



Instruction Manual

ModCon[®]75 Touch Controller

WARNING

THIS MANUAL MUST BE CAREFULLY READ BY ALL INDIVIDUALS WHO HAVE OR WILL HAVE THE RESPONSIBILITY FOR USING OR SERVICING THE PRODUCT. Like any piece of complex equipment, this instrument will perform as designed only if it is used and serviced in accordance with the manufacturer's instructions. OTHERWISE, IT COULD FAIL TO PERFORM AS DESIGNED AND PERSONS WHO RELY ON THIS PRODUCT FOR THEIR SAFETY COULD SUSTAIN SERIOUS PERSONAL INJURY OR LOSS OF LIFE.

The warranties made by Mine Safety Appliances Company with respect to the product are voided if the product is not used and serviced in accordance with the instructions in this manual. Please protect yourself and others by following them. We encourage our customers to write or call regarding this equipment prior to use or for any additional information relative to use or repairs.

For your local MSA contacts please go to our website www.MSAsafety.com

©MSA 2018 - All Rights Reserved



The Safety Company

1000 Cranberry Woods Drive
Cranberry Township, PA 16066
USA
Phone 1-800-MSA-2222
Fax 1-800-967-0398

(L)-Y Rev 0

MSA Permanent Instrument Warranty

1. **Warranty-** Seller warrants that this product will be free from mechanical defect or faulty workmanship for a period of eighteen (18) Months from date of shipment or one (1) year from installation, whichever occurs first, provided it is maintained and used in accordance with Seller's instructions and/ or recommendations. This warranty does not apply to expendable or consumable parts whose normal life expectancy is less than one (1) year such as, but not limited to, non-rechargeable batteries, sensor elements, filter, lamps, fuses etc. The Seller shall be released from all obligations under this warranty in the event repairs or modifications are made by persons other than its own or authorized service personnel or if the warranty claim results from physical abuse or misuse of the product. No agent, employee or representative of the Seller has any authority to bind the Seller to any affirmation, representation or warranty concerning the goods sold under this contract. Seller makes no warranty concerning components or accessories not manufactured by the Seller, but will pass onto the Purchaser all warranties of manufacturers of such components. **THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED OR STATUTORY, AND IS STRICTLY LIMITED TO THE TERMS HEREOF. SELLER SPECIFICALLY DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE.**
2. **Exclusive Remedy-** It is expressly agreed that Purchaser's sole and exclusive remedy for breach of the above warranty, for any tortious conduct of Seller, or for any other cause of action, shall be the repair and/ or replacement at Seller's option, of any equipment or parts thereof, which after examination by Seller is proven to be defective. Replacement equipment and/ or parts will be provided at no cost to Purchaser, F.O.B. Seller's Plant. Failure of Seller to successfully repair any nonconforming product shall not cause the remedy established hereby to fail of its essential purpose.
3. **Exclusion of Consequential Damage-** Purchaser specifically understands and agrees that under no circumstances will seller be liable to purchaser for economic, special, incidental or consequential damages or losses of any kind whatsoever, including but not limited to, loss of anticipated profits and any other loss caused by reason of non-operation of the goods. This exclusion is applicable to claims for breach of warranty, tortious conduct or any other cause of action against seller.

General Warnings

WARNING

1. The Controller described in this manual must be installed, operated and maintained in strict accordance with its labels, cautions, warnings, instructions, and within the limitations stated.
2. This is a general-purpose (GP) monitor and can be a source of ignition. Install, locate, and operate only in an area where hazardous atmosphere is not presented in accordance with all applicable codes. Locating the Controller in an area where a hazardous atmosphere is present can result in ignition of the hazardous atmosphere.
3. Use only genuine MSA replacement parts when performing any maintenance procedures provided in this manual. Failure to do so may seriously impair instrument performance. Repair or alteration of the ModCon75 Touch Controller beyond the scope of these maintenance instructions or by anyone other than authorized MSA service personnel, could cause the product to fail to perform as designed and persons who rely on this product for their safety could sustain serious personal injury or loss of life.
4. If a portion of the system in which the Controller is installed fails, remaining system functions may not operate properly. In this case, do not use the system until proper repairs are made.

**FAILURE TO FOLLOW THESE WARNINGS CAN RESULT IN
SERIOUS PERSONAL INJURY OR LOSS OF LIFE.**

Table of Contents

Chapter 1, Overview 8

Introducing the ModCon75 Touch Controller	8
The ModCon75 Touch System.....	8
Technical Description	9
Operating Panel.....	9
I/Os	10
Communications	10
HMI Application	10

Chapter 2, Operating Instructions..... 11

Before Installation	11
Safety and Environmental Guideline	12
 WARNING	12
Mounting	12
ModCon75 Touch Controller Panel Cutout	13
Earth Assembly	13
HMI Panel Mounting	14

Chapter 3, ModCon75 Touch HMI Panel 15

Overview.....	15
Installation Space Considerations	16
HMI Panel Mechanical Dimensions.....	16
 WARNING	17
Specifications	17

Chapter 4, ModCon75 Touch CPU Module 20

Overview.....	20
CPU Diagram	20
CPU Installation.....	20
 WARNING	20
Removing the CPU.....	22
RS485.....	22
 WARNING	22
RS485 Wiring	23
RS485 Termination.....	23
Battery Backup, Installation, and Replacement.....	23
 WARNING	24
Specifications	25

Chapter 5, ModCon75 Touch I/O Module..... 26

Overview.....	26
I/O Module Diagram	26
I/O Bus Connectors	27
 WARNING	27
I/O Installation.....	27
Removing the I/O.....	28
I/O Module Connection Points.....	29
Specifications	29

Chapter 6, Power Supply Requirements & Wiring 32

Overview.....	32
Safety Considerations	32

⚠ WARNING	32
Connecting the Power Supply	32
Chapter 7, ModCon75 Touch Wiring	34
⚠ WARNING	34
Wiring Procedure	34
Wiring Guidelines	34
I/O Relay Wiring	35
I/O Output's Power Supply	35
⚠ WARNING	35
Increasing Contact Life Span	36
Chapter 8, Operating Instructions	37
Power Up/Main Menu Screen.....	37
Touch Screen Buttons	37
Touch Screen Hierarchy.....	38
Add Units Button.....	38
Password Lock/Unlock	39
⚠ WARNING	40
View/Edit all X3 Transmitters or Sensors on Network.....	41
Add/Display Setpoints Button	42
⚠ WARNING	42
Alarm Setup.....	43
Latching, Zone Setup	44
Write SP's	46
Main Data Screen Button	47
Modbus Alarms.....	48

Fault Status.....	49
Remote I/O Editor Button (Optional)	50
Setting Remote Relay ID and Relay State	51
Remote I/O Editor Setup	51
Remote Relay Power Supply Wiring	52
 WARNING	52
Remote Relay Wiring.....	52
Zone Setpoints Editor Button.....	53
 WARNING	54
Network Settings Button	54
Date & Time Settings	54
Active Alarm/Fault Button	55
Active/Fault Screen Selection.....	55
Password Editor	56

Chapter 9,	
Technical Specifications	58
Specifications	58
Dimensions	59

Appendix A,	
Register Maps.....	61
Critical Memory Bits.....	61
Memory Integers, MI273 through MI297	61
Memory Integers, MI300 through MI449	62
Memory Integers, MI450 through MI474	66
Memory Integers, MI525 through MI599	67
Memory Integers, MI600 through MI624	69
Memory Integers, MI650 through MI674	70
Table 1.....	71

Table 2.....	71
Table 3.....	72
Table 4.....	73
Table 5.....	73

Appendix B, Optional Remote Relay Module 74

Dimensions	74
Specifications	75
Jumper Settings.....	76
I/O Input Jumper Settings.....	77
Communication Port Jumper Settings.....	78
RS485 Pin Layout.....	78
Opening the Remote Relay Module	79
Closing the Remote Relay Module	81
Remote Relay Module Mounting	81
DIN-rail Mounting.....	83

Chapter 1, Overview

Introducing the ModCon75 Touch Controller

The ModCon75 Touch Controller:

- is a pre-programmed logic controller with an integral operating panel
- self-configuring to Ultima X Gas Monitors with X3 Technology
- offers Modbus communications
- event logging
- operating panels contain a High-Resolution Touch Screen:
- The Touch screen displays:
 - o operator instructions
 - o alarms, faults, gas values, and transmitter/sensor tags
 - o real-time system information.



Figure 1. The ModCon75 Touch Controller

- Two types of modules are compatible with ModCon75 Touch Controllers:
 - o DIN rail I/O Module plugs directly into the back of a ModCon75 Touch Controller for a self-contained PLC unit with a local I/O configuration (integral to ModCon75 Touch Controller).
 - o Remote Relay Modules can also be easily integrated to greatly extend the system's external notification capacity.
- These features combine to offer a cost-effective solution for gas detection controller applications requiring:
 - o operator interface
 - o the ability to control small to medium processes.

Technical Description

ModCon75 Touch Controller

Dimensions :

- 211.1 x 150.1 x 114.1 mm (8.31 x 5.91 x 4.49")

Mounting:

- Panel-mounted via brackets

Power Requirement:

- 24 VDC controller unit

Real-time Clock (RTC)

Battery Back-up:

- Protects real-time clock (RTC) and all data, including variable data.

Operating Panel

- Contains a High-Resolution touch screen:
 - o Touch Screen Displays
 - o 1 Audio-out 3.5mm jack-**Not Supported, No Customer Connection**
 - o 1 Micro SD slot
 - o 2 type A, USB host ports-**Not Supported, No Customer Connection**
 - o 1 Mini-B USB device port-**Factory use only**
 - o 2 Ethernet ports, RJ45, 10/100 Mbps
 - o 1 Power input connector, 24 VDC

Note:

- The HMI panel is designed to comply with NEMA 4X, IP66 and IP65 when installed into a NEMA 4X, IP66 and IP65 enclosure. Note however that the Audio Protection Seal must remain plugged in for NEMA 4X, IP66 and IP65, in which case the audio sound level from the internal speaker is significantly reduced.

I/Os

- 16 Sink or Source, 24VDC inputs available-***Not Supported, No Customer Connection.***
- 9 Zone Relays, Horn, and Fault relay, 24VDC outputs available.

NOTE:

- o Inputs are not used in the standard ModCon75 Touch Controller.

Communications

RJ45

- The controller has two Ethernet ports, which may be used to.
 - o establish communications with devices to run a remote display
 - o establish Modbus TCP communications

PLC Application

- enables the user to perform automation tasks

HMI Application

- The HMI application customizes the operator interface to.
 - o enable the operator to enter data via the controller touch screen
 - o variables allow the user to display system data on the ModCon75 Touch LCD screen
 - o sensor status, tag name and sensor values
 - o I/O status and values

Chapter 2, Mounting

Before Installation

- Check the contents of the Controller Kit.
- Kit contains:
 - o the HMI panel, Figure 6
 - o the CPU module, Figure 8
 - o the I/O module, Figure 15
 - o a three-pin power supply connector
 - o four mounting brackets, each with an inserted screw
 - o a rubber seal to be seated in back of the HMI panel

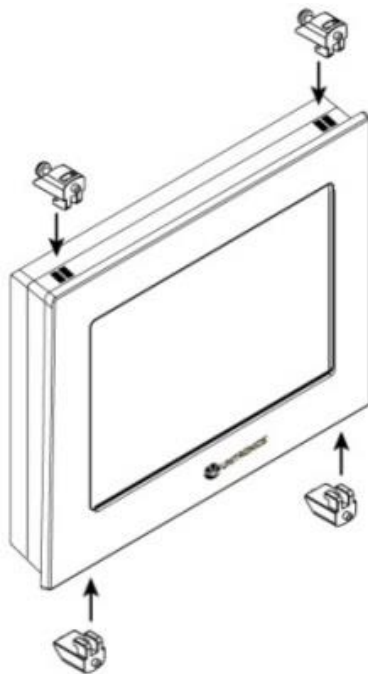


Figure 2. HMI Panel and Mounting Brackets

Safety and Environmental Guideline

WARNING

- This is a general-purpose (GP) monitor and can be a source of ignition. Install, locate, and operate only in an area where hazardous atmosphere is not present and in accordance with all applicable codes.
 - Do not install in areas with.
 - o excessive or conductive dust
 - o corrosive or flammable gas
 - o moisture or rain
 - o excessive heat
 - o regular impact shocks or excessive vibration.
 - Do not place in water or allow water to leak onto the controller.
 - Do not allow debris to fall inside the unit during installation.
 - Do not touch live wires.
 - Double-check all the wiring before turning ON the power supply.
 - Stay as far as possible from high-voltage cables and power equipment.
 - Allow a minimum of 0.4" of space for ventilation between the top and bottom edges of the controller and the enclosure walls.
 - Read and follow all instructions, warnings, and cautions pertaining to this controller.
- FAILURE TO FOLLOW THESE WARNINGS CAN RESULT IN SERIOUS PERSONAL INJURY OR LOSS OF LIFE.**

Mounting

NOTE:

- o The mounting panel cannot be more than 0.2" thick.
- To maximize system performance, avoid electromagnetic interference by.
 - o mounting the controller on a metal panel
 - o earthing the ModCon75 Touch Controller according to Figure 4.
- Make a panel cutout for your ModCon75 Touch Controller.
 - o See Figure 3 for cutout dimensions.
- If you are mounting the controller on a metal panel, earth the power supply.
 - o Bore a hole (Figure 4).
 - o Scrape the panel paint away from the contact area to ensure a conductive connection.
 - o Ensure proper ingress protection per applicable codes and standards.
 - o Drive the screw into the hole.

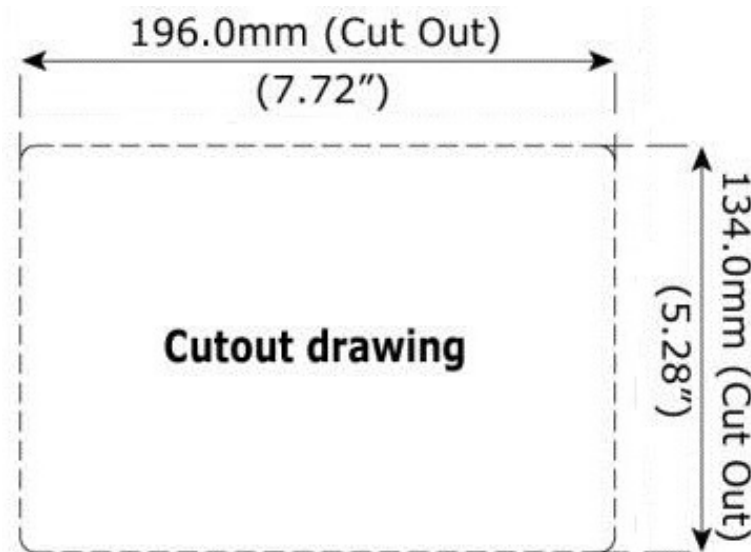


Figure 3. ModCon75 Touch Controller Panel Cut-out—Front View

- o On the screw's shank, place the following hardware in this order: washer, ring terminal, second washer, spring, and nut as shown in Figure 4.

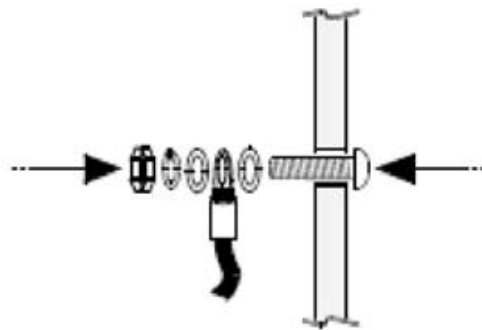


Figure 4. Earth Assembly

- Slide the HMI panel into the cutout, ensuring that the rubber seal is in place as shown in Figure 5.
- Push the four mounting brackets into their slots on the sides of the HMI panel as shown in Figure 5.
- Tighten the bracket screws against the HMI panel. Hold the brackets securely against the unit while tightening the screws.

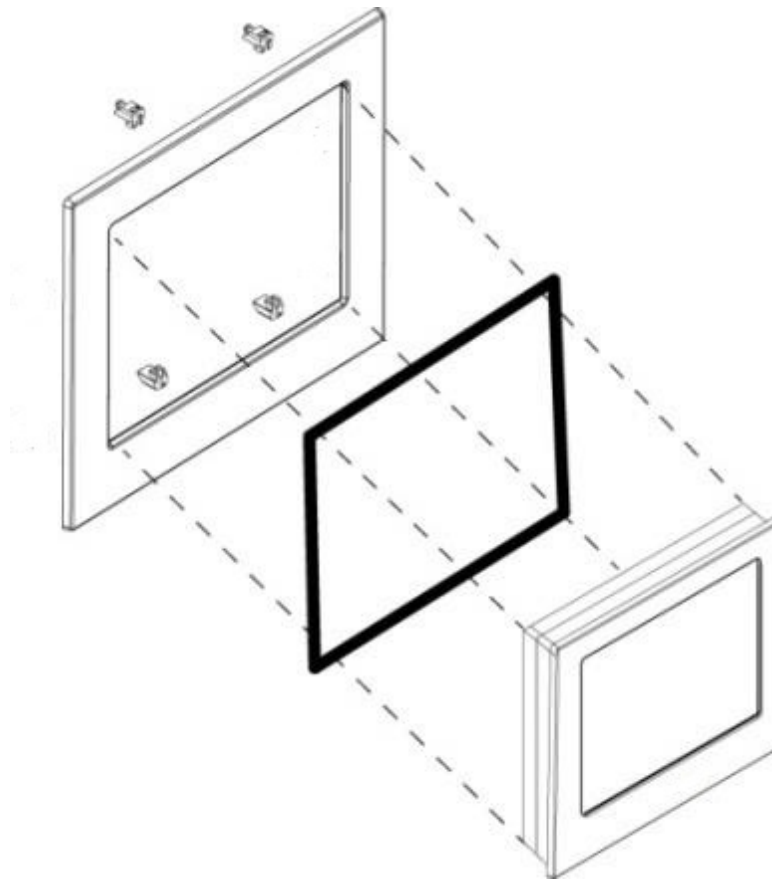


Figure 5. HMI Panel Mounting

Chapter 3,

ModCon75 Touch HMI Panel

The platform comprises the CPU controller, HMI panel and I/O module that snap together to form the ModCon75 Touch Controller.

HMI Panel

- High-resolution touch screen provides the operator interface for the system.
- The DIN-rail structure on the panel's back is designed to physically support the CPU controller and the I/O module.

HMI Panel Diagram

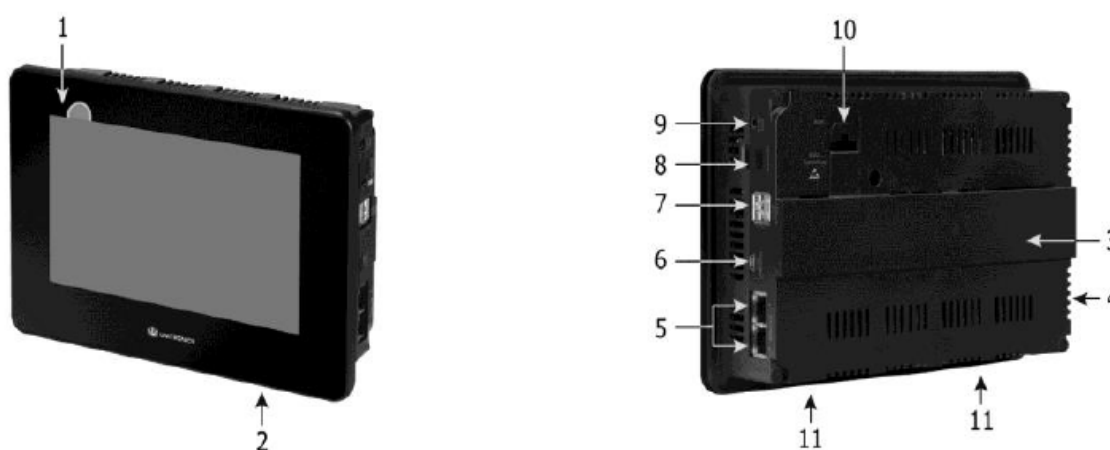


Figure 6. HMI Panel Front and Rear View

	Screen Protection	A plastic sheet attached to the HMI Panel screen for protection. Remove it during installation on the HMI Panel.
2	Audio Outlet Seal	Prevents dust accumulation in the small outlet that serves the HMI panel's embedded speaker.
Caution: Keep the seal in place when the embedded speaker is not used. The seal must be kept in place for IP65, IP66 and NEMA 4X compliance.		
3	DIN-rail structure	Physical support for the CPU and I/O modules.
4	24VDC power input	Connection point for the HMI Panel's power source. Connect the Terminal Block supplied with the kit to the end of the power cable.
5	2 Ethernet (RJ45) ports	Support high-speed Ethernet communications, 10/100Mbps.
6	USB Device	Not Supported, No Customer Connection.
7	2 USB Host ports	Not Supported, No Customer Connection.

8	Micro SD slot	Supports standard micro SD cards.
9	Audio-out jack	<i>Not Supported, No Customer Connection.</i>
10	Auxiliary connector (AUX)	Provides the electrical connection for the CPU.

Installation Space Considerations

- Allocate space for:
 - o The HMI Panel including the CPU and I/O modules that will be installed on it.
 - o Opening the doors of the CPU and I/O modules.

HMI Panel Mechanical Dimensions

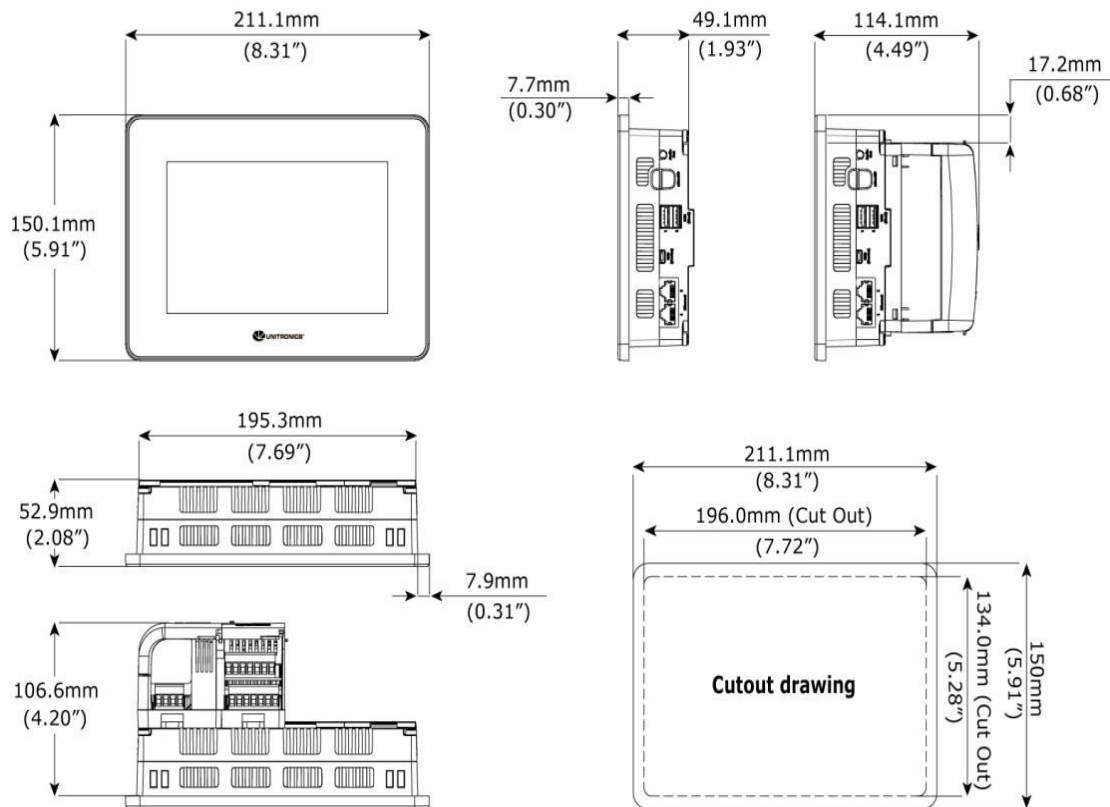


Figure 7. HMI Panel Mechanical Dimensions

HMI Panel Interface Connections

Ethernet	CAT-5e shielded cable with RJ45 connector
Micro SD	Standard micro SD

WARNING

- Disconnect system power before connecting or disconnecting any modules or devices.
- Components in this system are electrostatic discharge sensitive (ESDS). Use proper personal grounding procedures when removing, handling or adjusting the electronic modules.

FAILURE TO FOLLOW THESE WARNINGS CAN RESULT IN SERIOUS PERSONAL INJURY OR LOSS OF LIFE.

Specifications

Table 1. Specifications for ModCon75 HMI Panel

Power Supply	
Input voltage	24VDC
Permissible range	20.4VDC to 28.8VDC
Maximum current consumption	0.75A @ 24VDC

Display	
LCD type	TFT
Backlight type	White LED
Luminous intensity (brightness)	Typically, 400 nits (cd/m ²), at 25°C
Backlight longevity	50k hours
<i>Note:</i> Panel's longevity is the typical operating time after which the brightness drops to 50% of its original level.	
Resolution (pixels)	800 x 480 (WVGA)
Size	7"
Viewing area Height x Width (mm)	152.4 x 91.44
Color support	65,536 (16bit)

Surface treatment	Anti-glare
Touch screen	Resistive Analog
Actuation force (min)	>80 g (0.176 lb.)

System	
Processor	32bit, 800Mhz RISC Processor, with Graphic Accelerator
Internal memory	RAM: 512MB ROM: 3GB system memory 1GB user memory
External memory	Micro SD or Micro SDHC card Size: up to 32GB Data speed: up to 200Mbps

Audio
Note: The audio outlet seal must be inserted in the outlet in order to comply with IP65, IP66 or NEMA 4X.

Communication	
Ethernet port	
Number of ports	2
Port type	10/100 Base-T (RJ45)
Auto crossover	Yes
Auto negotiation	Yes
Isolation voltage	500VAC for 1 minute
Cable	Shielded CAT5e cable, up to 100m (328 ft.)
USB device – Not Supported, No Customer Connection	
USB host - Not Supported, No Customer Connection	

Environmental	
Protection	Front face: IP65/66, NEMA 4X Rear side: IP20, NEMA 1
Note: The audio outlet seal must be inserted in the outlet in order to comply with IP65, IP66 or NEMA 4X.	

Operating temperature	-20°C to 55°C (-4°F to 131°F)
Storage temperature	-30°C to 70°C (-22°F to 158°F)
Relative Humidity (RH)	5% to 95% (non-condensing)
Operating Altitude	2,000m (6,562 ft.)
Shock	IEC 60068-2-27, 15G, 11ms duration
Vibration	IEC 60068-2-6, 5Hz to 8.4Hz, 3.5mm constant amplitude, 8.4Hz to 150Hz, 1G acceleration

Chapter 4,

ModCon75 Touch CPU Module

- The CPU cannot operate independently. It must be plugged into the back of an HMI panel. The HMI panel provides the CPU's power source.

Features:

- IO/COM Bus connector for interfacing I/O modules
- Isolated RS485.
- Backup battery.

CPU Diagram

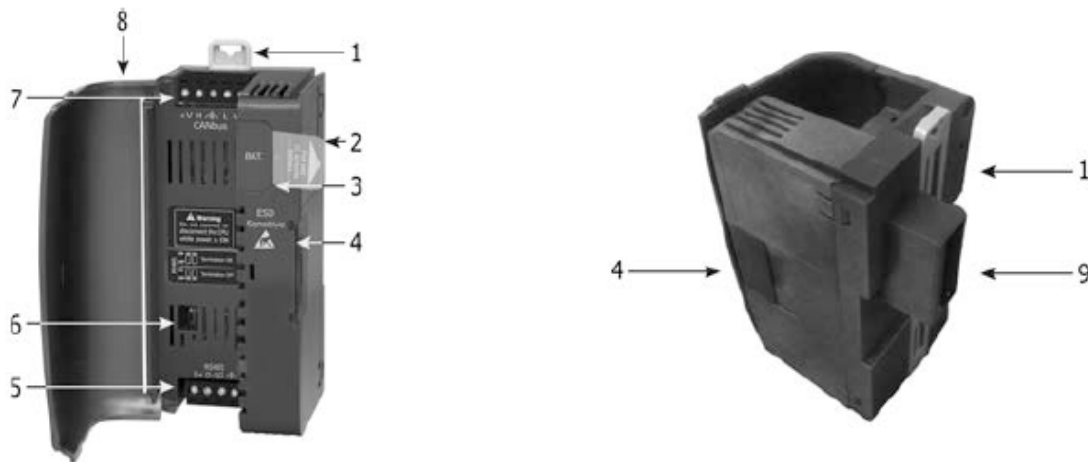


Figure 8. CPU Front and Rear View

1. DIN-rail clips
2. Battery pull-tab (remove during installation)
3. Battery compartment cover
4. IO/COM Bus connector, Shipped covered. Leave covered when not in use.
5. RS485 connector
6. RS485 termination selection DIP switch
7. CANbus connector-**Not Supported, No Customer Connection**
8. CPU door
9. CPU connector to HMI panel

Installation

WARNING

- Disconnect system power before connecting or disconnecting any modules.
- Components in this system are electrostatic discharge sensitive (ESDS). Use proper personal grounding procedures when removing, handling or adjusting the electronic modules.

FAILURE TO FOLLOW THESE WARNINGS CAN RESULT IN SERIOUS PERSONAL INJURY OR LOSS OF LIFE.

The AUX connector on the back of the HMI panel provides the connection point for the CPU, including power.

The DIN-rail type structure on the back of the panel provides the physical support.

1. Remove the AUX connector cover from the panel.
2. Remove the IO/COM bus connector cover.
3. Plug the CPU into the HMI panel AUX connector as shown in Figure 9. The guide tunnel on the CPU will be used to install the I/O module as shown in Figure 12.
4. Verify that the DIN-rail clips located on the top and bottom of the CPU have been locked onto the DIN-rail structure on the back of the HMI panel as shown in Figure 10.



Figure 9. CPU Assembly



Figure 10. Locked



Figure 11. Unlocked



Figure 12. Guide Tunnel

Removing the CPU

1. Power off the HMI panel before removing the CPU.
2. Disconnect the RS485 connector.
3. Disconnect the I/O module connected to the CPU (by pushing the Bus Connector lock to the right).
4. On the CPU, pull the top DIN-rail clip up and the bottom clip down to the unlocked position as shown in Figure 11.
5. Pull the CPU out of its place.

About the CPU I/O Bus Connector

- The IO/COM Bus connector on the right side of the CPU provides the electrical connection point for the I/O module. The connector is shipped covered by a protective cover, protecting the connector from debris, damage and ESD.

RS485

⚠ WARNING

- Disconnect power before making any communications connections.
FAILURE TO FOLLOW THIS WARNING CAN RESULT IN SERIOUS PERSONAL INJURY OR LOSS OF LIFE.

The CPU is shipped with a 4-pin RS485 terminal block. This connector is marked with a pin assignment that is identical to the corresponding marking on the CPU as shown in Figure 13.

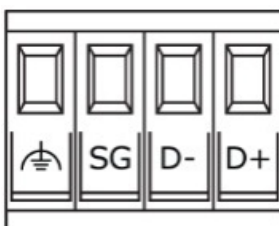


Figure 13. RS485 Terminal Block

RS485 Wiring

D+ Tx/Rx+ (Ultima X3 A)
D- Tx/Rx- (Ultima X3 B)
SG Signal Ground
Functional Ground

- Use shielded twisted-pair cable, in compliance with EIA RS485 specifications.
- When wiring each node, connect the cable shield to the functional ground point of the RS485 terminal block.

Note:

- In order to avoid ground loops, do not connect the RS485 functional ground terminal to the earth of the system, as it is internally connected to the HMI panel's functional ground point.

RS485 Termination

- Use the DIP switches shown in figure 9 to set the RS485 termination according to the table as shown in Table 2.
- The device is shipped with both its DIP switches set to ON; change the settings if the device is not at one of the ends of the RS485 network.

Table 2. DIP Switch Settings

Position		DIP Switch State
1	2	
ON	ON	Terminated (factory default)
OFF	OFF	Not Terminated

Battery: Back-up, Installation and Replacement

Backup

- In order to preserve back-up values for the Real Time Clock (RTC) and system data in the event of power off, the battery must be connected.

Battery Installation

- The CPU is shipped with the battery installed, but with a plastic battery pull-tab inserted in the battery compartment. Pull out the Battery pull-tab during installation in order to connect the battery.

Battery Replacement

WARNING

- Components in this system are electrostatic discharge sensitive (ESDS). Use proper personal grounding procedures while servicing the battery.

FAILURE TO FOLLOW THIS WARNING CAN RESULT IN SERIOUS PERSONAL INJURY OR LOSS OF LIFE.

Caution

- To preserve back-up values for RTC and system data during battery replacement, the CPU must be powered from the HMI panel.
1. Open the CPU door and remove the battery cover.
 2. Remove the used battery and insert the new one, ensuring that the polarity is aligned with polarity as shown in Figure 14.
 3. Replace the battery cover.
 4. Dispose of the used battery according to local and national standards and regulations.



Figure 14. Battery Polarity

Specifications

Table 3. Specifications for ModCon75 Touch CPU

General	
I/O Support	Zone relay module includes 9 Zone Alarm, Horn and Fault relay
Ladder Memory	1MB
Bit Operation	0.13 μ s
Battery	Model: CR2032 Lithium battery Battery Lifetime: 4 years typical at 25°C Battery Low detection and indication (via the HMI panel and via System Tag).
Connectors	IO/COM Bus connector CANbus connector – Not Supported, No Customer Connection

Communication	
RS485	
Voltage limits	-7 to +12 VDC maximum, Common+Differential
Baud rate range	1,200 – 115,200 bps
Nodes	Up to 32
Isolation voltage	500VAC for 1 minute
Cable type	Shielded twisted pair in compliance with EIA RS485
Cable Length	Maximum 1,200 m (3,937 ft.)
Termination	Set using DIP Switches

Environmental	
Protection	IP20, NEMA1
Operating temperature	-20°C to 55°C (-4°F to 131°F)
Storage temperature	-30°C to 70°C (-22°F to 140°F)
Relative Humidity (RH)	5% to 95% (non-condensing)
Operating Altitude	2,000m (6,562 ft.)
Shock	IEC 60068-2-27, 15G, 11ms duration
Vibration	IEC 60068-2-6, 5Hz to 8.4Hz, 3.5mm constant amplitude, 8.4Hz to 150Hz, 1G acceleration

Chapter 5,

ModCon75 Touch I/O Module

- The ModCon75 Touch HMI panel is delivered with one I/O Module. An optional Remote Relay Module is also available and is described in detail in Appendix B.

I/O Modules

- I/O Modules provide a ModCon75 Touch Controller with an on-board I/O configuration.
- The I/O Module plugs directly into the back of the ModCon75 Touch HMI panel, creating a self-contained control unit with a local I/O configuration.

I/O Module Diagram

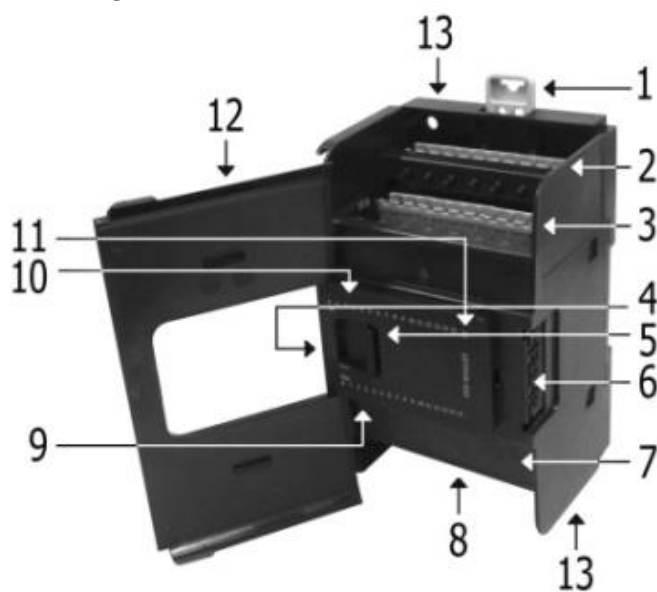


Figure 15. I/O Module

1	Din-rail clips	Provide physical support for CPU and I/O Module. There are two clips: one at the top (shown), one at the bottom (not shown).
2	Input I/Os	Input I/O connection points – Not Supported, No Customer Connection
3		
4	I/O Bus-left	Left-side Connector
5	Bus Connector Lock	Slide the Bus Connector Lock to the left to electrically connect the I/O module to the CPU.
6	I/O Bus-Right (Bus Connector Cover)	Right-Side Connector shipped covered. Leave covered when not in use.

7	Output I/Os	Output I/O connection points
8		
9	I/O LEDs	Green LEDs
10		
11	Status LED	Tricolor LED, Green/Red/Orange
Note	Refer to page 29 for LED indications	
12	Module door	Shipped covered with protective tape to prevent the door from being scratched. Remove tape during installation.
13	Screw holes	Enable panel-mounting; hole diameter: 4mm (0.15")

About the I/O Bus Connectors

- The I/O Bus connectors provide the physical and electrical connection points between modules. The connector is shipped covered by a protective cover, protecting the connector from debris, damage and ESD.
- The I/O Bus – Left (# 4 in Figure 15) will be connected to the ModCon75 Touch CPU module.
- The I/O Bus – Right (# 6 in Figure 15) do not remove its Bus Connector Cover.

WARNING

- Disconnect system power before connecting or disconnecting any modules.
- Components in this system are electrostatic discharge sensitive (ESDS). Use proper personal grounding procedures when removing, handling or adjusting the electronic modules.

FAILURE TO FOLLOW THESE WARNINGS CAN RESULT IN SERIOUS PERSONAL INJURY OR LOSS OF LIFE.

Installation

The Din-rail type structure on the back of the HMI panel provides the physical support for the I/O module.

1. Check the CPU to which you will connect the I/O module to verify its Bus Connector is not covered.
2. Verify the I/O module Bus Connector (Left) is not covered and the Bus Connector (Right) is covered.
3. Use the upper and lower guide-tunnels (tongue and groove) to slide the I/O module into place as shown in Figure 16.
4. Verify that the DIN-rail clips located at the top and bottom of the I/O module have snapped onto the DIN-rail.
5. Slide the Bus Connector Lock all the way to the left as shown in Figure 17.

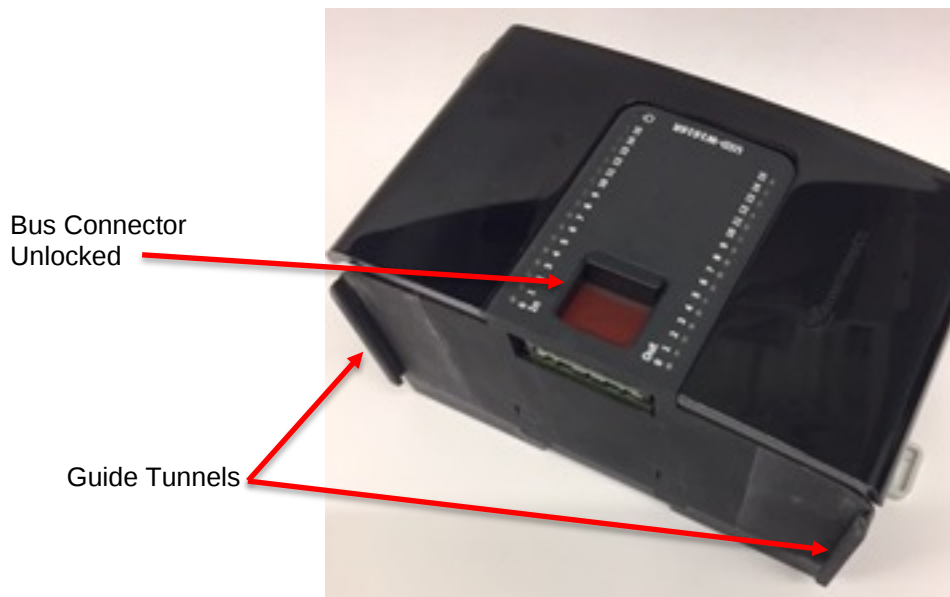


Figure 16. Guide Tunnels

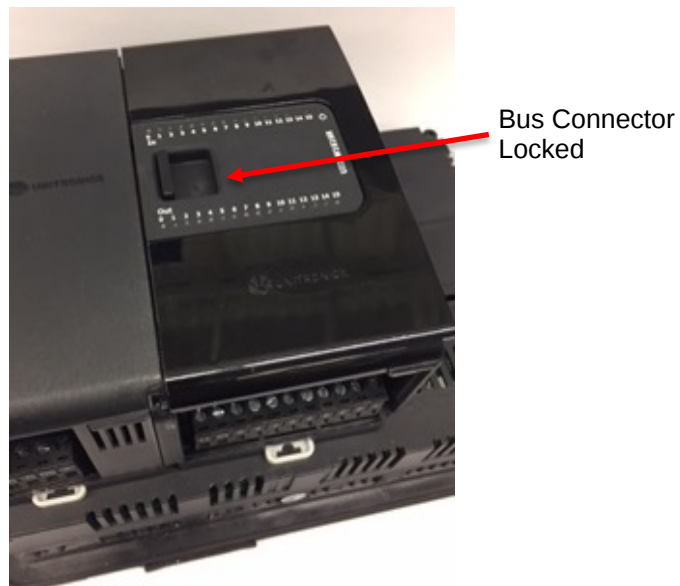


Figure 17. Bus Connector

Removing the I/O Module

- Disconnect the system power
- Disconnect the I/O terminals (#7, 8 shown in Figure 15).
- On the I/O module, pull the top DIN-rail clip up and the bottom clip down.
- Open the door of the I/O module and hold it with two fingers; then pull it carefully from its place.

I/O Module Connection Points

- The I/O connection points are arranged in two groups of eleven points each as shown in Figure 18.

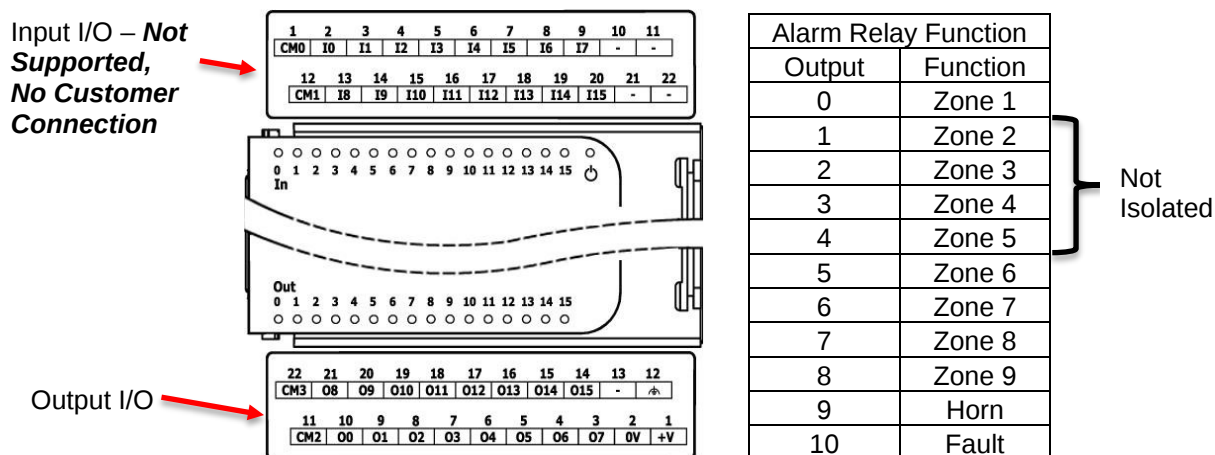


Figure 18. Connection Points

- I/O Outputs O0 – O7 share common CM2
- I/O Outputs O8 – O10 share common CM3
- I/O Outputs O11 – O15 not used

Specifications

Table 4. Specifications for ModCon75 Touch I/O Module

Outputs	
Number of outputs	Only I/O outputs O0 – O10 used, I/O outputs O11 – O15 not used
Output type	Relay, SPST-NO (Form A)
Isolation groups	Two groups of 8 outputs each
Isolation voltage	
Group to bus	1,500VAC for 1 minute
Group to group	1,500VAC for 1 minute
Output to output within group	None
Output power supply to bus	None
Output power supply to output	1,500VAC for 1 minute

Current	2A maximum per output 8A maximum per group (Resistive load)
Voltage	250VAC / 30VDC maximum
Minimum load	1mA, 5VDC
Switching times	10ms maximum
Short-circuit protection	None
Life expectancy	100k operations at maximum load
Note: Life expectancy of the relay contacts depends on the application that they are used in.	

Output Power Supply – The Relay outputs require an external power supply	
Nominal operating voltage	24VDC
Operating voltage	20.4 – 28.8VDC
Maximum current consumption	80mA@24VDC

LED Indications			
Input LEDs	Green		Input state
Output LEDs	Green		Output state
Status LED	A triple color LED. Indications are as follows:		
	Color	LED State	Status
	Green	ON	Operating normally
		Slow blink	Boot
		Rapid blink	OS initialization
	Green/Red	Slow blink	Configuration mismatch
	Red	Slow blink	No IO exchange
		Rapid blink	Communication error
	Orange	Rapid blink	OS Upgrade

Environmental	
Protection	IP20, NEMA1
Operating temperature	-20°C to 55°C (-4°F to 131°F)
Storage temperature	-30°C to 70°C (-22°F to 158°F)
Relative Humidity (RH)	5% to 95% (non-condensing)
Operating Altitude	2,000 m (6,562 ft.)
Shock	IEC 60068-2-27, 15G, 11ms duration
Vibration	IEC 60068-2-6, 5Hz to 8.4Hz, 3.5 mm constant amplitude, 8.4Hz to 150Hz, 1G acceleration.

Chapter 6,

Power Supply Requirement and Wiring

- The ModCon75 Touch Controller and I/O module require an external 24VDC power supply.
- The permissible input voltage range is 20.4 - 28.8 VDC, with less than 10% ripple.
- A non-isolated power supply can be used, provided that a 0 V signal is connected to the chassis.

Safety Considerations

WARNING

- This equipment is designed to operate at SELV/PELV/Class 2/Limited Power environments.
- All power supplies in the system must include double insulation. Power supply outputs must be rated as SELV/PELV/Class 2/Limited Power.
- Ensure power supply is disconnected during installation.
- Do not touch live wires.
- Standard safety considerations require that metal cabinet panels be earthed to avoid electrocution.
- Do not connect either the 'Neutral' or 'Line' signal of the 110/220 VAC to the device's 0V pin.
- In the event of voltage fluctuations or non-conformity to voltage power supply specifications, connect the device to a regulated power supply.
- A technician or engineer trained in the local and national electrical standards must perform all tasks associated with the electrical wiring of the device.
- Double-check all wiring before turning ON the power supply.

FAILURE TO FOLLOW THESE WARNINGS CAN RESULT IN SERIOUS PERSONAL INJURY OR LOSS OF LIFE.

Connecting the Power Supply

- Do not use tin, solder, or any other substance on the stripped wire that might cause the wire strand to break.
- Install unit at maximum distance from high-voltage cables and power equipment.
- To avoid damaging the wire, do not exceed a maximum torque of 0.5 Nm (5 kgf-m).
- Use crimp terminals for wiring.
- Use 26-12 AWG wire (0.13 mm²-3.31 mm²) for all wiring purposes.

1. Strip the wire to a length of 7 ±0.5 mm (0.250–0.300 inches).
2. Unscrew the terminal to its widest position before inserting a wire.
3. Connect the +V and 0V terminals as shown in Figure 19 & 20.
4. Tighten enough to keep the wire from pulling free.

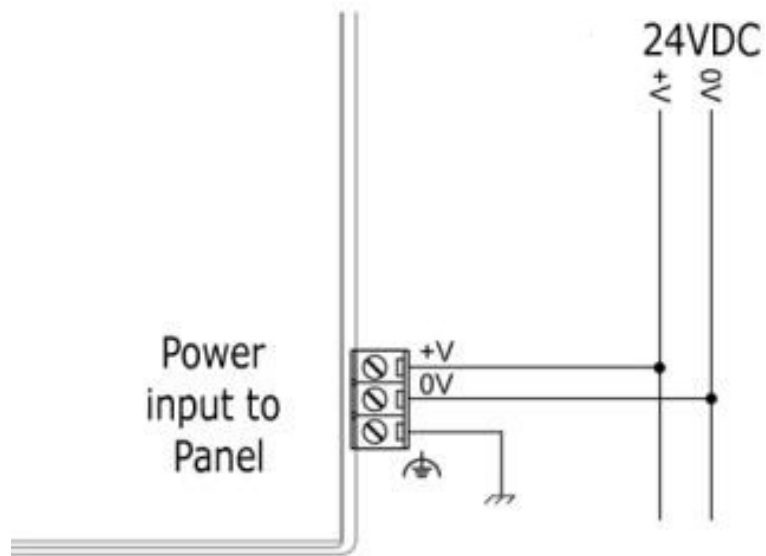


Figure 19. HMI Power Supply Connection

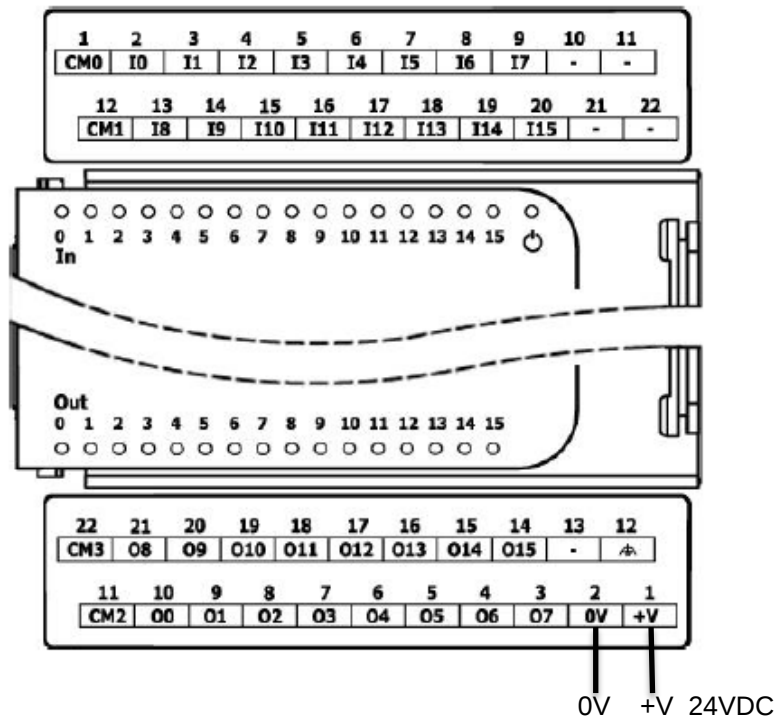


Figure 20. I/O Power Supply Connection

Chapter 7,

ModCon75 Wiring

General Wiring

WARNING

- Do not connect either the “Neutral” or “Line” signal of the 110/220VAC to device's 0V point.
- Do not touch live wires.
- All wiring activities are to be performed while power is OFF.
- Use over-current protection, such as a fuse or circuit breaker, to avoid excessive currents into the I/O module supply port.
- Unused points should not be connected (unless otherwise specified). Ignoring this directive may damage the device.
- Double-check all wiring before turning on the power supply.

FAILURE TO FOLLOW THESE WARNINGS CAN RESULT IN SERIOUS PERSONAL INJURY OR LOSS OF LIFE.

Note:

- To avoid damaging the wire, use a maximum torque of 0.5 Nm (5kgf-cm).
- Do not use tin, solder or any substance on stripped wire that might cause the wire strand to break.

Wiring Procedure

Use crimp terminals for wiring; use 26-12 AWG wire (0.13 mm² – 3.31 mm²).

1. Strip the wire to a length of 7+/-0.5mm (0.250-0.300 inches).
2. Unscrew the terminal to its widest position before inserting a wire.
3. Insert the wire completely into the terminal to ensure a proper connection.
4. Tighten enough to keep the wire from pulling free.

Wiring Guidelines

In order to ensure that the device will operate properly and to avoid electromagnetic interference:

- Use a metal cabinet. Make sure the cabinet and its doors are properly earthed.
- Use wires that are properly sized for the load.
- Route each I/O signal with its own dedicated common wire. Connect common wires at their respective common (CM) points at the I/O module.
- Individually connect each 0V point in the system to the power supply 0V terminal.
- Individually connect each functional earth point () to the earth of the system (preferably to the metal cabinet chassis). Use the shortest and thickest wires possible: less than 1m (3.3') in length, minimum wire size 14 AWG (2 mm²).
- Connect the power supply 0V to the earth of the system.

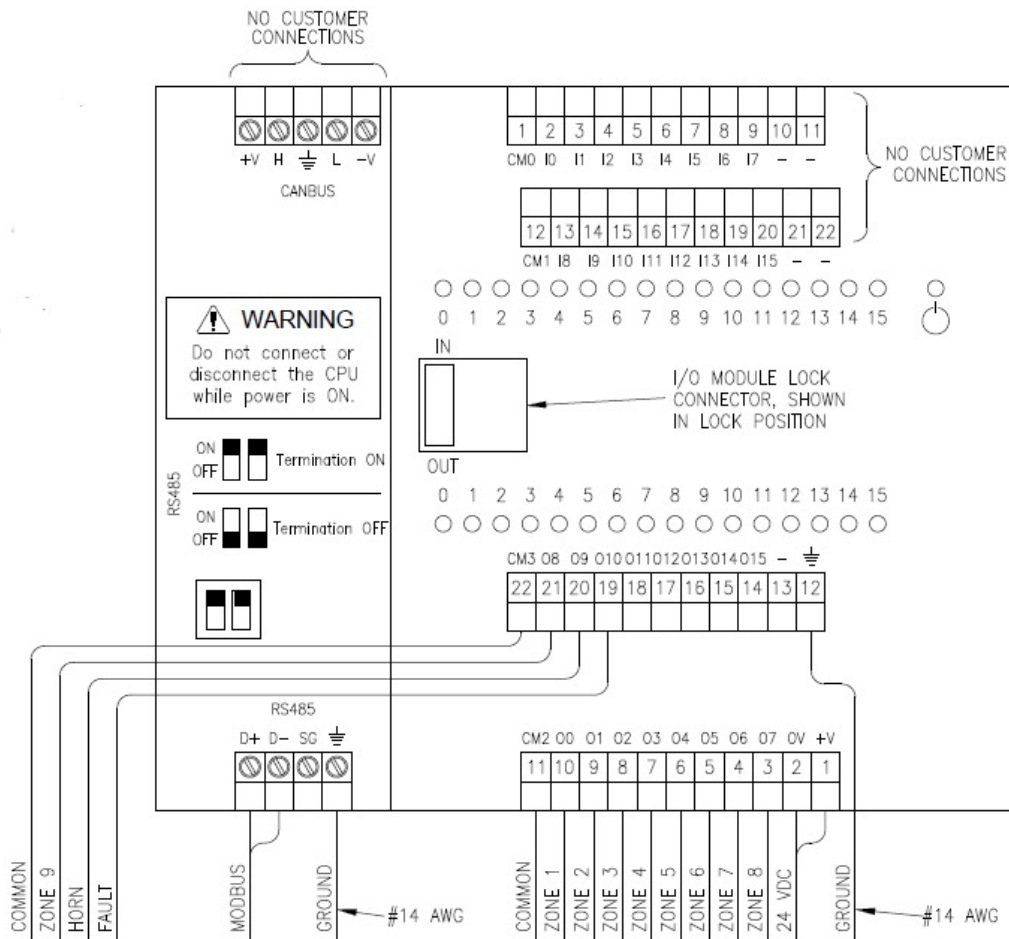


Figure 21. ModCon75 Touch Wiring

I/O Relay Wiring

I/O Output's Power Supply

- The I/O relay outputs require an external 24VDC power supply. Connect the 24V and 0V terminals as shown in Figure 21 & 22.

WARNING

- To avoid risk of fire or property damage, always use a limited current source or connect a current limiting device in series with the relay contacts.
- The 0V of the module must be connected to the HMI panel's 0V. Ignoring this directive may damage the device.
- In event of voltage fluctuations or non-conformity to voltage power supply specifications, connect the module to a regulated power supply.

FAILURE TO FOLLOW THE THESE WARNINGS CAN RESULT IN SERIOUS PERSONAL INJURY OR LOSS OF LIFE.

The outputs are arranged in two isolated groups:

- O0-O7 share common CM2
- O8-O15 share common CM3

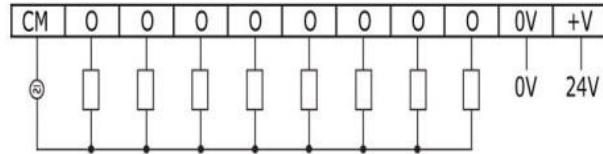


Figure 22. VDC Connection points

Increasing contact life span

To increase the life span of the relay contacts when driving inductive loads protect the module from potential damage by reverse EMF, connect:

- A clamping diode in parallel with each inductive DC load as shown in Figure 23.
- An RC snubber circuit in parallel with each inductive AC load as shown in Figure 24.

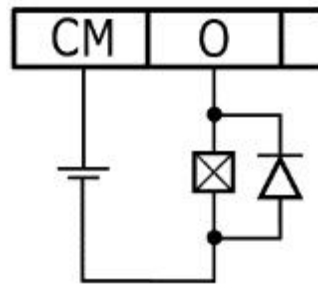


Figure 23. DC Load

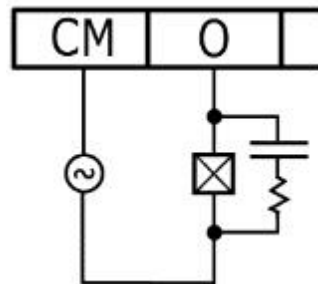


Figure 24. AC Load

Chapter 8, Operating Instructions

Power up/Main Menu Screen

- This screen appears when power is applied to the ModCon75 Touch Controller.



Figure 25. Power-up/Main Menu Screen

Touch Screen Buttons

8.1 Add Units:

- Add, and view/edit Ultima X3 ID's and sensor tags.

8.2 Add/Display Set points:

- View/Edit Sensor Alarm Features including Enable/Disable, Alarm Direction, Latch Status, Alarm Level, Alarm Zone.

8.3 Main Data Screen:

- Displays sensor tag, sensor type/range, and active/last sensor value with engineering units for all transmitters on the network in a sequencing manner or the ability to choose a specific transmitter to view. Also gives the user the ability to silence alarms, unlatch local zones and unlatch remote X3.

8.4 Remote IO Editor (Optional):

- Setup remote relay modules on the network.

8.5 Zone Set points Editor:

- View/Edit Zone Relay Features including: normally open/normally closed (NO/NC) relays, Latch/No Latch relays, On/Off Relay Delay, Relay Delay Time. Also gives the user the ability to view relay status (Open/Closed) at a glance for all zones.

8.6 Network Settings:

- View/Edit network address and DNS.

8.7 Active Alarms/Faults:

- View active alarms/faults and alarm/faults history.

8.8 Password Editor:

- User programmable.

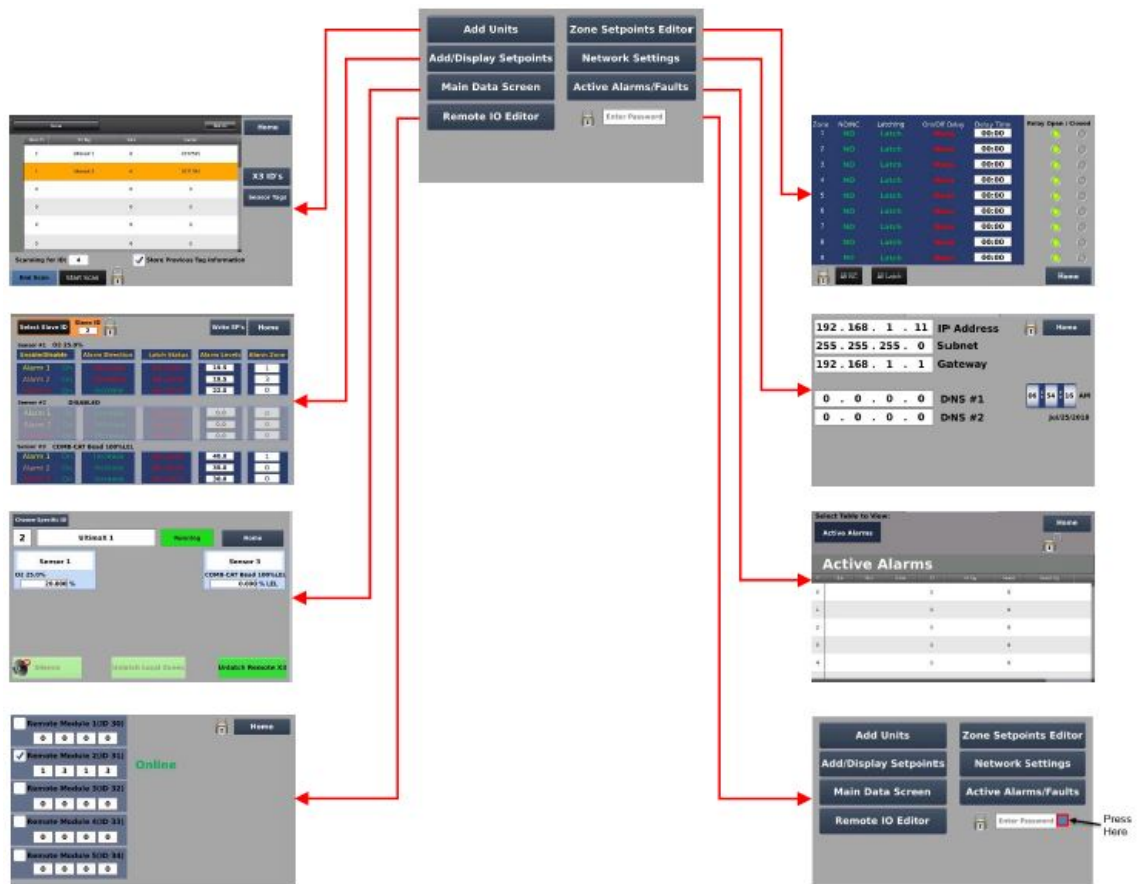


Figure 26. ModCon75 Touch Screen Hierarchy

8.1 Add Units Button:

- Password protected; see Figure 27.
- **A password is required to be entered on the Main Menu Screen to be able to edit the settings within any of the touch screen buttons. The controller will automatically lock 5 minutes after the touchscreen was last touched.**
 - o Press anywhere within the Enter Password box and enter the controller password.
 - o Password is user-configurable (Default = 0). Type password using displayed keyboard and press OK. The password lock/unlock graphic should change to appear unlocked when correct password is entered as shown in Figure 28.



Figure 27. Password Locked



Figure 28. Password Unlocked

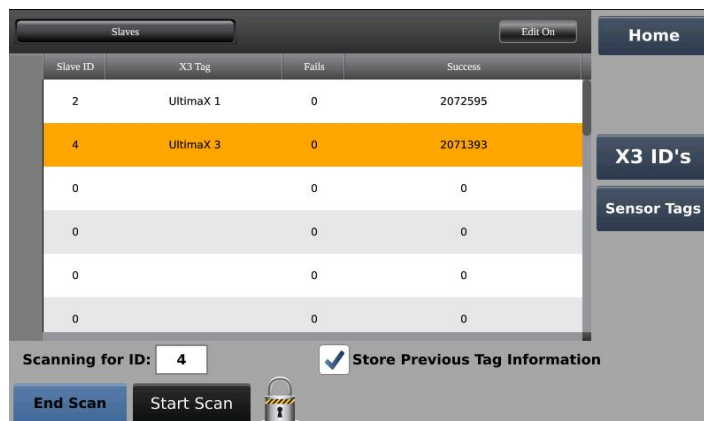


Figure 29. Add Units Screen

Use the screen shown in Figure 29 to:

- Add new X3 transmitters/sensors to the network registry.
 - o Add new transmitters/sensors to the network registry by pressing and holding the Start Scan button until the scanning begins, and the button is greyed out.
 - o Briefly press and release Stop Scan to interrupt/stop a scan process.
- View all X3 transmitters/sensors on the network registry.
 - o Press X3 ID's button to view/scroll thru all X3 transmitters in the network registry.

- Touch the white box the left of 'Store Previous Tag Information' to add check mark. Checking this box will store all previous tag information when attempting to make changes in case the user wishes to revert to a previous state.
- X3 ID's: to view network registry list.
- Sensor Tag's: to view sensors connected to an individual Ultima X3.
- Edit ON: to edit X3 tag (X3 ID's button) and edit sensor tag's (Sensor Tags button).
- Press Home - to go back to Main Menu Screen.

⚠ WARNING

- If new X3 transmitters/sensors are added/removed from the Modbus network, user must run Start Scan to repopulate the network registry. If Start Scan is not run, the output from added/removed X3 transmitters/sensors, including alarm/fault conditions, will not be displayed on the MdoCon75 Touch Controller.

FAILURE TO FOLLOW THIS WARNING CAN RESULT IN SERIOUS PERSONAL INJURY OR LOSS OF LIFE

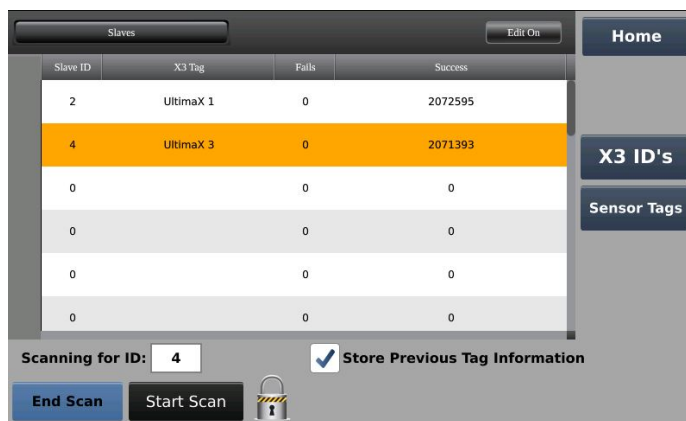


Figure 30. Add Units to the Network

To add X3 transmitters/sensors to the network: press Start Scan once the following three steps are completed:

1. First, verify all X3 transmitters/sensors (up to 25 X3 transmitters each with up to 3 sensors for a maximum of 75 sensors) are wired properly to the network.
2. Next, confirm each X3 transmitter connected to the network has a unique ID set by using the Ultima/Ultima X Series Controller and Calibrator (Valid network ID's are 2-26).

NOTE:

- o ID 0 is the broadcast Modbus address; ID 1 is the ModCon75 Touch address.
- o Baud rate = 19200 and Parity = even.

3. Press and hold the Start Scan button until the scanning begins, and button is greyed out.

NOTE:

- o Verify that the ModCon75 Touch Controller found all Ultima X3 transmitters on the network. If the total number is less than the actual number on the network, check your wiring and make sure that each X3 transmitter on the network has its own unique address in the range of 2 through 26.

➤ ***This process may take several minutes.***

View/Edit all X3 Transmitters or Sensors on the Network

- Press X3 ID's button. See Figure 31.
 - Displays Slave ID (X3 transmitter ID), X3 tag, Fails, and Success found on the network.
- To edit X3 Tag first verify that the password lock/unlock graphic is in the unlock position (review instructions on page 41 to unlock password lock/unlock graphic). Next press the Edit On button so it reads Edit Off. Next press on an existing X3 Tag or in the field to the right of the slave ID and within the X3 Tag column. Edit the X3 Tag using the displayed keyboard and press OK when finished. The updated/new X3 Tag should now be displayed. To finish editing press the Edit Off button so that it reads Edit On.
- Swipe up to view X3 ID's information for X3 transmitters in addition to the six shown initially.
- Press Sensor Tags button. See Figure 31.
 - Displays X3 ID, Sensors 1 Tag, Sensor 2 Tag, and Sensor 3 Tag found on the network.
- To edit Sensor Tags first verify that the password lock/unlock graphic is in the unlock position (review instructions on page 41 to unlock password lock/unlock graphic). Next press the Edit On button so it reads Edit Off. Next press on an existing Sensor Tag or in the field to the right of the X3 ID and within the appropriate Sensor Tag column. Edit the Sensor Tag using the displayed keyboard and press OK when finished. The updated/new Sensor Tag should now be displayed. To finish editing press the Edit Off button so that it reads Edit On.
- Swipe up to view Sensor Tags information for X3 transmitters in addition to the six shown initially.

Slave ID	X3 Tag	Fails	Success
2	UltimaX 1	0	2072595
4	UltimaX 3	0	2071393
0		0	0
0		0	0
0		0	0
0		0	0

Slaves Edit On Home

X3 ID's Sensor Tags

Scanning for ID: ☒ Store Previous Tag Information

End Scan Start Scan

Figure 31. Node IDs Found

8.2 Add/Display Setpoints Button:

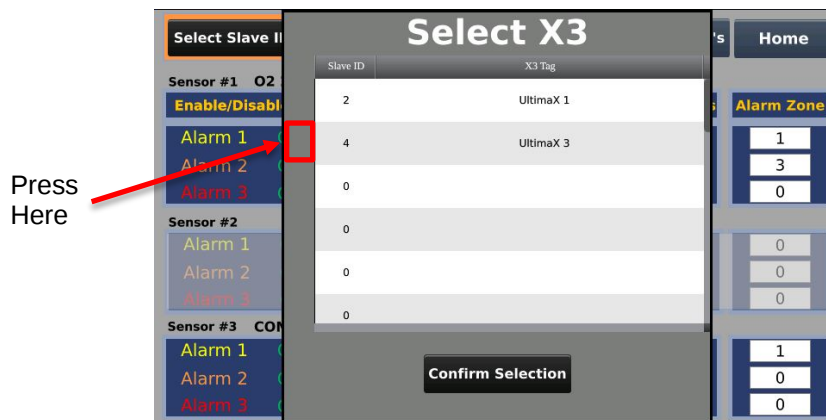
WARNING

- Failure to follow the instructions in this section can result in the ModCon75 Touch Controller not properly indicating a sensor alarm/fault condition.
FAILURE TO FOLLOW THIS WARNING CAN RESULT IN SERIOUS PERSONAL INJURY OR LOSS OF LIFE
- Press Add/Display Setpoints button (see Figure 24) to access the screen shown in Figure 29. Within this screen the user will be able to view/edit alarm Enable/Disable status, Alarm Direction, Latch Status, Alarm Levels, and Alarm Zone and write changes to a specific Slave ID (X3 transmitter).



Sensor	Enable/Disable	Alarm Direction	Latch Status	Alarm Levels	Alarm Zone
Sensor #1 O2 25.0%	Alarm 1 On	Decrease	No Latch	19.5	1
	Alarm 2 On	Decrease	No Latch	19.5	5
	Alarm 3 On	Increase	No Latch	22.0	0
Sensor #2 DISABLED	Alarm 1 On	Increase	No Latch	0.0	0
	Alarm 2 On	Increase	No Latch	0.0	0
	Alarm 3 On	Increase	No Latch	0.0	0
Sensor #3 COMB-CAT Bead 100%LEL	Alarm 1 On	Increase	No Latch	40.0	1
	Alarm 2 On	Increase	No Latch	35.0	0
	Alarm 3 On	Increase	No Latch	30.0	0

Figure 32. Add/Display Setpoints screen



Press Here

Slave ID	X3 Tag
2	UltimaX 1
4	UltimaX 3
0	
0	
0	
0	

Confirm Selection

Figure 33. To Select a Slave ID (X3 Transmitter)

- Press Select Slave ID button, see Figure 32.
- Swipe up to view Slave ID's for X3 transmitters in addition to the six shown initially. Press in the gray area to the left of a Slave ID as shown in Figure 30. Slave ID and X3 Tag will highlight yellow

when selected. Press Confirm Selection button to return to the screen in Figure 33.

- Verify the Slave ID number changes to the Slave ID Number you selected.
 - o The current alarm settings for all sensors on the selected Slave ID are displayed. If less than three sensors are connected to a single Slave ID, the sensor alarm settings for sensors that are not connected will be greyed out.
 - o **To modify any settings, verify the password lock/unlock graphic is unlocked (Review instructions on page 38 to unlock password lock/unlock graphic).**
 - Edit the Enable/Disable status for each alarm level on each sensor as appropriate. Valid options are On and Off.
 - Edit the Alarm Direction status for each alarm level on each sensor as appropriate. Valid options are Increase and Decrease.
 - Edit the Latch Status for each alarm level on each sensor as appropriate. Valid options are Latch and No Latch.
 - Edit the Alarm Level setpoints for each alarm level on each sensor as appropriate. Valid options are determined by sensor range. For combustible sensors, the maximum LEL value is 60%. All invalid alarm levels entries will be detected when attempting to write to the slaves. An Error Writing! prompt will be displayed if an invalid alarm level is attempting to write to slave.
 - Edit the Alarm Zone status for each alarm level on each sensor as appropriate. Valid options are whole numbers 0-9. Any value entered outside of this range or not a whole number within the range will prompt 'Value not in range'. Press OK to confirm Alarm Zone selection.
 - o When all desired changes are made, press the Write SP's button to write changes to the selected Slave ID.
 - o Repeat this procedure for all desired Slave ID editing.

Note:

- o If Write SP's button is not pressed prior to exiting the Add/Display Setpoints screen any modifications to alarm settings will not be saved to the X3 transmitter(s). Upon re-entering, the Add/Display Setpoints screen the alarm settings will revert to their previous state.

Sensor	Enable/Disable	Alarm Direction	Latch Status	Alarm Levels	Alarm Zone
Sensor #1 O2 25.0%	Alarm 1 On	Decrease	No Latch	19.5	1
	Alarm 2 On	Decrease	No Latch	19.5	3
	Alarm 3 On	Increase	No Latch	22.0	0
Sensor #2 DISABLED	Alarm 1 On	Increase	No Latch	0.0	0
	Alarm 2 On	Increase	No Latch	0.0	0
	Alarm 3 On	Increase	No Latch	0.0	0
Sensor #3 COMB-CAT Bead 100%LEL	Alarm 1 On	Increase	No Latch	40.0	1
	Alarm 2 On	Increase	No Latch	35.0	0
	Alarm 3 On	Increase	No Latch	30.0	0

Figure 34. Allows users to Set Latching / Non-latching Alarms

- This Latching Function only changes the relay operation of the Ultima X3 transmitters. For latching an alarm on the ModCon75 Touch Controller, use a Zone relay and program it for latching, Zone Setpoints Editor on the Home screen.
- A latched relay at the Ultima X3 unit may be cleared at the ModCon75 Touch Controller by pressing the Unlatch Remote X3 button on the Main Data Screen.

Sensor #	Enable/Disable	Alarm Direction	Latch Status	Alarm Levels	Alarm Zone
Sensor #1 O2 25.0%					
Alarm 1	On	Decrease	No Latch	19.5	1
Alarm 2	On	Decrease	No Latch	19.5	3
Alarm 3	On	Increase	No Latch	22.0	0
Sensor #2 DISABLED					
Alarm 1	On	Increase	No Latch	0.0	0
Alarm 2	On	Increase	No Latch	0.0	0
Alarm 3	On	Increase	No Latch	0.0	0
Sensor #3 COMB-CAT Bead 100%LEL					
Alarm 1	On	Increase	No Latch	40.0	1
Alarm 2	On	Increase	No Latch	35.0	0
Alarm 3	On	Increase	No Latch	30.0	0

Figure 35. Allows Users to Assign Zone Control Relays to Caution, Warning and Alarm Set points for Sensors 1, 2, and 3.

- Relay outputs and corresponding zones. Relay outputs shown correspond with I/O module terminal blocks per DSK3204-344.

Output O0=Zone 1	Output O5=Zone 6
Output O1=Zone 2	Output O6=Zone 7
Output O2=Zone 3	Output O7=Zone 8
Output O3=Zone 4	Output O8=Zone 9
Output O4=Zone 5	Output O9=Horn Relay
- The Horn relay Output (O9):
 - o Is used for remote alarms.
 - o Activates a horn on any caution, warning, or alarm condition.
 - o Silence of Horn is accomplished by pressing the Silence button on the Main Data Screen.

Sensor #	Enable/Disable	Alarm Direction	Latch Status	Alarm Levels	Alarm Zone
Sensor #1 O2 25.0%	Alarm 1 On	Decrease	No Latch	19.5	1
	Alarm 2 On	Decrease	No Latch	19.5	3
	Alarm 3 On	Increase	No Latch	22.0	0
Sensor #2 DISABLED	Alarm 1 On	Increase	No Latch	0.0	0
	Alarm 2 On	Increase	No Latch	0.0	0
	Alarm 3 On	Increase	No Latch	0.0	0
Sensor #3 COMB-CAT Bead 100%LEL	Alarm 1 On	Increase	No Latch	40.0	1
	Alarm 2 On	Increase	No Latch	35.0	0
	Alarm 3 On	Increase	No Latch	30.0	0

Figure 36. Current Setpoint values Read from the Selected Ultima X3 Unit

- If less than three sensors are connected to a single Slave ID (X3 transmitter) the sensor alarm settings for sensors that are not connected will be greyed out. In addition, the word DISABLED will be displayed to the right of each Sensor # that is not connected, see Figure 37.

Sensor #	Enable/Disable	Alarm Direction	Latch Status	Alarm Levels	Alarm Zone
Sensor #1 O2 25.0%	Alarm 1 On	Decrease	No Latch	19.5	1
	Alarm 2 On	Decrease	No Latch	19.5	3
	Alarm 3 On	Increase	No Latch	22.0	0
Sensor #2 DISABLED	Alarm 1 On	Increase	No Latch	0.0	0
	Alarm 2 On	Increase	No Latch	0.0	0
	Alarm 3 On	Increase	No Latch	0.0	0
Sensor #3 COMB-CAT Bead 100%LEL	Alarm 1 On	Increase	No Latch	40.0	1
	Alarm 2 On	Increase	No Latch	35.0	0
	Alarm 3 On	Increase	No Latch	30.0	0

Figure 37. Shows Disabled Sensor

Input field: 19.5

Buttons: 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, ., -, Cancel, Ok

Figure 38. Alarm Level Decimal

- Press the desired Alarm Level to change.
 - o To modify any settings, verify the password lock/unlock graphic is unlocked (Review instructions on page 38 to unlock password lock/unlock graphic).

NOTE:

- o The decimal point must be entered when typing the Alarm Level; the Decimal is not fixed; therefore, enter 19.5 as shown in Figure 38.
- Pressing the Alarm Level to change, a new window will come up.
 - o Type 19.5 and press the OK button
 - Verify the Alarm Level changes to the new number.
- Repeat the above for each desired Alarm Level change.

NOTE:

- o The ModCon75 Touch Controller displays to one decimal point.
- o With certain sensors (CIO2, CO2, etc.), alarm set points in the Ultima X3 unit may be represented to two decimal points. In this instance, the ModCon75 Touch Controller will round to the nearest single decimal.

Sensor	Sensor Name	Enable/Disable	Alarm Direction	Latch Status	Alarm Levels	Alarm Zone	
Sensor #1	O2 25.0%	Alarm 1	On	Decrease	No Latch	19.5	1
		Alarm 2	On	Decrease	No Latch	19.5	3
		Alarm 3	On	Increase	No Latch	22.0	0
	DISABLED	Alarm 1	On	Increase	No Latch	0.0	0
		Alarm 2	On	Increase	No Latch	0.0	0
		Alarm 3	On	Increase	No Latch	0.0	0
Sensor #3	COMB-CAT Bead 100%LEL	Alarm 1	On	Increase	No Latch	40.0	1
		Alarm 2	On	Increase	No Latch	35.0	0
		Alarm 3	On	Increase	No Latch	30.0	0

Figure 39. Displays all changed alarm settings prior to uploading to X3 transmitter(s).

- Write SP's button:
 - o Saves all changes to the ModCon75 Touch Controller and Ultima X3.
 - o Sets Controller relays (connections located on back of unit) to activate according to caution, warning or alarm settings set on the Choose Zone event screen.
 - o Provides status messages during the save process.
 - o Verifies that all values were saved by displaying Done! When complete.
 - o Indicates a problem during settings upload by displaying Error Writing! This could indicate that a value outside an alarm level range was entered such as a %LEL greater than 60 for a combustible sensor. The setting value in error will automatically revert to its previous setting.

NOTE:

- o If user does not press Write SP's, the changes will not be made. A Combustible sensor alarm level cannot be set Greater than 60%LEL.



Sensor	Enable/Disable	Alarm Direction	Latch Status	Alarm Levels	Alarm Zone
Sensor #1 O2 25.0%	Alarm 1 On	Decrease	No Latch	19.5	1
	Alarm 2 On	Decrease	No Latch	19.5	3
	Alarm 3 On	Increase	No Latch	22.0	0
Sensor #2	DISABLED				
Sensor #3 COMB-CAT Bead 100%LEL	Alarm 1 On	Increase	No Latch	40.0	1
	Alarm 2 On	Increase	No Latch	35.0	0
	Alarm 3 On	Increase	No Latch	30.0	0

Figure 40. Verification Screen

- Press the Home button to return to the Main Menu Screen. No changes made will take effect and be saved unless the Write SP's button was pressed before the Home button.

8.3 Main Data Screen Button:



Choose Specific ID: 2, UltimaX 1, Running, Home

Sensor 1: O2 25.0%, 20.800 %

Sensor 3: COMB-CAT Bead 100%LEL, 0.000 % LEL

Silence, Unlatch Local Zones, Unlatch Remote X3

Figure 41. Main Data Screen

- Running/Paused Button - By default this button indicates Running and the controller will cycle through all Slave ID's/sensors on the network. Press this button to change to Paused and user will be able to remain on the Slave ID and associated sensors present when button was pressed. Press Paused button to change to Running.
- Choose Specific ID Button - Press this button to more quickly select and pause on desired Slave ID and associated sensors.
- Unlatch Remote X3 Button - Unlatches all Ultima X3's.
- Unlatch Local Zones Button - Unlatches all Zone relays (Will turn Green when a Zone Relay latches).
- Silence Button - Silences all Horns (Will turn Green when a Horn needs silenced).
- Main Data Screen displays one Ultima X3 with up to three sensors on the ModCon75 Controller.
 - o Sensor tag, gas type, detection range, actual gas value, and engineering units are

displayed for each connected sensor.

- Home Button – Takes user back to Main Menu Screen.

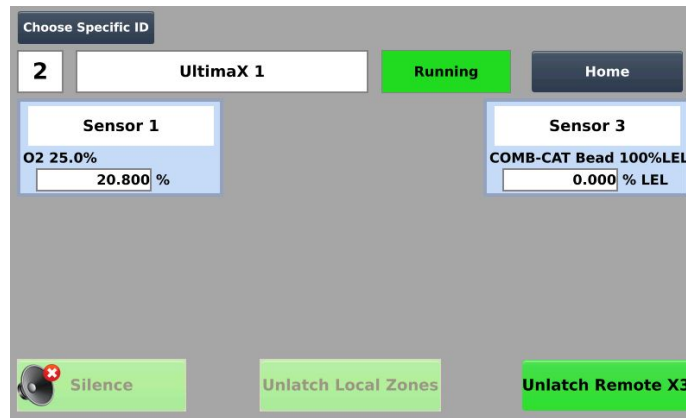


Figure 42. All Clear Status Screen

Modbus Alarms

- ModCon75 Touch will switch to the Main Menu Screen whenever a Modbus communications failure is detected. A flashing error banner at the bottom of the screen will indicate which Slave ID(s) is/are affected, see Figure 43.
- If Modbus communications are lost with all Slave ID's on the network the error banner will also indicate! NO UNITS RESPONDING!
- The fault relay will be activated during Modbus communications failure.
- The flashing Modbus communications failure banner with affected Slave ID will also be displayed at the top of the Main Data Screen see Figure 44.



Figure 43. Modbus Alarm Indication on Main Menu Screen

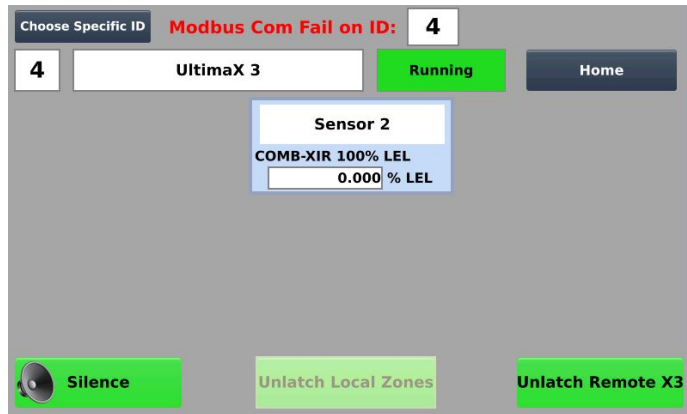


Figure 44. Modbus Alarm Indication on Main Data Screen

Fault Status

- ModCon75 Touch will switch to the Main Data Screen to display an active sensor fault and indicate which slave ID(s) and which sensor(s) is/are affected, see Figure 45.
- The Main Data Screen will also indicate an active sensor fault, see Figure 46.

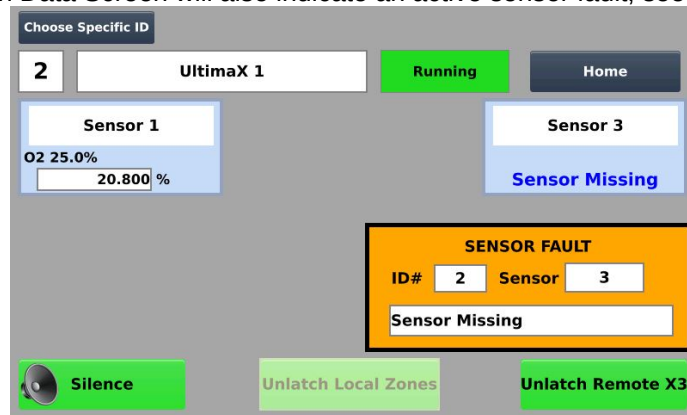


Figure 45. Sensor Fault



Figure 46. Main Menu Screen

- The ModCon75 will display the following sensor faults:
 - o + LOC
 - o Over-range
 - o Quick under-range
 - o Under-range
 - o Sensor missing
 - o Sensor End of Life
 - o Calibration fault
 - o Power Fail fault
 - o Configuration reset
 - o Span Calibration Fault
 - o Zero Calibration Fault
 - o Parameter Fault
 - o Incompatible Sensor
 - o Sensor Warning
- All other faults are shown as General Fault

8.4 Remote I/O Editor Button: (Optional: Requires Remote Relay Modules)



Figure 47. Remote Relay Editor Screen

Optional: Remote Relay units

- A total of five remote relay units may be added to the Modbus network (see Appendix C for additional details). Modbus ID numbers of the remote relay modules must be set for ID#30, 31, 32, 33 or 34.
 - o **To modify any settings, verify the password lock/unlock graphic is unlocked. Review instructions on page 37 to unlock password lock/unlock graphic.**
- Each Remote Relay has five additional relays (Relay O0 thru Relay O4).
- Relay O0 – Local Horn relay
- Relay O1 thru Relay O4 can be setup for any combination of Zone relay output (Zone 1 thru Zone 9).

NOTE:

- o If Zone Alarms are programmed as Latch, one can silence the alarm at the ModCon75 Touch (Silence Button), but the Zone alarm will not be cleared until the unlatch input is initiated at the ModCon75 Touch Controller.



Figure 48. Remote Relay Module

Setting the Remote Relay ID number and the Relay state:

- Set the Slave ID number by pressing the left or right arrows on the Remote relay module keypad to select the slave ID, press the enter key  and enter the desired ID number (ID#30, 31, 32, 33 or 34), press the enter key  to set the ID number selected, see Figure 48.
- Set the relays to Normally Open (NO) or Normally Closed (NC) by pressing the left or right on the Remote relay keypad to select the NO or NC relays press the enter key  and enter the desired relay state, 0 for NC or 1 for NO relays, press enter key  again to set relay state, see Figure 48.

NOTE:

- o Changing the Relay state to NC or NO will only change Relays O1 thru O4, Relay O0 (Local Horn Relay) will always be a NC relay.

Remote I/O Editor set up:

- Press the Remote I/O Editor Button to view or edit configuration of up to five remote relay modules connected to the ModCon75 Touch network.

NOTE:

- o **To modify any settings, verify the password lock/unlock graphic is unlocked. Review instructions on page 38 to unlock password lock/unlock graphic.**
- Press the white square next to the Remote relay module ID number (a check mark will appear) to select the module being used. Repeat check marking each Remote relay modules to be connected to the network.
- Offline will appear to the right of the Remote relay module that was just check marked until the Remote relay module has been set to the ID number selected as shown in Figures 47 and 48.
- The four white squares in a row on each Remote relay module ID number can be set to the desired zone relays (1 thru 9) as shown in Figure 47.

NOTE:

- o The zone relays can be set to X3 transmitters in the Add/Display Set points section and can be edited in the Zone Set points Editor Section.

Remote Relay Power Supply Wiring

- The Remote relay module requires an external 24VDC power supply.

⚠ WARNING

- Disconnect power while wiring the Remote relay module.
- Use separate wires to connect the functional earth line (pin 3) and the 0V line (pin 2) to the system earth ground.
- Install an external circuit breaker. Guard against short-circuiting in external wiring.
- Double-check all wiring before turning on the power supply.
- Do not connect either the “Neutral” or “Line” signal of the 110-220VAC to device’s 0V pin.
- In the event of voltage fluctuations or non-conformity to voltage power supply specifications, connect the device to a regulated power supply.

FAILURE TO FOLLOW THESE WARNINGS CAN RESULT IN SERIOUS PERSONAL INJURY OR LOSS OF LIFE.

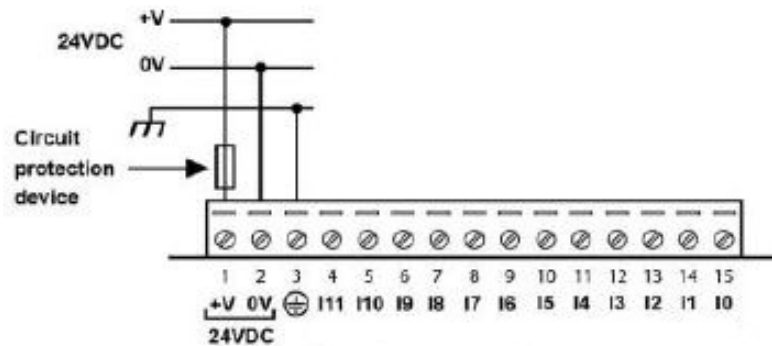


Figure 49. Power Supply Wiring

Remote Relay Wiring

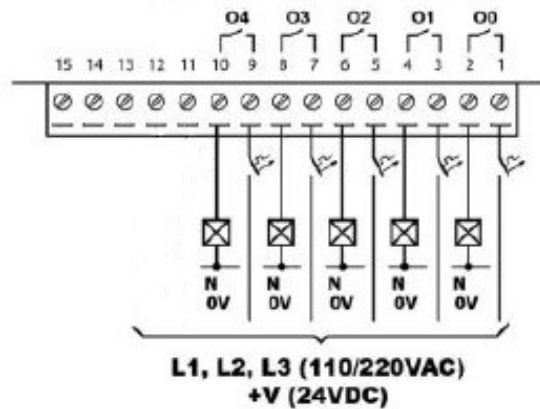


Figure 50. Remote Relay Wiring

- Increasing Contact Life Span as shown in Figure 50.
 - o To increase the life span of the relay output contacts and protect the device from potential damage by reverse EMF, connect:
 - A clamping diode in parallel with each inductive DC load.
 - An RC snubber circuit in parallel with each inductive AC load.

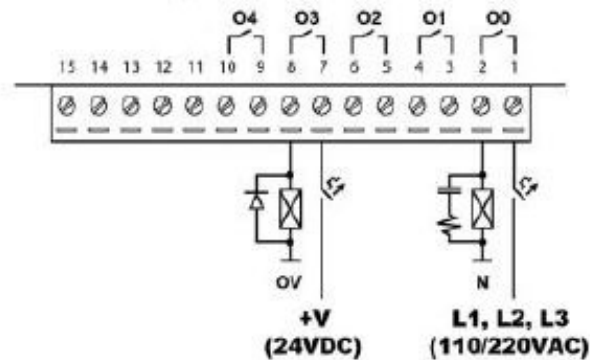


Figure 51. Remote Relay, Increasing Contact Life Span

- Detailed specifications, dimensions and jumper settings for the Optional Remote Relay Module can be found in Appendix B.

8.5 Zone Setpoints Editor Button:

- The Zone Setpoints Editor Screen enables the user to modify the following zone relay settings:
 - o Relay State – Normally open (NO - Closed while Alarming) or Normally Closed (NC - Open While Alarming)
 - o Relay Latch State – Latch or No Latch
 - o Relay Delay Type – None, On Delay, or Off Delay
 - o Delay Time – 00:00 to 59:59
- To Modify any settings, verify the password lock/unlock graphic is unlocked. Review instructions on page 37 to unlock password lock/unlock graphic.
- When NO/NC is set to NO the zone relay contact will close when activated/energized. If set to NC, the zone relay contact will open when activated/de-energized.



Figure 52. Zone Set points Editor Screen

- If Latch is selected the zone relay contact will remain in the alarming state even after the alarm condition that it is associated with it has ceased. To change the zone relay contact back to the non-alarming state the user must press the Unlatch Local Zones button on the Main Data Screen, see Figure 41. If No Latch is selected the zone relay contact will return to the non-alarming state automatically after the alarm condition that it is associated with has ceased.
- Zone relays can be set to either On Delay or Off Delay only if the Latching setting is set to No Latch.
 - o On Delay – Zone relay contact will change to the alarm state only when an associated alarm level is activated, and the set Delay Time has elapsed.
 - o Off Delay (Typically used for fan control) – Zone relay contact will remain in the alarming state for the set Delay Time after the associated alarm level has cleared.

NOTE:

- o When the Latching setting is set to Latch the On Delay, Off Delay, and Delay Time are disabled.

WARNING

- Do not use On Delay for any safety critical function. Use only for Process control.

FAILURE TO FOLLOW THIS WARNING CAN RESULT IN SERIOUS PERSONAL INJURY OR LOSS OF LIFE.

8.6 Network Settings Button:

- Press Network Settings button on the Main Menu screen.
- **To modify any settings, verify the password lock/unlock graphic is unlocked. Review instructions on page 37 to unlock password lock/unlock graphic.**
- For Ethernet capability, enter IP Address, Subnet Mask and Default Gateway information.
- Press Date or Time to change settings.

192 . 168 . 1 . 11 IP Address

255 . 255 . 255 . 0 Subnet

192 . 168 . 1 . 1 Gateway

0 . 0 . 0 . 0 DNS #1

0 . 0 . 0 . 0 DNS #2

06 : 54 : 16 AM

Jul/25/2018

Home

Figure 53. Network & Date/Time Settings

8.7 Active Alarms/Faults Button:

- Press the Active Alarms/Faults button on the Main Menu screen.
- **To modify any settings, verify the password lock/unlock graphic is unlocked. Review instructions on page 38 to unlock password lock/unlock graphic.**
- The Active Alarms/Faults screen allows the user to view the following:
 - o Active Alarms
 - o Active Faults
 - o Alarm History
 - o Fault History
- The Active Alarms/Faults History screen allows the user the save the following to a Micro SD card.
 - o Alarm History
 - o Fault History
- Press the Active Alarms button to change the screen. Another window will appear allowing the user to select the Active Alarms, Active Faults, Alarm History, and Fault History as shown in Figure 54.

Select Table to View:

Active Alarms

Active A

Fault History

Active Alarms

Active Faults

Ok

Cancel

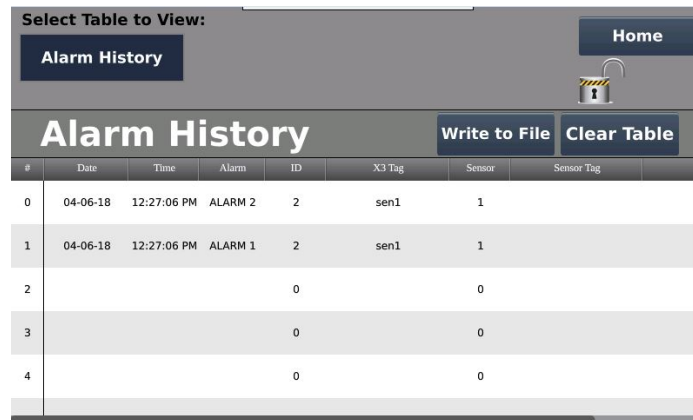
Home

Sensor Tag

#	Date	Time
0		
1		
2		
3		
4		

Figure 54. Active/Fault Screen Selection

- Use the up and down arrows to scroll through and select the desired screen to view. Press the OK button to change the current screen to the one selected.
- In the Alarm/Fault History screen, the data table can be saved to a Micro SD card or cleared by press the appropriate button as shown in Figure 55.



The screenshot shows a screen titled "Select Table to View:" with a dropdown menu set to "Alarm History". Below this is a "Home" button and a padlock icon. The main section is titled "Alarm History" and contains two buttons: "Write to File" and "Clear Table". Below these buttons is a table with the following data:

#	Date	Time	Alarm	ID	X3 Tag	Sensor	Sensor Tag
0	04-06-18	12:27:06 PM	ALARM 2	2	sen1	1	
1	04-06-18	12:27:06 PM	ALARM 1	2	sen1	1	
2				0		0	
3				0		0	
4				0		0	

Figure 55. Save/Clear History

- The Active Alarm/Fault History screen will display the following messages when using a Micro SD card.
 - o Failed to Write
 - o No SD Card
 - o Current Table Written

8.8 Password Editor:

- To create a new password press and hold the area indicated in Figure 56 for approximately 5 seconds until a new window appears, see Figure 57.
- In the new window that appears, touch the Previous Password box. Enter the previous password (default password is 0 (zero)) from displayed keyboard and press OK. Next, enter the new password from keyboard and press OK. Finally, press Save to set new password, see Figure 57.

- o User can change this password to protect against unauthorized changes.

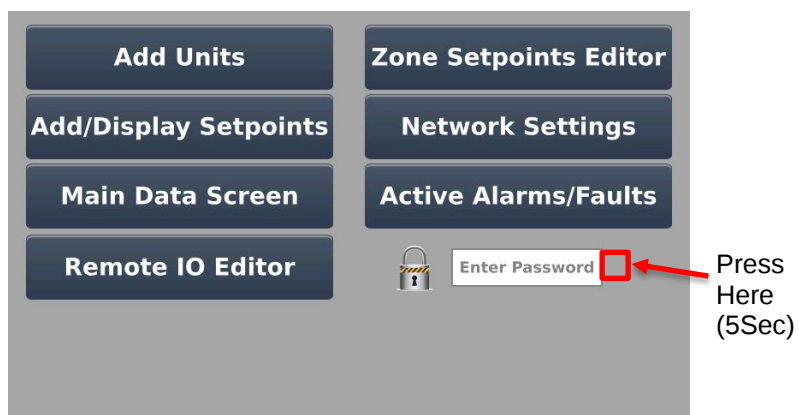


Figure 56. Password Editor



Figure 57. Enter Password

Chapter 9, Technical Specifications

Table 5. ModCon75 Touch Specifications

Input Voltage	24VDC
Permissible Voltage Range	22 to 28.8VDC with less than 10% Ripple
Maximum Current Consumption	0.75A @ 24 VDC
LCD Type	TFT
Backlight	White LED
Resolution	800 x 480 (WVGA)
Back-Up Battery	4 years at 25°C (77°F)
Dimensions	Figure 58 thru 60
Environment	IP65/66 / Nema 4X (Front Panel)
Operational Temperature	-20°C to 55°C (-4°F to 131°F)
Storage Temperature	-30°C to 70°C (-22°F to 158°F)
Relative Humidity	5% to 95% (non-condensing)

NOTE:

- See detailed ModCon75 Touch HMI Panel specifications on page 15.
- See detailed ModCon75 Touch CPU Module specifications on page 20.
- See detailed ModCon75 Touch I/O Module specifications on page 26.

Dimensions

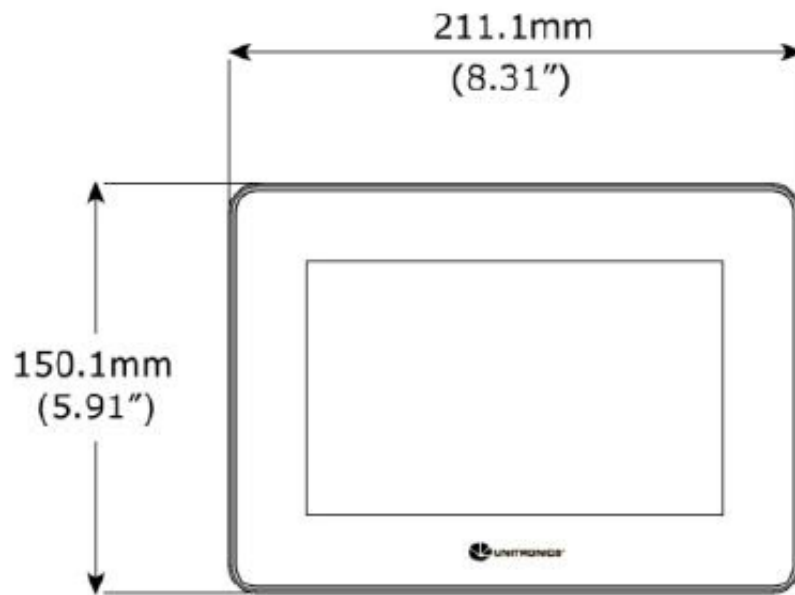


Figure 58. Dimensions, Front

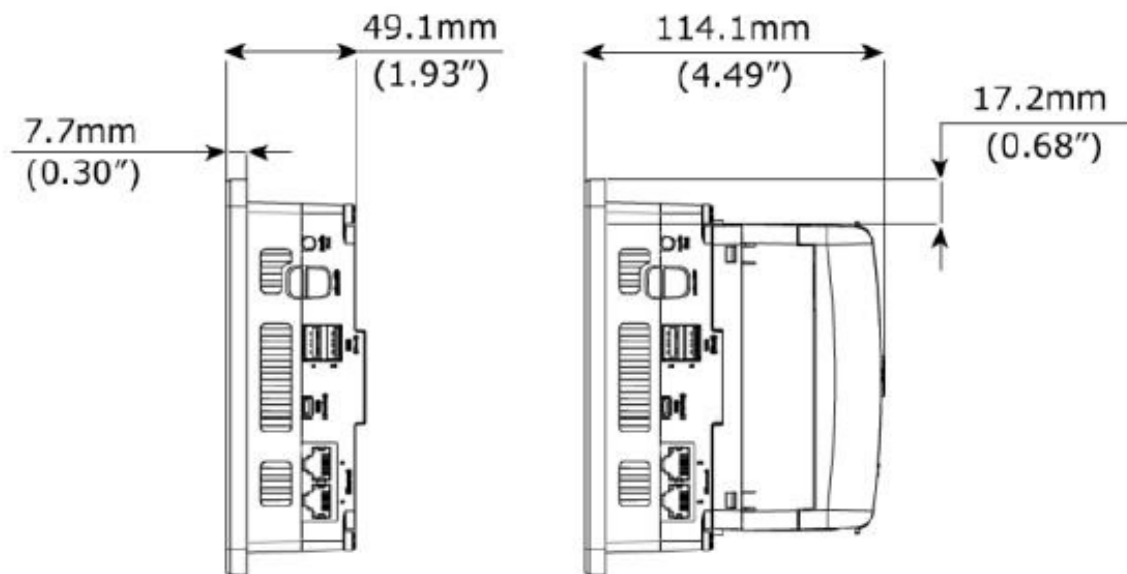


Figure 59. Dimensions, Side

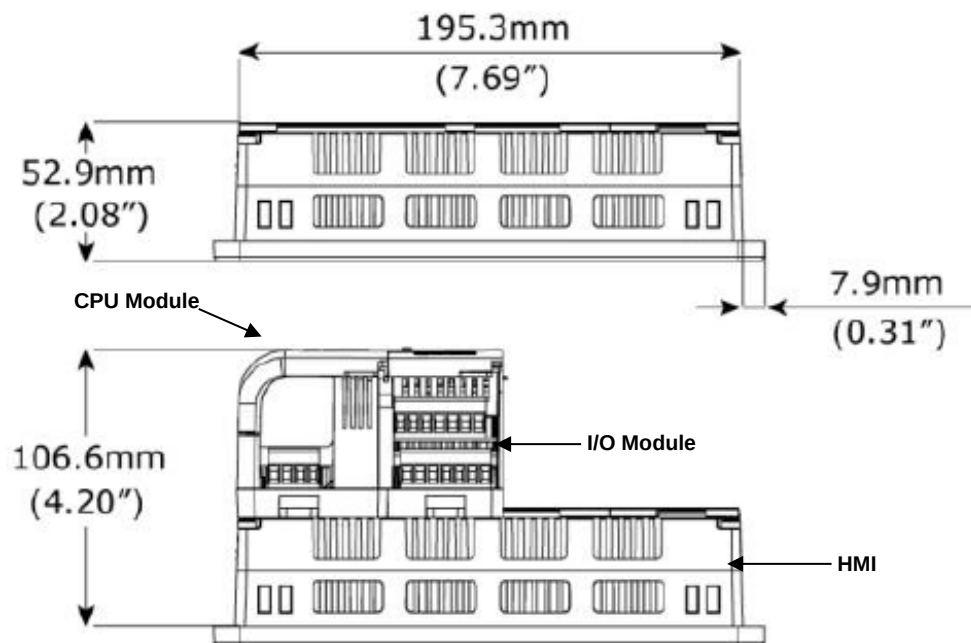


Figure 60, Dimensions, Top

Appendix A, Register Maps

The following register maps are provided for read-only use.

Critical Memory Bits	Read Coil function 01 Supported
10	Modbus Comm Failure
261	Sensor 1 Calibration Active
262	Sensor 2 Calibration Active
263	Sensor 3 Calibration Active
670	Zone 1 Alarm
671	Zone 2 Alarm
672	Zone 3 Alarm
673	Zone 4 Alarm
674	Zone 5 Alarm
675	Zone 6 Alarm
676	Zone 7 Alarm
677	Zone 8 Alarm
678	Zone 9 Alarm
	Write Coil Function 05 Supported
194	Acknowledge Alarm

Memory Integers	Read Input Register Function 04 Supported
	Refer to Table 1 for descriptions
273	Ultima X3 #2 Fault status message
274	Ultima X3 #3 Fault status message
275	Ultima X3 #4 Fault status message
276	Ultima X3 #5 Fault status message
277	Ultima X3 #6 Fault status message
278	Ultima X3 #7 Fault status message
279	Ultima X3 #8 Fault status message
280	Ultima X3 #9 Fault status message
281	Ultima X3 #10 Fault status message
282	Ultima X3 #11 Fault status message
283	Ultima X3 #12 Fault status message
284	Ultima X3 #13 Fault status message
285	Ultima X3 #14 Fault status message

286	Ultima X3 #15 Fault status message
287	Ultima X3 #16 Fault status message
288	Ultima X3 #17 Fault status message
289	Ultima X3 #18 Fault status message
290	Ultima X3 #19 Fault status message
291	Ultima X3 #20 Fault status message
292	Ultima X3 #21 Fault status message
293	Ultima X3 #22 Fault status message
294	Ultima X3 #23 Fault status message
295	Ultima X3 #24 Fault status message
296	Ultima X3 #25 Fault status message
297	Ultima X3 #26 Fault status message

Memory Integers	Read Input Register Function 04 Supported
300	Ultima X3 #2 Gas Value Sensor 1, Left of the Decimal Point
301	Ultima X3 #3 Gas Value Sensor 1, Left of the Decimal Point
302	Ultima X3 #4 Gas Value Sensor 1, Left of the Decimal Point
303	Ultima X3 #5 Gas Value Sensor 1, Left of the Decimal Point
304	Ultima X3 #6 Gas Value Sensor 1, Left of the Decimal Point
305	Ultima X3 #7 Gas Value Sensor 1, Left of the Decimal Point
306	Ultima X3 #8 Gas Value Sensor 1, Left of the Decimal Point
307	Ultima X3 #9 Gas Value Sensor 1, Left of the Decimal Point
308	Ultima X3 #10 Gas Value Sensor 1, Left of the Decimal Point
309	Ultima X3 #11 Gas Value Sensor 1, Left of the Decimal Point
310	Ultima X3 #12 Gas Value Sensor 1, Left of the Decimal Point
311	Ultima X3 #13 Gas Value Sensor 1, Left of the Decimal Point
312	Ultima X3 #14 Gas Value Sensor 1, Left of the Decimal Point
313	Ultima X3 #15 Gas Value Sensor 1, Left of the Decimal Point
314	Ultima X3 #16 Gas Value Sensor 1, Left of the Decimal Point
315	Ultima X3 #17 Gas Value Sensor 1, Left of the Decimal Point
316	Ultima X3 #18 Gas Value Sensor 1, Left of the Decimal Point
317	Ultima X3 #19 Gas Value Sensor 1, Left of the Decimal Point
318	Ultima X3 #20 Gas Value Sensor 1, Left of the Decimal Point
319	Ultima X3 #21 Gas Value Sensor 1, Left of the Decimal Point
320	Ultima X3 #22 Gas Value Sensor 1, Left of the Decimal Point
321	Ultima X3 #23 Gas Value Sensor 1, Left of the Decimal Point

322	Ultima X3 #24 Gas Value Sensor 1, Left of the Decimal Point
323	Ultima X3 #25 Gas Value Sensor 1, Left of the Decimal Point
324	Ultima X3 #26 Gas Value Sensor 1, Left of the Decimal Point
325	Ultima X3 #2 Gas Value Sensor 1, Right of the Decimal Point
326	Ultima X3 #3 Gas Value Sensor 1, Right of the Decimal Point
327	Ultima X3 #4 Gas Value Sensor 1, Right of the Decimal Point
328	Ultima X3 #5 Gas Value Sensor 1, Right of the Decimal Point
329	Ultima X3 #6 Gas Value Sensor 1, Right of the Decimal Point
330	Ultima X3 #7 Gas Value Sensor 1, Right of the Decimal Point
331	Ultima X3 #8 Gas Value Sensor 1, Right of the Decimal Point
332	Ultima X3 #9 Gas Value Sensor 1, Right of the Decimal Point
333	Ultima X3 #10 Gas Value Sensor 1, Right of the Decimal Point
334	Ultima X3 #11 Gas Value Sensor 1, Right of the Decimal Point
335	Ultima X3 #12 Gas Value Sensor 1, Right of the Decimal Point
336	Ultima X3 #13 Gas Value Sensor 1, Right of the Decimal Point
337	Ultima X3 #14 Gas Value Sensor 1, Right of the Decimal Point
338	Ultima X3 #15 Gas Value Sensor 1, Right of the Decimal Point
339	Ultima X3 #16 Gas Value Sensor 1, Right of the Decimal Point
340	Ultima X3 #17 Gas Value Sensor 1, Right of the Decimal Point
341	Ultima X3 #18 Gas Value Sensor 1, Right of the Decimal Point
342	Ultima X3 #19 Gas Value Sensor 1, Right of the Decimal Point
343	Ultima X3 #20 Gas Value Sensor 1, Right of the Decimal Point
344	Ultima X3 #21 Gas Value Sensor 1, Right of the Decimal Point
345	Ultima X3 #22 Gas Value Sensor 1, Right of the Decimal Point
346	Ultima X3 #23 Gas Value Sensor 1, Right of the Decimal Point
347	Ultima X3 #24 Gas Value Sensor 1, Right of the Decimal Point
348	Ultima X3 #25 Gas Value Sensor 1, Right of the Decimal Point
349	Ultima X3 #26 Gas Value Sensor 1, Right of the Decimal Point
350	Ultima X3 #2 Gas Value Sensor 2, Left of the Decimal Point
351	Ultima X3 #3 Gas Value Sensor 2, Left of the Decimal Point
352	Ultima X3 #4 Gas Value Sensor 2, Left of the Decimal Point
353	Ultima X3 #5 Gas Value Sensor 2, Left of the Decimal Point
354	Ultima X3 #6 Gas Value Sensor 2, Left of the Decimal Point
355	Ultima X3 #7 Gas Value Sensor 2, Left of the Decimal Point
356	Ultima X3 #8 Gas Value Sensor 2, Left of the Decimal Point
357	Ultima X3 #9 Gas Value Sensor 2, Left of the Decimal Point

358	Ultima X3 #10 Gas Value Sensor 2, Left of the Decimal Point
359	Ultima X3 #11 Gas Value Sensor 2, Left of the Decimal Point
360	Ultima X3 #12 Gas Value Sensor 2, Left of the Decimal Point
361	Ultima X3 #13 Gas Value Sensor 2, Left of the Decimal Point
362	Ultima X3 #14 Gas Value Sensor 2, Left of the Decimal Point
363	Ultima X3 #15 Gas Value Sensor 2, Left of the Decimal Point
364	Ultima X3 #16 Gas Value Sensor 2, Left of the Decimal Point
365	Ultima X3 #17 Gas Value Sensor 2, Left of the Decimal Point
366	Ultima X3 #18 Gas Value Sensor 2, Left of the Decimal Point
367	Ultima X3 #19 Gas Value Sensor 2, Left of the Decimal Point
368	Ultima X3 #20 Gas Value Sensor 2, Left of the Decimal Point
369	Ultima X3 #21 Gas Value Sensor 2, Left of the Decimal Point
370	Ultima X3 #22 Gas Value Sensor 2, Left of the Decimal Point
371	Ultima X3 #23 Gas Value Sensor 2, Left of the Decimal Point
372	Ultima X3 #24 Gas Value Sensor 2, Left of the Decimal Point
373	Ultima X3 #25 Gas Value Sensor 2, Left of the Decimal Point
374	Ultima X3 #26 Gas Value Sensor 2, Left of the Decimal Point
375	Ultima X3 #2 Gas Value Sensor 2, Right of the Decimal Point
376	Ultima X3 #3 Gas Value Sensor 2, Right of the Decimal Point
377	Ultima X3 #4 Gas Value Sensor 2, Right of the Decimal Point
378	Ultima X3 #5 Gas Value Sensor 2, Right of the Decimal Point
379	Ultima X3 #6 Gas Value Sensor 2, Right of the Decimal Point
380	Ultima X3 #7 Gas Value Sensor 2, Right of the Decimal Point
381	Ultima X3 #8 Gas Value Sensor 2, Right of the Decimal Point
382	Ultima X3 #9 Gas Value Sensor 2, Right of the Decimal Point
383	Ultima X3 #10 Gas Value Sensor 2, Right of the Decimal Point
384	Ultima X3 #11 Gas Value Sensor 2, Right of the Decimal Point
385	Ultima X3 #12 Gas Value Sensor 2, Right of the Decimal Point
386	Ultima X3 #13 Gas Value Sensor 2, Right of the Decimal Point
387	Ultima X3 #14 Gas Value Sensor 2, Right of the Decimal Point
388	Ultima X3 #15 Gas Value Sensor 2, Right of the Decimal Point
389	Ultima X3 #16 Gas Value Sensor 2, Right of the Decimal Point
390	Ultima X3 #17 Gas Value Sensor 2, Right of the Decimal Point
391	Ultima X3 #18 Gas Value Sensor 2, Right of the Decimal Point
392	Ultima X3 #19 Gas Value Sensor 2, Right of the Decimal Point
393	Ultima X3 #20 Gas Value Sensor 2, Right of the Decimal Point

394	Ultima X3 #21 Gas Value Sensor 2, Right of the Decimal Point
395	Ultima X3 #22 Gas Value Sensor 2, Right of the Decimal Point
396	Ultima X3 #23 Gas Value Sensor 2, Right of the Decimal Point
397	Ultima X3 #24 Gas Value Sensor 2, Right of the Decimal Point
398	Ultima X3 #25 Gas Value Sensor 2, Right of the Decimal Point
399	Ultima X3 #26 Gas Value Sensor 2, Right of the Decimal Point
400	Ultima X3 #2 Gas Value Sensor 3, Left of the Decimal Point
401	Ultima X3 #3 Gas Value Sensor 3, Left of the Decimal Point
402	Ultima X3 #4 Gas Value Sensor 3, Left of the Decimal Point
403	Ultima X3 #5 Gas Value Sensor 3, Left of the Decimal Point
404	Ultima X3 #6 Gas Value Sensor 3, Left of the Decimal Point
405	Ultima X3 #7 Gas Value Sensor 3, Left of the Decimal Point
406	Ultima X3 #8 Gas Value Sensor 3, Left of the Decimal Point
407	Ultima X3 #9 Gas Value Sensor 3, Left of the Decimal Point
408	Ultima X3 #10 Gas Value Sensor 3, Left of the Decimal Point
409	Ultima X3 #11 Gas Value Sensor 3, Left of the Decimal Point
410	Ultima X3 #12 Gas Value Sensor 3, Left of the Decimal Point
411	Ultima X3 #13 Gas Value Sensor 3, Left of the Decimal Point
412	Ultima X3 #14 Gas Value Sensor 3, Left of the Decimal Point
413	Ultima X3 #15 Gas Value Sensor 3, Left of the Decimal Point
414	Ultima X3 #16 Gas Value Sensor 3, Left of the Decimal Point
415	Ultima X3 #17 Gas Value Sensor 3, Left of the Decimal Point
416	Ultima X3 #18 Gas Value Sensor 3, Left of the Decimal Point
417	Ultima X3 #19 Gas Value Sensor 3, Left of the Decimal Point
418	Ultima X3 #20 Gas Value Sensor 3, Left of the Decimal Point
419	Ultima X3 #21 Gas Value Sensor 3, Left of the Decimal Point
420	Ultima X3 #22 Gas Value Sensor 3, Left of the Decimal Point
421	Ultima X3 #23 Gas Value Sensor 3, Left of the Decimal Point
422	Ultima X3 #24 Gas Value Sensor 3, Left of the Decimal Point
423	Ultima X3 #25 Gas Value Sensor 3, Left of the Decimal Point
424	Ultima X3 #26 Gas Value Sensor 3, Left of the Decimal Point
425	Ultima X3 #2 Gas Value Sensor 3, Right of the Decimal Point
426	Ultima X3 #3 Gas Value Sensor 3, Right of the Decimal Point
427	Ultima X3 #4 Gas Value Sensor 3, Right of the Decimal Point
428	Ultima X3 #5 Gas Value Sensor 3, Right of the Decimal Point
429	Ultima X3 #6 Gas Value Sensor 3, Right of the Decimal Point

430	Ultima X3 #7 Gas Value Sensor 3, Right of the Decimal Point
431	Ultima X3 #8 Gas Value Sensor 3, Right of the Decimal Point
432	Ultima X3 #9 Gas Value Sensor 3, Right of the Decimal Point
433	Ultima X3 #10 Gas Value Sensor 3, Right of the Decimal Point
434	Ultima X3 #11 Gas Value Sensor 3, Right of the Decimal Point
435	Ultima X3 #12 Gas Value Sensor 3, Right of the Decimal Point
436	Ultima X3 #13 Gas Value Sensor 3, Right of the Decimal Point
437	Ultima X3 #14 Gas Value Sensor 3, Right of the Decimal Point
438	Ultima X3 #15 Gas Value Sensor 3, Right of the Decimal Point
439	Ultima X3 #16 Gas Value Sensor 3, Right of the Decimal Point
440	Ultima X3 #17 Gas Value Sensor 3, Right of the Decimal Point
441	Ultima X3 #18 Gas Value Sensor 3, Right of the Decimal Point
442	Ultima X3 #19 Gas Value Sensor 3, Right of the Decimal Point
443	Ultima X3 #20 Gas Value Sensor 3, Right of the Decimal Point
444	Ultima X3 #21 Gas Value Sensor 3, Right of the Decimal Point
445	Ultima X3 #22 Gas Value Sensor 3, Right of the Decimal Point
446	Ultima X3 #23 Gas Value Sensor 3, Right of the Decimal Point
447	Ultima X3 #24 Gas Value Sensor 3, Right of the Decimal Point
448	Ultima X3 #25 Gas Value Sensor 3, Right of the Decimal Point
449	Ultima X3 #26 Gas Value Sensor 3, Right of the Decimal Point

Memory Integers	Read Input Register Function 04 Supported
	Refer to Table 3 for descriptions
450	Ultima X3 #2 Fault Status
451	Ultima X3 #3 Fault Status
452	Ultima X3 #4 Fault Status
453	Ultima X3 #5 Fault Status
454	Ultima X3 #6 Fault Status
455	Ultima X3 #7 Fault Status
456	Ultima X3 #8 Fault Status
457	Ultima X3 #9 Fault Status
458	Ultima X3 #10 Fault Status
459	Ultima X3 #11 Fault Status
460	Ultima X3 #12 Fault Status
461	Ultima X3 #13 Fault Status
462	Ultima X3 #14 Fault Status

463	Ultima X3 #15 Fault Status
464	Ultima X3 #16 Fault Status
465	Ultima X3 #17 Fault Status
466	Ultima X3 #18 Fault Status
467	Ultima X3 #19 Fault Status
468	Ultima X3 #20 Fault Status
469	Ultima X3 #21 Fault Status
470	Ultima X3 #22 Fault Status
471	Ultima X3 #23 Fault Status
472	Ultima X3 #24 Fault Status
473	Ultima X3 #25 Fault Status
474	Ultima X3 #26 Fault Status

Memory Integers	Read Input Register Function 04 Supported
	Refer to Table 4 for descriptions
525	Ultima X3 #2 Sensor 1 Current Alarm Status
526	Ultima X3 #3 Sensor 1 Current Alarm Status
527	Ultima X3 #4 Sensor 1 Current Alarm Status
528	Ultima X3 #5 Sensor 1 Current Alarm Status
529	Ultima X3 #6 Sensor 1 Current Alarm Status
530	Ultima X3 #7 Sensor 1 Current Alarm Status
531	Ultima X3 #8 Sensor 1 Current Alarm Status
532	Ultima X3 #9 Sensor 1 Current Alarm Status
533	Ultima X3 #10 Sensor 1 Current Alarm Status
534	Ultima X3 #11 Sensor 1 Current Alarm Status
535	Ultima X3 #12 Sensor 1 Current Alarm Status
536	Ultima X3 #13 Sensor 1 Current Alarm Status
537	Ultima X3 #14 Sensor 1 Current Alarm Status
538	Ultima X3 #15 Sensor 1 Current Alarm Status
539	Ultima X3 #16 Sensor 1 Current Alarm Status
540	Ultima X3 #17 Sensor 1 Current Alarm Status
541	Ultima X3 #18 Sensor 1 Current Alarm Status
542	Ultima X3 #19 Sensor 1 Current Alarm Status
543	Ultima X3 #20 Sensor 1 Current Alarm Status
544	Ultima X3 #21 Sensor 1 Current Alarm Status
545	Ultima X3 #22 Sensor 1 Current Alarm Status

546	Ultima X3 #23 Sensor 1 Current Alarm Status
547	Ultima X3 #24 Sensor 1 Current Alarm Status
548	Ultima X3 #25 Sensor 1 Current Alarm Status
549	Ultima X3 #26 Sensor 1 Current Alarm Status
550	Ultima X3 #2 Sensor 2 Current Alarm Status
551	Ultima X3 #3 Sensor 2 Current Alarm Status
552	Ultima X3 #4 Sensor 2 Current Alarm Status
553	Ultima X3 #5 Sensor 2 Current Alarm Status
554	Ultima X3 #6 Sensor 2 Current Alarm Status
555	Ultima X3 #7 Sensor 2 Current Alarm Status
556	Ultima X3 #8 Sensor 2 Current Alarm Status
557	Ultima X3 #9 Sensor 2 Current Alarm Status
558	Ultima X3 #10 Sensor 2 Current Alarm Status
559	Ultima X3 #11 Sensor 2 Current Alarm Status
560	Ultima X3 #12 Sensor 2 Current Alarm Status
561	Ultima X3 #13 Sensor 2 Current Alarm Status
562	Ultima X3 #14 Sensor 2 Current Alarm Status
563	Ultima X3 #15 Sensor 2 Current Alarm Status
564	Ultima X3 #16 Sensor 2 Current Alarm Status
565	Ultima X3 #17 Sensor 2 Current Alarm Status
566	Ultima X3 #18 Sensor 2 Current Alarm Status
567	Ultima X3 #19 Sensor 2 Current Alarm Status
568	Ultima X3 #20 Sensor 2 Current Alarm Status
569	Ultima X3 #21 Sensor 2 Current Alarm Status
570	Ultima X3 #22 Sensor 2 Current Alarm Status
571	Ultima X3 #23 Sensor 2 Current Alarm Status
572	Ultima X3 #24 Sensor 2 Current Alarm Status
573	Ultima X3 #25 Sensor 2 Current Alarm Status
574	Ultima X3 #26 Sensor 2 Current Alarm Status
575	Ultima X3 #2 Sensor 3 Current Alarm Status
576	Ultima X3 #3 Sensor 3 Current Alarm Status
577	Ultima X3 #4 Sensor 3 Current Alarm Status
578	Ultima X3 #5 Sensor 3 Current Alarm Status
579	Ultima X3 #6 Sensor 3 Current Alarm Status
580	Ultima X3 #7 Sensor 3 Current Alarm Status
581	Ultima X3 #8 Sensor 3 Current Alarm Status

582	Ultima X3 #9 Sensor 3 Current Alarm Status
583	Ultima X3 #10 Sensor 3 Current Alarm Status
584	Ultima X3 #11 Sensor 3 Current Alarm Status
585	Ultima X3 #12 Sensor 3 Current Alarm Status
586	Ultima X3 #13 Sensor 3 Current Alarm Status
587	Ultima X3 #14 Sensor 3 Current Alarm Status
588	Ultima X3 #15 Sensor 3 Current Alarm Status
589	Ultima X3 #16 Sensor 3 Current Alarm Status
590	Ultima X3 #17 Sensor 3 Current Alarm Status
591	Ultima X3 #18 Sensor 3 Current Alarm Status
592	Ultima X3 #19 Sensor 3 Current Alarm Status
593	Ultima X3 #20 Sensor 3 Current Alarm Status
594	Ultima X3 #21 Sensor 3 Current Alarm Status
595	Ultima X3 #22 Sensor 3 Current Alarm Status
596	Ultima X3 #23 Sensor 3 Current Alarm Status
597	Ultima X3 #24 Sensor 3 Current Alarm Status
598	Ultima X3 #25 Sensor 3 Current Alarm Status
599	Ultima X3 #26 Sensor 3 Current Alarm Status

Memory Integers	Read Input Register Function 04 Supported
	Refer to Table 2 for description
600	Ultima X3 #2 Fault Status Message
601	Ultima X3 #3 Fault Status Message
602	Ultima X3 #4 Fault Status Message
603	Ultima X3 #5 Fault Status Message
604	Ultima X3 #6 Fault Status Message
605	Ultima X3 #7 Fault Status Message
606	Ultima X3 #8 Fault Status Message
607	Ultima X3 #9 Fault Status Message
608	Ultima X3 #10 Fault Status Message
609	Ultima X3 #11 Fault Status Message
610	Ultima X3 #12 Fault Status Message
611	Ultima X3 #13 Fault Status Message
612	Ultima X3 #14 Fault Status Message
613	Ultima X3 #15 Fault Status Message
614	Ultima X3 #16 Fault Status Message

615	Ultima X3 #17 Fault Status Message
616	Ultima X3 #18 Fault Status Message
617	Ultima X3 #19 Fault Status Message
618	Ultima X3 #20 Fault Status Message
619	Ultima X3 #21 Fault Status Message
620	Ultima X3 #22 Fault Status Message
621	Ultima X3 #23 Fault Status Message
622	Ultima X3 #24 Fault Status Message
623	Ultima X3 #25 Fault Status Message
624	Ultima X3 #26 Fault Status Message

Memory Integers	Read Input Register Function 04 Supported
	Refer to Table 5 for descriptions
650	Ultima X3 #2 Calibration Status
651	Ultima X3 #3 Calibration Status
652	Ultima X3 #4 Calibration Status
653	Ultima X3 #5 Calibration Status
654	Ultima X3 #6 Calibration Status
655	Ultima X3 #7 Calibration Status
656	Ultima X3 #8 Calibration Status
657	Ultima X3 #9 Calibration Status
658	Ultima X3 #10 Calibration Status
659	Ultima X3 #11 Calibration Status
660	Ultima X3 #12 Calibration Status
661	Ultima X3 #13 Calibration Status
662	Ultima X3 #14 Calibration Status
663	Ultima X3 #15 Calibration Status
664	Ultima X3 #16 Calibration Status
665	Ultima X3 #17 Calibration Status
666	Ultima X3 #18 Calibration Status
667	Ultima X3 #19 Calibration Status
668	Ultima X3 #20 Calibration Status
669	Ultima X3 #21 Calibration Status
670	Ultima X3 #22 Calibration Status
671	Ultima X3 #23 Calibration Status
672	Ultima X3 #24 Calibration Status

673	Ultima X3 #25 Calibration Status
674	Ultima X3 #26 Calibration Status

Table 1		
Bit	Name	Function Description
Bit 0	Fault	Set if True
Bit 1	Sensor 1 Missing	Set if True
Bit 2	Sensor 2 Missing	Set if True
Bit 3	Sensor 3 Missing	Set if True
Bit 4	Sensor 1 Calibration Fault	Set if True
Bit 5	Sensor 2 Calibration Fault	Set if True
Bit 6	Sensor 3 Calibration Fault	Set if True
Bit 7	Sensor 1 Power Fail Fault	Set if True
Bit 8	Sensor 2 Power Fail Fault	Set if True
Bit 9	Sensor 3 Power Fail Fault	Set if True
Bit 10	Power Fault Main Unit +5VDC	Set if True
Bit 11	Sensor 1 End of Life	Set if True
Bit 12	Sensor 2 End of Life	Set if True
Bit 13	Sensor 3 End of Life	Set if True
Bit 14	Configuration Reset	Set if True
Bit 15	Sign	Set if True

Table 2		
Bit	Name	Function Description
Bit 0	Sensor 1 LOC	Set if True
Bit 1	Sensor 2 LOC	Set if True
Bit 2	Sensor 3 LOC	Set if True
Bit 3	Sensor 1 Over Range	Set if True
Bit 4	Sensor 2 Over Range	Set if True
Bit 5	Sensor 3 Over Range	Set if True
Bit 6	Sensor 1 Quick Under Range	Set if True

Bit 7	Sensor 2 Quick Under Range	Set if True
Bit 8	Sensor 3 Quick Under Range	Set if True
Bit 9	Sensor 1 Under Range	Set if True
Bit 10	Sensor 2 Under Range	Set if True
Bit 11	Sensor 3 Under Range	Set if True
Bit 12		Not Used
Bit 13		Not Used
Bit 14		Not Used
Bit 15		Always 1

Table 3		
Bit	Name	Function Description
Bit 0	Device Fault (any fault)	Set for all conditions
Bit 1	Calibration Active - Sensor 1	Set During Calibration
Bit 2	Calibration Active - Sensor 2	Set During Calibration
Bit 3	Calibration Active - Sensor 3	Set During Calibration
Bit 4	Warm Up Mode	Set During Startup
Bit 5	Low Alarm Active	Set While Alarm Relay is Active
Bit 6	Mid Alarm Active	Set While Alarm Relay is Active
Bit 7	High Alarm Active	Set While Alarm Relay is Active
Bit 8	Future	
Bit 9	Future	
Bit 10	Future	
Bit 11	Future	
Bit 12	Future	
Bit 13	Future	
Bit 14	Not Used	
Bit 15		

Table 4
0 = Normal Operation
1 = Caution
2 = Warning
3 = Alarm

Table 5
0 = Normal Operation
1 = Sensor 1 In Calibration
2 = Sensor 2 In Calibration
3 = Sensor 3 In Calibration

Appendix B, Optional Remote Relay Modules

- Optional Remote Relay units:
 - o Five remote relay units may be added to the Modbus network.
 - o Modbus ID numbers of the remote relay modules must be programmed for ID#30, 31, 32, 33 or 34.
 - o Relay O0 is the Local Horn relay.
 - o The Local Horn relay (O0) can only be silenced from the ModCon75 Touch Main Data Screen Silence button.

NOTE:

- o If Zone Alarms are programmed as Latch, user can silence the alarm at the ModCon75 Touch, but the Zone alarm will not clear until the unlatch input is initiated at the ModCon75 Touch Controller.

Dimensions

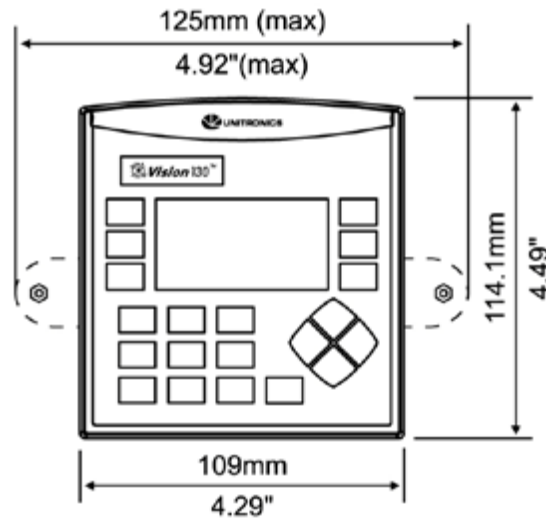


Figure B-1. Remote Relay Module, Front

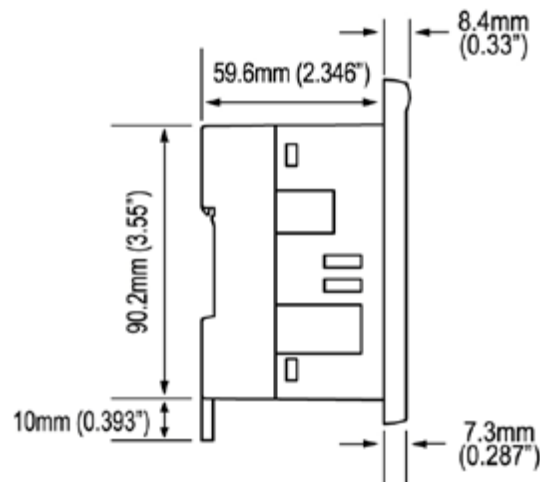


Figure B-2. Remote Relay Module, Side

Table B-1. Remote Relay Module Specifications

Power Supply	
Input voltage	24VDC
Permissible range	20.4VDC to 28.8VDC with less than 10% ripple
Max. current consumption	93mA @ 24VDC
Relay Outputs	
Number of outputs	6 relays (5 in use)
Output type	SPST-NO (form A)
Isolation	By relay
Type of relay	Fujitsu, JY-24H-K or compatible
Output current	5A maximum (resistive load)
Rated voltage	250VAC / 30VDC
Minimum load	10mA, 5VDC
Response time	10ms (typical)
Contact protection	External precautions required (Figure 51, pg. 53)
Graphic Display Screen	
LCD Type	STN, LCD display
Illumination backlight	White LED
Display resolution	128x64 pixels
Viewing area	2.4"
Colors	Monochrome
Screen Contrast	Via software
Screen brightness control	Via software
Communication Ports	
Port 1	1 channel, RS232/RS485
Galvanic isolation	No
Baud rate	19200 bps
RS232	
Input voltage	20VDC absolute maximum
Cable length	15m maximum (50 ft.)
RS485	
Input voltage	-7 to +12VDC differential maximum
Cable type	Shielded twisted pair, in compliance with EIA 485
Cable length	1200m maximum (3937 ft.)

Nodes	Up to 5
-------	---------

Battery Back-up	
Battery life	7 year typical 25°C (77°F), battery back-up for RTC and system data including variable data.
Battery replacement	Coin type 3V, lithium battery, CR2450
Clock	
Real Time Clock (RTC)	Real time clock functions (date and time)
Environment	
Operational temperature	0 to 50°C (32 to 122°F)
Storage temperature	-20 to 60°C (-4 to 140°F)
Relative Humidity (RH)	10% to 95% (non-condensing)
Mounting method	Panel mounted (IP65/66/NEMA 4X) DIN-rail mounted (IP20/NEMA 1)
Operating Altitude	2000m (6562 ft.)
Shock	IEC 60068-2-27, 15G, 11ms duration
Vibration	IEC 600068-2-6, 5Hz to 8.4Hz, 3.5mm constant amplitude, 8.4Hz to 150Hz, 1G acceleration

Jumper Settings

- Table B-2 and Figure B-3 indicates how to set a specific jumper to change input functionality.
- Table B-3 and Figure B-4 indicates how to set a specific jumper to change communication functionality.
- To open the controller and access the jumpers, see Figures B-3 and B-4.

WARNING

- Incompatible jumper settings and wiring connections may seriously damage the controller.
FAILURE TO FOLLOW THIS WARNING CAN RESULT IN SERIOUS PERSONAL INJURY OR LOSS OF LIFE.

Table B-2. Remote Relay I/O Input Jumper Settings

Digital Inputs	JP1	
npn (sink)	A	
pnp (source)	B*	
Inputs, Digital or Analog	JP5	JP6
Digital	A	A
Analog	B*	B*
Analog Inputs	JP3	JP4
Voltage	A	A
Current	B*	B*
*Default Settings		

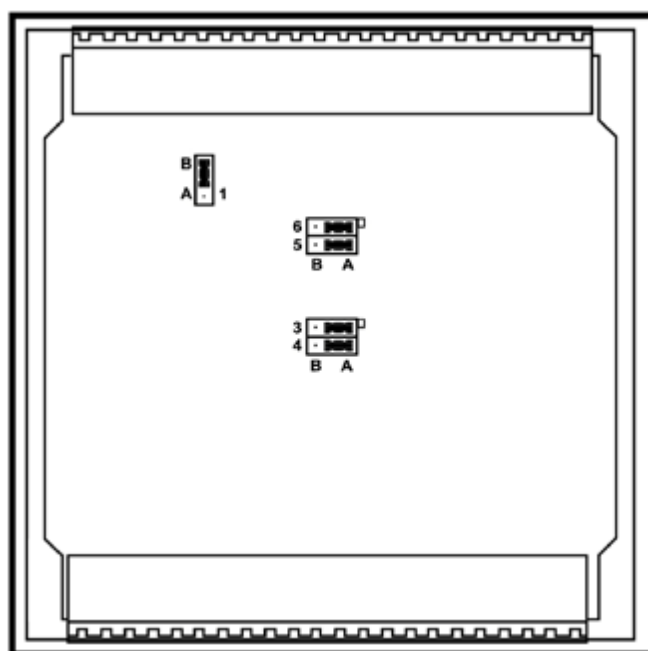


Figure B-3. Input Jumpers

Table B-3. Communication Port

TERM	OFF	ON*
COMM	232	485*
*Default Settings		

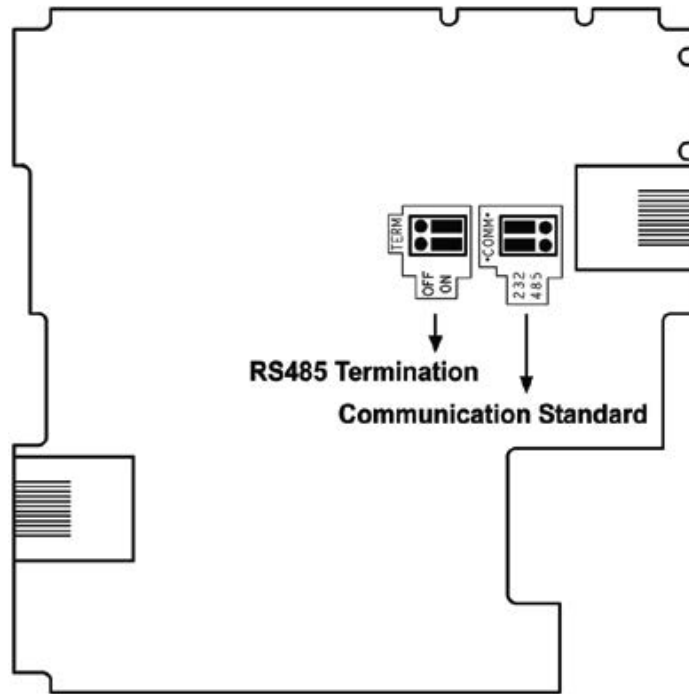


Figure B-4. Communication Port Jumpers

RS485**		Controller Port
Pin #	Description	
1	A signal (+)	
2	(RS232 signal)	
3	(RS232 signal)	
4	(RS232 signal)	
5	(RS232 signal)	
6	B signal (-)	

Figure B-5. RS485 Pin Layout

- **When a port is adapted to RS485, Pin 1 (DTR) is used for signal A, and Pin 6 (DSR) signal is used for signal B.

Opening the Remote Relay Module

WARNING

- Disconnect system power before connecting or disconnecting any modules or devices.
- Components in this module are electrostatic discharge sensitive (ESDS). Use proper personal grounding procedures when removing, handling or adjusting the electronic module.
- Avoid touching the printed circuit board directly. Hold the printed circuit board by its connectors.

FAILURE TO FOLLOW THESE WARNINGS CAN RESULT IN SERIOUS PERSONAL INJURY OR LOSS OF LIFE.

1. Turn off the power supply, disconnect, and dismount the remote relay module.
2. The back cover of the remote relay module comprises 4 screws, located in the corners. Remove the screws and pull off the back cover.

Changing the IO Jumper Settings

1. The I/O board of the remote relay is now exposed, enabling you to change I/O settings according to jumpers shown in Table B-2.

Changing Communication Jumper Settings

1. To access the communication jumpers, locate the screw close to COM port 1 (see Figure B-6) and remove it.
2. Hold the I/O printed circuit board by its top, bottom connectors, and steadily pull the board off as shown in Figure B-7.
3. Locate and then change the jumpers as required, see Figure B-3.

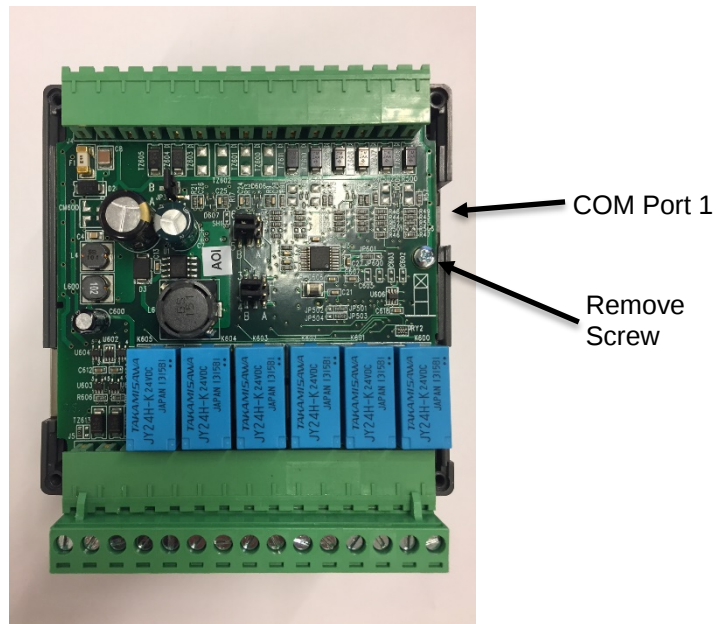


Figure B-6. Remote I/O Printed Circuit Board



Figure B-7. Remote I/O Printed Circuit Board Removal

Closing the Remote Relay Module

1. Gently replace the board. Make certain that the pins correctly into their matching receptacle. Do not force the board into place, see Figure B-7. Doing so may damage the remote relay module.
2. Replace the back cover of the remote relay module and fasten the corner screws.

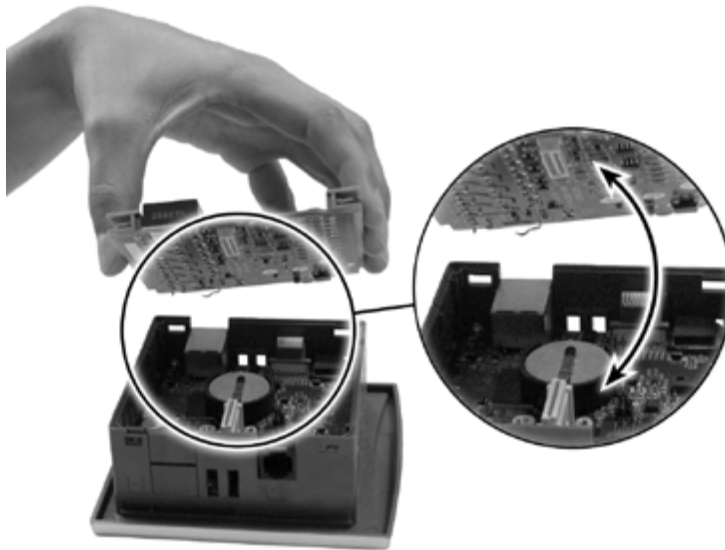


Figure B-7. Closing the Remote Relay

Remote Relay Module Mounting

Panel Mounting

Note:

- o The mounting panel cannot be more than 5 mm thick.

1. Make a panel cutout measuring 92x92 mm (3.622"x3.622").
2. Slide the remote relay module into the cutout, ensuring that the rubber seal is in place.
3. Push the 2 mounting brackets into their slots on the sides of the remote relay module as shown in Figure B-8.
4. Tighten the bracket screws against the panel. Hold the bracket securely against the unit while tightening the screw.
5. When properly mounted, the remote relay module is squarely situated in the panel cutout as shown in Figure B-9.

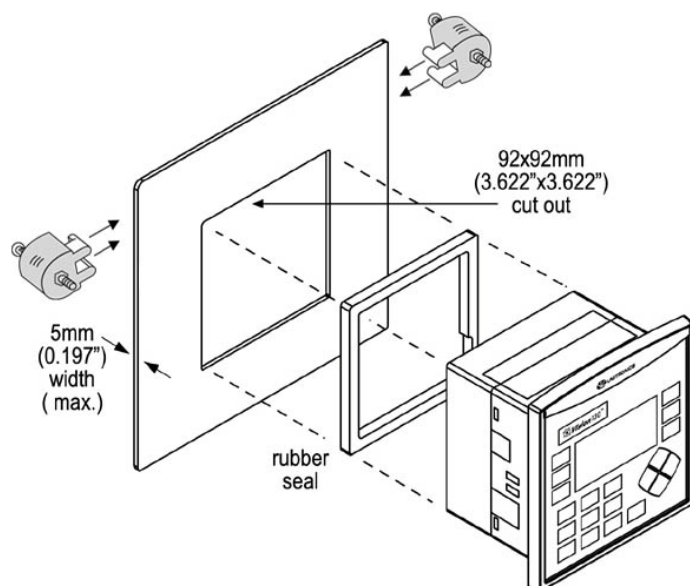


Figure B-8. Remote Relay Panel Mounting



Figure B-9. Remote Relay Panel Mounted

DIN-rail Mounting

1. Snap the remote relay module onto the DIN rail as shown in Figure B-10.
2. When properly mounted, the remote relay module is squarely situated on the DIN-rail as shown in Figure B-11.

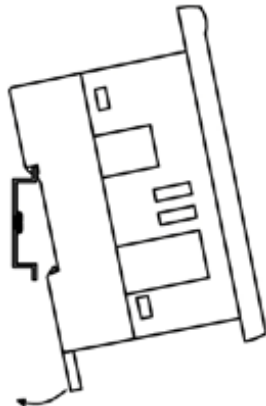


Figure B-10. Remote Relay DIN-Rail Mounting

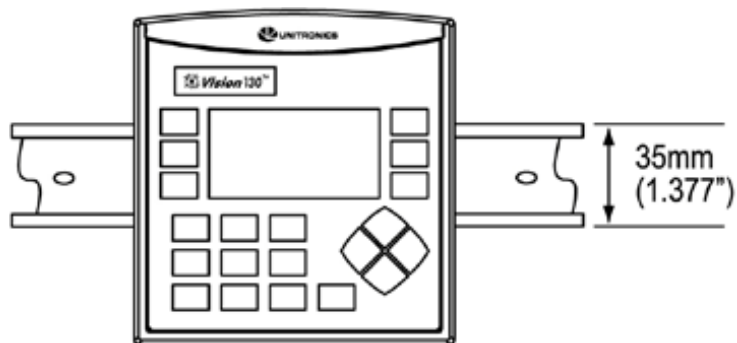


Figure B-11. Remote Relay Mounted