

## 9

## Remote I/O, Wireless Sensing Modules and Converters

- ☞ 9-2 Wireless IoT Sensing Devices
- ☞ 9-9 Serial and USB Converters
- ☞ 9-17 Ethernet I/O Modules
- ☞ 9-21 RS-485 I/O Modules



# Wireless IoT Sensing Devices

## Overview

Designed to be a complete IoT sensing solution, the WISE-4000 series goes beyond merely providing wireless communication for sensors—it also provides cloud connectivity for additional user applications. With support for IoT protocols such as MQTT, the WISE-4000 series can communicate with cloud services or other web services via secure web sockets. For wide area communication, WISE-4000 I/O modules and sensor nodes have been designed with LPWAN, LoRa, NB-IoT/LTE-M, 4G/LTE, and IP65-rated features, making them highly suitable for many kinds of industrial application. WISE-2000 sensor devices are all-in-one devices designed for specific applications and domain focused scenarios.

### IoT wireless I/O module and sensor node with modularized high adaptability design

Low Power Wide Area Networks (LPWAN) are created for Machine-to-Machine (M2M) and Internet of Things (IoT) networks. They are not a single technology, but rather a variety of low-power, wide area network technologies. Compared with a traditional mobile network, LPWANs are known for offering low power efficiency and longer range transmission. To shorten the gap between field site data and the cloud, WISE-4000 series provides wireless I/O and sensor modules that can get and pass data directly to the cloud by utilizing a variety wireless communication technologies.

For more domain focussed applications, WISE-2000 series offers a wireless and sensing all-in-one solution to simplify and accelerate the implementation of IoT applications. Industrial BB-WSx wireless edge sensor starter kits and nodes create a low power, dynamic and scalable mesh network that does not disrupt existing networks. Starter kits provide Node-RED dashboards and Advantech WISE-PaaS cloud connectivity.



# Wireless IoT Sensing Devices: Sensor Nodes

## WISE-4610 Series



|                         | Industrial LoRa/LoRaWAN Wireless Module                                                                                                                                                              |                              |                              |                                   | Industrial LoRa/LoRaWAN Wireless Module          |                                                             |                              |                                          |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|------------------------------|-----------------------------------|--------------------------------------------------|-------------------------------------------------------------|------------------------------|------------------------------------------|
| Model Name              | <a href="#">WISE-4610-NA</a>                                                                                                                                                                         | <a href="#">WISE-4610-EA</a> | <a href="#">WISE-4610-JA</a> | <a href="#">WISE4610JA 2001-T</a> | <a href="#">WISE-4610-NA</a>                     | <a href="#">WISE-4610-EA</a>                                | <a href="#">WISE-4610-JA</a> | <a href="#">WISE4610 JA2001-T</a>        |
| Frequency Range         | US 902~923 MHz                                                                                                                                                                                       | EU 863~870 MHz               | AS 923~923.5 MHz             | AS923-923.MHz                     | US 902~923 MHz                                   | EU 863~870 MHz                                              | AS 923~923.5 MHz             | AS923-923.MHz                            |
| Function                | Wireless Board                                                                                                                                                                                       |                              |                              |                                   | Wireless Board                                   |                                                             |                              |                                          |
| Positioning             | GPS/Galileo/BeiDou/GLONASS                                                                                                                                                                           |                              |                              |                                   | -                                                |                                                             |                              |                                          |
| Power Input             | 4100 mAh Lithium Rechargeable Battery                                                                                                                                                                |                              |                              |                                   | -                                                |                                                             |                              |                                          |
|                         | 10~50V <sub>DC</sub> External Power                                                                                                                                                                  |                              |                              |                                   | 10~50V <sub>DC</sub> External Power              |                                                             |                              |                                          |
|                         | 17~21V <sub>DC</sub> Solar Panel                                                                                                                                                                     |                              |                              |                                   | 17~21V <sub>DC</sub> Solar Panel                 |                                                             |                              |                                          |
| Configuration Interface | Micro-B USB                                                                                                                                                                                          |                              |                              |                                   | Micro-B USB                                      |                                                             |                              |                                          |
| I/O Module              |                                                                                                                                                                                                      |                              |                              |                                   |                                                  |                                                             |                              |                                          |
| Model Name              | WISE-S614-A                                                                                                                                                                                          | WISE-S614T-A                 | WISE-S615-A                  | WISE-S615T-A                      | WISE-S617-A                                      | WISE-S617T-A                                                | WISE-S672-A                  | WISE-S600 / WISE-S600T                   |
| Spec                    | 4AI&4DI (M12)                                                                                                                                                                                        | 4AI&4DI (Terminal Block)     | 4RTD (M12)                   | 4RTD (Terminal Block)             | 2AI,2DI, 1DO&1RS-485 with 12V power output (M12) | 2AI,2DI, 1DO&1RS-485 with 12V power output (Terminal Block) | 6DI,1RS- 485 & 1RS- 485/ 232 | Upon Customization Request *MOQ required |
| WISE-4610 Optional      | 1654011516-01 M12, A-code, 8 Pin, Male<br>1655005903-01 M12, A-code, 4 Pin, Female<br>1700028162-01 M12, A-code, 4 pin, Female with 1M cable<br>1700028163-01 M12, A-code, 8 Pin, Male with 1M cable |                              |                              |                                   |                                                  |                                                             |                              |                                          |

## WISE-4220 Series



|                         | WiFi 2.4G Wireless Module           |                  |               |                               | Built-in Temperature & Humidity Sensor*  |
|-------------------------|-------------------------------------|------------------|---------------|-------------------------------|------------------------------------------|
| Model Name              | <a href="#">WISE-4220-A</a>         |                  |               |                               | <a href="#">WISE-4220-S231A</a>          |
| Standard                | 802.11 b/g/n                        |                  |               |                               |                                          |
| Frequency               | 2.4G                                |                  |               |                               |                                          |
| Function                | Wireless Board                      |                  |               |                               |                                          |
| Power Input             | 10~50V <sub>DC</sub> External Power |                  |               |                               |                                          |
| Configuration Interface | Micro-B USB                         |                  |               |                               |                                          |
| Outdoor Range (LOS)     | 100m                                |                  |               |                               |                                          |
| I/O Module              |                                     |                  |               |                               |                                          |
| Model Name              | WISE-S214-A                         | WISE-S250-A      | WISE-S251-A   | WISE-S200-A                   | WISE-S235SL-A                            |
| Spec                    | 4AI&4DI                             | 6DI, 2DO&1RS-485 | 6DI & 1RS-485 | Stack Light Monitoring Sensor | Upon Customization Request *MOQ required |

\*Modularization doesn't effect on WISE-4220-S231 series

- 1 IoT Software Solutions
- 2 Edge AI and SKY Servers
- 3 Intelligent Systems
- 4 Machine Vision Solutions
- 5 Intelligent HMI and Monitors
- 6 Automation Computers
- 7 DAQ and Communication Gateways
- 8 Industrial Communication
- 9 Remote I/O, Wireless Sensing Modules and Converters
- 10 Intelligent Motion Control Solutions
- 11 EtherCAT Solutions and Automation Controllers
- 12 Industrial I/O Solutions
- 13 Intelligent Transportation Platforms
- 14 Utility and Energy Solutions

# Wireless IoT Sensing Devices: Sensor Nodes

## WISE-4671 Series



| Advanced Industrial Cat.NB1/Cat.M1 Wireless Module |                                                                                                                                                                                                      |                            |             |                       |                              |                                         |                           |                                             |                               |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-------------|-----------------------|------------------------------|-----------------------------------------|---------------------------|---------------------------------------------|-------------------------------|
| Model Name                                         | WISE-4671-UA                                                                                                                                                                                         |                            |             |                       |                              |                                         |                           |                                             |                               |
| Standard                                           | 3GPP Release13                                                                                                                                                                                       |                            |             |                       |                              |                                         |                           |                                             |                               |
| Band                                               | B2,3,4,8,12,13,20,28                                                                                                                                                                                 |                            |             |                       |                              |                                         |                           |                                             |                               |
| SIM Type                                           | Nano SIM/4FF                                                                                                                                                                                         |                            |             |                       |                              |                                         |                           |                                             |                               |
| Function                                           | Wireless Board                                                                                                                                                                                       |                            |             |                       |                              |                                         |                           |                                             |                               |
| Positioning                                        | GPS/Galileo/BeiDou/GLONASS                                                                                                                                                                           |                            |             |                       |                              |                                         |                           |                                             |                               |
| Power Input                                        | 4100 mAh Lithium Rechargeable Battery<br>10~50V <sub>DC</sub> External Power<br>17~21 V <sub>DC</sub> Solar Panel                                                                                    |                            |             |                       |                              |                                         |                           |                                             |                               |
| Configuration Interface                            | Micro-B USB                                                                                                                                                                                          |                            |             |                       |                              |                                         |                           |                                             |                               |
| I/O Module                                         |                                                                                                                                                                                                      |                            |             |                       |                              |                                         |                           |                                             |                               |
| Model Name                                         | WISE-S614-A                                                                                                                                                                                          | WISE-S614T-A               | WISE-S615-A | WISE-S615T-A          | WISE-S617-A                  | WISE-S617T-A                            | WISE-S672-A               | WISE-S600/<br>WISE-S600T                    | WISE-S235SL-A                 |
| Spec                                               | 4AI & 4DI (M12)                                                                                                                                                                                      | 4AI & 4DI (Terminal Block) | 4RTD (M12)  | 4RTD (Terminal Block) | 2AI,2DI, 1DO & 1RS-485 (M12) | 2AI,2DI, 1DO & 1RS-485 (Terminal Block) | 6DI,1RS-485 & 1RS-485/232 | Upon Customization Request<br>*MOQ required | Stack Light Monitoring Sensor |
| WISE-4671 Optional                                 | 1654011516-01 M12, A-code, 8 Pin, Male<br>1655005903-01 M12, A-code, 4 Pin, Female<br>1700028162-01 M12, A-code, 4 pin, Female with 1M cable<br>1700028163-01 M12, A-code, 8 Pin, Male with 1M cable |                            |             |                       |                              |                                         |                           |                                             |                               |

## WISE-4471 Series



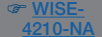
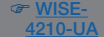
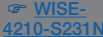
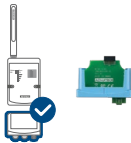
| Industrial Cat.NB1/Cat.M1 Wireless Module |                                     |                    |               |                                   |                                             |                               |
|-------------------------------------------|-------------------------------------|--------------------|---------------|-----------------------------------|---------------------------------------------|-------------------------------|
| Model Name                                | WISE-4471-UA                        |                    |               |                                   |                                             |                               |
| Standard                                  | 3GPP Release 13                     |                    |               |                                   |                                             |                               |
| Band                                      | B2,3,4,5,8,12,13,20,28              |                    |               |                                   |                                             |                               |
| SIM Type                                  | Micro SIM/3FF                       |                    |               |                                   |                                             |                               |
| Function                                  | Wireless Board                      |                    |               |                                   |                                             |                               |
| Power Input                               | 10~50V <sub>DC</sub> External Power |                    |               |                                   |                                             |                               |
| Configuration Interface                   | Micro-B USB                         |                    |               |                                   |                                             |                               |
| I/O Module                                |                                     |                    |               |                                   |                                             |                               |
| Model Name                                | WISE-S214-A                         | WISE-S250-A        | WISE-S251-A   | WISE-S472-A                       | WISE-S200-A                                 | WISE-S235SL-A                 |
| Spec                                      | 4AI & 4DI                           | 6DI, 2DO & 1RS-485 | 6DI & 1RS-485 | 1DI, 1RS-485 & 1RS-485 or 1RS-232 | Upon Customization Request<br>*MOQ required | Stack Light Monitoring Sensor |



# Wireless IoT Sensing Devices: Sensor Nodes

## WISE-4210/WISE-221x Series



|                         | Proprietary LPWAN(SUB-G) Wireless Module                                                         |                                                                                                  |                                                                                                |                                                                                                | Proprietary LPWAN(SUB-G) Built-in Temperature & Humidity Sensor*                                   |                                                                                                      | Propriety LPWAN (SUB-G) Wireless CT Node                                                         | Propriety LPWAN (SUB-G) Wireless Analog Input Modules                                            |
|-------------------------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Function                | AP                                                                                               |                                                                                                  | Node/Wireless Board                                                                            |                                                                                                | Sensor Node                                                                                        |                                                                                                      | Self-Powered Node                                                                                |                                                                                                  |
| Model Name              |  WISE-4210AP-NA |  WISE-4210AP-UA |  WISE-4210-NA |  WISE-4210-UA |  WISE-4210-S231NA |  WISE-4210-S231UA |  WISE-2210-NA |  WISE-2211-NA |
| Frequency               | 868MHz/923MHz                                                                                    | 433MHz                                                                                           | 868MHz/923MHz                                                                                  | 433MHz                                                                                         | 868MHz/923MHz                                                                                      | 433MHz                                                                                               | 868MHz/923MHz                                                                                    | 868MHz/923MHz                                                                                    |
| Standard                | IEEE 802.15.4g FSK/GFSK Modulation                                                               |                                                                                                  |                                                                                                |                                                                                                |                                                                                                    |                                                                                                      |                                                                                                  |                                                                                                  |
| Data Rate               | 625 bps, 2.5k bps, 5k bps, 50k bps                                                               |                                                                                                  | 625 bps, 50k bps                                                                               |                                                                                                |                                                                                                    |                                                                                                      | 625 bps, 2.5k bps, 5k bps, 50k bps                                                               |                                                                                                  |
| Power Input             | 10~50V <sub>DC</sub> External Power                                                              |                                                                                                  |                                                                                                |                                                                                                |                                                                                                    |                                                                                                      | Self Powered                                                                                     |                                                                                                  |
| Configuration Interface | Micro-B USB                                                                                      |                                                                                                  |                                                                                                |                                                                                                |                                                                                                    |                                                                                                      |                                                                                                  |                                                                                                  |
| Network Capacity        | 64 Clients                                                                                       |                                                                                                  |                                                                                                |                                                                                                |                                                                                                    |                                                                                                      |                                                                                                  |                                                                                                  |
| Outdoor Range (LOS)     | 5KM@625bps                                                                                       |                                                                                                  |                                                                                                |                                                                                                |                                                                                                    |                                                                                                      |                                                                                                  |                                                                                                  |
| I/O Module              |               |                                                                                                  |                                                                                                |                                                                                                |                 |                                                                                                      |                                                                                                  |                                                                                                  |
| Model Name              | WISE-S214-A                                                                                      | WISE-S250-A                                                                                      | WISE-S251-A                                                                                    | WISE-S200-A                                                                                    | WISE-S235SL-A                                                                                      | *Modularization doesn't effect WISE-4210-S231 and WISE-221x series                                   |                                                                                                  |                                                                                                  |
| Spec                    | 4AI&4DI                                                                                          | 6DI, 2DO & 1RS-485                                                                               | 6DI & 1RS-485                                                                                  | Upon Customization Request<br>*MOQ required                                                    | Stack Light Monitoring Sensor                                                                      |                                                                                                      |                                                                                                  |                                                                                                  |

\*Modularization doesn't effect WISE-4210-S231 and WISE-221x series

\*\* WISE-S250 does not support power saving mode

### Accessories:

| Antenna for WISE-4210/WISE-221X |                                          |
|---------------------------------|------------------------------------------|
| 1750008836-01                   | 863-870MHz Dipole Antenna                |
| 1750008837-01                   | 902-928MHz Dipole Antenna                |
| Battery for WISE-4210           |                                          |
| 1760002647-01                   | Bat.Cylindrical 3.6V/2500mAh AA Li/SOC12 |
| CT for WISE-221X                |                                          |
| 96PD-CT241-60A                  | 3~60A, 10.0+/-0.2mm, -20~65°C            |
| 96PD-CT248-100A                 | 5~100A, 15.7+/-0.3mm, -40~65°C           |
| 96PD-CT24F-200A                 | 10~200A, 20.5+/-0.3mm, -40~85°C          |

# Wireless IoT Sensing Devices: Sensor Nodes

## LoRaWAN Smart Vibration Sensor



| Model Name             |                                       | <a href="#">WISE-2410-NA</a><br><a href="#">WISE-2410-EA</a><br><a href="#">WISE2410JA1901-T</a><br><a href="#">WISE2410TA2001-T</a> |
|------------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| Wireless Communication | Topology                              | Star (LoRaWAN)                                                                                                                       |
|                        | Frequency Band                        | US 902-928 (MHz); EU 863-870 (MHz); TW 920-925 (MHz); JP 920-928 (MHz)                                                               |
|                        | Spreading Factor                      | 7~12                                                                                                                                 |
|                        | Transmit Power                        | Up to +18dBm                                                                                                                         |
|                        | Data Rate                             | 50 kbps at FSK mode<br>EU868;21.9 kbps at SF7 mode<br>US915;5.47 kbps at SF7 mode<br>JP923                                           |
| Vibration Sensor       | Axis                                  | X-Y-Z                                                                                                                                |
|                        | Frequency Range                       | 10~1000Hz                                                                                                                            |
|                        | Amplitude Range                       | ±2/4/8/16g                                                                                                                           |
|                        | Output Data Rate                      | 3200Hz                                                                                                                               |
|                        | Resolution                            | 10 bit (all g range)                                                                                                                 |
|                        | Sensitivity (TYP.)                    | 31.2mg/LSB                                                                                                                           |
|                        | Noise (MAX. TA = 25°C. 0g)            | ±150mg                                                                                                                               |
|                        | Nonlinearity                          | ±0.5 %                                                                                                                               |
|                        | Cross-Axis Sensitivity                | ±1 %                                                                                                                                 |
| Temperature Sensor     | Sensitivity Change Due to Temperature | ±0.02 %/°C                                                                                                                           |
|                        | Operating Range                       | -20°C ~ 85°C (USB powered);<br>-20°C ~ 50°C (Battery powered)                                                                        |
|                        | Resolution                            | 12 bit                                                                                                                               |
|                        | Accuracy                              | ±2.0°C (±35.6°F)<br>(vertical installation)                                                                                          |
| Mechanical             | Enclosure                             | IP66                                                                                                                                 |
|                        | Mounting                              | Mounting Stud; Curved Surface Magnet; Adhesives                                                                                      |
|                        | Dimension (L x W x H)                 | 42mm x 40.2mm x 84.7mm                                                                                                               |
| General                | Power Input                           | 3.6V AA Battery *2pcs<br>(Not included)                                                                                              |
|                        | Configuration Interface               | Micro-B USB                                                                                                                          |
|                        | Temperature (Operating)               | -20°C ~ 85°C (USB powered);<br>-20°C ~ 50°C (Battery powered)                                                                        |
|                        | Temperature (Storage)                 | -25°C ~ 90°C                                                                                                                         |
|                        | Humidity (Operating)                  | 10% ~ 95% RH                                                                                                                         |
|                        | Humidity (Storage)                    | 5% ~ 95% RH                                                                                                                          |

## Intelligent RFID Gateway



| Model Name             |                         | <a href="#">WISE-2834-CA</a>                                                             |
|------------------------|-------------------------|------------------------------------------------------------------------------------------|
| Wireless Communication | RFID Standard           | EPC Global Class 1 Gen. 2 (ISO18000-6C)                                                  |
|                        | Frequency Band          | US 902.75MHz - 927.25MHz;<br>EU 865.7MHz - 867.5MHz; TW 922.25MHz - 927.75MHz            |
|                        | Transmit Power          | Available to adjust from +10dBm ~ +31.5dBm                                               |
|                        | Receiver Sensitivity    | -82dBm                                                                                   |
|                        | Antenna Connector       | 4 RP-TNC                                                                                 |
| General                | Chipset                 | ARM Cortex-A8, 300MHz for system; ARM Cortex-M0 32-Bit 32MHz for I/O                     |
|                        | Memory                  | 512MB DDR3L                                                                              |
|                        | Storage                 | NAND Flash 512MB                                                                         |
|                        | OS Support              | Linux 3.12                                                                               |
|                        | LED Indicators          | Status, Serial (Tx, Rx), Wi-Fi communication, RFID Channel on/off, Wi-Fi Signal Strength |
|                        | Power Input             | 10V ~ 30V DC; Power Consumption: 3W (TYP.), 15W (Max.)                                   |
|                        | Slot                    | 1 x Micro SD card                                                                        |
|                        | USB                     | 1 x USB2.0 High Speed (Up to 480Mbps)                                                    |
|                        | Communication Speed     | 1 x 10/100 Based-T RJ-45;<br>1 x RS-485: 50 ~ 115.2 kbps                                 |
|                        | Digital Input           | 4 Dry/Wet Contact                                                                        |
|                        | Digital Output          | 4 Sink Type                                                                              |
|                        | Configuration Tool      | WISE Studio                                                                              |
|                        | Dimensions (L x W x H)  | 190mm x 120mm x 30.2mm                                                                   |
| Mechanical             | Mounting                | DIN 35 rail, Wall, Pole                                                                  |
| Operating System       | Temperature (Operating) | -25°C ~ 50°C                                                                             |
|                        | Temperature (Storage)   | 20% ~ 95% RH                                                                             |
|                        | Humidity (Operating)    | -40°C ~ 85°C                                                                             |
|                        | Humidity (Storage)      | 0% ~ 95% RH                                                                              |

# Wireless IoT Sensing Devices: Wzzard™ Mesh Sensor Nodes – for Industrial Application Sensors

## BB-WSD2x industrial series



| Model Number                | BB-WSD2C21150                                                                                                                                                                                                                                                                   | BB-WSD2C06010                                              | BB-WSD2C31010                                              | BB-WSD2M06010                                    | BB-WSD2M31010                                    | BB-WSD2M3101P2K                                                                                      | BB-WSD2M3101R100                                                                                      |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| Description                 | Industrial Cooler, HVAC Node                                                                                                                                                                                                                                                    | Industrial Digital Input Node                              | Industrial Power Monitor Node                              | Industrial Digital Input Node                    | Industrial Power Monitor Node                    | Industrial Power Monitor Node                                                                        | Industrial Power Monitor Node                                                                         |
| Wireless Technology         | Low power 802.15.4e, SmartMesh IP (to SmartSwarn 342 gateway) via MQTT protocol                                                                                                                                                                                                 |                                                            |                                                            |                                                  |                                                  |                                                                                                      |                                                                                                       |
| Connector                   | Conduit (UL Type 3 outdoor approved) 12.7mm (0.5 in)                                                                                                                                                                                                                            | Conduit (UL Type 3 outdoor approved) 12.7mm (0.5 in)       | Conduit (UL Type 3 outdoor approved) 12.7mm (0.5 in)       | M12                                              | M12                                              | M12                                                                                                  | M12                                                                                                   |
| Includes                    | 2 AI, 1 DI, 1 DO, 2 Thermocouples, 2 Thermistors, Internal Temperature, antenna, cable                                                                                                                                                                                          | 6 DI, Internal Temperature, antenna, cable                 | 3 AI, 1 DI, Internal Temperature, antenna, cable           | 6 DI, Internal Temperature, antenna, cable       | 3 AI, 1 DI, Internal Temperature, antenna, cable | 2 AI, Vbat measurement, 1 DI, Internal Temperature, Switched Vbat Power Out (2 sec.), antenna, cable | 12 AI, Vref measurement, 1 DI, Internal Temperature, Switched 3.3V Power Out (100 ms), antenna, cable |
| External Antenna (included) | RP-SMA, Omni-directional, 3.8 dBi, 2.4 GHz                                                                                                                                                                                                                                      |                                                            |                                                            |                                                  |                                                  |                                                                                                      |                                                                                                       |
| Power                       | Internal Power: (2) 3.6V 2400 mAh Lithium Thionyl Chloride AA Batteries<br>Battery Life: >5 years – based on 1 min. sensor sampling and reporting<br>Optional External Input Voltage: 10-30 VDC @ 40mA peak                                                                     |                                                            |                                                            |                                                  |                                                  |                                                                                                      |                                                                                                       |
| Sensor Power Out            | Switched Vbat: Battery Power – Turned on at time of measurement (20 mA max.)<br>Switched Vref: 3.3V (+/- 0.1%) – Turned on at time of measurement (20 mA max.)                                                                                                                  |                                                            |                                                            |                                                  |                                                  |                                                                                                      |                                                                                                       |
| Sensors                     | Analog Input (0 -10 VDC, 0 - 20 mA, 4 - 20 mA)<br>Digital Input (0 - 48 VDC)<br>Digital Input Frequency 1-1K Hz (accuracy +/- 1 Hz)<br>Digital Input Counter<br>Integrated Temperature<br>Thermocouple (J, K, N, R, S, T, B, E)<br>Digital Output, Sinking, up to 100mA @ 30VDC |                                                            |                                                            |                                                  |                                                  |                                                                                                      |                                                                                                       |
| Wireless Security           | Device authentication, 128-bit, AES-based wncryption with multiple keys, Message Integrity Check (MIC), Synchronized key changeovers, Customized key rotation                                                                                                                   |                                                            |                                                            |                                                  |                                                  |                                                                                                      |                                                                                                       |
| Temperature                 | -40 to +80 °C (operating)                                                                                                                                                                                                                                                       |                                                            |                                                            |                                                  |                                                  |                                                                                                      |                                                                                                       |
| Enclosure                   | IP67 rated fiber reinforced polyester PBT                                                                                                                                                                                                                                       |                                                            |                                                            |                                                  |                                                  |                                                                                                      |                                                                                                       |
| Mounting Option             | (4) Mounting Ears, M5 (#10) screws (UL approved option)                                                                                                                                                                                                                         |                                                            |                                                            |                                                  |                                                  |                                                                                                      |                                                                                                       |
| Mounting Option             | Magnetic Mounting (via internal enclosure magnet) Pull Force 2.13 kg (4.7 lb)<br>Note: Magnetic mounting models not rated for UL installations.                                                                                                                                 |                                                            |                                                            |                                                  |                                                  |                                                                                                      |                                                                                                       |
| Certifications              | UL C1/D2, CE, FCC, EN62479 (lower power), Shock, Vibration                                                                                                                                                                                                                      | UL C1/D2, CE, FCC, EN62479 (lower power), Shock, Vibration | UL C1/D2, CE, FCC, EN62479 (lower power), Shock, Vibration | CE, FCC, EN62479 (lower power), Shock, Vibration | CE, FCC, EN62479 (lower power), Shock, Vibration | CE, FCC, EN62479 (lower power), Shock, Vibration                                                     | CE, FCC, EN62479 (lower power), Shock, Vibration                                                      |
| UL Listed C1/D2 Conditions  | Yes. Indoor / Outdoor, w/ mounting ear installation                                                                                                                                                                                                                             | (pending)                                                  | Yes. Indoor / Outdoor, w/ mounting ear installation        | No (M12 connector not UL)                        | No (M12 connector not UL)                        | No (M12 connector not UL)                                                                            | No (M12 connector not UL)                                                                             |



# Wireless IoT Sensing Devices: Wzzard™ Mesh Starter Kits – for Industrial & Commercial Applications

## BB-WSK-xxx-2 kit series



| Model Number                     | BB-WSK-CBM-2                                                                                        | BB-WSK-HAC-2                                                                 | BB-WSK-REF-2                                                                    | BB-WSK-NRG-2                                       |
|----------------------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|---------------------------------------------------------------------------------|----------------------------------------------------|
| Description                      | Condition-based Monitoring Starter Kit                                                              | Energy Starter Kit                                                           | Refrigeration Monitoring Starter Kit                                            | HVAC/Compressor / Fan Monitoring Starter Kit       |
| Product Sensor & Format          | Industrial Low-Power Wireless Sensing<br>– temperature, vibration                                   | Industrial Low-Power Wireless Sensing<br>– current, differential temperature | Commercial Low-Power Wireless Sensing<br>– temperature, humidity, current, door | Industrial Low-Power Wireless Sensing<br>– current |
| Contents - Bundled Kits Include: | Wzzard Node, sensors & cables, gateway with cloud license and Node-RED starter flow with web server |                                                                              |                                                                                 |                                                    |

NOTE: Starter kits include everything to get started.

# Wireless IoT Sensing Devices: Wzzard™ Mesh Sensor Nodes – for Commercial Application Sensors

## BB-BB-WCD1Hx commercial series



| Model Number                     | BB-WCD1H2102H                                                                                                                                                 | BB-WCD1H3001HP100                                |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| Description                      | HVAC/cooler node for temperature & humidity sensing                                                                                                           | AI, vBAT Out temperature & humidity sensing node |
| Wireless Technology              | Low power 802.15.4e, 2.4GHz SmartMesh IP (to SmartSwarm 342 gateway) via MQTT protocol                                                                        |                                                  |
| Physical Connector               | Molex 6-pin MicroClasp                                                                                                                                        |                                                  |
| Sensors (industry standard type) | (2) Analog Inputs<br>(1) DI<br>(1) Thermistor                                                                                                                 | (3) AI                                           |
| Integrated Sensors (within node) | (1) Temperature<br>(1) Humidity                                                                                                                               | (1) Temperature<br>(1) Humidity                  |
| Antenna                          | Internal, included.                                                                                                                                           |                                                  |
| Power                            | Internal: 3.6V 1650 mAH Lithium Thionyl Chloride 2/3 AA battery.<br>Battery Life: 5-year battery life, based on 1 minute sensor sampling interval             |                                                  |
| Power Backup                     | -                                                                                                                                                             | vBat Out operating mode                          |
| LED Indication                   | Network Connectivity, Node Status                                                                                                                             |                                                  |
| Wireless Security                | Device authentication, 128-bit, AES-based wncryption with multiple keys, Message Integrity Check (MIC), Synchronized key changeovers, Customized key rotation |                                                  |
| Installation                     | Indoor                                                                                                                                                        |                                                  |
| Operating Temperature            | -20 to +70 °C (-4 to +158 °F)                                                                                                                                 |                                                  |
| Mounting                         | Mounting bracket (included)<br>VHB adhesive strip (included)<br>Zip tie (ties not included)                                                                   |                                                  |
| Certifications                   | UL C1/D2, CE, FCC, Industry Canada (RSS210), Shock, Vibration, Drop                                                                                           |                                                  |
| UL Listed C1/D2 Conditions       | UL C1/D2 rating is voided when using non UL-specified batteries. Do not mix old and new batteries                                                             |                                                  |

# Serial and USB Converters for the Industrial World

## Robust Features & Reliable Performance for Rugged Applications

### Bridging the connectivity gap

In the hazardous industrial world, existing equipment investments often rely on standard serial interfaces to communicate. Advantech connectivity solutions are designed with features that allow them to operate successfully in challenging environments. These devices help industrial equipment communicate reliably while protecting from damaging and costly power spikes, surges and transients.

Advantech serial and USB protocol devices have been supporting data communications and protecting mission critical applications for more than 30 years. Advantech's USB devices allow many USB conveniences to be reliably implemented on the factory floor with features such as high data transfer rates, isolation, Ethernet conversion, high retention USB ports and more.

ADAM-4500 modules suitable for establishing cost-effective industrial networks. Converter and repeater modules are available to convert RS-232 signals to RS-422 or RS-485 signals and extend the range of these signals.

**Isolation protection** – Isolate data lines from electrical noise

**Surge protection** – Suppress and dissipate power line surges

**ESD protection** – Safeguard against ESD transients

**Wide operating temperature** – Performance in extreme environments

**Port powering** – No separate power supply needed

**High retention USB ports** – Secure USB cables in high vibration uses

**Modbus support** – Widely used industrial device protocol

**Approvals, directives, standards** – Tested to global compliance standards



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3  
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4  
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5  
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6  
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7  
DAQ and Communication Gateways

8  
Industrial Communication

9  
Remote I/O, Wireless Sensing Modules and Converters

10  
Intelligent Motion Control Solutions

11  
EtherCAT Solutions and Automation Controllers

12  
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13  
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14  
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# Serial and USB Converters:

## USB Converters



| MODEL                 |                | <a href="#">BB-USOPTL4</a>                | <a href="#">BB-USOPTL4DR-2</a>            | <a href="#">BB-USO9ML2</a>                     | <a href="#">BB-485USB9F-2W</a>            |
|-----------------------|----------------|-------------------------------------------|-------------------------------------------|------------------------------------------------|-------------------------------------------|
| INTERFACE 1           | Interface      | USB                                       | USB                                       | USB                                            | USB                                       |
|                       | Connector      | Type B (Type B to Type A, cable included) | Type B (Type B to Type A, cable included) | Type B (Type B to Type A, cable included)      | Type B (Type B to Type A, cable included) |
|                       | Port/s         | 1                                         | 1                                         | 1                                              | 1                                         |
|                       | High Retention | Yes                                       | Yes                                       | Yes                                            | Yes                                       |
| INTERFACE 2           | Interface      | RS-422/485                                | RS-422/485                                | RS-232                                         | RS-485                                    |
|                       | Connector      | Terminal block                            | Terminal block                            | DB9 male                                       | DB9 male                                  |
|                       | Port/s         | 1                                         | 2                                         | 1                                              | 1                                         |
| Operating Temperature |                | 0 to +70 °C                               | 0 to +70 °C                               | 0 to +70 °C                                    | 0 to +70 °C                               |
| Protection            |                | Isolation: 2kV<br>ESD: 15kV               | Isolation: 3kV<br>ESD: 15kV               | Isolation: 2kV<br>ESD: 4kV Contact and 8kV Air | -                                         |
| Power Input           |                | USB 5 VDC                                 | USB 5 VDC                                 | USB 5 VDC                                      | USB 5 VDC                                 |
| Mounting              |                | Inline installation                       | DIN Rail                                  | Inline installation                            | Inline installation                       |
| Certificates          |                | CE, FCC                                   | CE, FCC                                   | CE, FCC, UL508                                 | CE, FCC                                   |



| MODEL                 |                | <a href="#">BB-485USBTB-2W-A</a>          | <a href="#">BB-USO9ML2-4P</a>        | <a href="#">BB-USO9ML4-4P</a>        |
|-----------------------|----------------|-------------------------------------------|--------------------------------------|--------------------------------------|
| INTERFACE 1           | Interface      | USB                                       | USB                                  | USB                                  |
|                       | Connector      | Type B (Type B to Type A, cable included) | Type B, cable included               | Type B, cable included               |
|                       | Port/s         | 1                                         | 1                                    | 1                                    |
|                       | High Retention | -                                         | Yes                                  | Yes                                  |
| INTERFACE 2           | Interface      | RS-485                                    | RS-232                               | RS-232                               |
|                       | Connector      | Terminal block                            | DB9 male                             | DB9 male                             |
|                       | Port/s         | 1                                         | 2                                    | 4                                    |
| Operating Temperature |                | 0 to +70 °C                               | 0 to +70 °C                          | 0 to +70 °C                          |
| Protection            |                | -                                         | Isolation: 2kV<br>ESD: 15kV          | Isolation: 2kV<br>ESD: 15kV          |
| Power Input           |                | USB 5 VDC                                 | USB 5 VDC<br>(or 10-30 VDC external) | USB 5 VDC<br>(or 10-30 VDC external) |
| Mounting              |                | Inline installation                       | Desk or panel                        | Desk or panel                        |
| Certificates          |                | CE, FCC                                   | FCC, UL508                           | FCC, UL508                           |





# Serial and USB Converters: Serial Converters



| MODEL                 |           | BB-422PP9TB                                                                        | BB-422PP9R               | BB-485SD9TB                                                                        | BB-485SD9R               |
|-----------------------|-----------|------------------------------------------------------------------------------------|--------------------------|------------------------------------------------------------------------------------|--------------------------|
| INTERFACE 1           | Interface | RS-232                                                                             | RS-232                   | RS-232                                                                             | RS-232                   |
|                       | Connector | DB9 female                                                                         | DB9 female               | DB9 female                                                                         | DB9 female               |
|                       | Port/s    | 1                                                                                  | 1                        | 1                                                                                  | 1                        |
| INTERFACE 2           | Interface | RS-422                                                                             | RS-422                   | RS-485                                                                             | RS-485                   |
|                       | Connector | Terminal block                                                                     | DB9 female               | Terminal block                                                                     | DB9 female               |
|                       | Port/s    | 1                                                                                  | 1                        | 1                                                                                  | 1                        |
| Operating Temperature |           | 0 to +70 °C                                                                        | 0 to +70 °C              | 0 to +70 °C                                                                        | 0 to +70 °C              |
| Protection            |           | -                                                                                  | -                        | -                                                                                  | -                        |
| Power Input           |           | Port-powered from RS-232<br>(Optional external 12-16 V <sub>DC</sub> power supply) | Port-powered from RS-232 | Port-powered from RS-232<br>(Optional external 12-16 V <sub>DC</sub> power supply) | Port-powered from RS-232 |
| Mounting              |           | Inline installation                                                                | Inline installation      | Inline installation                                                                | Inline installation      |
| Certificates          |           | CE, FCC                                                                            | CE, FCC                  | CE, FCC                                                                            | CE, FCC                  |



| MODEL                 |           | BB-485LDRC9                 | BB-485DRCI                    | BB-232CLDR            | BB-FOSTCDRI           |
|-----------------------|-----------|-----------------------------|-------------------------------|-----------------------|-----------------------|
| INTERFACE 1           | Interface | RS-232                      | RS-232                        | RS-232                | RS-232, RS-422/485    |
|                       | Connector | DB9 female & Terminal block | DB9 female                    | Terminal block        | Terminal block        |
|                       | Port/s    | 1                           | 1                             | 1                     | 1                     |
| INTERFACE 2           | Interface | RS-422/485                  | RS-422/485                    | Current Loop          | Fiber Optic           |
|                       | Connector | Terminal blocks             | Terminal block                | Terminal Block        | MM, ST                |
|                       | Port/s    | 1                           | 1                             | 1                     | 1                     |
| Operating Temperature |           | -40 to +80 °C               | -40 to +80 °C                 | -40 to +80 °C         | -40 to +80 °C         |
| Protection            |           | Isolation: 2kV              | Isolation: 2kV                | Isolation: 2kV        | Isolation: 2kV        |
| Power Input           |           | 10-30 V <sub>DC</sub>       | 10-48 V <sub>DC</sub>         | 10-30 V <sub>DC</sub> | 10-48 V <sub>DC</sub> |
| Mounting              |           | DIN Rail                    | DIN Rail                      | DIN Rail              | DIN Rail              |
| Certificates          |           | CE, FCC, cULus, UL508       | CE, FCC, KCC, UL C1/D2, UL508 | CE, FCC, UL508, CULus | CE, FCC, UL C1/D2     |



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2  
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3  
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4  
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6  
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7  
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8  
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9  
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10  
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11  
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12  
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13  
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14  
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# Serial and USB Converters: Serial Repeaters



| MODEL                 |  <a href="#">BB-485OPDR</a> |  <a href="#">BB-485OPDRI</a> |  <a href="#">BB-232OPDR</a> |  <a href="#">BB-232OPDRI</a>                 |
|-----------------------|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Interface             | RS-422/485                                                                                                   | RS-422/485                                                                                                    | RS-232                                                                                                       | RS-232                                                                                                                          |
| Type                  | Terminal block                                                                                               | (2) Terminal block                                                                                            | Terminal block                                                                                               | DB9 female, DB9 male                                                                                                            |
| Operating Temperature | -40 to +80 °C                                                                                                | -40 to +80 °C                                                                                                 | -40 to +80 °C                                                                                                | -40 to +80 °C                                                                                                                   |
| Protection            | Isolation: 2kV<br>Surge: 6.5 bi-directional avalanche breakdown device<br>500W peak power dissipation        | Isolation: 2kV on input/output/<br>power<br>Surge: 600W peak power dissipation                                | Isolation: 2kV                                                                                               | Isolation: 2kV on input/output/<br>power<br>Surge: 6.5 bi-directional avalanche breakdown device<br>500W peak power dissipation |
| Power Input           | 10-30 VDC                                                                                                    | 10-48 VDC                                                                                                     | 10-30 VDC                                                                                                    | 10-48 VDC                                                                                                                       |
| Enclosure             | IP20, plastic                                                                                                | IP20, plastic                                                                                                 | IP30, plastic                                                                                                | IP30, plastic                                                                                                                   |
| Mounting              | DIN rail                                                                                                     | DIN rail                                                                                                      | DIN rail                                                                                                     | DIN rail                                                                                                                        |
| Certificates          | CE, FCC, KCC, cULus Listed, UL508, UL Recognized                                                             | CE, FCC, KCC, UL C1/D2                                                                                        | CE, FCC, cULus Listed, UL508                                                                                 | CE, FCC, KCC, UL C1/D2, UL508                                                                                                   |



# Serial and USB Converters: USB Hubs



| MODEL                 |                | <a href="#">BB-UHR204</a>   | <a href="#">BB-UHR304</a>                     | <a href="#">BB-UHR307</a>                     | <a href="#">BB-UH104</a>    |
|-----------------------|----------------|-----------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------|
| USB Type              |                | USB 2.0                     | USB 2.0                                       | USB 2.0                                       | USB 2.0                     |
| Downstream            | Interface      | 4                           | 4                                             | 7                                             | 4                           |
|                       | Type           | Type A female               | Type A female                                 | Type A female                                 | Type A female               |
|                       | High Retention | Yes                         | Yes                                           | Yes                                           | Yes                         |
| Operating Temperature |                | -40 to +80 °C               | -40 to +80 °C                                 | -40 to +80 °C                                 | -40 to +80 °C               |
| Protection            |                | ESD: 15 kV air, 8kV contact | Isolation: 4kV<br>ESD: 15 kV air, 8kV contact | Isolation: 4kV<br>ESD: 15 kV air, 8kV contact | ESD: 15 kV air, 8kV contact |
| Power Input           |                | 10-30 V <sub>DC</sub>       | 10-30 V <sub>DC</sub>                         | 10-30 V <sub>DC</sub>                         | USB 5V                      |
| Enclosure             |                | IP30, metal                 | IP30, metal                                   | IP30, metal                                   | IP30, plastic               |
| Mounting              |                | DIN Rail, Desk, Panel       | DIN Rail, Desk, Panel                         | DIN Rail, Desk, Panel                         | Panel                       |
| Certificates          |                | CE, FCC, KCC                | CE, FCC, KCC, UL C1/D2                        | CE, FCC, KCC, UL C1/D2                        | CE, FCC                     |



| MODEL                 |                | <a href="#">BB-UH401</a>                      | <a href="#">BB-USH204</a> | <a href="#">BB-USH207</a> |
|-----------------------|----------------|-----------------------------------------------|---------------------------|---------------------------|
| USB Type              |                | USB 2.0                                       | USB 3.0                   | USB 3.0                   |
| Downstream            | Interface      | 1                                             | 4                         | 7                         |
|                       | Type           | Type A female                                 | Type A female             | Type A female             |
|                       | High Retention | Yes                                           | -                         | -                         |
| Operating Temperature |                | -40 to +80 °C                                 | 0 to +40 °C               | 0 to +40 °C               |
| Protection            |                | Isolation: 4kV<br>ESD: 15 kV air, 8kV contact | ESD: 8kV contact          | ESD: 8kV contact          |
| Power Input           |                | USB 5V                                        | 9-24 V <sub>DC</sub>      | 9-24 V <sub>DC</sub>      |
| Enclosure             |                | IP30, plastic                                 | Metal                     | Metal                     |
| Mounting              |                | Inline                                        | DIN rail                  | DIN rail                  |
| Certificates          |                | CE, FCC                                       | CE, FCC, KCC              | CE, FCC, KCC              |



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6  
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7  
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8  
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9  
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10  
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11  
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12  
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13  
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14  
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# Serial and USB Converters: Ethernet to Serial Conversion

## Virtual COM Software

## Modbus Protocol Support



| MODEL/ORDER #  |                           | <a href="#">BB-VESP211</a><br><a href="#">BB-VESP211-232</a><br><a href="#">BB-VESP211-485</a> | <a href="#">BB-VESR901</a><br><a href="#">BB-VESR902D</a> | <a href="#">BB-MESR901</a><br><a href="#">BB-MESR902T</a> |
|----------------|---------------------------|------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|
| Product Series |                           | BB-VESP211x                                                                                    | BB-VESR9xx                                                | BB-MESR9xx                                                |
| Ethernet       | Copper Ports              | 1                                                                                              | 1, 2                                                      | 1                                                         |
|                | WiFi Ports                | -                                                                                              | -                                                         | -                                                         |
| Serial         | Port Count                | 1                                                                                              | 1, 2                                                      | 1, 2                                                      |
|                | DB9                       | 232, 232/422/485                                                                               | 232/422/485                                               | 232/422/485                                               |
|                | Terminal Block            | 422/485                                                                                        | 232/422/485                                               | 232/422/485                                               |
|                | Isolation                 | -                                                                                              | -                                                         | -                                                         |
| Specifications | Temperature               | 0 to +80 °C (w/ PS)<br>-40 to +80°C (no PS)                                                    | -40 to +80 °C                                             | -40 to +80 °C                                             |
|                | Power DC                  | 10 to 30V <sub>DC</sub>                                                                        | 10 to 48V <sub>DC</sub>                                   | 10 to 48V <sub>DC</sub>                                   |
|                | Power Supply Included     | Yes, universal                                                                                 | -                                                         | -                                                         |
|                | Dual Power Inputs         | -                                                                                              | TB, External                                              | -                                                         |
|                | Mounting                  | Panel,<br>(DIN option)                                                                         | DIN<br>(Panel option)                                     | DIN<br>(Panel option)                                     |
|                | UL, UL Class 1/Division 2 | -                                                                                              | UL Listed, UL C1/D2                                       | UL Listed, UL C1/D2                                       |
|                | Certificates              | FCC, CE                                                                                        | FCC, CE                                                   | FCC, CE                                                   |



# Serial and USB Converters: USB Isolator



| MODEL #         |                          | BB-UHR402                                                                                                                                                                  |
|-----------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product Series: |                          | 2-port, 4kV, 12 Mbps Ruggedized                                                                                                                                            |
| Usb Ports       | Number of Ports          | 2                                                                                                                                                                          |
|                 | High Retention USB       | Yes                                                                                                                                                                        |
|                 | Upstream Port            | 1 Type B                                                                                                                                                                   |
|                 | Downstream Port          | 2 Type A                                                                                                                                                                   |
|                 | Downstream Power         | 500 mA                                                                                                                                                                     |
|                 | Speed                    | Smart-selectable: 12 Mbps (full speed) or 1.5 Mbps (low speed)                                                                                                             |
|                 | USB Protocol             | 1.1, 2.0                                                                                                                                                                   |
| Protection      | Isolation                | 4kV                                                                                                                                                                        |
|                 | ESD Protection (Level 4) | 8 kV Contact, 15 kV Air                                                                                                                                                    |
|                 | Temperature              | 0 to +50 °C                                                                                                                                                                |
| Specifications  | Power Input              | 10 to 30 VDC, external                                                                                                                                                     |
|                 | DIN Rail Mount           | Yes (w/ optional DIN adapter clips)                                                                                                                                        |
|                 | Panel Mount              | Yes                                                                                                                                                                        |
|                 | Shock/Vibration/Drop     | Yes                                                                                                                                                                        |
|                 | Certifications           | FCC, CE, KCC                                                                                                                                                               |
|                 |                          |   |

# Serial and USB Converters: 3-Stage Serial Surge Protector



| MODEL #           |                                                             | BB-HESP4DR                                                                                                                                                                                                                                                       |
|-------------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Serial Technology | Interface                                                   | RS-422/485                                                                                                                                                                                                                                                       |
|                   | Lines Protected                                             | (5) RS-422/485                                                                                                                                                                                                                                                   |
|                   | Connectors, line                                            | 5-position terminal blocks                                                                                                                                                                                                                                       |
|                   | Connectors, Equipment                                       | 5-position terminal blocks                                                                                                                                                                                                                                       |
|                   | Grounding                                                   | Dedicated chassis ground lug                                                                                                                                                                                                                                     |
|                   | Connections                                                 | Protected signal ground connection<br>Rugged terminal block connections                                                                                                                                                                                          |
|                   | Power Input                                                 | No power required                                                                                                                                                                                                                                                |
| Surge Suppression | Clamping Voltage<br>- stage 1: Gas Discharge Tube           | 72 VDC, minimum<br>108 VDC, maximum                                                                                                                                                                                                                              |
|                   | Series Resistance<br>- stage 2: Series Resistor             | 2.7 Ohms                                                                                                                                                                                                                                                         |
|                   | Clamping Voltage<br>- stage 3: Transient Voltage Suppressor | 6.45 VDC, minimum<br>7.14 VDC, maximum                                                                                                                                                                                                                           |
|                   | Clamping Time                                               | Less than 5 x10-9 seconds                                                                                                                                                                                                                                        |
|                   | Operating Temperature                                       | -40 to 80 °C (-40 to 176 °F)                                                                                                                                                                                                                                     |
|                   | Mounting                                                    | DIN Rail                                                                                                                                                                                                                                                         |
|                   | Certifications                                              | CE                                                                                                                                                                                                                                                               |
|                   |                                                             |    |

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6

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7

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8

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9

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10

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11

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12

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13

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14

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# Serial and USB Converters: Converters and Repeater Modules

## Repeaters



| Model                 | ADAM-4510<br>ADAM-4510S                           | ADAM-4510I                         |
|-----------------------|---------------------------------------------------|------------------------------------|
| Network               | RS-422<br>RS-485                                  | RS-422/485                         |
| Comm. Speed (bps)     | Serial: From 1,200 to 115.2K                      | From 1,200 to 115.2k               |
| Comm. Distance        | Serial: 1.2 km                                    | Serial: 1.2 km                     |
| Interface Connectors  | RS-422/485: plug-in screw terminal                | RS-422/485: plug-in screw terminal |
| LED Indicators        | Communication and power                           | Communication and Power            |
| Data Flow Control     | -                                                 | ✓                                  |
| Isolation Voltage     | ADAM-4510: -<br>ADAM-4510S: 3,000 V <sub>DC</sub> | 3,000 V <sub>DC</sub>              |
| Power Requirements    | 10 ~ 30 V <sub>DC</sub>                           | 10 ~ 48 V <sub>DC</sub>            |
| Operating Temperature | -10 ~ 70°C (14 ~ 158°F)                           | -40 ~ 85°C (-40 ~ 185°F)           |
| Operating Humidity    | 5 ~ 95% RH                                        |                                    |
| Power Consumption     | 1.4 W @ 24 V <sub>DC</sub>                        |                                    |
| Certification         | UL,CE,FCC                                         | C1D2, UL, CE, FCC                  |

## Converters



| Model                 | ADAM-4520                                                | ADAM-4520I                                               | ADAM-4521                                                | ADAM-4541<br>ADAM-4542+                                                                              | ADAM-4561<br>ADAM-4562                                                                                                |
|-----------------------|----------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Network               | 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 115.2K                             |                                                          |                                                          |                                                                                                      |                                                                                                                       |
| Comm. Distance        | Serial: 1.2 km                                           | Serial: 1.2 km                                           | Serial: 1.2 km                                           | ADAM-4541: 2.5 km<br>ADAM-4542+: 15 km                                                               | Serial: 1.2 km                                                                                                        |
| Interface Connectors  | RS-232: female DB9<br>RS-422/485: plug-in screw terminal | RS-232: female DB9<br>RS-422/485: plug-in screw terminal | RS-232: female DB9<br>RS-422/485: plug-in screw terminal | RS-232/422/485: plug-in screw terminal<br>Fiber: ADAM-4541: ST connector<br>ADAM-4542+: SC connector | USB: type A client connector<br>Serial: ADAM-4561: plug-in screw terminal (RS-232/422/485)<br>ADAM-4562: DB9 (RS-232) |
| LED Indicators        | Communication and power                                  |                                                          |                                                          |                                                                                                      |                                                                                                                       |
| Data Flow Control     | -                                                        | ✓                                                        | ✓                                                        | -                                                                                                    | ✓                                                                                                                     |
| Watchdog Timer        | -                                                        | -                                                        | ✓                                                        | -                                                                                                    | ✓                                                                                                                     |
| Isolation Voltage     | 3,000 V <sub>DC</sub>                                    | 3,000 V <sub>DC</sub>                                    | 1,000 V <sub>DC</sub>                                    | -                                                                                                    | ADAM-4561: 3,000 V <sub>DC</sub><br>ADAM-4562: 2,500 V <sub>DC</sub>                                                  |
| Power Requirements    | 10 ~ 30 V <sub>DC</sub>                                  | 10 ~ 48 V <sub>DC</sub>                                  | 10 ~ 30 V <sub>DC</sub>                                  | 10 ~ 30 V <sub>DC</sub>                                                                              | 10 ~ 30 V <sub>DC</sub>                                                                                               |
| Operating Temperature | -10 ~ 70°C (14 ~ 158°F)                                  | -40 ~ 85°C (-40 ~ 185°F)                                 | -10 ~ 70°C (14 ~ 158°F)                                  | -10 ~ 70°C (14 ~ 158°F)                                                                              | -10 ~ 70°C (14 ~ 158°F)                                                                                               |
| Operating Humidity    | 5 ~ 95% RH                                               |                                                          |                                                          |                                                                                                      |                                                                                                                       |
| Power Consumption     | 1.2 W @ 24 V <sub>DC</sub>                               | 1.2 W @ 24 V <sub>DC</sub>                               | 1 W @ 24 V <sub>DC</sub>                                 | ADAM-4541: 1.5 W @ 24 V <sub>DC</sub><br>ADAM-4542+: 3 W @ 24 V <sub>DC</sub>                        | ADAM-4561: 1.5 W @ 5 V <sub>DC</sub><br>ADAM-4562: 1.1 W @ 5 V <sub>DC</sub>                                          |
| Certification         | UL,CE,FCC                                                | C1D2, UL, CE, FCC                                        | UL,CE,FCC                                                | ADAM-4541: UL,CE,FCC<br>ADAM-4542+: CE,FCC                                                           | CE,FCC                                                                                                                |



# Ethernet I/O Modules

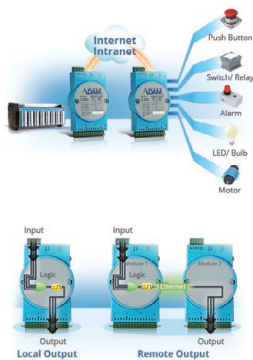
## Introduction

Advantech's Ethernet I/O Modules, ADAM-6000 series are easily integrated through the latest Internet technology, so they can remotely monitor device status more flexibly.

## Feature Highlights

### Simple and intuitive logic control

Advantech's ADAM-6000/6200 Peer-to-Peer (P2P) and Graphic Condition Logic (GCL) modules can perform as standalone products for measurement, control, and automation.



#### Peer-to-Peer(P2P) connection

- Easy channel mapping from different I/O modules without extra programming effort or additional controllers.
- Utilizes Peer-to-Peer modules, just configure settings through ADAM.NET utility.

#### Graphic Condition Logic (GCL)

- GCL function is built-in ADAM-6000 and ADAM-6200 modules for users to easily set up logic rules in any application
- User defined logic rules through graphical configuration environment in ADAM.NET Utility
- No additional controllers or programming is needed.

### Communication interface

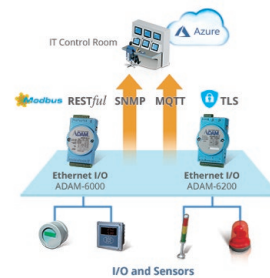


#### Flexible deployment with daisy chain networking and auto-bypass protection

ADAM-6200 series supports daisy chain connectivity that offers flexible cabling and space saving capabilities. With Ethernet auto-bypass function supported to prevent accidental power failures if one of the modules unexpectedly shuts down.

### Communication with IoT protocols

The ADAM-6000/6200 series supports multiple protocols for IoT applications: MQTT, SNMP, Restful, Modbus, which are very flexible and can be easily integrated with Microsoft Azure, Database, Network and SCADA systems.



#### Cloud

- Supports Azure IoT Hub

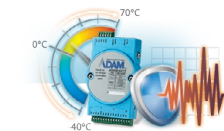
#### MQTT

- Actively publish MQTT message with user defined interval
- Shortens downtime with alarm event notification
- Privacy assured with the TLS (Transport Layer Security)
- User defined topic to integrate existing systems

#### SNMP

- Simple way to monitor I/O data on NMS (Network Management System)
- SNMP trap to notify alarm event
- Reduces implementation cost with ADAM MIB (Management Information Base) file

### Industrial design / isolation & wide-operating temp.



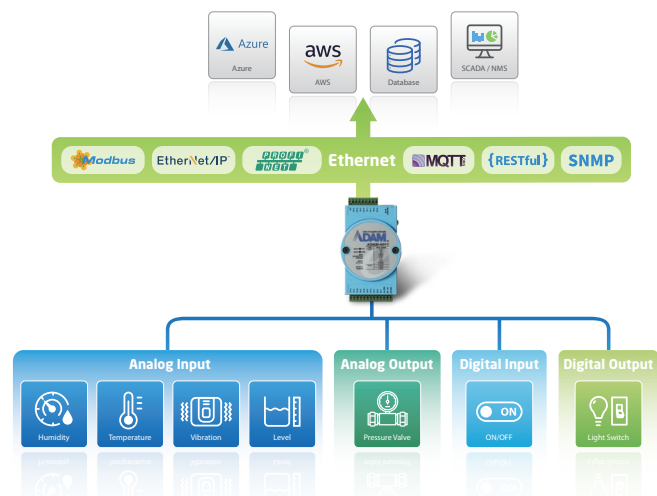
The ADAM-6000/6200 series has a rugged design.

- Supports isolation protection to avoid system damage from high-energy noise.
- Supports operating temperatures of between -40 ~ 70°C and can perform in most harsh environments.

## ADAM-6000/6100/6200 Series Comparison

|                          | ADAM-6000 Series | ADAM-6100 Series | ADAM-6200 Series    |
|--------------------------|------------------|------------------|---------------------|
| Daisy-chain Connectivity | -                | ✓                | ✓                   |
| Protocols                | MQTT             | ✓                | ✓                   |
|                          | SNMP             | ✓                | ✓                   |
|                          | Modbus           | ✓                | ✓                   |
|                          | RESTful          | ✓                | ✓                   |
|                          | PROFINET         | -                | ADAM-6100PN support |
|                          | Ethernet I/P     | -                | ADAM-6100EI support |

## Application Structure



# Ethernet I/O Modules



| Spec.                     | Model                   | ADAM-6015                                        | ADAM-6017                                                                                           | ADAM-6018+                       | ADAM-6022                                             | ADAM-6024                                             |
|---------------------------|-------------------------|--------------------------------------------------|-----------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------|-------------------------------------------------------|
| Interface                 |                         | 1x RJ-45 LAN port, 10/100 Mbps Ethernet          |                                                                                                     |                                  |                                                       |                                                       |
| Peer-to-Peer <sup>1</sup> |                         |                                                  | ✓                                                                                                   |                                  | -                                                     | Receiver Only <sup>2</sup>                            |
| GCL <sup>1</sup>          |                         |                                                  | ✓                                                                                                   |                                  | -                                                     | Receiver Only <sup>2</sup>                            |
| Resolution                |                         |                                                  | 16 bit                                                                                              |                                  | 16-bit for analog inputs<br>12-bit for analog outputs | 16-bit for analog inputs<br>12-bit for analog outputs |
| Analog Input              | Channels                | 7                                                | 8                                                                                                   | 8                                | 6                                                     | 6                                                     |
|                           | Sampling Rate           | 10 Hz                                            | 10/100 Hz                                                                                           | 10 Hz                            | 10 Hz                                                 | 10 Hz                                                 |
|                           | Voltage Input           | -                                                | ±150 mV, ±500 mV,<br>±1 V, ±5 V, ±10 V,<br>0 ~ 150 mV, 0 ~ 500<br>mV, 0 ~ 1 V, 0 ~ 5 V,<br>0 ~ 10 V | -                                | ±10 V                                                 | ±10 V                                                 |
|                           | Current Input           | -                                                | 0 ~ 20, 4 ~ 20, ±20 mA                                                                              | -                                | 0 ~ 20, 4 ~ 20 mA                                     | 0 ~ 20, 4 ~ 20 mA                                     |
|                           | Direct Sensor Input     | Pt, Balco, and Ni RTD                            | -                                                                                                   | J, K, T, E, R, S, B thermocouple | -                                                     | -                                                     |
|                           | Burnout Detection       | ✓                                                | ✓ (4 ~ 20mA only)                                                                                   | ✓                                | -                                                     | -                                                     |
|                           | Math. Functions         | Max. Min. Avg.                                   | Max. Min. Avg.                                                                                      | Max. Min. Avg.                   | -                                                     | -                                                     |
| Analog Output             | Channels                | -                                                | -                                                                                                   | -                                | 2                                                     | 2                                                     |
|                           | Current Output          | -                                                | -                                                                                                   | -                                | 0 ~ 20, 4 ~ 20 mA @<br>15 V <sub>DC</sub>             | 0 ~ 20, 4 ~ 20 mA @<br>15 V <sub>DC</sub>             |
|                           | Voltage Output          | -                                                | -                                                                                                   | -                                | 0 ~ 10 V <sub>DC</sub> @ 30 mA                        | 0 ~ 10 V <sub>DC</sub> @ 30 mA                        |
| Digital I/O               | Input Channels          | -                                                | -                                                                                                   | -                                | 2                                                     | 2                                                     |
|                           | Output Channels         | -                                                | 2 (sink)                                                                                            | 8 (sink)                         | 2 (sink)                                              | 2 (sink)                                              |
|                           | High/Low Alarm Settings | ✓                                                | ✓                                                                                                   | ✓                                | -                                                     | -                                                     |
| Isolation Protection      |                         |                                                  | 2,000 V <sub>DC</sub>                                                                               |                                  | 2,000 V <sub>DC</sub> <sup>3</sup>                    | 2,000 V <sub>DC</sub> <sup>3</sup>                    |
| Remark                    |                         | -                                                | -                                                                                                   | -                                | Built-in dual loop PID control algorithm              | -                                                     |
| Protocols                 |                         | D version :Modbus TCP, RESTful, MQTT, SNMP,ASCII |                                                                                                     |                                  | Modbus TCP                                            | D version: Modbus TCP,RESTful, MQTT, SNMP,ASCII       |
| Certificate               |                         | C1D2,UL,CE,FCC                                   | C1D2,UL,CE,FCC                                                                                      | C1D2,UL,CE,FCC                   | CE,FCC                                                | C1D2,UL,CE,FCC                                        |



| Spec.                     | Model                   | ADAM-6050                                       | ADAM-6051             | ADAM-6052      | ADAM-6060  | ADAM-6066        |
|---------------------------|-------------------------|-------------------------------------------------|-----------------------|----------------|------------|------------------|
| Interface                 |                         | 1x RJ-45 LAN port, 10/100 Mbps Ethernet         |                       |                |            |                  |
| Peer-to-Peer <sup>1</sup> |                         | ✓                                               | ✓                     | ✓              | ✓          | ✓                |
| GCL <sup>1</sup>          |                         | ✓                                               | ✓                     | ✓              | ✓          | ✓                |
| Digital I/O               | Input Channels          | 12                                              | 12                    | 8              | 6          | 6                |
|                           | Output Channels         | 6 (sink)                                        | 2 (sink)              | 8 (source)     | 6-ch relay | 6-ch power relay |
|                           | Extra Counter Channels  | -                                               | 2                     | -              | -          | -                |
|                           | Counter Input           | 3 kHz                                           | 4.5 kHz               | 3 kHz          | 3 kHz      | 3 kHz            |
|                           | Frequency Input         | 3 kHz                                           | 4.5 kHz               | 3 kHz          | 3 kHz      | 3 kHz            |
|                           | Pulse Output            | ✓                                               | ✓                     | ✓              | ✓          | ✓                |
|                           | High/Low Alarm Settings | -                                               | -                     | -              | -          | -                |
| Isolation Protection      |                         |                                                 | 2,000 V <sub>DC</sub> |                |            |                  |
| Protocols                 |                         | D version: Modbus TCP,RESTful, MQTT, SNMP,ASCII |                       |                |            |                  |
| Certificate               |                         | C1D2,UL,CE,FCC                                  | C1D2,UL,CE,FCC        | C1D2,UL,CE,FCC | UL,CE,FCC  | UL,CE,FCC        |

# Ethernet I/O Modules



| Model                     |                   | <a href="#">ADAM-6217</a>                                      | <a href="#">ADAM-6224</a>   | <a href="#">ADAM-6250</a>              | <a href="#">ADAM-6251</a> | <a href="#">ADAM-6256</a> | <a href="#">ADAM-6260</a>                           | <a href="#">ADAM-6266</a>    |
|---------------------------|-------------------|----------------------------------------------------------------|-----------------------------|----------------------------------------|---------------------------|---------------------------|-----------------------------------------------------|------------------------------|
| Interface                 |                   | 2x RJ-45 LAN port (Daisy-chain), 10/100 Mbps Ethernet          |                             |                                        |                           |                           |                                                     |                              |
| Peer-to-Peer <sup>1</sup> |                   | ✓                                                              | Receiver Only <sup>2</sup>  | ✓                                      | ✓                         | ✓                         | ✓                                                   | ✓                            |
| GCL <sup>1</sup>          |                   | ✓                                                              | ✓                           | ✓                                      | ✓                         | ✓                         | ✓                                                   | ✓                            |
| Analog Input              | Channels          | 8                                                              | -                           | -                                      | -                         | -                         | -                                                   | -                            |
|                           | Input Impedance   | >10MΩ (voltage)<br>120Ω (current)                              | -                           | -                                      | -                         | -                         | -                                                   | -                            |
|                           | Voltage Input     | ±150 mV,<br>±500 mV, ±1 V,<br>±5 V, ±10 V                      | -                           | -                                      | -                         | -                         | -                                                   | -                            |
|                           | Current Input     | 0 ~ 20, 4 ~ 20,<br>±20 mA                                      | -                           | -                                      | -                         | -                         | -                                                   | -                            |
|                           | Sampling Rate     | 10 Hz                                                          | -                           | -                                      | -                         | -                         | -                                                   | -                            |
|                           | Burnout Detection | ✓ (4 ~ 20 mA)                                                  | -                           | -                                      | -                         | -                         | -                                                   | -                            |
|                           | Resolution        | 16-bit                                                         | -                           | -                                      | -                         | -                         | -                                                   | -                            |
|                           | Accuracy          | ±0.1% of FSR (voltage) @ 25°C<br>±0.2% of FSR (current) @ 25°C | -                           | -                                      | -                         | -                         | -                                                   | -                            |
| Analog Output             | Channels          | -                                                              | 4                           | -                                      | -                         | -                         | -                                                   | -                            |
|                           | Voltage Output    | -                                                              | 0 ~ 5, 0 ~ 10, ±5,<br>±10 V | -                                      | -                         | -                         | -                                                   | -                            |
|                           | Current Output    | -                                                              | 0 ~ 20,<br>4 ~ 20 mA        | -                                      | -                         | -                         | -                                                   | -                            |
|                           | Resolution        | -                                                              | 12-bit                      | -                                      | -                         | -                         | -                                                   | -                            |
| Digital I/O               | Input Channels    | -                                                              | 4 (dry contact only)        | 8                                      | 16                        | -                         | -                                                   | 4                            |
|                           | Output Channels   | -                                                              | -                           | 7 (sink)                               | -                         | 16 (sink)                 | -                                                   | -                            |
|                           | Relay Output      | -                                                              | -                           | -                                      | -                         | -                         | 6 (5 Form C + 1 Form A)                             | 4 (Form C)                   |
|                           | Contact Rating    | -                                                              | -                           | -                                      | -                         | -                         | 250 V <sub>AC</sub> @ 5A<br>30 V <sub>DC</sub> @ 5A | -                            |
|                           | Counter Input     | -                                                              | -                           | 3 kHz                                  | 3 kHz                     | -                         | -                                                   | 3 kHz                        |
|                           | Frequency Input   | -                                                              | -                           | 3 kHz                                  | 3 kHz                     | -                         | -                                                   | 3 kHz                        |
|                           | Pulse Output      | -                                                              | -                           | 5 kHz                                  | -                         | 5 kHz                     | 5 kHz                                               | 5 kHz                        |
|                           | LED Indicator     | -                                                              | -                           | 8 digital outputs,<br>7 digital inputs | 16 digital inputs         | 16 digital outputs        | 6 relay                                             | 4 digital inputs,<br>4 relay |
| Power Consumption         |                   | 3.5 W                                                          | 6 W                         | 3 W                                    | 2.7 W                     | 3.2 W                     | 4.5 W                                               | 4.2 W                        |
| Isolation Voltage         |                   | 2,500 V <sub>DC</sub>                                          |                             |                                        |                           |                           |                                                     |                              |
| Watchdog Timer            |                   | System (1.6 s) Communication (programmable)                    |                             |                                        |                           |                           |                                                     |                              |
| Communication Protocol    |                   | Modbus TCP, RESTful, MQTT, SNMP, ASCII                         |                             |                                        |                           |                           |                                                     |                              |
| Power Requirements        |                   | 10 ~ 30 V <sub>DC</sub> (24 V <sub>DC</sub> standard)          |                             |                                        |                           |                           |                                                     |                              |
| Operating Temperature     |                   | -40 ~ 70°C (-40 ~ 158°F)                                       |                             |                                        |                           |                           |                                                     |                              |
| Storage Temperature       |                   | -40 ~ 85°C (-40 ~ 185°F)                                       |                             |                                        |                           |                           |                                                     |                              |
| Operating Humidity        |                   | 20 ~ 95% RH (non-condensing)                                   |                             |                                        |                           |                           |                                                     |                              |
| Storage Humidity          |                   | 0 ~ 95% RH (non-condensing)                                    |                             |                                        |                           |                           |                                                     |                              |
| Certification             |                   | CE, FCC                                                        | CE, FCC                     | CE, FCC                                | CE, FCC                   | CE, FCC                   | CE, FCC                                             | CE, FCC                      |

Note 1: Peer-to-peer and GCL cannot be run simultaneously; only one feature can be enabled at a time.

Note 2: The ADAM-6224 can only act as a receiver and generate analog output when peer-to-peer or GCL mode is used.

1

IoT Software Solutions

2

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3

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8

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9

Remote I/O, Wireless Sensing Modules and Converters

10

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11

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12

Industrial I/O Solutions

13

Intelligent Transportation Platforms

14

Utility and Energy Solutions

# Ethernet I/O Modules



| Model                |                     | ADAM-6117                                                                   | ADAM-6150             | ADAM-6151             | ADAM-6156             | ADAM-6160             |
|----------------------|---------------------|-----------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Interface            |                     | 10/100 Mbps Ethernet                                                        |                       |                       |                       |                       |
| Support Protocol     |                     | ADAM-6100EI: EtherNet/IP<br>ADAM-6100PN: Profinet                           |                       |                       |                       |                       |
| Analog Input         | Resolution          | 16-bit                                                                      | -                     | -                     | -                     | -                     |
|                      | Channels            | 8                                                                           | -                     | -                     | -                     | -                     |
|                      | Sampling Rate       | 10 Hz                                                                       | -                     | -                     | -                     | -                     |
|                      | Voltage Input       | ±150 mV<br>±500 mV<br>±1 V<br>±5 V<br>±10 V                                 | -                     | -                     | -                     | -                     |
|                      | Current Input       | 0 ~ 20, 4 ~ 20, ±20 mA                                                      | -                     | -                     | -                     | -                     |
|                      | Direct Sensor Input | -                                                                           | -                     | -                     | -                     | -                     |
| Analog Output        | Resolution          | -                                                                           | -                     | -                     | -                     | -                     |
|                      | Channels            | -                                                                           | -                     | -                     | -                     | -                     |
|                      | Current Output      | -                                                                           | -                     | -                     | -                     | -                     |
|                      | Voltage Output      | -                                                                           | -                     | -                     | -                     | -                     |
| Digital I/O          | Input Channels      | -                                                                           | 8                     | 16                    | -                     | -                     |
|                      | Output Channels     | -                                                                           | 7                     | -                     | 16                    | 6-ch power relay      |
| Isolation Protection |                     | 2,500 V <sub>DC</sub>                                                       | 2,500 V <sub>DC</sub> | 2,500 V <sub>DC</sub> | 2,500 V <sub>DC</sub> | 2,500 V <sub>DC</sub> |
| Connectors           |                     | 2 x RJ-45 LAN (daisy chain)<br>Plug-in screw terminal block (I/O and power) |                       |                       |                       |                       |
| Certification        |                     | CE,FCC                                                                      | CE,FCC                | CE,FCC                | CE,FCC                | CE,FCC                |

# RS-485 I/O Modules

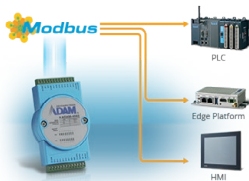
## Introduction

The ADAM-4000/ 4100 series feature rugged industrial-grade cases which are specially designed for reliable operation in harsh environments. Built-in microprocessors independently provide intelligent signal conditioning, analog I/O, digital I/O, data display, and RS-485 communication through Modbus protocols.

## Feature Highlights

### The most used protocol for industrial automation development

The new ADAM-4000/ 4100 modules feature Modbus/RTU remote data transmission protocol.



#### Standardized protocol

- One of the most widely used standard communication protocols for eAutomation development

#### Centralized control

- Universal remote I/O modules to operate the system via Modbus

#### Easy integration

- Provides the sample code and command for users to program

### Non-stop monitoring with watchdog timer and protection

For stable and constant performance, ADAM-4000/ 4100 features a Watchdog Timer and maximum protection to ensure the highest level of system reliability.



#### Noise protection

- Data accuracy assured by enhanced ESD / EFT / Surge Protection

#### Module stability ensured

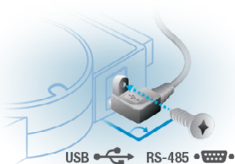
- Once a problem is detected, the Watchdog Timer automatically recovers the system

#### Save on maintenance costs

- The Watchdog Timer enhances system stability and reduces maintenance costs

### Various interfaces to meet your needs

Integration with embedded systems or PLC systems via USB or RS-485



#### Friendly L-shaped cable design\*

- Users can optionally order the 90 degree micro USB to a Type-A USB cable with a locking mechanism to provide a stable connection.

#### Micro USB interface\*

- The new ADAM-4100 series can be powered and transmit data via micro USB interface

\* Only featured on the B version of ADAM-4100 series selected models.

### Efficient management

Now, you can access ADAM-4100 modules (B version) by passive RFID for more efficient management.



#### Quickly obtain module status

- Quickly retrieve module information (I/O value, alarm event, and etc.) via the RFID interface.

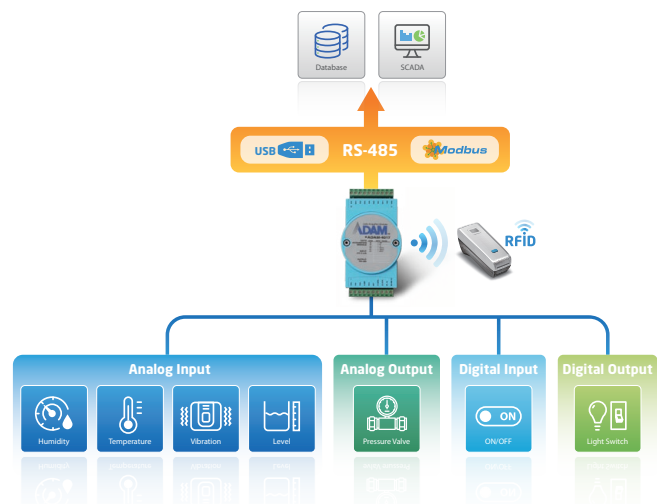
#### Easy maintenance

- Recorded RFID tag information (model name, serial number, user defined information, etc.) makes module field maintenance easy.

## ADAM-4000/4100 Series Comparison

|                         |              | ADAM-4000 Series       | ADAM-4100 Series       |
|-------------------------|--------------|------------------------|------------------------|
| Operation Temperature   |              | -10 ~ 70°C             | -40 ~ 85°C             |
| Power Input             |              | 10 ~ 30V <sub>DC</sub> | 10 ~ 48V <sub>DC</sub> |
| ESD                     |              | 8KV Air, 4KV contact   | 8KV Air, 6KV contact   |
| EFT                     |              | 2KV                    | 4KV                    |
| Surge                   |              | 0.5KV                  | 4KV                    |
| communication Interface | RS-485       | ✓                      | ✓                      |
|                         | USB          | -                      | ✓                      |
|                         | Passive RFID | -                      | ✓                      |

## Application Structure



# RS-485 I/O Modules

## Analog Input



| Model             |                                   | ADAM-4015             | ADAM-4017+                                  | ADAM-4018+                       | ADAM-4019+                                            |
|-------------------|-----------------------------------|-----------------------|---------------------------------------------|----------------------------------|-------------------------------------------------------|
| Resolution        |                                   |                       |                                             | 16 bit                           |                                                       |
| Analog Input      | Channels                          | 6 differential        | 8 differential                              | 8 differential                   | 8 differential                                        |
|                   | Sampling Rate                     | 10 Hz                 |                                             | 10 Hz                            | 10 Hz                                                 |
|                   | Voltage Input                     | -                     | ±150 mV<br>±500 mV<br>±1 V<br>±5 V<br>±10 V | -                                | ±100 mV<br>±500 mV<br>±1 V<br>±2.5 V<br>±5 V<br>±10 V |
|                   | Current Input                     | -                     | 4 ~ 20, ±20 mA                              | 4 ~ 20, ±20 mA                   | 4 ~ 20, ±20 mA                                        |
|                   | Direct Sensor Input               | RTD                   | -                                           | J, K, T, E, R, S, B thermocouple | J, K, T, E, R, S, B thermocouple                      |
|                   | Burnout Detection                 | ✓                     | -                                           | ✓                                | ✓ (4 ~ 20 mA and all T/C)                             |
|                   | Channel Independent Configuration | ✓                     | ✓                                           | ✓                                | ✓                                                     |
| Isolation Voltage |                                   | 3,000 V <sub>DC</sub> |                                             | 3,000 V <sub>DC</sub>            | 3,000 V <sub>DC</sub>                                 |
| Watchdog Timer    |                                   | ✓ (system and comm.)  | ✓ (system and comm.)                        | ✓ (system and comm.)             | ✓ (system and comm.)                                  |
| Modbus Support *  |                                   | ✓                     | ✓                                           | ✓                                | ✓                                                     |
| Certification     |                                   | C1D2, UL, CE, FCC     | C1D2, UL, CE, FCC                           | C1D2, UL, CE, FCC                | C1D2, UL, CE, FCC                                     |

\*All ADAM-4000 I/O modules support ASCII commands

## Analog Output



## Digital Input/Output



| Model                 |                 | ADAM-4021             | ADAM-4024             | ADAM-4050   | ADAM-4051             | ADAM-4052              |
|-----------------------|-----------------|-----------------------|-----------------------|-------------|-----------------------|------------------------|
| Resolution            |                 | 12 bit                | 12 bit                | -           | -                     | -                      |
| Analog Output         | Channels        | 1                     | 4                     | -           | -                     | -                      |
|                       | Voltage Output  | 0 ~ 10 V              | ±10 V                 | -           | -                     | -                      |
|                       | Current Output  | 0 ~ 20, 4 ~ 20 mA     | 0 ~ 20, 4 ~ 20 mA     | -           | -                     | -                      |
| Digital I/O           | Input Channels  | -                     | 4                     | 7           | 16                    | 8                      |
|                       | Output Channels | -                     | -                     | 8           | -                     | -                      |
|                       | Alarm Settings  | -                     | ✓                     | -           | -                     | -                      |
| Isolation Voltage     |                 | 3,000 V <sub>DC</sub> | 3,000 V <sub>DC</sub> | -           | 2,500 V <sub>DC</sub> | 5,000 V <sub>RMS</sub> |
| Digital LED Indicator |                 | -                     | -                     | -           | Yes                   | -                      |
| Watchdog Timer        |                 | ✓ (system)            | ✓ (system and comm.)  | ✓ (system)  | ✓ (system and comm.)  | ✓ (system)             |
| Safety Setting        |                 | -                     | ✓                     | -           | -                     | -                      |
| Modbus Support *      |                 | -                     | ✓                     | -           | ✓                     | -                      |
| Certification         |                 | CE, FCC               | C1D2, UL, CE, FCC     | UL, CE, FCC | C1D2, UL, CE, FCC     | UL, CE, FCC            |

\*All ADAM-4000 I/O modules support ASCII commands

## Digital Input/Output

## Relay Output

## Counter



| Model                 |                                   | ADAM-4053   | ADAM-4055             | ADAM-4056S<br>ADAM-4056SO                             | ADAM-4060  | ADAM-4068            | ADAM-4069            | ADAM-4080              |
|-----------------------|-----------------------------------|-------------|-----------------------|-------------------------------------------------------|------------|----------------------|----------------------|------------------------|
| Resolution            |                                   | -           | -                     | -                                                     | -          | -                    | -                    | -                      |
| Analog Input          | Channels                          | -           | -                     | -                                                     | -          | -                    | -                    | -                      |
|                       | Sampling Rate                     | -           | -                     | -                                                     | -          | -                    | -                    | -                      |
|                       | Voltage Input                     | -           | -                     | -                                                     | -          | -                    | -                    | -                      |
|                       | Current Input                     | -           | -                     | -                                                     | -          | -                    | -                    | -                      |
|                       | Direct Sensor Input               | -           | -                     | -                                                     | -          | -                    | -                    | -                      |
|                       | Burnout Detection                 | -           | -                     | -                                                     | -          | -                    | -                    | -                      |
|                       | Channel Independent Configuration | -           | -                     | -                                                     | -          | -                    | -                    | -                      |
| Analog Output         | Channels                          | -           | -                     | -                                                     | -          | -                    | -                    | -                      |
|                       | Voltage Output                    | -           | -                     | -                                                     | -          | -                    | -                    | -                      |
|                       | Current Output                    | -           | -                     | -                                                     | -          | -                    | -                    | -                      |
| Digital I/O           | Input Channels                    | 16          | 8                     | -                                                     | -          | -                    | -                    | -                      |
|                       | Output Channels                   | -           | 8                     | 12                                                    | 4-ch relay | 8-ch relay           | 8-ch power relay     | 2                      |
|                       | Alarm Settings                    | -           | -                     | -                                                     | -          | -                    | -                    | Yes                    |
| Counter (32-bit)      | Channels                          | -           | -                     | -                                                     | -          | -                    | -                    | 2                      |
|                       | Input Frequency                   | -           | -                     | -                                                     | -          | -                    | -                    | 50 kHz                 |
| Isolation Voltage     |                                   | -           | 2,500 V <sub>DC</sub> | 5,000 V <sub>DC</sub>                                 | -          | -                    | -                    | 2,500 V <sub>RMS</sub> |
| Digital LED Indicator |                                   | -           | ✓                     | ✓                                                     | -          | ✓                    | -                    | -                      |
| Watchdog Timer        |                                   | ✓ (system)  | ✓ (system and comm.)  | ✓ (system and comm.)                                  | ✓ (system) | ✓ (system and comm.) | ✓ (system and comm.) | ✓ (system)             |
| Safety Setting        |                                   | -           | ✓                     | -                                                     | ✓          | ✓                    | ✓                    | -                      |
| Modbus Support *      |                                   | -           | ✓                     | ✓                                                     | -          | ✓                    | ✓                    | supported in E version |
| Certification         |                                   | UL, CE, FCC | CE, FCC               | ADAM-4056SO: C1D2, UL, CE, FCC<br>ADAM-4056S: CE, FCC | CE, FCC    | CE, FCC              | UL, CE, FCC          | CE, FCC                |

\*All ADAM-4000 I/O modules support ASCII commands

1  
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# RS-485 I/O Modules



| Model                   |                                   | ADAM-4115                    | ADAM-4117                                                                                                                                          | ADAM-4118                        | ADAM-4150                                                                    | ADAM-4168                  |
|-------------------------|-----------------------------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|------------------------------------------------------------------------------|----------------------------|
| Resolution              |                                   | 16 bits                      | 16 bits                                                                                                                                            |                                  | -                                                                            | -                          |
| Analog Input            | Channels                          | 6                            | 8 differential                                                                                                                                     |                                  | -                                                                            | -                          |
|                         | Sampling Rate                     | 10/100 Hz (Total)            | 10/100 Hz (total)                                                                                                                                  |                                  | -                                                                            | -                          |
|                         | Voltage Input                     | -                            | 0 ~ 150 mV, 0 ~ 500 mV,<br>0 ~ 1 V, 0 ~ 5 V, 0 ~ 10 V,<br>0 ~ 15 V, $\pm 150$ mV,<br>$\pm 500$ mV, $\pm 1$ V, $\pm 5$ V,<br>$\pm 10$ V, $\pm 15$ V |                                  | $\pm 15$ mV, $\pm 50$ mV, $\pm 100$ mV, $\pm 500$ mV, $\pm 1$ V, $\pm 2.5$ V | -                          |
|                         | Current Input                     |                              | 0 ~ 20, 4 ~ 20, $\pm 20$ mA                                                                                                                        | 4 ~ 20, $\pm 20$ mA              | -                                                                            | -                          |
|                         | Direct Sensor Input               | Pt100, Pt1000, Ni 50, Ni 508 | -                                                                                                                                                  | J, K, T, E, R, S, B Thermocouple | -                                                                            | -                          |
|                         | Burnout Detection                 | -                            | ✓ (mA)                                                                                                                                             | ✓ (mA and All T/C)               | -                                                                            | -                          |
|                         | Channel Independent Configuration | ✓                            | ✓                                                                                                                                                  | ✓                                | -                                                                            | -                          |
| Digital I/O             | Input Channels                    |                              | -                                                                                                                                                  | -                                | 7                                                                            | -                          |
|                         | Output Channels                   |                              | -                                                                                                                                                  | -                                | 8                                                                            | 8-ch relay                 |
| Counter                 | Channels                          | -                            | -                                                                                                                                                  | -                                | 7                                                                            | -                          |
|                         | Input Frequency                   | -                            | -                                                                                                                                                  | -                                | 3 kHz                                                                        | -                          |
| Isolation Voltage       |                                   | 3,000 V <sub>DC</sub>        |                                                                                                                                                    |                                  |                                                                              |                            |
| Digital LED Indicator   |                                   | Communication and Power      |                                                                                                                                                    |                                  |                                                                              |                            |
| Watchdog Timer          |                                   | Yes (System & Communication) |                                                                                                                                                    |                                  |                                                                              |                            |
| Safety Setting          |                                   | ✓                            | -                                                                                                                                                  | -                                | ✓                                                                            | ✓                          |
| Communication Protocol  |                                   | ASCII Command/Modbus         |                                                                                                                                                    |                                  |                                                                              |                            |
| Power Requirements      |                                   | 10 ~ 48 V <sub>DC</sub>      |                                                                                                                                                    |                                  |                                                                              |                            |
| Operating Temperature   |                                   | -40 ~ 85°C (-40 ~ 185°F)     |                                                                                                                                                    |                                  |                                                                              |                            |
| Storage Temperature     |                                   | -40 ~ 85°C (-40 ~ 185°F)     |                                                                                                                                                    |                                  |                                                                              |                            |
| Operating Humidity      |                                   | 5 ~ 95% RH                   |                                                                                                                                                    |                                  |                                                                              |                            |
| Power Consumption       |                                   | 1.2 W @ 24 V <sub>DC</sub>   | 1.2 W @ 24 V <sub>DC</sub>                                                                                                                         | 0.5 W @ 24 V <sub>DC</sub>       | 0.7 W @ 24 V <sub>DC</sub>                                                   | 1.8 W @ 24 V <sub>DC</sub> |
| Communication Interface |                                   | RS-485, Micro USB            |                                                                                                                                                    |                                  |                                                                              |                            |
| Certification           |                                   | CE, FCC                      | C1D2, UL, CE, FCC                                                                                                                                  | C1D2, UL, CE, FCC                | C1D2, UL, CE, FCC                                                            | UL, CE, FCC                |