

# AquiNet

AquiNet  
Fieldbus Monitoring  
System



**INSTALLATION  
& OPERATION  
INSTRUCTIONS**



**aquilar**  
leak detection solutions

# AquiNet

## Fieldbus Network System

Please read these instructions carefully and keep them in a safe place (preferably close to the module) for future reference. These instructions must be followed carefully to ensure proper operation.

### A. GENERAL INFORMATION

Zone Communication Modules (ZC modules) can be added to any leak detection device with volt free contacts. When the relay changes over, a signal is sent via the fieldbus network to a master generator. Each master generator can monitor up to 100 zone communication modules. Multiple generators can also be linked to create very large networks. The master generator interfaces with a touch screen panel that runs the graphical user interface (GUI) which displays alarms and current system status. The GUI can be tailored specifically to the client's requirements.

#### INSTALLATION ITEMS (NOT SUPPLIED)

- Wall fasteners for surface mounting.

#### TOOLS REQUIRED

- Drill or hole punch for electrical conduit entries
- Phillips (cross-head) screwdriver
- Small flat-head screwdriver

#### STORAGE

Keep the module in a dry place prior to installation to avoid possible damage to internal components.

### B. PRODUCT INFORMATION

#### AQUINET

230Vac. 3A unswitched fused spur

#### OUTPUTS

BACnet / IP / Modbus / TCP / 4 volt free contacts

#### TFT

7" LCD 16M Colour 800x480 pixels.

NEMA 4 / IP66 front panel.

Resistive analogue touch screen

Software stored in non-volatile flash memory

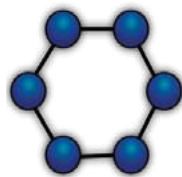
#### ENCLOSURE

H 330 x W 292 x D87mm

### C. TOPOLOGY

The topology of a bus system is the definition of which type of cable routing is allowed. AquiNet features a completely free topology

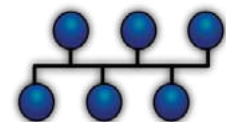
allowing the network to be established as a line, ring, star or a combination of these.



Ring



Star



Line

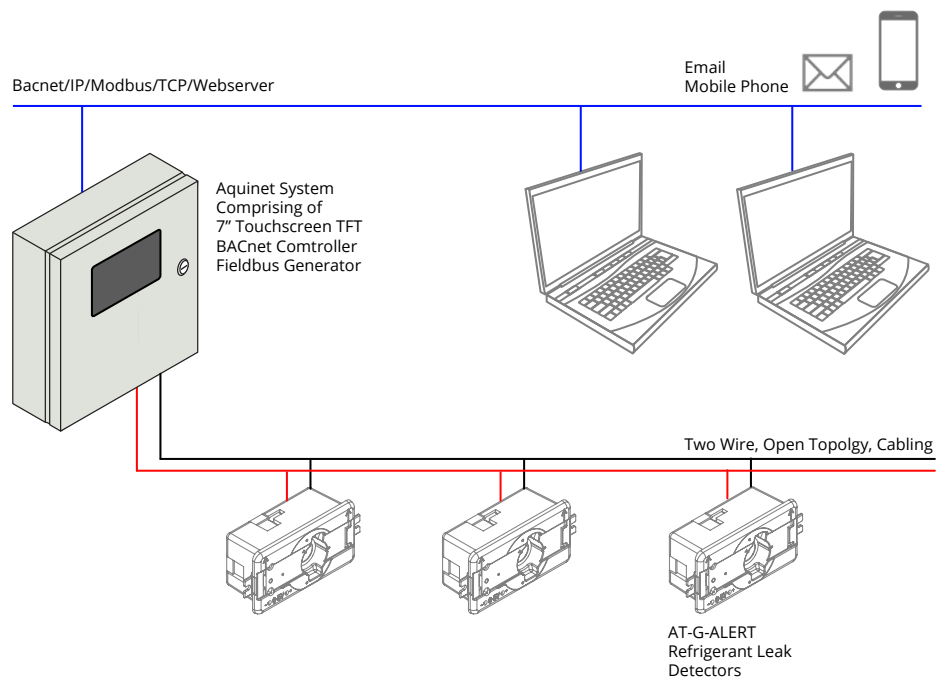
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**D. TYPICAL INSTALLATIONS**

Central monitoring of multiple refrigerant gas sensors (AT-G-ALERT) can be achieved by fitting an zone communication module to one of the volt free contacts. Each sensor is then connected, using the open topology, to the AquiNet panel. The built in touch screen will

display alarm status and alarms according to client's requirements. Multiple water leak detection systems, such as the AT-SZA / AT-MZA / Eco-1 / Eco-6 can be fitted with zone communication modules to provide a cost effective network solution.

**E. TYPICAL SYSTEM SCHEMATIC**



**F. CABLE AND INSTALLATION TIPS**

When planning the installation, a generic Bus cable can be used, however, it is better to use a twisted cable in order to prevent electrical noise from affecting one conductor more than the other and thereby creating an unbalanced system. In the case of very noisy installations (with sources such as contactors, inductive loads etc) we recommend the use of a shielded cable. The table below can be used to find the right cable. This can easily be carried out by considering the maximum distance between the main panel and the furthest module in the installation and checking the table below.

The values shown in the table have been calculated considering a balanced distribution of the modules on the Bus. Installations where most of the modules are placed at the end of the network may be critical and this is not recommended (the table is not valid in this case). The values shown in the table are also suitable for installations where the majority of the modules are placed at the beginning of the network (close to the main panel); this type of connection represents the best configuration to guarantee the best performance of the system.

## AquiNet Fieldbus Network System

### TABLE OF CABLE SECTIONS

Max Current Consumption	Cable Sizes		
	0.75mm <sup>2</sup> (AWG 19), twisted	1mm <sup>2</sup> (AWG 17), twisted	1.5mm <sup>2</sup> (AWG 15), twisted
450mA	50m	70m	100m
350mA	65m	90m	130m
300mA	75m	100m	150m
250mA	90m	120m	180m
200mA	115m	150m	230m
150mA	150m	200m	300m
100mA	225m	300m	450m
50mA	450m	600m	900m

It is recommended to select cables according to the length end consumption shown in the table above. It is also advisable to use polyethylene conductor insulation to have lower cable capacitance. The total consumption of all the modules supplied by

the Bus and the cable resistance affect the voltage of the Bus. The drop in Bus voltage might cause the modules placed far from the main panel to not work correctly. The modules used with the AquiNet system draw a maximum of 2mA each.

**NOTE: Please use the voltage calculator for cable selection this can be downloaded from [this link](#).**

### G. INSTALLATION ON

#### EXISTING CABLES

If the installation uses existing cables, it is important to verify the cross section of conductors according to the above cable section table. Once the cable size is checked, it is important to ensure that there is no leakage between the two conductors and, also, no leakage from the conductors to ground or shield. The best method of leakage testing before connecting any modules is to use an insulation tester (min. 500 V) to verify a resistance higher than 100.000 kΩ.

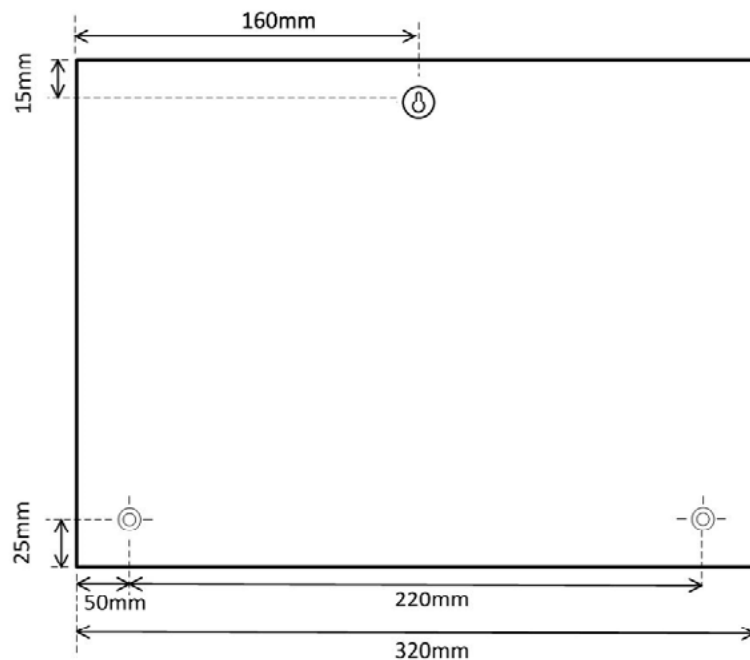
### H. CABLE ROUTING

The cable is a signal cable and it should, therefore, be routed as such. This means that it is better to keep it separate from power cables, high energy noise sources such as contactors, switched inductive loads etc. However, if there are no other alternative possibilities, the routing of the cable may pass close to power cables. Should the power cables be very noisy, we suggest using shielded cables.

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### I. SELECT THE MOUNTING POSITION

Choose a location indoors where the panel will be protected from the elements and temperature extremes. The panel is not suitable for a hazardous location.



### J. CABLE SPLICES AND CONNECTIONS

Cable splices are often the source of problems. It is strongly recommended to splice only cables of the same characteristics (wire cross section, capacitance, etc). The splicing contact resistance must be as low as possible. Twisted wire splicing under a wire nut or terminal strip can deteriorate over a certain period of time. It is, therefore, advisable to use soldering splices. For shielded cable the shield must be continued, but it must not be grounded at the splicing points. Splices need to be water-tight to prevent the entry of water into the cable, which could result in increased capacitance. Note: Bad splices and/or splices left uncovered, exposed to humid environments, could create critical problems difficult to locate. During the installation of each module, the length of external cables (input/output) must be selected according to the

data sheet reference. These wires must be treated as signal wires and be kept away from contactors, relays, motors and other inductive noise sources. In extreme cases it is necessary to use shielded cable. But here the shield must also be properly grounded at one point only. With the high flexibility of the Bus wiring, external input and output wires should, of course, be kept as short as possible by bringing the Bus to the points where signals are to be transmitted or received. Note: if multi-conductor cable is used, where some of the conductors are spare, we highly recommend connecting all spare wires to ground (preferably close to the main panel). This to reduce the "antenna effect" of open-end wires.

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**K. RECOMMENDATIONS**

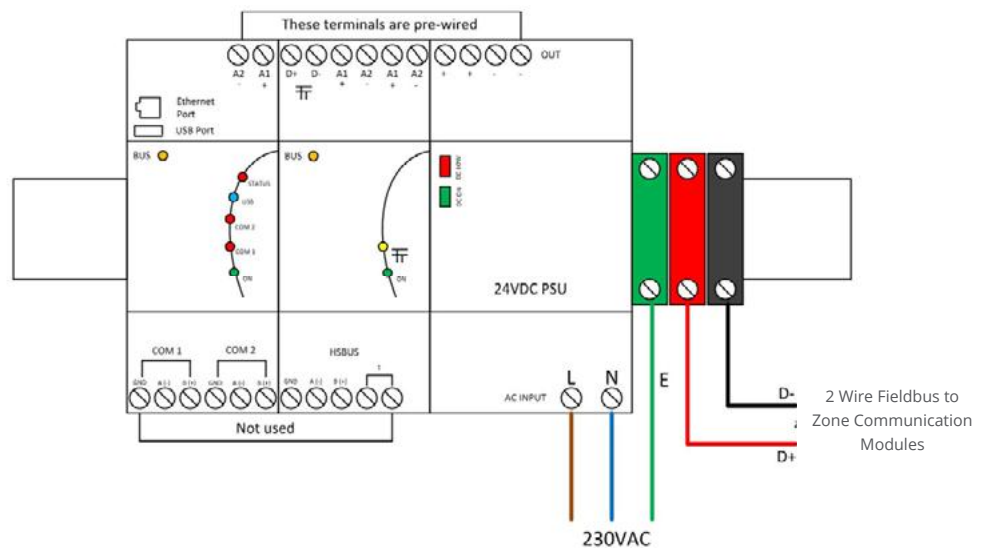
- Do not connect any of the wires to other voltage potentials.
- Do not connect any of the wires to protective earth (PE).
- Do not parallel any wires to increase the square of the cores.

**L. CONNECTING POWER AND FIELDBUS NETWORK**

- Pass the power cable through the knock-out/adaptor/bushing if fitted.
- Connect the power supply wires to the terminals as shown in the diagram below.
- The electrical supply should be fused at no more than 3 amps via an un-switched fused spur adjacent to the panel.
- The 2 wire fieldbus network cabling is wired into the D+ and D- terminals as shown in the diagram below.

The BACNet Gateway and Fieldbus Generator are supplied pre-wired. This cabling should not be removed or altered in any way.

**SINGLE PANEL WITH NO DECENTRALISED FIELDBUS GENERATORS**



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**SINGLE PANEL WITH DECENTRALISED FIELD BUS GENERATORS**

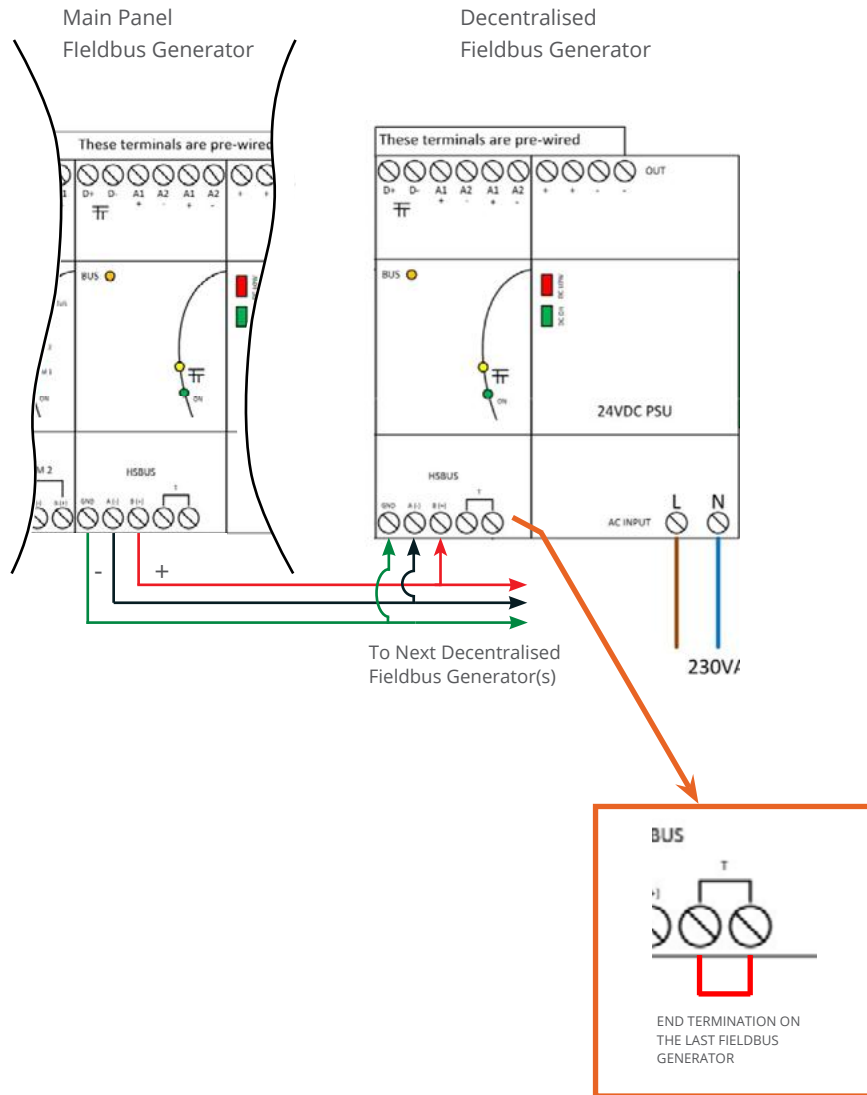


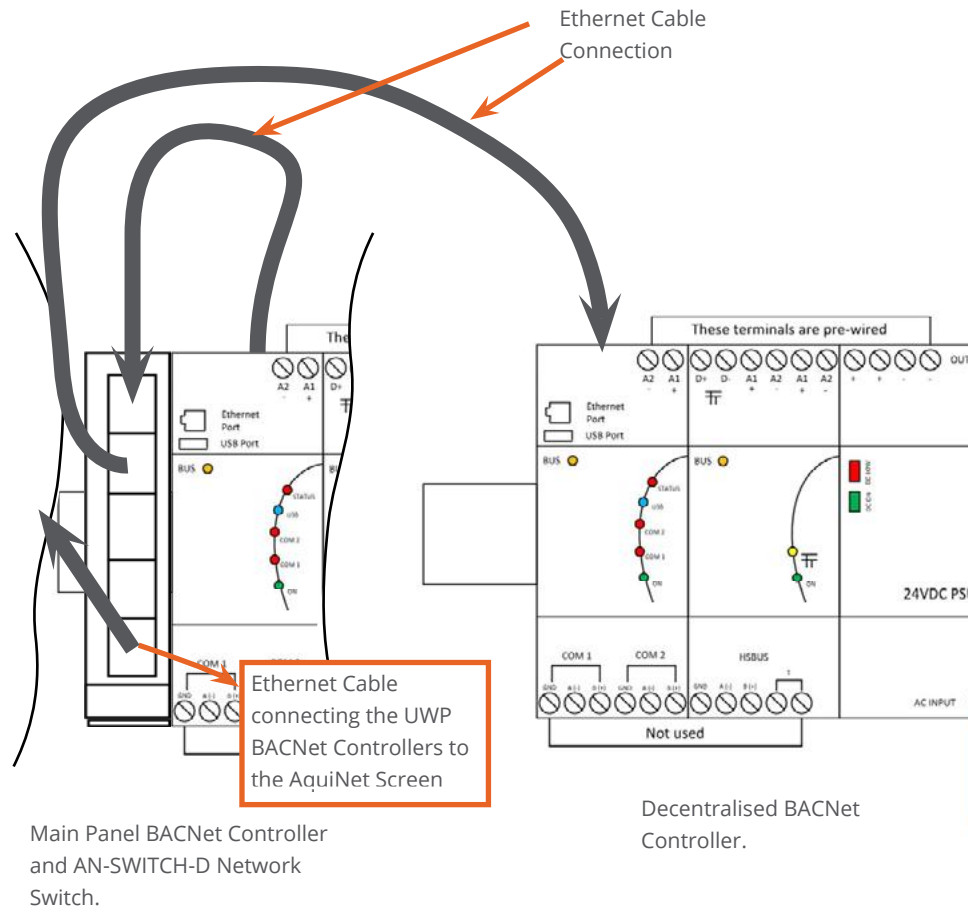
Figure i

Each Decentralised Fieldbus Generator requires its own fused spur power supply. The main panel and the decentralised generator(s) are connected in a daisy chain setting, the cable used should be for RS-485 networks and should be a 2 core screened, where the screen acts as a ground. Please follow modbus cable restrictions for this cable (1200m maximum length).

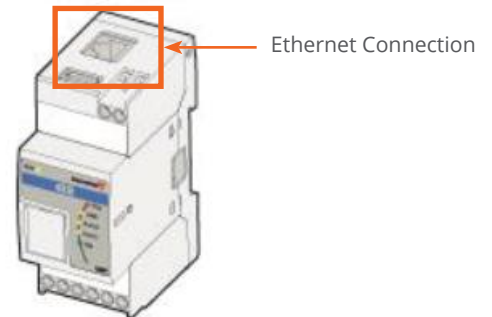
**Please note that Terminals T must be short-circuited in the last module of the network as shown in Figure i.**

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**SINGLE PANEL WITH DECENTRALISED BACNET CONTROLLER(S)**



Each decentralised BACNet controller requires its own fused spur power supply. The BACNet controller will have a Fieldbus Generator installed. The main panel and the decentralised BACNet Generators are both connected via Ethernet Cable, please follow Ethernet cable length rules for decentralised BACNet controller installation distances. The Ethernet port on the UWP BACNet controller is shown in the adjacent image.





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### N. UWP TOOL - MODULE CONFIGURATION

Once all the modules on the network have been wired and connected to the AquiNet panel, the UWP software tool can be used to discover the modules to check if all the wiring is correct.

#### SOFTWARE

- Contact Aquilar for the latest version of the UWP Tool.

#### TOOLS REQUIRED

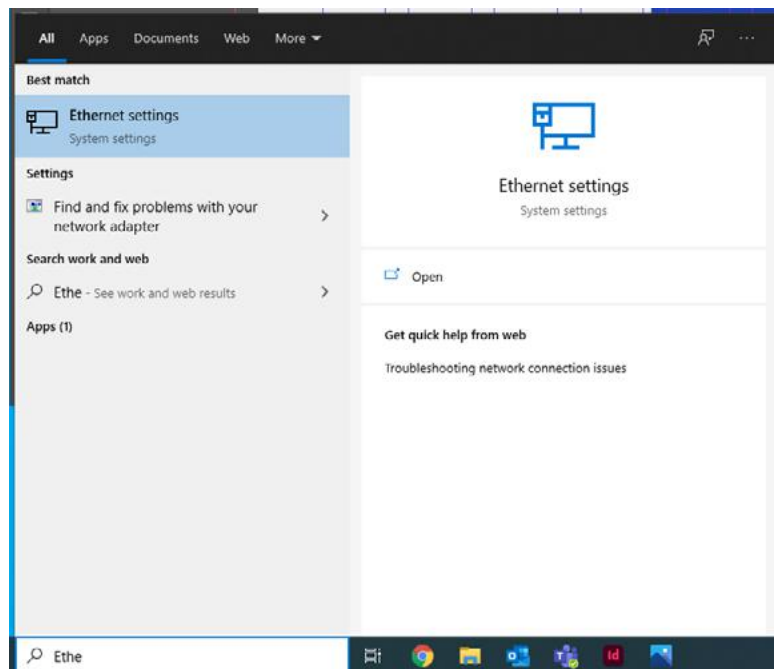
- Laptop running Windows, an Ethernet patch lead or a USB A to USB mini B cable
- Small flat head screw driver

Once installed, launch the program.

The configuration will load and display the list of all modules associated with the UWP Tool. If multiple UWP Controllers are used, ensure you are connected to the correct unit associated with the configuration file loaded.

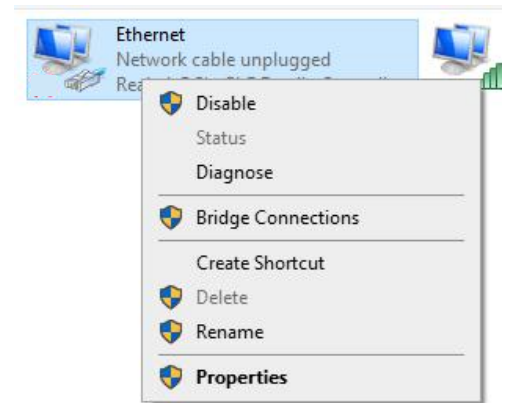
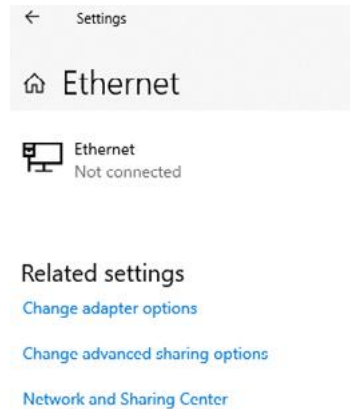
### TWO METHODS TO CONNECT TO THE UWP GATEWAY

**Method A Ethernet Connection:** - If using a laptop to connect to the UWP Gateway you may need to configure your network adaptor to enable communication. If this is necessary please follow the instructions below.



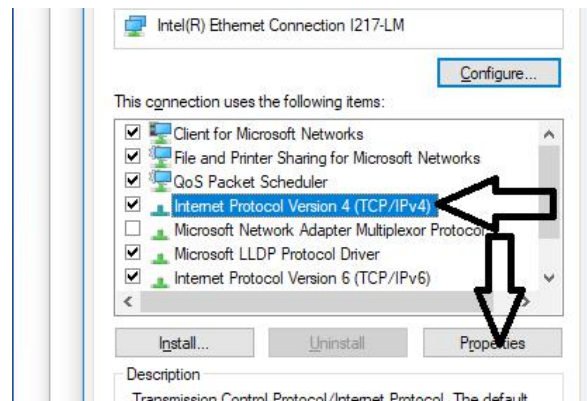
Search for 'Ethernet Settings' in Windows search, select Ethernet Settings from the left hand column 'Best Match'.

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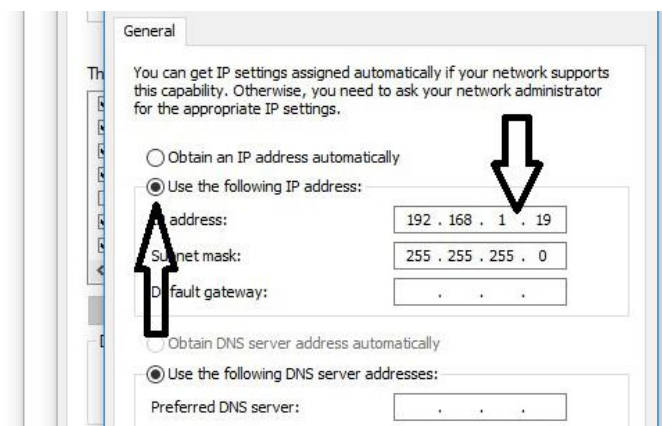


Select 'Change Adapter options'.

Right Click on your Ethernet Network Device where the UWP Gateway is plugged into and select Properties.



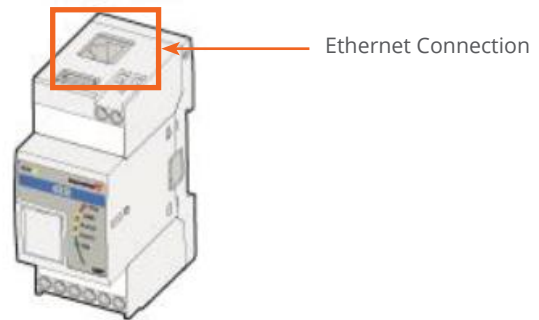
On the pop-up screen highlight 'Internet Protocol Version 4 (TCP/IPv4)' then click properties.



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Change the setting from obtain an IP address automatically, to use the following IP address. Enter an IP in the same range as the UWP gateway controller, for standard settings we recommend 192.168.1.19. Click ok (the subnet mask will self populate).

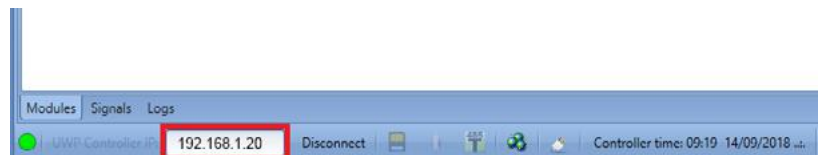
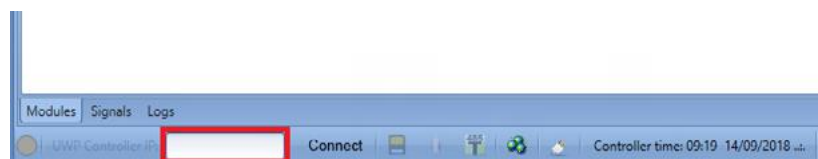
Connect a Ethernet patch lead from the computer into the Ethernet port of the UWP Gateway Controller. You may have to remove the Ethernet lead connecting the AquiNet touch screen to the UWP Gateway.



After a power on, the UWP Gateway master unit is ready to work after about 1 minute. Only when the yellow BUS Led starts flashing the master unit is ready.

At the bottom left of the window, type in the IP address of the UWP Gateway you are connecting to. The default for most configurations is 192.168.1.20. Aquilar will provide information if a different configuration is used.


Click connect and if a successful connection is made, the grey circle will turn green and the status light as shown below, on the UWP Gateway Controller will flash red.

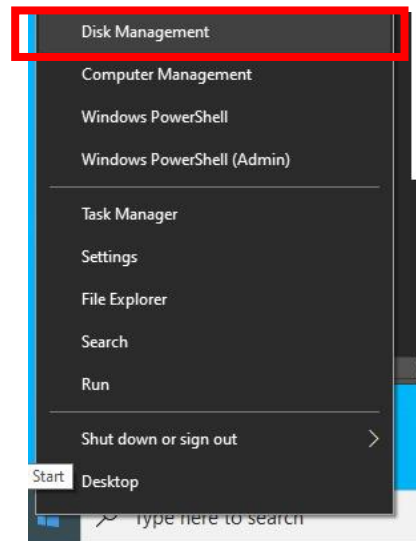


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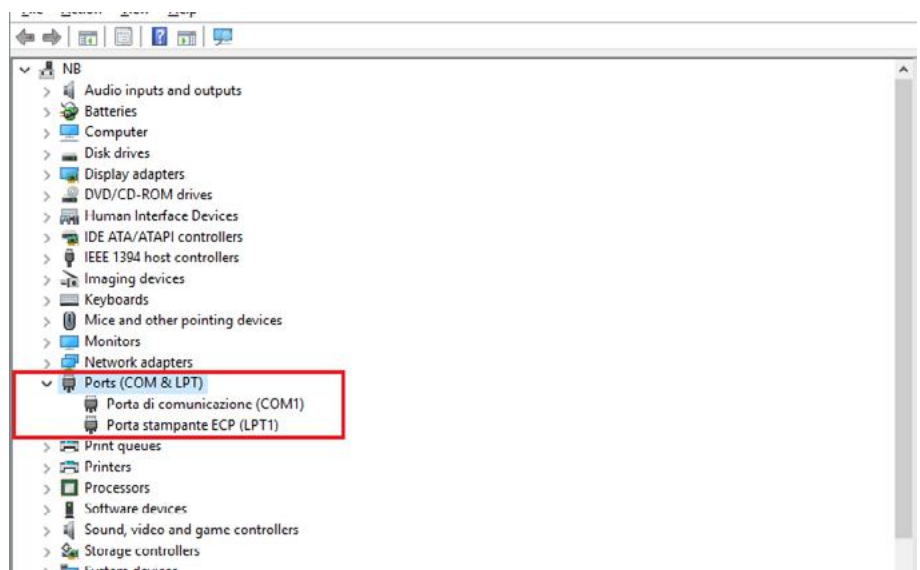
### Method B USB Connection:

#### INSTALLING THE USB DRIVER

1. Open Windows 10 Control Panel by right-clicking on the Start button  and click on Device Manager.

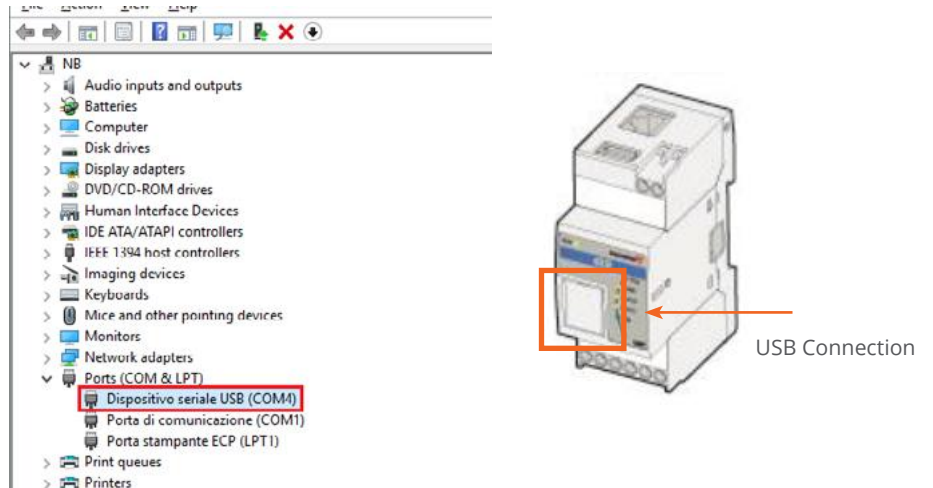


2. Before connecting the mini-USB cable to the PC and to the UWP 3.0 controller, in the list of hardware categories double-click on the category Ports (COM & LPT) and take note of the serial communication (COM) ports in use. In the example shown below, the only serial communication port is COM1.

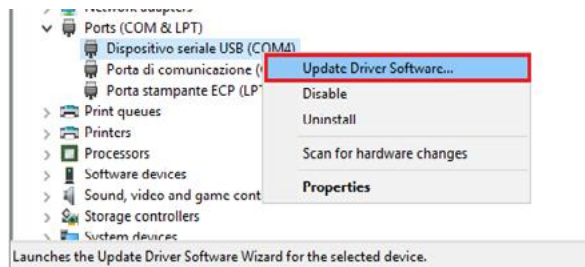


## AquiNet Fieldbus Network System

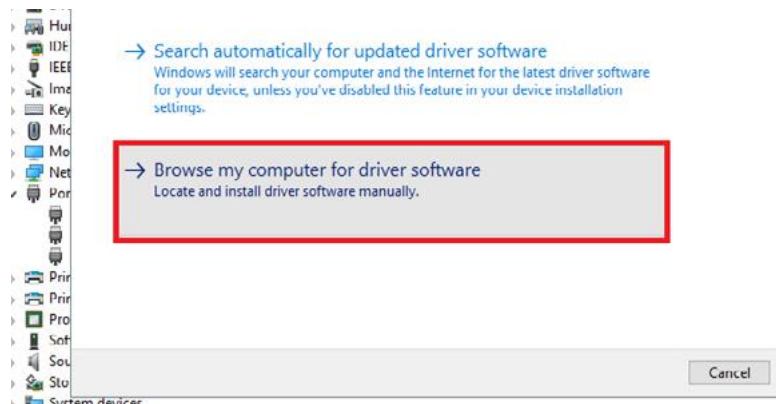
3. Plug the mini-USB cable into the PC and into the UWP 3.0 controller, using a small flat head screw driver open the small door on the UWP Gateway shown in the image below. A new serial communication port (COMx) will automatically be added after a few seconds. In the example shown below the new port added is COM4.



4. Right-click on the device and select Update Driver Software...

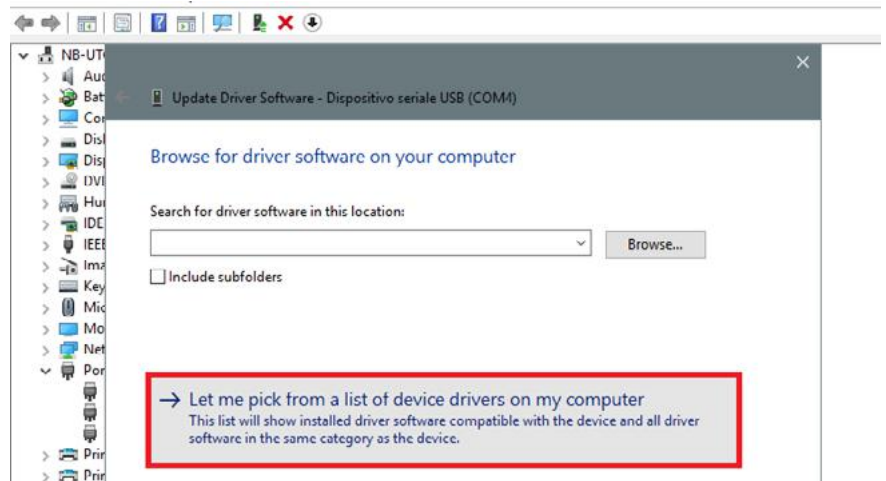


5. In the pop-up window, select the second option, Browse my computer for driver software

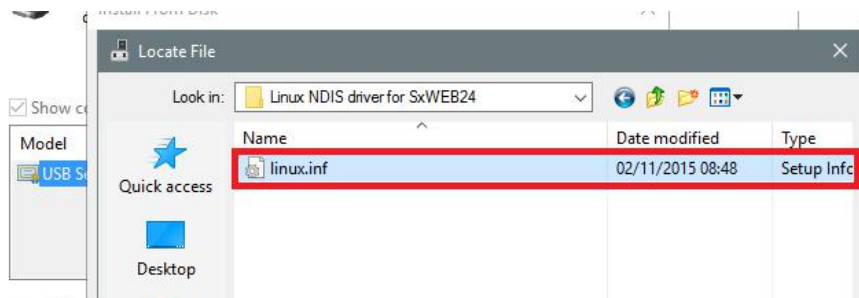


## AquiNet Fieldbus Network System

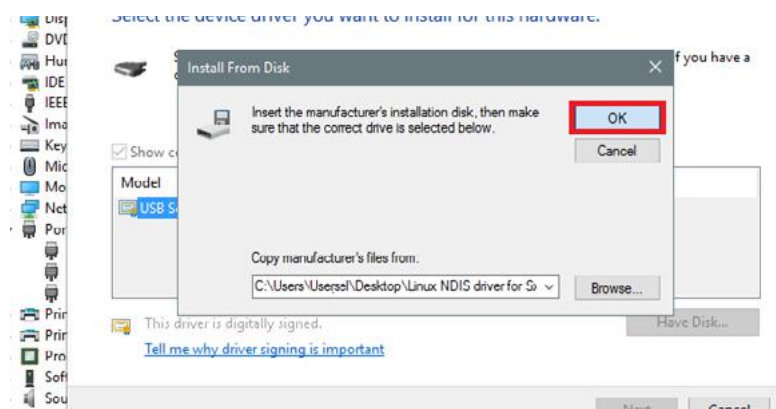
6. In the next page, select the option Let me pick from a list of device drivers on my computer



7. Browse for the linux.inf file, save it in the PC and press Open

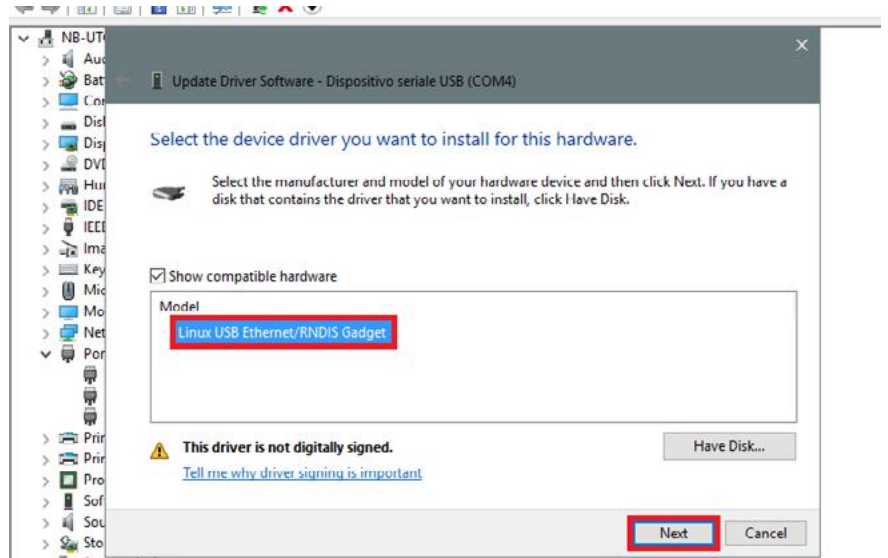


8. Press OK in the next window, as shown in the picture below



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9. The Linux USB Ethernet/RNDIS Gadget is ready to be installed. Click on Next to continue the installation.




Follow the instructions below to disable driver signature enforcement ONLY if the user gets the error shown in the picture below, otherwise go to step 11.

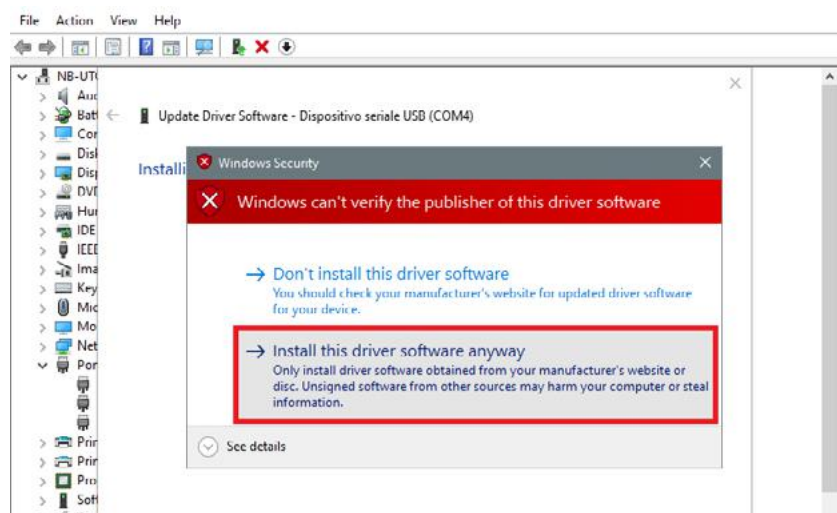


Windows 10 enforces driver signatures by default. This can be disabled to install drivers that are not digitally signed. Please refer to the following steps to disable driver signature enforcement.

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1. Click the **Start**  menu and select **Settings**.
2. Click **Update and Security**.
3. Click on **Recovery**.
4. Click **Restart** now under **Advanced Startup**.
5. Click **Troubleshoot**.
6. Click **Advanced options**.
7. Click **Startup Settings**.
8. Click on **Restart**.
9. On the Startup Settings screen press 7 or F7 to disable driver signature enforcement.
10. The computer will restart and the user will be able to install non-digitially signed drivers.

**10. N.B. Windows 10 does not detect the Digital signature, so to install the driver correctly, click on Install this driver software anyway.**



11. When the driver has been installed, in the Network adapter category a virtual network board named Linux USB Ethernet/ RNDIS Gadget #2 will be added, as shown in the picture below.



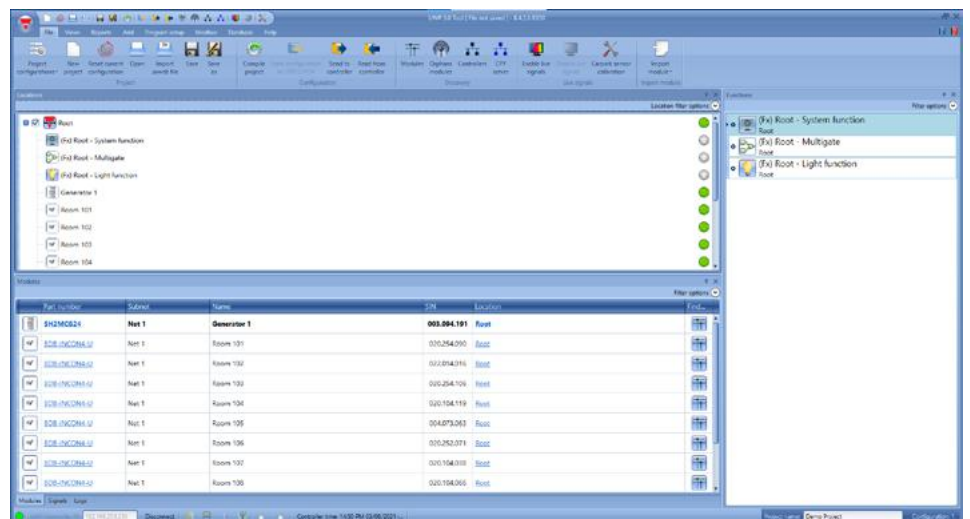
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### IMPORTANT

If the PC is running the Windows Firewall or a Third party Firewall / Antivirus, make sure that the ports 48007, 10000, 10001 are not blocked (input/output packets). These ports are used by the UWP Tool to search for the master unit in the network and for communication. If a firewall blocks these ports, the UWP Tool will not be able to find the controllers in the network or to use the Live Signals.

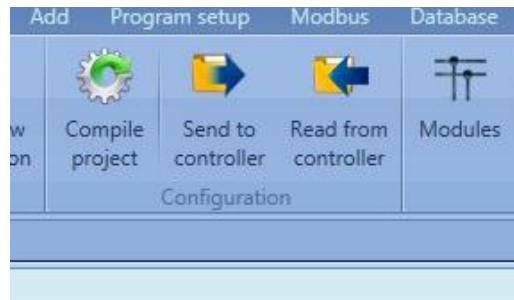
Aquilar will provide a configuration file associated with the project. This will contain details of all the modules on the network and have all the instance numbers pre-configured. This should be saved to an accessible folder on the machine used to carry out the system programming.

To open the config file for your project press open. This will open a browser window. Navigate to the location of your previously saved UWP Tool config file, select it and click open.

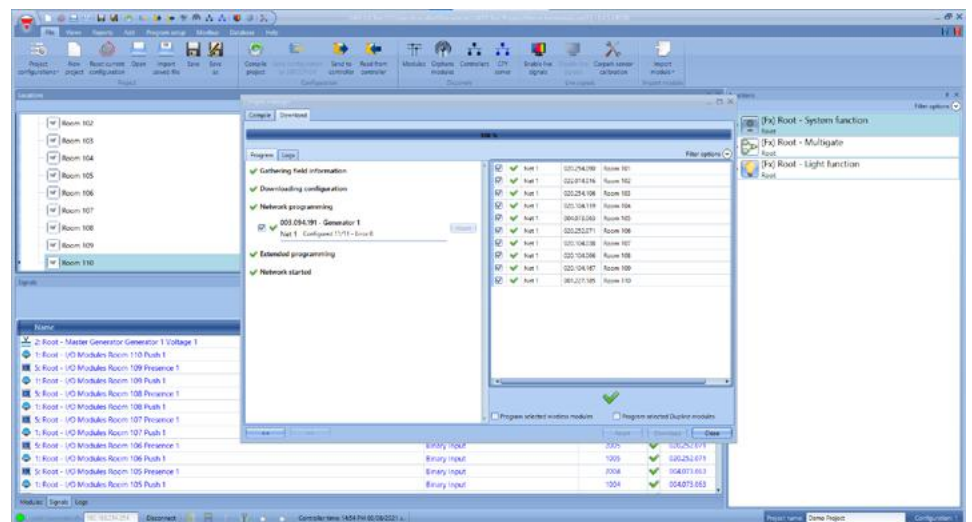


This will load the file for your project into the software. In the lower screen you should see a list of all the modules on your system. If correctly loaded you will see the correct name in the 'Project name:' box

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Click "Send to controller" from the file menu. (if this button is greyed out then the PC is not connected to a gateway). This will open the compile manager window, start the network and send the programme to the system via the gateway. Once complete you should see a window as below with all green ticks and no errors.



**IMPORTANT : MOST OF THE PANELS ARE SHIPPED WITH THE CONFIGURATION PRE-LOADED AND THE SYSTEM MAY FUNCTION ON POWER UP IF ALL WIRING IS CORRECT.**

If there are any errors, check the fieldbus dupline wiring for possible cross overs, loose connections or short circuits.

Once any dupline network wiring issues have been corrected press send to controller again. Please be aware that by default the software will only configure modules not found on the previous download attempts.

Refit the Ethernet cable (if this was used to connect to a PC) linking the touch screen to the UWP Gateway Controller. The 'sensor status' page on the touch screen should now register all the sensors as 'OK' next to the room and communications for each module. Depending on the size of system this may take several minutes to complete.

The system will now be monitoring for leaks.

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**CHANGING AN-ZCM ZONE CONTROL MODULES**

If an AN-ZCM is changed on site for any reason then the SIN number must also be changed in the configuration software.

Name	SIN	Location
<b>K1 SH2MCG24</b>	<b>001.192.193</b>	<b>Root</b>
K2 BDB-INCON4-U	020.104.119	<a href="#">Root</a>
K3 BDB-INCON4-U	020.104.167	<a href="#">Root</a>
K4 BDB-INCON4-U	020.104.038	<a href="#">Root</a>
K5 BDB-INCON4-U	020.104.066	<a href="#">Root</a>
K6 BDB-INCON4-U	001.227.185	<a href="#">Root</a>
K7 BDB-INCON4-U	020.195.186	<a href="#">Root</a>



Find the module that has been removed and enter the new modules SIN number.



The new modules SIN number can be found on the side of the module.

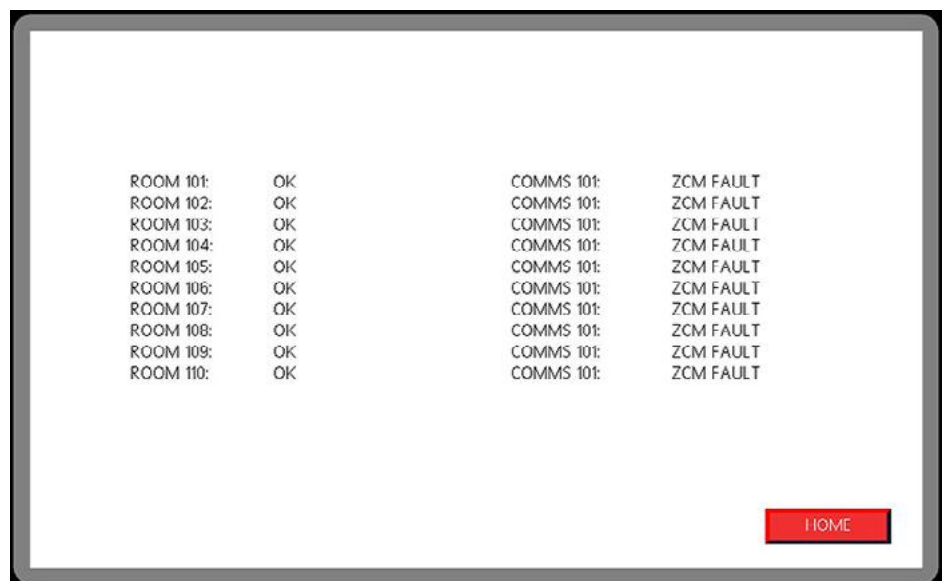
Save as a new or overwrite the existing configuration and then send to controller to allow the system to find the new module.

**P. USING THE GRAPHICAL USER INTERFACE**

The GUI is supplied bespoke for the project containing information relevant only to the project. An example of the interface as follows –

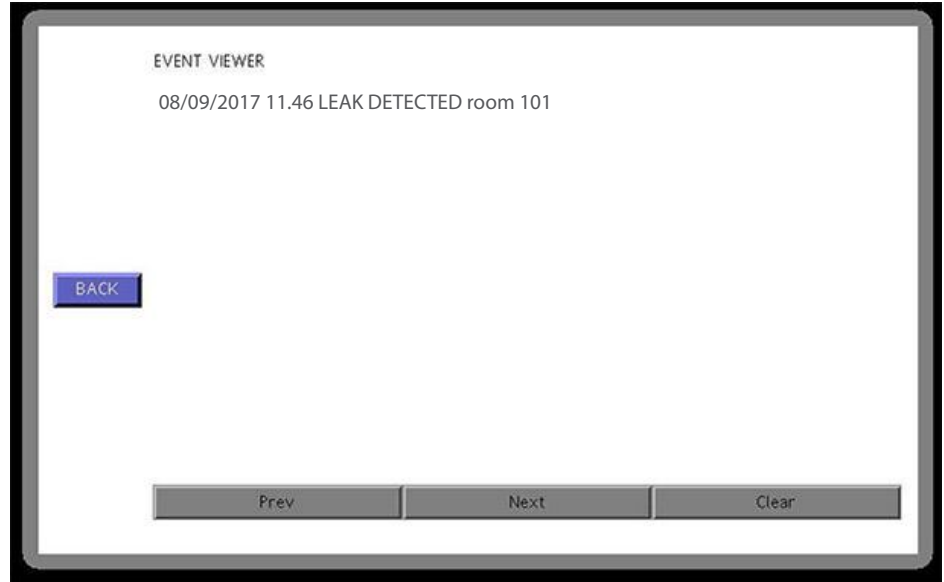


Home screen displays general status and buttons for access to other pages.



Page showing status of all sensors.

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