# Omni

## INSTALLATION INSTRUCTIONS



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# Document Management

**Document Title:** Omni Installation Instructions

## Revision History

| Version Number | Date | Summary of Changes |
|---|---|---|
| 1.0 | September 2017 | Document first edition |
| 1.1 | March 2018 | Update Omni U10 REM Images |
| 1.2 | August 2018 | Specification update for supported U10 REMs on Omni C20 controllers |

 

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# Omni

## 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 BEMS controller and associated devices.

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

**Installers should familiarise themselves with the content of this manual before attempting installation of the Omni Controller or associated devices in the Omni family.**

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 controller.*

## 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.

The manual covers the Omni System. This system is based on one or more controllers as the major control units interconnected with several ancillary units. These major control units included in this manual are:

- Omni Controller (all models)
- Omni U10 Remote Expansion Module

For purposes of explanation, a System is defined as one or more controller units interconnected with various ancillary units for the purpose of performing specific functions. An Omni system consists of one or more Omni Controllers as the major control unit(s).
The purpose of this manual is to provide clear and complete instructions for all phases of the installation of the devices that comprise your Omni System. 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 an Omni System containing a single Omni Controller.
- 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 of components of the Omni System. 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 System, power application and initial setup of the various units that comprise the system. |

*References made throughout this manual to "Omni", "Controller" or "BEMS Controller" refer to all models of the Omni BEMS Controller except where specified.*

*References made throughout this manual to "U10", "Omni U10" or "Omni REM" refer to the Omni U10 Remote Expansion Module.*

*All references made throughout this manual to controller model numbers (C40, C40D etc) refer to models with and without displays except where specified.*

 

## 1-2 Specifications Table

***Table 1-2:*** Specifications Table

| Specification | Omni C40 | Omni C20 | Omni C14 | Omni U10 |
|---|---|---|---|---|
| Processor Speed | 800MHz | 800MHz | 600MHz | 72MHz |
| Programmable Points (UI/O) | 40 | 20 | 14 | 10 |
| Non Volatile Memory | 128KB | 128KB | 8KB | - |
| Real-time Clock | Yes | Yes | Yes | - |
| RS-485 Ports | 3 | 3 | 2 | 1 |
| Ethernet - 100BASE-T | 2 | 2 | 1 | - |
| 8GB MicroSD for Logging (32GB max.) | Yes | Yes | Yes | - |
| HMI (on-board) | Optional | Optional | Optional | - |
| HMI (External) | Optional | Optional | - | - |
| USB-A (Host) | Yes | Yes | - | - |
| USB-Mini B (PC Link) | Yes | Yes | Yes | Yes |
| PC Link Speed | 480Mbps | 480Mbps | 480Mbps | 12Mbps |
| ISS RS-485 Comms | Yes | Yes | - | - |
| Status LED | Yes | Yes | Yes | Yes |
| Field Supply 24VDC | Yes | Yes | - | - |
| Expansion Port | Yes | Yes | - | - |
| UI/O Point Processing Limit | 90 | 70 | 14 | N/A |
| Omni U10 Support (Total Devices) | 5 | 5 | - | - |
| Web Server | Yes | Yes | Yes | - |
| Protocol Routing | Yes | Yes | Yes | - |
| BACnet Broadcast Management Device | Yes | Yes | Yes | - |
| Max. UI/O Power | 0.5W | 0.5W | 0.5W | 0.5W |
| Max. IO System Power | 18W | 10W | 4.5W | 4.5W |

- *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 on all controller models.*
- *The controller's MicroSD card also contains PDF documents. For the latest documents, visit www.innotech.com.au.*
- *The optional on-board HMI module can only be installed by qualified Innotech service technicians.*
- *Omni U10 Remote Expansion Modules add 10 points for each U10 used.*
  *Eg: An Omni C40 with 5 U10's will support 90 points total (40 [C40] + 50 [5 x U10's]).*
- *Not all controllers support the U10, see the table above for support and device limits.*

 

## 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 Omni System 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.
- Computer-Generated Wiring Diagram: the Innotech Focus software can be used to print a wiring diagram for the specific application.
- 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

**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 System.

It is recommended that the main units of the Omni System, such as the Omni Controllers and it's extended family of devices be mounted in steel cabinets to minimise the effects of electromagnetic interference.

The flexibility of the Omni controllers 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 Controllers 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 main devices of the Omni System. These paragraphs are intended to provide the installer with sufficient information to permit proper installation of the various units.

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

Controllers are the main processing units that provide overall control of the Omni system. Controllers are housed in a rectangular case made from flame retardant polycarbonate / ABS plastic listed under UL94-V0. The types of controller units included in this manual are:

- Omni C40/D
- Omni C20/D
- Omni C14/D
- Omni U10 Remote Expansion Module

 

## 2-2.1 Omni C40 Controller Dimensions & Identification

The Omni C40 & C40D Controllers are the largest controllers in the Omni controller range. The controller features 40 programmable points, 3 RS-485 comms inputs, 2 RJ45 ethernet ports, USB A and Mini-B connections and an ISS RS-485 input.

*Optional HMI shown in the C40D image.*

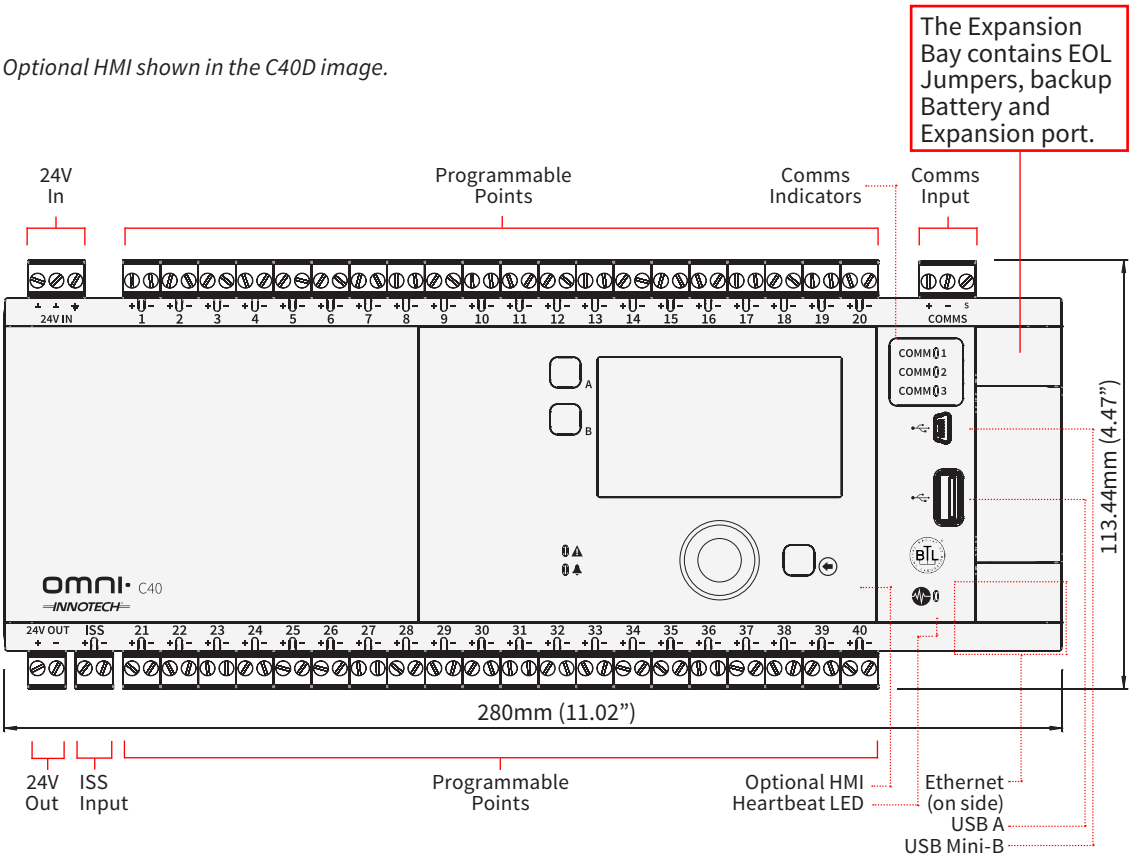


***Figure 2-1:*** Omni C40D Dimensions and Identification

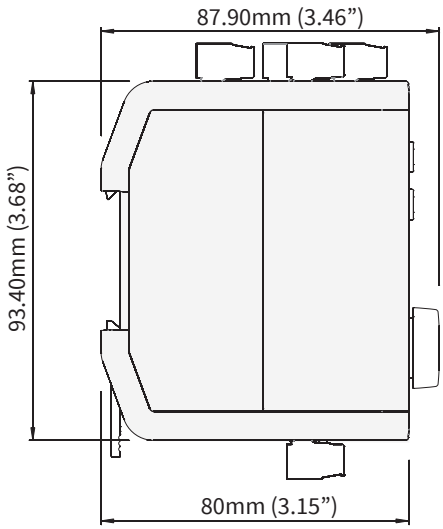


***Figure 2-2:*** Omni C40D Dimensions (End View)

 

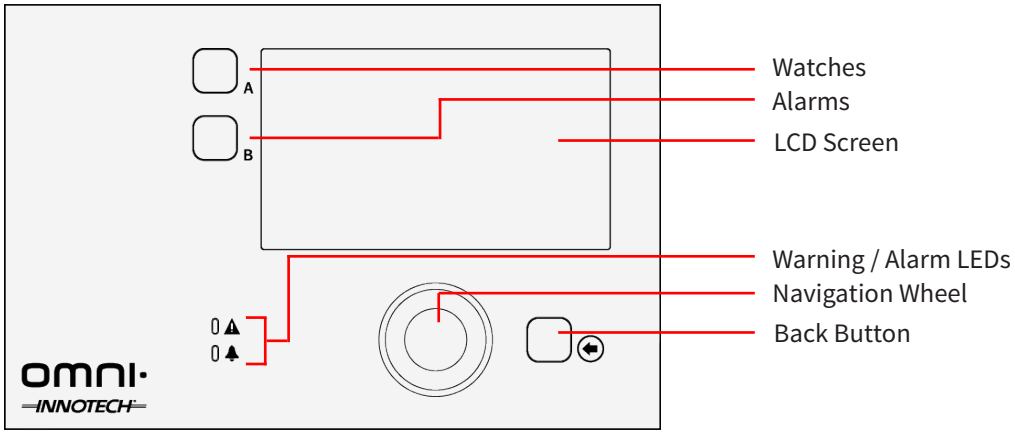


***Figure 2-3:*** Omni OMH01 HMI

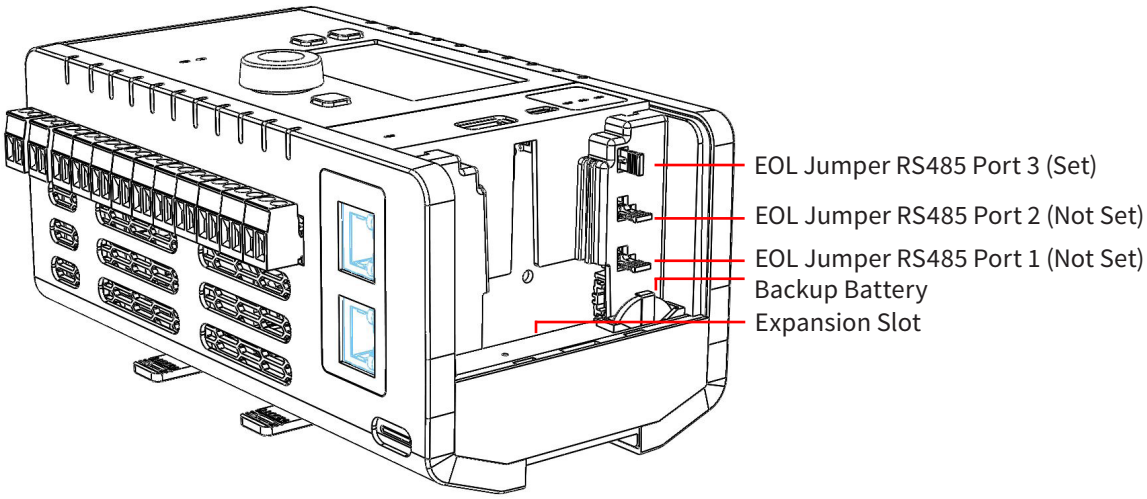


***Figure 2-4:*** Expansion Bay (C20D Shown)

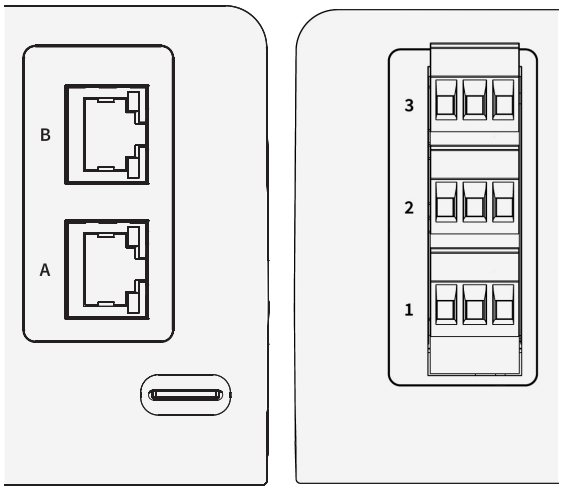


***Figure 2-5:*** Ethernet Ports, MicroSD Card Slot and RS-485 Ports on side of Omni C40

 

## 2-2.2 Omni C20 Controller Dimensions & Identification

The Omni C20 & C20D Controllers feature 20 programmable points, 3 RS-485 comms inputs, 2 RJ45 ethernet ports, USB A and Mini-B connections and an ISS RS-485 input.

*Optional HMI shown in C20D image.*

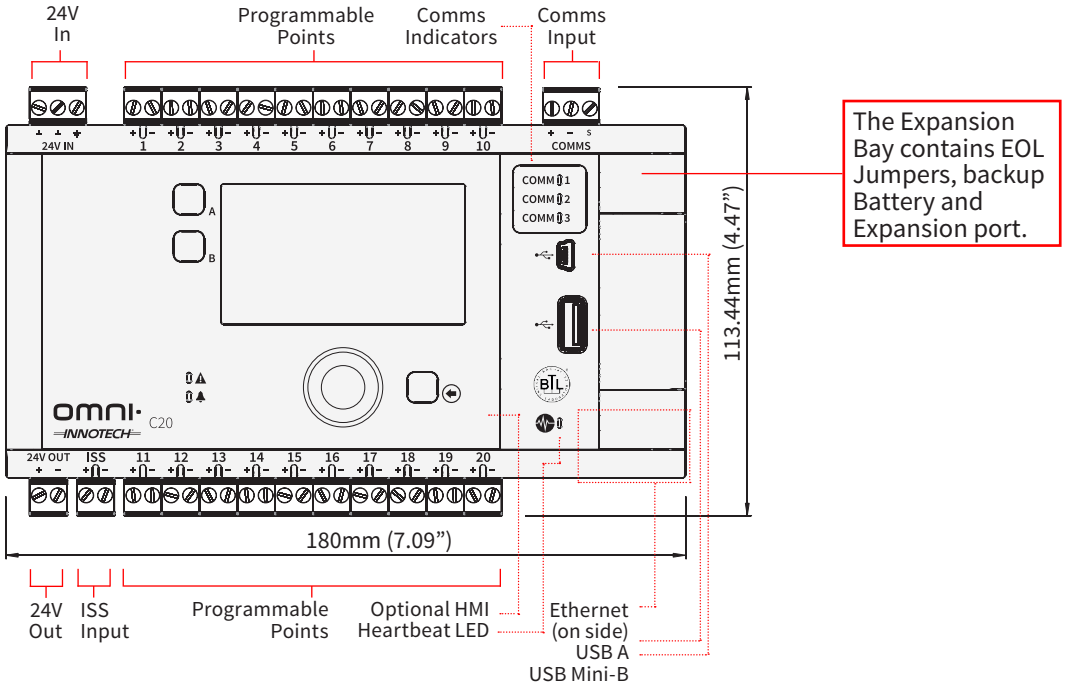


***Figure 2-6:*** Omni C20D Dimensions and Identification

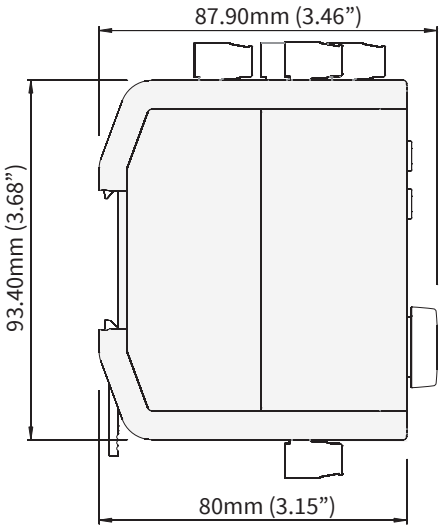


***Figure 2-7:*** Omni C20D Dimensions (End View)

 

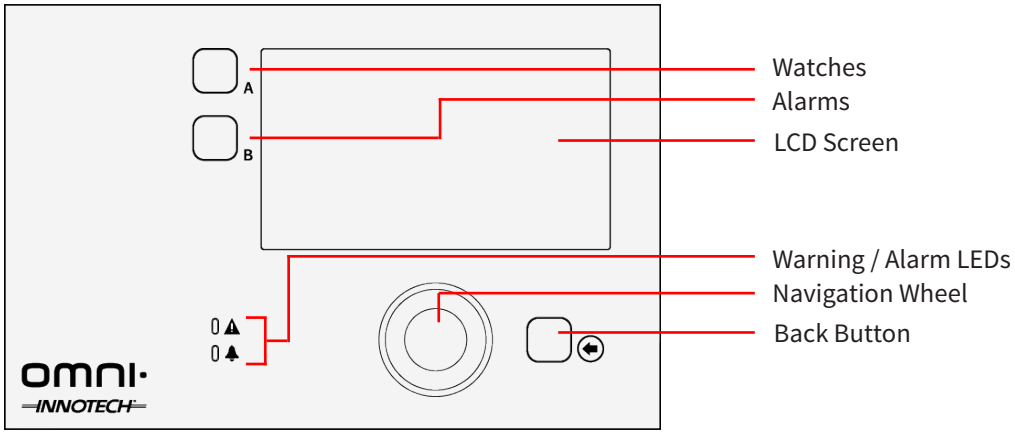


***Figure 2-8:*** Omni OMH01 HMI

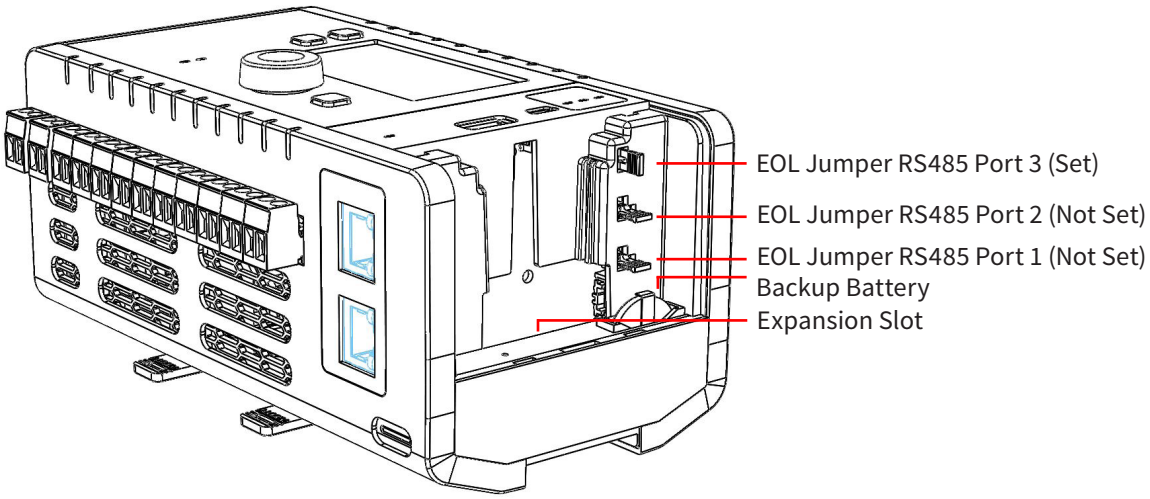


***Figure 2-9:*** Expansion Bay

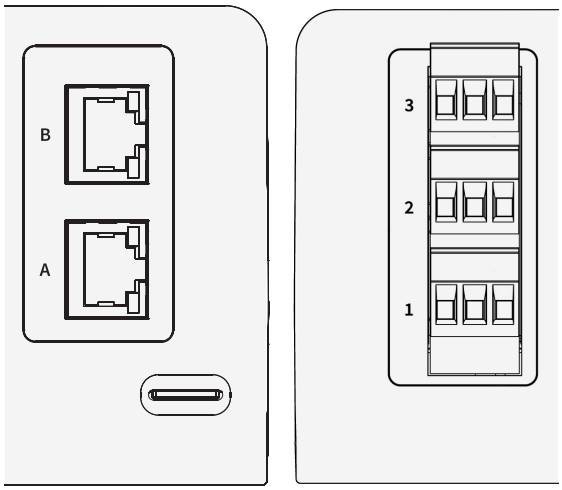


***Figure 2-10:*** Ethernet Ports, MicroSD Card Slot and RS-485 Ports on side of Omni C20

 

## 2-2.3 Omni C14 Controller Dimensions & Identification

The Omni C14 & C14D Controllers feature 14 programmable points, 2 RS-485 comms inputs, 1 RJ45 ethernet port and a USB Mini-B connection.

*Optional HMI shown in C14D image.*

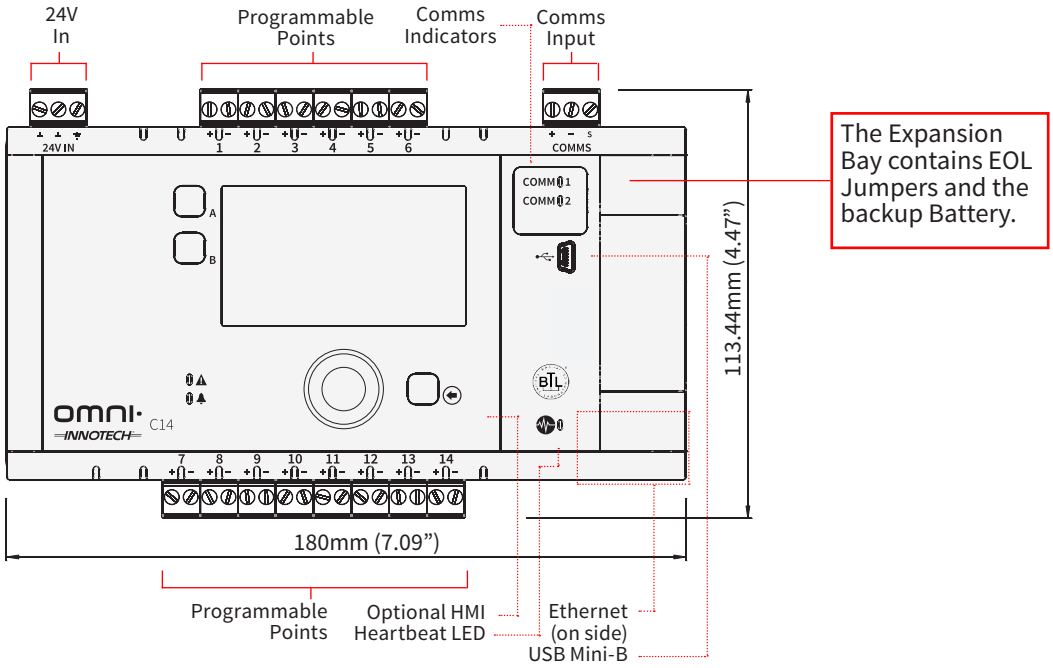


***Figure 2-11:*** Omni C14D Dimensions and Identification

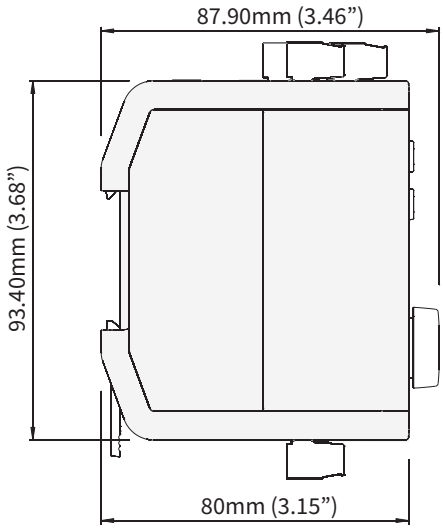


***Figure 2-12:*** Omni C14D Dimensions (End View)

 

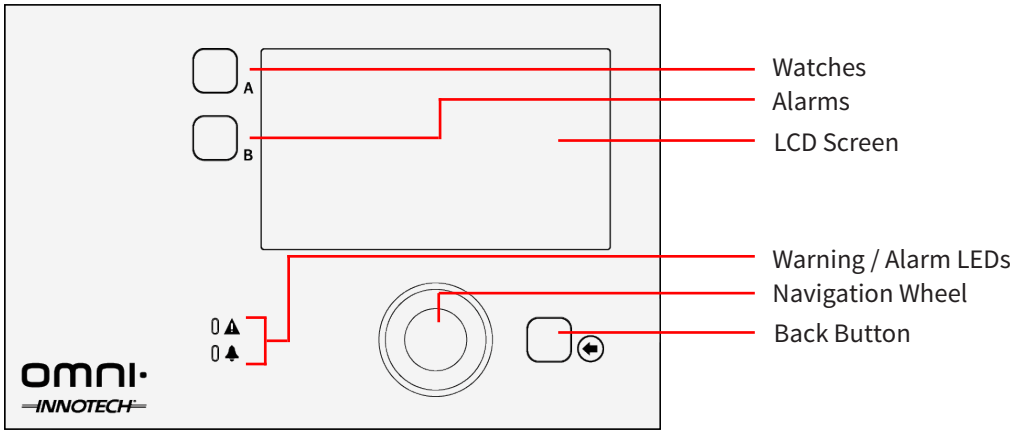


***Figure 2-13:*** Omni OMH01 HMI

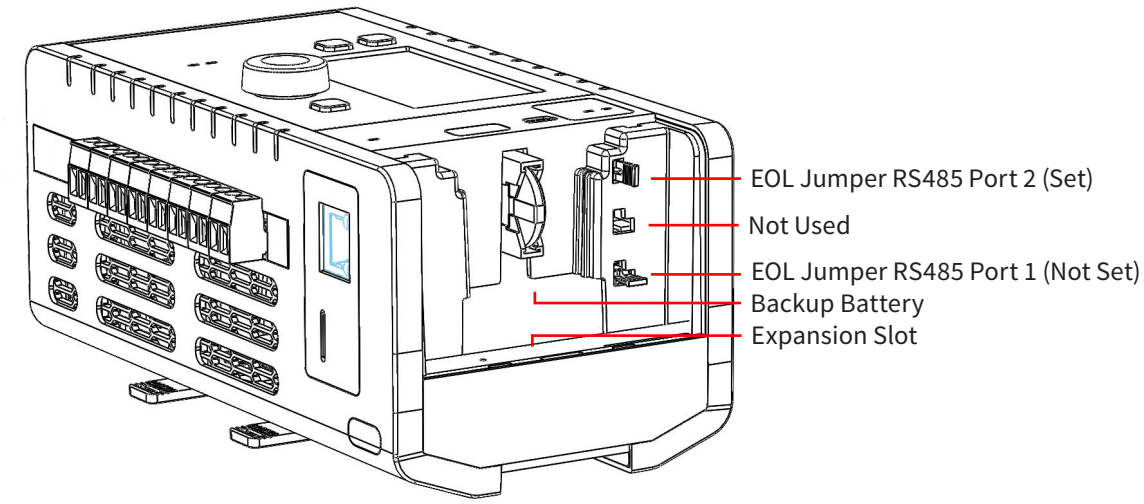


***Figure 2-14:*** Expansion Bay EOL Jumpers

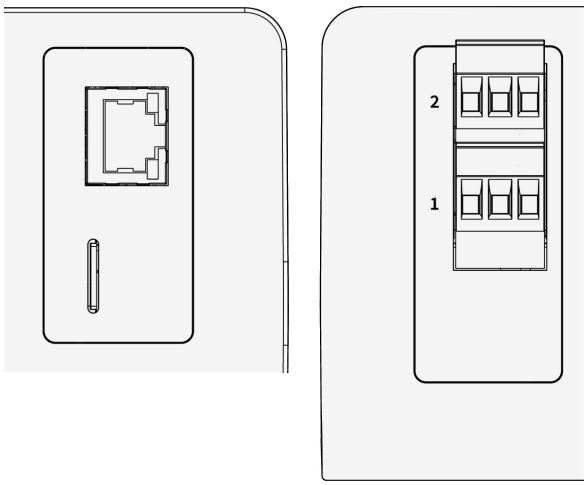


***Figure 2-15:*** Ethernet Port, MicroSD Card Slot and RS-485 Ports on side of Omni C14

 

## 2-2.4 Omni U10 Remote Expansion Module Dimensions & Identification

The Omni U10 can be used on the Omni C40 & C20 controllers. Each U10 adds an additional 10 Programmable Points to the connected Omni controller. The flexibility and features such as self-diagnostics, individual LED status indication and the ability to program each point as an Input or Output are all available as on the host controller.

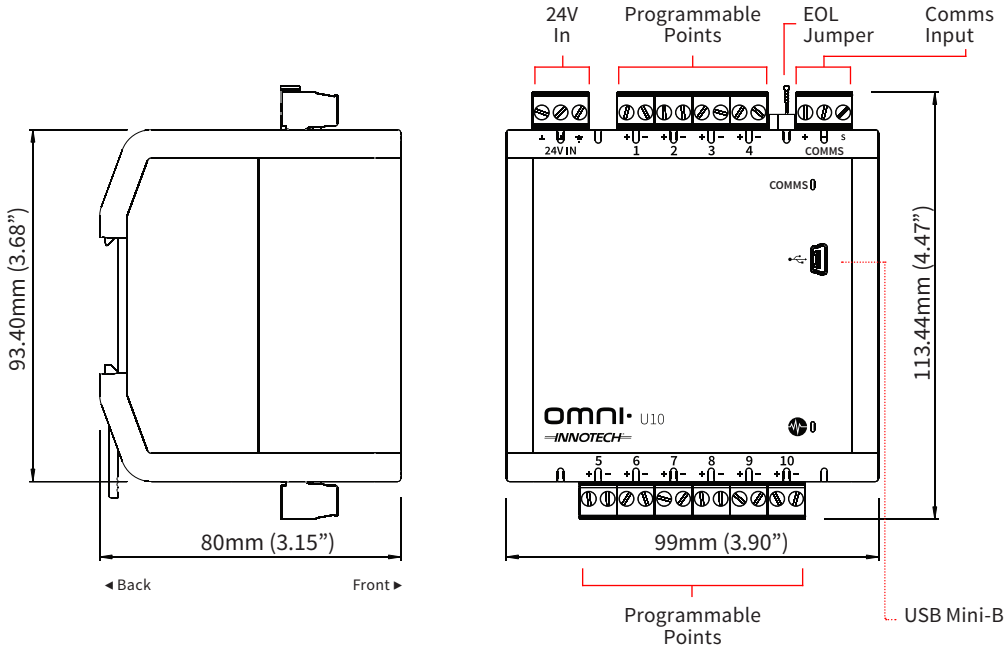


***Figure 2-16:*** Omni U10 Dimensions and Identification

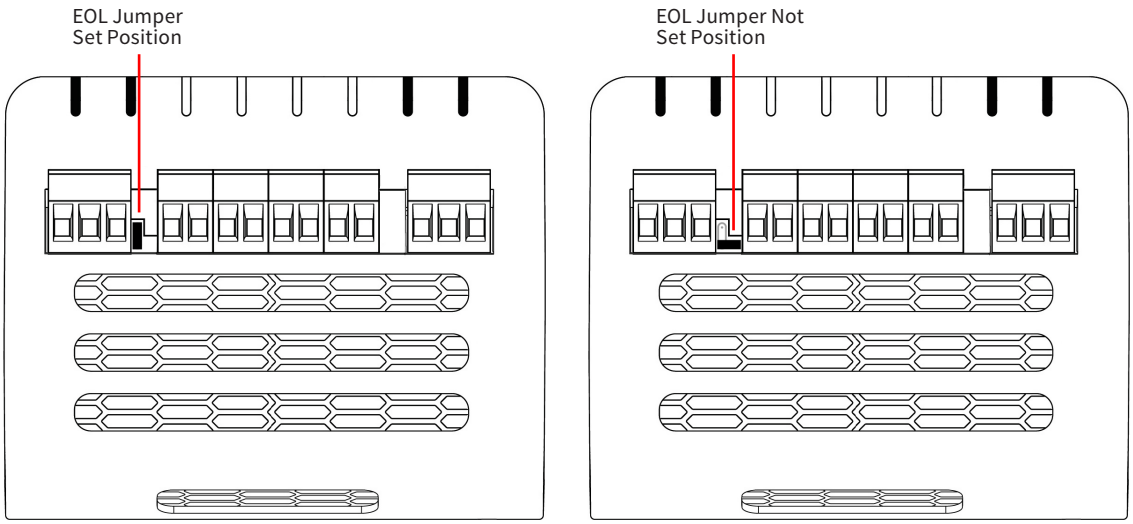


***Figure 2-17:*** Omni U10 EOL Jumper Setting

 

## 2-3 Expansion Bay

On all Omni controller models, the expansion bay at the right end of the controller contains RS-485 End of Line (EOL) Jumpers and the user replaceable real time clock battery. The C40 and C20 models also have an expansion card socket.

*Expansion Cards cannot be installed in the Omni C14, although it does still have an expansion bay.*

*Expansion cards are to be installed / replaced by qualified Innotech service technicians.*

### 2-3.1 Expansion Cards

Omni controller models C40 and C20 provide for the installation of optional modules for High Level Interface communication cards. Only one card can be installed at a time.

*Expansion modules have a white indicator on each side of the board. These indicators are used to show when the board is seated properly during installation. If the module is fully seated in the socket, these indicators will not be visible.*

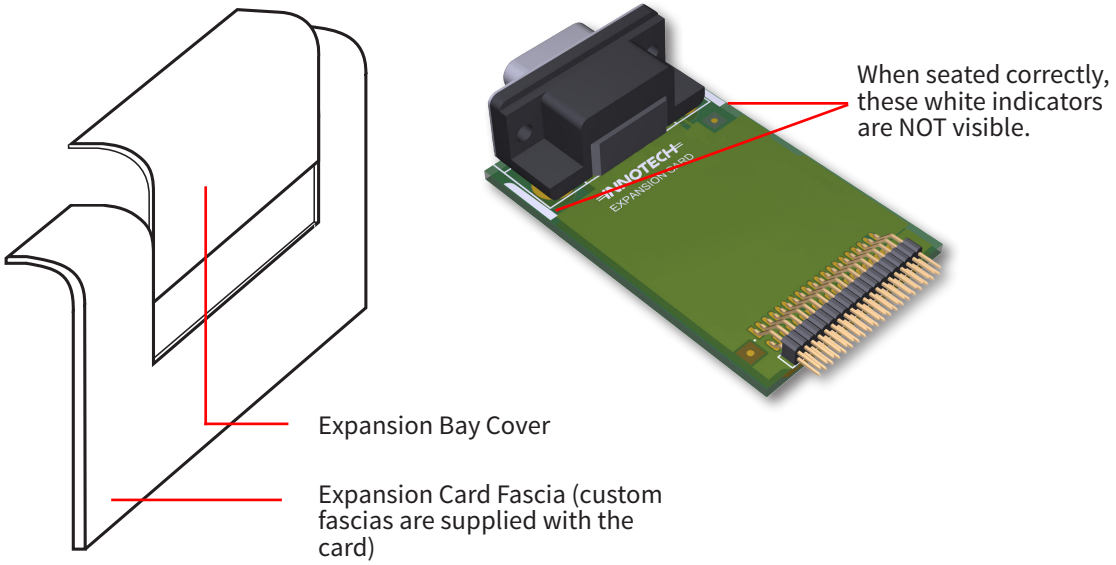


***Figure 2-18:*** Expansion Bay Cover and Expansion Board

#### 2-3.1.1 Expansion Card Installation

1. Open the expansion bay by sliding the cover open.
2. Insert the card into the guides and gently push the card in until it is fully seated in the socket.
3. Remove the blank fascia from the bay cover and install the custom fascia into the bay cover.
4. Replace the expansion bay cover.

 

## 2-3.2 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.*

### 2-3.2.1 Battery Specifications

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

### 2-3.2.2 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.*

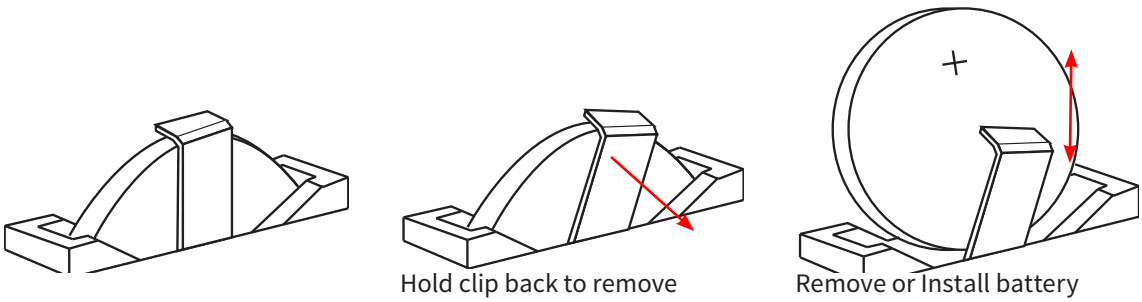


***Figure 2-19:*** Battery Holder & Battery Orientation

 

# 2-4 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.

## 2-4.1 General Installation Instructions

To ensure continued reliable operation of the Omni System, the following installation guidelines should be observed:

- The Omni Controller should be installed in a position that provides easy access to the front panel and sufficient room for power, and input/output cabling. The Controller 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 units in an area with minimum vibration and minimum exposure to mechanical damage.
- Ensure that there is enough clearance for cabling above and below the Omni controller.
- Ensure that the controller's vents are not impeded by the wiring or other obstructions.

## 2-4.2 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.

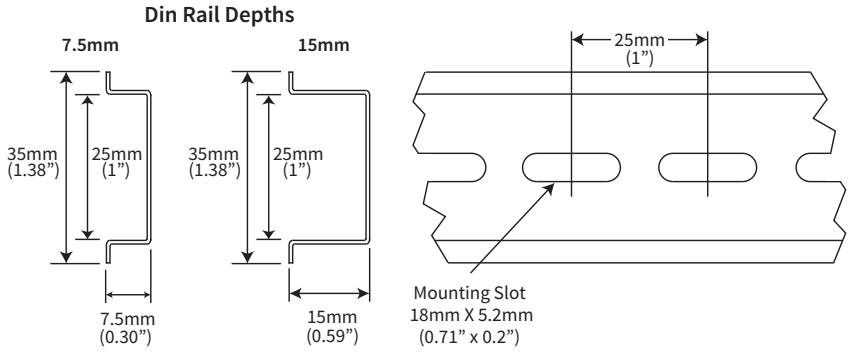


***Figure 2-20:*** DIN Rail Dimensions

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

 

### 2-4.2.1 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.

### 2-4.2.2 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.

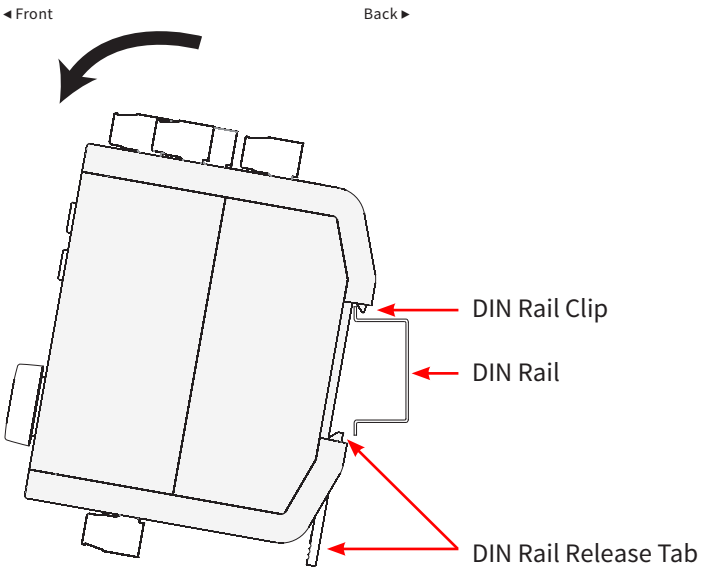


***Figure 2-21:*** DIN Rail Installation

 

# 2-5 HMI Installation

## 2-5.1 OMH01 Retrofit Onboard HMI

The OMH01 retrofit HMI display can only be installed by Innotech technical personnel. Refer to the OMH01 Installation Instructions supplied with the HMI for the correct installation procedure.

## 2-5.2 OMH02 External USB HMI Display Module

The external HMI can be mounted in the cabinet near the Omni controller(s) or used handheld. A USB cable is plugged into the back of the HMI and into the USB-A socket of the Omni C20 or Omni C40 controller.

One HMI can be used with multiple controllers by plugging the USB cable into another controller. The USB cable can be plugged in while the controller is powered.


***Figure 2-22:*** Omni USB HMI Display

 

# Omni

**INSTALLATION INSTRUCTIONS**

## 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 of the Omni System. Because of the flexibility of the Omni controllers and associated devices 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 devices (Omni C40/20/14, Omni U10)

*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 Omni System. More detailed information for wiring of controllers and devices are contained in subsequent paragraphs. All wiring between the controller/devices and system input/output devices, such as sensors, fans and compressors, 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 Omni system. 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
- Power supply and digital outputs cables must have multi-strand conductors with a cross-sectional area of 1mm$^2$ for each conductor
- The earth cable to an Omni System enclosure must be a minimum of 2.5mm$^2$, and wired in accordance with local electrical regulations
- For UIOs, a minimum 16 conductor (0.5mm$^2$) cable is strongly recommended.
- 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 Programmable Point (UI/O) Specifications

Omni devices are equipped with Programmable Points (UI/Os), which can be configured with Focus software to be used as inputs or outputs. Each Universal Input/Output has a signal terminal (+) and a reference terminal (–). The types of inputs and outputs that can be configured and the respective range for each per the table below.

***Table 3-2:*** Programmable Point Specifications

| **Current Loop Input** | |
|---|---|
| Range | 1mA to 20mA |
| Resolution | 12bit @ 4096 steps |
| Accuracy | ±1.5% of reading ±4 LSB @ 20°C (68°F) |
| Drift | ±200ppm/°C |

| **Current / Voltage Input** |
|---|
| Current / Voltage Input (CVT) |
| 333mVAC RMS type with internal burden resistor ONLY |
| ❗ CONNECTION OF STANDARD CURRENT TRANSFORMERS INSTEAD OF CVTs TO ANY UIO TERMINAL WILL CAUSE IRREPAIRABLE DAMAGE TO THE OMNI BEMS CONTROLLER AND PRESENT RISK OF ELECTROCUTION. |

| **Digital Input and Pulse Counter** | |
|---|---|
| Max Pulse Count Frequency @ 2V Amplitude | 100kHz |
| Max Digital Input Response Rate (frequency) | ½ block cycle rate |
| Max Digital Input Voltage | 12VDC |
| ℹ Contact pulse counting mode is suitable for electronic switches only, unless adequately de-bounced. | |

| **Sensor Input** | |
|---|---|
| Supports | Thermistor NTC, Thermistor PTC |
| Ranges | Selectable |
| Resolution | 12bit @ 4096 steps |
| Accuracy | ±1.5% of reading ±4LSB @ 20°C (68°F) |
| Drift | ±200ppm/°C |

| **Voltage Input** | |
|---|---|
| Ranges - 0 to 10VDC | Selectable |
| Resolution | 12bit @ 4096 steps |
| Limits | -0.5V to 12.5VDC |
| Accuracy | ±1.5% of reading ±4LSB @ 20°C (68°F) |
| Drift | ±200ppm/°C |

 

## Programmable Point Specifications (Continued)

| Current Loop Output | |
|---|---|
| Range | 0mA to 20mA |
| Resolution | 12bit @ 4096 steps |
| Maximum Output Voltage | 9VDC @ 20mA |
| Accuracy | ±1.5% of reading ±4LSB @ 20°C (68°F) |
| Drift | ±200ppm/°C |

| Digital Duty Cycle Output | |
|---|---|
| Frequency Range | 60mHz to 976Hz |
| Duty Cycle Resolution | 14bit (16383 steps) |
| Duty Cycle Range | 0 to 100% |
| Switch Modes | As per Digital Output specifications |

| Digital Pulse Output | |
|---|---|
| Pulse Width Range | 10µs to 268s |
| Pulse Resolution | 16bit (65535 steps) |
| Switch Modes | As per Digital Output specifications |

| Digital Output | | |
|---|---|---|
| **Switch Modes** | | |
| Toggle Switching (Auto) | On = 12VDC | Off = 0V |
| High Side Switching | On = 12VDC | Off = Open |
| Low Side Switching | On = 0V | Off = Open |
| Switch Current | Refer to Note | |
| **Protection** | | |
| Inrush and short circuit protected | Response Time: 64µs | |

For High Side and Toggle Switching modes, maximum available power is limited (45mA). For Low Side Switching, each channel can switch 200mA.

Caution must be used when using Low Side Switching. For more information, contact your Innotech representative.

| Voltage Output | |
|---|---|
| Range | 0V to 10VDC |
| Resolution | 12bit @ 4096 steps |
| Impedance | ~80Ω |
| Maximum Current | 10mA |
| Accuracy | ±1.5% of reading ±4LSB @ 20°C (68°F) & $R_{load}$ >10kΩ |
| Drift | ±200ppm/°C |

 

## 3-4 Digital Controller Wiring

The following paragraphs contain input/output connection information for the Omni Controllers and Omni devices. The Focus software, which is used to configure and program the controller, automatically produces a wiring diagram for the specific application. The wiring diagram and can be easily printed and used for reference.

Below is an **example** of a typical computer-generated wiring diagram. A printout of the wiring diagram and materials list is usually provided at the time of hardware delivery. Refer to Figure 3-1.

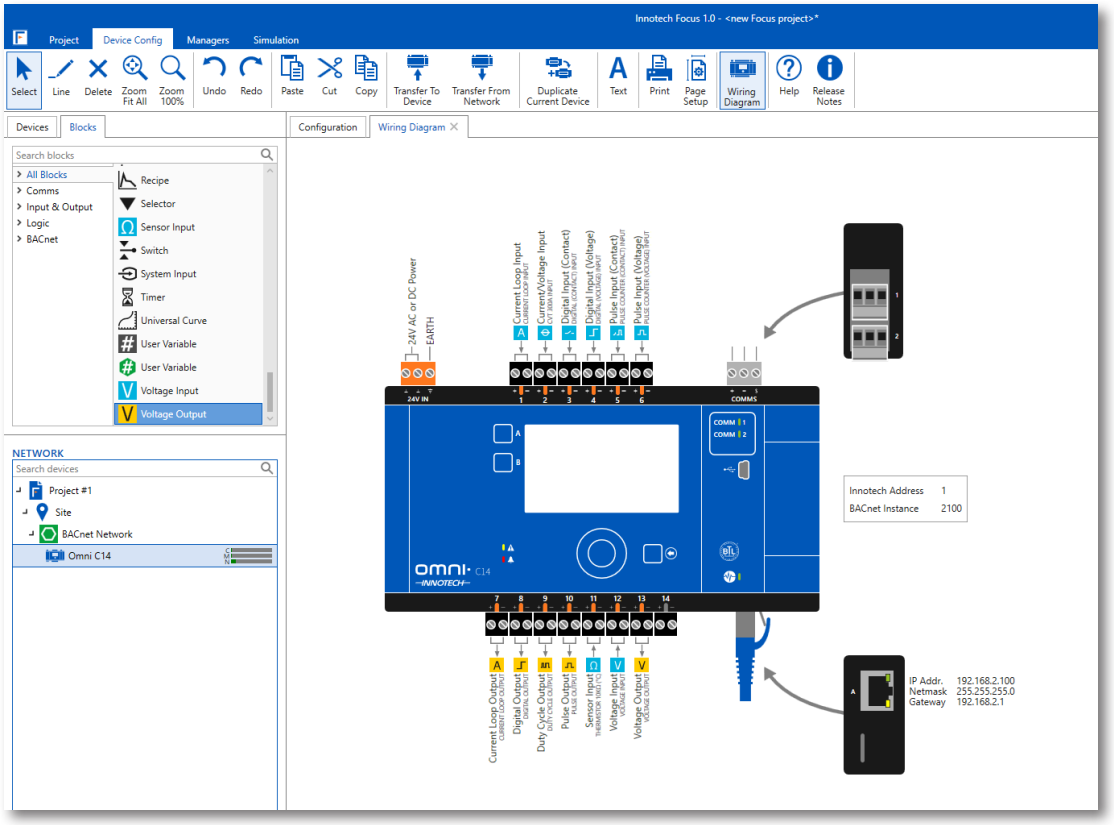


***Figure 3-1:*** Focus Generated Wiring Diagram Example

### 3-4.1 Common Programmable Point Information

Omni controllers are equipped with Programmable Points that can be configured using Innotech Focus software to suit a wide range of applications. Each Programmable Point has a signal terminal (+) and a reference terminal (–) and can be configured as Inputs or Outputs.

*See the Programmable Points specification table for more information.*

 

## 3-4.2 Omni C40/D Controller

Figure 3-2 shows the input/output connection groups for the Omni C40 Controller. The controller uses Phoenix type plug-in terminal strips located around the controller's perimeter.



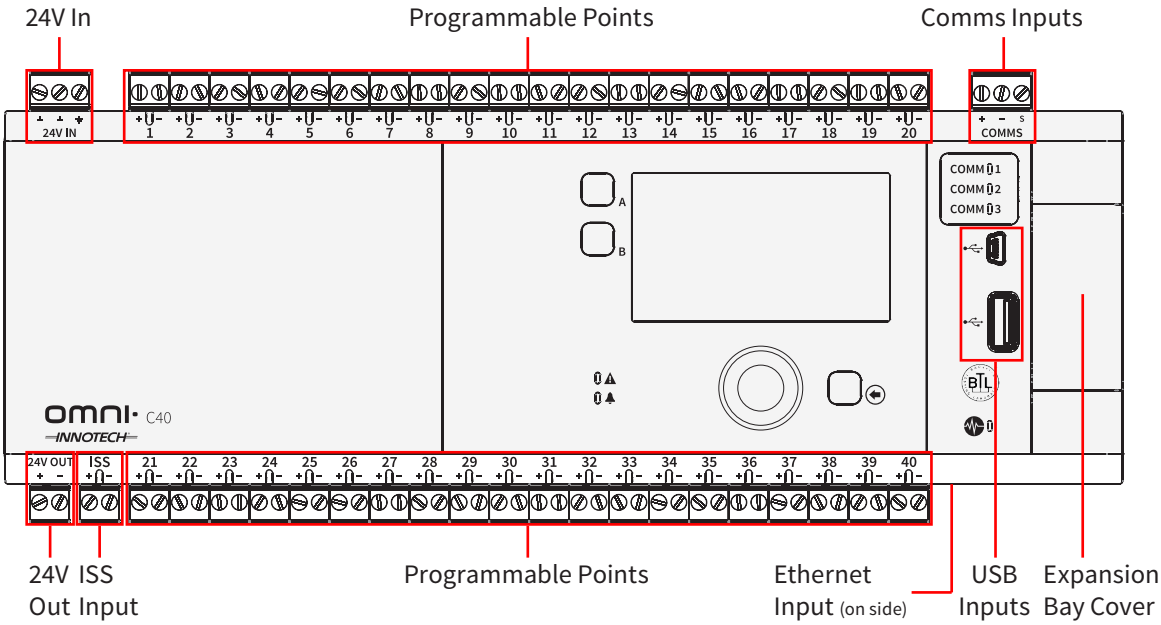


***Figure 3-2:*** Omni C40/D Input / Output Terminals

 

### 3-4.2.1 Power Input

The Omni C40 Controller power requirements are either AC or DC as below:

- 24VAC ±20%, 50/60 Hz
- 24VDC (18-35VDC)
- Power Consumption: 30 Watts max. (load dependent)

The Omni C40 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 3-3 is only for identification purposes and does not relate to any numbering on the physical controller or terminal.*

*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.*

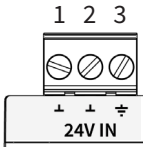


***Figure 3-3:*** Omni C40/D 24V Input Terminals

***Table 3-3:*** Recommended Wiring - C40

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

CAUTION

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

 

### 3-4.2.2 Programmable Points

The Omni C40's programmable points (Terminals 1 to 40) provide the capability of directly interfacing to digital input signal sources such as pushbutton switches and relay contacts.

### 3-4.2.3 24V Output

The 24V Output is used to supply power to external sensors such as a Current Loop Sensor etc. The 24V Out is an unregulated, isolated 24VDC output with ~1.5W, 65mA max and overload protection.

*The 24V Output terminal supplies minimal power and cannot be used to power an Omni device.*

### 3-4.2.4 ISS Input

The Omni C40 ISS Input provides the capability to connect an Omni HMI and innTOUCH display via Innotech's Innotech Smart Sensor (ISS) communication protocol.

### 3-4.2.5 RS-485 Comms

The Omni C40 Comms Inputs are provided for communications via BACnet MS/TP and Innotech Protocols (Maxim / Genesis II) and for connecting to a computer (using a USB Converter), Omni Controllers, U10 Remote Expansion Module (REM) and other means of communication via the RS-485 terminals.

### 3-4.2.6 Ethernet Ports

The Omni C40 Ethernet Inputs provide the capability for connection to your network, connection between Omni controllers, routing and more.

### 3-4.2.7 USB

The Omni C40 has two USB Inputs, USB-A and USB-Mini B. The USB-A provides the capability to connect an Omni HMI, USB flash drives and other supported devices. The USB-B connection is used for connection to a computer.

 

### 3-4.3 Omni C20/D Controller

Figure 3-4 shows the input/output connection groups for the Omni C20 Controller. The controller uses Phoenix type plug-in terminal strips located around the controller's perimeter.

- Power Input (3-4.3.1)
- Programmable Points (UI/O) (3-4.3.2)
- 24V Output (3-4.3.3)
- ISS Input (3-4.3.4)
- RS-485 Comms (3-4.3.5)
- Ethernet Communications Ports (3-4.3.6)
- USB Inputs (3-4.3.7)

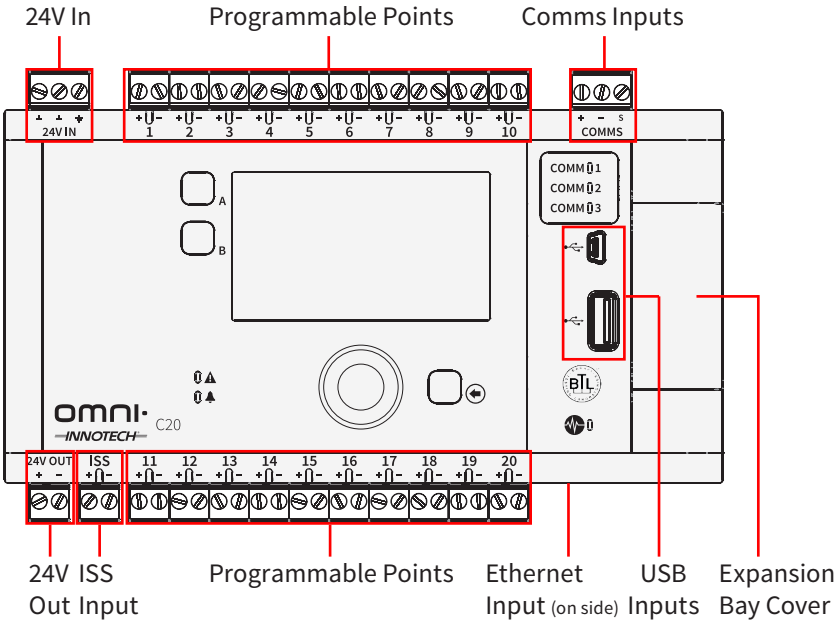


***Figure 3-4:*** Omni C20/D Input / Output Terminals

 

### 3-4.3.1 Power Input

The Omni C20 Controller power requirements are either AC or DC as below:

- 24VAC ±20%, 50/60 Hz
- 24VDC (18-35VDC)
- Power Consumption: 30 Watts max. (load dependent)

The Omni C20 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 3-5 is only for identification purposes and does not relate to any numbering on the physical controller.*

*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.*

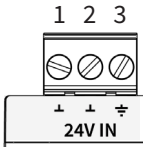


***Figure 3-5:*** Omni C20/D 24V Input Terminals

***Table 3-4:*** Recommended Wiring - C20

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

CAUTION

*Terminal 3 as shown above in Figure 3-5 MUST be Earthed.*

 

### 3-4.3.2 Programmable Points

The Omni C20's programmable points (Terminals 1 to 20) provide the capability of directly interfacing to digital input signal sources such as pushbutton switches and relay contacts.

### 3-4.3.3 24V Output

The 24V Output is used to supply power to external sensors such as a Current Loop Sensor etc. The 24V Out is an unregulated, isolated 24VDC output with ~1.5W, 65mA max and overload protection.

*The 24V Output terminal supplies minimal power and cannot be used to power an Omni device.*

### 3-4.3.4 ISS Input

The Omni C40 ISS Input provides the capability to connect an Omni HMI and innTOUCH display via Innotech's Innotech Smart Sensor (ISS) communication protocol.

### 3-4.3.5 RS-485 Comms

The Omni C20 Comms Inputs are provided for communications via BACnet MS/TP and Innotech Protocols (Maxim / Genesis II) and for connecting to a computer (using a USB Converter), Omni Controllers, U10 REMs and other means of communication via the RS-485 terminals.

### 3-4.3.6 Ethernet Ports

The Omni C20 Ethernet Inputs provide the capability for connection to your network, connection between Omni controllers, routing and more.

### 3-4.3.7 USB

The Omni C20 has two USB Inputs, USB-A and USB-Mini B. The USB-A provides the capability to connect an Omni HMI, USB flash drives and other supported devices. The USB-B connection is used for connection to a computer.

 

## 3-4.4 Omni C14/D Controller

Figure 3-6 shows the input/output connection groups for the Omni C14 Controller. The controller uses Phoenix type plug-in terminal strips located around the controller's perimeter.

- Power Input (3-4.4.1)
- Programmable Points (UI/O) (3-4.4.2)
- RS-485 Comms (3-4.4.3)
- Ethernet Communications Port (3-4.4.4)
- USB Port (3-4.4.5)

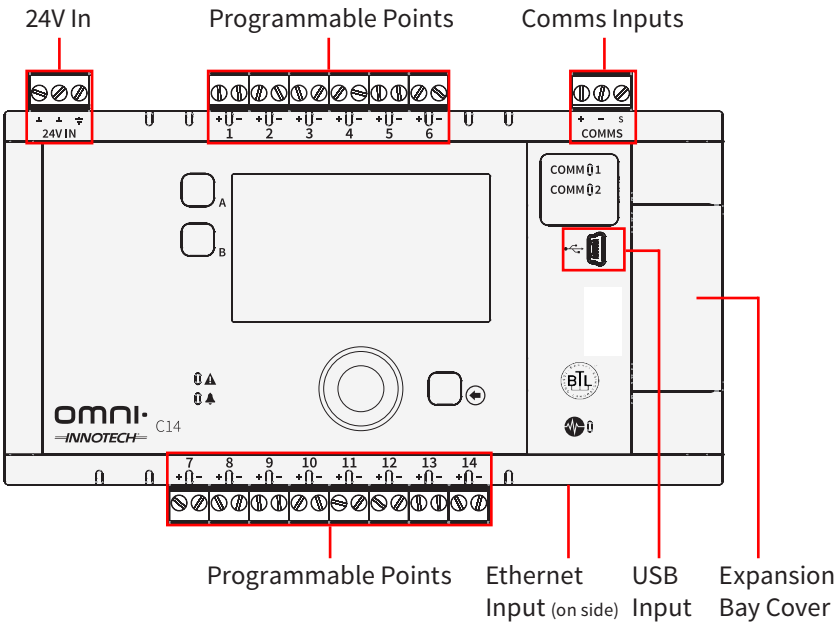


***Figure 3-6:*** Omni C14/D Input / Output Terminals

 

### 3-4.4.1 Power Input

The Omni C14 Controller power requirements are either AC or DC as below:

- 24VAC ±20%, 50/60 Hz
- 24VDC (18-35VDC)
- Power Consumption: 30 Watts max. (load dependent)

The Omni C14 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 3-7 is only for identification purposes and does not relate to any numbering on the physical controller.*

*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.*

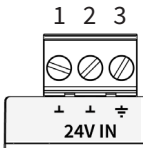


***Figure 3-7:*** Omni C14/D 24V Input Terminals

***Table 3-5:*** Omni C14/D 24V Input Recommended Wiring - C14

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

CAUTION

*Terminal 3 as shown above in Figure 3-7 MUST be Earthed.*

 

### 3-4.4.2 Programmable Points

The Omni C14's programmable points (Terminals 1 to 14) provide the capability of directly interfacing to digital input signal sources such as pushbutton switches and relay contacts.

### 3-4.4.3 RS-485 Comms

The Omni C14 Comms Inputs are provided for communications via BACnet MS/TP and Innotech Protocols (Maxim / Genesis II) and for connecting to a computer (using a USB Converter), Omni controllers and other means of communication via the RS-485 terminals.

### 3-4.4.4 Ethernet Port

The Omni C14 Ethernet Input provides the capability for connection to your network, connection between Omni controllers and more.

### 3-4.4.5 USB

The Omni C14 has one USB Input, USB-Mini B. The USB-B connection is used for connection to a computer.

 

## 3-4.5 Omni U10 Remote Expansion Module

Figure 3-8 shows the input/output connection groups for the Omni U10 REM. The controller uses Phoenix type plug-in terminal strips located around the controller's perimeter.

- Power Input (3-4.5.1)
- RS-485 Comms (3-4.5.2)
- USB Port (3-4.5.3)

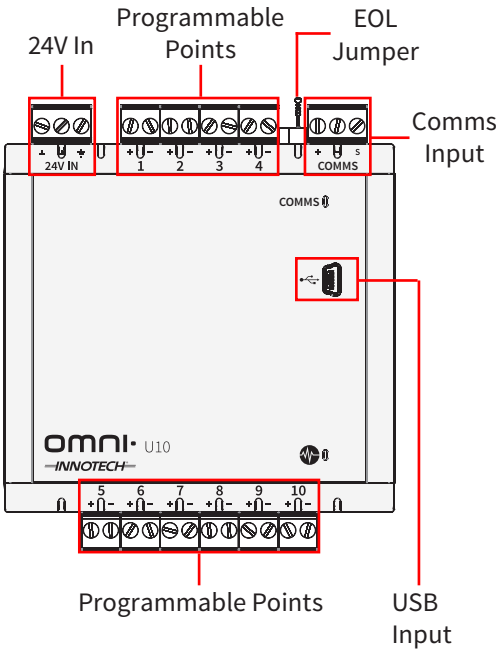


***Figure 3-8:*** Omni U10 Input / Output Terminals

 

### 3-4.5.1 Power Input

The Omni U10 REM power requirements are either AC or DC as below:

- 24VAC ±20%, 50/60 Hz
- 24VDC (18-35VDC)
- Power Consumption: 8 Watts max. (load dependent)

The Omni U10 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 3-9 is only for identification purposes and does not relate to any numbering on the physical controller.*

*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.*

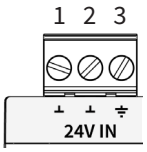


***Figure 3-9:*** Omni U10 24V Input Terminals

***Table 3-6:*** Omni U10 24V Input

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

CAUTION

*Terminal 3 as shown above in Figure 3-9 MUST be Earthed.*

 

### 3-4.5.2 RS-485 Comms

The Omni U10 Comms Inputs provide the capability to connect to the host Omni controller and other daisy-chained U10 REMs.

**Connecting U10 REMs**

Omni U10 REMs are connected to the Omni network via the RS-485 Comms port(s). Connection is achieved using daisy-chaining. The first U10 is connected to a Comms port on the host C40 or C20. For subsequent U10 REMs using an Omni controller host, the cable termination for the next U10 is done within the same terminal connector. When the last controller is connected, ensure to set the EOL Jumper to the correct position.

- *An Omni C20 & C40 can support up to 5 daisy-chained U10 REMs. The Omni C14 does not support the U10 REM.*
- *EOL Jumpers are accessed inside the expansion bay on all controllers.*

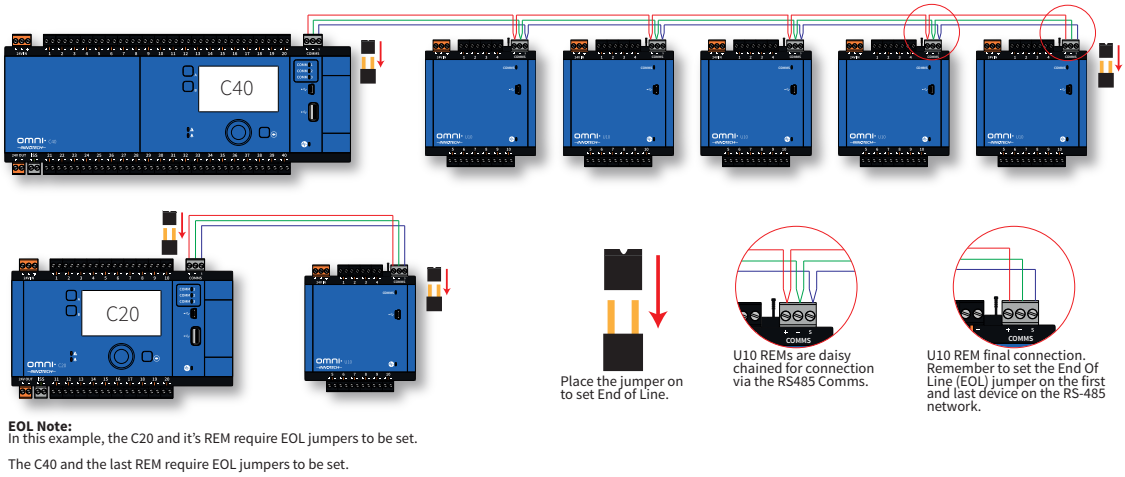


***Figure 3-10:*** U10 Connection to Omni

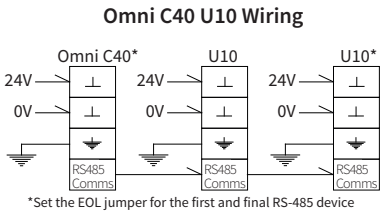


***Figure 3-11:*** Omni C40 U10 Connection

 

### 3-4.5.3 USB

The Omni U10 has one USB Input, USB-Mini B. The USB-B connection is used for connection to a computer.

## 3-4.6 General Wiring Diagrams for Omni Controllers

This section contains general wiring diagrams and images for the Omni controller.

### 3-4.6.1 Omni Earthed Mounted on DIN Rail

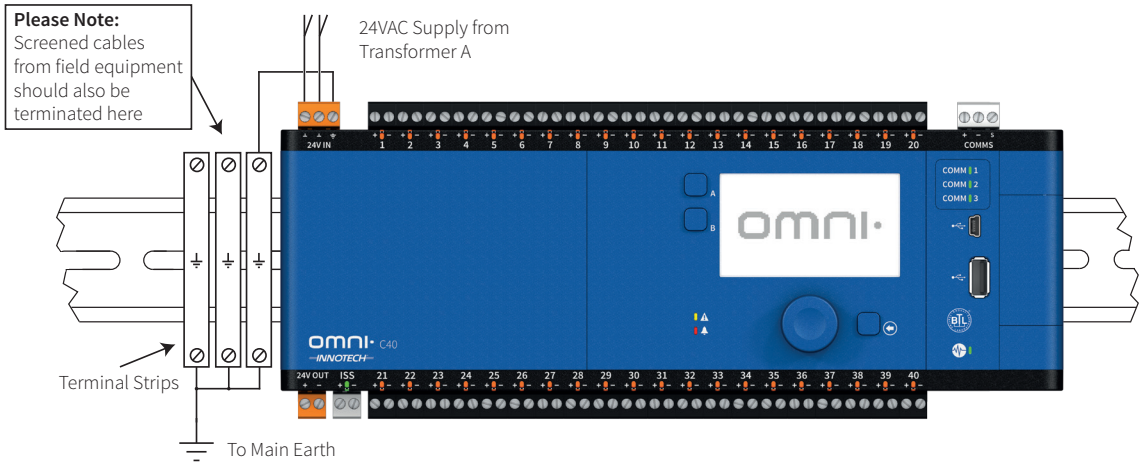


***Figure 3-12:*** Omni Mounted on DIN Rail

### 3-4.6.2 Typical 0-10VDC Input to Omni

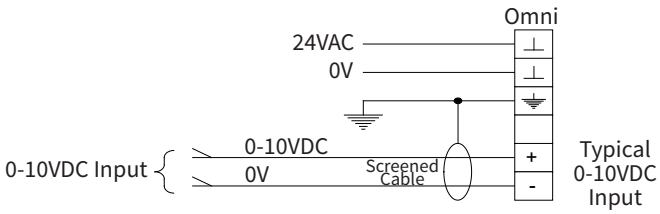


***Figure 3-13:*** Typical 0-10VDC Input to Omni

### 3-4.6.3 Typical 0-10VDC Output From Omni

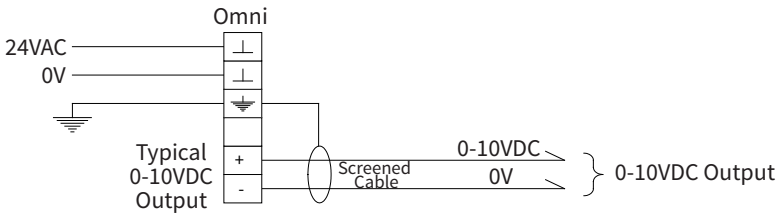


***Figure 3-14:*** Typical 0-10VDC Output from Omni

 

### 3-4.6.4 Typical 4-20mA Input to Omni

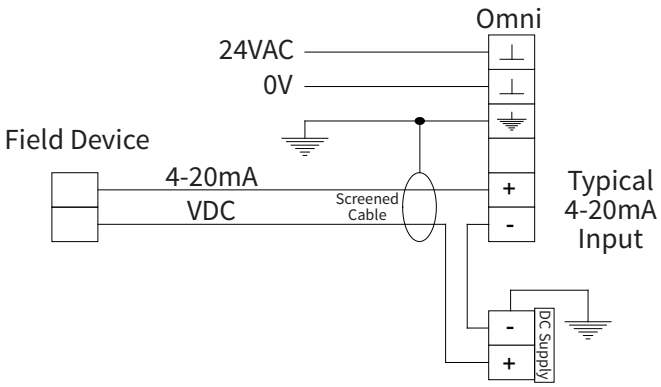


***Figure 3-15:*** Typical 4-20mA Input to Omni

### 3-4.6.5 Typical 4-20mA Output From Omni

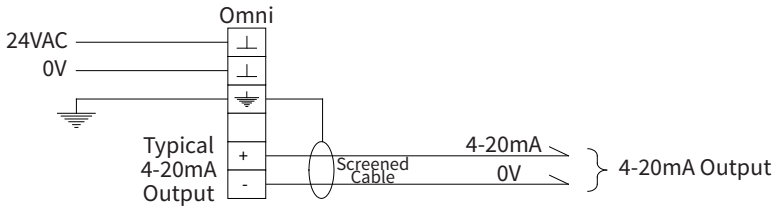


***Figure 3-16:*** Typical 4-20mA Output from Omni

### 3-4.6.6 Typical Digital Input to Omni

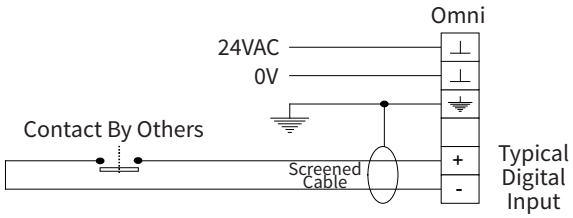


***Figure 3-17:*** Typical Digital Input to Omni

### 3-4.6.7 Typical Digital Output using Omni RL12 Relay

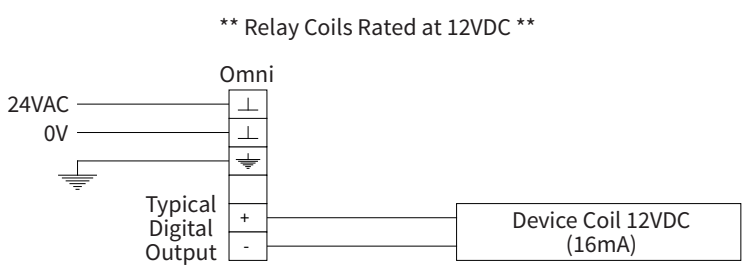


***Figure 3-18:*** Typical Digital Output from Omni

 

### 3-4.6.8 Typical 4-20mA Two Wire Input to Omni

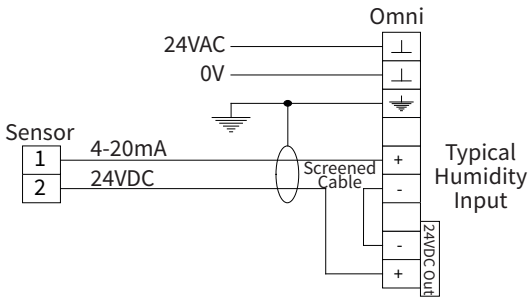


***Figure 3-19:*** Typical Two Wire 4-20mA Input to Omni

*The Omni 24VDC Suppy is an unregulated, isolated 24VDC output, ~1.5W, 65mA max, overload protected.*

### 3-4.6.9 Typical Thermistor Input to Omni

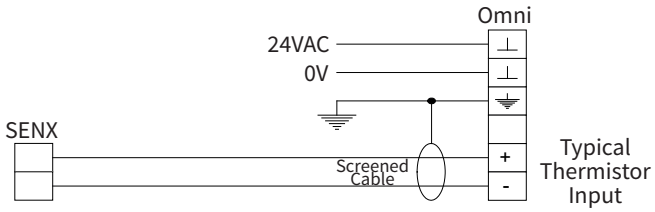


***Figure 3-20:*** Typical Thermistor Input to Omni

### 3-4.6.10 Typical Digital Output from Omni using External DC Supply

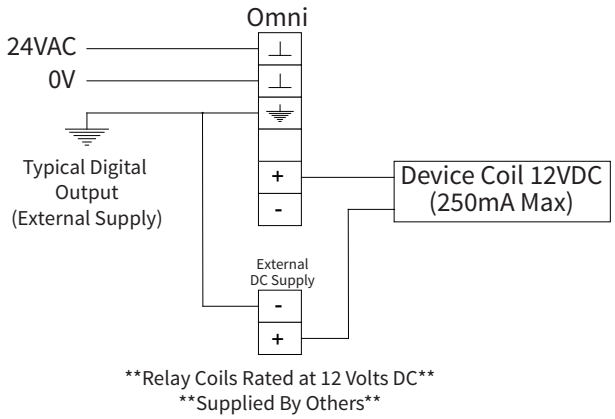


***Figure 3-21:*** Typical Digital Output from Omni using External DC Supply

 

### 3-4.6.11 PTC Sensor Wiring

The Omni Controller currently only supports PTC Sensors in 2 Wire mode. If using 3 or 4 wire PTC sensors, they can be wired as below:

- 3 wire PTC Sensor
  - UIO+: 2 common wires
  - UIO-: single wire

- 4 wire PTC Sensor
  - UIO+: 2 common wires
  - UIO-: 2 common wires

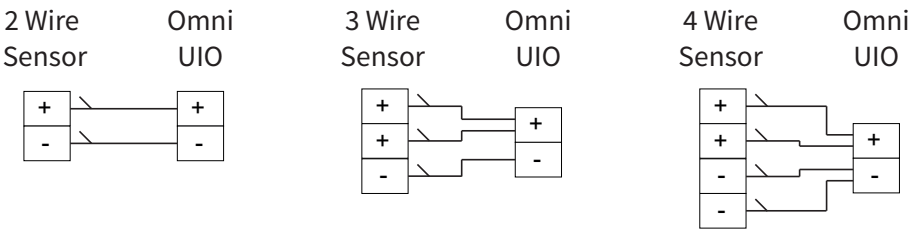


***Figure 3-22:*** PTC Sensor Wiring Examples

 

# Omni

## INSTALLATION INSTRUCTIONS

# 4 Networking

INNOTECH®

## 4-1 Overview

The flexibility of the Omni System 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 digital controller unit acts as a standalone controller. More complex installations use multiple Omni controllers and share data between themselves and/or a computer.

## 4-2 Omni Products

The Omni System products which can be connected are:

- Omni C40 Controller
- Omni C20 Controller
- Omni C14 Controller
- Omni U10 Remote Expansion Module

Legacy Innotech devices can also be connected to an Innotech network with Omni controllers.

Device connection is made by using Ethernet cables or by the RS-485 comms ports.

*Third party non-Innotech devices may also be able to be connected using Omni's native BACnet protocol.*

 

## 4-2.1 Definitions

### 4-2.1.1 Ethernet Comms

Omni Controllers have one or more Ethernet ports, which when connected to an active local area network, enables a PC to configure and monitor the Digital Controller and connected devices. Using the controller's IP address, it is also possible to connect to the controller remotely.

When connected to a Local Area Network, the digital controller should have a user-assigned IP Address to be configured using the Omni 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.

**Innotech TCP**
Connect using Innotech TCP by specifying the TCP Port for Innotech communications.

**BACIP Local**
The BACIP local settings configures the Omni for the local BACnet network communications and connecting from iComm via a BACnet UDP connection. This one BACnet UDP connection discovers all networked Omni controllers and is the preferred connection type.

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 the Omni BBMD from a remote iComm server 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.

**Modbus TCP**
This is a Modbus variant used for communications over TCP/IP networks. Modbus connection of Omni devices requires the purchase of a feature licence.

### 4-2.1.2 RS-485

**Innotech Net Comms**
Net Comms provides a means to configure or monitor Digital Controllers from a computer at a speed of 57,600 (default) or 9,600 baud rates.

**Innotech Global Comms**
The Global Points network provides a means for control data to be shared between Maxim or Genesis II Controllers on an Innotech network. The speed of the communication is relative to programmed Net Comms speed, being either 38,400 or 4,800.

**BACnet MS/TP**
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.

**Modbus RTU**
This is used for serial connection and makes use of a compact, binary representation of the data for protocol communication. The RTU format follows the commands/data with a cyclic redundancy check checksum as an error check mechanism to ensure the reliability of data.

**Omni REM**
This is used when connecting Omni REMs to your Omni controller.

 

## 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 System 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 Network Specifications

The network type and baud rate determine the maximum recommended cable specifications. For RS-485 cable runs longer than the recommended lengths an Innotech Repeater IR11 or IR12 should be used.

Repeaters may also be required if the number of devices connected to a network segment exceeds the maximum allowable number of devices for the specific network.

### 4-3.2 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.

***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 |

 

### 4-3.3 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.

### 4-3.4 Cable Specifications - RS-485

Innotech recommends the use of cables specifically designed for RS-485 networks. There are many cables on the market that meet the specifications for RS-485 networks.

Best reliability is achieved through a cable consisting of two individually shielded twisted pairs of low capacitance. Such cables also provide excellent mechanical strength and lowest electrical resistance, which is beneficial for maximum length cable runs.

Some CAT6 cable types may also be suitable in certain applications. Care should be taken when using CAT6 for Primary Networks as they frequently omit shielding. CAT6 cables should be shielded in order to provide reliable communications.

Any cable that meets or exceeds all the stated specifications is suitable for use:

- 2 twisted pairs
- Minimum conductor cross section AWG24 (0.205 $mm^2$)
- Stranded core type is recommended (7 strands of 0.193 mm)
- Conductor Foil screened cable with a wire drain
- Less than 50 pf capacitance per metre between conductors
- Less than 80 pf capacitance per metre between conductors and screen
- Impedance 100 – 120 Ohms
- Sheath thickness 0.8 mm 240 V rated
- Equivalent to the Belden Part #8102

*CAT6 STP (Shielded Twisted Pairs), where each pair is individually shielded, are suited for use with multiple RS-485 communications channels such as the Innotech Primary Comms network. Shielding is required because of increased pair to pair capacitance, which is the primary culprit for Global/Net channel cross talk.*

 

## 4-3.5 Innotech Subsystem Wiring Considerations

The maximum number of devices that can be connected on one section of Comms cable is 32. This limit is set by the characteristics of the RS-485 ICs. To increase the number of nodes or devices on a system, an Innotech Repeater IR11 or IR12 should be used.

In practice, the maximum length of cable is determined by the quality of the signals. The signal will be degraded by using cable which does not meet the RS-485 cable specification and by installing the cable in locations where it is subject to interference from other cables and equipment. In severe cases, it may not be possible to have 32 nodes on one section of cable, or to match the defined maximum cable length.

The two ports on an Innotech Repeater IR11 or IR12 module reside on different sections of the system and each section can have up to the maximum of 32 nodes. With a one repeater, a total of 64 nodes can be connected on the system. A repeater can be connected at any point on the network providing bus topology is maintained.

### 4-3.5.1 Omni Comms Wiring Connections

There are a number of rules that apply to the comms connection of an Omni System network:

- The screen must be continuous.
- Only one point earthed on the screen.
- Even if a network has a number of devices with a soft earth[1], one hard earth[2] is still required on that network.
- The Net and Global networks should have the same length cable run and path.
- If a Innotech Repeater is installed, each side of that repeater is a separate network and each requires a bonded earth connection on the screen.
- There are no End of Line termination (EOL) requirements on the primary network.

*1. Hard Earth - A bonded, hard or clean earth is defined as a low impedance earth point with little or no chance of conducted noise either already present or likely to be created when bonded to a circuit. For Innotech's reference we also explicitly mean there is no potential difference to true earth.*

*2. Soft Earth - A soft earth is where there is a path to earth via a circuit. This provides a tie to earth so potential differences are minimised. This path has higher impedance than a bonded earth. Soft earth is often used in 24 V supplied devices. The 'tie to earth' is in fact a 'tie to 0 V' because there is no dedicated earth terminal available. It is therefore expected that the 0 V is earthed near the supply transformer.*

### 4-3.5.2 BACnet MS/TP Wiring Considerations

BACnet MS/TP uses RS-485 for communication 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).

*Device numbers allowed per network length may be limited when using third party devices.*

 

### 4-3.5.3 Continuous Screen

The screen on a network needs to be continuous. That means it remains unbroken along its entire length. As there is one ‘S’ terminal on a typical network device both the Global and Net screens are to be connected to this tie terminal.

### 4-3.5.4 Innotech Net / Global Comms Connections

When other controllers are added to the network they must be installed in a manner that does not interrupt the integrity of the network. A lot of current devices will have the soft earth option and are fully isolated from the factory. There is no issue mixing the current style earth connection with previous models of hardware on the network if the following rules are applied.

For any soft earth type device connected to a primary network there are some general rules for connection.

- Do not break the continuity of the screen
- Use the ‘S’ terminal for both the entering and leaving screen termination
- You must earth the system at a single bonded earth point. This is regardless of the number of soft earth points connected
- Attempt to ensure the net and global networks are the same length and follow the same path

 

# 4-4 Cable Connection

This section contains information showing generalised connection examples which may not be appropriate to your installation. Configuration of the Omni devices needs to be undertaken using the HMI or on-board web-server. You may need to change the default IP address and BACnet Instance for the device from the HMI or use the USB Mini-B connection. This is available in the Port Assignment > Ethernet menu on the HMI or the on-board web server.

*Ethernet is Innotech's preferred connection method for Omni Controllers. TCP connection can be made via the ethernet port(s) or the USB-Mini B. Using ethernet enables many more features of the controller that cannot be used with RS-485 connections.*

**IMPORTANT**

*The next section for connecting to your controller using USB requires the latest version of iComm from the Innotech website to be installed. During installation device drivers will be installed to make this connection possible.*

## 4-4.1 Setting the IP and BACnet Instance via USB Connection

1. Connect a USB cable from your computer to the USB-Mini-B port on the Omni Controller. After connection, Windows will set up a new network connection for the Omni if the drivers have been installed. These drivers can be downloaded from the Innotech website.


***Figure 4-1:*** Connection from Computer to Omni via USB Mini-B

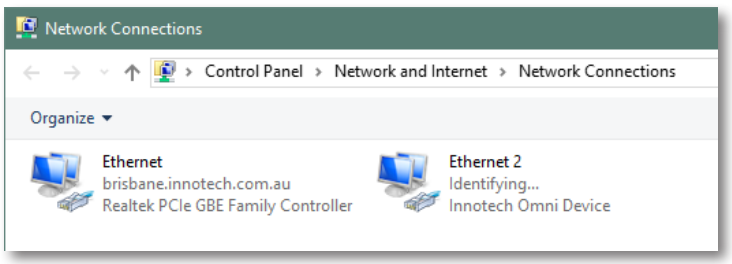


***Figure 4-2:*** Network Connections Window

 

2. After the connection has been made, you can now connect to your Omni controller using a supported browser by navigating to the address, **169.254.2.100**. Assuming the controller does not previously have a configuration installed, login using the default credentials. Username: Innotech, Password: 1111. If the controller contains a configuration, login using user credentials contained in the configuration.

*The password 1111 is only valid for 'blank' controllers, that is blank controllers with newly installed firmware. Focus software **will not** allow the transfer of a configuration with the password 1111.*

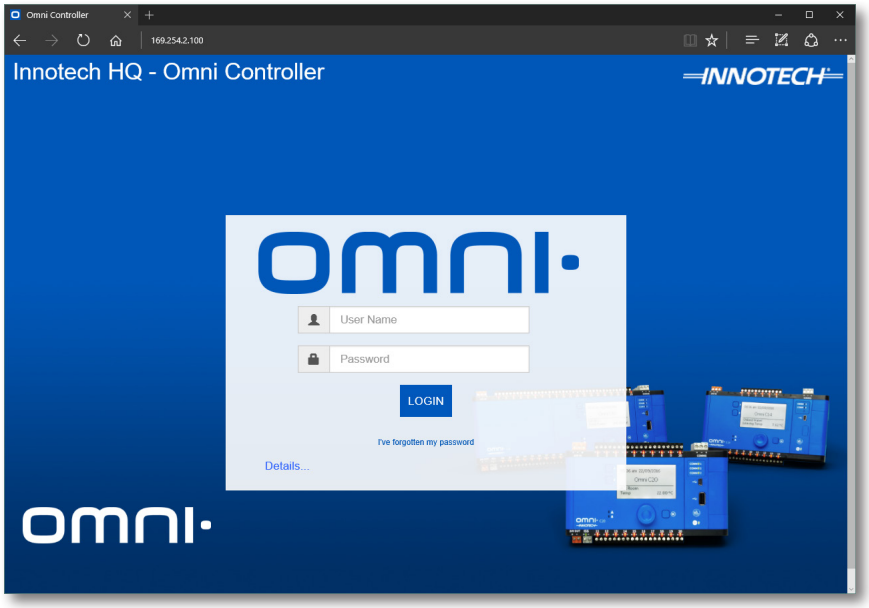


***Figure 4-3:*** Login Screen Accessed Using USB

3. After logging in, navigate to *Settings* > *Protocols* > *BACnet* to edit the BACnet instance (must be unique).
4. Click Update to save the settings then navigate to *Settings* > *Port Assignment* > *Ethernet* to edit the TCP/IP settings for your controller. Click Update when finished.

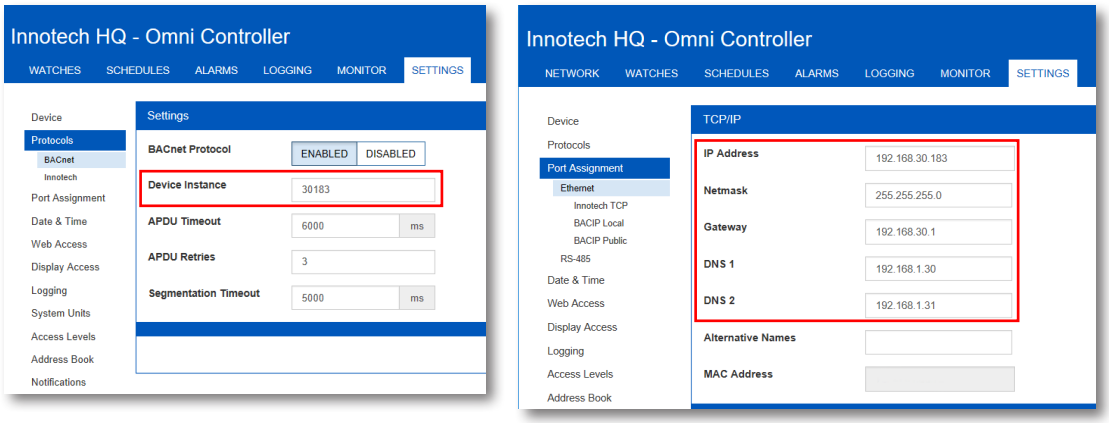


***Figure 4-4:*** BACnet and Ethernet Settings

 

## 4-4.2 Ethernet

Be sure to adhere to cable connection standards for Ethernet connections.

Omni C40 and C20 controllers 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 Omni will then operate as an Ethernet switch.

C14 controllers only have one Ethernet port and will be used in Switch mode by default.

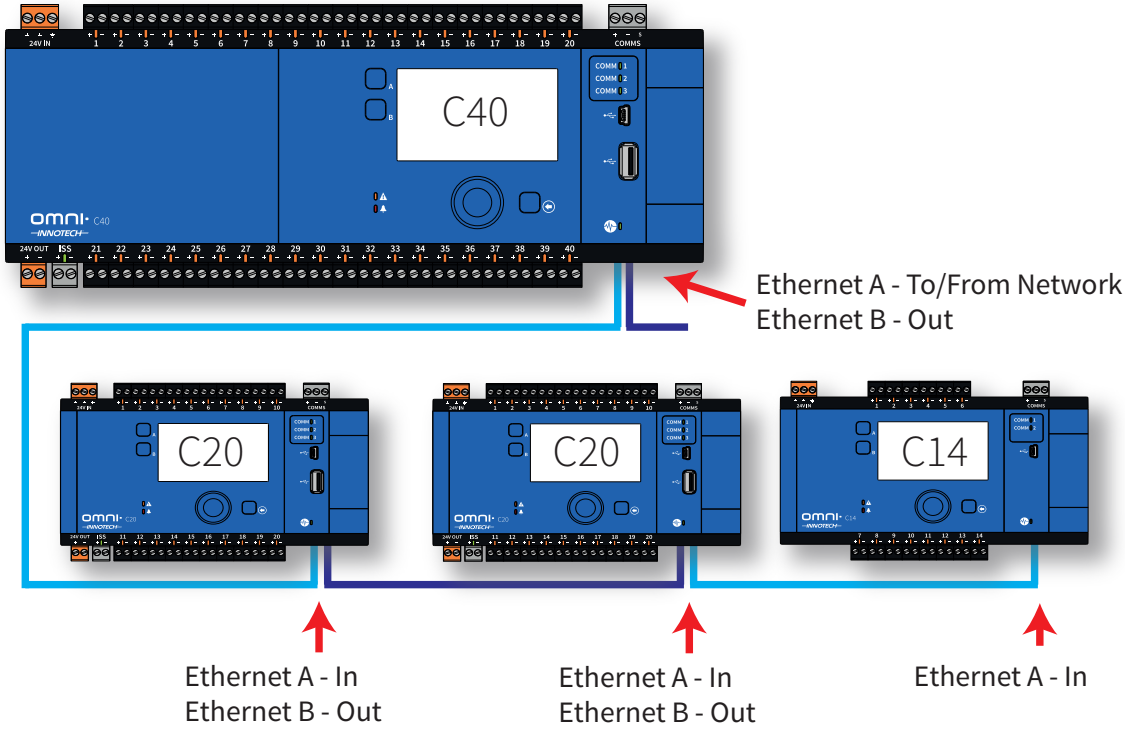


***Figure 4-5:*** Example Controller Wiring Topology - Ethernet

**IMPORTANT**

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

 

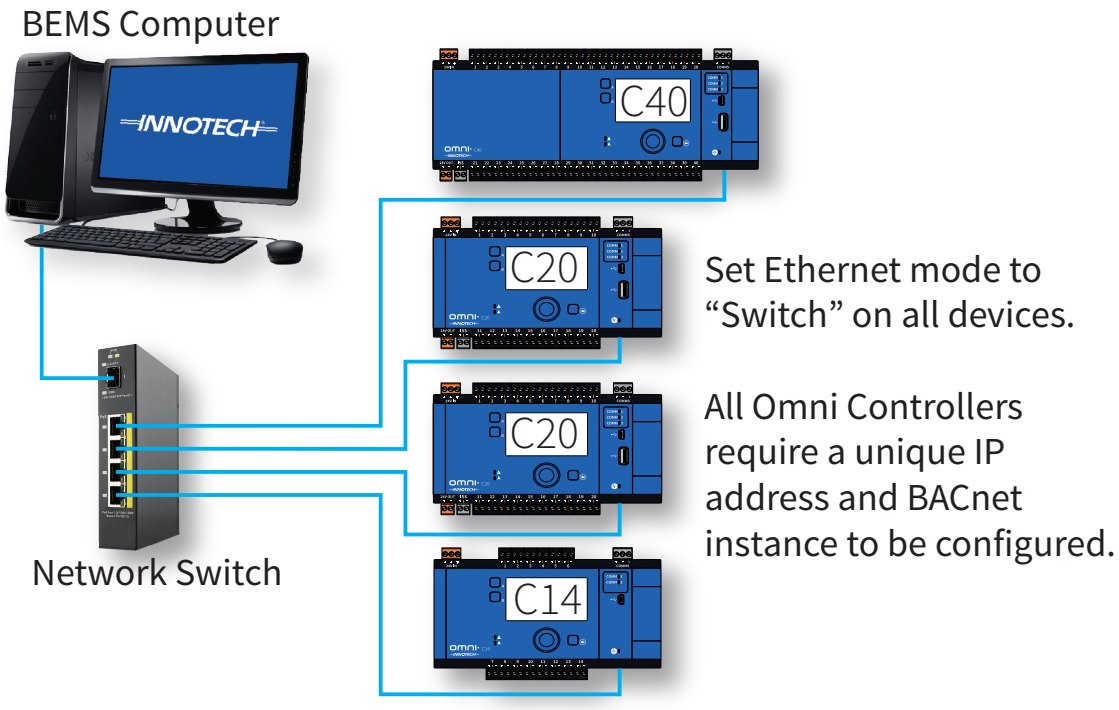


***Figure 4-6:*** Example Controller Wiring Topology - Ethernet with switch

### 4-4.2.1 Ethernet (TCP/IP)

Your Omni controller 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 controllers to ensure that a unique IP address and BACnet instance are assigned to each Omni.

The TCP/IP details can be changed in several ways.

- Change the details on the HMI (Port Assignment > Ethernet > Port # > TCP/IP)
- Create a configuration in Innotech Focus software and transfer a configuration to the controller using the default IP address
- Connect to the on-board web server by entering the default address into a supported web browser
- Connect via USB Mini-B and open the web page (recommended method).

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

**IMPORTANT**

- *If connecting to a controller 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 Omni.*
- *Ethernet cable lengths have a limit of 100 metres.*

 

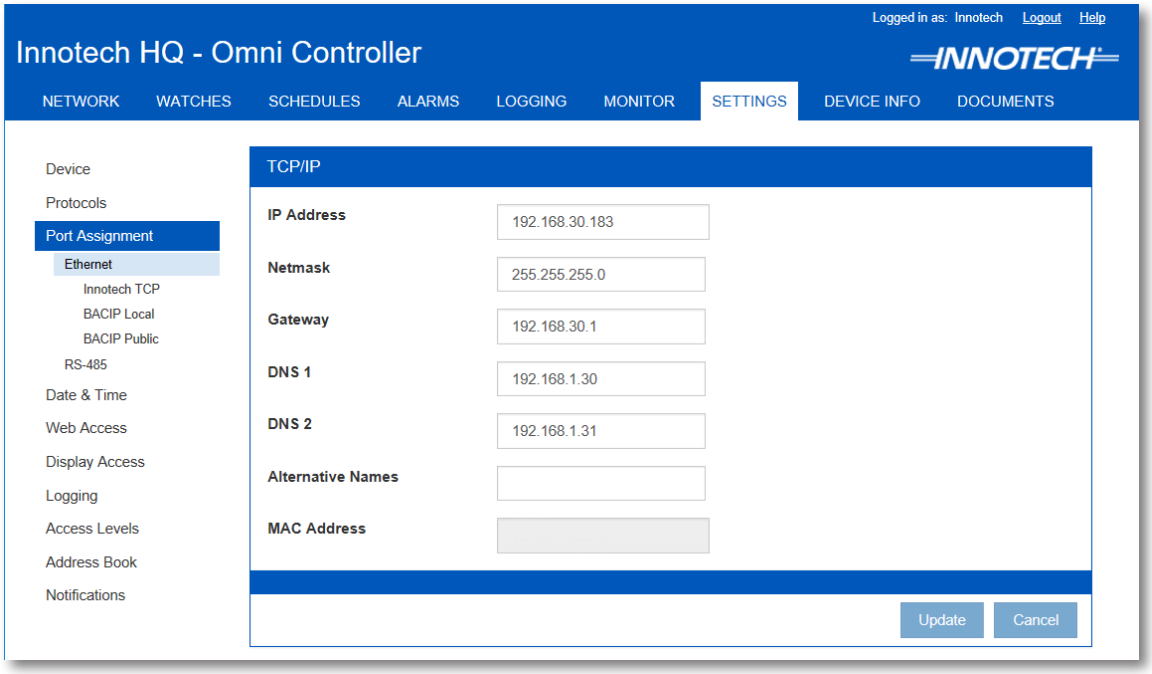


***Figure 4-7:*** Ethernet - TCP/IP Settings

### 4-4.2.2 Ethernet (Innotech TCP)

Innotech TCP's only setting is to specify the port (20000 default for Omni communication). This is used to disable TCP if required and is on by default.

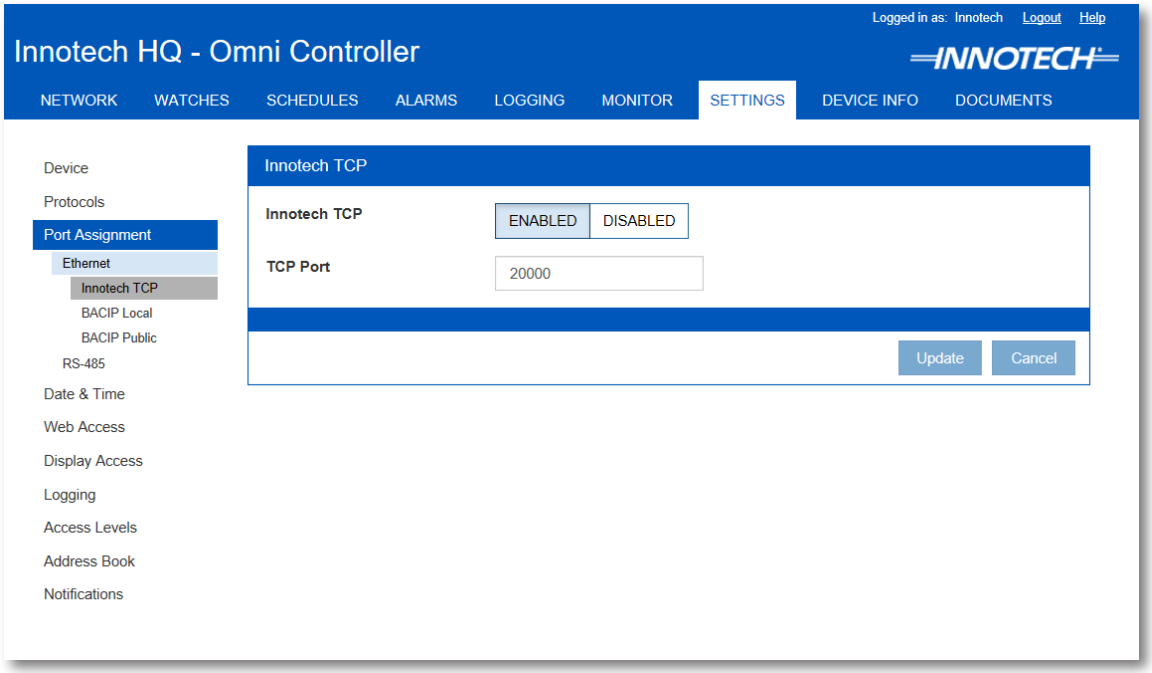


***Figure 4-8:*** Ethernet - Innotech TCP Settings

 

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

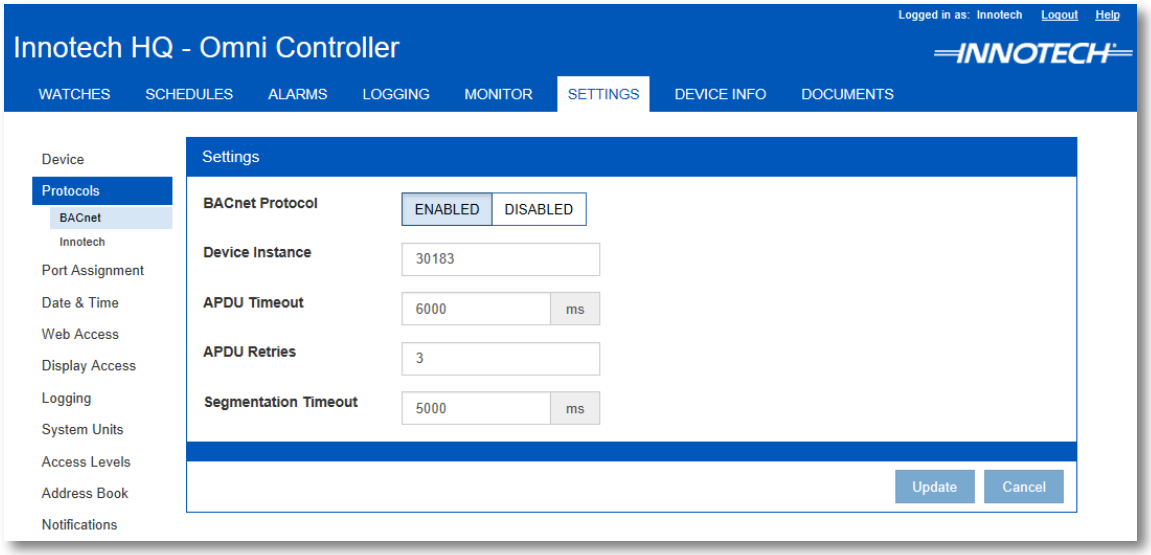


***Figure 4-9:*** Protocols Settings - BACnet

### 4-4.2.3 Ethernet (BACnet IP Local - Device)

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

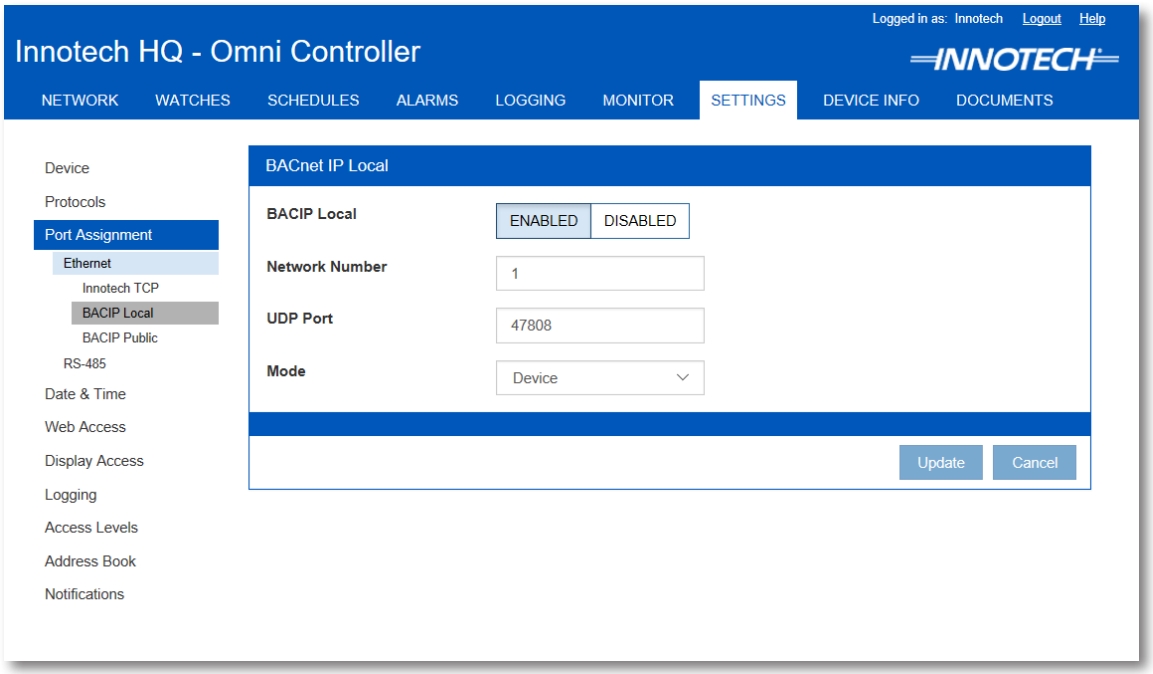


***Figure 4-10:*** Ethernet - BACnet IP Local - Device Settings

 

### 4-4.2.4 Ethernet (BACnet IP Public)

- Specify the Network Number and UDP port or accept the defaults
- Specify the maximum number of Foreign Devices
- Specify the Public IP Address
- Enter Address information into the Distribution Table

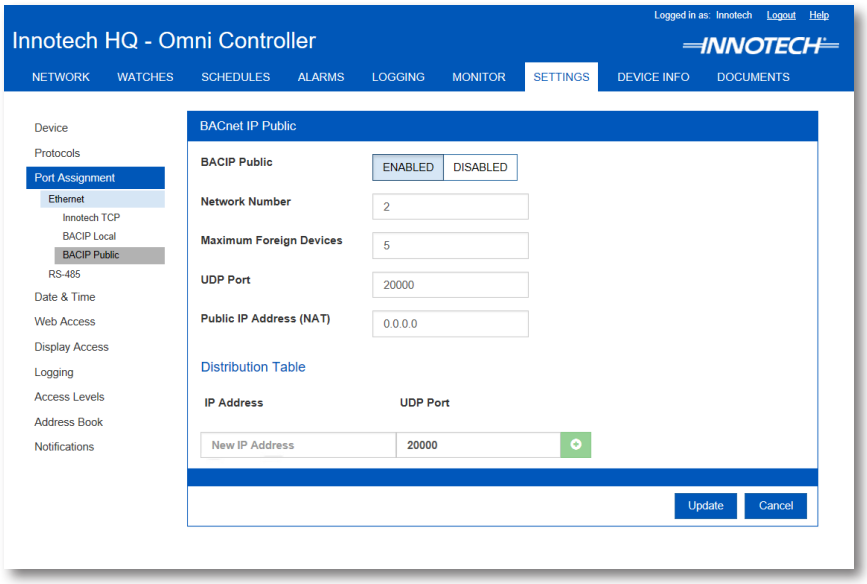


***Figure 4-11:*** Ethernet - BACnet IP Public Settings

### 4-4.2.5 Ethernet (Modbus TCP)

1. Enable Modbus TCP.
2. Enter the Response Timeout (or accept the default settings).
3. Click Update to update your Omni Controller.

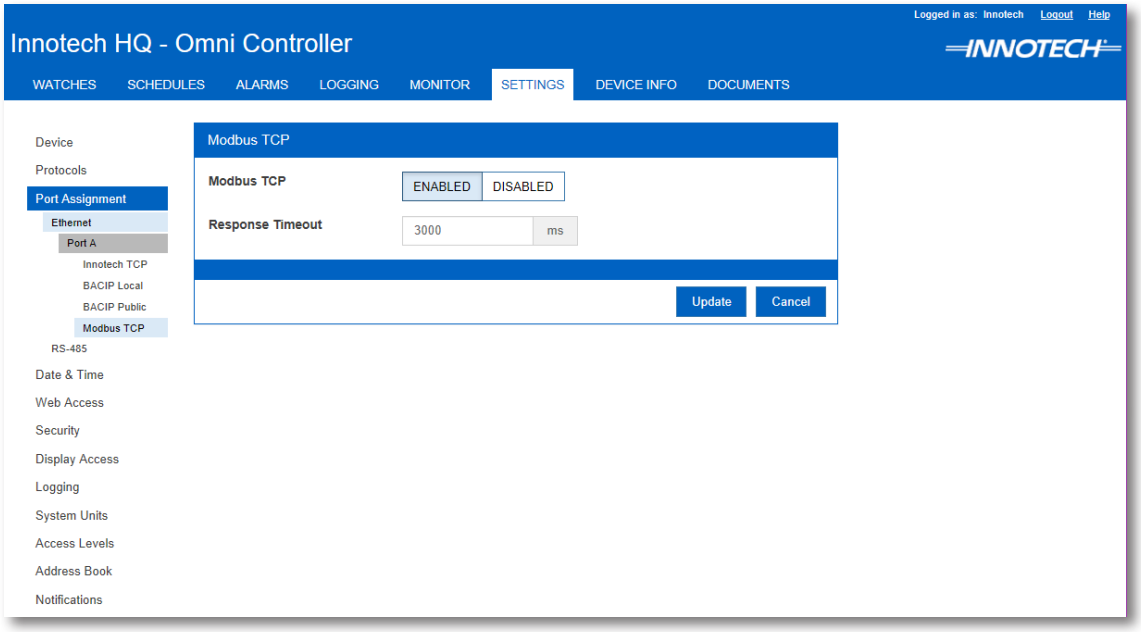


***Figure 4-12:*** Ethernet - Modbus TCP Settings

 

## 4-4.3 RS-485 Wiring Topology

**IMPORTANT**

*Innotech recommends connection of Omni controllers using Ethernet. If you proceed to connect Omni controllers using this cable type, you will not be able to access the on-board web server, schedules and other advanced functions.*

Installation of RS-485 connections on an Omni Network must adhere to the Bus topology. A Bus Topology is produced by connecting from one device to the next and then onto the next.

A simple means to identify if bus topology is used is to check that:

- There are TWO end connections
- Any joining is made between TWO cable ends only

Furthermore, there are a number of rules which apply to the comms connection of a RS-485 Network:

- The screen must be continuous.
- Only one point earthed on the screen.
- Even if a network has a device with a soft earth, one hard earth is still required on that network.
- The Net and Global networks should have the same length cable run and path.
- If a repeater is installed, each side of that repeater is a separate network and each requires a bonded earth connection on the screen.
- There are no End of Line termination (EOL) requirements on the RS-485 network.

Connection of devices via RS-485 is done by daisy chaining from one device to the next.

### 4-4.3.1 Connecting the Omni U10 using RS-485

Connect one end of an appropriate RS-485 cable to a Comms terminal on the Omni Controller. Connect the other end to the Comms terminal of a U10 REM. To connect subsequent U10 REMs, connect one end of the RS-485 cable to the U10's Comms terminal and the other end to the next U10 REM. After connection, set the End of Line jumpers.

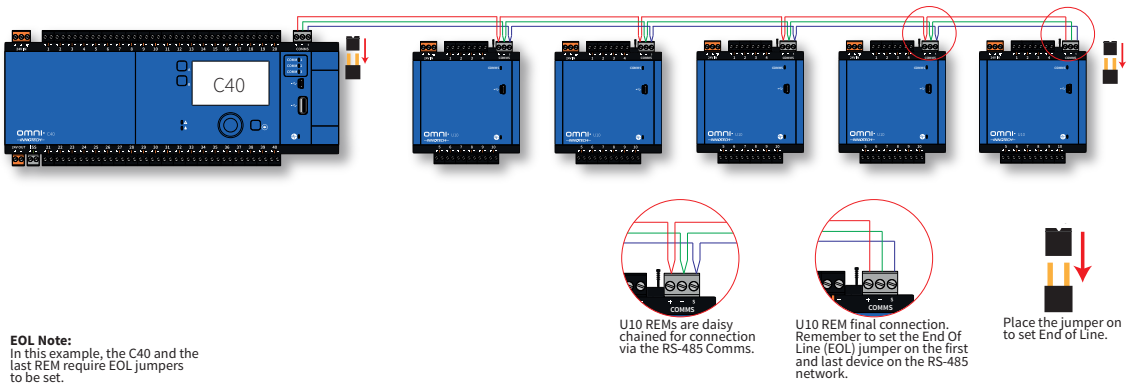


***Figure 4-13:*** Example U10 Wiring Topology - RS-485

 

### 4-4.3.2 RS-485 (Innotech Net)

Specify the Baud Rate, Timeout, Retries, Device Status Timeout and Message Speed Limit.

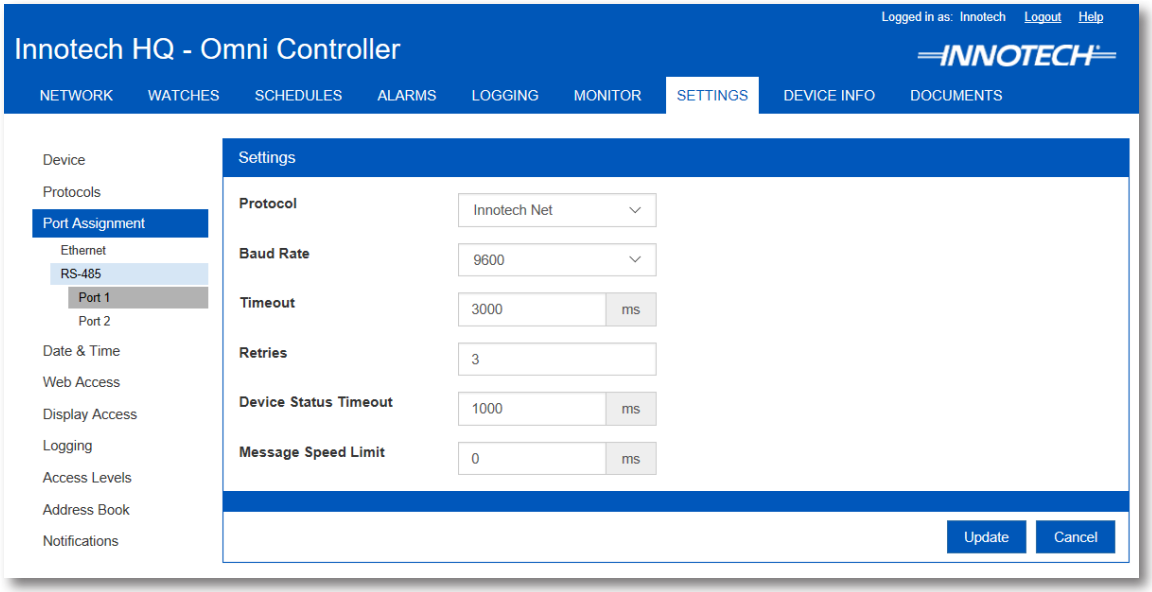


***Figure 4-14:*** RS-485 - Innotech Net Settings

### 4-4.3.3 RS-485 (Innotech Global)

Specify the Baud Rate, Survey Limit, Network Timeout and Regeneration Timeout.

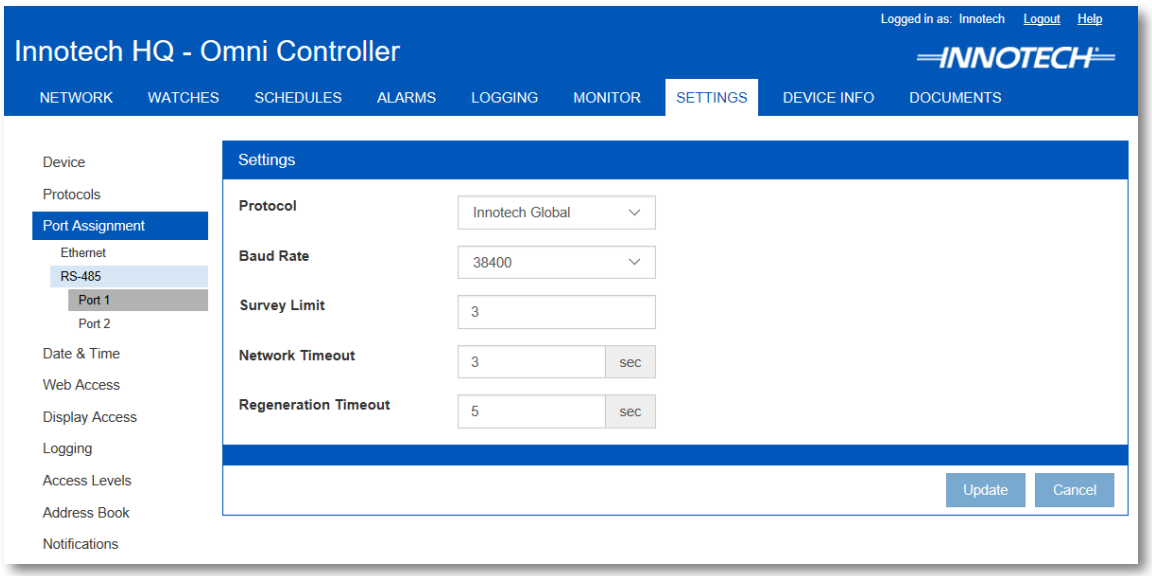


***Figure 4-15:*** RS-485 - Innotech Global Settings

 

### 4-4.3.4 RS-485 (BACnet MS/TP)

Specify the Node Address, Network Number, Maximum Masters and Maximum Info Frames. The Max Masters setting must be set to the number of the last device on the network.

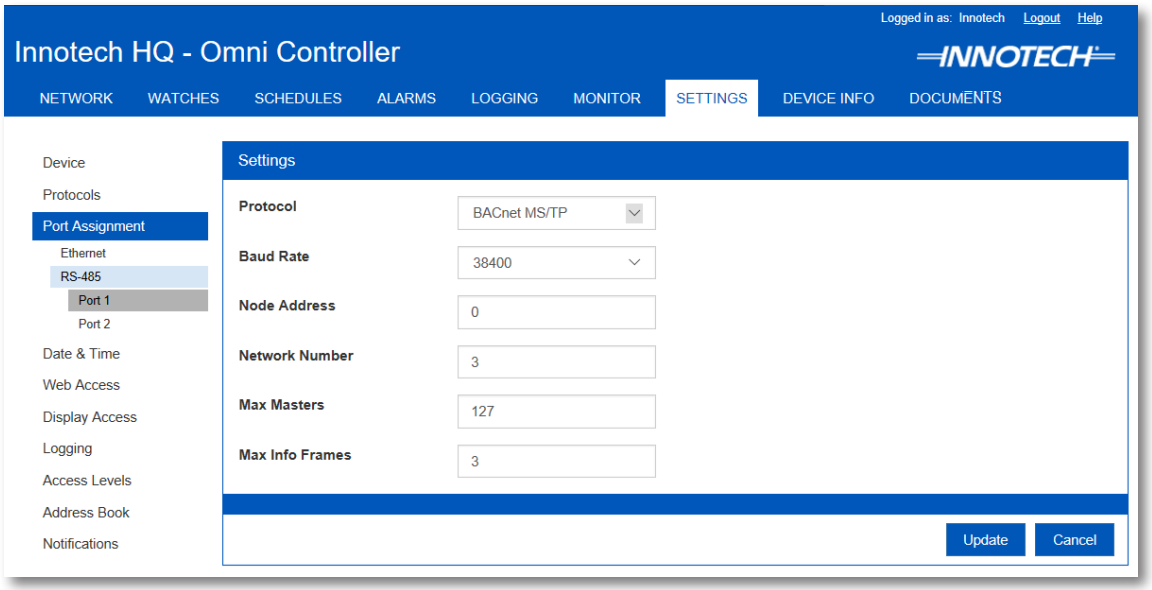


***Figure 4-16:*** RS-485 - BACnet MS/TP Settings

### 4-4.3.5 RS-485 (Modbus RTU)

4. Enter/Select details as required.
5. Click Update to update your Omni Controller.

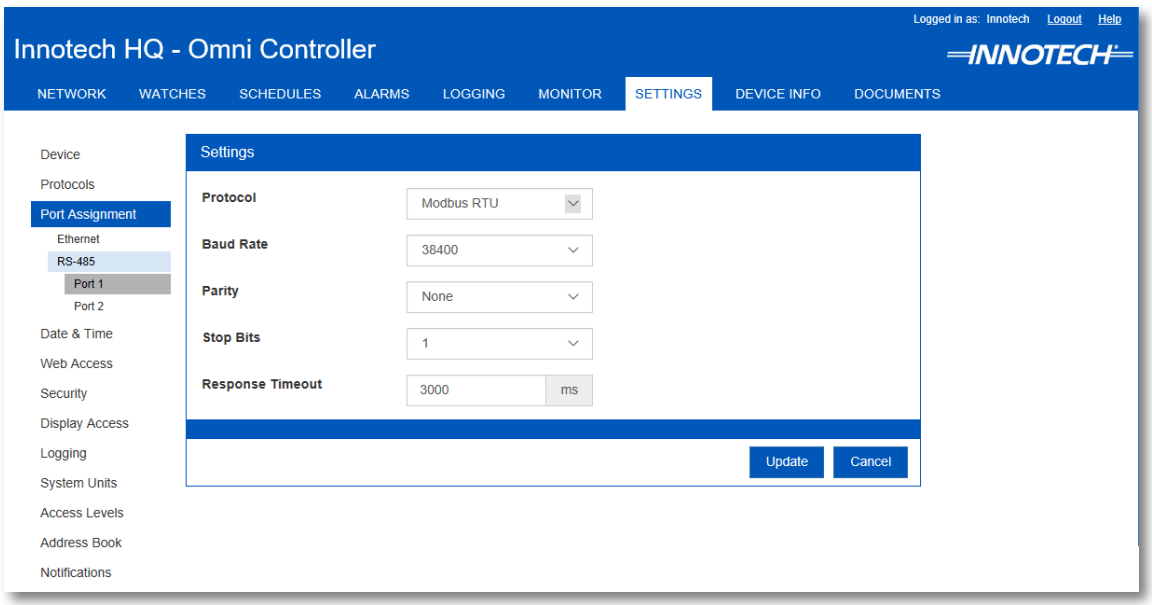


***Figure 4-17:*** RS-485 - Modbus RTU Settings

 

### 4-4.3.6 RS-485 (Omni REM)

If you are using one or more Omni U10 REMs, select your RS-485 port and change the protocol to Omni REM.

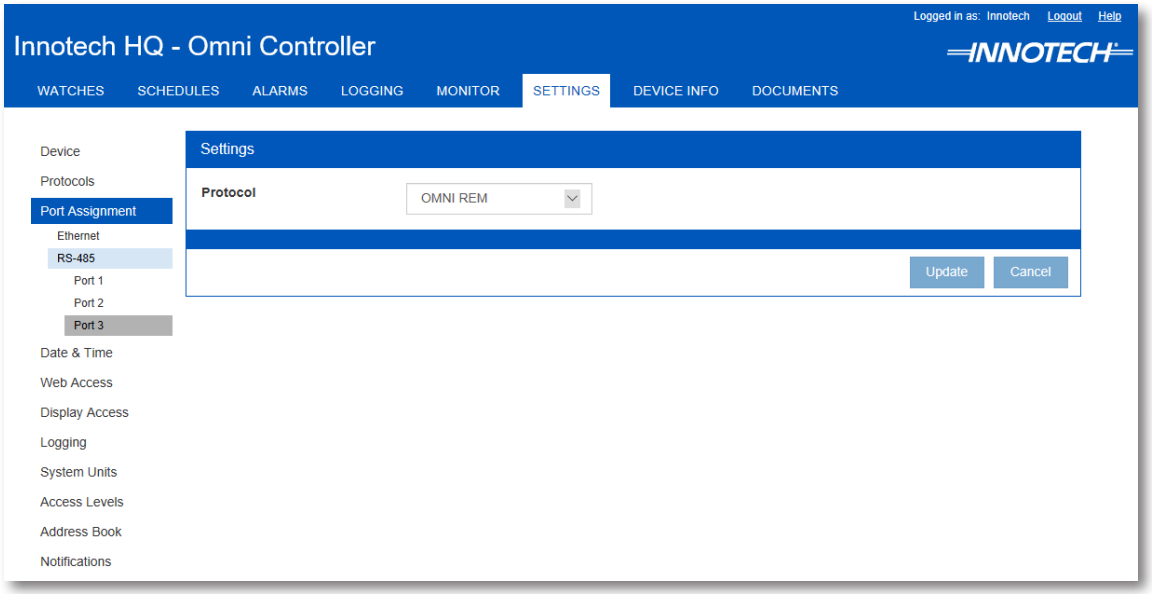


***Figure 4-18:*** RS-485 - Omni REM Settings

 

## 4-4.4 Ethernet and RS-485

Depending on your specific requirements, it is likely that a combination of connection types will be used. Connection to Remote Expansion Modules can only be done with RS-485. It is entirely possible to connect controllers via ethernet and REMs by RS-485.

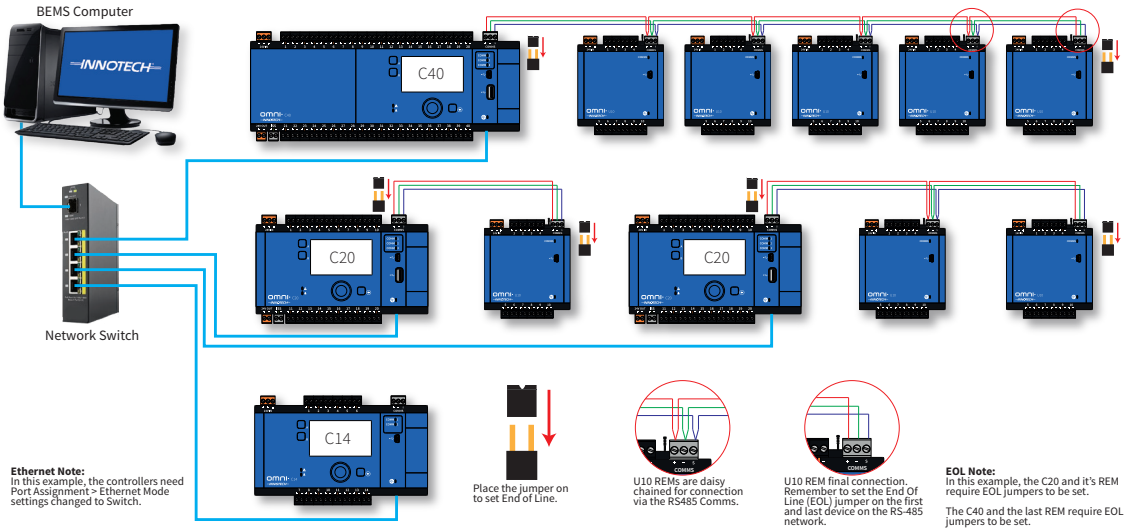


***Figure 4-19:*** Example Controller Wiring Topology - Ethernet with U10s (RS-485)

## 4-4.5 Connection of Innotech Legacy Devices

Connection of Innotech's legacy devices (non-Omni) is done using the Omni controller's RS-485 comms. The IG01 in the example below uses two comms ports to allow for data sharing.

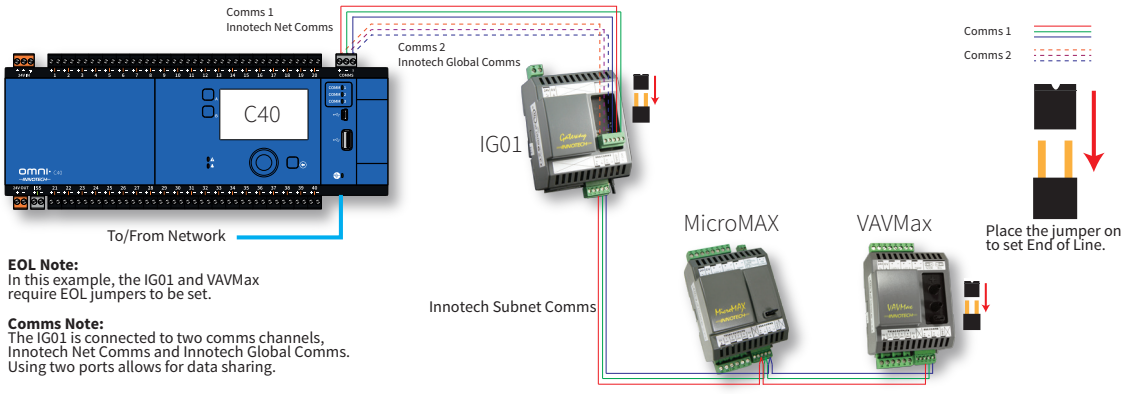


***Figure 4-20:*** Example Controller Wiring Topology - Connection IG01 and Sub-Network

 

This example shows the connection of Omni controllers using a switch, legacy primary network devices, IG01 sub-network and Omni U10 connection.

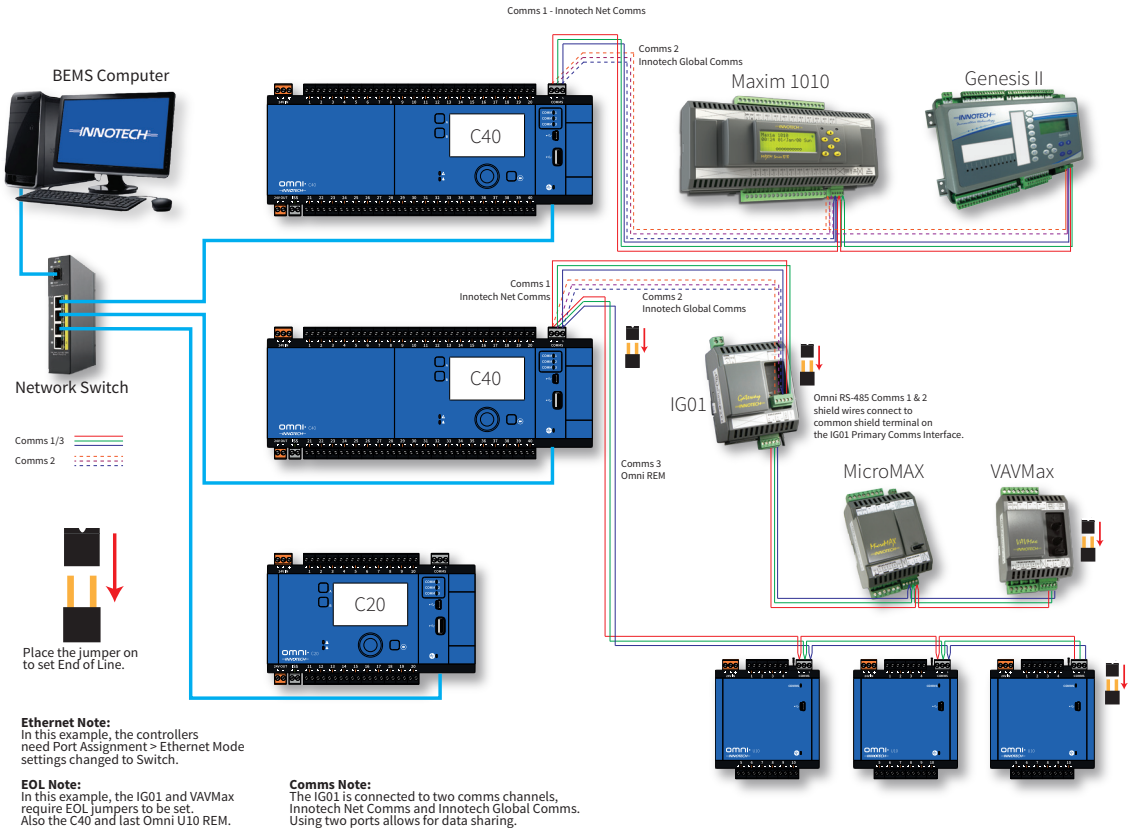


***Figure 4-21:*** Example Controller Wiring Topology - Connection of multiple devices

 

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# Omni

**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 Omni units 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 -10 to 50°C range
- 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 Input and Output Wiring

The purpose of checking the input and output wiring is two-fold. Firstly, the wiring is checked to verify that it is connected properly, thus ensuring proper operation of the system. Secondly, the wiring is also checked to ensure the absence of any external voltages that could damage an Omni product. The following paragraphs contain instructions for checking inputs and outputs.

### 5-1.2.1 Checking Power Inputs

Power inputs must be checked to ensure that the applied voltage is of the proper level. Table 5-1 shows the input voltage specifications for the various types of devices.

***Table 5-1:*** Omni System Power Inputs

| Unit | Operating Voltage | |
|---|---|---|
| | **24VAC** ±20% | **24VDC** (18 to 35VDC) |
| Omni C40 / C40D BEMS Controller | Yes | Yes |
| Omni C20 /C20D BEMS Controller | Yes | Yes |
| Omni C14 /C14D BEMS Controller | Yes | Yes |
| Omni U10 Remote Expansion Module | 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.*

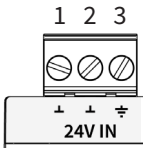


***Figure 5-1:*** Omni Power Terminals

**Check 24VAC and 24VDC inputs as follows:**

1. Ensure power to the device is turned off.
2. For 24VAC connection, ensure the AC Neutral is connected to Terminal 2 and the resistance between Terminal 2 and the enclosure's main earth link is 3.0 Ohms, or less.
3. Disconnect the power lead from Terminal 1.
4. Connect a digital volt-ohm-meter red (+) test lead to the disconnected power lead and the black (-) test lead to Terminal 2.
5. Set the voltmeter to the VAC range to measure 24 Volts.
6. Turn on the power.
7. The voltmeter should read 24 Volts ±10%. For 24VDC units, make sure the power lead going to Terminal 1 is positive and Terminal 2 is negative (although Omni devices are not polarity conscious).
8. Ensure measurement is in DC and not AC voltage.
9. Turn off the power.
10. Disconnect the digital voltmeter and reconnect the wire to Terminal 1.
11. Repeat Steps 1 through 9 for the remaining devices. For devices not included in this manual, refer to the appropriate product datasheet.

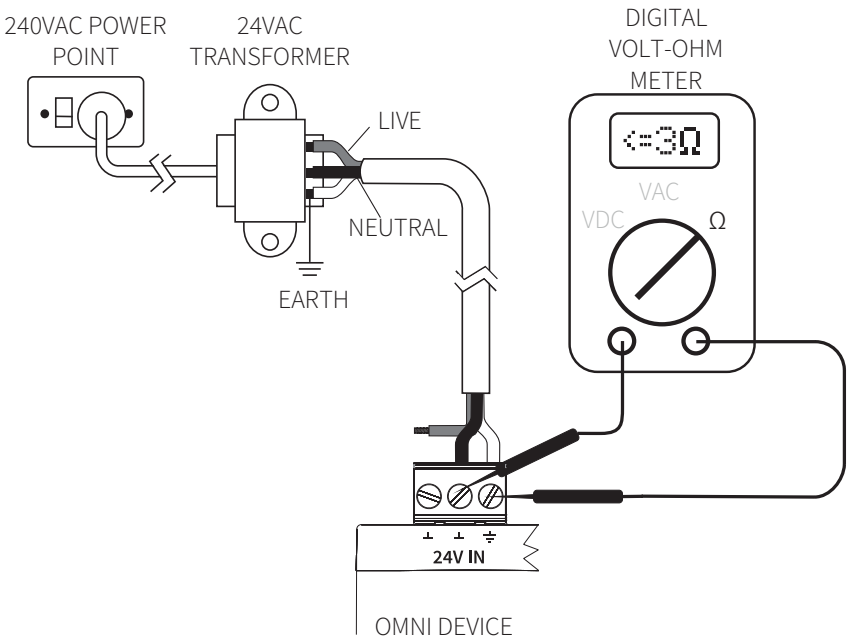


***Figure 5-2:*** Checking Resistance

 

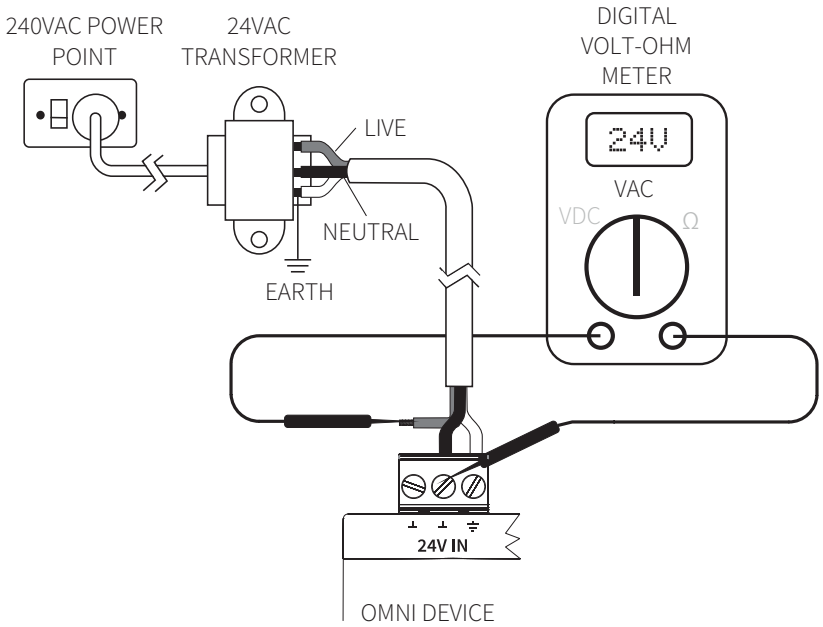


***Figure 5-3:*** Checking AC Power Input

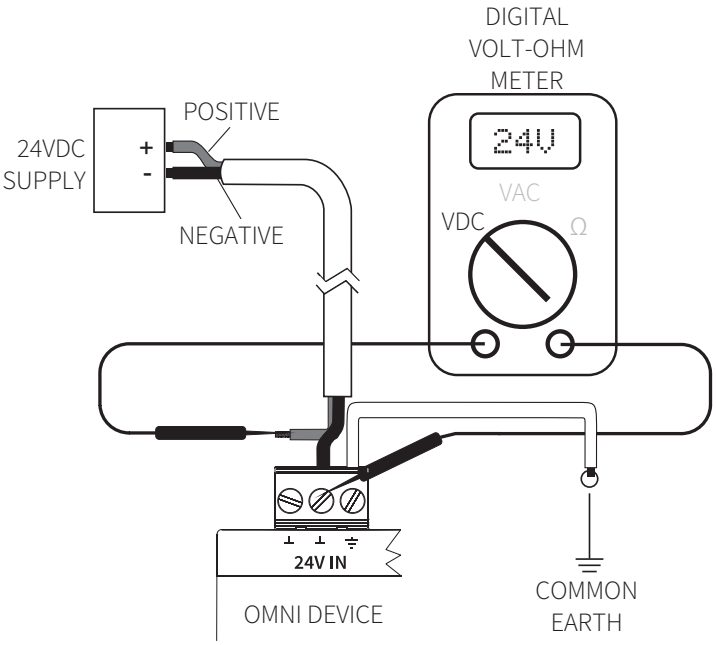


***Figure 5-4:*** Checking DC Power Input

 

### 5-1.2.2 Checking Digital Input/Output Wiring

Digital input wiring to controllers and remote expansion modules should be checked to ensure the following conditions:

- The digital signal source voltage is within the correct range
- The signal polarity is correct for digital input signals with DC sources
- Wiring to the signal actuator (switch, relay contacts, contact points, etc.) is correct

**CAUTION**

*Avoid risk of electrical shock, observe all local electrical safety requirements.*

**CAUTION**

- *Digital outputs are controlled by relays within the associated Omni device. These relays are connected to the external circuits that can contain up to 24VAC.*
- *Procedures in this manual require checking these circuits with power applied. To avoid death or serious injury by electrical shock, use extreme caution when working with energised circuits and follow precautions in this manual.*
- *Checks are to be performed only by qualified, licensed electricians who are familiar with local safety procedures. Under no circumstances should anyone other than a qualified electrician perform these checks.*

### 5-1.2.3 External-Source Digital Inputs

The following procedures for checking digital input wiring are specifically for the Omni Digital Controller and devices.

Refer to the Electrical Installation chapter for digital input terminal numbers for the various Omni devices.

Figure 5-5 is a schematic representation of a typical Digital Controller installation containing AC- and DC-powered digital inputs and how the wiring can be checked using a digital voltmeter. Use Figure 5-5 for reference when performing the following procedures:

1. Ensure power to the Digital Controller is turned off.
2. Set the digital voltmeter range to read at least 25 Volts.
3. Connect the voltmeter to the first input (Terminals 1). Observe polarity, ensuring the red (+) test lead is connected to the positive terminal (+) and the black (-) test lead is connected to the negative terminal.
4. Ensure the voltmeter reads Zero Volts. If the reading is other than Zero Volts it indicates the input is driven by Normally Closed contacts or the input is not wired correctly.
5. With the voltmeter still connected, manually close the input contacts. If it is not possible to close the circuit manually, connect a jumper wire across the contacts at the switching device.
6. Ensure the voltmeter indicates the proper signal voltage.
7. Ensure that the voltmeter indicates the correct polarity. The unit will not operate properly if the signal polarity is incorrect.
8. Release the manually closed contacts or remove the temporary jumper from the switch contacts.
9. Repeat Steps 3 through 8 for the remaining digital input channels.

 

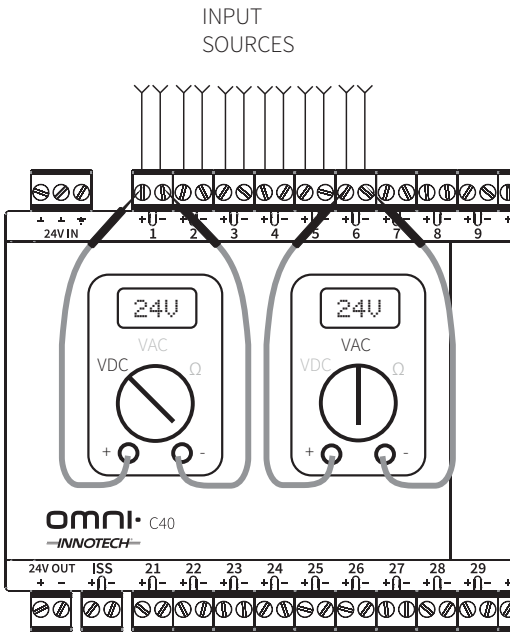


***Figure 5-5:*** Checking Digital Input Wiring

## 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 on the Omni devices.
- If external hubs or switches are used, ensure that the RJ45 connectors are fully seated and 'clicked' into the ethernet ports.
- 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.

 

## 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.
If only one cable is connected into an RS485 Comms connector on an Omni U10 REM, you must place the EOL jumper on that device.
If two cables are connected to the same RS485 Comms connector, the jumper should NOT be installed.
All controllers along the RS485 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.

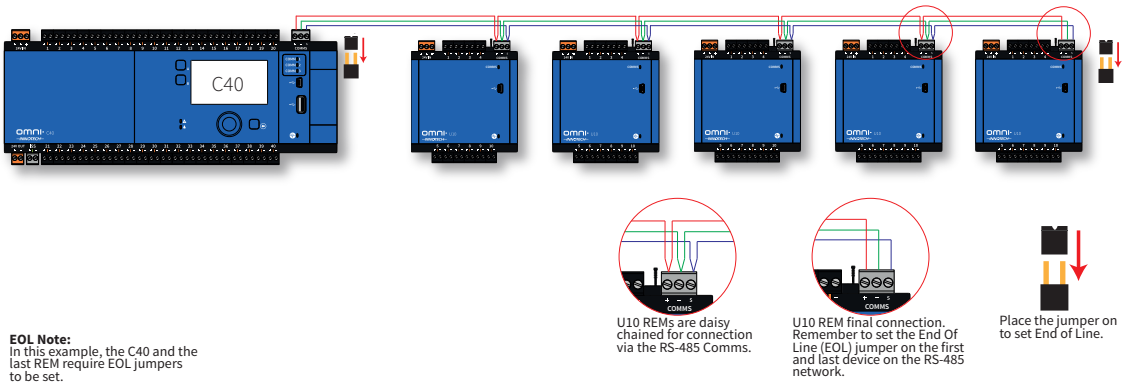


***Figure 5-6:*** End of Line Jumper, Typical Location

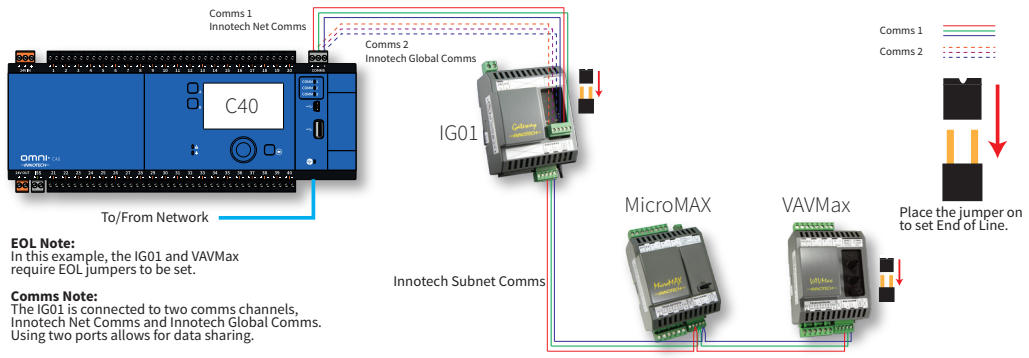


***Figure 5-7:*** IG01 and Sub-Network EOL Placement

 

## 5-1.6 Install Software and Configure the Controller(s)

The Innotech configuration software program was prepared for your Omni device at the factory before delivery of the system. The software contains all the data for internally configuring the controller(s) to perform the specific functions for which it was intended. Until the device is configured, it can not accept input signals or produce outputs.

To configure the controller(s), a Windows-based computer and the Innotech Focus software is required.

- *The following instructions are generalised procedures based on the assumption the operator is familiar with operation of a computer in a Windows environment.*
- *Installing Focus for the first time requires that your Innotech User Information be entered to retrieve your available licences. The licence is provided by Innotech to permit access to the Focus software. If a licence has not been provided, contact Innotech Control Systems using the contact details shown on the last page of this manual.*

### 5-1.6.1 Installing Focus Software

1. After downloading the Focus installation file, double click the file to start the installer.
2. Follow instructions on the screen to complete the installation process.
3. On first run, Focus setup will display request your Innotech User Information to be entered to retrieve available licence. Enter your information and click Retrieve Available Licences.
4. Once a licence is found it's details will be displayed in the window, click the licence and then click Activate Selected Licence.
5. After a brief moment Focus will be activated with the selected licence. Click Continue to close the window and Focus will start. This procedure will only be required at installation or if changing your licence details.

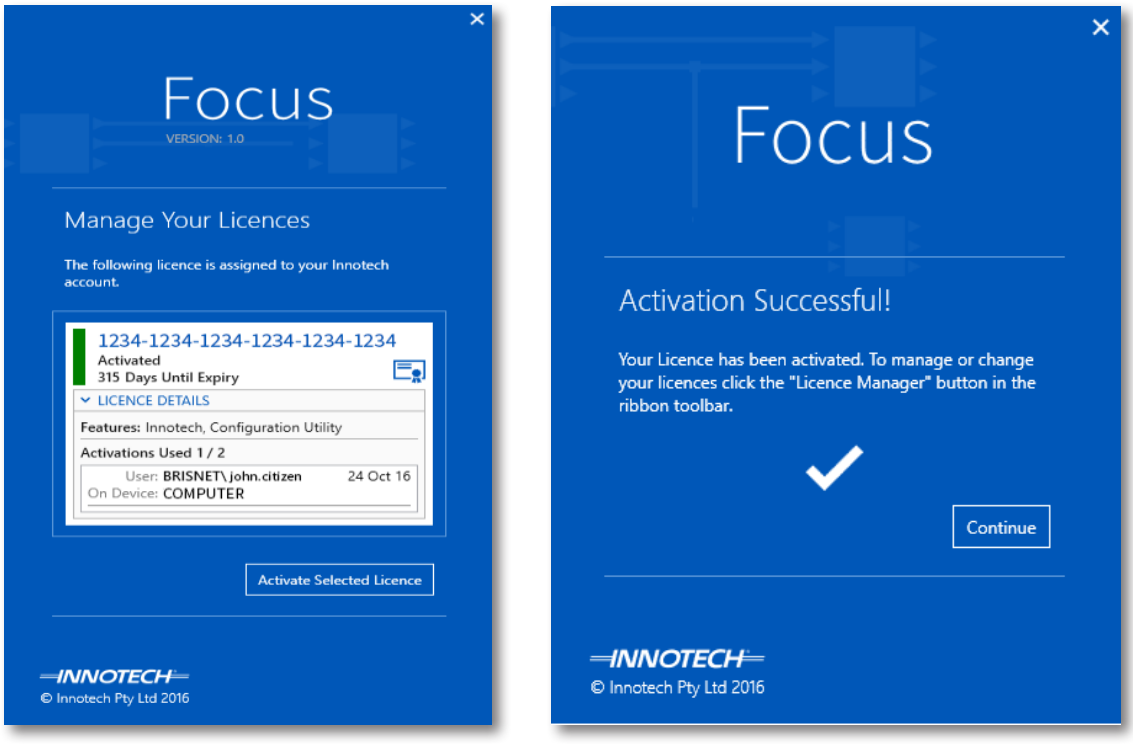


***Figure 5-8:*** Focus Activation Windows

 

### 5-1.6.2 Configuring a Controller

**The following is the procedure for configuring a single controller:**

1. Turn off the electrical power to the controller.
2. Connect to the controller via ethernet to your local network.
3. Turn on the computer and allow it to boot-up. Turn on the controller's operating power.
4. Using standard Windows procedures, open the Focus software.
5. Create a new configuration if required, otherwise click Open project and select a configuration file. After your configuration is created/loaded, click Transfer to Device on the Device Config tab.

### 5-1.6.3 Configuring an Omni U10 REM

For a functioning U10:

- The Omni controller's Port Assignment / RS-485 Protocol must be set to **Omni REM**.
- REM Address must be set using the Omni REM Addresser software.
- The Device address must be specified in your REM's Device Properties in Focus.

**Configure Settings**

Set the Port Assignment protocol to Omni REM.

**Set REM Address**

5. Open the Omni REM Addresser software from the Innotech folder.

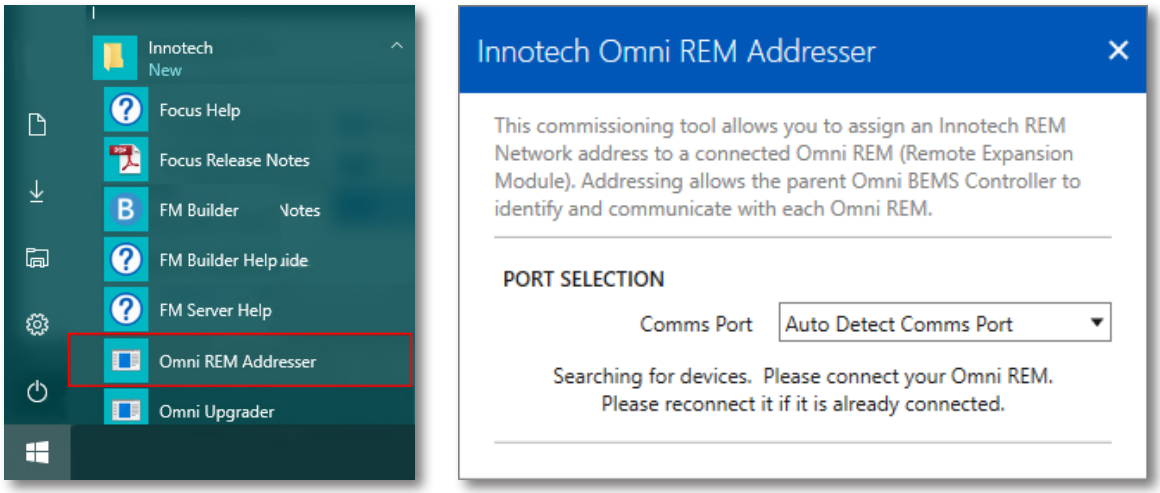


***Figure 5-9:*** Start Menu and Omni REM Addresser

 

6. Connect a USB cable between your computer and the Mini-USB on the front of the Omni U10 REM. Note: The U10 REM does not need to be powered for addressing.
7. The U10 REM should be automatically detected. If not, specify the Comms Port to connect to.
8. Select an address to send from the Configure Address section of the REM Addresser and click Send Address.

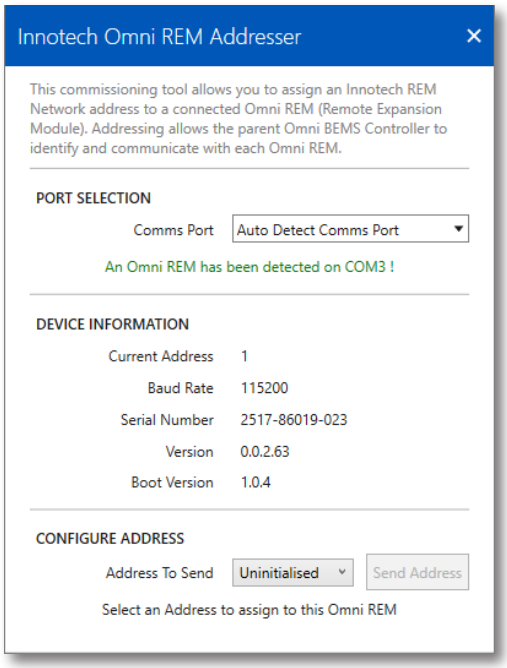


***Figure 5-10:*** Omni REM Addresser - REM Detected

9. After clicking Send Address, the new address will be set for the Omni U10 REM.

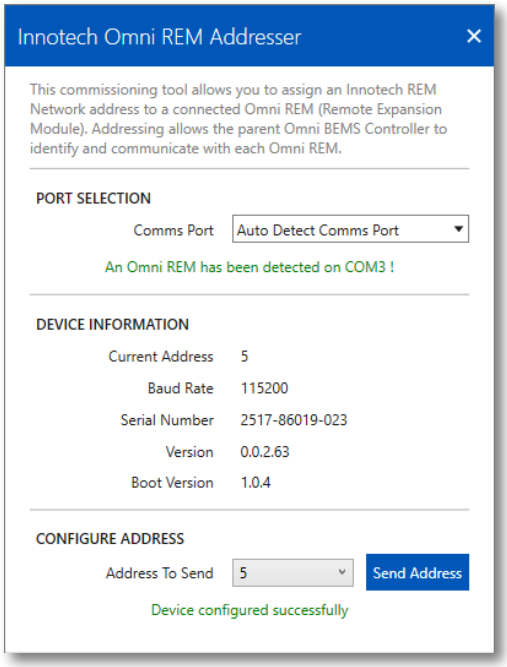


***Figure 5-11:*** Omni REM Addresser - Configured

 

### Upgrading a U10 REM

An upgrade is available for the Omni U10 REM when a spanner icon is shown next to the REM.

1. Click the Upgrade button to upgrade the REM. You can force an upgrade at any time even when the spanner is not shown.

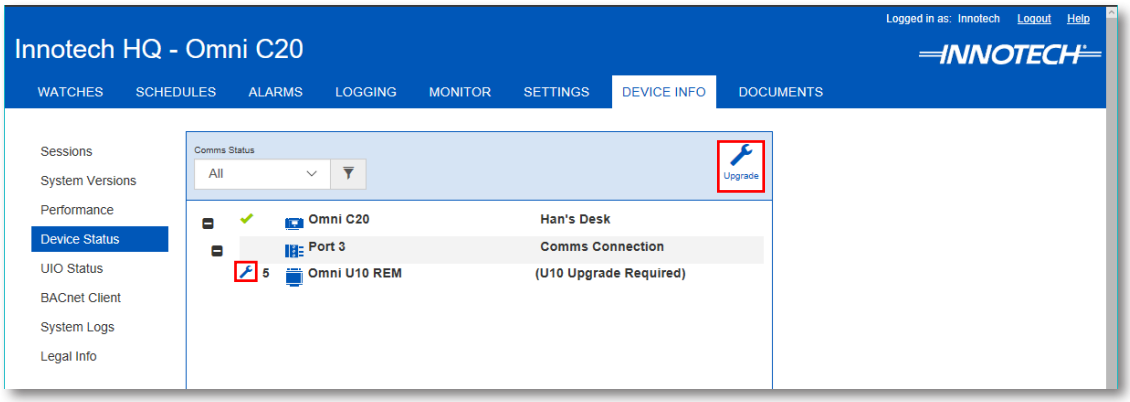


***Figure 5-12:*** Omni REM Upgrade Required

2. If required, change the Expansion Port and click Force Upgrade.
3. Click Upgrade to start the upgrade process. When finished, click Close.

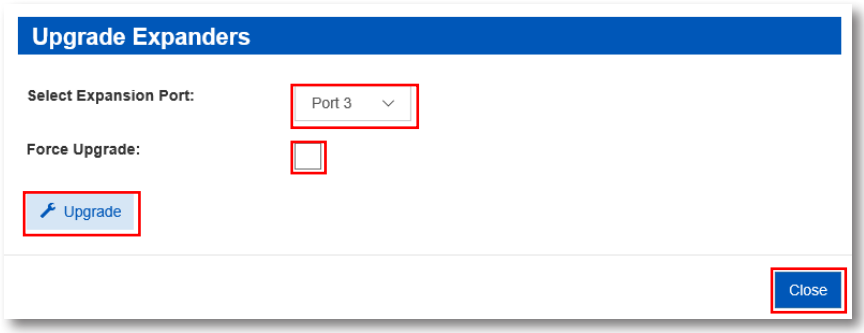


***Figure 5-13:*** Omni REM Upgrade Window

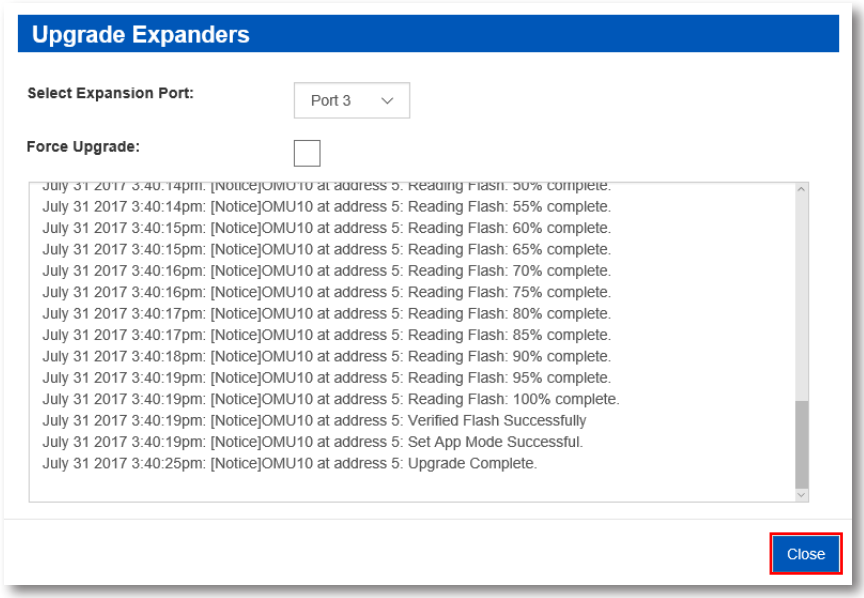


***Figure 5-14:*** Omni REM Upgrade Complete

 

## 5-1.7 Initial Tests

Initial tests of the system involve the use of the Focus software to perform a thorough check of the system. The basic approach to performing these tests is to use the software to apply simulated inputs to the controller and to check the effect on the output circuits. The following paragraphs describe the Focus software and the checks to be performed as part of initial tests.

### 5-1.7.1 Omni Web Server

Tests of the system are simplified by use of the on-board web server. The web server allows the operator to trace the flow of control and to view the various values within a configuration residing in a controller. Each controller can be monitored one at a time in real time. Therefore, what appears on the screen is what is actually happening inside the controller.

### 5-1.7.2 Performing Initial Tests

Because of the Omni system's flexibility, the various configurations can be vastly different from each other. For this reason, 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 using the on-board web server are divided into three separate phases; these tests should be performed on each controller in turn:

- In the first phase of testing, power is removed from all output circuits and the web server is used to monitor the states and input/output values of the various configuration blocks using variable input stimuli. This phase serves two purposes: It checks the configuration of the controller and it helps to familiarise the operator with the operation of the system.

- In the second phase of testing, the controller's primary output circuits, such as motor controllers and relay circuits are energised but the output machinery (fans, pumps, compressors, etc.) are de-energised. In this phase, the controller inputs are stimulated just enough to cause the output circuits to operate or change state. This phase checks the operation of the output control circuits without operating the plant machinery.

- In the third phase, the primary output control circuits as well as the plant machinery are energised. In this phase the controller inputs are carefully stimulated just enough to briefly test the operation of the plant machinery. This phase should involve the minimum of controller input stimulation required to operate the machinery.

 

### 5-1.7.3 First Phase Testing

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

1. Turn off all electrical power to the Omni System.
2. Connect the controller to the computer by finding it on a connected network.
3. Turn on the computer and allow it to boot-up. Turn on the controller's operating power. All output circuits should be de-energised at this time.
4. Open a web browser and navigate to your controller's address and then login.
5. On the monitor tab, carefully adjust the controller's input parameters, such as temperature, pressure, switch position, etc. Adjust the values within normal and practical operating limits and just enough to verify that a realistic change in output is produced. You may need to force the block to achieve desired results. Click a block to see the block details and make adjustments.
6. When all inputs and outputs have been checked, return the input parameters to their original settings. The first phase is completed.

### 5-1.7.4 Second Phase Testing

**Perform the second phase of initial tests of the system as follows:**

1. Turn on operating power to the primary output circuits such as pilot relays, motor controllers and heat valves.
2. Ensure that operating power to plant machinery (compressors, fans, etc.) is turned off.
3. Open a web browser and navigate to your controller's address and then login.
4. On the monitor tab, carefully adjust the controller's input parameters. Adjust the values within normal and practical operating limits and just enough to verify operation of the primary output circuits. You may need to force the block to achieve desired results. Click a block to see the block details and make adjustments.
5. When all outputs have been checked for proper operation, return the input parameters to their original settings. The second phase is completed.

### 5-1.7.5 Third Phase Testing

**Perform the third phase of initial tests of the system as follows:**

1. Turn on operating power to the plant machinery in accordance with the manufacturers instruction manuals.
2. Open a web browser and navigate to your controller's address and then login.
3. On the monitor tab, carefully adjust the controller's input parameters. Adjust the values within normal and practical operating limits and just enough to verify control and operation of the plant machinery. You may need to force the block to achieve desired results. Click a block to see the block details and make adjustments.
4. When items of plant machinery have been checked for proper operation, return the input parameters to their original settings. The third phase is completed.
5. Turn off operating power to the Omni controller.
6. Repeat procedures in 5-1.7.3 through 5-1.7.5 for the other controllers.

 

### 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. Apply normal operating power to the entire system in accordance with the applicable manufacturers instruction manuals.
2. 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.
3. Carefully check each unit of the system for proper operation. If necessary, the Web Server may be used in the Monitor tab to check proper operation within the controller.
4. Check manufacturers recommended adjustments and settings to ensure all units are set-up for optimum function.
5. At the controller HMI (or in your Focus configuration), enter final operational preferences such as schedules, passwords, flash watches, etc.
6. 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.

You can contact us via email, fax, or postal mail:


**Website:** www.innotech.com
**Email**: sales@innotech.com
**Phone**: +61 7 3421 9100
**Mail:** Innotech Control Systems
P.O. Box 292
Sunnybank QLD 4109
Australia


 