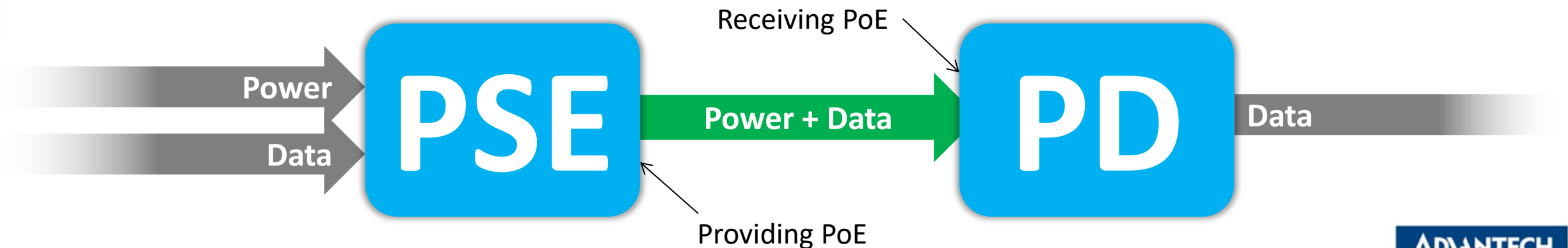
Power

Data

PSE

Power + Data

Receiving PoE

PD

Data

Providing PoE

PoE User Scenarios in Vertical Markets

02

Surveillance | Factory Automation | Food and Beverage
Network Infrastructure Adjustment | Remote Areas | Fiber Optic Applications

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Surveillance Scenario:

A smooth transition to the IoT era is a major task for every manager. Technology and ideas are evolving rapidly, yet facilities and infrastructure are often unchanging. **If you are expanding your investment with multiple devices that need electric power, there's a high possibility you don't have enough power and network resources.**

Solution:

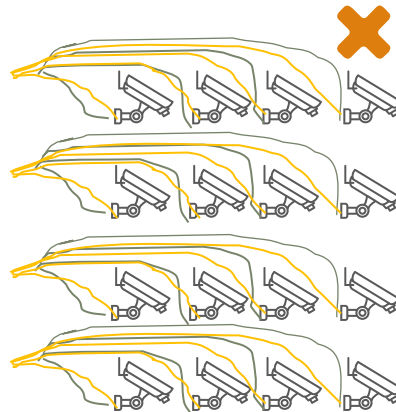**Advantech Ethernet switches provide up to 28 ports for PD devices** such as IP phones or IP cameras.
Such an expansion requires only 1 power and 1 Ethernet cable to save on wire redeployment time, effort, and cost.
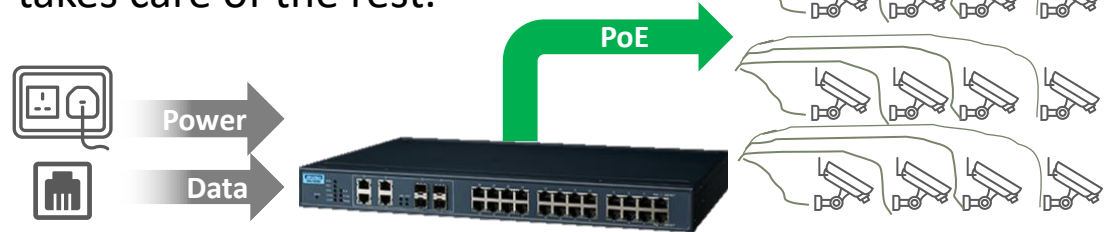
Without PoE	With PoE

16 IP cameras:
- 16 power resource
- 16 Ethernet resource

The building wasn't designed to accommodate that many devices when it was built.

You just need one power and one network plug socket from the building. The Ethernet switch takes care of the rest.

Power

Data

PoE

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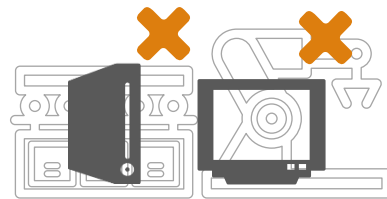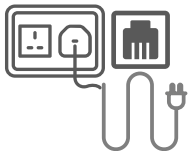
Factory Automation Scenario:

A traditional manufacturing site is equipped with isolated devices that don't communicate effectively with one another. The site relies on staff examination and maintenance to ensure all equipment works coherently. In the IoT era, edge computing and human-machine interfaces are more important than ever in replacing manual maintenance and management.

Solution:

Advantech edge data controller sensing gateways and web browser terminals with PoE (PD) functionality allow for painless device deployment even in corners with no extra power and network cables. With PoE (PSE) resources, deployment is as easy as "plug-n-play."
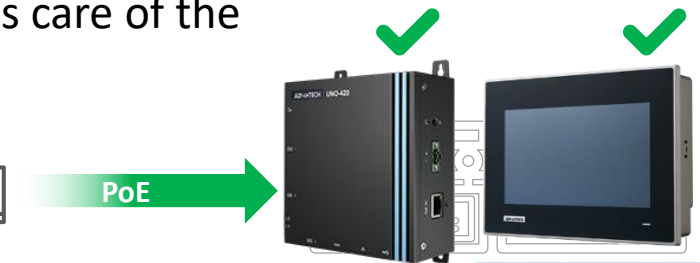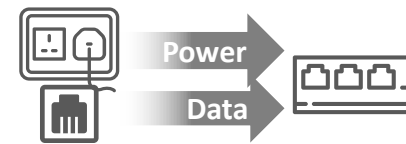
Without PoE	With PoE
Installing a new device requires extra power and network socket needs, **placing a huge burden on buildings, especially remote sites.**	**Only one power and one network plug socket from the building is required.** The Ethernet switch takes care of the rest.

Power

Data

PoE

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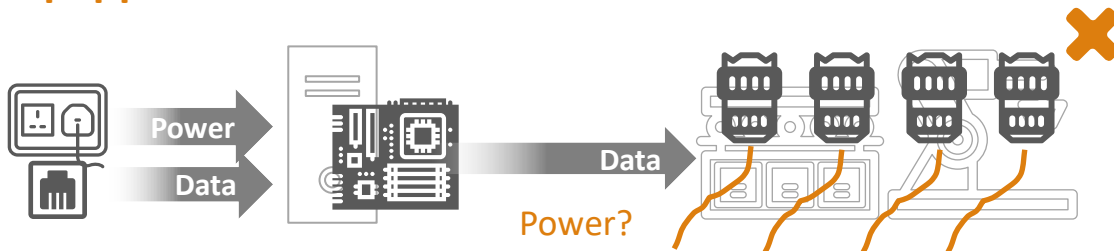
Food and Beverage Scenario:

Machine vision is widely adopted in food and beverage product quality assurance because it provides high precision at speed to shorten processing time and increase productivity. To embracing these benefits, **installing a sufficient amount of intelligent cameras, with power and network inputs, is necessary.**

Solution:

Advantech frame grabber (PSE) and industrial camera(PD) both support PoE functionality. The frame grabber serves as a power and network service to the industrial camera. Setting managers are freed from having to dig out more power and network holes.

| Without PoE	With PoE
When the frame grabber serves no PoE function, the connected industrial cameras **require other power inputs which the factory might not be sufficiently equipped with.**	As the frame grabber and industrial camera both support PoE function, no extra power and network hole is needed. **One single wire satisfies both needs.**

Power
Data
Data
Power?

Power
Data
PoE
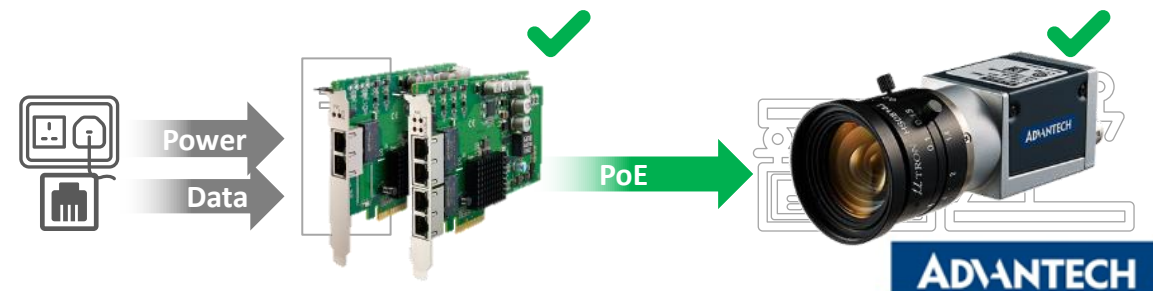
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Budget Restriction Scenario:

Every project has its own budgeting concern. For small business managers, replacing existing devices or **purchasing new ones with the latest technology** is often cost prohibitive. Maximizing the value of current assets is the key.

Solution:

Advantech industrial injector, splitter, and extender are network infrastructure devices that adjust your current power and network wire deployment for a PoE-friendly environment. These best-value components combine power and network cables into one, splitting PoE cables into power and network cables, or extending the data service distance.

Injector	Splitter	Extender

An injector **combines power and data into one wire**. Best used when there is PD but no PSE.

A splitter **divides PoE input into power and network cables**. Best used when the end device is not a PD.

A PoE extender serves as both PSE and PD, **extending PoE reach to 100~800 meters away** and widening power and data coverage with ease.

PoE Product Offerings

03

- Wired & Wireless Network Connectivity
- Machine Vision
- Edge Data Controller Sensing Gateway
- Web Browser Interface

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Advantech PoE Offerings: Overview

Wired & Wireless Network Connectivity

PSE & PD — Industrial Ethernet Switch

PSE & PD — Industrial Cellular Router

PSE & PD — Injector/ Splitter and Extender

PSE & PD — Media Converter

Edge Computing & Machine Vision

PD — Industrial Camera

PSE — Frame Grabber

PD — Web Browser Terminal

PD — Edge Data Controller Sensing Gateway

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Advantech PoE Offerings: Network Communication

View product page

Serves as:
PSE

Best for:
Multiple devices deployed in places where power and network resources are limited

Ethernet Switches:

- Advantech's PoE switches **provide 5~28 multiple switch ports with 15 ~ 90W (EKI-7712G-4FMPI) per port for powering IEEE802.3af/at/bt-compliant devices (PD)** via an Ethernet cable to eliminate the need for additional wiring

- The product portfolio includes **managed and unmanaged** Ethernet switches, supporting both **Din-Rail and rack mount** mounting methods and optional **fiber or combo ports,** to fulfill all sorts of wire deployment needs

- PoE switches come with **compact metal housing that has an IP30 rating,** making them suitable for use in dusty industrial environments

- Advantech's PoE products **are easy to install** and deliver reliable remote power to your devices, thus offering an industrial-grade outdoor PoE switch with a rugged housing for use in harsh environments
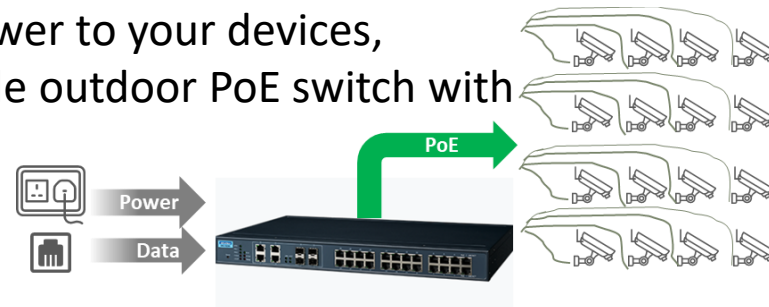
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Advantech PoE Offerings: Network Communication

View product page

Serves as:
PSE
PD

Best for:
Deploying new devices in places where wired network connectivity is almost impossible

Cellular Router:

- PoE (Power over Ethernet) versions of SmartFlex 4G/LTE cellular routers **simplify installation and reduce wire connections** to only Ethernet cables without the need for a separate power cable or power supply

- **The first version, with PoE PSE** (Power Sourcing Equipment) has the capability to **provide power for connected devices** such as IP cameras and Wi-Fi access points through the router. Both PoE and PoE+ are supported on two Ethernet ports of the router.

- **The second version, supporting PoE PD** (Powered Device), allows the router to be powered over Ethernet by another PoE PSE device

- Various models are available for the EMEA, NAM, LATAM, ASIA/Korea and Australia regions

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Advantech PoE Offerings: Network Communication

View product page

Serves as:
PSE
PD

Best for:
Quickly and economically adjusting current network infrastructure to PoE environment

Injectors, Splitters, and Extenders:

- Advantech's PoE injectors, splitters, and extenders are designed to **provide network operators with the most compact, reliable solution** for connecting intelligent devices into existing networks and equipment.

- Supports power injection over Ethernet with **PoE, PoE+, PoE++**

- Latest generation, with **Mega PoE of IEEE 802.3bt, features up to 90 watts**
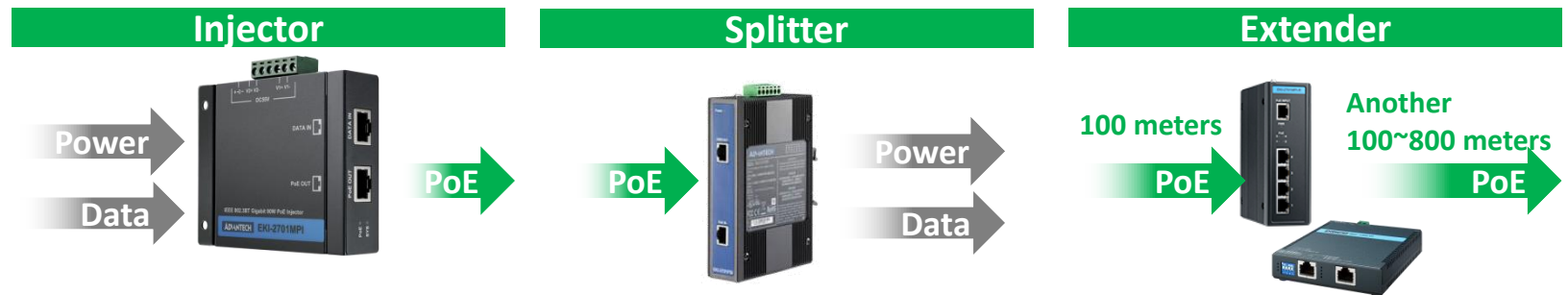
Injector	Splitter	Extender

Power
Data
PoE

PoE
Power
Data

100 meters
Another 100~800 meters
PoE
PoE

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Advantech PoE Offerings: Network Communication
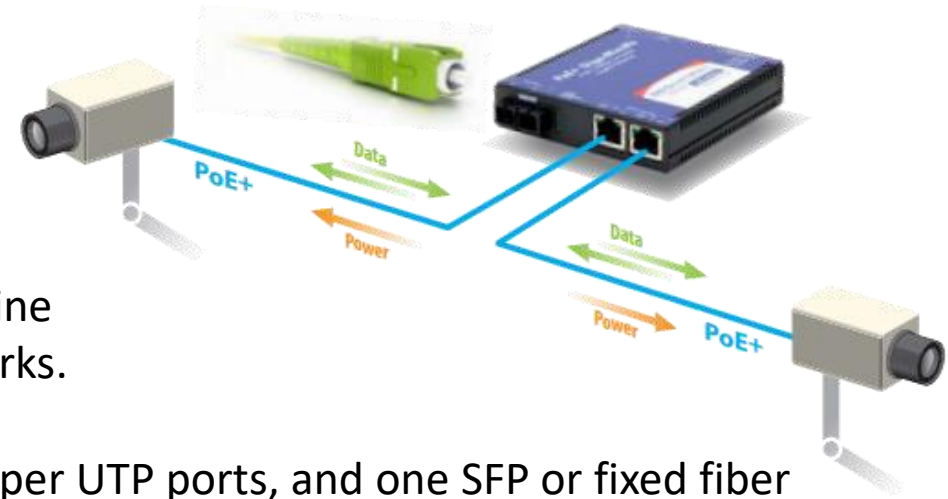

View product page

Serves as:
PSE
PD

Best for:
Quickly and economically adjusting current network infrastructure to PoE environment

Fiber/ Copper Media Converter:

- Multi-port media converters support both IEEE 802.3at (PoE+) and IEEE 802.3af (PoE) standards. The plug-and-play and PoE/ PoE+ capability features make this product line a valuable solution for Ethernet networks.

- Featuring two 10/100/1000Base-T copper UTP ports, and one SFP or fixed fiber transceiver for network connection, the PoE media converters serve as Power Source Equipment (PSE) devices that support a total power budget up to 60 watts.

- The IMC-390 series is capable of powering up two Powered Devices (PD) over standard CAT5 (or higher level) cable, whereas the IMC-380 can power one PD device over one copper port while transmitting data over the other port.

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Advantech PoE Offerings: Edge Computing

**UNO-420 Powered Device Sensing Gateway**

ESRP-PCS-UNO420

Digital Communication
(data acquisition & digital control)

Digital Output Alarm | Switch | Lighting

Communication Protocols
(e.g., RS-485/Ethernet)

HVAC | PLC | Water Pump | Power Meter

TPM 2.0

PoE

Programmable IO

View product page

Serves as:
PD

Best for:
PLC-to-cloud gateway deployment at places where power network resources are limited
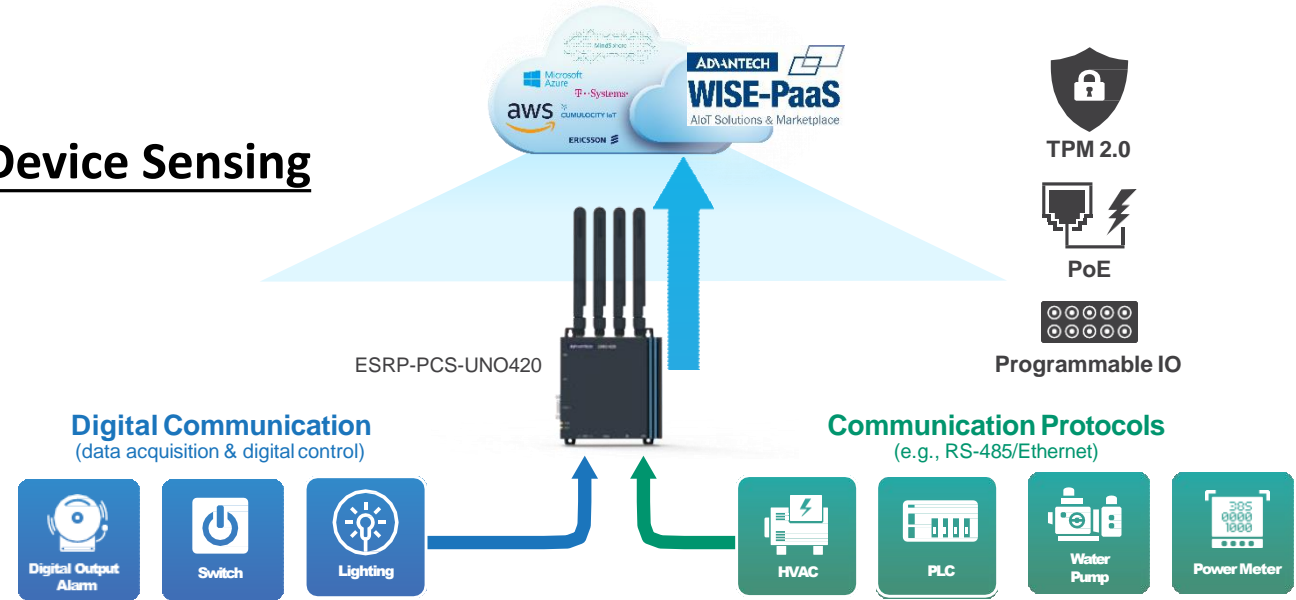
- Ensures easy installation in awkward or remote locations that may be difficult to reach with a power cable. UNO-420 is designed with both PoE PD/ DC support.
- Flexible programmable GPIO supports both 8-channel ADC & DAC to enhance the flexibility in power distribution in harsh environments
- Compact square size 125 x 125 x 50 mm with wall mount kit support
- Protocol converters supports 200+ different PLC for OT data acquisition & conversion into IT protocols: MQTT & OPC UA

Power

Data

PoE
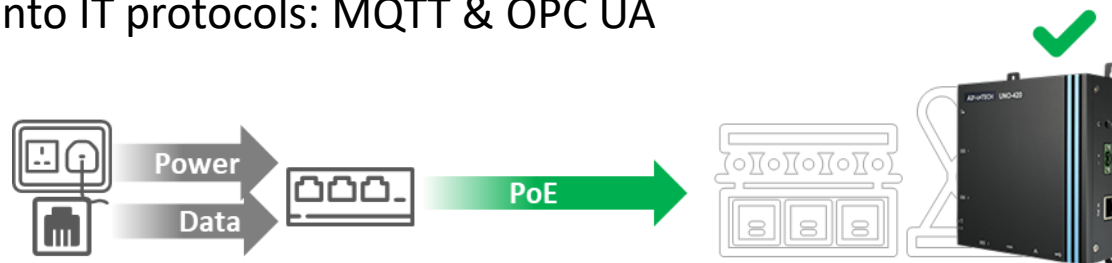
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Advantech PoE Offerings: Web Browser Terminal

PoE Terminal HMI:

TPC-71W-N10PA & 98R3T71W000

TPM 2.0

PoE

Information Visualization
(HTML5 Browser & Web-based HMI)

Reporter | Signage | Digital Meter

Communication Protocols
(data acquisition & digital control)

HVAC | PLC | Motor

Serves as:
PD

Best for:
Remote browser and HMI deployment in places where power network resources are limited

View product page

- TPC-71W is designed with both PoE PD/ 24VDC support to ensure easy installation in awkward or remote locations that may be difficult to reach with a power cable
- Protocol converter supports 450+ different PLC for OT data acquisition
- Support HTML5 & Web-based App/ HMI to visualize data in production reporter, signage, or digital meter

Power
Data
PoE

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Advantech PoE Offerings: Machine Vision

Industrial Camera

Frame Grabber

Serves as:
Frame grabber- PSE
Industrial camera- PD

Best for:
Price performance ratio, long cable distance, and multiple camera applications

Frame Grabber & Industrial Camera:

- PC-based automated optical identification system with multiple cameras to identify bar codes, data codes, and characters on beverage containers

- Institute GUI software building and deploy machine vision applications without any programming skills

- Supports a wide range of Advantech industrial PCs, smart cameras, and embedded systems, and can be deployed on different hardware platforms without modification

Industrial Camera

AIIS-3410

Frame grabber card

Power

Data

PoE