7 DAQ and Communication Gateways

Intelligent Edge DAQ Devices

Introduction

In the Industrial IoT era, companies and government are seeking solutions that can help them to utilize data analytics to raise service levels, create better products, and reduce operational costs. Ideally, the first step is the digitalization of assets such as factory equipment and infrastructure facilities. This means that increasingly more data needs to be acquired and analyzed, and both the volume and diversity of such data from different assets are also increasing. Equipment manufacturers, owners, and maintainers require an easy and reliable way to collect and monitor data from all kinds of field sites.

Advantech's edge data acquisition solutions WISE-EdgeLink, Node-RED and Python are designed to simplify remote monitoring. These solutions can improve service quality by facilitating product care, enabling equipment operation monitoring, and allow for efficiency and energy consumption analysis. This allows manufacturers, rental services, and end users to obtain insights on usage behaviors by deriving intelligence through the analysis of big data.

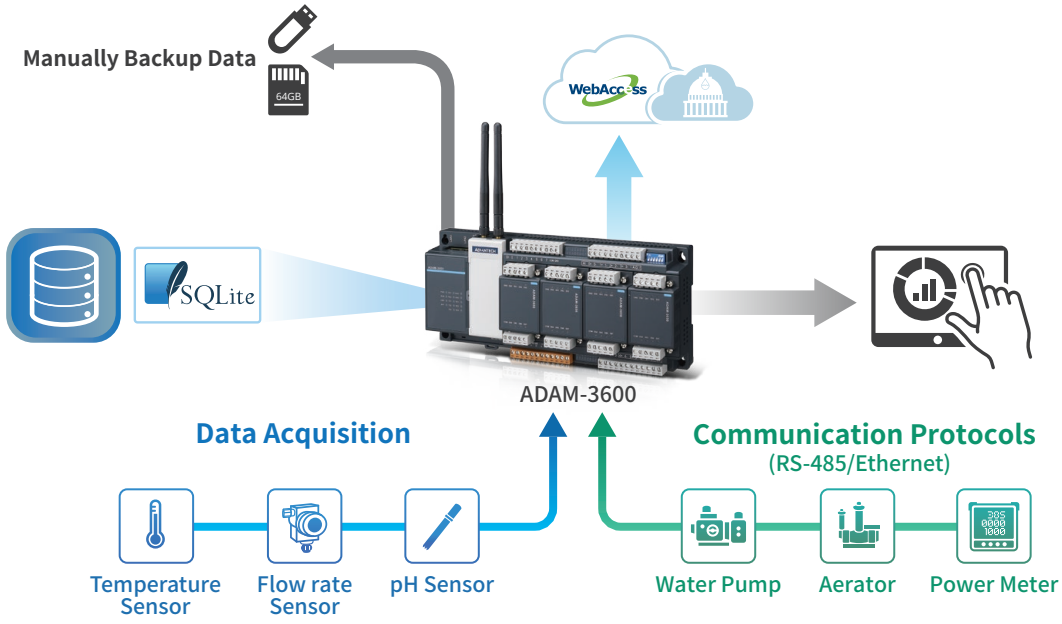
Edge DAQ Solutions

Advantech provides different types of edge data acquisition devices with various data monitoring software to meet your needs for data management.

ADAM-3600/ ECU-1155

Modular edge DAQ gateways

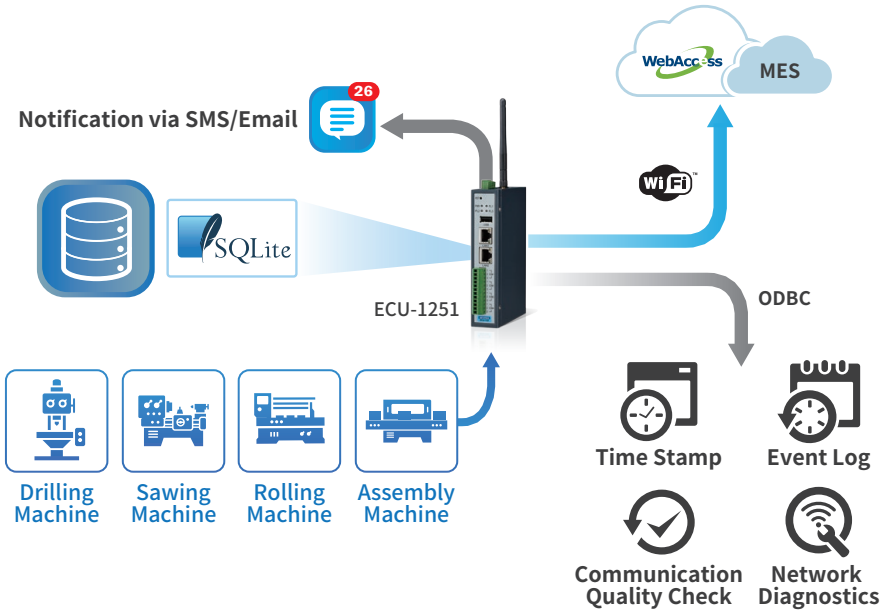
ADAM-3600 and ECU-1155 are intelligent Remote Terminal Units with multiple wireless function capability, multiple I/O selection, wide temperature range and support flexible communication protocols for oil, gas and water applications.



ECU-1000 Series

Intelligent communication gateways

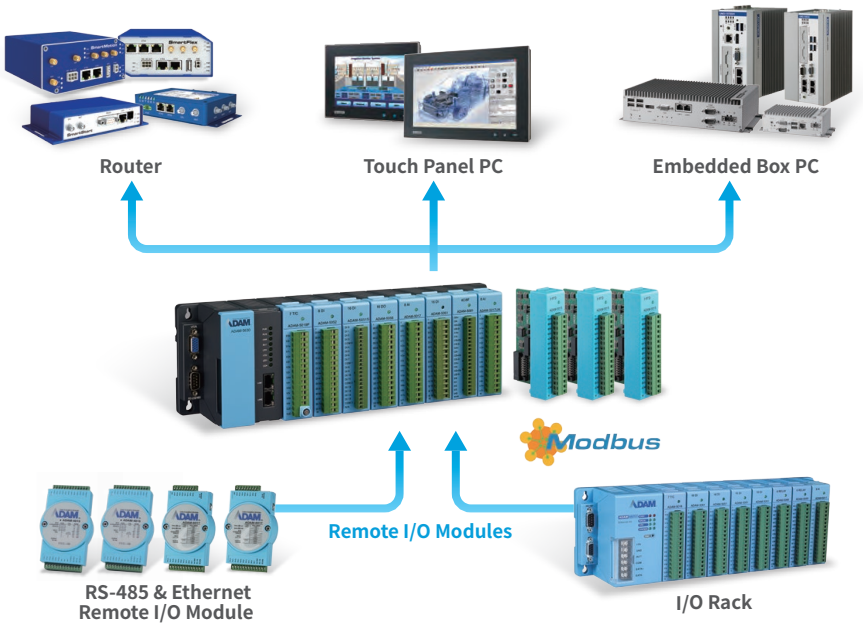
ECU-1000 series is a RISC-based gateway with robust platform design, wireless and Ethernet communication, multiple protocol support and WISE-EdgeLink integration. It is especially designed for energy management and equipment monitoring applications related to building, smart manufacturing, and substations.



ADAM-5630

Edge intelligent DAQ I/O racks

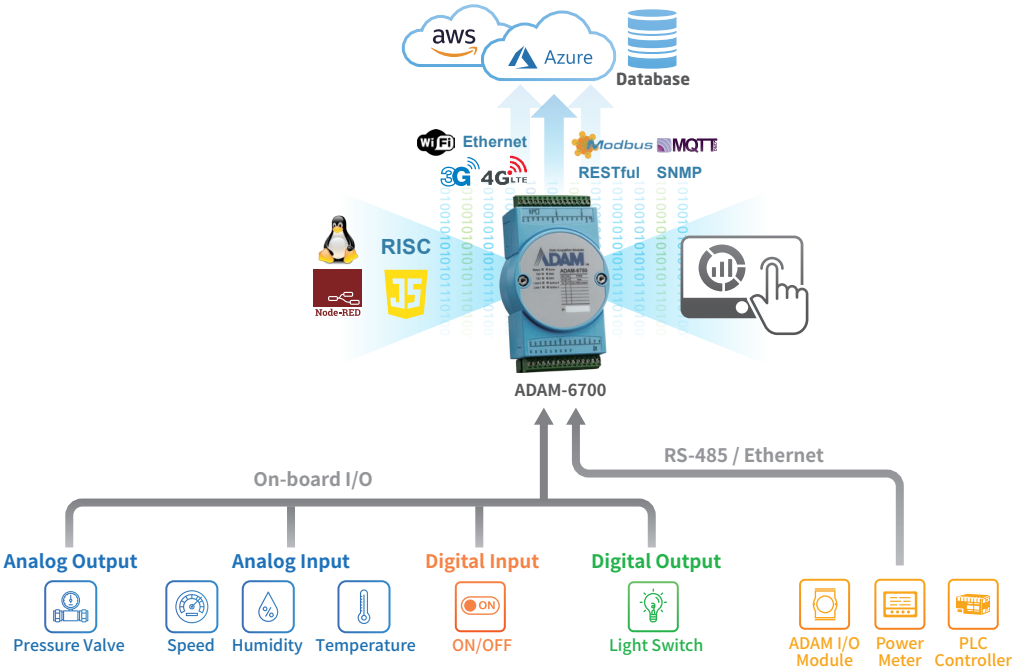
ADAM-5630 series is an edge intelligent I/O rack, featuring high performance open platform and able to develop various application programs. It also provides high expansion capability by supporting SNMP, Modbus/RTU and Modbus/TCP functions.



ADAM-6700

Intelligent I/O gateways

ADAM-6700 is the All-in-One intelligent I/O gateway offers an integrated solution in the form of a Linux-based gateway capable of performing multiple tasks at the edge. ADAM-6700 is equipped with a range of I/O for comprehensive data acquisition functionality.



Modular Edge DAQ Gateways

NEW

Model Name		ADAM-3600	ECU-1155
Description		Intelligent RTU	Container-Based Edge Intelligent Gateway
System	CPU	Cortex A8	Cortex-A9 DualLite 1GHz
	Operating system	Linux RT 3.12	Linux V4.19
	Programming interface	C (Linux), IEC-61131-3	C (Linux), IEC-61131-3
	Communication protocols	Modbus/RTU, Modbus/TCP, DNP3, IEC-60970-104, OPCUA	Modbus/RTU, Modbus/TCP, TCP/IP, DHCP, IEC104, MQTT, OPCUA
	Wireless communication	Cellular, Wi-Fi, Zigbee	Zigbee, Wi-Fi, Cellular
Serial Port	Number of ports	3	2
	Type	1 x RS-232/485, 2 x RS-485	2 x RS232/485, 2 x CAN
Network Port	Number of channels	2	2
	Number of independent IP addresses	2	2
	Speed	10/100 Mbps	10/100/1000 Mbps
	IP specifications	IPv4/IPv6	IPv4/IPv6
I/O	Onboard I/O	8 analog inputs, 8 digital inputs, 4 digital outputs	-
	Expansion slots	4	2
USB	USB2.0	1	1
Display Interface	VGA	1	-
	LED	System, serial, Ethernet, digital I/O, programmable	System, serial, Ethernet, digital I/O, programmable
Storage Interface	SD	1 x SD slot	1 x SD slot
Operating Temperature		-40~70 °C	-20~70 °C
Certification		CE/FCC	CE/FCC
Part Number		ADAM-3600-C2GL1A1E	ECU-1155

Expansion Modules

Model	Category	Channel	Part Number
ADAM-3617	Analog input module	4	ADAM-3617-AE
ADAM-3618	Analog input module	4, thermocouple	ADAM-3618-AE
ADAM-3624	Analog output module	4	ADAM-3624-AE
ADAM-3651	Digital input module	8	ADAM-3651-AE
ADAM-3656	Digital output module	8	ADAM-3656-AE
ADAM-3613	Analog input module	4, RTD	ADAM-3613-AE
ADAM-3668	Relay Module	4	ADAM-3668-AE

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) RTD (Pt100, Pt1000, Balco 500, Ni 518)
Resolution	16-bit

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

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}

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

Wireless Expansion Modules

96PD-RYUW131

Full/Half-sized mini card, supports 802.11bgn

1750006043 SMA(M) cable, 15 cm

1750000318 2-dBi antenna, 11 cm

96PD-EC25EFA

LTE CAT.4 Module with GNSS (Quectel EC25 series)

1750006264 SMA(F) cable, 15 cm

1750005865 Dipole antenna, 11 cm

Intelligent Communication Gateways




Model Name		ECU-1152TL	ECU-1251TL	ECU-1051TL	ECU-1050TL
Description		Industrial communication gateway	Industrial communication gateway	Industrial communication gateway	Industrial communication gateway
System	CPU	Cortex A8	Cortex A8	Cortex A8	Cortex A8
	Operating system	Linux RT 3.12	Linux RT 3.12	Linux RT 3.12	Linux RT 3.12
	Programming interface	C (Linux)	C (Linux)	C (Linux)	C (Linux)
	Wireless communication protocols	Modbus/RTU, Modbus/TCP, IEC-60870-101/104	Modbus/RTU, Modbus/TCP, IEC-60870-101/104	Modbus/RTU, Modbus/TCP, IEC-60870-101/104	Modbus/RTU, Modbus/TCP, IEC-60870-101/104
	Wireless communication	GRPS, 3G, LTE, Wi-Fi	GRPS, 3G, LTE, Wi-Fi	GRPS, 3G, LTE, Wi-Fi	GRPS, 3G, LTE, Wi-Fi
	Special functions	Monitoring, data identification, breakpoint transmission, initiative reporting	Monitoring, data identification, breakpoint transmission, initiative reporting	Monitoring, data identification, breakpoint transmission, initiative reporting	Monitoring, data identification, breakpoint transmission, initiative reporting
Serial Port	Number of ports	6	4	2	-
	Type	RS-232/485	RS-232/485	RS-232/485	-
Network Port	Number of channels	2	2	2	1
	Independent IP number	2	2	2	1
	Speed	10/100 Mbps	10/100 Mbps	10/100 Mbps	10/100 Mbps
	IP specifications	IPv4/IPv6	IPv4/IPv6	IPV4/IPV6	IPV4/IPV6
I/O	SIM card slot	1	1	2	2
	Expansion slots	1 x mini-pcie	1 x mini-pcie	1 x mini-pcie	2 x mini-pcie
USB	USB2.0	1	1	-	-
Display Interface	LED	PWR/Serial/Prog/LAN	PWR/Serial/Prog/LAN	PWR/Prog/LAN	PWR/Prog
Storage Interface	SD	1 x micro SD slot	1 x micro SD slot	1 x micro SD slot	1 x micro SD slot
Industry communication protocol		Modbus/ IEC-60870-104/BACnet IP/DNP3			
Programmable logic controller support		Siemens/Allen-Bradley/Schneider/Mitsubishi/Omron/Honeywell/Yokogawa/Delta/Panasonic			
Data logger		Realtime data logger			
Programing Support		Linux C, Web service API			
Operating Temperature		-40 ~ 70 °C	-40 ~ 70 °C	-40 ~70 °C	-40 ~70 °C
Certification		CE/FCC	CE/FCC	CE/FCC	CE/FCC
Part Number		ECU-1152TL-R11ABE	ECU-1251TL-R10AAE	ECU-1051TL-R10AAE	ECU-1050TL-R10AAE

Wireless Expansion Modules

96PD-RYUW131

Full/Half-sized mini card, supports 802.11bgn

1750006043 SMA(M) cable, 15 cm

1750000318 2-dBi antenna, 11 cm

96PD-EC25EFA

LTE CAT.4 Module with GNSS (Quectel EC25 series)

1750006264 SMA(F) cable, 15 cm

1750005865 Dipole antenna, 11 cm

Intelligent I/O Racks



System		☞ ADAM-5630	☞ ADAM-5630E	ADAM-5560
CPU		Cortex A8 600 MHz	Cortex A8 600 MHz	Intel Atom Z510P 1.1 GHz
RAM		512 MB DDR3L	512 MB DDR3L	1 GB DDR2 SDRAM
Flash ROM		-	-	-
Flash Memory		-	-	-
Flash Disk		1 GB	1 GB	-
OS		RT-Linux	RT-Linux	WinCE5.0/XP embedded
Control Software		Linux C SDK KW Softlogic	Linux C SDK KW Softlogic	ADAM-5560CE: C/C++ and .NET ADAM-5560KW: KW SoftLogic
Real-time Clock		✓	✓	✓
Watchdog Timer		✓	✓	✓
COM1		RS-232/485	RS-232/485	RS-232/485
COM2		RS-485	RS-485	RS-485
COM3		RS-485	RS-485	RS-232/485
COM4		RS-232/485	RS-232/485	RS-232/485
I/O Slots		4	8	7
Power Consumption		8W (for 5630 series only)		17 W
Isolation	Communication	2500 V_{DC} (COM1~COM3) (for 5630 series only)		2,500 V_{DC} (COM2 RS-485) 1,500 V_{DC} (COM1, COM3, COM4 RS-485)
	Communication Power	3,000 V_{DC}		
	I/O Module	3,000 V_{DC}		
Diagnosis	Status Display	Power, RUN, Error, BAT, user define (for 5630 series only)		Power, User Define
	Self Test	Yes, while ON		
	Software Diagnosis	✓		
Communication	Interface	RS-232/485		Ethernet (2 x RJ-45)
	Speeds	300 bps ~ 115.2 kbps		10/100 Mbps
	Max. Distance	4,000 feet (1.2 km)		100 m
	Max. Nodes	32	32	256 for Ethernet, 32 for RS-485
	Protocol	User Defined, Modbus/RTU Modbus/TCP, SNMP	User Defined, Modbus/RTU Modbus/TCP, SNMP	Modbus/RTU, Modbus/TCP
	Remote I/O	Modbus Device		
	Power Requirements	10 ~ +30 V_{DC}		
Environment	Operating Temperature	-20 ~ 70°C		0 ~ 55°C (32 ~ 131°F)
	Storage Temperature	-25 ~ 85°C (-13 ~ 185°F)		
	Humidity	5 ~ 95%		
Dimensions (mm)		231 x 110 x 75	355 x 110 x 75	355 x 110 x 75

Intelligent I/O Racks




System		☞ ADAM-5000/485	☞ ADAM-5000E	☞ ADAM-5000L/TCP	☞ ADAM-5000/TCP
CPU		80188	80188	RISC CPU	
RAM		-	-	4 MB	
Flash ROM (User AP)		-	-	512 KB	
Flash Memory (Data Storage)		-	-	-	
Flash Disk		-	-	-	
OS		-	-	Real-time OS	
Timer BIOS		-	-	-	
Real-time Clock		-	-	-	
Watchdog Timer		Yes			
I/O Slots		4	8	4	8
Power Consumption		3 W		4.0 W	5.0 W
Isolation	Communication	2,500 V_{DC}	3,000 V_{DC}	RS-485: 1,500 V_{DC}	
	Communication Power	3,000 V_{DC}			
	I/O Module	3,000 V_{DC}			
Diagnosis	Status Display	Power, CPU, Communication		Power, CPU, Error Diagnostic, Communication	
	Self Test	Yes, while ON			
	Software Diagnosis	✓			
Communication	Interface	RS-232/485 (2-wire)	RS-232/485 (2-wire)	Ethernet	
	Speeds (bps)	1,200, 2,400, 4,800, 9,600, 19.2 K, 38.4 K, 57.6 K, 115.2 K	1,200, 2,400, 4,800, 9,600, 19.2 K, 38.4 K, 57.6 K, 115.2 K	10 M, 100 M	
	Max. Distance	4,000 feet (1.2 km)	4,000 feet (1.2 km)	100 m without repeater	
	Data Format	Advantech protocol: N, 8, 1 Modbus protocol: N, 8, 1 N, 8, 2 E, 8, 1 O, 8, 1	Advantech protocol: N, 8, 1 Modbus protocol: N, 8, 1 N, 8, 2 E, 8, 1	TCP/IP	
	Max. Nodes	128	128	Depend on IP address	
	Protocols	ADAM ASCII/Modbus Protocol	ADAM ASCII/Modbus Protocol	Modbus/TCP	
	Remote I/O	-	-	20 nodes Modbus devices	
	Power Requirements	+10 ~ +30 V_{DC}			
Environment	Operating Temperature	-10 ~ 70°C (14 ~ 158°F)			
	Storage Temperature	-25 ~ 85°C (-13 ~ 185°F)			
	Humidity	5 ~ 95%			
Dimensions (mm)		231 x 110 x 75	355 x 110 x 75	231 x 110 x 75	355 x 110 x 75

Analog Input/Output Modules





Module		ADAM-5013	ADAM-5017	ADAM-5017P	ADAM-5017UH	ADAM-5018
Analog Input	Resolution	16 bit	16 bit	16 bit	12 bit	16 bit
	Input Channel	3	8	8	8	7
	Sampling Rate	10 (total*)	10 (total*)	10 (total*)	200K**	10 (total*)
	Voltage Input	-	±150 mV, ±500 mV ±1 V, ±5 V, ±10 V	±150 mV, ±500 mV ±15V, ±10V, ±5 V, ±1 V 0 ~ 150mV, 0 ~ 500mV 0 ~ 1V, 0 ~ 5V, 0 ~ 10V 0 ~ 15V	±10 V, 0 ~ 10 V	±15 mV, ±50 mV ±100 mV, ±500 mV ±1 V, ±2.5 V
	Current Input	-	±20 mA	±20 mA, 4 ~ 20mA	0 ~ 20 mA, 4 ~ 20 mA	±20 mA
	Direct Sensor Input	Pt or Ni RTD	-	-	-	J, K, T, E, R, S, B
Isolation		3,000 V_{DC}	3,000 V_{DC}	3,000 V_{DC}	3,000 V_{DC}	3,000 V_{DC}

*Sampling rate value depends on used channel number.
Example: Using 5 channels on ADAM-5017, sampling rate for each used channel will be 10/5 = 2 samples/second.
**The sampling rate varies with the controller.






Module		ADAM-5018P	ADAM-5024	ADAM-5050	ADAM-5051 ADAM-5051D ADAM-5051S	ADAM-5052	ADAM-5053S
Analog Input	Resolution	16 bit	-	-	-	-	-
	Input Channel	7	-	-	-	-	-
	Sampling Rate	10 (total*)	-	-	-	-	-
	Voltage Input	±15 mV, ±50 mV ±100 mV, ±500 mV ±1 V, ±2.5 V	-	-	-	-	-
	Current Input	4 ~ 20 mA	-	-	-	-	-
	Direct Sensor Input	J, K, T, E, R, S, B	-	-	-	-	-
Analog Output	Output Channels	-	4	-	-	-	-
	Resolution	-	12 bit	-	-	-	-
	Voltage Output	-	0 ~ 10 V	-	-	-	-
	Current Output	-	0 ~ 20 mA 4 ~ 20 mA	-	-	-	-
Digital Input and Digital Output	Digital Input Channels	-	-	16 DI/O (bit-wise selectable)	16 (ADAM-5051) 16w/LED (5051D/5051S)	8	32
	Digital Output Channels	-	-		-	-	-
Isolation		3,000 V_{DC}	3,000 V_{DC}	-	2,500 V_{DC} (5051S)	5,000 V_{RMS}	2,500 V_{DC}

*Sampling rate value depends on used channel number.
Example: Using 6 channels on ADAM-5017, sampling rate for each used channel will be 12/6 = 2 samples/second.

Intelligent I/O Racks

Digital Input/Output Modules





Module		ADAM-5055S	ADAM-5056 ADAM-5056D	ADAM-5056S ADAM-5056SO	ADAM-5057S	ADAM-5060
Digital Input and Digital Output	Digital Input Channels	8 w/LED	-	-	-	-
	Digital Output Channels	8 w/LED	16 (ADAM-5056) 16 w/LED (ADAM-5056D)	16 w/LED	32	6 relay (2 form A/4 form C)
Isolation		2,500 V_{DC}	-	2,500 V_{DC}	2,500 V_{DC}	-






Module		ADAM-5069	ADAM-5080	ADAM-5081	ADAM-5090 ADAM-5091	ADAM-5191	ADAM-5192
Digital Input and Digital Output	Digital Input Channels	-	-	-	-	-	-
	Digital Output Channels	8 power relay (form A)	-	-	-	-	-
Counter (32-bit)	Channels	-	4	4/8	-	-	-
	Input Frequency	-	0.3 ~ 1000 Hz max. (frequency mode) 5000 Hz max. (counter mode)	5 Hz ~ 1 MHz max. (frequency mode) 1 MHz max. (counter mode)	-	-	-
	Mode	-	Frequency, Up/ Down Counter, Bi-direction Counter	Frequency, Counter (Up/Down, Bi-direction, Up, A/B Phase)	-	-	-
Communication	Channels	-	-	-	4	4 (ADAM-5630 only)	2
	Type	-	-	-	RS-232/422/485	RS-232/422/485	LAN (ADAM-5630 only)
Isolation		-	1,000 V_{RMS}	2,500 V_{DC}	-	1,000 V_{DC}	

Intelligent I/O Gateways



		ADAM-6750	ADAM-6717	ADAM-6760D
CPU		ARM Cortex-A8 32-Bit 1GHz		
Memory		NAND flash 512MB		
RAM		DDR3L 512MB		
External storage		microSD (Optional)		
OS		Real-time Linux V3.12		
Programming		Node-Red(Graphic programming environment based on javascript),Linux C		
Operation Temperature		-40 ~ 70°C		
Interface	RS-485	2	2	2
	LAN	2	2	2
	USB	1 x USB type A, 1 x Micro USB		
Digital input	Channel	12	5	14
	Type	Dry contact logic 0 close to ground logic 1 Open Wet contact logic 0: 0 ~ 3 V_{DC} logic 1: 10 ~ 30 V_{DC}	Dry contact logic 0 close to ground logic 1 Open Wet contact logic 0: 0 ~ 3 V_{DC} logic 1: 10 ~ 30 V_{DC}	Dry contact logic 0 close to ground logic 1 Open Wet contact logic 0: 0 ~ 3 V_{DC} logic 1: 10 ~ 30 V_{DC}
	Counter input	3kHZ	-	-
Digital Output	Channel	12	4	6
	Voltage	Sink 30 V_{DC}, 0.1A max. per channel	Sink 30 V_{DC}, 0.1A max. per channel	Sink 30 V_{DC}, 0.1A max. per channel
	Pulse output	3kHz	-	-
Analog input	Channel	-	8	-
	Sampling rate	100kHZ (total)		
Relay output	Channel	-	-	8
	Contact rating (Resistive Load)	-	-	60 V_{DC} @ 0.6 A
Dimensions (W x L x H)		70 x 122 x 38 mm		

Intelligent I/O Gateways



		ADAM-6715	ADAM-6718	ADAM-6724
CPU		ARM Cortex-A8 32-Bit 1GHz		
Memory		NAND flash 512MB		
RAM		DDR3L 512MB		
External storage		microSD (Optional)		
OS		Real-time Linux V3.12		
Programming		Node-Red(Graphic programming environment based on javascript),Linux C		
Operation Temperature		-40 ~ 70°C		
Interface	RS-485	2	2	2
	LAN	2	2	2
	USB	1 x USB type A, 1 x Micro USB		
Digital input	Channel	4	4	5
	Type	Dry contact logic 0 close to ground logic 1 Open Wet contact logic 0: 0 ~ 3 V_{DC} logic 1: 10 ~ 30 V_{DC}	Dry contact logic 0 close to ground logic 1 Open Wet contact logic 0: 0 ~ 3 V_{DC} logic 1: 10 ~ 30 V_{DC}	Dry contact logic 0 close to ground logic 1 Open Wet contact logic 0: 0 ~ 3 V_{DC} logic 1: 10 ~ 30 V_{DC}
Digital Output	Channel	4	7	6
	Voltage	Sink 30 V_{DC}, 0.1A max. per channel	Sink 30 V_{DC}, 0.1A max. per channel	Sink 30 V_{DC}, 0.1A max. per channel
	Pulse output	3kHz	-	-
RTD	Channel	6	-	-
	Type	Pt100,Pt1000	-	-
Thermocouple	Channel	-	7	-
	Type	-	J, K, T, E, R, S, B type	-
Analog Output	Channel	-	-	3
	Type	-	-	Voltage,Current
Analog Input	Channel	-	-	3
	Type	-	-	Voltage,Current
Dimensions (W x L x H)		70 x 122 x 38 mm		