# Advantech's
# Oil & Gas Solutions

## Certified Products & Solutions for Oil & Gas Applications

✓ Industrial Panel PCs & Monitors
✓ Embedded Automation Computers
✓ Industrial Connectivity & Communication
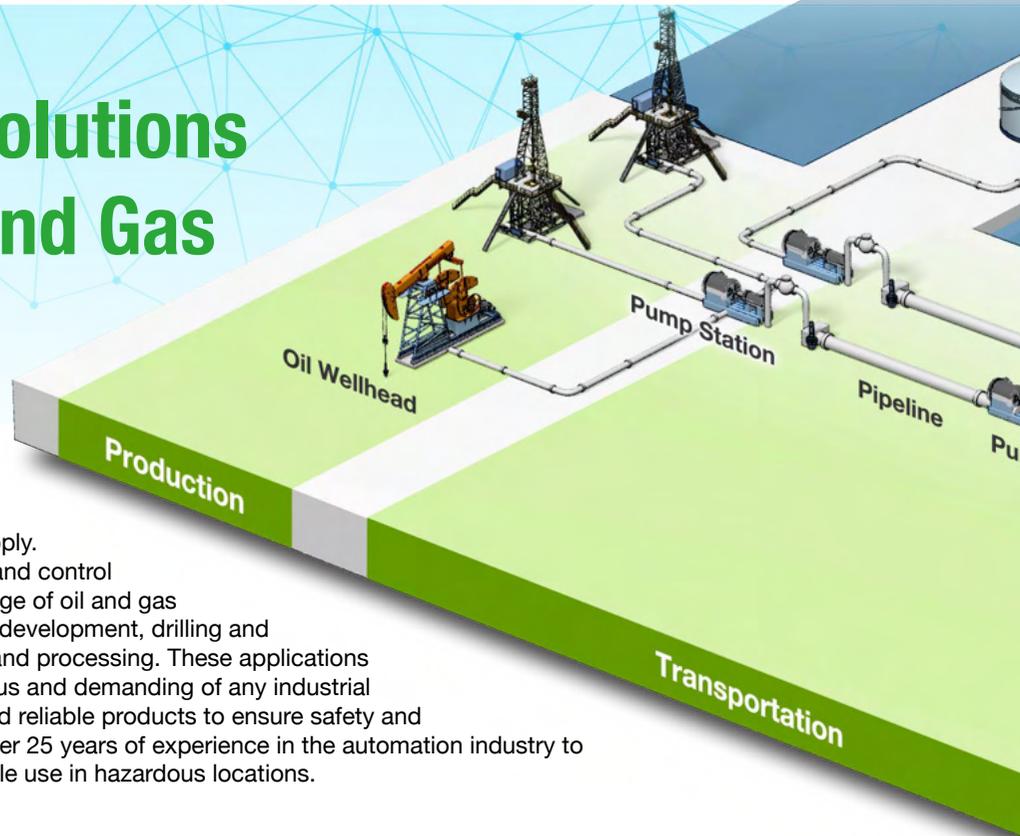✓ Data Acquisition Modules
✓ Wireless Remote Terminal Unit

**ADVANTECH**

*Enabling an Intelligent Planet*

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# Industrial Solutions for the Oil and Gas Industry

The Oil and Gas industry is still at the heart of the world's energy supply. Efficient and accurate monitoring and control systems are important at every stage of oil and gas production—from exploration and development, drilling and production, to fuel transportation and processing. 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 of experience in the automation industry to design different solutions for reliable use in hazardous locations.

## Certification Definition - Class I, Divisions 1 and 2

Hazardous locations facet potential hazards (e.g., fires, explosions, etc.) under normal or abnormal conditions. These locations typically feature the presence of flammable gases, vapors and liquids, or combustible dusts and fibers. According to the National Electrical Code NEC, there are three types of hazardous area categorized by Class—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 exist accidentally. Class I directly applies to oil and gas market applications. For example, petroleum refineries, gasoline storage facilities, dispensing areas, and utility gas plants. The gases and vapors of Class I locations are divided into codes A, B, C, and D according to the substance ignition temperature, its explosion pressure, and other flammable characteristics. Temperature classes also exist to designate permissible surface temperatures of electrical equipment required for normal operations in specific environments.

| CLASSES | GROUPS | DIVISIONS | |
| --- | --- | --- | --- |
| | | **1** | **2** |
| **Class I :** Gases, vapors, and liquids | **A:** Acetylene. <br> **B:** Hydrogen, gases or vapors of equivalent hazard. <br> **C:** Ethyl-ether vapors, ethylene, or cyclo-propane. <br> **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 +)
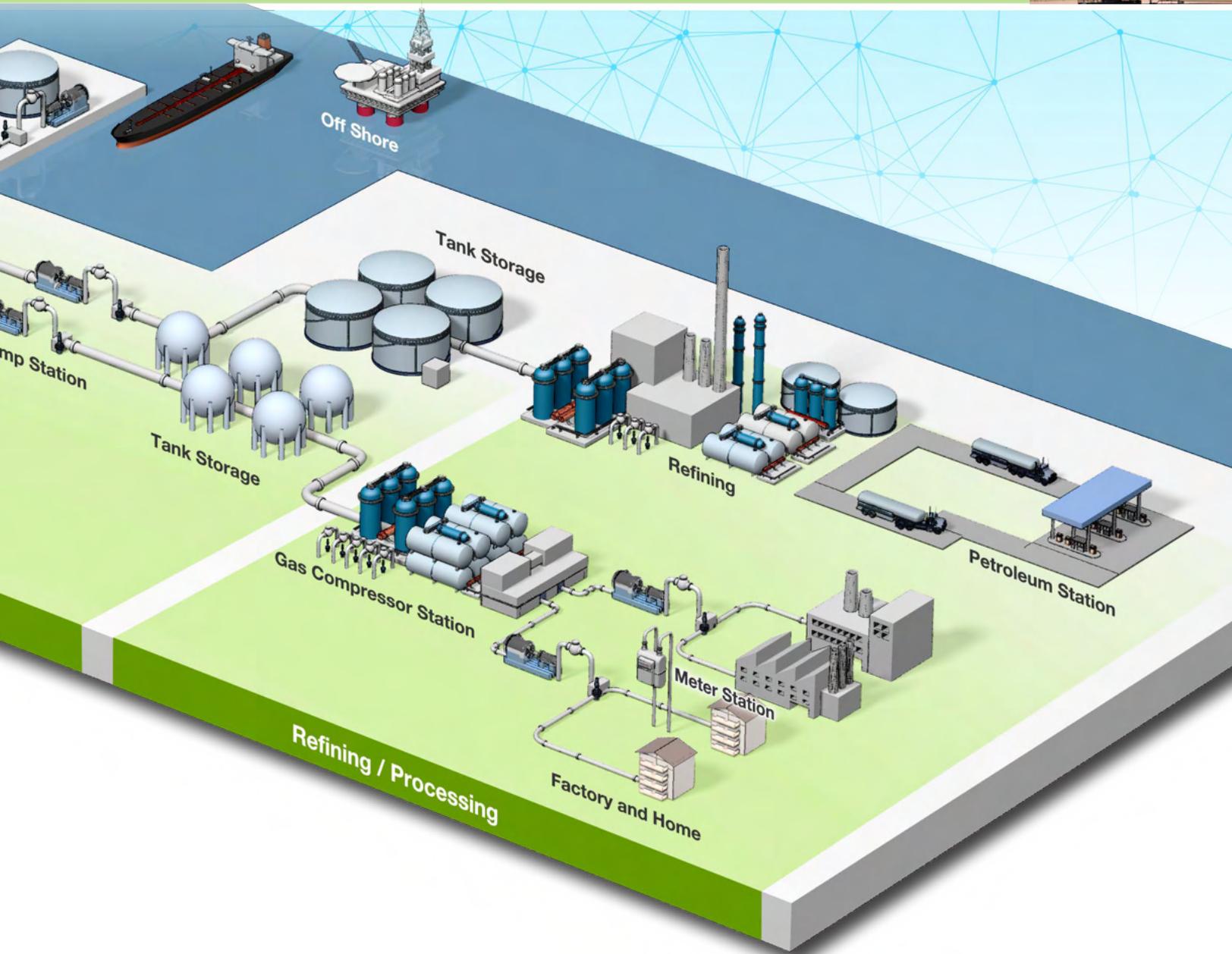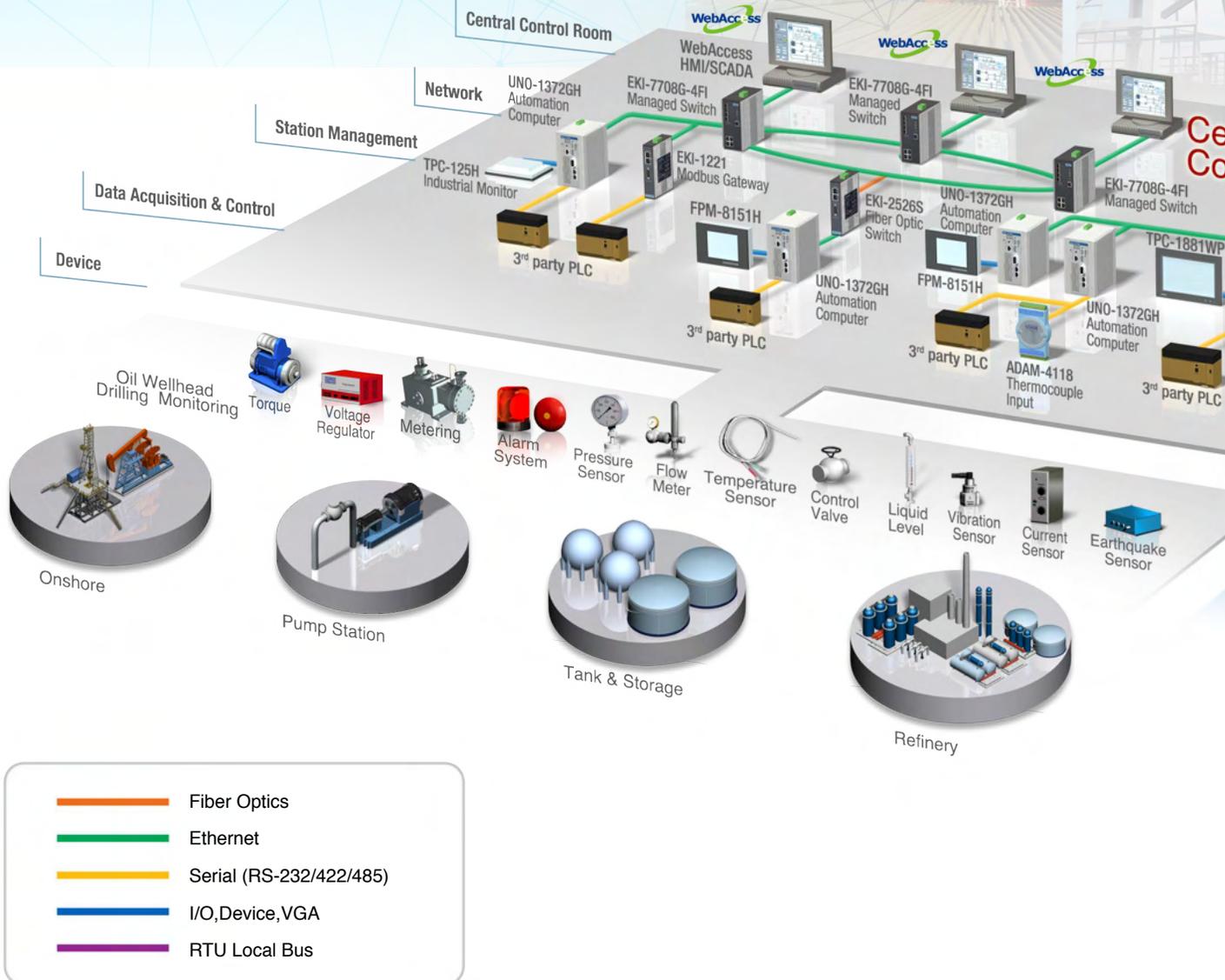
# Hazardous and Non-hazardous Locations

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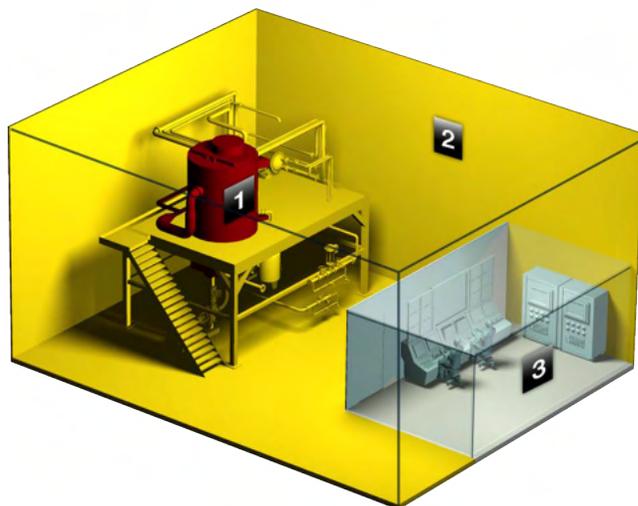


1. **Class I, Division I Area**
2. **Class I, Division II Area**
3. **Non Hazardous Location**

# Advantech's Certified Products and Solutions

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



Central Control Room

WebAccess HMI/SCADA

Network

Station Management

Data Acquisition & Control

Device

UNO-1372GH Automation Computer

EKI-7708G-4FI Managed Switch

EKI-7708G-4FI Managed Switch

EKI-7708G-4FI Managed Switch

TPC-125H Industrial Monitor

EKI-1221 Modbus Gateway

FPM-8151H

EKI-2526S Fiber Optic Switch

UNO-1372GH Automation Computer

TPC-1881WP

3rd party PLC

UNO-1372GH Automation Computer

FPM-8151H

3rd party PLC

UNO-1372GH Automation Computer

3rd party PLC

ADAM-4118 Thermocouple Input

3rd party PLC

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

Onshore

Pump Station

Tank & Storage

Refinery

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

## Product Offerings

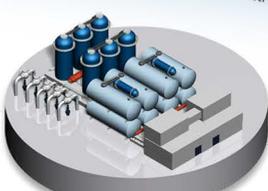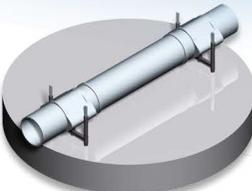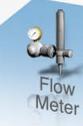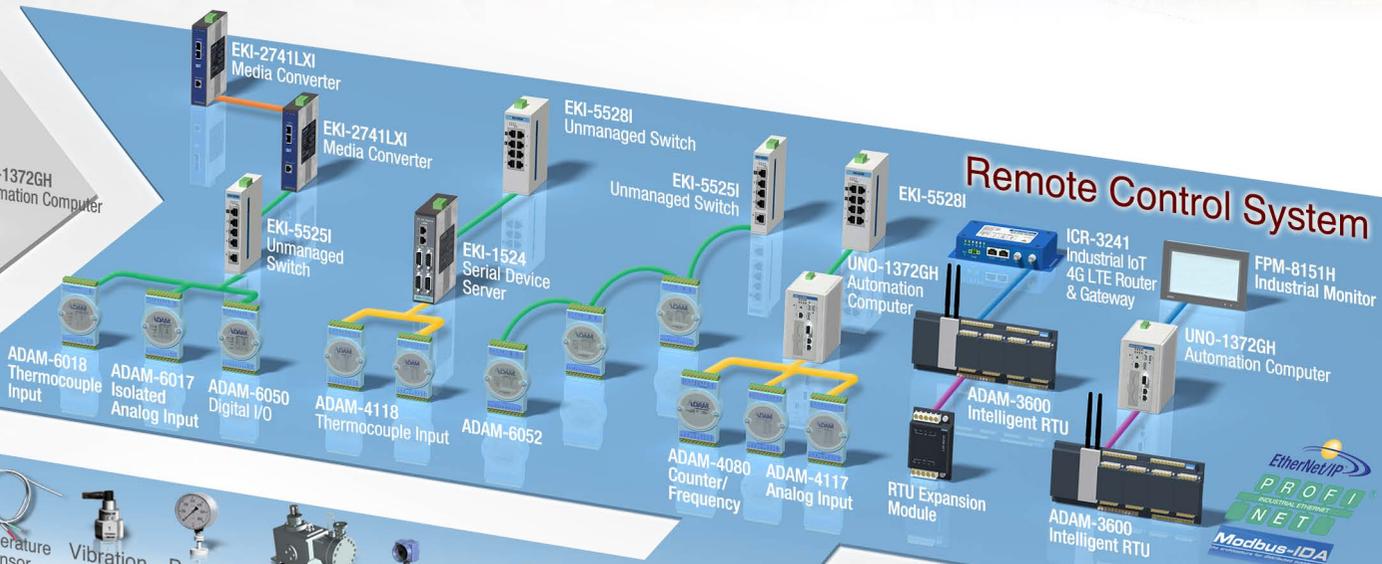| HMI/SCADA Software | Industrial PCs and Monitors | Industrial Ethernet Switches | Media Converters | S |
|---|---|---|---|---|

**Centralized Control System**

UNO-1372GH
Automation Computer

UNO-1372GH
Automation Computer

ADAM-6018
Thermocouple
Input

EKI-2741LXI
Media Converter

EKI-2741LXI
Media Converter

EKI-5528I
Unmanaged Switch

EKI-5525I
Unmanaged Switch

EKI-5528I

**Remote Control System**

EKI-5525I
Unmanaged
Switch

EKI-1524
Serial Device
Server

ICR-3241
Industrial IoT
4G LTE Router
& Gateway

FPM-8151H
Industrial Monitor

UNO-1372GH
Automation
Computer

UNO-1372GH
Automation Computer

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

RTU Expansion
Module

ADAM-3600
Intelligent RTU

ADAM-3600
Intelligent RTU

EtherNet/IP

PROFINET
INDUSTRIAL ETHERNET

Modbus-IDA

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

Pipeline

Gas Station

Central Control Room
(Non-hazardous Location)

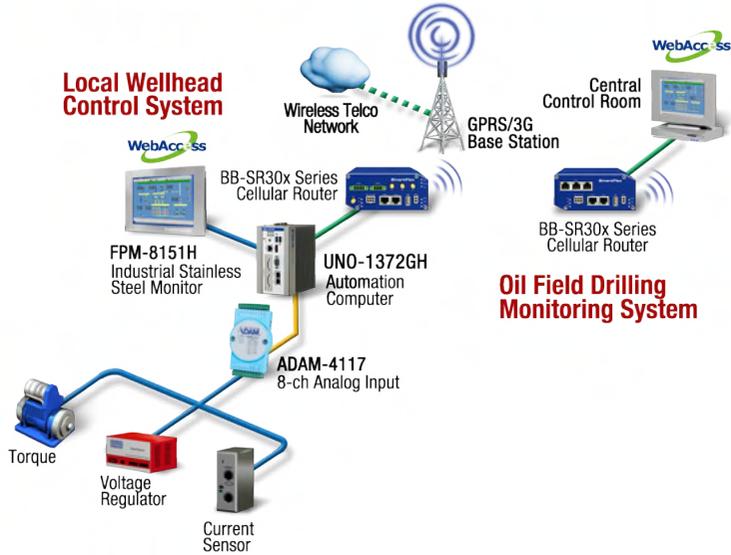| Serial Device Servers | Modbus Gateways | Domain-Focused Edge Gateways | Data Acquisition Modules | Repeaters / Converters | Remote Terminal Unit |
|---|---|---|---|---|---|

# Oil Field Drilling Monitoring System

Oil reservoirs typically extend over an area several hundred kilometers across. Full exploitation entails multiple wells scattered across an oil field. In addition, there may be exploratory wells probing the edges, pipelines to transport the oil elsewhere, and support facilities. Oil fields may be located far from civilization making logistics extremely complicated.



**Local Wellhead Control System**

WebAccess
Central Control Room

Wireless Telco Network

GPRS/3G Base Station

BB-SR30x Series Cellular Router

**FPM-8151H** Industrial Stainless Steel Monitor

**UNO-1372GH** Automation Computer

BB-SR30x Series Cellular Router

**Oil Field Drilling Monitoring System**

**ADAM-4117** 8-ch Analog Input

Torque

Voltage Regulator

Current Sensor

### ■ System Description

This system was created to help monitor the status of drills in an oilfield— automatically alerting technicians if the torque, voltage, current, or amp values exceed safe limits. These sensors are connected to an ADAM-4117, which is in turn connected to an UNO-1372GH for data processing and an FPM-8151H for local display and monitoring. This system is built at the base of the oil drill and connects back to the central control room through a BB-SR30x series cellular router. This enables the control room to monitor over 800 drills across multiple oil fields with the help of WebAccess.
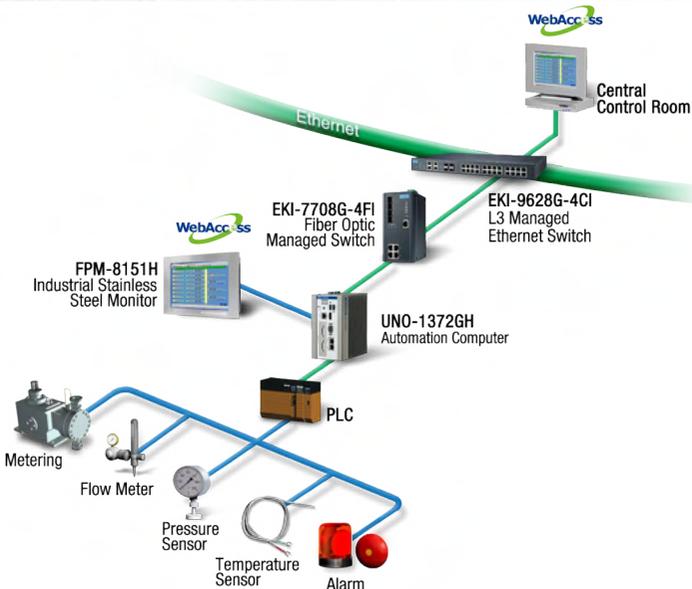
### ■ Benefits

Advantech WebAccess is a browser-based HMI/SCADA softwarepackage designed for powerful architectures with multiple SCADA servers and client applications. 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 for efficient remote diagnostics and maintenance.

# Pump Station Monitoring System

The oil and gas industry includes global processes of exploration, extraction, refining, transporting, and marketing. Oil is transported through cross continental pipelines using pump stations. It usually flows at an approximate speed of 1 ~ 6 m (3.2 ~ 19.6 ft) per second.



WebAccess
Central Control Room

Ethernet

**EKI-7708G-4FI** Fiber Optic Managed Switch

**EKI-9628G-4CI** L3 Managed Ethernet Switch

**FPM-8151H** Industrial Stainless Steel Monitor

**UNO-1372GH** Automation Computer

PLC

Metering

Flow Meter

Pressure Sensor

Temperature Sensor

Alarm

### ■ System Description

This monitoring system was placed every 30 km (18.6 mi) in 80 pump stations along a cross-continental pipeline. This system allows engineers to monitor all of the stations from a central control room through WebAccess. The pump stations themselves feature diverse installed sensors for metering pressure and temperature. These sensors are linked to a PLC which is connected to UNO-1372GH for data processing, and an FPM-8151H which enables local pump status checking by technicians. These devices are then connected to an EKI-7559SI, which transmits data back to a central control room through fiber optic cabling.

### ■ Benefits

Class I, Division 2 certification guarantees reliable performance in harsh environments. EKI-7708G's fiber optic capabilities helps central control room engineers view the status of each pump station, enabling fast and efficient response in an emergency.

# Oil Pipeline Monitoring

Oil pipelines are made from 0.91 ~ 1.82 m (3 ~ 6 ft) steel or plastic tubes. They have an inner diameter ranging between 10.1 to 121.9 cm (4 ~ 48 in). Most pipelines are buried at a typical depth of about 0.91 ~ 1.82 m (3 ~ 6 ft). As crude oil contains varying amounts of wax, buildups may occur within a pipeline. Often these pipelines are inspected and cleaned using pipeline inspection gauges. These gauges can detect anomalies in the pipes such as dents, metal loss/corrosion, cracking, or other mechanical damage.



**Leak Detection**

WebAccess

Central Control Room

Ethernet

EKI-5528I Unmanaged Switch

EKI-9628G-4CI L3 Managed Ethernet Switch

ADAM-6018 8-ch Isolated Thermocouple Input with 8-ch DO

ADAM-6017 8-ch Isolated Analog Input with 2-ch DO

ADAM-6050 18-ch Isolated Digital I/O

Flow Meter

Temperature Sensor

Pressure Sensor

Flow Meter

Vibration Sensor

Alarm

■ **System Description**

This system helps monitor and transmit the temperature, pressure, flow, and vibration data in an oil pipeline that stretches from China into Russia. Its sensors are connected to a series of ADAM modules— namely, ADAM-6017, ADAM-6018 and ADAM-6050. These modules help process and transmit data to a control room using an EKI- 5528I.
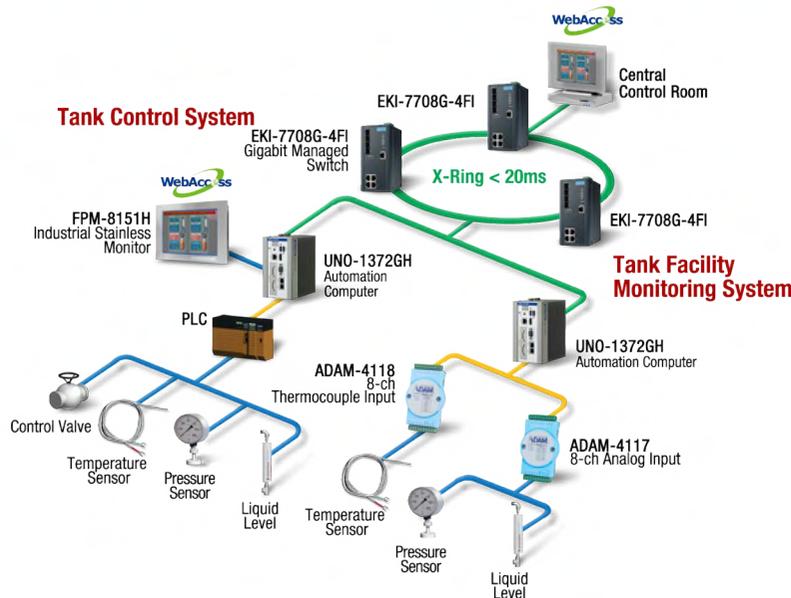
■ **Benefits**

ADAM-6018 is an excellent temperature data acquisition module for the industrial automation market. In addition to 8 T/C input channels, the ADAM-6018 is equipped with 8 digital output channels including auxiliary alarm outputs or pure outputs. ADAM-6017 is designed with 8 analog inputs and 2 digital outputs to satisfy industrial requirements. Each analog channel can configure an individual range for variety of applications. ADAM-6050 is a high-density I/O module featuring built-in a 10/100 based-T interface for seamless Ethernet connectivity. This module provides 12 digital input and 6 digital output channels with $2000V_{RMS}$ isolating protection.
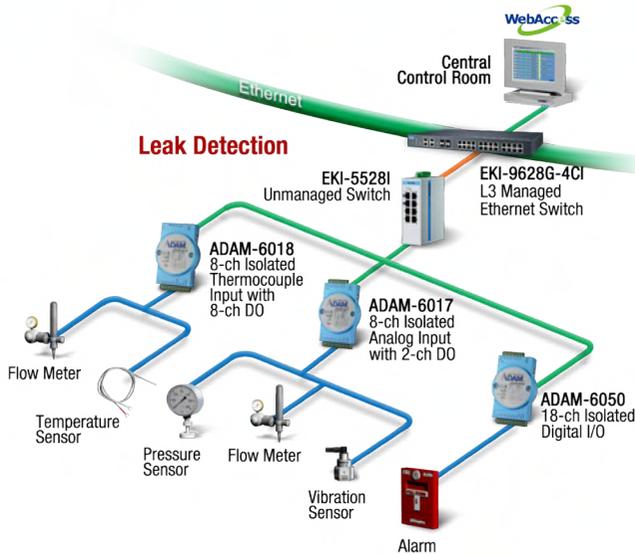
# Tank Storage Monitoring

This application was setup to help monitor a fueling operation. The information and 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.



**Tank Control System**

WebAccess

Central Control Room

EKI-7708G-4FI

EKI-7708G-4FI Gigabit Managed Switch

WebAccess

X-Ring < 20ms

EKI-7708G-4FI

FPM-8151H Industrial Stainless Monitor

UNO-1372GH Automation Computer

PLC

**Tank Facility Monitoring System**

UNO-1372GH Automation Computer

ADAM-4118 8-ch Thermocouple Input

ADAM-4117 8-ch Analog Input

Control Valve

Temperature Sensor

Pressure Sensor

Liquid Level

Temperature Sensor

Pressure Sensor

Liquid Level

■ **System Description**

The more than 400 Liquefied Natural Gas storage facilities connected to this system necessitate local tank control and remote monitoring. Most oil, fuel, or chemical storage units located in hazardous areas demand constant pressure, liquid levels, control valve, and temperature monitoring. A SCADA-based system for real-time data collection and transmission is essential for plant and personnel safety. A PLC is installed to handle local tank control. Data related to control and monitoring is processed by UNO-1372GH Atom E3845 1.91GHz computers and is accessible in the central control room through EKI-7708G Ethernet switches.
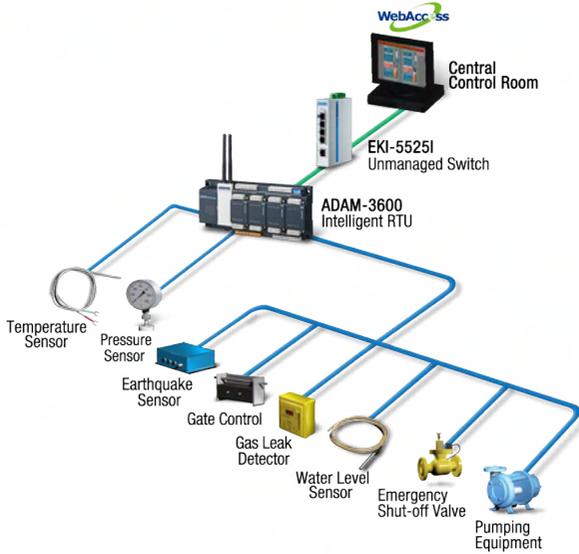
■ **Benefits**

In the remote monitoring system of local tanks, the temperature, pressure and liquid levels need to be sent to central control room. UNO-1372GH provides serial communication ports and fast Ethernet interfaces. ADAM-4117 AI and ADAM-4118 thermocouple modules take charge of pressure, liquid levels, and temperature data acquisition. Central control room technicians use Advantech's WebAccess, web-based SCADA software to analyze data from all of the fuel stations.

# Equipment Safety Status Monitoring

Supervisory control and data acquisition systems in refineries primarily acquire real-time factory meter data , alerts, and alert design. These systems then give immediate feedback to management systems.

**WebAccess**

Central Control Room

EKI-5525I
Unmanaged Switch

ADAM-3600
Intelligent RTU

Temperature Sensor

Pressure Sensor

Earthquake Sensor

Gate Control

Gas Leak Detector

Water Level Sensor

Emergency Shut-off Valve

Pumping Equipment

## ■ System Description

Unmanned compressor stations require reliable monitoring systems. The intelligent Remote Terminal Unit (RTU) is an ideal edge DAQ platform for local emergency control tasks as well as data acquisition and logging. It utilizes diverse I/O interfaces to gather data on several remote devices. It then preprocesses and converts data through communication protocols. Finally it transfers data via an EKI-5525I unmanaged Ethernet switch. EKI-5525I enables secure real-time monitoring in a control room. This solution enables managers to control and monitor situations as they arise.
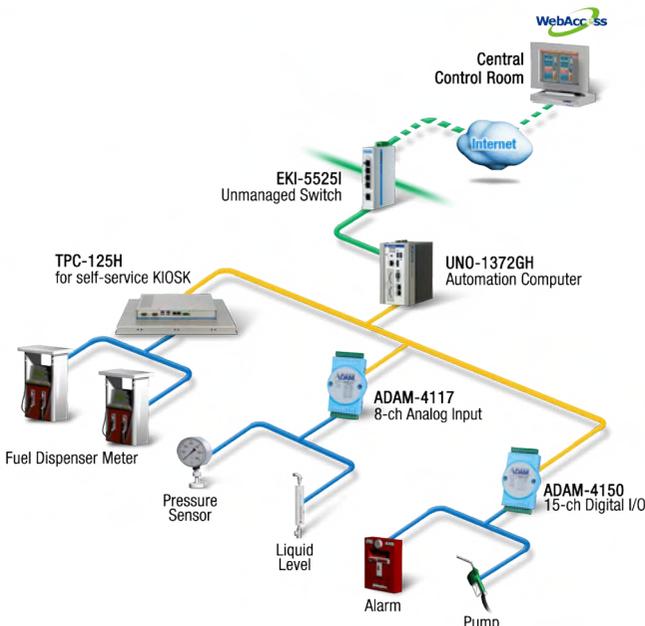
## ■ Benefits

Advantech's ADAM-3600 RTU delivers reliable and continuous monitoring capabilities; allowing compressor stations to operate safely even without technicians on hand, providing a safe and secure environment for gas compression and transportation.

# 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 streamlined the process of dispensing gasoline and is supported by real-time connectivity between the gas station and its corporate headquarters.

**WebAccess**

Central Control Room

EKI-5525I
Unmanaged Switch

Internet

TPC-125H
for self-service KIOSK

UNO-1372GH
Automation Computer

ADAM-4117
8-ch Analog Input

ADAM-4150
15-ch Digital I/O

Fuel Dispenser Meter

Pressure Sensor

Liquid Level

Alarm

Pump

## ■ System Description

This control and management platform is a turn-key solution UNO-1372GH integrated with ADAM-4000. The ADAM-4080 counter/ frequency Input module with two 32-bit counter input channels and a built-in programmable timer for frequency measurement helps manage the data gathered by fuel dispenser meters. ADAM-4117 analog input modules gather tank levels and pressure information. ADAM-4150 digital input/output modules are in charge of trigger alarms and pump on/off toggling. The control and management platform can transmit all information via EKI-5525I Ethernet switch to a designated location.

## ■ Benefits

In this application Advantech's turn-key system and software are a cost-effective solution. All the products installed provide excellent safety and 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 displays, and an user-friendly address mode for convenient address reading.

# Advantech WebAccess

Browser-based HMI and SCADA Software

## Powerful Architecture for Multiple SCADA Servers and Client Applications

Advantech WebAccess is a browser-based software package for human-machine interfaces (HMI), supervisory control, and data acquisition (SCADA). All the features found in conventional HMI and SCADA software packages including animated graphics displays, real-time data control, trends, alarms, and logs are available in an ordinary browser.  Advantech WebAccess is based on standard Internet architecture. Its basic components include SCADA node, project node, client and thin client. Advantech WebAccess also features the key functions below.



## Remote Diagnostics and Maintenance to Enhance Management Efficiency

Adventech's 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, the operator can use a web browser to remotely operate the system. This can significantly increase the efficiency of maintenance operations and reduce the corresponding costs.

## 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

Advantech WebAccess supports live full-motion video, audio, Adobe Flash, and Windows Media to increase operating efficiency. This enables the monitoring of trends, alarms, and data in a single display.

## Free Dynamic DNS Services to Reduce Infrastructure Construction Costs

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

## Centralized Data Gateway to WISE-PaaS Cloud Services

By configuring calculated and whitelisted data to WISE-PaaS Cloud services, data from different sites can be analyzed together for further centralized management. The analyzed information can provide advanced scope for resource consumption as well as equipment maintenance and forecasting, benefiting management scope and planning.

# 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.

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

| Model Name | ADAM-4015 | ADAM-4117 | ADAM-4118 | ADAM-4019+ | ADAM-4024 |
|---|---|---|---|---|---|
| Description | 6-ch RTD Module with Modbus | Robust 8-ch Analog Input Module with Modbus | Robust 8-ch Thermocouple Input Module with Modbus | 8-ch Universal Analog Input Module with Modbus | 4-ch Analog Output Module with Modbus |
| Resolution | 16-bit | | | | 12-bit |
| I/O Channel | AI: 6 differential | 8 differential | | | AO: 4; DI: 4 |
| AI Sampling Rate | 10 Hz | 10/100 Hz (total) | | 10 Hz | - |
| Certifications | Class I Division 2 Groups ABCD T5, RoHS, UL, CE, FCC | | | | |
| Operation Temperature | -10 ~ 70 °C (14 ~ 158 °F) | -40 ~ 85 °C (-40 ~ 185 °F) | | -10 ~ 70 °C (14 ~ 158 °F) | |

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

| Model Name | ADAM-4150 | ADAM-4051 | ADAM-4055 | ADAM-4056SO |
|---|---|---|---|---|
| Description | Robust 15-ch Digital I/O Module with Modbus | 16-ch Digital Input Module with Modbus | 16-ch Isolated Digital Input Module with Modbus | 12-ch Sink Type Isolated Digital Output Module with Modbus /12-ch Source Type Isolated Digital Output Module with Modbus |
| Channel | DI: 7; DO: 8; Counter: 7 (32-bit) | DI: 16 | DI: 8; DO: 8 | DO:12 Source type |
| Counter/pulse output | 3khz counter for DI, 1khz pulse output for DO | - | - | - |
| Certifications | Class I Division 2 Groups ABCD T5, RoHS, UL, CE, FCC | | | |
| Operation Temperature | -40 ~ 85 °C (-40 ~ 185 °F) | -10 ~ 70 °C (14 ~ 158 °F) | | |

## Dual Watchdog Timer

All ADAM-4100 robust family modules provide two watchdog timers. The 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 and High Reliability

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

## Ethernet I/O Modules - Analog Input/Output

| Model Name | ADAM-6015 | ADAM-6017 | ADAM-6024 | ADAM-6050 | ADAM-6051 | ADAM-6052 |
|---|---|---|---|---|---|---|
| Description | 7-ch Isolated RTD Input Modbus TCP Module | 8-ch Isolated Analog Input Modbus TCP Module with 2-ch DO | 12-ch Isolated Universal Input/Output Modbus TCP Module | 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 |
| Resolution | 16-bit | | 16-bit for AI / 12-bit for AO | - | - | - |
| AI/O Channel | 7 RTD | 8 AI | 6 AI / 2 AO | - | - | - |
| AI Sampling Rate | 10/100 Hz (total) | | 10 Hz (total) | - | - | - |
| DI/O Channel | - | 2 DO | 2 DI / 2 DO | 16DI (3khz counter)/ 6 DO (5khz pulse output) | 12DI (3khz counter)/ 2 counter (4.5khz )/ 2DO (5khz pulse output) | 8DI (3khz counter)/ 8 DO (5khz pulse output) |
| Certifications | Class I Division 2 Groups ABCD T5, RoHS, UL, CE, FCC | | | | | |
| Operation Temperature | -10 ~ 70 °C (14 ~ 158 °F) | -40 ~ 70 °C (-40 ~ 158 °F) | | | | |

## Repeaters / Converters

| Model Name | ADAM-4510I | ADAM-4520I |
|---|---|---|
| Description | Robust RS-422/485 Repeater | Robust RS-232 to RS-422/485 Converter |
| Network | RS-422/485 | RS-232/422/485 |
| Comm. Speed (bps) | 1,200 ~ 115.2k | |
| Comm. Distance | Serial: 1.2 km | |
| Isolation Voltage | 3,000 $V_{DC}$ | 1,000 $V_{DC}$ |
| Certifications | Class I Division 2 Groups ABCD T5, RoHS, UL, CE, FCC | |
| Operation Temperature | -40 ~ 85 °C (-40 ~ 185 °F) | |

## Repeaters / Converters

| Model Name | BB-485DRCI | BB-485DRCI-PH | BB-FOSTCDRI BB-FOSTCDRI-INV | BB-FOSTCDRI-PH-MT | BB-232OPDRI BB-485OPDRI | BB-232OPDRI-PH | BB-USR604 | BB-UHR304 BB-UHR307 | BB-UHR204 BB-UHR207 |
|---|---|---|---|---|---|---|---|---|---|
| Description | Industrial Isolated Converter | Hardened Industrial 2kV Isolated Converter | Industrial 2kV Isolated Serial to Fiber Converters | Hardened Industrial 2kV Isolated Serial to Fiber Converters | Industrial 2kV Isolated Repeaters | Hardened Industrial 2kV Isolated Repeater | 2kV Isolated Converter | 4kV Isolated  Hubs | Non-isolated Hubs |
| Connector 1 | DB9F | | Terminal block | | DB9F or  TB | | 4 DB9M | 4 or 7 Type A female | |
| Connector 2 | Terminal block | | Fiber, multi-mode, ST | | DB9M or  TB | | Type B | 1 Type B female | |
| Protocol | RS232 to RS422/485 | | Serial to fiber optic | | RS-232 or RS-422/485 | | USB 1.1/2.0 to serial | USB 1.1, 2.0 | |
| Isolation | 2kV (input, output, power) | | 2kV (input, output, power), EMI, RFI | | 2kV (input, output, power) | | 2kV isolation, 15kV air, 8kV ESD | 4kV isolation, 15kV air, 8kV ESD | - |
| Data Rate | Up to 115.2kbps | | | | | | 480 Mbps full-speed USB; 921.6 kbps serial | 12 Mbps, full-speed | 480 Mbps, high-speed |
| Operating Temperature | -40 ~ 80 °C (-40 ~ 176 °F) | -40 ~ 85 °C (-40 ~ 185 °F) | -40 ~ 80 °C (-40 ~ 176 °F) | -40 ~ 85 °C (-40 ~ 185 °F) | -40 ~ 80 °C (-40 ~ 176 °F) | -40 ~ 85 °C (-40 ~ 185 °F) | -40 ~ 80 °C (-40 ~ 176 °F) | | |
| Enclosure | IP 30, plastic | IP 30, metal | IP 20, plastic | IP 30, metal | | | | | |
| Mounting | 35mm DIN rail | Panel | 35mm DIN rail | Panel | 35mm DIN rail | Panel (DIN rail option) | DIN rail, panel | Desk, DIN rail, panel | |
| Power Input | 10 - 48$V_{DC}$ | | | | | | | 10 - 30$V_{DC}$ | |
| industrial Bus | Modbus ASCII, RTU, Allen-Bradley® DH-485 | | Modbus ASCII, RTU | | Model# BB-485OP-DRI: Modbus ASCII, RTU, Allen-Bradley® DH-485 | | Modbus ASCII, RTU | - | - |
| Special Features | - | - | Model# BB-FOSTCDRI-INV has inverted fiber state | - | Signal extension 15m/1.2km | Signal extension 15m/1.2km | High retention USB ports | | |
| Certifications | UL C1/D2, UL508, FCC, CE | UL C1/D2, FCC, CE | | | | | | UL C1/D2, FCC, CE. KCC (7-port only) | |

# Industrial Communication

Advantech provides interconnected solutions with industrial networking, device connectivity, and industrial wireless technology. With industrial-grade product design, Advantech's network communication 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 , Division 2 Groups A, B, C, D industrial communication solutions, including industrial ethernet switches, media converters, serial device servers, and modbus gateways.

## Industrial Ethernet Switch

| Model Name | EKI-2726FHPI | EKI-5524MMI/MMI-ST | EKI-5524SSI/SSI-ST | EKI-5525I | EKI-5526I | EKI-5526I-EI/MB/PN | EKI-5528-PNMA | EKI-5528I | EKI-5528I-EI/MB/PN |
|---|---|---|---|---|---|---|---|---|---|
| Description | 4GE PoE +2G SFP w/4 802.3at PoE Industrial Switch | 4+2MMF 10/100Mbps Switch, (w/ST), -40 ~ 75 ℃ (-40 ~ 167 °F) | 4+2SMF 10/100Mbps Switch, (w/ST), -40 ~ 75 ℃ (-40 ~ 167 °F) | 5-port 10/100Mbps Switch, -40 ~ 75 ℃ (-40 ~ 167 °F) | 16-port 10/100Mbps Switch, -40 ~ 75 ℃ (-40 ~ 167 °F) | 16FE Switch, ( w/ EtherNet/IP, TCP/IP or PROFINET) ,Wide Temperature | 8FE Switch with PROFINET MRP Master | 8-port 10/100Mbps Switch, -40 ~ 75 ℃ (-40 ~ 167 °F) | 8FE Switch with EtherNet/IP, TCP/IP or PROFINET, Wide Temperature |
| Port Number | 6 | 6 | 6 | 5 | 16 | 16 | 8 | 8 | 8 |
| Certification | CE, FCC, UL61010 | | | | | | | | |

| Model Name | EKI-5626CI | EKI-5626CI-EI/MB/PN | EKI-5629CI | EKI-5629CI-EI/MB/PN | EKI-5725I | EKI-5726FI | EKI-5726I | EKI-5728I | EKI-5729FI |
|---|---|---|---|---|---|---|---|---|---|
| Description | 16+2G Combo Gigabit Ind. Switch, -40 ~ 75 ℃ (-40 ~ 167 °F) | 16FE+2G Switch with EtherNet/IP, TCP/IP or PROFINET, Wide Temperature | 8+2G Combo Gigabit Switch, -40 ~ 75 ℃ (-40 ~ 167 °F) | 8FE+2G Switch with EtherNet/IP, TCP/IP, PROFINET, Wide Temperature | 5-port Full Giga-bit Ind. Switch, -40 ~ 75 ℃ (-40 ~ 167 °F) | 16G+2G Full Gigiabit Ind. Switch, -40 ~ 75 ℃ (-40 ~ 167 °F) | 16-port Full Gigabit Switch, -40 ~ 75 ℃ (-40 ~ 167 °F) | 8-port Ful Gigabit Switch, -40 ~ 75 ℃ (-40 ~ 167 °F) | 8G+2G Full Gigabit Switch, -40 ~ 75 ℃ (-40 ~ 167 °F) |
| Port Number | 18 | 18 | 10 | 10 | 5 | 18 | 16 | 8 | 10 |
| Certification | CE, FCC, UL61010 | | | | | | | | |

## Industrial Injector | Media Converter

| Model Name | EKI-2711HPI | EKI-2741FHPI | EKI-2741FPI | EKI-2742FPI | EKI-2541M/MI | EKI-2541S/SI |
|---|---|---|---|---|---|---|
| Description | High power 60W PoE Injector | Gigabit Media Converter SFP with 1x PoE 60W | Gigabit Media Converter SFP with 1x PoE 802.3at | Gigabit Media Converter SFP with 2x PoE 802.3at | Ethernet to multi-mode Fiber Media converter, (Wide Temperature) | Ethernet to single-mode fiber media converter, (Wide Temperature) |
| Port Number | 2 | 2 | 2 | 3 | 2 | 2 |
| Certification | UL61010 (UL508) C1D2 | | | | UL60950 C1D2 | |

## Serial Device Servers

| Model Name | | EKI-1521/I/CI | EKI-1522/I/CI | EKI-1524/I/CI |
|---|---|---|---|---|
| No. of Ethernet Port | | 2 | 2 | 2 |
| No. of Serial Port | | 1 | 2 | 4 |
| Ethernet Interface | | 10/100 Mbps | | |
| Serial Type | | RS-232/422/485 | | |
| Connector | Ethernet | 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 | | |

| Model Name | BB VESR901 BB-VESR902D |
|---|---|
| No. of Ethernet Port | 1 (RJ45) |
| Ethernet Interface | 10/100 |
| No. of Serial Port | 1 (DB9 or TB) ǀ 2 (TB) |
| Serial Type | RS-232/422/485 |
| Data Rate | Up to 230.4 kbps |
| Power | 10 to 48V DC |
| Operating Temperature | -40 ~ 85 °C (-40 ~ 185 °F) |
| Enclosure | IP30 |
| Mounting | 35mm DIN (panel option) |
| Certifications | FCC, CE, UL, UL C1/D2 |

## Modbus Gateways

| Model Name | EKI-1221 | EKI-1222 | EKI-1224 |
|---|---|---|---|
| No. of Ethernet Ports | 2 | 2 | 2 |
| No. of Serial Ports | 1 | 2 | 4 |
| Ethernet Interface | 10/100Mbps | | |
| Serial Type | RS-232/422/485, software selectable | | |
| Ethernet Feature | 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, UL/cUL 60950-1, FCC, CE, RoHS | | |

| Model Name | BB-MESR901 BB-MESR902T |
|---|---|
| No. of Ethernet Port | 1 (RJ45) |
| Ethernet Interface | 10/100 |
| Modbus | TCP, ASCII, RTU |
| No. of Serial Port | 1 (DB9 or TB) ǀ 2 (TB) |
| Serial Type | RS-232/422/485 |
| Data Rate | Up to 230.4 kbps |
| Power | 10 to 48V DC |
| Operating Temperature | -40 ~ 85 °C (-40 ~ 185 °F) |
| Enclosure | IP30 |
| Mounting | 35mm DIN (panel option) |
| Certifications | FCC, CE, UL, UL C1/D2 |

## Cellular Rouer and Gateways

| Model Name | SmartFlex BB-SR303, BB-SR305 | SmartFlex BB-SR300 |
|---|---|---|
| Type | Flexible 4G Router & IoT Gateway | Wired LAN Router |
| CPU / RAM | Cortex A8 CPU at 1GHz 256 MB flash memory, 512 MB RAM, 128kB M-RAM | Cortex A8 CPU at 1GHz 256 MB flash memory, 512 MB RAM, 128kB M-RAM |
| OS | Linux | Linux |
| SIM / Ethernet ports / Serial Ports | 2x SIM, 2x-5x (10/100Base-T), RS232* / RS422* / RS485* | 5x  (10/100Base-T) |
| Other Ports / Expansions | USB Host, I/O (2xIN, 1xOut), SD Card, PoE* (PD, PSE) | USB Host, I/O (2xIN, 1xOut), SD Card, PoE* (PD, PSE) |
| Wi-Fi / GNSS | Yes* / Yes* | Yes* / - |
| Operating Temperature | -40 ~ 75 °C (-40 ~ 167 °F) | -40 ~ 75 °C (-40 ~ 167 °F) |
| Casing | Plastic* / Metal* | Plastic* / Metal* |
| Certification | Anatel, CE, FCC/IC, UL C1D2/ATEX, E-Mark | Anatel, CE, FCC/IC, UL C1D2/ATEX, E-Mark |

# 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-1372GH, and Programmable Automation Controllers, the APAX series, to fulfill various application needs. Both the FPM and UNO-1372GH have passed Class I, Division 2 Groups A,B,C,D certification, which extends use to hazardous applications. UNO-1372GH is fanless, with no internal cabling and no moving parts, with a wide power input range and dual Ethernet to assure reliability and security.

## Industrial PCs and Monitors

| Model Name | | FPM-8151H | TPC-125H | TPC-1881WP |
|---|---|---|---|---|
| Display | Size (diagonal) | 15" XGA | 12" | 18.5" |
| | Resolution | 1024 x 768 | 1024 x 768 | 1366 x 768 |
| | Colors | 16.2 M | 16,2 M | 16.7 M |
| | Viewing Angle | 160, 140 | 178/178 | 170/160 |
| | Luminance | 350 | 600 | 300 |
| Direct VGA Input | | Yes | - | - |
| DVI Input | | Yes | - | - |
| Touchscreen (optional) | | Resistive | - | - |
| OSD (onscreen display) | | Yes | - | - |
| Power Adapter(voltage, AC) | | 100-240 V | 18 W (Typical) | 28W Typical, 60W Max. (Without Add-on card) |
| DC Power Input (voltage) | | 24 $V_{DC}$ | 24$V_{DC}$ +/- 20% | 24$V_{DC}$ +/- 20% |
| Front Panel Ingress Protection | | IP65 | - | - |
| Operating Temperature | | -20 ~ 60 °C (-4 ~ 140 °F) | - | - |
| Dimensions (W x H x D) | | 338 x 68 mm (16.61 x 13.31 x 2.68 in) | 311.8 x 238 x 55.4 mm (12.28 x 9.37 x 2.18 in) | 488 x 309 x 56.7 mm (19.21 x 12.17 x 2.23 in) |
| Certifications | | Class I Division 2 Groups ABCD T4, UL, CCC, CE, FCC Class A, RoHS | - | - |

## Embedded Automation Computer

| Model Name | UNO-410 | UNO-430 | UNO1372GH |
|---|---|---|---|
| Certification | C1D2, ATEX (opentype), CE, FCC, UL, CCC, BSMI | C1D2, ATEX (standalone), CE, FCC, UL, CCC, BSMI | C1D2, CE, FCC, UL, CCC, BSMI |
| Protection | IP40 | IP66 | IP40 |
| CPU | Intel Atom® X5-E3940, 1.8 GHz Quad Core | Intel Atom® X7-E3950, 2.0 GHz Quad Core | Intel Atom® E3845, 1.91 GHz Quad Core |
| Onboard RAM | Built-in 8GB DDR3L 1333 MHz, support up to 8GB | Built-in 8GB DDR3L 1333 MHz, support up to 8GB | Built-in 4GB DDR3L 1333 MHz, support up to 8GB |
| Battery-Backup RAM | - | - | - |
| Onboard Storage | - | - | - |
| Hardware Security | onboard TPM 2.0 | onboard TPM 2.0 | TPM 2.0 (optional) |
| Display | 2 x DP | - | 1 x VGA, 1 x HDMI |
| I/O | 2 x RS-232/422/485 (Terminal Block), 4 x USB3.1 Isolated 8DI/ 8DO, 2 X RJ45, 10/100/1000Mbps | 2 x isolated RS-422/485, 1 x RS-232 (console), 2 X RJ45, 10/100/1000Mbps | 1 x RS232, 1 x RS422/485, 1 x USB 3.0, 3 x USB 2.0, Isolated 4DI/ 4DO, 3 X RJ45, 10/100/1000Mbps, 1 x Line-Out |
| PCIe/PCI Expansion | 1*Full-size mPCle | 1 x M.2 B key 3042 for LTE module 1 x M.2 E key 2230 for Wifi module | 2*Full-size mPCle |
| Storage | 1 x M.2 B key (Both for 3042 LTE Module and 2242 SSD), 1 x 2.5" SSD bay | 1 x M.2 B-key (2242) | 1 x mSATA 1 x 2.5" HDD bay |
| SIM Card slot | 1 (nano) | 1 (standard) | NA |
| Operating Systems | Win10, Win10 LTSC, AdvLinux | Win10, Win10 LTSC, AdvLinux | WIN7/8, WES7, Win10 Ent., AdvLinux |
| Mounting | DIN rail mount | Wall mount | DIN rail/ Wall mount |
| Power Input Range | 10-36$V_{DC}$ | 10-36$V_{DC}$ | 10-36$V_{DC}$ |
| Operating Temperature | -40 ~ 70 °C (-40 ~ 158 °F) | -40 ~ 70 °C (-40 ~ 158 °F) | -20 ~ 60 °C (-4 ~ 140 °F) |
| Power Consumption | 35W (Typical), 55W (Max) | 15W (Typical), 30W (Max) | 24W(typical), 50W(Max) |
| Dimensions (W x D x H) | 35 x 105 x 150 mm (1.37 x 4.13 x 5.90 in) | 200 x 68 x 200 mm (7.87 x 2.67 x 5.90 in) | 85 x 139 x 152 mm (3.34 x 5.47 x 5.98 in) |
| Weight | 1 kg (2.2 lb) | 3 kg (6.61 lb) | 1.6 kg (3.52 lb) |

## Automation Controllers

### Remote Terminal Unit (RTU)

| Model Name | ADAM-3600 |
|---|---|
| Description | Intelligent RTU |
| CPU | Cortex A8 |
| RAM | DDR3L 256MB |
| On-Board IO | 8 analog inputs,<br>8 digital inputs,<br>4 digital outputs |
| Slot | 4 expansion slots |
| Wireless Communication | Cellular, Wi-Fi, Zigbee |
| Mini-PCIe | 1 x half-size, 1 x full-size |
| SIM Card Slot | Single SIM card slot / Dual SIM card slot |
| LAN | 2 |
| COM | 2 |
| USB | 1 |
| OS Version | Linux RT 3.12 |
| Certification | CE/FCC |

### Expansion Module for ADAM-3600

| Model Name | Category | Channel |
|---|---|---|
| ADAM-3617 | Analog input module | 4 |
| ADAM-3618 | Analog input module | 4, thermocouple |
| ADAM-3624 | Analog onput module | 4 |
| ADAM-3651 | Digital input module | 8 |
| ADAM-3656 | Digital output module | 8 |
| ADAM-3613 | Analog input module | 4, RTD |
| ADAM-3668 | Relay module | 4 |

| Analog Input | |
|---|---|
| Signal Input | Differential |
| Sampling Rate | 10 Hz |
| Voltage Input | '+/- 10 V, +/- 2.5 V |
| Input Current | 0~20 mA, 4~20 mA |
| Sensor Input | Thermocouple (type J, K, T, E, R, S, B)<br>RTD (Pt100, Pt1000, Balco 500, Ni 518) |
| ADAM-3613 | 16-bit |

| Analog Output | |
|---|---|
| Output Voltage | 0~10 V |
| Output Current | 0~20 mA, 4~20 mA |
| Resolution | '12-bit |

### Wide Array of Flexible I/Os
Wide array of on-board I/O and flexible expansion I/O modules supporting different acquisition requirements giving it a high cost performance

### Intelligent Connectivity Diagnosis Manager (iCD Manager)
Remotely monitor serial and Ethernet port status and send alarm information during communication failures to help improve intelligent monitoring.

| Digital Output | |
|---|---|
| Output Type | Open collect |
| Output Voltage | 8~30 $V_{DC}$ @ max 200 mA |

| Digital Input | |
|---|---|
| Input Type | Sink |
| Rated Voltage | 12/24 $V_{DC}$ |
| Logic "0" Voltage | '0~5 $V_{DC}$ |
| Logic "1" Voltage | 11~30 $V_{DC}$ |

### Wide Temperature Range
A -40 ~ 70 °C (-40 ~ 158 °F) operating temperature allows the ADAM-3600 to work in harsh environments and reduces maintenance costs for customers.

# Regional Service & Customization Centers

| China | Kunshan 86-512-5777-5666 | Taiwan | Taipei 886-2-7732-3399 | Netherlands | Eindhoven 31-40-267-7000 | Poland | Warsaw 00800-2426-8080 | USA | Milpitas, CA 1-408-519-3898 |

# Worldwide Offices

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| Taichung | 886-4-2372-5058 |
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| São Paulo | 55-11-5592-5367 |

**Mexico**
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| Mexico City | 52-55-6275-2727 |

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