FREEWAVE

ZumEdge™

Quick Start Guide

IOEX-4440;
4422; 4404

Z9-IO-PE-ZE

FreeWave ZumEdge Quick-Start

The ZumEdge is designed to quickly add I/O and application development capability to your Ethernet and serial IIoT systems. This guide will get you started with configuring the ZumEdge and I/Os to your application, and introduce you to the application development environment that comes standard on the ZumEdge. To get started, please follow this guide for initial configuration of the device.

To follow along with your device, you will need at least a ZumEdge base module and a FreeWave IOEX device, as well as a computer running Windows with a free Ethernet port that you can use to connect to the ZumEdge device. If no Ethernet port exists, a USB-to-Ethernet adapter will work in an identical way.

The example system used in this quick-start guide is a common tank level monitoring implementation. We'll use the ZumEdge to configure an IO module to deliver power to, and receive analog input from, a tank level sensor, with the assumption that the user will be communicating with the device through a REST API running on their control application. Once configured, the user will be able to read from, write to, and fully reconfigure the ZumEdge and IO devices through REST API calls.

Example System Implementation

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As of Jul-2019. Specifications are subject to change without notice.

LDS0010AA

Configure Ethernet Connection

1. To start, make sure that your IOEX module is connected to the ZumEdge through the stack connectors on the bottom and top of the respective devices. The modules should be unplugged for the time being

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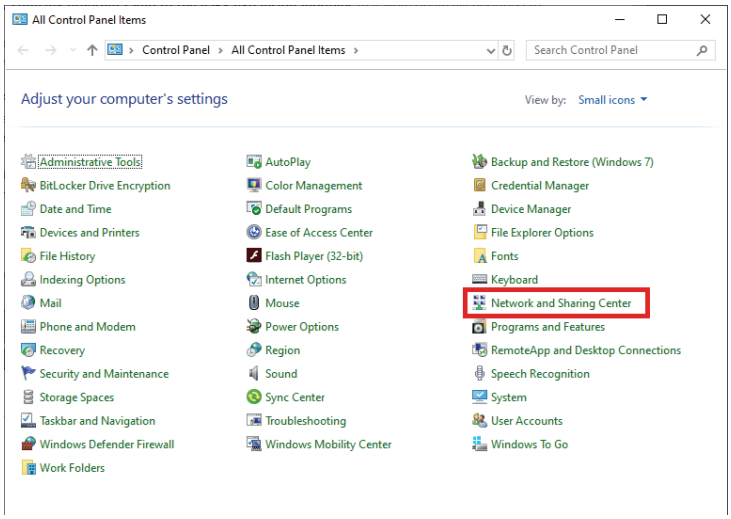
2. Open Control Panel, and head to the “Network and Sharing Center” section. If you don’t see this, change the “View by” selection in the top right of the window to “Small Icons”



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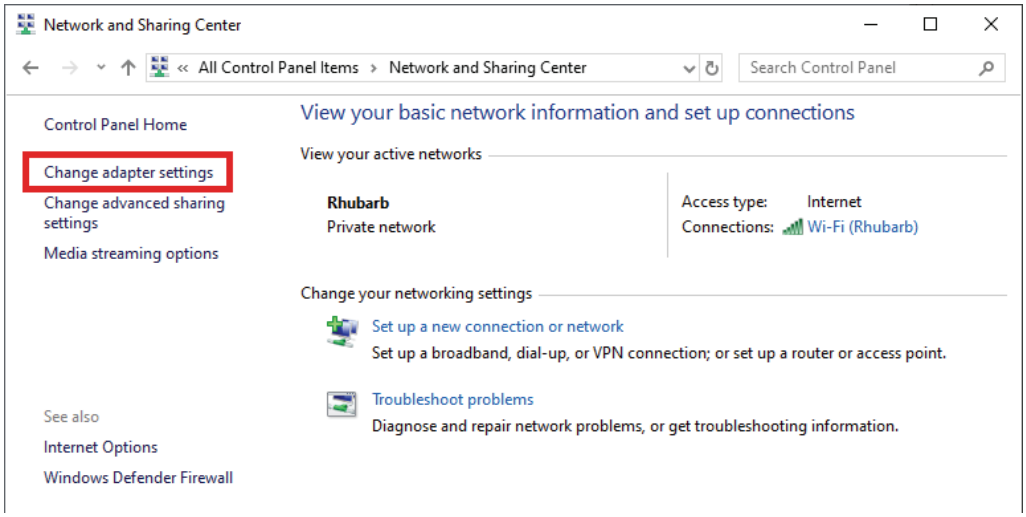
3. Once in the Network and Sharing Center, click “Change adapter settings” on the left hand side. This should open a new window.



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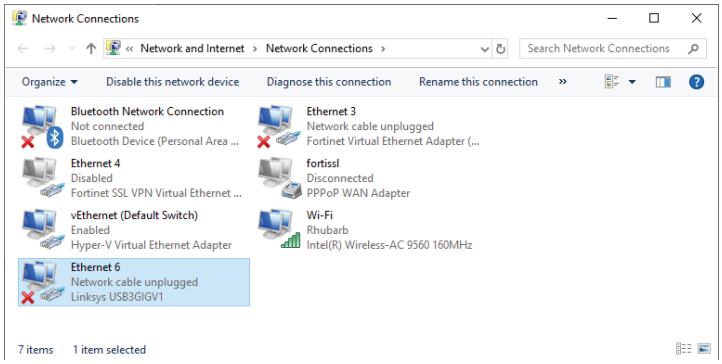
4. If you are using a USB to Ethernet adapter, plug it in to your computer's USB port now. You should see a new device pop up. If you are using an existing free Ethernet port, choose the port you will be using to connect the ZumEdge. Double click on the device to bring up the Properties menu.



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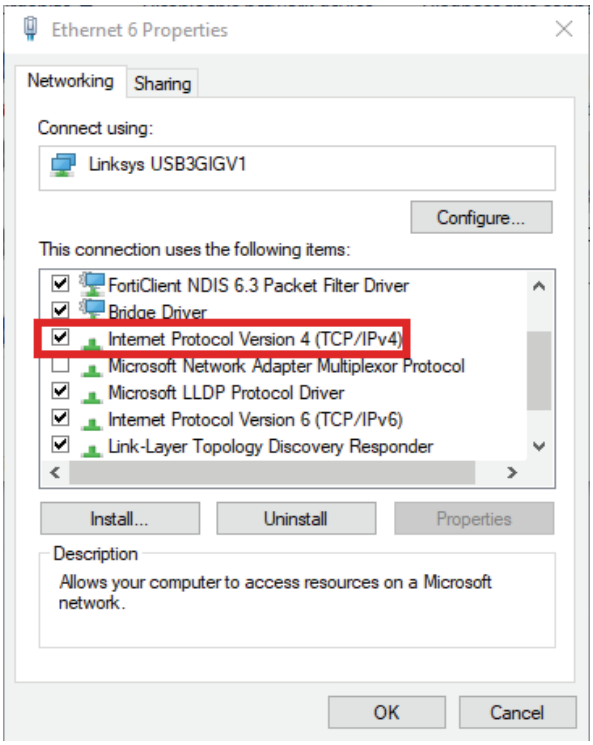
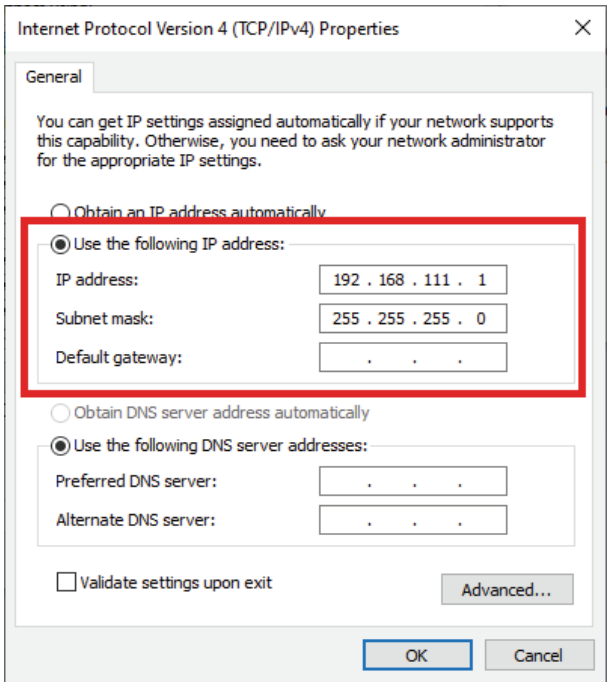
5. Somewhere in the list that pops up should be "Internet Protocol Version 4 (TCP/IPv4)". Make sure the check box next to it is checked and double click the entry



6. In the window that pops up, check "Use the following IP address" and enter the following

a. IP Address: 192.168.111.1
b. Subnet mask: 255.255.255.0
c. You can leave default gateway empty.



7. Click OK for the previous two windows and close the rest.

8. Power on and plug in your ZumEdge to the Ethernet port using the jack labeled "Ethernet"

9. Open a browser (Firefox or Chrome preferred) and navigate to http://192.168.111.100 to see the main web page for the ZumEdge.

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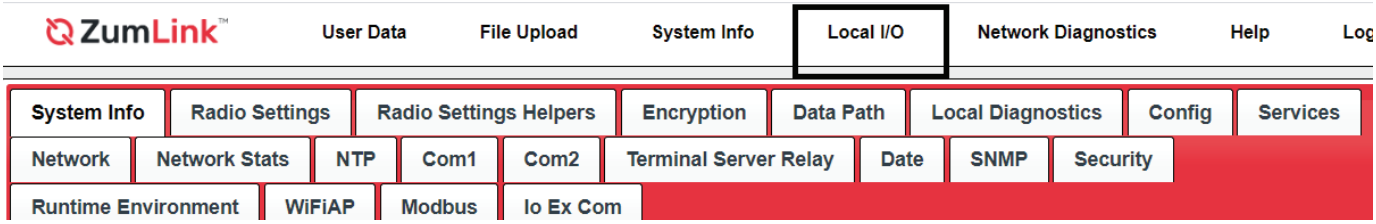
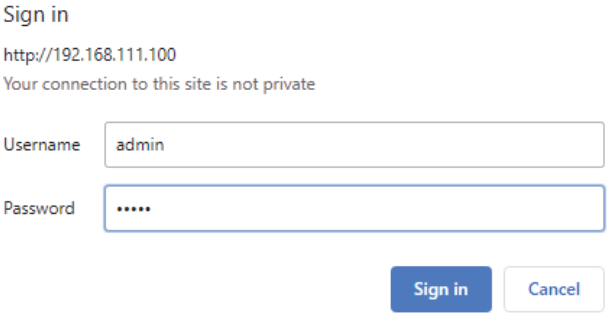
Configure I/O

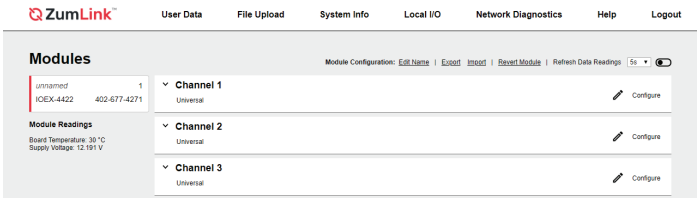
10. Click the “Local I/O” tab at the top.



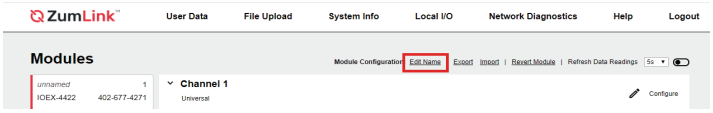
11. When prompted, username is “admin” and password is “admin”



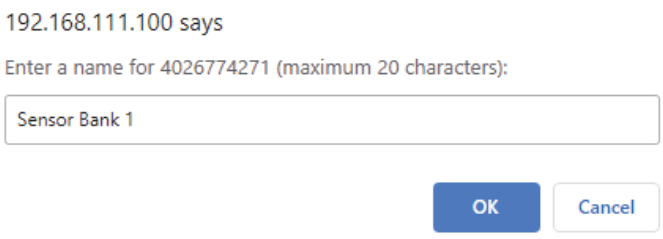
12. You will be greeted with the IO configuration page. On the left column, you will see a listing of IO modules connected to the device. On the right column you will see a listing of IO channels for the selected module. To start, your module should be named “unnamed” and your channels should be named “Channel x”.



13. To begin with configuration, let’s rename the elements to something more descriptive. Click the “Edit Name” link near the top of the page to change the name of the IOEX module.



14. In the pop-up window, change the name to “Sensor Bank 1” to represent a bank of sensors connected to the module. Click “OK”.



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15. For this exercise, we're going to assume that we're using an imaginary tank level sensor that has two lines:

a. A sensor power line that requires 12VDC
b. An analog output line that outputs 0-12V, proportional to the tank level

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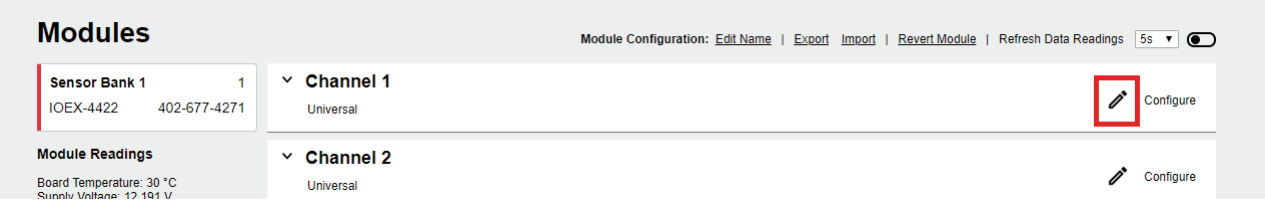
16. We'll start by configuring a "Sensor Power" line on the IOEX module. To configure the channel, click on the pencil icon to the right of the "Channel 1" box.



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17. When the configuration window opens, click the "Edit Name" link to change the name of the channel to "Tank Sensor Power". Click "OK"

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18. Next, click the drop-down menu at the top-right of the channel window. This will present a list of configuration options for this channel. Choose "Sensor Power" for this channel.

a. **Note:** The available options depend on what type of channel this IOEX module has. In our case, Channel 1 is a "Universal" channel and can be configured in all available orientations.

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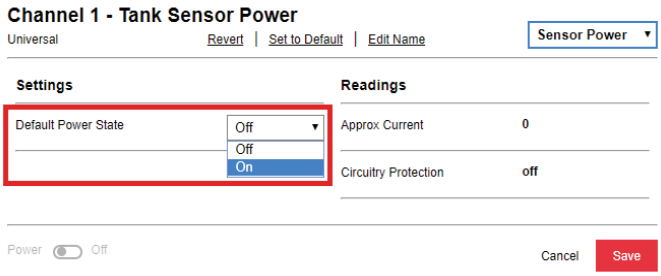
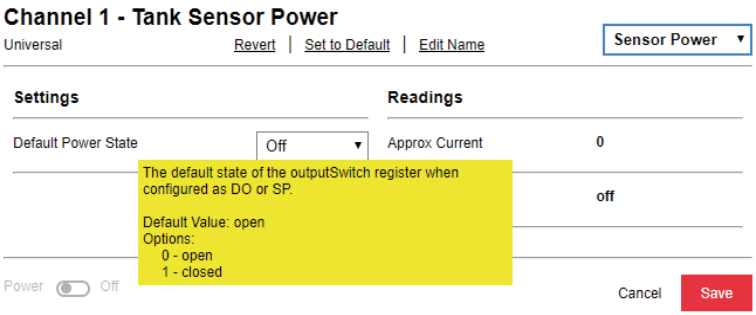
19. The “Sensor Power” configuration options will appear in the window. For this exercise, click on the drop-down menu next to the “Default Power State” button, and select “On”



a. **Note:** If you are unsure of what a setting means, you can hover over the setting label and a “tooltip” window will appear.



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20. To save this new setting, click the “Save” button. A “Writing Changes” message will appear. This indicates that the ZumEdge is writing these changes to the IOEX module.

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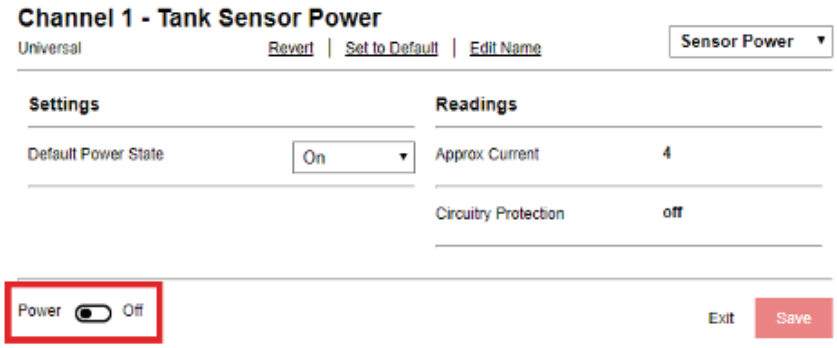
21. Once the pin is configured, a switch at the bottom left of the channel window will become active. This is your manual control for this channel. Click it to the “On” position to turn the channel “on” and start delivering power to our imaginary device.



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22. Click “Exit” to close the configuration window.

23. Next, let’s configure a second channel to be the analog input. Click the pencil icon on the right side of the “Channel 2” box.

24. Change the name of this channel to “Tank Sensor Input” by clicking the “Edit Name” icon as before.

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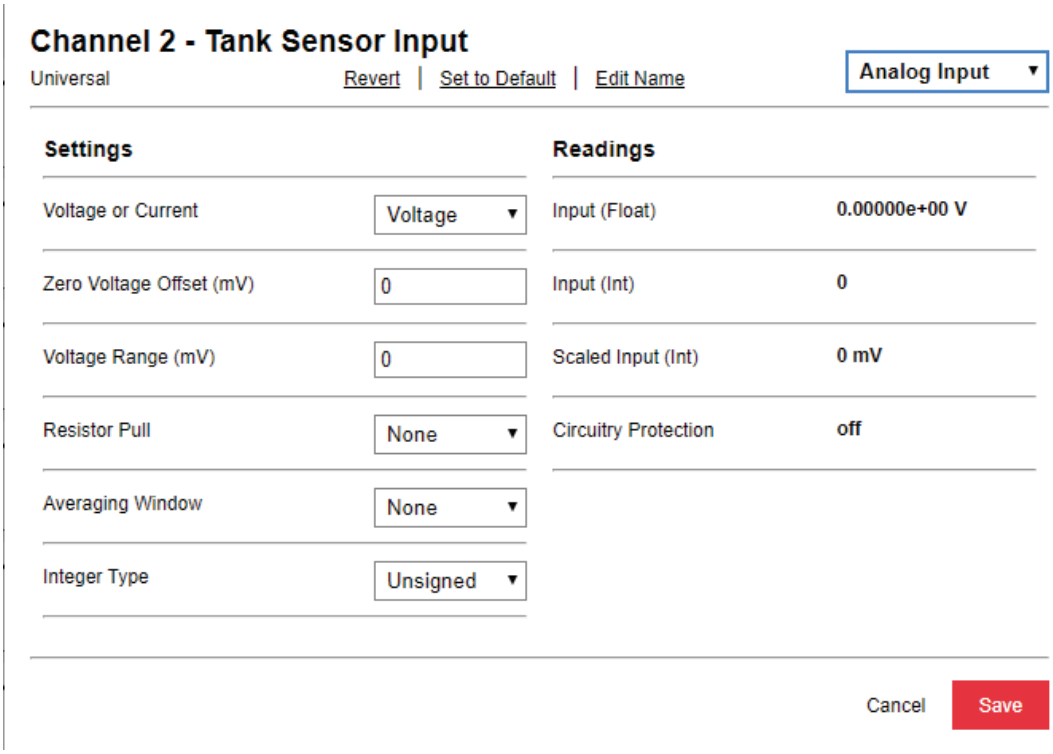
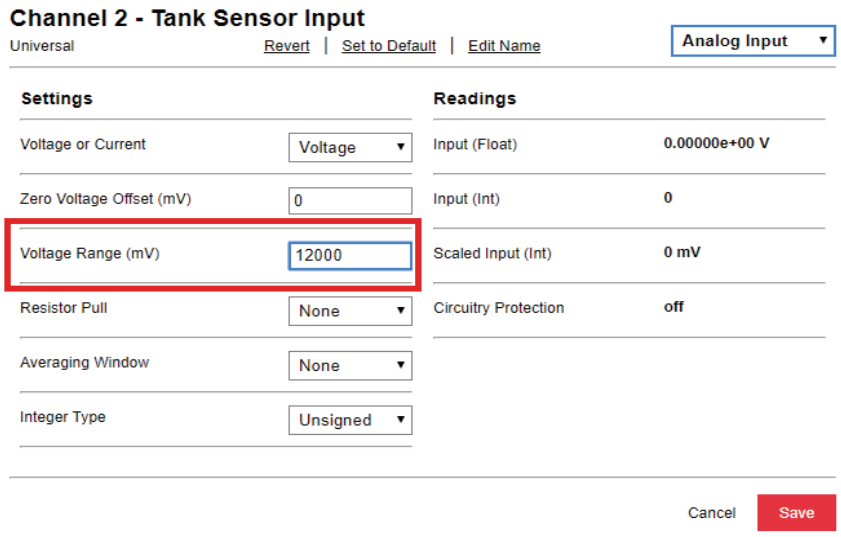
25. Click the drop-down menu at the top right of the window and select “Analog Input” to configure this channel as an analog input. Your channel screen should now look like this:



26. The channel configuration options are now visible in the window. Our imaginary sensor outputs a signal from 0-12V, so set the “Voltage Range (mV)” setting to 12000 to set the input range.



a. Have a look at the other settings. This IO can be configured to accept a wide range of analog voltage and current inputs, and has built in running-average functionality for noisy inputs.

27. Click the “Save” button. The ZumEdge will then write this configuration to the IOEX module.

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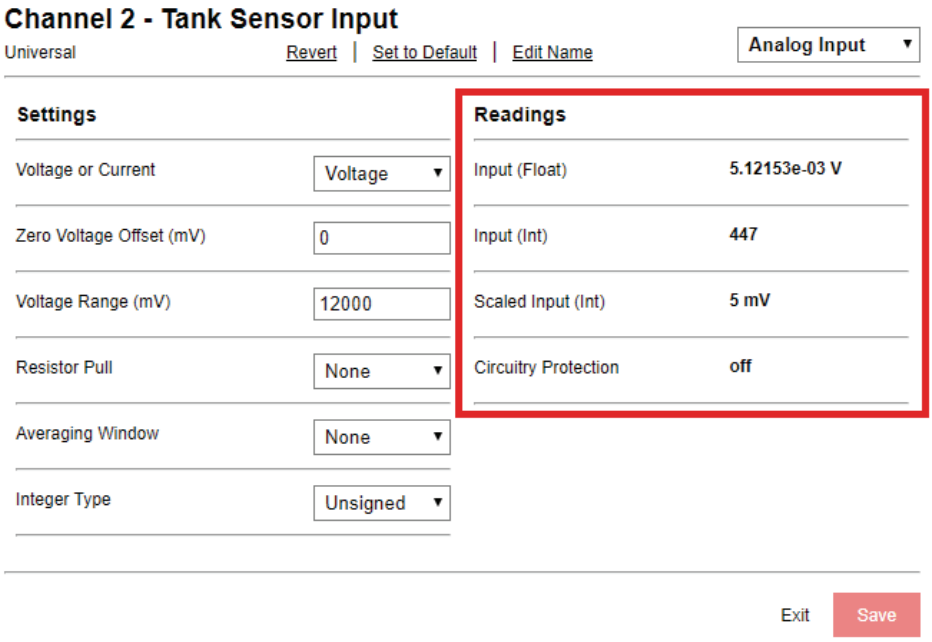
28. Notice that the values in the “Readings” columns have changed. When configured, they “read” the registers for this input and are displaying the initial readings. Since this is just a floating line, the values will be a low number. If we had a true sensor on this line, the values would read the value of the input from the analog sensor. To refresh these readings regularly, turn on the “Refresh Data Readings” switch above the channel list on the main page.



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29. Click “Exit” to close the configuration window.

30. Our system is now configured for our analog Tank Level sensor! This configuration will remain until changed by a user, even through power cycles.

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Controlling The System

31. Now that our system is configured, it becomes part of the network at this IP address, and can be controlled, read, and reconfigured through the ZumEdge REST API functionality. To see the library of available API calls, click the “For developers” link at the bottom of the screen.

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32. This module is also now a part of the Modbus TCP network. The Modbus settings are located on the left side of the screen. To see a listing of Modbus registers, click the link for the model number of IOEX module you have (IOEX-4422 for this alpha guide).

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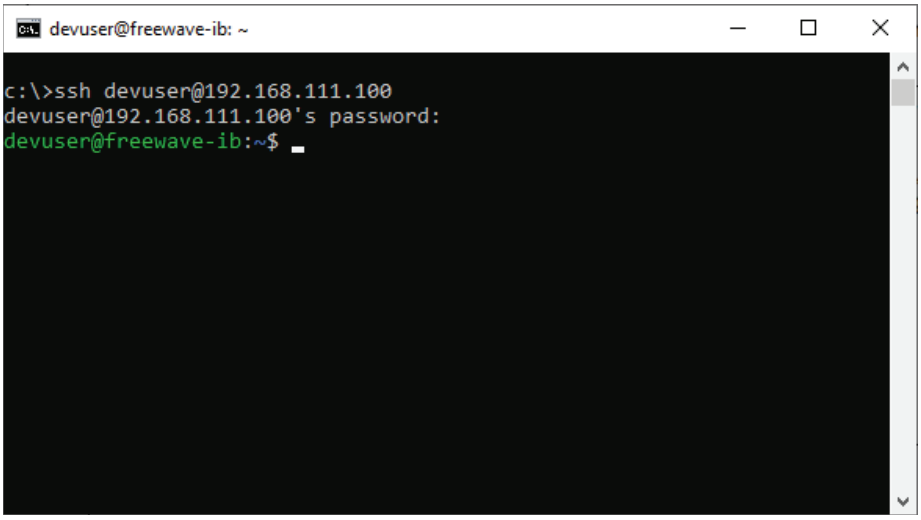
33. Along with the standard Modbus controls and new REST API controls, the ZumEdge comes standard with an Application Development environment where users and system integrators can write custom applications on the ZumEdge device. To start using the application development space, simply open a command prompt in Windows (press WIN+x, then c), and ssh into the ZumEdge with the command

ssh devuser@192.168.111.100
The default password is “devuser”.



From here you can begin write your user application to transform and process data and make decisions on the ZumEdge device itself!

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ZumEdge™

User Manual

IOEX-4440;
4422; 4404

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FCC Notifications

FCC Supplier's Declaration of Conformity

FreeWave Technologies, Inc.
5395 Pearl Parkway, Boulder, CO 80301
Phone Number: 303.381.9200
Website: www.freewave.com
FreeWave Technologies declare under our sole responsibility that the product Models:
Z9-IO-PE-ZE complies with Part 15 of FCC Rules.

Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The content of this guide covers FreeWave Technologies, Inc. models sold under FCC ID: KNYPMT0101AB.

All models sold under the listed FCC ID(s) must be installed professionally and are only approved for use when installed in devices produced by FreeWave Technologies or third party OEMs with the express written approval of FreeWave Technologies, Inc. Changes or modifications should not be made to the device.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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FCC Part 15 Class A

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the User-Reference Manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

FCC NEMA Installation and Label

Where applicable, the models described in this guide must be installed in a NEMA enclosure. When any FreeWave Technologies, Inc. module is placed inside an enclosure, a label must be placed on the outside of the enclosure. The label must include the text: "**Contains FCC ID: KNYPMT0101AB.**"

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 22.94 cm between the radiator and your body.

FCC Notification of Power Warning

The ZumEdge Z9-IO-PE-ZE covered in this document has a maximum transmitted output power of +30dBm. The antennas used MUST provide a separation distance of at least 22.94 cm from all persons and MUST NOT be co-located or operate in conjunction with any other antenna or transmitter.

Argentina CNC
Identificación CNC

Z9-IO-PE-ZE Contiene CNC ID: C-21612

ISED Notifications

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.
CAN ICES-3 (A)/NMB-3(A)

Ce dispositif est conforme aux normes permis-exemptes du Canada RSS d'industrie. L'opération est sujette aux deux conditions suivantes: (1) ce dispositif peut ne pas causer l'interférence, et (2) ce dispositif doit accepter n'importe quelle interférence, y compris l'interférence qui peut causer le fonctionnement peu désiré du dispositif. CAN ICES-3 (A)/NMB-3(A)

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ISED Host Installation and Label

The content of this documentation covers FreeWave Technologies, Inc. models sold under IC: 2329B-PMT0101AB. When any FreeWave Technologies, Inc. module is placed inside a Host, a label must be placed on the outside of the Host. The label must include the text **"Contains IC: 2329B-PMT0101AB".**

Professional Installation

All models sold under the listed IC ID must be professionally installed.

ISED Radiation Exposure Statement

This system has been evaluated for RF Exposure per RSS-102 and is in compliance with the limits specified by Health Canada Safety Code 6. The system must be installed at a minimum separation distance from the antenna to a general bystander of 20.5 inches (52cm) to maintain compliance with the General Population limits.

L'exposition aux radiofréquences de ce système a été évaluée selon la norme RSS-102 et est jugée conforme aux limites établies par le Code de sécurité 6 de Santé Canada. Le système doit être installé à une distance minimale de 20.5 pouces (52cm) séparant l'antenne d'une personne présente en conformité avec les limites permises d'exposition du grand public.

Only FCC and IC approved antennas may be used.
The antenna must be professionally installed on a fixed, mounted, and permanent outdoor structure to satisfy RF exposure requirements.
Any antenna placed outdoors must be properly grounded.
Use extreme caution when installing antennas and follow all instructions included with the antenna.

Approved Antennas

Yagi Directional Antennas

The 900 MHz is approved by the FCC for use with directional antennas with a dBi gain or less

900 MHz Yagi Directional Antennas

Gain (dBd)	Gain (dBi)	Manufacturer	Manufactuerer Model Number	FreeWave Part Number
6.5	8.6	WaveLink	PRO890-8-40F02N4	EAN0906YC

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Omni-directional Antennas

The 900 MHz is approved by the FCC for use with omni-directional antennas with a 10.5dBi gain or less.

900 MHz Omni-Directional Antennas

Gain (dBd)	Gain (dBi)	Manufacturer	Manufactuerer Model Number	FreeWave Part Number
2.85	5	Antenex	EB8965C	EAN0905WC
3	5.15	Maxrad	MAX-9053	EAN0900WC
0.85	3	Mobile Mark	PSKN3-925S	EAN0900SR
-2.15	0	Mobile Mark	PSTG0-915SE	EAN0900SQ

Alternative Antennas

Antennas other than those listed in this section can potentially be used with the **ZumEdge** with provisions.

- The antennas must be of a similar type.
- The antenna gain CANNOT exceed 10.5dBi for Omni-directional.
- The antenna gain CANNOT exceed 16.0dBi for Directional antennas.
- The overall system EIRP does not exceed 36dBm.

Warning! A proper combination with the **ZumEdge** is required to ensure the system meets FCC requirements.

UL and Safety Notification

Z9-IO-PE-ZE a Listed component under UL File Numbers: e484141 and e327789.

Standards and Editions

HazLoc Standards
UL 121201-2019
CSA C22.2 No. 213-17
Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Division 1 and 2 Hazardous (Classified) Locations
Ordinary Location Standards
UL 60950, 2nd Edition
CAN / CSA-C22.2 No. 60950, 2nd Edition
IEC 60950, 2nd Edition
EN 60950, 2nd Edition

Power Source

Z9-IO-PE-ZE is intended to be operated from a Limited Power Source (LPS) or Class 2 power source in accordance with IEC/EN/UL 60950-1 and CAN/CSA C22.2 No. 60950-1-07.

The Z9-IO-PE-ZE is approved to operate with an input voltage range of +7.5 to +30 VDC, 4A, Tmra of 60°C.

Hazardous Locations Installation Instructions

This equipment is suitable for use in Class I, Division 2, Groups A, B, C and D OR non-hazardous locations only.
Open type device intended to be installed in a suitable enclosure that requires the use of a tool to access.
Ambient: -40°C to +60°C
Temperature Code: T5
Input voltage rating of +7.5 to +30 VDC, 4A

WARNING – EXPLOSION HAZARD. DO NOT CONNECT OR DISCONNECT WHEN ENERGIZED.
AVERTISSEMENT – RISQUE D'EXPLOSION. NE PAS BRANCHER NI DÉBRANCHER SOUS TENSION.
WARNING – EXTERNAL USE OF THE ANTENNA IS NOT PERMITTED. THE ANTENNA IS TO BE TERMINATED AND MOUNTED INTERNAL TO THE FINAL INSTALLED ENCLOSURE
AVERTISSEMENT - L'UTILISATION EXTERNE DE L'ANTENNE N'EST PAS AUTORISÉE. L'ANTENNE DOIT ÊTRE TERMINÉE ET MONTÉE À L'INTÉRIEUR DU BOÎTIER FINAL INSTALLÉ

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