Intech Wireless
Z-2400-A2 Series
Communication Nodes for Analogue & Digital Signals

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Intech INSTRUMENTS LTD

ZigBee® Technology
Analogue & Digital Input/Output
New Turbo RF Transmitter
Configuration & Specifications

**www.intech.co.nz**

ZigBee®
The New Wireless Network Standard

ZigBee® Technology, Wireless Made Easy

ZigBee® is a specification for a suite of high level communication protocols using small, low-power digital radios based on the IEEE 802.15.4-2006 standard for wireless personal area networks (WPANs). ZigBee is targeted at radio-frequency (RF) applications that require a low data rate, secure networking, and low power consumption - especially good for solar powered sites.

If you are looking for wireless monitoring and/or remote control solutions, Intech's Z-2400 nodes may be the answer. The Intech Z-2400-A2 devices are integrated with ZigBee® technology to form a mesh network between nodes. This technique allows the range of an individual node to be expanded and multiplied, covering a much larger area. When the mesh network discovers a new Z-2400-A2 node, it will automatically incorporate it into the current wireless network.

Where the Z-2400-A2 series is concerned, the situation is made easy where two wireless points become too isolated to communicate directly. In which case, simply switch on a repeater wireless node between the two locations and the ZigBee network will automatically realign the wireless signal path.
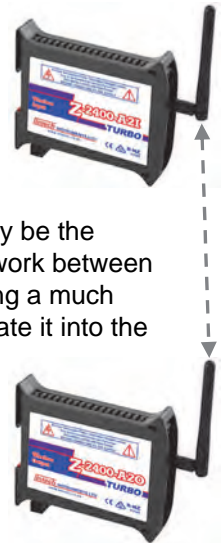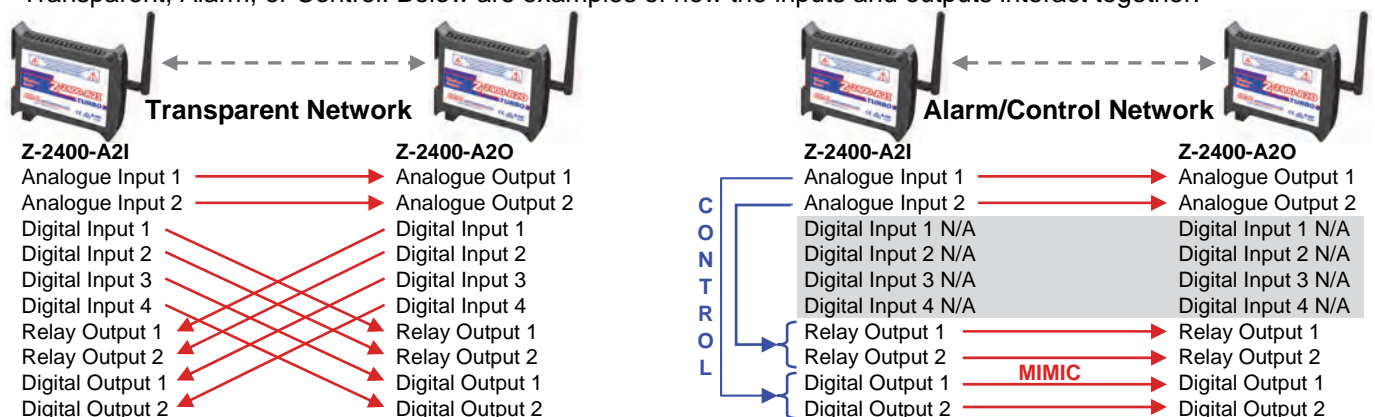
Z-2400-A2 Nodes

Z-2400-A2 nodes are specifically designed for replacement of wires.

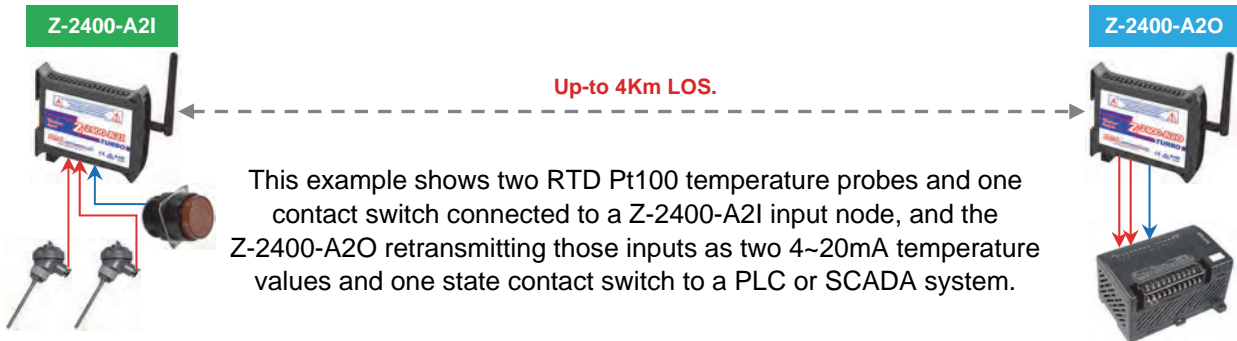| MODEL	DESCRIPTION
Z-2400-A2IO	The Z-2400-A2IO is the kit set of the Input (Z-2400-A2I) and Output (Z-2400-A2O) wireless nodes, supplied as a complete set paired to each other with a unique mesh ID.
Z-2400-A2I	The Z-2400-A2I is a 2 channel analogue input wireless node, when switched on it looks for the output node to sends it's input values to via the wireless link. The inputs are individually programmable as follows: • RTD: Pt100/Pt1000, -200~850°C. • Thermocouple: B, E, K, J, N, R, S, T, with CJC. • mA: 0~20mA (4~20mA). • mV: -200~200mV, -200~1000mV. • V: 0~10V, 0~18V. • Pulse/Digital Max speed 0~2500Hz. It also comes equipped with 4 digital inputs, 2 digital outputs, and 2 relay outputs.
Z-2400-A2O	Z-2400-A2O is a 2 channel analogue output wireless node. It acts as the base and controls it's entire ZigBee wireless network. The analogue outputs are 4~20mA at 24Vdc isolated. Like the input node, it comes equipped with the matching 4 digital inputs and 4 digital/relay outputs.
Z-2400-A2R	The Z-2400-A2R is quite simply a ZigBee wireless repeater. It is used to boost the signal strength between the other two nodes, input and output, to extend the range. The maximum number of repeater nodes per wireless mesh network is 15.

I/O Transmission for Z-2400-A2 Nodes

The Z-2400-A2 series can be configured to operate their digital input/outputs using three different methods: Transparent, Alarm, or Control. Below are examples of how the inputs and outputs interact together.
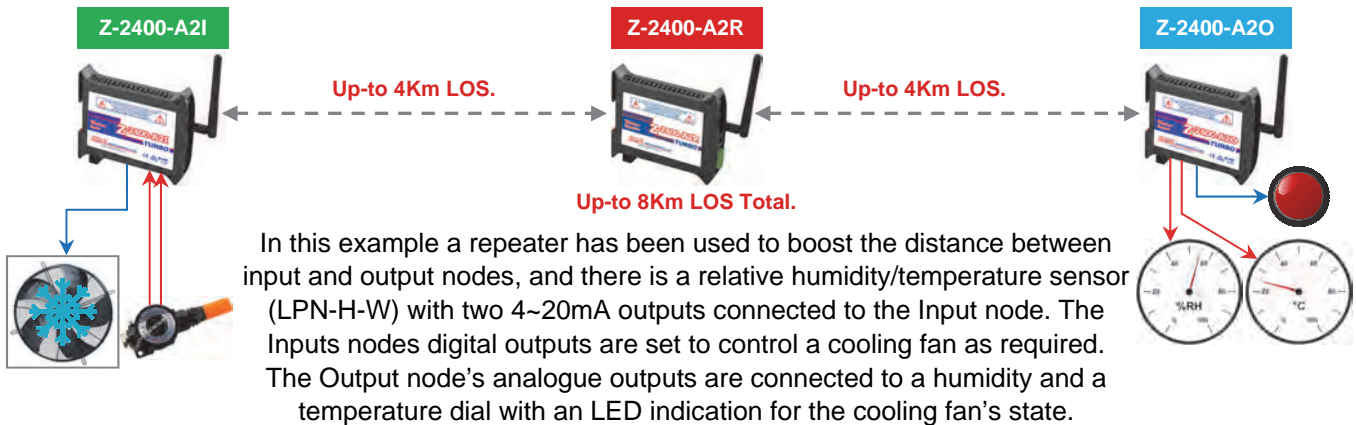
Transparent Network

Z-2400-A2I	Z-2400-A2O
Analogue Input 1	Analogue Output 1
Analogue Input 2	Analogue Output 2
Digital Input 1	Digital Input 1
Digital Input 2	Digital Input 2
Digital Input 3	Digital Input 3
Digital Input 4	Digital Input 4
Relay Output 1	Relay Output 1
Relay Output 2	Relay Output 2
Digital Output 1	Digital Output 1
Digital Output 2	Digital Output 2

Alarm/Control Network

CONTROL

Z-2400-A2I	Z-2400-A2O
Analogue Input 1	Analogue Output 1
Analogue Input 2	Analogue Output 2
Digital Input 1 N/A	Digital Input 1 N/A
Digital Input 2 N/A	Digital Input 2 N/A
Digital Input 3 N/A	Digital Input 3 N/A
Digital Input 4 N/A	Digital Input 4 N/A
Relay Output 1	Relay Output 1
Relay Output 2	Relay Output 2
Digital Output 1	Digital Output 1
Digital Output 2	Digital Output 2

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Z-2400-A2 Configuration Examples

1. Two Analogue & One Digital Wireless to a PLC or SCADA.

Z-2400-A2I

Z-2400-A2O

Up-to 4Km LOS.

This example shows two RTD Pt100 temperature probes and one contact switch connected to a Z-2400-A2I input node, and the Z-2400-A2O retransmitting those inputs as two 4~20mA temperature values and one state contact switch to a PLC or SCADA system.

2. Two Analogue & One Digital Wireless to a PLC or SCADA with Repeater.

Z-2400-A2I

Z-2400-A2R

Z-2400-A2O

Up-to 4Km LOS.

Up-to 4Km LOS.

Up-to 8Km LOS Total.

In this example a repeater has been used to boost the distance between input and output nodes, and there is a relative humidity/temperature sensor (LPN-H-W) with two 4~20mA outputs connected to the Input node. The Inputs nodes digital outputs are set to control a cooling fan as required. The Output node's analogue outputs are connected to a humidity and a temperature dial with an LED indication for the cooling fan's state.

3. Using 12dBi Mini Directional Antennas for More Distance. (ZB-MD24-12)

Z-2400-A2I

Z-2400-A2O

Up-to 12Km LOS.

Low Loss Coax

Low Loss Coax

For more Intech long range antennas available visit: **www.intech.co.nz/zigbee**

4. Using a Repeater for Pump and Tank Level.

In this example the Z-2400-A2I input node is used to connect to a 4~20mA signal from a level sensor in a water tank, and transmit it wirelessly over a highway to a Z-2400-A2R repeater node and down a steep bank to the Z-2400-A2O output node. The output node connects to a controller that controls the tank level by turning the water pump on and off.

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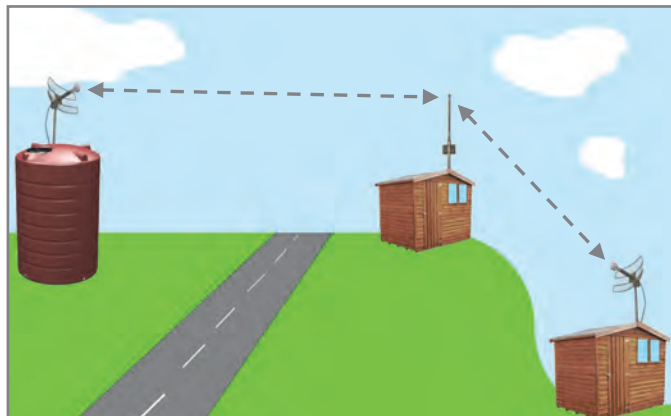
Z-2400-A2 Specifications

General Specifications

Wireless standard:	IEEE 802.15.4-2006.
Wireless range:	4Km typical line of sight *(approximately 50m typical when major obstructions block path of radio link)*.
Wireless Frequency:	2405~2485MHz.
Frequency Hopping:	15 Channels.
Turbo Wireless Power:	100mW (or 10mW, user selectable to comply with region wireless standards).
Power Supply:	9~36Vdc.
Power consumption:	2.5VA Max.
Isolation:	1500Vac between power supply and input or output channels.
Programming Port:	XU-USB Programming Key, uP Configure Software required (free to download).
Data Rate:	250Kb/s.

Z-2400-A2O

Two Analogue Outputs:	4~20mA, 700Ω 24Vdc, Isolated.
Four Digital Inputs:	Four 0~1Hz, 1.4~30Vdc.
Two Digital Outputs:	Open-Drain, 30Vdc, 1A Max.
Two Relay Outputs:	250Vac or 30Vdc, 5A Max.
One Excitation:	3Vdc.
LED Indications:	Power, Stack, Network, Wireless Link Quality.

Z-2400-A2R

LED Indications:	Power, Stack, Network, Wireless Link Quality.

Z-2400-A2I

Two Analogue Inputs:	16 Bits, Individually Isolated.

- RTD: Pt100/Pt1000, -200~850°C.
- Thermocouple: B, E, K, J, N, R, S, T, with CJC.
- mA: 0~20mA (4~20mA).
- mV: -200~200mV, -200~1000mV.
- V: 0~10V, 0~18V.
- Pulse, Frequency or On/Off, Max speed 0~2500Hz.

Four Digital Inputs:	Four 0~1Hz, 1.4~30Vdc.
Two Digital Outputs:	Open-Drain, 30Vdc, 1A Max.
Two Relay Outputs:	250Vac or 30Vdc, 5A Max.
One Excitation:	3Vdc.
LED Indications:	Power, Stack, Network, Wireless Link Quality.

LED High/Low Indication

Each Z-2400-A2 node comes fitted with High/Low LED indication on the front. The High/Low LEDs indicate the wireless Link Quality between itself and the nearest Z-2400-A2 node.
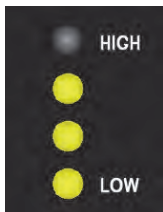
⇒ One illuminated LED indicates very weak or no signal level.
⇒ Two illuminated LED's indicates low signal level.
⇒ Three illuminated LED's indicate medium signal level.
⇒ Four illuminated LED's indicate high signal level.

Laws of Z-2400 wireless networks:

- Maximum Z-2400-A2 node network capacity per link:
    - ♦ 1 Output Base node.
    - ♦ 1 Input Remote node.
    - ♦ Up to 15 Repeater nodes. (*Note: Overall wireless speed will drop as more Repeater nodes are added.*)
- Multiple Z-2400 wireless links within range of each other will need to be setup with unique Mesh IDs.
- **LOS** refers to ideal 'Line Of Sight', where by there is no RF interference and no obstructions between or within the Fresnel zone of two communicating wireless nodes.
- **Good Signal Cannot be Guaranteed:** Even when all the correct installation placement and precautions are taken into account, no one can guarantee a good link, as there are many factors that cause problems. With the Z-2400 wireless series, additional interposing Repeaters can be used in between Input & Output nodes; this is particularly good when transmitting through solid walls or over hills. Another option is to also install higher gain antennas, especially if physical distance is the key issue.