Advantech's Oil & Gas Solutions

Certified Products & Solutions for Hazardous Applications

- Industrial Monitors
- Industrial Communication
- Embedded Automation Computers
- Data Acquisition & Control Modules
- Programmable Automation Controllers

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Industrial Solutions for Oil & Gas Applications
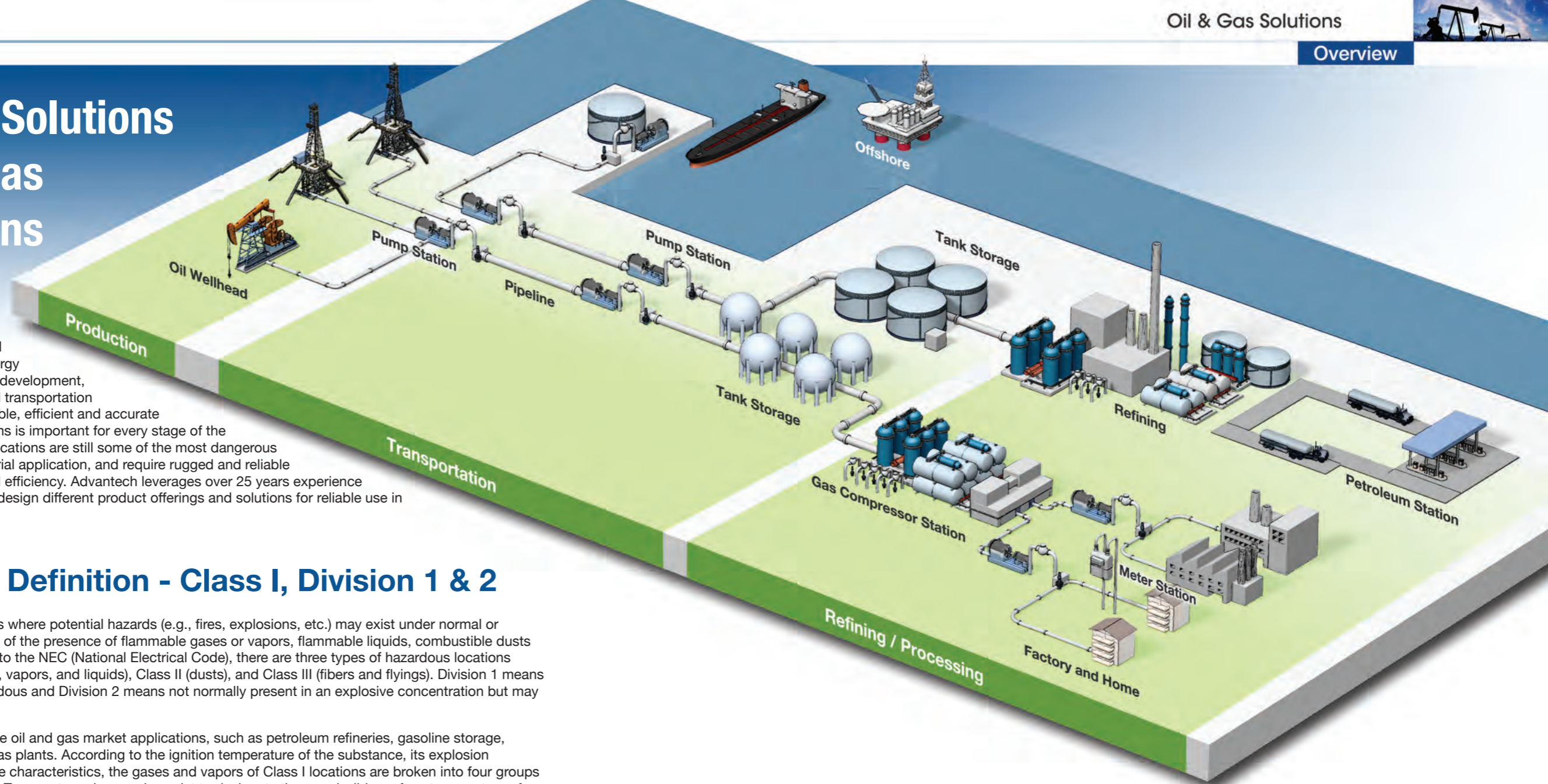
The oil and gas industry is still at the heart of the world's energy supply. From exploration and development, drilling and production, to fuel transportation and processing, creating reliable, efficient and accurate monitoring and control systems is important for every stage of the oil & gas industry. These applications are still some of the most dangerous and demanding of any industrial application, and require rugged and reliable products to ensure safety and efficiency. Advantech leverages over 25 years experience in the automation industry to design different product offerings and solutions for reliable use in hazardous locations.

## Certification Definition - Class I, Division 1 & 2

Hazardous locations are areas where potential hazards (e.g., fires, explosions, etc.) may exist under normal or abnormal conditions because of the presence of flammable gases or vapors, flammable liquids, combustible dusts or ignitable fibers. According to the NEC (National Electrical Code), there are three types of hazardous locations categorized by Class I (gases, vapors, and liquids), Class II (dusts), and Class III (fibers and flyings). Division 1 means normally explosive and hazardous and Division 2 means not normally present in an explosive concentration but may accidentally exist.

Class I is directly related to the oil and gas market applications, such as petroleum refineries, gasoline storage, dispensing areas and utility gas plants. According to the ignition temperature of the substance, its explosion pressure, and other flammable characteristics, the gases and vapors of Class I locations are broken into four groups by the Codes: A, B, C, and D. Temperature classes also exist to designate the permissible surface temperature of electrical equipment which allows them to operate normally in the surrounding atmosphere.

CLASSES	GROUPS	DIVISIONS	
		1	2
Class I : Gases, vapors, and liquids	A: Acetylene B: Hydrogen, gases or vapors of equivalent hazard C: Ethyl-ether vapors, ethylene, or cyclo-propane D: Gasoline, hexane, naptha, benzene, butane, propane, alcohol, etc.	Normally explosive and hazardous	Not normally present in an explosive concentration (but may accidentally exist)

TEMPERATURE CLASSES

- T6 85 ~ 100° C (185 ~ 212° F)
- T5 100 ~ 135° C (212 ~ 275° F)
- T4 135 ~ 200° C (275 ~ 392° F)
- T3 200 ~ 300° C (392 ~ 572° F)
- T2 300 ~ 450° C (572 ~ 842° F)
- T1 450° C + (842° F +)

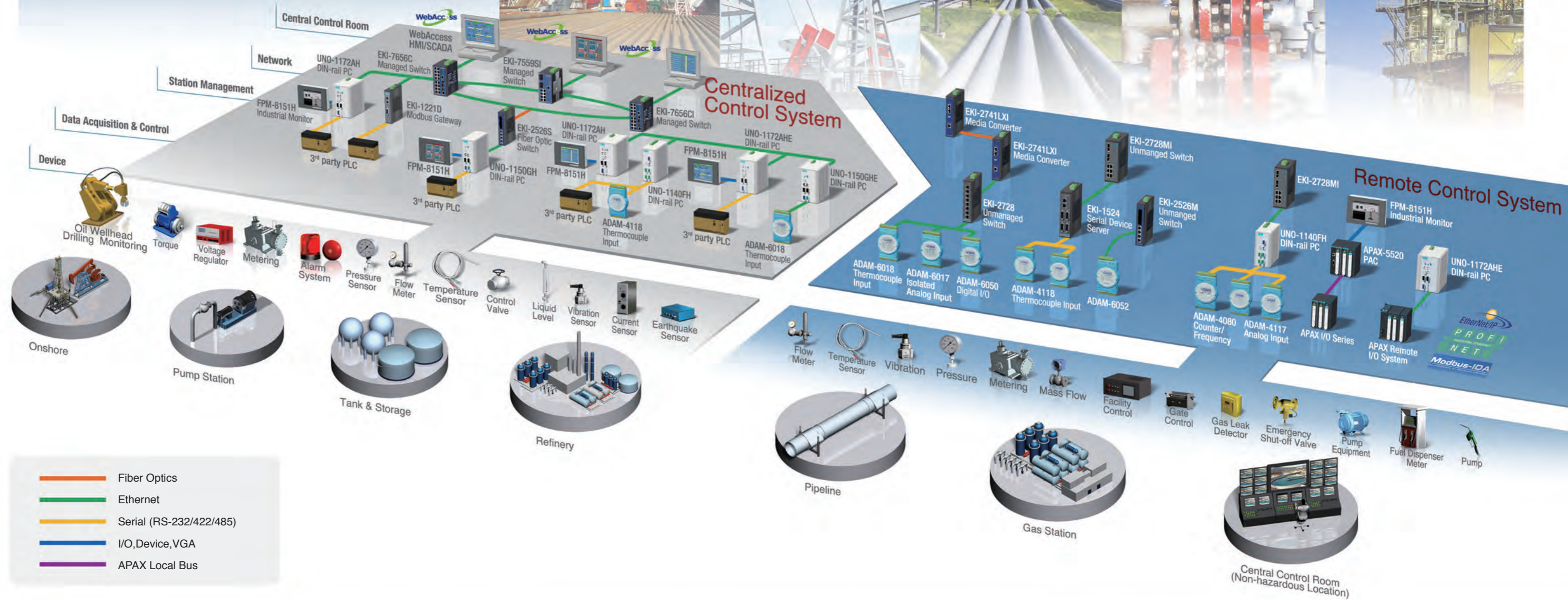## Hazardous and Non-hazardous Locations

Below is a conceptual diagram of Class I, Division 1 & 2 hazardous areas and non-hazardous areas.

1 Class I, Division I Area
2 Class I, Division II Area
3 Non-hazardous Location
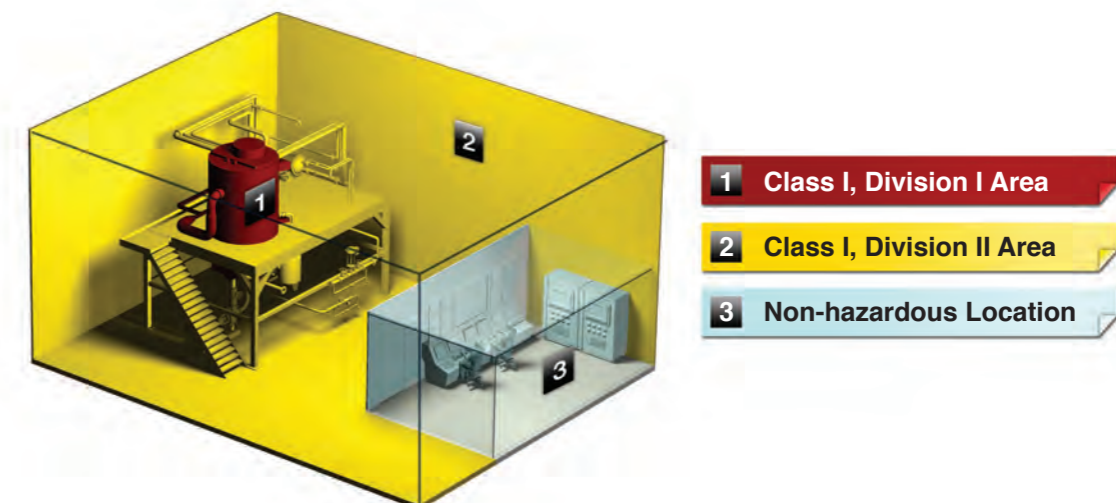
Advantech's Certified Products & Solutions

Advantech continues to provide vertical market-oriented product solutions to fulfill various application needs. Advantech's CID2 certified product offering includes; HMI, Industrial Communication, Embedded Automation Computers, and Data Acquisition modules. These solutions are well suited to fit the demanding requirements of various oil and gas applications. Furthermore, Advantech's standard product offerings can be used in non-hazardous locations, such as facility control and management for the oil and gas industry.

Central Control Room

WebAccess
WebAccess HMI/SCADA

Network

Station Management

Data Acquisition & Control

Device

UNO-1172AH DIN-rail PC
EKI-7656C Managed Switch
EKI-7559SI Managed Switch

Centralized Control System

FPM-8151H Industrial Monitor
EKI-1221D Modbus Gateway
EKI-2526S Fiber Optic Switch
EKI-7656CI Managed Switch
UNO-1172AH DIN-rail PC
UNO-1172AHE DIN-rail PC

3rd party PLC
FPM-8151H
UNO-1150GH DIN-rail PC
FPM-8151H
FPM-8151H
UNO-1150GHE DIN-rail PC

3rd party PLC
UNO-1140FH DIN-rail PC
UNO-1140FH DIN-rail PC
ADAM-4118 Thermocouple Input
3rd party PLC
ADAM-6018 Thermocouple Input

3rd party PLC

EKI-2741LXI Media Converter
EKI-2741LXI Media Converter
EKI-2728MI Unmanged Switch
EKI-2728MI

Remote Control System

EKI-2728 Unmanaged Switch
EKI-1524 Serial Device Server
EKI-2526M Unmanged Switch

FPM-8151H Industrial Monitor
UNO-1140FH DIN-rail PC
APAX-5520 PAC
UNO-1172AHE DIN-rail PC

ADAM-6018 Thermocouple Input
ADAM-6017 Isolated Analog Input
ADAM-6050 Digital I/O
ADAM-4118 Thermocouple Input
ADAM-6052

ADAM-4080 Counter/ Frequency
ADAM-4117 Analog Input
APAX I/O Series
APAX Remote I/O System

EtherNet/IP
PROFINET
Modbus-IDA

Oil Wellhead Drilling Monitoring
Torque
Voltage Regulator
Metering
Alarm System
Pressure Sensor
Flow Meter
Temperature Sensor
Control Valve
Liquid Level
Vibration Sensor
Current Sensor
Earthquake Sensor

Flow Meter
Temperature Sensor
Vibration
Pressure
Metering
Mass Flow
Facility Control
Gate Control
Gas Leak Detector
Emergency Shut-off Valve
Pump Equipment
Fuel Dispenser Meter
Pump

Onshore

Pump Station

Tank & Storage

Refinery

Pipeline

Gas Station

Central Control Room (Non-hazardous Location)

Legend:
— Fiber Optics
— Ethernet
— Serial (RS-232/422/485)
— I/O,Device,VGA
— APAX Local Bus

Product Offerings

HMI/SCADA Software	Industrial Monitors	Industrial Ethernet Switches	Media Converters	Serial Device Servers	Modbus Gateways	DIN-rail PCs	PACs	Data Acquisition Modules

WebAccess
ADAM

Oil Field Drilling Monitoring System

An oil field is a region with an abundance of oil wells extracting petroleum from below ground. Because the oil reservoirs typically extend over a large area, possibly several hundred kilometers across, full exploitation entails multiple wells scattered across the area. In addition, there may be exploratory wells probing the edges, pipelines to transport the oil elsewhere, and support facilities. Because an oil field may be remote from civilization, establishing a field is often an extremely complicated exercise in logistics.

System Description

Oil well management is a complicated process, but Advantech's Internet-of-Things system for oil and gas production produces good effects. Onsite RTU module (ADAM-4501), supports Modbus RTU/TCP, completes onsite data acquisition, packaging and uploads. Through an industrial wireless network, built by EKI-6351 and EKI-6341 modules, remote WebAccess software compiles and analyzes the data of well mouths. WebAccess' B/S structure shows its outstanding performance when it comes to remote management and maintenance.

- Zigbee wireless data acquisition module of ADAM-2000 series acquires analog data of temperature, flow, pressure, etc., at oil wells. Wireless Zigbee method greatly saves wiring costs. It is easy-to-use, increasing system maintainability.
- ADAM-4501, supporting Modbus RTU/TCP communication, works as onsite RTU. It is responsible for processing and uploading the acquired data, and packaging and uploading the acquired data from dynamometer.
- Industrial EKI-2525 Ethernet switch, suitable for rugged production site, connects onsite RTU, network camera, and wireless AP EKI-6351.
- Wireless AP at the pooling station is responsible for receiving data from each oil well. Industrial wireless AP EKI-6340 is IP67 protection rating, suitable for outdoor implementation.

Oil Pipeline Monitoring

Oil pipelines are made from steel or plastic tubes with inner diameter typically from 4 to 48 inches. Most pipelines are buried at a typical depth of about 3 to 6 feet. As crude oil contains varying amounts of wax, buildup may occur within a pipeline. Often these pipelines are inspected and cleaned using pipeline inspection gauges, used to detect anomalies in the pipe such as dents, metal loss caused by corrosion, cracking or other mechanical damage.

System Description

To ensure transmission quality, there are a lot of stations along long-distance oil and gas pipelines. The control system of the pipeline needs to perform real-time monitoring and control of each station. To guarantee its safety and stability, a communication system has to be stable, reliable, safe and rugged. With long-term cooperation with many professional oil and gas pipeline companies, Advantech's gateway and industrial Ethernet switch products have been successfully applied to many such systems.

- UNO-2174A/2178A embedded computer with WebAccess software has features like multiple serial ports, Ethernet ports, wide operating temperature, etc. UNO-2174A/2178A serves as protocol converter gateway at stations to convert protocols, such as electronic control system, compressor system, etc., for connecting PLC.
- Other than serving as a unified data protocol gateway at stations, UNO-2174A/2178A embedded computer also serves as protocol converter gateway; for example, converting Modbus RTU/TCP to IEC-60870-5-104 for control center. UNO series with flexible and high-performance protocol converting function is very suitable for onsite system.
- Control center adopts high-performance communication server UNO-4683 with an Intel Core i7 processor to process uploaded data, and to receive data with IEC-60870-5-104 protocol.
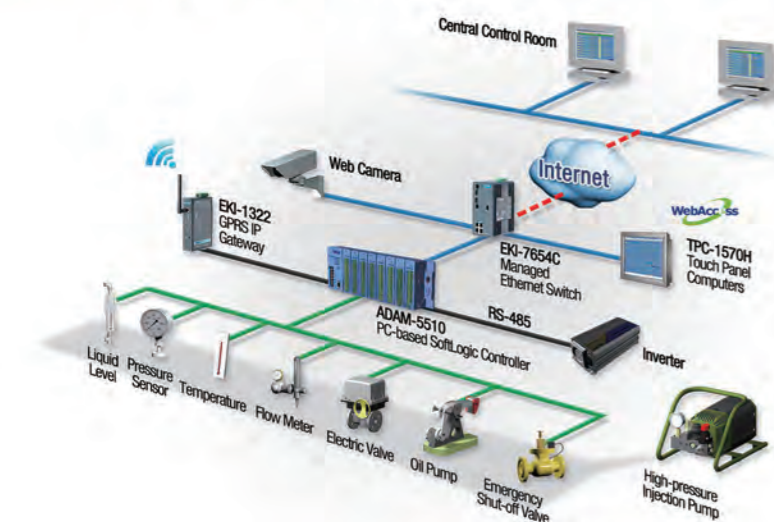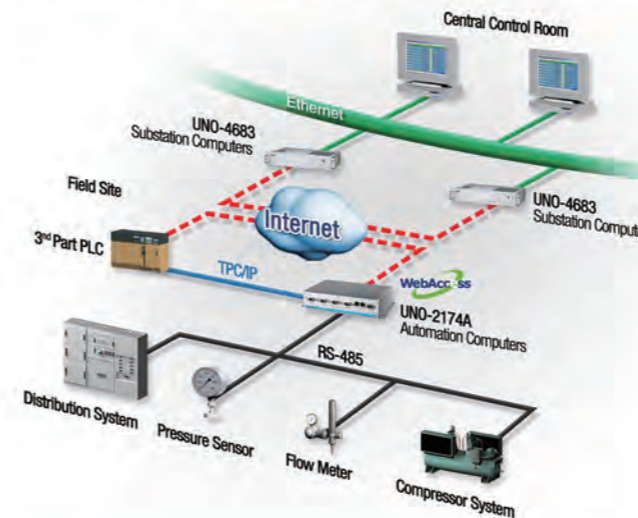
Pump Station Monitoring System

The oil & gas industry includes the global processes of exploration, extraction, refining, transporting, and marketing petroleum products, such as oil, which is transported through large pipes that can stretch across continents. The oil is kept in motion by pump stations along the pipeline, and usually flows at speed of about 1 to 6 meters per second.

System Description

The main function of an intelligent remote supervisory system is to monitor the operating status of local and remote intelligent equipment. WebAccess software manages and controls the water injection pumps & valves, the parameters of intelligent equipment such as the temperature and pressure of lubricating oil; valve opening angles; the details of valves, alerts and the open/close functions. WebAccess' powerful network functions are perfect for on-site and remote monitoring of intelligent equipment.

- High-performance ADAM-5510 PAC controller controls all relevant parameters and control loops, which has 8 I/O slot expansion to expand I/O module easily. ADAM-5510 controller acquires all monitoring data of water injection pump, and controls valves and inverter. According to experts' request, it gives real-time alarm and malfunction alert, corresponding analysis, and animated demo.
- Industrial EKI-1322 alert module sends real-time alert message to designated phone number, effectively help administrator to handle alert and malfunction of equipment.
- Industrial IP65-compliant TPC-1770H touch panel works as onsite HMI, facilitating human-computer interaction for the onsite personnel to control and operate intelligent equipment.
- Industrial EKI-7654C Ethernet switch builds a communication network, connecting ADAM-5510, webcam, and industrial touch panel TPC-1770H.

Tank Storage Monitoring

This application was setup to help monitor a fueling operation. The information & machine diagnostic data will be collected and sent back to the office and corporate headquarters. An accurate monitoring system not only measures fuel levels, but also temperatures and estimated volume information.

System Description

Oil terminal supervisory systems need technology that's reliable, easy to maintain, and scalable. They are not only responsible for safe production and transportation, but also need to have easy comprehensive data access. To acquire data separately from the tank farm and oil distribution zone the system uses a unified control module to control all the points of the oil terminal and ensure data transmission quality and safety whilst being compatible with other systems such as ERP.

- This case uses Advantech APAX-5570 and APAX-5520 PAC controllers as the main control system, coupled with Advantech TPC-1570 touch panel at onsite working station, to control various valves of oil discharge zone and tank farm, and to acquire specific parameters of flow, temperature, pressure, level of tank farm, and so on, in each region.
- Oil distribution zone uses Advantech EKI-1224 serial server to send serial data of flow computer to control center through Ethernet.
- The communication network of the whole oil terminal uses Advantech EKI-7654C to build industrial redundant network, and adopts EKI-4668C layer 3 switch to isolate office and onsite control networks.
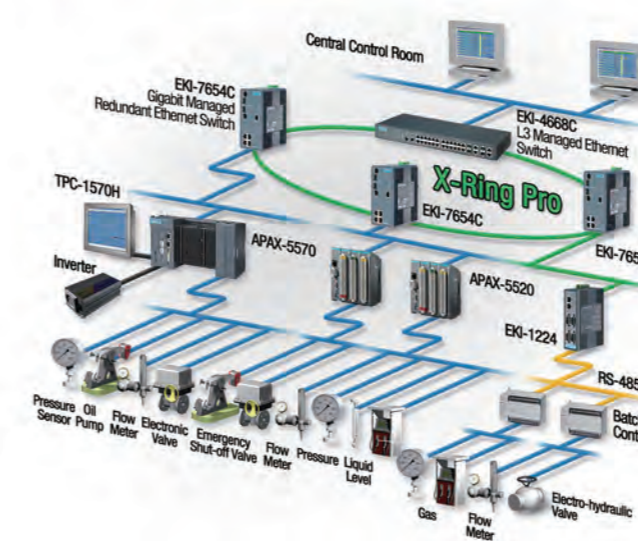
Equipment Safety Status Monitoring

Supervisory control and data acquisition system in refinery is mainly to acquire real-time meter data of each factory, meter alert, and alert design, and to feedback to management system immediately.

Advantech WebAccess

Browser-based HMI/SCADA Software

System Description

Supervisory control and data acquisition systems in refineries are used to acquire the real-time meter data of each factory to immediately feedback to the management system. The system uses the industry-leading internet configuration software, WebAccess, to build system network of data acquisition and process, utilizing the outstanding network features of WebAccess. It ensures effective and accurate large scale data acquisition (successfully being applied to 30,000 nodes), and fully supports a remote full-featured client.

- Advantech high-performance UNO-2174A/2178A embedded computer with WebAccess SCADA node in factory works as data communication server of DCS, SIS, PLC, and other systems to integrate and upload data.
- After UNO-2174A/2178A unifies protocol, all data goes to factory management workstation (IPC) with WebAccess SCADA node.
- At factory management workstation, WebAccess application compiles and sorts data, and upload to redundant and hot-standby server. After building connection, server will acquire data through SCADA node.
- If WebAccess remote client-end needs to check onsite data, it can directly check onsite SCADA node which ensures real-time data.

Powerful Architecture for Multiple SCADA Servers and Client Applications

Advantech WebAccess is a browser-based software package for human-machine interfaces (HMI), and supervisory control and data acquisition (SCADA). All the features found in conventional HMI and SCADA software packages are available in an ordinary browser including Animated Graphics Displays, Real-time Data Control, Trends, Alarms and Logs. Advantech WebAccess is based on standard Internet architecture; its basic components include SCADA Node, Project Node, Client and Thin Client. Advantech WebAccess is also featured key functions below for multiple SCADA servers and clients.

Fueling Station Management

This project implemented a gasoline pump control system for the dispensing, metering, and monitoring of gasoline tanks at a gas station. This fully automated system automated the process of dispensing gasoline and is supported by real-time connectivity between the gas station and its corporate headquarters.
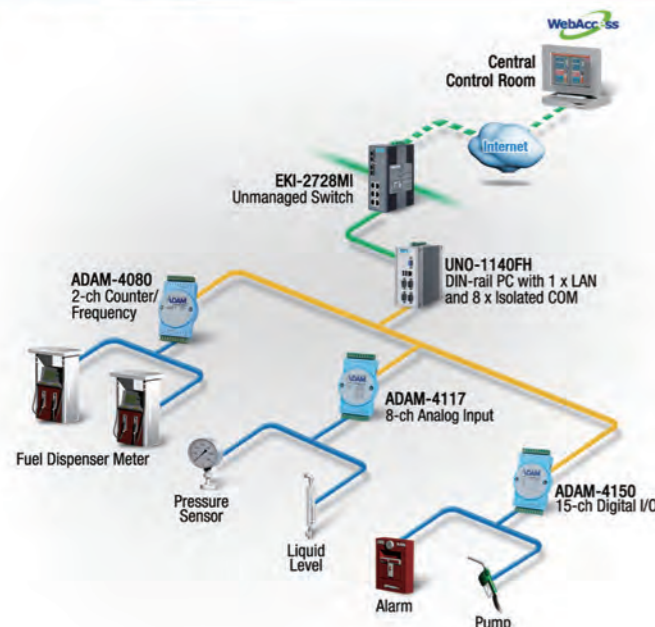
System Description

The control & management platform is an UNO-1140FH that is integrated with ADAM-4000 series as a turn-key solution. An ADAM-4080 counter/frequency Input module with two 32-bit counter input channels and a built-in programmable timer for frequency measurement helps to manage the details of the fuel dispenser meters data and ADAM-4117 analog input modules gather tank liquid levels, and pressure information. ADAM-4150 digital input/output module is in charge of alarms trigger and pumps on/off. Then the control & management platform can transmit all information via EKI-2728MI Ethernet switch to the corporate headquarters.

Benefits

In this application Advantech's complete turn-key system & software provided a good cost-effective solution. All the products installed provide excellent safety & reliability. The ADAM-4100 series modules are compact, versatile sensor-to-computer interface units designed for reliable operation in harsh environments. Their built-in microprocessors, encased in rugged industrial-grade ABS+PC plastic, independently provide intelligent signal conditioning, analog I/O, digital I/O, LED data display, and an address mode with a user-friendly design for convenient address reading.

Remote Diagnostics and Maintenance to Enhance Management Efficiency

The unique feature, which distinguishes Advantech WebAccess from the competition, is that all engineering projects, configurations, graphics building (DRAW), historical data analysis, automatic report generation and software management (download, start and restart remote nodes) is performed using a standard web browser. If there is any troubleshooting needed, no matter wherever the operator is located, he can use a web browser to operate the system. This can significantly increase the efficiency of maintenance operation and reduce the maintenance cost.

Redundant SCADA & COM Ports to Assure Reliable Communications

Advantech WebAccess is built-in to redundant SCADA and COM ports functionality, assuring continuous, reliable communications to automation equipment.

Integrated Audio, Video and Graphic Animations

To increase the operating efficient, Advantech WebAccess supports live full-motion video, audio, Adobe Flash and Windows Media and allow them to view in the same display, such as information of trends, alarms, push buttons and live data.

Free Dynamic DNS Services to Reduce Infrastructure Construction Costs

To decrease the inconvenience of varied IP address and increase convenient network access, Advantech WebAccess also provides free dynamic Domain Name System (DNS) services. The function not only reduces infrastructure construction cost, but also provides easy domain network access.

Supports Apple® iPhone® and Smart Phones Using Android™

In addition, Advantech WebAccess supports Apple iPhones and smart phones using Android through the WebAccess Thin Client and also supports GPS to send alarm messages as well. Users can use their smart devices to access the Advantech WebAccess to get information from field at anytime, anywhere.

Data Acquisition Modules

Advantech's FM approved remote I/O modules, including repeaters, converters, and both RS-485-based and Ethernet-based remote data acquisition modules, provide ideal industrial automation, control, and measurement solutions for confronting harsh environments and demanding applications. What's more, with wide operating temperatures and multiple mounting methods, Advantech's ADAM series can be implemented in diverse applications, making the system always connected and reliable. Besides, the Advantech's ADAM-3000 series consist of very cost-efficient, field configurable, isolated signal conditioning modules that can be easily installed to protect instruments and process signals from the harmful effects of most electrical interferences.

Repeaters / Converters

Model Name	ADAM-4510I /4510	ADAM-4520 /4520I	ADAM-4521	ADAM-4541/4542+	ADAM-4561
Description	Robust / RS-422/485 Repeater	Isolated / Robust RS-232 to RS-422/485 Converter	Addressable RS-422/485 to RS-232 Converter	Multi-mode /Single-mode Fiber Optic to RS-232/422/485 Converter	1-port Isolated USB to RS-232/422/485 Converter
Network	RS-422 RS-485	RS-232 to RS-422/485		Fiber Optic to RS-232/422/485	USB to RS-232/485/422
Comm. Speed (bps)	Serial: from 1,200 to 115.2 k				
Comm. Distance	Serial: 1.2 km				
Isolation Voltage	3,000 V_{DC}		1,000 V_{DC}	-	3,000 V_{DC}
Certifications	Class I Division 2 Groups ABCD T5, RoHS, UL, CE, FCC				

RS-485 I/O Modules - Analog Input/Output

Model Name	ADAM-4011/4013	ADAM-4012/4016	ADAM-4015/4015T	ADAM-4017/4017+	ADAM-4018/4018+	ADAM-4019+	ADAM-4021/4024	ADAM-4117/4118
Description	1-ch Thermocouple Input Module/ 1-ch RTD Input Module	1-ch Analog Input Module / 1-ch Analog Input / Output Module	6-ch RTD Module with Modbus / 6-ch Thermistor Module with Modbus	8-ch Analog Input Module / with Modbus	8-ch Thermocouple Input Module / with Modbus	8-ch Universal Analog Input Module with Modbus	1-ch Analog Input Module / 4-ch Analog Output Module with Modbus	Robust 8-ch Analog/ Thermocouple Input Module with Modbus
Resolution	16-bit						12-bit	16-bit
AI Channel	1 differential	6 differential	8 differential				-	8 differential
AI Sampling Rate	10 Hz (total)						-	10/100 Hz (total)
Certifications	Class I Division 2 Groups ABCD T5, RoHS, UL, CE, FCC							

RS-485 I/O Modules - Digital Input/Output

Model Name	ADAM-4050	ADAM-4051	ADAM-4052/4053	ADAM-4055	ADAM-4056SO/4056S	ADAM-4060/4068	ADAM-4080	ADAM-4150
Description	15-ch Digital I/O Module	16-ch Digital Input Module with Modbus	8-ch Isolated Digital Input Module with Modbus / 16-ch Digital Input Module	16-ch Isolated Digital Input Module with Modbus	12-ch Source / Sink Type Isolated Digital Output Module with Modbus	4-ch Relay Output Module / 8-ch Relay Output Module with Modbus	2-ch Counter / Frequency Module	Robust 15-ch Digital I/O Module with Modbus
Channel	7 DI / 8 DO	16 DI	ADAM-4052: 8 DI ADAM-4053: 16 DI	8DI / 8DO	12 DO	ADAM-4060: 4 ADAM-4068: 8	2 DO	7 DI/ 8 DO
Counter Input Frequency	-	-	-	-	-	-	50 kHz	3 kHz
Certifications	Class I Division 2 Groups ABCD T5, RoHS, UL, CE, FCC (ADAM-4053's Temperature Code is T6)							

Ethernet I/O Modules - Analog Input/Output

Model Name	ADAM-6015	ADAM-6017	ADAM-6018	ADAM-6024
Description	7-ch Isolated RTD Input Modbus TCP Module	8-ch Isolated Analog Input Modbus TCP Module with 2-ch DO	8-ch Isolated Thermocouple Input Modbus TCP Module with 8-ch DO	12-ch Isolated Universal Input/ Output Modbus TCP Module
Resolution	16-bit			16-bit for AI 12-bit for AO
AI/O Channel	7 RTD	8 AI	8 AI	6 AI / 2 AO
AI Sampling Rate	10 Hz (total)			
DI/O Channel	-	2 DO	8 DO	2 DI / 2 DO
Certifications	Class I Division 2 Groups ABCD T5, RoHS, UL, CE, FCC			

Ethernet I/O Modules - Digital Input/Output

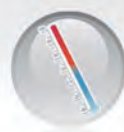| Model Name	ADAM-6050	ADAM-6051	ADAM-6052
Description	18-ch Isolated Digital I/O Modbus TCP Module	14-ch Isolated Digital I/O Modbus TCP Module with 2-ch Counter	16-ch Source-type Isolated Digital I/O Modbus TCP Module
DI/O Channel	16DI / 6 DO	12 DI / 2 DO	8 DI / 8 DO
Counter	-	2-ch	-
Counter Input Frequency	3 kHz	4.5 kHz	3 kHz
Certifications	Class I Division 2 Groups ABCD T5, RoHS, UL, CE, FCC		

Controllers

Model Name	ADAM-4501/4502	ADAM-4022T	ADAM-6022
Description	Ethernet-enabled Communication Controller	2-ch Serial Based Dual Loop PID Controller with Modbus	Ethernet-based Dual-loop PID Controller
Network	Ethernet, RS-232, RS-485	RS-485	Ethernet
Comm. Speed (bps)	Ethernet: 10/100M Serial: from 1,200 to 115.2 k	-	-
Comm. Distance	Ethernet: 100 m Serial: 1.2 km	Serial: 1.2 km	Ethernet: 100 m
Isolation Voltage	1,000 V_{DC}	3,000 V_{DC}	2,000 V_{DC}
Certifications	Class I Division 2 Groups ABCD T5, RoHS, UL, CE, FCC		

Isolated Signal Conditioning Modules

Model Name	ADAM-3011	ADAM-3014
Description	Isolated Thermocouple Input Module	Isolated DC Input/Output Module
Input Type	J, K, T, E, S, R, B Type Thermocouple	±10 mV, ±50 mV, ±100 mV, ±0.5 V, ±1 V, ±5 V, ±10 V, 0~10 mV, 0~50 mV, 0~100 mV, 0~0.5 V, 0~1 V, 0~5 V, 0~10 V, 0~20mA, ±20mA
Output Type	0~10 V	±5 V, ±10 V, 0~10 V, 0~20 mA
Certifications	Class I Division 2 Groups ABCD T5, RoHS, UL, CE, FCC	

Wide Temperature & Power Input Range

With an operating temperature ranging from -40~ 85° C (-40 ~ 185° F) and power input between 10~48 V_{DC}, ADAM-4100 robust RS-485-based I/O modules can work under severe environments and be used in demanding applications.

Dual Watchdog Timer

All ADAM-4100 robust family modules provide two watchdog timers. The system watchdog will reboot the system when the module hangs, and the communication watchdog will re-initialize the RS-485 network if there is no communication for a specific time.

Advanced Security & High Reliability

ADAM-6000 Peer-to-Peer output modules cannot be controlled by non-authorized PCs, but only by its paired input module. Meanwhile, when communication between pairs of ADAM-6000 modules is broken, the digital output module can generate pre-defined values to ensure communications.

Multiple Mounting Mechanisms

Most ADAM modules support versatile mounting methods, such as DIN-rail mounting, wall mounting and piggybacking, to fit various demands in the field. Customers no longer need to face mounting issues when installing and, more importantly, all needed mounting kits are included in the package.

Industrial Communication

Advantech provides interconnected solutions with Industrial Networking, Device Connectivity, and Industrial Wireless Technology. With industrial-grade product design, Advantech's ICOM products have passed the harsh tests of various vertical markets, such as IEC 61850 for substation automation, EN50155 for railway automation, and UL508 safety for industrial control equipment. In order to fulfill the connecting needs of hazardous applications, Advantech offers a comprehensive line of UL approved Class I , Division 2 Groups A, B, C, D industrial communication solutions, including Industrial Ethernet Switches, Media Converters, Serial Device Servers and Modbus Gateways.

Managed Ethernet Switches

Model Name	EKI-7758F	EKI-7656C/CI	EKI-7657C	EKI-7559SI/MI	EKI-2748FI/CI
Description	4G+4SFP Gigabit Managed Redundant Industrial Ethernet Switch	16+2G Combo Port Gigabit Managed Redundant Industrial Ethernet Switch	7+3G Combo Port Gigabit Managed Redundant Industrial Ethernet Switch with 2 x DI/O	8+2 SC-type Fiber Optic Managed Redundant Industrial Ethernet Switch with Wide Temperature	8Gx Managed Ethernet Switch with Wide Temperature
Ports Number	8	18	10	10	8/8
10/100Base-T(X)	-	16	7	8	-
100BaseFX	-	-	-	2	-
10/100/1000Base-T(X)	4	2	3	-	4/6
1000Base-SX/LX/LHX/XD/ZX/EZX	4	2	3	-	4/2
Control	VLAN/GVRP, QoS, IGMP Snooping/Query, LACP, Rate Limit				
Certifications	Class I Division 2 Groups ABCD T4, UL/cUL 60950-1, FCC, CE, RoHS				Class I Division 2 Groups ABCD T4, UL 508, FCC, CE, RoHS

Unmanaged Ethernet Switches

Model Name	EKI-2728MI	EKI-2728	EKI-2525/2528	EKI-2525M	EKI-2526M/S
Description	6Gx+2G Multi-mode Unmanaged Ethernet Switch with Wide Temperature	8-port Gigabit Unmanaged Industrial Ethernet Switch	5/8-port Unmanaged Industrial Ethernet Switch	4+1 100FX Port Multi-mode Unmanaged Industrial Ethernet Switch	4+2 100FX Port Multi-mode/Single-mode Industrial Ethernet Switch
Ports Number	8	8	5/8	5	6
10/100Base-T(X)	-	-	5/8	4	4
100BaseFX	-	-	-	1	2
10/100/1000Base-T(X)	6	8	-	-	-
1000Base-SX/LX/LHX/XD/ZX/EZX	2	-	-	-	-
Certifications	Class I Division 2 Groups ABCD T4, UL 508, FCC, CE, RoHS	Class I Division 2 Groups ABCD T4, UL/cUL 60950-1, FCC, CE, RoHS			

Model Name		EKI-1351	EKI-1352	EKI-1521	EKI-1522	EKI-1524
No. of Ethernet Port		WLAN	WLAN	2	2	2
No. of Serial Port		1	2	1	2	4
Ethernet Interface		802.11 b/g	802.11 b/g	10/100 Mbps	10/100 Mbps	10/100 Mbps
Serial Type		RS-232/422/485				
Connector	Ethernet	SMA	SMA	RJ45	RJ45	RJ45
	Serial	DB9				
Baud Rate		50 ~ 921.6 kbps , any baud rate setting				
Operating Mode		Virtual COM, TCP Server, TCP Client, UDP, Peer to Peer, AT Command, and RFC2217 modes				
Driver		32-bit/64-bit Windows 2000/XP/Vista/7, Windows Server 2003/2008, Windows CE 5.0/6.0, and Linux				
Certifications		Class I Division 2 Groups ABCD T4, UL/cUL 60950-1, FCC, CE, RoHS				

GPRS Device Gateway

Model Name	EKI-1321/1322	
No. of Ethernet Port	1	1
No. of Serial Port	1	2
Ethernet Interface	10/100/100 Mbps	
Serial Type	RS-232/422/485	
Cellular Interface	Quad-band GSM/GPRS	
Configuration	Windows Utility, Telnet, and Web Console	
Operation Mode	VCOM, RVCOM, TCP/UDP server mode, TCP/UDP client mode, Pair connection mode	
Baud Rate	50 bps ~ 921.6 kbps, any baud rate setting	
Certifications	CE, FCC, RoHS	

Modbus Gateways

Model Name	EKI-1221D	EKI-1222D	EKI-1221	EKI-1222	EKI-1224
No. of Ethernet Ports	2	2	2	2	2
No. of Serial Ports	1	2	1	2	4
Ethernet Interface	10/100Mbps				
Serial Type	RS-232/422/485, software selectable				
Ethernet Feature	Daisy-Chain Connectivity		Dual Ethernet Redundany		
Configuation	Windows Configuration Utility, Web-Browser Console				
Operating Mode	Modbus RTU Master, Modbus RTU Slave, Modbus ASCII Master, and Modbus ASCII Slave modes				
Baud Rate	50 bps ~ 921.6 kbps				
Certifications	Class I Division 2 Groups ABCD T4, FCC, CE, RoHS		Class I Division 2 Groups ABCD T4, UL/cUL 60950-1, FCC, CE, RoHS		

Media Converters

Model Name	EKI-2741F/SX/LX	EKI-2541M/S
Description	10/100/1000TX to Fiber Optic Gigabit Industrial Media Converters	10/100TX to Multi-mode / Single-mode SC Type Fiber Optic Industrial Media Converters
Ports Number	2	2
10/100Base-T(X)	-	1
100BaseFX	-	1
10/100/1000 Base-T(X)	1	-
1000Base-SX/LHX/XD/ZX/EZX	1	-
Certifications		

Redundant Power Input
To reduce the risk of power failure, Advantech provides +12 ~ 48 V$_{DC}$ dual power inputs. With power reserve protection which can prevent the switch device broken by wrong power wiring.

Wide Temperature
Advantech's Ethernet Switches and Media Converters support an extended operating temperature range of -40 ~ 75° C (-40 ~ 167° F) to withstand extreme environments and ensure system uptime in harsh environments.

X-Ring Pro Technology
With X-Ring Pro technology, Advantech's managed switches construct a steady and reliable network. When any error occurs in the communication network, the switch should smoothly switch to the redundant backup line in just 20ms.

Industrial Monitors and Controllers

Carrying industrial automation technology into the oil and gas industry, Advantech offers industrial monitors, the FPM series, two categories of automation controllers including embedded automation computers, the UNO-1100H series, and Programmable Automation Controllers, the APAX series, to fulfill various application needs. Both the FPM and UNO-1100H series have passed Class I, Division 2 Groups A,B,C,D certification, which extends use to hazardous applications. UNO-1100H series is fanless, with no internal cabling and no moving parts, with a wide power input range and dual Ethernet to assure reliability and security. APAX-5000 series integrates control, information processing and networking in a single controller, which support powerful control systems and is suitable for non-hazardous location applications.

Industrial Monitors

Model Name		FPM-8151H
Display	Size (diagonal)	15" XGA
	Resolution	1024 x 768
	Colors	16.2 M
	Viewing Angle	160, 140
	Luminance	350
Direct VGA Input		Yes
DVI Input		Yes
Touchscreen (optional)		Resistive
OSD (onscreen display)		Yes
Power Adapter(voltage, AC)		100-240 V
DC Power Input (voltage)		24 V$_{DC}$
Front Panel Ingress Protection		IP65
Operating Temperature		-20 ~ 60° C (-4 ~ 140° F)
Dimensions (W x H x D)		422 x 338 x 68 mm (16.61" x 13.31" x 2.68")
Certifications		Class I Division 2 Groups ABCD T4, UL, CCC, CE, FCC Class A, RoHS

DIN-rail Embedded Automation Computers

Model Name	UNO-1140FH	UNO-1150GH/1150GHE	UNO-1172AH/1172AHE
CPU	Advantech EVA-X4150 SoC,486SX grade, 150MHz	AMD Geode LX800, 500 MHz	Intel Atom D510, 1.66 GHz
Onboard RAM	64M Industrial SDRAM	256M DDR SDRAM	2GB DDR2 SDRAM
Battery-Backup SRAM	-	-	1 MB
Display	VGA	VGA	VGA
Audio	-	Yes	Yes
Serial Ports	4 x Iso. RS-232/485 4 x Iso. RS-485	2 x RS-232/422/485 2 x RS-232 (one pin header reserved)	2 x RS-232/422/485 2 x RS-232 (pin header)
Ethernet Ports	1 x 10/100Base-T	2 x 10/100Base-T	3 x 10/100/1000Base-T
USB Ports	2	2	4
Expansion	PC/104 (reserved)	UNO-1150GH: N/A UNO-1150GHE: 2 x PCI-104, 1 x Mini PCI	UNO-1172AH: 1 x Mini PCIe UNO-1172AHE: 2 x PC/104+, 1 x Mini PCI , 1 x Mini PCIe
CompactFlash Slots	One Internal	One Internal	One internal
Power Input Range	10(Min.) ~ 30 V$_{DC}$ (Max.)	9 (Min.)~36 V$_{DC}$ (Max.)	9 (Min.)~36 V$_{DC}$ (Max.)
Operating Temperature	-20 ~ 75° C (-4 ~ 167° F)	-10 ~ 60° C (14 ~ 140° F)	-10 ~ 65° C (14 ~ 149° F)
Power Consumption	10 W	15 W	24 W
Dimensions (W x H x D)	71 x 152 x 139 mm (2.8" x 6" x 5.5")	71 x 152 x 139 mm (2.8" x 6" x 5.5")/ 96.5 x 152 x 139 mm (3.8" x 6" x 5.5")	85.5 x 152 x 139 mm (3.4" x 6" x 5.5")/ 111 x 152 x 139 mm (4.4" x 6" x 5.5")
Certifications	Class I Division 2 Groups ABCD T4, UL, CCC, CE, FCC Class A, RoHS		

Stainless Steel Enclosures

FPM-8151H designed with robust anodizing coated aluminum front bezel and stainless steel rear cover

316L Stainless

Designed for Control Cabinets

UNO-1100H series features compact size, DIN-rail mountand front-accessible I/O that make installation within a control cabinet very easy.

81 mm

Battery-backup SRAM

The onboard battery-backup SRAM saves runtime process data in the event of a power failure. In addition, the SRAM can act as a data buffer that helps to reduce CF access time and extend product lifetime

Flexible Expansion

With Mini PCI, PCI-104 and PC/104+, it enables users to easily integrate wireless connections and Fieldbus I/O modules in a single package

Programmable Automation Controllers (PAC)

Controllers

Model Name	APAX-5520	APAX-5620
Description	PAC with XScale PXA270 CPU	PAC with XScale PXA270 CPU and CAN
Memory	256 DDR SDRAM onboard	256 DDR SDRAM onboard
Storage	CF slot	CF slot
LAN Ports	1	2
Serial Ports	1 x RS-485	2 x RS-485
CANopen interface	-	2
Certifications	CE, FCC class A, RoHS	

Digital Input/Output Modules

Model Name	APAX-5040	APAX-5046	APAX-5080
Description	24-ch DI Module	24-ch DO Module	4/8-ch Counter Module
Rated Voltage	24 V$_{DC}$	24 V$_{DC}$	24 V$_{DC}$
Counter Range	-	-	32-bit + 1-bit overflow/underflow
Counter Frequency	-	-	1 MHz (max.)
Fail Safe Value	-	Yes	Yes for DO
Certifications	CE, FCC class A, RoHS		

Analog Input/Output Modules

Model Name	APAX-5013	APAX-5017	APAX-5017H
Description	8-ch RTD Module	12-ch AI Module	12-ch High Speed AI Module
Input/Output Range	RTD	±150 mV, ±500 mV, ±1 V, ±5 V, ±10 V, ±20 mA, 0 ~ 20 mA, 4~20 mA	0 ~ 500 mV, ±10 V, 0 ~ 10 V, ±20 mA, 0 ~ 20 mA, 4 ~ 20 mA
Resolution	16-bit	16-bit	12-bit
Input: Sampling Rate Output: Slew Rate	8/10 sample/second (total*)	12 sample/second (total*)	1000 sample/second (per channel)
Certifications	CE, FCC class A, RoHS		

*: Sampling rate value depends on used channel number

Couplers

Modbus-IDA
PROFI NET
EtherNet/IP

Model Name	APAX-5070/71/72
Description	Modbus/TCP, PROFINET, Ethernet/IP Communication Coupler
Data Transfer Rates	10/100Mbps, 100 Mbps, 10/100 Mbps
Connect I/O Modules	32 (max.)
Digital Signals	2048 (max.)
Analog Signals	512 (max.)
Certificate	CE, FCC class A, RoHS

Dual Controllers for Different Tasks

One controller focuses on I/O processing,while another controller can execute other tasks such as HMI/SCADA, database,recipe, image processing, etc. This architecture ensures system reliability since I/O processing won't be affected by other tasks.

Changeable Controllers and Couplers

APAX-5000 I/O modules can combine different controllers or couplers to satisfy different applications. Using different couplers, I/O modules can link to various real-time Ethernet and fieldbus systems. It greatly saves I/O investment and offers scalability for future needs.

Flexible Expansion Topology

Star Topology

Line Topology

All APAX I/O modules are inserted on the backplane. Through the expansion port and Ethernet cable, different backplanes can be connected. This distributed architecture retains high-speed data transfers, so the distributed I/O modules provide real-time performance. Almost any topology, eg line, tree or star, can be easily established. Hot swap capability is also available for remote expansion I/O modules.