MAXIM Series Controllers

INSTALLATION INSTRUCTIONS

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1.0	June 2011	First release of Installation Instructions for Innotech MAXIM Series Controllers.
2.0	November 2013	Contact Details Update, Style Update.

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Chapter 1 - Preliminary Information

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1-1 Scope

This manual is intended to provide qualified technical personnel with complete and easy-to-follow instructions for installing, testing, and commissioning the MAXIM Series Controllers. Although every effort has been made to simplify the installation process, it is assumed that qualified personnel installing the MAXIM Series Controllers are familiar with local regulations, codes, and safety requirements.

It is highly recommended that installers familiarise themselves with the content of this manual before attempting to install the MAXIM Series Controllers.

Throughout this manual there are icons used to illustrate important information and points of caution, as illustrated and described below:

NOTE

*Notes indicate useful information which **should** be read.*

CAUTION

*Cautions indicate critical information which **must** be read.*

1-1.1 Systems Covered by this Manual

A system is defined as one or more MAXIM Series controllers interconnected with various ancillary units for the purpose of performing specific functions. Systems are intended for use in a variety of applications and are designed on a modular basis. Modularity provides the most economical and efficient means of adapting the system to the specific customer requirements. In our attempts to continuously improve overall customer satisfaction through product improvement, Innotech often provides updates and revisions to the MAXIM Series product line. The range of modules result in a large array of different types of hardware available to the customer.

With the exception of the MAXIM 1 controller, all MAXIM Series controllers can either be used in standalone applications to control external equipment, or in an Innotech network consisting of multiple controllers and devices supporting Global and Net Comms traffic. This manual covers the following Maxim Series Controllers:

- MAXIM I
- MAXIM II
- MAXIM III
- MAXIM 1010
- MiniMAX (MM01)
- MiniMAX (MM02)
- MicroMAX (UM01)
- VAVMax (VM01)
- Sub System Gateway (IG01)

1-1.2 Terminology used in this manual

In order to simplify the instructions, common terminology and references to other Innotech products are used throughout this manual. A brief description of some of the terminology is provided in this section.

Net comms communication is the primary means of communication between Innotech hardware and iComm software.

Global comms communication is a means of sharing data among different Innotech controllers and devices to carry out different functions.

Human Machine Interface (HMI) provides direct access for complete control and operation of various Innotech controllers. The HMI basically consists of the Liquid Crystal Display (LCD) and the keypad for direct interaction with the controllers.

1-1.3 Document layout

This technical manual consists of the following sections with a brief description of each section:

Table 1-1: Document Structure

Chapter	Description
Chapter 1 - Preliminary Information	This chapter contains general information such as general safety considerations and an overview of the MAXIM Series controllers.
Chapter 2 - Mechanical Installation	This chapter contains information such as physical descriptions of the controllers, mounting dimensions, and mechanical installation guidelines.
Chapter 3 - Electrical Installation	This chapter contains electrical wiring information and instructions.
Chapter 4 - Network Installation	This chapter provides a general network diagram and reference to the Innotech Device Network Cabling Manual.
Chapter 5 - Commissioning	This chapter provides instructions for post-installation inspection of the MAXIM System, and initial setup of the various units that comprise the system.
Appendix A - Using the CT01 Commissioning Tool	The Appendix provides instructions on using the CT01 for configuring MAXIM Series controllers.

1-2 Overview of MAXIM Series Controllers

This section of the manual provides general information for the MAXIM Series Controllers. The subsequent sections include information on controllers that are installed on the primary network, and those that are installed on the subsystem network. Information is also provided for the Subsystem Gateway (IG01). The MAXIM Series controllers are ideal for air conditioning and building automation, but yet flexible and powerful enough to suit a wide range of other applications.

The MAXIM family of controllers has a wide range of products to suit a broad range of customer requirements and applications, as illustrated in the table below.

Table 1-2: Features of MAXIM Series Controllers

	MAXIM Controllers				MiniMAX		MicroMAX	VAVMax	IG01
	I	II	III	1010	MM01	MM02	UM01	VM01	IG01
Configurable Universal Inputs	6	6	20	10	—	—	—	—	—
Configurable Universal Outputs	—	—	—	10	—	—	—	—	—
Configurable Universal Inputs / Outputs	—	—	—	—	7	7	2	2	—
Digital Relay Outputs	6	6	12	—	—	—	—	—	—
Analogue Outputs	4	4	8	—	—	—	—	—	—
TRIAC Outputs	—	—	--	—	4	4	4	4	-
Thermistor Input	—	—	—	—	—	—	1	1	—
Differential Pressure Sensor	—	—	—	—	—	—	—	1	—
Net Comms	RS232	✓	✓	✓	✓	—	—	—	✓
Global Comms	—	✓	✓	✓	✓	—	—	—	✓
Sub Net Comms	—	—	—	—	—	✓	✓	✓	✓
Ethernet	—	—	Optional	Optional	—	—	—	—	✓

1-2.1 Primary Network Controllers

The controllers that can be installed on the primary network provide communication channels with Net and Global comms functionality. These controllers can interface with other Innotech network resources. The MAXIM Series controllers that can be installed on the Innotech primary network are:

- MAXIM II
- MAXIM III
- MAXIM 1010
- MiniMAX (MM01)

These controllers can operate in standalone applications, using the respective universal inputs, universal outputs, analogue outputs, and digital outputs to transmit and receive information and control external equipment, or as part of a network of Innotech devices that support Net and Global comms communication.

However the MiniMAX (MM01) when installed in standalone applications does not provide Real Time Clock (RTC) synchronization functionality.

1-2.2 Sub System Network Controllers

These controllers are primarily designed to be installed on the subsystem network to be managed by the Sub System Gateway (IG01). The controllers on the subsystem network do not provide Global comms functionality. The MAXIM Series controllers that can be installed on the Innotech subsystem network are:

- MiniMAX (MM02)
- MicroMAX (UM01)
- VAVMax (VM01)

It is important to know that the VAVMax (VM01) and the MicroMAX (UM01) can operate in standalone applications, using the respective inputs and outputs to receive information to control external equipment, or as part of a primary network supporting Net comms communication. But in standalone applications or when installed on a primary network, these controllers will not have all of the respective features available. Features such as data logging, global points, alarms, and Real Time Clock synchronization are ONLY available when these controllers are installed on a subsystem network and managed by the Sub System Gateway (IG01).

Please refer to the datasheet of the relevant controller for more detailed information.

1-2.3 Sub System Gateway (IG01)

The Innotech® Sub System Gateway (IG01) is a gateway between the primary and subsystem networks. It provides the ability to add subsystem networks of Innotech controllers with a single communications channel for Net and Global comms functionality. The Sub System Gateway manages the resources for all connected devices, reducing the load on master controllers in a large network while reducing network traffic. It provides the following functionality to all connected devices that otherwise would not be available:

- Logging
- Battery backed Real Time Clock Synchronization
- Global points
- Alarms

The Innotech suite of software can communicate with all devices that are connected to the Sub System Gateway, providing the transfer of all global points between devices on the primary network and subsystem network.

Please refer to the Sub System Gateway (IG01) Datasheet for more information.

1-2.4 MAXIM I Controller

The MAXIM I Controller is unique in that it only operates in standalone applications, using the built in universal inputs, analogue outputs, and digital outputs to transmit and receive information and control external equipment. The MAXIM I controller cannot be installed on a network.

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 an authorised representative for clarification.
- To prevent damage to equipment, avoid applying electrical power to the equipment prior to commissioning, unless specifically instructed to do so in this manual.
- Only qualified personnel familiar with local codes and practices should perform the installation. Wiring should only be performed by personnel with electronics knowledge and wiring installation practices.

1-4 Tools and Materials

Other than those listed below, no special tools are required to install the MAXIM Series Controllers:

- Digital Multi Meter (DMM)
- Common hand tools

MAXIM Series Controllers

INSTALLATION INSTRUCTIONS

Chapter 2 - Mechanical Installation

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2-1 Overview

This section of the manual provides information to allow for the mechanical installation of the MAXIM Series controllers. Physical descriptions and dimension diagrams are provided for all controllers, followed by general installation instructions that include installing the MAXIM Series controllers on industry standard DIN rail.

Innotech recognises that the installation examples described in this manual may not suit the requirements of all customers. However this document should serve as a guide for all installations, regardless of whether your particular installation is similar to that of provided examples. In all cases, installation personnel should familiarise themselves with the information contained in this section.

NOTE

It is highly recommended that the MAXIM Series controllers be installed and mounted in a steel enclosure to minimise the effects of Electro Magnetic Interference (EMI), as illustrated in Figure 2-1 below.

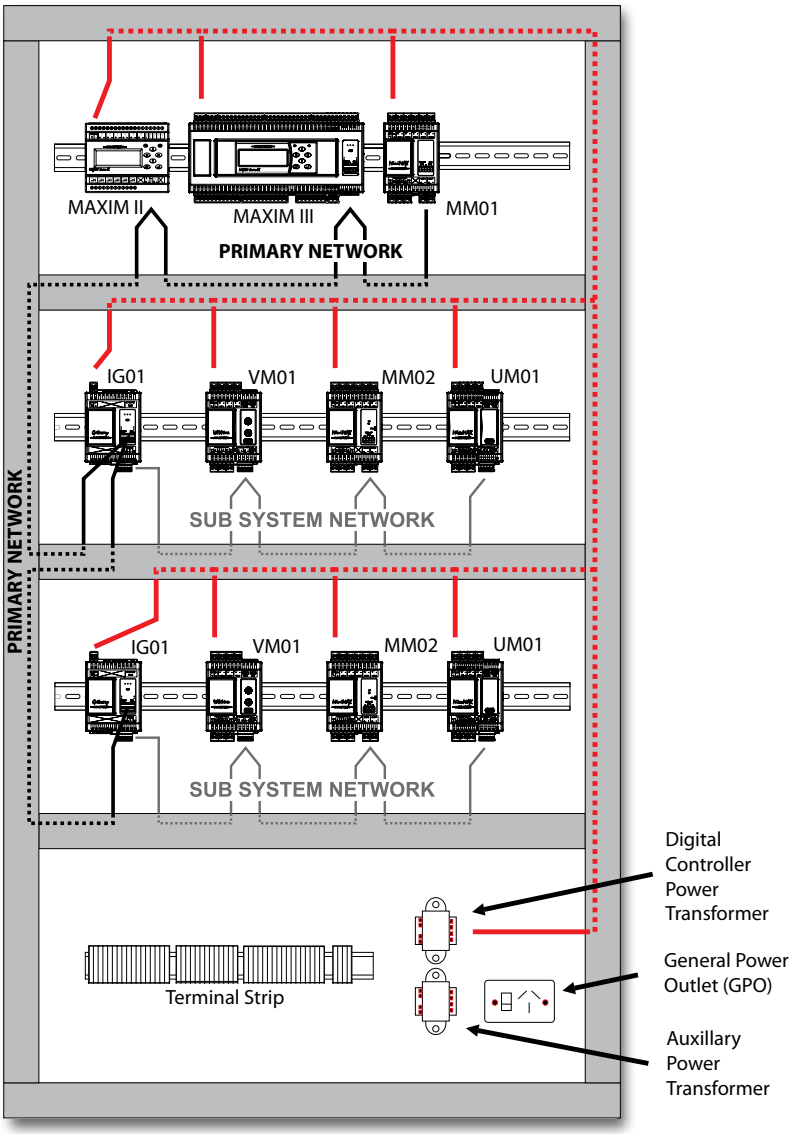

Figure 2-1: Typical Enclosure Installation

2-2 Physical Description and Dimension Diagrams

2-2.1 Overview

This section of the manual provides information on the general physical characteristics of the MAXIM Series controllers, followed by dimension diagrams to help with the mechanical installation.

NOTE

Please note that ALL physical dimensions illustrated in this section are in millimetres.

2-2.2 MAXIM I, II, III, and 1010 Controllers

The MAXIM Series I, II, III, and 1010 controllers are housed in DIN cases and are suitable to be mounted on DIN rail.

The exact dimensions of the MAXIM I and MAXIM II controllers are shown in Figure 2-2 below. Figure 2-3 on the next page shows the dimensions of the MAXIM III and MAXIM 1010 controllers.

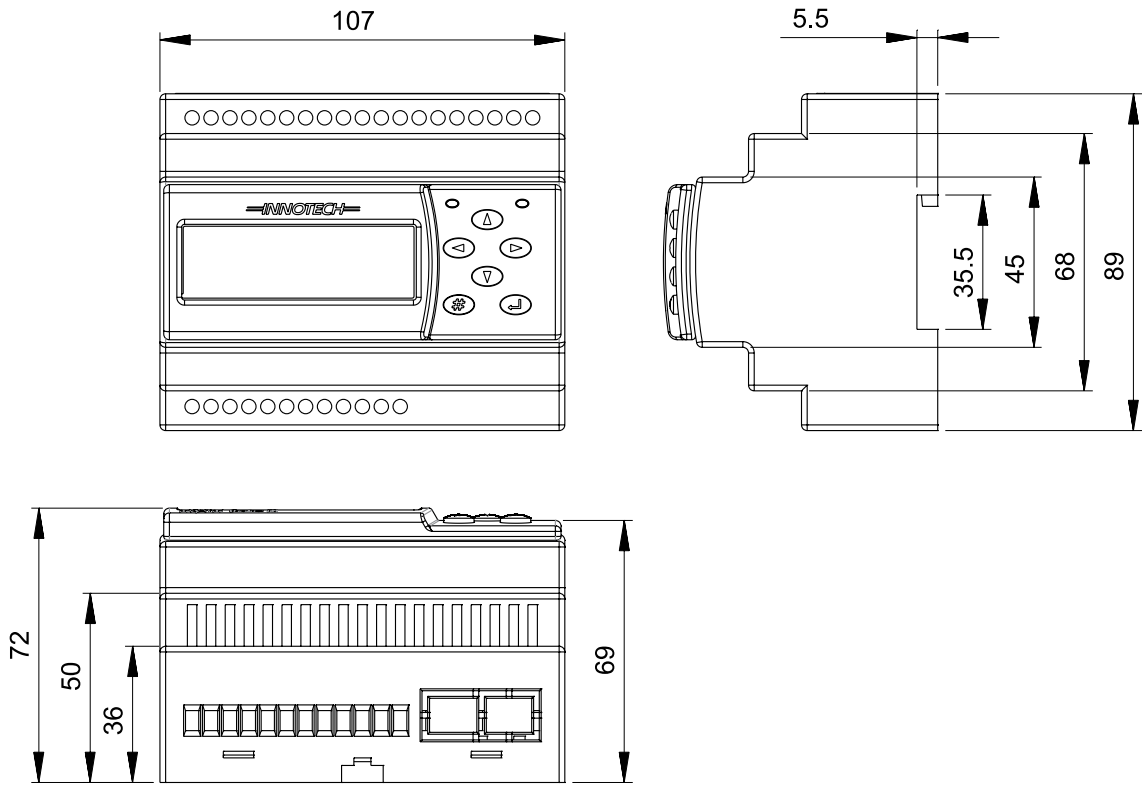

Figure 2-2: MAXIM I and MAXIM II Controller Dimensions

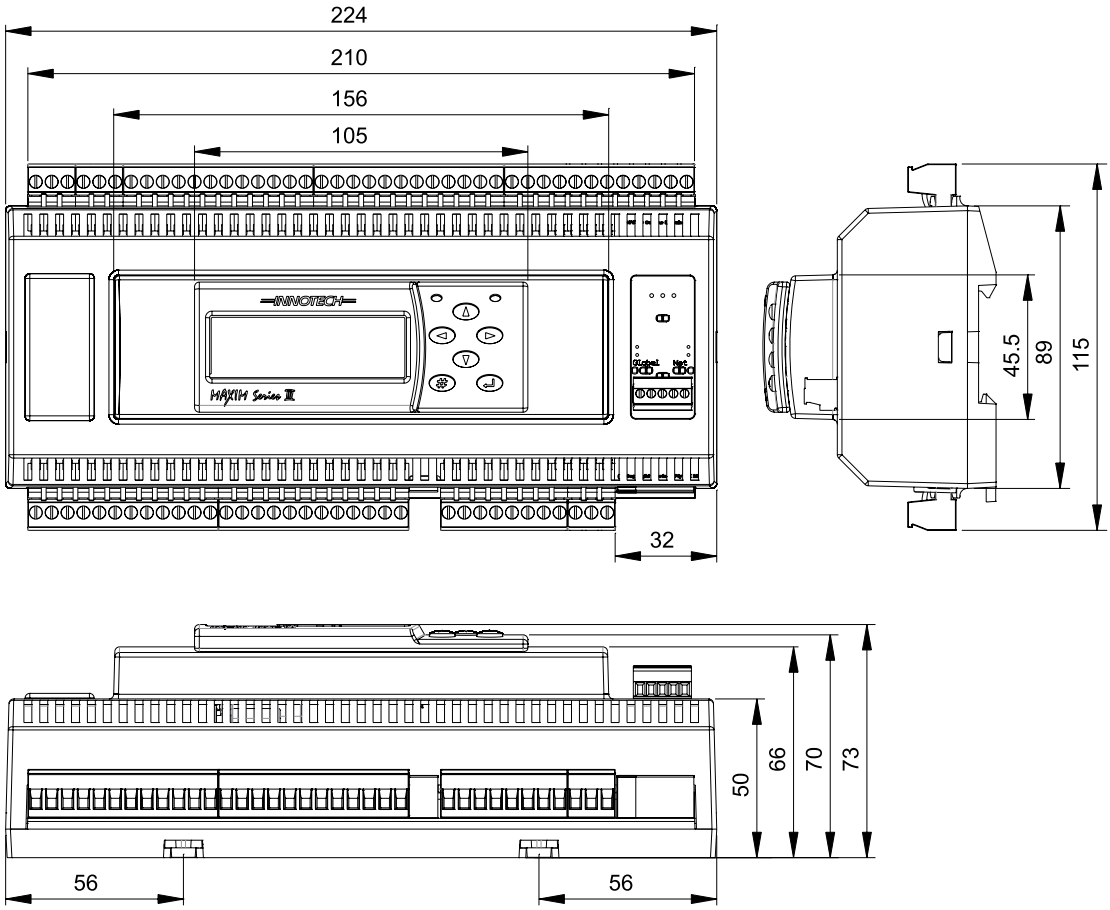

Figure 2-3: MAXIM III and MAXIM 1010 Controller Dimensions

2-2.3 MiniMAX, MicroMAX, VAVMax, and IG01

These controllers are housed in a compact DIN case and are suitable to be mounted on DIN rail. And since these controllers are housed in a common case, the dimensions therefore for each controller are the same, as illustrated in Figure 2-4 on the next page.

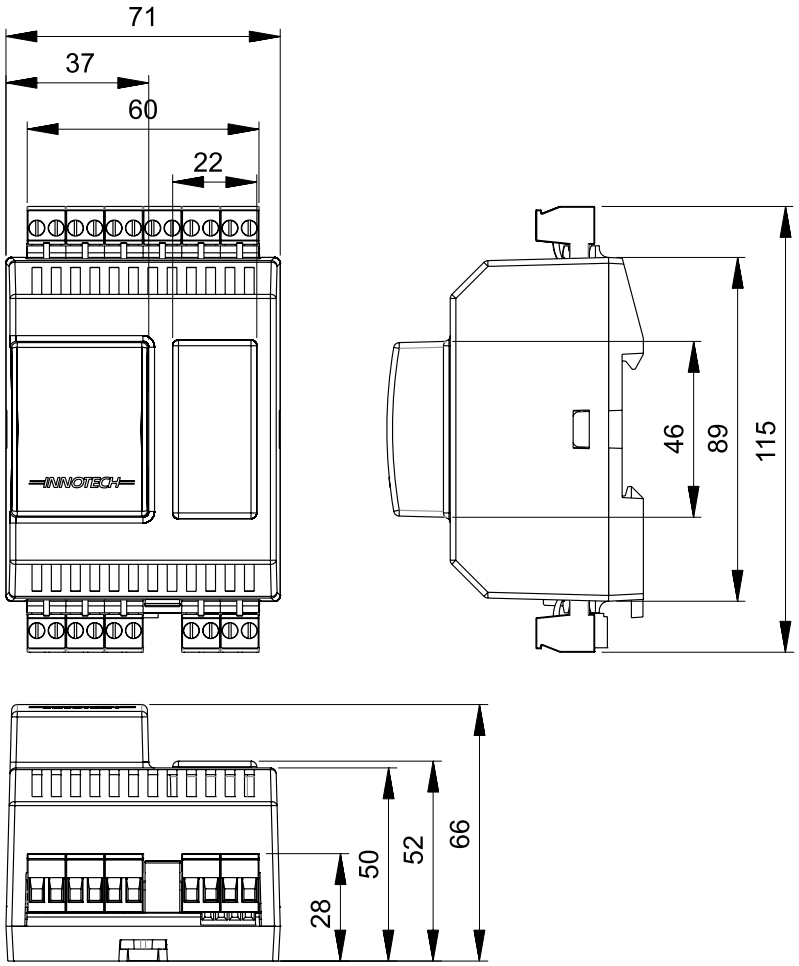

Figure 2-4: MiniMAX, MicroMAX, VAVMax and IG01 Controller Dimensions

2-2.3.1 VAVMax Differential Pressure Input

The Differential Pressure Input is only available on the VAVMax (VM01) controllers. It is used to measure and respond to changes in air velocity pressure, which is determined by how the VAVMax controller has been configured. The pressure sensor is factory calibrated for optimum performance and is an extremely sensitive electromechanical device. Therefore the following guidelines should be observed to prevent irreparable damage to the pressure sensor:

- Do NOT apply pressure from sources other than a pitot tube
- Do NOT apply excessive static or differential pressure when connecting or disconnecting air supply hoses to the VAVMax controller
- Do NOT drop the VAVMax controller

Listed below are the general operational parameters for the Differential Pressure Input:

- 3000 Pa maximum static operating pressure
- 0 to +250 Pa differential operating pressure
- -10 to +300 Pa maximum rated differential pressure
- Accuracy rate of ±5FS
- Only non-corrosive gases are to be used

2-3 General Installation Information

2-3.1 Overview

This section of the manual provides general installation guidelines to assist you with the mechanical installation of the MAXIM Series controllers.

2-3.2 General Installation Guidelines

The following installation guidelines are provided to ensure continued and reliable operation of the MAXIM Series controllers:

- The MAXIM I, II, III, and 1010 controllers should be installed in a position that provides easy access to the optional HMI, and sufficient room for power and input/output cabling. Placement of the these controllers should account for the optimum viewing angle of the LCD, which is approximately 80° vertically, and 80° horizontally, as illustrated in Figure 2-5 below.
- The controllers should not be exposed to high voltage, high current cables, or sources of strong radio frequency emissions such as transmitter antenna cables.
- The ambient temperature of the MAXIM Series controllers at the installation site should not exceed the normal operating temperature range recommended for the specific controller.
- The controllers should be installed in an area with minimum vibration and minimum exposure to mechanical damage.

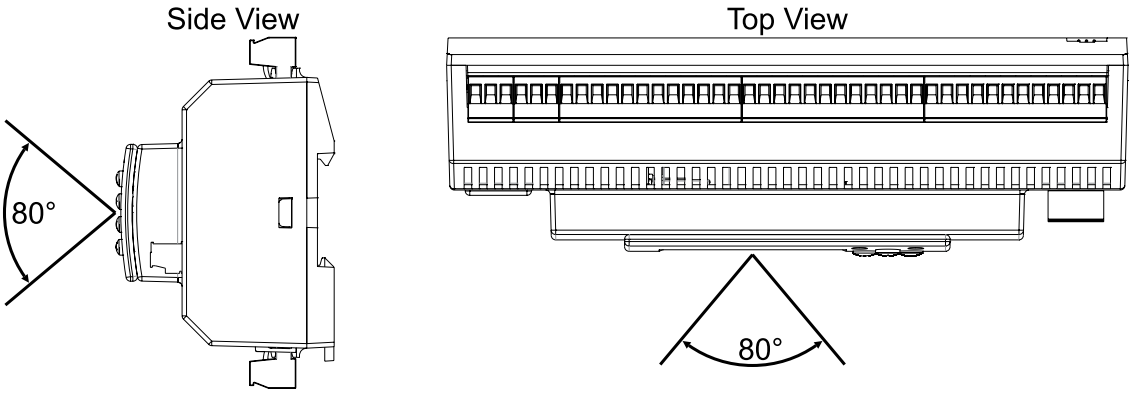

Figure 2-5: LCD Optimum Viewing Angle

2-3.3 Installing on DIN Rail

As mentioned earlier the MAXIM Series controllers are designed to be mounted on DIN rail. The DIN rail is a set of different standardized rails widely used for mounting industrial control equipment inside equipment racks.

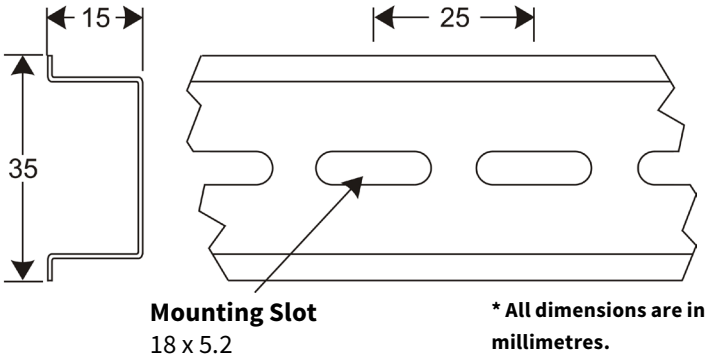

Figure 2-6: DIN Rail Dimensions

To install a MAXIM Series controller on a DIN rail, align the DIN rail clip on the top edge of the DIN rail. Push down on the controller until you hear the DIN rail release tab snap onto the bottom edge, as illustrated in Figure 2-7 below.

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

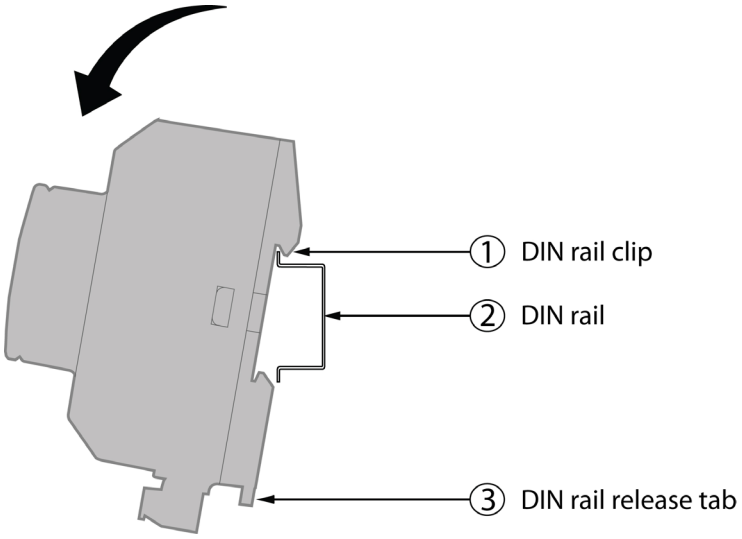

Figure 2-7: Installing MAXIM Controller on a DIN Rail

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MAXIM Series Controllers

INSTALLATION INSTRUCTIONS

Chapter 3 - Electrical Installation

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3-1 Overview

This section of the manual provides information to assist in the electrical installation of the MAXIM Series controllers, which can be installed in a wide variety of configurations to suit your requirements.

Innotech recognises that the installation examples described in this manual may not suit the requirements of all customers. However this document should serve as a guide for all installations, regardless of whether your particular installation is similar to that of provided examples. In all cases, installation personnel should familiarise themselves with the information contained in this section.

3-2 Electrical Installation Practices

Devices and equipment should be connected and wired according to their respective installation instructions and technical documentation.

CAUTION

Please ensure that electrical power to the MAXIM Series controllers and all connected devices and equipment is turned OFF throughout the installation process. Do NOT apply power to the controllers or any equipment until you are ready for commissioning as per Chapter 5 – Commissioning.

NOTE

Customers are encouraged to contact Innotech Control Systems Australia or your nearest authorised distributor for any clarification or further information regarding the installation process.

Cabling plays an important role in the installation of MAXIM Series controllers. Therefore shielded cable for wiring must be used in all cases. It is also critical to avoid running cables in the vicinity of high voltage power cables that carry switching voltages and high current. This is especially true when wiring sensor signal cables.

3-3 MAXIM Controller Wiring

Once a configuration has been transferred to the controller, the MAXCon software can be used to generate the connection details for all inputs and outputs as per your configuration. The connection details can be easily printed and will serve as a great reference to assist you in physically wiring your particular MAXIM Series controller based on your site requirements. The connection details will show the terminal and polarity for each configured input and output.

Please refer to MAXCon Online Help for further information on how to generate the connection details.

An example of the connection details generated for a MAXIM Series III controller is illustrated in Figure 3-1 on the next page.

Innotech MAXIM Series III Controller (v6.20)

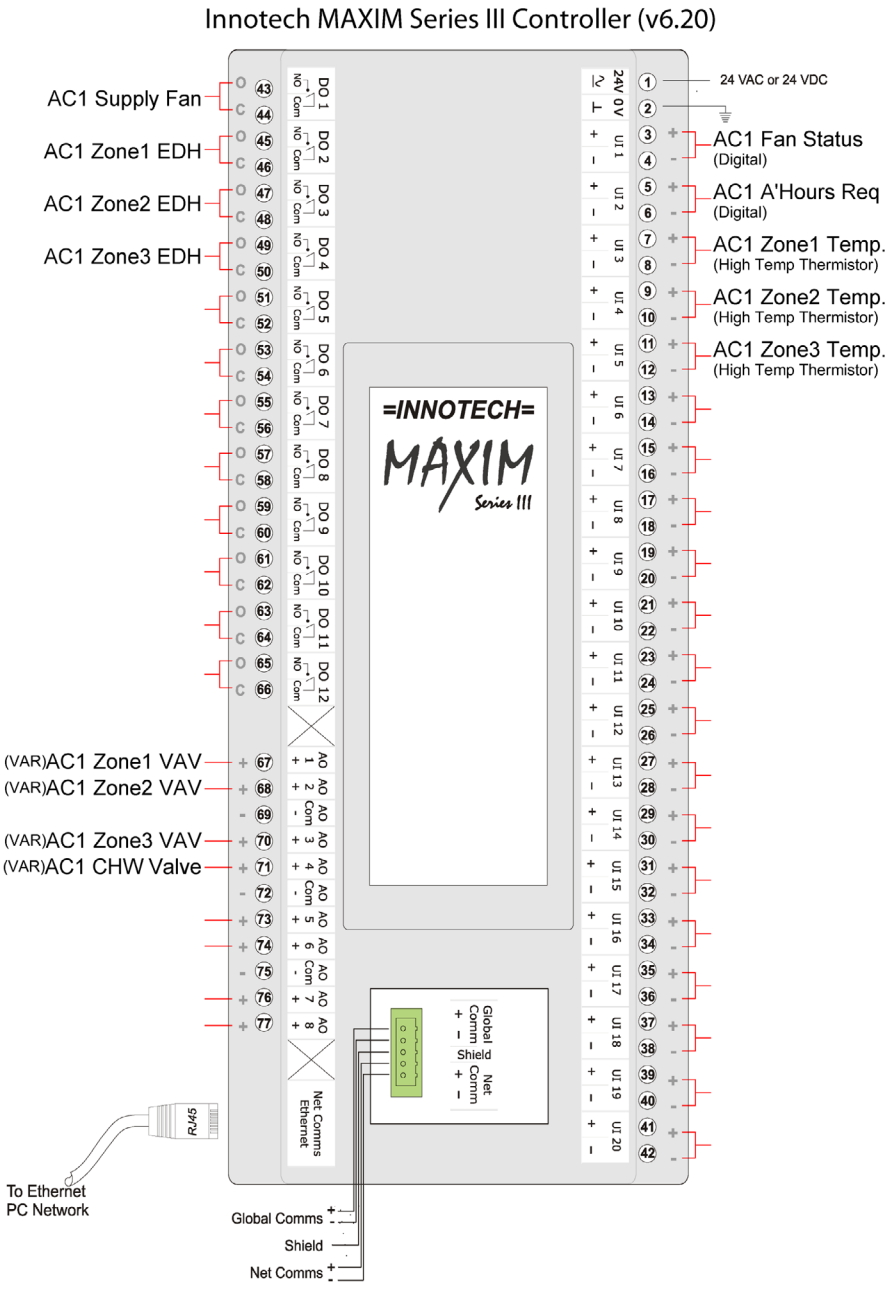

Figure 3-1: MAXIM Series III Connection Details Generated with MAXCon Software

3-3.1 MAXIM I, II, III, and 1010 Controllers

This section of the manual provides wiring information for MAXIM Series I, II, III, and 1010 controllers. Information is provided on wiring a power source, and all associated inputs and outputs.

The general layout of the input and output terminals for each of these controllers is illustrated in Figure 3-2 through Figure 3-5 below and on the next page.

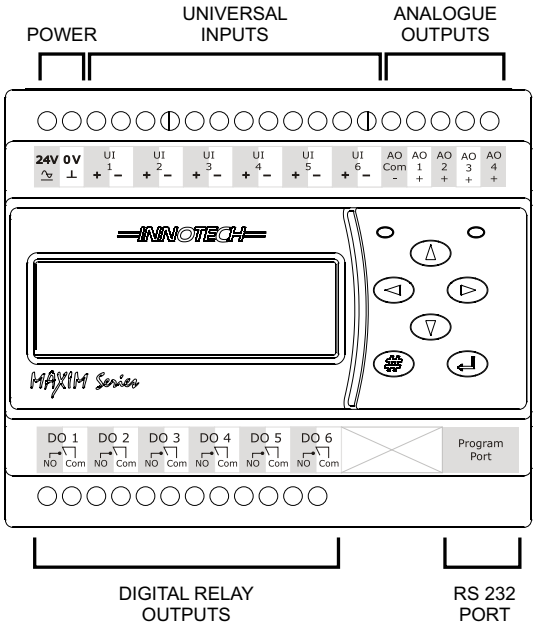

Figure 3-2: MAXIM I controller terminal connection layout

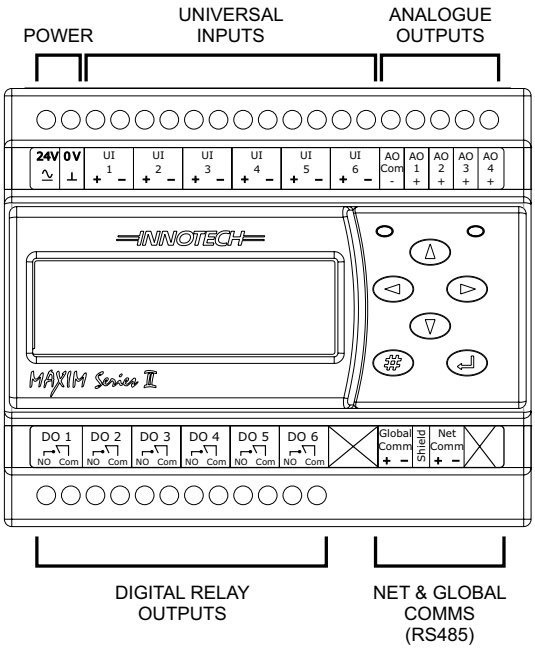

Figure 3-3: MAXIM II controller terminal connection layout

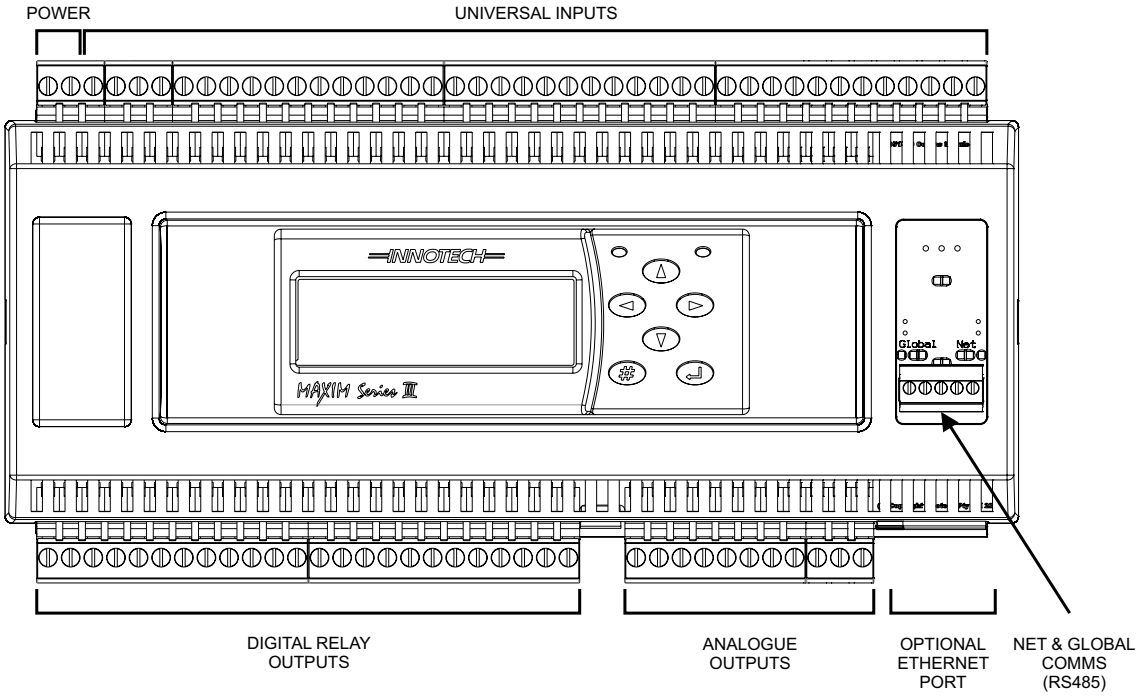

Figure 3-4: MAXIM III controller terminal connection layout

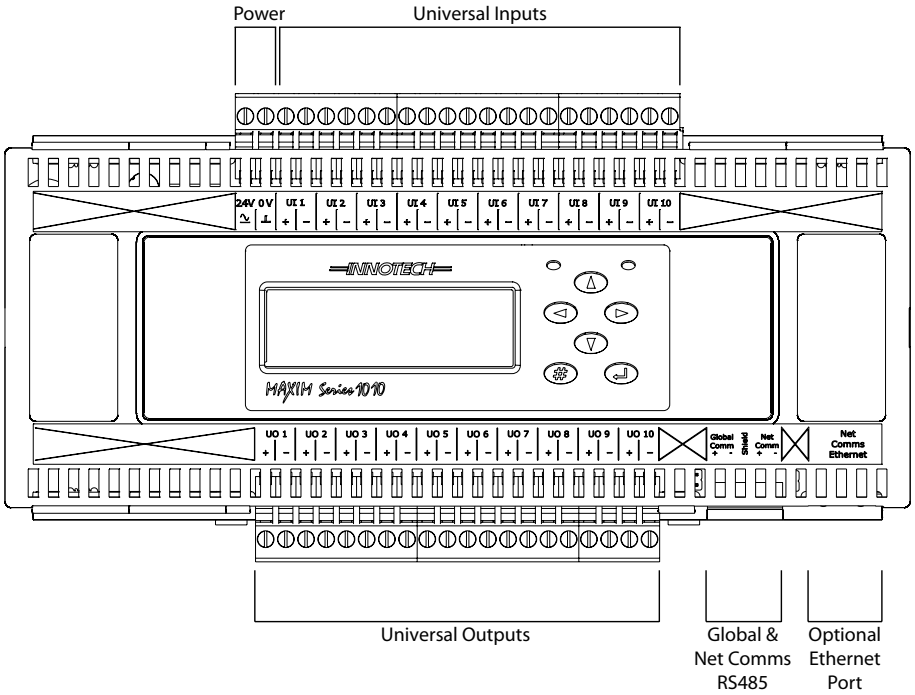

Figure 3-5: MAXIM 1010 controller terminal connection layout

3-3.1.1 Power Input

The MAXIM I, II, III, and 1010 controllers may by powered by either an AC or a DC power source. 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. Power input specifications for these controllers are detailed in Table 3-1 below.

Table 3-1: MAXIM I, II, III and 1010 Power Source Specifications

Controller	AC Power Source		DC Power Source	
MAXIM I and II	24 V AC ±10%, 50/60 Hz, Nominal Transformer rating:	5VA	24 V DC ±10% Nominal Transformer rating:	5VA
MAXIM III	24 V AC ±10%, 50/60 Hz, Nominal Transformer rating:	10VA	24 V DC ±10% Nominal Transformer rating:	10VA
MAXIM 1010	24 V AC ±10%, 50/60 Hz, Nominal Transformer rating:	16VA	24 V DC ±10% Nominal Transformer rating:	16VA

A single transformer may be used to supply voltage to more than one controller, but you must ensure that the planned load is well within the rating of the transformer. The transformer output terminal designated as AC Neutral must be solidly earthed to the main earth link of the enclosure panel. The power input terminals are Terminals 1 and 2 and are detailed in Table 3-2 below.

Table 3-2: MAXIM I, II, III and 1010 Controller Power Input Terminals

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

3-3.1.2 Universal Inputs

The MAXIM I, II, III, and 1010 controllers are equipped with Universal Inputs that can be configured to suit a wide range of applications as described in Table 3-3 below. Each Universal Input has a signal terminal (+) and a reference terminal (–).

Table 3-3: Input/Output Range for Universal Inputs

Input Type		Input Range	Output Range
Analogue		0-10VDC	0-10VDC
Thermistor	High Thermistor	100kΩ – 680kΩ	-20°C to 100°C
	Low Thermistor	662kΩ – 12kΩ	-50°C to 20°C
Lux Sensor		1MΩ – 0Ω	3 to 2500 LUX
Digital	Voltage	0 – 10VDC	OFF or ON
	Contact	Open or Closed	OFF or ON
Pulse Counter	Voltage	0 – 10V Square Wave 20ms Min. ON Time 20ms Min. OFF Time	0 to 25 pulses per second
	Contact	Open or Closed 20ms Min. ON Time 20ms Min. OFF Time	0 to 25 pulses per second
Duty Cycle	Voltage	0 – 1 Square Wave 1 – 13Hz	0 to 100%
	Contact	Open or Closed 1 – 13Hz	0 to 100%

NOTE

Please note that the LUX Sensor input mode is suitable for switching based on ambient light levels, but is NOT suitable for any operation which requires the accurate measurement or recording of light levels.

3-3.1.3 Analogue Outputs

The analogue outputs can be configured with MAXCon software to either heat valve mode or variable mode to suit your requirements. Each analogue output has a signal terminal (+) and a shared Com terminal (–). As illustrated in the connection details in Figure 3-1, the + terminal is the active signal, and the Com terminal is the signal reference of 0 V, which also can be referred to as ground.

It must be noted that on MAXIM Series I and II controllers only AO1 and AO2 can be configured to heat valve mode. However on MAXIM Series III all 8 Analogue Outputs can be configured to heat valve mode.

When an analogue output is configured to heat valve mode, the output is a Pulse Width Modulated (PWM) signal of 0 or 10 V DC with a maximum current rating of 5 m A. When an analogue output is configured to variable mode, the output is an analogue voltage signal varying from 0 to 10 V DC with a maximum current rating of 5 m A.

When an analogue output is configured as a PWM signal in heat valve mode, up to three Solid State Relays (SSR) connected in series may be used on each analogue output channel, as illustrated in Figure 3-6 below. The SSRs must be capable of a trigger voltage of 3 to 32 V DC and zero switching.

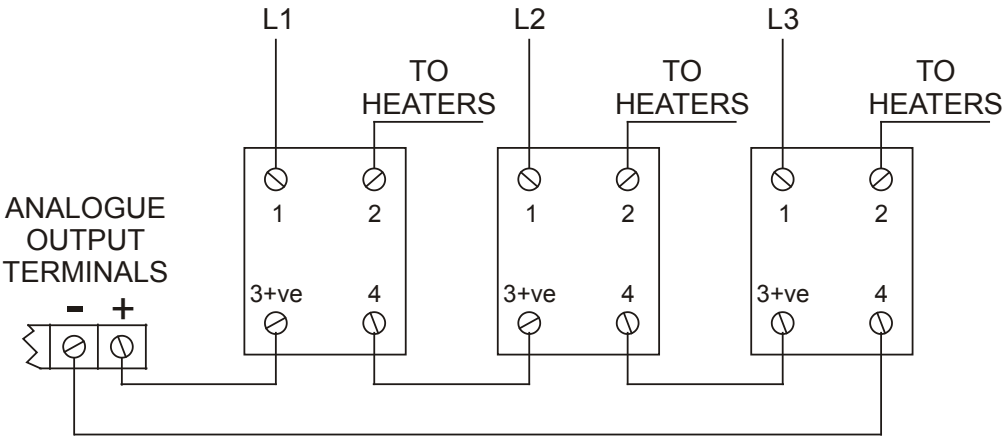

Figure 3-6: Analogue Output Driving Multiple Solid State Relays

If up to 6 SSRs are to be wired in series, you can use the Analogue Output as 0 to 10 V DC modulating in conjunction with the Innotech Heat Valve (IHV) module. Please refer to the following datasheets for more information on IHVs:

- DS3.31 for IHV Heat Valves
- DS3.32 for IHV42 Heat Valves

3-3.1.4 Digital Relay Outputs

The digital relay outputs have two terminals assigned to each channel representing the Normally Open (NO) and Common (COM) contacts of the associated relay. It is good practice to use pilot relays for the actual switching functions, particularly when it applies to inductive loads such as coils, solenoids, and motors. This protects the relays of the Digital Output channel, and allows for the pilot relays to be installed adjacent to the controlling switch gear.

The Digital Relay Outputs are rated at 24 V AC / DC, with a maximum current rating of 2 A supplied by a Class 2 transformer.

3-3.1.5 Universal Outputs

The MAXIM 1010 controller is equipped with 10 Universal Outputs that can be configured with MAXCon software to suit a wide range of applications. Each Universal Output has a signal terminal (+) and a reference terminal (–). The different types of outputs that the Universal Outputs can be configured as, and the respective range for each are shown in Table 3-4 below.

Table 3-4: MAXIM 1010 Universal Outputs

Output Type	Range
Analogue Output	0 - 10 V DC @ 5mA
Heat Valve / PWM Output	0 / 12 V DC @ 45mA
High Current Digital Output	0 / 12 V DC @ 45mA

On MAXIM 1010 controllers, all Universal Outputs can be configured to heat valve mode. When the Universal Output is configured to Heat Valve mode, the output is a Pulse Width Modulated (PWM) signal of 0 or 12 V DC with a maximum current rating of 45 m A. When the Universal Output is configured as an analogue output in variable mode, the output is an analogue voltage signal varying from 0 to 10 V DC with a maximum current rating of 5 m A.

In Digital Mode the output can drive 12 V DC relays to 0 V DC (OFF) or 12 V DC (ON) with a maximum current rating of 45mA.

3-3.2 MiniMAX Controllers (MM01 / MM02)

This section of the manual provides wiring information for the MiniMAX MM01 and MM02 controllers. Information is provided on wiring a power source and all associated inputs and outputs.

The general layout of the input and output terminals for each of these controllers is illustrated in Figure 3-7 below.

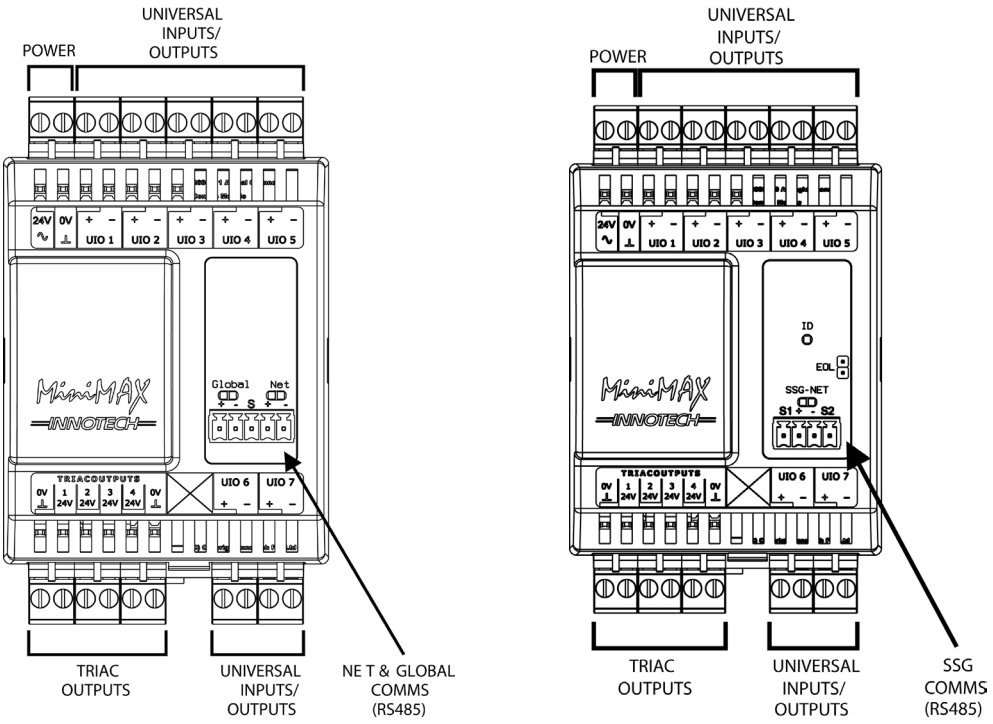

Figure 3-7: MiniMAX (MM01 & MM02) Controller Terminal Connection Layout

3-3.2.1 Power Input

The MiniMAX controllers are powered by a 24 VAC power source. The operating voltage must meet the requirements of Safety Extra Low Voltage (SELV) to EN60730. The transformer used must be a Class 2 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. Power input specifications for the MiniMAX controllers are detailed in Table 3-5 below.

Table 3-5: MiniMAX Power Source Specifications

Power Source	Rating
24 VAC ±10%, 50/60 Hz, Nominal Transformer rating with maximum TRIAC load:	35VA
24 VAC ±10%, 50/60 Hz, Nominal Transformer rating with no TRIAC load:	10VA

A single transformer may be used to supply voltage to more than one controller, but you must ensure that the planned load is well within the rating of the transformer. The transformer output terminal designated as AC Neutral must be solidly earthed to the main earth link of the enclosure panel. The dedicated power input terminals are Terminals 1 and 2 and are detailed in Table 3-6 below.

Table 3-6: MiniMAX Controller Power Input Terminals

Terminal	AC Supply
1	24VAC
2	0VAC (Neutral

3-3.2.2 Universal Inputs / Outputs

The MiniMAX controllers are equipped with seven Universal Inputs/Outputs which can be configured with MAXCon 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 are shown in Table 3-7 below.

Table 3-7: MiniMAX Universal Inputs/Outputs

UIO Type	Input Range	Output Range
Analogue Input	0 – 10 V DC	0 – 10 V DC
Dry Digital Input	Open or Closed	OFF or ON
Voltage Digital Input	0 – 10 V DC	OFF or ON
Thermistor Input	96 k Ω – 677 Ω	-20 °C to 100 °C
LUX Sensor Input	20 k Ω – 400 Ω 3 to 1000 LUX	0 to 2500 LUX
Dry Pulse Counter Input	0 – 10V Square Wave 1 to 13Hz	0 to 25 pulses per second ±1 pulse accuracy
Voltage Pulse Counter Input	0 – 10V Square Wave 20ms Min. ON Time 20ms Min. OFF Time	0 to 25 pulses per second ±1 pulse accuracy
Analogue Output	0 to 100%	0 – 10 V DC
Digital Output	OFF or ON	0 or 10 V DC
PWM Output	0 to 100%	0 to 100% Duty Cycle at 13Hz

When a UIO on a MiniMAX controller is configured as a Thermistor input type, it is designed to be used with Innotech SEN Series Detectors. The sensing range and accuracy for the SEN Series Detectors is as follows:

- Nominal sensing range: -5° C to 60 °C
- Accuracy +/-3.5%FS (R25 °C = 10 k Ω)

NOTE

It is not recommended to use the Pulse Counter on these controllers for accumulation as these controllers are not equipped with battery backup or flash RAM. The MAXIM II, MAXIM III, and MAXIM 1010 controllers are better suited for such situations.

3-3.2.3 TRIAC Outputs

The MiniMAX controllers are equipped with four TRIAC outputs used for switching the 24 V AC power supply through to the outputs of the controller. There are four 24 V terminals for each TRIAC output, and two 0 V terminals that are shared by the four TRIAC outputs. The TRIAC outputs are rated at a minimum current of 20 m A and maximum current of 250 m A. The TRIAC outputs can operate in two modes: Pulse Width Modulation (PWM) or Digital (ON/OFF). The output range for both modes of operation are described in Table 3-8 below.

Table 3-8: MiniMAX Controllers: Modes of Operation for TRIAC Outputs

TRIAC Output Mode	Output Range
Digital	ON or OFF
PWM Output	0-100% (0-10VDC)

3-3.3 VAVMax and MicroMAX Controllers

This section of the manual provides wiring information for the VAVMax and MicroMAX controllers. Information is provided on wiring a power source and all associated inputs and outputs.

The general layout of the input and output terminals for each of these controllers is illustrated in Figure 3-8 below.

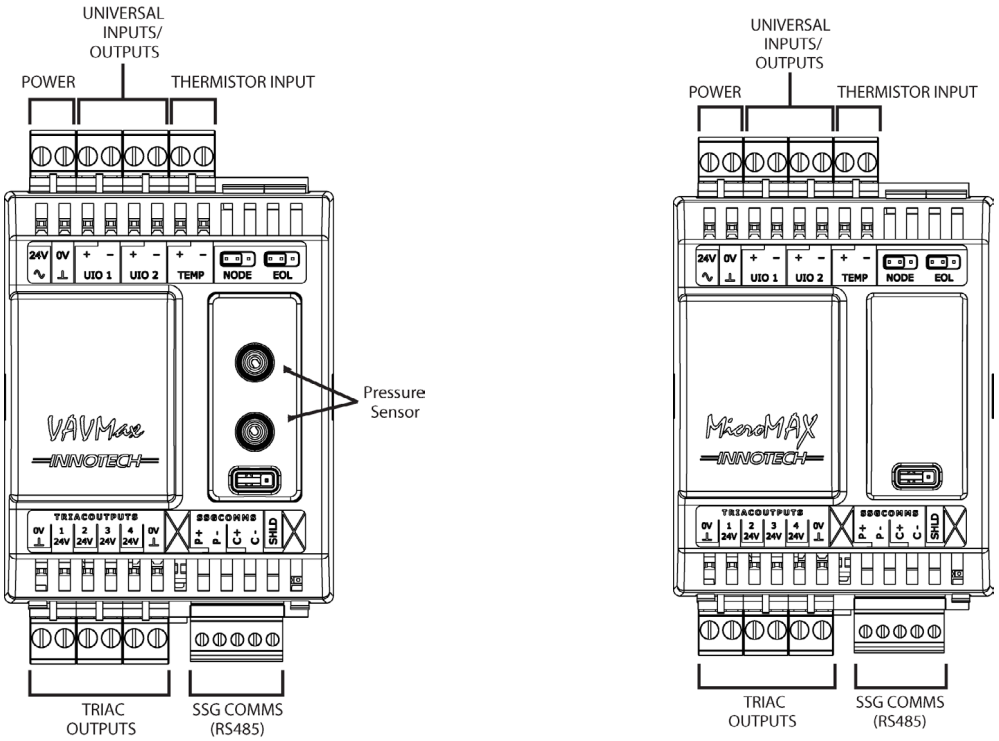

Figure 3-8: VAVMax and MicroMAX Controller Terminal Connection Layout

3-3.3.1 Power Input

The VAVMax and MicroMAX controllers are powered by a 24 VAC power source. The operating voltage must meet the requirements of Safety Extra Low Voltage (SELV) to EN60730. The transformer used must be a Class 2 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. Power input specifications for the VAVMax and MicroMAX controllers are detailed in Table 3-9 below.

Table 3-9: VAVMax and MicroMAX Power Source Specifications

Power Source	
24 VAC ±10%, 50/60 Hz, Nominal Transformer rating with maximum TRIAC load:	35VA
24 VAC ±10%, 50/60 Hz, Nominal Transformer rating with no TRIAC load:	10VA

A single transformer may be used to supply voltage to more than one controller, but you must ensure that the planned load is well within the rating of the transformer. The transformer output terminal designated as AC Neutral must be solidly earthed to the main earth link of the enclosure panel. The dedicated power input terminals are Terminals 1 and 2 and are detailed in Table 3-10 below.

Table 3-10: VAVMax and MicroMAX Power Terminals

Terminal	AC Supply
1	24VAC
2	0VAC (Neutral)

3-3.3.2 Universal Inputs / Outputs

The VAVMax and MicroMAX controllers are equipped with two Universal Inputs/Outputs which can be configured with MAXCon 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 is shown are Table 3-11 below.

Table 3-11: VAVMax and MicroMAX Universal Inputs/Outputs

UIO Type	Input Range	Output Range
Analogue Input	0 – 10 V DC	0 – 10 V DC
Dry Digital Input	Open or Closed	OFF or ON
Voltage Digital Input	0 – 10 V DC	OFF or ON
Thermistor Input	96 k Ω – 677 Ω	-20 °C to 100 °C
LUX Sensor Input	20 k Ω – 400 Ω 3 to 1000 LUX	0 to 2500 LUX
Dry Pulse Counter Input	0 – 10V Square Wave 1 to 13Hz	0 to 25 pulses per second ±1 pulse accuracy
Voltage Pulse Counter Input	0 – 10V Square Wave 20ms Min. ON Time 20ms Min. OFF Time	0 to 25 pulses per second ±1 pulse accuracy
Analogue Output	0 to 100%	0 – 10 V DC
Digital Output	OFF or ON	0 or 10 V DC
PWM Output	0 to 100%	0 to 100% Duty Cycle at 13Hz

When a UIO on a VAVMax or a MicroMAX controller is configured as a Thermistor input type, it is designed to be used with Innotech SEN Series Detectors. The sensing range and accuracy for the SEN Series Detectors is as follows:

- Nominal sensing range: -5° C to 60 ° C
- Accuracy ±3.5%FS (R25 ° C = 10 k Ω)

NOTE

It is not recommended to use the Pulse Counter on these controllers for accumulation as these controllers are not equipped with battery backup or flash RAM. The MAXIM II, MAXIM III, and MAXIM 1010 controllers are better suited for such situations.

3-3.3.3 TRIAC Outputs

The VAVMax and MicroMAX controllers are equipped with four TRIAC outputs used for switching the 24VAC power supply through to the outputs of the controller. There are four 24V terminals for each TRIAC output, and two 0V terminals that are shared by the four TRIAC outputs. The TRIAC outputs are rated at a minimum current of 20mA, and maximum current of 250mA. The TRIAC outputs can operate in two modes: Pulse Width Modulation (PWM) or Digital (ON/OFF). The output range for both modes of operation are described in Table 3-12 below.

Table 3-12: VAVMax and MicroMAX Controllers: Modes of Operation for TRIAC Outputs

TRIAC Output Mode	Output Range
Digital	ON or OFF
PWM Output	0-100% (0-10VDC)

NOTE

The use of pilot relays is recommended when switching high voltage and inductive loads.

3-3.3.4 Fixed Thermistor Input

The VAVMax and MicroMAX controllers are equipped with a fixed thermistor input labelled TEMP. The fixed thermistor input has a signal terminal (+) and a reference terminal (–). This input is designed for use with the Innotech SEN Series Detectors. The sensing range and accuracy for the SEN Series Detectors is as follows:

- Nominal sensing range -5°C to 60°C
- Accuracy +/-3.5%FS (R25°C = 10kΩ)

3-3.4 IG01 Sub System Gateway

This section of the manual provides wiring information for the IG01 Sub System Gateway. Information is provided on wiring a power source and all associated inputs and outputs.

The general layout of the input and output terminals for each of these controllers is illustrated in Figure 3-9 below.

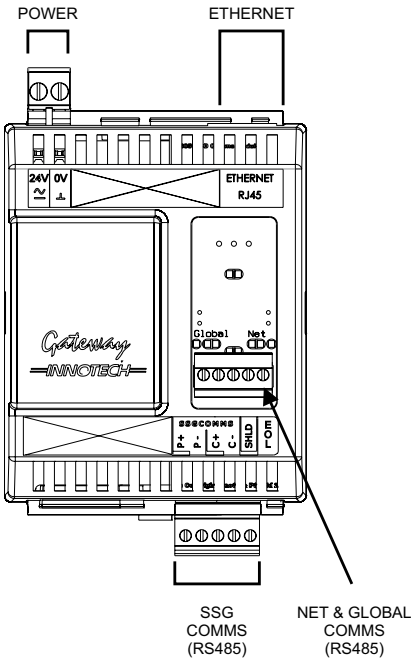

Figure 3-9: IG01 Sub System Gateway Terminal Connection Layout

3-3.4.1 Power Input

The IG01 Sub System Gateway may by powered by either an AC or a DC power source. 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. Power input specifications for these controllers are detailed in Table 3-13 below.

Table 3-13: IG01 Sub System Gateway Power Source Specifications

AC Power Source	DC Power Source
24 V AC ±10%, 50/60 Hz, Nominal Transformer rating 8VA or greater	24 V DC ±10% Nominal Transformer rating: 8VA or greater

A single transformer may be used to supply voltage to more than one controller, but you must ensure that the planned load is well within the rating of the transformer. The transformer output terminal designated as AC Neutral must be solidly earthed to the main earth link of the enclosure panel. The dedicated power input terminals are Terminals 1 and 2 and are detailed in Table 3-14 below.

Table 3-14: IG01 Sub System Gateway Power Terminals

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

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MAXIM Series Controllers

INSTALLATION INSTRUCTIONS

Chapter 4 - Network Installation

INNOTECH®

4-1 Overview

As mentioned in the Preliminary Information chapter, with the exception of the MAXIM I controller, all other MAXIM Series controllers can be installed on a primary or a sub system network depending on your specific model.

Installing a MAXIM Series controller on a network provides the ability to share data among all controllers and devices on that network. Additionally it also provides the ability for the MAXIM Series controllers to communicate with the Innotech iComm communication software, adding advanced Supervisory Control and Data Acquisition (SCADA) functionality.

The MAXIM Series controllers utilise RS485 balanced (differential) communications when installed on a network. Factors such as the type of network, cable distance, and single or multiple network installation factors must be considered when carrying out a network installation.

An optional Ethernet port is also available on the Sub System Gateway (IG01), and MAXIM Series II, III, and 1010 controllers for TCP/IP connectivity to your Local Area Network (LAN).

The MAXIM Series controllers have the flexibility to be installed in a wide range of applications. Although it is not possible to cover all installation situations that may be encountered, following some general guidelines and instructions will help to ensure the optimum installation for your particular situation. Therefore please refer to the DS 99.04 Installation Manual for Innotech Device Network Cabling for complete details and information on performing a network installation with MAXIM Series controllers.

A general network diagram of Innotech hardware is illustrated in Figure 4-1 below.

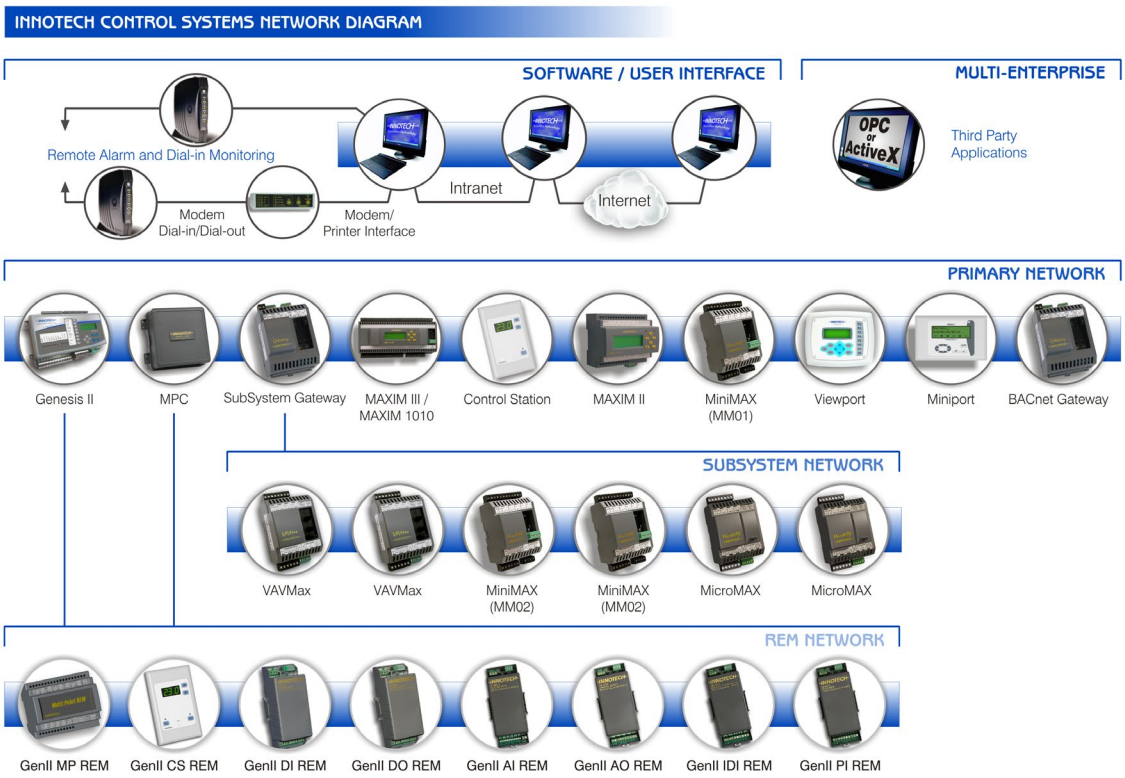

Figure 4-1: Innotech Network Diagram

MAXIM Series Controllers

INSTALLATION INSTRUCTIONS

Chapter 5 - Commissioning

INNOTECH®

5-1 Overview

The commissioning process of the MAXIM Series controllers can only be performed once the mechanical and electrical installation has been completed, and is intended to ready the controllers for full operation. The subsequent sections provide detailed information and steps for the commissioning process.

CAUTION

To prevent injury to personnel and damage to equipment, all electrical power must be turned OFF before starting the commissioning process. This includes power to the MAXIM Series controllers, and power to the 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 controller or circuit until instructed to do so by the steps in this section.

5-2 Inspect the Installation

This section of the manual provides detailed steps to perform the final inspection of the installation process. It is highly recommended that you perform a complete inspection of the mechanical and electrical installation process to ensure proper operation of the MAXIM Series controllers.

NOTE

Customers are encouraged to contact Innotech Control Systems Australia or your nearest authorised distributor for any clarification or further information regarding the installation process.

5-2.1 Mechanical Inspection

Please check the following items to complete the mechanical inspection of the installation process:

- Debris such as dust, metal chips, and moisture may have accumulated on the controllers during the installation process. Please ensure that all controllers are free of any such debris by thoroughly cleaning as necessary.
- Verify that all controllers are properly installed on DIN rail.
- Verify that cables entering and leaving the cable ducts do not make overly tight bends.
- Verify there is safe access to all MAXIM Series controllers for operation and maintenance.
- Verify that all controllers are installed in a location that is NOT subject to temperature extremes beyond the normal operating temperature.
- Verify that all controllers are located clear of high current or high voltage cables, and away from sources that may cause electrical interference.

5-2.2 Electrical Inspection

The electrical inspection of the installation process involves verifying all electrical connections are completed properly, and that there are no external voltages present on any of the inputs and outputs. The subsequent sections provide detailed information to perform a thorough electrical inspection of all wiring connections completed during the electrical installation process.

Before proceeding further with the electrical inspection, please check and verify the following items:

- Verify that all electrical power, including power to ancillary equipment is turned OFF.
- Verify all connections have been completed correctly with reference to the connection details generated for your particular installation.
- Verify that all steel enclosures are properly earthed.
- Verify that all wiring is routed clear of high current or high voltage cables, and away from sources that may cause electrical interference.
- Verify that all cables and wiring are free from physical damage.

NOTE

Please ensure that the electrical installation process is completed in accordance with DS99.04 Innotech Cabling Manual. Refer to the Cabling Manual for more detailed information.

5-2.2.1 Checking Power Inputs

The power inputs must be inspected to ensure that the supplied voltage is within the specifications of the particular controller, as illustrated in Figure 5-1 below. In cases where a DC power source is utilised, correct polarity must be verified, and the 0 V terminal must be connected to ground. When an AC power source is utilised you must verify that the AC Neutral wire is properly earthed and connected to the 0 V terminal on the particular controller.

You can check and verify correct operation of the 24 V AC and 24 V DC power supply inputs by following the steps below:

1. Verify that the main power and the circuit breaker are both OFF.
2. Verify that the resistance between the main earth link of the enclosure and Terminal 2 of the controller measures 3Ω or less.
3. Connect the red (+) test lead of your Digital Multi Meter (DMM) to the line voltage side (24V from the transformer) of the circuit breaker, and the black (–) lead of the DMM to the 0V terminal of the transformer.
4. Verify that the DMM is set to the proper range to measure 24V. In most cases the AUTO setting will suit most measurements.
5. Ensuring that the circuit breaker remains OFF, now only turn the 240V supply power ON and observe the reading on the DMM. The measured voltage should be 24V within ±10%. Please note that the DMM must be set correctly to measure either AC or DC voltage depending on the type of power source connected to the controller.
6. You can now turn the 240V supply power OFF and disconnect the DMM.
7. The above steps can be repeated to check the power inputs on other controllers.

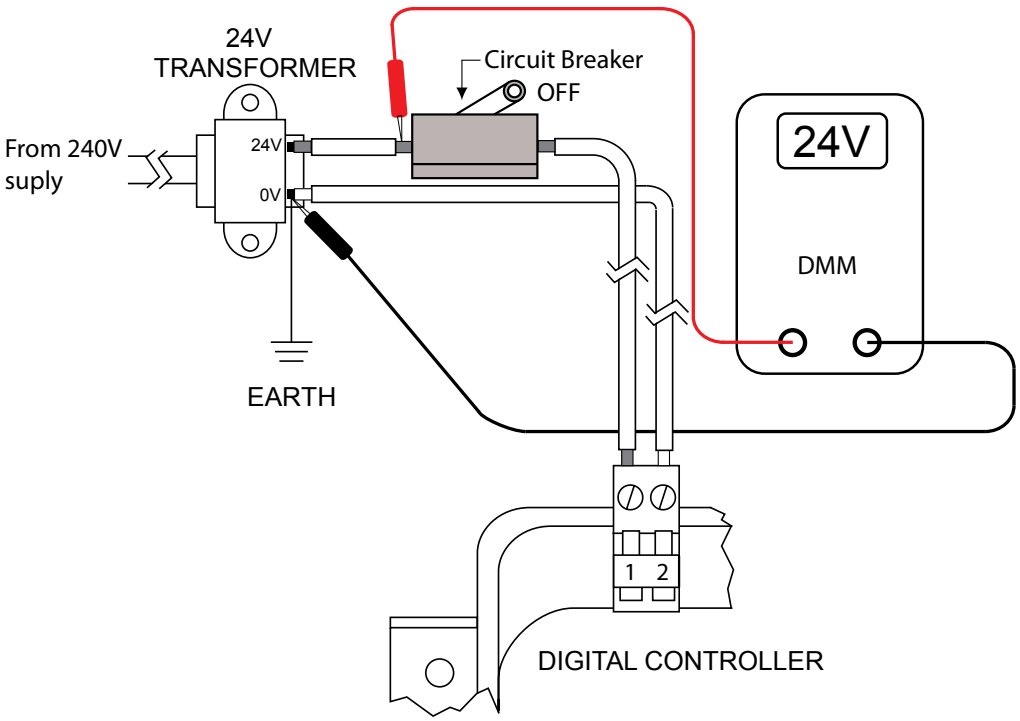

Figure 5-1: Checking Power Input Voltage

5-2.2.2 Checking Universal Inputs

Before any Universal Inputs are connected to a MAXIM Series controller, you MUST follow the steps listed below to verify that 0VAC is measured across these inputs. Please note that the voltage will be measured directly at the Universal Input wiring, and NOT at the controller, as illustrated in Figure 5-2 below. These steps do not apply if a DC source is connected to the Universal Inputs. In this case the expected voltage to be measured would be that of the source voltage.

Please note that these instructions are also applicable in situations where a Universal Input / Output on a MAXIM Series controller is configured as a Universal Input. The Universal Input / Output can be commissioned according to whether it is configured as a Universal Input or a Universal Output.

1. Verify that ALL Universal Inputs are labelled and disconnected from the controller.
2. Verify that the power to the controller is turned OFF.
3. Verify that the power to the equipment to which the Universal Inputs are connected is turned OFF.
4. Set the DMM voltage range to measure at least 25VAC; the AUTO setting will suit most measurements.
5. Connect the red (+) lead of the DMM to the Universal Input wire labelled (+), and the black (–) lead of the DMM to EARTH, as illustrated in Figure 5-2 below.
6. Observe and verify that the DMM measures 0VAC across the Universal Input wiring. If the reading is not 0VAC, this could possibly mean that the wiring is incorrect, or the Universal Input source may not be turned OFF.

Once you have performed these steps and verified 0V is measured across each Universal Input wiring, reconnect the wiring one by one to the corresponding Universal Input terminal on the MAXIM controller. It is important to observe the polarity when reconnecting the wiring to the controller.

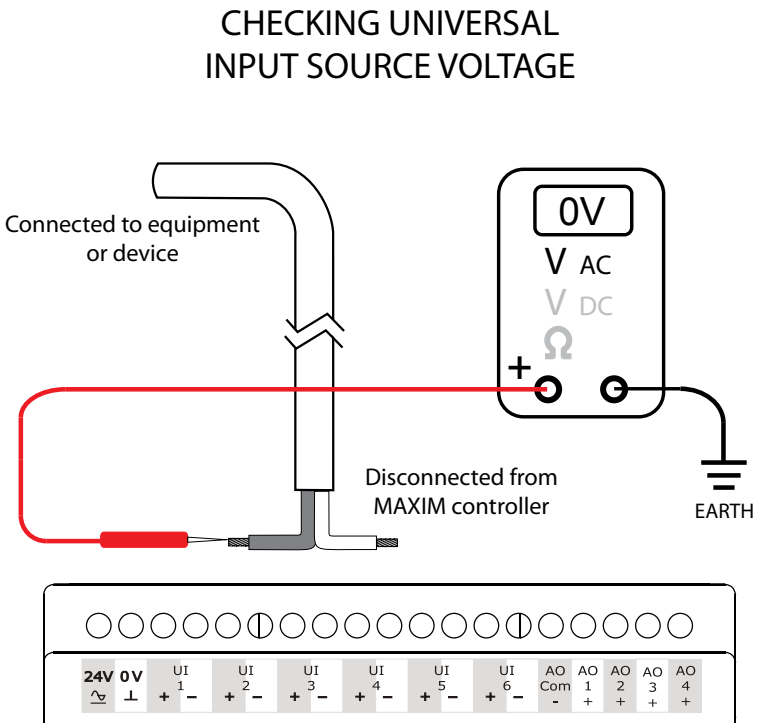

Figure 5-2: Checking Universal Inputs for 0V

5-2.2.3 Checking Digital Relay Outputs

The Digital Relay Outputs on MAXIM Series controllers are interfaced through relays, each with Single Pole Single Throw (SPST) contacts.

Before checking the Digital Relay Outputs, it is important to verify that there are no short circuits in the external wiring, which can cause the contact current to exceed the maximum rating. Excess current through the relay contacts can result in permanent damage to the controller.

The following is the general description of the process for safely checking the Digital Relay Outputs, with detailed steps outlined on the next page. With power applied to the digital output circuits, but NOT to the MAXIM controller, the output circuits are checked for correct operation. Visually check to verify that devices connected between the NO and Com terminals are OFF. If the operational status of these devices cannot be determined by simple observation (indicator lamp ON/OFF, etc.), a DMM can be used to measure the voltage across the particular device to determine whether or not it is energised.

The next step is to verify that the output circuits are energised when the Digital Relay Output is closed. For circuits using the NO contacts, a jumper wire is temporarily connected between the NO and Com terminals and the associated device is checked to verify that it is energised.

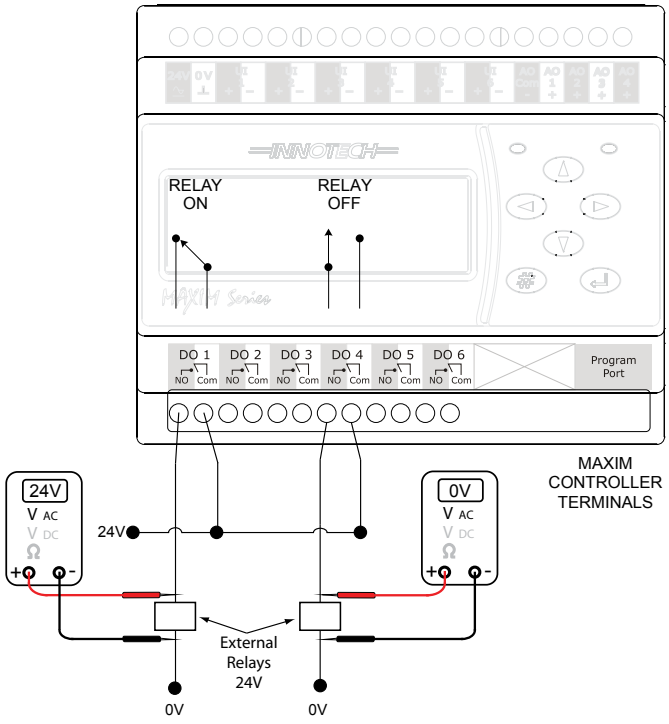

Figure 5-3: Checking Digital Relay Output Wiring

The steps below provide further details to check and verify proper operation of the Digital Relay Outputs on MAXIM Series controllers, as illustrated in Figure 5-3 on the previous page.

1. Verify that the MAXIM controller on which the Digital Relay Outputs will be checked is powered OFF. You must also verify that power is turned OFF to all of the digital output circuits to be checked.
2. Beginning at the first device connected to the NO contacts, turn the power ON to the output device.
3. Visually check to verify that devices connected between the NO and Com terminals are OFF.

   If this cannot be verified by a simple visual observation, connect a DMM across the device to measure the voltage. With the DMM set to the appropriate voltage, verify the that the measured voltage reads 0V.
4. Verify that the device is OFF by either visual inspection of the device itself, or verifying that the measured reading on the DMM is 0 V.
5. Temporarily connect a jumper wire between the NO and Com contacts of the Digital Relay Output to be checked. Verify that the jumper wire is of adequate size to temporarily carry the load.
6. Now turn the power ON to the output device.
7. Verify that the device is ON by either visual inspection of the device itself, or verifying that the measured reading on the DMM is the expected operating voltage of the device.
8. Turn the power to the output device OFF.
9. Remove the jumper wire connected in Step 6.
10. Repeat Step 2 through Step 10 for the remaining output devices connected to the NO contacts.

5-2.2.4 Checking Analogue Outputs

The Analogue Output wiring on MAXIM Series controllers should be checked to verify that the output terminals are free of any external voltage, to verify continuity through the external analogue circuit, and to verify that the resistance of the external analogue voltage is sufficient to avoid overloading the analogue output circuit.

This procedure is applicable to controllers with dedicated Analogue Outputs, and also applicable to those controllers equipped with Universal Outputs that have been configured to operate as Analogue Outputs.

1. Verify that power to the MAXIM controller is turned OFF.
2. Turn the power ON for the Digital Inputs, Digital Outputs, and if applicable the Analogue Inputs.

   This step is necessary to detect the presence of voltages at the analogue output terminals that may be caused by “sneak” circuits or incorrect wiring.
3. Disconnect the active signal wire (+) from the first Analogue Output terminal.
4. Connect the red (+) lead of the DMM to the disconnected active signal wire labelled (+), and the black (–) lead of the DMM to the Com terminal of the Analogue Output on the controller.
5. The DMM should measure 0 V, as illustrated in Figure 5-4 below. Be sure to set the DMM measurement range to measure the lowest possible voltage to ensure no voltage is present.
6. Change the DMM to measure resistance (Ω). The DMM should measure a minimum resistance of 2,000 Ω, as illustrated in Figure 5-5 on the next page. Depending on the DMM, a very high reading in Mega Ω will indicate an open circuit condition that should be corrected.
7. Disconnect the DMM and reconnect the signal wire(+) that was disconnected in Step 3.
8. Repeat Step 3 through Step 7 for the remaining Analogue Outputs.
9. Turn the power OFF that was applied in Step 2.

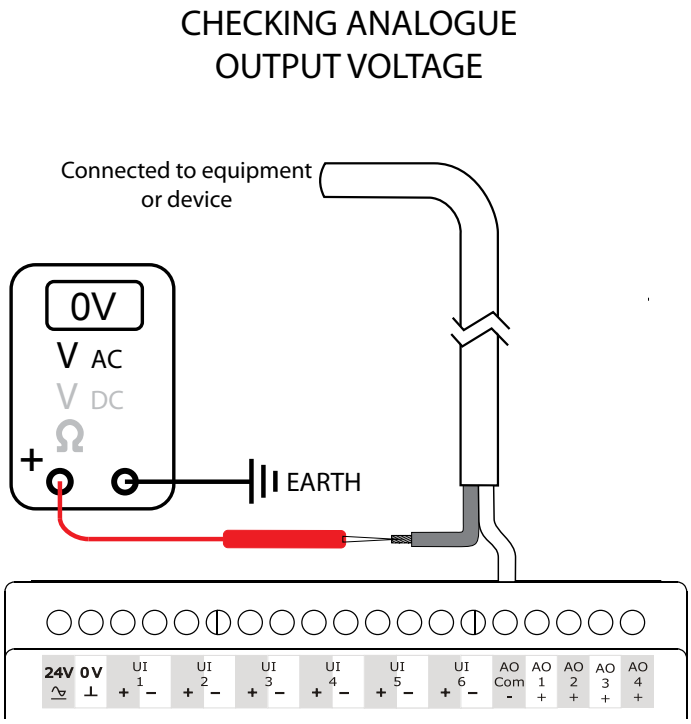

Figure 5-4: Checking Analogue Output Voltage

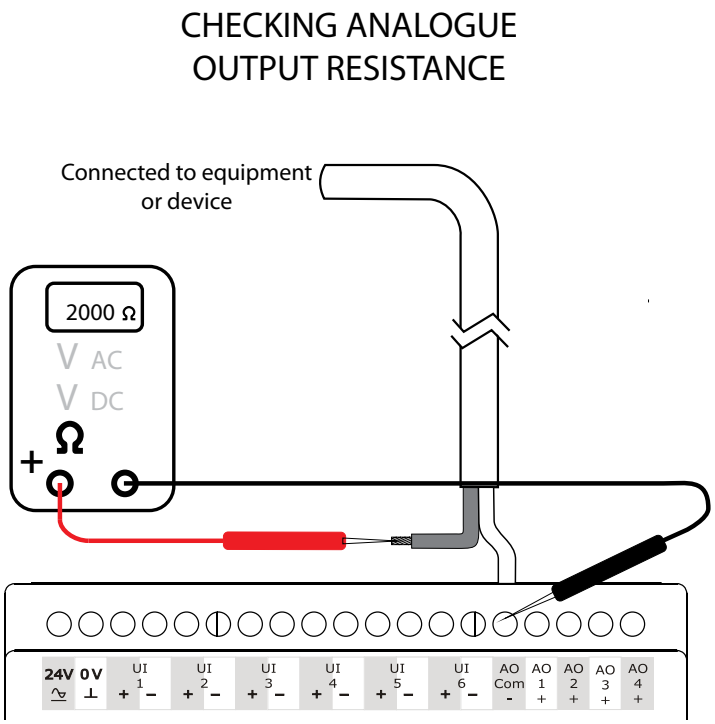

Figure 5-5: Checking Analogue Output Resistance

5-2.2.5 TRIAC Outputs

The following items should be checked and verified for proper operation of the TRIAC Outputs on applicable controllers:

- Verify correct polarity of the wiring connected to the TRIAC outputs.
- Inspect the controlling device for any defects or problems.
- Verify that the current draw for any contactors are within the tolerance of the TRIAC outputs.
- Power ON the TRIAC output (force ON using MAXMon).
- Check the TRIAC output voltages and verify proper operation of the controlling device

CAUTION

A TRIAC output cannot be tested without a load applied. Therefore a load of a minimum current rating of 20mA must be applied for correct operation of the TRIAC outputs.

5-2.2.6 End-of-Line Jumpers

The End-of-Line (EOL) jumpers are required for MAXIM Series controllers that are installed on a subsystem network. 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 a MAXIM controller installed on a subsystem network, you must place the EOL jumper on that controller.
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 last controller in the network.

NOTE

Refer to DS 99.04 Innotech Cabling Manual for EOLs and comms wiring when using repeaters, or more complex wiring configurations.

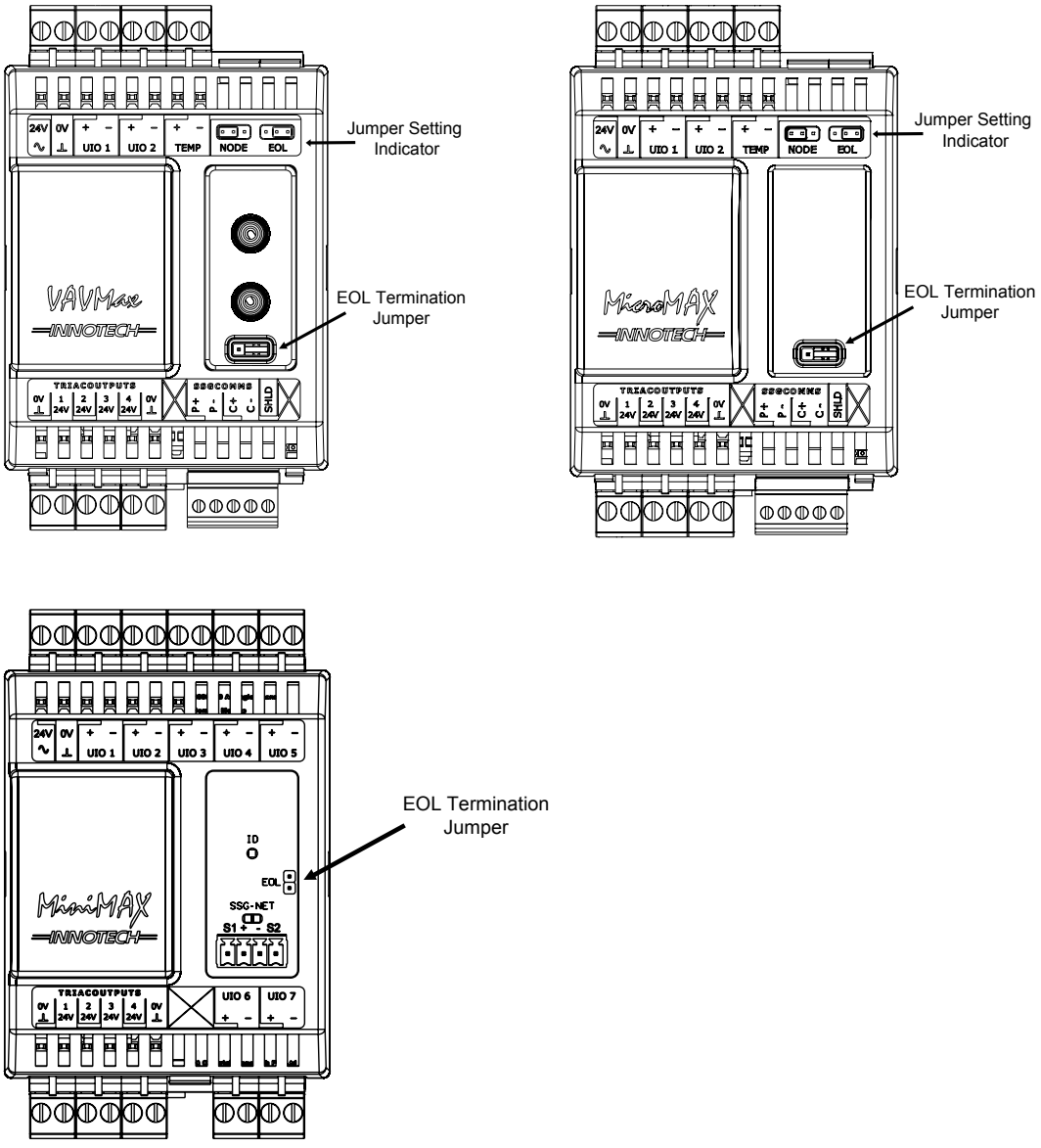

Figure 5-6: End of Cable Jumper Locations on Sub Network Devices

MAXIM Series Controllers

INSTALLATION INSTRUCTIONS

Appendix A - Using the CT01 Commissioning Tool

INNOTECH®

A-1 Overview

The Commissioning Tool – Subsystem Network (CT01) is a Human Machine Interface (HMI) that allows you to configure controllers on a Subsystem network. It provides full access and navigation through the menu structure of the Subsystem controllers. You can use the CT01 to commission the controllers as an alternative to the software method. The CT01 can interface directly with the following controllers:

- VAVMax (VM01)
- MiniMAX (MM02)
- MicroMAX (UM01)

It can also interface directly with the Subsystem Network using the provided adapter cable. Once connected to a Subsystem network, the CT01 can be used to search, log onto, and access any particular controller on that network.

The steps involved in commissioning your controllers using the CT01 are listed below:

- Connecting to the Sub System Network device.
- Logging onto the controller
- Configuring settings on a controller
- Commissioning the controller (Checking Max/Min airflows, Heater Bank testing & Temperature Calibration)

A-2 Connecting to Subsystem Network Devices

There are three options when connecting the CT01 to the Sub System network, and each is described and illustrated in the following sections.

A-2.1 Connecting directly to controller on sub system network

If you connect the CT01 directly to a controller on the sub system network, such as a VAVMax, you will only be able to communicate to that particular controller. You will not be able to connect to other controllers on the same network, as illustrated in Figure A-1.

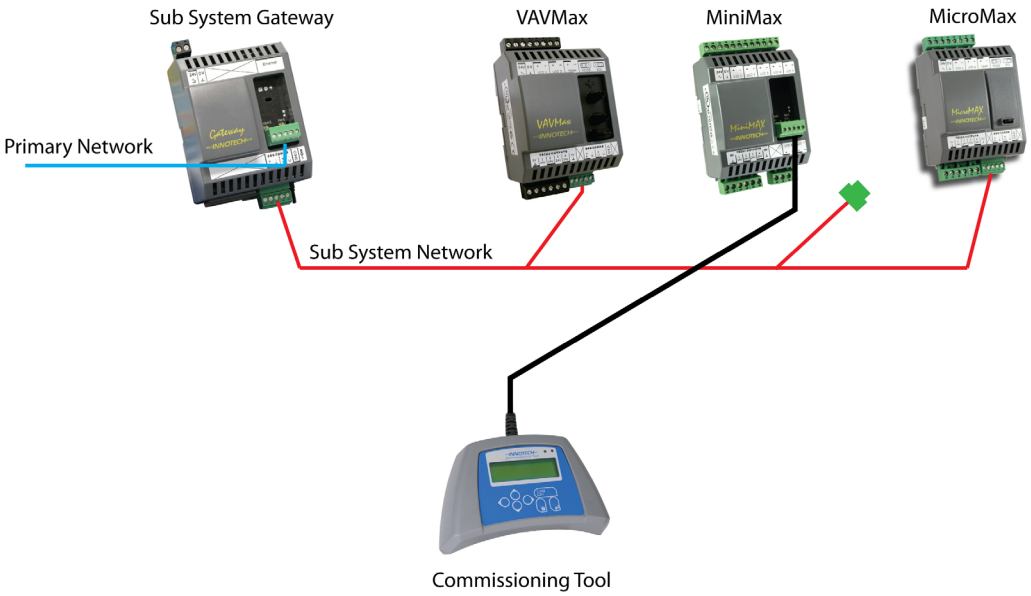

Figure A-1: Connecting the CT01 to a Sub System Network Device

A-2.2 Connecting to Sub System Gateway (IG01)

When you connect the CT01 to the Innotech Sub System Gateway (IG01) using the provided adaptor cable, the CT01 can communicate with all subsystem controllers on that network that are connected to the IG01, as illustrated in Figure A-2 below.

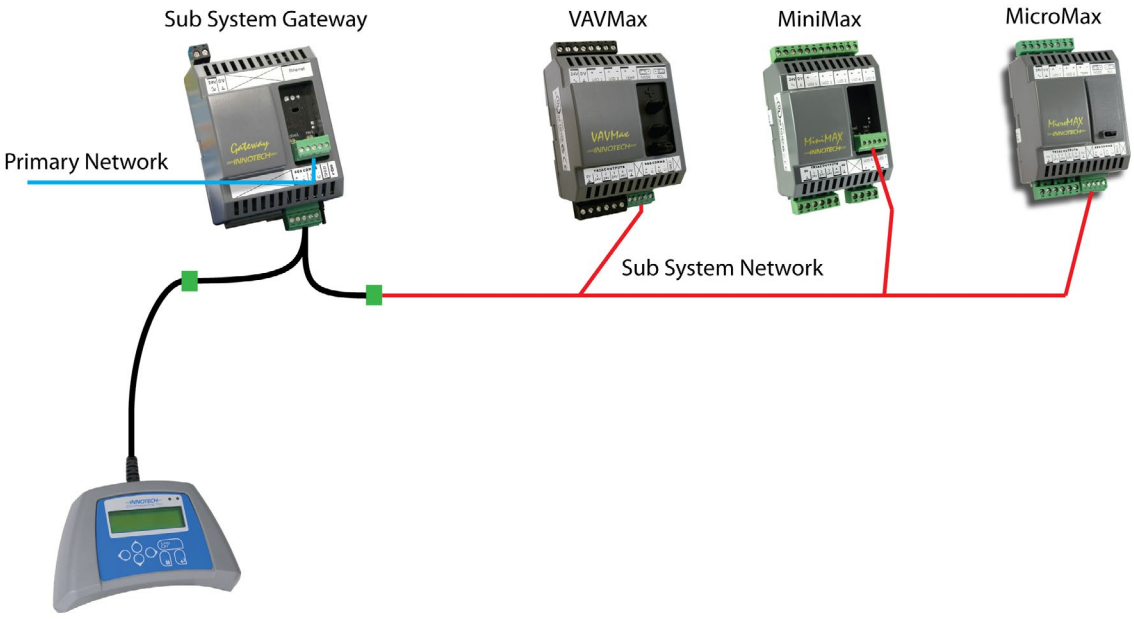

Figure A-2: Connecting the CT01 to a Sub System Gateway IG01

NOTE

The subsystem network must be reconnected as it was before once the commissioning process is complete.

A-2.3 Connecting to sub system network

When you connect the CT01 to the subsystem network at any point using the provided adaptor cable, the CT01 can communicate with all controllers on the sub system network that are connected to the IG01, EXCEPT for the controller that is directly connected to the CT01.

The IG01 will need to be unplugged from the subsystem network to allow this type of connection to work, as illustrated in Figure A-3 below.

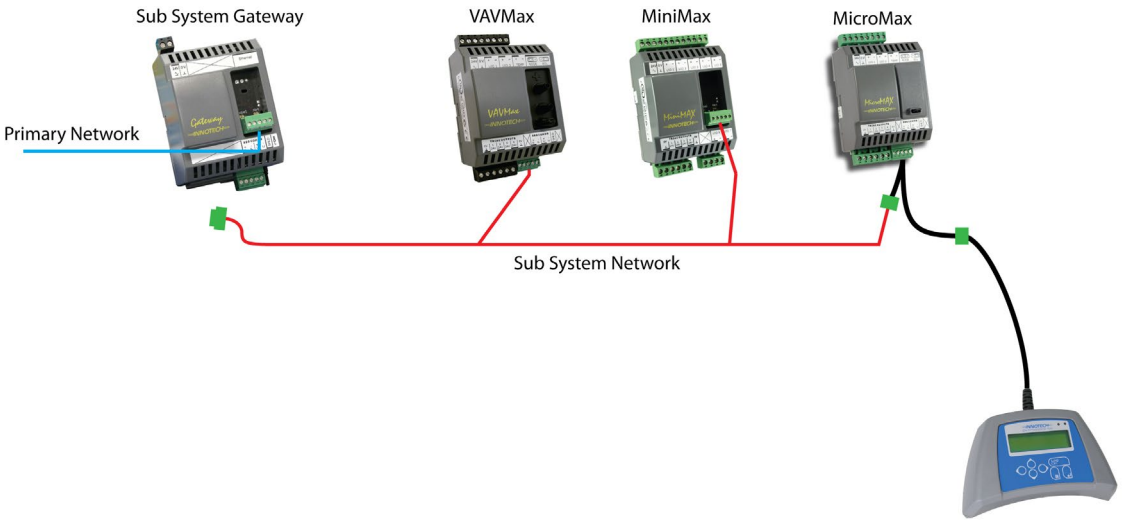

Figure A-3: Connecting the CT01 to a Sub Network Device

NOTE

The IG01 must be reconnected as it was before once the commissioning process is complete.

A-2.4 CT01 Menus and Navigation

The interface of the CT01 is relatively easy to navigate. To access the Menu page press the **Exit** button. To select how the CT01 is connected to the controller, select *Setup* and press the **Enter** button. Use the **Up** and **Down** navigation buttons to select between *Network* or *Standalone*. If the CT01 is connected directly to a controller as illustrated in Figure A-1 preivously, you will need to select *Standalone*. If the CT01 is connected to the network as illustrated in Figure A-2 and Figure A-3, you will need to select *Network*.

Figure A-4: CT01 Interface - Navigation and Menus

A-3 Logging onto the Controller

Connect the CT01 to the desired controller, or to the sub system network as described earlier, and the screen should activate.

Press the **Log On** button.

Select the controller to communicate with and press the **Enter** button. If you are connected to a sub system network, you will have a list of controllers on that network to choose from.

To navigate to the Watch Menu, select *Status* and press the **Enter** button. Now select *Watches* and press the **Enter** button. You can now use the **Up** and **Down** navigation buttons to scroll through the available selections. When indicated at the top of the LCD, you can press the **Enter** button to edit the applicable set points. Pressing the **Exit** button will take you back to the previous menu or page. You can view the following parameters in the Watch Menu:

- Zone temperature and temperature set point
- Cooling and heating demand
- Heater bank request
- Minimum and maximum air flow
- Airflow(L/S), air volume(m/3) and actual airflow set point
- Actuator travel time (only on DODC motors)
- Actuator demand
- Manual VAV calibration (for calibrating the pressure sensor and actuator position)
- Velocity Pressure (Pa)
- Pressure sensor fault status
- Commission mode enable, actuator manual enable, and actuator manual position.

A-4 VAVMax Settings

Configuring a VAVMax controller requires a number of parameters that have to be calibrated. You can use the CT01 to calibrate the following parameters on a VAVMax controller to suit your requirements:

- Zone temperature set point.
- Minimum Flow rate (L/s) – The minimum design air flow for that particular VAVMax controller.
- Maximum Flow rate (L/s) – The maximum design air flow for that particular VAVMax controller.
- K factor – The K factor is a value of calibration so the VAV Max can translate a pressure differential at the VAV into an air volume passing through the VAV.
- Calibration of temperature sensor(s).

A-5 Commissioning

The Commissioning Mode on the CT01 is used for heater bank testing and driving the VAVMax controller to a manual position for a time period of 4 hours. The Commissioning Mode can be enabled by following the instructions below:

1. Log onto a VAVMax controller as per the instructions in the previous section.
2. Select *Status* and press the **Enter** button. Now select *Watches* and press the **Enter** button.
3. Looking at the top of the LCD for menu names, use the navigation buttons to scroll left to the *Commissioning* menu.

The *Commissioning* menu contains the following information:

Table A-1: Commissioning Menu

Item	Description
Commissioning Mode Enable	Toggling this ON will enable the commissioning mode for 4hrs, after which it will turn OFF. Toggling it ON again will turn commissioning mode OFF again.
Commission mode for 4hrs	This is a count down timer that will indicate the time remaining before the commissioning mode turns OFF.
Actuator Manual Enable	This is to allow manual operation of the VAV actuator whilst commissioning mode is ON.
Actuator Manual Position	This is the required position when the Actuator Manual Enable is switched ON.

A-5.2 Configuring the K-Factor

The K factor value is required to be calibrated to allow the VAVMax controller to correctly read the pressure and calculate the airflow. The VAVMax does not need to know the duct size because it is contained within the K factor. The K factor can be set manually, or the VAVMax can calculate it automatically by following the steps below:

1. Log onto a VAVMax controller as per the instructions in the previous section.
2. Select *Commission* and press the **Enter** button.
3. Select *Calibrate* and press the **enter** button.
4. Scroll down to **Port 4.** The parameters *Measured* and *K factor* should be visible on the LCD. The *Measured* value is the airflow the VAVMax is currently reading.
5. Press the **Enter** button to calibrate the *Measured* value. Using the navigation buttons enter your total measured air volume in L/S for that particular VAVMax controller, and press the **Enter** button.
6. The VAVMax will now be calibrated and the K factor will be calculated.
7. Press the **Exit** button repeatedly to return to the main menu.

NOTE

The K-Factor may need to be rechecked and calibrated when the airflow is set to VMax.

A-5.1 Calibration of sensors

The calibration of sensors is normally completed by the Innotech commissioning technicians. However the CT01 can be used to calibrate the sensor if the need arises. Follow the steps below to calibrate sensors:

1. Log onto a VAVMax controller as per the instructions in the previous section.
2. Select *Commission* and press the **Enter** button.
3. Select *Calibrate* and press the **enter** button.
4. Each port corresponds to an input on the VAVMax controller. Port 3 is a dedicated temperature input.
5. To calibrate temperature input, take a note of the sensor reading with a reliable thermometer.
6. Scroll to *Port 3* and press the **Enter** button.
7. Using the navigation buttons enter the correct measured temperature and press the **Enter** button.
8. This will calibrate the sensor and provide an offset reading.
9. This same process can be used if Ports 1 or 2 are used for temperature inputs.
10. Press the **Exit** button repeatedly to return to the main menu..
11. The commissioning process is now complete.

NOTE

It is recommended to access and view the watch pages again to verify the controller is operating correctly. Verify that the temperatures are correct, and the minimum and maximum air flows have been calibrated.

Innotech Support

Innotech provides technical information on the Web to assist you with using its products.
At www.innotech.com.au, 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.au
Email: sales@innotech.com.au
Fax: +61 7 3421 9101
Mail: Innotech Control Systems
P.O. Box 292
Sunnybank
QLD 4109
Australia

