Engineering Note: EN0119 Remote Connection to Hydronix Control Systems via a Cellular Router

Summary:	A procedure detailing how to use a Cellular Router to connect remotely to a Hydro-Control (HC07), Hydro-View (HV05) or Hydro-Hub (HH01) that does not have a local internet connection available.
Products affected:	Hydro-Control (HC07), Hydro-Hub (HH01), Hydro-View (HV05)
Revision Date:	13/06/2025 Author: Colin Bury

1 Introduction

There are occasions when a Hydro-Control, Hydro-View or Hydro-Hub may be required to be installed in a remote location that does not have access to a local network connection. Alternatively, security policies may prevent these units from being connected to an organisation's network. While the Hydro-Control, Hydro-View or Hydro-Hub can function offline without issue, it is often desirable to be able to remotely manage the device from another location. One option to accomplish this is to use a Cellular Router in conjunction with a Virtual Private Network (VPN) to enable a direct connection between a remote PC and the Unit.

This Engineering Note provides an example of how to set up such a solution, using the InHand Networks IR302 Industrial LTE Router in conjunction with an OpenVPN based VPN server. While the exact steps detailed below will be different if using a device from another manufacturer, the principle of the set up should be similar.

2 Equipment

This example uses the InHand Networks IR302 Industrial LTE Router which has the following features:

WiFi: IEEE 802.1 1b/g/n, 150Mbps

4G LTE Cellular Modem

2x 100Mbps Ethernet Ports (1 LAN port and 1 port that can be configured as either WAN or LAN)

Dual SIM slots (supports automatic failover)

Power Supply: 9 – 36VDC (Nominally 24V)

DIN Rail mount

2x SMA Antennas (WIFI & 4G)

2x GPIOs (can be configured as RS232)

Built in VPN (OpenVPN & WireGuard)

https://inhandgo.com/products/inrouter300-lte-cellular-routers

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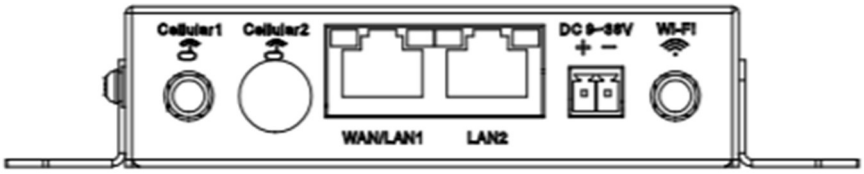
Other equipment required:

- Hydro-Control (HC07), Hydro-View (HV05) or Hydro-Hub (HH01)
- SIM card with appropriate, activated data plan
- Cat 5 or 6 ethernet cable (x2)
- Virtual Private Network (VPN) service
- Windows PC

3 Hardware Setup



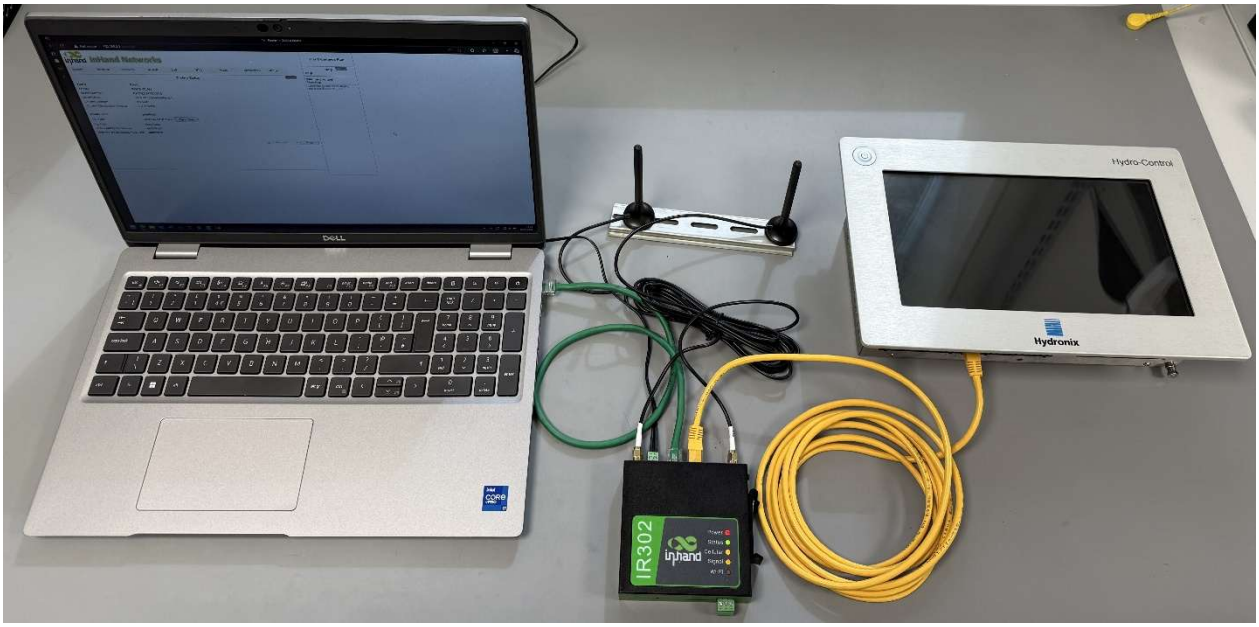
Detail of the InHand IR302 Router ports.

Attach the antenna marked “WIFI” to the WiFi SMA port and the antenna marked “4G” to the Cellular 1 SMA port.

Connect an ethernet cable from the PC to the LAN2 port on the Router.

Connect an ethernet cable from the Hydro-Control or Hydro-View to the WAN/LAN1 port.

Connect the 24V supply to the 9-36V DC power input.



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Fit the activated SIM card into Slot 1 of the SIM card holder and insert into the Router.

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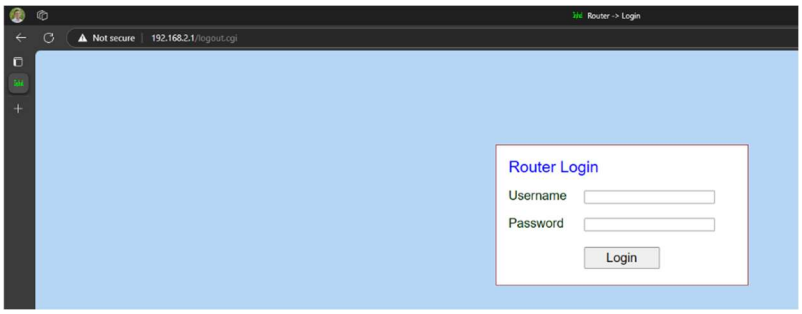
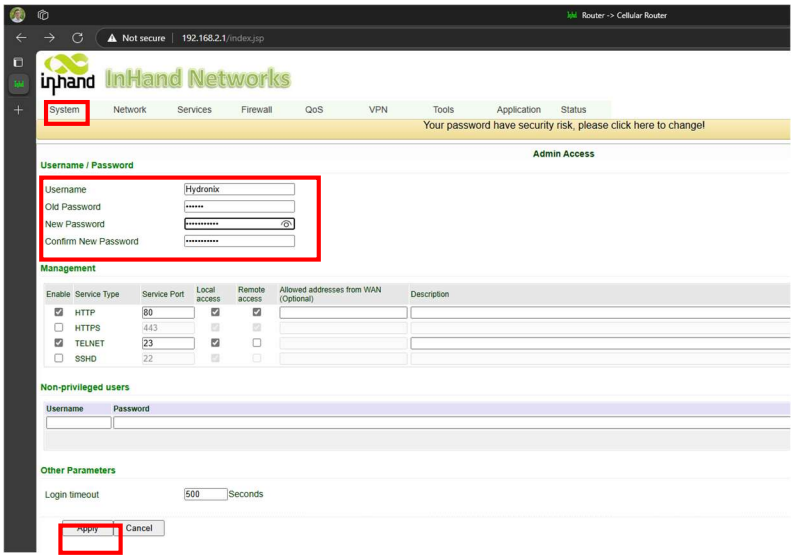
4 Initial Router Setup

On the PC, open a browser window and navigate to IP address **192.168.2.1**

At the login screen, enter the default username/password: **adm/123456**

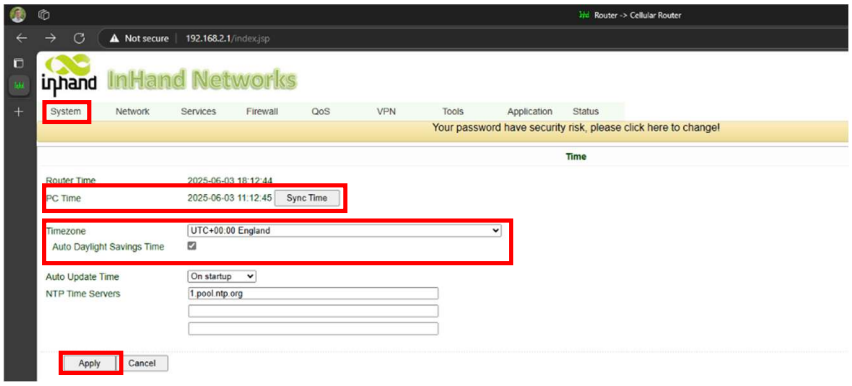


It is recommended that these credentials are changed. This can be done by selecting **System > Admin Access** from the top menu bar and entering a new Username and Password in the appropriate fields, followed by clicking the “Apply” button.



Log back in to the router with the new Username and Password.

The correct time zone and time should also be set by selecting **System > Time** from the top menu, then selecting the time zone from the drop-down list, checking the “Auto Daylight Saving Time” option and clicking on the “Apply” button. After this click on the “Sync Time” button to sync the PC’s time to the Router.



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4.1 Cellular Network Settings

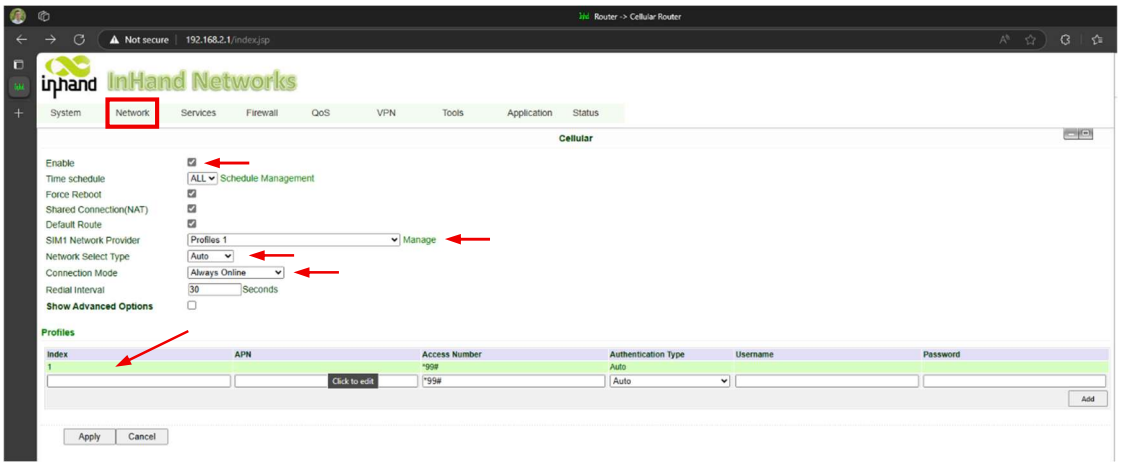
Setting up the Cellular connection, requires the following information about the SIM card: Access Point Name (APN), Access Number (typically the country dialling code, entered in the form "*xx#" where xx is the country code), Authentication Type (typically Auto), Username and Password. This information can be obtained from the SIM card provider.

For the purposes of this example, we are using a Vodafone Pay-As-You-Go SIM in the UK:

APN:	pp.vodafone.co.uk
Access Number:	*44#
Authentication Type:	Auto
Username:	wap
Password:	wap

Select **Network > Cellular** from the top menu. Check the "Enable" box, and in the drop-down next to "SIM1 Network Provider", select "Profiles 1".

Set "Network Select Type" to "Auto" and "Connection Mode" to "Always Online" from their respective drop-downs.



Next, click on the line "Index 1", below the "Profiles" heading to edit it and fill in the information listed above. Click on the "OK" and then "Apply" buttons to safe the information.

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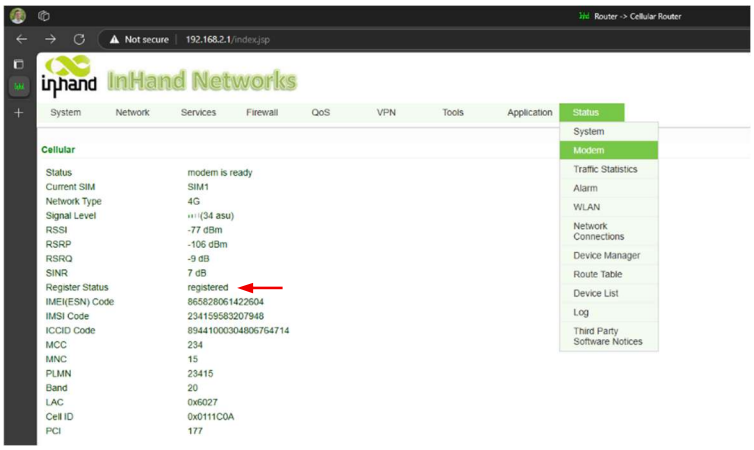
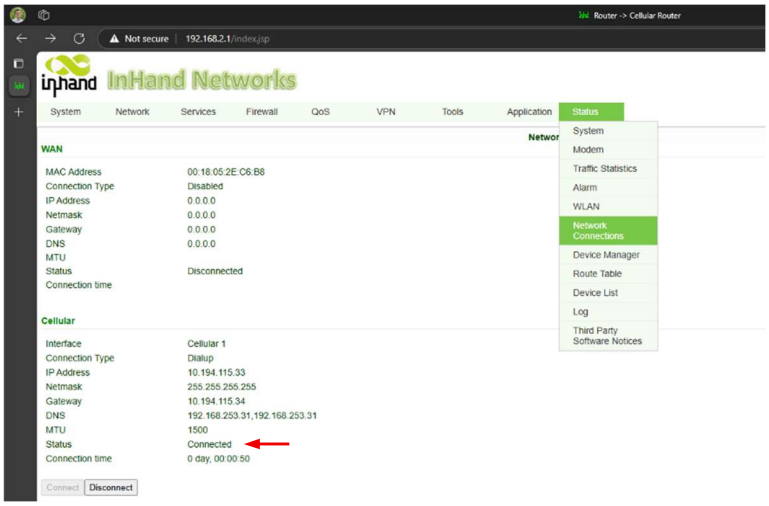
After a few minutes, the Router should now be connected to the Cellular network. The status of the Cellular connection can be seen by selecting **Status > Modem** from the top menu, it should look similar to the image below. “Register Status” should show as “registered” if the SIM card has been correctly authenticated.



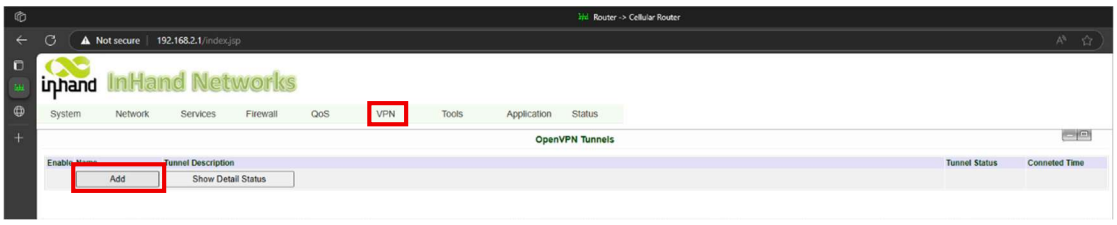
The status of the Network connection can be seen by selecting **Status > Network Connections**. Under the “Cellular” heading “Status” should show as “Connected”.



4.2 VPN Settings

Setting up the VPN connection will require an OpenVPN configuration file (e.g. config.ovpn). This file should be provided by the VPN administrator.

Select **VPN > OpenVPN Tunnels** from the top menu. On the “OpenVPN Tunnels” page, click on “Add” to create a new tunnel.



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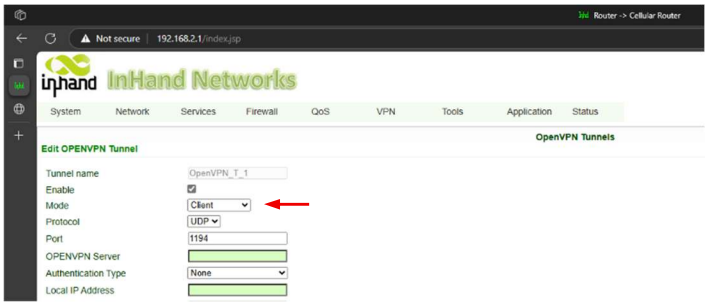
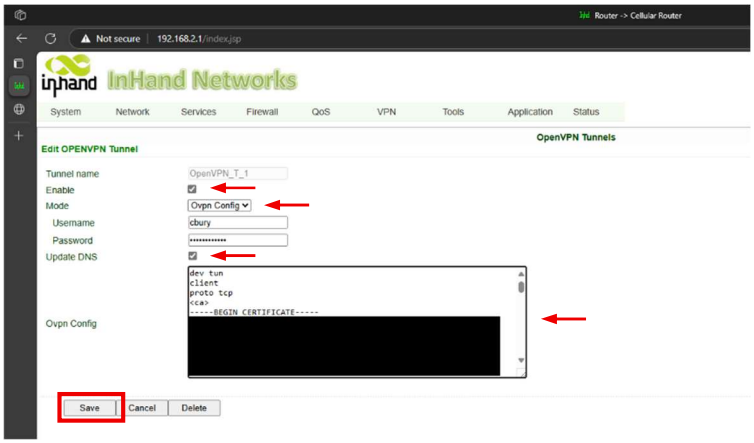
Click on the “Mode” drop-down and change this from “Client” to “Ovpn Config”.

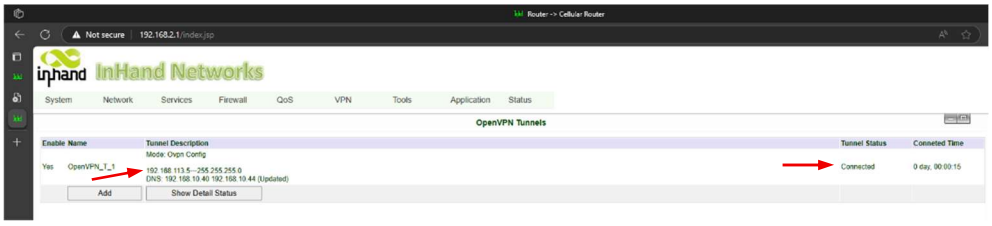


On this screen enter the Username and Password for the VPN and check “Enable” and “Update DNS”. Note that the Tunnel name is automatically created as “OpenVPN_T_1”.

Open the aforementioned OpenVPN configuration file in a text editor, then Copy and Paste the contents from this file to the box labelled “Ovpn Config”.



Click the “Save” button. After a few seconds, the “Tunnel Status” should show as “Connected”. Note and record the IP address of the connection in the “Tunnel Description” as this will be required later to connect remotely.



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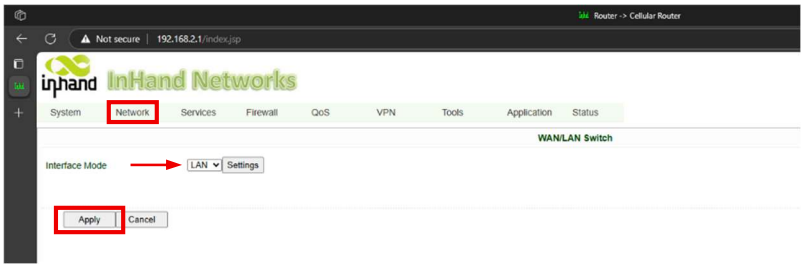
5 Connecting a Hydro-Control, Hydro-View or Hydro-Hub

If not already done so, the Hydro-Control, Hydro-View or Hydro-Hub should now be connected to the Router using an ethernet cable. Connect this cable to the WAN/LAN1 port.

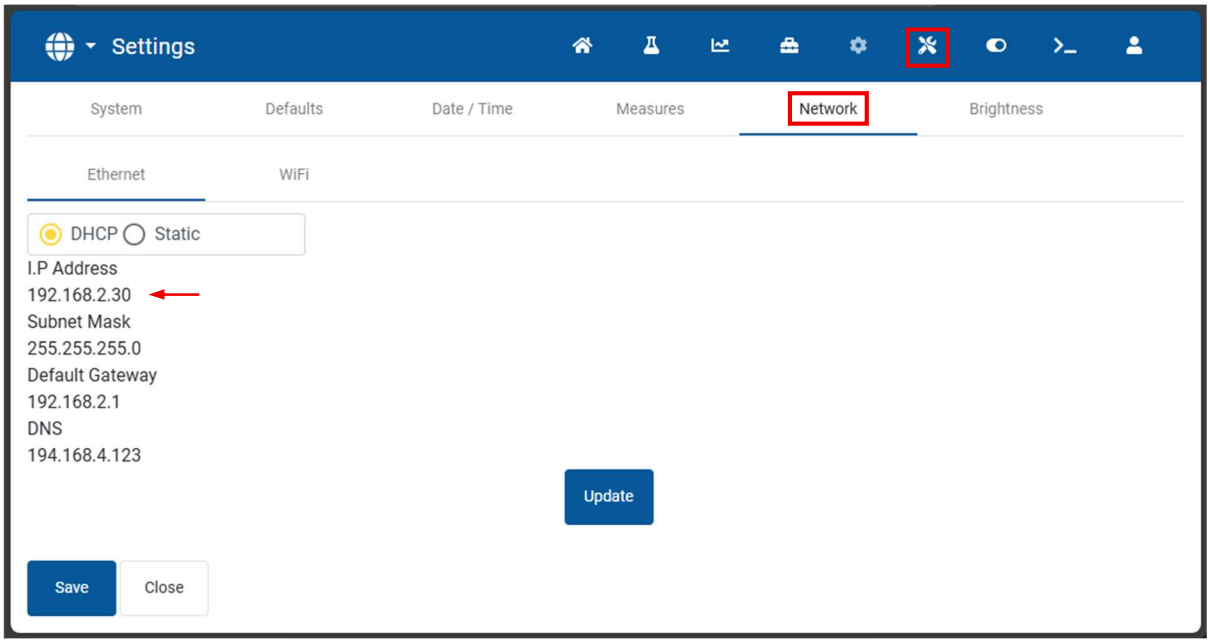
Select **Network > WAN/LAN Switch** from the top menu and select the LAN option from the Interface Mode drop-down, then click the “Apply” button.



5.1 Static DHCP Settings

To ensure that the Hydro-Control, Hydro-View or Hydro-Hub is always allocated the same IP address by the Router, it is necessary to set up a Static DHCP

On the Hydro-Control, navigate to the Settings screen and tap on the Network tab. Take note of the Network IP Address.



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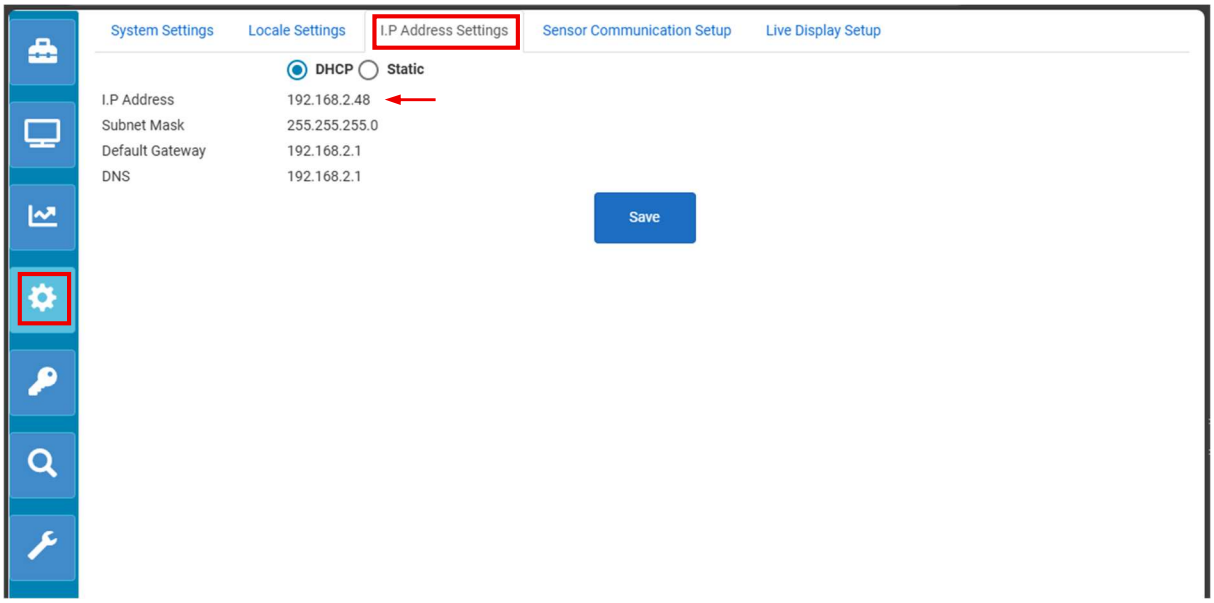
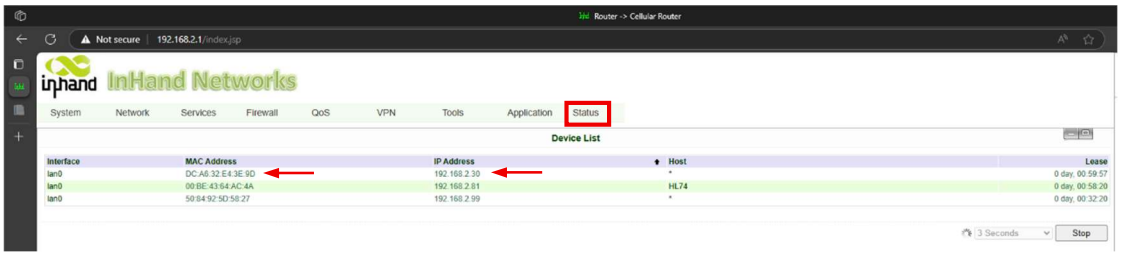
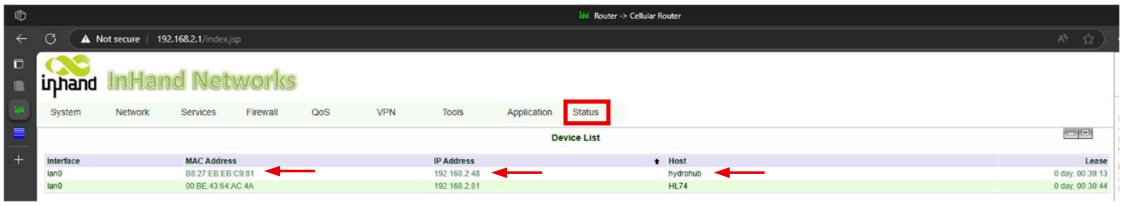
On the Hydro-View, log in as an Engineer and navigate to the “Settings” screen and tap on the “I.P Address” Settings tab. Take note of the IP address.



Back on the PC select **Status > Device List** from the top menu to display a list of the connected devices. There should be an entry with the IP address of the unit. Take note of the corresponding MAC address in the box to the left.



If using a Hydro-Hub (HH01), navigate directly to the **Status > Device List** screen. It may not be obvious at first which is the correct IP address for the device as the PC will also be listed here. The hostname should say “hydrohub”, but it may sometimes be blank. To check which is correct IP address, open a new browser window on the PC and navigate to the suspected IP address, port 5000 (e.g. http://192.168.2.48:5000). If the Hydro-Hub interface loads, that is the correct IP address. Take note of this address and the associated MAC address.



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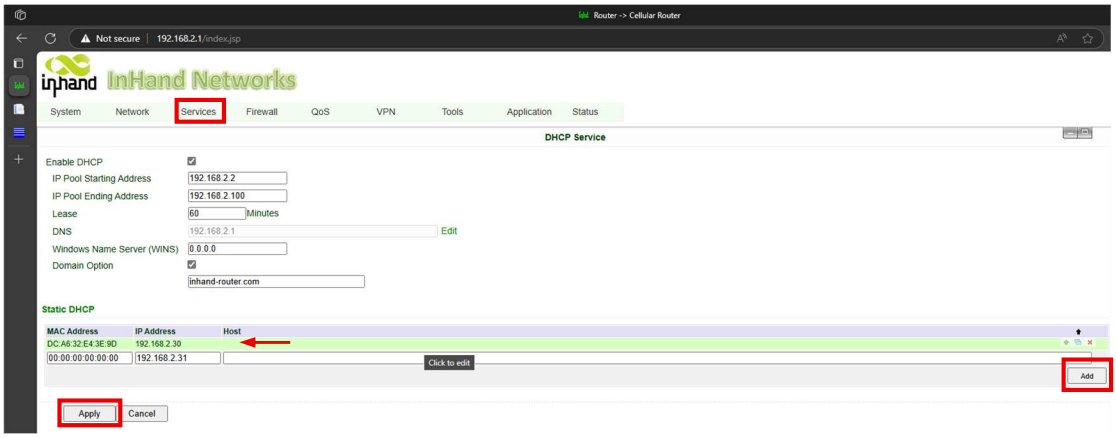
Next, select **Services > DHCP Service** from the top menu. On the line below the Static DHCP heading, fill in the MAC address and IP address noted above. Click on the “Add” button, followed by the “Apply” button.



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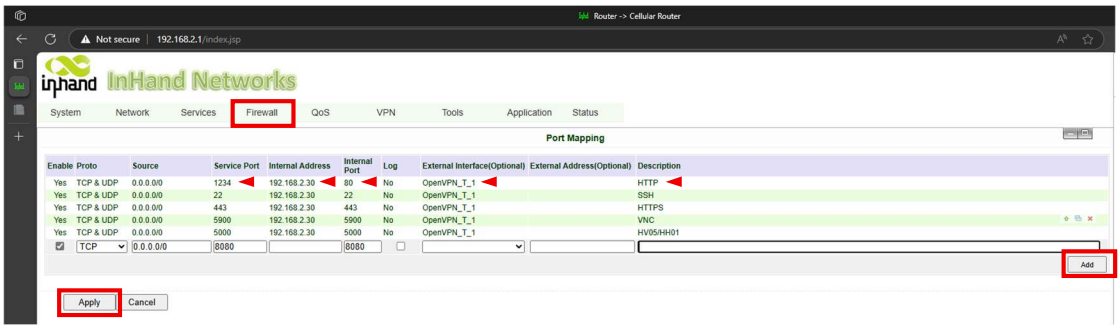
5.2 Firewall Settings

In order to access the Hydro-Control, Hydro-View or Hydro-Hub remotely, it is necessary to map the ports from the external connection to the internal IP address. This guide will map the ports required for HTTP* (1234), HTTPS (443), SSH (22), VNC (5900) and Hydro-View/Hydro-Hub (5000) connections. Depending on requirements, it may not be necessary to enable all of these.

Select **Firewall > Port Mapping** from the top menu. Enter the details for each one as shown below, clicking on the "Add" button after each line. Each entry should be set up as follows:

Enable:	Checked
Proto:	TCP & UDP
Source:	0.0.0.0/0
Service Port:	The external port as noted above
Internal Address:	The IP address as shown on the Hydro-Control or Hydro-View
Internal Port:	The internal port, usually the same as external (except port 80)
Log:	No
External Interface:	OpenVPN_T_1
Description:	As shown below

When all have been added, click on the "Apply" button.



The Router setup is now complete. The PC can now be disconnected from the Router.

** Note for the HTTP connection, a different external port number must be used as port 80 will be sent to the Router's setup screen. This example uses port 1234 for the external port.*

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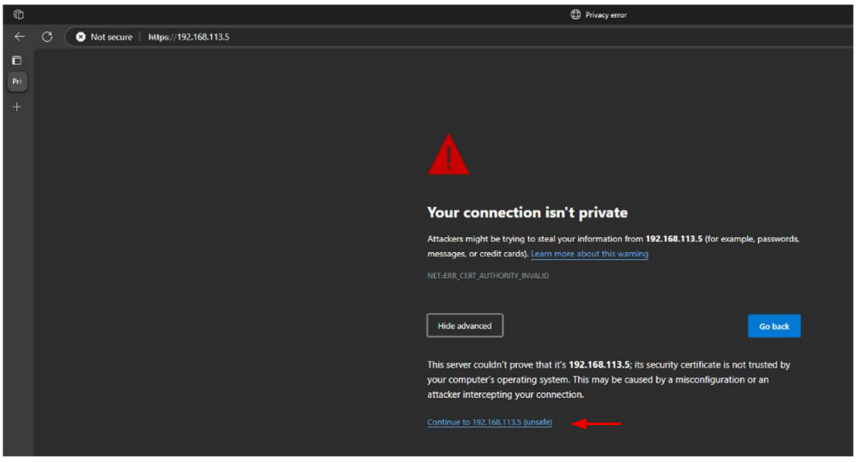
6 Connecting remotely via the VPN

With the Hydro-Control, Hydro-View or Hydro-Hub now connected to the VPN via the Router, it is now possible to connect to it from a remote PC.

Connect the remote PC to the same VPN as used to set up the Router. In browser window, navigate to the IP address noted in step 4.2 and port 1234 as set up in section 5.2. For this example, that would be:

http://192.168.113.5:1234 (For a Hydro-View or Hydro-Hub, the port will be :5000)

If warning is displayed regarding an insecure connection, click on “Advanced” followed by “Continue to 192.168.3.5 (unsafe)”



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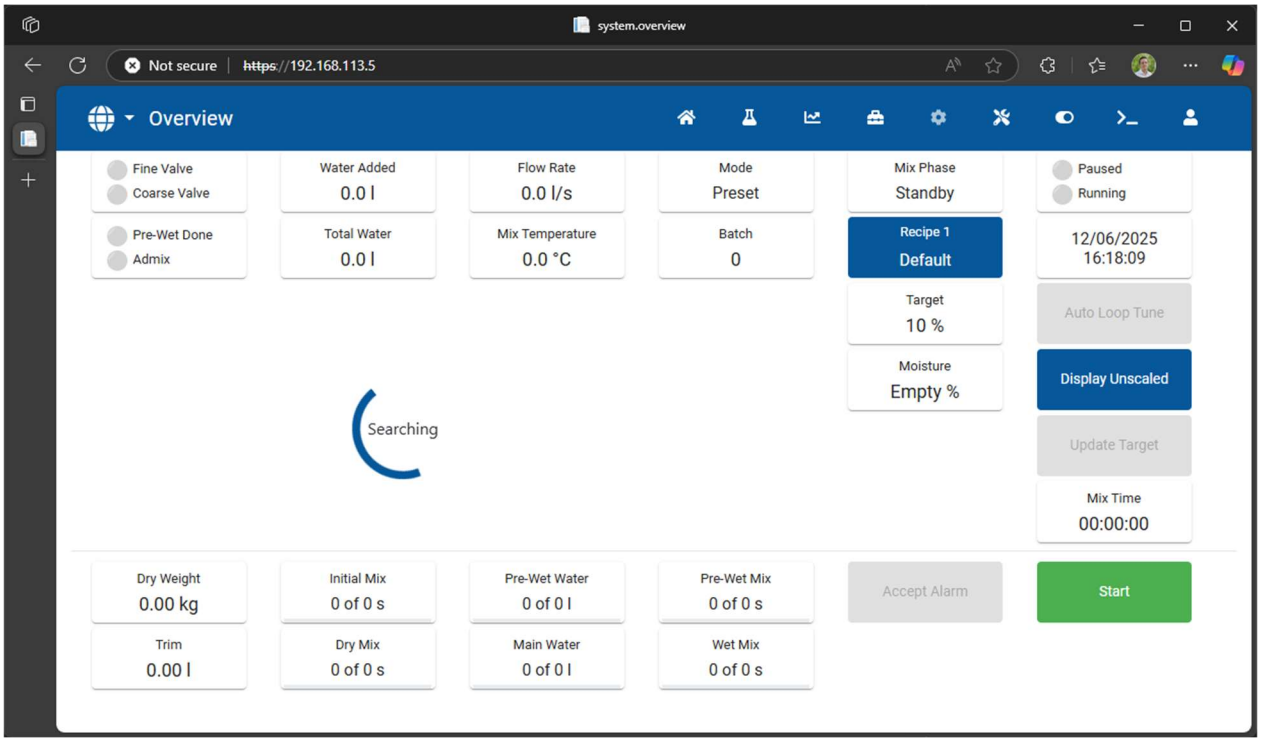
If everything has been set up correctly as per this document, the Hydro-Control, Hydro-View or Hydro-Hub interface will now be displayed in the browser window. Similarly, a VNC connection can now be established using port 5900.



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