9 Utility and Energy Solutions

Utility and Energy IoT Solutions

Introduction

The successful management of power and energy applications is becoming increasingly critical as new energy sources, distributed across a much wider area than fossil fuels, become increasingly important. The informatization, intellectualization, and energy development of these new energy sources will change the traditional model, from a single communication model without response, to an alarm-to-intercommunication unified model. Advantech, as a leading manufacturer of industrial PCs for power and energy applications, provides intelligent components, from smart meters, IEC-61850-3 certified industrial computers, intelligent wireless gateways, to SCADA software, substation automation system development, and energy management. Through a host of innovative products and solutions, Advantech has shown itself to be one of the key enablers of Industrial IoT and Industry 4.0.

Smart Substation Solutions

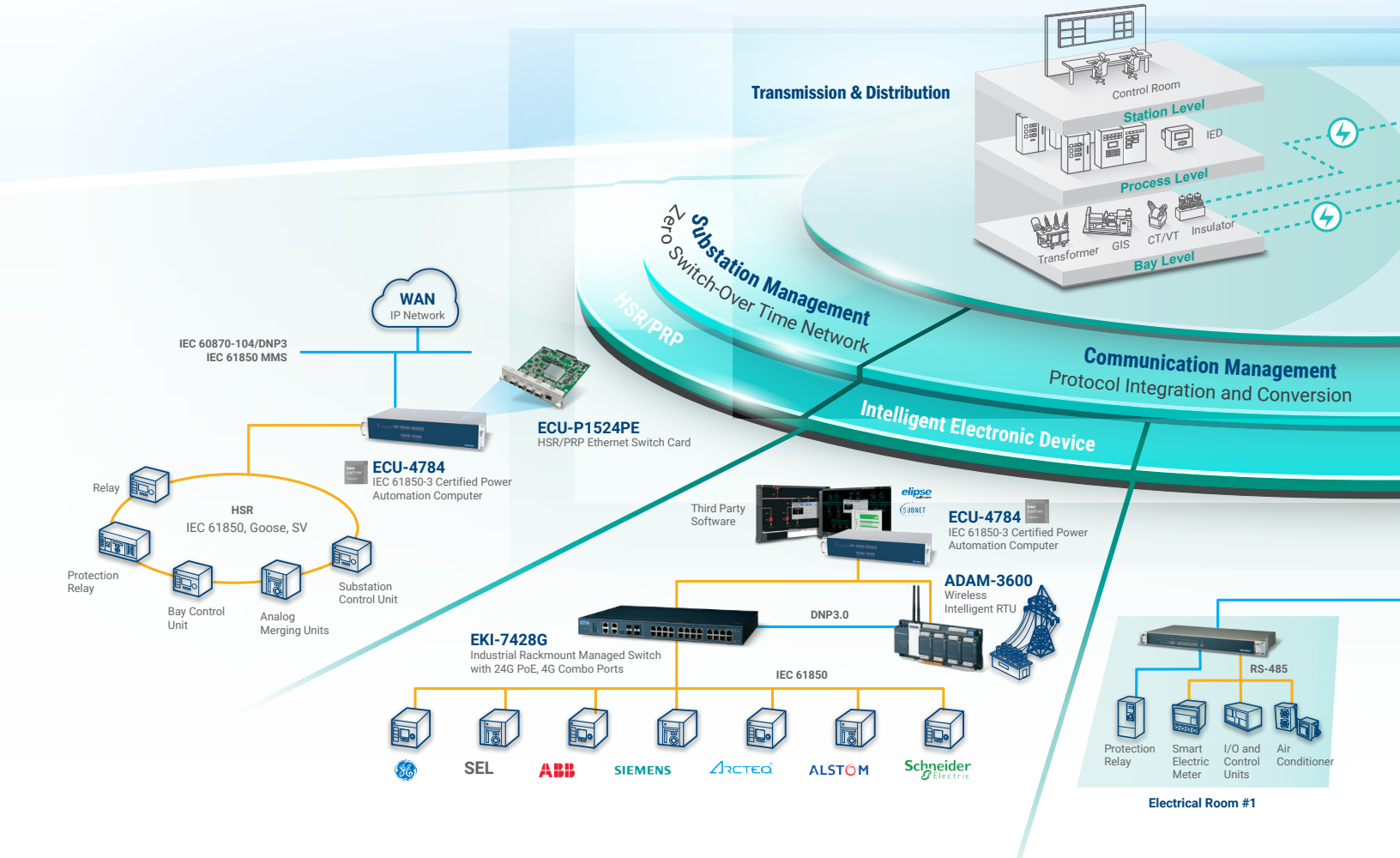
In smart substations, traditional primary devices including voltage transformers, GIS, and other isolated switches, normally operate without precaution, monitoring unified communication protocols. Along with the development of modern smart substations, the IEC-61850 standard is latest trend in substation applications and primary device monitoring. To meet these requirements, Advantech provides IEC-61850 compliant computer platforms for data communication and transmission which keeps primary devices operating normally.

SCADA applications

In smart substations, it's essential to be able to remotely monitor substations from a central management center. To achieve this, high performance computing platforms integrate HMI/DATA collection, data monitoring, and environmental status, which helps operators accurately evaluate equipment status and take action if necessary.

Communication and data gateway with IEC 61850

Within a substation, various devices use a wide variety of protocols, such as IEC-60870-101/103/104, Modbus or other private rules. The status and information of these devices needs to be accurately monitored and collected through a gateway computer with a unified communication transition protocol. It's very important that transfer devices use various protocols to unify the IEC-61850 protocol.



Distributed Energy Monitoring in Renewable Energy

With the increased construction of solar power plants, energy operators are finding it difficult to handle all the communication protocol requests caused by unstable communications made worse because of the lack of intelligent monitoring software. To address this, Advantech provides high-performance computing platforms, data acquisition modules, communication protocol gateways, network communications, and cloud software solutions with multiple communication protocols. In addition, Ethernet or wireless communications, network switchboards, and remote intelligent monitoring software provide all the hardware and software support needed to operate a modern solar power plant.

Wireless communication on distributed solar power

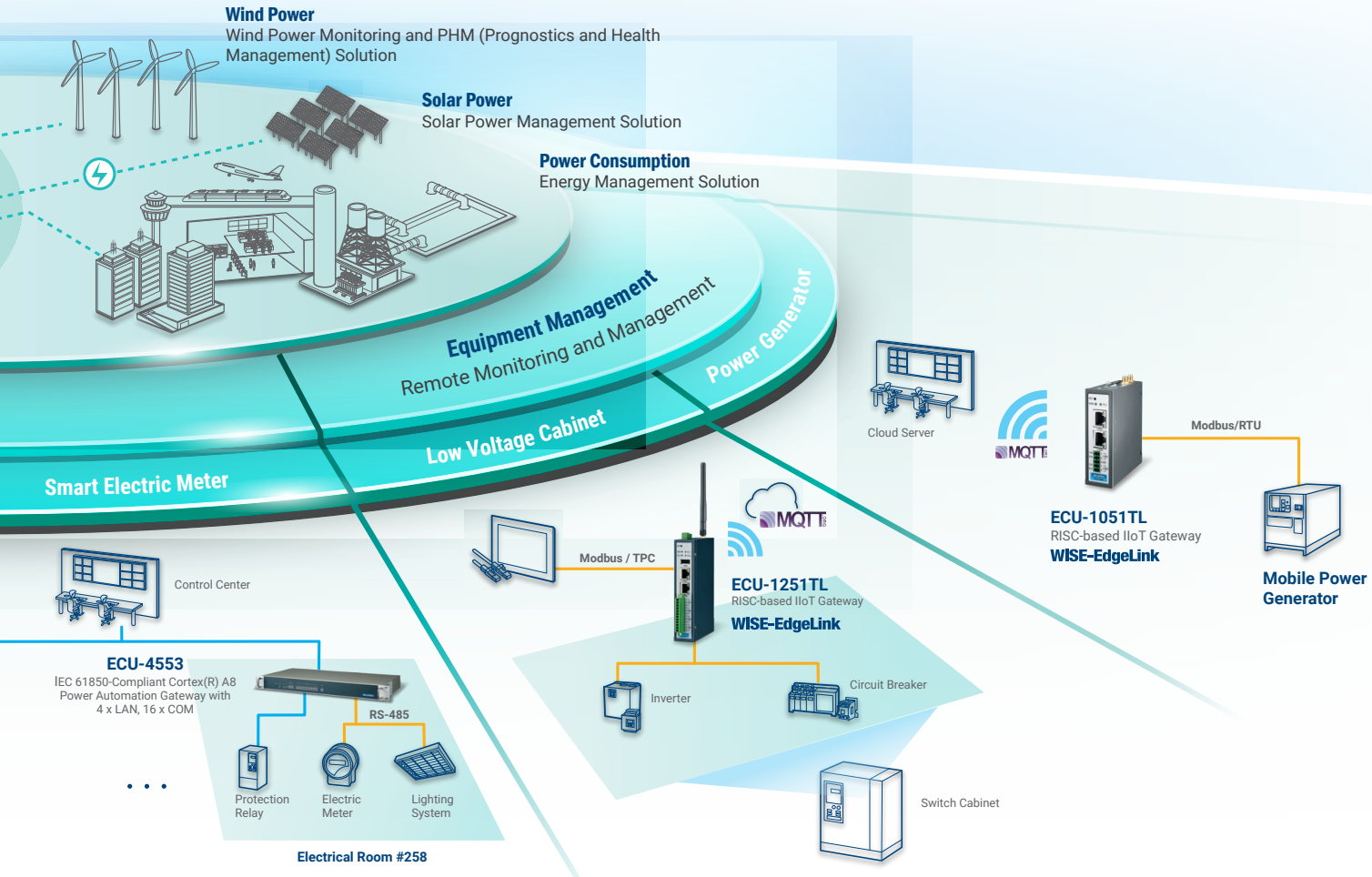
Distributed solar power farms are scattered over vast and remote areas, and establishing stable communication networks is not easy. To reduce wiring costs and maintain reliability, Advantech provides gateways capable of supporting 2G/3G/Wi-Fi/4G wireless for stable networks with data integrity.

Distributed Energy Monitoring in Energy Consumption

In order to reduce production costs and increase profitability, manufacturing requires integrated monitoring, management, and optimization processes to manage high energy-consumption facilities. Advantech not only provides practical and easy-to-implement energy management solutions, but also has a comprehensive hardware/software portfolio including smart meters, data acquisition modules, and control hosts. We also offer back-end management platforms and complete solutions for enterprises to achieve maximum energy efficiency.

High energy-consuming equipment monitoring applications

Since harmonics can have a significant impact on electrical distribution systems and the critical facilities they need, Advantech's energy management solution uses equipment failure diagnosis and prevention mechanisms to provide analytical information by monitoring harmonic currents generated by non-linear electronic loads, which improves production efficiency and reduces maintenance and energy costs.



Communication Central Platforms

x86-based Industrial Automation Computers



Model	☞ ECU-4574	☞ ECU-4674	☞ ECU-4784
Certification	IEC 61850-3/IEEE 1613 China Electricity Certificate IV level	IEC 61850-3 /IEEE 1613 Compliant China Electricity Certificate IV level	IEC 61850-3/IEEE 1613 China Electricity Certificate IV level
CPU	Intel® Atom® E3930 1.3GHz	Intel® Atom® E3930 1.3GHz	Intel® Celeron® 3955U/ Intel® Core™ i5-6300U/ i7-6600U
RAM	2G DDR3	4G DDR3	8G/16G DDR3L
Display	1 x VGA	1 x VGA	1 x DVI-D, 1 x DVI-I
Serial Ports	2 x isolated RS-232 8 x isolated RS-232/485	2 x isolated RS-232 1 x IRIG-B 16 x Isolated RS-232/485	2 x Isolated RS-232 (Standard) 8 x RS-232/422/485 (Terminal Block)
Ethernet Ports	8 x 10/100/1000 Base-T	8 x 10/100/1000 Base-T	8 x 10/100/1000Base-T
USB Ports	5 (1 x internal)	5 (1 x internal)	6 (1 x internal)
Expansion	1 x PCIE	1 x PCIE	2 x PCI/PCIE
Onboard I/O	–	8 x isolated DI, 8 x isolated DO	–
Watchdog Timer	✓	✓	✓
Storage	1 x Internal (CF)	1 x Internal (CF)	1 x M.2 (Key M)
2.5" HDD Expansion	2 x SATA	2 x SATA	3 x SATA
Operating Systems	WES7, Windows7, Linux	WES7, Windows7, Linux	Windows Server 2016, 2019, Linux
Mounting	1U Rackmount	2U Rackmount	2U Rackmount
Anti-Vibration	2 G w/CF, 1 G w/HDD	2 G w/CF, 1 G w/HDD	2 G w/M.2, 1 G w/HDD
Anti-Shock	30 G w/CF, 20 G w/HDD	30 G w/CF, 20 G w/HDD	30 G w/M.2, 20 G w/HDD
Operating Temperature	-20 ~ 70°C (-4 ~ 158°F)	-25 ~ 70°C (-13 ~ 158°F)	-20 ~ 70°C (-4 ~ 158°F)
Power Requirements	Supports Redundant power input Power 1: 100 ~ 240 V_{AC} or 100 ~ 240 V_{DC} Power 2: 100 ~ 240 V_{AC} or 100 ~ 240 V_{DC}	Supports Redundant power input Power 1: 100 ~ 240 V_{AC} or 100 ~ 240 V_{DC} Power 2: 100 ~ 240 V_{AC} or 100 ~ 240 V_{DC}	Supports Redundant Power Input Power 1: 100 ~ 240 V_{AC} or 100 ~ 240 V_{DC} Power 2: 100 ~ 240 V_{AC} or 100 ~ 240 V_{DC}
Dimensions (W x D x H)	440 x 272 x 44 mm	440 x 220 x 88 mm	440 x 280 x 88 mm
Weight	4.6 kg	6.0 kg	6.0 kg
Ordering Information	ECU-4574-A64SCE	ECU-4674-LA64SCE	ECU-4784-C36SCE ECU-4784-E36SCE/U ECU-4784-E45SCE/U

✓: supported, – : not supported, △ : optional



Model	☞ ECU-4784 6th Xeon	☞ ECU-4784 8th Xeon	☞ ECU-579
Certification	IEC 61850-3/IEEE 1613 China Electricity Certificate IV level	IEC 61850-3/IEEE 1613 China Electricity Certificate IV level	IEC 61850-3/IEEE 1613
CPU	Intel 6th Xeon® E3-1505L v5	Intel 8th Xeon® E-2276ML	Intel® Xeon® Scalable Family
RAM	16/32G DDR4	32/64G DDR4	up to 768G DDR4
Display	1 x VGA, 1 x DVI-D	1 x DVI-D, 1 x DVI-I	1 x VGA, 2 x DVI-D
Serial Ports	2 x Isolated RS-232 (Standard) 8 x RS-232/422/485 (Terminal Block)	2 x Isolated RS-232 (Standard) 8 x RS-232/422/485 (Terminal Block)	–
Ethernet Ports	8 x 10/100/1000Base-T	8 x 10/100/1000Base-T	4 x 10/100/1000Base-T
USB Ports	6 (1 x internal)	6 (1 x internal)	5 (2 x internal)
Expansion	2 x PCI/PCIE	2 x PCI/PCIE	4 x PCIe
Onboard I/O	–	–	–
Watchdog Timer	✓	✓	✓
Storage	1 x Internal (CFast)	1 x M.2 (Key M)	1 x M.2 2280 SATA SSD
2.5" HDD Expansion	2 x SATA	3 x SATA	4 x SATA
Operating Systems	WES7, Windows7, Windows 8, Windows Server 2012R2, Windows Server 2008R2(64bits), Windows Embedded 8 (64bits)	Windows 10, Windows Server 2016, 2019, Linux	Windows 10, Windows Server 2016, 2019, Linux
Mounting	2U Rackmount	2U Rackmount	2U Rackmount
Anti-Vibration	2 G w/CF, 1 G w/HDD	2 G w/M.2, 1 G w/HDD	1 G
Anti-Shock	30 G w/CF, 20 G w/HDD	30 G w/M.2, 20 G w/HDD	10 G
Operating Temperature	-20 ~ 60°C with 50% CPU/ I/O loading, without 2D/3D -20 ~ 45°C with 100% CPU/ I/O loading	-20 ~ 60°C with 50% CPU/ I/O loading, without 2D/3D (-4 ~ 140°F)	-20 ~ up to 60°C (Depends on CPU model and configuration) (-4 ~ 140°F)
Power Requirements	Supports Redundant power input Power 1: 100 ~ 240 V_{AC} or 100 ~ 240 V_{DC} Power 2: 100 ~ 240 V_{AC} or 100 ~ 240 V_{DC}	Supports Redundant Power Input Power 1: 100 ~ 240 V_{AC} or 100 ~ 240 V_{DC} Power 2: 100 ~ 240 V_{AC} or 100 ~ 240 V_{DC}	Supports Redundant Power Input Power 1: 100 ~ 240 V_{AC} or 100 ~ 240 V_{DC} Power 2: 100 ~ 240 V_{AC} or 100 ~ 240 V_{DC}
Dimensions (W x D x H)	440 x 280 x 88 mm	440 x 280 x 88 mm	440 x 280 x 88 mm
Weight	6.0kg	6.0 kg	10.0 kg
Ordering Information	ECU-4784-E56DAE ECU-4784-E56SAE ECU-4784-E57SAE	ECU-4784-G57SCE/U ECU-4784-G58SCE	ECU-579-SSDA ECU-579-SSNA

✓: supported, – : not supported, △ : optional

Edge Intelligent IoT Gateways

RISC-based Industrial Communication Gateways

Module	ECU-1251	ECU-1152	ECU-4553
Certification	CE/FCC	CE/FCC	CE/FCC/CCC
CPU	TI Cortex A8 800MHz	TI Cortex A8 800MHz	TI Cortex A8 800MHz
RAM	DDR3L 256MB	DDR3L 512MB	DDR3L 1GB
Serial Ports	4 x Isolated RS-232/485	6 x isolated RS-232/485	16 x isolated RS-232/485
Ethernet Ports	2 x 10/100 Base-T	2 x 10/100 Base-T	4 x 10/100 Base-T
CAN	–	–	2 x CAN 2.0B
Display	–	–	VGA
USB Ports	1	1	1
IRIG-B	–	–	✓
Storage	2 x SD (Micro-SD)	2 x SD (Micro-SD)	2 x SD (Micro-SD)
Watch Timer	✓	✓	✓
Power Requirements	10 ~ 30 V_{DC}	10 ~ 30 V_{DC}	100 ~ 240 V_{AC} or 100 ~ 240 V_{DC}
Operating System	RT-Linux 3.12	RT-Linux 3.12	RT-Linux 3.12
Mounting	Wall-mount/ DIN-rail	Wall-mount/ DIN-rail	1U Rack-mount
Anti-vibration	2G w/Micro-SD	2G w/Micro-SD	2G w/Micro-SD
Anti-shock	10G w/Micro-SD	10G w/Micro-SD	10G w/Micro-SD
Operating Temperature	-40 ~ 70°C	-40 ~ 70°C	-40 ~ 70°C
Typical Power Consumption	2.4W	2.4W	6.6W
Dimensions	140 x 96.5 x 30 mm	170 x 110 x 32.2 mm	440 x 220 x 44 mm
Weight	1.5 kg	1.5 kg	4.5 kg

✓: supported, – : not supported, △ : optional