Omni Vaisala Interface

INSTALLATION INSTRUCTIONS

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Document Management

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Revision History

Version Number	Date	Summary of Changes
1.0	September 2018	Initial Document Release.
2.0	March 2019	OmniWeb Vaisala BACnet Controller renamed to Omni Vaisala Interface.

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Omni Vaisala Interface

INSTALLATION INSTRUCTIONS

1 Preliminary Information

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1-1 Introduction

This manual is intended to provide qualified technical personnel with complete and easy-to-follow instructions for the installation and commissioning of the Innotech Omni Vaisala Interface (OMWEB02).

Although the intent of this manual is to simplify the installation task, instructions contained in this manual are based on the assumption that installation will be accomplished by technically qualified personnel. Also, these instructions assume that installation personnel are familiar with local regulations, codes and safety requirements.

Throughout this manual there are icons to illustrate notes and points of caution, as illustrated below:

These notices indicate a piece of useful information which should be read.

IMPORTANT

*These notices contain information about the software that **must be done** before proceeding further to ensure success.*

CAUTION

*These notices contain critical information, which **MUST** be read. Ignoring instructions in these notices could result in damage to person or device.*

1-1.1 Systems Covered by this Manual

Systems are intended for use in a variety of applications, the systems are designed on a modular basis. This flexible system provides the most economical and efficient means of adapting the system to the customer's specific requirements.

This document provides instructions to connection & configuration of a Vaisala Weather Transmitter and the OMWEB02.

It is recommended that installation personnel familiarise themselves with the information contained in this document.

The purpose of this manual is to provide clear and complete instructions for all phases of the installation of the device. In order to provide the clearest instructions possible with minimum confusion, instructions in this manual are based on the following approach:

- For simplicity of explanation, installation instructions in this manual are based on installations containing a single Omni device.
- Basic electrical wiring information is provided in the Electrical Installation chapter, and wiring instructions for network systems are contained in the Network Installation chapter.

1-1.2 Scope of this Technical Manual

This technical manual contains:

Table 1-1: Manual Scope

Chapter	Description
Chapter 1 - Preliminary Information	Contains installation related information of a general nature such as general safety considerations and pre-installation requirements.
Chapter 2 - Mechanical Installation	Contains instructions and related data to facilitate the mechanical installation the Omni. It also includes information such as physical descriptions of the units, mounting dimensions and mechanical installation guidelines.
Chapter 3 - Electrical Installation	Contains electrical wiring information useful for installation of a basic “standalone” system. Chapter 3 is augmented by network wiring information in Chapter 4 - Network Installation. Appropriate references are provided between Chapter 3 and Chapter 4 for installation of network wiring.
Chapter 4 - Network Installation	Provides detailed information for interconnecting various units in a network configuration. The two electrical installation areas: Chapter 3 and Chapter 4 are purposely separated from each other in the interest of clarity and to simplify the use of this manual.
Chapter 5 - Commissioning	Provides instructions for post-installation inspection and checking of the Omni, power application and initial setup of the device.

Unless specified, references to "Device", "Omni" and "OMWEB02" all refer to the Innotech Omni Vaisala Interface.

1-2 Specifications Table

Table 1-2: Specifications Table

Specification	OMWEB02
Processor Speed	800MHz
Non Volatile Memory	128KB
Real-time Clock	Yes
RS-485 Ports	2
Ethernet - 100BASE-T	2 (Port B unused)
USB-A (Host)	Yes
USB-Mini B (PC Link)	Yes
Status LED	Yes
Field Supply 24VDC	Yes
Web Server	Yes
Protocol Routing	Yes
8GB MicroSD for Logging	Yes

- *The real-time clock battery is user replaceable but should only be replaced by qualified Innotech service technicians or distributors. The battery is located in the expansion bay.*
- *The controller's MicroSD card also contains PDF documents. For the latest documents, visit www.innotech.com.*

1-2.1 Supported Vaisala Weather Transmitter Models

The OMWEB02 communicates directly with the Vaisala Weather Transmitter using a dedicated RS-485 channel.

For 'plug and play' communications, ensure to use the following order code when purchasing a Vaisala Weather Transmitter:

- WXT53X-C1XXXXXXXXX (Where "X" refers to factory options)

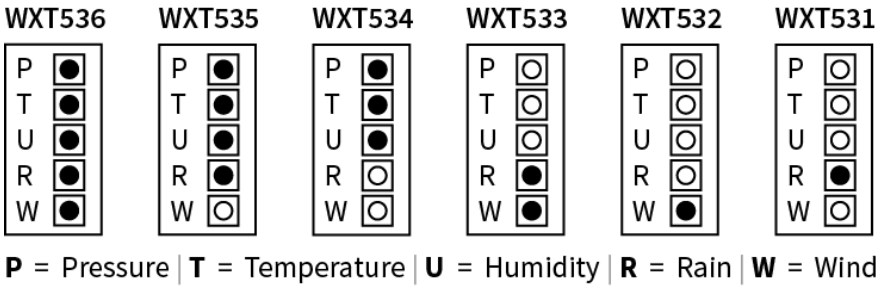

Figure 1-1: Vaisala Weather Transmitter Models

Unless specified, the Vaisala Weather Transmitters referred to in this document are the WXT53x model transmitters.

If a different order code is used, ensure that the Vaisala Weather Transmitter is configured to communicate using the Vaisala NMEA protocol on RS-485 at 19200 baud 8, N, 1.

1-3 Special Considerations

The following precautions and installation considerations must be observed to ensure personal safety and to prevent damage to equipment:

- Local safety regulations, building codes and ordinances must be complied with during installation. In cases of conflict with procedures in this manual, contact Innotech or its authorised representative for clarification.
- To prevent damage to equipment, avoid applying electrical power to the equipment prior to checking the system, unless specifically instructed to do so in this manual.
- The device can be installed using common tools and test equipment. Only qualified personnel familiar with local codes and practices should install the system. Wiring should only be performed by someone knowledgeable of electronics and wiring installation practices. Refer to the appropriate documentation when installing items provided by other manufacturers.

1-4 Installation Plans

The following installation items should be gathered and made available to the installation team:

- This technical manual
- For non-Innotech equipment, gather the manufacturer's installation-related data such as schematics, wiring diagrams, dimension diagrams, etc
- Any other data source as it becomes known

1-5 Tools and Test Equipment

A 2mm flat blade screwdriver is required for wiring of the terminals. A high impedance digital Multimeter is the only item of electronic test equipment required.

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Omni Vaisala Interface

INSTALLATION INSTRUCTIONS

2 Mechanical Installation

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2-1 Introduction

This section of the manual contains instructions and related data to facilitate the installation of components of the Omni Vaisala Interface (OMWEB02).

It is recommended that the device and it's extended family of devices be mounted in steel cabinets to minimise the effects of electromagnetic interference.

The flexibility of the OMWEB02 and associated devices allows them to be installed in a wide variety of configurations depending on the user's preference. For this reason it is not possible to include all the various installation configurations in this manual. Instead, this manual provides examples of installations that are considered typical.

Innotech recognises that the installation examples described in this manual may not meet the user's requirements. However, information in this document should be used as a guide for all installations, regardless of whether the specific circumstances match the examples given. In all cases, installation personnel should familiarise themselves with the information contained in this section.

It is highly recommended that the Omni Series Devices and peripheral devices be installed and mounted in a steel enclosure to minimise the effect of Electro Magnetic Interference (EMI).

2-2 Physical Descriptions

The following paragraphs contain physical descriptions, including dimensions and installation-related information, for the Omni. These paragraphs are intended to provide the installer with sufficient information to permit proper installation.

For devices not included in the following paragraphs, refer to the appropriate product datasheet.

The Omni Vaisala Interface is housed in a rectangular case made from flame retardant polycarbonate / ABS plastic listed under UL94-V0. The types of devices included in this manual are:

- Omni Vaisala Interface (OMWEB02)

2-2.1 Omni Vaisala Interface Dimensions & Identification

The OMWEB02 features two RS-485 comms inputs, two RJ45 ethernet ports (only 1 used) and USB A & Mini-B connections.

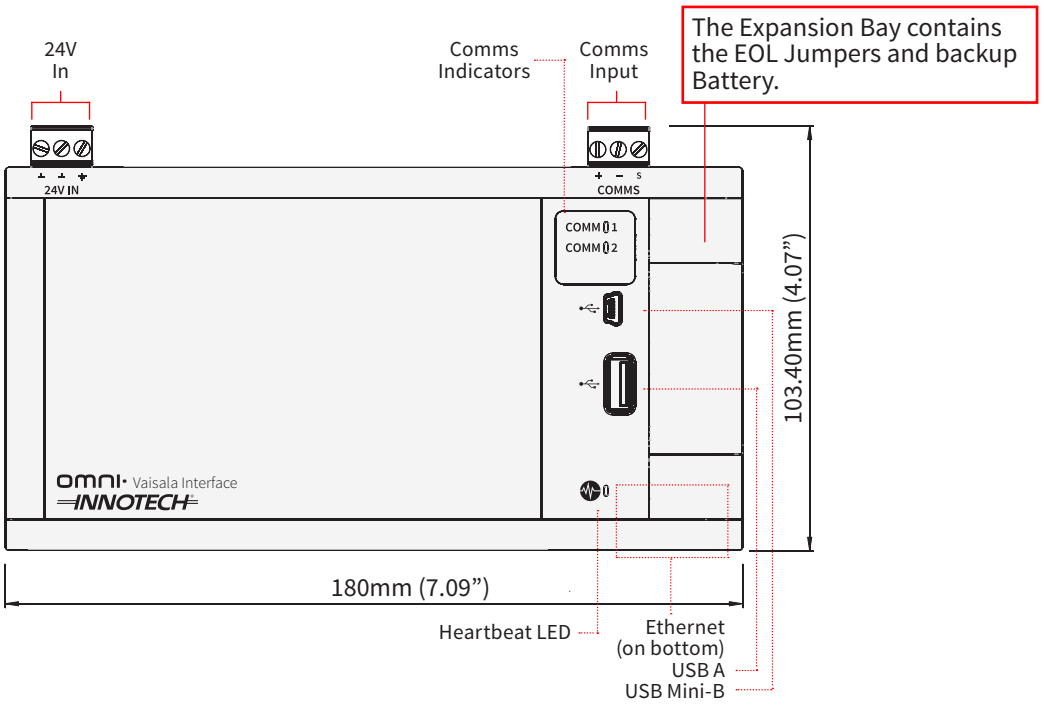

Figure 2-1: Dimensions and Identification

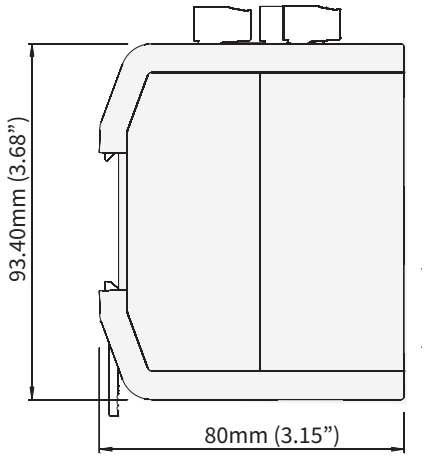

Figure 2-2: Dimensions (End View)

The expansion bay at the right end of the device contains RS-485 End of Line (EOL) Jumpers and the user replaceable real time clock battery. Push towards the front of the device to slide the cover off.

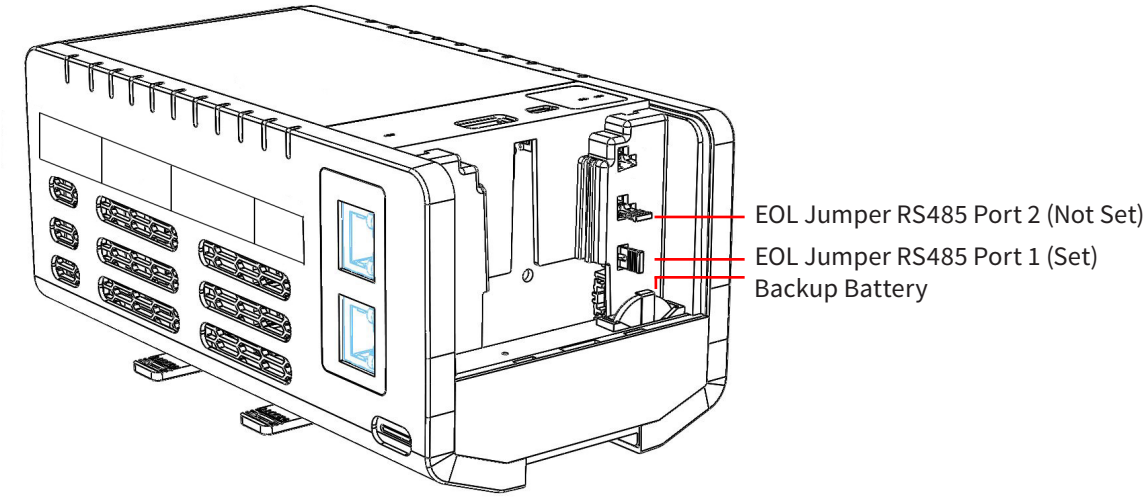

Figure 2-3: Expansion Bay

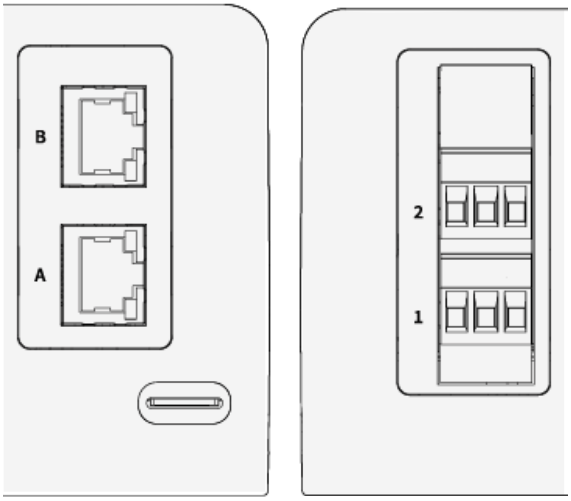

Figure 2-4: Ethernet Ports, MicroSD Card Slot and RS-485 Ports on side

Ethernet Port B is unused.

2-2.2 Backup Battery Replacement

CAUTION

Contains a Lithium Type Battery, Dispose of Properly. (In accordance with local regulations)
Caution: Risk of explosion if battery is replace by an incorrect type.

The real-time clock battery is user replaceable but it is recommended that it be replaced by qualified Innotech service technicians.

2-2.2.1 Battery Specifications

- Type: CR-2032 Lithium (user replaceable)
- Nominal voltage: 3 Volts
- Shelf life: 5 Years, dependent on ambient temperature

2-2.2.2 Battery Replacement

1. Open the expansion bay by sliding the cover open.
2. Hold back the retaining clip and remove the battery from the battery holder.
3. Insert a new CR-2032 battery into the battery holder in the correct orientation.
4. Replace the expansion bay cover.

IMPORTANT

- *The battery should be removed using a non-metallic object. Using a metal object could short the battery if it isn't completely flat.*
- *Avoid touching the battery surface with your fingers. The surface can be corroded by the oil on your skin.*

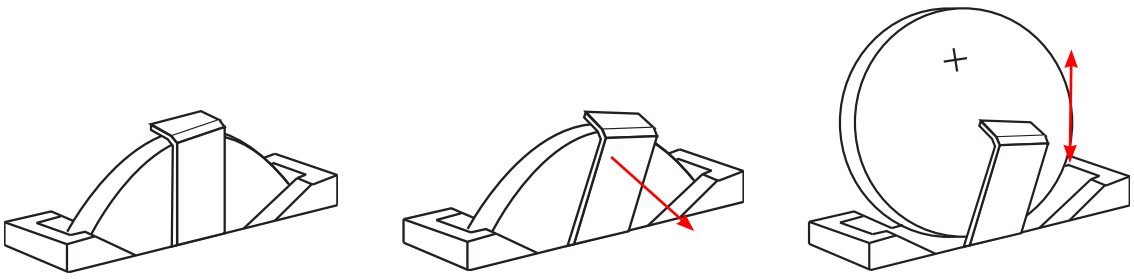

Figure 2-5: Battery Holder & Battery Orientation

2-3 Installation Instructions

A steel enclosure is recommended to contain the system with the aim of minimising EMI from surrounding equipment. To allow for the number of cables to enter and leave the enclosure, the minimum dimensions of slotted cable ducts should be 45mm x 45mm with 65mm clearance from the cable ducts to the terminals of the units.

2-3.1 General Installation Instructions

To ensure continued reliable operation of the device the following installation guidelines should be observed:

- The OMWEB02 should be installed in a position that provides easy access to the front panel and sufficient room for power, and input/output cabling. It should be mounted such that the controls are in easy reach of the user.
- Do not mount any units of the system near high voltage, high current cables or sources of strong radio frequency emissions such as transmitter antenna cables.
- The ambient temperature of the controller at the installation site should not exceed the -5 to 50°C (20°F to 122°F) operating temperature range.
- Mount the unit in an area with minimum vibration and minimum exposure to mechanical damage.
- Ensure that there is enough clearance for cabling above and below.
- Ensure that the vents are not impeded by the wiring or other obstructions.

2-3.2 DIN Rails

The DIN rail is an industry-standard item and is available from a large number of commercial sources. The rail is usually manufactured from galvanised steel and may be provided with a finish.

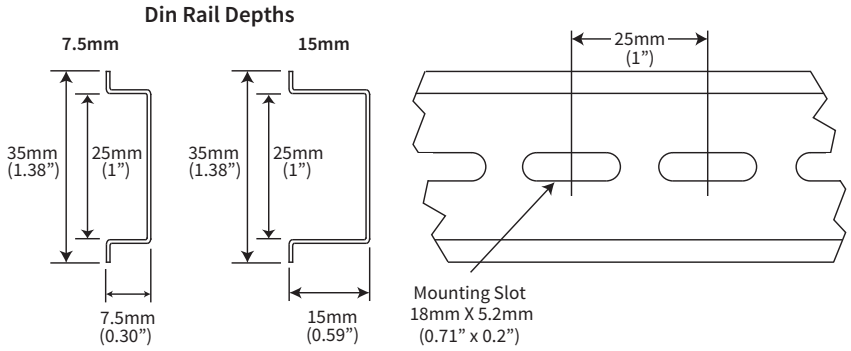

Figure 2-6: DIN Rail Dimensions

Allow a minimum 20mm (40mm recommended) gap between the end of the terminal plug and cable ducts.

2-3.2.1 Installation

1. Pull the DIN rail release tab down.
2. Align the DIN rail clip on the top edge of the DIN rail.
3. Lower the controller so it is level and push the DIN rail clip upwards to secure the device.

2-3.2.2 Removal

Pull the DIN rail release tab down until it releases from the bottom edge of the DIN rail, and then pull the bottom away and lift up.

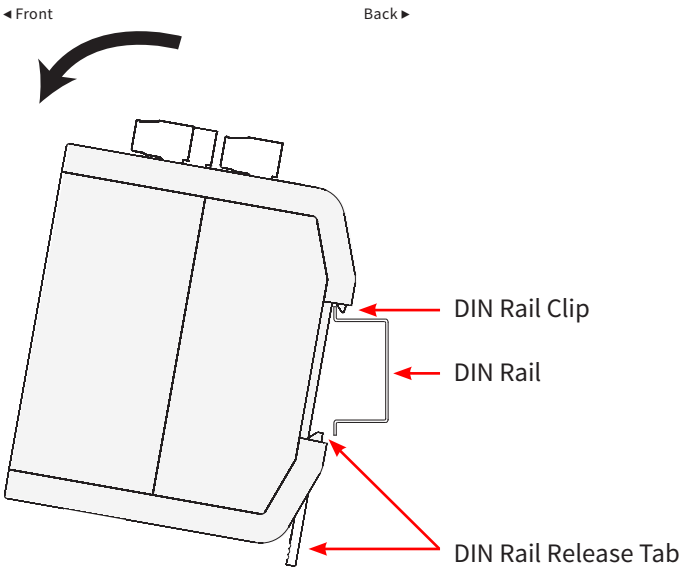

Figure 2-7: DIN Rail Installation

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Omni Vaisala Interface

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3 Electrical Installation

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3-1 Introduction

This section of the manual contains instructions and related data to facilitate the electrical installation. Because of the flexibility of the Omni family of devices, they can be installed in a wide variety of configurations depending on the user's preference. For this reason it is not possible to include all the various installation configurations in this manual. Instead, this manual provides examples of installations that are considered typical.

Innotech recognises that the installation examples described in this manual may not meet the user's requirements. However, information in this document should be used as a guide for all installations, regardless of whether the specific circumstances match the examples given. In all cases, installation personnel should familiarise themselves with the information contained in this section.

This section contains the following specific information:

- Electrical installation practices of a general nature
- Wiring information for Omni Vaisala Interface (OMWEB02)

If required, additional installation recommendations can be provided from Innotech Control Systems upon request.

3-2 Electrical Installation Practices

This paragraph provides general information which is intended to assist qualified personnel installing the device. More detailed information for wiring of controllers and devices are contained in subsequent paragraphs. All wiring must be in accordance with the instructions in the applicable instruction manual or datasheet.

CAUTION

Electrical power to the system must be turned off throughout the installation process. Do not apply power to any part of the system until ready for Commissioning (see "Commissioning").

If any data presented in this manual disagrees with information in the applicable instruction manual, information in the manufacturer's instruction manual takes precedence. Customers are encouraged to contact Innotech Control Systems for further information or clarification of information presented herein via the contact details at the back of this document.

Cabling plays an important role in the installation of the device. The following general cabling guidelines should be observed:

In all cases:

- When necessary to protect cabling from physical damage, both shielding and physical protection may be provided by running the cable in a metal conduit. Alternatively, use steel wire armoured (SWA) cable, which also contains an electromagnetic shield
- Avoid running cables in the vicinity of high voltage power cables or cables carrying switching voltages/currents. This especially applies to sensor signal cables
- Power supply cables must have multi-strand conductors with a cross-sectional area of 1mm^2 for each conductor
- The earth cable to the enclosure must be a minimum of 2.5mm^2, and wired in accordance with local electrical regulations
- For communications, a minimum 16 conductor (0.5mm^2) shielded cable is required

Table 3-1 provides assistance in determining the cabling requirements for various installation configurations. It shows the dimensions, wire gauge designations and resistance values per unit length for common wire sizes. Use this table to determine specific cabling requirements for your installation.

Table 3-1: Nominal Resistance for Wire Sizes at 20°C

Conductor Area (mm^2)	Diameter (mm)	Nearest SWG or BWG	Nearest AWG	Ohms per 100 metres
0.5	0.80	21	20	3.44
1.0	1.13	18	17	1.72
1.5	1.38	17	15	1.15
2.0	1.60	16	14	0.86
2.5	1.78	15	13	0.69

- *SWG = Standard Wire Gauge, BWG = British Wire Gauge, AWG = American Wire Gauge.*
- *All SWG, BWG and AWG numbers are for the largest wire if a direct equivalent to the mm^2 wire size is not available.*

3-3 Device Wiring

The following paragraphs contain connection information for the Omni Vaisala Interface.

3-3.1 Omni Vaisala Interface

Figure 3-1 shows the input/output connection groups for the device. The device uses Phoenix type plug-in terminals.

- Power Input (3-3.1.1)
- RS-485 Comms (3-3.1.2)
- Ethernet Communications Ports (3-3.1.3)
- USB Inputs (3-3.1.4)

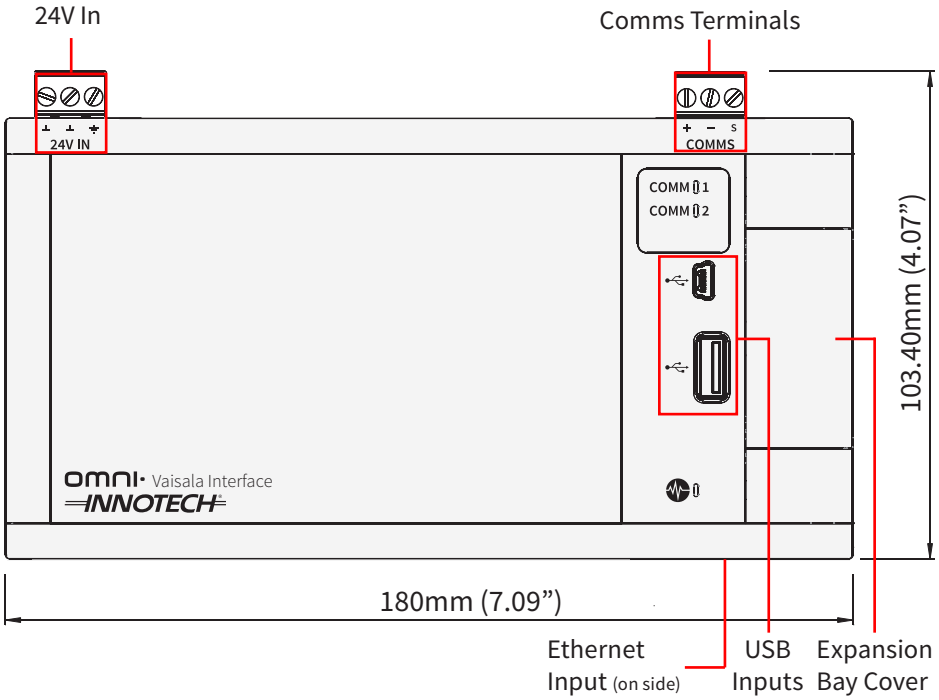

Figure 3-1: Omni Vaisala Interface Input / Output Terminals

3-3.1.1 Power Input

The power requirements are either AC or DC as below:

- 24VAC ±20%, 50/60 Hz
- 24VDC (18-35VDC)
- Power Consumption: 5W Nominal / 10W max.

The device has polarity independent supply wiring. The 24V and 0V wiring can be used in either terminal 1 or 2 per the image below.

The operating voltage must meet the requirements of Safety Extra Low Voltage (SELV) to EN60730. The transformer used must be a safety transformer in compliance with EN60742 and be designed for 100% duty. It must also be sized and fused in compliance with local safety regulations.

The terminal numbering used in Figure 3-2 is only for identification purposes.

Terminals 1 & 2 in the image below are not polarity conscious, meaning EITHER terminal can be 24V or 0V. For the purposes of clarity in this document, terminal 1 will be used for 24V and terminal 2 for 0V.

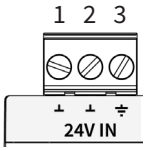

Figure 3-2: 24V Input Terminals

Table 3-2: Recommended Wiring

Terminal	AC Supply	DC Supply
1	24VAC	24VDC
2	0VAC (Neutral)	0VDC
3	Earth	Earth

CAUTION

Terminal 3 as shown above in Figure 3-2 MUST be Earthed.

3-3.1.2 RS-485 Comms

The RS-485 Comms terminals are provided for communications to the Vaisala Weather Transmitter via Vaisala NMEA (Port 1) or BACnet MS/TP (Port 2).

3-3.1.3 Ethernet Ports

The Ethernet Input (Port A) provides the capability for connection to your network. Port B is unused.

3-3.1.4 USB

The device has two USB Inputs, USB-A and USB Mini-B. The USB-A connection is a Service Upgrade Port only. The USB-B connector can be used to access the on-board web server.

3-3.2 General Wiring Diagrams for the OMWEB02

This section contains general wiring diagrams and images for the device.

3-3.2.1 Earth Mounted on DIN Rail

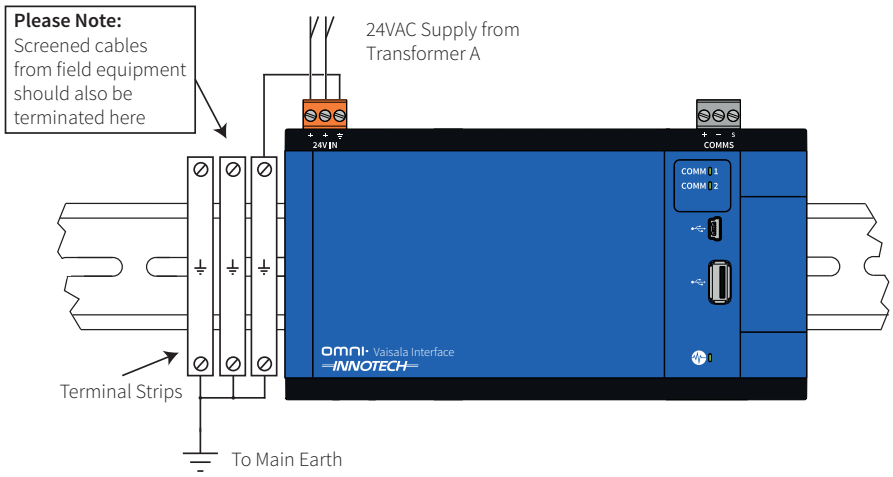

Figure 3-3: Mounted on DIN Rail

Omni Vaisala Interface

INSTALLATION INSTRUCTIONS

4 Networking

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4-1 Overview

The flexibility of the Omni family of devices means that it can be connected in any of several equipment configurations based on the system's operational requirements.

In the simplest configuration, a single device stands alone. More complex installations can use multiple Omni system devices and share data between themselves and/or a computer.

4-2 Omni Products

This section covers the following device(s):

- Omni Vaisala Interface (OMWEB02)

Device connection is best made by using Ethernet cables.

4-2.1 Definitions

4-2.1.1 Ethernet Comms

The OMWEB02 has two Ethernet ports, which when connected to an active local area network, enables a computer to configure and monitor the connected device(s). Using the device's IP address, it is also possible to connect to the device remotely. Ethernet Port B is unused.

When connected to a Local Area Network, the controller should have a user-assigned IP Address to be configured using the OMWEB02 Web-Server interface.

TCP / IP
TCP / IP is a standard network connection type. Connection is made via settings such as IP Address, Netmask and Gateway addresses.

BACIP Local
The BACIP local settings configures the local BACnet network communications.

Connect by specifying a unique Network Number, UDP Port and specifying the Mode. Foreign Device and BBMD require further settings for connection.

BACIP Public
The BACIP public is used to connect to BBMD from a remote iComm device on another subnet, in addition to other high level BACnet integration communications setups.

Connect using BACnet IP Public by specifying settings such as Network Number, Maximum Foreign Devices and IP Address(es) in the distribution table.

4-2.1.2 RS-485

Vaisala NMEA - Port 1
Vaisala NMEA is a proprietary protocol based on the standard NMEA data format defined and controlled by the National Marine Electronics Association (NMEA).

BACnet MS/TP - Port 2
BACnet MS/TP is a token passing protocol. It stands for Master Slave / Token Passing. It is well suited for connecting BACnet MS/TP devices.

4-3 Installation

It is not possible to cover all the situations that may be encountered in the wide range of installations found in the field. The following examples are provided as a guide to assist in deciding the best method of connection for an Omni device Installation.

Some situations require additional care to avoid hazardous conditions. These may be covered by legislation or regulations such as those set by Telecommunications Authorities, Electrical Wiring Rules and Local Authorities.

The Omni product line is designed to comply with the Extra Low Voltage standards and therefore any wiring connected to these products should also comply with these standards if the product compliance is to be maintained.

Communication links between equipment located within different electrical switchboards should be electrically isolated from one another. The voltages at the earth connections of the switchboards will usually have a small difference under normal conditions but, if a fault occurs on equipment connected to one switchboard, the voltage difference can increase dangerously. If a non-isolated communications link is used, this voltage difference can cause a large current to flow through the communications cable and the integrated circuits (ICs) connected to it. An isolated connection will block the current, but it would have to withstand the full supply voltage for up to several seconds.

4-3.1 Cable Specifications - Ethernet

Ethernet standards are limited by the bandwidth capability of the cable and the maximum cable length that can be utilised to achieve optimum performance. The following table shows the Ethernet standards and the recommended cable lengths to achieve desired data rates.

4-3.2 Ethernet Considerations

Only Cat 6 or Cat 5e cables should be used. Cat 5 Ethernet cabling should NOT be used.

The signal degrades over distance more in lower quality cables, which causes the bandwidth to drop due to frequent re-transmissions of data.

It is recommended that high quality branded Cat 6 / 5e Ethernet cable is used for your networking requirements to achieve the best results from your Omni device.

Table 4-1: Ethernet Standards

	Standard	Data Rate / Speed	Media Type	Maximum Length (m)	
				Half Duplex	Full Duplex
Ethernet	10BaseT	10Mbps	Cat 3 or higher UTP or STP	100	100
	10BaseFL	10Mbps	Fibre Optic	2000	Less than 2000
	10Base FB	10Mbps	Fibre Optic	2000	
Fast Ethernet	100BaseTX	100Mbps	Cat 5 UTP or STP	100	100
	100BaseFX	100Mbps	Fibre Optic	400	2000
	100BaseT4	100Mbps	Cat 3 or higher UTP or STP	100	
Gigabit Ethernet	1000BaseT	1Gbps	Cat 4 or higher UTP	100	550
	1000BaseTX	1Gbps	Fibre Optic	100	550
	1000BaseLX	1Gbps	Fibre Optic	316	5000

4-4 Cable Connection

This section contains information showing generalised connection examples which may not be appropriate to your installation. After connection, configuration of the Omni device needs to be undertaken using the on-board web server connecting via Ethernet or USB Mini-B connection.

4-4.1 Ethernet

Be sure to adhere to cable connection standards for Ethernet connections on the previous page.

Omni devices can be connected by 'daisy chaining' the devices by utilising both ethernet ports. When routing through these Omni controllers, the Port Assignment > Ethernet > Mode setting must be changed to Switch. The device will then operate as an Ethernet switch.

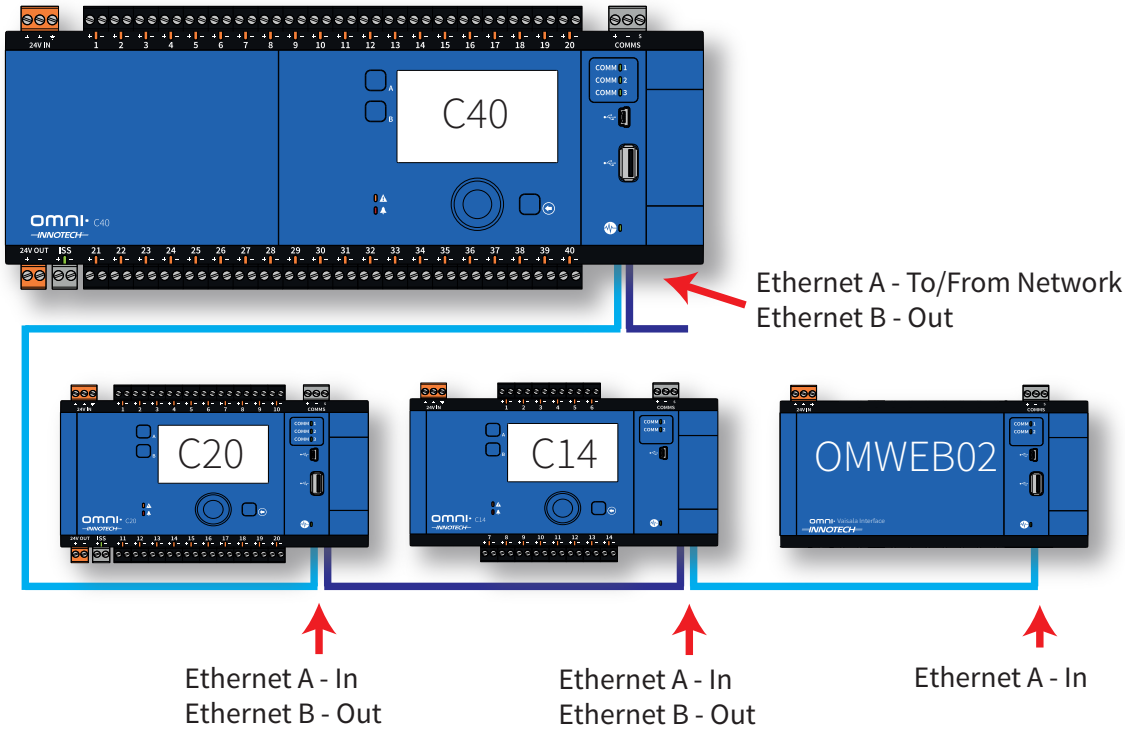


Figure 4-1: Example Wiring Topology - Ethernet

IMPORTANT

The example daisy-chain topology shown above is only recommended for up to 10 Omni devices. If you are using more devices, connection using Ethernet switches is recommended. Using a Network Switch will provide a faster connection for the devices.

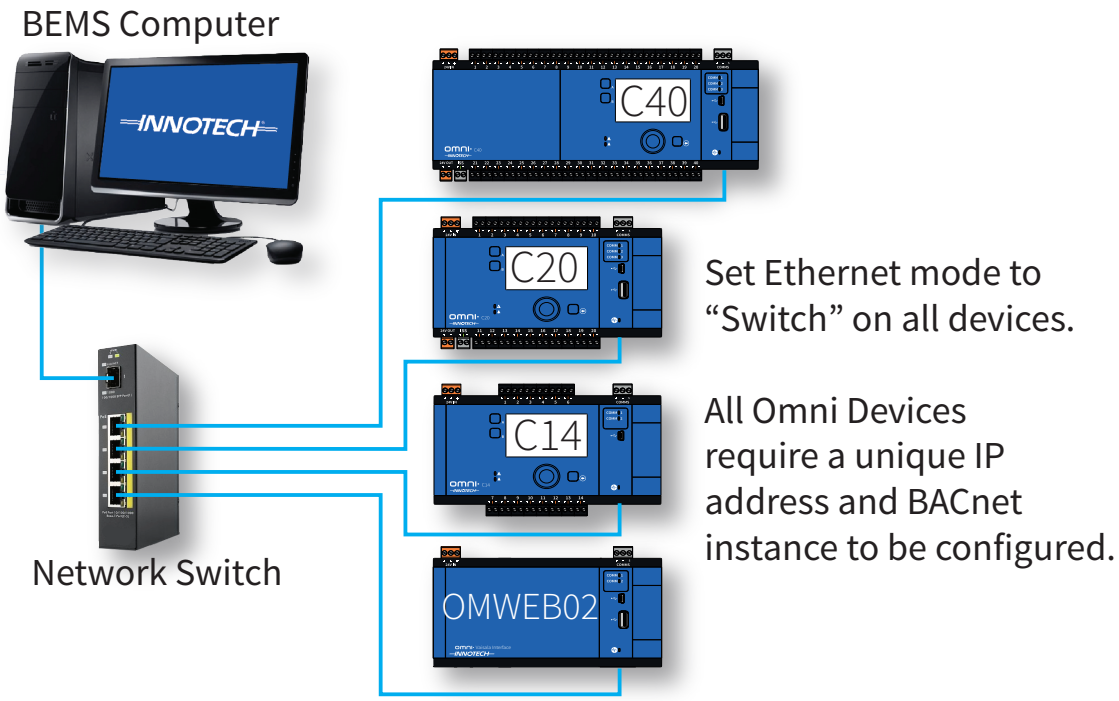


Figure 4-2: Example Wiring Topology - Ethernet with Switch

- *Ethernet Port B is not used.*

4-5 Omni Vaisala Interface Connection

4-5.1 Ethernet (TCP/IP)

Your device will arrive from the factory with the default IP address **192.168.2.100** and BACnet Instance of 2100. This will need to be changed when networking two or more Omni devices to ensure that a unique IP address and BACnet instance are assigned to each device.
The TCP/IP details can be changed in several ways.

- After connection to the network, connect to the on-board web server by entering the default address.
- Connect via USB Mini-B to open the web page.

TCP/IP connection settings at minimum require an IP Address, Netmask and Gateway. The MAC Address cannot be changed.

Click Login at the top right and log in using the default credentials, Username: **Vaisala**, Password: **1111**. After login, you will be asked to create a new password.

IMPORTANT

- *If connecting to a device with the default IP address, you may need to change your computer network IP settings to connect to the new network ID assigned to the device.*
- *Ethernet cable lengths have a limit of 100 metres.*

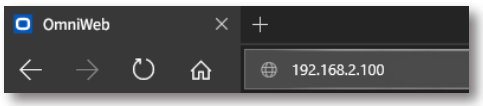


Figure 4-3: Access Embedded Web Server Using Default IP Address

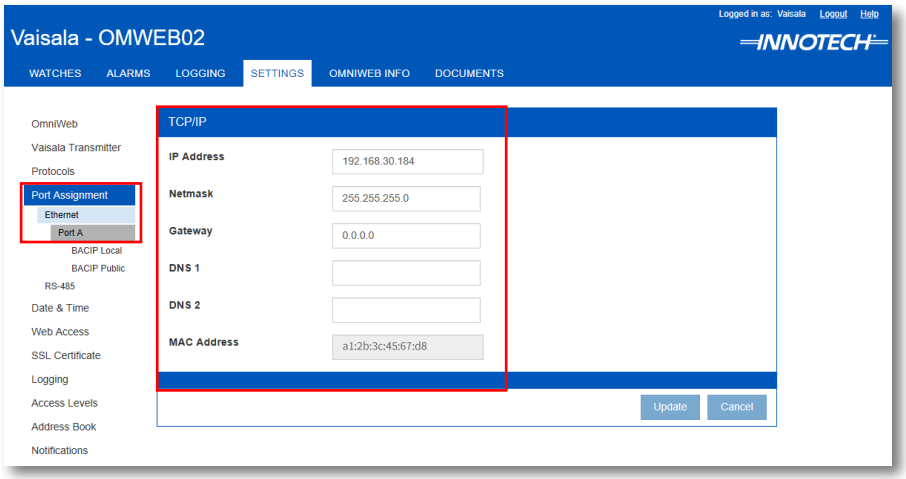


Figure 4-4: Ethernet Settings Screen

Figure 4-5: Connection from Laptop to OMWEB02 via Ethernet

4-6 Accessing the Embedded Web Server using the USB Mini-B

The Omni Vaisala Interface and Vaisala Weather Transmitter can be configured using the embedded web server. You can connect to the device using the USB Mini-B connection to configure the Ethernet settings.

1. Connect a USB cable from your computer to the USB Mini-B port on the OMWEB02. After connection, Windows will set up a new network connection for the device. If required, these drivers can be downloaded from the Innotech website.

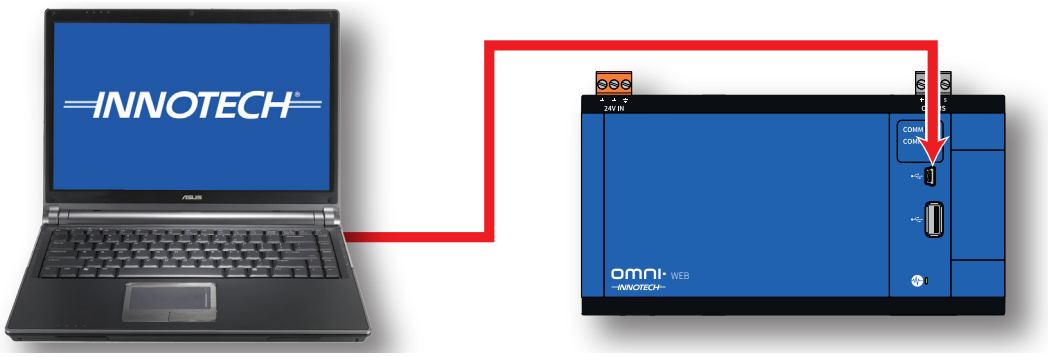


Figure 4-6: Connection from Laptop to OMWEB02 via USB Mini-B

Network connections window showing the added virtual Ethernet adapter, Ethernet 2 in this example is installed when using the USB Mini-B connection.

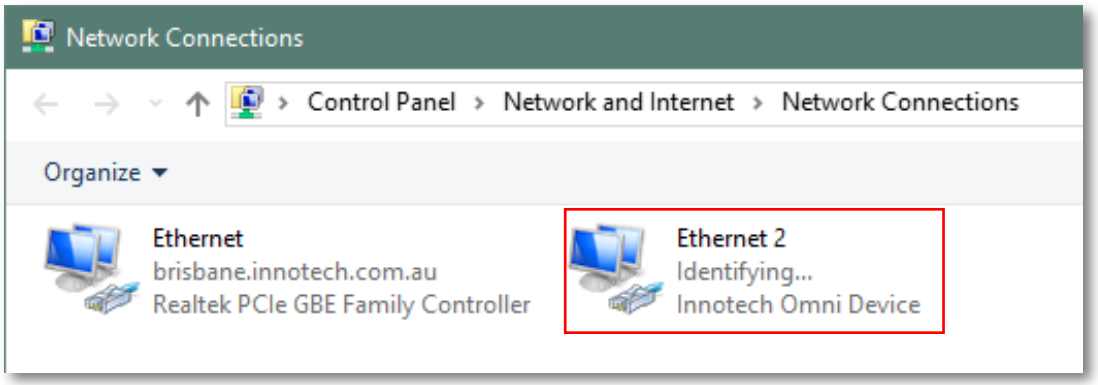


Figure 4-7: Network Connections Window

2. After the connection has been made, you can now connect to the OMWEB02 using a supported browser by navigating to the address, **169.254.2.100**. Click **Login** and log in using the default credentials.
   Username: **Vaisala**, Password: **1111**. After login, you will be asked to create a new password.
3. After logging in, navigate to Settings > Port Assignment > Ethernet > **Port A** to edit the TCP/IP settings for your controller. Click **Update** when finished.

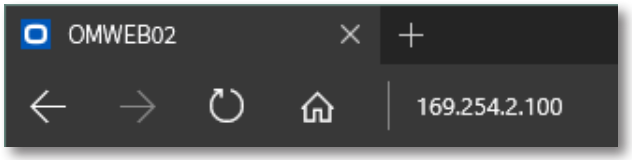


Figure 4-8: Access Embedded Web Server Using Default IP Address

4-6.1 Omni Vaisala Interface Configuration

After connection via Ethernet or USB Mini-B, access the Web Server and navigate to Settings > Port Assignment > Ethernet > **Port A**. After changing settings, click **Update** to update the controller.

TCP/IP connection settings at minimum require an IP Address, Netmask and Gateway. The MAC Address cannot be changed.

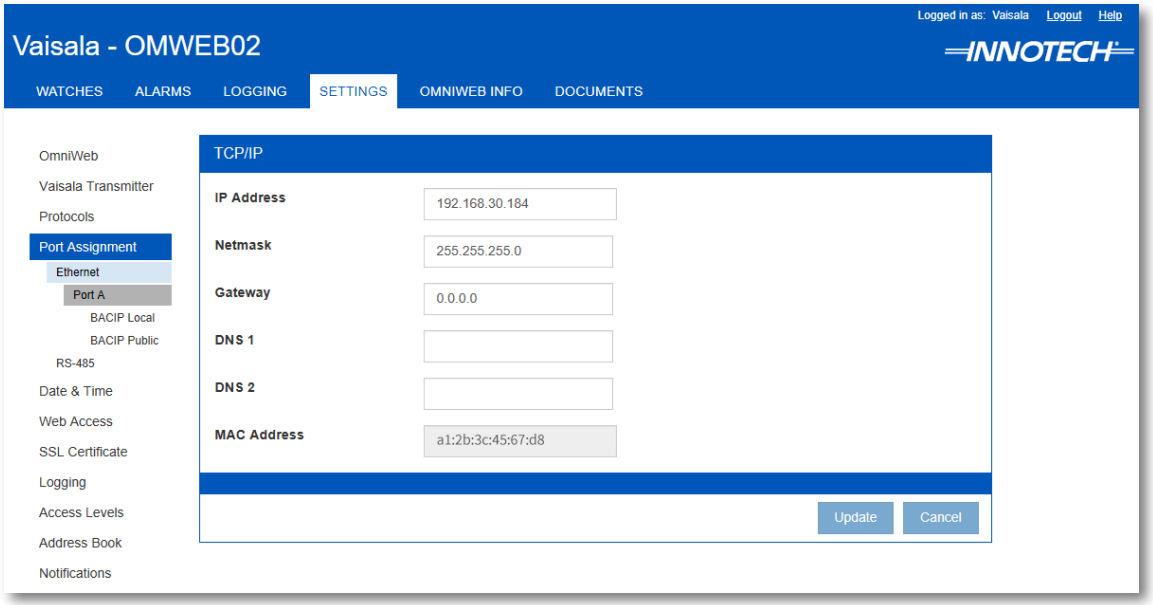


Figure 4-9: Ethernet - TCP/IP Settings

If the BACnet protocol is to be used, ensure that the BACnet Device Instance has been changed to a unique number for each OmniWeb device.

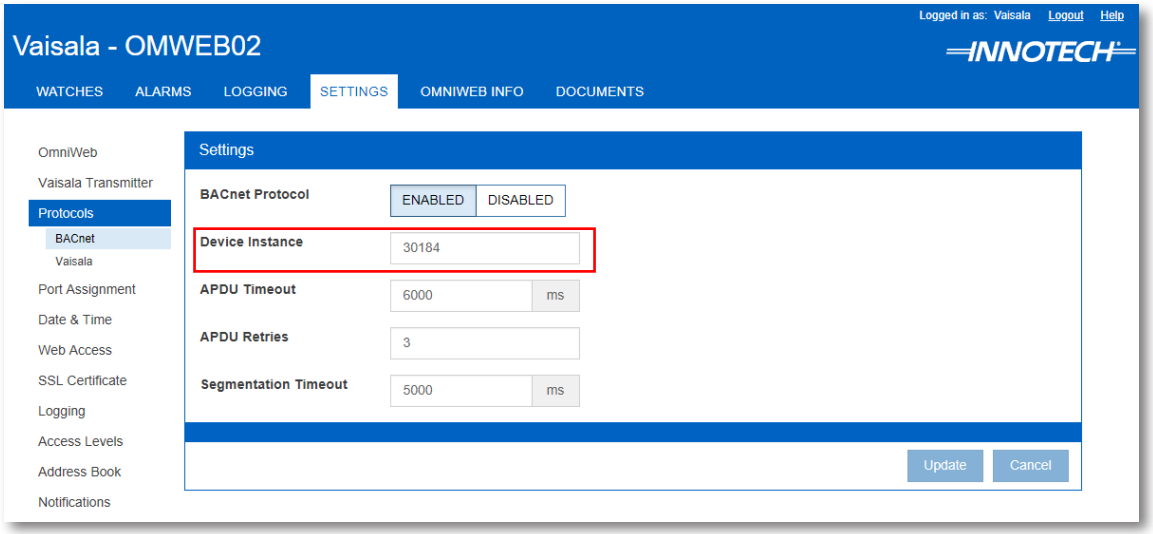


Figure 4-10: Protocols Settings - BACnet

4-6.1.1 Ethernet (BACnet IP Local - Device)

Specify the Network Number and UDP port or accept the defaults.

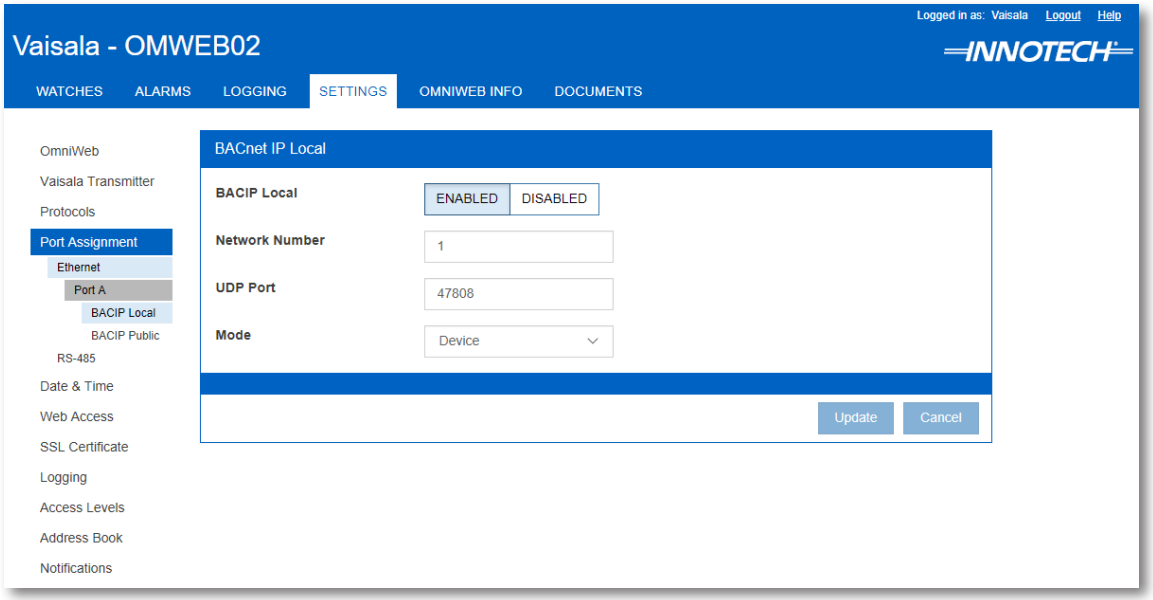


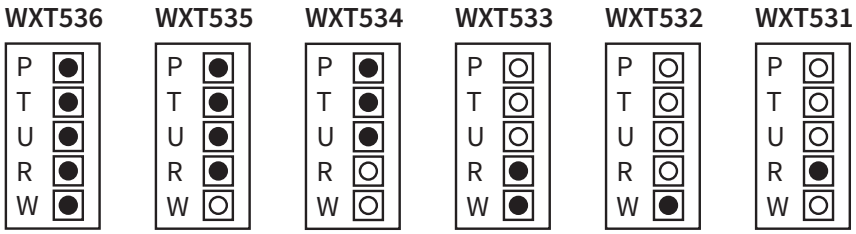
Figure 4-11: Ethernet - BACnet IP Local - Device Settings

4-7 Supported Vaisala Weather Transmitter Models

The OMWEB02 communicates directly with the Vaisala Weather Transmitter using a dedicated RS-485 channel.

For 'plug and play' communications, ensure to use the following order code when ordering a Vaisala Weather Transmitter:

- WXT53X-C1XXXXXXXXX (Where "X" refers to factory options)



P = Pressure | **T** = Temperature | **U** = Humidity | **R** = Rain | **W** = Wind

Figure 4-12: Vaisala Weather Transmitter Models

Unless specified, the Vaisala Weather Transmitters referred to in this document are the WXT53x model transmitters.

If a different order code is required, ensure that the Vaisala Weather Transmitter is configured to communicate using the Vaisala NMEA protocol on RS-485 at 19200 baud 8, N, 1.

4-8 Connecting the Vaisala Weather Transmitter and the OMWEB02

The Vaisala Weather Transmitter can be connected to the OMWEB02 using either the 8-Pin M12 connector or by wiring directly to the RS-485 Screw Terminals. Both the 8-Pin M12 Connector and Screw Terminals can be accessed from the bottom of the Vaisala Weather Transmitter.

The Vaisala Weather Transmitter and the OMWEB02 can be powered using a 24VDC to 32VDC power supply. If heating is required, it is recommended to provide independent cabling from the power supply to ensure robust operation and minimal interference. If this is not possible, a single cable run can be used to provide power for both the Vaisala Weather Transmitter and optional heating accessory. Ensure to use high capacity cable suitable for carrying such a current load over the distance required.

Refer to the following wiring guides for the most suitable option for your installation.

Please refer to the appropriate Vaisala technical documentation for more details at www.vaisala.com. Refer to the relevant datasheets for complete power supply details for the OMWEB02 and Vaisala Weather Transmitter.

4-8.1 BACnet MS/TP Wiring Considerations

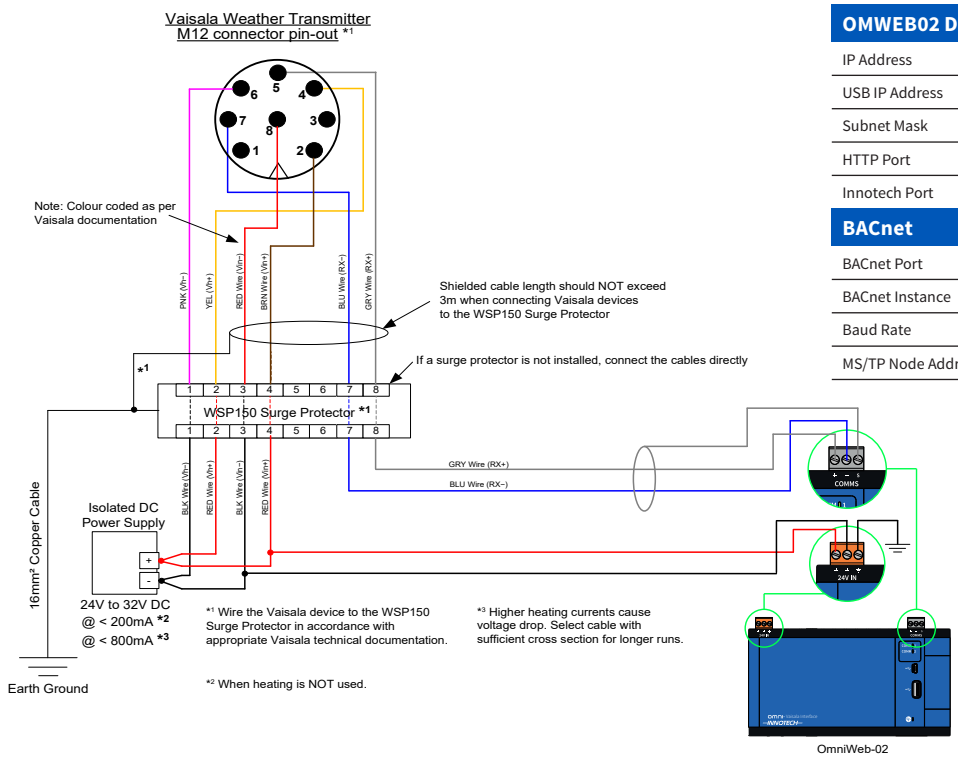
BACnet MS/TP uses RS-485 for communication on Port 2 and allows up to 32 devices to be installed on a single network no longer than 1219m (4000 ft).
Different Baud rates can be used but this will change the physical length of the network. If using a baud rate of 115,200, the maximum length is approximately 600m (1968ft). At 76,800 baud rate the maximum length is approximately 1219m (4000ft).

4-8.2 Wiring Using The 8-Pin M12 Connector With Independent Cabling For Heating

The wiring example provided below is recommended for most installations, providing a separate cabling run of high quality cable for the Vaisala Weather Transmitter heating current (if required). The pin connections for the 8-Pin M12 and wire colours are listed in Table 4-2 on page 41.

For installations that do require the optional heating accessory, ensure a high capacity cable between the DC Power supply and the Vaisala Weather Transmitter is used.

The 8-Pin M12 connector is located on the bottom of the Vaisala Weather Transmitter.



OMWEB02 Default Settings	
IP Address	192.168.2.100
USB IP Address	169.254.2.100
Subnet Mask	255.255.255.0
HTTP Port	80
Innotech Port	20000
BACnet	
BACnet Port	47808
BACnet Instance	2100
Baud Rate	38400
MS/TP Node Address	1

Figure 4-13: Vaisala Weather Transmitter M12 Connector with independent cabling for heating

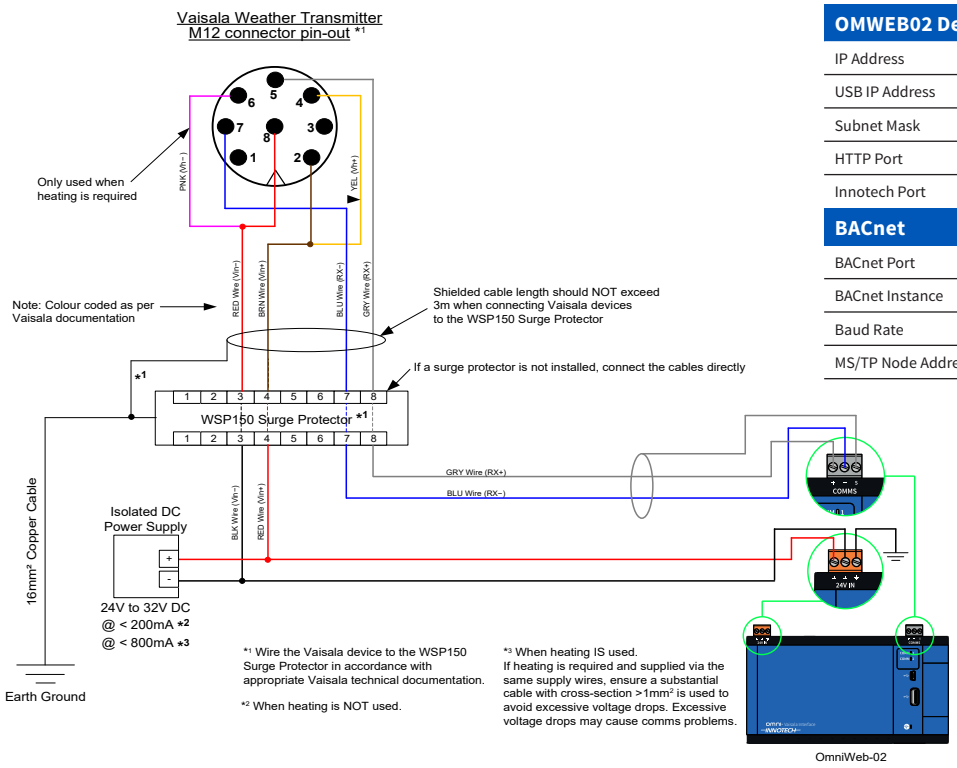
The 16mm² Copper Cable to Earth Ground cable is a critical component for the correct operation of the surge protector. Ensure this is installed correctly.

4-8.3 Wiring Using The 8-Pin M12 Connector With Split Cabling For Heating

The wiring example provided is an alternative M12 connector wiring guide, providing a shared cabling run of suitable high capacity cable for the Vaisala Weather Transmitter and heating accessory (if required). The pin connections for the 8-Pin M12 and wire colours are listed in Table 4-2 on page 41.

For installations that do require the optional heating accessory, ensure a high capacity cable between the DC Power supply and the Vaisala Weather Transmitter is used.

The 8-Pin M12 connector is located on the bottom of the Vaisala Weather Transmitter.



OMWEB02 Default Settings	
IP Address	192.168.2.100
USB IP Address	169.254.2.100
Subnet Mask	255.255.255.0
HTTP Port	80
Innotech Port	20000
BACnet	
BACnet Port	47808
BACnet Instance	2100
Baud Rate	38400
MS/TP Node Address	1

Figure 4-14: Vaisala Weather Transmitter M12 Connector with split cabling for heating

The 16mm² Copper Cable to Earth Ground cable is a critical component for the correct operation of the surge protector. Ensure this is installed correctly.

4-8.4 Vaisala Weather Transmitter 8-Pin M12 Connector Pin-Outs

Please take extreme care to ensure when installing and wiring that the wire colours and terminals correctly match as illustrated in Figure 4-13 or Figure 4-14, and described below in Table 4-2. Refer to the appropriate Vaisala technical documentation for more details at www.vaisala.com.

Table 4-2: M12 Pin-outs for WXT / WMT

Wire Colour	M12 Pin#	RS-485
Blue	7	RX-
Grey	5	RX+
White	1	
Green	3	
Pink	6	Vh- (heating GND)
Yellow	4	Vh+ (heating supply voltage)
Red	8	Vin- (operating GND)
Brown	2	Vin+ (operating supply voltage)

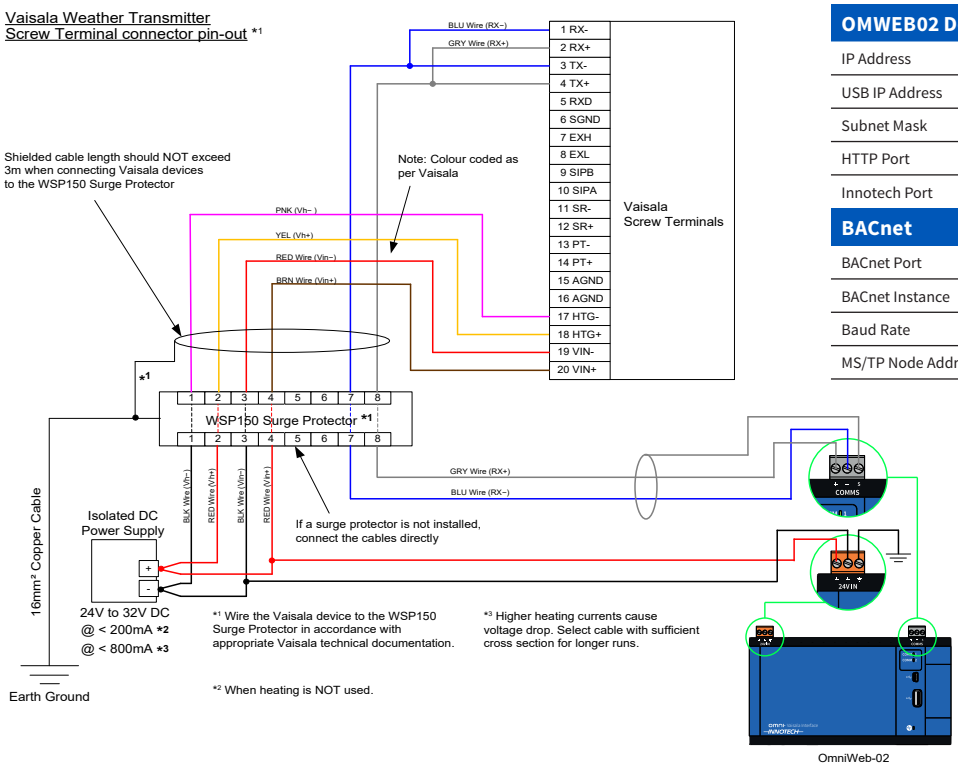
Exact minimum cable specifications for the power supply will vary, and are installation specific. Ensure to select the correct cable to carry the current load as required.

4-8.5 Wiring The Screw Terminal Connector W/ Independent Cabling For Heating

The wiring example provided below is recommended for most installations, providing a separate cabling run of high quality cable for the heating current (if required). The pin connections for the screw terminal connector and wire colours are listed in Table 4-3 on page 44.

For installations that do require the optional heating accessory, ensure a high capacity cable between the DC Power supply and the Vaisala Weather Transmitter is used.

The screw terminal connector can be accessed from the bottom of the Vaisala Weather Transmitter by unscrewing the three screws on the chassis, and carefully revealing the terminals. Cable runs can be fed through the small pluggable holes in the base of the unit. Ensure to fully seal the Vaisala Weather Transmitter once wiring is complete.



OMWEB02 Default Settings	
IP Address	192.168.2.100
USB IP Address	169.254.2.100
Subnet Mask	255.255.255.0
HTTP Port	80
Innotech Port	20000
BACnet	
BACnet Port	47808
BACnet Instance	2100
Baud Rate	38400
MS/TP Node Address	1

Figure 4-15: Wiring for Vaisala screw terminal connector w/ independent cabling for heating

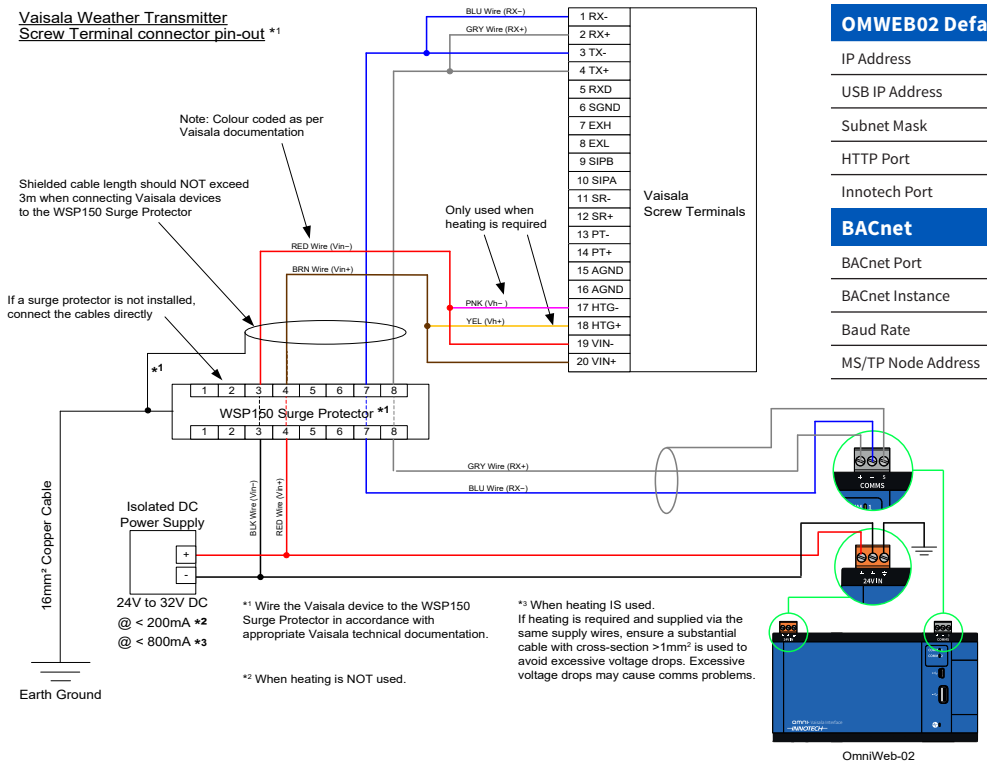
The 16mm² Copper Cable to Earth Ground cable is a critical component for the correct operation of the surge protector. Ensure this is installed correctly.

4-8.6 Wiring Using The Screw Terminal Connector With Split Cabling For Heating

The wiring example provided below is an alternative screw terminal wiring guide, providing a shared cabling run of suitable high capacity cable for the Vaisala Weather Transmitter and heating accessory (if required). The pin connections for the screw terminal connector and wire colours are listed in Table 4-3 on page 44.

For installations that do require the optional heating accessory, ensure a high capacity cable between the DC Power supply and the Vaisala Weather Transmitter is used.

The screw terminal connector can be accessed from the bottom of the Vaisala Weather Transmitter by unscrewing the three screws on the chassis, and carefully revealing the terminals. Cable runs can be fed through the small pluggable holes in the base of the unit. Ensure to fully seal the Vaisala Weather Transmitter once wiring is complete.



OMWEB02 Default Settings	
IP Address	192.168.2.100
USB IP Address	169.254.2.100
Subnet Mask	255.255.255.0
HTTP Port	80
Innotech Port	20000
BACnet	
BACnet Port	47808
BACnet Instance	2100
Baud Rate	38400
MS/TP Node Address	1

Figure 4-16: Wiring for Vaisala screw terminal connector with split cabling for heating

The 16mm² Copper Cable to Earth Ground cable is a critical component for the correct operation of the surge protector. Ensure this is installed correctly.

4-8.7 Vaisala Weather Transmitter Screw Terminal Pin-Outs

Please take extreme care to ensure when installing and wiring that the wire colours and terminals correctly match as illustrated in Figure 4-15 or Figure 4-16, and described below in Table 4-3. Refer to the appropriate Vaisala technical documentation for more details at www.vaisala.com.

Table 4-3: Screw Terminal Pin-outs for Vaisala Weather Transmitters

Screw Terminal Pin	RS-485
1 RX-	RX-
2 RX+	RX+
3 TX-	RX-
4 TX+	RX+
5 RXD	
6 SGND	
7 EXH	
8 EXL	
9 SIPB	
10 SIPA	
11 SR-	
12 SR+	
13 PT-	
14 PT+	
15 AGND	
16 AGND	
17 HTG-	Vh- (heating GND)
18 HTG+	Vh+ (heating supply voltage)
19 VIN-	Vin- (operating GND)
20 VIN+	Vin+ (operating supply voltage)

Exact minimum cable specifications for power supply will vary, and are installation specific. Ensure to select the correct cable to carry the current load as required.

4-8.8 Web Server RS-485 Configuration

- Select the Port that you have connected the Vaisala Weather Transmitter to:
  - Port 1 uses the Vaisala NMEA protocol, Port 2 uses the BACnet MS/TP protocol
- Enter or Select details as required and click Update to update the OMWEB02

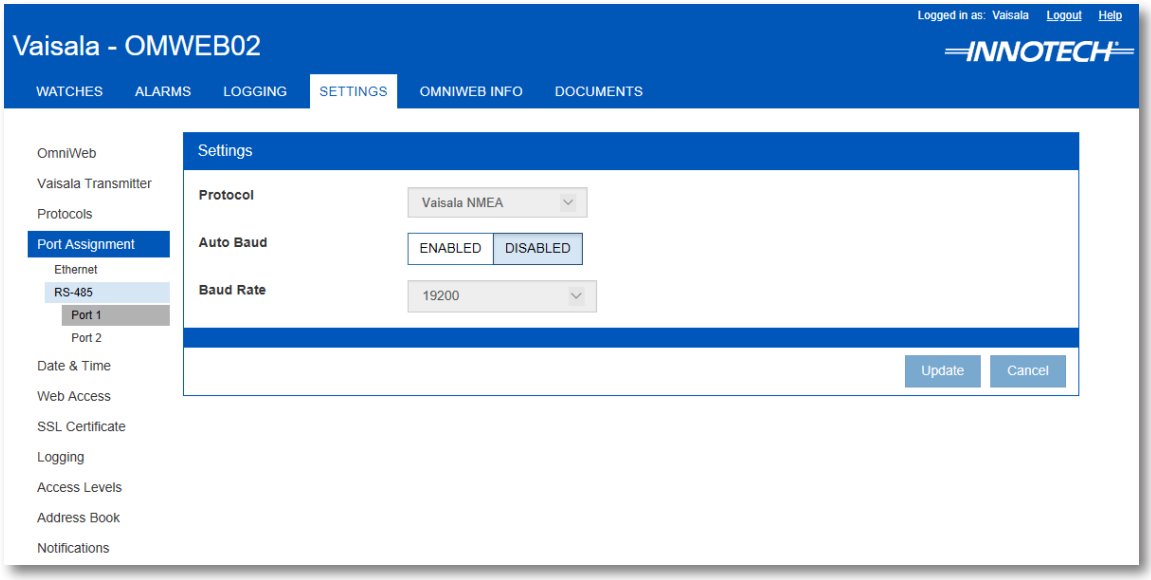


Figure 4-17: Port Assignment (RS-485 Port 1)

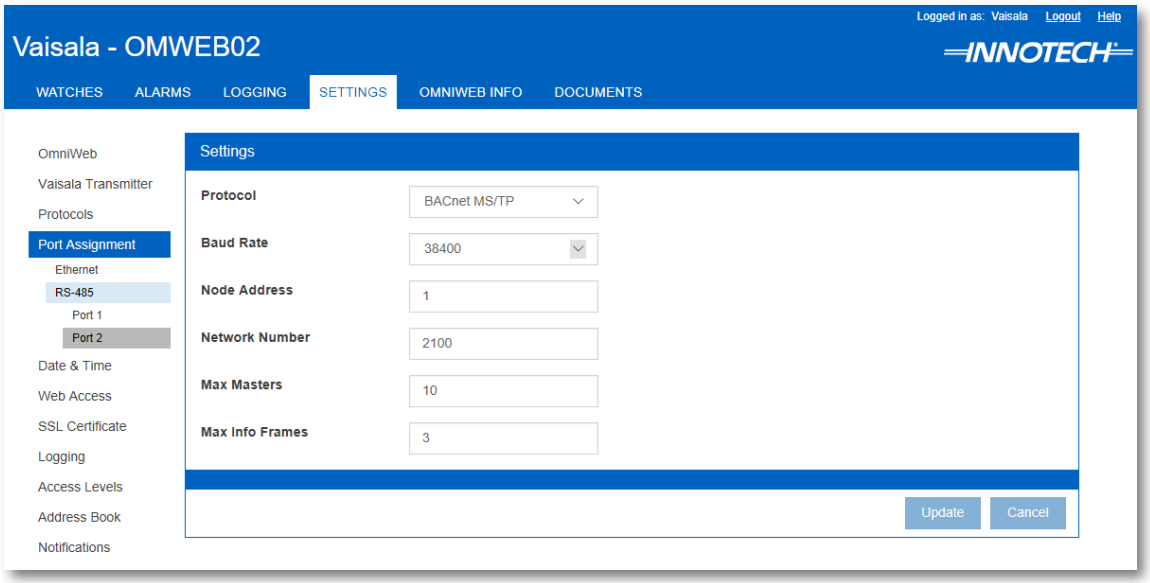


Figure 4-18: Port Assignment (RS-485 Port 2)

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Omni Vaisala Interface

INSTALLATION INSTRUCTIONS

5 Commissioning

INNOTECH®

5-1 Introduction

The commissioning phase begins upon completion of the mechanical and electrical installation of the system and is the phase in which the user makes the system ready for operation. The commissioning process consists of performing the following procedures, which are explained elsewhere in this section:

CAUTION

To prevent injury to personnel and damage to equipment, all electrical power must be off before starting the commissioning process this includes power to the devices and power to input and output circuits and equipment. When working with live power ensure that all electrical safety standards for work on live electrical systems meet local regulatory requirements. Do not apply power to any unit or circuit until instructed to do so by procedures in this section.

5-1.1 Inspect the Installation

Referring to Chapters 2, 3 and 4, inspect the entire system for correct mechanical, electrical and network installation. Correct any discrepancies noted. Inspection should include the factors listed in the following paragraphs, as a minimum.

5-1.1.1 Mechanical Inspection

Ensure that all units and enclosures are free of debris such as dust, metal chips, moisture, etc, that may have been deposited during installation. Clean as necessary.

- Ensure all covers are properly installed
- Ensure all units and DIN-rails are solidly mounted
- Check cable ducts. Ensure they are placed so that cables entering and leaving the ducts do not make overly tight bends
- Make sure all units are located to provide safe access for operation and maintenance
- Make sure all units are located where they are not subject to temperature extremes beyond the range shown on the product datasheet
- Make sure all units are located as far as practical from high current or high voltage cables or sources of RF emissions

5-1.1.2 Electrical Inspection

- Make sure all sources of electrical power, including power to ancillary items are off
- Check all input and output connections against the computer-generated wiring diagram supplied for your installation
- Ensure all connections are in accordance with the wiring diagram and that connections are solidly made
- Ensure all enclosures are solidly earthed
- Check all input and output cabling; ensure cabling requirements of Section 3 - Electrical Installation are met
- Make sure all cables are routed clear of high current, high voltage or high speed switching current cables and other sources of interference
- Inspect all cables running external to the enclosure. Ensure they are free from potential mechanical damage, such as impacts and chafing

Cabling plays an important role in the installation of Omni Systems. The following general cabling guidelines should be observed:

- In all cases, use electromagnetic-shielded cable for sensor wiring
- When necessary to protect cabling from physical damage, both shielding and physical protection may be provided by running the cable in a metal conduit. Alternatively, use steel wire armoured (SWA) cable, which also contains an electromagnetic shield
- Avoid running cables in the vicinity of high voltage power cables or cables carrying switching voltages/currents. This especially applies to sensor signal cables
- Interconnecting cables must have multi-strand conductors with a cross-sectional area of 1mm^2 for each conductor
- The earth cable to Omni enclosures must be 2.5mm^2

Table 3-1 provides assistance in determining the cabling requirements for various installation configurations. It shows the dimensions, wire gauge designations and resistance values per unit length for common wire sizes. Use Table 3-1 to determine specific cabling requirements for your installation.

5-1.2 Check the Wiring

5-1.2.1 Checking Power Inputs

Power inputs must be checked to ensure that the applied voltage is of the proper level. The table below shows the input voltage specifications for the various types of devices.

Table 5-1: Power Inputs

Unit	Operating Voltage	
	24VAC ±20%	**24VDC** (18 to 35VDC)
Omni Vaisala Interface (OMWEB02)	Yes	Yes

Terminals 1 & 2 in the image below are not polarity conscious, meaning EITHER terminal can be 24V or 0V. For the purposes of clarity in this document, terminal 1 will be used for 24V and terminal 2 for 0V.

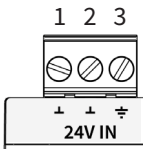


Figure 5-1: Power Terminals

Check 24VAC and 24VDC inputs as follows:

1. Ensure power to the device is turned off.
2. Ensure earth terminal is connected and check resistance back to main earth link, it must be less than 3 Ohms.
3. Unplug orange terminal from the device.
4. Connect multimeter test leads across terminals 1 and 2.
5. Set the voltmeter to the VAC range to measure 24 Volts.
6. Turn on the power.
7. The Voltmeter should read 24VAC + - 10% or 24VDC (18VDC to 35VDC).
8. Turn off the power.
9. Disconnect the multimeter and insert terminal back into controller.

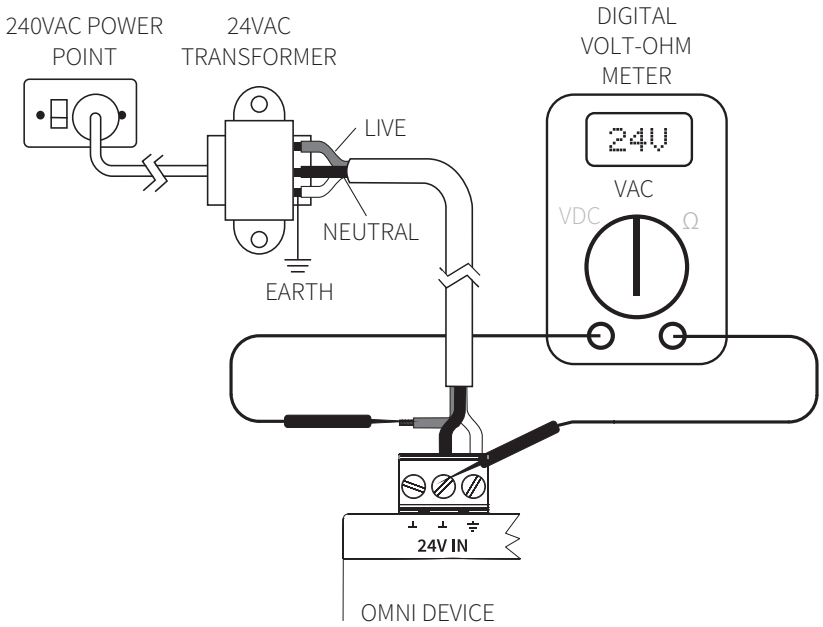


Figure 5-2: Checking AC Power Input

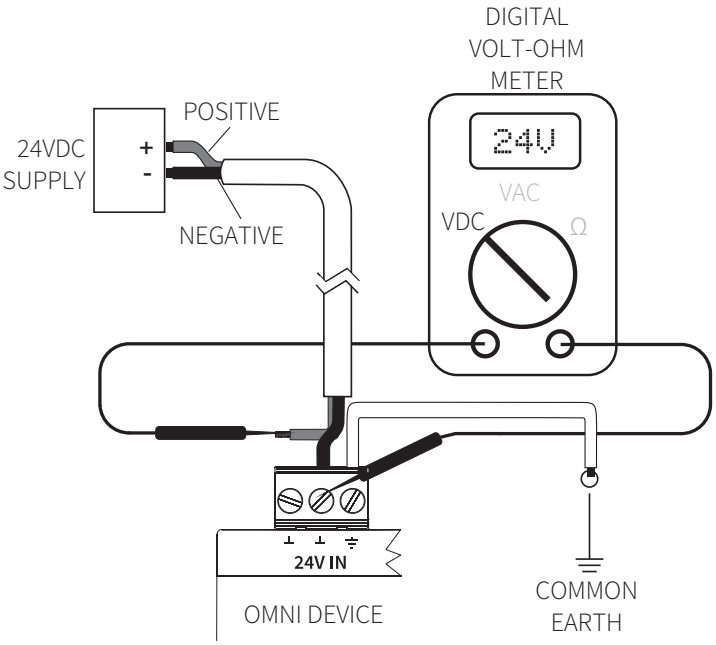


Figure 5-3: Checking DC Power Input

5-1.3 Check Ethernet Connections

- Checks should be made to ensure that all the RJ45 connectors are fully seated and 'clicked' into the ethernet port.
- If external hubs or switches are used, ensure that the RJ45 connectors are fully seated and 'clicked' in.
- If external hubs or switches are used, ensure they are powered. Refer to individual instruction documents as required.

5-1.4 Check RS-485 Connections

- Ensure that each RS-485 connected device is securely wired to the relevant terminals.
- Confirm that the devices are correctly wired to their terminals. DO NOT mix up the positive, negative and shield terminal connections.

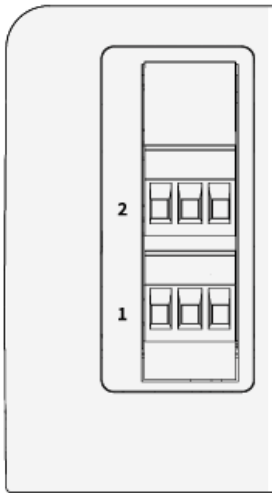


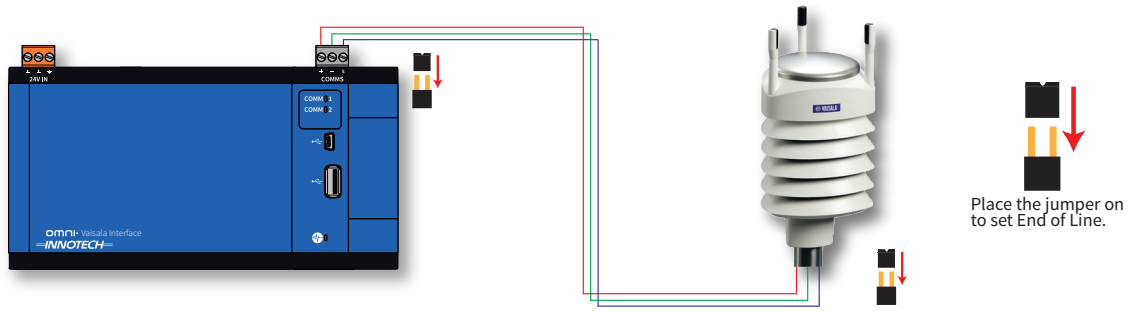
Figure 5-4: RS-485 Ports on side

5-1.5 Check EOL Jumpers

The End-of-Line (EOL) jumpers are required for RS-485 connected devices. There are certain rules that must be followed for proper installation of End-of-Line jumpers.

Ensure that the EOL jumpers have been set on the Omni Vaisala Port and the Vaisala transmitter.

All devices along the RS-485 Comms on a sub system network should be carefully checked to verify that the EOL jumpers are installed only on the first and last device in the network.



EOL Note:
In this example, the OMWEB02 and the Vaisala Transmitter require EOL jumpers to be set.

Comms Port Protocol Note:
Comms Port 1 - Vaisala NMEA
Comms Port 2 - BACnet MS/TP

Figure 5-5: End of Line Jumper, Typical Location

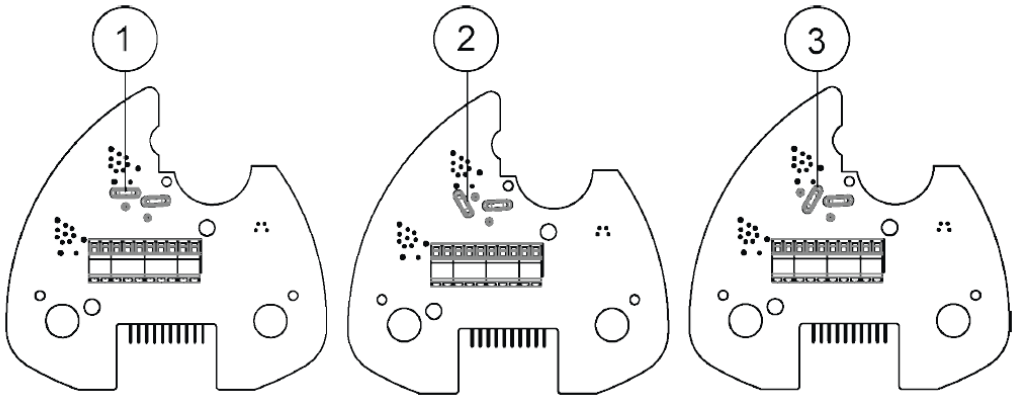


Figure 5-6: Vaisala Termination Jumper Positions

1 - NC, no termination
2 - R, 121 Ω termination
3 - RC, 121 Ω series with 4.7 nF capacitor termination

Source - Vaisala

IMPORTANT

Refer to relevant Vaisala documentation for further details about connection of the device.

5-1.6 Configure the Omni Vaisala Interface

The configuration of the device is preset in the factory. No modifications can be made to the configuration but settings can be changed on the device itself.

The OMWEB02 has an on-board web server which can be accessed with most devices using a web browser.

For details on accessing the web server see the Networking section and the Omni Vaisala Interface Datasheet & User Instructions.

The following instructions are generalised procedures based on the assumption the operator is familiar with operation of a computer in a Windows environment.

5-1.6.1 Configuring a Controller

Refer to previous sections for configuration information.

5-1.7 Initial Tests

5-1.7.1 Performing Initial Tests

It is not practical to provide detailed procedural instructions for performing initial tests that apply to all configurations. However, this paragraph describes the general methodology for performing the initial tests.

Initial tests use the on-board web server.

- The web server is used to monitor the values shown based on input stimuli received from the connected Vaisala Weather Transmitter. This phase serves two purposes: It checks the configuration of the device and it helps to familiarise the operator with the operation of the web server.

5-1.7.2 Testing

Perform the first phase of initial tests of the system as follows:

1. Connect the device to the computer by finding it on a connected network.
2. Connect the Vaisala Weather Transmitter to an RS-485 comms terminal on the OMWEB02.
3. Open a web browser and navigate to your device's address and then login.
4. On the Watches tab, view the values received from the Vaisala Weather Transmitter based on the transmitter type and settings of the Omni device.
5. If you are receiving values from the transmitter, testing is complete. You may need to undertake further configuration of the Omni device to suit your needs. See the Omni Vaisala Interface User Instructions or the on-board help for details.

5-1.8 Final System Check

Final check of the system involves checking the operation of the system, performing any necessary adjustments and verifying that the system functions properly under normal operating conditions. The following are the procedures for performing final system checkout:

1. Ensure all cabling is secure and correctly connected.
2. Ensure RS-485 EOL jumpers are set as required.
3. Apply normal operating power to the entire system in accordance with the applicable manufacturers instruction manuals.
4. Allow adequate time for the various units to stabilise. Unless specified otherwise in the applicable instruction manuals, allow approximately one hour for the circuits to stabilise.
5. Carefully check each unit of the system for proper operation. If necessary, the web server may be used in the Watches tab to check proper operation within the device.
6. Check manufacturers recommended adjustments and settings to ensure all units are set-up for optimum function.
7. The system is ready for operation.

Innotech Support

Innotech provides technical information on the Web to assist you with using its products.
At www.innotech.com, you can find technical manuals, user instructions, and data sheets for all our products.

For direct product support or product information, contact your local distributor, or an Innotech representative.

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