Intech®
Instruments

ezeio™ Controller and Intech Micro Remote Station input expansion.

Important Supplementary Manual - to be read in conjunction with the eze User Manual: http://ezesys.com/manual

ezeio™ Controller and Intech Micro Remote Station input expansion Index.

Section 1 covers the ezeio™ Controller four local inputs, and ***Section 2*** covers adding the power of the Intech Micro Remote Stations, to expand the inputs up to 40, plus adding more outputs.

Note: The eze System uses United States (US) English, so some spelling/terminology differs.

The ezeio™ User Manual page references listed within are correct for the 170314 version (ezeio™ models AAC– AAF).
The latest ezeio™ User Manual PDF can be found online via this address: **http://ezesys.com/manual**

Please Note: **Intech Instruments Ltd** are the **New Zealand** representative for **eze System, Inc** products.

ezeio™ Controller and Intech Micro Remote Station input expansion.

4 Analogue Inputs.
Interface with Intech Micro Remote Stations for Input Expansion.
Internet Based Setup and Monitoring.

Description.

The ezeio™ Controller comes ready to start monitoring, logging and controlling over the Internet.
As soon as the controller is connected to power and an Internet connection, it will start communicating with the eze System servers. There is no need for special software or network setup. The ezeio™ connection is encrypted, bi-directional and very efficient.

ezeio™ Controller and Intech Micro Remote Station input expansion.

Ordering Information.

ezeio-STD	ezeio™ Controller with Ethernet TCP/IP port, 4 analogue inputs and Modbus-RTU RS-485 Comms.
ezeio-GSM	ezeio™ Controller with Ethernet TCP/IP port and 3G/GSM transceiver, 4 analogue inputs and Modbus-RTU RS-485 Comms.
eze Cable-485	eze Cable RS485 (1m), for using ezeio™ controller with an Intech Micro Remote Station.

ezeio™ Controller Compatibility with Intech Micro Stations.

The Modbus-RTU RS-485 port on the ezeio™ Controller can be used to connect to **Intech Micro Remote Stations** that have Modbus RTU protocol support: **2400-A16**, the **2300 Series** and **2100-A16**.
This allows the controller to be easily expanded to log up to 40 channels Max per ezeio™ Controller.
If additional relay outputs are required, up to two 16x relay **2400-R2** can be connected to a **2400-A16** for relay expansion - refer to the 2400-A16 Installation Guide for more information. Alternatively the 4x relay **2300-RO4** can also be used for relay expansion.

ezeio™ Ethernet TCP/IP Connection.

Ensure that you connect the Ethernet cable with the **Ethernet port** on the ezeio™ Controller only. **Do NOT plug into the Modbus 485 port**.

For the **ezeio-GSM** 3G/GSM Controller, note that initial connection via Ethernet TCP/IP is required for setup of the ezeio™ controller before the 3G/GSM connection can be used. Detailed information can be found on page 4 >>

Typically the ezeio™ Controller should automatically connect once plugged into the Ethernet TCP/IP network. You may need to power cycle (turn the power off/on) the ezeio™.

See pages 13/14 of the ezeio™ User Manual for information on using the Ethernet TCP/IP connection:
http://ezesys.com/manual

IT Support information for the ezeio™ can be found at: **https://ezesys.com/support/for-it-professionals/**

Please note that Intech will not be able to help with the setup and operation of an Ethernet TCP/IP network and assigning of IP addresses.

Advanced information for IT.

Eze web link for IT wishing to know more information for their Firewall requirements:
https://ezesys.com/support/for-it-professionals/

Using a 3G/GSM data SIM in the ezeio-GSM Controller.

This section is for the **ezeio-GSM** Controller model only.
Note: Initial connection via Ethernet TCP/IP is required for ezeio™ setup before the 3G/GSM connection can be used.

1. Obtain a **3G/GSM data only SIM card** with no password. (Note: the ezeio-GSM controller takes a standard size SIM card.)
2. Place SIM card in a mobile phone to activate as per the providers instructions (or get the provider to do this at the time of purchase.)
3. ALWAYS remove power from the ezeio-GSM when inserting/removing the SIM card.
4. Place the SIM in the ezeio-GSM Controller with the chisel edge of the SIM at the top left (as shown circled below).
5. Follow the instructions in the ezeio-GSM Controller User Manual starting from page 25.


Slide the metal latch down to release hinged lid.

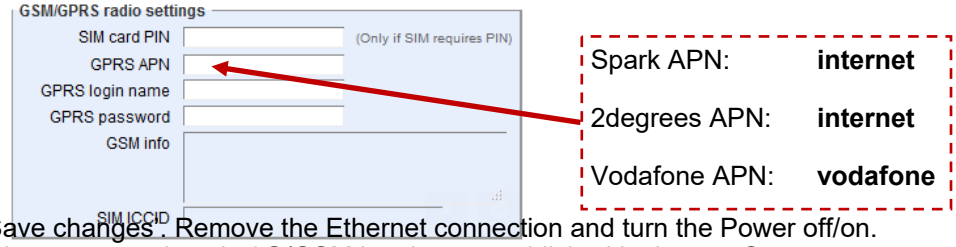

Lift the hinged lid up.


Insert SIM card into the lid. Orient cut corner top left.


Push down and lock by sliding the metal latch back up.

6. Power on the ezeio-GSM controller.
7. Connect the ezeio-GSM via Ethernet TCP/IP and login to **www.ezecontrol.com**
8. In the eze Configuration area, click on 'System'. Locate the **GSM/GPRS radio settings** area.

   Setting required for New Zealand - **GPRS APN** (leave all other areas blank) - match to your provider as listed below:



9. Click 'Save changes'. Remove the Ethernet connection and turn the Power off/on. Check that a connection via 3G/GSM has been established in the eze System.

Note: If you are outside New Zealand please contact your local 3G/GSM provider for the 3G/GSM data SIM and the APN settings needed.

Important: We strongly recommend having the **3G/GSM data SIM <u>on account.</u>**

Using Prepay will result in no connection if the credit runs out (if this happens, then once more credit has been added, the ezeio-GSM controller will need to have the power turned off/on in order to re-establish a connection). When an on account data plan is used there is no issue with this.

Data Usage:

This will depend on a number of factors, including how many inputs are used and the logging interval frequency. Our testing has shown around ~2.5MB/day is used with a system running 5 inputs and a logging interval of 5mins.

3G/GSM Network Coverage.

For 3G/GSM connection, the ezeio-GSM needs to be within the network coverage area where it will be used. Check on your 3G/GSM providers website for their 3G/GSM network coverage maps.

Please note that connection is unable to be guaranteed, even if the ezeio-GSM is within the 3G/GSM network coverage area.

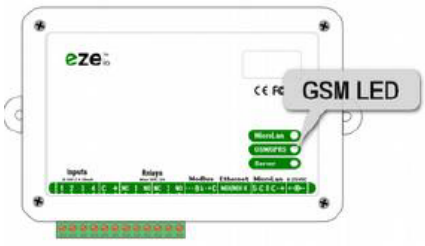
Examples of factors that can degrade the availability and/or quality of the 3G/GSM network coverage:

- Topographical features, e.g. tall buildings, hills, etc.
- The location and number of cell towers.
- Network capacity (the number of devices active in the area at any given time).

LED indication of connection to cell network.

The Radio LED indicates the status of the cell radio as described in the table below.

Note: 'on-blink' refers to the LED that is on most of the time, and pulses off.



Blink pattern	Meaning
off	GSM radio is turned off
on	Waiting for the GSM module to switch on
5 on-blink	Attempting to initialize GSM module
4 on-blink	GSM module requested SIM-PIN.
3 on-blink	Module active. Waiting for GPRS network.
2 on-blink	GPRS network ok. Establishing IP connection.
1 on-blink	Server link dropped. Reinitializing.
Normal blinks	1-5 blinks. Reception quality (e.g.1-5 "bars" on a cellphone)

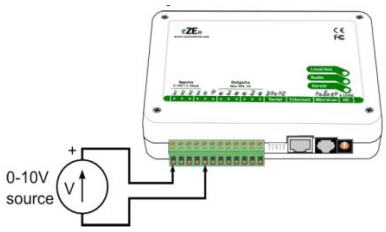
Section 1 - ezeio™ Controller.

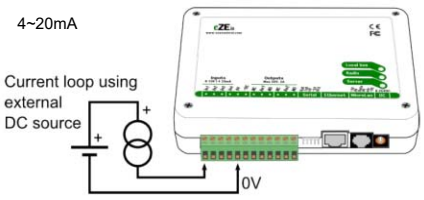
Configuring the ezeio™ Controller local inputs.

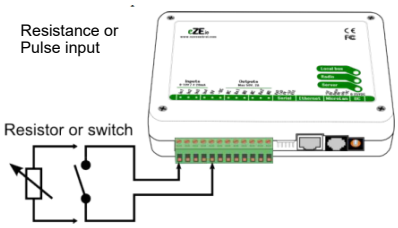
The ezeio™ Controller has four standard inputs. Each input may be configured individually in one of the four ways described here.

To access the input jumper settings, open the ezeio™ by removing the four black screws.

Jumper setting	Description
	0~5Vdc. Input impedance is >70kOhm. Raw reading is about 10000 at 5.0V (0.5V per count).
	0~10Vdc. Input impedance is >70kOhm. Raw reading is about 10000 at 10.0V (1mV per count).
	0~30mA (suitable for 4~20mA transducers). An internal 100 Ohm resistor connects the input terminal to Common. Raw reading is about 10000 at 30mA (3uA per count).
	Contact, Pulse or Resistive (0~50Ohm). An Internal 10K resistor will hold the input to 5V. *This is the factory default setting.*







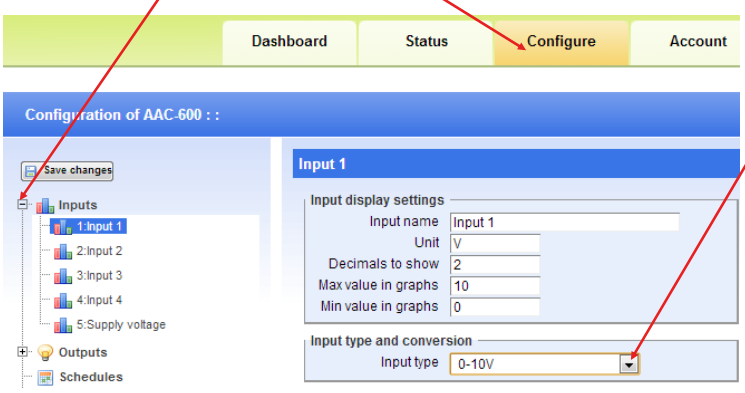
Read the main 'eze User Manual' pages 15 through to and including page 18, covering input connections.
http://ezesys.com/manual

Getting started with configuration.

Go to **https://ezecontrol.com/**

Enter your Account number, Login and Password. Click on 'Sign in'.

Click on the 'Configure' tab.
And then the + by the Inputs:

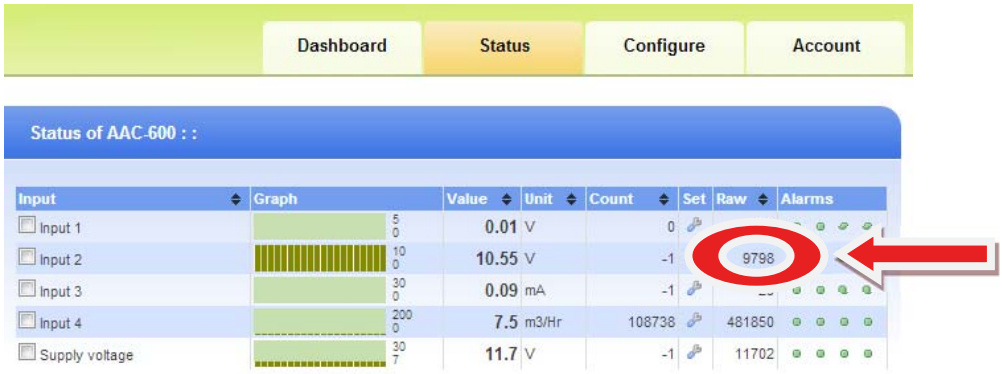


Now select which input you wish to configure. Select the 'Input type' to match the configuration of the 'Jumper' setting in the table above. Always remember to click on the 'Save Changes' button after making a change.

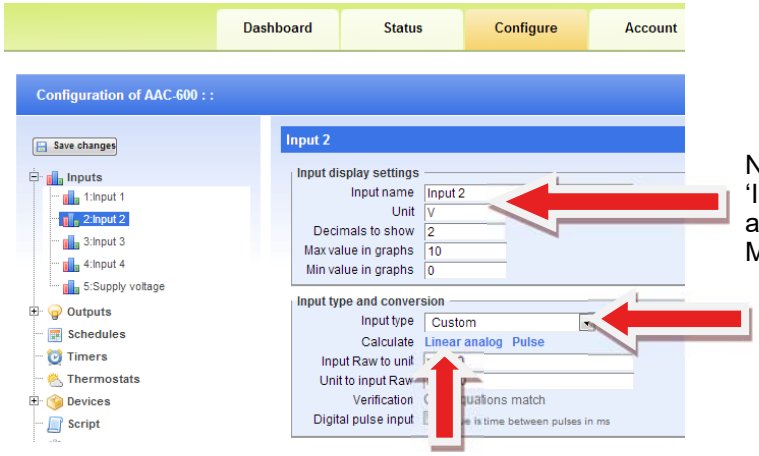
Important Note: The analogue inputs have a nominal calibration only (ex factory), and where accuracy is required, individual calibration of each channel is required. This is done with the use of an accurate signal calibrator.

Easy steps for Calibration.

1. **As an example:** on the ezeio™ Controller Input 2, the analogue input is set to 0~10Vdc. Apply an accurate 10Vdc signal to this input and on the eze 'Status Page', note the 'Raw' reading on channel 2.
   In this example below the Raw reading = 9798.

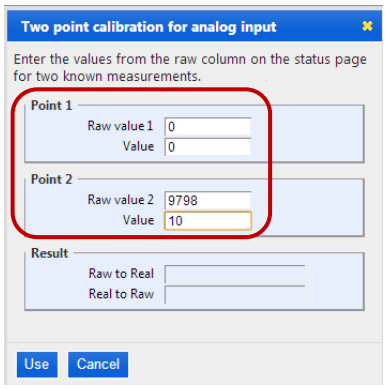


2. Now go to the eze Configure page and click on 'Input type' and select 'Custom' as shown.



Note: Do not use the percentage symbol % in the 'Input name' and 'Unit' text boxes, as this will result in an error.
Must type **percentage** as a word in full.

3. Now click on 'Linear analogue' and enter the values as shown next:



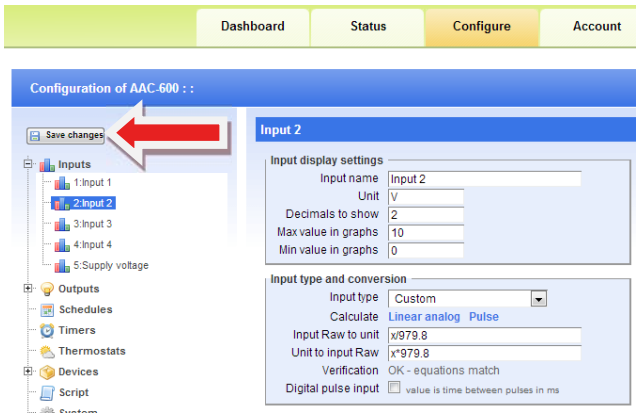
Point 1 and Point 2 are what we want this input to read, which in this example is '0~10Vdc'.

Point 1 is the zero point, which is 0 for the Raw Value and 0 for the Value.

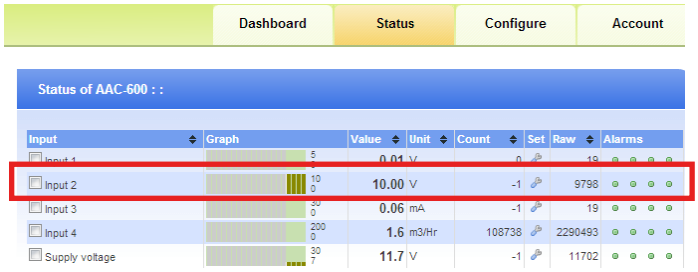
Point 2 = 9798 which is the Raw Value from step 1 at 10Vdc input, and the 'Value' for this example we want to read 10.
If you wish this to actually read another value, for example 100% then enter 100.

Click on 'Use'.

4. Now click on 'Save changes' and go back to the eze 'Status' tab.



5. The Status screen now displays input 2 at exactly 10.00 (or whatever value you have entered).



6. If you require good accuracy at a particular point of the span, then calibrate at that point instead of the full span point.
7. For the best average accuracy calibrate the scale between 0~75% of span.
8. Apply this procedure (as applicable) to all other analogue inputs on the ezeio™ Controller inputs to achieve accurate calibration.

Section 2A - 2400-A16.

Intech Micro 2400-A16 Station.

The **2400-A16** is a high quality, high accuracy I/O station (input/output expansion station), designed for a wide variety of applications and is easily implemented with the ezeio™.

Up to 16 Isolated Universal Analogue Inputs, with Plug In Terminals. Each Input is fully Isolated and Individually Selected & Scaled.

RTD, T/C, mA, mV, V & Pulse/Digital as follows:
RTD: Pt100/Pt1000, -200~320°C to -200~800°C.
T/C: Type B, E, K, J, N, R, S, T, with CJC.
mA: 4~20mA, 0~2.5mA.
mV: -25~25mV to -200~200mV.
Vdc: 0~1V to 0~15V.
Pulse/Digital: Meter pulses, Counting and Frequency. Max speed 2500Hz.

Four Isolated Digital Inputs. State or Count. Max speed 8000Hz.

Two Analogue, Isolated, 4~20mA Outputs.

Two Isolated, Relay Outputs for alarm or control.

Comms Ports (RS485 for connecting with ezeio™ Controller):
Port 1: Isolated RS422/RS485 or Ethernet TCP/IP (option).
Port 2: Isolated RS232/RS485.
USB programming port via **XU-USB** programming key.

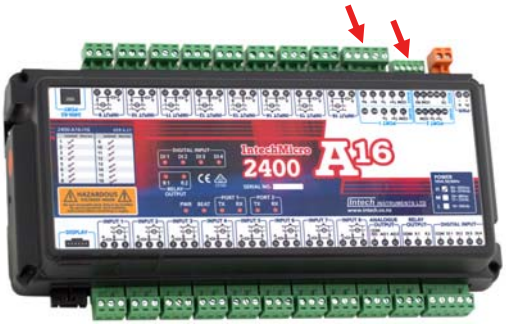
2400-A16 Notes:

1. More than one 2400-A16 can be added to a ezeio™ Controller. Using a combination of 2400-A16 and 2300 Series stations is also possible. Each station connected to the ezeio™ Controller must have a **unique** 'Polling Address' set in both the ezeio™ Controller and the station itself (2400-A16 = 'Address' {page 9}, 2300 = 'Station ID' {page 17}).
2. The eze System will accept up to **40 inputs total** per ezeio™ Controller (this total also includes the four analogue inputs on the ezeio™ Controller if they are used).
3. The 2400-A16 is available with two options for the number of analogue inputs: 8 inputs or 16 inputs.

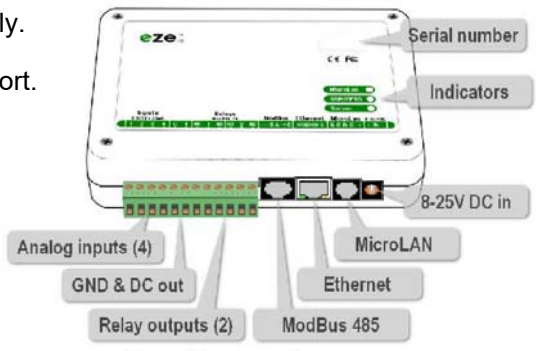
Adding a 2400-A16 station to an ezeio™ Controller.

Follow these steps to add one or more 2400-A16's:
Disconnect both the ezeio™ Controller and 2400-A16 from the power supply.

First is to connect the 2400-A16 to the ezeio™ Controller's 'ModBus 485' port.
The 2400-A16's comms ports 1 & 2 are both Modbus RTU RS485 capable.



ezeio™ Controller



Controller external connectors

Note: If supplied with the ezeio™ Controller from Intech, the **eze Cable-485** (1m length) is for connection with the 2400-A16 comm **port 1 or 2** as RS485. This allows the other comm port to be used with a SCADA or PLC system.

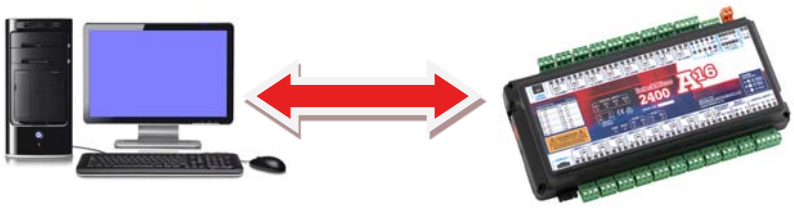
Connection to the ezeio™ Controller 'ModBus 485' port is by using a standard Ethernet cable plugged into the ezeio™ Controller 'ModBus 485' port and broken out to twisted pairs.
Two of these pairs are used to connect to one of the 2400-A16 RS485 ports, to the 'ModBus 485' port of the ezeio™ Controller as follows:

Blue pair:	Blue	= 70 on 2400-A16 comms.
	Blue/White	= 71 on 2400-A16 comms.
Brown pair:	Brown	= 74 on 2400-A16.
	Brown/White	= not connected.

After the connections are complete, power up both the ezeio™ Controller and the 2400-A16.

Initial configuration of 2400-A16 using Intech Micro Station Programmer Software.

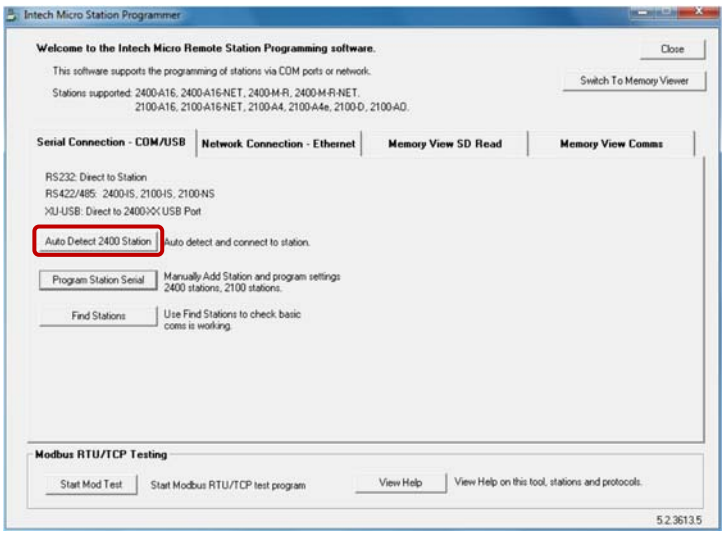
The first task is to configure the 2400-A16.



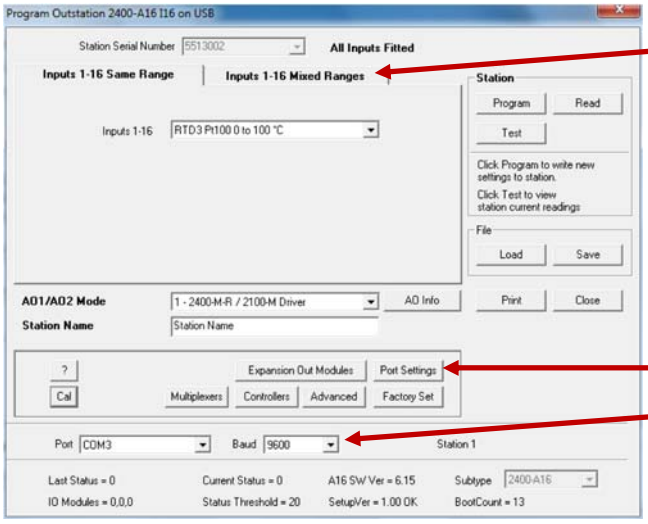
Connect the 2400-A16 to a computer as covered at the bottom of page 16 in the **'2400-A16 Installation Guide'**.
If you do not already have a copy of the 'Intech Micro Station Programmer Software', download and install from this link:

www.intech.co.nz/downloads/Install-StationProgrammer.html

Run the 'Intech Micro Station Programmer Software'.

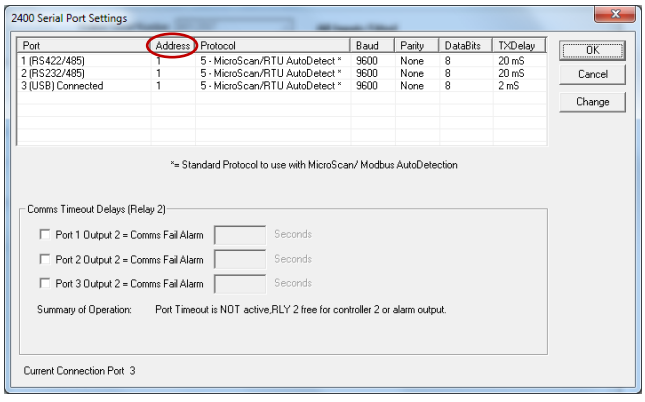


Click on the 'Auto Detect 2400 Station' button.



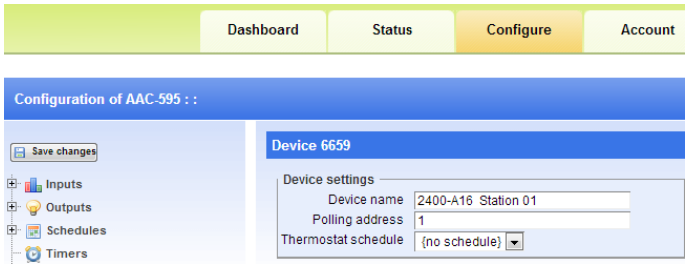
Configure the required input channel settings as shown.
If all inputs being used are the same type, use the 'Inputs 1-16 Same Range' tab.
If there are different input types being used, use the 'Inputs 1-16 Mixed Ranges' tab and configure each input as required.

The two important areas to make the same as the ezeio™ are the '**Port Settings**' and the '**Baud**' rate.



The **2400 Serial Port Settings** screen (left) displays the parameters the 2400-A16 should be set to, with special attention to the '**Address**' which is referred to on the ezeio™ Controller as the '**Polling address**'.

Note that on the 2400-A16, the 'Address' number can be set differently for each (comms) port, so make sure the 2400-A16 port used for connecting with the ezeio™ Controller is the same as that used in the ezeio™ Controller.



Remember that if two or more 2400-A16's are connected to the same ezeio™ Controller, the 2400-A16 '**Address**' and corresponding eze '**Polling address**' for each individual 2400-A16 must be set to a different number. **Never use the same number twice.**

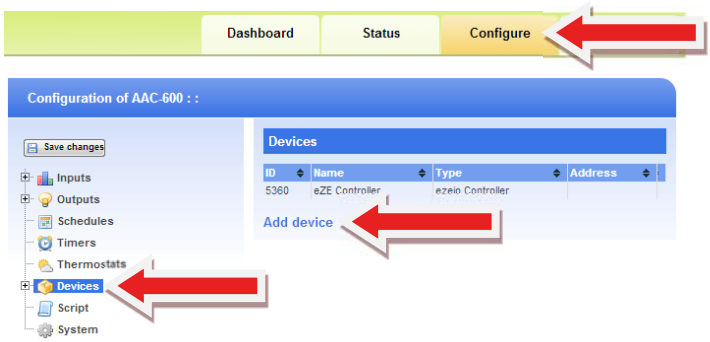
For example, the second 2400-A16 'Address' and eze corresponding 'Polling address' may be set to **2**.

Configuring the ezeio™ Controller with the 2400-A16.

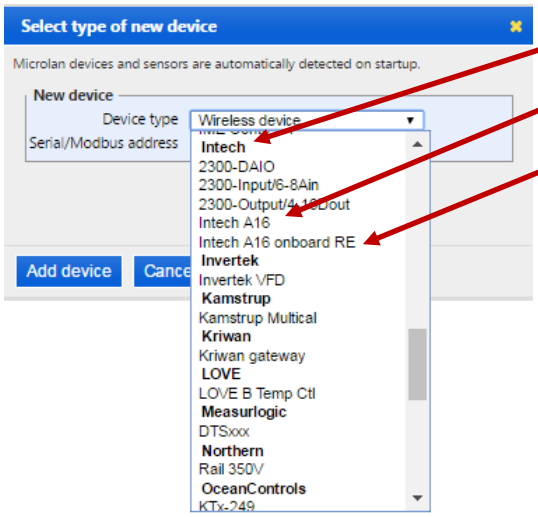
Go to **https://ezecontrol.com/**

Enter your Account number, Login and Password. Click on 'Sign in'.

The first task is to add the 2400-A16 onto the ezeio™ Controller. Click on the 'Configure' tab and wait for the Configure screen to appear:



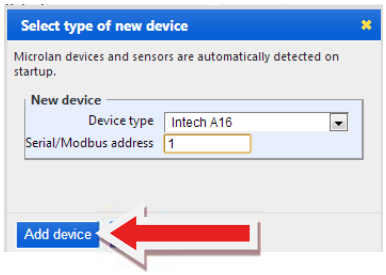
Click on 'Devices' and then click on 'Add device'.



Under 'Device type', scroll down to the **Intech** section:
Next select from the list, either:
'Intech A16'
or
'Intech A16 onboard RE'

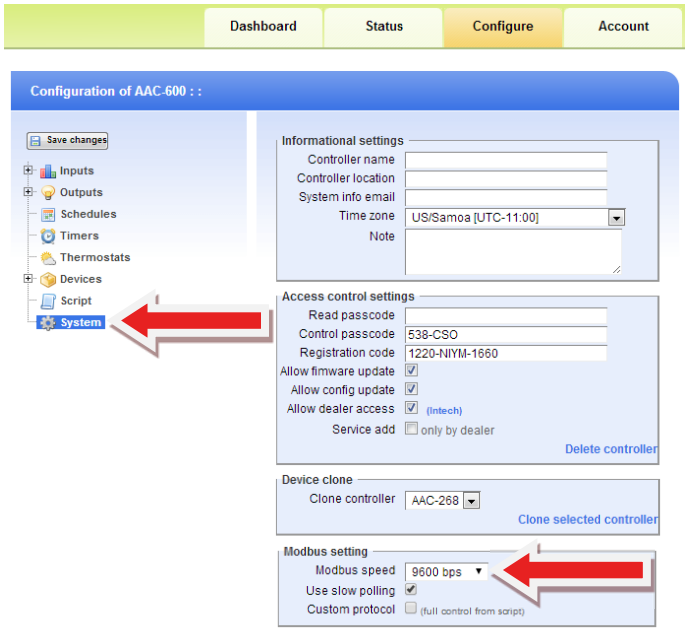
The two 'Intech A16' options relates to the 2400-A16 relay outputs only:
'Intech A16' supports the **2400-R2** (16 Channel Relay Output Expander).
'Intech A16 onboard RE' supports the 2400-A16 two onboard relay outputs.

Generally, the most popular option is the '**Intech A16 onboard RE**', and this option also includes the smart onboard Modbus Bridge, which allows MicroScan to retransmit data from the Recorder, to the Bridge. Eze can then copy this data from the Bridge to the Cloud.



Next, enter the 'Serial/ModBus address', which must be set to the same number used in the 2400-A16 as well. See page 8 <<
In this example, **1** has been entered (the 2400-A16 Comm Port connected with the ezeio™ has therefore also been configured as 'Address' = **1**.)

Click on 'Add device'.
Then Click the 'Save changes' button.

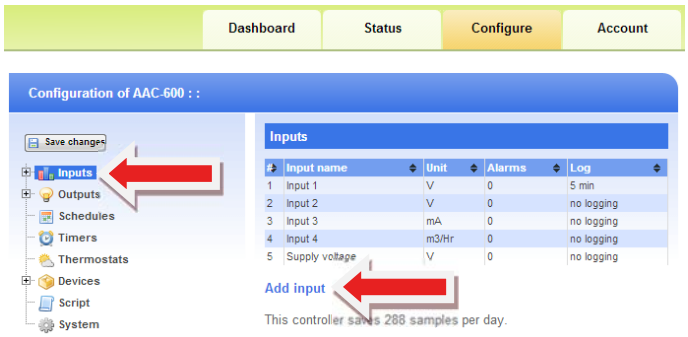


Next, click on ‘System’.

Locate the ‘Modbus setting’ area.
Set the ‘Modbus speed’ (i.e. Baud rate) to the same as that of the 2400-A16 (as shown). It is recommended to also tick the ‘Use slow polling’ box.

Note: Not all the options are shown in this picture.

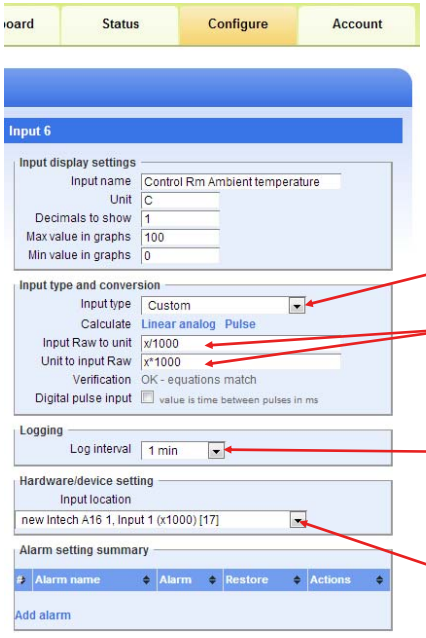
Next task is to add the 2400-A16 inputs onto the ezeio™ Controller:



Click on ‘Inputs’ and then click on ‘Add input’.

Important! eze System inputs cannot be re-ordered, so the **initial setup is critical!**

Example 1: eze temperature input scaling for RTD’s and thermocouples.

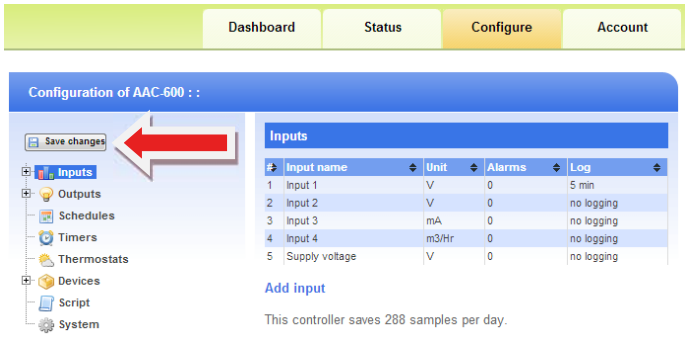


Select ‘Custom’ for all 2400-A16 input configurations.

Type in these 2 calibration details for all listed temperature probes, both RTD and Thermocouple.
The 2400-A16 sends the exact temperature to the ezeio™ Controller.

Under ‘Logging’, chose a ‘Log interval’ time.
Note: Failure to select a Logging time will result in this input not being viewable on eze.

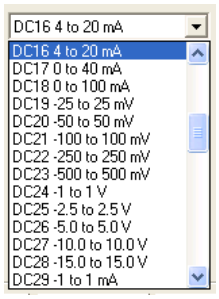
In this case, the Ambient Temperature Probe is wired in the 2400-A16, input 1.



Click on 'Save changes'.

Click on the 'Status' tab to see the Temperature.

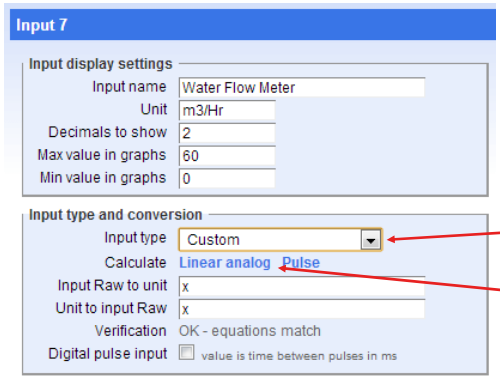
Example 2: For all other analogue values the 2400-A16 outputs to eze, 0~100% over the range selected on the 2400-A16 as per the table shown, which makes configuration very easy.



The ezeio™ controller displays input values from the selected range.

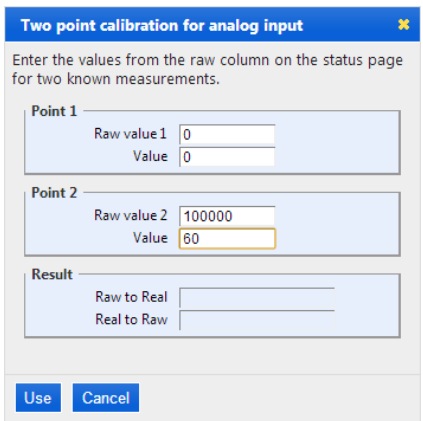
How eze scales this input:	
2400-A16 output value to eze	**eze Raw value**
0	0
100	100,000

Example 2.1: First example is a flow meter which is calibrated for 0~60 m3/Hr (cubic meters per hour).



Select 'Custom'.

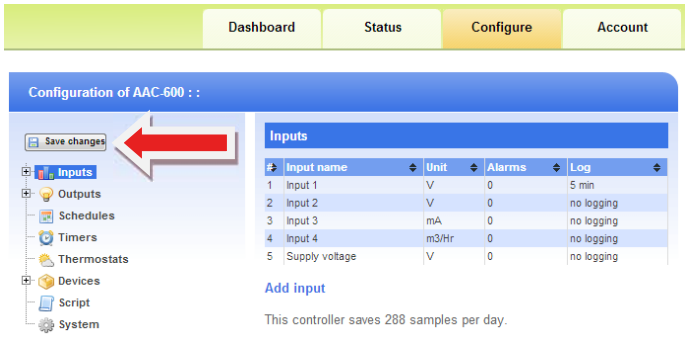
Click on 'Linear analogue'.



Point 1 is the zero point. As the flow meter range is 0~60m3/Hr, at zero flow, the Raw value and the flow meter value = 0.

Point 2 is Full Scale, which in this case is 60m3/Hr. At full scale input, the Raw value will be 100000, and the flow meter value = 60.

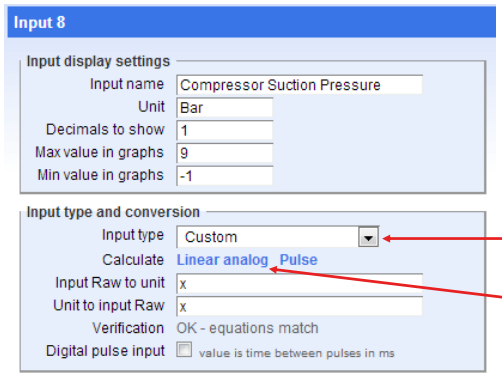
Click on 'Use' to enter this calibration setting.



Click on ‘Save changes’.

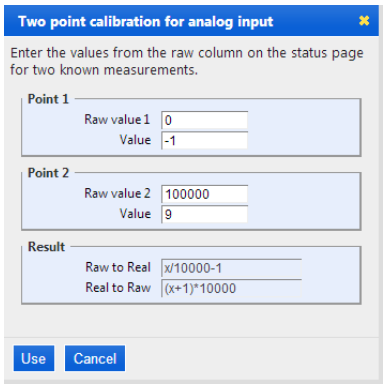
Click on the ‘Status’ tab to see the flow meter reading.

Example 2.2: Compound range such as a pressure transmitter that has a span of -1~9Bar.



Select ‘Custom’.

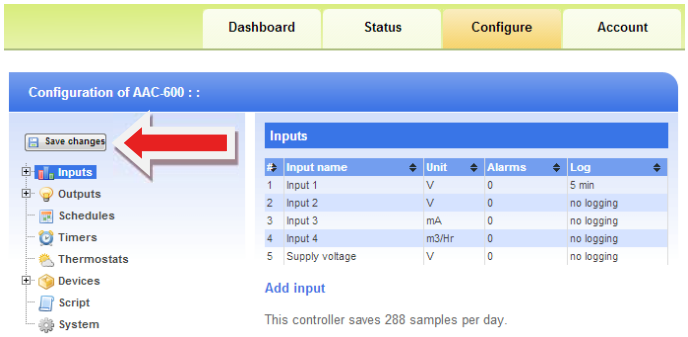
Click on ‘Linear analogue’.



Point 1 is the zero point. As the pressure transmitter range is -1 at minimum range, the Raw value and the pressure sensor value = 0, but the Value = -1Bar.

Point 2 is Full Scale, which in this case is 9Bar. At full scale input, the Raw value will be 100000, and the Value= 9.

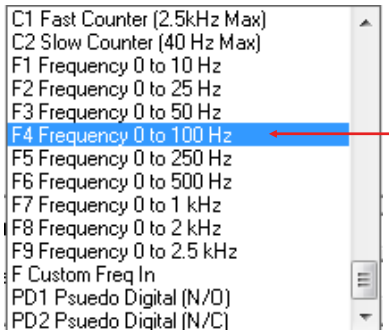
Click on ‘Use’ to enter this calibration setting.



Click on ‘Save changes’.

Click on the ‘Status’ tab to see the pressure.

Example 2.3: Pulse output from a flow meter or energy meter.
In this example, the water flow meter has a range of 0~80Hz = 0~1000 l/sec (litres per second), and this signal is wired into one of the 16 analogue inputs on the 2400-A16.

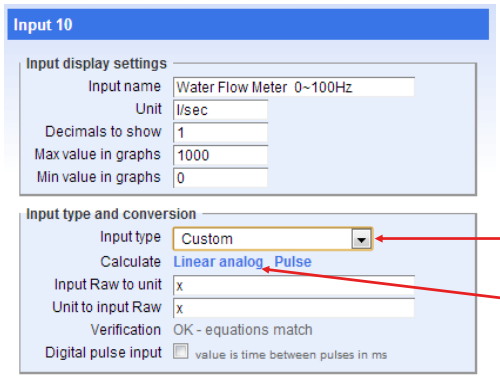


The closest range on the 2400-A16 is 0~100Hz.

By using simple maths, we calculate that the flow at 100Hz = 1250 l/sec.

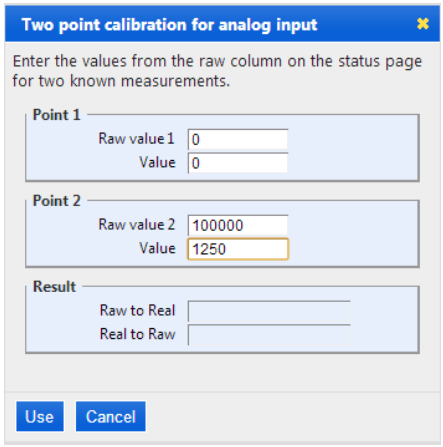
Therefore 1250 will be value used for full scale reading.

The 2400-A16 calculates this Hz input the same as the normal analogue input: 0Hz = 0% and 100Hz = 100%



Select ‘Custom’.

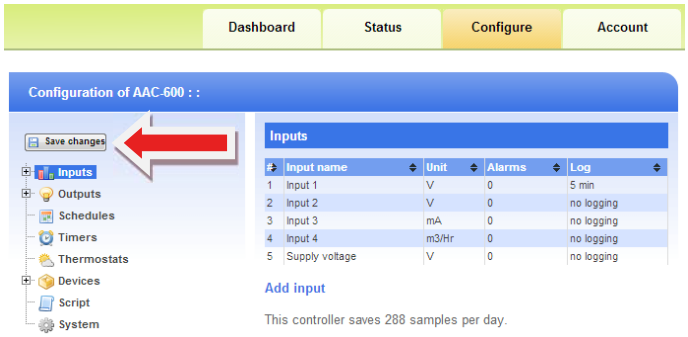
Click on ‘Linear analogue’.



Point 1 is the zero point. As the flow meter range is 0~1000Hz, at zero flow, the Raw value and the flow meter value = 0.

Point 2 is Full Scale, which in this case is 1250l/sec. At full scale input, the Raw value will be 100000, and the flow meter value = 1250.

Click on ‘Use’ to enter this calibration setting.

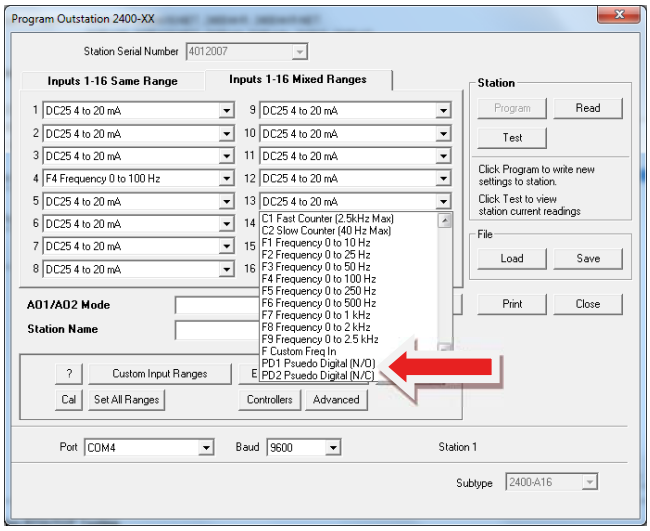


Click on ‘Save changes’.

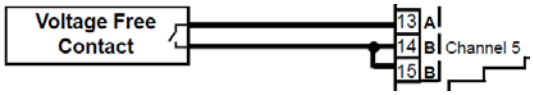
Click on the ‘Status’ tab to see the flow rate.

Example 2.4: Displaying an on/off state e.g. motor run/stop, valve open/closed, alarm on/off.

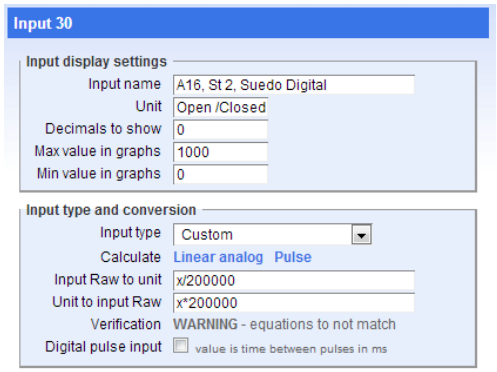
Using a spare analogue input.
Using the 'Intech Micro Station Programmer Software', setup a spare analogue channel as a PD1 Pseudo Digital (N/O) or PD2 Pseudo Digital (N/C).



Actual connection onto the spare 2400-A16 channel looks like this using a clean contact:



On eze, setup the input configuration for this 2400-A16 channel as below:



This will display on eze as '0' or '100%'.
In the above example, it is logging a valve which is 0% closed or 100% open.

The four Digital inputs on the 2400-A16 are also available, but need to be initialised by eze.

On Site Calibration Trim.

When an onsite calibration offset or zero adjustment is required to correct the reading on the eze web, follow this procedure:

With a Laptop or Tablet running Windows® 7/8/8.1/10, connect to the 2400-A16 using the **XU-USB programming key** available from an Intech Instruments Ltd distributor.

You will also need to install the 'Intech Micro Remote Station Programmer' software (free to download) from the following link:
www.intech.co.nz/downloads/Install-StationProgrammer.html

Use the 'Cal' button on the 'Station Programmer' software to individually offset the input channels to the desired reading.

For further information, please refer to the 2400-A16 Installation Guide - pages 8,16 and 19.

Section 2B - 2300 Series.

Intech Micro 2300 Series Stations.

The **2300 Series** are a system of modular I/O Remote Stations, that add an even lower cost option to Intech's already extensive intelligent I/O Remote Station family and also connect directly to the ezeio™ Controllers.

The 2300 series I/O stations are made up of stand-alone Analogue and Digital—Input or Output stations. Communications between the ezeio™ Controller and the 2300 Series station(s) is RS485 (1 pair with screen cable) multi drop as standard.

RTD, T/C, mA, mV & V, plus Digital input and relay outputs as follows:

Notes:

Model	Input Type	Default
2300-A8II	mA: 4~20mA, 0~20mA	mA: 4~20mA
2300-A8VI	Vdc: 0~10V, 2~10V	Vdc: 0~10V
2300-RTD6	RTD: Pt100, Pt1000, Ni120, Ni1000; -200~850°C	RTD: Pt100
2300-Tc8	Thermocouple: B, E, K, J, N, R, S, T, with CJC. mV: 0~50mV, -100~100mV.	Tc: Type J
2300-MULTI	Combination inputs and outputs.	RTD: Pt100, mA: 4~20mA
2300-D16	Digital, Input voltage: 12~24Vdc	
2300-RO4	Relay Outputs: 240Vac @ 0.5A, 28Vdc @ 1A	
2300-AO8I	mA Outputs: 4~20mA, 0~20mA	mA: 4~20mA

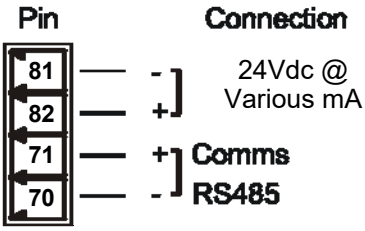
1. More than one 2300 Series station can be added to a ezeio™ Controller. Using a combination of 2300 Series and 2400-A16 stations is also possible.
   Each station connected to the ezeio™ Controller must have a **unique** 'Polling Address' set in both the ezeio™ Controller and the station itself (2400-A16 = 'Address' {page 11}, 2300 = 'Station ID' {page 18}).
2. The eze System will accept up to **40 inputs total** per ezeio™ Controller (this also includes the 4 analogue inputs on the ezeio™ Controller if they are used).
3. All the inputs/outputs of each 2300 model are set to the same type/level, except for the 2300-MULTI where each input/output is set individually. For individually selected and scaled Universal Inputs with eze, use the 2400-A16.

Adding a 2300 station to an ezeio™ Controller.

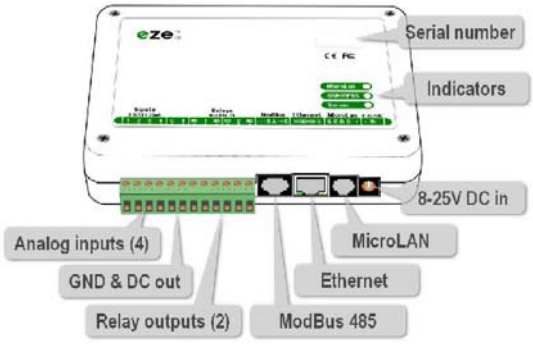
Follow these steps to add one or more 2300 stations:
Disconnect both the ezeio™ Controller and 2300 from the power supply.

Connect the 2300 station to the ezeio™ Controller's 'ModBus 485' port.

2300 Series Power and RS485 Comms Wiring.



ezeio™ Controller



Controller external connectors

Warning: If the power/communication connections are reversed, the remote station may become faulty.

Note: If supplied with the ezeio™ Controller from Intech, the **eze Cable-485** (1m length) is for connection with the 2300 station.

Connection to the ezeio™ Controller 'ModBus 485' port is by using a standard Ethernet cable plugged into the ezeio™ Controller 'ModBus 485' port and broken out to twisted pairs.
One of these pairs are used to connect the 2300 station RS485 port, to the 'ModBus 485' port of the ezeio™ Controller as follows:

Blue pair:	Blue	= 70 on 2300 station comms.
	Blue/White	= 71 on 2300 station comms.
Brown pair:	Brown	= 81 on 2300 station.
	Brown/White	= not connected.

WARNING! Take care to ensure that the screen (Brown wire if following above) does NOT contact terminal 82 on the 2300 station - damage will result.

Set the 'Station ID' on the 2300 station using the dip switches. **Default Station ID = 1**.
Refer to the 2300 'Installation Guide' - Station ID Table.

After the connections are complete, power up both the ezeio™ Controller and the 2300 station.

Changing the Modbus 'Polling address' on ezeio™.

Warning: When changing the 2400-A16 'Address' or 2300 'Station ID' number (eze = 'Polling address'), the inputs do not automatically reconfigure. They will still poll the old address.

So if you change the Modbus 'Polling address' under Device, you need to also refresh the input settings.

The quickest way to do this is to simply go to each input, change the location of the input to another input (under 'Input location' on the ezeio™), - Click on 'Save Changes' - change back and save again.

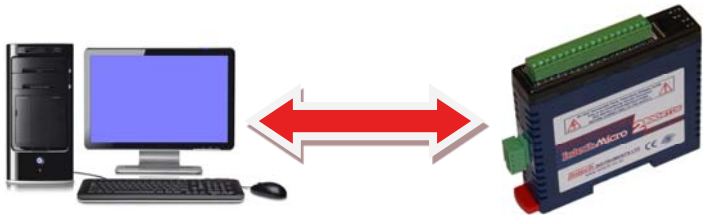
This will refresh the input settings, and the eze System will then poll the correct 2400-A16 or 2300 station.

Initial configuration of 2300-RTD6, 2300-Tc8 or 2300-MULTI stations using IOStudio 2300 Series MODBUS Configuration Software.

IMPORTANT: The steps below are only needed if you are using the following 2300 stations with an input type other than their default. Other 2300 Series models do not need this step.

2300-RTD6	Default = RTD Pt100	Options = RTD; Pt1000, Ni120, Ni1000
2300-Tc8	Default = Tc Type J	Options = Thermocouple: B, E, K, N, R, S, T, with CJC. mV: 0~50mV, -100~100mV
2300-MULTI	Default = 2x RTD Pt100, 2x 4~20mA	Options = RTD; Pt1000, Ni120, Ni1000 mA; 0~20mA

The first task is to configure the 2300 station.

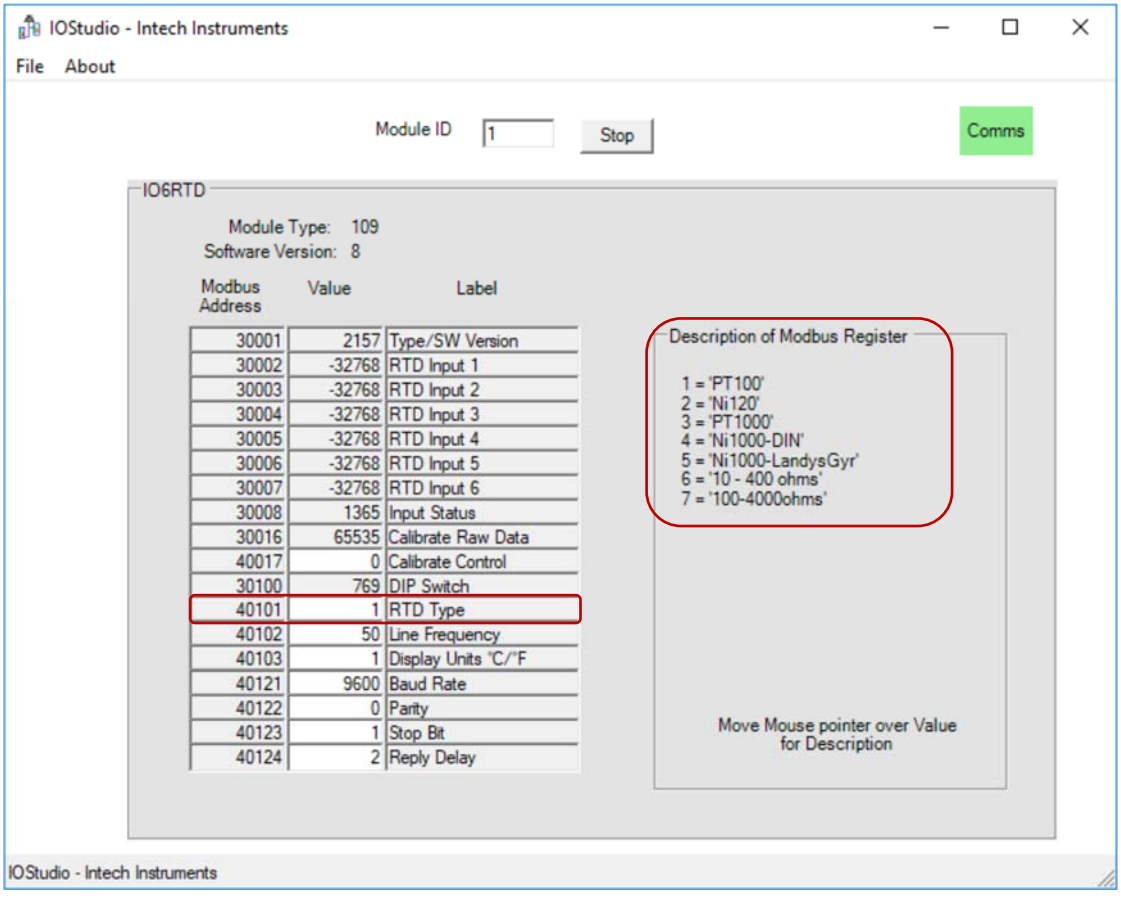


Connect the 2300 station to a computer as covered in the 2300 **'Installation Guide'**.
If you do not already have a copy of the free 'IOStudio 2300 Series MODBUS Configuration Software', download and install from this link:

www.intech.co.nz/downloads/Install-IOStudio.html

Run the 'IOStudio 2300 Series MODBUS Configuration Software'.

2300-RTD6 connected on IOStudio:

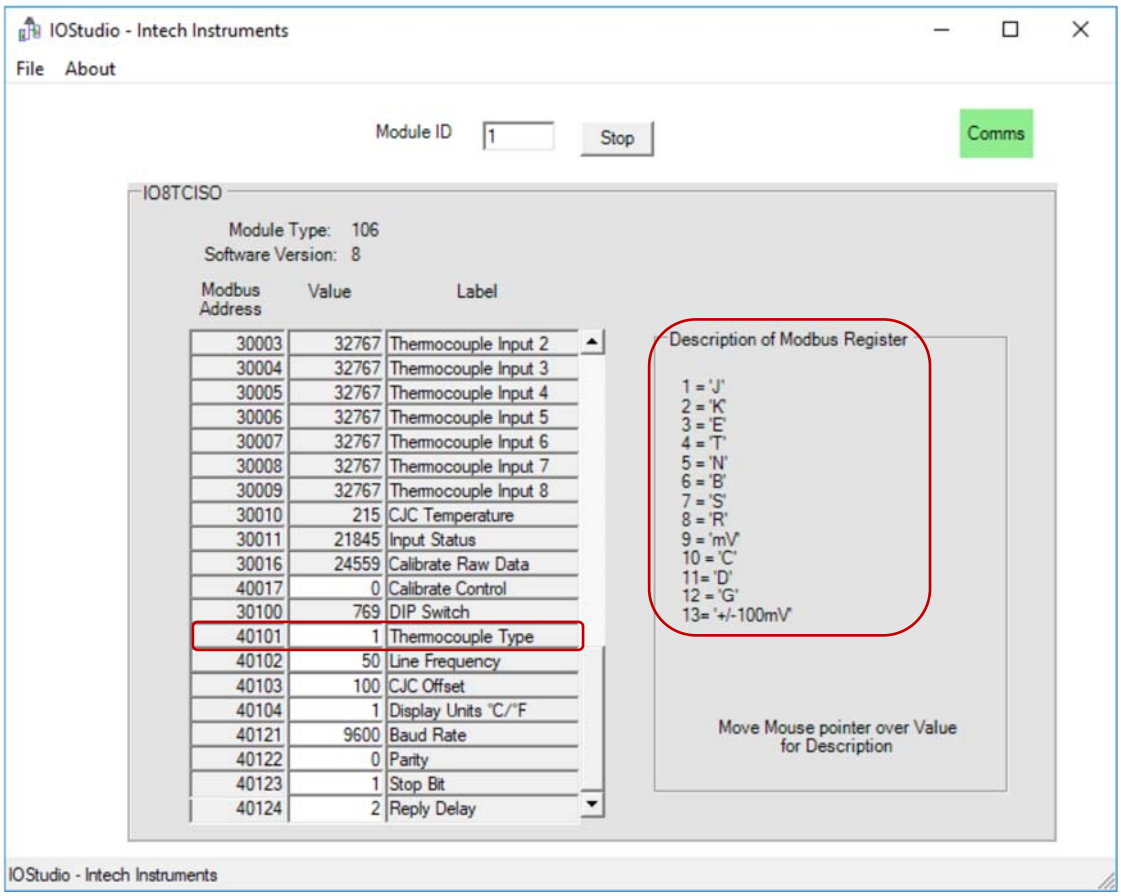


Locate the area:
Modbus Address: 40101
Label: RTD Type

Set the **Value** to the RTD type being used, as listed in the Description box.
Default **1** = Pt100.

Note: All six inputs are set to the same RTD type.

2300-Tc8 connected on IOStudio:

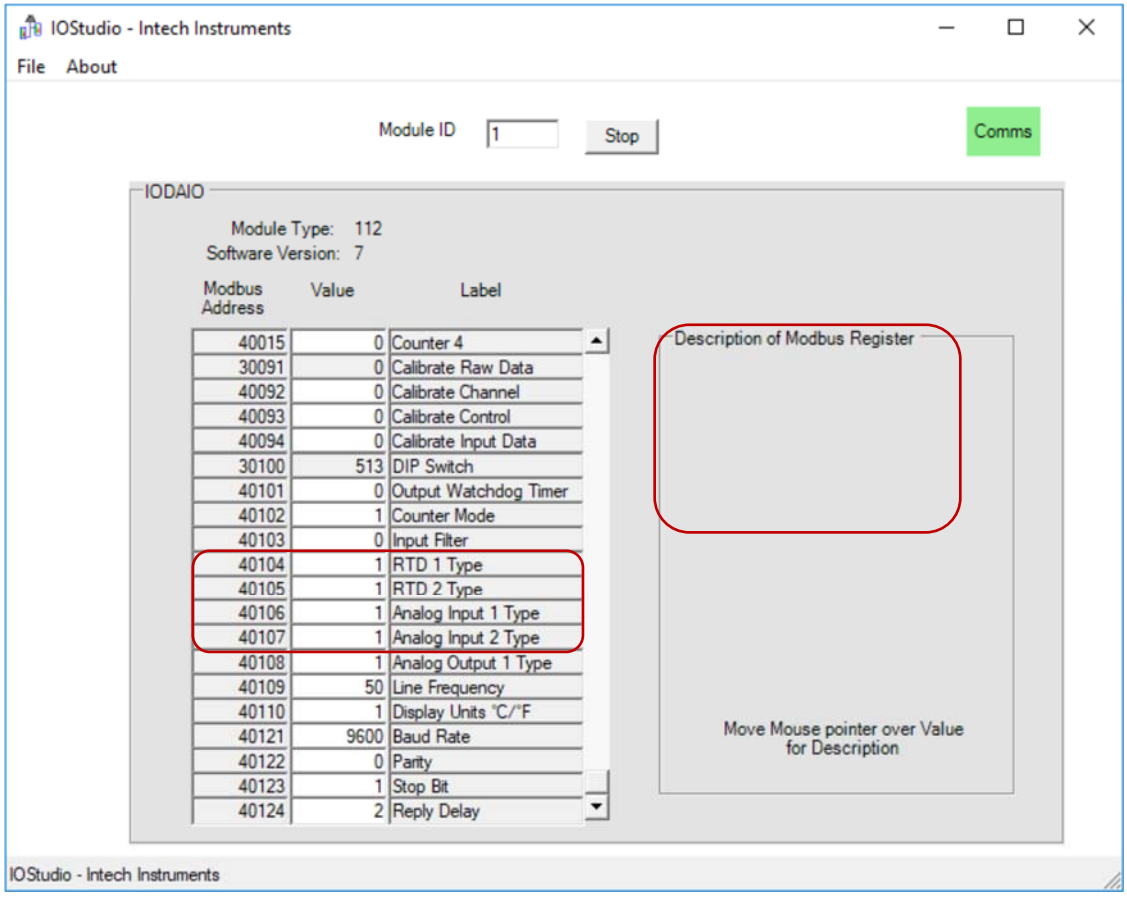


Locate the area:
Modbus Address: 40101
Label: Thermocouple Type.

Set the Value to the Tc type being used, as listed in the Description box. Default **1** = Type J.

Note: All eight inputs are set to the same Tc type / mV.

2300-MULTI connected on IOStudio:



Locate the area:
Modbus Address: 40104~40107
Label: RTD / Analog Input # Type

Set the 'Value' to the input type being used, as listed in the 'Description' box when the mouse pointer is over the 'Value' field for each input type. Default RTD = Pt100. Default Analog = 4~20mA.

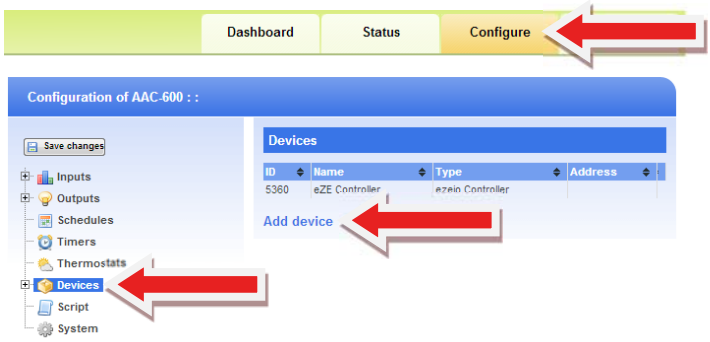
Note: Each input type (RTD/Analog) is set individually.

Configuring the ezeio™ Controller with a 2300 Series station.

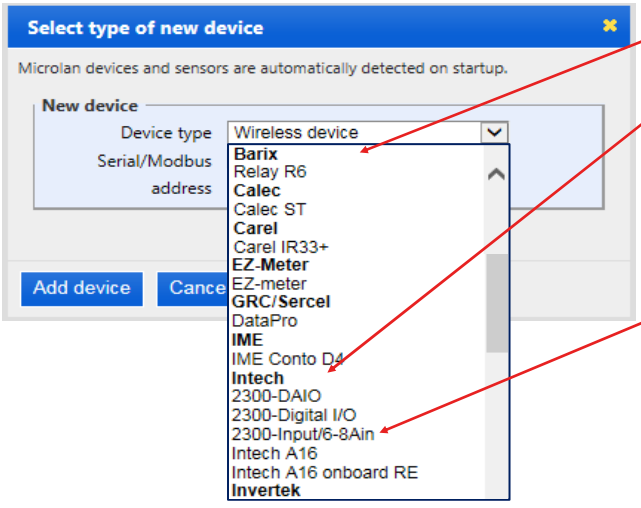
Go to **https://ezecontrol.com/**

Enter your Account number, Login and Password. Click on 'Sign in'.

The first task is to add the 2300 station onto the ezeio™ Controller. Click on the 'Configure' tab and wait for the Configure screen to appear:



Click on 'Devices' and then click on 'Add device'.

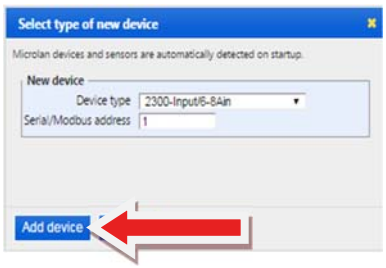


2300-R04 (Under 'Configure' and 'Outputs', Add just the 1st 4 relay outputs for the Ezeio)

Under 'Device type', scroll down to the **Intech** section.

Next, select from the list one of the 2300 options as follows:
'**2300-DAIO**' 2300-MULTI.
'**2300-Input/6-8Ain**' 2300 Series Input type stations.
'**2300-Output/4-16Dout**' 2300-AO8I or 2300-RO4 stations.

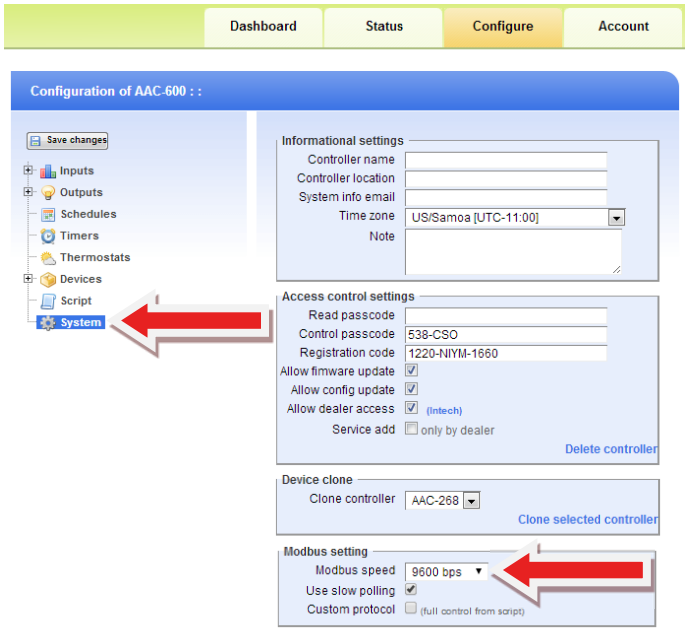
2300-Input/6-8Ain option covers the following models:
2300-A8II
2300-8VI
2300-Tc8
2300-RTD6



Next, enter the 'Serial/ModBus address', which must be set to the same number as has been set in the 2300 'Station ID' as well.
In this example, **1** has been entered (the 2300 station connected with the ezeio™ has therefore also been configured as 'Station ID' = **1**.)
Note: The 2300 'Station ID' is set via dip switches. Refer to the 2300 'Installation Guide' - Station ID Table.

Click on 'Add device'.
Then Click the 'Save changes' button.

Remember that if two or more 2300 stations are connected to the same ezeio™ Controller, the 2300 '**Station ID**' and corresponding eze '**Polling Address**' for each individual 2300 station must be set to a different number. **Never use the same number twice.**
For example, the second 2300 'Station ID' and eze corresponding 'Polling Address' may be set to 2.

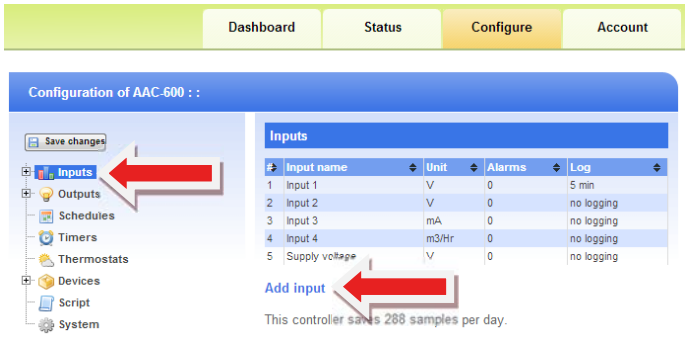


Next, click on ‘System’.

Locate the ‘Modbus setting’ area.
Set the ‘Modbus speed’ (i.e. Baud rate) to the same as that of the 2300 station (as shown). It is recommended to also tick the ‘Use slow polling’ box.

Note: Not all the options are shown in this picture.

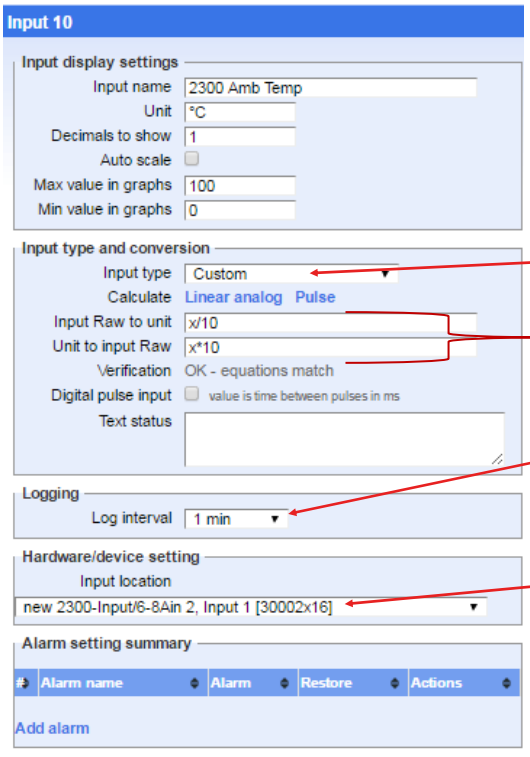
Next task is to add the 2300 inputs onto the ezeio™ Controller:



Click on ‘Inputs’ and then click on ‘Add input’.

Important! eze System inputs cannot be re-ordered, so the **initial setup is critical!**

Example: ezeio™ temperature input scaling for RTD’s and thermocouples.



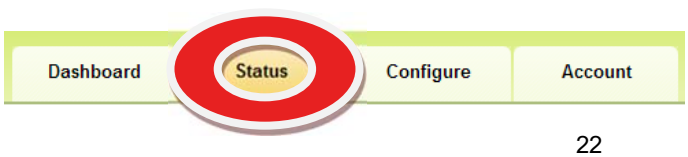
Under ‘Input type’, select ‘Custom’ for 2300-RTD6 and 2300-Tc8 input configurations.

Type in these 2 calibration details for all temperature inputs.
The 2300 station sends the exact temperature of the RTD’s and Thermocouple’s to the ezeio™ Controller.

Chose a ‘Logging’ time for this input to be logged.
Note: Failure to select a Logging time will result in this input not being logged.

In this case, the Ambient Temperature Probe is wired into the 2300-RTD6, input 1.

Then Click the ‘Save changes’ button.



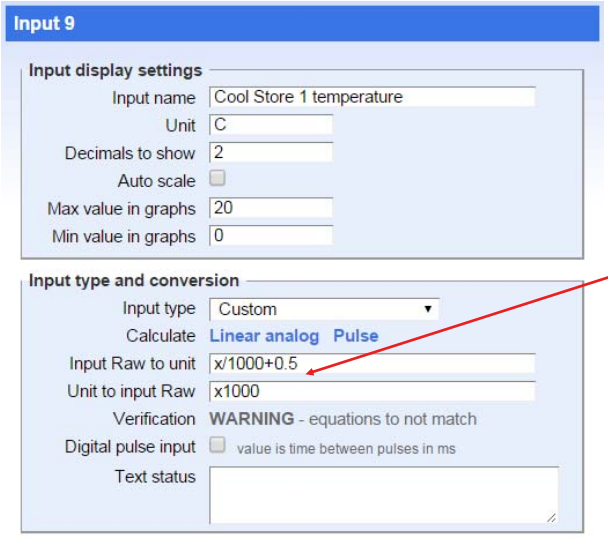
Click on the ‘Status’ tab to see the Temperature.

Section 3 - Calibration Offset adjustment during a calibration survey.

Instructions for applying an offset (zero) adjustment:

Important: Be careful not to overwrite or alter the existing calibration values! A copy of the existing calibration values should always be made before proceeding, to protect against accidental overwrite.

1. **Example 3.1:** *Cool Store 1 temperature* on the eze is reading 0.5°C low.
   A **+0.5°C offset** needs to be applied to correct the error:



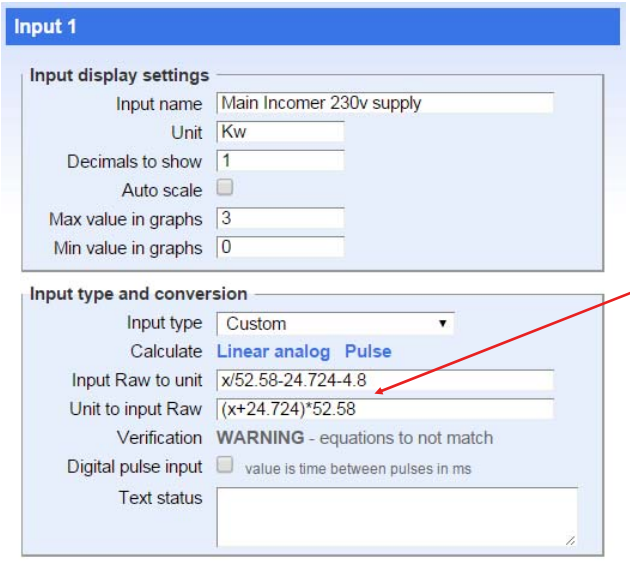
Click on the 'Configure' tab.
And then the + by the Inputs.
Select the input that needs adjustment.

Under both '**Input Raw to unit**' and '**Unit to input Raw**', type **+0.5** (as shown here), to the end of the existing calibration value.

Click on 'Save changes'.

Click on the 'Status' tab to check the temperature now reads correctly.

2. **Example 3.2:** *Main Incomer 230V supply* to the factory is reading 4.8 Kilowatts high on the eze.
   A **-4.8Kw offset** needs to be applied to correct the error:



Click on the 'Configure' tab.
And then the + by the Inputs.
Select the input that needs adjustment.

Under both '**Input Raw to unit**' and '**Unit to input Raw**', type **-4.8** (as shown here), to the end of the existing calibration value.

Click on 'Save changes'.

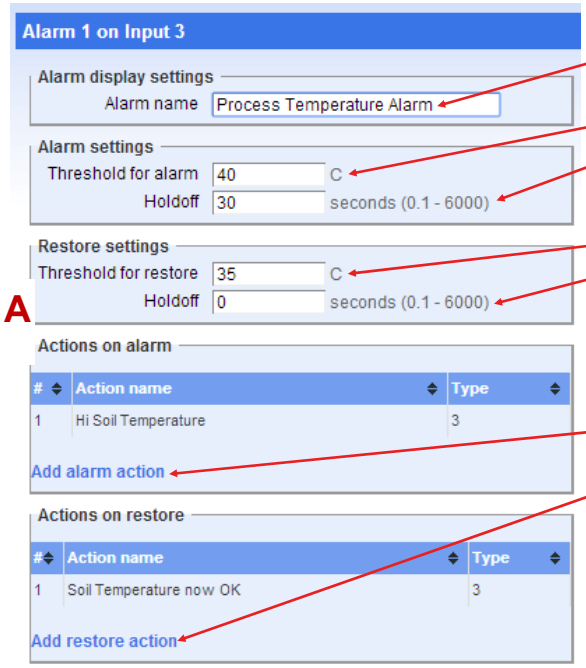
Click on the 'Status' tab to check the Kw now reads correctly.

Note: This procedure is the same for any reading - e.g. flowmeter, pH, pressure etc.

Section 4 - Alarms.

The eze System provides a powerful mix of alarm outputs including: alarm relay actuation on the ezeio™ Controller, 2400-A16 and 2300-RO4 relay outputs, email alarm messages, SMS text messages. All of this is covered in the eze User Manual, starting on page 47.
Supplementary notes: Terminology varies a little to that used with SCADA, but is easy to follow.
Each input can have up to four alarms.

To add Alarm 1, click 'Add Alarm', or to modify an existing alarm, select the alarm at bottom of the channel configuration screen.
Two set point settings are required, the first for setting the alarm, and the second for un-setting the alarm.



Give the alarm a meaningful name.

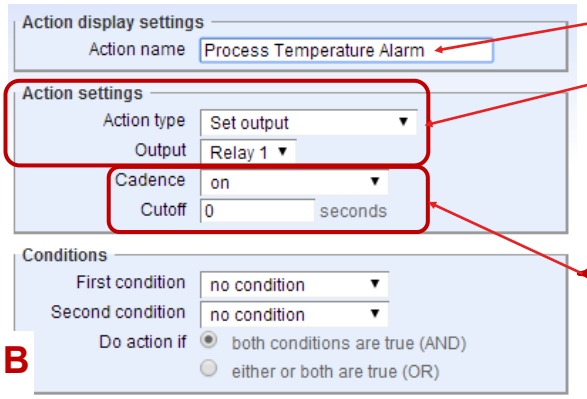
Set point value for triggering the alarm on.
Time delay – alarm condition must be present for this period before the alarm activates (from 1 sec to 100 mins).

Set point for turning the alarm off.
Time delay – alarm condition has cleared and must remain cleared for this period before the alarm deactivates (from 1 sec to 100 mins).

Setup both these areas.
'**Add alarm action**' relates to the '**Alarm settings**' Hi Temp Alarm setpoint above that activates the alarm relay or message.
'**Add restore action**' relates to the '**Restore settings**' setpoint above that deactivates the alarm relay or message when the temperature drops within alarm limits.

Setting up an Alarm Relay Output.

First setup '**Add alarm action**' for a high alarm relay output on the ezeio™ Controller (or the 2400-A16 or 2300 station).
Relay outputs have more options than txt or email messages.
On the next screen, give this alarm a meaningful name.

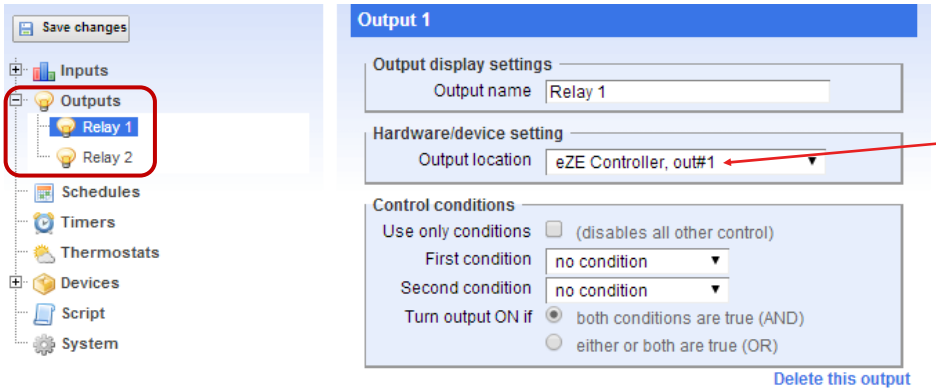


When in this alarm configuration screen, leave the 'Conditions' area configuration as it is shown here.

Under 'Action settings' select 'Set output' under the 'Action type'.
Then under 'Output' select 'Relay 1' - at this stage this is a label only and is not yet linked to an actual relay output.

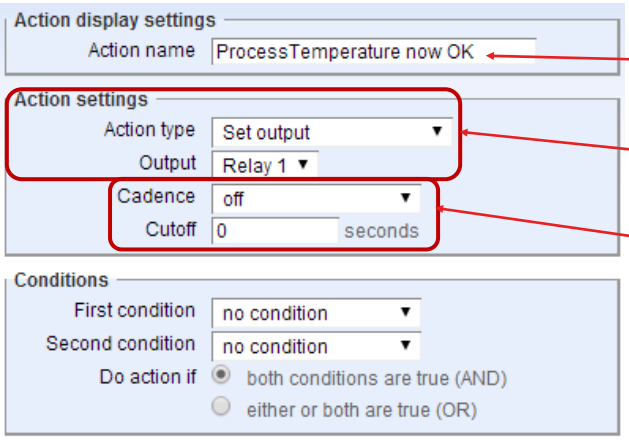
Under 'Cadence', choose 'on' to activate the relay output action.
'Cutoff' has two useful options:
Using '0' as shown will permanently activate the relay output until the 'Restore Action' setpoint deactivates the relay when the temperature drops within alarm limits.
Alternatively, enter a number greater than 15, and the output relay will, on an alarm condition, activate for that period and then deactivate.
E.g. 30 seconds will activate the output relay for approximately 30 seconds and then deactivate.
The alarm output will not activate again until the temperature returns within alarm limits, and then enters a new alarm condition.
Please note: These times are approximate only, depending on bandwidth etc.

Under ‘Outputs’, select ‘Relay 1’ to match that selected above.



Select the actual hardware relay. In this example, it is the ezeio™ Controller, Relay Output 1.

We now need to go back and click on ‘**Add restore action**’ above in **A**, to setup the set-point that deactivates the alarm relay when the temperature drops within alarm limits. The next screen is:



Give this alarm a meaningful name.

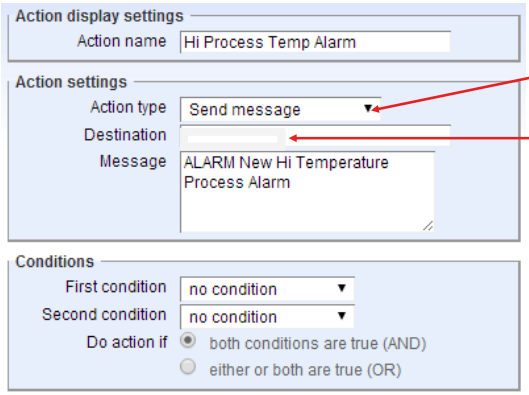
Under ’Action type’, select ‘Set output’, then under ’Output’ select Relay 1.

Set ‘Cadence’ to ‘off’ to deactivate the relay output action. ‘Cutoff’ in this example, has been set to ‘0’, as no time delay is required to deactivate the alarm relay.

This completes the configuration of the High Temperature Alarm set-points and alarm output relay.

If a Low Temperature Alarm is required, repeat this configuration process again, starting from the start of the ‘**Alarms**’ section.
The same alarm relay output can be chosen, or a separate Low Alarm Relay Output can be configured instead.

Example for configuration of an alarm SMS text or an email alarm message.



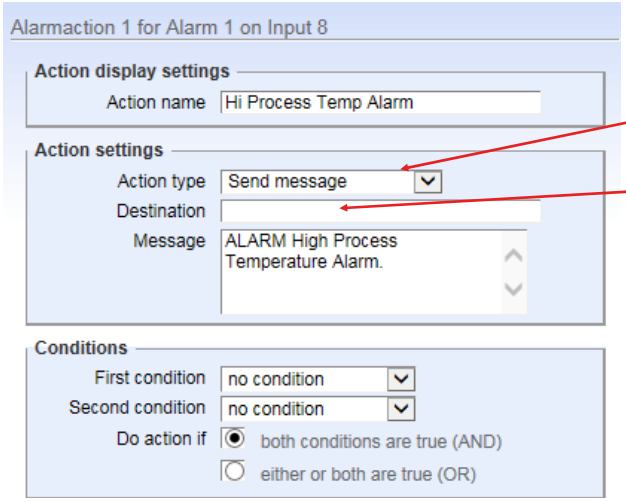
To configure sending an SMS text alarm or email alarm message, under ‘Action type’, select ‘**Send message**’. Refer to **B** on page 24.

For SMS text alarm messages, enter your mobile phone number in this box.
Note: International format of mobile phone number is required. e.g. New Zealand = **+642**xxxxxxx

For email alarm messages, enter your email address in this box. For multiple emails, use a semicolon (;) followed by a space between addresses.

Important note: The monthly ‘Service plan’ fee you chose from eze has a monthly limit on **SMS text messages**.
Be careful when configuring and saving configuration changes, as this resets the alarm code and will generate another SMS text message on any text alarms that have been activated. Move the alarm set point clear of any alarm point to prevent wasting SMS text messages when editing.
Alternatively use an email address when editing, then change to the mobile phone number when editing has been completed.

Example for Eze Voice Calls.



To configure sending an voice call under 'Action type' select '**Send message'**. Refer to **B** on page 24.

Enter your mobile phone number in the 'Destination' box.

Note: Use international format of landline or mobile number with 011 in front. e.g. New Zealand = 01164xxxxxxxx

For example; a voice message to a New Zealand cell phone will look like: 01164215642

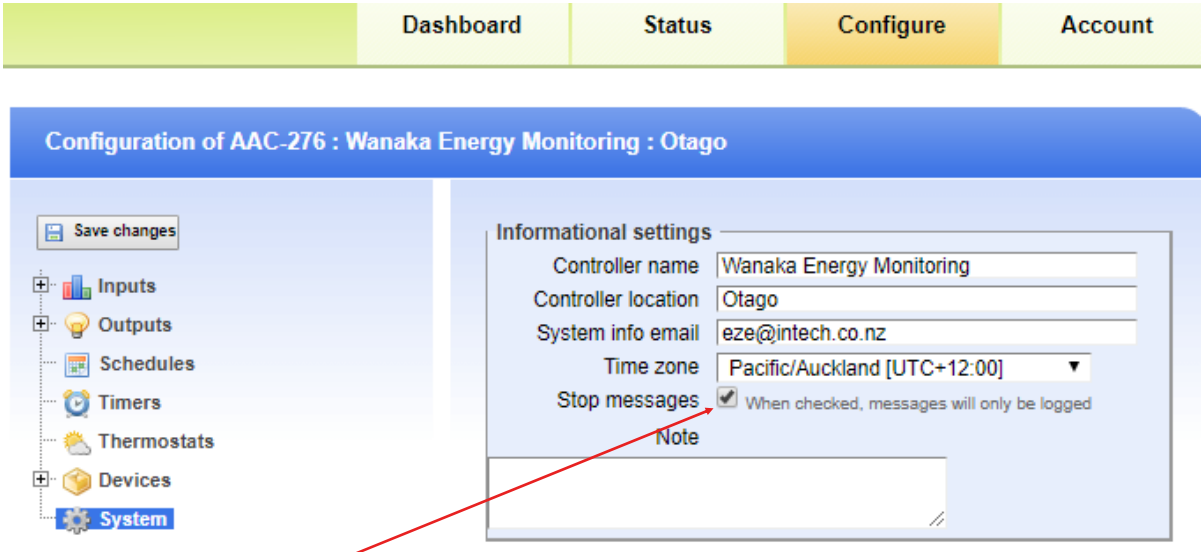
Voice calls count as one shot from your account SMS/Voice alarms.

The message reads out controller serial number, name, location, source, alarm, and action. It also ends with the link to logon to your controller. This is similar to what is in email alarms.

The message received comes from 001(612) 326-5729, a number from Minneapolis, MN, USA

Suspending all messages.

Click on the 'Configure' Tab and select 'System'.

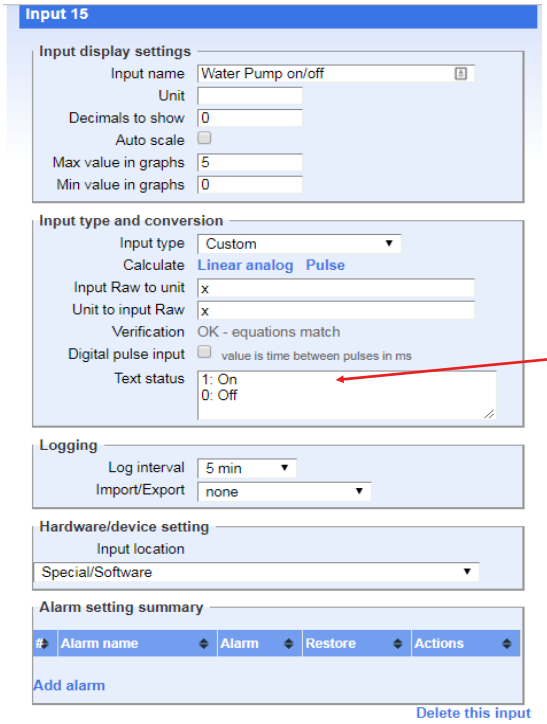


Tick the 'Stop Messages' box as shown. Remember to click on '**Save changes**'.

When you want the alarm messages to resume, untick the box, and click on '**Save changes**'.

Example for On/Off alarms.

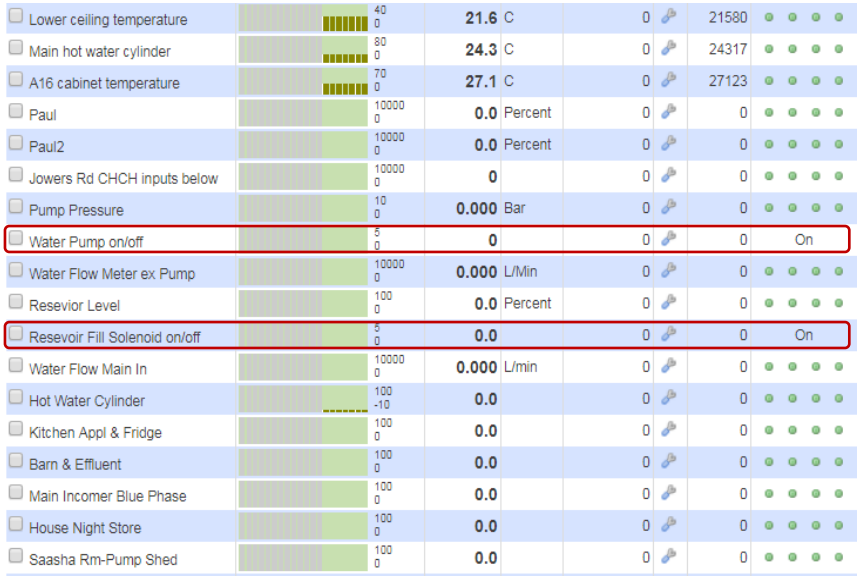
In situations where the input can be one of two options, eg we have a On/Off (switch) system.
On/Off alarms are determined by using 0 and 1.

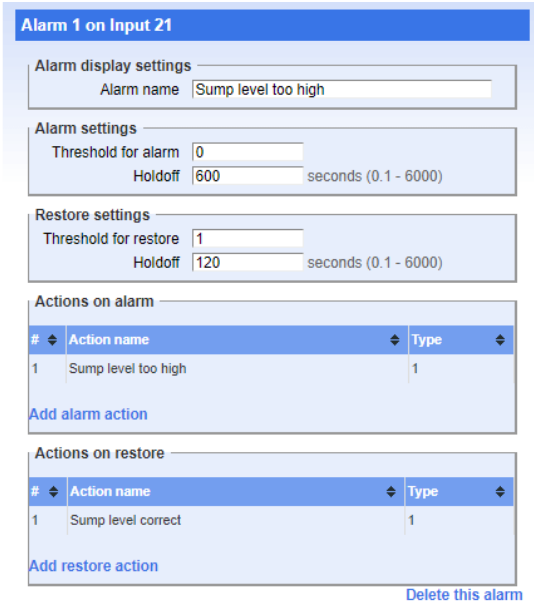


Under the ‘Configure’ tab
On/Off alarms are determined by using 0 and 1.

Alternatively 0 and 1 could be labelled ‘Unhealthy’ and ‘Healthy’.

These numbers are then represented in the ‘Status’ tab by the labels given to them in above.





This is another example of an On/Off system.

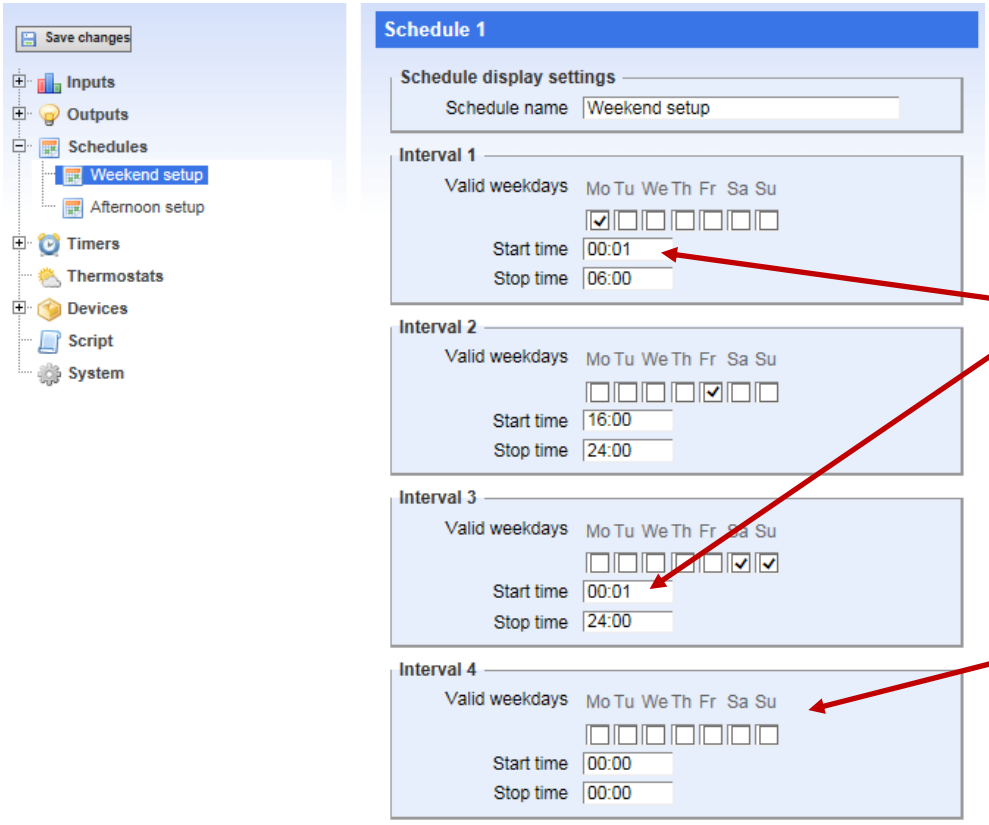
We can alarm this feature in a similar way as we do in the previous few pages.

Section 5 - Special Features.

Eze Scheduler.

The Eze Scheduler is a powerful tool used for scheduling events.
When adding a new schedule, you will be given four intervals.

E.g. Scheduling alarms:
Alarms, individually or collectively, can be scheduled to be active in the weekends, but not during the week.



The 'Start Time' must not be left with all zero's.

If left at all zero's, the accuracy of the Scheduler becomes unreliable.

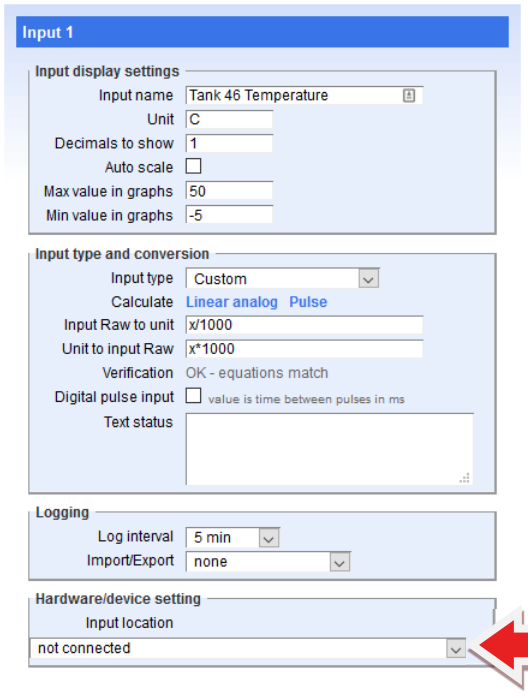
As in the example, if a midnight start is required, enter '00:01'.

If the start time is before or equal to the stop time, the interval will not be processed. '00:00' is the last time of the previous day, so cannot start with this time.

Untick any unused intervals.

Replacing Devices - replacing a damaged field station.

Replacing a failed field station or shifting the inputs over to another device without the need to re-type all the text in again:



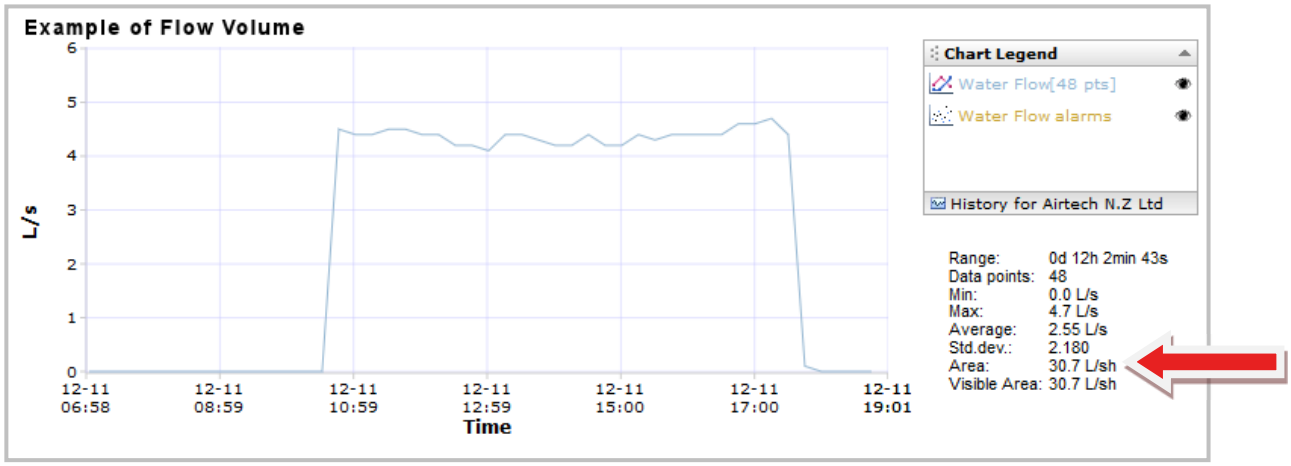
Disconnect all inputs that are now referencing e.g. an existing 2400A16, and set them to 'not connected' under Hardware Setting.

Then delete the device and re-add the new device.

Go through and reconnect the inputs to the new device.

Calculating the Flow Volume on an eze graph.

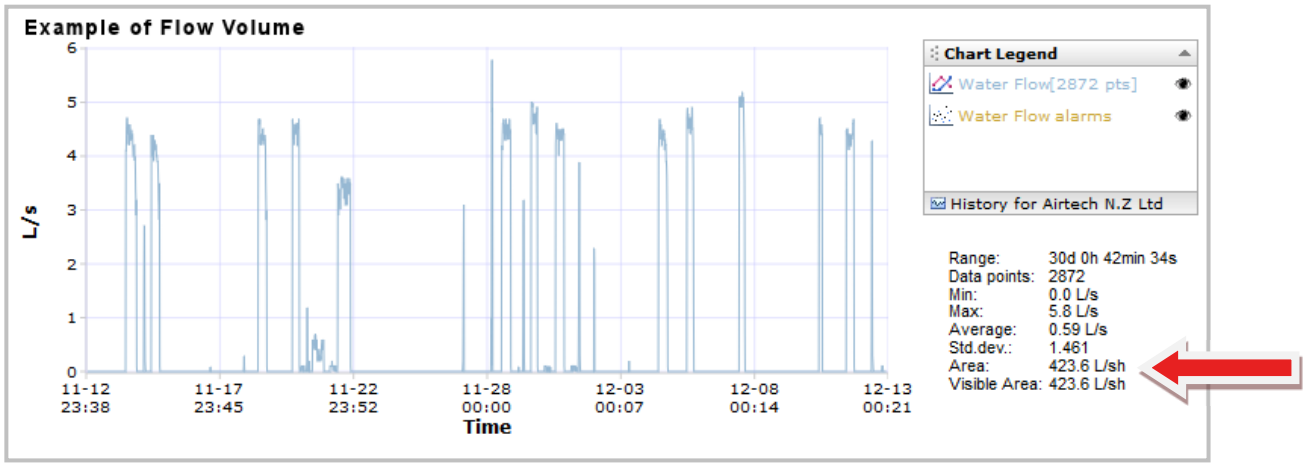
Example 5.1: Determining the flow in litres or m3 etc, from the 'Area' readings.
In this example we will use a generated a graph of a water flow meter under the 'Status' tab.



If the data shows L/s as on this graph, the 'Area' unit (volume) becomes L/s * hours, so that eliminates the time component but you need to multiply by 3600 (seconds in an hour).

So in this example, 30.7 * 3600 = 110520 L (110.520m3) of water is your volume.

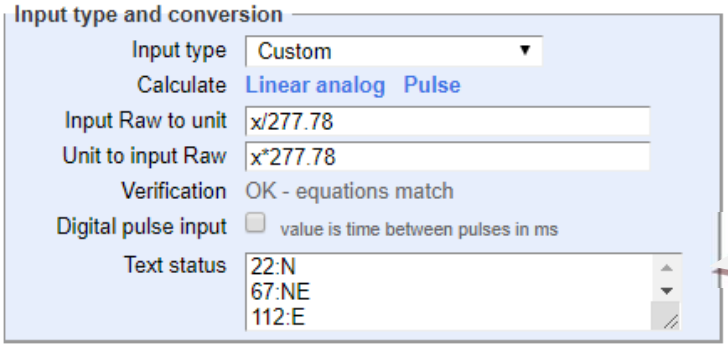
Example 5.2: Another example in L/sec.



423.6 * 3600 = 1,524,960 L (1524.960m3) of water is your volume.

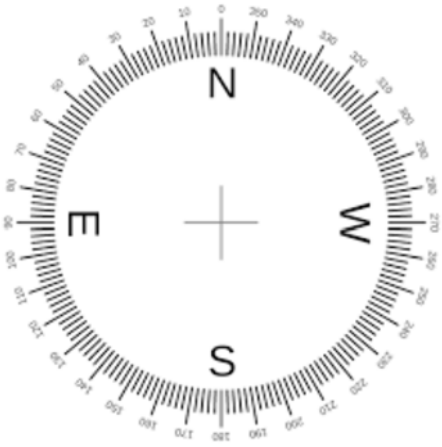
Setting up a eze channel to indicate digress compass reading.

Under ‘Configure’ select appropriate input.



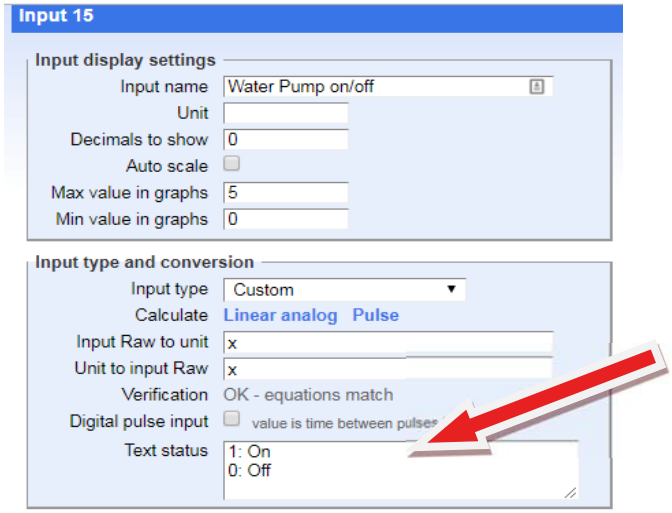
Copy these numbers into the channel ‘Text status’ box:

22:N
67:NE
112:E
157:SE
202:S
247:SW
292:W
337:NW
999:N



These numbers are the degree boundaries for what reading is to show in the data.
So for example 'East' would be between 67 and 112 degrees, and 'North' would be shown for 337 to 22 degrees.

Deleting text out of ‘Text status’ boxes.



When deleting all text out of the ‘Text status’ box, under custom, cloud doesn’t recognise that anything has changed when saving.
Putting a space in after deleting gives cloud something to save.

Eze Controller Raw Calibration Values for convenient getting started.

Note: For accurate calibration, follow the calibration procedures in this Supplementary Manual. This is only for approximate calibration.

I/P config	Input signal	Raw value
0~30mA (from list)	4mA	1400
	16mA	5580
All mV & V from list	Zero	0
	¾ scale	7500
Eze Thermistor	0C	6500
	65C	1950

Eze on Bd inputs, I/P channels 1 to 4: (readings taken at '0' and ¾ scale to avoid nonlinearity at FS)

I/P config	Input signal	Raw value
4~20mA	4mA	0
	20mA	100000
0~5v	0v	0
	5v	100000
0~10v	0v	0
	10v	100000

A16 I/P's calibration values on Eze Raw value:

2300-A8II + A8VI + Tc8 + RTD

I/P config	Input signal	Raw value
4~20mA	min span	0
	Full scale	4095

Data logging during loss of internet.

Each ezeio controller has a 4MB on-board flash memory that acts like a circular buffer for data samples.
The memory is organized as 8000 samples for all of the inputs **(max 40).**

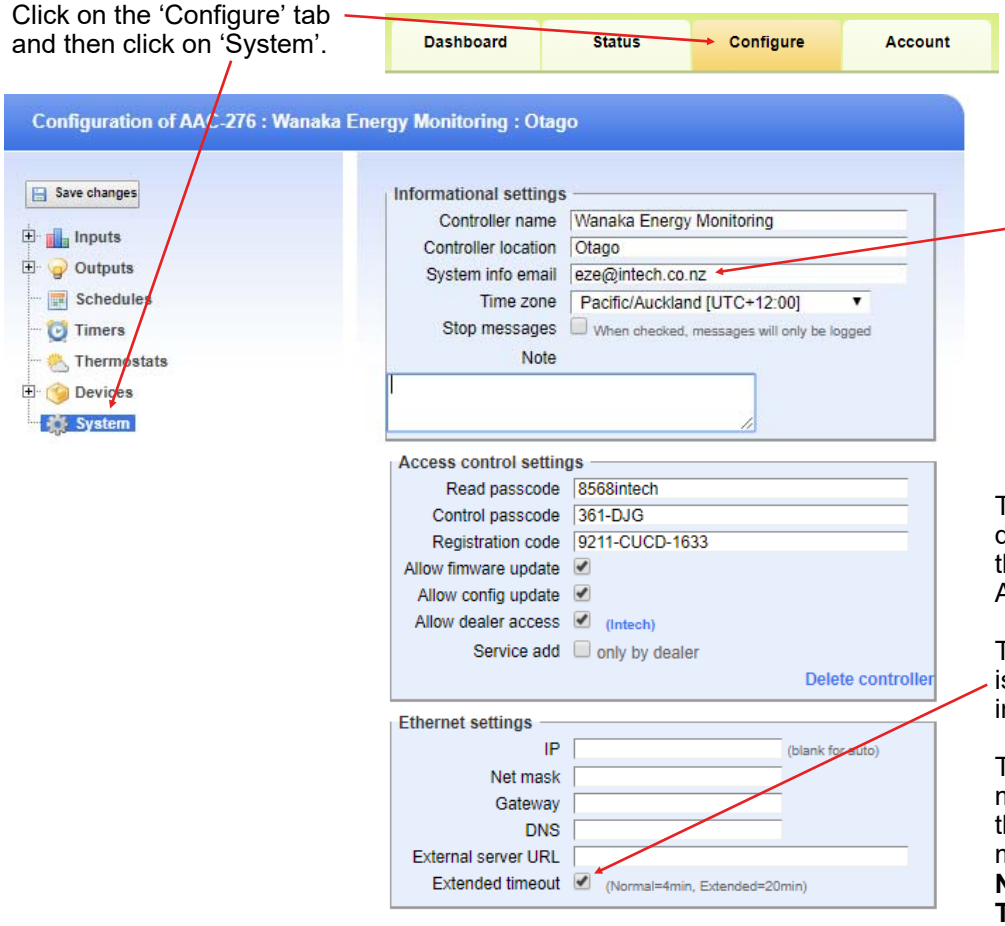
If you log at 5 minute intervals on all 40 inputs, you'll have:
8000x5 = 40000 minutes buffer in case of any communication blackouts.
That's almost 28 days.

The delayed data will automatically be uploaded as soon as the communication is restored.

Email alert for operational issues.

Eze can be set up to send an email alert to “Admin” should any operational issues occur. Alerts include any event that will affect the Ezeio performance. For example, loss of communications to the Eze Cloud including: GSM drop outs, Service Fee expiring, etc.

Click on the ‘Configure’ tab and then click on ‘System’.



Then enter the email address for the ‘admin’ person under ‘System info email’.
For multiple emails, use a semicolon (;) followed by a space between addresses.

To stop continuous emails about devices that loose contact with the cloud for short intervals.
A time delay can be setup.

Time delay before an email alert is sent is set by this ticking the indicated box.

The default time delay is four minutes. When the box is ticked the time delay extends to twenty minutes.
No Tick = 4 minutes
Tick = 20 minutes

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