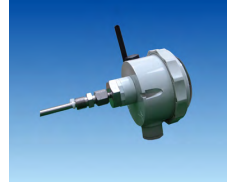




ZigBee WIRELESS SYSTEMS AND SENSORS

- Supports ZigBee Wireless Protocol
- Use of unlicensed 2.4 GHz Radio Band
- Ultra-low Power Consumption
- Easy to add and remove sensor nodes
- High Security 128 bit encryption plus Access Control lists available
- Flexible network Topology
- Up to 250 kbps Data Rate
- Low Cost and no Cabling!



Introduction

The range of Wireless Sensors and Systems designed and manufactured by Industrial Interface is based primarily around the ZigBee protocol working on the world-wide IEEE 802.15.4 wireless hardware standard.

The benefits of using the ZigBee protocol are highlighted in the bullet points above.

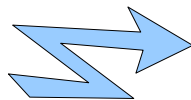
Of course the main benefit of wireless technology is the flexibility and cost savings obtained through not having to lay cables between sensors and control systems. It also allows for easy add-ons to existing wired systems.

These features, together with the wide range of sensors I/O modules and the Z-Port Ethernet Gateway enable complete data acquisition and control systems to be realised.

In addition using our Web server system allows these networks to be monitored from anywhere in the world using any standard internet browser.

Some typical uses are outlined below and in the following pages.

Example One: Simple Cable replacement system.

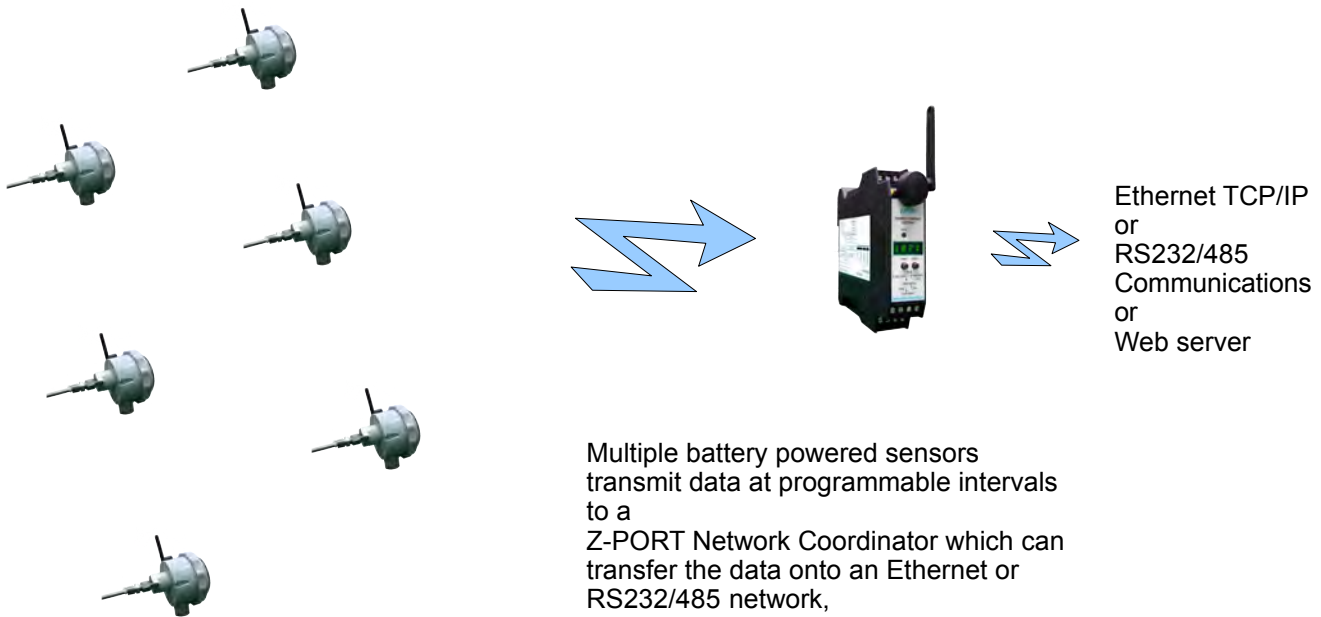


Transmitter accepts any standard process input and transmits value to receiver unit

Receiver gets values from transmitter and outputs value in analogue 4-20mA, 0-10V or similar format.

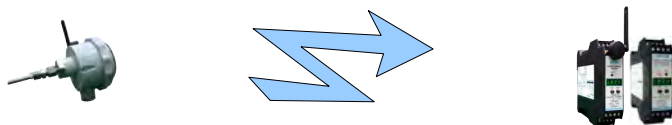


Example Two: Typical ZigBee Sensor Network.



Multiple battery powered sensors transmit data at programmable intervals to a Z-PORT Network Coordinator which can transfer the data onto an Ethernet or RS232/485 network, Data from up to 256 nodes can be stored on one Z-PORT module and up to 16 networks can co-exist together. Several different topologies are possible including Mesh self-healing wireless networks

Example Three: Wireless Trip Amplifier










A ZigBee wireless transmitter sends an OK message every 10 minutes unless an alarm condition is met. On reaching an alarm state the transmitter immediately sends an alarm message to the Z-200 receiver which can switch up to two relay outputs.



ZIGBEE WIRELESS CONTENTS

Data Sheets

Wireless Systems & Sensors

Z-200 ZigBee System Powered transmitter/receiver unit Cable Replacement option Multiple inputs, expandable using ISO-SLICE I/O		5
Z-PORT ZigBee Gateway ZigBee Network Coordinator with Ethernet or RS232 Gateway		7
Z-HEAD ZigBee Universal in-head transmitter		9
ISO-SLICE Isolated bus input/output System Universal input types Galvanic Isolation		11
Z-TEMP ZigBee Temperature and Relative Humidity Transmitter		13
Z-ROOT ZigBee Network Router		15
ZigBee Antennae A range of ZigBee Antennae including ATEX certified items		17



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July 2008



Z-200

ZIGBEE TRANSMITTER / RECEIVER SYSTEM

- Transmits up to 1024 I/O Values through ZigBee Wireless Link
- Simple Cable Replacement System
- Local indication of Input Values
- Expand the number of Inputs through Iso-Slice I/O Modules
- Receiver Output either analogue or Ethernet/RS232 Connection with Local Display



Description

The Z-200 unit allows almost any number of analogue or digital input values to be wirelessly transmitted to a remote receiver with either analogue 4-20mA, 0-10V, Ethernet or RS232 outputs.

The transmitter unit has one universal analogue input but the system can be expanded through the use of the optional slice I/O modules.

These modules connect automatically via the DIN rail mounted bus connector allowing the easy addition and removal of extra I/O.

The built-in display allows local monitoring of the individual inputs and outputs, a useful commissioning and operations tool.

The Z-200 has typically two uses:

- 1) To transmit a single variable to a receiver unit which outputs a 4-20mA or 0-10V signal corresponding to the input
- 2) To transmit multiple input values to a receiver unit which provides either multiple 4-20mA or 0-10V outputs or a single Ethernet or RS232 connection.

The transmitter and receiver units are identical units factory configured for either function.

Outputs

DC Current and Voltage

0-20mA, 4-20mA, 0-10mA into 750Ω
0-1 V, 0-10 V, 1-5V into a minimum 2kΩ

Inputs

The input types and ranges included below are our standard ones only. Contact Sales for others.

DC Current & Voltage

0-20mA, 4-20mA, 0-10mA into 15/30 Ω
0-1V, 0-10V, 1-5V into 100kΩ / 1MΩ
0-25mV, 0-100mV, 0-500mV into >10MΩ

Min & Max Full Scale Ranges are:

DC Current	0 - 1mA	0 - 5A
Bipolar DC Current	±5mA	±10mA
DC Voltage	0 - 25mV	0 - 300V*
Bipolar DC Voltage	±5V	±10V
2 Wire Pot	0 - 125Ω	0 - 1kΩ
3 Wire Pot	0 - 1kΩ	0 - 100kΩ

* Note: For input voltages greater than 60Vdc a Divider unit must be specified.

Thermocouples

Types E,J,K,N,R,S,T,B linearised or non-linearised
Ranges: Wide range of inputs
Cold junction compensation (can be turned off)
Upscale or downscale t/c burnout options

Resistance Thermometers

2, 3 or 4 wire PT100 or PT1000, linearised or non-linearised
Ranges: Wide range of inputs
Upscale or downscale RTD burnout options

Frequency Input

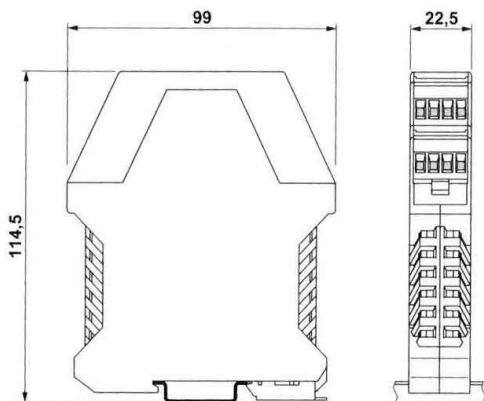
Wide range of freq inputs to 250kHz. Specify -FREQ

Additional I/O

Extra analogue and digital inputs and outputs are available through the ISO-SLICE slice I/O modules.



Parameter	Min	Typ	Max	Comments
Supply Voltage	16	24V	30	
Supply Current (mA)	65		120	24 V dc supply
Input Impedance (Volt)		1M Ω		
Input Impedance(mA)		15 Ω		
Volt drop (mA input)		0.3		At 20mA input
Output Linearity Error		$\pm 0.01\%$	$\pm 0.05\%$	
Temp Coefficient			$\pm 100\text{ppm}/^\circ\text{C}$	
Operating Ambient	0 $^\circ\text{C}$		55 $^\circ\text{C}$	
Relative Humidity	0%		90%	
Isolation Voltage <small>see note 1</small>	1kV			
Surge Voltage	2.5kV for 50 μS			Transient of 10kV/ μS
Notes	The process input level is shown on the 4 digit LED display. Figures based on 24 Vdc supply 20 degC ambient.			



Installation Data	
Mounting	DIN Rail TS35
Orientation	Any
Connections	Screw Clamp with pressure plate
Conductor size	0.5-4.0mm
Insulation Stripping	12mm
Weight	Approx 120g

Connection Details			
3.	Tx supply +ve		RTD 4 th wire
5.	Input mA +ve	T/C +ve	RTD +ve
4.	Input mA -ve	T/C -ve	RTD -ve
6.			RTD
3 rd wire			
1.	Power Supply -ve		
2.	Power Supply +ve		
10.	Output -ve		
12.	Output +ve		

Ordering Information	
Please supply:	
Part Number:	Z-200
Input Type:	e.g mA, Volt, T/C, RTD
Input Range:	e.g 4-20, 0-10, 0-500 $^\circ\text{C}$
Power Supply:	24 Vdc
Options:	Extra I/O available through ISO-SLICE modules



Z-PORT

ZIGBEE TO ETHERNET or RS232 GATEWAY

- 2.4GHz ZigBee to Ethernet Gateway
- Enables easy add-on of wireless networks to existing Ethernet systems
- Allows a single remote sensor to be incorporated into an Ethernet network without the need for expensive cabling
- RS232/485 version also available



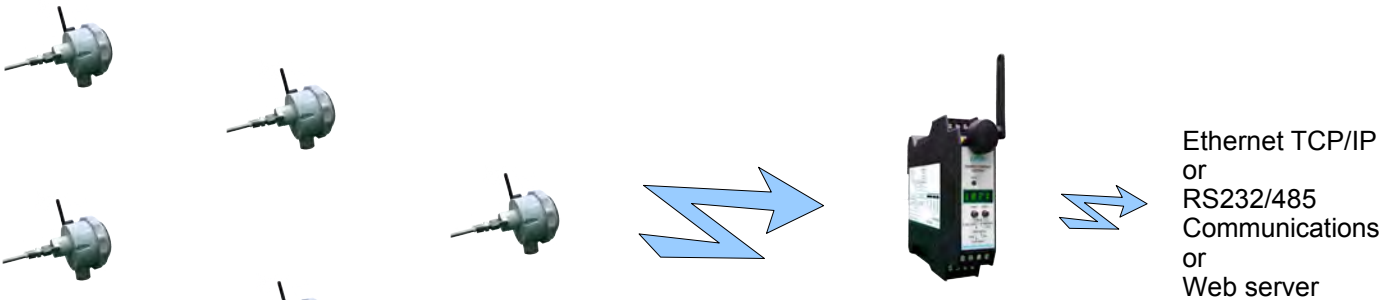
Description

The **Z-PORT Ethernet Gateway** provides a link between ZigBee based wireless sensors and sensor networks and Industrial Ethernet or RS232 networks.

This allows ZigBee based wireless networks or individual sensors to be incorporated into new or existing Industrial Ethernet data monitoring and control networks.

The Z-PORT has been carefully designed to support a range of network systems including sophisticated self-forming and self-healing mesh networks, to ensure that data gets to its destination.

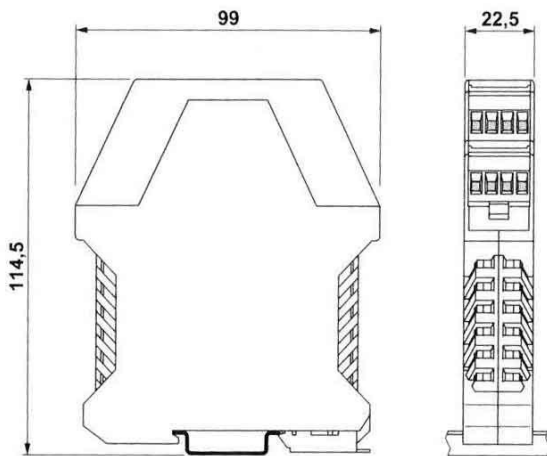
The Z-PORT can interface with standard 10/100BaseT Ethernet networks giving access to the standard MODBUS TCP protocol, ensuring compatibility with most industrial automation systems.



Multiple battery powered sensors transmit data at programmable intervals to a Z-PORT Network Coordinator which can transfer the data onto an Ethernet or RS232/485 network, Data from up to 256 nodes can be stored on one Z-PORT module and up to 16 networks can co-exist together. Several different topologies are possible including Mesh self-healing wireless networks



Parameter	Min	Typ	Max	Comments
Supply Voltage	16	24V	30	
Supply Current (mA)	100		120	24 V dc supply
Ethernet Interface				10Base-T or 100Base-T
Connector		RJ45		
Protocols				TCP/IP UDP/IP others available
RS232 Data Rate		2400		300 to 115,200 baud
Data bits		7 or 8		
Parity				Odd / even / none
Isolation voltage	1kV			
Operating Ambient	0°C		55°C	
Relative Humidity	0%		90%	
Surge Voltage	2.5kV for 50µS			Transient of 10kV/µS
Notes	Local LED display can display sensor values in real engineering units and Z-PORT set-up information			



Installation Data	
Mounting	DIN Rail TS35
Orientation	Any
Connections	Screw Clamp with pressure plate
Conductor size	0.5-4.0mm
Insulation Stripping	12mm
Weight	Approx 120g

Connection Details	
1.	Power Supply -ve
2.	Power Supply +ve

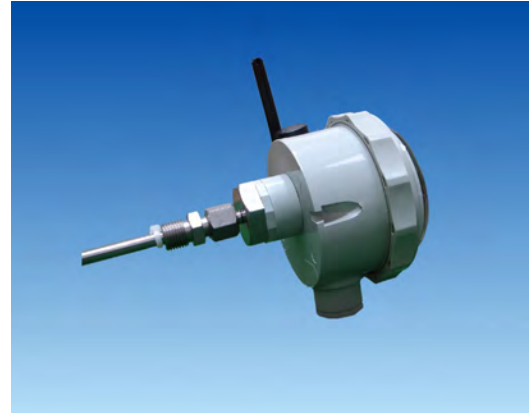
Ordering Information	
Please supply:	
Part Number:	Z-PORT
Power Supply:	24 Vdc
Options:	RS232/485 version specify Z-PORT-RS



Z-HEAD

UNIVERSAL INPUT ZIGBEE WIRELESS TRANSMITTER

- Battery Powered Wireless ZigBee Pressure Transmitter
- Wide Range of Inputs Including: RTD, Thermocouple, mA and Volts
- Long Battery Life, Low level Alarm
- Wide range of connection heads
- Complete Thermocouple, RTD, Pressure and Level probes available



Description

The Z-HEAD universal input ZigBee transmitter can accept a wide range of inputs from most process measurement devices and transmits the measured variable to a 2.4GHz ZigBee receiver unit.

The Z-HEAD is specially designed to maximise battery life and in a typical application the battery life can exceed three years. The data update rate is user selectable to suit the requirement of each measured variable and so maximise battery life.

Typical update rates include 1 second, 10 seconds, 60 seconds or 1 hour. The unit also transmits a signal strength reading which can be remotely monitored.

The unit mounts in most standard process connection heads and complete assemblies are available for RTD, Thermocouple, Pressure and Level sensors.

The Z-HEAD is designed to operate with the Z-200 or Z-PORT units. The Z-200 can output a 4-20mA or 0-10V signal whilst the Z-PORT can store up to 1024 variables for transmission to an Industrial Ethernet connection or an RS232/485 communications link.

Inputs

The input types and ranges included below are our standard ones only. Contact Sales for others.

DC Current & Voltage

0-20mA, 4-20mA, 0-10mA into 15/30 Ω
0-1V, 0-10V, 1-5V into 100k Ω / 1M Ω

Thermocouples

Types E,J,K,N,R,S,T,B linearised or non-linearised
Ranges: Wide range of inputs
Cold junction compensation (can be turned off)
Upscale or downscale t/c burnout options

Resistance Thermometers

2, or 3 wire PT100 , linearised or non-linearised.
Wide range of inputs upscale or downscale burnout.

Bridge Circuits

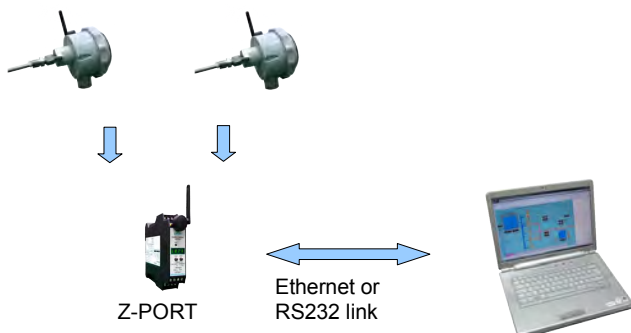
Most standard bridge circuits with mV outputs.

Pressure and Level Sensors

A full range of ZigBee enabled pressure and level sensors are available, please see Pressure and Level Section

Digital Inputs

A module for digital inputs is available which can operate in counting mode or status on/off mode





Parameter	Min	Typ	Max	Comments
Supply Voltage		3.6V		Battery Powered
Supply Current (mA)			40	When transmitting data
Input Impedance (Volt)		100k Ω		Dependent on range, typical = 0-10V
Operating Ambient	-200°C		70°C	
Relative Humidity	0%		90%	
Isolation Voltage ^{see note 1}	1kV			
Notes				



Installation Data	
Mounting	In Head or wall mount
Orientation	Any
Connections	Screw Clamp with pressure plate
Conductor size	0.5-4.0mm
Insulation Stripping	12mm
Weight	Approx 70g
Enclosure Size	85mm dia x 57mm deep

Connection Details

1. Power Supply -ve
2. Power Supply +ve

3. Input +ve
4. Input -ve
5. RTD 3rd wire
6. Bridge Excitation

Ordering Information

Please supply:

Part Number:	Z-HEAD
Input Type:	e.g mA, Volt, T/C, RTD
Input Range:	e.g 4-20, 0-10, 0-500°C
Power Supply:	Battery powered



ISO-SLICE

ISOLATED BUS I/O SYSTEM

- Universal Configurable input & output
- Communicates to Ethernet / RS232 or ZigBee Network Coordinator
- Inter-channel & input/output isolation
- Automatic Bus & Power connection via DIN rail bus connector
- Multiple inputs in one module
- Isolated Transmitter Supply
- Very High Accuracy, Low Cost



Description

The new **ISO-SLICE** isolated Bus I/O system combines full three-port isolation with access to an industrial bus. This bus connects to the E-100, or Z-200 coordinator modules can then be used to transmit the process values via either Ethernet or RS232/485 wired communications or ZigBee wireless networks.

A wide range of modules are available, from a single universal input to 8-way 4-20ma units. A selection guide is shown overleaf.

Full 3 port isolation is standard as is an isolated transmitter supply which can be used to power any standard 2-wire 4-20mA transmitter.

The input type and range can be user selected using simple DIL switches inside the unit. All RTD and Thermocouple inputs can be fully linearised.

Non-interactive zero and span controls make adjustment and calibration of the unit quick and simple.

The units have a wide ranging 12 to 36 Vdc. This supply can either be wired to the appropriate terminals or picked up automatically from the Bus connector.

Outputs

DC Current and Voltage

0-20mA, 4-20mA, 0-10mA into 750Ω
0-1V, 0-10V, 1-5V into a minimum 100kΩ
Others available up to a maximum of:
Current: 0-20mA. Voltage: 0-10Vdc

Inputs

DC/AC Current & Voltage

0-20mA, 4-20mA, 0-10mA into 15Ω
0-1V, 0-10V, 1-5V into 1MΩ

Min & Max Full Scale Ranges are:

DC Current	0 - 1mA	0 - 5A
Bipolar DC Current	±5mA	±10mA
DC Voltage	0 - 1V	0 - 300V*
Bipolar DC Voltage	±5V	±10V
2 Wire Pot	0 - 125Ω	0 - 1kΩ
3 Wire Pot	0 - 1kΩ	0 - 100kΩ

* Note: For input voltages greater than 60Vdc a Divider unit must be specified.

Thermocouples

Types E,J,K,N,R,S,T,B linearised or non-linearised
Ranges: Wide range of inputs
Cold junction compensation (can be turned off)
Upscale or downscale t/c burnout options
For 4 channel t/c input specify -4

Resistance Thermometers

2, 3 or 4 wire PT100 or PT1000, linearised or non-linearised
Ranges: Wide range of inputs
Upscale or downscale RTD burnout options
For 4 channel RTD module specify -3

Frequency Input

Wide range of freq inputs to 250kHz. Specify -7

Digital Input and Output modules

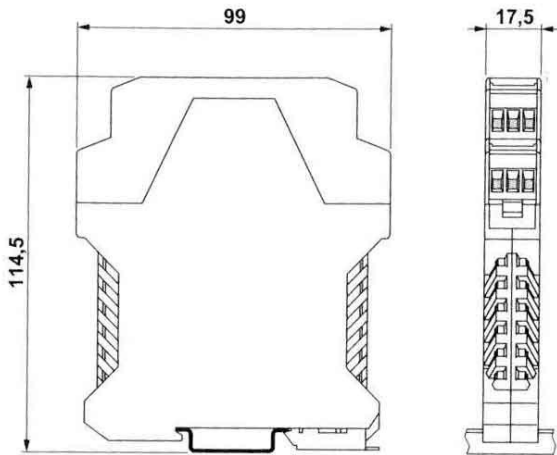
8 inputs, or 4 outputs Specify -5 or -6

Multi-input analogue modules

8 off 4-20mA or 0-10Vdc Modules Specify -2



Parameter	Min	Typ	Max	Comments
Supply Voltage	12	24V	36Vdc	
Supply Current (mA)		45	90	For 24 V dc supply (260mA for 50mS on start up)
Bus Connection				16-bit bus connection
Input Impedance (Volt)		1M Ω		Dependent on range (Typ=10V)
Input Impedance(mA)		15 Ω		Dependent on range (Typ=20mA)
Volt drop (mA input)		0.3		At 20mA input
Output Linearity Error		$\pm 0.01\%$	$\pm 0.05\%$	
Temp Coefficient			$\pm 50\text{ppm}/^\circ\text{C}$	
Load Resistance Error			$\pm 5\text{ppm}/\Omega$	$0 < R_L < 750\Omega$
Time Constant (10-90%)	25mS (fast)	60ms (normal)		Selectable fast/normal response
Operating Ambient	0 $^\circ\text{C}$		55 $^\circ\text{C}$	
Relative Humidity	0%		90%	
Isolation Voltage ^{see note 1}	1kV			
Surge Voltage	2.5kV for 50 μS			Transient of 10kV/ μS
Notes	Absolute maximum ratings indicate sustained limits beyond which damage to the device may occur. Accuracy figures based on 24Vdc supply, 4-20mA output with 250 Ω load and 20 $^\circ\text{C}$ ambient. Device is protected against reverse polarity connection.			



Installation Data	
Mounting	DIN Rail TS35
Orientation	Any
Connections	Screw Clamp with pressure plate
Conductor size	0.5-4.0mm
Insulation Stripping	12mm
Weight	Approx 95g

Ordering Information

Part Number	Universal inputs	mA or Vdc inputs	RTD inputs	Thermocouple inputs	Digital inputs	Digital outputs
ISOSLICE-1	1					
ISOSLICE-2		8				
ISOSLICE-3			4			
ISOSLICE-4				4		
ISOSLICE-5					8	
ISOSLICE-6						4
ISOSLICE-7	Freq Input					



Z-TEMP

AMBIENT TEMPERATURE and RH ZIGBEE TRANSMITTER

- Measures Ambient Temperature and Relative Humidity
- High accuracy, low cost unit
- Choice of enclosure types
- Long battery life
- User selectable update rates
- ZigBee Protocol



Description

The Z-TEMP ambient temperature and humidity transmitter has been designed to operate with the range of ZigBee components manufactured by Industrial Interface.

Either ambient temperature alone or both temperature and humidity measurements can be specified. Typically the unit transmits the measured values back to a Z-PORT which can be connected to an Ethernet or RS232/485 communications network.

The unit is specially designed to maximise battery life and in a typical application the battery life can exceed two years.

Two mounting head styles are available, an industrial wall or ceiling mounting unit or a commercial style version. Accessories include a DIN rail mounting clip and cap retaining strap.

Enclosure Styles



Style	Industrial Head
Orientation	Any
Wall/Ceiling Mounting	2 x 3mm screws
Enclosure Size	85mm dia x 57mm deep
Weight	Approx 70g



Style	Commercial Enclosure
Orientation	Any
Wall/Ceiling Mounting	2 x 4mm screws / adhesive
Enclosure Size	80 x 80 x 22 mm
Weight	Approx 70g

Ordering Information	
Please supply:	
Part Number:	Z-TEMP-X-Y
X = 1	Ambient Temp Only
X = 2	Ambient Temp and RH
Y = 1	Industrial Enclosure
Y = 2	Commercial Enclosure
For Example:	Ambient Temperature only in Commercial Enclosure
Z-TEMP-1-2	

Parameter	Min	Typ	Max	Comments
Supply Voltage		3.6V		Battery Powered
Supply Current (mA)			40	When transmitting data
Battery Life		2 Years		Dependent on update rate
Ambient Temperature Range	-40°C		80°C	
Relative Humidity Range	0%		100%	
Temperature Accuracy		+/- 0.5 deg C		At 30 deg C
Relative Humidity Accuracy		+/- 3%		Between 10 and 90% RH



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July 2008



Z-ROOT

ZIGBEE NETWORK ROUTER

- Increases range of ZigBee sensors
- Can be connected to up to 20 sensors or sub-Routers
- Choice of enclosure types
- AC or DC Powered versions
- ZigBee Protocol
- Low cost



Description

The Z-ROOT ZigBee network router has been designed to operate with the range of ZigBee components manufactured by Industrial Interface.

Up to 20 sensors or sub-routers can be wirelessly connected to each Z-ROOT.

Typically the unit transmits the measured values back to a Z-PORT which can be connected to an Ethernet or RS232/485 communications network.

Two mounting head styles are available, an industrial wall or ceiling mounting unit or a commercial style version. Accessories include a DIN rail mounting clip and cap retaining strap.

Enclosure Styles



Style	Industrial Head
Orientation	Any
Wall/Ceiling Mounting	2 x 3mm screws
Enclosure Size	85mm dia x 57mm deep
Weight	Approx 70g

Ordering Information Please supply:	
Part Number:	Z-ROOT-X
X = 1	DC Powered Unit
X = 2	AC Powered Unit
Y = 1	Industrial Enclosure
Y = 2	Commercial Enclosure
For Example: Z-ROOT-1-1	DC Powered Z-ROOT ZigBee Router in Industrial Enclosure



Style	Commercial Enclosure
Orientation	Any
Wall/Ceiling Mounting	2 x 4mm screws / adhesive
Enclosure Size	80 x 80 x 22 mm
Weight	Approx 70g

Parameter	Min	Typ	Max	Comments
Supply Voltage	3.6dc	24Vdc	260 Vac	
Supply Current (mA)			40mA	At 3.6Vdc when transmitting data
Operating Ambient Temperature Range	-40°C		85°C	
Relative Humidity Range	0%		90%	



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July 2008



ZIGBEE ANTENNAE AND ACCESSORIES

- Wide range of Antennae, cables and connectors available
- Including ATEX certified units
- High-Gain industrial hardened units
- Cost-effective proven solutions



ANT2401 Characteristics

Description

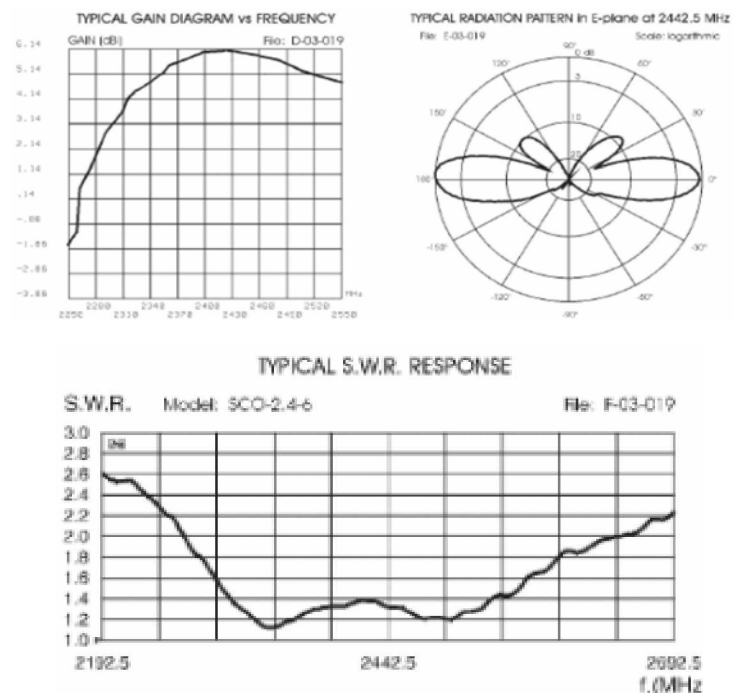
A wide range of ZigBee and other antennae are available from Industrial Interface, including ATEX rated antennae for hazardous areas.

The ANTA7000 is typically used on the Z-PORT and Z-200 units where they are mounted in non-metallic enclosures so transmission through the panel is not a problem. The connections is an SMA male.

The ANT2401 is a high gain antenna suitable for mounting on the outside of control panels or on internal or external walls. It has a high power teflon element protected by a glass fibre tube. Connection is via an N-Type female connector.

The EX-ANT is optimised and certified for use in hazardous environments. It has a wide angle beam providing excellent coverage in multi path environments, for example where there are metal walls and equipment.

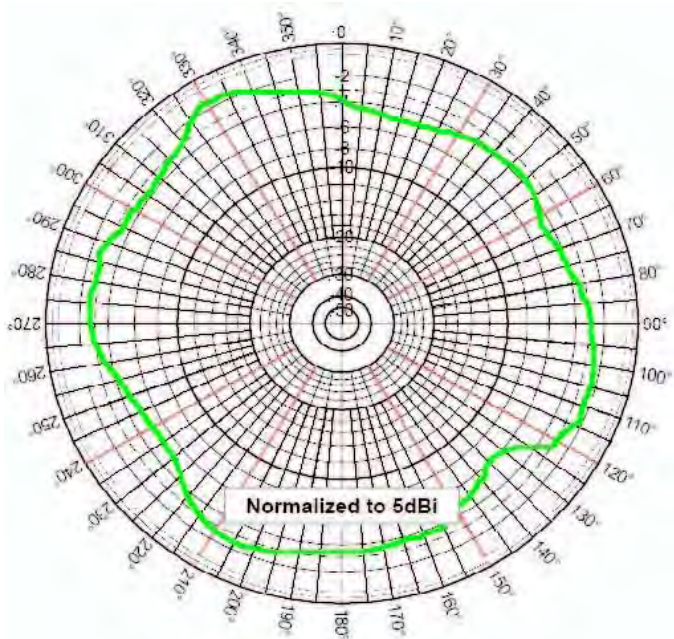
For a full listing of devices available or technical assistance in choosing a suitable antenna please contact our sales department.



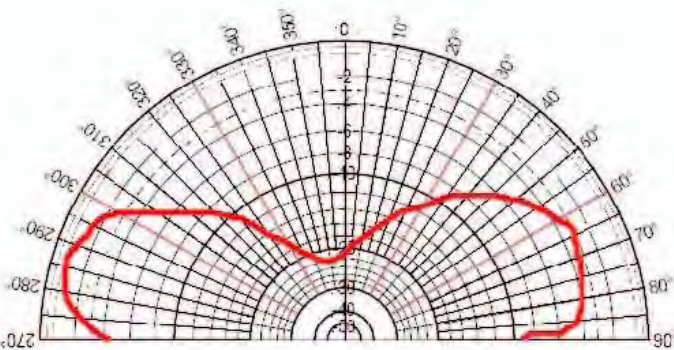
Type	Colinear Dipole Array
Frequency Range	2300 – 2500 MHz
Impedance	50 ohm unbalanced
Gain	6 dB
Max Power	20 Watts (CW) at 50 degC
Beamwidth Horiz	360 deg omni directional
3 dB Beamwidth Vert	22 deg at 2442.5 MHz
Feed System	DC-Ground / Base
Connector	N- Type Female



A7000 Characteristics



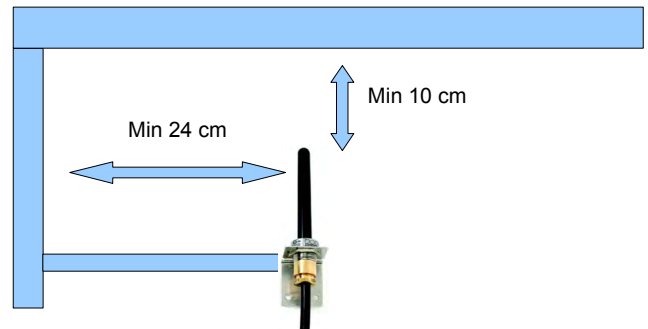
Azimuthal Pattern (X, Y or E-Plane)



Elevation Pattern (Z, Y or H-Plane)

EX-ANT Characteristics

Frequency Range	2400 & 5000 MHz
Impedance	50 ohm
Gain	2 dBi
Temperature	-30 to +60 degC
Vertical Beam Width	80 degrees
Horiz Beam Width	360 degrees
Max input power	2 Watts (Ex limitation)
Connector	10 metres cable
Weight	100g
Length	125 mm
Radome material	EX certified plastic
Wind survival	> 150 mph
Mounting Method	Wall / mast adaptor



Installation Guide