GASMARK

M-XM

M255 EXPANSION MODULES

Installation and Operation Manual

CTi GAS DETECTION SPECIALISTS

ctigas.com | 866-394-5861

Warning

To ensure your personal safety, read the Safety Information section before installing or servicing this device. Use this product only in the manner described in this manual.
If the equipment is used in a manner not specified by CTI, the protection provided by the equipment may be impaired.
This equipment should be installed by qualified personnel.

For technical support, contact:

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Safety Information

Use this product only in the manner described in this manual. If the equipment is used in a manner not specified by CTI, the protection provided by the equipment may be impaired.

Equipment should not be operated or serviced without reading the manual first.

Proper installation within an enclosure is necessary to limit exposure to electrically energized components.

Unless servicing equipment enclosure doors / covers should be closed.

This equipment should be installed by qualified personnel.

Any service performed on this equipment should be completed by authorized and qualified personnel.

Always disconnect power before performing any wiring or service to equipment.

1. General Description

The GASMARK™ M-XM Expansion Modules are intended to provide users with options to increase the number of inputs and/or outputs for the GASMARK™ M255 Gas Detection Control Panel.

Each module may be added independently to an M255 network providing additional input or output resources. This modular design provides users with the ability to tailor the network to the unique needs of their facility.

Expansion modules available:

M-AIM8 – Analog Input Module: Receives up to Eight (8) 4-20mA analog inputs and re-transmits over RS-485 Modbus to the GASMARK™ M255 Control Panel.

M-DIM4 – Discrete Input Module: Receives up to Four (4) NO/NC input devices such as switches or pushbuttons to be configured by the GASMARK™ M255 Control Panel.

M-AOM8 – Analog Output Module: Outputs up to Eight (8) 4-20mA signals to devices such as Entry Monitors or PLCs.

M-RM8 – Relay Output Module: Eight (8) relays available to meet user need for increased connections to audio/visual signaling or motor driven devices. Fully configurable on the GASMARK™ M255 Control Panel.

All modules allow an operator to monitor connected devices from the GASMARK™ M255 Control Panel.

Note: "Device(s)" in this manual will refer to any component which may be controlled and/or read via the M255 Control Panel.

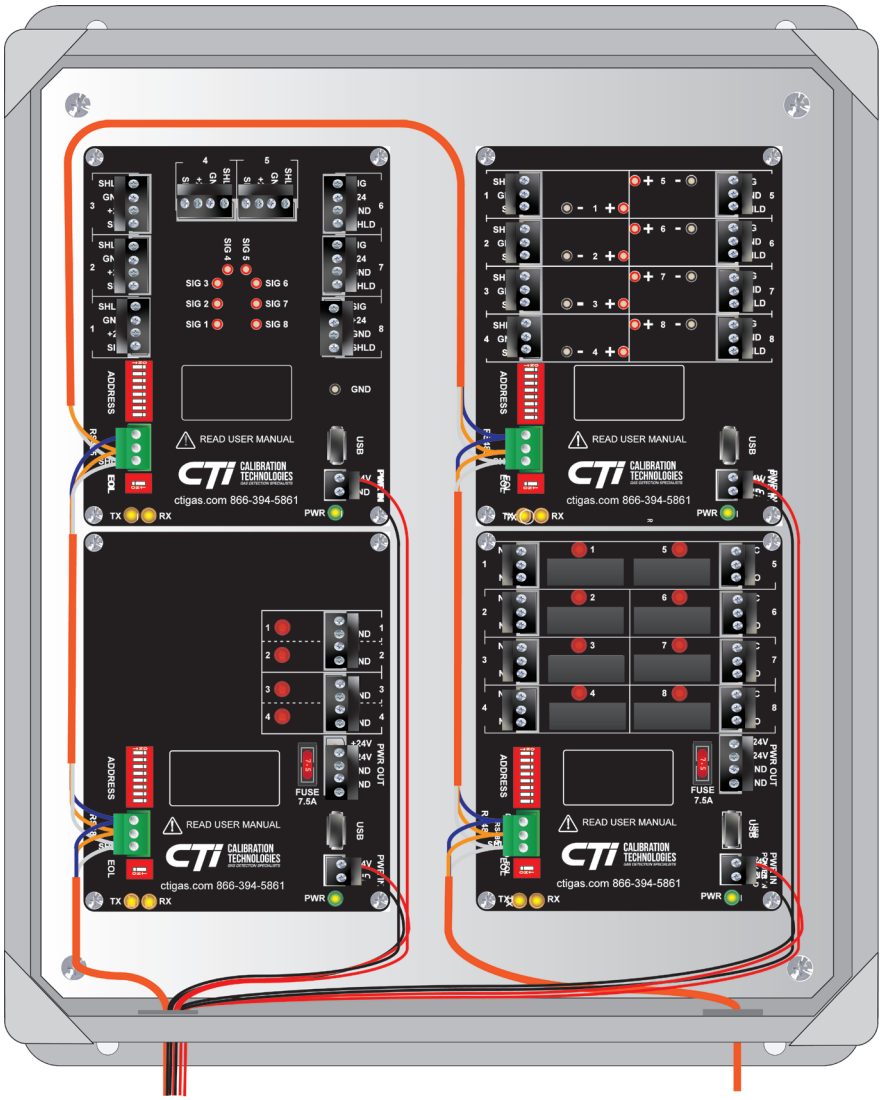
2. Installation

2.1 Installation Guidelines

Locating the GASMARK™ M-XM Modules as an Expansion Panel

- The GASMARK M-XM modules should be installed within an enclosure rated for the environment, forming an "expansion panel."
- Install the expansion modules through the holes on the circuit board only.
- When mounting the expansion panel the enclosure must be easily accessible for operating personnel.
- The expansion panel should be mounted on a solid surface with minimal vibration. If mounting on a wall with studs, the mounting screws should be screwed into the studs.
- Mount the expansion panel in a general-purpose location only. Do not install in a hazardous environment.
- Mount the expansion panel away from electromagnetic interference.
- Protect the expansion panel from physical damage.
- When connecting to metallic conduit, attach appropriately sized conduit hub to conduit prior to connection with enclosure is made.

Figure 1: Example M-XM Modules in M-XM-ENC - Power and Communications Layout



2.2 Wiring

2.2.1 Wiring Guidelines

- Before wiring, ensure enclosure and modules are free of dust, debris, and liquids.
- Electrical wiring must comply with all applicable codes
- Use stranded, copper wire/cable with a minimum of 167°F rating (75°C rating).
- All wiring should be rated for 300V or greater.
- Always use insulated, stranded, shielded copper cable for all communication cables. Refer to individual device manuals for wiring instructions.
- Do not pull communication wiring with AC power cables. This can cause electrical interference.
- Bonding between metallic conduit connections is not automatic with the non-conductive enclosure. Separate bonding must be provided.
- After wiring, any unused conduit holes should be covered with an appropriate sized plug, flammability rating V-1 or better, to maintain integrity of enclosure.

2.2.2 Power Wiring

Each module receives 24Vdc power from the GASMARK™ M255 or a separate external power supply.

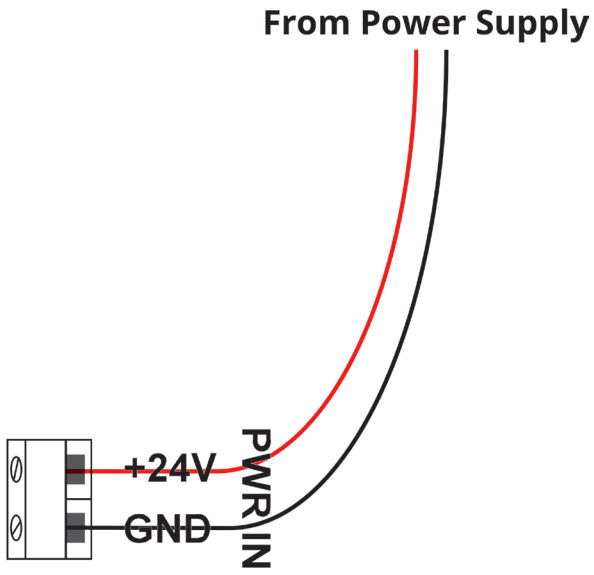
Additional power supplies may be added on the Modbus channels distributed throughout the network as needed. A power wiring calculator is available upon request, contact CTI for help with recommendations.

Caution:
To prevent excessive voltage drops and/or power supply overloads, careful consideration should be taken to take into account all 24Vdc devices on the power supplies. This includes gas detectors, audio/visual devices, etc. See Specifications on page 16 for maximum current draw for all devices.

If the supply voltage drops below 16V, a power supply should be added. When utilizing the 24Vdc supply for any connected relays for external devices (horn-strobes, fan controllers, etc.), ensure all device's minimum supply voltage is maintained under full load (all devices active)."

Note:
When adding a power supply, make sure to tie the power supply grounds together to maintain the same ground for all devices on that Modbus channel.

Figure 2: M-XM Module POWER Wiring



Terminal Block Plug (Field Wiring):
GND: From ground terminal of Power Supply.
24V: From 24Vdc terminal of Power Supply.

2.2.3 Communication Wiring

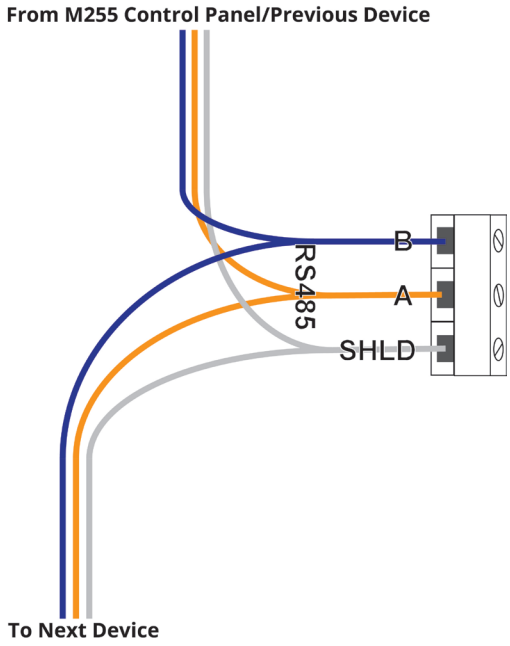
The GASMARK™ M255 and GASMARK M-XM Expansion Modules use Modbus RTU over RS-485 cable to communicate. This allows multiple devices to be daisy-chained together on a common communication line.

Each module has a communication port with three terminals: A, B, and Shield. In these terminals the communication cable is connected so that all the devices that take part in the communication are connected in parallel.

It is recommended to pull 24Vdc power cable with the communication cables. These cables can share the same conduit.

- RS-485 communication cable, 22-24 AWG, 2 conductor, twisted pair, shielded, stranded, with drain wire (Alpha Wire 6460 or equivalent)
- 4,000 ft max per channel.
- For optimum performance, it is recommended that no more than 128 devices are connected on any of the four channels available through the GASMARK™ M255.
- For optimum performance, CTI recommends that the M255 is always at the end of the line. When the M255 is at the end of the line, the EOL switches should always be set to the ON position.
- Avoid splices and T-taps on communication wiring. All terminations should be made at network device wire terminals.
- All of the 'A' terminals must be connected together and all the 'B' terminals must be connected together, respectively.
- Wire shields must be connected at all shield terminals, creating a continuous shield run from the GASMARK™ M255 to each device at the end of the line.

Figure 3: M-XM Module Communication Wiring



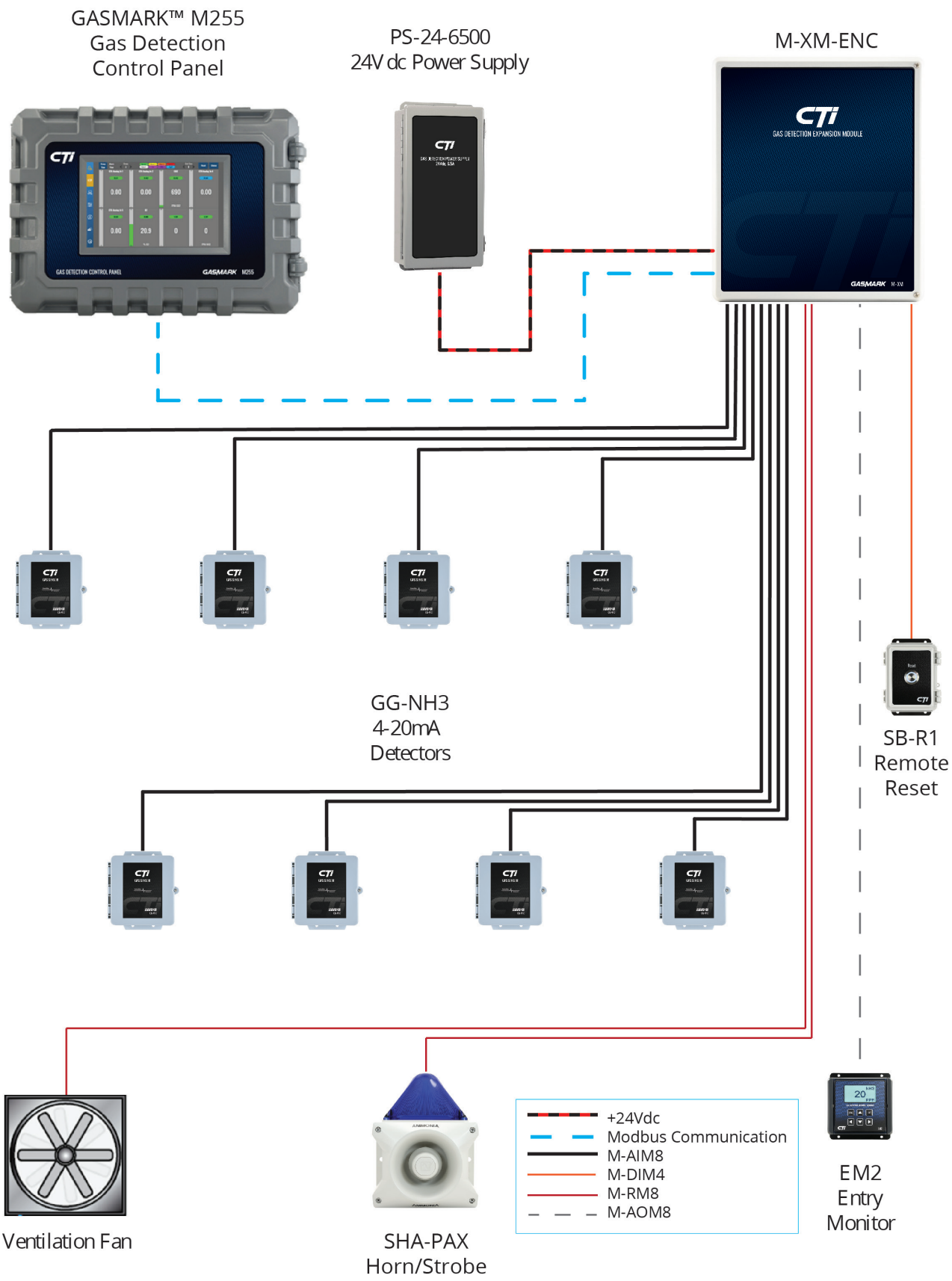
Terminal Block Plug (Field Wiring):
SHLD: From shield terminals of M255 or previous network device.
A: In from RS-485-A terminals of M255 or previous network device.
B: In from RS-485-B terminals of M255 or previous network device.

When connecting additional supported Modbus devices see the respective installation manuals for more details on communication wiring.

2.2.4 Wiring Other

Each expansion module has unique wiring concerns depending on the type of device. See Expansion Module information for more details.

Figure 4: Example M255 Network with M-XM Expansion Modules



3. Operation

3.1 Power-up

Before applying power, make a final check of all wiring for continuity, shorts, grounds, etc. It is usually best to disconnect external alarms and other equipment from the module until the initial start-up procedures are completed.

3.1.1 Normal Use

Operation of the unit is considered normal use only when the enclosure is closed. Opening of the enclosure should only be performed by authorized and qualified personnel, after disconnection from power and review of operation guidelines. Upon opening of enclosure please be aware of all internal markings prior to performing any tasks.

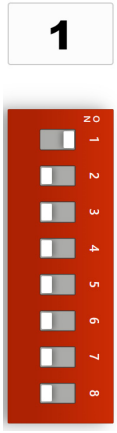
3.1.2 Initial Startup

Before applying power to an M-XM Expansion Module or a series of modules set the following:

Modbus Address:

The individual modules must be addressed to communicate on your Modbus network. This is accomplished via the 8-position DIP switch located on each module Each module may be addressed 1-255 depending on the sequence of the switch positions.

To ensure you are setting the switch to the correct address please use the Modbus DIP Switch Tool at ctigas.com.



End of Line:

If the Expansion Module is the final device on a specific Modbus channel it is considered "end of line" and should have the EOL switch set to the "ON" position, toward "EOL" label on circuit board.

3.2 Quick Start Guide

1. **Check Wiring**: Make sure all connected devices are terminated and wire terminals are tightened.
2. **Setup**: Configure M-XM Expansion Modules with proper Modbus Addresses and EOL settings.
3. **Apply Power**: Connect DC power supply to power the system.
4. **Discovery:** Discover all connected devices via the GASMARK™ M255.
5. **Devices**: Configure all settings via GASMARK™ M255.
6. **Test System:** Perform extensive startup test to verify all alarm functions perform as intended.
7. **Export:** Save new configuration and system settings of GASMARK™ M255 to USB drive for backup.

3.3 Responding to Fault

Any fault detected by the expansion modules will be displayed at the GASMARK™ M255. The device ID icon will change color.

3.3.1 Power Fault:

A power fault will be signaled if any of the expansion modules exceed voltage limitations, +10Vdc to +30Vdc.

Verify wiring between Power Supply and expansion module. Intermittent fault signals of attached devices could be an indication of a wire failure. If a break has occurred replace wiring.

3.3.2 Communications Fault:

A communication fault can occur if the M255 loses communication with supported devices.

A fast way to check is to access the M55 Unit Status screen.

This is usually a wiring problem but can occur if supported devices share a Modbus ID or there has been a hardware failure with a device.

Check the RS-485 Modbus wiring, if there is a break, all devices after the break will have faulted Comm Status and should be obvious when viewed at the control panel.

4. Expansion Modules

4.1 M-AIM8: Analog Input Module

The M-AIM8 Analog Input Module increases the number of 4-20mA detectors which can be attached to a GASMARK™ M255 Gas Detection Control Panel.

Each M-AIM8 supports up to 8 channels of 4-20mA detectors by utilizing analog to RS-485 Modbus conversion. Each Module will be assigned a single Modbus Address via an 8-position Dip Switch. The individual detectors are viewable on the GASMARK™ M255.

- Refer to the manual for each detector for cable recommendations.
- Analog detectors must be home-run back to M-AIM8.
- Length of cable should not exceed 1500 feet (457 meters), See detector manual for maximum length recommendations.

The M-AIM8 allows an operator to monitor the 4-20mA signal via test points on the module.

- Test points will read 0.4V-2.0V.

Figure 5: Example - M-AIM8 Board

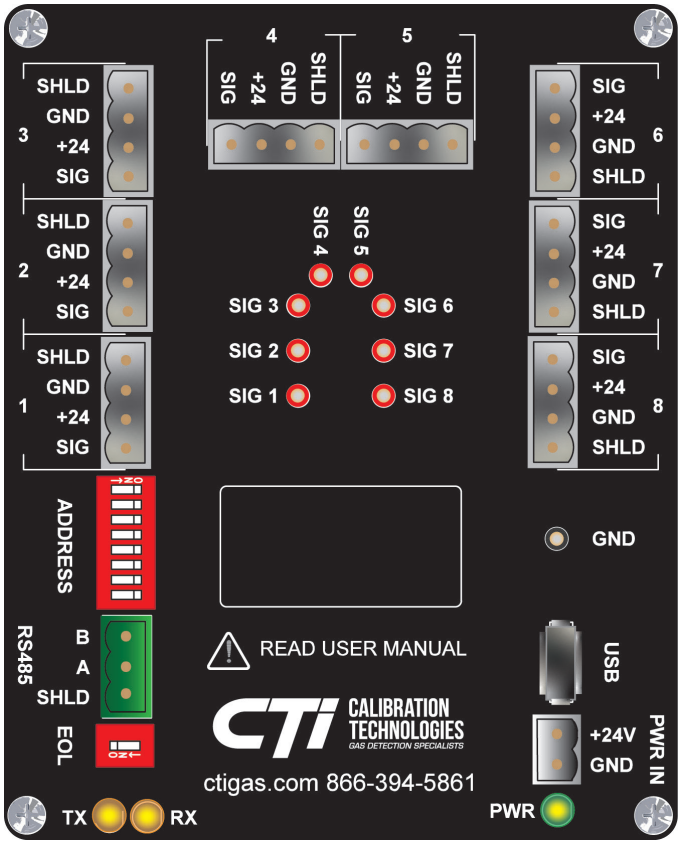
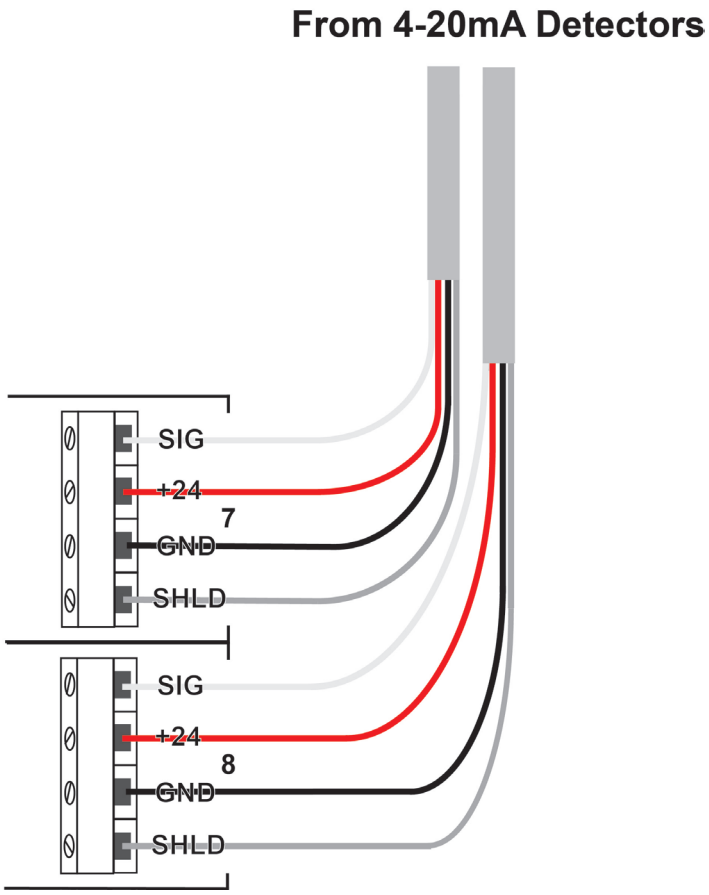


Figure 6: M-AIM8 Input Wiring



4.2 M-DIM4: Discrete Input Module

The M-DIM4 Discrete Input Module increases the number of discrete devices which can be attached to a GASMARK™ M255.

Each M-DIM4 can handle 4 additional inputs. Each channel is current sourcing.

A courtesy 24Vdc terminal block on the M-DIM4 can be used to provide power for devices with auxiliary lights or signals.

- The inputs are wired through two, four position headers, an input and a ground for up to 2 channels on each header.
- The 24Vdc courtesy, marked PWR OUT, has two +24 and two ground terminals that may be connected with the power terminals of device. See device manual for wire recommendations.
- For input wiring use 22 AWG, 2 conductor, stranded instrumentation cable, with drain wire and PVC jacket.

Note: The input terminals are intended to show contact open/closure only and should not have voltage applied.

Figure 7: M-DIM4 Input and Power Out Wiring

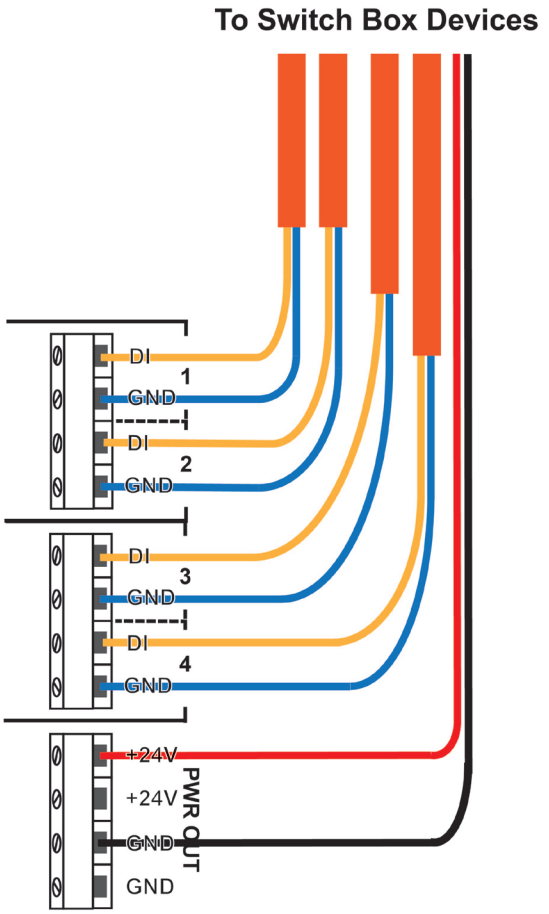
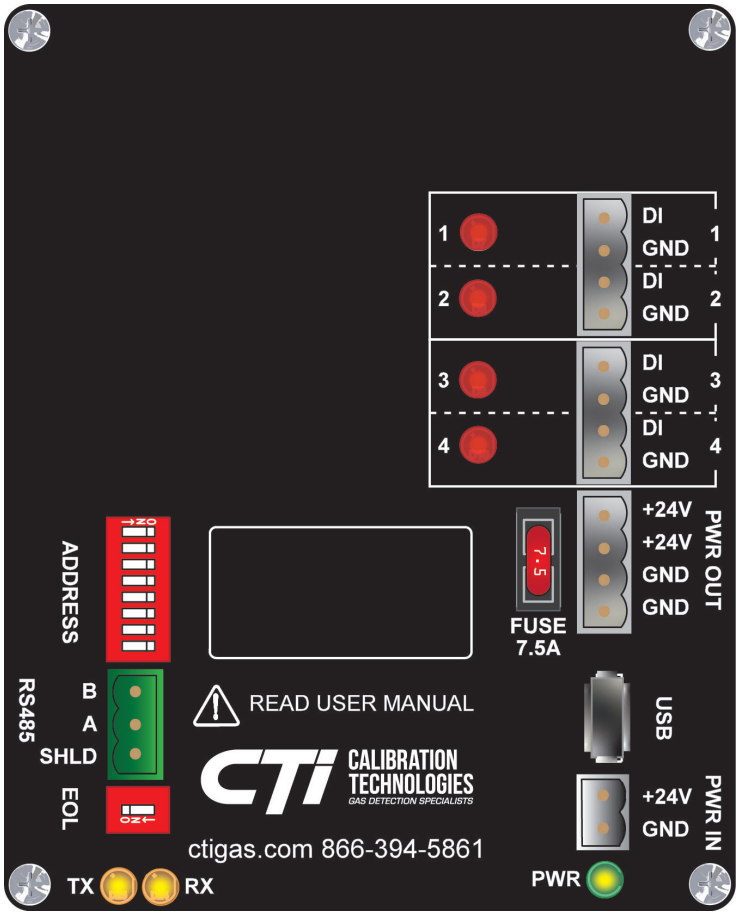


Figure 8: Example - M-DIM4



4.3 M-RM8: Relay Output Module

The M-RM8 Relay Output Module provides 8 additional general purpose relay outputs for use with the GASMARK M255.

The Relay Output Module can provide power to external devices requiring either AC or DC supply. Each relay on the module is rated up to 5A @ 24Vdc or 8A @ 120/240Vac.

Users can designate setpoints for the M-RM8 relays from the GASMARK™ M255. See Relay Output section of M255 manual for programming relays.

- All relays have Form C dry contacts and are rated 5A @ 30Vdc or 8A @ 240Vac (dry contacts require external power).
- Each relay has a status LED to show the state of the relay. Active LED indicates relay is energized.
- When utilizing external power supplies for powering devices such as horn/strobes, make sure the total current draw of all powered devices does not exceed the current limits of the system. Module will generate a fault signal back to GASMARK™ M255 if voltage supply exceeds limits.

4.3.1 DC Power Wiring

For powering 24Vdc external devices the Relay Output Module provides a courtesy terminal block which can be wired to.

- Connect one of the +24V terminals on the courtesy block with the common "C" terminal on the appropriate relay.
- Depending on whether the attached device should be Normally Open or Normally Closed the "NO" or "NC" terminal should be connected to the 24V input on the device.
- Ground from the courtesy header should be connected to the ground on the device.

4.3.2 AC Power Wiring:

Any attached device that requires AC power should be tied to a Class II Power Supply.

- Power should be provided by a dedicated 15A circuit breaker. It is recommended that the circuit breaker be located near the equipment, and clearly marked as the disconnect for the M255.
- See Specification on page 16 for requirements.
- AC wiring must be run in a separate conduit from the detector cables.
- AC Line wire should be connected with common "C," terminal of relay output plug.
- Whether Normally Open or Normally Closed connect the "NO" or "NC" terminal on relay output with the attached device.
- Neutral AC wiring should run from supply to the output device.

Figure 9: Example - M-RM8

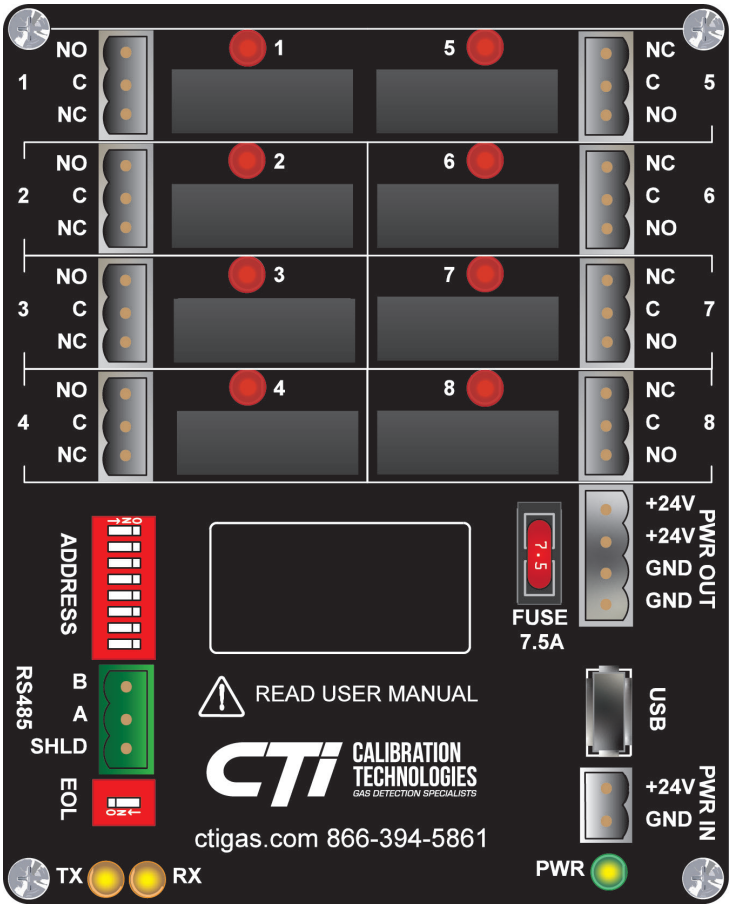
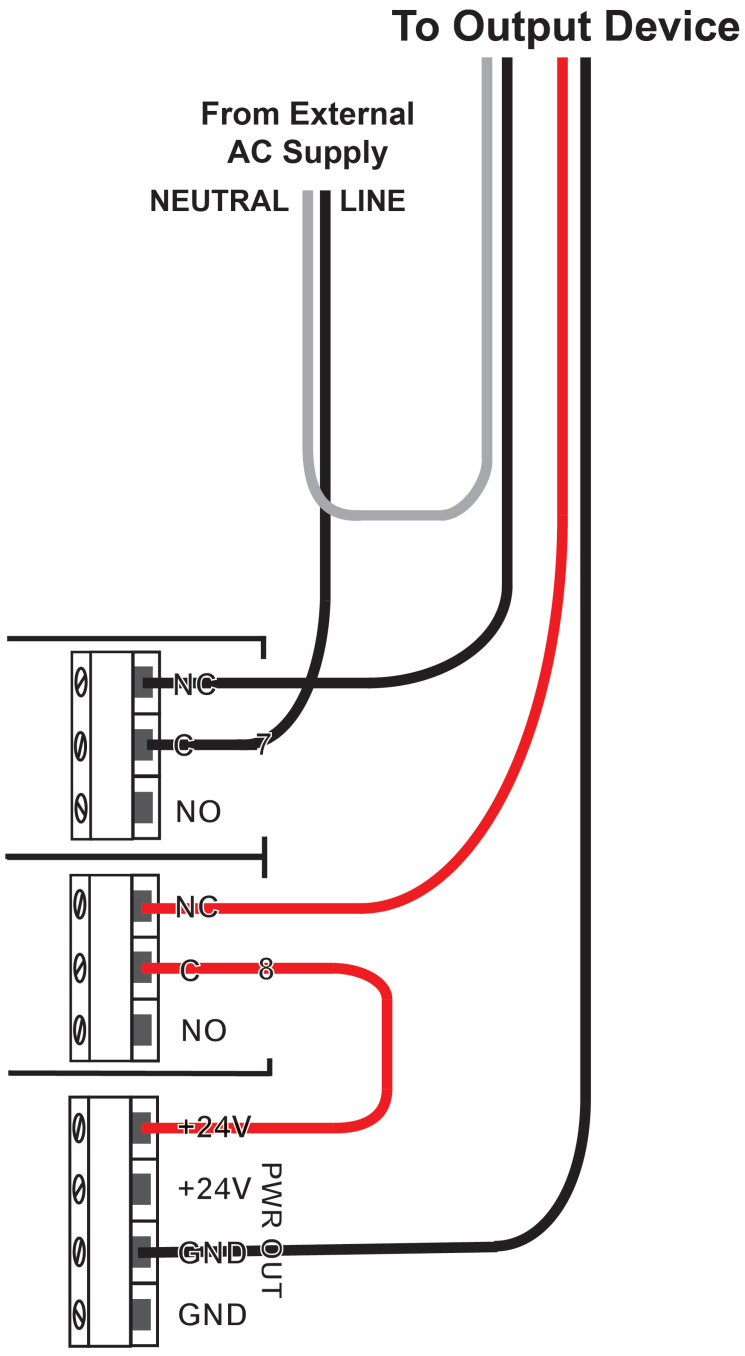


Figure 10: M-RM8 Output Wiring



4.4 M-AOM8: Analog Output Module

The M-AOM8 XM Analog-Output Module increases the number of 4-20mA output devices, such as entry monitors or a facility PLC, which can be attached to a GASMARK™ M255 Gas Detection Control Panel. Each M-AOM8 Analog-Output Module will support up to 8 channels of 4-20mA outputs.

- Refer to the manual for each device for cable recommendations.
- The Analog-Output Module requires each supported device to be wired via home-runs back to the GASMARK M-XM.
- Length of cable should not exceed 1500 feet (457 meters).

The M-AOM8 allows an operator to monitor the 4-20mA signal via test points on the module.

- Test points will read 0.4V-2.0V.

Figure 11: Example - M-AOM8

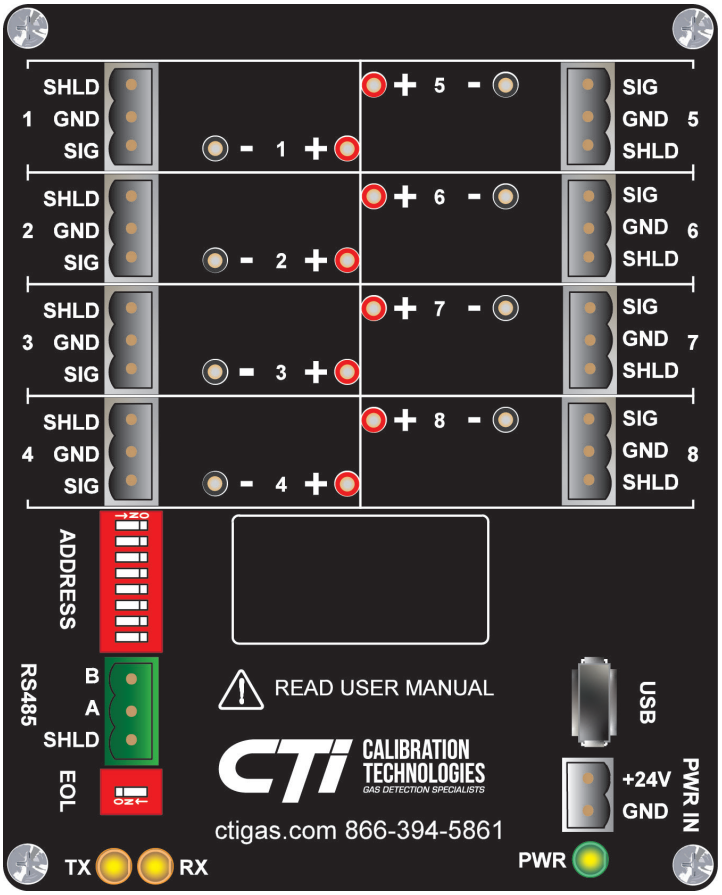
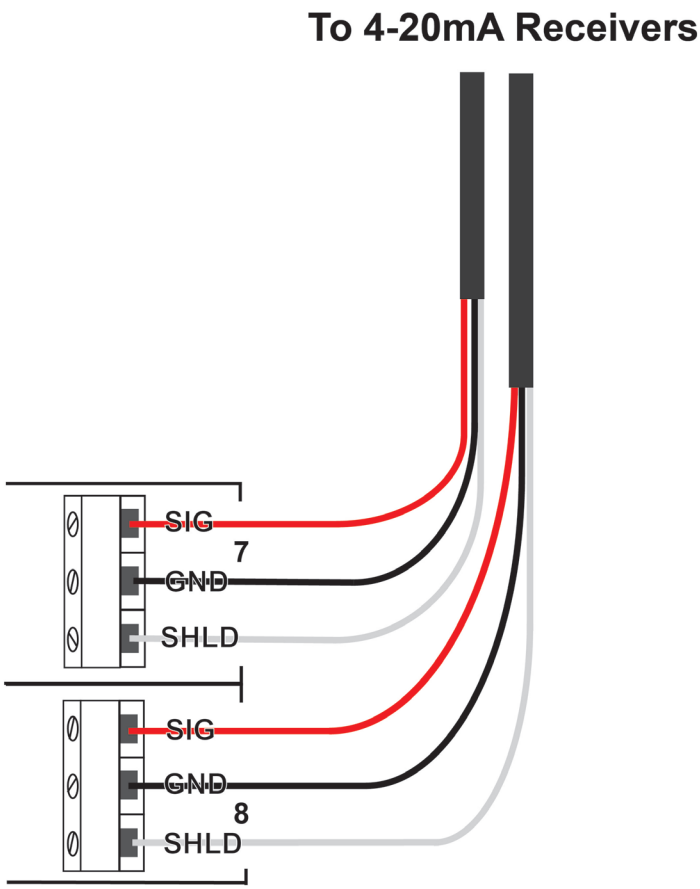


Figure 12: M-AOM8 Output Wiring



5. Maintenance

5.1 System Maintenance

All gas detection systems should be calibrated with certified calibration gas as specified in the individual device manuals. All alarm functions and outputs should be tested, verified, and documented after calibration.

5.2 Cleaning

Cleaning of the enclosure housing M-XM Expansion Modules should only be done with a damp, soft cloth. Do not use solvents or chemicals.

Cleaning of the modules should only be completed while the module is disconnected from power supply. A clean, dry, micro fiber cloth may be used to gently remove any accumulated dust.

Any service performed on this equipment should be completed by qualified/authorized personnel; equipment does not contain user serviceable components.

6. Specifications

	M-AIM8	M-DIM4	M-AOM8	M-RM8
Voltage	24Vdc with isolation or class 2 power supply			
Device Current	250mA @24Vdc			
Pass Through Current	1.5A@24Vdc per channel 12A Max per module	7.5A@24Vdc		7.5A@24Vdc Relay Output: 5A@24Vdc 8A@120-240 Vac
Communications Modbus	Modbus RTU, 8-E-1 @ 9600 baud			
Communications Analog	Input Signal: 4-20mA, 251 Ohm Input Impedance		Output Signal: 4-20mA	
Fuses	Not Field Serviceable	Replaceable 58V, 7.5A Blade	Not Field Serviceable	Replaceable 58V, 7.5A Blade
Terminal Plugs	26-12 AWG, torque 4.4 in-lbs.			
Dimensions	5.55" x 4.47" x 1.25"			
Weight	.44 lbs			
Location	Indoor - Dry Locations require NEMA Type 1 or better enclosure, Outdoor - Wet Locations require NEMA 4 or 4X enclosure			
Temperature Range	-4°F to 122°F (-20°C to 50°C)			
Humidity	10-90% RH condensing			
Altitude	Up to 4000 m (13,123 ft)			
Pollution Degree	Pollution Degree 2			
Transient Overvoltage	Category II			
Enclosure	NEMA Type 1 or better is required under Conditions of Acceptability. M-XM-ENC is rated as Type 4X to UL Std: 508 File No. E54315 CSA C22.2 No. 94, File No. LR36508			
Certifications	Conforms to UL Std: 61010-1 (2018), CSA Std: 22.2 No. 61010-1-2018			

7. Warranty

Limited Warranty & Limitation of Liability

Calibration Technologies, LLC (CTI) warrants this product to be free from defects in material and workmanship under normal use and service for a period of 2 years, beginning on the date of shipment to the buyer. This warranty extends only to the sale of new and unused products to the original buyer. CTI's warranty obligation is limited, at CTI's option, to refund of the purchase price, repair, or replacement of a defective product that is returned to a CTI authorized service center within the warranty period. In no event shall CTI's liability hereunder exceed the purchase price actually paid by the buyer for the product.

This warranty does not include:

a. routine replacement of parts due to the normal wear and tear of the product arising from use;
b. any product which in CTI's opinion, has been misused, altered, neglected or damaged by accident or abnormal conditions of operation, handling or use;
c. any damage or defects attributable to repair of the product by any person other than an authorized dealer or contractor, or the installation of unapproved parts on the product

The obligations set forth in this warranty are conditional on:

a. proper storage, installation, calibration, use, maintenance and compliance with the product manual instructions and any other applicable recommendations of CTI;
b. the buyer promptly notifying CTI of any defect and, if required, promptly making the product available for correction. No goods shall be returned to CTI until receipt by the buyer of shipping instructions from CTI; and
c. the right of CTI to require that the buyer provide proof of purchase such as the original invoice, bill of sale or packing slip to establish that the product is within the warranty period.

THE BUYER AGREES THAT THIS WARRANTY IS THE BUYER'S SOLE AND EXCLUSIVE REMEDY AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. CTI SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, INCLUDING LOSS OF DATA, WHETHER ARISING FROM BREACH OF WARRANTY OR BASED ON CONTRACT, TORT OR RELIANCE OR ANY OTHER THEORY.

Need help?

We answer the phone and monitor email!

Monday-Friday

8:30a - 4:30p (Central Time)

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CTi GAS DETECTION SPECIALISTS