

002750

CHECKFIRE MP-N ELECTRIC DETECTION & ACTUATION SYSTEM

Installation, Recharge, Inspection, and Maintenance Manual



This manual is intended for use with the CHECKFIRE MP-N (Mine Permissible) Electric Detection and Actuation System.

Those who install, operate, inspect, or maintain this system should read this entire manual. Specific sections will be of particular interest depending upon one's responsibilities.

As with all electro-mechanical equipment, the electric detection and actuation system needs periodic care to provide maximum assurance that it will operate effectively and safely. Inspection frequency shall be performed monthly, or sooner, depending on operating and/or environmental conditions. Maintenance shall be performed semi-annually, or sooner, depending on operating and/or environmental conditions.

The application and use of the CHECKFIRE MP-N system is limited to the application and uses described in this manual. For other applications, contact your local authorized ANSUL distributor or the ANSUL technical representative in your area.

Note: The converted metric values in this document are provided for dimensional reference only and do not reflect an actual measurement.

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Explanation of safety alerts:

DANGER

Indicates a hazardous situation in which a person **will experience serious personal injury or death** if the situation is not avoided.

WARNING

Indicates a hazardous situation in which a person **could experience serious personal injury or death** if the situation is not avoided.

CAUTION

Indicates a hazardous situation in which a person **could experience minor or moderate personal injury** if the situation is not avoided.

CAUTION

Addresses practices not related to personal injury, such as a system part malfunctioning, property damage, or system failure.

NOTICE

Addresses general practices or observations related to system function that are *not* related to personal injury.

TOTAL SYSTEM DESCRIPTION

The fire detection/suppression package is designed and approved for use in mining vehicles, including those that operate in an explosive methane/air atmosphere.

The CHECKFIRE MP-N Electric Detection and Actuation System, FM Approval No. 3036795, is a modified version of the FM approved SC-N Electric Detection and Actuation System, FM approval No. J.I.0B8A8. The modification has been done to meet the intrinsically safe requirements of MSHA.

Modification includes the addition of intrinsically safe circuitry to the battery assembly and the main control board.

Due to the inability to make intrinsically safe wiring connections, trouble and alarm relay contacts normally provided with the CHECKFIRE SC-N control module have been removed on the CHECKFIRE MP-N control module.

The complete CHECKFIRE MP-N system is composed of components which are combined to provide automatic fire detection and actuation for equipment hazard areas. The electric detection and actuation system is designed for use only with ANSUL fire suppression systems requiring pneumatic input as a means of actuation.

The CHECKFIRE MP-N system is typically used with an ANSUL A-101 Vehicle Fire Suppression system for 24-hour protection of equipment. The system is particularly suited for the protection of mining equipment that is subjected to extreme environmental and physical conditions.

Some of its features include linear (wire) and/or spot (thermal) detection, supervised circuitry, internally powered, adjustable shutdown and discharge time delays, and auxiliary shutdown relay.

CHECKFIRE MP-N Electric Detection and Actuation System consists of the following components:

1. Control Module
2. Manual/Automatic Actuator
3. Mounting Bracket
4. Detection Wire
5. Thermal Detectors
6. Pneumatic/Linear Detection
7. Gas Motor
8. LT-10-R Cartridge
9. Check Valve
10. MSHA Approved Pressure Switch (by others) or pneumatic shutdown device
11. Gas Motor Circuit Test Module (not shown)
12. Automatic Actuator

The control module is a self contained system, powered by its own internal lithium battery. This allows the detection system to operate around-the-clock without use of external power.

The control module may be installed where the ambient temperature is between -40 °F to 140 °F (-40 °C to 60 °C).

The CHECKFIRE MP-N Detection and Actuation System is approved by MSHA for permissible applications in an explosive methane/air atmosphere.

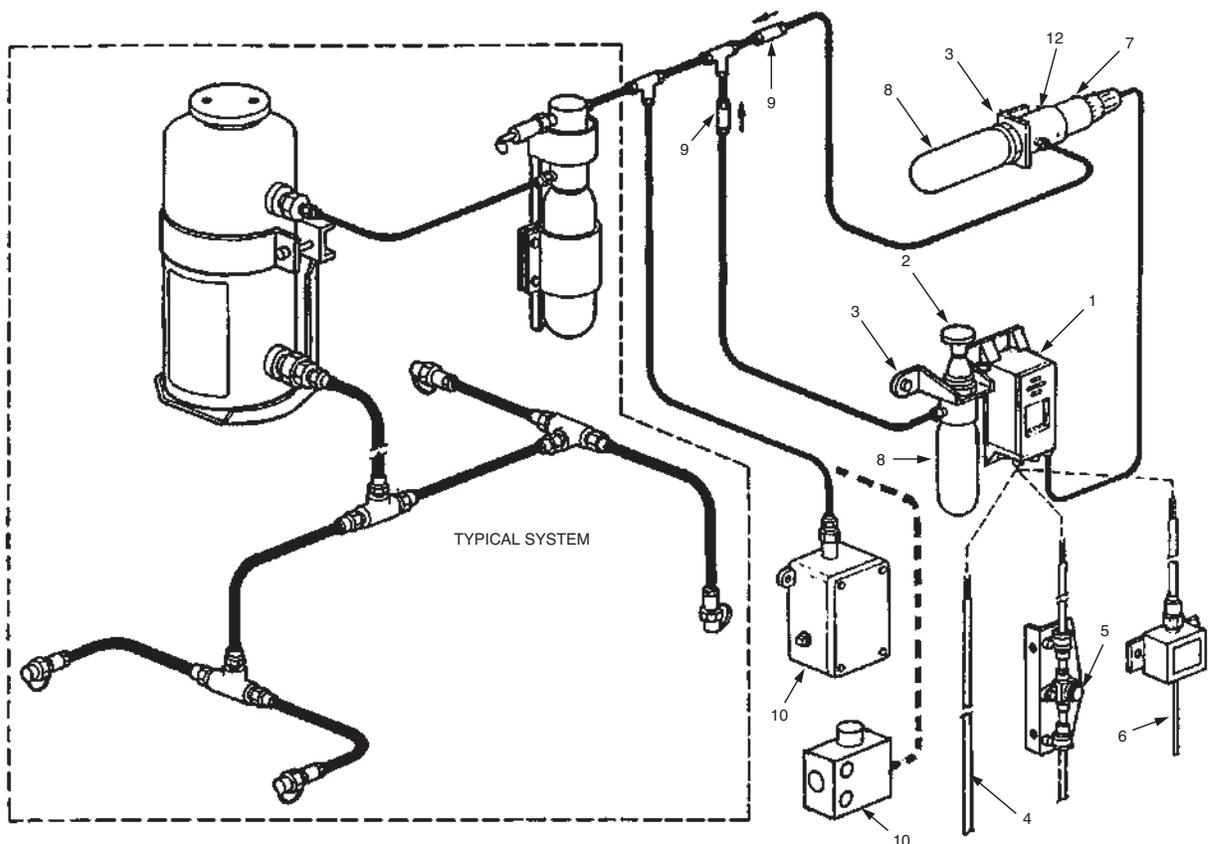


FIGURE 1
 003901

TOTAL SYSTEM DESCRIPTION (Continued)

Circuits

The first initiating circuit is the supervised detection circuit designed to be connected to linear (wire), linear pneumatic, and/or spot type thermal detectors that provide a contact closure input to initiate a fire detected condition. The second initiating circuit is designed to accept a contact closure type of actuating device such as an electric manual pull station or a pressure switch. The initiating circuits are low impedance and designed to eliminate nuisance alarms associated with contact bounce.

Two field programmable time delays provide timing of shutdown and release functions associated with the operation of the detection initiating circuit No. 1 and initiating circuit No. 2.

NOTICE

If factory preset time delay periods are to be extended, consider the lag time between fire ignition and automatic initiation when using thermal detection. Consequently, extending one or more time delay periods will likely extend the fire burn time.

- DETECTION INITIATING CIRCUIT NO. 1

The detection circuit consists of two time delays:

The first time delay is field programmed to assign the time between alarm (initiation of the detection circuit) and the operation of the shutdown relay. The first time delay is field programmable for 5, 10, 20, or 30 seconds.

The second time delay is field programmed to assign the time between the completion of the first time delay (when the shutdown relay operates) and the operation of the release circuit. The second time delay is field programmable for 0, 10, 20, or 30 seconds.

- INITIATING CIRCUIT NO. 2

The second input circuit (terminals 5 and 6) is field programmable to be used as either an initiating input circuit to cause a release output or as a pressure switch feedback input circuit which will sound alarms and transfer the shutdown relay, but will not cause a release output. If selected as an initiating circuit to cause a release, its operation will override the first time delay function and initiate a second time delay condition, causing the shutdown relay to immediately operate and system release to occur upon completion of the second time delay. When the second input circuit is used as an initiating input circuit to cause a release, the timing cycle of the second time delay can be adjusted in steps from 0 to 30 seconds. However, the settings of time delay 2 on initiating circuit No. 2 can never exceed the settings of time delay 2 on initiating circuit No. 1.

Selection of the second initiating circuit as a pressure switch feedback circuit will result in the operation of the alarm relay and shutdown relay immediately upon receiving the signal. The release circuit will not be initiated from this feedback circuit. When the pressure switch feedback input circuit has operated, the Alarm and Release LED's, along with the audio sounder, will pulse for 30 seconds at a fast rate and thereafter at a slow rate until the pressure switch is reset and then the control module is reset.

- A "DELAY" option is available for the operators use. Operation of the "DELAY" button will restart the first time delay cycle if initiated while the first time delay is active. Once the second time delay has started, operation of the "DELAY" button has no affect.
- The shutdown relay will operate after the first time delay cycle or immediately upon actuation of the pressure switch feedback circuit.
This relay can be used for vehicle shutdown or remote alarm initiating.

CONTROL MODULE

The Control Module, Part No. 427300, is the basis of the CHECKFIRE MP-N detection system. The module cover and back box is made of durable Noryl SE1gfN3 material with a flammability rating of UL94 V-1. The back box contains the field interface terminal block, battery, and field wiring entrance ports. The cover assembly contains the control PC board assembly, sounder, operator interface panel, and environmental seal. The enclosure meets International Standard IEC 529 requirements for dust and water spray in all directions. Mounting pads allow mounting to any suitable flat surfaces. Steel mounting brackets are also available.

All circuitry, relays, switches, and LED's are contained on a single PC board. A board mounted receptacle mates with the plug-in terminal block mounted in the back box. A high pitch sounder is threaded into the cover and plugged into the PC board. The PC board is encapsulated to provide added protection against moisture and dust. An RS232 interface cable connector is provided for field programming from a PC and for data retrieval from a trouble and alarm history buffer. The PC board assembly contains a DIP switch for optional manual programming functions without the use of a PC. See Figure 2.

CAUTION

When installed in an area that is classified as hazardous in accordance with the NEC Article 500, only equipment that has been approved for use in those areas can be used. This requirement applies to programming equipment such as PCs that may be used to program the CHECKFIRE MP-N.

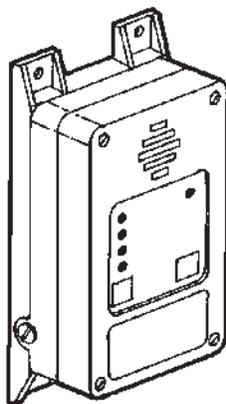


FIGURE 2
 002755

MANUAL AND AUTOMATIC ACTUATORS

The MSHA CHECKFIRE MP-N system is equipped with both manual and automatic agent release devices.

Manual Actuator

A 1/4 in. NPT street elbow is supplied with the actuator for convenient connection of the 1/4 in. actuation line to the fire suppression system.

The manual actuator is designed with a RED palm button which is attached to a cartridge seal piercing pin and a ring pin to guard against accidentally piercing the cartridge seal. To initiate agent release, the operator must pull out the ring pin and strike the RED palm button. The manual actuator must be located near the operator's control station. See Figure 3.

PART NO. 416792

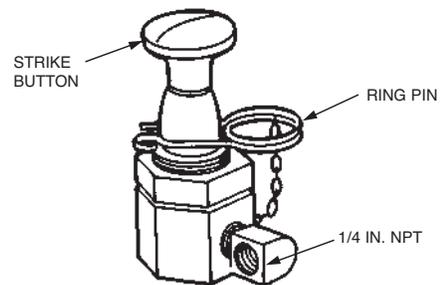


FIGURE 3
 003912

Automatic Actuator

The MSHA CHECKFIRE MP-N controller is provided with an agent release output which automatically and electrically actuates a gas motor as a result of a detected fire condition.

Automatic actuation is accomplished using the gas motor to pierce the seal of a nitrogen cartridge. The gas motor is made up of a miniature gas cylinder with piston and rod, a chemical charge and an electrical heating element.

When the heating element is energized by a small current from the control module, the chemical charge is ignited, generating a gas which drives the piston and rod outward. The gas produced by ignition also locks the piston and rod in the outward position.

The piston rod pushes the cartridge seal puncture pin through the cartridge seal to release the high pressure cartridge gas. The release of the cartridges gas in turn pressurizes the agent tank which causes agent release.

The gas motor must be replaced with gas motor replacement shipping assembly, Part No. 416756, after firing.

The gas motor actuator, Part No. 416735, can be installed remotely from the operator's control station. See Figure 4.

PART NO. 416735

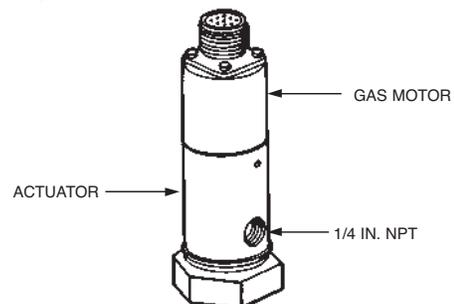


FIGURE 4
 003913

LT-10-R CARTRIDGE

The LT-10-R cartridge (Figure 5) is a pressure vessel that is factory-filled with nitrogen to 1800 psi at 70 °F (12400 kPa at 21 °C). The cartridge provides the pressure required to actuate the connected fire suppression system. Following operation, the cartridge must be replaced.

PART NO. 423423

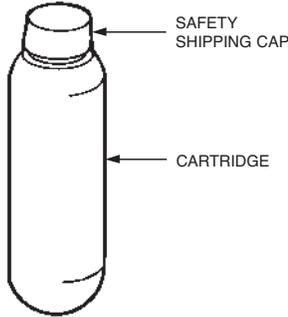


FIGURE 5
000851

MOUNTING BRACKETS

The CHECKFIRE MP-N Detection and Actuation System offers three types of steel mounting brackets.

The first type, Part No. 423525, is a combined bracket for mounting the control module and the pneumatic actuator together. See Figure 6.

The second type, Part No. 423528, is an individual bracket for mounting the control module separate from the pneumatic actuator. Note: When ordering this bracket, it is also necessary to order the pneumatic actuator bracket, Part No. 416828. See Figure 6.

The third type, Part No. 423531, is a retrofit bracket for mounting an MP-N module to any existing CHECKFIRE MP bracket.

All brackets can be fastened by either bolting or welding. Brackets are painted with red enamel paint.

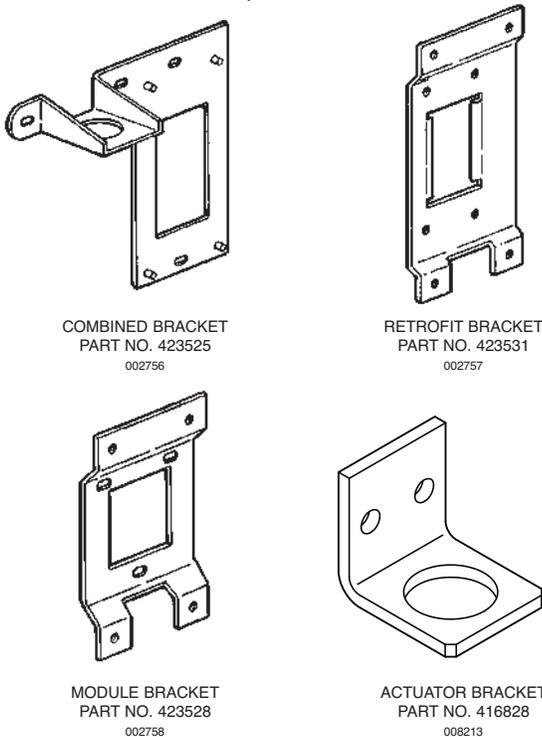


FIGURE 6

LINEAR DETECTION WIRE

The linear detection wire consists of two spring steel conductors which are separated by a heat-sensitive insulator. At the temperature rating of the wire, 356 °F (180 °C), the insulator melts, allowing the two conductors to make contact. This contact provides electrical continuity between the two conductors. The linear detection wire is supplied in lengths of 100 ft. (30.5 m), Part No. 71230, or 500 ft. (152.4 m), Part No. 71231, and must be ordered separately. See Figure 7.

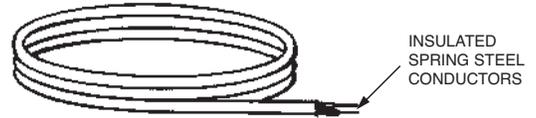


FIGURE 7
000855

THERMAL SPOT DETECTOR

Thermal detectors are normally open, contact closure devices. The fixed temperature design of these detectors will cause the contacts to close when the temperature of the surrounding air reaches the set point temperature of the detector. See Figure 8.

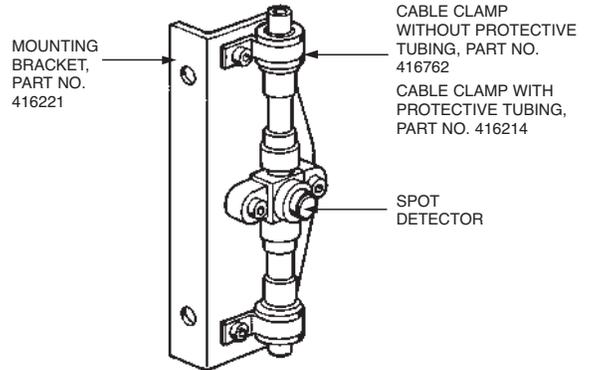


FIGURE 8
000856

Thermal detectors are available in three preset temperatures as shown below. Each temperature rating is stamped on the detector.

Rated Operating Temperature	Maximum Continuous Use Temperature	Color	Detector Part No.
°F (°C)	°F (°C)		
270 (132)	234 (112)	Blue	416218
325 (163)	280 (137)	Red	416219
360 (182)	312 (155)	Red	416220

PNEUMATIC/LINEAR DETECTOR

The pneumatic/linear detector, Part No. 416113, consists of 35 ft (10.7 m) of gas filled stainless steel tubing connected to a small pressure responder. When the gas in the tubing heats up, the increase in pressure operates the responder, thus closing the detection circuit of the control module. The pneumatic/linear detector will operate at a temperature of 900 °F (482 °C) over 12 in. (31 cm) or 300 °F (149 °C) over the total length. The detector assembly connects to the control module by means of a special wire assembly which is supplied with the detector assembly. See Figure 9.

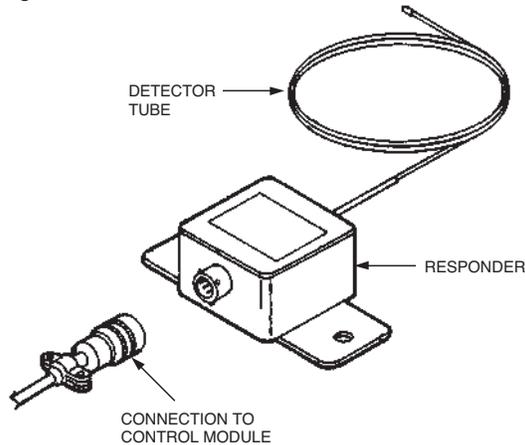


FIGURE 9
000857

BATTERY

The CHECKFIRE MP-N control module uses one 3.6 VDC lithium battery, Part No. 427308. All power required to run the detection system can be provided from this battery. The battery is supplied with two separate plug-in connectors. One connector is used for plugging into MP-N modules and the other connector is used for plugging into SC-N modules. **CAUTION:** Do not cut off unused connector assembly. It must remain on battery module even though it is not used. Simply tuck the extra connector assembly along side the battery module when installing the cover. The battery must be replaced annually, after discharge, or when the **YELLOW Battery LED** and the Audio Alarm are pulsing. Refer to Installation Section (page 19), New Battery Installation, for proper battery replacement procedures. See Figure 10.

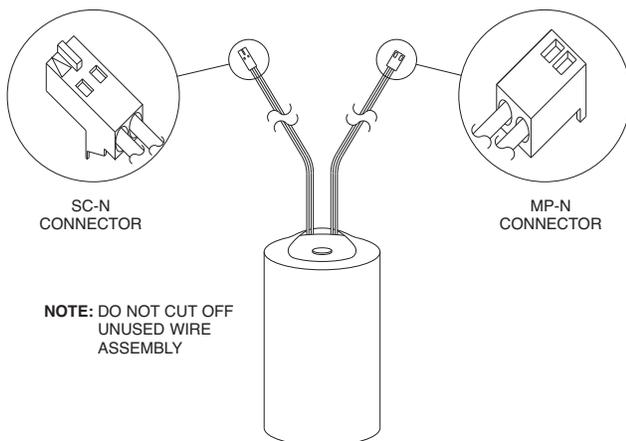


FIGURE 10
004877

END-OF-LINE RESISTOR

The End-Of-Line Resistor Assembly, Part No. 426520, is required for supervision of the external input circuits. The end-of-line resistor assembly is available in a package of 10, Part No. 426461. Each package consists of 10 of the required components to assemble 10 of the resistor assemblies. See Figure 11. The package contains an instruction sheet, Part No. 423542, detailing the assembly requirements.

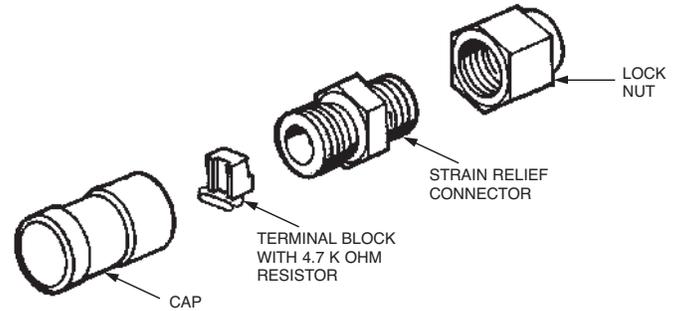


FIGURE 11
003050

CHECK VALVE

The 1/4 in. check valve, Part No. 25627, is installed in the actuation line between the manual/automatic actuator and the pneumatic actuator on the connected fire suppression system. This check valve allows actuation pressure to flow to the fire suppression system, but does not allow pressure from other actuation devices to back up into the manual/automatic actuator of the CHECKFIRE MP-N system. See Figure 12.

Other actuation devices in the fire suppression system also require check valves to be installed in the same fashion. This prevents pressure from escaping through an actuator whose cartridge was inadvertently removed.

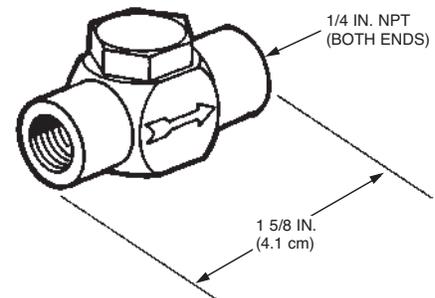


FIGURE 12
000899

RELEASE CIRCUIT TEST MODULE

The release circuit test module, Part No. 423541, is used in place of the gas motor during test procedures to simulate squib actuation or gas motor actuation on CHECKFIRE MP-N systems (indicator lamp on). It is also used when verifying time delay durations. See Figure 13.

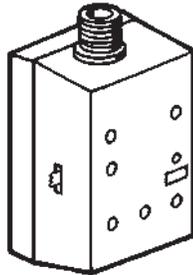


FIGURE 13
003015

SPLICING DEVICE

The In-Line Splice Kit, Part No. 428375, is required for detection wire connection between the control module and the linear detection wire or between separate pieces of linear detection cable.

- ▶ When the splicing device is used in the system, it is recommended to fill the splice body, Part No. 426783, with a high grade of silicone sealant (Dow Corning 737 or equal) to make a proper seal.
- ▶ The kit consists of the necessary number of components to assemble 10 complete assemblies. See Figure 14.

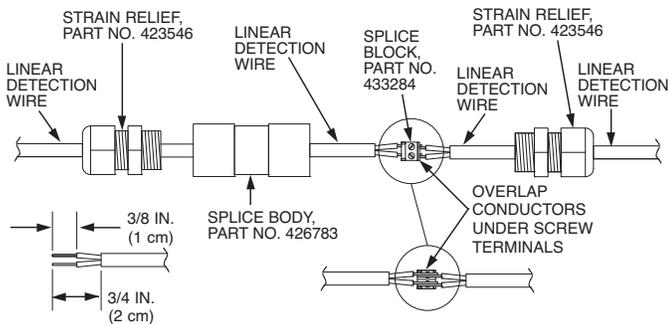


FIGURE 14
007045

EXTENDER CABLE ASSEMBLY/BATTERY EXTENDER CABLE ASSEMBLY

The Extender Cable Assembly, Part No. 426601, is used to conduct functional tests. It, along with the Battery Extender Cable, Part No. 428042, allows separation of the cover from the enclosure while maintaining circuit integrity. See Figure 15.

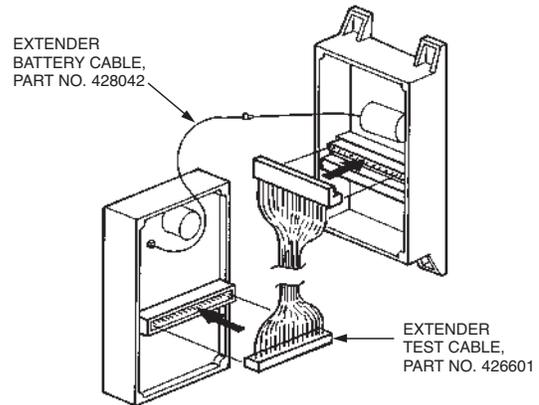


FIGURE 15
002978

RS232 PC INTERFACE CABLE KIT

The RS232 PC Interface Cable Kit, Part No. 423524, is required to field program the MP-N module. The kit contains the cable assembly and programming disc.

USER INTERFACE

This section is designed to give the user overall information on all features and components pertaining to the CHECKFIRE MP-N Control Module itself.

FIELD TERMINATIONS

Terminals 1 and 2 – Not Used

Terminals 3 and 4 – Detection Input Initiating Circuit No. 1

- Cable must be round jacketed, with an O.D. of 0.13 in. to 0.25 in., suitable for the intended usage
- Polarity need not be considered

Terminals 5 and 6 – Initiating Input Circuit No. 2

- Can be set up as either an initiating input circuit to cause a release output or pressure switch feedback input
- When set up for pressure switch feedback input, operation does not discharge system
- Polarity need not be considered
- Cable must be round jacketed, with an O.D. of 0.13 to 0.25 in., suitable for the intended usage

Terminals 7 and 8 – Release Circuit

- Polarity must be considered – Terminal No. 7 (+), Terminal No. 8 (-)
- 15 ft. maximum cable length between control module and pneumatic actuator
- Cable must be round jacketed, with an O.D. of 0.13 to 0.25 in., suitable for the intended usage

Terminals 9, 10, 11, 12 and 13 – Not Used

Terminals 14, 15, 16 – Shut Down Relay

- Cable must be round jacketed, with an O.D. of 0.13 in. to 0.25 in., suitable for the intended usage
- 3 amp maximum load
- Relay specification: 4A 250VAC, 3A 30VDC resistive
- Normally open, normally closed set of contacts
- Form “C” contact arrangement
- Contacts shown in normal condition – No. 14 (N.O.), No. 15 (Common), No. 16 (N.C.)

Terminal Block (see Figure 16)

- Terminal connections are sized for 12 - 24 AWG
- Terminal is labeled from left to right, No. 1 through No. 16
- The terminals are designed as follows:
 1. Not Used
 2. Not Used
 3. + Detection Input
 4. – Detection Input
 5. Initiating Input Circuit No. 2 (+)
 6. Initiating Input Circuit No. 2 (-)
 7. + Release Output
 8. – Release Output
 9. Not Used
 10. Not Used
 11. Not Used
 12. Not Used
 13. Not Used
 14. Shutdown N.O.
 15. Shutdown Common
 16. Shutdown N.C.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
		+	-	+	-	+	-						NO	C	NC

FIGURE 16
 004446

▶ **FRONT PANEL INDICATORS** (See Figure 17)

Battery Trouble (Yellow)

- ▶ The yellow BATTERY LED will pulse once every 10 seconds when the internal battery has reached its low-power threshold. Refer to Installation Section (page 19) for proper battery replacement procedure.

CAUTION

Battery must be replaced when yellow BATTERY LED is flashing. Failure to replace battery will prevent the CHECKFIRE module from activating a discharge. If a fire occurs, there could be personal injury and/or property damage.

Power Normal (Green)

- LED pulses once every 3 seconds when indicating normal power
- The green Power Normal LED pulses “on” once every 3 seconds indicating power is normal. If the power drops below an acceptable level, the green Power LED will be extinguished. Also, the Yellow Battery LED will pulse, indicating trouble.

Alarm (Red)

- The alarm LED will flash if an alarm condition exists. An alarm condition is caused by operation of the detection circuit or operation of the manual pull/pressure switch input circuit. The alarm condition will continue until the source of the alarm is removed and the control module is reset.

DETECTION CIRCUIT NO. 1 ACTIVATION MODE – Upon receipt of an input to the detection circuit, the Alarm LED and the sounder will pulse at a rate of 2 times per second and will continue at this rate until the first time delay period has expired.

After the first time delay, a second time delay mode is initiated. This causes the LED and sounder to pulse at a rate of 4 times per second.

After discharge, the LED and sounder will continue to pulse at a rate of 4 times per second for 30 seconds. After that, it will switch to the trouble mode and pulse once every 10 seconds.

INITIATING INPUT CIRCUIT NO. 2 – When programmed to cause a release, the first time delay mode will be by-passed and the LED will pulse at a rate of 4 pulses per second while the second time delay runs through its timing cycle. After the time delay setting is reached, it will pulse another 30 seconds at the same rate. After that, the control module will go into the post-discharge mode, at which time the Alarm LED and Release LED will pulse at a rate of one pulse per 10 seconds.

PRESSURE SWITCH CIRCUIT (FEED BACK) – When programmed as a pressure switch circuit, the Alarm LED will pulse a minimum of 30 seconds at 4 pulses per second. The control module will then go into the post-discharge mode and the Alarm and Release LED will pulse at a rate of one pulse per 10 seconds.

Detection Trouble (Yellow)

The Yellow Detection Trouble LED and the audio pulse once every 10 seconds when the control module detects a trouble in the detection circuit. The control module will automatically return to normal when the trouble is cleared.

Release Trouble (Yellow)

The Yellow Release LED and the audio will pulse at a rate of once every 10 seconds when a trouble condition is detected in the release circuit. The control module will return to normal when the trouble condition is cleared.

The Release trouble will also pulse after the system has completed a discharge cycle or a pressure switch feed back signal has been received. The trouble signal in this condition is used to indicate a recharge of the fire suppression system is necessary. A Release trouble under either of these conditions can only be cleared by resetting the control module.

Sounder (Audio)

The sounder gives the audio indication for all alarm and trouble outputs. The sounder will pulse at the same rate as the visual corresponding LED.

The sounder gives the audio indications of the various outputs. The sounder is rated at 85 Db at 10 feet.

The pulse rates are as follows:

- Alarm – Time Delay 1 = 2 pulses per second
Time Delay 2 = 4 pulses per second

Trouble – 1 pulse per 10 seconds

Loss of Power – 1 pulse per 10 seconds

Release Circuit Fired – 4 pulses per second for 30 seconds, then 1 pulse per 10 seconds

Low Battery – 1 pulse per 10 seconds

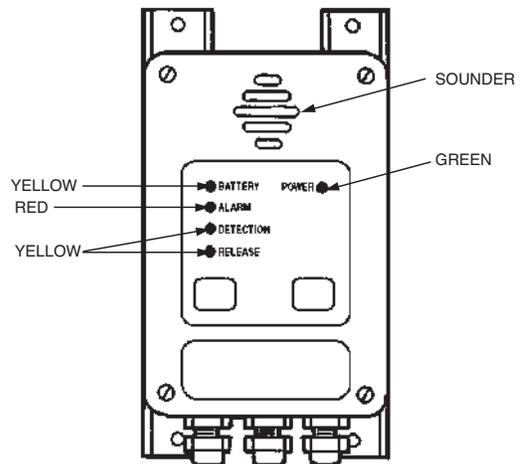


FIGURE 17

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FRONT PANEL BUTTONS (See Figure 18)

Delay

- Pushing the “DELAY” button during the first time delay cycle will restart the time delay cycle. If the second time delay cycle has already started, the “DELAY” button will have no effect.
- The “DELAY” button can also be used to check the diagnostics function. By depressing the delay button when the system is in the trouble condition, the LED’s will flash a pattern code. Each pattern code indicates a certain type of trouble. The code pattern is prioritized. The first trouble must be fixed before addressing the next one. Once the first trouble is taken care of, depressing the “DELAY” button will cause the LED’s to indicate the code for the next trouble, if there is one. When the “DELAY” button is pressed, three short audio and visual indications will acknowledge the switch has been depressed properly.

Reset

- The “RESET” button is used to re-initialize the control panel. When depressed, it provides an indication that all LED’s and the sounder are functional.
- It is used to upload the manual programming into the control module.
- If trouble(s) has not been cleared, the trouble indication will reappear after the RESET button is pressed.
- When the “RESET” button is pressed, three short audio and visual indications will acknowledge the switch has been depressed properly.

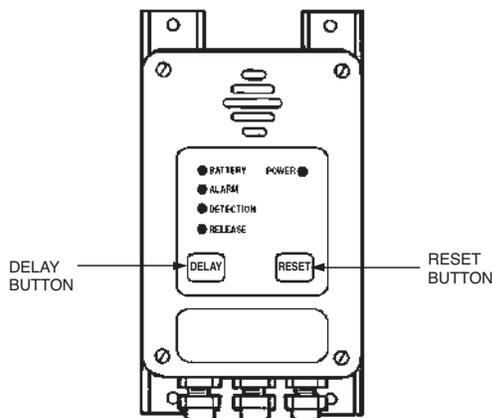


FIGURE 18
0002760

BATTERY CONNECTION

The 3.6 VDC internal lithium battery is connected to the control module by a removable type plug. The battery is supplied with two separate plug-in connectors. One connector is used for plugging into MP-N modules and the other connector is used for plugging into SC-N modules. **CAUTION:** Do not cut off unused connector assembly. It must remain on battery module even though it is not used. Simply tuck the extra connector assembly along side the battery module when installing the cover. The battery must be replaced annually or when the Yellow Battery LED and sounder are pulsing. A label is attached near the battery mounting location for recording the installation date.

CAUTION

Discharged lithium batteries may contain significant amounts of unused energy and should be handled with care. Do not compact for disposal. Before disposal, each battery must be fully discharged and electrically isolated by enclosing in a plastic bag and sealing the bag. Do not dispose of in fire. Check applicable solid waste disposal regulations for proper disposal of more than one battery.

BATTERY REPLACEMENT

- While in use, the battery requires replacement every year or when the Yellow Battery LED and sounder are pulsing. The battery must be replaced only by an authorized ANSUL service representative.
- The battery is held in place by a battery strap requiring a special tool for removal
- The shelf life of the battery is 8 years
- Control Module contains a label for recording battery replacement date
- ▶ • Refer to Installation Section for battery replacement procedure (page 19), New Battery Installation
- Make certain used battery is disposed of properly

ENCLOSURE

- The enclosure is watertight. It meets the requirements of International Standard IEC 529, “Degrees of Protection Provided by Enclosures” for an IP 66 rating

COVER REMOVAL

- The cover is attached with four tamper-proof screws
- When removing and installing cover, make certain seal is always correctly in place and not twisted
- Seal should always be kept clean
- A small amount of silicone lubricant will improve the seals effectiveness.

STRAIN RELIEF INSTALLATION

- Always use Dow Corning 737 RTV Sealant or equal on all strain relief and plug male threads

MOUNTING

There are four types of mounting options available for the CHECKFIRE MP-N Control Module.

- Control Module can be mounted without a bracket. It has molded-in mounting tabs on the back box. Note: Surface must be suitable.
- Control Module can be mounted on a combined bracket which will allow both the module and the manual actuator to be mounted together.
- Control Module can be mounted on its own bracket and the manual actuator can be also mounted on its own bracket.
- Control Module can be mounted to an existing CHECKFIRE MP bracket by the use of a retrofit bracket.

The Control Module should never be mounted in an area which is subject to pressure washing or steam cleaning.

HAZARD IDENTIFICATION

Before the CHECKFIRE MP-N Electric Detection and Actuation System is installed, the hazards to be protected must be identified. These hazard locations determine where the detection wire or thermal detectors and the fire suppression system nozzles are required. While the agent nozzles in existing fire suppression systems will point out the hazard areas, the following information should still be reviewed to best determine detection requirements. If an entire fire suppression/detection system is to be installed, this information is vital in determining proper placement of discharge nozzles and detection devices.

Fire Hazard Definition

A fire hazard is any area where an ignition source (high temperature or sparks) and fuel (flammable materials) may be found in close proximity.

Examples of ignition sources are engines, exhaust piping, turbochargers, battery compartments, electrical system equipment, torque converters, transmissions, hydraulic pumps, parking brakes, and friction from debris packed around parts.

Occasionally other components may reach high temperatures due to malfunction. The potential danger from these components must also be examined during hazard identification. A parking brake left engaged is an example of a potential high temperature source. Temperatures in excess of the detection wire or thermal detector ratings will cause the detection system to activate thereby actuating the fire suppression system.

The above mentioned heat sources can cause fire when they come in contact with flammable materials such as leaking fuel: either broken fuel lines, slow leaks, broken hydraulic lines, or a ruptured fuel tank. Type of Class A materials are part of the vehicle itself such as electric wiring insulation, padding, plastic parts, the packages on the vehicle, or debris due to poor maintenance. These materials can contribute to the rapid buildup or spreading of fire.

Other Considerations

Be aware that the propagation of fire from one area to another may cause a hazard to be larger than originally determined. Liquid fuel may spray, splash, or flow carrying the fire some distance from the starting point. Radiation, sparks, or conduction through metal can carry heat to an area where the danger of fire wouldn't normally exist.

Also, consider the fire history of the equipment being protected or of similar equipment. This information may be available through company records or vehicle operators may have had first hand experience enabling them to identify the locations of previous fires as well as special hazards such as a hydraulic hose that frequently ruptures.

Each hazard that is identified must have both fire suppression system fixed nozzles and detection wire or thermal detectors.

Equipment Shutdown

Another factor to examine is equipment shutdown. Provisions should be made to shut down any components that could possibly add to the intensity of the fire (fuel pumps, hydraulic pumps, engine, etc.) or any components that could possibly re-ignite the fire once it has been suppressed (battery, electrical system). Although a properly installed fire suppression/detection system is the primary means of protecting equipment from fire, an effective fire protection package also includes provisions for equipment shutdown.

The CHECKFIRE MP-N control module contains 3 amp 30VDC shutdown relay contacts to facilitate connection of shutdown devices recommended by the vehicle manufacturer. Example: opening or closing of coolant over-temperature alarm will bring about properly sequenced engine shutdown on many vehicles. Consult vehicle manufacturer for details.

PRE-INSTALLATION GUIDELINES

Before actually installing the CHECKFIRE MP-N Electric Detection and Actuation System, review all of the following information and plan (sketch) the system layout. This will help to avoid any unforeseen installation problems. Once an acceptable layout has been determined, record and keep it for future reference.

Control Module and Actuator Location

1. The control module and manual actuator must be mounted in the cab or control area of the equipment being protected. They must be positioned within arms reach of the operator to enable manual operation of the red strike button on the manual actuator as well as the delay and reset buttons (to extend time delay) on the front of the control module, and close enough so that the internal alarm can be heard.
2. The location must be suitable for bolting or welding if bolting is impractical. The mounting surface must be flat to avoid strain on the mounting bracket. The preferred mounting position is with the CHECKFIRE MP-N control module in an upright position.
3. There must be room enough to allow for proper wiring connection to the control module and to install the actuation line from the fire suppression system to the manual actuator. Also, the module and actuator should be accessible for periodic inspection and maintenance. The components should be mounted in a location that will not interfere with normal equipment maintenance.

NOTICE

The ambient temperature in the mounting environment must not fall below -40°F nor exceed 140°F (-40 to 60°C).

4. The gas motor actuator can be mounted in any convenient location within 10 ft. (3.1 m) of the module, which is not subject to damage or abuse. The gas motor actuator bracket can be welded or bolted to a rigid surface.

Detection Wire Routing

The preferred method for routing linear detection wire is to begin by connecting the detection wire directly to the CHECKFIRE MP-N control module.

Because linear detection wire need only be routed through the hazard area, another acceptable routing method is to use stranded 16 AWG jacketed wiring connected to the control module and routed to the beginning of the hazard area(s). At that point, a splicing device, Part No. 428375, can be used to make the proper connection between the stranded 16 AWG jacketed wire and the start of the linear detection wire. **This method can only be used when the splicing device can be adequately protected from damage and moisture.**

1. The total length of detection wire must not exceed 100 ft. (30.5 m). If possible, it should be run in a single continuous loop. Splices are acceptable when they are kept to a minimum and when they are made in accordance with the splicing technique found on Page 15 of Installation Section.

PRE-INSTALLATION GUIDELINES (Continued)

2. Do not install the linear detection wire within 12 in. (30 cm) of areas which will become extremely hot during operation, such as engine block, exhaust manifolds, turbochargers. etc.
 Note: Maximum installed ambient temperature at the wire location is 221 °F (105 °C).
3. Avoid routing detection wire directly across an opening. Where possible, install detection wire above the hazard area or around the perimeter of a hazard compartment to react to escaping heat. Do not allow struts, frame members, etc. to act as heat shields between the hazard and the detection wire.
4. Avoid areas where the detection wire may be damaged, such as outside the vehicle, near moving parts, in areas where rocks or debris may be thrown by wheels, or in the way of maintenance personnel.
5. To reduce its accessibility to damage, use only as much detection wire as is necessary to cover the hazard area.
6. The minimum bend radius for detection wire must not be less than 2 1/2 in. (65 mm).

Thermal Spot Detector Selection and Placement

Thermal detectors are used when single point detection is required. They are selected by temperature range relative to the hazard temperature. Table 1 indicates the thermal spot detector rated operating temperature required according to the maximum hazard temperatures.

Thermal Spot Detector		Maximum Hazard		Color	Detector Part No.
Rated Operating Temperature °F	(°C)	Temperature °F	(°C)		
270	(132)	234	(112)	Blue	416218
325	(163)	280	(137)	Red	416219
360	(182)	312	(155)	Red	416220

TABLE 1

The placement of thermal spot detectors should be based on the following requirements:

1. They can be wired directly to the control module using approved cable. Cable must have a temperature rating of 392 °F (200 °C) minimum, 16-18 gauge, two conductor with drain, minimum O.D. of 0.230 in. (5.8 mm). Again, placement of the detectors should allow for incoming and outgoing wire connections.
2. Secure the detector with the provided bracket and clamps.

Pneumatic/Linear Detection Tubing

1. When mounting tubing and responder, make certain they are not in areas subject to damage.
2. Avoid routing detection tubing directly across an opening. Where possible, install detection tubing above the hazard area or around the perimeter of a hazard compartment to react to escaping heat. Do not allow struts, frame members, etc., to act as heat shields between the hazard and the detection tubing.
3. The detection tubing assembly is 35 ft (10.7 m) long. If more than 35 ft (10.7 m) is required, additional assemblies can be added. See wiring diagram details on instruction sheet included with each Pneumatic/Linear Detection Shipping Assembly.

System Layout

Once the system components have been selected and their locations have been determined, sketch the layout of the system. This sketch should include the location of the components, as well as the proposed detection wire routing, thermal detector locations, and pneumatic actuation hose routing. Also, indicate areas where the wire must pass through bulkheads so that there is an acceptable routing from one hazard to the next. This sketch should be as precise as possible to avoid any unforeseen installation problems later.

INSTALLATION

Before installing the detection and actuation system, the System Planning portion of this manual should have been reviewed for particular application resulting in a system layout sketch. Always read the procedure before installing each component to become familiar with the correct installation steps as they apply to the particular application and sketch.

NOTICE

For ease of installation, the fire suppression system should be installed before the detection and actuation system.

INSTALLATION MATERIALS

All hardware and tools should be on hand before beginning the installation. Check the Component Index, Page 37, to make certain all necessary system components are available.

Material to be supplied by the installer includes:

- Ample cable ties or 1/4 in. (6 mm) clamps to guide and support the detection wire.
- Non-wire braid hose (1/4 in.) to be used as a protective covering for the detection or power wire at points of securement and when passing through bulkheads.
- Actuation line (1/4 in. hydraulic hose) and fittings to connect the electric detection and actuation system actuator to the fire suppression system. (See applicable ANSUL Fire Suppression Systems installation manual for additional details.)

Tools required to perform the installation include:

- Drill and Drill Bit Set (or welding equipment)
- 1/8 in. Blade Screwdriver
- 1/4 in. Blade Screwdriver
- Phillips Screwdriver
- Standard Sidecutters
- Small Sidecutters (1/4 in. cut)
- Wire Stripper
- Low Wattage Soldering Pencil (35 watt)
- Rosin Core Solder (60/40)
- Rubberized Electrician's Tape

MOUNTING BRACKET INSTALLATION

Three mounting bracket options are available:

- Mounting control module and pneumatic actuator on same bracket
- Separate brackets for control module and pneumatic actuator
- Control module retrofit bracket to existing CHECKFIRE MP bracket

Bolting

1. Using the bracket as a template, carefully mark the location of the bracket mounting holes.
2. Center punch the premarked hole locations and drill 3/8 in. (10 mm) holes through the mounting surface.
3. Secure the bracket to the mounting surface using appropriate length of 5/16 in. (8 mm) bolts with flat washers, lockwashers, and nuts. See Figure 19.

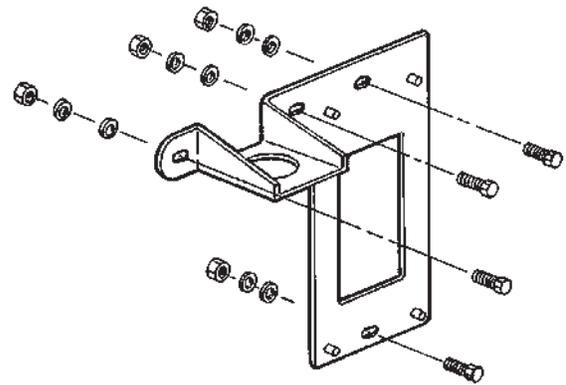


FIGURE 19
002761

Welding

NOTICE

Never weld on the vehicle frame without first consulting the owner and vehicle manufacturer.

1. Carefully mark the location of the bracket.
2. Clean the mounting bracket and mounting surface using a wire brush until clean steel surfaces are available for welding.
3. Secure the bracket to the mounting surface using 1/8 in. (3 mm) fillet welds at the top, bottom, and both sides. See Figure 20.
4. Remove all weld spatter from the bracket and mounting surface.
5. Prime and paint the exposed bare metal of the bracket and mounting surface.

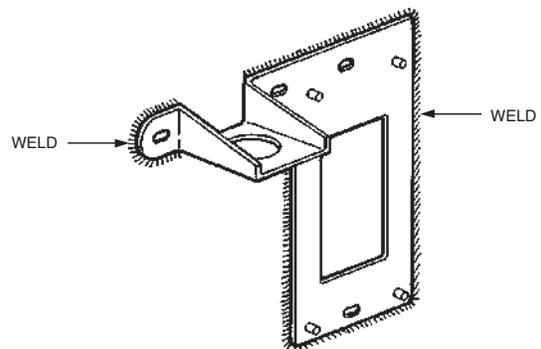
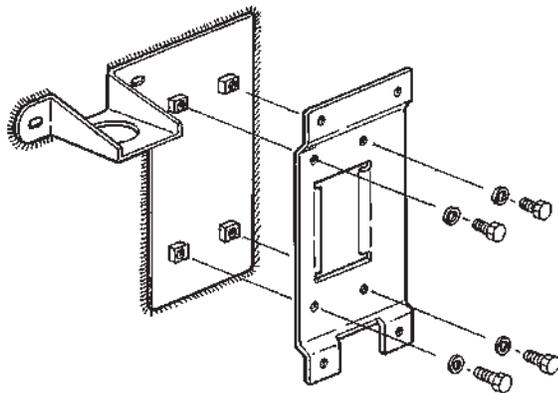


FIGURE 20
002762

MOUNTING TO EXISTING CHECKFIRE MP BRACKET

In some cases, retrofitting to an existing CHECKFIRE SC system may be an option. To accomplish this, use retrofit bracket, Part No. 423531. This bracket can be mounted directly to the existing SC bracket. See Figure 21.



NUTS AND BOLTS INCLUDED WITH RETROFIT BRACKET

FIGURE 21
002763

MANUAL ACTUATOR INSTALLATION

Mounting

1. Remove jam nut from lower threads of actuator and slide actuator through hole in mounting bracket.

NOTICE

Use washer, Part No. 416794, below bracket only.

2. Reinstall jam nut and tighten firmly (see Figure 22).
3. Install ring pin but do not attach seal at this time.

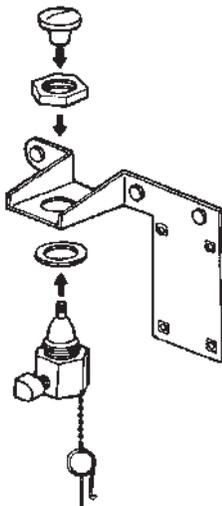


FIGURE 22
003917

Installing The Fire Suppression System Actuation Line

Install 1/4 in. actuation hose from outlet on actuator to pneumatic actuator on fire suppression system using a check valve at the intersection of each actuation device branch. (See Figure 23.)

The CHECKFIRE MP-N System output (using LT-10-R cartridge) can pressurize up to 75 lineal ft (22.8 m) of 1/4 in. actuation line with up to eight agent tanks and/or accessories. Check valves are used to protect against pressure loss if one or more actuator cartridges are removed or damaged; and by isolating each branch line, they reduce the overall lineal length of actuation line.

CAUTION

The fire suppression system could be accidentally actuated causing the release of agent if the gas motor or LT-10-R cartridge is installed at this time. Do not install these components until the appropriate installation step is reached.

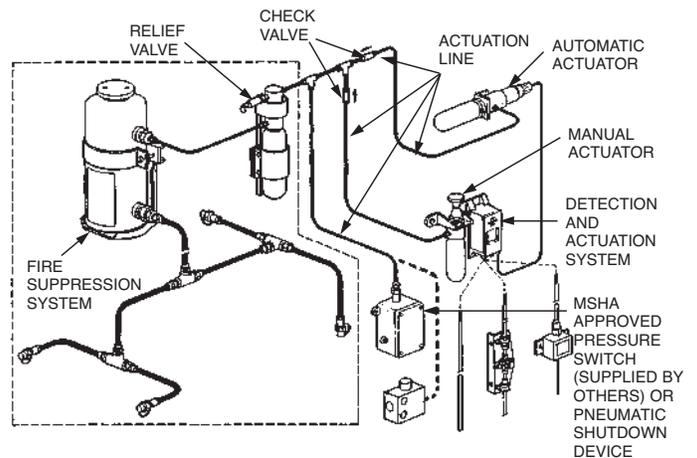


FIGURE 23
003901

MOUNTING THE CONTROL MODULE

The CHECKFIRE MP-N Control Module can be mounted to either a flat, rigid surface or utilizing one of the three bracket options.

If mounting the control module to a flat, rigid surface, use the appropriate fasteners.

If mounting the control module to the MP-N bracket, complete the following steps:

1. With the bracket securely mounted, position the holes in the control module mounting flanges over the threaded studs on the bracket. Using the supplied mounting hardware, securely fasten the control module to the bracket with four lock washers and nuts.
2. If utilizing the MP retrofit bracket, first fasten the retrofit bracket onto the existing MP bracket by using the supplied fasteners. With the MP retrofit bracket securely fastened, position the holes in the control module mounting flanges over the threaded studs and securely fasten.

Remove the cover from the control module. **If the internal 3.6 VDC battery is in place, disconnect the wire plug until the field wiring is complete.**

If the strain relief(s) and plug(s) are not in place, coat the male threads with Dow Corning 737 RTV Sealant or equal and install in holes of module back box.

At this point, the external field wiring can be installed.

GAS MOTOR ACTUATOR ASSEMBLY

Mounting

1. The gas motor must be mounted in a location where it will not be subjected to damage or corrosion.
2. The gas motor can be mounting in either the horizontal or vertical position.
3. It must be mounted within 10 ft (3.1 m) linear cable length of the CHECKFIRE Control Module.

NOTICE

After automatic system actuation, the internal gas motor device must be replaced. Make certain assembly is mounted in an accessible location.

4. Securely mount the actuator bracket, Part No. 54923, either by welding or bolting to a rigid surface.
5. Remove locknut from gas motor body, position body in bracket hole and reinstall locknut. Wrench tighten. See Figure 24. **Note: For proper installation, make certain the gas motor is threaded fully, 6 threads, onto the actuator body and properly secured with the allen head set screw.**

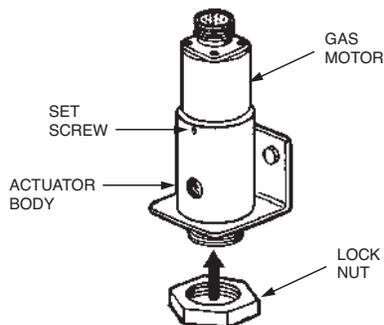


FIGURE 24
003925

CONTROL MODULE WIRING/DETECTION WIRE ROUTING

Mounting

1. Using the system layout sketch, investigate each point where the wire will be secured to the vehicle. Keep in mind all the guidelines in the System Planning Section. Do this on a vehicle that has been operated recently to avoid securing the wire too close to extremely hot components.
2. After the vehicle has cooled, loosely route the wire from the start of the hazard throughout the proposed path through the hazard areas. If splicing is required, see Splicing, Page 16, for detailed information.
3. Secure the detection wire by completing the following steps: See Figure 25.
 - a. Start at the beginning of the detection wire leading into the hazard area. Secure the detection wire every 12 to 18 in. (30 to 45 cm) using black nylon cable ties, Part No. 56691, and protective coverings, Part No. 56692, at points of securement. Secure more often if necessary. Attach the wire to mounting surfaces, decks, struts, etc., always keeping System Planning guidelines in mind.

NOTICE

The minimum bend radius for detection wire must not be less than 2 1/2 in. (64 mm).

CAUTION

Detection wire must never be routed through a hole or near sharp edges without being properly protected. Failure to protect the wire from being cut or abraded could cause it to short, causing a false discharge.

- b. Secure the wire at least once immediately before it passes through a hole in a vertical or horizontal surface. At the hole, a 1/4 in. (6 mm) rubber sleeve, Part No. 56692, or a special grommet to fit the hole should be used to protect the wire from wear due to vibration. If the rubber sleeve might slide from under the cable tie and off the wire, tape the rubber sleeve to the wire using electrician's tape to keep it from sliding (see Figure 25). This hose protection should also be used at locations where the wire would rub against other hard surfaces, rough edges, or sharp corners.

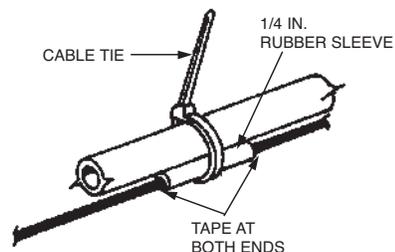


FIGURE 25
000872

**CONTROL MODULE WIRING/DETECTION WIRE ROUTING
(Continued)**

Splicing

If possible, the detection wire should be run in a continuous piece. However, if splices are required, they must be made using the following technique. See Figure 26.

The CHECKFIRE In-line Splice Kit, Part No. 428375, is used to make splices of the linear detection cable. It can also be used to make the transition splice from non-detection cable to linear detection cable.

The splice kit consists of Part No. 426783 plastic splice bodies, Part No. 423546 plastic water-tight strain reliefs, and Part No. 433284 splice block. Each kit contains enough of each component to make up ten (10) complete assemblies.

When used with the proper size smooth round jacketed cable, the splice will provide an IEC IP68 level of protection against water intrusion. Additional protection is provided by filling the splice body cavity with Dow Corning 737 sealant (or equal), and also applying the sealant to the threaded connections of the strain reliefs during assembly.

Specifications:

- Allowable cable outside diameter: 0.08 in. (2 mm) minimum, 0.24 in. (6.1 mm) maximum
- Acceptable wire size: 22 AWG (0.0253 in. (0.6 mm) diameter) to 18 AWG (0.0403 in. (1 mm) diameter)
- UL Recognized, CSA Certified Strain Reliefs

To properly make a detection circuit splice, the following steps should be completed:

1. Remove 3/4 in. (19 mm) of the wire outer jacket, exposing the internal Mylar wrap.
2. Remove 3/4 in. (19 mm) of the wire mylar wrap, being careful not to damage the internal heat sensitive conductors.
3. Strip 3/8 in. (10 mm) of heat sensitive insulation from the inner conductors, leaving 3/8 in. (10 mm) of insulation on each.
4. Loosen the compression nut of the strain relief assembly and slide the assembly over the end of the wire as shown in Figure 26. On the same wire end, slide the splice body onto the wire.
5. On the opposite wire, repeat Steps 1-3, then loosen the compression nut on another strain relief assembly and slide that assembly onto the wire.
6. Insert splice block on end of one set of exposed wires. Wires must be inserted far enough into splice block to protrude out the opposite side.
7. Insert other set of exposed detection wire through the opposite side of the splice block, again making certain that they protrude out the opposite side.
8. Tighten screws on splice block.
9. Once splice block assembly is completed on both sets of wire ends, apply Dow Corning 737 sealant (or equal) to strain relief threads going into the splice body.
10. Securely tighten the strain relief into the splice body. **Note:** Do not tighten compression nut unto wire at this time.

11. Slide splice body assembly near splice block. Fill splice body approximately 3/4 full with Dow Corning 737 sealant and pull splice body assembly over splice block so splice block is located approximately half way inside splice body. This operation should result in the splice block being enclosed in the sealant.
12. Fill remainder of splice body cavity with the sealant.
13. Apply Dow Corning 737 sealant to the thread on the unattached strain relief lock nut and thread this strain relief assembly unto the splice body.
14. With a wrench on both strain relief locks, simultaneously tighten both ends.
15. Complete assembly operation by securely tightening the strain relief onto the detection wire.

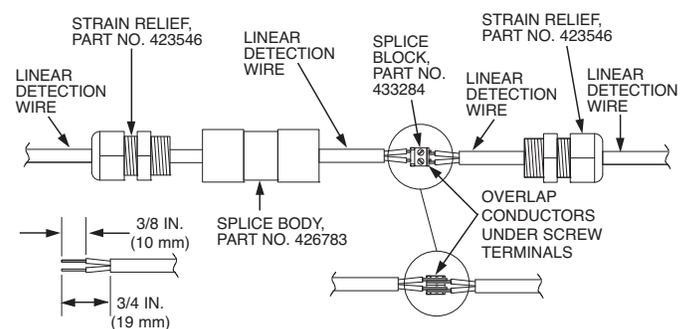


FIGURE 26
007045

Wiring

Once the detection wire has been routed and secured in the hazard area, complete the following steps:

1. Install an end of line resistor assembly, Part No. 426520, to the far end of the detection wire. To properly attach the E.O.L. Resistor assembly, complete the following steps (see Figure 26a):
 - a. Strip 1 in. (25 mm) of outer jacket off the linear detection wire or the spot detection cable.
 - b. Strip 1/4 in. (6 mm) of insulation off the two internal wires.
 - c. Loosen the lock nut on the strain relief connector and slide both lock nut and connector over end of wire.
 - d. Loosen screws on terminal block, insert bare wires, and securely tighten screws.
 - e. Apply a small amount of Dow Corning 737 sealant or equal on male threads of strain relief connector.
 - f. Screw E.O.L. cap to strain relief connector.
 - g. Tighten lock nut onto detection wire.
 - h. Secure E.O.L. cap to support device (by others) using a nylon cable tie, Part No. 56991.

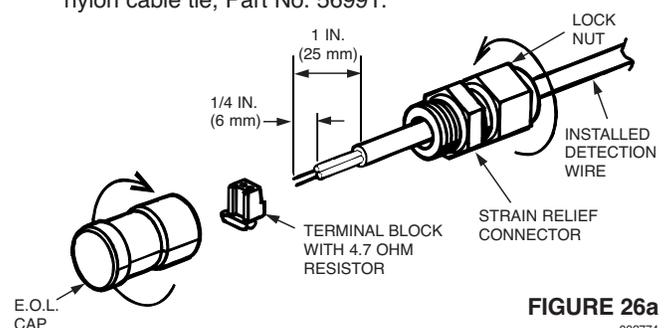


FIGURE 26a
002774

**CONTROL MODULE WIRING/DETECTION WIRE ROUTING
(Continued)**

Wiring (Continued)

2. Route the detection wire through a strain relief at the bottom of the MP-N control module, to the terminal strip in the control module. Make certain wire is not exposed to damage. See Figure 27.
3. On the terminal block at the control module, install the wires to terminals No. 3 and 4. See Figure 27. **Note:** It is not necessary to be concerned about polarity when installing these wires.

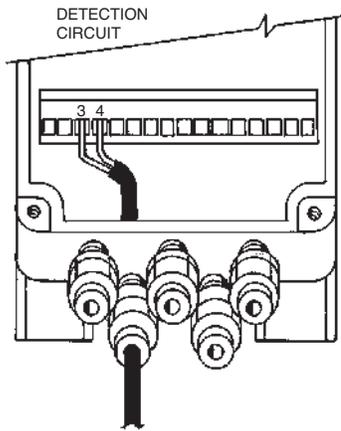


FIGURE 27
002765

Thermal Detector Installation

When installing the ANSUL spot detectors, use only components approved by ANSUL. These components consist of the following:

- Mounting Bracket Shipping Assembly, Part No. 416221 – Consists of one mounting bracket.
- Detector Clamp Package Shipping Assembly, Part No. 416214 (for use with protective tubing) – Consists of (2) cable clamps, (2) 1/4-20 x 1/2 in. socket head screws, (4) flatwashers, (2) spacers, and (2) 1/4-20 x 5/8 in. socket head screws.
- Detector Clamp Package Shipping Assembly, Part No. 416762 (for use without protective tubing) – Consists of (2) cable clamps, (2) 1/4-20 x 1/2 in. socket head screws, (4) flatwashers, and (2) 1/4-20 x 5/8 in. socket head screws.
- Detector Connector Package Shipping Assembly, Part No. 416213 – Consists of (2) connector housings, (6) pins, and (2) heat shrinkable sleeves.
- Protective Tubing Shipping Assembly, Part No. 416215 – Consists of 100 ft (30.5 m) of tubing.
- Multi-Conductor Cable, Part No. 417055 – Cable must be purchased by installer and must have a temperature rating of 392 °F (220 °C) minimum, 16-18 gauge, two conductor with drain, minimum O.D. of 0.230 in. (5.8 mm).
- AMP crimping tool, Part No. 416784.

To properly install the thermal detector, complete the following:

1. Secure the mounting bracket(s) near the hazard. Make certain the bracket does not shield the detector from the heat or flame.
2. Attach the correct temperature range spot detector to the bracket using (2) two flatwashers and (2) two 1/4-20 x 5/8 in. socket head screws supplied in detector clamp package. See Figure 28.

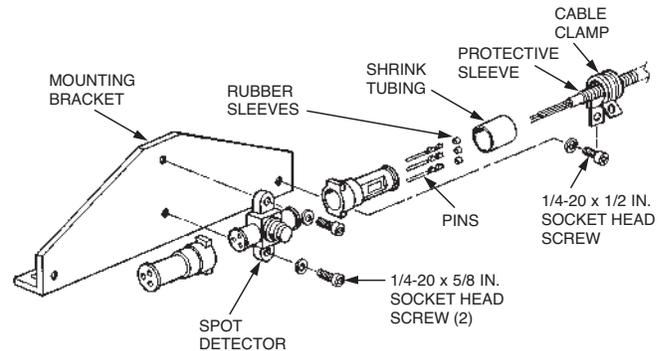


FIGURE 28
000875

3. Starting at the ANSUL CHECKFIRE Control Module, measure and route the cable to the first detector. **Note:** If protective tubing is to be used, make certain cable is run through it between each detector.
4. The circuit cable is 3 conductor. It consists of two insulated wires and one bare ground wire. Cut all wires equal in length and strip the outer jacket and inner sheath back 1 1/4 in. (32 mm). **Note:** Make certain not to cut into the insulation on the two insulated wires or cut into the bare ground wire. See Figure 28.
5. With the outer jacket and sheath cut back, strip the insulation on the two inner wires 1/4 in. (6 mm). See Figure 29.
6. Slide the rubber sleeves from the AMP connector over the 3 wires. The small end of the sleeves must be toward the striped end of the wires. See Figure 29.
7. Slide a piece of heat shrinkable tubing onto the cable. See Figure 29.
8. Crimp the pins onto all three wires, using AMP crimping tool, AMP part No. 90277-1. See Figure 29. This tool is required for proper crimping. It can be purchased through your local electronics distributor or is available through ANSUL as Part No. 416784.
9. Press the pins into the connector housing. The two insulated wires go into holes 2 and 3 and the bare ground wire goes into hole 1. Make certain each locks into place. The bare ground wire must go into hole 1 but it makes no difference which of the two insulated wires goes into hole 2 or 3. See Figure 29.
10. Press the rubber sleeves into the connector holes.
11. Fit the heat shrinkable tubing over the connector so it covers approximately 3/8 in. to 1/2 in. (9 mm to 13 mm) of the connector. Heat the tubing with an approved heat gun, shrinking the tubing onto the connector and cable to form a tight, waterproof fit. See Figure 29.

**CONTROL MODULE WIRING/DETECTION WIRE ROUTING
 (Continued)**

Thermal Detector Installation (Continued)

12. Coat the O-ring(s) on the detector(s) with silicon grease, then snap the connector onto the mounted detector and secure cable to detector bracket using appropriate cable clamp and 1/4-20 x 1/2 in. socket head screw supplied in detector cable clamp package shipping assembly.

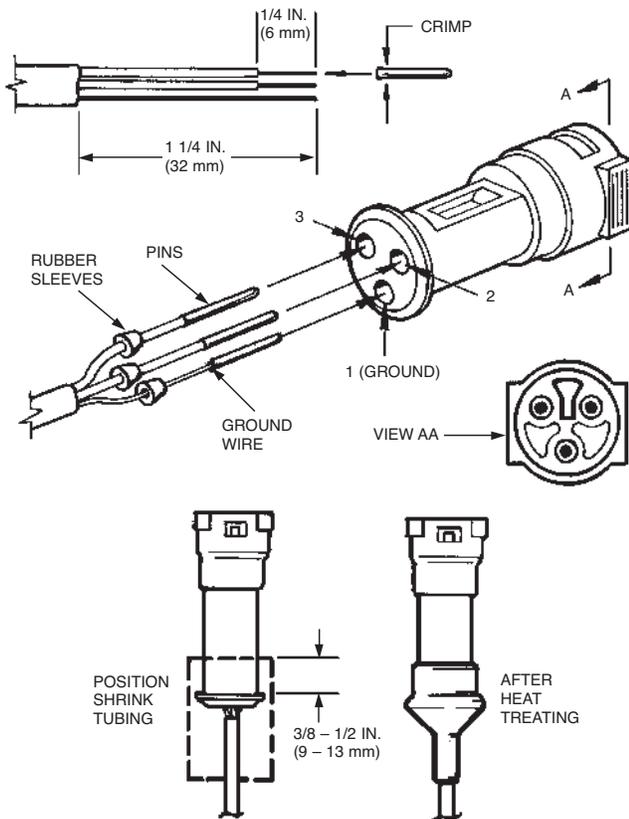


FIGURE 29
 000876

13. Complete this process on each detector in the system.
14. Attach the ground wire to the vehicle ground. Do this by mounting a sealed junction box in a convenient, protected location. The box must be mounted to a rigid support. Run the detection circuit cable to the box and attach to grounding screw. See Figure 30.
15. Attach the end-of-line resistor assembly, Part No. 426520. See Figure 30. See instruction sheet included with end-of-line resistor shipping assembly for detailed assembly information.

16. Run cable to the terminal strip at the control module. Make certain cable is not subject to damage. Install cable to terminals 3 and 4.

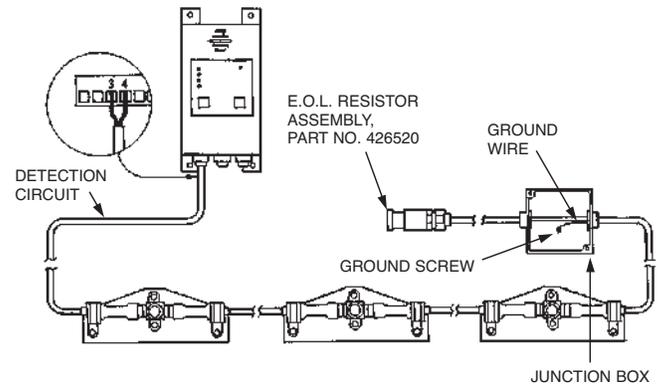


FIGURE 30
 002766

CONTROL MODULE WIRING/DETECTION WIRE ROUTING (Continued)

Pneumatic/Linear Detector Installation

The pneumatic/linear fire detection system, Part No. 416113, is a Systron Donner Model 808-DRV. This detection system is completely compatible with the ANSUL CHECKFIRE MP-N control module.

Each detection system is shipped with a detailed Installation, Maintenance Manual.

When installing the pneumatic/linear detection system to an ANSUL CHECKFIRE MP-N control module, use connector/cable assembly, Part No. 416216, and install per Figure 31.

Note: Attach end-of-line resistor assembly by following the detailed steps listed on the instruction sheet included with the end-of-line resistor shipping assembly.

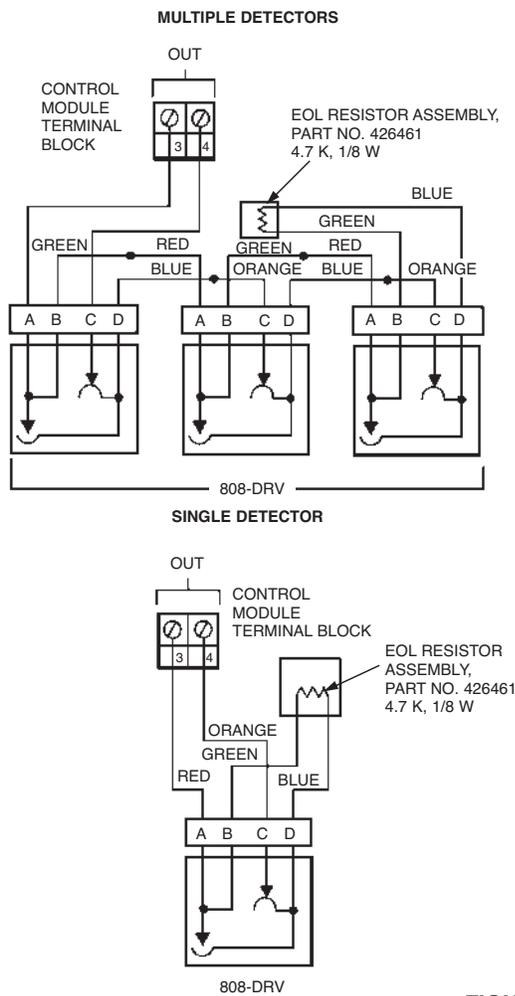


FIGURE 31
001059

INITIATING INPUT/PRESSURE SWITCH INPUT CIRCUIT NO. 2

The pressure switch feedback function provides a positive feedback that a discharge has occurred. It also initiates shutdown functions and control module alarms regardless of the type of actuation, either automatic or manual.

Initiating input circuit/pressure switch input circuit must be wired to Terminals 5 and 6 on the control module terminal strip. The pressure switch circuit must also have an end of line resistor assembly, Part No. 426461, installed in the circuit. See Figure 32.

Note: If pressure switch/electric pull station circuit is not used, a 4.7 k ohms resistor must be connected across terminals 5 and 6 inside the control module.

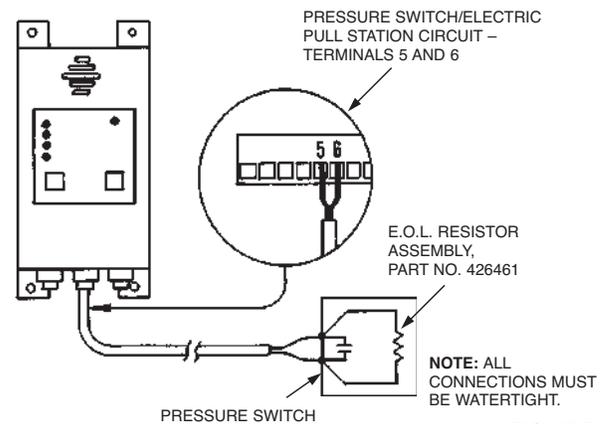


FIGURE 32
002769

RELEASE CIRCUIT LEAD CONNECTOR

Release circuit connector cable assembly, Part No. 416129, is supplied with the CHECKFIRE MP-N shipping assembly (Part No. 416354). The cable assembly is precut to 10 ft (3.1 m) to reach between the actuator assembly and the control module.

⚠ CAUTION

Do not attach release circuit connector to live gas motor actuator at this time. If gas motor actuator is connected, the gas motor could be actuated accidentally during installation.

1. Locate the release circuit connector end of the assembly at the gas motor actuator. Route the cable from that location, through the strain relief, to the terminal strip at the control module. See Figure 33.
2. Leaving a little slack, cut off excess cable.
3. Strip the internal wires approximately 1/4 in. (6 mm) and securely fasten the black/white leads to Terminal 7 and the red/green leads to Terminal 8 on the control module. See Figure 33.

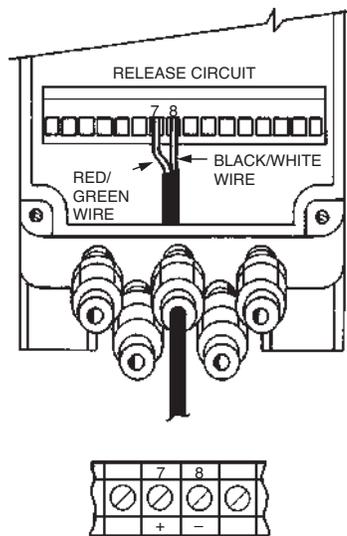


FIGURE 33
002767

4. Attach the release circuit tester, Part No. 423541, to the gas motor connector cable. This will be required when performing the functional test.

Shutdown Device Connection

1. Install the shutdown device in accordance with manufacturer's instructions. Also check with vehicle manufacturer to make certain the appropriate shutdown device is being used. The relay contact ratings are 3 amp @ 30 VDC resistive. Only MSHA approved intrinsically safe circuitry may be connected to shutdown contacts.
2. Terminals 14 (NO), 15 (C), and 16 (NC), are the shutdown relay terminals on the control module. The ends of stranded wire should be tinned with 60/40 rosin core solder, using a low wattage soldering pencil, before connection to the control terminals.

Note: Use 0.13 to 0.25 in. diameter round jacketed cable to maintain water tight integrity.

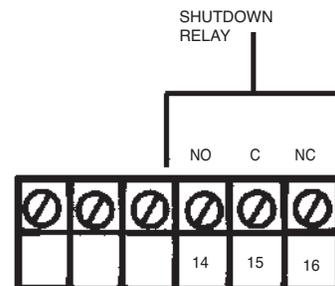


FIGURE 34
000870

NEW BATTERY INSTALLATION

A new 3.6 VDC Lithium Battery, Part No. 427308, must be properly installed into a CHECKFIRE MP-N module. The following installation instructions apply to modules with Firmware V1.05 or greater (the Firmware version can be found on the serial number label, located on the inside front cover above the green terminal strip.)

⚠ CAUTION

These instructions are for installation of a new battery only. If a partially used battery has been removed during recharge, inspection, or maintenance, and will be re-installed, do not press and hold the DELAY and RESET buttons. Improper re-installation of a partially used battery will eventually prevent the CHECKFIRE module from activating a discharge leaving the vehicle and personnel unprotected. If a fire occurs, there could be personal injury and/or property damage.

⚠ CAUTION

Battery must be replaced when yellow BATTERY LED is flashing. Failure to replace battery will prevent the CHECKFIRE module from activating a discharge. If a fire occurs, there could be personal injury and/or property damage.

⚠ CAUTION

Failure to follow these instructions will result in system malfunction.

CAUTION

The battery is supplied with two separate plug-in connectors. One connector is used for plugging into MP-N modules and the other connector is used for plugging into SC-N modules. Do not cut off unused connector assembly. It must remain on battery module even though it is not used. Simply tuck the extra connector assembly along side the battery module when installing the cover.

CAUTION

Contact your local waste management company for information concerning the correct disposal of lithium batteries.

Note: If the CHECKFIRE module does not have a battery installed, skip to step 3.

1. Open cover and remove the 3.6 VDC lithium battery requiring replacement (see Figure 34a). Check applicable solid waste disposal regulations for proper disposal of lithium batteries. Do not discard battery in fire or general waste disposal.

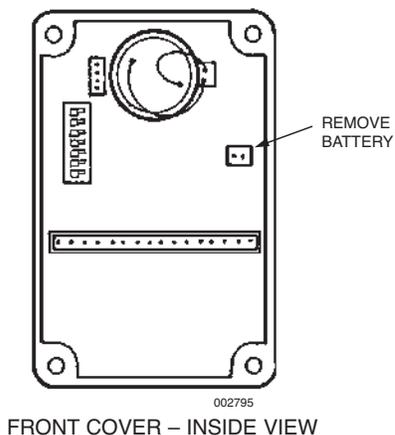
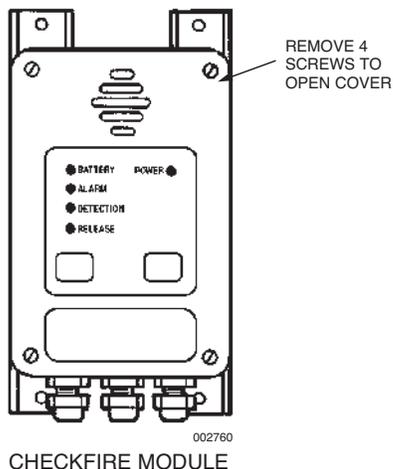


FIGURE 34a

2. The MP-N power circuitry may hold a residual charge even after battery removal. Allow the module to remain unpowered for at least 30 seconds to ensure all residual charge has dissipated from the circuitry.

3. Record the new battery replacement date on the label near the battery or on the battery itself.
4. Prior to installing the new battery, press and hold the DELAY and RESET buttons simultaneously, as shown in Figure 34b.

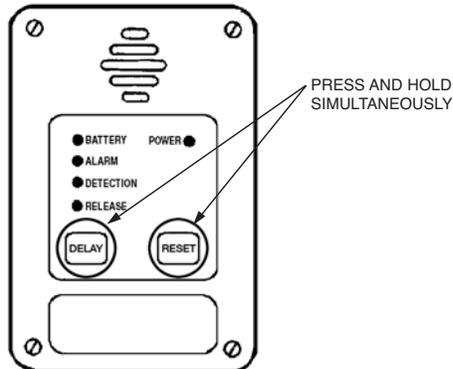


FIGURE 34b
009026

5. Plug the new battery into the inside cover of the module while continuing to hold the DELAY and RESET buttons, see Figure 34c.

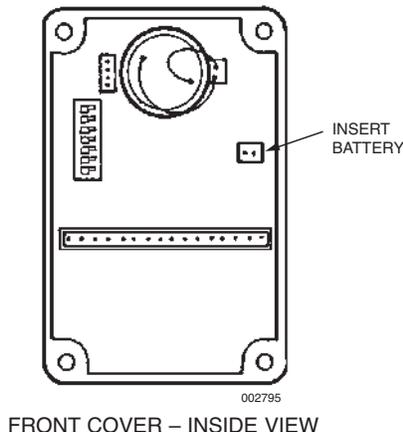
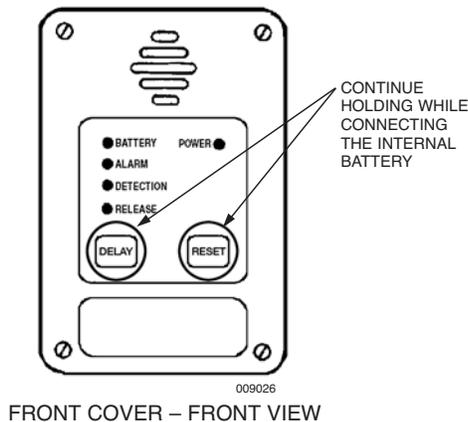


FIGURE 34c

6. Continue holding the DELAY and RESET buttons while the module powers up (3 beeps while all LEDs are on). When ONLY the green POWER LED remains flashing, the DELAY and RESET buttons may be released, see Figure 34d.

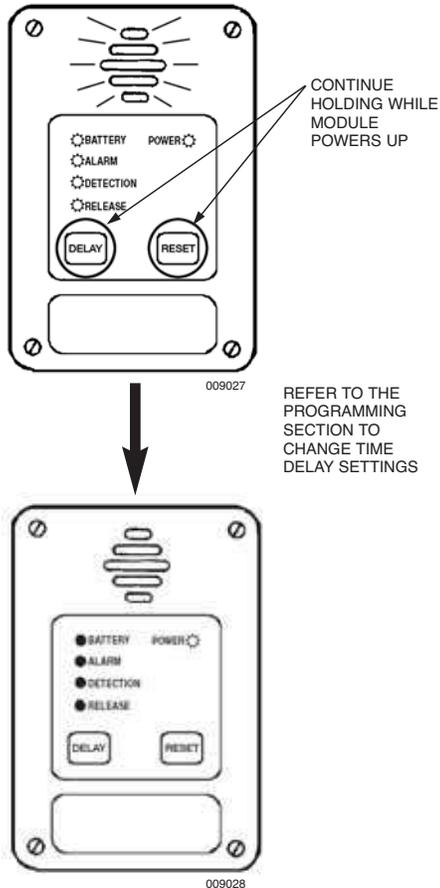


FIGURE 34d

Note: If the BATTERY LED continues flashing, perform the following procedure:

- a. Remove the internal battery
 - b. Allow the module to remain unpowered for at least 30 seconds
 - c. Follow steps 4 through 6.
7. Re-install the cover, making sure the cover seal is clean and correctly in place (not twisted). A small amount of silicone lubricant will improve the seal effectiveness.

FUNCTION TEST

Before conducting the following FUNCTION TEST, connect the internal battery to the front cover using the battery extender cable assembly, Part No. 426604, and connect the Extender Test Cable Assembly, Part No. 426601, to the terminal strip inside the back box and the mating terminal strip inside the cover. (The Extender Test Cable Assembly allows separation of the cover from the back box while maintaining circuit integrity.)

Depress the "RESET" button on the control module. This will set the module to normal. Reset will be acknowledged by the control module with short pulses from the sounder.

At this point, the GREEN Power LED should be the only LED pulsing.

CAUTION

When performing any of the functional tests, make certain the release circuit tester, Part No. 423541, is attached to the gas motor connector.

The following tests will verify that the system will operate upon receiving an electrical signal from a detection device (simulated fire condition) or when actuated using an electric pull station. The accuracy of the time delay setting(s) will also be verified during this test. If the system is connected to a vehicle shutdown device, the vehicle should be left running during this test to verify that the shutdown device is functioning. If noted results are not attained, refer to the Troubleshooting Section of this manual for corrective action.

Detection Circuit Functional Test

NOTICE

Before conducting the functional test, each time delay setting must be known.

Before conducting the functional test, remove the module cover and install the extender cable(s). Then, using a digital Ohmmeter, measure the resistance between terminals 3 and 4 with the detection wire connected. The resistance value should read approximately 4.7K ohms. This will verify the circuit is intact and the end-of-line resistor is connected.

1. Using a short length of insulated wire stripped at both ends, hold one end of the wire to Terminal 3 and hold the other end to Terminal 4. See Figure 35.

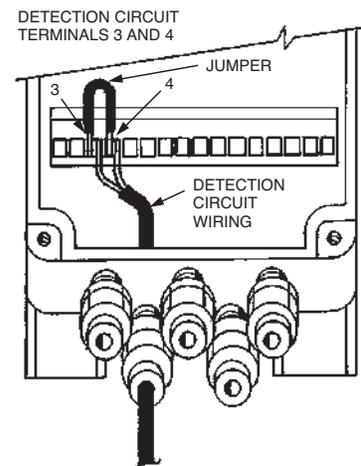


FIGURE 35

002770

Hold the wire on the terminals for a time which is shorter than the time programmed in for the first time delay.

The following will take place while the jumper wire is being held on the terminals:

- The RED Alarm LED and sounder will pulse at a rate of two times per second
- The first time delay cycle will start
- The alarm relay will activate (non-latching)

FUNCTION TEST (Continued)

1. (Continued)

After verifying the above, remove the jumper wire. The control module will reset to normal (as long as the cycle for Time Delay No. 1 has not been exceeded). Normal is when only the GREEN Power LED is pulsing and no other LED's or the Audio Alarm are operating. Also, the alarm relay will return to normal.

2. This next test will verify the settings of the time delays. Again, hold the jumper wire on Terminals 3 and 4. Continue to hold the jumper wire on these terminals until the second time delay has started. Once the second time delay has started, the jumper wire can be removed.

The following will take place while the jumper wire is being held on the terminals:

- The RED Alarm LED and sounder will pulse at a rate of two times per second
- The first time delay cycle will start and time through its cycle
- The alarm relay will activate (non-latching)

After the first time delay has completed its cycle, the following will take place:

- The RED Alarm LED and sounder will pulse at a rate of four times per second
- The second time delay cycle will start and time through its cycle
- The alarm relay will activate (latching)
- The shut-down relay will activate (latching), causing vehicle shutdown

- ▶ At the end of the second time delay cycle, the release circuit (gas motor) will activate, causing the GREEN LED on the release circuit tester to illuminate.
- ▶ 3. After the jumper wire has been removed, reset release circuit test module by pressing the reset button on the tester. Do not disconnect the test module at this time.
- 4. Push the "RESET" button on the CHECKFIRE MP-N control module and the module will return to the normal condition.
- 5. If required, make certain to reset any auxiliary shutdown devices.

Initiating Circuit No. 2

Initiating circuit No. 2 can be programmed as an initiating input circuit, which will cause a release to occur, or as a pressure switch feedback input circuit, which will not cause a release to occur. If programmed as an initiating input circuit, two options are available. The first option allows the circuit to be programmed for immediate release and the second option allows for shutdown/time delay/release. If choosing the shutdown/time delay/release option, the programming will also require a length of time delay to be chosen.

Before conducting the functional test, remove the module cover and install the extender cable(s). Then, using a digital Ohmmeter, measure the resistance between terminals 3 and 4 with the detection wire connected. The resistance value should read approximately 4.7K ohms. This will verify the circuit is intact and the end-of-the-line resistor is connected.

Immediate Release Option

1. Using the jumper wire, hold the wire on Terminals 5 and 6. This is the pull station circuit. If the circuit was programmed for immediate release, the following will take place:
 - The RED Alarm LED and the sounder will pulse at a rate of four times per second
 - The alarm relay will operate (latching)
 - The shutdown relay will operate (latching)
 - ▶ • The release circuit (gas motor) will activate, causing the GREEN LED on the release circuit tester to illuminate
 - ▶ 2. Reset release circuit test module by pressing the reset button on the tester. **Do not disconnect the test module at this time.**
 - 3. Push the "RESET" button on the CHECKFIRE MP-N Control Module and the module will return to the normal condition.
 - 4. If required, make certain to reset any auxiliary shutdown devices.

Shutdown/Time Delay/Release Option

1. Using the jumper wire, hold the wire on Terminals 5 and 6. This is the pull station circuit. If the circuit was programmed for shutdown/time delay/release, the following will take place:
 - The RED Alarm LED and sounder will pulse at a rate of four times per second
 - The alarm relay will operate immediately (latching)
 - The shutdown relay will operate immediately (latching)
 - A single time delay cycle will start (during test, verify length of delay)
 - ▶ After the single time delay cycle is completed, the release circuit (gas motor) will actuate, causing the GREEN LED on the release circuit tester to illuminate.
 - ▶ 2. Reset release circuit test module by pressing the reset button on the tester. **Do not disconnect the test module at this time.**
 - 3. Push the "RESET" button on the CHECKFIRE MP-N Control Module and the module will return to the normal condition.
 - 4. If required, make certain to reset any auxiliary shutdown devices.

Pressure Switch Option

1. Using the jumper wire, hold the wire on terminals 5 and 6. This is the pressure switch circuit. The following will take place:
 - The alarm relay will operate (latching)
 - The shutdown relay will operate (latching)
 - The RED alarm LED and the sounder will pulse at a rate of four times per second.
2. Push the "RESET" button on the CHECKFIRE MP-N Control Module and the module will return to the normal condition.
3. If required, make certain to reset any auxiliary shutdown devices.

PLACING THE SYSTEM IN SERVICE

After all testing has been successfully completed, the system may be placed in service.

NOTICE

Record installation date on label inside control module enclosure before securing cover.

1. Confirm cover seal is clean and correctly in place (not twisted). A small amount of silicone lubricant will improve the seal effectiveness. Set cover in place so that screws line up with enclosure. (Battery module must be installed with retaining strap secured.)

NOTICE

Cover should fit in place easily. Do not force cover into position. Make certain wires are not pinched between cover and enclosure.

2. Secure front cover to enclosure using the four captive screws.
3. Remove gas motor wire connector from test module and connect to gas motor assembly.

NOTICE

When gas motor wire connector is removed from test module, the control module yellow release LED and audio alarm will temporarily pulse. This will stop when wire connector is reconnected to gas motor.

4. Push "reset" button on CHECKFIRE MP-N control module to reset system. Reset has been acknowledged by the control module when the sounder emits three rapid beeps and the LEDs all illuminate.

⚠ CAUTION

The fire suppression system will discharge dry chemical if the cartridge is installed when operating the strike button. Make sure cartridge is not installed at this time.

Pull ring pin and push strike button on manual actuator several times to ensure smooth movement.

5. Install LT-10-R cartridge into manual actuator by completing the following steps (Figure 36):
 - a. Make certain puncture pin is fully retracted and insert ring pin through actuator body into puncture pin shaft. Attach visual inspection seal, Part No. 197.
 - b. Remove shipping cap and weigh cartridge before installation. Replace if weight is 1/4 ounce (7.1 g) or more below weight stamped on LT-10-R cartridge (Shipping Part No. 423423).

- c. Screw cartridge into actuator body and hand tighten.

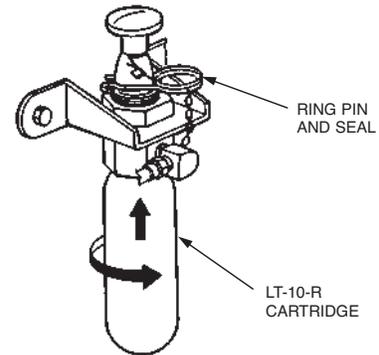


FIGURE 36
003943

6. Install LT-10-R cartridge into gas motor actuator by completing the following steps:
 - a. Make certain puncture pin is fully retracted. See Figure 37.
 - b. Remove shipping cap and weigh cartridge before installation. Replace if weight is 1/4 ounce (7.1 g) or more below weight stamped on LT-10-R cartridge (Shipping Assembly Part No. 423423).
 - c. Screw cartridge into actuator body and hand tighten.

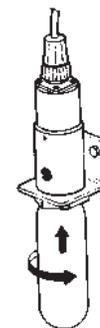


FIGURE 37
003944

7. If a vehicle shutdown device is not used, affix the "WHEN FIRE ALARM SOUNDS" nameplate (Label No. 71086) in the operator's line of vision. (See Figure 38.)

WHEN FIRE ALARM SOUNDS
THIS VEHICLE IS EQUIPPED WITH AN AUTOMATIC FIRE DETECTION, ALARM, AND SUPPRESSION SYSTEM. WHEN FIRE ALARM SOUNDS, BRING EQUIPMENT TO A SAFE STOP, SHUT OFF ENGINE, AND EXIT.
TO MANUALLY OPERATE: PULL RING PIN AND STRIKE RED PALM BUTTON ON ACTUATOR.

LABEL NO. 71086

FIGURE 38

PLACING THE SYSTEM IN SERVICE (Continued)

Shutdown/Time Delay/Release Option (Continued)

8. If a vehicle shutdown device is installed and the shutdown time delay is being used, complete the following steps: See Figure 39.
 - a. Affix the "IN CASE OF FIRE" nameplate, Part No. 79060, near the operator's line of vision.
 - b. Using Label No. 79404, cut along the dotted line to remove the required number square.
 - c. Peel the protective backing from the number square to expose the adhesive.
 - d. Place the number square on the space provided in the third sentence of Label No. 79060: "THIS VEHICLE WILL AUTOMATICALLY SHUTDOWN AFTER ____ SECONDS"

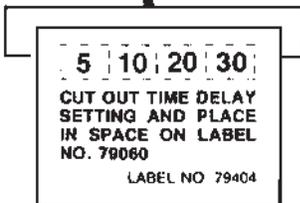
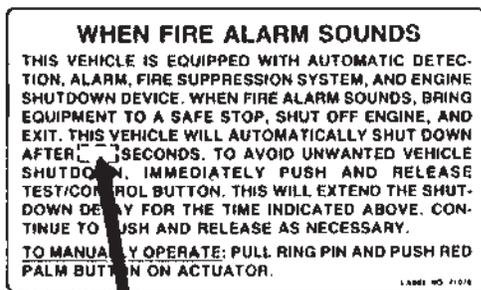


FIGURE 39
000886

9. If a vehicle shutdown device is NOT installed, affix the "WHEN FIRE ALARM SOUNDS" nameplate, Part No. 71086, near the operator's line of vision. See Figure 40.

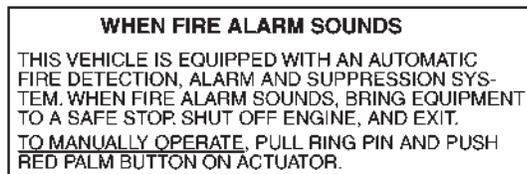


FIGURE 40
000887

Read these precautions carefully until they are clearly understood. All equipment operators or anyone who has any responsibility for the equipment should fully understand how the CHECKFIRE MP-N Detection and Actuation System operates. Every operator should be fully trained in these procedures.

1. When the system alarm sounds, bring the equipment to a safe controlled stop, shut off the engine, and exit. (Equipment left running may add fuel to the fire or reignite the fire with heat or sparks.)

Automatic Equipment Shutdown – The CHECKFIRE MP-N system is equipped with a shutdown relay and time delay. If a shutdown device is connected to the system, all responsible personnel should understand shutdown device operation and the length of the time delay (in seconds). If the DELAY button (on the control module cover) is pushed and released before the end of the shutdown time delay period, the time delay will automatically repeat itself. This delay can be repeated (using the DELAY button) as many times as is necessary to stop the vehicle safely before it shuts down. (The DELAY button can also be held in indefinitely to delay shutdown – the shutdown delay will then restart after the button is released.)

The CHECKFIRE MP-N system can utilize an explosion-proof pressure switch for shutdown. If the pressure switch is connected to the system, all responsible personnel should understand shutdown device operation and the length of the time delay (in seconds). If the delay/reset button (on the control module cover) is pushed and released before the end of the pre-alarm time delay period, the time delay will automatically repeat itself. This delay can be repeated (using the delay/reset button) as many times as is necessary to stop the vehicle safely before it shuts down. (The delay/reset button can also be held in indefinitely to delay shutdown – the pre-alarm delay will then restart after the button is released.)

2. Move away from the equipment taking a hand portable extinguisher along if possible.
- 3.

⚠ WARNING

In case of fire, evacuate area to lessen risk of injury from flames, heat, hazardous vapors, explosions, or other hazards that may be created.

Stand by with a hand portable extinguisher to guard against any fire that may reignite after the fire suppression system has been discharged. Remain alert until the equipment cools and the possibility of reignition is no longer a threat.

Manual System Actuation

The system can be actuated manually by pulling the ring pin and striking the red button on the manual/automatic actuator as shown in Figure 41. Again, bring the equipment to a safe stop, shut off the engine, manually actuate the system, move a safe distance from the vehicle, and stand by with a hand portable extinguisher.

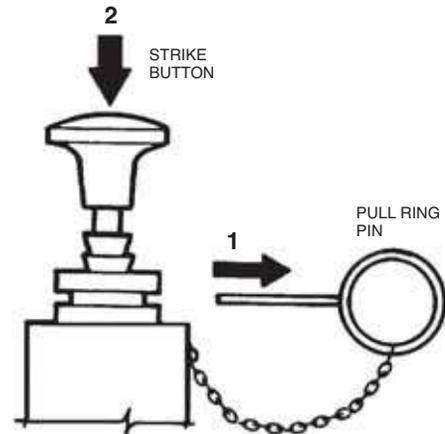


FIGURE 41
002773

RECHARGE

For continued protection, the CHECKFIRE MP-N Detection and Actuation System and the fire suppression system must be recharged immediately after operation.

1. Loosen screws and remove cover from control module.
2. Remove battery module from enclosure and properly discard. Battery must be replaced after each discharge.
3. Remove the empty LT-10-R cartridge from the manual actuator or the automatic gas motor.
4. If system was manually actuated – skip steps 5-6, and proceed to step 7.
5. If system was automatically actuated – remove the empty LT-10-R cartridge from the gas motor actuator. Do not install cartridge at this time.
6. Unscrew threaded connector on top of gas motor actuator. Replace gas motor and clean and lubricate actuator by completing the following steps: See Figure 42.
 - a. Loosen allen head set screw which is locking gas motor onto gas motor actuator. Use 3/32 in. allen wrench.
 - b. Unscrew discharged gas motor and discard.

NOTICE

When gas motor is removed, puncture pin may pop up, out of actuator body.

- c. Remove puncture pin and spring from actuator body. It may be necessary to push pin from bottom to overcome "O" ring friction.
- d. Clean inside of actuator with a dry, soft cloth. Also, lubricate "O" ring with a good grade of silicone grease.
- e. Reinstall spring and puncture pin in actuator body. Push pin down until bottom of pin is flush with bottom of actuator body.
- f. Thread new gas motor, Part No. 416756, unto top of actuator and secure with allen head set screw. **Note: For proper assembly, the new gas motor must be threaded fully, 6 threads, onto the actuator body and properly secured with the allen head set screw.**

NOTICE

When gas motor is installed onto actuator body, bottom of puncture pin must be flush with bottom of body, ± 1/16 in. (1.6 mm).

- g. Reattach thread connector to gas motor thread. Hand tighten.

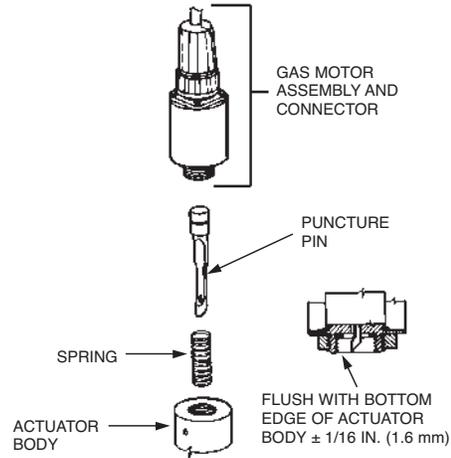


FIGURE 42
003945

7. Disconnect detection wire (or thermal detector leads) from the control module as follows:
 - a. Loosen screws at terminals 3 and 4 of detection/output module.
 - b. Loosen strain reliefs on detection wire.
 - c. Slide the detection wire (or thermal detector leads) out of the control module.
 - d. If damaged, remove entire length of detection wire (or thermal detector leads), cutting cable ties at points of securement.
 - e. If thermal detectors are used, remove and replace any that are damaged.
8. If detection wire is used, install an entire new length by referring to Detection Wire Routing, Pages 14-16.
9. If spot detectors are used, install any replacement detectors and all interconnecting wire by referring to Thermal Detector Installation, Pages 16-17. If pneumatic/linear tubing is used, refer to instructions included with shipping assembly.
10. Reset any auxiliary shutdown or alarm equipment in accordance with manufacturer's instructions
- ▶ 11. Install new battery, Part No. 427308, in module. Refer to New Battery Installation, Page 19. Record date of installation.
12. Recharge the fire suppression system in accordance with the corresponding manual.
13. Test the system and place into service by completing the procedures on Pages 21 through 24 (Function Test, and Placing the System in Service).
14. Record date of recharge on a tag or in permanent record file. Notify operating personnel that the system is back in service.

INSPECTION AND MAINTENANCE

To ensure the CHECKFIRE MP-N Electric Detection and Actuation System will operate as intended, proper inspection and maintenance procedures must be performed at the specified intervals.

DAILY INSPECTIONS

The equipment operator must check the system daily by visually verifying that the GREEN power LED is flashing and no other LED is illuminated. Also, no audio alarm should be sounding. If any other conditions exist, contact the local authorized ANSUL distributor or whoever has been trained and authorized by ANSUL to perform inspection and maintenance checks.

MAINTENANCE

To give maximum assurance that the system will operate as intended, maintenance must be performed at six-month intervals or sooner depending on the operating environment. Maintenance should be performed by an authorized ANSUL distributor or someone who has been trained and authorized by ANSUL to perform maintenance checks.

1. Check all mounting bolts for tightness or corrosion.
2. **Remove** the LT-10-R cartridge from the manual/automatic actuator, install shipping cap, and set aside in a safe location.

CAUTION

Cartridge must be removed before continuing with the following steps or accidental system actuation will take place when gas motor is actuated.

3. Remove the connector lead from the gas motor.
4. Hand tighten the lead connector onto the test module, Part No. 423541.
5. Inspect the detection and interconnecting wiring as follows:
 - a. Check for wear due to vibration at penetrations, around corners, etc.
 - b. Check for damage from direct impact or other abuse.
 - c. Check for tightness at points of securement. Make certain fasteners have not come loose which would allow the wire to sag or shift.
6. If thermal detectors are used, check that they are securely mounted and have not corroded or been damaged.

NOTICE

If a vehicle shutdown device is installed, the vehicle should be running at this time to verify that the device is functioning properly.

7. Before conducting the functional test, remove the module cover and install the extender cable(s). Then, using a digital Ohmmeter, measure the resistance between terminals 3 and 4 with the detection wire connected. The resistance value should read approximately 4.7K ohms. This will verify the circuit is intact and the end-of-line resistor is connected.

8. **Check first time delay – Alarm to Shutdown** – Using a short length of insulated wire stripped at both ends, hold one end of the wire to Terminal 3 and the other end to Terminal 4 on the control module. See Figure 43.

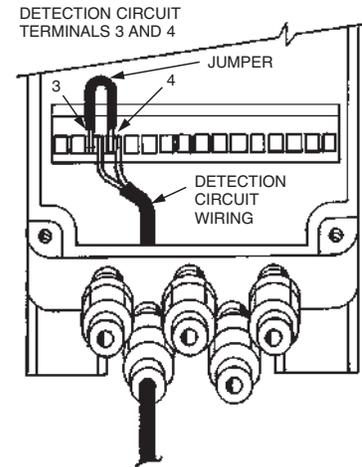


FIGURE 43

002770

Using a jumper wire, temporarily short Terminals 3 and 4, removing the jumper before the end of the first time delay cycle. This will test the non-latching function of the first time delay. While the wire is being held in place, the RED Alarm LED will pulse and the sounder will operate.

Remove the jumper wire. At this point, both the RED Alarm LED and the sounder will stop pulsing and the first time delay will recycle back to zero. The control module will return to normal with only the GREEN Power LED on.

9. **Check second time delay – Shutdown to Discharge** – Once again, hold the wire on Terminals 3 and 4. The RED Alarm LED and the Audio Alarm will pulse. Hold the wire on the terminals for a period longer than what the first time delay is set up for. While holding the wire on the terminals, time the length of the first time delay to verify that it is the same as what it was set for.

At the end of the first time delay cycle, the pulse rate of the Audio Alarm will change. This will start the cycle of the second time delay. At this point, the timing cycle is latched, and the wire jumper need not be held on the terminals. Also at this point, the shutdown relay will operate, causing the vehicle to shutdown.

Time the length of the second time delay to confirm that it is the same as what has been set.

When the second time delay cycle is completed, the release circuit will activate causing the GREEN LED on the test module to illuminate.

10. Reset test module by pressing the reset button on the tester. Do not disconnect test module at this time.
11. After making sure that the control module is reset and operating in a normal non-alarm non-trouble mode, remove the gas motor actuator cable from the tester and connect to gas motor assembly. **Note: For proper assembly, the new gas motor must be threaded fully, 6 threads, onto the actuator body and properly secured with the allen head set screw.**

MAINTENANCE (Continued)

12. **Yearly** – Remove control module cover screws and replace internal 3.6 VDC lithium battery, Part No. 427308.

 **CAUTION**

The battery is supplied with two separate plug-in connectors. One connector is used for plugging into MP-N modules and the other connector is used for plugging into SC-N modules. Do not cut off unused connector assembly. It must remain on battery module even though it is not used. Simply tuck the extra connector assembly along side the battery module when installing the cover.

- ▶ Refer to Installation Section for New Battery Installation instructions, Page 19.
- ▶

Record date of new battery installation on label located near battery. Reinstall control module cover and depress “RESET” button.

 **CAUTION**

Contact your local waste management company for information concerning the correct disposal of lithium batteries.

13. Reinstall LT-10-R cartridge, Part No. 423423, by completing the following steps:
- a. Make certain puncture pin is fully retracted and insert ring pin through actuator body into puncture pin shaft. Attach visual inspection seal, Part No. 197.
 - b. Remove shipping cap and weigh cartridge before installing. Replace if weight is 1/4 ounce (7.1 g) or more below weight stamped on LT-10-R cartridge. (Shipping Part No. 423423).
 - c. Screw cartridge into actuator body and hand tighten.
14. Reset any auxiliary shutdown and alarm equipment in accordance with manufacturer’s instructions.
15. Record date of maintenance on an affixed tag or in a permanent record file.

DIAGNOSTICS

The diagnostics feature offers a means to pinpoint various trouble symptoms by displaying a flashing code on the control module status LED's.

If there is more than one trouble at a time, the system will display them in a pre-set priority.

In multiple trouble situations, the first trouble must be cleared before the system will display the next one.

The system must be in the trouble mode in order to display the diagnostics codes.

With the system in the trouble mode, depress the "DELAY" button. With the "DELAY" button depressed, the trouble codes will be indicated on the LED's.

LED Code

Trouble

▶ Yellow Battery LED flashing	Internal battery requires replacement
▶ Yellow Release LED flashing	Release circuit is open
Yellow Release LED flashing Red Alarm LED flashing	Release circuit has operated
Yellow Detection LED flashing	Detection circuit is open
Yellow Detection LED flashing Red Alarm LED flashing	Initiating input circuit No. 2 is open

HISTORY BUFFER

The CHECKFIRE MP-N control module is programmed to record faults, alarms, and programming changes in a numerical sequence. The module will store approximately 55 recorded events (when software v4.11 is installed). If the number of events exceeds 55, the earlier events will be erased to make room for the later ones.

A sample History Buffer screen appears as follows:

Event	dddd:hh:mm:ss	Description
▶ 0	0000:00:00:32	Programmed
▶ 1	0000:00:01:46	Detection TD1 Initiated
2	0000:00:01:52	Delay Engaged
3	0000:00:02:15	Delay Released
▶ 4	0000:00:02:25	Detection TD2 Initiated
▶ 5	0000:00:02:35	Release Initiated
▶ 6	0000:00:05:10	Manual Reset
7	0000:00:05:13	All Clear
▶ 8	385:12:24:32	Internal Battery Low
▶ 9	405:20:32:07	Internal Battery Fault

The recorded event indicates which circuit had a fault or an alarm recorded. Along with the type of fault or alarm, the history buffer also records the time, relative to the last time the module was powered up. New events are recorded by days: hours: minutes: seconds that have transpired from the last time the module was powered up. If power is removed and then restored, the counter starts over at 0000:00:00:00; however, previous history will remain until deleted manually.

▶ Below is a listing and explanation of each type of recorded history event:

All Clear: The module is free of any fault or alarm conditions.

Amp-Hours Limit Exceeded*: Indicates that the charge drawn off the battery has exceeded the recommended limit. The battery must be serviced immediately. (Ver. 4.11 only)

Amp-Hours Reset*: Charge accumulator has been successfully reset to zero. (Ver. 4.11 only)

Bad Checksum: Indicates that an error has been detected in the E-Prom. If this occurs, the factory default program settings are restored.

Delay Engaged: Indicates the delay button has been depressed during TD1 of an alarm condition.

Delay Released: Indicates the time the Delay button was released after initiating.

Detection Circuit Fault: Indicates an open circuit in the detection circuit.

Detection TD1 Initiated: Indicates the Time Delay 1 sequence has been initiated. This occurs as a result of operation of the detection circuit.

Detection TD2 Initiated: Indicates the start of the Time Delay 2 sequence as a result of a detection input.

Int Bad Log: Indicates an error has been detected in the datalog. If this occurs, the datalog is automatically cleared and reset.

Internal Battery Fault: Indicates that the internal battery voltage has dropped below the minimum operating threshold or the battery has been disconnected.

Internal Battery Low: Indicates the internal battery voltage has dropped below a "Normal" threshold level and requires replacement.

Manual Fault: Indicates an open in initiating input circuit No. 2 or pressure switch circuit.

Manual Reset: Indicates the Reset button has been depressed. The clock is not reset during a soft reset.

Manual Time Delay: Indicates the start of the time delay as a result of the initiating input No. 2 input circuit being initiated.

Pressure Switch: Indicates activation of the pressure switch input circuit.

Programmed: Indicates the unit is programmed or a programming change has been made using the PC programming option.

Release Circuit Fault: Indicates an open in the gas motor circuit or the gas motor has fired.

Release Initiated: Indicates the control module has fired the gas motor.

Switch Enabled: Indicates the manual programming switch is enabled and the program settings are being taken from the program switch settings.

Unknown: Indicates an unexplainable event in the control module circuitry.

▶ * Software V4.11 only

TROUBLESHOOTING TABLE

The following table designates normal operating and trouble conditions for the CHECKFIRE MP-N Detection and Actuation System.

<u>Condition</u>	<u>Green Power Normal</u>	<u>Yellow Power Fault</u>	<u>Red Alarm</u>	<u>Yellow Detection Fault</u>	<u>Yellow Release Fault</u>	<u>Audio Alarm</u>	<u>Alarm Relay</u>	<u>Shutdown Relay</u>	<u>Trouble Relay</u>	<u>Agent Release</u>
battery normal module normal	pulsing once every 3 seconds	off	off	off	off	off	normal	normal	normal	off
battery normal detection fault	pulsing once every 3 seconds	off	off	pulsing once every 10 seconds	off	pulsing once every 10 seconds	normal	normal	transferred	off
battery normal release fault	pulsing	off	off	off	pulsing once every 10 seconds	pulsing once every 10 seconds	normal	normal	transferred	off
battery normal detection fault release fault	pulsing	off	off	pulsing once every 10 seconds	pulsing once every 10 seconds	pulsing once every 10 seconds	normal	normal	transferred	off
battery fault module normal	off	pulsing once every 10 seconds	off	off	off	pulsing once every 10 seconds	normal	normal	transferred	off
battery fault detection fault	off	pulsing once every 10 seconds	off	pulsing once every 10 seconds	off	pulsing once every 10 seconds	normal	normal	transferred	off
battery fault release fault	off	pulsing once every 10 seconds	off	off	pulsing once every 10 seconds	pulsing once every 10 seconds	normal	normal	transferred	off
battery fault detection fault release fault	off	pulsing once every 10 seconds	off	pulsing once every 10 seconds	pulsing once every 10 seconds	pulsing once every 10 seconds	normal	normal	transferred	off
alarm detected alarm to shutdown period – TD1	pulsing once every 3 seconds	off	pulsing twice every	off	off	pulsing twice every second	transferred	normal	normal	off
detection fault initiating circuit No. 2 fault release fault battery normal	pulsing once every 10 seconds	off	off	pulsing once every 10 seconds	pulsing once every 10 seconds	pulsing once every 10 seconds	normal	normal	transferred	off
battery fault detection fault manual pull circuit fault	off	pulsing once every 10 seconds	off	pulsing once every 10 seconds	off	pulsing once every 10 seconds	normal	normal	transferred	off
initiating circuit No. 2 activated pre release period (manual release time delay)	pulsing once every 3 seconds	off	pulsing 4 times per second	off	off	pulsing 4 times per second	transferred	transferred	normal	off

TROUBLESHOOTING TABLE (Continued)

<u>Condition</u>	<u>Green Power Normal</u>	<u>Yellow Power Fault</u>	<u>Red Alarm</u>	<u>Yellow Detection Fault</u>	<u>Yellow Release Fault</u>	<u>Audio Alarm</u>	<u>Alarm Relay</u>	<u>Shutdown Relay</u>	<u>Trouble Relay</u>	<u>Agent Release</u>
pressure switch activated (0 to 30 seconds after activated)	pulsing once every 3 seconds	off	pulsing 4 times per second	off	off	pulsing 4 times per second	transferred	transferred	normal	off
pressure switch activated (post 30+ seconds period)	pulsing once every 3 seconds	off	pulsing once every 10 seconds	off	pulsing once every 10 seconds	pulsing once every 10 seconds	transferred	transferred	transferred	off
shutdown to release period (2nd time delay)	pulsing once every 3 seconds	off	pulsing 4 times per second	off	off	pulsing 4 times per second	transferred	transferred	normal	off
0 - 30 seconds after release	pulsing once every 3 seconds	off	pulsing 4 times per second	off	off*	pulsing 4 times per second	transferred	transferred	transferred	fired
30+ seconds after release	pulsing once every 3 seconds	off	pulsing once every 10 seconds	off	pulsing once every 10 seconds	pulsing once every 10 seconds	transferred**	transferred	transferred	fired
initiating circuit No. 2 battery normal	pulsing once every 3 seconds	off	off	pulsing once every 10 seconds	off	pulsing once every 10 seconds	normal	normal	transferred	off
initiating circuit No. 2 detection fault battery normal	pulsing once every 3 seconds	off	off	pulsing once every 10 seconds	off	pulsing once every 10 seconds	normal	normal	transferred	off
initiating circuit No. 2 detection fault release fault battery normal	pulsing once every 3 seconds	off	off	pulsing once every 10 seconds	pulsing once every 10 seconds	pulsing once every 10 seconds	normal	normal	transferred	off
initiating input circuit No. 2 circuit activated (0-30 seconds after system activation)	pulsing once every 3 seconds	off	pulsing 4 times per second	off	off*	pulsing 4 times per second	transferred	transferred	transferred	fired
pressure switch activated detection fault (30+ seconds after system activation)	pulsing once every 3 seconds	off	pulsing once every 10 seconds	transferred	transferred	transferred	off			

* Will pulse if circuit opens as a result from release

** Can be silenced at this time

PROGRAMMING

The MP-N control module can be manually programmed by using the manual programming switch located on the control module PC board or it can be programmed from a PC through an RS-232 interface cable.

A number of settings can be programmed into the MP-N control module:

- Select initiating circuit No. 2 to operate as either an initiating input circuit or pressure switch feedback circuit
- If selected as an initiating input circuit, it can be programmed as either shutdown/immediate release or shutdown/time delay/release
- Alarm to Shutdown (Time Delay 1) can be programmed for 5, 10, 20, 30 seconds
- Shutdown to Release (Time Delay 2) can be programmed for 0, 10, 20, 30 seconds

The MP-N control module is factory programmed with the following defaults:

- First time delay (Alarm to Shutdown) = 10 seconds
- Second time delay (Shutdown to Release) = 10 seconds
- Initiating Input Circuit = Pressure Switch Feedback
- Manual Programming Switch = Disabled

NOTICE

If factory preset time delay periods are to be extended, consider the lag time between fire ignition and automatic initiation when using thermal detection. Consequently, extending one or more time delay periods will likely extend the fire burn time.

If the factory defaults are acceptable, no additional programming is required. However, the factory program is only active if the manual programming switch is disabled.

Manual Programming Switch

The manual programming switch is a PC board mounted, switch package containing 7 switches. See Figure 44. To manually program the MP-N control module, each individual switch must be set in the correct position.

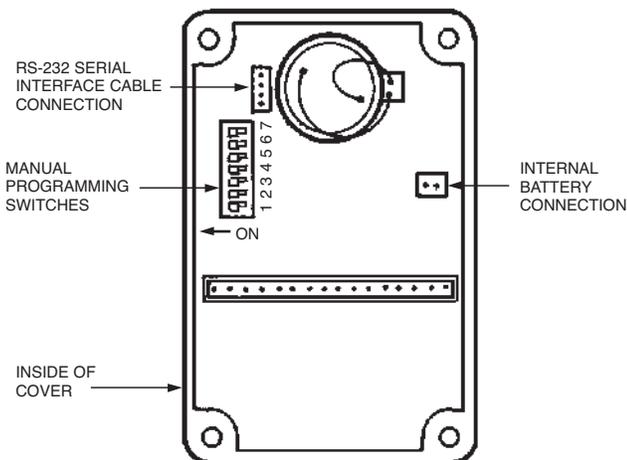


FIGURE 44
002795

NOTICE

Do not remove see-through cover on manual programming switch (see Figure 44). Switch position(s) can be moved by using a blunt, not sharp, object. Do not damage switch cover.

Switch No. 1

If this switch is ON (Enable), it enables manual programming through the manual programming switch. If switch No. 1 is on, the operation of the control module will correspond to the settings of the other manual programming switches

If this switch is OFF (Disable), the operation of the control module will correspond to the settings of the PC program.

SPECIAL NOTE

This switch must be ON in order to manually program the control panel.

Switch No.2

This switch is used to select initiating circuit No. 2 to operate as either an initiating input circuit or a pressure switch feedback

ON = Pressure Switch Feedback

OFF = Initiating Input Circuit

Switch No. 3

This switch is used to select either the shutdown/ time delay/ release or the shutdown/immediate release mode for the electric manual pull input

This switch is only active if the switch No. 2 is in the OFF position

If switch No. 3 is set to ON, then operation of the electric manual pull station will cause the control module to go through a shutdown/ time delay/ release sequence. The time delay cycle will be whatever is programmed on switches No. 6 and 7

If set to OFF, operation of the electric manual pull station will cause the control module to activate will go to the shutdown and immediately operate the circuit

Switch No. 4 and 5

These two switches set the cycle time for time delay 1 (Alarm to Shutdown)

Switch No. 4 ON / Switch No. 5 ON = 5 seconds

Switch No. 4 OFF / Switch No. 5 ON = 10 seconds

Switch No. 4 ON / Switch No. 5 OFF = 20 seconds

Switch No. 4 OFF / Switch No. 5 OFF = 30 seconds

Switch No. 6 and 7

These two switches set the cycle time for time delay 2 (Shutdown to Release)

Switch No. 6 ON / Switch No. 7 ON = 0 seconds

Switch No. 6 OFF / Switch No. 7 ON = 10 seconds

Switch No. 6 ON / Switch No. 7 OFF = 20 seconds

Switch No. 6 OFF / Switch No. 7 OFF = 30 seconds

After all switches have been set, the “RESET” button on the control module must be depressed. If this is not done, the switch settings will not be entered into the program.

PC PROGRAMMING

PC Programming is another means of setting up the MP-N Control Module with the required options.

One advantage of using the PC programming approach versus the manual programming switch feature is, with the PC, the module can be programmed to have a shorter time delay period when using the initiating input circuit than what is programmed into the second time delay cycle of the detection circuit. When using the manual programming switch feature, the electric manual pull time delay will automatically correspond to the setting of the second time delay cycle of the detection circuit.

The control module is field programmed through a PC computer using an RS-232 serial interface cable. The interface cable kit is available as Part No. 423524. **Note:** If the computer does not contain a serial port, a USB-to-serial adapter will be required to communicate with the module; such as the CableMAX 765288 USB-to-serial adapter.

NOTICE

If factory preset time delay periods are to be extended, consider the lag time between fire ignition and automatic initiation when using thermal detection. Consequently, extending one or more time delay periods will likely extend the fire burn time.

EXPLAINING THE MENU

The CHECKFIRE MP-N programming software menu or graphic user interface (GUI) is shown below (see Figure 45). This GUI can be used to read the module's current programming configuration, program the module, and view the contents of the module's history buffer.

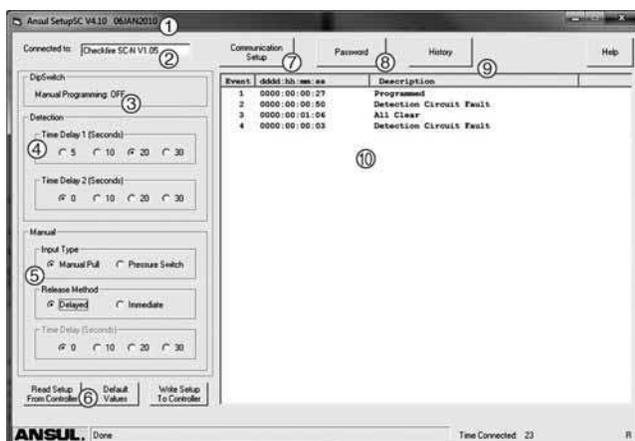


FIGURE 45
009032

The programming screen is explained as follows (see Figure 45 for corresponding numbers):

- Software Version:** The GUI header shows which version of software is currently running. This should read "Ansul SetupSC V4.11" when used with the MP-N control module.
- Firmware Version:** The "Connected to:" box displays the current firmware revision level of the module connected to the PC.

- DipSwitch:** When this section displays "Manual Programming OFF" the module will respond to a connected PC. If the DipSwitch indicates "Manual Programming ON" the module may be programmed by setting the switches on the inside front cover. See the "Manual Programming Switch" section under "Switch No. 1" for more details.
- Detection - Input Programming:** The Detection area (see Figure 46) provides programming of the two time delays associated with the detection circuit input.

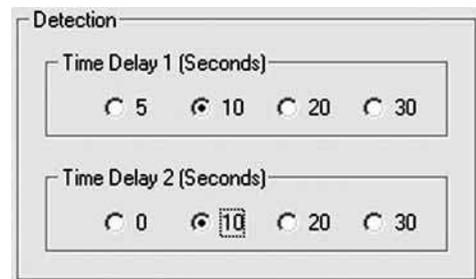


FIGURE 46
009033

Time Delay 1 (Alarm-to-Shutdown Time Delay): Time Delay 1 is the preferred delay time between alarm initiation and the transfer of the module's on-board Shutdown relay. The time is selectable for 5, 10, 20 or 30 seconds.

Time Delay 2 (Shutdown-to-Release Delay): Time Delay 2 is the preferred delay time between the transfer of the module's on-board Shutdown relay and the initiation of the release circuit. The time is selectable for 0, 10, 20 or 30 seconds.

- Manual - Input Programming:** The Manual Input circuit may be programmed for either electric Manual Pull or Pressure Switch feedback (see Figure 47).

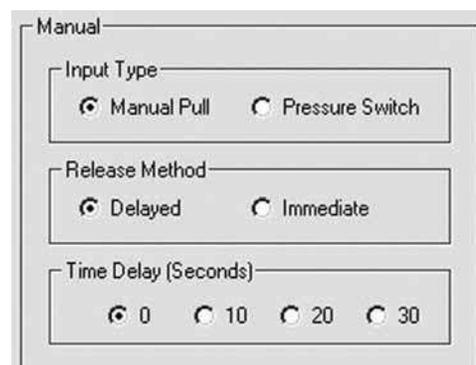


FIGURE 47
009034

When Manual Pull is selected the circuit may be programmed for either of the following:

Delayed - Release: Selecting "Delayed" allows for a time delay between input activation and activation of the release circuit. The release circuit delay may be programmed for 0, 10, 20 or 30 seconds. **Note:** The program will not allow this delay to be set higher than Time Delay 2 setting used in the Detection Input programming section. (Example: If Time Delay 2 is set for 10 seconds the Delayed choices will be 0 or 10.)

► EXPLAINING THE MENU (Continued)

Immediate - Release: Selecting “Immediate” provides immediate release circuit activation upon activation of the Manual Input circuit. If selected, the “Time Delay” section will disappear.

When programmed for “Pressure Switch,” the “Release Method” section of the program will disappear and the module will be programmed for pressure switch feedback. **Note:** When programmed for pressure switch feedback, the module will not activate the release circuit when an input is received on the Manual Input circuit.

6. **Programming Setup:** These buttons (see Figure 48) provide communication between the controller and the PC to read/write the controller setup.

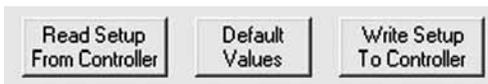


FIGURE 48
009035

Read Setup From Controller: Reads the module’s current programming configuration.

Default Values: Restores the modules factory default programming setup. Must click “Write Setup To Controller” button after selecting the Default Values. When default values have been written to the controller the password returns to the original factory set password (see number 8).

Write Setup To Controller: Uploads the selected programming configuration to the module.

7. **Communication Setup:** Clicking the Communication Setup button opens the current communication setup window. These settings should not be changed unless instructed by TFPP Technical Services. Figure 49 shows the standard settings for the module. **Note:** COM Port settings may vary from PC to PC.

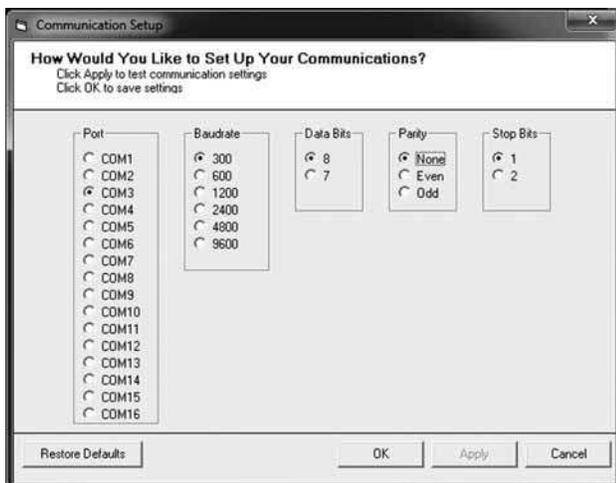


FIGURE 49
009036

8. **Password:** The Password button opens the Enter Password window with options for entering or changing the password to protect access to the PC programming (see Figure 50).



FIGURE 50
009037

When changing the password for the module, perform the following steps:

- a. If needed, enter the factory default password **CHKFRSCN**. **Note:** Password is case-sensitive.
- b. Click the “Change Password” button. You will be prompted to enter a new password.
- c. Enter a new password and click the “OK” button
- d. Re-enter the same new password and click the “OK” button again.
- e. Close the “Enter Password” window.
- f. To save the new password you must click on the “Write Setup To Controller” button. **Note:** Selecting the “Write Setup To Controller” button reprograms the entire module. Verify the module programming is complete prior to uploading the new setup.
- g. Record the new password in a secure location.

NOTICE

In previous CHECKFIRE versions The S key is used to change the system password. There are two revisions of programming software utilizing different passwords. The earlier version used a programming disc supplied with the programming cable under Part No. 423524 and accepts the password, PESHTIGO. A downloadable version on the ANSUL Extranet accepts the password, CHKFRSCN.

Use the appropriate password for the version of programming software on the module. If the software version is unknown, try each password to determine which will be accepted. If a new password is desired, type S. The status will indicate: **Enter new password:** Type the new password and press Enter. Once the U key loads the revised inputs the new password is now the only password for the program. Be sure to record the new password in a secure location.

► EXPLAINING THE MENU (Continued)

9. **History:** This button opens the History window with options to save the current history file, erase the current history file, and refresh the history file (see Figure 51).

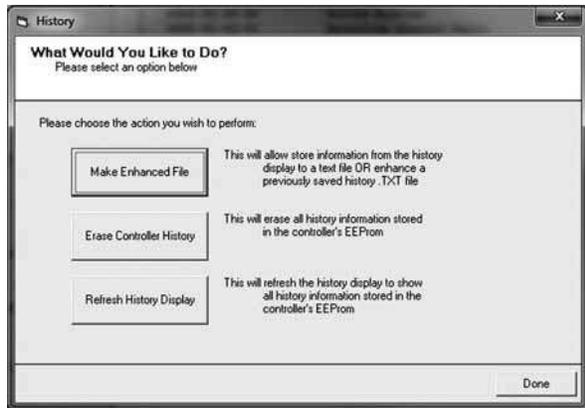


FIGURE 51
009038

Make Enhanced File: Select this button to save the current history file. To save the current history file, perform the following steps:

1. Select "Make Enhanced File" button
2. Select "Write From Microcontroller" and press the "Next" button
3. Click "Save As" and specify the desired file name and save location. Once specified, click "Save."
4. Select the desired "Output Characteristics Options" and click the "Save Enhanced History File" Button.
5. The module will save the current history file to .enh and .txt files to the specified location and open both for viewing.
6. Click "Cancel" or "Back" to return to the program GUI

Erase Controller History: Select this button to erase the current history file on the module. **Note:** Once erased, the history file is unrecoverable. The history file should be saved prior to erasing to preserve the data.

Refresh History Display: Reads and uploads the most up-to-date history file from the module's EEPROM.

10. **History Event Window:** Displays the list of history events. When the window is full a scroll bar appears on the right hand side of the window.

► PROGRAMMING WITH A PC

To program the module with a PC, perform the following steps:

Step No. 1: Check the Manual Programming Switches on the back of the module's inside cover. Ensure Switch No. 1 is in the "OFF" position to enable PC programming (see Figure 44).

Step No. 2: Connect the internal 3.6 VDC battery to power the module. Refer to Installation Section (page 19), New Battery Installation, for proper battery connection procedure. **Note:** If programming with the front cover assembly removed from the back box, it is normal for the sounder and LED's to pulse once every 10 seconds. This will stop when the programming is completed and the computer and internal battery are disconnected.

Step No. 3: Attach the RS-232 interface cable (and associated USB-to-RS232 adapter, if required) between the computer and the CHECKFIRE MP-N control module.

Step No. 4: Open the "SetupSC_VB_V411.exe" program. The computer should automatically detect the proper COM port and connect to the module. Connection is established when the "Connected To:" box reads "Checkfire SC-N V1.XX". If the box continues to read "No Controller Detected" it may be necessary to close the program and reopen it until communication is established. Once communication is established, move to the next step.

Step No. 5: Click on the "Password" button. Type in the factory default password **CHKFRSCN** and click "Ok". The module's programming can now be changed.

Step No. 6: If the factory default settings are acceptable, skip to step no. 10.

Step No. 7: Select the desired Time Delay settings for the Detection Input circuit as well as the desired configuration of the Manual Input Circuit by clicking the desired radio buttons.

Step No. 8: Once the desired configuration has been selected; click the "Write Setup To Controller" button.

Step No. 9: If done correctly, the history file will update in real-time and post the "Programmed" history event in the file.

Step No. 10: At this point the programming is complete. Disconnect the RS-232 serial interface cable from the control module. The module will continue to pulse once every 10 seconds. Disconnecting the internal module battery will silence the module. The internal programming will remain intact. The module is now ready to be installed and wired. (When replacing battery refer to Installation Section (page 19) for proper battery replacement procedures.)

Step No. 11: If all programming is complete, the program may be closed and the PC may be shutdown.

RELEASE CIRCUIT TEST MODULE INSTRUCTIONS

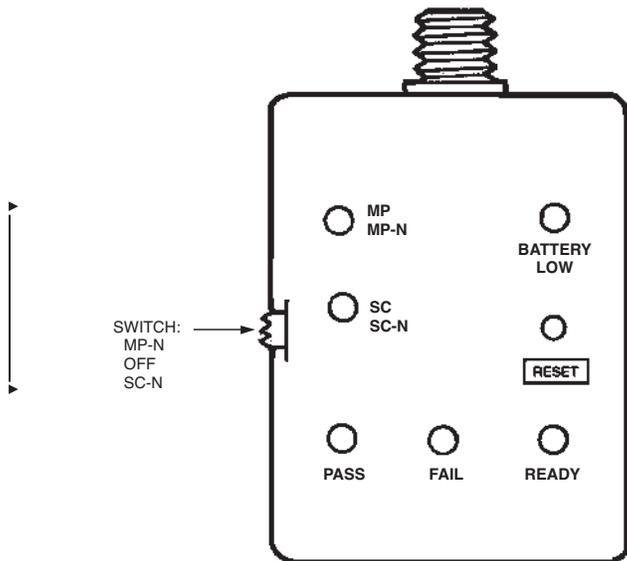


FIGURE 52
003016

▶ Operation is as follows (see Figure 52):

- ▶ 1. The receptacle on the tester mates with the connector on the gas motor actuation cable, Part No. 416129, used with the CHECKFIRE MP-N. **Note:** The Release Circuit Test Module is shipped with a Test Adapter, Part No. 436243, provided for testing units with PAD Connector/Cable Assembly, Part No. 436114, or PAD Cable Assembly 20 ft (6.1 m), Part No. 436242. Not required for MP-N.
- ▶ 2. A three-position slide switch is located on the side of the enclosure to select the type of release circuit to test (MP-N or SC-N) and the middle position is "OFF."
- ▶ 3. Steps for operation are:
 - ▶ a. With slide switch, select type of release circuit to be tested. This will also turn the unit on.
 - ▶ b. Press the reset button on the tester. This will illuminate the "READY LED" if it is not already illuminated.
 - ▶ c. Connect to control unit actuator cable.
 - ▶ d. Proceed with activating output. (Refer to Function Test, Page 21, in the Installation Section.)
 - ▶ e. Once the unit activates, the unit tester will indicate a "PASS" or "FAIL" status resulting from the test.
 - ▶ f. The tester can then be reset by pressing the RESET button, which will prepare it for the next test.

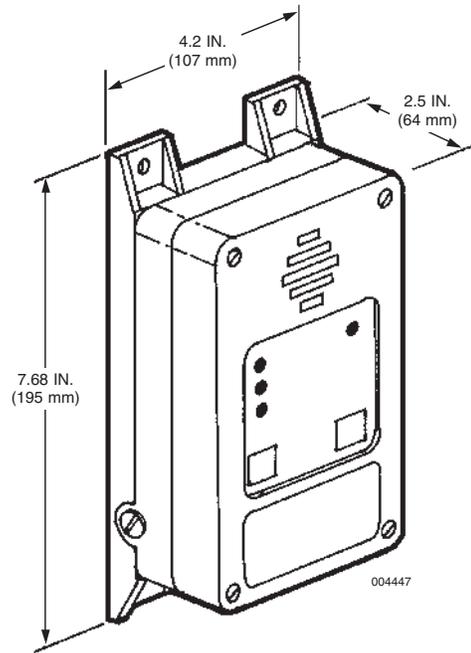
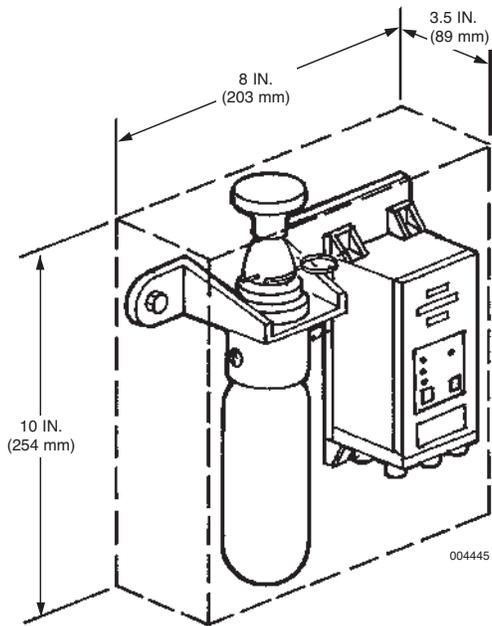
COMPONENT INDEX

Part No.	Shipping Assembly	Weight lb.	(kg)
Main Assemblies			
427312	CHECKFIRE MP-N Electric Detection and Actuation System Includes:	10	(4.5)
	427300 Control Module (module contains nuts and washers for mounting to bracket)		
	416792 Manual Actuator		
	423525 Combined Mounting Bracket		
	416129 Cable with Connector		
	423423 Nitrogen Cartridge, LT-10-R (2)		
	53051 1/4 in. Check Valve (2)		
	79064 Label Package		
	53081 Owner's Manual		
	416735 Gas Motor Actuator Shipping Assembly		
427308	Battery Shipping Assembly (3.6 VDC)	1/4	(0.11)
426461	End of Line Resistor Assembly (Package of 10)	1/4	(0.11)
▶ 426520	End of Line Resistor Assembly (Single)	1/4	(0.11)
Accessory Equipment			
71230	Linear Detection Wire, 356 °F (180 °C), 100 ft. (30.5 m)	2	(0.90)
71231	Linear Detection Wire, 356 °F (180 °C), 500 ft. (152.4 m)	10	(4.54)
416218	Spot Detector – 270 °F (132 °C)	1/4	(0.11)
416219	Spot Detector – 325 °F (163 °C)	1/4	(0.11)
416220	Spot Detector – 360 °F (182 °C)	1/4	(0.11)
416213	Spot Detector Connector Package (one required for each detector)	1/4	(0.11)
416214	Spot Detector Cable Clamp Package (for use with protective tubing) –one required for each detector	1/4	(0.11)
416762	Spot Detector Cable Clamp Package (for use without protective tubing) –one required for each detector	1/4	(0.11)
416215	Flex Protective Tubing – 100 ft. (30.5 m)	4	(1.81)
416221	Spot Detector Bracket	1	(0.45)
416784	Amp Crimp Tool – Spot Detector	1	(0.45)
416113	Pneumatic/Linear Detector 808-DRV	1	(0.45)
416216	Connector/Cable Assembly For Pneumatic/Linear Detector	1/4	(0.11)
416378	Cable Clips (Package of 50) For Pneumatic/Linear Detector	1/4	(0.11)
56691	Nylon Cable Ties (Pkg. of 20)	1	(0.45)
56692	Rubber Sleeves (Pkg. of 20)	1/4	(0.11)
▶ 428375	Splicing Device (For Linear Detection Wire)	1	(0.45)
423541	Release Circuit Test Module (9 VDC Battery Not Included)	1	(0.45)
428966	Cover Removal Tool	1/4	(0.11)
428042	Battery Extender Cable Assembly	1/4	(0.11)
426601	Extender Cable Assembly	1/4	(0.11)
▶ 416129	Gas Motor Cable Assembly	1/4	(0.11)
423524	RS232 PC Interface Cable Kit	1/4	(0.11)
▶ 57593	High Temperature Silicone Grease – dielectric/not a sealant (Dow Corning #4)	1/4	(0.11)
Recharge Materials			
▶ 423423	Nitrogen Cartridge, LT-10-R (DOT/TC)	2	(0.90)
416756	Gas Motor Replacement	1	(0.45)
Spare Parts			
427300	Control Module	2	(0.90)
57452	Manual Actuator	4	(1.80)
423525	Mounting Bracket – MP Module/Manual Actuator	2	(0.90)
416901	Detection/Output Module Assembly	1/2	(0.22)
427308	Battery Module Assembly	1/2	(0.22)
53051	Check Valve, 1/4 in. (Pkg. of 2)	1/2	(0.22)
427310	Installation and Maintenance Manual	1/4	(0.11)
416355	Operating Instruction Label Package	1/4	(0.11)
416735	Gas Motor Actuator	2	(0.90)
197	Visual Inspection Seal	–	–
423503	Hardware Kit		
428964	4 Pack of Tamper-Proof Cover Screws	1/4	(0.11)
428970	Battery Straps and Screws (6 of Each)	1/4	(0.11)
428972	6 Pack of Cover Seals	1/4	(0.11)
428968	Front Cover Assembly	1/4	(0.11)

COMPONENT DIMENSIONS

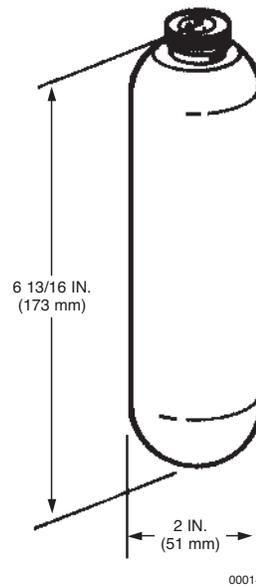
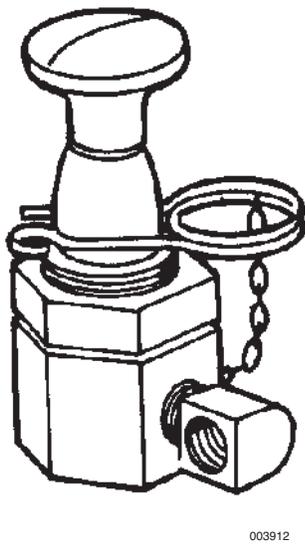
Required Mounting Area For Control Module, Actuator, and Bracket

Control Module – Part No. 427300

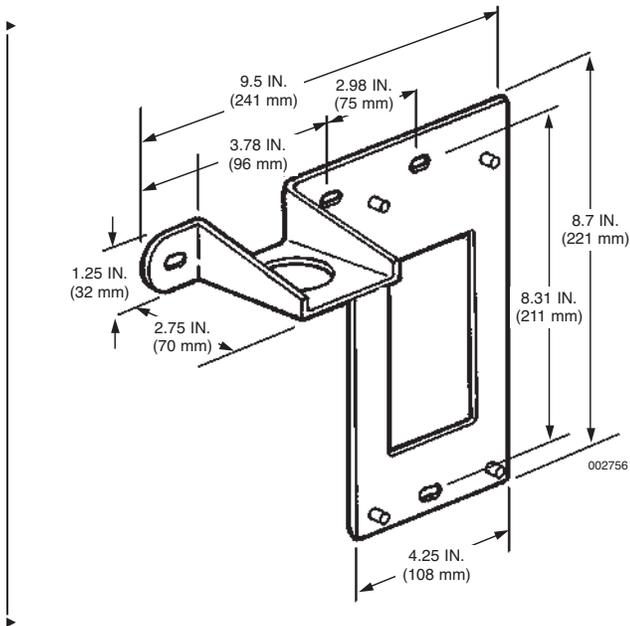


Manual Actuator – Part No. 416792

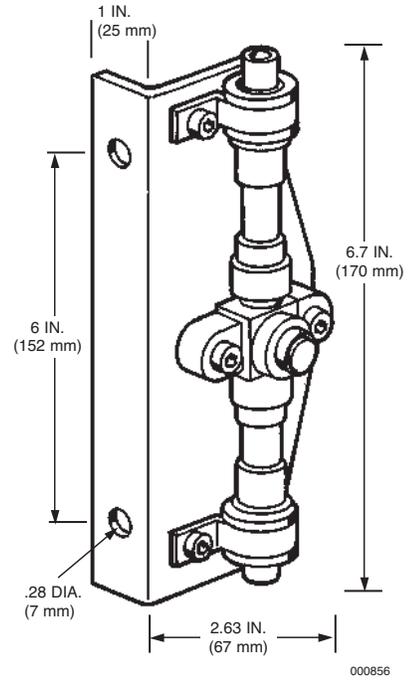
LT-10-R Cartridge – Part No. 423423



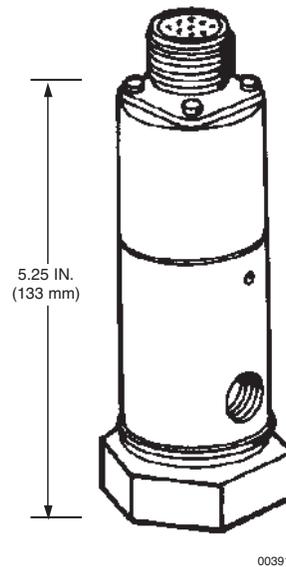
COMPONENT DIMENSIONS (Continued)
Mounting Bracket – Part No. 423525



Spot Detector Connector Package – Part No. 416213
Spot Detector Bracket – Part No. 416221
Spot Detector Cable Clamp – Part No. 416762
Spot Detector – Part No. 416114, 416115 and 416116



Gas Motor Actuator – Part No. 416735



DETECTION WIRE FLUID RESISTANCE CAPABILITY

Resistance Rating Key:

G = GOOD

L = LIMITED

C = CONDITIONAL (Service conditions must be outlined to ANSUL for approval of wire suitability for applications.)

U = UNACCEPTABLE (Not to be used)

Agent	Rating	Agent	Rating	Agent	Rating
Acetate Solvents, Crude	U	Diesel Oil, Light	L	Naphtha	C
Acetate Solvents, Pure	U	Ethers	U	Naphthalene	U
Acetic Acid, Dilute (20%)	U	Ethyl Acetate	U	Nickel Chloride	G
Acetic Acid, Glacial	U	Ethyl Alcohol	C	Nickel Sulfate	G
Acetone	U	Ethyl Chloride	U	Nitric Acid, 10%	L
Air	G	Ethylene Dichloride	U	Nitric Acid, 70%	U
Alcohols	C	Ethylene Glycol	L	Nitrobenzene	U
Aluminum Chloride	G	Ferric Chloride	G	Oleic Acid	C
Aluminum Fluoride	G	Ferric Sulfate	G	Oleum Spirits	U
Aluminum Sulfate	G	Ferrous Salt Solutions	G	Perchlorethylene	C
Ammonia Liquid (Anhydrous)	U	Formaldehyde	L	Picric Acid, Molten	U
Ammonia, Chloride	G	Formic Acid	L	Picric Acid, Solution	U
Ammonium Hydroxide	L	Fuel Oil	L	Potassium Chloride	G
Ammonium Nitrate	G	Furfural	U	Potassium Cyanide	G
Ammonium Phosphate	G	Gasoline	C	Potassium Hydroxide	C
Ammonium Sulfate	G	Glycerine, Glycerol	L	Potassium Sulfate	G
Amyl Acetate	U	Grease, Petro	L	Soda Ash Sodium Carbonate	G
Amyl Alcohol	L	Heptane	C	Sodium Bisulfate	G
Asphalt	C	Hexane	L	Sodium Chloride	G
Barium Chloride	G	Hydraulic Fluids & Lubricating Oils,		Sodium Cyanide	G
Barium Hydroxide	G	Straight Petroleum Base	L	Sodium Hydroxide	C
Barium Sulfide	G	Water and Petroleum Oil		Sodium Hypochlorite	C
Benzene, Benzol	C	Emulsion (FR)	L	Sodium Nitrate	G
Benzene (Petroleum Ether)	C	Water and Glycol Solution	L	Sodium Peroxide	C
Benzene (Petroleum Naphtha)	C	Straight Phosphate-Ester (FR)	L	Sodium Phosphate	G
Borax	L	Silicone Oils	L	Sodium Silicate	G
Boric Acid	L	Hydrobromic Acid	U	Sodium Sulfate	G
Bromine	U	Hydrochloric Acid, Cold	C	Sodium Sulfide	C
Butyl Acetate	U	Hydrochloric Acid, Hot	U	Sodium Thiosulfate, "Hypo"	G
Butyl Alcohol, Butanol	L	Hydrocyanic Acid	C	Soybean Oil	L
Calcium Bisulfite	L	Hydrofluoric Acid, Cold	C	Stannic Chloride	G
Calcium Chloride	G	Hydrofluoric Acid, Hot	C	Stearic Acid	L
Calcium Hydroxide	G	Hydrogen Peroxide (Dilute)	G	Sulfur Dioxide	C
Calcium Hypochlorite	L	Hydrogen Peroxide (Concentrated)	C	Sulfur Trioxide	C
Carbolic Acid Phenol	C	Hydrogen Sulfide	C	Sulfuric Acid, 10%, Cold	L
Carbon Dioxide	G	Kerosene	L	Sulfuric Acid, 10%, Hot	L
Carbon Disulfide	U	Lacquer Solvents	U	Sulfuric Acid, 75%, Cold	L
Carbon Monoxide, Hot	U	Lactic Acid	C	Sulfuric Acid, 75%, Hot	L
Carbon Tetrachloride	L	Linseed Oil	L	Sulfuric Acid, 95%, Cold	U
Carbonic Acid	G	Magnesium Chloride	G	Sulfuric Acid, 95%, Hot	U
Castor Oil	C	Magnesium Hydroxide	G	Sulfuric Acid, Fuming	U
Chlorinated Solvents	C	Magnesium Sulfate	G	Sulfurous Acid	L
Chlorine, Dry	U	Mercuric Chloride	U	Tannic Acid	G
Chlorine, Wet	U	Mercury	L	Tartaric Acid	G
Chloroacetic Acid	U	Methyl Alcohol, Methanol	L	Toluene	U
Chloroform	U	Methyl Chloride	U	Trichloroethylene	U
Chlorosulphonic Acid	U	Methyl Ethyl Ketone	U	Turpentine	L
Chromic Acid	U	Methyl Isopropyl-Keytone	U	Varnish	U
Citric Acid	L	Mineral Oil	L	Xylene	U
Copper Chloride	G			Zinc Chloride	L
Copper (II) Sulfate	G			Zinc Sulfate	G
Creosote	U				

TYCO FIRE PROTECTION PRODUCTS
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MARINETTE, WI 54143-2542

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